FOREWORD

This Arctic Cat Service Manual contains service and maintenance information for the Model Year 2006 Arctic Cat Snowmobiles. This manual is designed to aid service personnel in service-oriented applications.

This manual is divided into sections. The sections cover specific snowmobile components or systems and, in addition to the standard service procedures, includes assembling, disassembling, and inspecting instructions. When using this manual as a guide, the technician should use discretion as to how much disassembly is needed to correct any given condition.

The service technician should become familiar with the operation and construction of the components or systems by carefully studying the complete manual. This will assist the service technician in becoming more aware of and efficient with servicing procedures. Such efficiency not only helps build consumer confidence but also saves time and labor.

All Arctic Cat publications and snowmobile decals display the words Warning, Caution, and Note to emphasize important information. The symbol ⚠ **WARNING** identifies personal safety-related information. Be sure to follow the directive because it deals with the possibility of severe personal injury or even death. The symbol ⚠ **CAUTION** identifies unsafe practices which may result in snowmobile-related damage. Follow the directive because it deals with the possibility of damaging part or parts of the snowmobile. The symbol ■ **NOTE:** identifies supplementary information worthy of particular attention.

At the time of publication, all information, photographs, and illustrations were technically correct. Some photographs and illustrations used in this manual are used for clarity purposes only and are not designed to depict actual conditions. Because Arctic Cat Inc. constantly refines and improves its products, no retroactive obligation is incurred.

All materials and specifications are subject to change without notice.

Keep this manual accessible in the shop area for reference.

Product Service and Warranty Department
Arctic Cat Inc.

ISMA
International Snowmobile Manufacturers Association

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SECTION 1 — GENERAL INFORMATION

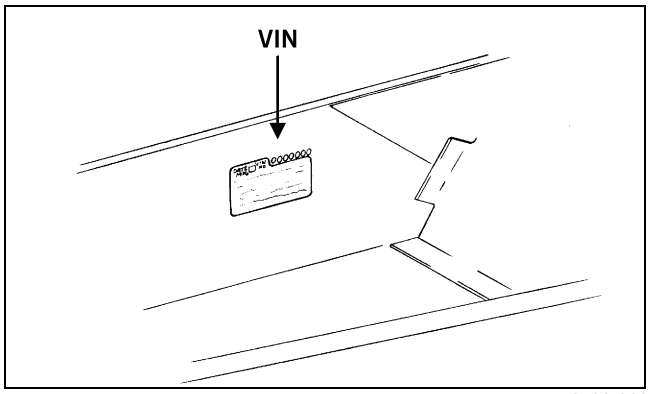
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Snowmobile Identification

The Arctic Cat Snowmobile has two important identification numbers. The Vehicle Identification Number (VIN) is stamped into the tunnel near the right-side footrest. The Engine Serial Number (ESN) is stamped into the crankcase of the engine.



0726-383

These numbers are required to complete warranty claims properly. No warranty will be allowed by Arctic Cat Inc. if the engine serial number or VIN is removed or mutilated in any way.

Recommended Gasoline and Oil

RECOMMENDED GASOLINE (Carbureted Models)

The recommended gasoline to use in these snowmobiles is 87 minimum octane regular unleaded. In many areas, oxygenates (either ethanol or MTBE) are added to the gasoline. Oxygenated gasolines containing up to 10% ethanol or up to 15% MTBE are acceptable gasolines; however, whenever using oxygenated gasolines, the carburetor main jet must be one size larger than the main jet required for regular unleaded gasoline. For example, if a 400 main jet is recommended for regular unleaded gasoline, a 410 main jet must be installed if using an oxygenated gasoline.

When using ethanol blended gasoline, it is not necessary to add a gasoline antifreeze since ethanol will prevent the accumulation of moisture in the fuel system.

⚠ CAUTION

Do not use white gas or gasolines containing methanol. Only Arctic Cat approved gasoline additives should be used.

RECOMMENDED GASOLINE (EFI Models)

The recommended gasoline to use in these snowmobiles is 87 minimum octane regular unleaded. In many areas, oxygenates (either ethanol or MTBE) are added to the gasoline. Oxygenated gasolines containing up to 10% ethanol or up to 15% MTBE are acceptable gasolines. Do not use gasolines containing methanol.

■ NOTE: On the 700 cc and 900 cc engines when using the recommended gasoline, the Fuel Designation Connector (the gray wire at the ECU) must be connected.

■ NOTE: On the 700 cc and 900 cc engines when using oxygenated gasolines, the Fuel Designation Connector (the gray wire at the ECU) must be disconnected.

⚠ CAUTION

Do not use white gas or gasoline containing methanol. Only Arctic Cat approved gasoline additives should be used.

⚠ CAUTION

On the 700 cc and 900 cc engines if oxygenated gasoline is to be used, it is extremely important that the Fuel Designation Connector at the ECU is disconnected. If not, severe engine damage may occur.

■ NOTE: On the 700 cc and 900 cc engines in order for the ECU to change modes, the engine must be OFF when connecting or disconnecting the Fuel Designation Connector.

RECOMMENDED OIL

The recommended oil to use in the oil-injection system is Arctic Cat 50:1 Injection Oil (for standard models) or Arctic Cat Synthetic APV 2-Cycle Oil (for APV models). The oil is specially formulated to be used either as an injection oil or as a pre-mix oil (for carbureted model break-in) and meets all of the lubrication requirements of the Arctic Cat snowmobile engine.

Break-In Procedure

The Arctic Cat 2-stroke engine (when new or rebuilt) requires a short break-in period before the engine is subjected to heavy load conditions. Arctic Cat requires that the first tankful of fuel be premixed at a 100:1 ratio in all oil-injection models.

During the break-in period, a maximum of 1/2 throttle is recommended; however, brief full-throttle accelerations and variations in driving speeds contribute to good engine break-in.

⚠ CAUTION

DO NOT exceed the one (1) tankful limitation of a 100:1 gas/oil break-in mixture. Continuous use of a gas/oil mixture, unless consistently operating in extremely cold conditions (-26°C/-15°F or colder), could cause spark plug fouling and excessive carbon buildup. A 100:1 gas/oil mixture must be used in conjunction with the oil-injection system to ensure adequate engine lubrication in extremely cold conditions.

Genuine Parts

When replacement of parts is necessary, use only genuine Arctic Cat parts. They are precision-made to ensure high quality and correct fit.

High Altitude Operation

Operating a snowmobile at varying altitudes requires changes in performance components. These changes affect drive train components (on all models) and carburetion components (on carbureted models).

High altitude information decal(s) are located beneath the hood of the snowmobile.

⚠ CAUTION

On carbureted models, carefully follow the Main Jet Chart recommendations for proper main jet selection for altitude, temperature, and gasoline being used.

King Cat and M-Series snowmobiles are initially set up at the factory for operation between 6000-9000 feet. Consult the appropriate specifications for this information.

Preparation For Storage

Prior to storing the snowmobile, it must be properly serviced to prevent corrosion and component deterioration. An authorized Arctic Cat Snowmobile dealer should perform this service; however, the owner/operator can perform this service if desired. To prepare the snowmobile for storage, Arctic Cat recommends the following procedure:

1. Clean the seat cushion with a damp cloth and Arctic Cat Vinyl Protectant (p/n 0638-313).
2. Clean the snowmobile thoroughly by hosing dirt, oil, grass, and other foreign matter from the skid frame, tunnel, hood, and belly pan. Allow the snowmobile to dry thoroughly. DO NOT get water into any part of the engine.
3. Place the rear of the snowmobile up on a shielded safety stand.

■ NOTE: On 500/600/700 cc models, the air silencer boot can be pried forward to access the intake bores. Pry the boot forward; then proceed to step 7.

■ NOTE: On some standard models, the air-intake silencer is a one-piece unit, and the silencer boot(s) can be removed to access the intake bore(s). Remove the boots; then proceed to step 7.

■ NOTE: On some standard models, the air-intake silencer includes a cover/tool tray assembly and a baffle/resonator, and the silencer boot cannot be removed to access the intake bores. Proceed to step 4.

4. Open the air-intake silencer cover; then remove the three screws securing the cover/tool tray assembly to the silencer.
5. Close the cover; then tip the cover/tool tray assembly forward and out of its slots and remove the assembly.
6. Using a large flat-blade screwdriver, remove the baffle/resonator tabs from the air-intake silencer slots and remove the baffle/resonator to access the intake bores.

■ NOTE: The baffle/resonator can be removed more easily by removing the back tabs first.

7. Start the engine and allow to idle. With the engine idling, spray Arctic Cat Engine Storage Preserver (p/n 0636-177) into the intake(s) until the engine exhaust starts to smoke heavily or until the engine starts to drop in RPM. Turn engine off.

■ NOTE: On 500/600/700 cc models, secure the air silencer boots onto the intake bores.

■ NOTE: On some standard models, install the air-intake silencer boot(s); on some standard models, install the baffle/resonator and the cover/tool tray assembly.

8. Plug the exhaust system outlet with a clean cloth.
9. With the ignition switch in the OFF position:

A. Disconnect the high tension lead(s) from the spark plug(s); then remove the plug(s), connect it/them to the lead(s), and ground it/them on the cylinder head(s).

⚠ CAUTION

Never crank the engine over without grounding the spark plug(s). Damage to coils and/or CDI unit may result.

B. Pour 29.5 ml (1 fl oz) of SAE #30 petroleum-based oil into each spark plug hole and pull the recoil starter handle slowly about 10 times.

C. Install the spark plug(s) and connect the high tension lead(s).

10. On carbureted models, drain the gas from each carburetor float chamber.

11. Fill the gas tank to its rated capacity; then add Arctic Cat Fuel Stabilizer (p/n 0638-165) to the gas tank following directions on the container for the stabilizer/gasoline ratio. Tighten the gas tank cap securely.

12. On models with a chain case, drain the lubricant by removing the chain-case drain plug located on the backside of the chain-case assembly. Remove the chain-case cover and inspect chain, sprockets, chain tensioner, and rollers for wear and the chain for proper tension. Install the drain plug, chain-case cover, and seal; then pour Arctic Cat Transmission Lube (p/n 0636-817) into the filler hole - 236 ml (8 fl oz) for standard transmission or 354 ml (12 fl oz) for reverse transmission.

13. On models with a gear case, drain the fluid from the gear case. Install the drain plug; then pour Arctic Cat Synthetic ACT Drive Fluid (p/n 4639-025) into the gear case - 89 ml (3 fl oz).

14. Clean and inspect the drive clutch and driven pulley.

15. Remove the drive belt from the drive clutch/driven pulley. Lay the belt on a flat surface or slide it into a cardboard sleeve to prevent warping or distortion during storage; then clean and inspect the drive clutch and driven pulley.

16. Apply light oil to the upper steering post bushing, ski spindles and bolts, front and rear pivot bushings of the skid frame, and plungers of the shock absorbers.

17. Lubricate all grease fittings (front and rear suspension, spindles, speedometer drive adapter, and the driven shaft support bearing) with a low-temperature grease.

18. Tighten all nuts, bolts, and cap screws making sure all calibrated nuts, bolts, and cap screws are tightened to specifications. Make sure all rivets holding the components together are tight. Replace all loose rivets.

19. Clean and polish the hood, console, and chassis with Arctic Cat Hood and Windshield Cleaner/Polish (p/n 0636-174). DO NOT USE SOLVENTS OR SPRAY CLEANERS. THE PROPELLENT WILL DAMAGE THE FINISH.

20. On electric start models, disconnect the battery cables making sure to disconnect the negative cable first; then clean the battery posts and cables.

⚠ CAUTION

On models with remote start, make sure to leave the battery cables disconnected. Failure to disconnect the battery cables when storing the snowmobile for a prolonged period of time (six weeks or more) will result in a discharged or damaged battery.

21. If possible, store the snowmobile indoors. Raise the track off the floor by blocking up the back end making sure the snowmobile is secure. Loosen the track adjusting bolts to reduce track tension. Cover the snowmobile with a machine cover or a heavy tarpaulin to protect it from dirt and dust.

22. If the snowmobile must be stored outdoors, position the snowmobile out of direct sunlight; then block the entire snowmobile off the ground making sure the snowmobile is secure. Loosen the track adjusting bolts to reduce track tension. Cover with a machine cover or a heavy tarpaulin to protect it from dirt, dust, and rain.

⚠ CAUTION

Avoid storing in direct sunlight and using a plastic cover as moisture may collect on the snowmobile causing corrosion.

Preparation After Storage

Taking the snowmobile out of storage and correctly preparing it for another season will assure many miles and hours of trouble-free snowmobiling. Arctic Cat recommends the following procedure:

⚠ CAUTION

On carbureted models if the gas in each carburetor float chamber was not drained prior to storage, the carburetor(s) must be cleaned before starting the engine.

1. Clean the snowmobile thoroughly. Polish the exterior of the snowmobile.
2. Clean the engine. Remove the cloth from the exhaust system. Check exhaust system and air-intake silencer/air filter for obstructions.
3. Inspect all control wires and cables for signs of wear or fraying. Replace if necessary. Use cable ties or tape to route wires and cables away from hot or rotating parts.
4. Inspect the drive belt for cracks and tears. Check belt specifications. Replace if damaged or worn. Install the drive belt.

■ NOTE: If the old belt is worn but in reasonable condition, retain it with the snowmobile as a spare in case of emergency.

5. On carbureted models, inspect the in-line fuel filter and replace if necessary.
6. Inspect all fuel hoses and oil hoses for deterioration or cracks; replace if necessary. Make sure all connections are tight; then fill the oil-injection reservoir with the recommended injection oil.

■ NOTE: After prolonged storage, Arctic Cat recommends one tankful of 100:1 gas/oil mixture be used in conjunction with the oil-injection system to ensure proper lubrication.

7. Inspect the entire brake system, all controls, headlight, taillight, brakelight, ski wear bars, and headlight aim; adjust or replace as necessary.
8. Inspect each spark plug. Replace, gap, or clean as necessary.
9. Adjust the track to the proper tension and alignment. Lock the jam nuts.
10. Adjust the carburetor(s) and choke cable on carbureted models and throttle cable on all models.

⚠ WARNING

On VM-style carburetors, be sure to tighten the swivel adapter jam nuts securely. If a jam nut isn't tightened, the adjuster can rotate out of the carburetor cap causing the piston valve not to return to the full-closed position.

11. Tighten all nuts, bolts, and cap screws making sure all calibrated nuts, bolts, and cap screws are tightened to specifications.
12. Lubricate all grease fittings (rear suspension, spindles, speedometer drive adapter, and the driven shaft support bearing) with a low-temperature grease.
13. On liquid cooled models, check the coolant level and all coolant hoses and connections for deterioration or cracks. Add properly mixed coolant as necessary.
14. On fan cooled models, clean the engine cooling fins and all vents.
15. On electric start models, charge the battery; then connect the battery cables making sure to connect the positive cable first. Test the electric start system.

After Break-In Checkup
(100 Miles)

The 100 mile checkup offered by some dealerships reduces problems and warranty costs. A program of this kind should be offered by all dealerships. Many dealerships have added the price of the checkup into the selling price of the snowmobile, and others offer it as a bonus to the customers who purchase snowmobiles from their dealership.

There are three areas that require adjustment after the break-in period in order to obtain peak performance. These areas are the following.

A. Carburetor jetting

B. Drive belt deflection/Break-In

C. Track tension and alignment

CARBURETOR JETTING (Carbureted Models)— Altitude, temperature, and the use of oxygenated gasoline affect the carburetion needed for optimum engine performance. The carburetor main jets must be changed in conjunction with changes in operating altitude, oxygenated gasoline usage, and temperature.

DRIVE BELT DEFLECTION — Drive belt deflection is very important to the snowmobile. Even if it is checked and is correct when the snowmobile is set up, it does change (more so during the break-in period). This is because the rubber engine mounts and the rubber snubber on the torque link will all take a "set" during the first 100 miles, which allows the distance between the drive clutch and driven pulley to shorten. When this happens, the snowmobile will appear to have a too long drive belt. To add to this, the drive belt itself wears and stretches somewhat. This all leads to a low-end performance problem and, if not corrected, causes premature drive belt wear.

After the break-in period, drive belt deflection should be checked according to the instructions given in this manual. To correct for too much deflection, washer(s) from between the driven pulley sheaves can be removed to "tighten the drive belt" and allow the belt to return to the proper ratio for drive clutch engagement.

DRIVE BELT BREAK-IN — It is critical for maximum drive belt life to allow the belt to break in before subjecting it to hard use such as wide-open-throttle operation or hill climbing.

The first 20 miles on the drive belt should be at 1/2 throttle or lower. This will allow the belt to gain its optimum flexibility and will extend belt life. Do not exceed 50 MPH during the first 20 miles.

If this procedure isn't followed, it is possible to destroy a new drive belt in less than 50 miles. This should be explained to customers at the time of drive belt sales.

To increase the life of a drive belt, it is very important that the belt be warmed up before subjecting it to any type of use. In cold temperature (0° or below), the engine should be allowed to idle for a period of 8 to 10 minutes. This will allow heat from the engine compartment to soften the drive belt. Not only will this procedure increase belt life but will also help prevent engine damage from cold seizure.

Each operator should be instructed to drive the snowmobile for several minutes at a low throttle setting to warm the belt up before using wide-open-throttle. This practice should be followed on all models for maximum belt life.

In addition to instructing each operator about these drive belt break-in procedures, Arctic Cat also recommends that the operators be informed that a drive belt (like brake pads, wear strips, etc.) is considered a normal wear item and is listed as an exclusion on the Arctic Cat Limited Warranty.

TRACK TENSION AND ALIGNMENT — There is a certain amount of stretch on all tracks during the first 500 miles. The track must be adjusted after the first 50 to 100 miles to the specifications given in the Setup and Pre-delivery Manual and periodically thereafter. If these adjustments aren't performed, the track may "derail" which leads to track and slide rail damage.

Along with these three major areas, there are also other areas that should be checked and adjusted during the "After Break-In Checkup." A checklist to assist you with this service follows. Not only will the customer be happier, but it also gets the customer back into your dealership, which in many cases will mean additional sales in accessories, belts, oil, etc.

After Break-In Checkup Checklist

Below is a recommended list of items to check after the break-in period. By performing this inspection, warranty cost can be reduced and customer satisfaction can be increased.

The recommended mileage for this inspection is between 100 and 300 miles. Please encourage the customers to have this important checkup done.

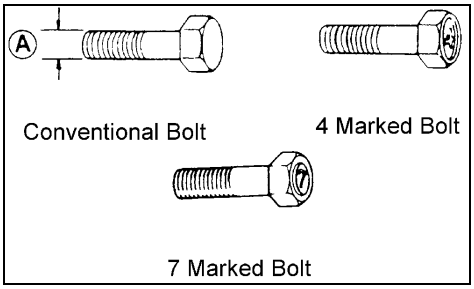
- ❑ Jet carburetor(s) according to average temperature, type of gasoline being used, and altitude
- ❑ Adjust drive belt deflection
- ❑ Adjust track tension and alignment
- ❑ Check throttle cable tension
- ❑ Check oil-injection pump adjustment
- ❑ Check engine idle
- ❑ Check coolant level
- ❑ Check chain case lubricant level
- ❑ Check lights (high/low beam, brakelight)
- ❑ Check safety switch operation
- ❑ Check driveshaft area for any rubbing components
- ❑ Check steering hardware for tightness
- ❑ Check skid frame and A-arm mounting hardware for tightness
- ❑ Check brake lever travel and adjustment
- ❑ Grease all lubrication points

Torque Conversions

ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m
1	0.1	21	2.9	41	5.7	61	8.4	81	11.2
2	0.3	22	3.0	42	5.8	62	8.6	82	11.3
3	0.4	23	3.2	43	5.8	63	8.7	83	11.5
4	0.6	24	3.3	44	6.1	64	8.9	84	11.6
5	0.7	25	3.5	45	6.2	65	9.0	85	11.8
6	0.8	26	3.6	46	6.4	66	9.1	86	11.9
7	1.0	27	3.7	47	6.5	67	9.3	87	12.0
8	1.1	28	3.9	48	6.6	68	9.4	88	12.2
9	1.2	29	4.0	49	6.8	69	9.5	89	12.3
10	1.4	30	4.2	50	6.9	70	9.7	90	12.5
11	1.5	31	4.3	51	7.1	71	9.8	91	12.6
12	1.7	32	4.4	52	7.2	72	10.0	92	12.8
13	1.8	33	4.6	53	7.3	73	10.1	93	12.9
14	1.9	34	4.7	54	7.5	74	10.2	94	13.0
15	2.1	35	4.8	55	7.6	75	10.4	95	13.1
16	2.2	36	5.0	56	7.7	76	10.5	96	13.3
17	2.4	37	5.1	57	7.9	77	10.7	97	13.4
18	2.5	38	5.3	58	8.0	78	10.8	98	13.6
19	2.6	39	5.4	59	8.2	79	10.9	99	13.7
20	2.8	40	5.5	60	8.3	80	11.1	100	13.8

Tightening Torque
(General Bolts)

Type of Bolt	Thread Diameter A (mm)	Tightening Torque	
		kg-m	ft-lb
(Conventional or 4 Marked Bolt)	5	0.2-0.4	1.5-3.0
	6	0.4-0.7	3.0-5.0
	8	1.0-1.6	7.0-11.5
	10	2.2-3.5	16.0-25.5
(7 Marked Bolt)	5	0.3-0.6	2.0-4.5
	6	0.8-1.2	6.0-8.5
	8	1.8-2.8	13.0-20.0
	10	4.0-6.0	29.0-43.5



Fraction/Decimal Conversion Chart

8ths	16ths	32nds	64ths	64ths (cont)
1/8 = .125	1/16 = .0625	1/32 = .03125	1/64 = .015625	33/64 = .515625
1/4 = .250	3/16 = .1875	3/32 = .09375	3/64 = .046875	35/64 = .546875
3/8 = .375	5/16 = .3125	5/32 = .15625	5/64 = .078125	37/64 = .578125
1/2 = .500	7/16 = .4375	7/32 = .21875	7/64 = .109375	39/64 = .609375
5/8 = .625	9/16 = .5625	9/32 = .28125	9/64 = .140625	41/64 = .640625
3/4 = .750	11/16 = .6875	11/32 = .34375	11/64 = .171875	43/64 = .671875
7/8 = .875	13/16 = .8125	13/32 = .40625	13/64 = .203125	45/64 = .703125
—	15/16 = .9375	15/32 = .46875	15/64 = .234370	47/64 = .734375
—	—	17/32 = .53125	17/64 = .265625	49/64 = .765625
—	—	19/32 = .59375	19/64 = .296875	51/64 = .796875
—	—	21/32 = .65625	21/64 = .328125	53/64 = .828125
—	—	23/32 = .71875	23/64 = .359375	55/64 = .859375
—	—	25/32 = .78125	25/64 = .390625	57/64 = .890625
—	—	27/32 = .84375	27/64 = .421875	59/64 = .921875
—	—	29/32 = .90625	29/64 = .453125	61/64 = .953125
—	—	31/32 = .96875	31/64 = .484375	63/64 = .984375

Drill Bit Sizes (Number) Chart

No.	Size of Drill in Inches	No.	Size of Drill in Inches	No.	Size of Drill in Inches	No.	Size of Drill in Inches
1	.2280	21	.1590	41	.0960	61	.0390
2	.2210	22	.1570	42	.0935	62	.0380
3	.2130	23	.1540	43	.0890	63	.0370
4	.2090	24	.1520	44	.0860	64	.0360
5	.2055	25	.1495	45	.0820	65	.0350
6	.2040	26	.1470	46	.0810	66	.0330
7	.2010	27	.1440	47	.0785	67	.0320
8	.1990	28	.1405	48	.0760	68	.0310
9	.1960	29	.1360	49	.0730	69	.0292
10	.1935	30	.1285	50	.0700	70	.0280
11	.1910	31	.1200	51	.0670	71	.0260
12	.1890	32	.1160	52	.0635	72	.0250
13	.1850	33	.1130	53	.0595	73	.0240
14	.1820	34	.1110	54	.0550	74	.0225
15	.1800	35	.1100	55	.0520	75	.0210
16	.1770	36	.1065	56	.0465	76	.0200
17	.1730	37	.1040	57	.0430	77	.0180
18	.1695	38	.1015	58	.0420	78	.0160
19	.1660	39	.0995	59	.0410	79	.0145
20	.1610	40	.0980	60	.0400	80	.0135

MM/IN. Conversion Chart

mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
.01	.00039	.41	.01614	.81	.03189	21	.82677	61	2.40157
.02	.00079	.42	.01654	.82	.03228	22	.86614	62	2.44094
.03	.00118	.43	.01693	.83	.03268	23	.90551	63	2.48031
.04	.00157	.44	.01732	.84	.03307	24	.94488	64	2.51968
.05	.00197	.45	.01772	.85	.03346	25	.98425	65	2.55905
.06	.00236	.46	.01811	.86	.03386	26	1.02362	66	2.59842
.07	.00276	.47	.01850	.87	.03425	27	1.06299	67	2.63779
.08	.00315	.48	.01890	.88	.03465	28	1.10236	68	2.67716
.09	.00354	.49	.01929	.89	.03504	29	1.14173	69	2.71653
.10	.00394	.50	.01969	.90	.03543	30	1.18110	70	2.75590
.11	.00433	.51	.02008	.91	.03583	31	1.22047	71	2.79527
.12	.00472	.52	.02047	.92	.03622	32	1.25984	72	2.83464
.13	.00512	.53	.02087	.93	.03661	33	1.29921	73	2.87401
.14	.00551	.54	.02126	.94	.03701	34	1.33858	74	2.91338
.15	.00591	.55	.02165	.95	.03740	35	1.37795	75	2.95275
.16	.00630	.56	.02205	.96	.03780	36	1.41732	76	2.99212
.17	.00669	.57	.02244	.97	.03819	37	1.45669	77	3.03149
.18	.00709	.58	.02283	.98	.03858	38	1.49606	78	3.07086
.19	.00748	.59	.02323	.99	.03898	39	1.53543	79	3.11023
.20	.00787	.60	.02362	1.0	.03937	40	1.57480	80	3.14960
.21	.00827	.61	.02402	1	.03937	41	1.61417	81	3.18897
.22	.00866	.62	.02441	2	.07874	42	1.65354	82	3.22834
.23	.00906	.63	.02480	3	.11811	43	1.69291	83	3.26771
.24	.00945	.64	.02520	4	.15748	44	1.73228	84	3.30708
.25	.00984	.65	.02559	5	.19685	45	1.77165	85	3.34645
.26	.01024	.66	.02598	6	.23622	46	1.81102	86	3.38582
.27	.01063	.67	.02638	7	.27559	47	1.85039	87	3.42519
.28	.01102	.68	.02677	8	.31496	48	1.88976	88	3.46456
.29	.01142	.69	.02717	9	.35433	49	1.92913	89	3.50393
.30	.01181	.70	.02756	10	.39370	50	1.96850	90	3.54330
.31	.01220	.71	.02795	11	.43307	51	2.00787	91	3.58267
.32	.01260	.72	.02835	12	.47244	52	2.04724	92	3.62204
.33	.01299	.73	.02874	13	.51181	53	2.08661	93	3.66141
.34	.01339	.74	.02913	14	.55118	54	2.12598	94	3.70078
.35	.01378	.75	.02953	15	.59055	55	2.16535	95	3.74015
.36	.01417	.76	.02992	16	.62992	56	2.20472	96	3.77952
.37	.01457	.77	.03032	17	.66929	57	2.24409	97	3.81889
.38	.01496	.78	.03071	18	.70866	58	2.28346	98	3.85826
.39	.01535	.79	.03110	19	.74803	59	2.32283	99	3.89763
.40	.01575	.80	.03150	20	.78740	60	2.36220	100	3.93700

Servicing Symbols

Listed in the table below are symbols indicating special instructions and other important information necessary for proper servicing. Please note the definition for each symbol. These symbols are used throughout this manual.

SYMBOL	DESCRIPTION
	Torque control required
	243 - apply blue Loctite #243 (p/n 1639-413) 270 - apply green Loctite #270 (p/n 1639-817) 271 - apply red Loctite #271 (p/n 1639-820) 609 - apply green Loctite #609 (p/n 1639-821)
	Lubricate with Arctic Cat 50:1 Injection Oil (p/n 0636-286) - Non-APV Engines Lubricate with Arctic Cat Synthetic APV 2-Cycle Oil (p/n 2639-512) - APV Engines
	Lubricate with Arctic Cat Low-Temp Grease (p/n 0636-593)
	3B - Three Bond Sealant (p/n 0636-070) HT - High-Temp Sealant (p/n 0636-069) AS - Anti-Seize Thread Compound (p/n 0678-146)

SECTION 2 - ENGINE

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Arctic Cat Engine Specifications

ITEM		370 cc	440 cc	500 cc EFI	500 cc Carb	570 cc	600 cc EFI	700 cc Carb	700 cc EFI	900 cc EFI
Engine Model Number		AA37A8	AS44A9	AX50L5	AV50L5	AA56A5	AJ60L3	AE70L4	AD70L4	AB86L5
Displacement	— cc — cu in.	367 22.41	431 26.3	499 30.4	499 30.4	565 34.5	599 36.54	698 42.59	698 42.59	862 52.6
No. of Cylinders		2	2	2	2	2	2	2	2	2
Bore	— mm — in.	60 2.362	65 2.559	71 2.795	71 2.795	73.8 2.910	73.8 2.906	79.7 3.145	79.7 3.145	85 3.346
Stroke	— mm — in.	65 2.559	65 2.559	63 2.480	63 2.480	66 2.598	70 2.755	70 2.755	70 2.755	76 2.992
Compression Ratio		6.3:1	6.5:1	6.34:1	6.30:1	6.4:1	6.46:1	6.49:1	6.49:1	6.41:1
Cooling System		Fan Cooled	Fan Cooled	Liquid Cooled	Liquid Cooled	Fan Cooled	Liquid Cooled	Liquid Cooled	Liquid Cooled	Liquid Cooled
Gasoline Octane (min)		87	87	87	87	87	87	87	87	87
Fuel Mixture		Oil Injection	Oil Injection	Oil Injection	Oil Injection	Oil Injection	Oil Injection	Oil Injection	Oil Injection	Oil Injection
Ignition Timing	degrees — mm — in.	18③* 2.012 0.079	18③* 2.012 0.079	16③* 1.535 0.060	30③* 5.258 0.207	18③* 2.049 0.081	15②* 1.509 0.059	12⑦* 0.969 0.038	12⑧* 0.969 0.038	23④* 3.775 0.149
Spark Plug (NGK)		BR9EYA	BR9EYA	BR9EYA	BR9EYA	BR9EYA	BR9EYA	BR9EYA	BR9EYA	BR9EYA
Spark Plug Gap	— mm — in.	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031
Lighting Coil Output		12V/185W	12V/185W	12V/156W	12V/156W	12V/210W	12V/190W	12V/156W	12V/190W	12V/190W
Ignition Type		CDI/NOI	CDI/NOI	CDI/NOI	CDI/NOI	CDI/NOI	CD/NOI	CDI/NOI	CDI/NOI	CDI/NOI
Piston Skirt/Cylinder Clearance Range	— mm — in.	0.060-0.150 0.0024-0.0059	0.080-0.150 0.0031-0.0059	0.075-0.105 0.0029-0.0041	0.075-0.105 0.0029-0.0041	0.095-0.150 0.0037-0.0059	0.075-0.105 0.0029-0.0041	0.075-0.105 0.0029-0.0041	0.075-0.105 0.0029-0.0041	0.075-0.105 0.0029-0.0041
Piston Ring End Gap Range	— mm — in.	0.15-0.80 0.006-0.031	0.15-0.83 0.006-0.033	0.20-0.40 0.008-0.016	0.20-0.40 0.008-0.016	0.20-0.83 0.008-0.033	0.30-0.50 0.012-0.0196	0.30-0.50 0.012-0.0196	0.30-0.50 0.012-0.0196	0.30-0.50 0.012-0.020
Cylinder Trueness Limit (max)	— mm — in.	0.1 0.004	0.1 0.004	0.1 0.004	0.1 0.004	0.1 0.004	0.1 0.004	0.1 0.004	0.1 0.004	0.1 0.004
Piston Pin Diameter Range	— mm — in.	17.995-18.000 0.7085-0.7087	15.995-16.000 0.6297-0.6299	21.995-22.000 0.8659-0.8661	21.995-22.000 0.8659-0.8661	17.995-18.000 0.7085-0.7087	21.995-22.000 0.8659-0.8661	21.995-22.000 0.8659-0.8661	21.995-22.000 0.8659-0.8661	23.995-24.000 0.9447-0.9449
Piston Pin Bore Diameter Range	— mm — in.	17.998-18.006 0.7086-0.7089	15.996-16.004 0.6298-0.6301	22.002-22.010 0.8662-0.8665	22.002-22.010 0.8662-0.8665	17.998-18.006 0.7086-0.7089	22.002-22.010 0.8662-0.8665	22.002-22.010 0.8662-0.8665	22.002-22.010 0.8662-0.8665	24.002-24.010 0.9450-0.9453
Connecting Rod Small End Bore Diameter Range	— mm — in.	23.003-23.011 0.9056-0.9059	21.003-21.011 0.8269-0.8272	27.003-27.011 1.0631-1.0634	27.003-27.011 1.0631-1.0634	23.003-23.011 0.9056-0.9059	27.003-27.011 1.0631-1.0634	27.003-27.011 1.0631-1.0634	27.003-27.011 1.0631-1.0634	29.003-29.011 1.1410-1.1420
Connecting Rod Radial Play Range	— mm — in.	0.02-0.03 0.0008-0.0012	0.02-0.03 0.0008-0.0012	0.003-0.020 0.0001-0.0007	0.003-0.020 0.0001-0.0007	0.02-0.03 0.0008-0.0012	0.003-0.020 0.0001-0.0007	0.003-0.020 0.0001-0.0007	0.003-0.020 0.0001-0.0007	0.003-0.020 0.0001-0.0008
Crankshaft Runout (t.i.r.)	— mm — in.	0.05 0.002	0.05 0.002	0.05 0.002	0.05 0.002	0.05 0.002	0.05 0.002	0.05 0.002	0.05 0.002	0.05 0.002
Crankshaft End Play Range	— mm — in.	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004
Reed Stopper Height	— mm — in.	N/A	N/A	8.0 0.315	8.0 0.315	6.0 0.236	11.0 0.433	11.0 0.433	11.0 0.433	11.0 0.433

① @ 1400 RPM
② @ 1800 RPM
③ @ 2000 RPM
④ @ 2500 RPM
⑤ @ 3200 RPM
⑥ @ 3500 RPM
⑦ @ 4000 RPM
⑧ @ 4350 RPM

*Engine Warm

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Torque Conversions

ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m
1	0.1	21	2.9	41	5.7	61	8.4	81	11.2
2	0.3	22	3.0	42	5.8	62	8.6	82	11.3
3	0.4	23	3.2	43	5.8	63	8.7	83	11.5
4	0.6	24	3.3	44	6.1	64	8.9	84	11.6
5	0.7	25	3.5	45	6.2	65	9.0	85	11.8
6	0.8	26	3.6	46	6.4	66	9.1	86	11.9
7	1.0	27	3.7	47	6.5	67	9.3	87	12.0
8	1.1	28	3.9	48	6.6	68	9.4	88	12.2
9	1.2	29	4.0	49	6.8	69	9.5	89	12.3
10	1.4	30	4.2	50	6.9	70	9.7	90	12.5
11	1.5	31	4.3	51	7.1	71	9.8	91	12.6
12	1.7	32	4.4	52	7.2	72	10.0	92	12.8
13	1.8	33	4.6	53	7.3	73	10.1	92	12.9
14	1.9	34	4.7	54	7.5	74	10.2	94	13.0
15	2.1	35	4.8	55	7.6	75	10.4	95	13.1
16	2.2	36	5.0	56	7.7	76	10.5	96	13.3
17	2.4	37	5.1	57	7.9	77	10.7	97	13.4
18	2.5	38	5.3	58	8.0	78	10.8	98	13.6
19	2.6	39	5.4	59	8.2	79	10.9	99	13.7
20	2.8	40	5.5	60	8.3	80	11.1	100	13.8

Piston Replacement Guide

ENGINE SIZE	YEAR	PISTON	RING	PISTON & RING SET
370 cc	2006	*	3004-825	3005-913
440 cc	2006	*	3006-413	3005-920
500 cc w/APV	2006	*	3005-828	3006-427
500 cc w/o APV	2006	*	3005-828	3006-746
570 cc	2006	*	3006-004	3006-528
600 cc	2006	*	3006-004	3006-645
900 cc	2006	*	3006-394	3006-393
700 cc	2006	*	3006-500	3006-499

* Not a Service Part

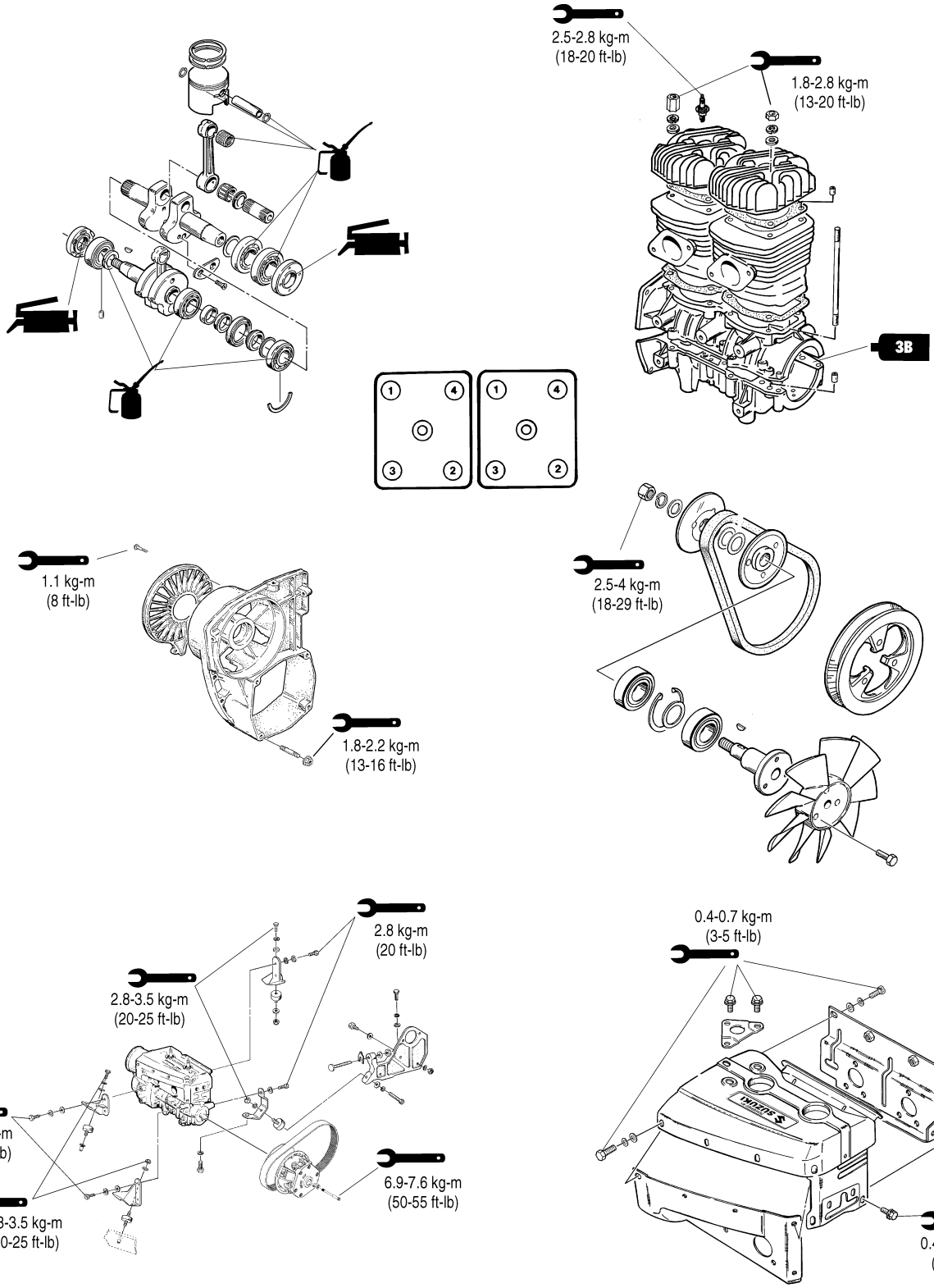
Assembly Schematics Table of Contents

370/440 cc 2-6
570 cc 2-8
900 cc 2-10
500 cc (Carb) 2-12
500 cc EFI 2-14
600/700 cc 2-16

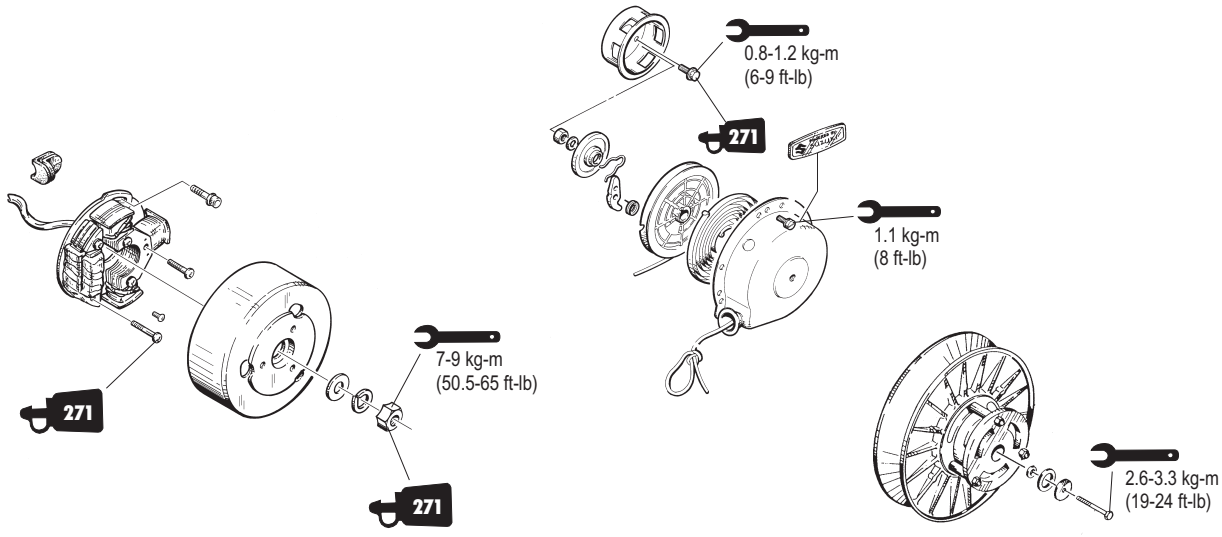
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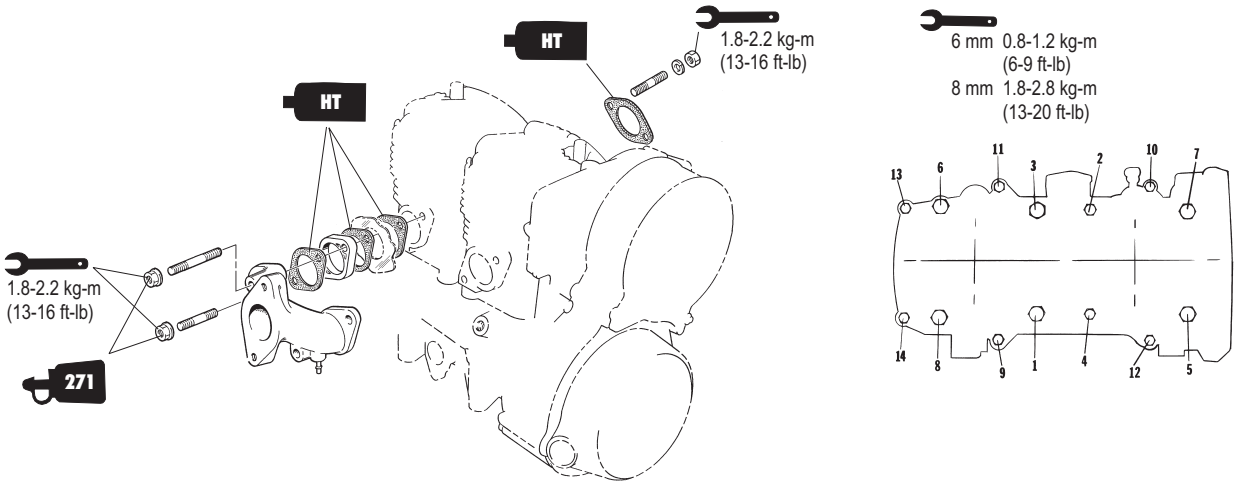
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	Torque control required
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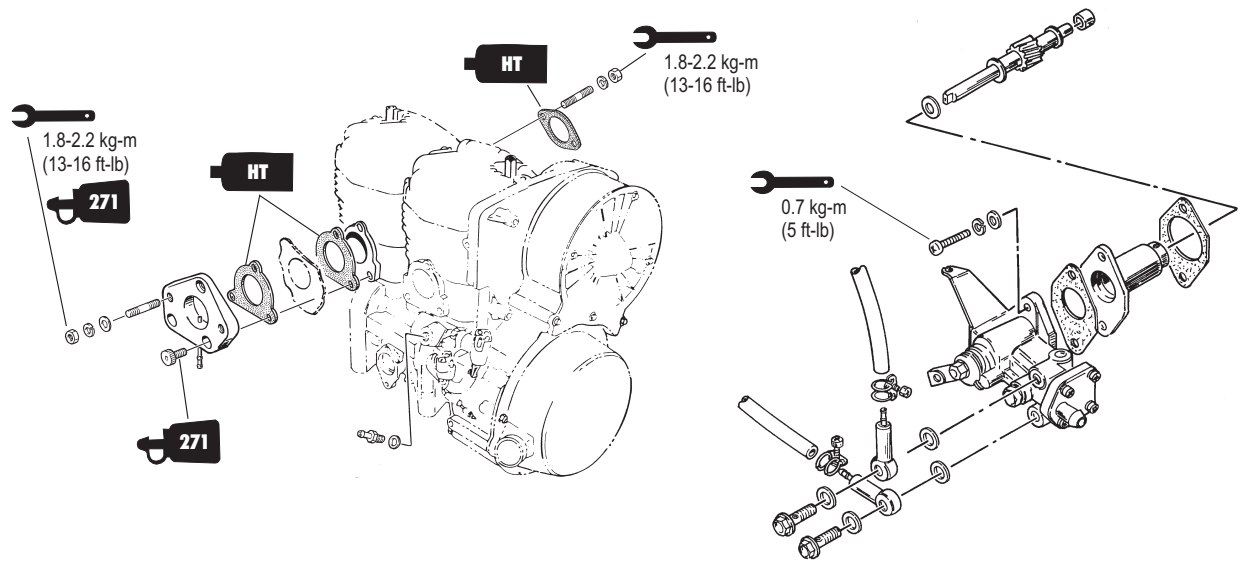
370/440 cc



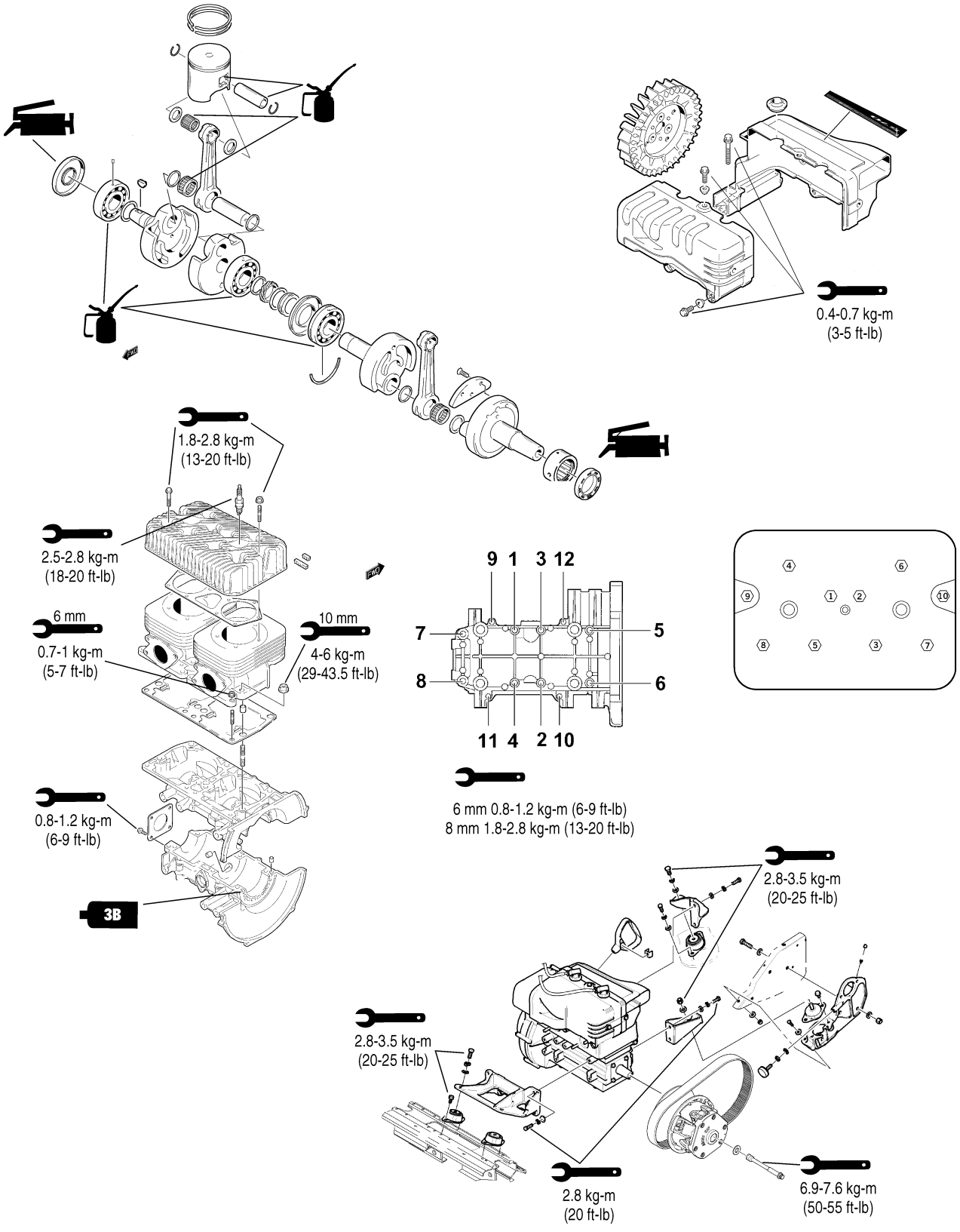
3744-ENG05


0.8-1.2 kg-m
(6-9 ft-lb)
271
1.1 kg-m
(8 ft-lb)
7-9 kg-m
(50.5-65 ft-lb)
271
271
2.6-3.3 kg-m
(19-24 ft-lb)

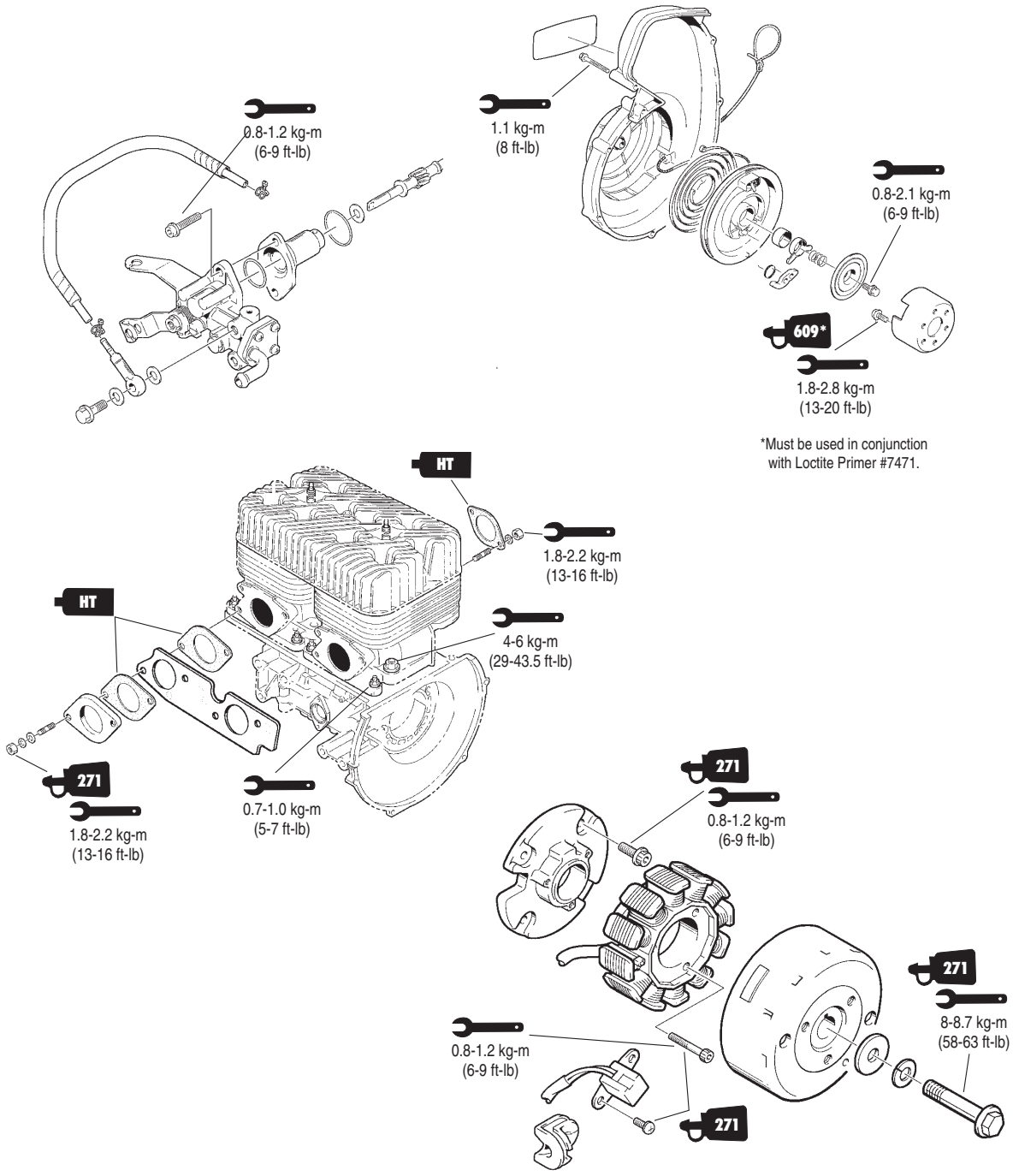

HT
1.8-2.2 kg-m
(13-16 ft-lb)
HT
6 mm 0.8-1.2 kg-m
(6-9 ft-lb)
8 mm 1.8-2.8 kg-m
(13-20 ft-lb)
1.8-2.2 kg-m
(13-16 ft-lb)
271
13 6 11 3 2 10 7
14 8 9 1 4 12 5


HT
1.8-2.2 kg-m
(13-16 ft-lb)
1.8-2.2 kg-m
(13-16 ft-lb)
271
HT
271
0.7 kg-m
(5 ft-lb)

570 cc



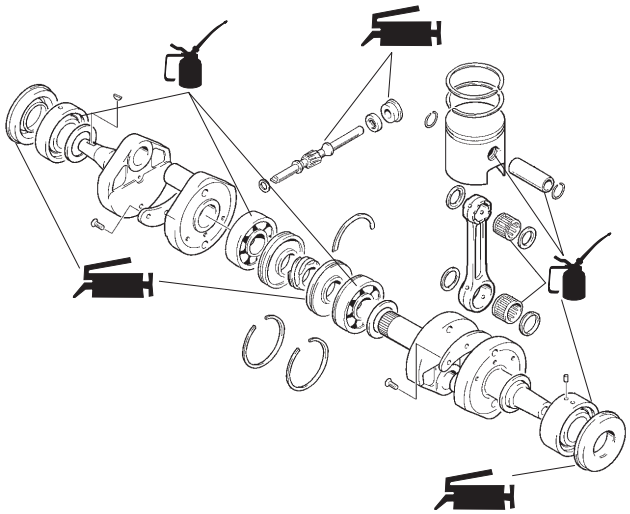
570-ENG05

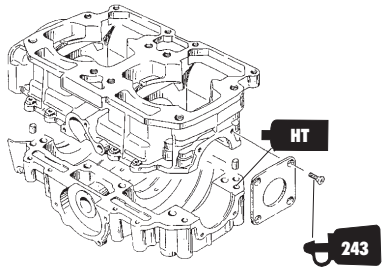

0.8-1.2 kg-m
(6-9 ft-lb)
1.1 kg-m
(8 ft-lb)
0.8-2.1 kg-m
(6-9 ft-lb)
609*
1.8-2.8 kg-m
(13-20 ft-lb)
*Must be used in conjunction
with Loctite Primer #7471.
HT
1.8-2.2 kg-m
(13-16 ft-lb)
HT
4-6 kg-m
(29-43.5 ft-lb)
271
1.8-2.2 kg-m
(13-16 ft-lb)
0.7-1.0 kg-m
(5-7 ft-lb)
271
0.8-1.2 kg-m
(6-9 ft-lb)
271
8-8.7 kg-m
(58-63 ft-lb)
0.8-1.2 kg-m
(6-9 ft-lb)
271

2

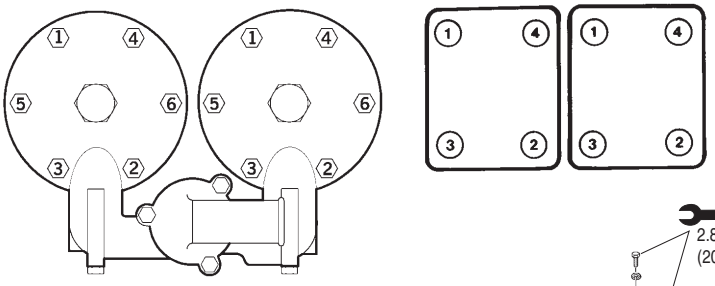
570ENG

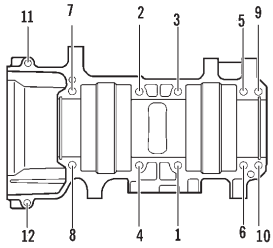
900 cc

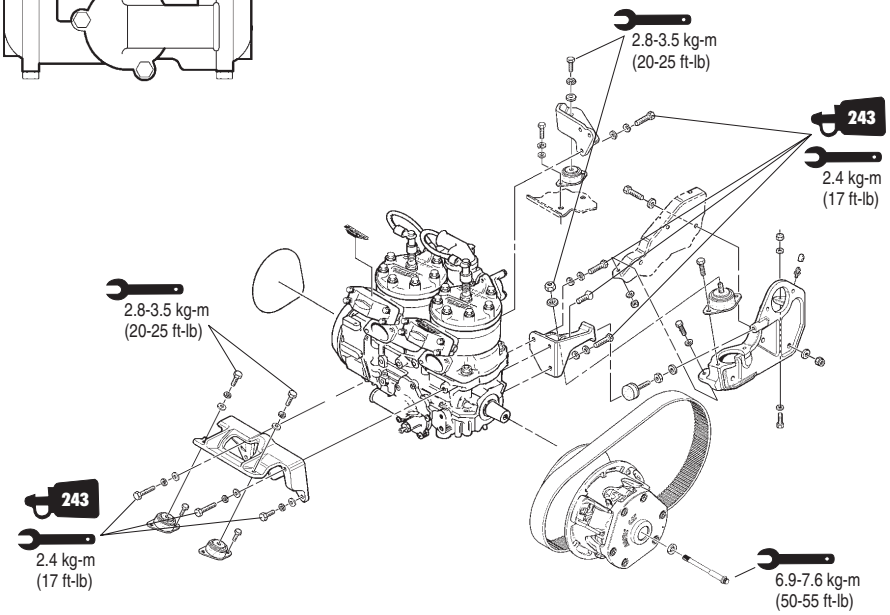




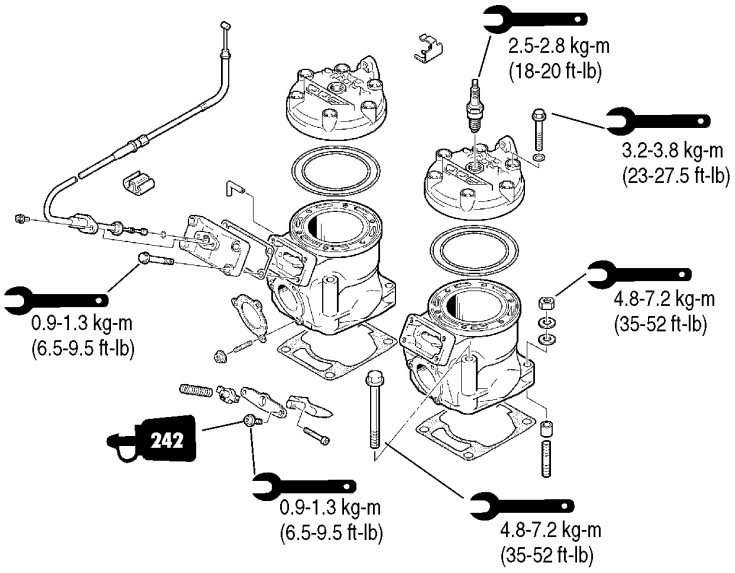
10 mm 4.2-4.8 kg-m
(30-35 ft-lb)
6 mm 0.8-1.2 kg-m
(6-9 ft-lb)

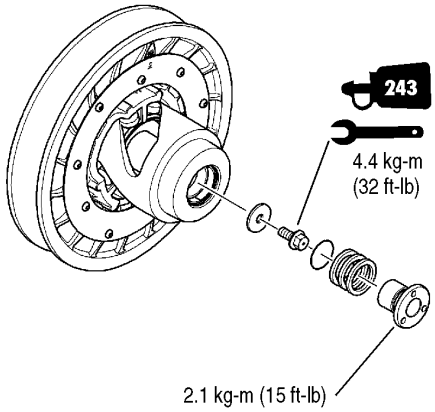


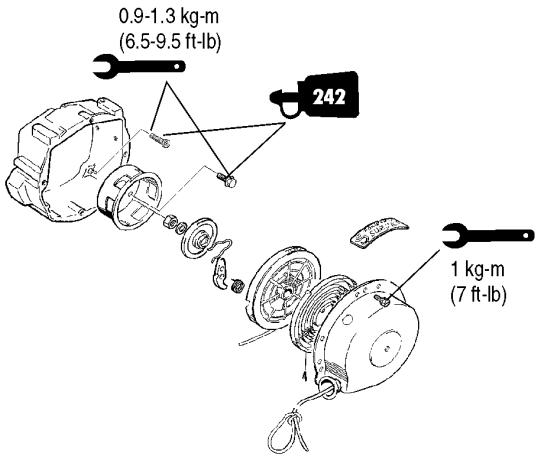


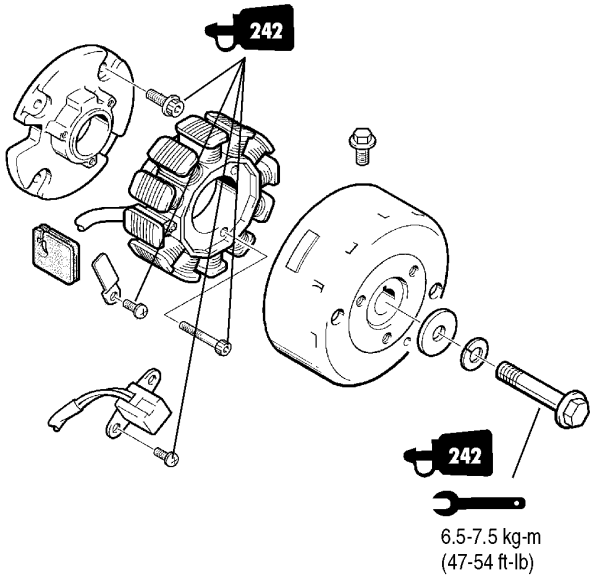


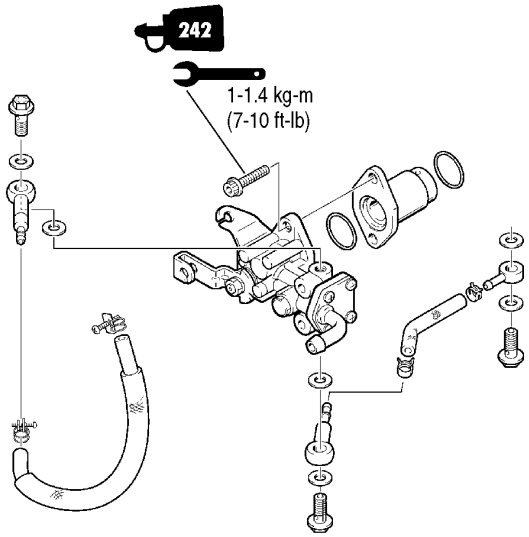
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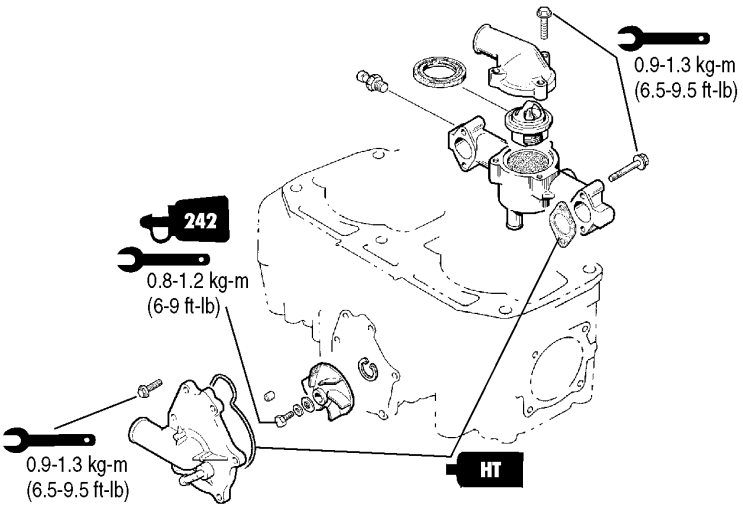






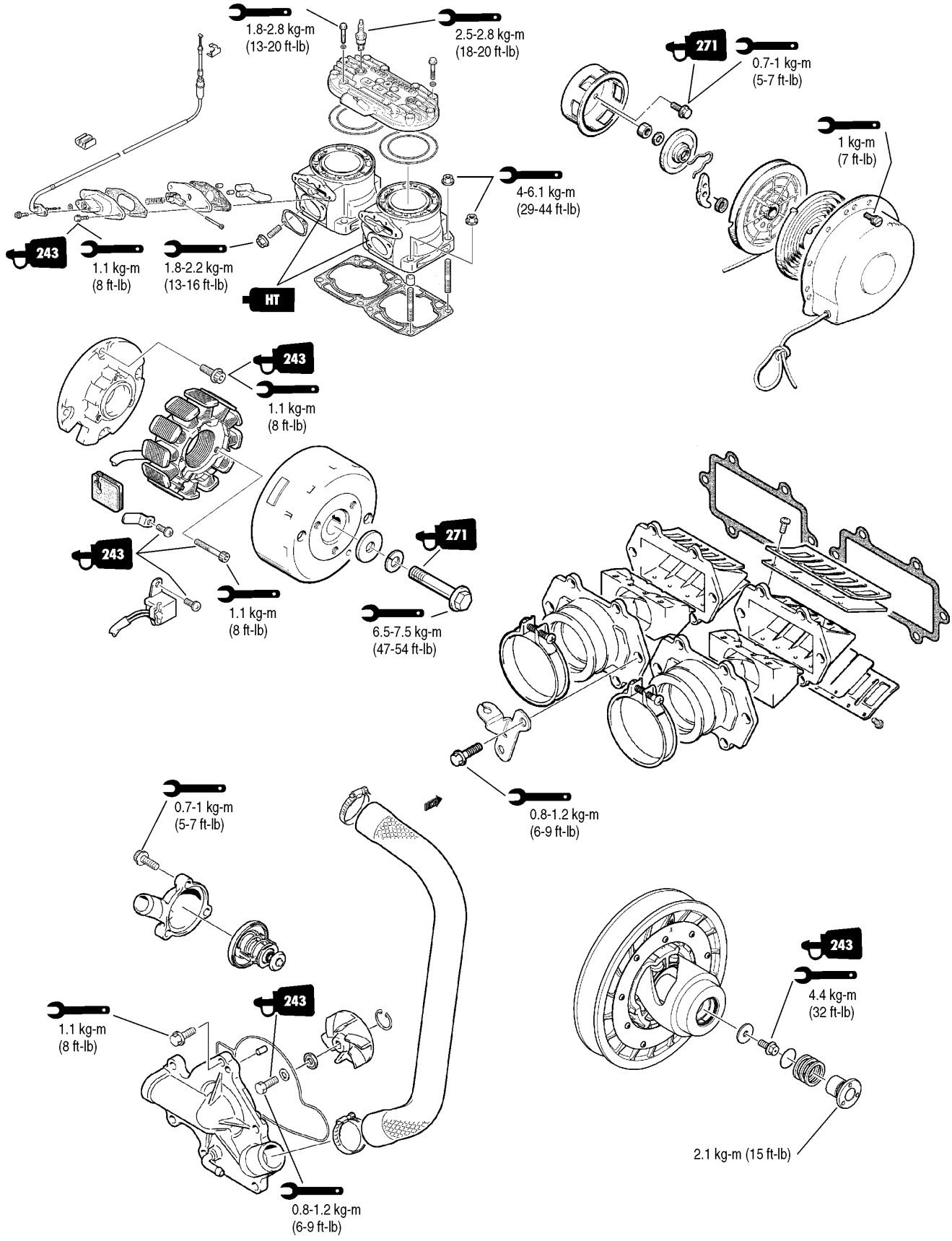


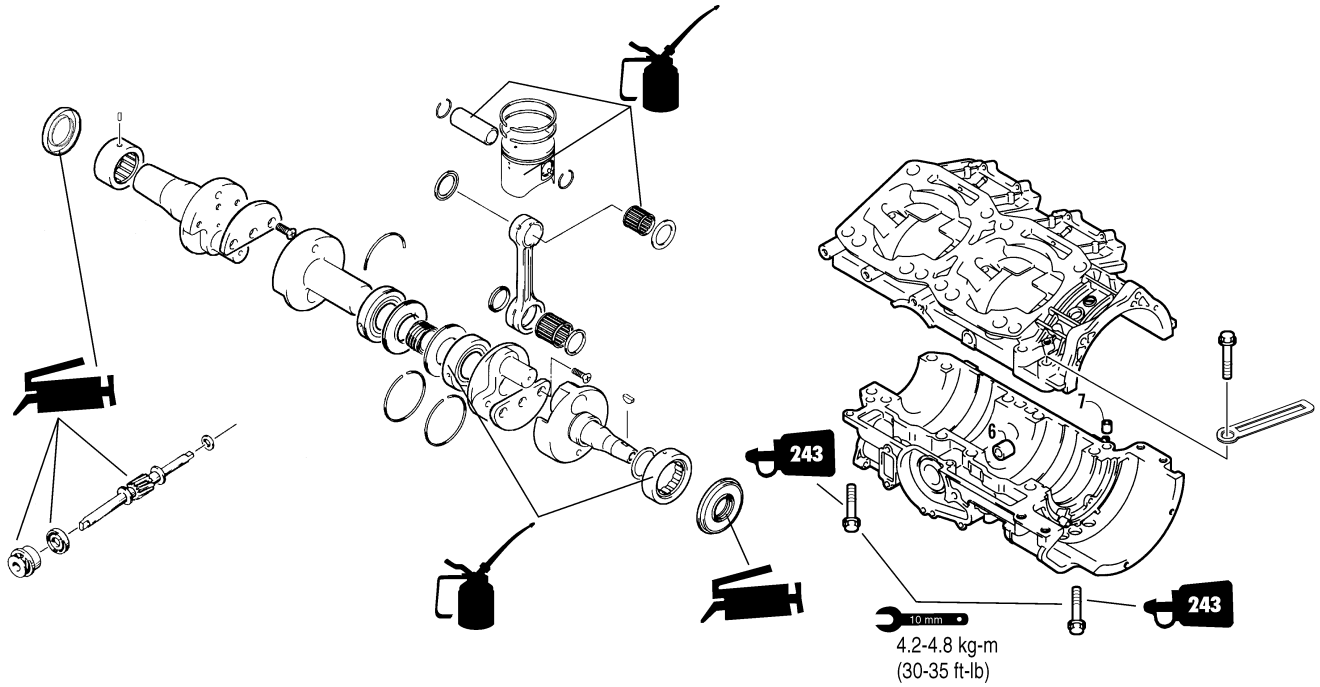


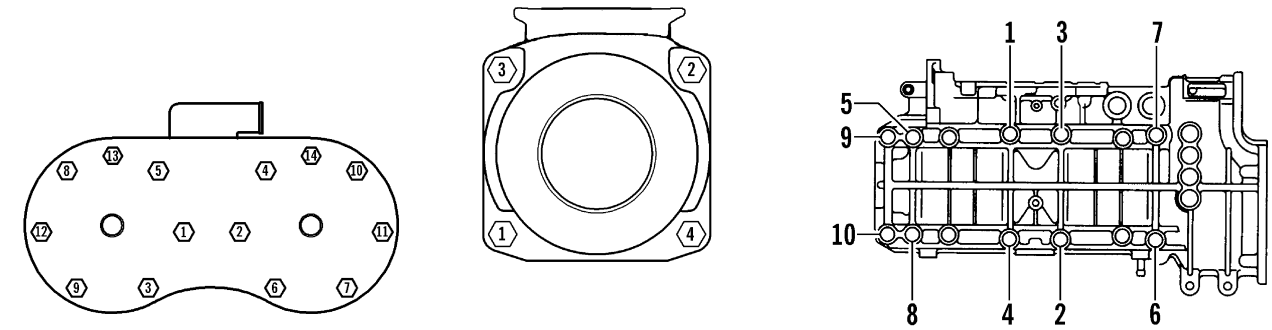


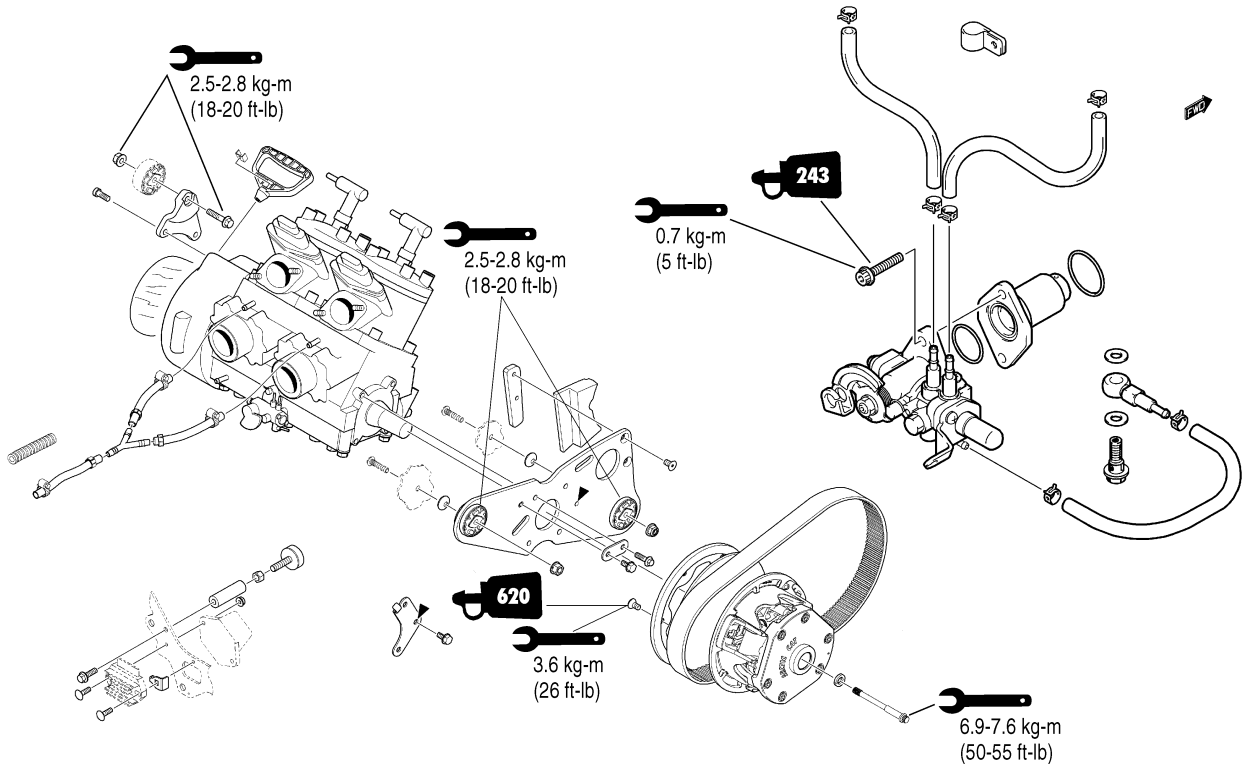
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500 cc (Carb)


1.8-2.8 kg-m
(13-20 ft-lb)
2.5-2.8 kg-m
(18-20 ft-lb)
271
0.7-1 kg-m
(5-7 ft-lb)
1 kg-m
(7 ft-lb)
4-6.1 kg-m
(29-44 ft-lb)
243
1.1 kg-m
(8 ft-lb)
1.8-2.2 kg-m
(13-16 ft-lb)
HT
243
1.1 kg-m
(8 ft-lb)
243
271
1.1 kg-m
(8 ft-lb)
6.5-7.5 kg-m
(47-54 ft-lb)
0.8-1.2 kg-m
(6-9 ft-lb)
0.7-1 kg-m
(5-7 ft-lb)
1.1 kg-m
(8 ft-lb)
243
0.8-1.2 kg-m
(6-9 ft-lb)
243
4.4 kg-m
(32 ft-lb)
2.1 kg-m (15 ft-lb)

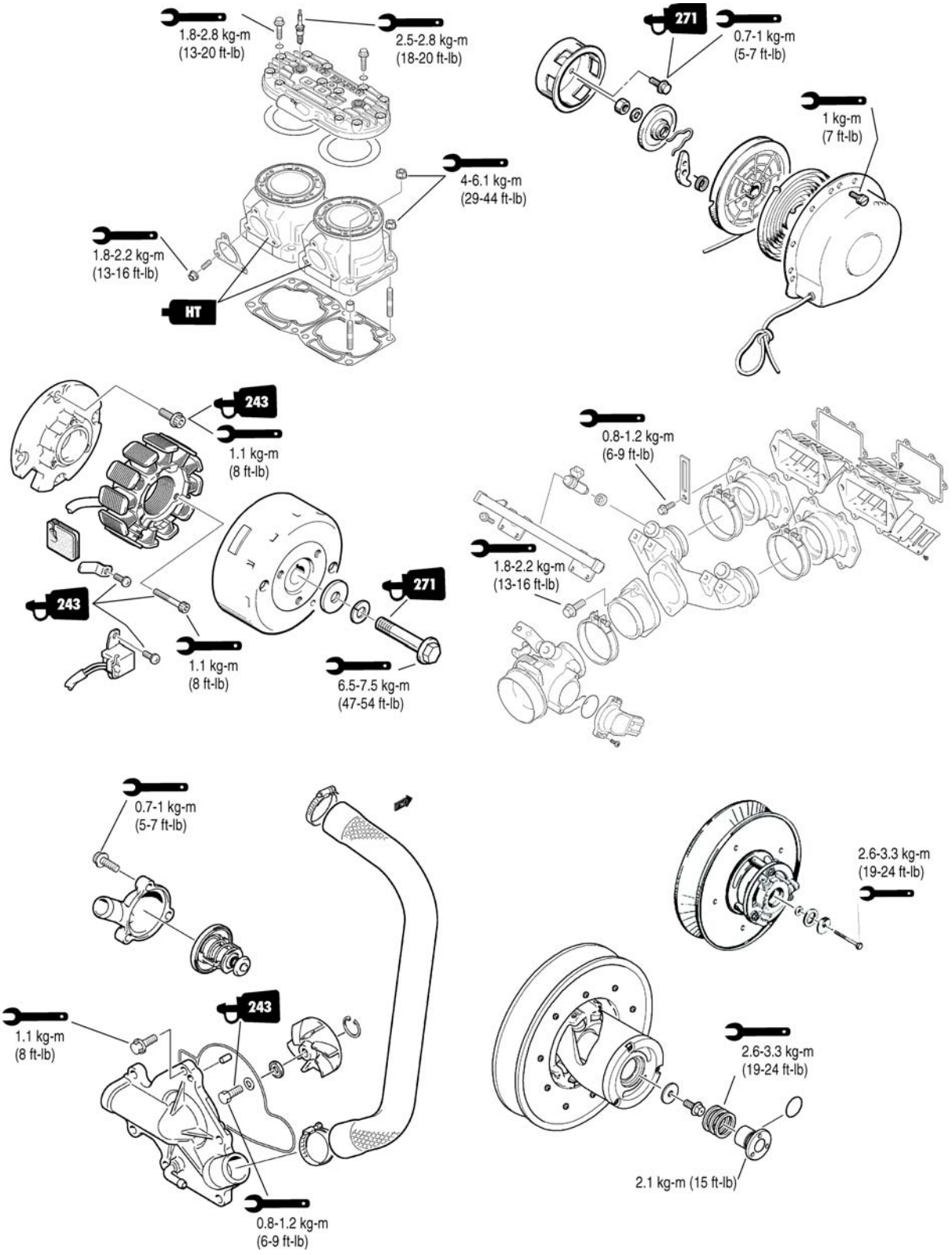




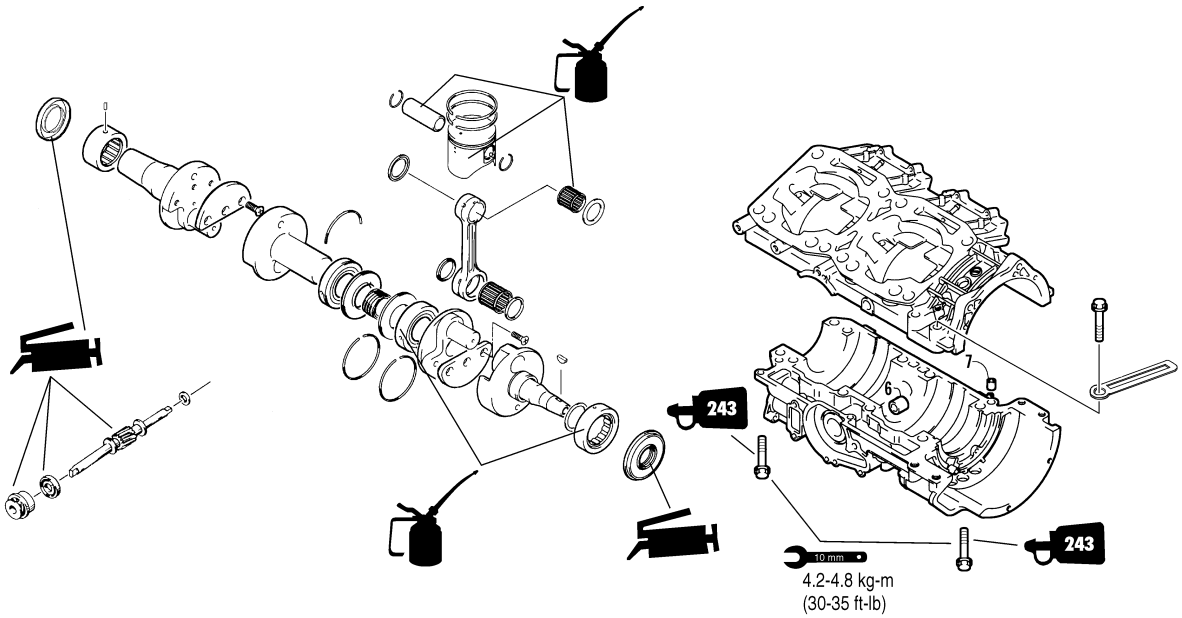


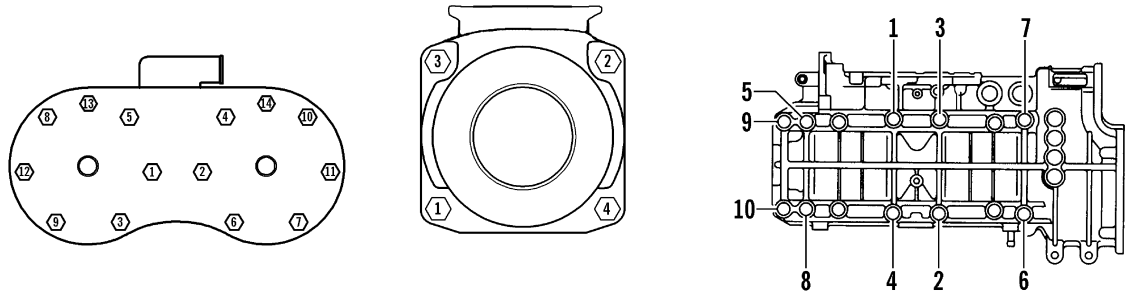
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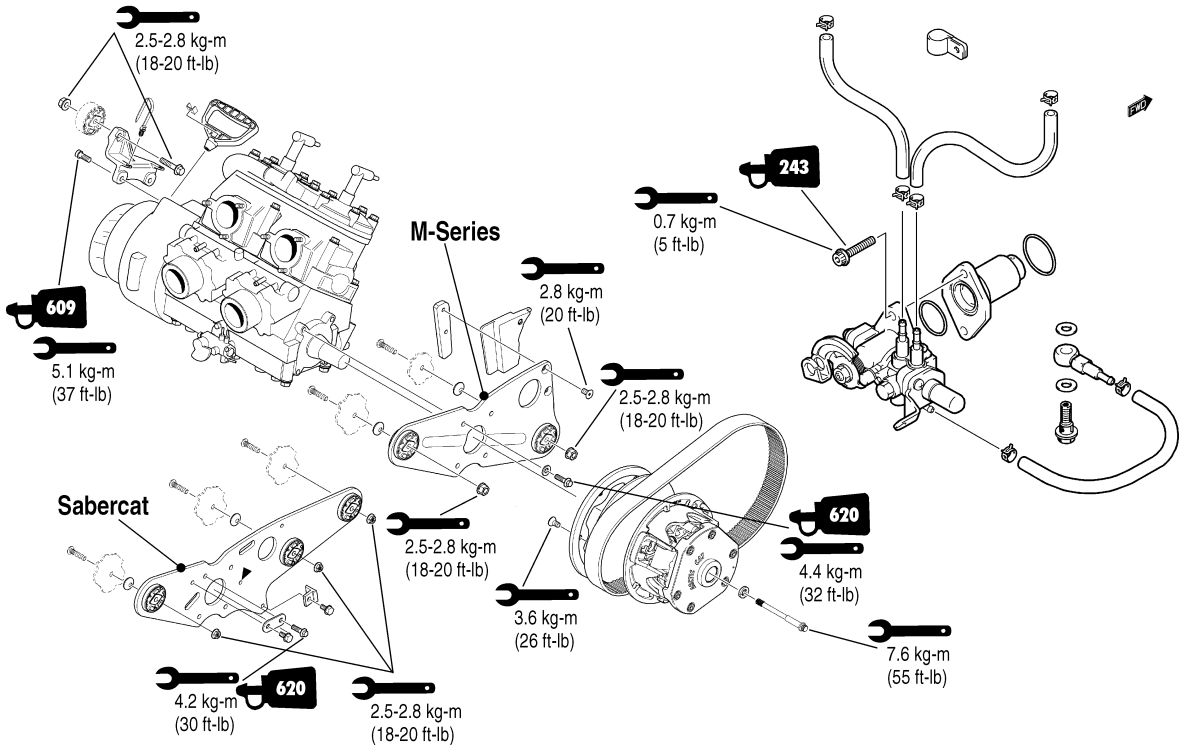
500 cc EFI



500CC1A

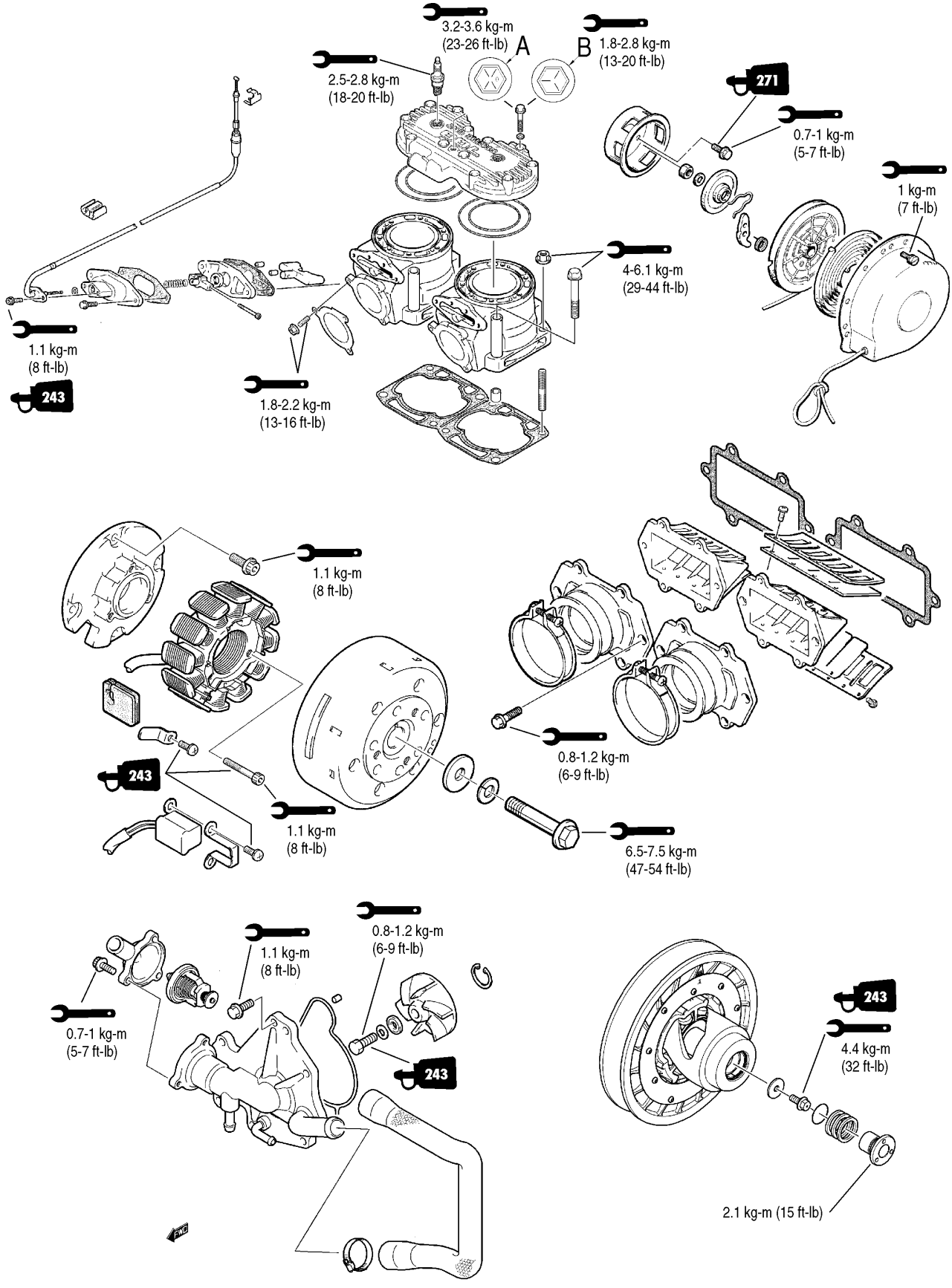

243
243
4.2-4.8 kg-m
(30-35 ft-lb)


1 3 7
5
9
10
8 4 2 6

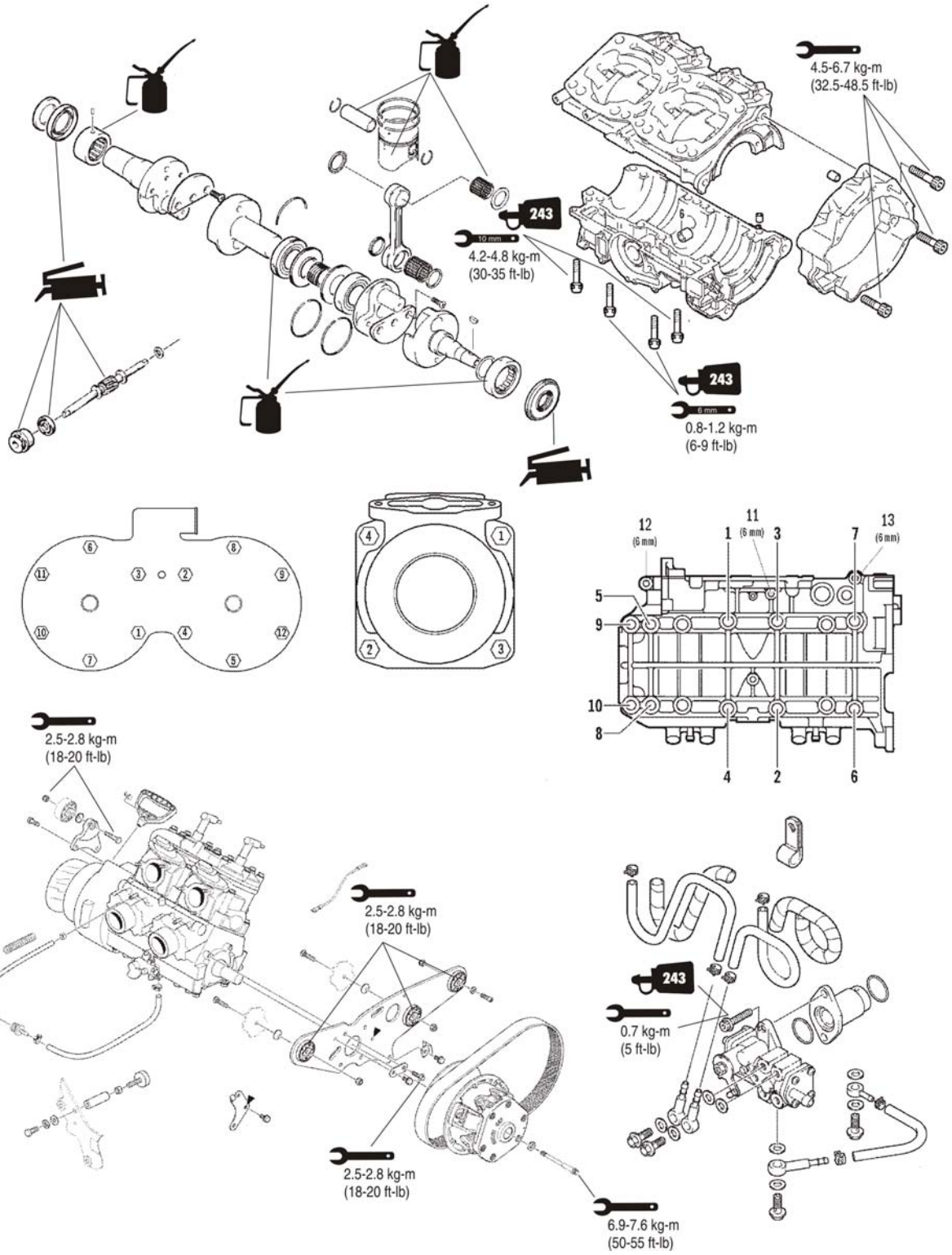

2.5-2.8 kg-m
(18-20 ft-lb)
609
5.1 kg-m
(37 ft-lb)
M-Series
2.8 kg-m
(20 ft-lb)
2.5-2.8 kg-m
(18-20 ft-lb)
243
0.7 kg-m
(5 ft-lb)
Sabercat
2.5-2.8 kg-m
(18-20 ft-lb)
620
4.4 kg-m
(32 ft-lb)
3.6 kg-m
(26 ft-lb)
7.6 kg-m
(55 ft-lb)
4.2 kg-m
(30 ft-lb)
620
2.5-2.8 kg-m
(18-20 ft-lb)

500CC2A_05

600/700 cc



700CC1B



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Engine Piston Travel Versus Crank Angle Chart

When using any of the charts below, first know the engine stroke and timing in degrees; then select the proper chart and read across from the degree figure to find timing in either mm or inches.

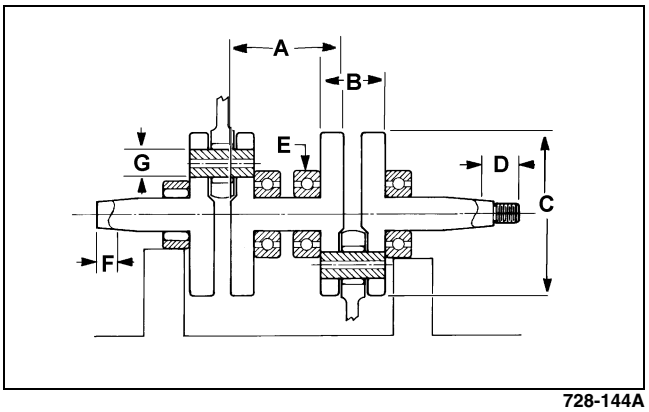
	500 cc		600/700 cc		370 cc - 440 cc		570 cc		900 cc	
	63 mm stroke		70 mm stroke		65 mm stroke		66 mm stroke		76 mm stroke	
Degree BTDC	mm BTDC	in. BTDC	mm BTDC	in. BTDC	mm BTDC	in. BTDC	mm BTDC	in. BTDC	mm BTDC	in. BTDC
5	0.151	0.006	0.169	0.007	0.157	0.006	0.160	0.006	0.182	0.007
6	0.218	0.009	0.243	0.009	0.226	0.009	0.230	0.009	0.262	0.010
7	0.296	0.012	0.331	0.013	0.308	0.012	0.313	0.012	0.356	0.014
8	0.387	0.015	0.432	0.017	0.402	0.016	0.409	0.016	0.465	0.018
9	0.489	0.019	0.546	0.021	0.508	0.020	0.517	0.020	0.588	0.023
10	0.603	0.024	0.674	0.026	0.627	0.025	0.638	0.025	0.726	0.029
11	0.729	0.029	0.815	0.032	0.757	0.030	0.772	0.030	0.878	0.035
12	0.867	0.034	0.969	0.038	0.901	0.035	0.917	0.036	1.044	0.041
13	1.017	0.040	1.136	0.045	1.056	0.042	1.076	0.042	1.224	0.048
14	1.178	0.046	1.316	0.052	1.223	0.048	1.246	0.049	1.417	0.056
15	1.351	0.053	1.509	0.059	1.403	0.055	1.429	0.056	1.625	0.064
16	1.535	0.060	1.714	0.067	1.594	0.063	1.624	0.064	1.847	0.073
17	1.730	0.068	1.933	0.076	1.797	0.071	1.830	0.072	2.082	0.082
18	1.937	0.076	2.164	0.085	2.012	0.079	2.049	0.081	2.331	0.089
19	2.155	0.085	2.407	0.095	2.238	0.088	2.280	0.090	2.594	0.102
20	2.384	0.094	2.663	0.105	2.476	0.097	2.522	0.099	2.869	0.113
21	2.624	0.103	2.931	0.115	2.725	0.107	2.776	0.109	3.158	0.124
22	2.875	0.113	3.211	.0126	2.986	0.118	3.041	0.120	3.460	0.136
23	3.137	0.124	3.504	0.138	3.257	0.128	3.318	0.131	3.775	0.149
24	3.409	0.134	3.808	0.150	3.540	0.139	3.606	0.142	4.103	0.162
25	3.692	0.145	4.123	0.162	3.834	0.151	3.905	0.154	4.443	0.175
26	3.985	0.156	4.451	0.175	4.138	0.163	4.215	0.166	4.796	0.189
27	4.288	0.169	4.790	0.188	4.453	0.175	4.536	0.179	5.161	0.203
28	4.602	0.181	5.139	0.202	4.778	0.188	4.867	0.192	5.538	0.218
29	4.925	0.194	5.500	0.216	5.114	0.201	5.209	0.205	5.927	0.233
30	5.258	0.207	5.872	0.231	5.459	0.215	5.561	0.219	6.328	0.249
31	5.601	0.220	-	-	5.815	0.229	5.923	0.233	-	-
32	-	-	-	-	6.181	0.243	6.295	0.248	-	-
33	-	-	-	-	6.556	0.258	6.677	0.263	-	-

Crankshaft Runout/Repair Specifications

For those who have crankshaft work sent out to another shop, it is advisable to provide them with this information.

To use the specifications, first refer to the drawing; then find the letter which indicates the specification and refer to the chart below the illustration. Be sure to note the proper engine column. Specifications are called out in both millimeters and inches.

■ NOTE: We have given the proper location for checking crankshaft runout as the very edge of the straight portion of the shaft where the oil seal makes contact. From the illustration, note that Arctic Cat has called out three check points: at either end, out on the taper as shown, and also on the center bearing race. The crankshaft is still supported on the outer bearings using V blocks. The maximum runout shouldn't exceed 0.05 mm (0.002 in.).



728-144A

Engine		Bore X Stroke	A	B	C	G	Runout D, E, F Point	
370 cc		60 X 65					(± .002)	
440 cc	mm (in.)	65 X 65	100 ± 0.15 (3.937 ± 0.006)	55 ± 0.15 (2.165 ± 0.006)	100 (3.937)	22 (0.866)	D 35 (1.377)	F 22 (0.866)
500 cc	mm (in.)	71 X 63	114.7 ± 0.15 (4.515 ± 0.006)	66.5 ± 0.15 (2.618 ± 0.006)	106 ± 0.4 (4.465 ± 0.015)	27 (1.062)	(± .002) D 5 (0.196)	F 5 (0.197)
570 cc	mm (in.)	73.8 X 66	119 ± 0.15 (4.70 ± 0.006)	62.3 ± 0.15 (2.45 ± 0.006)	109.7 (4.320)	24 (0.945)	(± .002) D 30 (1.181)	F 15 (0.590)
600 cc	mm (in.)	73.8 X 70	119.7 ± 0.15 (4.712 ± 0.006)	64 ± 0.15 (2.519 ± 0.006)	118 ± 0.4 (4.645 ± 0.015)	30 (1.181)	(± .002) D 5 (0.196)	F 5 (0.196)
700 cc	mm (in.)	79.7 X 70	119.7 ± 0.15 (4.712 ± 0.006)	64 ± 0.15 (2.519 ± 0.006)	118 ± 0.4 (4.645 ± 0.015)	30 (1.181)	(± .002) D 5 (0.196)	F 5 (0.196)
900 cc	mm (in.)	85 X 76	125.5 ± 0.15 (4.94 ± 0.006)	68 ± 0.15 (2.68 ± 0.006)	123 + 0-0.4 (4.84 + 0-0.015)	30 (1.2)	(± .002) D 30 (1.181)	F 15 (0.590)

■ NOTE: Measure in from the shaft end the specified amount when checking runout at points D-F. When checking runout in the center, place indicator on center of bearing as shown at Point E. Maximum runout at any of the 3 measuring points is ±0.05 mm (0.002 in.).

Cylinder Head Volume Specifications

■ **NOTE: For cylinder head volume tests, see Measuring Critical Components in this section.**

ENGINE TYPE	SQUISH - GAP		HEAD INSTALLED VOLUME (cc)	FLAT PLATE VOLUME (cc)
370 cc	mm in.	2.27-2.95 .089-.116	19.1-22.0	24.3-25.1
440 cc	mm in.	1.39-1.87 .055-.074	20.4-26.4	25.2
500 cc	mm in.	1.4 .055	22.43	20.45
570 cc	mm in.	1.3 .051	27.01	28.8
600 cc	mm in.	1.5 .059	25.0-27.6	29.7
700 cc	mm in.	1.5 .059	30.5	34.5
900 cc	mm in.	1.36 .054	34.1-38.0	39.9

■ **NOTE: For accurate reading when using the head installed volume method, subtract 2.44 cc from the total amount of fluid used (if using a BR9EYA spark plug) or 2.20 cc (if using a BR9ES spark plug).**

⚠ CAUTION

The above specifications are not intended to be used for engine modification. Reducing the head volume to the smaller specification could cause piston detonation problems which is not a warranty situation.

Engine

This engine servicing section has been organized into sub-sections which show a progression for the complete servicing of the Arctic Cat engine. For consistency purposes, this section shows a complete and thorough progression; however, for efficiency it may be preferable to remove the engine as a complete assembly, to remove and disassemble only those components which need to be addressed, and to service only those components. Also, some components may vary from model to model. The technician should use discretion and sound judgment.

■ **NOTE: Some illustrations and photographs used in this section are used for clarity purposes only and are not designed to depict actual conditions.**

Removing Engine Table of Contents

F/C Models 2-20
900 cc Models 2-22
500/600/700 cc Models 2-25

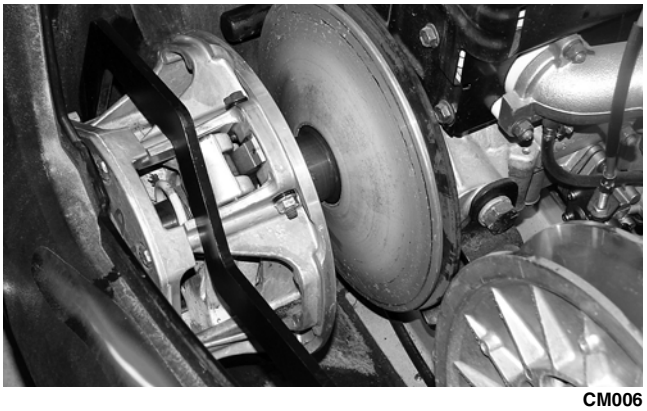
Removing Engine
(F/C Models)

■ **NOTE: If equipped with electric start, disconnect the battery.**

1. Turn the gas tank shut-off valve to the CLOSED position.
2. Open the belt guard.
3. Remove the drive belt; then remove the plug from the belly pan.

■ **NOTE: Before installing the clutch puller, apply oil to the threads of the puller and a small amount of grease to the tip of the puller.**

4. Remove the bolt and lock washers securing the drive clutch to the crankshaft; then using the Drive Clutch Puller (p/n 0644-207) and an impact wrench or a breaker bar and Drive Clutch Spanner Wrench (p/n 0644-136), tighten the puller. If the drive clutch will not release, sharply strike the head of the puller with a hammer. Repeat this procedure until the clutch releases.



CM006

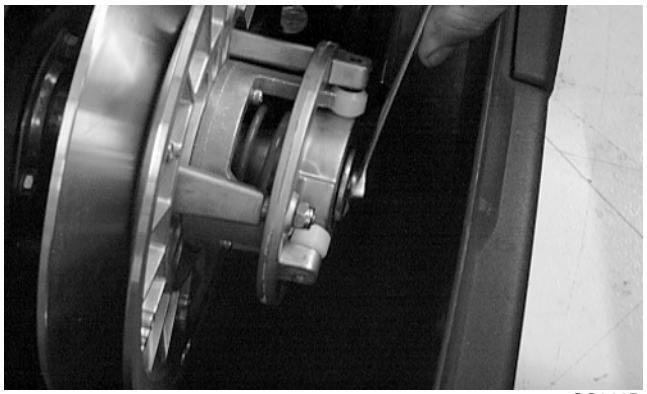


CM007

5. Remove the clutch from the engine compartment.

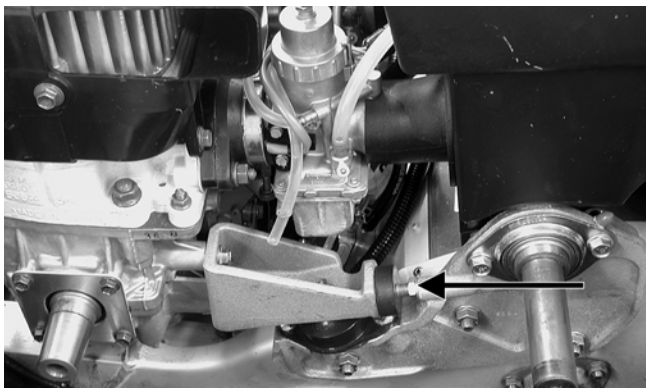
6. Remove the cap screw and washer securing the driven pulley; then slide the pulley off the driven shaft. Account for and note the position of any alignment washers.

■ **NOTE: If the driven pulley will not slide off the driven shaft, use the Driven Pulley Puller (p/n 0744-023) for removal.**



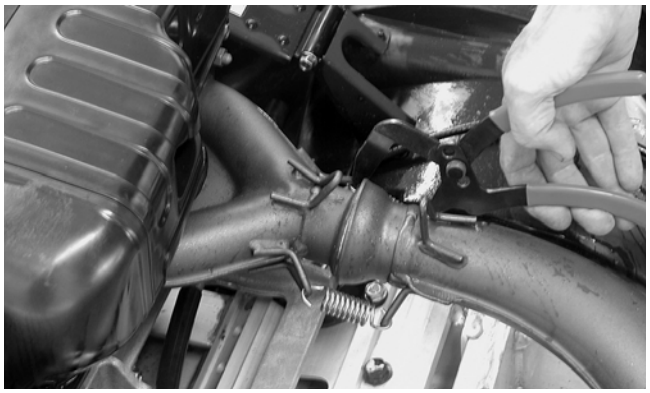
SC013D

7. Loosen the torque bumper from the engine mount.



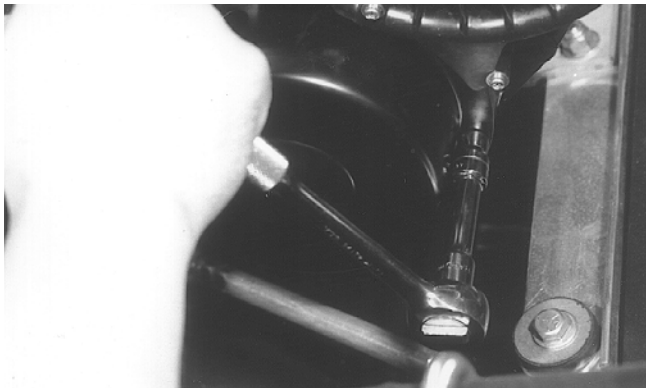
MS367A

8. Remove the springs securing the expansion chamber to the exhaust manifold and resonator; then remove expansion chamber.



MS368

9. Remove the cap screws and lock washers securing the recoil starter; then remove the starter. Leave it in the engine compartment.



AB082

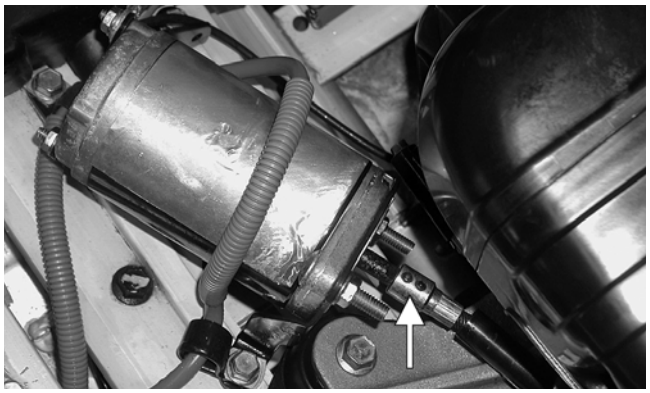
10. Disconnect the four-prong main wiring harness connector and the CDI unit wiring harness.

11. Disconnect the impulse hose from the crankcase.

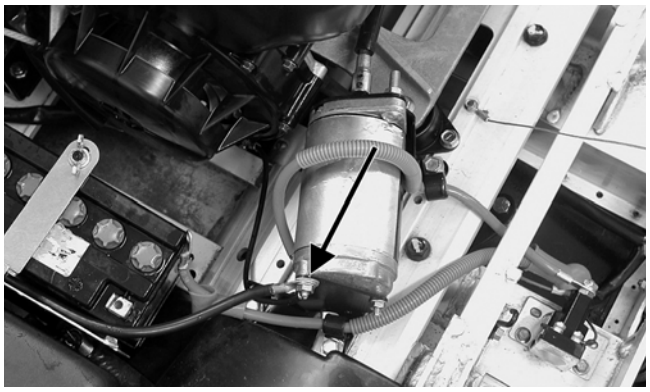
12. Disconnect the spark plug caps.

13. Loosen the carburetor flange clamp(s). Remove the carburetor(s) from the intake flange(s) and carburetor boot(s). Place the carburetor(s) to the side in an upright position.

■ **NOTE: If equipped with electric start, remove the lock nut and washer securing the ground cable to the starter motor and loosen the two Allen-head cap screws (A) securing the flex-drive to the starter motor; then remove the cap screws securing the starter motor to the chassis. Remove the starter motor.**

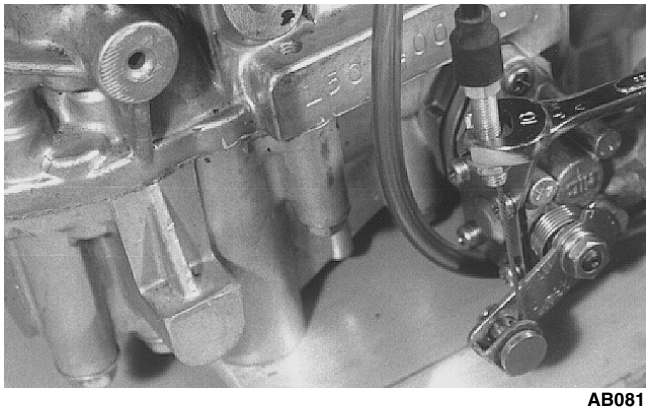


MS369A



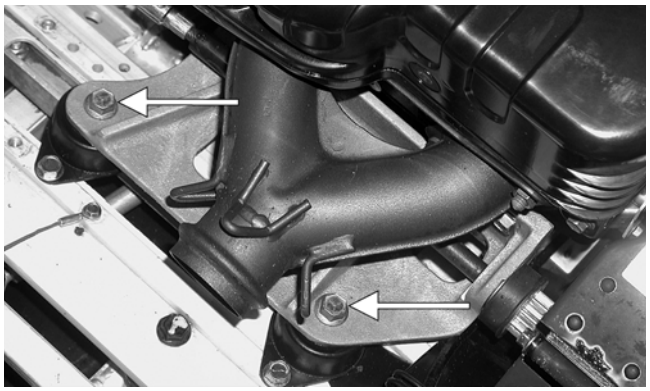
MS370A

14. Disconnect the oil-injection cable from the oil-injection pump. Account for the E-clip and washer; then disconnect the oil supply hose from the pump and plug the hose to prevent leakage.



AB081

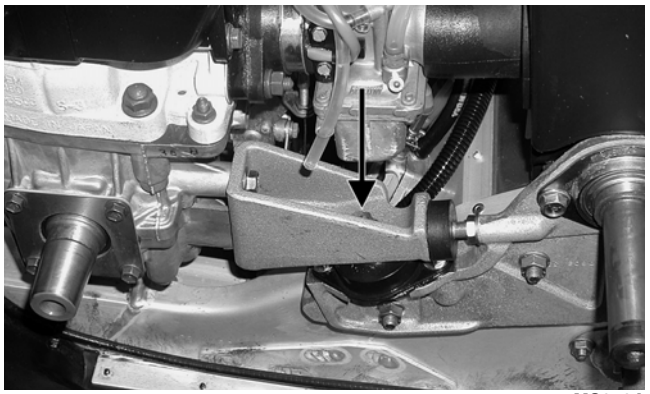
15. Remove the cap screws securing the engine to the chassis. Account for washers, cap screws, and lock nuts.



MS371A



MS372A



MS373A

16. Lift the engine out of the engine compartment.

17. Remove the cap screws, washers, and lock washers securing the engine mounting brackets to the engine; then remove the brackets.

Removing Engine
(900 cc Models)

■ **NOTE: If applicable, disconnect the battery cables.**

1. Remove all springs securing the expansion chamber(s) and remove the expansion chamber(s) from the engine compartment.

2. Open the belt guard; then remove the drive belt.

■ **NOTE: To remove the drive belt, see Section 8.**

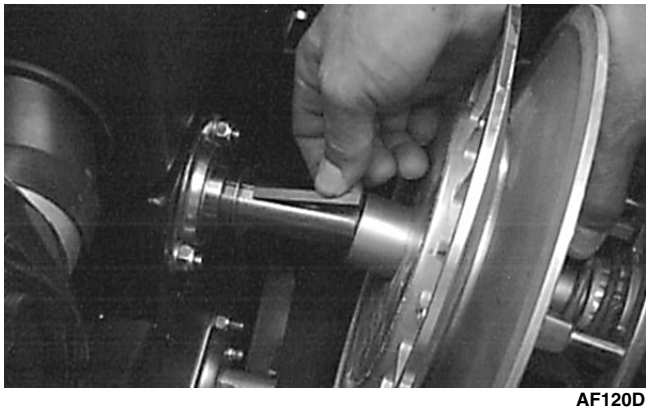
3. Remove the plug from the belly pan. Using a ½-in. 12-point socket, remove the cap screw and lock washer securing the drive clutch to the crankshaft.

4. Using Clutch Puller (p/n 0644-207) and an impact wrench or a breaker bar and Spanner Wrench (p/n 0644-136), tighten the puller. If the drive clutch will not release, sharply strike the head of the puller. Repeat this step until the clutch releases. Remove the drive clutch. If applicable, account for the two sleeves.



CM008

5. Remove the cap screw and washer securing the driven pulley; then slide the driven pulley off the driven shaft. Account for a key, stub shaft, and alignment washers.

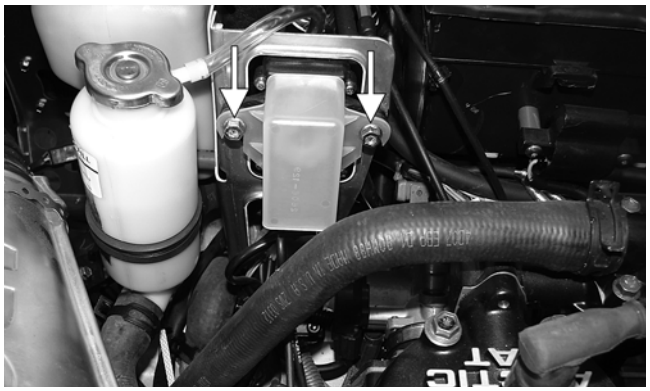


AF120D

■ **NOTE: If the driven pulley is tight on the driven shaft, pull the driven pulley off using the Driven Pulley Puller (p/n 0644-460).**

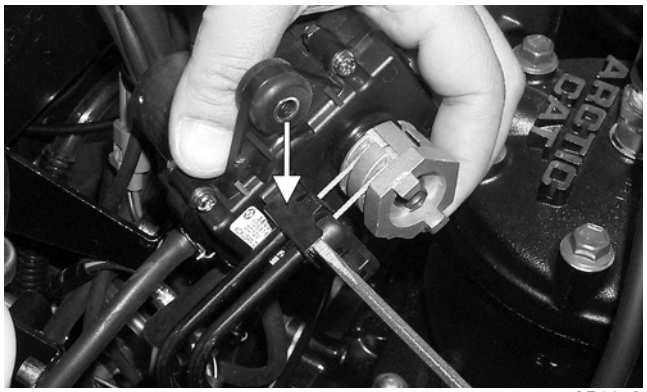
■ **NOTE: Remove the cap screw securing the driven pulley; then slide the driven pulley off the gear case input shaft. Account for alignment washers.**

6. Loosen the two cap screws securing the servomotor cover.



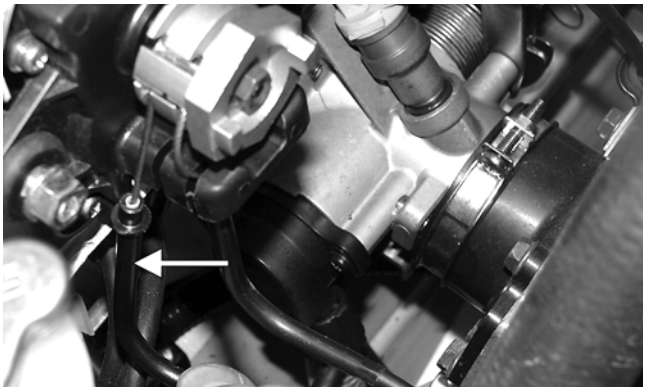
CM019A

7. Using a small screwdriver, pry off the cable retaining cover.



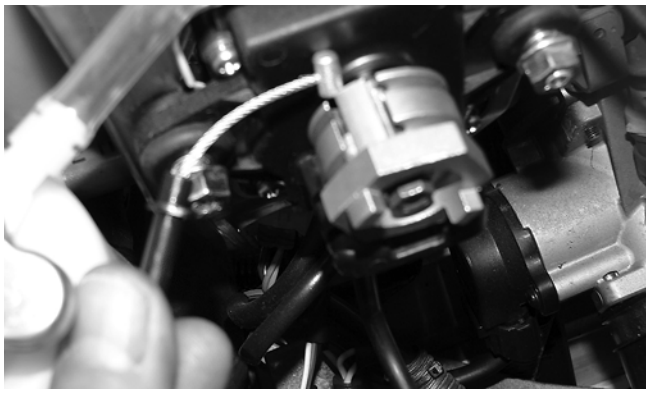
AP117A

8. Rotate the servomotor actuator counterclockwise to loosen the cable; then pull the cable housings out of the holder.



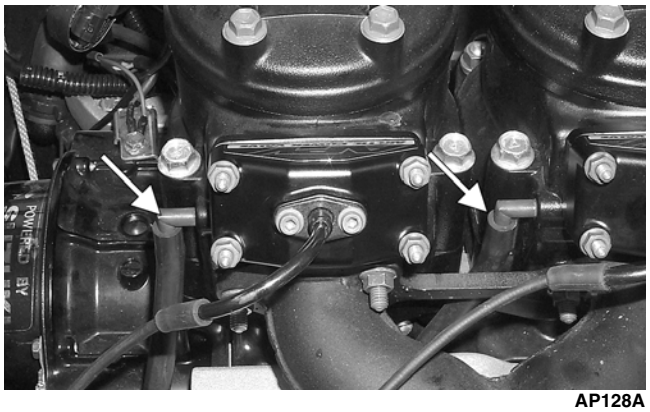
CM020A

9. Pull the cable up and out of the cable housing holder; then slide each cable drum to the left and out of the servomotor actuator.



CM021

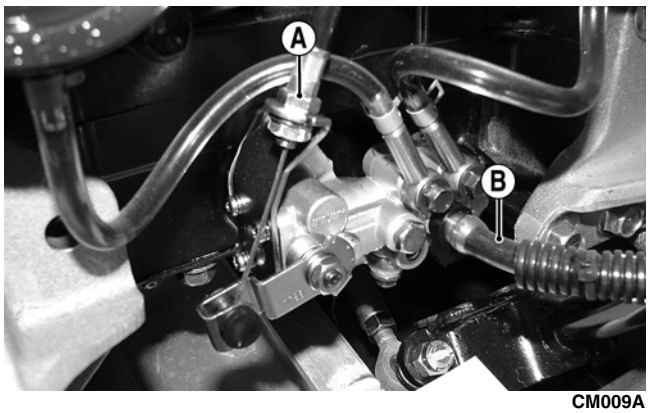
10. Remove the two APV drain hoses and route them out of the way.



AP128A

11. Disconnect the straps securing the air-intake silencer; then move the silencer forward and out of the engine compartment.

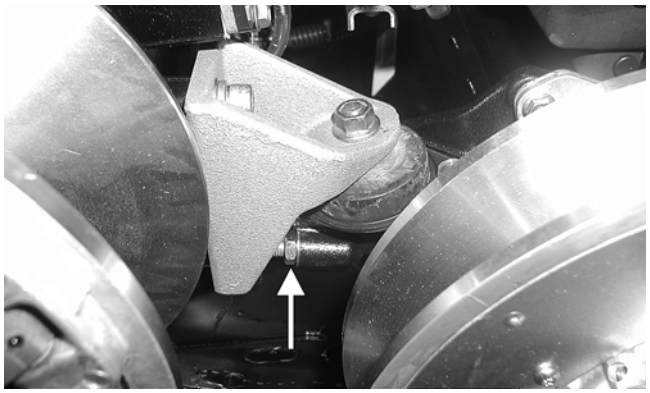
12. Disconnect the oil-injection cable (A) from the oil-injection pump; then disconnect the oil-supply hose (B) from the pump and plug the hose to prevent oil drainage.



CM009A

13. Loosen the flange clamps securing the throttle body to the flange; then remove the throttle body. Place to one side in an upright position.

14. Loosen the engine torque bumper and remove the left rear engine nut and washer.



FS110A

15. Secure the hood with a tie-down strap; then remove the hood cable.

16. Disconnect all electrical wires from the engine.

17. Remove the recoil starter from the engine. Leave it in the engine compartment.

■ **NOTE: If applicable, disconnect the solenoid-to-starter motor cable from the starter motor.**

18. Loosen the cap screws/lock nuts securing the engine mounting brackets to the front end.

19. Drain the engine coolant (see Liquid Cooling System - Section 3).

20. Loosen the clamp securing the supply hose to the coolant tank and remove the hose. Loosen the clamp securing the hose to the thermostat cap; then remove the hose from the cap.

■ **NOTE: Inspect the engine to ensure all wires, hoses, and cables have been removed.**

21. Lift the engine with mounting brackets out of the engine compartment.

22. Remove the cap screws securing the engine mounting brackets to the crankcase; then remove the brackets.

23. Remove the exhaust manifold from the engine. Account for nuts, washers, and gaskets.

24. Remove the clamp securing the coolant supply hose to the water pump. Then remove the hose from the pump.

Removing Engine
(500/600/700 cc Models)

■ **NOTE: In this sub-section unless otherwise noted, the Firecat r and Sabercat will be designated as "A Models," the Firecat (w/o Reverse) will be designated as "B Model," and the Crossfire and M-Series will be designated as "C Models."**

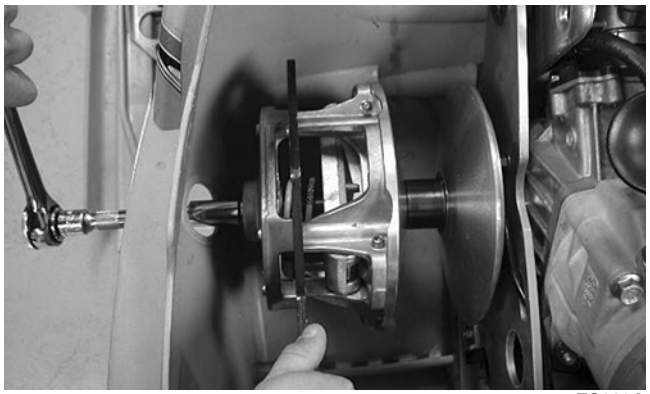
■ **NOTE: Prior to starting the removing procedure, disconnect the hood harness and the air intake connector from the air silencer; then remove the cables and pins securing the hood to the front end and remove the hood.**

1. Remove all springs securing the expansion chamber and resonator; then remove these components from the engine compartment.

2. On A and B Models, open the belt guard or on C Models, remove the belt guard; then remove the drive belt (see Section 8).

■ **NOTE: At this point, remove the access panel(s) from the left-side belly pan. On C Models, the right-side belly pan can also be removed.**

3. Using a ½-in. 12-point socket, remove the cap screw and lock washer securing the drive clutch to the crankshaft.

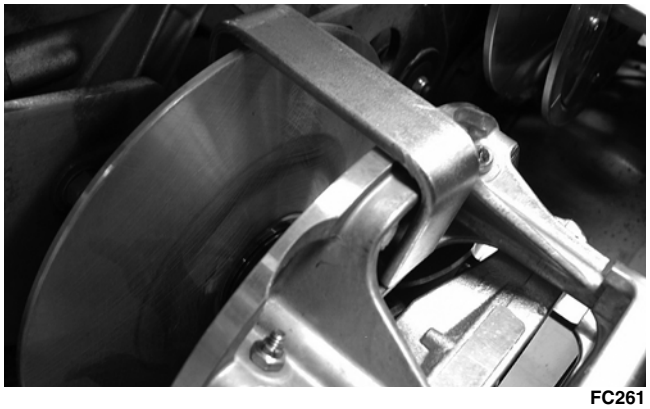


FC002A

4. Using Clutch Compressor (p/n 0644-420), lock the drive clutch in the compressed position with the locking clamp.



FC260



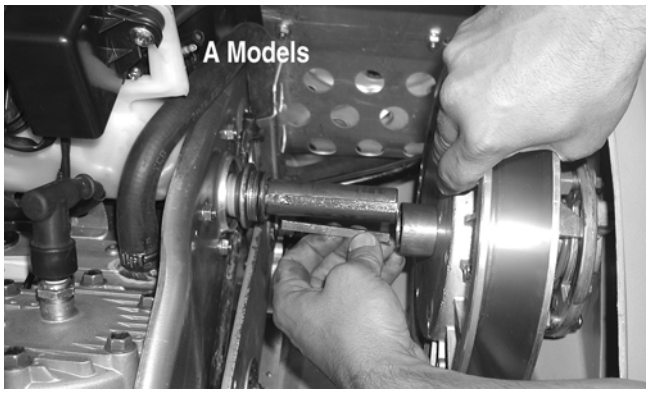
FC261

5. Using Clutch Puller (p/n 0644-207) and an impact wrench or a breaker bar and Spanner Wrench (p/n 0644-136), tighten the puller. If the drive clutch will not release, sharply strike the head of the puller. Repeat this step until the clutch releases. Remove the drive clutch. If applicable, account for the two sleeves.



FC002

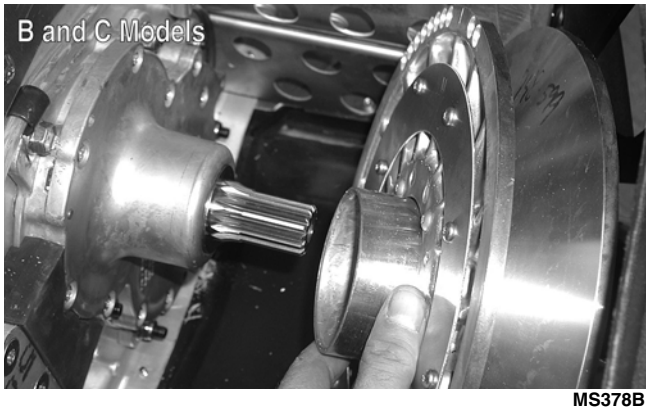
6. On the A Models, remove the cap screw and washer securing the driven pulley; then slide the driven pulley off the driven shaft. Account for a key, stub shaft, alignment washers, and an inner and outer O-ring.



FC003A

■ **NOTE: On the A Models if the driven pulley is tight on the driven shaft, pull the driven pulley off using the Driven Pulley Puller (p/n 0744-023).**

■ **NOTE: On the B Models, remove the access panel from the belly pan; then remove the cap screw from the driven pulley and slide the driven pulley off the gear case input shaft. Account for alignment washers.**



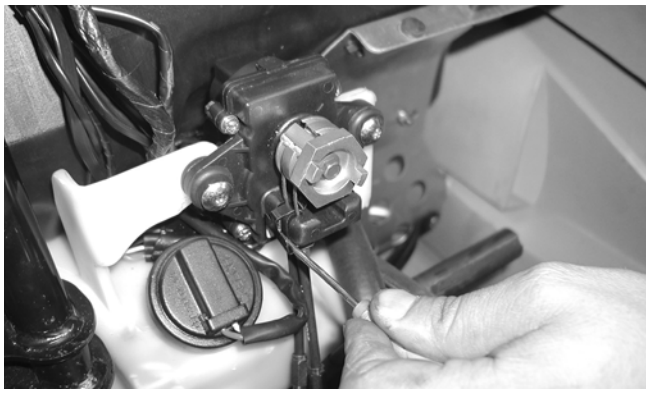
MS378B

■ **NOTE: If the driven pulley is tight on the driven shaft, pull the driven pulley off using the Driven Pulley Puller (p/n 0644-460).**

7. Loosen the two cap screws securing the servomotor and cover; then remove the cover. Using a small screwdriver, pry off the cable retaining cover.

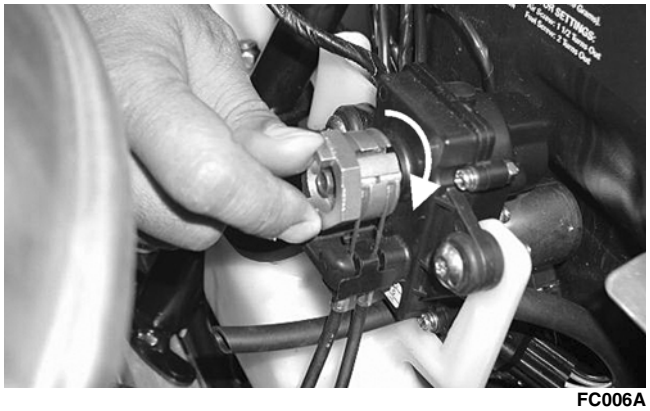


FS038A



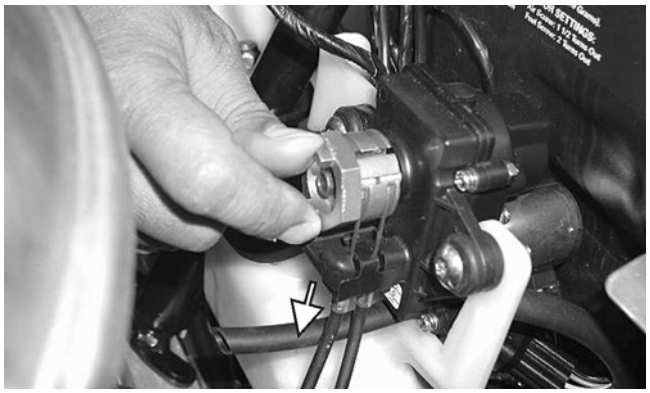
FC005

8. Rotate the servomotor actuator counterclockwise to loosen the cable; then pull the cable housings out of the holder.



FC006A

9. Pull the cable down and out of the cable housing holder; then slide each cable drum back and out of the servomotor actuator.



FC006B

10. Drain the engine coolant (see Liquid Cooling System - Section 3).

11. Disconnect the ignition harness from the ECU/CDI; then remove the torx-head screw securing the air silencer to the front end. Remove the silencer.



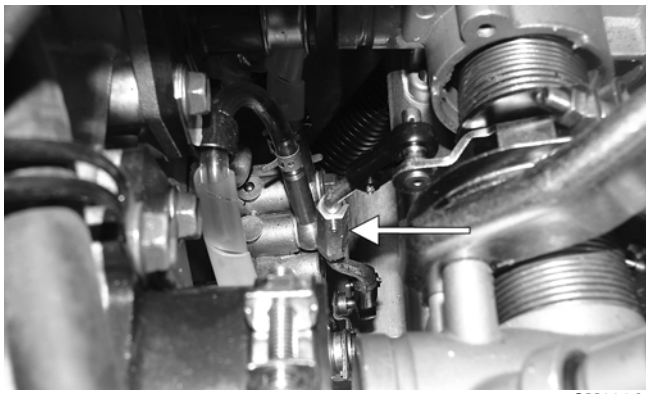
CM026A

12. Pull the air silencer boot forward enough to gain access to the throttle body/carburetor assembly.



CM027

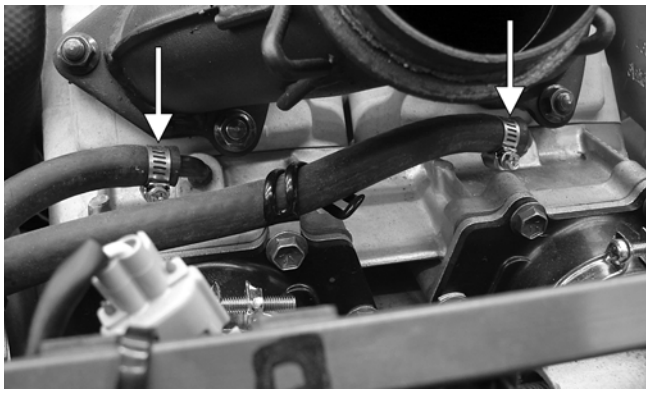
13. Loosen the flange clamps securing the throttle body/carburetor assembly to the flange; then move the throttle body/carburetor assembly forward to allow room to disconnect the oil injection cable/control rod from the oil-injection pump.



CM028A

14. On the carbureted models, disconnect the impulse hose from the crankcase.

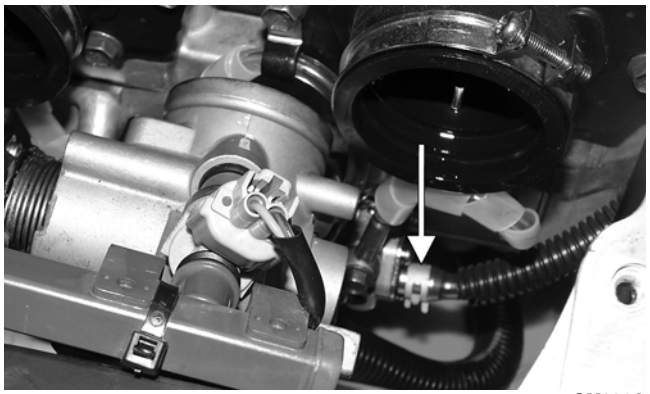
15. Loosen the clamps securing the coolant hoses connected to the cylinders beneath the exhaust ports; then remove the vent tube from the top of the cylinder head.



CM030A

16. Move the throttle body/carburetor assembly to one side out of the way to a secure position.

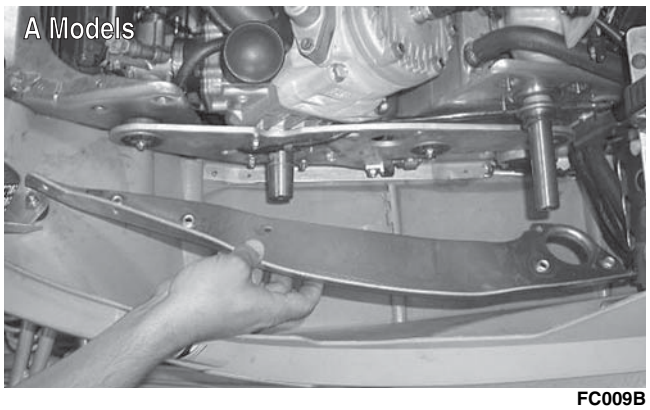
■ **NOTE: With the throttle body/carburetor assembly out of the way, disconnect the oil hose from the oil pump; then plug the oil hose.**



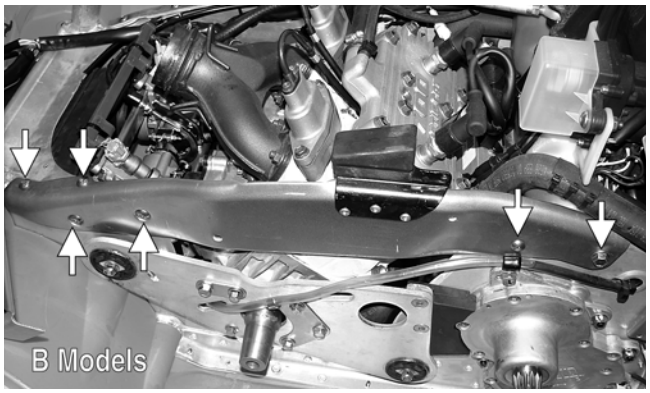
CM029A

17. Remove the recoil starter and ground wire from the engine. Leave it in the engine compartment.

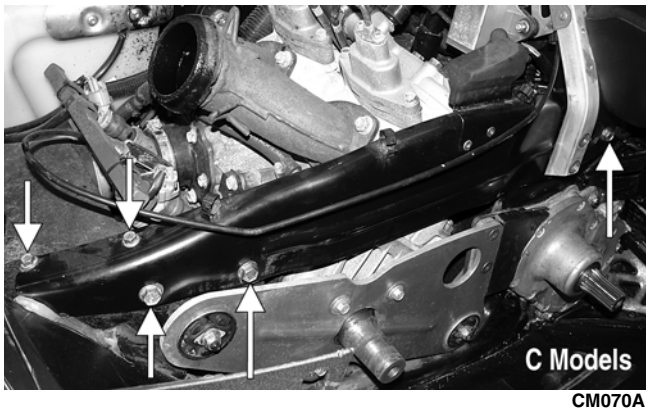
18. Remove the cap screws and lock nuts securing the side-plate brace to the chassis.



FC009B

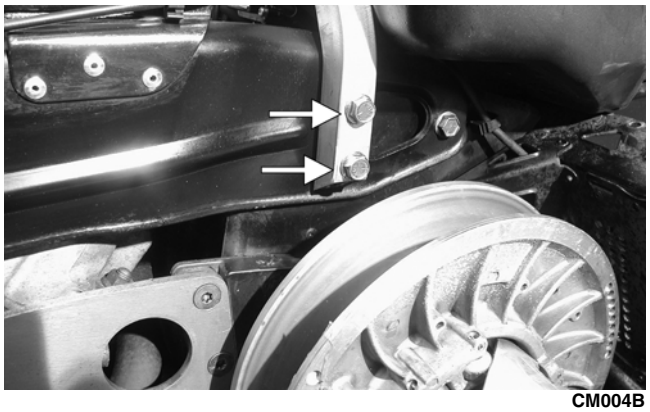


CM031A

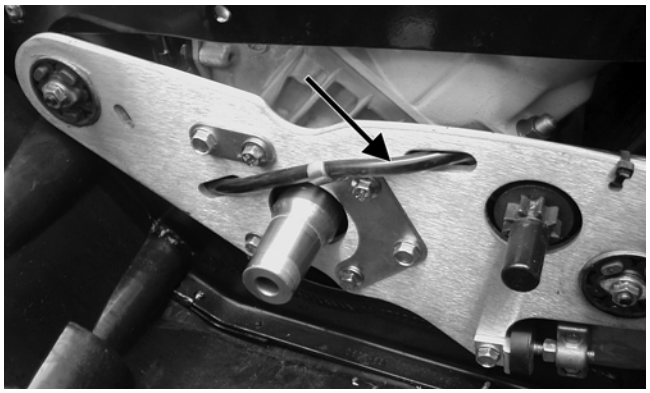


CM070A

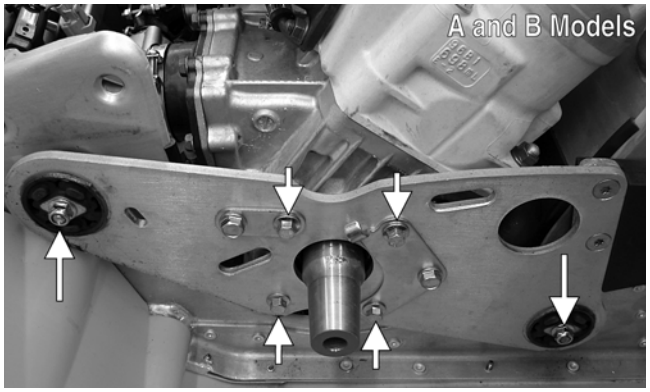
■ **NOTE: On the Crossfire/M-Series, the cap screws securing the steering support to the chassis must be removed to remove the side-plate brace.**


CM004B

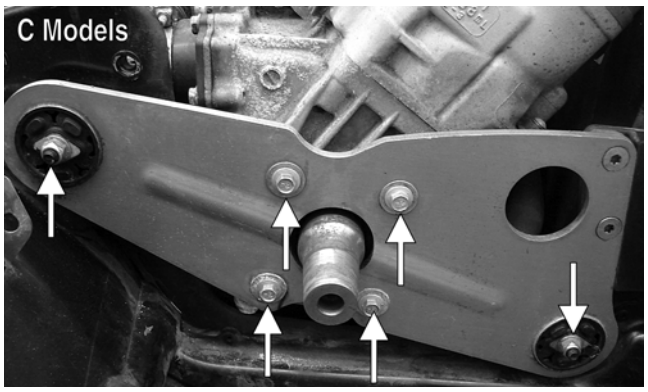
■ **NOTE: On the Firecat/Sabercat models after removing the side plate brace, remove the oil hose from the engine mounting bracket.**


MS387B

19. Remove the cap screws and lock nuts securing the left-side engine mounting bracket to the engine and chassis. Remove the bracket.

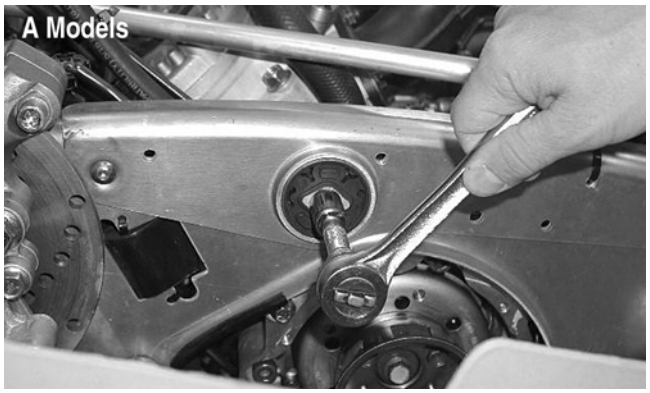


CM032A

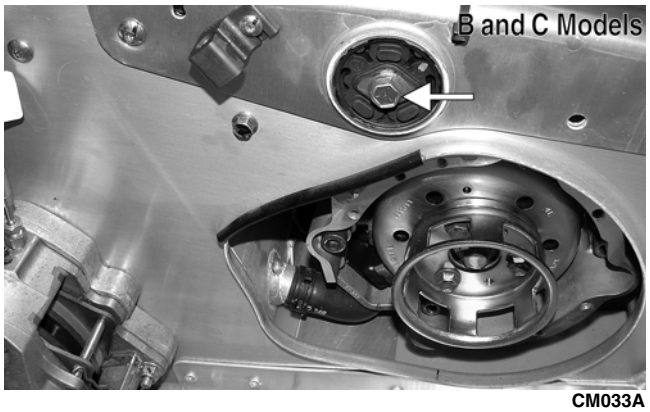


CM042A

20. Loosen the cap screw/lock nut securing the right-side engine mounting bracket to the front end.



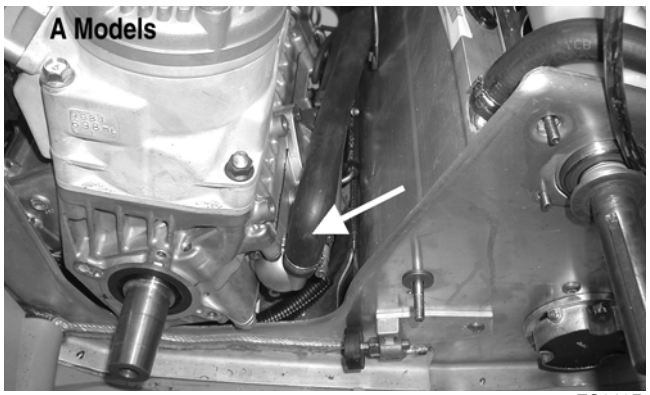
FC011B



CM033A

21. Disconnect all electrical wires from the engine.

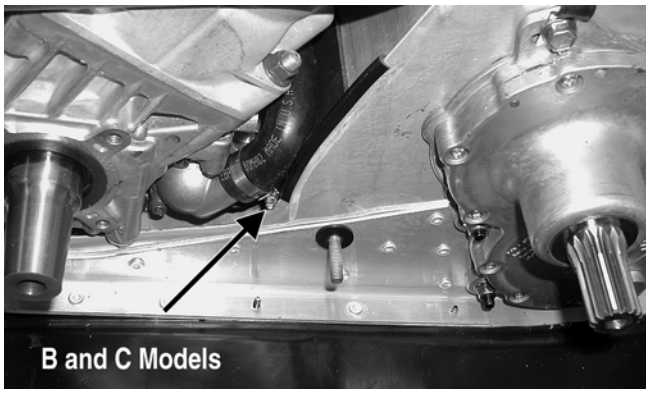
22. Disconnect the lower coolant hose; then move the engine toward the left and up to allow enough room to remove the remaining coolant hose.



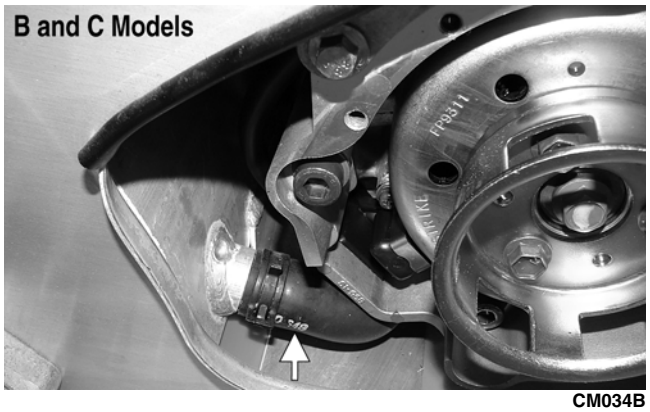
FC012B



FC047B



MS382C



CM034B

■ **NOTE: If equipped with electric start, loosen the two set screws securing the flex-drive shaft to the pinion drive.**

■ **NOTE: Inspect the engine to ensure all wires, hoses, and cables have been removed.**

23. Lift the engine out of the engine compartment.

24. Remove the exhaust manifold from the engine. Account for nuts, washers, and gaskets.

25. Remove the clamp securing the coolant supply hose from the cylinder head to the water pump. Then remove the hose from the engine.

Disassembling Engine Table of Contents

370/440 cc Models 2-30
570 cc Models 2-33
900 cc Models 2-39
500/600/700 cc Models 2-44

Disassembling Engine
(370/440 cc Models)

1. Remove the four nuts and lock washers securing the exhaust manifold; then remove the exhaust manifold. Account for two gaskets.

2. Noting the location of the longer cap screws for assembly purposes, remove the 14 cap screws, lock washers, and washers securing the top and exhaust-side cooling shrouds.

3. Lift the top cooling shroud off the engine and slide the exhaust-side cooling shroud off the exhaust-manifold studs. Account for two exhaust-manifold shroud gaskets.



AB014

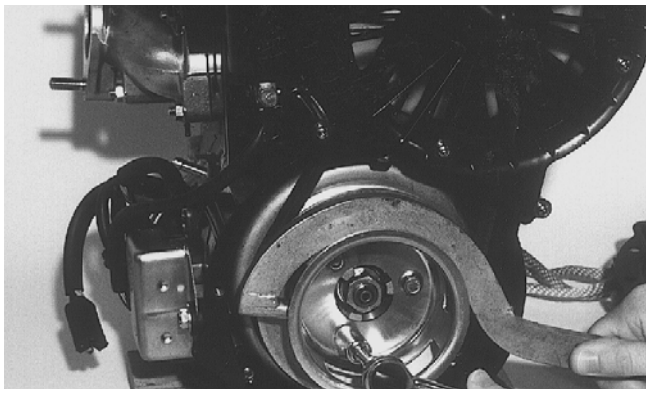
4. Disconnect the two oil-injection hoses from their fittings on the intake manifold (single carburetor) or on the adapter plates (twin carburetor).

5. A. On the 370 cc, remove the nuts securing the intake manifold; then remove the manifold with flange from the engine. Account for two insulators. Discard the gaskets.

   B. On the 440 cc, remove the nuts, lock washers, and washers securing the intake flanges; then remove the flanges from the engine. Remove the screws securing the adapter plates; then remove the adapter plates. Discard the gaskets.

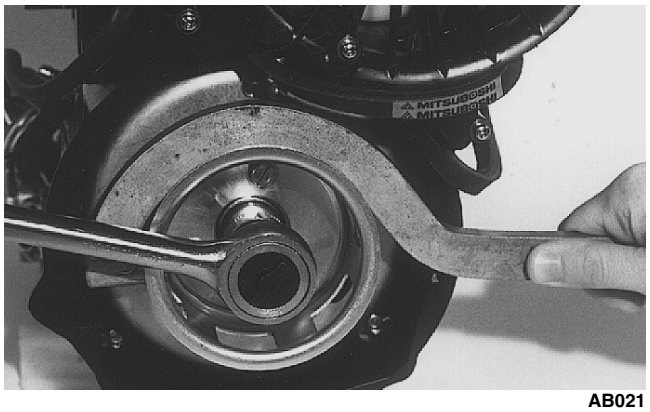
6. Remove the intake-manifold cooling shroud from the engine. Discard the two gaskets.

7. Using Flywheel Spanner Wrench (p/n 0144-007) to secure the crankshaft, remove the three cap screws and lock washers securing the starter pulley to the flywheel. Remove the starter pulley; then carefully pry the fan belt drive pulley from its seated position on the flywheel and remove.



AB020

8. Temporarily install the starter pulley on the flywheel with three cap screws. Using the flywheel spanner wrench to secure the crankshaft, loosen and remove the flywheel nut and washers.



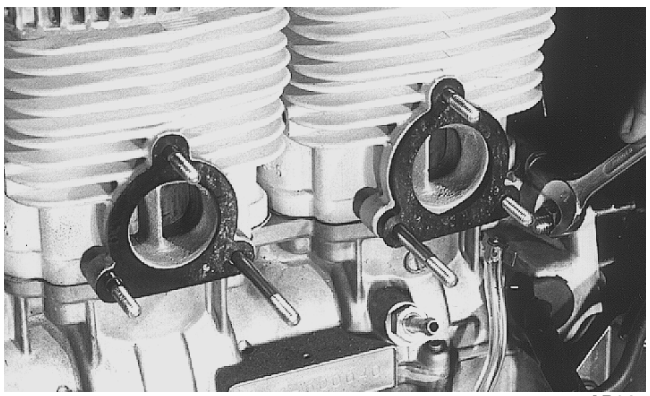
AB021

■ **NOTE: If an impact wrench is being used, use of a flywheel spanner wrench will not be necessary.**

9. Remove the cap screws securing the starter pulley to the flywheel and remove the pulley.

10. Remove the flange nuts securing the fan case to the crankcase; then remove the fan case.

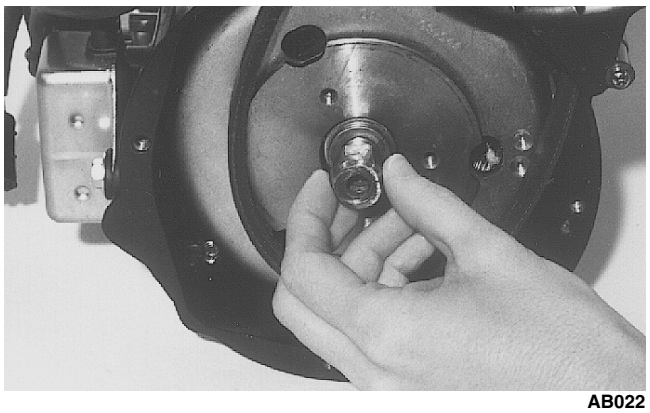
■ **NOTE: For further servicing of the axial fan components, see section 3.**



AB015

11. Install a protective cap onto the end of the crankshaft.

■ **NOTE: A suitable protective cap can be made by welding a 3 mm (1/8 in.) plate on one side of a spare flywheel nut.**



AB022

⚠ CAUTION

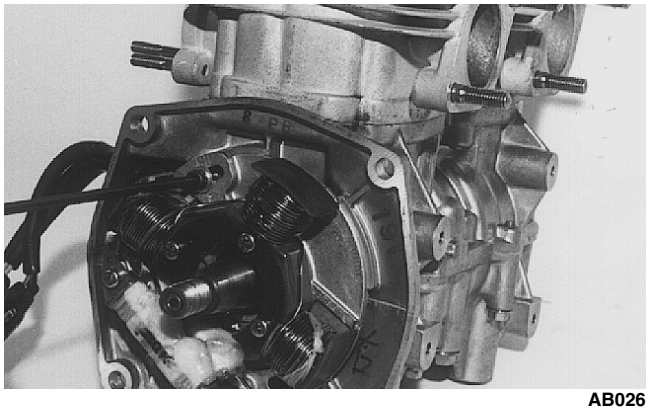
To prevent damage to the crankshaft, thread a protective cap onto the crankshaft. The puller must bottom on the cap and not on the crankshaft. Also, do not thread puller bolts more than 12.7 mm (1/2 in.) into the flywheel. Damage to the coils may result.

12. Using the Flywheel Puller (p/n 0744-040) or suitable equivalent, remove the flywheel from the crankshaft by tightening the puller bolt, striking the head of the puller bolt with a hammer, and tightening again. Repeat procedure until the flywheel is free. Account for the key in the end of the crankshaft.

■ **NOTE: To ensure the cleanliness of the flywheel magnets, place the flywheel (with the magnets facing upward) on a clean bench.**

13. Scribe a reference line on the stator plate and crankcase to aid in assembly; then remove the two Allen-head cap screws, lock washers, and washers securing the stator plate.

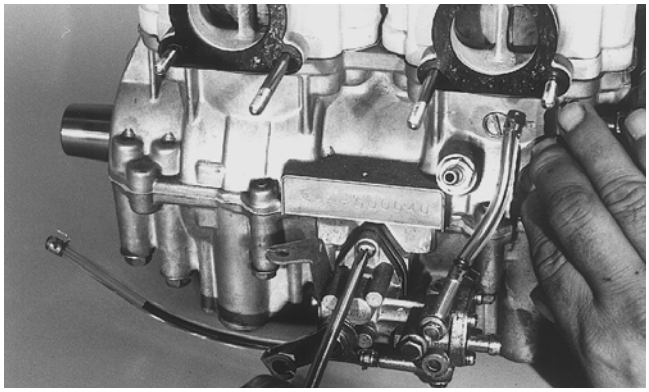
■ **NOTE: The two stator plate Allen-head cap screws had Loctite applied to the threads during assembly. Before removing them, apply a sharp blow to the head of each screw to break the Loctite loose. If this isn't done, the screws can be very difficult to remove.**



AB026

14. Remove the stator plate from the engine.

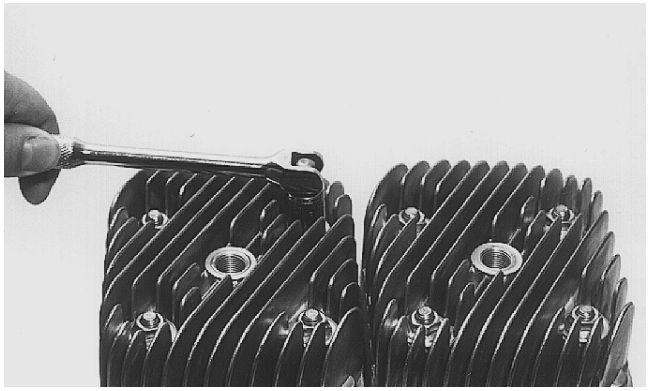
15. Remove the screws, lock washers, and washers securing the oil-injection pump to the crankcase; then remove the pump, retainer, shim, and gear. Account for two gaskets.



AB018

16. Remove the spark plugs.

17. Remove the eight nuts, lock washers, and washers securing the cylinder heads to the cylinders. Note the position of the different-sized nuts. Remove the heads and account for two gaskets and four dowel pins.



B563

18. Using a rubber hammer, gently tap the cylinders and remove from the crankcase by lifting them straight up off their studs. Discard the two gaskets. Account for two dowel pins.

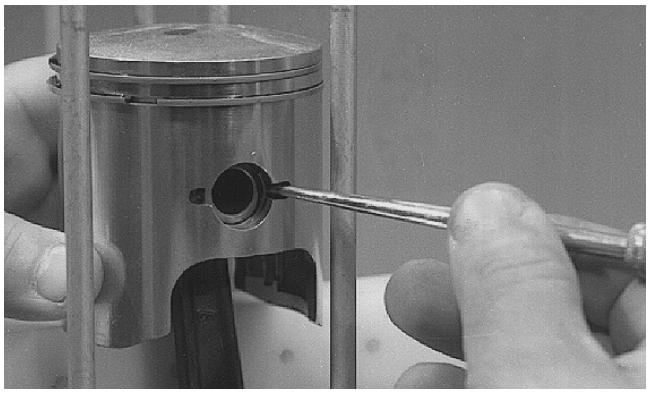
⚠ CAUTION

When removing a cylinder, make sure to support the pistons so they will not be damaged.

19. Using a felt-tipped marker, mark an M on the MAG-side head, cylinder, and piston and a P on the PTO-side head, cylinder, and piston.

■ NOTE: For proper assembly, keep all MAG-side components and all PTO-side components separated. Assemble them on their proper sides.

20. Remove the PTO-side piston-pin circlip from the PTO-side piston; remove the MAG-side piston-pin circlip from the MAG-side piston.



A829

21. Using the Piston-Pin Puller (p/n 0644-328), remove the piston pins from both pistons.



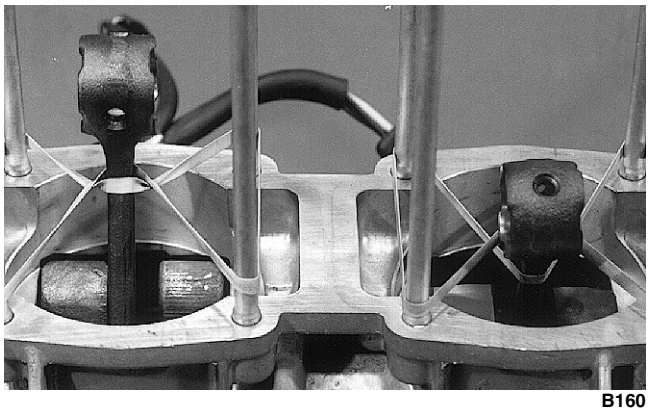
A830

⚠ CAUTION

DO NOT use any type of punch to drive the piston pin free of the piston; damage may result. Use a piston-pin puller only.

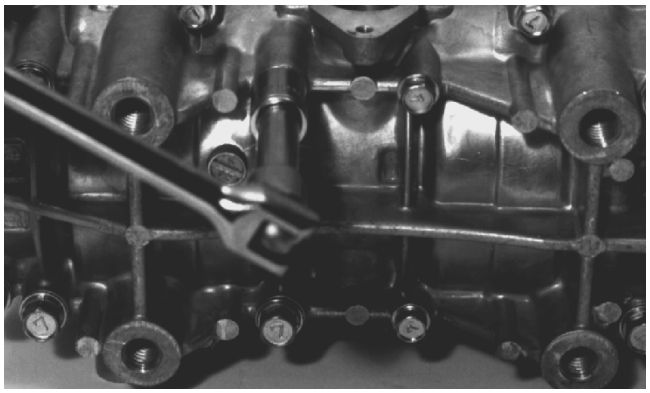
22. Lift the pistons clear of the connecting rods and remove the small end connecting-rod bearings; then remove the piston rings. Keep each piston with its rings, piston pin, and bearing together as a set.

■ NOTE: Place rubber bands over the connecting rods and around the cylinder studs. This will keep the connecting rods from damaging the crankcase.



B160

23. Remove the cap screws securing the crankcase halves. Note the position of the different-sized cap screws.



A831

24. Separate the crankcase halves by installing two crankcase cap screws in diagonal corners leaving the heads approximately 6 mm (1/4 in.) out. Using a plastic hammer, tap on each cap screw head until the halves separate. Remove the cap screws.

⚠ CAUTION

DO NOT drive any tool between the crankcase halves to separate the crankcase. Damage to the sealing surfaces will result.

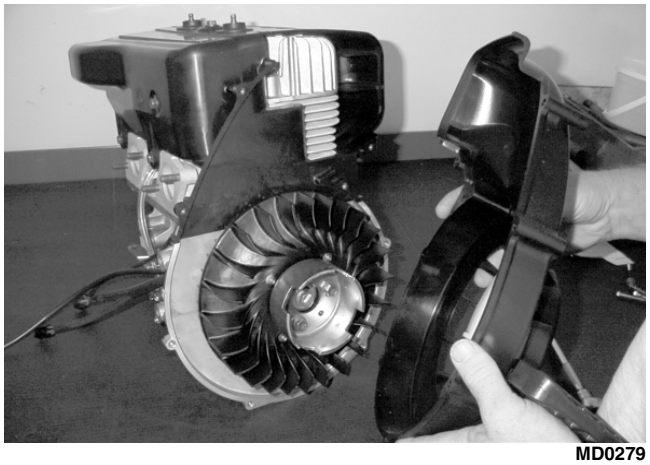
25. Remove the rubber bands holding the connecting rods; then separate the crankcase halves. Account for the two dowel pins. Lift the crankshaft free from the crankcase half and slide the two crankshaft seals off the crankshaft. Account for the C-ring and five bearing retaining pins.

Disassembling Engine
(570 cc Models)

1. Remove the exhaust manifold. Account for the gaskets.

2. Remove the nuts, lock washers, and washers securing the intake flange assembly. Account for the gaskets, insulators, and the heat deflector.

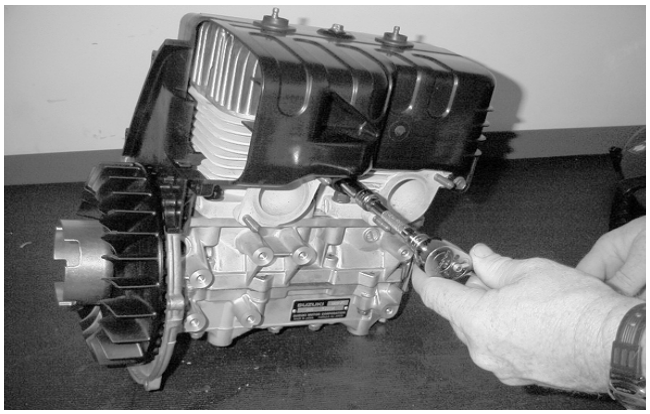
3. Remove eight cap screws securing the main fan shroud; then remove the shroud with the recoil starter assembly.



MD0279

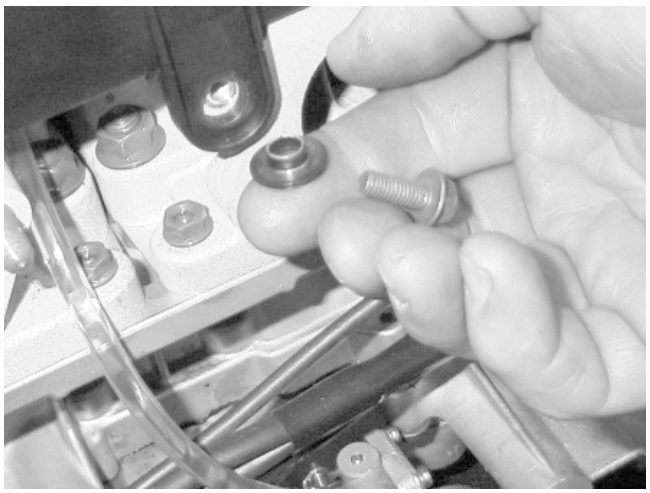
■ **NOTE: Cap screws securing the front and rear shrouds use special washers.**

4. Remove the five cap screws securing the front (exhaust-side) shroud to the cylinder head. Account for the special washers.



MD0276

■ **NOTE: Keep the special mounting hardware with the shrouds for assembling purposes.**



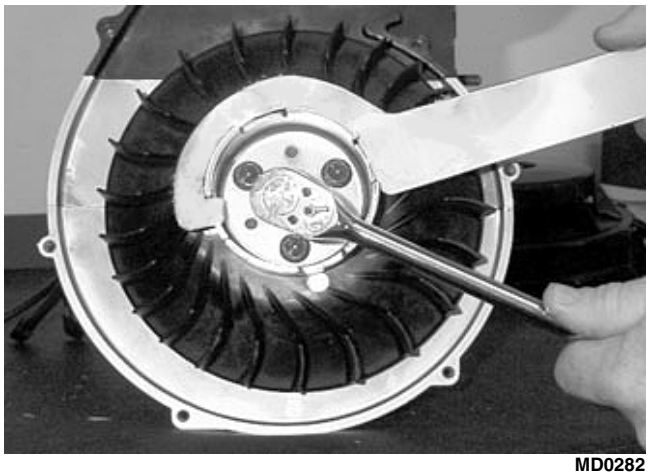
MD0065

5. Remove the spark plug grommets.



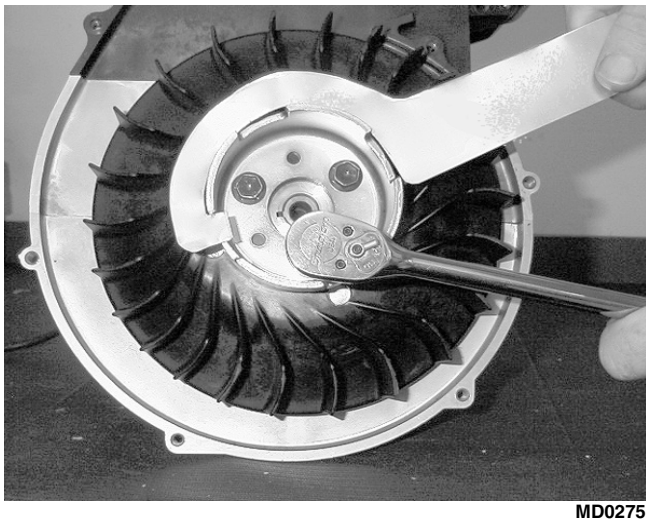
MD0060

6. Using Spanner Wrench (p/n 0144-007) to hold the starter pulley, remove the cap screw securing the flywheel to the crankshaft.



MD0282

7. Using Spanner Wrench (p/n 0144-007) to hold the starter pulley, remove the three cap screws securing the starter pulley and fan to the flywheel.



MD0275

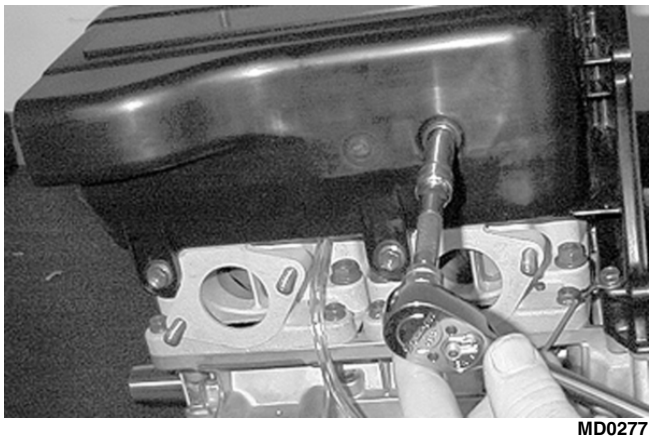
⚠ CAUTION

To prevent damage to the crankshaft, install a protective insert into the end of the crankshaft. The puller must bottom on the insert and not on the crankshaft. Also, do not thread puller bolts more than five threads into the flywheel. Damage to the stator coils may result.

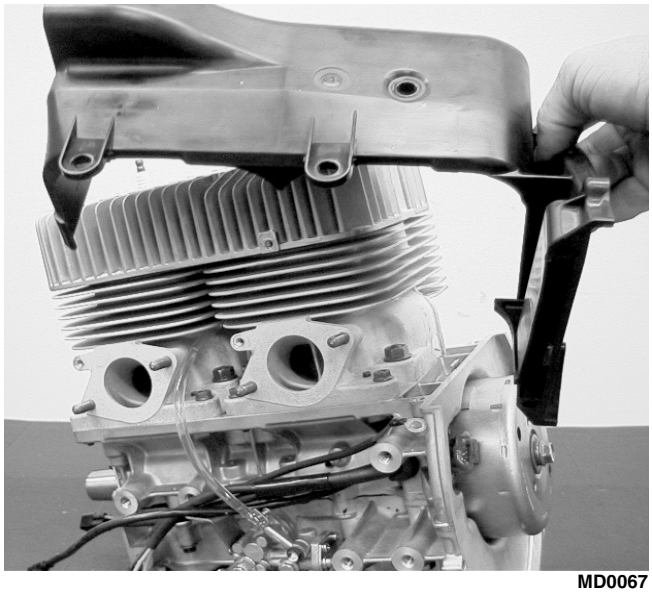
8. Using Flywheel Puller (p/n 0744-040) or suitable substitute, remove the flywheel.

■ NOTE: To ensure the cleanliness of the flywheel magnets, place the flywheel (with the magnets facing upward) on a clean bench.

9. Remove the six cap screws securing the rear (intake-side) shroud; then remove the shroud. Account for the special washers.



MD0277

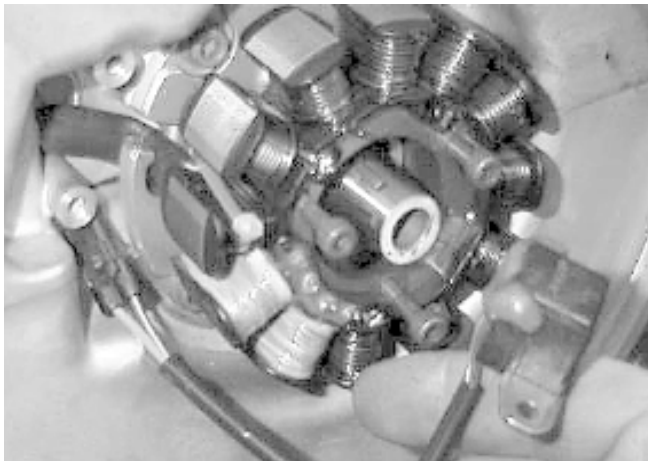


MD0067

10. Remove the rubber insulator grommet from the crankcase; then remove two Phillips-head cap screws securing the ignition timing sensor and pull the wires through the hole in the crankcase.

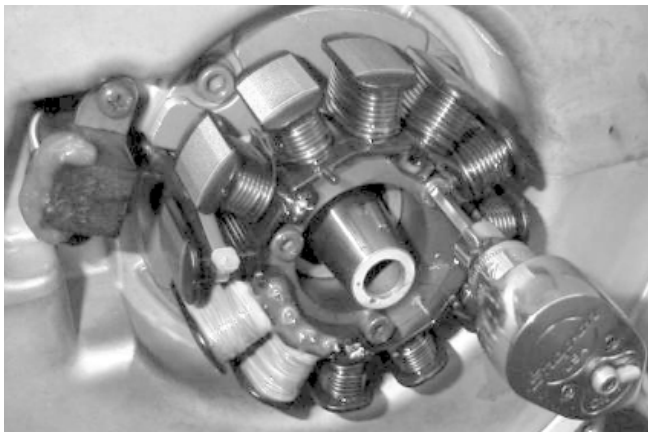


MD0075



MD0074

11. Remove the three Allen-head cap screws securing the stator and remove it along with the stator wiring.



MD0072



MD0076

12. Remove the four Allen-head cap screws securing the stator plate. Remove the stator plate.



MD0255



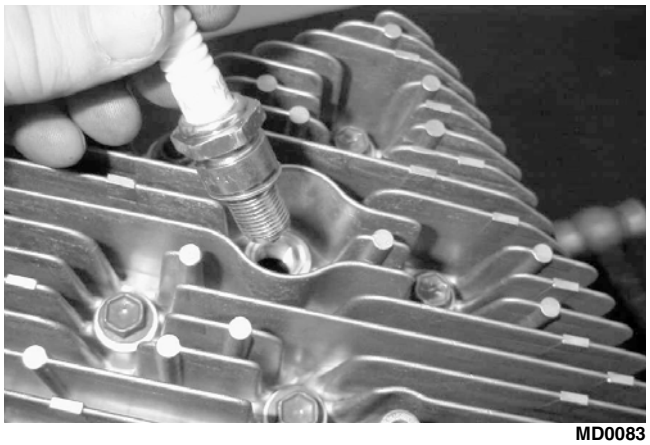
MD0078

13. Remove the four cap screws securing the seal retainer plate on the PTO-side; then remove the plate.



MD0081

14. Remove the spark plugs.



MD0083

15. Remove the eight cap screws, two nuts, and two washers securing the cylinder head to the cylinders; then remove the cylinder head. Discard the cylinder head gasket.



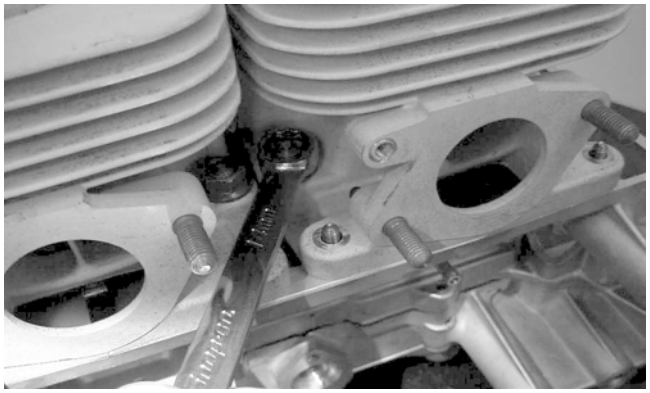
MD0289

16. Remove the four 6 mm nuts and eight 10 mm nuts securing the cylinders to the crankcase.

■ **NOTE: Using a felt-tip marker, mark the cylinders as to MAG-side and PTO-side for assembling. Also, mark the pistons at this time.**



MD0087

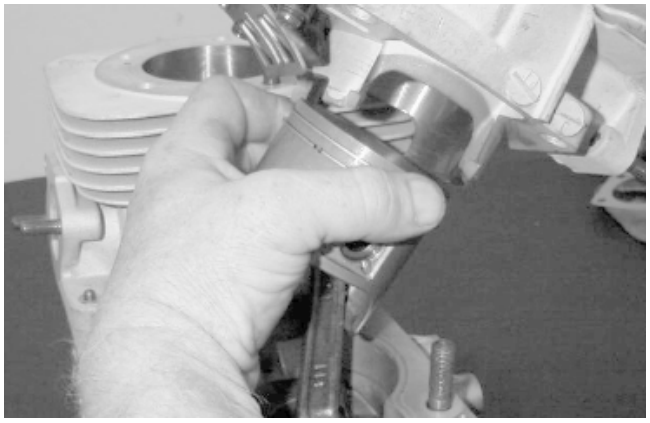


MD0086

17. Remove the cylinders making sure to support the pistons so they are not damaged. Account for four dowel pins.

⚠ CAUTION

When removing a cylinder, make sure to support the piston so it will not be damaged.



MD0230



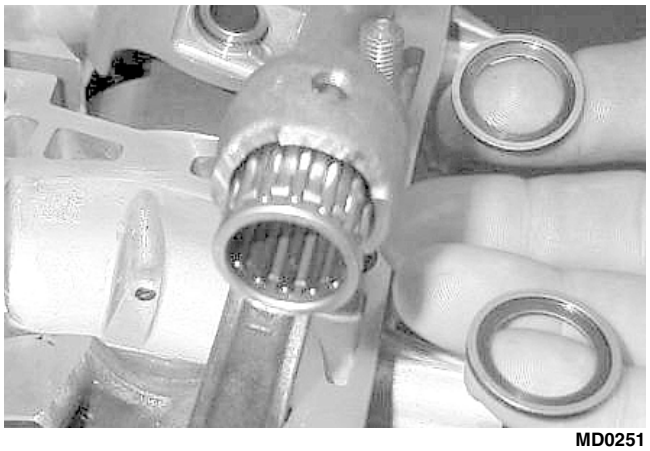
MD0096

18. Using an awl, remove the outside piston-pin circlip and remove the piston pin using Piston Pin Puller (p/n 0644-328) taking care not to drop the piston-pin bearing washers into the crankcase.



MD0094

■ **NOTE: The open sides of the piston pin bearing washers face inward.**

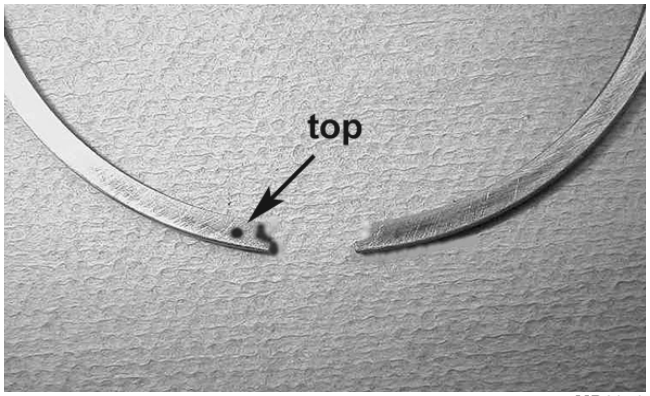


MD0251

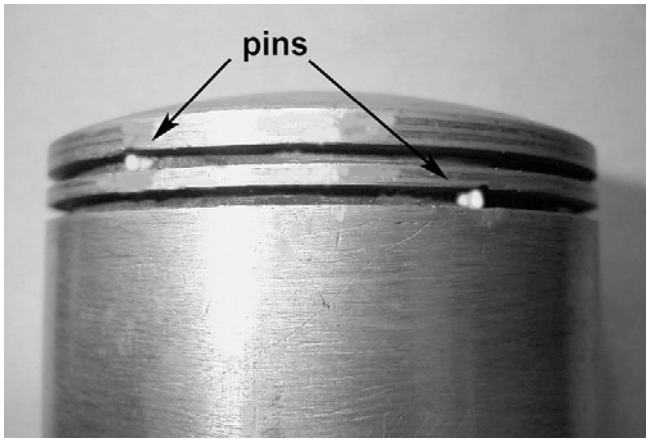


MD0208

■ **NOTE: If the existing rings will not be replaced with new rings, note the location and top side of each ring for proper installation. When replacing with new rings, replace as a complete set only. When replacing rings note notches in ring ends which correspond with locating pins in ring grooves on intake side of the piston. This prevents the rings from turning on the piston when assembled.**

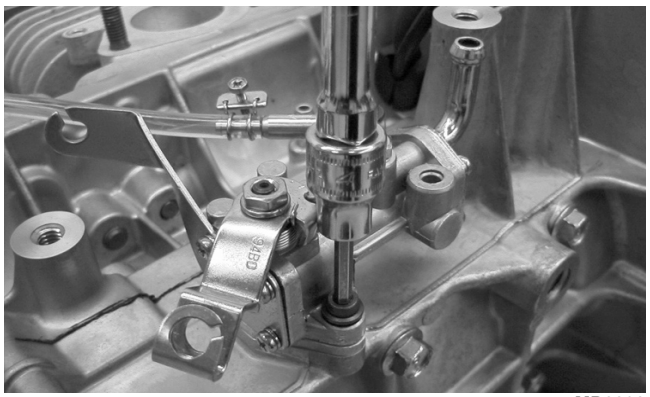


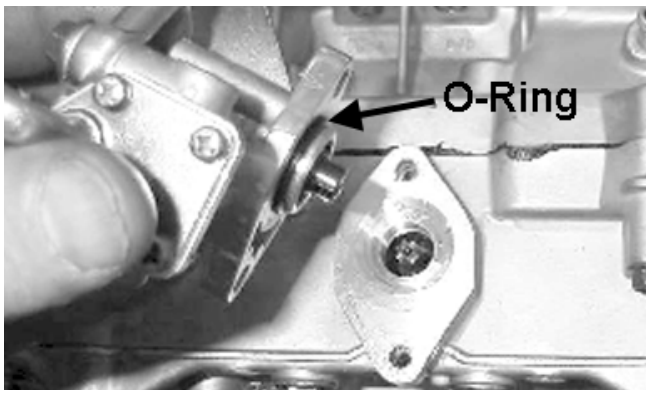
MD0272



MD0271

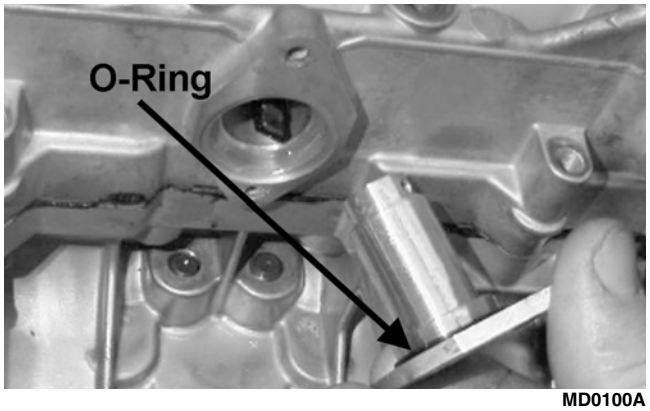
19. Remove the two Allen-head cap screws securing the oil-injection pump; then remove the pump. Account for an O-ring.


MD0090



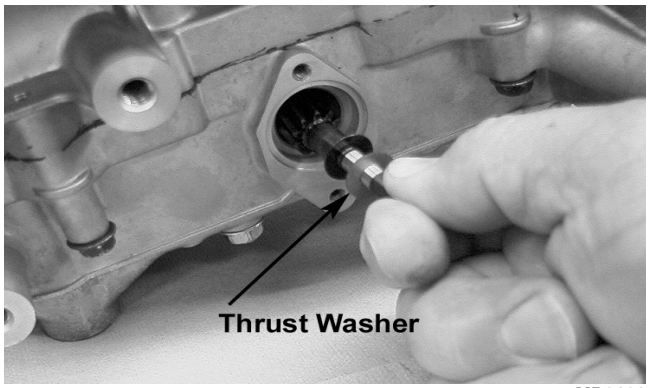
MD0092A

20. Remove the oil-injection pump driveshaft retainer. Account for an O-ring.



MD0100A

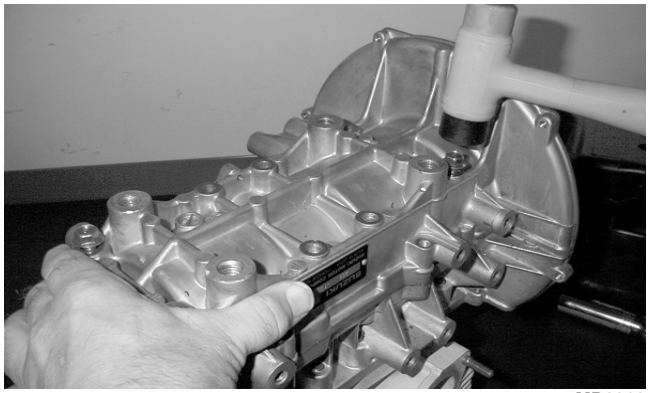
21. Remove the oil-injection pump driveshaft. Account for a thrust washer.



MD0101

22. Place the crankcase (with its bottom side up) on two blocks of wood. Remove the 12 cap screws securing the crankcase halves. Note the position of the different-sized cap screws.

23. Separate the crankcase halves by installing two of the cap screws in opposite corners leaving the heads approximately 6 mm (1/4 in.) out. Using a plastic mallet, tap on each cap screw until the crankcase halves separate. Account for four dowel pins.


MD0283

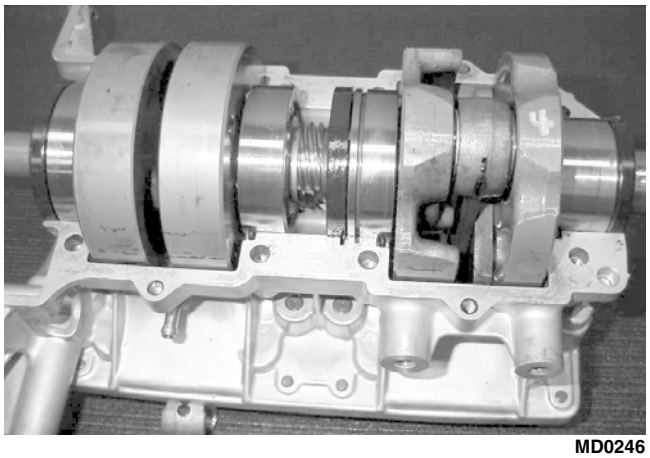


MD0204

24. Remove the two cap screws; then remove the crankshaft assembly from the upper crankcase half making sure to hold both ends of the crankshaft to keep the bearings and seals from falling off. Account for bearings and a C-ring.

⚠ CAUTION

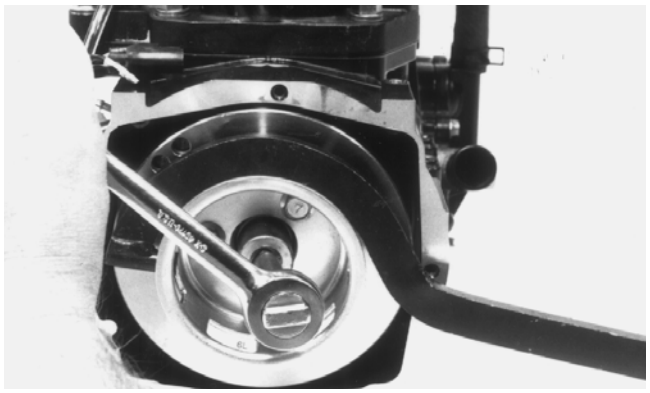
To prevent damage to the crankshaft, crankshaft bearings, or seals, be sure to always lift the crankshaft from both ends.



MD0246

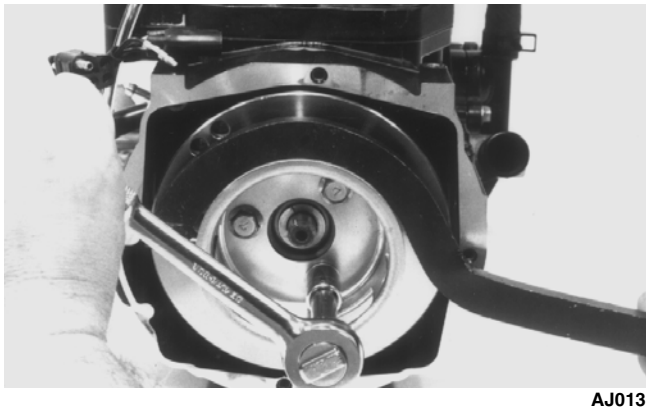
Disassembling Engine
(900 cc Models)

1. Using a spanner wrench to secure the flywheel, remove the flywheel cap screw, lock washer, and flat washer.



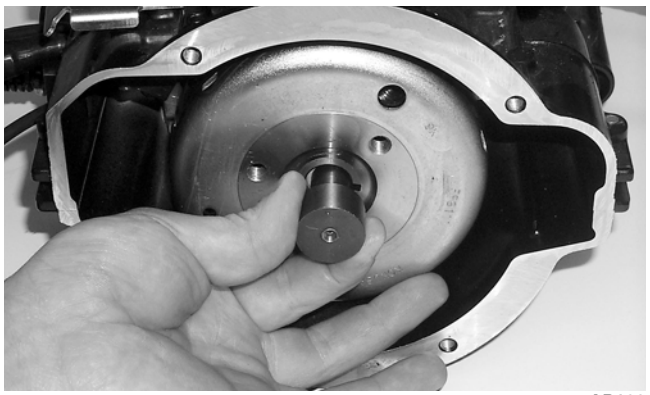
AJ012

2. Using a spanner wrench to secure the crankshaft, remove the three cap screws from the starter pulley. Remove the starter pulley.



AJ013

3. Install the Flywheel Puller Insert (p/n 0644-179) into the end of the crankshaft.

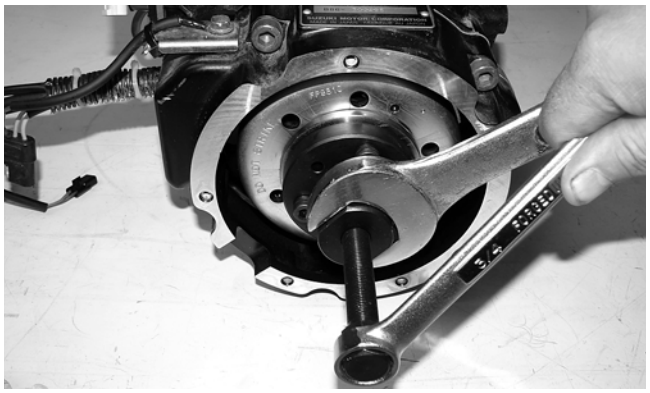


AP130

⚠ CAUTION

To prevent damage to the crankshaft, place a puller insert into the crankshaft. Do not thread puller bolts more then 12.7 mm (1/2 in.) into the flywheel. Damage to the coils may result.

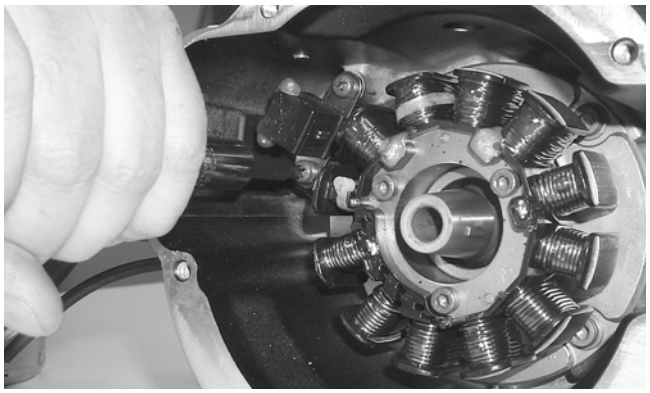
4. Using Flywheel Puller (p/n 0744-040), remove the flywheel from the crankshaft by tightening the puller bolt, striking the head of the puller bolt with a brass hammer, and tightening again. Repeat procedure until the flywheel is free. Account for the key in the crankshaft keyway.



CM010

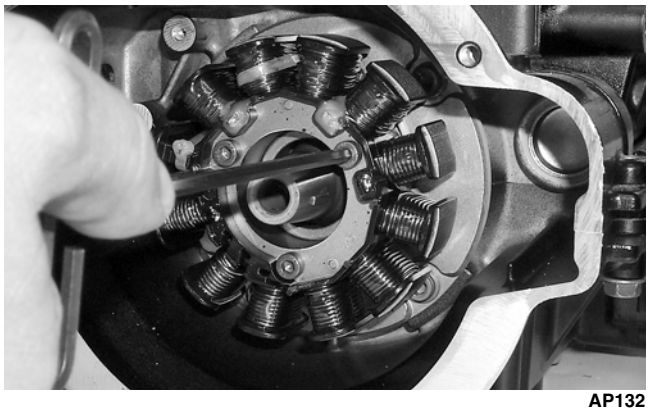
■ **NOTE: To ensure the cleanliness of the flywheel magnets, place the flywheel (with the magnets facing upward) on a clean bench.**

5. Remove the two screws securing the timing sensor; then loosen the screws securing the wiring harness retainer tab. Remove the timing sensor from the crankcase.



AP131

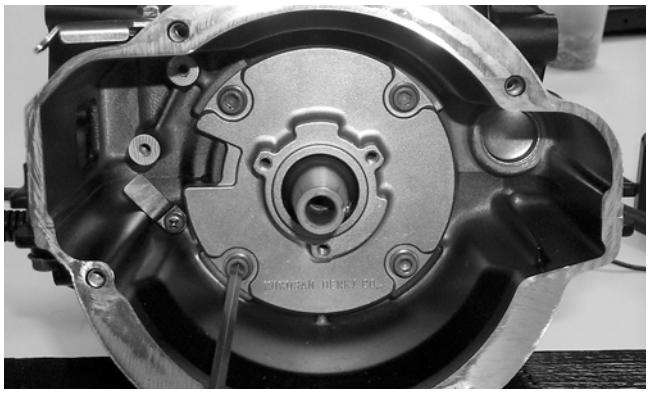
6. Remove the cap screws securing the stator.



AP132

7. Remove the rubber grommet from the stator wiring harness. Slide the stator free of the crankshaft and remove.

8. Remove the cap screws securing the stator backing plate. Remove the plate from the crankcase.



AP133

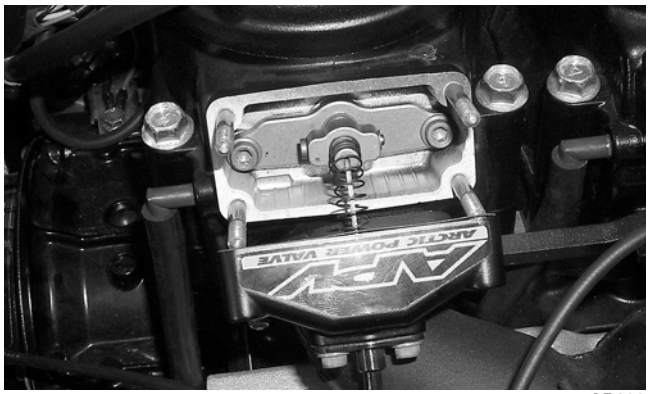
9. Remove the nuts securing the APV covers to the cylinders; then slide the covers back to expose the valves.



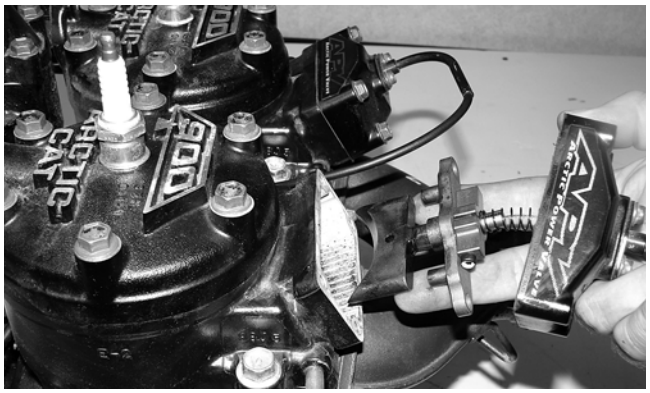
AP134

10. Remove the cap screws securing the valves to the cylinders; then remove the APV assemblies and set them aside.

■ **NOTE: The following two photographs are for clarity purposes only. These models may vary slightly.**



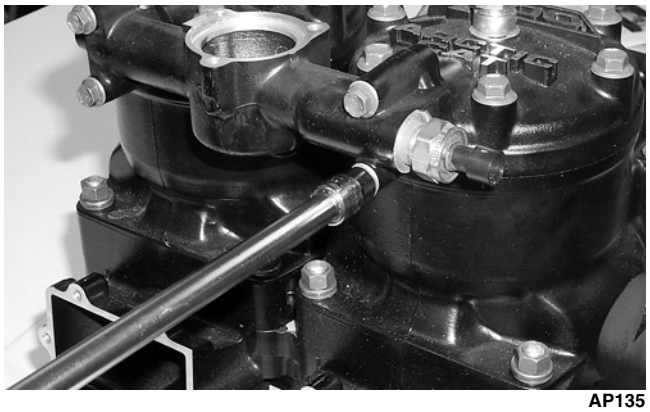
AP120



CM011

11. Remove the three cap screws securing the thermostat cap; then remove cap, rubber gasket, and thermostat.

12. Remove the cap screws securing the thermostat manifold to the cylinder heads. Remove the manifold and discard the gaskets.



AP135

13. Remove the spark plugs.

14. Remove the cap screws and O-rings securing each head; then separate each head from each cylinder. Account for two O-rings beneath each head.

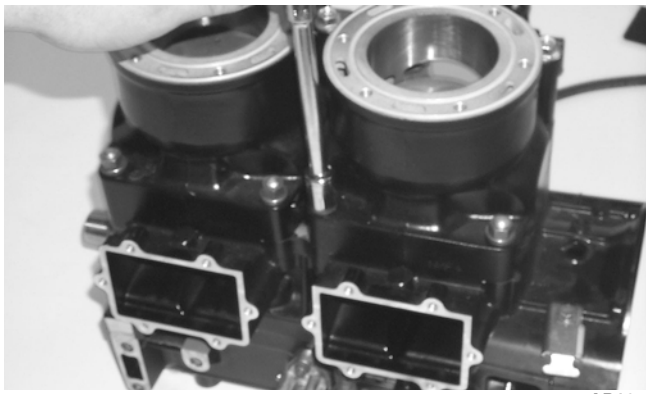
■ **NOTE: Mark each cylinder head, cylinder, and piston and keep together as an assembly. Mark the MAG cylinder components #1 and the PTO cylinder components #2.**



CM012

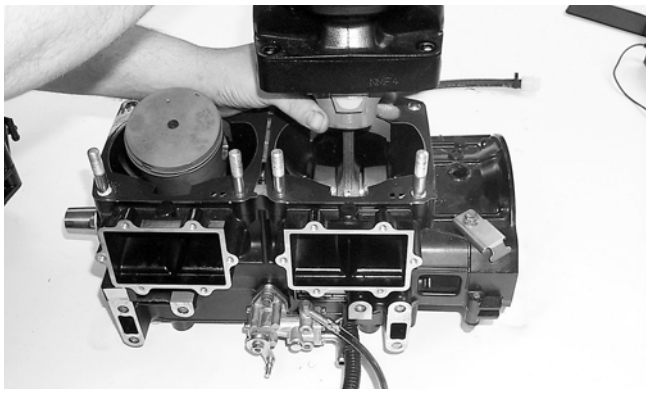
■ **NOTE: If servicing the intake flanges, remove them at this time.**

15. Remove the four cylinder base nuts and four flange cap screws securing the cylinders to the crankcase. Account for four flat washers and lock washers. Using a rubber hammer, gently tap on the side of each cylinder to free it from the crankcase.



AP137

16. Slowly lift each cylinder straight up and free of the studs. Grasp the connecting rod and piston as the cylinder clears the piston to prevent the rod from dropping against the crankcase. Remove and save the cylinder base gaskets.



AP138

17. Remove the PTO-side piston-pin circlip from the PTO-side piston; remove the MAG-side piston-pin circlip from the MAG-side piston.



AP140

18. Using the Piston Pin Puller (p/n 0644-328), remove the piston pins from both pistons.



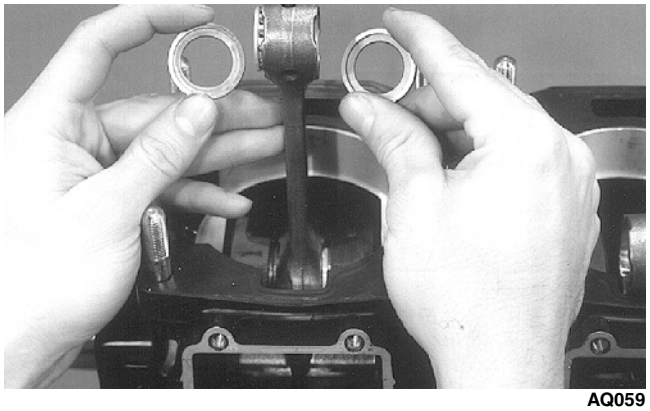
AP141

■ **NOTE: For proper assembly, keep all MAG-side components and all PTO-side components separated. Assemble them on their proper sides.**

⚠ CAUTION

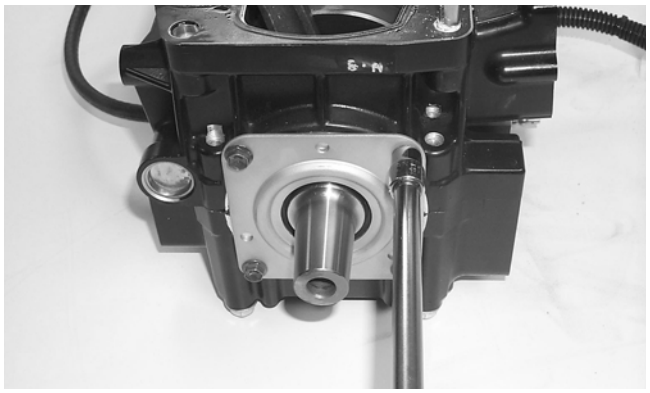
DO NOT use any type of punch to drive the pin free of the piston; damage may result. Use a piston-pin puller only.

19. Lift the pistons clear of the connecting rods and account for two washers. Remove the small-end connecting-rod bearings; then remove the piston rings. Keep each piston with its rings; keep each piston, pin, and bearing together as a set.



AQ059

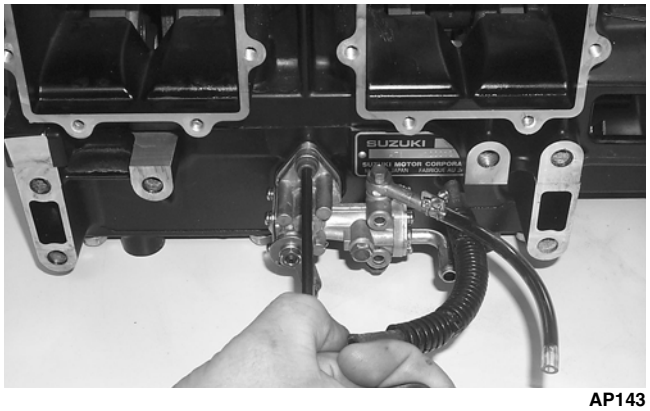
20. Remove the four cap screws securing the PTO-end plate to the crankcase; then remove the plate.



AP142

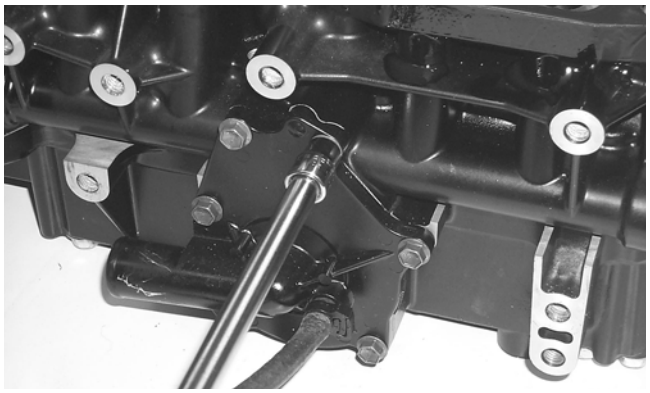
21. Remove the intake manifold and reed block assemblies.

22. Remove either lower union bolt securing the lower check valve assembly; then remove the two cap screws securing the oil-injection pump to the crankcase. Remove the pump, retainer, and two O-rings.



AP143

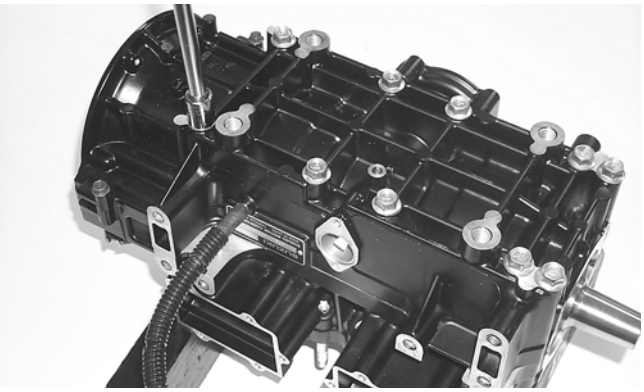
23. Remove the six cap screws securing the water pump cover to the crankcase. Remove the cover and O-ring seal. Account for two dowel pins.



AP145

■ **NOTE: Do not remove the water pump impeller or the impeller shaft unless necessary. Only remove impeller and shaft if there are signs of coolant leakage from the small hole located in the bottom of the crankcase directly behind the water pump housing.**

24. Lay the engine on its side and remove the cap screws securing the crankcase halves. Note the position of the different-sizes cap screws for assembling.



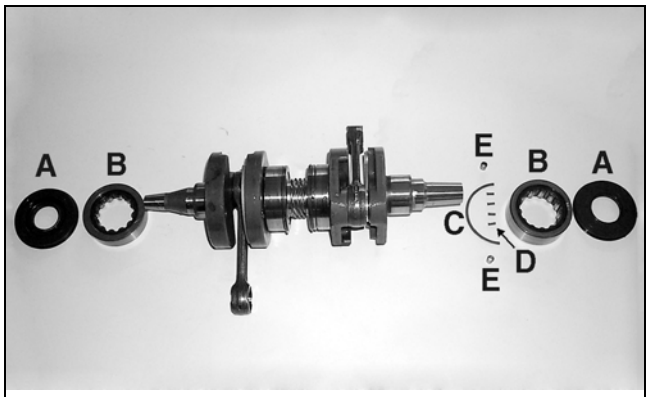
AP146

25. Separate the crankcase halves by installing two crankcase cap screws in opposite corners leaving the heads approximately 6 mm (1/4 in.) out. Using a plastic tipped hammer, tap on each cap screw head until the case halves separate; then remove the two cap screws. Lift the top half of the crankcase off the bottom half. Grasp the connecting rods as the top half of the crankcase is removed. Do not allow them to drop onto the sealing surface of the bottom case half.

⚠ CAUTION

DO NOT drive any tool between halves to separate the crankcase. Damage to the sealing surfaces will result.

26. Lift the crankshaft free from the crankcase half and slide the crankshaft oil seals off the ends of the crankshaft. Account for the C-ring. Slide the bearings off the crankshaft. Remove and account for the four bearing retaining pins and the two crankcase dowel pins from the crankcase.



KEY

- **A. Oil Seal**
- **B. Bearing**
- **C. C-Ring**
- **D. Bearing Retaining Pin**
- **E. Dowel Pins**

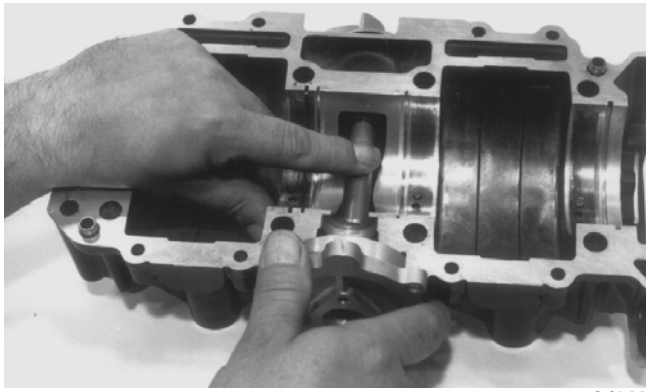
AP148A

⚠ CAUTION

DO NOT remove the water pump impeller or shaft unless necessary. The shaft and impeller should only be removed from the lower crankcase half when there is a coolant leakage problem or a rough inner bearing. To inspect for either condition, follow steps A through D.

A. Remove the O-ring from the oil-injection pump retainer. Slide the retainer into position on the shaft in the lower half of the crankcase.

B. While holding the retainer tight against the crankcase, rotate the shaft. Bearing rotation must feel smooth.

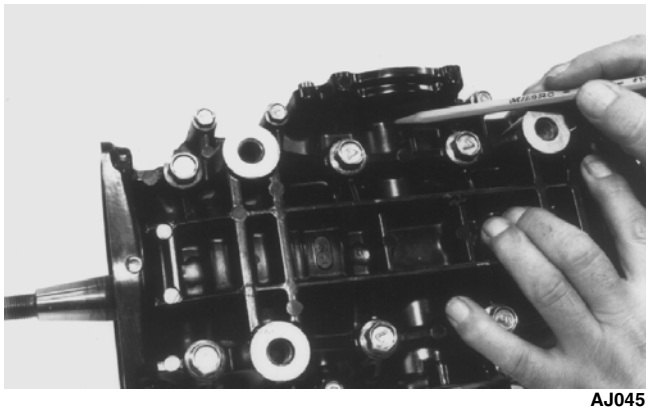


AJ044

C. If any roughness is felt, remove the retainer and inspect its bearing by turning it several revolutions. If it is smooth, the shaft must then be removed and the inner bearing inspected. Turn inner bearing by hand. If any roughness is felt, replace the inner bearing.

D. Check the bottom of the water pump housing for any signs of coolant leakage. The small hole, located on the bottom of the crankcase directly behind the water pump housing, will show coolant stains if the seal has any leak-

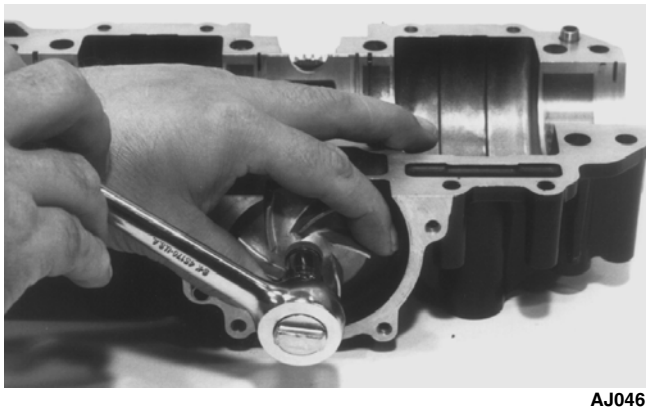
age problems. If stains or any signs of leakage are present, remove impeller and shaft and replace seals.



AJ045

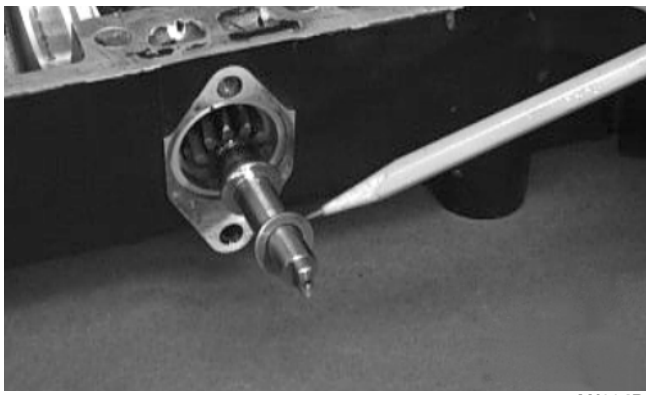
■ **NOTE: For instructions on bearing and seal replacement, see the appropriate Assembling Engine sub-section of this manual. Complete steps 27-32 only if there is a bad seal or shaft bearing.**

27. Remove the cap screw securing the impeller to the shaft.



AJ046

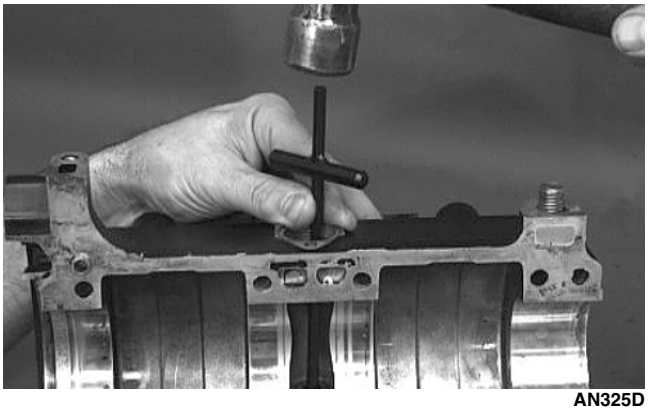
28. Remove the oil-injection pump/water pump driveshaft from the lower crankcase half. Account for the thrust washer on the outer end of the shaft.



AN324D

■ **NOTE: Do not replace the inner seals unless the water pump shows signs of leaking coolant out of the small bleed hole in the bottom half of the crankcase. If a water pump seal is to be replaced, use the Water Pump Bearing and Seal Kit (p/n 0644-084).**

29. Place the crankcase on the bench with the water pump side down. Using the long seal driver, drive the mechanical water pump seal from the crankcase.

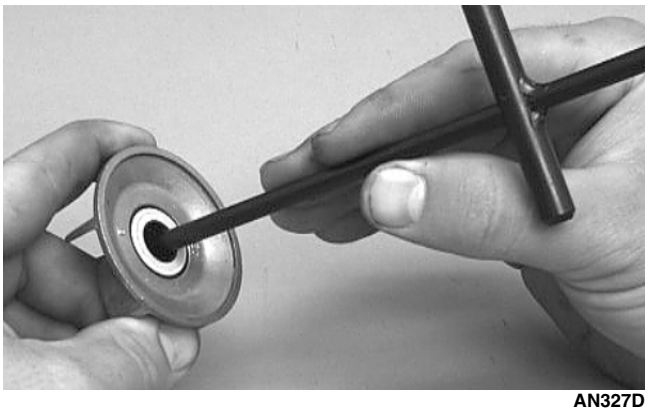


AN325D

30. Using a pair of snap ring pliers, remove the snap ring securing the inner seal in the crankcase.

31. Using the hooked end of the tool, pull the inner seal free of the crankcase.

32. Using the hooked end of the tool, pry the seal ring from the backside of the water pump impeller.



AN327D

Disassembling Engine
(500/600/700 cc Models)

1. Using the spanner wrench to secure the flywheel, remove the flywheel nut, lock washer, and flat washer; then remove the three starter pulley cap screws and remove the pulley.

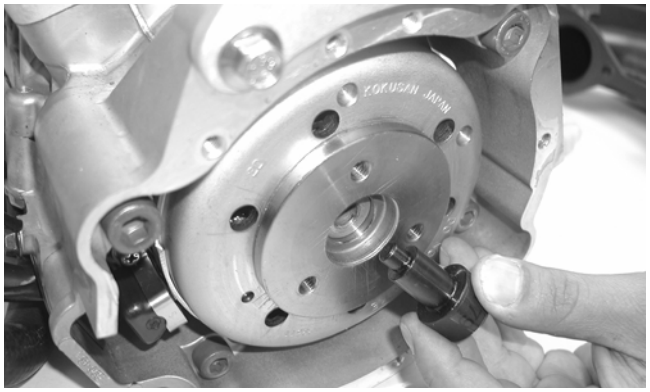


FC014



FC015

2. Install Flywheel Pulley Insert (p/n 0644-179) onto the end of the crankshaft.

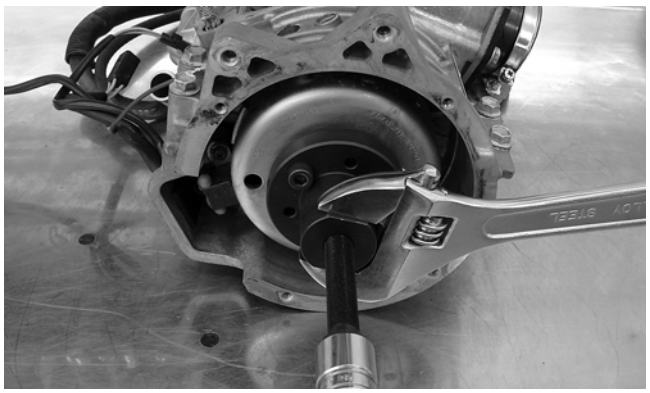


FC016

3. Using Flywheel Puller (p/n 0744-040) or suitable substitute, remove the flywheel from the crankshaft by tightening the puller bolt, striking the head of the puller bolt with a hammer, and tightening again. Repeat this procedure until the flywheel is free. Account for the key.

⚠ CAUTION

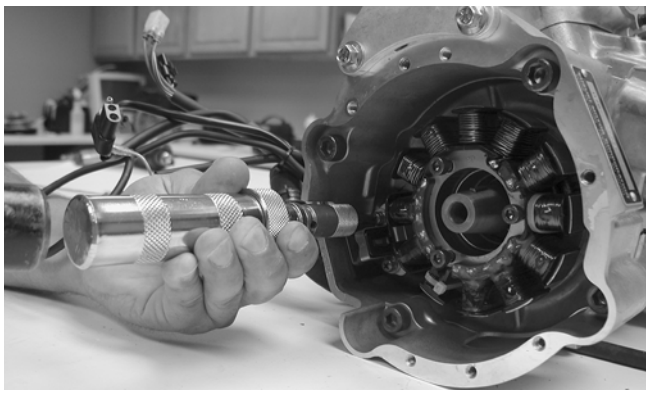
To prevent damage to the crankshaft, do not thread puller bolts more than 12.7 mm (1/2 in.) into the flywheel. Damage to the coils may result.



CM013

■ NOTE: To ensure the cleanliness of the flywheel magnets, place the flywheel (with the magnets facing upward) on a clean bench.

4. Remove the ignition timing sensor.



FC022

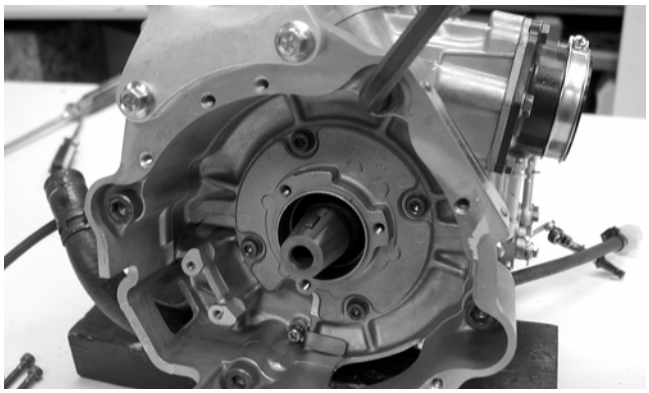
5. Remove the Allen-head cap screws securing the stator to the stator plate. Move the stator to the side to access the Phillips-head cap screw securing the stator lead wire; then remove the cap screw.



FC018

6. On the 600/700 cc, remove the Allen-head cap screws securing the magneto case to the crankcase. Account for four alignment pins.

■ NOTE: Note the different-sized cap screws for assembling purposes.

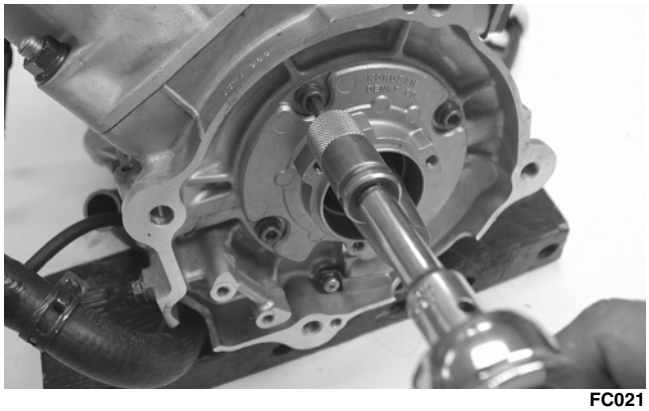


FC019

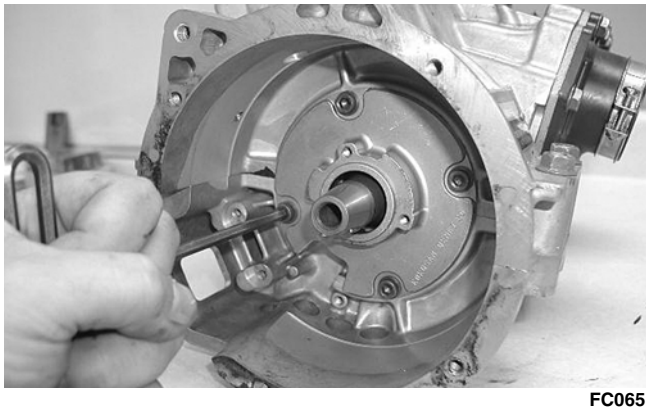


FC020

7. Remove the stator plate from the engine.



FC021



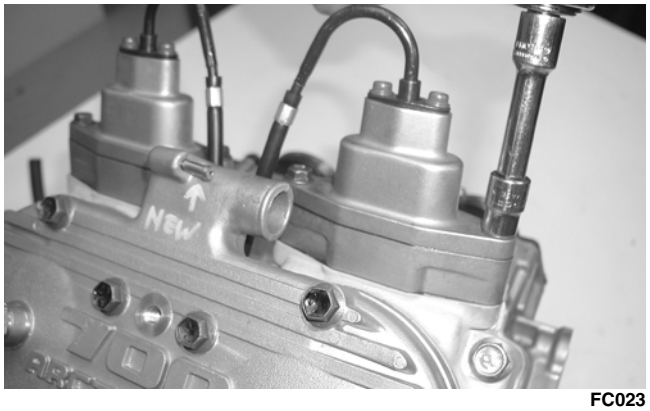
FC065

■ **NOTE: The stator plate screws had Loctite applied to the threads during assembly. Using an impact driver, apply a sharp blow to the head of each screw to break the Loctite loose before removal.**

8. Remove the cap screws securing the APV assemblies to the cylinders; then remove the APV assemblies and set them aside.

■ **NOTE: Note that the APV exhaust valves and gaskets are directional for assembling purposes.**

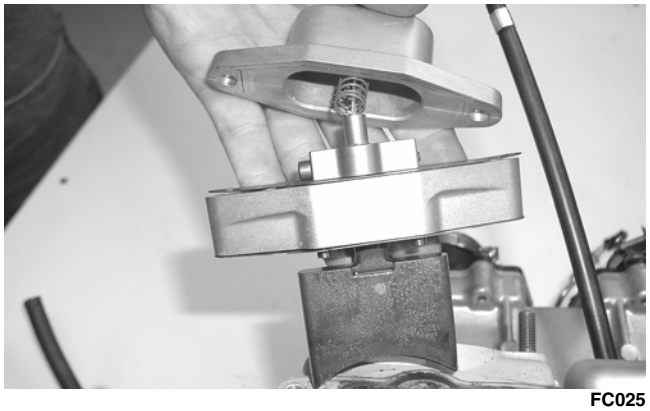
■ **NOTE: The following photographs are for clarity purposes only. The models may vary slightly.**



FC023



FC024

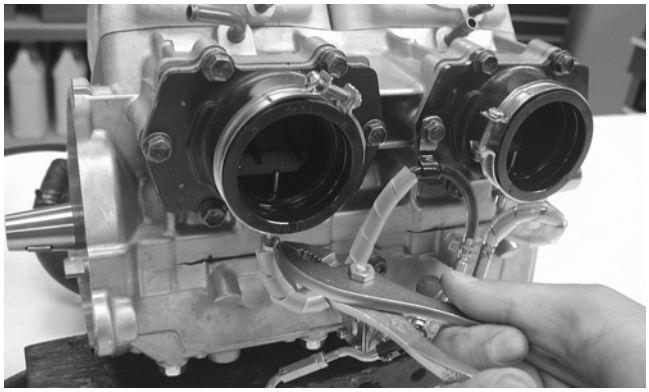


FC025

9. Remove the spark plugs.

10. Remove the cap screws with O-rings securing the cylinder head; then separate from the cylinders. Account for the O-rings.

11. Remove the oil-injection hose from each cylinder and the crankcase nozzle.



FC026

■ **NOTE: When removing the cylinders, place the engine on its intake flanges on a drain tray to allow residual coolant to drain from the cylinder/crankcase water jacket.**

12. On the 500 cc, remove the eight nuts securing the cylinders to the crankcase; then using a rubber hammer, gently tap the cylinders and remove from the crankcase by lifting them straight up off their studs. Account for gasket(s) and any alignment pins.

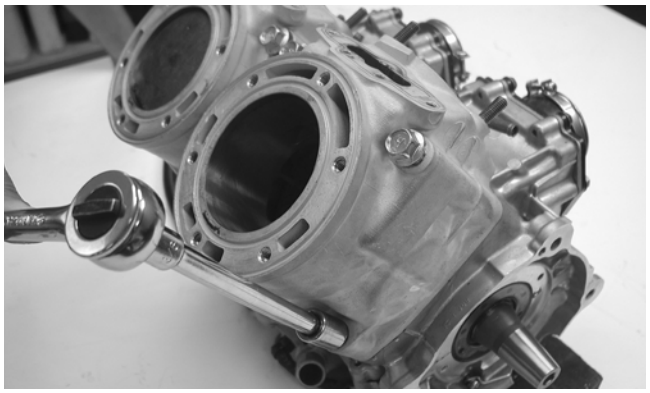
13. On the 600/700 cc, remove the four nuts and four bolts securing the cylinders to the crankcase; then using a rubber hammer, gently tap the cylinders and remove from the crankcase by lifting them straight up off their studs. Account for gasket(s) and any alignment pins.

⚠ CAUTION

When removing a cylinder, be sure to support the piston to prevent damage to the crankcase and piston.

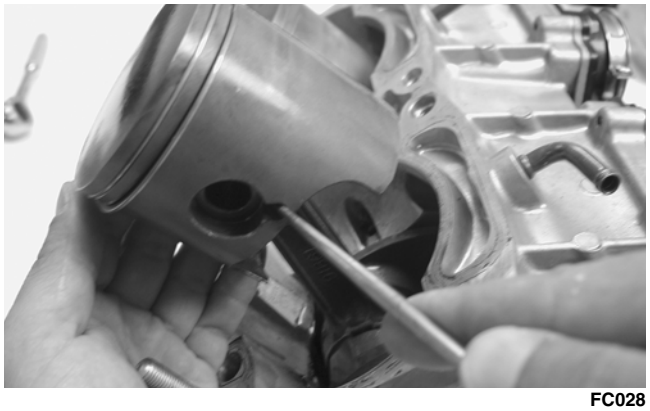


FC067



FC027

14. Remove the PTO-side piston-pin circlip from the PTO-side piston; then remove the MAG-side piston-pin circlip from the MAG-side piston.



FC028

15. Using Piston Pin Puller (p/n 0644-328), remove the piston pins from both pistons.

■ **NOTE: For proper assembly, keep all MAG-side components and all PTO-side components separated. Assemble them on their proper sides.**

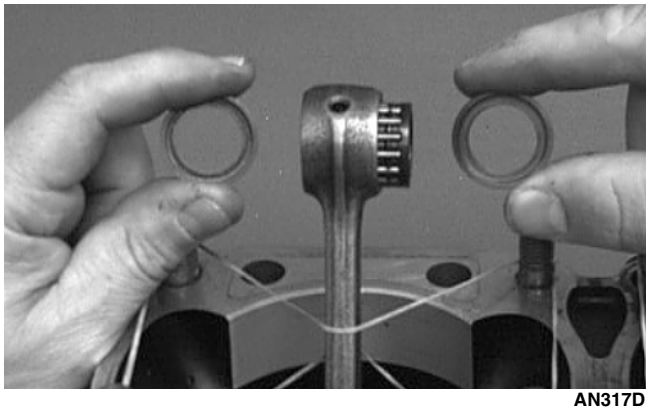


FC029

⚠ CAUTION

DO NOT use any type of punch to drive the piston pin free of the piston; damage may result. Use a piston-pin puller only.

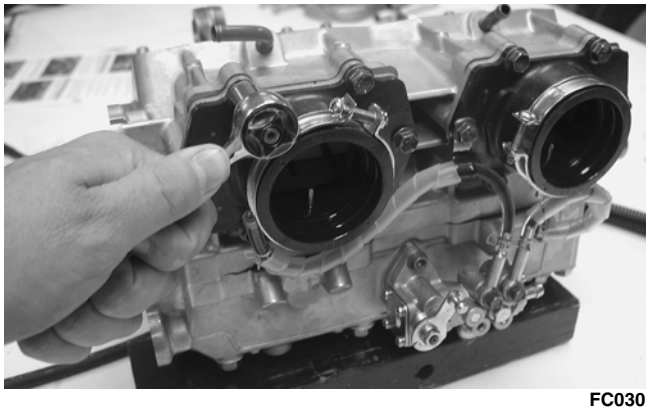
16. Lift the pistons clear of the connecting rods and remove the small-end connecting-rod bearings (account for two washers); then remove the piston rings. Keep each piston with its rings; keep each piston pin and bearing together as a set.



AN317D

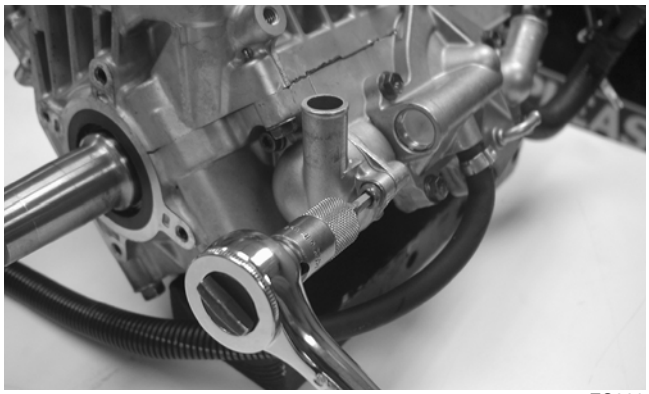
■ **NOTE: Place rubber bands over the connecting rods and around the cylinder studs. This will prevent the connecting rods from damaging the crankcase.**

17. Remove the intake flanges and reed valve assemblies.



FC030

18. Remove the three cap screws securing the thermostat cap; then remove the cap, gasket, and thermostat.

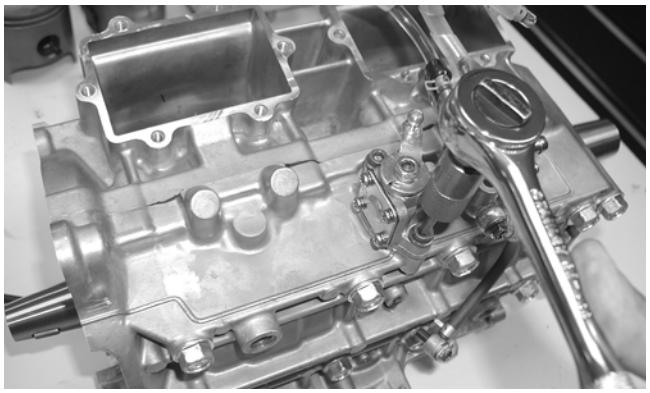


FC032

19. Remove the six screws securing the water pump cover to the crankcase and remove the cover. Account for the O-ring gasket and the alignment pins.

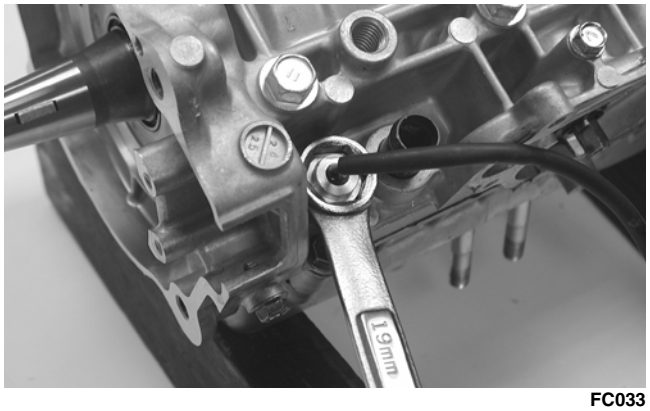
20. Remove the cap screw securing the water pump impeller; then slide the impeller free of the shaft.

21. Remove either lower union cap screw securing the lower check valve assembly; then remove the two screws securing the oil-injection pump to the crankcase. Remove the pump, retainer, and O-ring.



FC031

22. Turn the engine upside down on support blocks and remove the water temperature sensor switch.



FC033

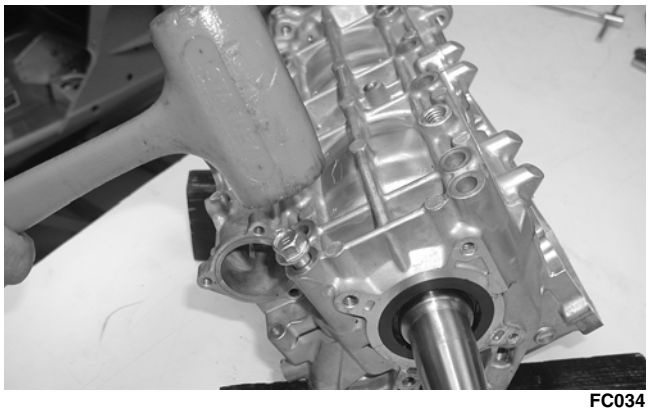
23. With its bottom side up on two support blocks, remove the cap screws securing the crankcase halves.

■ **NOTE: The end bearings are not pressed onto the crankshaft.**

24. Separate the crankcase halves by installing two crankcase cap screws in opposite corners leaving the heads approximately 6 mm (1/4 in.) out. Using a plastic-tipped hammer, tap on each cap screw head until the case halves separate. Remove the cap screws.

⚠ CAUTION

DO NOT drive any tool between halves to separate the crankcase. Damage to the sealing surfaces will result.



FC034

25. Lift the bottom half of the crankcase off the top half.

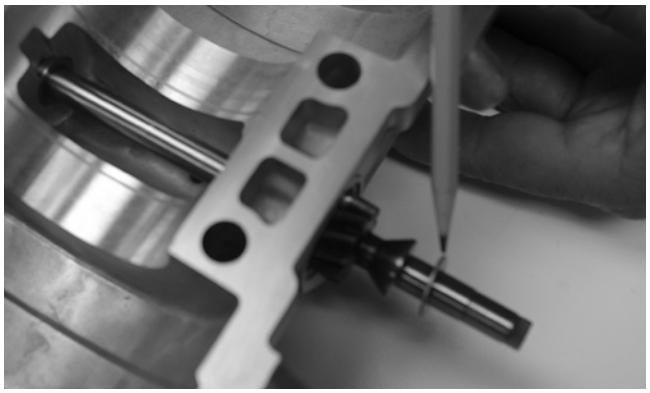
⚠ CAUTION

Care must be taken to not allow the connecting rods to drop onto the sealing surface of the bottom case half.

26. Lift the crankshaft free from the top half of the crankcase and slide the crankshaft oil seals off the crankshaft. Account for the C-ring. Remove the bearing retaining pins and account for the crankcase dowel pins.

■ NOTE: On the 600/700 cc, account for the rubber spacer on the PTO-end of the crankshaft.

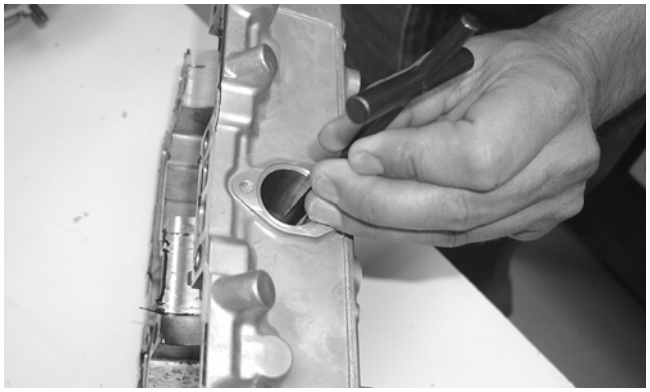
27. Remove the oil-injection pump/water pump driveshaft from the lower crankcase half. Account for the thrust washer on the outer end of the shaft.



FC035

■ NOTE: Do not replace the inner seals unless the water pump shows signs of leaking coolant out of the small bleed hole in the bottom half of the crankcase. If a water pump seal is to be replaced, use the Water Pump Bearing and Seal Kit (p/n 0644-084).

28. Place the crankcase on the bench with the water pump side down. Using the long seal driver, drive the mechanical water pump seal from the crankcase.

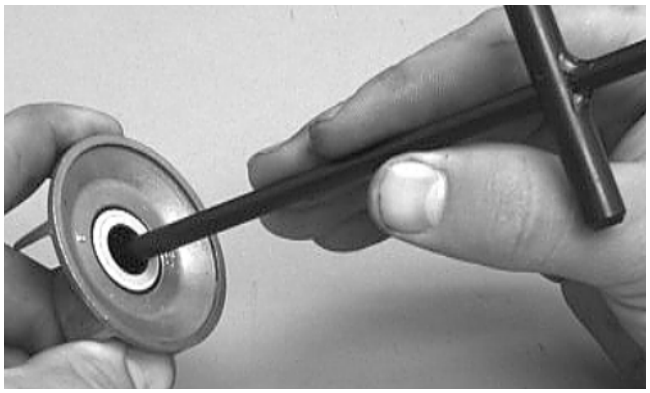


FC036

29. Using a pair of snap ring pliers, remove the snap ring securing the inner seal in the crankcase.

30. Using the hooked end of the tool, pull the inner seal free of the crankcase.

31. Using the hooked end of the tool, pry the seal ring from the backside of the water pump impeller.



AN327D

Servicing Top-Side Components
(500/600/700 cc Models)

Many services can be performed without removing the engine. Some components may vary from model to model. The technician should use discretion and sound judgment when removing and installing components.

■ **NOTE: Some photographs used in this sub-section are used for clarity purposes only and are not designed to depict actual conditions.**

REMOVING TOP-SIDE COMPONENTS

To access top-side components, use the following procedure:

1. Remove the expansion chamber and resonator; then remove the exhaust manifold.

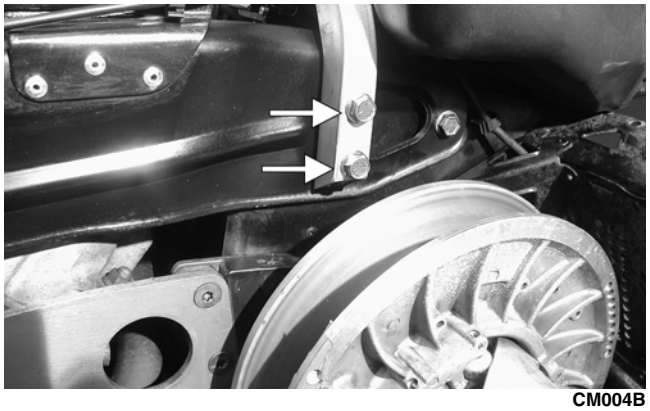


CM035

2. Drain the engine coolant (see Liquid Cooling System - Section 3).

3. Remove the cap screws and the lock nuts securing the side-plate brace to the chassis; then remove the brace.

■ **NOTE: On the Crossfire/M-Series, the cap screws securing the steering support to the chassis must be removed to remove the side-plate brace.**



CM004B

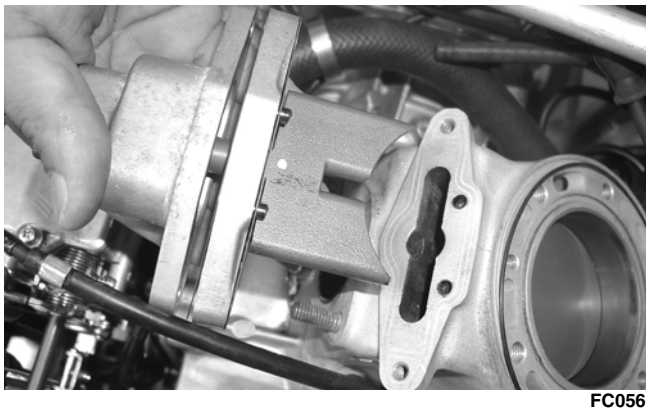
4. Remove the coolant hose and breather hose connected to the cylinder head.

5. Remove the twelve 10 mm cap screws and two 8 mm cap screws securing the cylinder head; then remove the cylinder head. Account for the O-rings.



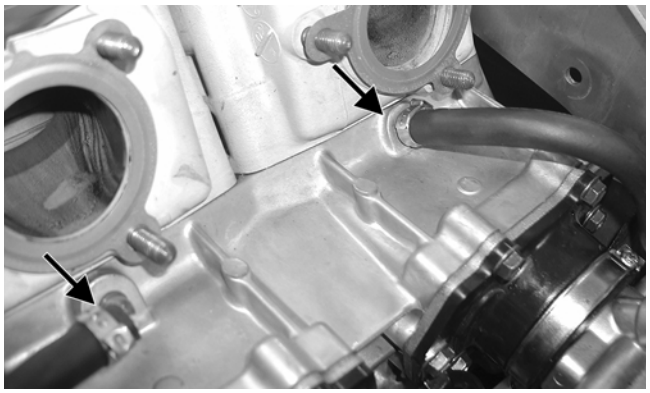
FC060

6. Remove the APV's from the cylinder.



FC056

7. Disconnect the two coolant hoses located beneath the exhaust ports on the cylinders.



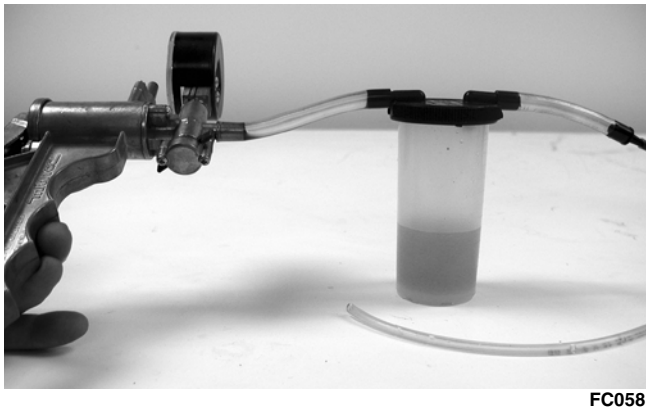
FC050A

■ **NOTE: At this point, remove all loose hardware to avoid any falling down into the chassis.**

8. Remove the residual coolant from the cylinder/crankcase water jacket.

■ **NOTE: After draining the coolant, approximately 1.75 fluid oz of coolant will remain on both the MAG-side and PTO-side. To remove the residual coolant, use the following procedure.**

a. Using Vacuum Pump (p/n 0644-131), or a suitable substitute, rig the pump to 3/16 in. outside diameter hose.



FC058

b. In turn on each fitting of the crankcase, run the vacuum pump to purge the cylinder/crankcase water jacket of the residual coolant.



FC057

■ **NOTE: It is critical that all residual coolant is totally removed from the cylinder/crankcase.**

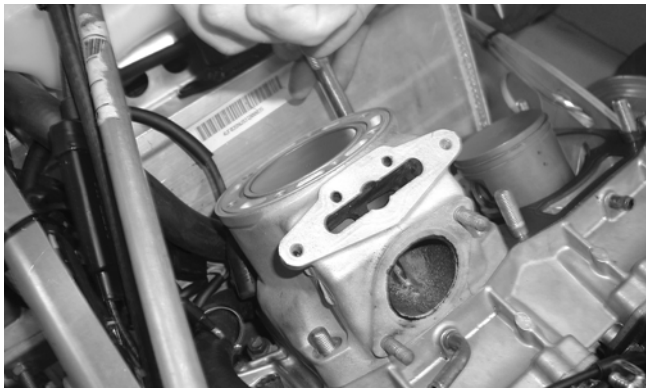
■ **NOTE: At this point, remove all loose hardware to avoid any falling down into the chassis.**

9. Remove the nuts (500 cc) or the cap screws and nuts (600/700 cc) securing the cylinders to the crankcase; then using a rubber hammer, gently tap the cylinders and remove from the crankcase by lifting them straight up off their studs. Account for gasket(s) and any alignment pins.



FC061

■ **NOTE: If servicing the MAG-side only, the PTO-side cylinder must be removed.**



FC062

■ **NOTE: When removing the MAG-side piston, the piston must be at top-dead-center.**



FC064

■ **NOTE: For servicing procedures, see Cleaning and Inspecting Engine and Measuring Critical Components in this section.**

INSTALLING TOP-SIDE COMPONENTS

■ **NOTE: Critical torque specifications are located in the Assembly Schematics sub-section of this section.**

■ **NOTE: When installing the pistons, make sure to install the MAG-side piston-pin circlips first; then install the pistons and secure with the piston pin and PTO-side piston-pin circlips.**

1. Place the cylinders into position on the crankcase accounting for gasket(s) and any alignment pins.



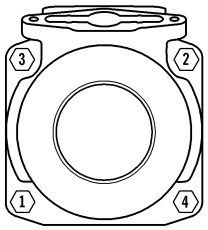
FC061



FC062

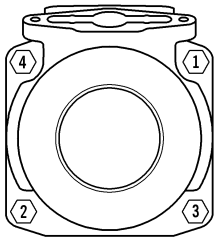
2. Secure the cylinders with existing hardware tightened to specifications using the appropriate pattern shown.

500 cc



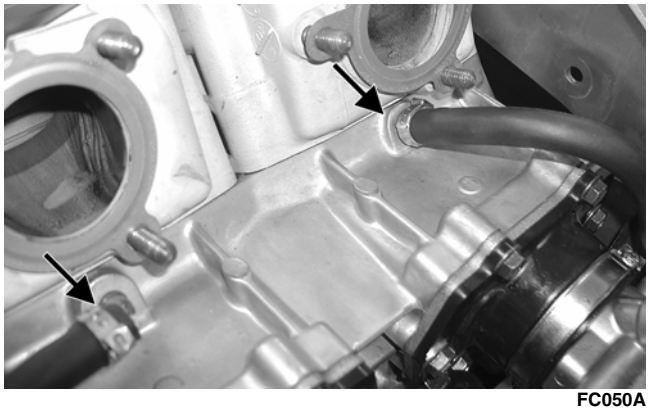
0738-206

600/700 cc



0738-220

3. Connect the two coolant hoses on the cylinders beneath the exhaust ports.

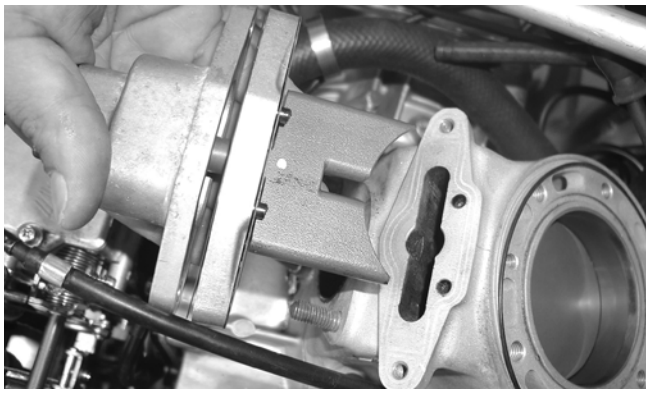


FC050A

4. Install the APV's onto the cylinder and secure with existing hardware.

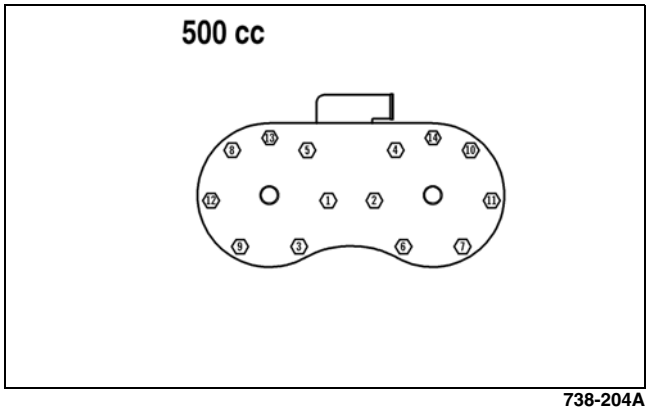
⚠ CAUTION

The long side of the exhaust valve must be facing toward the cylinder head or severe engine damage may occur.

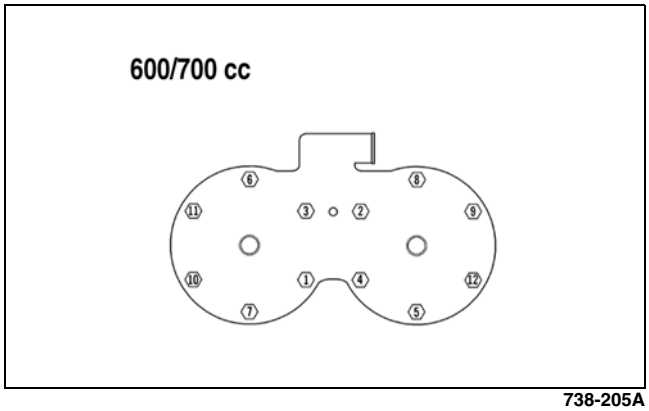


FC056

5. Place the cylinder head into position on the cylinders making sure the O-rings are properly positioned; then on the 500 cc in two steps, tighten the 6 mm cap screws to specifications and on all models in two steps, tighten the 8 mm cap screws to specifications using the appropriate pattern shown.



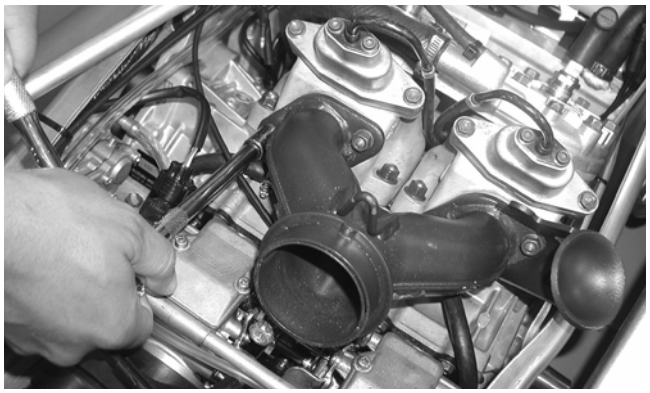
738-204A



738-205A

6. Install the coolant hose and breather hose onto the cylinder head.

7. Install the exhaust manifold. Tighten existing hardware to specifications.



FC049

8. Install the expansion chamber and resonator using existing hardware.

9. Install the side-plate brace and secure with existing hardware.

■ **NOTE: On the Crossfire/M-Series after securing the brace, secure the steering support to the chassis. Tighten to specifications.**

10. Fill the cooling system with recommended coolant (see Liquid Cooling System in Section 3).

Cleaning and Inspecting Engine

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

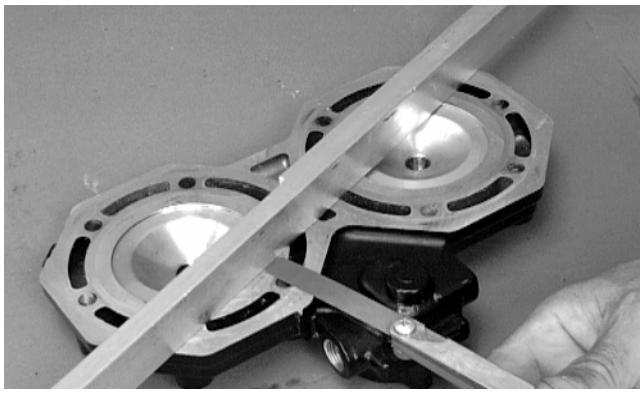
CYLINDER HEAD

1. Using a non-metallic carbon removal tool, remove any carbon buildup from the combustion chambers being careful not to nick, scrape, or damage the combustion chambers or the sealing surfaces.

2. Inspect the spark-plug holes for any damaged threads. Repair damaged threads using a helicoil insert.

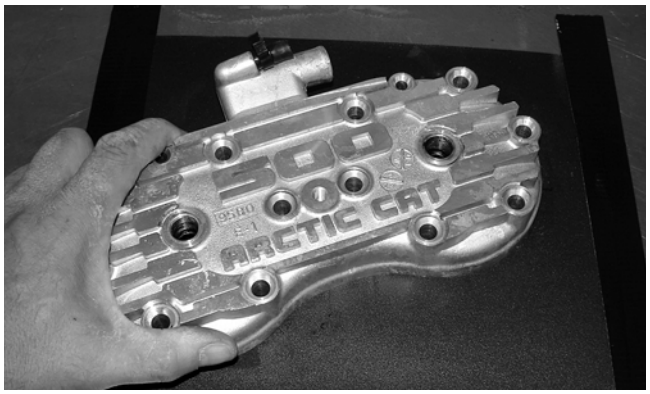
3. Inspect the cylinder head for flatness using a straightedge and a feeler gauge. Acceptable warpage must not exceed 0.05 mm (0.002 in.).

■ **NOTE: If the warpage exceeds specification, resurface the cylinder head using procedures identified in step 4.**



AN426D

4. Place the cylinder heads on a Surface Plate (p/n 0644-016) covered with #400 grit wet-or-dry sandpaper. Using light pressure, move each cylinder head in a figure eight motion. Inspect the sealing surface for any indication of high spots. A high spot can be noted by a bright metallic finish. Correct any high spots before assembly by continuing to move the cylinder head in a figure eight motion until a uniform bright metallic finish is attained.



CM018

⚠ CAUTION

Water or parts-cleaning solvent must be used in conjunction with the wet-or-dry sandpaper or damage to the sealing surface may result.

CYLINDERS

1. Using a non-metallic carbon removal tool, remove carbon buildup from the exhaust ports.

2. Wash the cylinders in parts-cleaning solvent.

3. Inspect the cylinders for pitting, scoring, scuffing, and corrosion. If marks are found, repair the surface with an appropriate ball hone and honing oil (see chart).

BALL HONES	
Engine Size	p/n
370 cc	0644-290
440/500 cc	0644-291
570/600 cc	0644-292
700 cc	0644-293
900 cc	0644-294

■ **NOTE: To produce the proper 60° crosshatch pattern, use a low RPM drill (600 RPM) at the rate of 30 strokes per minute. If honing oil is not available, use a lightweight, petroleum-based oil. Thoroughly clean the cylinders after honing using detergent soap and hot water and dry with compressed air; then immediately apply oil to the cylinder bores. If a bore is severely damaged or gouged, the cylinder will have to be replaced.**

4. Place the head surface of each cylinder on the surface plate covered with #400 grit wet-or-dry sandpaper. Using light pressure, move each cylinder in a figure eight motion. Inspect the surface for any indication of high spots. A high spot can be noted by a bright metallic finish. Correct any high spots before assembly by continuing to move the cylinder in a figure eight motion until a uniform bright metallic finish is attained.

⚠ CAUTION

Water or parts-cleaning solvent must be used in conjunction with the wet-or-dry sandpaper or damage to the sealing surface may result.

PISTON ASSEMBLY

1. Using a non-metallic carbon removal tool, remove the carbon buildup from the dome of each piston.

2. Take an old piston ring and snap it into two pieces; then grind the end of the old ring to a 45° angle and to a sharp edge. Using the sharpened ring as a tool, clean carbon from the ring-grooves. Be sure to position the ring with its tapered side up.

⚠ CAUTION

Improper cleaning of the ring-grooves by the use of the wrong type of ring-groove cleaner will result in severe damage to the piston.

3. Inspect each piston for cracks in the piston pin and skirt areas.

4. Inspect each piston for seizure marks or scuffing. Repair with #400 grit wet-or-dry sandpaper and water or honing oil.



AN135

■ **NOTE: If scuffing or seizure marks are too deep to correct with the sandpaper, it will be necessary to replace the piston.**

5. Inspect the perimeter of each piston for signs of excessive "blowby." Excessive "blowby" indicates worn piston rings or an out-of-round cylinder.

CRANKCASE

1. Wash the crankcase halves in parts-cleaning solvent.

■ **NOTE: Before washing the crankcase halves, make sure the four bearing dowel pins have been removed and accounted for.**

2. Inspect the crankcase halves for scoring, pitting, scuffing, or any imperfections in the casting.

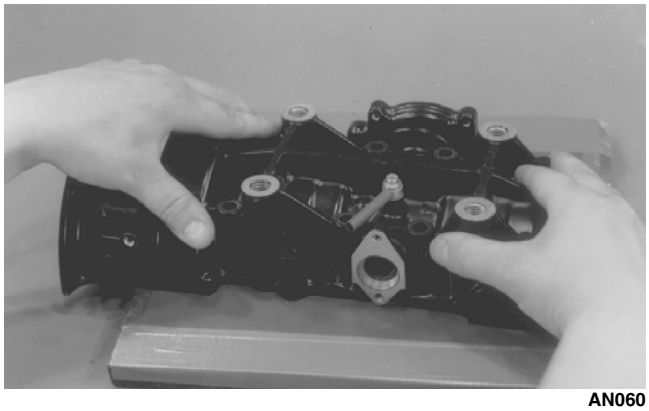
3. Inspect all threaded areas for damaged or stripped threads.

4. Inspect the bearing areas for cracks or excessive bearing movement. If evidence of excessive bearing movement is noted, repair by peening the bearing area in a pinking (sawtooth) pattern.

5. Inspect the bearing dowel pins for wear.

6. Inspect the sealing surfaces of the crankcase halves for trueness by placing each crankcase half on the surface plate covered with #400 grit wet-or-dry sandpaper. Using light pressure, move each half in a figure eight motion. Inspect the sealing surfaces for any indication of high spots. A high spot can be noted by a bright metallic finish. Correct any high spots by continuing to move the half in a figure eight motion until a uniform bright metallic finish is attained.

■ **NOTE: Care must be taken not to remove an excessive amount of aluminum, or the crankcase will have to be replaced. If excessive aluminum is removed, too much pre-load will be exerted on the crankshaft bearings when assembled.**


AN060

⚠ CAUTION

Water or parts-cleaning solvent must be used in conjunction with the wet-or-dry sandpaper or damage to the sealing surface may result.

INTAKE MANIFOLD INSULATORS (Single Carburetor)/ ADAPTER PLATES (Twin Carburetors)

■ **NOTE: For fan cooled models only.**

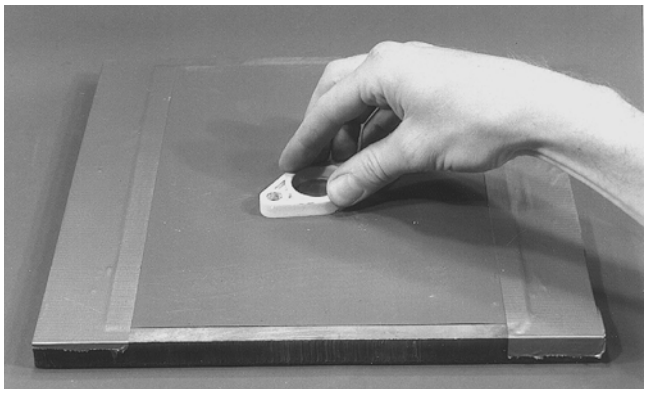
1. Inspect for cracks, scoring, pitting, imperfections, or warping.

2. Inspect the sealing surfaces for trueness by placing each on the surface plate covered with #400 grit wet-or-dry sandpaper. Using light pressure, move both sides in a figure eight motion. Inspect the sealing surface for any indication of high spots or warping. Correct high spots by continuing to move each side in a figure eight motion. Warped components must be replaced.

■ **NOTE: On the twin carburetor model in order to inspect adapter plate trueness, it will be necessary to remove the studs.**

⚠ CAUTION

Water or parts-cleaning solvent must be used in conjunction with the wet-or-dry sandpaper or damage to the sealing surfaces may result.

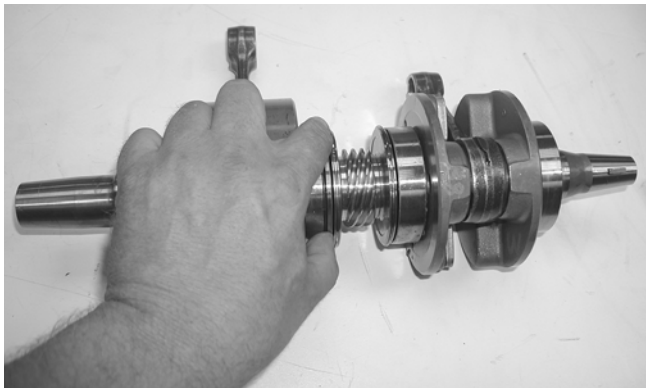


A932

CRANKSHAFT

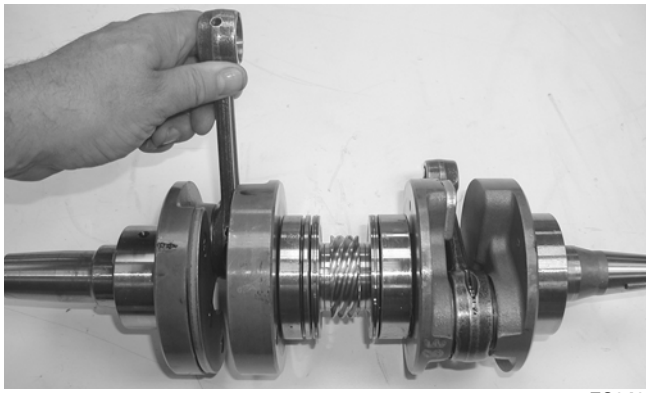
1. Wash the crankshaft with bearings in parts-cleaning solvent.

2. Inspect the bearings for wear, scoring, scuffing, damage, or discoloration. Rotate the bearings. Bearings must rotate freely and must not bind or feel rough. If any abnormal condition is noted, replace the bearing.



FC039

3. Inspect the connecting-rod bearings by rotating them. The bearings must rotate freely and must not bind or feel rough. If a connecting-rod bearing must be replaced, the connecting rod and crank pin must also be replaced.



FC040

4. Inspect the oil-injection pump drive gear for any signs of worn or chipped teeth. If either condition exists, replace the gear.

■ **NOTE: Lubricate bearings thoroughly prior to assembly.**

REMOVING OUTER CRANKSHAFT BEARINGS

⚠ WARNING

Safety glasses must be worn when spreading bearings.

■ **NOTE: Steps 1-3 are for removing the MAG-side bearing.**

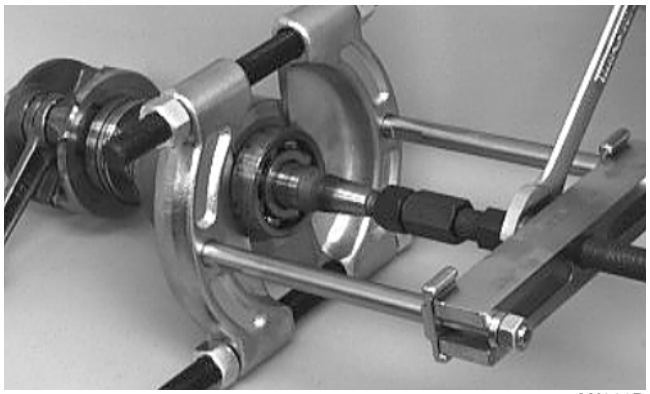
1. Place a bearing support (block of wood, etc.) beneath the MAG-side bearing.

⚠ CAUTION

A bearing support must be positioned beneath the bearing that is being removed to prevent crankshaft damage.

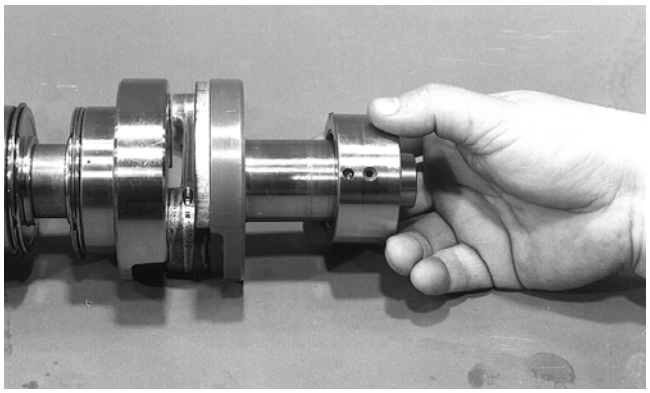
2. Drive a chisel or bearing splitter between the bearing race and crankshaft counterweight until the bearing is spread far enough to install the jaws of the crankshaft bearing remover.

3. Place the protective cap on the crankshaft end; then using the Crankshaft Bearing Remover (p/n 0144-302), remove the bearing from the end of the crankshaft. Account for any shim(s). Note the position of the dowel pin hole.



AN068D

4. On certain models, the PTO-side bearing may be removed simply by sliding the bearing off the PTO end.



AN151A

■ **NOTE: On certain models, the end bearings are not pressed onto the crankshaft. The bearings can be removed simply by sliding them off the crankshaft.**

5. Inspect the crankshaft bearing area for wear. If any wear is noted on either end, replace the crankshaft end.

INSTALLING OUTER CRANKSHAFT BEARINGS

■ **NOTE: On certain models, steps 1-3 are for installing the MAG-side bearing.**

1. Wrap a thick towel around the crankshaft; then secure the crankshaft vertically in a vise.

2. Heat the bearing either by placing the entire bearing in a pan of oil on a hot plate or by squirting oil into the bearing and using a propane torch to heat the inner race of the bearing until a slight smoke is noted coming from the bearing.

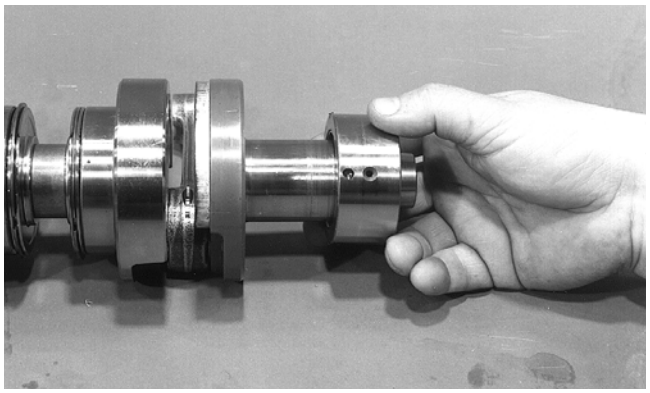
⚠ CAUTION

DO NOT overheat the bearing.

3. Place any shims removed during disassembly onto the crankshaft; then slide the bearing onto the crankshaft making sure the dowel-pin hole in the outer race is properly positioned and will align with its hole and pin in the crankcase.

4. On certain models, slide the PTO-side bearing onto the PTO end making sure the dowel-pin hole will align with the hole and pin in the crankcase.

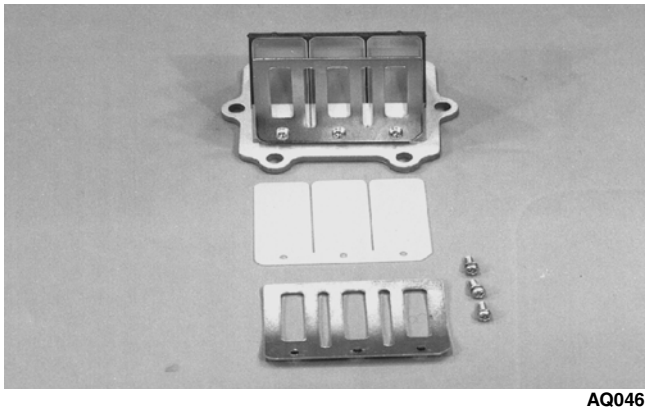
■ **NOTE: On certain models, install the bearings by sliding each bearing onto the crankshaft making sure the dowel-pin hole in the outer race is properly positioned and will align with its hole and pin in the crankcase.**



AN151A

REED VALVE ASSEMBLY

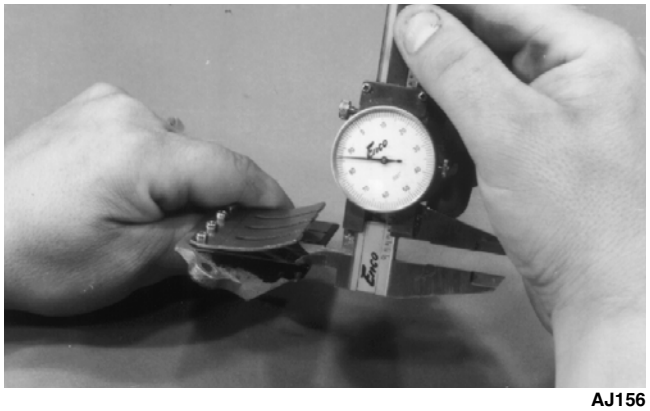
1. Inspect the reed valves, stoppers, and valve blocks for cracks or any deterioration.



AQ046

2. Wash the reed valves, stopper, and cage assembly in parts-cleaning solvent and blow dry.

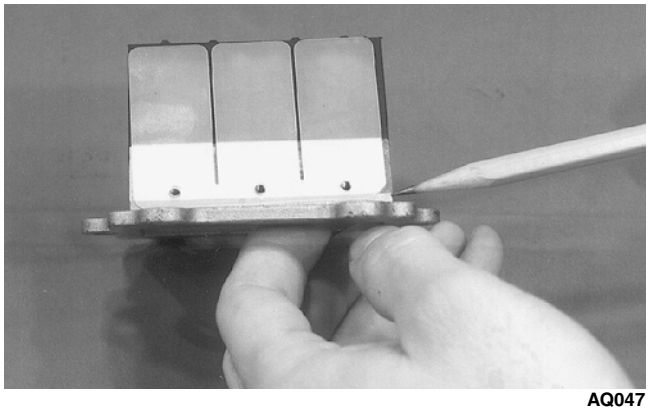
3. Inspect the reed stopper height. Using a caliper, measure the distance from the seat to the bottom outer tip edge of the stopper. Measurement must not exceed specifications. If measurement is not within specifications, either bend or replace the reed stopper.



AJ156

4. Inspect the reed-to-seat clearance. Using a feeler gauge, measure the clearance. Clearance must be less than 0.20 mm (0.008 in.). If clearance is not within specifications, replace the reed valve.

5. To assemble, place the reed valves on the cage with its clipped corner positioned to the lower right hand corner of the cage. Place the reed stopper assembly into position and secure with the three screws coated with red Loctite #271.



AQ047

Measuring Critical Components

■ **NOTE: Critical engine component specifications can be found at the beginning of this section.**

CYLINDER HEAD VOLUME (Squish-Gap Method)

To check the squish gap, a micrometer and a heavy piece of solder will be needed.

1. Remove the spark plugs from the engine.
2. Insert the solder piece down through the spark plug hole and push it up against the inner cylinder bore towards the MAG-side of the engine.
3. Pull the recoil rope and crank the engine over several times while the solder is being held firmly in place.
4. Remove the solder from the cylinder. Using the micrometer, measure the very end of the squeezed solder piece. Record the reading.

■ **NOTE: If the solder hasn't been squeezed by the piston, a larger piece of solder must be used. Repeat procedure.**

5. Using the opposite end of the solder piece, insert it down through the spark plug hole towards the PTO-side of the engine. Push on the solder until it contacts the inner cylinder bore.
6. Pull the recoil rope and crank the engine over several times. Remove the solder from the cylinder and measure the squeezed end with a micrometer. Record reading and refer to the chart.

■ **NOTE: Measure from PTO to MAG-side of the piston to accurately measure the squish gap. Never measure across piston, exhaust to carburetor side, as the piston will rock and the reading won't be accurate.**

Readings may vary from side to side. Make sure the smaller reading is within the specifications listed.

CYLINDER HEAD VOLUME (Cylinder Head Installed Method)

To check the cc volume, a measuring tool called a buret will be needed. It is capable of measuring a liquid in cc volumes.

1. Fill buret with 10W engine oil.
2. Remove the spark plugs from the cylinders.
3. Run piston up to TDC (Top Dead Center).
4. Insert buret into spark plug hole and open buret valve. Run oil into the spark plug hole until it reaches the top of the spark plug hole. Turn off the buret valve.
5. Check the buret scale to see how much oil has been used to fill the combustion chamber. From the total amount, subtract 2.20 cc or 2.44 cc. Compare the findings with the chart.

■ **NOTE: The above procedure will work fine on a new engine. Engines with many hours of use, may require a small change in the procedure. In step 3, remove the cylinder head. Wipe a small amount of heavy grease around the outer diameter of the piston to seal space between the piston and cylinder bore. Replace head and tighten to specification; then continue with steps 4 and 5.**

CYLINDER HEAD VOLUME (Flat Plate Method)

The third method of checking for proper combustion chamber volume will require a 1/8 in. or 3/16 in. thick piece of plexiglass, some heavy grease, and a buret.

The plexiglass piece must be flat and also large enough to cover the entire gasket surface of the cylinder head. Using a 3/16 in. drill bit, drill two holes through the plexiglass piece. Locate the holes one inch apart inside the combustion chamber area (towards center of piece).

1. Remove the cylinder head from the engine. Clean all carbon from the combustion chamber area.

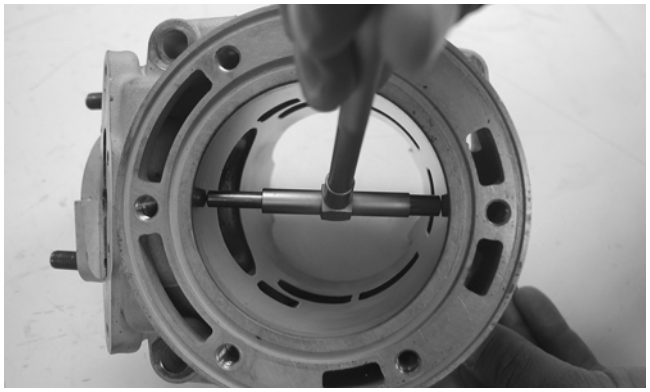
2. Position the cylinder head squarely in a vise with its gasket surface up. Leave a BR9ES spark plug in place and grip the metal portion of the spark plug for holding the cylinder head.

3. Apply a light coat of grease to the gasket surface of the head. Squeeze the piece of plexiglass firmly down onto the gasket surface. The grease will act as a sealant between the two pieces.

4. Using a buret filled with light oil, fill the combustion chamber through either of the two holes drilled in the plexiglass. Continue to fill the combustion chamber until the fluid appears at the bottom of the second hole. Stop filling procedure and take a reading off the buret as to how much fluid was used. The specification found in the chart includes the spark plug volume, so there won't be any need to subtract from the reading.

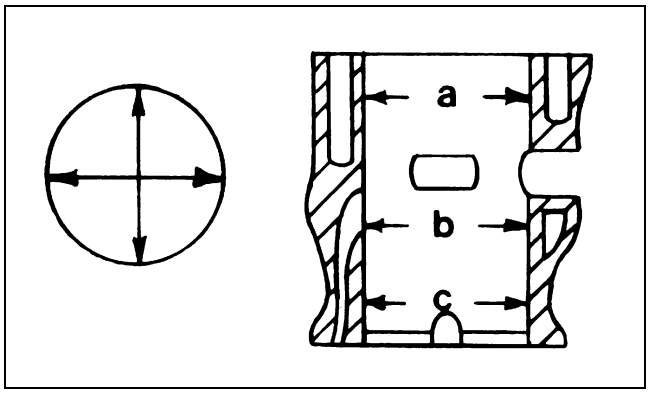
CYLINDER TRUENESS

1. Measure each cylinder in the three locations from front to back and side to side for a total of six readings.



FC044

2. The trueness (out-of-roundness) is the difference between the highest and lowest reading. Maximum trueness (out-of-roundness) must not exceed specifications.



0725-586

PISTON SKIRT/CYLINDER CLEARANCE

1. Measure each cylinder front to back about 2.5 cm (1 in.) from the bottom of each cylinder.

2. Measure the corresponding piston skirt diameter at a point 1 cm (0.394 in.) above the piston skirt at a right angle to the piston-pin bore. Subtract this measurement from the measurement in step 1. The difference (clearance) must be within specifications.

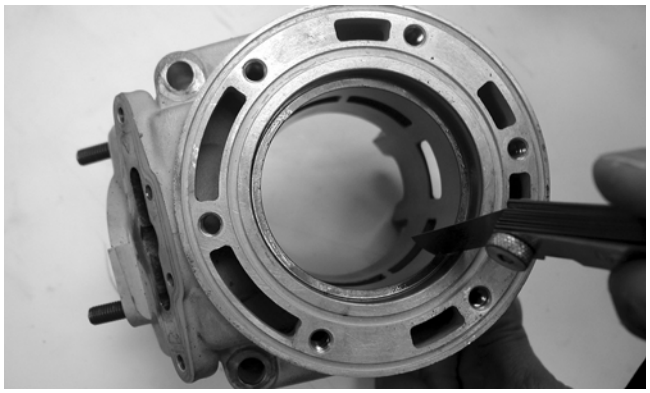


AC091

PISTON-RING END GAP

1. Place each piston ring in the wear portion above the exhaust port of its respective cylinder. Use the piston to position each ring squarely in each cylinder.

2. Using a feeler gauge, measure each piston-ring end gap. Acceptable ring end gap must be within specifications.



FC045

PISTON PIN AND PISTON-PIN BORE

1. Measure the piston pin diameter at each end and in the center. Acceptable piston pin measurement must be within specifications. If any measurement varies by more than 0.02 mm (0.001 in.), the piston pin and bearing must be replaced as a set.



AN056

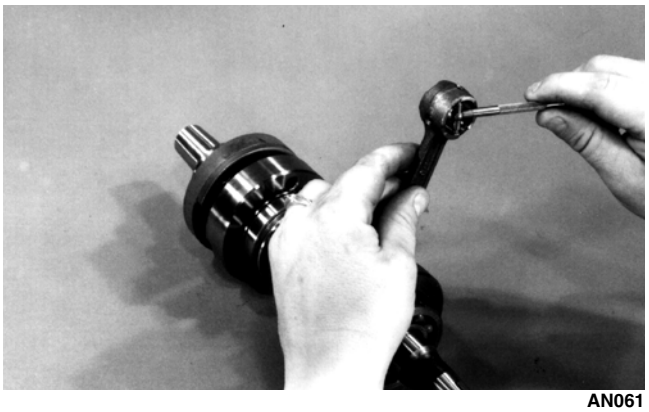
2. Insert a snap gauge into each piston-pin bore; then remove the gauge and measure it with a micrometer. The diameter measurement must be within specifications. Take two measurements to ensure accuracy.



AC092

CONNECTING-ROD SMALL END BORE

1. Insert a snap gauge into each connecting-rod small end bore; then remove the gauge and measure it with a micrometer.



AN061

2. The diameter measurement must be within specifications.

CRANKSHAFT RUNOUT

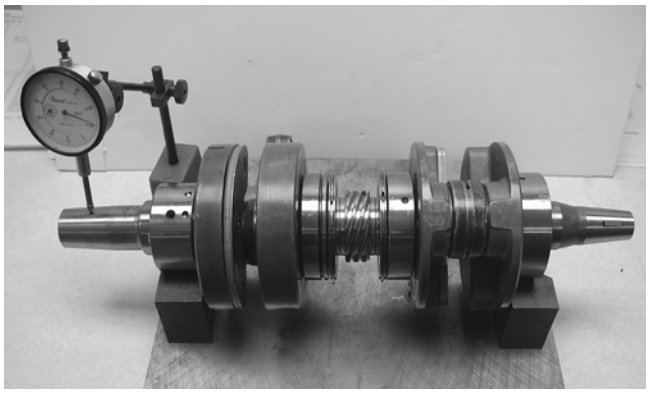
1. Using the V Blocks (p/n 0644-022), support the crankshaft on the surface plate.

■ **NOTE: The V blocks should support the crankshaft on the outer bearings.**

2. Mount a dial indicator and base on the surface plate. Position the indicator contact point against the crankshaft location point F (PTO-end) from the crankshaft end. Zero the indicator and rotate the crankshaft slowly. Note the amount of crankshaft runout (total indicator reading).

■ **NOTE: For runout location point specifications, see Crankshaft Runout Specifications chart on page 19 of this section.**

3. Position the indicator contact point against the crankshaft location point D (MAG-end) from the crankshaft end. Zero the indicator and rotate the crankshaft slowly. Note the amount of crankshaft runout (total indicator reading).



FC046

4. Position the indicator contact point against the crankshaft at location point E (center). Zero the indicator and rotate the crankshaft slowly. Note the amount of crankshaft runout (total indicator reading).

5. If runout exceeds specifications at any of the checkpoints, the crankshaft must be either straightened or replaced.

Assembling Engine Table of Contents

370/440 cc Models 2-61
570 cc Models 2-65
900 cc Models 2-72
500/600/700 cc Models 2-78

■ **NOTE: Critical torque specifications are located in the Assembly Schematics sub-section of this section.**

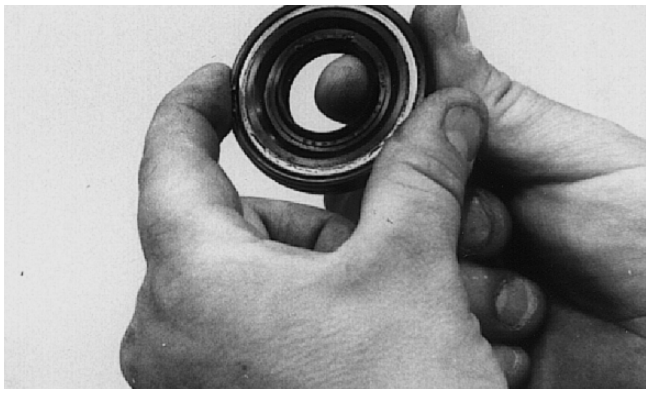
Assembling Engine (370/440 cc Models)

■ **NOTE: The use of new gaskets and seals is recommended when assembling the engine.**

■ **NOTE: When the use of a lubricant is indicated, use Arctic Cat 50:1 Injection Oil.**

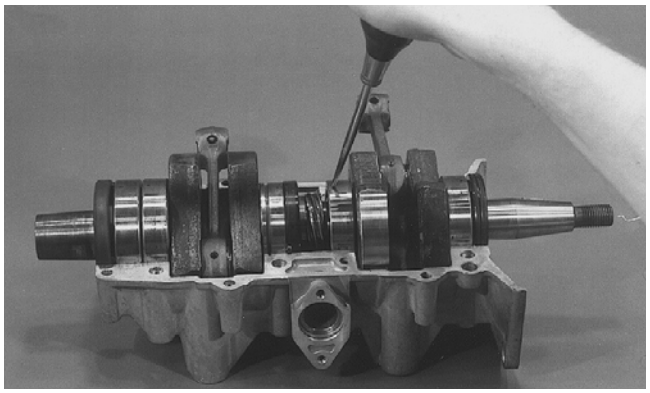
1. Install the C-ring and the five bearing retaining pins into the lower crankcase half.

2. Lubricate the inner lips of the crankshaft oil seals with grease; then slide the seals onto the crankshaft making sure the spring side of each seal faces the center of the crankshaft.



AC087

3. Apply oil to the crankshaft bearings; then install the dowel pins, C-ring, and crankshaft into the lower crankcase half. Be sure the alignment hole in each bearing is positioned over its respective bearing retaining pin in the crankcase; then seat the crankshaft.



MS986A

■ **NOTE: Make sure the crankshaft center seal is properly positioned in the groove of the lower crankcase half.**

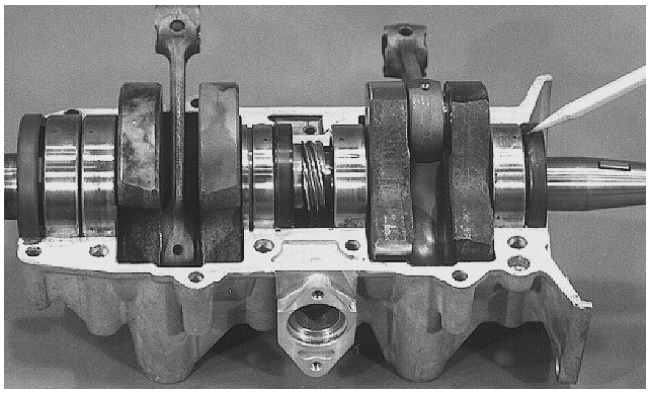
■ **NOTE: To check the bearing for proper position, place the point of a sharp tool into the dimple found in the bearing race. Strike the tool with the palm of the hand in either direction. If the bearing moves, it isn't positioned correctly and must be rotated until it drops onto the dowel pin.**

⚠ CAUTION

If the bearings are not properly seated during assembly, the crankcase halves will not seal tightly and engine damage will result.

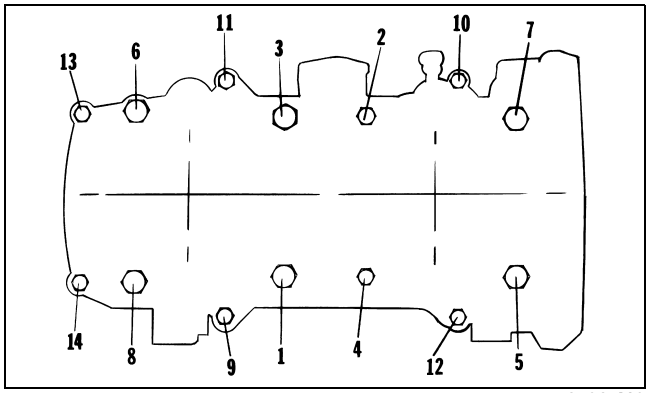
4. Apply a thin coat of Three Bond Sealant (p/n 0636-070) to the crankcase sealing surfaces.

5. Assemble the crankcase halves making sure the crankcase dowel pins are properly positioned and the end seal tab will not block the oil transfer port in the upper crankcase half.



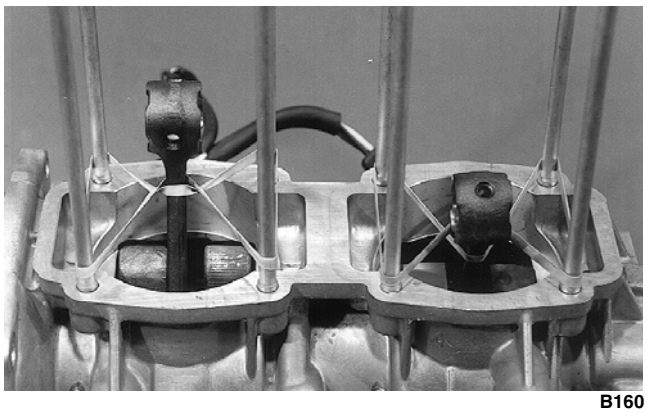
AB092

6. Install the crankcase cap screws making sure the cap screws are in the corresponding-sized holes. Tighten in three steps the 8 mm cap screws to specifications and the 6 mm cap screws to specifications using the pattern shown.



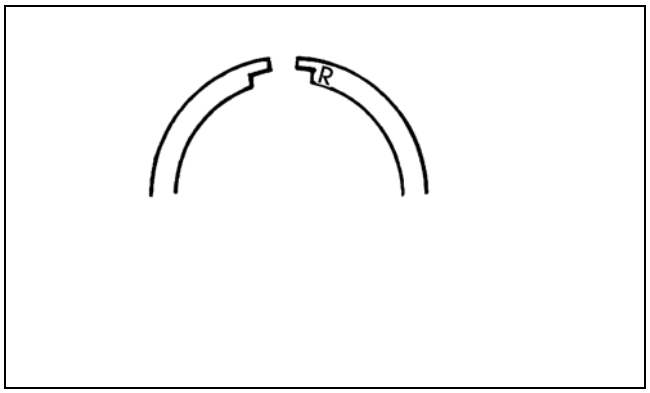
0726-412

■ **NOTE: Secure the connecting rods with rubber bands on the cylinder studs.**



B160

7. Install the piston rings on each piston so the letter on the top (inclined surface) of each ring faces the dome of the piston.



726-306A



AC088

⚠ CAUTION

Incorrect installation of the piston rings will result in engine damage.

8. Apply oil to the connecting-rod small-end bearings; then install the small-end bearings into the connecting rods.

■ **NOTE: Apply oil to the piston pin before installing.**

9. Place each piston over the connecting rod so the arrow on the piston dome points toward the exhaust port; then secure with a piston pin.

■ **NOTE: The arrow is found either up inside the piston or on the dome top.**

10. Install the new circlips so the open end is directed either down or up.



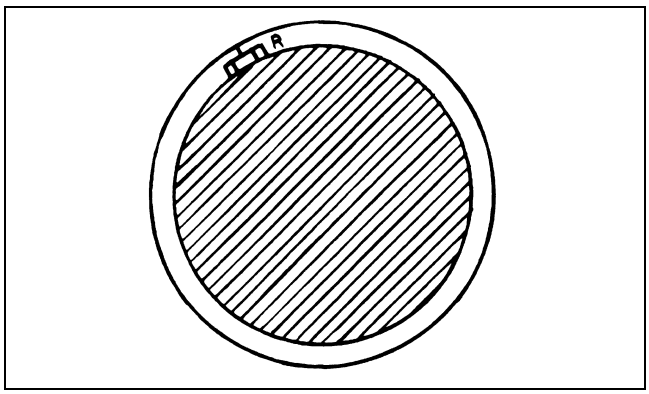
B324D

⚠ CAUTION

Make sure circlips are firmly seated and the open end is directed either down or up before continuing with assembly.

11. Install the cylinder base gaskets onto the crankcase making sure each gasket aligns with crankcase transfer passages.

12. Rotate each piston ring until the ring ends are properly positioned on each side of the ring keeper; then apply oil to the piston assemblies and cylinder bores. Remove the rubber bands from the connecting rods.

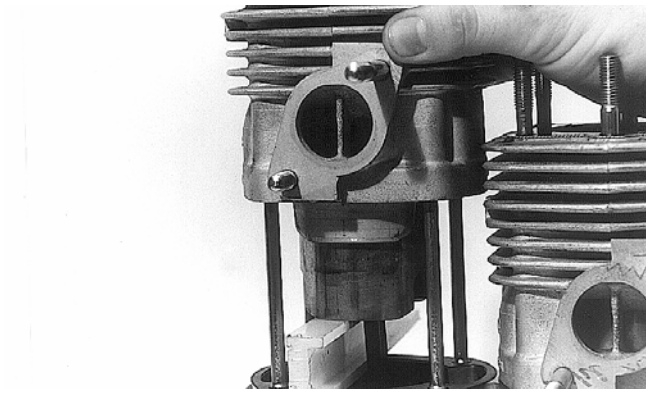


726-306B

■ **NOTE: Apply a generous amount of oil to the surfaces of the pistons, rings, and cylinder bores.**

■ **NOTE: Inspect the cylinder-base gasket to ensure proper positioning.**

13. For each piston, place a piston holder (or suitable substitute) beneath the piston skirt and square the piston in respect to the crankcase; then using a ring compressor or the fingers, compress the rings and slide the cylinder over the piston. Remove the piston holder and seat the cylinder firmly onto the crankcase.

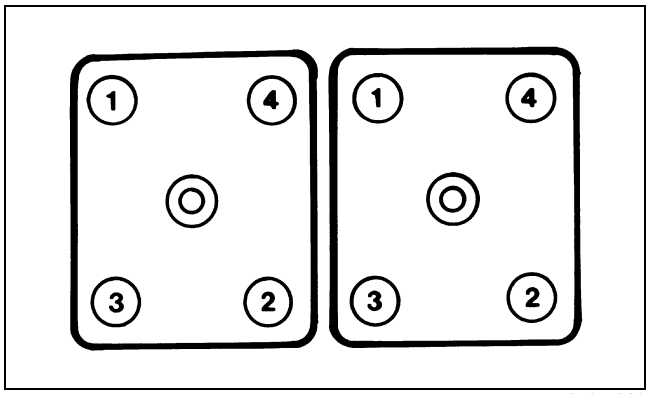


A828

14. Place each cylinder head with dowel pins and gasket into position and install the eight nuts. DO NOT TIGHTEN AT THIS TIME.

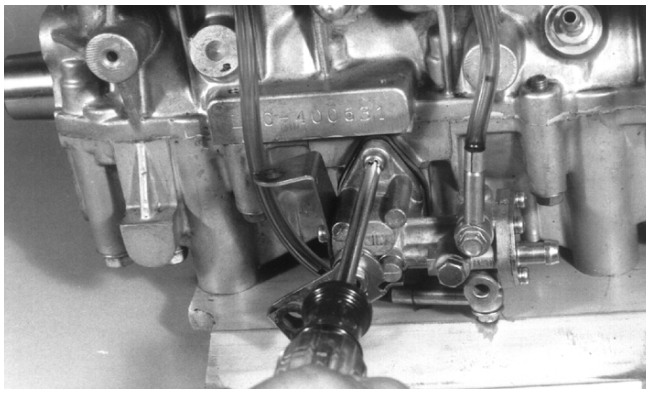
15. Temporarily install the exhaust manifold and secure with four nuts and lock washers to square the cylinders. Tighten the manifold nuts to specifications.

16. With the exhaust manifold in place, tighten the cylinder head nuts (from step 14) in three steps to specifications using the pattern shown.



0725-318

17. In order, install the gear, shim, gasket, retainer, gasket, and oil-injection pump. Secure with two screws, lock washers, and washers. Tighten to specifications.



AB078

⚠ CAUTION

Be sure the gear is properly aligned with the slot of the oil-injection pump shaft. The injection pump will be damaged if these two components are not aligned.

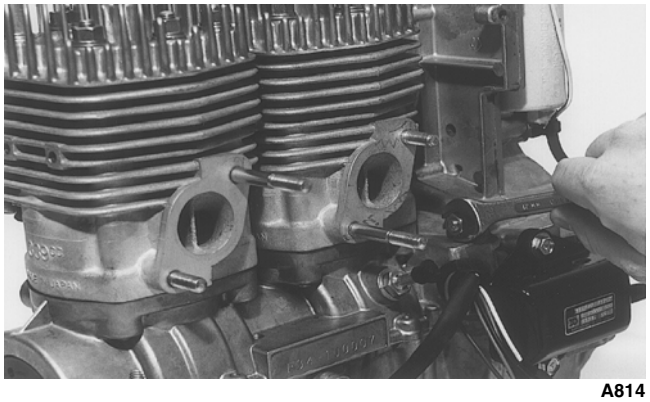
■ NOTE: If removed, secure the ignition coil to the fan case.

18. Align the reference marks made during disassembly; then secure the stator plate with two Allen-head cap screws (coated with red Loctite #271), lock washers, and washers.

■ NOTE: Before installing the flywheel, wipe the crankshaft and flywheel taper clean using a clean cloth.

19. Install the key in the crankshaft and slide the flywheel onto the crankshaft making sure the keyways match.

20. Place the fan case into position and secure with four nuts. Tighten the nuts to specifications.



A814

21. On the 370 cc, apply a thin coat of High-Temp Sealant (p/n 0636-069) to both sides of the intake gaskets; then in order, install a gasket (one on each port), shroud, gasket (one on each port), insulator (one on each port), gasket (one on each port), and intake manifold with flange. Secure with nuts (threads coated with red Loctite #271). Tighten nuts in three steps to specifications.

22. On the 440 cc, apply a thin coat of High-Temp Sealant (p/n 0636-069) to both sides of the intake gaskets and the front side of each adapter plate; then in order, install a gasket (one on each port), shroud, gasket (one on each port), and adapter plate (one on each port). Secure with screws coated with red Loctite #271.

23. Place the intake flanges into position and secure with nuts (threads coated with red Loctite #271), lock washers, and washers. Tighten to specifications.

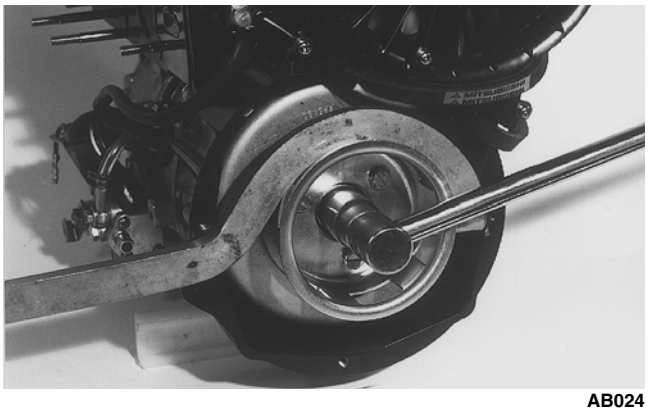
24. Remove the exhaust manifold.

25. Install spark plugs and tighten to specifications.

26. Attach the oil-injection hoses to their fittings. Secure with clamps.

27. Test the engine for air leaks (see Section 3).

28. Temporarily secure the starter pulley on the flywheel with three cap screws. Install the flywheel washer, lock washer, and nut. Apply red Loctite #271 to the crankshaft threads before installing the flywheel nut. Using a spanner wrench to secure the crankshaft, tighten the flywheel nut to specifications.

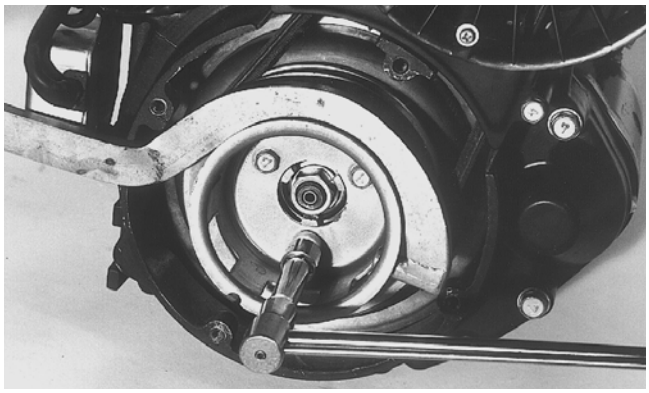


AB024

29. Remove the starter pulley. Position the fan belt drive pulley into the belt. Align the starter pulley holes with those in the belt pulley. Start one of the cap screws into the flywheel; then rotate the belt pulley and starter pulley in a counterclockwise direction.

30. When the pulley pivots on the cap screw, rock the pulleys backward or forward until the remaining cap screw holes align. Install the remaining two cap screws and tighten evenly to specifications.

■ **NOTE: Apply red Loctite #271 to the threads of the cap screws before installing.**



AB040

31. Place an exhaust manifold gasket on each exhaust port making sure the metal side of the gasket faces the cylinder. Slide the exhaust-side cooling shroud onto the exhaust port studs; then place the upper cooling shroud into position and secure the shrouds with 14 cap screws noting the location of the longer cap screws from disassembling. Tighten to specifications. Connect the spark-plug caps.



AB012

32. Apply a thin coat of High-Temp Sealant (p/n 0636-069) to the exhaust-manifold gasket; then place a gasket on each exhaust port making sure the metal side of each gasket faces away from the cylinder. Install the exhaust manifold, lock washers, and nuts and tighten to specifications.

Assembling Engine
(570 cc Models)

■ **NOTE: The use of new gaskets and seals is recommended when assembling the engine.**

■ **NOTE: When the use of a lubricant is indicated, use Arctic Cat 50:1 Injection Oil.**

1. Place the upper crankcase half (with its bottom side up) on two blocks of wood.

⚠ CAUTION

To prevent damage to the crankshaft, crankshaft bearings, or seals, make sure to always lift the crankshaft from both ends.

2. Lightly grease the inner lips of the crankshaft seals; then slide them onto the crankshaft.

3. Apply oil to the crankshaft bearings; then install the crankshaft into the upper crankcase half. Be sure the alignment hole in each bearing is positioned over its respective dowel pin in the crankcase; then seat the crankshaft.

■ **NOTE: To check the bearing for proper position, place the point of a sharp tool into the dimple found in the bearing race. Strike the tool with the palm of the hand in either direction. If the bearing moves, it isn't positioned correctly and must be rotated until it drops onto the dowel pin.**

■ **NOTE: Make sure the crankshaft center C-ring (integral with the center seal) is properly positioned in the groove of the upper crankcase half.**

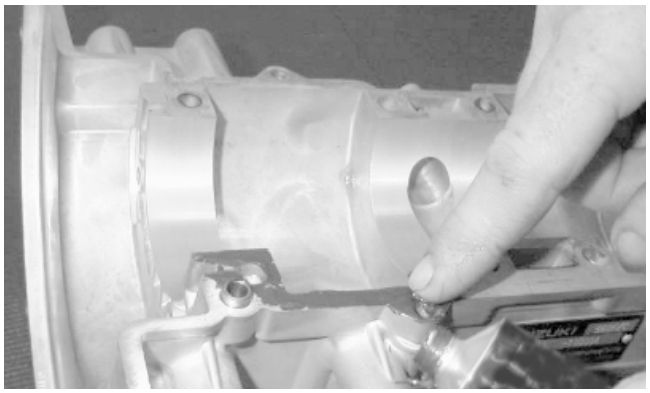
⚠ CAUTION

If the bearings are not properly seated during assembly, the crankcase halves will not seal tightly and severe engine damage will result.

4. Install the four crankcase dowel pins.

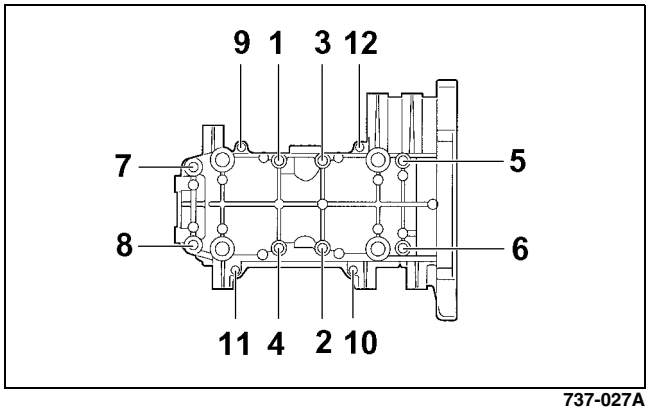
5. Evenly apply a thin coat of Three Bond Sealant (p/n 0636-070) to the entire bottom half crankcase sealing surface.

■ **NOTE: Use only Three Bond Sealant (p/n 0636-070) to seal the crankcase halves.**



MD0203

6. Install crankcase lower half. Install eight 8 mm and four 6 mm cap screws. Tighten in three steps the 8 mm cap screws to specifications and the 6 mm cap screws to specifications using the pattern shown.



737-027A



MD0212

■ **NOTE: Check the reed valve on each cylinder for cracking or fraying around the edges. Make sure they are closing completely.**

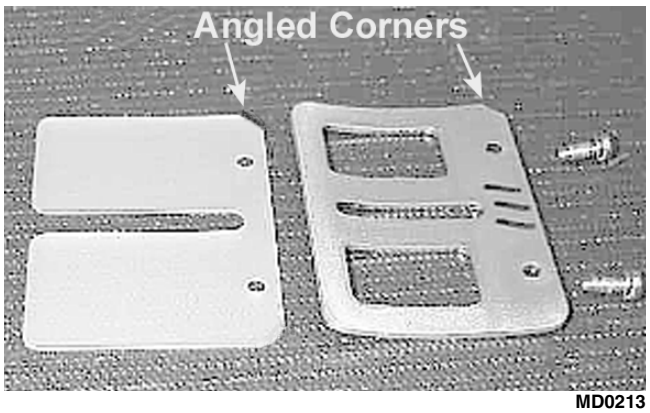
■ **NOTE: To inspect a reed valve assembly, remove the two Phillips-head screws securing the reed valve and reed valve stopper to the block; then remove the reed valve and stopper.**



MD0088

■ **NOTE: Apply blue Loctite #243 on the Phillips-head screws when assembling.**

■ **NOTE: Make sure the angled corner on the reed valve align with the angled corner on the reed valve stopper.**

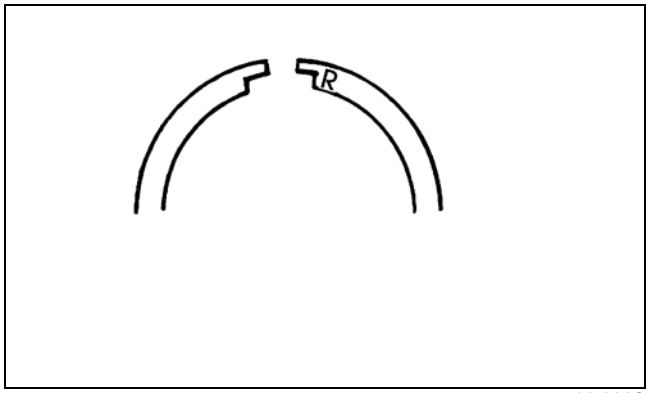


MD0213

⚠ CAUTION

Do not over-tighten the Phillips-head screws when installing the reed valves and reed valve stoppers.

7. Install the piston rings on each piston so the letter on the top (inclined surface) of each ring faces the dome of the piston.



726-306A

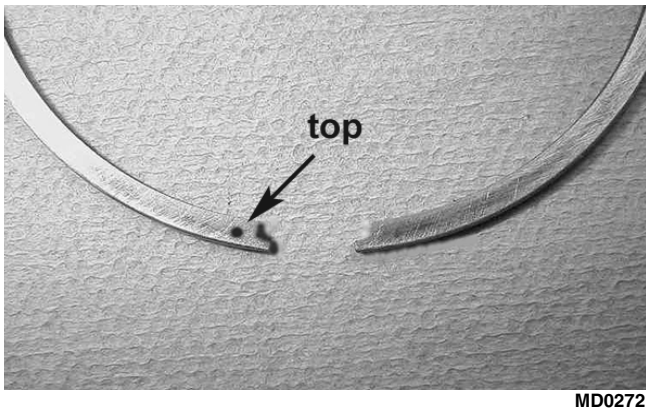
⚠ CAUTION

Incorrect installation of the piston rings will result in engine damage.

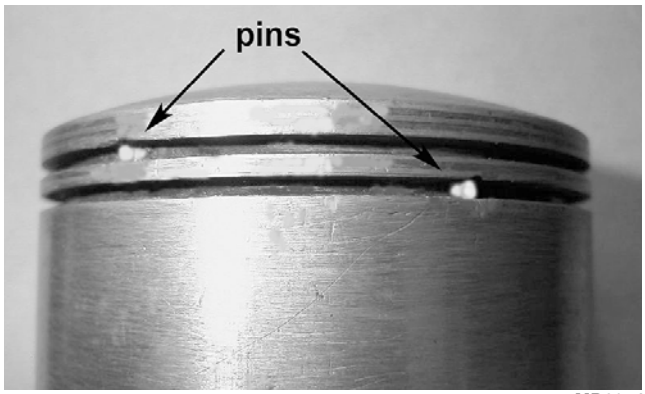
■ **NOTE: If the existing rings will not be replaced with new rings, note the location and top side of each ring for proper installation. When replacing with new rings, replace as a complete set only. When replacing rings note notches in ring ends which correspond with locating pins in ring grooves on intake side of the piston. This prevents the rings from turning on the piston when assembled.**



MD0208



MD0272

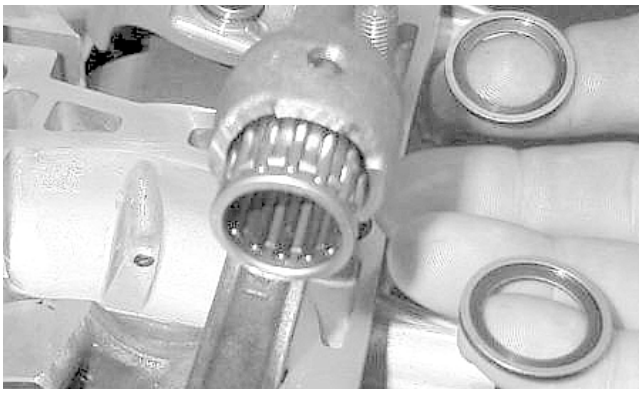


MD0271

8. Lubricate the piston pin bearings and install them into the connecting rods.

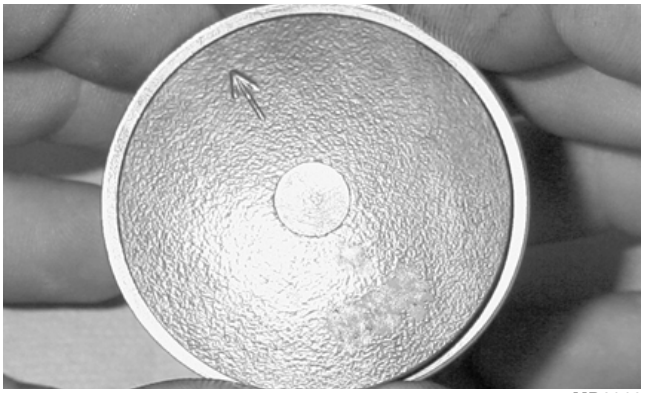
9. Install a piston pin bearing washer on each side of the bearings with the open sides facing the bearings.

■ **NOTE: The open sides of the piston pin bearing washers must face the bearing.**



MD0251

10. Place pistons over the connecting rods with the arrow (or indicator dot) pointing toward the exhaust port; then secure with an oiled piston pin. Install piston pin circlips with the open ends up or down.



MD0293



MD0248

11. Place the cylinder base gasket into position on the crankcase making sure the gasket is properly oriented so the dowel pins will fit through the holes easily.

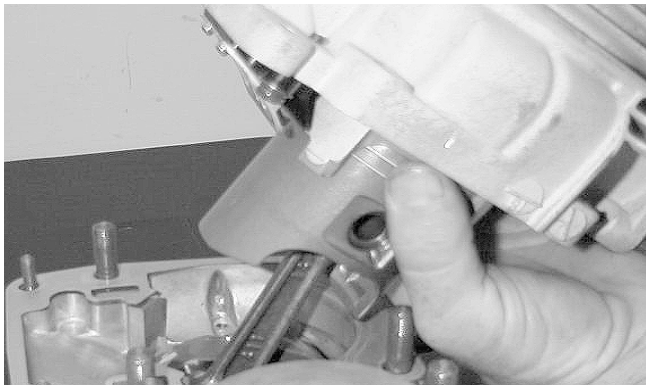
■ **NOTE: Be sure to spray a thin coat of Copper Coat Gasket Sealant (p/n 0636-092) onto the gasket if it is being reused.**

⚠ CAUTION

Make sure the circlips are firmly seated in their grooves and the open ends are pointed up or down before continuing with assembly.

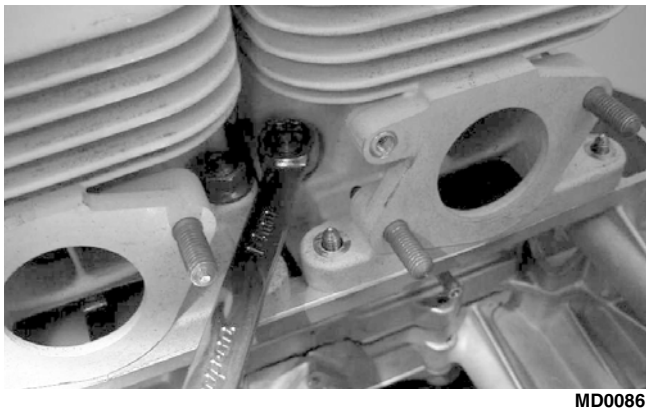
12. Rotate each piston ring until the ring ends are properly positioned with the pins in the ring grooves; then apply oil to the piston assemblies and cylinder bores. Using a ring compressor or the fingers, compress the rings and slide the cylinder over the piston. Seat the cylinder firmly onto the crankcase.

■ **NOTE: The cylinders should slide on easily. DO NOT force them on.**

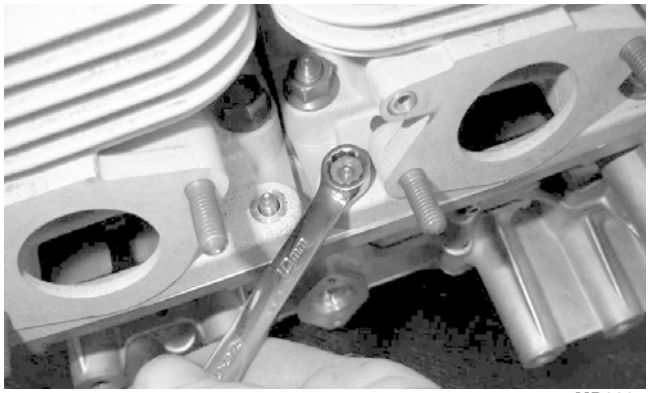


MD0229

13. Secure each cylinder by installing the four 6 mm and eight 8 mm nuts. Tighten the 8 mm nuts to specifications and the 6 mm nuts to specifications.

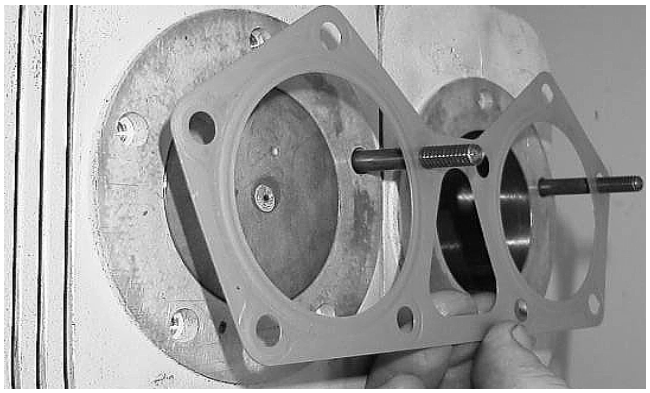


MD0086



MD0087

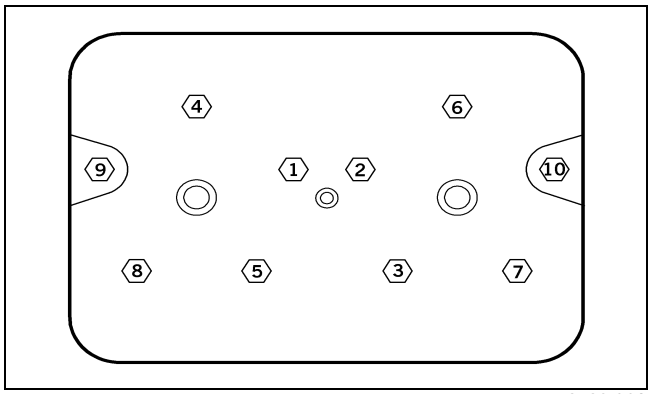
14. Install a new cylinder head gasket and the cylinder head; then install the eight cap screws and two nuts with washers. Tighten in three steps to specifications using the pattern shown.



MS384

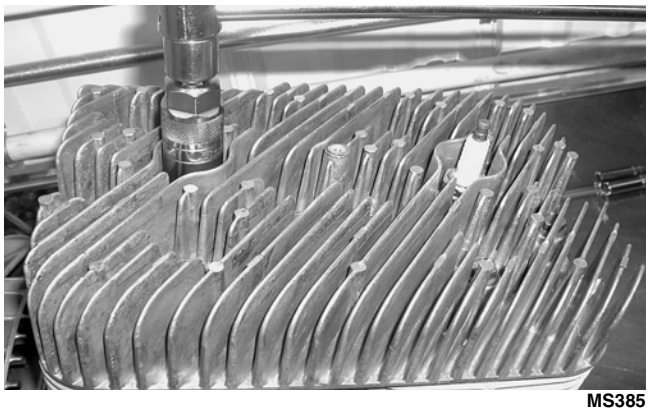


MS384



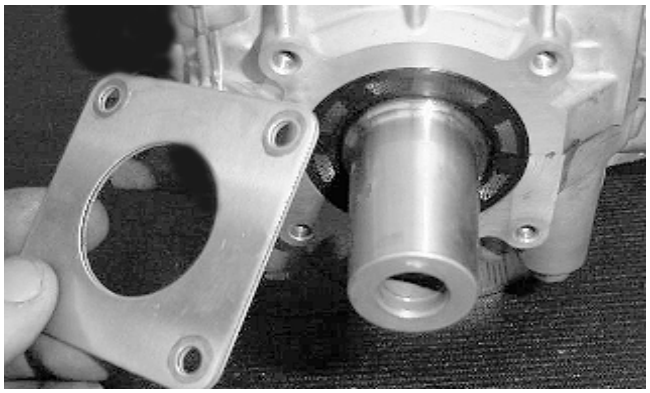
0738-291

15. Install the spark plugs; then tighten to specifications.

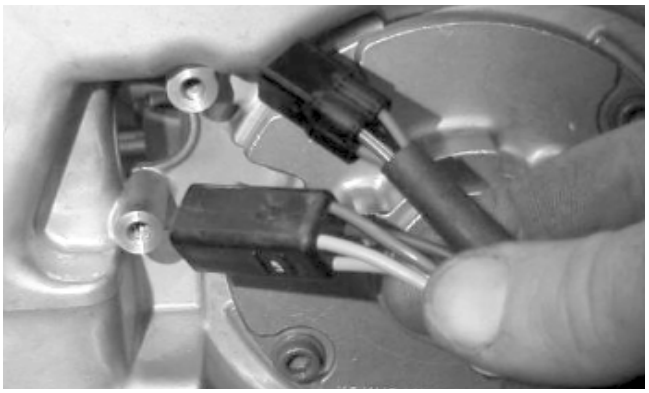


MS385

16. Position the seal retainer plate on the PTO-side; then install the four cap screws. Tighten the cap screws to specifications.



MD0253



MD0076



MD0292



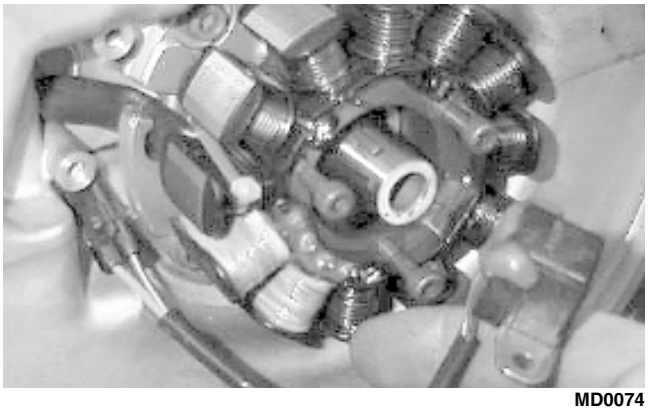
MD0274

17. Install the stator plate and secure with four Allen-head cap screws. Install the stator plate so the ignition wire cut-out is in the upper left position. Lightly coat the four Allen-head cap screws with red Loctite #271; then tighten them to specifications.

19. Place the ignition timing sensor wiring through the hole in the crankcase; then position the ignition timing sensor and install two Phillips-head cap screws (coated with red Loctite #271). Tighten the cap screws securely.

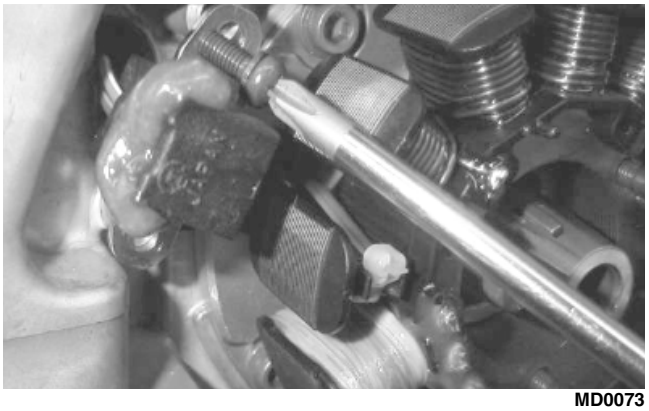


MD0255



MD0074

18. Place the stator wiring through the hole in the crankcase; then install the stator. Lightly coat the three Allen-head cap screws with red Loctite #271; then tighten them to specifications.



MD0073

20. Install the rubber insulator grommet into the crankcase.



MD0262

21. Install the key; then install the flywheel and cap screw. Tighten the cap screw only until snug.

■ **NOTE: Do not tighten the flywheel cap screw at this point.**



MD0264

22. Place the fan and starter pulley into position on the flywheel. Using Spanner Wrench (p/n 0144-007) to hold the starter cup, tighten the three cap screws (coated with green Loctite #609 and Loctite Primer #7471) to specifications.

⚠ CAUTION

Do not use green Loctite #609 without also using Loctite Primer #7471.

⚠ CAUTION

When installing the fan, make sure that the locating pins on the flywheel align with the indentations in the fan.



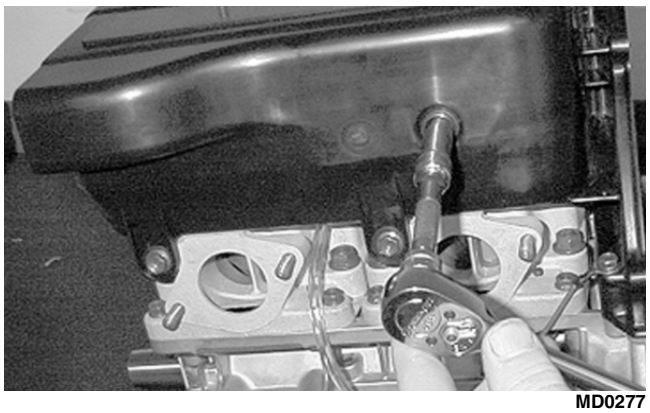
MD0280

23. Using Spanner Wrench (p/n 0144-007) to hold the starter cup, tighten the flywheel cap screw from step 21 (threads coated with red Loctite #271) to specifications.



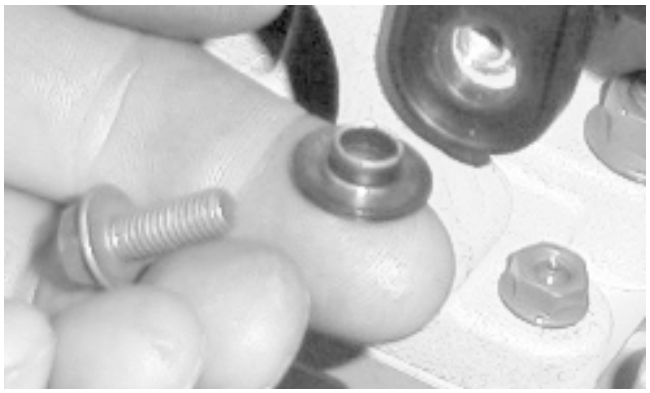
MD0278

24. Using the six cap screws and the special washers, install the rear (intake-side) shroud. Tighten the cap screws to specifications.



MD0277

25. Using the five 6 mm cap screws and the special washers, install the front (exhaust-side) cooling shroud and tighten to specifications. Install the rubber spark plug grommets; then tighten the cap screws securely.



MD0269



MD0268

26. Install the main fan shroud and recoil starter assembly. Tighten the eight cap screws to specifications.



MD0279



MD0291

27. Lubricate the oil-injection pump driveshaft; then while rotating the driveshaft, install it and the thrust washer into the lower crankcase half.

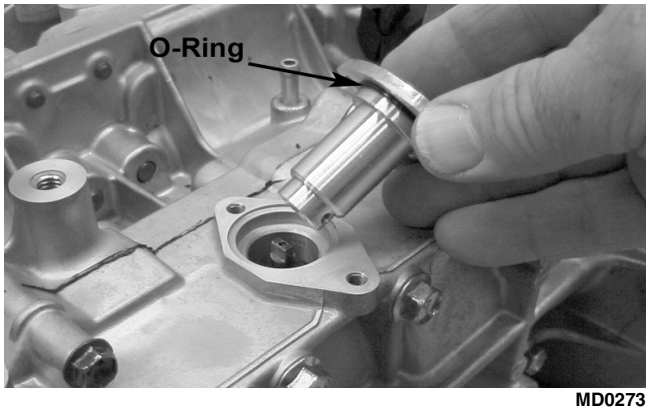
■ **NOTE: Make sure the thrust washer is installed on the oil injection pump driveshaft when it is installed.**



MD0252

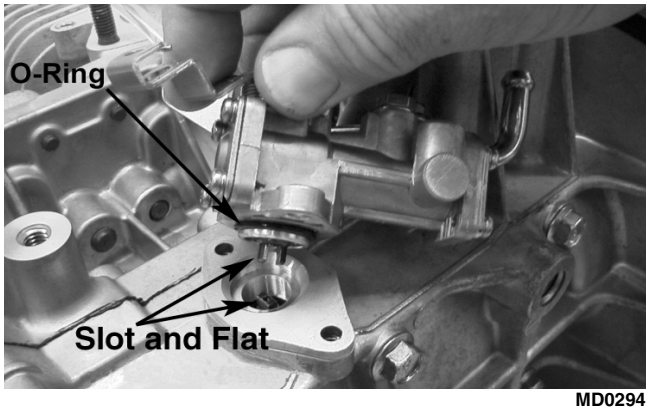
28. Install the oil injection pump driveshaft retainer and O-ring.

■ **NOTE: Make sure the O-ring is installed on the oil injection pump driveshaft retainer when it is installed.**

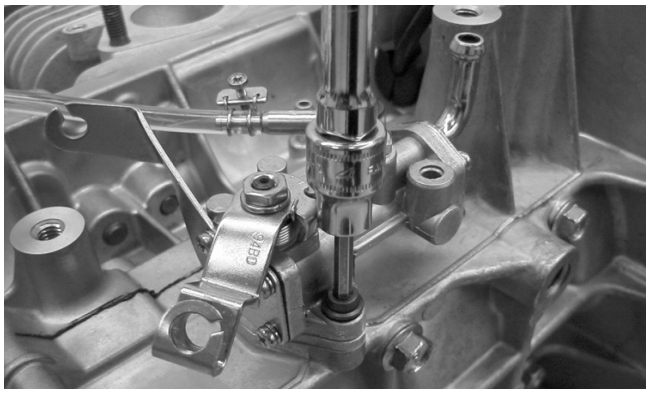


MD0273

29. Install the oil injection pump aligning the slot on the oil pump with the flat on the end of the oil injection pump driveshaft. Tighten the Allen-head cap screws to specifications.



MD0294



MD0090

30. Install the intake flange assembly using washers, lock washers, and nuts. Note the placement of gaskets, heat deflector, gaskets, insulators, and flanges. Tighten the nuts (threads coated with red Loctite #271) to specifications.

31. Install the exhaust manifold and gaskets using lock washers and nuts. Tighten the nuts to specifications.

Assembling Engine
(900 cc Models)

■ **NOTE: The use of new gaskets and seals is recommended when assembling the engine.**

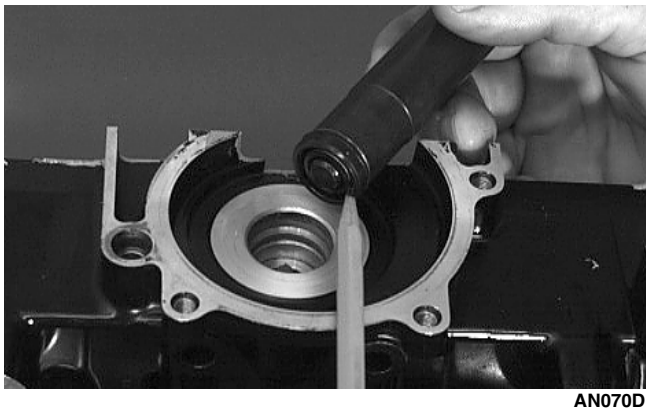
■ **NOTE: When the use of a lubricant is indicated, use Arctic Cat Synthetic APV 2-Cycle Oil.**

■ **NOTE: Do steps 1-5 only if the water pump has been disassembled.**

1. Apply a thin coat of grease to the inner seal lips of the water pump seal.

2. Using the seal driver, position the inner water pump shaft seal onto the seal driver and gently tap the seal down into position.

■ **NOTE: Grease must be applied to the lips of the inner seal before installation.**

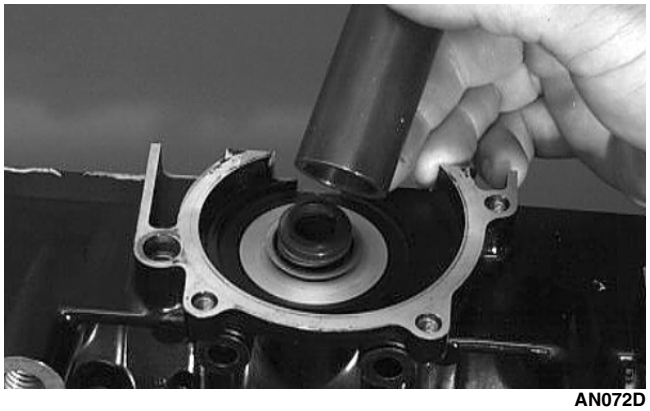


AN070D

■ **NOTE: The seal must be installed with its spring side towards the crankshaft.**

3. Install the snap ring securing the inner seal in the crankcase.

4. Using the seal driver, carefully install the outer water pump seal. Gently tap the seal down into position until it seats itself against its flange.

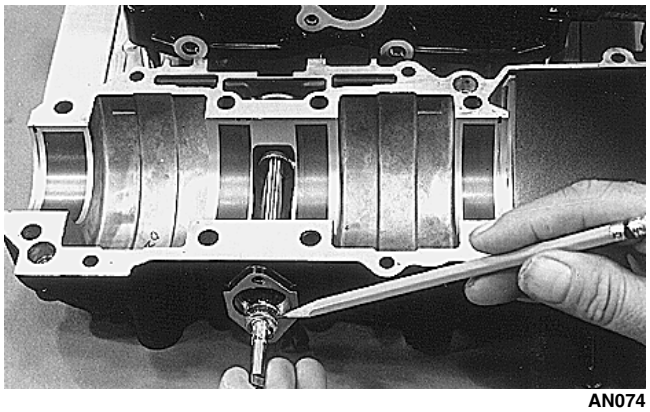


AN072D

5. Apply a thin coat of grease to the sealing surface of the oil-injection pump/water pump driveshaft; then place the Oil Seal Installation Tool (p/n 0644-219) at the end of the shaft. Twist the driveshaft clockwise as it is pushed through the oil and water pump seals; then remove the tool. Position the shim on the oil-injection pump end of the driveshaft.

⚠ CAUTION

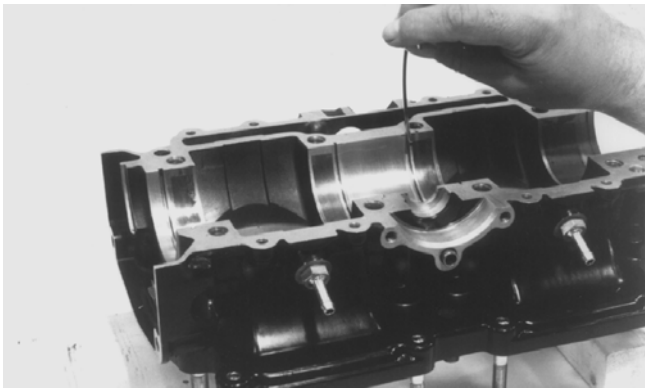
Be very careful not to damage the seals when installing the oil pump driveshaft. Be certain to use the seal installation tool. Twist the driveshaft clockwise as it enters the seal area and while it is being pushed through the seals.



AN074

6. Set the top half of the crankcase upside down on the work bench with a 4 in. block of wood under each end.

7. Install the C-ring in the upper crankcase half. Install the four bearing retaining pins in the crankcase bearing areas.

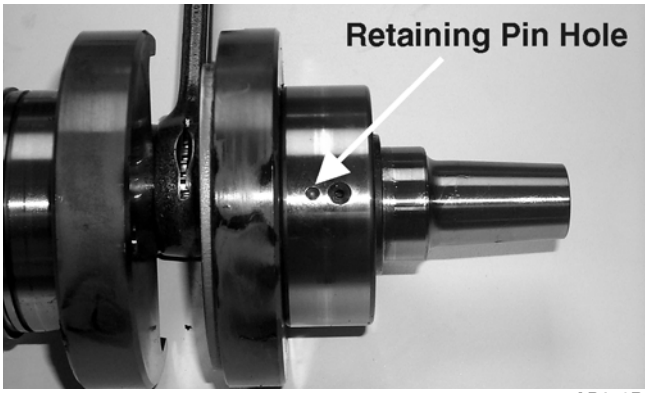


AJ095

8. Using Arctic Cat Synthetic APV 2-Cycle Oil, lubricate the crankshaft bearings and slide them onto the crankshaft.

⚠ CAUTION

The retaining pin holes on both bearings must be positioned toward the center of the crankshaft.



AP150B

9. Lubricate the inner lips of the crankshaft oil seals with grease; then slide the seals onto the crankshaft making sure the spring side of each seal faces the center of the crankcase.

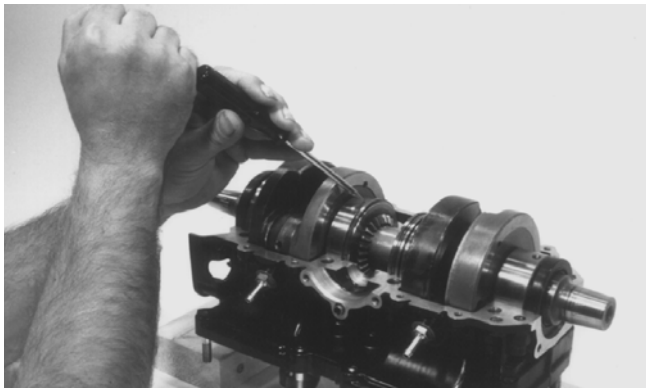
■ NOTE: There is a MAG-side seal and a PTO-side seal.

10. Apply Arctic Cat Synthetic APV 2-Cycle Oil to all of the crankshaft bearings; then install the crankshaft into the upper crankcase half. Be sure the retaining pin hole in each bearing is positioned over its respective dowel pin in the crankcase.

■ NOTE: Check all bearings by trying to rotate them to make sure they are being held in position by the retaining pin. Each bearing must drop onto the retaining pin.

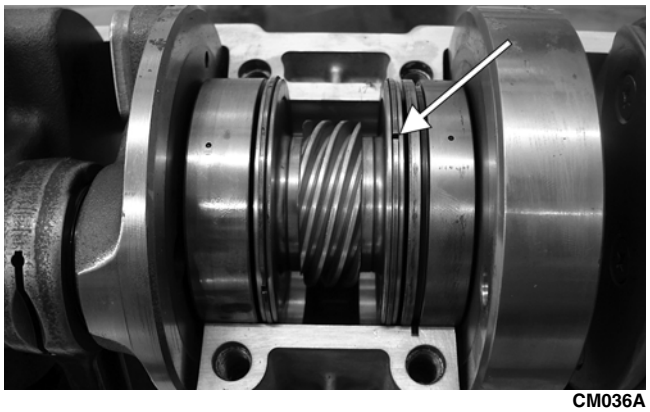
⚠ CAUTION

If the bearings are not properly seated during assembly, the crankcase halves will not seal tightly and severe engine damage will result.



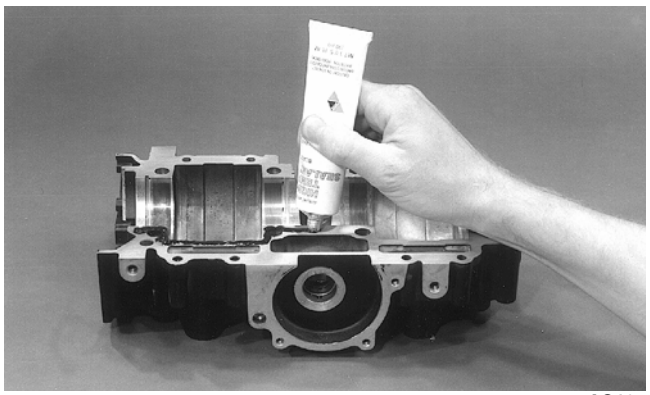
AJ097

11. Rotate the crankshaft center seal rings so the end gaps of the two large rings are 180° apart, one end gap being positioned downward and the other upward; then seat the crankshaft.



CM036A

12. Apply a thin coat of High-Temp Sealant (p/n 0636-069) to the lower crankcase sealing surface.



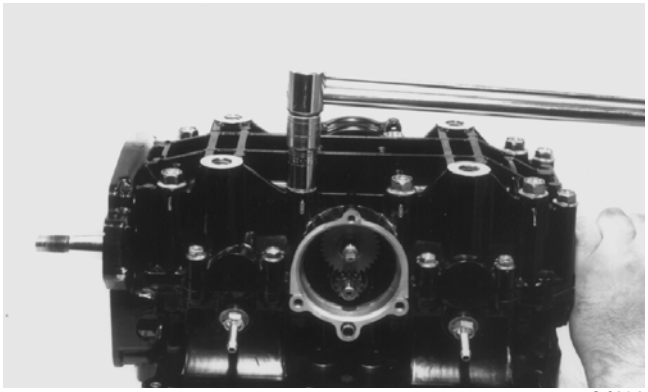
AQ127

⚠ CAUTION

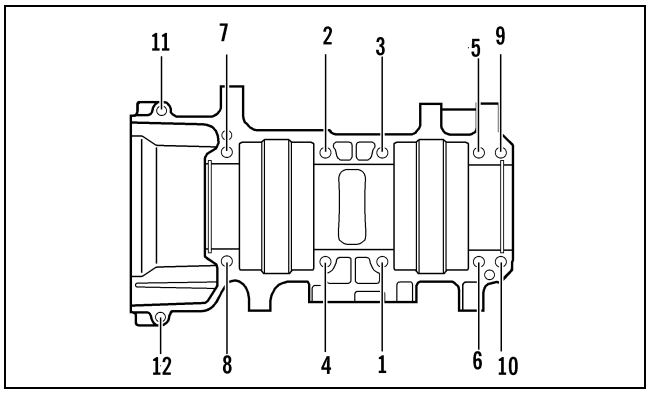
Check to make sure the two crankcase half dowel pins are in position at opposite corners of the lower case half.

13. Assemble the crankcase halves.

14. Install the crankcase cap screws securing the crankcase halves making sure the proper-sized cap screws are in the proper holes. Tighten in three steps the 10 mm cap screws to specifications and the 6 mm cap screws to specifications using the pattern shown.

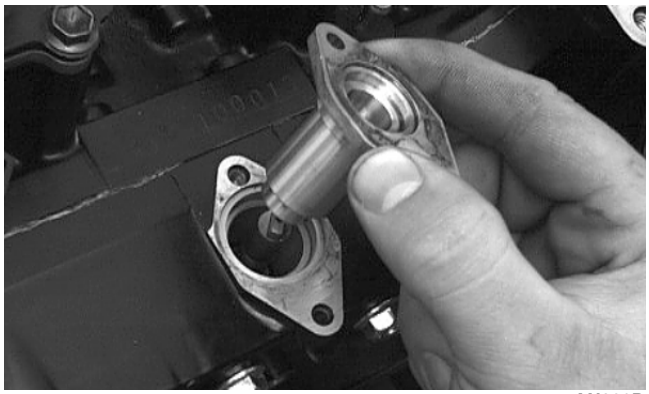


AJ101



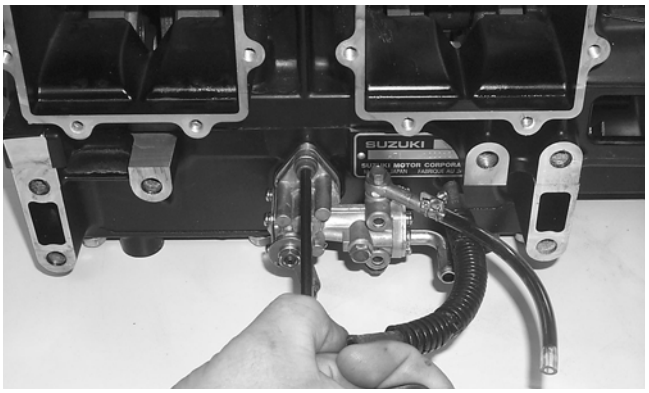
736-280A

15. Install the oil-injection pump retainer O-ring and retainer.



AN088D

16. Install the O-ring and the oil-injection pump making sure the pump shaft slot and pump driven gear shaft align. Secure with two screws (coated with blue Loctite #243) and washers. Tighten the two screws to specifications.



AP143

⚠ CAUTION

Be sure the oil-injection pump/water pump driveshaft is properly aligned with the slot of the oil-injection pump. The pump will be damaged if these two components are not aligned.

17. Place the lower check valve assembly into position and secure with the gaskets and the union bolt.

18. Position the rubber seal retainer and seal into the back side of the water pump impeller.

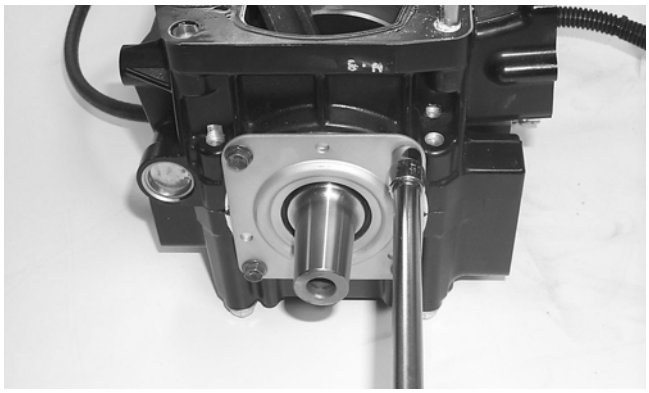
19. Using both thumbs, press the seal into position making sure its marked side is positioned towards the rubber seal cup; then apply a thin coat of grease to the seal outer surface.

20. Place the impeller into position and secure with a cap screw and washer. Be sure the rubber side of the washer is directed toward the impeller. Apply blue Loctite #243 to the threads of the cap screw and tighten to specifications.

⚠ CAUTION

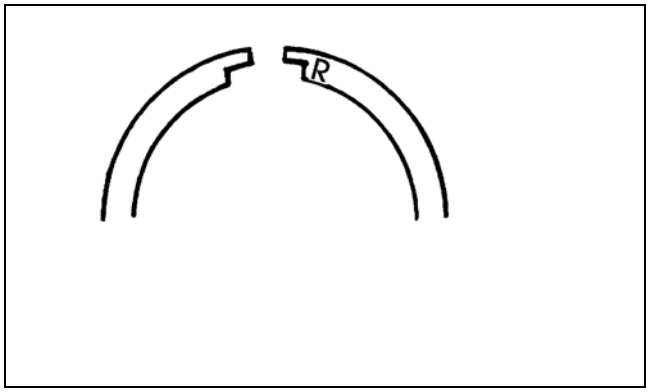
The rubber side of the washer, which secures the impeller, must be positioned toward the impeller. If installed incorrectly, a coolant leak will result.

21. Place the end plate into position on the crankcase; then apply blue Loctite #243 to the four cap screws and tighten securely.



AP142

22. Install the piston rings on each piston so the letter on the top or inclined surface of each ring faces the dome of the piston.

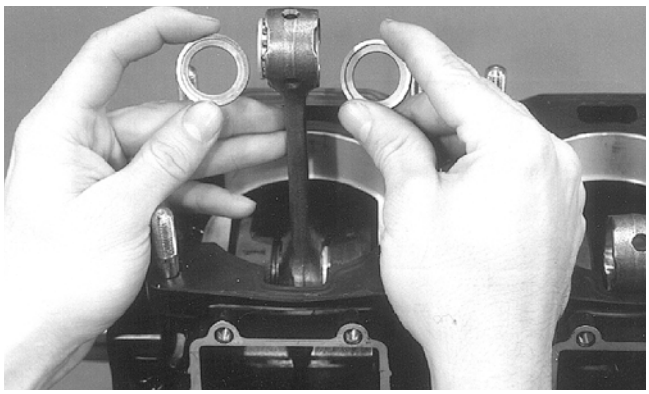


726-306A

⚠ CAUTION

Incorrect installation of the piston rings will result in engine damage.

23. Apply oil to the connecting-rod small end bearings; then install the small-end bearings and thrust washers.



AQ059

24. Place each piston over the connecting rod so the arrow on each piston will point toward the exhaust port and secure with a piston pin; then install the new circlips so the open end is directed either down or up.

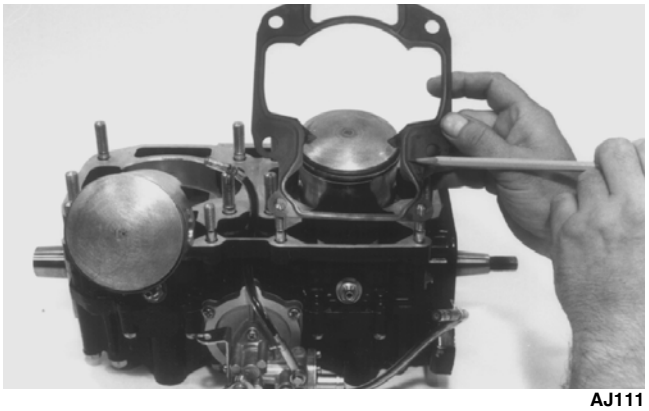


AJ110

⚠ CAUTION

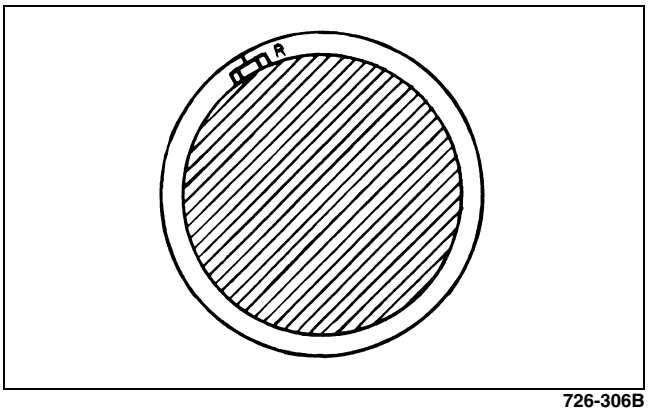
Make sure circlips are firmly seated and the open end is directed either down or up before continuing with assembly.

25. Apply a thin coat of Copper Coat Gasket Sealant (p/n 0636-092) to both sides of each cylinder-base gasket if the gaskets are being reused. If using new gaskets, it isn't necessary to apply copper coat. Install the gasket with the raised portion of the gasket positioned upward.



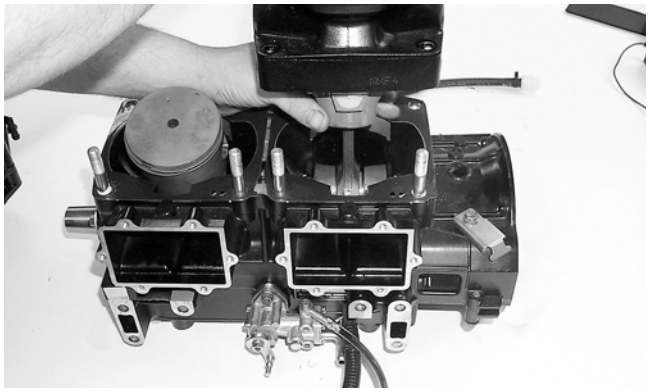
AJ111

26. Rotate each piston ring until the ring ends are properly positioned on either side of the ring keeper; then apply oil to the piston assemblies and cylinder bores.



726-306B

27. In turn on each cylinder, place a piston holder (or suitable substitute) beneath the piston skirt and square the piston in respect to the crankcase; then using a ring compressor or the fingers, compress the rings and slide the cylinder over the piston. Remove the piston holder and seat the cylinder firmly onto the crankcase.



AP138

28. Secure each cylinder with four flange cap screws and four nuts with flat and lock washers. Using a crisscross pattern, tighten the nuts and cap screws to specifications.

29. Place the O-rings into position on the top of each cylinder.



AJ118

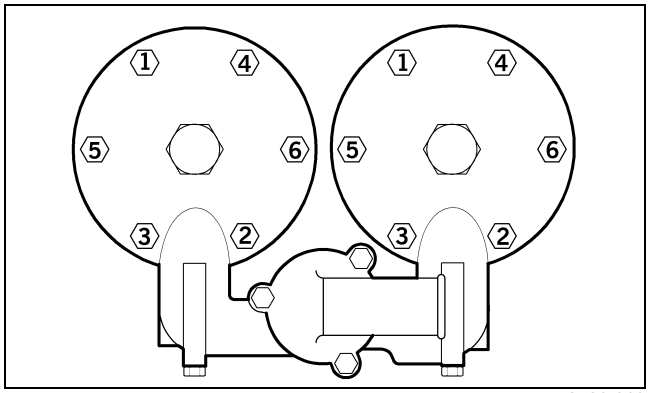
■ **NOTE: If reusing O-rings and they are slightly stretched, shrink the O-rings by cooling them (in a refrigerator for example) for a short period of time.**

30. Check sealing surface to make sure the surface is clean; then set the cylinder heads in position.

31. Apply a thin coat of High-Temp Sealant (p/n 0636-069) to the two thermostat housing gaskets. Place the gaskets and housing into position and secure with four cap screws and washers. Tighten the four cap screws in a crisscross pattern to specifications.

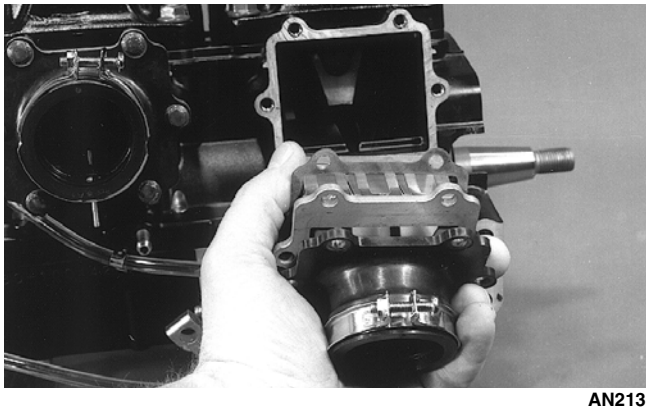
■ **NOTE: The thermostat housing cap screws must be tightened before tightening the head cap screws. This will allow the gasket surfaces of the head to align with the housing and prevent any coolant leakage.**

32. Tighten the head cap screws in three steps to specifications using the pattern shown; then install the spark plugs and tighten to specifications.



0738-292

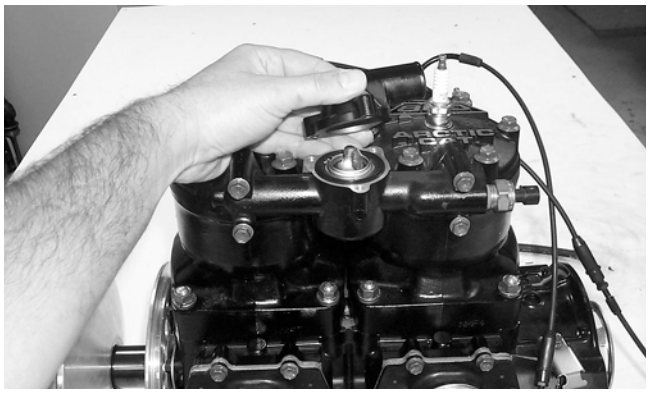
33. If removed in turn for each cylinder, install the gasket, reed valve assembly, and carburetor flange to the crankcase; then secure with six cap screws. Tighten to specifications.



AN213

34. Test the engine for air leaks (see Section 3).

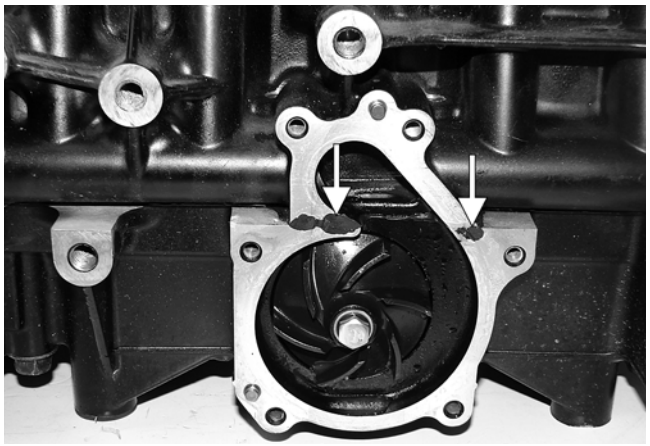
35. Place the thermostat with gasket and cap into position. Secure with three cap screws. Tighten to specifications.



AP152

36. Apply a thin coat of silicone sealant to the crankcase water pump housing sealing surface.

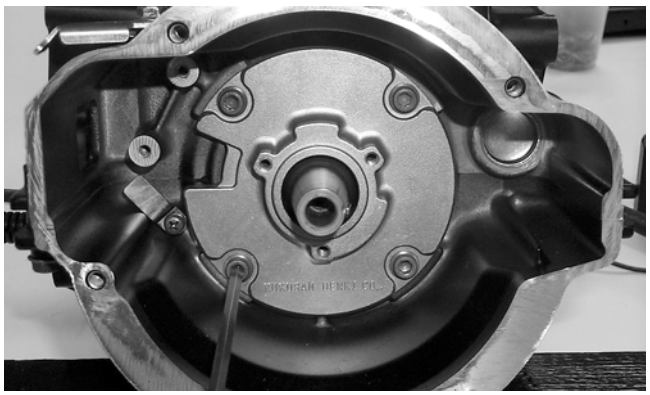
■ **NOTE: Sealant is required only on the crankcase seam.**



CM015A

37. Apply a thin coat of High-Temp Sealant (p/n 0636-069) to the water pump cover seal and position the O-ring into the cover. Carefully place the cover over the impeller and onto the crankcase. Secure with six cap screws. Tighten cap screws evenly to specifications.

38. Install the stator backing plate and secure with four cap screws. Apply blue Loctite #243 to the threads of each cap screw before installation. Tighten securely.



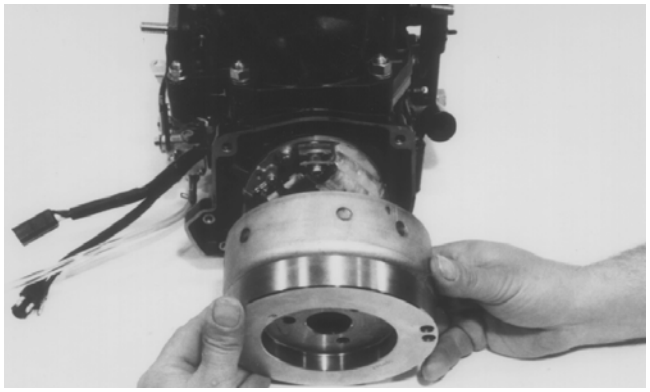
AP133

39. Set the timing sensor into position in the magneto housing. Apply blue Loctite #243 to the threads of the two screws and secure the timing sensor to the housing.

40. Route the stator wiring harness through the rubber grommet; then place the stator into position and secure with three screws coated with blue Loctite #243. Tighten securely.

41. Secure the stator wiring harness to the magneto housing using the tab plate and screw.

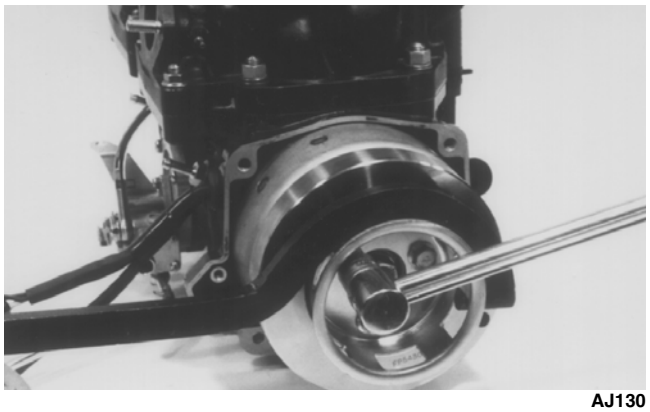
42. Install the key in the crankshaft and slide the flywheel onto the crankshaft making sure the keyways align.



AJ128

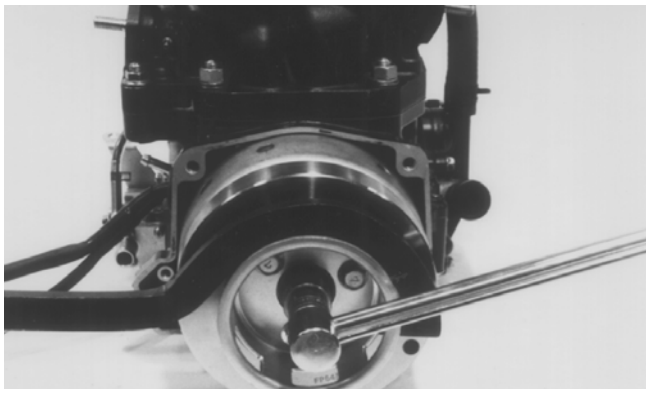
43. Apply blue Loctite #243 to the threads of the cap screw; then install the flat washer, lock washer, and cap screw securing the flywheel. Tighten the cap screw finger-tight.

44. Place the starter pulley into position on the flywheel and secure with three cap screws coated with blue Loctite #243. Tighten the three cap screws evenly to specifications.



AJ130

45. Using a spanner wrench, tighten the flywheel cap screw (from step 43) to specifications.



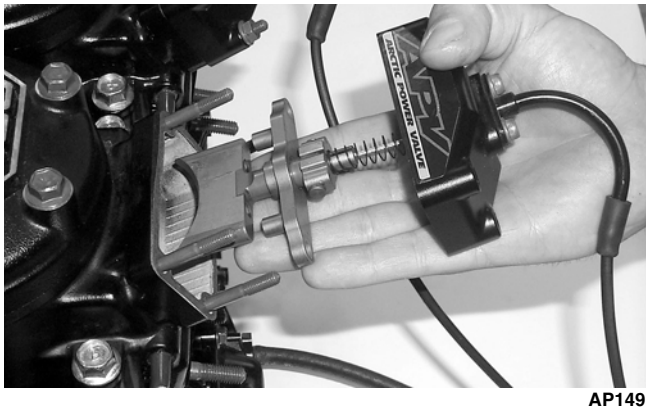
AJ131

46. Place the exhaust manifold into position on the cylinders; then secure with flange nuts. Tighten to specifications.

47. Place the engine mounting brackets into position on the engine; then secure with cap screws (coated with blue Loctite #243), lock washers, and flat washers. Tighten to specifications.

48. Slide the APV assemblies into position in the cylinders making sure the grooved sides are down; then slide the valve keepers into position and secure with two cap screws (coated with blue Loctite #243). Tighten to specifications.

■ **NOTE: The following two photographs are for clarity purposes only. These models may vary slightly.**



AP149



AP120

49. Slide the APV covers into position and secure with exisiting nuts. Tighten to specifications.

50. Position the coolant supply hose on the water pump and secure with a clamp.

Assembling Engine
(500/600/700 cc Models)

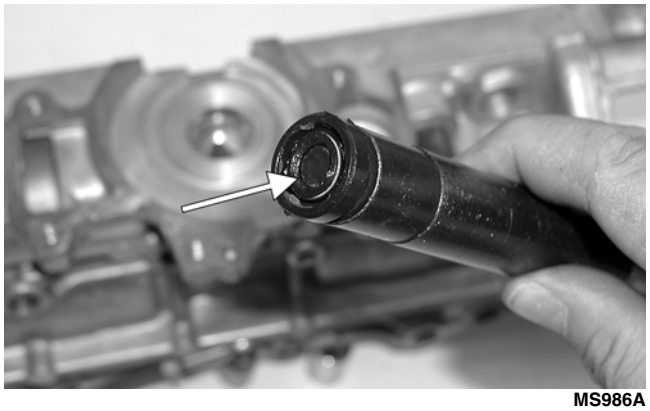
■ **NOTE: The use of new gaskets and seals is recommended when assembling the engine.**

■ **NOTE: When the use of a lubricant is indicated, use Arctic Cat Synthetic APV 2-Cycle Oil.**

1. Apply a thin coat of grease to the inner seal lips of the water pump seal.

2. Using the seal driver, position the inner water pump shaft seal onto the seal driver and gently tap the seal down into position.

■ **NOTE: Grease must be applied to the lips of the inner seal before installation.**



MS986A

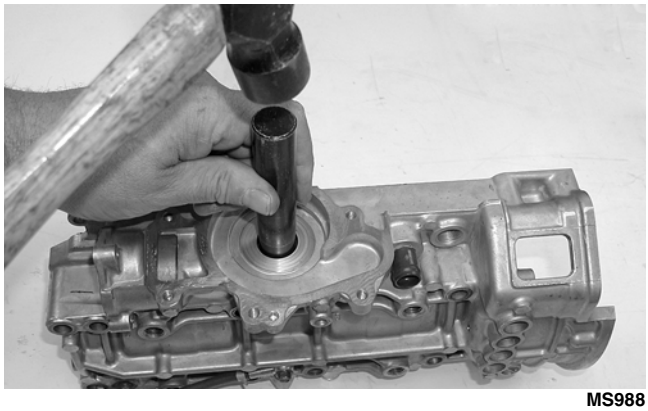
■ **NOTE: The seal must be installed with its spring side towards the crankshaft.**

3. Install the snap ring securing the inner seal in the crankcase.



MS415

4. Using the seal driver, carefully install the outer water pump seal. Gently tap the seal down into position until it seats itself against its flange.

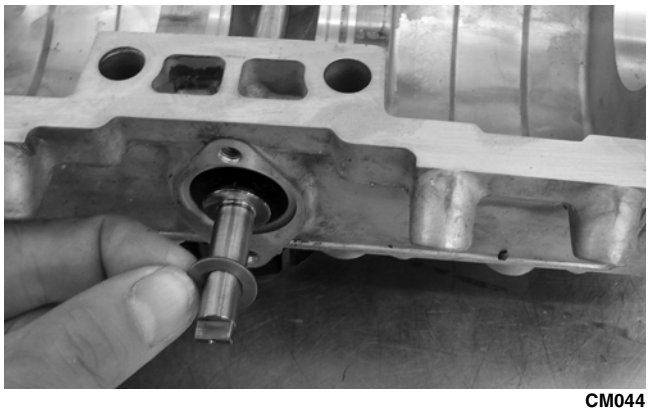


MS988

5. Apply a thin coat of grease to the sealing surface of the oil-injection pump/water pump driveshaft; then place the Oil Seal Installation Tool (p/n 0644-219) at the end of the shaft. Twist the driveshaft clockwise as it is pushed through the oil and water pump seals; then remove the tool. Position the shim on the oil-injection pump end of the driveshaft.

⚠ CAUTION

Be very careful not to damage the seals when installing the oil pump driveshaft. Be certain to use the seal installation tool. Twist the driveshaft clockwise as it enters the seal area and while it is being pushed through the seals.

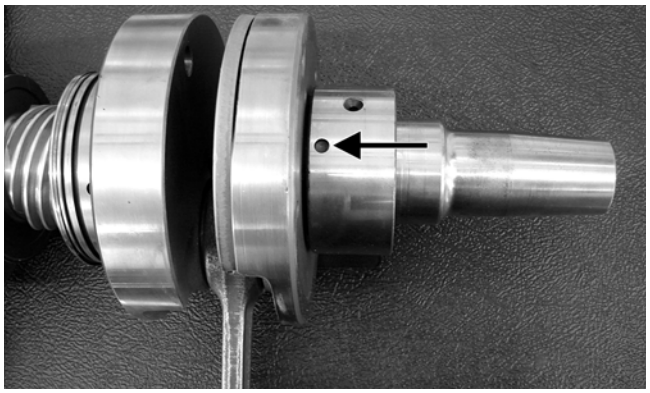


CM044

6. Position the upper crankcase half upside-down on two wooden blocks; then install the C-ring, the four bearing retaining pins, and the two crankcase dowel pins.

7. Place the PTO-side crankshaft bearing into position making sure the bearing retaining pin hole is positioned inward.

■ NOTE: The bearing retaining pin hole is the hole that doesn't go entirely through the bearing case.

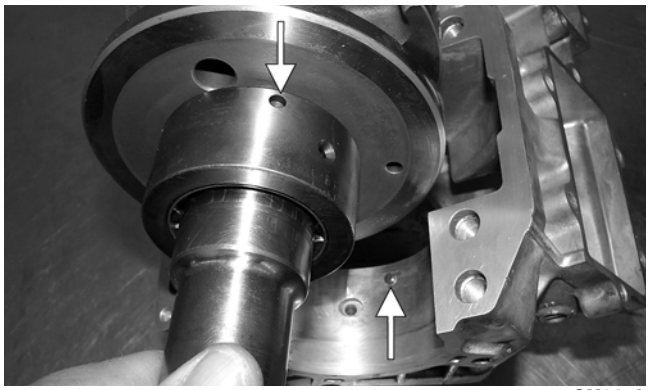


CM043A

8. Lubricate the inner lips of the crankshaft oil seals with grease; then slide the seals (and rubber spacer on the 600/700 cc) onto the crankshaft making sure the spring side of each seal faces the center of the crankshaft.

■ NOTE: There is a MAG-side seal and a PTO-side seal.

9. Apply oil to the crankshaft bearings; then install the crankshaft into the upper crankcase half. Be sure the alignment hole in each bearing is positioned over its respective dowel pin in the crankcase; then seat the crankshaft.



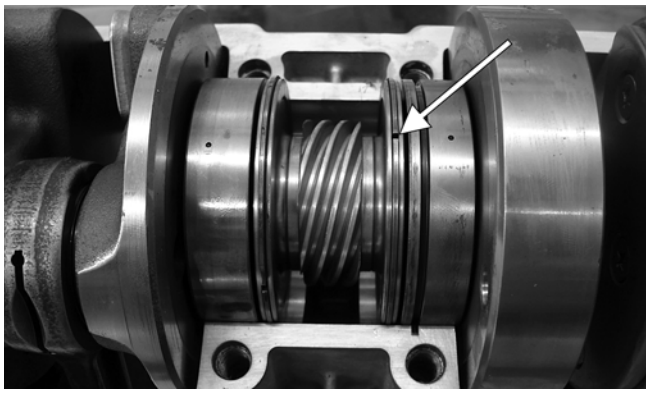
CM045A

■ NOTE: To check the bearing for proper position, place the point of a sharp tool into the dimple found in the bearing race. Strike the tool with the palm of the hand in either direction. If the bearing moves, it isn't positioned correctly and must be rotated until it drops onto the dowel pin.

⚠ CAUTION

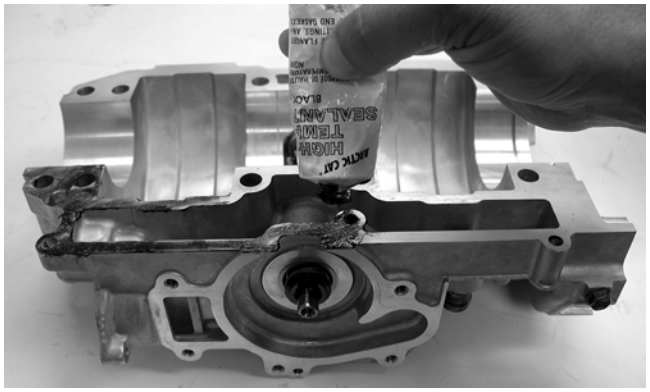
If the bearings are not properly seated during assembly, the crankcase halves will not seal tightly and severe engine damage will result.

10. Position the two center seal rings with their end gaps 180° apart (up on one and down on the other).



CM036A

11. Apply a thin coat of High-Temp Sealant (p/n 0636-069) to the entire bottom half of the crankcase sealing surface.



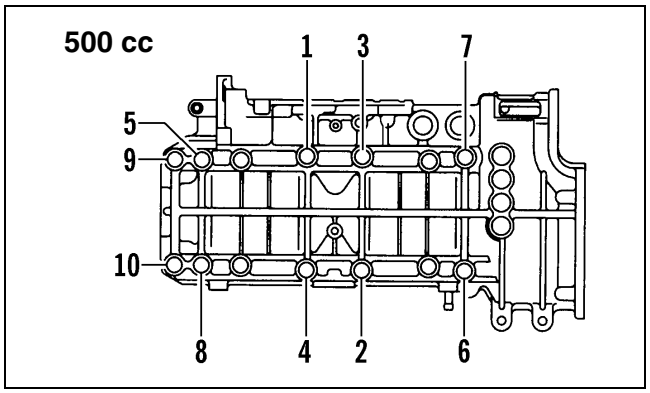
FC071

■ **NOTE: Use only Arctic Cat High-Temp Sealant (p/n 0636-069) to seal the crankcase halves.**

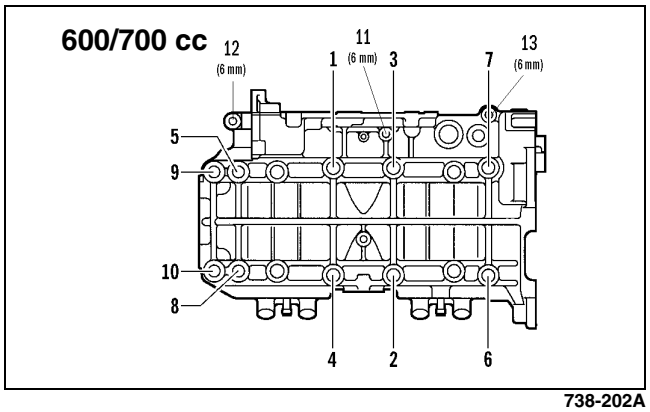
12. Assemble the crankcase halves making sure that the crankshaft gear and oil-injection pump driveshaft gears mesh. Rotate the crankshaft one full turn to align the crankshaft gear and pump driveshaft.

13. Install the crankcase cap screws (coated with blue Loctite #243) securing the crankcase halves.

14. Tighten the three 6 mm cap screws to specifications and the ten 10 mm cap screws to specifications using the appropriate pattern shown.



0738-201



738-202A

■ **NOTE: Secure the connecting rods with rubber bands on the cylinder studs.**

15. Install the oil-injection pump retainer O-ring and retainer.



FC082

16. Install the O-ring and the oil-injection pump making sure the pump shaft slot and pump driven gear shaft align. Secure with two screws (coated with blue Loctite #243) and washers. Tighten the two screws to specifications.

⚠ CAUTION

Be sure the oil-injection pump/water pump driveshaft is properly aligned with the slot of the oil-injection pump. The pump will be damaged if these two components are not aligned.

17. Position the rubber seal retainer and seal into the back side of the water pump impeller.

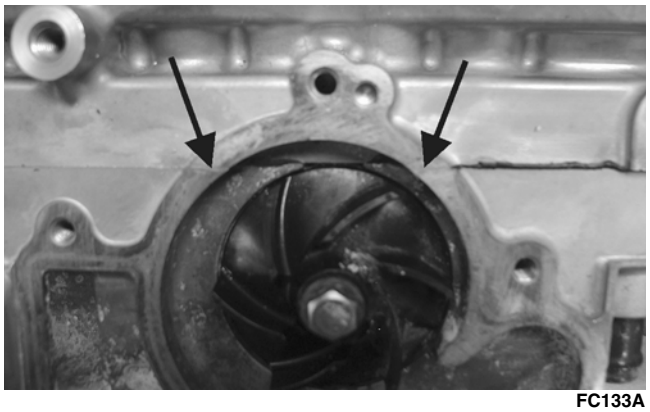
18. Using both thumbs, press the seal into position making sure its marked side is positioned towards the rubber seal cup; then apply a thin coat of grease to the seal outer surface.

19. Place the impeller into position and secure with a cap screw and washer. Be sure the rubber side of the washer is directed toward the impeller. Apply blue Loctite #243 to the threads of the cap screw and tighten to specifications.

⚠ CAUTION

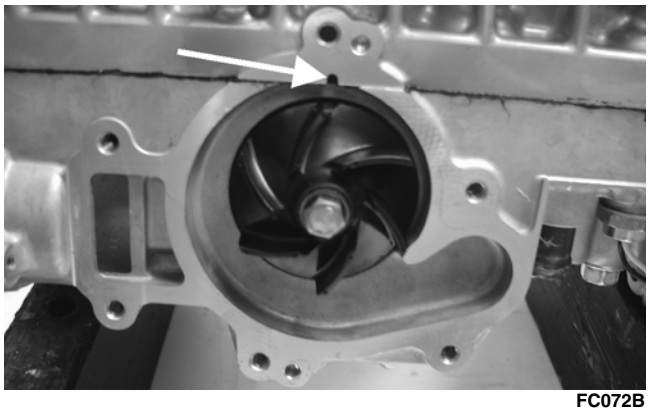
The rubber side of the washer, which secures the impeller, must be positioned toward the impeller. If installed incorrectly, a coolant leak will result.

20. Apply high-temperature sealant to the crankcase/water pump cover seam; then install the dowel pins into the crankcase.

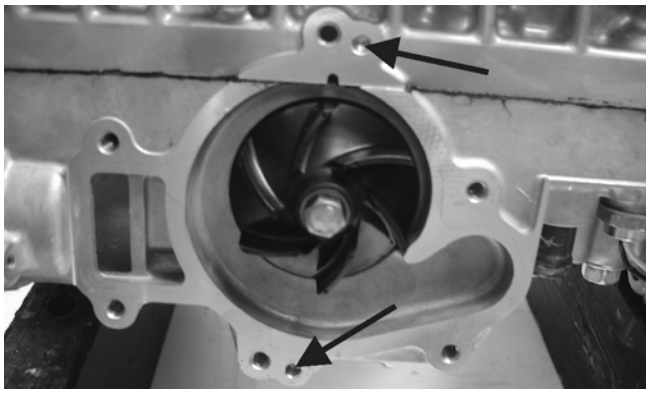


FC133A

■ NOTE: It is important to not get sealant into the breather hole in the crankcase. If sealant gets into the hole, carefully remove before proceeding.



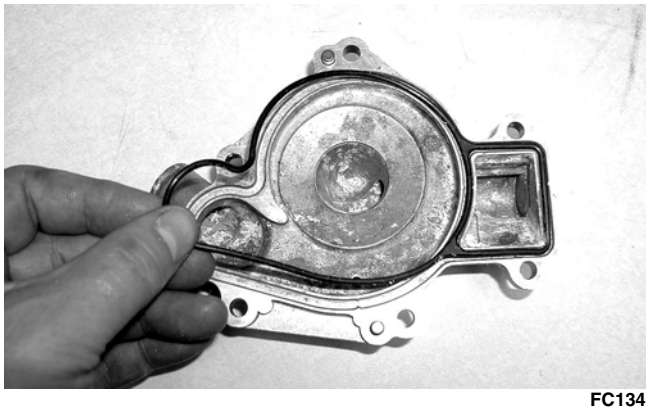
FC072B



FC072A

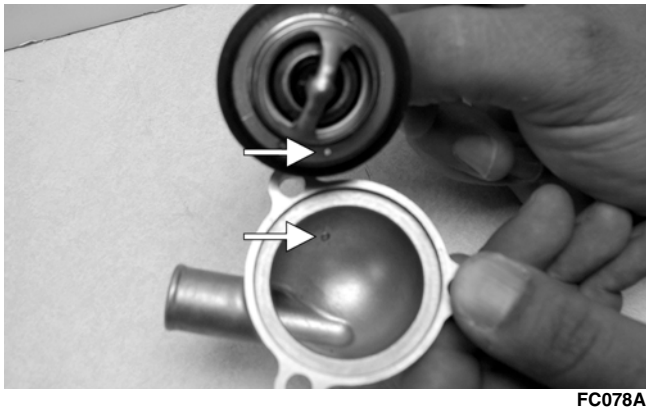
■ NOTE: Sealant is only required on the crankcase seam.

21. Position the O-ring into the water pump cover; then install the cover. Secure with six screws. Tighten to specifications.

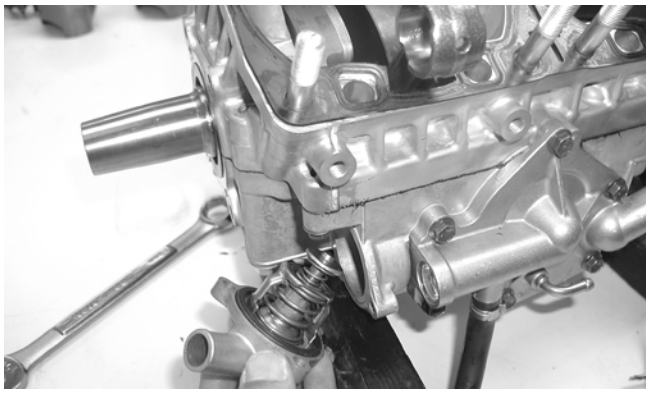


FC134

22. Noting the alignment dots, install the thermostat housing with thermostat. Tighten the existing hardware securely.



FC078A

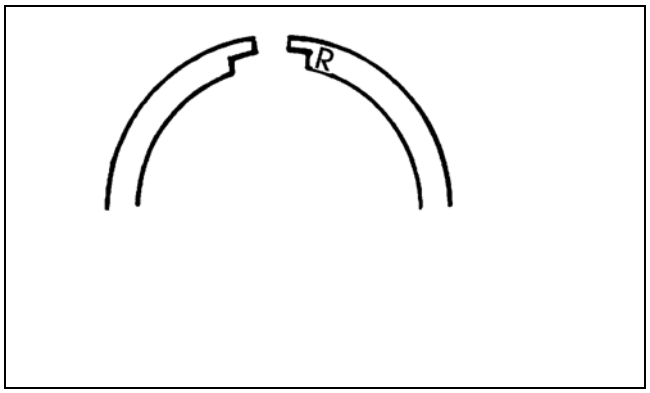


FC073

23. Secure the intake flanges, reed valve assemblies, and gaskets with cap screws. Tighten to specifications.

24. Place the cylinder base gasket into position on the crankcase.

25. Install the piston rings on each piston so the letter on the top (inclined surface) of each ring faces the dome of the piston.

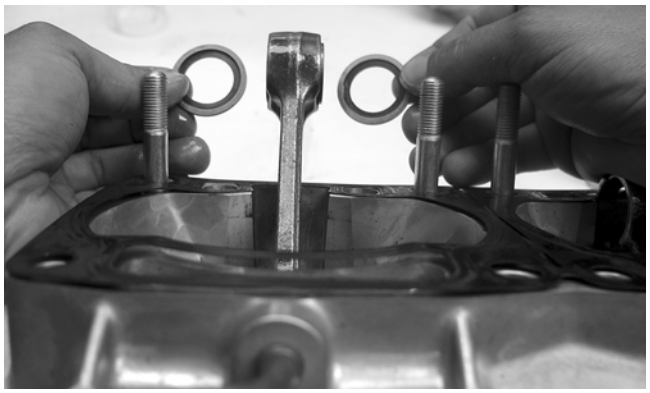


726-306A

⚠ CAUTION

Incorrect installation of the piston rings will result in engine damage.

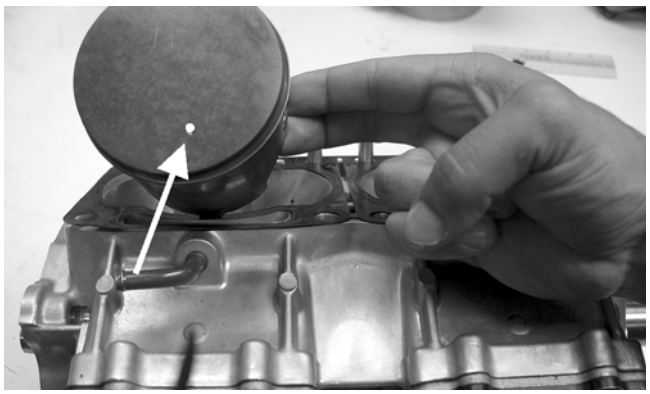
26. Apply oil to the connecting-rod small end bearings; then install the small-end bearings. Install a washer on each side of the connecting rod.



FC075

27. Place each piston over the connecting rod so the arrow (or indicator dot) on each piston will point toward the intake/exhaust ports; then secure with an oiled piston pin.

■ NOTE: The arrow (or indicator dot) is found either up inside the piston or on the dome top.



FC079A

28. Install the new circlips so the open end is directed either up or down.



B324D

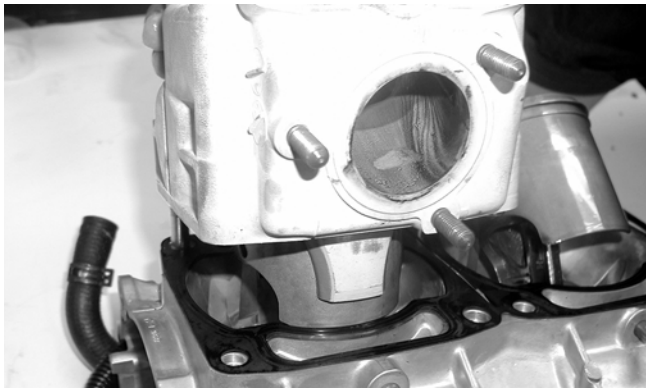
⚠ CAUTION

Make sure the circlips are firmly seated and the open end is directed either up or down before continuing with assembly.

29. Rotate each piston ring until the ring ends are properly positioned on either side of the ring keeper; then apply oil to the piston assemblies and cylinder bores. Remove the rubber bands from the connecting rods.

30. In turn on each cylinder, place a piston holder (or suitable substitute) beneath the piston skirt and square the piston in respect to the crankcase; then using a ring compressor or the fingers, compress the rings and slide the cylinder over the piston. Remove the piston holder and seat the cylinder firmly onto the crankcase.

■ **NOTE: The cylinders should slide on easily. DO NOT force the cylinders on.**



FC076

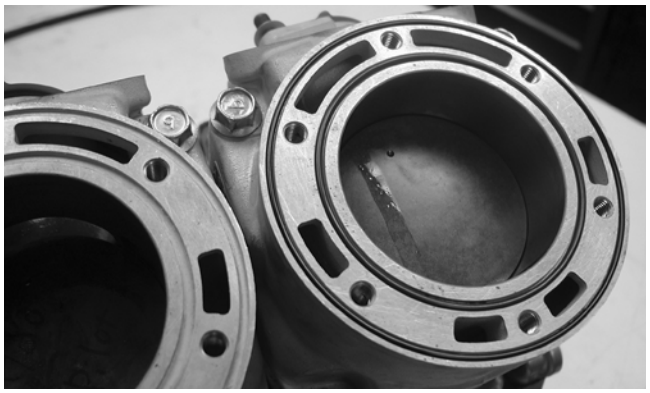
31. On the 500 cc, secure each cylinder by installing the four nuts, washers, and lock washers. DO NOT TIGHTEN AT THIS TIME.

32. On the 600/700 cc, secure each cylinder by installing the four nuts and four cap screws. DO NOT TIGHTEN AT THIS TIME.

■ **NOTE: The cylinders will be tightened at the same time as the exhaust manifold is installed to assure proper cylinder to exhaust manifold alignment.**

33. Install the oil-injection hoses and secure with the clamps; then place the lower check-valve assembly into position and secure with the gaskets and union cap screw. Tighten securely.

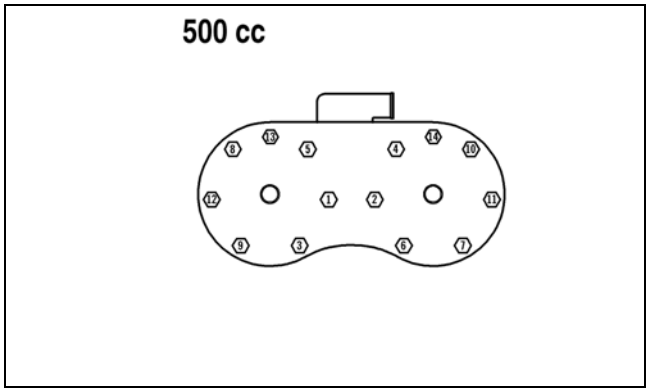
34. Install the two cylinder O-rings on the top of each cylinder making sure they are correctly positioned in the grooves.



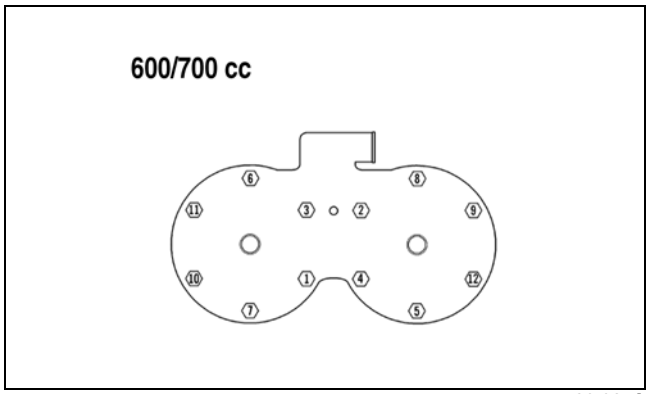
FC077

35. Place new O-rings onto each of the head cap screws. Place four of these cap screws into the cylinder head. Thread the spark plugs in part way; then while holding the head above the cylinder, carefully start all four cap screws while observing the cylinder O-rings to make sure they remain in position. Slowly place the head into position on top of the O-rings. Start the remaining cap screws being very careful not to move the cylinder head. ONLY FINGER-TIGHTEN AT THIS TIME.

36. From step 35 on the 500 cc in two steps, tighten the 6 mm cap screws to specifications and on all models in two steps, tighten the 8 mm cap screws to specifications using the appropriate pattern shown.



738-204A



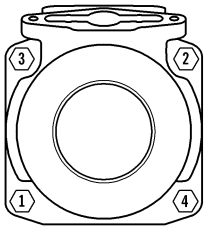
738-205A

37. Apply a thin coat of high-temperature silicone sealant to each exhaust port; then install the exhaust gaskets with the metal sides facing out.

38. Install the exhaust manifold and secure with four nuts and lock washers. Tighten the four nuts to specifications.

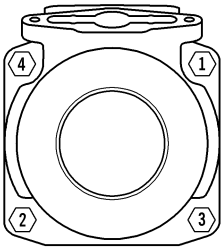
39. Secure the cylinders (from steps 31-32) by tightening the cylinder base nuts (and cap screws on the 600/700 cc) to specifications in three steps using the appropriate pattern shown; then tighten the spark plugs to specifications. Pressure test the engine (see Section 3).

500 cc



0738-206

600/700 cc



0738-220

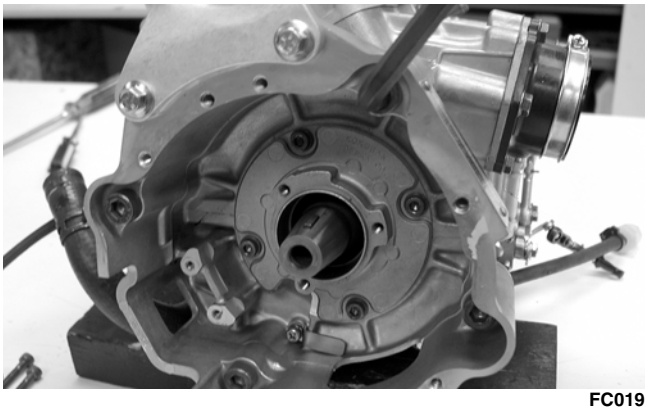
40. Secure the stator plate to the crankcase with the Allen-head cap screws coated with blue Loctite #243 and tightened to specifications; then install the stator assembly with wires and a grommet into the crankcase.



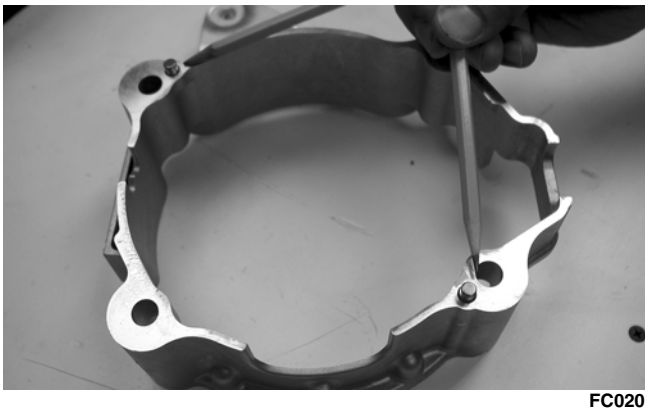
FC018

41. Secure the ignition timing sensor with screws coated with blue Loctite #243.

42. On the 600/700 cc, install the magneto case on the crankcase accounting for the different-sized cap screws and the alignment pins. Tighten cap screws to specifications.



FC019



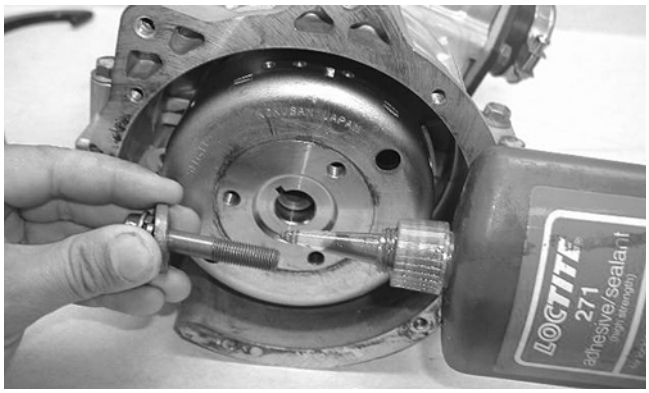
FC020

43. Install the key in the crankshaft.

44. Thread two puller bolts into the flywheel; then slide the flywheel onto the crankshaft making sure the keyways match. Remove the puller bolts.

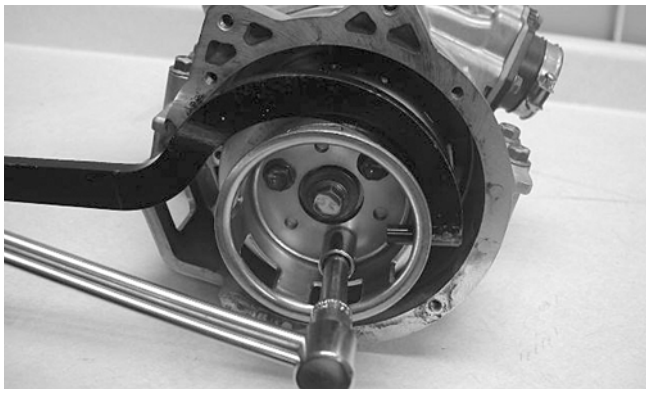
■ **NOTE: Before installing the flywheel, be sure to wipe the crankshaft and flywheel tapers clean using a clean towel.**

45. Apply red Loctite #271 to the threads of the flywheel cap screw; then finger-tighten with a large flat washer and lock washer. DO NOT TIGHTEN AT THIS TIME.



FC080

46. Place the starter pulley in position; then loosely secure the starter pulley with three cap screws (coated with red Loctite #271) and lock washers. Secure the pulley while using the spanner wrench and tighten the three cap screws evenly to specifications.



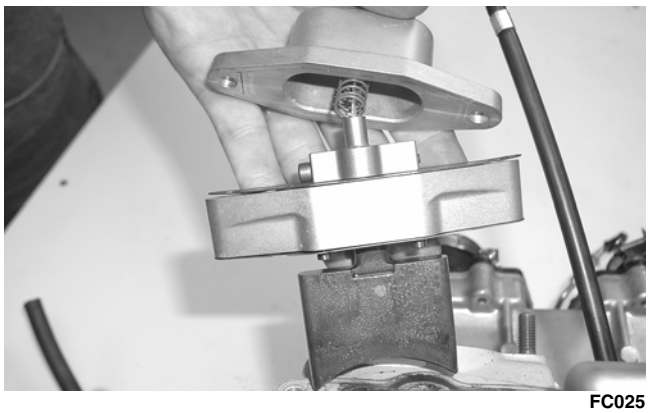
FC081

47. Using the spanner wrench, tighten the flywheel cap screw (from step 45) to specifications.

48. Slide the APV assemblies into position in the cylinders; then slide the valve keepers into position and secure with cap screws (coated with blue Loctite #243). Tighten to specifications.

⚠ CAUTION

The long side of the exhaust valve must be facing toward the cylinder head or severe engine damage may occur.



FC025



FC024

2

Installing Engine Table of Contents

F/C Models 2-85
900 cc Models 2-87
500/600/700 cc Models 2-89

■ **NOTE: Critical torque specifications are located in the Assembly Schematics sub-section of this section.**

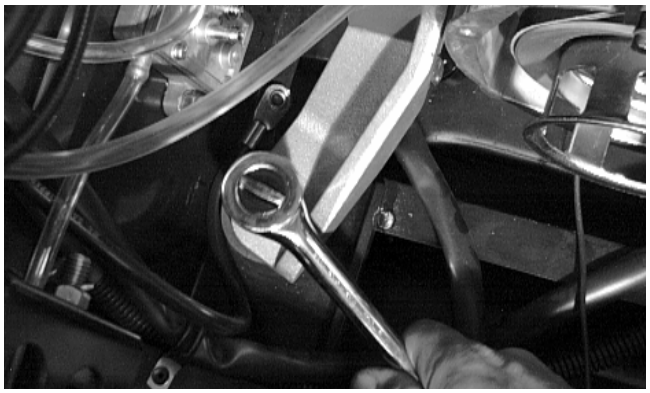
Installing Engine (F/C Models)

1. Place each engine mounting bracket onto the engine. Secure with cap screws, washers, and lock washers. Tighten to specifications.

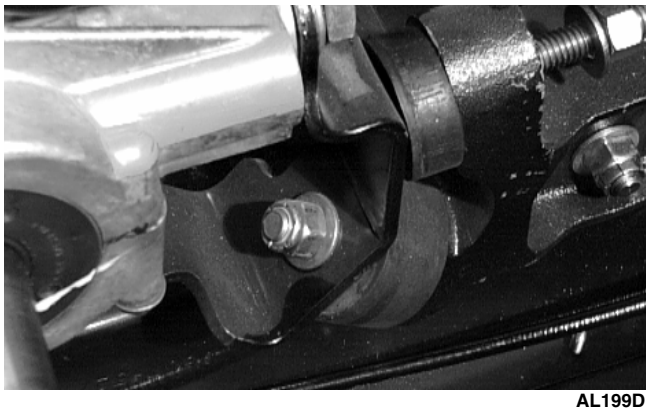
2. Place the engine assembly into position in the engine compartment. Secure the engine to the front end with the cap screws, washers, and lock nuts. Tighten to specifications.



AL201D



AL200D



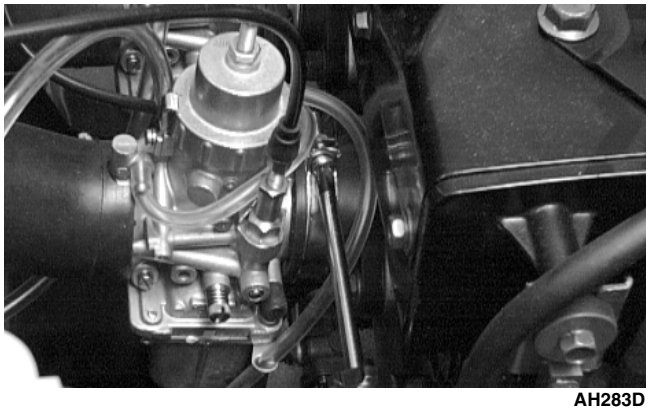
AL199D

3. Connect the oil-supply hose to the oil-injection pump; then bleed the system (see Section 4).

■ NOTE: If equipped with electric start, place the starter motor bracket on the crankcase and install the front two and lower rear cap screws, lock washers, and washers. Place the starter motor into position and secure with two washers and lock nuts.

4. Connect the oil-injection cable to the oil-injection pump control arm and secure the cable mounting pin with a nylon washer and E-clip.

5. Place the carburetor(s) into position making sure the boot(s) are properly positioned and secure with the flange clamp(s).



AH283D

⚠ CAUTION

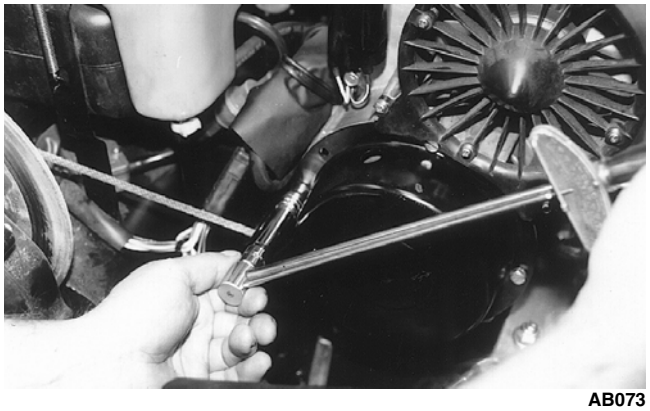
When installing the throttle bodies/carburetors, make sure the gasline hoses are properly routed to avoid premature wear and/or contact with exhaust components.

■ NOTE: At this point, check oil-injection system synchronization (see Section 4).

6. Connect the impulse hose to the crankcase, the main wiring harness, the CDI unit wiring harness, and the spark plug caps.

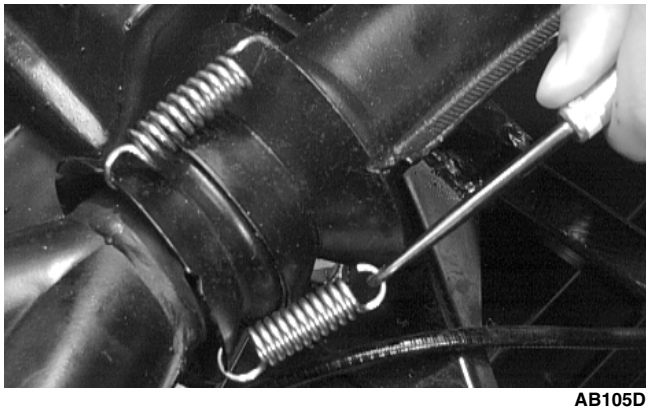
7. Place the recoil starter into position and secure with four cap screws and lock washers. Tighten to specifications.

■ NOTE: If equipped with electric start, secure the battery ground cable with the rear cap screw.



AB073

8. Place the expansion chamber and grafoil gasket into position and secure with springs.



AB105D

9. Place the engine mount shims into position between the torque bumper and engine mounting bracket; then tighten the torque bumper jam nut.

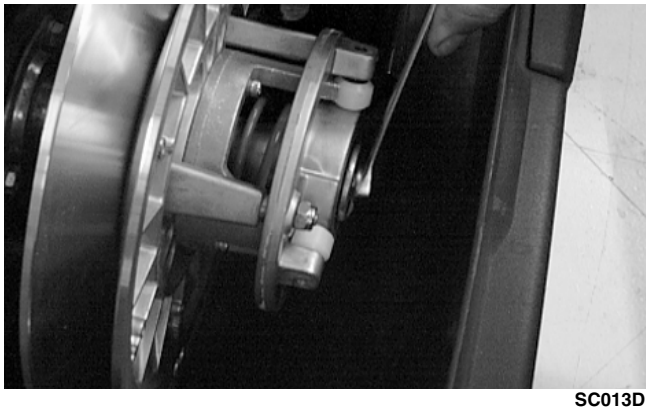
10. Place the drive clutch into position on the crankshaft; then install the lock washer and bolt. Tighten the clutch bolt to specifications.



CM016

■ **NOTE: Apply a coat of Anti-Seize Thread Compound (p/n 0678-146) to the keyway end of the driven shaft.**

11. Install the driven pulley and alignment washers. Secure with a cap screw and washer tightened to specifications.



SC013D

■ **NOTE: At this point, check drive clutch/driven pulley alignment (see Section 8).**

12. Install the drive belt and secure the belt guard. Install the plug in the belly pan.

■ **NOTE: If equipped with electric start, connect the battery.**

13. Turn the gas tank shut-off valve to the OPEN position.

14. Check the ignition timing.

15. Place the rear of the snowmobile up on a shielded safety stand. Start engine and allow to warm up. Adjust engine idle to 1500 RPM and check all safety switches for proper operation.

16. Test drive the snowmobile; then tighten the clutch bolt to specifications.

⚠ CAUTION

If the engine had a major overhaul or if any major part was replaced, proper engine break-in procedures must be followed.

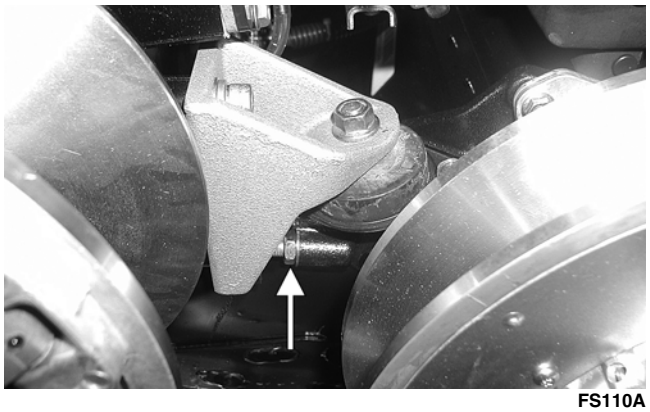
Installing Engine
(900 cc Models)

■ **NOTE: Prior to installing the engine, secure the coolant supply hose to the water pump housing.**

1. Place the engine into the engine compartment; then place the coolant supply hose on the coolant tank and secure with the clamp.

2. Secure the right-side front and rear and left-side front engine mounts to the front end making sure the mounts are properly positioned. Tighten the cap screws and nut to specifications.

3. Adjust the torque bumper to allow a clearance between the engine and the torque bumper of 1.78 mm (0.070 in.); then secure the adjustment by tightening the jam nut.



FS110A

4. Secure the hood cable to the front end and the ground wire to the magneto case with the machine screw. Tighten securely.

5. Secure the rear ground wires to the magneto case with the machine screw tightened to specifications.

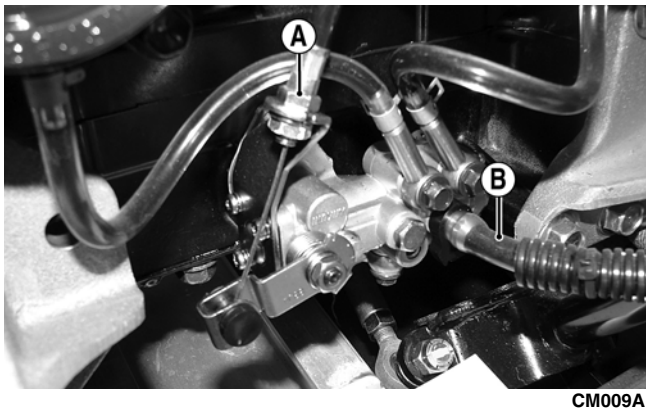
6. Place the coolant return hose into position on the thermostat housing and secure with the clamp.

7. Place the recoil starter into position and secure the starter with four cap screws and lock washers. Tighten to specifications.

8. Connect all electrical wires.

■ **NOTE: Use cable ties to secure the wiring harnesses as necessary.**

9. Connect the oil-injection cable (A) to the oil-injection pump and secure; then connect the oil-supply hose (B) to the pump and secure with the clamp. Bleed the oil-injection system (see Section 4).



CM009A

10. Place the throttle bodies into position and secure with the flange clamps.

⚠ CAUTION

When installing the throttle bodies/carburetors, make sure the gasline hoses are properly routed to avoid premature wear and/or contact with exhaust components.

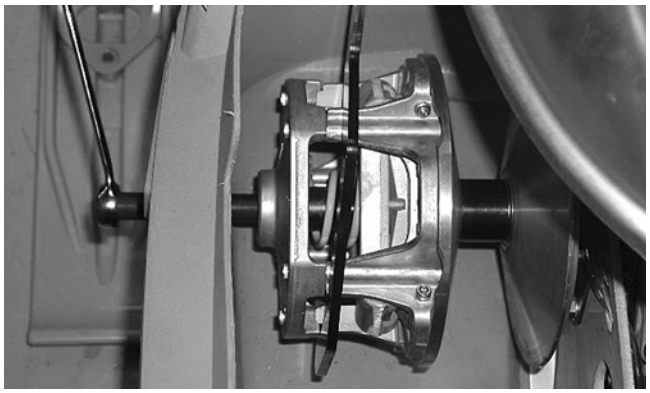
11. Synchronize the oil-injection system (see Section 4).

12. Place the expansion chamber and grafoil gaskets into position and secure to the exhaust manifold, front end, and resonator with the springs.

■ **NOTE: When installing the three exhaust manifold springs, the long hook portion of the spring must be attached to the exhaust manifold or premature spring failure will result.**

■ **NOTE: Before installing the drive clutch, be sure to wipe both the crankshaft taper and clutch mounting taper clean using a clean towel.**

13. Place the drive clutch into position on the crankshaft and secure with the cap screw and lock washer. Tighten to specifications.


FC002

■ **NOTE: Apply a coat of Anti-Seize Thread Compound (p/n 0678-146) to the splines of the input shaft.**

14. Install the alignment washer; then install the driven pulley on the gear case input shaft. Tighten to specifications.

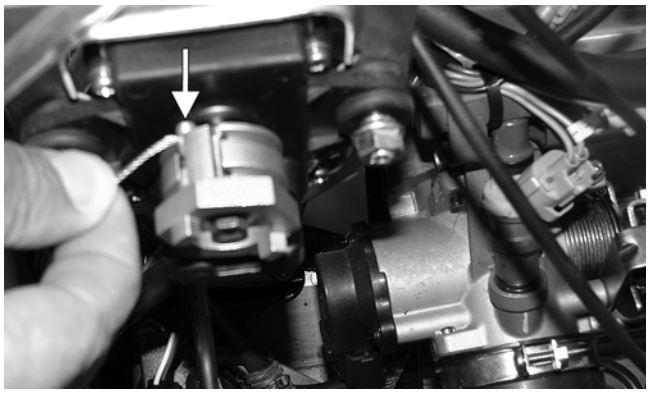

FS111

15. Check drive clutch/driven pulley alignment (see Section 8).

16. Install the drive belt. Check belt deflection. Secure the belt guard.

17. Fill the cooling system (see Section 3).

18. Slide the APV cable drums into the servomotor actuator; then place the cable housings into position in the servomotor. Secure the cable housings with the holder.



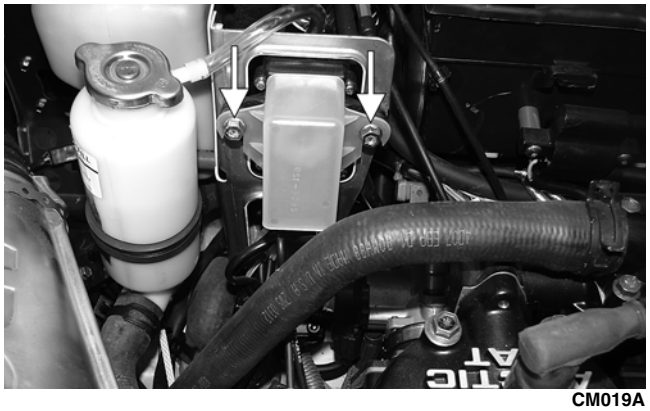
CM017A



CM022

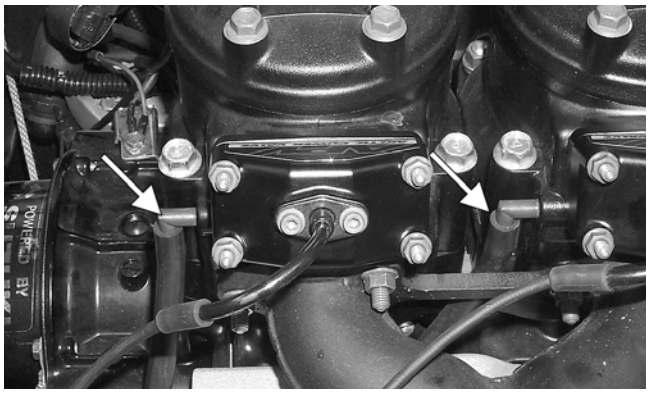
19. Check APV cable adjustment. See Arctic Power Valve (APV) System in Section 3.

20. Place the servomotor cover into position on the mounting plate; then secure with two cap screws.



CM019A

21. Connect the two APV drain hoses making sure they are not in contact with hot or moving parts.



AP128A

22. Install the air intake silencer and secure with the straps.

23. Start engine and verify ignition timing.

24. Test drive or run the snowmobile and recheck the coolant level after 5-6 minutes.

⚠ CAUTION

If the engine had a major overhaul or if any major component was replaced, proper engine break-in procedures must be followed. If the proper engine break-in procedures are not followed, severe engine damage may result.

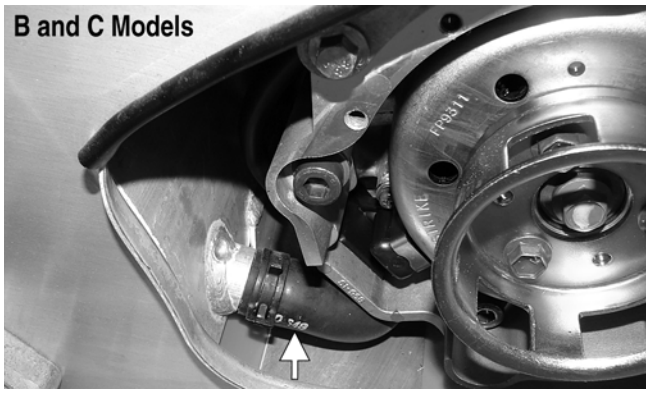
Installing Engine
(500/600/700 cc Models)

■ NOTE: In this sub-section unless otherwise noted, the Firecat r and Sabercat will be designated as "A Models," the Firecat (w/o Reverse) will be designated as "B Model," and the Crossfire and M-Series will be designated as "C Models."

1. Place the engine into the engine compartment and position it so the magneto case is resting on the right-front torque bumper; then attach the water pump coolant hose to the front heat exchanger. Secure with the hose clamp.



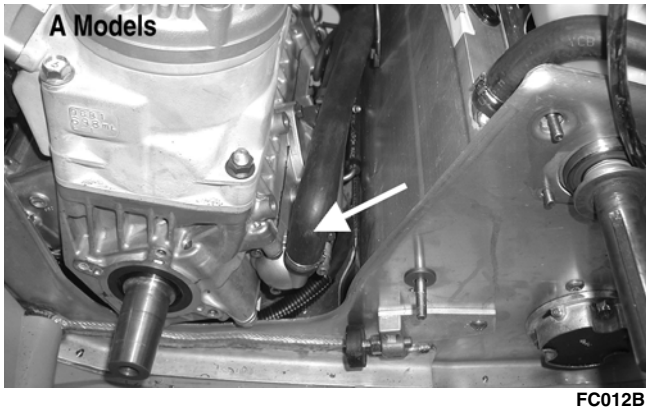
FC047B



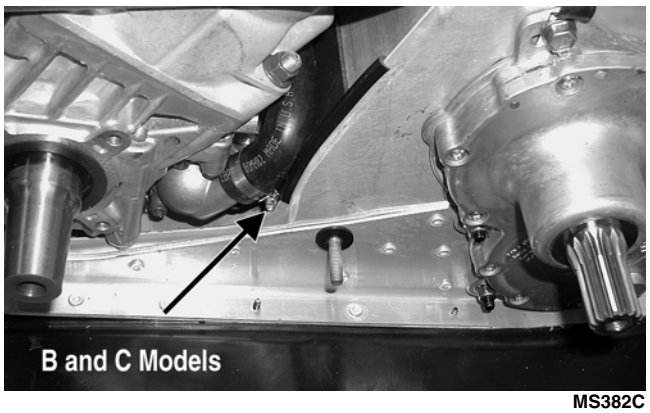
CM034B

■ **NOTE: If equipped with electric start, insert the flex-drive shaft into the pinion drive and secure with the two set screws.**

2. Place the engine into the mounting position; then from the left side, tip the engine forward, raise the left side of the engine, and allow the chassis to support the engine in this position. Connect the coolant tank hose to the bottom left outlet on the engine and secure with the hose clamp.



FC012B

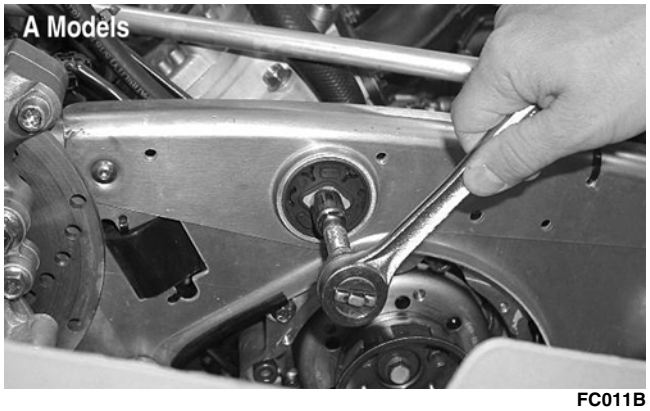


MS382C

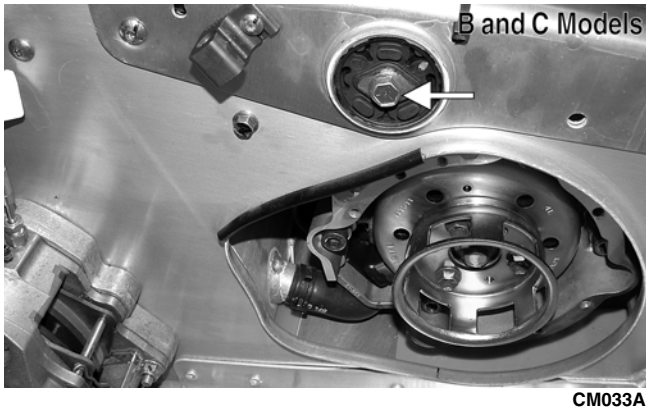
3. Connect all electrical wiring making sure all wiring and coolant hoses are routed properly; then place the engine into the mounting position.

■ **NOTE: Use cable ties to secure the wiring harnesses as necessary.**

4. Install the cap screw securing the right-side engine mounting bracket to the side plate. DO NOT TIGHTEN AT THIS TIME.



FC011B

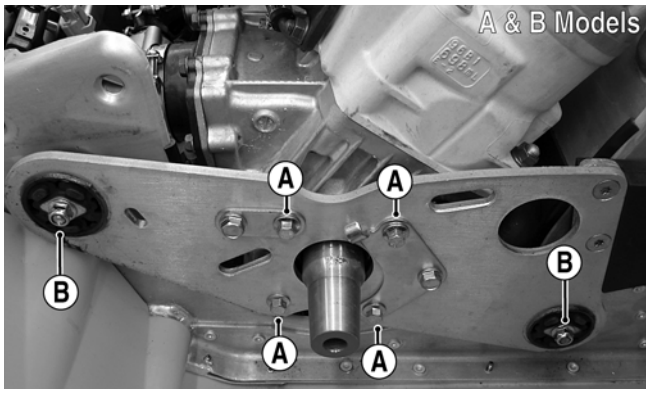


CM033A

5. Install the left-side engine mounting bracket to the engine and to the front frame. DO NOT TIGHTEN AT THIS TIME.

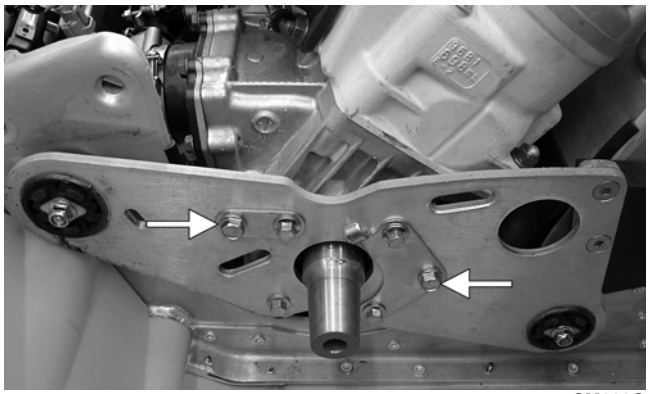
■ **NOTE: On the Firecat/Sabercat models, it will be necessary to install the reinforcement plate when installing the engine mounting bracket to the engine.**

6. From step 5, tighten the four mounting bracket plate-to-engine cap screws (A) to specifications; then tighten the two remaining cap screws (B) securing the engine mounting bracket to the chassis (from step 5) to specifications.



CM032B

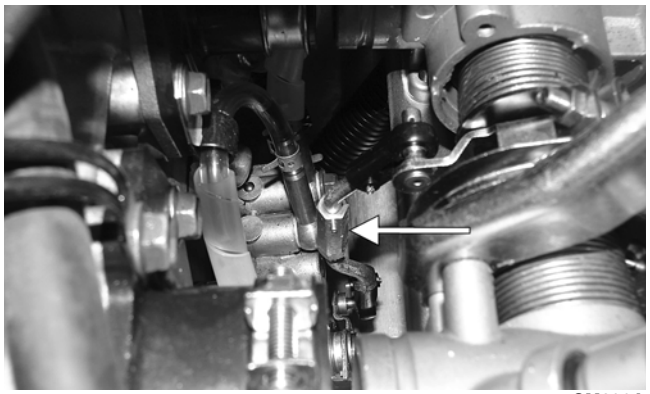
■ **NOTE: On the Firecat/Sabercat models, tighten the two remaining plate cap screws to specifications.**



CM032C

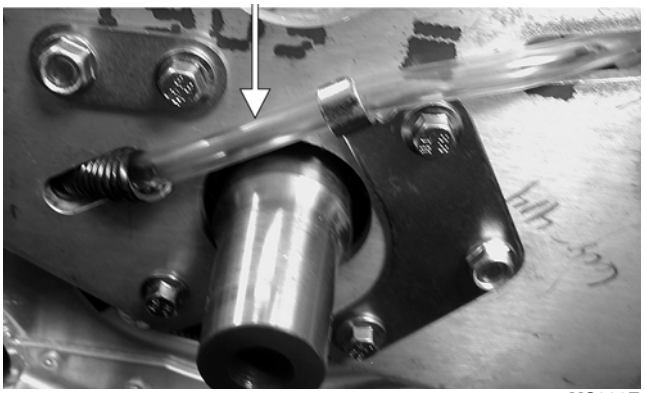
7. Tighten the right-side engine cap screw and nut (from step 4) to specifications.

8. Connect the oil-injection cable/control rod to the oil-injection pump and secure.

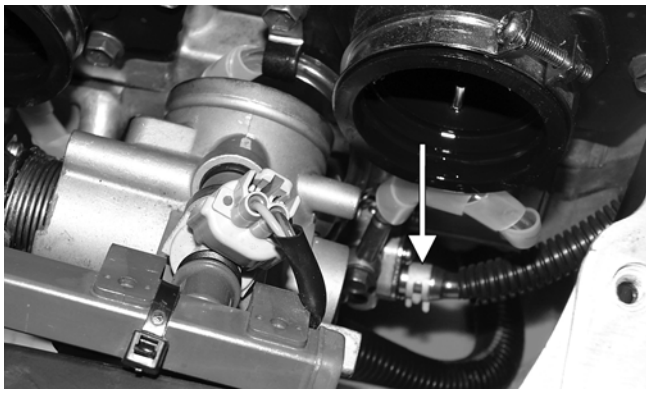


CM028A

9. On B and C Models, route the oil-supply hose through the left-side engine mounting bracket, into the reinforcement plate, and to the pump and secure with the clamp. Bleed the oil-injection system (see Section 4).



MS389E



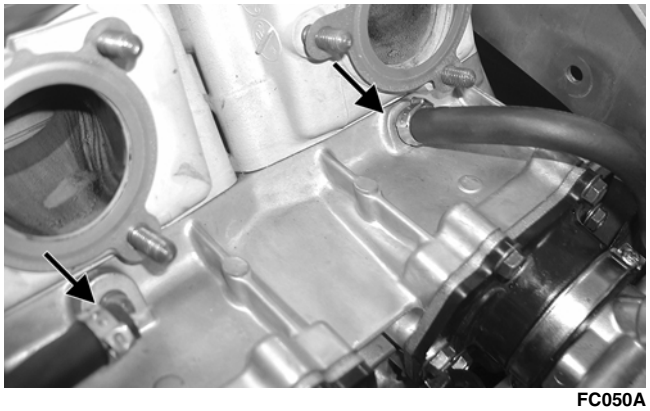
CM029A

10. On carbureted models, connect the impulse hose to the crankcase.

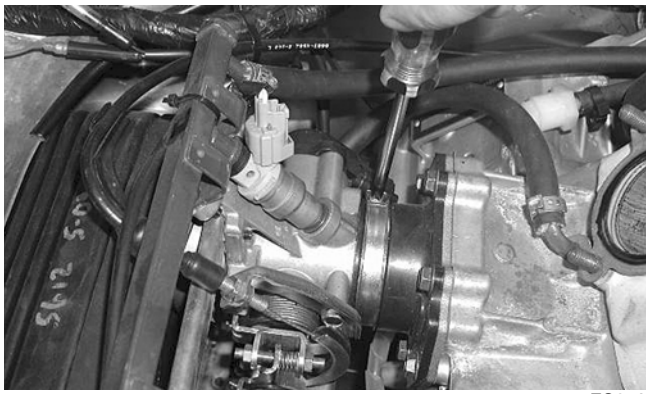
11. Confirm that the two coolant hoses which run beneath each exhaust port on the cylinders are accessible to connect and that the fuel line and oil pump linkage or cable and impulse lines are connected; then place the throttle bodies/carburetors into position and secure with the flange clamps. Synchronize the oil-injection pump (see Section 4).

⚠ CAUTION

When installing the throttle bodies/carburetors, make sure the gasline hoses are properly routed to avoid premature wear and/or contact with exhaust components.

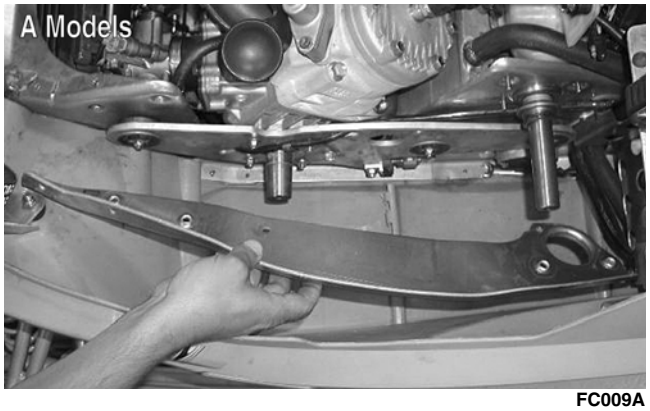


FC050A

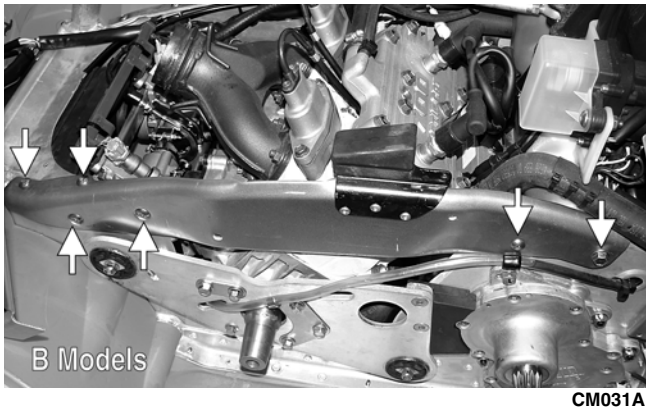


FC051

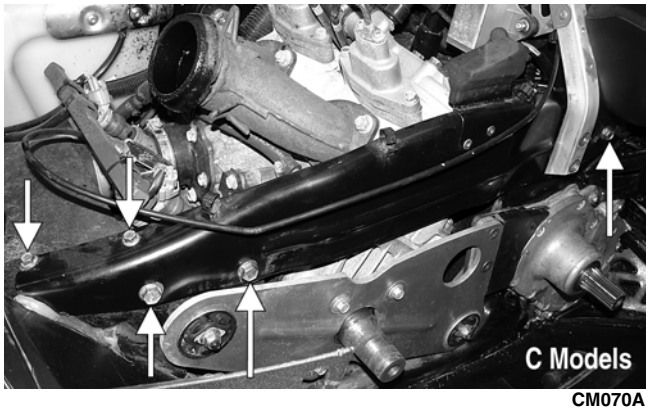
12. Install the side-plate brace onto the chassis and secure with the lock nuts and cap screws. Tighten securely.



FC009A

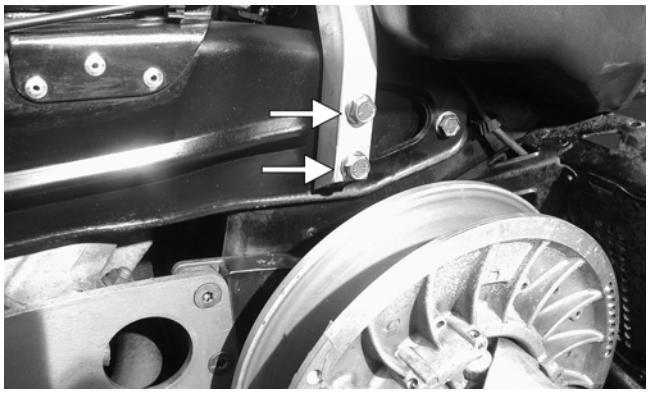


CM031A



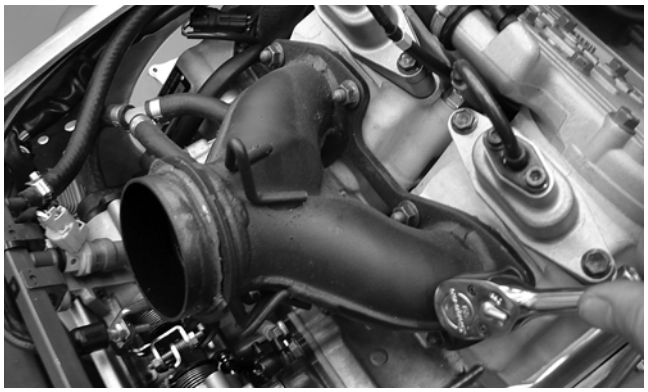
CM070A

■ **NOTE: On the Crossfire/M-Series after securing the brace, secure the steering support to the chassis. Tighten to specifications.**



CM004B

13. Install the exhaust manifold noting that the gaskets are directional (can go on only one way); then install the four cap nuts and tighten to specifications.



CM035

14. Fill the cooling system (see Liquid Cooling System in Section 3).

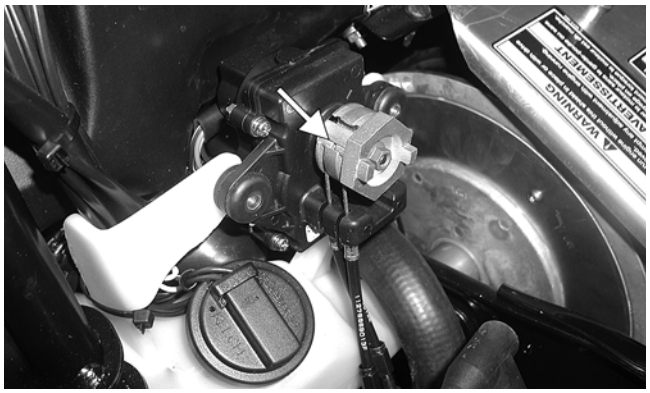
15. Place the recoil starter with ground wire into position and secure the starter with four cap screws and lock washers. Tighten to specifications.



FC052

■ **NOTE: Steps 16-18 are for APV-equipped engines only.**

16. Slide the APV cable drums into the servomotor actuator; then place the cable housings into position in the servomotor. Secure the cable housings with the cable retaining cover.



FS039B

17. Place the servomotor cover into position; then secure with two cap screws.



FS038A

18. Check APV cable adjustment. See Arctic Power Valve (APV) System in Section 3.

■ **NOTE: Before installing the drive clutch, be sure to wipe both the crankshaft taper and clutch mounting taper clean using a clean towel.**

■ **NOTE: On the A and B Models before installing the drive clutch, it must be locked in the compressed position.**

19. Place the drive clutch into position on the crankshaft and secure with the cap screw and lock washer. Tighten to specifications.



FC002

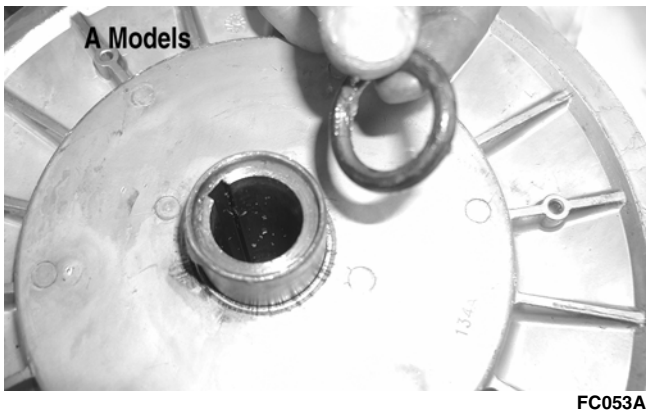
20. Using Clutch Compressor (p/n 0644-420), compress the drive clutch and remove the locking clamp.

⚠ WARNING

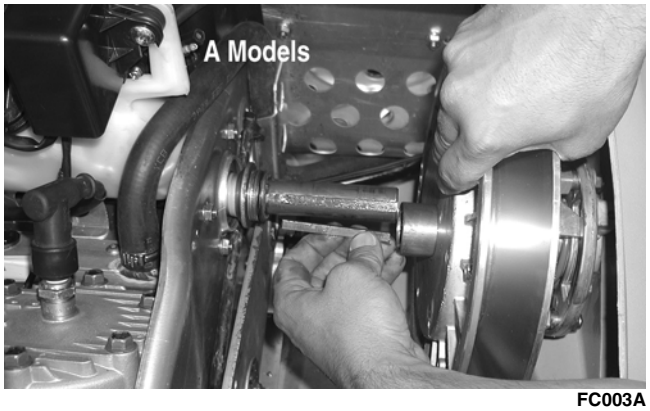
Never attempt to start the engine without removing the locking clamp from the drive clutch. Severe damage and/or injury may occur.

21. On the A Models, install the driven pulley (with inner and outer O-rings), key, stub shaft, and alignment washers. Secure with a cap screw and washer. Tighten to specifications.

■ **NOTE: Apply a coat of Anti-Seize Thread Compound (p/n 0678-146) to the keyway end of the driven shaft.**

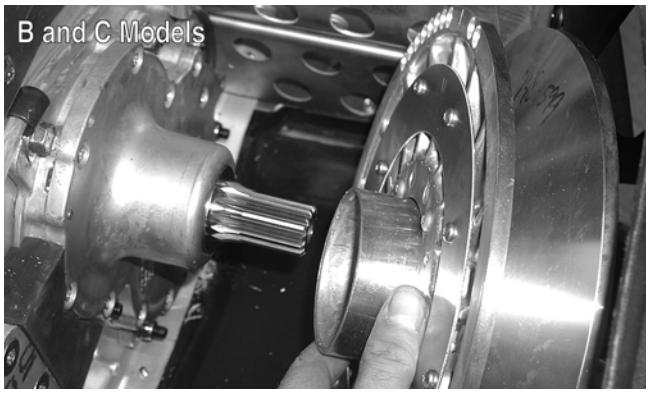


FC053A



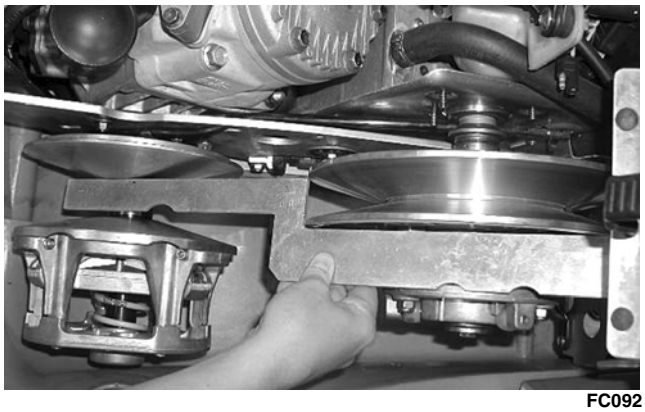
FC003A

■ **NOTE: On the B and C Models, install the alignment washers; then install the driven pulley on the gear case input shaft. Tighten the cap screw to specifications.**



MS378B

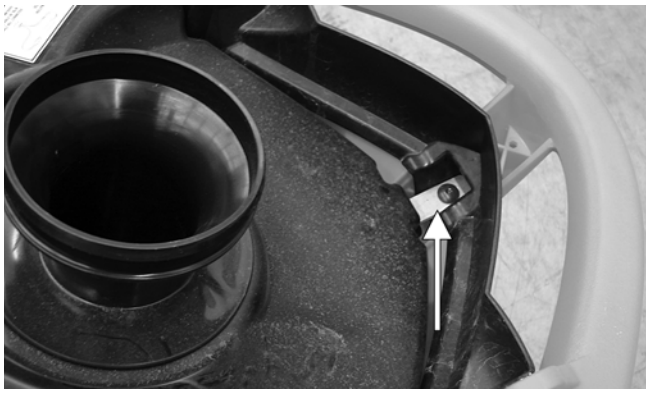
22. Check drive clutch/driven pulley alignment (see Section 8).


FC092

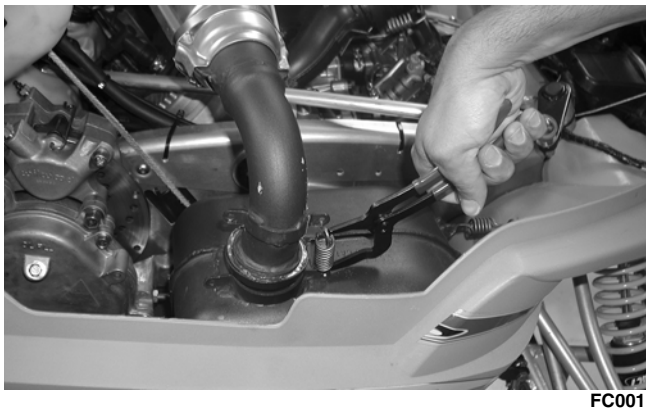

MS390

23. Install the drive belt. Check belt deflection. Secure the belt guard.

24. With the air silencer properly positioned on the throttle body/carburetor assembly, secure the silencer with the torx-head cap screw.


CM026A

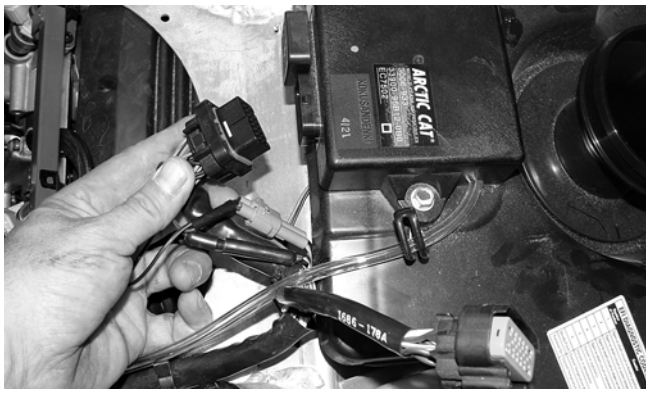
25. Install the resonator and secure with three springs; then place the expansion chamber and grafoil gaskets into position and secure to the exhaust manifold and resonator with the springs.


FC001

■ **NOTE: When installing the three exhaust manifold springs, the long hook portion of the spring must be attached to the exhaust manifold or premature spring failure will result.**

26. Place the hood into position on the front end and secure with the two pins and the cables.

27. Connect the ignition harness and the hood harness; then connect the air intake connector.



CM038

⚠ CAUTION

Never run the engine with the hood harness disconnected or damage to the electrical system will result.

28. Start engine and verify ignition timing.

29. Test drive or run the snowmobile and recheck the coolant level after 5-6 minutes. Tighten the drive clutch cap screw to specifications.

⚠ CAUTION

If the engine had a major overhaul or if any major component was replaced, proper engine break-in procedures must be followed. If the proper engine break-in procedures are not followed, sever engine damage may result.

Troubleshooting Engine
(Carbureted Models)

Problem: Engine Does Not Start (No Spark at Spark Plugs)	
Condition	**Remedy**
1. **Ignition switch** malfunctioning — not in RUN position	1. Replace ignition switch — turn switch to RUN position
2. **Wiring harness** shorting	2. Repair — replace wiring harness
3. **Emergency stop switch knob** in DOWN position — malfunctioning	3. Move knob to UP position — replace throttle switch
4. **Throttle/ignition monitor switch (TM-style)** adjusted too loose — malfunctioning	4. Adjust (tighten) throttle cable — replace throttle switch
5. **Throttle/ignition monitor switch (VM-style)** adjusted too tight — malfunctioning	5. Adjust (loosen) throttle cable — replace throttle switch
6. **Carburetor safety switches (VM-style)** adjusted incorrectly — malfunctioning	6. Adjust — replace carburetor safety switches
7. **Spark plugs** fouled — damaged	7. Clean — gap — replace spark plugs
8. **Spark-plug caps** damaged — leaking — shorting	8. Replace spark-plug caps
9. **High tension wires/coil** loose — grounded — faulty	9. Service — replace high tension wires/coil
10. **CDI unit** faulty	10. Replace CDI unit
11. **Charge coil (1)** faulty	11. Replace coil
12. **Charge coil (2)** faulty	12. Replace coil
13. **Flywheel magnets** weak	13. Replace flywheel
14. **Flywheel key** sheared	14. Replace key

Problem: Engine Does Not Start (No Fuel at Cylinders)	
Condition	**Remedy**
1. **Gas tank** empty	1. Fill tank
2. **Shut-off valve (VM-style)** closed	2. Open shut-off valve
3. **Fuel hose** broken — pinched	3. Replace — service hose
4. **Gas-tank vent — hose** obstructed	4. Remove obstruction — replace vent — hose
5. **In-line fuel filter** obstructed — damaged	5. Remove obstruction — replace in-line fuel filter
6. **Fuel pump** malfunctioning — faulty	6. Replace — repair — clean fuel pump
7. **Impulse hose** cracked — broken — pinched —disconnected	7. Replace — connect impulse hose
8. **Carburetors** adjusted incorrectly — dirty — damaged	8. Troubleshoot — clean — replace carburetors
9. **Primary compression (crankcase)** absent	9. Repair — replace damaged — worn engine components

Problem: Engine Overheats	
Condition	**Remedy**
1. **Spark plug heat range** too hot	1. Install lower heat-range spark plugs
2. **Coolant** low — absent	2. Add coolant
3. **Carburetors** adjusted incorrectly — jetted incorrectly — dirty	3. Troubleshoot — clean carburetors — jet correctly
4. **Carburetor-to-cylinder** air leak	4. Replace — repair gaskets — intake flanges — service intake ports
5. **Heat exchangers** no snow for cooling	5. Select new trail — install ice studs to chew up hard packed snow and ice
6. **Rings/grooves** carboned	6. Clean — replace rings — pistons
7. **Exhaust ports** obstructed	7. Remove obstruction
8. **Muffler** obstructed	8. Remove obstruction
9. **Gas/air mixture** incorrect	9. Replace jets — adjust jet needle E-clip position
10. **Oil-injection pump** malfunctioning — adjusted incorrectly	10. Replace — bleed — adjust oil-injection pump
11. **Primary compression (crankcase)** low — absent	11. Repair — replace damaged — worn engine components
12. **Ignition timing** adjusted incorrectly	12. Time ignition
13. **Gasoline octane** too low	13. Use 87 minimum octane gasoline
14. **Water pump — thermostat** damaged — faulty	14. Replace — rebuild water pump — replace thermostat

Problem: Engine Backfires	
Condition	**Remedy**
1. **Throttle/ignition monitor switch** adjusted incorrectly	1. Adjust throttle cable free-play — service spring
2. **Spark plugs** fouled — damaged	2. Clean — gap — replace spark plugs
3. **Spark plug heat range** too hot	3. Install lower heat-range spark plugs
4. **High tension wires/coil** shorting	4. Service — replace high tension wires/coil
5. **Carburetor-to-cylinder** air leak	5. Repair — replace gaskets — intake flanges service intake ports
6. **Carburetors** adjusted incorrectly — dirty — damaged — loose	6. Troubleshoot — tighten carburetors
7. **Gas/air mixture** incorrect — too lean	7. Adjust jetting
8. **Oil-injection pump** malfunctioning — adjusted incorrectly	8. Replace — bleed — adjust oil-injection pump

Problem: Engine Four-Cycles (Floods Excessively)	
Condition	**Remedy**
1. **Carburetors** adjusted incorrectly — dirty — damaged	1. Troubleshoot — clean carburetors
2. **Gas/air mixture** incorrect	2. Adjust jetting
3. **Oil-injection pump** malfunctioning — adjusted incorrectly	3. Replace — bleed — adjust oil-injection pump
4. **Air-intake silencer** obstructed	4. Remove obstruction

Problem: Engine Stops Gradually	
Condition	**Remedy**
1. **In-line fuel filter** obstructed — damaged	1. Remove obstruction — replace in-line fuel filter
2. **Fuel hose** obstructed — broken — pinched	2. Remove obstruction — replace — repair fuel hose
3. **Head gasket(s)** burned out	3. Replace head gasket(s) — service cylinders —head
4. **Cylinder head** loosening	4. Tighten cylinder head cap screws
5. **Spark plugs** loose	5. Tighten spark plugs
6. **Impulse hose** cracked	6. Replace impulse hose
7. **High tension wires/coil** faulty	7. Service — replace high tension wires/coil
8. **Float bowl vent hose (TM-style)** obstructed —kinked — damaged	8. Service — replace float bowl vent hose
Problem: Engine Stops Suddenly	
Condition	**Remedy**
1. **In-line fuel filter** obstructed — damaged	1. Remove obstruction — replace in-line fuel filter
2. **Fuel hose** obstructed — broken — pinched	2. Remove obstruction — repair — replace fuel hose
3. **CDI unit** faulty	3. Replace CDI unit
4. **Ignition coil** faulty	4. Replace ignition coil
5. **Charge coil (1)** faulty	5. Replace coil
6. **Charge coil (2)** faulty	6. Replace coil
7. **Gas-tank vent — hose** obstructed — damaged	7. Remove obstruction — replace vent — hose
8. **Engine** seized	8. Overhaul engine
9. **Throttle/ignition monitor switch** faulty — **throttle cable** adjusted incorrectly	9. Replace throttle control — adjust throttle cable free-play — adjust — connect — replace carburetor safety switches (VM-style)
Problem: Engine Fails to Stop (Continues to Run, Even with All Switches Off)	
Condition	**Remedy**
1. **CDI unit** shorted to ground	1. Replace CDI unit
2. **Main wiring harness four-prong connector** disconnected	2. Connect four-prong connector

Troubleshooting Engine
(EFI Models)

Problem: Engine Does Not Start (No Spark at Spark Plugs)	
Condition	**Remedy**
1. **Ground connections** dirty — loose	1. Check all ground connections — clean and tight
2. **Throttle/ignition monitor switch** malfunctioning — **ignition switch** not on	2. Replace faulty switch — turn switch on
3. **Wiring harness** shorting — disconnected	3. Repair — replace — connect wiring harness
4. **Emergency stop switch** in DOWN position — malfunctioning	4. Move switch to UP position — replace throttle control
5. **Throttle/ignition monitor switch** malfunctioning	5. Adjust throttle cable tension — replace throttle body assembly
6. **Spark plugs** fouled — damaged	6. Clean — replace spark plugs
7. **Spark-plug caps** damaged — leaking — shorting	7. Replace spark-plug caps
8. **High tension leads/coil** loose — grounded — faulty	8. Service — replace high tension leads/coil
9. **ECU** faulty	9. Replace ECU
10. **Ignition timing sensor** faulty	10. Replace sensor
Problem: Engine Does Not Start (No Fuel at Cylinders)	
Condition	**Remedy**
1. **Gas tank** empty	1. Fill tank
2. **Injector dropping resistor** faulty	2. Replace dropping resistor
3. **Fuel pressure regulator** faulty	3. Replace regulator — hose
4. **Gasoline** contaminated	4. Replace gasoline
5. **Fuel pump** faulty	5. Service — replace fuel pump — connections — wires
6. **Fuel hose** broken — pinched	6. Replace — service hose
7. **Gas-tank vent** — **hose** obstructed	7. Remove obstruction — replace vent — hose
8. **Pick-up valve(s)** obstructed — damaged	8. Remove obstruction — replace pick-up valve(s)
9. **Primary compression** absent	9. Repair — replace damaged — worn engine components
10. **ECU** faulty	10. Replace ECU

Problem: Engine Does Not Start (Fuel Does Not Ignite)	
Condition	**Remedy**
1. **ECU LED** trouble code	1. Service — replace problem component
2. **Spark** absent	2. Check for spark — see No Spark at Spark Plugs sub-section
3. **Primary compression** low	3. Service engine
4. **Secondary compression** low	4. Service engine
5. **Engine** flooded	5. Clear engine (hold throttle full-open)
6. **Gasoline** contaminated	6. Clean tank and entire fuel system
Problem: Engine Does Not Idle	
Condition	**Remedy**
1. **ECU LED** trouble code	1. Service — replace problem component
2. **Throttle position sensor idle adjustment** incorrect	2. Adjust idle RPM to specifications
3. **Injector(s)** faulty	3. Replace injector(s)
4. **Fuel pressure regulator** faulty	4. Replace regulator — hose
5. **Air-intake silencer** obstructed	5. Clean air-intake silencer
Problem: Engine Loses Power or Runs on One Cylinder	
Condition	**Remedy**
1. **Sensor** faulty	1. Check LED for trouble code — repair — replace problem circuit or sensor
2. **Spark plug** fouled	2. Replace spark plugs
3. **External coil** faulty	3. Service — replace coil
4. **Gas tank vent — hose** obstructed	4. Service — replace vent hose
5. **Secondary compression** low	5. Service engine
6. **Fuel pressure regulator** faulty	6. Replace regulator
7. **Pick-up valve(s)** obstructed — out of position	7. Replace — relocate pick-up valve(s)
8. **Oil-injection pump** malfunctioning — adjusted incorrectly	8. Replace — bleed — adjust oil-injection pump
9. **Throttle bodies** out of synchronization	9. Replace throttle bodies from a similar engine — if problem is corrected, replace the original assembly
10. **Injector** faulty	10. Replace injector
11. **Dropping resistor** faulty	11. Test resistor — replace as necessary

Problem: Engine Overheats	
Condition	**Remedy**
1. **Spark plug heat range** too hot	1. Install lower heat-range spark plugs
2. **Coolant** low — absent	2. Add coolant
3. **Heat exchanger** obstructed	3. Remove obstruction
4. **Intake flange to cylinder** air leak	4. Replace — seal intake flange(s)
5. **Drive system (drive clutch — driven pulley — track — drive belt)** adjusted incorrectly — worn — damaged	5. Troubleshoot — adjust drive system
6. **Rings/grooves** carboned	6. Clean — replace rings — pistons
7. **Exhaust ports** obstructed	7. Remove obstruction
8. **Expansion chamber** obstructed	8. Remove obstruction
9. **Oil-injection pump** malfunctioning — adjusted incorrectly	9. Replace — bleed — adjust oil-injection pump
10. **Primary compression** low — absent	10. Repair — replace damaged — worn engine components
11. **Gasoline octane** too low	11. Use 87 minimum octane gasoline
12. **Water pump — thermostat** damaged — faulty	12. Replace water pump — thermostat
Problem: Engine Backfires	
Condition	**Remedy**
1. **LED** trouble code	1. Service — replace problem component
2. **Throttle/ignition monitor switch** adjusted incorrectly	2. Adjust throttle cable tension — service spring
3. **Spark plugs** fouled — damaged	3. Clean — replace spark plugs
4. **High tension leads/coil** shorting	4. Service — replace high tension leads/coil
5. **ECU** faulty — damaged	5. Replace ECU
6. **Fuel mixture** lean	6. Repair fuel regulator — injector(s)
7. **Oil-injection pump** malfunctioning — adjusted incorrectly	7. Replace — bleed — adjust oil-injection pump
Problem: Engine Four-Cycles (Floods Excessively)	
Condition	**Remedy**
1. **LED** trouble code	1. Service — replace problem component
2. **Fuel pressure** too high	2. Replace regulator — hose
3. **Injector** faulty	3. Replace injector
4. **Throttle position sensor** faulty	4. Replace throttle body assembly
5. **Air-intake silencer** obstructed	5. Remove obstruction

Problem: Engine Stops Suddenly	
Condition	**Remedy**
1. **Gas tank** empty	1. Fill tank
2. **Spark** absent	2. See No Spark at Spark Plugs sub-section
3. **LED** trouble code	3. Service — replace problem component
4. **CDI relay** faulty	4. Replace CDI relay
5. **Fuel filter(s)** obstructed	5. Replace filter(s)
6. **Fuel pressure** low	6. Replace regulator — hose
7. **Fuel pump** faulty	7. Service — replace fuel pump
8. **Fuel pump relay** faulty	8. Replace relay
9. **Gas tank vent hose** obstructed	9. Service vent hose
10. **ECU** faulty	10. Replace ECU
11. **Fuel hose** obstructed — broken — pinched	11. Remove obstruction — repair — replace fuel hose
12. **Ignition coil** faulty	12. Replace ignition coil
13. **Engine** seized	13. Overhaul engine
14. **Throttle/ignition monitor switch — throttle cable tension** faulty — adjusted incorrectly	14. Replace throttle control — adjust throttle cable
Problem: Engine Fails to Stop (Continues to Run, Even with All Switches Off)	
Condition	**Remedy**
1. **ECU** shorted to ground	1. Replace ECU
2. **Engine wiring harness connections** wet	2. Clean — dry connections

SECTION 3 — ENGINE-RELATED ITEMS

3

TABLE OF CONTENTS

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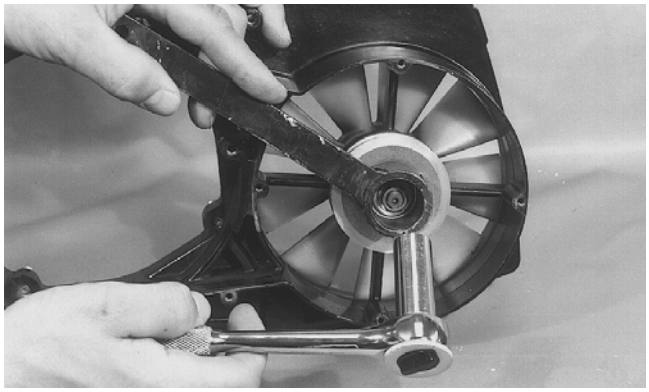
Axial Fan/Belt
(370/440 cc)

REMOVING FAN

1. Remove the four cap screws securing the recoil starter to the fan case.
2. Remove the three cap screws securing the recoil starter pulley and fan drive pulley to the flywheel; then remove the recoil starter pulley and fan drive pulley.
3. Remove the cap screws and flange nuts securing the fan case assembly to the engine; then remove the fan case from the engine compartment.

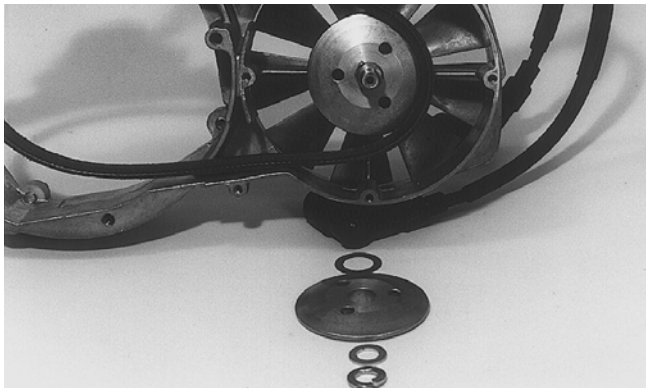
DISASSEMBLING

1. Remove the fan cover; then remove the belt.
2. Using the Fan Spanner Wrench (p/n 0644-139), remove the nut, lock washer, and washer securing pulley halves.



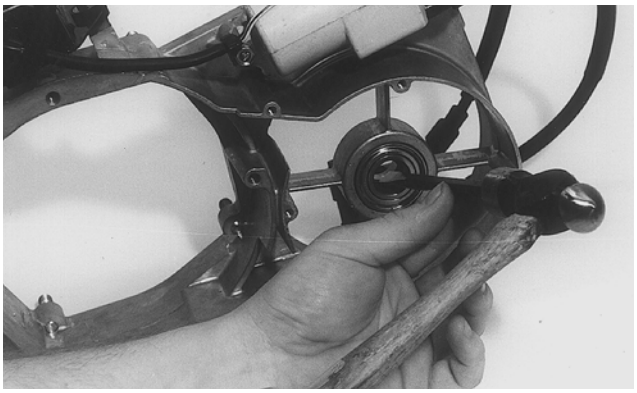
AB102

3. Slide the outer pulley half, shim(s), fan belt, and inner pulley half off the shaft and account for the key and the fan belt.



A908

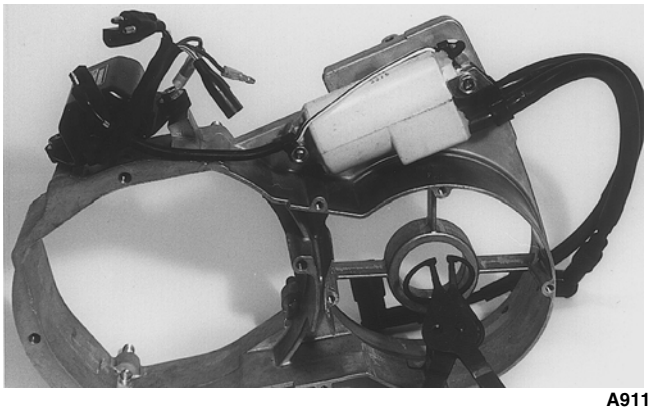
4. Remove the fan with shaft.
5. Drive the bearings from the fan case and account for the spacer between the bearings.



A910

■ **NOTE: A circlip is positioned between the bearings. The bearings must be driven from the center to the outside of the fan case.**

6. Remove the circlip from the fan case.



A911

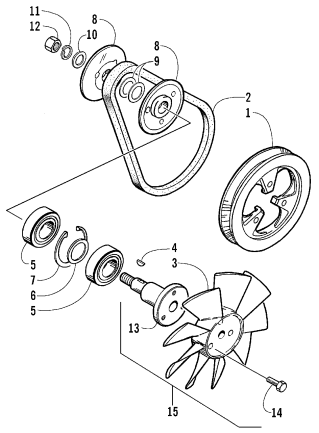
CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean all axial fan components.
2. Inspect the fan case and shaft threaded areas for damage or stripped threads; then check the shaft keyway and key for excessive wear.
3. Inspect the fan for broken, bent, or damaged vanes.
4. Inspect the bearings for smooth rotation.
5. Inspect the pulley halves for cracks, gouges, or other damage.
6. Inspect the fan belt for cracks, tears, or fraying.

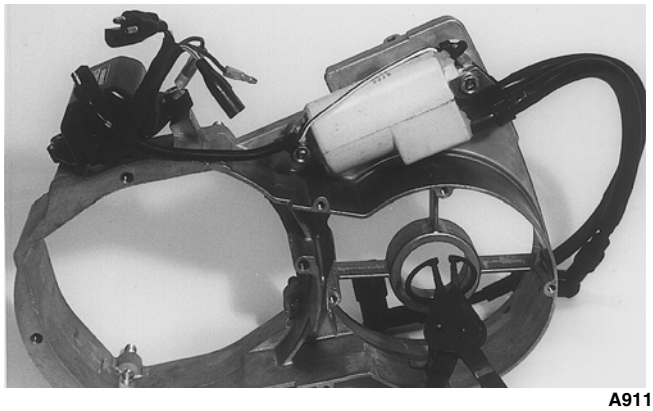
ASSEMBLING

KEY
1. Drive Pulley
2. Belt
3. Fan
4. Key
5. Bearing
6. Spacer
7. Circlip
8. Pulley Half
9. Shim
10. Washer
11. Lock Washer
12. Nut
13. Shaft
14. Cap Screw
15. Fan Assy



0733-277

1. Install the circlip into the groove of the fan case.

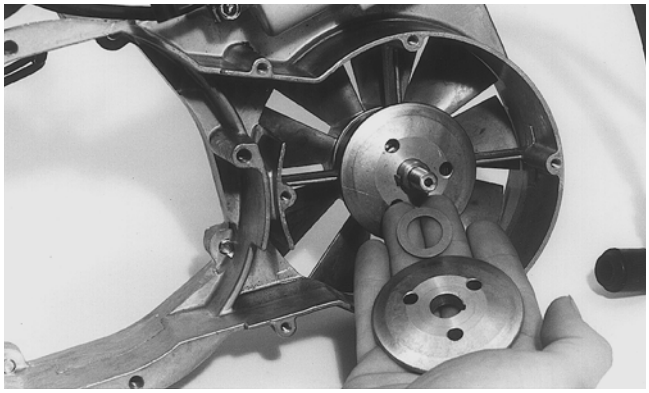


A911

2. Press a bearing into the fan case until it is seated against the circlip.
3. From the opposite side of the fan case, install the spacer and press the remaining bearing into the fan case until it is seated.

■ **NOTE: The spacer is positioned between the two fan-case bearings.**

4. Insert the fan with shaft through the fan bearings.
5. Install the key into the shaft.
6. Slide the inner pulley half, required shim(s), fan belt, and outer pulley half onto the shaft.



A913

7. Using the fan spanner wrench, secure the pulley with a washer, lock washer, and nut. Tighten the nut to 2.5-4 kg-m (18-29 ft-lb).

INSTALLING FAN

1. Place the fan case assembly on the engine; then secure with flange nuts and cap screws. Tighten the flange nuts to 1.8-2.2 kg-m (13-16 ft-lb). Tighten the cap screws to 0.4-0.7 kg-m (3-5 ft-lb).
2. Place the new fan belt into position on the upper pulley.
3. Place the fan drive pulley onto the fan belt and align one of its holes with one of the mounting holes in the flywheel; then start a cap screw into the aligned holes and finger-tighten.
4. Rotate the fan drive pulley clockwise while observing the other two holes in the pulley. When they align with the two holes in the flywheel, start the remaining two mounting cap screws.
5. Tighten the three cap screws only to position the fan drive pulley on the flywheel; then remove the three cap screws and install the recoil starter pulley. Apply red Loctite #271 to the threads of the three cap screws and install them into the flywheel. Tighten the three cap screws evenly to 0.8-1.2 kg-m (6-9 ft-lb).
6. Check the fan belt tension. Adjust as necessary.
7. Install the fan cover and secure with six screws. Tighten the screws to 1.1 kg-m (8 ft-lb).
8. Install the recoil starter. Secure with four cap screws. Tighten to 1.1 kg-m (8 ft-lb).

REPLACING FAN BELT

1. Remove the fan cover and the recoil starter.
2. Remove the three cap screws securing the recoil starter pulley and the fan drive pulley to the flywheel.

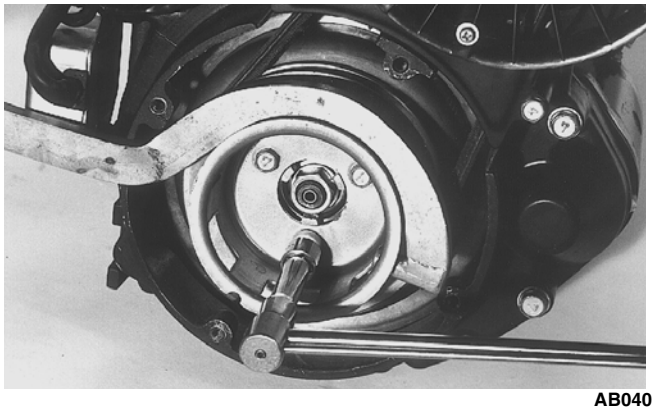
3. Remove the fan drive pulley and fan belt from the engine.

4. Place the new fan belt into position on the upper pulley.

5. Place the fan drive pulley onto the fan belt and align one of its holes with one of the mounting holes in the flywheel; then start a cap screw into the aligned hole and finger-tighten.

6. Rotate the fan drive pulley clockwise while observing the other two holes in the pulley. When they align with the two holes in the flywheel, start the remaining two cap screws.

7. Tighten the three cap screws only to position the fan drive pulley on the flywheel; then remove the three cap screws and install the recoil starter pulley. Apply red Loctite #271 to the threads of the three cap screws and install into the flywheel. Tighten the three cap screws evenly to 0.8-1.2 kg-m (6-9 ft-lb).



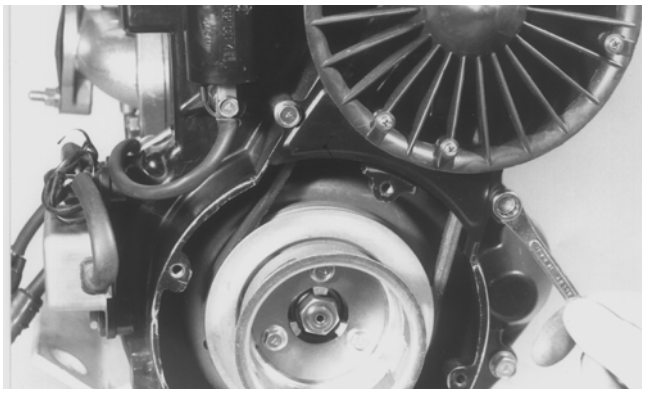
AB040

■ **NOTE: With the new belt installed, check fan belt tension (see Checking Belt Tension).**

8. Install the fan cover. Tighten the screws to 1.1 kg-m (8 ft-lb). Install the recoil starter. Tighten the cap screws to 1.1 kg-m (8 ft-lb).

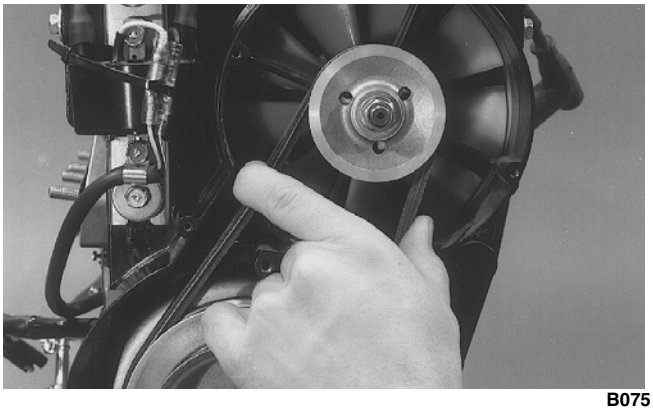
CHECKING BELT TENSION

1. Remove the fan cover.



AB075

2. Squeeze the belt at midspan and observe the belt deflection. The maximum belt deflection on either side must not exceed 6 mm (1/4 in.). If the deflection is not within specifications, adjust the belt tension.



B075

3. Install the fan cover. Tighten the screws to 1.1 kg-m (8 ft-lb).

ADJUSTING BELT TENSION

1. Remove the fan cover.

2. Using the fan spanner wrench, remove the nut, lock washer, and washer securing the pulley halves.

3. Slide the outer pulley half off the shaft and account for any shim(s).

4. Add or remove shim(s) to attain correct belt tension.

■ **NOTE: To increase belt tension, remove shim(s); to decrease belt tension, install shim(s).**

5. Install the fan belt and the outer pulley half on the shaft and, using the fan spanner wrench, secure pulley with a washer, lock washer, and nut. Tighten to 2.5-4 kg-m (18-29 ft-lb).

6. Recheck belt tension; adjust if necessary.

7. Install fan cover. Tighten the screws to 1.1 kg-m (8 ft-lb).

Repairing Water Pump
(900 cc)

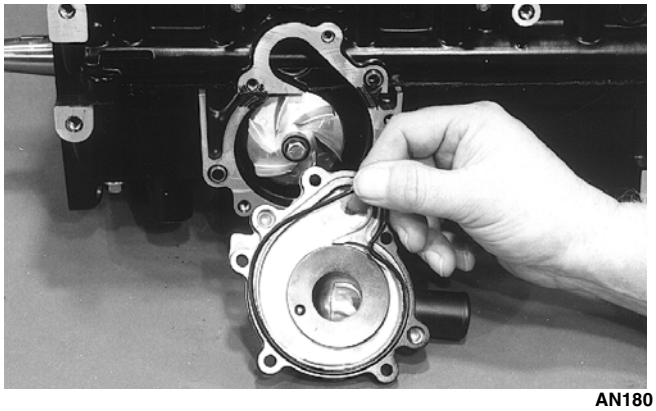
■ **NOTE: A bleed hole is located at the bottom of the water pump housing. If there are any signs of coolant leakage from the bleed hole, the water pump seals must be replaced. When servicing the water pump, use Water Pump Bearing and Seal Kit (p/n 0644-084).**

1. Remove the expansion chamber from the engine compartment.

2. Attach a long piece of fuel hose to the engine coolant drain valve (located on the front lower half of the crankcase). Route the fuel hose outside the engine compartment and into a container. Open the drain valve and remove the filler cap. Once the coolant stops flowing, remove the hose and tighten the drain valve.

3. Remove the coolant hose from the water pump cover.

4. Remove the screws securing the water pump cover; then remove the cover and account for the O-ring seal.



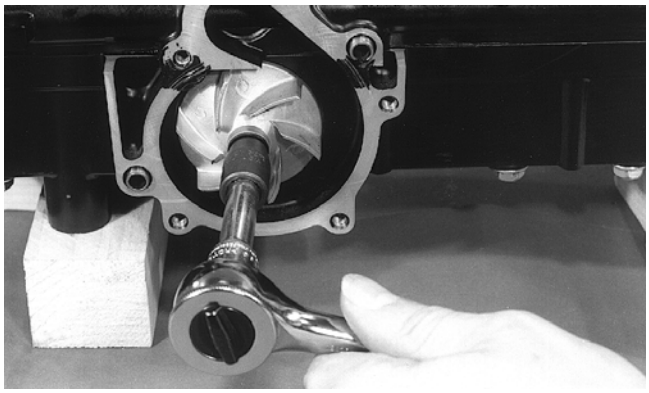
AN180

5. Loosen the throttle body flange clamps; then remove the throttle body assembly.

6. Remove the mounting hardware securing the engine to the front-end assembly. Remove the hose from the thermostat housing and tip the engine forward.

7. Remove either lower union cap screw securing the lower check valve assembly. Remove the two screws securing the oil-injection pump and pull the oil pump from the engine. Leave the pump hose and cable attached.

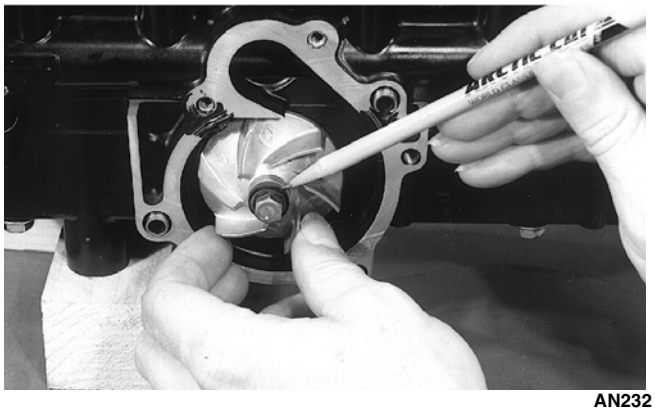
8. Remove the cap screw securing the impeller.



AN233

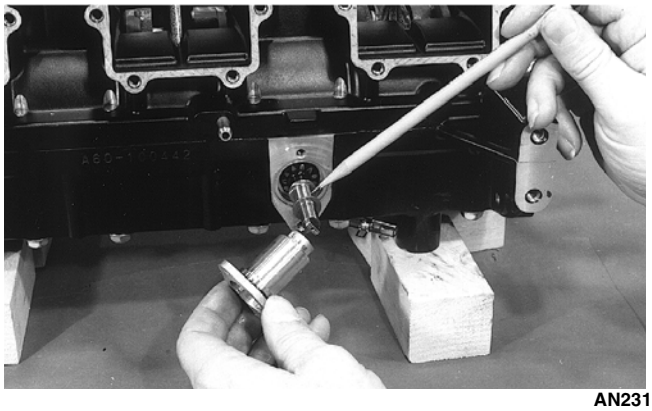
9. Remove the impeller from the shaft.

■ **NOTE: If the impeller won't slide off the shaft, start the cap screw into the shaft and tap on the cap screw driving the shaft back out of the impeller.**



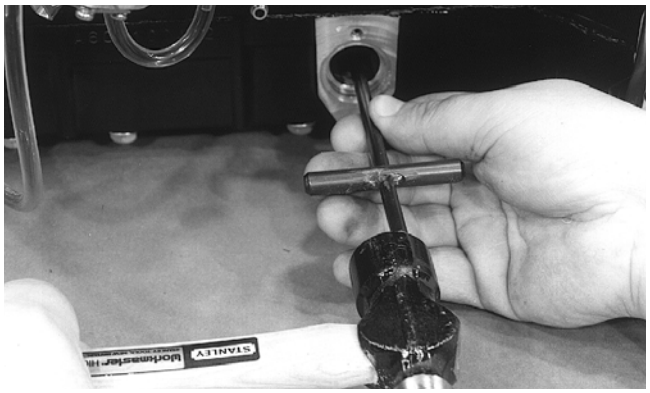
AN232

10. Remove the oil-injection pump retainer and shaft from the opposite side of the crankcase. Account for the thrust washer located between the retainer and shaft flange.



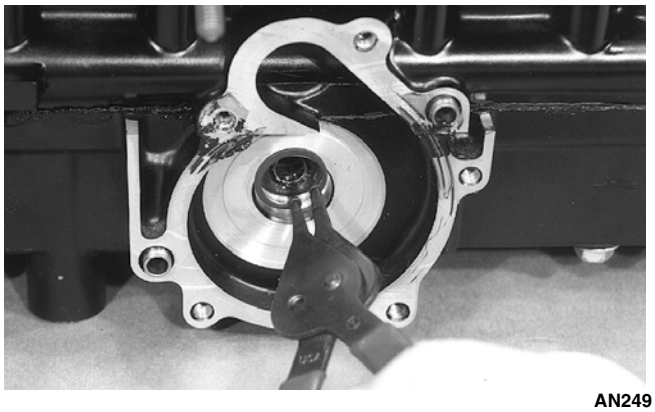
AN231

11. Using the long seal driver, drive the water pump seal from the crankcase.



AN250

12. Using a pair of snap ring pliers, remove the snap ring securing the inner seal in the crankcase.

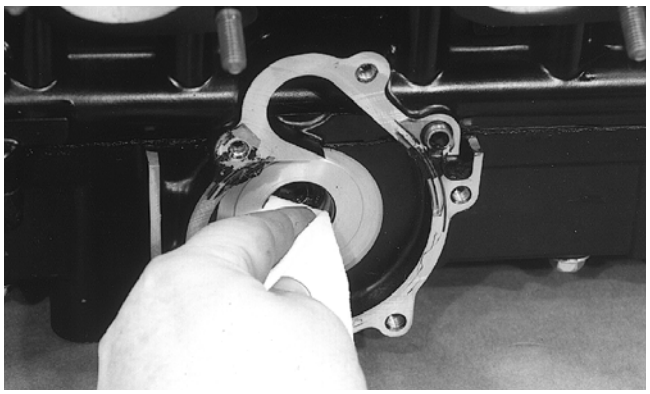


AN249

13. Using the hooked end of the long seal driver, pull the inner seal free of the crankcase.

ASSEMBLING

1. Wipe the seal area clean using a clean rag.



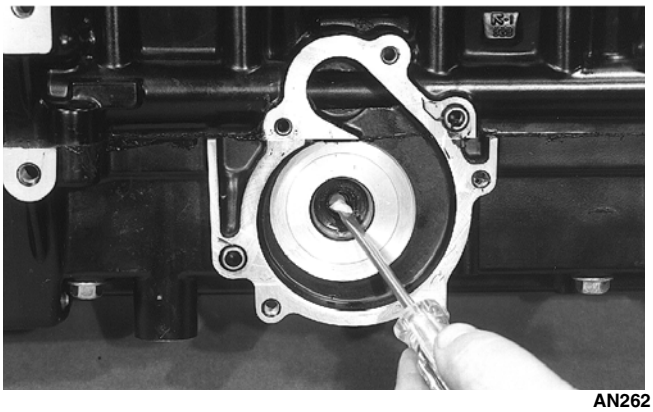
AN248

2. Position the inner seal onto the seal driver (spring side towards the crankshaft). Gently tap into position.



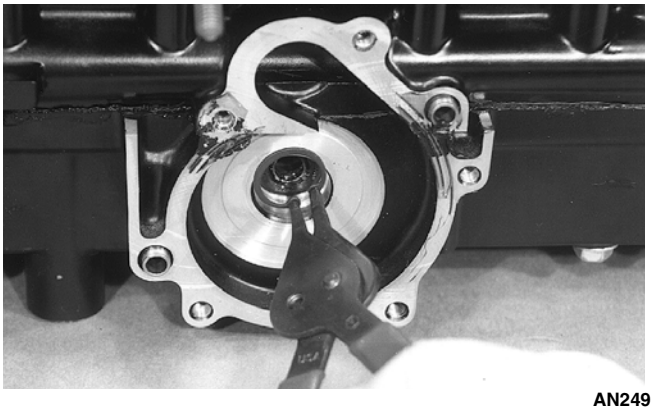
AN259

3. Using a small screwdriver, apply a light coat of grease to the inner seal lips.



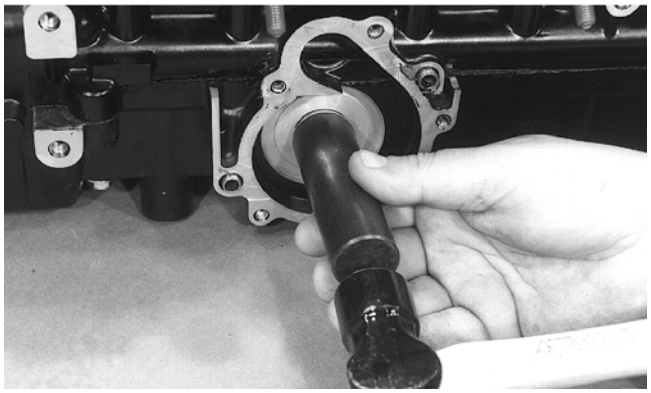
AN262

4. Using a pair of snap ring pliers, install the snap ring securing the inner seal in the crankcase.



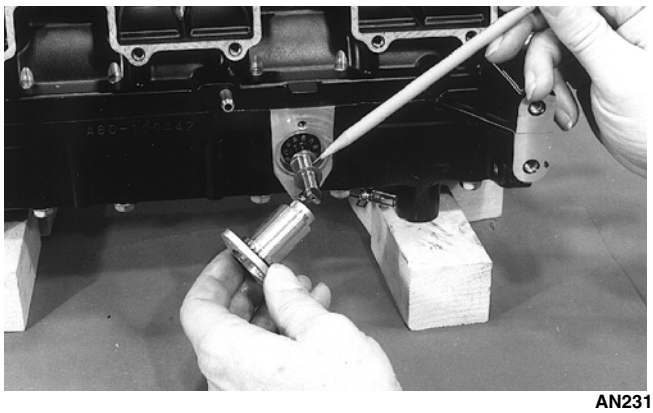
AN249

5. Using the seal driver, carefully install the outer water pump seal. Gently tap the seal down into position until it seats itself against its flange.



AN261

6. Apply a light coat of grease to the sealing surface of the oil-injection pump driveshaft; then install Oil Seal Installation Tool (p/n 0644-219) at the end of the shaft. Twist the shaft as it is pushed through the oil and water pump seals; then remove the tool. Position the shim on the oil pump end of the shaft.



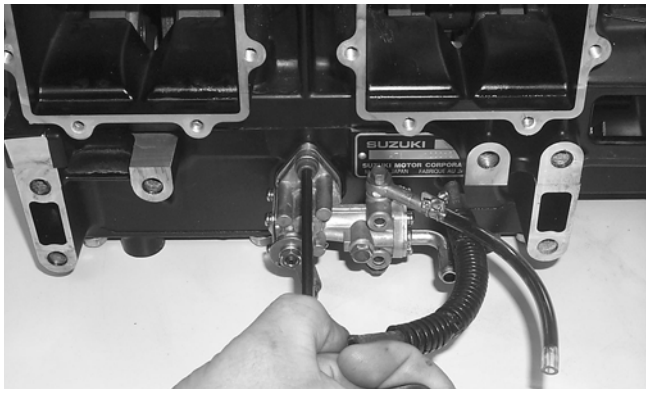
AN231

7. Install the oil-injection pump retainer O-ring and retainer.



AN088D

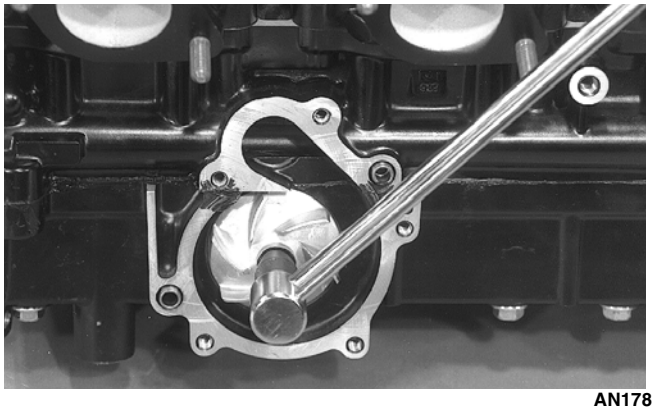
8. Install the O-ring and the oil-injection pump. Make sure the pump shaft and oil pump align. Secure with two screws and washers. Tighten the two screws to 0.7 kg-m (5 ft-lb).



AP143

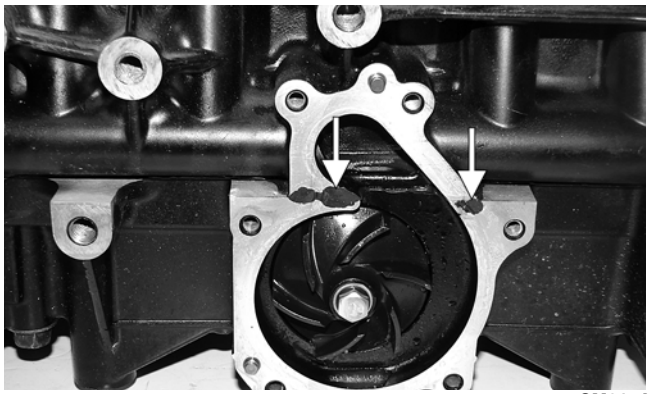
9. Place the lower check valve into position; then secure with the gaskets and union cap screw. Tighten securely.

10. Place the impeller into position and secure with a cap screw and washer. Be sure the rubber side of the washer is directed towards the impeller. Apply blue Loctite #243 to the threads of the cap screw and tighten to 0.8-1.2 kg-m (6-9 ft-lb).



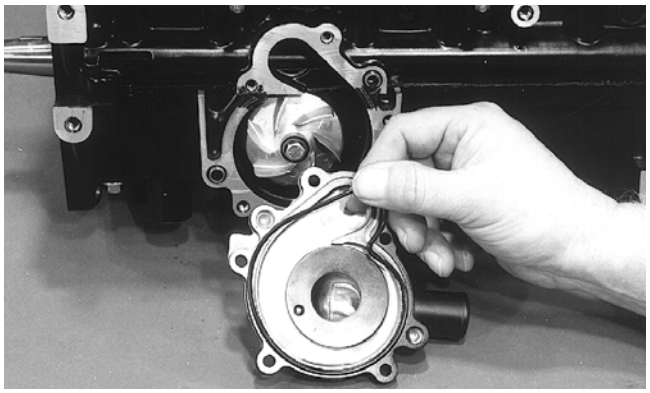
AN178

11. Apply sealant to the crankcase seam; then install the alignment pins into the crankcase (if removed).



CM015A

12. Position the O-ring into the water pump cover; then install the cover. Secure with the screws. Tighten to 1.1 kg-m (8 ft-lb).



AN180

13. Set the engine down into position and secure to the front-end assembly. Tighten to specifications (see Section 2).

14. Connect the coolant hose to the water pump cover and secure with the clamp.

15. Install the throttle body assembly and secure with clamps.

16. Install the expansion chamber and secure with springs.

■ **NOTE: When installing the springs, the long hook portion of the spring must be attached to the exhaust manifold or premature spring failure will result.**

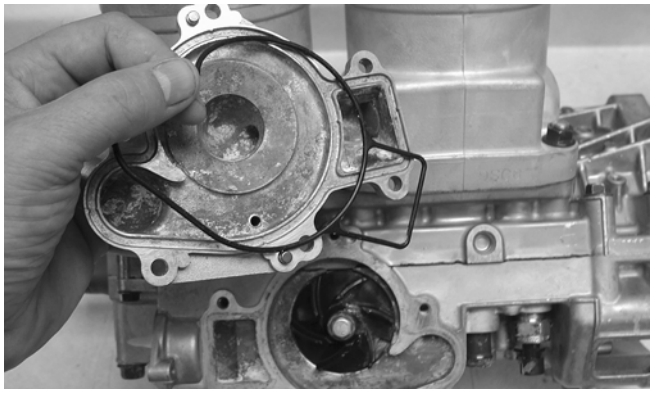
17. Install the thermostat hose and fill the cooling system with antifreeze. Start and run the engine. Check for leaks and recheck the cooling system to make sure it has been properly filled.

Repairing Water Pump
(500/600/700 cc)

■ **NOTE: The engine must be removed for this procedure.**

■ **NOTE: A bleed hole is located at the bottom of the water pump housing. If there are any signs of coolant leakage from the bleed hole, the water pump seals must be replaced. When servicing the water pump, use Water Pump Bearing and Seal Kit (p/n 0644-084).**

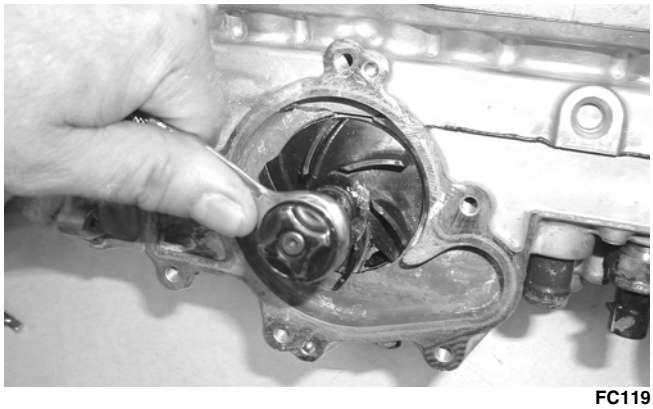
1. Remove the screws securing the water pump cover; then remove the cover and account for the O-ring seal.



FC118

2. Remove either lower union cap screw securing the lower check valve assembly. Remove the two screws securing the oil-injection pump and pull the oil pump from the engine. Leave the pump hose and cable attached.

3. Remove the cap screw securing the impeller. Account for the rubber washer behind the cap screw.



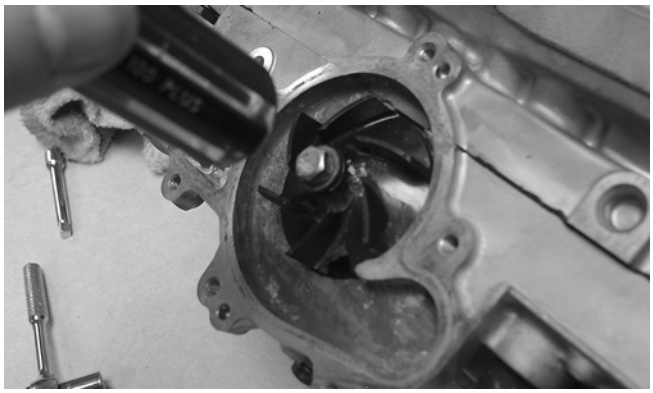
FC119

4. Remove the impeller from the shaft.



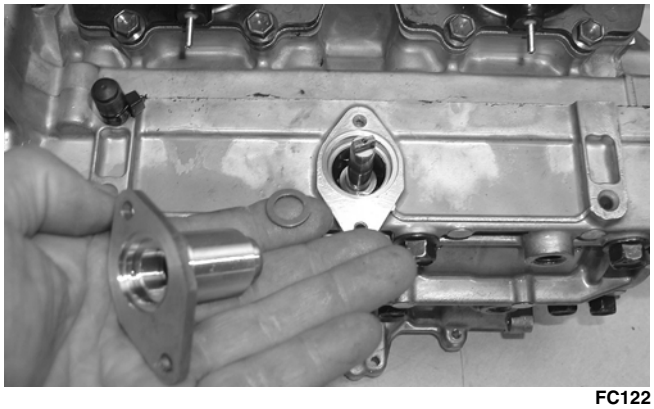
FC120

■ **NOTE: If the impeller will not slide off the shaft, start the cap screw into the shaft and tap on the cap screw driving the shaft back out of the impeller.**



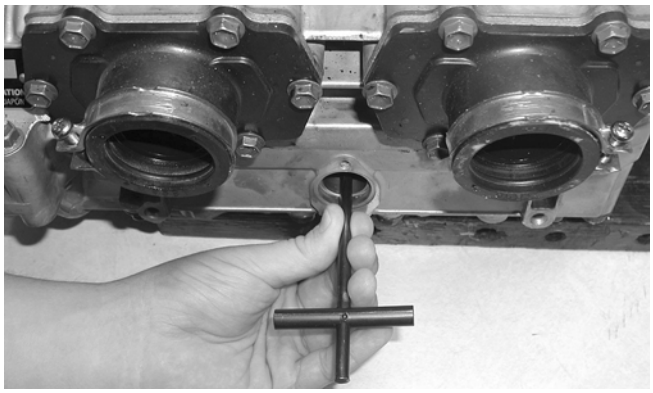
FC121

5. Remove the oil-injection pump retainer and shaft from the opposite side of the crankcase. Account for the thrust washer located between the retainer and shaft flange.



FC122

6. Using the long seal driver, drive the water pump mechanical seal from the crankcase.



FC123

7. Using a pair of snap ring pliers, remove the snap ring securing the inner seal in the crankcase.

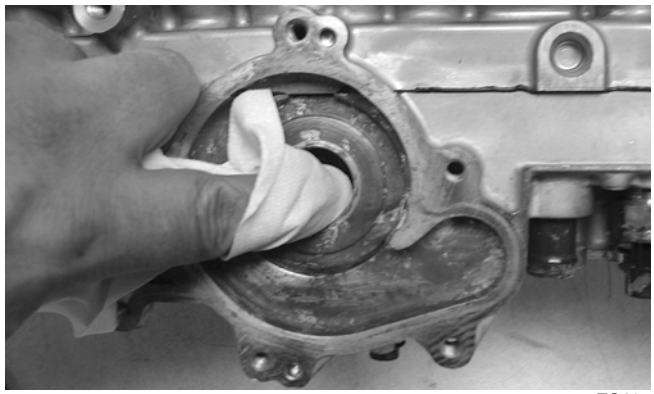


FC124

8. Using the hooked end of the long seal driver, pull the inner seal free of the crankcase.

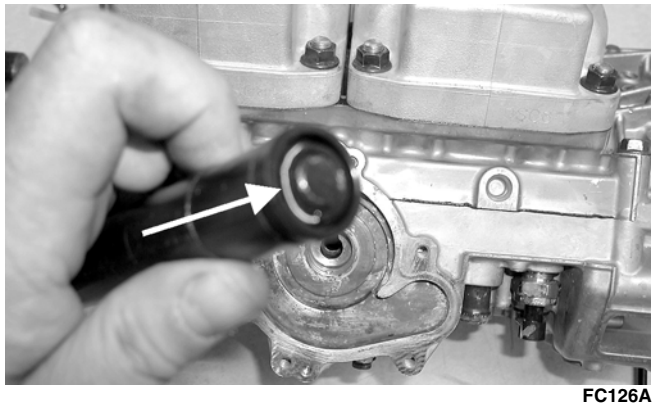
ASSEMBLING

1. Wipe the seal area clean using a clean rag.



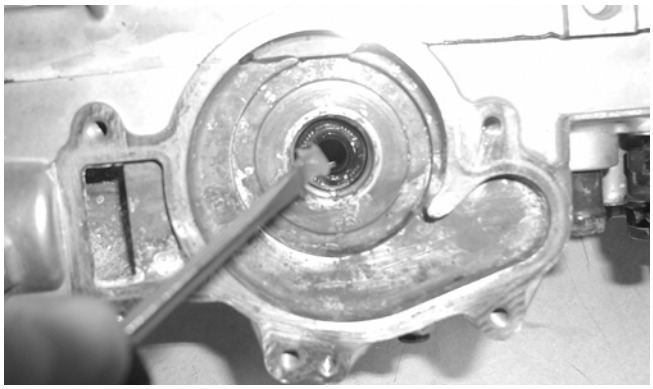
FC125

2. Position the inner seal onto the seal driver (spring side towards the crankshaft). Gently tap into position.



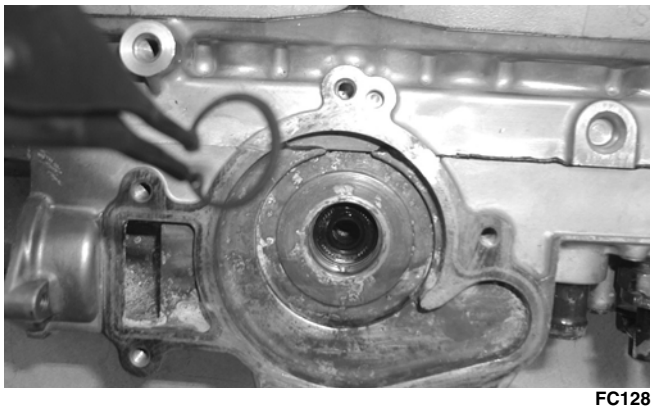
FC126A

3. Using a small screwdriver, apply a light coat of grease to the inner seal lips.



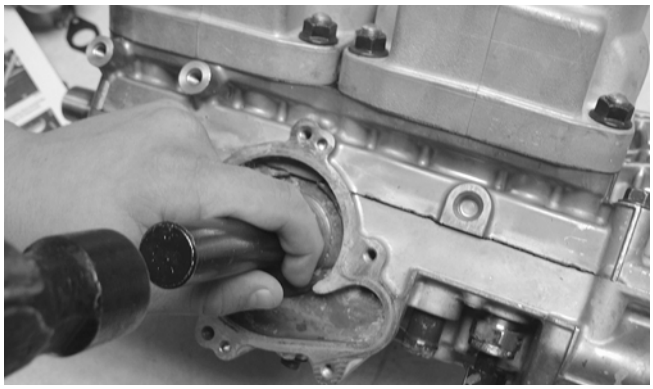
FC127

4. Using a pair of snap ring pliers, install the snap ring securing the inner seal in the crankcase.



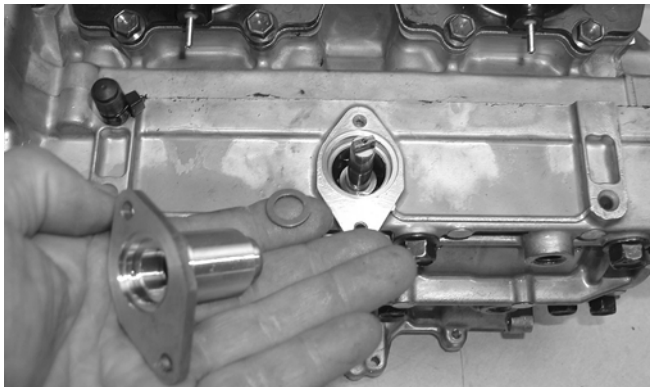
FC128

5. Using the seal driver, carefully install the outer water pump mechanical seal. Gently tap the seal down into position until it seats itself against its flange.



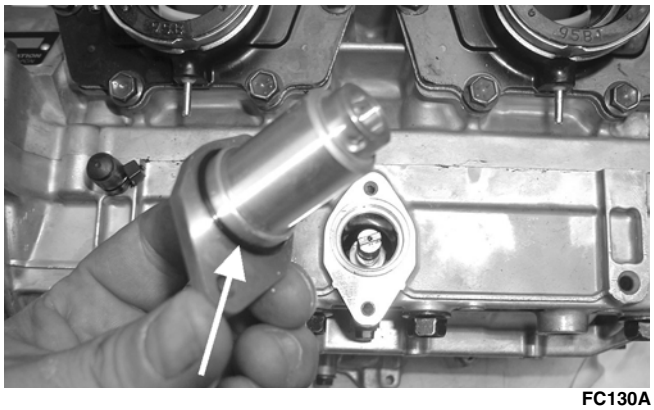
FC129

6. Apply a light coat of grease to the sealing surface of the oil-injection pump driveshaft; then install Oil Seal Installation Tool (p/n 0644-219) at the end of the shaft. Twist the shaft as it is pushed through the oil and water pump seals; then remove the tool. Position the shim on the oil pump end of the shaft.



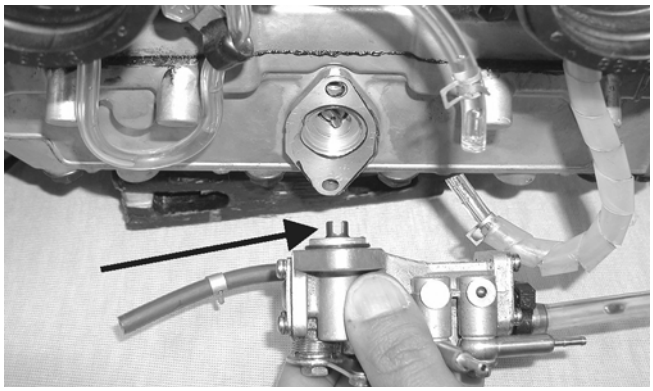
FC122

7. Install the oil-injection pump retainer O-ring and retainer.



FC130A

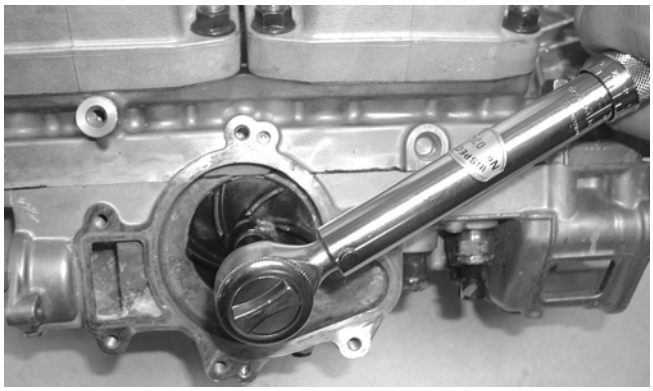
8. Install the O-ring and the oil-injection pump. Make sure the pump shaft and oil pump align. Secure with two screws. Tighten the two screws to 0.7 kg-m (5 ft-lb).



FC131A

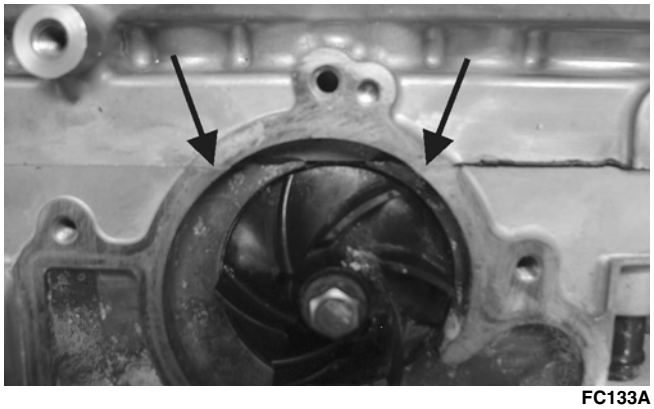
9. Place the lower check valve into position; then secure with the gaskets and union cap screw. Tighten securely.

10. Place the impeller into position and secure with a cap screw and washer. Be sure the rubber side of the washer is directed towards the impeller. Apply blue Loctite #243 to the threads of the cap screw and tighten to 0.8-1.2 kg-m (6-9 ft-lb).



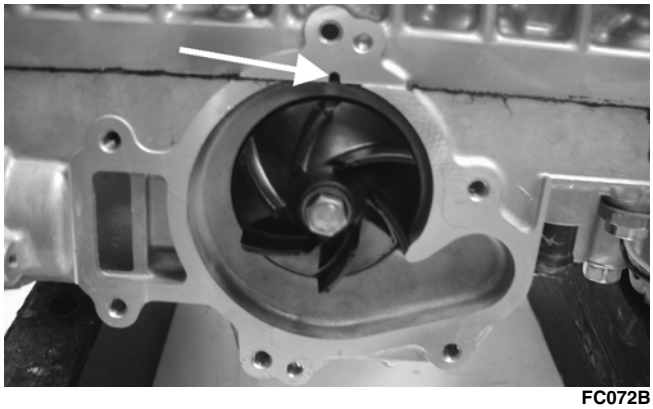
FC132

11. Apply sealant to the crankcase seam; then install the alignment pins into the crankcase (if removed).



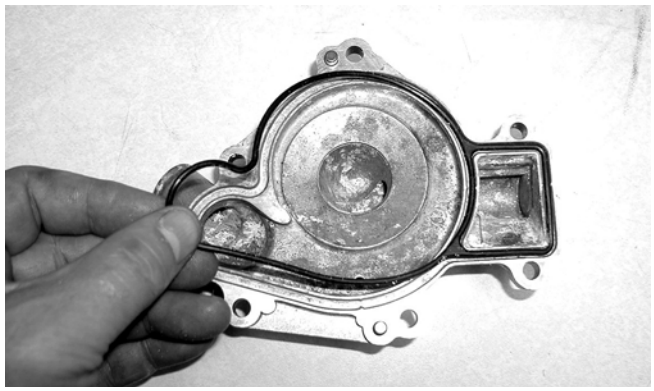
FC133A

■ **NOTE: It is important to not get sealant into the breather hole in the crankcase. If sealant gets into the hole, carefully remove before proceeding.**



FC072B

12. Position the O-ring into the water pump cover; then install the cover. Secure with the screws. Tighten to 1.1 kg-m (8 ft-lb).



FC134

Pressure Testing Engine

1. Test the engine for air leaks using the following procedure and Compression/Pressure Tester Kit (p/n 0644-366).

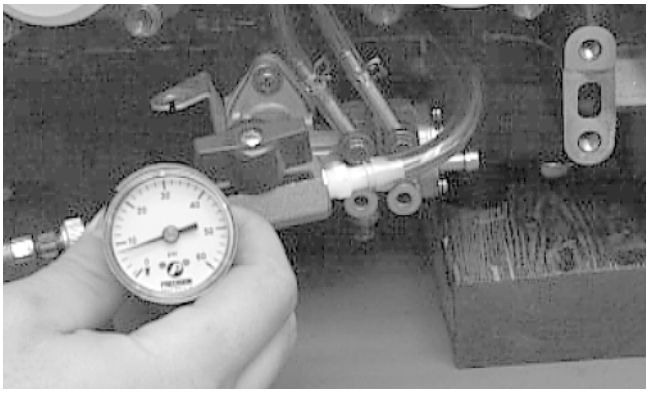
   a. Install a plug into each intake-manifold port and tighten the flange clamps securely.

   b. Place a rubber plug and cover on each exhaust port and secure.

   c. Connect the tester pump to an impulse fitting on the crankcase; then plug any remaining impulse fittings and pressurize the crankcase to 8 psi and close the valve.

⚠ CAUTION

DO NOT exceed 8 psi pressure or damage to the seals will result.



AN128D

   d. Monitor the pressure gauge. The pressure must not drop at a rate of more than 1 psi per minute.

e. If the pressure drops faster than specified, inspect for an air leak with soapy water or by completely submerging the pressurized engine in clean fresh water. Repair as needed.

⚠ CAUTION

When submerging the engine to test for air leaks, all external electrical components must be removed to avoid damage.

Liquid Cooling System

The liquid cooling system consists of heat exchangers, water pump, coolant temperature sensor, and thermostat. The system should be inspected for leaks or damage whenever an overheating problem is experienced.

DRAINING COOLING SYSTEM

1. Loosen the coolant tank cap.

2. On the 500/600/700 cc, remove the coolant hose from the inlet pipe of the cylinder head; then plug the inlet pipe, or on the 900 cc, remove the coolant hose from the thermostat cap; then plug the cap.

■ NOTE: It is advisable to place a shop towel under the coolant hose before removing to avoid having any residual coolant drain into the engine compartment.

3. Using a suitable vacuum device connected to the coolant hose, drain the coolant from the system.

FILLING COOLING SYSTEM

⚠ CAUTION

Be sure the cooling system is throughly filled using the following procedure.

1. Elevate the front of the snowmobile 30-60 cm (12-14 in.).

2. Remove the coolant tank cap and check coolant level. The coolant tank should be filled to the coolant level line.

3. Install the coolant tank cap; then start the engine. Run the engine at 3000-3500 RPM until the bottom heat exchangers become hot to the touch. Stop the engine and allow the system to cool.

4. Lower the front of the snowmobile and elevate the rear of the snowmobile 12-14 in. Repeat the procedures in step 3.

5. Check the coolant level. Add coolant as required to the coolant tank (coolant tank should be filled to coolant level line). Repeat procedure until coolant level stabilizes in the coolant tank.

■ NOTE: If coolant is required, mix coolant for a temperature of -36°C (-34°F). Follow mixing recommendations of the manufacturer of the coolant.

⚠ CAUTION

It is extremely important that the Filling Cooling System procedure is followed very closely and the cooling system is properly filled. If the system isn't properly filled, piston damage will occur.

INSPECTING COOLANT HOSES AND CLAMPS

All coolant hoses and connections should be checked annually for deterioration, cracks, and wear.

All coolant hoses and clamps should be replaced every four years.

INSPECTING THERMOSTAT

1. Inspect the thermostat for corrosion, wear, or spring damage.

2. Using the following procedure, inspect the thermostat for proper operation.

   a. Suspend the thermostat in a container filled with water.

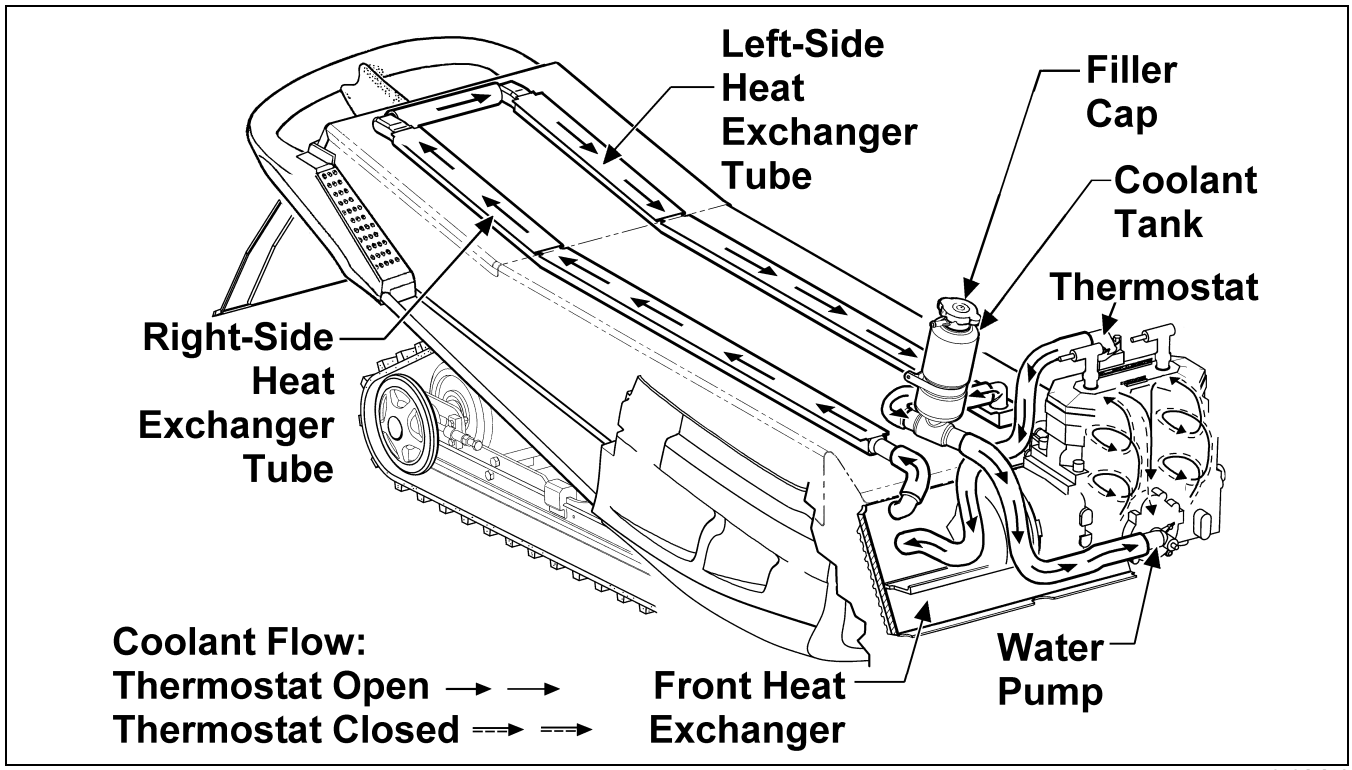
   b. Heat the water and monitor the temperature with a thermometer.

   c. The thermostat should open at 50°C (122°F). Once the thermostat starts to open, IMMEDIATELY remove the thermostat as it will lock in the open position if allowed to open fully.

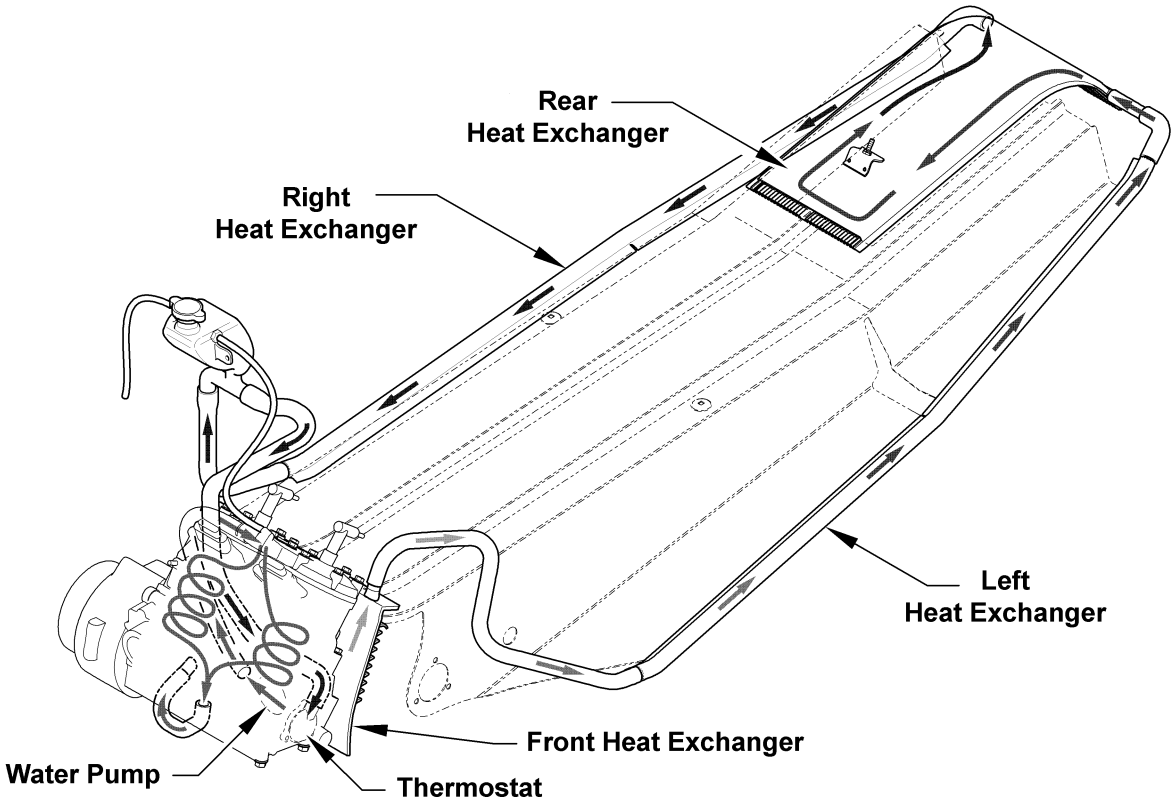
■ NOTE: The thermostat is of the lock-open type. If the thermostat is ever allowed to fully open, it will remain open and replacement will be necessary.

Cooling System Schematics

The following schematics are representative of the different styles of 2-stroke cooling systems in the 2006 Arctic Cat snowmobiles. Some components may vary from model to model; therefore, the technician should use discretion and sound judgment when servicing a particular cooling system.



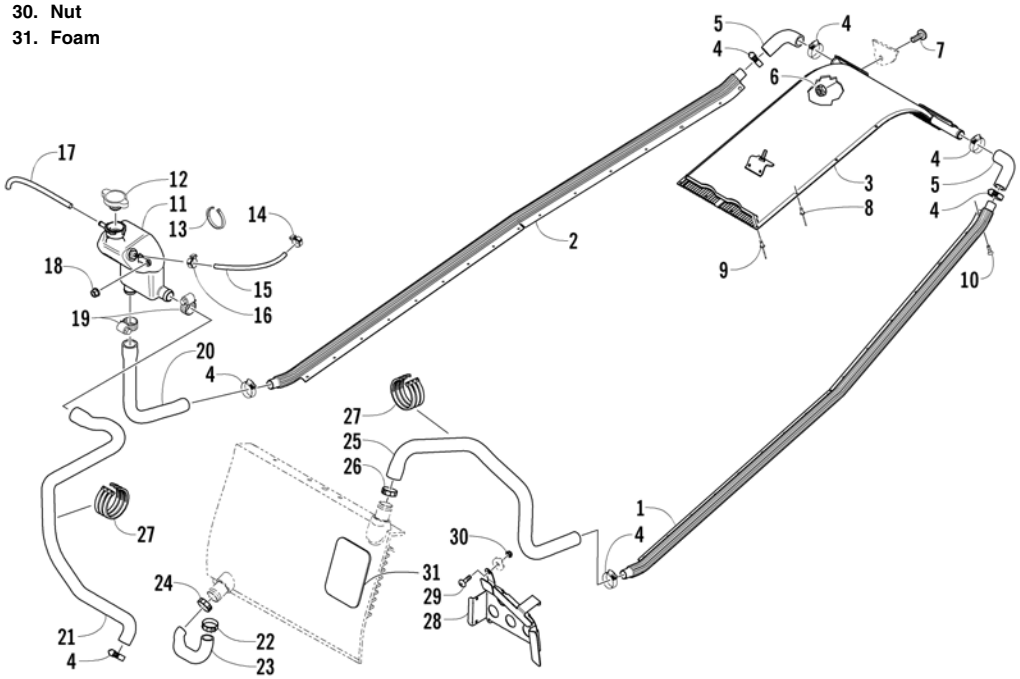
0734-451



738-067A

KEY

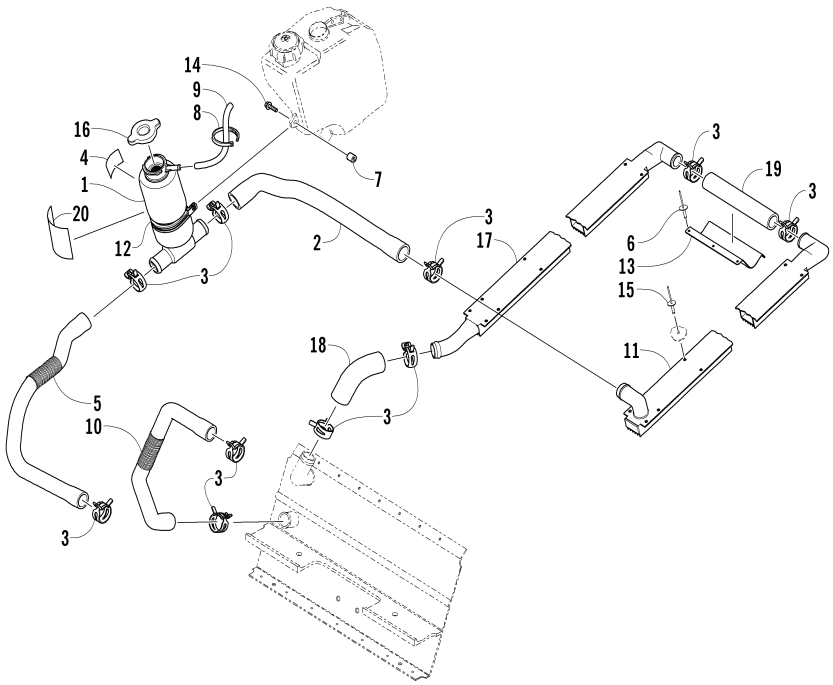
1. Left Heat Exchanger
2. Right Heat Exchanger
3. Rear Heat Exchanger
4. Hose Clamp
5. Hose
6. Lock Nut
7. Machine Screw
8. Rivet
9. Rivet
10. Plastite Screw
11. Coolant Tank
12. Cap
13. Cable Tie
14. Hose Clamp
15. Hose
16. Hose Clamp
17. Hose
18. Lock Nut
19. Hose Clamp
20. Hose
21. Hose
22. Hose Clamp
23. Hose
24. Hose Clamp
25. Hose
26. Hose Clamp
27. Cable Tie
28. Hose Protector
29. Machine Screw
30. Nut
31. Foam



0740-722

KEY

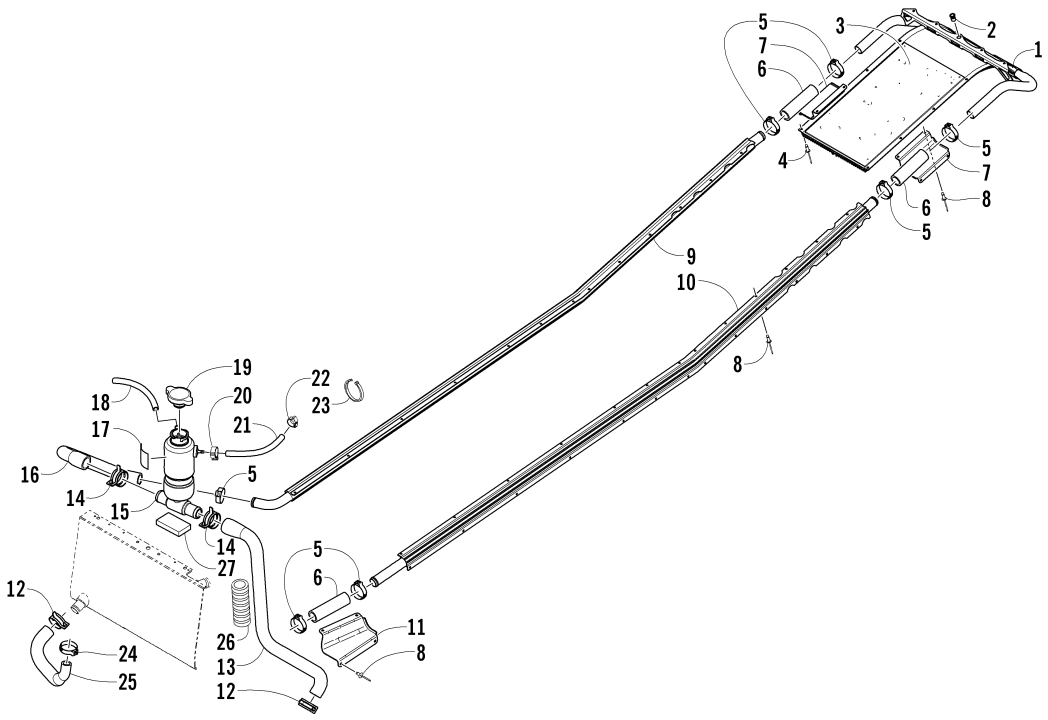
1. Coolant Tank
2. Hose
3. Clamp
4. Decal
5. Hose
6. Rivet
7. Spacer
8. Cable Tie
9. Hose
10. Hose
11. Heat Exchanger
12. Clamp
13. Hose Guard
14. Cap Screw
15. Rivet
16. Cap
17. Heat Exchanger
18. Hose
19. Hose
20. Foil Tape



0739-147

KEY

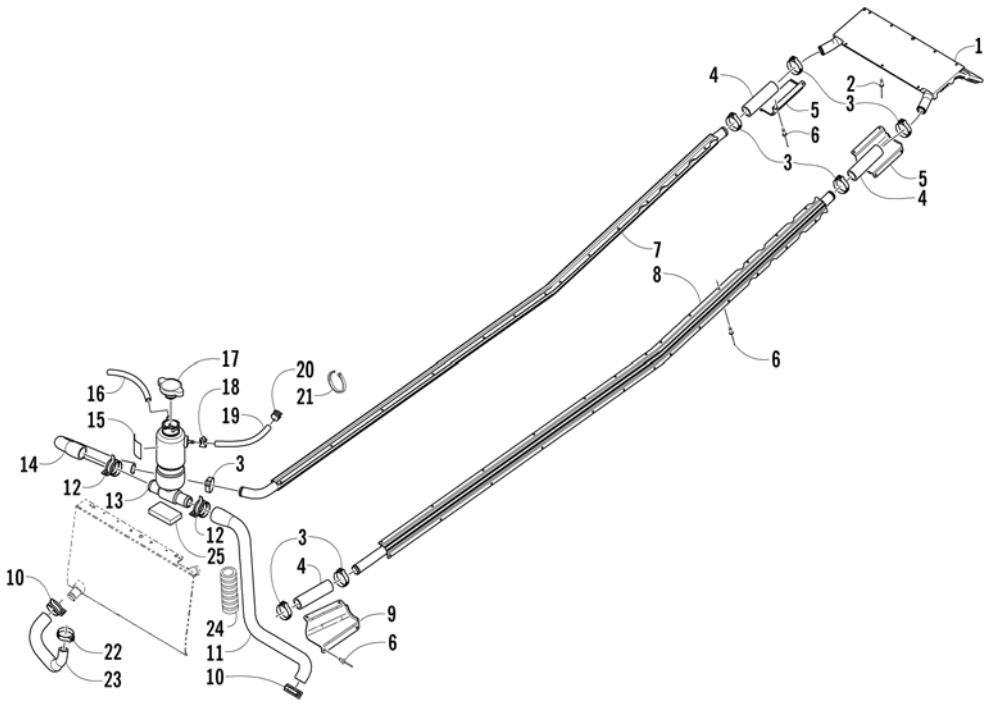
1. Heat Exchanger
2. Insert
3. Foam
4. Rivet
5. Clamp
6. Hose
7. Protector
8. Rivet
9. Heat Exchanger
10. Heat Exchanger
11. Protector
12. Clamp
13. Hose
14. Clamp
15. Coolant Tank
16. Hose
17. Decal
18. Hose
19. Cap
20. Clamp
21. Hose
22. Clamp
23. Cable Tie
24. Clamp
25. Hose
26. Protector
27. Pad



0740-776

KEY

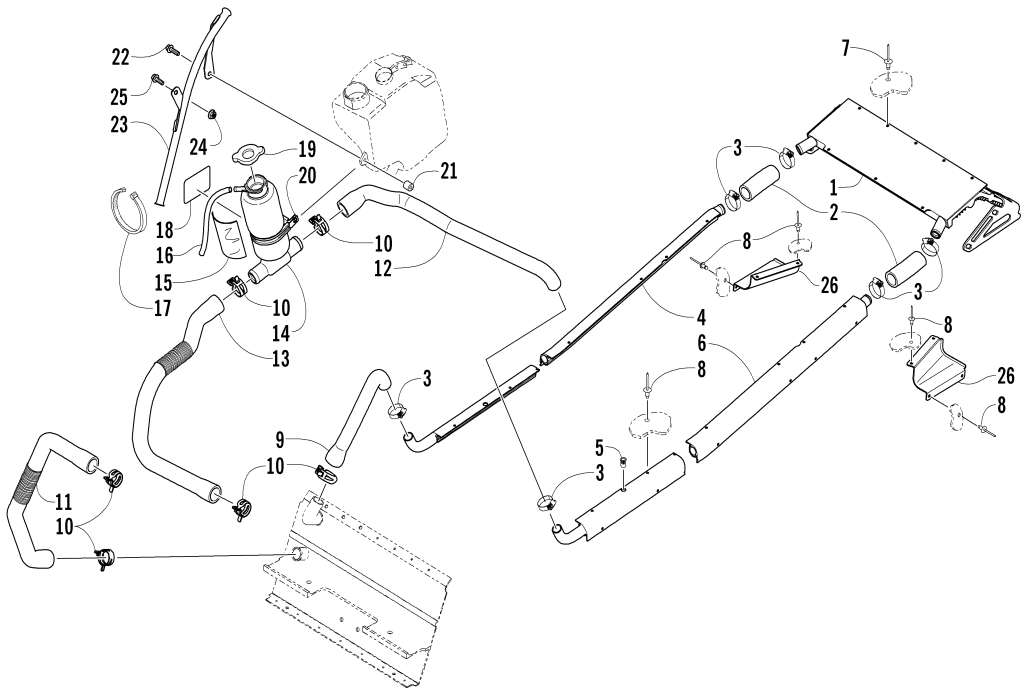
1. Heat Exchanger
2. Rivet
3. Clamp
4. Hose
5. Protector
6. Rivet
7. Heat Exchanger
8. Heat Exchanger
9. Hose Protector
10. Clamp
11. Hose
12. Clamp
13. Coolant Tank
14. Hose
15. Decal
16. Hose
17. Cap
18. Clamp
19. Hose
20. Clamp
21. Cable Tie
22. Clamp
23. Hose
24. Hose Protector
25. Support Pad



0739-574

KEY

1. Heat Exchanger
2. Hose
3. Clamp
4. Heat Exchanger
5. Insert
6. Heat Exchanger
7. Rivet
8. Rivet
9. Hose
10. Clamp
11. Hose
12. Hose
13. Hose
14. Coolant Tank
15. Foil Tape
16. Hose
17. Cable Tie
18. Decal
19. Cap
20. Clamp
21. Spacer
22. Cap Screw
23. Rope Guide
24. Lock Nut
25. Cap Screw
26. Protector



0739-568

Recoil Starter

REMOVING

1. Tie a slip-knot in the starter rope below the console and allow the rope to slowly retract against the starter case.

2. Remove the knot at the handle, remove the handle, and account for the handle cap; then thread the rope through the bushing in the console.

3. Remove the cap screws securing the starter assembly to the magneto case; then remove the starter assembly.

DISASSEMBLING

⚠ WARNING

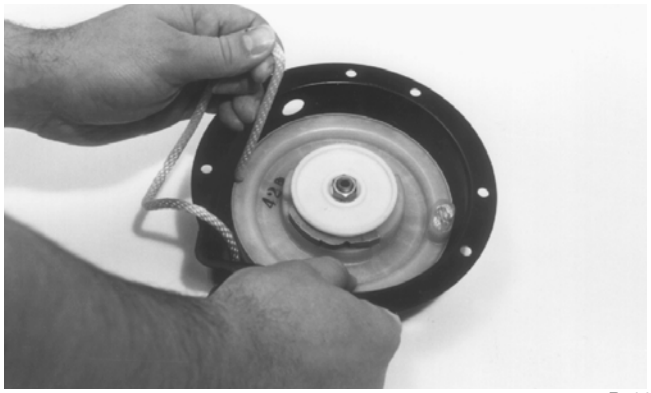
Always wear safety glasses when servicing the recoil starter.

1. Secure the recoil starter in a vise.

⚠ WARNING

During the disassembly procedure, continuous downward pressure must be exerted on the reel so it does not accidentally disengage and cause injury.

2. Rotate the roller counterclockwise until the notch of the roller is near the rope guide in the case. Guide the rope into the notch and slowly allow the roller to retract until all recoil spring tension is released.

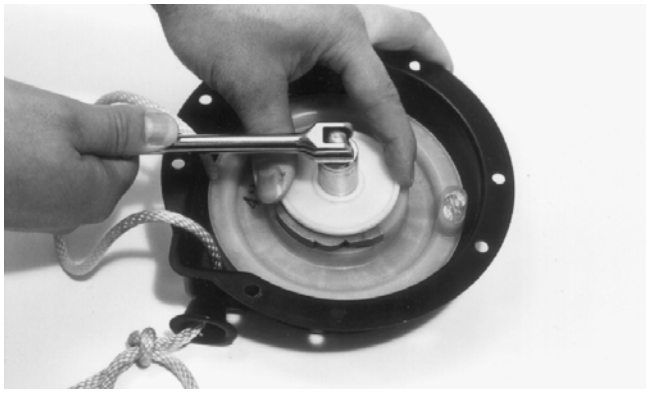


B522

⚠ WARNING

Care must be taken when allowing the recoil roller to unwind. Make sure all spring tension is released before continuing.

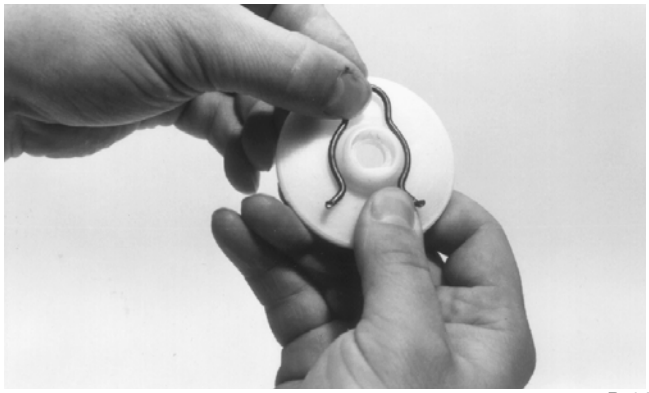
3. While exerting downward pressure on the friction plate, remove the nut and washer or cap screw.



B523

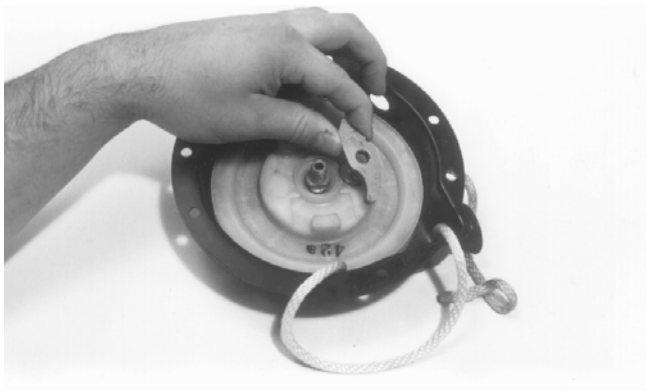
4. Slowly release the plate and lift the plate with friction spring free of the recoil roller.

5. Remove the friction spring from the plate.



B524

6. Remove the pawl; then remove the return spring.



B525

7. Carefully lift the roller free of the case making sure the main spring does not accidentally disengage from the case.

⚠ WARNING

Care must be taken when lifting the roller free of the case.

8. Remove the main spring from the case by lifting the spring end up and out. Hold the remainder of the spring with thumbs and alternately release each thumb to allow the spring to gradually release from the case.

■ **NOTE: Do not remove the main spring unless replacement is necessary. It should be visually inspected in place to save time.**

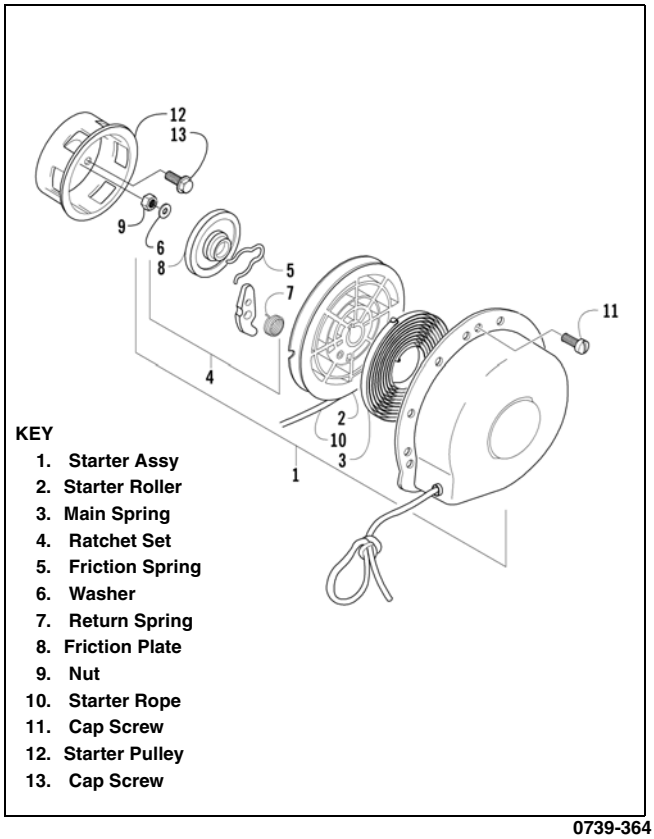
9. Unwind the rope from the roller, untie the slip-knot, and remove the rope.

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean all recoil starter components.
2. Inspect all springs, washers, and pawl for wear or damage.
3. Inspect the roller and case for cracks or damage.
4. Inspect the center hub for wear, cracks, or damage.
5. Inspect the rope for breaks or fraying.
6. Inspect the main spring for cracks, crystallization, or abnormal bends.
7. Inspect the handle for damage, cracks, or deterioration.

ASSEMBLING



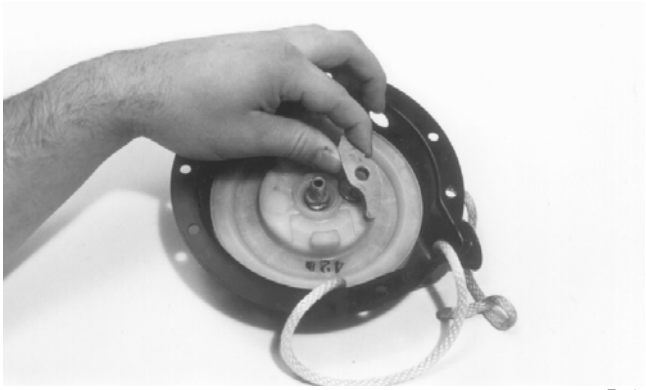
KEY
1. Starter Assy
2. Starter Roller
3. Main Spring
4. Ratchet Set
5. Friction Spring
6. Washer
7. Return Spring
8. Friction Plate
9. Nut
10. Starter Rope
11. Cap Screw
12. Starter Pulley
13. Cap Screw

0739-364

1. Hook the end of the main spring around the mounting lug in the case.
2. Insert the main spring into the case; then wind it in a counterclockwise direction until the complete spring is installed.

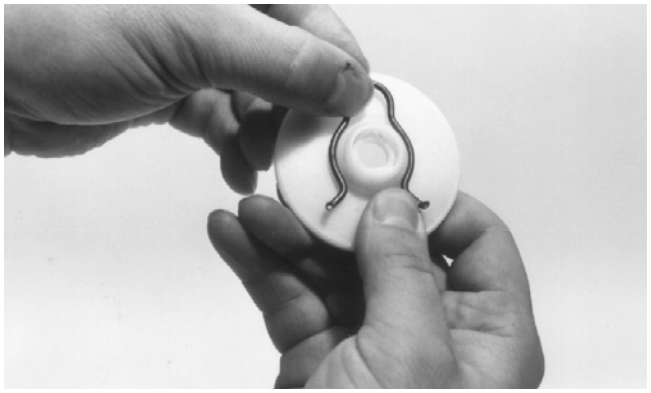
■ **NOTE: The main spring must seat evenly in the recoil case.**

3. Insert the rope through the hole in the roller and tie a knot in the end; then wrap the rope counterclockwise around the roller leaving approximately 50 cm (20 in.) of rope free of the roller.
4. Apply low-temperature grease to the main spring and hub.
5. Align the hook in the end of the main spring with the notch in the roller.
6. Carefully slide the roller over the hub and engage the spring with the roller.
7. Install the return spring making sure the end is properly installed in the hole in the roller; then install the pawl making sure the return spring is properly preloaded.



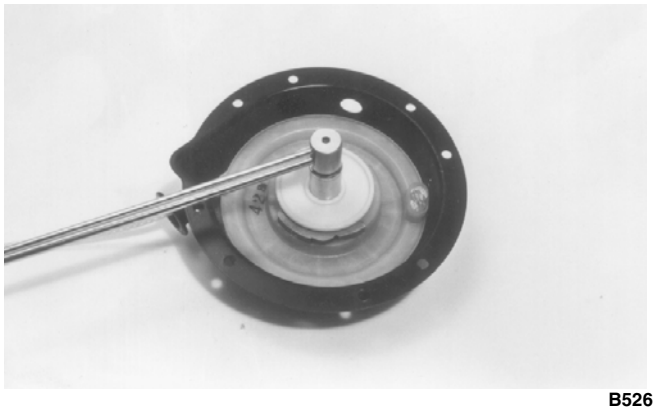
B525

8. Slide the end of the rope through the rope guide of the case; then tie a slip-knot in the rope.
9. Place the friction spring into position on the friction plate making sure the head of the spring is opposite the flat of the inner hole. Apply a low-temperature grease to the plate.



B524

10. Place the plate into position making sure the flat of the inner hole is correctly positioned in the hub. Apply blue Loctite #243 to the threads; then secure the drive plate with a washer and nut or with a cap screw. Tighten the nut to 1 kg-m (7 ft-lb) or tighten the cap screw to 0.8-2.1 kg-m (6-9 ft-lb).



B526

11. With 50 cm (20 in.) of rope exposed, hook the rope in the notch of the roller.

12. Rotate the roller four or five turns counter-clockwise; then release the rope from the notch and allow the rope to retract.

13. Pull the rope out two or three times to check for correct tension.

■ **NOTE: Increasing the rotations in step 12 will increase spring tension.**

INSTALLING

1. Place the starter assembly into position against the magneto case.

2. Secure the starter with cap screws. Tighten to 1 kg-m (7 ft-lb) on the L/C models or to 1.1 kg-m (8 ft-lb) on the F/C models.

■ **NOTE: Before tightening the cap screws, slowly pull the recoil rope until the pawl engages; then tighten the cap screws. This will center the recoil against the magneto case.**

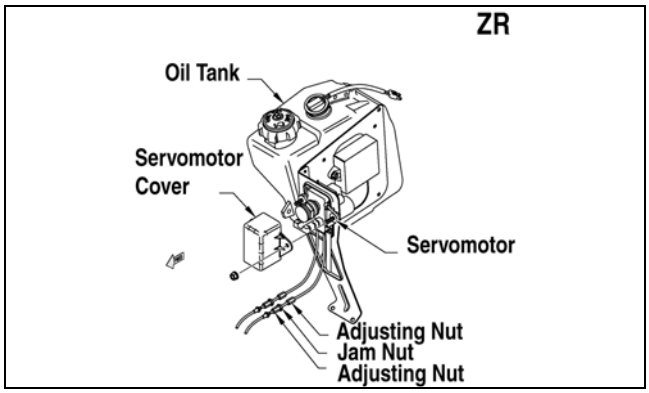
3. Thread the rope through the bushing in the console; then install the handle and secure with a knot. Seat the cap.

4. Release the slip-knot in the rope.

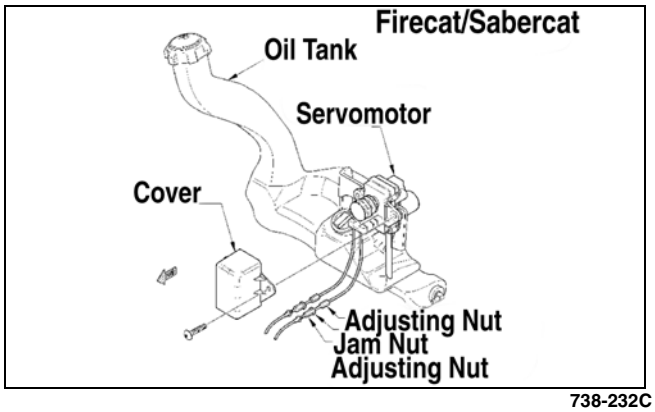
Arctic Power Valve (APV) System

■ **NOTE: The servo will cycle once at APV cycle RPM. If the servo cycles three times, cable length adjustment or valve inspection is required.**

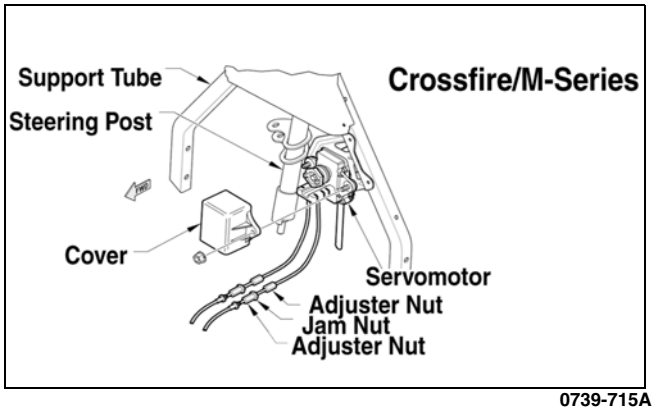
APV VALVE POSITION		
ENGINE MODEL	One Stage RPM Ranges	
	Acceleration	
	APV Cycle RPM	Peak H.P. RPM
500 cc (Carb)	7050	83-8500
600 cc EFI	7300	78-8000
700 cc EFI	7100 (Low Alt) 7200 (High Alt)	78-8000
700 cc (Carb)	7000	78-8000
900 cc EFI	6800	73-7500



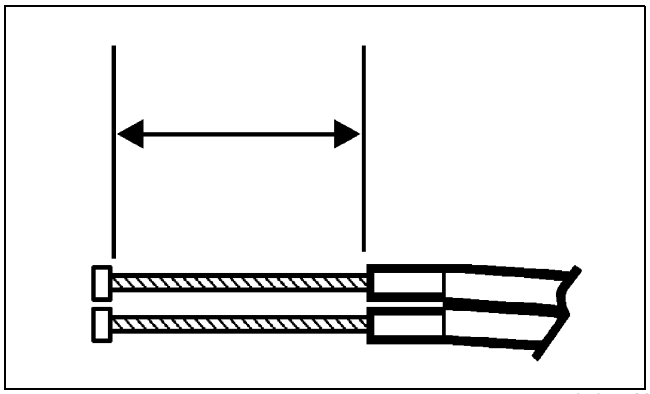
739-581B



738-232C



0739-715A



0735-516

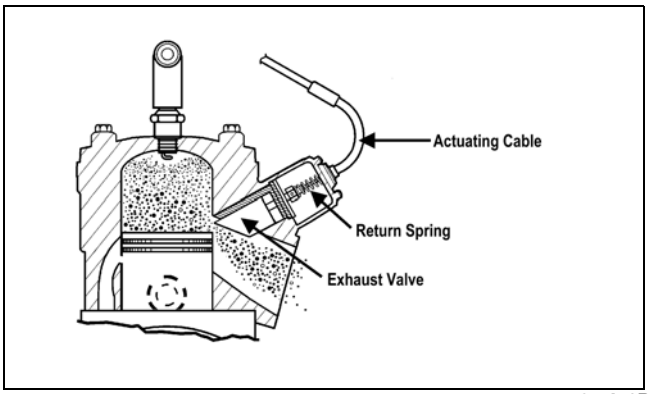
APV CABLE LENGTH	
ENGINE MODEL	CENTER ± 1 mm (0.039 in.)
500 cc	34.5 mm (1.35 in.)
600 cc	34.5 mm (1.35 in.)
700 cc	34.5 mm (1.35 in.)
900 cc	39.5 mm (1.56 in.)

The Arctic Power Valve (APV) System adjusts the size of the exhaust ports to produce maximum horsepower on the top end while providing excellent low end power and increased touring fuel economy.

THEORY

Two-cycle engines and their exhaust systems are designed to produce maximum horsepower in a given RPM range. This RPM range will change according to how high (or low) the exhaust port is in relation to the cylinder. Engines designed for racing have a “high port” exhaust system and will produce more horsepower at higher RPM but only with the loss of low end power and overall fuel economy. “Low port” engines will produce maximum horsepower in the low RPM ranges and provide good mid-range fuel economy, but they sacrifice top end performance.

The APV system does not increase engine horsepower, but it does allow the engine to be designed for maximum top end horsepower without the losses associated with a “high port” exhaust system.



735-476B

COMPONENTS

The main components of the APV system are the following.

A. DC Power Coil/Lighting Coil

B. Regulator/Rectifier

C. Condenser

D. CDI Unit or ECU

E. Servomotor

F. Power Valve Cables

G. Power Valves

DC Power Coil/Lighting Coil

As the engine is turned over on models having a power coil, the DC power coil (located on the stator plate) generates AC current which flows to both the regulator/rectifier and the CDI unit on carbureted models or the ECU on the EFI models.

The AC current which flows to the CDI or ECU signals either of these components that the engine is turning over in the proper direction. If the engine should backfire and start to run in reverse, the signal from the DC power coil will indicate this reverse rotation. The CDI or ECU computer then shuts down.

On several models, AC current for the APV system is supplied by the lighting coil. This AC current is regulated to 13.5 volts by the voltage regulator. These models also may not have a separate regulator/rectifier or condenser. These two components are then located within the ECU and perform the same function.

The AC current generated by the DC power coil, or lighting coil, which flows to the regulator/rectifier, is the power source for the APV system.

Regulator/Rectifier

The AC current from the power coil first enters the regulator/rectifier which is then changed from AC current to pulsating DC current. Since the APV circuit cannot use pulsating DC current, it must be converted (by the condenser) to straight DC current which is necessary for the APV system.

On those models using the lighting coil as a power source, AC current enters the ECU from the lighting coil and is changed from AC to DC current by a rectifier located within the ECU.

Condenser

The pulsating DC current from the regulator/rectifier is passed through the condenser. The condenser filters the pulsating DC current and converts it to regular DC current, much like from a 12-volt battery.

There is one major difference between the carbureted and fuel injected models concerning the condenser's location. On the carbureted models, the condenser is a separate component. In the fuel injected models, the condenser is located within the ECU and is part of the ECU.

CDI Unit or ECU

The computer within the CDI or ECU has been programmed to raise and lower the power valves at a specific engine rpm. When this rpm is reached, DC current is routed to the servomotor by the CDI or the ECU.

Servomotor

The servomotor consists of two circuits. One circuit is a DC circuit, which operates the DC motor within the servo, and the other is a potentiometer, which measures the resistance, amperage, and servo pulley position.

The computer within the CDI unit and ECU have been programmed to operate the servomotor between a low and high resistance range. If resistance is not within the range, the computer will shut down the APV circuit. The computer will then make a total of three more attempts to cycle the power valves. If the correct resistance, amperage, or pulley position isn't seen, the APV circuit is shut down and no more attempts will be made until the engine is shut down and restarted.

Cables

The exhaust valves are connected to the actuating cables and, along with the return springs, are contained inside the APV housing on the exhaust side of each cylinder. The other end of the actuating cable is connected to the servo. There is also a vent hose on each APV housing to relieve the pressure of "blowby" gases that may escape from the cylinder.

OPERATION

At idle and low speed operation, the exhaust valves are held in the "low port" position by the return spring. When engine RPM reaches a predetermined point, the CDI/ECU will send a signal to the servo which will cycle and pull the exhaust valves into the up or "high port" position. The RPM at which the valves open is different with each model.

If the servomotor cycles the exhaust valves as explained above, the exhaust valve circuit is operating satisfactorily. If the servomotor makes no attempt to open the valves or if the servo attempts to cycle the valves three times (then stops working), there is a problem and it must be corrected.

Servomotor Cycles Three Times

In this situation the CDI or ECU computer has been programmed with a resistance range (low and high) that the servomotor must operate within. If the servomotor is put under too much load, its resistance goes up and may exceed the range upper limit. It will then stop and attempt two more times. If the resistance still is too high, it shuts down.

The same is true if the resistance is too low under a light load. The servomotor resistance will be low and the servomotor will again cycle two more times to attempt to find the correct circuit resistance. If not sensed by the CDI or ECU computer, the servo is shut down.

Improper servomotor circuit resistance is normally caused by one or more of the following:

A. Incorrect exhaust valve cable length (too long or too short).

B. Exhaust valve cable(s) sticking, broken, or disconnected at pulley.

C. Exhaust valves sticking.

D. Exhaust valve spring(s) weak or broken.

Check each of the above probable causes in the order given to locate the problem of the servomotor cycling three times in succession; then shutting down.

Check for correct exhaust valve cable length specifications for model being worked on in this section.

Servomotor Makes No Attempt To Cycle

If when running the engine the servomotor makes no attempt to operate, this is caused by one or more of the following:

A. Bad connection from the wiring harness and connector from the DC power coil or the lighting coil to the regulator/rectifier, to condenser, to CDI or ECU, or from CDI or ECU to servomotor.

B. DC coil output is non-existent or too low.

C. Regulator/rectifier output is too low.

D. Condenser output is too low.

E. CDI or ECU output to servomotor is too low.

F. Servomotor failure.

■ **NOTE: When troubleshooting the above components with either a CDI or ECU, there are some major differences. With the CDI system, the regulator/rectifier and condenser are located separately outside the CDI unit.**

On the fuel injected models, the condenser (and sometimes the rectifier) are part of the ECU. In this case, first check to make sure the lighting coil output meets specifications; then check the DC current coming from the ECU to the servomotor. If the current entering the ECU is satisfactory, but low coming out, the ECU would be considered to be bad.

■ **NOTE: For testing individual APV system components, see Section 5.**

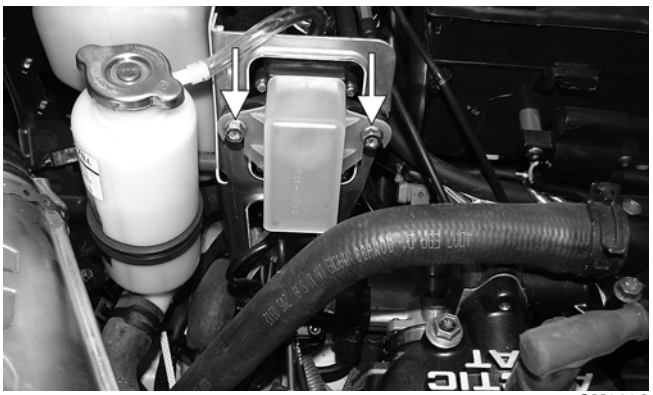
MAINTENANCE

The APV system requires only periodic cleaning and cable adjustment. The cables should be checked every 1000-2000 miles and adjusted as necessary. To ensure maximum performance and minimize maintenance requirements, Arctic Cat recommends using Arctic Cat Synthetic APV 2-Cycle Oil. Using oils other than the recommended oil may increase the frequency of required cleaning due to increased buildup of carbon deposits.

CABLE ADJUSTMENT (900 cc)

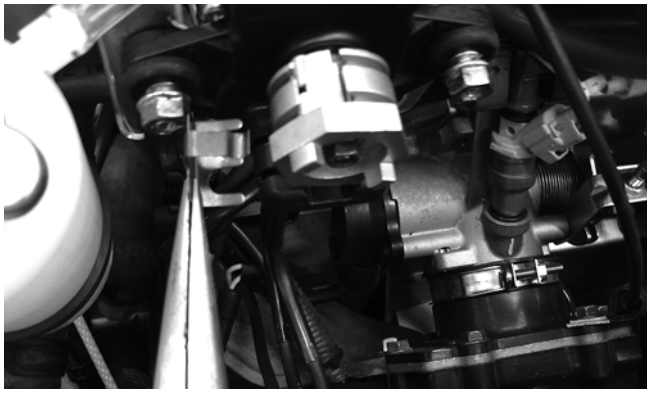
Proper cable adjustment is critical to the operation of the APV system. While it is recommended that the cable adjustment be inspected every 1000-2000 miles, the cable should not need adjustment often. To check the cable adjustment, use the following procedure.

1. Remove the two cap screws securing the servo cover.



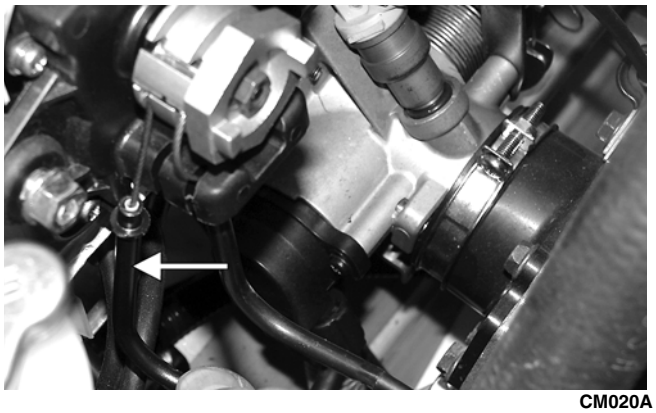
CM019A

2. Using a needle-nose pliers or a small screwdriver, remove the cable retaining cover.



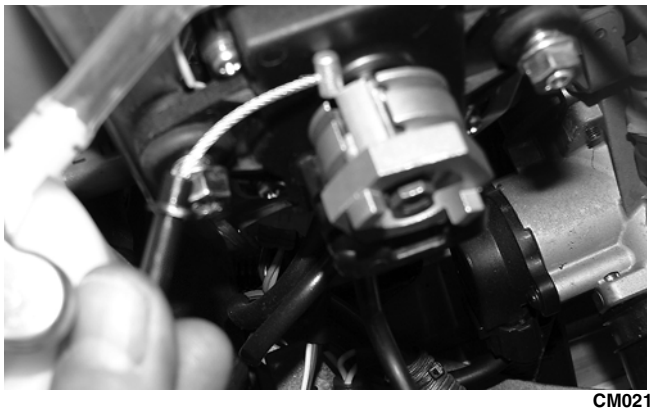
CM022

3. Rotate the servo actuator counterclockwise to loosen the cable; then pull the cable housings out of the holder.



CM020A

4. Pull the cable up and out of the cable housing holder; then slide each cable drum to the left and out of the servo actuator.



CM021

■ **NOTE: Before proceeding with the cable adjustment, ensure that the exhaust valves are free to move.**

5. While holding the cable housing firmly, pull the cable as far out as it will go; then release. Repeat three to four times. The cable/exhaust valve should move freely without binding. If the cable/exhaust valve does not move freely, the exhaust valve assembly will need to be removed for further inspection.

■ **NOTE: When measuring the cables, they are to be routed and as close to their installed position as possible.**

6. While holding the cable housing, lightly pull on one cable end to remove any slack.

7. Measure the amount of exposed cable from the cable housing to the end of the cable.

■ **NOTE: The two cable measurements must be equal in length or less than 0.5 mm (0.020 in.) difference in length from each other.**

■ **NOTE: Repeat steps 6 and 7 for each cable; then compare the measurements to the appropriate chart.**

■ **NOTE: The measurements must be within the specifications from the chart. If the measurements are within specifications, no adjustment is necessary. If they are not within specifications, proceed to step 8.**

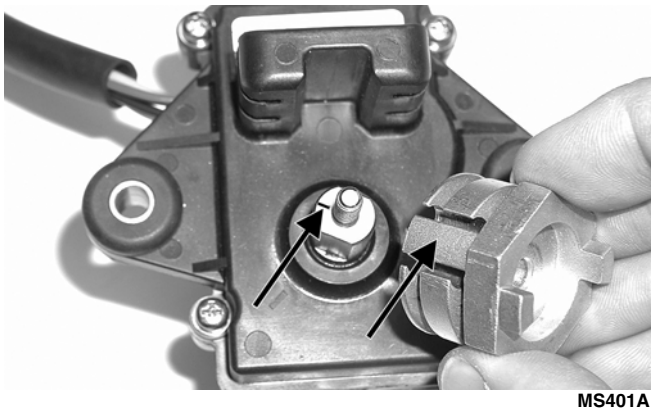
8. Loosen the jam nut on the cable to be adjusted; then using the adjusting nuts, lengthen or shorten the housing as needed.

9. Once the proper length has been attained, hold the adjusting nut in place and tighten the jam nut securely.

10. Install the actuating cables into the servo.

11. Install the servo cover and secure with the two cap screws.

■ **NOTE: If for any reason the pulley was removed from the servo, make certain to align the space between the two cables with the mark on the shaft of the servo.**



MS401A

CABLE ADJUSTMENT (500/600/700 cc)

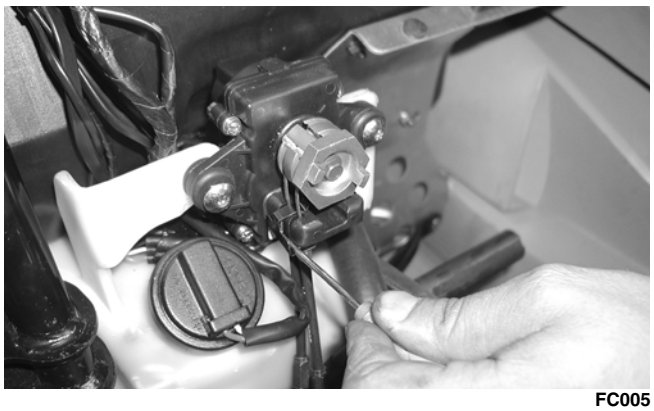
Proper cable adjustment is critical to the operation of the APV system. While it is recommended that the cable adjustment be inspected every 1000-2000 miles, the cable should not need adjustment often. To check the cable adjustment, use the following procedure.

1. Remove the two cap screws securing the servomotor cover.



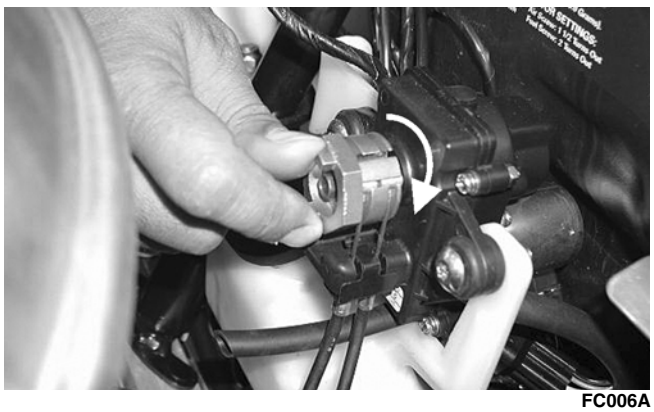
FC004

2. Using a small screwdriver, remove the cable retaining cover.

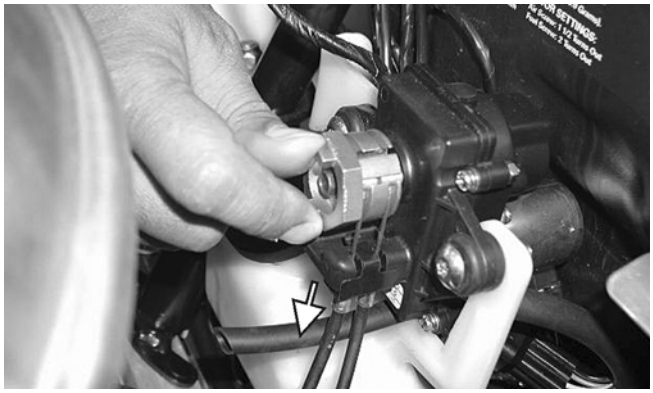


FC005

3. Rotate the servomotor actuator counterclockwise to loosen the cable; then pull the cable housings out of the holder.



FC006A



FC006B

4. Pull the cable up and out of the cable housing holder; then slide each cable drum back and out of the actuator.

■ **NOTE: Before proceeding with the cable adjustment, ensure that the exhaust valves are free to move.**

5. While holding the cable housing firmly, pull the cable as far out as it will go; then release. Repeat three to four times. The cable/exhaust valve should move freely without binding. If the cable/exhaust valve does not move freely, the exhaust valve assembly will need to be removed for further inspection.

■ **NOTE: When measuring the cables, they are to be routed and as close to their installed position as possible.**

6. While holding the cable housing, lightly pull on one cable end to remove any slack.

7. Measure the amount of exposed cable from the cable housing to the end of the cable.

■ **NOTE: The two cable measurements must be equal in length or less than 0.5 mm (0.020 in.) difference in length from each other.**

■ **NOTE: Repeat steps 6 and 7 for each cable; then compare the measurements to the appropriate chart.**

■ **NOTE: The measurements must be within the specifications from the chart. If the measurements are within specifications, no adjustment is necessary. If they are not within specifications, proceed to step 8.**

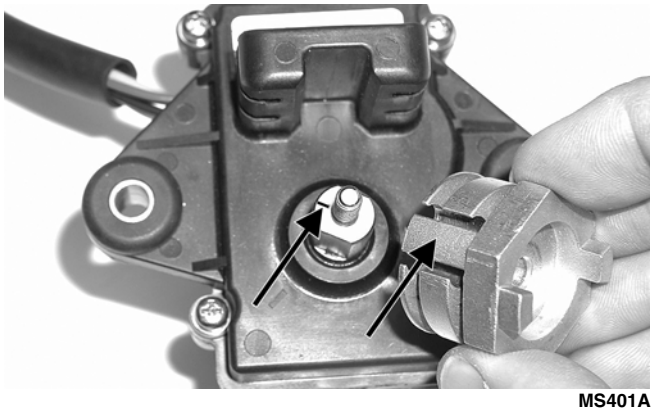
8. Loosen the jam nut on the cable to be adjusted; then using the adjusting nuts, lengthen or shorten the housing as needed.

9. Once the proper length has been attained, hold the adjusting nut in place and tighten the jam nut securely.

10. Install the actuating cables into the servomotor.

11. Install the servo cover and secure with the two cap screws.

■ **NOTE: If for any reason the pulley was removed from the servo, make certain to align the space between the two cables with the mark on the shaft of the servo.**

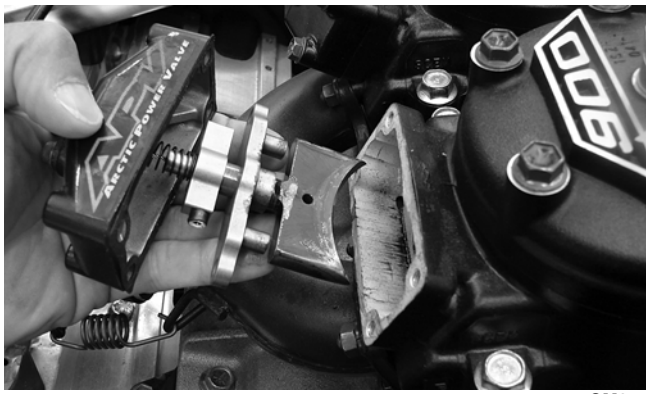


MS401A

REMOVING/DISASSEMBLING (900 cc)

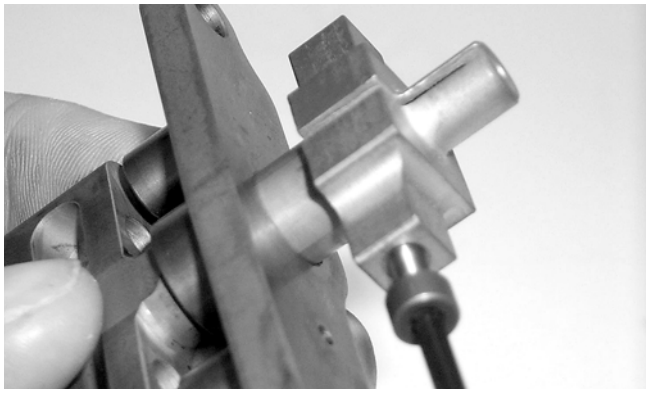
■ **NOTE: To avoid a parts mix-up, it is recommended that only one valve assembly at a time be removed from the engine.**

1. Remove the valve assembly from the engine (see Section 2).



CM057

2. Remove the retaining screw securing the exhaust valve to the valve stopper.



AP123

3. Hold the valve stopper securely and pull the cable back and up until it clears the top of the stopper; then slowly release the cable and remove it from the valve stopper.



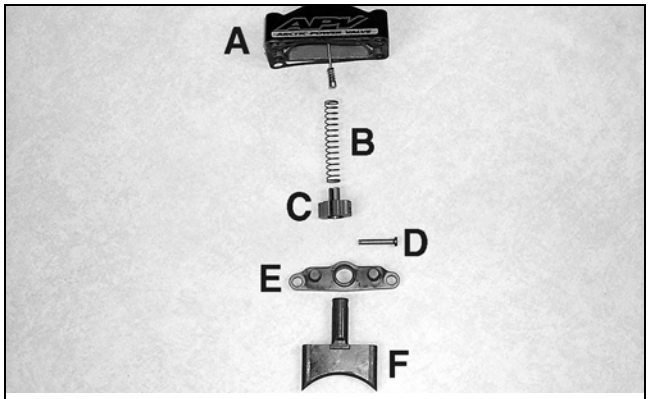
AP125

Cleaning and Inspecting

1. Remove all carbon deposits with solvent and a soft abrasive such as a Scotch-Brite pad.

2. Inspect all parts for nicks, burrs, or other signs of unusual wear.

ASSEMBLING/INSTALLING (900 cc)



KEY
- A. Cover
- B. Return Spring
- C. Valve Stopper
- D. Retaining Screw
- E. Retaining Plate
- F. Exhaust Valve

AP124B

1. Slide the return spring over the end of the actuating cable.

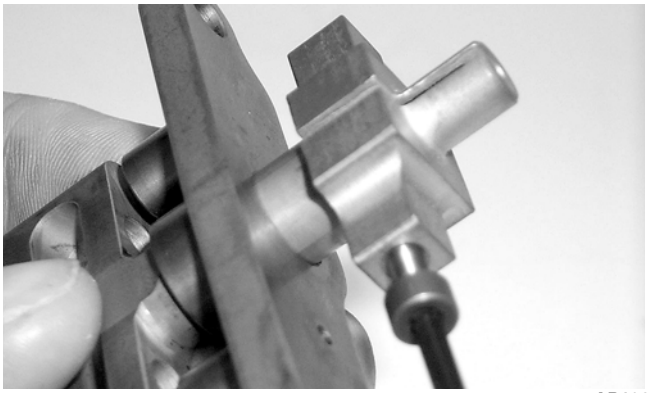
■ NOTE: Make sure that the small cable end spring stays in place at the end of the cable.

2. Place the valve stopper on the cable and slide it down until the cable end is inside the stopper.



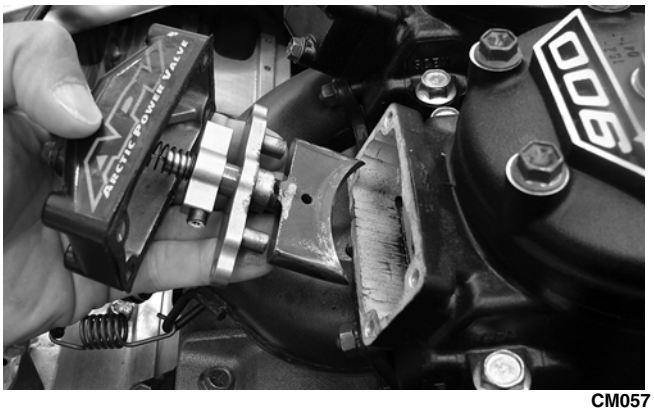
AP125

3. Slide the exhaust valve through the retaining plate and insert it into the valve stopper. Secure with the retaining screw. Tighten to 0.6 kg-m (4 ft-lb).



AP123

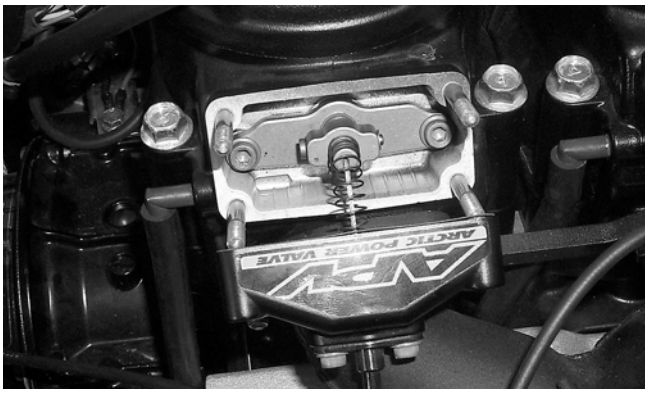
4. Slide the valve assembly into the proper cylinder.



CM057

■ NOTE: The flat side of the retaining plate must be down.

5. Secure the valve assembly to the cylinder with two Allen-head cap screws (coated with blue Loctite #243). Tighten to 0.9-1.3 kg-m (6.5-9.5 ft-lb).



AP120

6. Place the valve cover with the gasket into position on the engine. Secure with four cap screws. Tighten to 0.9-1.3 kg-m (6.5-9.5 ft-lb).



CM023

7. Perform steps 6-10 in the appropriate Cable Adjustment in this sub-section.

REMOVING/DISASSEMBLING (500/600/700 cc)

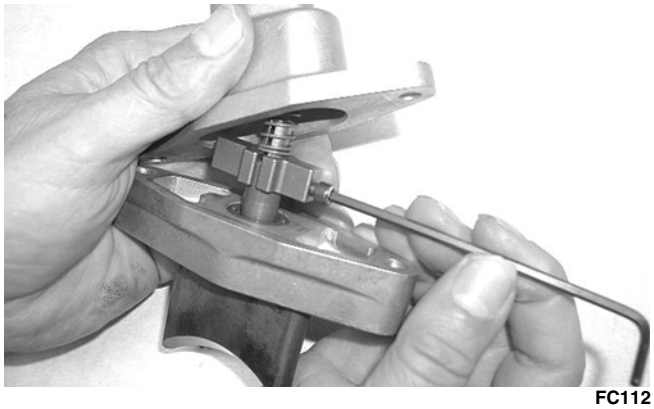
■ NOTE: To avoid a parts mix-up, it is recommended that only one valve assembly at a time be removed from the engine.

1. Remove the valve assembly from the engine.



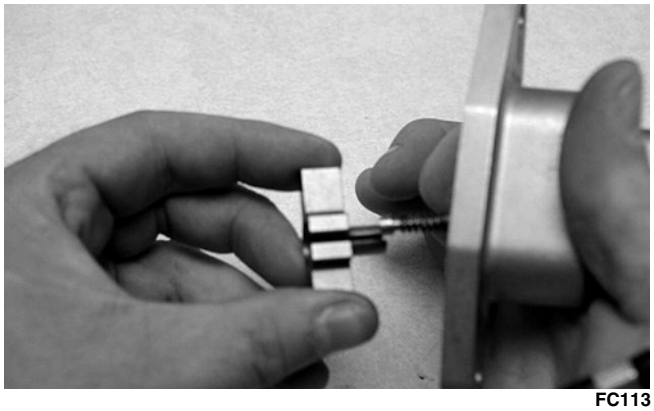
FC115

2. Remove the retaining screw securing the exhaust valve to the valve stopper.



FC112

3. Hold the valve stopper securely and pull the cable back and up until it clears the top of the stopper; then slowly release the cable and remove it from the valve stopper.



FC113

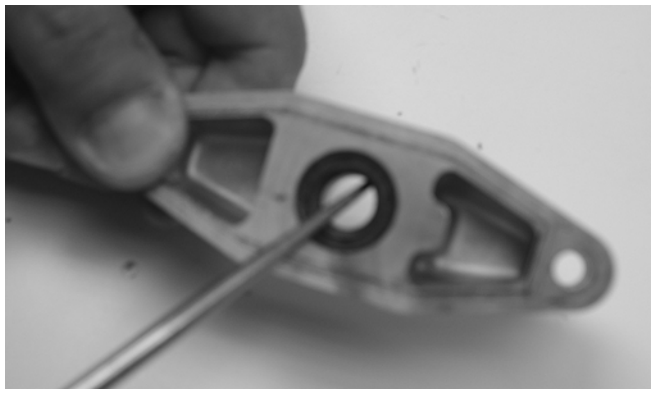
Cleaning and Inspecting

1. Remove all carbon deposits with solvent and a soft abrasive such as a Scotch-Brite pad.

2. Inspect all parts for nicks, burrs, or other signs of unusual wear.

Replacing Oil Seal

1. Carefully pry the seal up from beneath taking care not to damage the valve plate.



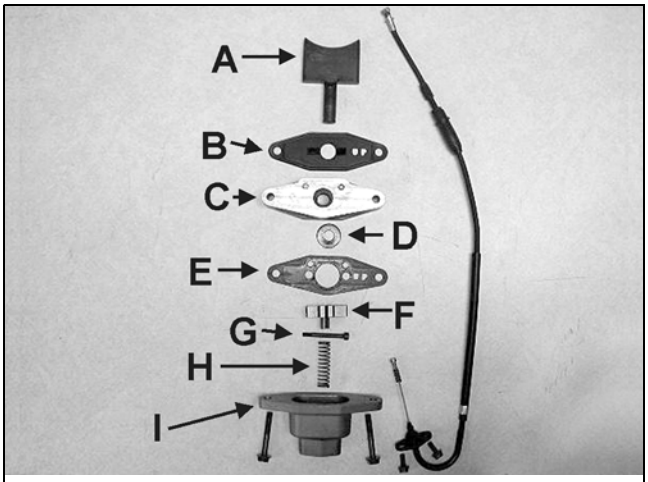
FC116

2. Install the new seal using an appropriate-sized seal driving tool.



FC117

ASSEMBLING/INSTALLING (500/600/700 cc)

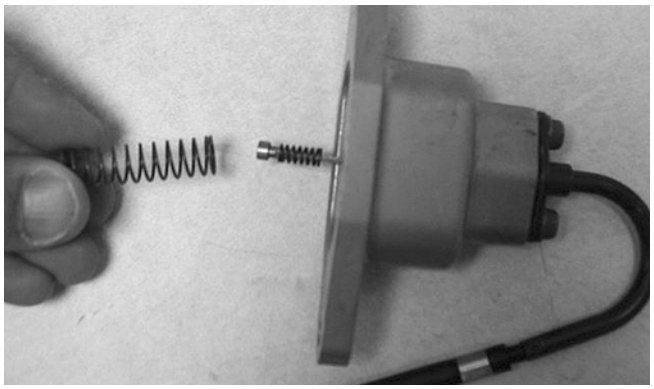


KEY

A. Exhaust Valve
B. Cover Gasket
C. Valve Plate
D. Oil Seal
E. Gasket
F. Stopper
G. Stopper Pin
H. Return Spring
I. Valve Cover

FC111A

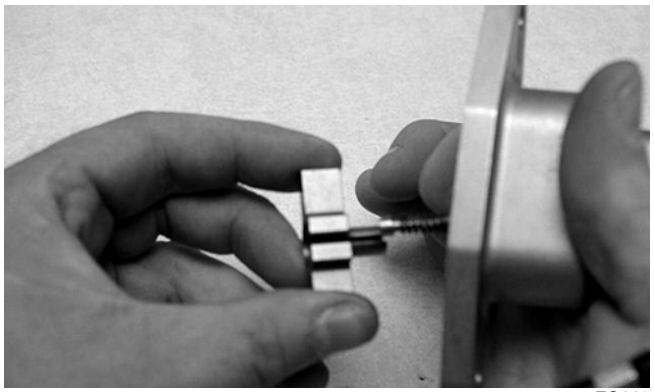
1. Slide the return spring over the end of the actuating cable.



FC114

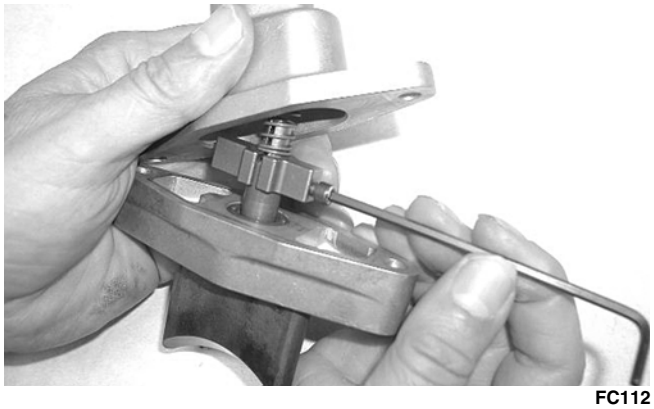
■ **NOTE: Make sure that the small cable end spring stays in place at the end of the cable.**

2. With the cover gasket properly positioned, place the valve stopper on the cable end and slide it down until the cable end is inside the stopper.



FC113

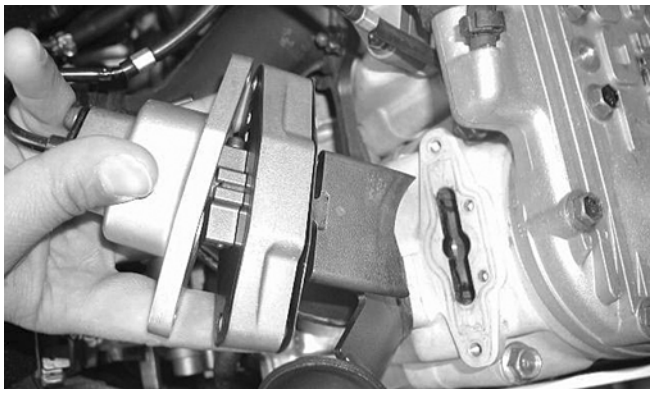
3. With the valve plate gasket properly positioned, slide the exhaust valve through the valve plate and insert it into the valve stopper. Secure with the retaining screw. Tighten to 0.6 kg-m (4 ft-lb).



FC112

■ **NOTE: Note that the exhaust valve gaskets are directional and must be installed correctly.**

4. Slide the valve assembly into the proper cylinder.



FC115

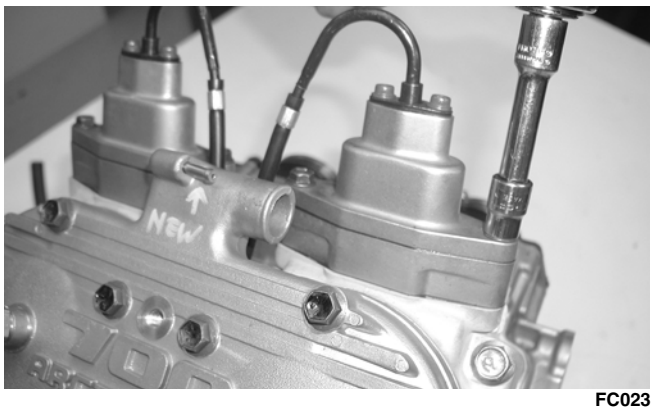
⚠ CAUTION

The long side of the exhaust valve must be facing toward the cylinder head or severe engine damage may occur.



FC024

5. Place the valve cover into position on the engine. Secure with two cap screws. Tighten to 0.9-1.3 kg-m (6.5-9.5 ft-lb).



FC023

6. Perform steps 6-10 in appropriate Cable Adjustment in this sub-section.

TROUBLESHOOTING (Carbureted Models)

The APV system has a self-cleaning and self-testing mode built in. Every time that the engine is started, the servo will cycle once, and this will wipe-off the carbon that has accumulated on the exhaust valves. The CDI unit also monitors the voltages at the servo during this cycle to assure they are within operational tolerances.

If all voltages are within tolerance, the system is ready for operation. If the voltages are not within tolerance, the servo will cycle two more times. If the voltages remain out of tolerance, the system will not operate.

Problem: Engine loses power; no top end	
Condition	**Remedy**
1. Exhaust valves sticking in down position	1. Remove carbon deposits, burrs, etc.
2. Cables adjusted too long	2. Inspect—adjust
Problem: Poor acceleration; hesitation	
Condition	**Remedy**
1. Exhaust valve sticking in up position	1. Remove carbon deposits, burrs, etc.—inspect/replace return spring
2. Cables adjusted too short	2. Inspect—adjust

TROUBLESHOOTING (EFI Models)

The APV system used on EFI models is very similar to that found on carbureted models. The self-cleaning and self-testing modes are much alike. The main difference between the two is the higher total electrical power required by the EFI and APV systems combined. Because of these more demanding power requirements, the EFI APV system gets power from the stator lighting coil. The ECU constantly monitors the power output of the lighting coil, and if the lighting coil output gets too high or too low, the ECU will activate the fail-safe mode. The fail-safe mode is an ECU operated engine RPM limiter. When activated, the fail-safe mode will be seen as an immediate loss of engine horsepower.

For example, if the headlight and taillight are disabled, the ECU will sense a high voltage condition and activate the fail-safe mode. Adding more than 4 amps of accessories will create a low voltage condition and activate the fail-safe mode.

■ NOTE: When running an APV equipped EFI engine on a dynamometer, first connect a Voltage Regulator (p/n 0603-142, 2-wire) or (p/n 0630-643, 3-wire) between the lighting coil and the ECU. There must also be a minimum 2.5 amp load installed in-line between the voltage regulator and the ECU (a 2.5 amp load is equivalent to one high beam headlight bulb).

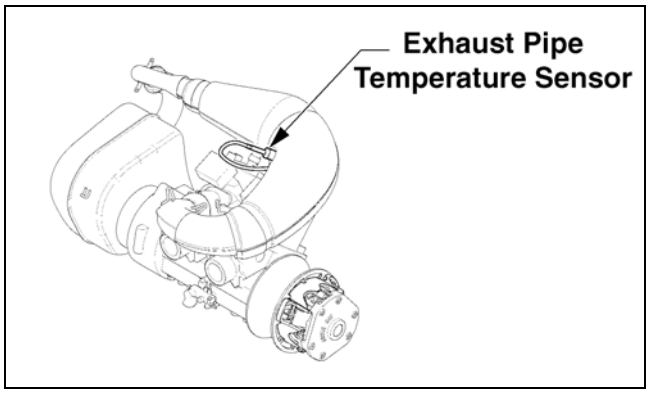
Problem: Engine loses power; no top end	
Condition	**Remedy**
1. Exhaust valves sticking in down position	1. Remove carbon deposits, burrs, etc.
2. Cables adjusted too long	2. Inspect—adjust
3. Lighting coil output voltage out of tolerance	3. Inspect—replace stator
Problem: Poor acceleration; hesitation	
Condition	**Remedy**
1. Exhaust valve sticking in up position	1. Remove carbon deposits, burrs, etc.—inspect/replace return spring
2. Cables adjusted too short	2. Inspect—adjust
3. Lighting coil output voltage out of tolerance	3. Inspect—replace stator

Troubleshooting EFI engines with the APV system should be done with the Arctic Cat EFI Analyzer (p/n 0644-342). To update an existing EFI Analyzer, order Kit (p/n 0644-341).

Exhaust Controlled Timing (ECT) System

The 500/600 cc APV models are equipped with the Exhaust Controlled Timing (ECT) system which utilizes an exhaust pipe temperature sensor. This system automatically adjusts the ignition timing to provide maximum performance through a variety of operating conditions. The CDI unit receives input on engine RPM (demand) and exhaust temperature (engine condition) and adjusts the ignition timing accordingly. This system is not adjustable and is maintenance free.

If a system fault is suspected, use an ohmmeter to check continuity of the exhaust pipe temperature sensor located in the expansion chamber. A reading of either 0 ohm or infinity indicates a failed sensor.



0737-314

■ **NOTE: A disabled ECT system WILL NOT cause engine damage; however, a failed ECT system will have slower throttle response and may produce slightly less top-end performance.**

SECTION 4 - FUEL SYSTEMS

4

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Fuel System
(Carbureted)

This sub-section has been organized for servicing carbureted fuel systems; however, some components may vary from model to model. The technician should use discretion and sound judgment when removing/ disassembling and assembling/installing components.

Whenever any maintenance or inspection is made on the fuel system in which fuel leakage may occur, there should be no welding, smoking, or open flames in the area.

■ **NOTE: Some illustrations and photographs used in this sub-section are used for clarity purposes only and are not designed to depict actual conditions.**

Fuel System
(Carbureted)
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Carburetor Specifications

MODEL	ALTITUDE	TYPE	MAIN JET	NEEDLE JET	JET NEEDLE	PILOT JET	CUT-AWAY	PILOT AIR SCREW (TURNS OUT)	FUEL MIXTURE SCREW (TURNS OUT)
Bearcat 570	0-5000		250	P-4 (480)	6DF7-3	40	2.5	1 3/4	
	5-9000	VM-34	*	-	6DF7-2	-	-	-	N/A
	9-Over	(2)	*	-	6DF7-1	-	-	-	
Firecat 500	0-5000		360	Fixed	9EH06-3	40	3.0	1 5/8	2
	5-9000	TM-38	*	-	9EH06-2	-	-	1 1/2	1
	9-Over	(2)	*	-	9EH06-1	-	-	1	2 1/2
Firecat 700	0-5000		450	Fixed	9EJI-4	30	3.0	1 1/2	1
	5-9000	TM-40	*	-	9EJI-3	-	-	3/4	1 1/2
	9-Over	(2)	*	-	9EJI-2	35	-	-	1
Panther 370	0-5000		250	P-6 (159)	6DH7-3	40	2.5	1	
	5-9000	VM-32	*	-	-	35	-	-	N/A
	9-Over	(2)	*	-	-	-	-	-	
Panther 570	0-5000		250	P-4 (480)	6DF7-3	40	2.5	1 3/4	
	5-9000	VM-34	*	-	6DF7-2	-	-	-	N/A
	9-Over	(2)	*	-	6DF7-1	-	-	-	
Z 370	0-5000		250	P-6 (159)	6DH7-3	40	2.5	1	
	5-9000	VM-32	*	-	-	-	-	-	N/A
	9-Over	(1)	*	-	-	-	-	-	
Z 440	0-5000		280	P-4 (480)	6DH7-3	35	2.5	1	
	5-9000	VM-32	*	-	-	-	-	-	N/A
	9-Over	(2)	*	-	-	-	-	-	
Z 570	0-5000		250	P-4 (480)	6DF7-3	40	2.5	1 3/4	
	5-9000	VM-34	*	-	6DF7-2	-	-	-	N/A
	9-Over	(2)	*	-	6DF7-1	-	-	-	
	0-3000		*	-	9EJ2-4	30	-	-	-
	3-6000		*	-	9EJ2-3	-	-	-	-
M7**	6-9000	TM-40	340	Fixed	9EJ2-3	35	2.5	1 3/4	1
	9-Over	(2)	*	-	9EJ2-2	-	-	-	-

*See Main Jet Chart **Initially set up at the factory for operation between 6000-9000 feet

Pre-Maintenance Checks

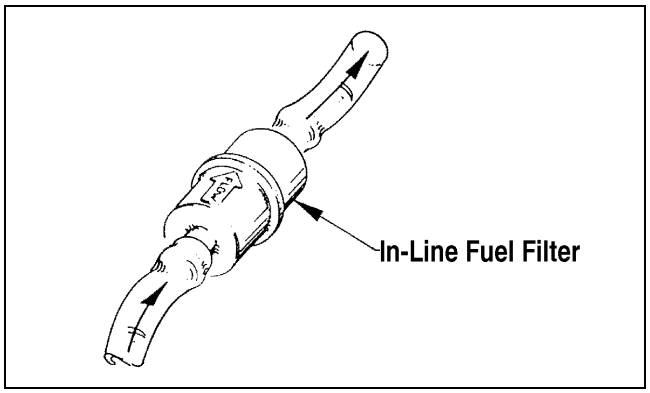
Before troubleshooting the fuel system, several simple checks should be performed. Many times what appears to be a serious problem is only a minor one.

1. Make sure the gas tank shut-off valve was in the OPEN position.

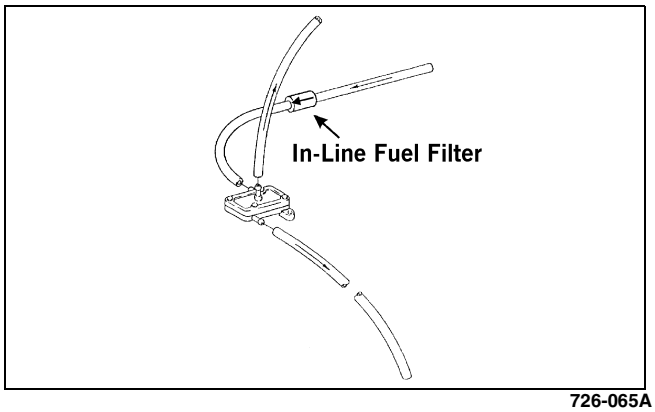
2. Turn the shut-off valve to the CLOSED position; then remove the in-line fuel filter. If the filter is dirty, replace the filter.

■ **NOTE: Determine which style in-line fuel filter is being replaced and remove and install accordingly.**

3. Install a new filter making sure the arrow on the filter is directed toward the fuel pump.



728-272B



726-065A

4. Check the hoses to ensure that all are correctly connected; then check for cracks. If any cracks are evident in the hoses, replace them making sure none are against any hot or moving parts. Hoses must fit tightly. If hoses do not fit tightly, cut 6 mm (1/4 in.) from the end and install.

5. Check the impulse hose for cracks or any possible air leaks. The hose must fit tightly at both ends. If loose or cracked, replace the hose.

6. Check each carburetor vent hose for kinks or obstructions; remove any obstructions.

7. Check each carburetor float chamber drain hose for water or debris. If seen, clean by removing the plug and draining the drain hose into a small container.

8. Check the gas tank vent hose and fuel hose for obstructions; remove any obstructions.

9. Turn the shut-off valve to the OPEN position.

Changing Main Jet(s)
(VM-Style)

The carburetor main jet(s) must be changed in conjunction with the changes in temperature, altitude, and type of gasoline being used.

1. Loosen each carburetor flange clamp and remove each carburetor from the intake flange and boot.

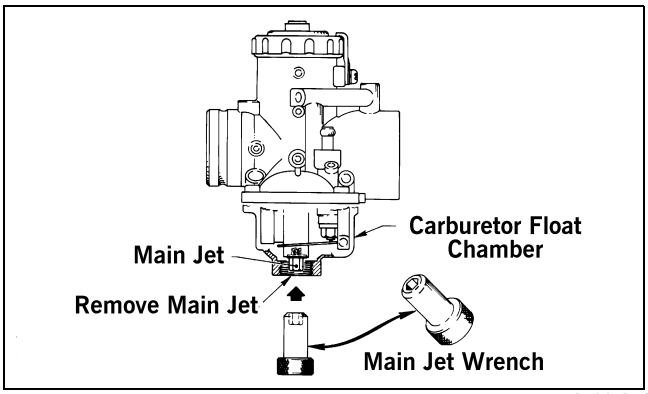
2. Remove the drain plug and O-ring from each carburetor float chamber and drain the gas into either a small container or an absorbent towel.

3. Using the Main Jet Wrench (p/n 0644-065), thread the main jet out of each carburetor. Account for the baffle ring. Install the new main jet with baffle ring and tighten securely.

4. Install the drain plug and O-ring; then tighten securely.

⚠ CAUTION

When installing the throttle bodies/carburetors, make sure the gasline hoses are properly routed to avoid premature wear and/or contact with exhaust components.



0728-054

5. Install and secure each carburetor.

Changing Main Jets
(TM-Style)

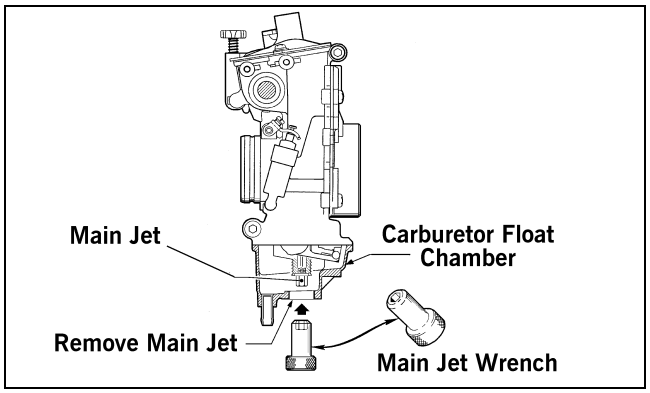
The carburetor main jets must be changed in conjunction with the changes in temperature, altitude, and type of gasoline being used.

1. Tip the snowmobile onto its left side; then using a torx-bit, remove the screws securing the center belly pan (skid plate) to the front end.

■ NOTE: A piece of cardboard should be used to protect the finish on the hood and belly pan.

2. Using a swivel adapter and a 17 mm socket, remove the drain plugs from the float chambers.

3. Using the Main Jet Wrench (p/n 0644-065), thread the main jet out of each carburetor. Account for the washer. Install the new main jet and washer and tighten securely.



0734-280

4. Install the drain plug with O-ring; then tighten securely.

5. Place the center belly pan (skid plate) into position on the front end; then secure with the screws.

■ **NOTE: If the snowmobile has been tipped on its side for an extended period of time, inspect the oil-line hose for any signs of air bubbles. If air bubbles are visible, see Related Items sub-section for bleeding procedure.**

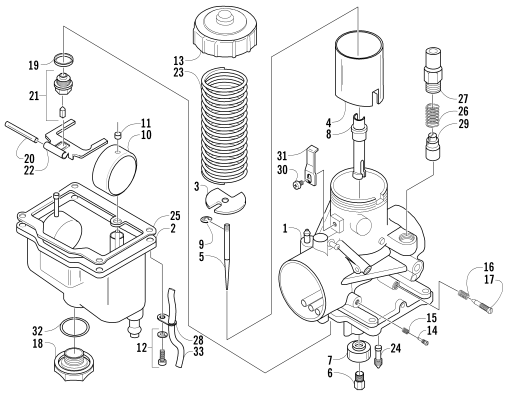
Carburetor Schematics

■ **NOTE: Some components may vary from model to model. The technician should use discretion and sound judgment.**

VM-32

KEY

1. Mixing Body Assy
2. Float Chamber
3. Plate
4. Piston Valve
5. Jet Needle
6. Main Jet
7. Baffle Ring
8. Needle Jet
9. E-Clip
10. Float
11. Cap
12. Screw w/Spring Washer
13. Mixing Body Top
14. Pilot Air Screw
15. Spring
16. Spring
17. Idle Speed Screw
18. Drain Plug
19. Washer
20. Float Pin
21. Needle Valve Assy
22. Float Arm
23. Piston Valve Spring
24. Pilot Jet
25. Gasket
26. Starter Plunger Spring
27. Starter Plunger Cap
28. Hose Plate
29. Starter Plunger
30. Screw w/Spring Washer
31. Plate
32. O-Ring
33. Vent Hose

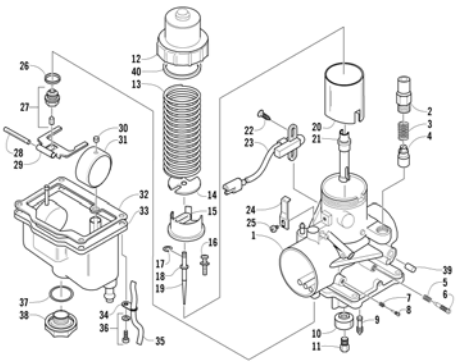


0736-506

VM-34

KEY

1. Mixing Body Assy
2. Starter Plunger Cap
3. Starter Plunger Spring
4. Starter Plunger
5. Spring
6. Idle Speed Screw
7. Spring
8. Pilot Air Screw
9. Pilot Jet
10. Baffle Ring
11. Main Jet
12. Mixing Body Top
13. Piston Valve Spring
14. Plate
15. Magnet Block
16. Screw w/ Washer
17. E-Clip
18. Washer
19. Jet Needle
20. Piston Valve
21. Needle Jet
22. Self-Tapping Screw
23. Magnetic Switch
24. Plate
25. Screw w/Spring Washer
26. Washer
27. Needle Valve Assy
28. Float Pin
29. Float Arm
30. Cap
31. Float
32. Gasket
33. Float Chamber
34. Plate
35. Hose
36. Screw w/Spring Washer
37. O-Ring
38. Drain Screw
39. Cap
40. Washer (570 cc)

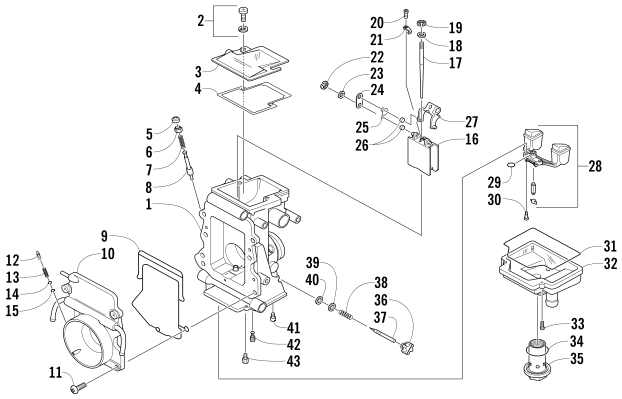


0738-474

TM-38

KEY

1. Mixing Body
2. Screw w/ Washer
3. Top Cap
4. Gasket
5. Plunger Cap
6. Guide Holder
7. Starter Plunger Spring
8. Starter Plunger
9. Gasket
10. Funnel Assy
11. Screw
12. Air Screw
13. Spring
14. Washer
15. O-Ring
16. Throttle Valve
17. Jet Needle
18. Washer
19. E-Clip
20. Retaining Plate Screw
21. Retaining Plate
22. E-Clip
23. Washer
24. Plate
25. Clip
26. Bushing
27. Lever Assy
28. Float Assy
29. O-Ring
30. Screw
31. Gasket
32. Float Chamber
33. Screw
34. O-Ring
35. Drain Plug
36. Cap
37. Fuel Mixture Screw
38. Spring
39. Washer
40. Rubber Washer
41. Starter Jet
42. Pilot Jet
43. Main Jet

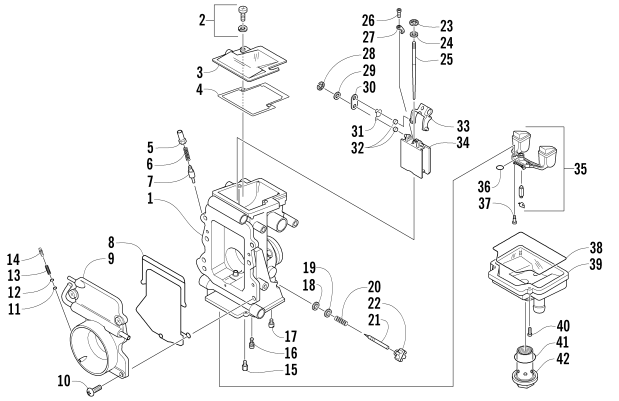


0738-091

TM-40

KEY

1. Mixing Body
2. Screw Assy
3. Top Cap
4. Gasket
5. Plunger Cap
6. Spring
7. Starter Plunger
8. Gasket
9. Funnel Assy
10. Screw
11. O-Ring
12. Washer
13. Spring
14. Air Screw
15. Main Jet
16. Pilot Jet
17. Starter Jet
18. Rubber Washer
19. Washer
20. Spring
21. Fuel Mixture Screw
22. Cap
23. E-Clip
24. Washer
25. Jet Needle
26. Retaining Plate Screw
27. Retaining Plate
28. E-Clip
29. Washer
30. Plate
31. Clip
32. Bushing
33. Lever Assy
34. Throttle Valve
35. Float Assy
36. O-Ring
37. Screw
38. Gasket
39. Float Chamber
40. Screw
41. O-Ring
42. Drain Plug

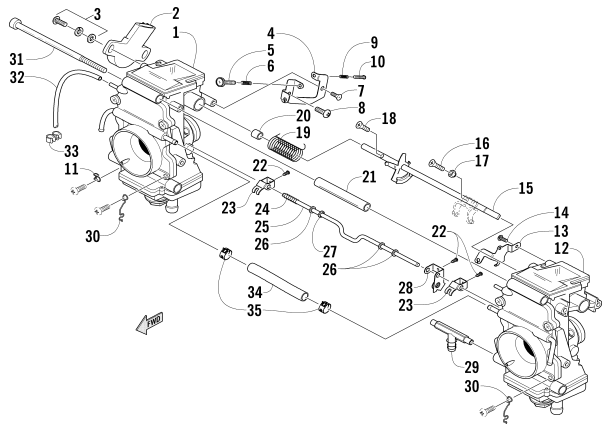


0738-670

TM-38

KEY

1. Carburetor Assy
2. Sensor Assy
3. Screw w/ Washers
4. Bracket
5. Idle Speed Screw
6. Spring
7. Screw
8. Screw
9. Spring
10. Throttle Stop Screw
11. Hose Clip
12. Carburetor Assy
13. Bracket
14. Screw
15. Throttle Lever Shaft Assy
16. Lever Ring Screw
17. Lever Ring
18. Screw
19. Spring
20. Spacer
21. Spacer
22. Screw
23. Starter Lever
24. Spring
25. Shaft
26. Washer
27. Clip
28. Starter Lever
29. T-Fitting
30. Hose Clip
31. Bolt
32. Hose
33. Hose Clamp
34. Hose
35. Hose Clamp

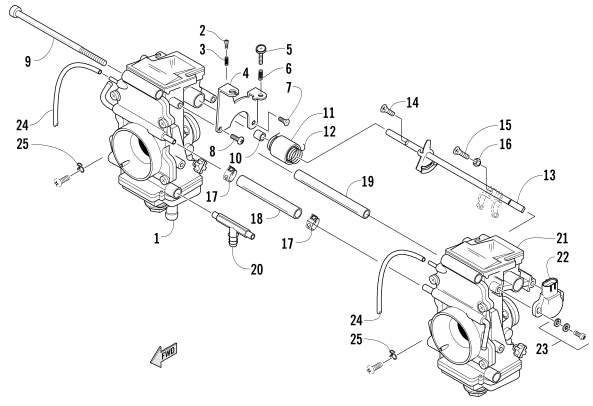


0738-687

TM-40

KEY

1. Carburetor Assy
2. Throttle Stop Screw
3. Spring
4. Bracket
5. Idle Speed Screw
6. Spring
7. Screw
8. Screw
9. Bolt
10. Spacer
11. Sleeve
12. Spring
13. Throttle Lever Shaft Assy
14. Screw
15. Lever Ring Screw
16. Lever Ring
17. Hose Clamp
18. Hose
19. Spacer
20. T-Fitting
21. Carburetor Assy
22. Sensor Assy
23. Screw w/Washers
24. Hose
25. Clip



0738-671

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Removing Carburetor
(VM-Style)

■ **NOTE: On twin carburetor models, remove the carburetors using this basic procedure.**

1. Turn the gas tank shut-off valve to the CLOSED position.
2. Remove the mixing body top by rotating it counterclockwise; then remove the top with spring, plate, jet needle with E-clip, and piston valve from the carburetor.



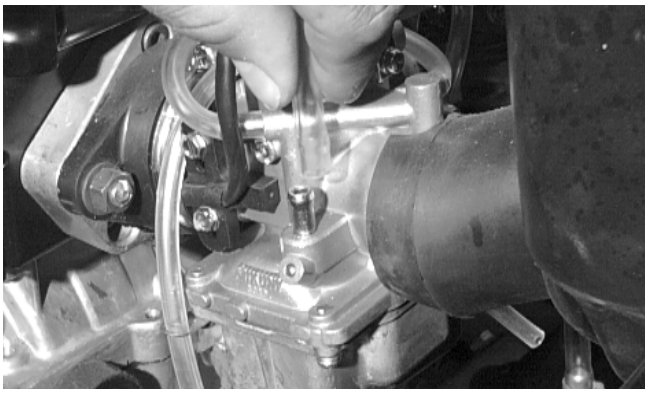
CM047

3. Remove the brass choke-cable housing from the carburetor. Account for a washer.



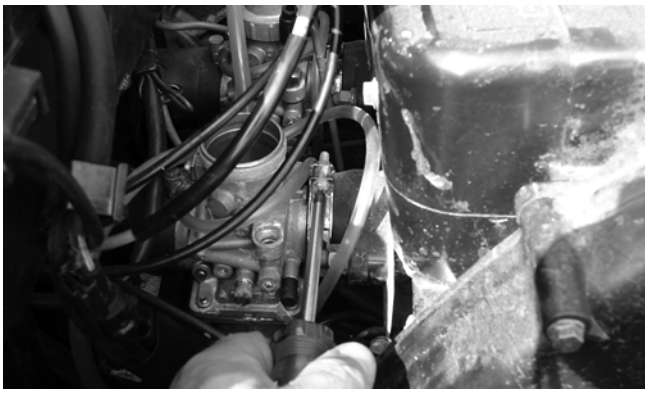
CM048

4. Disconnect the fuel hose from the carburetor inlet fitting.



AH284D

5. If applicable, disconnect the safety switch wiring harness connector from the main wiring harness.
6. Loosen the carburetor-flange clamp; then remove the carburetor.



CM049

■ **NOTE: Slide the carburetor into the air-intake silencer boot until free of the flange; then remove carburetor.**

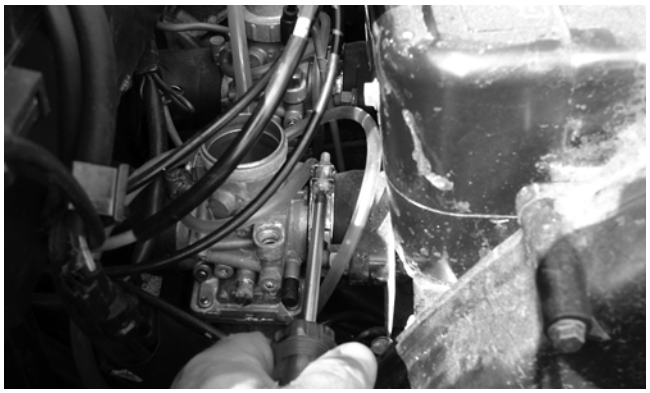
⚠ CAUTION

Keep MAG-side and PTO-side carburetors identified for installing purposes.

Removing Carburetors
(TM-Style)

1. Remove the expansion chamber and resonator.
2. Route the coolant drain hose through the exhaust outlet in the belly pan and drain the coolant.
3. Disconnect the four coolant hoses from the carburetors accounting for four clamps.
4. Disconnect the throttle cable; then unplug the TPS harness.

5. Loosen the carburetor flange clamps; then move the carburetors far enough forward until clearance will allow the carburetor assembly to be removed from the engine compartment.

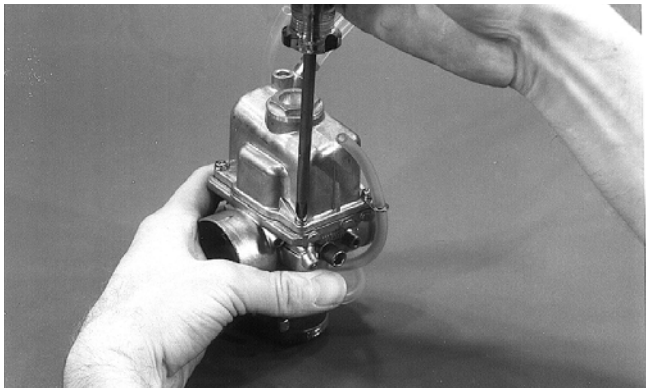


CM049

Disassembling Carburetor (VM-Style)

■ **NOTE: On twin carburetor models unless there is a problem with the safety switches, do not loosen or remove the screws securing the switch to the carburetor.**

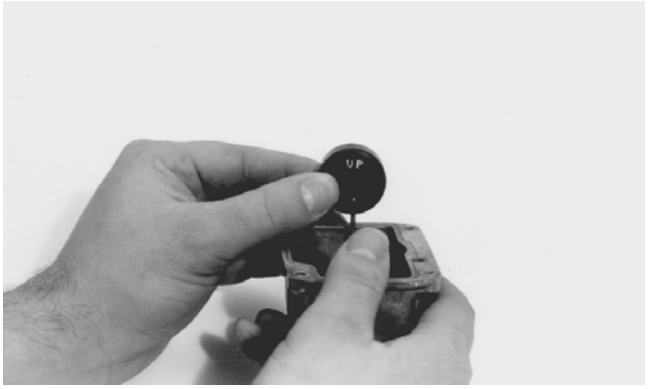
1. Remove the four screws and lock washers securing the float chamber; then remove the float chamber and gasket.



AH144

■ **NOTE: The floats should be removed only if replacement is necessary or the float chamber requires cleaning with carburetor cleaner.**

2. Remove the caps from the float towers; then remove the floats. Remove the drain plug and O-ring.

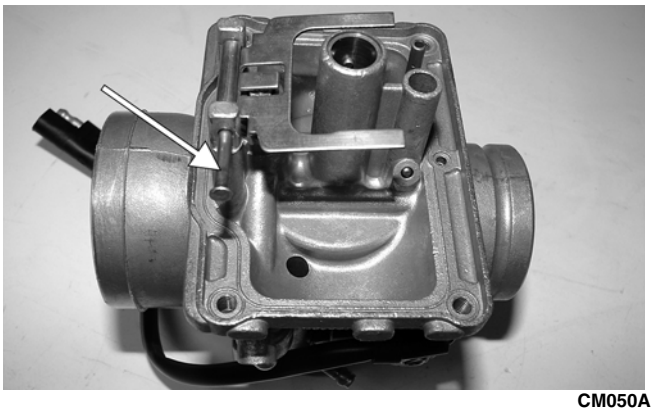


B344

3. Remove the float arm pin; then remove the float arm.

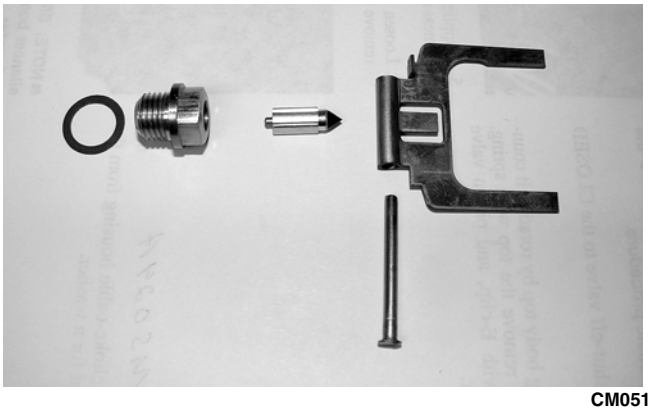
⚠ CAUTION

Use care when removing the float arm pin or the towers may break. Also, the pin must be removed from its flattened side.



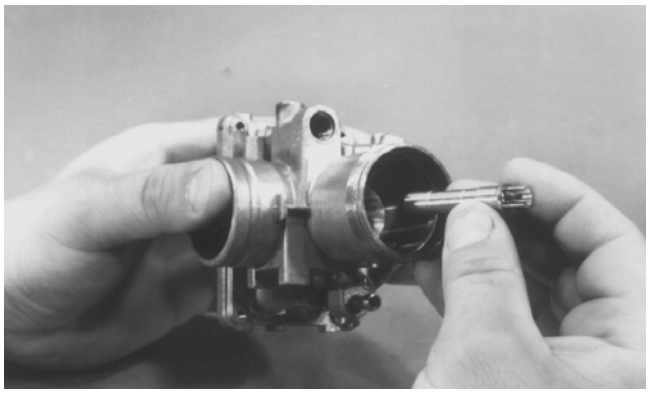
CM050A

4. Remove the needle valve and the seat. Account for a washer from the seat.



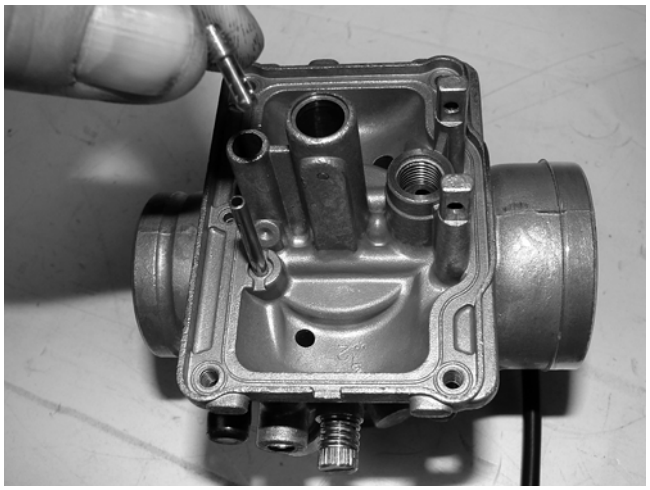
CM051

5. Remove the main jet and baffle ring; then remove the main jet extender guide from the needle jet. Push the needle jet out through the top of the carburetor.



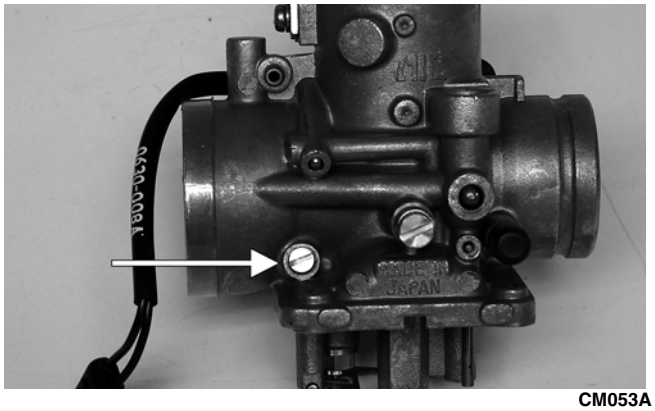
AH084

6. Remove the pilot jet.



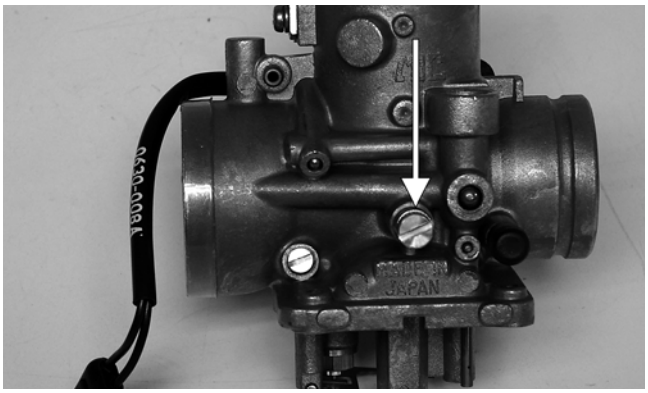
CM052

7. While counting the rotations for installing purposes, rotate the pilot air screw clockwise until lightly seated; then remove the pilot air screw and spring.



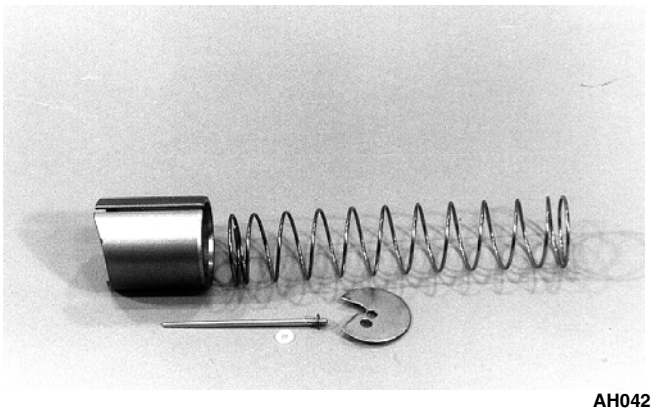
CM053A

8. Remove the idle speed screw and spring.



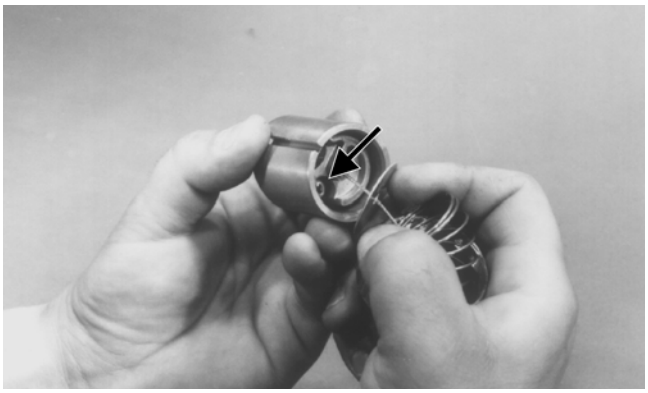
CM053B

9. On the 370 cc, remove the throttle cable from the piston valve; then remove the valve.

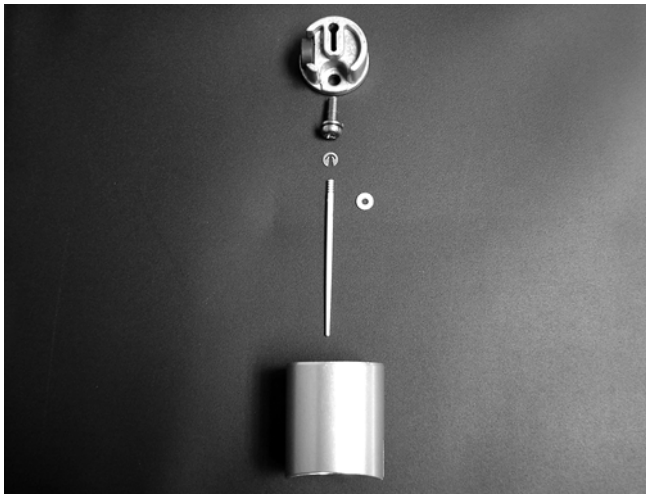


AH042

10. On the 440/570 cc, remove the Phillips-head screw securing the throttle cable retainer to the piston valve; then remove the retainer. Account for the jet needle with E-clip and washer.



AH074A



CM054

■ **NOTE: Note the position of the E-clip on the jet needle for assembly purposes.**

⚠ CAUTION

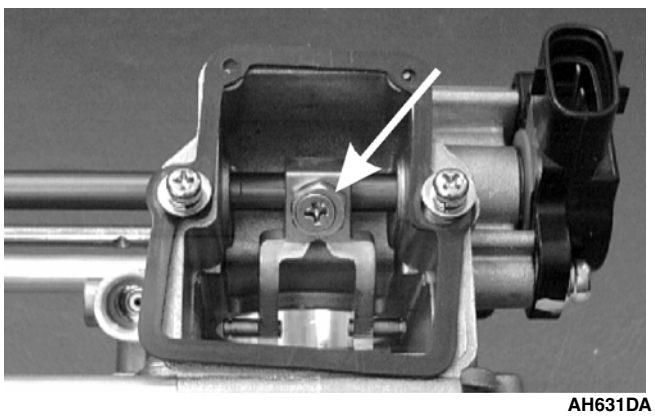
If an engine problem has been experienced due to improper gas/air mixture, verify the carburetor jetting and E-clip position with the Specification Chart and Main Jet Chart on the snowmobile for altitude, temperature, and type of gasoline.

11. Separate the starter plunger assembly from the choke cable by compressing the spring and removing the plunger from the cable; then remove the spring. Thread the plunger cap off the cable.

Disassembling Carburetors (TM-Style)

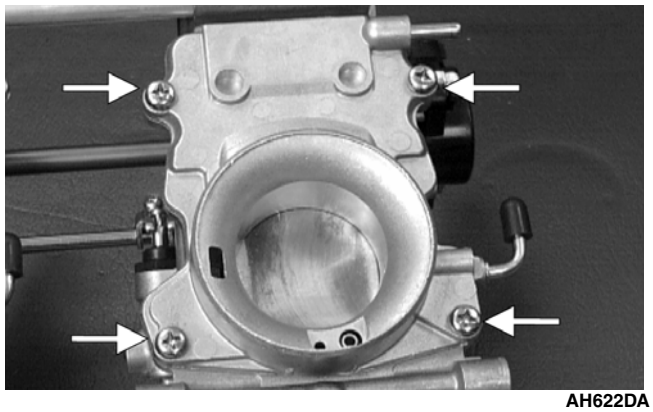
⚠ CAUTION

Do not loosen the lever assembly from the throttle lever shaft. If the lever assembly is loosened, the carburetors must be synchronized.



AH631DA

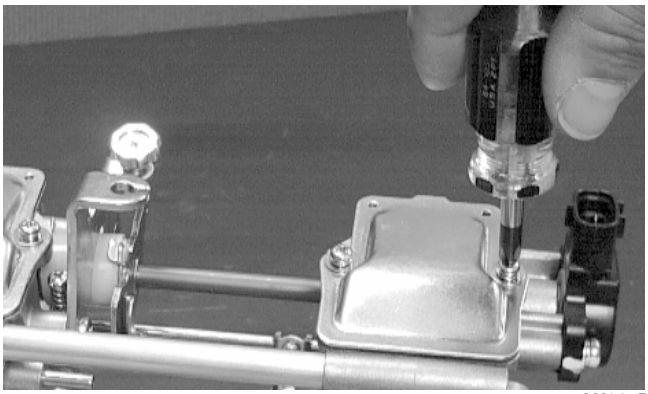
■ **NOTE: The carburetors do not have to be removed to change jet needles or main jets; however, changing throttle valves requires removing the funnel assemblies. The clearance between the throttle valve, mixing body, and funnel assembly (approximately 0.50 mm or 0.020 in.) is normal and should not be a concern.**



AH622DA

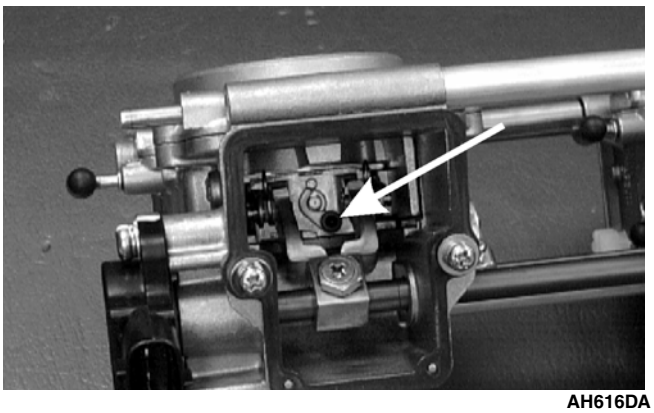
■ **NOTE: Disassemble the carburetors using this basic procedure.**

1. Loosen the screws (with washers) securing the top cap to the mixing body; then slide the cap off the body. Account for the gasket.



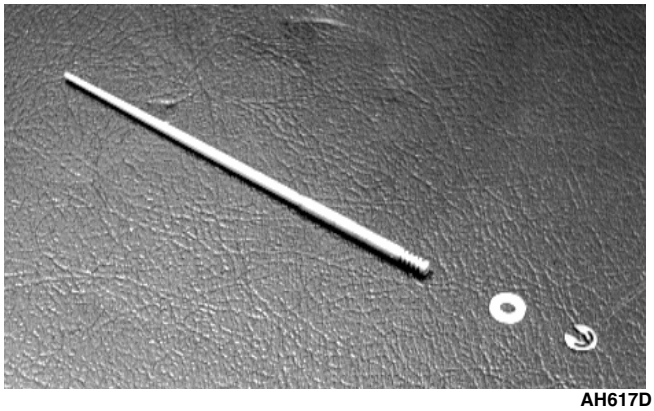
AH615D

2. Loosen the screw securing the jet needle retaining plate; then slide the plate out of the way.



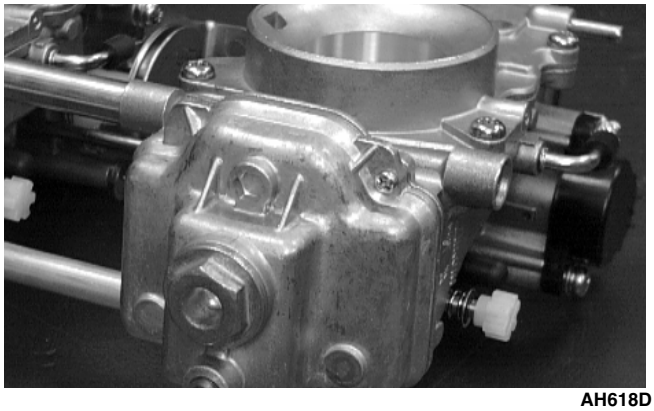
AH616DA

3. Using a pair of needle-nose pliers, remove the jet needle assembly. Account for the E-clip and washer.



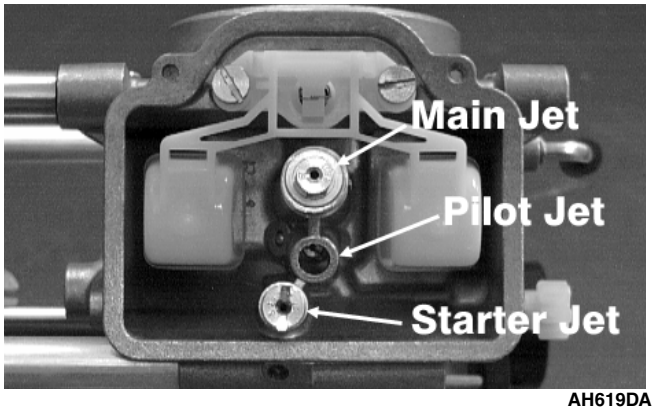
AH617D

4. Remove the Phillips-head screw and the drain plug (with O-ring) securing the float chamber to the mixing body. Remove the chamber and account for the O-ring.



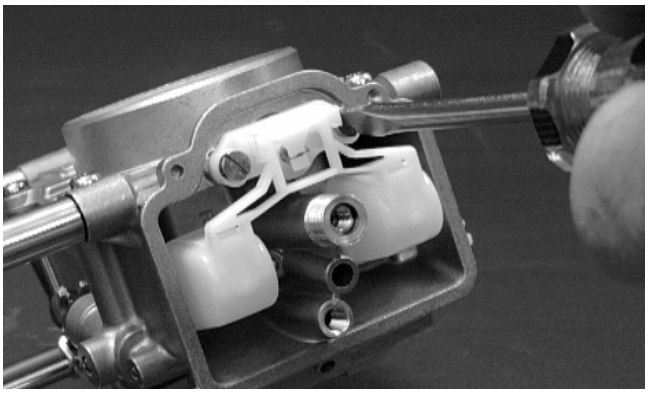
AH618D

5. Remove the main jet (with washer), pilot jet, and starter jet.



AH619DA

6. Remove the screws securing the float assembly.



AH620D

7. Remove the float assembly by lifting it up and out of the mixing body. Account for the O-ring.



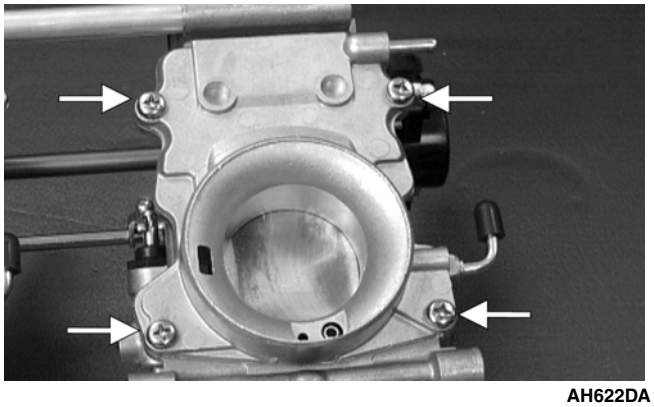
AH621D

■ **NOTE: It may be necessary to use a spray lubricant such as WD-40 to aid in removing the float assembly.**

⚠ CAUTION

To remove the throttle valve, the jet needle must be removed or damage to the jet needle will result.

8. Remove the Phillips-head screws securing the funnel assembly to the mixing body.



AH622DA

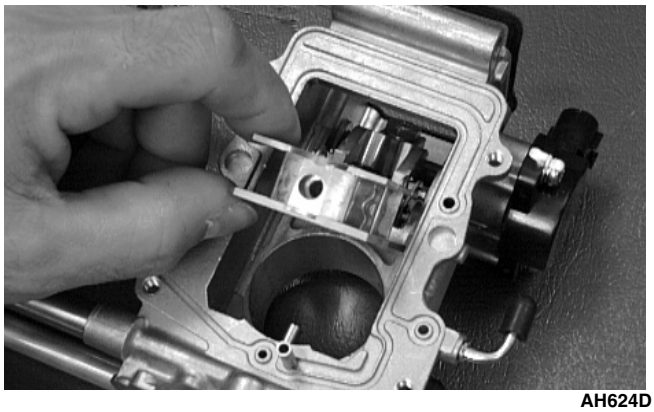
9. Move the throttle lever to the full-open position; then remove the funnel assembly. Account for the gasket.

4



AH623D

10. Move the throttle lever slightly open; then rotate the throttle valve out of the mixing body.

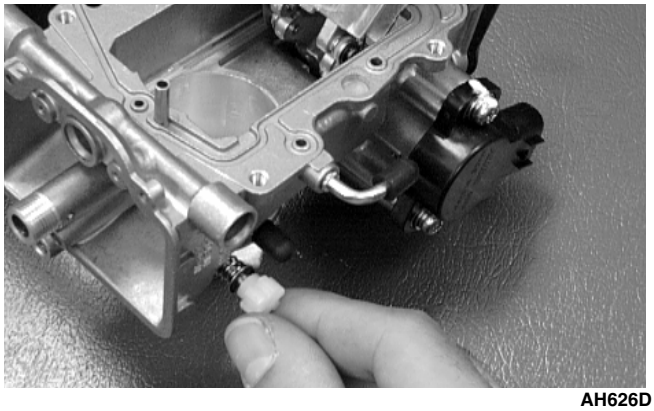


AH624D

11. While counting the rotations for installing purposes, rotate the fuel mixture screw clockwise until lightly seated; then remove the mixture screw. Account for a rubber washer, washer, spring, and cap.

⚠ CAUTION

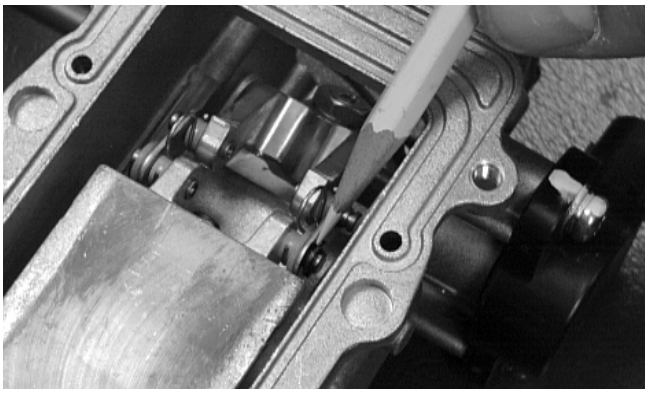
Do not force a mixture screw when seating. Forcing a mixture screw may result in damage to the screw taper and/or mixing body.



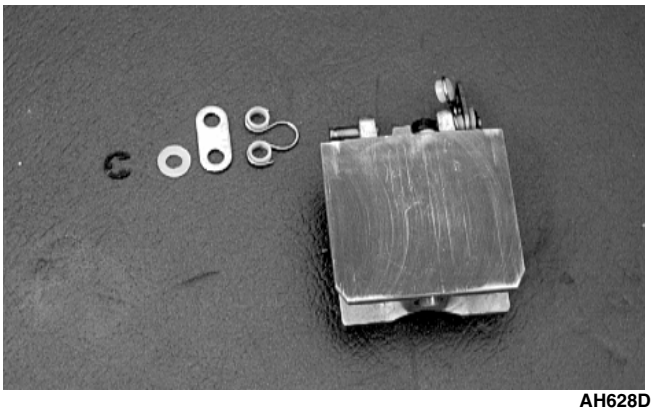
AH626D

■ **NOTE: In the following step, only one E-clip needs to be removed to free the throttle valve from the lever assembly.**

12. Remove the E-clip securing the plate to the throttle valve; then slide the throttle valve to one side and remove. Account for the plate, washer, clip, and bushings.



AH627D



AH628D

Cleaning Carburetor

⚠ CAUTION

DO NOT place any non-metallic components in parts-cleaning solvent or carburetor cleaner because damage or deterioration will result.

1. Place all metallic components in a wire basket and submerge in carburetor cleaner.
2. Soak for approximately 30 minutes; then rinse with fresh parts-cleaning solvent.
3. Wash all non-metallic components with soap and water. Rinse thoroughly.
4. Dry all components with compressed air only making sure all holes, orifices, and channels are unobstructed.

5. Blow compressed air through all hoses to remove any obstructions.

⚠ WARNING

Always wear safety glasses when drying components with compressed air.

⚠ CAUTION

DO NOT use wire or small drill bits to clean carburetor orifices, holes, or channels. Distorted or damaged orifices, holes, or channels can result in poor carburetor operation.

Inspecting Carburetor

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect the mixing body for cracks, nicks, stripped threads, and any other imperfections in the casting.
2. Inspect the piston/throttle valve for cracks, score marks, or imperfections in the casting.
3. On the VM-style, inspect the condition of the piston valve spring.
4. Inspect the float for perforations or damage.
5. Inspect the gaskets, O-rings, and washers for distortion, tears, or noticeable damage.
6. When applicable, inspect the tips of the idle speed screw, jet needle, pilot air screw, needle valve, and fuel mixture screw for wear, damage, or distortion.

■ NOTE: On the VM-style when inspecting the inlet needle, inspect the side guides and tip for wear. If the guides show any sign of wear, replace the inlet needle.

7. Inspect the pilot jet and main jet for obstructions or damage.
8. Inspect the starter plunger and seat for wear or damage.
9. Inspect the carburetor mounting flanges for damage and tightness.

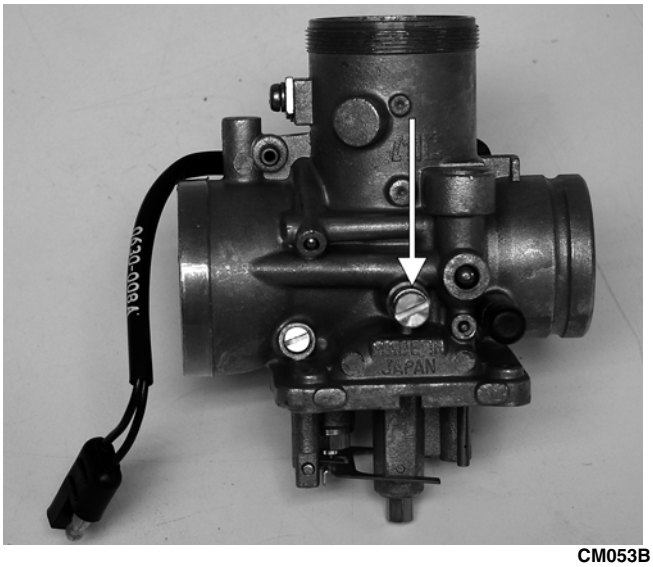
⚠ CAUTION

An air leak between the carburetor and engine will cause a lean condition and severe engine damage will result.

10. On the TM-style, inspect the throttle shaft seal for damage and signs of leaking.

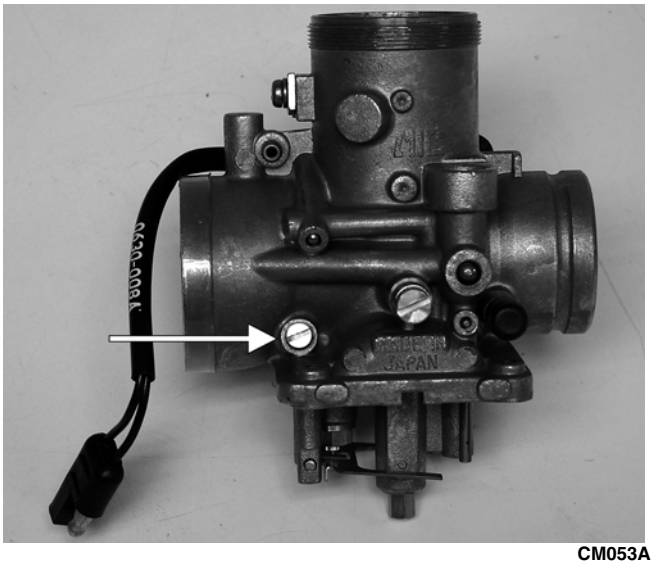
Assembling Carburetor (VM-Style)

1. Install the idle speed screw and spring.



CM053B

2. Install the pilot air screw and spring. Rotate clockwise until lightly seated; then turn counterclockwise the same number of turns as noted in disassembling for an initial setting.

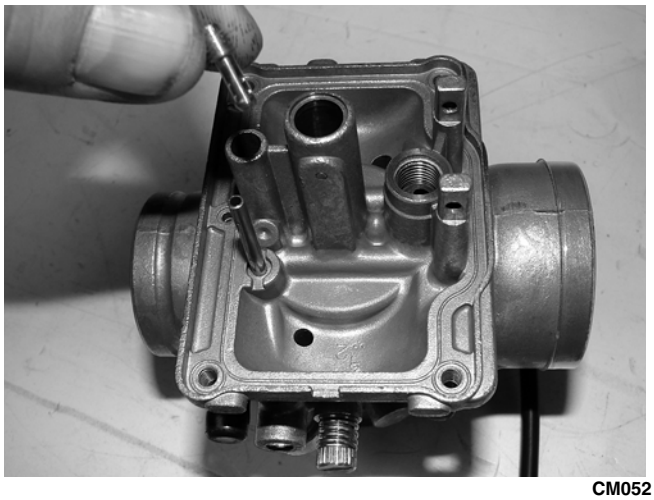


CM053A

⚠ CAUTION

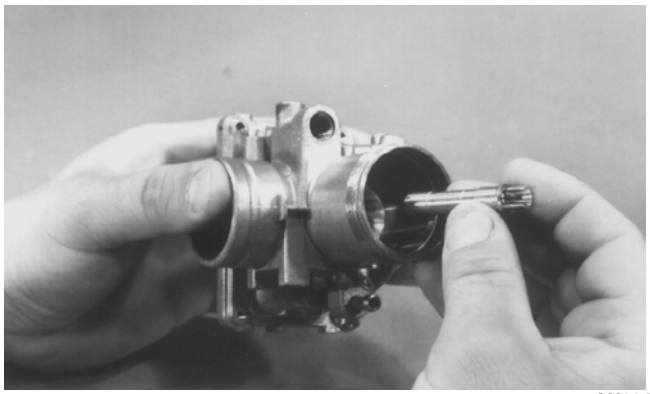
DO NOT force the pilot air screw when seating. Forcing the screw will result in damage to the carburetor body.

3. Install the pilot jet.



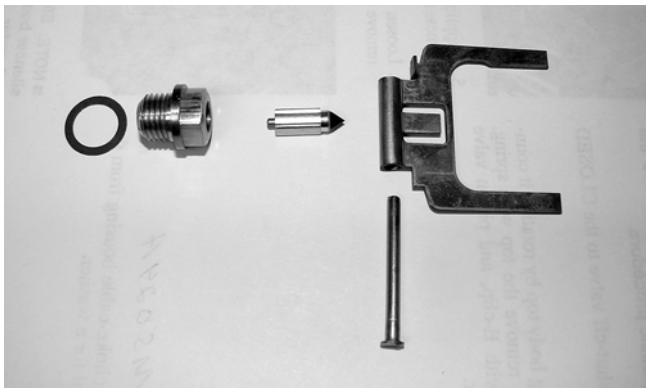
CM052

4. Insert the needle jet into position from the top of the carburetor making sure the groove in the needle jet is aligned with the pin in the mixing body; then place the jet extender, baffle ring, and main jet into position and secure.



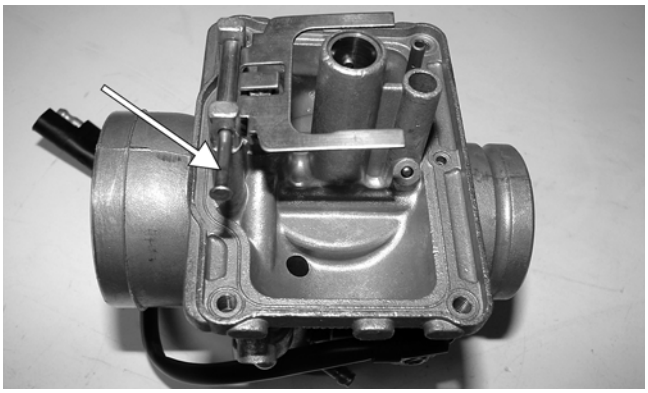
AH084

5. In order, place a washer and inlet seat into position and secure. Install the inlet needle valve.



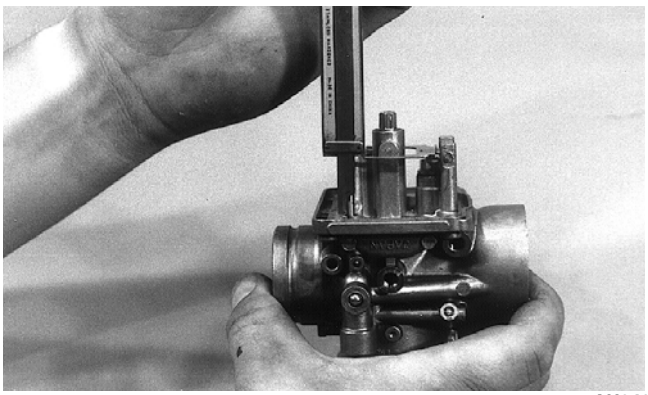
CM051

6. Place the float arm into position and secure with the pin.



CM050A

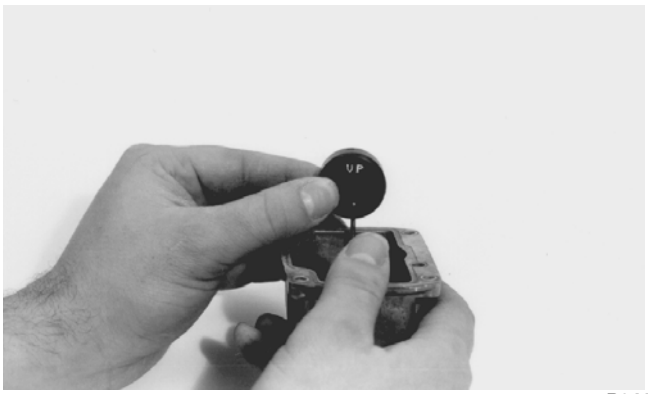
7. Check the float arm height. Using a calipers, measure the distance from the gasket surface to the top of the float arm (with the carburetor inverted). If measurement is not within specifications, adjust by bending the actuating tab.



AH046

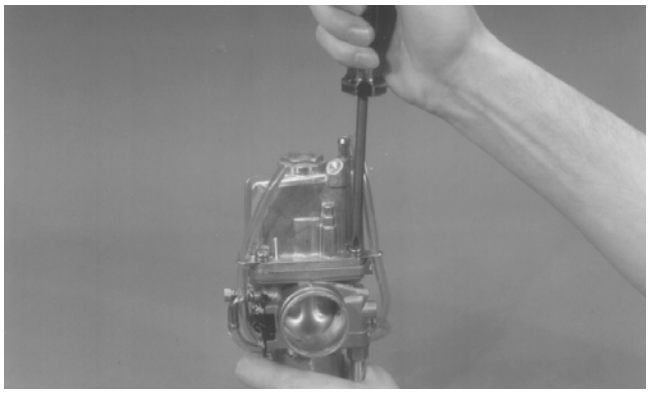
FLOAT ARM HEIGHT	
VM-32/34	22-24 mm (0.86-0.94 in.)

8. Place the O-ring and drain plug into position and secure; then place the floats into position making sure the word UP is properly positioned. Press the caps onto the float towers.



B344

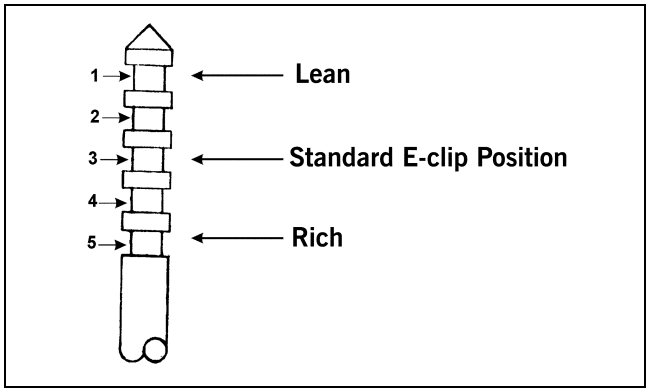
9. Place the gasket and float chamber into position and secure with the four screws and lock washers making sure the hose plates are properly positioned on the two front screws. Install the vent hoses.



AH137

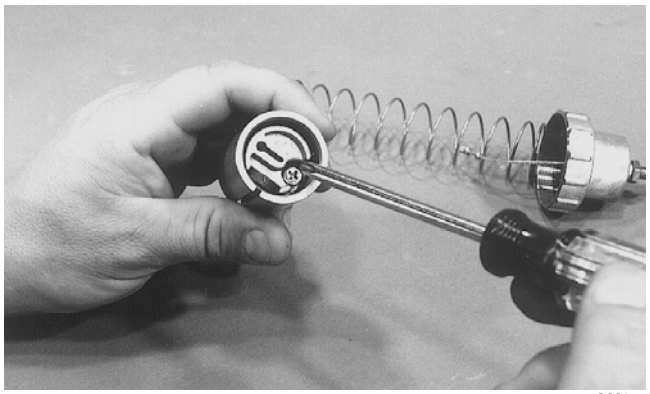
10. Place the E-clip into position on the jet needle. From the bottom of the jet needle, slide the E-clip washer up against the E-clip. Place the jet needle into the piston valve.

■ **NOTE: Place the E-clip in the proper position as noted in disassembly.**



725-266C

11. On the 440/570 cc, place the cable retainer into the piston valve and secure with the Phillips-head screw. On the 370 cc, place the spring and plate over the throttle cable and compress the spring. Guide the cable end down into the cable retainer slot and slide the cable end to the center of the piston valve. Release the spring and retainer plate to lock the cable in position.



AH075

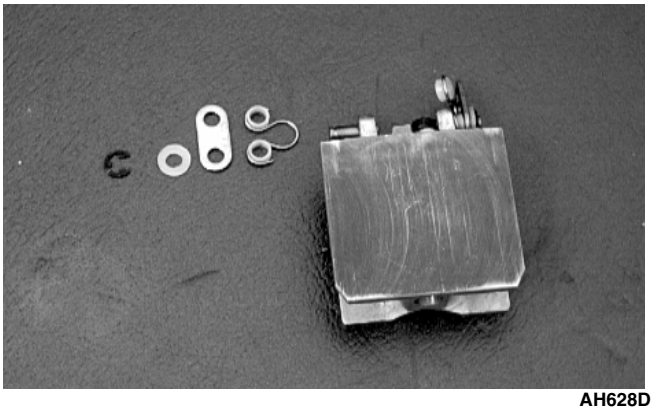
■ **NOTE: The round part of the cable end must come through the hole in the plate/piston valve. If it doesn't, the cable isn't assembled to the piston valve correctly.**

12. Thread the plunger cap onto the choke cable. Place the spring over the cable end and compress. Position the cable end into the starter plunger and release the spring.

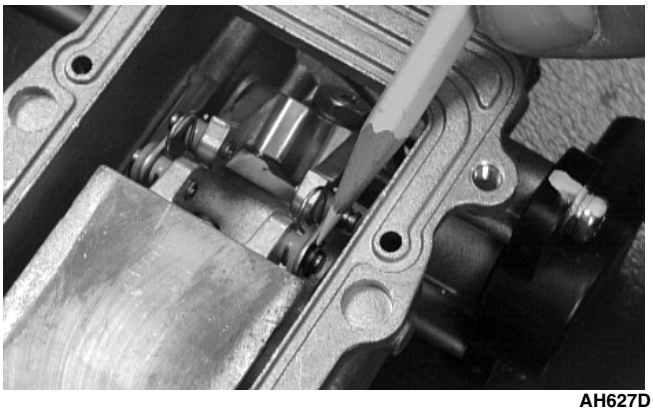
Assembling Carburetors
(TM-Style)

1. Place the throttle valve into the mixing body making sure the cutaway faces the funnel assembly side; then slide the bushing assembly/plate onto the lever assembly. Secure the assembly with the remaining bushings with clip, plate, washer, and E-clip.

■ **NOTE: When installing the throttle valve, the cutaway must face the funnel assembly side.**

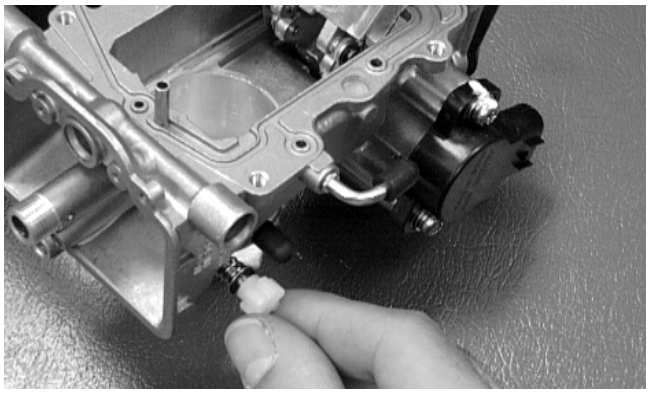


AH628D



AH627D

2. Making sure the cap, spring, washer, and rubber washer are accounted for from disassembly, install the fuel mixture screw in the mixing body.



AH626D

3. Rotate the fuel mixture screw clockwise until lightly seated; then rotate the mixture screw counterclockwise the same number of turns as noted in disassembling for an initial setting.

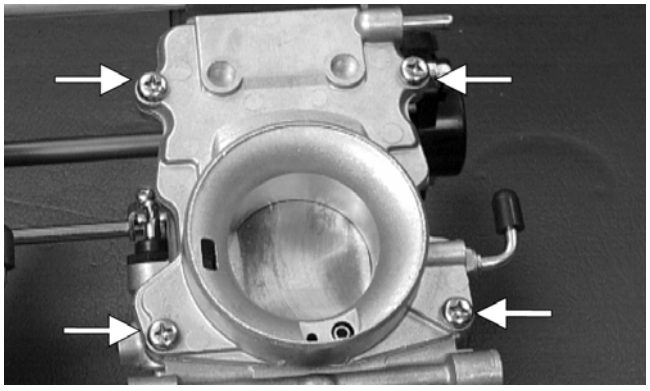
⚠ CAUTION

Do not force the mixture screw when seating. Forcing the mixture screw may result in damage to the screw taper and/or mixing body.

4. Move the throttle lever to the full-open position; then secure the funnel assembly w/gasket to the mixing body.



AH623D



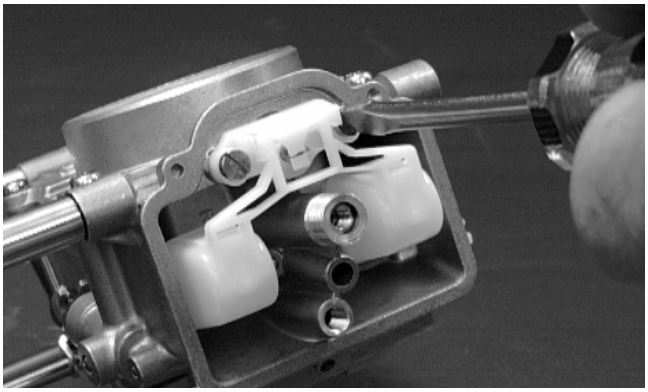
AH622DA

5. Accounting for the O-ring from disassembly, install the float assembly by pressing in on the screw mounting holes; then secure the float assembly with the screws.

■ **NOTE: It may be necessary to use a spray lubricant such as WD-40 to aid in installing the float assembly.**

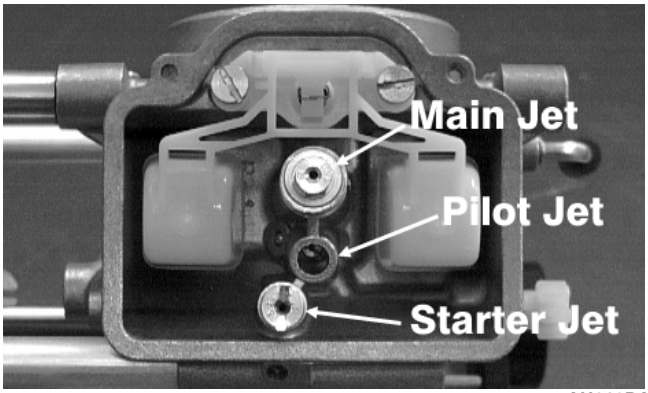


AH621D



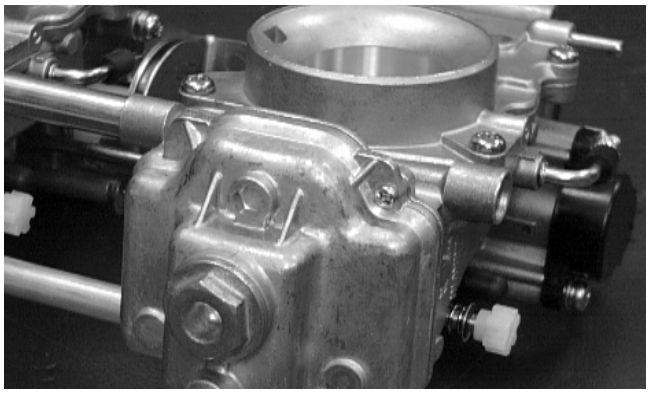
AH620D

6. Install the starter jet, pilot jet, and main jet (with washer).



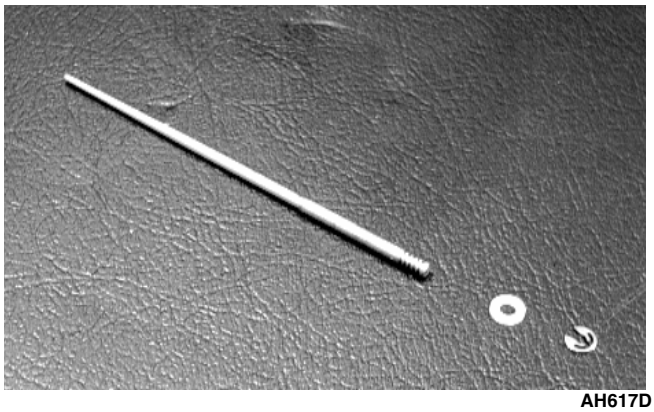
AH619DA

7. Place the float chamber and O-ring into position on the mixing body; then secure with the screw and drain plug (with O-ring).

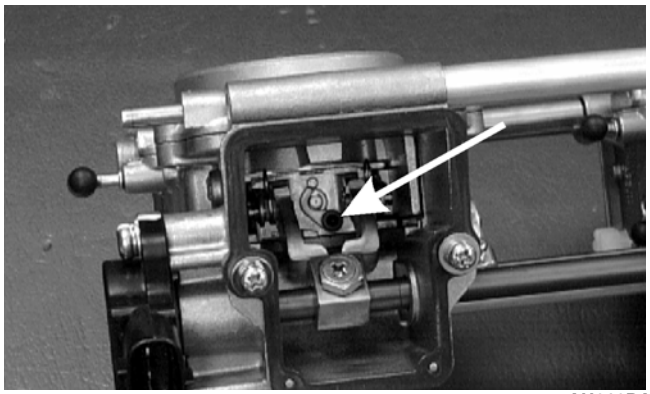


AH618D

8. Place the washer and E-clip (above the washer) onto the jet needle; then install the jet needle assembly into the mixing body. Secure with the retaining plate and screw.

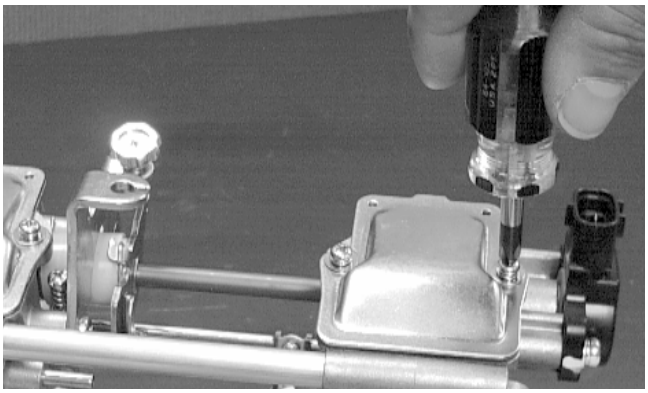


AH617D



AH616DA

9. Place the top cap and gasket on the mixing body; then secure with the screws (with washers).



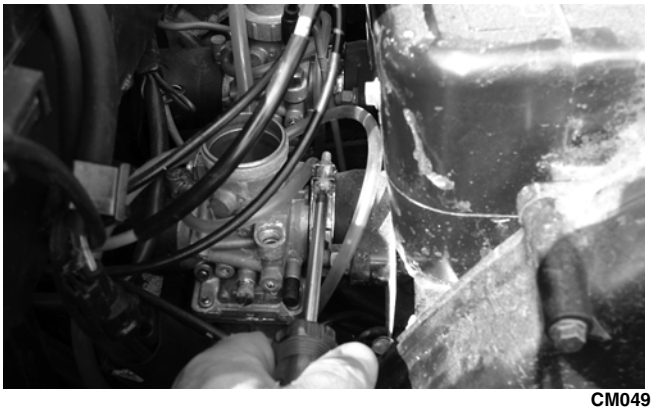
AH615D

■ **NOTE: If the lever assembly was loosened from the throttle lever shaft, the carburetors must be synchronized.**

Installing Carburetor (VM-Style)

■ **NOTE: On twin carburetor models, install the carburetors using this basic procedure.**

1. Place the carburetor into position in the flange and air-intake silencer boot; then tighten the flange clamp making sure the carburetor is level. Do not over-tighten the flange clamp as it will damage the carburetor flange.



CM049

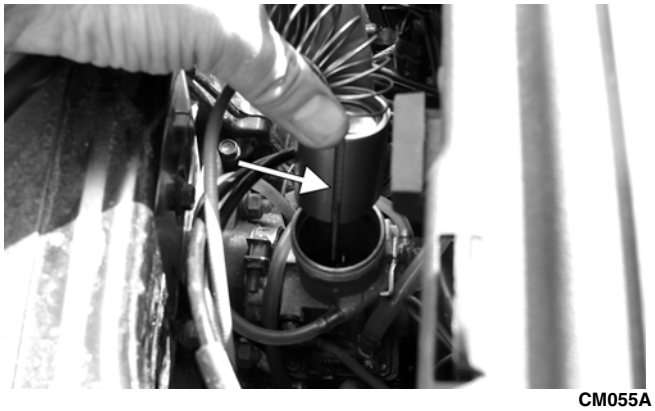
■ **NOTE: Slide the carburetor into the air-intake silencer boot; then slide the carburetor into the flange.**

2. Connect the fuel hose to the carburetor inlet fitting.

⚠ CAUTION

When installing the throttle bodies/carburetors, make sure the gasline hoses are properly routed to avoid premature wear and/or contact with exhaust components.

3. Place the piston valve into position making sure the full-length groove in the piston valve is aligned with the pin in the mixing chamber bore.



CM055A

4. Thread the brass choke-cable housing into the carburetor making sure the washer is properly positioned and tighten securely.



CM048

5. Secure the mixing body top by tightening the screw and lock washer making sure the mixing body top plate is properly positioned.

■ **NOTE: Prior to threading the mixing body top onto the carburetor, assure the rubber washer is positioned correctly on the body top.**

6. If applicable, connect the safety switch harness to the main wiring harness.

7. Turn the gas tank shut-off valve to the OPEN position.

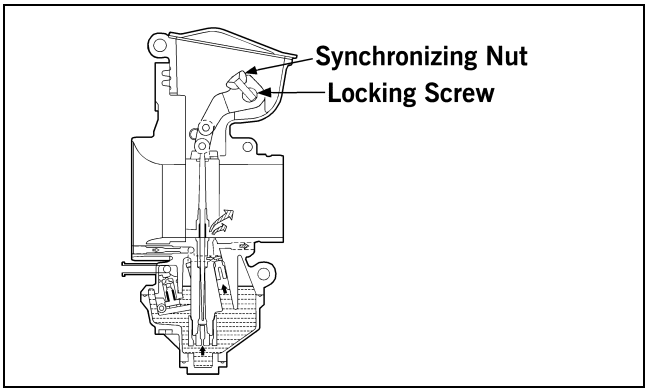
8. Adjust the carburetors (see appropriate Adjusting Carburetors in this sub-section).

Installing Carburetors (TM-Style)

1. Prior to installing the carburetors, the carburetor throttle valves must be checked for synchronization.

A. With the throttle in the idle position, select a small drill bit that will just fit under the cut-away of the fixed throttle valve.

B. Using the same drill bit, check the clearance under the adjustable throttle valve cutaway. If clearance is different from the first carburetor checked, adjust the throttle valve by loosening the lever ring locking screw; then using an open-end wrench, rotate the synchronizing nut in either direction until the clearance is the same as the first carburetor checked.



0734-445

C. After synchronization has been attained, hold the synchronizing nut with the open-end wrench and tighten the lever ring locking screw.

2. Connect the coolant hoses to the carburetors and secure with the clamps.

3. Pry the air silencer boot forward far enough to allow the carburetor assembly to be placed into position; then tighten the carburetor flange clamps, connect the TPS harness, and connect the throttle cable.

⚠ CAUTION

When installing the throttle bodies/carburetors, make sure the gasline hoses are properly routed to avoid premature wear and/or contact with exhaust components.

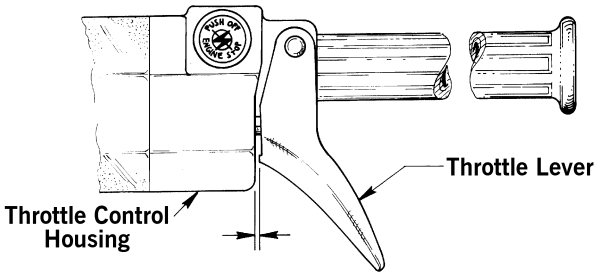
■ **NOTE: Make sure that the coolant drain is tightened and that the drain hose is routed correctly in the front end.**

4. Install the resonator and the expansion chamber.

5. At this point, there must be free-play gap in the throttle lever.

■ **NOTE: If throttle cable free-play is incorrect, the throttle safety switch will be activated prematurely and the engine will not start.**

■ **NOTE: If cable free-play must be corrected, utilize the jam nuts on the throttle cable bracket until free-play is attained.**



Gap of 0.75-1.5 mm (0.030-0.060 in.) between the Throttle Switch Body and Throttle Lever when Safety Switch is set properly

733-081C

6. Fill the cooling system with coolant.

■ **NOTE: Because the coolant fills slowly into the engine, it is necessary to wait for 10 minutes after filling the coolant tank to allow the engine to fill with coolant.**

7. Recheck the coolant level. If the level is low after 10 minutes, repeat step 6.
8. Install the coolant cap to the "first" position.
9. Start the engine. Do not exceed 3000 RPM.

■ **NOTE: After the engine has run for about 3-5 minutes, the right-side running board heat exchanger should feel warm to the touch. This is a sign that the thermostat has opened.**

10. Shut off the engine.
11. Tighten the coolant cap to the "second" position.
12. Tip the snowmobile onto the left-hand side (PTO-side) to allow air to move from the rear heat exchanger to the coolant tank.
13. Recheck the coolant level. If the coolant level is low, repeat step 6.
14. Install the coolant cap to the "first" position.
15. Place the snowmobile onto a safety stand.
16. Start the engine and run for 1 to 2 minutes. Do not exceed 5000 RPM.
17. Monitor the heat exchanger temperature by touch.
18. Shut the engine off for 5 minutes.
19. Start the engine and run for about 3-5 minutes; then repeat steps 10-18 an additional 2-3 times.

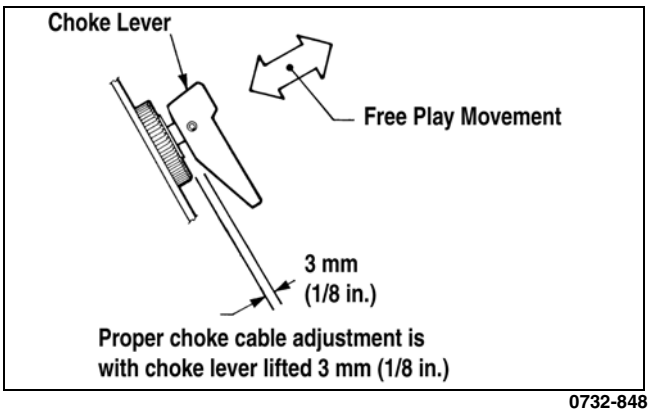
Adjusting Carburetor(s)
(VM-Style)

⚠ CAUTION

The air-intake silencer and boots must be in position whenever the engine is run. If the silencer is removed and the engine is run, a lean condition will result. Therefore, DO NOT run the engine when the air-intake silencer is removed.

ADJUSTING CHOKE CABLE(S)

1. Be sure the ignition switch key is in the OFF position and the brake lever lock is set.
2. Loosen the jam nut securing the choke cable adjuster. Rotate the choke cable adjuster clockwise until it bottoms against the brass plunger cap.
3. Slowly rotate the choke cable adjuster counterclockwise while checking the choke lever for free-play. As soon as all free-play has been removed from the end of the lever, stop rotating the adjuster.
4. With free-play removed from the lever, slowly rotate the choke cable adjuster once again clockwise while checking the choke cable lever for free-play. Adjust until 3 mm (1/8 in.) free-play between front bottom edge of lever and housing is attained. Securely tighten the adjuster jam nut.



Proper choke cable adjustment is with choke lever lifted 3 mm (1/8 in.)

0732-848

5. On twin carburetor models, repeat steps 3 and 4 on each carburetor.

■ **NOTE: On twin carburetor models if a carburetor choke cable is adjusted too tight, the engine will only operate on 1 cylinder at idle.**

ADJUSTING PISTON VALVE(S)

■ **NOTE: On some models, the air-intake silencer is a one-piece unit, and the silencer boot(s) can be removed to access the intake bore(s). Remove the boots; then proceed to step 4.**

■ **NOTE: On some models, the air-intake silencer includes a cover/tool tray assembly and a baffle/resonator, and the silencer boot cannot be removed to access the intake bores. Proceed to step 1.**

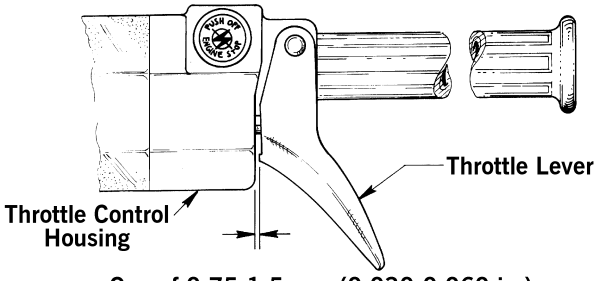
1. Open the air-intake silencer cover; then remove the 3 Phillips-head screws securing the cover/tool tray assembly to the silencer.
2. Tip the cover/tool tray assembly forward and out of its slots and remove the assembly.
3. Using a large flat-blade screwdriver, remove the resonator tabs from the air-intake silencer slots and remove the resonator to access the intake bores.

■ **NOTE: The resonator can be removed more easily by removing the back tabs first.**

4. Rotate each idle speed screw counterclockwise until all spring tension is removed.
5. Loosen the jam nut securing each throttle cable swivel adapter; then rotate the swivel adapter clockwise until the piston valve bottoms in the piston valve bore.
6. In turn on each carburetor, place a finger lightly against the side of the piston valve; then rotate the carburetor swivel adapter counterclockwise until slight upward movement of the valve is noted.
7. In turn on each carburetor, place a finger against either piston valve. Rotate the idle speed screw clockwise until it contacts the valve.
8. Compress the throttle lever to the full-open position; then rotate each idle speed screw clockwise 2 complete turns. Release the throttle lever.

■ **NOTE: On single carburetor models, the throttle control is equipped with a 2-wire throttle control switch connector. There must be free-play between the lever and the control housing.**

■ **NOTE: On twin carburetor models, the throttle control is equipped with a 3-prong emergency stop switch connector. There must be free-play between the lever and the control housing.**



Gap of 0.75-1.5 mm (0.030-0.060 in.) between the Throttle Switch Body and Throttle Lever when Safety Switch is set properly

733-081C

■ **NOTE: If cable free-play gap is not correct, rotate each swivel adapter an equal amount until recommended free-play is achieved. Each piston valve must be resting against the tip of its idle speed screw.**

■ **NOTE: On twin carburetor models if throttle cable free-play is incorrect, the carburetor safety switches will be activated prematurely and the engine will not start.**

9. On some models, install the air-intake silencer boot(s); on some models, install the baffle/resonator and the cover/tool tray assembly.

SYNCHRONIZING PISTON VALVES

■ **NOTE: Arctic Cat recommends using the Carburetor Synchronizer (p/n 0644-069). If the carburetor synchronizer is not available, use the following procedure.**

1. Open the air-intake silencer cover; then remove the 3 Phillips-head screws securing the cover/tool tray assembly to the silencer.
2. Tip the cover/tool tray assembly forward and out of its slots and remove the assembly.
3. Using a large flat-blade screwdriver, remove the resonator tabs from the air-intake silencer slots and remove the resonator to access the intake bores.

■ **NOTE: The resonator can be removed more easily by removing the back tabs first.**

4. Check to make sure the piston valves start to open at the exact same moment by placing a thumb and finger against the valves; then lightly compress the throttle lever.

5. With slight pressure being applied to the throttle lever, the piston valves should start to open at the exact same time. Compress and release the throttle lever several times to assure accurate determination of piston valve opening.

6. If a piston valve starts to open before another, rotate the swivel adapter on the valve which is lifting first clockwise, just enough to synchronize the valves.

■ **NOTE: Recheck by repeating steps 4-6.**

7. Tighten the swivel adapter jam nuts securely. Slide the rubber throttle cable caps down over the swivel adapters.

■ **NOTE: There must be free-play in the throttle lever.**

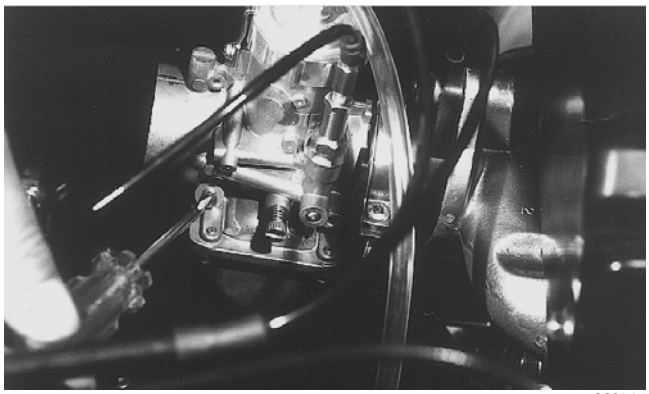
⚠ WARNING

Be sure to tighten the swivel adapter jam nuts securely. If a swivel adapter jam nut is not tightened, the adjuster can rotate out of the carburetor cap causing the piston valve not to return to the full-closed position.

8. After synchronization has been attained, install the resonator and cover/tool tray assembly.

ADJUSTING PILOT AIR SCREW(S)

1. While counting the rotations, carefully rotate each pilot air screw clockwise until lightly seated.



AH006

⚠ CAUTION

Do not force a pilot air screw when rotating it clockwise; damage to the pilot air screw needle tip will result.

2. Rotate each pilot air screw counterclockwise the same number of turns as noted in step 1 for an initial setting.

3. Synchronize the oil-injection pump (see Related Items in this section).

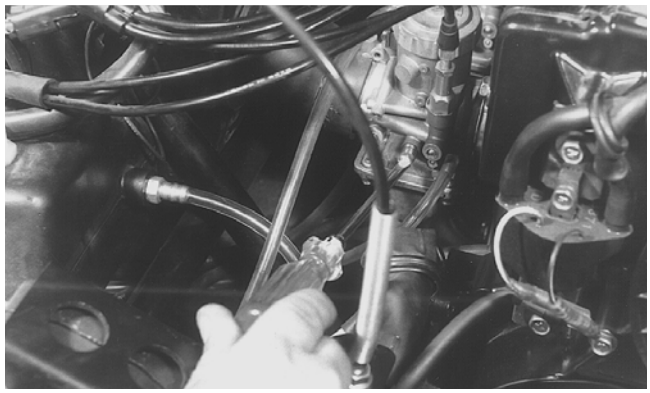
ADJUSTING ENGINE IDLE SPEED

1. With the snowmobile on a shielded safety stand, start the engine, release the brake lever lock, and thoroughly warm up. Fine-tune each idle speed screw and each pilot air screw until the engine idles smoothly at the desired RPM (1500 RPM is recommended).

■ **NOTE: Make engine idle adjustment only after the engine has reached running temperature. Since the idle speed screw(s) have not been adjusted, apply slight throttle pressure to keep the engine running. Allow engine to warm up for 2-3 minutes.**

2. On twin carburetor models after the engine has been allowed to warm up for 2-3 minutes, adjust engine idle by first rotating the PTO-side carburetor idle speed screw clockwise until the tachometer reads 1480 RPM.

3. On twin carburetor models, rotate the MAG-side carburetor idle speed screw clockwise until tachometer reads 1500 RPM.



AH055

4. On twin carburetor models, rotate the PTO-side carburetor idle speed screw clockwise until the tachometer reads slightly above 1500 RPM; then rotate the idle speed screw counterclockwise to achieve exact 1500 RPM reading. The piston valves should now be synchronized and the engine should idle without holding any throttle pressure.

■ **NOTE: If the engine has no ignition spark with the throttle in the idle position but has proper spark with the throttle lever slightly compressed, the carburetor safety switches must be repositioned.**

5. Test the throttle control lever by compressing and releasing it several times. The lever must return to the idle position quickly and completely.

⚠ WARNING

DO NOT operate the snowmobile when any component in the throttle system is damaged, frayed, kinked, worn, or improperly adjusted. If the snowmobile is operated when the throttle system is not functioning properly, personal injury could result.

Adjusting Carburetors
(TM-Style)

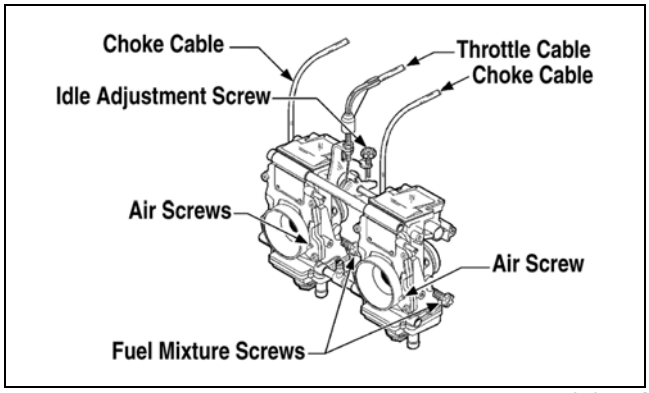
⚠ CAUTION

The air-intake silencer and boots must be in position whenever the engine is run. If the silencer is removed and the engine is run, a lean condition will result. Therefore, DO NOT run the engine when the air-intake silencer is removed.

ADJUSTING CHOKE CABLES

1. Be sure ignition switch key is in the OFF position and the brake lever lock is set.

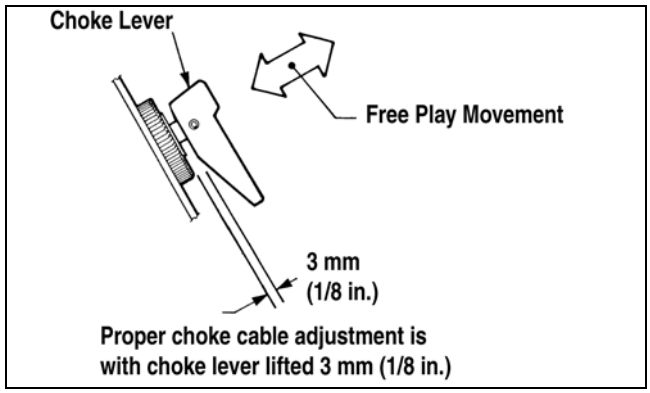
2. Loosen the jam nut securing each choke cable adjuster on the side of the carburetor.



0735-774

3. Slowly rotate one choke cable adjuster while checking the choke lever for free-play. As soon as all free-play has been removed from the end of the choke lever, stop rotating the adjuster.

4. With free-play removed from the lever, slowly rotate the adjuster again while checking the choke lever for free-play. Adjust until 3 mm (1/8 in.) free-play between front bottom edge of lever and housing is attained. Securely tighten the jam nut.



0732-848

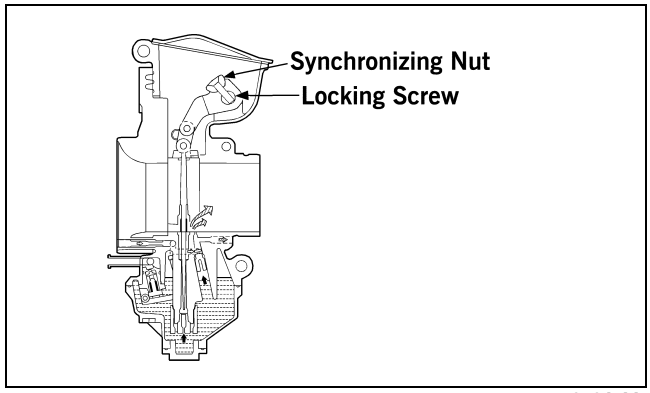
5. Repeat steps 3 and 4 on the other carburetor.

SYNCHRONIZING THROTTLE VALVES

■ NOTE: Pry the air silencer boot forward far enough to access the intake bores.

1. With the throttle in the idle position, select a small drill bit that will just fit under the cutaway of the fixed throttle valve.

2. Using the same drill bit, check the clearance under each adjustable throttle valve cutaway. If clearance is different from the first carburetor checked, adjust the throttle valve by loosening the lever ring locking screw; then using an open-end wrench, rotate each synchronizing nut in either direction until the clearance is the same as the first carburetor checked.



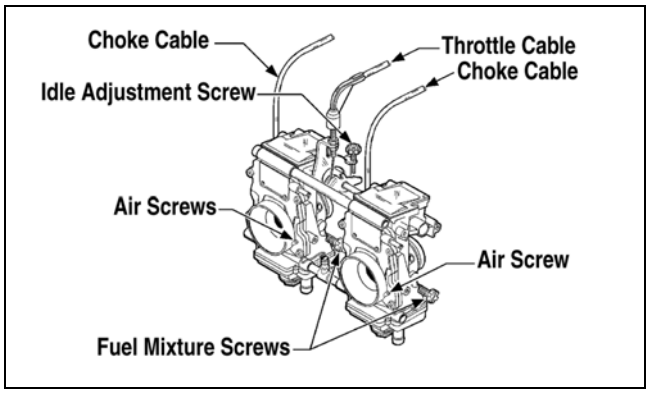
0734-445

3. After synchronization has been attained, hold the synchronizing nut with the open-end wrench and tighten the lever ring locking screw.

■ NOTE: Make sure the air silencer boot is properly positioned over the carburetor bores.

ADJUSTING FUEL MIXTURE SCREWS

1. While counting the rotations, carefully rotate the fuel mixture screws clockwise until lightly seated.



0735-774

⚠ CAUTION

Do not force a fuel mixture screw when rotating it clockwise; damage to the mixture screw taper may result.

2. Rotate each fuel mixture screw counterclockwise the same number of turns as noted in step 1 for an initial setting.

ADJUSTING AIR SCREWS

1. While counting the rotations, carefully rotate the air screws clockwise until lightly seated.

⚠ CAUTION

Do not force an air screw when rotating it clockwise; damage to the air screw will result.

2. Rotate the air screws counterclockwise the exact number of rotations ± 1/4 turn from the seated position as an initial setting.

ADJUSTING ENGINE IDLE SPEED

■ NOTE: Make engine idle adjustment only after the engine has reached running temperature. Since the idle speed screw has not been adjusted, apply slight throttle pressure to keep the engine running. Allow engine to warm up for 2-3 minutes.

1. After the engine has been allowed to warm up for 2-3 minutes, fine-tune the idle speed screw until the tachometer reads 1500 RPM.

2. Test the throttle control lever by compressing and releasing it several times. The lever must return to the idle position quickly and completely.

⚠ WARNING

DO NOT operate the snowmobile when any component in the throttle system is damaged, frayed, kinked, worn, or improperly adjusted. If the snowmobile is operated when the throttle system is not functioning properly, personal injury could result.

Throttle Position Sensor

1. Disconnect the TPS wiring harness connector.

2. Using Throttle Position Sensor Adjustment Tool Kit (p/n 3639-891), connect its wiring harness to the TPS. Connect the red and black meter leads to the white and black jacks of the TPS adjustment tool.

■ NOTE: Before using the TPS adjustment tool, verify its battery condition. The battery used in the tool is a 9-volt battery. To check battery condition, use a digital volt/ohmmeter set on DC volt scale. Test between the adjustment tool black and red jacks. Insert the red lead of the digital voltmeter into the red jack of the adjustment tool and the black lead of the digital voltmeter into the black jack of the adjustment tool. If voltage is found below 4.9 volts, replace the battery.

3. Set the multimeter selector to the DC scale; then SLOWLY depress the throttle lever. The meter reading should show a smooth rise all the way to wide-open throttle. Repeat this step until it is assured that there are no open areas or “peaks” in the reading.

■ NOTE: If a reading contains open areas or peaks, the throttle position sensor may be faulty. Refer to the proper Checking/Adjusting TPS procedure in Section 5 - Throttle Position Sensor in this manual.

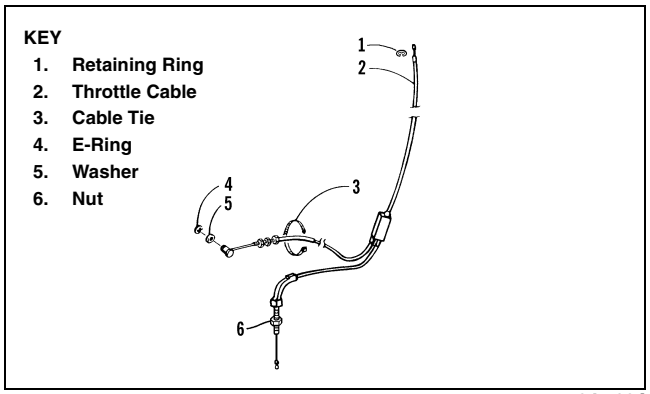
4. Disconnect the adjustment tool harness from the TPS. Connect the snowmobile TPS harness to the TPS.

■ NOTE: Before installing the TPS harness connector, apply dielectric grease to the connector pins.

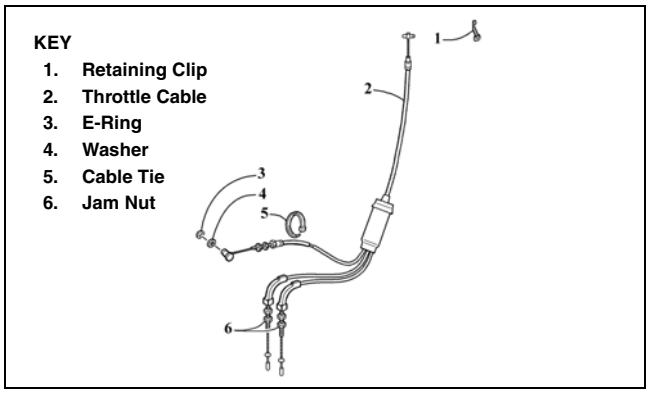
Throttle Cable
(VM-Style)

■ NOTE: Determine which type of cable is being replaced and remove and install accordingly.

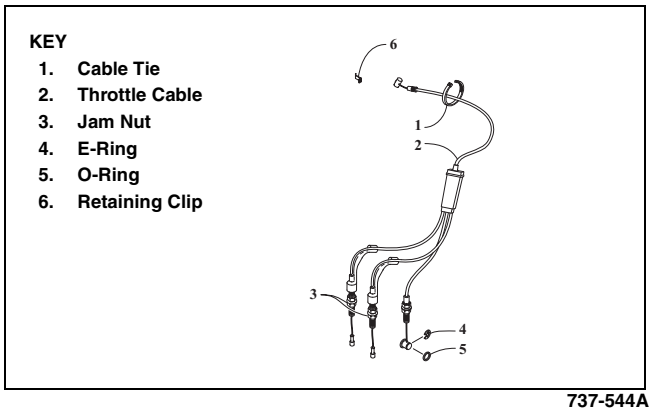
REMOVING



734-533A



736-742A



737-544A

1. Loosen the throttle cable adjuster jam nuts.
2. Remove the mixing body tops.
3. Remove the throttle cables from the piston valves.
4. Remove the throttle cables from the mixing body tops.
5. Remove the handlebar pad and console.
6. Remove the cable ties securing the throttle cable.
7. Remove the throttle cable end from the throttle lever.
8. Using Throttle Cable Removal Tool (p/n 1639-963), push down on the throttle cable retaining clip; then remove the cable from the throttle switch assembly.

■ NOTE: On twin carburetor models, it may be necessary to remove the PTO-side carburetor.

9. Remove the E-ring securing the oil-injection cable to the control arm. Account for a washer.
10. Loosen the jam nut securing the adjustment cable; then remove the cable from the oil-injection pump.

INSTALLING

1. Route the throttle cable from the throttle switch assembly to the carburetors and oil-injection pump; avoid any sharp bends or moving parts.
2. Install the oil-injection adjustment cable on the oil-injection pump; secure with the jam nuts.
3. Install the oil-injection cable on the control arm; secure with a washer and E-ring.

■ NOTE: Install the PTO-side carburetor if removed.

4. Install the throttle cable into the throttle switch assembly making sure it snaps into place.
5. Install the throttle cable end on the throttle lever.
6. Secure the throttle cable to the steering post with cable ties.
7. Install the handlebar pad and console.
8. Attach the throttle cable to each throttle valve. The valve must seat in the groove of the throttle cable end; then thread the throttle cable into each mixing body top.
9. Install each piston valve and mixing body top on the carburetor(s). Tighten securely.
10. Adjust the carburetor(s) (see appropriate Adjusting Carburetors in this sub-section).

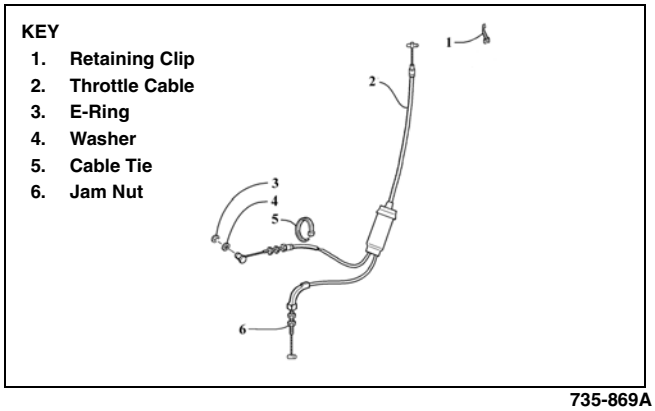
⚠ CAUTION

Compress the throttle control lever to ensure free movement. If the throttle cable sticks or binds, correct the problem before starting the engine.

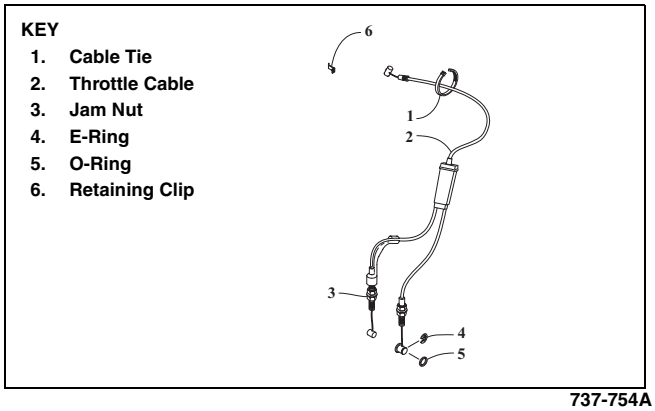
11. Synchronize the oil-injection pump (see Related Items sub-section).

Throttle Cable
(TM-Style)

■ **NOTE: Determine which type of cable is being replaced and remove and install accordingly.**



735-869A



737-754A

REMOVING

1. Loosen the throttle cable adjuster jam nut at the bracket.
2. Remove the throttle cable from the pulley on the throttle lever shaft.
3. Remove the handlebar pad and console.
4. Remove the throttle cable from the throttle lever.
5. Using Throttle Cable Removal Tool (p/n 1639-963), push down on the throttle cable retaining clip; then remove the cable from the throttle switch assembly.
6. Open the belt guard; then remove the drive belt.
7. Remove the oil-injection cable from the control arm.

■ **NOTE: Some models are equipped with "control rod" actuated oil pump. The control rod simply snaps off and on at the control arm.**

8. Loosen the jam nut securing the adjustment cable; then remove the cable from the oil-injection pump.

INSTALLING

1. Install the oil-injection adjustment cable on the oil-injection pump; secure with the jam nuts.
2. Install the oil-injection cable on the control arm.
3. Route the throttle cable from the carburetor to the throttle switch assembly making sure it snaps into place.

⚠ CAUTION

Avoid any sharp bends and hot or moving components or damage may occur.

4. Install the throttle cable on the throttle lever.
5. Install the handlebar pad and console.
6. Install the throttle cable into the throttle lever shaft pulley.
7. Install the throttle cable into the bracket; then adjust the jam nut to attain no free-play between the throttle lever and the control housing.

■ **NOTE: There must be no free-play between the lever and the control housing.**

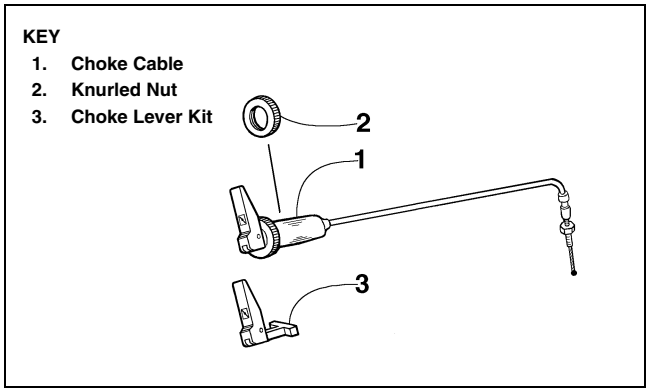
⚠ CAUTION

Compress the throttle control lever to ensure free movement. If the throttle cable sticks or binds, correct the problem before starting the engine.

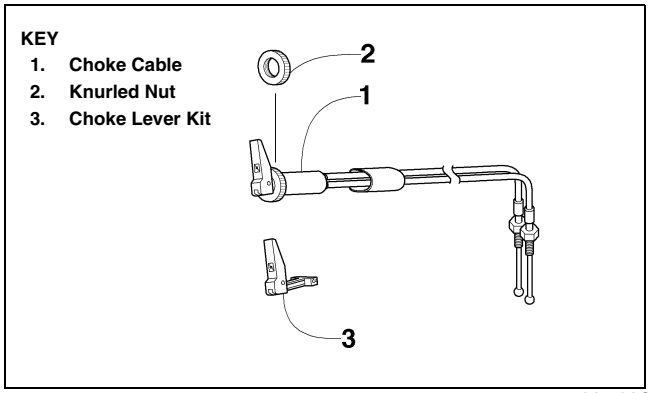
8. Synchronize the oil-injection pump (see Related Items sub-section).
9. Install the drive belt; then close and secure the belt guard.

Choke Cable
(VM-Style)

■ **NOTE: Determine which type of cable is being replaced and remove and install accordingly.**



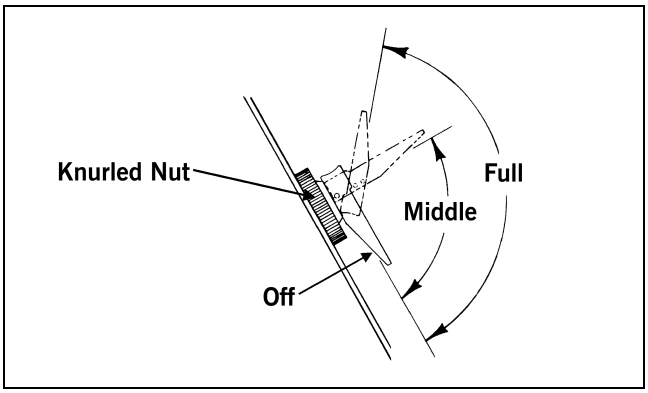
737-490A



736-596A

REMOVING

1. Bend down the lock tabs locking each brass choke cable housing on each carburetor.
2. Using a 12-mm wrench, remove each brass choke cable housing from each carburetor. Account for the lock tab washers.
3. Remove each brass plunger and spring from the cable end; then remove each brass choke cable housing.
4. Remove the screws securing the console.
5. Position the choke lever in the middle-choke position; then remove the knurled nut securing the choke lever housing to the console.



725-001A

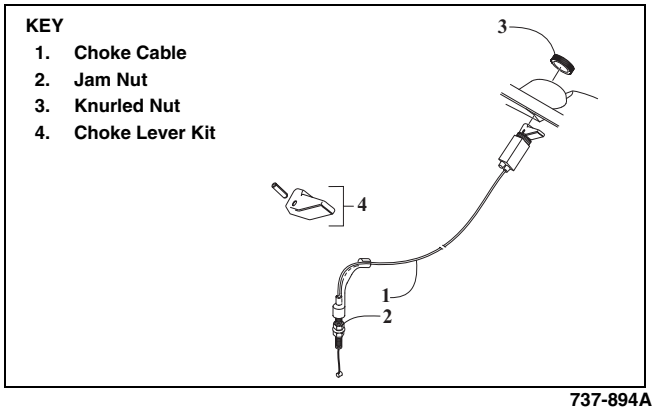
6. Slide the choke lever housing from the console.
7. Cut any cable ties used to secure the choke cable and remove the choke cable from the engine compartment.

INSTALLING

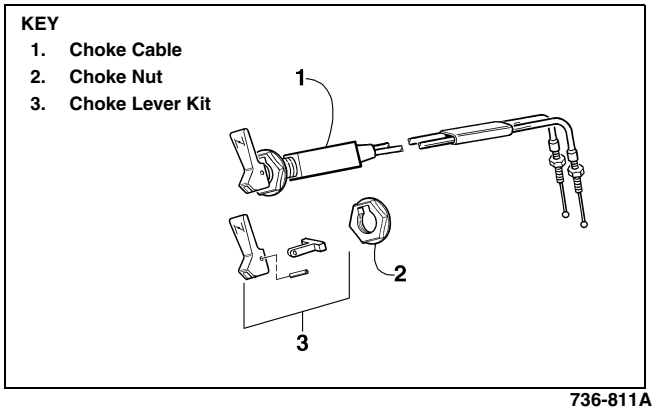
1. Position the choke lever in the middle-choke position; then from the back side of the console, insert the choke lever housing through the console. Secure with the knurled nut.
2. Route the choke cable from the console to each carburetor; avoid any sharp bends or moving parts.
3. Install each brass choke cable housing onto the cable end; then install each spring and brass plunger.
4. Place the lock tab washer on each brass housing and insert a choke plunger into each carburetor.
5. Thread each brass choke cable housing into each carburetor and tighten. Bend the lock tab up to secure the brass housing. Adjust the choke cable (see appropriate Adjusting Carburetors in this sub-section).
6. Place the console into position and secure with the screws.

Choke Cable
(TM-Style)

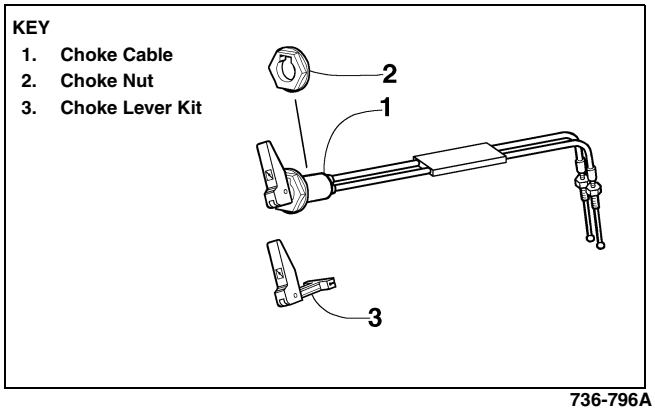
■ **NOTE: Determine which type of cable is being replaced and remove and install accordingly.**



737-894A



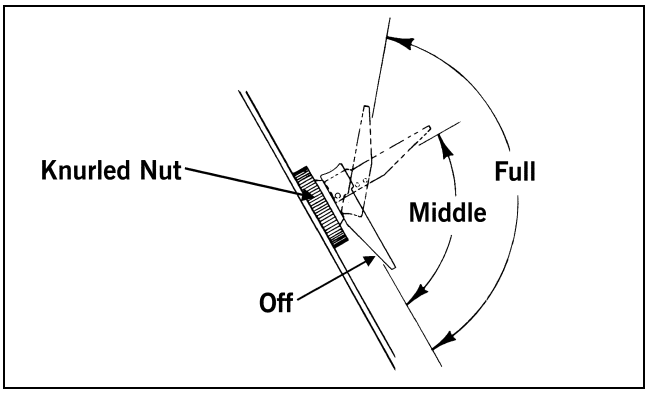
736-811A



736-796A

REMOVING

1. Loosen the jam nuts securing the choke cable to the bracket.
2. Remove the cable from the starter plunger lever.
3. Position the choke lever in the middle-choke position; then remove the knurled nut securing the choke housing to the console.

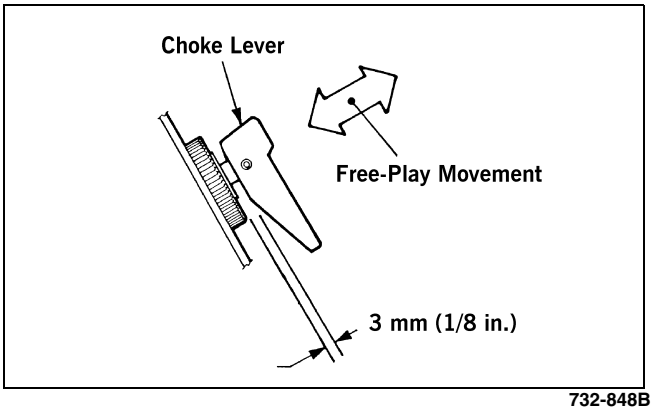


725-001A

4. Remove the console.
5. Slide the choke cable from the console.

INSTALLING

1. Position the choke lever in the middle-choke position; then from the back side of the console, insert the choke lever housing through the console. Secure with the knurled nut.
2. Route the choke cable from the console to the carburetors; avoid any sharp bends or moving parts.
3. Install the choke cable into the bracket; then secure with jam nuts making sure the choke lever has 3 mm (1/8 in.) free-play between the edge of the lever and the housing.

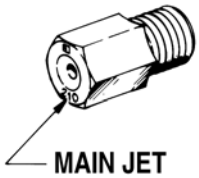


732-848B

4. Place the console into position and secure.

Mikuni Tuning Components

MAIN JETS AVAILABLE (VM/TM)			
JET	P/N	JET	P/N
120	6505-270	400	6505-124
130	6505-216	410	6505-212
140	6505-217	420	6505-125
150	6505-168	430	6505-146
160	6505-064	440	6505-126
170	6505-065	450	6505-147
180	6505-056	460	6505-127
190	6505-066	470	6505-148
200	6505-144	480	6505-149
210	6505-145	490	6505-150
220	6505-137	500	6505-151
230	6505-067	510N	6506-378
240	6505-079	520	6505-530
250	6505-068	520N	6506-379
260	6505-017	530N	6506-380
270	6505-069	540	6505-531
280	6505-080	540N	6506-381
290	6505-123	550N	6506-382
300	6505-128	560	6505-172
310	6505-136	560N	6506-383
320	6505-074	580	6505-211
330	6505-070	600	6505-532
340	6505-076	620	6505-174
350	6505-071	640	6505-533
360	6505-038	660	6505-535
370	6505-072	680	6505-169
380	6505-077	700	6505-536
390	6505-078	720	6505-538



MAIN JET
Size indicated in this area

JET NEEDLES AVAILABLE (VM/TM)			
JET NEEDLE (VM-Style)	P/N	JET NEEDLE (TM-Style)	P/N
6CH3	6505-519	9CFH1-56	6506-116
6DH2	6505-252	9DH2-59	6506-110
6DH3	6505-509	9DH5-61	6506-114
6DH4	6505-003	9DEH1-55	6506-118
6DH7	6505-215	9DEH2-57	6506-115
6DH8	6505-236	9EGY01-57	6506-192
6DF7	6506-297	9EH09	6506-173
7DJ2	6505-549	9EH2-57	6506-111
7DH2	6505-097	9EH6-60	6506-117
7DH5	6505-814	9EJ1-60	6506-384
		9EH7-62	6506-113
		9DFH2-58	6506-200
		9DFH2-59	6506-201
		9DFH3-56	6506-186
		9DEH3	6506-182
		9DFH1-56	6506-221
		9DFH9-59	6506-304
		9EH6-59	6506-228
		9DH9-54	6506-272
		9EH6-58	6506-290
		9DFH4-60	6506-260
		9EFH9-60	6506-374



JET NEEDLE
Number indicated
in this area

PILOT JETS AVAILABLE (VM/TM)			
JET NO.	P/N	JET NO.	P/N
17.5	6505-218	35	6505-029
20	6505-138	40	6505-047
22.5	6505-310	45	6505-278
25	6505-075	50	6505-262
27.5	6505-503	52.5	6505-261
30	6505-073	55	6505-255

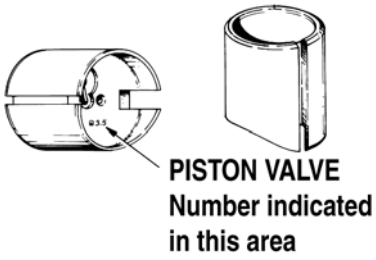


PILOT JET
Size indicated in this area

Mikuni Tuning Components (cont)

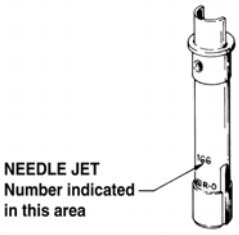
PISTON VALVES AVAILABLE (VM-Style)		
SLIDE	**CARB. SIZE (mm)**	**P/N**
2.0	28-30	6505-048
3.0	28-30	6505-161
3.0	30	6505-510
3.5	30	6505-528
2.5	32-34	6505-246
3.5	32-34	6505-248
2.5	34	6505-500
2.5	34	6505-614*
3.0	34	6505-507
3.0	34	6505-561*
2.0	36	6505-877
3.0	36	6505-592*
3.0	38	6505-643
3.5	38	6505-436
3.5	38	6505-525
3.5	38	6505-526
3.5	38	6505-554
3.5	38	6505-613*
4.0	38	6505-504
3.5	40	6505-575*
1.0	40-44	6505-092
2.5	40-44	6505-570
3.5	40-44	6505-548
3.0	40-44	6505-809
3.5	40-44	6505-813*

* For models with carburetor switch

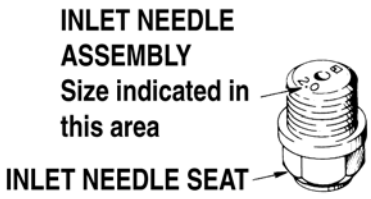


THROTTLE VALVES AVAILABLE (TM-Style)		
SLIDE	**CARB. SIZE. (mm)**	**P/N**
2.0	38	6506-119
3.0	38	6506-120
3.0	38	6506-232
3.5	38	6506-210
2.5	40	6506-273

NEEDLE JETS AVAILABLE (VM-Style)			
NEEDLE JET	**P/N**	**NEEDLE JET**	**P/N**
O-6 (480)	6505-931	Q-3 (480)	6505-599
O-8 (480)	6505-824	Q-4 (166)	6505-214
P-0 (159)	6505-155	Q-4 (480)	6505-636
P-0 (166)	6505-007	Q-5 (159)	6505-119
P-0 (169)	6505-051	Q-5 (166)	6505-520
P-0 (480)	6505-598	Q-5 (480)	6505-580
P-2 (480)	6505-595	Q-6 (166)	6505-506
P-4 (159)	6505-221	Q-8 (480)	6506-112
P-4 (480)	6505-540	R-0 (166)	6505-505
P-4 (169)	6505-164	Z-4 (224)	6505-808
P-5 (480)	6505-542	Z-5 (224)	6505-541
P-6 (159)	6505-247	Z-6 (224)	6505-597
P-6 (166)	6505-268	Z-8 (224)	6505-572
P-6 (480)	6505-539	Z-9 (224)	6505-618
P-8 (159)	6505-298	AA-0 (224)	6505-544
P-8 (166)	6505-433	AA-1 (224)	6505-609
P-8 (480)	6505-543	AA-3 (224)	6505-604
Q-0 (159)	6505-260	AA-4 (224)	6505-605
Q-0 (166)	6505-190	AA-5 (224)	6505-099
Q-0 (480)	6505-529	AA-8 (224)	6505-571
Q-2 (166)	6505-508	BB-0 (224)	6505-182
Q-2 (480)	6505-641	BB-5 (224)	6505-180



INLET NEEDLE ASSEMBLIES AVAILABLE (VM-Style)		
SEAT DIA.	**CARB. SIZE (mm)**	**P/N**
1.5 mm (Steel)	28, 30, 32, 34	6505-026
1.5 mm (Viton)	28, 30, 32, 34	6505-160
1.5 mm (Steel)	28 — 34 GVM	6505-245
1.5 mm (Viton)	36, 38, 40, 44	6505-171
1.8 mm (Viton)	36, 38, 40, 44	6505-175
2.0 mm (Viton)	36, 38, 40, 44	6505-176



INLET NEEDLE ASSEMBLIES AVAILABLE (TM-Style)		
SEAT DIA.	**CARB. SIZE (mm)**	**P/N**
1.5 mm (Steel)	38	6506-121
1.8 mm (Steel)	38	6506-144

4

Major Tuning Components

To assist you in selecting four major tuning components of the VM-style and TM-style carburetors, listed below are the jet needles, needle jets, pilot jets, and piston/throttle valves (slides) on charts according to their size.

NEEDLE JETS	TYPE - 159-166-480 VM30-32-34-38	TYPE 224 VM40-44
LEAN	N-4	
	N-6	
	N-8	
	O-0	
	O-2	
	O-4	
	O-5	
	O-6	
	O-7	
	O-8	
	P-0	
	P-2	
	P-4	
	P-5	
	P-6	
	P-8	
	Q-0	Z-0
	Q-2	Z-5
	Q-3	Z-6
	Q-4	Z-8
	Q-5	AA-0
	Q-6	AA-1
	Q-8	AA-2
	R-0	AA-3
	R-2	AA-5
	R-4	AA-8
	R-5	BB-0
	R-6	BB-5
RICH	R-8	

■ **NOTE: The above needle jets may come in different types; for example, (159) - (166) - (480) - (224). When selecting a new needle jet, use the correct series or type.**

JET NEEDLES (VM-STYLE)		
LEAN	6DH2	7F7
	6DH3	7DH2
	6DH4	7F6
	6DH7	7DH3
	6DH8	7DH5
	6DH41	7H2
RICH	6EGJ1	7J2

■ **NOTE: The above chart shows the average performance of a given needle between 1/4 and 3/4 throttle. Needles are constructed in such a way that at any given point, the needle could be richer or leaner than the rating it has.**

PILOT JETS	
LEAN	12.5
	15
	17.5
	20
	22.5
	25
	27.5
	30
	32.5
	35
	37.5
	40
	45
	50
	55
	60
	65
RICH	70

PISTON/THROTTLE VALVE (SLIDES)	
LEAN	4.0
	3.5
	3.0
	2.5
	2.0
	1.5
RICH	1.0

Troubleshooting Fuel System

Problem: Carburetor Too Rich (0-1/4 Opening)	
Condition	**Remedy**
1. **Choke plunger** will not seat	1. Adjust — service — replace choke cable —plunger assembly
2. **Pilot air screw (VM-style)** too far in	2. Adjust pilot air screw
3. **Fuel mixture screw (TM-style)** too far out	3. Adjust fuel mixture screw
4. **Pilot air passage** obstructed — damaged	4. Remove obstruction — replace pilot air screw — carburetor
5. **Float/inlet needle** obstructed — damaged — adjusted incorrectly	5. Remove obstruction — replace inlet needle — float — adjust float tab
6. **Pilot jet** loose	6. Tighten pilot jet

Problem: Carburetor Too Rich (1/4-3/4 Opening)	
Condition	**Remedy**
1. **Pilot air screw (VM-style)** too far in	1. Adjust pilot air screw
2. **Fuel mixture screw (TM-style)** too far out	2. Adjust fuel mixture screw
3. **Needle jet — jet needle** worn — adjusted incorrectly — incorrect	3. Replace needle jet — replace — adjust jet needle E-clip
4. **Pilot air passage** obstructed — damaged	4. Remove obstruction — replace pilot air screw — carburetor
5. **Pilot jet** loose	5. Tighten pilot jet
6. **Float/inlet needle** obstructed — damaged — adjusted incorrectly	6. Remove obstruction — replace inlet needle —float — adjust float tab
7. **Main jet** loose — too large	7. Tighten — replace main jet
8. **Primary air passage** obstructed	8. Remove obstruction

Problem: Carburetor Too Rich (3/4-WOT Opening)	
Condition	**Remedy**
1. **Main jet** loose — too large	1. Tighten — replace with smaller main jet
2. **Float/inlet needle** obstructed — damaged — adjusted incorrectly	2. Remove obstruction — replace inlet needle —float — adjust float tab
3. **Needle jet — jet needle** worn — adjusted incorrectly — incorrect	3. Replace needle jet — replace — adjust jet needle E-clip

Problem: Carburetor Too Lean (0-1/4 Opening)	
Condition	**Remedy**
1. **Choke plunger** remains seated	1. Adjust — service choke cable — plunger assembly
2. **Pilot air screw (VM-style)** too far out — damaged	2. Adjust — replace pilot air screw
3. **Fuel mixture screw (TM-style)** too far in — damaged	3. Adjust — replace fuel mixture screw
4. **Throttle valve** sticks open — damaged — worn	4. Service — replace throttle valve — throttle cable — spring
5. **Pilot jet — outlet** obstructed	5. Remove obstruction
6. **Float/inlet needle** obstructed — damaged — adjusted incorrectly	6. Remove obstruction — replace inlet needle — float — adjust float tab
7. **Float bowl vent hose (TM-style)** obstructed — kinked — damaged	7. Service — replace float bowl vent hose

Problem: Carburetor Too Lean (1/4-3/4 Opening)	
Condition	**Remedy**
1. **Pilot air screw (VM-style)** too far out — damaged	1. Adjust — replace pilot air screw
2. **Fuel mixture screw (TM-style)** too far in — damaged	2. Adjust — replace fuel mixture screw
3. **Needle jet** obstructed	3. Remove obstruction
4. **Pilot jet — outlet — main jet** obstructed	4. Remove obstruction
5. **Float/inlet needle** obstructed — damaged — adjusted incorrectly	5. Remove obstruction — replace inlet needle — float — adjust float tab
6. **Jet needle E-clip position** incorrect	6. Adjust E-clip
7. **Float bowl vent hose (TM-style)** obstructed — kinked — damaged	7. Service — replace float bowl vent hose
Problem: Carburetor Too Lean (3/4-WOT Opening)	
Condition	**Remedy**
1. **Main jet** obstructed — too small	1. Remove obstruction — replace with larger main jet
2. **Float/inlet needle** obstructed — damaged — adjusted incorrectly	2. Remove obstruction — replace inlet needle — float — adjust float tab
3. **Needle jet — jet needle** obstructed	3. Remove obstruction
4. **Float chamber vent hose (TM-style)** obstructed — kinked — damaged	4. Service — replace float chamber vent hose
Problem: General Fuel System (Engine Cuts Out at High RPM)	
Condition	**Remedy**
1. **Fuel delivery** inadequate	1. Repair — replace fuel pump — impulse hose
2. **In-line fuel filter** obstructed — damaged	2. Remove obstruction — replace in-line fuel filter
3. **Gasoline** contaminated	3. Replace gasoline — de-ice — clean carburetors
4. **Gas-tank vent — hose** obstructed	4. Remove obstruction — replace vent — hose
Problem: General Fuel System (One Cylinder Runs Lean)	
Condition	**Remedy**
1. **Carburetor-to-cylinder** air leak	1. Repair — replace gaskets — flanges — service intake ports — tighten clamps
2. **Carburetors (VM-style)** not aligned vertically	2. Align carburetors vertically
3. **Primary compression (crankcase)** low	3. Troubleshoot engine
4. **Carburetors** not synchronized	4. Synchronize carburetors

Fuel System
(EFI)

This sub-section has been organized for servicing EFI fuel systems; however, some components may vary from model to model. The technician should use discretion and sound judgment when removing/disassembling and assembling/installing components.

■ **NOTE: Some illustrations and photographs used in this section are used for clarity purposes only and are not designed to depict actual conditions.**

Fuel System
(EFI)
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EFI Specifications

Fuel Pressure	42.8-47.3 psi
Temperature Sensor (Closes)	194°-206° F (90°-97° C)
Throttle Valve Angle - Degrees (500 cc)	3.300-6.000 - Idle 75.300-89.800 - Full-Open
Throttle Valve Angle - Degrees (600/700 cc)	4.000-6.700 - Idle 75.000-89.500 - Full-Open
Throttle Valve Angle - Degrees (900 cc)	4.000-6.700 - Idle 75.000-89.500 - Full-Open
Throttle Valve Angle - Volts (500 cc)	0.616-0.7240 - Idle 3.485-4.0585 - Full-Open
Throttle Valve Angle - Volts (600/700 cc)	0.646-0.7540 - Idle 3.472-4.0485 - Full-Open
Throttle Valve Angle - Volts (900 cc)	0.646-0.7540 - Idle 3.472-4.0485 - Full-Open

Diagnostic Codes

Number of Flashes	Trouble
1	Open or short circuit in throttle position sensor.
2	Open or short circuit in water temperature sensor.
3	Open or short circuit in intake air temperature sensor.
4	Open or short circuit in barometric pressure sensor.
5	Failure in injector(s).
6	Failure in servomotor.
7	Failure in exhaust temperature sensor.
Steady Flash (500/600/700 cc)	Coolant Temperature Above 80° C (176° F) - 600/700 cc or Above 83° C (182° F) - 500 cc.
Constant On (500/600/700 cc)	Coolant Temperature Above 93° C (200° F).

Introduction

The EFI system is lightweight in design and is made up of a number of components which are explained in this sub-section. The EFI system eliminates the worry of changing main jets to compensate for altitude or temperature. This EFI system will provide quick and easy starting under all conditions.

The electrical control unit (ECU) has a self-diagnostic mode built in. It is a very valuable factor in troubleshooting. Once the problem area has been determined from the trouble code flashed by the LED (light emitting diode) located under the left end of the ECU (check engine light in the speedometer/tachometer on "Laydown" engine models), follow the troubleshooting procedure in this sub-section.

When troubleshooting the EFI system, special tools are required. These special tools are the following.

A. EFI Analyzer (p/n 0644-342)

B. Compression/Pressure Tester Kit (p/n 0644-366)

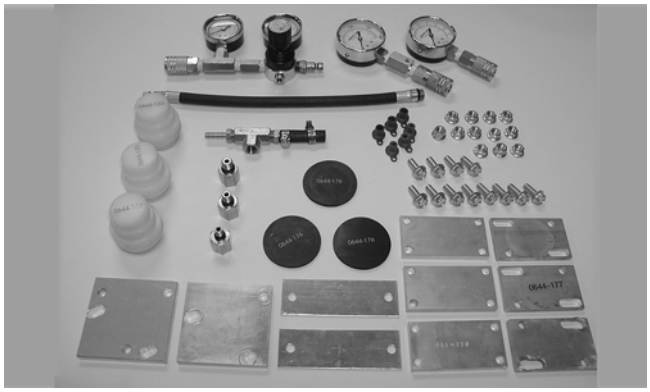
C. Fluke Model 73 Multimeter (p/n 0644-191)

D. EFI Analyzer Update Kit (p/n 0637-243)

■ **NOTE: Troubleshooting EFI engines with the APV system should be done with the Arctic Cat EFI Analyzer (p/n 0644-342). To update your existing EFI Analyzer, order Kit (p/n 0644-341).**

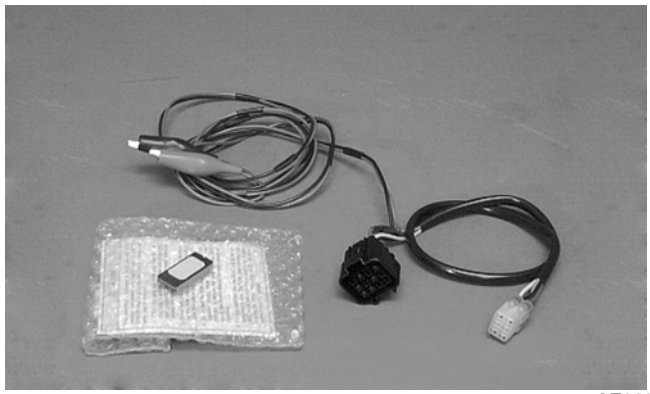


AE131


0644-366



AE114


AE141

Arctic Cat EFI System

The Arctic Cat EFI System operates off a series of coils located on the stator.

The EFI system is made up of the following components.

1. Charge coils (1 and 2) which are located on the stator provide AC voltage to operate the CDI unit. The CDI unit is located within the ECU. The AC voltage is converted to DC voltage within the ECU.

2. A fuel pump coil located on the stator operates the low voltage, high output fuel pump. At cranking speed, the high output fuel pump provides enough fuel to charge the fuel rail.

3. An injector coil located on the stator provides the injectors with DC voltage for operation through the ECU.

4. A lighting coil located on the stator plate provides output to operate accessories and the lighting system.

5. An electrical control unit (ECU) calculates input from five sensors (intake air temperature sensor, water temperature sensor, throttle position sensor, ignition timing sensor, barometric pressure sensor) to provide the engine with the correct fuel mixture and timing for optimum operation.

EFI FEATURES

1. Automatic compensation for temperature.

2. Automatic compensation for altitude.

3. Optimum throttle response through high pressure injection.

4. Quick starting in every condition.

5. Improved fuel efficiency with maximum mileage in every condition.

6. Engine RPM more stable in every condition.

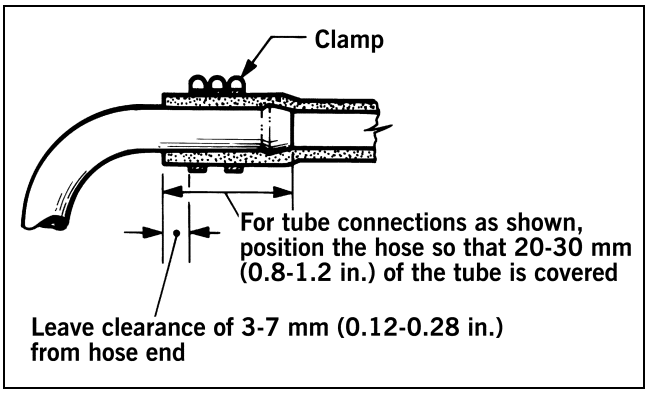
PRECAUTIONS

⚠ WARNING

Whenever working on the fuel system if a fuel hose is removed from any component, slowly bleed the pressure from the hose into an absorbent towel before removing the hose from the component.

⚠ WARNING

Always tighten fuel hose clamps securely.



0729-325

⚠ CAUTION

Always use resistor-type spark plugs and spark plug caps. Non-resistor components will cause the ECU to malfunction.

OPTIONAL STARTING PROCEDURE (900 cc)

1. To start an engine for the first time or after performing service work on the fuel system, place the emergency stop switch and the ignition switch in the ON position. Disconnect the yellow water temperature sensor lead wire at the ECU. Crank the engine over 6-8 times with the recoil starter. With the water temperature sensor lead disconnected, the fuel system will call for maximum mixture and the system will charge faster. After 6-8 brisk pulls on the recoil starter rope, reconnect the yellow sensor lead. The engine should start in 2-3 additional pulls. After charging the fuel system, the engine should start in 3-4 pulls when cold.

2. Start the engine without compressing the throttle. When the engine starts for the first time, do not touch the throttle. It will idle slowly and may stop. Repeat this procedure until the engine starts and builds RPM on its own. This may require 3-4 restarts. Once the engine has been started and run, the next cold start should occur in 2-3 pulls of the recoil starter rope.

FLOODED ENGINE

If the engine should become flooded, set the brake lever lock, compress the throttle lever to the full-open position, and crank the engine over until it starts and clears itself. Release the brake lever lock.

FUEL SYSTEM

The EFI fuel system consists of the following components.

1. Gas tank

2. Electric high output fuel pump
3. Two pick-up valves with micron screens
4. High-pressure fuel hose
5. Fuel rail
6. Fuel pressure regulator located in the fuel pump
7. Throttle body assembly
8. Injectors
9. ECU

These components are grouped into the fuel handling system. They work together along with five electrical sensors (following list) and the ECU to provide the engine with a precise fuel mixture for combustion. The five sensors are the following.

1. Ignition Timing Sensor
2. Intake Air Temperature Sensor
3. Water Temperature Sensor
4. Throttle Position Sensor
5. Barometric Pressure Sensor

The fuel is first drawn into the electric fuel pump through two pick-up valves and hoses. The fuel is then routed through a high-pressure fuel hose to the fuel rail.

The fuel pressure is maintained specified psi in the fuel rail by the fuel regulator.

With the fuel pressure maintained at a constant psi, the ECU evaluates the information it receives from the five electrical sensors and opens the injectors for precise periods of time (pulse widths) to meet engine demands.

■ **NOTE: The entire EFI system depends on all coils functioning properly on the stator.**

Individual EFI Components

ECU

The ECU is the brain of the EFI system. It uses five sensor inputs to determine the correct fuel/air ratio for the engine given the existing conditions of altitude and temperature.



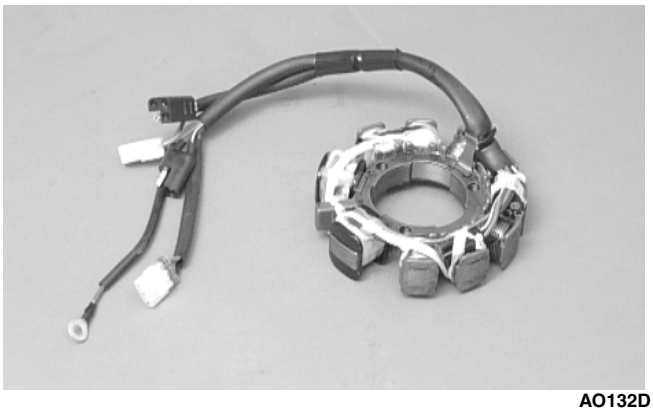
MS396

If any of the sensors should fail while the engine is running, the ECU will sense a problem and go into a "fail safe" mode. This is an over-rich condition and will greatly reduce performance. However, the engine will be protected from a possible lean condition and engine damage.

The ECU is equipped with a check engine light in the speedometer (900 cc) or in the speedometer/tachometer (500/600/700 cc) which will flash a series of pulses when a problem exists with any of the sensors. By observing the code, the technician can determine the problem sensor by comparing the code flashed with the trouble code chart (see Diagnostic Codes in this sub-section).

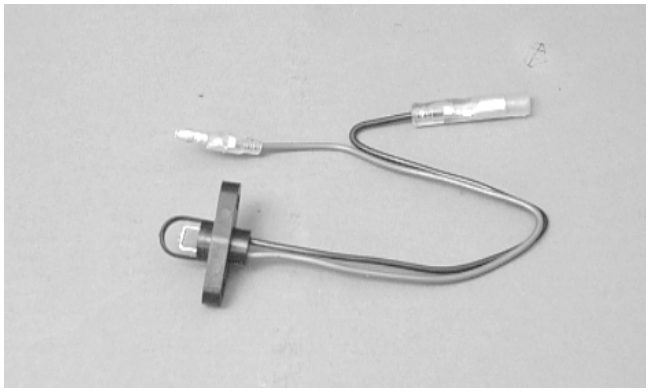
■ **NOTE: There are no repairs that can be made to the ECU.**

If the ECU is not receiving current from one of the output coils on the stator, that circuit will not operate. Coils on the stator are the capacitor charge coil which operates the CDI within the ECU, the injector coil which operates the injectors, the fuel pump coil which operates the fuel pump, and the lighting coil which operates all accessories and the lighting system. Refer to the wiring diagram.



AO132D

INTAKE AIR TEMPERATURE SENSOR



AO135D

The intake air temperature sensor is mounted on the front of the air-intake silencer. Its purpose is to sense air temperature entering the air-intake silencer and engine. The ECU sends current to this sensor, and (depending on the temperature) the sensor will pass a certain amount of current through the sensor to ground. The ECU measures how much current passes through the sensor to ground. From this measurement, the ECU determines the air temperature and calculates the fuel/air mixture ratio. This sensor is very sensitive to temperature change. Resistance will drop as the temperature rises.

WATER TEMPERATURE SENSOR

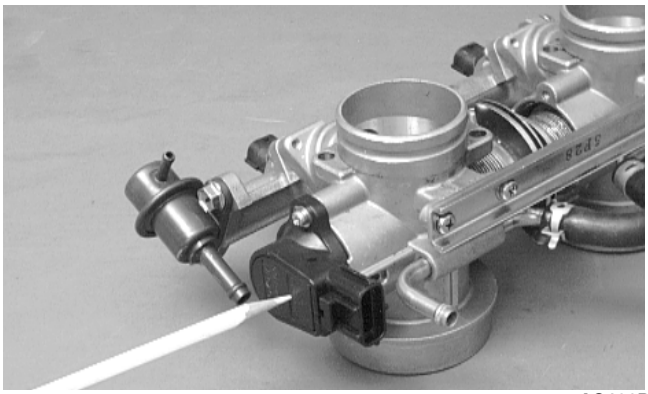


AO069

The water temperature sensor is located on the bottom of the thermostat manifold on 900 cc models and on the lower crankcase on 500/600/700 cc models. This sensor is very sensitive to temperature change. The ECU measures the current flow through the sensor to ground. From this measurement, the ECU can determine the engine coolant temperature and calculate the correct fuel/air mixture ratio.

■ **NOTE: If the coolant temperature rises above 80° C (176° F), the temperature sensor starts to richen the fuel mixture. At this time, the check engine light will flash constantly. Once the engine coolant temperature reaches the specified temperature 93° C (200° F), the temperature sensor will signal the ECU to go into the rich mode to protect the engine from overheating. At this time, the check engine light will be constantly on.**

THROTTLE POSITION SENSOR

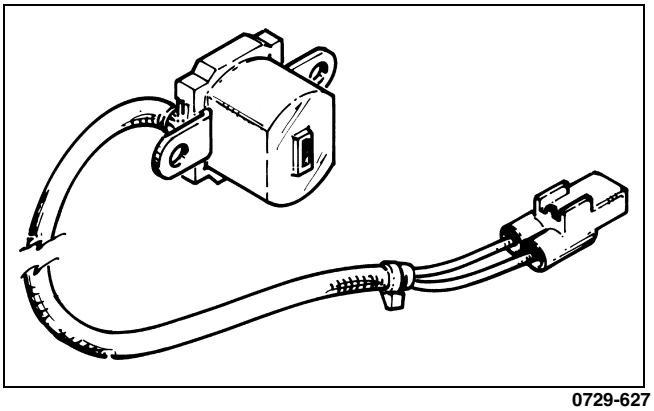


AO136D

The throttle position sensor, located at the end of the throttle shaft, is a potentiometer (a potentiometer is, essentially, a voltage divider). This sensor transforms the throttle-valve position into output voltage to the ECU. In addition, the sensor detects the opening or closing speed of the throttle valve and feeds that rate of voltage change to the ECU.

■ **NOTE: The input from the throttle position sensor is one of the main inputs for the ECU calculation of fuel/air mixture ratio.**

IGNITION TIMING SENSOR

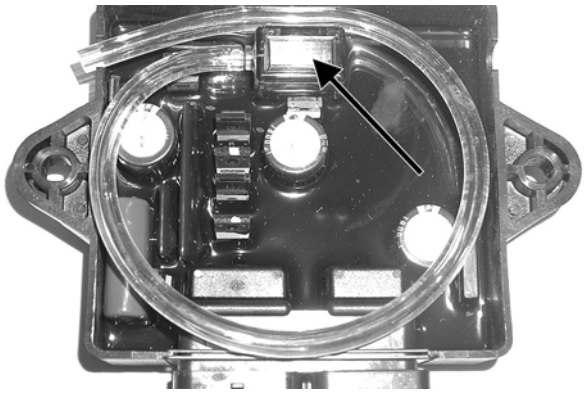


0729-627

This sensor is located on the top of the magneto case near the cylinder on some models. On other models the sensor is located inside the magneto case next to the flywheel, and on these models, the recoil starter and the flywheel must be removed to access the sensor.

This sensor is triggered by a small metal disc precisely mounted to the flywheel flange. Each time the metal disc rotates past the sensor, a signal is sent to the ECU. From this signal, the ECU determines ignition and injection timing and RPM.

BAROMETRIC PRESSURE SENSOR



FS020A

This sensor is located inside the ECU and is part of the ECU unit. Its purpose is to sense atmospheric pressure. From this information, the ECU determines the correct fuel/air mixture ratio.

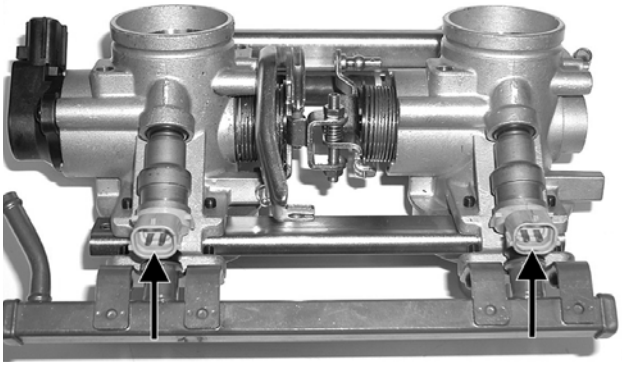
■ NOTE: This sensor is not replaceable. If it should fail, the ECU must be replaced.

FUEL INJECTORS



FS021

The fuel injectors are positioned in the top of each throttle body. O-rings seal the top and bottom of each injector, and they are held in position by a locking plate secured to the fuel rail.



FS022A

The fuel injector is an electromagnetic injection valve controlled by a signal from the ECU. The coil used in the injector is a high-pressure resistance type. The ECU determines the optimum fuel injection time and duration based on signals from the five sensors.

When voltage is sent to the fuel injector, it energizes the coil and opens the needle valve, thereby injecting fuel. Because the fuel pressure (pressure differential between fuel line and manifold) is kept constant, the amount of fuel injected is determined by the duration of time the valve is open.

The injectors are coded with symbols (■-●-▲) and are color-coded yellow and green. When replacement of a fuel injector is necessary, the injector must be replaced with an injector of the same code symbol and color.

⚠ CAUTION

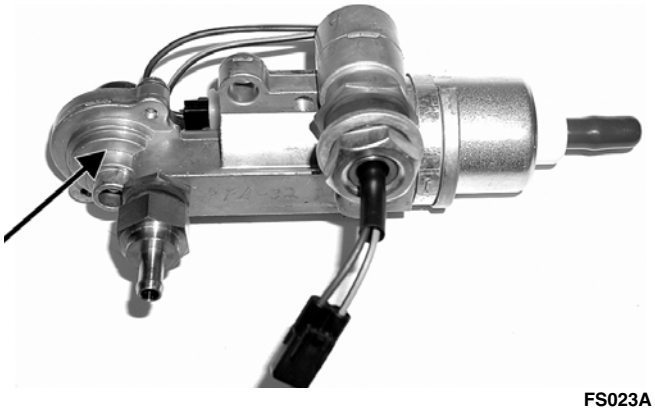
Do not replace an injector with one of a different code symbol or color. Severe engine damage may occur.



FS025A

FUEL PRESSURE REGULATOR

The fuel pressure regulator is located in the fuel pump. The fuel pressure regulator maintains the fuel pressure at a constant specified level.



FS023A

FUEL PUMP CIRCUIT

The fuel pump and its circuit are provided with current from the fuel pump coil on the stator.



FS024

For this circuit to function correctly, five components must be in good working order.

Check the following components before considering the fuel pump assembly to be defective.

A. Fuel pump coil - see coil test procedure.

B. Emergency stop switch and ignition switch must be ON and in good working order.

C. Fuel pump - see fuel pump test procedure.

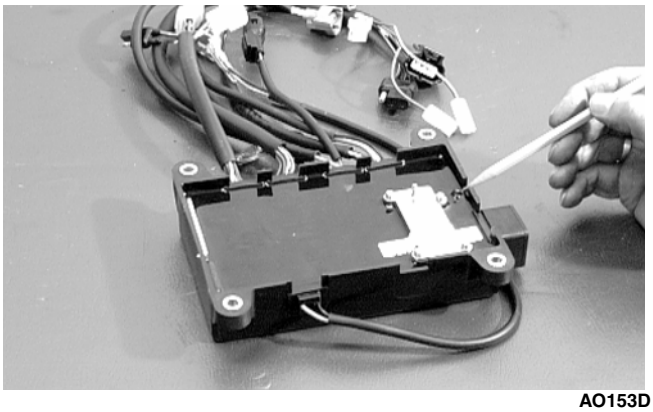
D. Wiring harness and connectors - clean the connectors and test the harness.

E. ECU.

Self-Diagnostic EFI System

INTRODUCTION

The Electronic Control Unit (ECU) contains a built-in, self-diagnostic system which detects trouble within the five-sensor signal network and then flashes a code in the check engine light in the speedometer (900 cc) or in the speedometer/tachometer (500/600/700 cc).



AO153D

The fuel system and the ignition system remain two separate systems. In a no-start situation, first determine if the problem is caused by lack of spark or by a fuel delivery problem or by an internal engine condition (low cylinder compression for example).

Using the EFI Ignition Analyzer, equipped with the update EPROM (chip) and test harness, connect the test harness to the ECU diagnostic connectors. Connect the test harness red external lead to the positive terminal of a 12-volt battery and connect the black external test harness lead to the negative terminal.

If any of the circuits are faulty, a code will now be flashed by the LED/check engine light.

If no code is flashed, turn on the analyzer. Press the MENU SELECT buttons until the words KOKUSAN appear on the display; then press the TEST button. The analyzer is now programmed for testing the Arctic Cat EFI System.

Using the MENU SELECT buttons, press the button repeatedly until Memory Problem Diagnosis Test appears on the display; then press the TEST button. If any sensors have intermittent problems, they will be indicated on the display.

Proceed to individual components test procedures covered throughout this section.

The code flashed from the LED/check engine light will first be a number of flashes. Count the number of flashes and refer to Diagnostic Codes in this subsection. The code repeats itself with approximately a 2-second delay between each series of flashes.

■ NOTE: When reading the LED/check engine light flash sequence, have paper and pencil available to write down the codes being flashed. More than one code may be flashed.

Once the problem area has been determined, check the components involved using the Fluke Model 73 Multimeter (p/n 0644-191) or the EFI Analyzer (p/n 0644-342) depending on which test is being made.

Diagnostic Codes

Number of Flashes	Trouble
1	Open or short circuit in throttle position sensor.
2	Open or short circuit in water temperature sensor.
3	Open or short circuit in intake air temperature sensor.
4	Open or short circuit in barometric pressure sensor.
5	Failure in injector(s).
6	Failure in servomotor.
7	Failure in exhaust temperature sensor.
Steady Flash (500/600/700 cc)	Coolant Temperature Above 80° C (176° F) - 600/700 cc or Above 83° C (182° F) - 500 cc.
Constant On (500/600/700 cc)	Coolant Temperature Above 93° C (200° F).

TROUBLESHOOTING INDIVIDUAL COMPONENTS

■ NOTE: With the Arctic Cat EFI System, it is extremely important that the ECU receives the proper current output from four coils (two charge coils, an injector coil, and a fuel pump coil) to function as designed. If a problem exists, these coils should be checked using the following procedures.

Charge Coil (1)/Charge Coil (2) Resistance Test

The charge coils power the CDI system and the ECU. To test these coils, disconnect the 3-wire connector from the ECU to the stator.

1. Set the meter selector to the OHMS scale and test between the black/red and brown/white wires (charge coil 1).
2. The meter must show 17 ohms ± 20%.
3. Test between the green/red and brown/white wires (charge coil 2).
4. The meter must show 17 ohms ± 20%.

■ NOTE: If either test is not within specifications, the stator must be replaced. Refer to the wiring diagram.

Injector Coil Resistance Test

The injector coil located on the stator powers the two injectors.

1. Disconnect the double-wire plug with two blue/white leads from the stator to the ECU.
2. Set the meter selector to the OHMS scale.
3. Connect a meter lead to each of the blue/white leads. The meter must show 19 ohms ± 20%.

■ NOTE: If reading is not within the specification, recheck to confirm test results. If still out of tolerance, replace the stator.

■ NOTE: If the resistance test is good, a peak reading voltage test should also be made. Refer to Peak Voltage Tests and Specifications in this sub-section.

Fuel Pump Coil Resistance Test

The fuel pump coil powers the fuel pump through the ECU.

■ NOTE: With the engine running, there should 12.3-12.9 DC volts supplied to the fuel pump for operation. To test fuel pump coil resistance, use the following procedure.

1. Disconnect the double-plug with the two orange wires from the ECU.
2. Set the meter selector to the OHMS scale. Connect a meter lead to each of the two orange leads.
3. The meter must show 1.9 ohms ± 20%.

■ NOTE: If reading is out of tolerance, recheck to confirm reading. If still out of tolerance, replace the stator.

■ NOTE: If the resistance test is good, a peak reading voltage test should also be made. Refer to Peak Voltage Tests and Specifications in this sub-section.

Lighting Coil Resistance Test

The lighting coil located on the stator provides AC power to the lighting system and accessories through a charging system. To test the lighting coil resistance, follow this procedure.

1. Disconnect the 3-wire connector at the engine.
2. Set the meter selector to the OHMS scale.
3. Test between the two yellow leads.
4. The meter must show 0.10 ohm ± 20%.

■ NOTE: If reading is out of tolerance, recheck to confirm reading. If still out of tolerance, replace the stator.

ECU

ACTIVATING ECU MEMORY

■ NOTE: The ECU memory on the 2006 Arctic Cat EFI system (with the APV system) can be activated only by using the EFI Analyzer (p/n 0644-342) which has had the Update Harness Kit (p/n 0644-341) installed. For 500/600/700 cc models, use EFI Analyzer Update Kit (p/n 0637-243).

The ECU has a self-diagnostic mode built into the unit. It is a very valuable tool in troubleshooting. Once the problem area code has been flashed by the light emitting diode (LED) located at the end of the ECU (check engine light in the speedometer/tachometer on "Laydown" engine models), follow the troubleshooting procedure in this sub-section.

The ECU also has a memory mode for determining if any of the five sensors have intermittently failed. To activate the memory system, follow these steps.

1. Connect the analyzer test harness to the ECU diagnostic connector.
2. Connect the analyzer test harness red and black leads to a 12-volt battery.
3. Turn the analyzer switch ON.
4. Press the analyzer MENU SELECT buttons repeatedly until KOKUSAN appears on the display. Once the word KOKUSAN appears on the display, press the TEST button. The analyzer is now set up to test the EFI system.
5. Press the analyzer MENU SELECT buttons repeatedly until the words Memory Problem Diagnosis Test appears on the display.

Memory Problem Diagnosis Test

6. Press the analyzer TEST button. If all sensors are good, SENSORS ALL O.K. will appear on the display. If any of the sensors have intermittently failed or are faulty, they will appear on the display. Proceed then to checking the faulty sensor individually as covered in this section.

■ NOTE: Once problem areas have been determined, always check the component(s) for clean and tight connections.

7. To erase the memory of the ECU, press the TEST button once again; then push the MENU SELECT buttons until Diagnosis Memory Clear appears on the display. Turn the analyzer OFF and then back ON again. Reselect KOKUSAN mode; then proceed to the Memory Problem Diagnosis Test and push the TEST button. The display should indicate SENSORS ALL O.K. which indicates the memory has been cleared.

REMOVING

1. Disconnect the two wiring harness leads (one lead on 500/600/700 cc models) from the front of the ECU.
2. Remove the four screws securing the ECU to the air-intake silencer.
3. Remove the ECU.

■ NOTE: If there are any questions concerning lead or harness connections, there is an batteryless EFI system wiring diagram in the back of this section.

INSTALLING

1. Secure the ECU to the air-intake silencer with the screws.

■ NOTE: Make sure the diagnostic connector plug faces the oil reservoir.

2. Connect the wiring harness to the ECU.

■ NOTE: Make sure all connectors are clean and tight. Apply dielectric grease to all connectors.

Testing Individual Components

■ **NOTE: For individual resistance testing procedures, see Section 5 in this Volume.**

■ **NOTE: For the following tests, use the Fluke Model 73 Multimeter (p/n 0644-191) or a multimeter of the same quality.**

THROTTLE POSITION SENSOR

(All Models)

1. Disconnect the TPS wiring harness connector.
2. Using Throttle Position Sensor Adjustment Tool Kit (p/n 3639-891), connect its wiring harness to the TPS. Connect the red and black meter leads to the red and black jacks of the TPS adjustment tool.

■ **NOTE: Before using the TPS adjustment tool, verify its battery condition. The battery used in the tool is a 9-volt battery. To check battery condition, use a digital volt/ohmmeter set on DC volt scale. Test between the adjustment tool black and red jacks. Insert the red lead of the digital voltmeter into the red jack of the adjustment tool and the black lead of the digital voltmeter into the black jack of the adjustment tool. If voltage is found below 4.9 volts, replace the battery.**

3. Set the multimeter selector to the DC scale; then SLOWLY depress the throttle lever. The meter reading should show a smooth rise all the way to wide-open throttle. Repeat this step until it is assured that there are no open areas or "peaks" in the reading.

■ **NOTE: If a reading contains open areas or peaks, the throttle position sensor may be faulty. Refer to the proper Checking/Adjusting TPS procedure in Section 5 - Throttle Position Sensor in this manual.**

4. Disconnect the adjustment tool harness from the TPS. Connect the snowmobile TPS harness to the TPS.

■ **NOTE: Before installing the TPS harness connector, apply dielectric grease to the connector pins.**

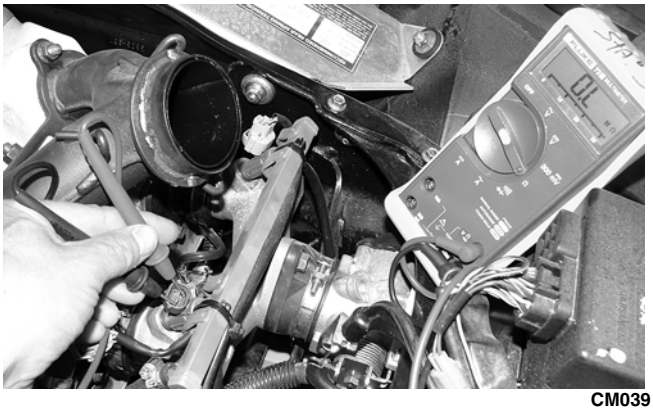
FUEL INJECTORS



FS021

Testing Resistance

1. Disconnect the fuel injector wiring harness.
2. Set the meter selector to the OHMS scale.
3. Test between the two injector terminals. Test specification is 2.4-3.3 ohms.



CM039

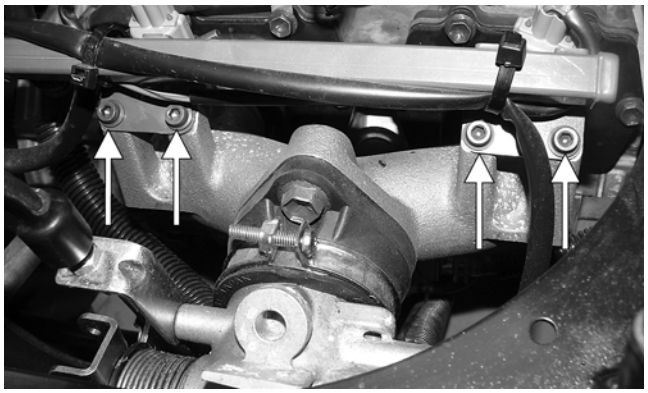
4. If not within specifications, replace the injector.

Removing

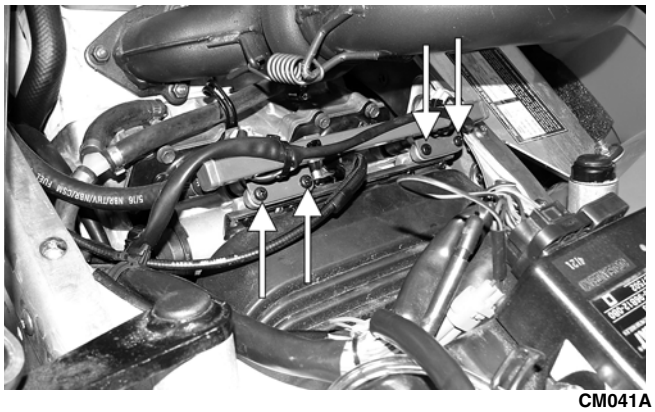
⚠ CAUTION

The fuel supply hose may be under pressure. Place an absorbent towel around the connection to absorb fuel; then remove the hose slowly to release the pressure.

1. Loosen the clamp securing the fuel supply hose to the fuel rail; then remove the hose from the fuel rail.
2. Disconnect the wiring harness from each injector.
3. Remove the screws securing the injector hold-down plate to the throttle body assembly; then remove the plate from the injectors.

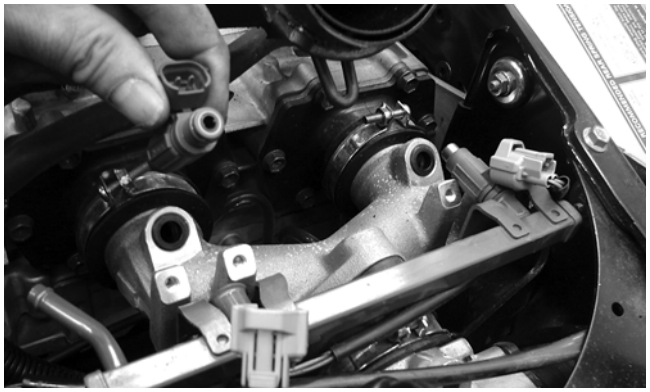


CM040A



CM041A

4. Remove the fuel injectors from the throttle body/intake manifold assembly.



CM046

Installing

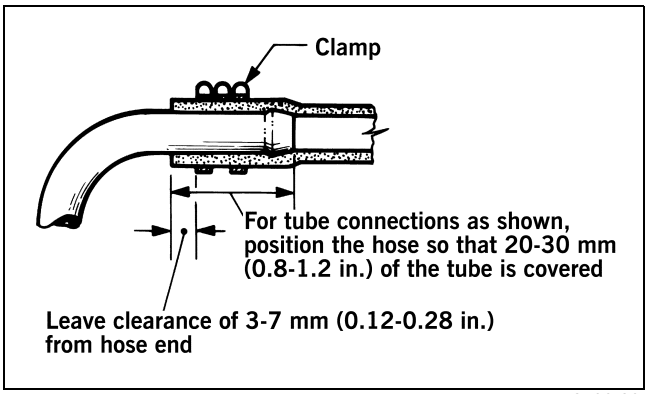
1. Apply a light coat of oil to all O-rings; then install the upper and lower O-rings onto each injector.

2. Install the injectors into the throttle body assembly.

3. Place the injector hold-down plate into position on top of the injectors and secure with two screws.

4. Connect the fuel delivery hose to the fuel rail and secure with a clamp.

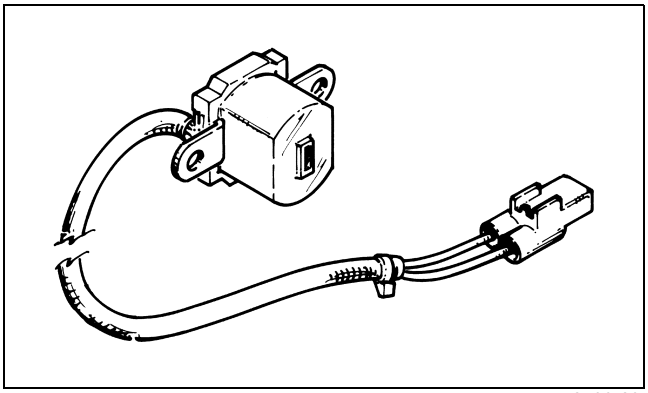
■ **NOTE: When securing the fuel delivery hose, position the clamp as shown.**



0729-325

5. Connect the wiring harness to the injectors making sure the number 1 harness is connected to the MAG-side injector.

IGNITION TIMING SENSOR



0729-627

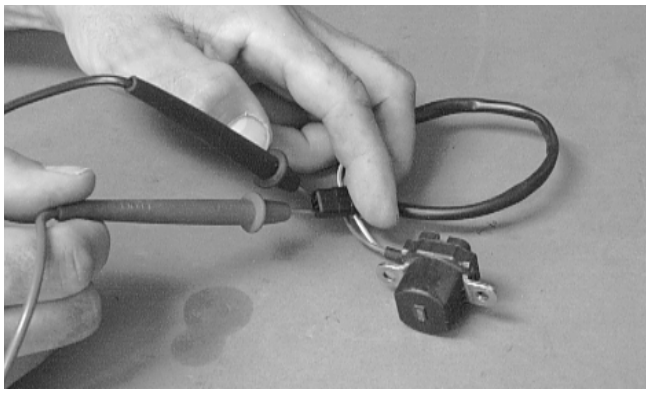
■ **NOTE: This sensor is located inside the magneto case next to the flywheel, and the recoil starter and the flywheel must be removed to access the sensor.**

Testing Resistance

1. Disconnect the two leads from the sensor to the main wiring harness.

2. Set the meter selector to the OHMS scale.

3. Test between the green/white and brown leads from the sensor. Test specification is 152-228 ohms.



AO147D

Removing

1. Open the rubber boot that protects the main wiring harness connections; then disconnect the ignition timing sensor from the ECU wiring harness.
2. Remove the two screws securing the sensor to the magneto housing.
3. Remove the sensor.

Installing

1. Using two screws coated with blue Loctite #243, secure the sensor to the magneto housing (inner mounting hole).
2. Connect the sensor to the ECU wiring harness; then close the rubber boot.
3. Secure loose wires with cable ties.

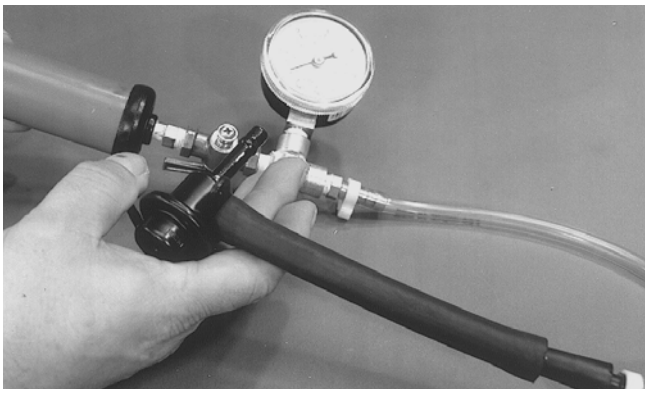
ELECTRIC FUEL PUMP

1. Remove the hardware securing the console to the gas tank and frame; then move the console out of the way.
2. Disconnect the fuel pump from the main wiring harness.
3. Connect the positive lead of a 12-volt power supply to the red wire and the negative lead of the 12-volt power supply to the black wire.
4. The pump should operate (it would be heard running).

■ NOTE: If the fuel pump fails to operate, the pump is defective and must be replaced.

TESTING FUEL PRESSURE REGULATOR

1. Using the Fuel Pressure Tester (p/n 0644-203), connect the tester to the regulator fuel inlet.



AO053

■ NOTE: A short piece of 3/8 in. I.D. hose will be needed to make the above connections.

2. Pressurize the regulator to 2.0-2.2 kg/cm² (28-31.3 psi). Turn the pressure tester shut off valve to the OFF position. Observe the gauge for several minutes and note if there is any loss of pressure. If pressure begins to drop, the cause may be a ruptured diaphragm, worn spring, or leaking valve. If the regulator fails to build or maintain pressure, replace the regulator.

■ NOTE: If there is a drop in pressure, check the hose connections to ensure there are no leaks.

WATER TEMPERATURE SENSOR

Testing Resistance

■ NOTE: The water temperature sensor is very sensitive to temperature change. Before the resistance test is conducted, it is important to know the coolant temperature. If the engine has been operated recently and the coolant is warm, the resistance will measure lower than if the coolant was at room temperature or colder. For accurate test results, check the coolant temperature in the filler neck using a thermometer.

1. Disconnect the water temperature sensor wiring harness from the main harness.
2. Set the meter selector to the OHMS position and test the resistance between the two leads from the sensor.
3. Compare the resistance reading to the EFI Component Voltage/Resistance Chart - Water Temperature in this sub-section. If resistance is not within the specification, replace the sensor.

■ NOTE: A water temperature sensor voltage test can be made using the EFI Analyzer. Please refer to the analyzer test procedures provided on the following pages.

Removing

1. Drain the cooling system.
2. Remove the throttle body assembly.
3. Disconnect the wiring harness from the water temperature sensor.
4. Remove the sensor from the water temperature case.

Installing

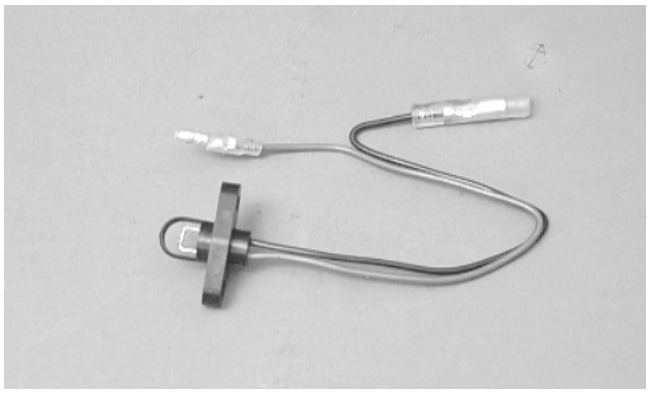
1. Apply teflon tape to the threads of the water temperature sensor; then install the sensor.
2. Connect the wiring harness to the sensor.
3. Install the throttle body assembly.
4. Fill the cooling system.

INTAKE AIR TEMPERATURE SENSOR

Testing Resistance

■ **NOTE: It is very important to know the component temperature before conducting this test. Allow the engine to reach room temperature.**

1. Disconnect the wiring harness from the intake air temperature sensor.



AO135D

2. Set the meter selector in the OHMS position and test the two leads located in the sensor connector. Compare with the EFI Component Voltage/ Resistance Chart - Air Temperature in this subsection.

■ **NOTE: The intake air temperature sensor employs a thermistor, which is very sensitive to temperature changes. Resistance will change as temperature varies.**

Removing

1. Disconnect the wiring harness from the intake air temperature sensor.
2. Using a standard screwdriver, pry the sensor end to end to remove it from the air-intake silencer. Account for two push pins.

Installing

1. Place the sensor into position in the air-intake silencer and secure with push pins.
2. Connect the wiring harness to the intake air temperature sensor. Secure the sensor leads with cable ties so they do not rub on any other components.

EFI Analyzer

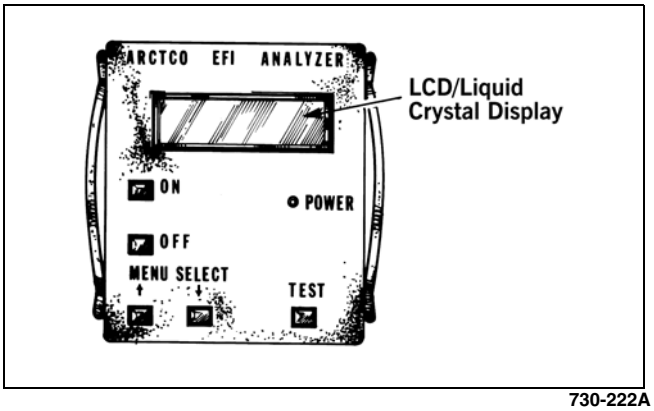
■ **NOTE: Troubleshooting EFI engines with the APV system should be done with the Arctic Cat EFI Analyzer (p/n 0644-342). To update your existing EFI Analyzer, order Update Harness Kit (p/n 0644-341).**

GENERAL INFORMATION

The EFI Analyzer (p/n 0644-342) makes it possible for technicians to easily perform EFI system troubleshooting in a short period of time.

To use the analyzer on the EFI system, a 12-volt battery to power the analyzer is necessary. Follow the instructions under Analyzer Setup for testing the EFI system.

Analyzer Nomenclature



730-222A

1. LCD - Liquid Crystal Display.
2. Power-Light illuminates when the analyzer is properly connected to the snowmobile EFI analysis test plug.

3. On/Off Switches.

4. Menu Select (up/down) - Enables selection of a test function quickly.

5. Test - Once the test function is selected, push the button to complete the test. The button also cancels the current test so the next test function can be selected.

Analyzer Test Function (Batteryless System)

There is special information which can be retrieved from the 2004 and newer ECU's such as total running time on engine, running times by temperature, maximum RPM by temperature, EPROM chip change check, number of fuel changes by wire disconnect, and last fuel type used. This information can only be retrieved with the EFI analyzer.

When the MENU SELECT buttons are pressed, there will be three modes: First mode, ARCTCO, second mode, KOKUSAN, and third mode, KOKUSAN SPECIAL, which is used only to retrieve special information (explained earlier) found on the 2004 and newer EFI system ECU's.

At this point, select KOKUSAN SPECIAL on the display by pushing the TEST button. The entire system can now be tested by moving to the next test using the MENU SELECT buttons.

If the analyzer is turned off during the test procedure, the test function on the display will automatically start over at the top of the list when turned back on. This means the selection of the system being tested must be repeated before continuing.

Once a test has been completed, press the TEST button again to cancel the test, which allows the selection of a different test using one of the MENU SELECT buttons.

Kokusan Special Mode

The snowmobile can be run with either regular gasoline or oxygenated gasoline. Special instructions located on top of the tool box lid will instruct to disconnect two wires located in front of the ECU if oxygenated gasoline is used. If regular gasoline is to be used, the gray wire at the ECU must remain connected or the mixture will be too rich.

Menu List Organization (Kokusan Special Mode)

1. Throttle Adjust - given in both volts and degree.

2. Fuel Change Number - number of times fuel leads have been switched between regular gasoline and oxygenated gasoline.

3. Last Gasoline Type - in case of engine failure, what the system was last set for - regular gasoline or oxygenated gasoline.

4. Other Rom Check - (for 2001 and earlier models except 2001 600 cc) will indicate if the EPROM chip has been changed. If none appears on the display, the EPROM chip has not been changed since the ECU was assembled.

5. Maximum Revolutions by Temperature - provides a range in increments of 10° from -30° C to -101° C. Will show engine RPM for each temperature range and if the engine has been operated in the range.

6. Total Running Time - will show total hours on the engine.

7. Barometric Pressure - provides current air pressure.

To test an batteryless EFI system using the EFI Analyzer, follow all instructions carefully and completely.

Analyzer Setup

1. Before connecting the analyzer to the snowmobile, always check to make sure the analyzer is OFF; then connect the analyzer batteryless test harness (equipped with red and black external leads) to the ECU diagnosis connector.

2. Attach the red external lead to the positive terminal of a 12-volt battery; then connect the negative external lead to the negative post.

3. Press the ON button of the analyzer. At this point, the power light of the analyzer must be illuminated.

4. To retrieve information found under Kokusan Special Mode, push MENU SELECT button until KOKUSAN SPECIAL mode appears on the display; then push the TEST button. The analyzer is now ready to test the special areas shown on the menu list under KOKUSAN SPECIAL mode.

■ NOTE: When testing the EFI system, KOKUSAN SPECIAL mode must be on the display. Once the TEST button is pressed with KOKUSAN SPECIAL mode on the display, the analyzer will stay in this mode until it is turned OFF.

■ NOTE: Each time the analyzer is turned OFF, reselection of the KOKUSAN SPECIAL mode is necessary.

EFI Components Not Tested by Analyzer

When troubleshooting the EFI system with the EFI Analyzer, there are EFI components the analyzer will NOT diagnose. These components, (in the following list) must be tested using a good digital volt/ohmmeter or a fuel pressure gauge using recommended procedures in this sub-section and in Section 5.

1. Fuel Pump Coil - Injection Coil - Timing Sensor.
2. Ignition Primary Coil.
3. Ignition Secondary Coil.
4. Fuel Pressure Regulator - Maintains fuel pressure at specified psi.
5. Electric Fuel Pump - Located in the gas tank. Supplies fuel under pressure to fuel injectors.
6. Switches and Stator Coils - Supplies all systems with electrical current.
7. Servomotor.

Recommended EFI Troubleshooting Sequence (Kokusan Mode)

When troubleshooting the EFI system, use the following troubleshooting sequence to locate problems quickly and efficiently.

EXISTING PROBLEM DIAGNOSIS TEST

This should be the first test made. In this mode, the analyzer tests the following components all at once.

A. Throttle Position Sensor

B. Intake Air Temperature Sensor

C. Water Temperature Sensor

D. Barometric Pressure Sensor

E. Fuel Injectors

After pushing the TEST button on the analyzer, the display will indicate either SENSORS ALL O.K. or which of the sensors are defective. Check these components individually using the recommended procedures in this sub-section.

MEMORY PROBLEM DIAGNOSIS TEST

This should be the second test made. In this mode, the analyzer will reveal any problems in the sensor area which might have occurred intermittently as the snowmobile was being operated.

If there were any such intermittent problems, the problem area will be shown on the display. Check the indicated area for a wire connection problem or loose or corroded connections.

Testing Individual EFI Components

■ NOTE: For all of the following tests using the EFI Analyzer, the analyzer power light must be illuminated. If not illuminated, the problem must be corrected before proceeding. Also the analyzer must be properly connected to a 12-volt battery.

EXISTING PROBLEM DIAGNOSIS TEST (Engine Off) FUNCTION

■ NOTE: Select KOKUSAN SPECIAL by pressing the TEST button. This will allow the testing of the EFI system.

1. With the analyzer OFF, connect its harness to the diagnosis test plug. Connect the external leads of the harness to a good 12-volt battery.
2. Switch the analyzer ON.
3. With analyzer power light illuminated, press the MENU SELECT buttons repeatedly until the words Existing Problem Diagnosis Test appear on the display.

Existing Problem Diagnosis TEST

4. Press the TEST button. If all sensors are good, SENSORS ALL O.K. will appear on the display. If any of the sensors listed under Existing Problem Diagnosis Test are defective, that sensor will be indicated on the display. Proceed then to check the defective sensor individually as covered in this section.

■ NOTE: If proceeding to another test, first press the TEST button once again to cancel the present test. To select a different test function, use the MENU SELECT buttons.

MEMORY PROBLEM DIAGNOSIS TEST (Engine Off) FUNCTION

■ NOTE: Select KOKUSAN SPECIAL by pressing the TEST button. This will allow the testing of the EFI system.

1. With the analyzer OFF, connect its wiring harness to the diagnosis test plug. Connect the external leads of the harness to a good 12-volt battery.
2. Switch the analyzer ON.
3. With both indicator lights illuminated, press the MENU SELECT buttons repeatedly until Memory Problem Diagnosis Test appears on the display.

Memory Problem Diagnosis TEST

4. Press the analyzer TEST button. If there has been an intermittent problem in a sensor, that sensor will be indicated on the display. Make necessary repairs.

■ NOTE: If proceeding to another test, first press the TEST button once again to cancel the present test. To select a different test function, use the MENU SELECT buttons.

CLEARING MEMORY

1. With the analyzer harness attached to the diagnosis test plug, press the MENU SELECT buttons until the words Diagnosis Memory Clear appear on the display.

Diagnosis Memory Clear

2. Press the analyzer TEST button and the words Please Key Off should appear on the LCD; then turn the analyzer switch to the OFF position. Immediately turn the analyzer switch to the ON position and the memory should now be clear.

Please Key Off

■ NOTE: To check if the memory is clear, perform Memory Problem Diagnosis Test to see if all sensors test good. If a problem still remains on memory, repeat Clearing Memory procedure.

THROTTLE VALVE ANGLE TEST (Degrees/Volts) FUNCTION

The correct throttle valve angle is extremely important for proper engine operation. If the throttle valve angle isn't correct in the idle position, the engine may be very difficult to start "cold." If the throttle valve angle isn't correct in any of the off-idle positions, engine damage or poor performance may result because of an incorrect mixture.

■ NOTE: Select KOKUSAN by pressing the TEST button. This will allow the testing of the batteryless EFI system.

1. Connect the analyzer harness to the diagnosis test plug. Make sure the analyzer is OFF.
2. Switch the analyzer ON.
3. With the analyzer power light illuminated, press the MENU SELECT buttons on the analyzer repeatedly until the words Throttle Valve Angle appear on the display.

Throttle Valve Angle

■ NOTE: When performing the Throttle Valve Angle Test, test both the idle and full-open throttle positions. Specifications are given for both positions in degrees and volts.

4. With the throttle in the "idle" position (engine not running), press the analyzer TEST button. The throttle valve angle should now appear on the display.

Throttle Valve Angle - Degrees		
Model	**Idle**	**Full-Open**
500 cc	3.300°-6.000°	75.300°-89.800°
600/700 cc	4.000°-6.700°	75.000°-89.500°
900 cc	4.000°-6.700°	75.000°-89.500°

Throttle Valve Angle - Voltage		
Model	**Idle (Volts)**	**Full-Open (Volts)**
500 cc	0.616-0.724	3.485-4.0585
600/700 cc	0.646-0.754	3.472-4.0485
900 cc	0.646-0.754	3.472-4.0485

5. If the "idle" position throttle valve angle or voltage isn't within test specifications, push down on the throttle shaft to make sure it is fully closed. If the test specifications are now within tolerance, loosen the throttle cable.

6. If the “idle” position throttle valve angle test specification remains out of tolerance, adjust the idle speed screw. If the throttle valve angle cannot be corrected by either an idle speed screw or cable adjustment, replace the throttle body assembly.

7. Compress the throttle lever to the “full-open” position (engine not running). The test specification must be within the tolerance shown in chart. If the test specification is out of tolerance, grasp the throttle cable next to the throttle shaft and pull on the cable. If the test specification is now within tolerance, adjust the throttle cable. If the throttle valve angle remains out of tolerance, replace the throttle body assembly.

8. If the specifications listed below ARE DISPLAYED during the test, replace the throttle body assembly.

Throttle Valve Angle - Degrees/Volts	
Degrees/Volts	**RPM Range**
2.25/0.57	Idle to 3000

■ NOTE: If the Throttle Position Sensor should fail, the ECU will go into the “fail safe” mode and the above readings in the idle position will be displayed.

■ NOTE: If proceeding to another test, first press the TEST button once again to cancel the present test. To select a different test function, use the MENU SELECT buttons.

INTAKE AIR TEMPERATURE SENSOR (Engine Off) FUNCTION

■ NOTE: When using an analyzer which has been updated with the new EPROM chip, first select Kokusan by pressing the TEST button. This will allow the testing of batteryless EFI system.

1. With the analyzer OFF, connect its harness to the diagnosis test plug. Connect the external leads of the harness to a good 12-volt battery.

2. Switch the analyzer ON.

3. With the analyzer power light illuminated, press the MENU SELECT buttons repeatedly until Intake Air Temperature appears on the display.

Intake Air Temperature

4. Press the analyzer TEST button and the intake air temperature will be indicated on the display.

■ NOTE: Intake air temperature will be displayed in both °C and °F.

■ NOTE: The temperature indicated should be close to room temperature if the snowmobile hasn't recently been run. Consider what temperature the snowmobile is actually at.

5. If when testing the intake air temperature sensor, an indicated temperature of -40° C and °F is noted and the actual snowmobile temperature isn't close to this temperature, replace the sensor. The ECU will automatically go to -40° C and °F when the intake air temperature sensor fails.

■ NOTE: If proceeding to another test, first press the TEST button once again to cancel the present test. To select a different test function, use the MENU SELECT buttons.

BAROMETRIC PRESSURE SENSOR TEST (Engine Off) FUNCTION

■ NOTE: Select KOKUSAN SPECIAL by pressing the TEST button. This will allow the testing of the EFI system.

1. With the analyzer OFF, attach its harness to the diagnosis test plug.

2. Switch the analyzer ON.

3. With the analyzer power light illuminated, press the MENU SELECT buttons repeatedly until the words Barometric Pressure appear on the display.

Barometric Pressure

4. Press the analyzer TEST button and actual area barometric pressure will be indicated.

■ NOTE: Actual area barometric pressure can be obtained from a local airport, radio station, etc.

5. If the barometric pressure sensor has failed, the ECU will automatically go to the barometric pressure shown below. If these readings APPEAR on the display, replace the ECU.

Model	Barometric Pressure	
500 cc	880 mm/hg	(34.65 in./hg)
600/700 cc	880 mm/hg	(34.65 in./hg)
900 cc	880 mm/hg	(34.65 in./hg)

Peak Voltage Tests and Specifications

■ NOTE: For peak voltage testing procedures, see Section 5 in this Volume.

Throttle Position Sensor

If the snowmobile is under warranty, the throttle position sensor on the EFI system is not a serviceable part. If the sensor should malfunction, the complete throttle body assembly must be replaced.

■ **NOTE: If the snowmobile is in warranty, breaking the seal on the idle screw jam nut or the Phillips-head screws on the TPS will void warranty.**

■ **NOTE: It is important to order a throttle body assembly with the same symbol marking on the injectors as the ones being replaced. The symbol is located on the side of the injector top.**

If the snowmobile is out of warranty and the TPS must be replaced, see Section 5 - pages 17-18.

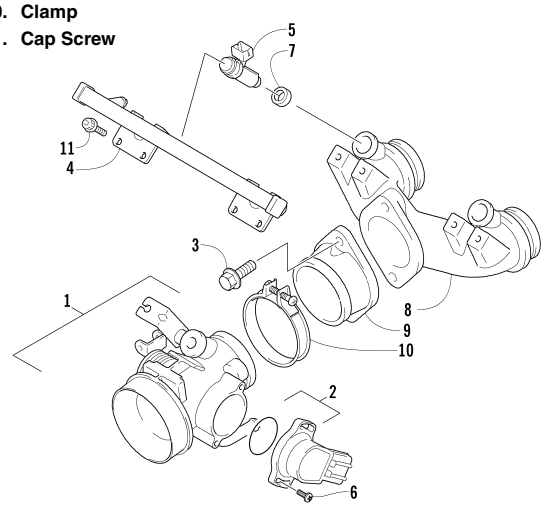
Throttle Body Assembly

■ **NOTE: Determine which type of assembly is being replaced and remove and install accordingly.**

KEY

1. Throttle Body
2. Throttle Position Sensor
3. Cap Screw
4. Delivery Pipe
5. Fuel Injector
6. Screw
7. Cushion
8. Intake Manifold
9. Flange
10. Clamp
11. Cap Screw

500 cc

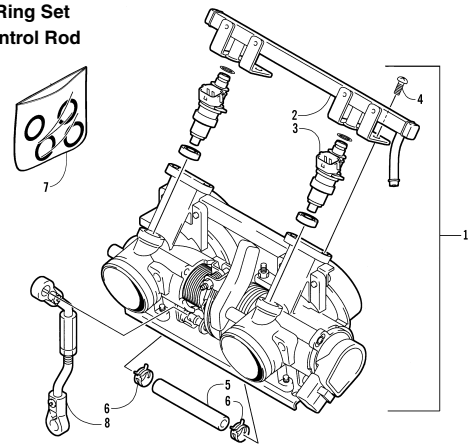


741-059A

KEY

1. Throttle Body
2. Delivery Pipe
3. Fuel Injector
4. Screw
5. Hose
6. Clamp
7. O-Ring Set
8. Control Rod

600/700 cc

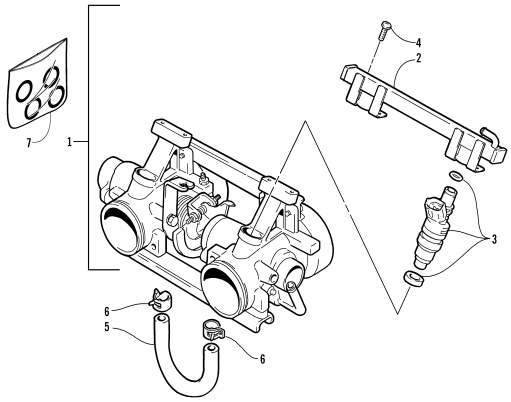


0738-076

KEY

1. Throttle Body Assembly
2. Delivery Pipe
3. Fuel Injector
4. Screw
5. Hose
6. Hose Clamp
7. O-Ring Set

900 cc



0736-975

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REMOVING

■ **NOTE: On the 500/600/700 cc, the expansion chamber must be removed for this procedure.**

1. Disconnect the wiring harness from each injector and from the throttle position sensor connector.
2. Remove the coolant hoses from the throttle body assembly and plug them to prevent leakage.

■ **NOTE: On the 500/600/700 cc, the throttle body assembly must be moved forward and out of the air silencer in order to remove the coolant hoses.**

3. Remove the fuel supply hose from the delivery pipe.

⚠ CAUTION

Since the fuel supply hose may be under pressure, remove it slowly to release the pressure. Place an absorbent towel around the connection to absorb fuel.

4. Loosen the flange clamps.
5. Slide the throttle body assembly out of the flanges; then loosen the jam nut securing the throttle cable and remove.
6. Remove the throttle body assembly.

INSTALLING

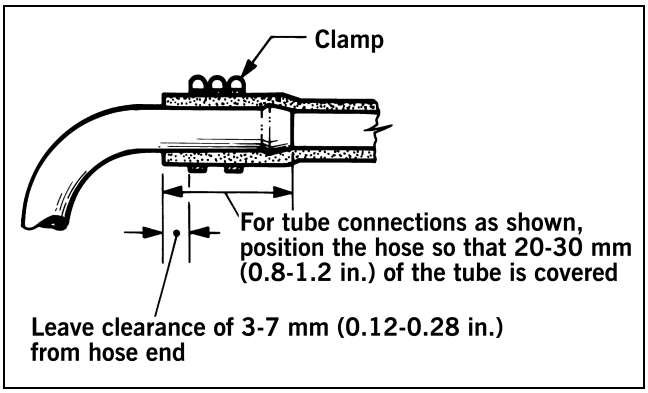
1. Attach the throttle cable to the throttle body. Secure with jam nut.
2. Place the throttle body assembly into position. Make sure the flanges and boots are positioned properly. Secure with flange clamps.

■ **NOTE: On the 500/600/700 cc, the coolant hoses must be connected first; then the throttle body assembly must be installed into the air silencer.**

3. Connect the fuel supply hose to the delivery pipe.

⚠ CAUTION

These hoses must be connected to the correct fittings.



0729-325

4. Secure the coolant hose to throttle body assembly.
5. Connect the wiring harness to each injector and throttle position sensor.

■ **NOTE: On the 500/600/700 cc, install the expansion chamber.**

6. Place the rear of the snowmobile on a shielded safety stand and start the engine without touching the throttle. It may idle slowly and stop. Restart using the same procedure until the engine starts and builds RPM on its own.

⚠ WARNING

Check all hose connections for leakage. Repair as necessary.

7. Check the cooling system.
8. Adjust the throttle cable as necessary.

Throttle Body Flange

REMOVING

1. Loosen the clamp(s) securing the throttle body assembly to the throttle body flange(s).
2. Remove the throttle body assembly from the flange(s).
3. In turn on each flange, remove the two nuts, lock washers, and flat washers securing the intake flange to the cylinder; then remove the flange.

INSTALLING

1. Apply a thin coat of high-temperature silicone to the cylinder side of each flange; then attach each flange to a cylinder and secure each with two flat washers, lock washers, and nuts. Tighten to 1.5-1.9 kg-m (11-14 ft-lb).

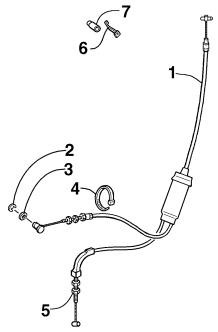
2. Install the flange clamp(s) on the flange(s); then place the throttle body assembly into the flange(s) and secure with the clamp(s).

3. Secure all wires and hoses with cable ties.

Throttle Cable

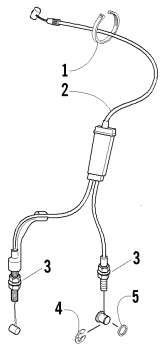
■ **NOTE: Determine which type of cable is being replaced and remove and install accordingly.**

KEY
1. Throttle Cable
2. E-Ring
3. Washer
4. Cable Tie
5. Locking Nut
6. Retaining Clip
7. Rubber Plug



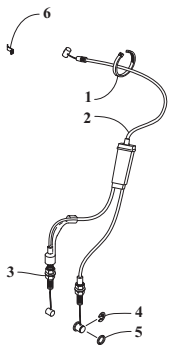
738-064A

KEY
1. Cable Tie
2. Throttle Cable
3. Jam Nut
4. E-Ring
5. O-Ring



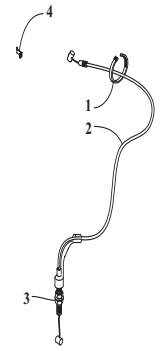
741-132A

KEY
1. Cable Tie
2. Throttle Cable
3. Jam Nut
4. E-Ring
5. O-Ring
6. Retaining Clip



737-754A

KEY
1. Cable Tie
2. Throttle Cable
3. Locking Nut
4. Retaining Clip



737-973A

REMOVING

1. Loosen the throttle cable adjuster at the bracket.

2. Remove the throttle cable from the pulley on the throttle body lever shaft.

3. On the 900 cc, remove the E-clip securing the oil-injection cable to the oil-injection pump control arm. Account for a washer.

4. On the 900 cc, loosen the oil-injection cable jam nuts.

5. On the other models, remove the handlebar pad and the console (if applicable).

6. Remove the cable ties securing the throttle cable.

7. Remove the throttle cable ends from the throttle lever and from the throttle control housing.

■ **NOTE: The EFI models (except the 900 cc) are equipped with a control rod activated oil pump. If it must be removed, the rod simply snaps off and on at the control arm.**

INSTALLING/ADJUSTING

1. Install the throttle cable into the throttle switch assembly making sure the cable snaps into place.

2. Install the throttle cable end on the throttle lever.

3. Route the throttle cable from the throttle switch assembly to the throttle body assembly and oil-injection pump; avoid any sharp bends or moving components.

4. Attach the throttle cable to the pulley on the throttle body shaft.

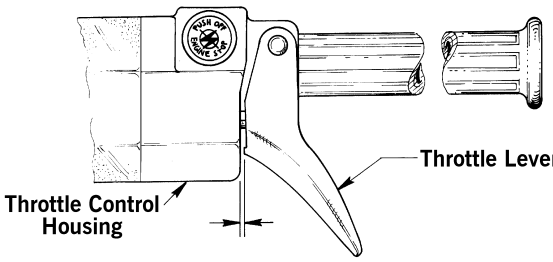
5. On the 900 cc, install the oil-injection cable adjuster on the oil-injection pump; secure with the jam nuts.

6. On the 900 cc, install the oil-injection cable on the control arm; secure with a washer and E-clip.

7. Secure the throttle cable to the handlebar and steering post with cable ties.

8. On the other models, install the handlebar pad and the console (if applicable).

9. Adjust the throttle cable tension by turning the jam nuts in the appropriate direction until there is 0.75-1.5 mm (0.030-0.060 in.) free-play in the throttle lever and the butterfly completely opens and closes. Tighten the jam nuts securely.



Gap of 0.75-1.5 mm (0.030-0.060 in.) between the Throttle Switch Body and Throttle Lever when Safety Switch is set properly

733-081C

⚠ CAUTION

Compress the throttle control lever to ensure free movement. If the throttle cable sticks or binds, correct the problem before starting the engine.

10. Synchronize the oil-injection pump.

Basic EFI System Information

Item			Description
Basic system		Fuel supply system	Electronically controlled multi-point injection
		Ignition system	(CDI system) Digital
Air/fuel flow meter		System	O/N (throttle opening/engine revolution) system & atmospheric pressure compensation
		Component parts	Throttle opening sensor Atmospheric pressure sensor
Injection system			One time simultaneous injection per revolution (synchronized ignition)
Fuel system		Fuel pressure	Regulated specified pressure
Throttle system		System	1 stage x duplex (1 bore/cylinder)
		Diameter of the bore	46 x 2 (Effective area equivalent to 40)
		Type of valve	Butterfly type
		Operating angle	See Testing Individual EFI Components in this section
		Radius of drum	R25 (at wire center)
Adjusting system for idle revolution			Throttle adjusting screw type
Component parts and specifications	Control unit		Fuel injection control
	Fuel system	Fuel pump	Electric
		Injection	Side feed type
		Pressure regulator	Diaphragm type
		Fuel filter	Fine screens on pick-up hose
		Fuel piping	Regulated specified pressure
	Throttle body		1 bore/cylinder x duplex
	Sensor, etc.	Throttle sensor	Revolution scrubbing type potentiometer
		Pressure sensor	Semiconductor type
		Water temperature sensor	Thermistor type
		Intake air temperature sensor	Thermistor type
	Cable harness		Equivalent to current harness
	Other		EFI System

EFI Component Voltage/Resistance Chart - Air Temperature

TEMP/C	TEMP/F	VOLTAGE	OHMS
100	212	0.113	555
98	208	0.121	595
96	205	0.128	635
94	201	0.136	675
92	198	0.143	715
90	194	0.151	755
88	190	0.162	819
86	187	0.173	883
84	183	0.184	947
82	180	0.195	1011
80	176	0.206	1075
78	172	0.222	1160
76	169	0.238	1245
74	165	0.253	1330
72	162	0.269	1415
70	158	0.285	1500
68	154	0.308	1640
66	151	0.331	1780
64	147	0.353	1920
62	144	0.376	2060
60	140	0.399	2200
58	136	0.432	2410
56	133	0.465	2620
54	129	0.498	2830
52	126	0.531	3040
50	122	0.564	3250
48	118	0.612	3595
46	115	0.659	3940
44	111	0.707	4285
42	108	0.754	4630
40	104	0.802	4975
38	100	0.869	5490
36	97	0.937	6005
34	93	1.004	6520
32	90	1.072	7035
30	86	1.139	7550

TEMP/C	TEMP/F	VOLTAGE	OHMS
28	82	1.230	8540
26	79	1.322	9530
24	75	1.413	10520
22	72	1.505	11510
20	68	1.596	12500
18	64	1.716	14020
16	61	1.836	15540
14	57	1.955	17060
12	54	2.075	18580
10	50	2.195	20100
8	46	2.323	23060
6	43	2.452	26020
4	39	2.580	28980
2	36	2.709	31940
0	32	2.837	34900
-2	28	2.969	39940
-4	25	3.101	44980
-6	21	3.233	50020
-8	18	3.365	55060
-10	14	3.497	60100
-12	10	3.610	76080
-14	7	3.722	92060
-16	3	3.835	108040
-18	-0.4	3.947	124020
-20	-4	4.060	140000
-22	-8	4.142	156000
-24	-11	4.224	172000
-26	-15	4.306	188000
-28	-18	4.388	204000
-30	-22	4.470	220000
-32	-26	4.522	261000
-34	-29	4.574	302000
-36	-32	4.625	343000
-38	-36	4.677	384000
-40	-40	4.729	425000

EFI Component Voltage/Resistance Chart - Water Temperature

TEMP/C	TEMP/F	VOLTAGE	OHMS
110	230	0.115	129
108	226	0.129	137
106	223	0.143	145
104	219	0.157	153
102	216	0.171	161
100	212	0.185	169
98	208	0.192	180
96	205	0.199	191
94	201	0.206	202
92	198	0.213	213
90	194	0.220	224
88	190	0.235	240
86	187	0.250	256
84	183	0.265	273
82	180	0.280	289
80	176	0.295	305
78	172	0.317	327
76	169	0.339	349
74	165	0.361	371
72	162	0.383	393
70	158	0.405	415
68	154	0.438	445
66	151	0.471	475
64	147	0.504	505
62	144	0.537	535
60	140	0.570	565
58	136	0.598	609
56	133	0.626	653
54	129	0.654	697
52	126	0.682	741
50	122	0.710	785
48	118	0.759	849
46	115	0.808	913
44	111	0.857	977
42	108	0.906	1041
40	104	0.955	1105
38	100	1.023	1214
36	97	1.091	1323
34	93	1.159	1432
32	90	1.227	1541
30	86	1.295	1650

TEMP/C	TEMP/F	VOLTAGE	OHMS
28	82	1.377	1800
26	79	1.459	1950
24	75	1.541	2100
22	72	1.623	2250
20	68	1.705	2400
18	64	1.806	2670
16	61	1.907	2940
14	57	2.008	3210
12	54	2.109	3480
10	50	2.210	3750
8	46	2.327	4170
6	43	2.444	4590
4	39	2.561	5010
2	36	2.678	5430
0	32	2.795	5850
-2	28	2.901	6510
-4	25	3.007	7170
-6	21	3.113	7830
-8	18	3.219	8490
-10	14	3.325	9150
-12	10	3.421	9422
-14	7	3.517	9694
-16	3	3.613	9966
-18	-0.4	3.709	10238
-20	-4	3.805	10510
-22	-8	3.885	13688
-24	-11	3.965	16866
-26	-15	4.045	20044
-28	-18	4.125	23222
-30	-22	4.205	26400
-32	-26	4.267	30520
-34	-29	4.329	34640
-36	-32	4.391	38760
-38	-36	4.453	42880
-40	-40	4.515	47000
-42	-44	4.553	55100
-44	-47	4.591	63200
-46	-51	4.629	71300
-48	-54	4.667	79400
-50	-58	4.705	87500

Troubleshooting Fuel System

Problem: Too Rich	
Condition	**Remedy**
1. **Diagnostic** trouble code	1. Replace problem sensor
2. **Fuel pressure** too high	2. Replace regulator
3. **Fuel return hose** obstructed	3. Service — replace hose — remove obstruction
4. **Injectors** leaking	4. Replace injectors
Problem: Too Lean	
Condition	**Remedy**
1. **Diagnostic** trouble code	1. Replace problem sensor
2. **Fuel pressure** too low	2. Replace regulator/fuel pump
3. **Vent hose** obstructed	3. Remove obstruction
4. **Fuel filter(s)** obstructed	4. Replace fuel filter(s)

Fuel System
(Related Items)

Some components may vary from model to model. The technician should use discretion and sound judgment when removing and installing components.

Whenever any maintenance or inspection is made on the fuel system in which fuel leakage may occur, there should be no welding, smoking, or open flames in the area.

■ **NOTE: Some illustrations and photographs used in this section are used for clarity purposes only and are not designed to depict actual conditions.**

Fuel System
(Related Items)
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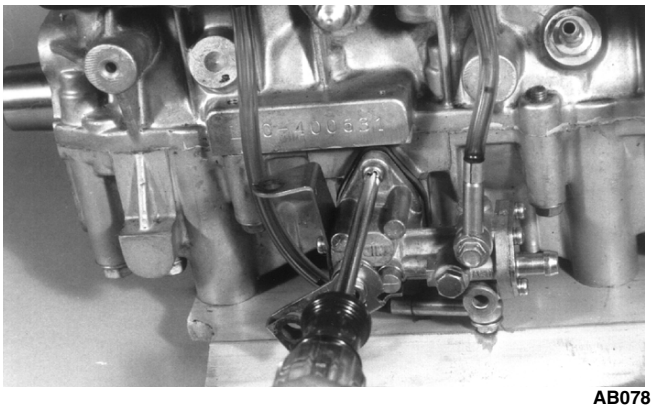
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Oil-Injection Pump

REMOVING

■ **NOTE: On 500/600/700 cc models to service the oil-injection pump, the engine must be removed (see Section 2); then proceed to step 3.**

1. Turn the gas tank shut-off valve to the CLOSED position.
2. If applicable, remove the carburetors.
3. Disconnect the oil-supply hose from the pump and plug to prevent oil drainage.
4. Remove the two oil-delivery hoses from the adapter plates.
5. Disconnect the oil-injection cable/control rod.
6. Remove the two screws, lock washers (if applicable), and washers (if applicable) securing the oil-injection pump and retainer to the crankcase.



AB078

7. Pull the oil-injection pump away from the engine and account for a gasket.

8. Turn the pump sideways; then remove the lower union bolt. Account for two gaskets. Remove the pump.

9. Remove the remaining union bolts securing the check valves to the pump. Account for two gaskets.

10. Remove the check valves. Account for two gaskets.

INSTALLING

1. In turn on each front union bolt, install a gasket, check valve, and gasket; then install on the oil-injection pump.

2. Place the gasket and oil-injection pump near the engine; then install the lower union bolt through a gasket, check valve, and gasket.

3. Position the oil-injection pump on the engine making sure the oil-injection pump gear is correctly aligned with the oil-injection pump drive gear.

4. Secure the pump with two screws, lock washers (if applicable), and washers (if applicable). Tighten screws to 0.7 kg-m (5 ft-lb).

5. Connect the two oil-delivery hoses to the adapter plates. Secure with clamps.

6. Connect the oil-injection cable/control rod to the pump and secure.

7. Connect the oil-supply hose to the oil-injection pump inlet fitting. Secure with the clamp.

8. Bleed the oil-injection system (see Bleeding Oil-Injection System in this sub-section).

9. Check the oil-injection system synchronization (see Synchronizing Oil-Injection Pump in this sub-section). Tighten the jam nuts securely.

■ NOTE: On 500/600/700 cc models to install the engine, see procedure in Section 2.

10. If applicable, install the carburetors.

11. Turn the shut-off valve to the OPEN position.

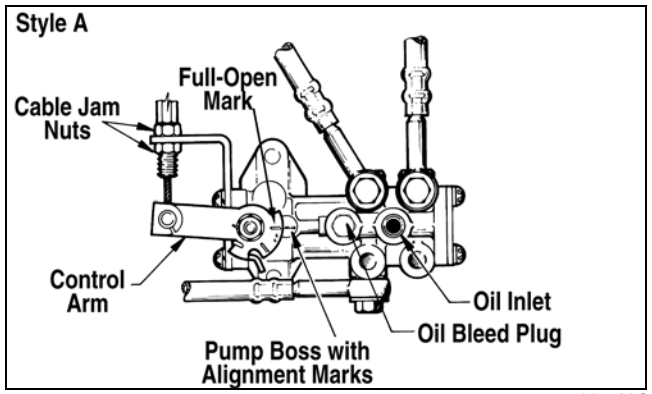
Synchronizing Oil-Injection Pump

■ NOTE: Determine which style of oil-injection pump is being serviced and refer to the appropriate illustration for component details.

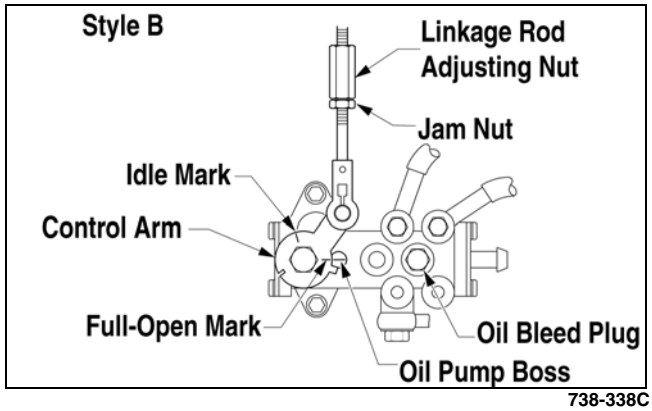
■ NOTE: On certain models, the oil pump cable adjuster is located at the juncture of the throttle cable.

⚠ CAUTION

Use a 100:1 fuel mixture for the following procedure.



728-713A



738-338C

INSPECTING/ADJUSTING/ SYNCHRONIZATION

1. With the engine off on models with a cable operated oil pump (style A), disconnect the throttle cable from the throttle lever.

2. Pull the throttle cable to the FULL-OPEN position; then using a suitable clamping device, secure the cable in this position.

⚠ CAUTION

Care must be taken when securing the cable not to kink or damage the cable.

■ NOTE: On EFI models (Style B), rotate the throttle shaft until it contacts the stop screw.

3. Check to be sure the mark on the control arm is aligned with alignment mark on the oil-injection pump boss.

4. If the marks are not aligned, adjust synchronization by loosening the jam nuts on the adjuster. Rotate the jam nuts/adjuster nut until proper alignment is attained. Tighten jam nuts.

5. Return the throttle shaft/throttle cable to the CLOSED position.

■ NOTE: On models with a cable operated oil pump (Style A), connect the throttle cable to the throttle lever.

■ NOTE: When the cable/linkage adjusting nut is adjusted correctly, the throttle lever will move approximately 3.2 mm (1/8 in.) before the oil-injection pump arm begins to move. This will ensure the throttle/ignition monitor switch will function properly and will prevent spark plug fouling at low RPM operation.

6. Inspect all oil hoses that they are full of oil. If they are not full of oil or air bubbles are detected, bleeding is necessary.

Bleeding Oil-Injection System
(370/440/570/900 cc Models)

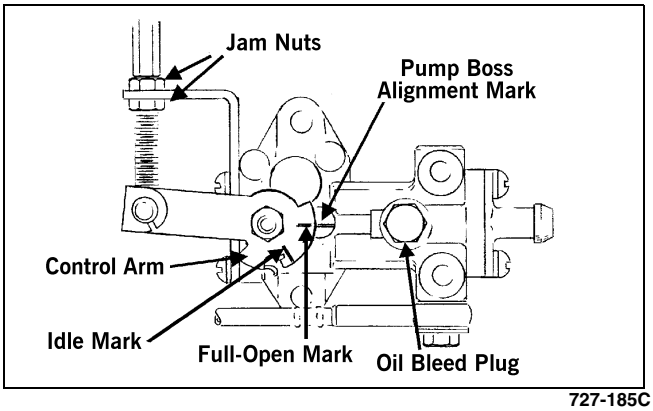
⚠ CAUTION

Whenever bleeding the oil-injection system, use a 100:1 gas/oil mixture in the gas tank to ensure adequate engine lubrication. Failure to use the 100:1 mixture during oil-injection system bleeding will result in severe engine damage.

1. Fill the oil reservoir with recommended injection oil.

2. Place an absorbent towel below the oil bleed plug; then remove the bleed plug from the pump. Allow the oil to flow through the oil-supply hose until the hose is filled with oil and free of air bubbles; then install the bleed plug.

■ NOTE: To aid in bleeding the oil system, blow into the vent hose to force the oil toward the pump. The oil reservoir cap must be on for this procedure.



727-185C

3. Using a shielded safety stand, raise the rear of the snowmobile. Engage the brake lever lock; then start the engine and allow it to idle.

4. Using a stiff wire with a hooked end, pull the control arm upward to the full-open position.

⚠ WARNING

Keep hands and clothing away from all moving or rotating parts.

5. Idle the engine until oil flowing to the top of the oil-delivery hoses is free of air bubbles.

6. When oil flows free of all air bubbles, shut the engine off and check for leakage.

7. Release the brake lever lock.

Bleeding Oil-Injection System
(500/600/700 cc Models)

■ NOTE: The oil reservoir must be full for this procedure.

1. Tip the snowmobile onto its left side; then using a torx-bit, remove the screws securing the center belly pan (skid plate) to the front end.

2. Loosen, but don't remove, the oil bleed plug; then finger-tighten the bleed plug.

3. Tip the snowmobile back to the upright position; then raise the rear of the snowmobile onto a safety stand so the track is at least 61 cm (24 in.) off the ground.

4. Place a drain pan beneath the engine compartment; then loosen the bleed plug until oil begins to drain out.

5. Allow the oil to drain out until there are no visible signs of air bubbles in the oil-line hose; then tighten the bleed plug.

6. Lower the rear of the snowmobile, tip the snowmobile onto its left side, ensure the bleed screw is secure, and install the center belly pan (skid plate).

■ NOTE: On the Firecat/Sabercat models if the snowmobile has been tipped on its side for an extended period of time, inspect the oil-line hose for any signs of air bubbles. If air bubbles are visible, repeat the bleeding procedure.

■ NOTE: Prior to operating the snowmobile, make sure the oil reservoir is full of recommended oil.

Testing Oil-Injection Pump

■ NOTE: These tests must be made with the snowmobile and the oil at a "room" temperature of 20°-30° C (68°-86° F).

⚠ WARNING

Always wear safety glasses when performing this test.

1. Disconnect the oil pump cable from the control arm on the pump.

■ NOTE: On EFI models, disconnect the control rod from the throttle shaft at the throttle bodies.

2. Clamp off the oil-supply hose between the oil reservoir and oil pump; then remove the supply hose from the pump.

3. Attach a suitable length of oil-supply hose to the oil pump; then using Oil Injection Usage Tool (p/n 0644-007), fill the hose with Arctic Cat Synthetic APV 2-Cycle Oil.

■ NOTE: On all engines, use Arctic Cat Synthetic APV 2-Cycle Oil (p/n 2639-512). Use of any other oil will cause inaccurate oil consumption readings.

■ NOTE: When filling the oil-supply hose with oil, do not insert the usage tool until it is tight in the hose. There must be enough room around the tip of the tool and the hose to allow air in the hose to escape.

4. Fill the usage tool with recommended oil to the 0 line.

5. Wipe the tip of the tool to remove excess oil; then attach the tool to the oil-supply hose and remove the bulb.

6. Secure the tool to the oil reservoir by twisting the rubber strap one half turn and placing the rubber strap around the tool and the oil reservoir filler neck.

■ NOTE: On 500/600/700 cc models to access the oil pump, tip the snowmobile on its left side; then using a torx-bit, remove the screws securing the center belly pan (skid plate) to the front end.

7. Remove the oil bleed plug from the oil pump; then allow the oil to drain from the pump until test oil is visible. Install the bleed plug; then refill the usage tool to the 0 line.

■ NOTE: On EFI models, the control rod must be secured in the IDLE position. It is advisable to secure the rod to a convenient engine component away from any moving parts. Securing the rod prevents misalignment of the control arm due to engine/chassis movement.

⚠ WARNING

Keep hands and clothing away from all moving or rotating parts.

8. With the control arm secured in the IDLE position, start the engine and run the engine at recommended RPM for 3 minutes. Compare the amount of oil used against the specifications on the chart.

9. With the control arm secured in the FULL-OPEN position (line-to-line), run the engine at recommended RPM for 2 minutes. Compare the amount of oil used against the specifications on the chart.

Oil Consumption

MODEL	RPM	IDLE 3 Minutes	FULL-OPEN 2 Minutes
370 cc	2000	0.7-1.2 cc	3.6-4.4 cc
440 cc	2000	1.8-2.8 cc	4.6-5.6 cc
500 cc (Carb)	1833	1.2-2.1 cc	6.0-7.5 cc
500 cc EFI	1833	0.7-1.5 cc	5.1-6.3 cc
570 cc	2000	1.0-1.5 cc	5.1-6.2 cc
600 cc	1833	1.5-2.5 cc	7.1-8.9 cc
700 cc EFI	1833	1.4-2.7 cc	9.1-11.3 cc
700 cc (Carb)	1833	0.9-2.0 cc	7.7-9.6 cc
900 cc EFI	1833	1.1-2.6 cc	10.2-12.7 cc

10. If the oil-injection pump output does not meet the specifications, see Testing Oil-Injection Check Valves in this sub-section.

11. Disconnect the oil usage tool, remove the plug from the reservoir, attach the oil-supply hose to the oil reservoir, and remove the vacuum pump.

12. Bleed the oil-injection system (see appropriate Bleeding Oil-Injection System in this sub-section).

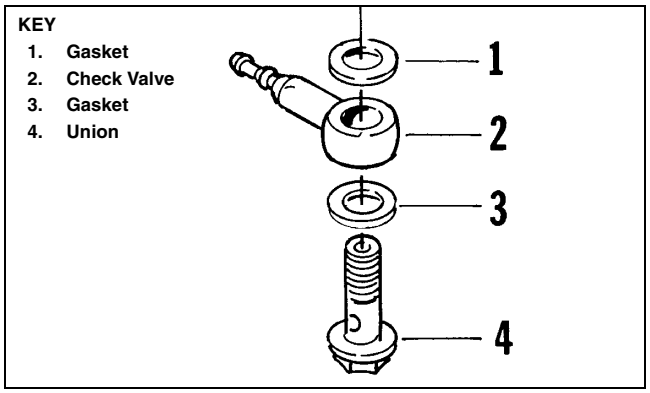
■ **NOTE: After testing the oil pump, it is critical that the oil pump is correctly synchronized with the carburetor(s)/throttle bodies (see Synchronizing Oil-Injection Pump on page 58 in this section).**

Testing Oil-Injection Check Valves

In the event there is an engine problem due to lack of lubrication, the oil-injection pump check valves should be tested using a vacuum pump to make sure the check valves are operating properly.

When testing the check valves, remove them from the pump assembly.

1. Remove the check valves from the oil-injection pump.



731-551A

2. Attach the vacuum test pump hose to the check valve.

3. Squeeze the vacuum pump handle and watch the pump gauge. The check valve should release at 4.5-5 lb and again reset itself at 3.5-4 lb. If "release" and "reset" are not within specifications, replace the check valve.

4. Record the "release" and "reset" readings for the valve; then perform the test on the other valve. The "release" and "reset" readings must fall within specifications and must be within 1.5 lb of each other. If either or both are not met, replace the check valves.

5. If the check valves are within specifications but the oil-injection usage is not, replace the oil-injection pump.

Fuel Pump
(Carbureted Models)

■ **NOTE: When servicing a fuel pump, determine which style pump is being serviced and follow the appropriate procedure.**

PRELIMINARY CHECKS

1. Make sure the gas tank shut-off valve is in the OPEN position.

2. Make sure there is adequate gasoline in the gas tank.

3. Make sure all hoses are clear and free of kinks and obstructions.

4. Make sure the fuel filter is not plugged or damaged.

5. Make sure fuel and impulse hoses are in good condition.

6. Make sure there is evidence of good impulse at the crankcase impulse fitting.

TESTING PRESSURE

1. Connect a pressure gauge between fuel pump and carburetor using a piece of fuel hose and a T-fitting.

2. Place snowmobile on a safety stand and start the engine. At the following engine speeds, the specified pressures must be indicated.

RPM	psi	kg/cm²
1000-2000	3.0-3.5	0.21-0.25
3000-4000	4.5-5.5	0.32-0.39
5000-6000	6.0-7.0	0.42-0.49

3. Remove gauge and hose and connect fuel hose to carburetor.

TESTING VACUUM

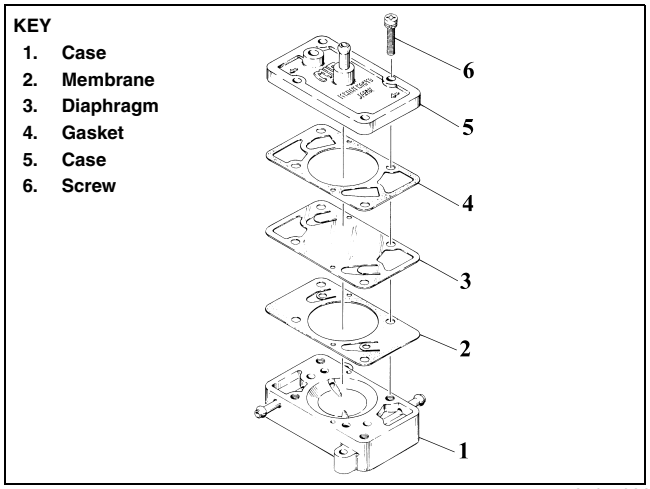
■ **NOTE: Make sure adequate fuel is in the carburetor for this test.**

1. Turn the gas tank shut-off valve to the CLOSED position; then disconnect fuel supply hose from the shut-off valve.
2. Connect a vacuum gauge directly to the fuel pump inlet fitting.
3. With snowmobile on a safety stand, start the engine and accelerate to 2000-3000 RPM for a period of 30 seconds. Note maximum reading of gauge. Reading must be within the range listed.

Acceptable Fuel Pump Vacuum (2-3000 RPM)	
in.-hg	**mm-hg**
7-10	175-250

4. Stop engine. Connect fuel hose. Turn the shut-off valve to the OPEN position.

SERVICING



0727-830

1. Scribe a line across the fuel pump sections.
2. Remove the screws securing the fuel pump; then from the top of the fuel pump, remove the top case, gasket, diaphragm, and membrane.

■ **NOTE: Be sure all fuel pump components are clean and the fittings are tight.**

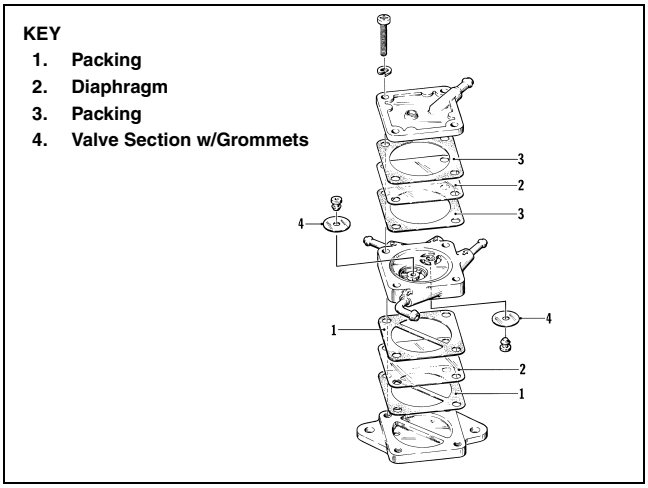
3. In sequence on the bottom case of the fuel pump, place the membrane, diaphragm, gasket, and top case.

■ **NOTE: Make sure the scribed line made during disassembly is aligned and the tabs on the two lower packings align with the tabs on the bottom and valve section of the pump.**

4. Secure the fuel pump with the screws. Tighten securely.

SERVICING

1. Scribe a line across the fuel pump sections.



0728-279

2. Remove the screws securing the fuel pump; then from the top of the fuel pump, remove the top, packing, diaphragm, packing, valve section, packing, diaphragm, and packing.

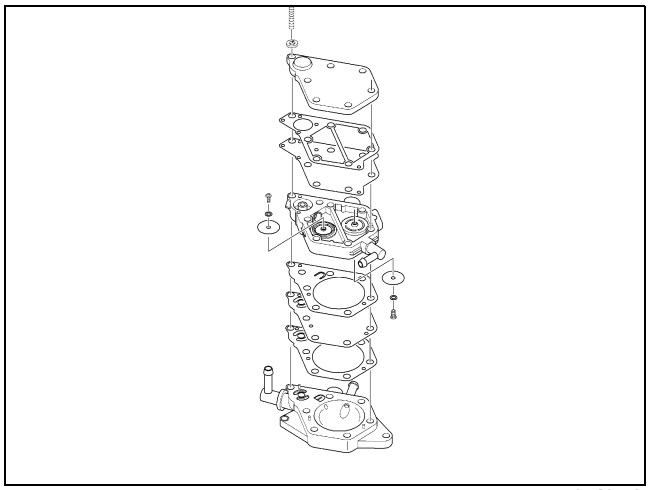
■ **NOTE: Be sure all fuel pump components are clean and the fittings are tight.**

3. Push the grommets out of the valve section; then remove the valve from each grommet.
4. Place a valve onto each grommet; then push each valve with grommet into the valve section.
5. In sequence on the bottom of the fuel pump, place a packing, diaphragm, packing, valve section, packing, diaphragm, packing, and top.

■ **NOTE: Make sure the scribed line made during disassembly is aligned.**

6. Secure the fuel pump with the screws. Tighten securely.

SERVICING



0740-717

1. Scribe a line across the fuel pump sections.
2. Remove the screws and lock washers securing the fuel pump; then from the top of the fuel pump, remove the cap, thick packing, diaphragm, thin rubber packing, valve section, thin rubber packing, diaphragm, and thick packing.
3. Push the grommets out of valve section; then remove the valve from each grommet.

■ **NOTE: Be sure all fuel pump components are clean and the fittings are tight.**

4. Place a valve onto each grommet; then push each valve with grommet into the valve section of the fuel pump.
5. In sequence on the bottom of the fuel pump, place a thick packing, diaphragm, thin rubber packing, valve section, thin rubber packing, diaphragm, thick rubber packing, and cap.

■ **NOTE: Make sure the scribed line made during disassembly is aligned and the tabs on the two lower packings align with the tabs on the bottom and valve section of the pump.**

6. Secure the fuel pump with the screws and lock washers. Tighten securely.

SERVICING

1. Scribe a line across the fuel pump sections.
2. Remove the Phillips-head screws and lock washers securing the fuel pump sections; then from the top of the fuel pump, remove the cap, gasket, diaphragm, gasket, valve section, gasket, diaphragm, and gasket.

■ **NOTE: Be sure all fuel pump components are clean and the fittings are tight.**

3. Push the grommets out of the valve section; then remove the valve from each grommet.
4. Place a valve onto each grommet; then push each valve with grommet into the valve section of the fuel pump.
5. In sequence on the bottom of the fuel pump, place a gasket, diaphragm, gasket, valve section, gasket, diaphragm, gasket, and cap.

■ **NOTE: Make sure the scribed line made during disassembly is aligned and the tabs on the two upper gaskets align.**

6. Secure the fuel pump with the Phillips-head screws and lock washers. Tighten securely.

Air-Intake Silencer
(Cover/Tool Tray Style)

The air-intake silencer is a specially designed component used to silence the incoming fresh air and also to catch the fuel that “spits back” out of the throttle body/carburetors. The throttle body/carburetors are calibrated with the air-intake silencer in position; therefore, the engine must never be run with the air-intake silencer removed.

CLEANING AND INSPECTING

1. Check for holes or cracks in the silencer.
2. Periodically clean the silencer by removing the cover/tool tray assembly and vacuuming the interior of the silencer.

Air-Intake Silencer
(500/600/700 cc Engine Style)

The air-intake silencer is a specially designed component used to silence the incoming fresh air and also to catch the fuel that “spits back” out of the throttle body/carburetors. The throttle body/carburetors are calibrated with the air-intake silencer in position; therefore, the engine must never be run with the air-intake silencer removed.

REMOVING

1. Remove the two hood pins securing the hood to the front end; then carefully move the hood back allowing it to rest against the handlebar.

2. Using a #20 torx-bit, remove the three screws securing the air silencer to the front bumper assembly. Account for the position of the hood screen.

■ **NOTE: On the 500/600/700 cc EFI, it is necessary to first remove the two screws securing the ECU to the air silencer.**

CLEANING AND INSPECTING

1. Check for holes or cracks in the silencer.

2. Periodically clean the silencer by blowing fresh air through it.

INSTALLING

1. Position the hood screen to the front bumper assembly; then install the air silencer into the front end.

2. Secure the air silencer with the three screws.

■ **NOTE: On the 500/600/700 cc EFI, secure the ECU to the air silencer with the two screws.**

Gas Tank/Seat Assembly

■ **NOTE: To service the gas tank/seat assembly, see Section 7.**

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Electrical Specifications Chart

MODEL	ENGINE MODEL	IGNITION MANUFACTU-RER	IGNITION TIMING				SPARK PLUG (NGK)	SPARK PLUG GAP		IGNIT-ION TYPE	LIGHTING COIL OUTPUT @3000 RPM
			Degrees	mm	in.	Degrees/ Fail-Safe (± 2°)		mm	in.		
370 cc	AA37A8	Kokusan Denki	*18 ③	2.012	0.079	N/A	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/185W
440 cc	AS44A9	Kokusan Denki	*18 ③	2.012	0.079	N/A	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/185W
500 cc (Carb)	AV50L5	Kokusan Denki	*30 ③	5.258	0.207	12° ④	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/156W
500 cc (EFI)	AX50L5	Kokusan Denki	*16 ③	1.535	0.060	12° ④	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/156W
570 cc	AA56A5	Kokusan Denki	*18 ③	2.049	0.081	N/A	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/210W
600 cc (EFI)	AJ60L3	Kokusan Denki	*15 ②	1.509	0.059	N/A	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/190W
700 cc (Carb)	AE70L4	Kokusan Denki	*12 ⑦	0.969	0.038	N/A	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/156W
700 cc (EFI)	AD70L4	Kokusan Denki	*12 ⑧	0.969	0.038	N/A	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/190W
900 cc (EFI)	AB86L5	Kokusan Denki	*23 ④	3.775	0.149	12° ④	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/190W

1 @ 1400 RPM
2 @ 1800 RPM
3 @ 2000 RPM
4 @ 2500 RPM
5 @ 3200 RPM
6 @ 3500 RPM
7 @ 4000 RPM
8 @ 4350 RPM

*Engine Warm

Resistance Tests Chart

ITEM	KOKUSAN				
	EFI Models	500 cc (Carb)	570 cc	370/440 cc	700 cc (Carb)
Ignition Coil — Primary	0.30 ± 20% B/OR ↔OR/B	0.34 ± 20% OR/B ↔ B/OR	0.30 ± 15% OR ↔ B	0.30 ± 15% OR ↔ B	0.30 ± 20% OR ↔ B
Ignition Coil — Secondary	8500 ± 20% HT ↔ HT	8500 ± 20% HT ↔HT	8500 ± 20% HT ↔ HT	8500 ± 20% HT ↔ HT	8500 ± 20% HT ↔ HT
Lighting Coil	0.10 ± 20% Y ↔ Y	0.15 ± 20% Y ↔ Y	0.15 ± 20% Y ↔ Y	0.22 ± 20% Y ↔ Y	0.10 ± 20% Y ↔ Y
Stator Coil (Charge)	N/A	N/A	N/A	160 ± 20% R/W ↔ B/R	N/A
(DC Power)	N/A	0.89 ± 20% R/Y ↔ Y/R	N/A	N/A	0.89 ± 20% R/Y ↔ Y/R
(Charge 1)	17 ± 20% B/R ↔G/R	N/A	15 ± 20% B/R ↔ G/R	N/A	N/A
(Charge 2)	17 ± 20% BR/W ↔ G/R	N/A	15 ± 20% BR/W ↔ G/R	N/A	N/A
Ignition Timing Sensor	190 ± 20% G/W ↔ BR	185 ± 20% G/W ↔ BR/G	185 ± 20% G/W ↔ BR	N/A	185 ± 20% G/W ↔ BR/G
Injector Coil	19 ± 20% BL/W ↔ BL/W	N/A	N/A	N/A	N/A
Fuel Pump Coil	1.9 ± 20% OR/W ↔ OR/W	N/A	N/A	N/A	N/A
Spark Plug Cap	5000 ± 20%	5000 ± 20%	5000 ± 20%	5000 ± 20%	5000 ± 20%

ABBREVIATION KEY

B Black
BL Blue
W White
Y Yellow
G Green
R Red
BR Brown
GRND Ground
N/A Not Applicable
OR Orange
POS Positive
HT High Tension
NEG Negative

■ NOTE: All Models must use both resistor type spark plugs and spark plug caps.

Electrical Specifications
(370/440 cc)

■ **NOTE: The ignition system is a Normally Open Ignition (NOI).**

Description	Resistance Test Test Value	+ Test Connections -	
Ignition Coil Primary (External) Secondary	 0.26-0.35 ohm 6800-10,200 ohms	 orange high tension wire	 black high tension wire
Stator Coil (Charge)	128-192 ohms	red/white	black/red
Lighting Coil	0.17-0.26 ohm	yellow	yellow
Spark-Plug Cap	4000-6000 ohms	cap end	cap end
Description	**Test Value**	**+ Test Connections -**	
Voltage Regulator	11-14 AC volts	yellow	brown
Low Oil-Light Sending Unit	Less than 1 ohm (float end down)	terminal	terminal
Ignition Switch	Less than 1 ohm (key in OFF position)	terminal	terminal
Description	**Peak Voltage Test**	**+ Test Connections -**	
Primary Coil (External)	170-187V	orange	black
Stator Coil (Charge)	200-220V	red/white	black/red
Lighting Coil	9.0-9.9V	yellow	yellow

Peak Voltage Tests were made with the Fluke Model 73 Multimeter (p/n 0644-191) set to the DC Volt scale and the Peak Voltage Reading Adapter (p/n 0644-307) with the connectors plugged in, spark plugs removed and grounded, and by pulling the recoil starter rope briskly.

■ **NOTE: Lighting coil output is unregulated voltage.**

Electrical Specifications
(500 cc Carbureted)

■ **NOTE: The ignition system is a Normally Open Ignition (NOI).**

Description	Resistance Test Test Value	+ Test Connections -	
Ignition Coil Primary Secondary	 0.27-0.41 ohm 6800-10,200 ohms	 orange/black high tension wire	 black/orange high tension wire
DC Power Coil	0.71-1.07 ohms	red/yellow	yellow/red
Ignition Timing Sensor	148-222 ohms	green/white	brown/green
Lighting Coil	0.12-0.18 ohm	yellow	yellow
Spark-Plug Cap	4000-6000 ohms	cap end	cap end
Description	**Test Value**	**+ Test Connections -**	
Voltage Regulator	11-14 AC Volts	yellow	brown
Regulator/Rectifier	11.2-16.8 DC Volts (@ 2000 RPM)	red/blue	brown/yellow
Condenser	11.6-17.4 DC Volts (@ 2000 RPM)	red	brown
Low Oil-Light Sending Unit	Less than 1 ohm (float end down)	terminal	terminal
Ignition Switch	Less than 1 ohm (key in OFF position)	terminal	terminal
Description	**Peak Voltage Test**	**+ Test Connections -**	
Primary Coil (External)	150V	orange/black	black/orange
DC Power Coil	10V	red/yellow	yellow/red
Ignition Timing Sensor	1.4-1.6V	green/white	brown/green
Lighting Coil	4V	yellow	yellow
DC Power Coil	12.6-18.4V (@ 2000 RPM)	red/yellow	yellow/red

Peak Voltage Tests were made with MaxiClips (p/n 0644-455), the Fluke Model 73 Multimeter (p/n 0644-191) set to the DC Volt scale, and the Peak Voltage Reading Adapter (p/n 0644-307) with the engine running at 2000 RPM or with the connectors plugged in, spark plugs removed and grounded, and by pulling the recoil starter rope briskly.

■ **NOTE: Lighting coil output is unregulated voltage.**

■ **NOTE: On APV-equipped carbureted models, the traditional charge coil(s) have been replaced by a single DC power coil on the stator.**

Electrical Specifications
(570 cc)

■ **NOTE: The ignition system is a Normally Open Ignition (NOI).**

Description	Resistance Test Test Value	+ Test Connections -	
Ignition Coil Primary (External) Secondary	 0.26-0.35 ohm 6800-10,200 ohms	 orange high tension wire	 black high tension wire
Charge Coil (1)	12-18 ohms	black/red	green/red
Charge Coil (2)	12-18 ohms	brown/white	green/red
Ignition Timing Sensor	148-222 ohms	green/white	brown
Lighting Coil	0.12-0.18 ohm	yellow	yellow
Spark-Plug Cap	4000-6000 ohms	cap end	cap end
Description	**Test Value**	**+ Test Connections -**	
Voltage Regulator	11-14 AC volts	yellow	brown
Low Oil-Light Sending Unit	Less than 1 ohm (float end down)	terminal	terminal
Ignition Switch	Less than 1 ohm (key in OFF position)	terminal	terminal
Description	**Peak Voltage Test**	**+ Test Connections -**	
Primary Coil (External)	185-204V	orange	black
Charge Coil (1)	69-76V	black/red	green/red
Charge Coil (2)	79-87V	brown/white	green/red
Ignition Timing Sensor	1.4-1.6V	green/white	brown
Lighting Coil	7.0-7.7V	yellow	yellow

Peak Voltage Tests were made with the Fluke Model 73 Multimeter (p/n 0644-191) set to the DC Volt scale and the Peak Voltage Reading Adapter (p/n 0644-307) with the connectors plugged in, spark plugs removed and grounded, and by pulling the recoil starter rope briskly.

■ **NOTE: Lighting coil output is unregulated voltage.**

Electrical Specifications
(EFI Models)

■ **NOTE: The ignition system is a Normally Open Ignition (NOI).**

Description	Resistance Test Test Value	+ Test Connections -	
Ignition Coil Primary Secondary	 0.24-0.36 ohm 6800-10,200 ohms	 black/orange high tension wire	 orange/black high tension wire
Charge Coil (1)	13.6-20.4 ohms	black/red	green/red
Charge Coil (2)	13.6-20.4 ohms	brown/white	green/red
Lighting Coil	0.08-0.12 ohm	yellow	yellow
Ignition Timing Sensor	152-228 ohms	green/white	brown
Injection Coil	15.2-22.8 ohms	blue/white	blue/white
Fuel Pump Coil	1.52-2.28 ohms	orange	orange
Spark-Plug Cap	4000-6000 ohms	cap end	cap end
Description	**Test Value**	**+ Test Connections -**	
Voltage Regulator	10-15 AC Volts (@ 2000 RPM)	yellow	brown
Voltage Regulator (APV)	10.7-16.1 DC Volts (@ 2000 RPM)	red/blue	brown
Low Oil-Light Sending Unit	Less than 1 ohm (float end down)	terminal	terminal
High Temperature Sensor	Open (water temperature lower than 190°F)	terminal	ground
	Up to 20 ohms (water temperature higher than 230°F)	terminal	ground
High Temperature Warning Light	Less than 10 ohms	terminal	terminal
Ignition Switch	Less than 1 ohm (key in OFF position)	terminal	terminal
Description	**Peak Voltage Test**	**+ Test Connections -**	
Primary Coil	151-176V	black/orange	orange/black
Charge Coil (1)	100-110V	black/red	green/red
Charge Coil (2)	85-94V	brown/white	green/red
Lighting Coil	5.4-5.8V	yellow	yellow
Ignition Timing Sensor	4.4V	green/white	brown
Injection Coil	12V	blue/white	blue/white
Fuel Pump Coil	12.3V	orange/white	orange/white
Lighting Coil	14.8-22.2V (@ 2000 RPM)	yellow	brown

Peak Voltage Tests were made with the MaxiClips (p/n 0644-455), Fluke Model 73 Multimeter (p/n 0644-191) set to the DC Volt scale, and the Peak Voltage Reading Adapter (p/n 0644-307) with the engine running at 2000 RPM or with the connectors plugged in, spark plugs removed and grounded, and by pulling the recoil starter rope briskly.

■ **NOTE: Lighting coil output is unregulated voltage.**

Electrical Specifications
(700 cc Carbureted Models)

■ **NOTE: The ignition system is a Normally Open Ignition (NOI).**

Description	Resistance Test Test Value	+ Test Connections -	
Ignition Coil Primary (External) Secondary	 0.24-0.36 ohm 6800-10,200 ohms	 orange high tension wire	 black high tension wire
DC Power Coil	0.71-1.07 ohms	red/yellow	yellow/red
Lighting Coil	0.08-0.12 ohm	yellow	yellow
Ignition Timing Sensor	148-222 ohms	green/white	brown/green
Spark-Plug Cap	4000-6000 ohms	cap end	cap end
Description	**Test Value**	**+ Test Connections -**	
Voltage Regulator	11-14 AC Volts	yellow	brown
Regulator/Rectifier	11.2-16.8 DC Volts (@ 2000 RPM)	red/blue	brown/yellow
Condenser	11.6-17.4 DC Volts (@ 2000 RPM)	red	brown
Low Oil-Light Sending Unit	Less than 1 ohm (float end down)	terminal	terminal
High Temperature Sensor	Open (water temperature lower than 190°F)	terminal	ground
	Up to 20 ohms (water temperature higher than 230°F)	terminal	ground
High Temperature Warning Light	Less than 10 ohms	terminal	terminal
Ignition Switch	Less than 1 ohm (key in OFF position)	terminal	terminal
Description	**Peak Voltage Test**	**+ Test Connections -**	
Primary Coil (External)	229V	orange	black
DC Power Coil	10V	red/yellow	yellow/red
Lighting Coil	4V	yellow	yellow
Ignition Timing Sensor	1.4-1.6V	green/white	brown/green
DC Power Coil	12.6-18.4V (@ 2000 RPM)	yellow/red	red/yellow

Peak Voltage Tests were made with MaxiClips (p/n 0644-455), the Fluke Model 73 Multimeter (p/n 0644-191) set to the DC Volt scale, and the Peak Voltage Reading Adapter (p/n 0644-307) with the engine running at 2000 RPM or with the connectors plugged in, spark plugs removed and grounded, and by pulling the recoil starter rope briskly.

■ **NOTE: Lighting coil output is unregulated voltage.**

■ **NOTE: On APV-equipped carbureted models, the traditional charge coil(s) have been replaced by a single DC power coil on the stator.**

Testing Electrical Components

All tests of the engine electrical components should be made using the digital Fluke Model 73 Multimeter (p/n 0644-191). Replace any component that does not have a test value within specifications.

■ **NOTE: Whenever using a digital-style tester, "open (infinite resistance)" denotes an overload and the meter reading will be OL since the meter is not calibrated to register resistance values of that magnitude.**

■ **NOTE: Whenever testing switches, less than 1 ohm is desirable with the switch in the activated position.**

Troubleshooting Ignition System
(EFI Models)

When troubleshooting the standard "normally open" ignition system, use the following procedure.

1. Remove the spark plugs and visually check their condition. Replace any fouled plug. Attach the spark plugs to the high tension leads and ground them on the cylinder heads.

⚠ CAUTION

Before checking for spark, place all the engine switches in the deactivated position. In the event the engine could be flooded, pull the starter rope (slowly at first) several times to clear the engine of excess fuel.

⚠ CAUTION

Never crank the engine over without grounding the spark plugs. Damage to coils and/or CDI unit may result.

■ **NOTE: Make sure the ignition switch and the emergency stop switch are in the ON position.**

2. Crank the engine over and check for spark. If no spark is present, check to make sure the throttle cable is properly tensioned. Compress the throttle control and while holding the throttle control in this position, crank the engine over and check for spark. If spark is now present, adjust the throttle cable tension.
3. If no spark is present, disconnect the main wiring harness from the engine. Crank the engine over. If spark is present, the problem is either one or more of the following:

   A. Defective emergency stop switch

   B. Defective safety switch in throttle-control housing

   C. Corroded or loose wire connection at the throttle-control housing or main wiring harness

   D. Defective ignition switch

■ **NOTE: To check these possible causes, proceed to Testing Ignition System.**

Testing Ignition System
(EFI Models)

■ **NOTE: There must be free-play between the throttle lever and the control housing.**

MAIN WIRING AND SAFETY SWITCHES

1. Check the wiring connections coming from the ignition key and emergency stop switches. The throttle control switch connector is located on the front side of the steering post. If any of the connections appear dirty or corroded, clean them with fine sandpaper and compressed air; then connect all wires and squeeze the connections with a pliers for additional tightness.
2. Disconnect the main wiring harness connector coming from the engine stator assembly. Disconnecting this connector will bypass the main wiring harness and all switches which will not allow the engine to be shut off without first installing an additional auxiliary ground wire.
3. Insert an auxiliary ground wire into the black wire of the four-wire main harness connector on the engine side. To stop the engine once it has been started, touch the auxiliary ground wire to the engine.
4. Support the rear of the snowmobile up on a shielded safety stand; then set the brake lever lock. Inspect the complete throttle mechanism to assure that it's working properly.

5. Attempt to start the engine. To stop the engine (if the engine starts), touch the auxiliary ground wire installed into the four-wire connector to a ground on the engine. If the engine fails to start, the problem is with the coils mounted on the engine, high tension coil assembly, or the ECU. If the engine starts, the problem is with the switches, main wiring harness, or throttle cable free-play.

IGNITION KEY SWITCH

1. Disconnect the ignition key switch connectors; then connect the ohmmeter leads to each of the ignition key switch terminals.

2. With the switch in the OFF position, the meter must read less than 1 ohm of resistance.

3. With the switch in the ON position, the meter must read OL (infinite resistance).

THROTTLE CONTROL SWITCH

1. Verify that the throttle cable has free-play between the throttle lever and control housing.

2. Disconnect the throttle control switch connector; then connect one ohmmeter lead to the brown wire and the other lead to the black/white wire of the emergency stop switch.

3. With the throttle lever in the idle position and the emergency stop knob in the up (RUN) position, the meter must read no resistance (open). If the meter reads resistance (closed), replace the switch.

4. With the throttle lever in the idle position and the emergency stop knob in the down (STOP) position, the meter must read resistance (closed). If the meter reads no resistance (open), replace the switch. With the emergency stop knob still in the down (STOP) position, move the throttle lever to the wide open position. The meter must read no resistance (open). If the meter reads resistance (closed), replace the switch.

5. Connect one ohmmeter lead to the brown wire and the other lead to the violet wire. With the emergency stop knob in the down (STOP) position, the meter must read resistance (closed). If the meter reads no resistance (open), replace the switch. With the emergency stop knob in the up (RUN) position, the meter must read no resistance (open). If the meter reads resistance (closed), replace the switch.

Troubleshooting Ignition System
(Fan Cooled Models)

When troubleshooting the standard “normally open” ignition system, use the following procedure.

1. Remove the spark plugs and visually check their condition. Replace any fouled plug. Attach the spark plugs to the high tension leads and ground them on the cylinder heads.

⚠ CAUTION

Before checking for spark, place all the engine switches in the deactivated position. In the event the engine could be flooded, pull the starter rope (slowly at first) several times to clear the engine of excess fuel.

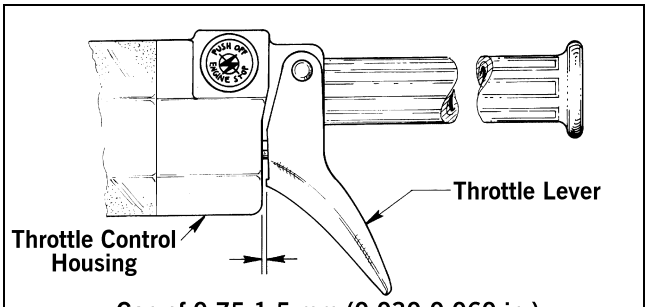
⚠ CAUTION

Never crank the engine over without grounding the spark plugs. Damage to coils and/or CDI unit may result.

■ NOTE: Make sure the ignition switch and the emergency stop switch are in the ON position.

2. Crank the engine over and check for spark. If no spark is present, check to make sure the throttle cable is properly tensioned. Compress the throttle control and while holding the throttle control in this position, crank the engine over and check for spark. If spark is now present, adjust the throttle cable tension.

■ NOTE: On all models, there must be 0.75-1.5 mm (0.030-0.060 in.) free-play between the throttle lever and the control housing.



Gap of 0.75-1.5 mm (0.030-0.060 in.) between the Throttle Switch Body and Throttle Lever when Safety Switch is set properly

733-081C

3. If no spark is present, disconnect the main wiring harness from the engine. Crank the engine over. If spark is present, the problem is either one or more of the following.

   A. Defective emergency stop switch

B. Defective safety switch in throttle-control housing

C. Grounded or shorted wire connection at the throttle-control housing or main wiring harness

D. Defective ignition switch

■ **NOTE: To check these possible causes, proceed to Testing Ignition System. If no spark is present, proceed to Arctic Cat Ignition Analyzer in this section.**

Testing Ignition System
(Single Carburetor F/C Models)

■ **NOTE: The throttle control is equipped with a two-wire throttle control switch connector. There must be 0.75-1.5 mm (0.030-0.060 in.) throttle cable free-play between the throttle lever and the control housing.**

MAIN WIRING AND SAFETY SWITCHES

1. Check the wiring connections coming from the ignition key and throttle control switches. The two-wire throttle control switch connector is located on the front side of the steering post. If any of the connections appear dirty or corroded, clean them with fine sandpaper and compressed air; then connect all wires and squeeze the connections with a pliers for additional tightness.

2. Disconnect the main wiring harness four-wire connector coming from the engine stator assembly. Disconnecting the connector will bypass the main wiring harness and all switches which will not allow the engine to be shut off without first installing an additional auxiliary ground wire.

3. Insert an auxiliary ground wire into the black wire of the four-wire main harness connector on the engine side. To stop the engine once it has been started, touch the auxiliary ground wire to the engine.

4. Support the rear of the snowmobile up on a shielded safety stand; then set the brake lever lock. Inspect the complete throttle mechanism to assure that it's working properly.

5. Attempt to start the engine. To stop the engine (if the engine starts), touch the auxiliary ground wire installed into the four-wire connector to a ground on the engine. If the engine fails to start, the problem is with the coils mounted on the engine, high tension coil assembly, or the CDI unit. If the engine starts, the problem is with the switches, main wiring harness, or throttle cable free-play.

MAIN HARNESS

1. Disconnect the main wiring harness four-wire connector coming from the engine stator assembly. Connect one ohmmeter lead to the violet wire and the other lead to the brown wire on the chassis side of the main wiring harness four-wire connector. With all switches in the RUN position, the meter must read no resistance (open).

2. If the meter reads resistance (closed), test the Ignition Key Switch and Throttle Control Switch independently of each other.

IGNITION KEY SWITCH

1. Disconnect the ignition key switch connectors; then connect the ohmmeter leads to each of the ignition key switch terminals.

2. With the key switch in the OFF position, the meter must read resistance (closed). If the meter reads no resistance (open), the switch must be replaced.

THROTTLE CONTROL SWITCH

■ **NOTE: The throttle control has a two-wire wiring harness connector located on the front side of the steering post. Whenever working with a two-wire throttle control switch, the throttle cable must be adjusted so there is 0.75-1.5 mm (0.030-0.060 in.) free-play between the throttle lever and control housing.**

1. Verify that the throttle cable has the specified amount of free-play between the throttle lever and control housing.

2. Disconnect the two-wire throttle control switch connector; then connect the ohmmeter leads to each of the switch wires.

3. With the throttle lever in the idle position and the emergency stop knob in the down (STOP) position, the meter must read resistance (closed). If the meter reads no resistance (open), replace the switch.

4. Depress the throttle lever with the emergency stop knob in the up (RUN) position. The meter must read no resistance (open). If the meter reads resistance (closed), replace the switch.

5. With the throttle lever depressed and the emergency stop knob in the down (STOP) position, the meter must read resistance (closed). If the meter reads no resistance (open), replace the switch.

Testing Ignition System
(Twin Carburetor F/C Models)

■ **NOTE: There must be 0.75-1.5 mm (0.030-0.060 in.) free-play between the throttle lever and the control housing (see Section 4 - Adjusting Carburetors).**

MAIN WIRING AND SAFETY SWITCHES

1. Check the wire connections at the ignition key switch and at the emergency stop switch. This connector is located on the front side of the steering post. If any of the connections appear dirty or corroded, clean with fine sandpaper and compressed air; then connect all wires and squeeze connections with a pliers for added tightness.

2. Disconnect the main wiring harness connector coming from the engine. Using an ohmmeter, connect one lead to the black wire in the connector of the main harness. Connect the remaining ohmmeter lead to the brown wire in the connector of the main harness.

3. With all switches in the RUN position, the meter must read resistance (closed). If the meter reads no resistance (open), proceed to testing Emergency Stop/Throttle Switch, Carburetor Safety Switches, and Ignition Key Switch.

EMERGENCY STOP/ THROTTLE SWITCH

1. If the meter read no resistance (open) in the previous test, locate the wiring harness coming from the emergency stop/throttle switch assembly.

2. Disconnect the three-wire connector. Using an ohmmeter, connect one meter lead to the black wire and the other meter lead to the black/red wire in the connector.

3. With the emergency stop knob, located on top of the throttle control, in the ON (pulled up) position and the throttle lever compressed, the meter must read resistance (closed).

4. If the meter reads no resistance (open) and the lever/control housing free-play is correct, replace the throttle switch.

5. If the meter reads resistance (closed) but the engine will not start, with the ohmmeter leads still connected, alternately release and compress the throttle lever; then move the emergency stop knob down and up.

6. The meter must read no resistance (open) when the throttle lever is released and the emergency stop knob is in either the UP or the DOWN position.

7. If the meter reads resistance (closed), replace the throttle switch.

8. Connect one meter lead to the black/red wire and the other meter lead to the black/white wire.

9. With the throttle lever released (idle position) and the emergency stop knob in the DOWN position, the meter must read no resistance (open).

10. If above tests were good, proceed to testing Carburetor Safety Switches and Ignition Key Switch.

CARBURETOR SAFETY SWITCHES

1. If the meter read no resistance (open) in the previous test, disconnect the carburetor safety switches one at time and test for a closed circuit.

2. Attach the two ohmmeter leads to the two leads coming from each carburetor switch. The meter must read resistance (closed).

3. If the meter reads no resistance (open), the switch must either be adjusted or replaced (see Synchronizing Carburetor Safety Switches in this sub-section). If the meter reads resistance (closed), proceed to testing Ignition Key Switch.

IGNITION KEY SWITCH

1. If the meter read resistance (closed) in the previous test, disconnect the ignition key switch connectors and connect the ohmmeter leads to each of the leads from the switch.

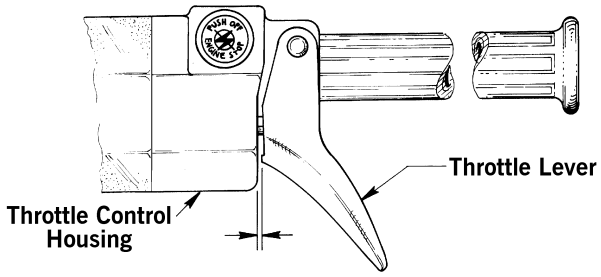
2. With the key switch in the OFF position, the meter must read resistance (closed). If the meter reads no resistance (open), replace the switch.

SYNCHRONIZING CARBURETOR SAFETY SWITCHES

Before synchronizing the carburetor safety switches, check to make certain the carburetor idle speed screws are adjusted equally and the piston valves are synchronized. The carburetor safety switches affect ignition spark at idle only. If ignition spark problems are observed at partial or full-throttle positions, the problem is not with the carburetor safety switches.

■ **NOTE: There must be 0.75-1.5 mm (0.030-0.060 in.) free-play between the throttle lever and the control housing.**

1. Inspect the cable free-play gap between the throttle lever and the control housing at idle. Adjust the throttle cable swivel adapter at the top of each carburetor for 0.75-1.5 mm (0.030-0.060 in.) cable free-play gap between the throttle lever "nibs" and the control housing. While observing if there is any cable free-play gap, apply slight pressure to the throttle lever to take up any cable slack that may be present. However, do not apply enough pressure to actually raise the carburetor slides during this adjustment. After cable free-play is properly adjusted, tighten the jam nut on each carburetor securely.



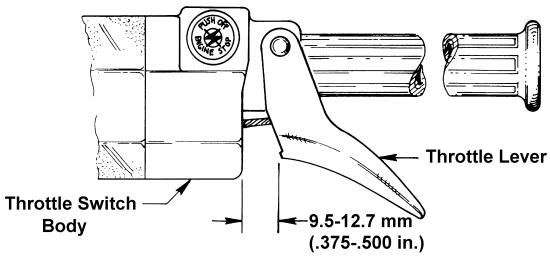
Gap of 0.75-1.5 mm (0.030-0.060 in.) between the Throttle Switch Body and Throttle Lever when Safety Switch is set properly

733-081c

2. To determine which switch needs adjusting, disconnect both carburetor safety switches from the main wiring harness connector.

3. Connect a digital ohmmeter to one carburetor safety switch connector; then compress the throttle lever while observing the meter reading and measure the gap between the throttle lever and control housing at the moment the meter reading changes from open to closed. Repeat this step for the other carburetor safety switch.

■ **NOTE: The correct throttle lever/housing gap should be in a range of 9.5 - 12.7 mm (0.375-0.500 in.) the moment the meter reading changes from open to closed. A switch that changes from open to closed before the other one is the switch that must be raised to attain safety switch synchronization.**



Gap of 9.5-12.7 mm (0.375-0.500 in.) between the Throttle Switch Body and Throttle Lever when the Safety Switches open and close.

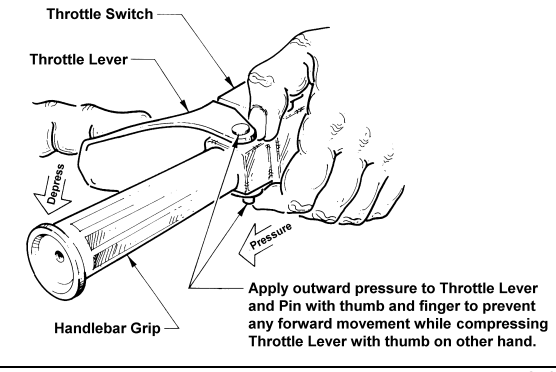
733-082A

4. If an adjustment is necessary, loosen the switch bracket screws, move the switch up, tighten the screws, and then reset using step 3.

■ **NOTE: After completion of any adjustments, throttle lever "side pressure" should not cause an ignition miss at idle. Carburetor switches set too low or an excessively tight throttle cable makes the shutdown system very sensitive to throttle lever "side pressure" near idle. To test carburetor safety switch synchronization, follow steps 5-9.**

5. Reconnect the carburetor safety switch connectors. Place the rear of the snowmobile on a shielded safety stand; then start the engine and allow it to warm up for 3-4 minutes.

6. Hold both the top and bottom of the throttle lever pin so that depression of the throttle lever does not move the lever pin in its control slot.



0728-916

7. Slowly depress the throttle lever to increase engine RPM.

■ **NOTE: It is very important that engine RPM be allowed to increase slowly, since most engines have a "rich area" at approximately 2500 RPM.**

5

8. Observe the tachometer and the drive clutch to determine the moment the carburetor safety switches shut down the ignition. Since retaining the throttle lever pin prevents the switch in the throttle control housing from closing, the carburetor safety switches should shut down the ignition at or slightly after clutch engagement.

9. Repeat steps 6-8 several times. If ignition shutdown always occurs at or slightly after clutch engagement, the carburetor safety switches are synchronized.

10. Again, inspect the gap between the throttle lever and the control housing at idle. Adjust the throttle cable swivel adapter at the top of each carburetor for 0.75-1.5 mm (0.030-0.060 in.) cable free-play gap between the throttle lever "nibs" and the control housing. While observing if there is any cable free-play gap, apply slight pressure to the throttle lever to take up any cable slack that may be present. However, do not apply enough pressure to actually raise the carburetor slides during this adjustment. After cable free-play is properly adjusted, tighten the jam nut on each carburetor securely.

■ **NOTE: After completion of any adjustments, throttle lever "side pressure" should not cause an ignition miss at idle. Carburetor safety switches set too low or an excessively tight throttle cable makes the shutdown system very sensitive to throttle lever "side pressure" near idle.**

Troubleshooting Ignition System
(L/C Models)

When troubleshooting the standard "normally open" ignition system, use the following procedure.

1. Remove the spark plugs and visually check their condition. Replace any fouled plug. Attach the spark plugs to the high tension leads and ground them on the cylinder heads.

⚠ CAUTION

Before checking for spark, place all the engine switches in the deactivated position. In the event the engine could be flooded, pull the starter rope (slowly at first) several times to clear the engine of excess fuel.

⚠ CAUTION

Never crank the engine over without grounding the spark plugs. Damage to coils and/or CDI unit may result.

■ **NOTE: Make sure the ignition switch and the emergency stop switch are in the ON position.**

2. Crank the engine over and check for spark. If no spark is present, check to make sure the carburetor throttle cables are properly tensioned. Compress the throttle control and while holding the throttle control in this position, crank the engine over and check for spark. If spark is now present, adjust the carburetor throttle cable tension.

3. If no spark is present, disconnect the main wiring harness from the engine. Crank the engine over. If spark is present, the problem is either one or more of the following:

   A. Defective emergency stop switch

   B. Defective safety switch in throttle-control handle

   C. Corroded or loose wire connection at the throttle-control housing or main wiring harness

   D. Defective ignition switch

■ **NOTE: To check these possible causes, proceed to Testing Ignition System. If no spark is present, proceed to Peak Voltage Tests.**

Testing Ignition System
(L/C Models)

■ **NOTE: There must be 0.75-1.5 mm (0.030-0.060 in.) throttle cable free-play between the throttle lever and the control housing.**

MAIN WIRING AND SAFETY SWITCHES

1. Check the wiring connections coming from the ignition key and emergency stop switch. The throttle control switch connector is located on the front side of the steering post. If any of the connections appear dirty or corroded, clean them with fine sandpaper and compressed air; then connect all wires and carefully squeeze the connections with a pliers for additional tightness.

2. Disconnect the main wiring harness connector coming from the engine stator assembly. Disconnecting this connector will bypass the main wiring harness and all switches which will not allow the engine to be shut off without first installing an additional auxiliary ground wire.

3. Insert an auxiliary ground wire into the black wire of the main harness connector on the engine side. To stop the engine once it has been started, touch the auxiliary ground wire to the engine.

4. Support the rear of the snowmobile up on a shielded safety stand; then set the brake lever lock. Inspect the complete throttle mechanism to assure that it's working properly.

5. Attempt to start the engine. To stop the engine (if the engine starts), touch the auxiliary ground wire installed into the connector to a ground on the engine. If the engine fails to start, the problem is with the coils mounted on the engine, high tension coil assembly, or the CDI unit. If the engine starts, the problem is with the switches, main wiring harness, or throttle cable free-play.

MAIN HARNESS

1. Disconnect the main wiring harness connector coming from the engine stator assembly. Connect one ohmmeter lead to the violet wire and the other lead to the brown wire on the chassis side of the main wiring harness four-wire connector. With all switches in the RUN position, the meter must read no resistance (open).

2. If the meter reads resistance (closed), test the Ignition Key Switch, Throttle Control Switch, and Carburetor Safety Switches independently of each other.

IGNITION KEY SWITCH

1. Disconnect the ignition key switch connectors; then connect the ohmmeter leads to each of the ignition key switch terminals.

2. With the switch in the OFF position, the meter must read less than 1 ohm resistance.

3. With the switch in the ON position, the meter must read OL (infinite resistance).

THROTTLE CONTROL SWITCH

1. Verify that the throttle cable has 0.75-1.5 mm (0.030-0.060 in.) free-play between the throttle lever and control housing.

2. Disconnect the throttle control switch connector; then connect one ohmmeter lead to the brown wire and the other lead to the black/white wire of the emergency stop switch.

3. With the throttle lever in the idle position and the emergency stop knob in the up (RUN) position, the meter must read no resistance (open). If the meter reads resistance (closed), replace the switch.

4. With the throttle lever in the idle position and the emergency stop knob in the down (STOP) position, the meter must read resistance (closed). If the meter reads no resistance (open), replace the switch. With the emergency stop knob still in the down (STOP) position, move the throttle lever to the wide open position. The meter must read no resistance (open). If the meter reads resistance (closed), replace the switch.

EMERGENCY STOP SWITCH

1. Connect one ohmmeter lead to one side of the connector and the other lead to the other side of the connector.

■ NOTE: On models with a three-pin connector, connect one ohmmeter lead to the external pin connector and the other lead to either of the internal pin connectors.

2. With the emergency stop knob in the down (STOP) position, the meter must read resistance (closed). If the meter reads no resistance (open), replace the switch.

3. With the emergency stop knob in the up (RUN) position, the meter must read no resistance (open). If the meter reads resistance (closed), replace the switch.

Throttle Position Sensor
(500/600/700/900 cc Models)

■ NOTE: If a TPS must be replaced on an EFI model, order p/n 3006-939 for 600/700 cc models or p/n 3006-940 for 900 cc models.

■ NOTE: Ignition timing and fail-safe timing specifications are located on the Electrical Specifications Chart in this section.

DIGITAL 3-D IGNITION (Carbureted Models)

The advantage of a 3-D ignition system is it actually has up to twelve slightly different timing curves which are controlled by both throttle position and engine RPM. This system allows the CDI to select the timing curve best suited to the operating conditions providing both maximum performance and increased engine durability.

When checking the ignition timing, a couple points must be remembered. First, since the ignition timing is affected by the throttle position, the throttle position sensor (TPS) must be in good operating condition and adjusted correctly. Second, the ignition timing must be checked according to the Ignition Timing Specifications in this section.

⚠ CAUTION

Never remove the drive belt to make the timing check. Always place the rear of the snowmobile on a shielded safety stand and allow the track to rotate freely.

When checking ignition timing, it is important that the timing light be connected to the number 1 spark plug wire, which is the MAG-side cylinder. If the number 2 cylinder spark plug wire is used, the timing light may show a 2° error in ignition timing when ignition timing is actually correct.

For example, the correct ignition timing on the 500 cc carbureted is 30° ± 2° BTDC at 2000 RPM.

To quickly check TPS operation, measure the timing according to the chart; then disconnect the TPS wiring and recheck the timing. A system with a functioning TPS will show a change in the timing. This is known as “Fail-Safe Ignition Timing” and is built into the system to protect the engine should the TPS fail. If this change is not seen, the TPS may have failed and must be checked.

If the ignition timing isn’t 30° ± 2° at 2000 RPM, the TPS should be checked for proper adjustment using the Throttle Position Sensor Adjustment Tool Kit (p/n 3639-891) and a digital voltmeter.

TESTING TPS (All Models)

For procedures for testing the TPS, see Testing Individual Components in the EFI sub-section of Section 4, or see Throttle Position Sensor in the Carbureted sub-section of Section 4.

VERIFYING TPS ADJUSTMENT TOOL

Before using the TPS adjustment tool, verify its battery condition. The battery used in the tool is a 9-volt battery. To check battery condition, use a digital volt/ohmmeter set on DC volt scale. Test between the adjustment tool black and red jacks. Insert the red lead of the digital voltmeter into the red jack of the adjustment tool and the black lead of the digital voltmeter into the black jack of the adjustment tool. The green power light of the analyzer should now be illuminated. If voltage is found below 4.9 volts, replace the battery.

CHECKING TPS (Carbureted Models)

■ NOTE: To check the TPS, TPS Adjustment Tool (p/n 3639-891) must be used.

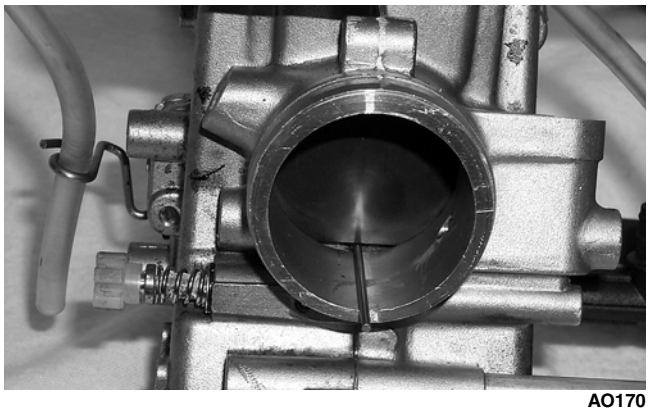
1. Remove the carburetor assembly from the engine compartment (see Section 4).

2. Loosen the idle adjustment screw until it is not in contact with the throttle lever.



AO171

3. Depress the throttle lever to raise the throttle valves (slides); then insert Pin Gauge (p/n 0644-345) into the TPS-side carburetor throat beneath the valve. Slowly release the throttle lever allowing the valve to rest on the gauge.



AO170

■ **NOTE: The pin gauge MUST be installed on the engine side of the carburetor.**

4. Using TPS Adjustment Tool (p/n 0644-299), connect its wiring harness to the TPS. Connect the red and black digital voltmeter leads to the white and black jacks of the TPS adjustment tool.

5. With the throttle in the closed position (valve resting on the pin gauge), compare the reading on the voltmeter to the chart. If the reading is at the prescribed specification, proceed to step 6. If the reading is not at the prescribed specification, proceed to Adjusting TPS (Carbureted Models) in this sub-section.

Engine	Idle Position	Wide-Open Position
500 cc	0.52-0.56V	3.8V+
700 cc	0.50-0.54V	3.9V+

6. Hold the throttle in the wide-open position; then compare the reading on the voltmeter to the chart. If the reading is not within the specification range, recheck the closed position reading. If the closed position reading is correct and the wide-open position reading is not, the TPS is faulty and must be replaced.

7. If both voltmeter readings are correct, remove the test harness and pin gauge, install the carburetor assembly (see Section 4), and connect the snowmobile TPS harness to the TPS.

■ **NOTE: Before installing the TPS harness connector, apply dielectric grease to the connector pins.**

ADJUSTING TPS (Carbureted Models)

1. Using TPS Screwdriver (p/n 0644-344), loosen the two retaining screws securing the TPS to the carburetor.

2. Adjust the TPS to obtain the correct closed position reading on the voltmeter.

3. Tighten the two retaining screws securely.

4. To verify TPS position is correct, proceed to steps 6 and 7 of Checking TPS (Carbureted Models) in this sub-section.

REPLACING TPS (Carbureted Models)

Removing

1. Disconnect the throttle cable from the throttle shaft.

2. Turn the idle adjustment screw counterclockwise until it is not in contact with the throttle lever.

3. Disconnect the TPS wiring harness connector. Using TPS Screwdriver (p/n 0644-344), remove the two retaining screws securing the TPS to the carburetor/throttle body.

Installing

1. Install the new TPS and secure with two retaining screws, flat washers, and lock washers.

2. Adjust the TPS using the appropriate procedures in this sub-section.

CHECKING TPS (EFI Models)

■ **NOTE: If the snowmobile is in warranty, breaking the seal on the idle screw jam nut or the Phillips-head screws on the TPS will void warranty. If the TPS is tested out of specification, the throttle assembly must be replaced. If the snowmobile is out of warranty, proceed to Adjusting TPS (EFI Models).**

■ **NOTE: Before using the TPS adjustment tool, verify its battery condition. The battery used in the tool is a 9-volt battery; also, the Test Harness (p/n 0686-999) must be plugged into the analyzer for testing voltage.**

1. Using Throttle Position Sensor (TPS) Adjustment Tool Kit (p/n 3639-891), connect its wiring harness to the TPS. Connect the red and black digital voltmeter leads to the white and black jacks of the TPS adjustment tool.

2. Ensure that the throttle cable/control rod has the proper amount of free-play.

3. With the throttle in the idle position, compare the reading on the voltmeter to the chart. If the reading is within prescribed specification, proceed to step 4.

Engine	Idle Position	Wide-Open Position
500 cc	0.616-0.724V	3.485-4.0585V
600/700 cc	0.646-0.754V	3.472-4.0485V
900 cc	0.646-0.754V	3.472-4.0485V

4. Compress the throttle lever slowly to the full-open position. The meter reading should show a smooth rise in voltage all the way to the full-open throttle position. If the voltage seems to be erratic or doesn't meet the prescribed specification, repeat this procedure several times to confirm results.

5. If the full-open throttle voltage remains erratic or out of specification and if the snowmobile is under warranty, replace the throttle body assembly. If the snowmobile is no longer under warranty, proceed to Adjusting TPS (EFI Models).

6. If the TPS is within the prescribed specification, disconnect the adjustment tool harness from the TPS. Connect the snowmobile TPS harness to the TPS.

■ NOTE: Before installing the TPS harness connector, apply dielectric grease to the connector pins.

ADJUSTING TPS (EFI Models)

■ NOTE: If the snowmobile is in warranty, the TPS is not a service part; if the snowmobile is out of warranty, proceed to step 1.

■ NOTE: It is important that the throttle shaft is in the completely closed position for this procedure.

1. Disconnect the throttle cable/control arm from the throttle shaft.

2. Rotate the idle screw counterclockwise until it no longer contacts the throttle shaft stop. The throttle shaft should now be completely closed. Open the throttle shaft by hand and release it, allowing the shaft to snap closed several times.

3. Disconnect the TPS wiring harness from the TPS; then using Throttle Position Sensor (TPS) Adjustment Tool Kit (p/n 3639-891, connect its wiring harness to the TPS. Connect the red and black digital voltmeter leads to the white and black jacks of the TPS adjustment tool.

4. While observing the digital voltmeter, slowly rotate the sensor until 0.413 volts is observed on the LCD (Liquid Crystal Display) of he multimeter. While holding the sensor in this position, tighten the two screws which secure the sensor to the throttle body securely.

5. Gently snap the throttle open and closed several times to check the TPS voltage. If it has changed from the 0.413 specification, loosen the two screws which secure the sensor and make necessary adjustments.

6. With the full-closed position set to specification, rotate the idle screw clockwise until it contacts the throttle shaft stop. Using the digital multimeter and test harness, rotate the idle screw inward until the prescribed specification is observed.

■ NOTE: It is recommended to rotate the idle screw past the recommended voltage specification by two or three volts; then rotate the idle screw counterclockwise to the correct idle position voltage.

7. With the idle position set to specification, compress the throttle lever to the full-open position. The full-open specification should be observed. Gently snap the throttle lever open and closed several times and note if the reading remains within the specification.

■ NOTE: If, after adjusting the Throttle Position Sensor to the IDLE POSITION specification, the FULL-OPEN POSITION is less than 3.47 volts, recheck the FULL-CLOSED POSITION setting. If the FULL-CLOSED POSITION setting is correct, replace the sensor.

TPS Voltage (EFI Models)					
Engine	Full-Closed	Idle		Full-Open	
		min	max	min	max
500 cc	0.413	0.616	0.724	3.485	4.0585
600/700 cc	0.413	0.646	0.754	3.472	4.0485
900 cc	0.413	0.646	0.754	3.472	4.0485

REPLACING TPS (EFI Models)

■ NOTE: If the snowmobile is in warranty, the TPS is not a service part; if the snowmobile is out of warranty, proceed to step 1.

■ NOTE: It is important that the throttle shaft is in the completely closed position for this procedure.

Removing

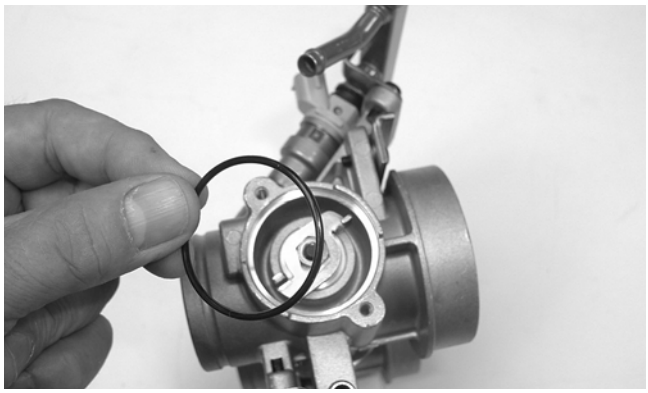
1. Disconnect the throttle cable from the throttle shaft.

2. Rotate the idle screw counterclockwise until it no longer contacts the throttle shaft stop. The throttle shaft should now be completely closed. Open the throttle shaft by hand and release it, allowing the shaft to snap closed several times.

3. Disconnect the TPS wiring harness from the TPS; then noting the position of the TPS, remove the two screws securing the TPS to the throttle body housing and remove the sensor. Account for the O-ring which fits into groove of throttle body.

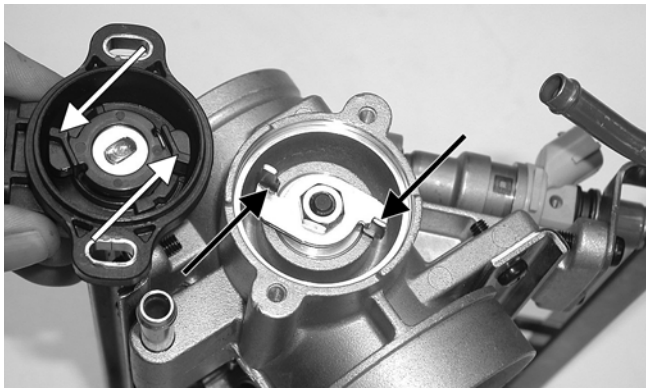
Installing

1. Apply a light coat of silicone grease to the area around the outside of the TPS flange and into the O-ring groove. Install the O-ring into the groove.



MS399

2. Install the new TPS onto the throttle shaft by aligning the “flats” on the throttle shaft cam with the “flats” on the sensor.



MS400A

3. Install the two screws, flat washers, and lock washers securing the sensor to the throttle body. Do not tighten at this time.

4. Adjust the TPS - see Adjusting TPS (EFI Models) in this sub-section.

5. Disconnect the adjustment tool harness from the TPS. Connect the snowmobile TPS harness to the newly installed or adjusted TPS.

■ **NOTE: Before installing the TPS harness connector, apply dielectric grease to the connector pins.**

FAIL-SAFE IGNITION TIMING

Engines equipped with throttle position sensor have a protective feature called “fail-safe” ignition timing which prevents engine damage should the TPS fail. If the TPS does fail, the engine will run normally at low RPM but will run poorly at high RPM. This will allow the operator to get the snowmobile to safety with little or no engine damage.

■ **NOTE: The engine will continue to operate this way until the TPS is replaced.**

Testing Electrical Resistances
(EFI Models)

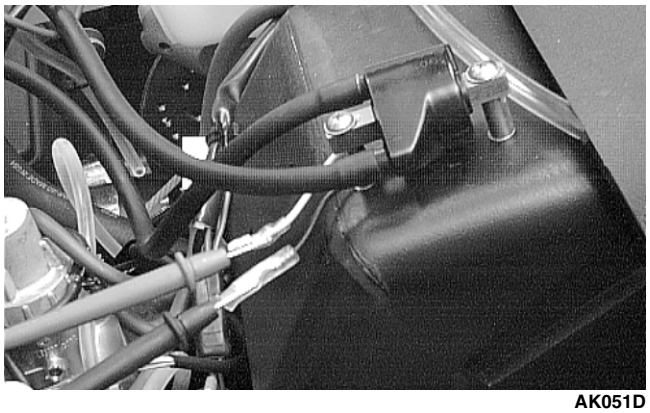
■ **NOTE: Resistance tests of the engine electrical components should be made using the Fluke Multimeter only. Analog-style multitesters may not be accurate enough to use in these critical tests. Replace any component that does not have a test value within specifications.**

IGNITION COIL (Primary)

1. Disconnect the double wire plug from the ECU to the ignition coil.

2. Set the selector in the OHMS position.

3. Connect the red meter lead to the black/orange lead; then connect the black meter lead to the orange/black lead.



AK051D

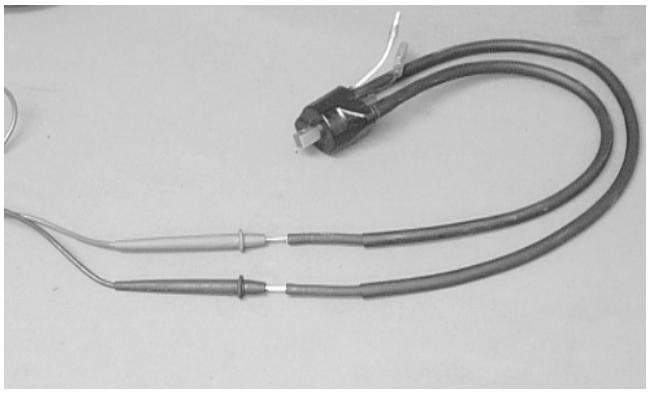
4. Ignition coil primary resistance must be between 0.24-0.36 ohm.

IGNITION COIL (Secondary)

1. Remove the spark-plug caps from the high tension wires.

2. Set the selector in the OHMS position.

3. Connect the red meter lead to one high tension wire; then connect the black meter lead to the other high tension wire.

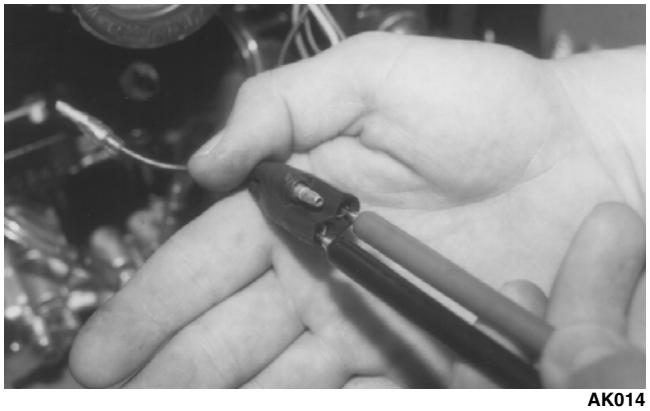


AK050D

4. Ignition coil secondary resistance must be between 6800-10,200 ohms.

CHARGE COIL (1)

1. Disconnect the triple-wire plug from the ECU to the magneto.
2. Set the selector in the OHMS position.
3. Connect the red meter lead to the black/red wire in the plug; then connect the black meter lead to the green/red wire in the plug.

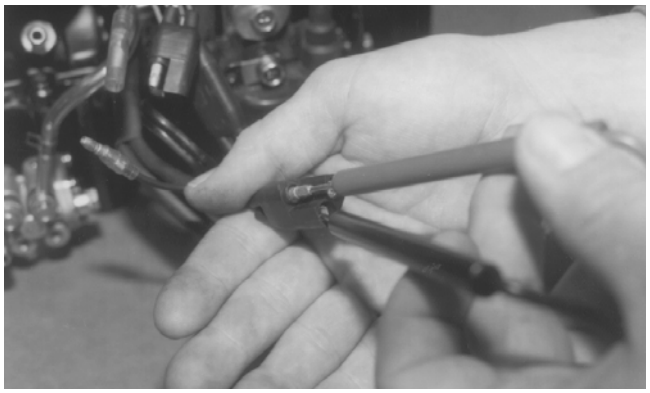


AK014

4. Charge coil (1) resistance must be between 13.6-20.4 ohms.

CHARGE COIL (2)

1. Disconnect the triple-wire plug from the ECU to the magneto.
2. Set the selector in the OHMS position.
3. Connect the red meter lead to the brown/white wire in the plug; then connect the black meter lead to the green/red wire in the plug.



AK013

4. Charge coil (2) resistance must be between 13.6-20.4 ohms.

LIGHTING COIL

1. Disconnect the main wiring harness from the engine.
2. Set the selector in the OHMS position.
3. Connect the two meter leads to each of the yellow leads in the connector from the engine.



AK015

4. Lighting coil resistance must be between 0.08-0.12 ohm.

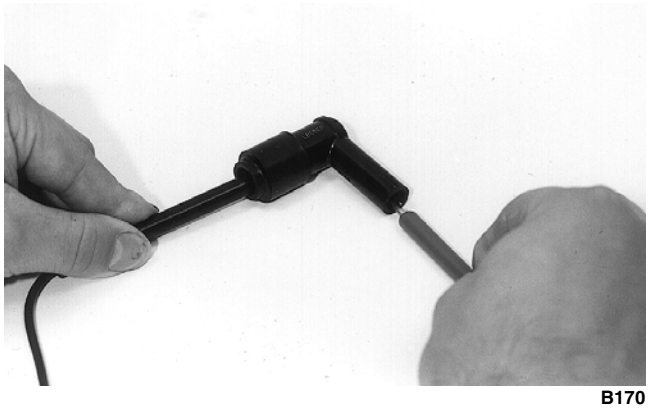
IGNITION TIMING SENSOR

1. Disconnect the two timing sensor leads (green/white and brown) from the ECU.
2. Set the selector in the OHMS position; then connect the meter leads to the sensor leads.
3. Ignition timing sensor resistance must be between 152-228 ohms.

SPARK-PLUG CAP

1. Remove the spark-plug caps from the high tension wires.
2. Set the selector in the OHMS position.

3. In turn on each cap, touch a tester lead to each end of the spark-plug cap.



B170

4. Spark-plug cap resistance must be between 4000-6000 ohms.

IGNITION SWITCH

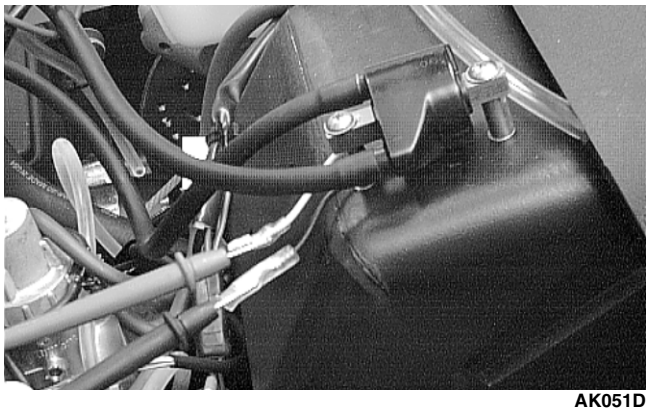
1. Remove the main wiring harness connectors from the ignition switch.
2. Rotate the key to the OFF position.
3. The meter must read less than 1 ohm resistance between the ignition switch terminals.
4. Rotate the key to the RUN position.
5. The meter must read OL (infinite resistance).

Testing Electrical Resistances
(370/440 cc Models)

■ **NOTE: Resistance tests of the engine electrical components should be made using the Fluke Multimeter only. Analog-style multitesters may not be accurate enough to use in these critical tests. Replace any component that does not have a test value within specifications.**

IGNITION COIL (Primary)

1. Disconnect the two connectors from the CDI unit to the ignition coil.
2. Set the selector in the OHMS position.
3. Connect the red meter lead to the orange lead; then connect the black meter lead to the black lead.

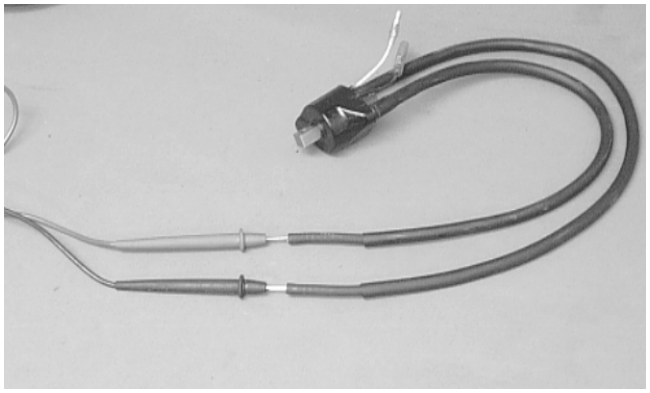


AK051D

4. Ignition coil primary resistance must be between 0.26-0.35 ohm.

IGNITION COIL (Secondary)

1. Remove the spark-plug caps from the high tension wires.
2. Set the selector in the OHMS position.
3. Connect the red meter lead to one high tension wire; then connect the black meter lead to the other high tension wire.

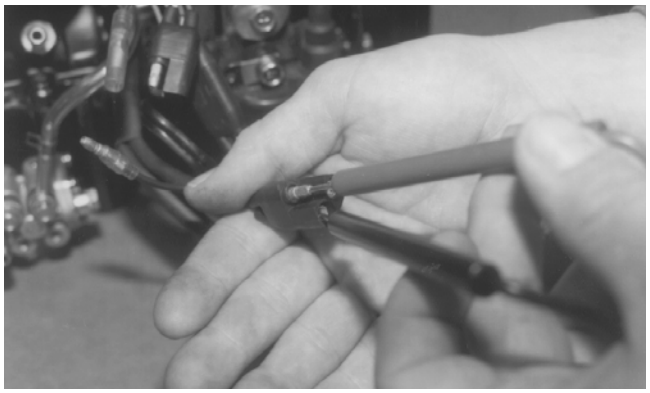


AK050D

4. Ignition coil secondary resistance must be between 6800-10,200 ohms.

STATOR COIL (Charge)

1. Disconnect the triple-wire plug from the CDI unit to the magneto.
2. Set the selector in the OHMS position.
3. Connect the red meter lead to the red/white wire in the plug; then connect the black meter lead to the black/red wire in the plug.

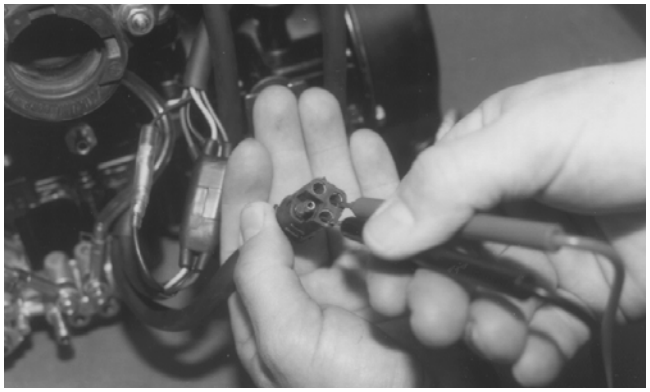


AK013

4. Stator (charge) coil resistance must be between 128-192 ohms.

LIGHTING COIL

1. Disconnect the main wiring harness from the engine.
2. Set the selector in the OHMS position.
3. Connect the two meter leads to each of the yellow leads in the connector from the engine.

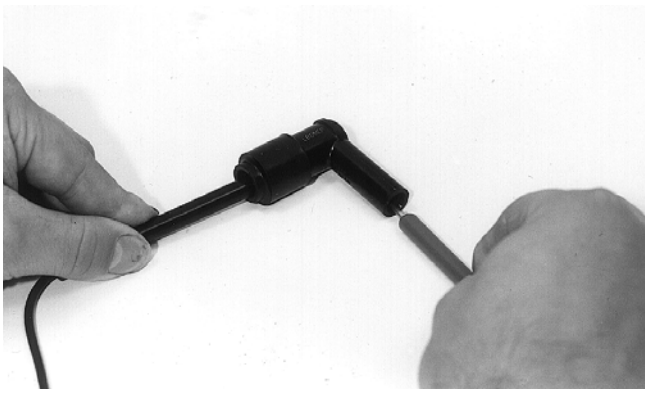


AK015

4. Lighting coil resistance must be between 0.17-0.26 ohm.

SPARK-PLUG CAP

1. Remove the spark-plug caps from the high tension wires.
2. Set the selector in the OHMS position.
3. In turn on each cap, touch a tester lead to each end of the spark-plug cap.



B170

4. Spark-plug cap resistance must be between 4000-6000 ohms.

IGNITION SWITCH

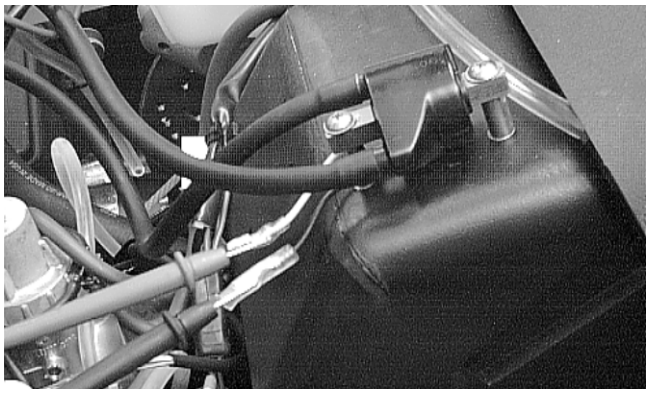
1. Remove the main wiring harness connectors from the ignition switch.
2. Rotate the key to the OFF position.
3. The meter must read less than 1 ohm resistance between the ignition switch terminals.
4. Rotate the key to the RUN position.
5. The meter must read OL (infinite resistance).

Testing Electrical Resistances
(500 cc Carbureted Model)

■ NOTE: Resistance tests of the engine electrical components should be made using the Fluke Multimeter only. Analog-style multitesters may not be accurate enough to use in these critical tests. Replace any component that does not have a test value within specifications.

IGNITION COIL (Primary)

1. Disconnect the double wire plug from the CDI unit to the ignition coil.
2. Set the selector in the OHMS position.
3. Connect the red meter lead to the orange/black lead; then connect the black meter lead to the black/orange lead.

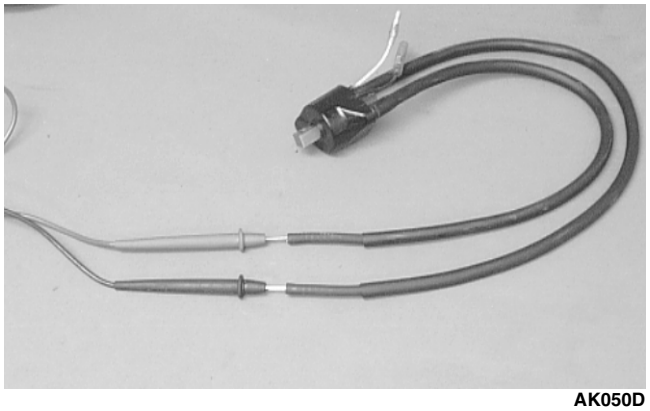


AK051D

4. Ignition coil primary resistance must be between 0.27-0.41 ohm.

IGNITION COIL (Secondary)

1. Remove the spark-plug caps from the high tension wires.
2. Set the selector in the OHMS position.
3. Connect the red meter lead to one high tension wire; then connect the black meter lead to the other high tension wire.



AK050D

4. Ignition coil secondary resistance must be between 6800-10,200 ohms.

DC POWER COIL

■ NOTE: On APV-equipped carbureted models, the traditional charge coil(s) have been replaced by a single DC power coil on the stator.

1. Disconnect the two plugs (red/yellow and yellow/red) from the CDI unit to the DC power coil.
2. Set the selector in the OHMS position.
3. Connect the red meter lead to one wire; then connect the black meter lead to the other wire.
4. DC power coil resistance must be between 0.71-1.07 ohms.

LIGHTING COIL

1. Disconnect the main wiring harness from the engine.
2. Set the selector in the OHMS position.
3. Connect the two meter leads to each of the yellow leads in the connector from the engine.



AK015

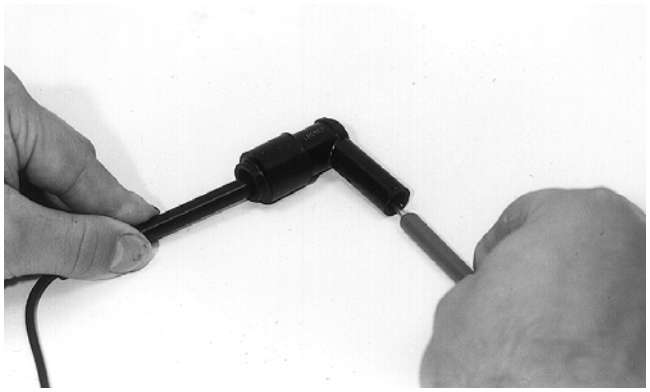
4. Lighting coil resistance must be between 0.12-0.18 ohm.

IGNITION TIMING SENSOR

1. Disconnect the two timing sensor leads (green/white and brown/green) from the CDI unit.
2. Set the selector in the OHMS position; then connect the meter leads to the sensor leads.
3. Ignition timing sensor resistance must be between 148-222 ohms.

SPARK-PLUG CAP

1. Remove the spark-plug caps from the high tension wires.
2. Set the selector in the OHMS position.
3. In turn on each cap, touch a tester lead to each end of the spark-plug cap.



B170

5

4. Spark-plug cap resistance must be between 4000-6000 ohms.

IGNITION SWITCH

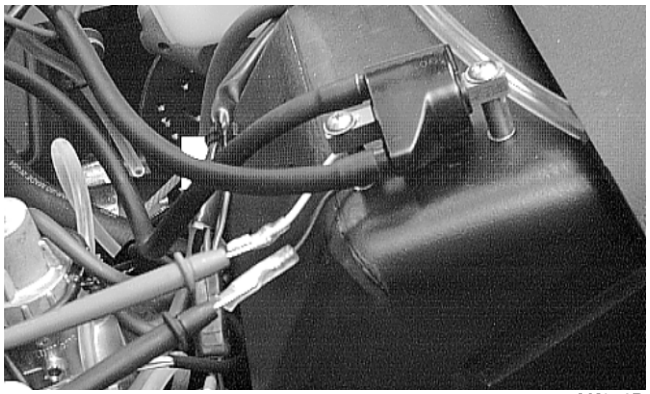
1. Remove the main wiring harness connectors from the ignition switch.
2. Rotate the key to the OFF position.
3. The meter must read less than 1 ohm resistance between the ignition switch terminals.
4. Rotate the key to the RUN position.
5. The meter must read OL (infinite resistance).

Testing Electrical Resistances
(570 cc Model)

■ **NOTE: Resistance tests of the engine electrical components should be made using the Fluke Multimeter only. Analog-style multitesters may not be accurate enough to use in these critical tests. Replace any component that does not have a test value within specifications.**

IGNITION COIL (Primary)

1. Disconnect the double wire plug from the CDI unit to the ignition coil.
2. Set the selector in the OHMS position.
3. Connect the red meter lead to the orange wire in the plug; then connect the black meter lead to the black wire in the plug.

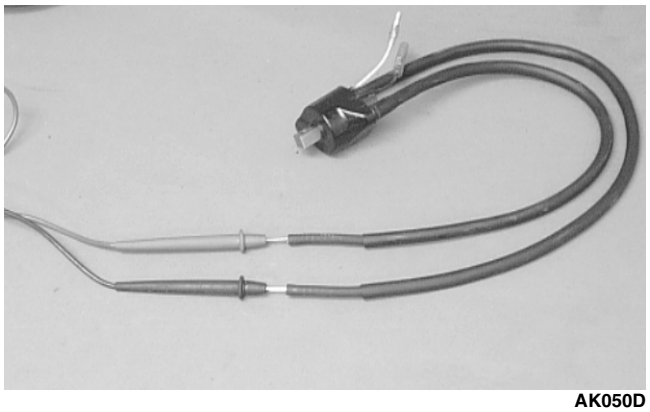


AK051D

4. Ignition coil primary resistance must be between 0.26-0.35 ohm.

IGNITION COIL (Secondary)

1. Remove the spark-plug caps from the high tension wires.
2. Set the selector in the OHMS position.
3. Connect the red meter lead to one high tension wire; then connect the black meter lead to the other high tension wire.

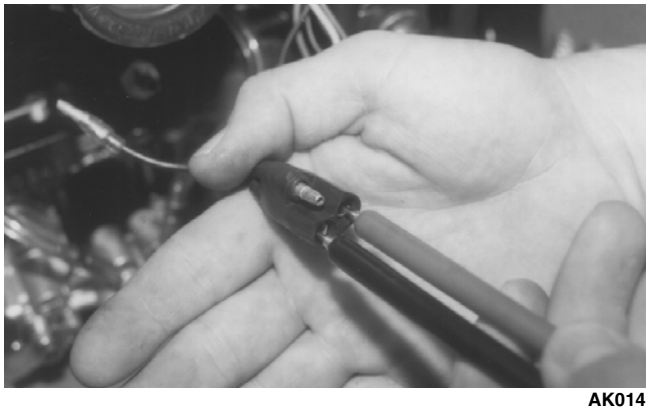


AK050D

4. Ignition coil secondary resistance must be between 6800-10,200 ohms.

CHARGE COIL (1)

1. Disconnect the three-wire plug from the CDI unit to the magneto.
2. Set the selector in the OHMS position.
3. Connect the red meter lead to the black/red wire in the plug; then connect the black meter lead to the green/red wire in the plug.



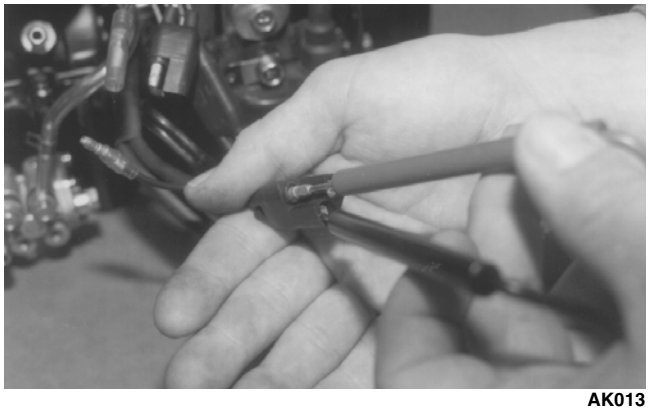
AK014

4. Charge coil (1) resistance must be between 12-18 ohms.

CHARGE COIL (2)

1. Disconnect the three-wire plug from the CDI unit to the magneto.
2. Set the selector in the OHMS position.

3. Connect the red meter lead to the brown/white wire in the plug; then connect the black meter lead to the green/red wire in the plug.

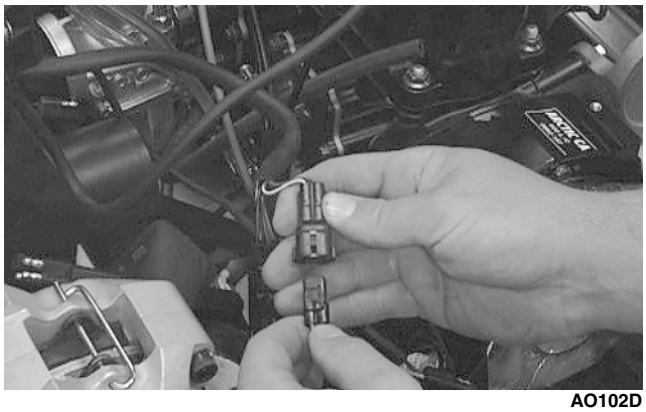


AK013

4. Charge coil (2) resistance must be between 12-18 ohms.

IGNITION TIMING SENSOR

1. Disconnect the green/white and brown wires from the timing sensor to the main harness.

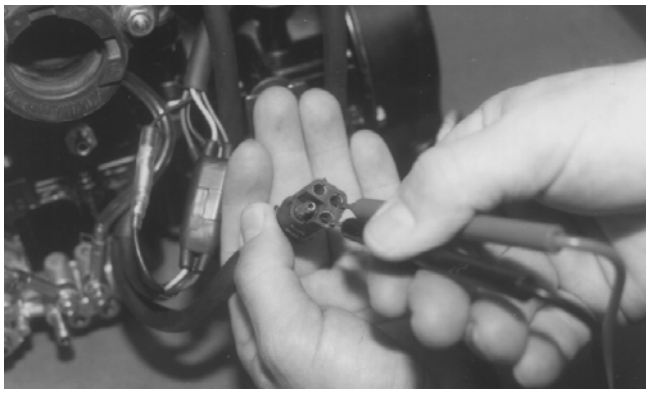


AO102D

2. Set the selector in the OHMS position.
3. Connect the red tester lead to the green/white wire; then connect the black tester lead to the brown wire.
4. Ignition timing sensor resistance must be between 148-222 ohms.

LIGHTING COIL

1. Disconnect the main wiring harness from the engine.
2. Set the selector in the OHMS position.
3. Connect the two meter leads to each of the yellow leads in the connector from the engine.

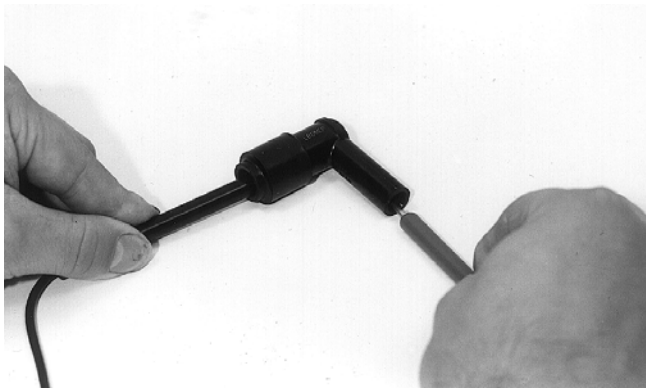


AK015

4. Lighting coil resistance must be between 0.12-0.18 ohm.

SPARK-PLUG CAP

1. Remove the spark-plug caps from the high tension wires.
2. Set the selector in the OHMS position.
3. In turn on each cap, touch a tester lead to each end of the spark-plug cap.



B170

4. Spark-plug cap resistance must be between 4000-6000 ohms.

IGNITION SWITCH

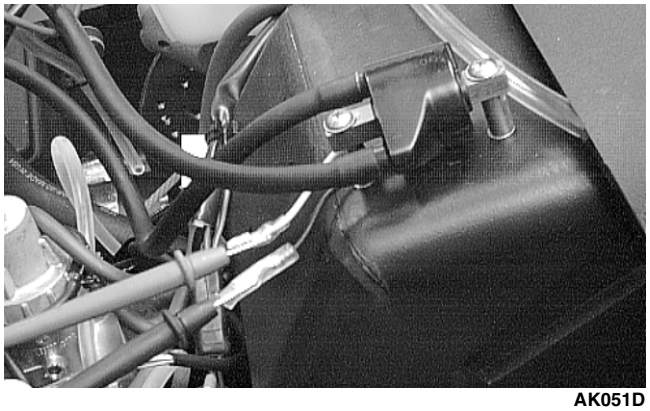
1. Remove the main wiring harness connectors from the ignition switch.
2. Rotate the key to the OFF position.
3. The meter must read less than 1 ohm resistance between the ignition switch terminals.
4. Rotate the key to the RUN position.
5. The meter must read OL (infinite resistance).

Testing Electrical Resistances
(700 cc Carbureted Models)

■ **NOTE: Resistance tests of the engine electrical components should be made using the Fluke Multimeter only. Analog-style multitesters may not be accurate enough to use in these critical tests. Replace any component that does not have a test value within specifications.**

IGNITION COIL (Primary)

1. Disconnect the double wire plug from the CDI unit to the ignition coil.
2. Set the selector in the OHMS position.
3. Connect the red meter lead to the orange lead; then connect the black meter lead to the black lead.

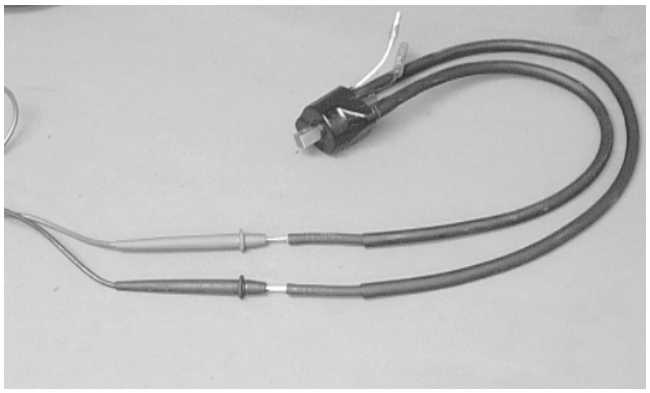


AK051D

4. Ignition coil primary resistance must be between 0.24-0.36 ohm.

IGNITION COIL (Secondary)

1. Remove the spark-plug caps from the high tension wires.
2. Set the selector in the OHMS position.
3. Connect the red meter lead to one high tension wire; then connect the black meter lead to the other high tension wire.



AK050D

4. Ignition coil secondary resistance must be between 6800-10,200 ohms.

DC POWER COIL

■ **NOTE: On APV-equipped carbureted models, the traditional charge coil(s) have been replaced by a single DC power coil on the stator.**

1. Disconnect the two plugs (red/yellow and yellow/red) from the CDI unit to the DC power coil.
2. Set the selector in the OHMS position.
3. Connect the red meter lead to one wire; then connect the black meter lead to the other wire.
4. DC power coil resistance must be between 0.71-1.07 ohms.

LIGHTING COIL

1. Disconnect the main wiring harness from the engine.
2. Set the selector in the OHMS position.
3. Connect the two meter leads to each of the yellow leads in the connector from the engine.



AK015

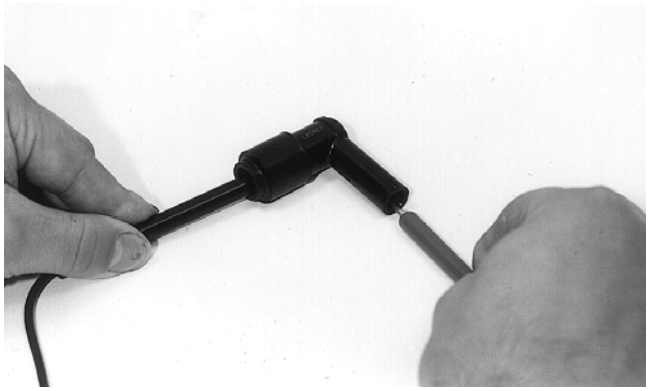
4. Lighting coil resistance must be between 0.08-0.12 ohm.

IGNITION TIMING SENSOR

1. Disconnect the two timing sensor leads (green/white and brown/green) from the CDI.
2. Set the selector in the OHMS position; then connect the meter leads to the sensor leads.
3. Ignition timing sensor resistance must be between 148-222 ohms.

SPARK-PLUG CAP

1. Remove the spark-plug caps from the high tension wires.
2. Set the selector in the OHMS position.
3. In turn on each cap, touch a tester lead to each end of the spark-plug cap.



B170

4. Spark-plug cap resistance must be between 4000-6000 ohms.

IGNITION SWITCH

1. Remove the main wiring harness connectors from the ignition switch.
2. Rotate the key to the OFF position.
3. The meter must read less than 1 ohm resistance between the ignition switch terminals.
4. Rotate the key to the RUN position.
5. The meter must read OL (infinite resistance).

Voltage Regulator Test
(Carbureted Models)

■ NOTE: The following test should be made using MaxiClips (p/n 0644-455) and the Fluke Model 73 Multimeter (p/n 0644-191) set to the AC Volt scale.

■ NOTE: Test specifications are on the Electrical Specifications (Individual) pages in this section.

This test should be made at the accessory connector of the hood harness.

⚠ WARNING

Most voltages generated by the ignition system are sufficient to interrupt pacemakers! All technicians, especially those using pacemakers, must avoid contact with all electrical connections after the engine has been started.

1. Connect the red maxiclip and meter lead to the yellow wire in the connector; then connect the black maxiclip and meter lead to the brown wire in the connector.
2. Start the engine and allow it to idle. Meter reading must be within specification.

Voltage Regulator Test
(EFI Models)

■ NOTE: The following test should be made using MaxiClips (p/n 0644-455) and the Fluke Model 73 Multimeter (p/n 0644-191) set to the AC Volt scale.

■ NOTE: Test specifications are on the Electrical Specifications (individual) pages in this section.

⚠ WARNING

Most voltages generated by the ignition system are sufficient to interrupt pacemakers! All technicians, especially those using pacemakers, must avoid contact with all electrical connections after the engine has been started.

■ NOTE: Locate 3-wire connector at the voltage regulator.

1. Connect the red maxiclip and meter lead to the yellow lead of the connector; then connect the black maxiclip and meter lead to the brown lead of the connector.
2. With the rear of the snowmobile on a shielded safety stand, run the engine at 2000 RPM.
3. Meter reading must be within specification.

■ Repeat test three times to confirm results.

Voltage Regulator (APV) Test
(EFI Models)

■ **NOTE: The following test should be made using MaxiClips (p/n 0644-455) and the Fluke Model 73 Multimeter (p/n 0644-191) set to the DC Volt scale.**

■ **NOTE: Test specifications are on the Electrical Specifications (individual) pages in this section.**

■ **NOTE: Locate the red/blue and brown leads at the voltage regulator.**

1. Connect the red maxiclip and meter lead to the red/blue lead; then connect the black maxiclip and meter lead to the brown lead.
2. With the rear of the snowmobile on a shielded safety stand, run engine at 2000 RPM.
3. Meter reading must be within specification.

■ **NOTE: Repeat this test three times to confirm results.**

Regulator/Rectifier Test
(Carbureted APV Models)

■ **NOTE: The following test should be made using MaxiClips (p/n 0644-455) and the Fluke Model 73 Multimeter (p/n 0644-191) set to the DC Volt scale.**

■ **NOTE: Test specifications are on the Electrical Specifications (individual) pages in this section.**

■ **NOTE: Locate the 4-wire connector at the regulator/rectifier.**

1. Connect the red maxiclip and meter lead to the red/blue lead in the connector; then connect the black maxiclip and meter lead to the brown/yellow lead.
2. With the rear of the snowmobile on a shielded safety stand, run the engine at 2000 RPM.
3. Meter reading must be within specification.

■ **NOTE: Repeat test three times to confirm results.**

Condenser Test
(Carbureted APV Models)

■ **NOTE: The following test should be made using MaxiClips (p/n 0644-455) and the Fluke Model 73 Multimeter (p/n 0644-191) set to the DC Volt scale.**

■ **NOTE: Test specifications are on the Electrical Specifications (individual) pages in this section.**

■ **NOTE: Locate the leads at the condenser.**

1. Connect the red maxiclip and meter lead to the red lead; then connect the black maxiclip and meter lead to the brown lead.
2. With the rear of the snowmobile on a shielded safety stand, run the engine at 2000 RPM.
3. Meter reading must be within specification.

■ **NOTE: Repeat test three times to confirm results.**

Servomotor Test

■ **NOTE: A 12-volt battery and test leads will be needed for this test.**

1. Remove the servomotor from the snowmobile.

⚠ CAUTION

Care must be taken not to contact the servo yellow, orange, or black/white terminals, or damage to the potentiometer circuit will result.

2. Contact the black/red servo terminal with the battery positive lead; then contact the red/black servo terminal with the battery negative lead.
3. The servo should rotate when the negative lead contacts the red/black terminal. Note the direction of rotation.
4. Reverse the connections on the servo terminals: positive lead to red/black and negative lead to black/red. The servomotor should rotate in the opposite direction.
5. Install the servomotor.

■ **NOTE: If the servo operates correctly in the above test but fails to operate when connected to the ECU/CDI at the designated RPM, proceed to Potentiometer Test.**

Potentiometer Test

■ **NOTE: The following test should be made using MaxiClips (p/n 0644-455) and the Fluke Model 73 Multimeter (p/n 0644-191) set to the ohms scale.**

1. Remove the servomotor from the snowmobile.
2. Connect the red maxiclip and meter lead to the black/white servo terminal; then connect the black maxiclip and meter lead to the yellow servo terminal.
3. Rotate the servo pulley counterclockwise. The ohms should increase as the pulley is rotated until it reaches 4700-5000 ohms.
4. Continue the pulley rotation, and there will be a small area in the rotation at which the ohm reading will disappear; then it will return again.
5. Continue the pulley rotation, and the ohms should appear at a very low value but will again increase to 4700 ohms. This is normal operation.
6. Install the servomotor.

■ **NOTE: If the servo operates correctly and the potentiometer test is correct but fails to operate when connected to the ECU/CDI at the designated RPM, replace the ECU/CDI.**

Peak Voltage Tests
(Fan Cooled Models)

■ **NOTE: The following tests should be made using the Fluke Model 73 Multimeter (p/n 0644-191) set to the DC Volt scale with Peak Voltage Reading Adapter (p/n 0644-307).**

■ **NOTE: Peak voltage test specifications are on the Electrical Specifications (Individual) pages in this section.**

The Fluke Multimeter w/Adapter can perform the following tests.

A. Stator/Charge Coil(s) Output

B. Lighting Coil Output

C. Primary Coil Output

■ **NOTE: Peak Voltage Tests were made with connectors plugged in, spark plugs removed and grounded, and by pulling the recoil starter rope briskly.**

⚠ WARNING

Most voltages generated by the ignition system are sufficient to interrupt pacemakers! All technicians, especially those using pacemakers, must avoid contact with all electrical connections when making these tests.

STATOR (Charge) COIL OUTPUT (370/440 cc)

1. Connect the red meter lead to the red/white wire from the stator; then connect the black meter lead to the black/red wire from the stator.
2. Pull the recoil starter rope briskly. Meter reading must be within specification.

LIGHTING COIL OUTPUT

1. Connect the red meter lead to one yellow wire; then connect the black meter lead to the other yellow wire.
2. Pull the recoil starter rope briskly. Meter reading must be within specification.

CHARGE COIL (1) OUTPUT (570 cc)

1. Connect the red meter lead to the black/red wire; then connect the black meter lead to the green/red wire.
2. Pull the recoil starter rope briskly. Meter reading must be within specification.

CHARGE COIL (2) OUTPUT (570 cc)

1. Connect the red meter lead to the brown/white wire; then connect the black meter lead to the green/red wire.
2. Pull the recoil starter rope briskly. Meter reading must be within specification.

PRIMARY COIL OUTPUT

1. Connect the red meter lead to the orange wire; then connect the black meter lead to the black wire.
2. Pull the recoil starter rope briskly. Meter reading must be within specification.

Peak Voltage Tests
(700 cc Carbureted Models)

■ **NOTE: The following tests should be made using the Fluke Model 73 Multimeter (p/n 0644-191) set to the DC Volt scale with Peak Voltage Reading Adapter (p/n 0644-307). For "engine running" test, use MaxiClips (p/n 0644-455).**

■ **NOTE: Peak voltage test specifications are on the Electrical Specifications (Individual) pages in this section.**

The Fluke Multimeter w/Adapter can perform the following tests.

A. DC Power Coil Output

B. Primary Coil Output

C. Ignition Timing Sensor

D. Lighting Coil Output

■ **NOTE: Peak Voltage Tests (unless otherwise indicated) were made with connectors plugged in, spark plugs removed and grounded, and by pulling the recoil starter rope briskly.**

⚠ WARNING

Most voltages generated by the ignition system are sufficient to interrupt pacemakers! All technicians, especially those using pacemakers, must avoid contact with all electrical connections after the engine has been started.

DC POWER COIL OUTPUT

1. Connect the red meter lead to the red/yellow wire from the stator; then connect the black meter lead to the yellow/red wire from the stator.
2. Pull the recoil starter rope briskly. Meter reading must be within specification.

DC POWER COIL OUTPUT (@ 2000 RPM)

■ **NOTE: Locate the 4-wire connector attached to the regulator/rectifier.**

1. Attach the red maxiclip to the yellow/red lead; then attach the black maxiclip to the red/yellow lead.
2. Connect the red meter lead to the red maxiclip; then connect the black meter lead to the black maxiclip.
3. With the rear of the snowmobile on a shielded safety stand, run the engine at 2000 RPM.
4. Meter reading must be within specification.

PRIMARY COIL OUTPUT

1. Connect the red meter lead to the orange wire; then connect the black meter lead to the black wire.
2. Pull the recoil starter rope briskly. Meter reading must be within specification.

IGNITION TIMING SENSOR

1. Connect the red meter lead to the green/white wire; then connect the black meter lead to the brown/green wire.
2. Pull the recoil starter rope briskly. Meter reading must be within specification.

LIGHTING COIL OUTPUT

1. Connect the red meter lead to one yellow wire; then connect the black meter lead to the other yellow wire.
2. Pull the recoil starter rope briskly. Meter reading must be within specification.

Peak Voltage Tests
(500 cc Carbureted Model)

■ **NOTE: The following tests should be made using the Fluke Model 73 Multimeter (p/n 0644-191) set to the DC Volts scale with Peak Voltage Reading Adapter (p/n 0644-307). For "engine running" test, use MaxiClips (p/n 0644-455).**

■ **NOTE: Peak voltage test specifications are on the Electrical Specifications (Individual) pages in this section.**

The Fluke Multimeter w/Adapter can perform the following tests.

A. DC Power Coil Output

B. Primary Coil Output

C. Ignition Timing Sensor

D. Lighting Coil Output

■ **NOTE: Peak Voltage Tests (unless otherwise indicated) were made with connectors plugged in, spark plugs removed and grounded, and by pulling the recoil starter rope briskly.**

⚠ WARNING

Most voltages generated by the ignition system are sufficient to interrupt pacemakers! All technicians, especially those using pacemakers, must avoid contact with all electrical connections when pulling the recoil starter rope or after the engine has been started.

DC POWER COIL OUTPUT

1. Connect the red meter lead to the red/yellow wire from the stator; then connect the black meter lead to the yellow/red wire from the stator.
2. Pull the recoil starter rope briskly. Meter reading must be within specification.

DC POWER COIL OUTPUT (@ 2000 RPM)

■ **NOTE: Locate the 4-wire connector attached to the regulator/rectifier.**

1. Attach the red maxiclip to the yellow/red lead; then attach the black maxiclip to the red/yellow lead.
2. Connect the red meter lead to the red maxiclip; then connect the black meter lead to the black maxiclip.
3. With the rear of the snowmobile on a shielded safety stand, run the engine at 2000 RPM.
4. Meter reading must be within specification.

PRIMARY COIL OUTPUT

1. Connect the red meter lead to the orange/black wire; then connect the black meter lead to the black/orange wire.
2. Pull the recoil starter rope briskly. Meter reading must be within specification.

IGNITION TIMING SENSOR

1. Connect the red meter lead to the green/white wire; then connect the black meter lead to the brown/green wire.
2. Pull the recoil starter rope briskly. Meter reading must be within specification.

LIGHTING COIL OUTPUT

1. Connect the red meter lead to one yellow wire; then connect the black meter lead to the other yellow wire.
2. Pull the recoil starter rope briskly. Meter reading must be within specification.

Peak Voltage Tests
(EFI Models)

■ **NOTE: The following tests should be made using the Fluke Model 73 Multimeter (p/n 0644-191) set to the DC Volt scale with Peak Voltage Reading Adapter (p/n 0644-307). For "engine running" test, use MaxiClips (p/n 0644-455).**

■ **NOTE: Peak voltage test specifications are on the Electrical Specifications (Individual) pages in this section.**

The Fluke Multimeter w/Adapter can perform the following output tests.

A. Fuel Pump Coil

B. Injector Coil

C. Charge Coil (1) Output

D. Charge Coil (2) Output

E. Ignition Timing Sensor

F. Primary Coil Output

G. Lighting Coil Output

■ **NOTE: Peak Voltage Tests (unless otherwise indicated) were made with connectors plugged in, spark plugs removed and grounded, and by pulling the recoil starter rope briskly.**

⚠ WARNING

Most voltages generated by the ignition system are sufficient to interrupt pacemakers! All technicians, especially those using pacemakers, must avoid contact with all electrical connections when pulling the recoil starter rope or after the engine has been started.

FUEL PUMP COIL

1. Test between the two orange/white wires in the four-prong connector from the stator.

2. Pull the recoil starter rope briskly. Meter reading must be within specification.

INJECTOR COIL

1. Test between the two blue/white leads in the connector harness from the stator plate.

2. Pull the recoil starter rope briskly. Meter reading must be within specification.

CHARGE COIL (1) OUTPUT

1. Test between the green/red and black/red wires in the triple-plug connector from the stator.

2. Pull the recoil starter rope briskly. Meter reading must be within specification.

CHARGE COIL (2) OUTPUT

1. Test between the green/red and brown/white wires in the triple-plug connector from the stator.

2. Pull the recoil starter rope briskly. Meter reading must be within specification.

IGNITION TIMING SENSOR

1. Test between the green/white and brown wires in the connector from the sensor.

2. Pull the recoil starter rope briskly. Meter reading must be within specification.

PRIMARY COIL OUTPUT

1. Connect the red meter lead to the black/orange wire; then connect the black meter lead to the orange/black wire.

2. Pull the recoil starter rope briskly. Meter reading must be within specification.

LIGHTING COIL OUTPUT

1. Connect the red meter lead to one yellow wire; then connect the black meter lead to the other yellow wire.

2. Pull the recoil starter rope briskly. Meter reading must be within specification.

LIGHTING COIL OUTPUT (@ 2000 RPM)

1. Attach the red maxiclip to the yellow lead; then attach the black maxiclip to the brown lead.

2. Connect the red meter lead to the red maxiclip; then connect the black meter lead to the black maxiclip.

3. With the rear of the snowmobile on a shielded safety stand, run the engine at 2000 RPM.

4. Meter reading must be within specification.

Testing Low-Oil Light Sensor

The low-oil light sensor is a magnetic switch. Its operation is based on a magnet located around the inside diameter of a 1/2 in. hole in a plastic float. The switch located in the stem of the sending unit is positioned through the hole in the float. When the float drops to the lower part of the stem, the magnet closes the electrical contacts (located in the stem) allowing the current to pass on to the warning light.

If the sensor should fail, it must be replaced. To test the sensor, use the following procedure.

1. Remove the sensor from the oil reservoir by twisting and pulling upwards. Wipe excess oil from the sensor.

2. Unplug the sensor from the wiring harness.

3. Using an ohmmeter, set the selector on the X1K position.

4. Touch each of the meter leads to one of the two wires coming from the sensor. With the sensor in its normal position (float end down), the meter should read resistance.

5. If the meter reads no resistance, check to make sure good contact has been made with each of the wires coming from the sensor. If the meter still reads no resistance, replace the sensor.

6. While maintaining contact between the meter leads and the sensor, raise the float. The meter must read no resistance. If the meter reads resistance, replace the sensor.

7. If the sensor tested out satisfactory but the light doesn't illuminate with only a small amount of oil in the reservoir, check the bulb.

8. If the bulb is in good condition, check for voltage at the connection where the sensor plugs into the accessory wiring harness. Using a multimeter set on the 50 ACV scale, start the engine and allow it to idle. Touch the red lead of the voltmeter to the red wire in the two-prong connector. Touch the black lead to the black wire in the wiring harness. At idle, the meter should read 5 to 6 volts (AC). If no voltage is present but the lights on the snowmobile operate normally, either check the wiring harness for a broken wire or replace the harness.

Testing High Temperature Sensor

1. Disconnect the main wiring harness connector from the temperature sensor.

2. Connect an ohmmeter between the sensor terminal and any convenient chassis ground (or any brown wire). The ohmmeter must read less than 20 ohms of resistance with the water temperature more than +230°F. The ohmmeter must read no resistance with the water temperature less than +190°F.

■ NOTE: It may be easier to remove the sensor from the water manifold for testing purposes. Immerse the sensor body (only up to the threads) in automatic transmission fluid and slowly heat the fluid. The ohmmeter must indicate the above resistances when connected between the sensor terminal and the sensor body/chassis.

Testing High Temperature Warning Light

1. Disconnect the main wiring harness connector from the temperature sensor.

2. Temporarily place a jumper wire from the main wiring harness sensor connector to any convenient chassis ground (or any brown wire).

3. If the high temperature warning light is not illuminated with the engine running (and the harness terminal grounded), test the light bulb. An ohmmeter must read less than 10 ohms across the bulb filament.

4. If the bulb does not illuminate even when tested good, use the ohmmeter to test the bulb harness. Also test the red/white wire continuity from the temperature sensor connector to the bulb connector.

Testing Fuel Gauge

1. Disconnect the fuel gauge from the hood wiring harness.

2. Connect the positive lead of a 12-volt power supply to the yellow wire and the negative lead of the 12-volt power supply to the brown wire.

3. The fuel gauge needle should peg in the negative (empty) direction.

4. With the fuel gauge still connected to the 12-volt power supply (from step 2), install a jumper wire (such as a paper clip) between the brown wire and the gray wire.

5. The fuel gauge needle should peg in the positive (full) direction.

■ NOTE: A fuel gauge failing these testing procedures is defective and must be replaced.

Testing Fuel Gauge Sender

1. Remove the hardware securing the console to the fuel tank and frame; then move the console out of the way.

2. Disconnect the fuel gauge sender unit (black two-wire connector) from the main wiring harness.

3. Connect the ohmmeter leads to the two sender wires.

4. Compare the reading to the chart following.

Fuel Gauge Sender	
Position	**Ohms**
Full	4-6
1/2	37.6-56.4
Empty	76-114

Testing Electric Fuel Pump

1. Remove the hardware securing the console to the gas tank and frame; then move the console out of the way.
2. Disconnect the fuel pump (white two-wire connector on the ZR 900 EFI or the black two-wire connector on the remaining EFI models) from the main wiring harness.
3. Connect the positive lead of a 12-volt power supply to the red wire and the negative lead of the 12-volt power supply to the black wire.
4. The pump should operate (it would be heard running).

■ **NOTE: If the fuel pump fails to operate, the pump is defective and must be replaced.**

Solenoid
(Electric Start Models)

TESTING

■ **NOTE: The electric start solenoid may be tested using either one of the following methods.**

Method #1

1. Disconnect the electric start harness from the main wiring harness.
2. Place the ohmmeter leads across the solenoid coil terminals (brown wire and red/white wire).
3. The ohmmeter must read between 3 and 5 ohms.

Method #2

1. Connect the battery to the solenoid coil terminals (brown wire and red/white wire).
2. A loud, audible “click” should be heard as the solenoid internal contacts make connection.
3. Disconnect the battery from the solenoid.
4. A loud, audible “click” should be heard as the solenoid internal contacts release.

■ **NOTE: An in-line ammeter would measure between 2 and 4 amps of solenoid coil current flow with the battery connected.**

⚠ CAUTION

NEVER connect an in-line ammeter with the large starter cables because the 200 amps of current flow will instantly damage most ammeters.

Charging Diode
(Electric Start Models)

TESTING

1. Disconnect the electric start harness from the main wiring harness.

⚠ CAUTION

To prevent ohmmeter damage when testing circuits on snowmobiles equipped with an electric start, be sure to disconnect the battery before testing.

2. Connect the ohmmeter positive lead (red) to the diode yellow wire and the ohmmeter negative lead (black) to the diode red wire. The ohmmeter must read between 300 and 700 ohms.
3. Connect the ohmmeter positive lead (red) to the diode red wire and the ohmmeter negative lead (black) to the diode yellow wire. The ohmmeter must read OPEN (infinite resistance).

Fuse
(Electric Start Models)

TESTING

1. Remove the fuse from the fuse holder.
2. Connect the ohmmeter across the fuse end-caps.
3. The ohmmeter must read less than 1 ohm of resistance.

Ignition Switch - Electric Start Function
(Electric Start Models)

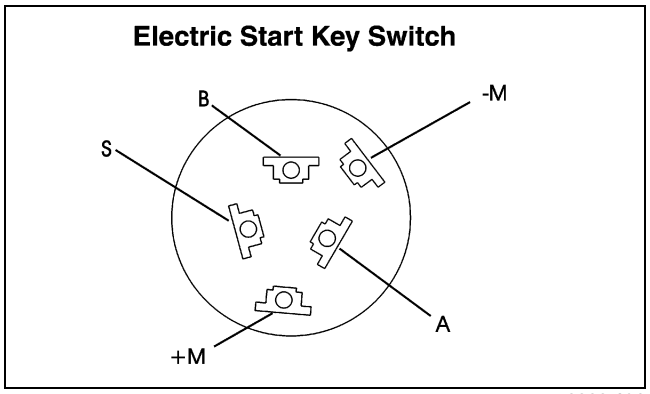
TESTING

⚠ CAUTION

To prevent ohmmeter damage when testing circuits on snowmobiles equipped with an electric start, be sure to disconnect the battery before testing.

1. Disconnect the wiring harness from the ignition switch; then remove the switch from the console.
2. Using the ohmmeter, test the connections indicated in the following chart. If the meter does not read as specified or has more than one ohm of resistance, the switch must be replaced.

Position	Lead to Terminal	Lead to Terminal	Meter Reading
OFF	-M	+M	CLOSED
ON	-M	+M	OPEN
ON	B	A	CLOSED
START	-M	+M	OPEN
START	B	S	CLOSED



0000-126

■ **NOTE: Some ignition-switch terminals may not be labeled (-M, +M, A, B, or S). Refer to the wiring harness diagram of the ignition switch when connecting the ohmmeter.**

Starter Motor

REMOVING (370/440 cc Models)

1. Disconnect the battery.
2. Remove the expansion chamber.
3. Remove the nut and washer(s) securing the positive cable; then remove cable from the starter motor.
4. Remove the drive clutch.
5. Remove the hardware securing the starter motor and end plate/drive cap assembly to the bracket; then remove the starter motor assembly.

REMOVING (570 cc Model)

1. Disconnect the battery.

■ **NOTE: On certain models, it may be necessary to remove the expansion chamber.**

2. Remove the nut and washer(s) securing the positive cable; then remove cable from the starter motor.
3. Loosen the two Allen-head screws securing the flex-drive shaft to the pinion drive; then remove the hardware securing the starter motor to the bracket. Remove the starter motor assembly.

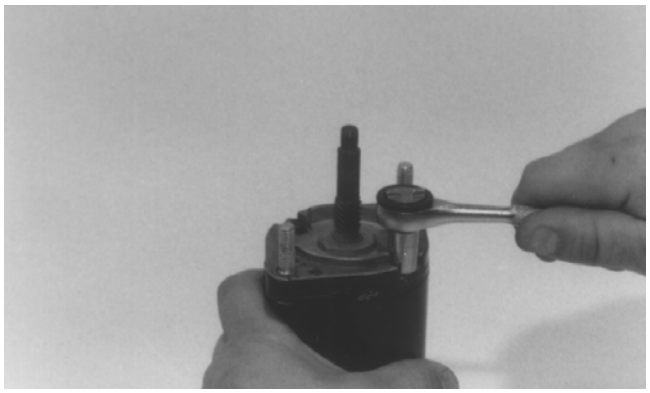
REMOVING (500/600/700 cc Models)

1. Disconnect the battery.
2. Remove the nut and washer(s) securing the positive cable; then remove cable from the starter motor.
3. Remove the lock nut securing the upper mounting bracket to the steering support; then remove the two lock nuts securing the starter motor to the lower bracket and remove the starter motor assembly.
4. Loosen the two Allen-head screws securing the flex-drive shaft to the pinion drive; then remove the lock nuts securing the lower mounting bracket and remove the bracket.

DISASSEMBLING

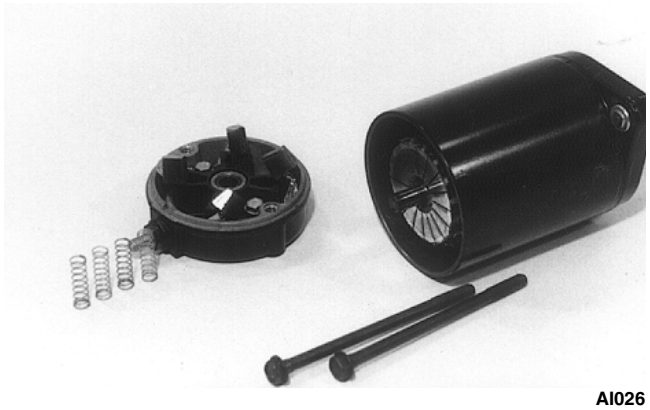
■ **NOTE: For assembly purposes, scribe a reference line on the end plate/drive cap, commutator cap, and the case.**

1. If applicable, remove the snap ring securing the primary gear to the starter motor; then remove the gear and account for the spring washer.
2. Remove the two long through-bolts. As the bolts are being removed, hold pressure against the commutator cap.



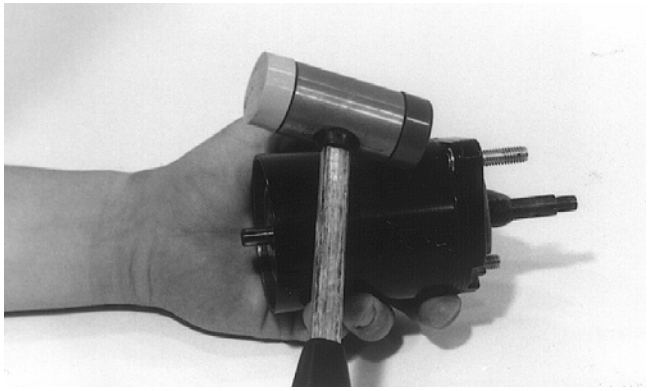
AI050

3. Slowly remove the cap and account for the four brush holder springs.



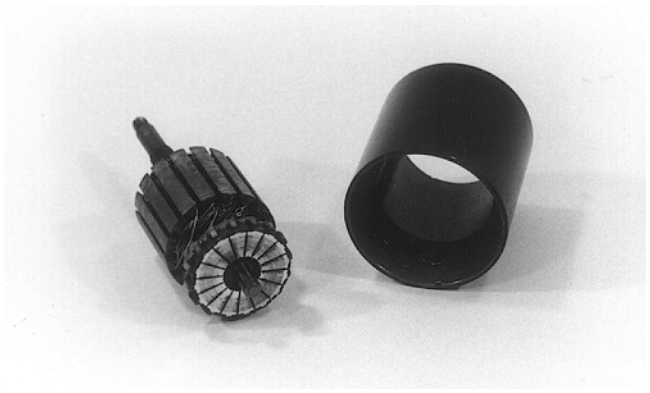
AI026

4. Using a plastic hammer, tap the end plate/drive cap free of the starter case and slide the cap free from the armature shaft. Account for any washers.



AI027

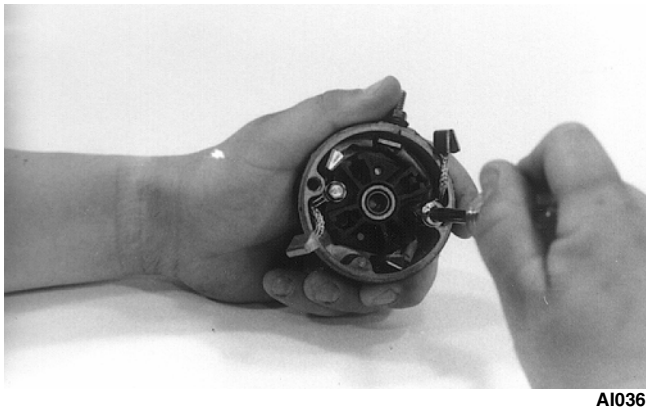
5. Slide the armature free of the starter case.



AI028

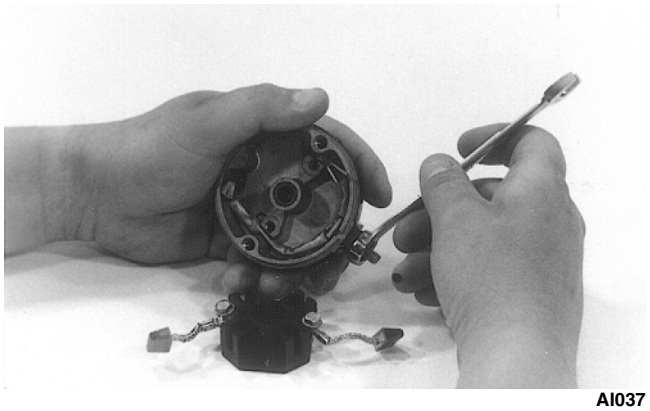
6. Lift all brushes from the brush holder and account for the four brush springs.

7. Using a 5/16-in. socket, remove the two cap screws securing the ground brushes to the commutator cap. Remove the brushes and brush holder from the cap.



AI036

8. Using a 7/16-in. wrench, remove the nut securing the cable stud to the cap. Account for the number of and the position of washers.



AI037

9. While holding the brush wires, pull the stud from the end cap. Account for the plastic insulator.

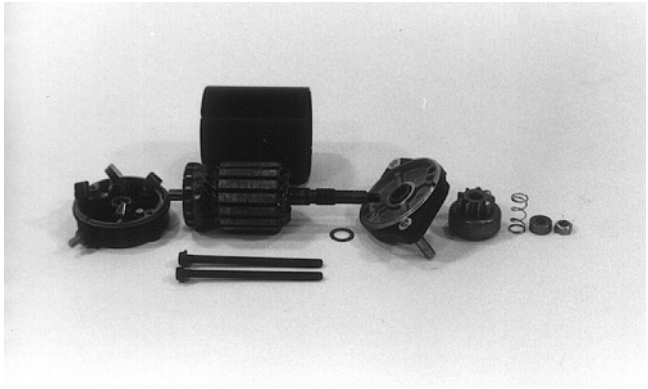
CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Thoroughly clean all components except the armature and brushes in parts-cleaning solvent; then dry with compressed air.

⚠ WARNING

When using compressed air to dry components, always wear safety glasses.



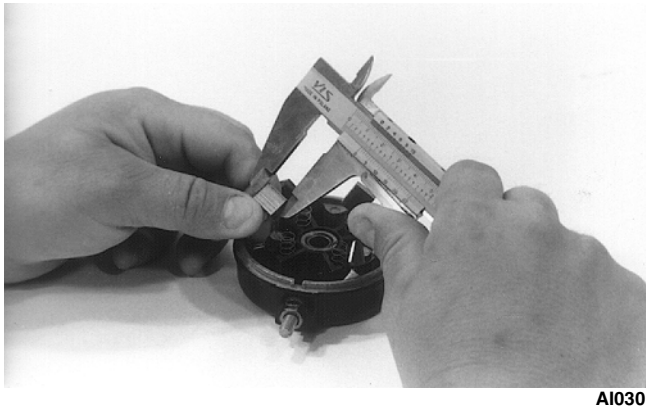
AI029

⚠ CAUTION

Do not wash the armature and brushes in any kind of solvent. Use only compressed air and clean dry cloth in cleaning these components.

2. Inspect all threaded areas for damaged or stripped threads.

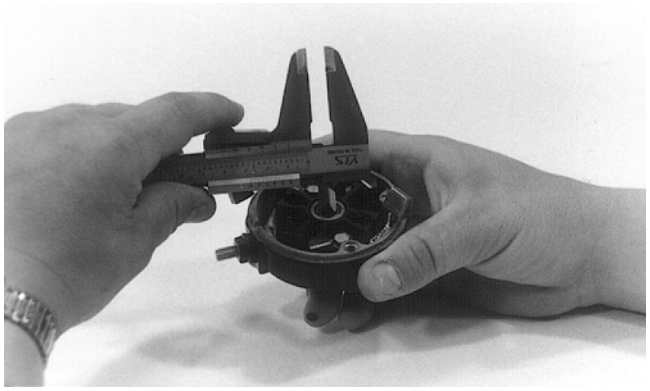
3. Inspect the brush holder assembly and brushes for damage or wear. Using a calipers, measure the length of the brushes. If brush measurement is less than 7.5 mm (0.30 in.), replace brushes as a set along with new brush springs.



AI030

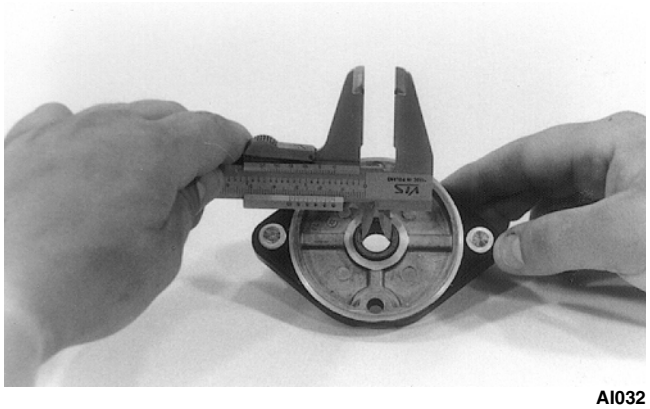
4. Inspect brush leads for cracks, wear, or fraying. If any of these conditions exist, replace the brushes as a set along with new brush springs.

5. Inspect the commutator cap bushing for wear. Using a calipers, measure inner diameter at the cap bushing. If found to be 8.6 mm (0.338 in.) or larger, replace the cap.



AI031

6. Inspect the end plate/drive cap bushing for wear. Using a calipers, measure the inner diameter of the cap bushing. If found to be 13.2 mm (0.523 in.) or larger, replace the cap.



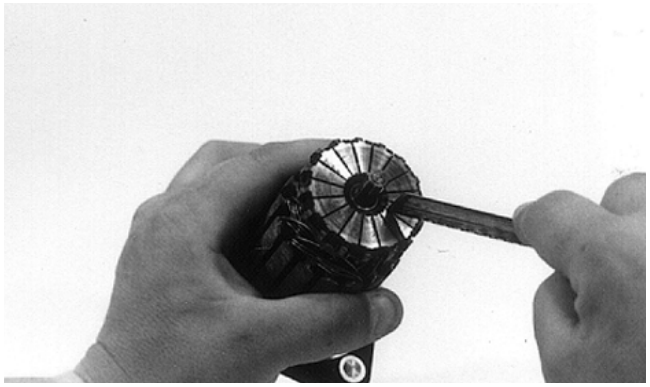
AI032

7. Inspect the brass commutator end of the armature for any burned spots or damage. If the commutator is slightly burned or damaged, the armature must be replaced. This is a molded commutator and no attempt to turn it down in a lathe should be tried.

⚠ CAUTION

Do not use emery cloth to clean the commutator as emery particles will become imbedded in the brass commutator resulting in a short circuit. Use only #00 grit sandpaper.

8. Inspect the commutator for buildup in the grooves. Buildup in the grooves must be removed to prevent any chance of arcing between individual sections of the commutator. Carefully remove any buildup using a thinly ground hacksaw blade. Do not cut any deeper than the original groove which can be seen by looking at the commutator from the side.



AI033

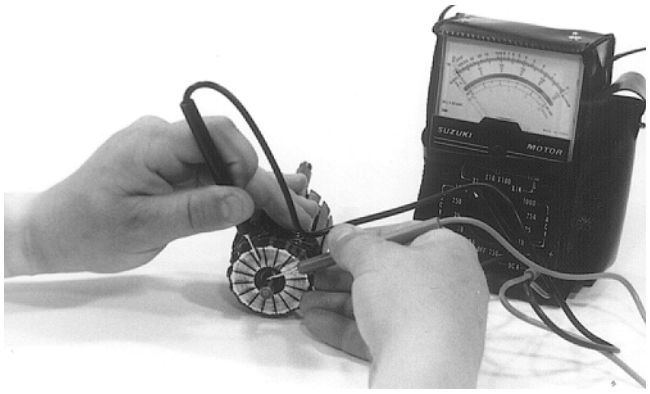
■ **NOTE: After cleaning any buildup from the commutator, use compressed air to clean.**

9. Inspect the armature for shorting. Use the multitester and the following procedure:

   A. Set the selector on the OHMS position; then touch the leads and zero the meter.

   B. Touch the black tester lead to the armature shaft.

   C. Using the red tester lead, probe the commutator end of the armature. The meter indicator should not move. If the indicator needle moves, the armature must be replaced.

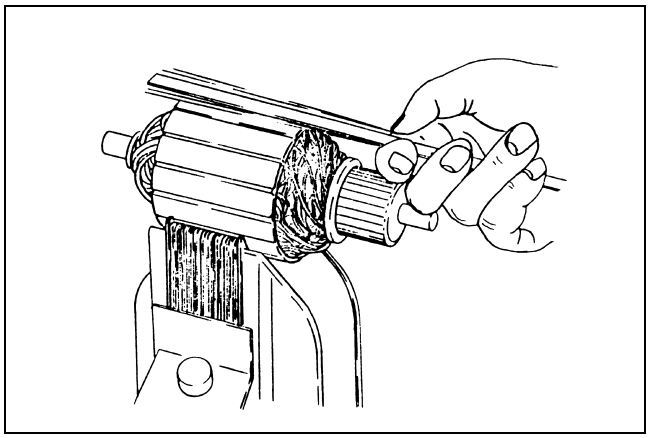


AI034

10. Inspect the armature for shorting. Use a "growler" and the following procedure:

    A. Place the armature in the "growler."

    B. While holding a metal strip over the armature, rotate the armature an entire revolution. If the metal strip vibrates at any point on the armature, the armature is shorted and must be replaced.



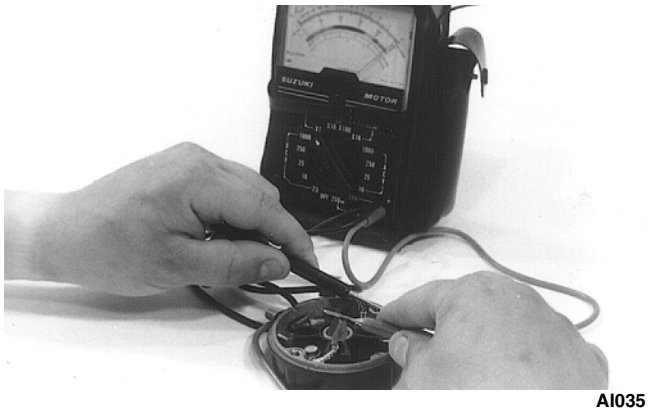
0725-653

11. Inspect the ground brushes to make sure they are properly grounded. Use the multitester and the following procedure:

    A. Set the selector on the OHMS position; then touch the leads and zero the meter.

    B. Touch the black tester lead to a ground brush.

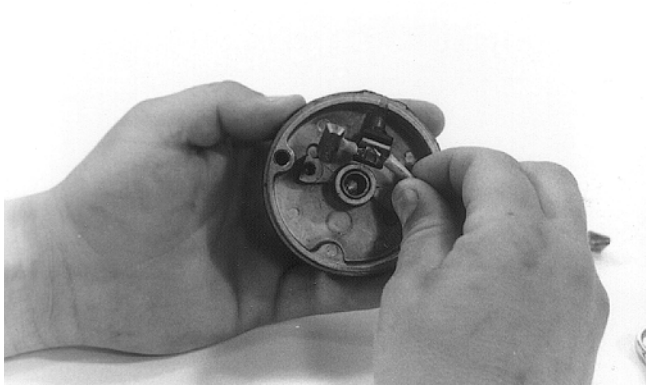
    C. Touch the red tester lead to the commutator cap. The meter needle should move to the right. If the needle does not move to the right, check that the ground connection is tight and clean. Recheck for proper ground. If there still isn't any meter needle movement, replace the brushes as a set along with new brush springs.



AI035

ASSEMBLING

1. Install the stud with the positive brush set attached in the commutator cap. Make sure the insulator is in position over the stud and the longest brush lead is positioned to the right of the stud hole.

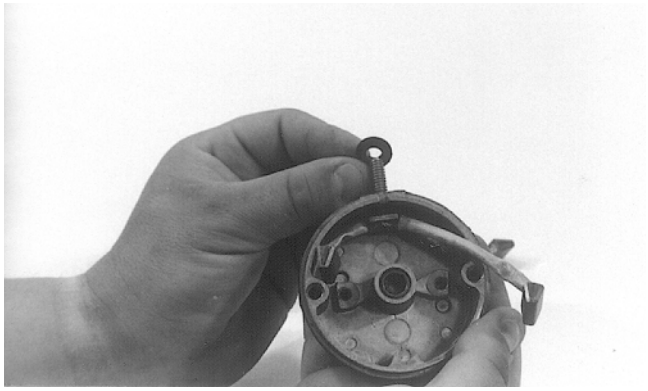


AI038

⚠ CAUTION

Check the stud to make sure insulator is between stud and cap on backside.

2. In order from disassembling, place the washers on the stud. Apply a small amount of red Loctite #271 to the stud threads and secure with the nut. Tighten to 0.7 kg-m (5 ft-lb).



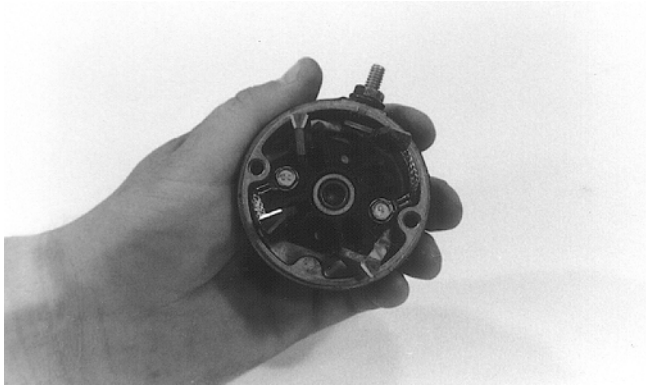
AI039

3. Place the brush holder into position in the commutator cap.

■ **NOTE: Position the longest positive brush lead beneath the ground wire on right side.**

4. Place a cap screw through the left ground brush lead eyelet and position the eyelet flat against the brush holder. Secure with a cap screw.

5. Place the right ground brush eyelet flat against the brush holder and secure with a cap screw. The eyelet stem must be positioned to the top of the threaded hole boss in the commutator cap.



AI040

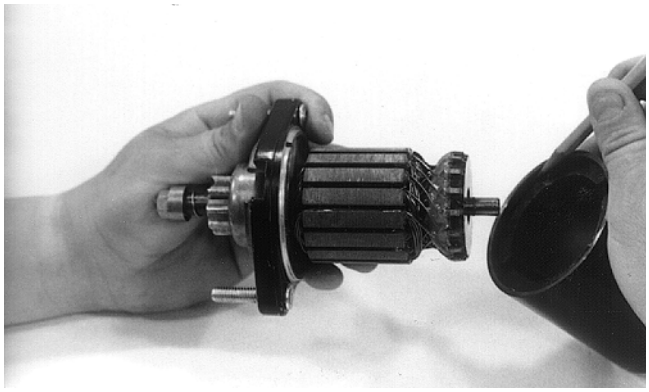
6. Place the four brush springs into the brush holder and place each brush (flat side down) on top of the springs.

■ **NOTE: Apply a small amount of low-temperature grease to the cap bushings.**

7. Place a wave washer and a thrust washer on the armature shaft; then slide the front cap into position.

8. Apply a thin coat of grease to the armature shaft and slide the drive gear and spring washer onto the shaft. Secure with a snap ring.

9. Start the commutator end of the armature assembly into the starter case at the end with the fields nearest the end of the housing. Align the marks on the front cap and case.



AI042

10. Compress the four brushes (flat side down) into the brush holder. Hold the brushes in position using the Starter Assembly Tool (p/n 0644-052).



AI043

11. Carefully place the starter case and armature assembly into the commutator cap. Again, check to make sure the scribed marks of these two components are aligned. With the case flat on the assembly tool, slowly pull the tool from the starter motor. The case should then drop into place.



AI044

12. Apply red Loctite #271 to the threads of the two through-bolts; then install and secure the bolts. Tighten to 1-1.4 kg-m (7-10 ft-lb).

■ **NOTE: The starter shouldn't be picked up until the two through-bolts have been secured. Spring pressure from the brush springs will push the commutator cap off the case.**

DISASSEMBLING PINION

1. Remove the dust cap from the end of the pinion drive by first pulling straight out and then twisting the dust cap to the side.

2. Place a 11 mm or a 7/16 in. socket over the end of the pinion shaft and tap the socket gently with a hammer.

■ **NOTE: This procedure will dislodge the snap-ring retainer and expose the snap ring.**

3. Using a side cutter, diagonal cutter, or suitable pliers, remove and discard the snap ring.

4. Remove the snap-ring retainer (note end-for-end orientation), pinion spring, spring retainer, and pinion gear. Retain all components.

CLEANING AND INSPECTING PINION

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Using parts-cleaning solvent, wash grease from the pinion gear. Dry with compressed air.

⚠ WARNING

When using compressed air to dry components, always wear safety glasses.

2. Inspect the pinion gear for wear. If the gear is worn or chipped, replace the pinion assembly.

3. Inspect the inner gear and housing. If the gear shows any signs of wear, replace the pinion assembly.

4. Inspect the inner housing for tightness and cracks. If the housing shows any signs of being loose or cracked, replace the pinion assembly.

5. Inspect the pinion return spring for wear. If the spring shows any worn areas, replace the spring.

ASSEMBLING/INSTALLING PINION

1. Slide the pinion gear, spring retainer, pinion spring, and snap-ring retainer (note end-for-end orientation) onto the shaft in their original positions.

2. Place new Snap Ring (p/n 0645-384) over the end of the pinion shaft; then slide the snap ring over the shaft. Using a 11 mm or 7/16 in. socket and a hammer, gently tap the snap ring into the groove on the shaft.

3. Apply Pinion Grease (p/n 1056-072) over the pinion spring area.

4. Slide the dust cover over the pinion assembly being careful not to dislodge the grease. Firmly push the dust cover until it snaps into its retaining groove.

TESTING STARTER MOTOR

■ **NOTE: Before installing the starter motor, perform test to ensure proper operation using the following procedure.**

1. Attach a black jumper cable to a good ground on the starter.

2. Attach the opposite end of the black jumper cable to the negative post of a good 12V battery.

3. Attach the red jumper cable to the positive post of the battery.

4. Holding the starter firmly down on a work bench, touch the red jumper cable to the positive cable stud of the starter.

⚠ WARNING

Be sure to keep clear of the pinion gear area as it will spin at a high RPM when the red cable is touched to the positive stud. Personal injury may result if contact is made with a spinning pinion.

■ NOTE: Starter motor must instantly spin at a high RPM. The pinion must snap out against the stopper. If the motor does not spin, remove the red cable immediately. Check the battery condition and all connections. If everything checks out satisfactorily and the starter does not spin, disassemble the motor and check for pinched or broken wires.

INSTALLING (370/440 cc Models)

1. Place the starter motor into the bracket; then secure with existing hardware. Tighten to 1.7-2.1 kg-m (12-15 ft-lb).

2. Attach the red positive cable to the positive stud terminal and secure with a nut and washers. While tightening the nut, hold the cable in position so it is parallel with the starter.

⚠ CAUTION

Check the cable installation to make sure it isn't near any moving parts or against any sharp edges.

3. Secure the positive cable to the starter motor with a long cable tie.

4. Connect the cable to the positive post of the battery; then connect the negative cable to the negative post.

5. Install the drive clutch.

6. Install the expansion chamber.

INSTALLING (570 cc Models)

1. Install the flex-drive shaft onto the starter motor and secure with the two Allen-head screws.

2. Place the starter motor into the bracket assembly; then secure with existing hardware. Tighten to 2.4 kg-m (17 ft-lb).

3. Attach the red positive cable to the positive stud terminal and secure with a nut and washers. While tightening the nut, hold the cable in position so it is parallel with the starter.

⚠ CAUTION

Check the cable installation to make sure it isn't near any moving parts or against any sharp edges.

INSTALLING (500/600/700 cc Models)

1. Place the lower mounting bracket into position and secure with the lock nuts.

2. Install the flex-drive shaft onto the starter motor and secure with the two Allen-head screws.

3. Place the starter motor into the upper bracket; then secure with existing hardware. Tighten securely.

4. Attach the red positive cable to the positive stud terminal and secure with a nut and washers. While tightening the nust, hold the cable in position so it is parallel with the starter.

⚠ CAUTION

Check the cable installation to make sure it isn't near any moving parts or against any sharp edges.

Troubleshooting Electric Start

Problem: Hot or Smoking Wires	
Condition	**Remedy**
1. **System** wired incorrectly	1. Check wiring against wiring diagram
Problem: Starter Does Not Turn Over	
Condition	**Remedy**
1. **Battery** discharged 2. **Connection** loose 3. **Grounding** improper 4. **Fuse** blown - not installed	1. Check/charge the battery 2. Check tightness of all connections 3. Check round connections 4. Check - replace fuse

Ignition Timing

■ **NOTE: Ignition timing can be checked and/or verified on all snowmobile engines; however, ignition timing can be adjusted only on certain models. Refer to the following Ignition Timing Specifications sub-section for information on models which are adjustable and on models for which no timing adjustment is required.**

CHECKING

1. Connect a timing light to the MAG-side spark plug lead.
2. Using a shielded safety stand, raise the rear of the snowmobile off the floor and start the engine. Gradually increase the engine speed to the specified RPM; the pointer should align with the proper timing mark on the flywheel.
3. If timing is not correct, adjust the ignition timing.

ADJUSTING

1. Remove the recoil starter, starter pulley, and flywheel.
2. Loosen the two screws securing the stator plate and rotate the stator plate in the proper direction to attain correct timing.

■ **NOTE: Rotate the stator plate clockwise to retard the timing or counterclockwise to advance the timing. The stamped marks on the stator plate at the upper socket-head cap screw mounting hole can be used for timing.**

3. Tighten the screws securing the stator plate.
4. Install the flywheel, starter pulley, and recoil starter.
5. Recheck timing for accuracy and adjust if necessary.

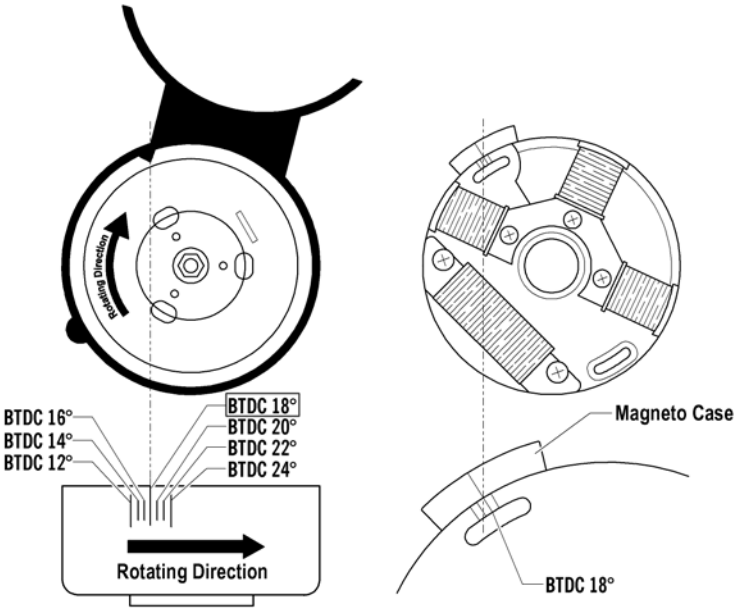
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370 cc

■ NOTE: For 6000 RPM timing purposes on the 370 cc, use a dial indicator and scribe a mark on the flywheel for 13° BTDC.

Ignition Timing - Engine Warm
BTDC - 18°/2000 RPM - 2.012 mm (0.079 in.)
BTDC - 13°/6000 RPM - 1.056 mm (0.042 in.)



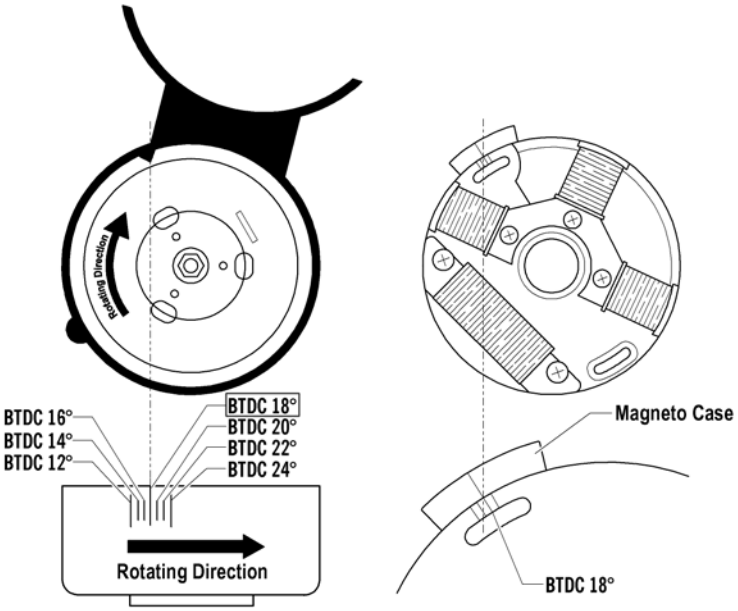
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5

440 cc

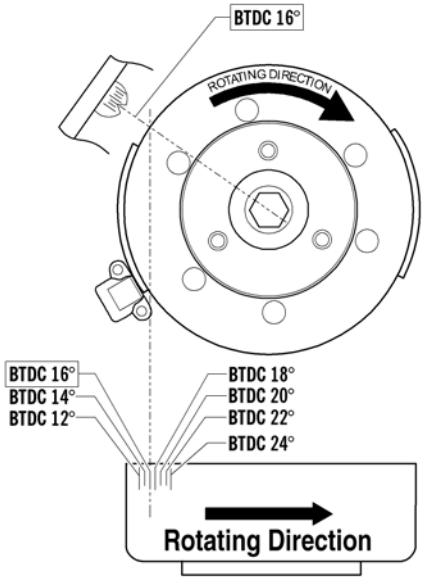
■ NOTE: For 6000 RPM timing purposes on the 440 cc, use a dial indicator and scribe a mark on the flywheel for 13° BTDC.

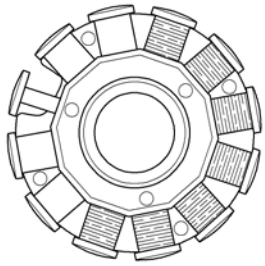
Ignition Timing - Engine Warm
BTDC - 18°/2000 RPM - 2.012 mm (0.079 in.)
BTDC - 13°/6000 RPM - 1.056 mm (0.042 in.)



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Ignition Timing - Engine Warm
BTDC - 16°/2000 RPM - 1.535 mm (0.060 in.)





Stator/Coil Assembly
(no timing adjustment required)

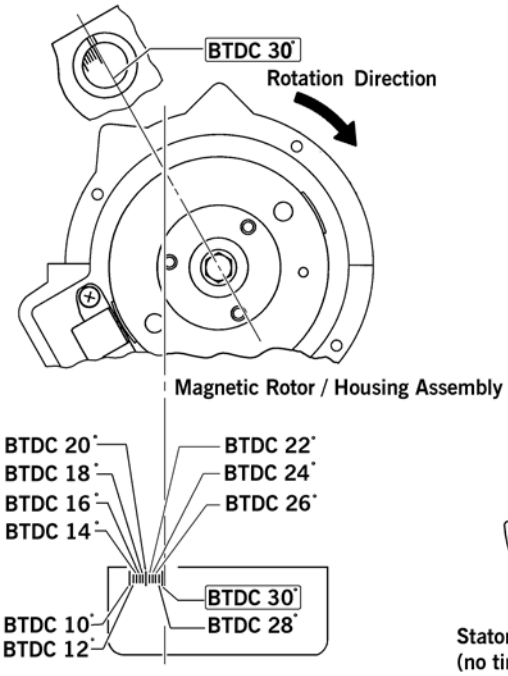
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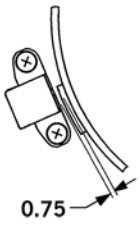
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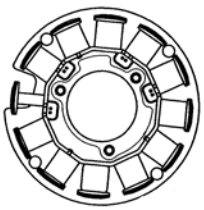
500 cc Carbureted

■ NOTE: For timing verification on the 500 cc w/ APV, use a dial indicator and scribe a mark on the flywheel for 30° BTDC.

Ignition Timing - Engine Warm
BTDC - 30°/2000 RPM - 5.258 mm (0.207 in.)





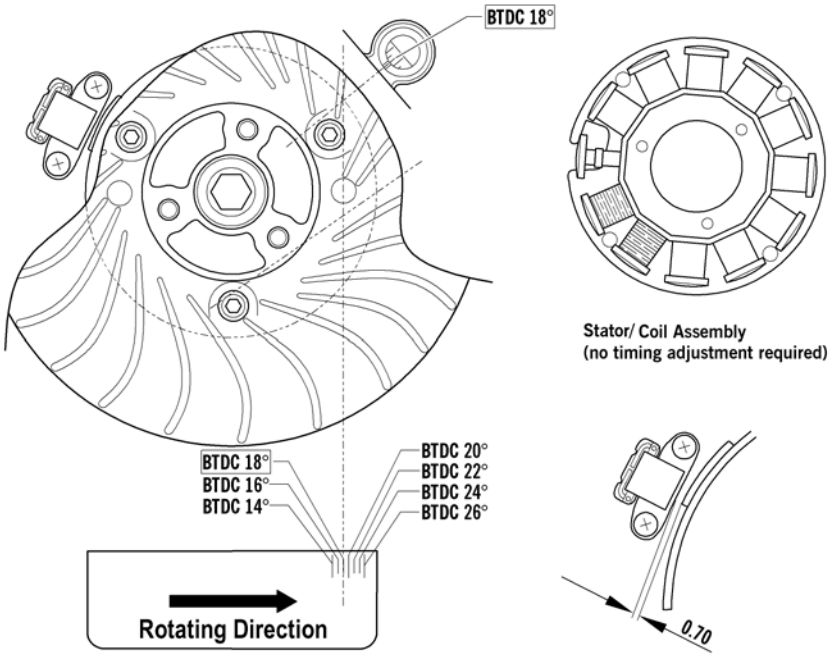


Stator/ Coil Assembly
(no timing adjustment required)

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570 cc

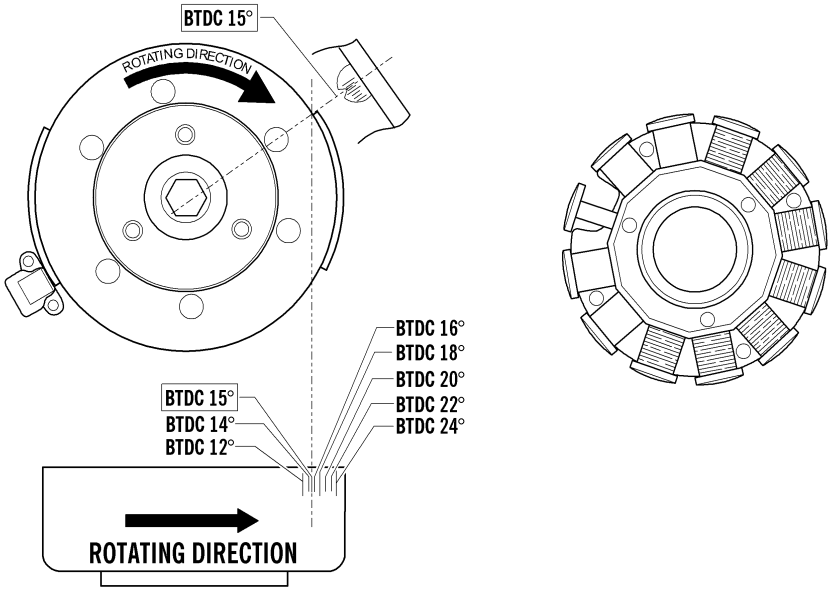
Ignition Timing - Engine Warm
BTDC - 18°/2000 RPM - 2.049 mm (0.081 in.)



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600 cc EFI

Ignition Timing - Engine Warm
BTDC - 15°/1800 RPM - 1.509 mm (0.059 in.)

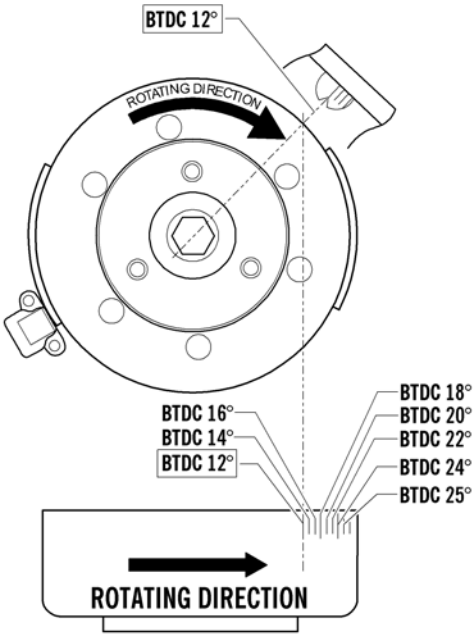


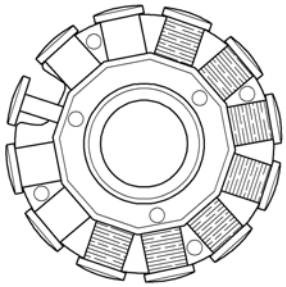
0740-130

700 cc Carbureted

■ NOTE: For timing verification on the 700 cc Carb, use a dial indicator and scribe a mark on the flywheel for 12° BTDC.

Ignition Timing - Engine Warm
BTDC - 12°/4000 RPM - 0.969 mm (0.038 in.)





Stator/Coil Assembly
(no timing adjustment required)

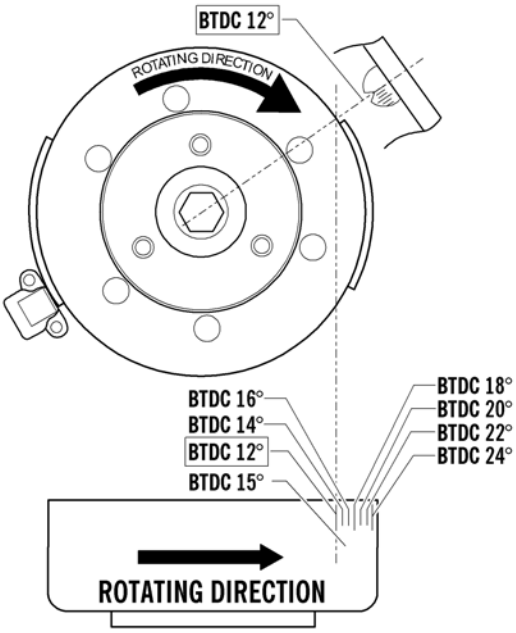
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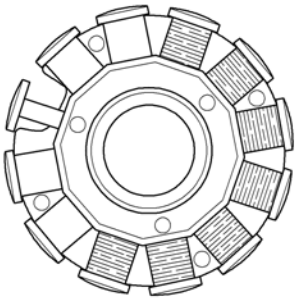
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700 cc EFI

■ NOTE: For timing verification on the 700 cc EFI, use a dial indicator and scribe a mark on the flywheel for 12° BTDC.

Ignition Timing - Engine Warm
BTDC - 12°/4350 RPM - 0.969 mm (0.038 in.)





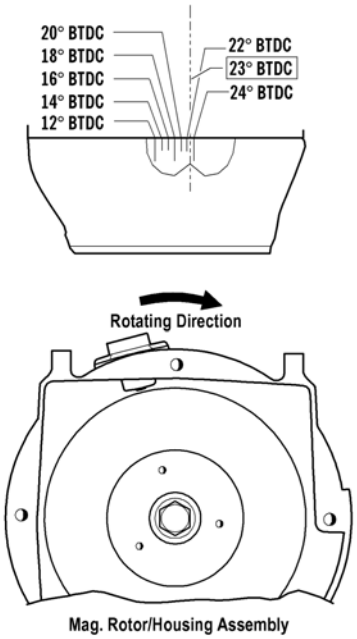
Stator/Coil Assembly
(no timing adjustment required)

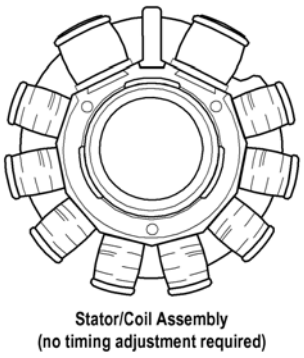
740-132A

900 cc EFI

■ NOTE: For timing verification on the 900 cc EFI, use a dial indicator and scribe a mark on the flywheel for 23° BTDC.

Ignition Timing - Engine Warm
BTDC - 23°/2500 RPM - 3.775 mm (0.149 in.)





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5

SECTION 6 — CHASSIS ELECTRICAL SYSTEMS

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Brakelight Switch
(Hydraulic System)

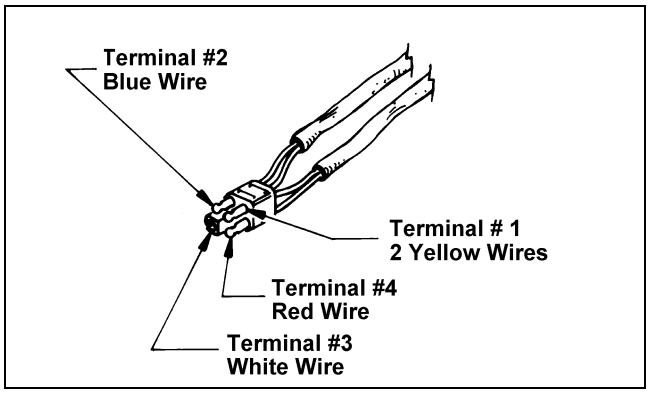
TESTING/REMOVING

■ **NOTE: On Crossfire/M-Series models, the close-out panel must be removed.**

■ **NOTE: On Firecat/Sabercat models, the servo-motor must be removed from the mounting bracket to access the brakelight switch harness connector.**

1. Disconnect the wiring harness from the brake control.

2. To test the brakelight switch, connect one tester lead to the #1 (yellow) terminal; then connect the other lead to the #4 (red) terminal.



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3. With the brake lever compressed, the meter must read resistance. With the brake lever released, the meter must read no resistance. If the meter does not read as specified, the brake-light switch is defective and must be replaced.

4. On push-activated style to remove the switch, use a small screwdriver to compress the plastic locking tabs by pushing in on the tabs; then slide the switch free of the brake control.



AF201D

5. On brake lever-activated style to remove the switch, remove the Allen-head cap screw from beneath the master cylinder and free the switch from the master cylinder assembly.

INSTALLING

1 On push-activated style, slide the brakelight switch into the brake control assembly until the self-locking tabs snap into position. Give the switch body a light pull to make sure the switch is properly secured.

2. On brake-lever-activated style, place the switch into position beneath the master cylinder assembly making sure the alignment pins are properly positioned; then secure the switch with the Allen-head screw.

3. Connect the switch harness to the main wiring harness. Position the wires so they will not be either pinched or come in contact with any moving components. Start the engine and check the switch for proper operation.

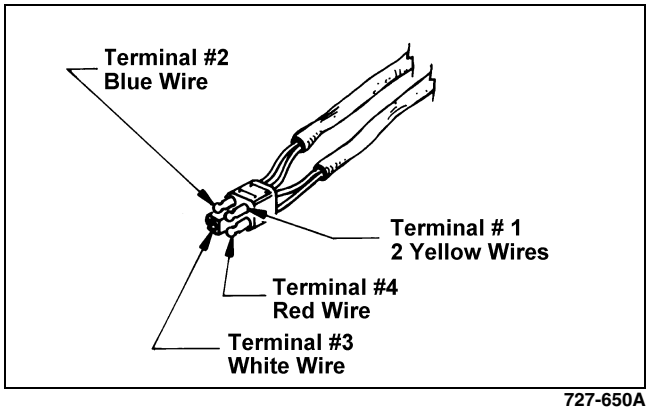
Brakelight Switch
(Mechanical System)

TESTING/REMOVING

1. Disconnect the wiring harness from the brake control.

Terminal	Corresponding Wire Color	Wire Usage
1	Yellow	Power Supply
2	Blue	Headlight - High Beam
3	White	Headlight - Low Beam
4	Red	Brakelight

2. Connect one tester lead to the #1 terminal; then connect the other lead to the #4 terminal.



727-650A

Back to TOC Back to Section TOC Next

3. With the brake lever compressed, the meter must read less than 1 ohm of resistance. With the brake lever released, the meter must read no resistance. If the meter does not read as specified, the brakelight switch is defective and must be replaced.

4. Use a small screwdriver to compress the plastic locking tabs by pushing in on the tabs; then slide the switch free of the brake control.



AF907D

INSTALLING

1. Slide the brakelight switch into the brake control assembly until the self-locking tabs snap into position. Give the switch body a light pull to make sure the switch is properly secured.

2. Connect the switch harness to the main wiring harness. Position the wires so they will not be either pinched or come in contact with any moving components. Start the engine and check the switch for proper operation.

Headlight Dimmer Switch

TESTING

1. Disconnect the headlight dimmer switch plug (located next to the air-intake silencer on standard models or behind the servomotor on Crossfire/Firecat/M-Series/Sabercat models).

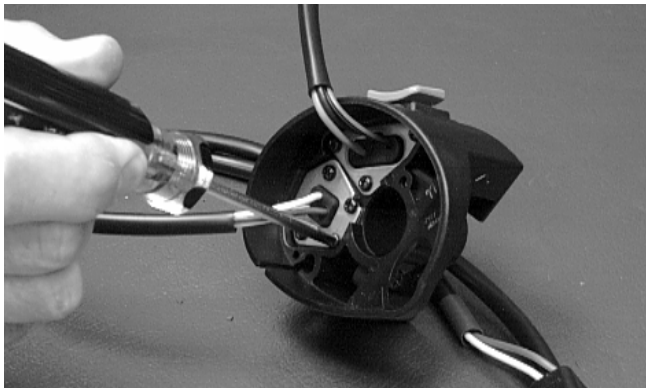
2. Use the tester connections indicated in the following chart. If the meter does not read as specified, the headlight dimmer switch is defective and must be replaced.

Position	Lead to Terminal (Wire Color)	Lead to Terminal (Wire Color)	Meter Reading
High Beam	1 (Yellow)	2 (Blue)	Less than 1 ohm
High Beam	1 (Yellow)	3 (White)	OL
Low Beam	1 (Yellow)	2 (Blue)	OL
Low Beam	1 (Yellow)	3 (White)	Less than 1 ohm

REMOVING (Standard/Crossfire/M-Series Models)

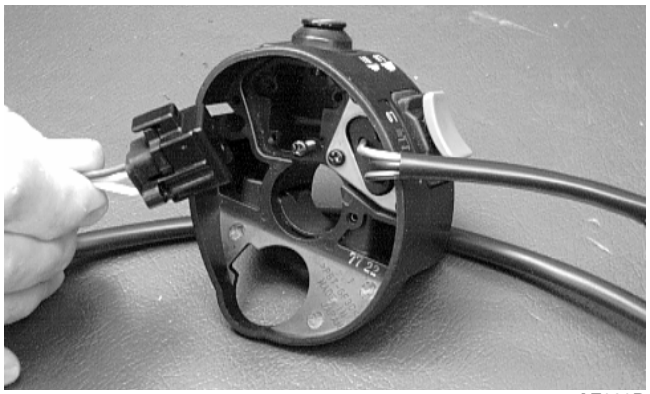
1. Remove the handlebar pad.

2. Remove the screws from the cover plate securing the dimmer switch.



AF908D

3. Remove the plate and lift the switch free of the control.



AF909D

INSTALLING (Standard/Crossfire/M-Series Models)

1. Place the dimmer switch into the control and secure with the cover plate and screws.

2. Connect the four-prong plug; then install and secure the handlebar pad.

REMOVING (Firecat/Sabercat/ZR Models)

1. Remove the Allen-head cap screw from beneath the master cylinder.
2. Free the switch from the master cylinder assembly.

INSTALLING (Firecat/Sabercat/ZR Models)

1. Place the switch into position beneath the master cylinder assembly making sure the alignment pins are properly positioned; then secure the switch with the Allen-head screw.
2. Connect the four-prong plug.

Testing Handlebar Warmer Elements
(HI/OFF/LO Function)

1. Remove the handlebar pad; then disconnect the handlebar warmer three-wire connector.
2. In the element connector, connect one ohmmeter lead to the green/white lead; then connect the other ohmmeter lead to the yellow lead.
3. The meter must read between 7.2 and 8.8 ohms.
4. In the element connector, connect the ohmmeter between the green/black and yellow lead wires.
5. The meter must read between 12.6 and 15.4 ohms.
6. Replace any element measuring less than or more than the specified amount.

■ **NOTE: Repeat test for the other element.**

7. Connect the leads; then install and secure the handlebar pad.

Testing Handlebar Warmer Elements
(Variable-Range Function)

1. Disconnect the handlebar warmer three-prong connector from the six-prong main harness connector.
2. In the element connector, connect one ohmmeter lead to the green terminal; then connect the other ohmmeter lead to the black terminal.
3. The meter must read between 16.8-25.2 ohms.
4. In the element connector, connect the ohmmeter between the green and yellow terminals.
5. The meter must read between 8 and 12 ohms.
6. Replace any element measuring less than or more than the specified amount.

■ **NOTE: Repeat test for the other element.**

7. Connect the three-prong connector to the six-prong main harness connector.

Testing Thumb Warmer Element
(HI/OFF/LO Function)

1. Remove the handlebar pad; then disconnect the thumb warmer three-wire connector.
2. In the element connector, connect one ohmmeter lead to the green/white lead; then connect the other ohmmeter lead to the yellow lead.
3. The meter must read between 3.6 and 4.4 ohms.
4. In the element connector, connect one ohmmeter lead to the green/black lead; then connect the other ohmmeter lead to the yellow lead.
5. The meter must read between 10.8 and 13.2 ohms.

■ **NOTE: If either test is not within specification, replace the thumb warmer element.**

6. Connect the leads; then install and secure the handlebar pad.

Testing Thumb Warmer Element
(Variable-Range Function)

1. Disconnect the thumb warmer three-prong connector from the six-prong main harness connector.
2. In the element connector, connect one ohmmeter lead to the green terminal; then connect the other ohmmeter lead to the yellow terminal.
3. The meter must read between 3.2 and 4.8 ohms.
4. In the element connector, connect one ohmmeter lead to the black terminal; then connect the other ohmmeter lead to the yellow terminal.
5. The meter must read between 9.6 and 14.4 ohms.

■ **NOTE: If either test is not within specification, replace the thumb warmer element.**

6. Connect the three-prong connector to the six-prong main harness connector.

Testing Handlebar Warmer Switch
(HI/OFF/LO Function)

1. Remove the handlebar pad.
2. Disconnect the handlebar warmer three-wire connector.
3. In the switch connector, connect the ohmmeter leads to the green/white and yellow lead wires.
4. With the switch in the OFF (middle) position, the meter must read an open circuit. With the switch in the HI position, the meter must read 1 ohm or less resistance.
5. In the switch connector, connect the ohmmeter leads to the green/black and yellow leads.
6. With the switch in the OFF (middle) position, the meter must read an open circuit. With the switch in the LO position, the meter must read 1 ohm or less resistance.
7. Connect the leads; then install and secure the handlebar pad.

Testing Handlebar Warmer Switch
(Variable-Range Function)

1. Disconnect the handlebar warmer switch three-prong connector (located behind the servomotor) from the main harness.
2. In the switch connector, connect the ohmmeter leads to the black and brown wires.
3. With the switch in the OFF (lower) position, the meter must read an open circuit. With the switch in the LO position, the meter must read 1 ohm or less resistance.
4. In the switch connector, connect the ohmmeter leads to the green and brown wires.
5. With the switch in the OFF (lower) position, the meter must read an open circuit. With the switch in the MED position, the meter must read 1 ohm or less resistance.
6. In the switch connector, connect the ohmmeter leads to the black and green wires.
7. With the switch in the OFF (lower) position, the meter must read an open circuit. With the switch in the HI position, the meter must read 1 ohm or less resistance.
8. Connect the three-prong connector to the main harness.

Testing Thumb Warmer Switch
(HI/OFF/LO Function)

1. Remove the handlebar pad.
2. Disconnect the thumb warmer three-wire connector.
3. In the switch connector, connect one ohmmeter lead to the green/white lead; then connect the other ohmmeter lead to the brown lead.
4. With the switch in the OFF (middle) position, the meter must read an open circuit. With the switch in the HI position, the meter must read 1 ohm or less resistance.
5. In the switch connector, connect one ohmmeter lead to the green/red lead; then connect the other ohmmeter lead to the yellow lead.

6. With the switch in the OFF (middle) position, the meter must read an open circuit. With the switch in the LO position, the meter must read 1 ohm or less.

7. Connect the leads; then install and secure the handlebar pad.

Testing Thumb Warmer Switch (Variable-Range Function)

1. Disconnect the thumb warmer switch three-prong connector (located behind the servomotor) from the main harness.

2. In the switch connector, connect one ohmmeter lead to the black/white wire; then connect the other ohmmeter lead to the brown wire.

3. With the switch in the OFF (lower) position, the meter must read an open circuit. With the switch in the LO position, the meter must read 1 ohm or less resistance.

4. In the switch connector, connect one ohmmeter lead to the green/white wire; then connect the other ohmmeter lead to the brown wire.

5. With the switch in the OFF (lower) position, the meter must read an open circuit. With the switch in the MED position, the meter must read 1 ohm or less resistance.

6. In the switch connector, connect one ohmmeter lead to the black/white wire; then connect the other ohmmeter lead to the green/white wire.

7. With the switch in the OFF (lower) position, the meter must read an open circuit. With the switch in the HI position, the meter must read 1 ohm or less resistance.

8. Connect the three-prong connector to the main harness.

Testing Passenger Handwarmer Switch

1. Disconnect the lead wires from the switch.

2. Connect the ohmmeter leads to each of the lead wires.

3. With the switch in one position, the meter must read OL (infinite resistance).

4. When the switch is moved to the other position, the meter must read less than 1 ohm of resistance.

Testing Passenger Handwarmer Elements

■ **NOTE: During this test, resistance will vary due to temperature; therefore, this test should be made at room temperature of 20° C (68° F).**

1. Disconnect the lead wires from the main wiring harness.

2. Connect one ohmmeter lead to the green/white wire from the element; then connect the other ohmmeter lead to the yellow wire from the element.

3. The meter must read between 7.6-9.2 ohms.

Testing Passenger Seatwarmer Elements

■ **NOTE: During this test, resistance will vary due to temperature; therefore, this test should be made at room temperature of 20° C (68° F).**

1. Disconnect the lead wires from the main wiring harness.

2. Connect one ohmmeter lead to the green/white wire from the element; then connect the other ohmmeter lead to the yellow wire from the element.

3. The meter must read between 7.6-9.2 ohms.

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Steering and Body

This section has been organized into sub-sections for servicing steering and body components; however, some components may vary from model to model. The technician should use discretion and sound judgment when removing and installing components.

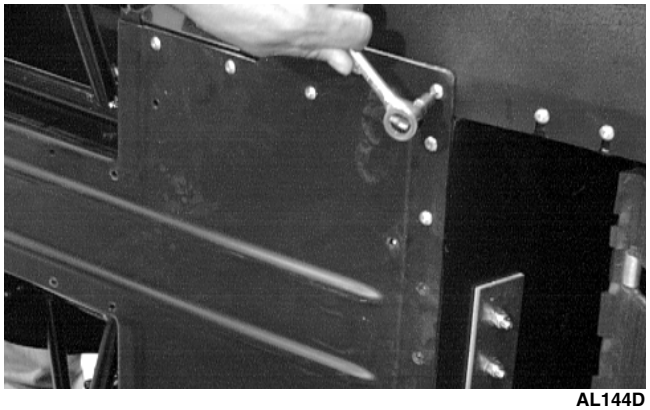
■ **NOTE: Some illustrations and photographs used in this section are used for clarity purposes only and are not designed to depict actual conditions.**

■ **NOTE: Critical torque specifications are located on pages 68-69 of this section.**

Steering Post
(Bearcat/King Cat/Panther/Z/ZR)

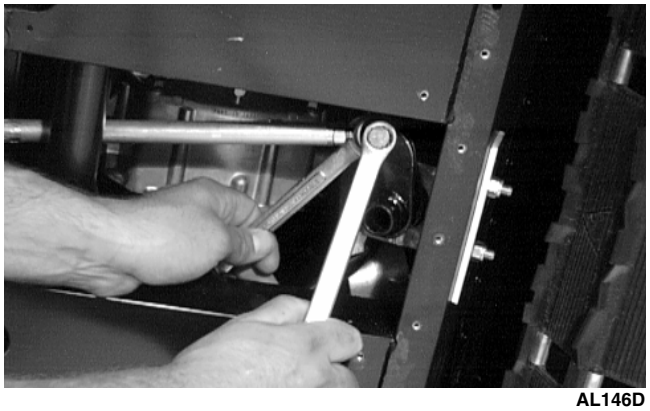
REMOVING

1. Tip the snowmobile on its side. Remove the screws securing the skid plate.



AL144D

2. Remove the cotter pin, cap screw, and lock nut securing the tie rod to the steering post.



AL146D

3. Remove the two cap screws and lock nuts securing the lower steering post bracket to the front end assembly. Account for the backing plate, two washers, bearing caps, bearing halves, and washers.



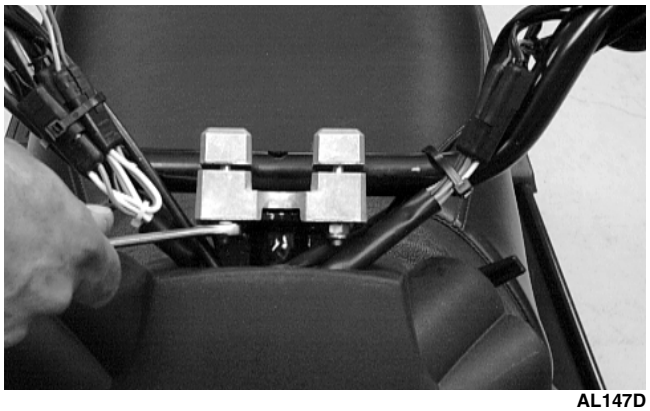
AL145D

4. Tip the snowmobile upright. Remove the handlebar pad.



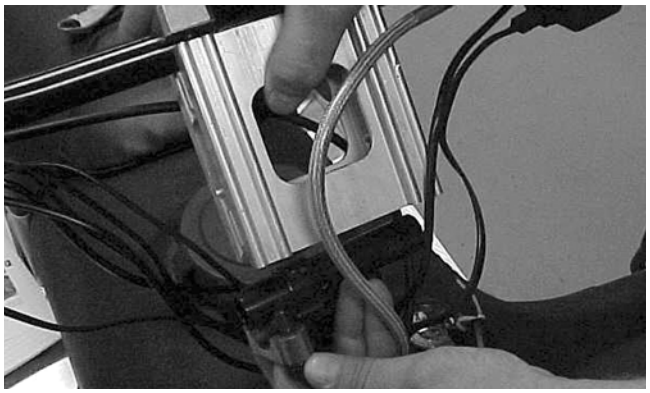
AL136D

5. Remove the four lock nuts and cap screws securing the adjuster caps to the adjuster block; then remove the caps. Place the handlebar assembly to the side. Remove the adjuster block.



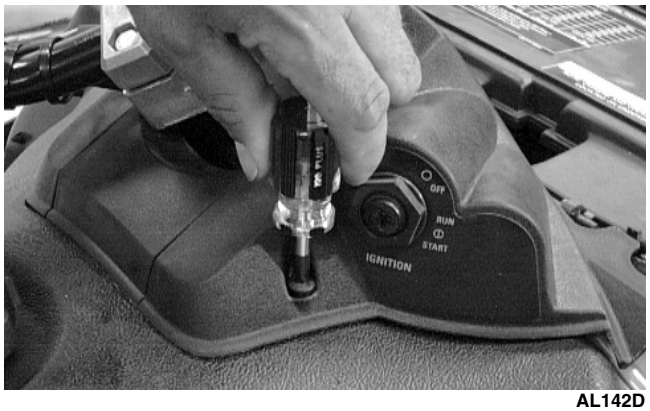
AL147D

■ **NOTE: On the King Cat/ZR models, remove the four lower Allen-head cap screws securing the handlebar riser to the steering post; then lay the handlebar/riser assembly aside. Account for the lower adjuster caps.**



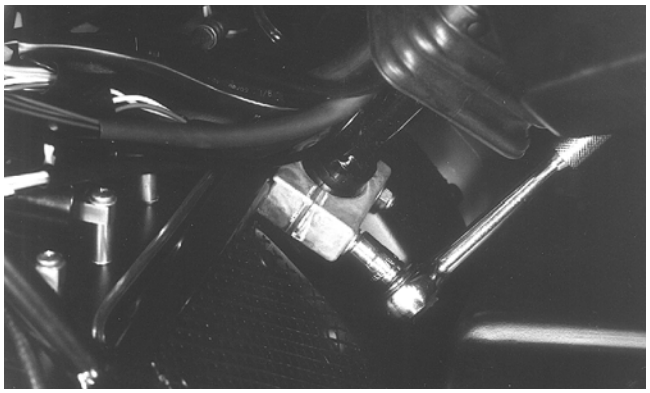
FC200

6. Remove the Phillips-head screws securing the console to the gas tank.



AL142D

7. Remove the two cap screws and lock nuts securing the steering post to the steering support. Account for the two washers, bearing caps, bearing halves, washers, and backing plate.



AL090

8. Remove the sheet metal screws securing the recoil starter rope cup.



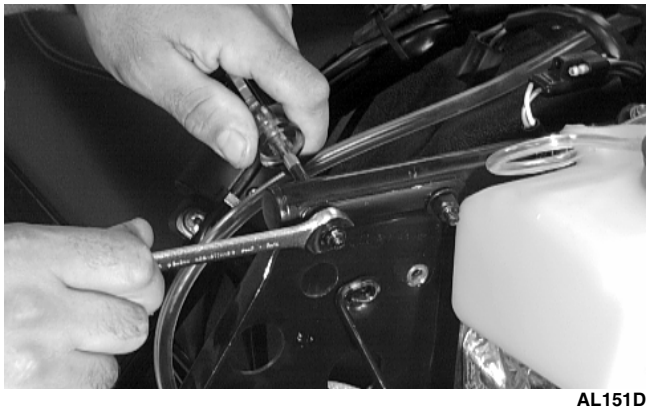
AL149D

9. Remove the cap screws securing the recoil starter rope wire form. Account for the lock nut.



AL150D

10. Remove the cap screws securing the steering support to the footrest (both sides).



AL151D

11. Remove the cap screws securing the oil reservoir to the steering support. Account for the lock nut and a flat washer.

7



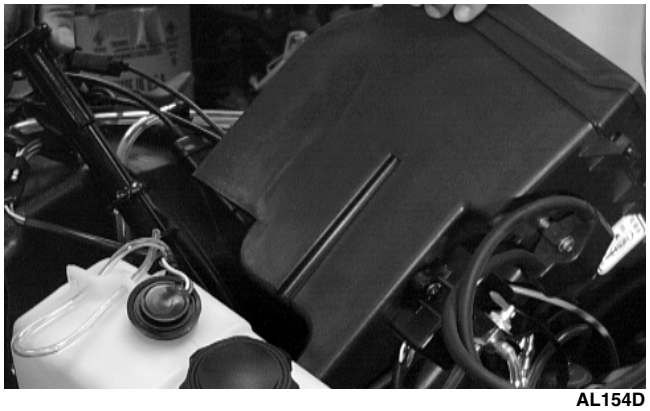
AL152D

12. Remove the cap screws securing the air-intake silencer to the steering support. Account for the washers, lock washers, and spacers.



AL153D

13. Move the air-intake silencer forward.



AL154D

14. Carefully slide the steering post out of the chassis. Be careful not to hook any wires or hoses.

INSPECTING

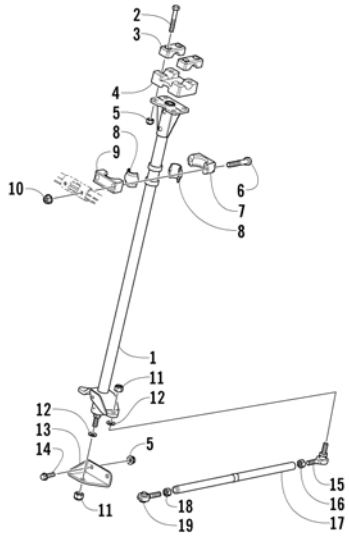
■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect all welded areas for cracks or deterioration.

2. Inspect the steering post and steering-post brackets for cracks, bends, or wear.

3. Inspect the bearing halves, bearing caps, and bearing housings for cracks or wear.

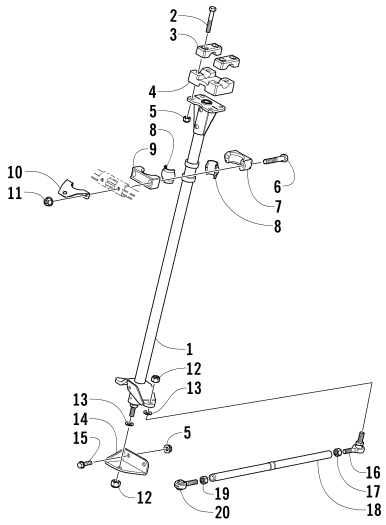
INSTALLING



KEY

1. Steering Post
2. Cap Screw
3. Adjuster Cap
4. Adjuster Block
5. Lock Nut
6. Cap Screw
7. Housing Cap
8. Bearing Half
9. Bearing Housing
10. Lock Nut
11. Lock Nut
12. Washer
13. Backing Plate
14. Cap Screw
15. Ball Joint (Left)
16. Hex Nut (Left)
17. Tie Rod Tube
18. Hex Nut (Right)
19. Ball Joint (Right)

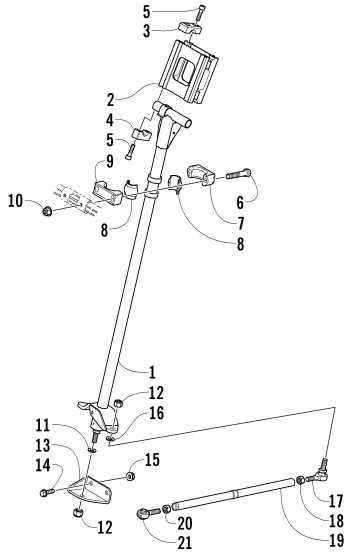
0738-352



KEY

1. Steering Post
2. Cap Screw
3. Adjuster Cap
4. Adjuster Block
5. Lock Nut
6. Cap Screw
7. Housing Cap
8. Bearing Half
9. Bearing Housing
10. Hood Switch Mounting Bracket
11. Lock Nut
12. Lock Nut
13. Washer
14. Backing Plate
15. Cap Screw
16. Ball Joint (Left)
17. Hex Nut (Left)
18. Tie Rod Tube
19. Hex Nut (Right)
20. Ball Joint (Right)

0738-507



KEY

1. Steering Post	8. Bearing Half	15. Lock Nut
2. Riser	9. Bearing Housing	16. Washer
3. Adjuster Cap	10. Lock Nut	17. Ball Joint (Left)
4. Adjuster Cap	11. Washer	18. Hex Nut (Left)
5. Cap Screw	12. Lock Nut	19. Tie Rod Tube
6. Cap Screw	13. Plate	20. Hex Nut (Right)
7. Housing Cap	14. Cap Screw	21. Ball Joint (Right)

0739-124

1. Carefully slide the steering post into position in the chassis. Be careful not to hook any wires or hoses.

2. Secure the air-intake silencer to the steering support with the washers, lock washers, spacers, and cap screws.



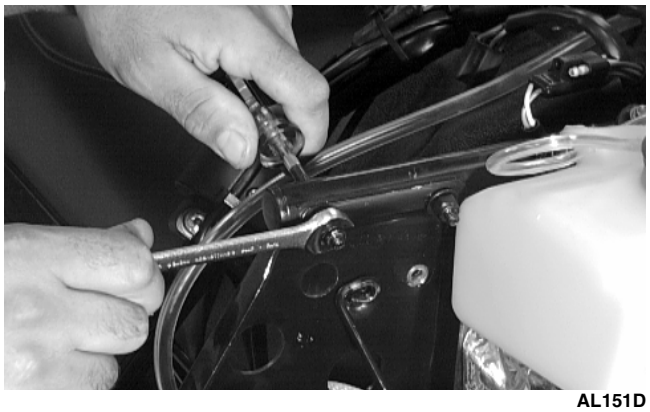
AL153D

3. Secure the oil reservoir to the steering support with the washer and lock nut.



AL152D

4. Secure the steering support to the footrest (both sides) with the cap screws.



AL151D

5. Secure the recoil starter rope wire form with the cap screws and lock nut.



AL150D

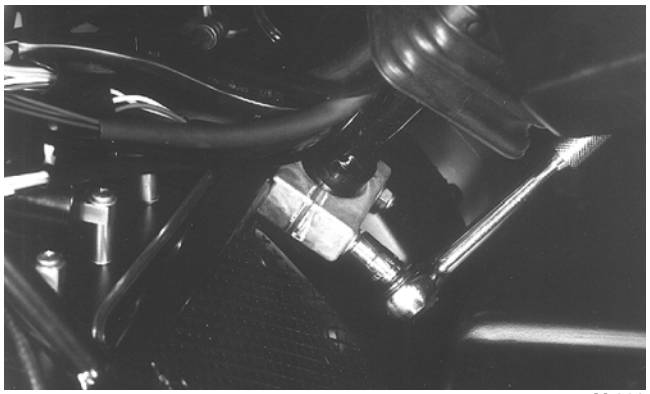
6. Secure the recoil starter rope cup with the sheet metal screws.

7



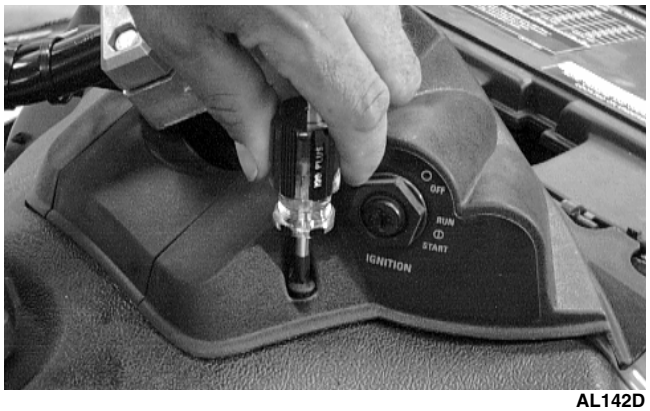
AL149D

7. On the upper end of the steering post, apply a light oil to the bearing halves and place into position around the steering post; then place the bearing cap between the steering support and the steering post. Place the bearing housing into position and secure with the backing plate, two cap screws, washers, and lock nuts. Tighten to specifications.



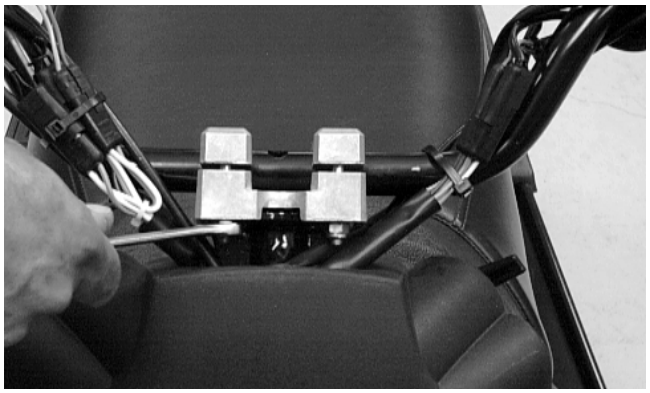
AL090

8. Secure the console with the Phillips-head screws.



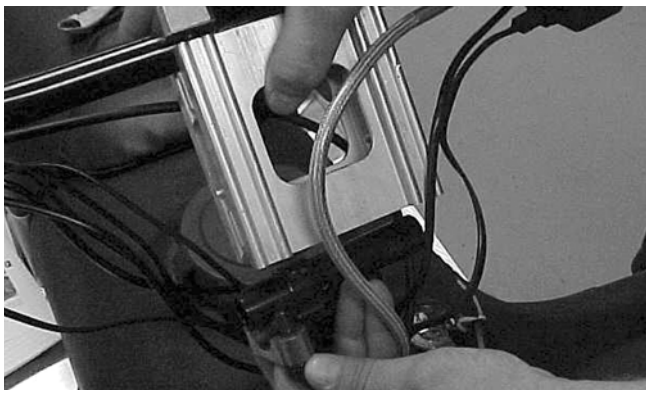
AL142D

9. Place the adjuster block, handlebar assembly, and adjuster caps into position; then secure with four cap screws and lock nuts. Tighten lock nuts evenly to specifications.



AL147D

■ **NOTE: On the King Cat/ZR models, place the handlebar/riser assembly onto the steering post; then secure to the steering post with the lower adjuster cap and four Allen-head cap screws. Tighten cap screws to specifications.**



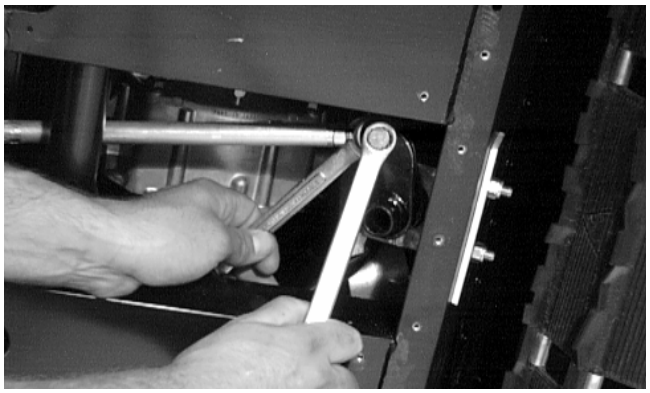
FC200

10. Secure the handlebar pad.



AL136D

11. Tip the snowmobile on its side; then place the tie rod into position. Secure with a cap screw (coated with green Loctite #609) and lock nut. Tighten to specifications. Install the cotter pin and spread the pin.



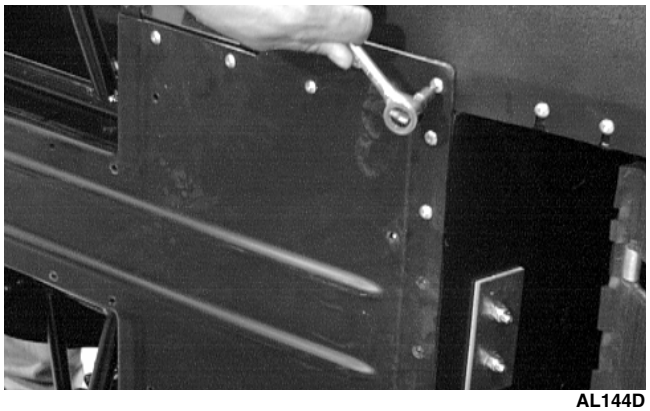
AL146D

12. On the lower end of the steering post, apply a light oil to the bearing halves and place into position around the steering post; then place the bearing cap and bearing housing into position. Install the backing plate and secure with two cap screws, washers, and lock nuts. Tighten to specifications.



AL145D

13. Install the skid plate. Secure with screws.



AL144D

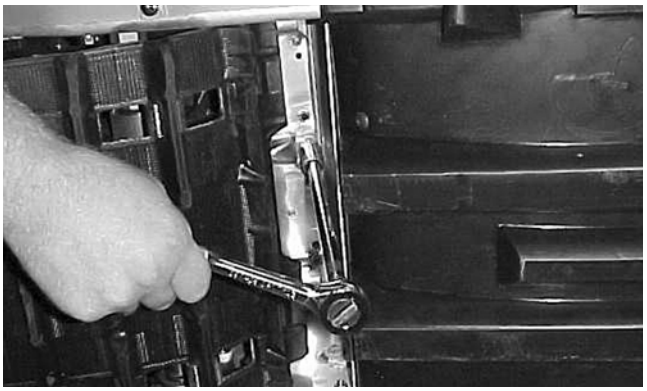
■ **NOTE: Turn the handlebar to the full-left and full-right to ensure free movement.**

Steering Post
(Crossfire/Firecat/M-Series/ Sabercat)

REMOVING

1. Using a piece of cardboard to protect the hood and belly pan, tip the snowmobile on its PTO-side.

2. From beneath the front end, remove the lock nut and washer securing the steering post to the steering post stop.



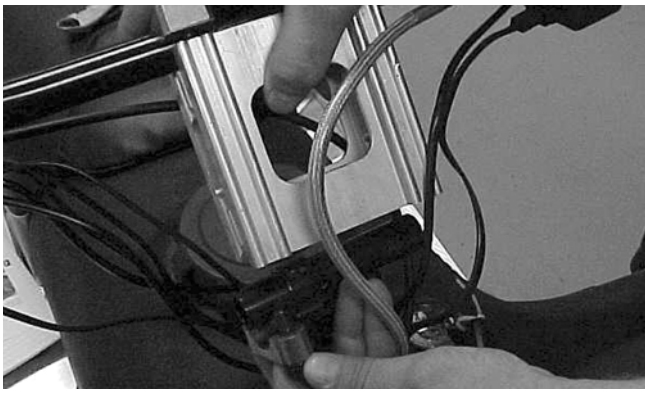
FC199

3. Tip the snowmobile upright. Remove the handlebar pad.

4. Remove the cable ties securing the wiring and brakeline hose to the steering post.

■ **NOTE: On the Crossfire/M-Series models, remove the routing clips securing the brake hose and wiring to the steering support.**

5. On the Firecat/Sabercat models, remove the four lower Allen-head cap screws securing the handlebar riser to the steering post; then lay the handlebar riser assembly aside. Account for the lower adjuster caps.



FC200

6. On the Crossfire/M-Series models, remove four lock nuts and cap screws securing the handlebar to the adjuster block.



CM001

7. On the Firecat Sabercat models, remove the five torx-head screws securing the console to the gas tank; then lay the console aside.

8. On the Crossfire/M-Series models, remove the ignition switch and the 11 torx-head cap screws and four lock nuts securing the console to the gas tank; then lay the console aside.

9. Remove the cap screw and lock nut securing the steering tie rod to the steering post.

■ **NOTE: The expansion chamber must be removed for this procedure.**



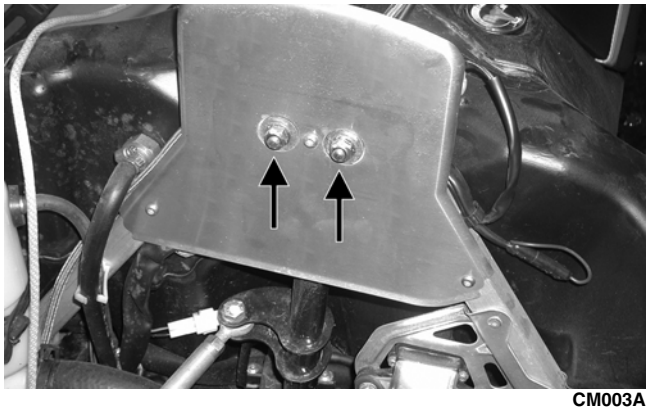
CM002A

10. On the Firecat/Sabercat models, remove the two lock nuts and two torx-head cap screws with nuts securing the steering post mounting block. Account for the plastic steering post mounting block and the retaining plate.



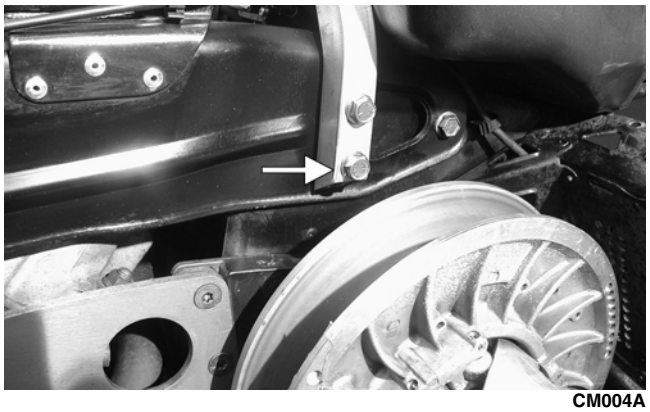
FC203

11. On the Crossfire/M-Series models, remove the two lock nuts from the steering post mounting block.



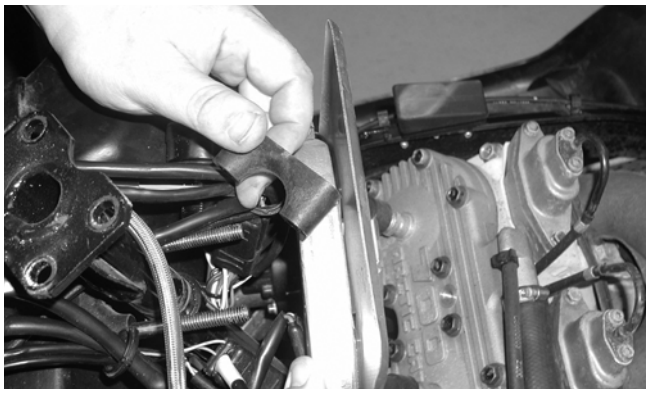
CM003A

12. On the Crossfire/M-Series models, remove the two lower cap screws securing the steering support to the chassis.



CM004A

■ **NOTE: Removing only the two lower cap screws will allow the steering support to be moved forward so the mounting block and steering post can be removed.**



CM005

13. Remove the steering post. Account for all mounting hardware.

⚠ CAUTION

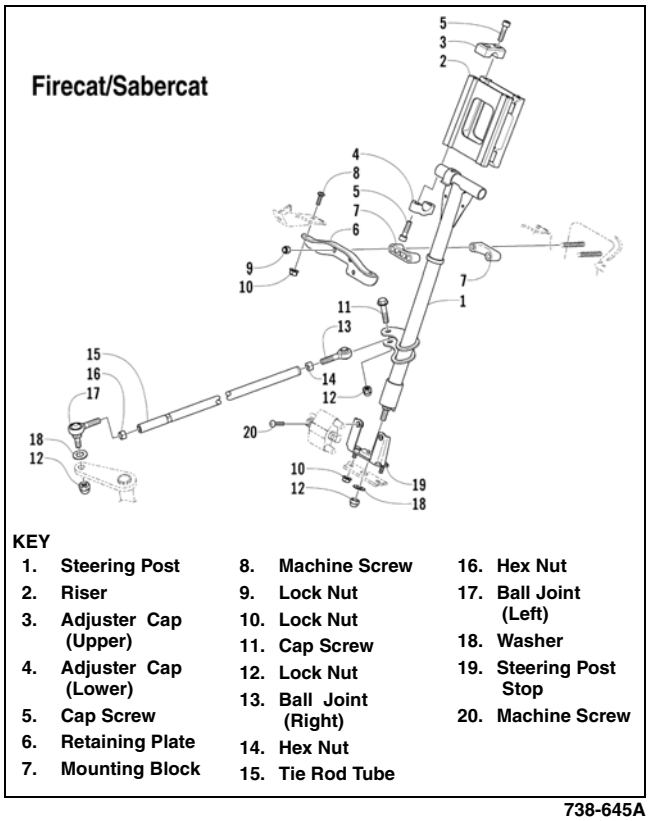
Care must be taken not to hook any wires or hoses when removing the steering post.

INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect all welded areas for cracks or deterioration.
2. Inspect the steering post and steering-post retaining plate for cracks, bends, or wear.
3. Inspect the adjuster caps and mounting block for cracks or wear.

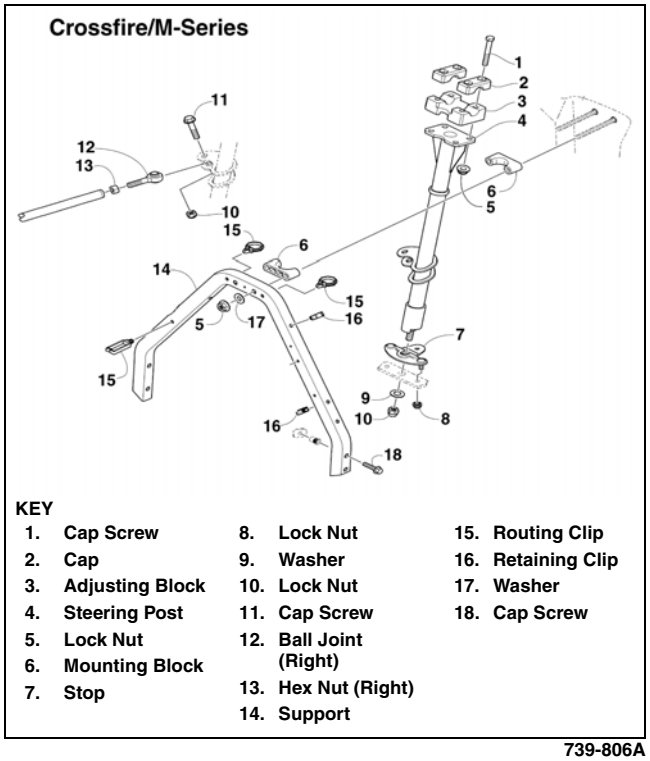
INSTALLING



KEY

1. Steering Post
2. Riser
3. Adjuster Cap (Upper)
4. Adjuster Cap (Lower)
5. Cap Screw
6. Retaining Plate
7. Mounting Block
8. Machine Screw
9. Lock Nut
10. Lock Nut
11. Cap Screw
12. Lock Nut
13. Ball Joint (Right)
14. Hex Nut
15. Tie Rod Tube
16. Hex Nut
17. Ball Joint (Left)
18. Washer
19. Steering Post Stop
20. Machine Screw

738-645A



KEY

1. Cap Screw
2. Cap
3. Adjusting Block
4. Steering Post
5. Lock Nut
6. Mounting Block
7. Stop
8. Lock Nut
9. Washer
10. Lock Nut
11. Cap Screw
12. Ball Joint (Right)
13. Hex Nut (Right)
14. Support
15. Routing Clip
16. Retaining Clip
17. Washer
18. Cap Screw

739-806A

1. Carefully slide the steering post into position in the chassis. Be careful not to hook any wires or hoses.

7

2. On the Crossfire/M-Series models after the steering post is in position on the chassis, install the steering support and mounting blocks to the gas tank with two lock nuts taking care not to pinch any wiring.



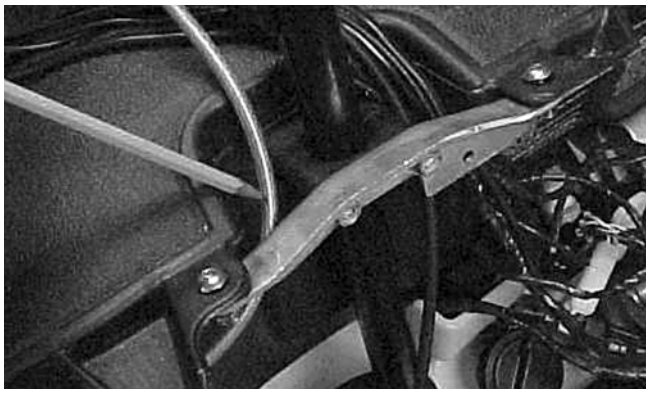
CM005

3. On the Firecat/Sabercat models, place the steering post mounting block and retaining plate into position taking care not to pinch any wiring. Tighten to specifications. Tighten to specifications.



FC203

■ **NOTE: On the Firecat/Sabercat models, the brakeline hose should be positioned behind the retaining plate.**



FC204

4. On the Crossfire/M-Series models, install the two lower cap screws to the steering support. Tighten to specifications.

■ **NOTE: If for any reason the upper cap screw and lock nut are removed from the right-side of the steering support, make sure to install the ground wire to the cap screw.**

5. Place the steering tie rod into position on the steering post. Secure with the cap screw (threads coated with green Loctite #609) and lock nut. Tighten the lock nut to specifications.



FC205

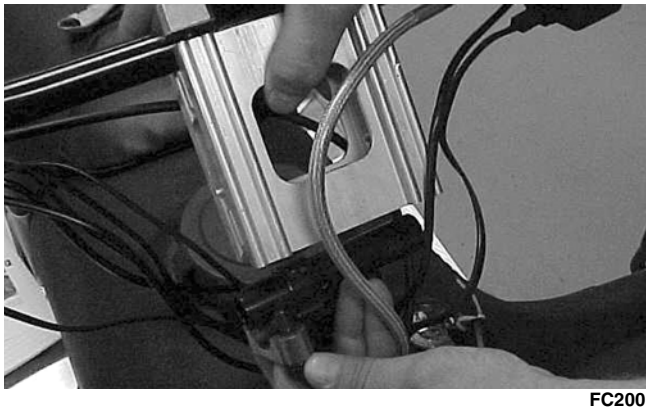
6. On the Firecat/Sabercat models, secure the console to the gas tank with the five torx-head screws. Do not over-tighten the screws.



FC227

■ **NOTE: On the Crossfire/M-Series models, secure the console to the gas tank with the 11 torx-head cap screws and four lock nuts. Tighten securely; then install the ignition switch.**

7. Place the handlebar/riser assembly onto the steering post; then secure to the steering post with the lower adjuster cap and four Allen-head cap screws. Tighten cap screws to specifications.



FC200

■ **NOTE: On the Crossfire/M-Series models, secure the adjuster block to the steering post with four cap screws and lock nuts. Tighten to specifications.**

8. On the Crossfire/M-Series models, secure the wiring and brake hose to the steering support with the routing clips.

9. On the Firecat/Sabercat models, secure the wiring and brakeline hose to the steering post with cable ties; then install the handlebar pad.

10. Using a piece of cardboard to protect the hood and belly pan, tip the snowmobile on its PTO-side.

11. From beneath the front end, secure the steering post to the steering post stop with the washer and lock nut (threads coated with green Loctite #609). Tighten the lock nut to specifications.



FC199

Ski

REMOVING

1. Place the front of the snowmobile on a support stand.

2. Remove the cotter pin; then remove the slotted nut and cap screw securing the ski assembly to the spindle. Remove the ski. Account for the rubber damper and washers.



AL095D

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the ski for cracks or deterioration.

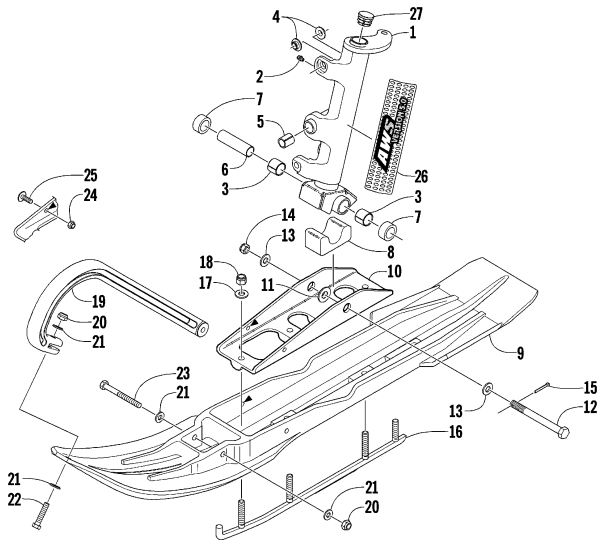
2. Inspect the ski for abnormal bends or cracks.

3. Inspect the wear bar for wear.

4. Inspect all hardware and the spindle bushings for wear and damage.

5. Inspect the rubber damper for damage or wear.

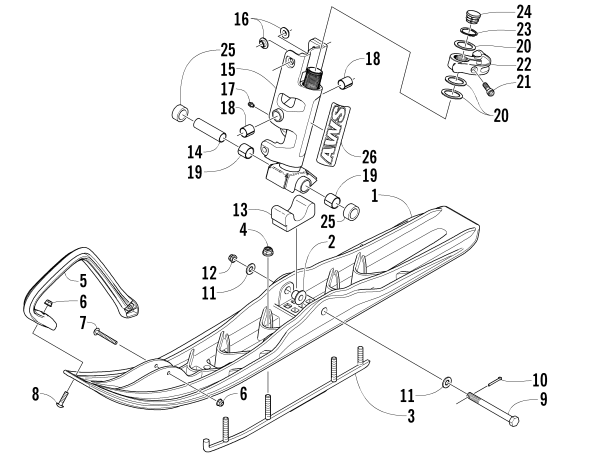
INSTALLING



KEY

1.	Spindle	10.	Ski Saddle	19.	Plastic Handle
2.	Grease Fitting	11.	Ski Saddle Insert	20.	Lock Nut
3.	Bearing	12.	Cap Screw	21.	Washer
4.	Spindle Insert	13.	Washer	22.	Cap Screw
5.	Bearing	14.	Lock Nut	23.	Cap Screw
6.	Spindle Axle	15.	Cotter Pin	24.	Lock Nut
7.	Spacer	16.	Wear Bar	25.	Machine Screw
8.	Damper	17.	Washer	26.	Decal
9.	Ski	18.	Lock Nut	27.	Spindle Cap

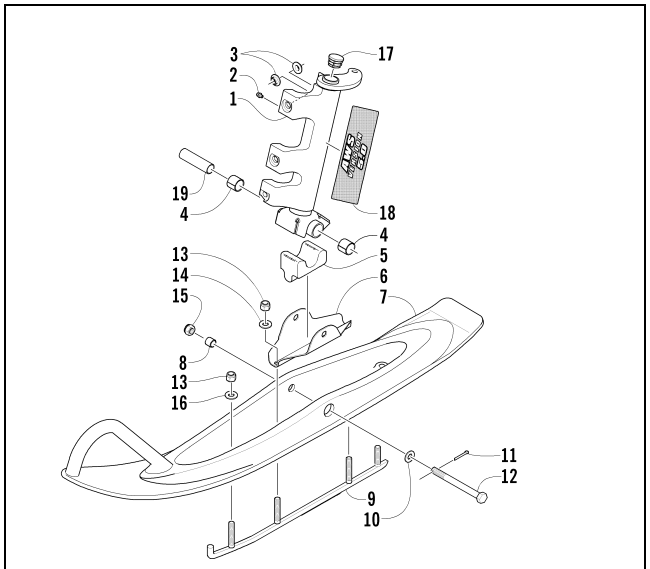
737-380A



KEY

1.	Ski	10.	Cotter Pin	19.	Bearing
2.	Ski Insert	11.	Washer	20.	Thrust Washer
3.	Wear Bar	12.	Lock Nut	21.	Cap Screw
4.	Lock Nut	13.	Damper	22.	Steering Arm
5.	Plastic Handle	14.	Spindle Axle	23.	Retaining Ring
6.	Lock Nut	15.	Spindle	24.	Spindle Cap
7.	Machine Screw	16.	Spindle Insert	25.	Spacer
8.	Machine Screw	17.	Grease Fitting	26.	Decal
9.	Cap Screw	18.	Bearing		

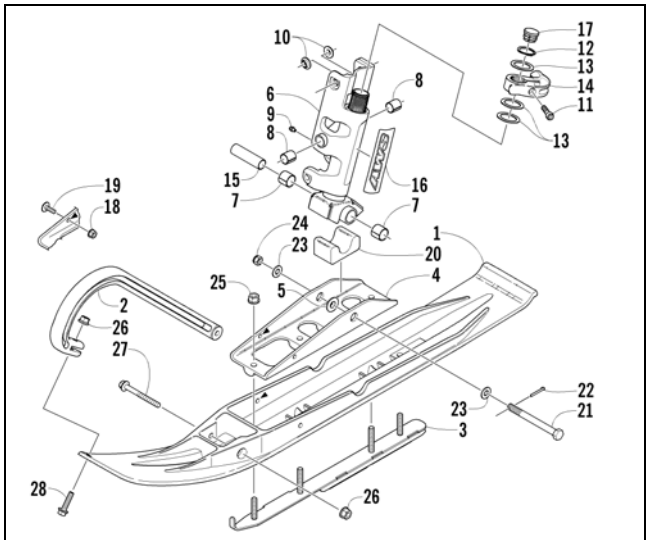
0740-020



KEY

1.	Spindle	8.	Ski Insert	15.	Lock Nut
2.	Grease Fitting	9.	Wear Bar	16.	Washer
3.	Spindle Insert	10.	Washer	17.	Spindle Cap
4.	Bearing	11.	Cotter Pin	18.	Decal
5.	Damper	12.	Cap Screw	19.	Axle
6.	Ski Saddle	13.	Lock Nut		
7.	Ski	14.	Washer		

0737-454



KEY

1.	Ski	11.	Cap Screw	21.	Cap Screw
2.	Handle	12.	Retaining Ring	22.	Cotter Pin
3.	Wear Bar	13.	Washer	23.	Washer
4.	Saddle	14.	Steering Arm	24.	Lock Nut
5.	Ski Insert	15.	Spindle Axle	25.	Lock Nut
6.	Spindle	16.	Decal	26.	Lock Nut
7.	Bearing	17.	Spindle Cap	27.	Cap Screw
8.	Bearing	18.	Lock Nut	28.	Cap Screw
9.	Grease Fitting	19.	Machine Screw		
10.	Spindle Insert	20.	Damper		

0740-542

1. Position the ski over the saddle.

2. Apply a low-temperature grease to the non-threaded portion of the cap screw; then slide the cap screw (with washer as required) through the ski and saddle accounting for the rubber damper.

■ **NOTE: Install the cap screw so the lock nut will be located to the inside of the ski.**

3. Apply red Loctite #271 to the threads of the cap screw; then tighten the lock nut (with washer as required) to specifications.

4. Place the cotter pin into the ski cap screw and spread the pin.

Ski Wear Bar

The ski wear bar is a replaceable bar attached to the underside of the ski. The purpose of the wear bar is to assist in turning the snowmobile, to minimize ski wear, and to maintain good steering control. If the snowmobile is operated primarily in deep snow, ski wear bar wear will be minimal; however, if the snowmobile is operated on terrain where the snow cover is minimal, the ski wear bar will wear faster. Arctic Cat recommends that the ski wear bars be checked once a week and replaced if worn to 1/2 of original diameter.

REMOVING

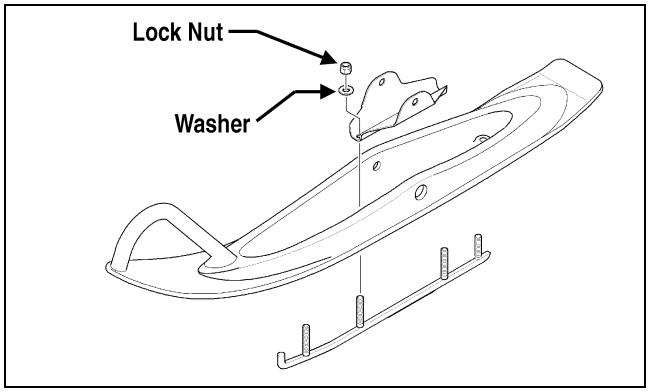
1. Remove ice and snow buildup from the ski.

2. With the gas tank nearly empty (less than 1/4 full), lay the snowmobile on its side.

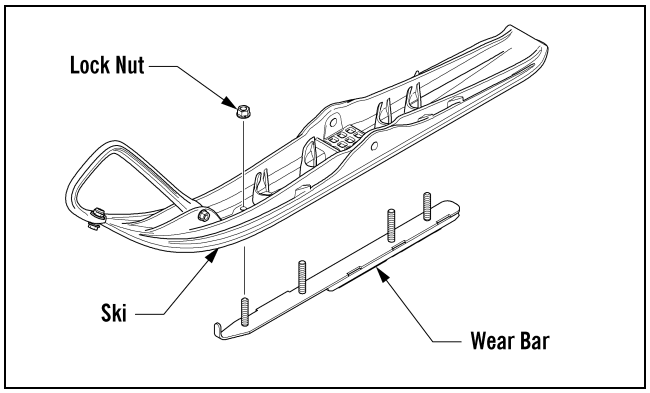
⚠ CAUTION

A piece of cardboard should be used to protect the finish on the belly pan.

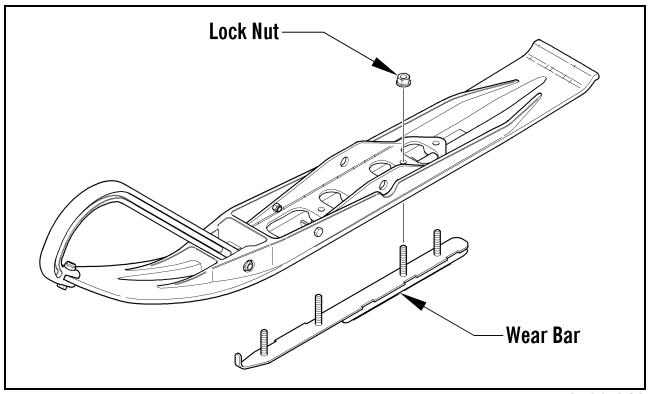
3. Remove the lock nuts and washers securing the wear bar to the ski. Account for any spacers.



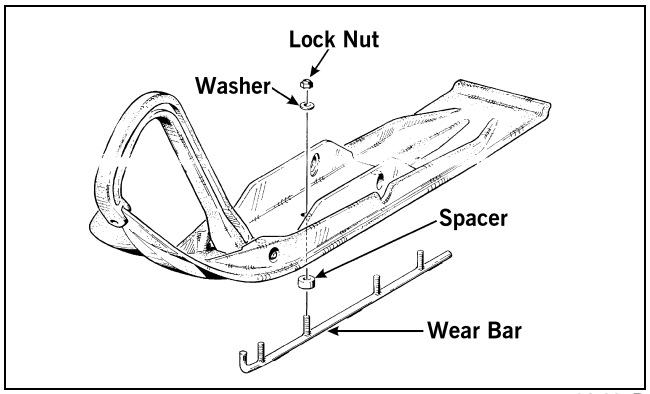
737-454A



0739-596



0739-016



731-037D

4. Pry the rear of the wear bar down until the wear bar studs are clear of the ski; then slide the wear bar rearward until the front of the wear bar is free from the ski.

5. Remove the wear bar.

INSTALLING

1. Place spacers (if applicable) on the wear bar studs; then insert the front of the wear bar into the hole at the front of the ski and swing the wear bar upward.

⚠ WARNING

DO NOT bend the ski wear bar excessively when installing. Excessive bending of the ski wear bar may cause premature wear, breakage, and possible injury.

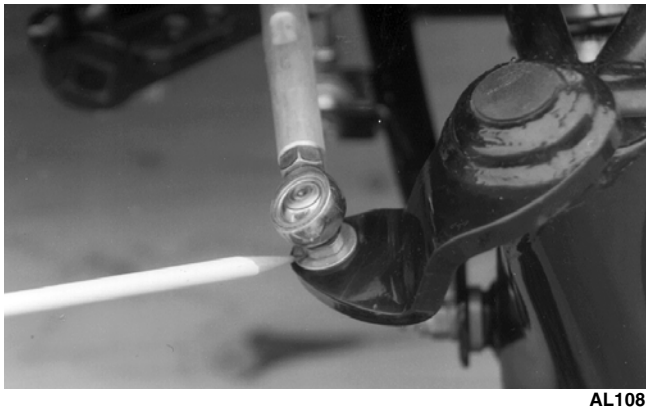
2. Insert the wear bar studs into the holes in the ski.
3. Center the wear bar studs in the holes and install the washers and lock nuts.
4. Tighten lock nuts securely.

Drag Link
(Bearcat/King Cat/Panther/Z/ZR)

REMOVING

1. Remove the expansion chamber if necessary.
2. Remove the lock nuts securing the tie rods to the spindles on both sides of the snowmobile. Account for O-rings and washers.

■ **NOTE: Note whether the tie rod is installed on the top side or on the bottom side of the spindle arm for installing purposes.**



AL108



AL655D

3. On the side from which the drag link will be removed, remove the self-tapping screws securing the steering boot to the front end.
4. Remove the cap screws and lock nuts securing the steering tie rod to the steering arm. Account for washers.



AL092

5. Move the drag link from side to side to gain access to the lock nuts and cap screws securing the steering arms to the drag link; then remove the cap screws and lock nuts. Account for washers and drag link bearing axles.
6. From the opposite side from which the boot was removed, carefully pull the steering boot over the tie rod end; then remove the drag link.

■ **NOTE: Applying soapy water to the steering boot will aid in pulling the boot over the tie rod end.**

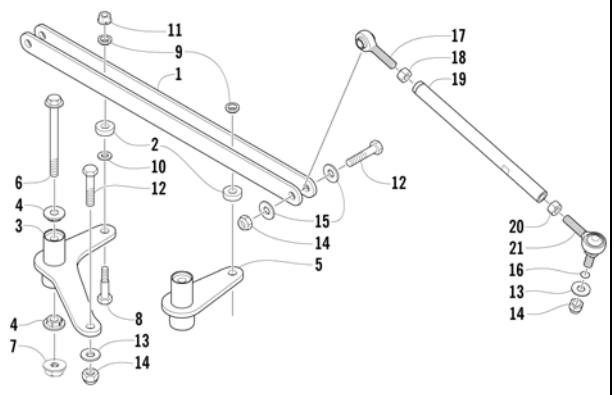
7. Place the drag link in a vise and remove the tie rod ends from the drag link.

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the entire drag link (especially in the areas where the ball joints attach) for any signs of cracks, wear, or damage.
2. Inspect the bearings, inserts, and axles for wear or damage.

INSTALLING



KEY

1.	Drag Link	8.	Cap Screw	15.	Washer
2.	Bearing	9.	Axle	16.	O-Ring
3.	Steering Arm	10.	Washer	17.	Ball Joint (Right)
4.	Insert	11.	Lock Nut	18.	Hex Nut (Right)
5.	Idler Arm	12.	Cap Screw	19.	Tie Rod Tube
6.	Cap Screw	13.	Washer	20.	Hex Nut (Left)
7.	Lock Nut	14.	Lock Nut	21.	Ball Joint (Left)

0738-354

1. Place the drag link in a vise; then secure the tie rod to the drag link with cap screws, washers, and lock nuts (threads coated with green Loctite #609). Tighten to specifications.

2. Slide the drag link in from the side of the snowmobile from which the steering boot was removed; then carefully slide the boot over the tie rod end.

■ NOTE: Applying soapy water to the steering boot will aid in sliding the boot over the tie rod end.

3. Secure the drag link to the steering and idler arms with cap screws (coated with green Loctite #609), washers, bearing axles, and lock nuts. Tighten to specifications.



AL092

4. Secure the steering tie rod to the steering arm with a cap screw (coated with green Loctite #609), washer, and a lock nut. Tighten to specifications.

5. Place the steering boot into position on the front end (bulk head). Secure with self-tapping screws.

6. Install the tie rods (threaded area coated with green Loctite #609) on the spindle arms as noted during removing. Secure with O-rings, washers, and lock nuts. Tighten to specifications.



AL108



AL655D

■ NOTE: Check all drag link and ball joint fasteners to ensure they are tight. Turn the handlebars full-left and full-right several times to ensure free movement.

7. Install and secure the expansion chamber (if removed).

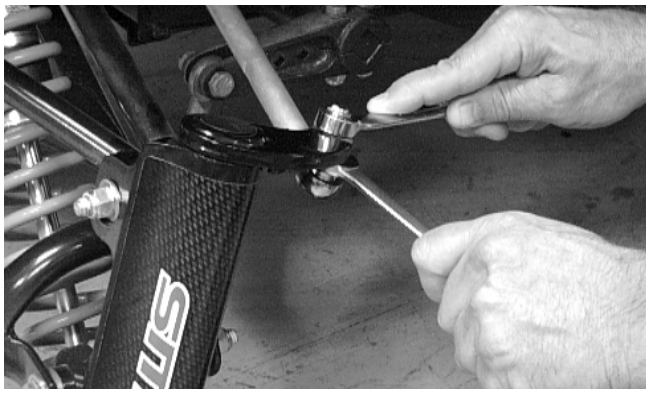
8. Check and adjust ski alignment (see appropriate Ski Alignment in this section).

Front Tie Rods
(Bearcat/King Cat/Panther/Z/ZR)

REMOVING AND DISASSEMBLING

1. Remove the lock nut securing the tie rod to the spindle. Account for a washer and O-ring.

■ NOTE: Note that the tie rod is installed on the bottom side of the spindle arm for installing purposes.



AL655D

2. Remove the self-tapping screws or rivets securing the steering boot and retainer to the front end.

3. Turn the handlebar in the appropriate direction; then remove the cap screw and lock nut securing the steering arm to the drag link. Account for washers.

4. Loosen the jam nut securing each ball joint to the tie rod; then remove the ball joints from the tie rod. Slide the rod from the steering boot. Remove the jam nuts from the ball joints.

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the ball joints and tie rods for damaged threads or wear.

2. Inspect the ball joints and tie rods for cracks or unusual bends.

3. Wash the ball joints in parts-cleaning solvent. Dry with compressed air. Inspect the ball joint pivot area for wear. Apply a low-temperature grease to the ball joints.

⚠ WARNING

Always wear safety glasses when using compressed air.

ASSEMBLING AND INSTALLING

1. Slide the tie rod through the steering boot and retainer; then install the jam nuts on the ball joints and thread the ball joints onto the tie rod.

■ **NOTE: Each jam nut and ball joint is either a right-hand or left-hand thread; therefore, each can only be installed on one end of the tie rod. The right-hand thread is the inside ball joint and jam nut.**

2. Secure the tie rod to the ball joint on the forked end of the drag link with a cap screw, washers, and lock nut. Tighten to specifications.

3. Secure the steering arm to the drag link with a cap screw, lock nut, and washers. Tighten to specifications.

4. Position an O-ring and washer on the ball joint assembly (threads coated with green Loctite #609). Install the ball joint on the spindle arm as noted in removing; then secure with a lock nut. Tighten to specifications.



AL655D

5. Place the steering boot and retainer into position and secure with self-tapping screws or rivets.

6. Adjust ski alignment (see appropriate Ski Alignment in this section).

7. Apply blue Loctite #243 to the jam nut threaded area and tighten the jam nuts against the tie rod to specifications.

⚠ WARNING

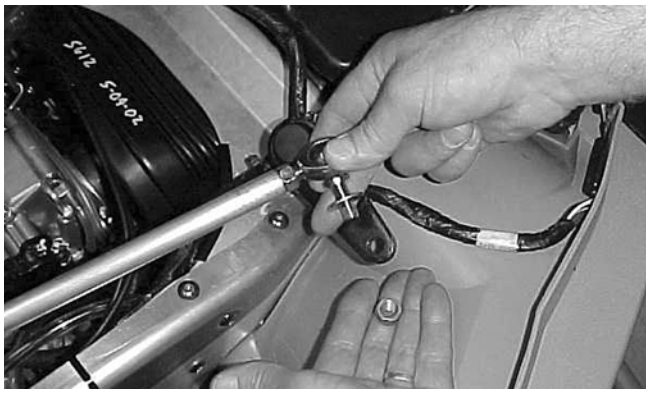
Neglecting to lock the jam nuts against the tie rod may cause loss of snowmobile control and possible personal injury.

Front Tie Rods
(Crossfire/Firecat/M-Series/ Sabercat)

REMOVING

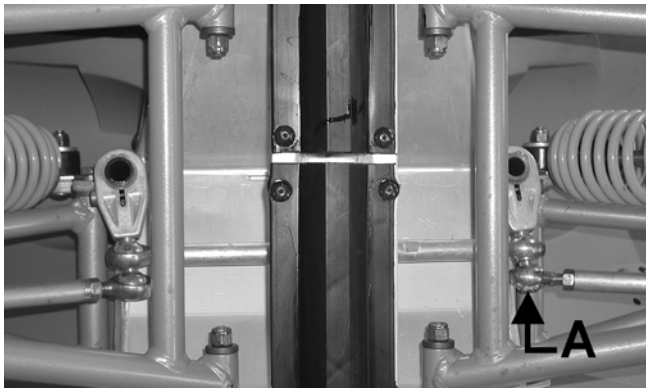
1. Remove the lock nut securing the steering tie rod to the upper arm of the steering shaft. Account for the washer.

■ **NOTE: Note that the tie rod is installed on the top side of the upper arm for installing purposes.**



FC206

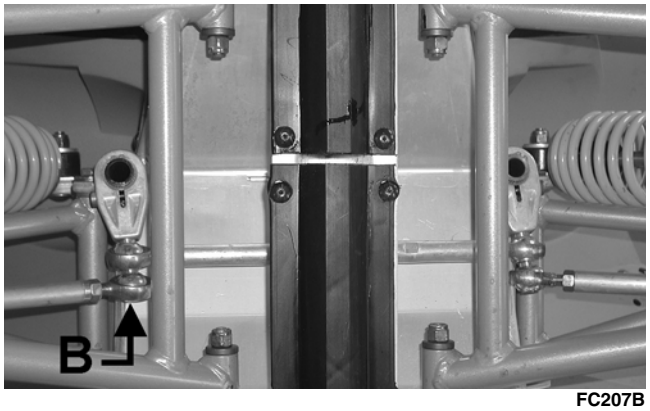
2. From the right-side, remove the Allen-head cap screw (A) securing the two tie rod ends to the lower arm of the steering shaft.



FC207A

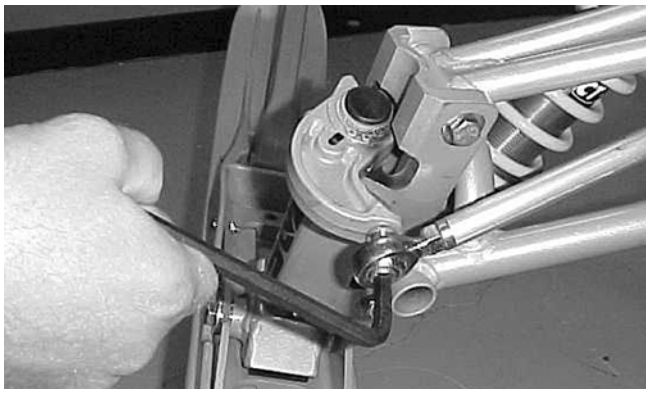
3. Remove the Allen-head cap screw securing the tie rod to the right-side spindle arm.

4. From the left-side, remove the Allen-head cap screw (B) securing the two tie rod ends to the lower arm of the idler shaft.



FC207B

5. Remove the Allen-head cap screw securing the tie rod end to the left-side steering arm.



FC209

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the ball joints and tie rods for damaged threads or wear.

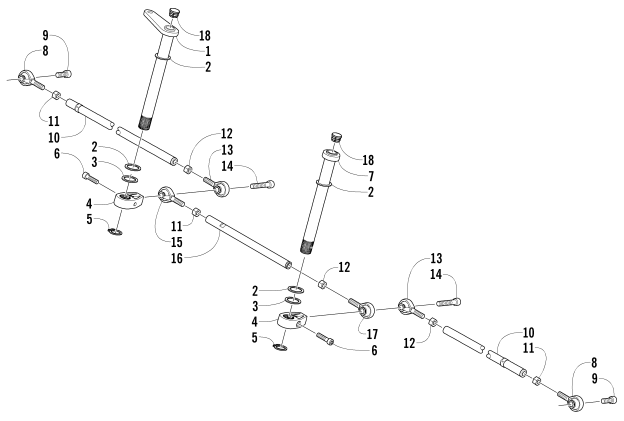
2. Inspect the ball joints and tie rods for cracks or unusual bends.

3. Wash the ball joints in parts-cleaning solvent. Dry with compressed air. Inspect the ball joint pivot area for wear. Apply a low-temperature grease to the ball joints.

⚠ WARNING

Always wear safety glasses when using compressed air.

INSTALLING



KEY

1.	Steering Shaft	7.	Idler Shaft	13.	Ball Joint
2.	Thrust Washer	8.	Ball Joint	14.	Cap Screw
3.	Thrust Washer	9.	Cap Screw	15.	Ball Joint
4.	Shaft Arm	10.	Tie Rod Tube	16.	Tie Rod Tube
5.	Snap Ring	11.	Hex Nut	17.	Ball Joint
6.	Cap Screw	12.	Hex Nut	18.	Plug

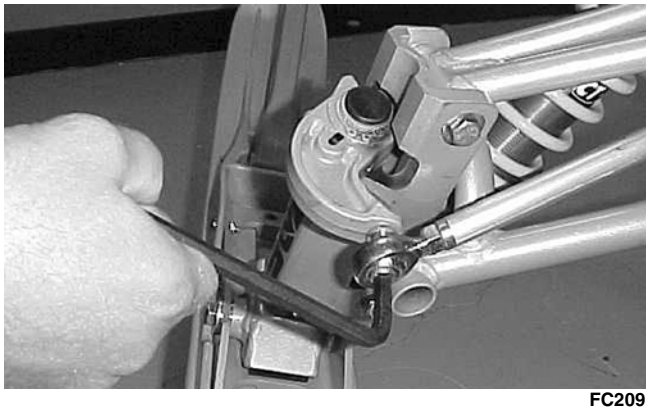
0739-808

1. Place the two tie rod ends into position on the lower arm of the idler shaft. Secure with the Allen-head cap screw (B) coated with green Loctite #609. Tighten to specifications.



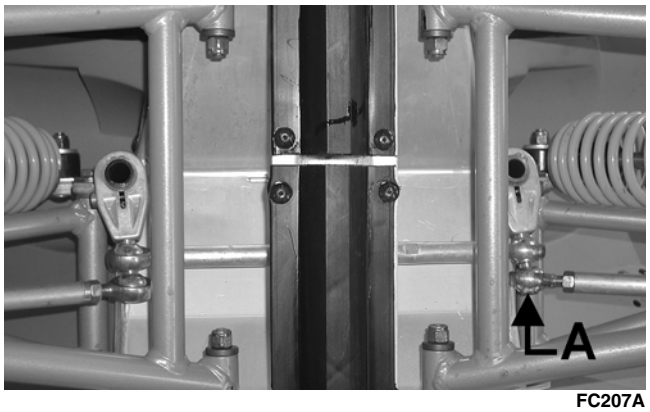
FC207B

2. Place the tie rod into position on the left-side steering arm. Secure with the Allen-head cap screw coated with green Loctite #609. Tighten to specifications.



FC209

3. Place the two tie rod ends into position on the lower arm of the steering shaft. Secure with the Allen-head cap screw (A) coated with green Loctite #609. Tighten to specifications.



FC207A

4. Place the tie rod into position on the right-side spindle arm. Secure with the Allen-head cap screw coated with green Loctite #609. Tighten to specifications.

5. Place the steering tie rod into position on the upper arm of the steering shaft. Secure with the washer and lock nut (threads coated with green Loctite #609). Tighten lock nut to specifications.



FC206

Spindle
(Bearcat/King Cat/Panther/Z/ZR)

REMOVING

1. Position the front of the snowmobile up on a safety stand.

2. Remove the ski.

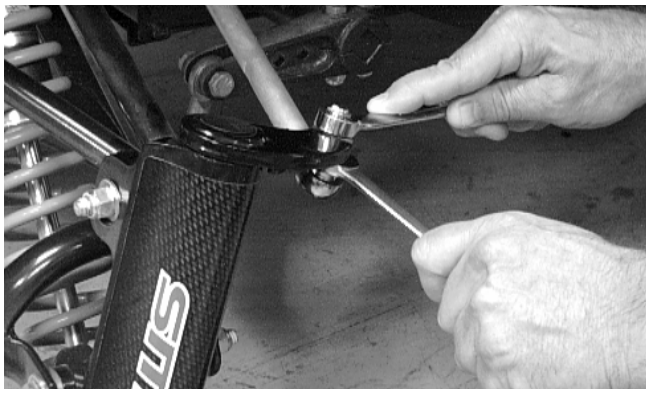
3. Remove the lock nut and cap screw securing the shock absorber to the spindle. Account for all mounting hardware.



AL156D

4. Remove the lock nut securing the tie-rod ball joint to the spindle (account for the washer and the O-ring); then remove the ball joint from the spindle.

■ **NOTE: Note that the tie rod is installed on the bottom side of the spindle arm for installing purposes.**



AL655D

5. Remove the two cap screws and lock nuts securing the spindle to the suspension arms. Account for all mounting hardware.



AL159D



AL160D

6. Inspect the tie-rod ball joint in place. If damage, wear, or unusual bends are noted, loosen the jam nut; then remove the ball joint from the tie rod.

INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect the spindle for excessive wear, cracks, bends, or imperfections.

2. Inspect all welds for cracking.

3. Inspect the suspension arm bushings and axle area for wear.

4. Secure the spindle in a vise. Rotate the spindle clockwise and counterclockwise. The movement should be smooth and free. If the spindle movement is rough or binding, grease the spindle with a good low-temperature grease. Rotate the spindle. If the movement remains rough, replace the spindle.

■ NOTE: When greasing the spindle, use enough grease so that it can be seen coming out at both the top and bottom of the spindle.

5. Inspect the spindle axle and bearings for wear, damage, or loose fit. Replace the bearings as a set.

■ NOTE: Replacing the ski bolt bushings is difficult. The existing bushings will be damaged during removal. Be careful, however, not to damage the spindle when removing the bearing. Press the new bushings into the spindle.

INSTALLING

1. Place the upper and lower suspension arm ends with bushings in position into the spindle. Secure with cap screws (threads coated with green Loctite #609) and lock nuts. Tighten to specifications.

2. Place the steering tie-rod ball joint into position (threads coated with green Loctite #609) on the spindle arm as noted during removing (with washer and O-ring) and secure with a lock nut. Tighten to specifications.



AL655D

3. Install the ski.

4. Align the lower shock eyelet with the mounting hole in the spindle; then secure with the cap screw, optional washers, and lock nut. Tighten to specifications.

5. Remove the safety stand from beneath the front end.

Spindle
(Crossfire/Firecat/M-Series/ Sabercat)

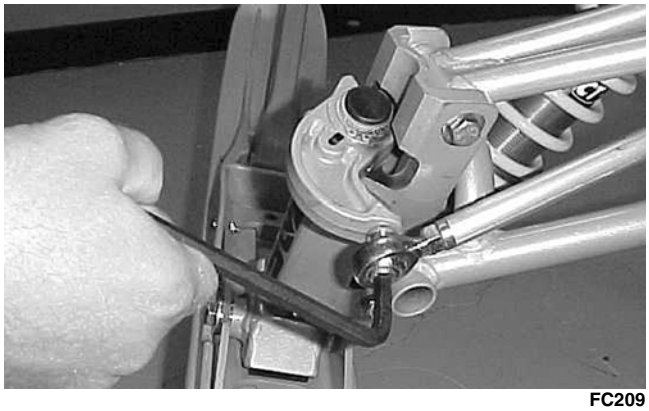
REMOVING

1. Position the front of the snowmobile up on a safety stand.
2. Remove the ski.
3. Remove the lock nut and cap screw securing the shock absorber to the spindle. Account for all mounting hardware.



FC208

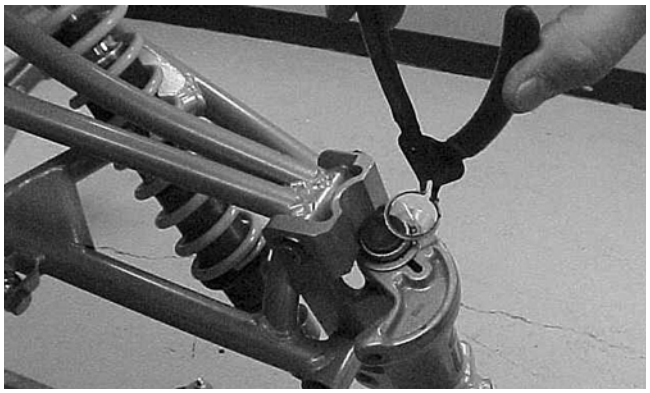
4. Remove the Allen-head cap screw securing the tie rod to the spindle arm.


FC209

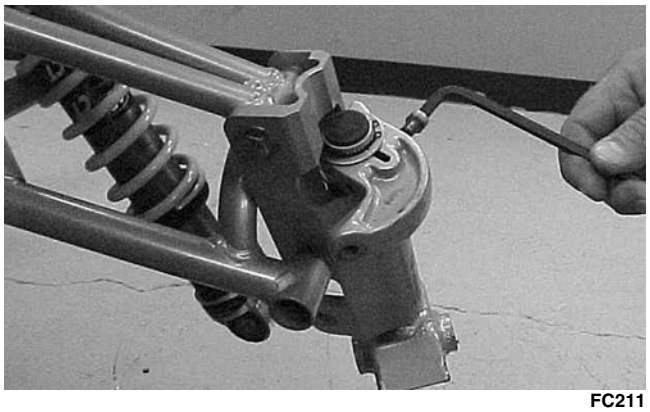
5. Remove the snap ring securing the steering arm to the spindle.

⚠ CAUTION

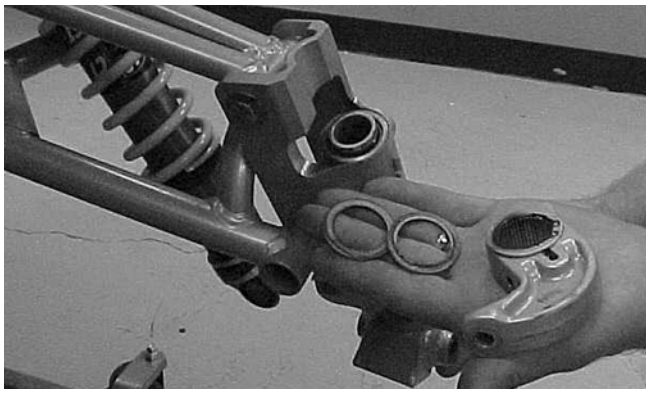
Care must be taken to not over-extend the snap ring. If the snap ring is over-extended, it must be replaced.


FC210

6. Remove the Allen-head cap screw securing the steering arm to the spindle.


FC211

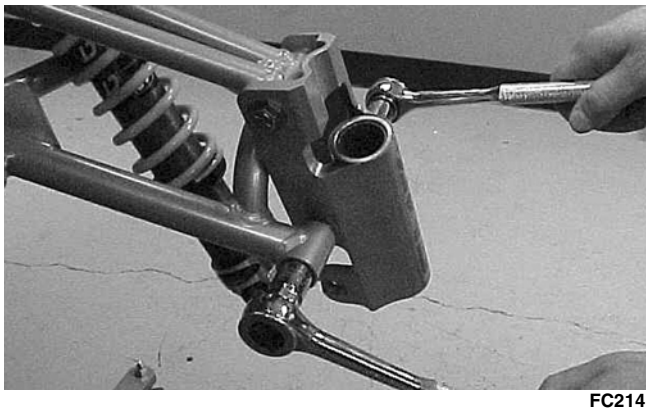
7. Remove the cap from the spindle; then using a plastic mallet, tap the spindle shaft out the bottom of the spindle. Account for the two washers from between the steering arm and the spindle.


FC212

8. Remove the two cap screws and lock nuts securing the spindle to the arms. Account for all mounting hardware.



FC213



FC214

9. Remove the spindle.

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the spindle for excessive wear, cracks, bends, or imperfections.
2. Inspect all welds for cracking.
3. Inspect the suspension arm bushings and axle area for wear.
4. Secure the spindle in a vise. Rotate the spindle clockwise and counterclockwise. The movement should be smooth and free. If the spindle movement is rough or binding, grease the spindle with a good low-temperature grease. Rotate the spindle. If the movement remains rough, replace the spindle.

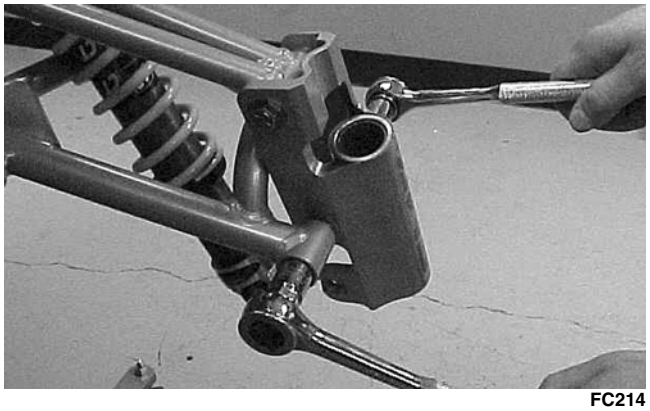
■ **NOTE: When greasing the spindle, use enough grease so that it can be seen coming out at both the top and bottom of the spindle.**

5. Inspect the spindle axle and bearings for wear, damage, or loose fit. Replace the bearings as a set.

■ **NOTE: Replacing the ski bolt bushings is difficult. The existing bushings will be damaged during removal. Be careful, however, not to damage the spindle when removing the bearing. Press the new bushings into the spindle.**

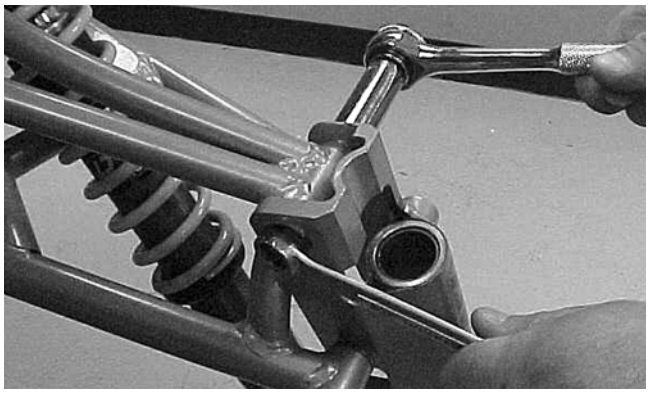
INSTALLING

1. Insert the spindle shaft into the spindle making sure the two washers are correctly positioned.
2. Place the upper and lower suspension arm ends with bushings in position into the spindle. Secure with cap screws (threads coated with green Loctite #609) and lock nuts. Tighten the lower lock nut to specifications.



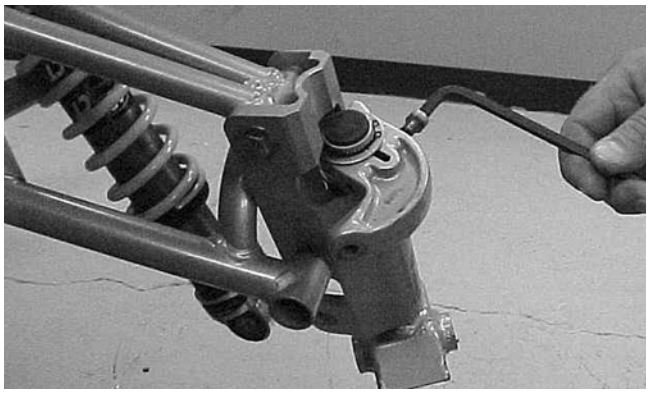
FC214

3. Tighten the upper lock nut to specifications.



FC213

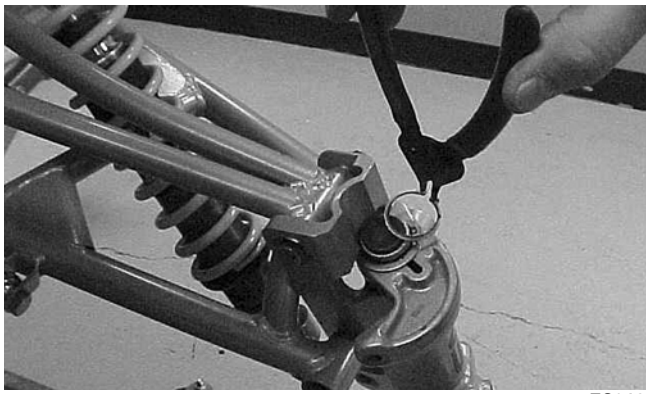
4. Install the cap onto the spindle; then place the steering arm tie rod into position on the spindle. Secure with the Allen-head cap screw coated with green Loctite #609. Tighten to specifications.



FC211

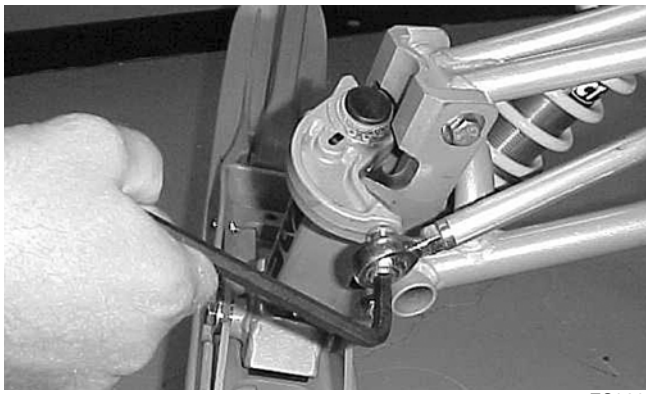
5. Install the snap ring noting the correct direction of the snap ring.

■ **NOTE: The sharp side of the snap ring should be directed away from the spindle arm.**



FC210

6. Place the tie rod into position on the spindle arm. Secure with the Allen-head cap screw coated with green Loctite #609. Tighten to specifications.



FC209

7. Place the shock absorber into position on the spindle. Secure with the cap screw and lock nut. Tighten to specifications.

8. Install the ski.

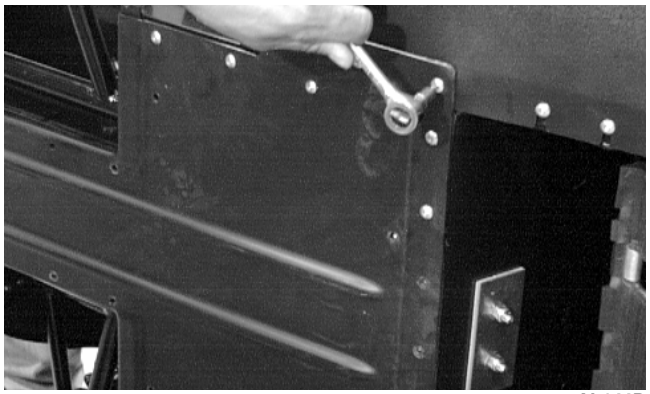
9. Remove the safety stand from beneath the front end.

Steering Tie Rod
(Bearcat/King Cat/Panther/Z/ZR)

REMOVING

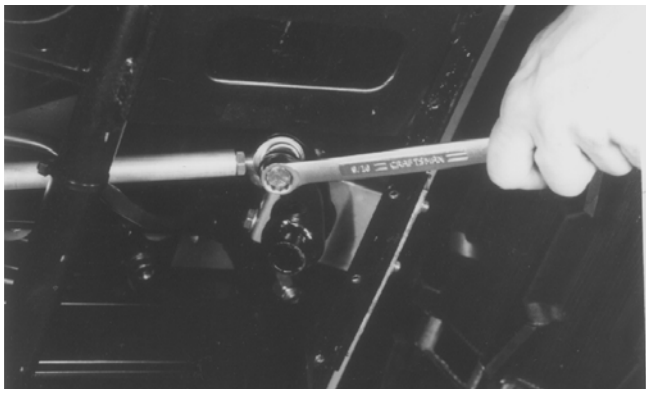
1. Remove the screws securing the skid plate; then remove the skid plate.

■ **NOTE: The front machine screw on some models is secured with a washer and lock nut.**



AL144D

2. Remove the cotter pins, cap screws, and slotted nuts securing the steering tie rod to the steering post and steering arm; then remove the tie-rod assembly.



AL089

3. Loosen the jam nuts securing the ball joints to the steering tie rod; then remove the ball joints.

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the ball joints for damaged threads or wear.

2. Inspect the tie rod for damage, unusual bends, or wear.

INSTALLING

1. Position the handlebar in the straight-ahead position; then position the skis straight ahead.

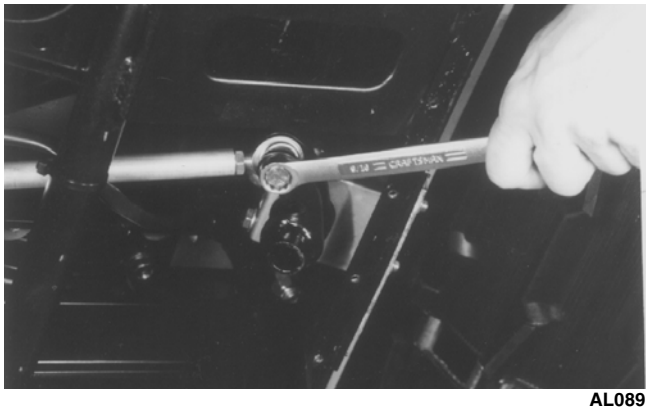
2. Thread the jam nuts onto the ball joints; then equally thread the ball joints onto the steering tie rod.

■ **NOTE: There must be an approximate equal number of threads exposed on each ball joint.**

3. Place the tie-rod assembly into position; then rotate the steering tie rod until the holes in the ball joints align with the holes in the steering post and steering arm.

4. Ensure correct handlebar/ski alignment (adjust steering tie rod as necessary); then apply blue Loctite #243 to the jam nut threaded area and tighten to specifications.

5. Secure the tie-rod assembly with the two cap screws (coated with green Loctite #609), washers, and slotted nuts. Tighten to specifications; then install the cotter pins and spread the cotter pins.



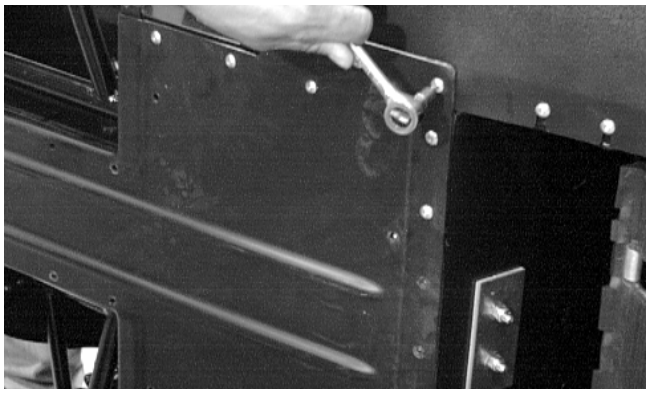
AL089

⚠ WARNING

Neglecting to lock the jam nuts against the tie rod may cause loss of snowmobile control and possible personal injury.

6. Install the skid plate; then secure with screws.

■ **NOTE: The front machine screw on some models is secured with a washer and lock nut.**



AL144D

Steering Tie Rod
(Crossfire/Firecat/M-Series/ Sabercat)

REMOVING

1. Remove the cap screw and lock nut securing the steering tie rod to the steering post.



FC202

2. Remove the cap screw and lock nut securing the steering tie rod to the upper arm of the steering shaft. Account for the washer.



FC206

7

INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect the ball joints for damaged threads or wear.

2. Inspect the tie rod for damage, unusual bends, or wear.

INSTALLING

■ NOTE: There must be an approximate equal number of threads exposed on each ball joint.

1. Place the steering tie rod into position on the upper arm of the steering shaft. Secure with the cap screw (coated with green Loctite #609), washer, and lock nut. Tighten the lock nut to specifications.



FC206

2. Place the steering tie rod into position on the steering post. Secure with the cap screw coated with green Loctite #609 and lock nut. Tighten lock nut to specifications.



FC205

Ski Alignment

CHECKING

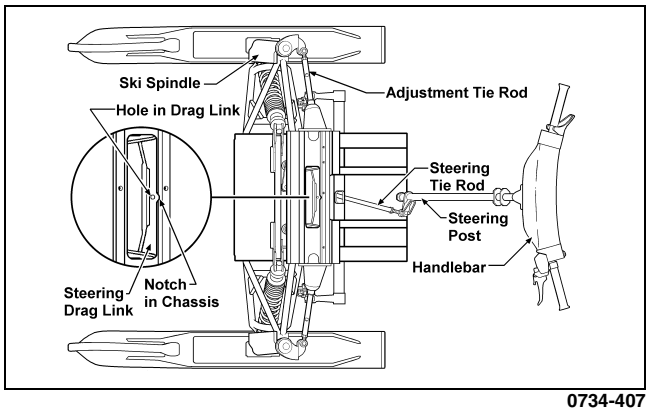
Toe-Out Range
1.6-6.4 mm (1/16-1/4 in.)

■ NOTE: Track tension and alignment must be properly adjusted prior to checking or adjusting ski alignment. Ski alignment must be performed on a flat, level surface. Ski toe-out must fall within the range of 1.6- 6.4 mm (1/16-1/4 in.).

1. Raise the front end of snowmobile just high enough to keep the skis from contacting the floor.

2. Turn the handlebar to the straight-ahead position. Visually inspect the handlebar for being centered and in the straight-ahead position.

■ NOTE: At this point on Bearcat/King Cat/Panther/Z/ZR models, the hole in the middle of the drag link should be aligned with the notch (half moon shaped) in the chassis.



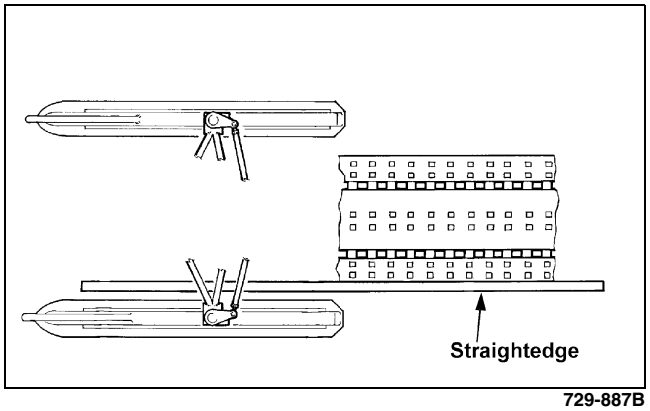
0734-407

■ NOTE: On Bearcat/King Cat/Panther/Z/ZR models if the handlebar is not in the straight-ahead position when the hole in the middle of the drag link aligns with the notch in the chassis, the steering tie rod must be adjusted. When handlebar alignment is correct, apply blue Loctite #243 to the jam nut threaded area and tighten both jam nuts securely against the steering tie rod.

3. With the handlebar in the straight-ahead position, secure the handlebar to prevent the alignment from becoming disturbed during the remainder of the alignment procedure.

■ NOTE: Track tension and alignment must be properly adjusted prior to placing the straightedge against the outside edge of the track.

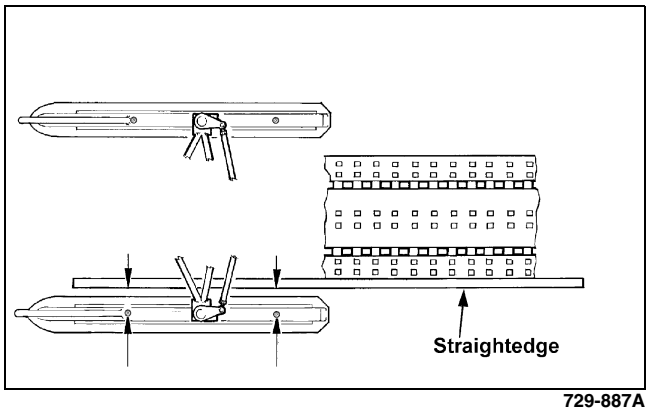
4. Place a long straightedge against the outside edge of the track so it lies near the inside edge of the left-side ski.



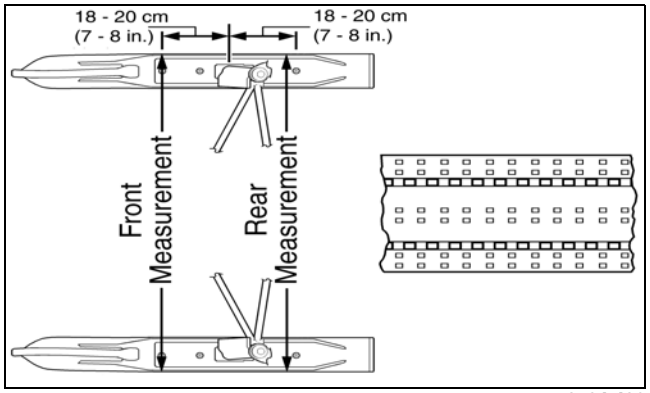
729-887B

■ **NOTE: The straightedge should be long enough to extend from the back of the track to the front of the ski.**

5. Measure the distance from the straightedge to the left-side ski wear bar bolts in two places: approximately 18-20 cm (7-8 in.) in front of the spindle and 18-20 cm (7-8 in.) behind the spindle. Record the measurements taken for the left side.



729-887A



0734-408

6. Place the straightedge against the outside edge of the track so it lies near the inside edge of the right-side ski.

7. Measure the distance from the straightedge to the right-side ski wear bar bolts in two places: 18-20 cm (7-8 in.) in front of the spindle and 18-20 cm (7-8 in.) behind the spindle. Record the measurements taken for the right side.

⚠ WARNING

The measurement from the front and rear wear bar bolts to the straightedge can be equal (ski parallel to the track), but the front measurement must never be less (ski toed-in) or poor handling will be experienced. The front wear bar bolt measurement to the straightedge must not exceed the measurement from the rear wear bar bolt to the straightedge (ski toed-out) by more than 3.9 mm (5/32 in.).

8. If ski alignment is not as specified, adjust the alignment of the ski(s) not parallel to the straightedge.

ADJUSTING

■ **NOTE: The following procedure can be used to adjust the alignment of either ski.**

1. On Bearcat/King Cat/Panther/Z/ZR models, remove the appropriate steering boot.

2. Secure the idler tie rod (Crossfire/Firecat/M-Series/Sabercat models) or secure the steering drag link (Bearcat/King Cat/Panther/Z/ZR models) in the centered position.

3. Loosen both spindle tie rod jam nuts on the same side as the ski to be aligned.

4. Using a wrench on the spindle tie rod “flats,” rotate the spindle tie rod until recommended specification is attained.

5. Apply blue Loctite #243 to each jam nut thread area; then lock the jam nuts against the spindle tie rod.

■ **NOTE: Repeat this procedure on each side (if necessary) until ski toe-out is within specification.**

6. On Bearcat/King Cat/Panther/Z/ZR models, install the steering boot.

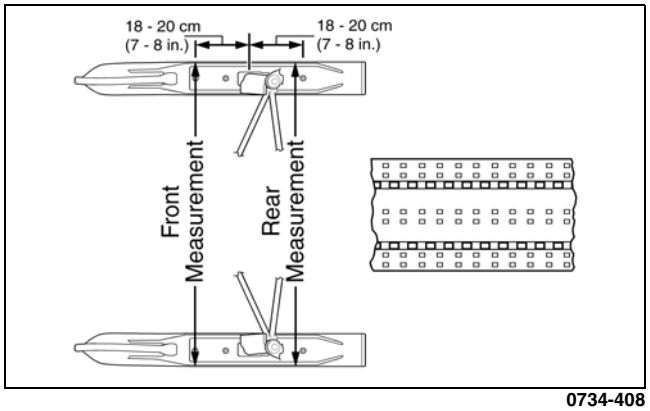
⚠ WARNING

Neglecting to lock the tie rod by tightening the jam nuts may cause loss of snowmobile control and possible personal injury.

VERIFYING

1. With the handlebar in the straight-ahead position, verify ski alignment by measuring across from the outside edge of the left-side wear bar bolts to the outside edge of the right-side wear bar bolts (without using the straightedge) in two places: approximately 18-20 cm (7-8 in.) in front of the spindle and 18-20 cm (7-8 in.) behind the spindle.

2. The measurement from in front of the spindle to the outer edge of the wear bar bolts (without using the straightedge) must not exceed the rear measurement by more than 1.6-6.4 mm (1/16-1/4 in.) toe-out.



0734-408

⚠ WARNING

The measurement taken in front of the spindle must never be less than the measurement taken behind the spindle or poor handling will be experienced. Neglecting to lock the tie rod by tightening the jam nuts may cause loss of snowmobile control and possible personal injury.

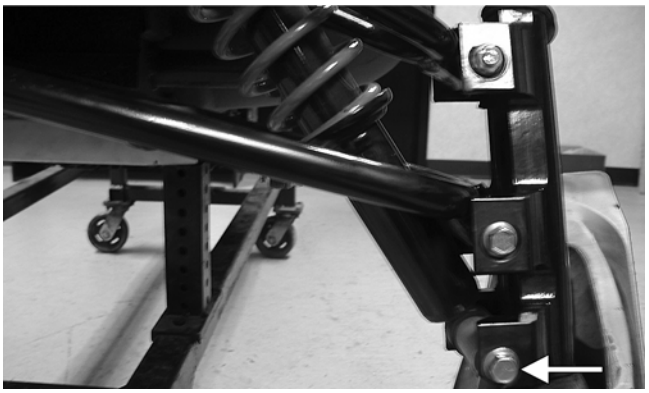
Front Suspension Arms
(Bearcat/King Cat/Panther/Z/ZR)

REMOVING

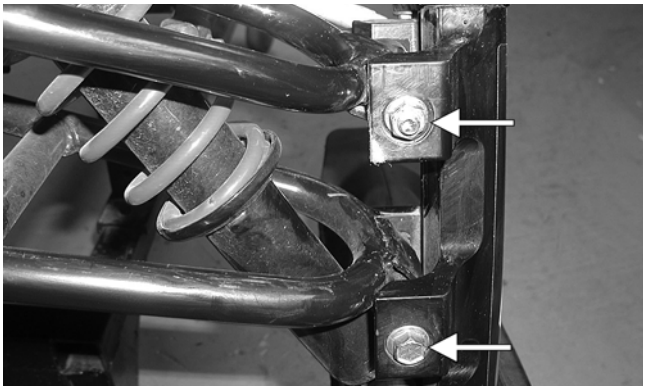
1. Remove the expansion chamber if necessary.

2. Position the front of the snowmobile up onto a safety stand.

3. Remove the lock nuts and cap screws securing the shock absorber; then remove the shock absorber. Account for all mounting hardware.

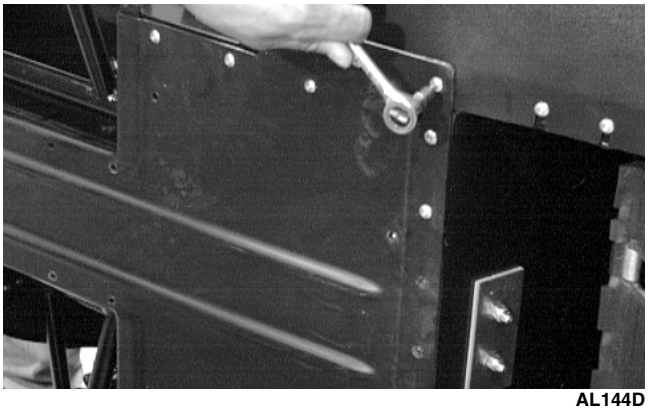

FS084C

4. Remove the cap screws and lock nuts securing the spindle to the front suspension arms. Account for all mounting hardware.


FS086A

5. On models with a sway bar, remove the cap screw and lock nut securing the sway bar link to the front suspension arm.

6. Remove the screws and lock nut securing the skid plate; then remove the skid plate.


AL144D

7. If applicable, remove the self-tapping screws securing the steering boot to the front end.

8. Remove the cap screws and lock nuts securing the suspension arms to the front end; then remove the arms.

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

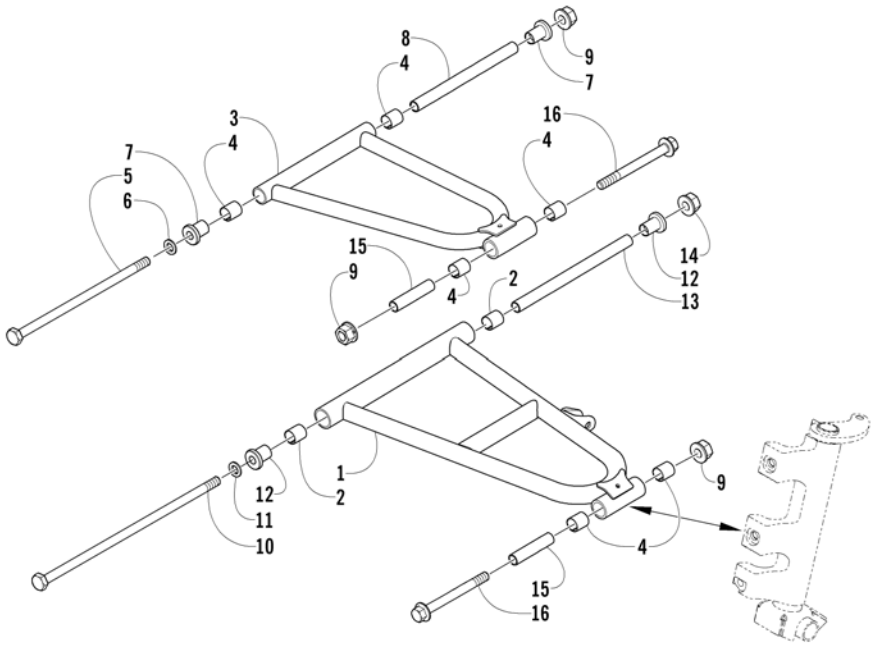
1. Inspect the arm welded areas for cracks or any signs of deterioration.
2. Inspect the bearings and axles for wear or damage.
3. Inspect the arm tubing for signs of twisting or bending.

INSTALLING

■ **NOTE: Determine which style arms are being installed and refer to the appropriate illustration for component details; then install accordingly.**

KEY

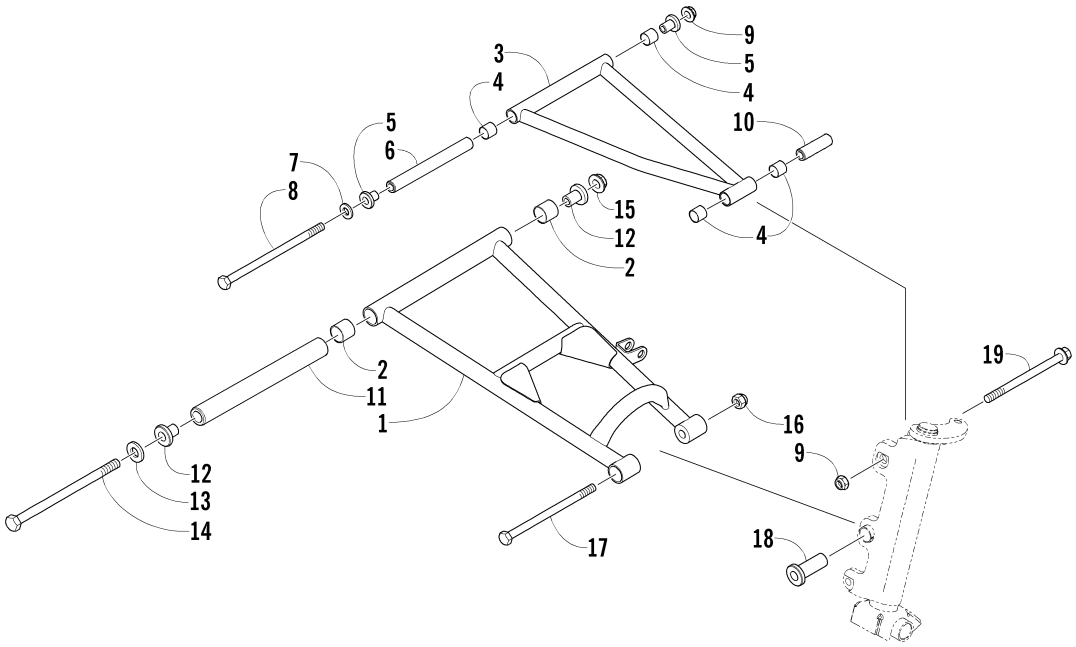
1. Lower Arm
2. Bearing
3. Upper Arm
4. Bearing
5. Cap Screw
6. Washer
7. Axle
8. Axle Tube
9. Lock Nut
10. Cap Screw
11. Washer
12. Axle
13. Axle Tube
14. Lock Nut
15. Axle
16. Cap Screw



0738-350

KEY

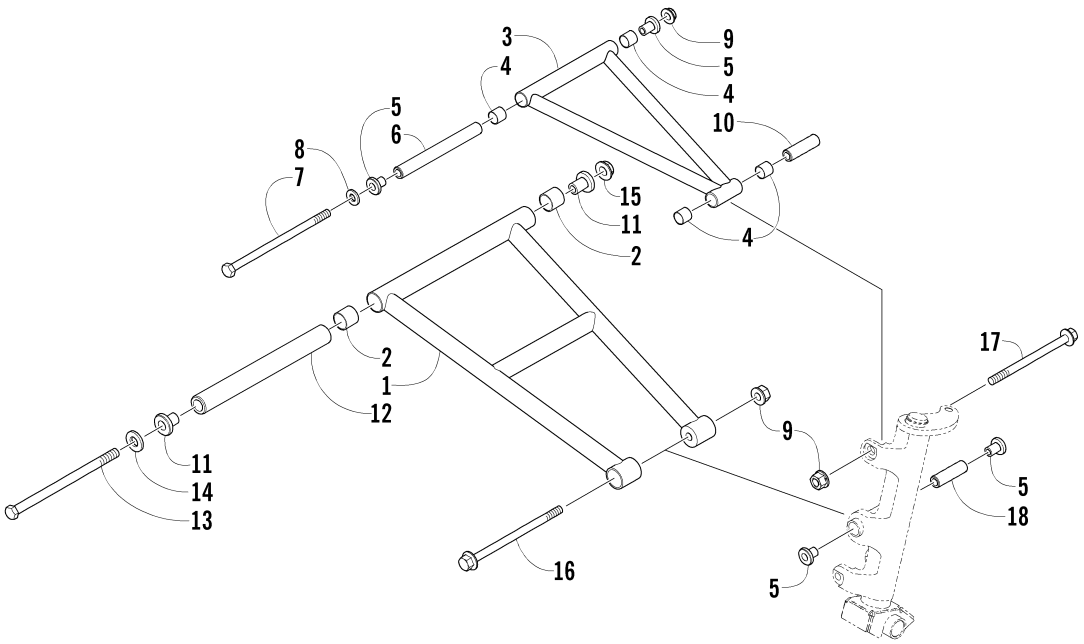
1. Lower Arm
2. Bearing
3. Upper Arm
4. Bearing
5. Axle
6. Tube
7. Washer
8. Cap Screw
9. Lock Nut
10. Tube
11. Tube
12. Axle
13. Washer
14. Cap Screw
15. Lock Nut
16. Lock Nut
17. Cap Screw
18. Axle
19. Cap Screw



0739-121

KEY

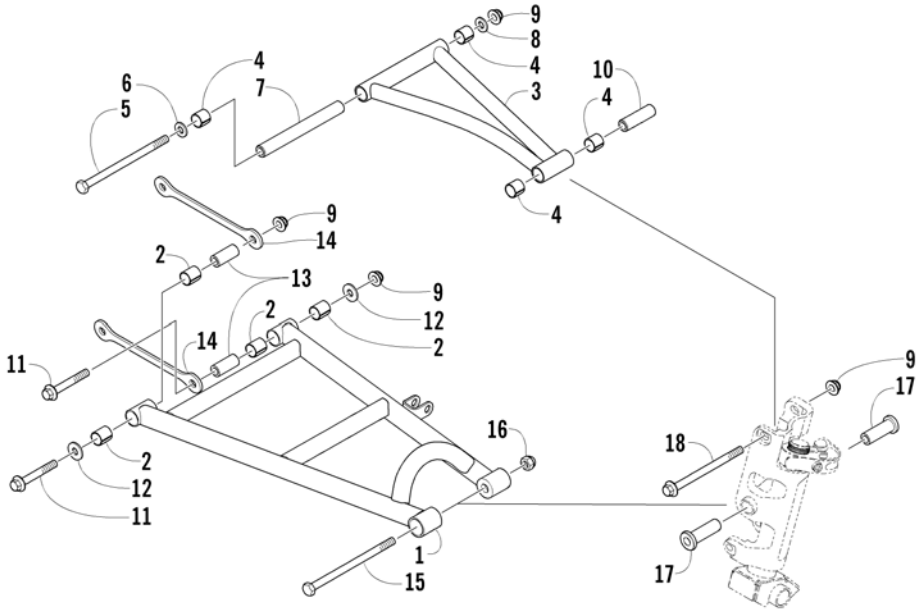
1. Lower Arm
2. Bearing
3. Upper Arm
4. Bearing
5. Axle
6. Tube
7. Cap Screw
8. Washer
9. Lock Nut
10. Tube
11. Axle
12. Tube
13. Cap Screw
14. Washer
15. Lock Nut
16. Cap Screw
17. Cap Screw
18. Tube



0738-551

KEY

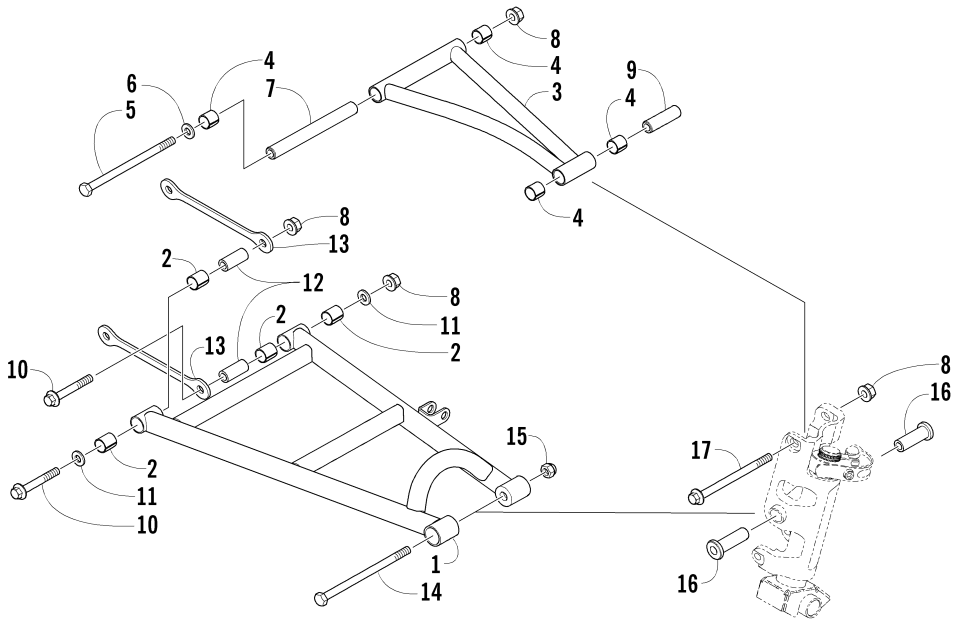
1. Lower Arm
2. Bearing
3. Upper Arm
4. Bearing
5. Cap Screw
6. Washer
7. Axle (Upper Arm - Inner)
8. Washer
9 Lock Nut
10. Tube
11. Cap Screw
12. Washer
13 Axle (Lower Arm - Inner)
14. Brace
15. Cap Screw
16. Lock Nut
17. Axle
18. Cap Screw



0740-543

KEY

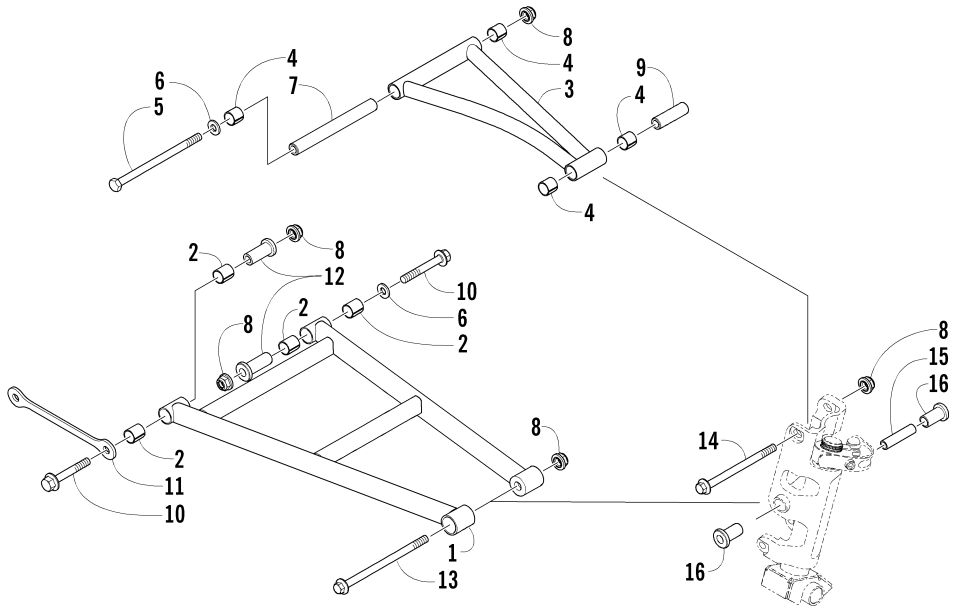
1. Lower Arm
2. Bearing
3. Upper Arm
4. Bearing
5. Cap Screw
6. Washer
7. Axle
8. Lock Nut
9. Tube
10. Cap Screw
11. Washer
12. Axle
13. Brace
14. Cap Screw
15. Lock Nut
16. Axle
17. Cap Screw



0739-735

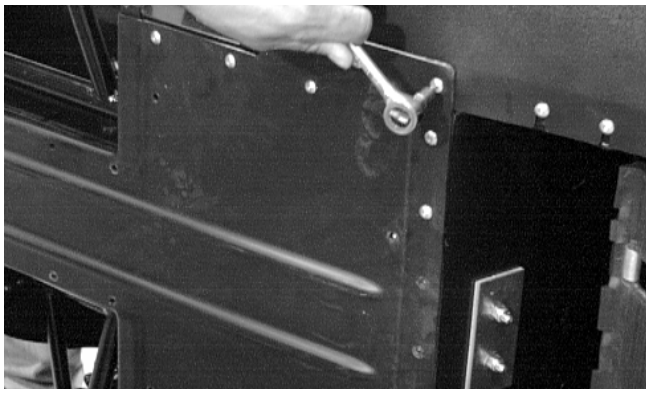
KEY

1. Lower Arm
2. Bearing
3. Upper Arm
4. Bearing
5. Cap Screw
6. Washer
7. Axle (Upper Arm - Inner)
8. Lock Nut
9. Tube
10. Cap Screw
11. Brace
12. Axle (Lower Arm - Inner)
13. Cap Screw
14. Cap Screw
15. Axle Tube
16. Axle



0739-803

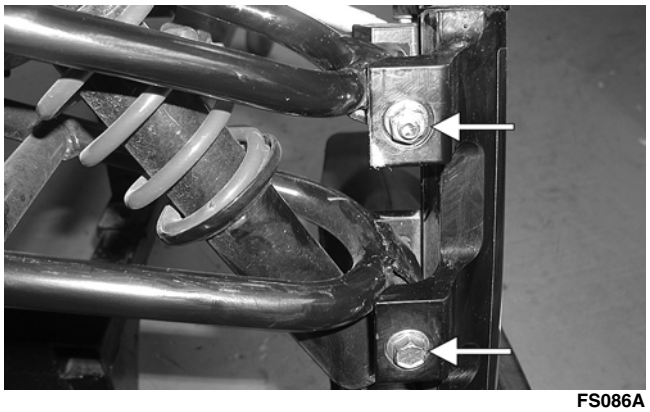
1. Place the suspension arms into position on the front end and secure with the cap screws (coated with green Loctite #609) and lock nuts. Tighten the upper arm cap screw and lock nut to specifications. Tighten the lower arm cap screw and lock nut to specifications.
2. If applicable, place the steering boot into position on the front end. Secure with the self-tapping screws.
3. Install the skid plate and secure with the screws, washer, and lock nut.



AL144D

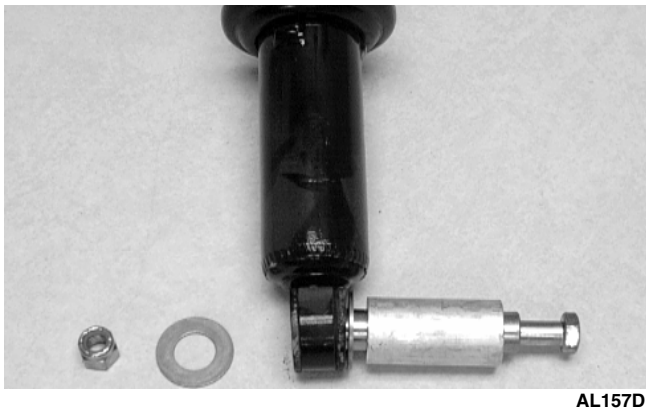
4. If applicable, place the sway bar link into position on the suspension arm and secure with cap screw and lock nut. Tighten securely.

5. Accounting for mounting hardware, install the spindle onto the suspension arm with the cap screws and lock washers.

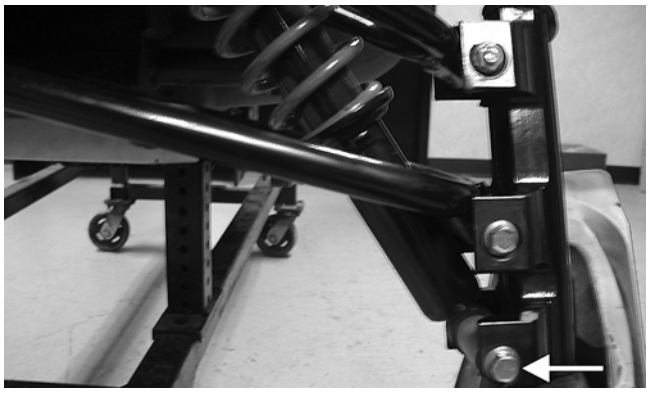


FS086A

6. Place the shock absorber into position and secure with two cap screws, washers, axles, spacers, sleeves, and lock nuts. Tighten to specifications.



AL157D



FS084C

7. Install and secure the expansion chamber if removed.

Front Suspension Arms
(Crossfire/Firecat/M-Series/ Sabercat)

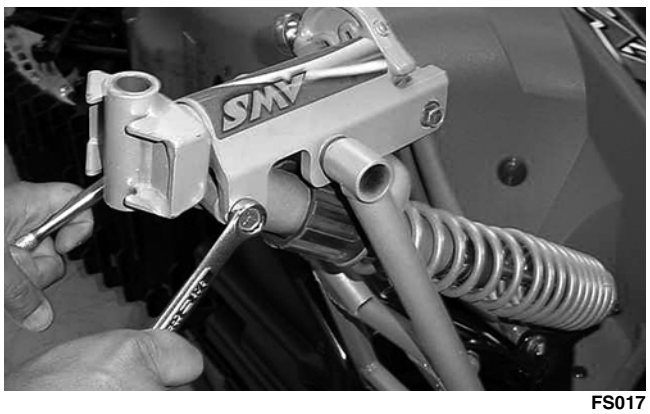
REMOVING

1. Position the front of the snowmobile up onto a safety stand.

2. Remove the ski.

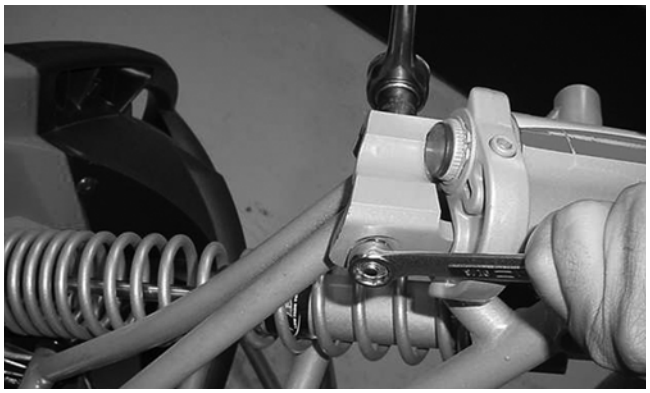
3. Remove the Allen-head cap screw securing the tie rod to the steering arm.

4. Remove the lock nuts and cap screws securing the shock absorber; then remove the shock absorber. Account for all mounting hardware.

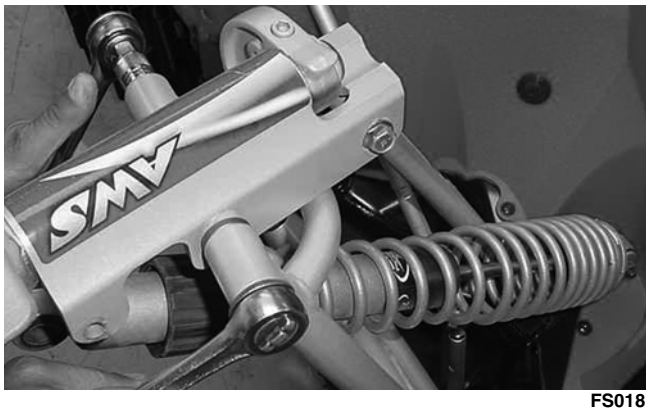


FS017

5. Remove the cap screws and lock nuts securing the spindle to the front suspension arms. Account for all mounting hardware.

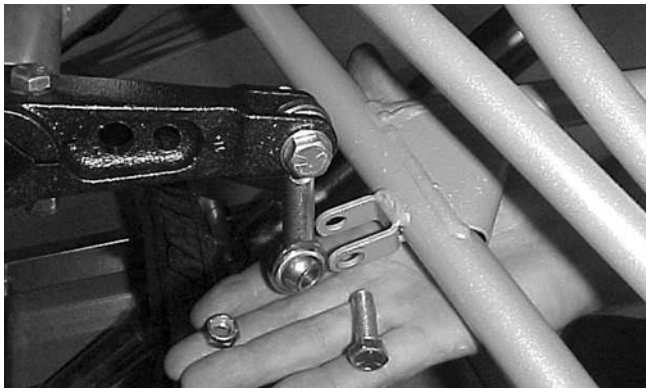


FS019



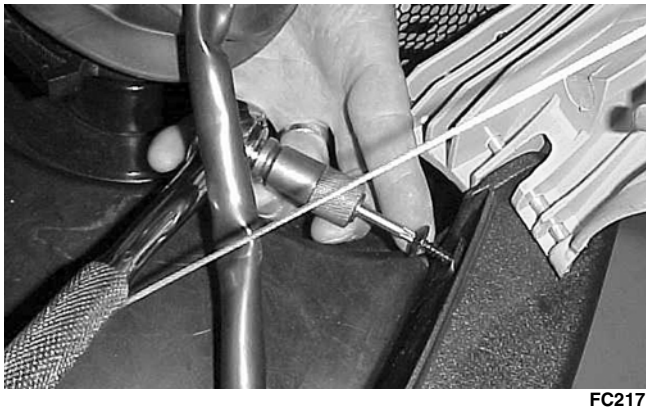
FS018

6. Remove the cap screw and lock nut securing the sway bar link to the front suspension arm.



FC216

7. Remove the three torx-head screws securing the air silencer to the front bumper.



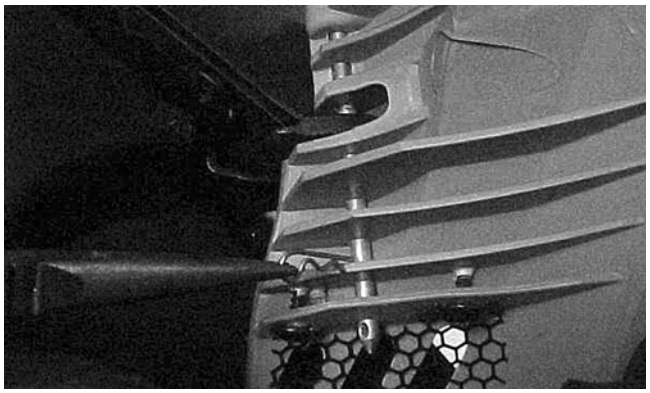
FC217

8. Remove the two torx-head cap screws securing the front bumper to the side belly pans.



FC218

9. Remove the two hairpin clips and hood pins securing the hood to the front bumper.



FC219

⚠ CAUTION

To avoid damage to the hood, carefully close it and rest it on the handlebar.



FC220

10. Remove the remaining eight torx-head screws securing the front bumper. Account for the center belly pan screen.

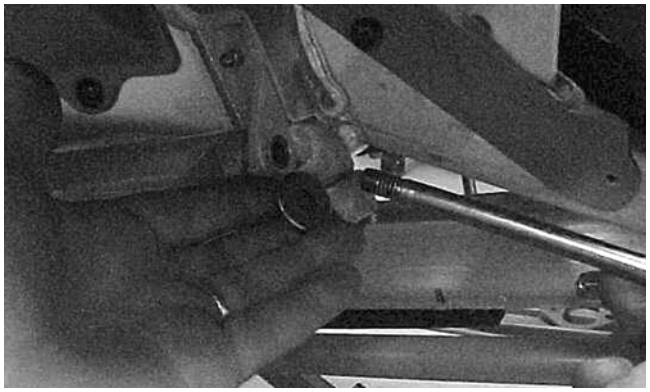


FC221



FC222

11. Remove the cap screw and lock nut securing the upper arm. Account for the washer.



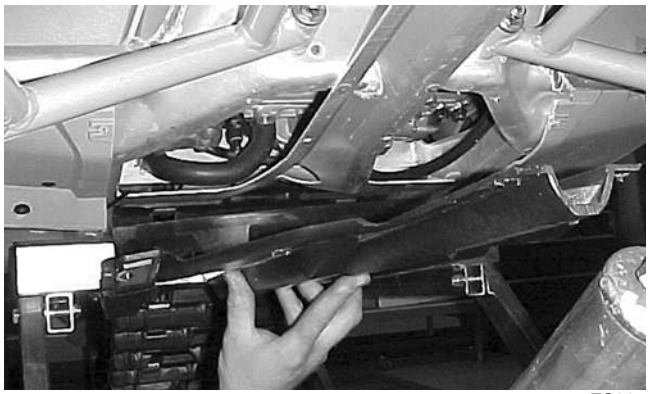
FC223

12. Remove the 10 torx-head screws securing the center belly pan to the frame. Note the location of the different-length screws for installing purposes.



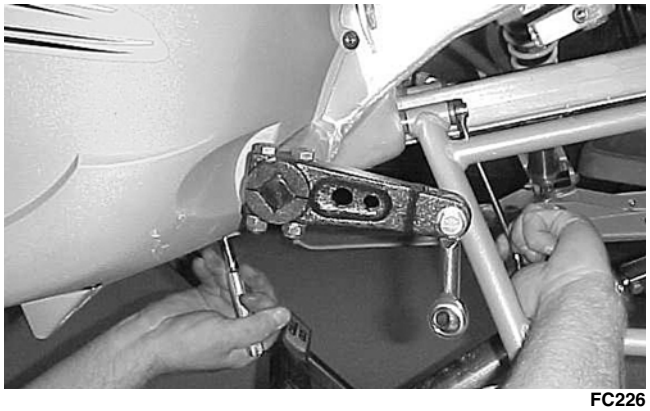
FC224

13. Remove the rear belly pan.



FC225

14. Remove the two cap screws and lock nuts securing the lower arm; then remove the arm. Account for all mounting hardware.



FC226

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

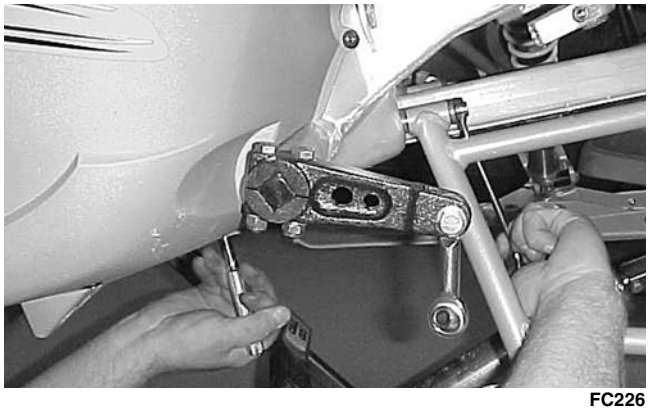
1. Inspect the arm welded areas for cracks or any signs of deterioration.

2. Inspect the bearings and axles for wear or damage.

3. Inspect the arm tubing for signs of twisting or bending.

INSTALLING

1. Place the suspension arms into position on the front end and secure with the cap screws and lock nuts. Tighten each cap screw (threads coated with green Loctite #609) and lock nut to specifications.



FC226

2. Place the rear belly pan into position; then secure with the 10 torx-head screws.



FC224

3. Place the front bumper into position; then secure with the eight torx-head screws. Place the center belly pan screen into position.

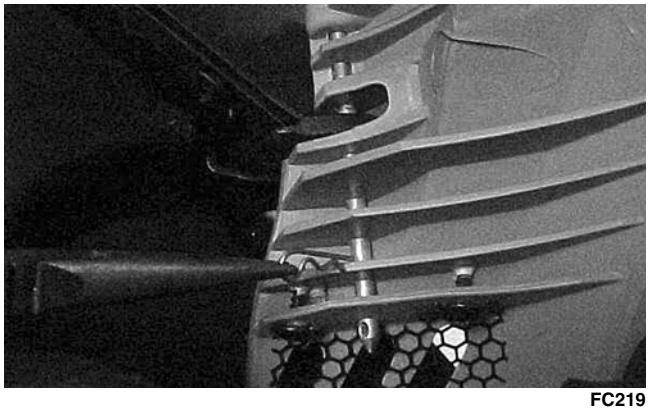


FC221



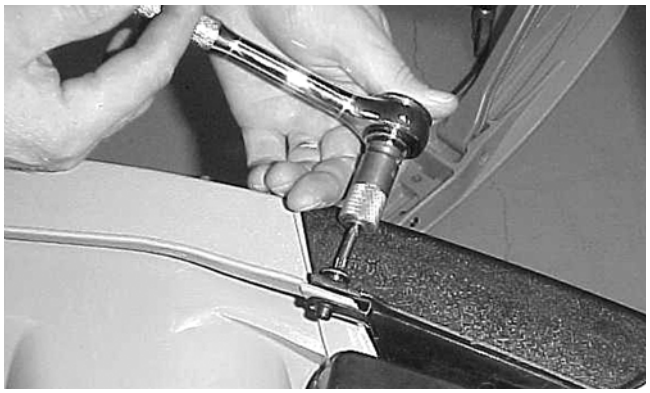
FC222

4. Place the hood into position on the front bumper; then install the two hood pins and hair-pin clips.



FC219

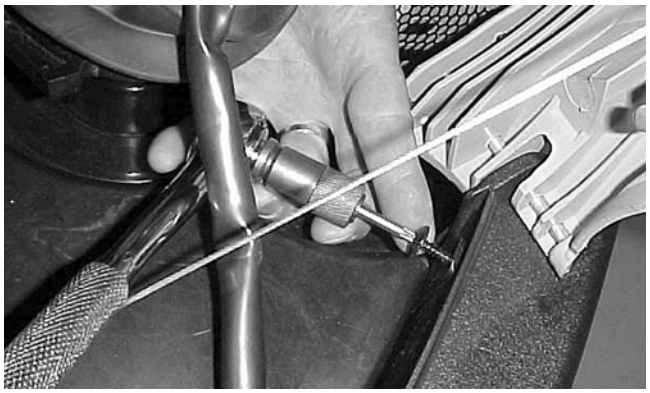
5. Place the side belly pans into position on the front bumper; then secure with the two torx-head cap screws.



FC218

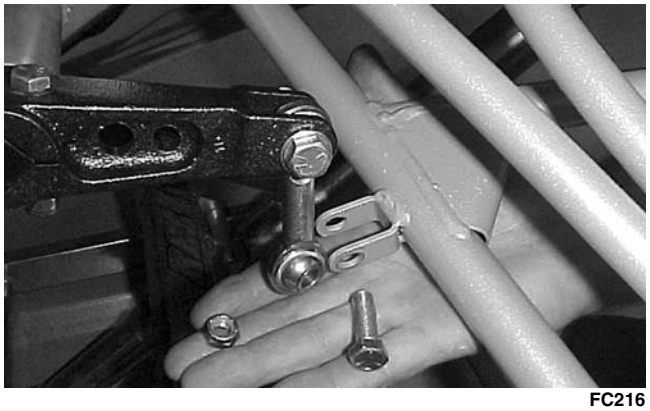
6. Place the air silencer into position on the front bumper; then secure with the three torx-head screws.

7



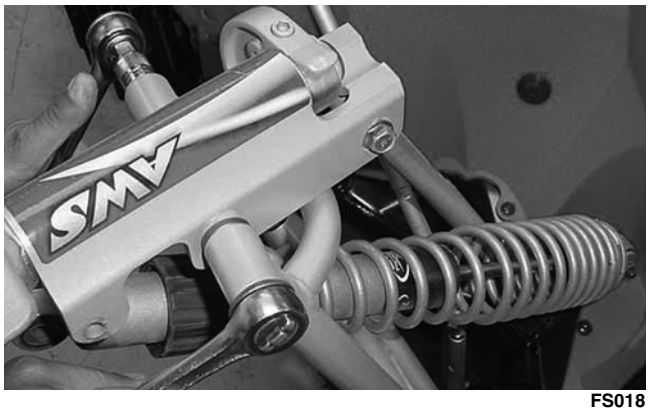
FC217

7. Secure the sway bar link to the front arm with the cap screw and lock nut. Tighten the lock nut securely.

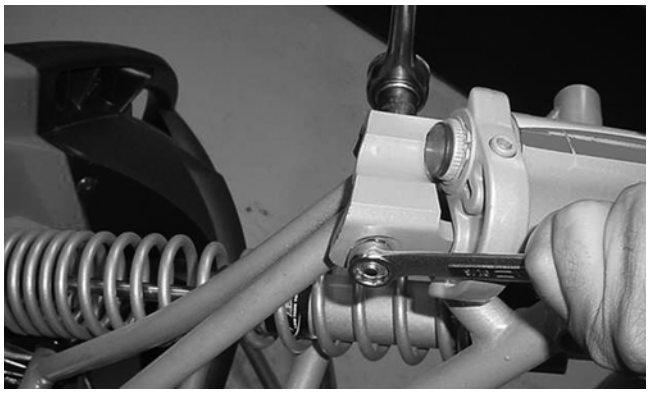


FC216

8. Secure the arms to the spindle with existing hardware. Coat the threads with green Loctite #609; then tighten the upper arm lock nut to specifications and the lower arm lock nut to specifications.

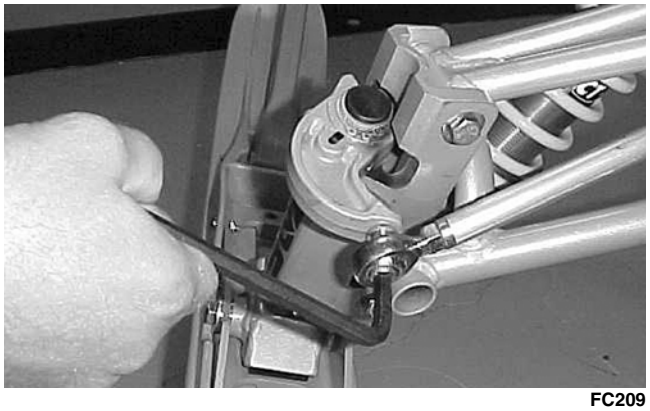


FS018



FS019

9. Secure the tie rod to the steering arm with the Allen-head cap screw (coated with green Loctite #609). Tighten to specifications.



FC209

10. Place the front shock absorber into position; then secure with existing hardware. Tighten to specifications.



FS017

11. Install the ski with existing hardware.

12. Remove the snowmobile from the safety stand.

Front Suspension (Ski) Shock Absorber

REMOVING

1. Position the front of the snowmobile up onto a safety stand taking all pressure off the skis.

2. Remove the cap screws securing the shock absorber to the front end assembly and spindle; then remove the shock absorber. Account for all mounting hardware.

■ NOTE: On models with a remote reservoir, remove the clamp securing the reservoir to the belly pan.

■ NOTE: Note the number of threads exposed between the spring adjuster and shock housing for installing purposes.

3. Using the Shock Spring Removal Tool (p/n 0644-057), remove the spring from the shock body by compressing the spring; then remove the spring retainer from the top of the spring. Inspect the shock absorber by quickly compressing and extending the shock plunger while firmly holding the shock body. Resistance must be felt in both directions.

CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect the shock absorber seal area for signs of excessive oil leakage.

2. Inspect the shock absorber mounting eyelet, bushings, and sleeve for wear or damage.

3. Inspect the threaded shock sleeve for damage or wear. Clean the sleeve and apply a light coat of grease to the threads before installing.

INSTALLING

1. Using the shock spring tool, place the spring on the shock absorber and secure with the retainer.

2. Adjust the retainer nut (spring adjuster) until the specified amount of threads are exposed between the spring adjuster and the shock housing (noted in removing) as an initial setting.

3. Install the bushings, sleeves, and spacers into each shock end; then place the shock absorber into position. Install both cap screws from the front. Tighten the lock nuts to specifications.

Sway Bar

REMOVING

1. Remove the lock nuts and cap screws securing the sway bar arm to the links and remove.

2. Remove the lock nuts and cap screws securing the sway bar arms to the sway bar; then remove the arms. Pull the sway bar out and account for two bearings.

INSPECTING

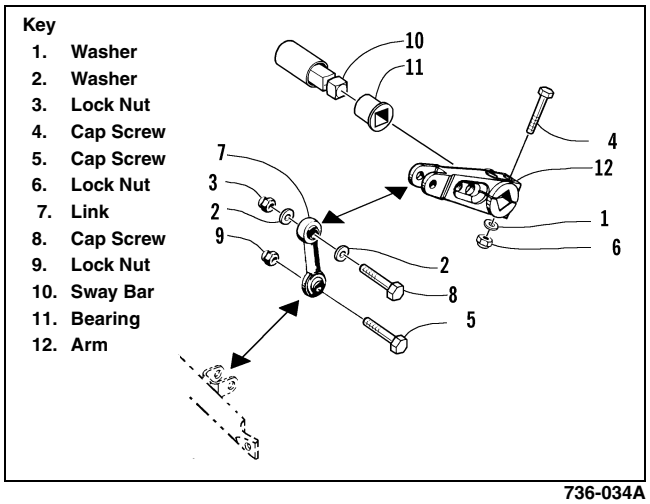
■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect the sway bar for any signs of twisting, fatigue, or wear.

2. Inspect the sway bar arms for cracks or damage.

3. Inspect the links, bushings, bushing retainers, and hardware for damage or wear.

INSTALLING



736-034A

1. Place the sway bar into position; then install a bearing on each end of the sway bar.

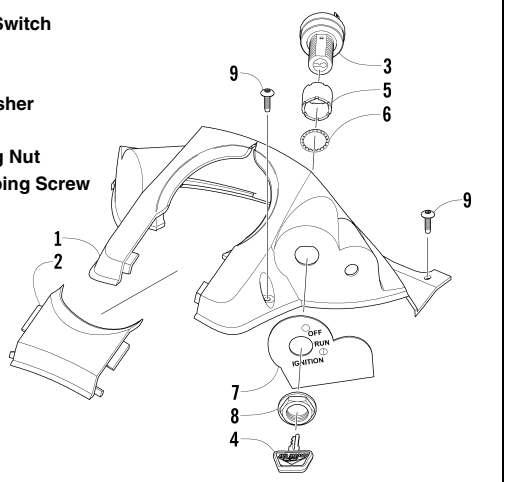
2. Slide the sway bar arms onto the sway bar until the holes in the arms align with the notches in the sway bar. Install the cap screws and lock nuts. Tighten securely.

■ NOTE: Make sure the arms are positioned on the same flat on both ends of the sway bar.

3. Place the links into position on the sway bar arms; then secure with cap screws and lock nuts.

Console
(King Cat/ZR)

KEY
1. Console
2. Door
3. Ignition Switch
4. Key
5. Spacer
6. Lock Washer
7. Decal
8. Retaining Nut
9. Self-Tapping Screw



0738-577

REMOVING

1. Remove the self-tapping screws securing the console; then raise the console.

■ **NOTE: If applicable, remove the cap screws and washers securing the remote adjuster clamp to the console; then lay the adjuster on the air-intake silencer.**

2. Disconnect the wiring harness from the ignition switch.

3. Remove the console.

INSTALLING

1. Place the console into position.

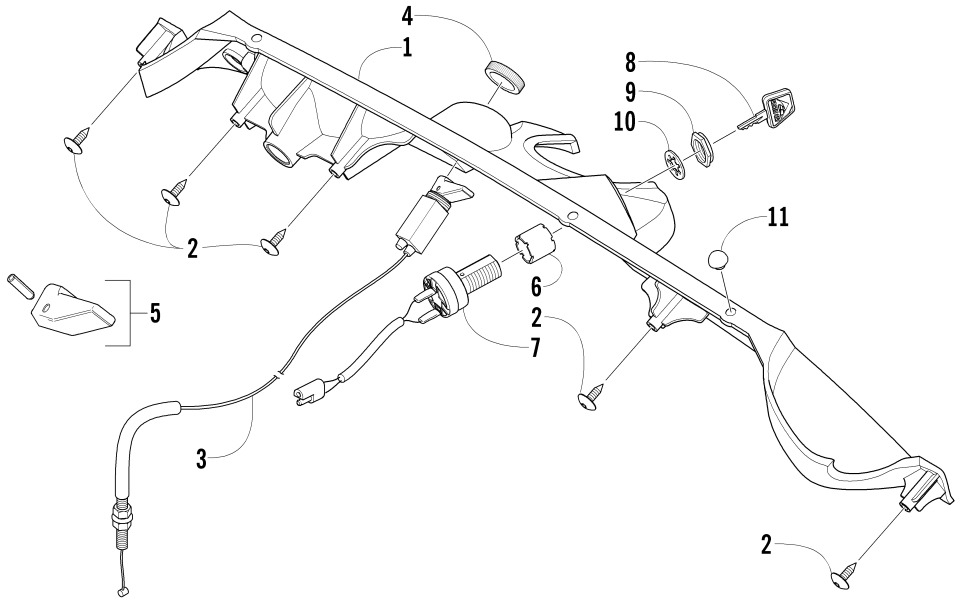
2. Connect the wiring harness to the ignition switch.

3. Secure the console with the self-tapping screws.

Console
(Crossfire/Firecat/M-Series/ Sabercat)

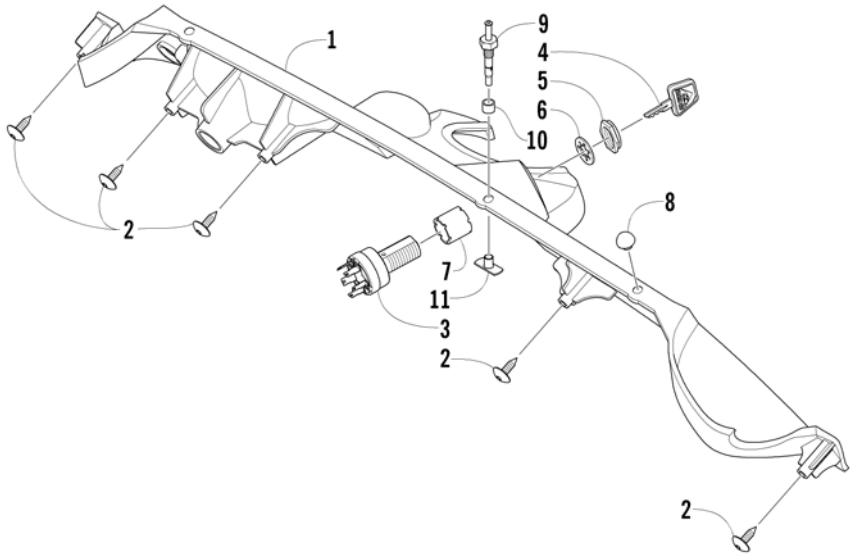
■ **NOTE: Determine which style console is being removed and installed and refer to the appropriate illustration for component details; then remove and install accordingly.**

KEY
1. Console
2. Self-Tapping Screw
3. Choke Cable
4. Choke Nut
5. Choke Lever Kit
6. Ignition Switch Spacer
7. Ignition Switch
8. Key
9. Retaining Nut
10. Ignition Switch Washer
11. Molded Bumper



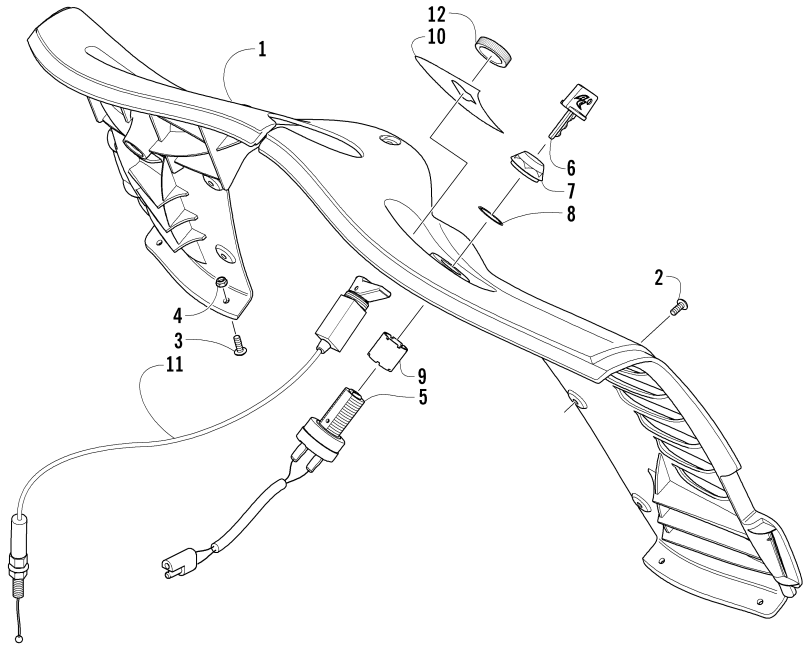
0739-750

KEY
1. Console
2. Self-Tapping Screw
3. Ignition Switch
4. Key
5. Retaining Nut
6. Ignition Switch Washer
7. Ignition Switch Spacer
8. Molded Bumper
9. Switch (Remote Start)
10. Spacer (Remote Start)
11. T-Nut (Remote Start)



0740-566

KEY
1. Console
2. Machine Screw
3. Machine Screw
4. Nut
5. Ignition Switch
6. Key
7. Retaining Nut
8. Ignition Switch Washer
9. Ignition Switch Spacer
10. Decal
11. Choke Cable (Carbureted)
12. Choke Nut (Carbureted)



0740-856

REMOVING

1. Pull the recoil starter rope outward; then tie a slip-knot in the recoil rope near the case. Slowly allow the rope to retract to the knot.

2. Untie the knot in the end of the recoil starter rope; then remove the handle from the rope. Account for the cap.

3. On the carbureted models, remove the knurled nut securing the choke assembly to the console; then slide the choke cable out of the console.

4. Disconnect the wiring harness from the ignition switch.

5. Remove the torx-head screws securing the console; then remove the console.



FC227

INSTALLING

1. Place the console into position; then secure the console with the torx-head screws.



FC227

2. Connect the wiring harness to the ignition switch.

3. On the carbureted models, slide the choke cable through the console. Secure the choke assembly to the console with the knurled nut.

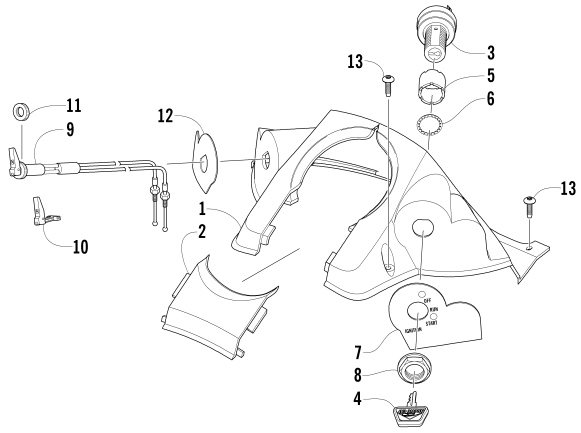
4. Thread the recoil starter rope through the console and handle. Tie a knot at the end of the recoil rope. Seat the cap. Remove the slip-knot and allow the rope to retract.

Console
(Bearcat/Panther/Z)

■ **NOTE: Determine which type of console is being removed and installed and refer to the appropriate illustration for component details; then remove and install accordingly.**

KEY

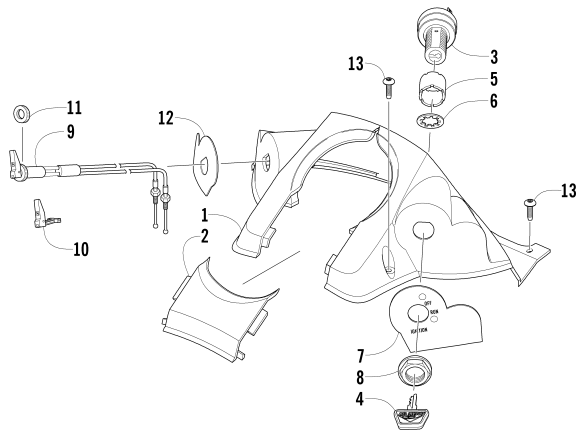
1. Console
2. Door
3. Ignition Switch
4. Key
5. Spacer
6. Lock Washer
7. Decal - Right
8. Nut
9. Choke Cable
10. Choke Lever Kit
11. Choke Nut
12. Decal - Left
13. Self-Tapping Screw



0738-391

KEY

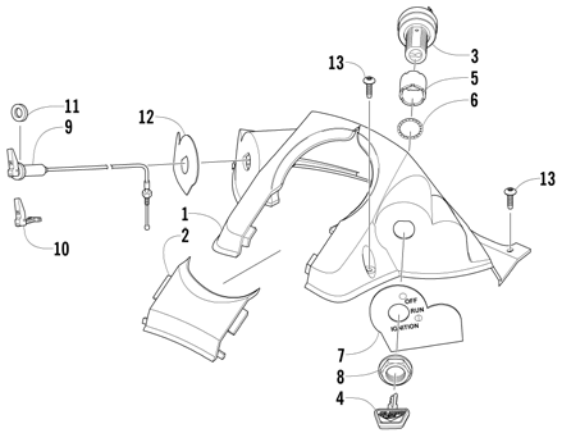
1. Console
2. Door
3. Ignition Switch
4. Key
5. Spacer
6. Lock Washer
7. Decal - Right
8. Nut
9. Choke Cable
10. Choke Lever Kit
11. Choke Nut
12. Decal - Left
13. Self-Tapping Screw



0738-654

KEY

1. Console
2. Door
3. Ignition Switch
4. Key
5. Spacer
6. Lock Washer
7. Decal - Right
8. Nut
9. Choke Cable
10. Choke Lever Kit
11. Choke Nut
12. Decal - Left
13. Self-Tapping Screw



0738-341

REMOVING

1. Remove the self-tapping screws securing the console; then raise the console.
2. Disconnect the wiring harness from the ignition switch and the outlet (if applicable). Remove the choke nut securing the choke assembly to the console; then slide the choke cable out of the console.
3. Remove the console.

INSTALLING

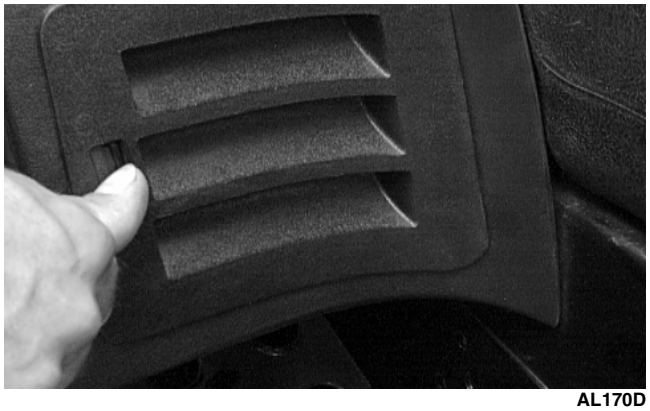
1. Place the console into position.
2. Connect the wiring harness to the ignition switch and the outlet (if applicable). Secure the choke assembly to the console with the choke nut.
3. Secure the console with the self-tapping screws.

Belly Pan
(Bearcat/King Cat/Panther/Z/ZR)

■ **NOTE: The following procedure is for a typical Arctic Cat snowmobile belly pan. Some components will vary from model to model. The technician should use discretion and sound judgment.**

REMOVING LEFT-SIDE

1. Remove the left-side louver.



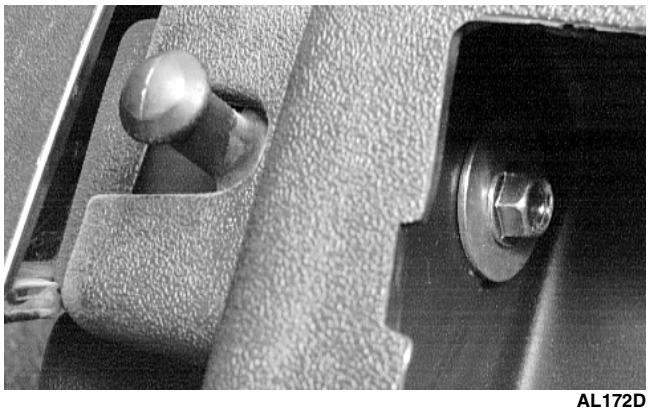
AL170D

2. Remove the left-side louver foam.



AL171D

3. Remove the left-side cap screw securing the bumper to the air-intake silencer plenum.



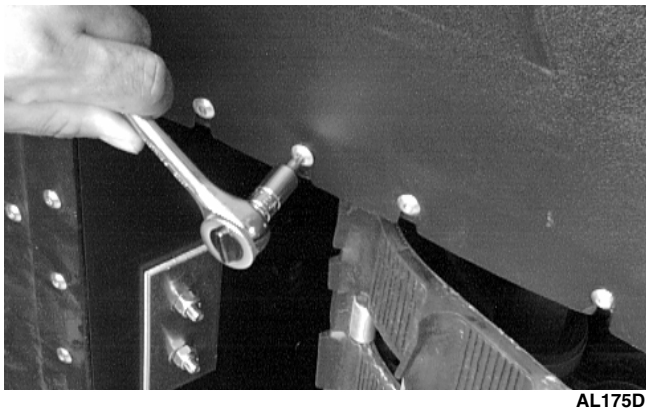
AL172D

4. Open the belt guard; then remove the speedometer cable from the speedometer drive.
5. Cut the cable ties securing the speedometer cable to the belly pan; then route the speedometer cable away from the belt guard.
6. Remove the left-side front belly pan cap screw.



AL173D

7. Using a piece of cardboard to protect the finish, tip the snowmobile on the right side; then remove the torx-head screws securing the belly pan to the frame and tunnel.



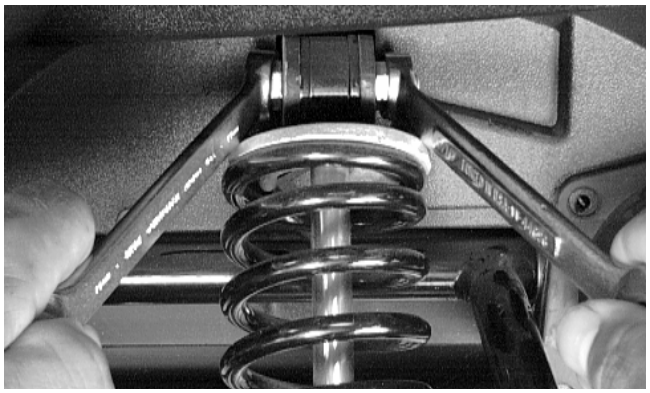
AL175D

8. Remove the screws securing the left-side steering tie rod boot; then remove the boot.



AL177D

9. Remove the shock absorber bolt.



AL178D

10. Remove the torx-head screws securing the belly pan underneath the shock mount.



AL179D

11. Remove the front belly pan-to-nosepiece Phillips-head screws.



AL181D

12. Remove the front belly pan-to-nosepiece torx-head screws.



AL182D

13. Remove the belly pan assembly from the snowmobile.

INSPECTING LEFT-SIDE

1. Inspect for gouges, cuts, and tears.
2. Inspect all belly pan threaded bosses that they are in good shape.

INSTALLING LEFT-SIDE

1. Place the belly pan assembly in position in the frame.
2. Secure the front belly pan to the nosepiece with torx-head screws.



AL182D

3. Secure the front belly pan to the nosepiece with Phillips-head screws.



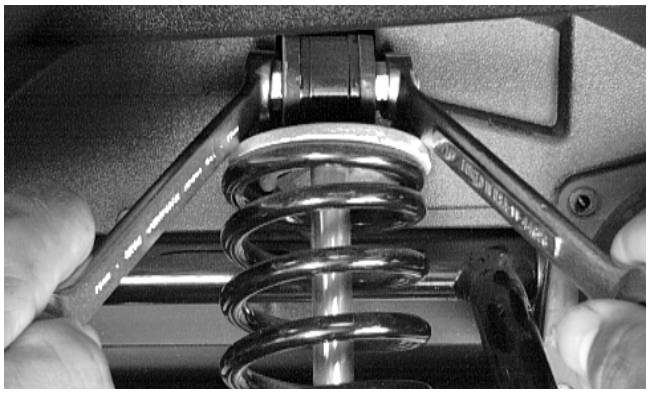
AL181D

4. Install the torx-head screws securing the belly pan underneath the shock mount.



AL179D

5. Install the shock absorber bolt. Tighten to specifications.



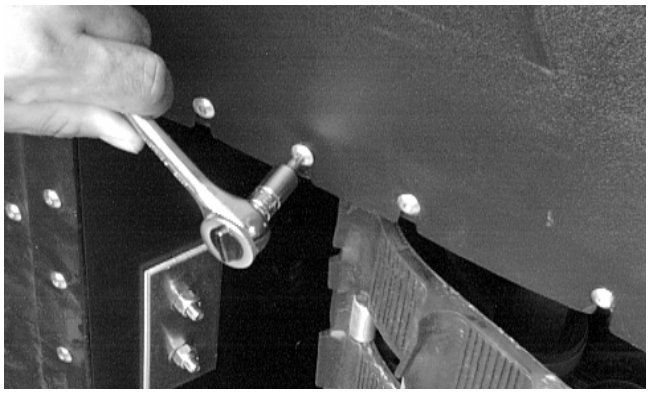
AL178D

6. Install the left-side steering tie rod boot. Secure with the screws.



AL177D

7. Install the torx-head screws securing the belly pan to the frame and tunnel; then return the snowmobile to an upright position.



AL175D

8. Install the left-side front belly pan cap screw.

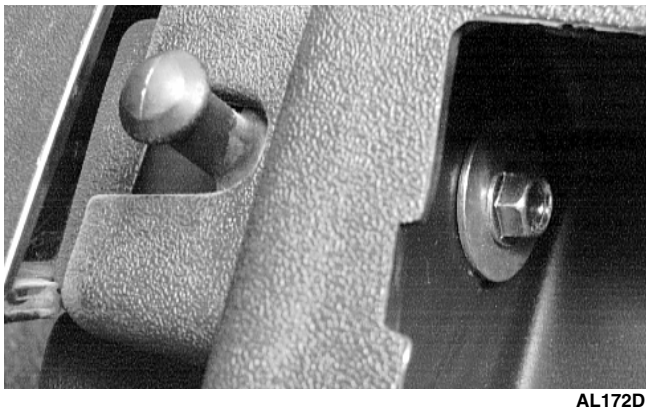


AL173D

9. Route the speedometer cable through the belt guard; then install cable ties to secure the speedometer cable to the belly pan.

10. Place the speedometer cable through the speedometer drive; then close the belt guard.

11. Install the left-side cap screw securing the bumper to the air-intake silencer plenum.



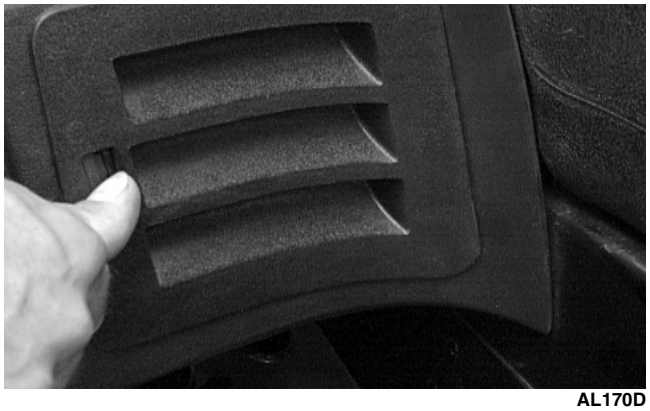
AL172D

12. Insert the left-side louver foam.



AL171D

13. Install the left-side louver.



AL170D

REMOVING RIGHT-SIDE

1. Remove the right-side front belly pan cap screw. Account for a flat washer and a lock nut.



AL183D

2. Remove the right-side louver.



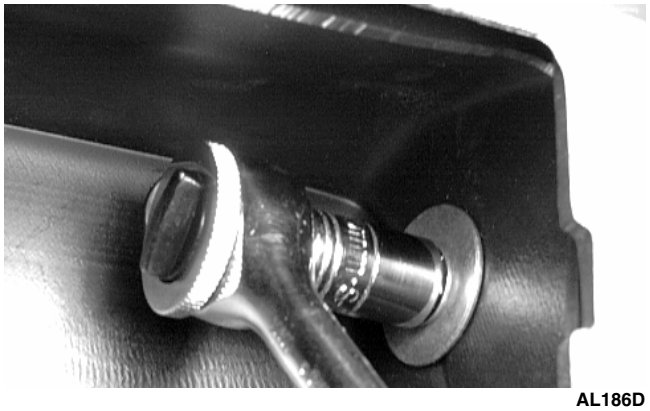
AL184D

3. Remove the right-side louver foam.



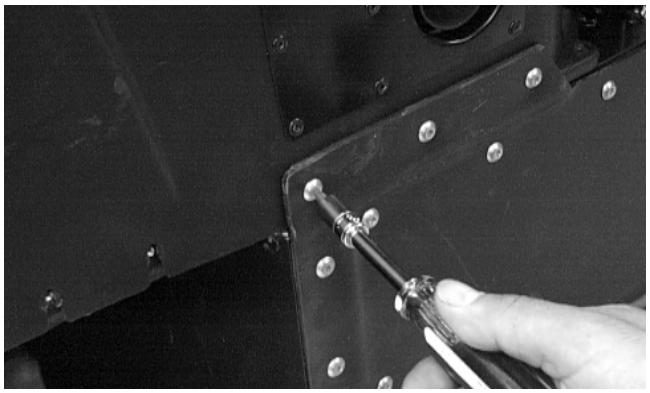
AL185D

4. Remove the right-side cap screws securing the bumper to the air-intake silencer plenum.



AL186D

5. Using a piece of cardboard to protect the finish, tip the snowmobile on the left side; then remove the right-side belly pan torx-head screws from the center belly pan and tunnel.



AL188D

6. Remove the screws securing the right-side steering tie rod boot; then remove the boot.



AL190D

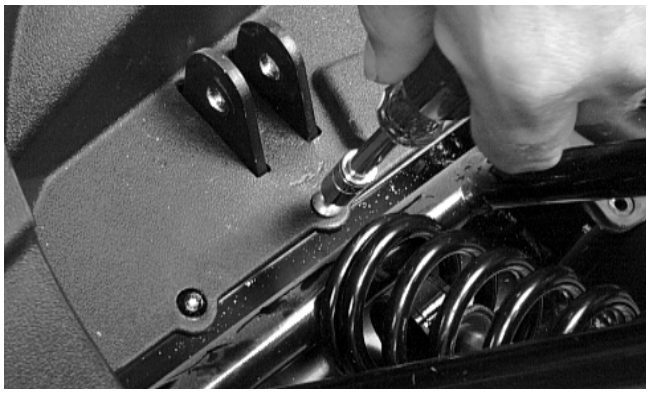
7. Remove the shock absorber.



AL178D

8. Remove the belly pan torx-head screws underneath the shock mount.

7



AL179D

9. Remove the front belly pan-to-nosepiece Phillips-head screw.



AL181D

10. Remove the front belly pan-to-nosepiece torx-head screws.



AL182D

11. Remove the belly pan from the frame.

INSPECTING RIGHT-SIDE

1. Inspect for gouges, cuts, and tears.
2. Inspect all belly pan threaded bosses that they are in good shape.

INSTALLING RIGHT-SIDE

1. Place the belly pan assembly in position in the frame.
2. Install the nosepiece torx-head screws to the front belly pan.



AL182D

3. Install the nosepiece Phillips-head screw to the front belly pan.



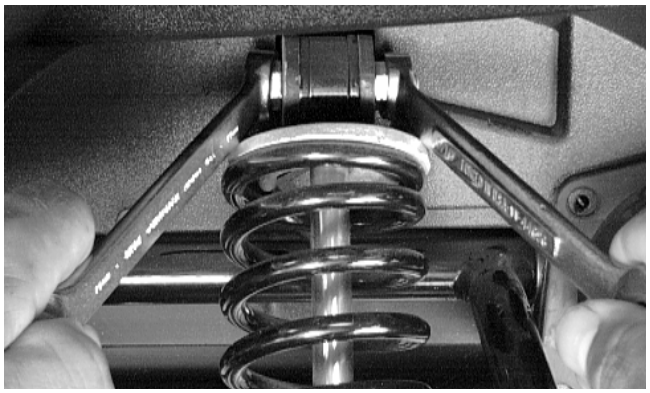
AL181D

4. Install the belly pan torx-head screws underneath the shock mount.



AL179D

5. Install the shock absorber. Tighten to specifications.



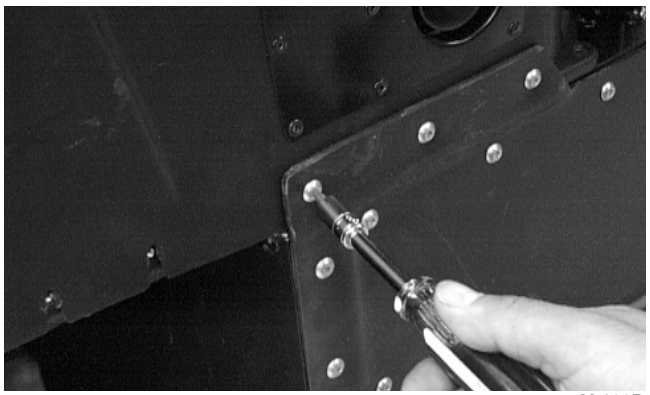
AL178D

6. Install the right-side steering tie rod boot. Secure with the screws.



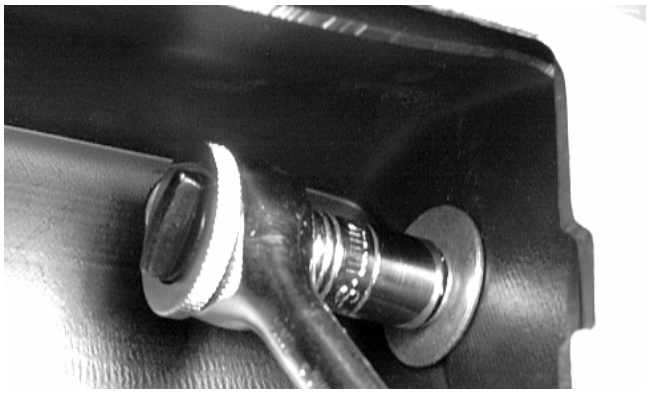
AL190D

7. Install the right-side belly pan torx-head screws to the center belly pan and tunnel; then return the snowmobile to an upright position.



AL188D

8. Install the right-side cap screws securing the bumper to the air-intake silencer plenum.



AL186D

9. Insert the right-side louver foam.



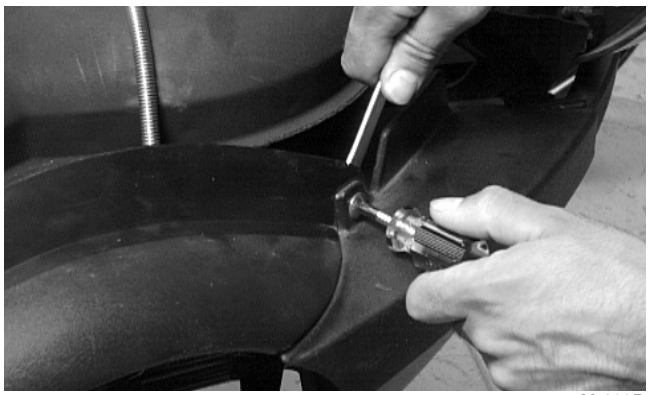
AL185D

10. Install the right-side louver.



AL184D

11. Install the right-side front belly pan cap screw, washer, and lock nut.



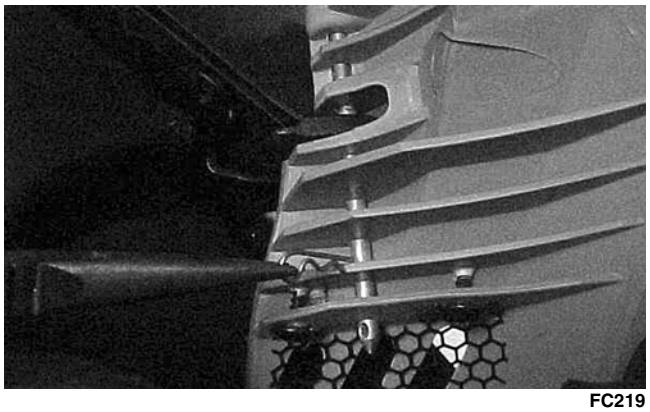
AL183D

Belly Pan
(Crossfire/Firecat/M-Series/ Sabercat)

REMOVING

1. Remove the hairpin clips from the hood pins; then remove the pins securing the hood to the front bumper.

■ **NOTE: On the M-Series, remove the access panels.**



FC219

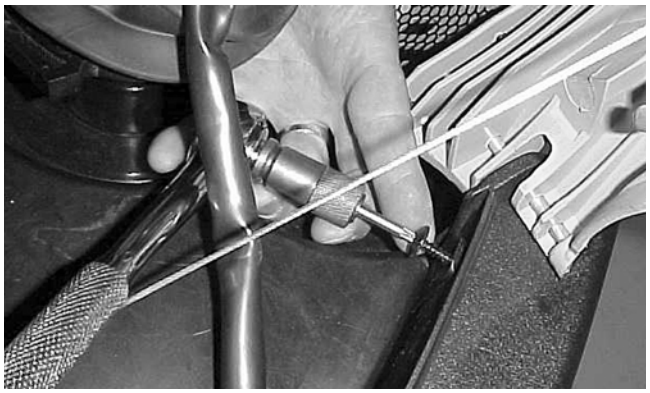
⚠ CAUTION

To avoid damage to the hood, carefully close it and rest it on the handlebar.



FC220

2. Disconnect the ignition harness; then remove the torx-head screws securing the air silencer to the front bumper.



FC217

3. Remove the remaining torx-head screws securing the front bumper. Account for the center belly pan screen.



FC221



FC222

4. Remove the torx-head screws securing the center belly pan to the frame. Note the location of different-length screws for installing purposes.



FC224

5. Remove the center belly pan.



FC225

■ **NOTE: If removing the right-side belly pan only, the resonator must be removed. If removing the left-side belly pan only, the clutch guard must be removed.**

6. Remove the torx-head screws securing each side belly pan to the frame.

7. Using a 3/16 in. drill bit, drill out the rivets securing each side belly pan to the frame; then remove the belly pans.

INSPECTING

1. Inspect for gouges, cuts, and tears.

2. Inspect all belly pan threaded bosses that they are in good shape.

INSTALLING

■ **NOTE: Steps 1-2 should be used for each side belly pan.**

1. Place the side belly pan into position on the frame; then secure with the torx-head screws.

2. Using an appropriate rivet gun, secure the side belly pan with six rivets.

3. Place the rear belly pan into position; then secure with the torx-head screws.



FC224

4. Place the front bumper into position; then secure with the eight torx-head screws. Place the center belly pan screen into position.



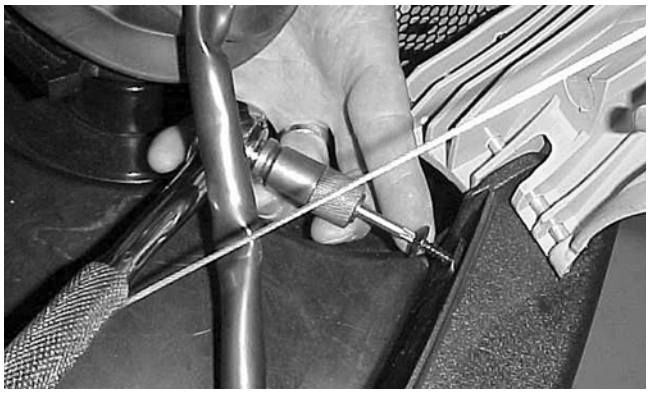
FC221



FC222

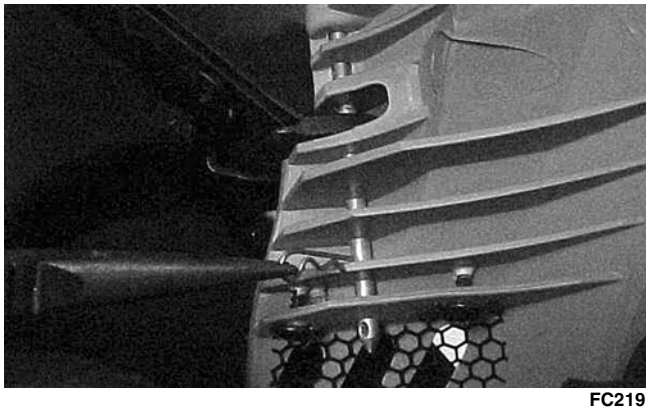
5. Place the air silencer into position on the front bumper; then secure with the torx-head screws. Connect the ignition harness.

7



FC217

6. Place the hood into position on the front bumper; then install the two hood pins and hairpin clips.



FC219

■ **NOTE: If applicable, install the resonator and/or the clutch guard.**

Gas Tank/Seat Assembly
(Bearcat/King Cat/Panther/Z/ZR)

■ **NOTE: Some components may vary from model to model. The technician should use discretion and sound judgment.**

REMOVING

■ **NOTE: If so equipped, turn the gas tank shut-off valve to the CLOSED position.**

1. Remove the console (see the appropriate Console in this section).
2. Remove the two cap screws, washers, and lock nuts (located in the rear compartment) securing the seat to the tunnel.
3. Remove the vent hose from the gas tank.
4. On EFI models, disconnect the wiring harness from the fuel pump. Label the fuel hoses "supply" and "return"; then remove the hoses from the fuel pump.

⚠ CAUTION

Since the fuel supply hose may be under pressure, remove it slowly to release the pressure. Place an absorbent towel around the connection to absorb fuel.

5. Raise the rear of the seat high enough to disconnect the taillight wiring harness.
6. On the carbureted models, slide the gas tank/seat assembly back far enough to access the fuel hose; then disconnect the fuel hose.
7. Remove the gas tank/seat assembly.

INSTALLING

1. Place the seat in position on the tunnel; then on carbureted models, connect the fuel hose.
2. Connect the vent hose to the gas tank.
3. On EFI models, connect the fuel supply and return hoses to the fuel pump. Secure with clamps; then connect the wiring harness to the fuel pump.
4. Raise the rear of the seat high enough to connect the taillight wiring harness making sure the harness is positioned into the groove of the seat base.

⚠ CAUTION

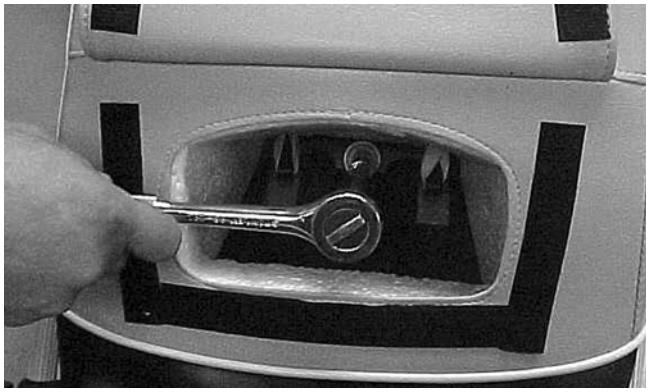
On EFI models, the fuel hoses must be connected to their respective fittings and tightened securely or leakage will result.

5. Secure the seat to the tunnel with two cap screws, washers, and lock nuts.
6. Install the console (see the appropriate Console in this section).

Gas Tank/Seat Assembly
(Crossfire/Firecat/M-Series/ Sabercat)

REMOVING

1. On Firecat models from inside the rear compartment, remove the nut and washer securing the assembly to the tunnel; then remove the seat assembly.



FC228

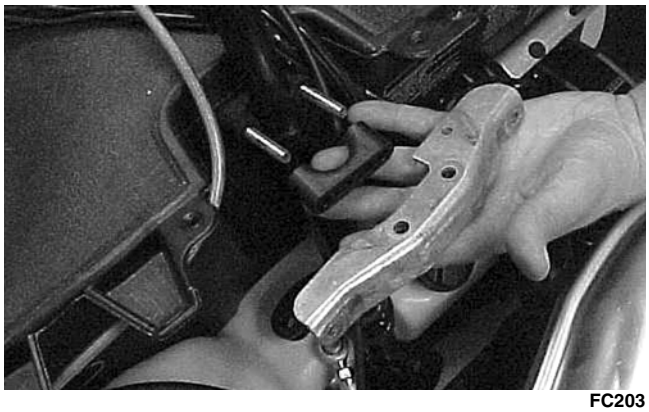
2. On Sabercat models, unhook the hold-down straps and remove the storage compartment; then trip the seat latches and remove the seat.

■ NOTE: On the Crossfire/M-Series models, trip the seat latches inside the storage compartment and remove the seat.

3. Remove the console (see the appropriate Console in this section).

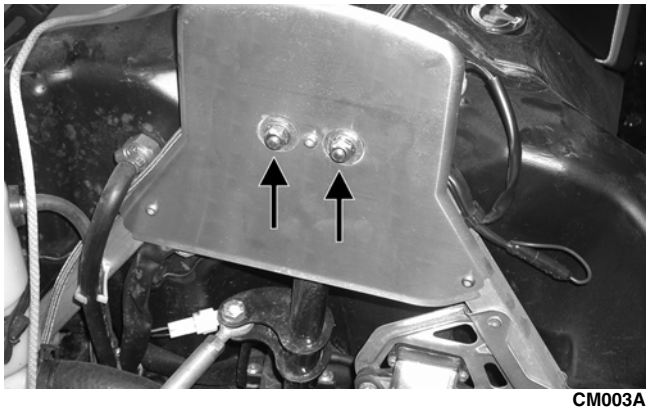
4. Drain the gasoline from the gas tank.

5. On the Firecat/Sabercat models, remove the two lock nuts and two torx-head cap screws with nuts securing the steering post mounting block. Account for the plastic steering post mounting block and the retaining plate.



FC203

■ NOTE: On the Crossfire/M-Series models, remove the two lock nuts securing the steering post mounting blocks to the gas tank; then remove the two lock nuts securing the gas tank to the chassis. Disconnect the fuel hose and remove the gas tank.

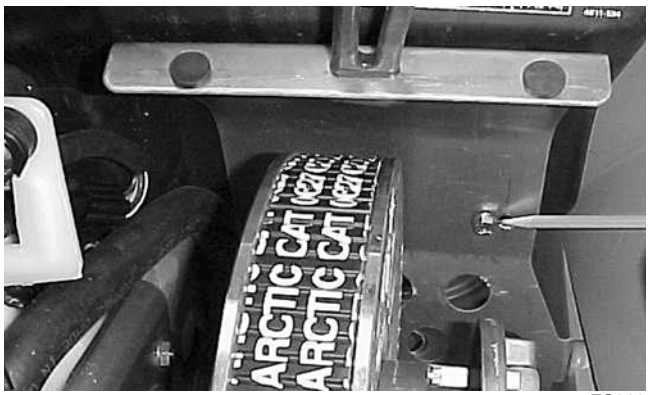


CM003A

6. On Firecat/Sabercat models, remove the lock nuts securing the gas tank to the tunnel and footrests; then remove the four torx-head screws securing the side belly pans to the tank. Account for all mounting hardware.



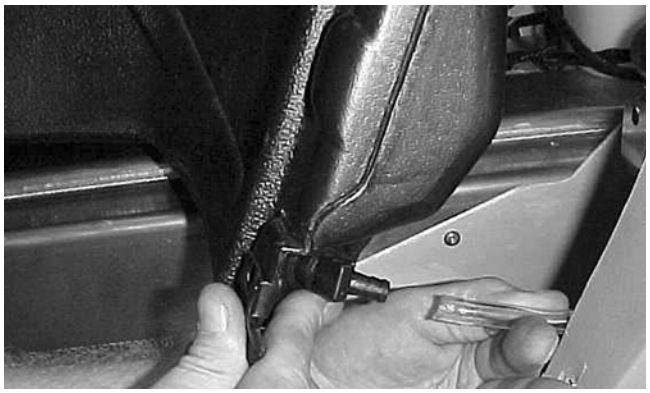
FC229



FC230

7. On Firecat/Sabercat models, remove the fuel hose from the lower right-side corner of the tank; then remove the gas tank assembly.

7



FC231

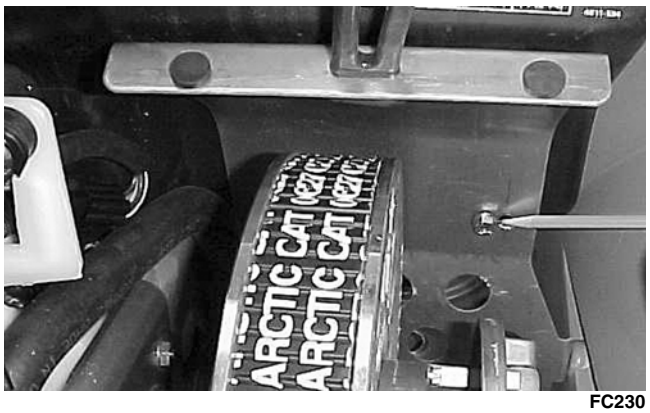
INSTALLING

1. On Firecat/Sabercat models, install the fuel hose to the lower right-side corner of the gas tank; then place the gas tank assembly into position on the tunnel.



FC231

2. On Firecat/Sabercat models, secure the side belly pans to the tank with the four torx-head screws; then secure the tank to the footrests and tunnel with the nine lock nuts.



FC230

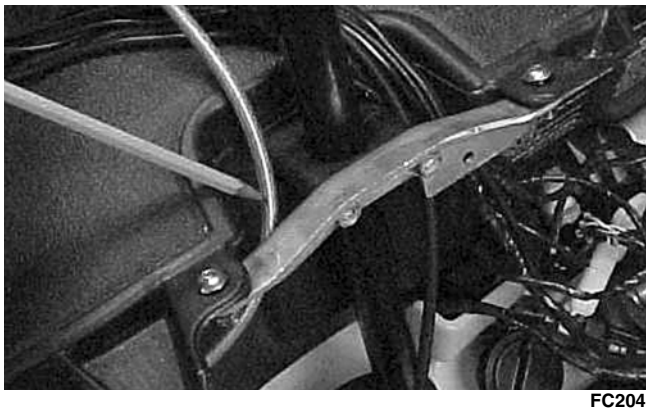


FC229

3. On Firecat/Sabercat models, place the steering post mounting block and retaining plate into position taking care not to pinch any wiring and making sure the brakeline hose is positioned behind the retaining plate. Tighten to specifications.



FC203



FC204

■ **NOTE: On Crossfire/M-Series models, install the gas tank onto the steering post mounting blocks and the steering support; then secure the gas tank to the chassis and to the steering support with the four lock nuts. Connect the fuel hose.**

4. Install the console (see the appropriate Console in this section).

5. On Firecat models from inside the rear compartment, secure the seat assembly to the tunnel with the nut and washer.



FC228

6. On Sabercat models, place the seat into position and secure with the latches; then install the storage compartment and secure with hold-down straps.

■ NOTE: On Crossfire/M-Series models, place the seat into position and secure with the latches inside the storage compartment.

Seat Cushion

■ NOTE: Some components may vary from model to model. The technician should use discretion and sound judgment.

REMOVING

■ NOTE: Steps 1-3 do not apply to Sabercat models.

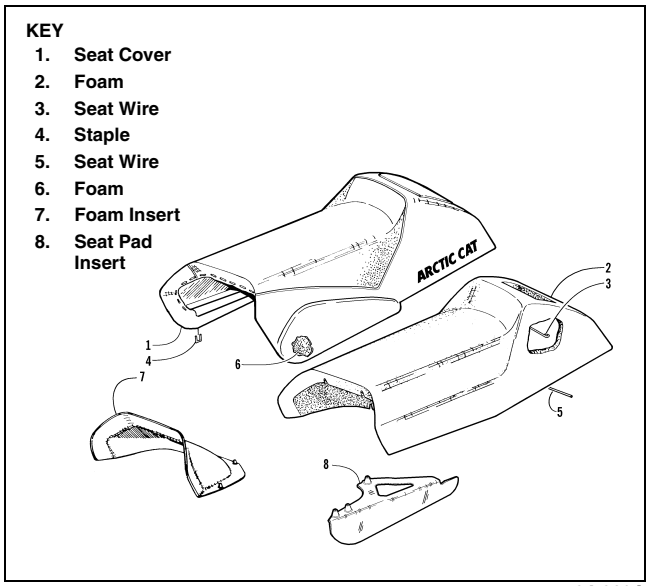
1. Remove the gas tank/seat assembly (see the appropriate Gas Tank/Seat Assembly in this section).
2. Remove the two screws securing the taillight cover; then remove the cover.
3. Remove the two screws securing the front of the seat cushion to the seat base.
4. On Sabercat models, remove the three self tapping screws securing the seat panel to the back of the seat assembly.
5. Using a sharp tool, pry out all staples securing the seat cover to the plastic seat base.
6. From beneath the seat foam, remove the seat wire from the two elastic loops; then remove the cover from the seat base and seat foam.

INSTALLING

■ NOTE: If the seat cover was removed, position the cover over the seat foam and plastic seat base. Check to make sure it is positioned straight; then fold the rear edge of the cushion down and around the base. Using a staple gun and 6 mm (1/4 in.) staples, staple the rear flap of the cushion to the base in the same areas as the original staples were located. Position staples 2.5 cm (1 in.) apart. Fold the sides of the cushion down around the bottom edge of the base. Position the staples in the same areas as the original staples were located.

⚠ CAUTION

On Bearcat/King Cat/Panther/Z/ZR models, beneath the seat base is a dotted guideline to follow when stapling the seat cover. Do not staple inside this guideline or perforation of the gas tank may occur.



734-302A

1. Position the cover over the seat foam and seat base; then pull the two elastic loops through the slots in the seat foam and secure with the seat wire. Check to make sure it is positioned straight.
2. Fold the rear edge of the cushion down and around the plastic base. Using a staple gun and 6 mm (1/4 in.) staples, staple the rear flap of the cushion to the plastic base in the same areas as the original staples were located. Position staples 2.5 cm (1 in.) apart.
3. Fold the sides of the cushion down around the bottom edge of the plastic seat base. Position the staples in the same area as the original staples were located.

■ **NOTE: Note the cushion fit. If any wrinkles are noted, remove by pulling the cushion material in the appropriate direction before securing with staples.**

4. Fold the front cushion material back and onto the plastic seat base. Check for wrinkles and secure with staples and two screws.

5. On Sabercat models, secure the seat panel to the seat assembly with the three self-tapping screws.

6. Install the taillight housing and secure with the screws.

7. Install the gas tank/seat assembly (see appropriate Gas Tank/Seat Assembly in this section).

Taillight Housing

REMOVING

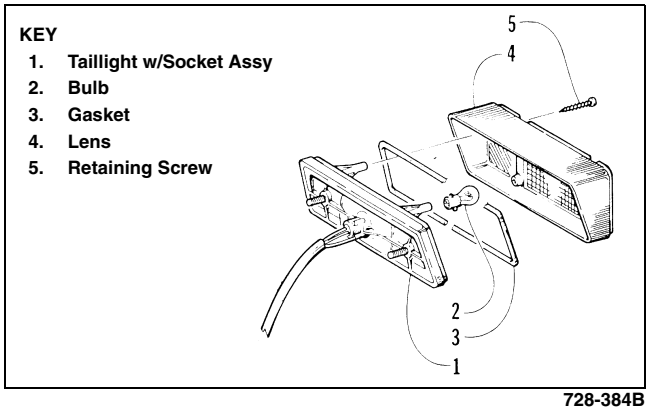
1. Remove the four screws securing the taillight lens to the housing. Account for a gasket.

2. Remove the four machine screws securing the backing plate to the taillight housing.

3. Remove the two screws, lock washers, and washers securing the seat base to the tunnel. Lift the seat from the tunnel. Disconnect the taillight wiring harness.

4. Remove the two lock nuts and washers securing the taillight housing to the rear of the seat base. Pull the housing free of the base.

INSTALLING



728-384B

1. Connect the wiring harness and place the seat into position. Secure with two screws, lock nuts, and washers.

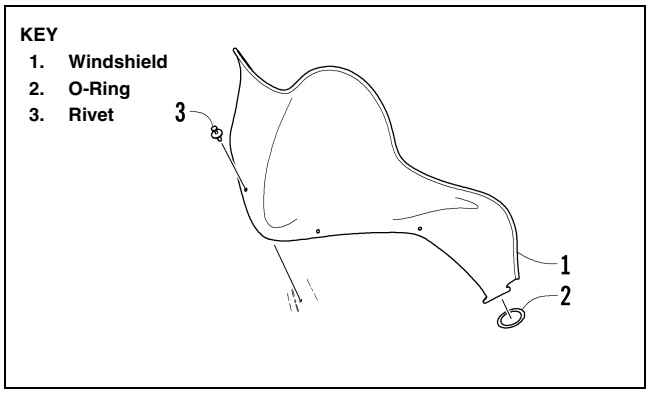
2. Place the taillight housing into position and secure to the seat base with two lock nuts and washers. Tighten securely.

3. Install the taillight bulb, gasket, and lens. Secure lens with four screws.

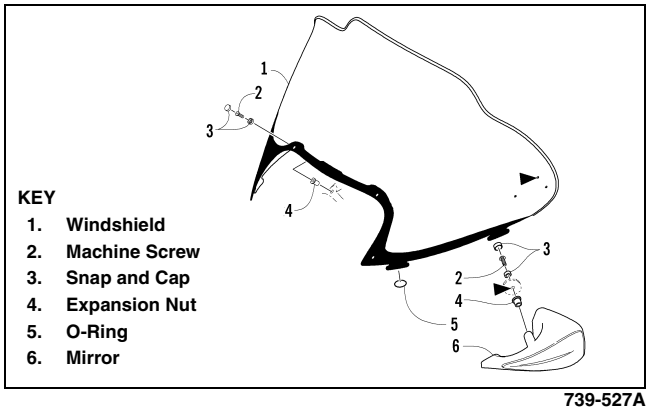
4. Secure the backing plate to the taillight housing with the existing machine screws.

Windshield

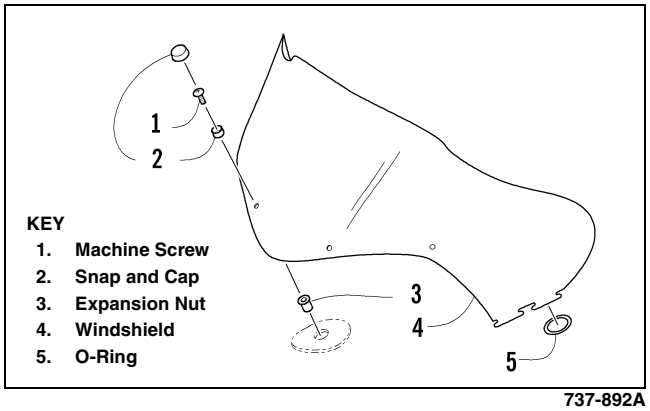
REMOVING



740-254A



739-527A



737-892A

1. Remove the O-rings securing windshield to the hood.

2. Remove the caps covering the screws; then remove the screws w/snaps.

3. Remove the windshield.

INSTALLING

1. Place the windshield into position and install the O-rings.

2. Secure the windshield to the hood with screws w/snaps. Install the caps.

Backrest/Rack/Taillight Assembly

■ **NOTE: Some components may vary from model to model. The technician should use discretion and sound judgment.**

REMOVING

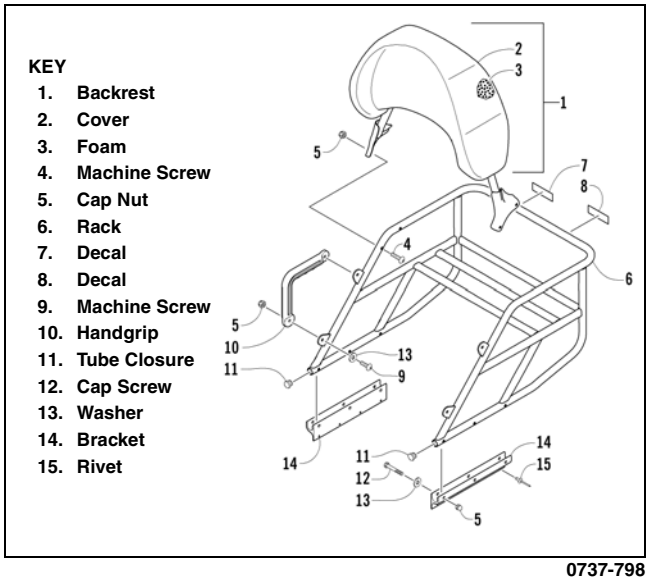
1. Remove the cap screws, washers, and cap nuts securing the rack to the backrest.

2. In turn on each side, remove the two cap screws (inside the tunnel) securing the backrest assembly to the tunnel. Account for the washers.

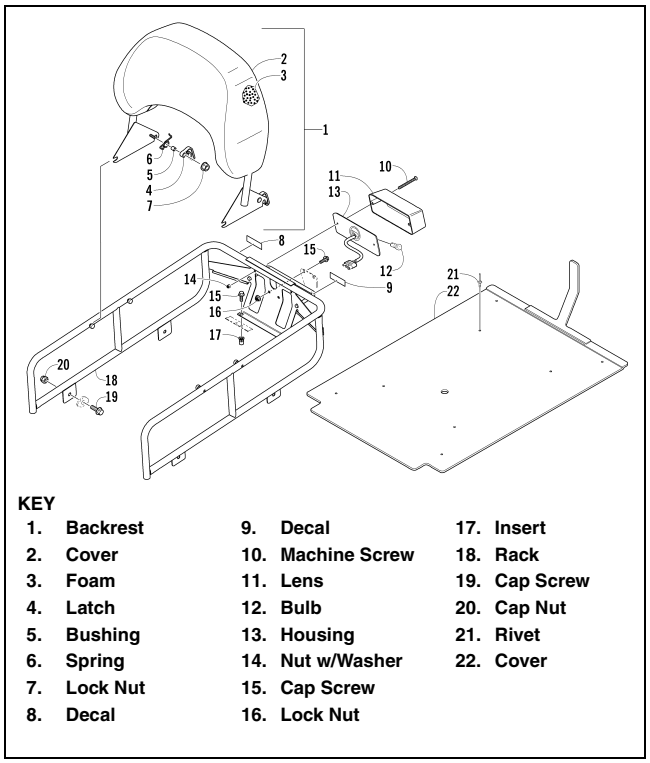
3. If applicable, disconnect the passenger handwarmer wiring harness.

4. Remove the backrest assembly from the tunnel. Account for the two spacers.

INSTALLING



0737-798



0739-930

1. Place the backrest assembly and spacers (located on the rear hole on each side) into position and align holes with tunnel mounting holes.

2. Install the cap screws with washers from the inside of the tunnel and secure with the washers and lock nuts. Tighten securely.

3. In turn on each side, install the 1/4-in. cap screw in the front hole and the 5/16-in. cap screw in the rear hole. Secure with a flat washer and lock nut. Tighten securely.

4. If applicable, connect the passenger handwarmer wiring harness.

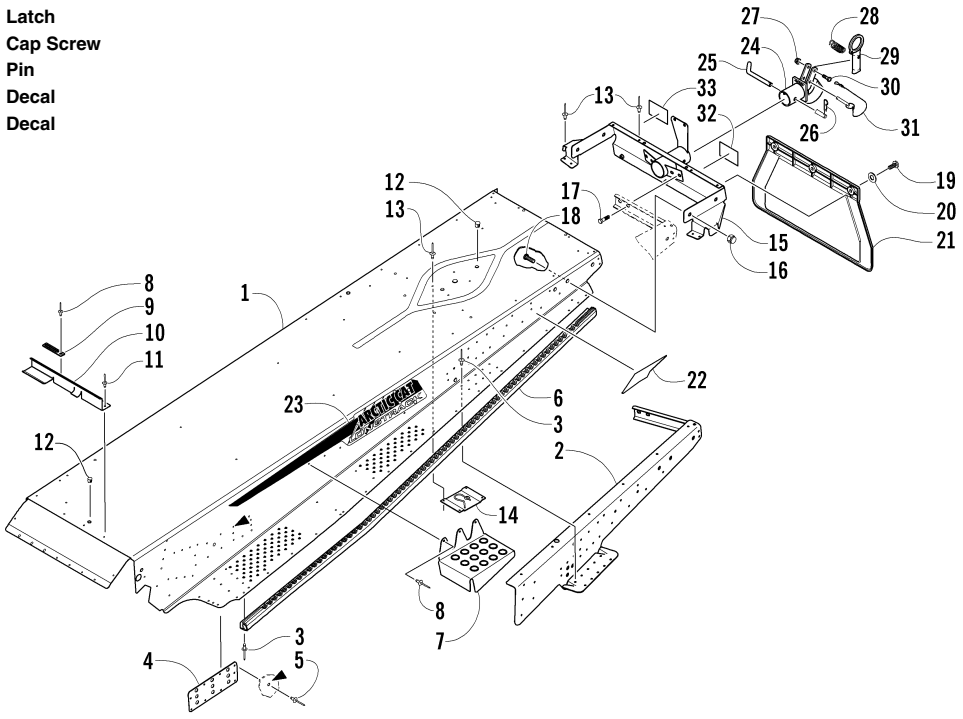
5. Place the rack into position and secure with the cap screws, washers, and cap.

Tunnel/Rear Bumper/ Snowflap
(Bearcat/King Cat/Panther/Z/ZR)

■ **NOTE: Determine which style tunnel assembly is being disassembled and refer to the appropriate illustration for component details; then remove/ disassemble and assemble/install accordingly. Some components will vary from model to model. The technician should use discretion and sound judgment.**

Key

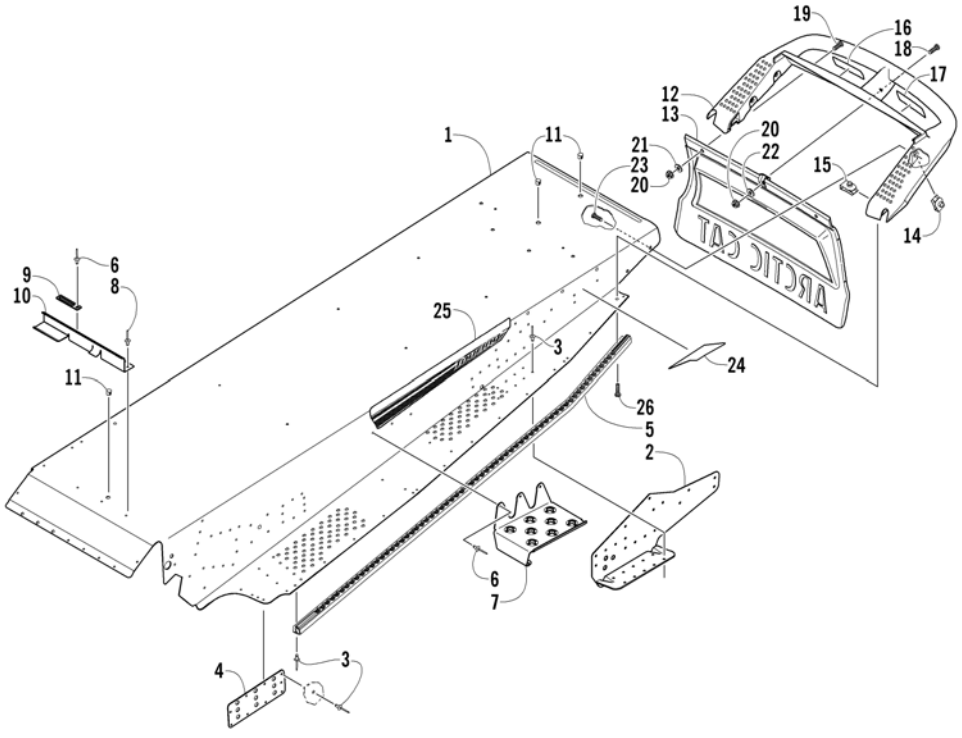
1. Tunnel Assy
2. Bracket
3. Rivet
4. Plate - Front
5. Rivet
6. Tunnel Roll
7. Footrest
8. Rivet
9. Clamp
10. Bracket
11. Rivet
12. Plug
13. Rivet
14. Plate
15. Bumper
16. Cap Nut
17. Cap Screw
18. Cap Screw
19. Machine Screw
20. Washer
21. Snowflap
22. Reflector
23. Decal
24. Hitch
25. Pin
26. Clip
27. Lock Nut
28. Spring
29. Latch
30. Cap Screw
31. Pin
32. Decal
33. Decal



0740-408

KEY

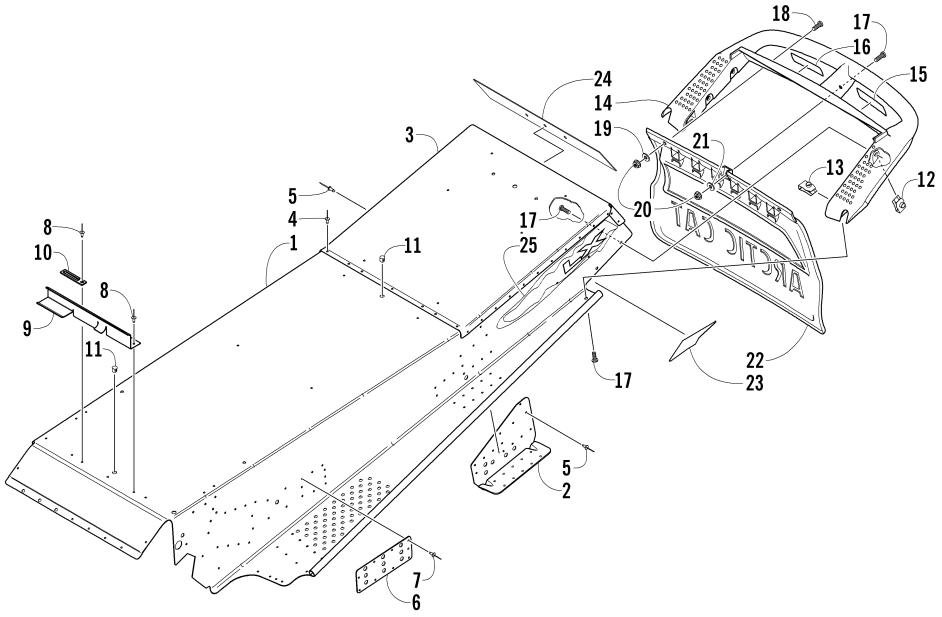
1. Tunnel Assy
2. Bracket
3. Rivet
4. Plate - Front
5. Tunnel Roll
6. Rivet
7. Footrest
8. Rivet
9. Clamp
10. Bracket
11. Plug
12. Bumper
13. Snowflap
14. U-Nut
15. U-Nut
16. Decal
17. Decal
18. Machine Screw
19. Machine Screw
20. Lock Nut
21. Washer
22. Washer
23. Machine Screw
24. Decal
25. Decal
26. Machine Screw



0740-434

KEY

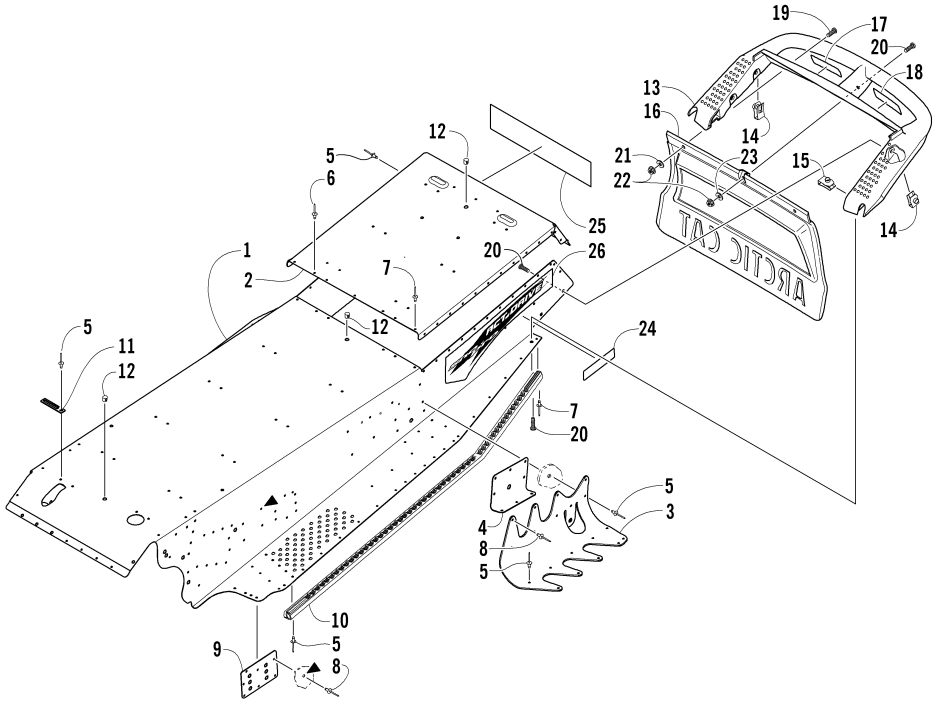
1. Tunnel Assy
2. Bracket
3. Tunnel Plate - Rear
4. Rivet
5. Rivet
6. Mounting Plate - Front
7. Rivet
8. Rivet
9. Bracket
10. Clamp
11. Plug
12. U-Nut
13. U-Nut
14. Rear Bumper
15. Decal
16. Decal
17. Machine Screw
18. Machine Screw
19. Washer
20. Lock Nut
21. Washer
22. Snowflap
23. Reflector
24. Decal
25. Decal



0740-384

KEY

1. Tunnel Assy
2. Tunnel Plate - Rear
3. Bracket
4. Backing Plate - Rear
5. Rivet
6. Rivet
7. Rivet
8. Rivet
9. Mounting Plate - Front
10. Tunnel Roll
11. Clamp
12. Plug
13. Rear Bumper
14. U-Nut
15. U-Nut
16. Snowflap
17. Decal
18. Decal
19. Cap Screw
20. Machine Screw
21. Washer
22. Lock Nut
23. Washer
24. Decal
25. Decal
26. Decal

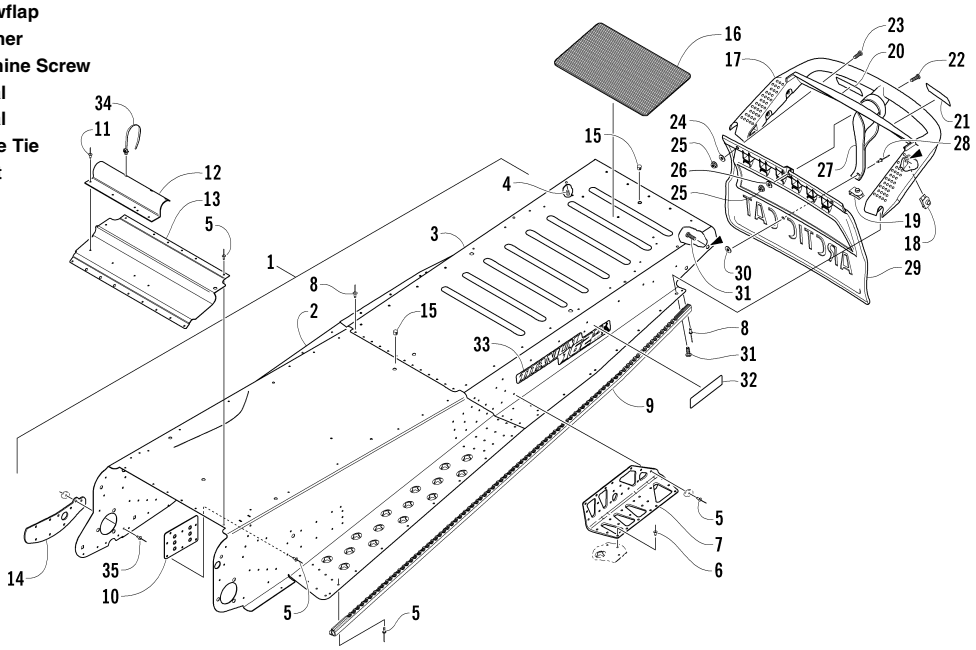


0739-621

7

KEY

1. Tunnel Assy
2. Tunnel - Front
3. Tunnel - Rear
4. Stud
5. Rivet
6. Rivet
7. Bracket - Rear
8. Rivet
9. Roll
10. Mounting Plate - Front
11. Rivet
12. Bracket
13. Driven Shaft Cover
14. Backing Plate
15. Plug
16. Pad
17. Bumper
18. U-Nut
19. U-Nut
20. Decal
21. Decal
22. Machine Screw
23. Machine Screw
24. Washer
25. Lock Nut
26. Washer
27. Strap
28. Rivet
29. Snowflap
30. Washer
31. Machine Screw
32. Decal
33. Decal
34. Cable Tie
35. Rivet



0739-291

REMOVING/DISASSEMBLING

■ NOTE: The snowflap can be removed without removing the bumper by removing the three bumper/snowflap cap screws.

1. Remove the cap screws securing the bumper assembly to the tunnel. Account for the U-nuts and cap screws.
2. Slide the bumper/snowflap off the tunnel.
3. Remove the cap screws securing the snowflap to the bumper and separate the bumper and snowflap. Account for cap screws, washers, and lock nuts.

ASSEMBLING/INSTALLING

1. Secure the snowflap to the bumper with the cap screws, washers, and lock washers taking care to place the washers next to the underside of the snowflap. Finger-tighten the cap screws to the lock nuts; then tighten the cap screws securely.
2. Place the bumper assembly into position on the tunnel and secure with the cap screws and U-nuts. Tighten the cap screws securely.

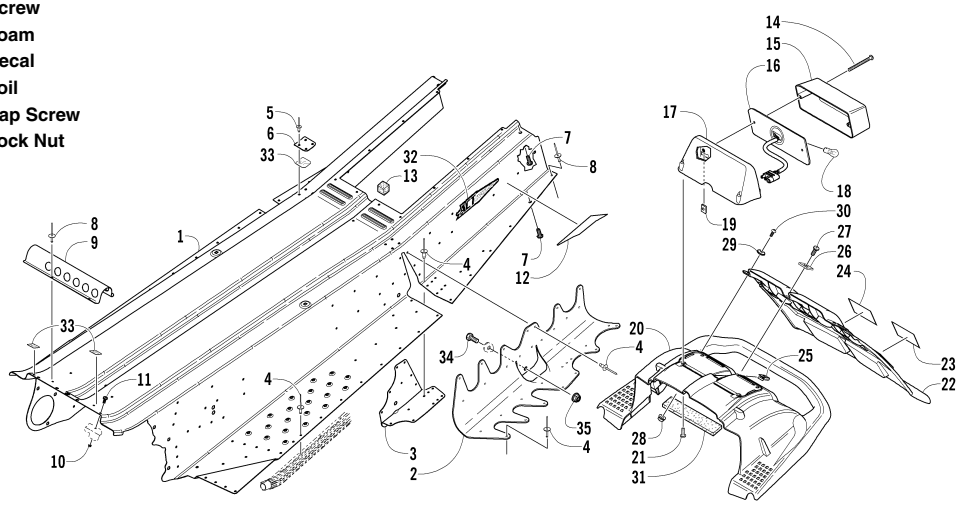
Tunnel/Rear Bumper/ Snowflap

(Crossfire/Firecat/M-Series/ Sabercat)

■ NOTE: Determine which style tunnel assembly is being disassembled and refer to the appropriate illustration for component details; then remove/ disassemble and assemble/install accordingly. Some components will vary from model to model. The technician should use discretion and sound judgment

KEY

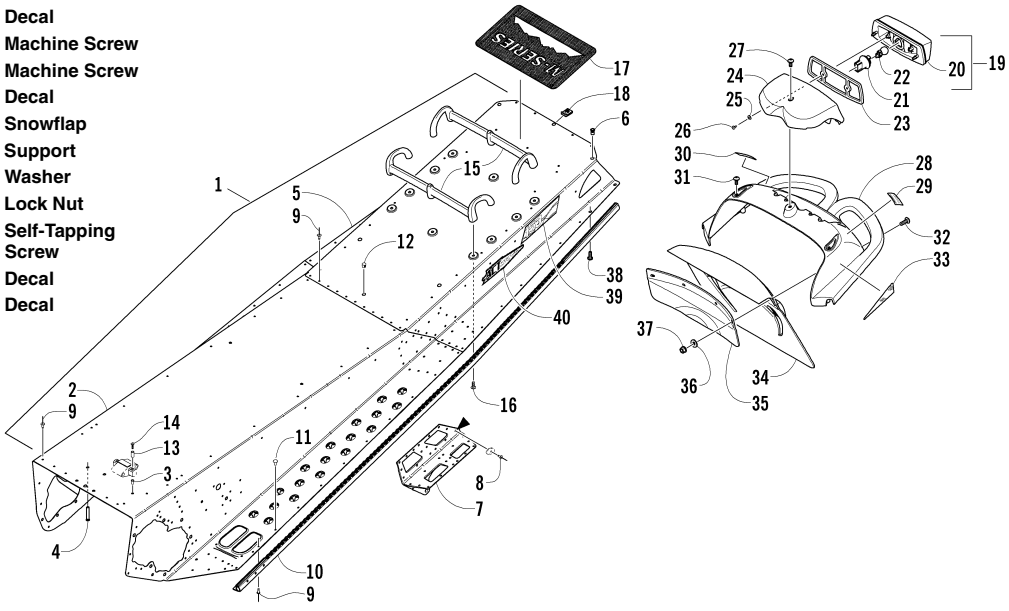
1. Tunnel Assy
2. Bracket - Rear
3. Plate
4. Rivet
5. Rivet
6. Bracket
7. Self-Tapping Screw
8. Rivet
9. Harness Protector
10. Lock Nut
11. Machine Screw
12. Decal
13. Foam
14. Machine Screw
15. Lens
16. Taillight w/Socket
17. Housing
18. Bulb
19. Speed Nut
20. Bumper
21. Screw
22. Snowflap
23. Decal
24. Decal
25. Speed Nut
26. Washer
27. Machine Screw
28. Lock Nut
29 Washer
30. Machine Screw
31. Foam
32. Decal
33. Foil
34. Cap Screw
35. Lock Nut



0740-760

KEY

1. Tunnel Assy
2. Tunnel - Front
3. Insert
4. Stud
5. Tunnel - Rear
6. Insert
7. Bracket - Rear
8. Rivet
9. Rivet
10. Tunnel Roll
11. Rivet
12. Plug
13. Spacer
14. Machine Screw
15. Rack
16. Machine Screw
17. Pad
18. Speed Nut
19. Taillight Assy
20. Housing
21. Socket
22. Bulb
23. Spacer
24. Housing
25. Washer
26. Self-Tapping Screw
27. Machine Screw
28. Bumper
29. Decal
30. Decal
31. Machine Screw
32. Machine Screw
33. Decal
34. Snowflap
35. Support
36. Washer
37. Lock Nut
38. Self-Tapping Screw
39. Decal
40. Decal

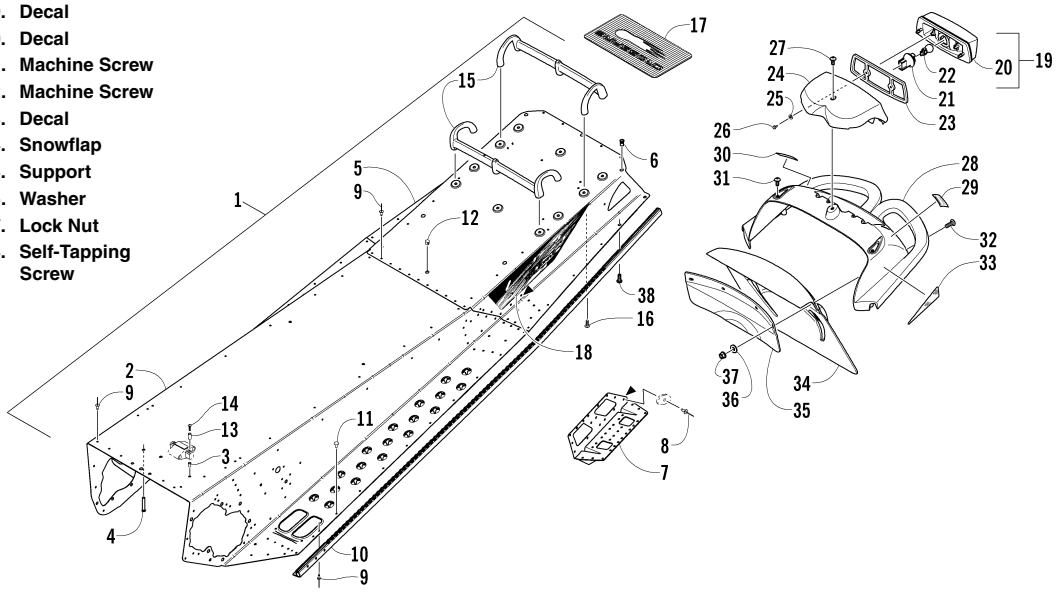


0740-753

7

KEY

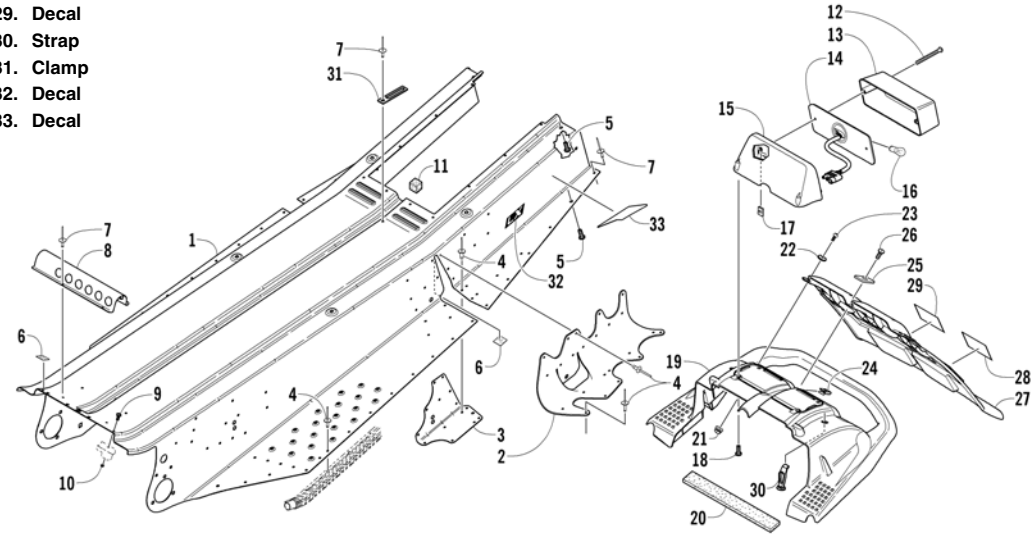
1. Tunnel Assy
2. Tunnel - Front
3. Insert
4. Stud
5. Tunnel - Rear
6. Insert
7. Bracket - Rear
8. Rivet
9. Rivet
10. Roll
11. Rivet
12. Plug
13. Spacer
14. Machine Screw
15. Rack
16. Machine Screw
17. Pad
18. Decal
19. Taillight Assy
20. Housing
21. Socket
22. Bulb
23. Spacer
24. Housing
25. Washer
26. Self-Tapping Screw
27. Machine Screw
28. Bumper
29. Decal
30. Decal
31. Machine Screw
32. Machine Screw
33. Decal
34. Snowflap
35. Support
36. Washer
37. Lock Nut
38. Self-Tapping Screw



0740-767

KEY

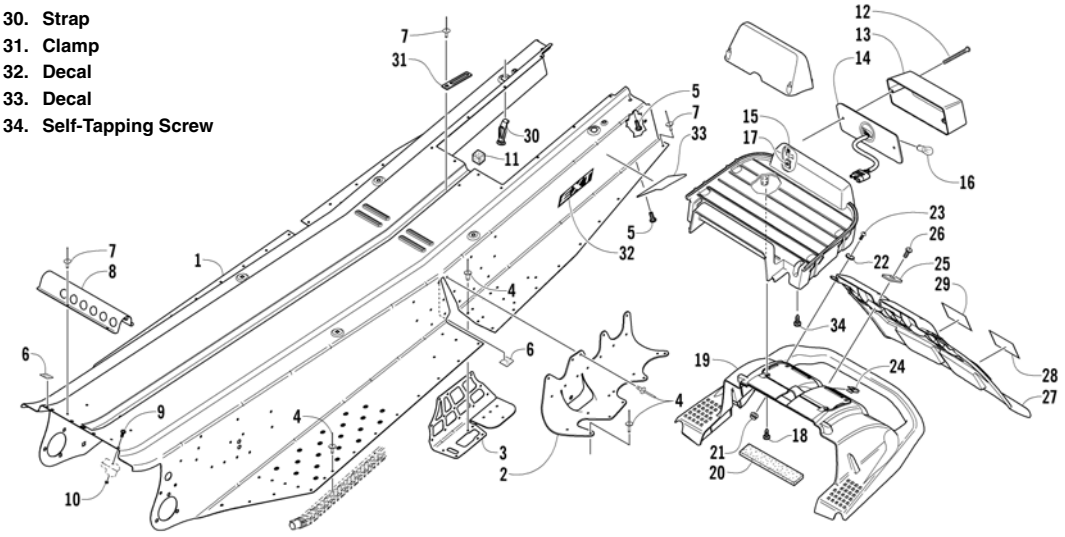
1. Tunnel Assy
2. Bracket - Rear
3. Plate
4. Rivet
5. Self-Tapping Screw
6. Foil
7. Rivet
8. Harness Protector
9. Machine Screw
10. Lock Nut
11. Foam
12. Machine Screw
13. Lens
14. Taillight w/Socket
15. Housing
16. Bulb
17. Speed Nut
18. Self-Tapping Screw
19. Bumper
20. Foam
21. Lock Nut
22. Washer
23. Machine Screw
24. Speed Nut
25. Washer
26. Machine Screw
27. Snowflap
28. Decal
29. Decal
30. Strap
31. Clamp
32. Decal
33. Decal



0740-503

KEY

1. Tunnel Assy
2. Bracket - Rear
3. Plate
4. Rivet
5. Self-Tapping Screw
6. Foil
7. Rivet
8. Harness Protector
9. Machine Screw
10. Lock Nut
11. Foam
12. Machine Screw
13. Lens
14. Taillight w/Socket
15. Housing
16. Bulb
17. Speed Nut
18. Self-Tapping Screw
19. Bumper
20. Foam
21. Lock Nut
22. Washer
23. Machine Screw
24. Speed Nut
25. Washer
26. Machine Screw
27. Snowflap
28. Decal
29. Decal
30. Strap
31. Clamp
32. Decal
33. Decal
34. Self-Tapping Screw



0740-504

REMOVING

1. Remove the torx-head screws securing the snowflap to the bumper; then remove the snowflap.

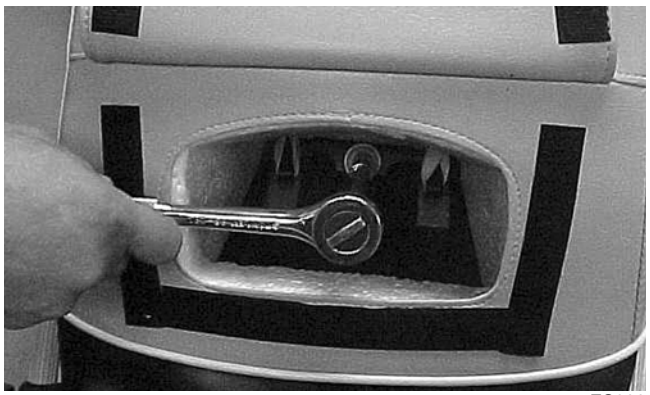


FC232

2. Remove the torx-head screws securing the bumper to the tunnel.

3. On Firecat/Sabercat models from inside the rear compartment, remove the nut and washer securing the seat assembly to the tunnel; then disconnect the taillight wiring harness.

■ NOTE: On the Crossfire/M-Series after removing the torx-head screws, remove the taillight housing from the bumper assembly; then disconnect the taillight wiring harness.

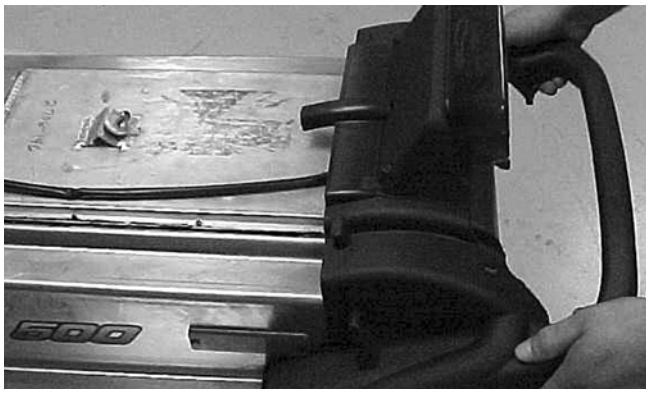


FC228



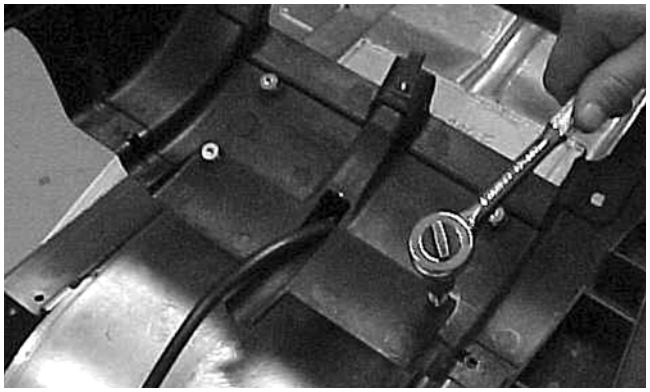
FC233

4. Remove the taillight/bumper assembly from the tunnel.



FC234

5. On Firecat/Sabercat models from the underside of the bumper, remove the four torx-head screws securing the taillight assembly to the bumper.

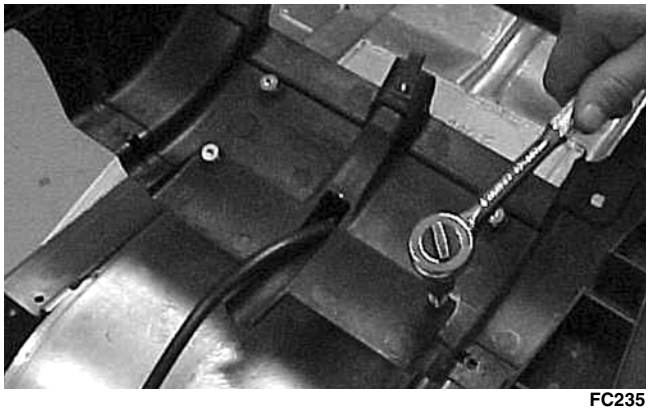


FC235

■ **NOTE: On the Crossfire/M-Series, remove the two cap screws securing the taillight assembly to the housing.**

INSTALLING

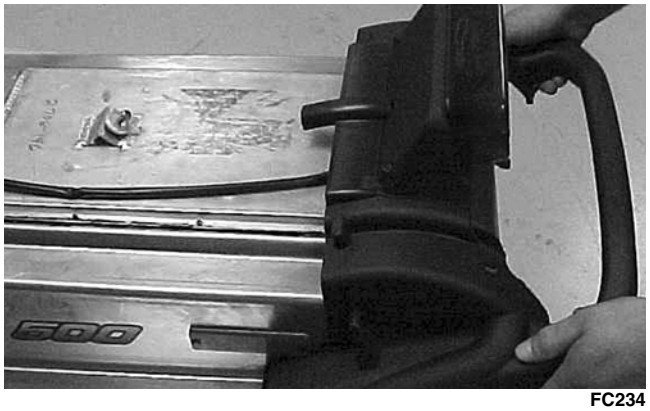
1. On the Firecat/Sabercat models, place the taillight assembly into position on the bumper; then secure with the four torx-head screws.



FC235

■ **NOTE: On the Crossfire/M-Series, install the bumper assembly to the tunnel; then secure with the six torx-head cap screws.**

2. On the Firecat/Sabercat models, place the taillight/bumper assembly into position on the tunnel.



FC234

3. On the Firecat/Sabercat models, secure the taillight/bumper assembly to the tunnel with the 10 torx-head screws.

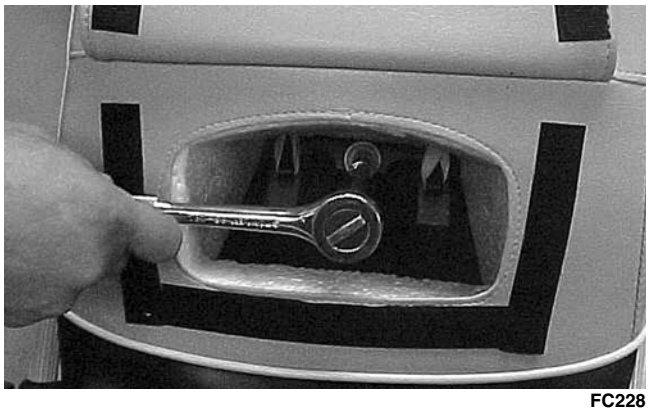
4. On the Firecat/Sabercat models, connect the taillight wiring harness; then position the seat assembly onto the tunnel.



FC233

■ **NOTE: On the Crossfire/M-Series, connect the taillight wiring harness; then install the taillight housing onto the bumper assembly.**

5. On the Firecat/Sabercat models from inside the rear compartment, secure the seat assembly to the tunnel with the nut and washer.



FC228

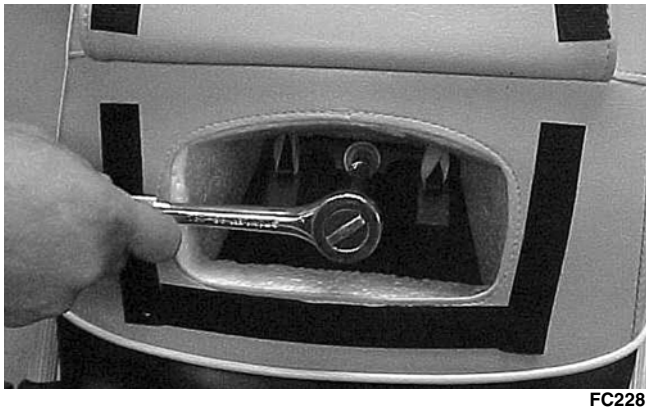
6. Secure the snowflap to the bumper with the torx-head screws.

Heat Exchanger
(Crossfire/Firecat/M-Series/ Sabercat)

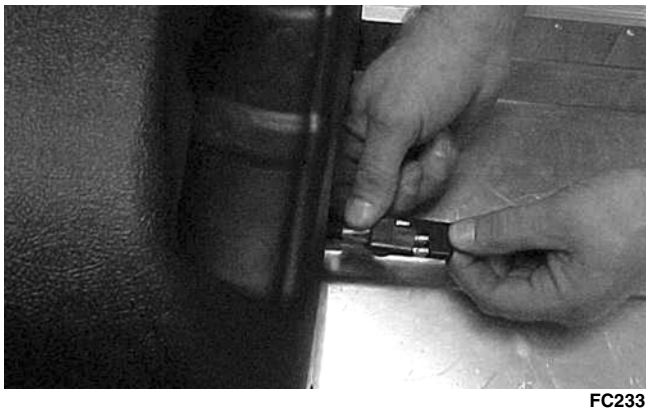
REMOVING

■ NOTE: The cooling system must be drained for this procedure (see Liquid Cooling System - Section 3).

1. On the Firecat/Sabercat models, remove the three torx-head screws securing the snowflap to the bumper; then remove the snowflap.
2. Remove the torx-head screws securing the bumper to the tunnel.
3. On the Firecat/Sabercat models from inside the rear compartment, remove the nut and washer securing the seat assembly to the tunnel; then disconnect the taillight wiring harness.



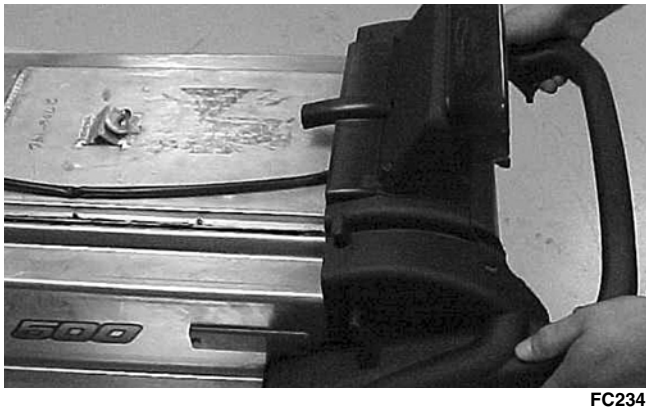
FC228



FC233

■ NOTE: At this point on Crossfire/M-Series models, the seat and gas tank must be removed (see appropriate Gas Tank/Seat Assembly sub-section in this section) and the slide rail must be removed (see Section 9) to continue this procedure.

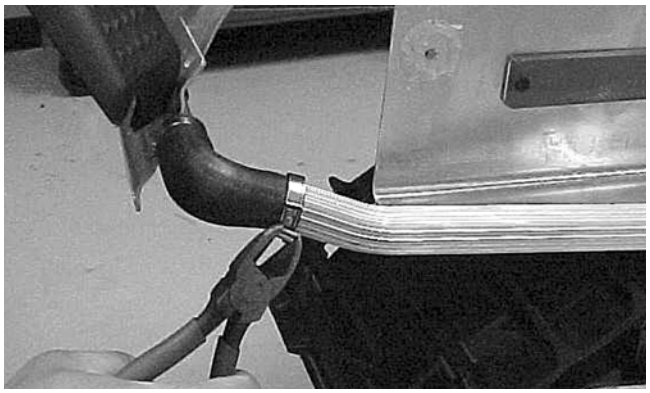
4. Remove the taillight/bumper assembly from the tunnel.



FC234

■ NOTE: When removing the right-side belly pan, the resonator must be removed. When removing the left-side belly pan, the clutch guard must be removed.

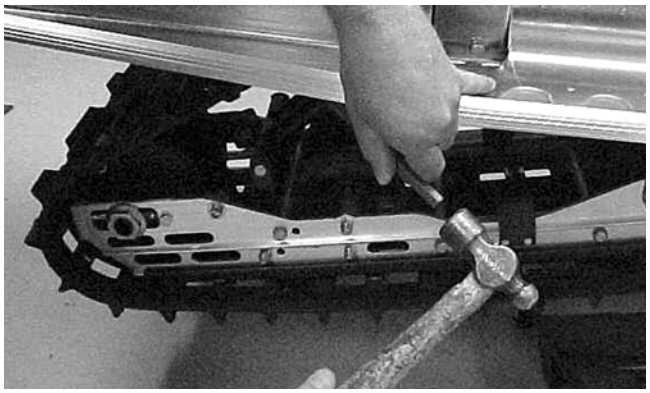
5. On the Firecat/Sabercat models from each side, remove the torx-head screws securing the side belly pan to the frame.
6. On the Firecat/Sabercat models from each side using a 3/16 in. drill bit, drill out the rivets securing the side belly pan to the frame; then remove the belly pan.
7. Remove the clamps and coolant hoses on each end of the heat exchanger.



FC242

8. From beneath the running board using a ball-peen hammer and a chisel, shear off the rivets securing the heat exchanger.

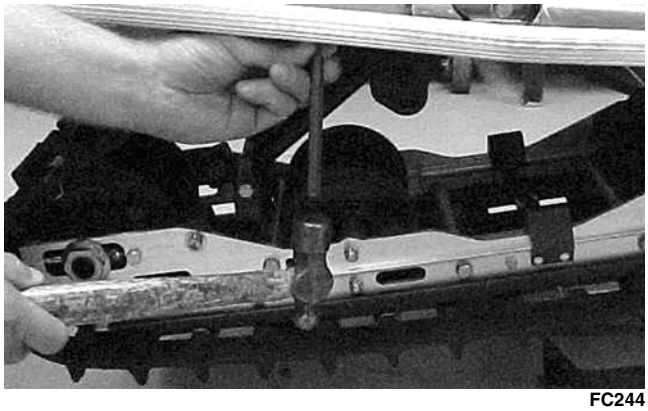
■ NOTE: On the Crossfire/M-Series models, the heat exchangers are located at the upper corners of the tunnel.



FC243

■ **NOTE: On the Crossfire/M-Series models, it is advisable to drill the rivets out of the tunnel to avoid scratching the tunnel surface.**

9. On the Firecat/Sabercat models from beneath the running board using a punch, drive out the sheared rivets; then remove the heat exchanger.



FC244



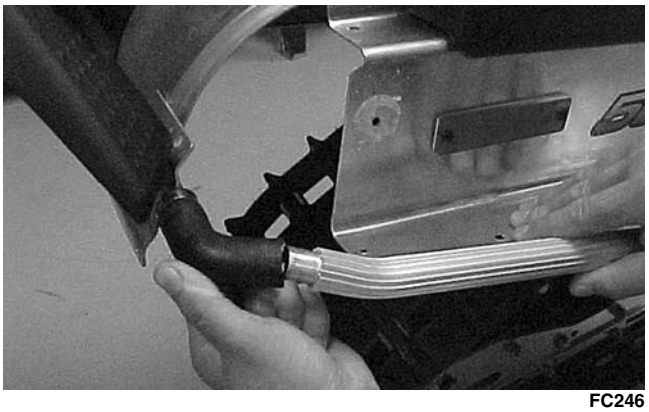
FC245

INSTALLING

1. On the Firecat/Sabercat models, place the heat exchanger into position against the running board; then on each end of the heat exchanger, install the coolant hoses and new clamps. Tighten the clamps securely.

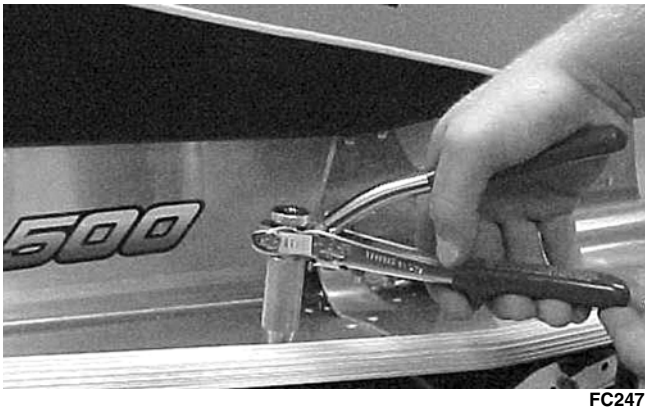
■ **NOTE: On the Crossfire/M-Series, position the exchangers at the top of the tunnel; then install the coolant hoses and new clamps. Tighten the clamps securely.**

■ **NOTE: Installing the coolant hoses and clamps at this time will aid in holding the heat exchanger against the running board (Firecat/Sabercat) or tunnel (Crossfire/M-Series).**



FC246

2. Using an appropriate rivet gun, secure the heat exchanger to the running board (Firecat/Sabercat) or the tunnel (Crossfire/M-Series).



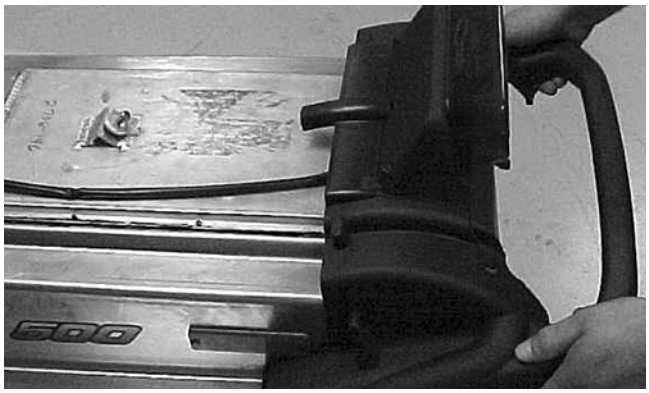
FC247

■ **NOTE: On the Crossfire/M-Series after the exchangers have been secured, install the hose protectors.**

3. On Firecat/Sabercat models on each side, place the side belly pan into position on the frame; then secure with the torx-head screws.

4. On Firecat/Sabercat models on each side using an appropriate rivet gun, secure the side belly pan with rivets.

5. On Firecat/Sabercat models, place the taillight/bumper assembly into position on the tunnel.



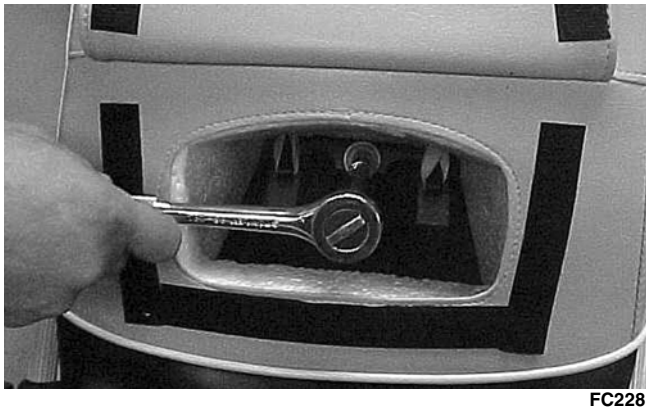
FC234

6. Secure the taillight/bumper assembly to the tunnel with the torx-head screws.

7. On Firecat/Sabercat models, connect the taillight wiring harness; then position the seat assembly onto the tunnel.

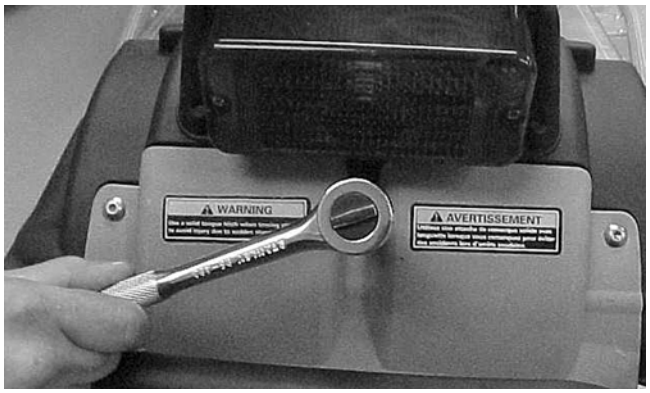

FC233

8. On Firecat/Sabercat models from inside the rear compartment, secure the seat assembly to the tunnel with the nut and washer.


FC228

■ NOTE: On Crossfire/M-Series models, connect the taillight wiring harness; then install the taillight assembly to the rear bumper assembly. Secure with the torx-head cap screw.

9. On Firecat/Sabercat models, secure the snowflap to the bumper with the three torx-head screws.



FC232

■ NOTE: At this point on the Crossfire/M-Series, install the slide rail (see Section 9); then install the gas tank and seat (see appropriate Gas Tank/Seat Assembly sub-section in this section).

10. Fill the cooling system with the recommended coolant; then use the following procedure.

■ NOTE: Use a good quality, glycol-based, automotive-type antifreeze. While the cooling system is being filled, allow enough time for the coolant to pass through the "weep hole" in the thermostat and into the system; then fill the tank and run the engine for five to ten minutes after the initial fill (until the thermostat opens). Add more coolant if necessary.

■ NOTE: Because the coolant fills slowly into the engine, it is necessary to wait for 10 minutes after filling the coolant tank to allow the engine to fill with coolant.

11. Recheck the coolant level. If the level is low after 10 minutes, repeat step 10.

12. Install the coolant cap to the "first" position.

13. Start the engine. Do not exceed 3000 RPM.

■ NOTE: After the engine has run for about 3-5 minutes, the right-side running board heat exchanger should feel warm to the touch. This is a sign that the thermostat has opened.

14. Shut off the engine.

15. Tighten the coolant cap to the "second" position.

16. Recheck the coolant level. If the coolant level is low, repeat step 10.

17. Install the coolant cap to the "first" position.

18. Place the snowmobile onto a safety stand.

19. Start the engine and run for 1 to 2 minutes. Do not exceed 5000 RPM.

20. Monitor the heat exchanger temperature by touch.

21. Shut off the engine for 5 minutes.

22. Start the engine and run for about 3-5 minutes; then repeat steps 14-22 an additional 2-3 times.

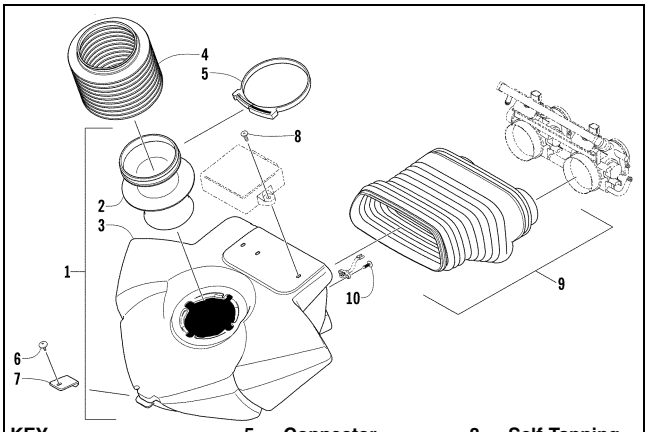
23. Take the snowmobile for a test drive. Do not exceed 5000 RPM during the test ride. Let the engine cool down; then recheck the coolant level and add if necessary.

⚠ CAUTION

After operating the snowmobile for the initial 5-10 minutes, stop the engine, allow the engine to cool down, and check the coolant level. Add coolant as necessary.

Air Silencer Assembly
(Crossfire/Firecat/M-Series/ Sabercat)

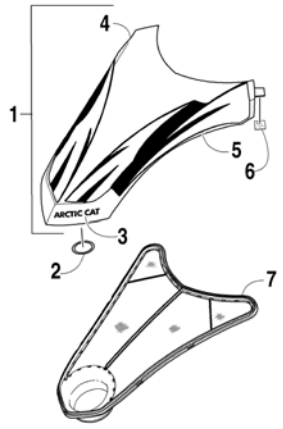
REMOVING



KEY
1. Air Silencer Assy
2. Intake
3. Silencer
4. Intake Connector (Hose)
5. Connector Clamp
6. Self-Tapping Screw
7. Hold-Down Bracket
8. Self-Tapping Screw
9. Boot
10. Retaining Clip

737-994A

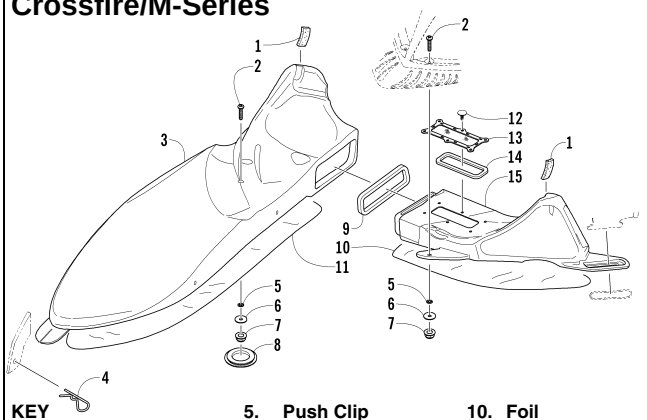
Firecat/Sabercat



KEY
1. Hood Cover Assy
2. O-Ring
3. Decal
4. Hood Cover
5. Decal
6. Foil
7. Hood Screen

740-878A

Crossfire/M-Series



KEY
1. Foam
2. Screw
3. Air Intake - Right
4. Hairpin Clip
5. Push Clip
6. Washer
7. Lock Nut
8. Plug
9. Foam
10. Foil
11. Foil
12. Retaining Clip
13. Screen
14. Seal
15. Air Intake - Left

0740-143

1. Remove the connector clamp securing the intake connector (hose) to the hood screen (right-side on the Crossfire/M-Series).



FC248

■ **NOTE: Steps 2-4 are for the Firecat/Sabercat models. On Crossfire/M-Series models, proceed to step 5.**

2. Remove the two O-rings from the front mounting tabs of the hood cover; then carefully close the hood while supporting the hood cover.

3. Raise the front of the hood cover; then carefully pull forward on the cover to release the rear cover locking tabs from the hood.



FC249



FC250

4. Using a flat-blade screwdriver, carefully pry up (in multiple locations) on the hood screen to remove it from the hood cover.


FC251

■ NOTE: Steps 5-7 are for the Crossfire/M-Series models.

5. With the hood closed, loosen the headlight adjustment knobs.

6. Carefully push the headlight lenses rearward far enough to remove the torx-head screws securing the air silencer plenum to the hood.

7. Open the hood; then remove the O-rings securing the air silencer plenums to the hood and remove the air silencer plenums.

INSTALLING

■ NOTE: Steps 1-4 are for the Firecat/Sabercat models. On Crossfire/M-Series models, proceed to step 5.

1. Place the hood screen into position on the hood cover; then carefully push down (in multiple locations) until the screen is correctly and firmly seated in the hood cover.

2. Place the rear hood cover locking tabs into position on the hood; then carefully lower the hood cover into position on the hood.



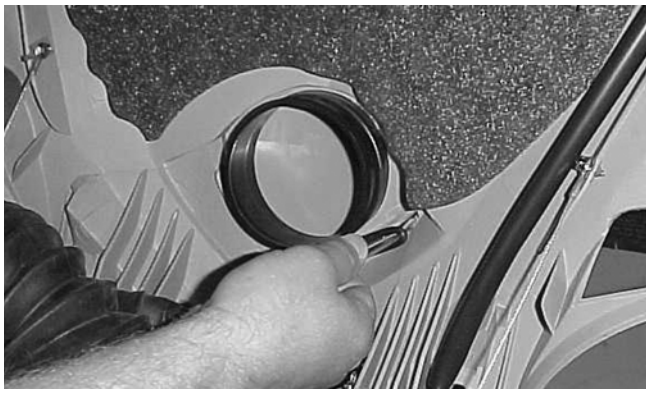
FC250



FC249

3. While supporting the hood cover, carefully open the hood; then install the two O-rings onto the front mounting tabs of the cover.

4. Place the intake connector (hose) onto the hood screen; then secure with the connector clamp.



FC252

■ **NOTE: Steps 5-8 are for the Crossfire/M-Series models.**

5. Press the air silencer plenums into place on the hood and secure with the O-rings; then close the hood.

6. Carefully push the headlight lenses rearward far enough to install the torx-head screws. Tighten the screws securely.

7. Tighten the headlight adjustment knobs.

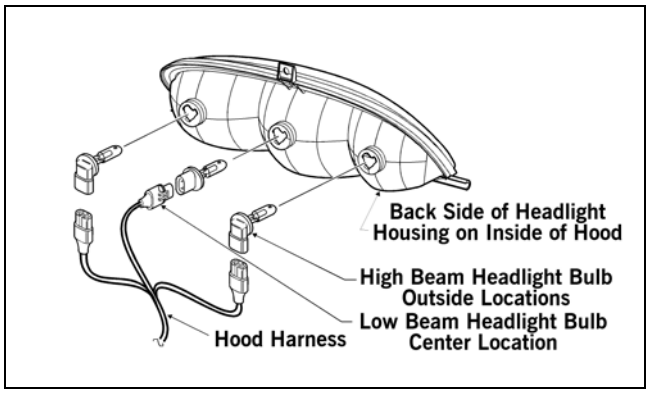
8. Check headlight aim (see appropriate Adjusting Headlight Aim in this sub-section).

Headlight Assembly
(Bearcat/King Cat/Panther/Z/ZR)

REMOVING HEADLIGHT BULB

■ **NOTE: The bulb portion of the headlight is fragile. HANDLE WITH CARE. When replacing the headlight bulb, the bulb assembly must first be removed from the housing. Do not touch the glass portion of the bulb. If the glass is touched, it must be cleaned with a dry cloth before installing.**

1. Pull the wiring harness retaining clip away from the headlight bulb base and disconnect the wiring harness from the bulb.



0733-178

2. Rotate the headlight bulb base counterclockwise and remove the bulb from the headlight housing.

INSTALLING HEADLIGHT BULB

⚠ CAUTION

Do not touch the glass portion of the bulb. If the glass portion is touched, it must be cleaned with a dry cloth before installing.

1. While holding the bulb by its base, insert the bulb into the headlight housing and rotate it clockwise until it locks into the housing.

2. Plug the wiring harness into the headlight bulb base making sure the retaining clip locks onto the base.

3. Check headlight aim (see Adjusting Headlight Aim in this section).

⚠ WARNING

Do not operate the snowmobile unless headlight beam is adjusted properly. An incorrectly adjusted beam will not provide the operator the optimum amount of light.

Headlight Assembly
(Firecat/Sabercat)

REMOVING HEADLIGHT BULB/ HEADLIGHT

1. Remove the adjustment screw w/knob at the console.

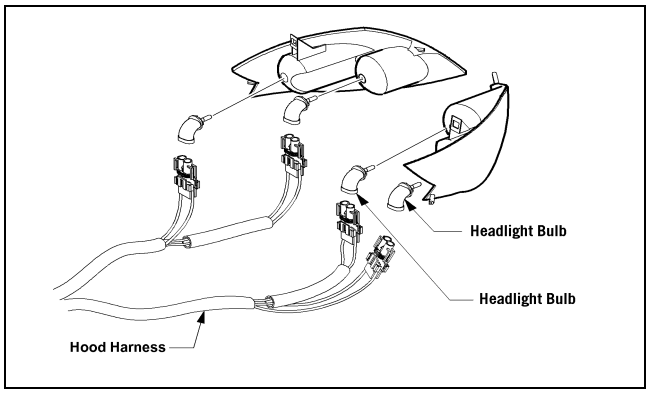
2. From beneath the hood, unplug the wiring harness connectors from the bulbs.

■ **NOTE: If replacing the headlight assembly, the adjustment knobs must be removed.**

■ **NOTE: The bulb portion of the headlight is fragile. HANDLE WITH CARE.**

3. Remove the bulb from the headlight housing.

4. Remove the hairpin clips securing the headlight assembly to the hood. Account for the adjuster spring.



737-299A

INSTALLING HEADLIGHT/HEADLIGHT BULB

1. Beneath the hood, place the headlight assembly into position in the mounting tabs.

2. Place the adjuster spring into position; then thread the adjustment screw into the headlight assembly.

3. Install the hairpin clips to secure the headlight assembly to the hood.

■ NOTE: When replacing the headlight bulb, the bulb assembly must first be removed from the housing. Do not touch the glass portion of the bulb. If the glass is touched, it must be cleaned with a dry cloth before installing.

⚠ CAUTION

Do not touch the glass portion of the bulb. If the glass portion is touched, it must be cleaned with a dry cloth before installing.

4. Plug the wiring harness into the headlight bulb.

5. Insert the bulb into the headlight housing.

6. Check headlight aim (see Adjusting Headlight Aim in this section).

⚠ WARNING

Do not operate the snowmobile unless headlight beam is adjusted properly. An incorrectly adjusted beam will not provide the operator the optimum amount of light.

Headlight Assembly
(Crossfire/M-Series)

REMOVING HEADLIGHT BULB/HEADLIGHT

■ NOTE: The bulb portion of the headlight is fragile. HANDLE WITH CARE. When replacing the headlight bulb, the bulb assembly must first be removed from the housing. Do not touch the glass portion of the bulb. If the glass is touched, it must be cleaned with a dry cloth before installing.

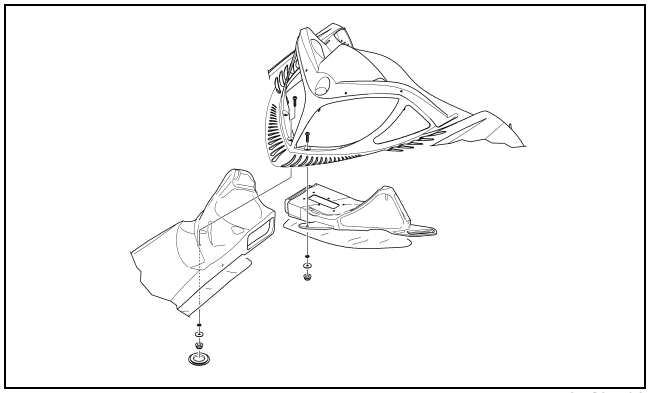
To access the headlight assembly, use the following procedure.

1. With the hood closed, loosen the headlight adjustment knobs.

2. Open the hood; then on the right-side air intake, remove the rubber plug and hairpin clip at the forward end of the intake assembly.

■ NOTE: Carefully push the headlight lenses inward far enough to access the torx-head screws securing the air intake assembly to the hood.

3. Remove the lock nuts from the torx-head screws and the O-rings securing the air intake assembly to the hood and remove the air intake assembly to access the bulbs.



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■ NOTE: If replacing the headlight assembly, the adjustment knobs must be removed.

4. If replacing the bulb(s), remove the bulb(s) from the headlight housing and disconnect the wiring harness from the bulb(s).

5. Remove the hairpin clips securing the headlight assembly to the hood; then remove the assembly.

INSTALLING HEADLIGHT BULB/ HEADLIGHT

1. Install the headlight assembly on the hood; then secure with the hairpin clips.

⚠ CAUTION

Do not touch the glass portion of the bulb. If the glass portion is touched, it must be cleaned with a dry cloth before installing.

2. If the bulb(s) was replaced, plug the wiring harness into the headlight bulb and secure with cable ties.
3. Insert the bulb into the headlight housing.
4. Press the air intake assembly into place on the hood and secure with the O-rings and hairpin clips.
5. Carefully push the headlight lenses inward far enough to access the torx-head screws. Install the lock nuts and tighten securely.
6. Install the headlight adjustment knobs.
7. Check headlight aim (see Adjusting Headlight Aim in this sub-section).

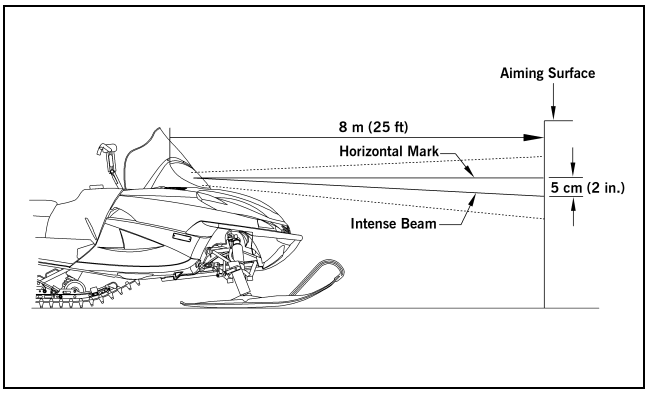
Adjusting Headlight Aim

The headlight can be adjusted for vertical aim of the HIGH/LOW beam. The geometric center of HIGH beam zone is to be used for vertical aiming.

1. Position the snowmobile on a level floor so the headlight is approximately 8 m (25 ft) from an aiming surface (wall or similar surface).

■ NOTE: There should be an "average" operating load on the snowmobile when adjusting headlight aim.

2. Measure the distance from the floor to midpoint of the headlight.
3. Using the measurement obtained in step 2, make a horizontal mark on the aiming surface.
4. Make a vertical mark which intersects the horizontal mark on the aiming surface directly in front of the headlight.
5. Start the engine. Select the headlight dimmer switch HIGH beam position. DO NOT USE LOW BEAM.
6. Observe the headlight beam aim. Proper aim is when the most intense beam is centered on the vertical mark 5 cm (2 in.) below the horizontal mark on the aiming surface.



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7. Adjust the headlight housing mounting screws (on Bearcat/King Cat/Panther/Z/ZR models) or the console adjustment knobs (on the Crossfire/ Firecat/M-Series/Sabercat models) until correct aim is obtained. Shut the engine off.

Torque Specifications

(Bearcat/King Cat/Panther/Z/ZR)

ITEM		TORQUE
Ski	ft-lb kg-m	21-26 2.9-3.6
Handlebar Adjuster Block (Bearcat/Panther/Z)	ft-lb kg-m	10 1.4
Handlebar Adjuster Block (King Cat/ZR)	ft-lb kg-m	25 3.5
Steering Post/Tie Rod*	ft-lb kg-m	30 4.2
Drag Link/Tie Rod*	ft-lb kg-m	20 2.8
Drag Link/Steering/Idler Arm*	ft-lb kg-m	30 4.2
Spindle Arm/Tie Rod*	ft-lb kg-m	30 4.2
Suspension Arms/Spindle*	ft-lb kg-m	30 4.2
Shock Absorber/Spindle	ft-lb kg-m	20 2.8
Front Suspension Arm* (Upper)	ft-lb kg-m	30 4.2
Front Suspension Arm* (Lower)	ft-lb kg-m	40 5.5
Steering Post/Chassis*	ft-lb kg-m	30 4.2
Tie Rod/Steering Arm*	ft-lb kg-m	30 4.2
Steering Arm/Chassis*	ft-lb kg-m	30 4.2

* w/Green Loctite #609

Torque Specifications
(Crossfire/Firecat/M-Series/ Sabercat)

ITEM		TORQUE
Ski	ft-lb kg-m	21-26 2.9-3.6
Handlebar Adjuster Block Cap	ft-lb kg-m	25 3.5
Handlebar Adjuster Block	ft-lb kg-m	10 1.4
Steering Post Mounting Block	ft-lb kg-m	15 2.1
Steering Post Mounting Block (Crossfire/M-Series)	ft-lb kg-m	10 1.4
Steering Post Stop**	ft-lb kg-m	2 0.3
Steering Tie Rod/Shaft Arm*	ft-lb kg-m	30 4.2
Steering Post/Tie Rod*	ft-lb kg-m	30 4.2
Spindle Arm/Tie Rod*	ft-lb kg-m	40 5.5
Suspension Arm/Spindle* (Upper)	ft-lb kg-m	30 4.2
Suspension Arm/Spindle* (Lower)	ft-lb kg-m	40 5.5
Shock Absorber/Spindle	ft-lb kg-m	20 2.8
Front Suspension Arm* (Upper)(Firecat)	ft-lb kg-m	30 4.2
Front Suspension Arm* (Lower)	ft-lb kg-m	30 4.2
Steering Post/Chassis*	ft-lb kg-m	30 4.2
Steering Support/Chassis** (Crossfire/M-Series)	ft-lb kg-m	20 2.8
Tie Rod (Center)/Steering Arm*	ft-lb kg-m	40 5.5

* w/Green Loctite #609
** w/Blue Loctite #243

Torque Specifications
(General Bolts)

Type of Bolt	Thread Diameter (mm)	Torque	
		kg-m	ft-lb
(Conventional or 4 Marked Bolt)	5	0.2-0.4	1.5-3.0
	6	0.4-0.7	3.0-5.0
	8	1.0-1.6	7.0-11.5
	10	2.2-3.5	16.0-25.5
(7 Marked Bolt)	5	0.3-0.6	2.0-4.5
	6	0.8-1.2	6.0-8.5
	8	1.8-2.8	13.0-20.0
	10	4.0-6.0	29.0-43.5

SECTION 8 — DRIVE TRAIN AND BRAKE SYSTEMS

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DRIVE SYSTEM SPECIFICATIONS

MODEL	ALTITUDE	DRIVE CLUTCH	DRIVE SPRING		CAM ARM		DRIVEN PULLEY		
		P/N	P/N	COLOR	P/N	GRAMS	P/N	SPRING	COLOR
Bearcat 570	0-5000	0725-498	0646-149	Red	0746-687	57.0	0726-159	0648-114	Red/White
	5-9000	-	-	-	0746-692	50.0	-	-	-
	9-Over	-	-	-	-	-	-	-	-
Firecat 600 EFI r	0-5000	0725-511	0646-229	Yellow/White	0746-670	65.0	0726-182	0748-025	Green
	5-9000	-	-	-	0746-669	60.0	-	-	-
	9-Over	-	-	-	0746-702	58.0	-	-	-
Firecat 700 EFI r	0-5000	0725-510	0646-229	Yellow/White	0746-671	70.0	0726-182	0748-025	Green
	5-9000	-	-	-	0746-694	63.0	-	-	-
	9-Over	-	-	-	0746-702	58.0	-	-	-
Panther 370 r	0-5000	0725-494	0646-149	Red	0746-771	44.0	0726-211	0648-012	Blue
	5-9000	-	0646-147	Yellow/Green	-	-	-	-	-
	9-Over	-	-	-	0746-772	42.0	-	0148-227	Yellow
Panther 570	0-5000	0725-535	0646-149	Red	0746-666	55.0	0726-162	0148-227	Yellow
	5-9000	-	-	-	0746-661	52.0	-	-	-
	9-Over	-	0646-147	Yellow/Green	-	-	-	-	-
Sabercat 500 EFI/ 500 EFI LX	0-5000	0725-515	0646-149	Red	0746-692	50.0	0726-220	0648-114	Red/Whtie
	5-9000	-	-	-	0746-690	47.0	-	-	-
	9-Over	-	-	-	0746-691	44.0	-	-	-
Sabercat 600 EFI LX	0-5000	0725-514	0646-229	Yellow/White	0746-670	65.0	0726-182	0748-025	Green
	5-9000	-	-	-	0746-669	60.0	-	-	-
	9-Over	-	-	-	0746-702	58.0	-	-	-
Sabercat 700 EFI/LX/ EXT	0-5000	0725-502	0646-229	Yellow/White	0746-671	70.0	0726-182	0748-025	Green
	5-9000	-	-	-	0746-694	63.0	-	-	-
	9-Over	-	-	-	0746-702	58.0	-	-	-
Z 370/370 LX	0-5000	0725-494	0646-149	Red	0746-771	44.0	0726-211	0648-012	Blue
	5-9000	-	0646-147	Yellow/Green	-	-	-	0148-227	Yellow
	9-Over	-	-	-	0746-772	42.0	-	-	-
Z 440 LX	0-5000	0725-495	0646-149	Red	0746-661	52.0	0726-101	0148-227	Yellow
	5-9000	-	-	-	0746-690	47.0	-	-	-
	9-Over	-	0646-147	Yellow/Green	-	-	-	-	-
Z 570/570 LX	0-5000	0725-535	0646-149	Red	0746-666	55.0	0726-162	0148-227	Yellow
	5-9000	-	-	-	0746-661	52.0	-	-	-
	9-Over	-	0646-147	Yellow/Green	-	-	-	-	-
King Cat 900 EFI*	0-3000	-	-	-	0746-715	77.0	-	-	-
	3-6000	-	-	-	0746-710	72.0	-	-	-
	6-9000	0725-478	0646-373	Yellow/Green	0746-689	69.0	0726-168	0648-674	Red/White
	9-Over	-	-	-	0746-699	66.0	-	-	-

DRIVE SYSTEM SPECIFICATIONS

MODEL	ALTITUDE	TORQUE BRACKET		GEAR RATIO	CHAIN		DRIVE BELT	ENGAGEMENT RPM	PEAK RPM
		P/N	DEGREE		PITCH	P/N	P/N		
Bearcat 570	0-5000	0648-002	53°	18/44	72	1602-042	0627-013	3000	71-7300
	5-9000	0648-126	53°/51°	-	-	-	-	-	-
	9-Over	-	-	-	-	-	-	-	-
Firecat 600 EFI r	0-5000	0648-002	53°	22/40	72	1602-042	0627-020	3800	78-8000
	5-9000	0148-222	51°	19/39	70	1602-041	-	4000	-
	9-Over	-	-	-	-	-	-	4200	-
Firecat 700 EFI r	0-5000	0648-002	53°	24/39	72	1602-042	0627-035	4000	78-8000
	5-9000	0148-222	51°	22/40	70	1602-041	-	4200	-
	9-Over	-	-	-	-	-	-	4300	-
Panther 370 r	0-5000	0648-222	51°	18/44	72	1602-042	0627-021	3800	7200
	5-9000	0648-014	49°	-	-	-	-	-	-
	9-Over	-	-	-	-	-	-	-	-
Panther 570	0-5000	0648-014	49°	19/39	70	1602-041	0627-021	3500	71-7300
	5-9000	0648-002	53°	-	-	-	-	-	-
	9-Over	0648-014	49°	-	-	-	-	-	-
Sabercat 500 EFI/500 EFI LX	0-5000	0648-681	62°/50°	20/39	70	1602-041	0627-020	4200	78-8000
	5-9000	0648-014	49°	19/40	-	-	-	-	-
	9-Over	-	-	-	-	-	-	4800	-
Sabercat 600 EFI LX	0-5000	0648-002	53°	22/40	72	1602-042	0627-020	4200	78-8000
	5-9000	0648-014	49°	19/39	70	1602-041	-	-	-
	9-Over	- -	- -	-	-	-	-	4500	-
Sabercat 700 EFI/LX/ EXT	0-5000	0648-002	53°	24/39	72	1602-042	0627-035	4000	78-8000
	5-9000	0148-222	51°	22/40	-	-	-	4200	-
	9-Over	-	-	-	-	-	-	4300	-
Z 370/370 LX	0-5000	0148-222	51°	18/44	72	0107-372	0627-021	3800	7200
	5-9000	0648-014	49°	-	-	-	-	4200	-
	9-Over	-	-	-	-	-	-	-	-
Z 440 LX	0-5000	0648-002	53°	19/39	70	0107-216	0627-021	3500	7000
	5-9000	0648-014	49°	-	-	-	-	-	-
	9-Over	-	-	-	-	-	-	-	-
Z 570/570 LX	0-5000	0648-014	49°	19/39	70	1602-041	0627-021	3800	71-7300
	5-9000	0648-002	53°	-	-	-	-	-	-
	9-Over	-	-	-	-	-	-	-	-
King Cat 900 EFI*	0-3000	0648-005	55°	19/40	70	0602-968	-	3500	73-7500
	3-6000	-	-	19/43	72	0602-972	-	-	-
	6-9000	0648-024	55°/53°	19/43	72	0602-972	0627-020	3800	73-7500
	9-Over	-	-	-	-	-	-	-	-

DRIVE SYSTEM SPECIFICATIONS

MODEL	ALTITUDE	DRIVE CLUTCH	DRIVE SPRING		CAM ARM		DRIVEN PULLEY		
		P/N	P/N	COLOR	P/N	GRAMS	P/N	SPRING	COLOR
Crossfire 600 EFI/ 600 EFI Sno Pro	0-3000	0725-524	0646-229	Yellow/White	0746-671	70.0	0726-208	0648-732	Green
	3-6000	-	-	-	0746-670	65.0	-	-	-
	6-900	-	-	-	0746-694	63.0	-	-	-
	9-Over	-	-	-	0746-669	60.0	-	-	-
Crossfire 700 EFI/ 700 EFI Sno Pro	0-3000	0725-530	0646-229	Yellow/White	0746-672	75.0	0726-227	0648-732	Green
	3-6000	-	-	-	0746-671	70.0	-	-	-
	6-9000	-	-	-	0746-703	68.0	-	-	-
	9-Over	-	-	-	0746-670	65.0	-	-	-
Firecat 500/500 Sno Pro	0-5000	0725-504	0646-229	Yellow/White	0746-668	55.0	0726-214	0648-693	White
	5-9000	-	-	-	0746-744	50.0	-	-	-
	9-Over	-	-	-	0746-748	46.0	-	-	-
Firecat 600 EFI/600 EFI Sno Pro	0-5000	0725-509	0646-229	Yellow/White	0746-671	70.0	0726-222	0648-732	Green
	5-9000	-	-	-	0746-694	63.0	-	-	-
	9-Over	-	-	-	0746-669	60.0	-	-	-
Firecat 700/700 Sno Pro	0-5000	0725-507	0646-229	Yellow/White	0746-672	75.0	0726-215	0648-732	Green
	5-9000	-	-	-	0746-670	65.0	-	-	-
	9-Over	-	-	-	0746-694	63.0	-	-	-
Firecat 700 EFI/700 EFI Sno Pro	0-5000	0725-507	0646-229	Yellow/White	0746-672	75.0	0726-222	0648-732	Green
	5-9000	-	-	-	0746-695	67.0	-	-	-
	9-Over	-	-	-	0746-694	63.0	-	-	-
M5*	0-3000	-	0646-149	Red	0746-702	58.0	-	-	-
	3-6000	-	-	-	0746-668	55.0	-	-	-
	6-9000	0725-520	0646-147	Yellow/Green	0746-662	52.0	0726-224	0648-693	White
	9-Over	-	-	-	0746-744	50.0	-	-	-
M6 EFI*	0-3000	-	-	-	0746-671	70.0	-	-	-
	3-6000	-	-	-	0746-670	65.0	-	-	-
	6-9000	0725-526	0646-229	Yellow/White	0746-694	63.0	0726-224	0648-693	White
	9-Over	-	-	-	0746-669	60.0	-	-	-
M7*	0-3000	-	-	-	0746-672	75.0	-	-	-
	3-6000	-	-	-	0746-671	70.0	-	-	-
	6-9000	0725-528	0646-229	Yellow/White	0746-695	67.0	0726-224	0648-693	White
	9-Over	-	-	-	0746-694	63.0	-	-	-
M7 EFI*	0-3000	-	-	-	0746-672	75.0	-	-	-
	3-6000	-	-	-	0746-671	70.0	-	-	-
	6-9000	0725-528	0646-229	Yellow/White	0746-703	68.0	0726-224	0648-693	White
	9-Over	-	-	-	0746-670	65.0	-	-	-
M7 EFI (LE)*	0-3000	-	-	-	0746-672	75.0	-	-	-
	3-6000	-	-	-	0746-671	70.0	-	-	-
	6-9000	0725-532	0646-379	Titanium	0746-703	68.0	0726-226	0648-718	White
	9-Over	-	-	-	0746-670	65.0	-	-	-
ZR 900 EFI	0-5000	0725-533	0646-155	Purple	0746-742	83.0	0726-228	0648-693	White
	5-9000	-	0646-147	Yellow/Green	0746-673	80.0	-	-	-
	9-Over	-	-	-	0746-672	75.0	-	-	-
ZR 900 EFI Sno Pro	0-5000	0725-533	0646-155	Purple	0746-742	83.0	0726-228	0648-693	White
	5-9000	-	0646-147	Yellow/Green	0746-673	80.0	-	-	-
	9-Over	-	-	-	0746-672	75.0	-	-	-

* Initially set up at the factory for operation between 6000-9000 feet.

DRIVE SYSTEM SPECIFICATIONS

MODEL	ALTITUDE	TORQUE BRACKET		RING GEAR		TRANSFER GEAR		INPUT GEAR		RATIO	DRIVE BELT	ENGAGE-MENT RPM	PEAK RPM
		P/N	DEGREE	P/N	T	P/N	T	P/N	T		P/N		
Crossfire 600 EFI/600 EFI Sno Pro	0-3000	0648-731	44°/40°	0702-675	76	0702-709	60/34	0702-691	60	60/60	0627-036	3800	78-8000
	3-6000	-	-	-	-	-	-	-	-	-	-	4000	-
	6-9000	0648-765	36°	-	-	-	-	-	-	-	-	-	-
	9-Over	-	-	-	-	-	-	-	-	-	-	4200	-
Crossfire 700 EFI/700 EFI Sno Pro	0-3000	0648-764	44°/40°	0702-675	76	0702-709	60/34	0702-691	60	60/60	0627-036	3600	78-8000
	3-6000	-	-	-	-	-	-	-	-	-	-	3800	-
	6-9000	0648-765	36°	-	-	-	-	-	-	-	-	4600	-
	9-Over	-	-	-	-	-	-	-	-	-	-	4800	-
Firecat 500/500 Sno Pro	0-5000	0748-637	48°/42°	0702-675	76	0702-712	63/34	0702-688	57	57/63	0627-044	4200	83-8500
	5-9000	0748-622	36°	-	-	-	-	-	-	-	-	-	-
	9-Over	-	-	-	-	-	-	-	-	-	-	4500	-
Firecat 600 EFI/ 600 EFI Sno Pro	0-5000	0748-637	48°/42°	0702-675	76	0702-707	58/34	0702-693	62	62/58	0627-044	4200	78-8000
	5-9000	0748-622	36°	-	-	0702-709	60/34	0702-691	60	60/60	-	-	-
	9-Over	-	-	-	-	-	-	-	-	-	-	4500	-
Firecat 700/700 Sno Pro	0-5000	0748-636	44°/40°	0702-675	76	0702-704	55/34	0702-696	65	65/55	0627-044	4000	78-8000
	5-9000	-	-	-	-	0702-709	60/34	0702-691	60	60/60	-	4200	-
	9-Over	0748-622	36°	-	-	-	-	-	-	-	-	4300	-
Firecat 700 EFI/ 700 EFI Sno Pro	0-5000	0748-637	48°/42°	0702-675	76	0702-704	55/34	0702-696	65	65/55	0627-044	4000	78-8000
	5-9000	0748-636	44°/40°	-	-	0702-709	60/34	0702-691	60	60/60	-	4200	-
	9-Over	0748-622	36°	-	-	-	-	-	-	-	-	4300	-
M5 EFI*	0-3000	-	-	-	-	-	-	-	-	-	-	3600	78-8000
	3-6000	-	-	-	-	-	-	-	-	-	-	3800	-
	6-9000	0648-765	36°	0702-675	76	0702-712	63/34	0702-688	57	57/63	0627-036	4600	78-8000
	9-Over	-	-	-	-	-	-	-	-	-	-	4800	-
M6 EFI*	0-3000	0648-764	44°/40°	-	-	-	-	-	-	-	-	3800	78-8000
	3-6000	-	-	-	-	-	-	-	-	-	-	4000	-
	6-9000	0648-765	36°	0702-675	76	0702-712	63/34	0702-688	57	57/63	0627-036	4000	78-8000
	9-Over	-	-	-	-	-	-	-	-	-	-	4200	-
M7*	0-3000	0648-764	44°/40°	-	-	-	-	-	-	-	-	3600	78-8000
	3-6000	-	-	-	-	-	-	-	-	-	-	3800	-
	6-9000	0648-765	36°	0702-675	76	0702-712	63/34	0702-688	57	57/63	0627-036	3800	78-8000
	9-Over	-	-	-	-	-	-	-	-	-	-	4000	-
M7 EFI*	0-3000	0648-764	44°/40°	-	-	-	-	-	-	-	-	3600	78-8000
	3-6000	-	-	-	-	-	-	-	-	-	-	3800	-
	6-9000	0648-765	36°	0702-675	76	0702-712	63/34	0702-688	57	57/63	0627-036	3800	78-8000
	9-Over	-	-	-	-	-	-	-	-	-	-	4000	-
M7 EFI (LE)*	0-3000	0648-764	44°/40°	-	-	-	-	-	-	-	-	3600	78-8000
	3-6000	-	-	-	-	-	-	-	-	-	-	3800	-
	6-9000	0648-765	36°	0702-675	76	0702-712	63/34	0702-688	57	57/63	0627-036	3800	78-8000
	9-Over	-	-	-	-	-	-	-	-	-	-	4000	-
ZR 900 EFI	0-5000	0748-648	50°/38°	0702-645	76	0702-703	54/34	0702-697	66	66/54	0627-045	3500	73-7500
	5-9000	0748-628	50°/36°	-	-	-	-	-	-	-	-	-	-
	9-Over	-	-	-	-	-	-	-	-	-	-	3800	-
ZR 900 EFI Sno Pro	0-5000	0748-648	50°/38°	0702-645	76	0702-703	54/34	0702-697	66	66/54	0627-045	3500	73-7500
	5-9000	0748-628	50°/36°	-	-	-	-	-	-	-	-	-	-
	9-Over	-	-	-	-	-	-	-	-	-	-	3800	-

* Initially set up at the factory for operation between 6000-9000 feet.

Drive System Components

Below is a list of Arctic Drive Clutch and Driven Pulley components that are available through the Arctic Cat Service Parts Department. Hopefully, this information will be useful when doing any fine-tuning on the drive system. Now there is virtually a cam arm weight for all needs.

SPRINGS - ARCTIC DRIVEN		
p/n	Color	Rate @ 1 7/16 in.
0748-025	Green	157 lb
0648-732**	Green	280 lb
0648-693**	White	260 lb
0648-718**	White	260 lb
0648-674*	Red/White	105 lb
0148-227	Yellow	92 lb
0648-012	Blue	79 lb
0648-010	White	58 lb
0148-176	Black	42 lb
0648-702	Red/Black	**

* Titanium ** ACT Driven @1 5/8 in.

ARCTIC CAT DRIVE CLUTCH SPRING CHART				
	p/n	Rate @ 2 9/16 in.	Rate @ 1 5/16 in.	Color
LIGHT	0646-148	53 lb	224 lb	Red/Blue
	0646-150	72 lb	188 lb	Silver
	0646-149	74 lb	228 lb	Red
	0646-376	75 lb	275 lb	Gold
	0646-147	114 lb	267 lb	Yellow/Green
	0646-373*	114 lb	267 lb	Yellow/Green
	0646-155	121 lb	240 lb	Purple
	0646-229	122 lb	285 lb	Yellow/White
	0646-248	143 lb	290 lb	Orange/White
	0646-684	158 lb	290 lb	Black

* Titanium

■ **NOTE: The Arctic Cat drive clutch spring has a smaller O.D. than the Comet and cannot be interchanged.**

DRIVEN CAMS (Torque Brackets)			
p/n	Degree	p/n	Degree
0148-180	45	0648-681	62/50
0148-222	51	0648-682	58/52
0648-001	52/44	0648-683	58/50
0648-002	53	0648-694**	50/36
0648-005	55	0648-696	66/50/0.27 66/52/0.27
0648-006	57	0648-719	68/42/0.34 68/44/0.32
0648-011	48/44	0648-727**	50/38
0648-014	49	0648-729**	48/42
0648-016	57/50	0648-730**	44/40
0648-026	42	0648-731**	46/40
0648-025	47	0648-733**	46/38
0648-024	55/53	0648-764**	44/40
0648-107*	57/50	0648-765**	36
0648-125	51/49	0748-622***	36
0648-126	53/51	0748-628***	50/36
0648-448**	36	0748-636***	44/40
0648-655	70/35	0748-637***	48/42
0648-656	62/54	0748-648***	50/38
0648-679	50/36	0748-653***	42/36

* Base is 0.100 thicker than that of p/n 0648-016.
**ACT Driven (10.0 in.)
***ACT Driven (10.4 in.)

ARCTIC CAT DRIVE CLUTCH CAM ARMS			
p/n	Grams	p/n	Grams
0746-500	54.0	0746-606	48.4
0746-501	48.5	0746-607	46.0
0746-502	44.5	0746-608	47.5
0746-503	41.0	0746-609	52.0
0746-523	47.0	0746-610	50.0
0746-524	48.5	0746-611	47.0
0746-525	44.0	0746-612	46.65
0746-526	42.0	0746-614	64.0
0746-527	50.5	0746-615	62.0
0746-528	46.5*	0746-616	66.0
0746-529	49.5*	0746-617	60.0
0746-530	53.5*	0746-618	51.5
0746-531	44.5	0746-619	47.0
0746-532	44.0*	0746-620	60.0
0746-533	47.5*	0746-627	84.8**
0746-534	51.5*	0746-629	75.0**
0746-535	52.5	0746-633	68.0
0746-536	45.0*	0746-634	70.5
0746-537	39.5*	0746-635	58.0
0746-538	49.5	0746-636	63.0
0746-539	53.0	0746-638	47.5
0746-540	46.5	0746-640	71.5
0746-546	48.0	0746-642	50.5
0746-547	50.0	0746-645	52.0
0746-549	46.0	0746-646	57.0
0746-559	55.5	0746-647	49.0
0746-560	55.0	0746-650	67.0
0746-561	50.0	0746-653	63.5
0746-562	42.0	0746-655	56.5
0746-563	44.5	0746-658	49.0
0746-564	45.5	0746-661	52.0**
0746-565	43.5	0746-662	52.0**
0746-566	48.0	0746-663	52.0**
0746-568	50.0	0746-666	55.0**
0746-569	48.5	0746-669	60.0**
0746-570	47.0	0746-670	65.0**
0746-574	48.5	0746-671	70.0**
0746-576	46.0	0746-672	75.0
0746-577	42.0	0746-673	80.0**
0746-578	51.5	0746-676	70.0**
0746-579	46.5	0746-687	57.0**
0746-580	47.0	0746-689	69.0**
0746-581	52.5	0746-690	47.0**
0746-582	48.5	0746-691	44.0**
0746-583	46.5	0746-692	50.0**
0746-584	45.0	0746-694	63.0**
0746-585	49.0	0746-695	67.0**
0746-586	45.0*	0746-699	66.0**
0746-587	50.0	0746-701	49.0**
0746-588	54.5	0746-702	58.0**
0746-589	45.0	0746-703	68.0**
0746-590	40.5*	0746-704	51.0**
0746-591	44.0	0746-708	51.0**
0746-592	52.0	0746-710	72.0**
0746-593	45.5	0746-713	48.0**
0746-594	44.5	0746-715	77.0**
0746-595	41.5	0746-716	73.0**
0746-596	44.5	0746-742	83.5**
0746-597	43.5	0746-744	50.0**
0746-598	44.0	0746-748	46.0**
0746-600	50.0	0746-749	65.0**
0746-602	42.5	0746-771	44.0**
0746-604	41.5	0746-772	42.0**
0746-605	52.0		

* Notched Cam Arm **w/Set Screw

Chain Case Performance Calibrations

(8-Tooth Drive Sprockets)

CHAIN CASE PERFORMANCE SPECIFICATIONS*			RPM (Engine)				
SPROCKETS	RATIO	CHAIN PITCH	7400	7800	8000	8200	8700
18/44	0.409	72	76.3	80.4	82.5	84.5	86.6
19/44	0.432	74	80.5	84.9	87.1	89.2	91.4
19/43	0.442	72	82.4	86.9	89.1	91.3	93.5
20/44	0.455	74	84.8	89.3	91.6	93.9	96.2
19/41	0.463	72	86.4	91.1	93.4	95.8	98.1
20/40	0.500	72	93.2	98.3	100.8	103.3	105.8
22/42	0.524	74	97.7	103.0	105.6	108.2	110.9
22/41	0.537	74	100.1	105.5	108.2	110.9	113.6
21/39	0.538	72	100.4	105.8	108.6	111.3	114.0
23/40	0.575	72	107.2	113.0	115.9	118.8	121.7
24/40	0.600	74	111.9	117.9	121.0	124.0	127.0
19/40	0.475	70	88.6	93.4	95.8	98.2	100.5

* USE AS A GUIDE ONLY

RPM x Ratio x 0.225 x 1.12 = MPH

(9-Tooth Drive Sprockets)

CHAIN CASE PERFORMANCE SPECIFICATIONS*			RPM (Engine)				
Sprockets	Ratio	Chain Pitch	6000	7000	8000	9000	10,000
24/35	0.686	70	98.2	114.6	130.9	147.3	163.7
22/33	0.667	68	95.5	111.4	127.3	143.2	159.1
21/33	0.636	68	91.0	106.2	121.4	136.6	151.7
24/39	0.615	72	88.0	102.7	117.4	132.0	146.7
22/37	0.595	70	85.2	99.4	113.6	127.7	141.9
20/35	0.571	68	81.7	95.4	109.0	122.6	136.2
21/37	0.568	70	81.3	94.9	108.4	122.0	135.5
19/35	0.543	68	77.7	90.7	103.6	116.6	129.5
20/39	0.513	70	73.4	85.7	97.9	110.1	122.4
21/41	0.512	72	73.3	85.5	97.7	109.9	122.1
20/41	0.488	72	69.9	81.5	93.1	104.8	116.4
18/37	0.486	68	69.6	81.2	92.8	104.3	115.9
16/33	0.484	66	69.3	80.8	92.4	103.9	115.5
19/41	0.463	72	66.3	77.3	88.4	99.4	110.5
18/39	0.461	70	66.0	77.0	88.0	99.0	110.0
17/37	0.459	68	65.7	76.6	87.6	98.5	109.5
19/59	0.487	74	69.7	81.3	92.9	104.6	116.2
19/40	0.475	70	68.0	79.3	90.7	102.0	113.3
22/40	0.550	72	78.7	91.8	105.0	118.1	131.2
22/41	0.536	74	76.7	89.5	102.3	115.1	127.9
23/40	0.575	72	82.3	96.0	109.7	123.5	137.2
23/44	0.522	74	74.7	87.2	99.6	112.1	124.5
26/41	0.634	74	90.7	105.9	121.0	136.1	151.2

* USE AS A GUIDE ONLY

RPM x Ratio x 0.213 x 1.12 = MPH

Chain Case Performance Calibrations

(10-Tooth Drive Sprockets)

CHAIN CASE PERFORMANCE SPECIFICATIONS*			RPM (Engine)					
Sprockets	**Ratio**	**Chain Pitch**	**7400**	**7800**	**8000**	**8200**	**8400**	**8700**
18/44	0.409	72	80.3	84.6	86.8	89.0	91.1	94.4
19/44	0.432	74	84.7	89.3	91.6	93.9	96.2	99.6
19/43	0.442	72	86.7	91.4	93.8	96.1	98.4	102.0
20/44	0.455	74	89.2	94.0	96.4	98.9	101.3	104.9
19/41	0.463	72	90.9	95.9	98.3	100.8	103.2	106.9
20/40	0.500	72	98.1	103.4	106.1	108.7	111.4	115.4
22/42	0.524	74	102.8	108.4	111.1	113.9	116.7	120.9
22/41	0.537	74	105.3	111.0	113.8	116.7	119.5	123.8
21/39	0.538	72	105.7	111.4	114.2	117.1	120.0	124.2
23/40	0.575	72	112.8	118.9	122.0	125.0	128.1	132.7
24/40	0.600	74	117.8	124.1	127.3	130.5	133.7	138.4
19/40	0.475	70	93.2	98.3	100.8	103.3	105.8	109.6

* USE AS A GUIDE ONLY

RPM x Ratio x 0.02368 x 1.12 = MPH

Gear Case Performance Calibrations

(ACT Drive - Crossfire/Firecat/ M-Series)

Drive Sprocket	Gear Ratio		Engine RPM 6200	6400	6600	6800	7000	7200	7400	7600
			Snowmobile Speed (mph)							
9 Tooth (2.52 in. pitch)	66	54	109	113	116	120	123	127	130	134
	63	57	99	102	105	108	111	115	118	121
	60	60	89	92	95	98	101	104	107	109
	57	63	81	83	86	89	91	94	96	99
10 Tooth (2.52 in. pitch)	66	54	121	125	129	133	137	141	145	149
	63	57	110	113	117	120	124	127	131	134
	60	60	99	102	106	109	112	115	118	122
	57	63	90	93	96	98	101	104	107	110
8 Tooth (3.0 in. pitch)	66	54	116	119	123	127	130	134	138	142
	63	57	104	108	111	115	118	121	125	128
	60	60	95	98	101	104	107	110	113	116
	57	63	86	88	91	94	97	99	102	105

Drive Sprocket	Gear Ratio		Engine RPM 7800	8000	8200	8400	8600	8800	9000
			Snowmobile Speed (mph)						
9 Tooth (2.52 in. pitch)	66	54	137	141	144	148	151	155	158
	63	57	124	127	131	134	137	140	143
	60	60	112	115	118	121	124	127	130
	57	63	102	104	107	109	112	115	117
10 Tooth (2.52 in. pitch)	66	54	153	156	160	164	168	172	176
	63	57	138	142	145	149	152	156	159
	60	60	125	128	131	134	138	141	144
	57	63	113	116	119	122	125	127	130
8 Tooth (3.0 in. pitch)	66	54	145	149	153	156	160	164	168
	63	57	131	135	138	142	145	148	152
	60	60	119	122	125	128	131	134	137
	57	63	108	110	113	116	119	121	124

CHAINS & SPROCKETS

For reference, all spockets and chains available from Arctic Cat are listed below.

■ **NOTE: Added to the list are wide 15 link chains with corresponding wide sprockets. These chains and sprockets are 3 mm (1/8 in.) wider than the 13 link chains and corresponding sprockets and approximately 25% stronger.**

UPPER SPROCKET (w/11 Link Chain)	
NUMBER OF TEETH	**P/N**
15	0107-217
16	0107-340
17	0107-218
18	0107-341
19	0107-219
20	0107-409
21	0107-408
22	0107-301
23	0602-363
24	0107-508

LOWER SPROCKET (w/11 Link Chain)	
NUMBER OF TEETH	**P/N**
33	0107-513
35	0107-325
35*	0702-074
37	0107-407
39	0107-220
39*	0702-072
40	0107-903
41	0107-369

STANDARD CHAIN (11 Link)	
PITCH	**P/N**
64	0107-322
66	0107-358
68	0107-215
70	0107-216
70*	0602-371
72	0107-372

* Reverse and 2-Speed Sprocket

WIDE CHAIN (13 Link)	
PITCH	**P/N**
68	0602-495
70	1602-041
72	1602-042

WIDE CHAIN (15 Link)	
68	1602-036
70	0602-968
72	0602-972
74	1602-037
70**	1602-578
72**	1602-579
74**	1602-550

WIDE SPROCKET (w/13 Link Chain) (UPPER)	
NUMBER OF TEETH	**P/N**
18	0602-445
18	1602-378 (cut steel)
19	0602-444
20	0602-456
21	0602-494
22	0602-455
23	0602-452
24	0602-446
19*	0602-470

WIDE SPROCKET (w/15 Link Chain) (UPPER)	
20	0602-967
18	0602-995
19	1602-383 (powder metal)
19	0602-973
23	1602-118
24	0602-974
26	1602-193
19**	1602-548 (2004)
20**	1602-600 (2004)
21**	1602-685 (2004)

WIDE SPROCKET (w/13 Link Chain) (LOWER)	
NUMBER OF TEETH	**P/N**
35	0602-457
39	0602-451
40	0602-453
39*	0702-170
39 (Light)	1602-087
40*	0702-393
41	1602-119
42	0602-909
43	1602-333 (cut steel)
43	1602-394 (powder metal)
44	0602-812
44*	0602-813
39****	1602-414 (2003)
40****	1602-415 (2003)
41****	1602-416 (2003)
42****	1602-417 (2003)
43****	1602-418 (2003)

WIDE SPROCKET (w/15 Link Chain) (LOWER)	
35*	0602-142
39*	0702-370
39	0602-975
40*	0702-394
44*	0702-383
35	1602-603
39	1602-604
40	1602-605
43***	1602-549 (2004)
44***	1602-688 (2004)
45***	1602-689 (2004)
46***	1602-690 (2004)

* Reverse and 2-Speed Sprocket
**These are Borg Warner chains and they must be used with Borg Warner sprockets only or damage to the chains or sprockets will result.
***These are Borg Warner sprockets and they must be used with Borg Warner sprockets (upper or lower) and chains or damage to the sprockets and chains will result. Sixteen-tooth inner spline with a 37.5° angle. Cannot be used on a 2003 Sno Pro.
****Borg Warner sprockets used in 2003. Fifteen-tooth inner spline with a 30° angle. Cannot be used on a 2004 Sno Pro.

Arctic Cat Drive Belt Dimension Chart

BELT P/N	LENGTH	WIDTH
0100-022	41 3/8 ± 3/64 inch	1 3/16 inch
0100-032	43 1/2 ± 3/64 inch	1 3/16 inch
0100-042	46 3/4 ± 3/64 inch	1 3/16 inch
0100-043	46 9/16 ± 3/64 inch	1 3/16 inch
0100-066	45 7/16 ± 3/64 inch	1 3/16 inch
0100-080	44 1/8 ± 3/8 inch	1 3/16 inch
0100-088	43 1/8 ± 3/16 inch	1 3/16 inch
0100-092	43 13/16 ± 3/16 inch	1 1/4 inch
0227-002	47 1/2 ± 3/16 inch	1 1/4 inch
0227-007	43 1/4 ± 3/16 inch	1 1/4 inch
0227-010	49 ± 3/16 inch	1 1/4 inch
0227-011	44 ± 3/16 inch	1 1/4 inch
0227-014	45 1/2 ± 3/16 inch	1 1/4 inch
0227-016	45 1/16 ± 3/16 inch	1 1/4 inch
0227-017	42 13/16 ± 3/16 inch	1 1/4 inch
0227-019	43 1/4 ± 3/16 inch	1 1/4 inch
0227-020	46 11/16 ± 3/16 inch	1 1/4 inch
0227-022	45 1/2 ± 3/16 inch	1 1/4 inch
0227-023	45 7/16 ± 1/8 inch	1 1/4 inch
0227-026	43 1/4 ± 3/16 inch	1 1/4 inch
0227-027	43 1/4 ± 3/16 inch	1 1/4 inch
0227-030	43 1/2 ± 3/16 inch	1 3/8 inch
0227-032	43 5/8 ± 3/16 inch	1 3/8 inch
0227-100	45 1/2 ± 3/16 inch	1 3/8 inch
0227-101	43 5/16 ± 3/16 inch	1 3/8 inch
0227-103	43 5/8 ± 3/16 inch	1 3/8 inch
*0627-001	43 5/8 ± 3/16 inch	1 3/8 inch
*0627-002	43 3/8 ± 3/16 inch	1 3/8 inch
*0627-004	43 5/16 ± 3/16 inch	1 3/8 inch
*0627-006	43 5/8 ± 3/16 inch	1 3/8 inch
*0627-008	45 3/4 ± 3/16 inch	1 3/8 inch
**0627-009	47 3/4 ± 3/16 inch	1 3/8 inch
***0627-010	47 3/4 ± 3/16 inch	1 3/8 inch
**0627-011	45 3/4 ± 3/16 inch	1 3/8 inch
**0627-012	47 3/4 ± 3/16 inch	1 3/8 inch
0627-013	49 ± 3/16 inch	1 7/16 inch
0627-014	49 ± 3/16 inch	1 7/16 inch
***0627-020	47 3/4 ± 3/16 inch	1 13/32 inch
**0627-021	47 3/4 ± 3/16 inch	1 13/32 inch
***0627-031	47 3/4 ± 3/16 inch	1 13/32 inch
***0627-032	44 9/16 ± 3/16 inch	1 15/32 inch
***0627-033	50 5/16 ± 3/16 inch	1 7/16 inch
***0627-034	44 ± 3/16 inch	1 13/32 inch
0627-035	47 3/4 ± 3/16 inch	1 13/32 inch
***0627-036	45 ± 3/16 inch	1 7/16 inch
0627-044	44 11/16 ± 3/16 inch	1 15/32 inch
0627-045	45 7/32 ± 3/16 inch	1 15/32 inch
0627-048	47 ± 3/16 inch	1 15/32 inch
0627-049	48 5/32 ± 3/16 inch	1 15/32 inch

* High Performance Belt

** Double-Cog High Performance Belt

*** Double-Cog High Performance Belt w/Hard Compound

■ **NOTE: The difference between Drive Belt (p/n 0627-010) and Drive Belt (p/n 0627-020) is width. If one of these belts is substituted for the other, the driven pulley will need a shim added or a shim removed to obtain correct belt deflection. Both of these belts are constructed of "hard compound" and should be used only when recommended. If these belts are used when a softer compound belt is recommended (such as a p/n 0627-012 or 0627-021), the engine will run at a higher RPM.**

Arctic Cat Drive Belt Replacement Chart

1997

Puma, Puma Deluxe, Puma 2-Up	0627-012
Jag, Jag Deluxe	0627-012
Panther, Panther L/C	0627-012
Z440, ZL440	0627-012
Bearcat 340	0627-013
Bearcat 440 & 550	0627-014
Cougar, Cougar M/C	0627-012
Pantera	0627-012
EXT EFI Models	0627-012
Powder Special EFI	0627-012
Thundercat, ZRT 800, ZRT 600	0627-010
ZR 580, ZR440	0627-010
EXT 600, Powder Extreme	0627-010
Powder 580 Carb	0627-010

1998

Jag 340, Panther 340	0627-012
Jag 440, Jag 440 DLX	0627-012
Z 440, Panther 440	0627-012
Panther 550	0627-021
Bearcat 340	0627-013
Bearcat 440, Bearcat Wide Track	0627-014
Cougar, Cougar DLX, Cougar M/C	0627-021
Pantera 580	0627-021
Pantera 800	0627-020
EXT EFI	0627-020
EXT EFI DLX	0627-021
EXT 600, EXT 600 Touring	0627-020
Powder Special, Powder Special EFI	0627-020
Powder Extreme	0627-020
Thundercat, Thundercat M/C	0627-020
ZRT 600, ZRT 800	0627-020
ZR 600, ZR 600 EFI	0627-020
ZL 440	0627-021
ZL 500, ZR 500	0627-020
ZR 440	0627-020

1999

Jag 340 DLX, Panther 340	0627-012
Jag 440, Jag 440 DLX	0627-012
Panther 440	0627-012
Panther 550	0627-021
Bearcat 340, Bearcat 440 I	0627-013
Bearcat 440 II, Bearcat Wide Track	0627-014
Pantera 580 EFI	0627-021
Pantera 800	0627-020
Triple Touring 600	0627-020
Powder Special 500 EFI	0627-020
Powder Special 600 Models	0627-020
Powder Special 700	0627-020
Thundercat, Thundercat M/C	0627-020
Z 370	0627-021
Z 440	0627-021
ZL 440	0627-021
ZL 500 Models, ZL 600 Models	0627-020
ZR 500 Models	0627-020
ZR 600 Models	0627-020
ZR 700	0627-020
ZRT 600, ZRT 800	0627-020

2000

Bearcat 340	0627-013
Bearcat 440 I/440 II/Wide Track	0627-014
Pantera Models	0627-020
Panther 340/440	0627-012
Panther 550	0627-021
Powder Special Models	0627-020
Thundercat Models	0627-020
Triple Touring 600	0627-020
Z Models	0627-021
ZL 440/550	0627-021
ZL 500/580/600/700	0627-020
ZR Models	0627-020
ZRT Models	0627-020

2001

Bearcat W/T	0627-014
Mountain Cat Models	0627-020
Pantera Models	0627-020
Panther 370 Models	0627-013
Panther 440 Models	0627-012
Panther 550	0627-021
Thundercat	0627-020
Triple Touring 600	0627-020
Z Models	0627-021
ZL Models	0627-020
ZR Models	0627-020
ZRT Models	0627-020

2002

Bearcat W/T	0627-014
Mountain Cat Models	0627-020
Pantera 550	0627-021
Pantera Models (EFI)	0627-020
Panther Models	0627-021
Thundercat	0627-020
Z Models	0627-021
ZL Models	0627-020
ZR Models	0627-020
ZRT 600	0627-020

2003

Firecat Models	0627-020
Mountain Cat Models	0627-020
Pantera 550	0627-021
Pantera Models (EFI)	0627-020
Panther Models	0627-021
Z Models	0627-021
ZL Models	0627-020
ZR Models	0627-020

2004

Bearcat 570	0627-013
Firecat 500 Models	0627-020
Firecat 600/700 Models	0627-031
King Cat	0627-020
Mountain Cat Models	0627-020
Pantera 550	0627-021
Pantera Models (EFI)	0627-020
Panther Models	0627-021
Sabercat 500	0627-020
Sabercat 600/700 Models	0627-031
Z Models	0627-021

2005

Bearcat 570	0627-013
Firecat 500 Models	0627-034
Firecat 600/700 Models	0627-034
King Cat	0627-020
M-Series	0627-036
Pantera 550	0627-021
Pantera 600 EFI	0627-020
Panther Models	0627-021
Sabercat 500	0627-020
Sabercat 600/700 Models	0627-035
Z Models	0627-021
ZR 900 Models	0627-032

2006

Bearcat 570	0627-013
Crossfire Models	0627-036
Firecat 500 Models	0627-044
Firecat 600 EFI r	0627-020
Firecat 600/700 Models w/o Reverse	0627-044
Firecat 700 EFI r	0627-035
King Cat Models	0627-020
M-Series Models	0627-036
Panther 370/570 Models	0627-021
Sabercat 500/600 Models	0627-020
Sabercat 700 Models	0627-035
Z Models	0627-021
ZR 900 EFI Models	0627-045

Center-to-Center/Offset Specifications

YEAR	MODELS	CENTER-TO-CENTER		OFFSET		YEAR	MODELS	CENTER-TO-CENTER		OFFSET	
		cm	in.	mm	in.			cm	in.	mm	in.
1997	Puma Models, Jag Models, Panther Models, Z440	30.9	12.200	34.67	1.365	2000	Bearcat Models	30.9	12.200	34.72	1.367
							All Remaining Models	30.9	12.200	34.67	1.365
	Cougar, Pantera, All EXT, Models, ZR440, Thundercat, ZRT600, ZRT800, ZL440	30.9	12.200	34.67	1.365	2000	Bearcat Models	30.9	12.200	34.72	1.367
							All Remaining Models	30.9	12.200	34.67	1.365
	Bearcat Models	30.9	12.200	34.72	1.367	2002	Bearcat W/T	30.9	12.200	34.72	1.367
							All Remaining Models	30.9	12.200	34.67	1.365
	Powder Special, Powder Extreme, Powder EFI	30.9	12.200	34.67	1.365	2003	All Models	30.9	12.200	34.67	1.365
	ZR580EFI	30.9	12.200	11.53	0.454	2004	All 2-Stroke Models (except ZR 900 Models)	30.9	12.200	34.67	1.365
	Jag Models, Panther Models,, Z 440, Cougar Models, Pantera Models, EXT Models, Powder Special					2005	Standard-Drive Models	30.9	12.200	34.67	1.365
							ACT-Drive Firecat Models	27.9	11.000	17.98	0.708
1998	Models, Powder Extreme, Thundercat Models, ZRT600, ZRT800, ZR600, ZL440, ZL500, ZR500, ZR440	30.9	12.200	34.67	1.365		ACT-Drive M-Series Models	29.2	11.500	17.98	0.708
							ACT-Drive ZR 900 Models	28.6	11.273	17.98	0.708
	Bearcat Models	30.9	12.200	34.72	1.367	2006	Standard-Drive Models	30.9	12.200	34.67	1.365
							ACT-Drive Firecat Models	27.9	11.000	17.98	0.708
	Jag Models, Panther Models, Z Models, Pantera Models, Triple						ACT-Drive Crossfire/M-Series Models	29.2	11.500	17.98	0.708
1999	Touring 600, Powder Special Models, Thundercat Models, ZL Models, ZR Models, ZRT Models	30.9	12.200	34.67	1.365						
							ACT-Drive ZR 900 EFI Models	28.6	11.273	17.98	0.708
	Bearcat Models	30.9	12.200	34.72	1.367						

Drive Train and Brake Systems

This section has been organized into sub-sections for servicing drive train and brake systems; however, some components may vary from model to model. The technician should use discretion and sound judgment when removing and installing components.

■ **NOTE: Some illustrations and photographs used in this section are used for clarity purposes only and are not designed to depict actual conditions.**

■ **NOTE: Critical torque specifications are located on page 144 of this section.**

Drive Belt

The belt dimensions and construction are two factors that influence the performance of the drive system. The two belt dimensions that are important to the performance of the snowmobile are the outside circumference and the width. Both of these dimensions will influence shifting characteristics.

If the drive belt is longer than specified, the drive clutch and driven pulley will not have the full shift ratio. Also, a too-long drive belt will cause poor acceleration and a decrease in top speed.

If the drive belt is shorter than specified, the drive clutch and driven pulley will have a different shift pattern because they are in different ratios from those for which they were originally matched. A too-short drive belt will cause a loss in performance and a bog on engagement.

■ **NOTE: A drive belt that is worn thin may produce the same effect as one that is too long.**

Drive belt construction has an influence on the way the drive clutch and driven pulley will shift and on the amount of power that will be transmitted through the system. ONLY ARCTIC CAT DRIVE BELTS SHOULD BE USED. Different brands of belts may not have the same construction causing either more friction or more slippage when the belt is wedged between the sheaves and, thus, a loss of efficiency.

■ **NOTE: A stiff belt causes a HP loss to the track. As a belt warms up, it gets more flexible and transmits power with less HP loss.**

Drive Clutch

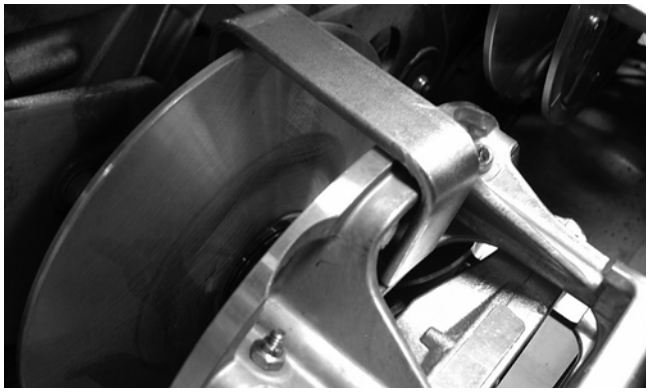
CHANGING CAM ARMS

The cam arms on the drive clutch can be changed without disassembling the clutch. To change the cam arms, use the following procedure.

1. Check to make sure the ignition switch is in the OFF position.
2. Remove the drive belt.
3. Using Clutch Compressor (p/n 0644-420), compress the movable sheave inward; then insert the compressor clamp and slowly release the compressor locking the movable sheave.

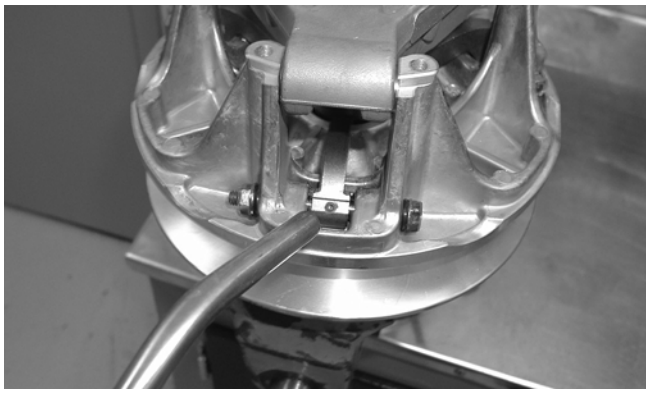


FC260



FC261

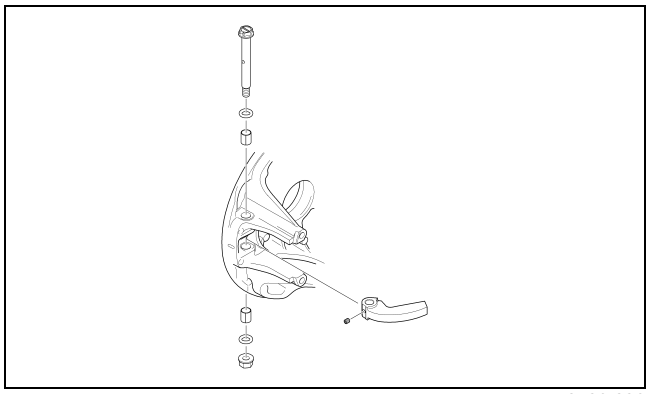
4. Remove the lock nuts from the three cam arm pins.
5. Using a small torch, apply heat to the cam arm set screws to loosen the Loctite used in assembly.



FS001

■ **NOTE: Heat must be applied to the cam arms in order to remove the set screws.**

6. After the lock nuts and set screws have been removed, remove the cam arm pins one at a time noting the position of the alignment notches for assembling purposes. Account for the O-rings.



0739-038

7. Change the cam arms with existing pins making sure the head of each pin is positioned toward the direction of drive clutch rotation.

■ **NOTE: The drive clutch rotates counterclockwise.**

8. With the cam arm pin alignment notch properly positioned to the cam arm set screw, install the new cam arm set screws (pre-coated with Loctite) and tighten securely.

9. Secure the cam arm pins with new lock nuts and tighten to specifications.

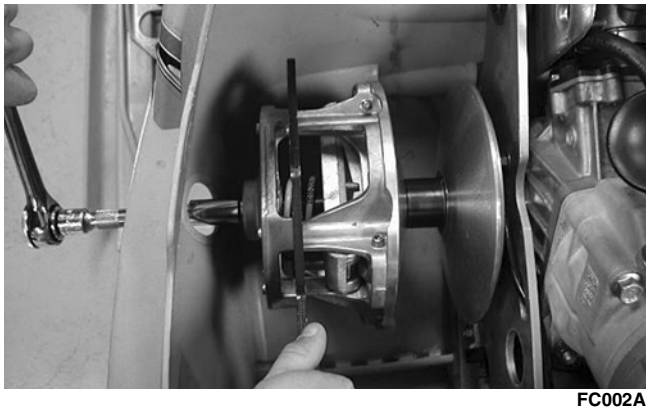
⚠ CAUTION

When installing cam arms, always use new lock nuts and cam arm set screws.

REMOVING

1. Open the belt guard; then remove the drive belt and the plug from the belly pan.

2. Remove the bolt and lock washer securing the drive clutch to the crankshaft.



FC002A

3. Using Clutch Compressor (p/n 0644-420), compress the movable sheave inward; then insert the compressor clamp and slowly release the compressor locking the movable sheave.



FC260



FC261

■ **NOTE: Before installing the clutch puller, apply oil to the threads of the puller and a small amount of grease to the tip of the puller.**

4. Using the Clutch Puller (p/n 0644-207) and an impact wrench or a breaker bar and the Drive Clutch Spanner Wrench (p/n 0644-136), tighten the puller. If the drive clutch will not release, sharply strike the head of the puller. Repeat this step until the clutch releases.



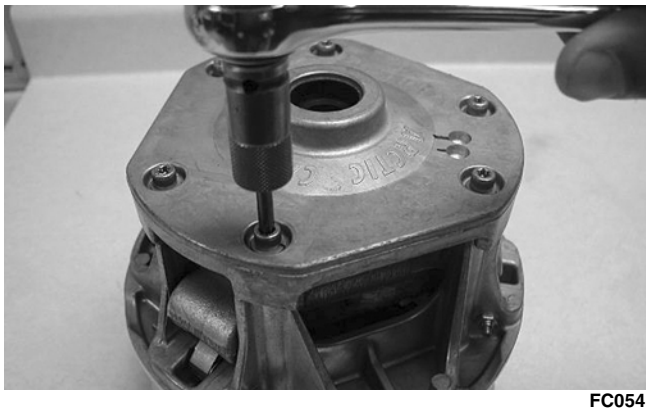
FC002

5. Remove the drive clutch from the engine compartment. Account for any spacers.

DISASSEMBLING

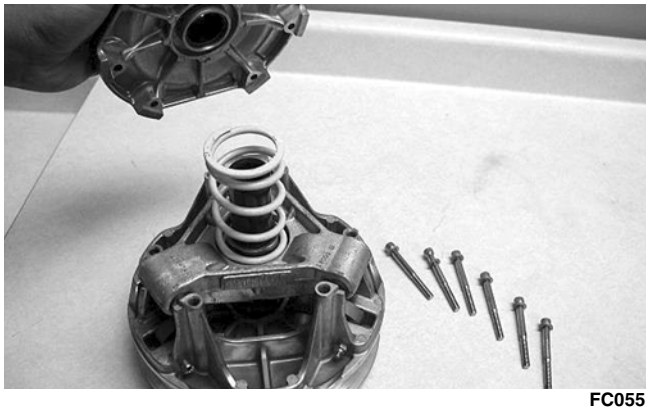
■ **NOTE: Note the timing marks on the cover, spider, and movable sheave. These must be aligned when assembling the drive clutch for balance purposes.**

1. Loosen the machine screws securing the cover. Remove every other cap screw and lock washer from the cover; then while firmly holding the cover, remove the remaining screws and lock washers equally.



FC054

2. Remove the cover and spring.

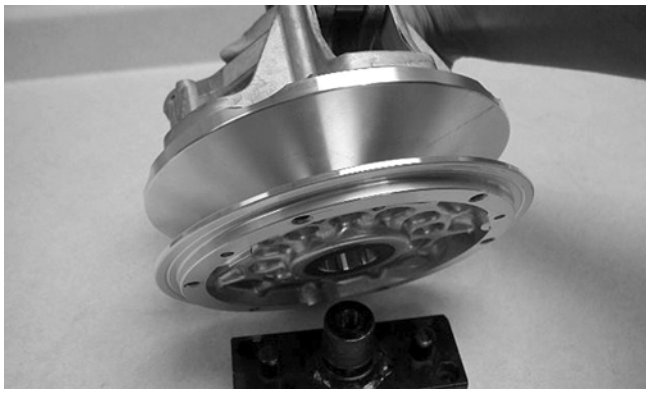


FC055

3. Position the drive clutch over the Clutch Holder (p/n 0744-035) for 30 mm crankshaft or (p/n 0644-380) for 33 mm crankshaft.

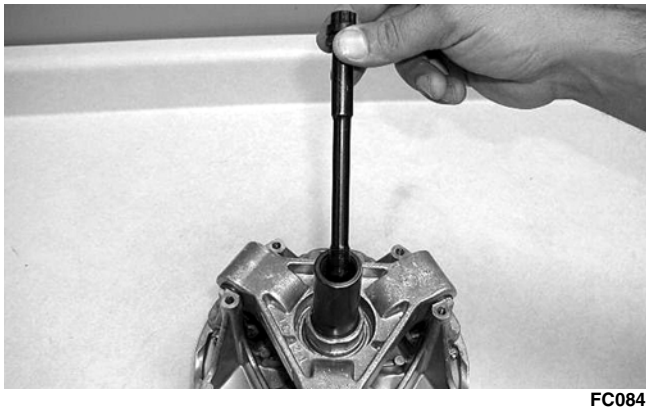
■ **NOTE: The clutch holders are from Spider Removal Kit (p/n 0644-449).**

■ **NOTE: The holder should either be secured in a vise or bolted to a sturdy work bench.**



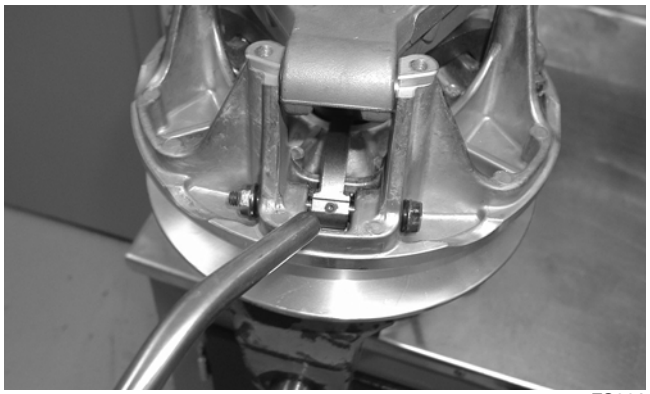
FC083

4. Secure the drive clutch to the holder using the clutch bolt and lock washer.



FC084

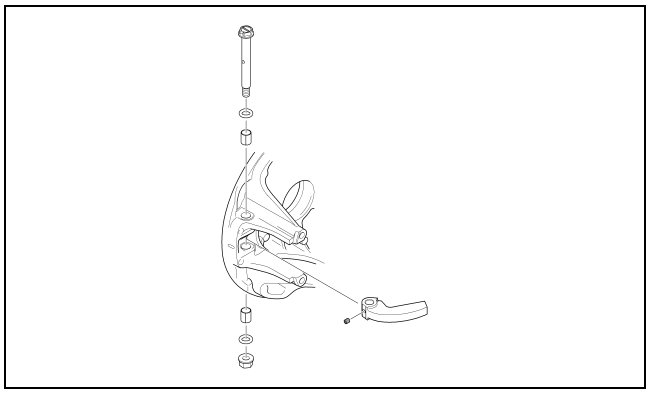
5. Remove the cam arm pin lock nuts; then using a small torch, apply heat to the cam arm set screws to loosen the Loctite used in assembly.



FS001

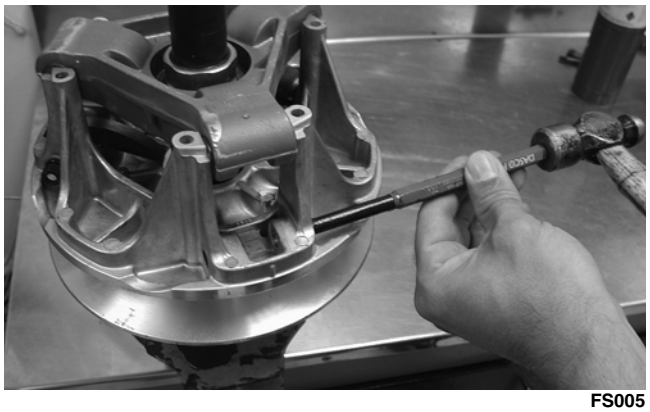
■ **NOTE: Heat must be applied to the cam arm in order to remove the set screws.**

6. After the lock nuts and set screws have been removed, remove the cam arm pins one at a time noting the position of the alignment notches for assembly purposes. Account for the O-rings.



0739-038

7. Using a suitable driving tool, remove the cam arm pin bushings from the movable sheave.



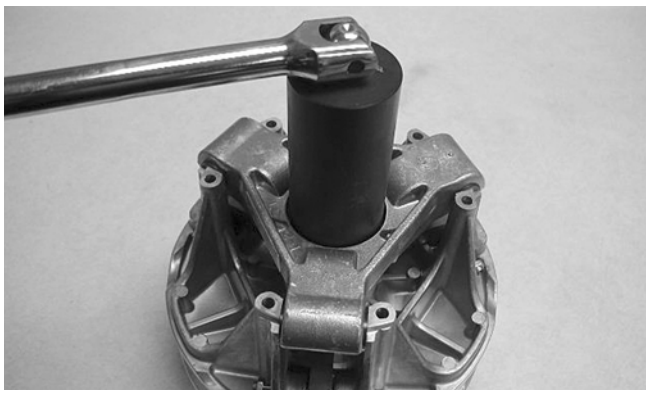
FS005

⚠ CAUTION

Care must be taken not to damage the inner bore of the movable sheave.

8. Using the Thin Wall Deep Socket (p/n 0644-138), remove the spider retainer nut.

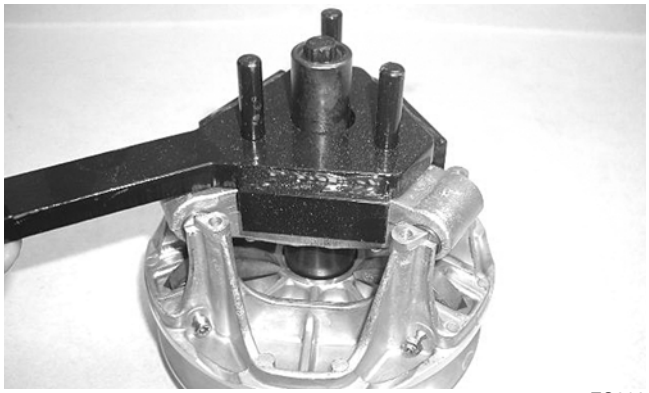
■ NOTE: The deep socket is from Spider Removal Kit (p/n 0644-449).



FC085

9. Using a small torch, heat the threaded area of the spider. Place the Spider Removal Tool (p/n 0744-036) over the heated spider and break spider loose by turning it counterclockwise.

■ NOTE: The removal tool is from Spider Removal Kit (p/n 0644-449).



FC086

■ NOTE: Applying heat to the spider threaded area will aid in clutch disassembly. The heat will loosen the Loctite used during assembly.

10. Remove the drive clutch from the clutch holder using the clutch puller and the same procedure as pulling the drive clutch from the crankshaft.

11. Remove the spider assembly, spacer washers, and movable sheave.



MS405

■ NOTE: The spider is a non-serviceable component and must be replaced with a new one.

CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Using parts-cleaning solvent, wash grease, dirt, and foreign matter off all components; dry with compressed air.

2. Remove any drive belt dust accumulation from the stationary sheave, movable sheave, and bushings using parts-cleaning solvent only.

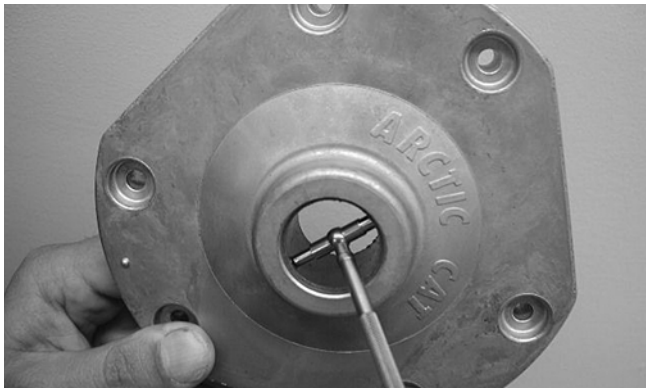
⚠ CAUTION

Do not use steel wool or a wire brush to clean components having a bushing; damage to the bushing will result.

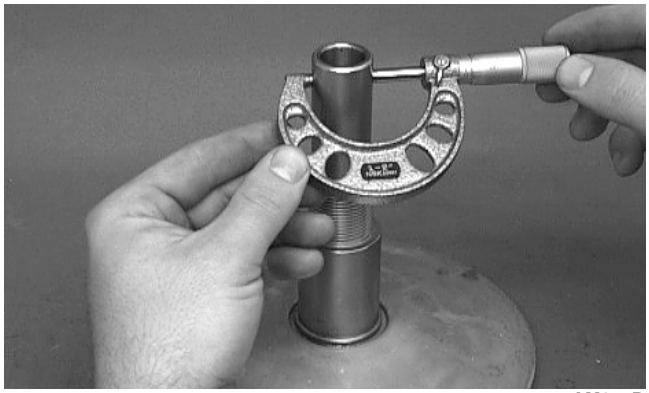
3. Inspect stationary sheave, movable sheave, and cover for cracks or imperfections in the casting.

4. Inspect the cam arm pins for wear or bends.

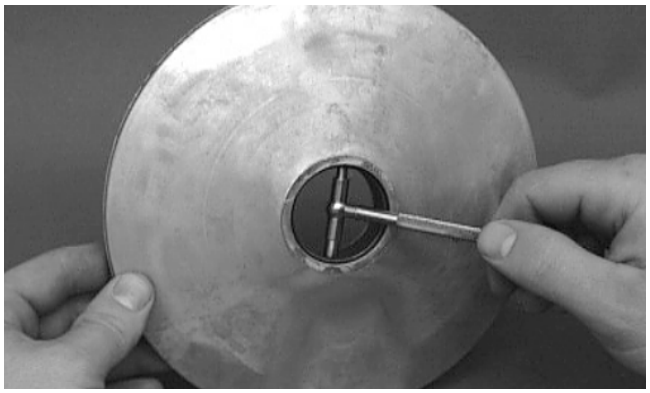
5. Inspect the bushing in the cover for wear, damage, or cracks. Measure the inside diameter of the bushing and the outside diameter of the stationary sheave hub. The difference (clearance) must be less than 0.20 mm (0.008 in.). If cover bushing is not within specifications, replace the cover.

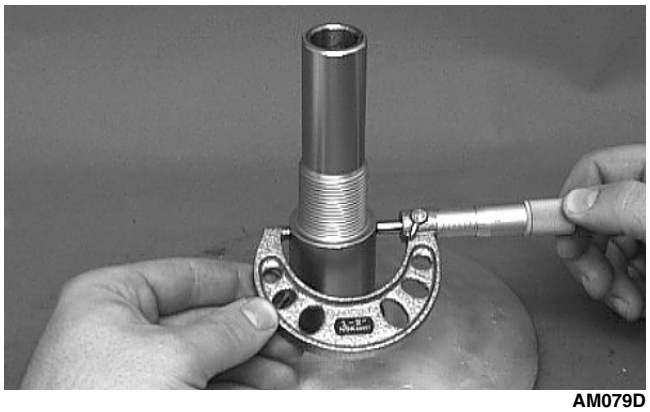


FC087


AM077D

6. Inspect the bushing in the movable sheave for wear, damage, or cracks. Measure the inside diameter of the bushing and the outside diameter of the stationary sheave hub. The difference (clearance) must be less than 0.20 mm (0.008 in.). If movable sheave bushing is not within specifications, replace the movable sheave.


AM023D

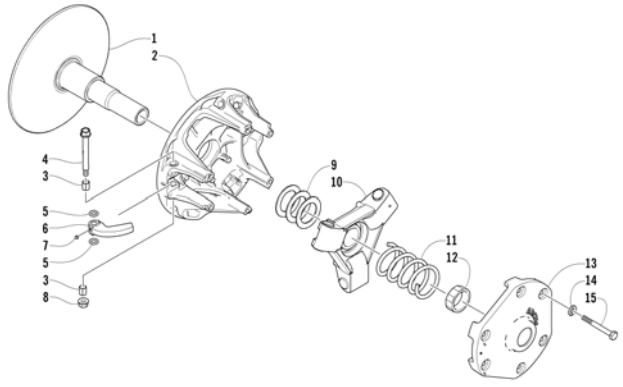

AM079D

7. Inspect the spring for proper compression rate qualities (see Drive System Components page).

8. Inspect all threaded areas for any cracked or stripped threads.

9. Inspect the stationary sheave and shaft for damage or wear.

ASSEMBLING



KEY

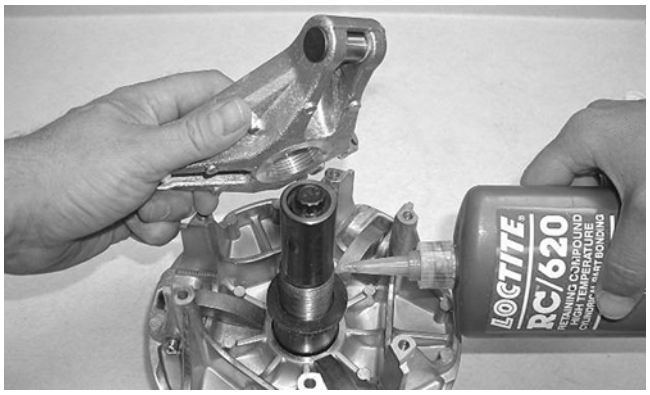
1. Stationary Sheave
2. Movable Sheave
3. Bearing
4. Pin
5. O-Ring
6. Cam Arm
7. Set Screw
8. Lock Nut
9. Spacer Washer
10. Spider Assy
11. Spring
12. Nut
13. Cover
14. Lock Washer
15. Machine Screw

0738-469

⚠ WARNING

Do not reuse a spider assembly that has been removed. Always replace a used spider assembly with a new one.

1. Apply green Loctite #620 to the entire threaded area of the shaft.



FC088

■ NOTE: Make sure all threads are clean and free of oily residue.

2. Align the spider assembly and movable sheave timing marks; then place the movable sheave, spacer washers, and spider into position on the stationary sheave hub.



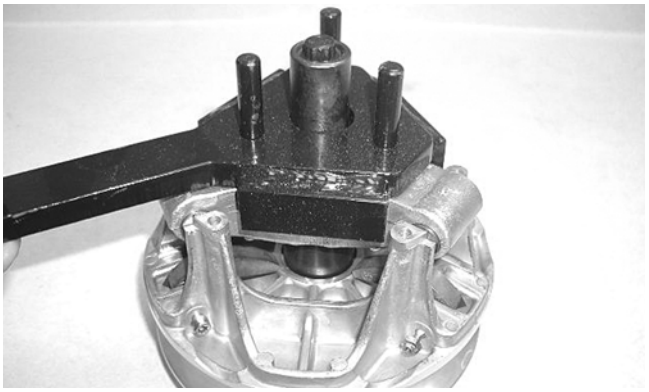
MS406A

⚠ CAUTION

Failure to align the spider and movable sheave timing marks will cause drive clutch to be out of balance resulting in clutch and crankshaft damage.

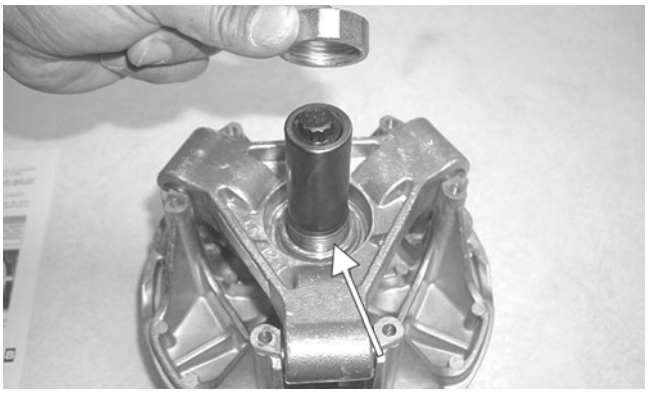
3. Thread the spider onto the shaft. Tighten the spider using the spider removal tool to specifications.

■ NOTE: Allow the Loctite to cure at room temperature for 24 hours.



FC086

4. Apply green Loctite #620 to the threads of the stationary shaft above the spider. Install the spider retainer nut and tighten to specifications.

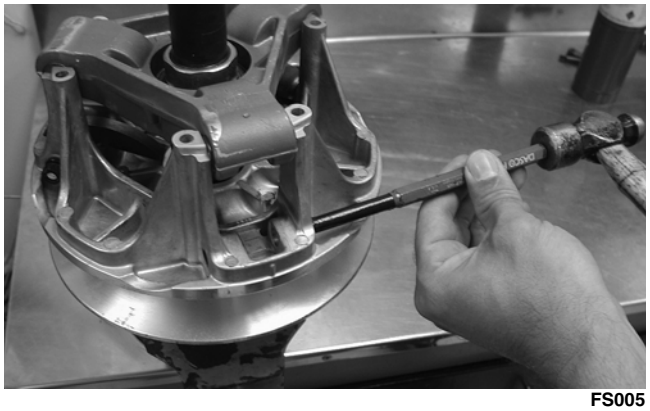


FC089A

8

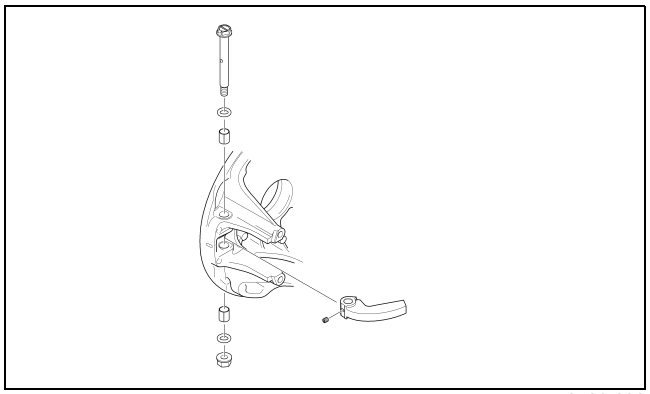
■ **NOTE: Grasp the movable sheave and lift it upward; then release it. It must move freely and not bind at any point.**

5. With a suitable driving tool, carefully install the new cam arm pin bushings into the movable sheave.



FS005

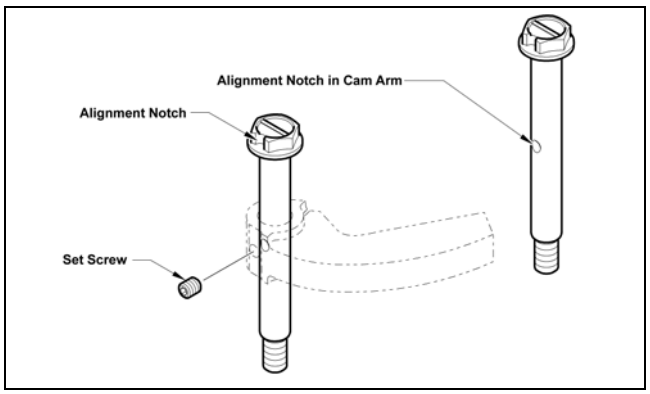
6. With the head of each cam arm pin positioned towards the direction of the drive clutch rotation, install the cam arms.



0739-038

■ **NOTE: The drive clutch rotates counterclockwise.**

7. With the cam arm pin properly positioned, install the new set screws (pre-coated with Loctite) and tighten securely.



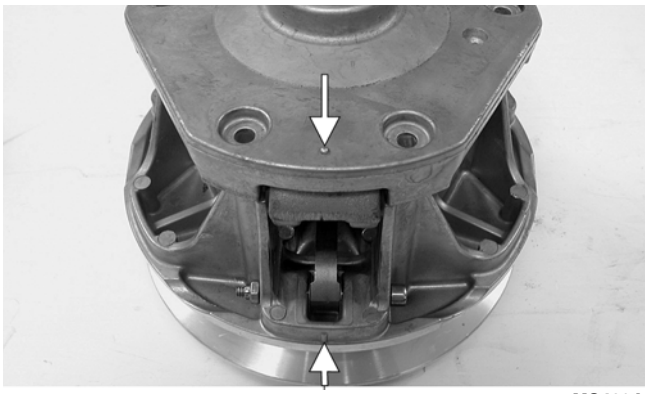
739-040A

8. Secure the cam arm pins with new lock nuts and tighten to specifications.

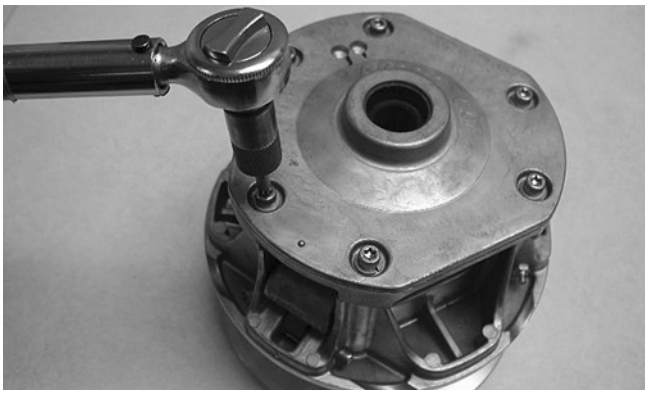
⚠ CAUTION

When installing cam arms, always use new lock nuts and cam arm set screws.

9. Place the spring and cover into position making sure the timing mark on the cover is properly aligned; then compress the spring and install the nine machine screws and lock washers. In a crisscross pattern, tighten evenly to specifications.



MS402A



FC091

⚠ CAUTION

Care must be taken when installing the cover not to damage the bushing.

INSTALLING

1. Install any spacers as accounted for in removing; then insert the clutch bolt with lock washer.

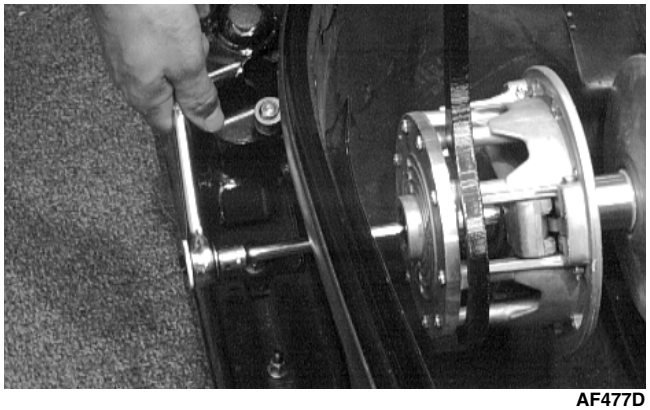
■ **NOTE: Be sure to wipe the clutch taper and crankshaft taper clean of any oil film or dirt before installing the drive clutch.**

2. Place the clutch into position on the crankshaft.

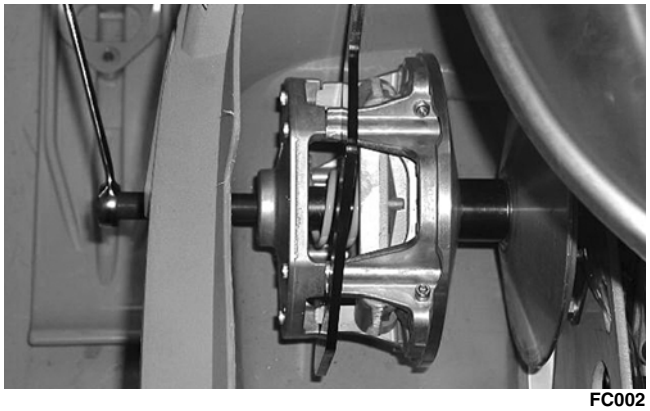
3. Using a 12-point 1/2-in. socket and the drive clutch spanner wrench, tighten the clutch bolt to specifications.

⚠ CAUTION

When installing the drive clutch, do not tighten the clutch bolt with any kind of impact tool. Tighten clutch bolt using a hand torque wrench only. Failure to do so could result in stationary sheave or crankshaft damage.

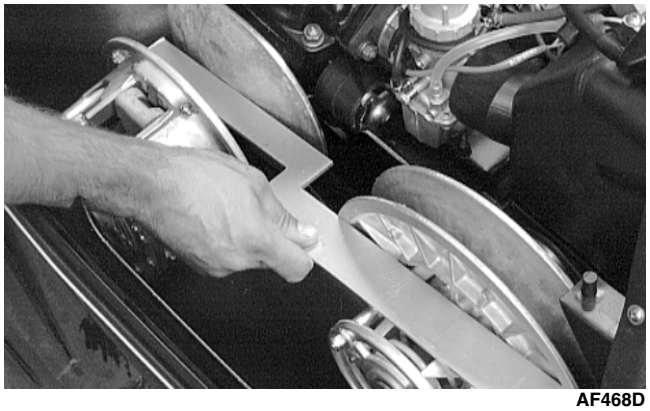


AF477D

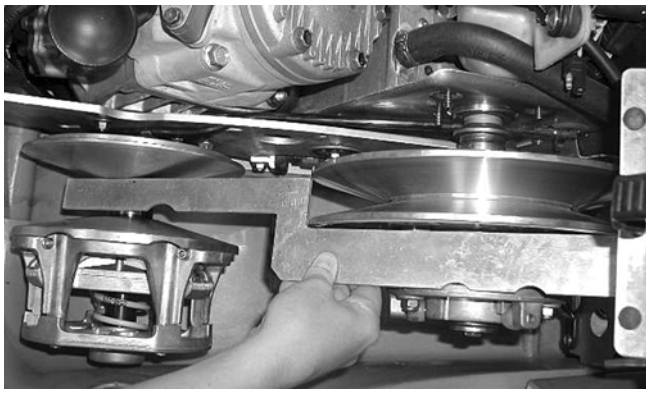


FC002

4. Check alignment between the drive clutch and driven pulley (see Drive Clutch/Driven Pulley in this section).



AF468D



FC092

5. Install the drive belt. Check drive belt deflection (see Drive Clutch/Driven Pulley in this section). Secure the belt guard and install the plug in the belly pan.

⚠ WARNING

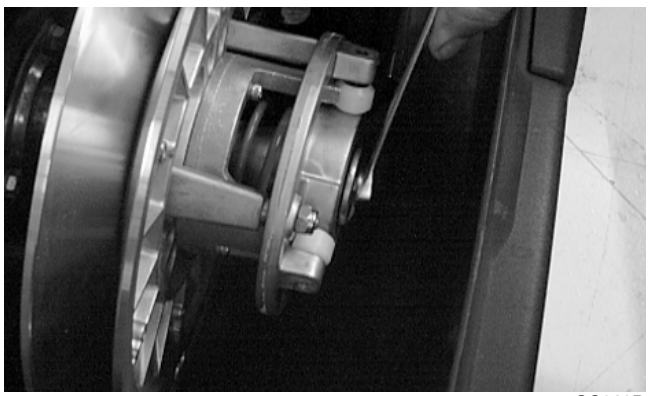
Never operate the engine without the belt guard secured.

6. Either test drive the snowmobile or run the engine for five minutes; then tighten the drive clutch bolt to specifications.

Roller Driven Pulley
(STD)

REMOVING

1. Open the hood; then open the belt guard.
2. Remove the drive belt.
3. Remove the cap screw and washer securing the driven pulley; then account for and note the position of any alignment washers.

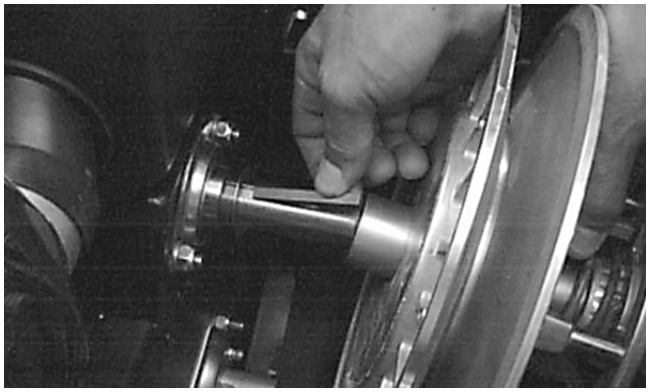


SC013D

4. Slide the driven pulley off the driven shaft; then remove pulley from the engine compartment.

■ **NOTE: If the driven pulley is tight on the shaft, pull the driven pulley off using the Driven Pulley Puller (p/n 0744-023).**

5. Remove the key, alignment washers, and stub shaft from the driven shaft.



AF120D

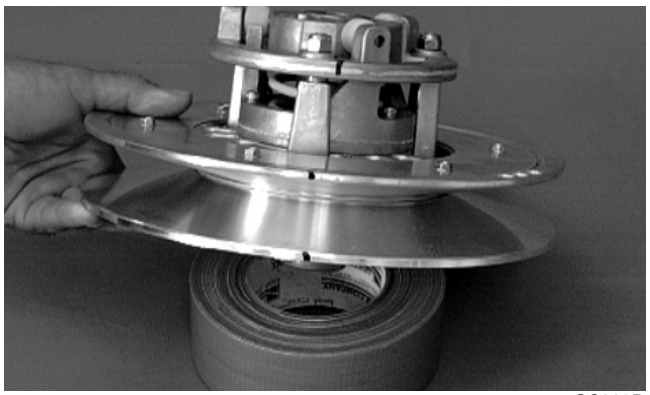
DISASSEMBLING

1. Scribe a line across all driven pulley components to ensure correct assembly and pulley balance.



SC001D

2. Place the driven pulley on a work fixture so the roller plate is directed upward.



SC002D

■ **NOTE: To aid in driven pulley servicing, use a roll of duct tape as a work fixture. The work fixture will increase the stability of the pulley during the repair procedure.**

3. Remove the three lock nuts securing the roller plate; then carefully slide the plate off the stationary shaft allowing the spring to release tension.

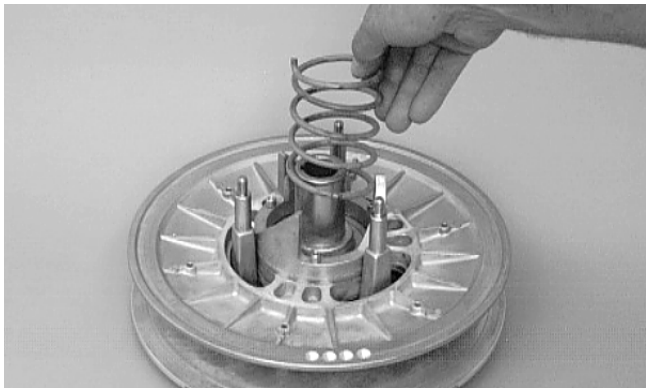
⚠ WARNING

The roller plate is under spring pressure. Care must be taken when removing the lock nuts to prevent the plate from ejecting prematurely.



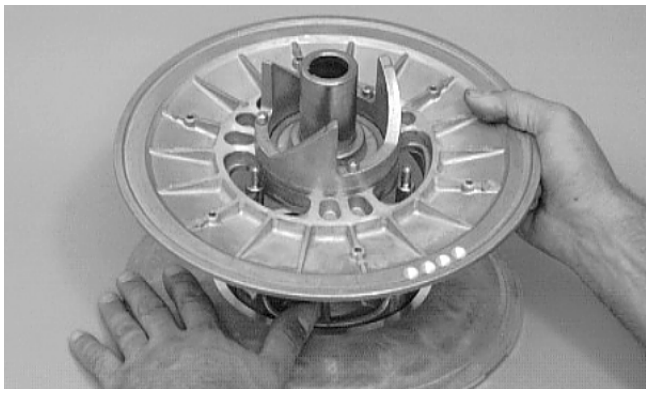
SC003D

4. Remove the spring.

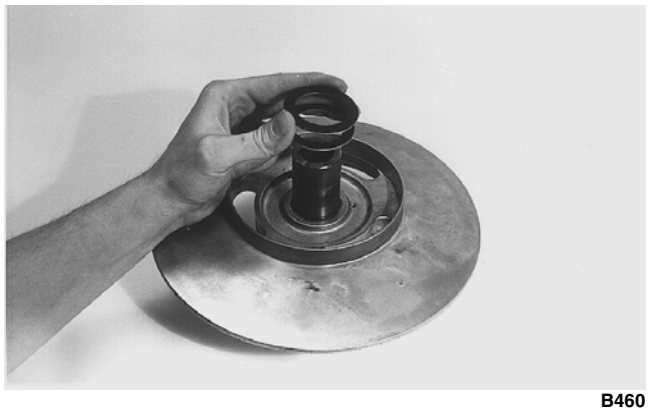


B458D

5. Slide the movable sheave off the stationary shaft; then remove any thrust washers located between the sheaves noting the position of washers for assembling purposes.

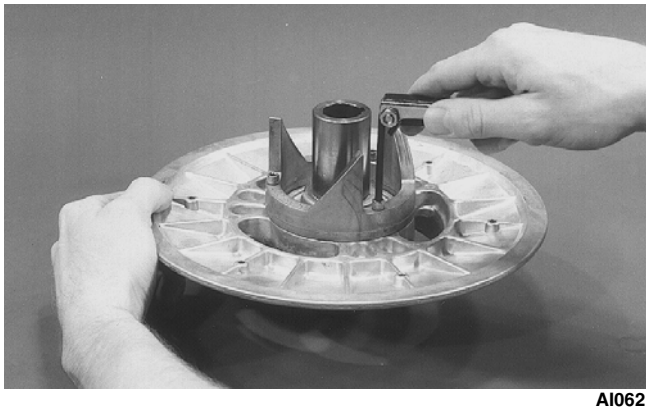


B459D



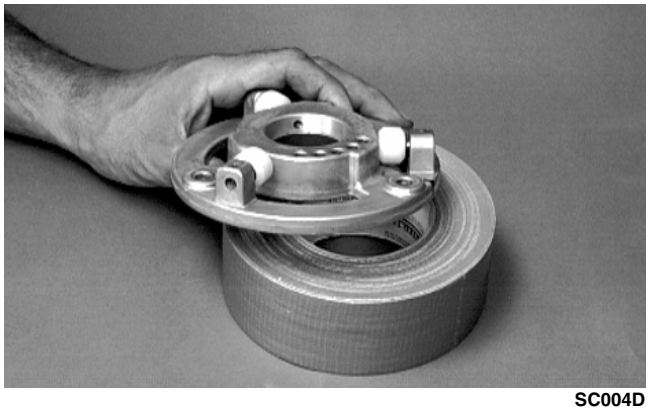
B460

6. Remove the three socket head screws and lock washers securing the torque bracket (cam) to the stationary sheave; then remove torque bracket.



AI062

7. Place the roller plate on a work fixture (roll of duct tape, etc.).



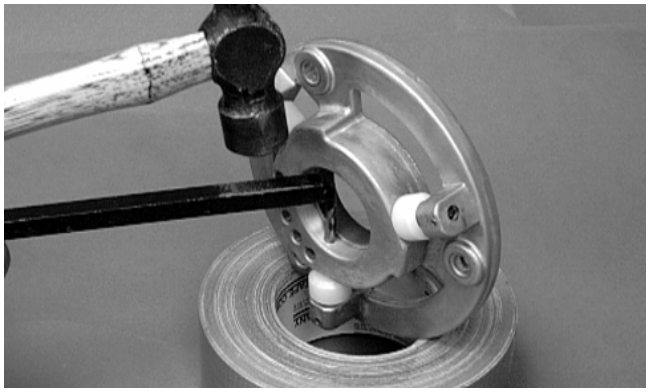
SC004D

8. Using a 1/8-in. punch, remove the spring pin securing the roller, roller pin, and thrust washer to the plate.

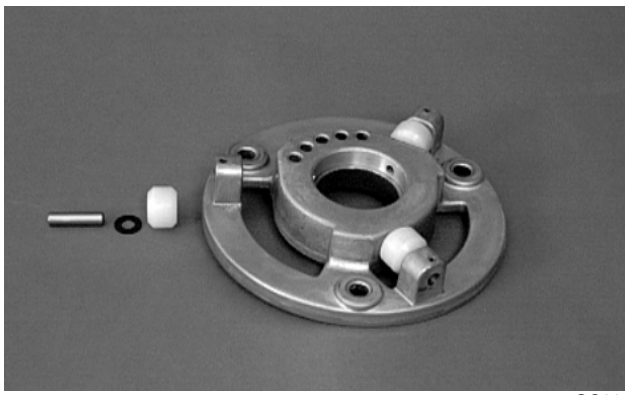


SC005D

9. Using the Roller Pin Removal Tool (p/n 0644-276) from inside the plate, drive the roller pin out of the plate. Account for the pin, thrust washer, and roller.



SC006D



SC007D

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Using parts-cleaning solvent, wash grease, drive belt dust, and foreign matter off all components.

⚠ CAUTION

Do not use steel wool or a wire brush to clean driven pulley components. A wire brush or steel wool will cause the sheaves to be gouged (thus, the drive belt may not slide properly between sheaves). Decreased performance and possible accelerated drive belt wear will result.

2. Inspect the rollers for damage, cracks, or wear.

3. Inspect the sheaves for any gouges, cracks, or other damage. Also, inspect threaded areas of sheaves for damaged or stripped threads.

4. Inspect the torque bracket (cam) for cracks or damage. The ramp portions of the bracket and caps must be free of gouges and damage. Minor scratches may be repaired using #320 grit wet-or-dry sandpaper.



B465

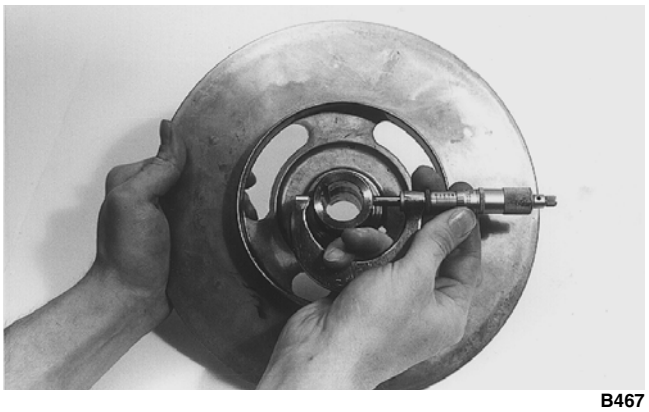
5. Inspect spring for distortion, crystallization, or breaks.

6. Inspect the roller plate, rollers, pins, and spring mounting holes for cracks, damage, or wear.

7. Inspect the roller plate and movable sheave bearings for wear. For each respective bearing, measure the outside diameter of the shaft and the inside diameter of the bearing. Compare the readings. Clearance between the shaft and the respective bearing must not exceed 0.5 mm (0.020 in.). If the clearance exceeds the specification, the bearing must be replaced.



B466D



B467

REMOVING BEARINGS

To remove driven pulley bearings, use the Bearing Removal and Installation Tool (p/n 0644-167) and the following procedure.

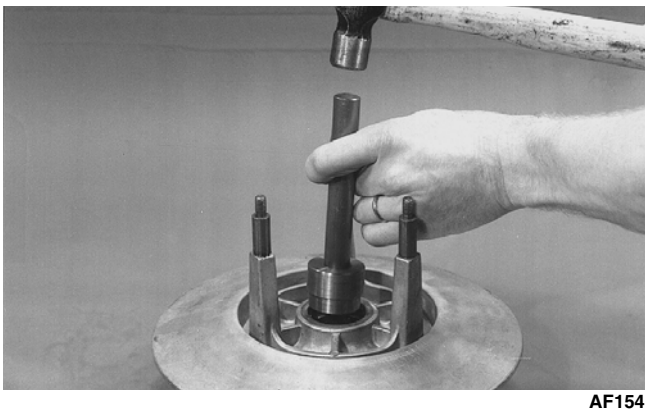
⚠ WARNING

Always wear safety glasses when using the bearing driver.

■ **NOTE: To remove the movable sheave bearing, heat must be applied around the bearing.**

1. Place the movable sheave (or roller plate) flat on a press.

2. Using the bearing tool, press the bearing out.



AF154

INSTALLING BEARINGS

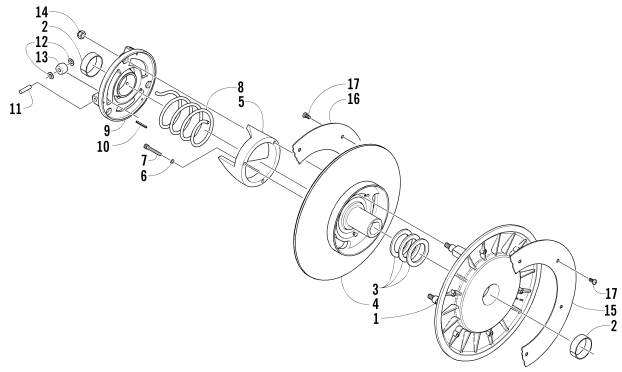
■ NOTE: Before installing a bearing, apply red Loctite #271 to the outside face of the bearing.

1. Place the movable sheave (or roller plate) flat on a press.

2. Using the bearing tool, press the bearing into position. The bearing must be flush with the outside of the bearing boss.

3. Wipe off excess Loctite. Allow the Loctite to cure for 24 hours at room temperature.

ASSEMBLING



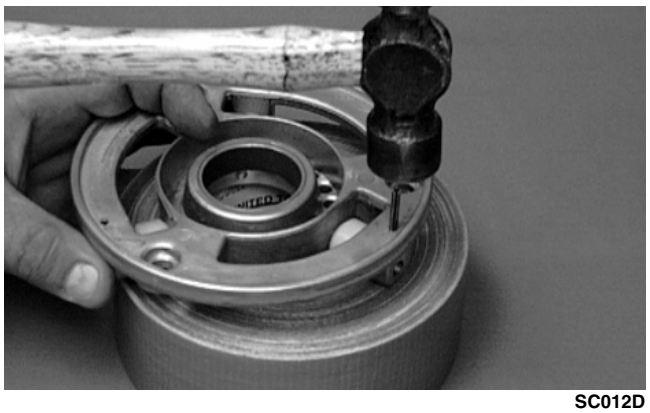
KEY

1. Movable Sheave
2. Bearing
3. Thrust Washer
4. Stationary Sheave
5. Torque Bracket (Cam)
6. Lock Washer
7. Socket Head Screw
8. Spring
9. Roller Plate
10. Spring Pin
11. Roller Pin
12. Spring Washer
13. Roller
14. Lock Nut
15. Cover
16. Cover
17. Self-Tapping Screw

0737-913

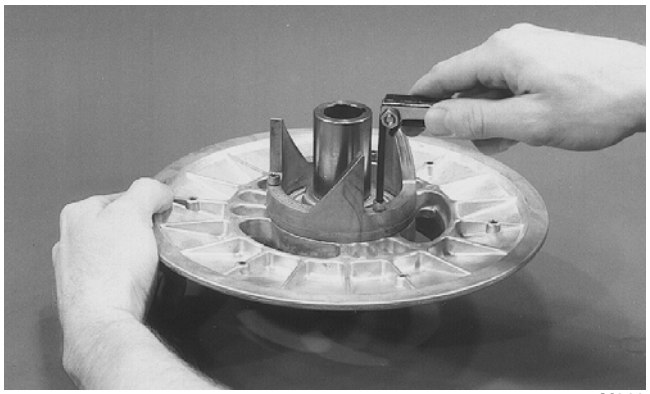
1. Place the roller and thrust washer (toward the outside of the roller plate) and secure with the roller pin.

2. Secure the roller, thrust washer, and pin into position with the spring pin. Drive the pin in until it is flush with the plate.



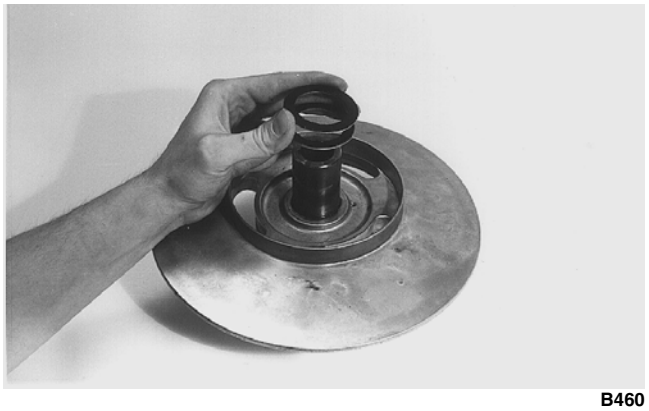
SC012D

3. Place the torque bracket (cam) into position on the stationary sheave making sure the degree number on the bracket aligns with the part number on the stationary sheave. Install the three socket head screws and lock washers. DO NOT tighten at this time.



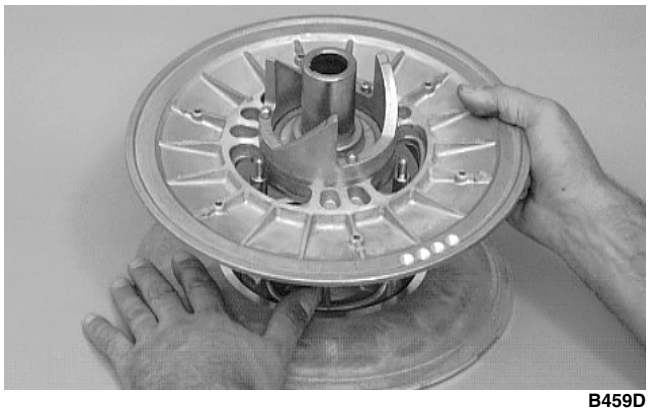
AI062

4. Place any thrust washers (as noted during disassembly) on the stationary sheave shaft.



B460

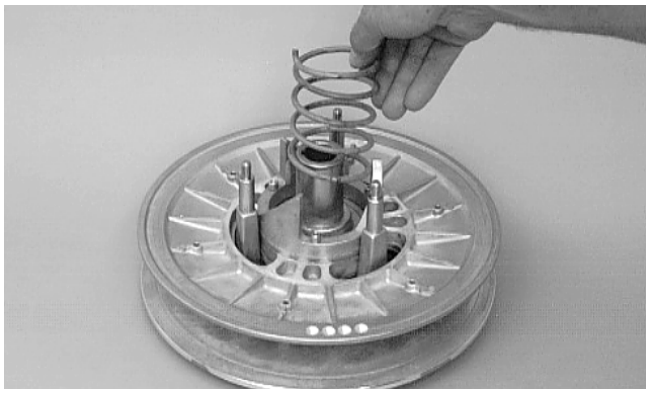
5. Align the scribed line made during disassembly; then slide the movable sheave onto the stationary sheave shaft.



B459D

6. Place the sheaves on a work fixture (roll of duct tape, etc.).

7. Place the spring over the stationary sheave hub and hook the turned down end of the spring into the hole in the casting of the stationary sheave.



B458D

8. Place the roller plate over the spring and hook the turned-up end of the spring in the 3rd hole (standard spring tension) of the plate.

9. While holding the sheaves to prevent them from rotating, grasp the roller plate and rotate it approximately 120° clockwise until the mounting holes align; then push the plate into position and install the three lock nuts. Tighten the lock nuts to specifications.

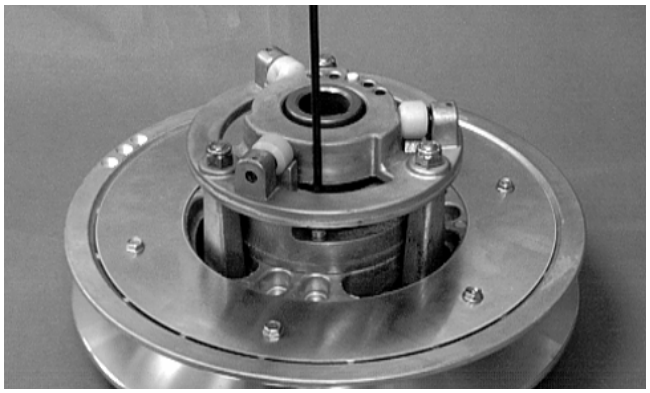
■ NOTE: The line scribed during disassembly should be aligned.



SC003D

10. Rotate the movable sheave to ensure free movement without binding.

11. Rotate the torque bracket (cam) until it is tight; then using a long hex wrench, tighten the three socket-head cap screws (from step 3) securing the bracket to specifications.



SC011D

INSTALLING

1. Slide the alignment washers onto the end of the driven shaft.

2. Install the key in the driven shaft keyway; then place the stub shaft into the driven pulley. Place the driven pulley on the shaft. Align its keyway with the driven shaft keyway.

■ NOTE: A small amount of Loctite Anti-Seize Thread Compound (p/n 0678-146) applied to the driven shaft will aid in future driven pulley removal.

3. Secure the driven pulley by installing any alignment washers, the washer, and cap screw (coated with blue Loctite #243). Tighten the cap screw to specifications.



SC013D

4. Check drive clutch/driven pulley alignment (see Drive Clutch/Driven Pulley in this section); adjust as necessary.

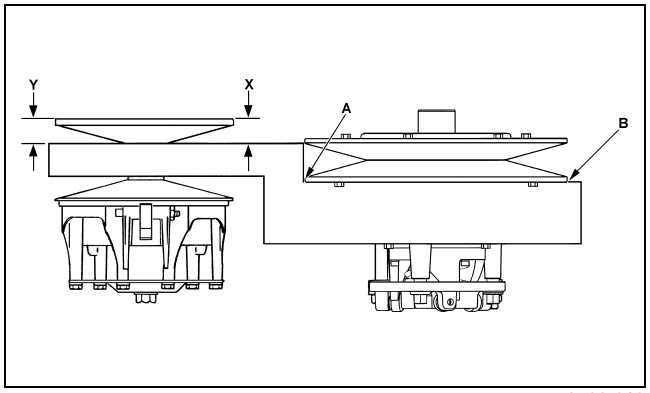
5. Install the drive belt and check drive belt deflection (see Drive Clutch/Driven Pulley in this section). Secure the belt guard.

Drive Clutch/ Driven Pulley (STD)

CHECKING OFFSET

If premature drive belt wear is experienced or if the drive belt turns over, parallelism/offset must be checked. Also, parallelism/offset must be checked whenever either the drive clutch or driven pulley is serviced. To check the parallelism/offset, use the Clutch Alignment Bar (p/n 0644-320) and the following procedure.

1. Open the belt guard and remove the drive belt.
2. Install the clutch alignment bar between the drive clutch sheaves and against the outside edge of the driven pulley stationary sheave.
3. Allow the alignment bar to rest on the drive clutch shaft.



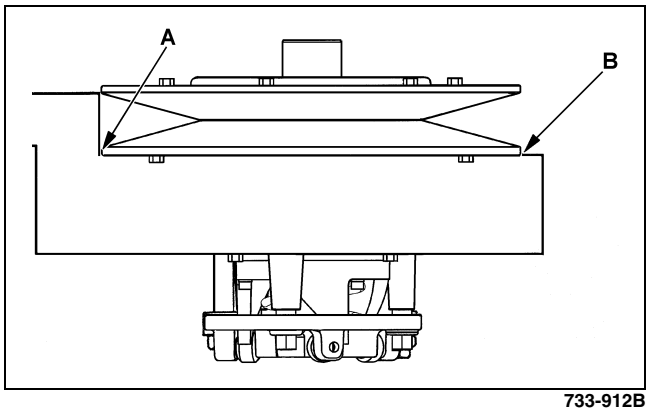
0733-912

■ **NOTE: The alignment bar must extend beyond the front edge of the drive clutch.**

4. With the bar against the outside edge of the driven pulley stationary sheave at points A and B, the bar should just clear the inside edge of the stationary sheave of the drive clutch and rest on the stationary shaft. If the bar does not clear the inside edge or is more than 1.5 mm (0.060 in.) from the inside edge, the offset must be corrected.



AF465D



733-912B

CORRECTING OFFSET

1. To correct offset, the driven pulley must be moved laterally on the driven shaft. Remove the cap screw and washers securing the driven pulley; then remove the driven pulley.

■ **NOTE: If the driven pulley is tight on the driven shaft, pull the driven pulley off using the Driven Pulley Puller (p/n 0744-023).**

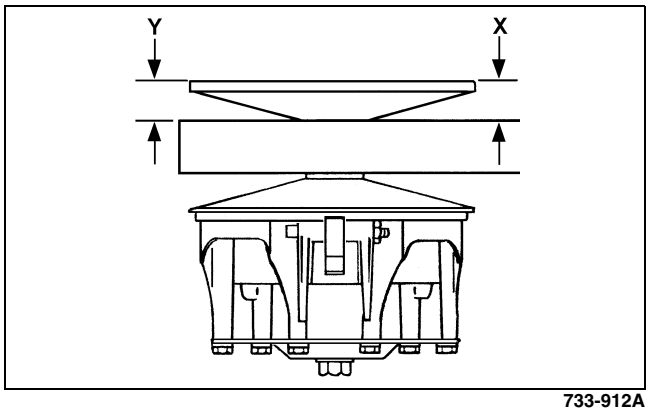
2. To move the driven pulley inward on the shaft, remove washer(s) as required from behind the pulley.
3. To move the driven pulley outward on the shaft, add alignment washer(s) as required behind the driven pulley.

■ **NOTE: Make sure the keyways match when installing the driven pulley. Arrange washers to allow the least amount of "float" on the driven shaft. A maximum of 1.5 mm (0.060 in.) of float is acceptable.**

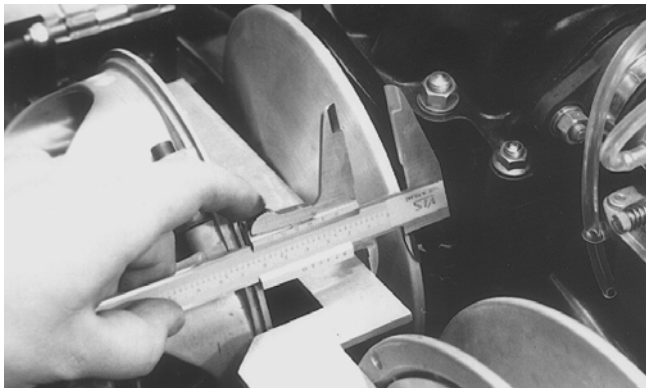
4. Install the driven pulley and secure with a cap screw and washers. Tighten the cap screw to specifications.

CHECKING PARALLELISM

1. Check parallelism of the drive clutch/driven pulley using the alignment bar and reference points X and Y with the alignment bar against the driven pulley at points A and B. Using a calipers or a machinist's scale, measure X and Y from the back side of the alignment bar. Measurements X and Y must be equal or measurement Y must be more than measurement X, but Y must not exceed measurement X by more than 1.6 mm (0.062 in.).



733-912A



AF041

■ **NOTE: The offset must be correct before checking parallelism.**

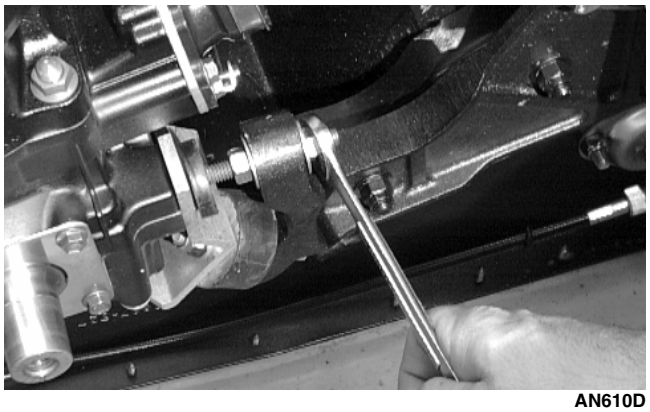
2. If parallelism is not within specifications, the parallelism must be corrected.

CORRECTING PARALLELISM (Torque Bumper w/Bearing Support Bracket)

1. To correct parallelism, minor adjustments can be made by adjusting the torque bumper on the left-rear engine mount.

   A. Loosen the cap screws and nuts securing the engine mounting brackets to the front end.

   B. Using the jam nuts on the torque bumper, adjust parallelism and periodically check the parallelism. When the parallelism is correct, tighten the cap screws and nuts securing the engine mounting brackets to the front end; then tighten the torque bumper jam nuts allowing 1.5 mm (0.060 in.) clearance between the torque bumper and the engine.



AN610D

2. Recheck both offset and parallelism to ensure accuracy and make further adjustments as necessary.

■ **NOTE: After parallelism and offset have been corrected, check for proper drive belt deflection. This is critical for optimum performance.**

CORRECTING PARALLELISM (Torque Bumper w/Shims)

1. To correct parallelism, minor adjustments can be made by removing shims from or installing shims on the left-rear engine mount.

   A. Loosen the cap screws securing the engine mounting brackets to the front end.

   B. Add or remove shims as needed to attain correct parallelism.

   C. When parallelism is correct, secure the engine mounting brackets to the front end.

2. Recheck both offset and parallelism to ensure accuracy and make further adjustments as necessary.

■ **NOTE: After parallelism and offset have been corrected, check for proper drive belt deflection. This is critical for optimum performance.**

CORRECTING PARALLELISM (Engine Snubber w/Engine Plate)

1. To correct parallelism, minor adjustments can be made by adjusting the engine snubber on the left-rear engine mount.

A. Loosen the cap screws securing the engine plate to the engine mounts.

B. Either lengthen or shorten the snubber and periodically check the parallelism measurement. When the parallelism measurement is correct, loosen the snubber to allow 1.5 mm (0.060 in.) clearance between the snubber and the engine; then lock the jam nuts on the snubber and tighten the cap screws securing the engine plate.

2. Recheck both offset and parallelism to ensure accuracy and make further adjustments as necessary.

■ NOTE: After parallelism and offset have been corrected, check for proper drive belt deflection. This is critical for optimum performance.

DRIVE BELT DEFLECTION

Drive belt length, condition, and deflection are all important for peak performance. To check and adjust drive belt deflection, use the following procedure.

1. Turn the engine off; then open the belt guard.
2. Make sure the drive belt is sitting at the top of the driven pulley sheaves.
3. Place a straightedge on top of the drive belt. The straightedge should reach from the drive clutch to the top of the driven pulley.
4. Using a stiff ruler centered between the drive clutch and driven pulley, push down on the drive belt just enough to remove all slack. Note the amount of deflection on the ruler at the bottom of the straightedge. The deflection should be within the range of 25-31 mm (1-1 1/4 in.).

■ NOTE: Push down on the belt with the ruler only until the bottom of the belt flexes upward; then read the amount of deflection.

5. To correct drive belt deflection, washers can be removed or added between the stationary and movable sheaves of the driven pulley.

■ NOTE: If the drive belt deflection is above specifications, the snowmobile will bog and lack power at clutch engagement. For good performance, proper belt deflection is critical.

6. Secure the belt guard.

ACT Roller Driven Pulley

(ZR/Crossfire/Firecat/M-Series)

REMOVING

1. Remove the drive belt.

■ NOTE: For removing drive belt, see Removing/Installing Drive Belt (ACT Roller Driven Pulley) in this section.

2. Using a 9/16-in. socket and extension, remove the cap screw securing the driven pulley to the driven shaft.
3. Slide the driven pulley off the driven shaft.

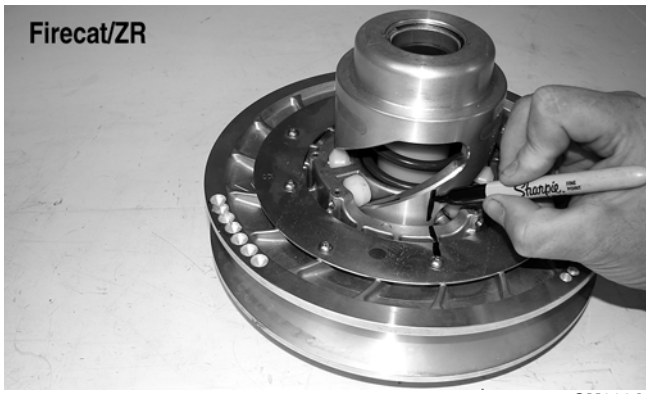
■ NOTE: After removing the driven pulley, retrieve the cap screw washer from inside the pulley bore; then account for and remove any alignment washers. These washers must be used during installing.

DISASSEMBLING

1. Prior to disassembling, mark the driven pulley sheaves and torque bracket.

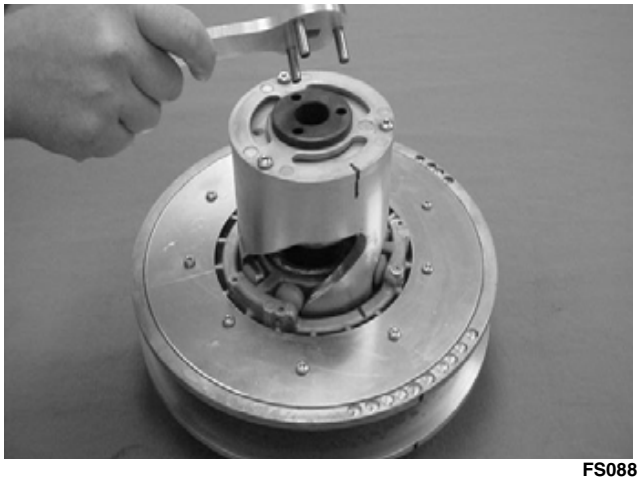


CM075A

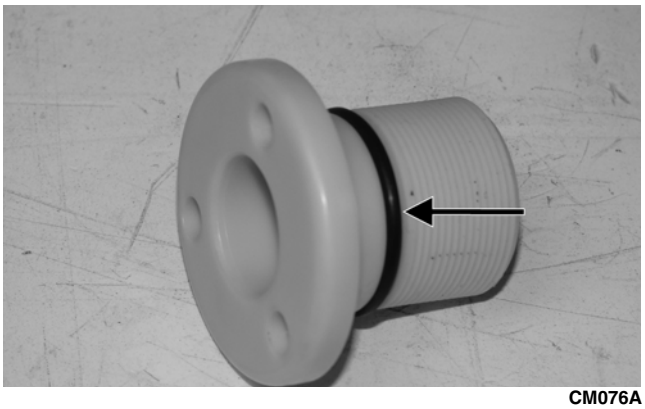


CM060A

2. Using Drive Belt Deflection Tool (p/n 0644-412), remove the sheave adjuster. Account for an O-ring and shim washers.



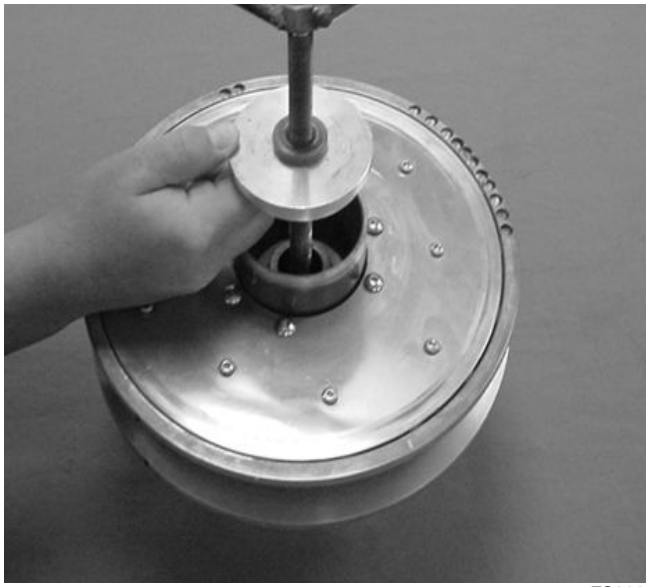
FS088



CM076A

■ **NOTE: The sheave adjuster has left-hand threads.**

3. Place the driven pulley on the Driven Pulley Compressor (p/n 0644-444); then install the compressor flange spacer and wing nut and compress the driven pulley spring.



FS090

4. Remove the torx-head cap screws securing the movable sheave to the pulley.



CM061

■ **NOTE: To loosen the torx-head cap screws, it may be necessary to insert a torx-bit and strike each screw with a hammer.**

5. Release the compression of the spring by removing the wing nut; then remove the movable sheave. Account for the spacer (retainer).



FS093



FS094

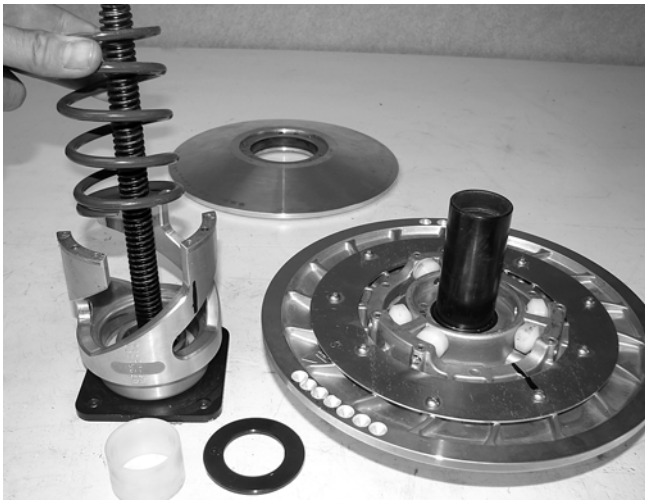
■ **NOTE: Note the location of the holes in the spacer for assembling purposes.**

6. Remove the stationary sheave; then remove the plastic washer (spring seat) and the spacer.



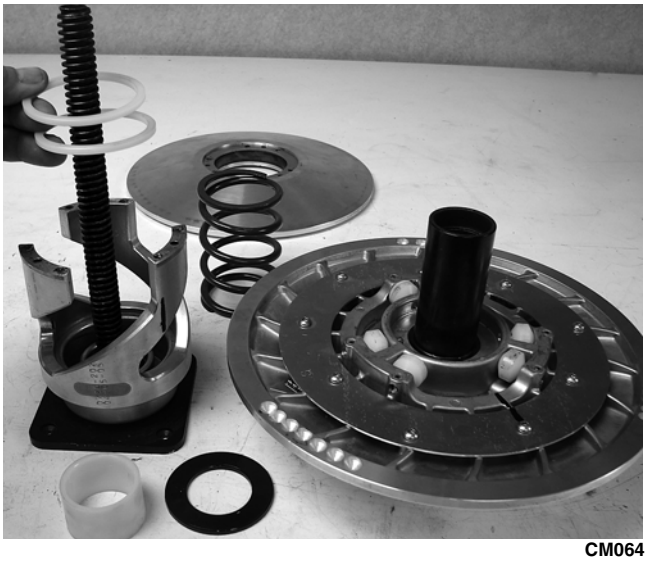
CM062

7. Remove the spring.



CM063

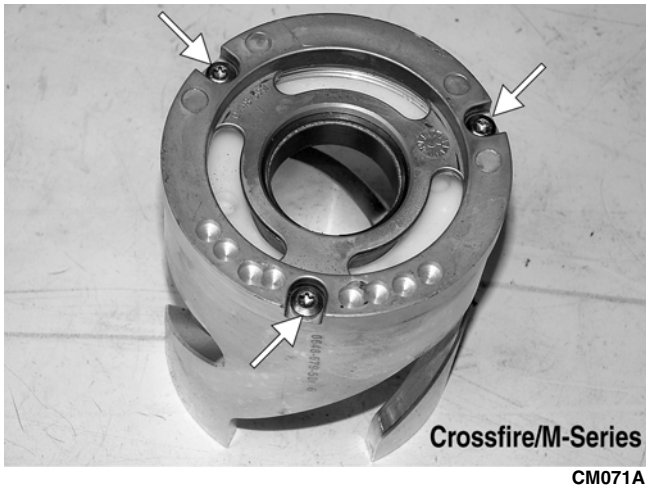
■ **NOTE: On the Firecat/ZR models, remove the remaining spring seats.**



CM064

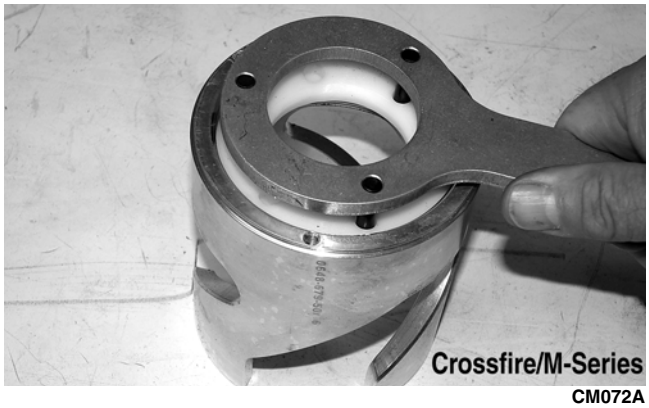
■ **NOTE: Premature wear will result if the plastic washer is not installed during assembling.**

8. On the Crossfire/M-Series models, remove the three torx-head screws securing the cover to the torque bracket.

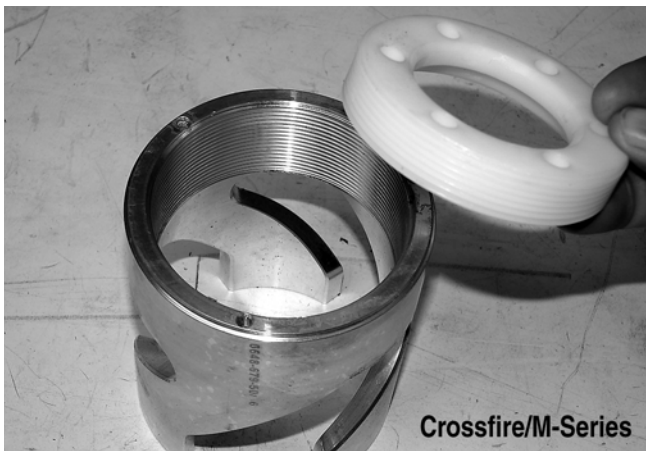


CM071A

9. Using Driven Pulley Spring Adjustment Tool (p/n 0644-413), remove the spring adjuster.



CM072A



CM073A

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

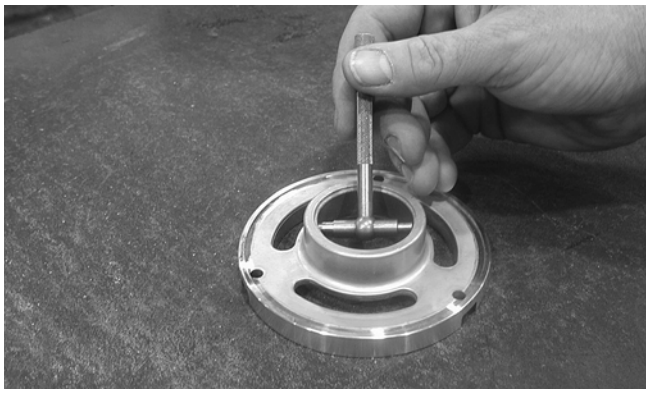
1. Using parts-cleaning solvent, wash grease, drive belt dust, and foreign matter off all components.

⚠ CAUTION

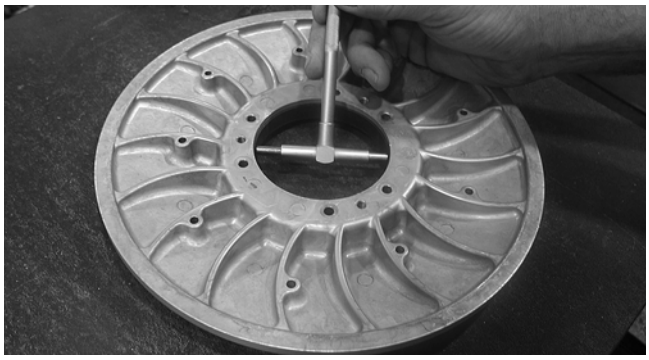
Do not use steel wool or a wire brush to clean driven pulley components. A wire brush or steel wool will cause the sheaves to be gouged (thus, the drive belt may not slide properly between sheaves). Decreased performance and possible accelerated drive belt wear will result.

2. Inspect the rollers for damage, cracks, or wear.
3. Inspect the sheaves for any gouges, cracks, or other damage. Also, inspect threaded areas of sheaves for damaged or stripped threads.
4. Inspect the torque bracket for cracks or damage. The ramp portions of the bracket must be free of gouges and damage. Minor scratches may be repaired using #320 grit wet-or-dry sandpaper.
5. Inspect spring for distortion, crystallization, or breaks.
6. Inspect the rollers, pins, and spring mounting holes for cracks, damage, or wear.
7. Inspect the cover and movable sheave bearings for wear. For each respective bearing, measure the outside diameter of the shaft and the inside diameter of the bearing. Compare the readings. Clearance between the shaft and the respective bearing must not exceed 0.5 mm (0.020 in.). If the clearance exceeds the specification, the bearing must be replaced.

■ **NOTE: The movable sheave bearing is a non-serviceable component.**



FS121



FS122



FS123

REPLACING TORQUE BRACKET BEARING/COVER BEARING

1. Remove the snap ring.
2. Using a suitable driving tool, drive the bearing out.

⚠ WARNING

Always wear safety glasses when using the bearing driver.

3. Install the new bearing; then secure with the snap ring.

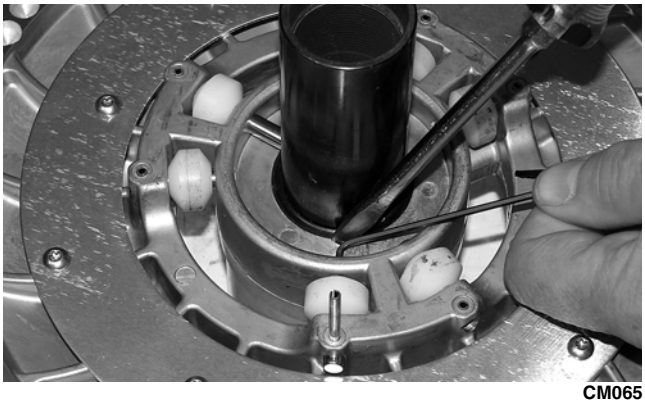
REPLACING ROLLERS

1. Drive the spring pins through the stationary sheave until there is enough room to drive out the cam roller pin.



FS101

2. Using an Allen wrench and a flat-blade screwdriver, press the roller pin out of the stationary sheave.

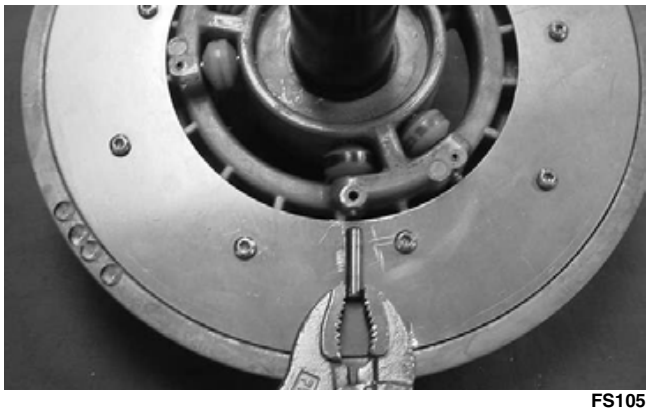


CM065

⚠ CAUTION

Care must be taken not to damage the driven pulley shaft.

■ NOTE: Once the roller pin is exposed, it may be necessary to use a pair of vise-grips to remove the pin.

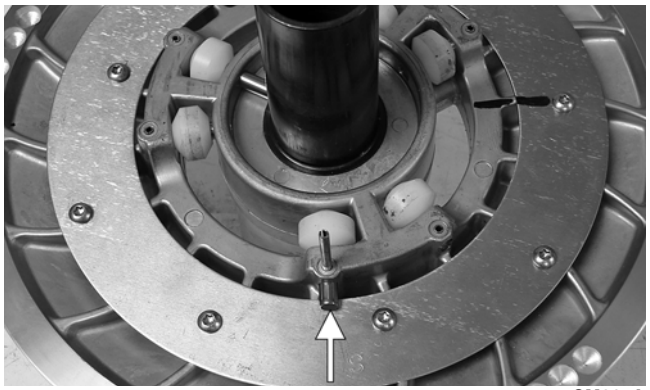


FS105

3. Place the new roller into position and tap the roller pin in far enough to install the spring pin.

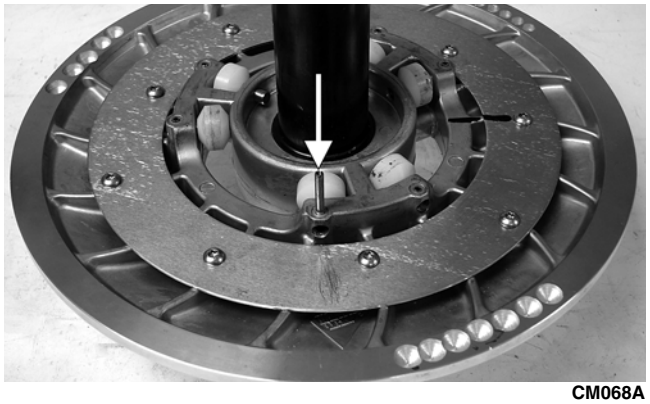


CM066



CM067A

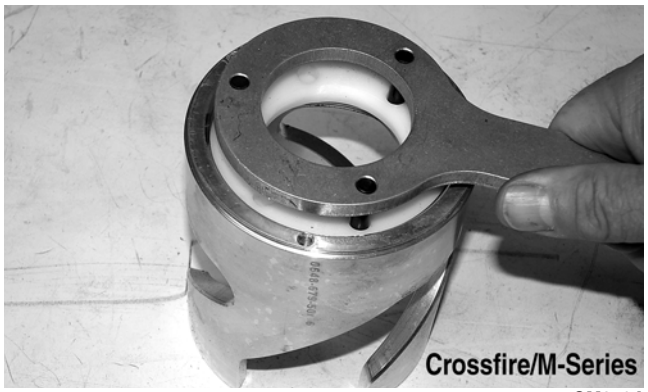
4. Tap the spring pin back into place.



CM068A

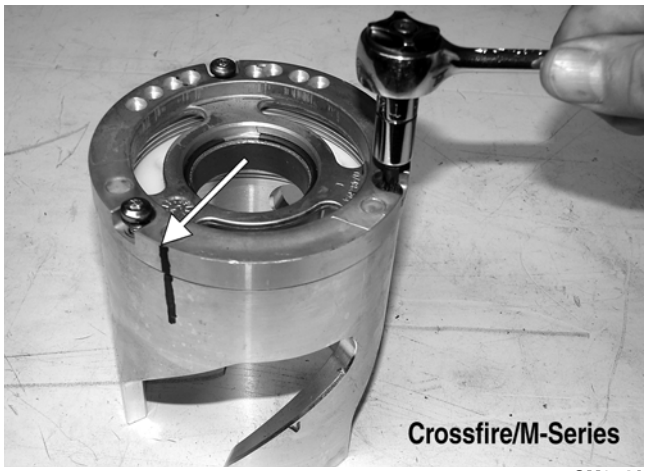
ASSEMBLING

1. On the Crossfire/M-Series models using Driven Pulley Spring Adjustment Tool (p/n 0644-413), install the spring adjuster.



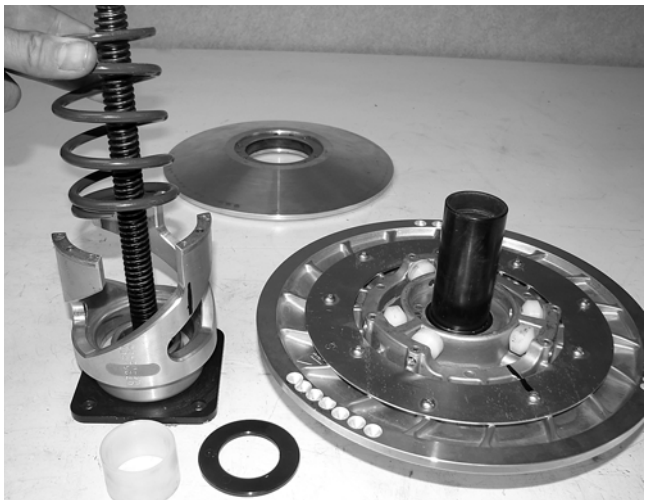
CM072A

2. Noting the alignment marks made during disassembling, install the torque bracket cover and secure with three torx-head screws. Tighten to specifications.



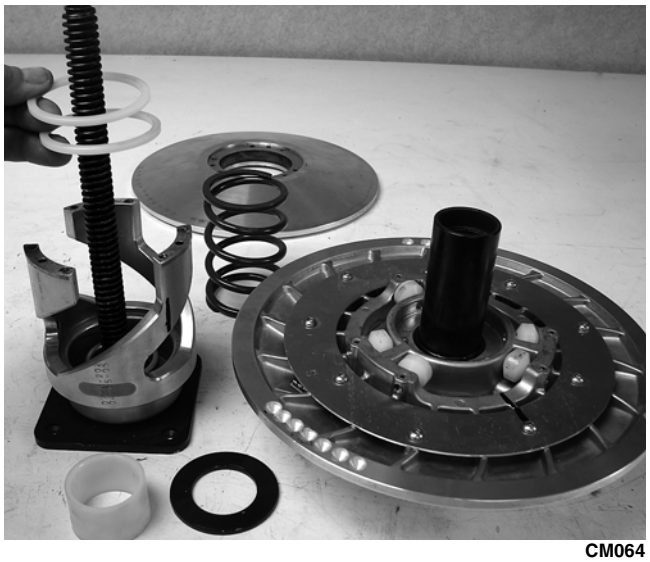
CM074A

3. Place the torque bracket onto the Driven Pulley Compressor (p/n 0644-444); then place the spring and plastic washer (spring seat) into position.



CM063

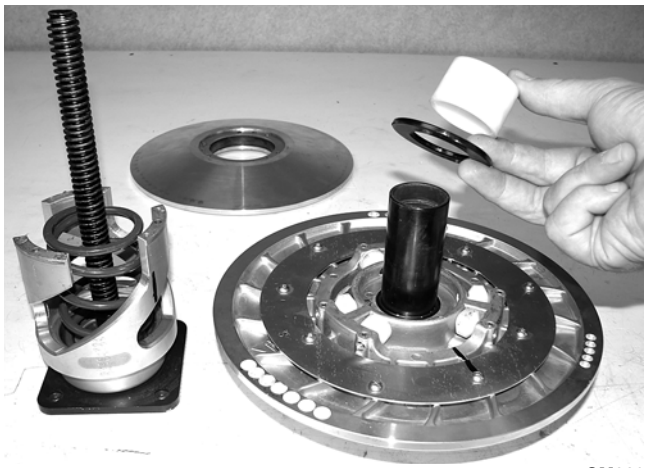
■ **NOTE: On the Firecat/ZR models prior to installing the spring, install the spring seats onto the torque bracket.**



CM064

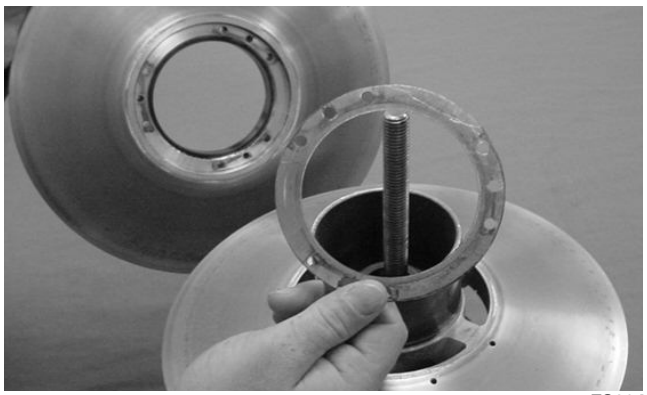
■ **NOTE: Premature wear will result if the plastic washer is not installed.**

4. Noting the alignment marks made during disassembling and with the spring seat and spacer on the stationary sheave shaft, place the stationary sheave onto the torque bracket.



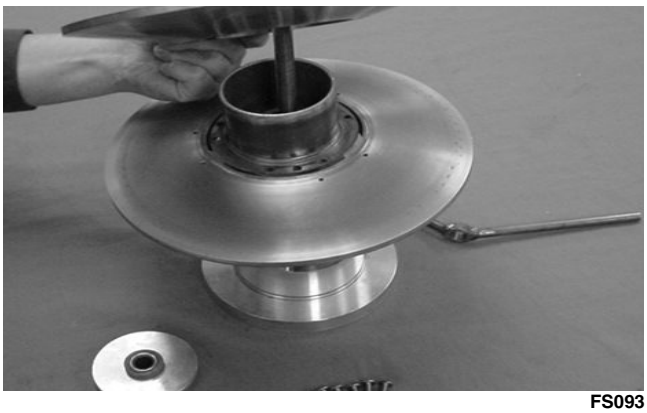
CM062

5. Place the spacer (retainer) into position on the stationary sheave noting the proper location of the holes from disassembling.



FS094

6. Noting the alignment marks made during disassembling, place the movable sheave onto the stationary sheave.



FS093

7. With the pulley in place on the compressor, install the compressor flange spacer and wing nut; then compress the driven pulley spring.



CM069

8. Install the torx-head cap screws securing the movable sheave. Tighten to specifications.



CM061

9. Remove the pulley from the compressor and install the sheave adjuster.

8



FS088

■ **NOTE: The sheave adjuster has left-hand threads.**

■ **NOTE: At this time, leave the O-ring and shim washer off the sheave adjuster. They will be installed when installing the drive belt.**

INSTALLING

1. Set the brake lever lock.
2. Slide the driven pulley onto the driven shaft making sure alignment washers are in place.
3. Secure the pulley with the cap screw (coated with blue Loctite #243) and washer. Tighten to specifications.
4. Install the drive belt.

■ **NOTE: For installing drive belt, see Removing/ Installing Drive Belt (ACT Roller Driven Pulley) in this section.**

Drive Clutch/ Driven Pulley
(ZR/Crossfire/Firecat/M-Series)

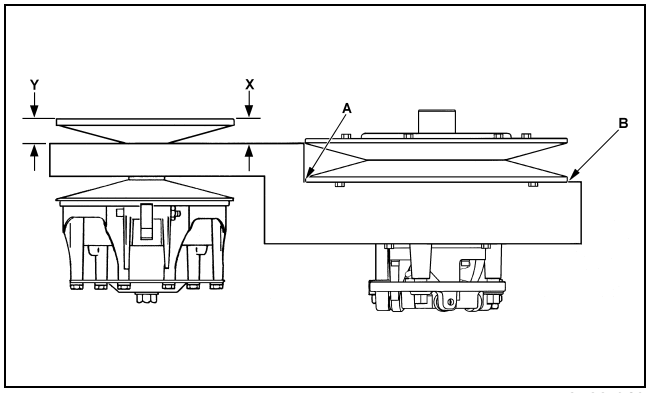
CHECKING OFFSET

If premature drive belt wear is experienced or if the drive belt turns over, parallelism/offset must be checked. Also, parallelism/offset must be checked whenever either the drive clutch or driven pulley is serviced. To check the parallelism/offset, use the Clutch Alignment Bar (p/n 0644-427) and the following procedure.

1. Open the belt guard and remove the drive belt.

■ **NOTE: For removing drive belt, see Removing/ Installing Drive Belt (ACT Roller Driven Pulley) in this section.**

2. Install the clutch alignment bar between the drive clutch sheaves and against the outside edge of the driven pulley stationary sheave.
3. Allow the alignment bar to rest on the drive clutch shaft.



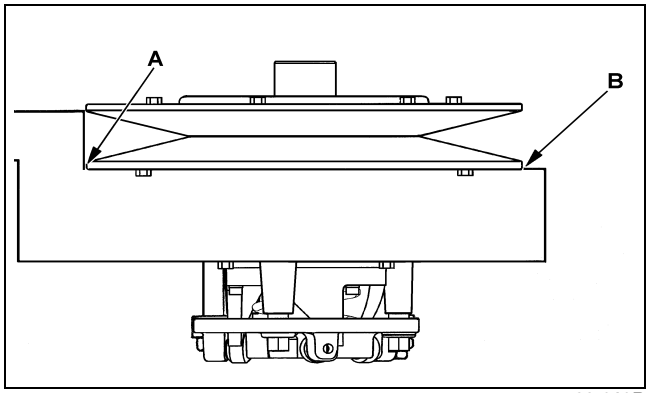
0733-912

■ **NOTE: The alignment bar must extend beyond the front edge of the drive clutch.**

4. With the bar against the outside edge of the driven pulley stationary sheave at points A and B, the bar should just clear the inside edge of the stationary sheave of the drive clutch and rest on the stationary shaft. If the bar does not clear the inside edge or is more than 1.5 mm (0.060 in.) from the inside edge, the offset must be corrected.



AF465D



733-912B

CORRECTING OFFSET

1. To correct offset, the driven pulley must be moved laterally on the driven shaft. Remove the cap screw and washers securing the driven pulley; then remove the driven pulley.

■ NOTE: If the driven pulley is tight on the driven shaft, pull the driven pulley off using the Driven Pulley Puller (p/n 0644-468) for right-hand threads or (p/n 0644-469) for left-hand threads.

2. To move the driven pulley inward on the shaft, remove washer(s) as required from behind the pulley.

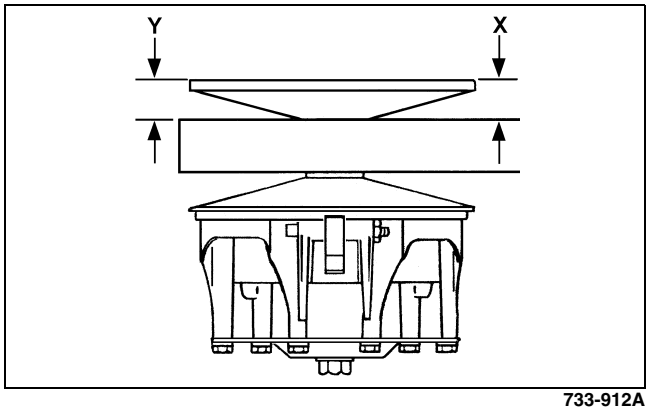
3. To move the driven pulley outward on the shaft, add alignment washer(s) as required behind the driven pulley.

■ NOTE: Arrange washers to allow a minimum of 0.5 mm (0.020 in.) of "float" on the driven shaft. A maximum of 1.5 mm (0.060 in.) of float is acceptable.

4. Install the driven pulley and secure with a cap screw (coated with blue Loctite #243) and washers. Tighten the cap screw to specifications.

CHECKING PARALLELISM

1. Check parallelism of the drive clutch/driven pulley using the alignment bar and reference points X and Y with the alignment bar against the driven pulley at points A and B. Using a calipers or a machinist's scale, measure X and Y from the back side of the alignment bar. Measurements X and Y must be equal or measurement Y must be more than measurement X, but Y must not exceed measurement X by more than 1.6 mm (0.062 in.).



733-912A



AF041

■ NOTE: The offset must be correct before checking parallelism.

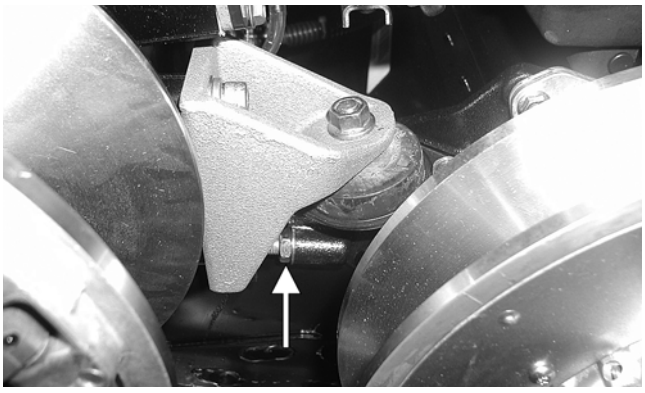
2. If parallelism is not within specifications, the parallelism must be corrected.

CORRECTING PARALLELISM

1. To correct parallelism, minor adjustments can be made by adjusting the torque bumper on the left-rear engine mount.

   A. Loosen the cap screws and nuts securing the engine mounting brackets to the front end.

   B. Using the jam nuts on the torque bumper, adjust parallelism and periodically check the parallelism. When the parallelism is correct, tighten the cap screws and nuts securing the engine mounting brackets to the front end; then adjust the torque bumper jam nuts allowing the torque bumper to lightly contact the engine.



FS110A

2. Recheck both offset and parallelism to ensure accuracy and make further adjustments as necessary.

■ NOTE: After parallelism and offset have been corrected, check for proper drive belt deflection. This is critical for optimum performance.

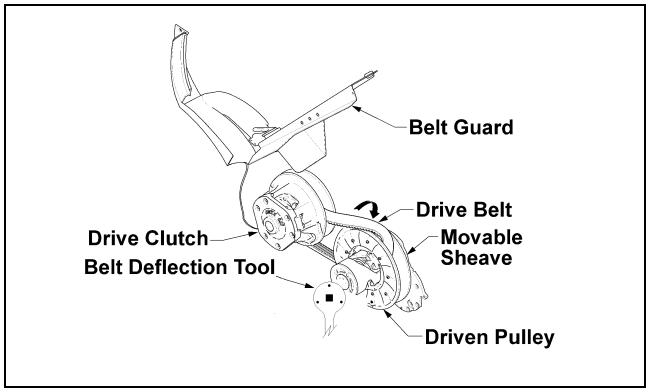
DRIVE BELT DEFLECTION

Drive belt length, condition, and deflection are all important for peak performance. To check and adjust drive belt deflection, use the following procedure.

1. Turn the engine off; then open the belt guard.
2. Make sure the drive belt is sitting at the top of the driven pulley sheaves.
3. Place a straightedge on top of the drive belt. The straightedge should reach from the drive clutch to the top of the driven pulley.
4. Using a stiff ruler centered between the drive clutch and driven pulley, push down on the drive belt just enough to remove all slack. Note the amount of deflection on the ruler at the bottom of the straightedge. The deflection should be at 31 mm (1 1/4 in.).

■ **NOTE: Push down on the belt with the ruler only until the bottom of the belt flexes upward; then read the amount of deflection.**

5. To correct drive belt deflection, remove the sheave adjuster from the pulley, remove or add shim washers to the adjuster, and install the adjuster.



739-267B

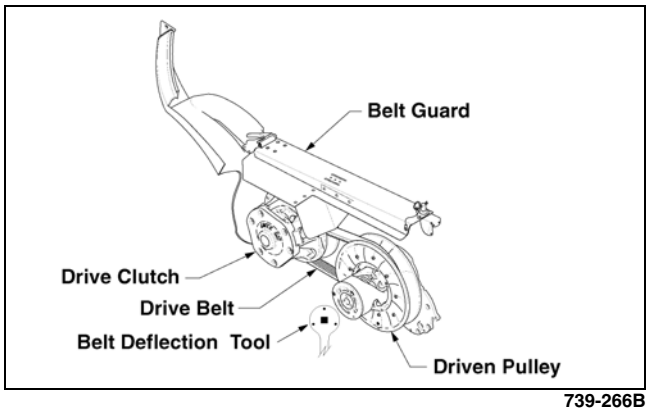
■ **NOTE: Adding shim washers will decrease belt deflection; removing shim washers will increase belt deflection.**

■ **NOTE: If the drive belt deflection is above specifications, the snowmobile will bog and lack power at clutch engagement. For good performance, proper belt deflection is critical.**

6. Secure the belt guard.

Removing/Installing Drive Belt
(ACT Roller Driven Pulley)

1. Turn ignition key to the OFF position and wait for all moving parts to stop.
2. Set the brake lever lock.
3. Open the hood; then open the belt guard.
4. Remove the driven pulley access panel from the belly pan.
5. Using the Drive Belt Deflection Tool (p/n 0644-412), remove the sheave adjuster from the end of the driven pulley. Account for and remove the O-ring and shim washers. Note the orientation of the components for installing purposes.



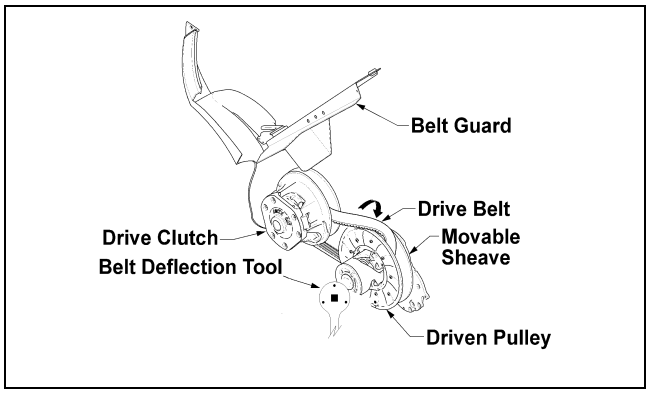
739-266B

■ **NOTE: On the Crossfire/M-Series models, the sheave adjuster has left-hand threads.**

6. With the O-ring and shim washers removed, carefully thread the sheave adjuster back into the driven pulley; then tighten the adjuster with the deflection tool until it bottoms against the driven shaft.

■ **NOTE: By bottoming the sheave adjuster against the driven shaft, the sheaves of the driven pulley will spread far enough to allow the removal of the drive belt.**

7. Remove the drive belt from the drive clutch and driven pulley.



739-267B

8. Place the drive belt (so the part number can be read) between the sheaves of the drive clutch first; then between the sheaves of the driven pulley.

9. Using the deflection tool, remove the sheave adjuster from the end of the driven pulley.

10. Place the shim washers and O-ring (as noted in removing) onto the sheave adjuster; then carefully thread the sheave adjuster back into the driven pulley. Tighten the adjuster securely using the deflection tool.

11. Close the belt guard; then install the driven pulley plug.

⚠ WARNING

Never operate the snowmobile without the belt guard secured in place.

12. Release the brake lever lock.

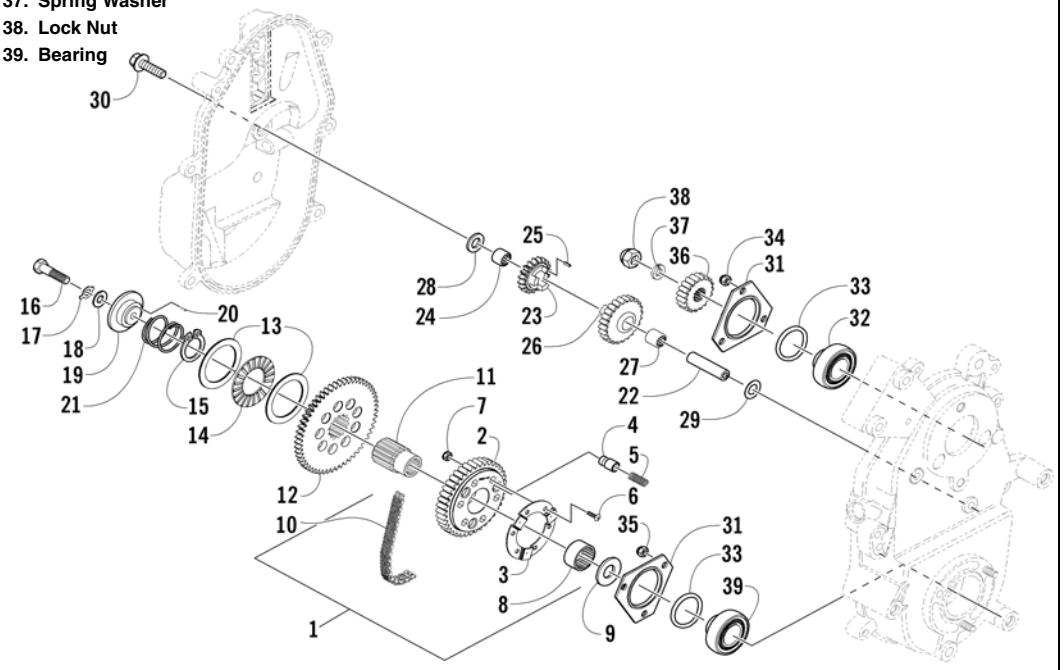
Drive Train Schematics
(w/Reverse)

■ **NOTE: Determine which type of drive train is being serviced and refer to the appropriate illustration for component details; then disassemble and assemble accordingly. Some components will vary from model to model. The technician should use discretion and sound judgment when removing and installing components.**

KEY

1. Sprocket Assy
2. Sprocket
3. Spring Retainer
4. Slip Pin
5. Compression Spring
6. Cap Screw
7. Lock Nut
8. Bearing
9. Shaft Spacer
10. Chain
11. Driveshaft Extension
12. Reverse Gear
13. Thrust Washer
14. Thrust Bearing
15. Retaining Ring
16. Cap Screw
17. Tab Lock Washer
18. Washer
19. Shaft Retainer
20. Spring Pin
21. Return Spring
22. Reverse Shaft
23. Reverse Idler Assy
24. Bearing
25. Aligner Pin
26. Reverse Idler
27. Bearing
28. Thrust Washer
29. Reverse Idler Spacer
30. Cap Screw
31. Flange Plate
32. Bearing
33. O-Ring
34. Lock Nut
35. Lock Nut
36. Sprocket
37. Spring Washer
38. Lock Nut
39. Bearing

Chain Case Assy

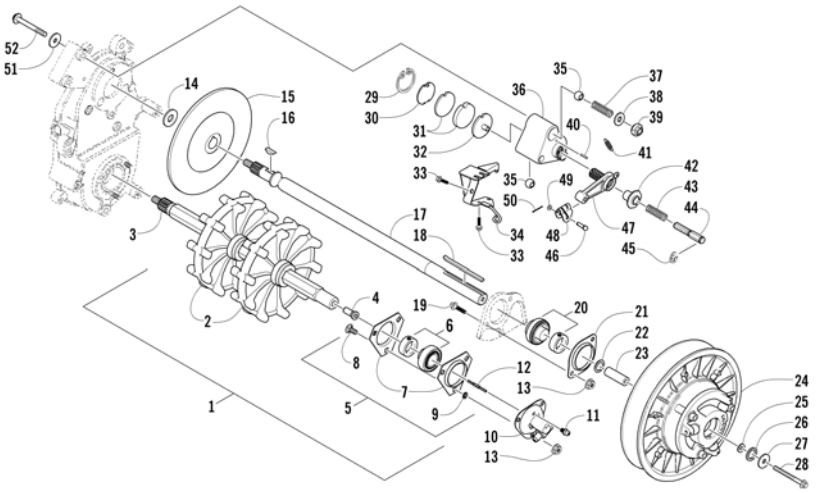


0738-366

KEY

1. Track Drive Assy
2. Drive Sprocket
3. Driveshaft
4. Drive Bushing
5. Flange Plate
6. Bearing
7. Flange Plate
8. Carriage Bolt
9. Solder Ring
10. Drive Adapter
11. Grease Fitting
12. Cable Adapter
13. Lock Nut
14. Washer
15. Brake Disc
16. Key
17. Driven Shaft
18. Key
19. Cap Screw
20. Bearing/Lock Collar
21. Flange Plate
22. Washer
23. Stub Shaft
24. Driven Pulley
25. Washer
26. Washer
27. Washer
28. Cap Screw
29. Snap Ring
30. Stationary Pad Backing Plate
31. Brake Pad Set
32. Brake Pad Piston
33. Cap Screw
34. Brake Cable Bracket
35. Alignment Ball
36. Brake Caliper Assy
37. Compression Spring
38. Washer
39. Brake Caliper Nut
40. Spring Pin
41. Return Spring
42. Brake Adjuster Knob
43. Compression Spring
44. Brake Adjuster Screw
45. E-Ring
46. Clevis Pin
47. Activator Arm
48. Clevis Pin
49. Washer
50. Cotter Pin
51. Washer
52. Brake Caliper Mounting Bolt

Drive & Driven Shafts/ Quick-Adjust Brake Assy

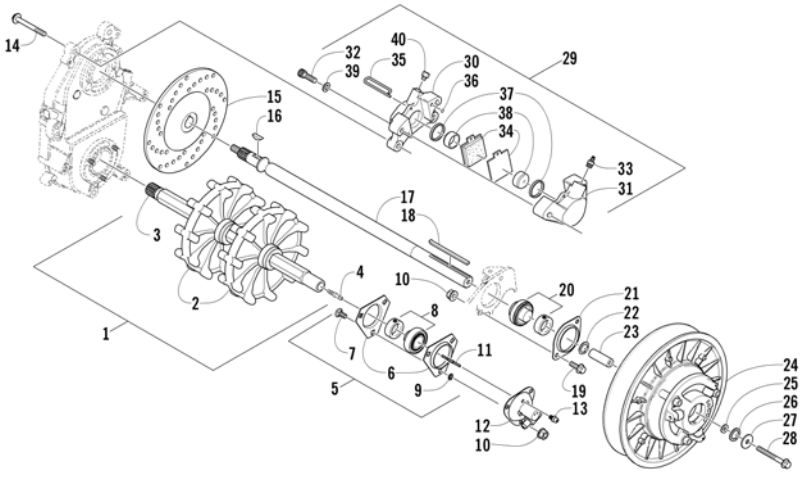


0738-367

KEY

1. Track Drive Assy
2. Drive Sprocket
3. Driveshaft
4. Drive Bushing
5. Flange Plate/ Bearing Assy
6. Flange Plate
7. Carriage Bolt
8. Bearing
9. Solder Ring
10. Lock Nut
11. Cable Adapter
12. Drive Adapter
13. Grease Fitting
14. Cap Screw
15. Brake Disc
16. Key
17. Driven Shaft
18. Key
19. Cap Screw
20. Bearing
21. Flange Plate
22. Washer
23. Stub Shaft
24. Driven Pulley
25. Washer
26. Washer
27. Washer
28. Cap Screw
29. Brake Caliper Assy
30. Housing
31. Housing
32. Cap Screw
33. Bleed Screw
34. Brake Pad Set
35. Retaining Pin
36. Housing O-Ring
37. O-Ring
38. Piston
39. Washer
40. Adapter Fitting

Drive & Driven Shafts/ Hydraulic Brake Assy

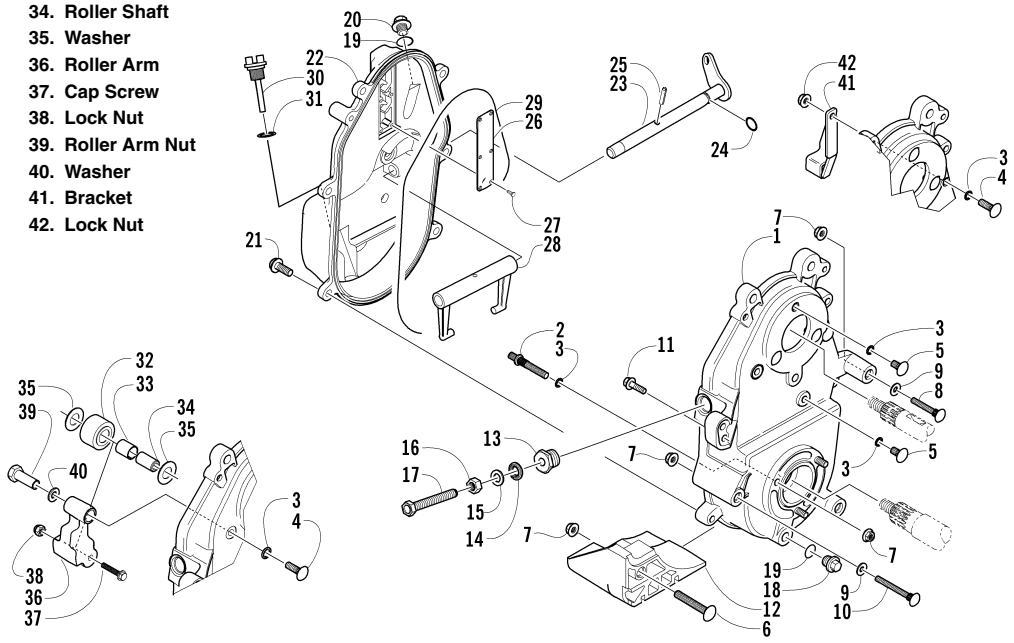


0738-426

Chain Tensioner Assy

KEY

1. Chain Case
2. Stud
3. O-Ring
4. Bolt
5. Bolt
6. Carriage Bolt
7. Lock Nut
8. Carriage Bolt
9. Washer
10. Carriage Bolt
11. Cap Screw
12. Guard
13. Adapter
14. Seal
15. Washer
16. Nut
17. Adjuster
18. Drain Plug
19. O-Ring
20. Drain Plug
21. Cap Screw
22. Cover
23. Shift Fork Shaft
24. O-Ring
25. Spring Pin
26. Vent Cover
27. Self-Tapping Screw
28. Shift Fork
29. Seal
30. Oil Level Stick
31. O-Ring
32. Roller
33. Bearing
34. Roller Shaft
35. Washer
36. Roller Arm
37. Cap Screw
38. Lock Nut
39. Roller Arm Nut
40. Washer
41. Bracket
42. Lock Nut

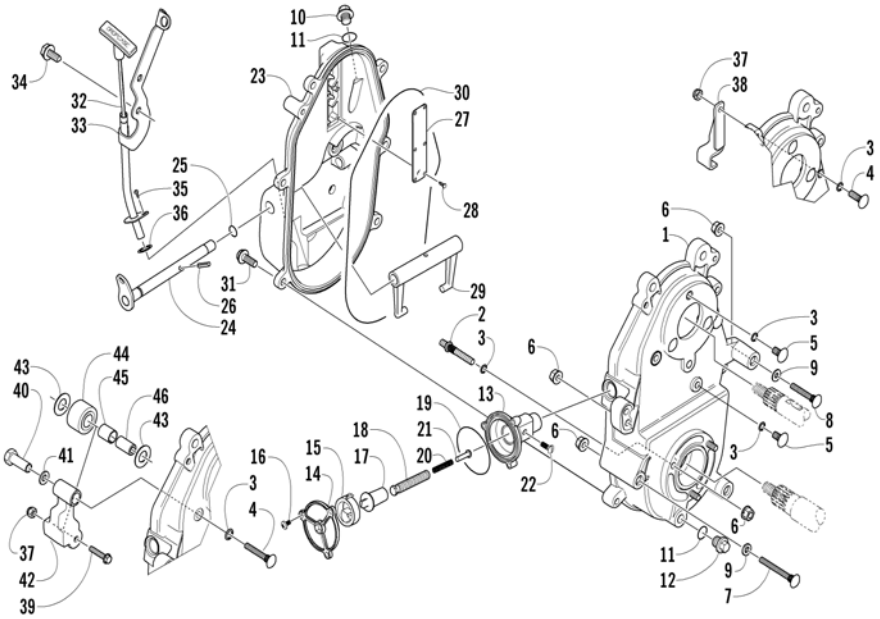


0740-397

Chain Tensioner Assy

KEY

1. Chain Case
2. Stud
3. O-Ring
4. Bolt
5. Bolt
6. Lock Nut
7. Carriage Bolt
8. Carriage Bolt
9. Washer
10. Drain Plug
11. O-ring
12. Drain Plug
13. Adjuster Housing
14. Cover
15. Adjuster Spring
16. Self-Tapping Screw
17. Adjuster Shaft
18. Adjuster Screw
19. O-Ring
20. Compression Spring
21. Rivet
22. Machine Screw
23. Cover
24. Shift Fork Shaft
25. O-Ring
26. Spring Pin
27. Vent Cover
28. Self-Tapping Screw
29. Shift Fork
30. Seal
31. Cap Screw
32. Oil Level Stick
33. Tube
34. Self-Tapping Screw
35. Self-Tapping Screw
36. O-Ring
37. Lock Nut
38. Bracket
39. Cap Screw
40. Nut
41. Washer
42. Roller Arm
43. Washer
44. Roller
45. Bearing
46. Roller Shaft

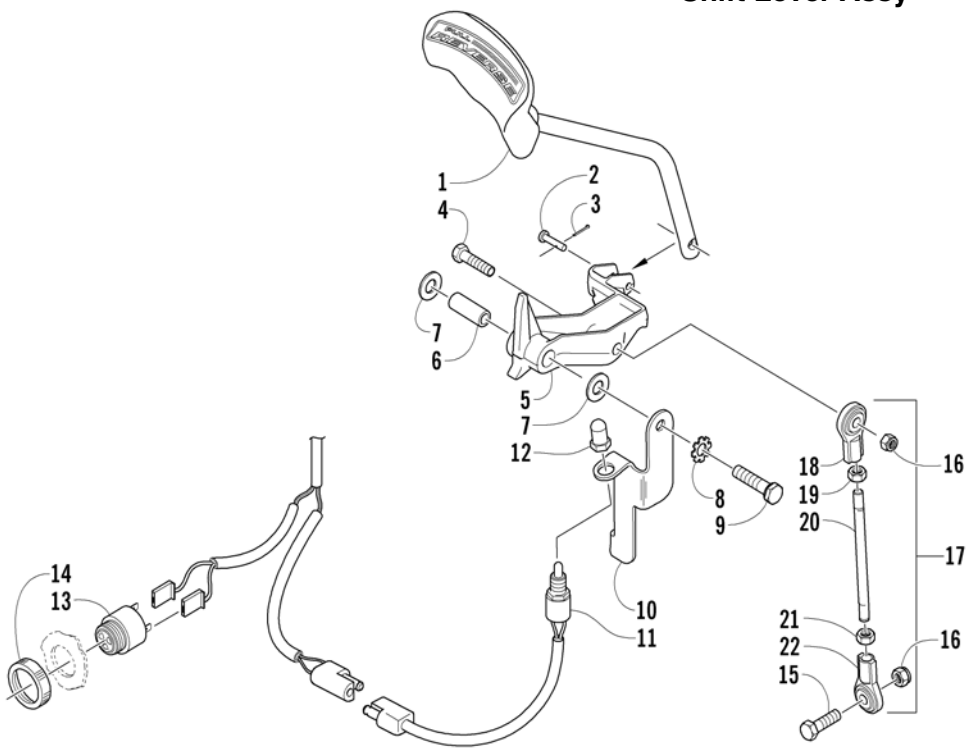


0739-863

Shift Lever Assy

KEY

1. Lever
2. Clevis Pin
3. Cotter Pin
4. Cap Screw
5. Shift Pivot
6. Axle
7. Washer
8. External Tooth Lock Washer
9. Cap Screw
10. Bracket
11. Alarm Switch
12. Switch Boot
13. Reverse Alarm
14. Retaining Ring
15. Cap Screw
16. Lock Nut
17. Shift Linkage Assy
18. Rod End - Left
19. Jam Nut - Left
20. Linkage Rod
21. Jam Nut - Right
22. Rod End - Right

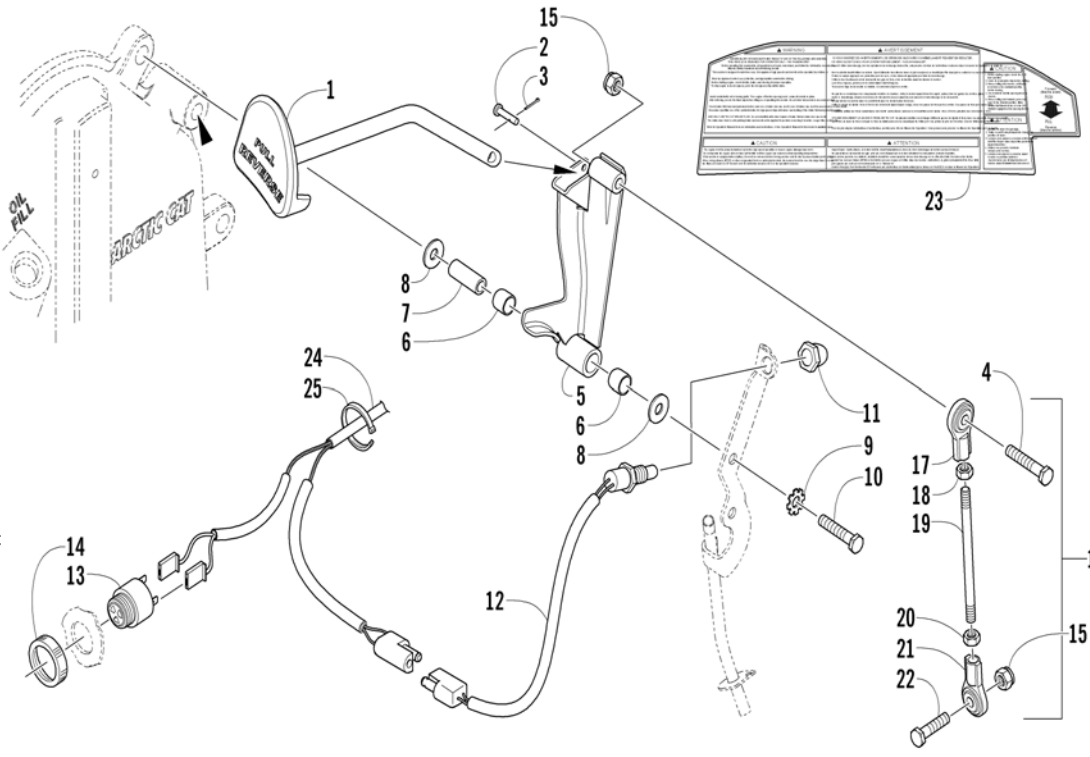


0739-453

Shift Lever Assy

KEY

1. Lever
2. Clevis Pin
3. Cotter Pin
4. Cap Screw
5. Shift Pivot
6. Bushing
7. Axle
8. Washer
9. External Tooth Lock Washer
10. Cap Screw
11. Switch Boot
12. Alarm Switch
13. Reverse Alarm
14. Retaining Ring
15. Lock Nut
16. Shift Linkage
17. Rod End - Left
18. Jam Nut - Left
19. Linkage Rod
20. Jam Nut - Right
21. Rod End - Right
22. Cap Screw
23. Decal
24. Harness
25. Cable Tie



0738-714

8

Drive Train Schematics

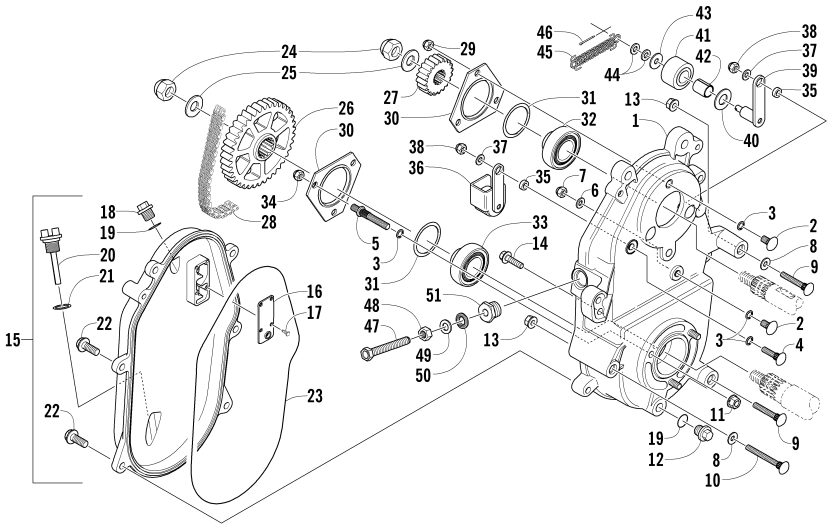
(w/o Reverse)

■ **NOTE: Determine which type of drive train is being serviced and refer to the appropriate illustration for component details; then disassemble and assemble accordingly. Some components will vary from model to model. The technician should use discretion and sound judgment when removing and installing components.**

KEY

1. Chain Case w/ Studs
2. Ribbed Bolt
3. Stud O-Ring
4. Ribbed Bolt
5. Stud
6. Washer
7. Nut
8. Washer
9. Carriage Bolt
10. Carriage Bolt
11. Lock Nut
12. Plug
13. Lock Nut
14. Cap Screw
15. Chain Case Cover
16. Vent Cover
17. Self-Tapping Screw
18. Plug
19. O-Ring
20. Oil Level Stick
21. O-Ring
22. Cap Screw
23. Seal
24. Lock Nut
25. Washer
26. Sprocket
27. Sprocket
28. Chain
29. Lock Nut
30. Flange
31. Seal
32. Bearing
33. Bearing
34. Lock Nut
35. Bushing
36. Tightener Arm Assy
37. Washer
38. Lock Nut
39. Tightener Arm
40. Washer
41. Tightener Roller
42. Bearing
43. Washer
44. Washer
45. Spring Assy
46. Cotter Pin
47. Chain Adjuster Screw
48. Nut
49. Washer
50. Seal
51. Adapter

Chain Case Assy

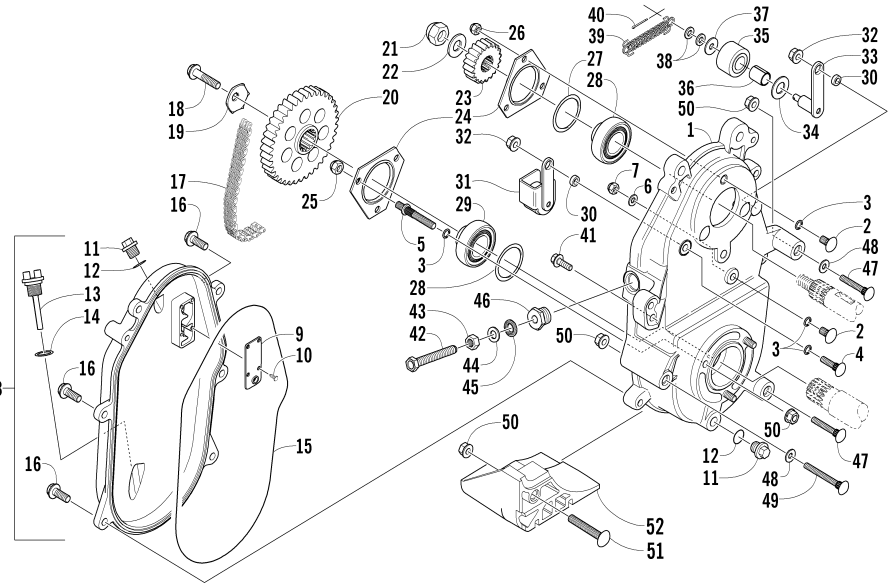


0739-700

Chain Case Assy

KEY

1. Chain Case w/ Studs
2. Ribbed Bolt
3. O-Ring
4. Ribbed Bolt
5. Stud
6. Washer
7. Nut
8. Cover Assy
9. Vent Cover
10. Self-Tapping Screw
11. Plug
12. O-Ring
13. Oil Level Stick
14. O-Ring
15. Seal
16. Cap Screw
17. Chain
18. Cap Screw
19. Pyramidal Washer
20. Sprocket
21. Lock Nut
22. Spring Washer
23. Sprocket
24. Flange Plate
25. Lock Nut
26. Lock Nut
27. Bearing
28. O-Ring
29. Bearing
30. Bushing
31. Tightener Arm Assy
32. Lock Nut
33. Arm
34. Washer
35. Roller
36. Bearing
37. Washer
38. Washer
39. Spring Assy
40. Cotter Pin
41. Cap Screw
42. Adjuster
43. Nut
44. Washer
45. Seal
46. Adapter
47. Carriage Bolt
48. Washer
49. Carriage Bolt
50. Lock Nut
51. Carriage Bolt
52. Guard

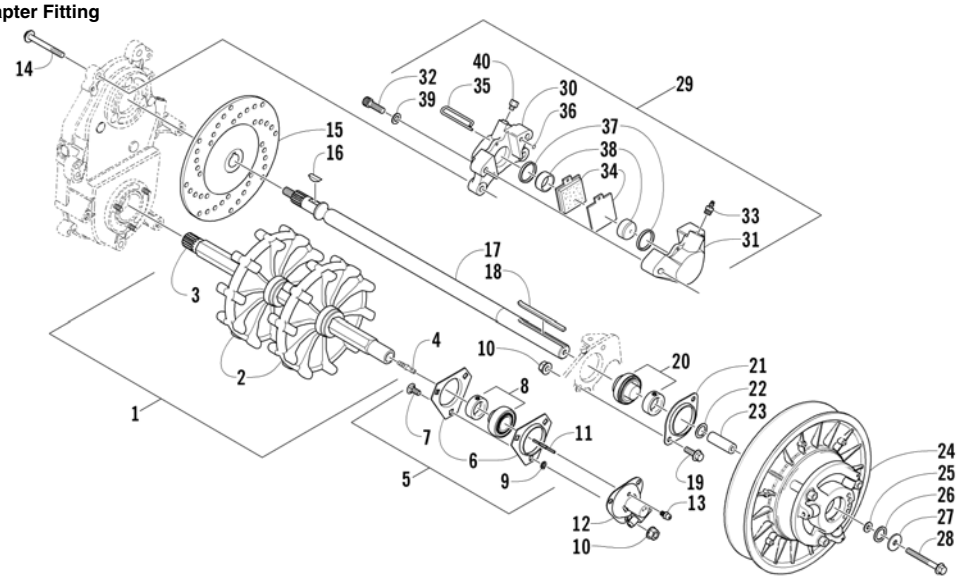


0739-908

Drive & Driven Shafts/ Hydraulic Brake Assy

KEY

1. Track Drive Assy
2. Drive Sprocket
3. Driveshaft
4. Drive Bushing
5. Flange Plate
6. Flange
7. Carriage Bolt
8. Bearing
9. Solder Ring
10. Lock Nut
11. Cable Adapter
12. Drive Adapter
13. Grease Fitting
14. Cap Screw
15. Brake Disc
16. Key
17. Driven Shaft
18. Key
19. Cap Screw
20. Bearing
21. Flange
22. Washer
23. Stub Shaft
24. Driven Pulley
25. Washer
26. Washer
27. Washer
28. Cap Screw
29. Brake Caliper Assy
30. Housing
31. Housing
32. Cap Screw
33. Bleed Screw
34. Brake Pad Set
35. Retaining Pin
36. O-Ring
37. O-Ring
38. Piston
39. Washer
40. Adapter Fitting



0738-426

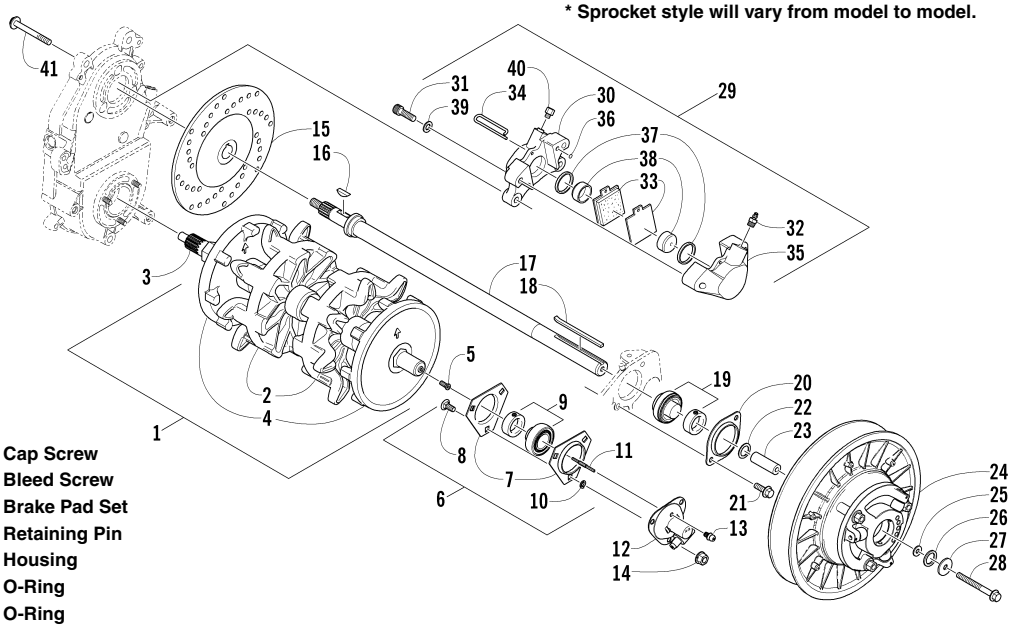
8

Drive & Driven Shafts/ Hydraulic Brake Assy

KEY

1. Track Drive Assy*
2. Drive Sprocket
3. Driveshaft
4. Drive Sprocket
5. Drive Bushing
6. Flange Plate
7. Flange Plate
8. Carriage Bolt
9. Bearing
10. Solder Ring
11. Cable Adapter
12. Drive Adapter
13. Grease Fitting
14. Lock Nut
15. Brake Disc
16. Key
17. Driven Shaft
18. Key
19. Bearing
20. Flange Plate
21. Cap Screw
22. Washer
23. Stub Shaft
24. Driven Pulley
25. Washer
26. Washer
27. Washer
28. Cap Screw
29. Brake Caliper Assy
30. Housing
31. Cap Screw
32. Bleed Screw
33. Brake Pad Set
34. Retaining Pin
35. Housing
36. O-Ring
37. O-Ring
38. Piston
39. Washer
40. Adapter Fitting
41. Cap Screw

* Sprocket style will vary from model to model.

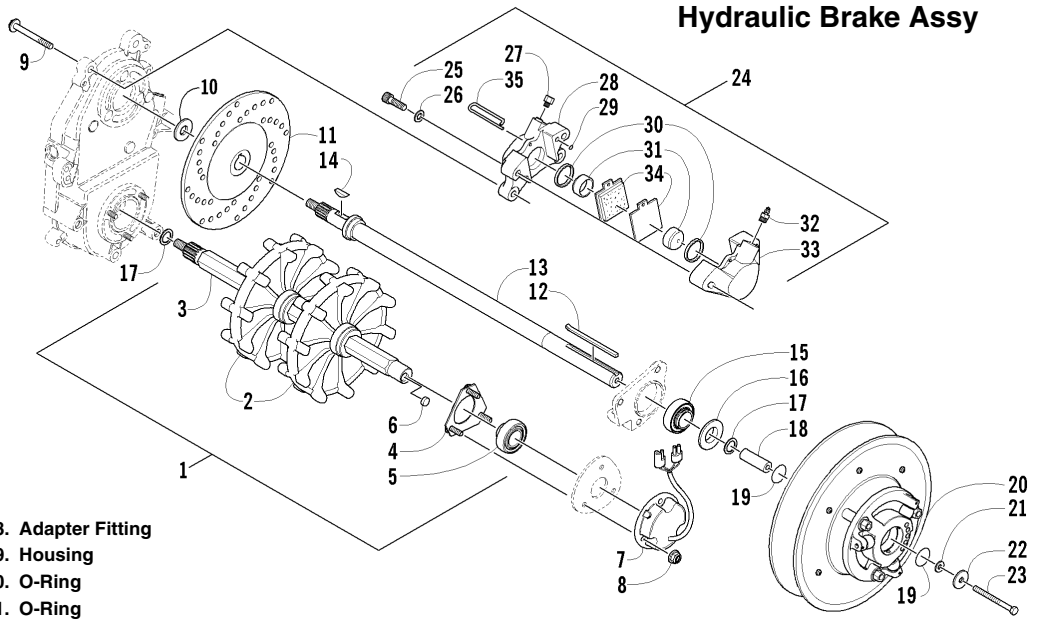


0739-549

Drive & Driven Shafts/ Hydraulic Brake Assy

KEY

1. Track Drive Assy
2. Drive Sprocket
3. Driveshaft
4. Flange Plate
5. Bearing
6. Magnet
7. Voltage Regulator/ Speedometer Pickup Module
8. Lock Nut
9. Cap Screw
10. Washer
11. Brake Disc
12. Key
13. Driven Shaft
14. Key
15. Bearing
16. Spacer
17. Washer
18. Stub Shaft
19. O-Ring
20. Driven Pulley
21. Washer
22. Washer
23. Washer
24. Cap Screw
25. Brake Caliper Assy
26. Cap Screw
27. Washer
28. Adapter Fitting
29. Housing
30. O-Ring
31. O-Ring
32. Piston
33. Bleed Screw
34. Housing
35. Brake Pad Set
36. Retaining Pin



0740-562

Drive Train Schematics

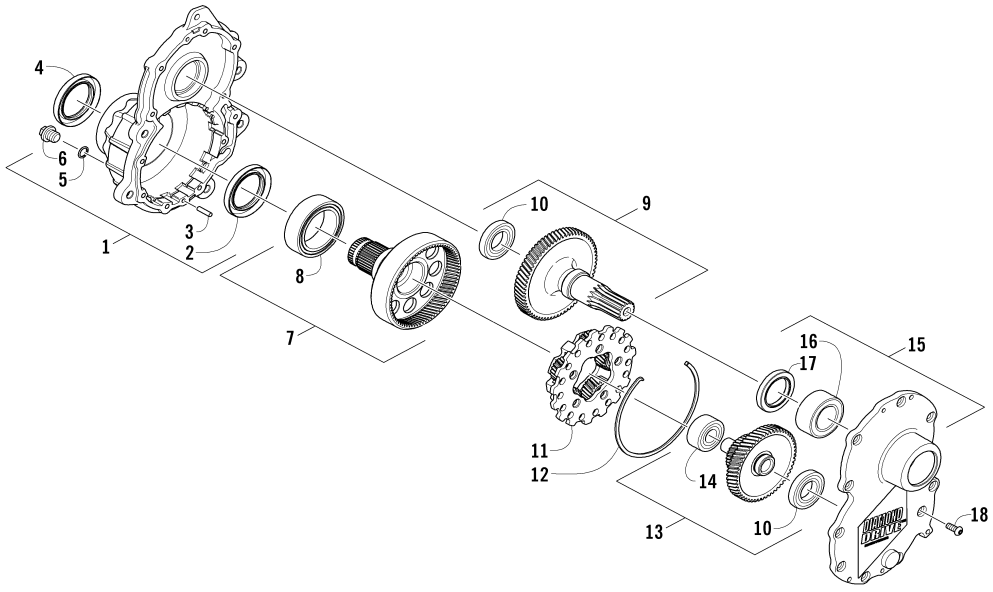
(w/ACT Drive)

■ **NOTE: Determine which type of drive train is being serviced and refer to the appropriate illustration for component details; then disassemble and assemble accordingly. Some components will vary from model to model. The technician should use discretion and sound judgment when removing and installing components.**

KEY

1. Gear Case
2. Oil Seal
3. Dowel Pin
4. Oil Seal
5. O-Ring
6. Plug
7. Ring Gear
8. Bearing
9. Input Shaft
10. Bearing
11. Planetary Gear
12. Retaining Ring
13. Transfer Gear
14. Bearing
15. Cover
16. Bearing
17. Oil Seal
18. Machine Screw

Gear Case Assy



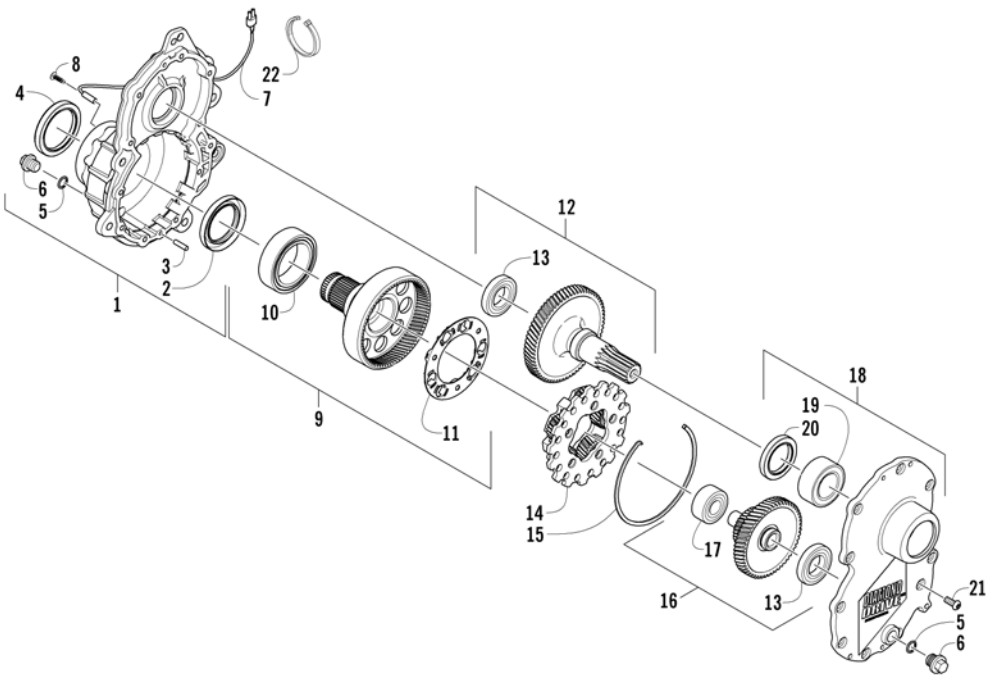
0739-602

8

Gear Case Assy

KEY

1. Gear Case
2. Oil Seal
3. Dowel Pin
4. Oil Seal
5. O-Ring
6. Plug
7. Speedometer Sensor
8. Clip
9. Ring Gear
10. Bearing
11. Retainer
12. Input Shaft
13. Bearing
14. Planetary Gear
15. Retaining Ring
16. Transfer Gear
17. Bearing
18. Cover
19. Bearing
20. Oil Seal
21. Machine Screw
22. Cable Tie

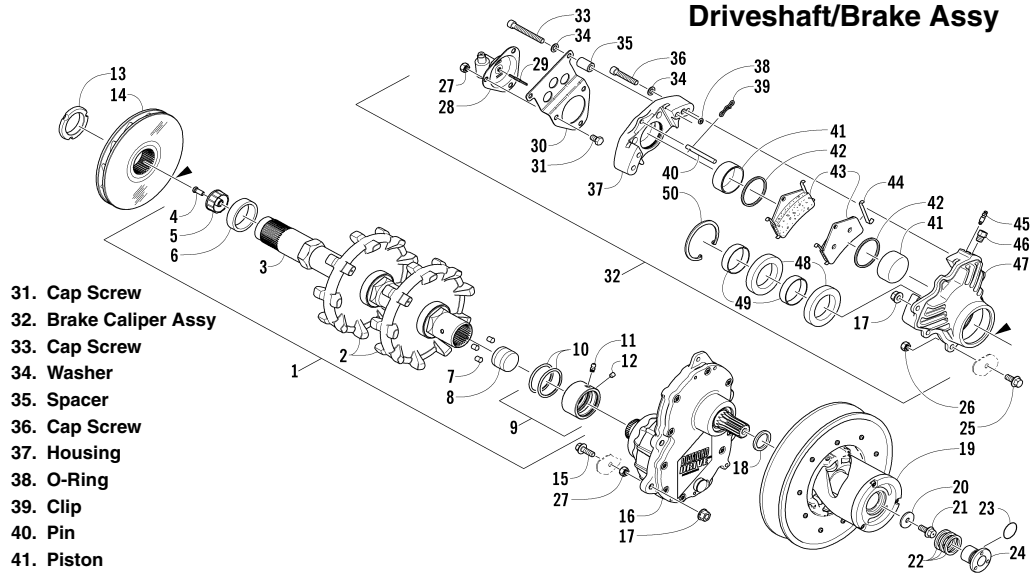


0740-711

Driveshaft/Brake Assy

KEY

1. Track Drive Assy
2. Drive Sprocket
3. Driveshaft
4. Drive Bushing
5. Plug
6. Collar
7. Pin
8. Plug
9. Lock Collar
10. O-Ring
11. Grease Fitting
12. Set Screw
13. Retaining Nut
14. Brake Disc
15. Cap Screw
16. Gear Case Assy
17. Lock Nut
18. Washer
19. Driven Pulley
20. Washer
21. Cap Screw
22. Washer
23. O-Ring
24. Sheave Adjuster
25. Cap Screw
26. Lock Nut
27. Lock Nut
28. Drive Adapter
29. Cable Adapter
30. Bracket
31. Cap Screw
32. Brake Caliper Assy
33. Cap Screw
34. Washer
35. Spacer
36. Cap Screw
37. Housing
38. O-Ring
39. Clip
40. Pin
41. Piston
42. O-Ring
43. Brake Pad Set
44. Clip
45. Bleeder Fitting
46. Fitting
47. Housing
48. Bearing
49. Sleeve
50. Ring

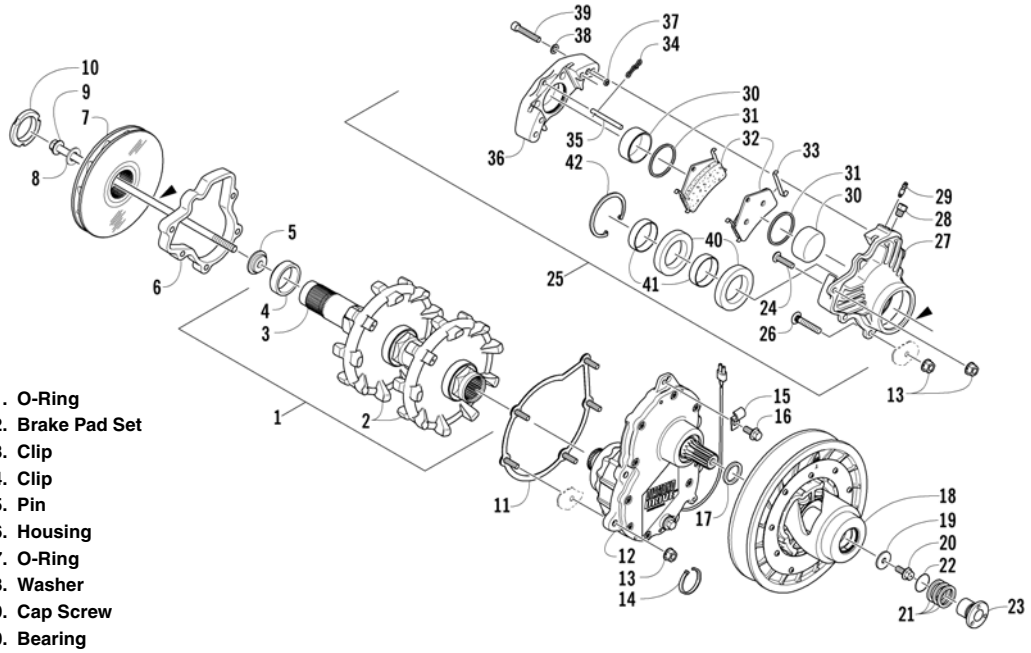


0739-601

KEY

1. Track Drive Assy
2. Drive Sprocket
3. Driveshaft
4. Collar
5. Insert
6. Spacer
7. Brake Disc
8. Washer
9. Cap Screw
10. Retaining Nut
11. Mounting Plate
12. Gear Case Assy
13. Lock Nut
14. Cable Tie
15. Clamp
16. Cap Screw
17. Washer
18. Driven Pulley
19. Washer
20. Cap Screw
21. Washer
22. O-Ring
23. Sheave Adjuster
24. Machine Screw
25. Brake Caliper Assy
26. Carriage Bolt
27. Housing
28. Fitting
29. Bleeder Fitting
30. Piston
31. O-Ring
32. Brake Pad Set
33. Clip
34. Clip
35. Pin
36. Housing
37. O-Ring
38. Washer
39. Cap Screw
40. Bearing
41. Sleeve
42. Ring

Driveshaft/Brake Assy

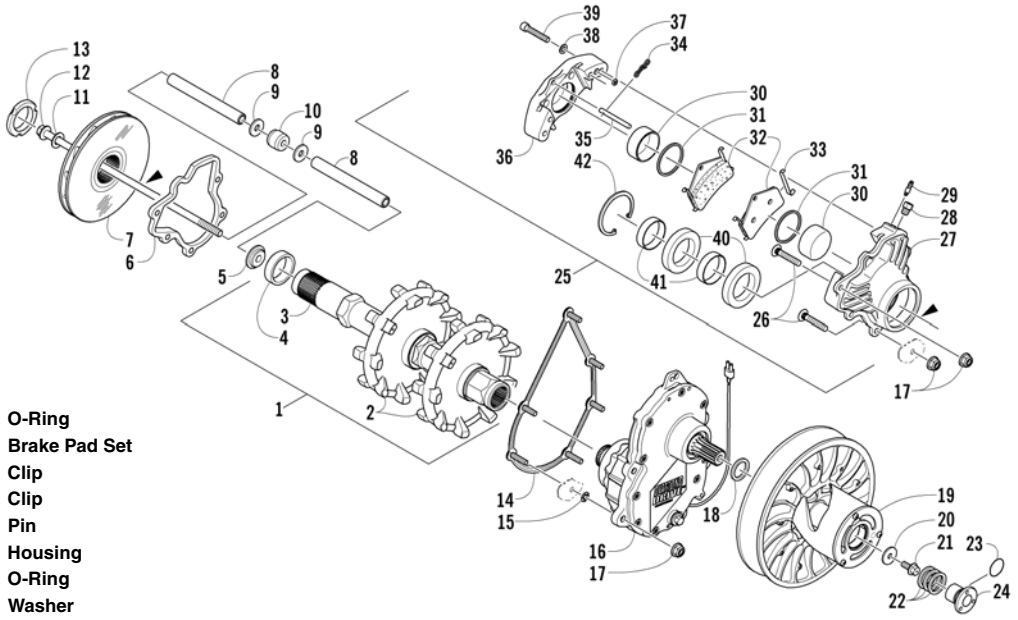


0740-712

KEY

1. Track Drive Assy
2. Drive Sprocket
3. Driveshaft
4. Collar
5. Insert
6. Spacer
7. Brake Disc
8. Tube
9. Washer
10. Isolator
11. Washer
12. Cap Screw
13. Retaining Nut
14. Plate
15. Push Nut
16. Gear Case Assy
17. Lock Nut
18. Washer
19. Driven Pulley
20. Washer
21. Cap Screw
22. Washer
23. O-Ring
24. Sheave Adjuster
25. Brake Caliper Assy
26. Carriage Bolt
27. Housing
28. Fitting
29. Bleeder Fitting
30. Piston
31. O-Ring
32. Brake Pad Set
33. Clip
34. Clip
35. Pin
36. Housing
37. O-Ring
38. Washer
39. Cap Screw
40. Bearing
41. Sleeve
42. Ring

Driveshaft/Brake Assy



0740-757

Drive Train/Brake Disc
(Standard w/Reverse)

DISASSEMBLING

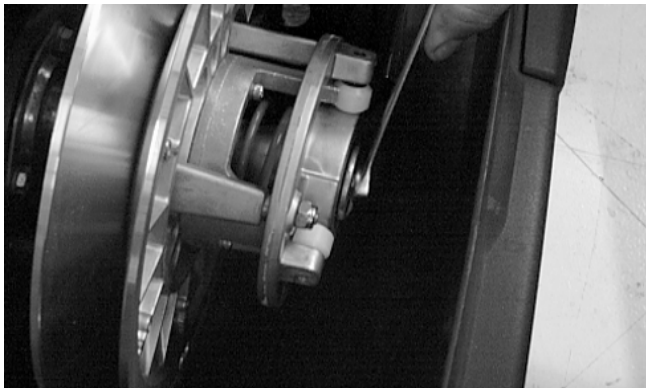
1. Remove the chain-case drain plug located on the lower back side of the chain case inside the tunnel and drain the chain case lubricant.

2. Disconnect the battery cables. Remove the battery and battery tray.

■ NOTE: On Firecat r/Sabercat models, the expansion chamber and resonator must be removed prior to step 2.

3. Open the belt guard and remove the drive belt.

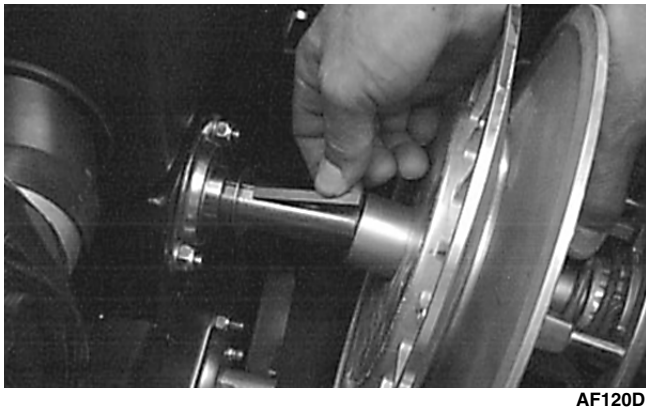
4. Remove the cap screw and washer securing the driven pulley; then account for and note the position of any alignment washers.



SC013D

5. Slide the driven pulley off the driven shaft; then remove the driven pulley from the engine compartment. Account for the key, stub shaft, and alignment washers.

■ NOTE: If the driven pulley is tight on the driven shaft, pull the driven pulley off using the Driven Pulley Puller (p/n 0744-023).



AF120D

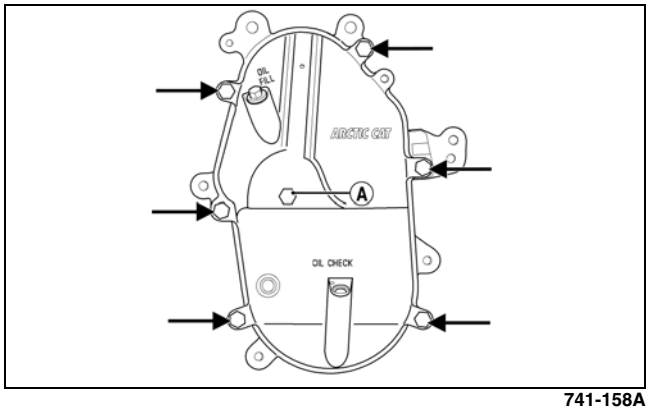
■ NOTE: Tip the snowmobile on its left side positioning the chain case side of the snowmobile up. Place a piece of cardboard under the side of the snowmobile to prevent scratching of bumper and belly pan.

⚠ CAUTION

On models with mirrors before tipping the snowmobile on its side, position a block of wood under the side of the snowmobile to keep the mirrors from contacting the floor or damage may occur.

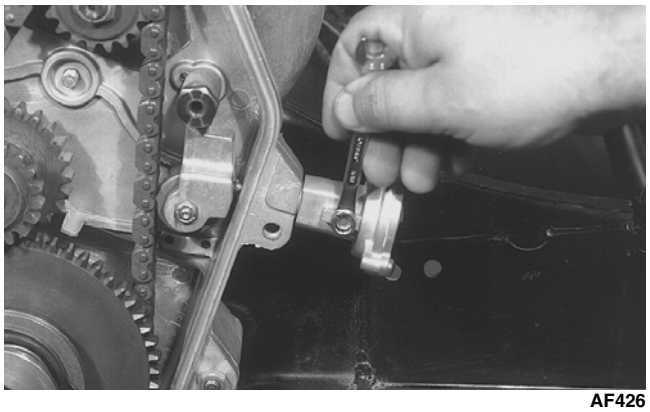
6. Disconnect the shift linkage from the arm on chain case.

7. Remove the cap screw (A) from the center of the chain case; then remove the remaining cap screws securing the chain case cover; then remove the cover by pulling outward and lifting up so the shift fork clears the large inner washer.



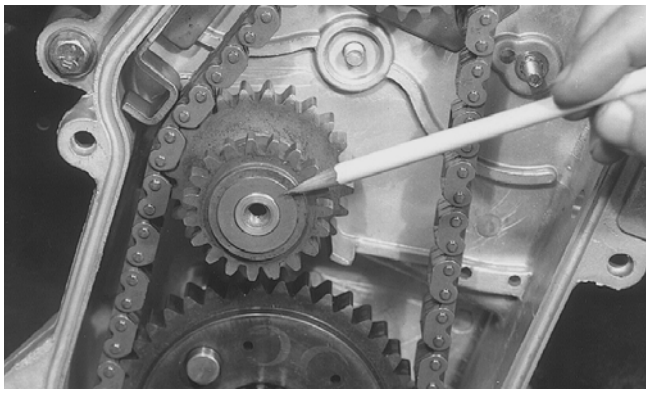
741-158A

8. Remove the screw from the chain adjuster housing and install an 8-32 set screw to lock the chain adjuster in position.



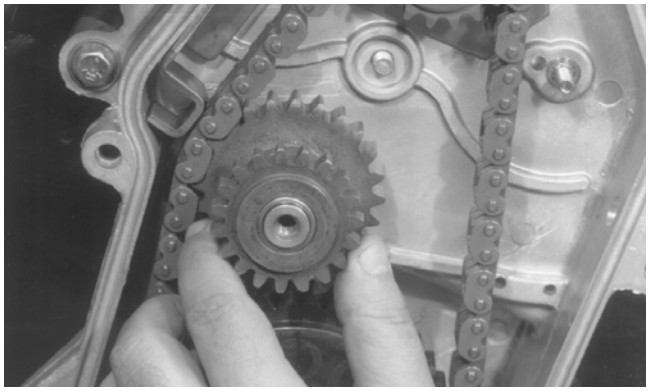
AF426

9. Remove the shim washer from the idler sprocket.



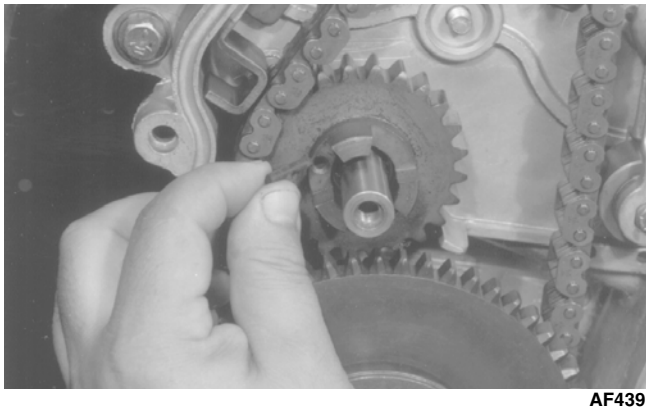
AF436

10. Remove the outer idler sprocket from the shaft.



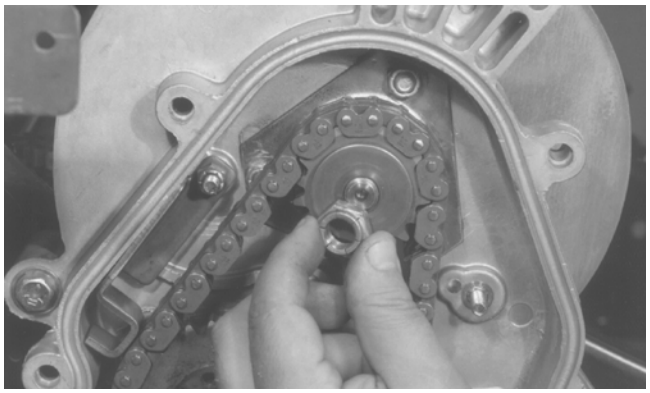
AF437

11. Slide the small rubber alignment pin from the face of the inner idler sprocket and place in safe location until assembly.



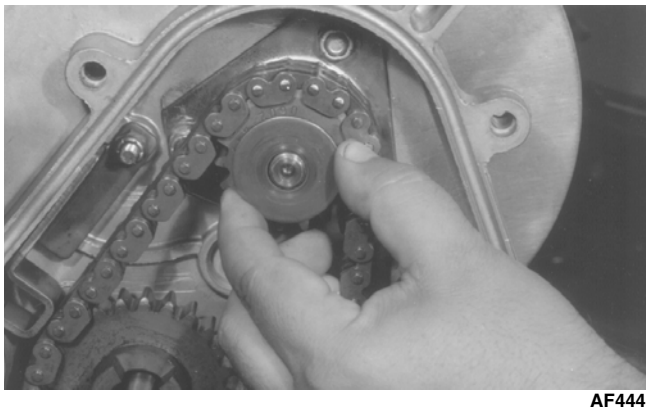
AF439

12. Remove the lock nut securing the top sprocket.



AF432

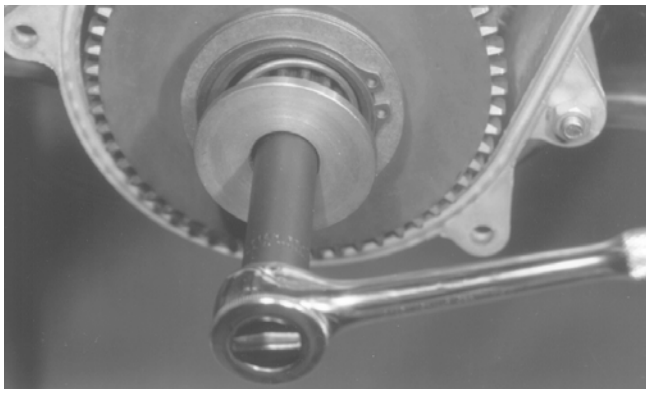
13. Remove the spring washer in front of the top sprocket.



AF444

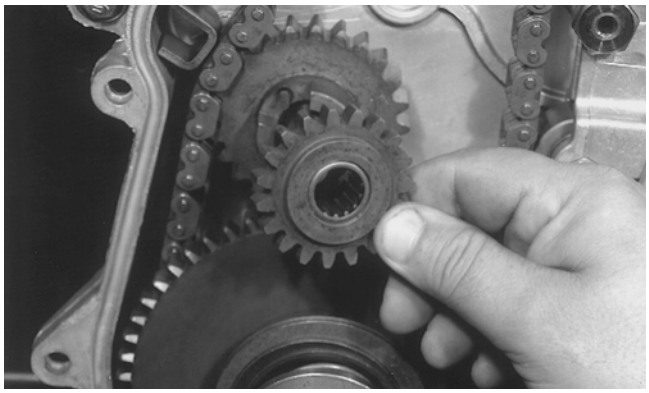
14. Set the brake lever lock. Remove the cap screw and large washer securing the bottom sprocket.

■ **NOTE: The bottom sprocket cap screw and washer are spring loaded.**



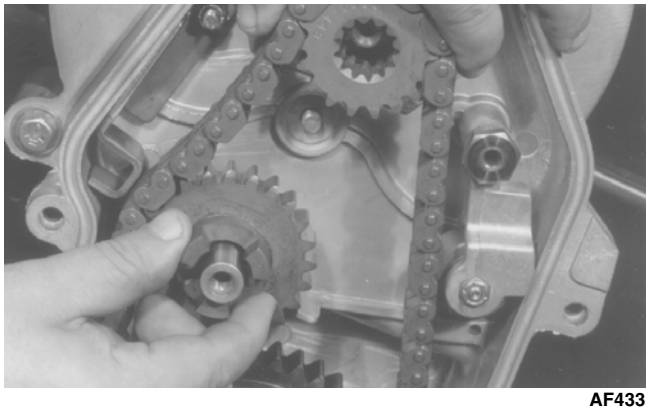
AF428

15. Remove the reverse gear.



AF442

16. Remove the top sprocket, chain, and idler gear. Account for one shim washer located behind the idler gear.



AF433

■ **NOTE: If the chain is too tight and wont allow the top sprocket to be removed, remove the PTO-side driven shaft bearing. This will allow the driven shaft to be lifted at the PTO-side and will loosen the chain.**

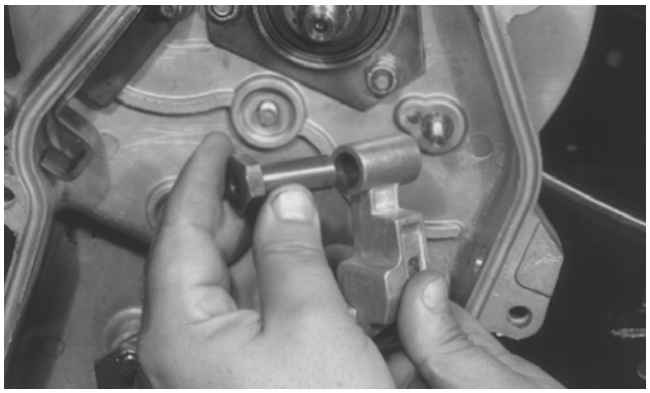
17. Remove the driveshaft extension, bottom sprocket, and spacer washer.



AF427

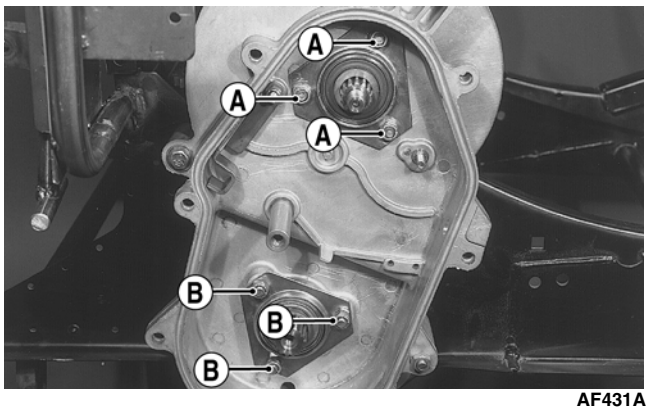
18. Check the idler gear shaft. If the shaft surface is rough, remove the shaft using a pair of vise-grip pliers. Rotate the shaft counterclockwise.

19. Remove the shoulder nut securing the chain tightener arm; then remove the arm from the chain case.



AF447

20. Remove the three lock nuts (A) securing the top bearing flange plate. Remove the flange plate, seal, and bearing; then remove the three lock nuts (B) securing the bottom bearing flange plate. Remove the flange plate, seal, and bearing.



AF431A

■ **NOTE: Steps 21-25 are for Bearcat/Panther/Z models.**

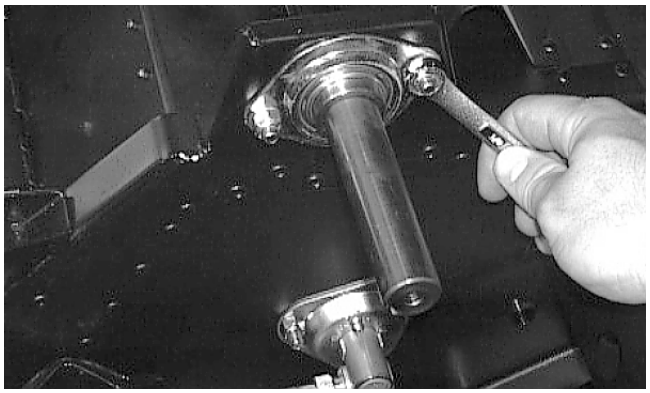
21. Remove the screw securing the air-intake silencer to the steering support; then pull the silencer forward and place it on the carburetor/ throttle body assembly.

■ **NOTE: Using a hold-down strap, secure the air-intake silencer to the engine.**

22. Loosen the set screw on the PTO-side driven shaft collar. Drive the collar clockwise (opposite shaft rotation) until it is free.

■ **NOTE: A fine file should be used to remove any burrs left by the collar set screw.**

23. Remove the lock nuts and carriage bolts securing the PTO-side driven shaft flange plates.



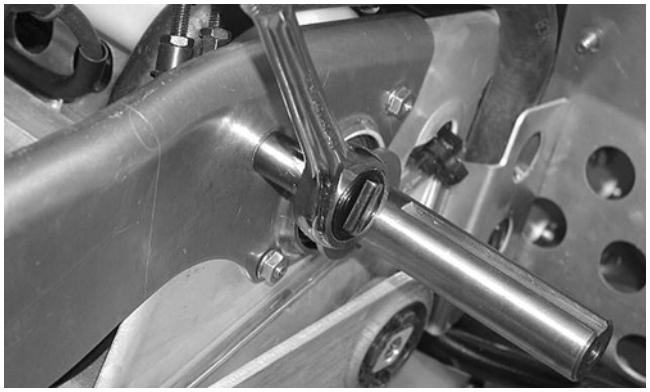
AF002D

24. Force the driven shaft toward the PTO-side (rotating the shaft to prevent the brake disc from binding on the shaft) until brake disc is free. Account for the key.

25. Continue to slide the driven shaft until it is out of the PTO-side. Account for a bearing, two flange plates, and the PTO-side driven shaft collar.

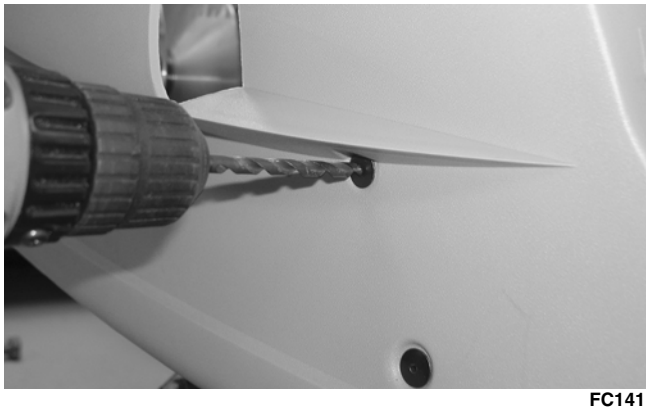
■ NOTE: Steps 26-29 are for Firecat r/Sabercat models.

26. Remove the three bearing retainer nuts from the PTO-side plate brace; then remove the machine screws securing the PTO-side plate brace and remove the brace.



FC140

27. Remove the two large-head rivets below the left-side air-out vent on the left-side belly pan.



FC141

28. Using a rubber mallet (or suitable substitute), tap the driven shaft from the chain case side until free.



FC142

29. Pull down on the side pan by the left-side hood latch; then slide the driven shaft out the PTO-side of the chassis.



FC143

30. Remove the skid frame from the tunnel (see Section 9).

31. Remove the three PTO-side lock nuts securing the driveshaft flange bearing assembly and cable adapter. Remove the adapter and speedometer cable.



AF053

32. Tap the driveshaft toward the chain case to unseat the MAG-side bearing. Remove the bearing.

33. Slide the driveshaft toward the MAG-side until the PTO-side of the driveshaft is out of its mounting hole. Tilt the end of the driveshaft away from the tunnel and slide the driveshaft free of the tunnel. Remove the track.



AF055

34. Scribe a line on the driveshaft along the edge of each sprocket to aid in assembly. Loosen the set screw on the collar and drive the collar clockwise until free; then remove the bearing and flange plates from the driveshaft.

35. Press the sprockets off the driveshaft.

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Thoroughly wash all metallic components in parts-cleaning solvent. Dry using compressed air.

2. Wash all non-metallic components with soap and water.

3. Inspect the driveshaft and driven shaft for damaged splines or stripped threads.

4. Inspect the bearings for any roughness or damage.

5. Inspect the seals for any breaks or damage.

6. Inspect the track for cuts, gouges, or wear.

7. Inspect the keyways in the driven shaft for wear or damage.

8. Inspect the brake disc for wear or cracks.

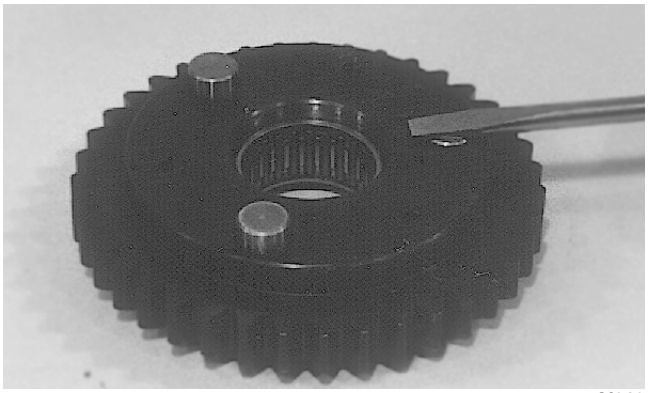
9. Inspect the track drive sprockets for wear or damage.

10. Inspect the top sprocket for any chipped or worn teeth.

11. Inspect the bottom sprocket teeth for wear. Turn the inner sprocket bearing by hand and inspect for any signs of being rough.

12. Inspect the three bottom sprocket drive pins. Check the pin edges for chipping and wear.

13. Inspect the drive pin springs for tension by pushing each pin into the sprocket and releasing it. It must snap back out without any signs of binding. If any of these items (pins, bearing, sprocket, teeth) appear worn, replace the sprocket as an assembly.



AI019

14. Inspect the idler gear sprocket teeth and bearings. Rotate the inner bearings by hand. Check each sprocket tooth for any signs of chipping and wear.

15. Closely inspect the drive chain for broken links.

16. Inspect the reverse gear. Inspect the teeth for wear and chipping. Inspect the edges of drive pin holes for any signs of chipping and wear.

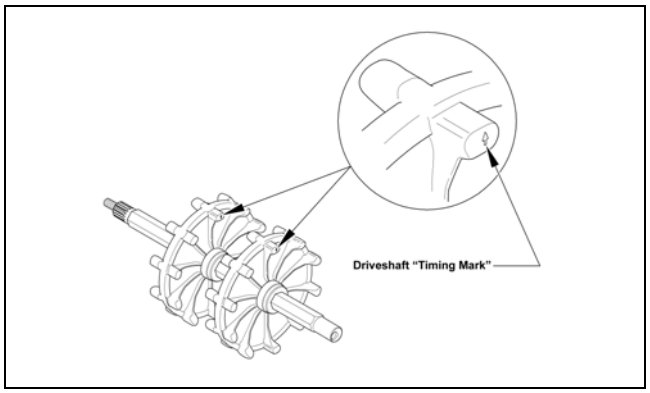
17. Remove the snap ring from the reverse gear. Remove the outer thrust washer, thrust bearing, and inner thrust washer. Inspect the thrust bearing by placing it between the two thrust washers and rotating the thrust washer. Rotation must feel smooth. If any roughness is noted, replace the thrust washers and bearing as a set.

18. Inspect the chain tightener bearing. Rotate the tightener roller and check for smooth rotation. If rotation feels rough, replace roller and bearing assembly.

ASSEMBLING

1. Press the sprockets on the driveshaft noting the scribed marks on the shaft and the timing mark found on one tooth of each sprocket. The timing mark is an arrow molded into the outer surface of one drive tooth. All the arrow markings must be in alignment.

■ **NOTE: Sprocket style will vary from model to model.**



739-057A

■ **NOTE: Make sure all sprockets are installed correctly to ensure correct timing of the sprockets. The bearing is positioned between the flange plates.**

2. Assemble the driveshaft components on the PTO-side of the driveshaft.

3. Install the bearing lock collar; then install the flange bearing assembly with the bolts facing towards the tunnel.

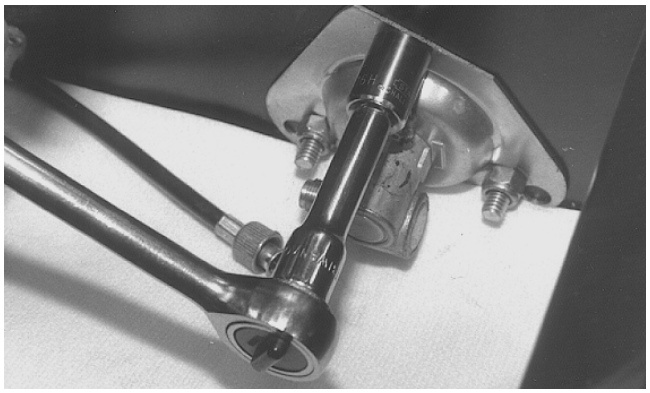
4. Position the front of the track up into the tunnel. Install the driveshaft with the splined end through its mounting hole in the chain case.



AF055

5. Place the PTO-side of the driveshaft into position by sliding the bolts of the flange bearing assembly through the holes in the tunnel.

6. Place the cable adapter into position on the flange bearing assembly bolts. Secure with three lock nuts. Tighten to specifications.



AF053

■ **NOTE: Steps 7-11 are for Bearcat/Panther/Z models.**

7. Slide the MAG-side bearing onto the driveshaft (inner race flange must be positioned toward drive chain); then install the O-ring and flange plate. Secure with three carriage bolts and lock nuts. Tighten to specifications.

■ **NOTE: Prior to installation, lubricate the O-ring with Low-Temp Snowmobile Grease (p/n 0636-593).**

8. Slide the brake disc into position on the splined end of the driven shaft.

9. Install the PTO-side bearing with collar and flange plates on the driven shaft; do not tighten the collar at this time. Place the driven shaft into position making sure the brake disc and flange plates are properly positioned. Secure the PTO-side bearing and flange plates with two carriage bolts and lock nuts. Tighten to specifications.

10. On the MAG-side driven shaft, install the bearing, O-ring, and flange plate. Secure with three lock nuts. Tighten to specifications.

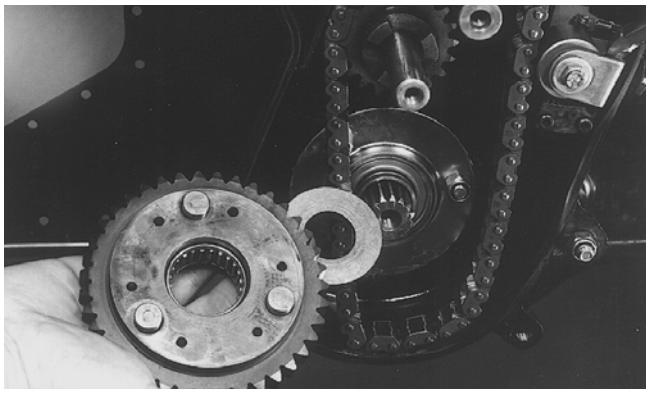
■ **NOTE: Prior to installation, lubricate the O-ring with Low-Temp Snowmobile Grease (p/n 0636-593).**

⚠ CAUTION

Tighten the flange plate nuts evenly or the O-ring seal may be damaged.

■ **NOTE: If washers were removed from behind the upper sprocket, install them at this time.**

11. Install the spacer washer on the driveshaft.



AF090

■ **NOTE: Steps 12-14 are for Firecat r/Sabercat models.**

12. Pull down on the side pan by the left-side hood latch; then slide the driven shaft into the chasis and into the chain case.



FC143

13. Place the PTO-side plate brace into position; then install the three bearing retaining nuts on the PTO-side plate brace. Tighten nuts securely.



FC140

14. Secure the brace with machine screws.



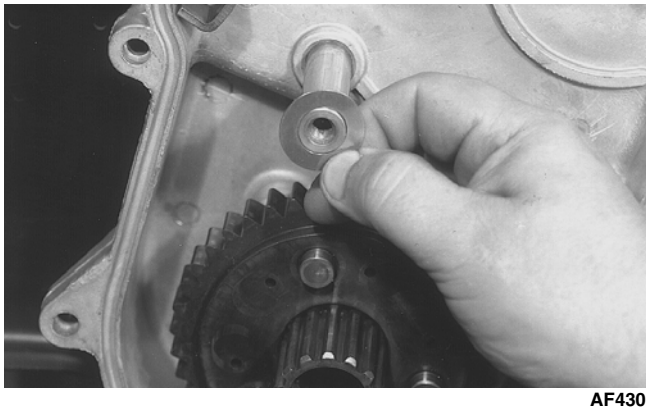
FC136

15. Install the bottom sprocket and driveshaft extension.



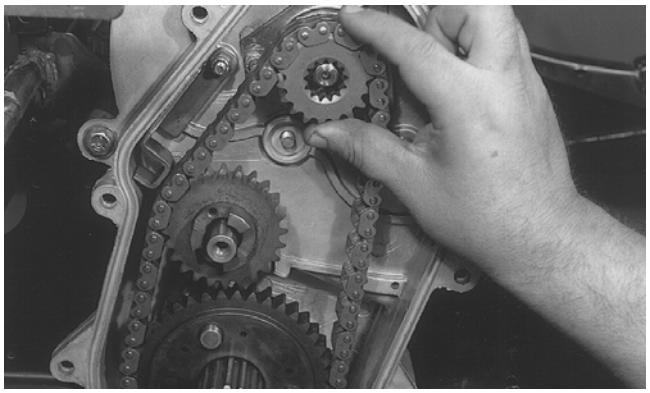
AF427

16. Position one shim washer on the idler gear shaft.



AF430

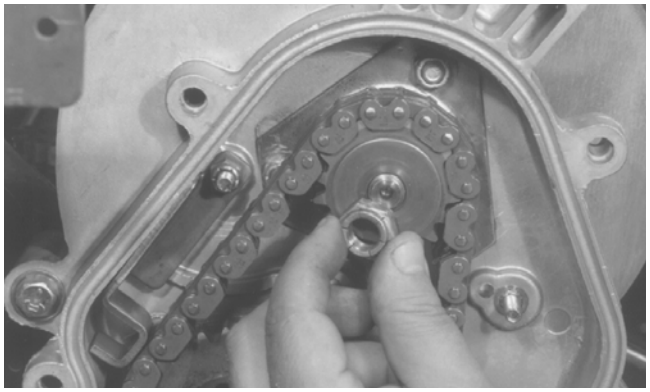
17. Position the chain around the lower reverse sprocket; then place the idler sprocket and top sprocket into the chain. Slide sprockets into position on the idler shaft and driven shaft.



AF441

■ **NOTE: If the chain tension is too tight to allow installation of the top sprocket, remove the PTO-side driven shaft bearing. This will allow the driven shaft to be lifted at the PTO-side and will allow the sprocket to slide onto the splined end of the driven shaft.**

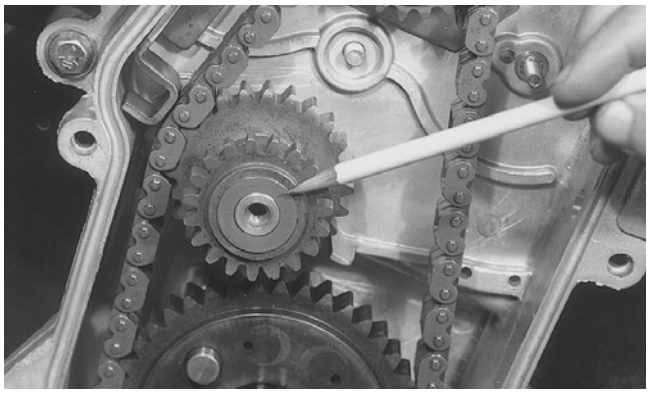
18. Secure the top sprocket with a spring washer (with the high side directed away from the sprocket) and lock nut (coated with green Loctite #609). Tighten the lock nut to specifications.



AF432

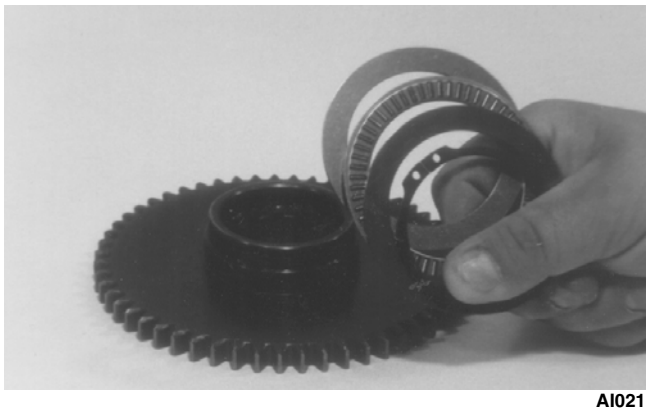
■ **NOTE: If the PTO-side driven shaft bearing was removed to make the sprocket installation easier, install the bearing and flange plate. Lock the bearing collar by driving it in the direction of rotation to lock the collar to the bearing and shaft. Tighten the collar set screw.**

19. Place the rubber alignment pin into position in the idler sprocket; then slide the outer idler gear on the shaft. Install shim washer on the shaft.



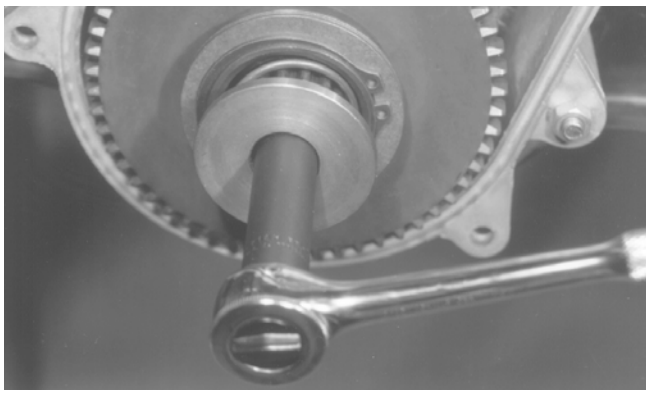
AF436

20. If the lower reverse sprocket was disassembled, assemble the thrust washer, bearing, and thrust washer. Secure with the snap ring. Apply transmission lube to the bearing and rotate by hand.



AI021

21. Slide the reverse gear onto the driveshaft extension; then position the spring into the reverse gear and secure with heavy washer and cap screw (coated with blue Loctite #243). Tighten to specifications.



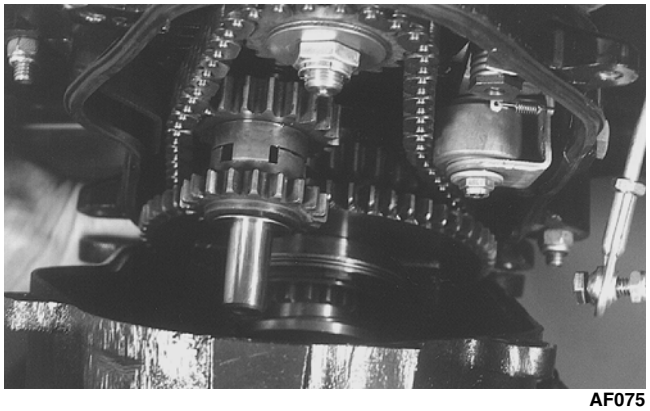
AF428

22. Install the chain tensioner arm, apply blue Loctite #243 to the stud threads, and tighten the shoulder nut to specifications.

23. Remove the set screw from the chain adjuster housing and install the adjuster plug.

24. Check that the chain-case O-ring seal is positioned correctly on the housing.

25. Position the shift fork behind the large thrust washer and bearing on the reverse gear; then position the cover on the housing.



AF075

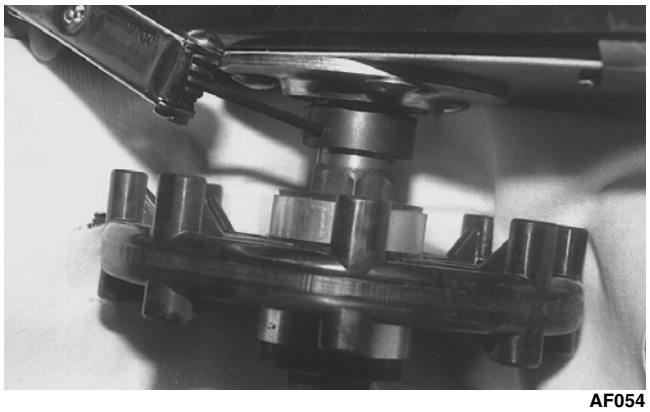
26. Apply blue Loctite #243 to the threads of the cap screw; then install the cap screw through the center of the cover and into the idler shaft. Tighten the cap screw enough to draw the idler shaft into the cover.

27. Place the shift pivot and reverse switch bracket into position on the cover; then secure the chain-case cover with cap screws and lock washers. Tighten the cap screws to specifications.

28. Place the shift linkage into position on the back side of the arm and secure with a cap screw and lock nut. Tighten to specifications.

29. Place the reverse lever into position on the shift pivot and secure with a clevis pin and cotter pin.

30. On the PTO-side of the track driveshaft, slide the lock collar against the bearing, drive the collar in the direction of rotation until tight, and tighten the collar set screw.



AF054

31. Install the skid frame (see Section 9).

32. On standard models, remove the hold-down strap securing the air-intake silencer; then place the silencer into position making sure the boot is properly positioned on the carburetor/throttle body assembly. Secure the silencer to the steering support with the two screws.

33. Apply a light coat of grease or Loctite Anti-Seize Thread Compound (p/n 0678-146) to the driven shaft; then install the driven shaft alignment washers (as required) and key. Install the stub shaft and the driven pulley, alignment washers (as required), washer, and cap screw (coated with blue Loctite #243). Tighten to specifications.

■ NOTE: Make sure the keyways match when installing the driven pulley. Arrange washers to allow the least amount of float on the driven shaft. A maximum of 1.5 mm (0.060 in.) float is allowable.



SC013D

34. Check the alignment of the drive clutch/driven pulley (see appropriate Drive Clutch/Driven Pulley in this section).

35. Assure that the chain case drain plug is tightened to specifications; then pour 354 ml (12 fl oz) of Arctic Cat Transmission Lube (p/n 0636-817) into the chain case.

36. Install the drive belt and check belt deflection. Secure the belt guard.

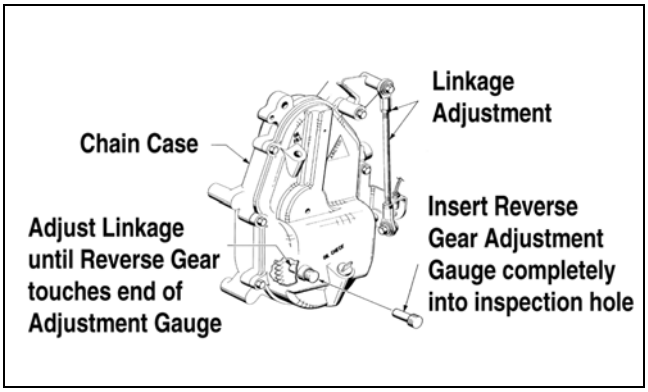
37. Install and secure the battery tray and battery; then connect the battery cables making sure to connect the positive cable first.

■ NOTE: On Firecat r/Sabercat models, install the resonator and expansion chamber.

ADJUSTING REVERSE LINKAGE

1. Start the engine; then test the shifting characteristics of the reverse transmission.

2. If adjustment of the reverse gear is necessary, stop the engine and remove the chain case inspection plug located behind the oil level stick; then insert the Reverse Gear Adjustment Gauge (p/n 0644-244) completely into the inspection hole.



0731-734

3. Pull the shift lever into the reverse position while holding the adjustment gauge firmly against the chain case cover. Slight outward pressure should be felt on the gauge as the lever locks into reverse.

4. If no contact is noted, loosen the jam nuts securing the lower shift linkage and adjust the linkage rod until the gauge is pushed out of the chain case 0.254-0.381 mm (0.010-0.015 in.). Lock the adjustment by tightening the jam nuts securely against the tie rod ends.

■ **NOTE: To adjust the linkage rod, the shift lever must be moved to the forward position.**

5. Install the inspection plug.

6. Start the engine; then test the shifting characteristics of the reverse transmission. Adjust as necessary.

⚠ CAUTION

The linkage must be properly adjusted. If the linkage is too short, damage to the shift fork may occur. If the linkage is adjusted too long, the gears will not shift totally into reverse.

Drive Train/Brake Disc
(Standard w/o Reverse)

⚠ CAUTION

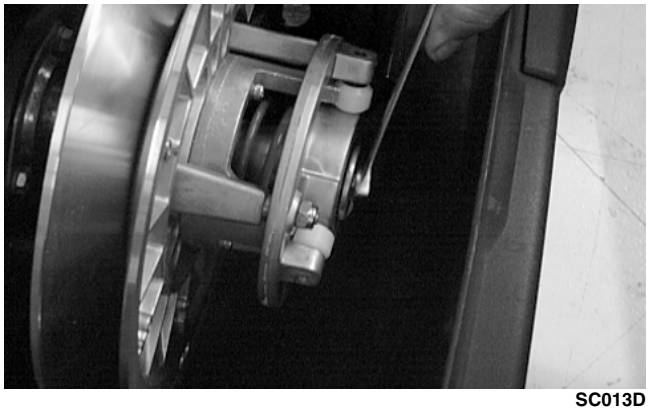
Never use an impact driver on models with a composite chain case. Damage to the chain case will occur.

DISASSEMBLING

1. Remove the chain-case drain plug (located on the lower back side of the chain case inside the tunnel) and drain the chain case lubricant.

2. Open the belt guard and remove the drive belt.

3. Remove the cap screw and washer securing the driven pulley; then account for and note the position of any alignment washers.

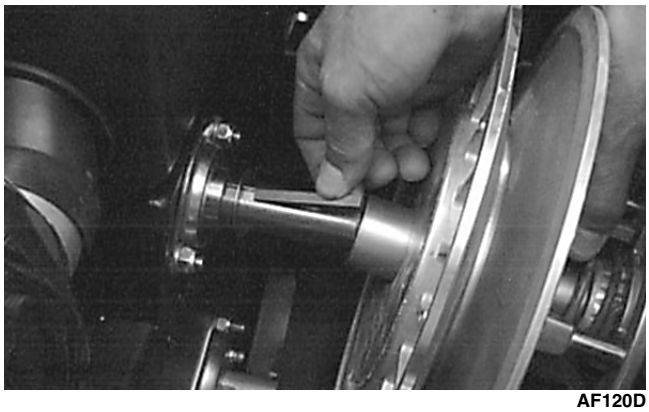


SC013D

4. Slide the driven pulley off the driven shaft; then remove the driven pulley from the engine compartment. Account for the stub shaft, key, and alignment washers.

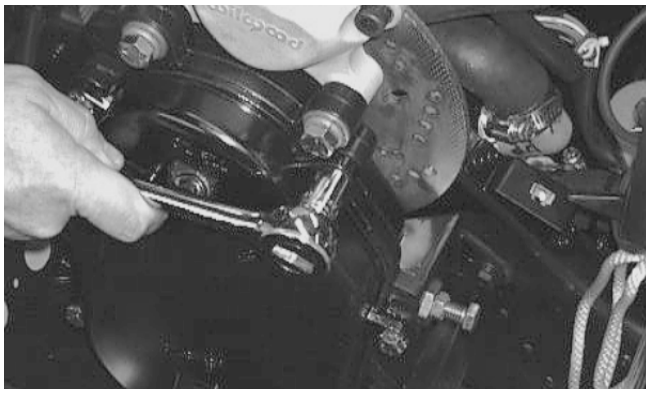
■ **NOTE: On Sabercat models, account for the inner and outer O-rings.**

■ **NOTE: If the driven pulley is tight on the driven shaft, pull the driven pulley off using the Driven Pulley Puller (p/n 0744-023).**



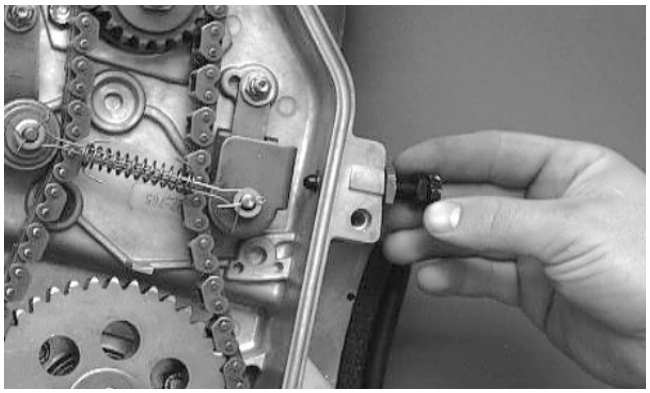
AF120D

5. Remove the cap screws and lock washers securing the chain-case cover; then remove the cover.



AF111D

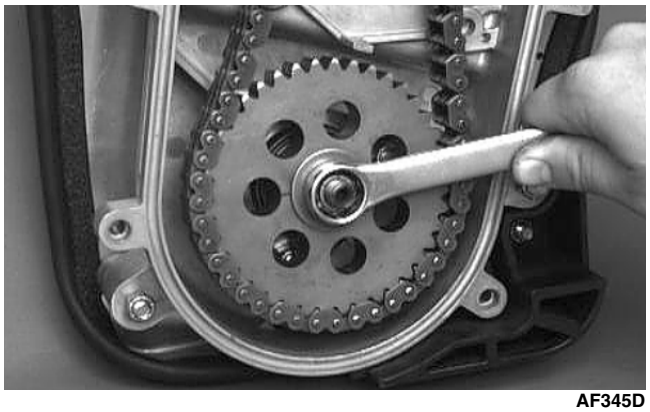
6. Loosen the mechanical chain tensioner bolt; then remove the cotter pins and washers securing the tensioner spring to the link pins. Remove the spring, rollers, and washers.



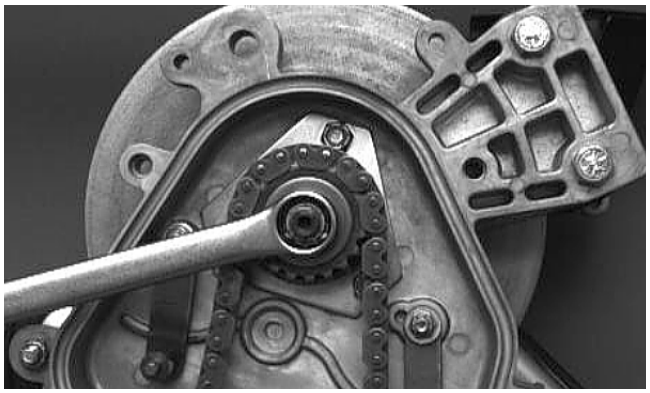
AF347D

7. Remove the flex nut securing the front roller cage and roller. Remove the cage and roller.

8. Set the brake lever lock; then remove the lock nut and spring washer securing the bottom sprocket and the lock nut and spring washer securing the top sprocket.



AF345D



AF344D

9. Slide both sprockets with chain off the shafts. Account for washer(s) behind the top sprocket. Release the brake lever lock.

■ NOTE: If a sprocket will not slide off the shaft, thread the nut onto the shaft; then use a puller to loosen the sprocket. The nut will prevent damage to the threads.

10. Remove the six lock nuts securing the top and bottom chain case flange plates. Remove the flange plates, seals, and bearings.



AF116D

11. On Bearcat/Panther/Z models, remove the screws securing the air-intake silencer to the steering support; then pull the silencer forward and place it on the carburetors/throttle body.

■ NOTE: Using a hold-down strap, secure the air-intake silencer to the engine.

12. Loosen the set screw on the PTO-side driven shaft collar. Drive the collar clockwise (opposite shaft rotation) until it is free.

■ NOTE: A fine file should be used to remove any burrs left by the collar set screw.

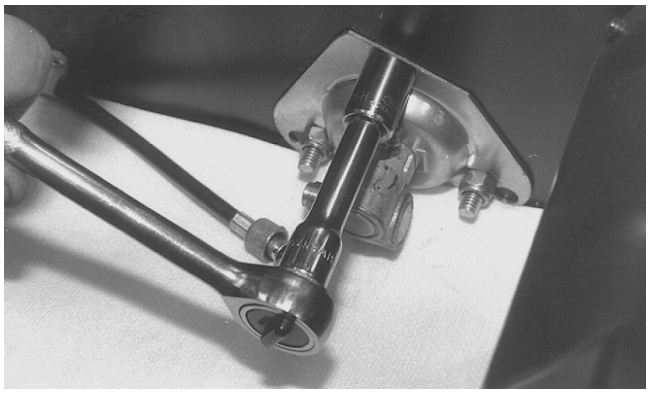
13. Remove the two lock nuts and carriage bolts securing the PTO-side driven shaft flange plate.

14. Force the driven shaft toward the PTO-side (rotating the shaft to prevent the brake disc from binding on the shaft) until the brake disc is free. Account for the key.

15. Continue to slide the driven shaft until it is out of the PTO-side. Account for a bearing, flange plate, and the PTO-side driven shaft collar.

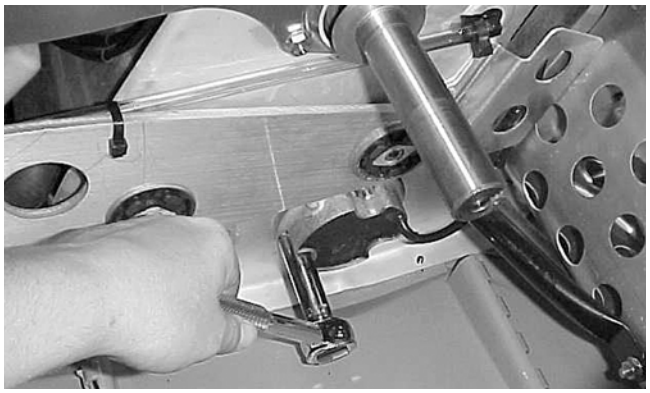
16. Remove the skid frame from the tunnel (see Section 9).

17. On Bearcat/Panther/Z models, remove the three PTO-side lock nuts securing the driveshaft flange bearing assembly and the speedometer cable adapter. Remove the cable adapter and speedometer cable.



AF053

■ **NOTE: On Firecat r/Sabercat models, remove the three lock nuts securing the voltage requlator/ speedometer pickup module; then remove the module.**



FC257

18. Tap the driveshaft toward the chain case to unseat the MAG-side bearing. Remove the bearing.

19. Slide the driveshaft toward the MAG-side until the PTO-end of the driveshaft is out of its mounting hole. Tilt the end of the driveshaft away from the tunnel and slide the driveshaft free of the tunnel. Remove the track.



AF055

20. Scribe a line on the driveshaft along the edge of each sprocket to aid in assembly. Loosen the set screw on the collar and drive the collar clockwise until free; then remove the bearing and flange plates from the driveshaft.

21. Press the sprockets off the driveshaft.

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Thoroughly wash all metallic components in parts-cleaning solvent. Dry using compressed air.

2. Wash all non-metallic components with soap and water.

3. Inspect the driveshaft and driven shaft for damaged splines or stripped threads.

4. Inspect the bearings for any roughness or damage.

5. Inspect the seals for any breaks or damage.

6. Inspect the track for cuts, gouges, or wear.

7. Inspect the keyways in the driven shaft for wear or damage.

8. Inspect the brake disc for wear or cracks.

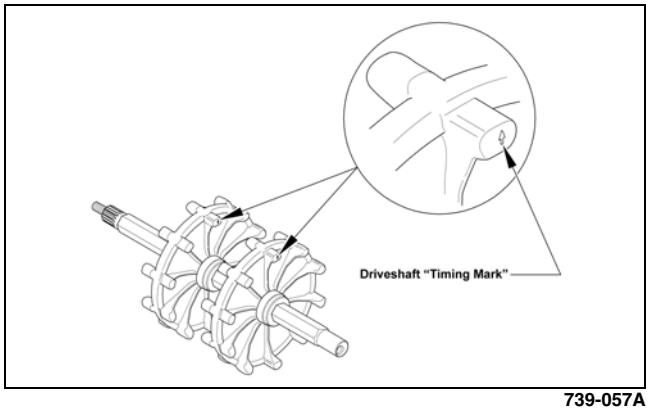
9. Inspect the chain, sprockets, and chain tensioner components for wear or damage.

10. Inspect the track drive sprockets for wear or damage.

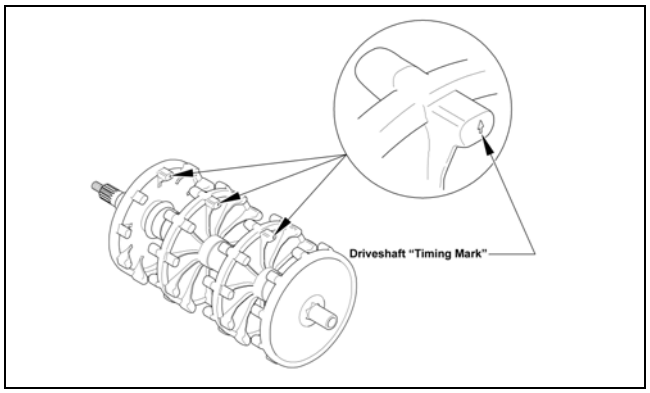
ASSEMBLING

1. Press the sprockets on the driveshaft noting the scribed marks on the shaft and the timing mark found on one tooth of each sprocket. The timing mark is an arrow molded into the outer surface of one drive tooth of the inside sprockets and on the inside surface of the outside sprockets. All the arrow markings must be in alignment.

■ **NOTE: Sprocket style will vary from model to model.**



739-057A



739-059A

■ **NOTE: Make sure the sprockets are installed correctly and the bearing is positioned between the flange plates ensuring correct timing of the sprockets.**

2. Assemble the driveshaft components on the PTO-end of the driveshaft.

3. Install the bearing lock collar; then install the flange bearing assembly with the bolts facing towards the tunnel.

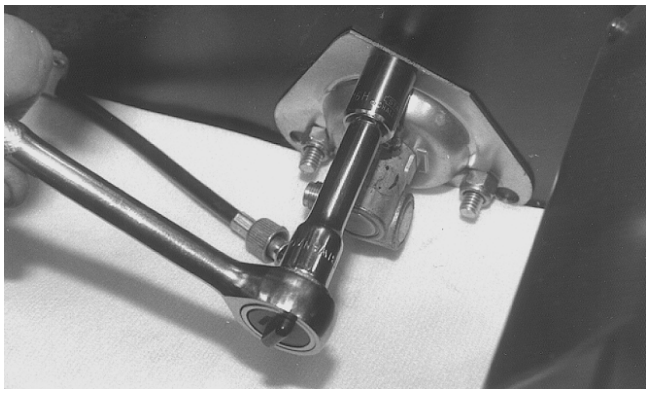
4. Position the front of the track into the tunnel. Install the driveshaft with the splined end through its mounting hole in the chain case.



AF055

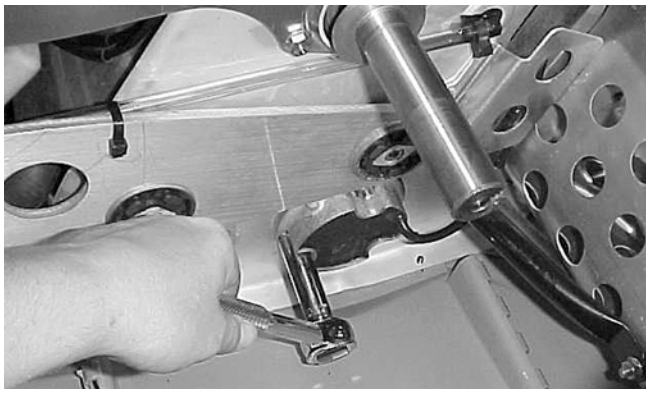
5. Place the PTO-end of the driveshaft into position by sliding the bolts of the flange bearing assembly through the holes in the tunnel.

6. On Bearcat/Panther/Z models, place the cable adapter into position on the flange bearing assembly bolts. Secure with three lock nuts. Tighten to specifications.



AF053

■ **NOTE: On Firecat r/Sabercat models, place the voltage regulator/speedometer pickup module into position. Install and tighten the three lock nuts to specifications.**



FC257

7. Slide the MAG-side bearing onto the driveshaft (inner race flange must be positioned toward drive chain); then install the O-ring seal and flange plate. Insert the cap screws from the inside of the tunnel through the chain case, seal, and flange. Secure with three lock nuts. Tighten to specifications.

8. Place the bottom sprocket onto the splines. Finger-tighten a lock nut (threads coated with blue Loctite #243) and spring washer. DO NOT TIGHTEN AT THIS TIME.

9. Install the PTO-side bearing with collar and flange plate on the driven shaft; do not tighten the collar at this time.

10. Place the driven shaft into position making sure the brake disc and flange plate are properly positioned. Secure the PTO-side bearing and flange plate with two carriage bolts and lock nuts. Tighten to specifications.

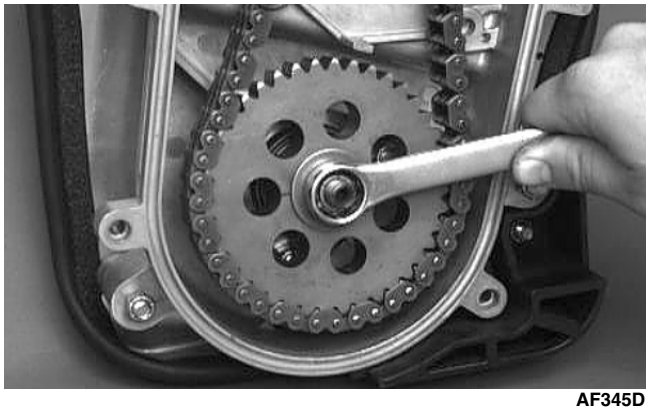
11. On the MAG-side of the driven shaft, install the bearing, seal, and flange plate. Secure with three lock nuts. Tighten to specifications.

■ **NOTE: If washers were removed from behind the top sprocket; install them at this time.**

12. Loop the chain around the bottom sprocket and slide the top sprocket with chain onto the driven shaft. Secure the top sprocket with a lock nut (threads coated with green Loctite #609) and spring washer. Tighten to specifications. Tighten the bottom sprocket lock nut (from step 8) to specifications.



AF344D

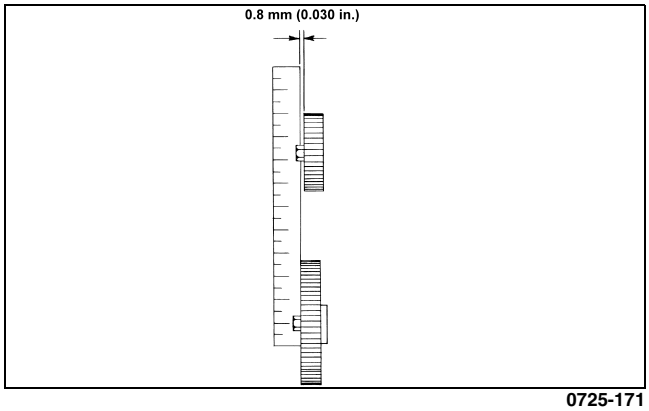


AF345D

13. Check the alignment of the sprockets using the following procedure.

    A. Place a straightedge against the faces of the sprockets.

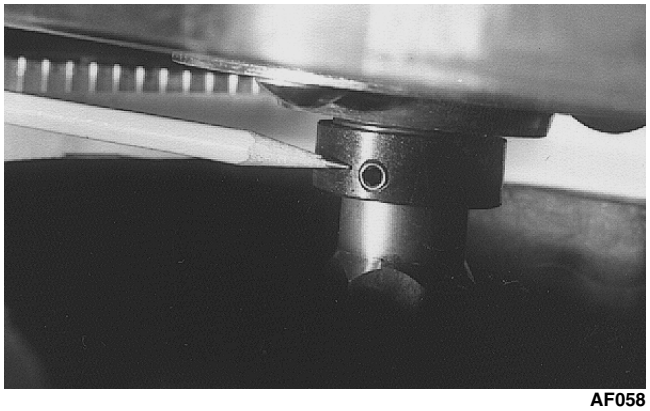
    B. Using a feeler gauge, check for clearance along the faces of both sprockets. If clearance exceeds 0.8 mm (0.030 in.), shimming is necessary.



0725-171

■ **NOTE: Sprockets can only be shimmed out.**

14. On Bearcat/Panther/Z models on the PTO-side of the driven shaft and the track driveshaft, slide the lock collar against the bearing, drive the collar in the direction of rotation until tight, and tighten the collar set screw securely.



AF058

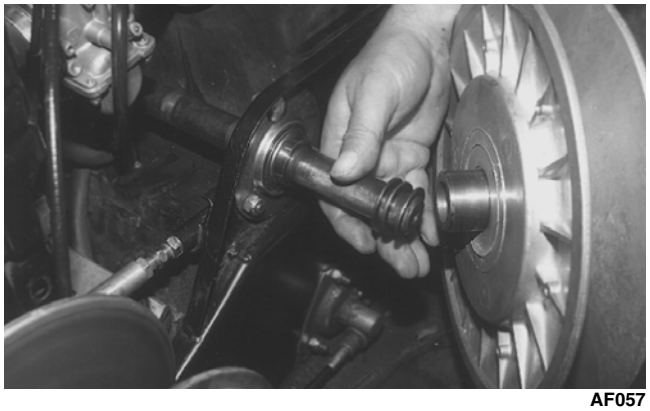
15. Install the skid frame (see Section 9).

16. On Bearcat/Panther/Z models, remove the hold-down strap securing the air-intake silencer; then place the silencer into position making sure the boot is properly positioned on the carburetors/ throttle body.

17. On Bearcat/Panther/Z models, secure the silencer to the steering support with the two screws.

18. Apply a light coat of grease or Loctite Anti-Seize Thread Compound (p/n 0678-146) to the driven shaft; then install the driven shaft alignment washers (as required) and key. Install the driven pulley, stub shaft, alignment washers (as required), washer, and cap screw. Tighten the cap screw (coated with blue Loctite #243) to specifications.

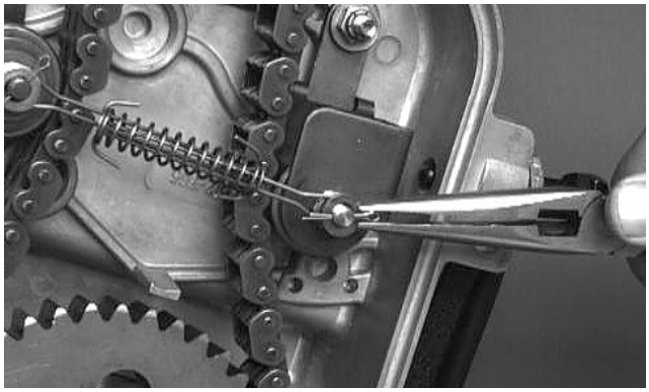
■ **NOTE: Make sure keyways match when installing the driven pulley. Arrange washers to allow the least amount of float on the driven shaft. A maximum of 1.5 mm (0.060 in.) float is allowable.**



AF057

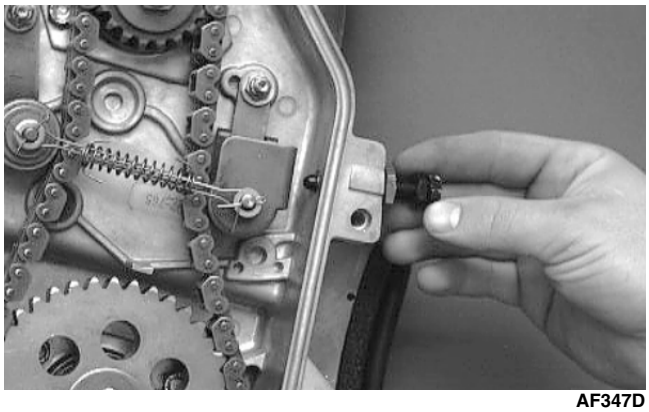
19. Check the alignment of the drive clutch/driven pulley (see appropriate Drive Clutch/Driven Pulley in this section).

20. Tip the snowmobile onto the PTO-side using cardboard to prevent scratching the belly pan; then install the washers, rollers, and spring. Secure with two washers and cotter pins.



AF113D

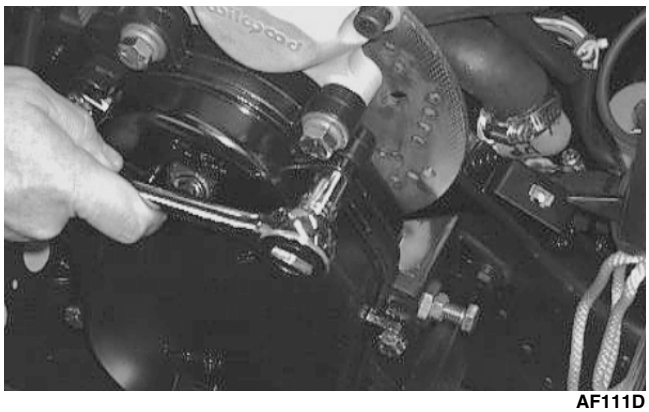
21. Tighten the mechanical chain tensioner finger-tight; then lock the jam nut against the chain case.



AF347D

22. Place the front roller cage and roller into position and secure with the flex lock nut.

23. Check the position of the chain-case cover O-ring seal; then place the chain-case cover into position and secure with six cap screws and lock washers. Tighten to specifications.



AF111D

24. Install the drain plug and tighten to specifications; then pour 236 ml (8 fl oz) of Arctic Cat Transmission Lube (p/n 0636-817) into the chain case.

25. Install the drive belt and check drive belt deflection (see appropriate Drive Clutch/Driven Pulley in this section). Secure the belt guard.

Drive Train/Brake Disc
(ZR Models)

Removing Gear Case 8-64
Removing Track Driveshaft 8-65
Installing Track Driveshaft 8-67
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Removing Drive Sprockets..... 8-72
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REMOVING GEAR CASE

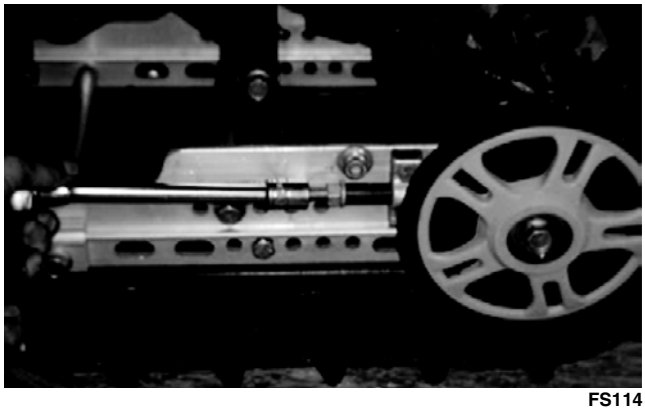
■ **NOTE: The gear case drive fluid does not have to be drained for this procedure.**

1. Remove the springs securing the resonator and expansion chamber; then remove from the engine compartment.

2. Remove the drive belt (see Removing/Installing Drive Belt (ACT Roller Driven Pulley) in this section).

3. Remove the air-intake louvre from the left-side belly pan; then remove the hardware securing the left-side belly pan to the chassis.

■ **NOTE: Completely loosen the track tension to aid in removing/installing the gear case.**

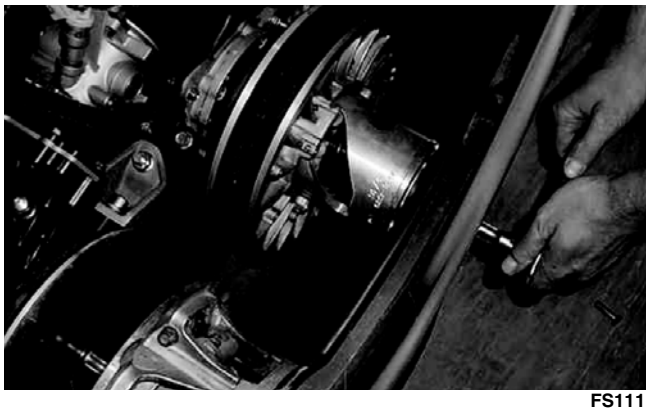


FS114

4. Using a 9/16-in. socket and extension, remove the cap screw securing the driven pulley to the driven shaft.

5. Slide the driven pulley off the driven shaft.

■ **NOTE: Account for and remove any alignment washers. These washers must be used during installing.**



FS111

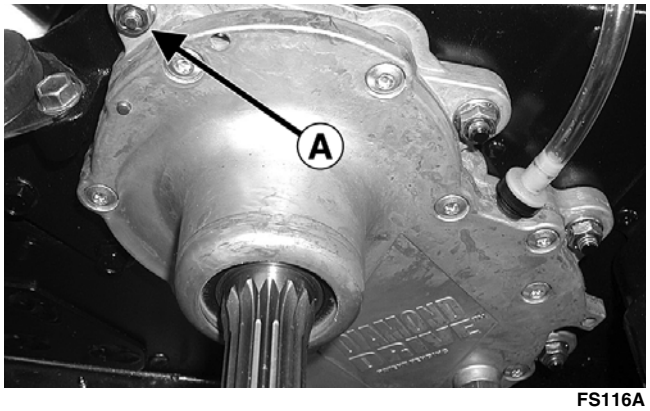
■ **NOTE: Tip the snowmobile on its right side positioning the gear case side of the snowmobile up. Place a piece of cardboard under the side of the snowmobile to prevent scratching of bumper and belly pan.**

6. Remove the lock nut and cap screw (with shim if applicable) and the remaining five lock nuts securing the gear case to the chassis.



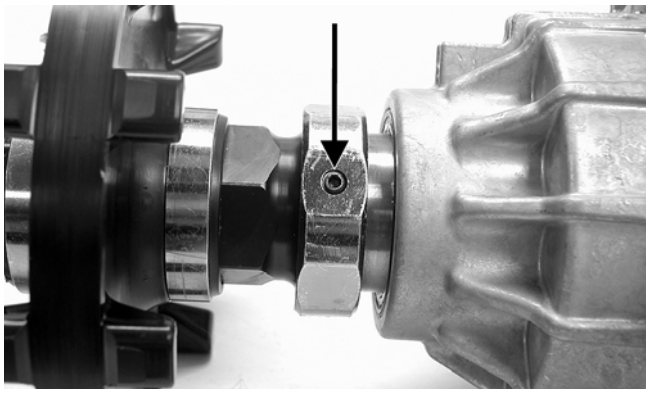
FS115

■ **NOTE: If there is a shim (A), note its location for installing purposes.**



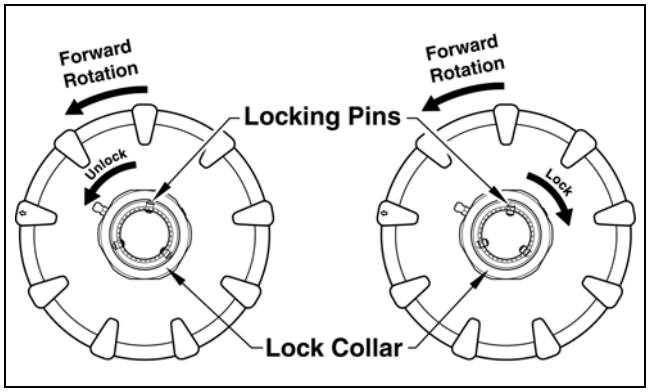
FS116A

7. Loosen the Allen-head screw from the driveshaft lock collar.



MS393A

8. Rotate the lock collar in forward shaft rotation to allow the locking pins to recess into the driveshaft.



740-161A

9. Remove the gear case from the chassis.



FS118

■ **NOTE: Account for the cap screw and lock nuts on the gear case.**

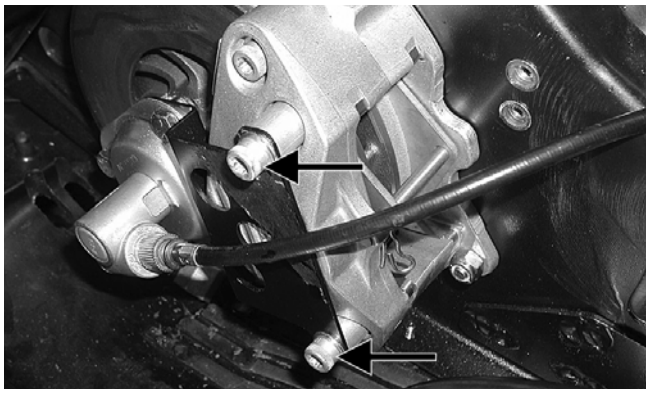
■ **NOTE: If removing the lock collar from the driveshaft, account for the three locking pins.**

REMOVING TRACK DRIVESHAFT

■ **NOTE: The gear case drive fluid does not have to be drained for this procedure.**

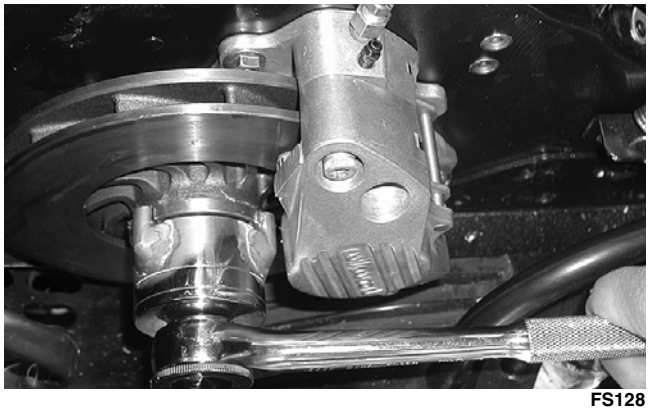
1. Remove the springs securing the resonator and expansion chamber; then remove from the engine compartment.

A. At this point, remove the two Allen-head cap screws securing the speedometer drive adapter assembly to the brake caliper; then remove the adapter assembly.



FS127A

B. At this point, engage the brake lever lock; then using Brake Disc Socket Wrench (p/n 0644-415), remove the retaining nut from the driveshaft.



FS128

2. Remove the drive belt (see Removing/Installing Drive Belt (ACT Roller Driven Pulley) in this section).

3. Remove the air-intake louvre from the left-side belly pan.

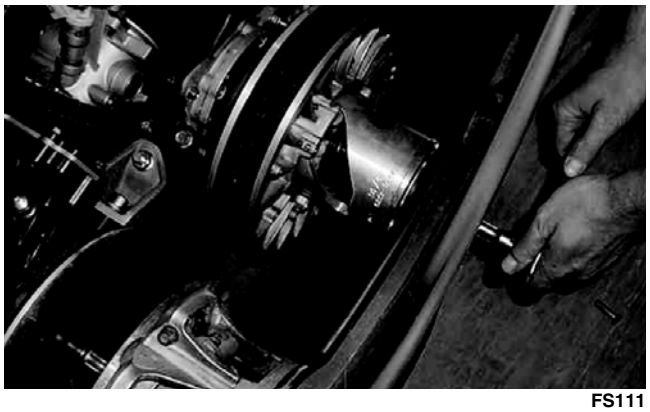
4. Remove the hardware securing the left-side belly pan to the chassis.

■ **NOTE: Completely loosen the track tension.**



FS114

5. Using a 9/16-in. socket and extension, remove the cap screw securing the driven pulley to the driven shaft.



FS111

6. Slide the driven pulley off the driven shaft.

■ **NOTE: Account for and remove any alignment washers. These washers must be used during installing.**

7. Place a support stand under the rear bumper; then while holding the flared bushing, remove the rear cap screws securing the skid frame to the tunnel. Account for lock washers and flat washers.

■ **NOTE: The support stand should hold the snowmobile level but not raised off the floor.**

8. Remove the front cap screws securing the skid frame to the tunnel. Account for a flat washer and a lock washer.

9. Remove the support stand; then tip the snowmobile onto one side using a piece of cardboard to protect against scratching. Remove the skid frame.

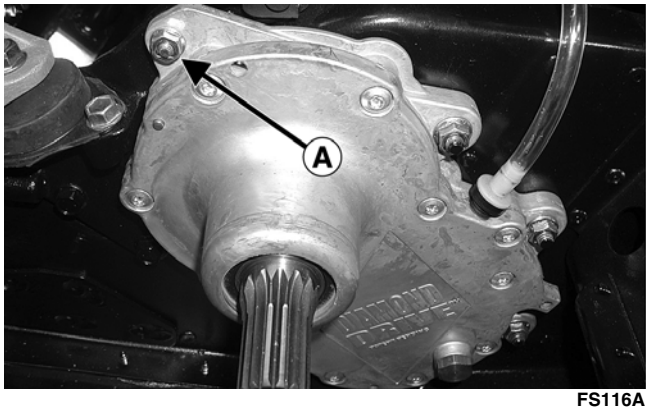
■ **NOTE: Tip the snowmobile on its right side positioning the gear case side of the snowmobile up. Place a piece of cardboard under the side of the snowmobile to prevent scratching of bumper and belly pan.**

10. Remove the lock nut and cap screw (with shim if applicable) and the remaining five lock nuts securing the gear case to the chassis.



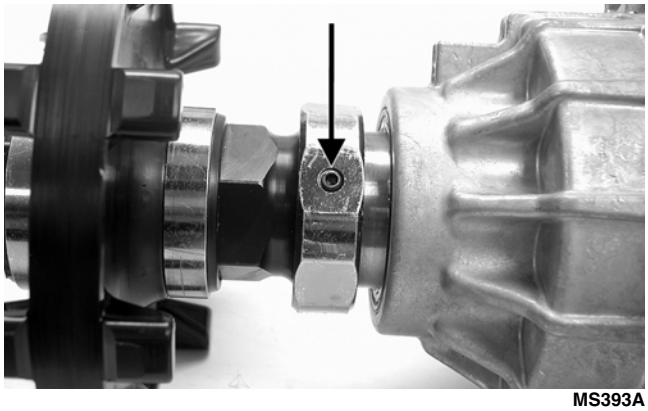
FS115

■ **NOTE: If there is a shim (A), note its location for installing purposes.**



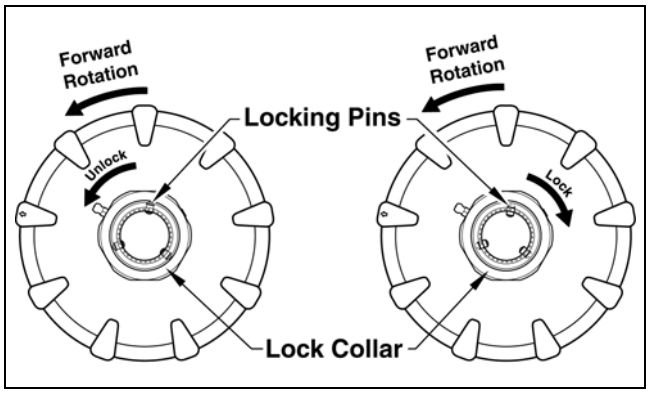
FS116A

11. Loosen the Allen-head screw from the driveshaft lock collar.



MS393A

12. Rotate the lock collar in forward shaft rotation to allow the locking pins to recess into the driveshaft.



740-161A

13. Disconnect the driveshaft coupler; then remove the gear case from the chassis.



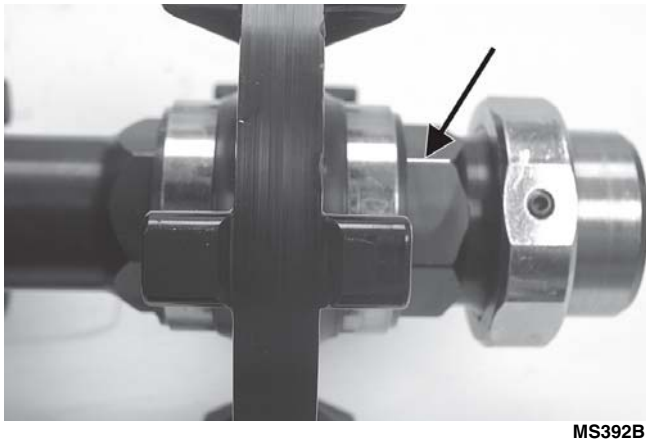
FS118

■ **NOTE: Account for the cap screw and lock nuts on the gear case.**

14. Engage the brake lever lock (leaving it locked for installing purposes); then remove the track/driveshaft assembly from the brake caliper housing.

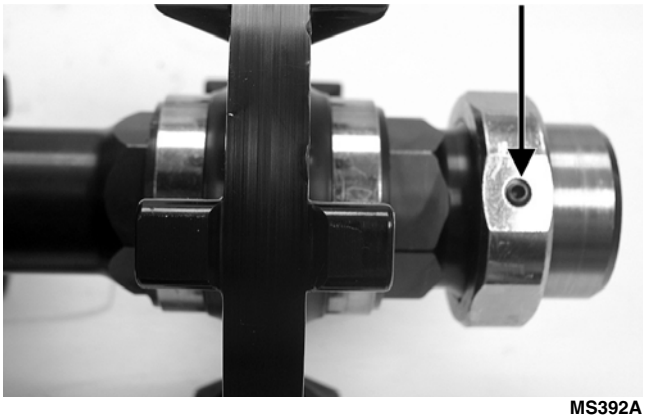
INSTALLING TRACK DRIVESHAFT

1. If removed, place the lock collar onto the driveshaft (with the three locking pins extended from the driveshaft); then scribe a line on the driveshaft in line with the set screw. Turn the lock collar until the locking pins are recessed into the driveshaft.



MS392B

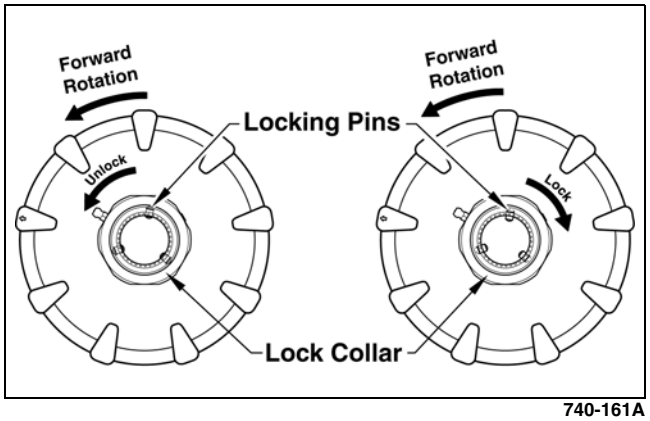
■ **NOTE: At this point, lightly snug the collar set screw to keep the collar in place.**



MS392A

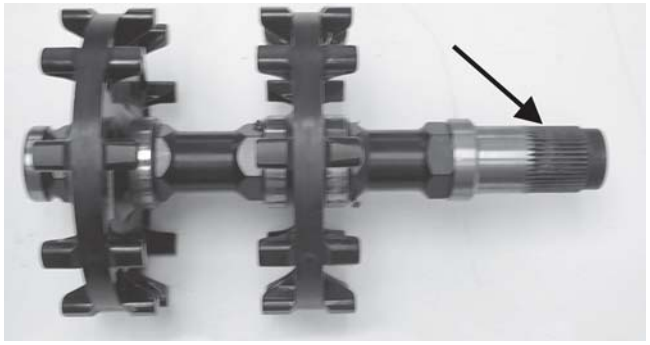
⚠ CAUTION

If the locking pins are protruding into the splined area, the gear case cannot be properly installed onto the driveshaft and component damage may occur.



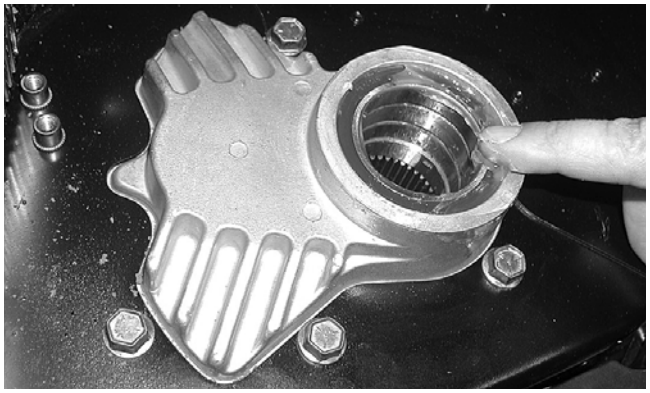
740-161A

2. On the splined end of the driveshaft, apply a coat of Anti-Seize Thread Compound (p/n 0678-146) to the ends of the splines.



MS313B

■ **NOTE: Prior to installing the driveshaft, apply a coat of grease to the brake caliper housing seal.**



FS125

3. Place the track/driveshaft assembly into the tunnel and install the driveshaft into the brake caliper housing assembly.

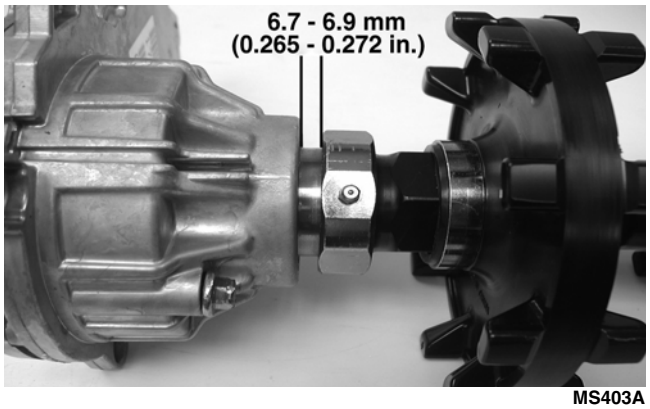
■ **NOTE: When installing the driveshaft into the housing, keep the driveshaft approximately 9.5-12.7 mm (3/8-1/2 in.) from bottoming into the housing to aid in installing the gear case.**



FS126A

4. Place the gear case onto the driveshaft; then press the gear case toward the chassis until it is in position.

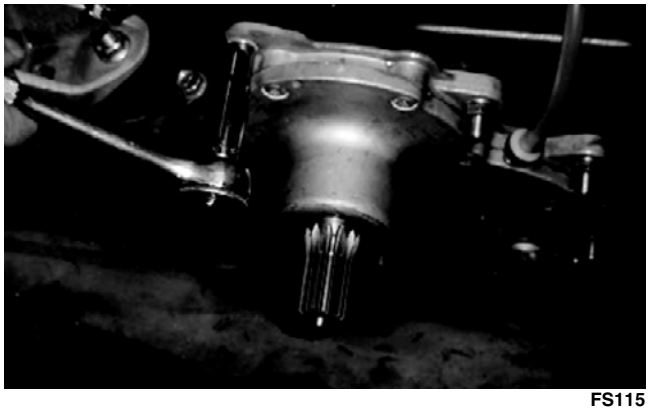
■ **NOTE: When the driveshaft is properly seated onto the gear case, there should be a clearance of 6.7-6.9 mm (0.265-0.272 in.) between the gear case and the lock collar.**



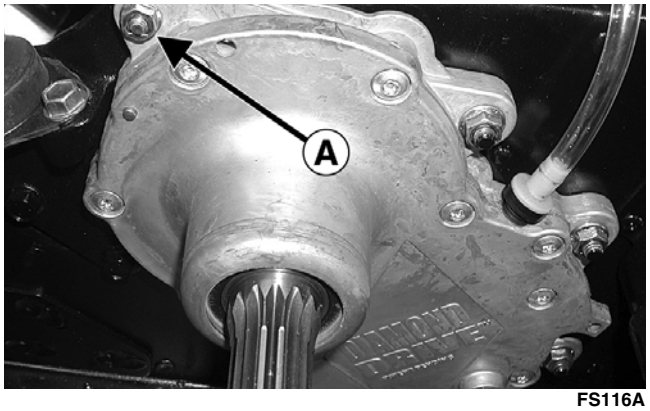
MS403A

5. Install the five lock nuts onto the cap screws securing the gear case to the chassis. Tighten to specifications.

6. Install the remaining cap screw (with the shim if applicable) and lock nut. Tighten to specifications.

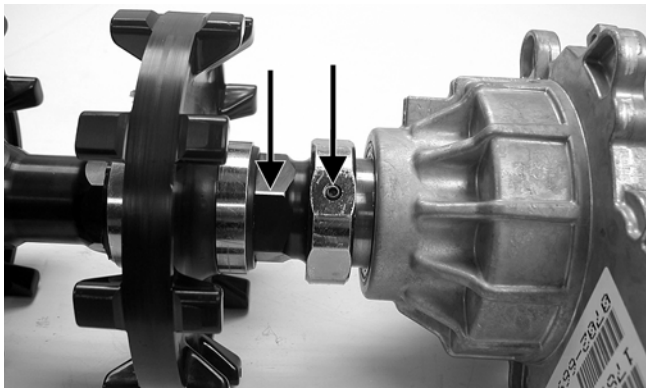

FS115

■ **NOTE: If a shim was on the cap screw at removing, make sure to install the shim on the cap screw (A); it is important for drive system alignment.**



FS116A

7. Loosen the set screw and rotate the lock collar so the set screw is directly in line with the mark scribed on the driveshaft; then tighten the set screw.

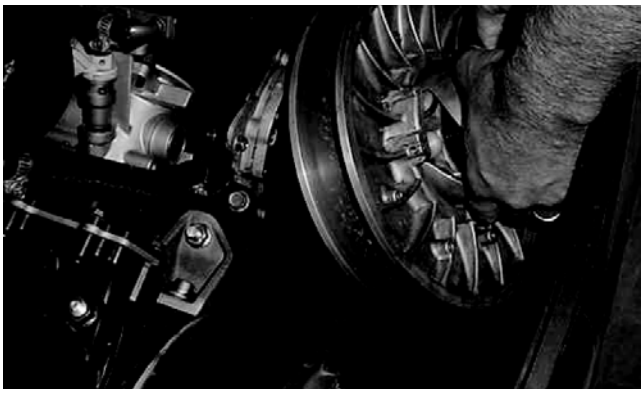

MS391A

■ **NOTE: The driveshaft should now be locked into place. Pull outward on the gear case for verification. If the gear case cannot be moved outward, the driveshaft is properly locked.**

8. Install the skid frame (see Section 9).

9. Place the snowmobile in the upright position; then engage the brake lever lock.

10. Slide the driven pulley onto the driven shaft making sure alignment washers are in place.


FS112

11. Secure the pulley with the cap screw (coated with blue Loctite #243) and washer. Tighten to specifications.

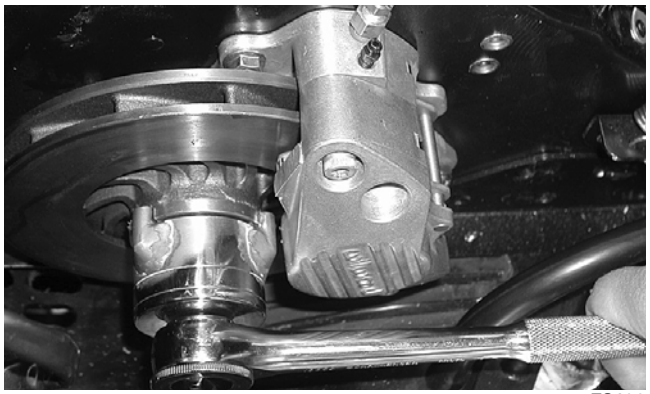
12. Install the drive belt.

■ **NOTE: For installing drive belt, see Removing/ Installing Drive Belt (ACT Roller Driven Pulley) in this section.**

13. Place the left-side belly pan into position and secure with existing hardware; then install the air-intake louvre.

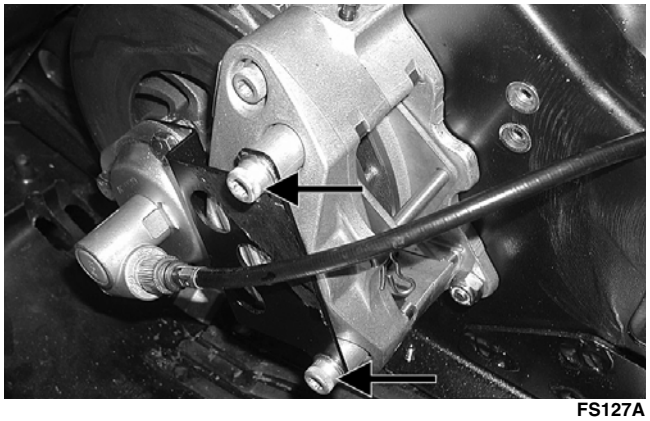
14. Apply Anti-Seize Thread Compound (p/n 0678-146) to the splines of the brake disc and to the threads of the retaining nut; then install the disc and nut. Using Brake Disc Socket Wrench (p/n 0644-415), tighten nut to specifications.

■ **NOTE: The brake lever lock must be engaged for this procedure.**



FS128

15. Place the speedometer drive adapter assembly onto the brake caliper; then install the Allen-head cap screws and tighten to specifications.



FS127A

16. Place the expansion chamber and resonator into position and secure with the springs.

17. Adjust the track for alignment and recommended tension (see Section 9); then tighten the cap screws securely.



FS114

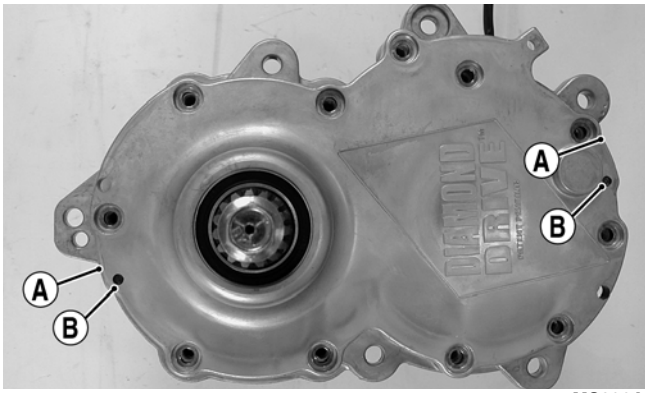
DISASSEMBLING GEAR CASE

1. Remove the eleven torx-head cap screws securing the gear case cover to the gear case assembly.



MS327A

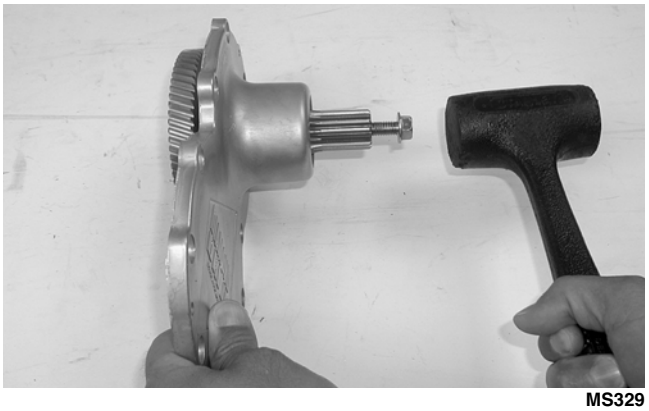
2. Insert two flat-blade screwdrivers into the notches (A) on the gear case located near the upper and lower dowl pins (B) of the gear case; then working back and forth, pry the cover up and off the gear case.



MS328A

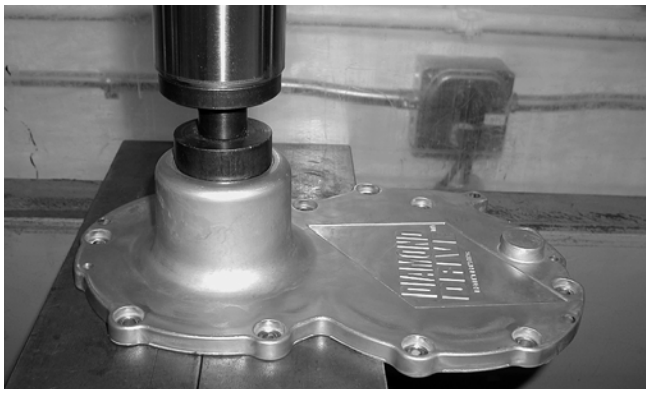
3. Drain the gear case fluid into a suitable container.

4. With a cap screw threaded into the input shaft and using a soft hammer, drive the input shaft out of the gear case cover.



MS329

5. Using a suitable bearing press and fixture, press the input shaft bearing out of the gear case cover. Account for a bearing and a seal.

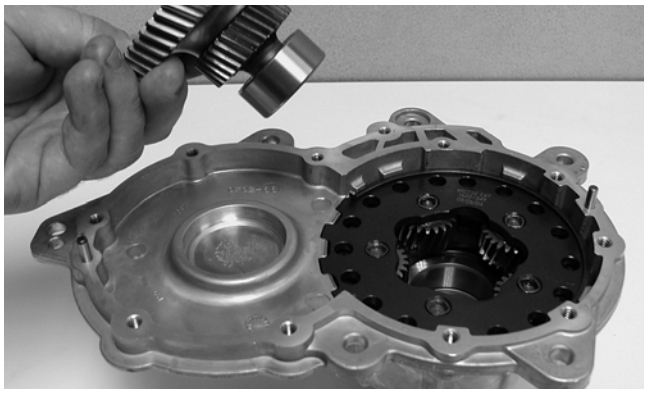


MS330



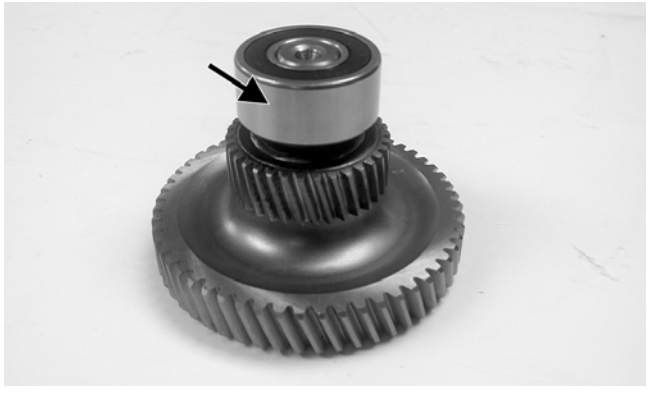
MS331

6. Remove the transfer gear assembly from the gear case.



MS332

7. Using a suitable bearing press and fixture, remove the main bearing from the transfer gear assembly.



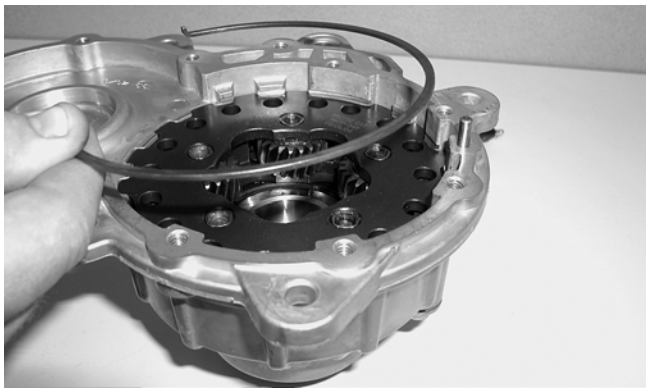
MS333A

8. Using a suitable bearing press and fixture, remove the outer bearing from the transfer gear.



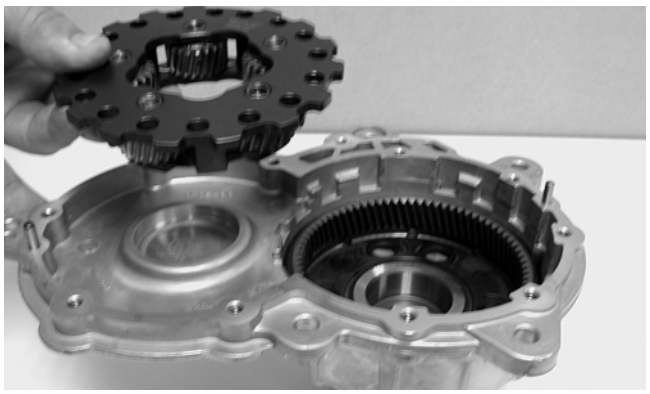
MS334A

9. Remove the retaining ring securing the planetary gear assembly to the gear case.



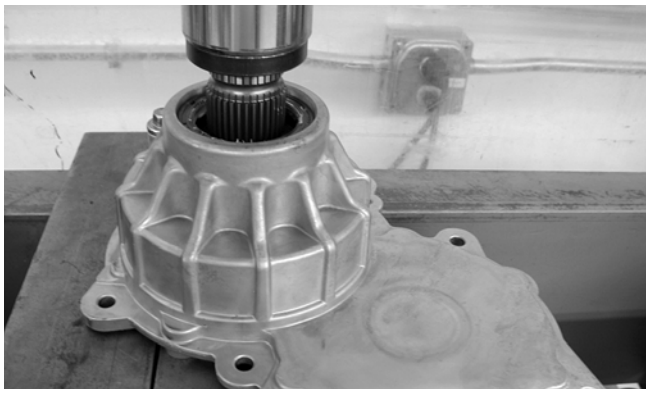
MS335

10. Note the position of the larger spacing between the tabs for assembling purposes; then remove the planetary gear assembly from the gear case.



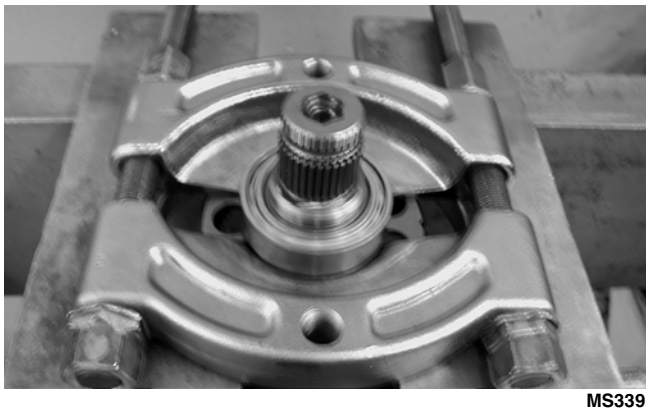
MS336

11. Using a suitable press and fixture, remove the ring gear assembly from the gear case.



MS337

12. With a suitable bearing press and fixture, remove the bearing from the ring gear.

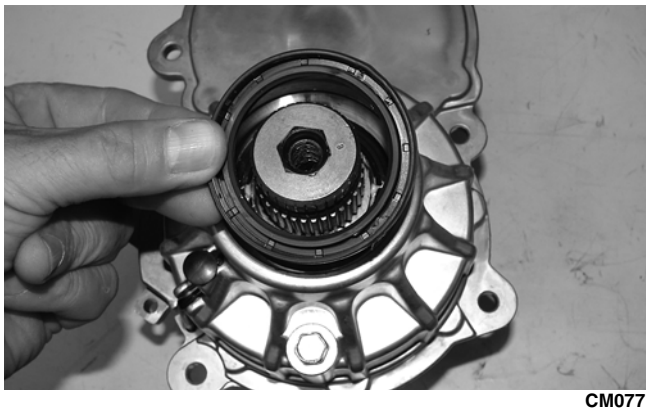


MS339



MS340

13. Using an appropriate seal removing tool, remove the ring gear seals from the gear case.



CM077



MS342

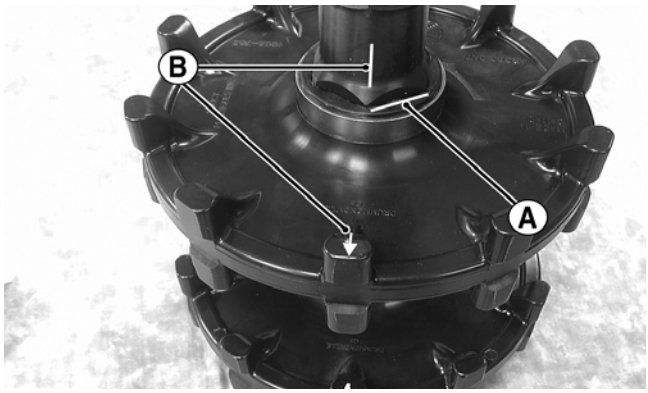
CLEANING AND INSPECTING GEAR CASE

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Wash the gear case halves in parts-cleaning solvent.
2. Inspect the gear case halves for scoring, pitting, scuffing, or any imperfections in the casting.
3. Inspect all threaded areas for damaged or stripped threads.
4. Inspect the bearing areas for cracks or excessive bearing movement. If evidence of excessive bearing movement is noted, replace the component.
5. Inspect the sealing surfaces of the gear case halves for trueness.
6. Wash the unsealed gear case bearings in parts-cleaning solvent.
7. Inspect the bearings for wear, scoring, scuffing, damage, or discoloration. Rotate the bearings. Bearings must rotate freely and must not bind or feel rough. If any abnormal condition is noted, replace the bearing.
8. Apply a light film of Arctic Cat ACT Drive Fluid (p/n 4639-025) to the unsealed bearings prior to assembling.

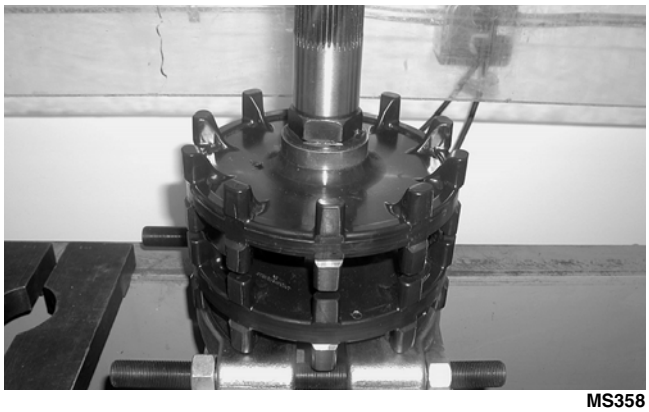
REMOVING DRIVE SPROCKETS

1. For installing purposes, scribe a line on the driveshaft (A) next to the drive sprocket for proper alignment; then scribe a line on the driveshaft directly in line with the timing arrows (B) on the drive sprockets for proper sprocket timing.



MS357A

2. Using a suitable press positioned against the tension-collar of the drive sprocket (located on the gear case) and of the driveshaft, press the drive sprockets off the driveshaft.


MS358

⚠ CAUTION

Always press against the tension-collar of the drive sprockets or damage to the components will occur.


MS359A

■ NOTE: The drive sprockets must be removed from the gear case end of the driveshaft.

Cleaning and Inspecting

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

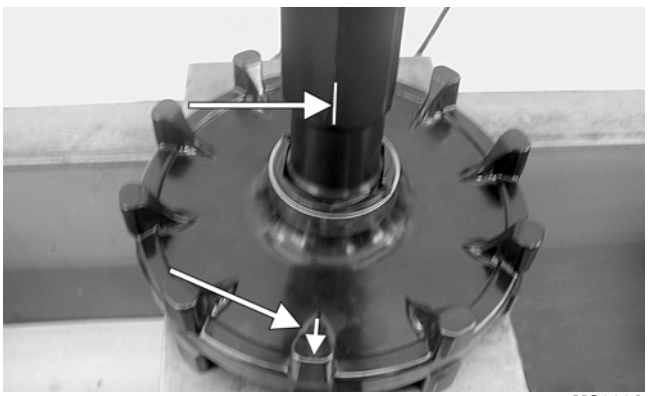
1. Thoroughly wash all metallic components in parts-cleaning solvent. Dry using compressed air.
2. Wash all non-metallic components with soap and water.
3. Inspect the driveshaft for damaged splines or stripped threads.
4. Inspect the bearings for any roughness or damage.
5. Inspect the seals for any breaks or damage.
6. Inspect the track for cuts, gouges, or wear.
7. Inspect the brake disc for wear or cracks.
8. Inspect the track drive sprockets for wear or damage.

INSTALLING DRIVE SPROCKETS

■ NOTE: Prior to installing the sprockets onto the driveshaft, it is advisable to lightly chamfer the inside edge of the sprocket to avoid binding.


MS362

1. Properly align the scribed line on the driveshaft (from removing) with the timing arrow on the drive sprocket; then slide the sprocket onto the driveshaft as far as it will go.


MS360A

2. Using a suitable press and fixture, press the driveshaft into the sprocket until it aligns with the line scribed in removing.

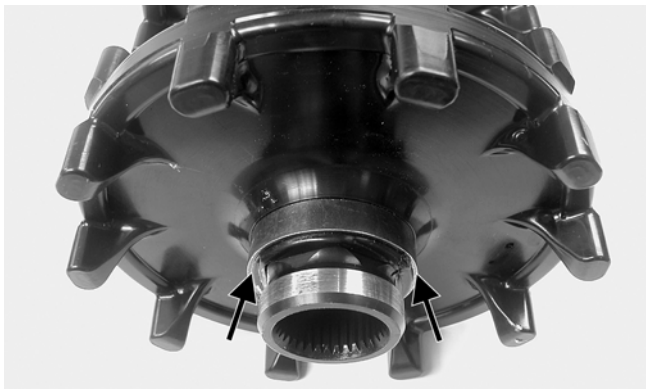


MS361A

3. Slide the remaining sprocket onto the driveshaft making sure the timing arrow/lines (from removing) are aligned; then using the press/fixture, press the sprocket to the remaining alignment line.

⚠ CAUTION

Always press against the tension-collar of the drive sprockets or damage to the components will occur.



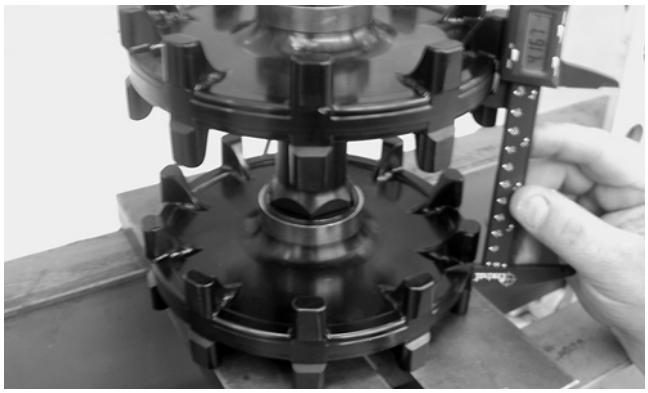
MS359A

■ **NOTE: The drive sprockets must be installed on the gear case end of the driveshaft.**

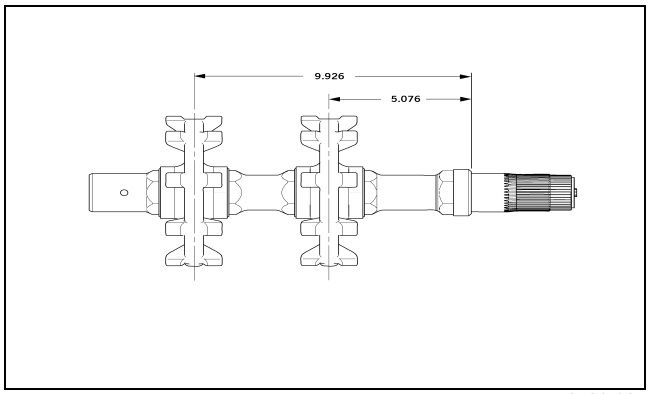


MS363A

4. Using a calipers, measure distances between the sprockets and from the sprockets to each end of the driveshaft for proper location (see illustrations).



MS364

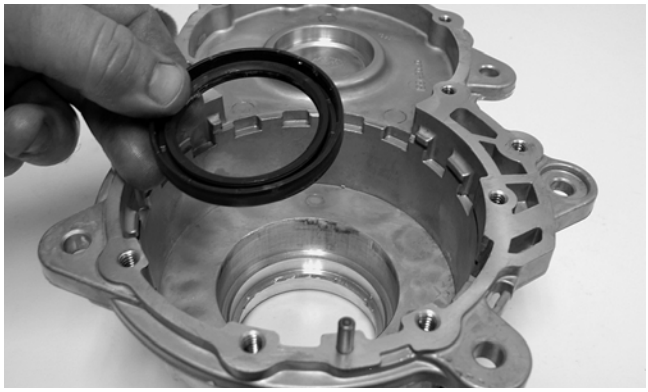


0739-397

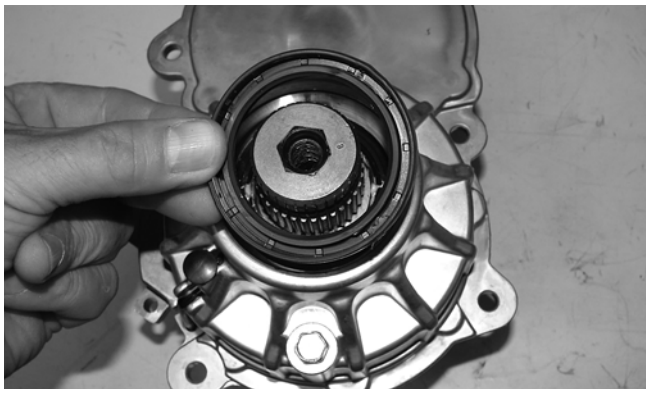
ASSEMBLING GEAR CASE

1. Using an appropriate seal installation tool, install the two oil seals into the ring gear opening of the gear case.

■ **NOTE: Grease must be applied to the inner seal prior to installing.**



MS342

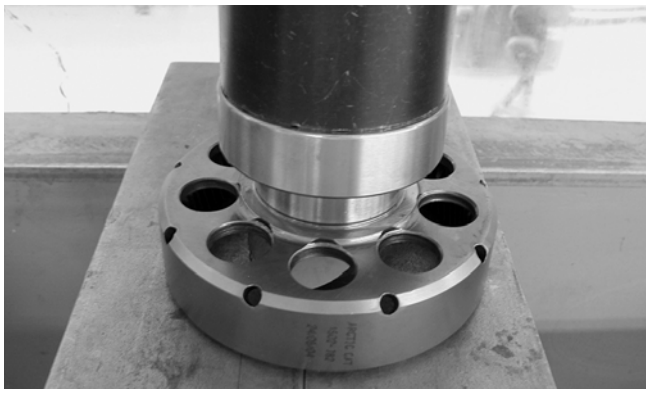


CM077

2. Using a suitable bearing press, install the bearing onto the ring gear.

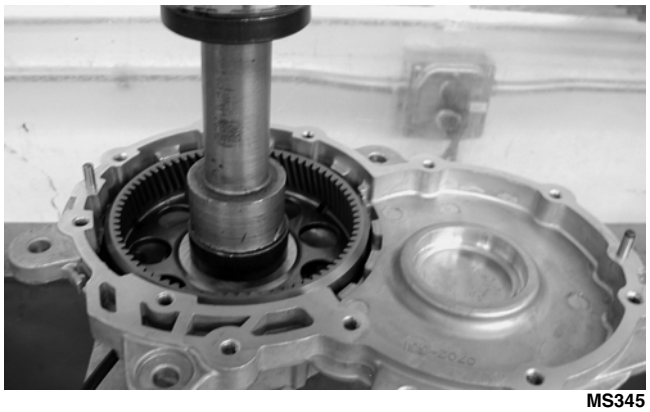


MS343



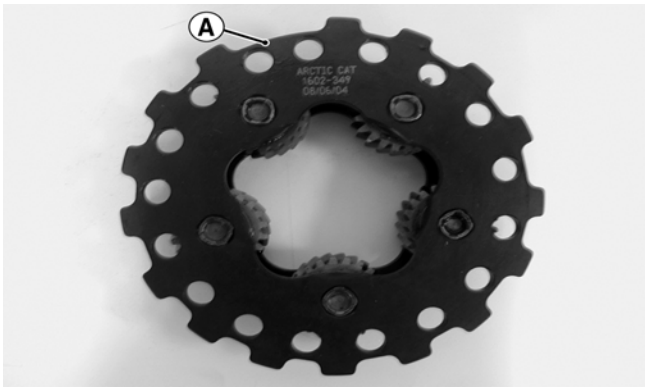
MS344

3. Using a suitable press, install the ring gear assembly to the gear case.

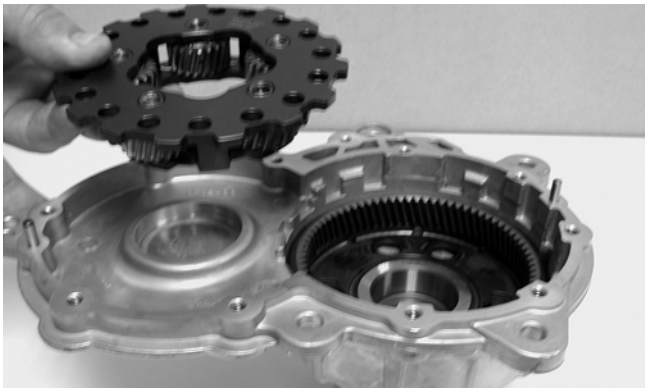


MS345

4. Noting the location of the large spacing (A) between the tabs of the planetary gear assembly, install the assembly to the ring gear/gear case.

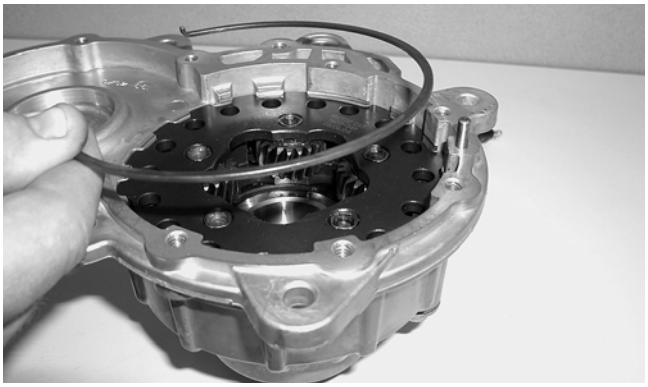


MS346A



MS336

5. Install the retaining ring securing the planetary gear assembly to the gear case.



MS335

6. Using a suitable bearing press, install the outer bearing to the transfer gear assembly; then install the inner bearing to the assembly.

8

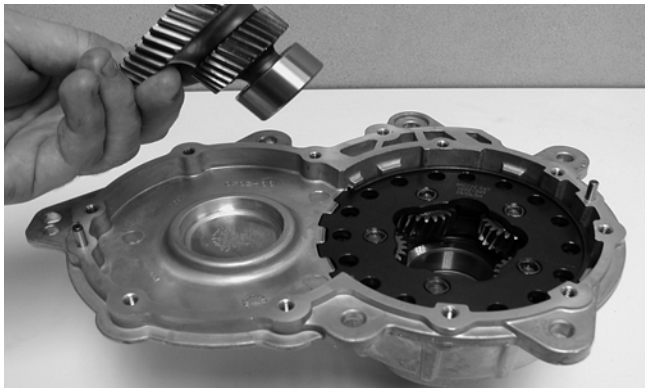


MS334A



MS348

7. Install the transfer gear assembly into the planetary gear assembly/gear case.



MS332

8. Using a suitable bearing press, install the inner bearing onto the input shaft.



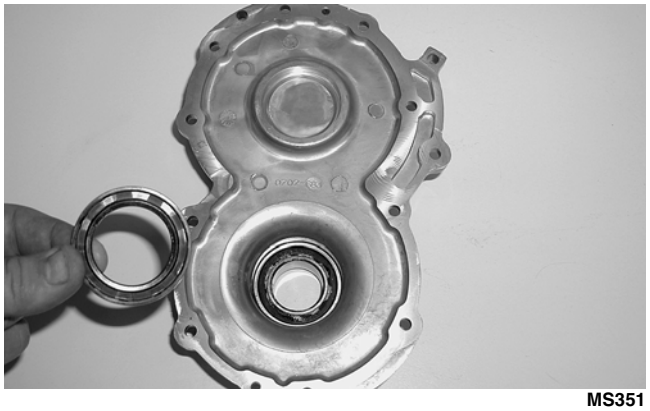
MS334A

9. Using a suitable bearing press and fixture, install the input shaft bearing to the gear case; then install the oil seal.

■ NOTE: Grease must be applied to the inner seal prior to installing.

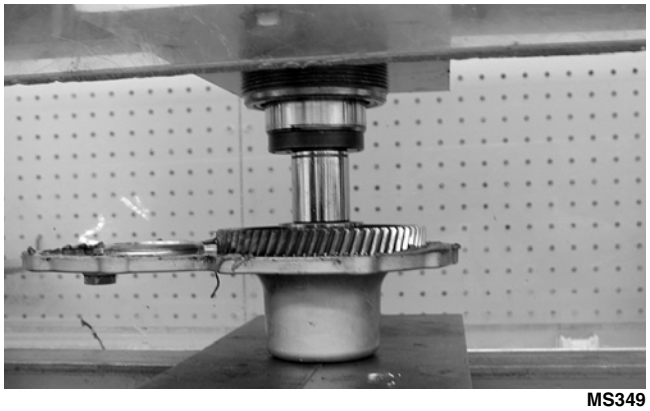


MS347



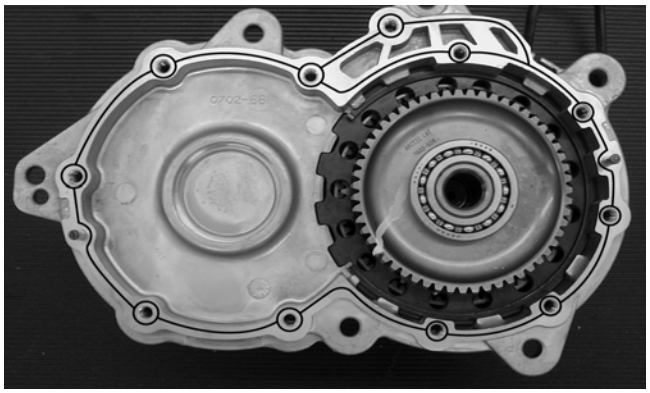
MS351

10. Using a suitable press, install the input shaft to the gear case cover.



MS349

11. Apply a film of High-Temp Silicone Sealant (p/n 4639-030) to the sealing surfaces of the gear case.



MS350A

⚠ CAUTION

Care must be taken not to allow silicone sealant into the cap screw holes and dowel pin holes or damage to the gear case may occur when tightening the cap screws.

12. With the dowel pins in place, install the cover to the gear case and secure with eleven torx-head cap screws; then in a crisscross pattern, tighten to specifications.



MS327A

13. Pour 89 ml (3 fl oz) of Arctic Cat ACT Drive Fluid (p/n 4639-025) into the drain/fill hole; then install the plug. Tighten securely.

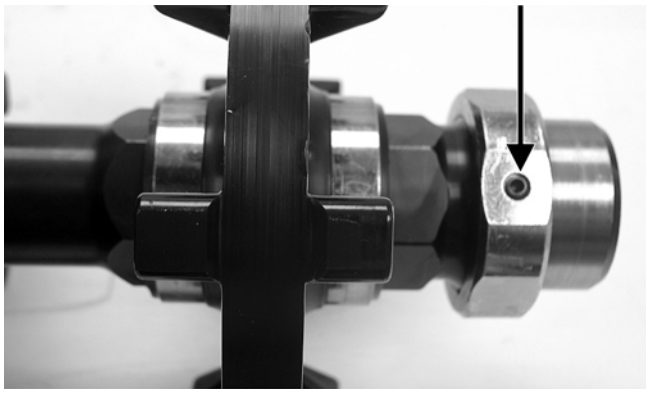
⚠ CAUTION

Do not add more or less than the recommended amount of drive fluid to the gear case or damage to the gear case will occur.

INSTALLING GEAR CASE

1. If removed, place the lock collar onto the driveshaft (with the three locking pins extended from the driveshaft); then scribe a line on the driveshaft in line with the set screw. Turn the lock collar until the locking pins are recessed into the driveshaft.

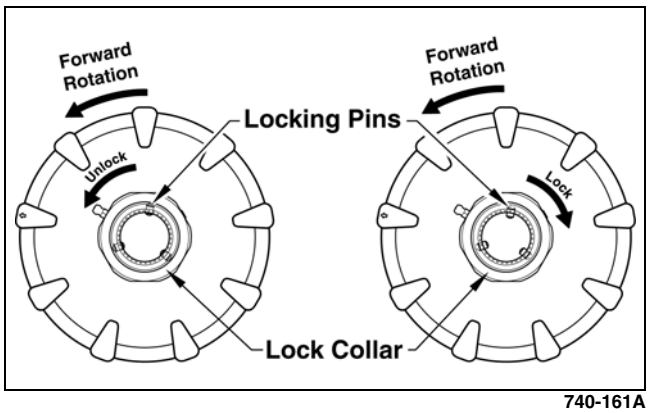
■ NOTE: At this point, lightly snug the collar set screw to keep the collar in place.



MS392A

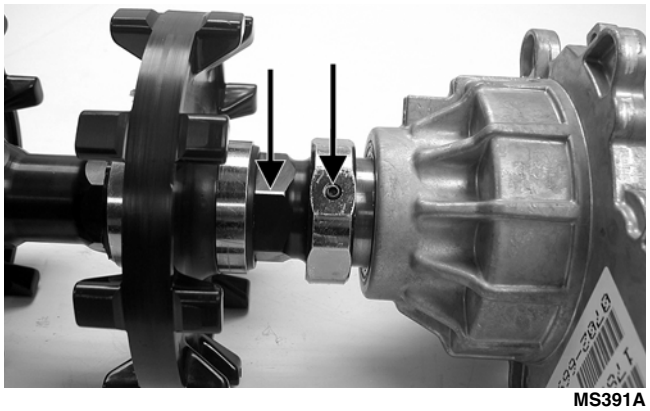
⚠ CAUTION

If the locking pins are protruding into the splined area, the gear case cannot be properly installed onto the driveshaft and component damage may occur.



740-161A

2. Loosen the set screw and rotate the lock collar so the set screw is directly in line with the mark scribed on the driveshaft; then tighten the set screw.



MS391A

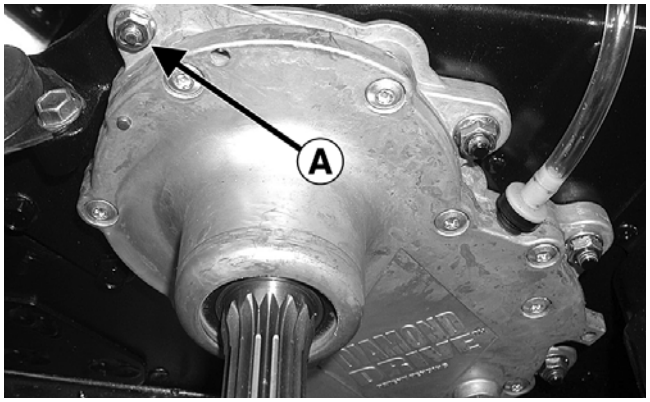
3. Place the gear case onto the driveshaft; then press the gear case toward the chassis until it is in position.

■ NOTE: When the gear case is properly seated onto the driveshaft, there should be a clearance of 6.7-6.9 mm (0.265-0.272 in.) between the gear case and the lock collar.

4. Install the five lock nuts onto the cap screws securing the gear case to the chassis. Tighten to specifications.

5. Install the remaining cap screw (with the shim if applicable) and lock nut. Tighten to specifications.

■ **NOTE: If a shim was on the cap screw at removing, make sure to install the shim on the cap screw (A); it is important for drive system alignment.**



FS116A

■ **NOTE: The gear case should now be locked into place. Pull outward on the gear case for verification. If the gear case cannot be moved outward, the gear case is properly locked.**

6. Place the snowmobile in the upright position; then engage the brake lever lock.

7. Slide the driven pulley onto the driven shaft making sure alignment washers are in place.



FS112

8. Secure the pulley with the cap screw (coated with blue Loctite #243) and washer. Tighten to specifications.

9. Install the drive belt.

■ **NOTE: For installing drive belt, see Removing/Installing Drive Belt (ACT Roller Driven Pulley) in this section.**

10. Place the left-side belly pan into position and secure with existing hardware; then install the air-intake louvre.

11. Place the expansion chamber and resonator into position and secure with the springs.

12. Adjust the track for alignment and recommended tension (see Section 9).

Drive Train/Brake Disc
(Firecat Models)

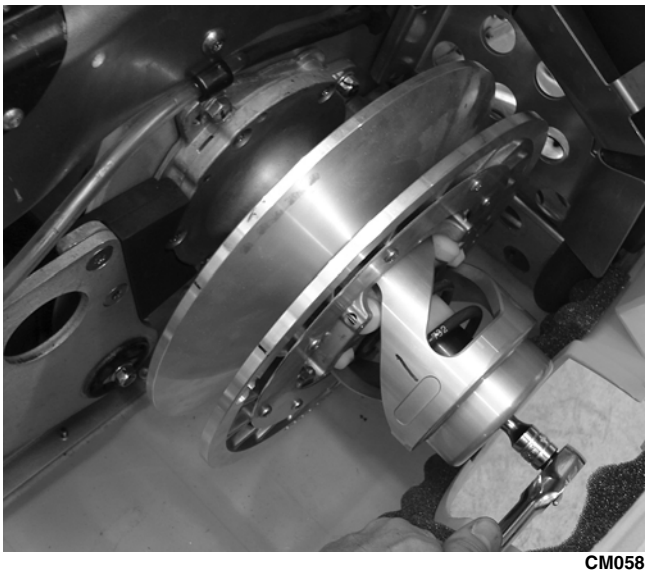
Removing Gear Case 8-78
Removing Track Driveshaft 8-80
Installing Track Driveshaft 8-82
Disassembling Gear Case 8-83
Cleaning and Inspecting Gear Case 8-86
Removing Drive Sprockets 8-86
Installing Drive Sprockets 8-88
Assembling Gear Case 8-89
Installing Gear Case 8-92

REMOVING GEAR CASE

■ **NOTE: The gear case drive fluid does not have to be drained for this procedure.**

1. Remove the access panel from the left-side belly pan.

2. Remove the belt guard; then using a 9/16-in. socket and extension, remove the cap screw securing the driven pulley to the driven shaft.

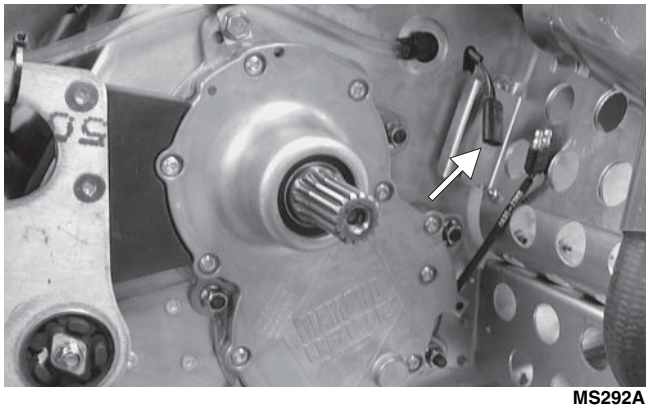


CM058

3. Slide the driven pully off the driven shaft.

■ **NOTE: Account for and remove any alignment washers. These washers must be used during installing.**

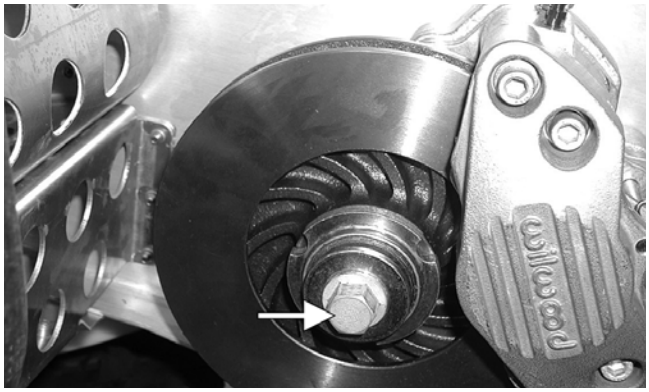
4. Remove the speedometer sensor connector from behind the coolant hose protector; then disconnect the sensor.



MS292A

5. Release the pressure on the snubber (located between the gear case and left-side engine plate) by lifting upward on the engine plate with a short pry bar; then remove the snubber.

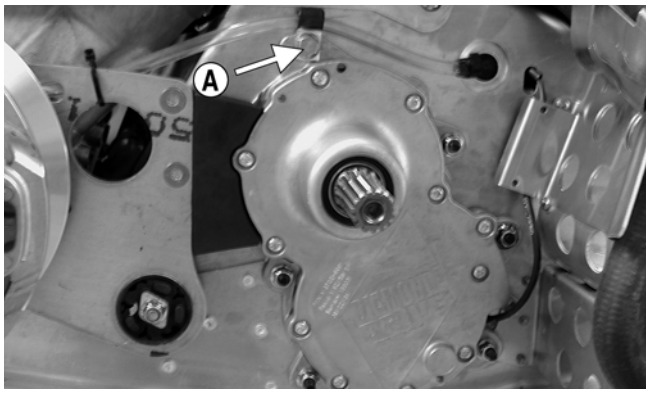
6. Engage the brake lever lock; then loosen the long cap screw (from the brake-disc side of the driveshaft) until it is completely free of the gear case shaft.



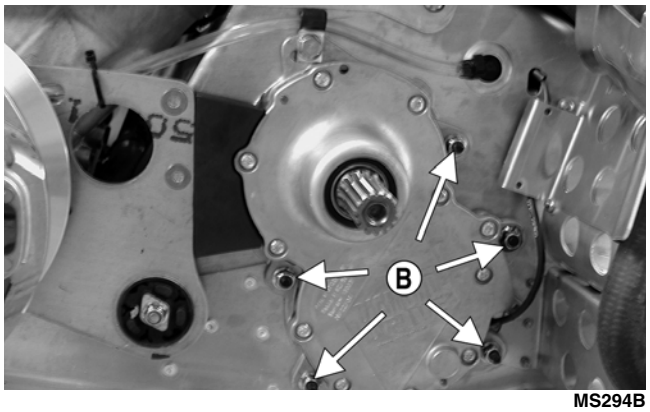
MS303A

■ **NOTE: Tip the snowmobile on its right side positioning the gear case side of the snowmobile up. Place a piece of cardboard under the side of the snowmobile to prevent scratching of bumper and belly pan.**

7. Remove the cap screw (A) and the remaining lock nuts (B) securing the gear case to the chassis. Account for an oil-hose clamp.



MS294A



MS294B

8. To loosen and remove the gear case, lightly pry upward on the gear case in the area where the gear case and the track driveshaft join. When the gear case has been loosened, pull upward on the gear case until it is clear from the mounting studs; then remove the gear case.

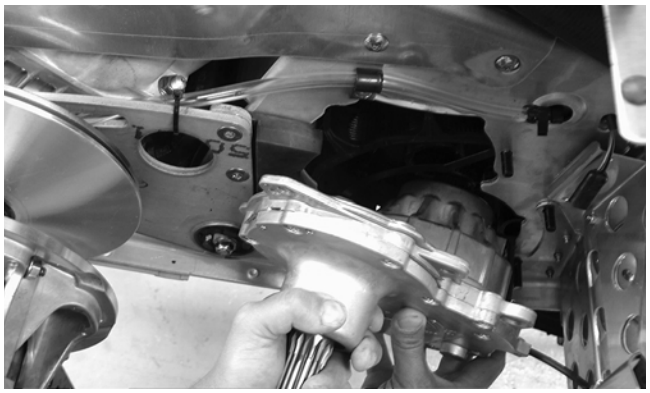


SNO-015

⚠ CAUTION

When using a pry bar to remove the gear case, apply pressure with care to prevent possible damage to the gear case.

■ **NOTE: If the gear case is difficult to remove, it may be necessary to loosen the track tension.**



MS297

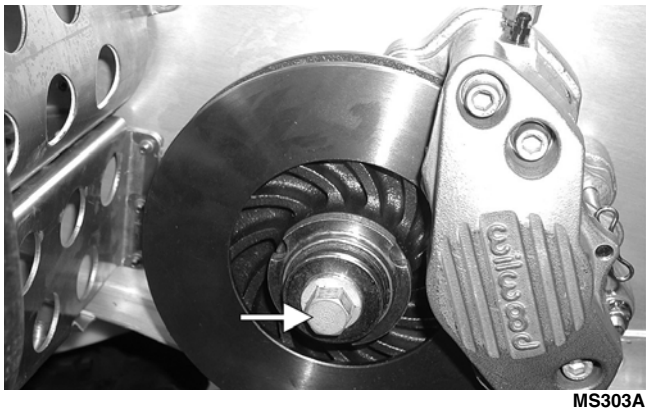
■ **NOTE: Account for the cap screw, lock nuts, and the gear case mounting plate.**

REMOVING TRACK DRIVESHAFT

■ **NOTE: The gear case drive fluid does not have to be drained for this procedure.**

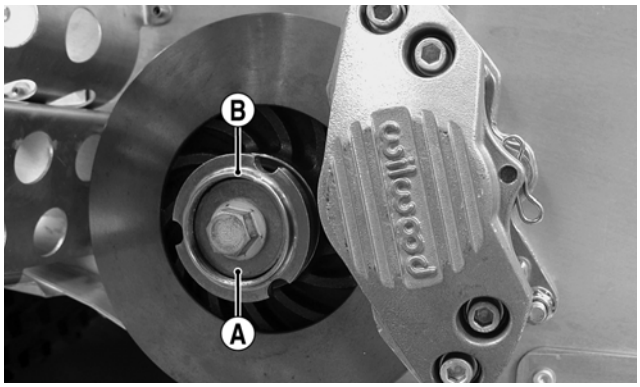
1. Remove the springs securing the resonator and expansion chamber; then remove from the engine compartment.

2. Engage the brake lever lock; then loosen the long cap screw enough to release pressure from the flat washer.



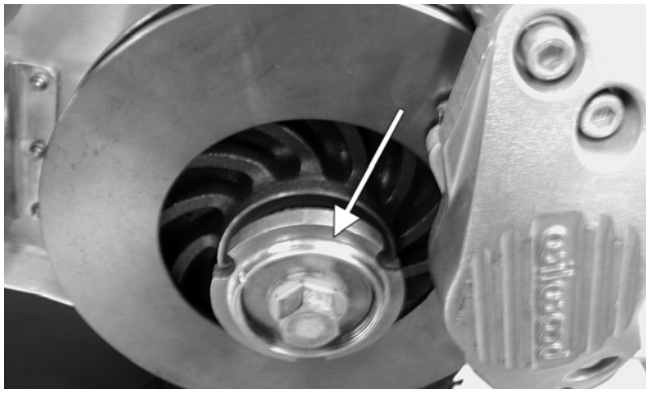
MS303A

■ **NOTE: Releasing pressure from the flat washer (A) will allow it to become centered on the driveshaft when the brake disc retaining nut (B) is removed.**



MS304A

3. Using Brake Disc Socket Wrench (p/n 0644-415), remove the retaining nut from the driveshaft.



MS305A

4. Loosen the long gear case cap screw completely.



MS306

5. Using the Rear Suspension Spring Tool (p/n 0144-311), remove the spring from the adjusting cam.

⚠ WARNING

Care must be taken when removing the spring or damage or injury could result.



AG624DA

6. Place a support stand under the rear bumper; then while holding the flared bushing, remove the rear cap screws securing the skid frame to the tunnel. Account for lock washers and flat washers.

■ NOTE: The support stand should hold the snowmobile level but not raised off the floor.

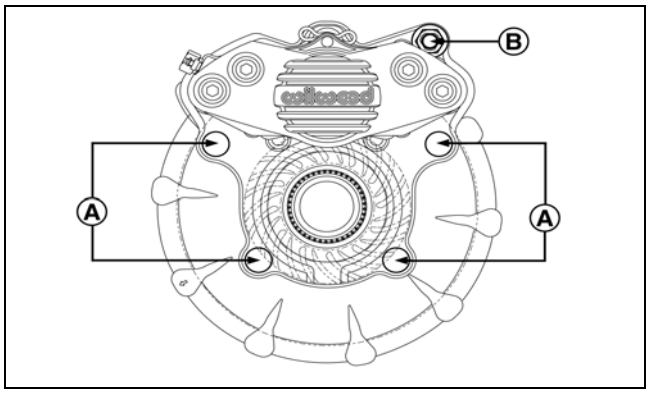
7. Remove the front cap screws securing the skid frame to the tunnel. Account for a flat washer and a lock washer.

8. Remove the support stand; then tip the snowmobile onto the left side using a piece of cardboard to protect against scratching. Remove the skid frame.

■ NOTE: Avoid tipping the snowmobile onto the right side. If left on the right side for more than five minutes, air may get into the oil hose. If air is apparent in an oil hose, the system will eventually have to be bled (see Section 2 - Bleeding Oil-Injection System - Firecat Models).

9. Remove the four lock nuts (A) from inside the tunnel and cap screw (with lock nut B) securing the brake housing to the chassis.

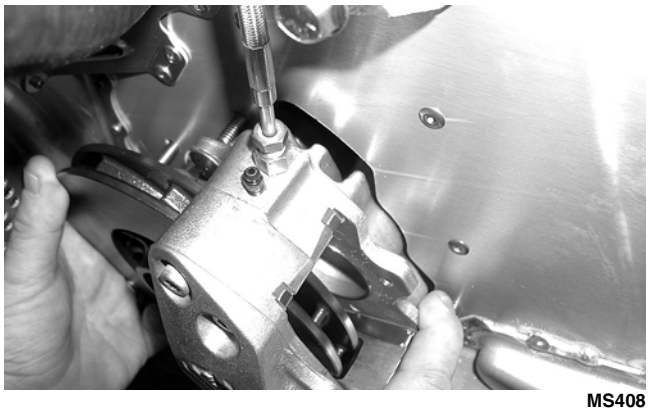
■ NOTE: The four remaining cap screws will come out with the brake housing.



740-188A

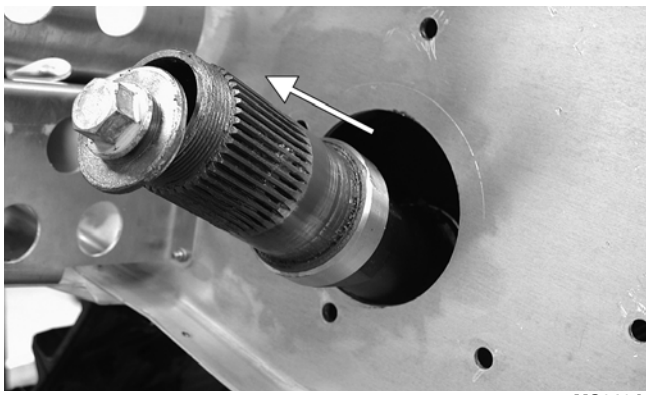
■ NOTE: Releasing the weight of the track from the driveshaft will aid in removing the brake housing.

10. With mounting hardware removed, use a flat-blade screwdriver and carefully pry (from side to side) the brake housing from the chassis; then remove the housing and brake disc from the chassis and driveshaft. Account for a spacer.

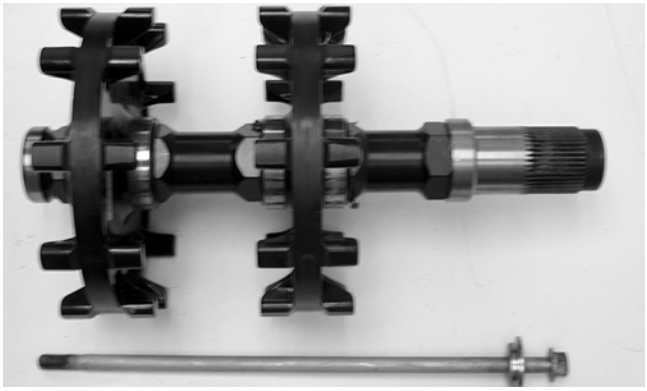


MS408

11. Pull the driveshaft toward the brake assembly side of the chassis until it is free of the gear case; then remove the track/driveshaft assembly.

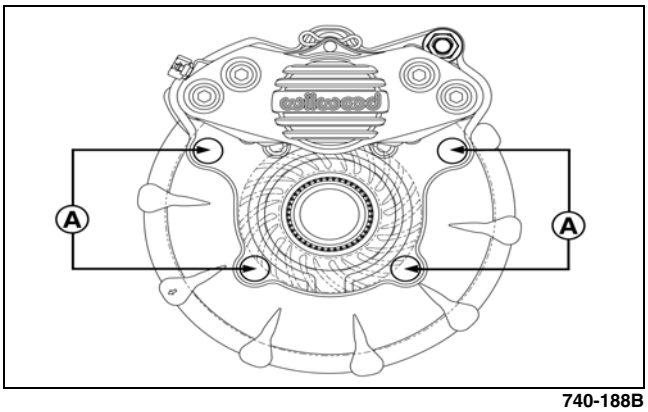


MS312A



MS313

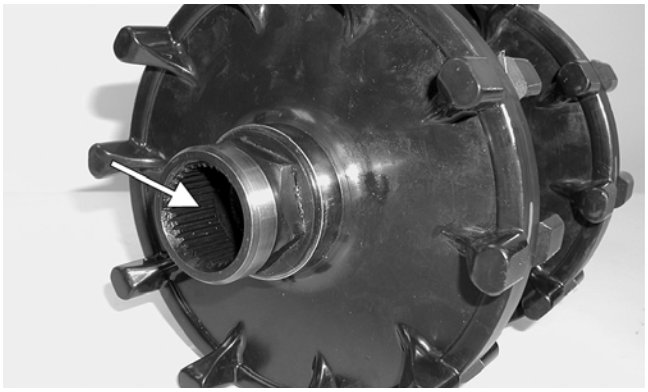
■ **NOTE: Account for the four cap screws (A) on the brake housing.**



740-188B

INSTALLING TRACK DRIVESHAFT

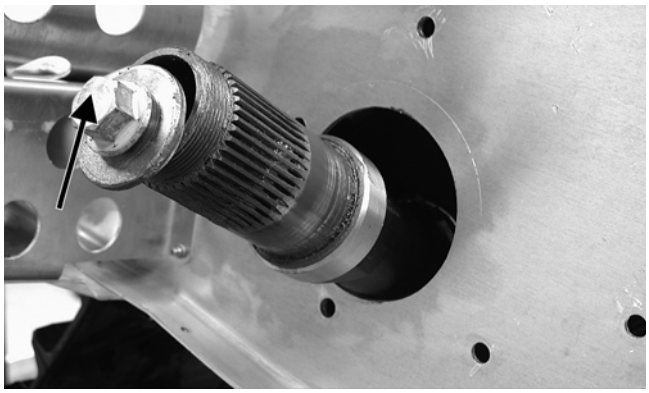
■ **NOTE: Prior to installing the driveshaft, apply a coat of grease to the internal splines of the driveshaft.**



MS315A

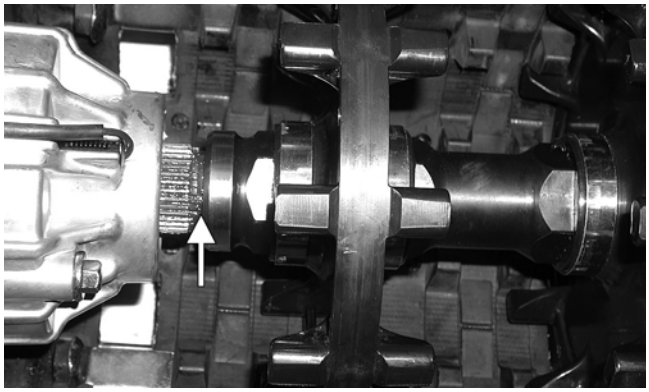
1. Insert the cap screw into the driveshaft and place the track/driveshaft assembly into the brake housing side of the tunnel.

■ **NOTE: It is important that the cap screw is inserted into the driveshaft prior to installing the assembly into the tunnel.**

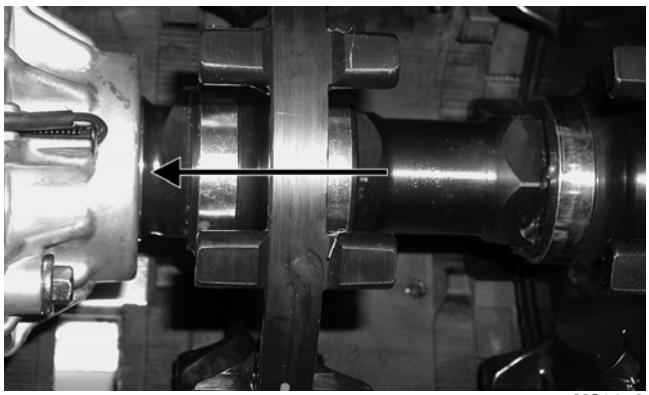


MS312B

2. With the splines of the gear case and driveshaft properly aligned, push the driveshaft toward the gear case until the driveshaft is properly seated.



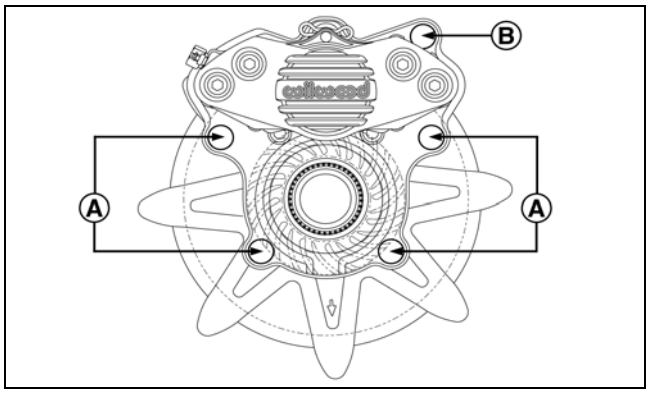
MS316A



MS317A

3. With the brake disc positioned in the brake housing assembly, properly align the splines of the driveshaft with the brake disc; then place the brake housing on the chassis. Using a soft hammer, carefully tap the housing (from side to side) until it seats properly.

4. Install the four lock nuts onto the cap screws (A) and the cap screw and lock nut (B) securing the inner brake housing to the chassis; then in a crisscross pattern, tighten to specifications.



740-186A

5. Apply Anti-Seize Thread Compound (p/n 0678-146) to the splines of the brake disc and to the threads of the retaining nut; then install the spacer, disc, and nut. Do not tighten at this time.

6. Install the skid frame (see Section 9).

7. Place the snowmobile in the upright position; then engage the brake lever lock.

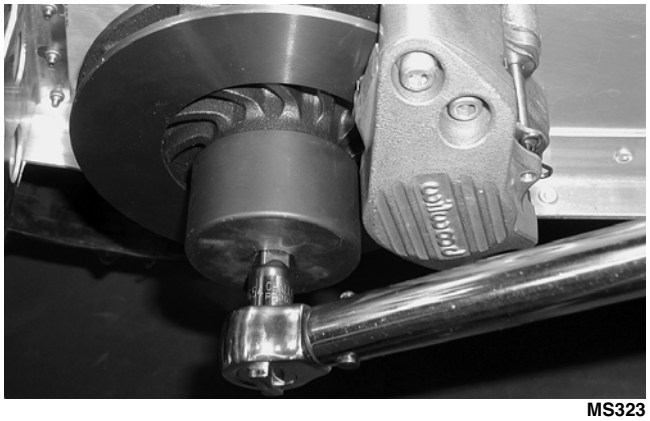
8. Secure the driveshaft to the ring gear with the cap screw (coated with blue Loctite #243 for a standard cap screw) and washer. Tighten to specifications.

⚠ CAUTION

If the long cap screw has a silver coating, it has been pre-treated with Scotch Grip and does not need Loctite applied.


MS322

9. Using Brake Disc Socket Wrench (p/n 0644-415), tighten the brake disc retaining nut (from step 6) to specifications.


MS323

10. Place the expansion chamber and resonator into position and secure with the springs.

11. Check the track for alignment and recommended tension; then tighten the cap screws securely.

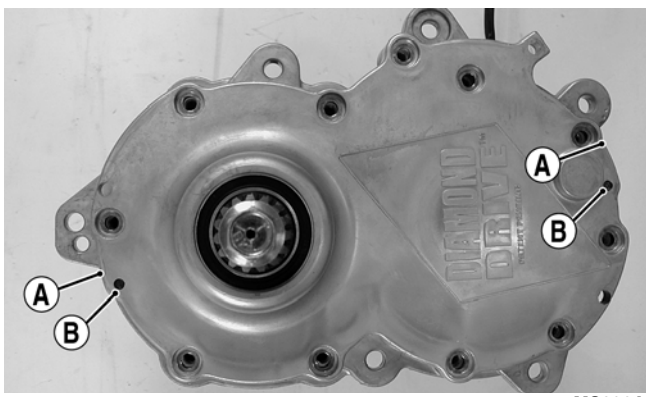
DISASSEMBLING GEAR CASE

1. Remove the eleven torx-head cap screws securing the gear case cover to the gear case assembly; then cut the cable tie securing the speedometer sensor wire to the gear case cover.



MS327A

2. Insert two flat-blade screwdrivers into the notches (A) on the gear case located near the upper and lower dowl pins (B) of the gear case; then working back and forth, pry the cover up and off the gear case.

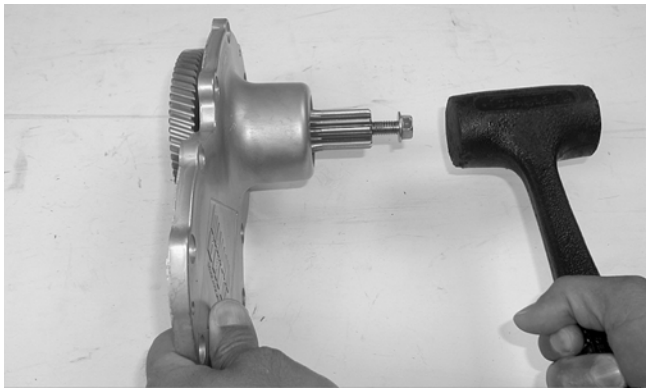


MS328A

8

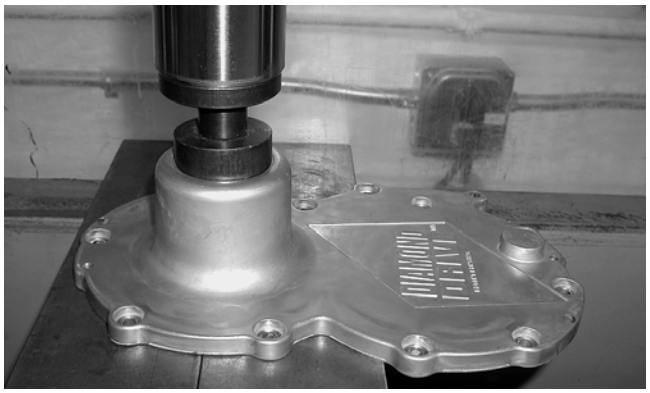
3. Drain the gear case fluid into a suitable container.

4. With a cap screw threaded into the input shaft and using a soft hammer, drive the input shaft out of the gear case cover.



MS329

5. Using a suitable bearing press and fixture, press the input shaft bearing out of the gear case cover. Account for a bearing and a seal.

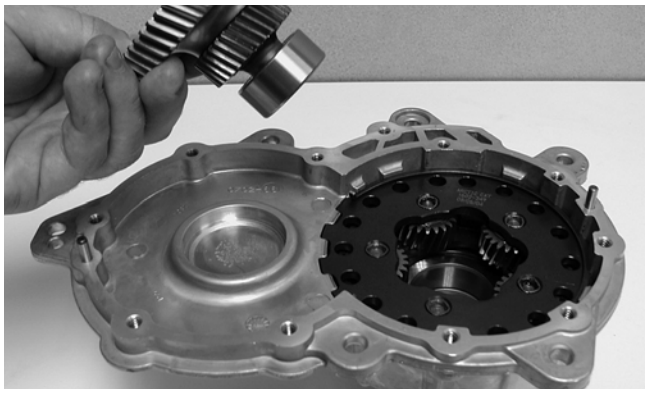


MS330



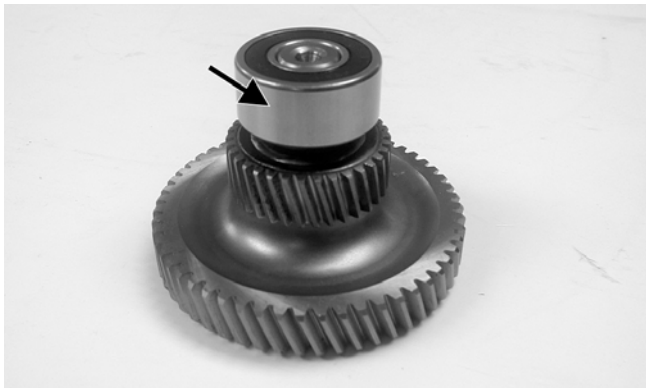
MS331

6. Remove the transfer gear assembly from the gear case.



MS332

7. Using a suitable bearing press and fixture, remove the main bearing from the transfer gear assembly.



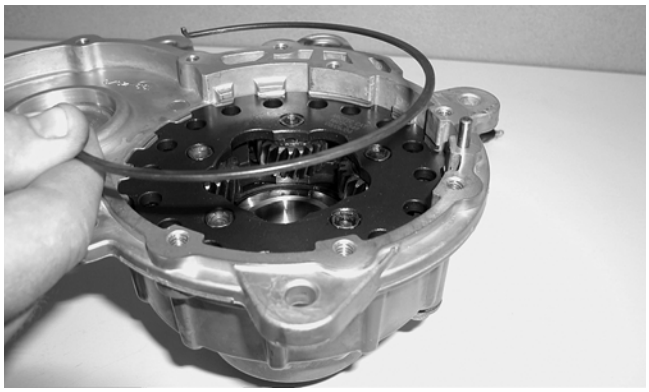
MS333A

8. Using a suitable bearing press and fixture, remove the outer bearing from the transfer gear.



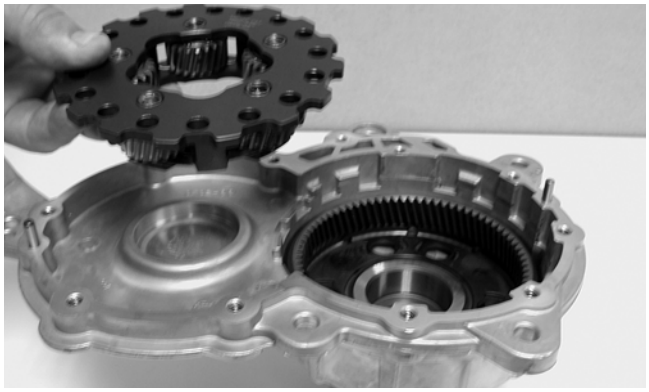
MS334A

9. Remove the retaining ring securing the planetary gear assembly to the gear case.



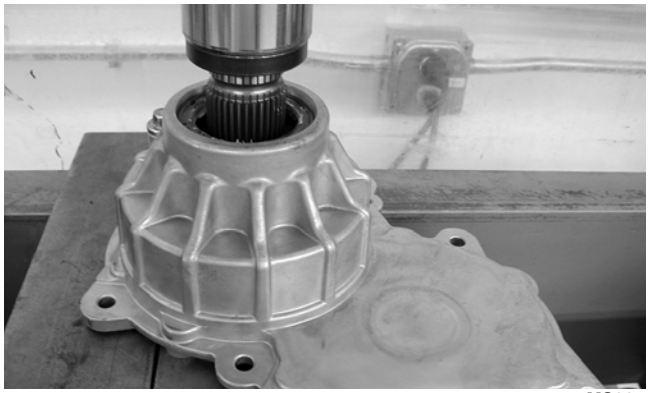
MS335

10. Note the position of the larger spacing between the tabs for assembling purposes; then remove the planetary gear assembly from the gear case.



MS336

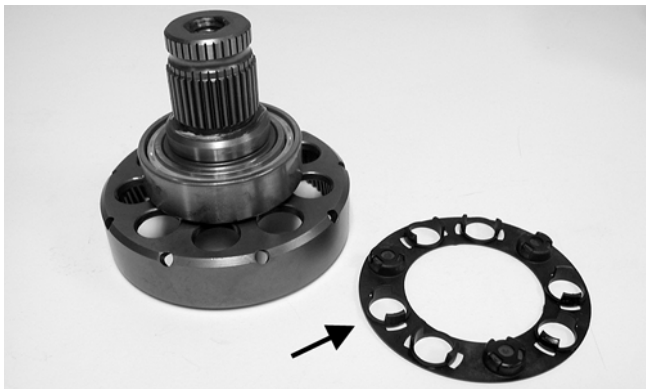
11. Using a suitable press and fixture, remove the ring gear assembly from the gear case.



MS337

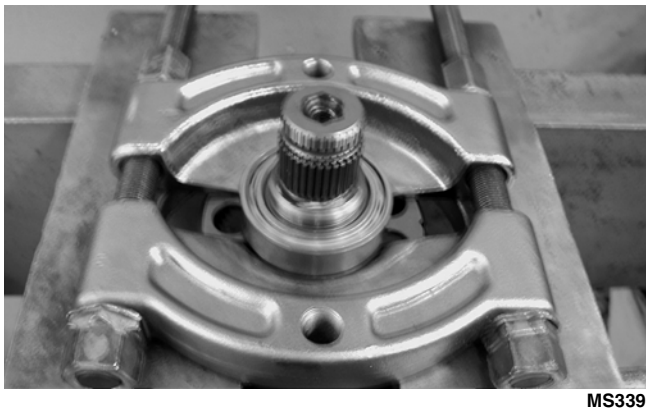
⚠ CAUTION

After the ring gear has been removed if bearing removal is required, the speedometer magnet retainer must be removed from the ring gear to avoid damaging the retainer.



MS338A

12. With a suitable bearing press and fixture, remove the bearing from the ring gear.

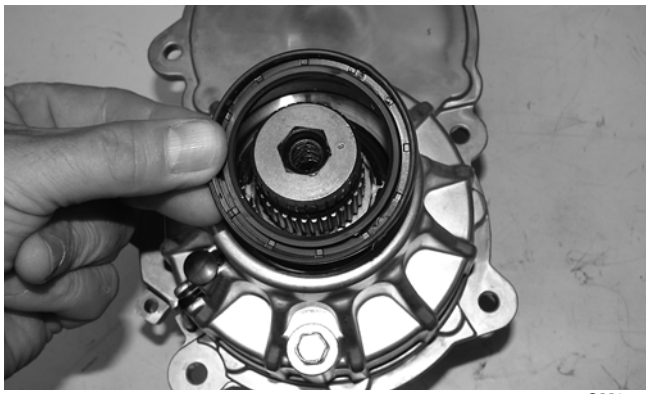


MS339



MS340

13. Using an appropriate seal removing tool, remove the ring gear seals from the gear case.



CM077

8



MS342

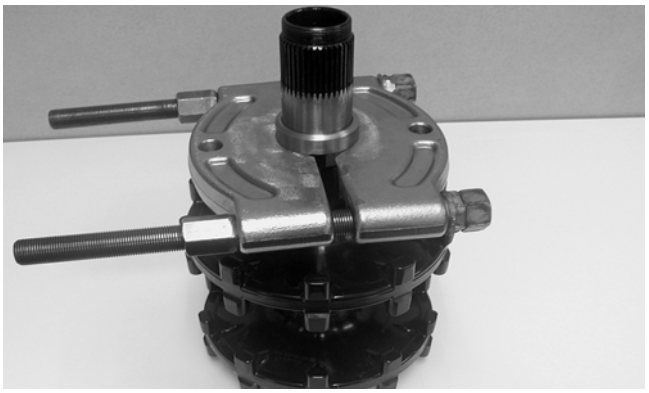
CLEANING AND INSPECTING GEAR CASE

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

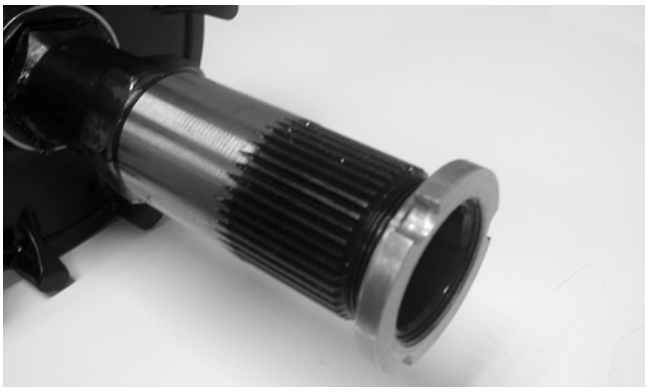
1. Wash the gear case halves in parts-cleaning solvent.
2. Inspect the gear case halves for scoring, pitting, scuffing, or any imperfections in the casting.
3. Inspect all threaded areas for damaged or stripped threads.
4. Inspect the bearing areas for cracks or excessive bearing movement. If evidence of excessive bearing movement is noted, replace the component.
5. Inspect the sealing surfaces of the gear case halves for trueness.
6. Wash the unsealed gear case bearings in parts-cleaning solvent.
7. Inspect the bearings for wear, scoring, scuffing, damage, or discoloration. Rotate the bearings. Bearings must rotate freely and must not bind or feel rough. If any abnormal condition is noted, replace the bearing.
8. Apply a light film of Arctic Cat ACT Drive Fluid (p/n 4639-025) to the unsealed bearings prior to assembling.

REMOVING DRIVE SPROCKETS

1. Install Crankshaft Bearing Remover (p/n 0144-302) onto the driveshaft between the spacer/collar; then install the brake disc retaining nut with the flat side facing outward.



MS353

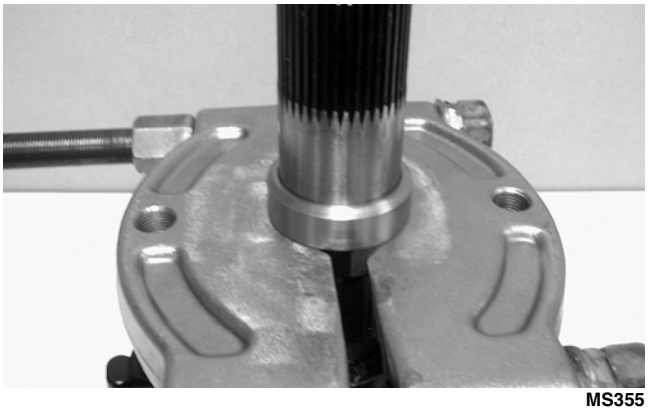


MS354

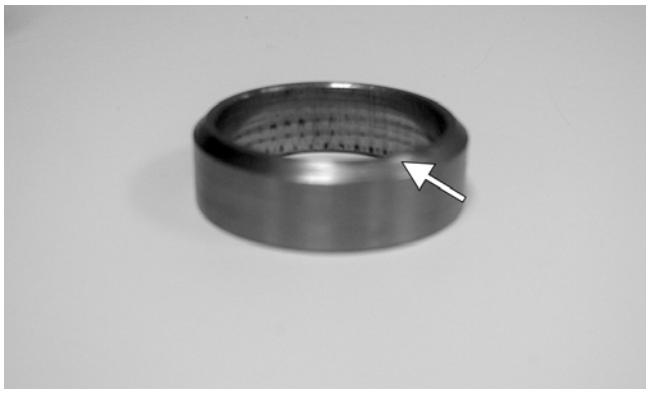
⚠ CAUTION

Make sure to install the retaining nut with the flat side facing outward or damage to the driveshaft will occur.

2. Using a suitable press, remove the spacer/collar from the driveshaft. Note that the tapered side of the collar faces outward.

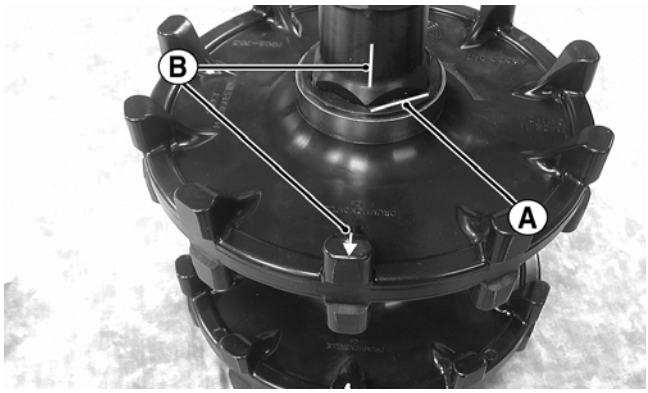


MS355



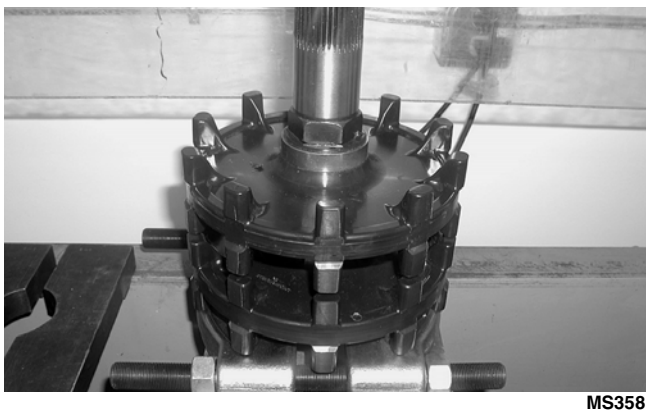
MS356A

3. For installing purposes, scribe a line on the driveshaft (A) next to the drive sprocket for proper alignment; then scribe a line on the driveshaft directly in line with the timing arrows (B) on the drive sprockets for proper sprocket timing.



MS357A

4. Using a suitable press positioned against the tension-collar of the drive sprocket (located on the gear case) and of the driveshaft, press the drive sprockets off the driveshaft.



MS358

⚠ CAUTION

Always press against the tension-collar of the drive sprockets or damage to the components will occur.



MS359A

■ **NOTE: The drive sprockets must be removed from the brake disc end of the driveshaft.**

Cleaning and Inspecting

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Thoroughly wash all metallic components in parts-cleaning solvent. Dry using compressed air.
2. Wash all non-metallic components with soap and water.
3. Inspect the driveshaft for damaged splines or stripped threads.
4. Inspect the bearings for any roughness or damage.
5. Inspect the seals for any breaks or damage.
6. Inspect the track for cuts, gouges, or wear.
7. Inspect the brake disc for wear or cracks.
8. Inspect the track drive sprockets for wear or damage.

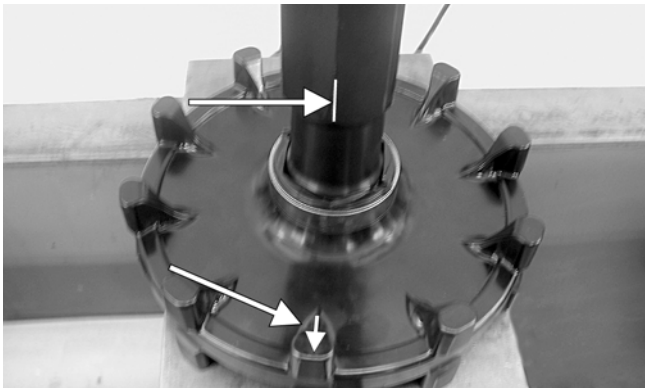
INSTALLING DRIVE SPROCKETS

■ **NOTE: Prior to installing the sprockets onto the driveshaft, it is advisable to lightly chamfer the inside edge of the sprocket to avoid binding.**



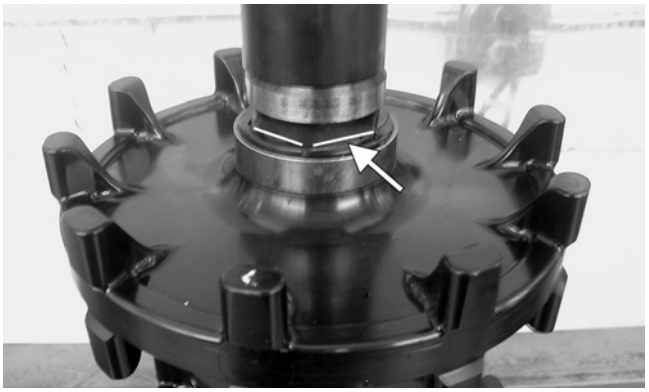
MS362

1. Properly align the scribed line on the driveshaft (from removing) with the timing arrow on the drive sprocket; then slide the sprocket onto the driveshaft as far as it will go.



MS360A

2. Using a suitable press and fixture, press the driveshaft into the sprocket until it aligns with the line scribed in removing.

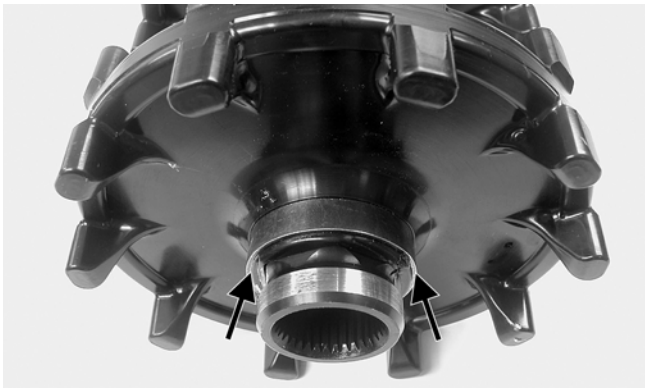


MS361A

3. Slide the remaining sprocket onto the driveshaft making sure the timing arrow/lines (from removing) are aligned; then using the press/fixture, press the sprocket to the remaining alignment line.

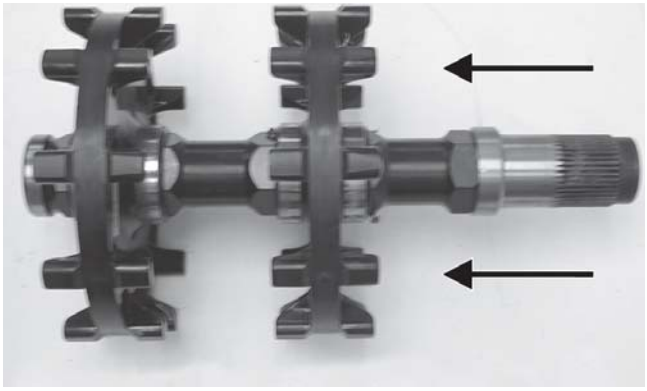
⚠ CAUTION

Always press against the tension-collar of the drive sprockets or damage to the components will occur.



MS359A

■ **NOTE: The drive sprockets must be installed on the brake disc end of the driveshaft.**

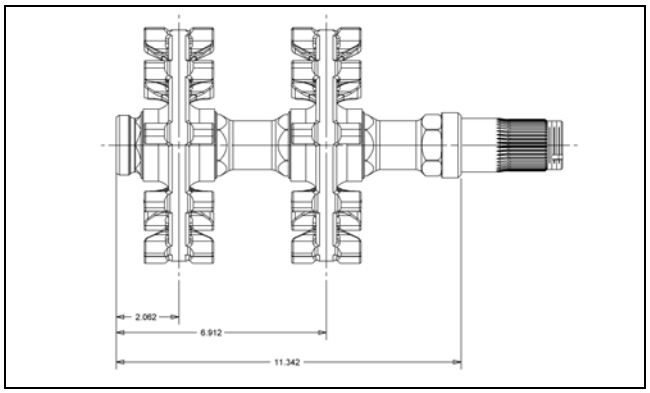


MS313C

4. Using a calipers, measure distances between the sprockets and from the sprockets to each end of the driveshaft for proper location (see illustrations).

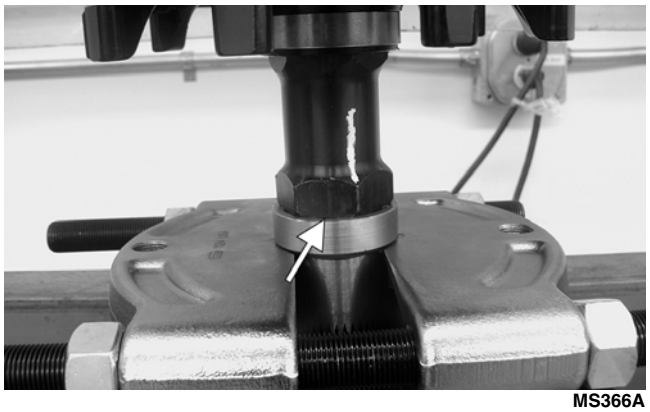


MS364



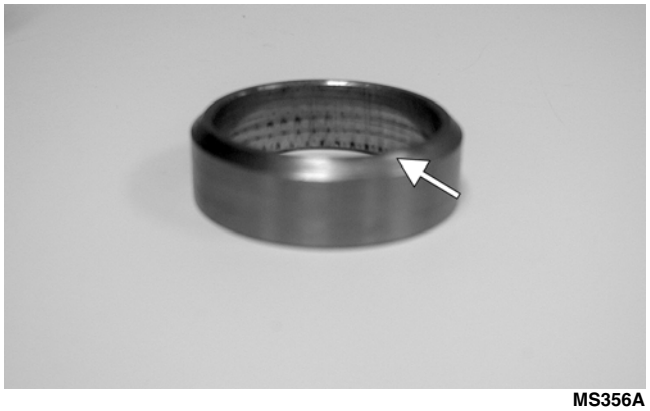
0740-042

5. Using Crankshaft Bearing Remover (p/n 0144-302) and a suitable press, install the spacer/collar onto the driveshaft until it is seated against the hex-shaped hub of the driveshaft.



MS366A

■ **NOTE: Take note to install the spacer/collar with the tapered side facing outward.**

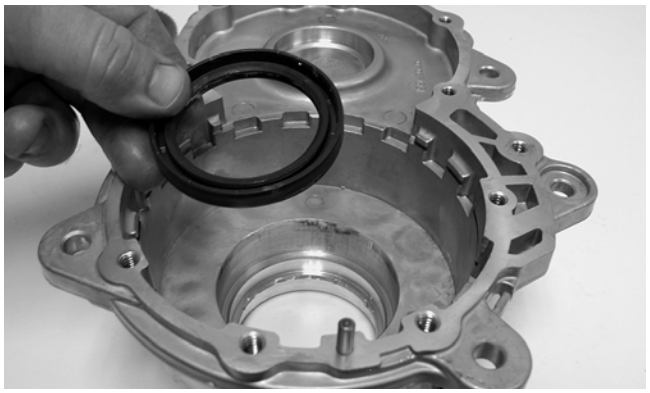


MS356A

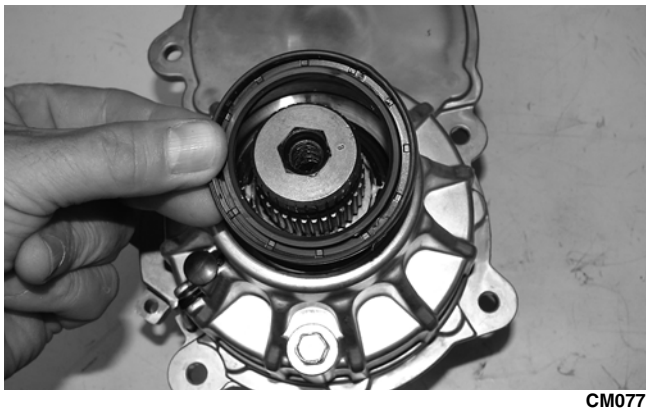
ASSEMBLING GEAR CASE

1. Using an appropriate seal installation tool, install the two oil seals into the ring gear opening of the gear case.

■ **NOTE: Grease must be applied to the inner seal prior to installing.**



MS342

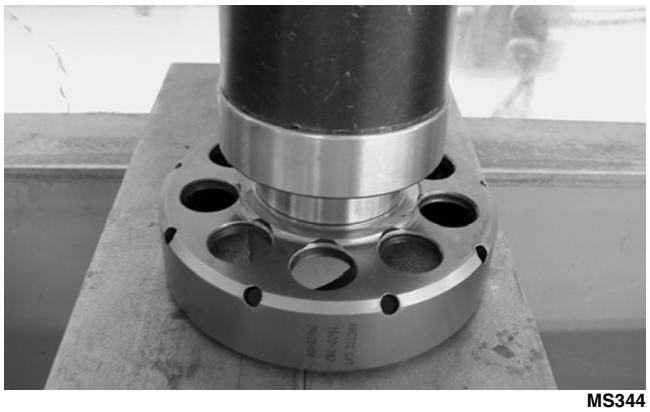


CM077

2. Using a suitable bearing press, install the bearing onto the ring gear.



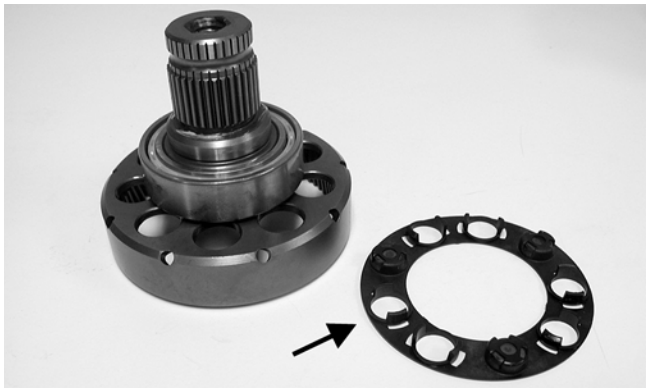
MS343



MS344

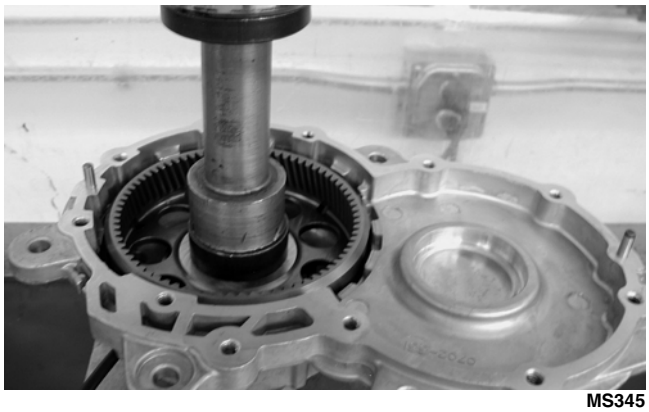
■ **NOTE: After the bearing has been installed into the ring gear, install the speedometer magnet retainer to the ring gear.**

8



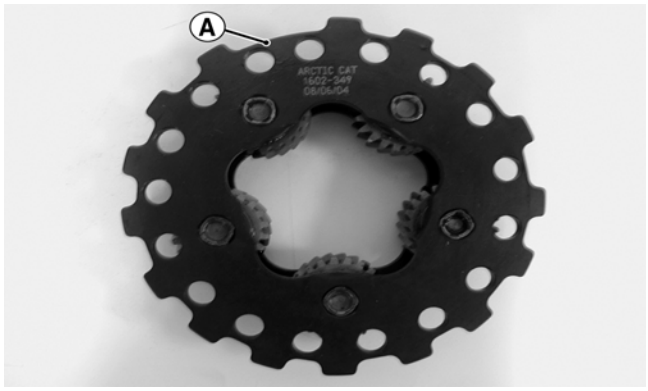
MS338A

3. Using a suitable press, install the ring gear assembly to the gear case.



MS345

4. Noting the location of the large spacing (A) between the tabs of the planetary gear assembly, install the assembly to the ring gear/gear case.



MS346A



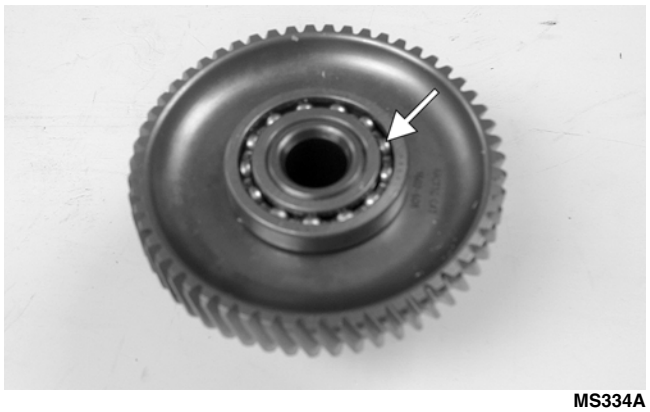
MS336

5. Install the retaining ring securing the planetary gear assembly to the gear case.

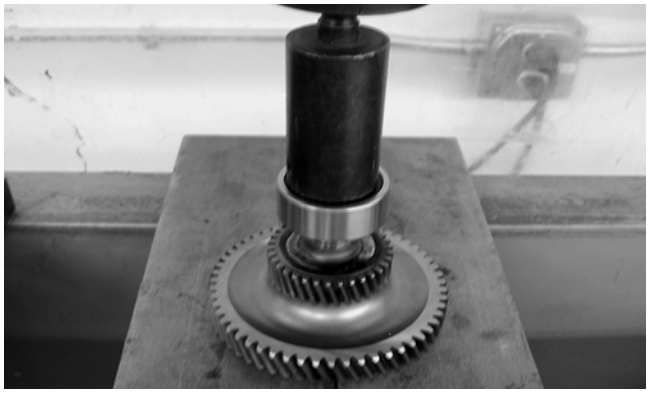


MS335

6. Using a suitable bearing press, install the outer bearing to the transfer gear assembly; then install the inner bearing to the assembly.

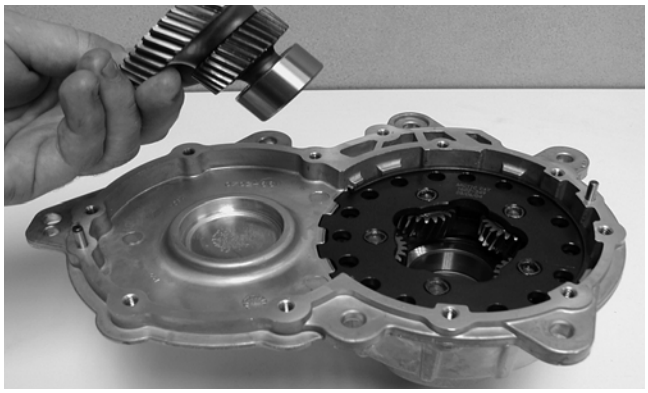


MS334A



MS348

7. Install the transfer gear assembly into the planetary gear assembly/gear case.



MS332

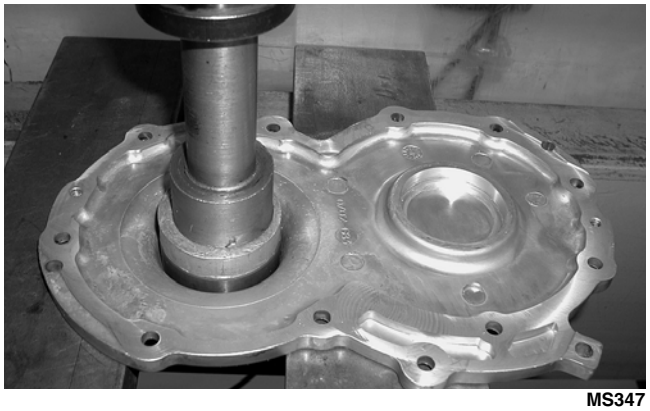
8. Using a suitable bearing press, install the inner bearing onto the input shaft.



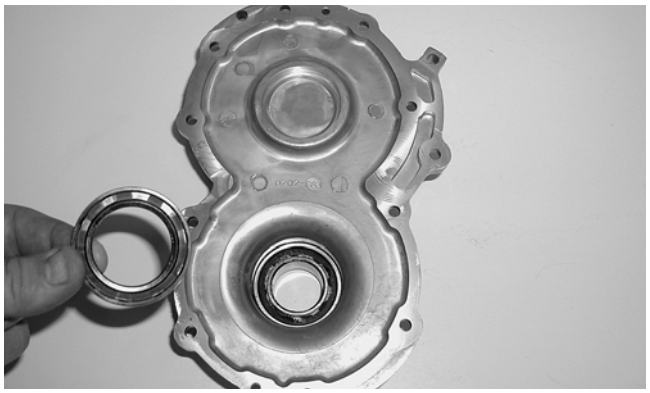
MS334A

9. Using a suitable bearing press and fixture, install the input shaft bearing to the gear case; then install the oil seal.

■ **NOTE: Grease must be applied to the inner seal prior to installing.**

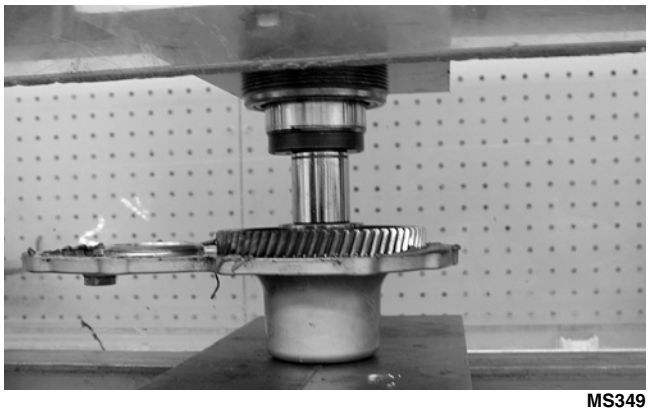


MS347



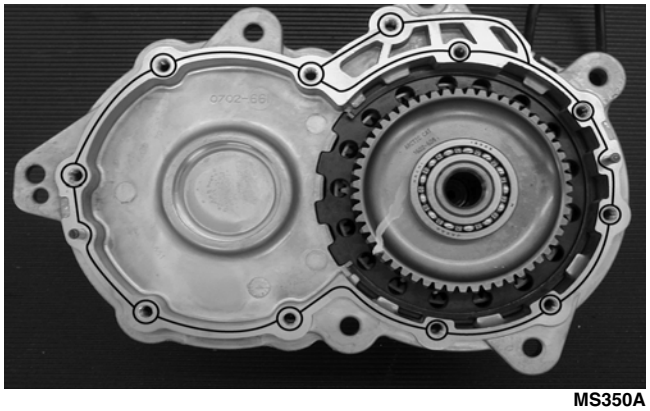
MS351

10. Using a suitable press, install the input shaft to the gear case cover.



MS349

11. Apply a film of High-Temp Silicone Sealant (p/n 4639-030) to the sealing surfaces of the gear case.



MS350A

⚠ CAUTION

Care must be taken not to allow silicone sealant into the cap screw holes and dowel pin holes or damage to the gear case may occur when tightening the cap screws.

12. With the dowel pins in place, install the cover to the gear case and secure with eleven torx-head cap screws; then in a crisscross pattern, tighten to specifications.



MS327A

13. Secure the speedometer sensor wire to the gear case cover with a cable tie.



MS327B

14. Pour 89 ml (3 fl oz) of Arctic Cat ACT Drive Fluid (p/n 4639-025) into the drain/fill hole; then install the plug. Tighten securely.

⚠ WARNING

Do not add more or less than the recommended amount of drive fluid to the gear case or damage to the gear case will occur.

INSTALLING GEAR CASE

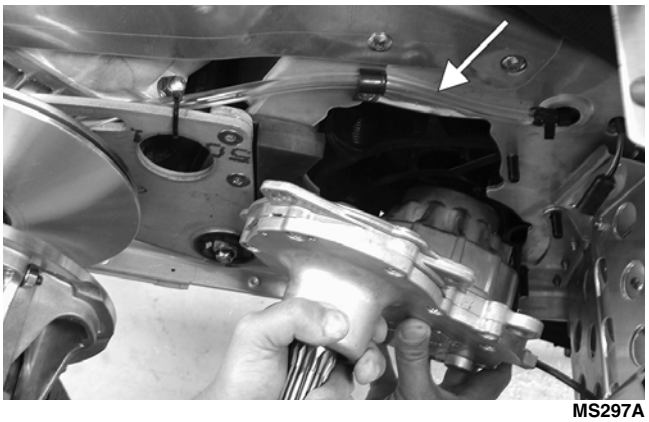
1. Using a Scotch Brite pad, clean the gear case/drive unit seal-mating surface on the track driveshaft; then thoroughly wipe clean.

■ NOTE: Prior to placing the gear case onto the driveshaft, apply a light coat of Arctic Cat Low-Temp Snowmobile Grease (p/n 0636-593) to the splines of the ring gear shaft.

2. Position the gear case so the sensor wire can be connected and routed. Connect the sensor wire; then align the gear case output shaft with the splines of the track driveshaft and position the gear case onto the mounting studs. Making sure the sensor wire does not become pinched under the gear case, push downward on the gear case until it is seated.

⚠ CAUTION

Care must be taken not to pinch or damage the oil hose when installing the gear case.

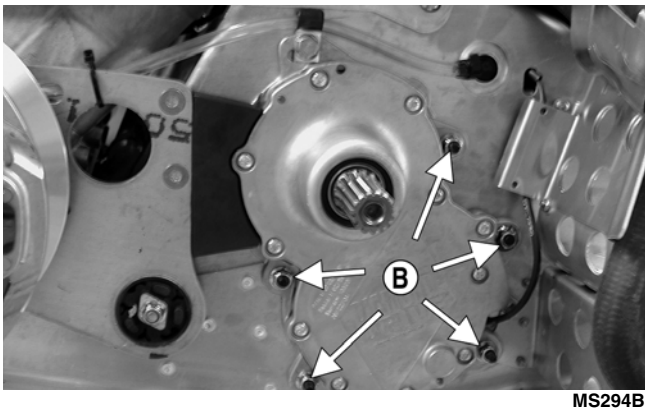


MS297A

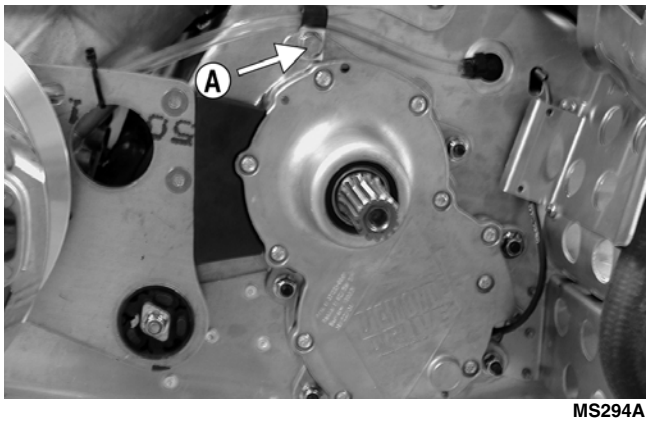
■ NOTE: If the gear case cannot be easily installed, it may be necessary to loosen the track tension.

3. Using a rubber mallet, lightly tap downward on the gear case to ensure that it is fully seated.

4. Install the lock nuts (B) and cap screw with oil-hose bracket (A) securing the gear case to the chassis. Do not tighten at this time.

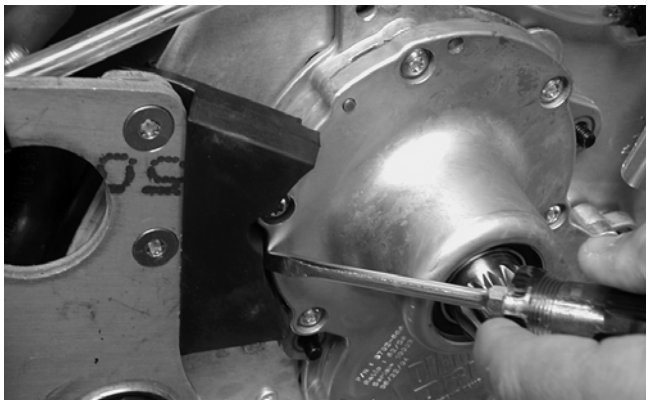


MS294B



MS294A

5. Install the torque bumper behind the engine mounting block; then carefully work it into place with the aid of a flat-blade screwdriver.



MS299

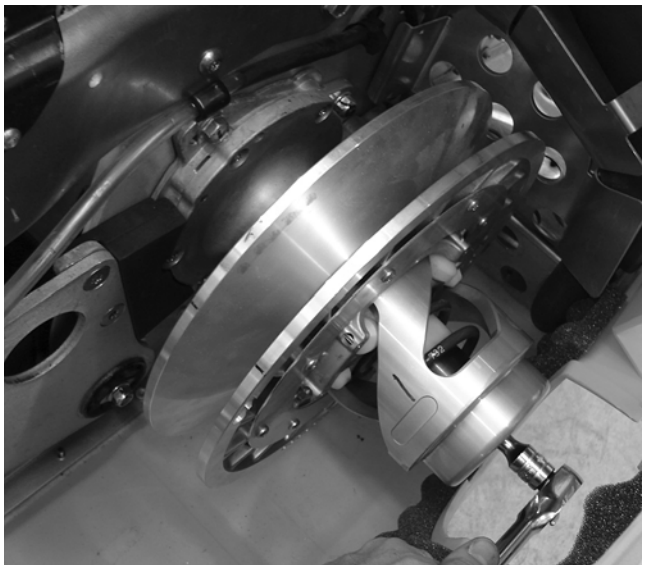
■ **NOTE: Use of a quality silicone spray will aid in installing the torque bumper.**

6. In a crisscross pattern, tighten the cap screw and lock nuts (from step 4) to specifications.

■ **NOTE: At this point, secure the speedometer sensor connector behind the coolant hose protector with a cable tie.**

7. Place the snowmobile in the upright position; then engage the brake lever lock.

8. Slide the driven pulley onto the driven shaft making sure alignment washers are in place; then secure the pulley with the cap screw (coated with blue Loctite #243) and washer. Tighten to specifications.

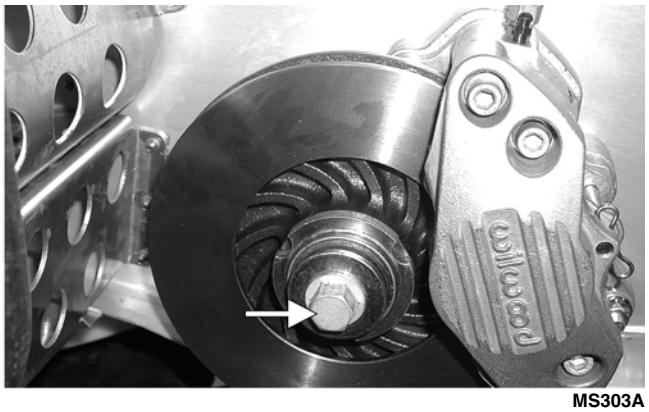


CM058

9. Install the drive belt.

■ **NOTE: For installing drive belt, see Removing/ Installing Drive Belt (ACT Roller Driven Pulley) in this section.**

10. Install the long cap screw into the gear case shaft; then tighten to specifications.



MS303A

11. Place the left-side access panel into position and secure with existing hardware.

12. Adjust the track for alignment and recommended tension; then tighten the cap screws to specifications (see Section 9).

8

Drive Train/Brake Disc
(Crossfire/M-Series Models)

Removing Gear Case..... 8-94
Removing Track Driveshaft 8-95
Installing Track Driveshaft 8-96
Disassembling Gear Case 8-98
Cleaning and Inspecting Gear Case 8-101
Removing Drive Sprockets..... 8-101
Installing Drive Sprockets..... 8-103
Assembling Gear Case 8-104
Installing Gear Case 8-107

REMOVING GEAR CASE

■ **NOTE: The gear case drive fluid does not have to be drained for this procedure.**

1. Remove the access panels from both sides of the snowmobile.

■ **NOTE: At this point, engage the brake lever lock.**

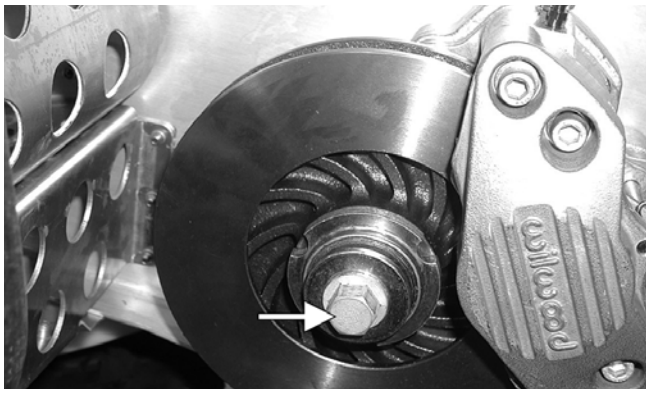
2. Remove the belt guard; then using a 9/16-in. socket and extension, remove the cap screw securing the driven pulley to the driven shaft. Remove the pulley from the driven shaft.



MS291

■ **NOTE: Account for and remove any alignment washers. These washers must be used during installing.**

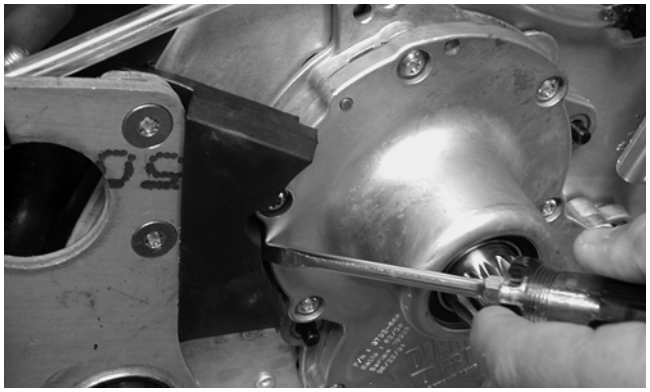
3. Remove the long cap screw (from the brake-disc side of the driveshaft).



MS303A

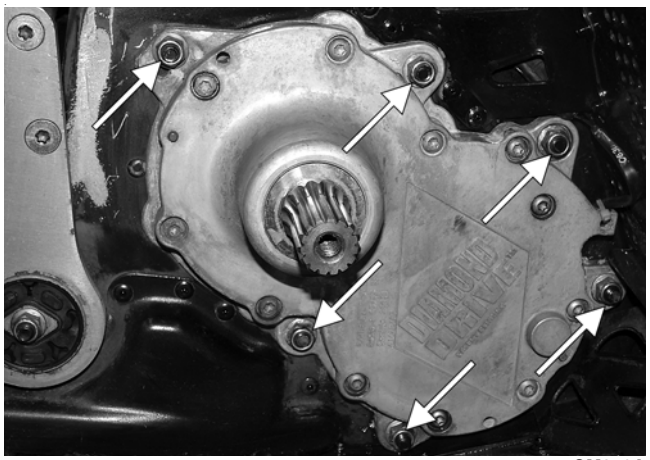
■ **NOTE: Tip the snowmobile on its right side positioning the gear case side of the snowmobile up. Place a piece of cardboard under the side of the snowmobile to prevent scratching of bumper and belly pan.**

4. Release the pressure on the snubber (located between the gear case and left-side engine plate) by lifting upward on the engine plate with a short pry bar; then remove the snubber.



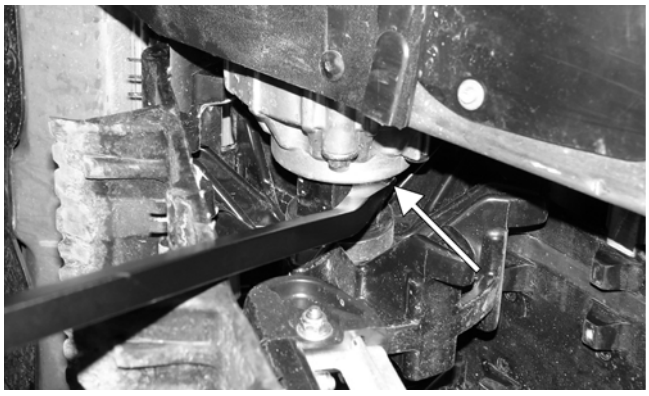
MS299

5. Remove the lock nuts securing the gear case to the chassis.



CM059A

6. To loosen and remove the gear case, lightly pry upward on the gear case in the area where the gear case and the track driveshaft join. When the gear case has been loosened, pull upward on the gear case until it is clear from the mounting studs; then disconnect the speedometer sensor and pull it out from under the left side of the footrest support bracket. Remove the gear case.



SNO-015

⚠ CAUTION

When using a pry bar to remove the gear case, apply pressure with care to prevent possible damage to the gear case.

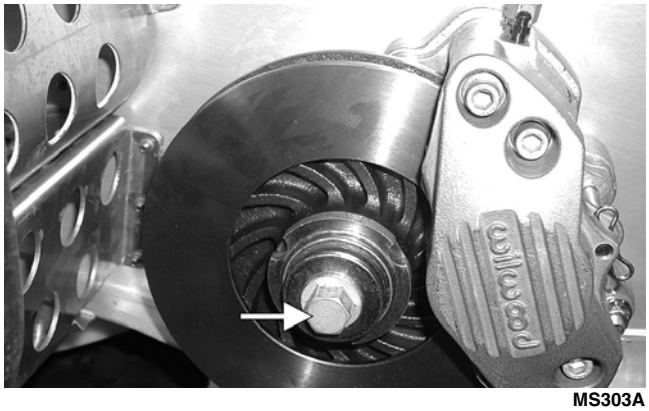
■ NOTE: If the gear case is difficult to remove, it may be necessary to loosen the track tension.

■ NOTE: Account for the lock nuts.

REMOVING TRACK DRIVESHAFT

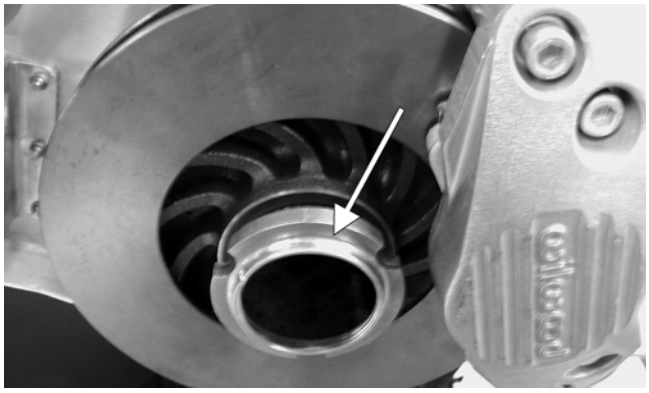
■ NOTE: The gear case drive fluid does not have to be drained for this procedure.

1. Remove the access panels from both sides of the snowmobile.
2. Remove the springs securing the resonator; then remove from the engine compartment.
3. Engage the brake lever lock; then remove the long cap screw from the driveshaft.



MS303A

4. Using Brake Disc Socket Wrench (p/n 0644-415), remove the retaining nut from the driveshaft.



MS305B

5. Using the Rear Suspension Spring Tool (p/n 0144-311), remove the spring from the adjusting cam.

⚠ WARNING

Care must be taken when removing the spring or damage or injury could result.



AG624DA

6. Remove the rear cap screws securing the skid frame to the tunnel. Account for lock washers and flat washers.
7. Remove the front cap screws securing the skid frame to the tunnel. Account for a flat washer and a lock nut.
8. Tip the snowmobile onto the right side positioning the gear case side of the snowmobile up. Place a piece of cardboard under the side of the snowmobile to protect against scratching. Remove the skid frame.
9. Using a 9/16-in. socket and extension, remove the cap screw securing the driven pulley to the driven shaft.

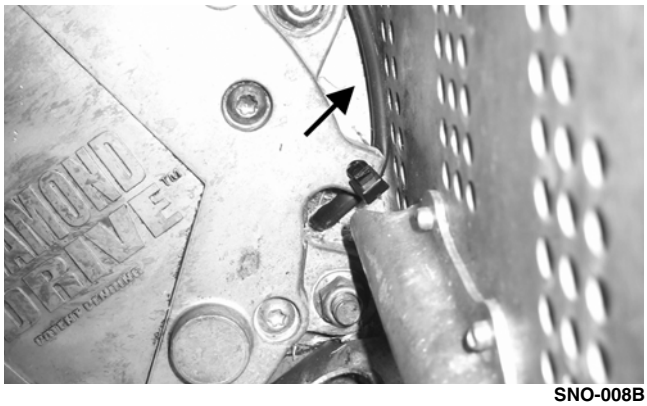


MS291

10. Slide the driven pully off the driven shaft.

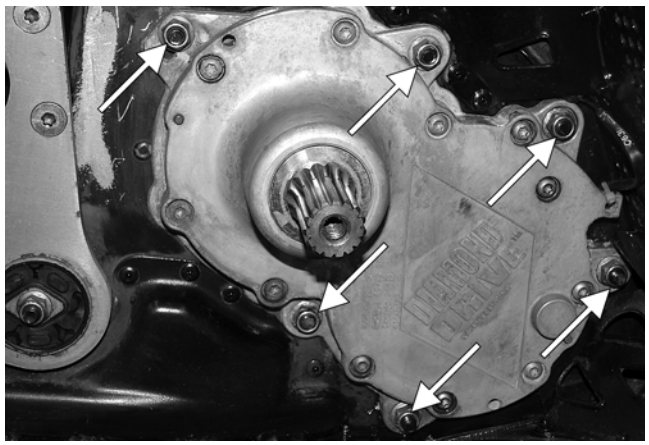
■ **NOTE: Account for and remove any alignment washers. These washers must be used during installing.**

11. Remove the speedometer sensor connector from behind the coolant hose protector; then disconnect the sensor.



SNO-008B

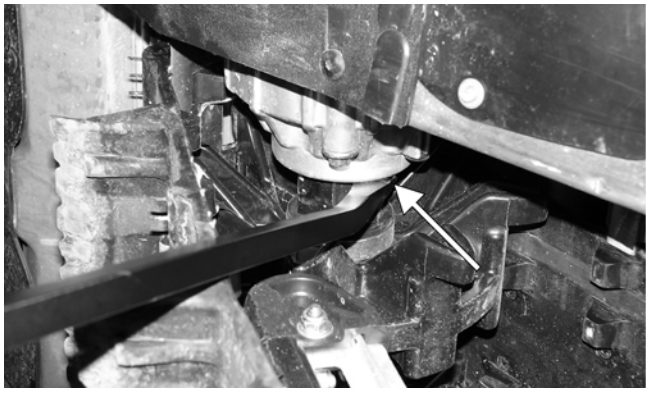
12. Remove the lock nuts securing the gear case to the chassis. Account for a rubber bumper and the lock nuts.



CM059A

13. Remove the gear case from the chassis.

■ **NOTE: If the gear case will not come loose, use a pry bar between the track and the gear case to carefully pry the gear case until it clears the studs.**

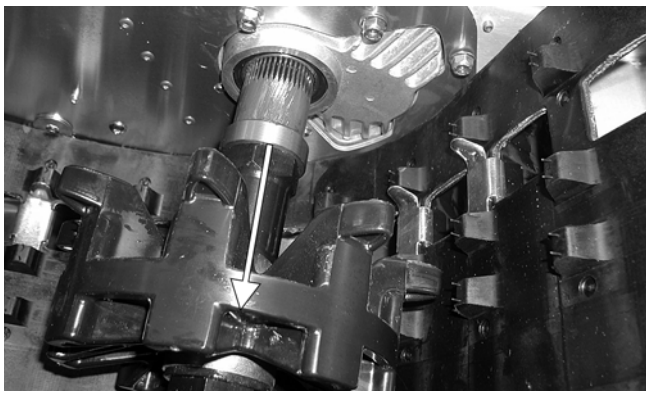


SNO-015

■ **NOTE: Account for the lock nuts.**

■ **NOTE: At this point, loosen the five nuts securing the brake caliper housing such that the driveshaft will clear the housing.**

14. With the gear case removed, pull the driveshaft toward the gear case side of the tunnel until it clears the brake caliper housing; then remove the track and driveshaft.



MS409A

■ **NOTE: It may be necessary to spread the tunnel slightly to remove the driveshaft from the brake caliper.**

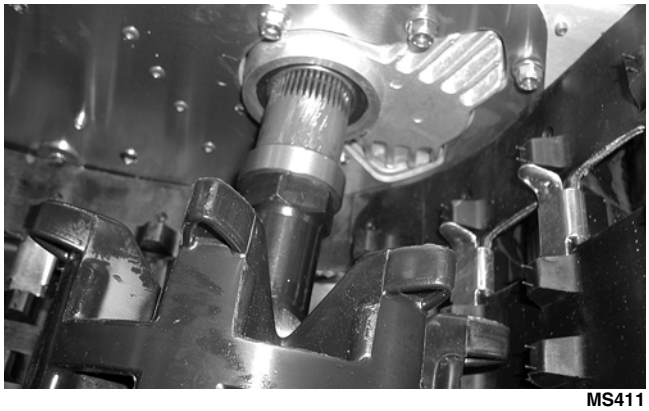
INSTALLING TRACK DRIVESHAFT

■ **NOTE: Prior to installing the driveshaft, apply a coat of Anti-Seize Thread Compound (p/n 0678-146) to the internal splines of the driveshaft.**



MS315A

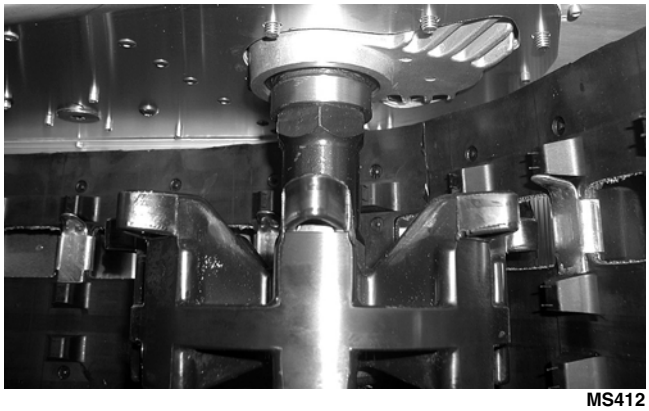
1. Place the track/driveshaft assembly into the bearing of the brake housing just far enough to allow the brake disc to be installed in the brake housing assembly.



MS411

■ **NOTE: At this point, tighten the five nuts securing the brake caliper housing to specifications.**

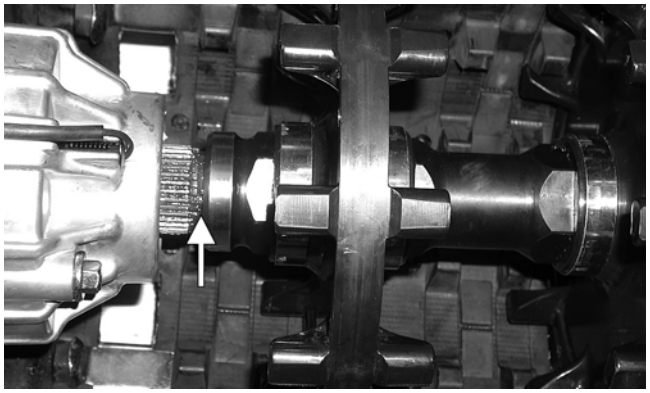
2. With the brake lever lock engaged and the brake disc positioned in the brake housing assembly, properly align the splines of the driveshaft with the brake disc; then push the driveshaft the rest of the way into the brake housing until it is properly seated.



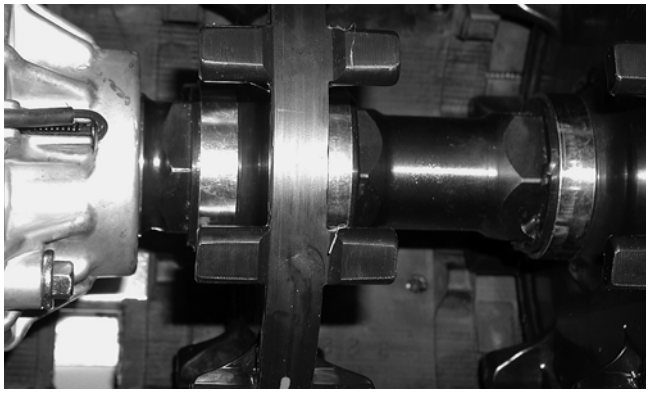
MS412

■ **NOTE: Prior to placing the gear case onto the driveshaft, apply a light coat of Anti-Seize Thread Compound (p/n 0678-146) to the splines of the ring gear shaft.**

3. Place the gear case onto the driveshaft; then press the gear case toward the sprocket until it properly seats into place on the chassis. It may be necessary to rotate the driveshaft slightly for proper seating.

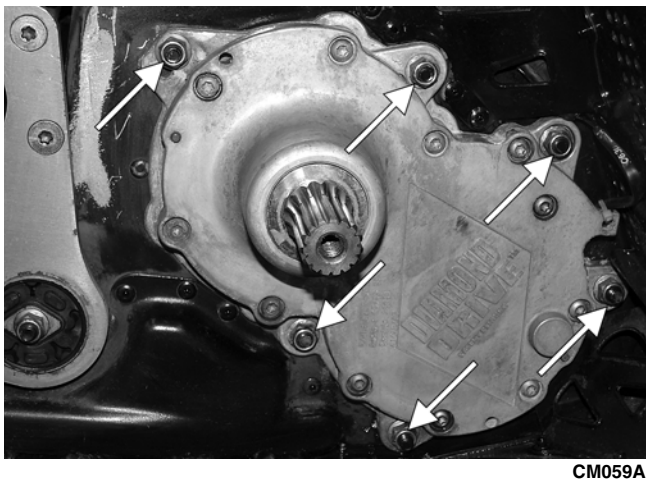


MS316A



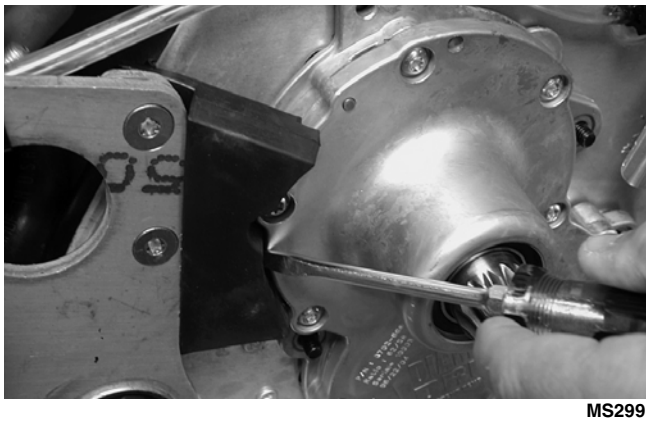
MS317

4. Install the lock nuts securing the gear case to the chassis. Tighten in a crisscross pattern to specifications.



CM059A

5. Install the torque bumper behind the engine mounting block; then carefully work it into place with the aid of a flat-blade screwdriver.



MS299

■ **NOTE: Use of a quality silicone spray will aid in installing the torque bumper.**

■ **NOTE: At this point, connect the speedometer sensor connector; then secure it behind the coolant hose protector with a cable tie.**

6. Install the skid frame (see Section 9).

7. Apply Anti-Seize Thread Compound (p/n 0678-146) to the threads of the brake disc retaining nut; then install the nut.

8. Using Brake Disc Socket Wrench (p/n 0644-415), tighten the brake disc retaining nut to specifications.



MS323

■ **NOTE: After the retaining nut is tightened to specifications, peen the nut at the flat spot of the driveshaft.**

9. Secure the driveshaft to the ring gear with the cap screw (coated with blue Loctite #243 for a standard cap screw) and washer. Tighten to specifications.

⚠ CAUTION

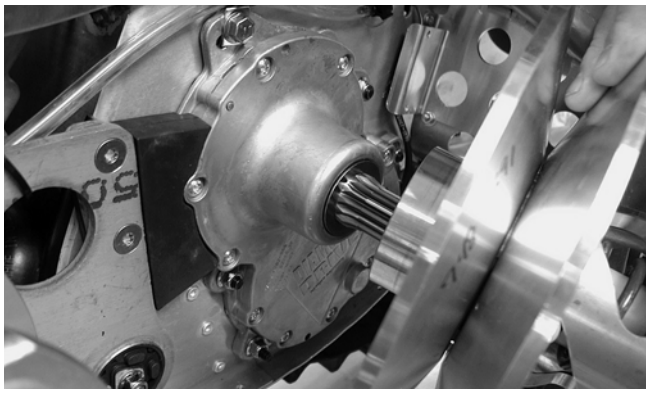
If the long cap screw has a silver coating, it has been pre-treated with Scotch Grip and does not need Loctite applied.



MS322

10. Place the resonator into position and secure with the springs.

11. Slide the driven pulley onto the driven shaft making sure alignment washers are in place.



MS302

12. Secure the pulley with the cap screw (coated with blue Loctite #243) and washer. Tighten to specifications.

13. Install the drive belt.

■ **NOTE: For installing drive belt, see Removing/Installing Drive Belt (ACT Roller Driven Pulley) in this section.**

14. Place the access panels into position and secure with existing hardware.

15. Check the track for alignment and recommended tension; then tighten the cap screws securely (see Section 9).

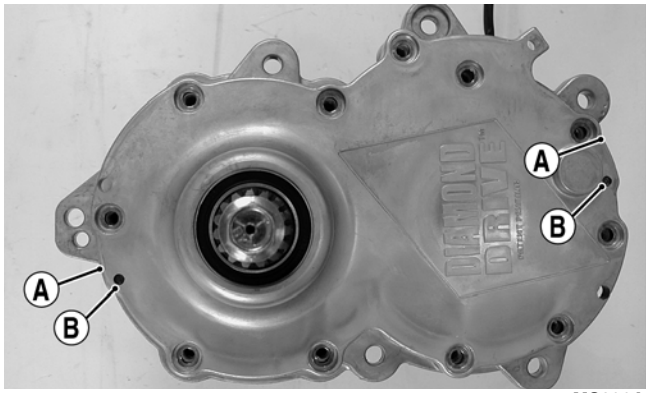
DISASSEMBLING GEAR CASE

1. Remove the eleven torx-head cap screws securing the gear case cover to the gear case assembly; then cut the cable tie securing the speedometer sensor wire to the gear case cover.



MS327A

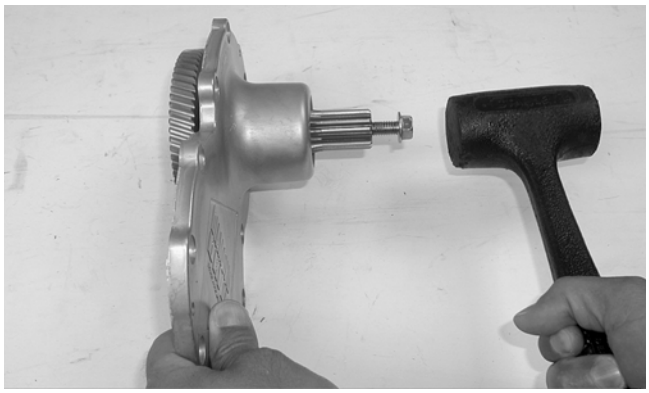
2. Insert two flat-blade screwdrivers into the notches (A) on the gear case located near the upper and lower dowl pins (B) of the gear case; then working back and forth, pry the cover up and off the gear case.



MS328A

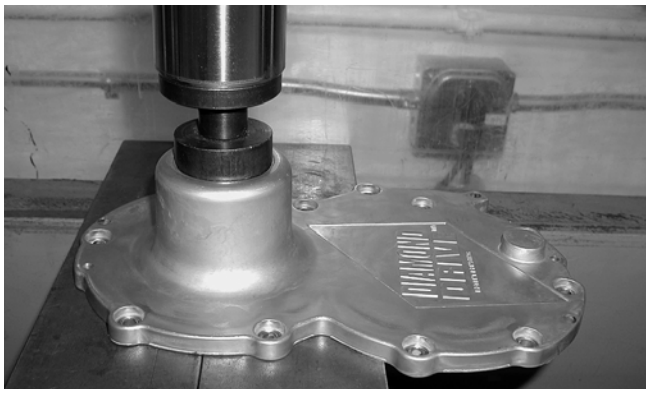
3. Drain the gear case fluid into a suitable container.

4. With a cap screw threaded into the input shaft and using a soft hammer, drive the input shaft out of the gear case cover.



MS329

5. Using a suitable bearing press and fixture, press the input shaft bearing out of the gear case cover. Account for a bearing and a seal.

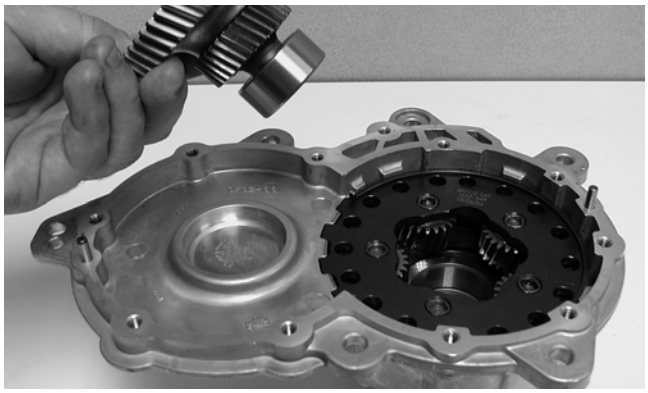


MS330



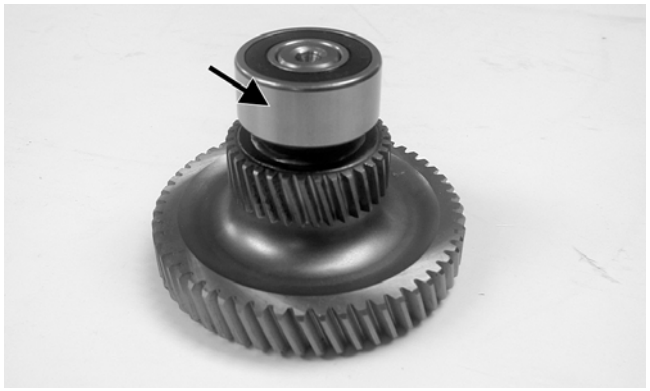
MS331

6. Remove the transfer gear assembly from the gear case.



MS332

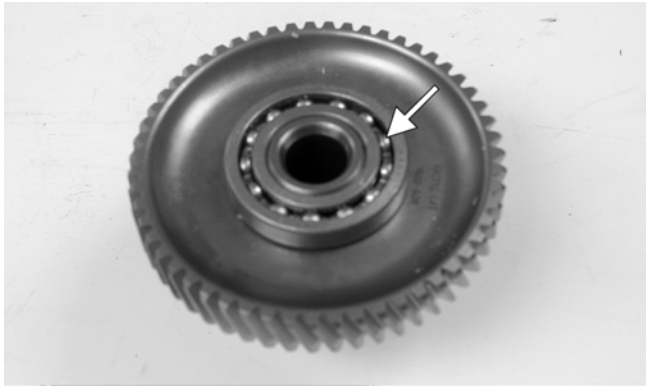
7. Using a suitable bearing press and fixture, remove the main bearing from the transfer gear assembly.



MS333A

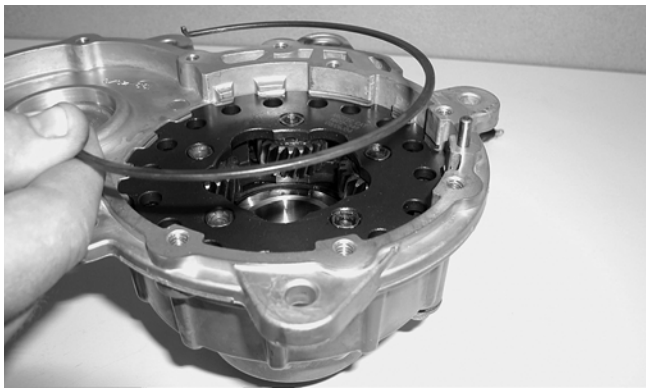
8

8. Using a suitable bearing press and fixture, remove the outer bearing from the transfer gear.



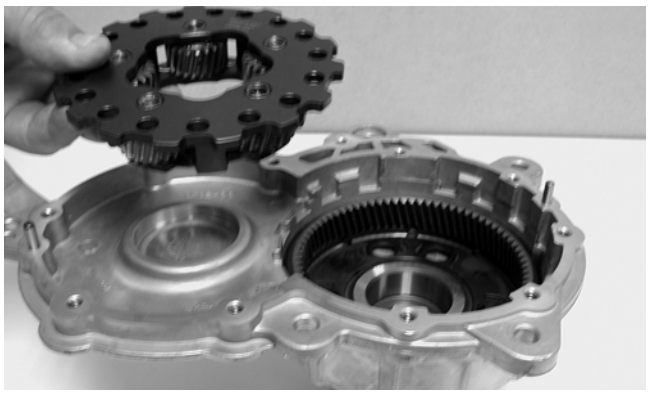
MS334A

9. Remove the retaining ring securing the planetary gear assembly to the gear case.



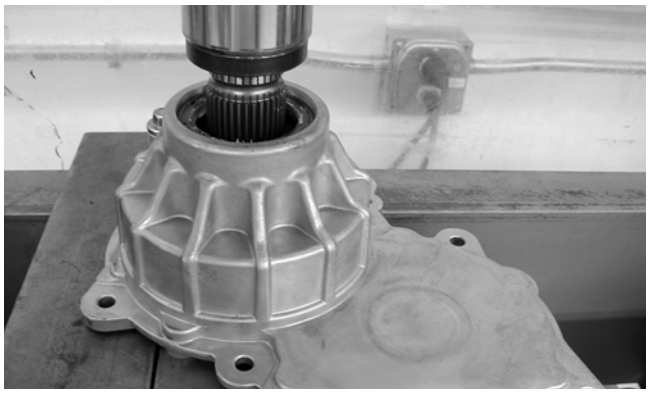
MS335

10. Note the position of the larger spacing between the tabs for assembling purposes; then remove the planetary gear assembly from the gear case.



MS336

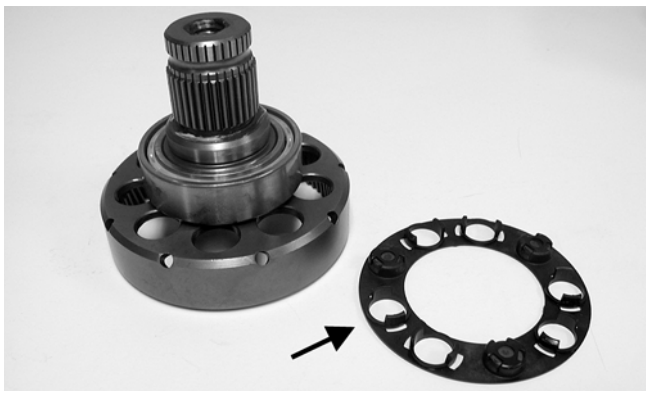
11. Using a suitable press and fixture, remove the ring gear assembly from the gear case.



MS337

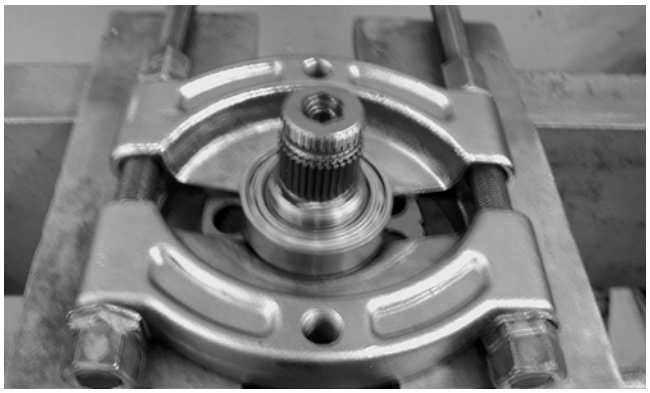
⚠ CAUTION

After the ring gear has been removed if bearing removal is required, the speedometer magnet retainer must be removed from the ring gear to avoid damaging the retainer.



MS338A

12. With a suitable bearing press and fixture, remove the bearing from the ring gear.

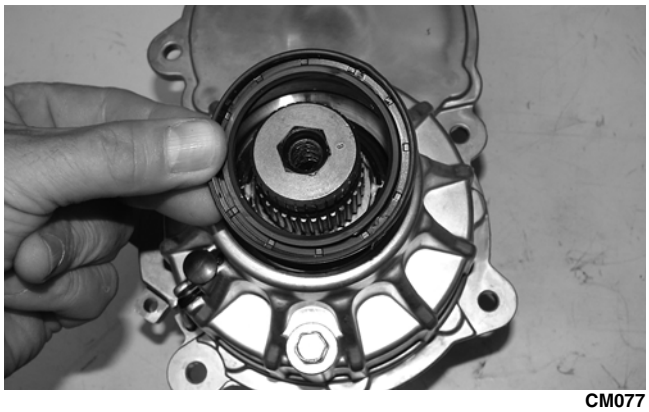


MS339



MS340

13. Using an appropriate seal removing tool, remove the ring gear seals from the gear case.



CM077



MS342

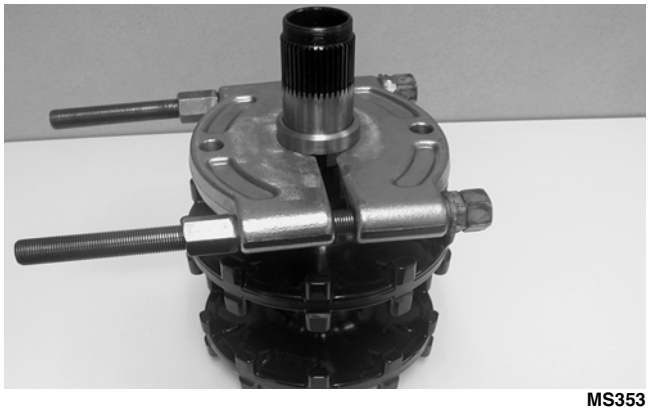
CLEANING AND INSPECTING GEAR CASE

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Wash the gear case halves in parts-cleaning solvent.
2. Inspect the gear case halves for scoring, pitting, scuffing, or any imperfections in the casting.
3. Inspect all threaded areas for damaged or stripped threads.
4. Inspect the bearing areas for cracks or excessive bearing movement. If evidence of excessive bearing movement is noted, replace the component.
5. Inspect the sealing surfaces of the gear case halves for trueness.
6. Wash the unsealed gear case bearings in parts-cleaning solvent.
7. Inspect the bearings for wear, scoring, scuffing, damage, or discoloration. Rotate the bearings. Bearings must rotate freely and must not bind or feel rough. If any abnormal condition is noted, replace the bearing.
8. Apply a light film of Arctic Cat ACT Drive Fluid (p/n 4639-025) to the unsealed bearings prior to assembling.

REMOVING DRIVE SPROCKETS

1. Install Crankshaft Bearing Remover (p/n 0144-302) onto the driveshaft between the spacer/collar; then install the brake disc retaining nut with the flat side facing outward.



MS353

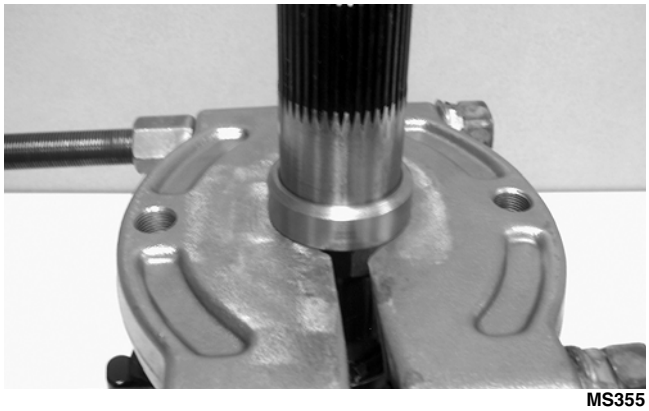


MS354

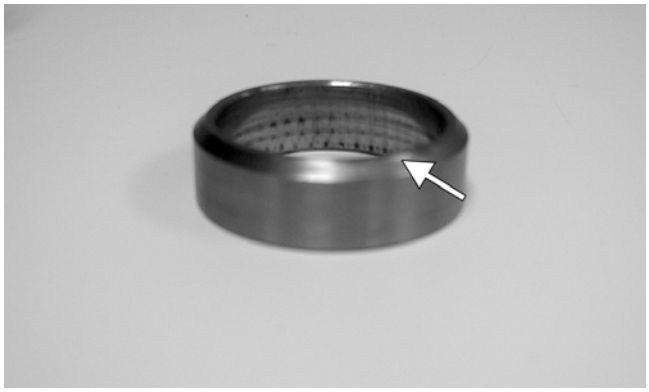
⚠ CAUTION

Make sure to install the retaining nut with the flat side facing outward or damage to the driveshaft will occur.

2. Using a suitable press, remove the spacer/collar from the driveshaft. Note that the tapered side of the collar faces outward.

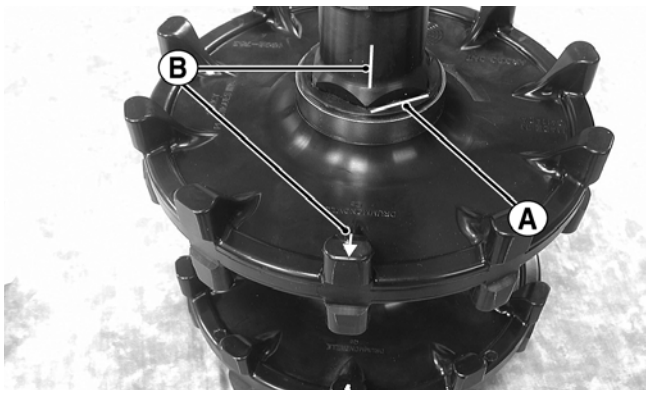


MS355



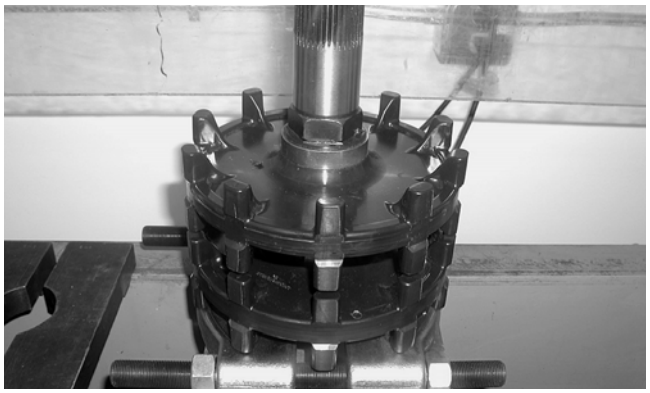
MS356A

3. For installing purposes, scribe a line on the driveshaft (A) next to the drive sprocket for proper alignment; then scribe a line on the driveshaft directly in line with the timing arrows (B) on the drive sprockets for proper sprocket timing.



MS357A

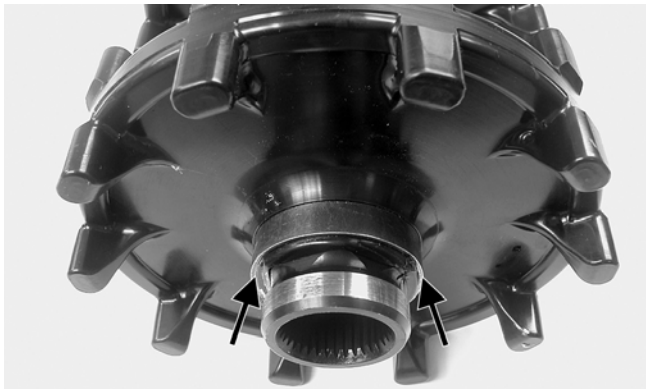
4. Using a suitable press positioned against the tension-collar of the drive sprocket (located on the gear case) and of the driveshaft, press the drive sprockets off the driveshaft.



MS358

⚠ CAUTION

Always press against the tension-collar of the drive sprockets or damage to the components will occur.



MS359A

■ **NOTE: The drive sprockets must be removed from the brake disc end of the driveshaft.**

Cleaning and Inspecting

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Thoroughly wash all metallic components in parts-cleaning solvent. Dry using compressed air.
2. Wash all non-metallic components with soap and water.
3. Inspect the driveshaft for damaged splines or stripped threads.
4. Inspect the bearings for any roughness or damage.
5. Inspect the seals for any breaks or damage.
6. Inspect the track for cuts, gouges, or wear.
7. Inspect the brake disc for wear or cracks.

8. Inspect the track drive sprockets for wear or damage.

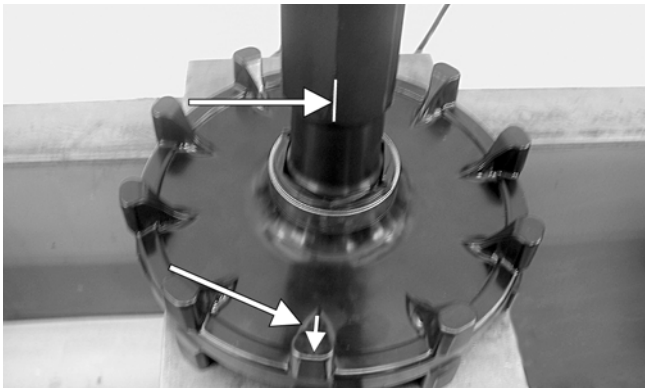
INSTALLING DRIVE SPROCKETS

■ **NOTE: Prior to installing the sprockets onto the driveshaft, it is advisable to lightly chamfer the inside edge of the sprocket to avoid binding.**



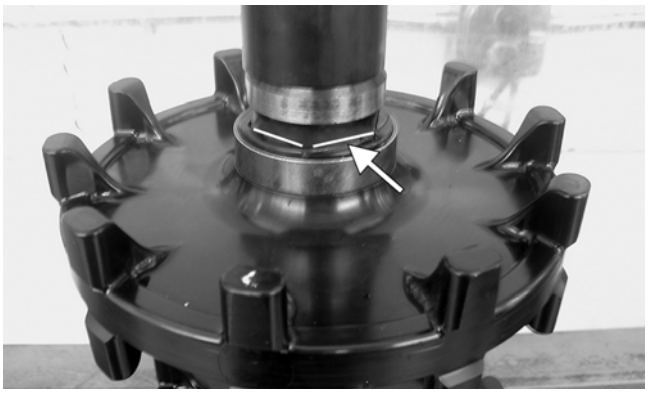
MS362

1. Properly align the scribed line on the driveshaft (from removing) with the timing arrow on the drive sprocket; then slide the sprocket onto the driveshaft as far as it will go.



MS360A

2. Using a suitable press and fixture, press the driveshaft into the sprocket until it aligns with the line scribed in removing.

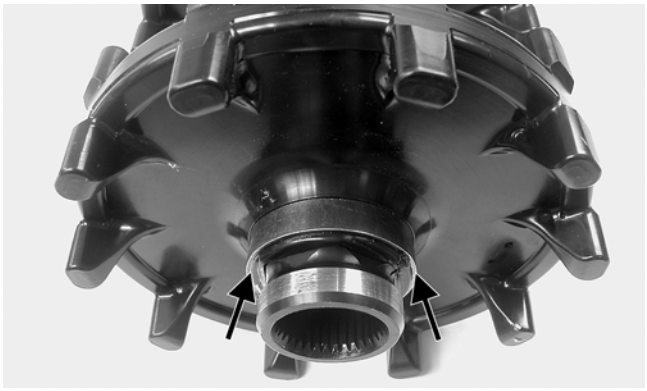


MS361A

3. Slide the remaining sprocket onto the driveshaft making sure the timing arrow/lines (from removing) are aligned; then using the press/fixture, press the sprocket to the remaining alignment line.

⚠ CAUTION

Always press against the tension-collar of the drive sprockets or damage to the components will occur.



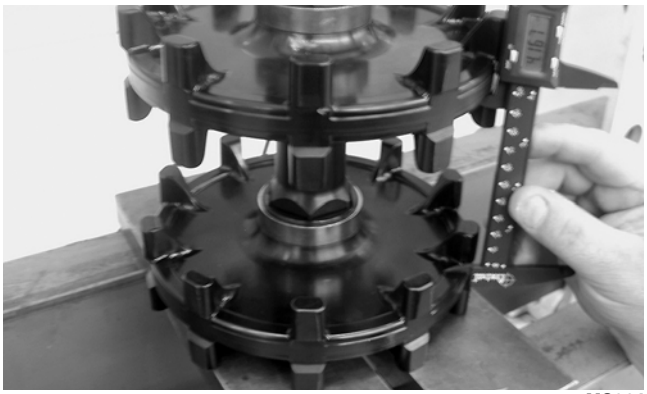
MS359A

■ **NOTE: The drive sprockets must be installed on the brake disc end of the driveshaft.**



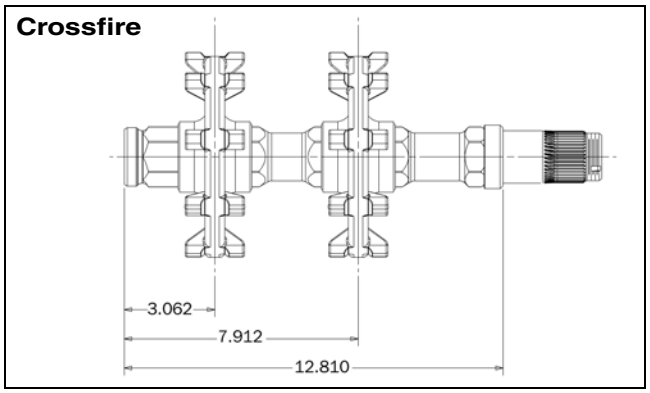
MS363A

4. Using a calipers, measure distances between the sprockets and from the sprockets to each end of the driveshaft for proper location (see illustrations).

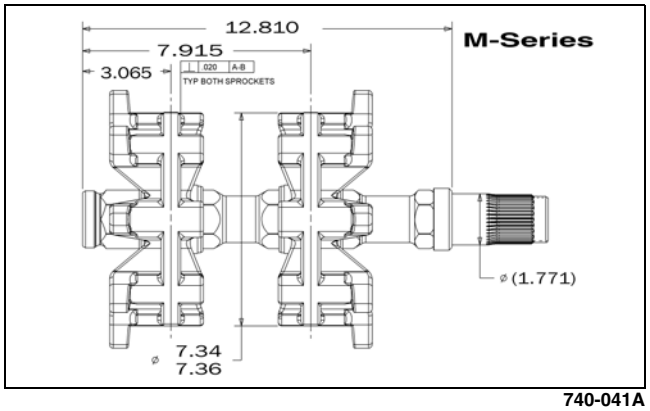


MS364

8

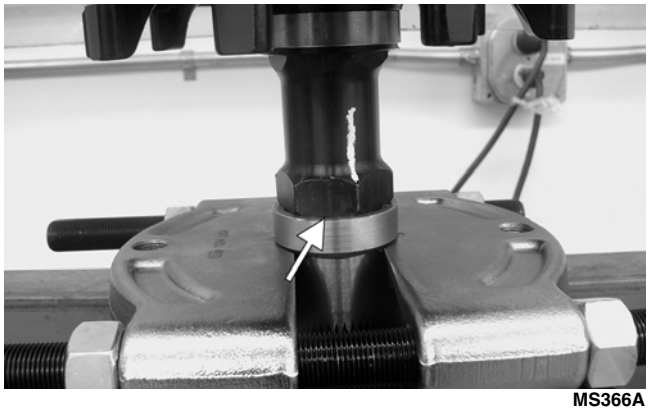


741-095A



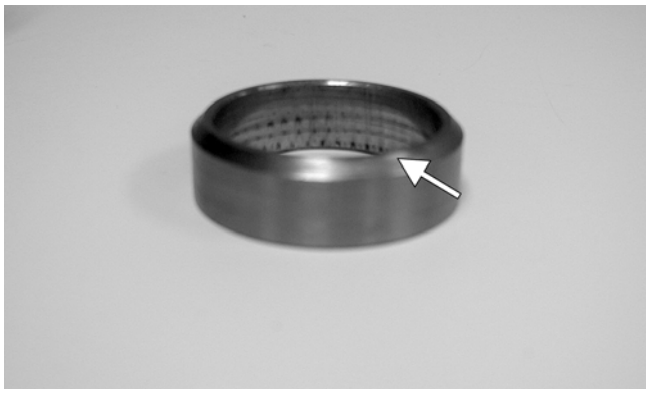
740-041A

5. Using Crankshaft Bearing Remover (p/n 0144-302) and a suitable press, install the spacer/collar onto the driveshaft until it is seated against the hex-shaped hub of the driveshaft.



MS366A

■ **NOTE: Take note to install the spacer/collar with the tapered side facing outward.**

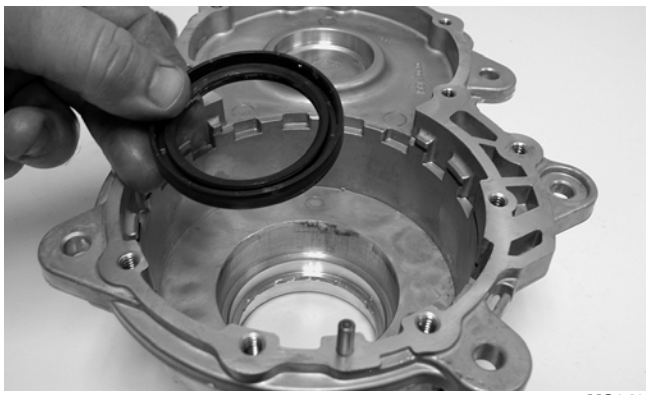


MS356A

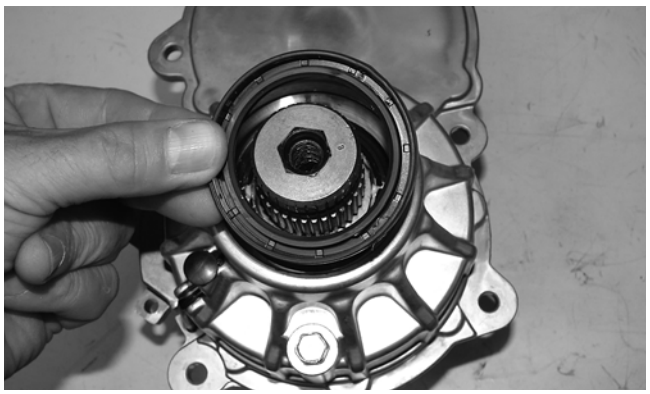
ASSEMBLING GEAR CASE

1. Using an appropriate seal installation tool, install the two oil seals into the ring gear opening of the gear case.

■ **NOTE: Grease must be applied to the inner seal prior to installing.**



MS342

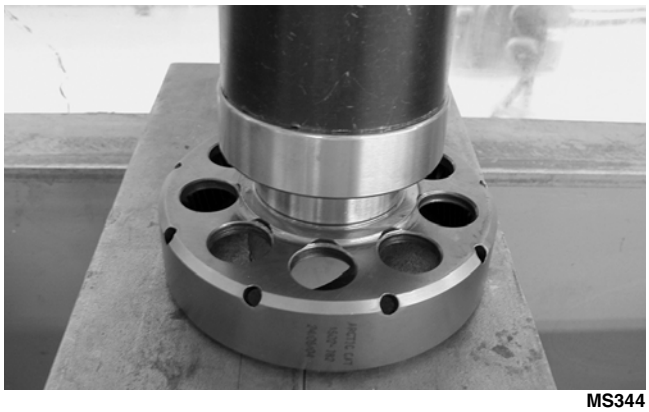


CM077

2. Using a suitable bearing press, install the bearing onto the ring gear.



MS343



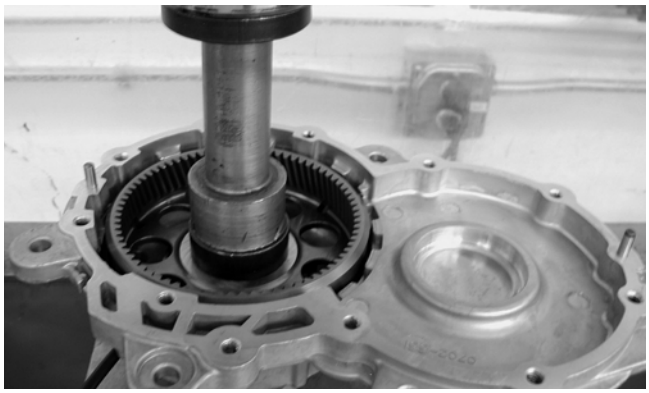
MS344

■ **NOTE: After the bearing has been installed into the ring gear, install the speedometer magnet retainer to the ring gear.**



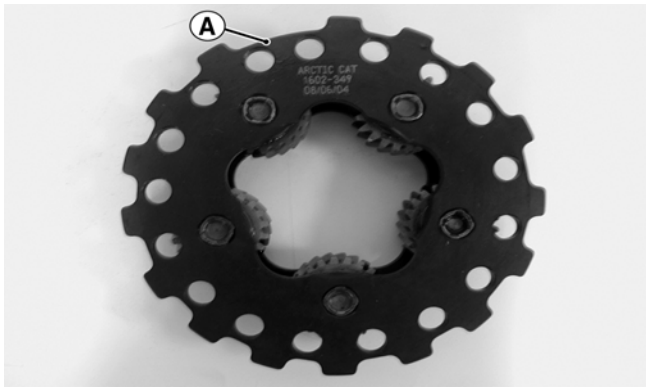
MS338A

3. Using a suitable press, install the ring gear assembly to the gear case.

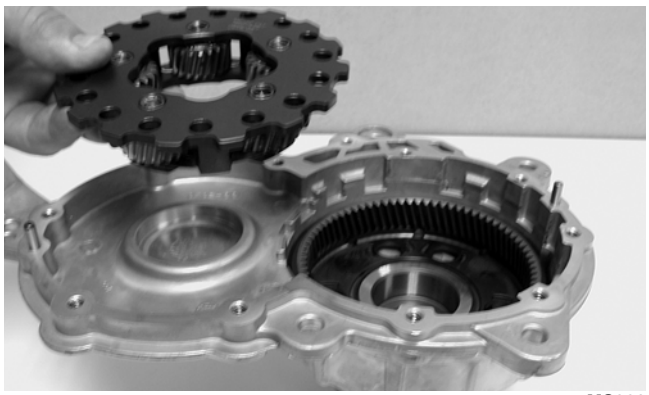


MS345

4. Noting the location of the large spacing (A) between the tabs of the planetary gear assembly, install the assembly to the ring gear/gear case.



MS346A



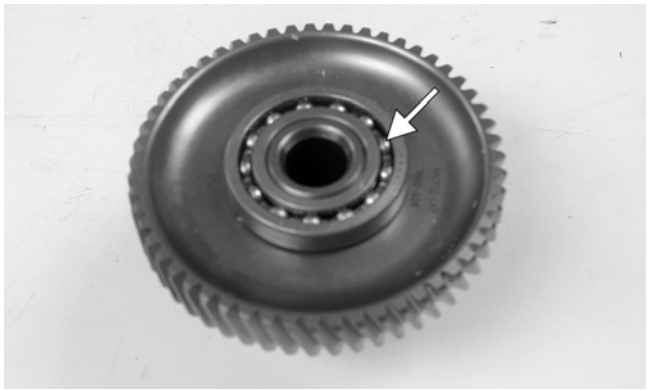
MS336

5. Install the retaining ring securing the planetary gear assembly to the gear case.

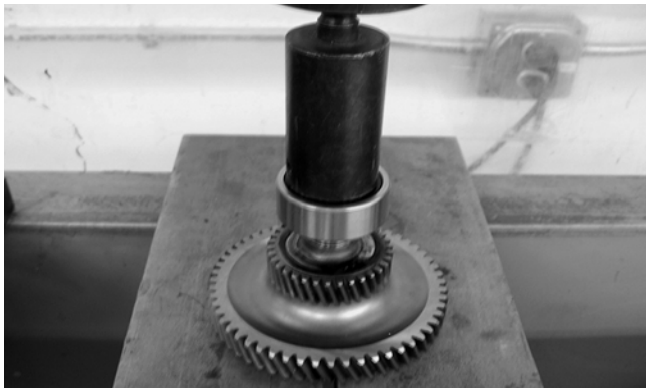


MS335

6. Using a suitable bearing press, install the outer bearing to the transfer gear assembly; then install the inner bearing to the assembly.

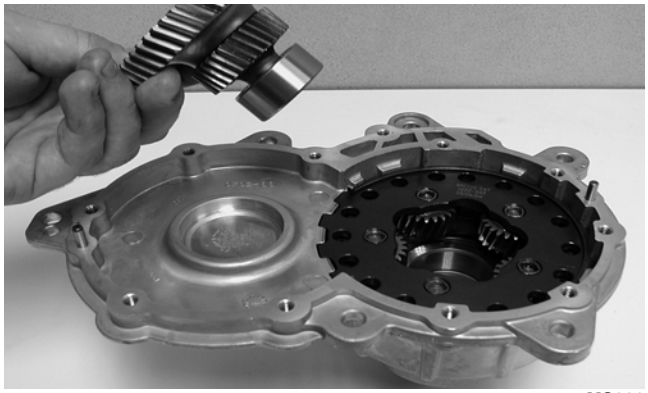


MS334A



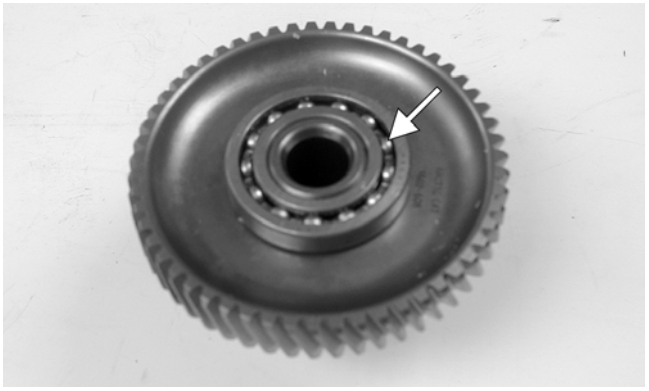
MS348

7. Install the transfer gear assembly into the planetary gear assembly/gear case.



MS332

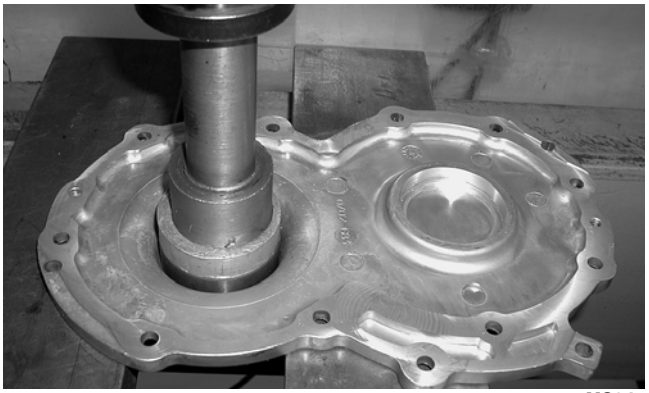
8. Using a suitable bearing press, install the inner bearing onto the input shaft.



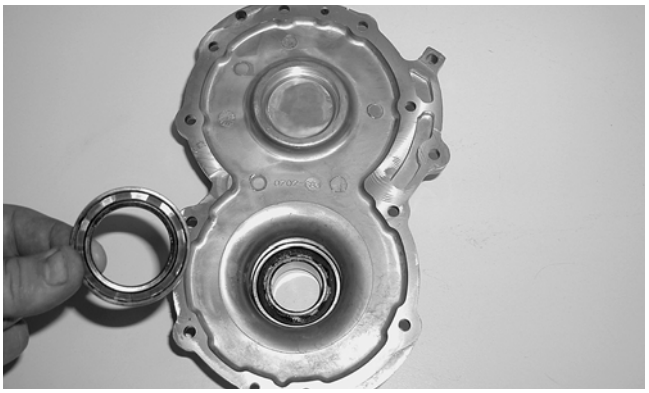
MS334A

9. Using a suitable bearing press and fixture, install the input shaft bearing to the gear case; then install the oil seal.

■ **NOTE: Grease must be applied to the inner seal prior to installing.**

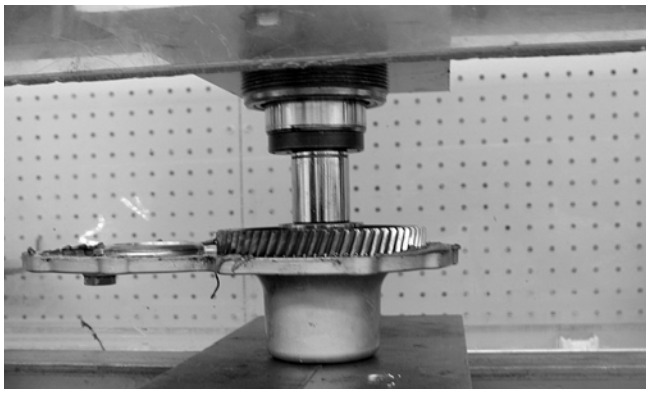


MS347



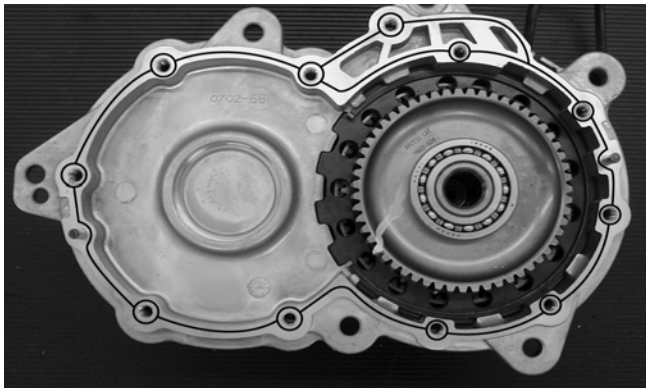
MS351

10. Using a suitable press, install the input shaft to the gear case cover.



MS349

11. Apply a film of High-Temp Silicone Sealant (p/n 4639-030) to the sealing surfaces of the gear case.



MS350A

⚠ CAUTION

Care must be taken not to allow silicone sealant into the cap screw holes and dowel pin holes or damage to the gear case may occur when tightening the cap screws.

12. With the dowel pins in place, install the cover to the gear case and secure with eleven torx-head cap screws; then in a crisscross pattern, tighten to specifications.



MS327A

13. Secure the speedometer sensor wire to the gear case cover with a cable tie.



MS327B

14. Pour 89 ml (3 fl oz) of Arctic Cat ACT Drive Fluid (p/n 4639-025) into the drain/fill hole; then install the plug. Tighten securely.

⚠ CAUTION

Do not add more or less than the recommended amount of drive fluid to the gear case or damage to the gear case will occur.

INSTALLING GEAR CASE

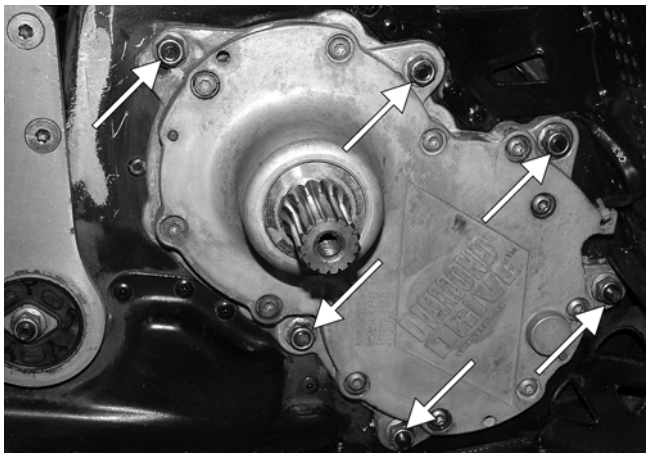
1. Using a Scotch Brite pad, clean the gear case/drive unit seal-mating surface on the track driveshaft; then thoroughly wipe clean.

■ NOTE: Prior to placing the gear case onto the driveshaft, apply a light coat of Arctic Cat Low-Temp Snowmobile Grease (p/n 0636-593) to the internal splines of the track driveshaft.

2. Position the gear case so the sensor wire can be connected and routed. Connect the sensor wire; then align the gear case output shaft with the splines of the track driveshaft and position the gear case onto the mounting studs. Making sure the sensor wire does not become pinched under the gear case, push downward on the gear case until it is seated.

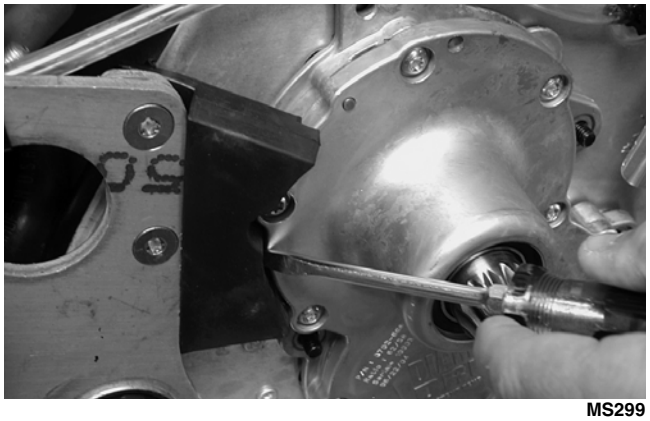
3. Using a rubber mallet, lightly tap downward on the gear case to ensure that is fully seated.

4. Loosely secure the gear case by first installing the six flange nyloc nuts and finger tighten; then tighten all the nuts to specifications.


CM059A

■ **NOTE: When tightening the nuts to the proper torque factor, it is advisable to begin tightening the nuts located on the bottom of the gear case and working upward until all nuts are tightened to the proper torque factor.**

5. Install the torque bumper behind the engine mounting bracket; then carefully work it into place with the aid of a flat-blade screwdriver.


MS299

■ **NOTE: Use of a quality silicone spray will aid in installing the torque bumper.**

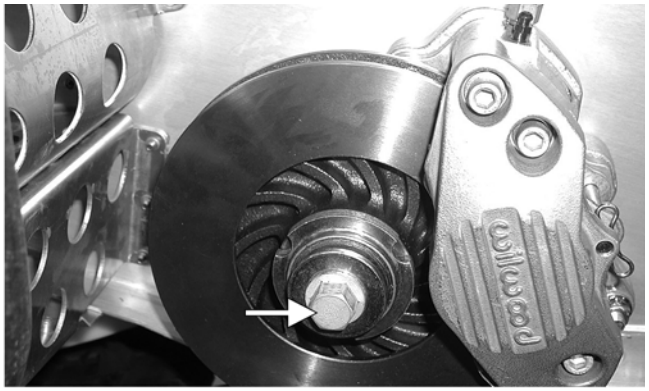
6. Slide the driven pulley onto the driven shaft making sure alignment washers are in place; then secure the pulley with the cap screw (coated with blue Loctite #243) and washer. Tighten to specifications.


MS291

7. Install the drive belt.

■ **NOTE: For installing drive belt, see Removing/ Installing Drive Belt (ACT Roller Driven Pulley) in this section.**

8. Install the long cap screw into the gear case shaft; then tighten to specifications.


MS303A

9. Install the drive belt guard and side panels.

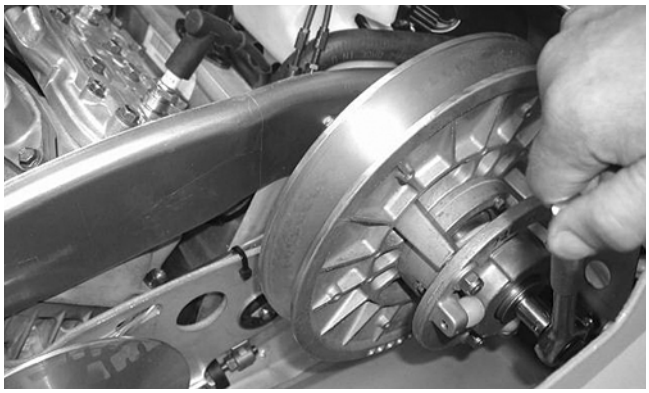
■ **NOTE: If the track was loosened to aid in removing the gear case, tighten track to proper tension and alignment.**

Replacing Driven Shaft PTO-End Bearing
(Firecat r/Sabercat Models)

REMOVING DRIVEN SHAFT

To remove the driven shaft, use the following procedure:

1. Remove the driven pulley.

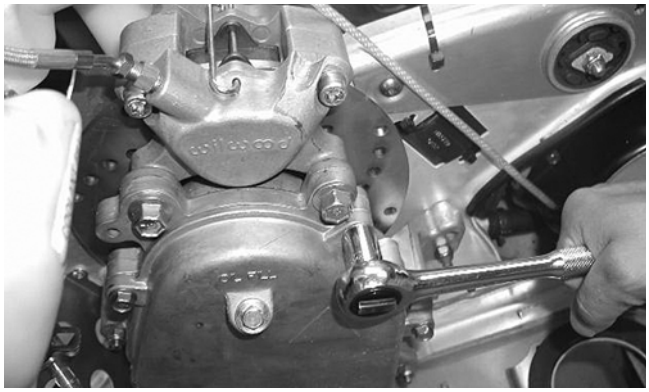


FC135

2. Remove the two torx-head screws on the back-side pan near the left-side hood latch.

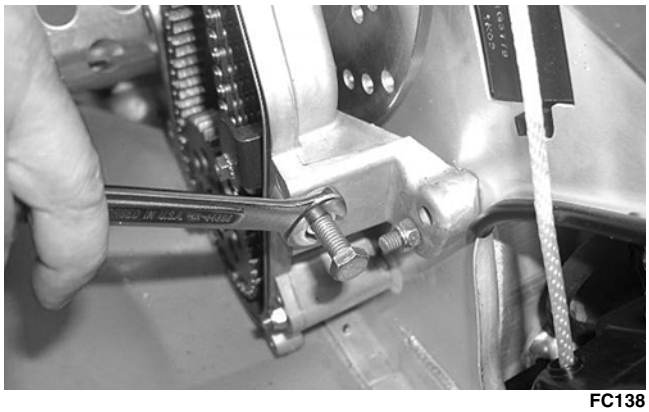
3. Drain the lubricant from the chain case.

4. Remove the six cap screws from the chain case cover; then remove the cover.



FC137

5. Release chain tension; then remove the two lock nuts and spring washers securing the top and bottom sprockets. Account for and note the orientation of the spring washers.



FC138



FC139

6. Remove the sprockets and chain.

7. Remove the four torx-head screws at the front left side. Account for two lock nuts and cup washers.



FC136

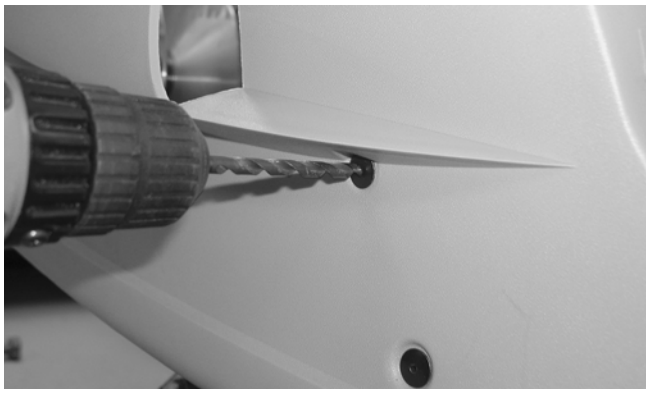
■ **NOTE: It may be necessary to use a magnet to aid in retrieving the hardware.**

8. Remove the three bearing retainer nuts from the PTO-side plate brace; then remove the machine screws securing the PTO-side plate brace and remove the brace.



FC140

9. Remove the two large-head rivets below the left-side air-out vent on the left-side belly pan.



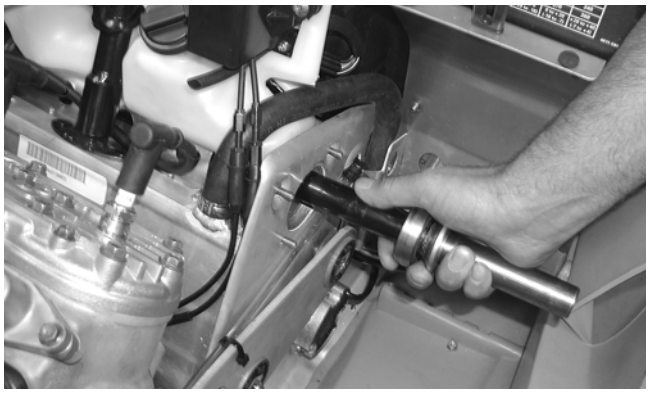
FC141

10. Using a rubber mallet (or suitable substitute), tap the driven shaft from the chain case side until free.



FC142

11. Pull down on the side pan by the left-side hood latch; then slide the driven shaft out the PTO-side of the chassis.

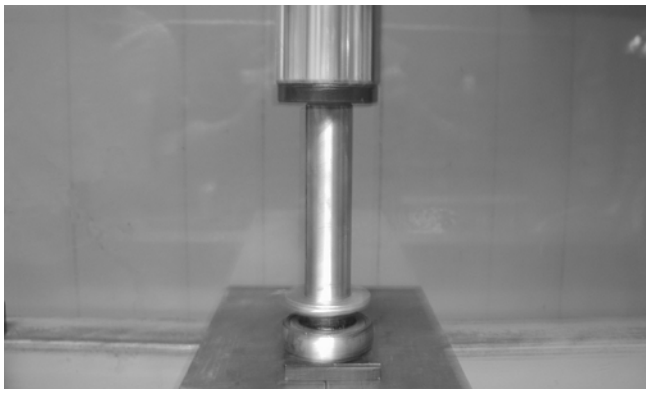


FC143

REPLACING BEARING

■ NOTE: Do not remove the brake disc stop collar from the shaft. The stop collar is not a service part. If damaged, the driven shaft must be replaced.

1. Using a suitable bearing press fixture, press the bearing and spacer off the shaft.



FC144

2. Apply green Loctite #609 to the inner race of the new bearing; then slide the bearing onto the shaft (raised side of bearing directed to the PTO-end) until it contacts the raised portion of the shaft.



FC146

■ NOTE: It is critical that the raised side of the bearing is facing the PTO-end of the shaft.

3. Slide the spacer onto the shaft until it contacts the bearing; then using a suitable bearing press fixture, press the bearing and spacer onto the shaft until the spacer is 10.4 cm (4.1 in.) in from the end of the shaft.



FC145



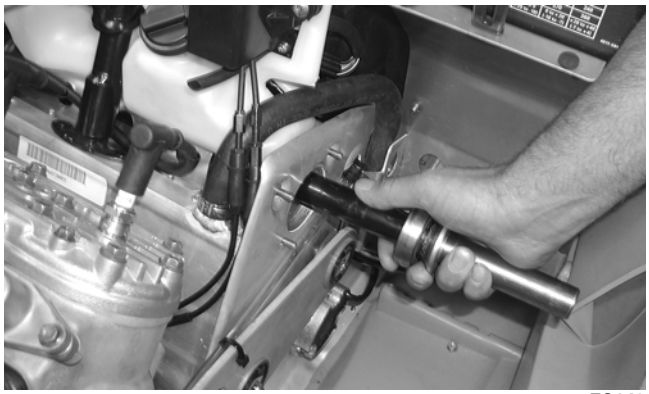
FC147

⚠ CAUTION

Do not press the bearing and spacer beyond the given specification. Damage may occur to the bearing, spacer, and shaft.

INSTALLING DRIVEN SHAFT

1. Pull down on the side pan by the left-side hood latch; then slide the driven shaft into the chassis and into the chain case.



FC143

2. Place the PTO-side plate brace into position; then install the three bearing retaining nuts on the PTO-side plate brace. Tighten nuts securely.



FC140

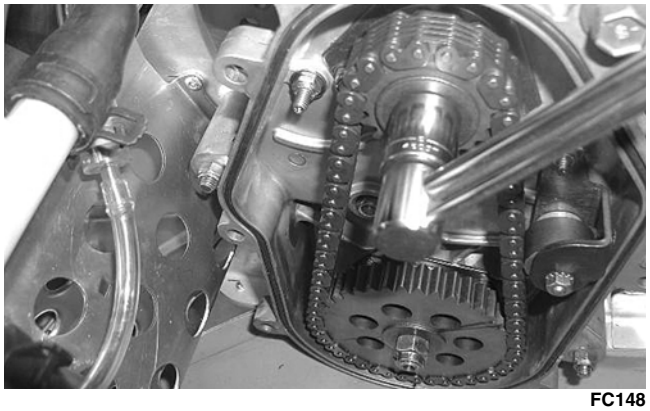
3. Secure the brace with the machine screws.



FC136

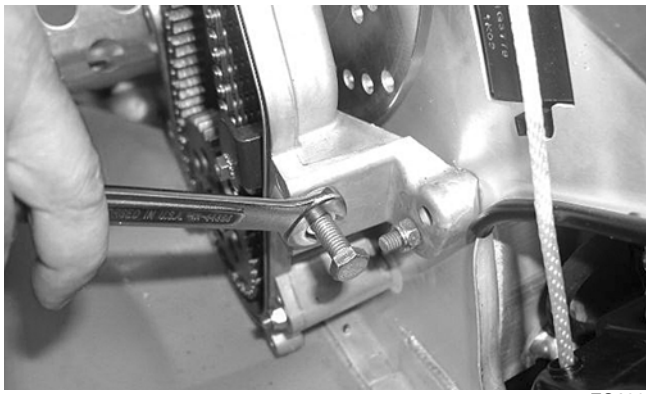
4. Place the sprockets with chain into the chain case.

5. Secure the top sprocket with a lock nut (threads coated with green Loctite #609) and spring washer. Tighten to specifications. Tighten the bottom sprocket lock nut (threads coated with blue Loctite #243) with spring washer to specifications.



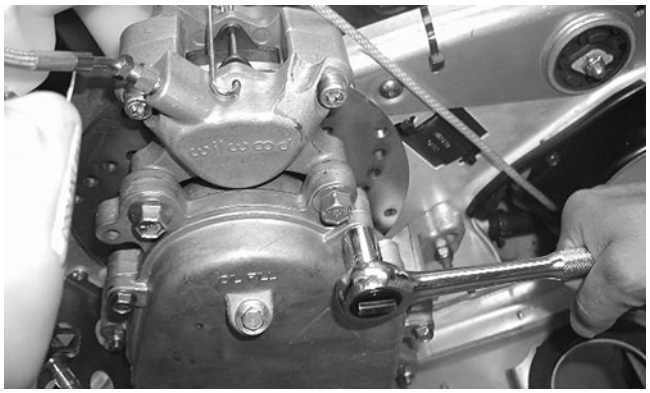
FC148

6. Tighten the mechanical chain tensioner finger-tight; then lock the jam nut against the chain case.



FC138

7. Check the position of the chain-case cover O-ring seal; then place the chain-case cover into position and secure with six cap screws. Tighten to specifications.



FC137

8. Install the drain plug and tighten to specifications; then pour recommended amount of Arctic Cat Transmission Lube (p/n 0636-817) into the chain case.

9. Install the four torx-head screws at the front left side making sure the two lock nuts and the cup washers are correctly positioned.

10. Install the two torx-head screws on the backside pan near the left-side hood latch.

11. Replace the two large-head rivets below the left-side air-out vent on the left-side belly pan.

12. Install the driven pulley.



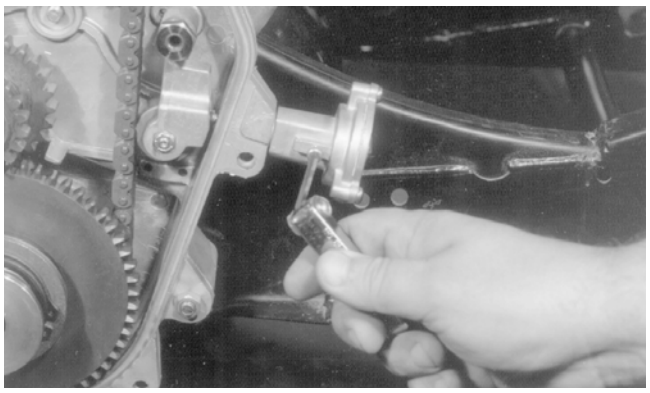
FC135

Chain Adjuster

■ **NOTE: Some photographs used in this sub-section are used for clarity purposes only and are not designed to depict actual conditions.**

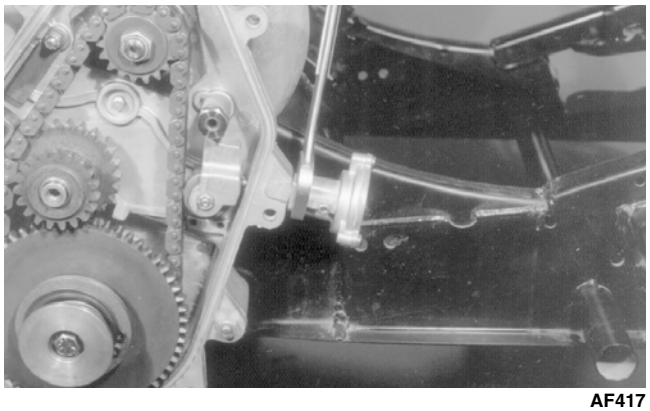
REMOVING AND DISASSEMBLING

1. Remove the small plug from the adjuster housing and install an 8-32 set screw into the threaded hole of the adjuster housing.



AF416

2. Using a 3/4-in. wrench, remove the chain adjuster from the chain case.



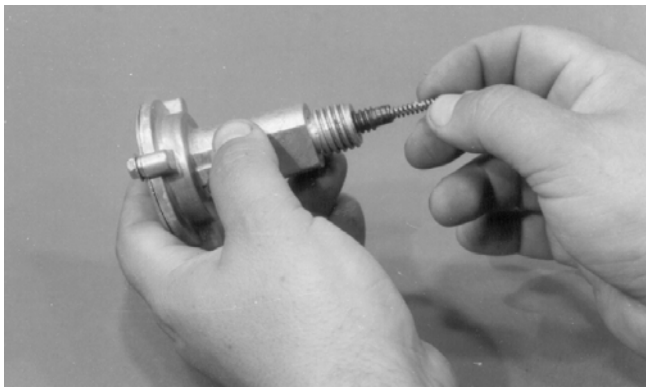
AF417

3. Remove the adjuster stem from the end of the adjuster screw.



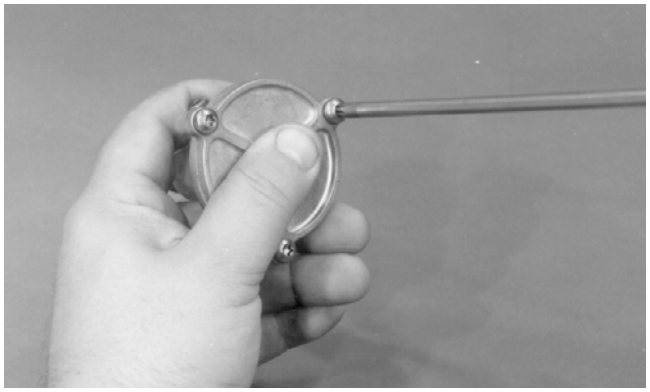
AF418

4. Using a small piece of wire, remove the small spring from the end of the adjuster screw.



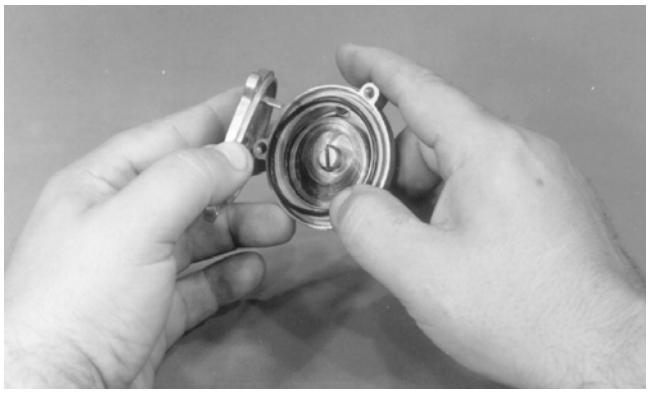
AF401

5. While holding the end cap in position, remove the three cap screws securing the end cap to the adjuster housing.



AF419

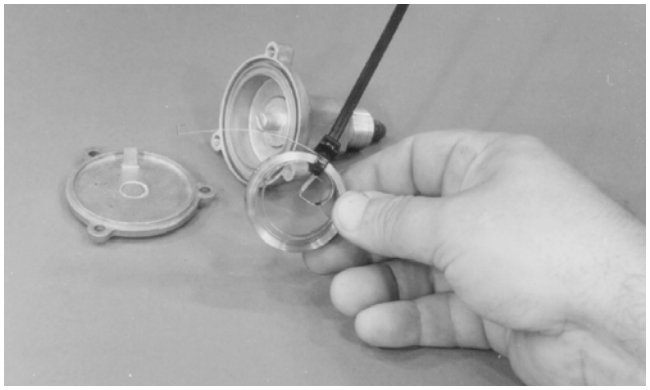
6. Slowly and carefully lift the end cap from the adjuster housing until it is free of the hooked end of the spring.



AF420

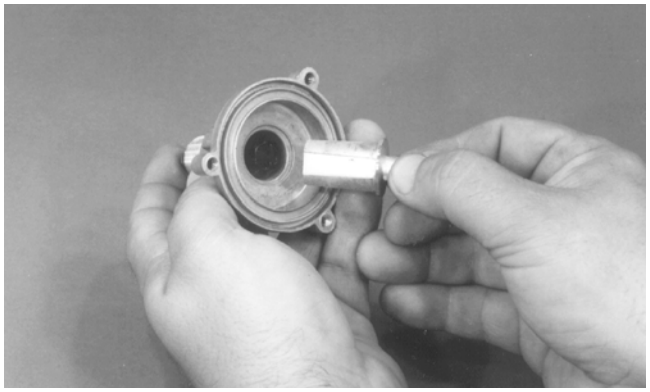
7. Remove the O-ring seal from the adjuster housing.

8. Carefully lift the spring from the housing and secure the spring using a cable tie.



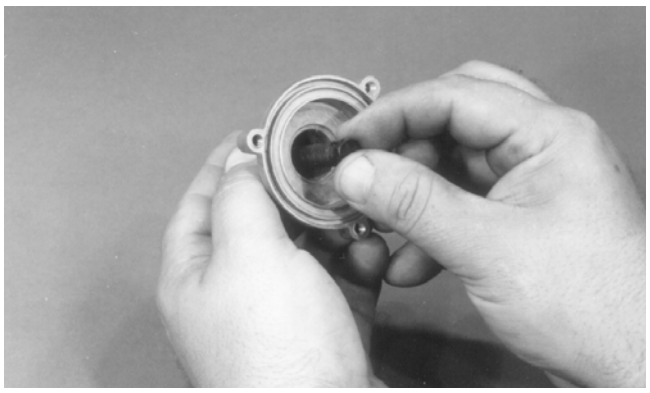
AF421

9. Remove the set screw from the adjuster housing; then remove the adjuster socket from the housing by pulling it free of the adjuster bolt.



AF422

10. Rotate the adjuster bolt counterclockwise until it is free of the housing; then remove the adjuster bolt.

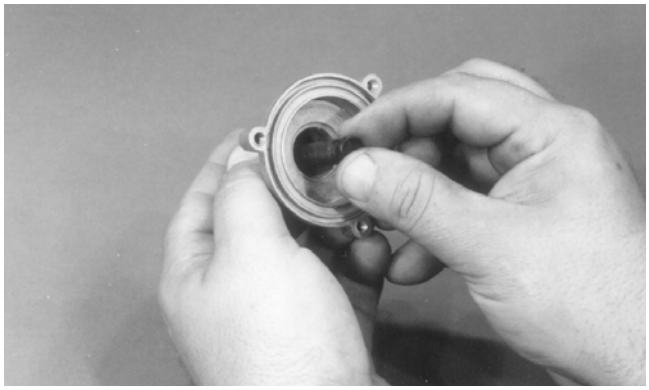


AF423

11. Wash all components in parts-cleaning solvent and inspect all components for any signs of wear.

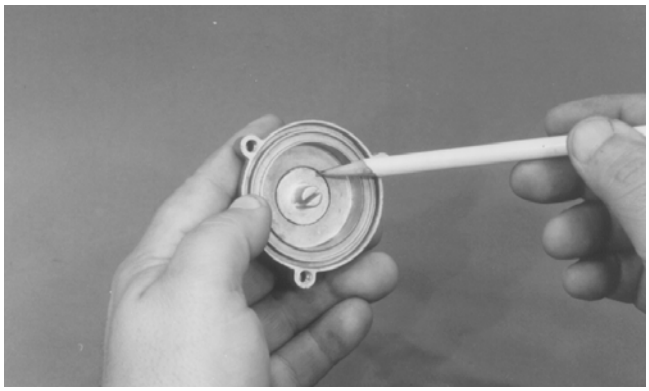
ASSEMBLING AND INSTALLING

1. Apply a light coat of oil to the threads of the adjuster bolt; then turn the adjuster bolt clockwise into the housing a few turns.



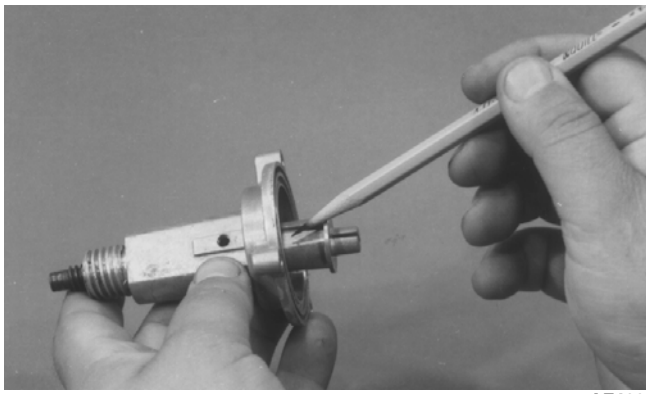
AF423

2. Slide the adjuster socket over the end of the adjuster bolt and push the socket down firmly into position. Rotate the adjuster socket clockwise until its flange seats against the housing inner surface.

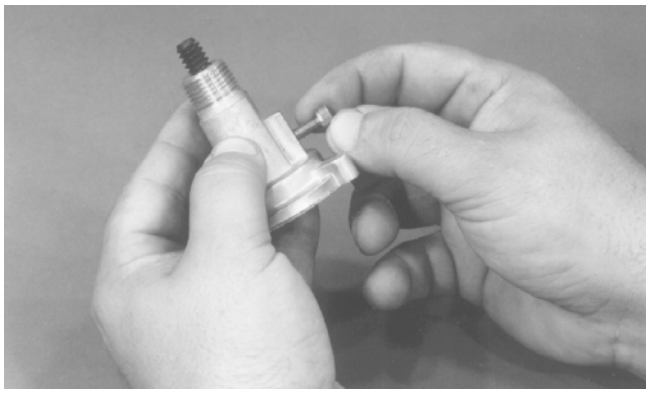


AF424

3. With the flat surface of the adjuster socket located under the threaded hole in the housing, install an 8-32 set screw.

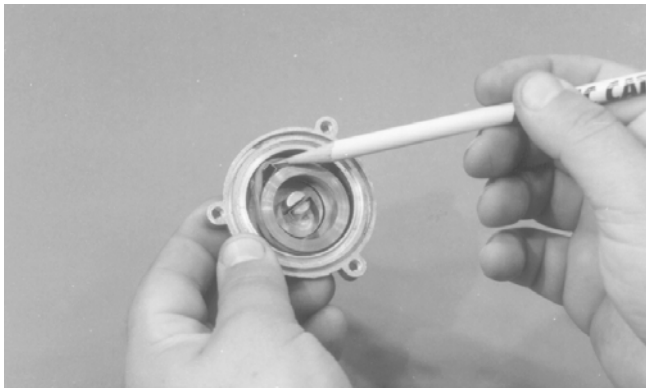


AF403



AF425

4. Install the bent tab of the spring into the slot of the adjuster socket with the outer hooked end of the spring positioned in the clockwise direction.



AF406

5. With the spring in position, remove the cable tie used to prevent it from unwrapping.

6. Place the O-ring seal into position; then set the end cap into position. Make sure its tab is hooked into the end of the spring.



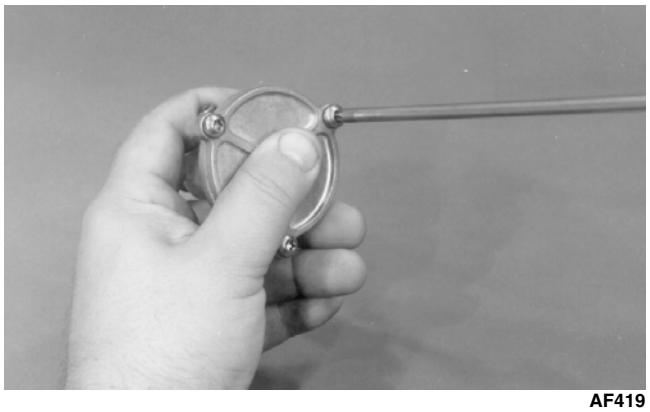
AF405

7. While holding the end cap down into position, rotate the end cap 20 turns clockwise to tension the spring.



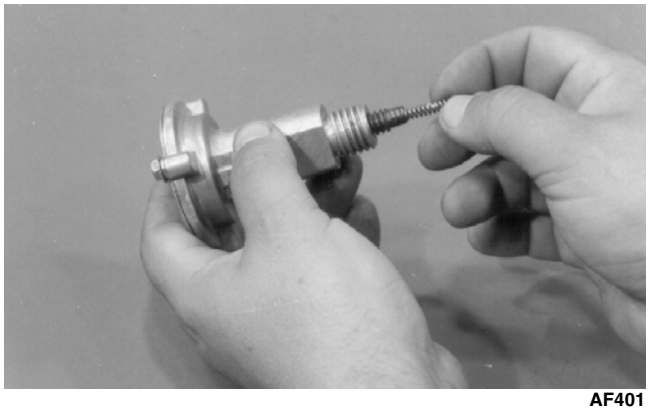
AF400

8. Install the three cap screws (coated with blue Loctite #243) and tighten to 1 kg-m (7 ft-lb).



AF419

9. Apply a thin coat of grease to the spring and place the spring into position in the end of the adjuster bolt.



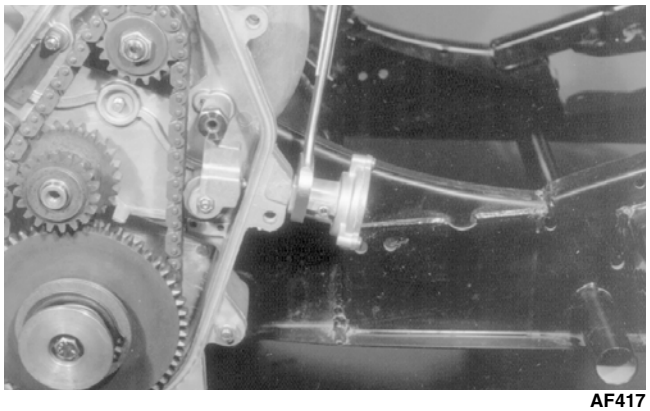
AF401

10. Use a thin coat of grease on the stem shaft to hold it in position; then place the stem into the end of the adjuster bolt.



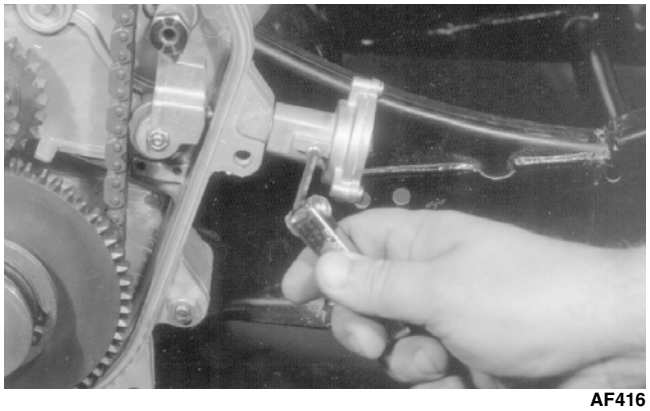
AF418

11. Securely tighten the adjuster assembly to the chain case.



AF417

12. Remove the set screw from the adjuster housing and install the cap screw.



AF416

Brake System
(Hydraulic)

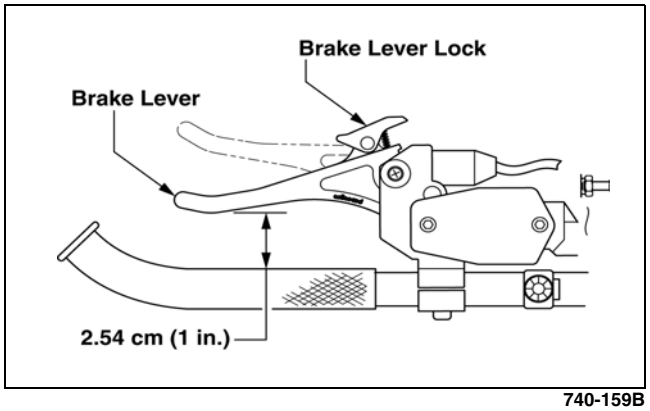
CHECKING BRAKE LEVER TRAVEL

1. Compress the brake lever fully.

■ **NOTE: Do not pump the brake lever as it will produce an inaccurate reading.**

8

2. Measure the distance between the brake lever and the handlebar. The distance must be greater than 2.54 cm (1 in.).



740-159B

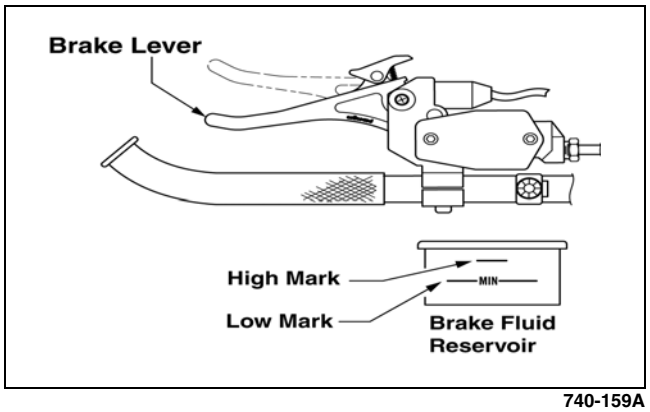
3. If the distance is less than specified, check the brake fluid level (see Checking and Adding Brake Fluid in this sub-section), inspect for leakage, and check the brake pads (see Checking and Replacing Brake Pads in this sub-section).

⚠ WARNING

Do not operate the snowmobile if the distance between the compressed brake lever and handlebar is less than 2.54 cm (1 in.). Brake loss may occur. Brake loss can result in severe personal injury.

CHECKING AND ADDING BRAKE FLUID

1. With the master cylinder in a level position, check fluid level in the reservoir. The brake fluid level must be just below the high mark.



740-159A

2. If the brake fluid level is below the low mark, remove the reservoir cover and add approved brake fluid until the fluid level is just below the high mark. Install and secure the reservoir cover. DO NOT allow moisture to contaminate the brake system.

⚠ CAUTION

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the snowmobile.

⚠ WARNING

Do not overfill the master cylinder reservoir. Overfilling the reservoir may cause the brake system to hydraulically lock. Use only approved brake fluid. Never substitute or mix different types or grades of brake fluid. Brake loss may occur. Brake loss can result in severe injury or even death.

CHANGING BRAKE FLUID

The brake fluid must be changed on a regular basis and/or whenever the brake fluid has been overheated or contaminated. The brake fluid should be changed every 1000 miles or at the end of the snowmobiling season, whichever occurs first.

Arctic Cat recommends the removal and disassembly of the brake caliper assembly when changing the brake fluid (see Removing/Installing Caliper in this sub-section).

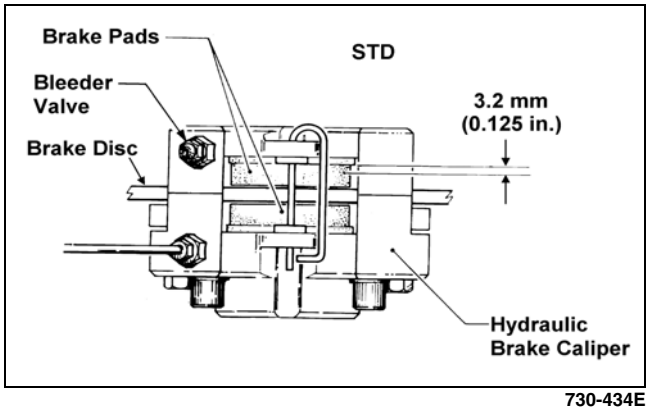
⚠ CAUTION

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the snowmobile.

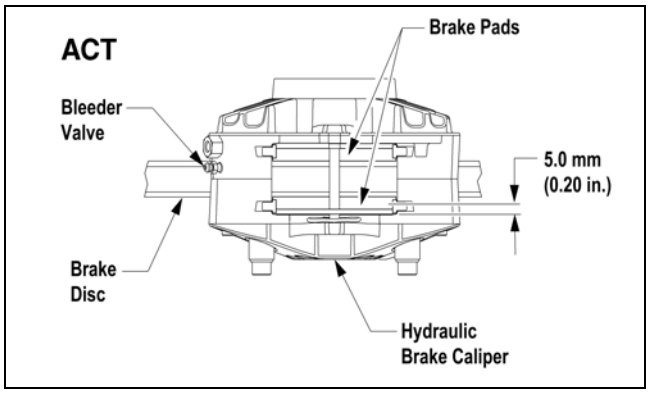
⚠ WARNING

Use only Arctic Cat approved brake fluid. Any substitute may result in a loss of brakes.

1. Slide a piece of flexible tubing over the ball of the bleeder valve and direct the other end into a container.



730-434E



739-269A

2. Slowly compress the brake lever and hold. Open the bleeder valve to release the fluid; then compress the brake lever repeatedly until all brake fluid is expelled. Close the bleeder valve.

3. Add new approved brake fluid to the reservoir; then compress the brake lever and hold. Open the bleeder valve. Repeat the compression until brake fluid flows free of air bubbles and appears clean.

■ NOTE: It may be necessary to refill the reservoir a number of times to eliminate all air bubbles in the system.

4. When the brake fluid is free of all air and the brake lever feels firm when compressed, fill the reservoir to a level just below the high mark; then install and secure the cover. Remove the tube from the bleeder valve.

5. Proceed to bleed the brake system (see Bleeding Brake System in this sub-section).

BLEEDING BRAKE SYSTEM

If the brake lever feels spongy when applied, the brake system may need to be bled. To bleed the brake system, use the following procedure.

1. Remove the master cylinder reservoir cover and fill the reservoir to the high mark with approved brake fluid.

⚠ CAUTION

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the snowmobile.

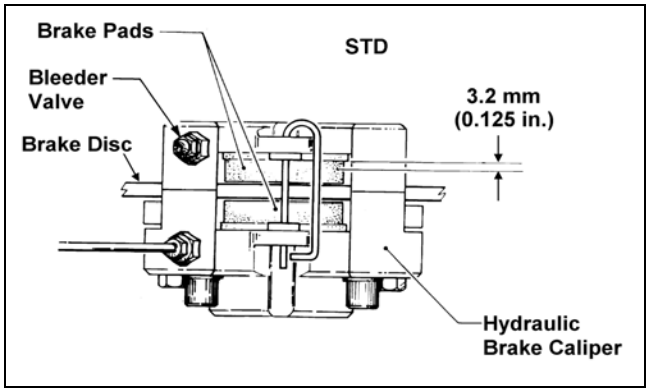
⚠ WARNING

Use only approved brake fluid. Any substitute may result in a loss of brakes.

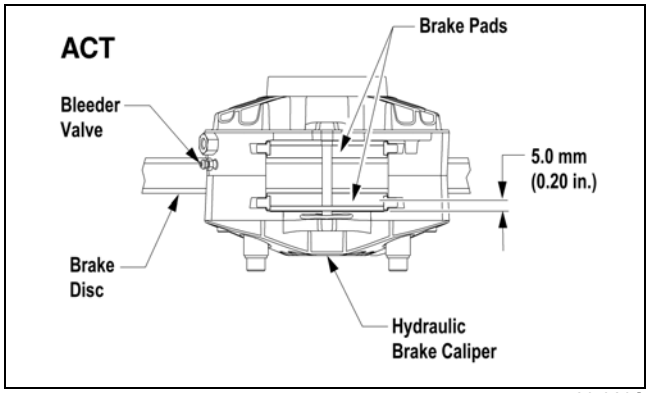
⚠ WARNING

Do not use brake fluid from a container that has been opened for a long period of time. Unsealed brake fluid containers will absorb moisture and can contaminate the fluid inside.

2. Slide a piece of flexible tubing over the ball of the bleeder valve and direct the other end into a container.



730-434E



739-269A

3. Slowly compress the brake lever and hold. Open the bleeder valve to release the fluid and air. When the fluid stops flowing, close the bleeder valve; then release the brake lever.

4. Repeat step 3 until the brake fluid flows free of air bubbles.

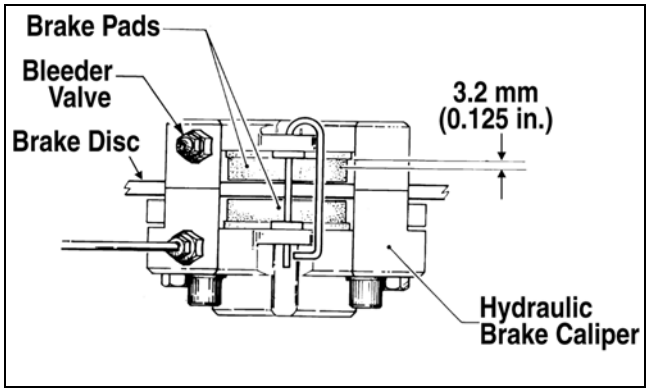
■ NOTE: It may be necessary to refill the reservoir during the bleeding process.

5. When the brake fluid is free of all air and the brake lever feels firm when compressed, fill the reservoir to a level just below the high mark; then install and secure the cover. Remove the tube from the bleeder valve.

CHECKING AND REPLACING BRAKE PADS (STD)

To check and replace the brake pads, use the following procedure.

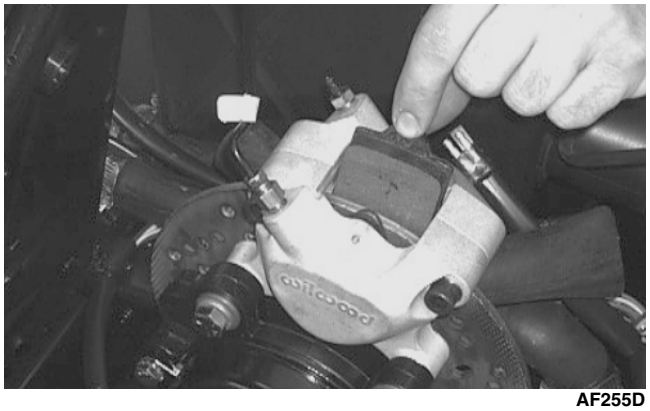
1. Measure the thickness of both brake pads. The brake pad thickness must be greater than 3.2 mm (0.125 in.). If the brake pad thickness is less than specified, replacement of both pads is necessary.



0730-434

2. Remove the retaining pin securing the brake pads to the caliper assembly.

3. Pull both brake pads out of the caliper assembly.



AF255D

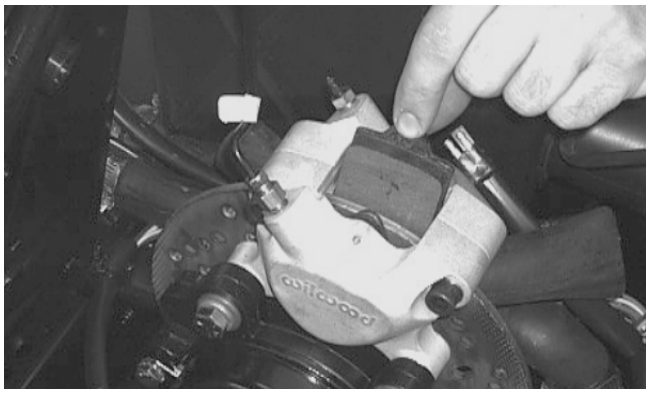
4. Using a large screwdriver, slowly push both brake pistons into the caliper.

⚠ CAUTION

Care must be taken not to pry against the brake disc when pushing on the pistons or severe damage may occur.

5. Position the new brake pads into the caliper and secure with the retaining pin.

■ NOTE: When installing new brake pads, always install them as a set. Never install just one pad or use brake pads which have been used in another snowmobile.



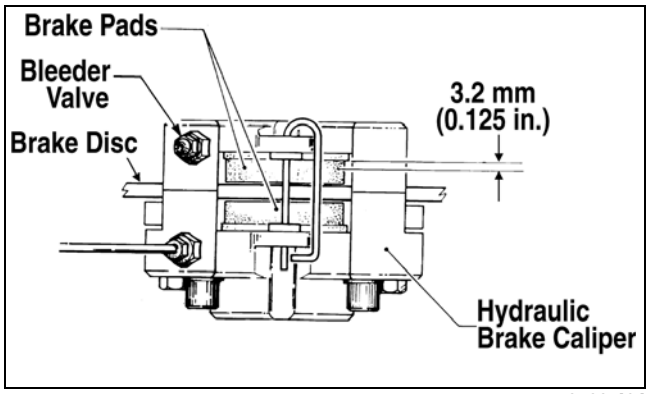
AF255D

6. Compress the brake lever repeatedly to ensure correct positioning of the brake pads; then release.

■ NOTE: When new brake pads are installed, a burnishing process is required. Drive the snowmobile slowly and compress the brake lever repeatedly until the pads just start to heat up; then allow them to cool down. This process stabilizes the pad material and extends the life of the pads.

REMOVING CALIPER (STD)

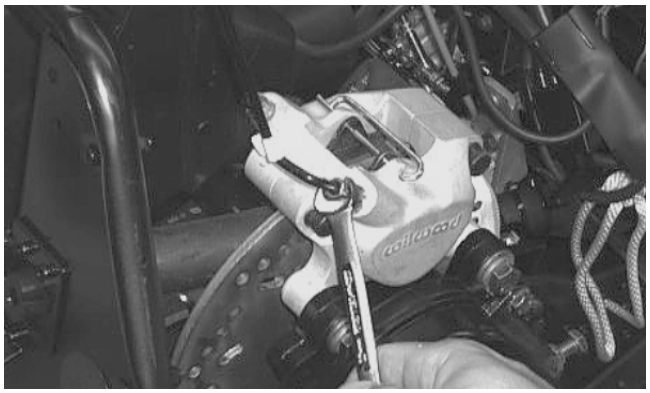
1. Slide a piece of flexible tubing over the ball of the bleeder valve and direct the other end into a container.



0730-434

2. Open the bleeder valve and compress the brake lever several times to drain the reservoir of fluid.

3. Remove the brake hose from the caliper. Use an absorbent towel to collect any remaining brake fluid.

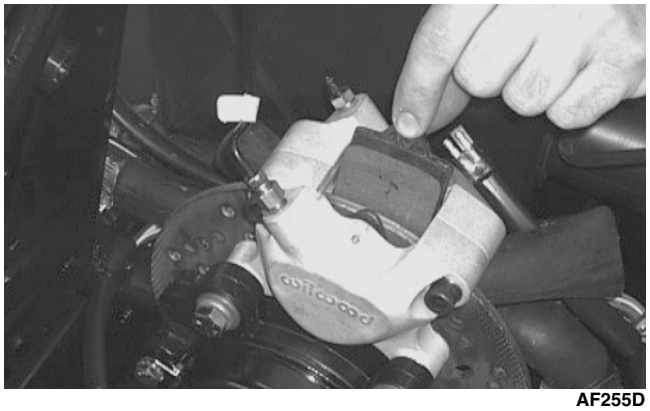


AF262D

⚠ CAUTION

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the snowmobile.

4. Remove the retaining pin securing the brake pads to the caliper assembly; then remove the brake pads.



AF255D

5. Loosen the upper cap screws securing the caliper halves; then remove the two cap screws, lock washers, and flat washers securing the brake caliper to the chain case.

⚠ CAUTION

Never use an impact driver on models with composite chain case. Damage to the chain case will occur.



AF261D

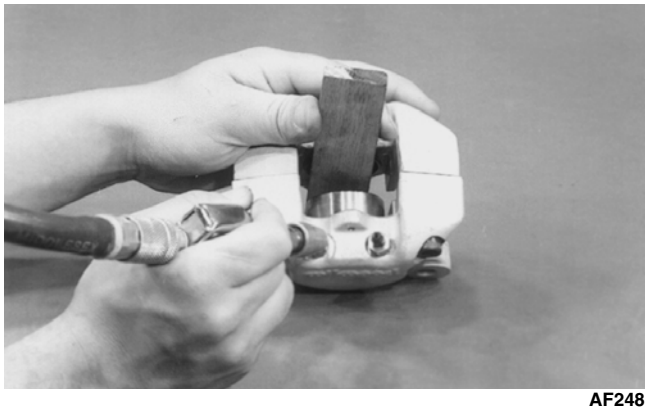
6. Remove the caliper assembly from the engine compartment.

Disassembling

1. Position a piece of wood between the pistons. Using low-pressure compressed air, blow into the caliper brake hose fitting to remove the brake pistons.

⚠ WARNING

Always wear safety glasses when using compressed air.



AF248

2. Remove the two cap screws securing the caliper halves. Account for the small O-ring.

3. Remove the piston O-rings and discard.



AF264

Cleaing and Inspecting

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect the brake pistons for gouges, cracks, pitting, scuffing, or corrosion. If any of these conditions exist, replace the piston.

2. Clean the piston outer surface by using a Scotch-Brite pad and clean brake fluid as a cleaner.

⚠ CAUTION

Do not use any sharp cleaning tool on the piston surface as it may cause damage. Parts-cleaning solvent must not be used as it can damage the piston O-ring.



AF230

3. Inspect the brake caliper for gouges, cracks, pitting, scuffing, or corrosion. If any of these conditions exist, replace the caliper.

4. Clean the caliper inner wall surface using a soft Scotch-Brite pad and clean brake fluid. Wipe caliper wall clean with a clean rag and brake fluid.

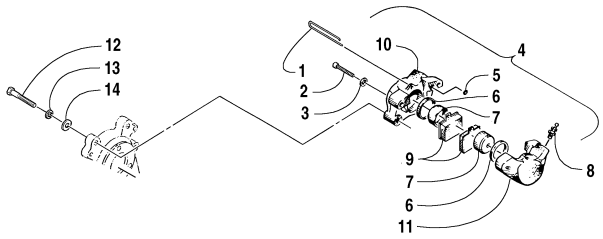


AF267

5. Inspect the condition of the brake pads. Replace if damaged or worn. The brake pad thickness must be greater than 3.2 mm (0.125 in.). If the brake pad thickness is less than specified, replacement of both pads is necessary.

6. Inspect the brake hose for cracks and deterioration and check the condition of the threaded connectors.

Assembling



KEY

1. Retaining Pin
2. Cap Screw
3. Washer
4. Brake Caliper Assy
5. Housing O-Ring
6. O-Ring
7. Piston
8. Bleed Screw
9. Brake Pad Set
10. Housing
11. Housing
12. Cap Screw
13. Lock Washer
14. Washer

736-850A

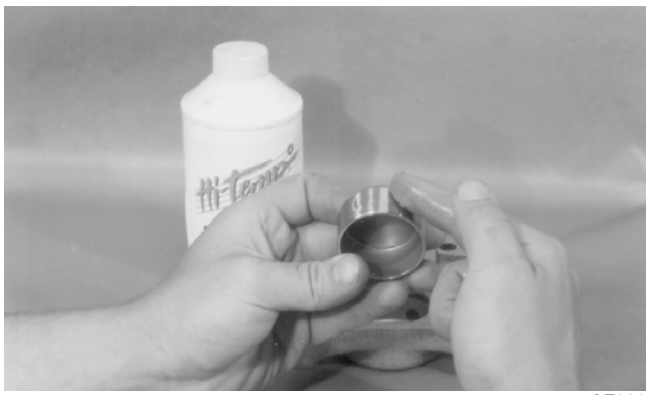
1. Apply approved brake fluid to the new O-ring; then install the O-ring into the groove of each caliper half.



AF251

■ **NOTE: Always use a new O-ring when assembling the brake caliper.**

2. In each caliper half, apply approved brake fluid to the brake piston; then while twisting, install the piston with the open side facing out.

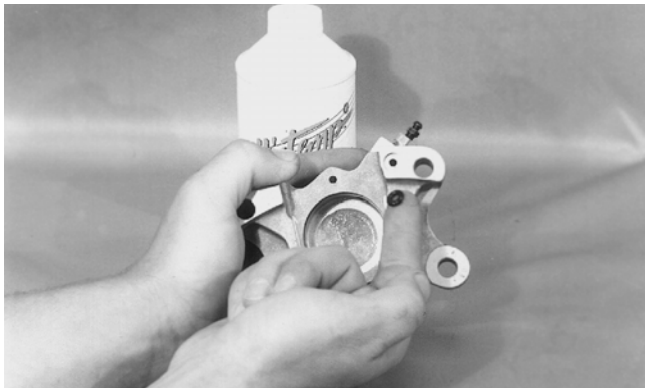


AF266



AF269

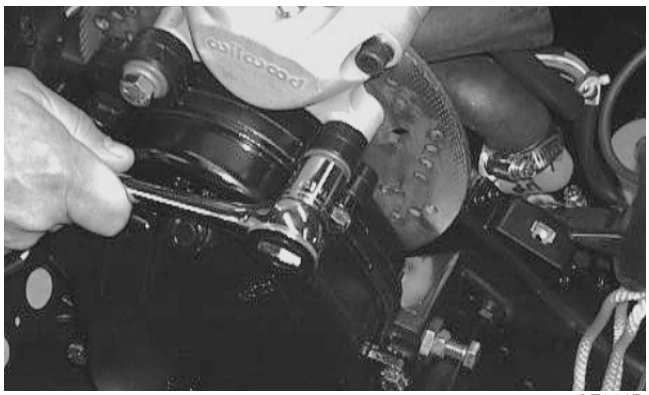
3. Place the small O-ring into position; then assemble the two caliper halves. Secure with the cap screws. Do not tighten at this time.



AF264

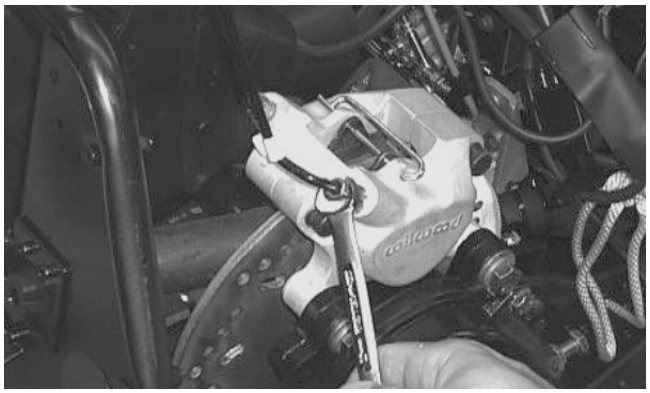
INSTALLING CALIPER (STD)

1. Secure the caliper assembly on the chain case using two cap screws, lock washers, and flat washers. Tighten the cap screws to specifications. Tighten the upper cap screws to specifications.



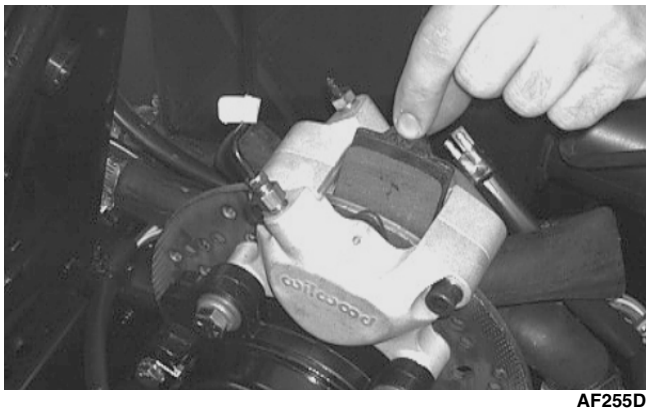
AF261D

2. Install the brake hose on the caliper and tighten securely.

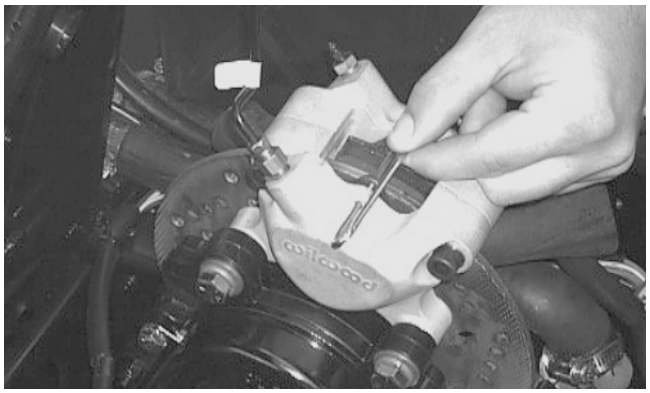


AF262D

3. Install the brake pads. Secure with the retaining pin.



AF255D



AF237D

4. Bleed the brake system (see Bleeding Brake System in this sub-section).

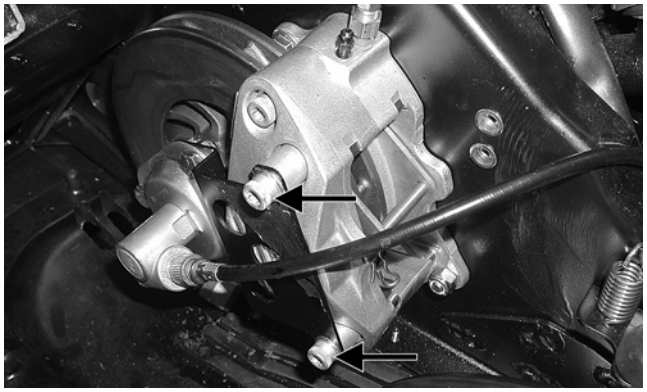
■ **NOTE: If new brake pads were installed, a burnishing process is required. Drive the snowmobile slowly and compress the brake lever repeatedly until the pads just start to heat up; then allow them to cool down. This process stabilizes the pad material and extends the life of the pads.**

REPLACING BRAKE PADS/BRAKE DISC/BRAKE CALIPER (ZR)

Removing Components

1. Remove the springs securing the resonator and expansion chamber; then remove from the engine compartment.

2. Remove the two Allen-head cap screws securing the speedometer drive adapter assembly to the brake caliper; then remove the adapter assembly.

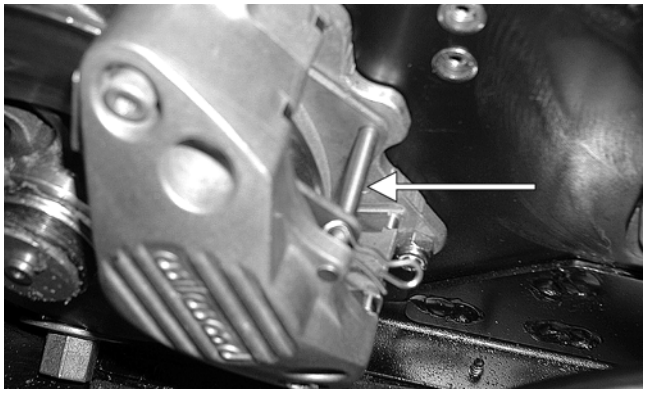


FS127A

■ **NOTE: If replacing only the brake disc or only the brake caliper, proceed to step 6.**

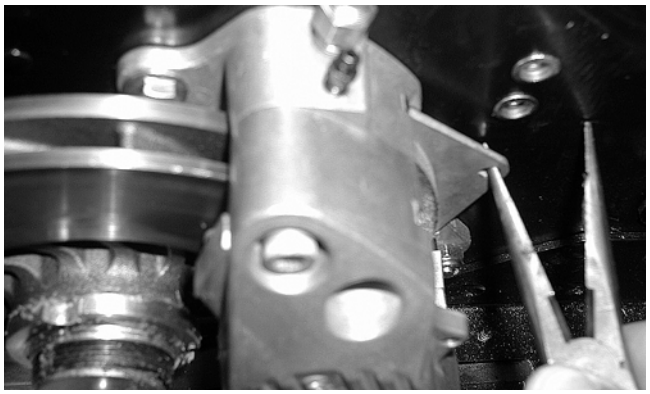
■ **NOTE: Measure the thickness of both brake pads. The brake pad thickness must be greater than 5.0 mm (0.20 in.). If the brake pad thickness is less than specified, replacement of both pads is necessary.**

3. Remove the hairpin clip from the brake pad retaining pin; then remove the pin.



FS129A

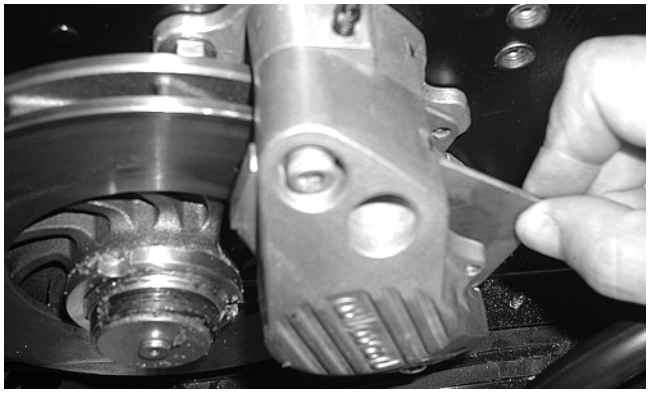
4. Using a needle-nose pliers, remove the brake pads from the caliper.



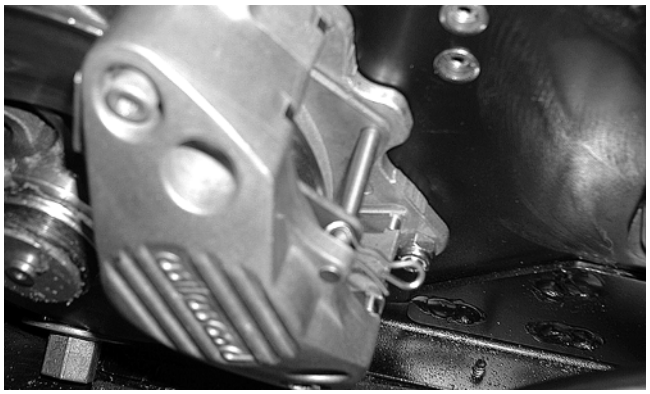
FS130

■ **NOTE: When installing new brake pads, always install them as a set. Never install just one pad or use brake pads which have been used in another snowmobile.**

5. Install the new brake pads into the caliper; then secure with the retaining pin and hairpin clip.



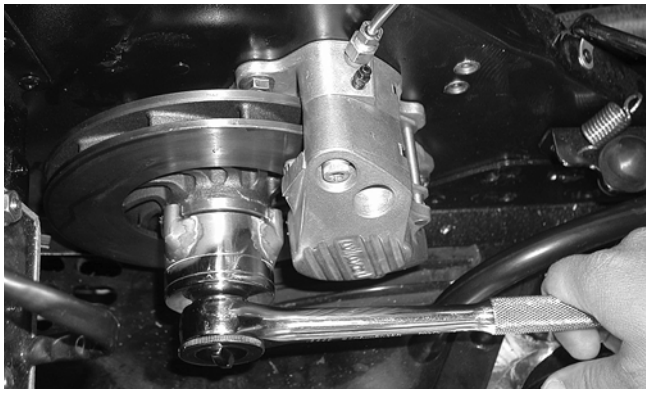
FS133



FS129

■ **NOTE: When new brake pads are installed, a burnishing process is required. Drive the snowmobile slowly and compress the brake lever repeatedly until the pads just start to heat up; then allow them to cool down. This process stabilizes the pad material and extends the life of the pads.**

6. Engage the brake lever lock; then using Brake Disc Socket Wrench (p/n 0644-415), remove the retaining nut from the driveshaft.

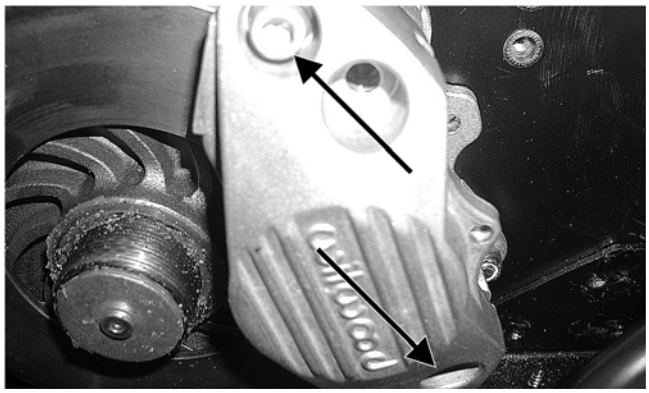


FS128

7. Disengage the brake lever lock and slowly compress the brake lever; then lock the lever in the first notch.

■ NOTE: Locking the lever in the first notch will limit brake fluid loss when separating the caliper housings.

8. Remove the two Allen-head cap screws securing the caliper housings together. Account for two spacers.



FS131A

9. Remove the outside caliper housing from the inside caliper housing. Account for the O-ring.

10. Remove the brake disc from the driveshaft.

■ NOTE: To aid in removing the inner caliper housing, completely loosen track tension.

11. Remove the five nuts from the cap screws securing the inside caliper housing to the chassis; then remove the inside caliper housing.

Cleaning and Inspecting

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect the condition of the brake pads. Replace if damaged or worn. The brake pad thickness must be greater than 5.0 mm (0.20 in.). If the brake pad thickness is less than specified, replacement of both pads is necessary.

2. Inspect the brake hose for cracks and deterioration and check the condition of the threaded connectors.

Installing Components

■ NOTE: To aid in installing the inner caliper housing, completely loosen track tension.

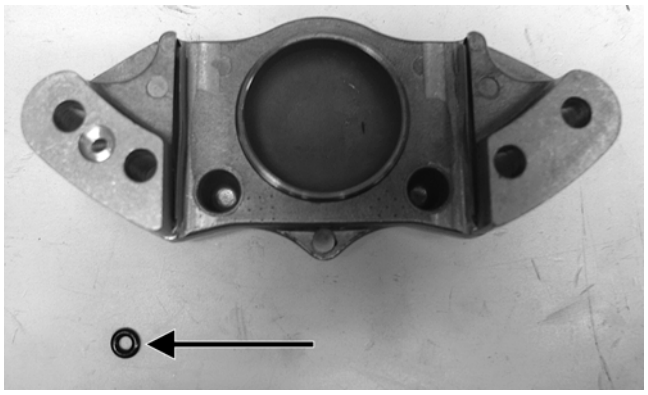
1. Place the inside caliper housing into place on the chassis; then install the five nuts and tighten to specifications.

2. Apply High-Temp Silicone (p/n 1048-052) to the splines of the brake disc and to the threads of the retaining nut; then install the disc and nut.

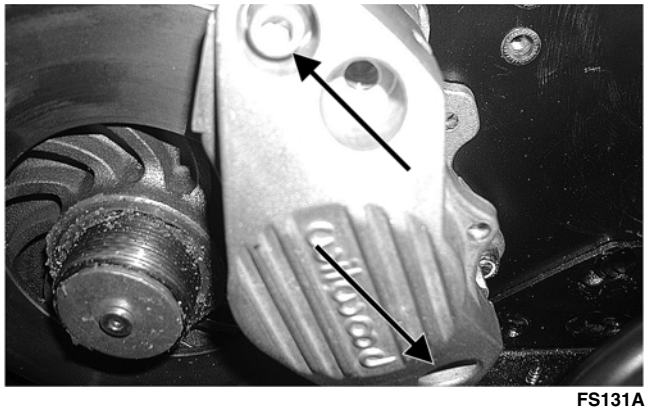
■ NOTE: At this point, tighten the retaining nut only until snug.

3. Place the outside caliper housing into position with two spacers and install the Allen-head cap screws; then tighten to specifications.

■ NOTE: Always use a new O-ring when installing the outside housing.



FS132A

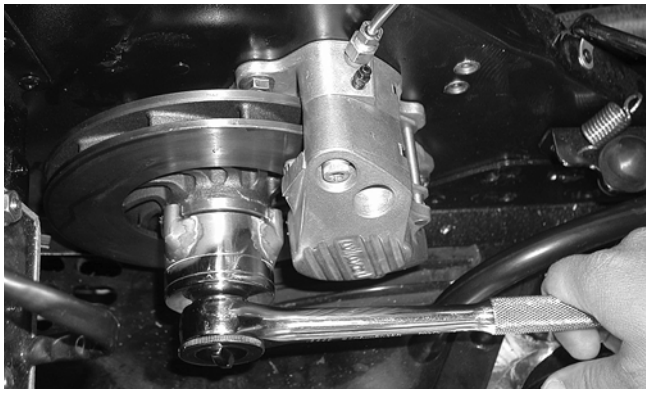


FS131A

4. Bleed the brake system (see Bleeding Brake System in this sub-section).

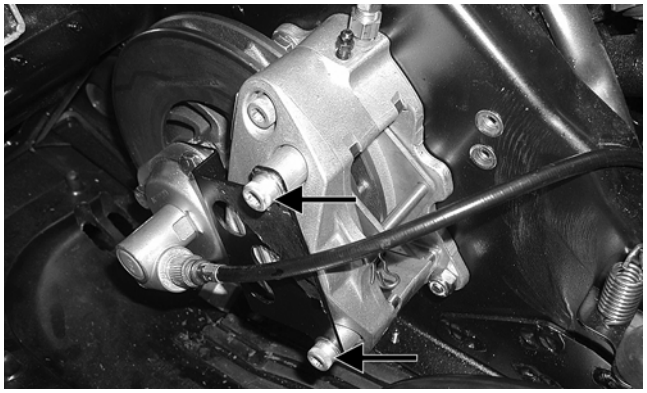
5. Engage the brake lever lock; then using Brake Disc Socket Wrench (p/n 0644-415), tighten the brake disc retaining nut to specifications.

■ NOTE: The brake lever lock must be engaged for this procedure.



FS128

6. Place the speedometer drive adapter assembly onto the brake caliper; then install the Allen-head cap screws and tighten to specifications.



FS127A

7. Place the expansion chamber and resonator into position and secure with the springs.

8. Adjust track alignment and tension (see Section 9).

REPLACING BRAKE PADS/BRAKE DISC/BRAKE CALIPER (Crossfire/ Firecat/M-Series)

REMOVING COMPONENTS

1. Remove the springs securing the resonator and expansion chamber; then remove from the engine compartment.

■ NOTE: If replacing only the brake disc or only the brake caliper, proceed to step 6.

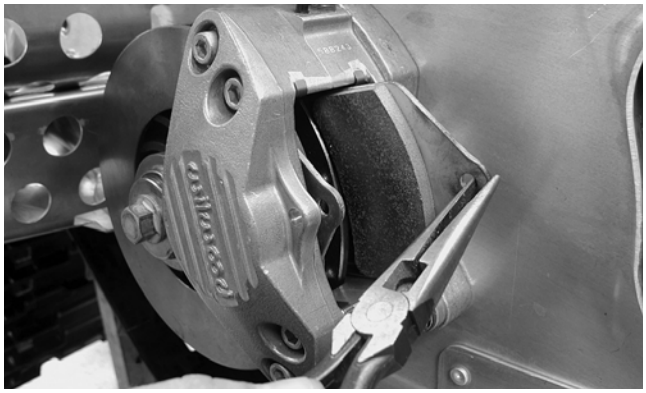
■ NOTE: Measure the thickness of both brake pads. The brake pad thickness must be greater than 5.0 mm (0.20 in.). If the brake pad thickness is less than specified, replacement of both pads is necessary.

2. Remove the hairpin clip from the brake pad retaining pin; then remove the pin.



MS324

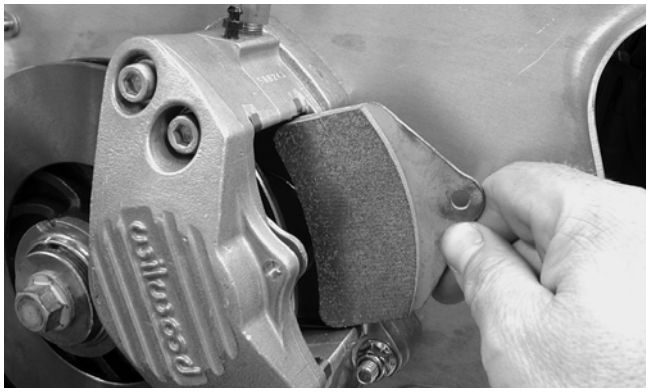
3. Using a needle-nose pliers, remove the brake pads from the caliper.



MS325

■ NOTE: When installing new brake pads, always install them as a set. Never install just one pad or use brake pads which have been used in another snowmobile.

4. Install the new brake pads into the caliper; then secure with the retaining pin and hairpin clip.



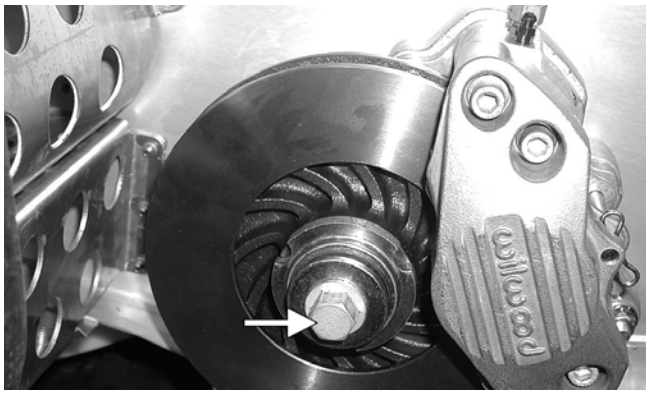
MS326



MS324

■ **NOTE: When new brake pads are installed, a burnishing process is required. Drive the snowmobile slowly and compress the brake lever repeatedly until the pads just start to heat up; then allow them to cool down. This process stabilizes the pad material and extends the life of the pads.**

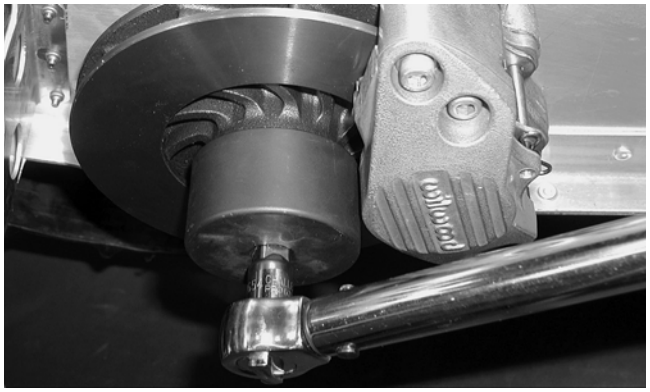
5. Engage the brake lever lock; then loosen the long driveshaft/ring gear cap screw enough to take pressure off the flat washer.



MS303A

■ **NOTE: Releasing pressure from the flat washer will allow it to center itself to the driveshaft when removing the brake disc retaining nut.**

6. Engage the brake lever lock; then using Brake Disc Socket Wrench (p/n 0644-415), remove the retaining nut from the driveshaft.



MS323

7. Disengage the brake lever lock and slowly compress the brake lever; then lock the lever in the first notch.

■ **NOTE: Locking the lever in the first notch will limit brake fluid loss when separating the caliper housings.**

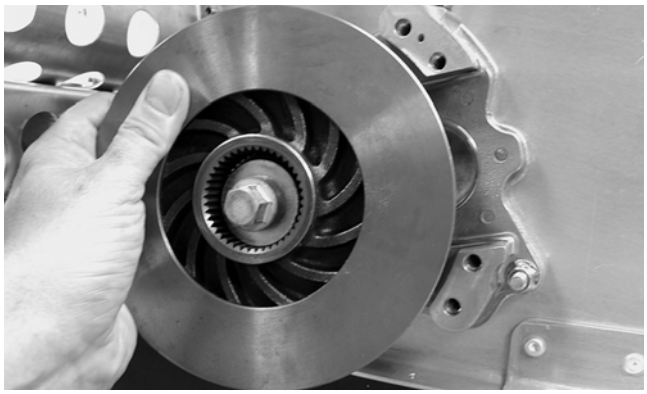
8. Remove the four Allen-head cap screws securing the caliper housings together.



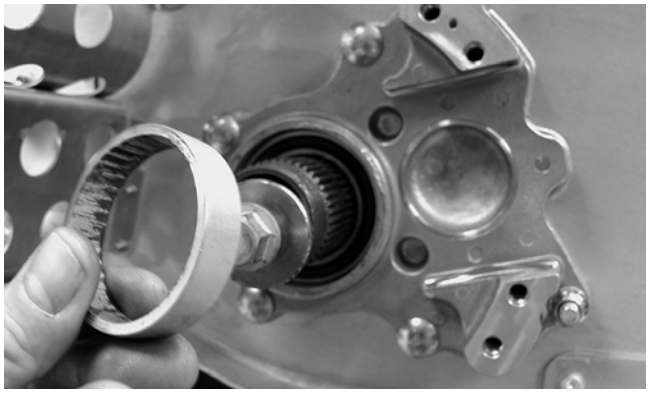
MS321A

9. Remove the outside caliper housing from the inside caliper housing. Account for the O-ring.

10. Remove the brake disc and spacer from the driveshaft.

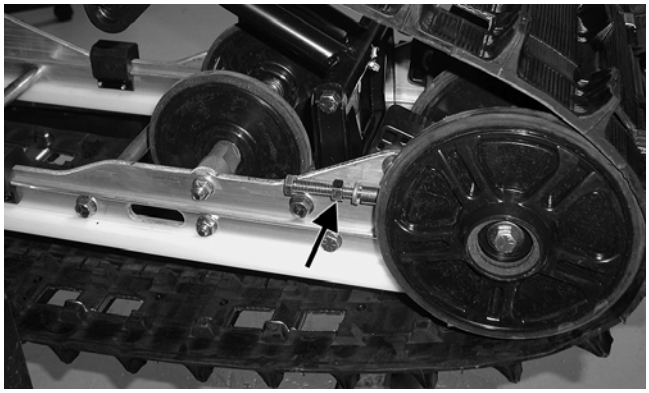


MS308



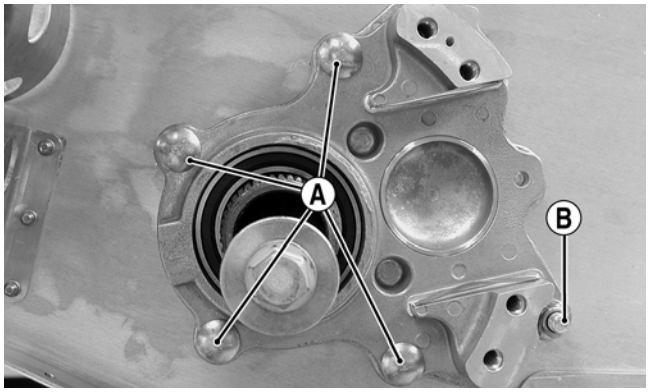
MS309

■ **NOTE: To aid in removing the inner caliper housing, completely loosen track tension.**



MS295A

11. Remove the four lock nuts (A) and the Phillips-head cap screw with lock nut (B) securing the inside caliper housing to the chassis; then remove the inside caliper housing.



MS310A

Cleaning and Inspecting

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

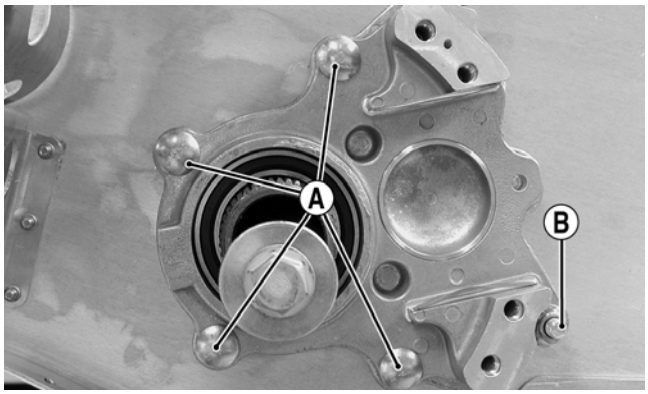
1. Inspect the condition of the brake pads. Replace if damaged or worn. The brake pad thickness must be greater than 5.0 mm (0.20 in.). If the brake pad thickness is less than specified, replacement of both pads is necessary.

2. Inspect the brake hose for cracks and deterioration and check the condition of the threaded connectors.

Installing Components

■ **NOTE: To aid in installing the inner caliper, completely loosen track tension.**

1. Place the inside caliper housing into place on the chassis; then install the four lock nuts (A) and the Phillips-head cap screw with lock nut (B) and tighten to specifications.



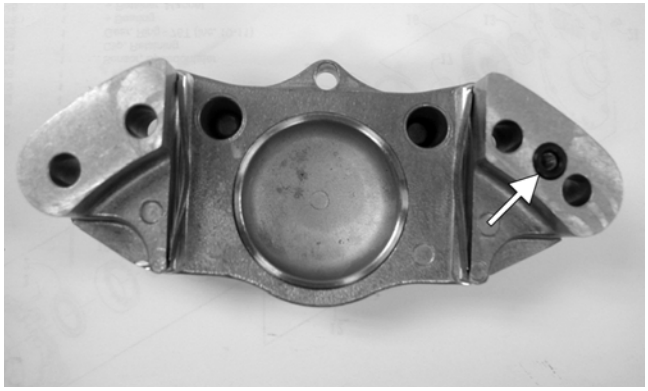
MS310A

2. Apply Anti-Seize Thread Compound (p/n 0678-146) to the splines of the brake disc and to the threads of the retaining nut; then install the disc and nut.

■ **NOTE: At this point, tighten the retaining nut only until snug.**

3. Place the outside caliper housing into position and install the Allen-head cap screws; then tighten to specifications.

■ **NOTE: Always use a new O-ring and make sure the O-ring is properly seated in the outer brake housing.**



MS320A



MS321A

4. Bleed the brake system (see Bleeding Brake System in this sub-section).

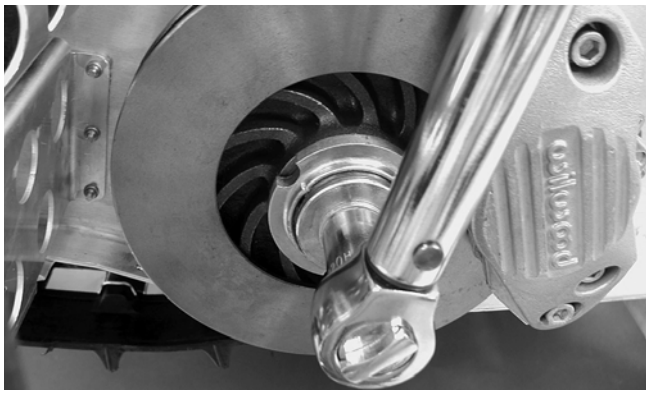
5. Engage the brake lever lock; then using Brake Disc Socket Wrench (p/n 0644-415), tighten the brake disc retaining nut (from step 2) to specifications.

■ **NOTE: The brake lever lock must be engaged for this procedure.**



MS323

6. Tighten the long driveshaft/ring gear cap screw (from step 5 of Removing) to specifications.



MS322

7. Place the expansion chamber and resonator into position and secure with the springs.

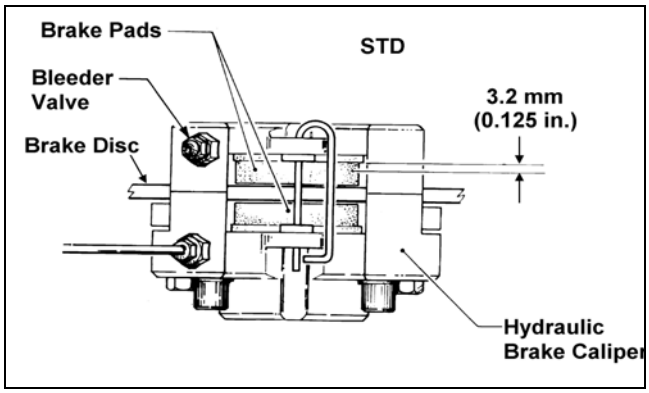
8. Adjust track alignment and tension (see Section 9).

8

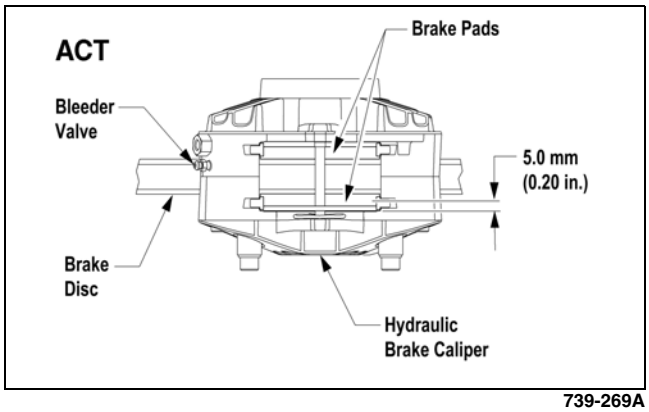
Brake Lever/Master Cylinder Assembly
(Hydraulic System)

REMOVING

1. Slide a piece of flexible tubing over the ball of the bleeder valve and direct the other end into a container. Remove the reservoir cover; then open the bleeder valve. Allow the brake fluid to drain completely.



730-434E



739-269A

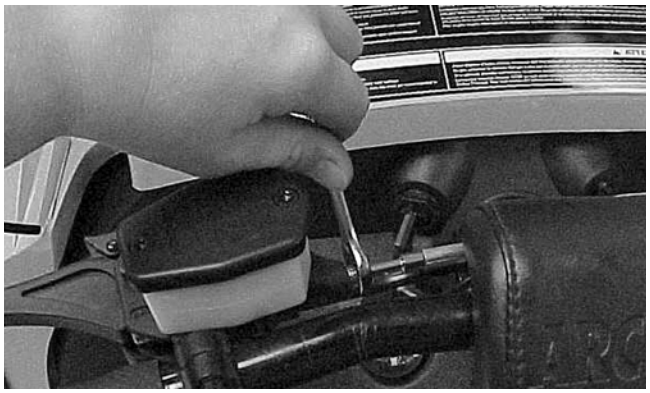
2. On standard models to remove the switch, use a small screwdriver to compress the plastic locking tabs by pushing in on the tabs; then slide the switch free of the brake control.



AF201D

3. On models equipped with a brake lever actuated dimmer switch to remove the switch, remove the Allen-head cap screw from beneath the master cylinder and free the switch from the master cylinder assembly.

4. Place an absorbent towel around the connection to absorb brake fluid. Remove the brake fluid hose from the master cylinder.



FC258

⚠ CAUTION

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the snowmobile.

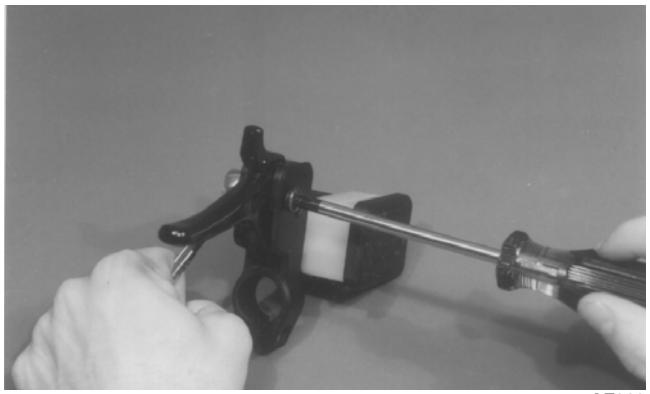
5. Remove the two torx-head screws and clamp securing the brake assembly to the handlebar; then remove the assembly from the handlebar.



FC259

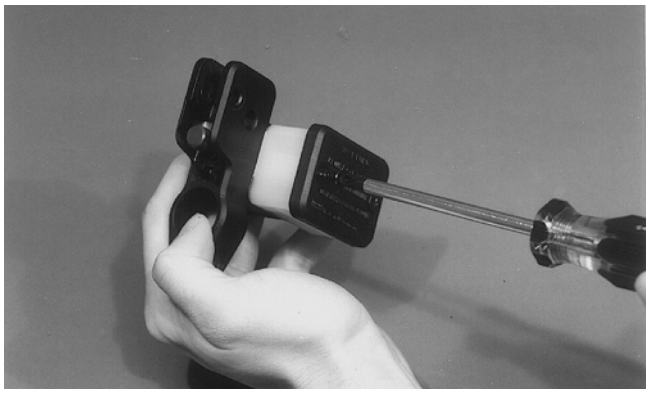
DISASSEMBLING

1. Remove the screw and lock nut securing the brake lever.



AF202

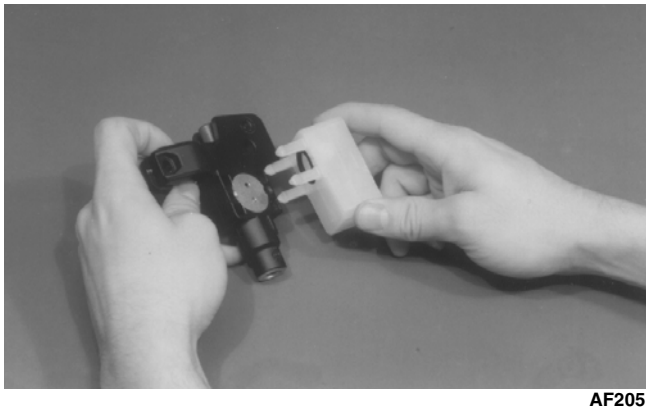
2. Remove the two screws securing the reservoir cover; then remove the cover.



AF204

3. Remove the two screws securing the reservoir to the master cylinder.

4. Compress the locking tabs of the reservoir and remove the reservoir from the master cylinder. Account for an O-ring seal.



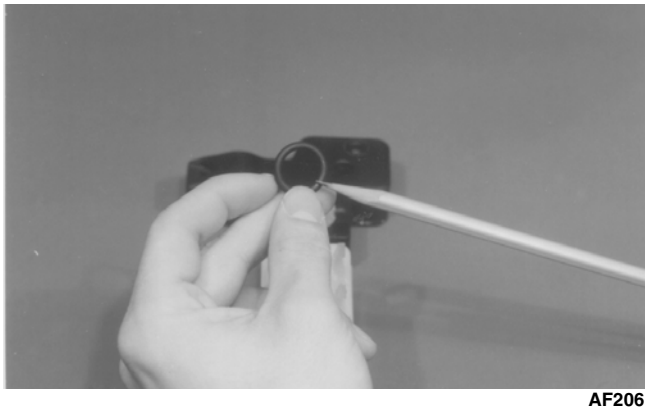
AF205

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the screw securing the brake lever for wear and for cracked, stretched, or damaged threads.

2. Inspect the O-ring for deterioration and distortion.

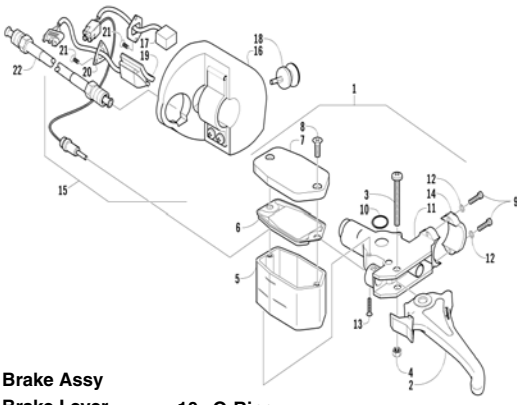


AF206

3. Inspect the reservoir for cracks and leakage.

4. Inspect the brake fluid hose for cracks, deterioration, and the condition of the fittings (threaded and compression).

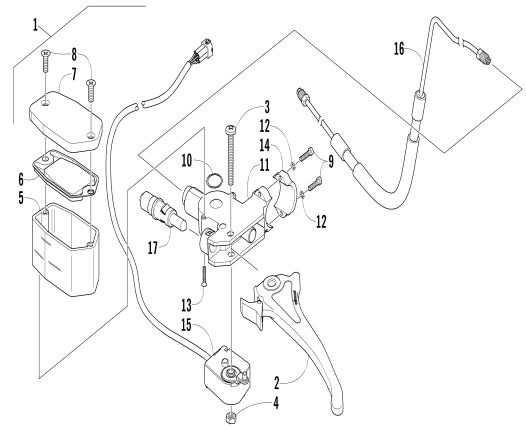
ASSEMBLING



KEY

1. Brake Assy
2. Brake Lever
3. Lever Mounting Screw
4. Lock Nut
5. Reservoir
6. Gasket
7. Cover
8. Screw
9. Machine Screw
10. O-Ring
11. Master Cylinder
12. Lock Washer
13. Screw
14. Clamp
15. Dimmer Control Assy
16. Dimmer Control Housing
17. Switch Assy
18. Dimmer Knob
19. Handwarmer Switch
20. Cover Plate
21. Self-Tapping Screw
22. Brakeline

0737-603



KEY

1. Brake Assy
2. Brake Lever
3. Lever Mounting Screw
4. Lock Nut
5. Reservoir
6. Gasket
7. Cover
8. Screw
9. Machine Screw
10. O-Ring
11. Master Cylinder
12. Lock Washer
13. Screw
14. Clamp
15. Brakelight/ Dimmer Switch
16. Brakeline
17. Spring Assy

0739-125

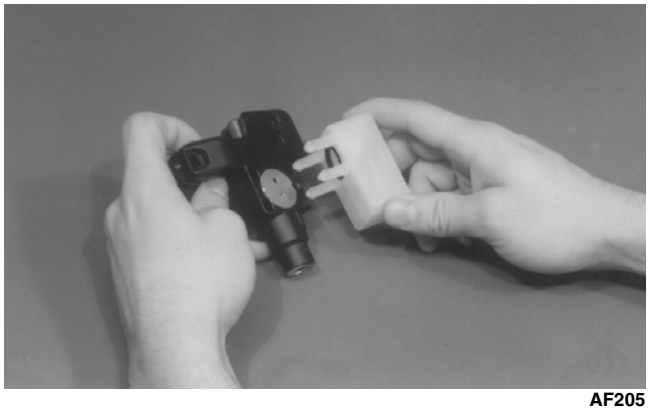
8



AF207

1. Apply approved high temperature brake fluid to the O-ring seal; then install the seal on the reservoir.

2. Install the reservoir on the master cylinder. Secure with two screws.

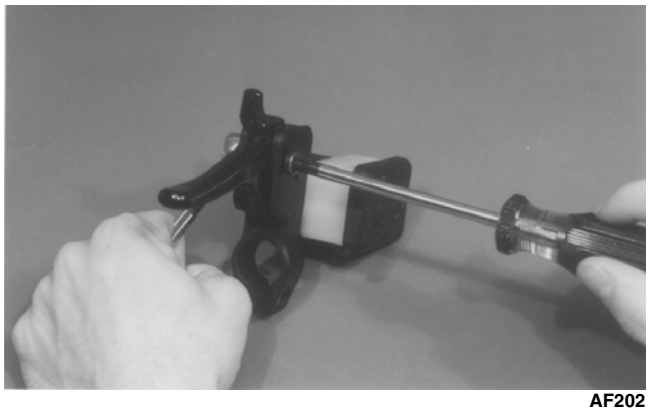


AF205

3. Install the brake lever. Secure with a screw and a new lock nut. Tighten the lock nut just to the point of ensuring free brake lever movement.

⚠ WARNING

Do not over-tighten the lock nut. Over-tightening the lock nut will cause the brake lever to bind. The lever must work freely and fully return to its stop after installation.



AF202

⚠ WARNING

A new lock nut must be used to secure the brake lever.

INSTALLING

1. Position the brake assembly on the handlebar. Secure with two torx-head machine screws and clamp; tighten securely.

2. Install the hose on the master cylinder. Tighten securely.



AF911D

3. On standard models, slide the brakelight switch into the brake control until the self-locking tabs snap into position. Lightly pull on the switch to make sure it is properly secured.

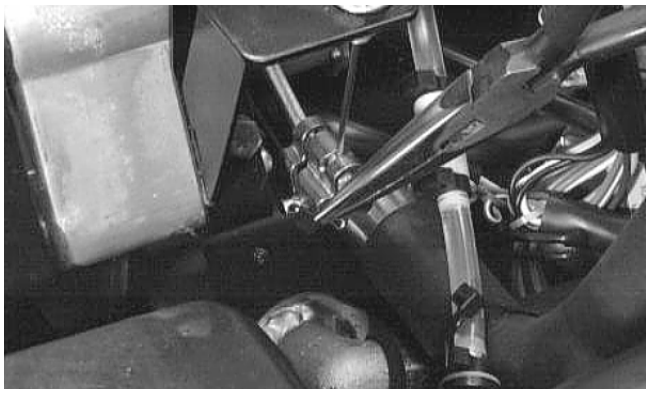
4. On models equipped with a brake lever actuated dimmer switch, place the switch into position beneath the master cylinder assembly making sure the alignment pins are properly positioned; then secure the switch with the Allen-head screw.

5. Bleed the brake system (see Brake System - Hydraulic sub-section).

Brake System
(Mechanical/Quick-Adjust)

REMOVING

1. Remove the cotter pin, washer, pin, and clevis from the brake actuator arm.

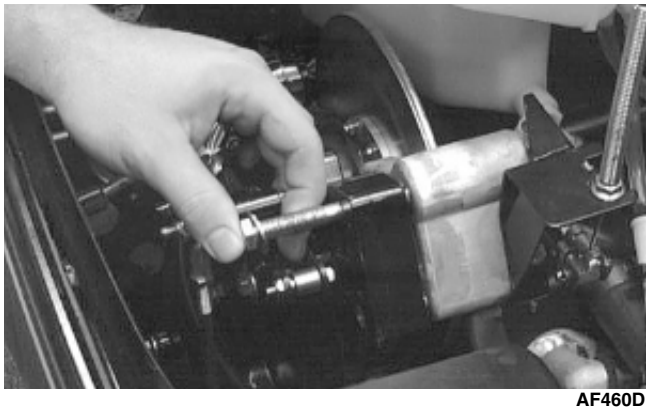


AF297D

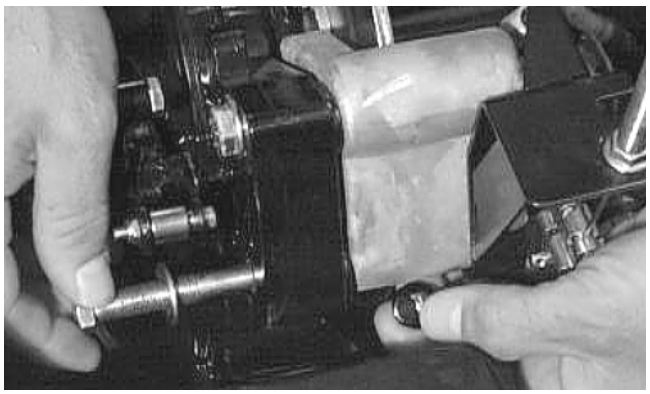
2. Remove the recoil starter rope from the brake cable bracket.

3. Loosen the jam nut on the brake cable and remove the cable from the bracket.

4. Loosen and remove the two mounting cap screws (account for the front alignment ball) and remove the brake caliper.



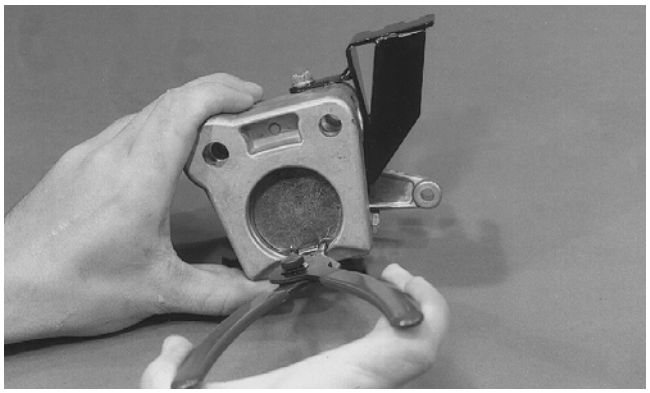
AF460D



AF293D

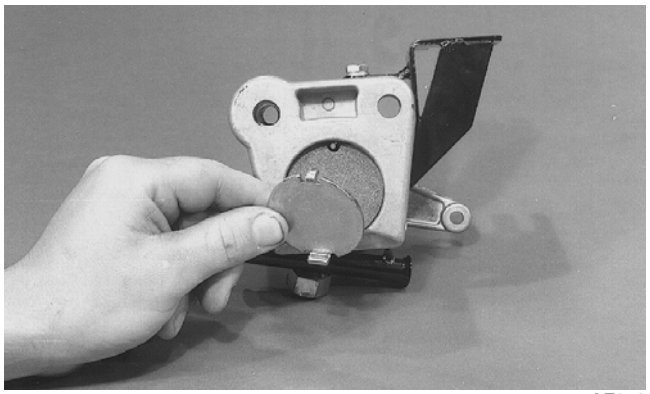
DISASSEMBLING

1. Remove the snap ring on the stationary side of the caliper.



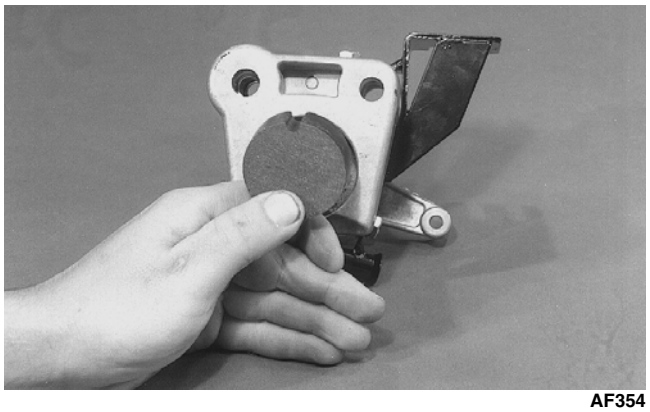
AF318A

2. Remove the brake pad support plate.



AF356

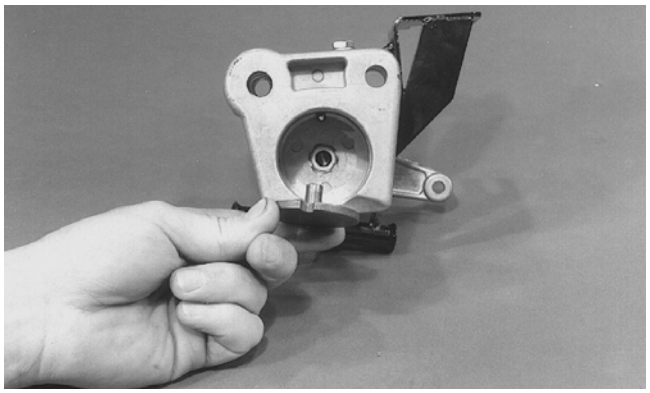
3. Remove the stationary brake pad.



AF354

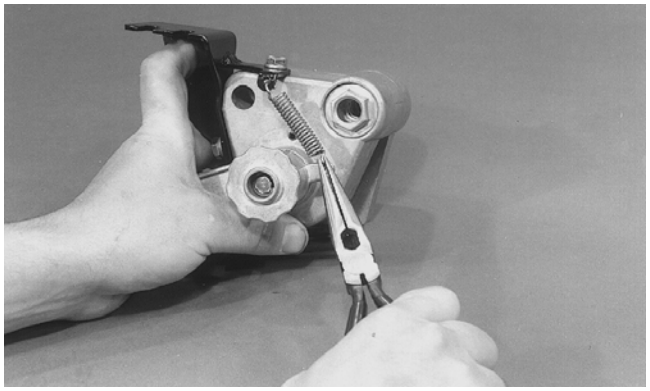
4. Remove the movable brake pad.

5. Remove the brake piston.



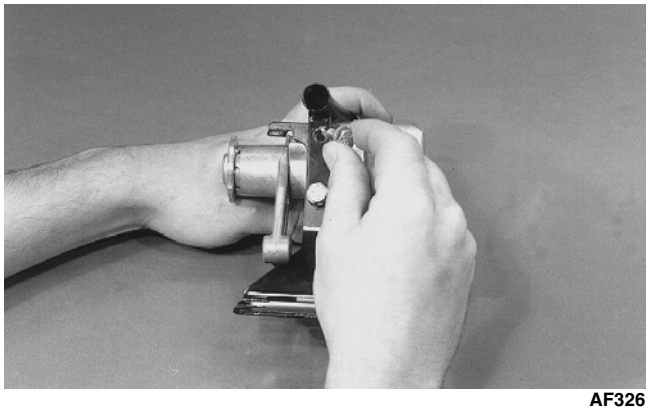
AF353

6. Remove the brake actuator arm return spring.



AF351A

7. Loosen and remove the three cap screws securing the brake cable bracket and remove the bracket.



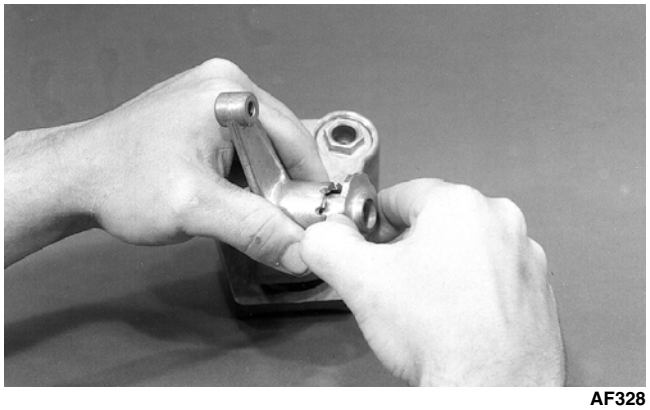
AF326

8. Remove the brake actuator arm assembly from the caliper.



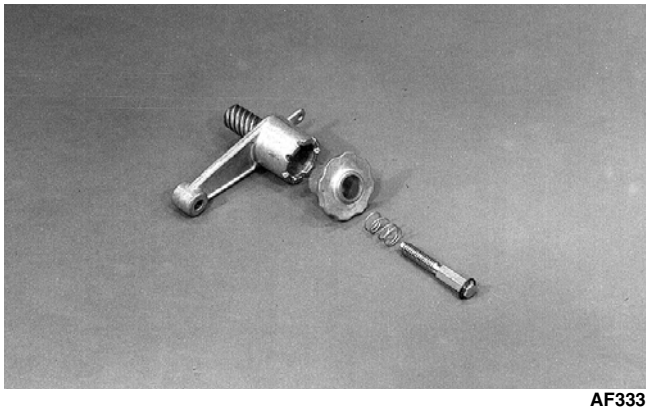
AF283

9. Pull out on the quick-adjust knob and turn counterclockwise to remove.



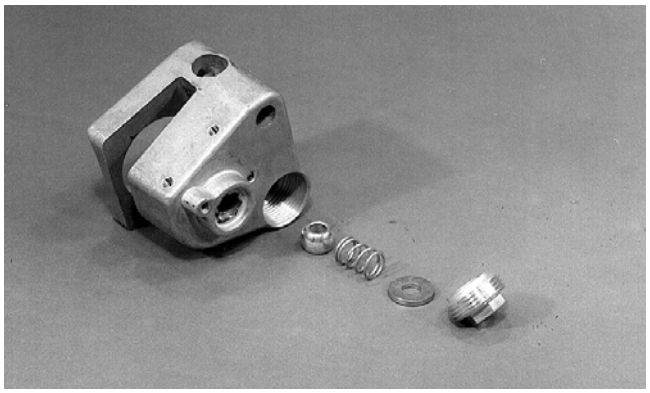
AF328

10. Remove the adjustment bolt and spring from the quick-adjust knob.



AF333

11. On the rear of the caliper, loosen and remove the jam nut, washer, spring, and ball assembly.

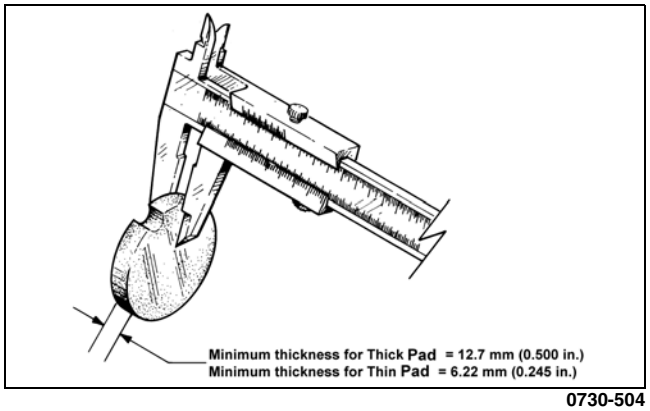


AF331

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Using a calipers, measure the stationary and movable brake pads. The movable brake pad thickness must exceed 12.7 mm (0.500 in.). The stationary brake pad thickness must exceed 6.22 mm (0.245 in.).



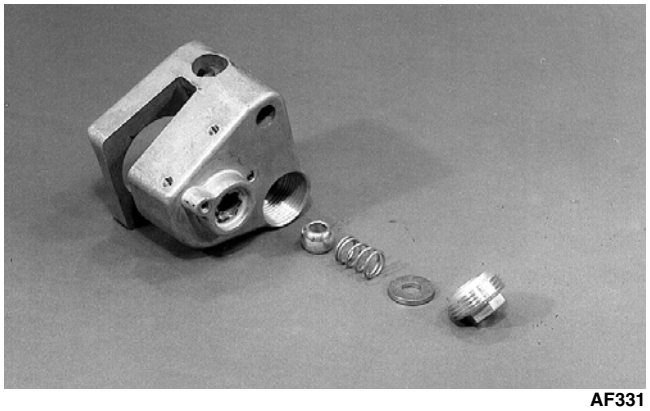
0730-504

■ **NOTE: When replacing brake pads, always replace both pads as a set.**

2. Wash all brake components with parts-cleaning solvent and dry thoroughly.
3. Inspect all brake components for signs of wear, fatigue, cracks, or stripped threads.
4. Inspect the spring for cracks, stretching, or unusual bends.
5. Inspect the brake cable for any signs of fraying or broken strands. Replace as needed.

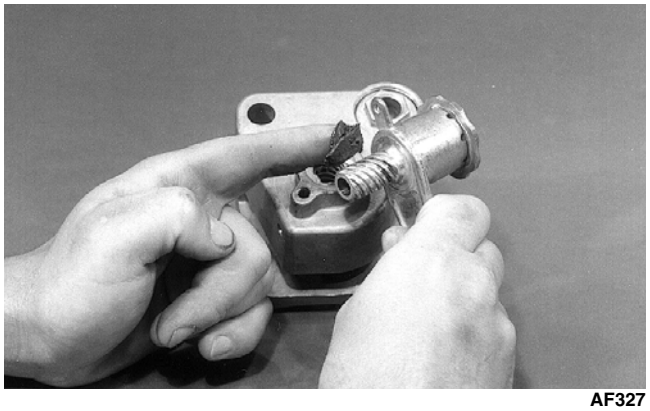
ASSEMBLING

1. In the rear mounting hole of the caliper, temporarily install the mounting cap screw. In sequence, install the alignment ball (apply a small amount of grease to the ball), spring, washer, and jam nut. Turn the jam nut in until slight spring pressure is felt; then remove the mounting cap screw.



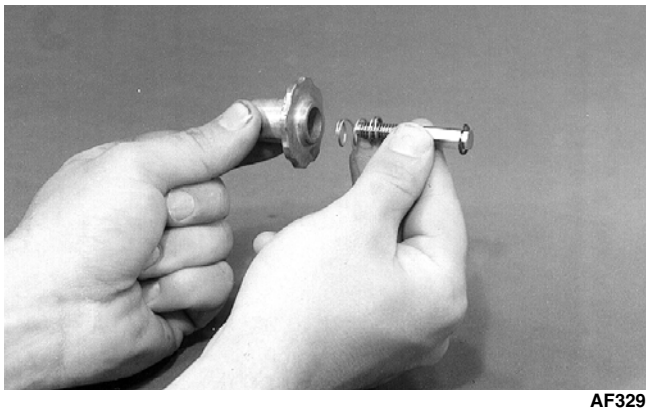
AF331

2. Apply Arctic Cat All-Temperature Grease (p/n 0636-593) to the actuator shaft.



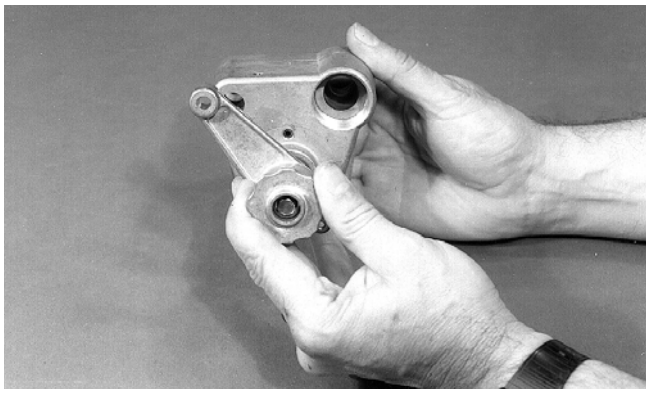
AF327

3. Insert the adjustment bolt with spring and quick-adjust knob into the actuator assembly and turn in 2 or 3 turns.



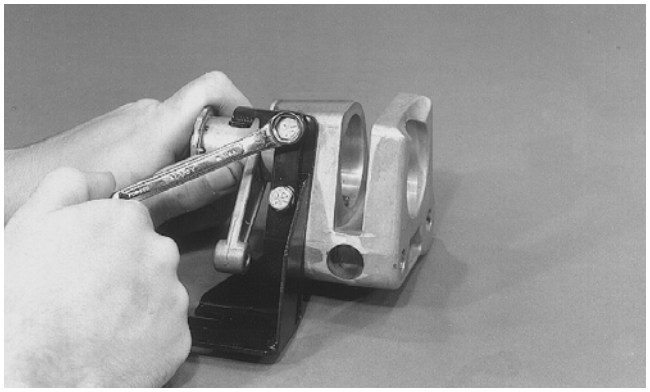
AF329

4. With the actuator shaft arm in the 11 o'clock position (located over the front mounting hole), install the actuator shaft into the brake caliper assembly.



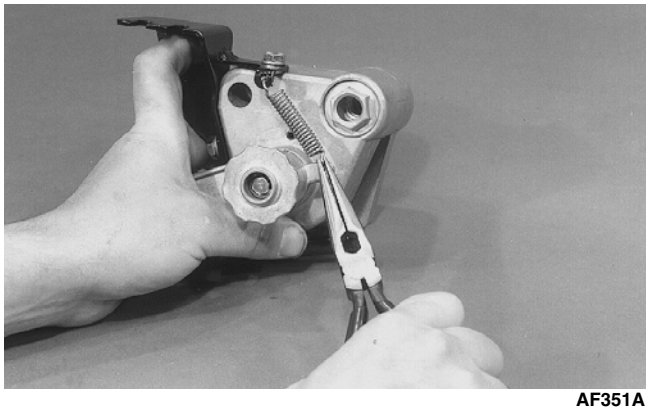
AF338

5. Place the brake cable bracket and rope guide into position and secure with the three cap screws and lock washers.



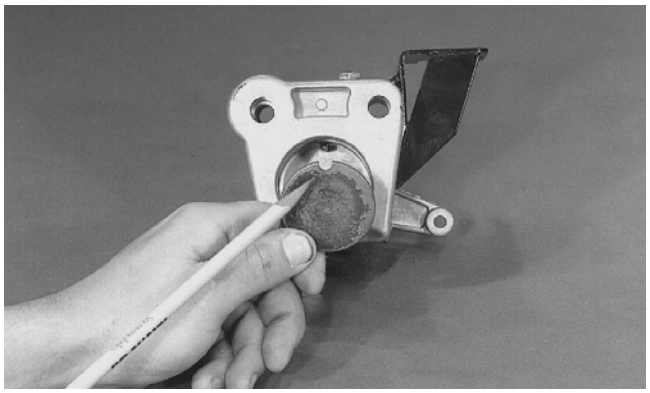
AF352A

6. Install the brake arm actuator return spring.



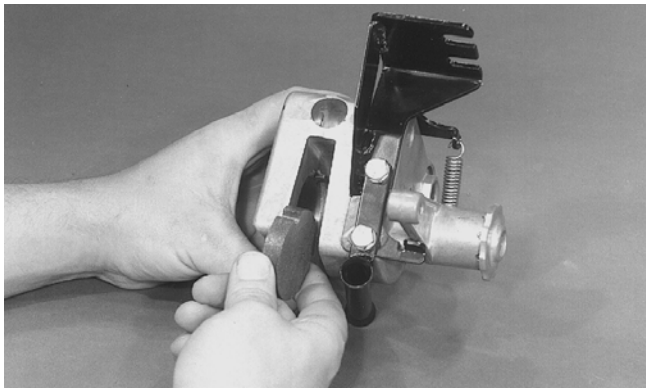
AF351A

7. Install the brake piston making sure that the slot in the piston aligns with the roll pin in the caliper.



AF325A

8. Install the movable (thick) brake pad into the caliper making sure that the slot in the pad aligns with the roll pin in the caliper.

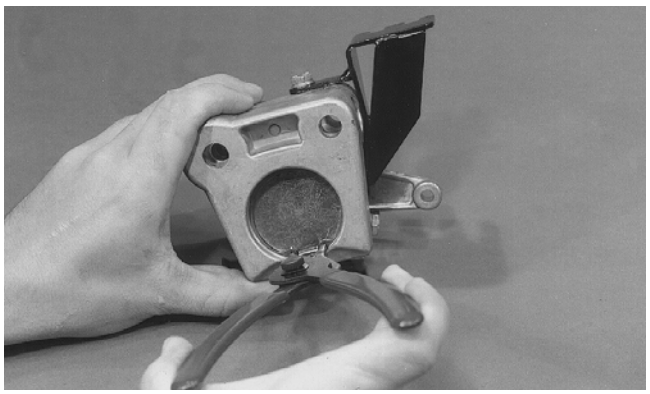


AF320

9. Install the snap ring into the caliper making sure that the sharp edge of the snap ring faces out and the opening faces down.

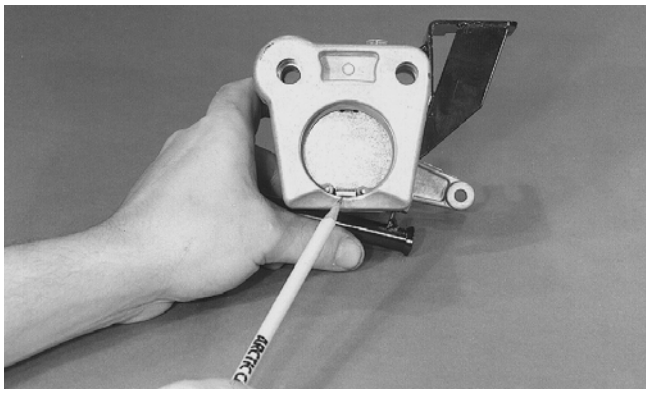
⚠ WARNING

Be sure the snap ring is fully seated. Personal injury may result if the snap ring isnt seated properly within the slot of the caliper.



AF318A

10. Install the brake pad support plate with the large tab located in the opening of the snap ring.

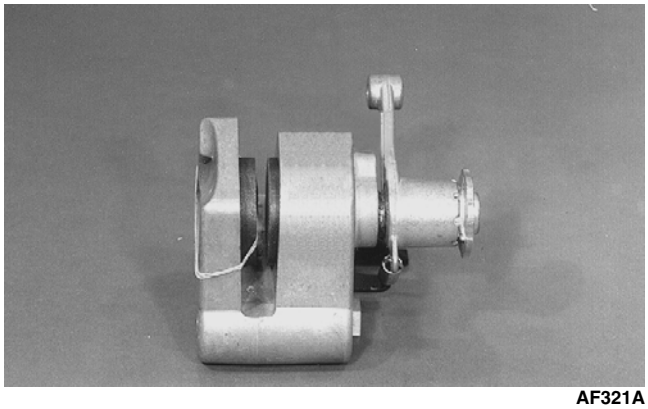


AF322

11. Install the stationary (thin) brake pad into the caliper making sure the slot in the pad aligns with the small tab on the support plate. Use a rubber band to hold the pad and plate in position.

INSTALLING

1. With the rubber band holding the stationary pad and support plate in position, install the caliper assembly over the brake disc. Remove the rubber band.

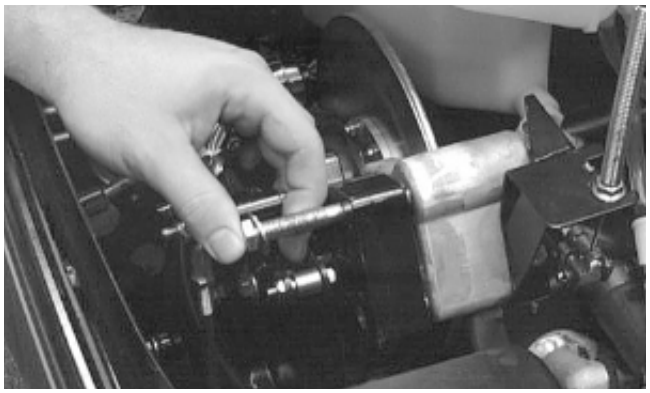


AF321A

⚠ CAUTION

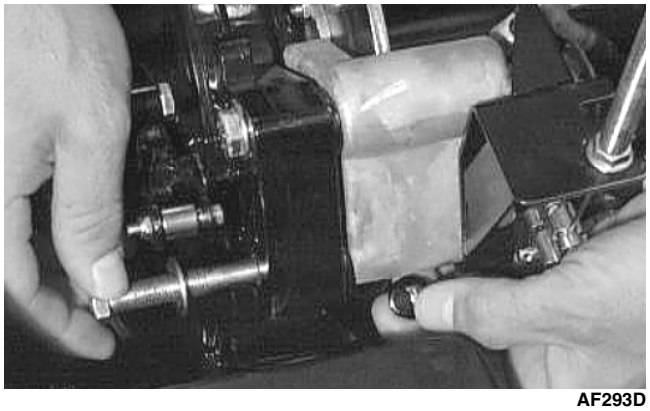
Make sure that the brake pads are properly positioned in the caliper or damage to the brake system will result.

2. Apply blue Loctite #243 to the rear mounting cap screw with washer and install. DO NOT TIGHTEN AT THIS TIME.

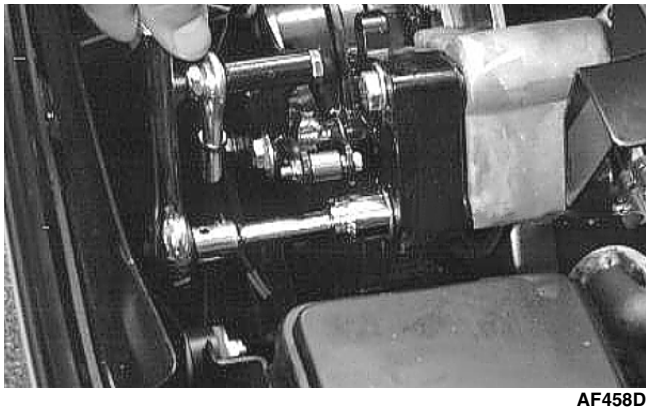


AF460D

3. Apply a small amount of grease to the alignment ball and install into the front of the caliper. Apply blue Loctite #243 to the front cap screw with washer; then install and tighten both cap screws to specifications.

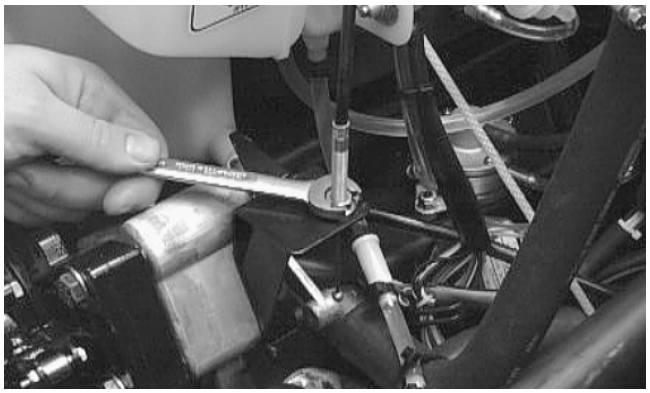


AF293D



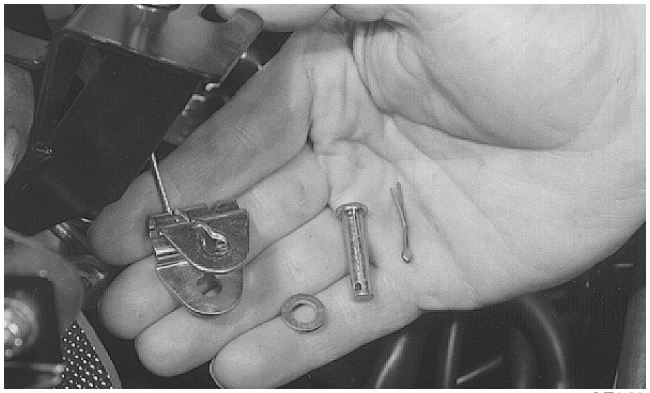
AF458D

4. Place the brake cable into the rear slot of the brake cable bracket and tighten securely.



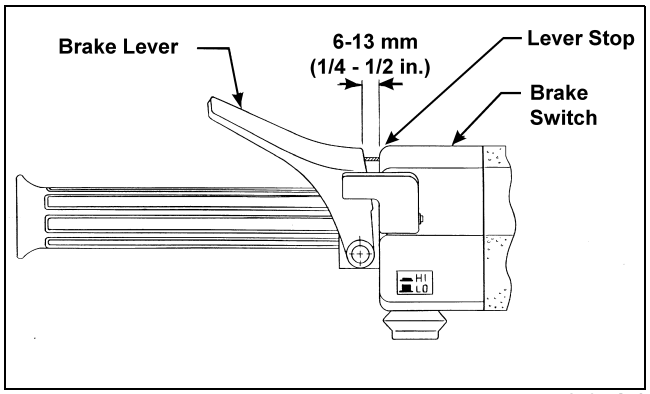
AF462D

5. Insert the cable end into the rear slot of the clevis. Install the pin through the clevis and actuator arm; then install the washer. Install a new cotter pin into the clevis pin and spread the cotter pin.



AF340

6. Pull out on the quick-adjust knob and turn clockwise until there is 6-13 mm (1/4-1/2 in.) free-play at the brake lever.



0727-451

7. Set the brake lever lock; then securely tighten the jam nut on the upper mounting cap screw.



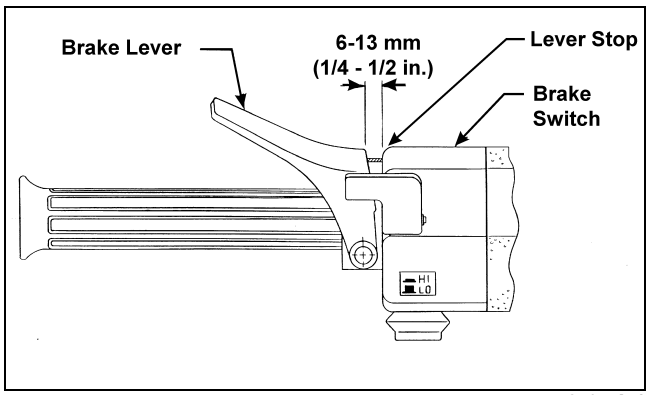
AF298

8. Release the brake lever lock and recheck the brake lever free-play (adjust as needed); then place the recoil starter rope into the guide portion of the brake cable bracket.

ADJUSTING BRAKE LEVER TRAVEL

1. Rotate the brake disc alternately forward and backward while slowly compressing the brake lever.

2. At the point where the disc is locked, check the distance between the brake lever and lever stop. The distance must be within a range of 6-13 mm (1/4-1/2 in.).



0727-451

⚠ WARNING

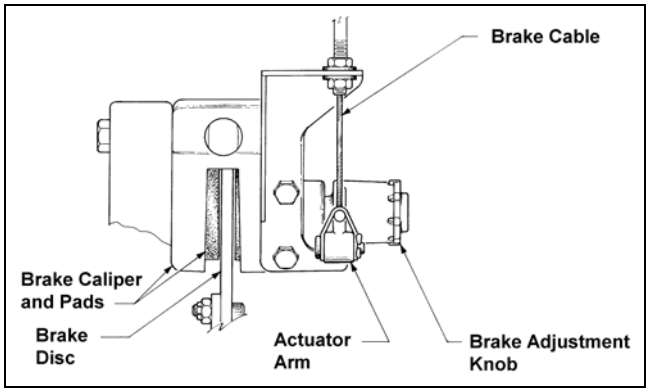
Before making any adjustment, make certain the brake quick-adjust knob isnt hot. If the snowmobile has just been used, allow some time for the knob to cool or burns may result.

3. To decrease brake lever travel (set up brake), pull out on the spring-loaded quick-adjust knob and rotate the knob clockwise periodically checking the brake lever travel distance until the correct travel distance is attained. Once the correct brake lever travel has been obtained, release the knob into a secured position.

■ **NOTE: If the quick-adjust knob has reached its maximum adjustment (cannot be rotated any further clockwise), both brake pads must be replaced.**

⚠ WARNING

DO NOT attempt to adjust the brake with the flange nuts on the brake cable bracket. Incorrect brake adjustment may occur causing possible brake failure.



0730-151

4. To increase brake lever travel (loosen the brake), pull out on the quick-adjust knob and rotate the knob counterclockwise periodically checking the brake lever travel. Once the desired brake lever travel is obtained, release the knob into a secured position.

REPLACING BRAKE PADS

⚠ CAUTION

The brake pads must be replaced as a set. Do not under any circumstances ever replace only one of the brake pads.

1. Using a 1/2-in. socket, remove the front brake assembly guide pin. Slowly pull the pin from the assembly and catch the alignment ball as it drops from the hole in the front of the caliper assembly.

2. Remove the rear guide pin; then slide the brake caliper assembly forward free of the brake disc.

3. Remove the stationary brake pad from the caliper assembly.

4. Tip the caliper on its side and allow the movable brake pad to drop free of the caliper assembly.

5. Place the new movable brake pad into position; then temporarily secure with a rubber band to hold it in place.

6. With the backing plate in position (wide tab positioned between the snap ring ears), install the stationary brake pad making sure the notch in the pad is aligned with small tab of the backing plate. Using a rubber band, temporarily secure the pad.

7. Place the brake assembly back into position over the brake disc. Apply green Loctite #609 to the rear guide pin; then install the rear guide pin.

8. Insert the alignment ball into the hole at the front of the caliper, apply green Loctite #609 to the front guide pin, and install the front guide pin. Tighten the two alignment pins to specifications. Cut and remove the two rubber bands.

■ **NOTE: When new brake pads have been installed, a burnishing process is required. Drive the snowmobile slowly and compress the brake lever repeatedly until the pads just start to heat up; then allow them to cool down. This process stabilizes the pad material and extends the life of the pads.**

Brake Control
(Mechanical/Quick-Adjust)

REMOVING AND DISASSEMBLING

1. Remove the Phillips-head screws securing the handlebar pad to the handlebar.



AL136D

2. Remove the retaining ring, washer, and pin securing the brake lever.

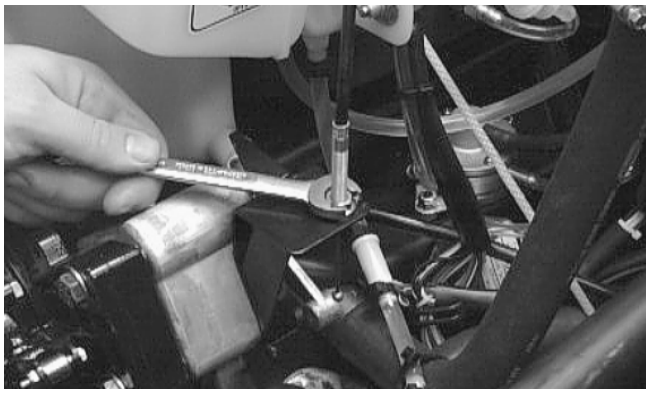


AL137D



AL138D

3. Loosen the jam nut securing the brake cable to the brake cable bracket.


AF462D

4. Disconnect the brake cable from the seat in the brake lever and remove the lever; then slide the brake cable free of the brake control.


AL140D

5. Remove the brake lever from the brake control housing.

6. Remove the four screws securing the console; then raise the console to gain access to the main wiring harness.

7. Disconnect the brake control wiring harness from the main wiring harness.


AL141D

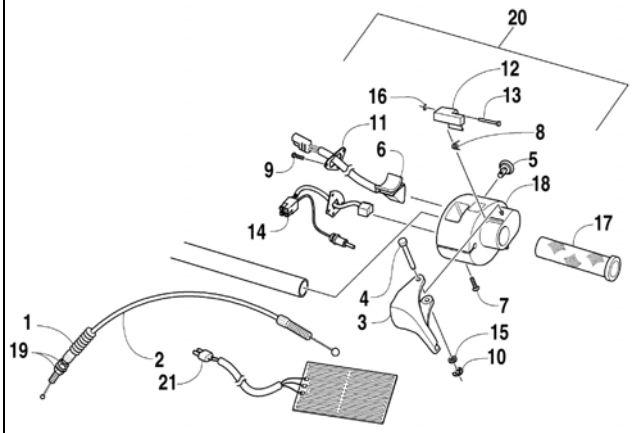
8. Cut the cable ties holding the wiring harnesses and cables to the steering post noting their locations for installing purposes.

9. Using a sharp knife, cut the grip off the handlebar; then using a solvent, clean adhesive from the handlebar.

10. Remove the machine screw securing the brake control to the handlebar; then slide the brake control off the handlebar.


AL143D

ASSEMBLING AND INSTALLING



Key			
1.	Spring	11.	Cover Plate
2.	Brake Cable	12.	Actuator
3.	Brake Lever	13.	Pin
4.	Axle	14.	Dimmer Switch
5.	Knob	15.	Washer
6.	Handwarmer Control	16.	Retaining Ring
7.	Machine Screw	17.	Grip
8.	Spring	18.	Housing
9.	Self-Tapping Screw	19.	Flange Nut
10.	Retaining Ring	20.	Brake Control Assy
		21.	Handwarmer Element

739-879A

1. Slide the brake control onto the handlebar and secure with the machine screw.



AL143D

2. Connect the wiring harness at the console.

3. Connect the brake control wiring harness to the main wiring harness; then secure the harnesses with cable ties.



AL141D

4. Place the console into position and secure with four screws making sure all wiring harnesses are positioned under the console.

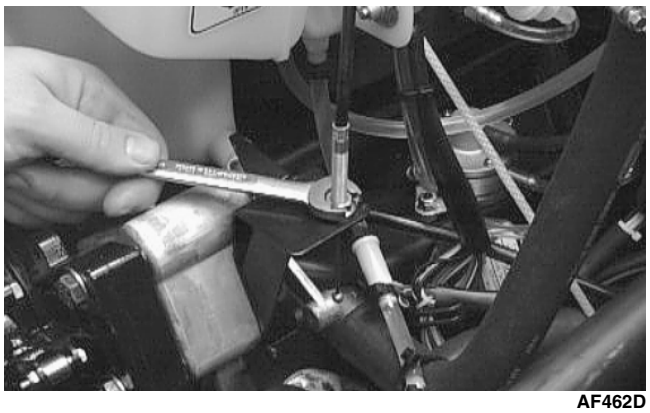
■ **NOTE: Secure wiring harnesses and cables to the steering post with cable ties as noted in removing.**

5. Connect the end of the brake cable to the seat of the brake lever.



AL140D

6. Secure the brake cable to the bracket by tightening the jam nut.



AF462D

7. Secure the brake lever with the pin, washer, and retaining ring.



AL138D



AL137D

8. Secure the handlebar pad to the handlebar with the Phillips-head screws.

9. Apply Handlebar Grip Adhesive (p/n 0636-071) to the bore of the handlebar grip; then using a rubber hammer, drive the grip into position.

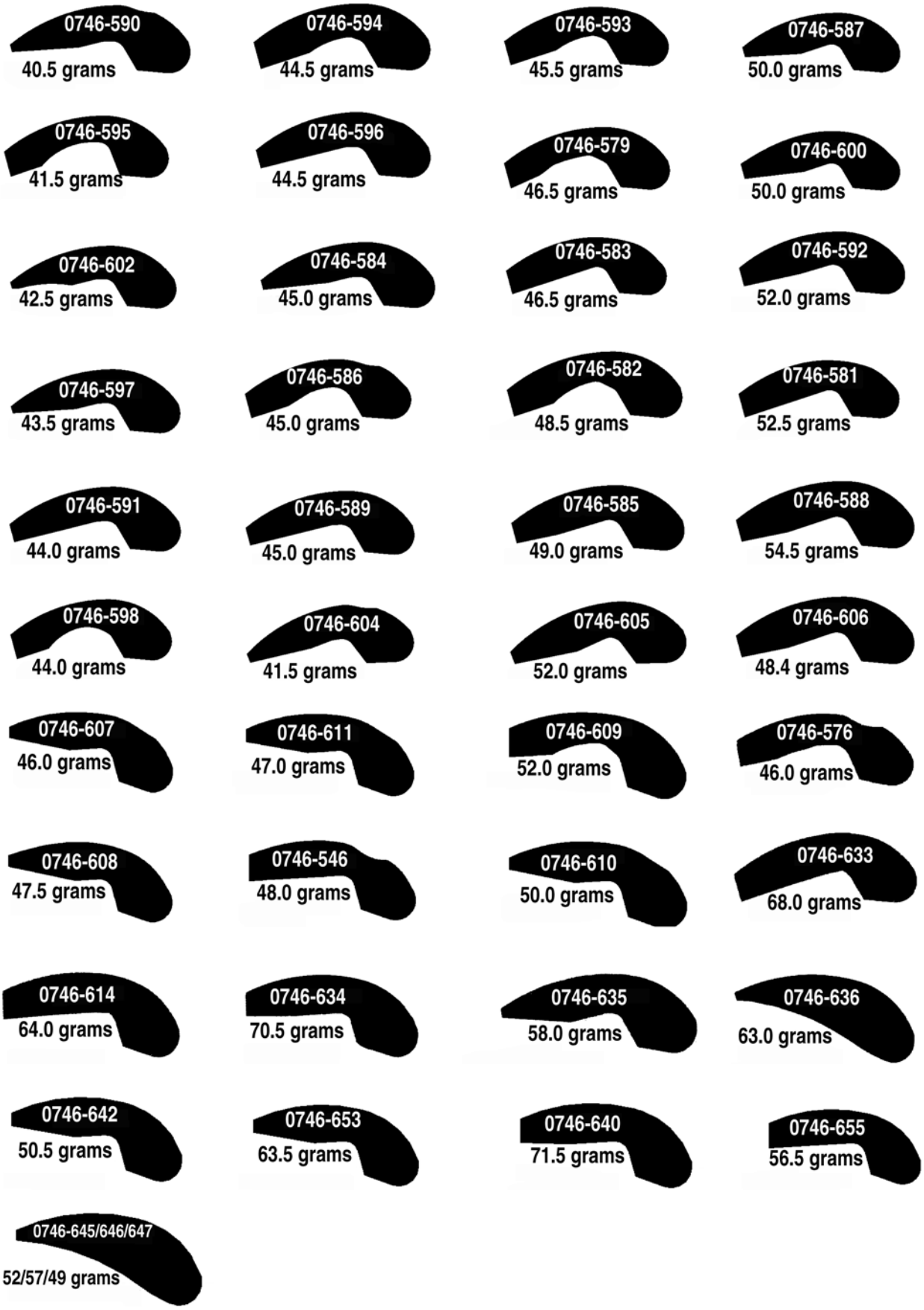
⚠ WARNING

The handlebar adhesive is extremely flammable. The product contains acetone and the vapors, when released, can be easily ignited. Keep away from heat, sparks, and open flame. Use only in a well-ventilated area. Avoid prolonged breathing of vapor. Avoid eye and skin contact. Keep container closed when not in use.

Arctic Cat Cam Arms



Arctic Cat Cam Arms



Arctic Cat Cam Arms



Torque Specifications

■ **NOTE: STD refers to chain case drive models; ACT refers to gear case drive models.**

ITEM		TORQUE
Drive Clutch	ft-lb kg-m	55 7.6
Spider***	ft-lb kg-m	250 34.5
Spider Retainer Nut***	ft-lb kg-m	85 11.8
Drive Clutch Cover	ft-lb kg-m	10 1.4
Cam Arm Pin Lock Nut (6-Post)	ft-lb kg-m	10 1.4
Drive Clutch (6-Post)/Ring Gear Damper**	ft-lb kg-m	22 3.0
Driven Pulley* (STD)	ft-lb kg-m	24 3.3
Driven Pulley* (ACT)	ft-lb kg-m	32 4.4
Driven Pulley Roller Plate (STD)	ft-lb kg-m	20 2.8
Torque Bracket (STD)	ft-lb kg-m	7.5 1.5
Chain Case Top Sprocket**	ft-lb kg-m	40 5.5
Chain Case Bottom Sprocket** (w/Reverse)	ft-lb kg-m	35 4.8
Chain Case Bottom Sprocket* (w/o Reverse)	ft-lb kg-m	35 4.8
Reverse Gear* (STD)	ft-lb kg-m	15 2.1
Chain Tensioner Arm* (STD)	ft-lb kg-m	8 1.1
Chain Case/Tunnel	ft-lb kg-m	15 2.1
Chain Case Cover	ft-lb kg-m	12-15 1.7-2.1

ITEM		TORQUE
Chain Case Drain Plug	ft-lb kg-m	35 4.8
Shift Linkage Arm (STD)	ft-lb kg-m	25 3.5
Brake Caliper/Chain Case*	ft-lb kg-m	30 4.2
Flange Plate - AWS 5 (Lower)	ft-lb kg-m	15 2.1
Flange Plate - Sabercat (Lower)	ft-lb kg-m	11 1.5
Flange Plate - STD (Upper)	ft-lb kg-m	11 1.5
Torque Bracket Cover (ACT)	ft-lb kg-m	5.5 0.75
Movable Sheave (ACT)	ft-lb kg-m	5.5 0.75
Speedometer Drive Adapter (ACT)	ft-lb kg-m	17 2.4
Gear Case/Chassis	ft-lb kg-m	20 (5/16-in.) 2.8
Gear Case/Chassis (ZR)	ft-lb kg-m	15 (1/4-in.) 2.1
Brake Caliper Housing/Chassis (ACT)	ft-lb kg-m	20 2.8
Outside Caliper Housing/Inside Caliper Housing (ACT)	ft-lb kg-m	16.5 2.3
Gear Case Cover	ft-lb kg-m	11 1.5
Gear Case Drain Plug	ft-lb kg-m	35 4.8
Driveshaft/Ring Gear Cap Screw	ft-lb kg-m	70 9.7
Driveshaft/Brake Disc Retaining Nut (ACT)	ft-lb kg-m	120 16.6

* w/Blue Loctite #243
** w/Green Loctite #609
***w/Green Loctite #620

Troubleshooting Drive Clutch/ Driven Pulley

Problem: Midrange Shift-Up (Too Quickly - Lowers RPM)	
Condition	**Remedy**
1. **Drive clutch spring** weak	1. Replace drive clutch spring
2. **Driven pulley spring** weak	2. Replace driven pulley spring
3. **Driven pulley spring preload tension** inadequate	3. Increase spring preload tension
4. **Center-to-center distance** too close	4. Adjust center-to-center distance
5. **Driven pulley bearing** worn — damaged	5. Replace bearing — movable sheave
Problem: Midrange Shift-Up (Too Slowly - Raises RPM)	
Condition	**Remedy**
1. **Drive clutch components** dirty	1. Clean drive clutch components
2. **Driven pulley components** dirty	2. Clean driven pulley components
3. **Driven pulley spring preload tension** excessive	3. Decrease spring preload tension
4. **Driven pulley bearing** worn — dirty	4. Clean — replace bearing — movable sheave
Problem: Excessive Belt Deposits	
Condition	**Remedy**
1. **Offset** adjusted incorrectly	1. Adjust offset
2. **Drive clutch/driven pulley sheaves** rough — damaged — dirty	2. Repair — replace — clean drive clutch/driven pulley
3. **Driven pulley movable sheave travel** impaired	3. Service driven pulley
4. **Driven pulley bearing** worn — dirty	4. Clean — replace bearing — movable sheave
Problem: Excessive Belt Drag—Impaired Drive Clutch Disengagement	
Condition	**Remedy**
1. **Drive clutch components** dirty — damaged	1. Clean — replace drive clutch components
2. **Drive belt** does not meet measurement specifications	2. Replace drive belt
Problem: Engine RPM Suddenly Increases—Drive Clutch Vibrates	
Condition	**Remedy**
1. **Cam arm pin** bent — damaged	1. Replace pin
2. **Cam arm** damaged — broken	2. Replace cam arm
3. **Drive clutch** out of balance	3. Align — replace components — drive clutch
Problem: Driven Pulley Vibrates	
Condition	**Remedy**
1. **Sheave rivets** loose — broken	1. Replace sheave
2. **Driven pulley** out of balance	2. Service — replace driven pulley

Problem: Drive Clutch Engagement (Before Specified RPM)	
Condition	**Remedy**
1. **Drive clutch spring** weak — bent	1. Replace spring
2. **Cam arms** incorrect — worn	2. Replace cam arms
Problem: Drive Clutch Engagement (After Specified RPM)	
Condition	**Remedy**
1. **Drive clutch spring** incorrect	1. Replace spring
2. **Spider buttons** worn	2. Replace buttons
Problem: Drive Clutch Sticks	
Condition	**Remedy**
1. **Drive clutch components** dirty	1. Clean drive clutch components
2. **Movable sheave** bent — binding	2. Clean — replace movable sheave
3. **Spider buttons** worn	3. Replace buttons
Problem: Drive Clutch Jerks—Shifts Erratically	
Condition	**Remedy**
1. **Drive clutch** dirty	1. Clean — drive clutch components
2. **Rollers** worn	2. Replace rollers
3. **Cam arms** rough	3. Polish — replace cam arms
4. **Spider buttons** worn	4. Replace buttons
5. **Sheaves** dirty	5. Clean sheaves

Troubleshooting Drive Belt

Problem: Drive Belt Glazed	
Condition	**Remedy**
1. **Drive belt** does not meet measurement specifications	1. Replace drive belt
2. **Drive clutch spring tension** inadequate	2. Replace drive clutch spring
3. **Drive clutch components** dirty — damaged	3. Clean — replace drive clutch
4. **Offset — parallelism — center-to-center distance** adjusted incorrectly	4. Adjust offset — parallelism — center-to-center distance
Problem: Drive Belt Lugs Torn Off—Frayed—Worn in One Spot	
Condition	**Remedy**
1. **Drive belt** does not meet measurement specifications	1. Replace drive belt
2. **Offset — parallelism — center-to-center distance** adjusted incorrectly	2. Adjust offset — parallelism — center-to-center distance
3. **Drive clutch engagement — idle RPM** too high	3. Service drive clutch — reduce idle RPM
4. **Drive clutch components** dirty — damaged	4. Clean — replace drive clutch components
5. **Driven pulley/shaft rotation** impaired	5. Service driven pulley/shaft — chain-case components
6. **Drive belt** damaged from improper break-in	6. Replace drive belt

Troubleshooting Hydraulic Brake System

Problem: Caliper Leaks	
Condition	**Remedy**
1. **Caliper O-ring** deteriorated — severed	1. Replace O-ring
2. **Piston — O-ring** damaged	2. Repair piston — replace piston — O-ring
Problem: Lever Spongy — Bottoms Out	
Condition	**Remedy**
1. **Brake system air bubbles** present	1. Bleed brake system
2. **Master cylinder** damaged — faulty	2. Replace master cylinder
Problem: Oscillation Feedback in Lever	
Condition	**Remedy**
1. **Brake pad residue** present on brake disc	1. Replace pads — clean disc
2. **Caliper** loose	2. Tighten mounting bolts
3. **Brake disc** warped — cracked — damaged — misaligned	3. Replace disc — driven shaft bearing
Problem: Loss of Brake	
Condition	**Remedy**
1. **Brake fluid** overheated — contaminated	1. Replace fluid
2. **Master cylinder** damaged — faulty	2. Replace master cylinder
3. **Caliper — brake hose** leaking	3. Replace caliper O-ring — repair piston — replace piston — O-ring — brake hose
4. **Air ducts** obstructed — missing	4. Remove obstruction — replace air ducts
5. **Brake lever linkage** damaged	5. Repair — replace lever — mounting bolt
Problem: Brakes Drag	
Condition	**Remedy**
1. **Master cylinder** damaged — faulty	1. Replace master cylinder
2. **Brake disc** warped — damaged — misaligned	2. Replace disc — driven shaft bearing
3. **Brake pads** worn — tapered	3. Replace pads
Problem: Snowmobile Won't Stop — Have to Pull Too Hard on Lever	
Condition	**Remedy**
1. **Pads/brake disc** glazed	1. Replace pads — clean disc
2. **Brake lever** binding	2. Loosen pivot bolt — replace master cylinder
3. **Caliper pistons** binding	3. Service caliper assembly

SECTION 9 — TRACK/REAR SUSPENSION

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Understanding the Suspension

GENERAL

Quick acceleration and the ability to go through the turns with power are the most important handling qualities. This section explains how the skid frame functions to provide these two important handling qualities. Before proceeding, however, note these terms.

Weight Transfer — A shift in the center of gravity in any direction depends on the force applied.

Track Tension — The amount of tightness or looseness of the track when correctly mounted in the chassis.

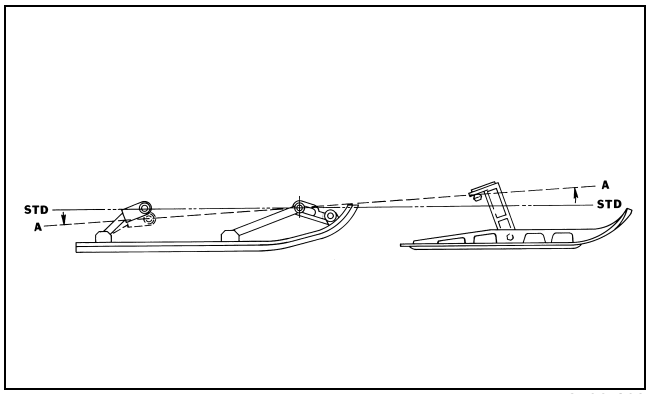
Spring Tension — The amount of force exerted on the spring by either fork tension adjustment or eyebolt adjustment.

Ski Pressure — The amount of force exerted downward on the skis.

Good weight transfer characteristics are needed for fast acceleration (shift of weight from skis to track) and for cornering (shift of weight back to skis to hold the front end in turns). Effective weight transfer depends on suspension tension, position of rider, and the position of the front arm limiter.

To understand how the suspension system works, think of the entire system in terms of three points; the skid frame rear axle center, the skid frame front arm, and the ski saddle center.

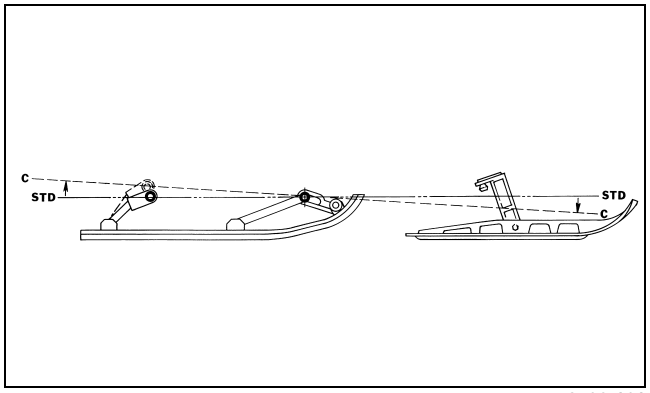
Assume that the front arm functions as a stationary pivot point between the rear axle center and the ski saddle center. Also assume that the ski saddle center is the same height off the ground as the rear axle center. This produces the standard position arrangement.



0728-180

Under acceleration when the center of gravity is transferred to the rear of the machine, the rear suspension collapses slightly. This brings the rear arm point downward and with the front arm stationary, the teeter-totter effect reduces the pressure on the skis, position A.

However, for controlled cornering, more pressure is needed on the skis. So when the driver decelerates coming into a corner, the center of gravity is transferred forward, putting the required pressure onto the skis and reducing the pressure on the rear suspension, position C.



0728-181

This is essentially what weight transfer is all about — the shift of weight to the rear of the machine for positive traction and good acceleration or to the front of the machine for positive handling and cornering control.

Back to TOC Back to Section TOC Next

Suspension Setup Basics

FRONT ARM SPRING TENSION

■ **NOTE: Read the following information closely as it pertains to all suspensions used in the last several years. If there are any questions, please contact the Arctic Cat Service Department.**

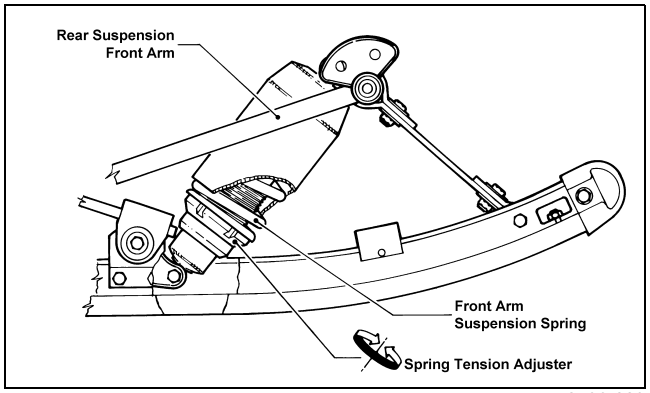
It is desirable to run with very light front arm spring tension. When riding in 4 in. or more of snow, the machine will be quicker if the front spring tension is adjusted lightly.

If the spring tension is adjusted too stiff, the track angle at the front of the skid frame is steep. This steep angle prevents the snowmobile from getting up on plane and slows down by 5 to 8 mph.

When riding in sticky snow (springtime or warm days) or hill climbing on hard snow, it may be desirable to stiffen the front arm spring tension. When this is done, weight is transferred back quicker. The problem with too much front arm spring tension is that the feel of the snowmobile becomes very short. The reason for this is the front arm becomes the pivot point between the spindles and rear of the machine. With dominant spring tension on the front arm, the suspension is basically contacting the snow from a point below the front arm to the skis or the spindle pressure point. This makes for a very short and darting machine on the trail. This is especially true when decelerating and the center of gravity is transferred forward.

A good method for adjusting the front spring tension follows.

■ **NOTE: On those models having a coil spring over the front arm shock absorber, the spring tension should be set as soft as possible when operating on trails and in deep snow.**



0729-662

FRONT ARM LIMITER STRAPS

Under no circumstances should the front arm limiter strap be lengthened. If lengthened, it may cause shock absorber travel problems.

The two limiter straps on AWS models can be shortened if desired. This adjustment must be made to suit driving style and some test driving time. With the rear arm in its present mounting location, no advantage has been noted from changing the strap length. If the front arm straps are shortened, the result will be more ski pressure and aggressive steering.

SKI SHOCK ABSORBER SPRINGS

The shock absorber springs have been matched to the shock valving and rear suspension. These springs are the result of hours of testing and comparison riding trying many different combinations of springs and shocks. If there is a need to make changes, there are several spring and shock sizes to choose from. While making these changes, keep the following points in mind.

Heavier Or Stiffer Springs

1. These will require shocks with more rebound control, or the front end will become like a pogo stick.
2. With stiffer springs, the front end will become more aggressive in the corners as more weight will be transferred to the skis when decelerating. Also, more weight is transferred to the rear on acceleration and can cause the rear shocks and spring to bottom out.
3. If the springs are too stiff for general riding conditions and style, the ride comfort is gone.

Spring Tension Too Soft

1. Front end bottoms out; hard on front end parts.
2. Less aggressive steering in corners on deceleration, and less weight is transferred to the skis because of softer springs.
3. Less weight gets transferred to rear of the machine upon acceleration.

■ **NOTE: When softening the ski springs, also soften the rear to match entire suspension.**

⚠ CAUTION

If the ski shock spring is adjusted too loose, the spring retainer may fall out. If the spring is adjusted beyond specification, the spring will coil bind and spring adjuster damage will occur.

ADJUSTING FRONT SHOCKS (Fox Air Shocks)

The air shocks are individually adjustable for the terrain conditions and driving style of the operator. The shocks are preset at 3.5 kg/cm^2 (50 psi) as an initial setting on the King Cat 900 EFI, 4.6 kg/cm^2 (65 psi) on the Crossfire Sno Pro/Firecat Sno Pro, and 4.2 kg/cm^2 (60 psi) on the M7 EFI LE; however, it is possible to "fine tune" the shocks to match the operator's weight, riding style, and terrain conditions.

■ NOTE: Care should be taken to have equal pressure in the shocks before operating the snowmobile.

To increase or decrease air pressure, use the following procedure.

■ NOTE: Adding air pressure will increase the air spring force; reducing air pressure will decrease air spring force.

⚠ WARNING

Do not exceed 105 kg/cm^2 (150 psi) in the shock.

1. Remove the air valve cap from the shock.
2. Thread the valve of Air Shock Pump (p/n 2603-614) onto the shock air valve approximately six rotations.

■ NOTE: As the pump is being attached to the shock, the hose will fill with air. This will result in a lower gauge pressure 0.14-3.52 kg/cm^2 (2-5 psi).

3. To decrease air pressure in the shock, press the black bleed valve button half way down and hold until desired pressure is attained.

■ NOTE: Pressing the button fully down and releasing it will allow only a small amount of air to escape (micro-adjust).

4. To increase air pressure in the shock, pump until desired pressure is attained.
5. Remove the pump valve from the shock air valve.

■ NOTE: As the pump valve is being removed from the shock, the sound of air loss is from the pump hose, not from the shock.

6. Install the air valve cap onto the shock.

FRONT ARM SPRING TENSION TOO STIFF

1. Slows machine down in loose snow.
2. Causes the machine to dart and dive as a result of less track on the ground on deceleration.

■ NOTE: It has been our experience that a tight front arm works well under only two conditions: sticky snow conditions in the spring of the year and in hill climbing on hard packed snow.

It has also been our experience with AFS models that with the front arm adjusted too soft, the spring may come off the roller. There haven't been any other problems in handling caused by a soft front arm.

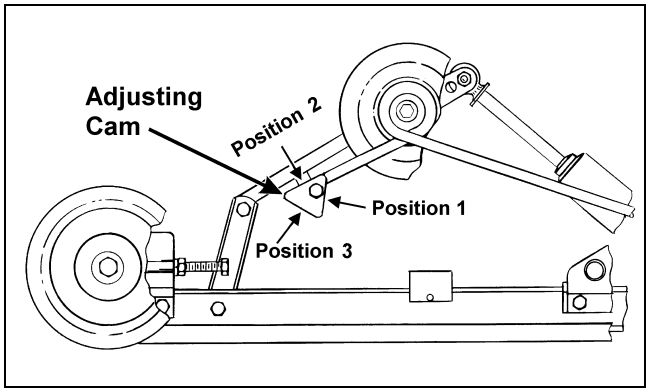
REAR ARM SPRING TENSION

The rear spring tension is adjusted for the weight of the driver. There are three possible adjustments.

1st block position - set for up to 150 lb

2nd block position - set for 150 to 200 lb

3rd block position - set for over 200 lb



727-720A

REAR ARM MOUNTING POSITION (Between Rails)

There are several mounting holes found in the rails for installing the rear arm.

The holes have been added to the suspension to provide adjustment to fine-tune the suspension to driving styles.

If the ride is too soft, moving the rear arm back between the rails will stiffen the ride. By moving the rear arm forward, it will collapse quicker and allow more transfer of weight to the back of the suspension. This will also affect the handling by providing a softer ride and also easier steering.

The drawbacks of moving the rear arm forward are that the suspension may bottom out quicker and some travel is lost.

■ NOTE: When making any changes to the front or rear suspension, the change should be made at both ends to keep the suspension balanced. For example, installing stiffer springs in front may require installing the next step stiffer spring in back to keep everything in balance.

ADJUSTING REAR ARM COUPLER (Groove Style)

■ NOTE: The couplers are installed in the 2-groove position at production.

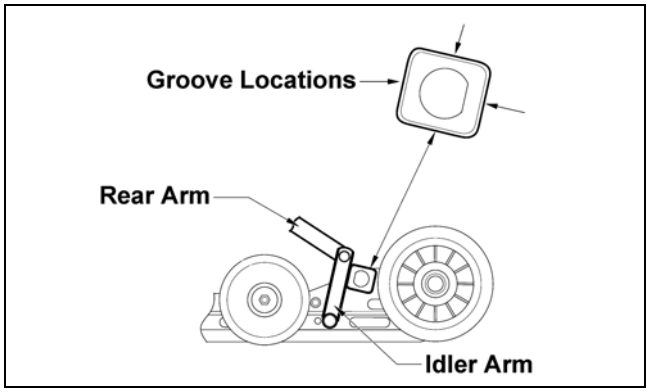
The rear arm coupler provides advantages over the standard suspension.

First, with the coupler system, ski lift under acceleration is greatly reduced which provides improved handling. Second, when riding through rough terrain, the rear suspension arm receives some needed assistance from the front arm shock and spring. This happens as the rear arm is fully collapsed and locked up by the coupler blocks. The front arm then starts to collapse the shocks and spring which assist the rear springs. The result is a smoother ride for the operator.

Each of the coupler blocks has four positions (notched grooves on the outside surface of the block). When changing the block position, change both to the same groove number. To make coupler adjustment, follow the procedure below.

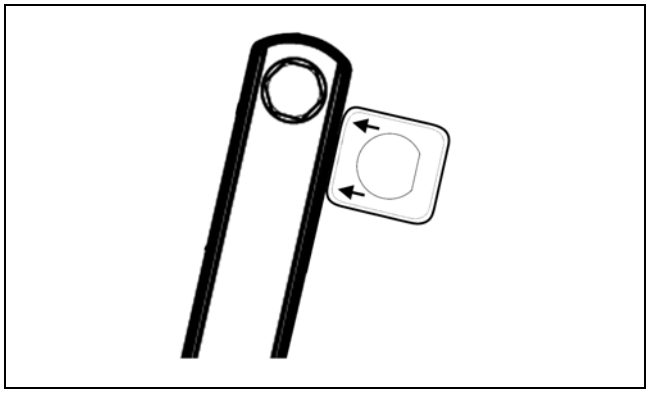
1. Using a 9/16-in. wrench, loosen the two cap screws that secure the coupler blocks to the inside of the suspension rails.

2. Rotate the coupler blocks to the desired position making sure both are set the same.



738-230B

■ NOTE: When setting the block, the chosen groove position must be directed toward the idler arm.



738-230C

3. Place a 4-in. block of wood under the rear of the suspension just in front of the rear idler wheels. This will assist in collapsing the suspension.

4. Collapse the rear suspension until the rear arm is firmly against the coupler blocks. This will align the two blocks squarely with the arm. While in this position, tighten the two cap screws securing the blocks.

ADJUSTING REAR ARM COUPLER (Number Style)

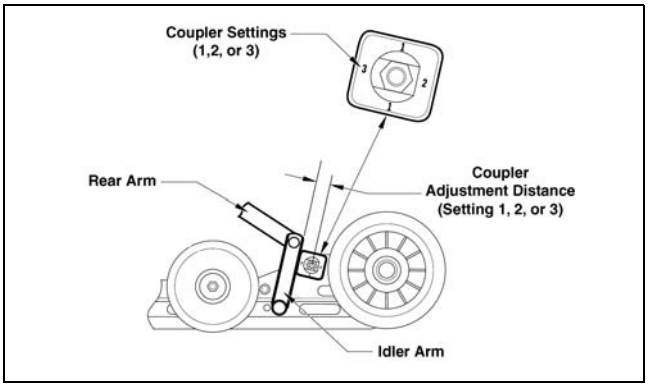
The rear arm coupler provides advantages over the standard suspension.

First, with the coupler system, ski lift under acceleration is greatly reduced which provides improved handling. Second, when riding through rough terrain, the rear suspension arm receives some needed assistance from the front arm shock and spring. This happens as the rear arm is fully collapsed and locked up by the coupler blocks. The front arm then starts to collapse the shocks and spring which assist the rear springs. The result is a smoother ride for the operator.

If additional coupler action is desired, the coupler blocks can be set to the number 2 or 3 position. Each of the coupler blocks has three positions numbered on the inside surface of the block. When changing the block position, change both to the same number. To make the coupler adjustment, follow the procedure below.

1. Using an 8 mm Allen-wrench, loosen the two cap screws that secure the coupler blocks to the inside of the suspension rails.

2. Rotate the coupler blocks to the desired position making sure both are set the same.



738-230A

3. Place a 4-in. block of wood under the rear of the suspension just in front of the rear idler wheels. This will assist in collapsing the suspension.

4. Collapse the rear suspension until the rear arm is firmly against the coupler blocks. This will align the two blocks squarely with the arm. While in this position, tighten the two cap screws securely.

Suspension Mounting Location Chart

■ **NOTE: The Rear Arm Mounting Position refers to where the rear arm mounts into the tunnel. The Rear Arm To Rail Position refers to where the lower portion of the rear arm mounts between the slide rails.**

MODEL	TRACK LENGTH & LUG HEIGHT	SKID FRAME	FRONT ARM MOUNTING POSITION	REAR ARM MOUNTING POSITION	REAR ARM TO RAIL POSITION	SHOCK LINK ROD LENGTH
Bearcat 570	15" x 156" x 1.00"	Fastrack—Stamped Rail*	Upper	Above Running Board	No Adjustment	12.600 in. (320.04 mm)
Crossfire Models	15" x 136" x 1.25"	Fastrack—Stamped Rail*	Upper	Above Running Board	No Adjustment	12.200 in. (309.88 mm)
Panther Models	15" x 136" x 1.00"	Fastrack—Stamped Rail*	Upper	Below Running Board	No Adjustment	12.200 in. (309.88 mm)
Z 370/370 LX/440 LX Models	15" x 121" x .750"	Fastrack—Stamped Rail*	Upper	Above Running Board	Second Hole Back	11.750 in. (298.45 mm)
Z 570 Models	15" x 121" x .850"	Fastrack—Stamped Rail*	Upper	Above Running Board	Second Hole Back	11.750 in. (298.45 mm)
Sabercat Models (STD)	13.5" x 128" x 1.00"	Fastrack—Stamped Rail	Upper	Above Running Board	Second Hole Back	11.750 in. (298.45 mm)
Sabercat EXT Model	13.5" x 144" x 1.25"	Fastrack—Stamped Rail	Upper	Above Running Board	First Hole Back	11.750 in. (298.45 mm)
Firecat Models (STD)	13.5" x 128" x 1.00"	Fastrack—Stamped Rail	Upper	Above Running Board	Second Hole Back	11.050 in. (280.67 mm)
Firecat Sno Pro Models	13.5" x 128" x 1.375" 13.5" x 128" x 1.000"	Fastrack—Stamped Rail	Upper	Above Running Board	Second Hole Back	11.050 in. (280.67 mm)
ZR 900 EFI	15" x 121" x 1.00"	Fastrack—Stamped Rail*	Upper	Above Running Board	Second Hole Back	11.750 in. (298.45 mm)
ZR 900 EFI Sno Pro	15" x 121" x 1.25"	Fastrack—Stamped Rail*	Upper	Above Running Board	Second Hole Back	11.050 in. (280.67 mm)
King Cat 900 EFI	15" x 162" x 2.25"	Fastrack—Stamped Rail*	Upper	Below Running Board	No Adjustment	11.750 in. (298.45 mm)
M5 EFI	15" x 141" x 1.60"	Fastrack—Stamped Rail*	Upper	Below Running Board	No Adjustment	11.750 in. (298.45 mm)
M6 EFI	15" x 141" x 2.25" 15" x 153" x 2.25"	Fastrack—Stamped Rail*	Upper	Below Running Board	No Adjustment	11.750 in. (298.45 mm)
M7 Models	15" x 141" x 2.25" 15" x 153" x 2.25" 15" x 162" x 2.25"	Fastrack—Stamped Rail*	Upper	Below Running Board	No Adjustment	11.750 in. (298.45 mm)

* w/Torque Sensing Link

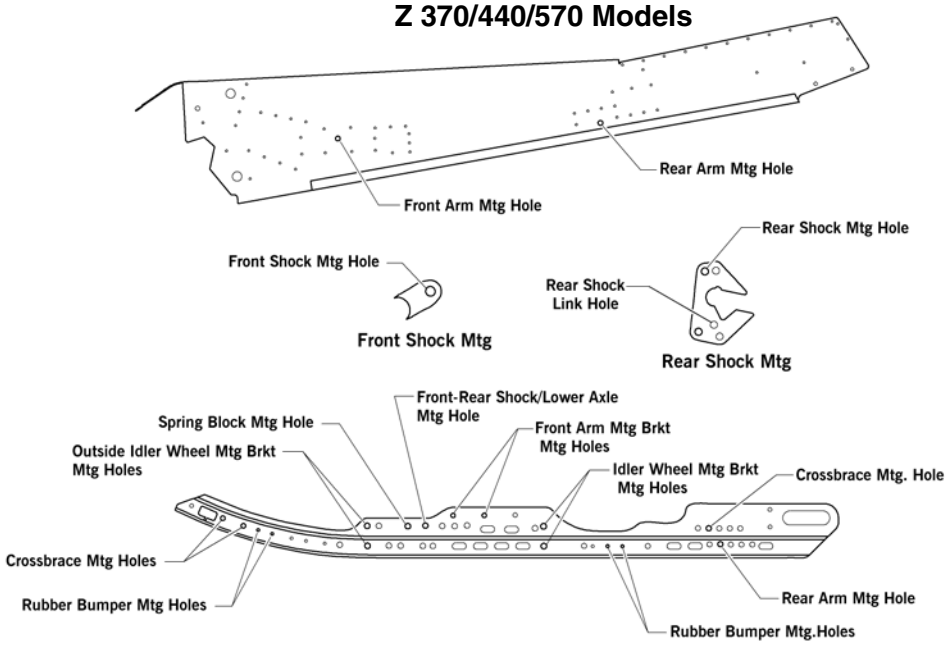
Chassis and Skid Frame Mounting Locations

The suspensions have several possible mounting locations in the slide rails and tunnel. However, it is recommended by Arctic Cat Inc. that when disassembling and assembling the suspension, all stock mounting locations be used as shown in the following illustrations.

⚠ CAUTION

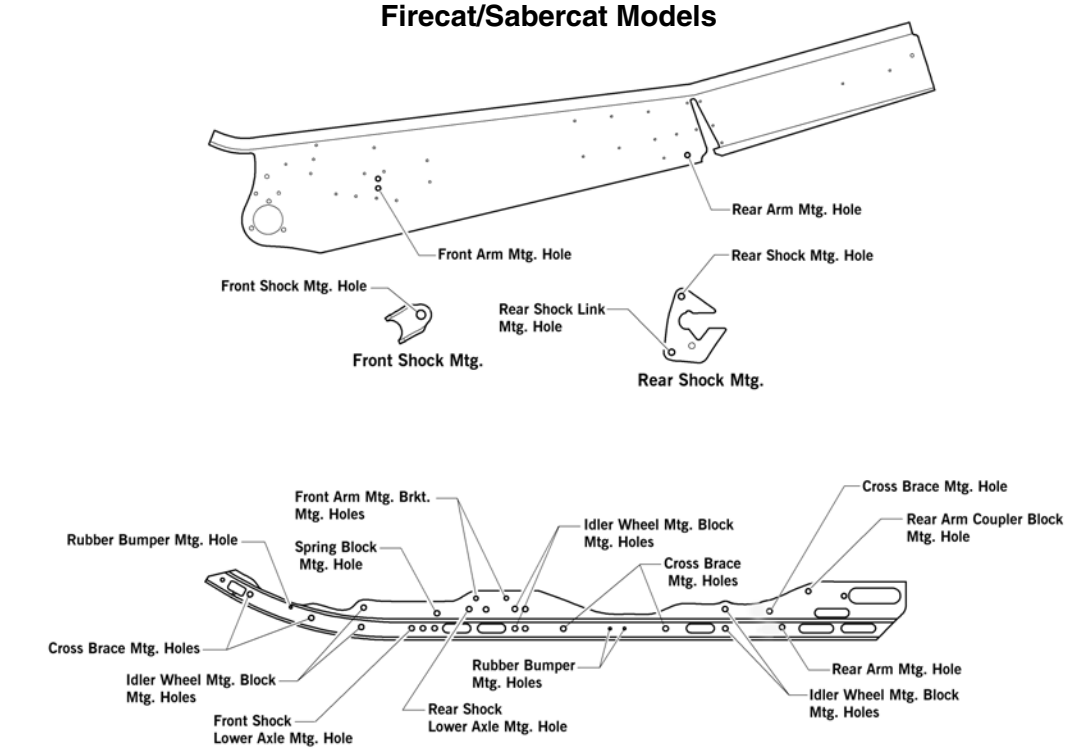
It is extremely important that all stock mounting locations be used. If any alterations to the skid frame are made, shock absorber and suspension damage may occur.

Z 370/440/570 Models



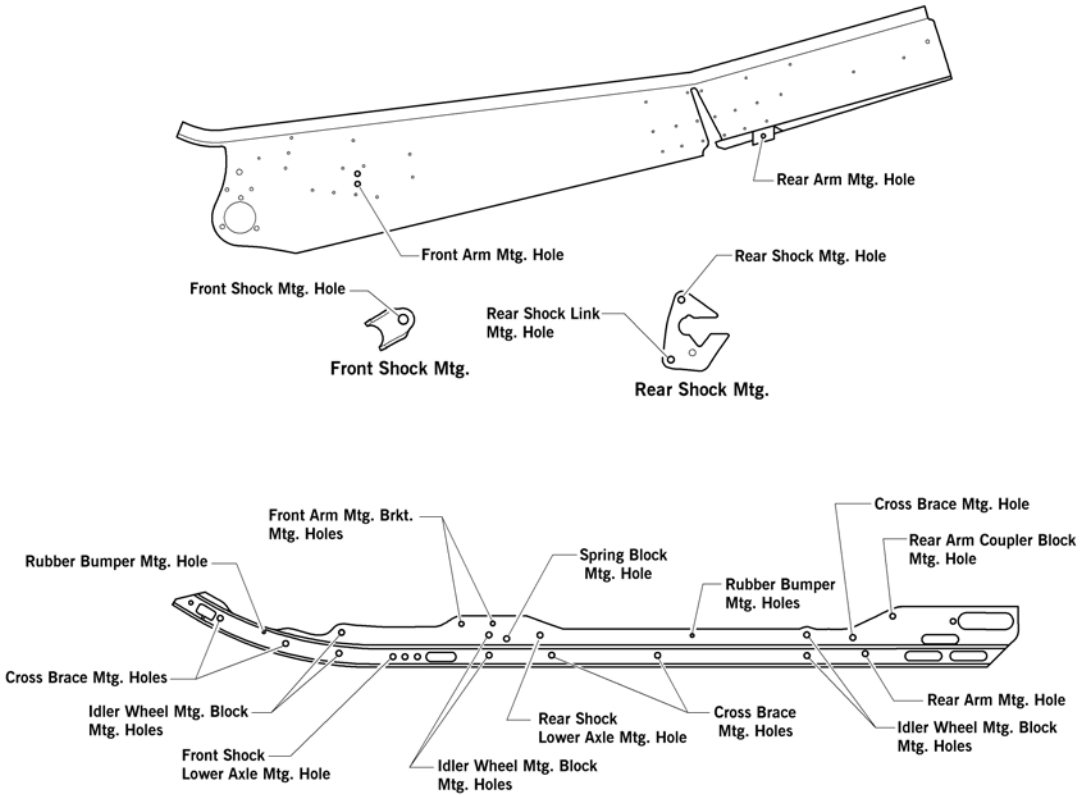
739-214A

Firecat/Sabercat Models



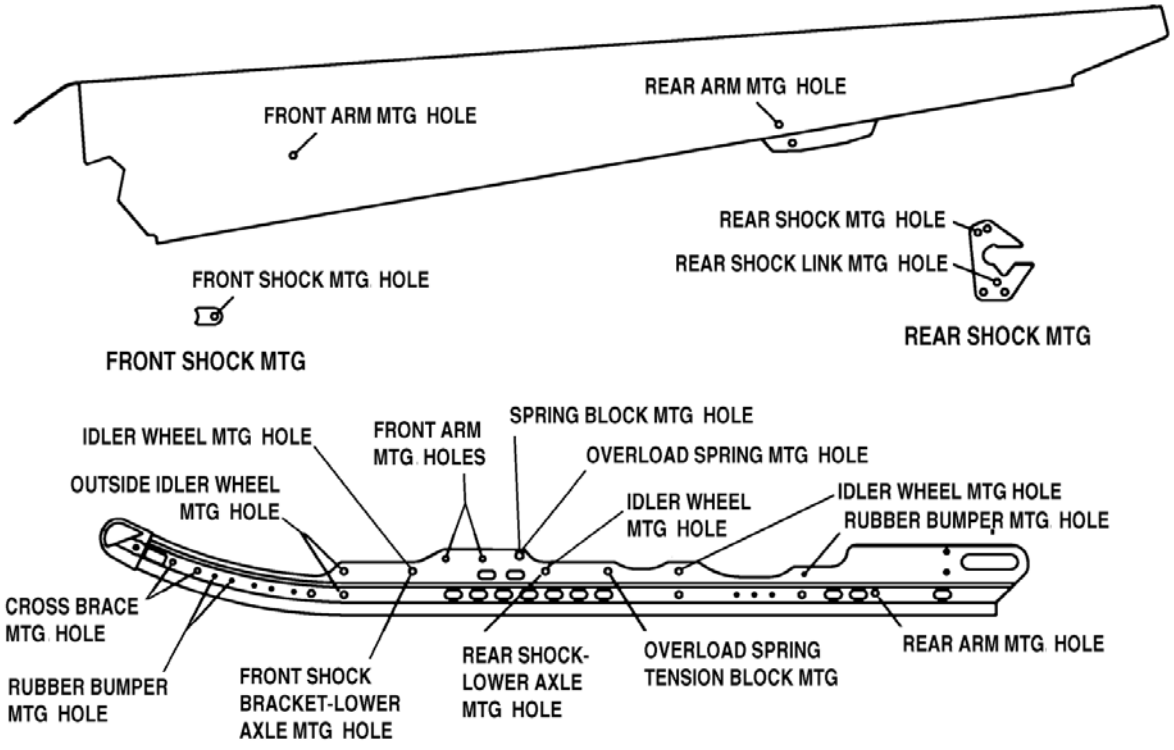
739-202B

Sabercat EXT Model



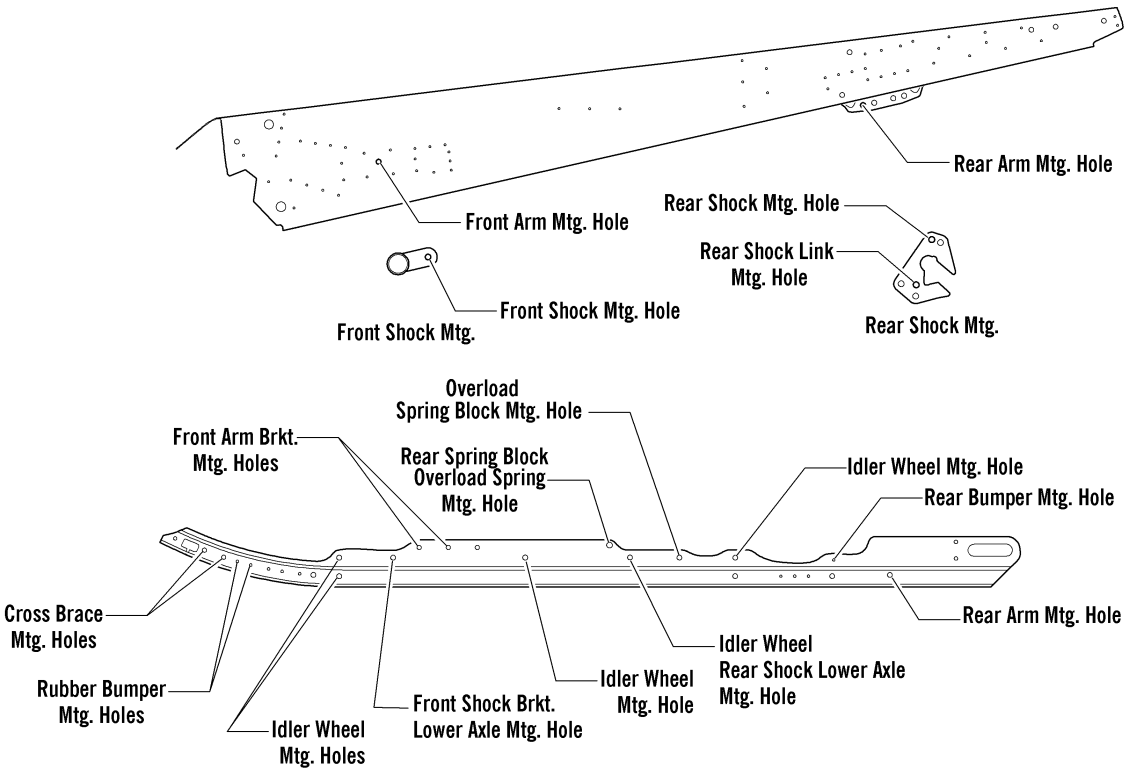
739-203B

Panther Models



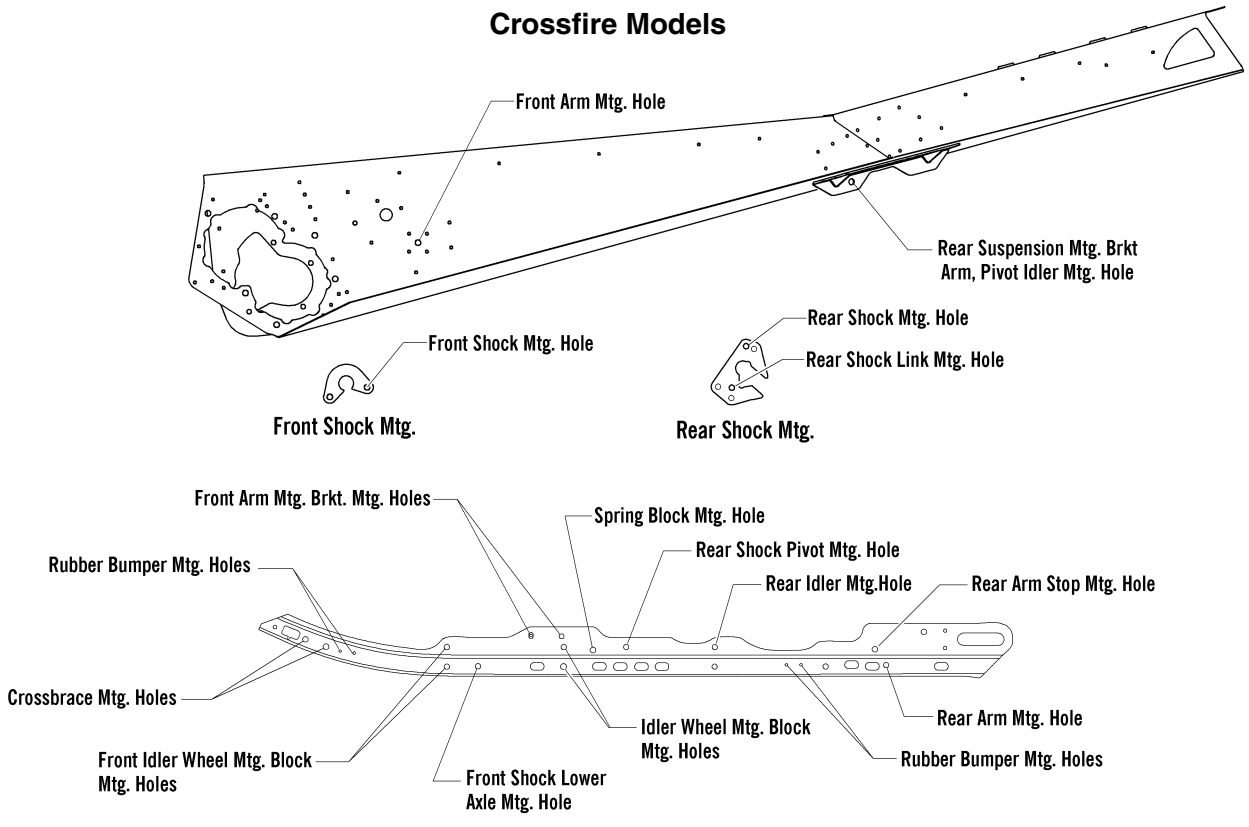
735-315A

Bearcat 570



0739-989

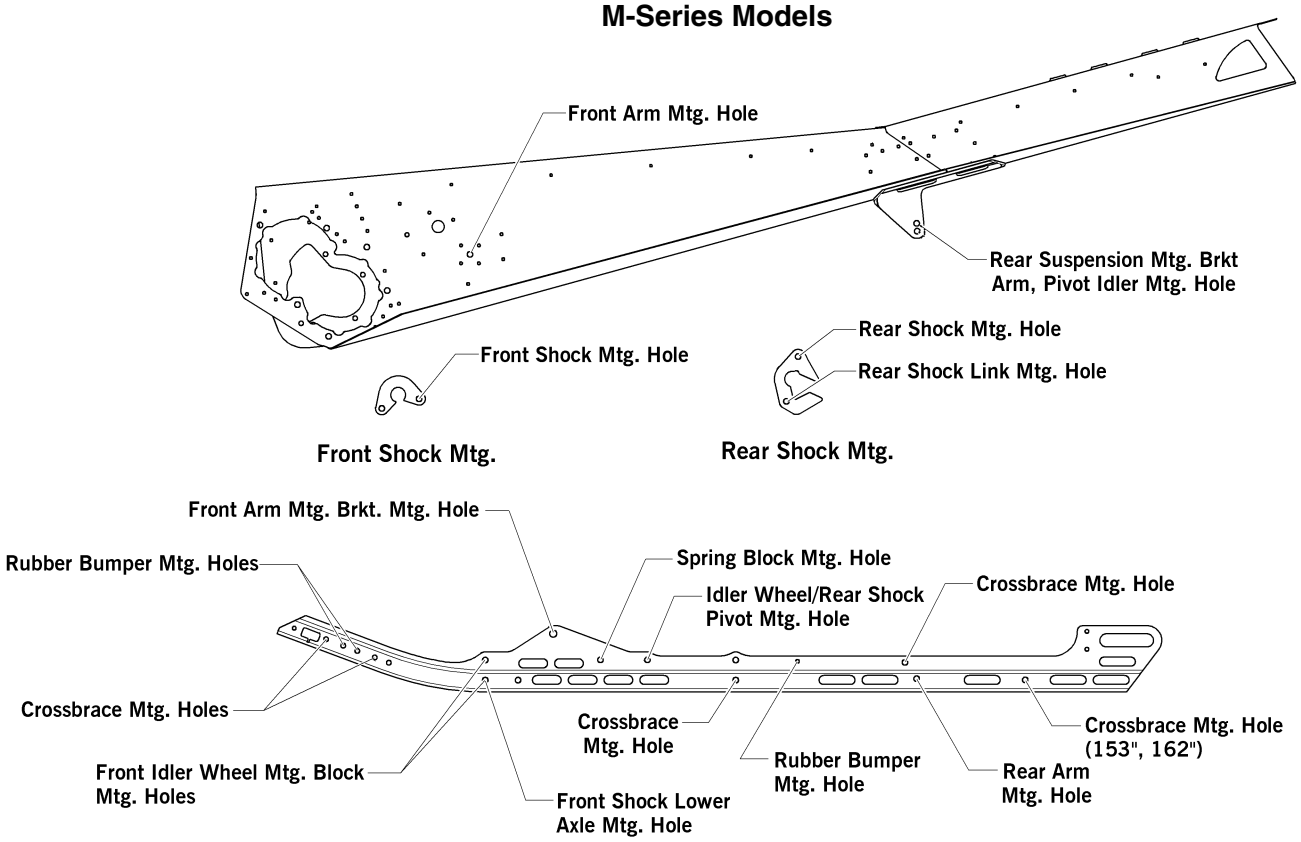
Crossfire Models



0740-887

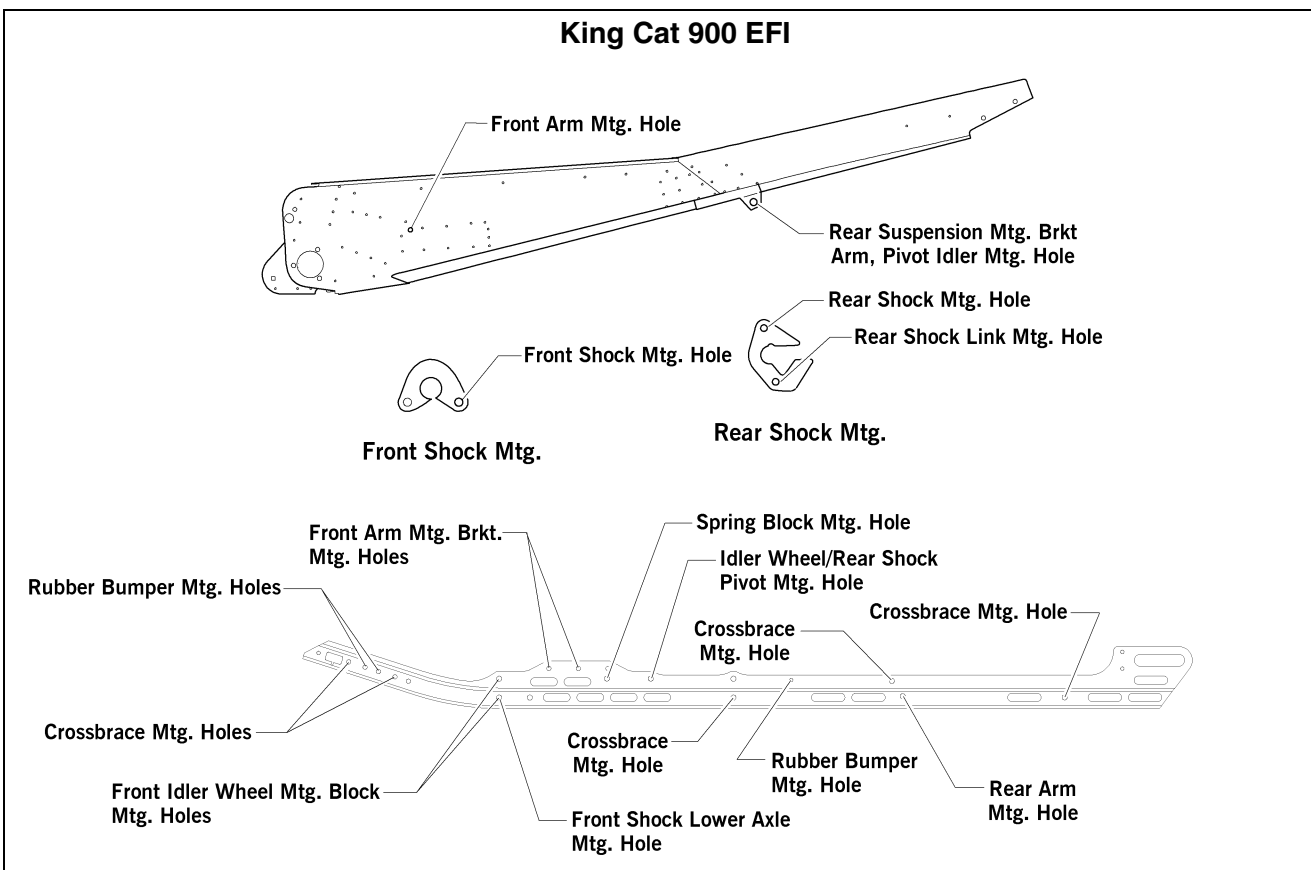
9

M-Series Models



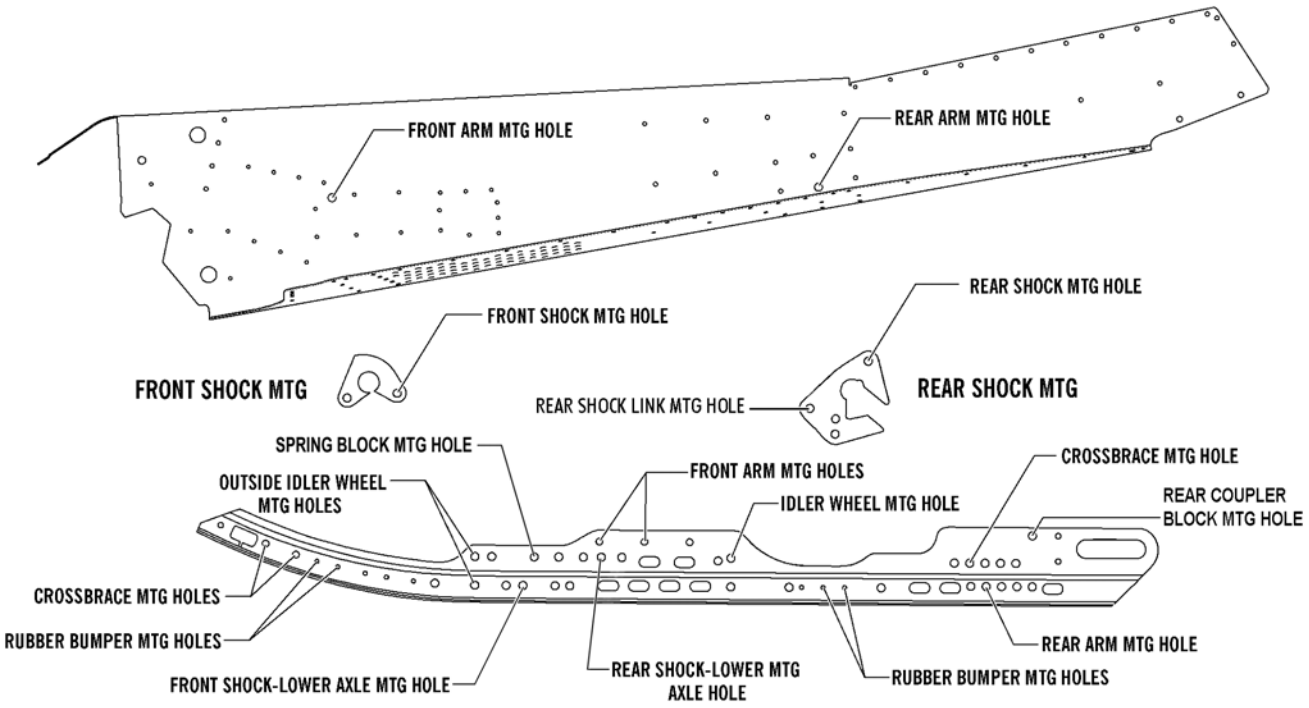
039-828A

King Cat 900 EFI



0740-127

ZR 900 EFI Models



737-323C

9

Servicing Chart

This chart is designed to direct the technician to the appropriate Skid Frame Schematics and Repair Procedure for servicing the rear suspension. Select the snowmobile model from the list and follow the chart to attain schematic designation and repair procedure.

Snowmobile Models	Slide Rail Style	Front Arm Style	Rear Arm Style	Idler Wheels Style	Repair Procedure
Bearcat 570	E	A	A	C	2
Firecat (STD)	F	D	D	F	4
Firecat Sno Pro	G	E	D	G	4
Crossfire 600 EFI	K	H	E	J	3
Crossfire 600 EFI Sno Pro	K	H	E	J	3
Crossfire 700 EFI	K	H	E	J	3
Crossfire 700 EFI Sno Pro	K	H	E	J	3
M5 EFI	B	B	B	D	4
M6 EFI	B	B	B	D	4
M7 (Carb)	B	B	B	D	4
M7 EFI	B	B	B	D	4
M7 EFI LE	B	B	B	D	4
King Cat 900 EFI	C	C	C	E	3
Panther 370	D	A	A	B	2
Panther 570	D	A	A	B	2
Sabercat (STD)/LX	F	D	D	F	4
Sabercat EXT	H	D	D	F	4
Z 370/370 LX	A	A	A	A	1
Z 440 LX	A	A	A	A	1
Z 570/570 LX	A	A	A	A	1
ZR 900 EFI	I	F	F	H	3
ZR 900 EFI Sno Pro	J	G	G	I	3

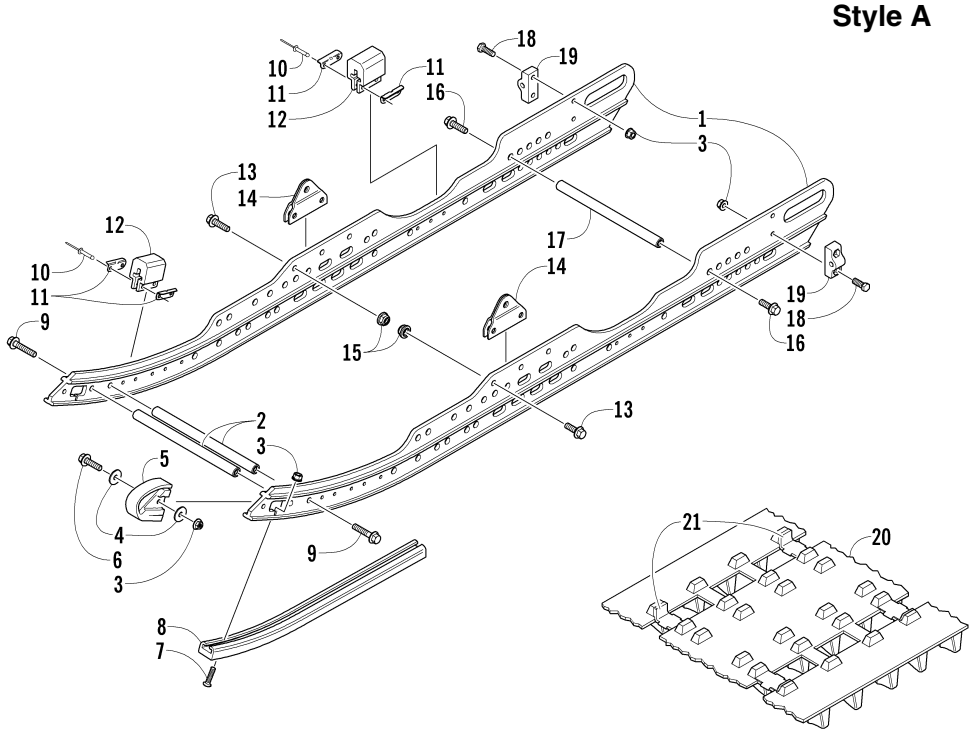
Slide Rail Schematics

■ **NOTE: Some components illustrated in this subsection may vary from actual conditions. The technician should use discretion and sound judgment when removing and installing components.**

KEY

1. Formed Rail
2. Rail Support
3. Lock Nut
4. Washer
5. End Cap
6. Cap Screw
7. Machine Screw
8. Wear Strip
9. Cap Screw
10. Rivet
11. Bracket
12. Shock Pad
13. Cap Screw
14. Bracket
15. Lock Nut
16. Cap Screw
17. Axle
18. Cap Screw
19. Adjuster
20. Track Assy
21. Wear Clip w/Guide

Style A

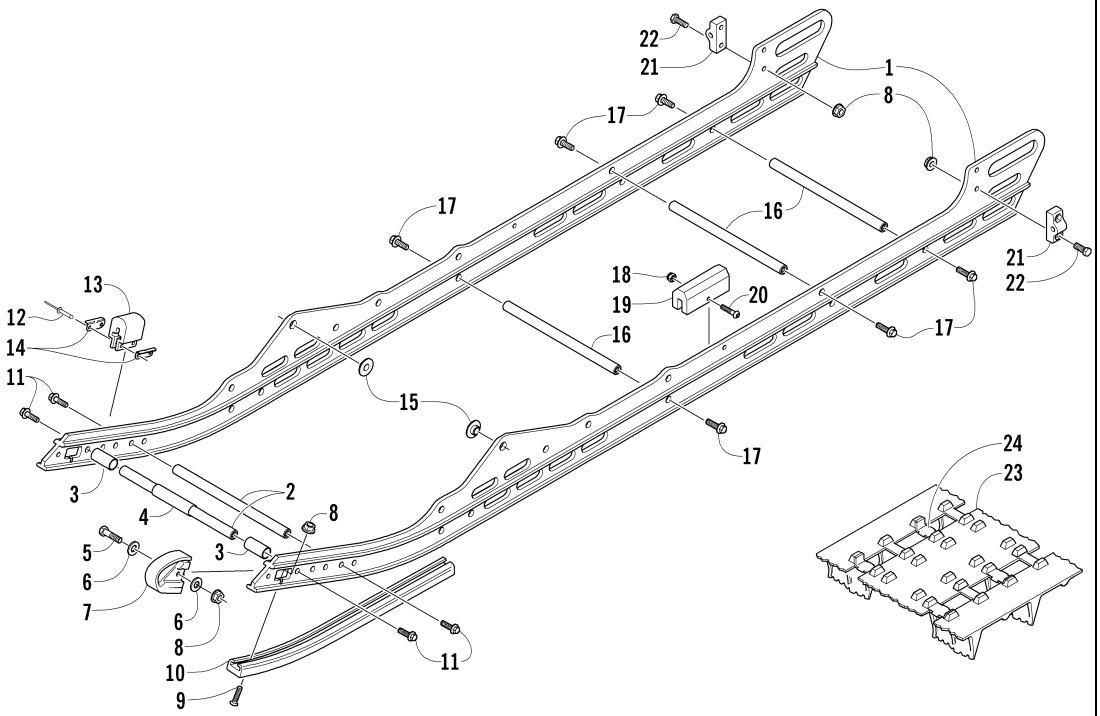


0739-432

KEY

1. Formed Rail
2. Rail Support
3. Spacer
4. Spacer
5. Cap Screw
6. Washer
7. End Cap
8. Lock Nut
9. Machine Screw
10. Wear Strip
11. Cap Screw
12. Rivet
13. Shock Pad
14. Retaining Bracket
15. Insert
16. Axle
17. Cap Screw
18. Lock Nut
19. Pad
20. Machine Screw
21. Track Adjuster
22. Cap Screw
23. Track Assy
24. Guide Clip

Style B



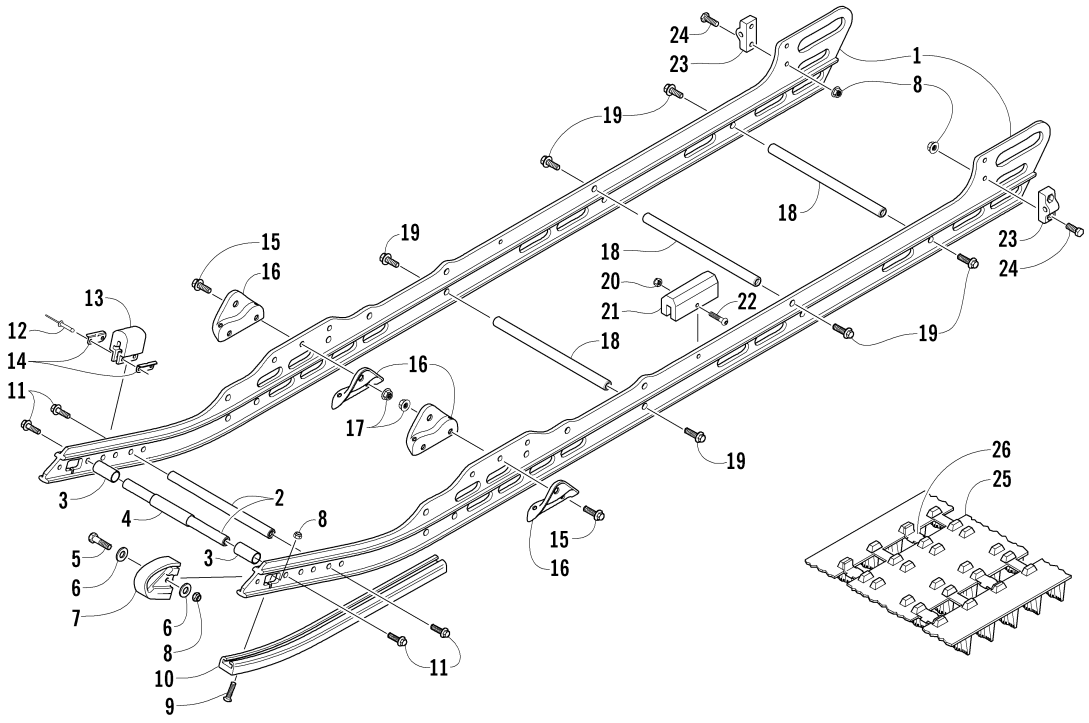
0740-024

9

Style C

KEY

1. Formed Rail - Stamped
2. Rail Support
3. Spacer
4. Spacer
5. Cap Screw
6. Washer
7. End Cap
8. Lock Nut
9. Machine Screw
10. Wear Strip
11. Cap Screw
12. Rivet
13. Shock Pad
14. Retaining Bracket
15. Cap Screw
16. Mounting Bracket
17. Lock Nut
18. Axle
19. Cap Screw
20. Lock Nut
21. Shock Pad
22. Machine Screw
23. Track Adjuster
24. Cap Screw
25. Track Assy
26. Guide Clip

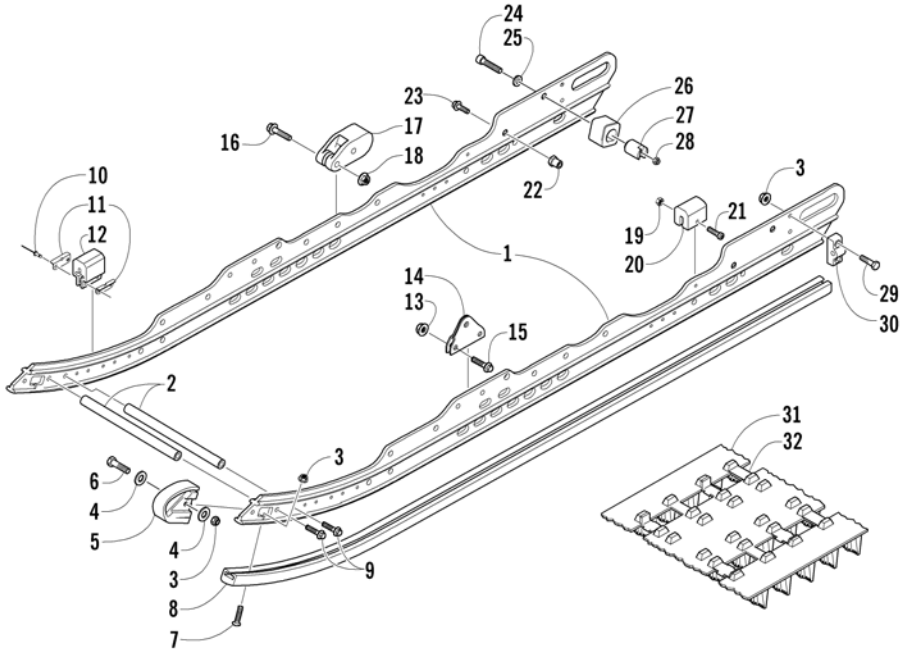


0739-702

Style D

KEY

1. Formed Rail
2. Rail Support
3. Lock Nut
4. Washer
5. End Cap
6. Cap Screw
7. Machine Screw
8. Wear Strip
9. Cap Screw
10. Rivet
11. Bracket
12. Shock Pad
13. Lock Nut
14. Bracket
15. Cap Screw
16. Cap Screw
17. Tension Block
18. Lock Nut
19. Lock Nut
20. Shock Pad
21. Machine Screw
22. Rear Arm Stop
23. Cap Screw
24. Cap Screw
25. Washer
26. Coupler Block
27. Bushing
28. Lock Nut
29. Cap Screw
30. Track Adjuster
31. Track Assy
32. Guide Clip

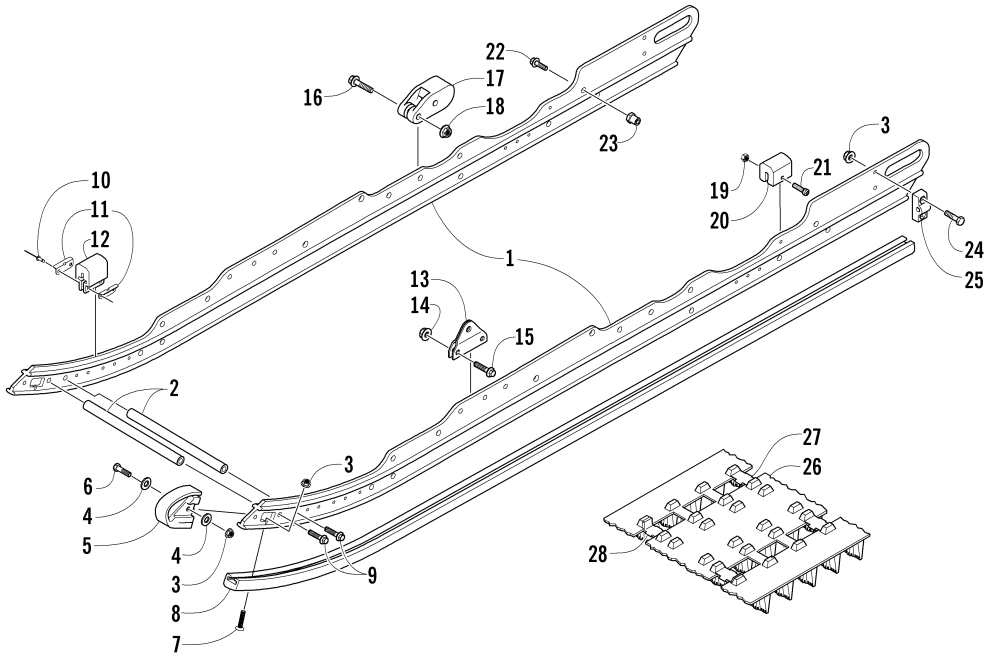


0739-484

Style E

KEY

1. Formed Rail
2. Rail Support
3. Lock Nut
4. Washer
5. End Cap
6. Cap Screw
7. Machine Screw
8. Wear Strip
9. Cap Screw
10. Rivet
11. Retaining Bracket
12. Pad
13. Mounting Bracket
14. Lock Nut
15. Cap Screw
16. Cap Screw
17. Tension Block
18. Lock Nut
19. Lock Nut
20. Pad
21. Machine Screw
22. Cap Screw
23. Arm Stop
24. Cap Screw
25. Track Adjuster
26. Track Assy
27. Wear Clip
28. Guide Clip

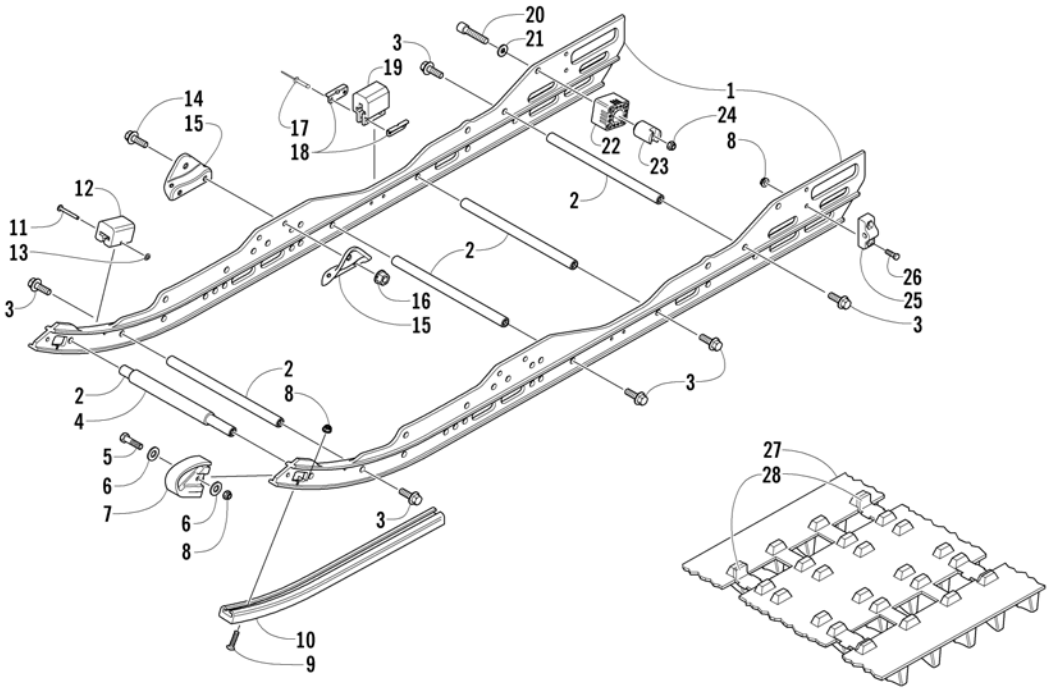


0739-509

Style F

KEY

1. Formed Rail
2. Inner Axle
3. Cap Screw
4. Spacer
5. Cap Screw
6. Washer
7. End Cap
8. Lock Nut
9. Machine Screw
10. Wear Strip
11. Solid Rivet
12. Pad
13. Push Nut
14. Cap Screw
15. Bracket
16. Lock Nut
17. Rivet
18. Bracket
19. Pad
20. Cap Screw
21. Washer
22. Coupler Block
23. Bushing
24. Lock Nut
25. Track Adjuster
26. Cap Screw
27. Track Assy
28. Guide Clip

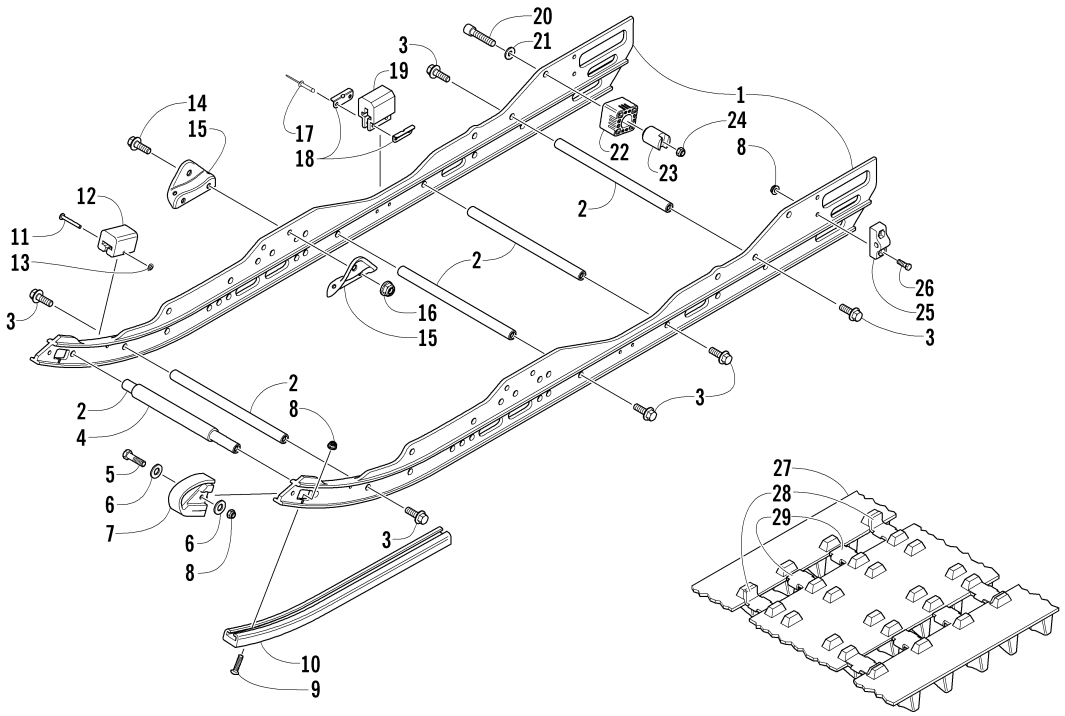


0739-681

Style G

KEY

1. Formed Rail
2. Axle
3. Cap Screw
4. Spacer
5. Cap Screw
6. Washer
7. End Cap
8. Lock Nut
9. Machine Screw
10. Wear Strip
11. Rivet
12. Pad
13. Push Nut
14. Cap Screw
15. Mounting Bracket
16. Lock Nut
17. Rivet
18. Retaining Bracket
19. Pad
20. Cap Screw
21. Washer
22. Coupler Block
23. Bushing
24. Lock Nut
25. Track Adjuster
26. Cap Screw
27. Track Assy
28. Guide Clip
29. Wear Clip

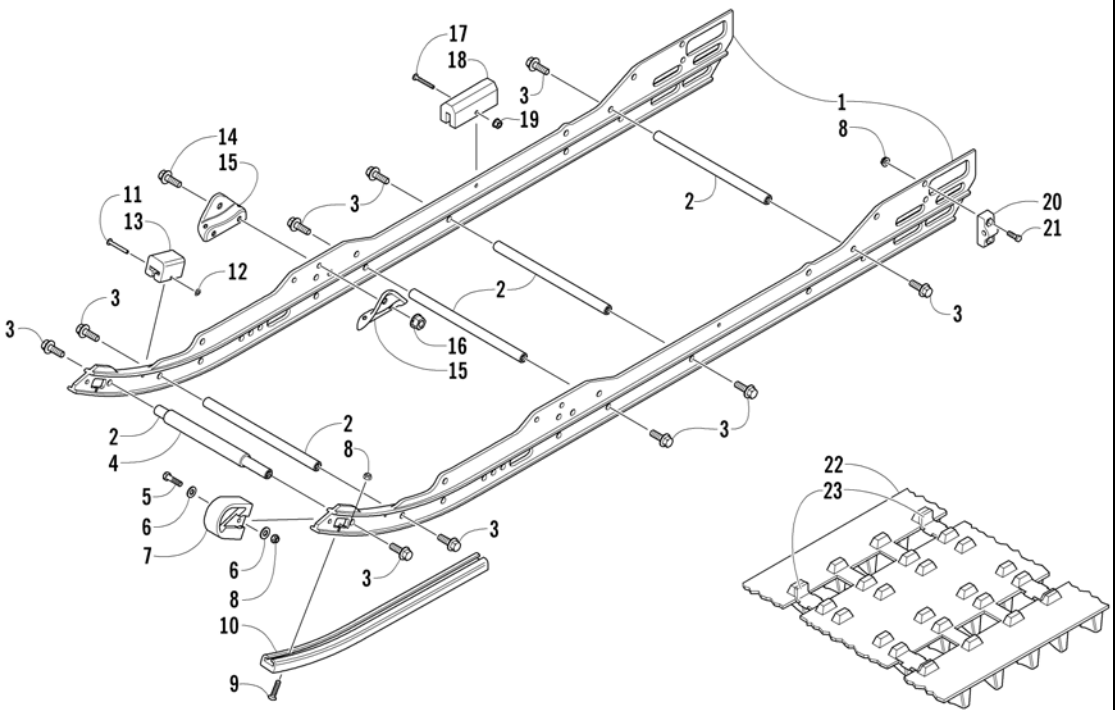


0740-790

Style H

KEY

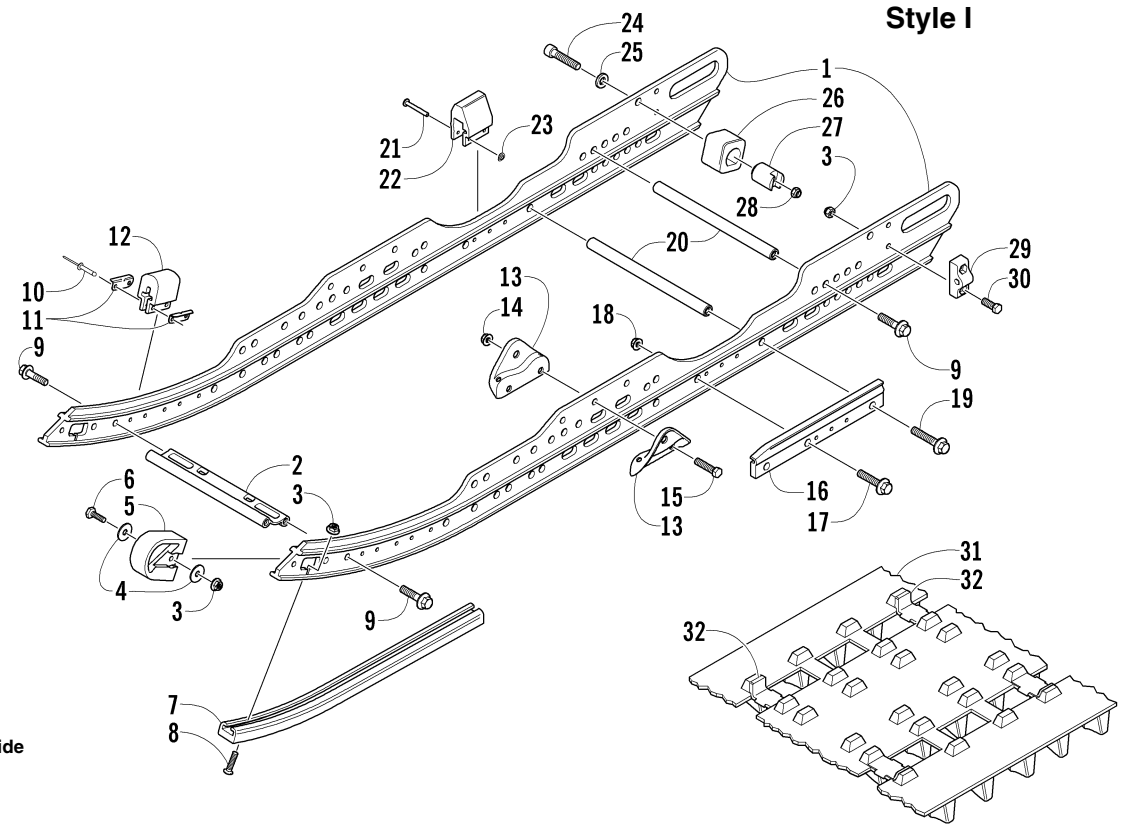
1. Formed Rail
2. Rail Support
3. Cap Screw
4. Spacer
5. Cap Screw
6. Washer
7. End Cap
8. Lock Nut
9. Machine Screw
10. Wear Strip
11. Rivet
12. Push Nut
13. Pad
14. Cap Screw
15. Mounting Bracket
16. Lock Nut
17. Machine Screw
18. Pad
19. Lock Nut
20. Track Adjuster
21. Cap Screw
22. Track Assy
23. Guide Clip



0739-683

KEY

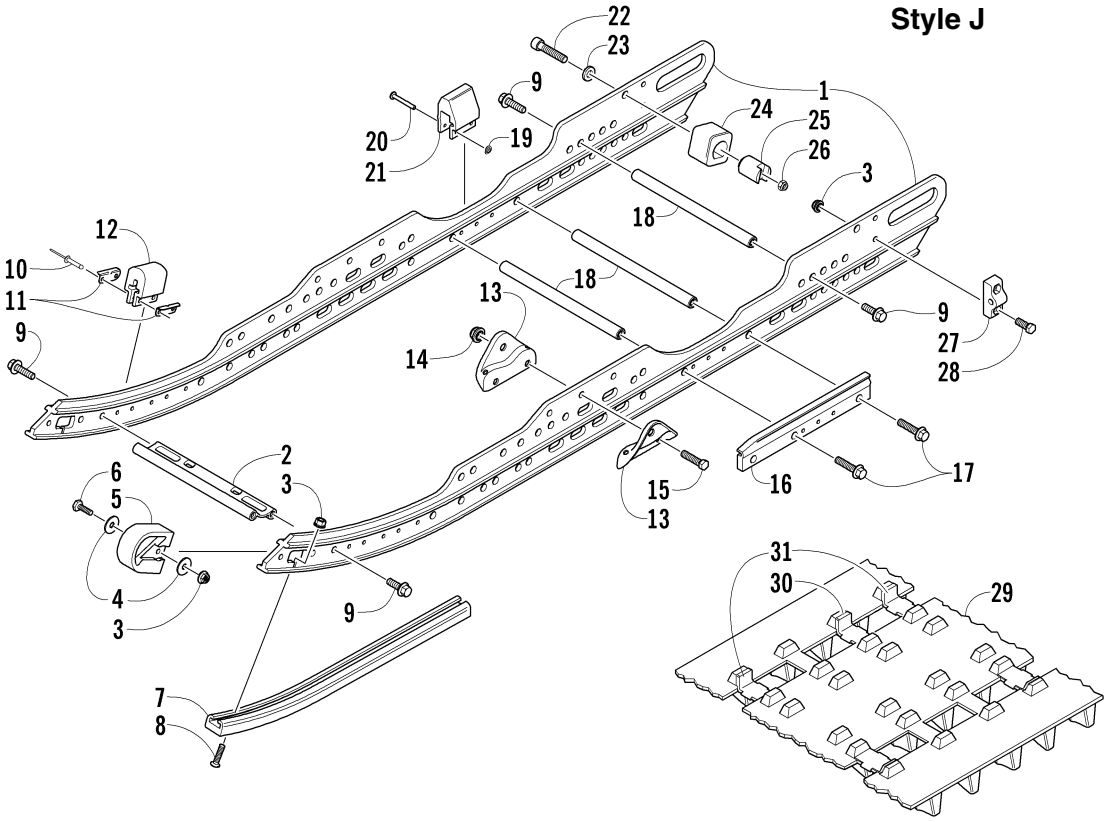
1. Formed Rail
2. Rail Support
3. Lock Nut
4. Washer
5. End Cap
6. Cap Screw
7. Wear Strip
8. Machine Screw
9. Cap Screw
10. Rivet
11. Bracket
12. Shock Pad
13. Bracket
14. Lock Nut
15. Cap Screw
16. Brace
17. Cap Screw
18. Lock Nut
19. Cap Screw
20. Axle
21. Rivet
22. Shock Pad
23. Push Nut
24. Cap Screw
25. Washer
26. Coupler Block
27. Bushing
28. Lock Nut
29. Adjuster
30. Cap Screw
31. Track Assy
32. Wear Clip w/Guide



0741-113

KEY

1. Formed Rail
2. Rail Support
3. Lock Nut
4. Washer
5. End Cap
6. Cap Screw
7. Wear Strip
8. Machine Screw
9. Cap Screw
10. Rivet
11. Retaining Bracket
12. Shock Pad
13. Mounting Bracket
14. Lock Nut
15. Cap Screw
16. Brace
17. Cap Screw
18. Axle
19. Push Nut
20. Rivet
21. Pad
22. Cap Screw
23. Washer
24. Coupler Block
25. Bushing
26. Lock Nut
27. Track Adjuster
28. Cap Screw
29. Cap Screw
30. Guide Clip
31. Wear Clip

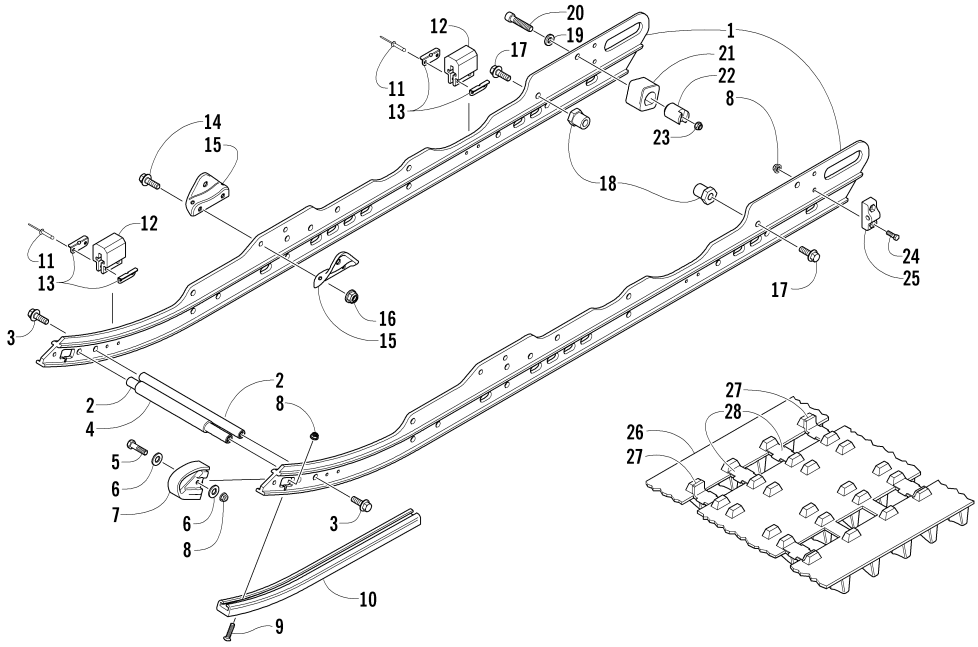


0741-144

Style K

KEY

1. Formed Rail
2. Axle
3. Cap Screw
4. Spacer
5. Cap Screw
6. Washer
7. End Cap
8. Lock Nut
9. Machine Screw
10. Wear Strip
11. Rivet
12. Pad
13. Retaining Bracket
14. Cap Screw
15. Mounting Bracket
16. Lock Nut
17. Cap Screw
18. Bushing
19. Washer
20. Cap Screw
21. Coupler Block
22. Bushing
23. Lock Nut
24. Cap Screw
25. Track Adjuster
26. Track Assy
27. Guide Clip
28. Wear Clip



0740-758

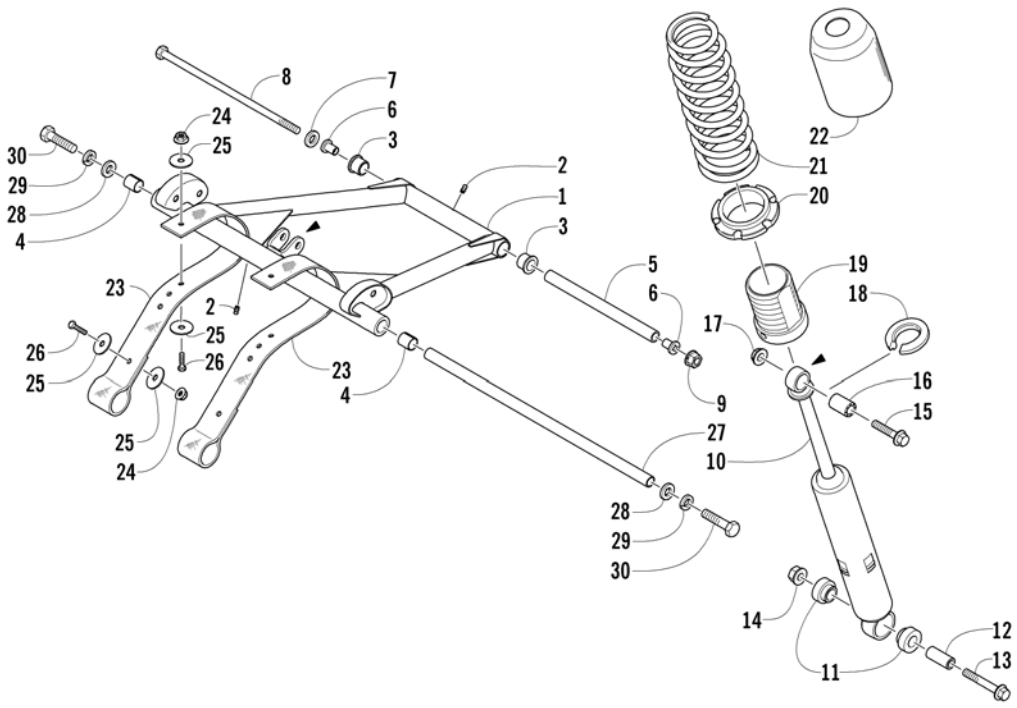
Front Arm Schematics

■ **NOTE: Some components illustrated in this subsection may vary from actual conditions. The technician should use discretion and sound judgment when removing and installing components.**

KEY

1. Front Arm
2. Grease Fitting
3. Bushing
4. Bearing
5. Axle Tube
6. Axle
7. Washer
8. Cap Screw
9. Lock Nut
10. Shock Absorber
11. Bushing
12. Axle
13. Cap Screw
14. Lock Nut
15. Cap Screw
16. Axle
17. Lock Nut
18. Retainer
19. Sleeve
20. Retainer Nut
21. Spring
22. Shock Cover
23. Limiter Strap
24. Lock Nut
25. Washer
26. Cap Screw
27. Inner Axle
28. Washer
29. Lock Washer
30. Cap Screw

Style A

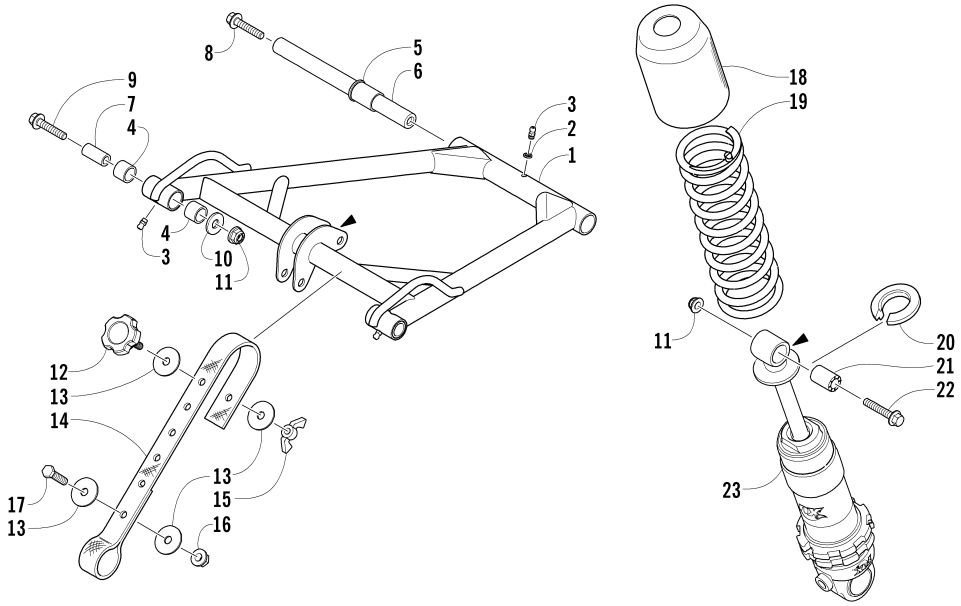


0739-434

KEY

1. Front Arm
2. Washer
3. Grease Fitting
4. Bushing
5. Bushing
6. Axle
7. Axle
8. Cap Screw
9. Cap Screw
10. Washer
11. Lock Nut
12. Adjuster Knob
13. Washer
14. Limiter Strap
15. Wing Nut
16. Lock Nut
17. Cap Screw
18. Cover
19. Spring
20. Retainer
21. Axle
22. Cap Screw
23. Shock Absorber

Style B



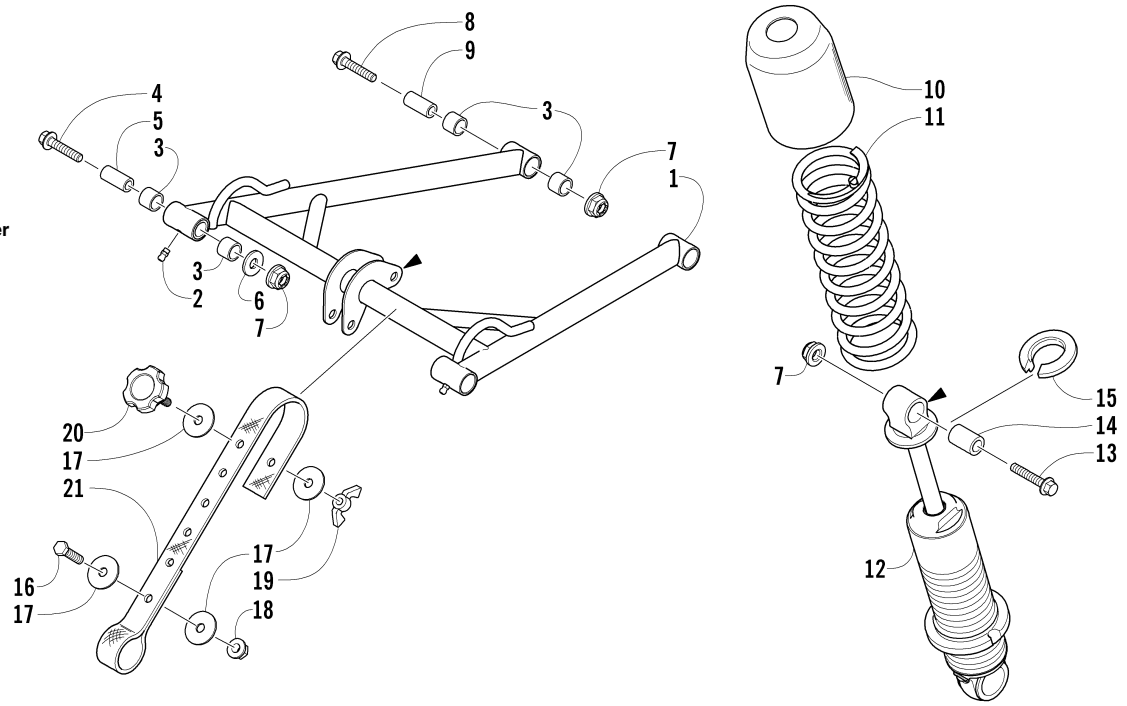
0740-343

9

Style C

KEY

1. Front Arm
2. Grease Fitting
3. Bushing
4. Cap Screw
5. Axle
6. Washer
7. Lock Nut
8. Cap Screw
9. Spacer
10. Shock Cover
11. Spring
12. Shock Absorber
13. Cap Screw
14. Axle
15. Retainer
16. Cap Screw
17. Washer
18. Lock Nut
19. Wing Nut
20. Adjuster Knob
21. Limiter Strap

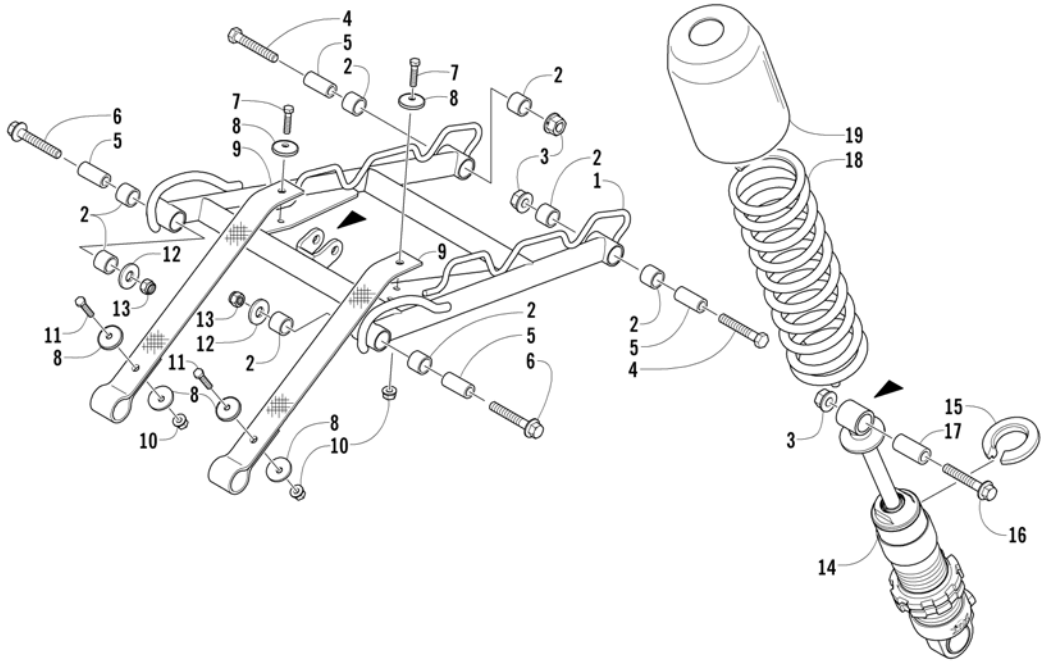


0740-954

Style D

KEY

1. Front Arm
2. Bushing
3. Lock Nut
4. Cap Screw
5. Spacer
6. Cap Screw
7. Cap Screw
8. Washer
9. Limiter Strap
10. Lock Nut
11. Cap Screw
12. Washer
13. Lock Nut
14. Shock Absorber
15. Retainer
16. Cap Screw
17. Axle
18. Spring
19. Cover

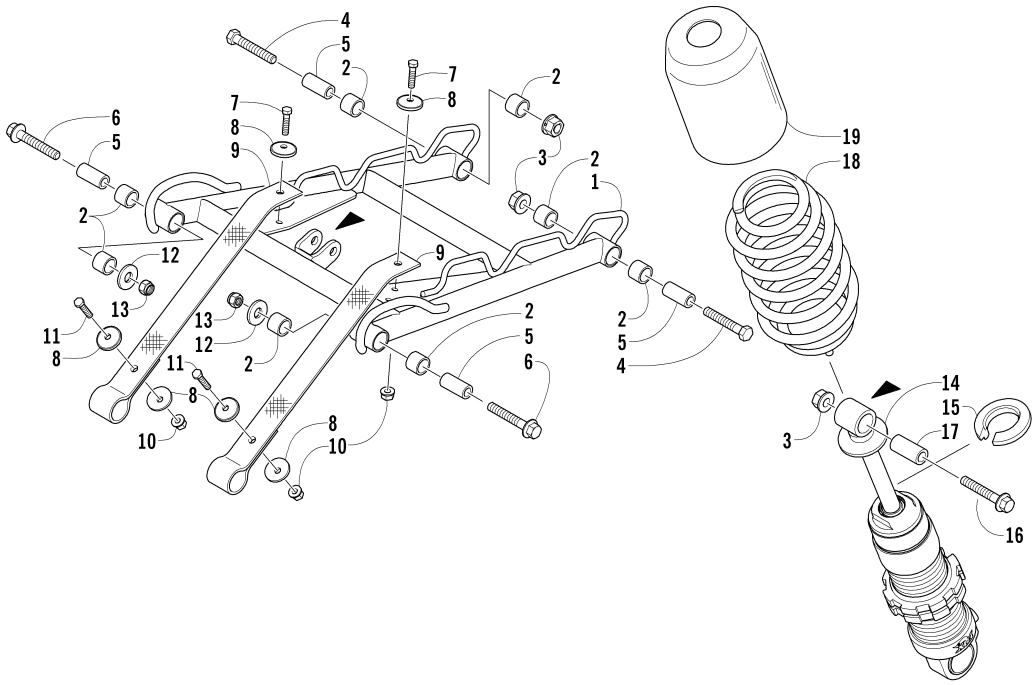


0740-548

Style E

KEY

1. Front Arm
2. Bushing
3. Lock Nut
4. Cap Screw
5. Spacer
6. Cap Screw
7. Cap Screw
8. Washer
9. Limiter Strap
10. Lock Nut
11. Cap Screw
12. Washer
13. Lock Nut
14. Shock Absorber
15. Retainer
16. Cap Screw
17. Axle
18. Spring
19. Cover

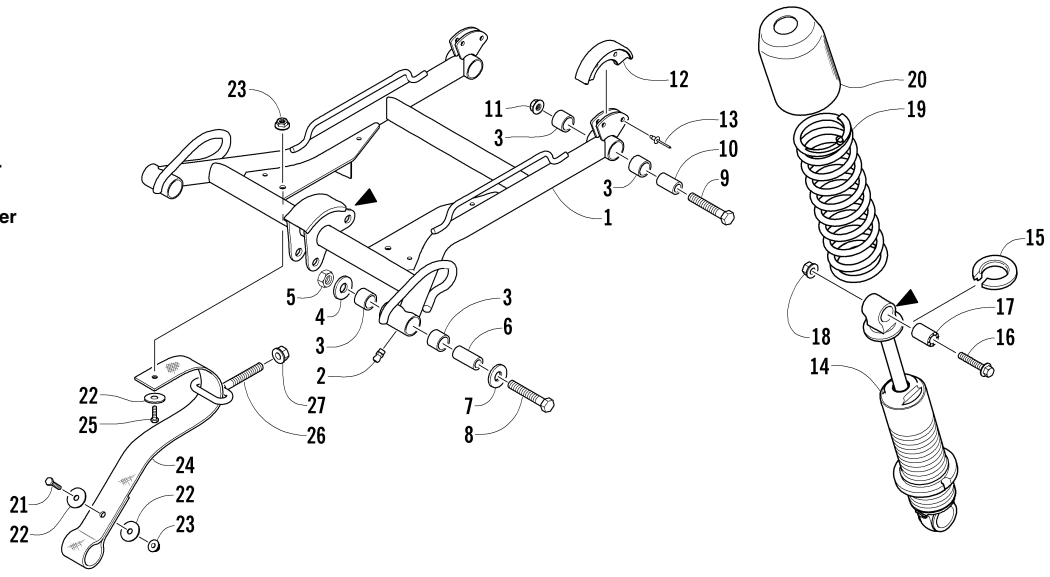


0740-742

Style F

KEY

1. Front Arm
2. Grease Fitting
3. Bushing
4. Washer
5. Lock Nut
6. Axle
7. Washer
8. Cap Screw
9. Cap Screw
10. Spacer
11. Lock Nut
12. Guide Bumper
13. Rivet
14. Shock Absorber
15. Retainer
16. Cap Screw
17. Axle
18. Lock Nut
19. Spring
20. Shock Cover
21. Cap Screw
22. Washer
23. Lock Nut
24. Limiter Strap
25. Cap Screw
26. Adjuster
27. Lock Nut



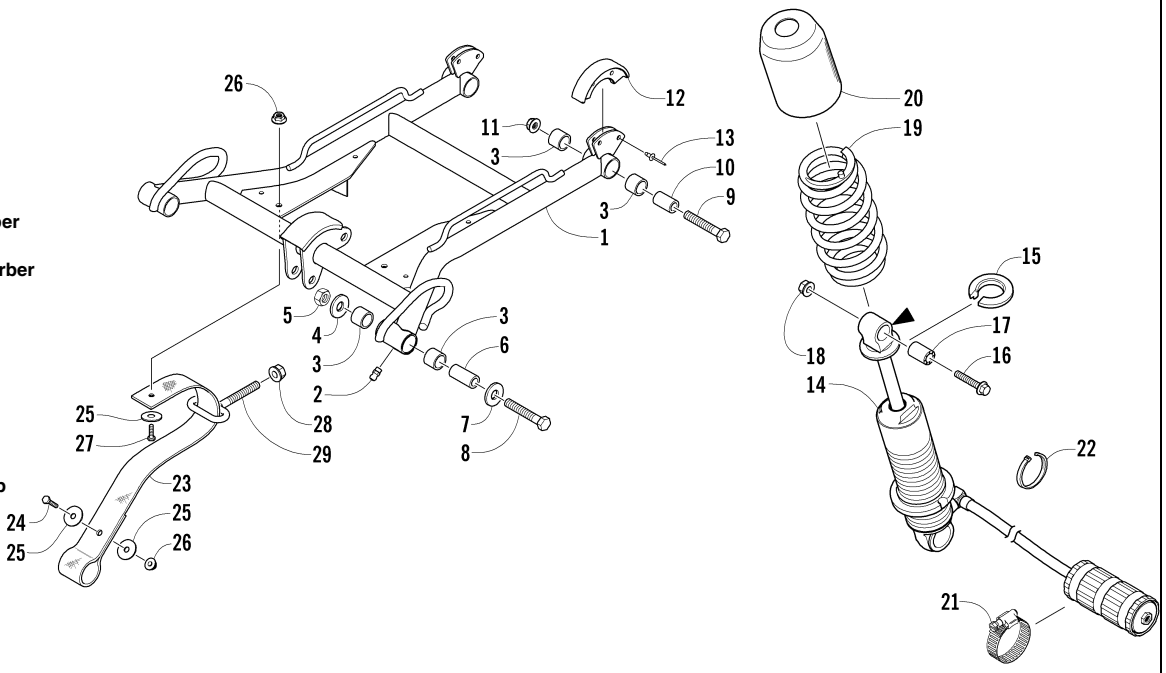
0739-607

9

Style G

KEY

1. Front Arm
2. Grease Fitting
3. Bushing
4. Washer
5. Lock Nut
6. Axle
7. Washer
8. Cap Screw
9. Cap Screw
10. Spacer
11. Lock Nut
12. Guide Bumper
13. Rivet
14. Shock Absorber
15. Retainer
16. Cap Screw
17. Axle
18. Lock Nut
19. Spring
20. Cover
21. Clamp
22. Cable Tie
23. Limiter Strap
24. Cap Screw
25. Washer
26. Lock Nut
27. Cap Screw
28. Lock Nut
29. Adjuster

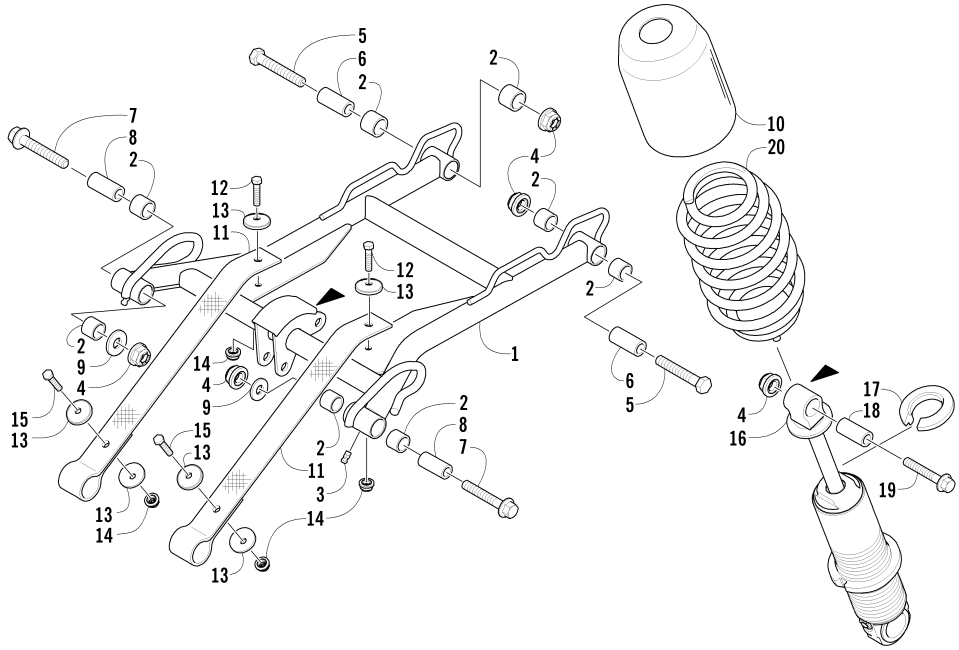


0739-632

Style H

KEY

1. Front Arm
2. Bushing
3. Grease Fitting
4. Lock Nut
5. Cap Screw
6. Spacer
7. Cap Screw
8. Axle
9. Washer
10. Cover
11. Limiter Strap
12. Cap Screw
13. Washer
14. Lock Nut
15. Cap Screw
16. Shock Absorber
17. Retainer
18. Axle
19. Cap Screw
20. Spring



0740-761

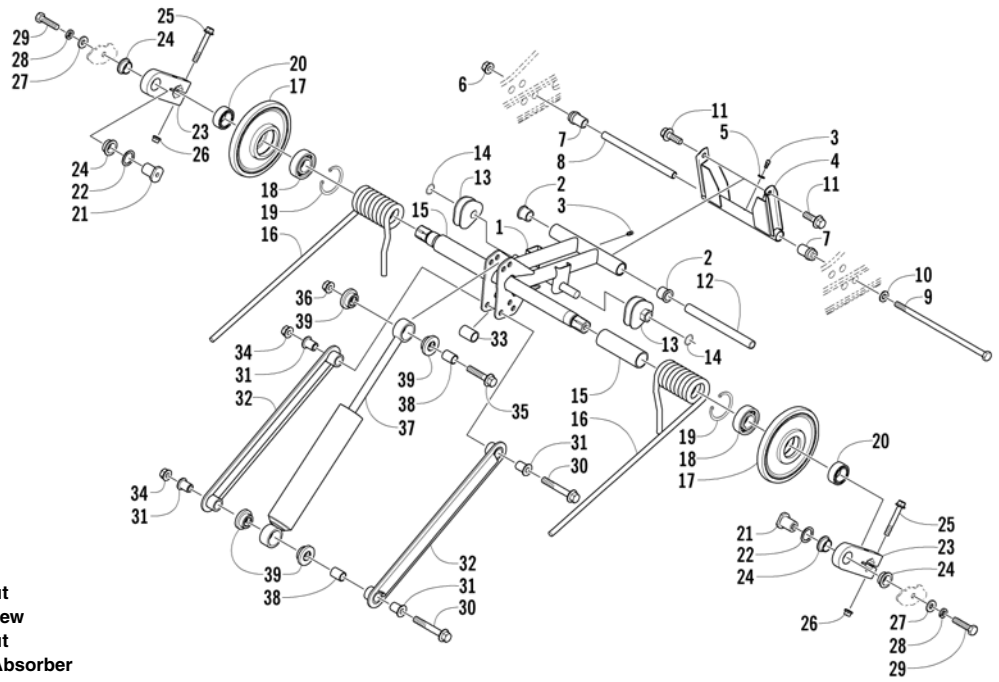
Rear Arm Schematics

■ **NOTE: Some components illustrated in this subsection may vary from actual conditions. The technician should use discretion and sound judgment when removing and installing components.**

Style A

KEY

1. Idler Arm
2. Bushing
3. Grease Fitting
4. Rear Arm
5. Washer
6. Lock Nut
7. Bushing
8. Axle Tube
9. Cap Screw
10. Washer
11. Cap Screw
12. Axle
13. Adjuster Block
14. Ring
15. Sleeve
16. Spring
17. Idler Wheel
18. Bearing
19. Ring
20. Spacer
21. Axle
22. Washer
23. Pivot Arm
24. Bushing
25. Cap Screw
26. Lock Nut
27. Washer
28. Lock Washer
29. Cap Screw
30. Cap Screw
31. Axle
32. Link
33. Spacer
34. Lock Nut
35. Cap Screw
36. Lock Nut
37. Shock Absorber
38. Sleeve
39. Bushing

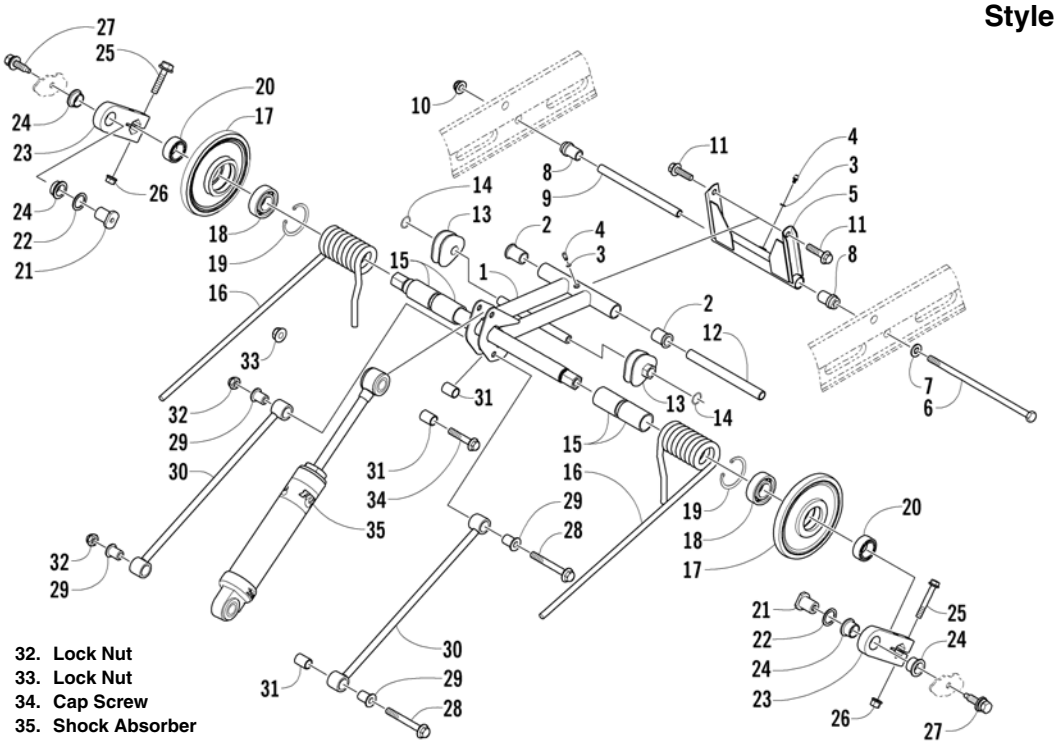


0739-927

Style B

KEY

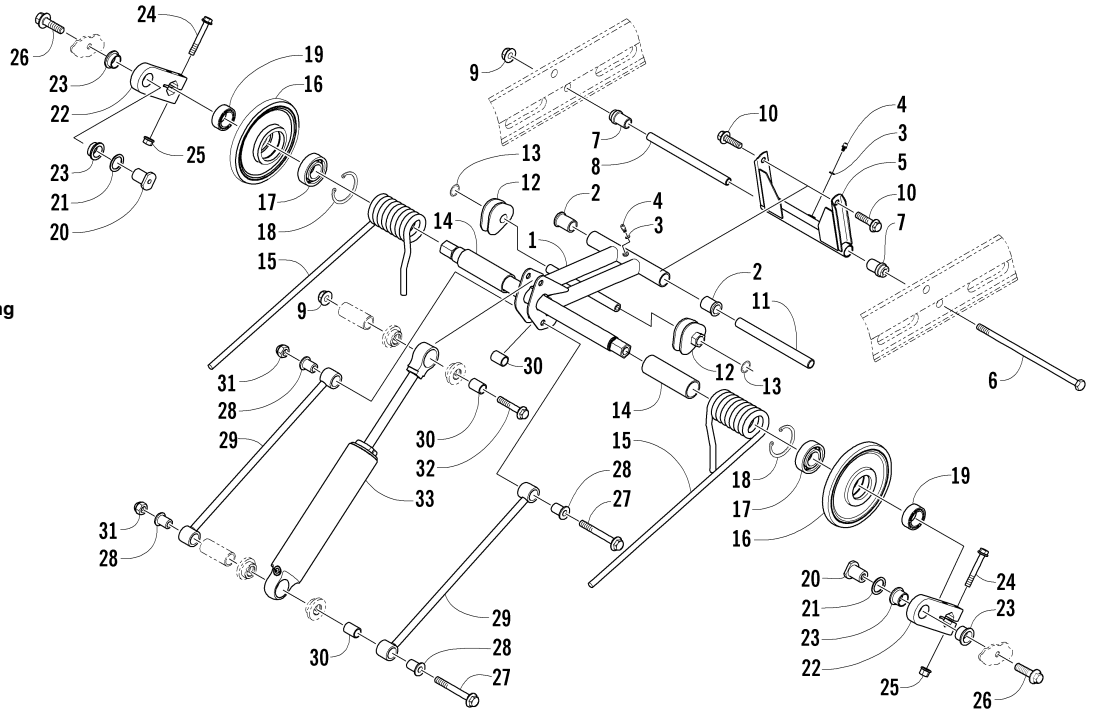
1. Idler Arm
2. Bushing
3. Washer
4. Grease Fitting
5. Rear Arm
6. Cap Screw
7. Washer
8. Bushing
9. Axle Tube
10. Lock Nut
11. Cap Screw
12. Axle
13. Adjuster Block
14. Ring
15. Sleeve
16. Spring
17. Idler Wheel
18. Bearing
19. Ring
20. Spacer
21. Axle
22. Washer
23. Pivot Arm
24. Bushing
25. Cap Screw
26. Lock Nut
27. Cap Screw
28. Cap Screw
29. Axle
30. Link
31. Sleeve
32. Lock Nut
33. Lock Nut
34. Cap Screw
35. Shock Absorber



0739-842

Style C

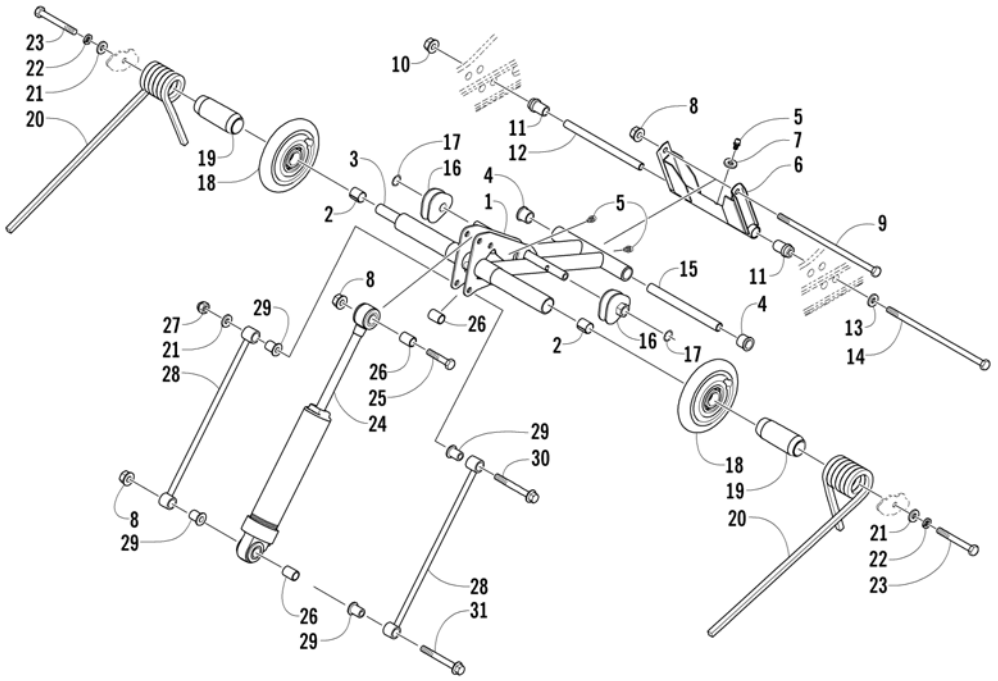
KEY
1. Idler Arm
2. Bushing
3. Washer
4. Grease Fitting
5. Rear Arm
6. Cap Screw
7. Bushing
8. Axle Tube
9. Lock Nut
10. Cap Screw
11. Axle
12. Spring Block
13. Retaining Ring
14. Sleeve
15. Suspension Spring
16. Idler Wheel
17. Bearing
18. Retaining Ring
19. Spacer
20. Axle
21. Washer
22. Pivot Idler Arm
23. Bushing
24. Cap Screw
25. Lock Nut
26. Cap Screw
27. Cap Screw
28. Link Axle
29. Link
30. Sleeve
31. Lock Nut
32. Cap Screw
33. Shock Absorber



0739-558

Style D

KEY
1. Idler Arm
2. Bearing
3. Axle
4. Bushing
5. Grease Fitting
6. Rear Arm
7. Washer
8. Lock Nut
9. Cap Screw
10. Lock Nut
11. Bushing
12. Axle Tube
13. Washer
14. Cap Screw
15. Axle
16. Adjuster Block
17. Retaining Ring
18. Idler Wheel
19. Sleeve
20. Suspension Spring
21. Washer
22. Lock Washer
23. Cap Screw
24. Shock Absorber
25. Cap Screw
26. Sleeve
27. Lock Nut
28. Link
29. Link Axle
30. Cap Screw
31. Cap Screw

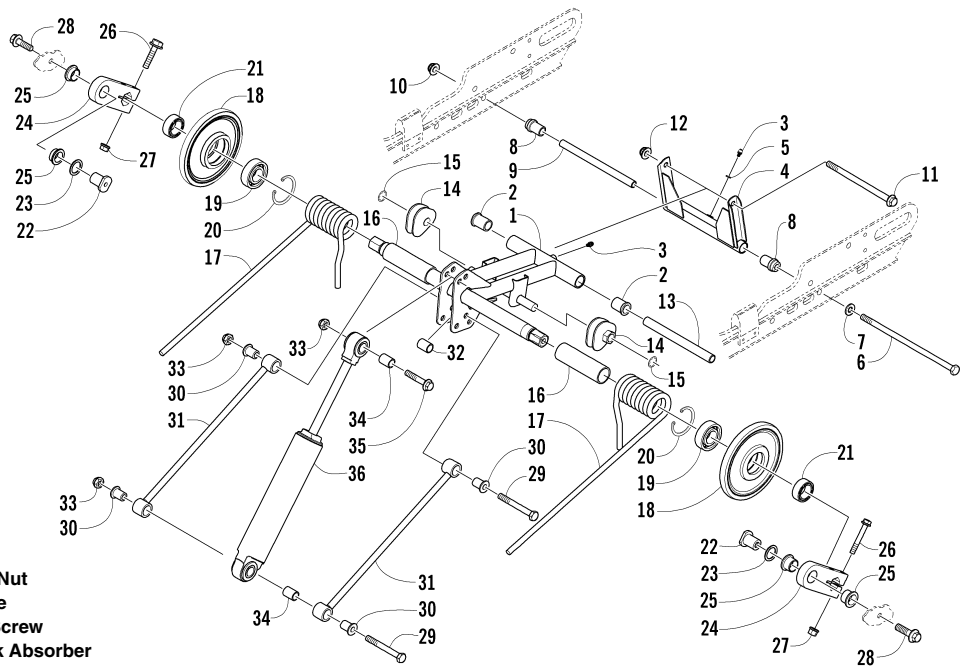


0740-552

Style E

KEY

1. Idler Arm
2. Bushing
3. Grease Fitting
4. Rear Arm
5. Washer
6. Cap Screw
7. Washer
8. Bushing
9. Axle Tube
10. Lock Nut
11. Cap Screw
12. Lock Nut
13. Axle
14. Adjuster Block
15. Retaining Ring
16. Sleeve
17. Suspension Spring
18. Idler Wheel
19. Bearing
20. Retaining Ring
21. Spacer
22. Axle
23. Washer
24. Pivot Arm
25. Bushing
26. Cap Screw
27. Lock Nut
28. Cap Screw
29. Cap Screw
30. Link Axle
31. Link
32. Spacer
33. Lock Nut
34. Sleeve
35. Cap Screw
36. Shock Absorber

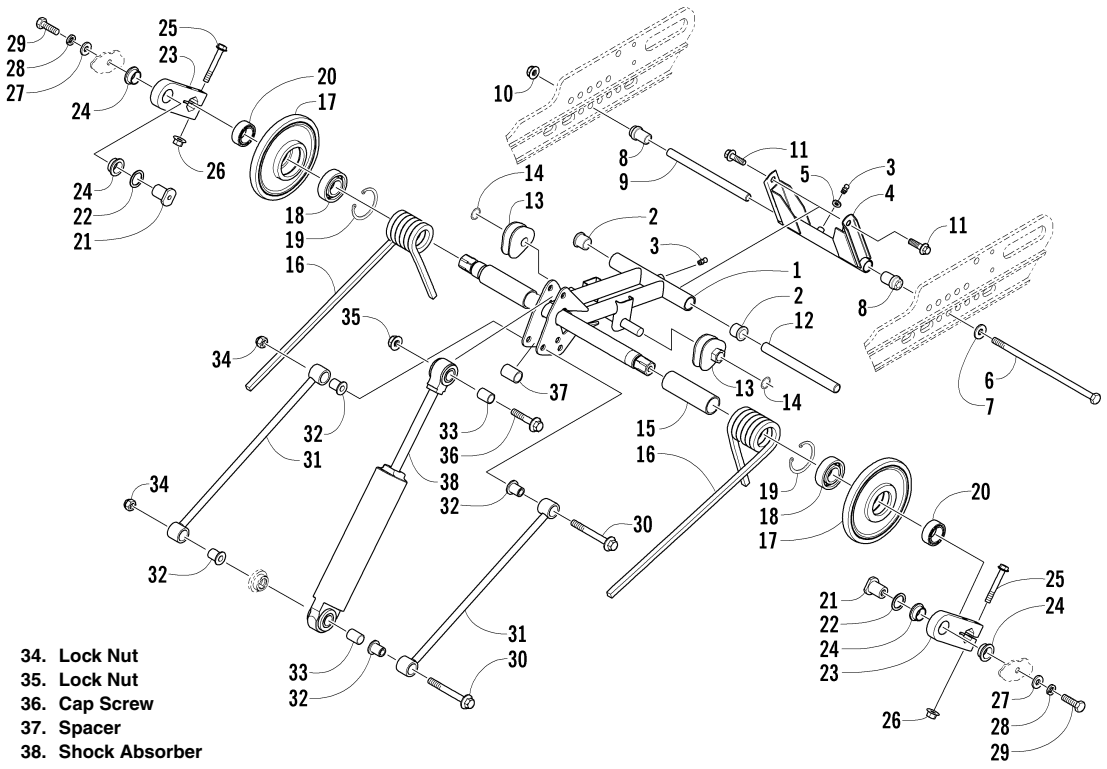


0740-762

Style F

KEY

1. Idler Arm
2. Bushing
3. Grease Fitting
4. Rear Arm
5. Washer
6. Cap Screw
7. Washer
8. Bushing
9. Axle Tube
10. Lock Nut
11. Cap Screw
12. Axle
13. Adjuster Block
14. Ring
15. Sleeve
16. Spring
17. Idler Wheel
18. Bearing
19. Ring
20. Spacer
21. Axle
22. Washer
23. Pivot Arm
24. Bushing
25. Cap Screw
26. Lock Nut
27. Washer
28. Lock Washer
29. Cap Screw
30. Cap Screw
31. Link
32. Axle
33. Sleeve
34. Lock Nut
35. Lock Nut
36. Cap Screw
37. Spacer
38. Shock Absorber



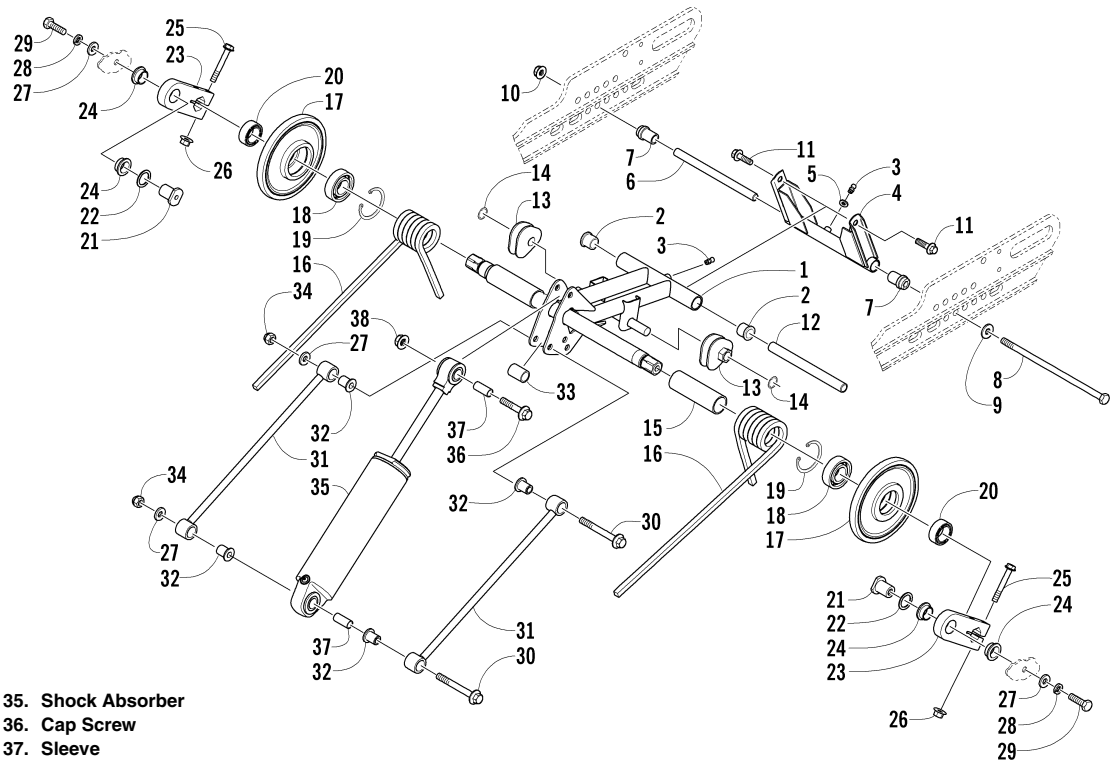
0739-608

9

Style G

KEY

1. Idler Arm
2. Bushing
3. Grease Fitting
4. Rear Arm
5. Washer
6. Axle Tube
7. Bushing
8. Cap Screw
9. Washer
10. Lock Nut
11. Cap Screw
12. Axle
13. Adjuster Block
14. Ring
15. Sleeve
16. Spring
17. Idler Wheel
18. Bearing
19. Ring
20. Spacer
21. Axle
22. Washer
23. Pivot Arm
24. Bushing
25. Cap Screw
26. Lock Nut
27. Washer
28. Lock Washer
29. Cap Screw
30. Cap Screw
31. Link
32. Axle
33. Spacer
34. Lock Nut
35. Shock Absorber
36. Cap Screw
37. Sleeve
38. Lock Nut



0739-634

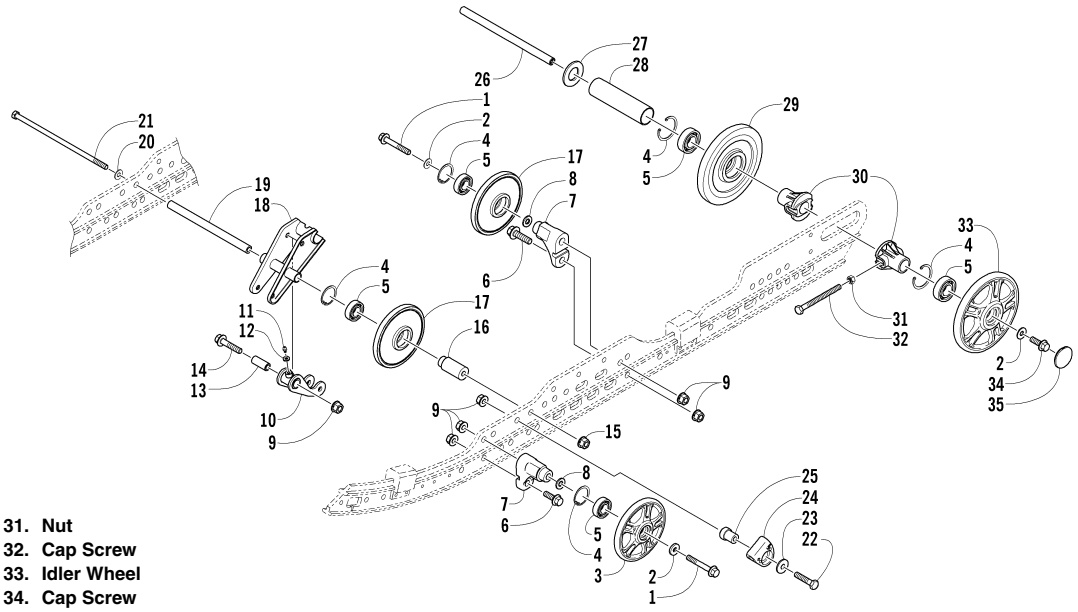
Idler Wheels Schematics

■ **NOTE: Some components illustrated in this subsection may vary from actual conditions. The technician should use discretion and sound judgment when removing and installing components.**

Style A

KEY

1. Cap Screw
2. Washer
3. Idler Wheel
4. Retaining Ring
5. Bearing
6. Cap Screw
7. Mounting Block
8. Washer
9. Lock Nut
10. Pivot
11. Grease Fitting
12. Washer
13. Axle
14. Cap Screw
15. Lock Nut
16. Mounting Block
17. Idler Wheel
18. Mounting Bracket
19. Axle
20. Washer
21. Cap Screw
22. Cap Screw
23. Washer
24. Spring Slide
25. Slide Block
26. Axle
27. Washer
28. Spacer
29. Idler Wheel
30. Bushing
31. Nut
32. Cap Screw
33. Idler Wheel
34. Cap Screw
35. Cap

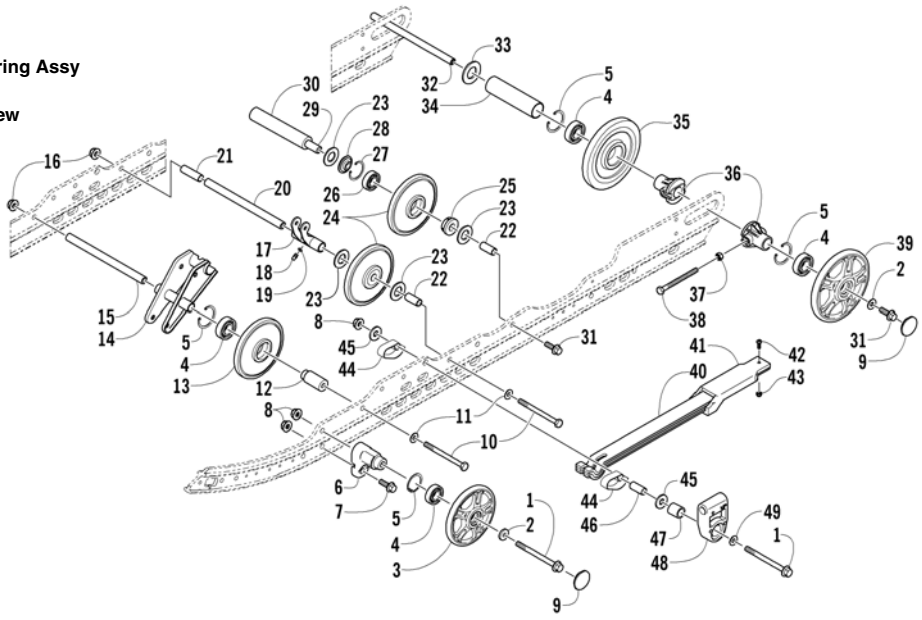


0740-372

Style B

KEY

1. Cap Screw
2. Washer
3. Idler Wheel
4. Bearing
5. Retaining Ring
6. Mounting Block
7. Cap Screw
8. Lock Nut
9. Cap
10. Cap Screw
11. Washer
12. Mounting Block
13. Idler Wheel
14. Bracket
15. Axle
16. Lock Nut
17. Pivot
18. Grease Fitting
19. Washer
20. Axle
21. Spacer
22. Spacer
23. Washer
24. Idler Wheel
25. Insert
26. Bearing
27. Retaining Ring
28. Insert
29. Axle
30. Spacer
31. Cap Screw
32. Axle
33. Washer
34. Spacer
35. Idler Wheel
36. Adjuster Bushing
37. Nut
38. Cap Screw
39. Idler Wheel
40. Overload Spring Assy
41. Wear Block
42. Machine Screw
43. Lock Nut
44. Retaining Clip
45. Washer
46. Bushing
47. Spacer
48. Spring Slide
49. Washer

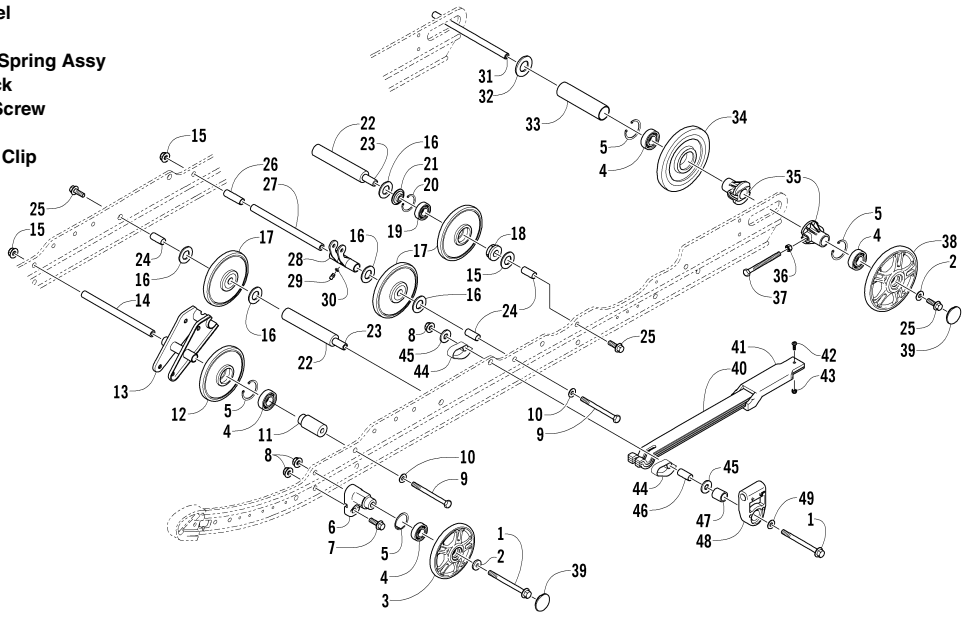


0740-443

Style C

KEY

1. Cap Screw
2. Washer
3. Idler Wheel
4. Bearing
5. Retaining Ring
6. Mounting Block
7. Cap Screw
8. Lock Nut
9. Cap Screw
10. Washer
11. Mounting Block
12. Idler Wheel
13. Bracket
14. Axle
15. Lock Nut
16. Washer
17. Idler Wheel
18. Insert
19. Bearing
20. Retaining Ring
21. Insert
22. Spacer
23. Axle
24. Spacer
25. Cap Screw
26. Spacer
27. Axle
28. Pivot
29. Grease Fitting
30. Washer
31. Axle
32. Washer
33. Spacer
34. Idler Wheel
35. Adjuster Bushing
36. Nut
37. Cap Screw
38. Idler Wheel
39. Cap
40. Overload Spring Assy
41. Wear Block
42. Machine Screw
43. Lock Nut
44. Retaining Clip
45. Washer
46. Bushing
47. Spacer
48. Spring Slide
49. Washer

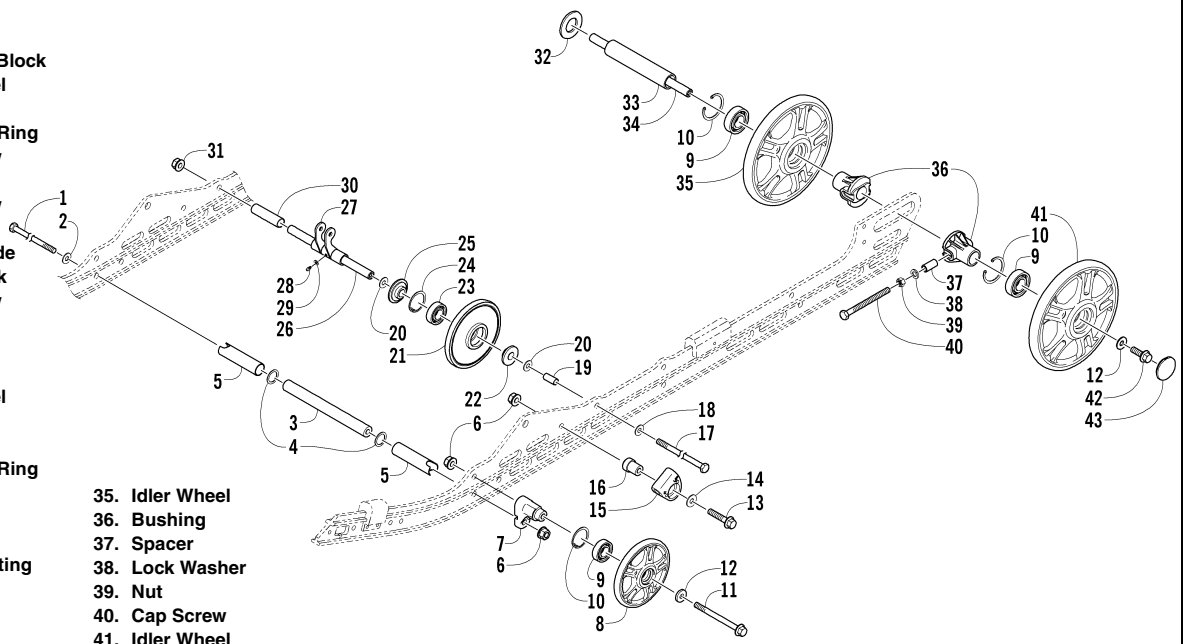


0740-428

Style D

KEY

1. Cap Screw
2. Washer
3. Axle
4. Washer
5. Spacer
6. Lock Nut
7. Mounting Block
8. Idler Wheel
9. Bearing
10. Retaining Ring
11. Cap Screw
12. Washer
13. Cap Screw
14. Washer
15. Spring Slide
16. Slide Block
17. Cap Screw
18. Washer
19. Spacer
20. Washer
21. Idler Wheel
22. Insert
23. Bearing
24. Retaining Ring
25. Insert
26. Axle
27. Pivot
28. Grease Fitting
29. Washer
30. Spacer
31. Lock Nut
32. Washer
33. Spacer
34. Axle
35. Idler Wheel
36. Bushing
37. Spacer
38. Lock Washer
39. Nut
40. Cap Screw
41. Idler Wheel
42. Cap Screw
43. Cap

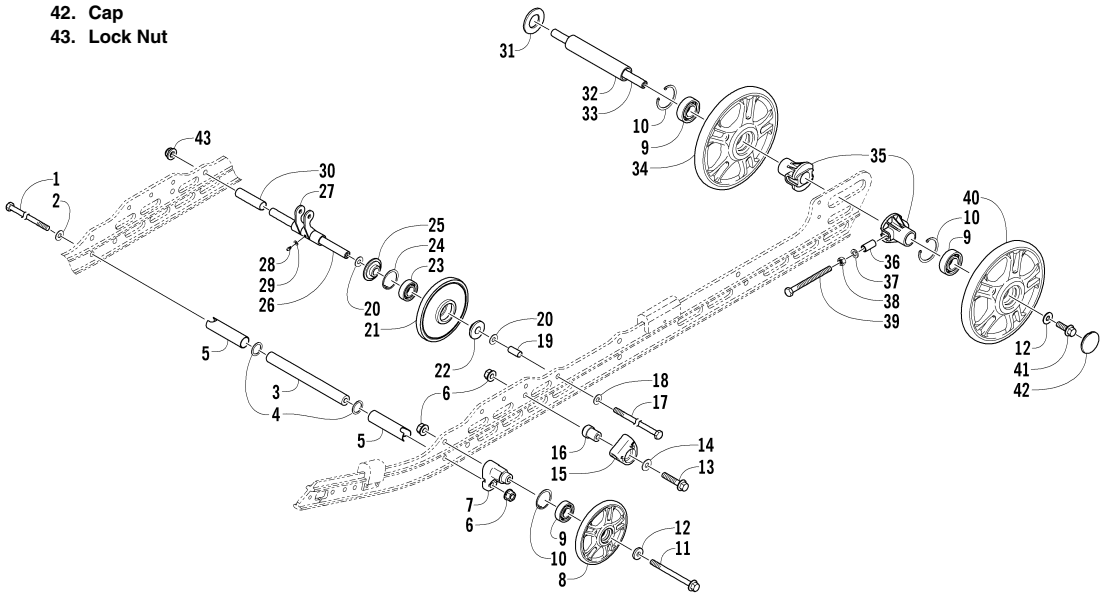


0739-826

Style E

KEY

1. Cap Screw
2. Washer
3. Axle
4. Washer
5. Spacer
6. Lock Nut
7. Mounting Block
8. Idler Wheel
9. Bearing
10. Retaining Ring
11. Cap Screw
12. Washer
13. Cap Screw
14. Washer
15. Spring Slide
16. Slide Block
17. Cap Screw
18. Washer
19. Spacer
20. Washer
21. Idler Wheel
22. Insert
23. Bearing
24. Retaining Ring
25. Insert
26. Axle
27. Pivot
28. Grease Fitting
29. Washer
30. Spacer
31. Washer
32. Spacer
33. Axle
34. Idler Wheel
35. Bushing
36. Spacer
37. Lock Washer
38. Nut
39. Cap Screw
40. Idler Wheel
41. Cap Screw
42. Cap
43. Lock Nut

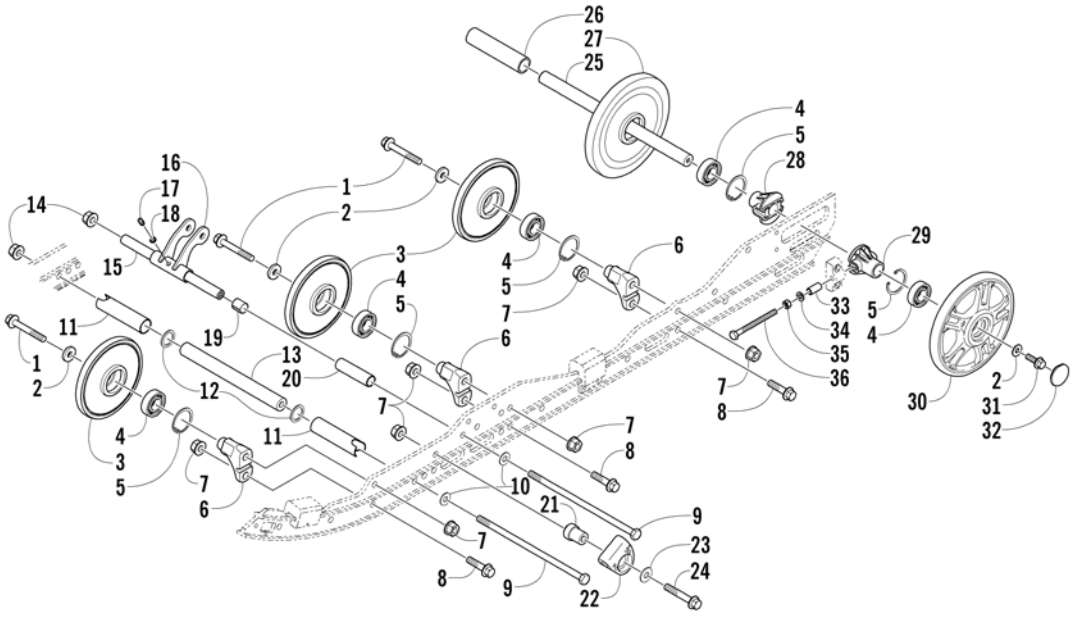


0740-953

Style F

KEY

1. Cap Screw
2. Washer
3. Idler Wheel
4. Bearing
5. Retaining Ring
6. Mounting Block
7. Lock Nut
8. Cap Screw
9. Cap Screw
10. Washer
11. Spacer
12. Washer
13. Axle
14. Lock Nut
15. Axle
16. Pivot
17. Grease Fitting
18. Washer
19. Bearing
20. Spacer
21. Slide Block
22. Spring Slide
23. Washer
24. Cap Screw
25. Axle
26. Spacer
27. Idler Wheel
28. Adjuster Bushing
29. Adjuster Bushing
30. Idler Wheel
31. Cap Screw
32. Cap
33. Spacer
34. Lock Washer
35. Nut
36. Cap Screw

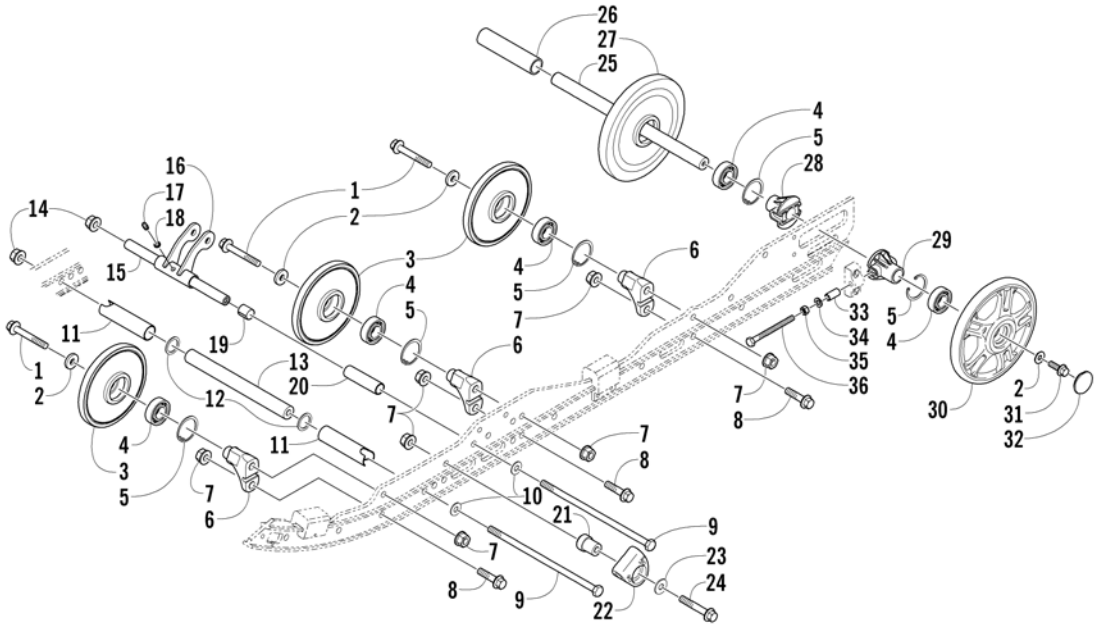


0739-830

Style G

KEY

1. Cap Screw
2. Washer
3. Idler Wheel
4. Bearing
5. Retaining Ring
6. Mounting Block
7. Lock Nut
8. Cap Screw
9. Cap Screw
10. Washer
11. Spacer
12. Washer
13. Axle
14. Lock Nut
15. Axle
16. Pivot
17. Grease Fitting
18. Washer
19. Bearing
20. Spacer
21. Slide Block
22. Spring Slide
23. Washer
24. Cap Screw
25. Axle
26. Spacer
27. Idler Wheel
28. Bushing
29. Bushing
30. Idler Wheel
31. Cap Screw
32. Cap
33. Spacer
34. Lock Washer
35. Nut
36. Cap Screw

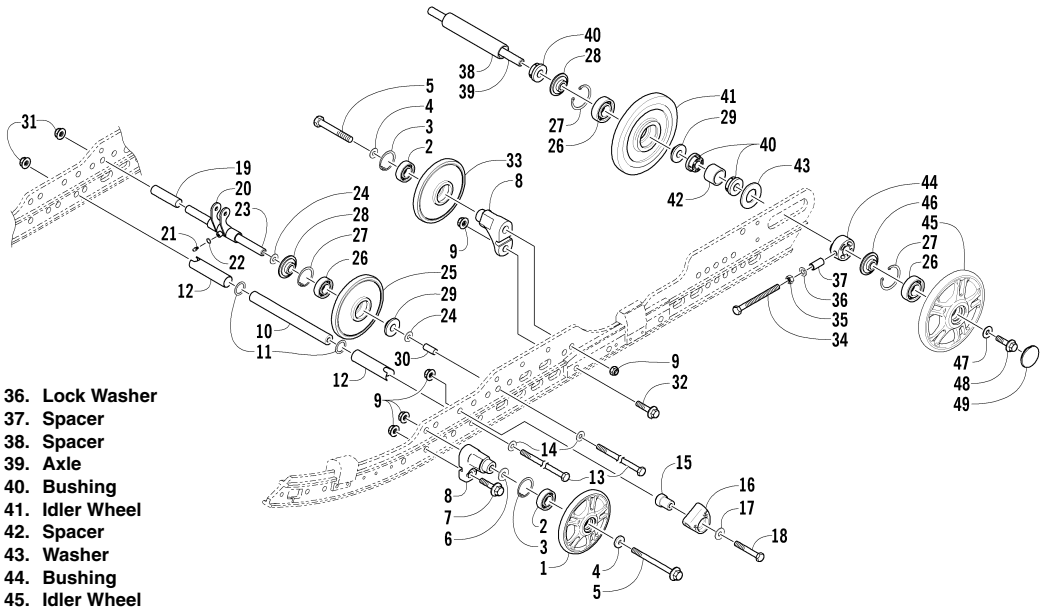


0739-830

Style H

KEY

1. Idler Wheel
2. Bearing
3. Retaining Ring
4. Washer
5. Cap Screw
6. Washer
7. Cap Screw
8. Mounting Block
9. Lock Nut
10. Axle
11. Washer
12. Spacer
13. Cap Screw
14. Washer
15. Slide Block
16. Spring Slide
17. Washer
18. Cap Screw
19. Spacer
20. Pivot
21. Grease Fitting
22. Washer
23. Axle
24. Washer
25. Idler Wheel
26. Bearing
27. Retaining Ring
28. Insert
29. Insert
30. Spacer
31. Lock Nut
32. Cap Screw
33. Idler Wheel
34. Cap Screw
35. Nut
36. Lock Washer
37. Spacer
38. Spacer
39. Axle
40. Bushing
41. Idler Wheel
42. Spacer
43. Washer
44. Bushing
45. Idler Wheel
46. Insert
47. Washer
48. Cap Screw
49. Cap

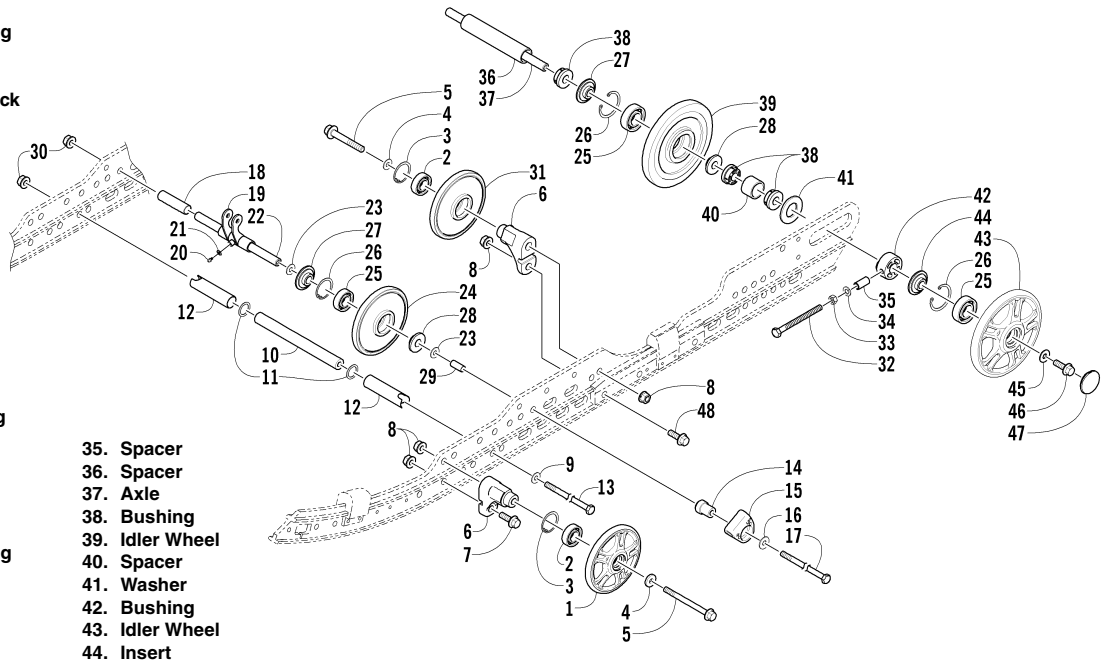


0739-606

Style I

KEY

1. Idler Wheel
2. Bearing
3. Retaining Ring
4. Washer
5. Cap Screw
6. Mounting Block
7. Cap Screw
8. Lock Nut
9. Washer
10. Axle
11. Washer
12. Spacer
13. Cap Screw
14. Slide Block
15. Spring Slide
16. Washer
17. Cap Screw
18. Spacer
19. Pivot
20. Grease Fitting
21. Washer
22. Axle
23. Washer
24. Idler Wheel
25. Bearing
26. Retaining Ring
27. Insert
28. Insert
29. Spacer
30. Lock Nut
31. Idler Wheel
32. Cap Screw
33. Nut
34. Lock Washer
35. Spacer
36. Spacer
37. Axle
38. Bushing
39. Idler Wheel
40. Spacer
41. Washer
42. Bushing
43. Idler Wheel
44. Insert
45. Washer
46. Cap Screw
47. Cap
48. Cap Screw

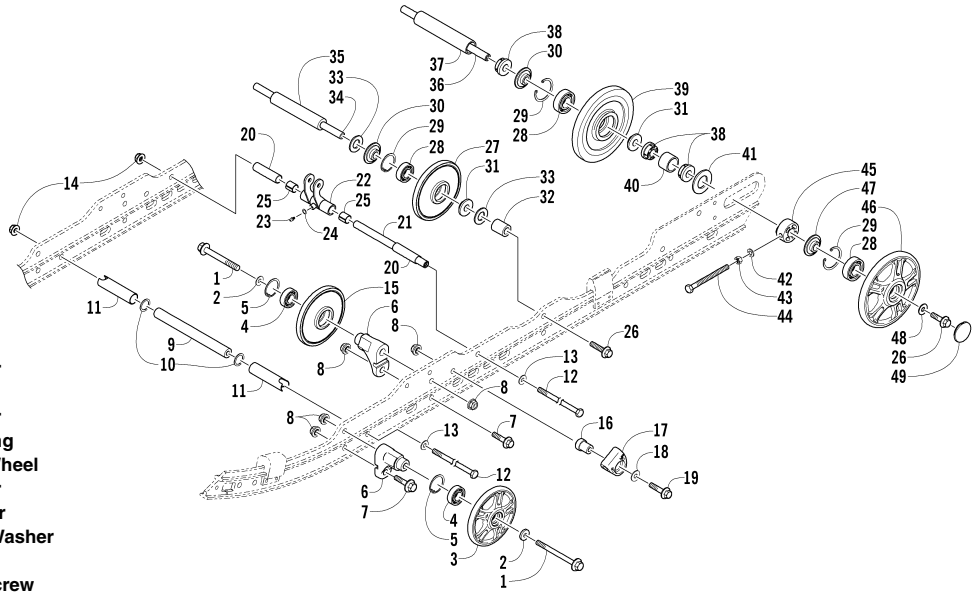


0739-631

Style J

KEY

1. Cap Screw
2. Washer
3. Idler Wheel
4. Bearing
5. Retaining Ring
6. Mounting Block
7. Cap Screw
8. Lock Nut
9. Axle
10. Washer
11. Spacer
12. Cap Screw
13. Washer
14. Lock Nut
15. Idler Wheel
16. Slide Block
17. Spring Slide
18. Washer
19. Cap Screw
20. Spacer
21. Axle
22. Pivot
23. Grease Fitting
24. Washer
25. Bearing
26. Cap Screw
27. Idler Wheel
28. Bearing
29. Retaining Ring
30. Insert
31. Insert
32. Spacer
33. Washer
34. Axle
35. Spacer
36. Axle
37. Spacer
38. Bushing
39. Idler Wheel
40. Spacer
41. Washer
42. Lock Washer
43. Nut
44. Cap Screw
45. Bushing
46. Idler Wheel
47. Insert
48. Washer
49. Cap



0740-759

Repair Procedure 1 - Track/Rear Suspension

This Track/Rear Suspension sub-section (Repair Procedure 1) has been organized so each procedure can be completed individually and efficiently. Each sub-section has (as necessary) Removing, Disassembling, Cleaning and Inspecting, Assembling, and Installing procedures. Some components may vary from model to model. The technician should use discretion and sound judgment when removing and installing components.

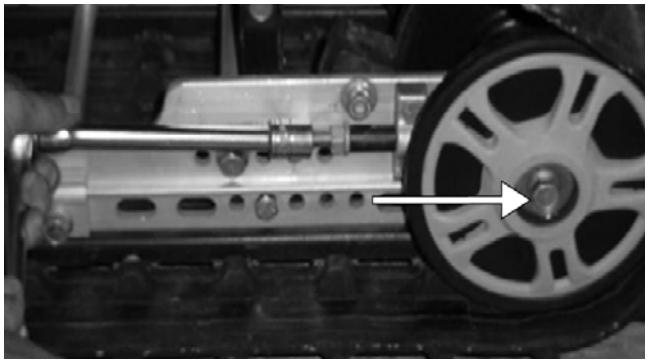
■ **NOTE: Critical torque specifications are located on page 174 of this section.**

■ **NOTE: Some illustrations and photographs used in this sub-section are used for clarity purposes only and are not designed to depict actual conditions.**

Removing Skid Frame

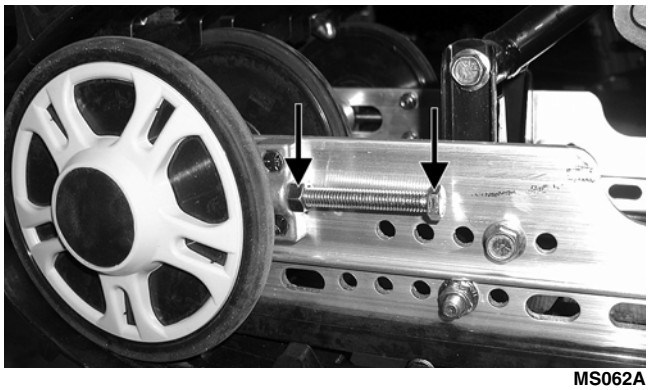
■ **NOTE: Many service procedures can be performed without removing the skid frame. Closely observe the note introducing each sub-section for this important information.**

1. To avoid having the adjuster bushings binding when loosening the track, remove the rear idler wheel caps and loosen the cap screws on the rear axle.



FS082A

2. Loosen the jam nuts and two track-tension adjusting bolts.



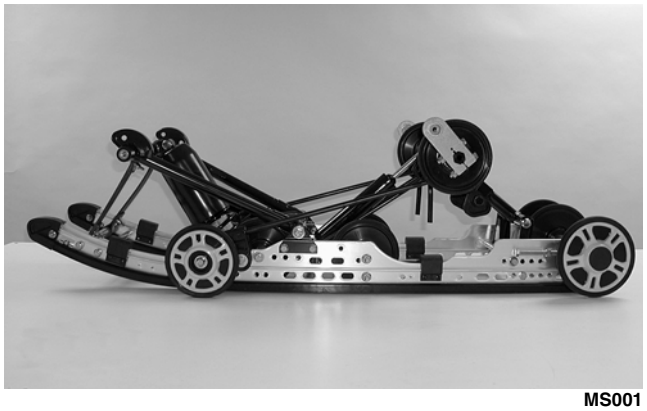
MS062A

3. Place a support stand under the rear bumper; then while holding the flared bushing, remove the rear cap screws securing the skid frame to the tunnel. Account for lock washers and flat washers.

■ **NOTE: The support stand should hold the snowmobile level but not raised off the floor.**

4. Remove the front cap screws securing the skid frame to the tunnel. Account for a flat washer and a lock washer.

5. Remove the support stand; then tip the snowmobile onto one side using a piece of cardboard to protect against scratching. Remove the skid frame.



MS001

Wear Strips

REMOVING

■NOTE: The skid frame does not have to be removed for this procedure; however, if wear strip binding or slide rail damage has occured, the skid frame should be removed for this procedure (see Removing Skid Frame in this sub-section).

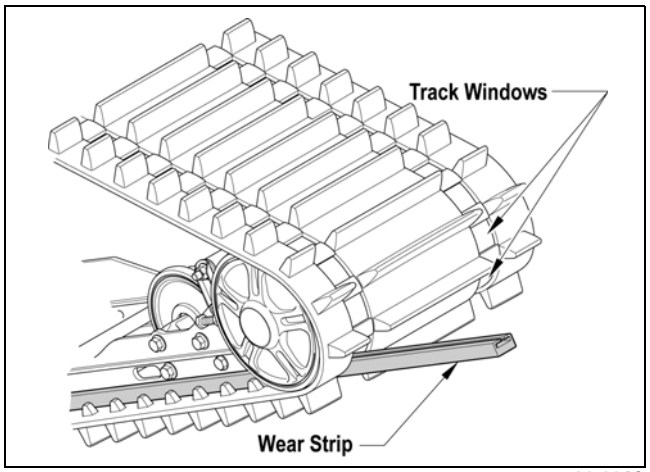
1. Remove the machine screw and lock nut securing the wear strip to the front of the slide rail.



MS016B

■NOTE: If the skid frame has been removed due to difficulty in removing the wear strip, it may be necessary to use a pipe wrench, start from either end, and hook the edge of the wear strip with the pipe wrench jaw and twist the wear strip off the slide rail. Move the pipe wrench 7.5 cm (3 in.) and again twist the wear strip off the rail. Repeat this procedure until the wear strip is free of the rail.

2. Align the wear strip with the openings (windows) in the track; then using a suitable driving tool, drive the wear strip rearward off the slide rail.



739-884A

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

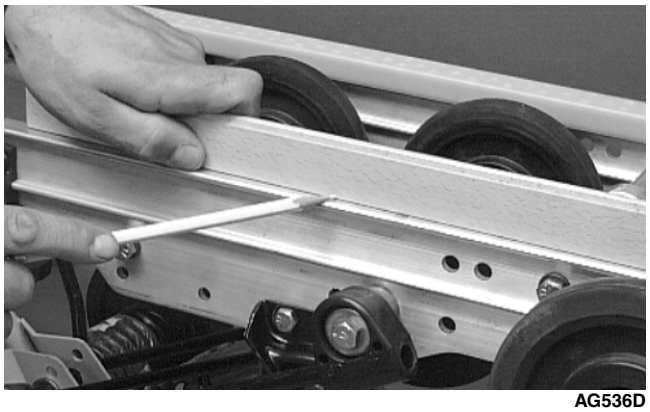
1. Clean the slide rail using parts-cleaning solvent and compressed air.

⚠ WARNING

Always wear an approved pair of safety glasses when using compressed air.

2. Inspect the slide rail for cracks. If any cracks are found, replace the slide rail.

3. Using a straightedge, inspect the slide rail for any unusual bends. With the slide rail removed, place the straightedge along the bottom surface of the slide rail. If the rail is found to be bent, it must be replaced.

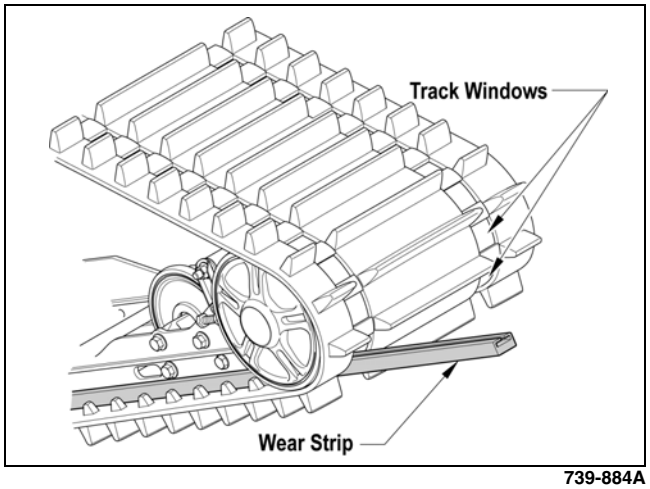


AG536D

INSTALLING

■NOTE: Apply a light coat of grease to the slide rail surface to aid in installing a new wear strip. If there are any sharp edges on the lower portion of the rail, use a file to remove them.

1. Align the wear strip with the openings (windows) in the track and from the back, start the wear strip onto the rail; then using a block of wood and a hammer, drive the wear strip forward into position.



739-884A

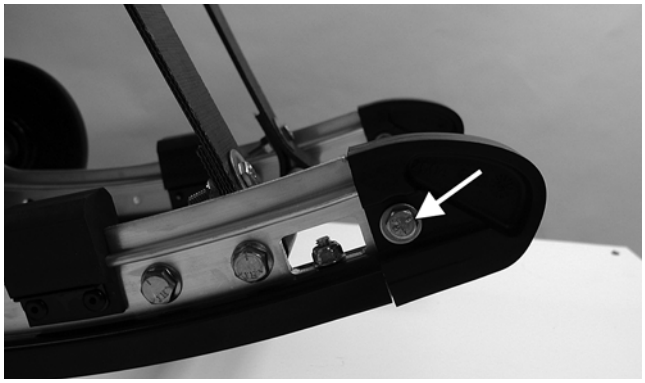
2. Secure with a machine screw and lock nut. Tighten to specifications.

End Caps

■**NOTE: The skid frame does not have to be removed for this procedure.**

REMOVING

1. Remove the lock nut, washers, and cap screw securing the end cap.



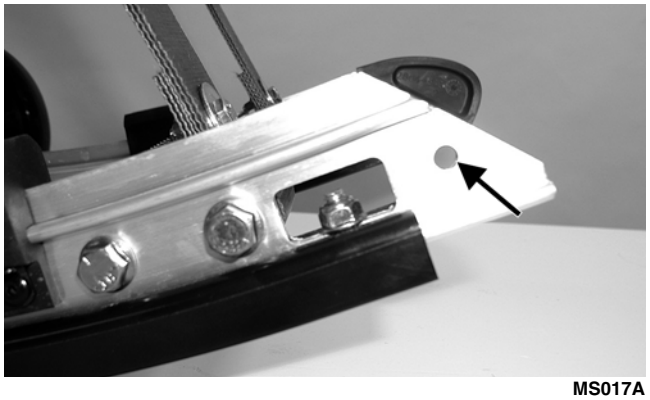
MS016A

2. Using a hammer, tap the end cap off the rail.

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the end cap area of the slide rail for cracks and wear.



MS017A

2. Inspect the end cap for any signs of cracking or wear.



MS290A

3. Clean both the slide rail area and the end cap. Using compressed air, clean the areas of dirt and gravel.

⚠ WARNING

Always wear an approved pair of safety glasses when using compressed air.

4. Inspect the cap screw for cracked, stretched, or damaged threads. Use a new lock nut when assembling.

INSTALLING

1. Position the end cap on the slide rail; then align the hole in the end cap with the hole in the slide rail.

2. Secure with a cap screw, washers, and lock nut. Tighten to specifications.

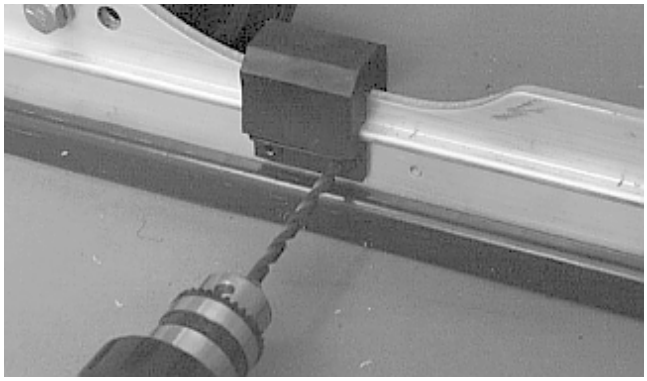
Shock Pads

■**NOTE: The skid frame does not have to be removed for this procedure.**

REMOVING

■**NOTE: The shock pads should be removed only if being replaced.**

1. Using a 3/16-in. drill bit, drill out the rivets securing each shock pad to the slide rail. Account for the retaining brackets.



AG476D

2. Remove the shock pads.

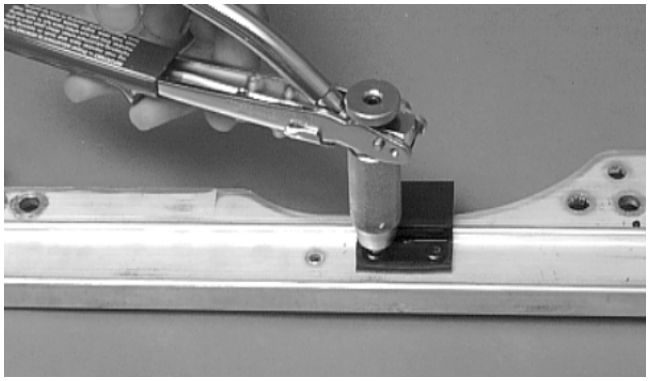
INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect the pads and retaining brackets for damage or wear.
2. Inspect the rivet holes in the slide rail for damage or elongation.

INSTALLING

1. Place the pads and retaining brackets into position on the slide rail.
2. Secure the pads with rivets.



AG531D

Front Outer Idler Wheels

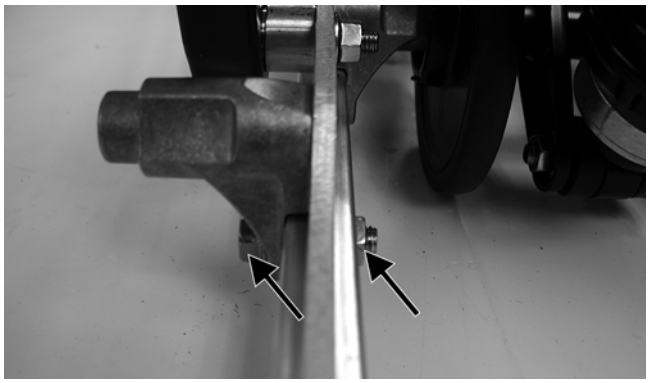
■NOTE: The skid frame does not have to be removed for this procedure.

REMOVING

1. Remove the cap screws and lock nuts securing the front outer idler wheel and the idler wheel mounting block. Account for flat washers and two shim washers (if applicable).

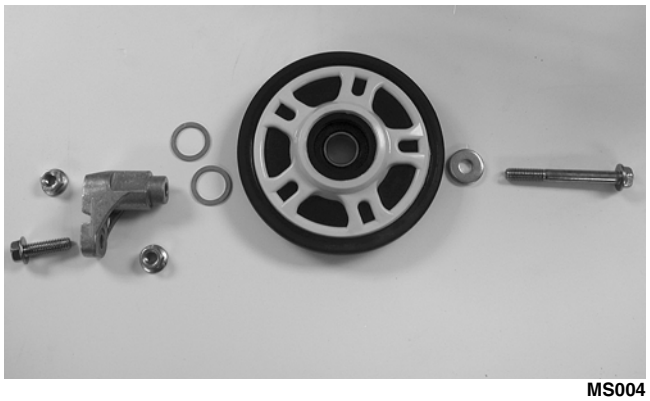


MS002A



MS003A

2. If applicable, note the locations of the shim washers for assembly purposes. The shim washers are to be installed to the inside of the idler wheels.



MS004

■ **NOTE: On the idler wheels with inserts, account for a spacer.**



MS005

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearing with a clean cloth.
2. Inspect each idler wheel and each plastic hub for cracks or damage.
3. Rotate the idler wheel bearing (by hand) and inspect for binding or roughness.
4. If a bearing must be replaced, use this procedure.

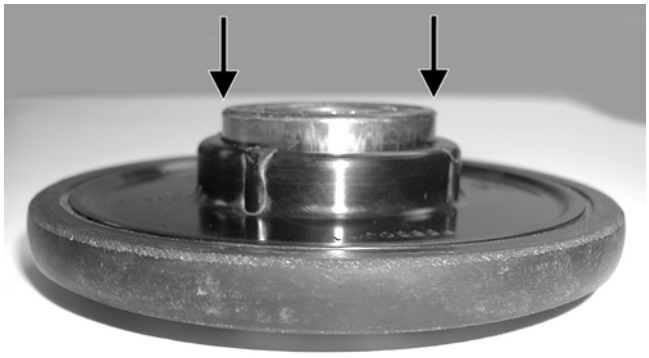
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert (if applicable) and the snap ring.

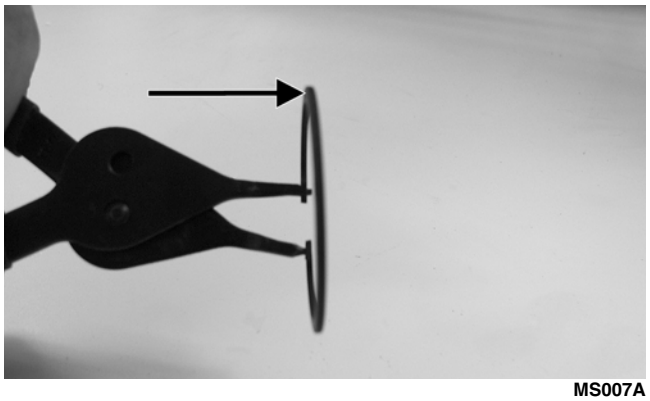
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

E. Install the insert (if applicable).



MS008

INSTALLING

1. Secure the mounting block on the slide rail with a cap screw and lock nut. Tighten to specifications.



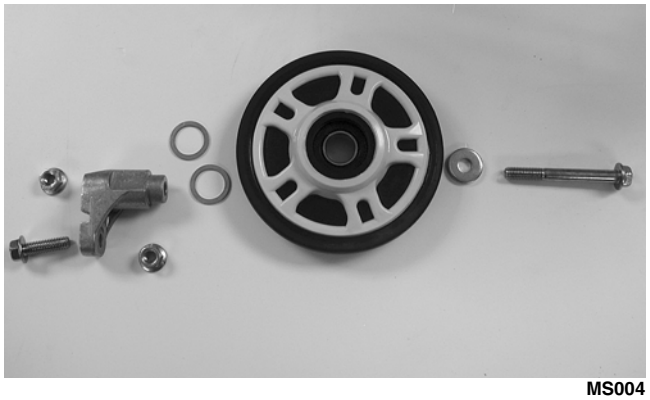
MS009

■ **NOTE: For proper alignment, it is advisable to install an idler wheel cap screw into the top mounting block hole prior to tightening.**



MS009A

2. Place the two shim washers (if applicable), idler wheel, and axle against the mounting block making sure there is a flat washer on the outside of the idler wheel.



MS004

■ **NOTE: On idler wheels with inserts, install spacers.**



MS005

3. Secure the idler wheel assembly with a cap screw and a lock nut. Tighten cap screws to specifications.



MS010

Rear Inner Idler Wheels

■ **NOTE: The skid frame does not have to be removed for this procedure.**

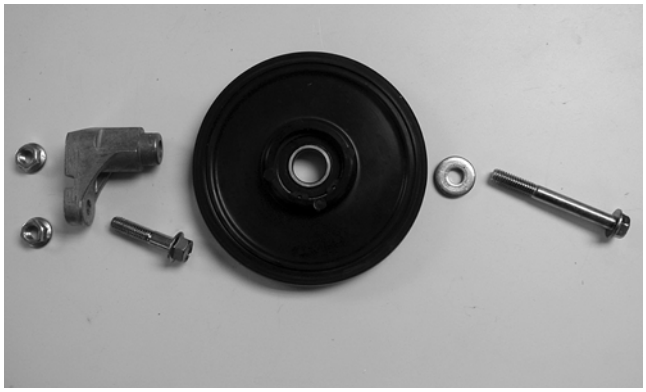
REMOVING

1. Remove the cap screws, washers, and lock nuts securing the rear inner idler wheel and the idler wheel mounting block. Account for all mounting hardware.



MS137

2. Note the location of the flat washer for assembly purposes.



MS138

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean the bearing with a clean cloth.
2. Inspect each idler wheel and plastic hub for cracks or damage.
3. Rotate the idler wheel bearings (by hand) and inspect for binding or roughness.
4. If a bearing must be replaced, use this procedure.

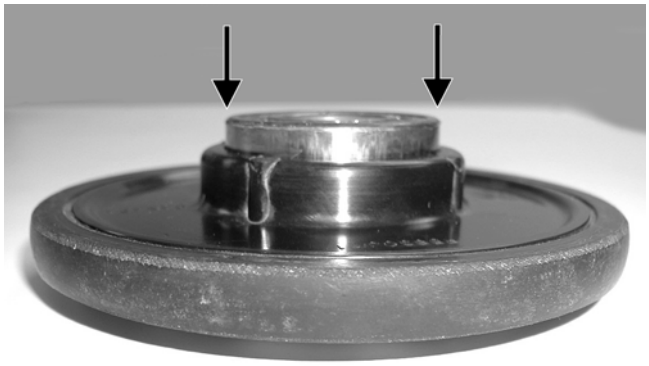
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert (if applicable) and the snap ring.

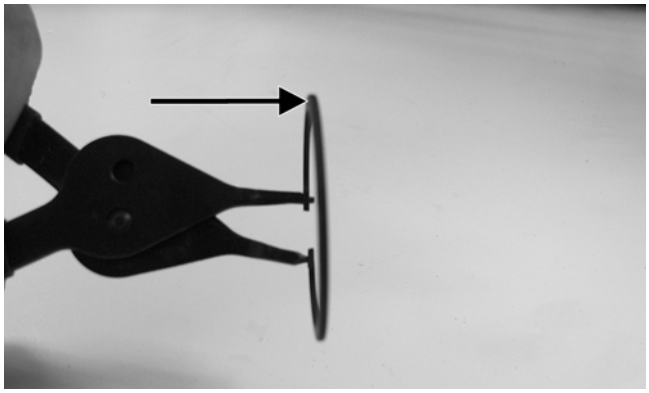
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

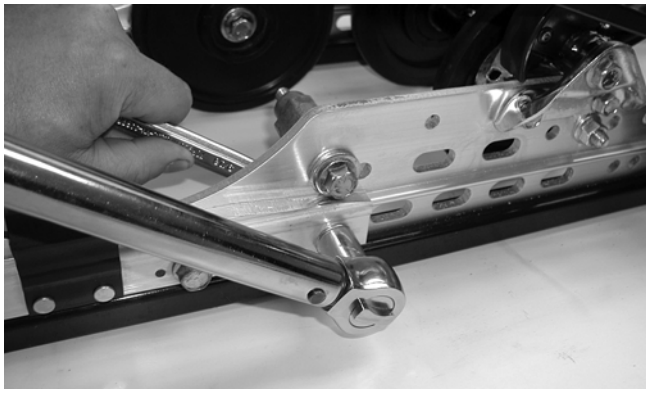
E. Install the insert (if applicable).



MS008

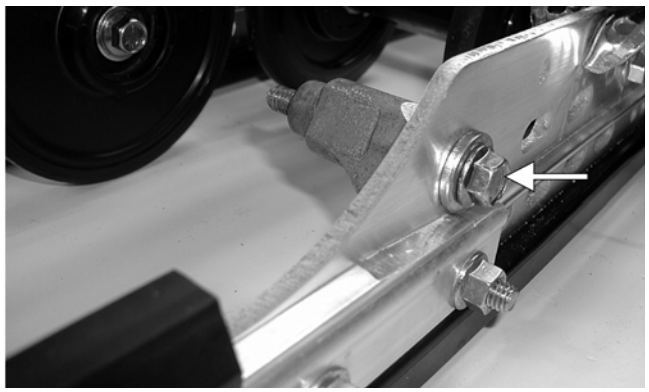
INSTALLING

1. Secure the mounting block on the slide rail with a cap screw and lock nut. Tighten to specifications.



MS139

■NOTE: For proper alignment, it is advisable to install an idler wheel cap screw into the top mounting block hole prior to tightening.



MS140A

2. Place the idler wheel into position against the mounting block making sure there is a flat washer on the cap screw. Tighten to specifications.



MS141

Rear Upper Idler Wheels/Rear Springs

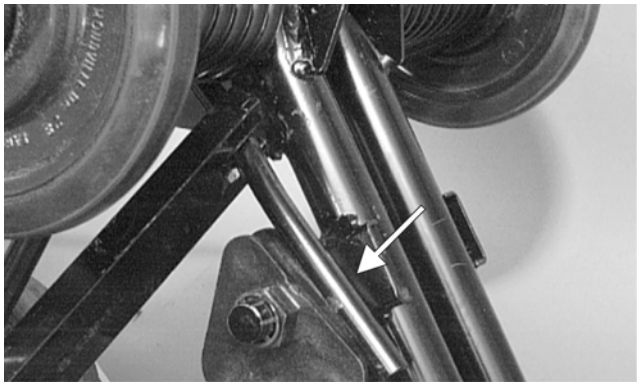
■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this subsection).**

REMOVING

1. Using the Rear Suspension Spring Tool (p/n 0144-311), remove the spring from the adjusting cam.

⚠ WARNING

Care must be taken when removing the spring or damage or injury could result.



AG624DA

2. Mark the offset pivot idler and the idler arm for assembly purposes.



MS142

3. Remove the cap screws securing the offset pivot idler arm assembly to the idler arm; then remove the offset pivot arm idler assembly. Account for a flanged axle, flared bushing, idler spacer collar, and lock nuts.



MS064

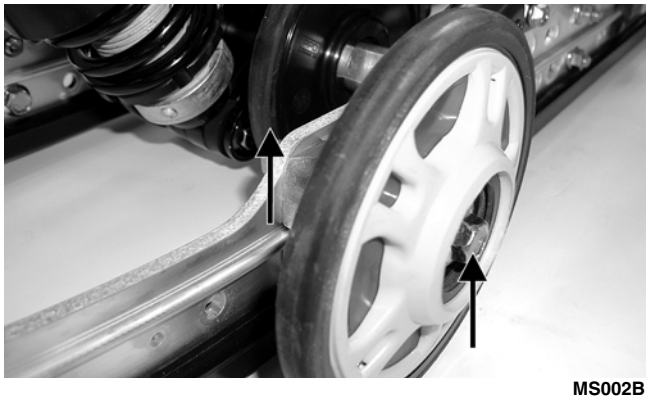
4. Remove the idler wheel.

■ **NOTE: Use Idler Wheel Puller Kit (p/n 0644-122) to remove the wheel.**



MS011

5. Remove the cap screw and flat washer securing the front outer idler wheel to the mounting block and remove the idler wheel.

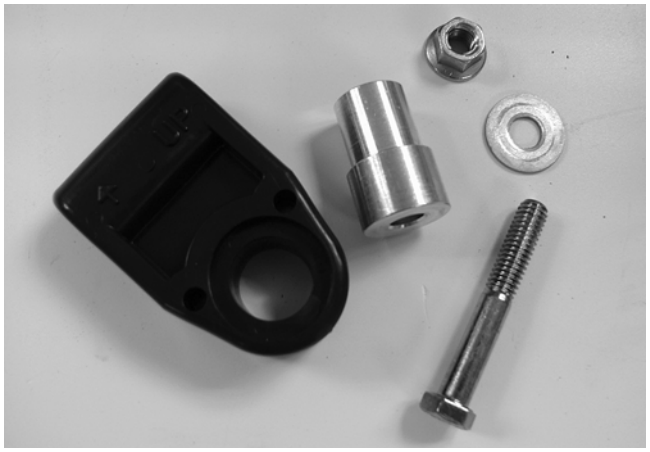


MS002B

6. Remove the cap screw, flat washer, and lock nut securing the spring slide to the slide rail. Account for the spring slide and all mounting hardware.



MS013A



MS014

7. Remove the spring and sleeve from the idler arm.



MS145

■ **NOTE: Use the same procedure for the other side.**

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearing with a clean cloth.
2. Inspect each idler wheel and plastic hub for cracks or damage.
3. Rotate the idler wheel bearings (by hand) and inspect for binding or roughness.
4. If a bearing must be replaced, use this procedure.

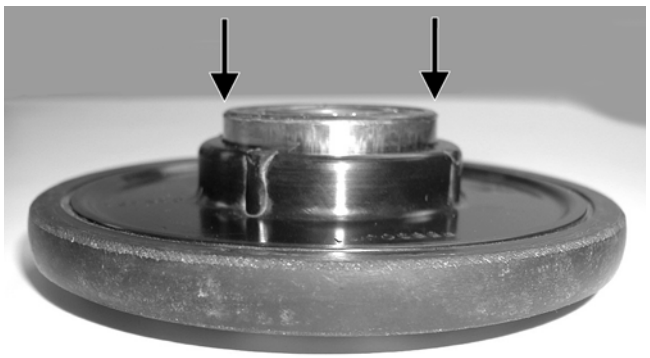
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert (if applicable) and the snap ring.

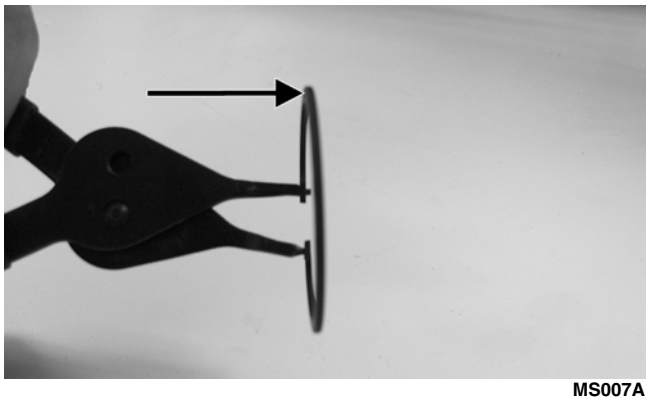
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

E. Install the insert (if applicable).



MS005

5. Inspect the spring, spring slide, sleeve, washers, slide block insert, and shaft area for wear.

6. Inspect the adjusting cams and arms for cracks.

INSTALLING

1. Slide the sleeve and spring onto the idler arm.



MS145

2. Place the spring slide and slide block (with spring in slide block) into position on the slide rail. Secure with a cap screw, lock nut, and washer. Tighten to specifications.



MS014



MS015

3. Install the rear upper idler wheel on the idler arm.



MS074

⚠ CAUTION

When driving the idler wheel onto the idler arm, use a tool to contact the inside race of the bearing or damage to the wheel or bearing may occur.



MS072A

4. Install the idler spacer collar onto the idler arm.

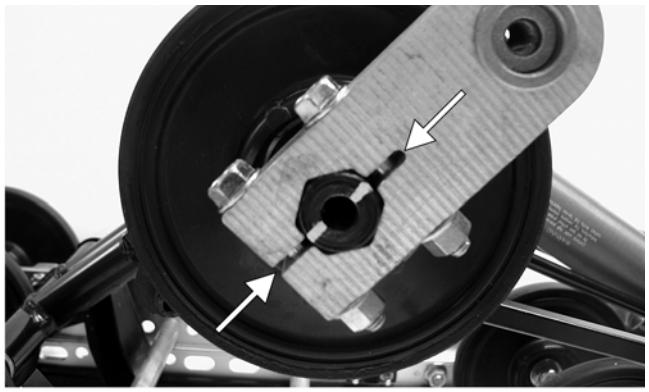


MS064

5. Place the flared bushings with a thin flat washer through the notched side of the offset pivot idler arm assembly.

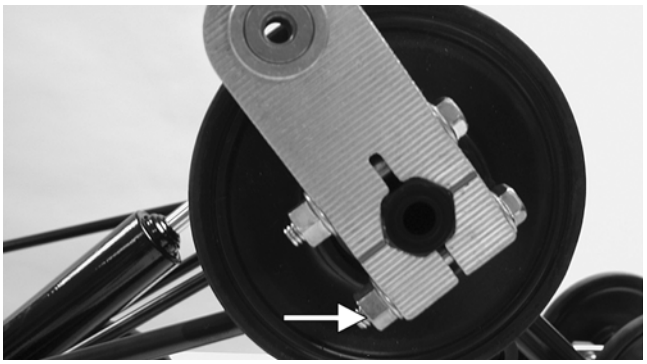
■ **NOTE: If the flared bushings in the offset pivot idler arm is loose, it must be cleaned and green Loctite #609 must be applied to it prior to installation.**

6. Align the marks on the idler arm to the centerline of the offset pivot idler arm assembly. Secure the offset pivot idler arm to the idler arm with cap screws and lock nuts. Tighten to specifications.



MS146A

■ **NOTE: When tightening the pivot idler arm lock nuts, tighten the lower lock nut first or binding may occur.**



MS019B

Rear Axle and Idler Wheels

■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this subsection).**

DISASSEMBLING

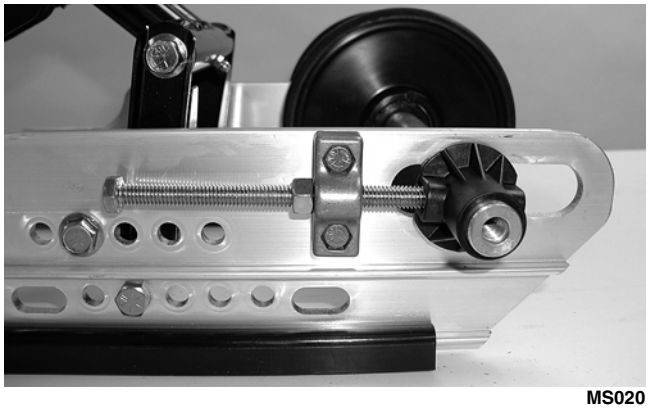
1. Remove the cap screw and large flat washer securing the outer rear idler wheel. Remove the outer idler wheel from the shaft.



FC194

■ **NOTE: The large flat side of the wheel insert is positioned next to the inner plastic adjuster bushing. The idler wheel must be installed with the wheel insert properly positioned.**

2. Loosen the track adjusting bolts. Slide the outer adjuster bushings off the axle.

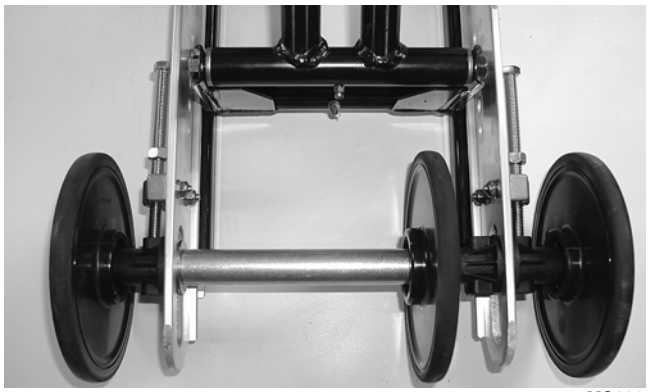


MS020



MS021

3. Carefully slide the shaft out from the inner idler wheels and note the position of the spacers and washers.



MS022

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearings with a clean cloth.
2. Inspect all idler wheel inserts (inner and outer) for any cracks.
3. Inspect the outer rubber portion of the idler wheels for cracks and poor bonding.
4. Inspect the plastic insert of each idler wheel for cracks.
5. Inspect the shaft for wear and damaged threads.
6. Inspect all idler wheel bearings. Turn each bearing (by hand) and if any roughness or binding is noted, replace the bearing.
7. If a bearing must be replaced, use this procedure.

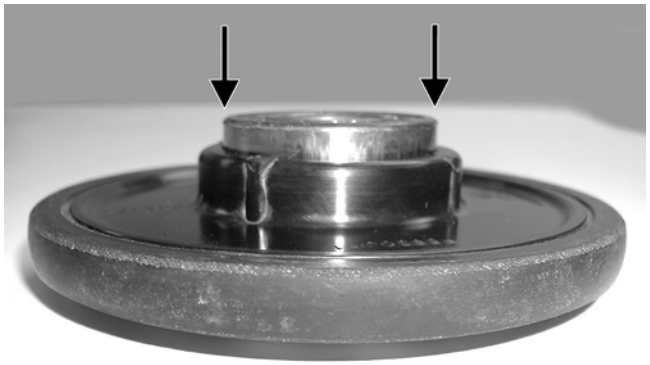
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert (if applicable) and the snap ring.

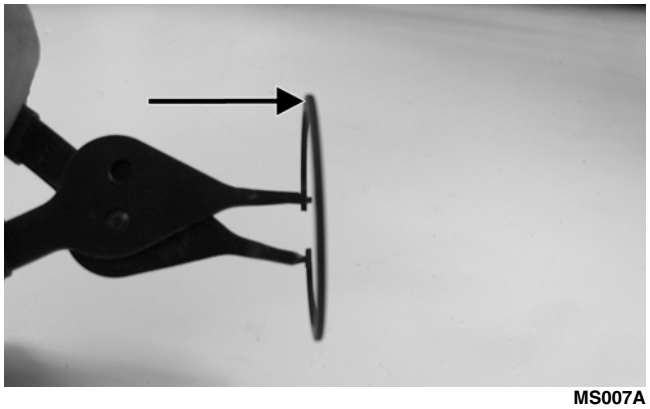
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

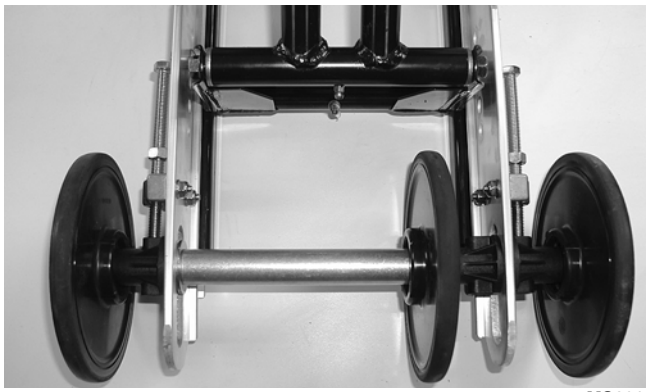
E. Install the insert (if applicable).



MS008

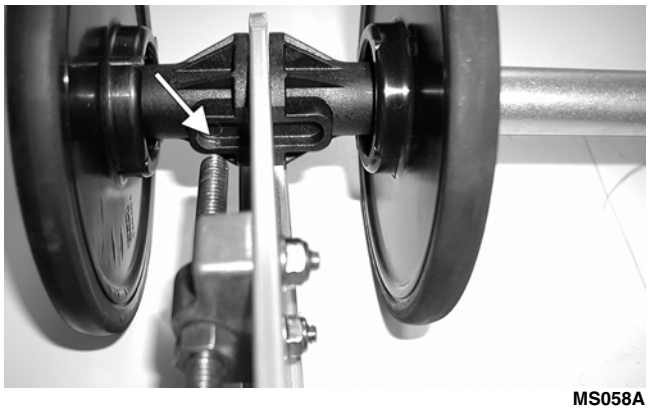
ASSEMBLING

1. In order from the right-hand side, slide the axle through the slide rail axle slot; then place a bushing, inner idler wheel with insert (if applicable), and long spacer with a flat washer on the axle. Slide the axle through the opposite slide rail axle slot. Place the plastic adjuster bushings on the axle (on the outside of each axle slot).



MS022

■ **NOTE: Make sure the slot in the adjuster bushing is aligned directly with the adjusting bolt.**



MS058A

2. Place the outer idler wheels on the axle (with the large flat of the insert directed inward) and secure with two cap screws (coated with blue Loctite #243) and large flat washers. Tighten cap screws only until snug.



MS212

■ **NOTE: It is advisable to tighten the rear idler wheel axle only until snug until the skid frame has been installed and track tension has been adjusted; then the axle assembly must be tightened to specifications.**

3. Install the skid frame (see Installing Skid Frame in this sub-section).

■ **NOTE: It is advisable to install the rear arm springs onto the adjuster blocks after the skid frame has been installed.**

4. Adjust track alignment (see Track Alignment in this sub-section).

5. Adjust track tension deflection (see Track Tension in this sub-section).

Idler Arm/Rear Arm

■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section).**

DISASSEMBLING

1. Remove the rear upper idler wheels and springs (see Rear Upper Idler Wheels/Rear Springs in this sub-section).

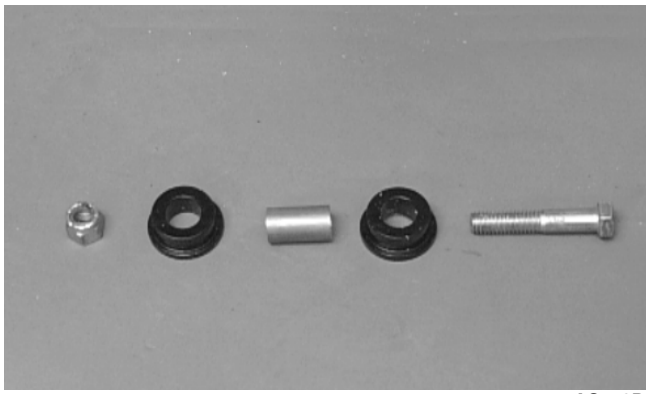


MS011

2. Remove the cap screw and lock nut securing the upper shock eyelet to the idler arm. Account for a spacer, lock nut, and bushings.



MS024A



AG553D

■ **NOTE: Mark the hole that the upper shock links are mounted in for assembly purposes.**

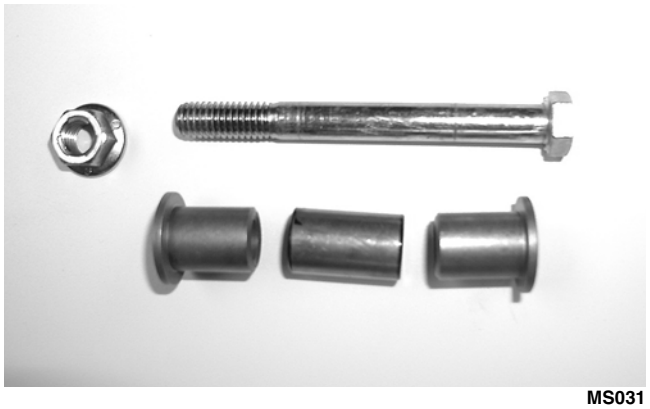


MS025

3. Remove the cap screw and lock nut securing the upper shock links to the idler arm. Account for a lock nut, spacer, flat washers, and axle links.

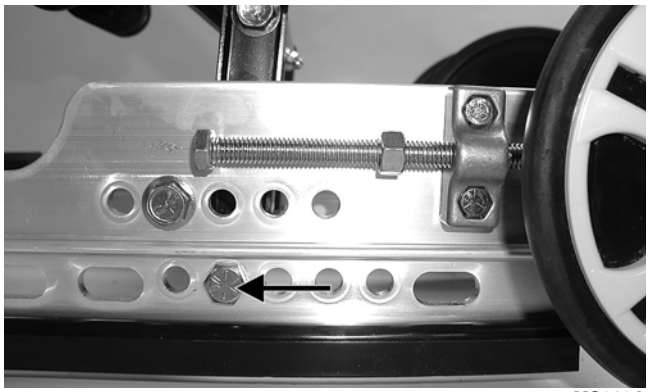


MS026



MS031

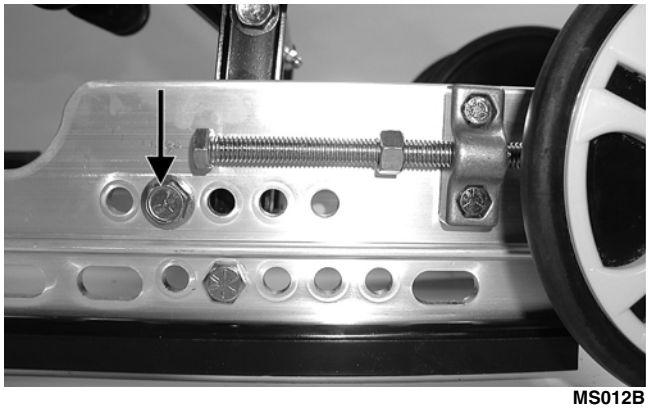
4. Remove the cap screw and lock nut securing the rear arm to the slide rail. Account for the serrated axles and axle tube.



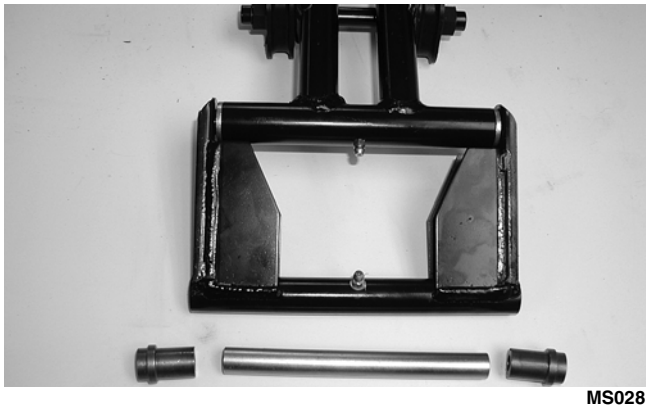
MS012A

■ **NOTE: If applicable, note the mounting hole from which the rear arm was removed for assembly purposes.**

■ **NOTE: To remove the rear arm, it may be necessary to loosen the rear arm stop.**



MS012B

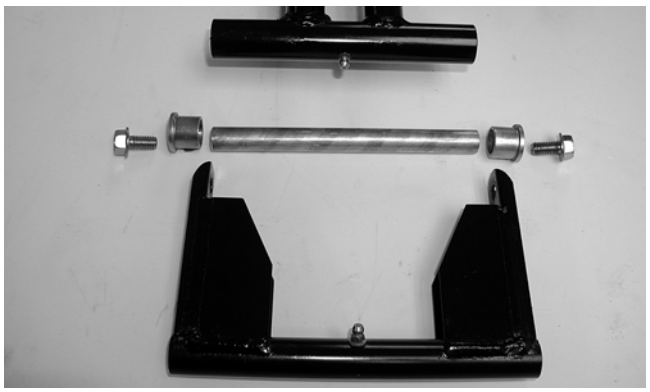


MS028

5. Remove the two cap screws securing the rear arm to the idler arm. Account for the aluminum axle and bushing assemblies.



MS029A



MS030

CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean the bearings with a clean cloth.
2. Inspect each idler wheel for cracks or damage.
3. Inspect the bushings (located in the arm pivot area) for wear or damage.
4. Inspect all welds and the tubing of the upper arm for cracks or unusual bends.
5. Inspect the two adjusting cams for damage.
6. Rotate the idler wheel bearings (by hand) and check for binding or roughness.
7. If a bearing must be replaced, use this procedure.

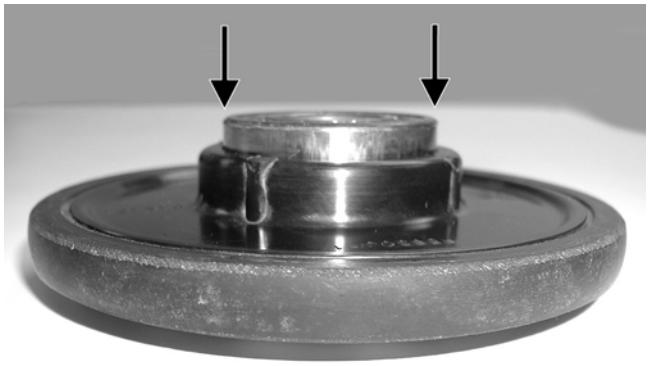
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert (if applicable) and the snap ring.

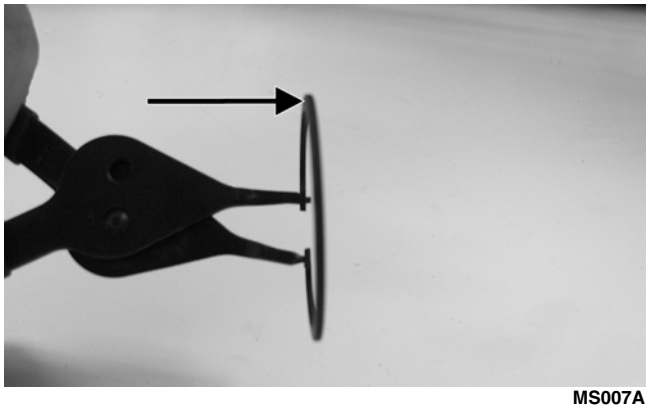
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

E. Install the insert (if applicable).



MS008

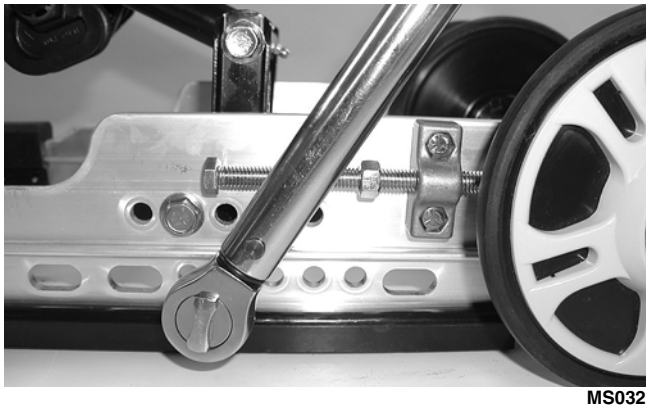
ASSEMBLING

1. Install the rear arm onto the idler arm with an aluminum axle, bushing assemblies, and two cap screws (coated with blue Loctite #243). Tighten only until snug.



MS029A

2. Place the rear arm assembly into position between the slide rails. Secure with a cap screw and lock nut. Tighten to specifications.



MS032

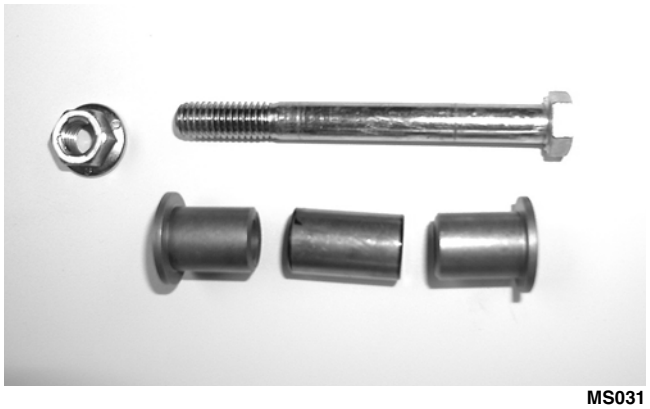
■ **NOTE: Install the rear arm assembly into the appropriate mounting hole as noted during disassembly.**

3. Place a support beneath the rear arm; then tighten the two cap screws (from step 1) to specifications.



MS033

4. Position the shock links in the appropriate holes of the idler arm brackets (see Chassis and Skid Frame Mounting Locations in this section). Place a spacer between the center of the brackets. Insert the axle links into the upper shock link eyelets; then insert the cap screw with washer through the eyelets. Secure with a cap screw, washer, and lock nut. Tighten securely.



MS031



MS026

5. Place the upper shock eyelet with bushings between the idler arm brackets making sure the spacer is properly positioned between the brackets. Secure with a cap screw and lock nut. Tighten securely.



MS027

■ NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.

6. Grease the idler arm and rear arm grease fittings with a low-temperature grease.

7. Install the rear upper idler wheels, rear springs, and offset pivot idler (see Rear Upper Idler Wheels/Rear Springs in this sub-section).

8. Install the skid frame (see Installing Skid Frame in this sub-section).

■ NOTE: It is advisable to install the rear arm springs onto the adjuster blocks after the skid frame has been installed.

Front Arm/Front Shock Absorber/Front Inner Idler Wheels

■ NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section), and the rear springs must be removed from the adjusting cams.

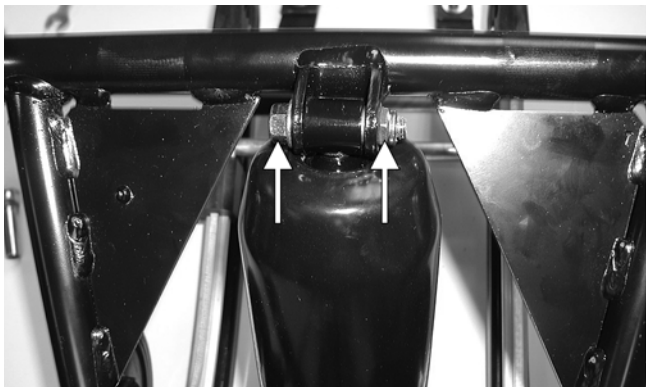
REMOVING

1. Remove the upper cap screws and lock nuts securing the limiter straps to the rail support. Account for flat washers.



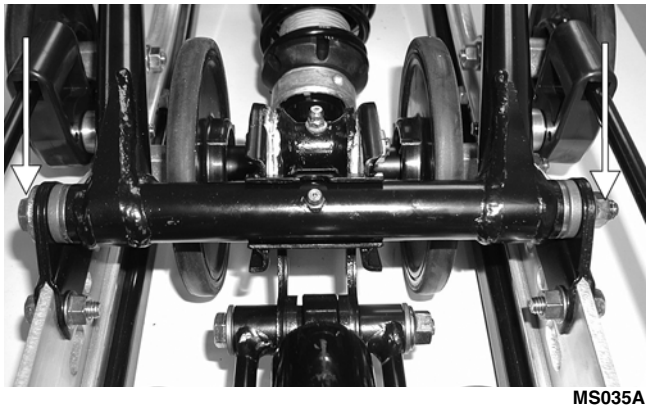
MS034A

2. Remove the cap screw and lock nut securing the upper front shock absorber eyelet to the front arm. Pull the shock eyelet free of the bracket. Account for a serrated axle.



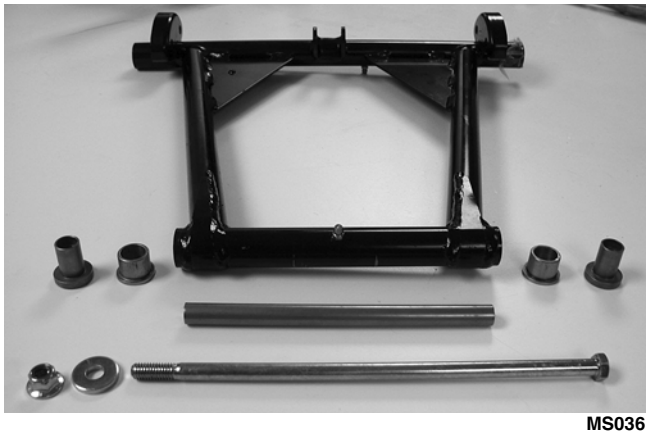
MS039A

3. Remove the cap screw and lock nut securing the front arm to the front arm mounting brackets.



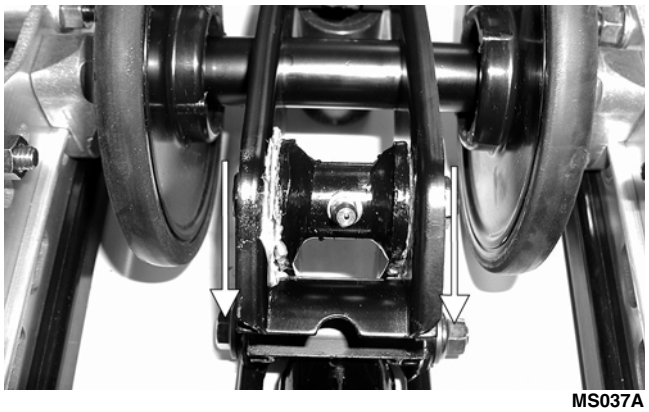
MS035A

4. Remove the front arm and account for an axle tube and serrated axles.



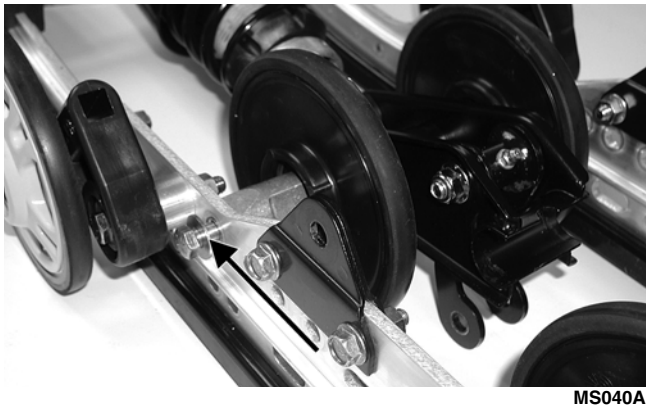
MS036

5. Remove the cap screw and lock nut securing the shock rod links and shock absorber to the pivot assembly. Account for the cap screw and lock nut.



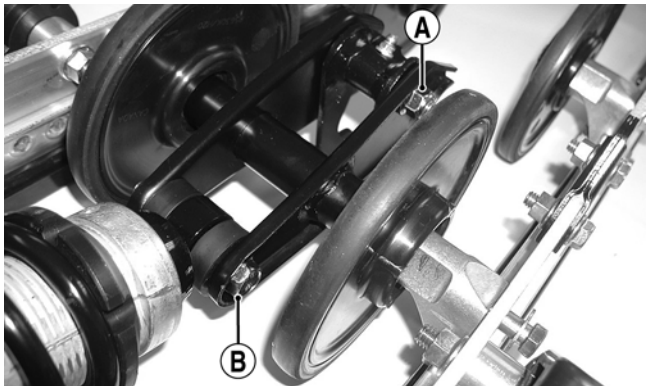
MS037A

6. Remove the cap screw and lock nut securing the front inner idler wheel assembly to the slide rails. From one side, gently tap the assembly rearward until the mounting blocks clear the slide rails; then remove the assembly.



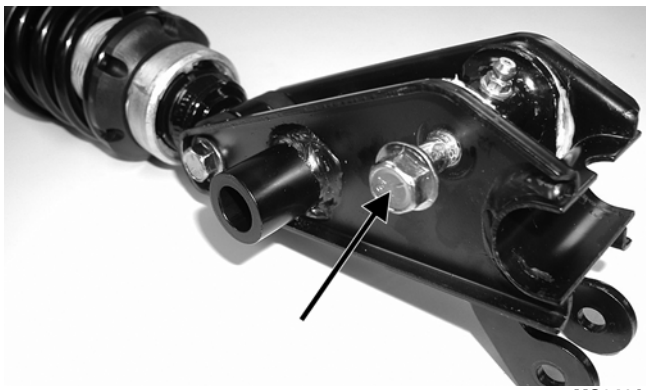
MS040A

■ **NOTE: To aid in disassembling, loosen the cap screws and lock nuts securing the pivot (A) and the front shock absorber (B).**



MS038C

7. With the mounting blocks and idler wheels removed from the assembly, remove the cap screw securing the front shock mounting bracket to the rear shock pivot. Account for an axle, cap screw, and lock nut.



MS041A

8. Remove the cap screw securing the front shock to the mounting bracket.



AG691D

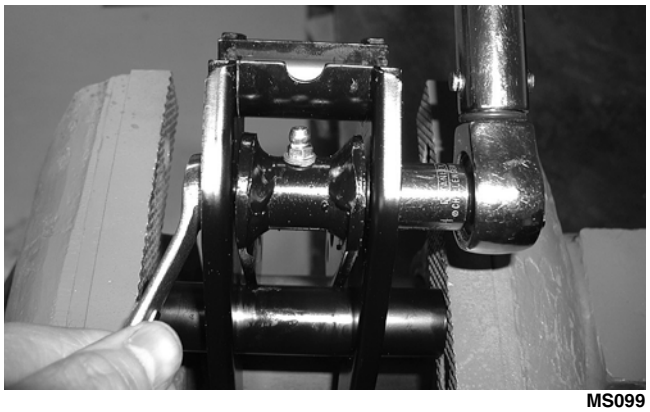
INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect all front arm weldments for cracks or unusual bends.
2. Closely inspect all tubing for cracks or unusual bends.
3. Inspect the bearings, bushings, and front arm spacers for wear or damage.
4. Inspect the shock absorber for any signs of oil leakage especially at the point where the shock shaft enters the shock body.
5. Inspect the shock absorber eyelet welds (at each end) for any cracks, signs of separation, or for unthreading.
6. Inspect the shock absorber for damage.

INSTALLING

1. Secure the front shock mounting bracket in a vise; then install the rear shock pivot with axle to the mounting bracket with the cap screw and lock nut. Tighten securely.



MS099

⚠ CAUTION

Take care when clamping the bracket in a vise not to damage the bracket.

2. Securely tighten the shock eyelet to the front shock mounting bracket.



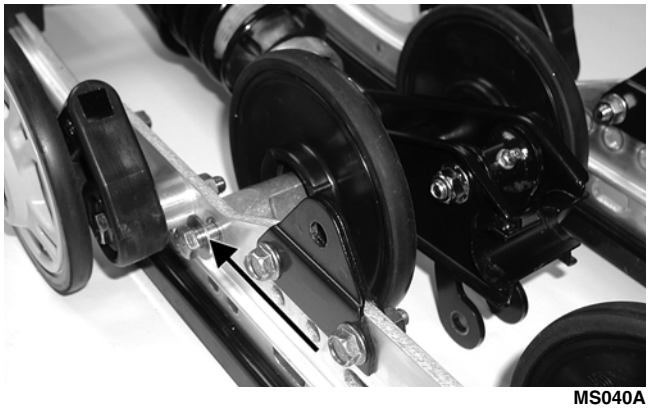
AG691D

3. Place the idler wheels with mounting blocks onto the bracket assembly.



MS044

4. Slide the front inner idler wheel assembly into position on the slide rail; then align the assembly with the proper hole (as noted in removing). Install the cap screw, flat washer, and lock nut; then tighten to specifications.



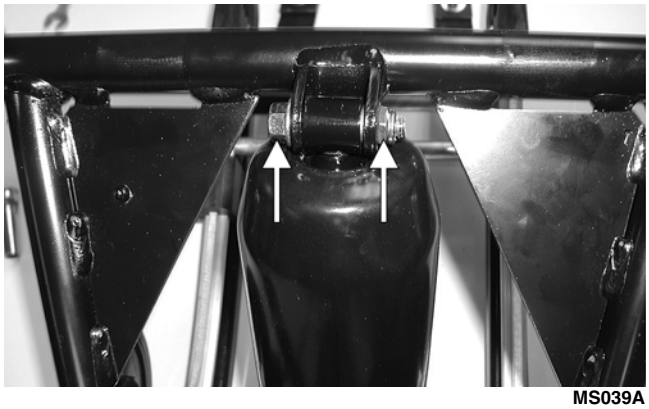
MS040A

5. Position the front arm with spacers, an axle tube, and serrated axles to the mounting brackets. Secure with the cap screw and lock nut. Tighten to specifications.



MS045

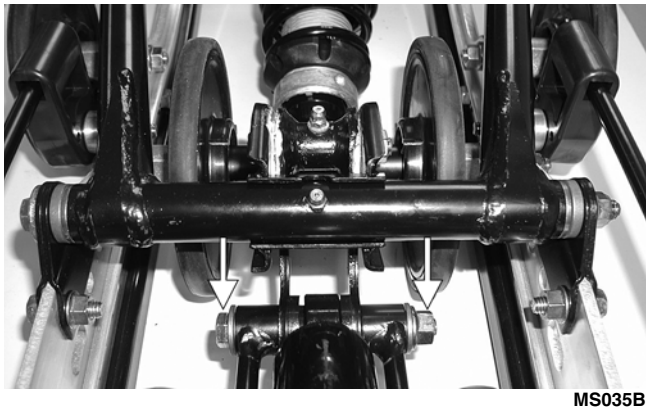
6. Position the upper shock eyelet and serrated axle in the front arm. Secure with a cap screw and lock nut. Tighten securely.



MS039A

■NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.

7. Place the rear shock absorber and shock links into position on the pivot; then install the axles, cap screw, and lock nut. Tighten securely.



MS035B

8. Secure the limiter straps with cap screws, washers, and lock nuts. Tighten to specifications.



MS034A

9. Install the skid frame (see Installing Skid Frame in this sub-section).

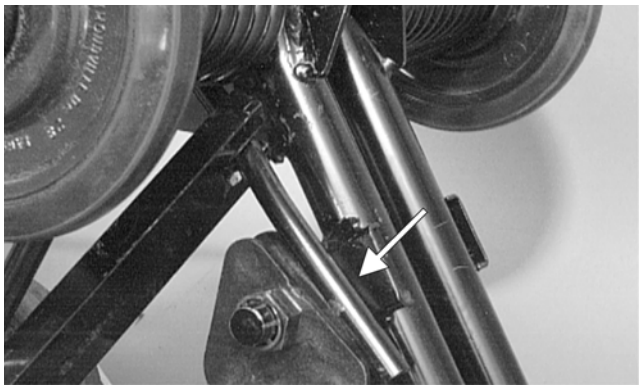
■NOTE: It is advisable to install the rear arm springs onto the adjuster blocks after the skid frame has been installed.

Rear Shock Absorber and Shock Links

■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this subsection).**

DISASSEMBLING

1. Using the Rear Suspension Spring Tool (p/n 0144-311), remove the spring from the adjusting cam.

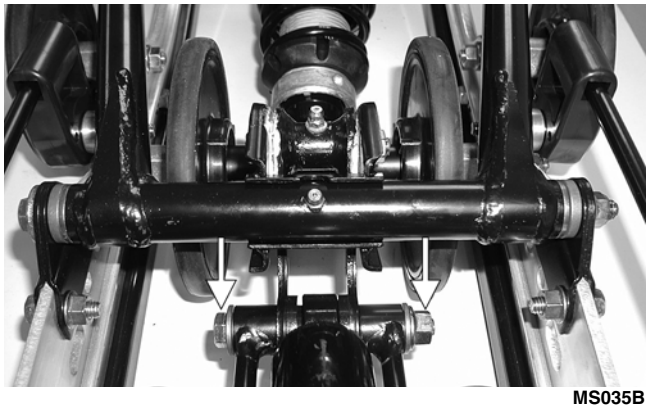


AG624DA

⚠ WARNING

Care must be taken when removing the spring from the adjusting cam or damage or injury could result.

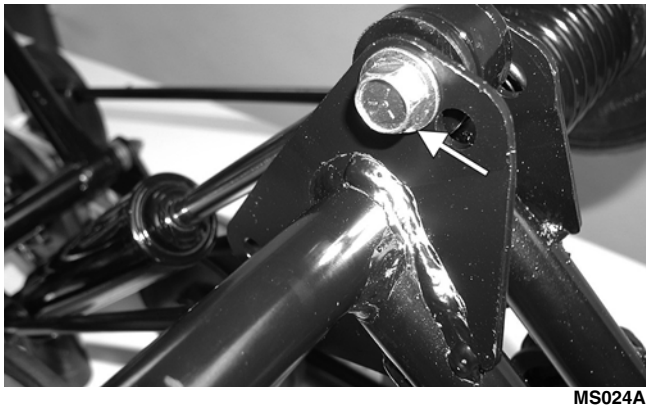
2. Remove the cap screw securing the lower shock eyelet and shock links. Account for shock sleeves, axle links, and a lock nut.



MS035B

■ **NOTE: Lay components out in order as they are removed.**

3. Remove the cap screw and lock nut securing the shock absorber at the upper eyelet and remove the shock absorber. Account for a sleeve and bushings.



MS024A

4. Mark the hole that the upper shock links are mounted in for assembly purposes; then remove the cap screw and lock nut securing the shock links to the upper arm bracket. Account for all mounting hardware.



MS025

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean shock pivot and idler wheel axle in part-cleaning solvent. Dry with compressed air.

⚠ WARNING

Always wear an approved pair of safety glasses when using compressed air.

2. Clean the idler wheel bearings with a clean cloth.
3. Closely inspect the idler wheel axle for wear, bends, or damaged threads at either end.
4. Inspect the idler wheels for signs of cracking, wear, or outer rubber separation from plastic wheel.
5. Rotate the idler wheel bearings (by hand) and inspect for any signs of binding or roughness.

6. If a bearing must be replaced, use this procedure.

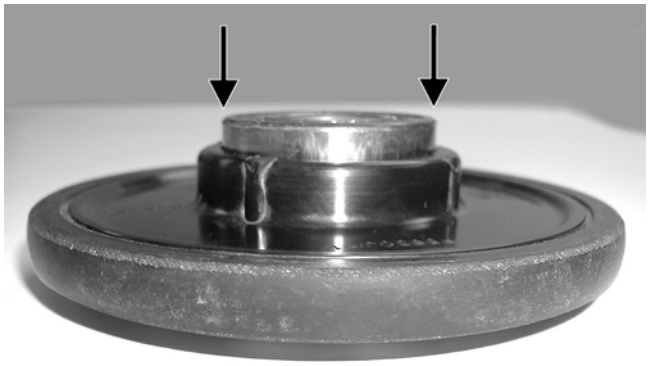
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert (if applicable) and the snap ring.

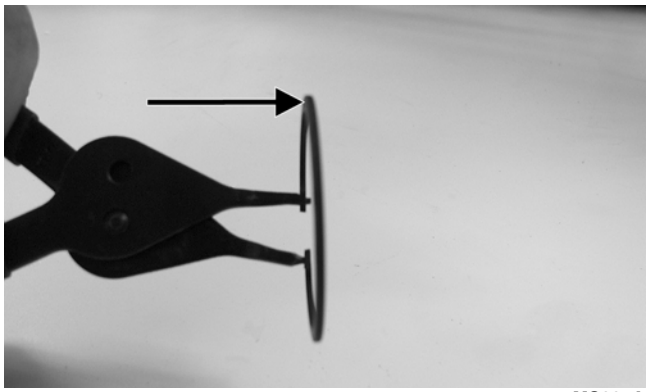
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

E. Install the insert (if applicable).

7. Inspect the shock absorber for any signs of oil leakage especially at the point where the shock shaft enters the shock body.

8. Inspect the rubber shock bushings located in the shock absorber eyelets for cracks or deterioration.

9. Inspect the shock absorber eyelet welds (at each end) for any cracks or signs of separation.

10. Inspect the welds securing the eyelets of the shock links for cracks or signs of separation. Either weld the eyelet or replace the shock link.

11. Inspect the axle surfaces for any signs of corrosion. If corrosion is found, lightly buff the surface of the axle with #400 wet-or-dry sandpaper; then apply a light coat of grease.

ASSEMBLING

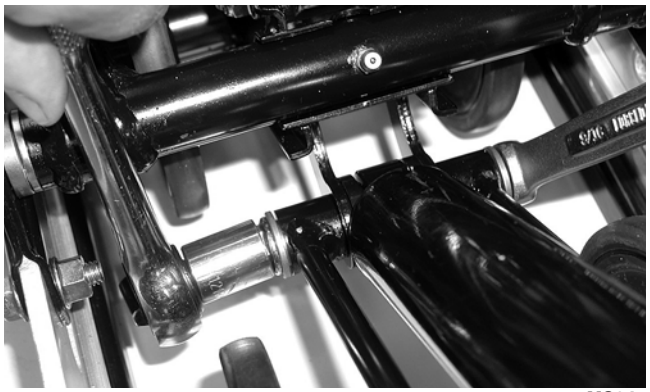
1. Secure the shock eyelet to the idler arm with bushings, sleeve, lock nut, and a cap screw. Tighten securely.



MS027

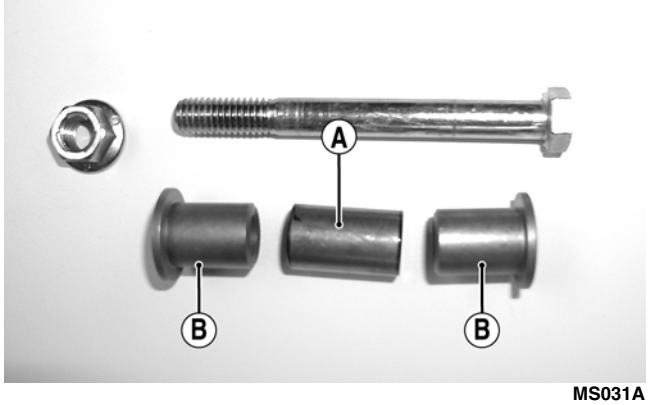
2. Secure the rear shock links and the lower shock absorber eyelet to the shock pivot bracket by placing the bushings and shock sleeve into the shock eyelet; then install the axle links into the rear shock links. Secure the assembly by installing a cap screw through the shock link assembly, shock pivot bracket and shock eyelet assembly, and shock link assembly. Secure the assembly with a lock nut. Tighten securely.

■ NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.

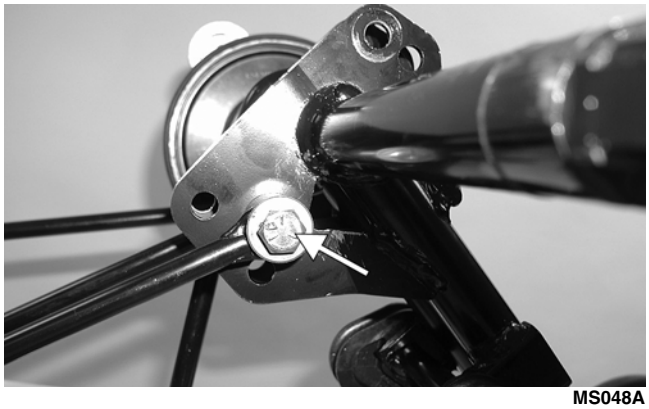


MS047

3. Position the shock links in the appropriate holes of the idler arm brackets (see Chassis and Skid Frame Mounting Locations in this section). Place a spacer (A) between the center of the brackets. Insert the axle links (B) into the upper shock link eyelets; then insert the cap screw with washer through the eyelets. Secure with a cap screw, washer, and lock nut. Tighten securely.

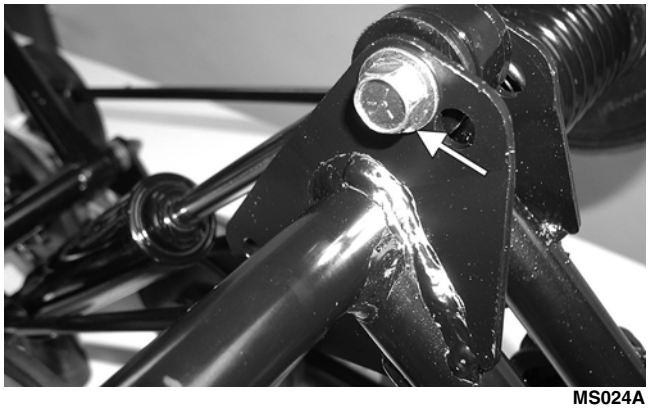


MS031A


MS048A

4. Install the upper shock absorber eyelet to the appropriate hole in the idler arm as noted in disassembling.

■ NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.


MS024A

5. Install the skid frame (see Installing Skid Frame in this sub-section).

■ NOTE: It is advisable to install the rear arm springs onto the adjuster blocks after the skid frame has been installed.

Slide Rails

■ NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section).

REMOVING

■ NOTE: When it is necessary to replace one or both slide rails, it is recommended that one slide rail be removed at a time. The remaining slide rail will then hold the rail supports, axles, and brackets in their correct assembly order. Always mark the mounting hole locations during disassembly to speed up the assembly process and to prevent any damage. This method is much quicker than to completely disassemble the entire skid frame. To replace either rail, use the following procedure.

1. Remove the end cap from the slide rail. Account for a cap screw, lock nut, and two flat washers.


MS016A

2. Remove the machine screw and lock nut securing the wear strip to the front of the slide rail; then using a suitable driving tool, drive the wear strip rearward off the slide rail.


MS016B

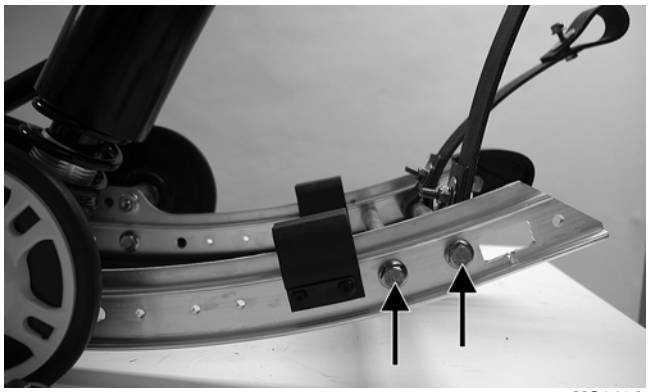
■**NOTE: If binding of the wear strip occurs, it may be necessary to use a pipe wrench, start from either end, and hook the edge of the wear strip with the pipe wrench jaw and twist the wear strip off the slide rail. Move the pipe wrench 7.5 cm (3 in.) and again twist the wear strip off the rail. Repeat this procedure until the wear strip is free of the rail.**

3. Remove the front arm limiter straps from the front arm of the skid frame.



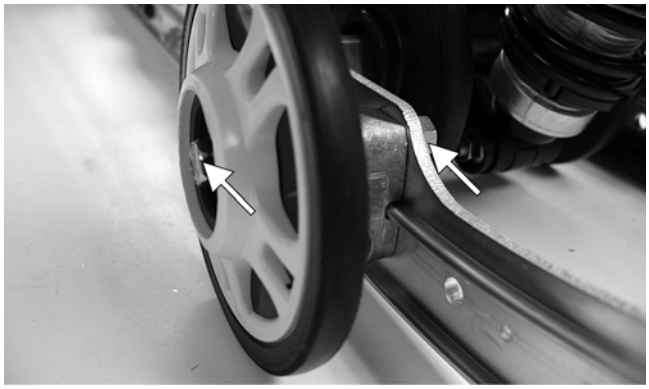
MS034A

4. Remove the cap screws securing the two front rail supports to the slide rail.

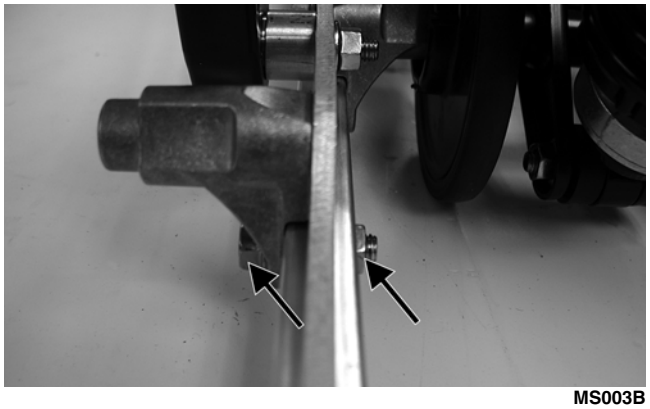


MS049A

5. Remove the cap screws and lock nuts securing the front outer idler wheel and the idler wheel mounting block.

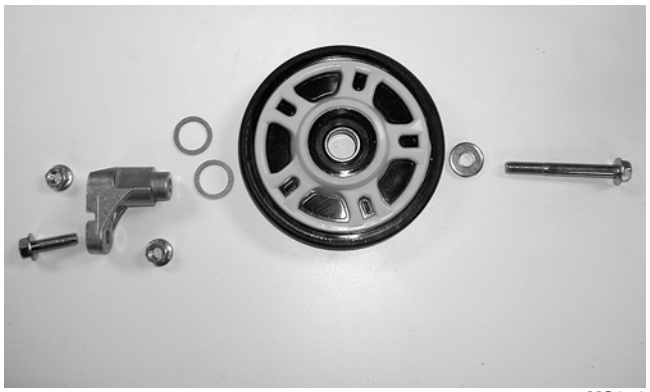


MS050A



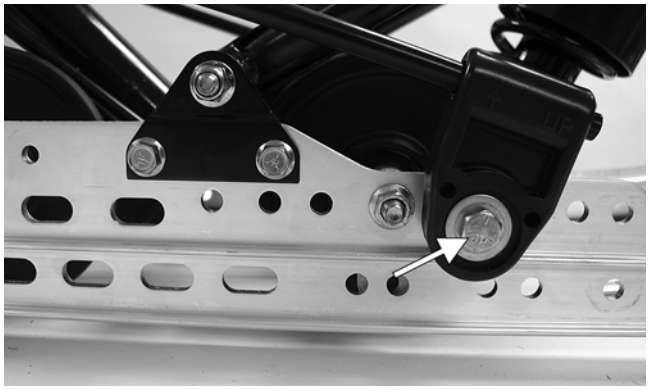
MS003B

6. Account for a flat washer and two spacer washers.



MS051

7. Remove the cap screw and flat washer securing the spring slide to the rail. Account for a spacer and the slide block.

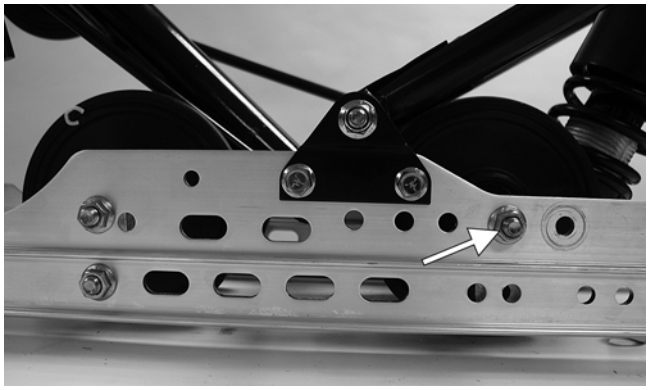


MS052A

■**NOTE: If not already done, remove the short spring leg from the adjusting cam. Also, it is recommended that the cap screw be removed from the front shock absorber to the front arm to aid in slide rail installing.**

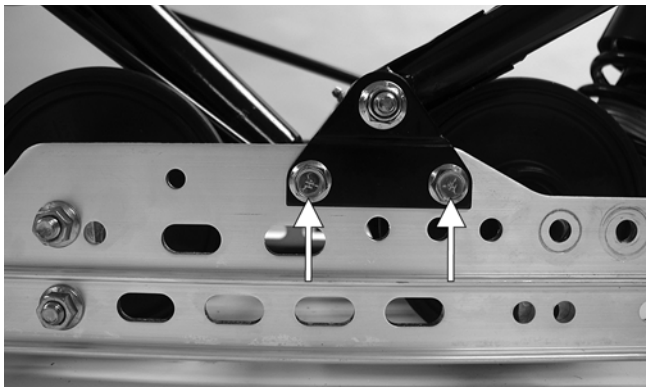
8. Remove the lock nut, cap screw, and flat washer securing the inner idler wheel assembly to the slide rail. Discard the lock nut.

■**NOTE: If it is necessary to remove the cap screws from the center components for replacing the slide rail, install the cap screw from the opposite side into the assembly to secure components and aid in replacing the slide rail.**



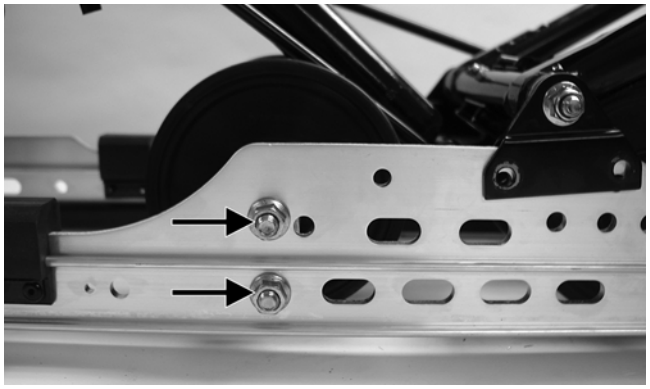
MS053A

9. Note the mounting position of the front arm mounting bracket and remove the cap screws securing the front arm mounting bracket. Account for lock nuts.



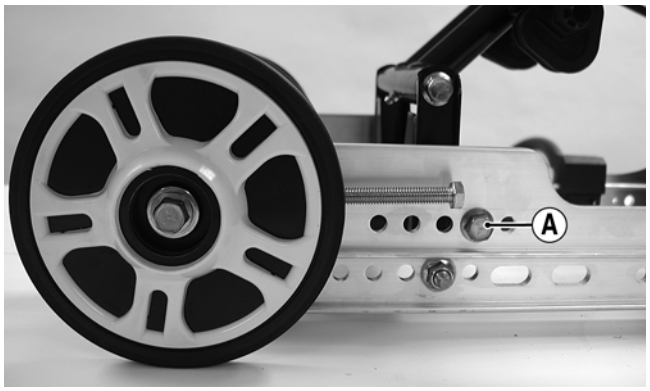
MS054A

10. Note the mounting location for installing purposes; then remove the cap screw and lock nut securing the rear inner idler wheels and mounting block.

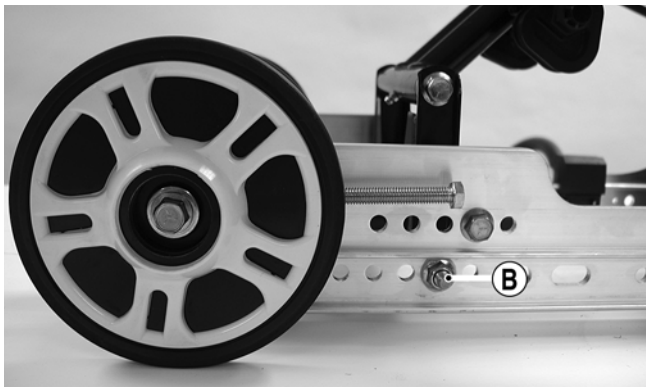


MS055A

11. Note the mounting positions of the rear arm limiter (A) and rear arm (B); then remove the cap screws, lock washers, and lock nuts from the rear arm limiter and rear arm.



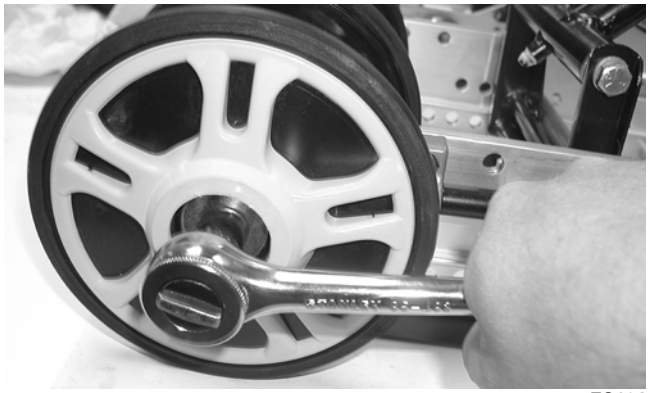
MS056A



MS056B

12. Mark the location of the rear coupler block (if applicable); then remove the block. Account for the block, bushing, cap screw, and lock nut.

13. Remove the idler wheel insert; then remove the cap screw and flat washer securing the rear idler wheel. Remove the idler wheel; then remove the adjuster bushing.



FC194

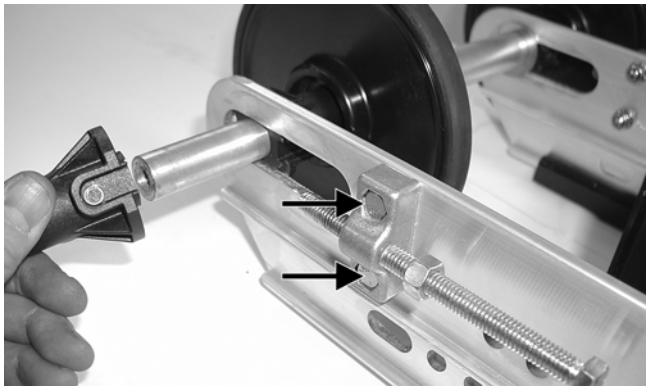


MS057

■ **NOTE: The adjusting bolt may have to be loosened to remove the adjuster bushing.**

■ **NOTE: At this point, the slide rail should be free of the skid frame components and can be removed.**

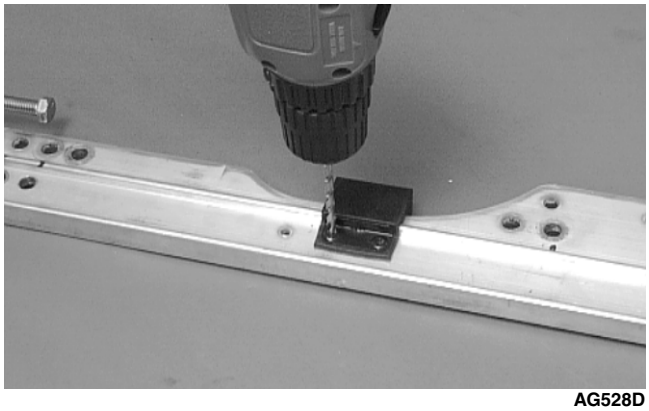
14. Remove the cap screws and lock nuts securing the track adjuster bracket.



MS057A

■ **NOTE: The shock pads should be removed only if being replaced.**

15. Using a drill and a 3/16-in. drill bit, drill out the rivets and remove the shock pads. Note the shock pad location for installation. Account for the retaining brackets.

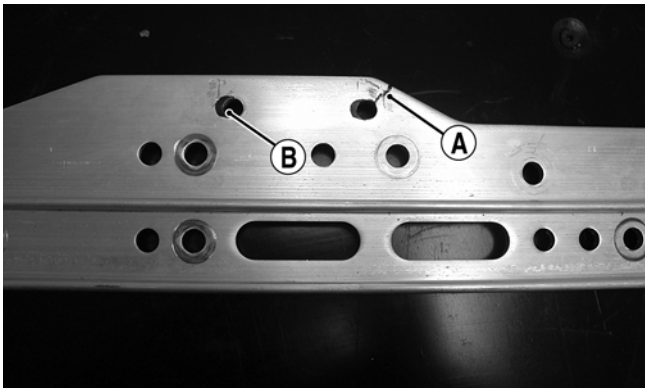


AG528D

INSPECTING

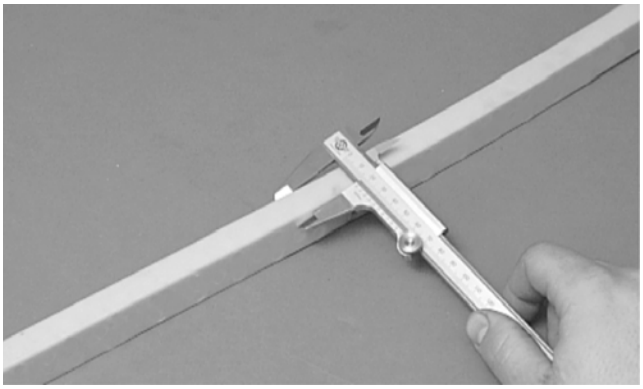
■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the slide rail for cracks (A), elongated holes (B), or unusual bends.

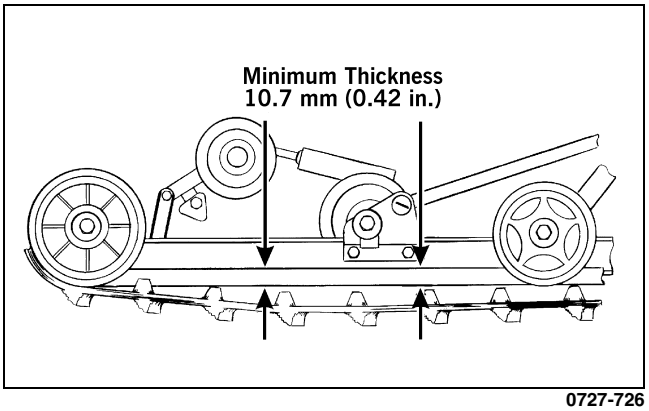


MS220A

2. Inspect the wear strip for wear. The wear strip must be 10.7 mm (0.42 in.) thick or thicker. If the wear strip measurement is less than specified, replacement of both wear strips is necessary.



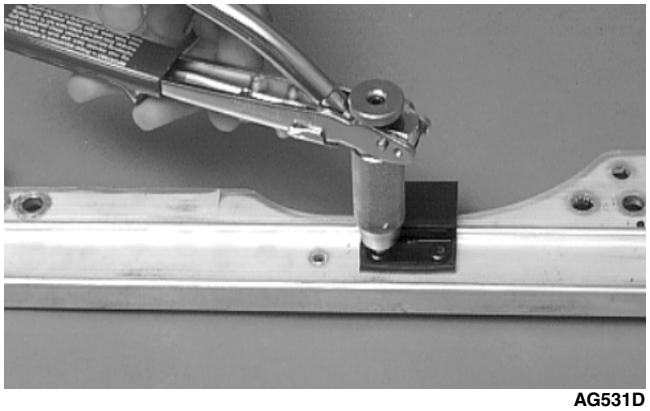
AG530D



0727-726

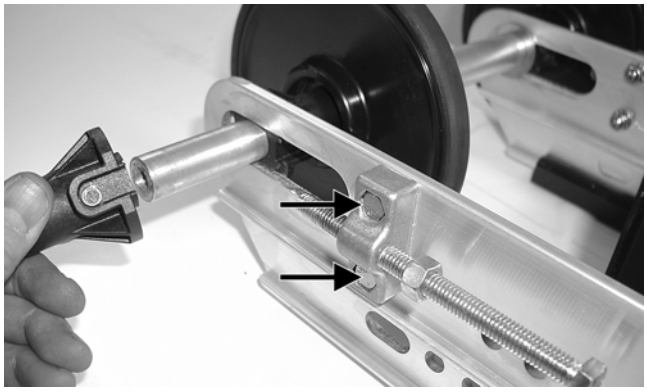
INSTALLING

1. Install the shock pads and retaining brackets; then secure with rivets.



AG531D

2. Secure the track adjuster bracket with the cap screws and lock nuts. Tighten only until snug.

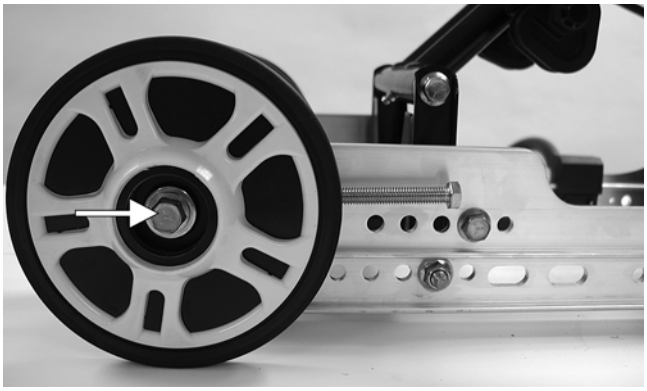


MS057A

3. Place the rail into position; then install the adjuster bushing and rear idler wheel. Install the cap screw and flat washer. Tighten only until snug.



MS058A

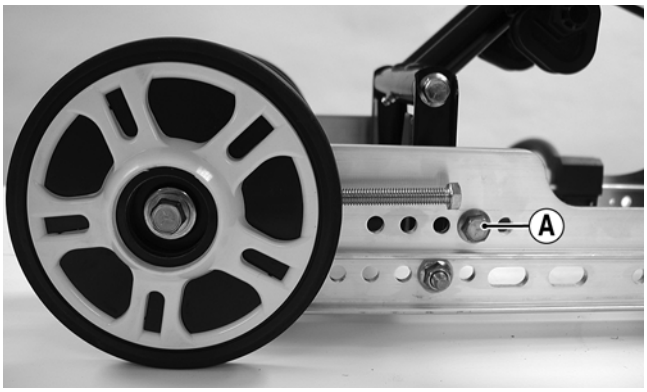


MS056C

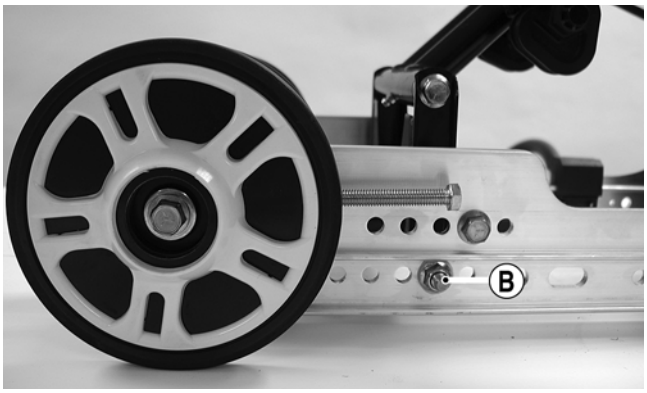
■ **NOTE: Care must be taken that the adjuster bushing slot is aligned properly with the adjuster bolt.**

■ **NOTE: It is advisable to tighten the rear idler wheel axle only until snug until the skid frame has been installed and track tension has been adjusted; then the axle assembly must be tightened to specifications.**

4. Install the rear arm limiter cap screw (A) in the appropriate hole (as noted during disassembly); then install the rear arm in the appropriate hole as noted during disassembly. Install cap screw (B) and lock nut. Tighten only until snug.



MS056A



MS056B

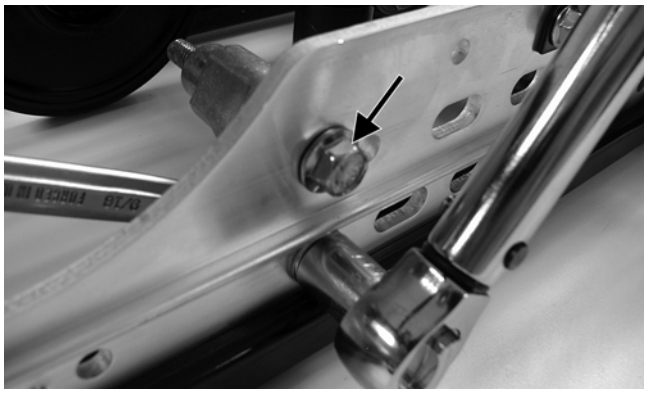
5. If applicable, install coupler block w/bushing. Secure with cap screw and lock nut. Tighten to specifications.

6. Install the rear inner idler wheel mounting block in the appropriate holes as noted during disassembly and secure with cap screw and lock nut. Tighten to specifications.



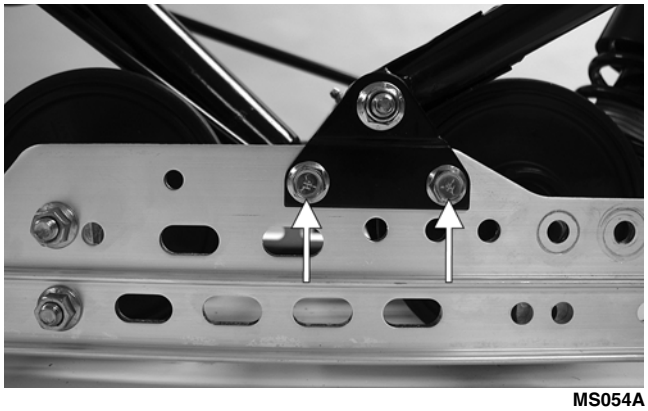
MS059

■**NOTE: To obtain proper alignment for the idler wheel cap screw, place the cap screw in the top hole through the rail and mounting block prior to tightening.**



MS059A

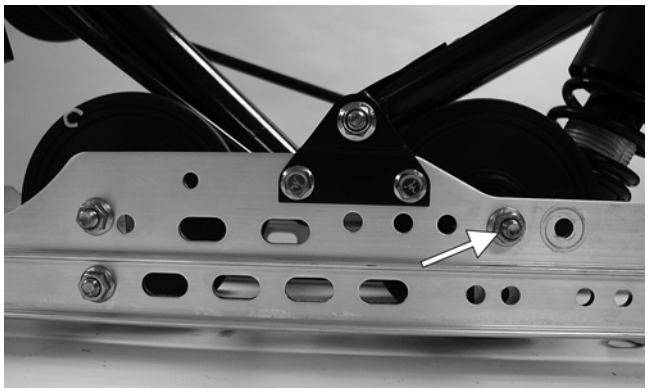
7. Secure the front arm mounting bracket with the cap screws and lock nuts. Tighten to specifications.



MS054A

■**NOTE: At this point if the front arm shock absorber was removed from the front arm, install it and tighten securely.**

8. Install the cap screw and lock nut (if removed) securing the front inner idler wheel assembly to the slide rails. Tighten to specifications.



MS053A

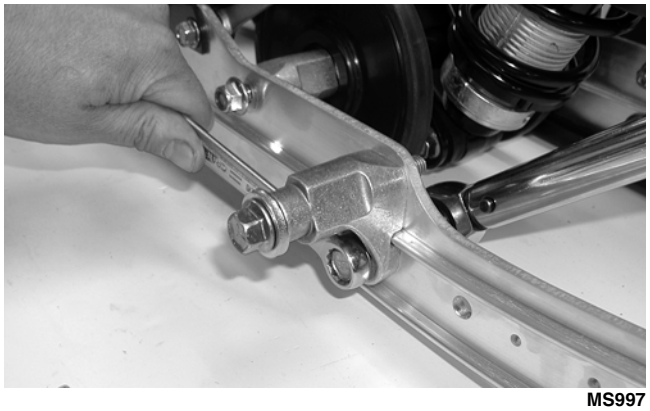
■**NOTE: At this point, tighten the cap screws A and B (from step 4) to specifications.**

9. Place the spring into the slide block; then place the spring slide and slide block assembly into position on the slide rail. Secure with a cap screw and washer. Tighten to specifications.



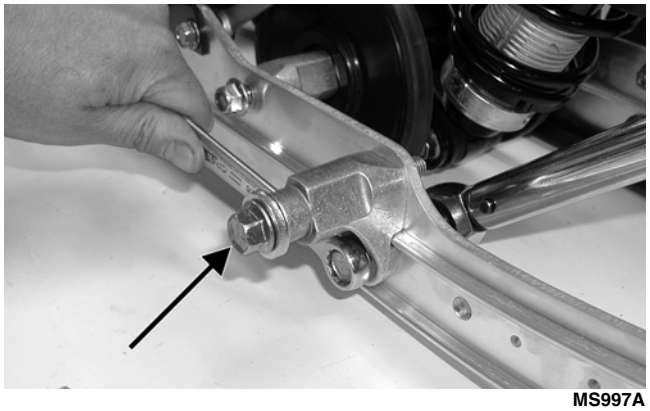
MS060

10. Secure the outer idler wheel mounting block with the cap screw and lock nut. Tighten to specifications.



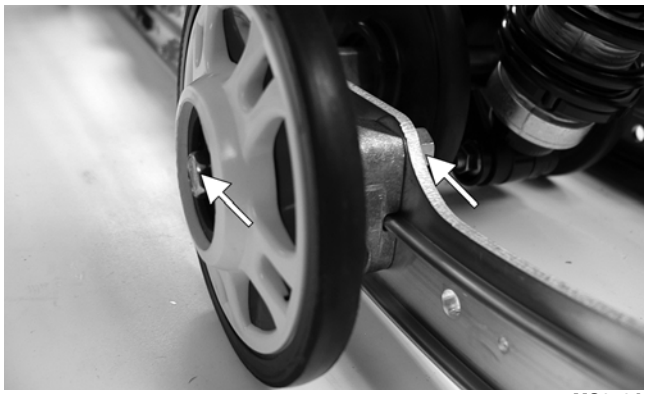
MS997

■**NOTE: To obtain proper alignment for the idler wheel cap screw, place the cap screw in the top hole through the rail and mounting block prior to tightening.**



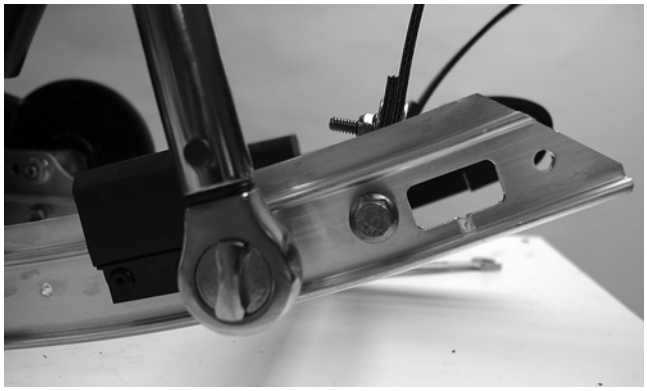
MS997A

11. Secure the outer and inner idler wheels to the mounting blocks with existing hardware. Tighten to specifications.



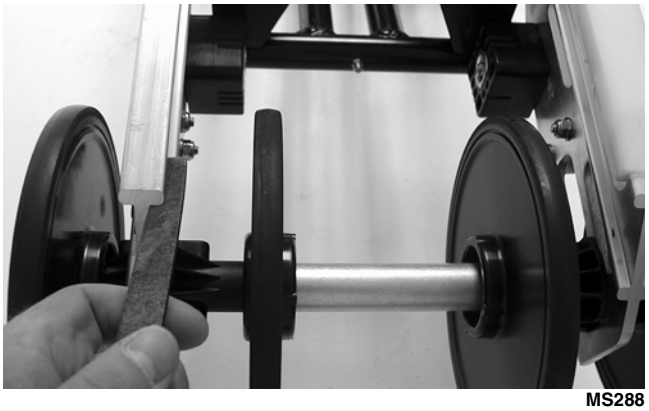
MS050A

12. Secure the rail supports with cap screws (coated with blue Loctite #243). Tighten to specifications.



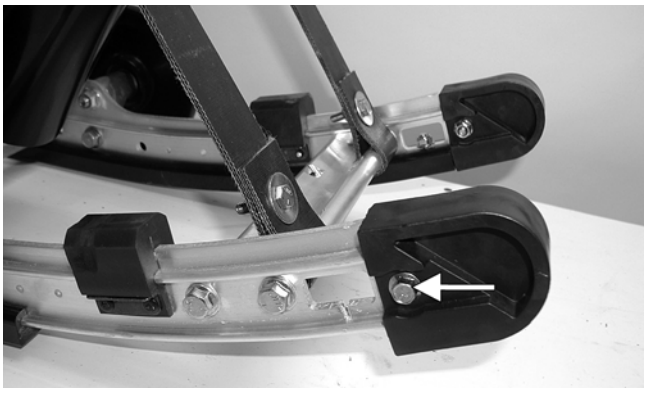
MS061

■ **NOTE: Apply a light coat of grease to the slide rail surface to aid in installing a new wear strip. If there are any sharp edges on the lower portion of the rail, use a file to remove them.**



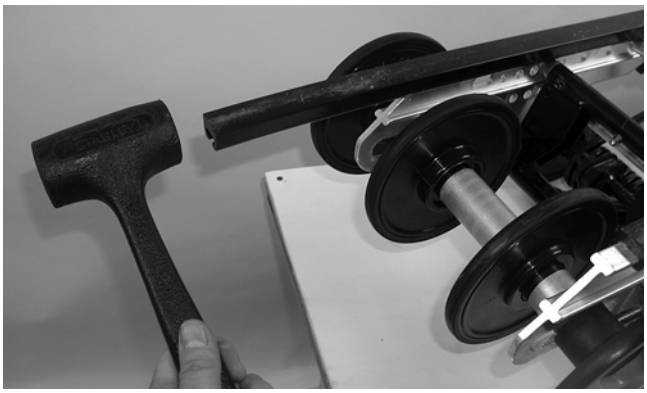
MS288

13. Secure the end cap onto the slide rail using a cap screw, flat washers, and a lock nut. Tighten to specifications.



MS206A

14. From the back, start the wear strip onto the rail; then using a soft hammer, drive the wear strip forward into position. Secure with a machine screw and lock nut. Tighten to specifications.



MS207



MS016B

15. Install the skid frame (see Installing Skid Frame in this sub-section).

■ **NOTE: It is advisable to install the rear arm springs onto the adjuster blocks after the skid frame has been installed.**

16. Adjust track tension deflection (see Track Tension in this sub-section) and track alignment (see Track Alignment in this sub-section).

⚠ CAUTION

After proper track tension and alignment have been attained, make certain that the rear axle assembly is tightened to specifications or component damage will occur.

Installing Skid Frame

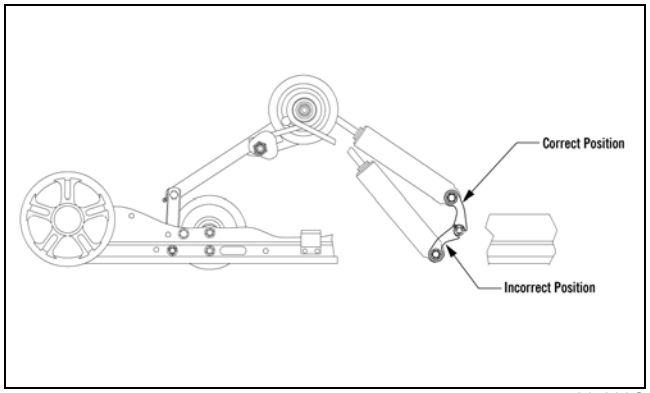
1. Place a piece of cardboard on the floor to protect against scratching and tip the snowmobile onto one side.

2. Pull the track away from the tunnel and spread open; then place the skid frame into the track.

3. Position the front of the skid frame into the tunnel and align the front arm with the appropriate mounting hole in the tunnel. Insert the cap screw with washers through the tunnel mounting hole and through the front arm. DO NOT TIGHTEN AT THIS TIME. Repeat this procedure on the other side.

⚠ CAUTION

When installing the skid frame, make sure the rear arm shock mounting location on the pivot/axle is positioned correctly above the axle or component damage will occur.



739-992A

■ **NOTE: To aid in centering the front arm with the hole in the tunnel, position the skid frame and track at a 45° angle to the bottom of the tunnel.**

4. Elevate the rear of the skid frame and the track into position in the tunnel.

5. Align the pivot idler arm assembly with the appropriate hole in the tunnel. Secure the pivot idler arm assembly with a cap screw (coated with red Loctite #271), lock washer, and flat washer. DO NOT TIGHTEN AT THIS TIME.

■ **NOTE: Do not install the short legs of the rear springs onto the adjusting cams at this time.**

6. At this time, tighten all four skid frame mounting cap screws securely.

7. Using the Rear Suspension Spring Tool (p/n 0144-311), install the short legs of the rear springs onto the adjusting cams making sure the cams are in the same adjustment positions.

8. Tighten the two track tension adjusting bolt evenly until track deflection is within specifications; then lock the jam nuts to secure the adjustment.

9. Check track tension deflection and alignment; adjust if necessary (see Track Tension and Track Alignment in this sub-section).

Track Tension

⚠ WARNING

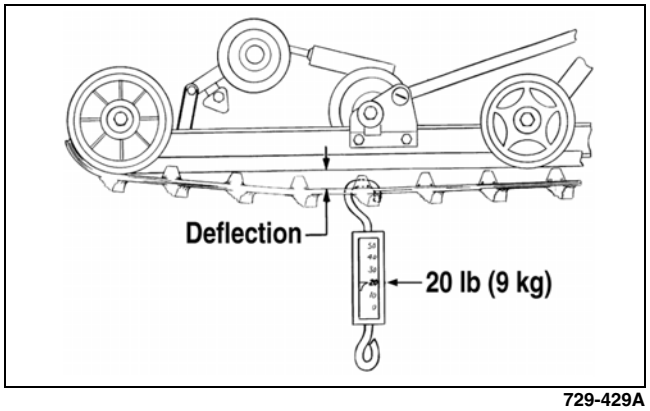
Deactivate all switches.

CHECKING DEFLECTION

1. Tip the snowmobile on its side.

2. Hook a spring scale around a track clip at mid-span; then pull the track down with the scale to 9 kg (20 lb) and measure the distance between the bottom of the wear strip and the inside surface of the track clip. Track deflection must be within specifications.

Rear Suspension Style	Setup Tension	After Break-In Tension
FasTrack w/Torque Sensing Link (121 in. Track)	38-44 mm (1 1/2-1 3/4 in.)	44-51 mm (1 3/4-2 in.)



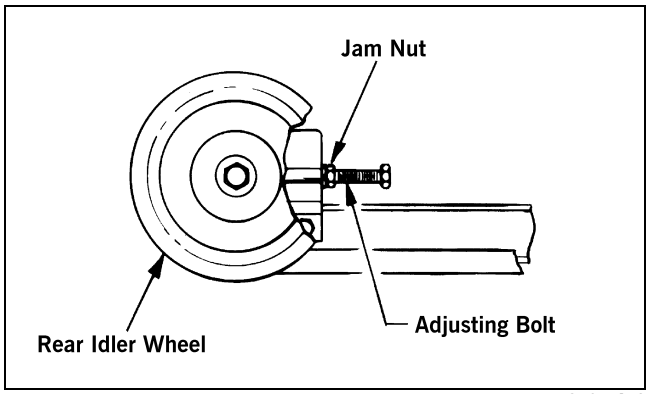
729-429A

■ NOTE: If the track is new, it will stretch slightly and take a "set" within the first 300 to 500 miles of operation.

ADJUSTING DEFLECTION

1. Place the snowmobile up on a shielded safety stand. Check to make sure the track is 2-3 in. off the floor.

2. If the measurement is not as specified, loosen the jam nuts of the adjusting bolts.



0727-456

3. If the measurement obtained in step 2 is more than specified, tighten the adjusting bolts. If the measurement obtained is less than specified, loosen the adjusting bolts. When the measurement is within specification range, lock the adjustment by bottoming the jam nuts against the axle housings.

■ NOTE: If the track tension must be loosened, it may be necessary to loosen the rear axle assembly slightly.

■ NOTE: Vigorously push the underside of the track up and down. Track must not hit the top of the tunnel or slap the skid frame.

4. After correct track tension is obtained, check track alignment (see Track Alignment in this sub-section).

■ NOTE: Track tension and track alignment are interrelated; always check both even if only one adjustment seems necessary. Always establish correct track tension before checking and/or adjusting alignment.

⚠ CAUTION

After proper track tension and alignment have been attained, make certain that the rear axle assembly is tightened to specifications or component damage will occur.

Track Alignment

■NOTE: Proper track alignment is when the rear idler wheels are equidistant from the inner drive lugs on the inside surface of the track.

CHECKING

1. Using a shielded safety stand, raise the rear of the snowmobile off the floor making sure the track is free to rotate.

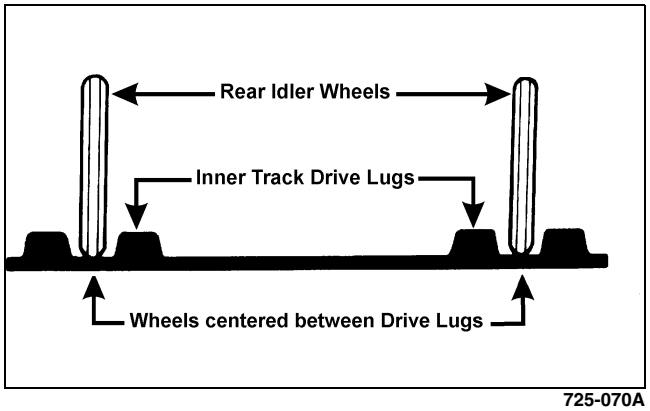
⚠ WARNING

The tips of the skis must be positioned against a wall or similar object for safety. Keep hands, feet, and clothing away from moving components.

2. Start the engine and accelerate slightly. Use only enough throttle to rotate the track several revolutions. SHUT THE ENGINE OFF.

■NOTE: Allow the track to coast to a stop. Do not apply the brake because it could produce inaccurate alignment conditions.

3. When the track stops rotating, check the relationship of the rear idler wheels and the inner track drive lugs. If the distance from the idler wheels to the inner drive lugs is the same on both sides, no adjustment is necessary.



725-070A

4. On the side of the track which has the inner drive lugs closer to the rear idler wheel, loosen the adjusting bolt jam nut; then rotate the adjusting bolt clockwise 1-1 1/2 turns.

■NOTE: If track alignment must be adjusted, it may be necessary to loosen the rear axle assembly slightly.

5. Continue to check the track alignment and make the necessary adjustments until proper alignment is obtained.

6. After proper track alignment is obtained, lock the jam nut against the axle housing.

■NOTE: Make sure correct track tension is maintained after adjusting track alignment.

⚠ CAUTION

After proper track alignment has been attained, make certain that the rear axle assembly is tightened to specifications or component damage will occur.

■NOTE: Field test the track under actual conditions and, after the field test, check track alignment and track tension; adjust as necessary.

Repair Procedure 2 - Track/Rear Suspension

This Track/Rear Suspension sub-section (Repair Procedure 2) has been organized so each procedure can be completed individually and efficiently. Each sub-section has (as necessary) Removing, Disassembling, Cleaning and Inspecting, Assembling, and Installing procedures. Some components may vary from model to model. The technician should use discretion and sound judgment when removing and installing components.

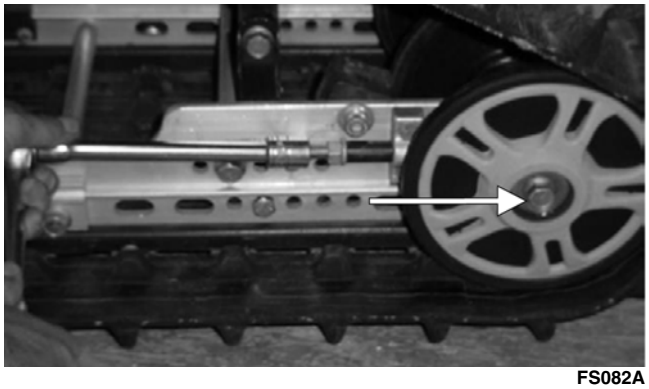
■NOTE: Critical torque specifications are located on page 174 of this section.

■NOTE: Some illustrations and photographs used in this sub-section are used for clarity purposes only and are not designed to depict actual conditions.

Removing Skid Frame

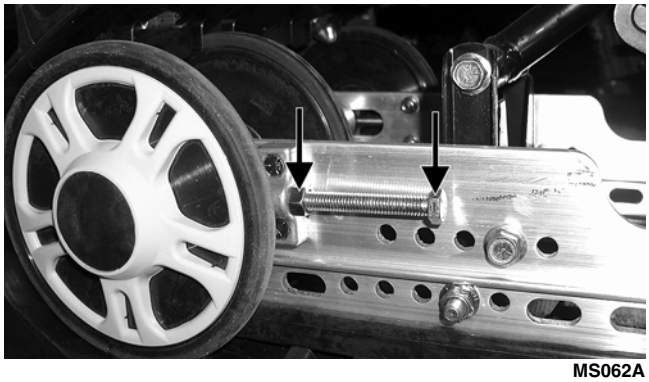
■NOTE: Many service procedures can be performed without removing the skid frame. Closely observe the note introducing each sub-section for this important information.

1. To avoid having the adjuster bushings binding during removal, remove the rear idler wheel caps and loosen the cap screws on the rear axle.



FS082A

2. Loosen the jam nuts and two track-tension adjusting bolts.



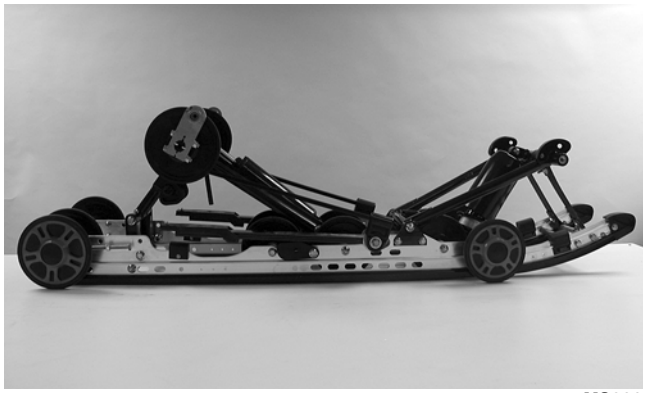
MS062A

3. Place a support stand under the rear bumper; then while holding the flared bushing, remove the rear cap screws securing the skid frame to the tunnel. Account for lock washers and flat washers.

■ NOTE: The support stand should hold the snowmobile level but not raised off the floor.

4. Remove the front cap screws securing the skid frame to the tunnel. Account for a flat washer and a lock washer.

5. Remove the support stand; then tip the snowmobile onto one side using a piece of cardboard to protect against scratching. Remove the skid frame.



MS066

Wear Strips

REMOVING

■ NOTE: The skid frame does not have to be removed for this procedure; however, if wear strip binding or slide rail damage has occured, the skid frame should be removed for this procedure (see Removing Skid Frame in this sub-section).

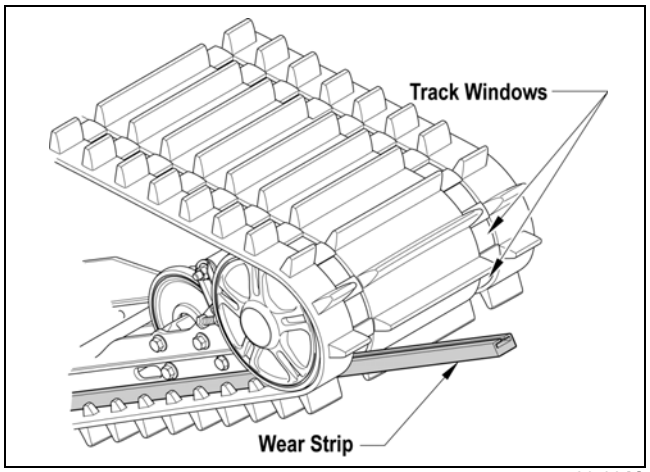
1. Remove the machine screw and lock nut securing the wear strip to the front of the slide rail.



MS016B

■ NOTE: If the skid frame has been removed due to difficulty in removing the wear strip, it may be necessary to use a pipe wrench, start from either end, and hook the edge of the wear strip with the pipe wrench jaw and twist the wear strip off the slide rail. Move the pipe wrench 7.5 cm (3 in.) and again twist the wear strip off the rail. Repeat this procedure until the wear strip is free of the rail.

2. Align the wear strip with the openings (windows) in the track; then using a suitable driving tool, drive the wear strip rearward off the slide rail.



739-884A

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

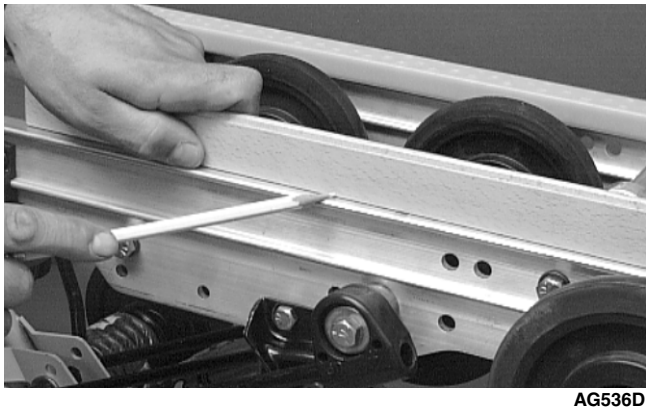
1. Clean the slide rail using parts-cleaning solvent and compressed air.

⚠ WARNING

Always wear an approved pair of safety glasses when using compressed air.

2. Inspect the slide rail for cracks. If any cracks are found, replace the slide rail.

3. Using a straightedge, inspect the slide rail for any unusual bends. With the slide rail removed, place the straightedge along the bottom surface of the slide rail. If the rail is found to be bent, it must be replaced.

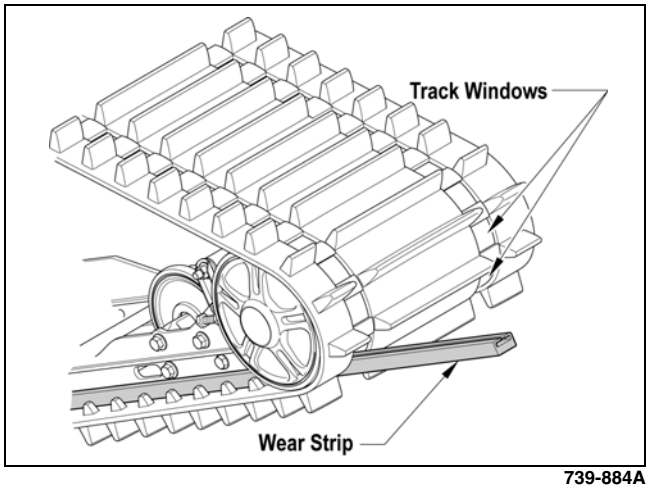


AG536D

INSTALLING

■**NOTE: Apply a light coat of grease to the slide rail surface to aid in installing a new wear strip. If there are any sharp edges on the lower portion of the rail, use a file to remove them.**

1. Align the wear strip with the openings (windows) in the track and from the back, start the wear strip onto the rail; then using a block of wood and a hammer, drive the wear strip forward into position.



739-884A

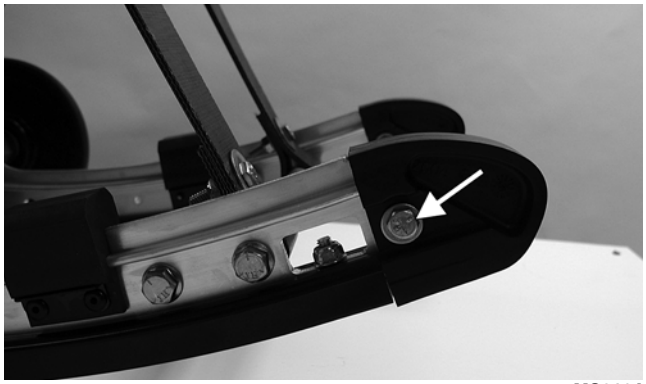
2. Secure with a machine screw and lock nut. Tighten to specifications.

End Caps

■**NOTE: The skid frame does not have to be removed for this procedure.**

REMOVING

1. Remove the lock nut, washers, and cap screw securing the end cap.



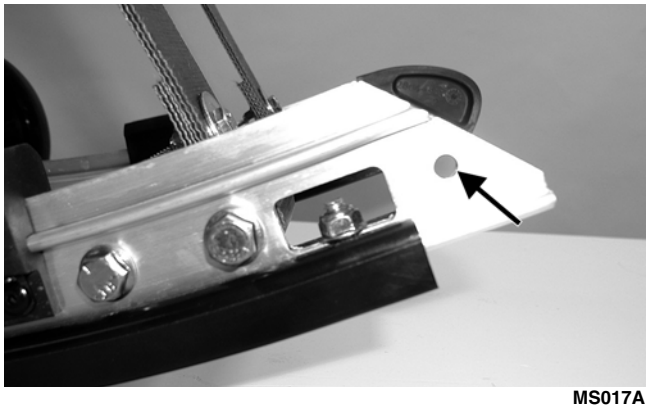
MS016A

2. Using a hammer, tap the end cap off the rail.

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the end cap area of the slide rail for cracks and wear.



MS017A

2. Inspect the end cap for any signs of cracking or wear.



MS290A

3. Clean both the slide rail area and the end cap. Using compressed air, clean the areas of dirt and gravel.

⚠ WARNING

Always wear an approved pair of safety glasses when using compressed air.

4. Inspect the cap screw for cracked, stretched, or damaged threads. Use a new lock nut when assembling.

INSTALLING

1. Position the end cap on the slide rail; then align the hole in the end cap with the hole in the slide rail.

2. Secure with a cap screw, washers, and lock nut. Tighten to specifications.

Shock Pads

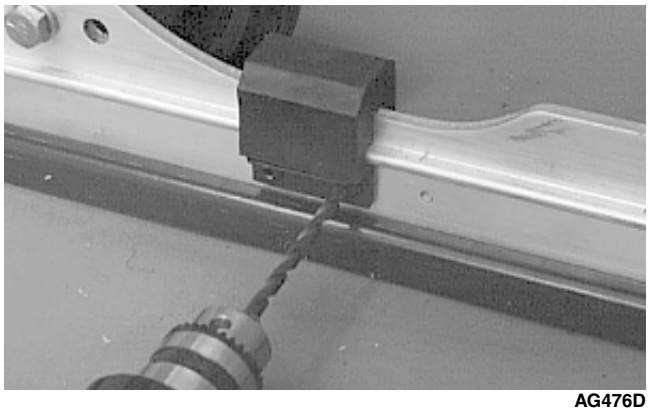
NOTE: The skid frame does not have to be removed for this procedure.

■

REMOVING

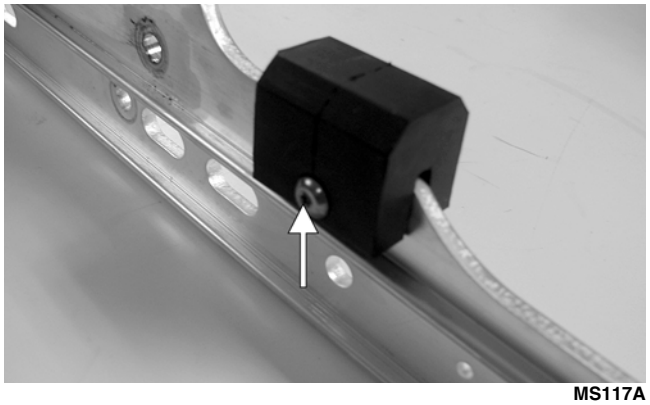
■ NOTE: The shock pads should be removed only if being replaced.

1. Using a 3/16-in. drill bit, drill out the rivets securing each front shock pad to the slide rail. Account for the retaining brackets.



AG476D

2. Remove the torx-head screws and lock nuts securing the rear shock pads to the slide rail.



MS117A

3. Remove the shock pads.

INSPECTING

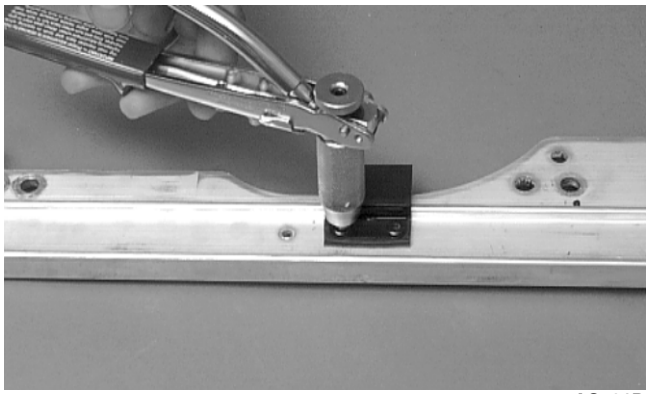
■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect the pad and retaining brackets for damage or wear.

2. Inspect the rivet holes in the slide rail for damage or elongation.

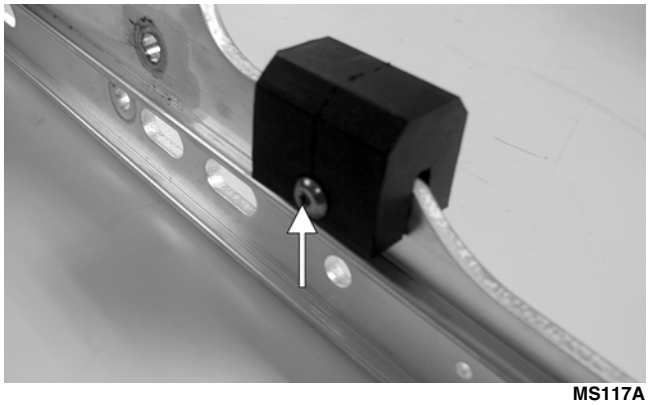
INSTALLING

1. Place the front pads and retaining brackets into position on the slide rail.
2. Secure the front pads with rivets.



AG531D

3. Place the rear pads into position on the slide rails.
4. Secure the rear pads with the torx-head screws.



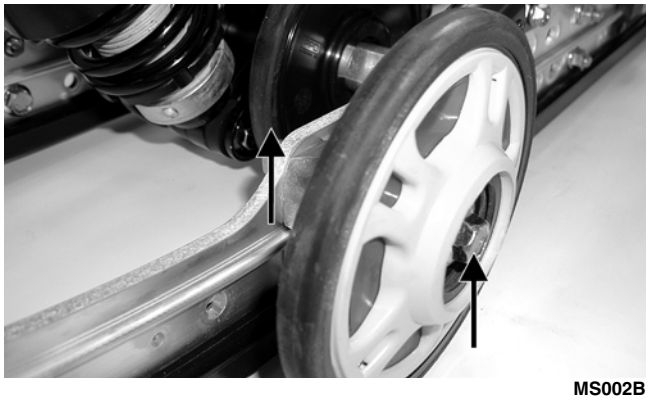
MS117A

Front Outer Idler Wheels

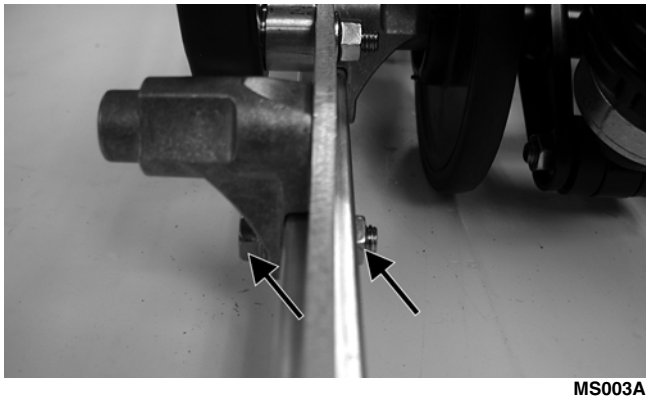
■NOTE: The skid frame does not have to be removed for this procedure.

REMOVING

1. Remove the cap screws and lock nuts securing the front outer idler wheel and the idler wheel mounting block. Account for flat washers and two shim washers (if applicable).

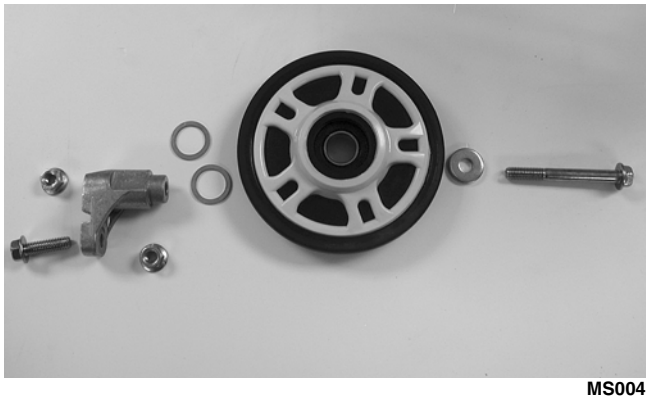


MS002B



MS003A

2. If applicable, note the locations of the shim washers for assembly purposes. The shim washers are to be installed to the inside of the idler wheels.



MS004

■NOTE: On the idler wheels with inserts, account for a spacer.



MS005

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean the bearing with a clean cloth.
2. Inspect each idler wheel and each plastic hub for cracks or damage.
3. Rotate the idler wheel bearing (by hand) and inspect for binding or roughness.
4. If a bearing must be replaced, use this procedure.

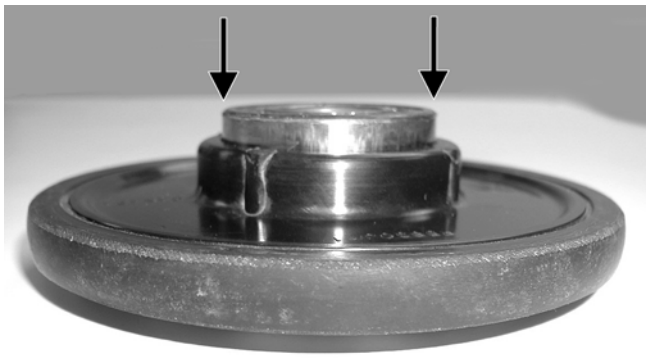
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert (if applicable) and the snap ring.

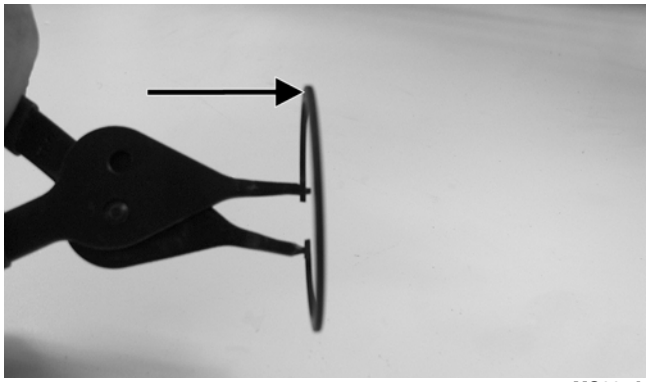
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

E. Install the insert (if applicable).



MS008

INSTALLING

1. Secure the mounting block on the slide rail with a cap screw and lock nut. Tighten to specifications.



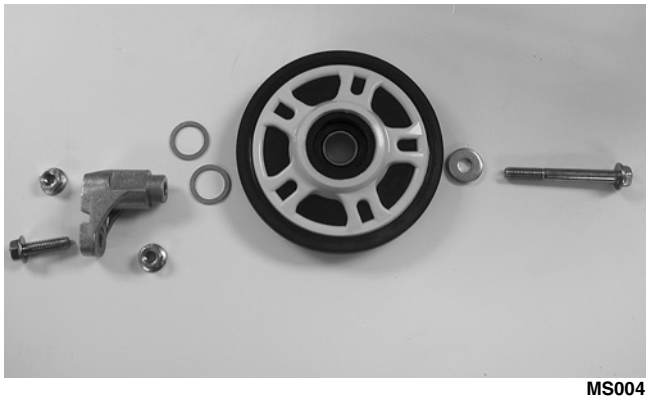
MS009

■NOTE: For proper alignment, it is advisable to install an idler wheel cap screw into the top mounting block hole prior to tightening.



MS009A

2. Place the two shim washers (if applicable), idler wheel, and axle against the mounting block making sure there is a flat washer on the outside of the idler wheel.



MS004

■**NOTE: On idler wheels with inserts, install spacers.**



MS005

3. Secure the idler wheel assembly with a cap screw and a lock nut. Tighten cap screws to specifications.



MS208

Rear Inner Idler Wheels

■**NOTE: The skid frame does not have to be removed for this procedure.**

REMOVING

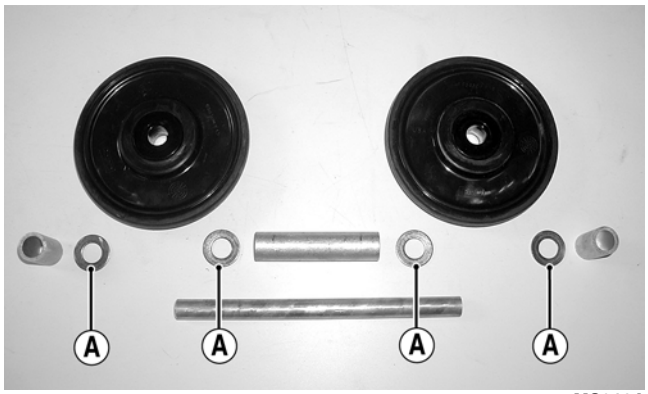
1. Remove the cap screws securing the rear inner idler wheel and the idler wheel assembly. Account for four flat washers, three spacers, and an axle.



MS209A

2. Note the locations of the washers and spacers for installing purposes.

■**NOTE: The washers (A) must be installed next to the idler wheels. The short spacers (B) must be installed against the slide rail.**



MS210A



MS210B

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearing with a clean cloth.

2. Inspect each idler wheel and plastic hub for cracks or damage.

3. Rotate the idler wheel bearings (by hand) and inspect for binding or roughness.

4. If a bearing must be replaced, use this procedure.

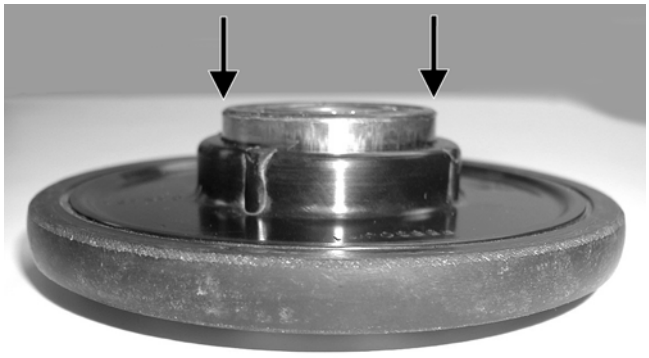
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert (if applicable) and the snap ring.

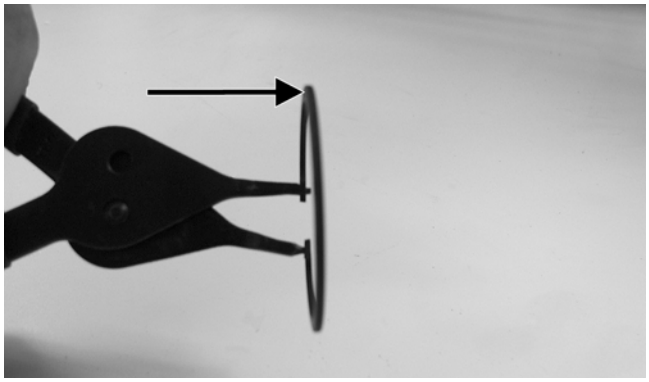
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the "sharp side" is directed away from the bearing.



MS007A

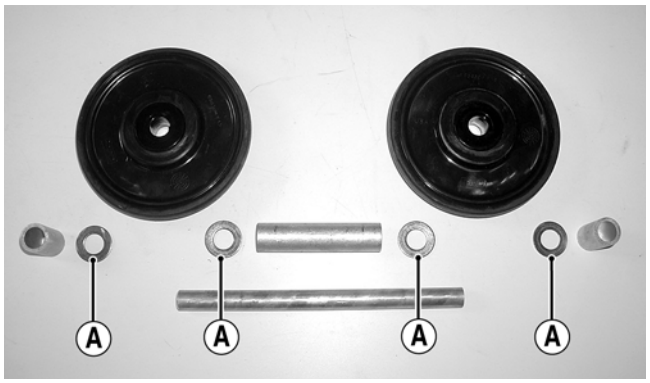
E. Install the insert (if applicable).



MS008

INSTALLING

1. Place the long spacer on the axle; then from each side, install a washer (A), idler wheel, washer, and a short spacer (B). Tighten to specifications.



MS210A



MS210B

2. Place the idler wheel and axle assembly into position between the slide rails. Tighten to specifications.



MS211

Rear Upper Idler Wheels/Rear Springs

■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this subsection).**

REMOVING

1. Using the Rear Suspension Spring Tool (p/n 0144-311), remove the spring from the adjusting cam.

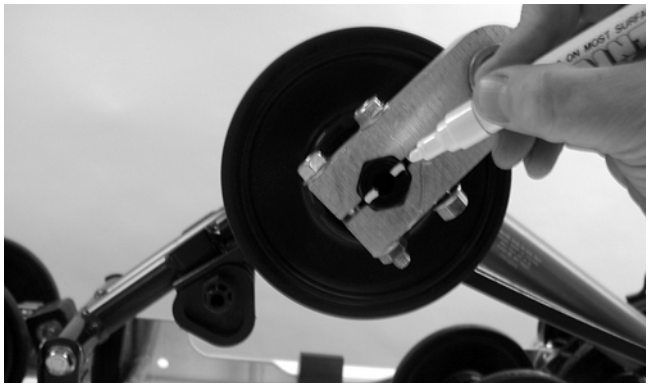
⚠ WARNING

Care must be taken when removing the spring or damage or injury could result.



MS063

2. Mark the offset pivot idler and the idler arm for assembly purposes.



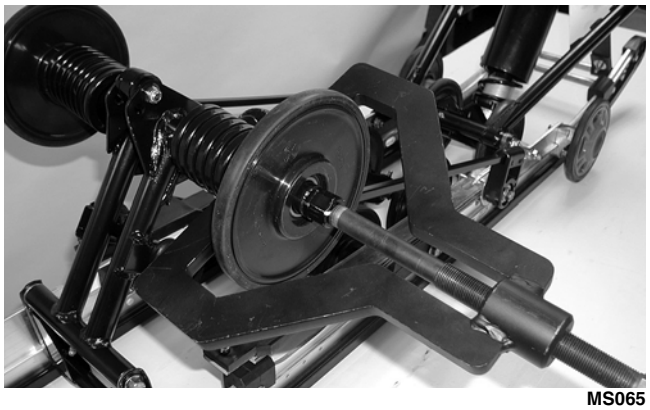
MS142

3. Remove the cap screws securing the offset pivot idler arm to the idler arm; then remove the offset pivot idler arm assembly. Account for a flanged axle, washer, flared bushings, idler spacer collar, and lock nuts.



MS064

4. Using Idler Wheel Puller Kit (p/n 0644-122), remove the wheel.

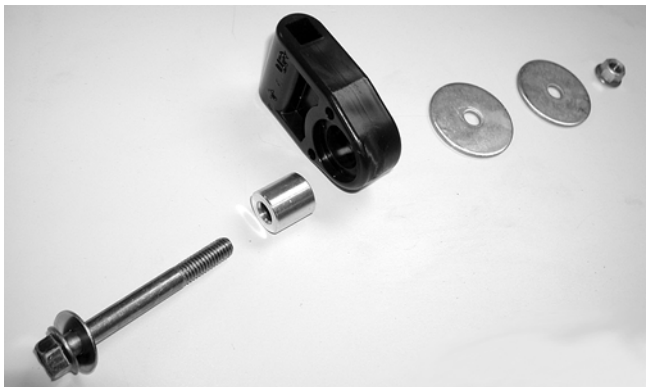


MS065

5. Remove the cap screw, lock nut, and flat washer securing the spring slide to the rail. Account for a slide block and washer.



MS067A



MS068

6. Remove the spring and sleeve from the idler arm.



MS069

■**NOTE: Use the same procedure for the other side.**

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearing with a clean cloth.
2. Inspect each idler wheel and plastic hub for cracks or damage.
3. Rotate the idler wheel bearings (by hand) and inspect for binding or roughness.
4. If a bearing must be replaced, use this procedure.

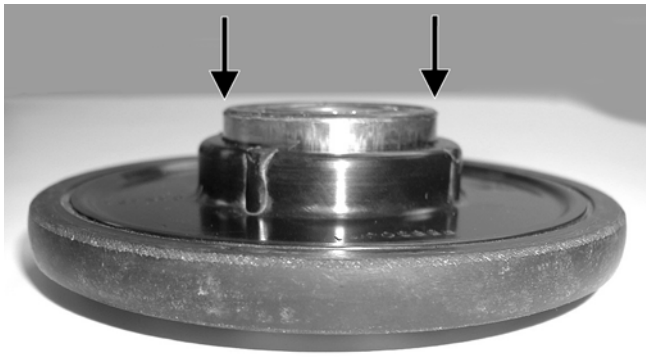
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert (if applicable) and the snap ring.

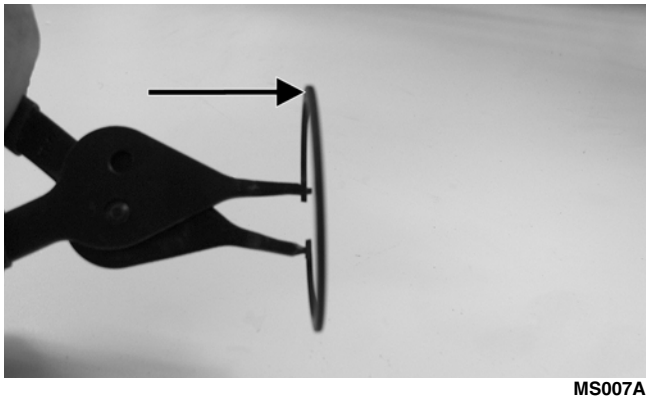
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

E. Install the insert (if applicable).



MS008

5. Inspect the spring, spring slide, sleeve, washers, slide block insert, and shaft area for wear.

6. Inspect the adjusting cams and arms for cracks.

INSTALLING

1. Slide the sleeve and spring onto the idler arm.



MS069

2. Place the slide spacer and slide block (with spring in slide block) into position on the slide rail. Secure with a cap screw, flat washers, and lock nut. Tighten to specifications.

■ NOTE: Make sure the spring is located above the spring slide mounting bolt.



MS070

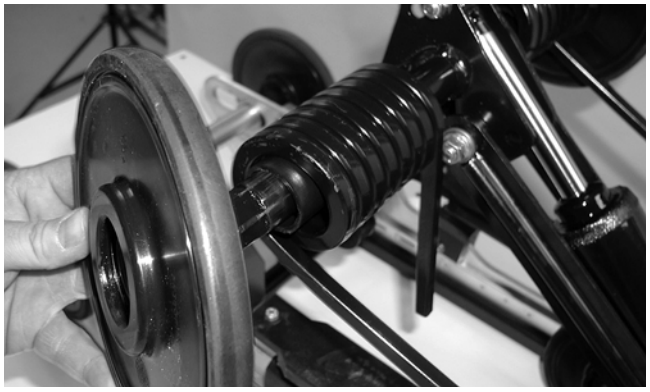


MS068



MS071

3. Using a suitable driving tool, install the rear upper idler wheel on the idler arm.



MS074

⚠ CAUTION

When driving the idler wheel onto the idler arm, use a tool to contact the inside race of the bearing or damage to the wheel or bearing may occur.

4. Install the idler spacer collar onto the idler arm.

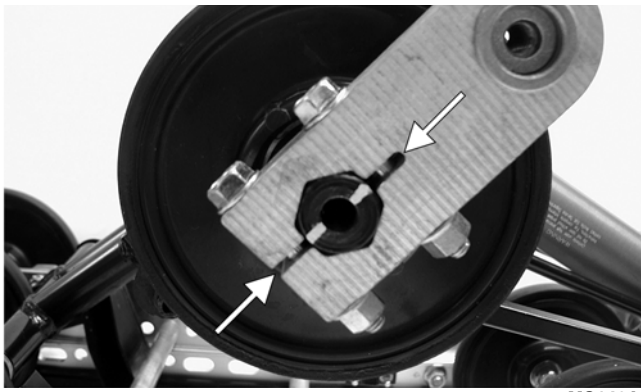


MS064

5. Place the flared bushings with a thin flat washer through the notched side of the offset pivot idler arm assembly.

■ NOTE: If the flared bushing in the offset pivot idler arm is loose, it must be cleaned and green Loctite #609 must be applied to it prior to installation.

6. Align the marks on the idler arm to the centerline of the offset pivot idler arm assembly. Secure the offset pivot idler arm to the idler arm with cap screws and lock nuts. Tighten to specifications.



MS146A

■**NOTE: When tightening the pivot idler arm lock nuts, tighten the lower lock nut first or binding may occur.**

7. Install the skid frame (see Installing Skid Frame in this sub-section).

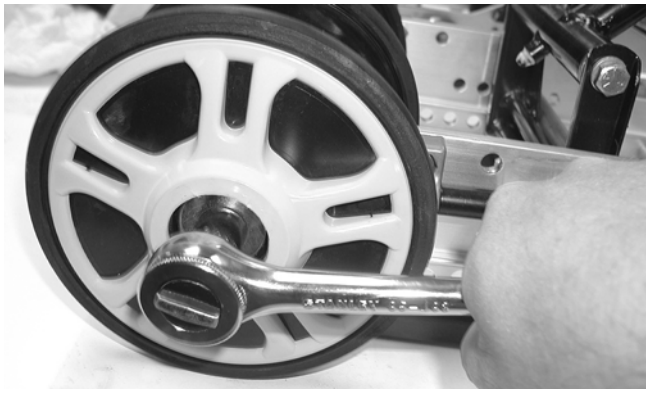
■**NOTE: It is advisable to install the rear arm springs onto the adjuster blocks after the skid frame has been installed.**

Rear Axle and Idler Wheels

■**NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section).**

DISASSEMBLING

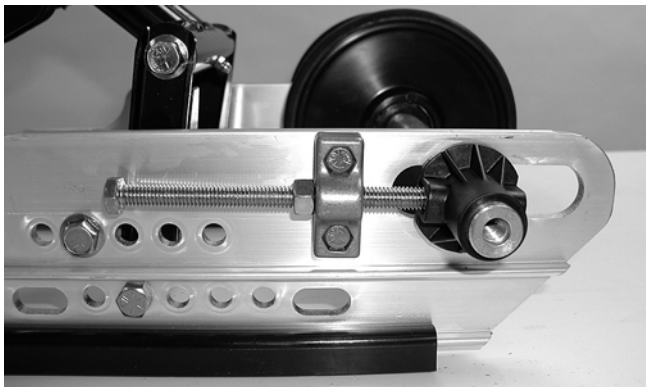
1. Remove the cap screw and large flat washer securing the outer rear idler wheel. Remove the outer idler wheel from the shaft.



FC194

■**NOTE: The large flat side of the wheel insert is positioned next to the inner plastic adjuster bushing. The idler wheel must be installed with the wheel insert properly positioned.**

2. Loosen the track adjusting bolts. Slide the outer adjuster bushings off the axle.

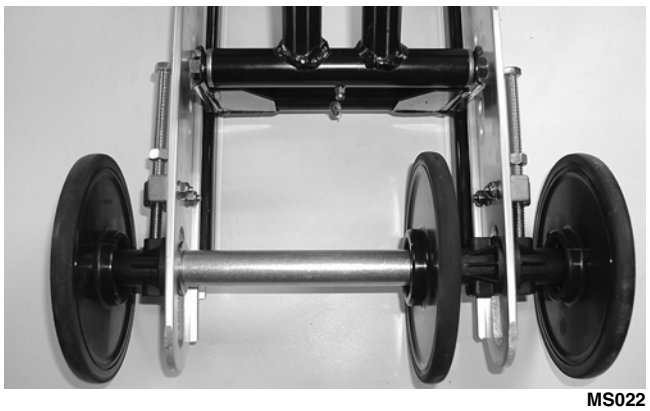


MS020



MS021

3. Carefully slide the shaft out from the inner idler wheels and note the position of the spacers and washers.



MS022

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearings with a clean cloth.

2. Inspect all idler wheel inserts (inner and outer) for any cracks.
3. Inspect the outer rubber portion of the idler wheels for cracks and poor bonding.
4. Inspect the plastic insert of each idler wheel for cracks.
5. Inspect the shaft for wear and damaged threads.
6. Inspect all idler wheel bearings. Turn each bearing (by hand) and if any roughness or binding is noted, replace the bearing.
7. If a bearing must be replaced, use this procedure.

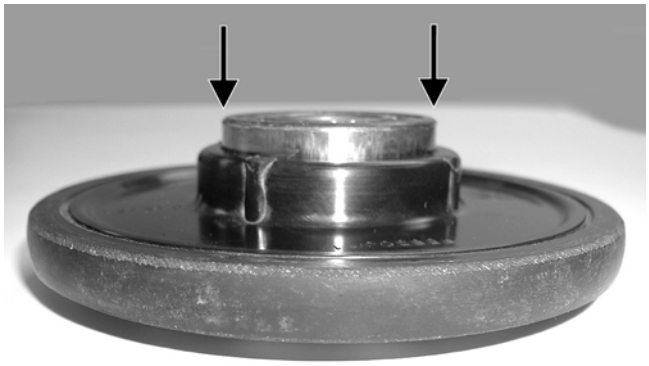
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert (if applicable) and the snap ring.

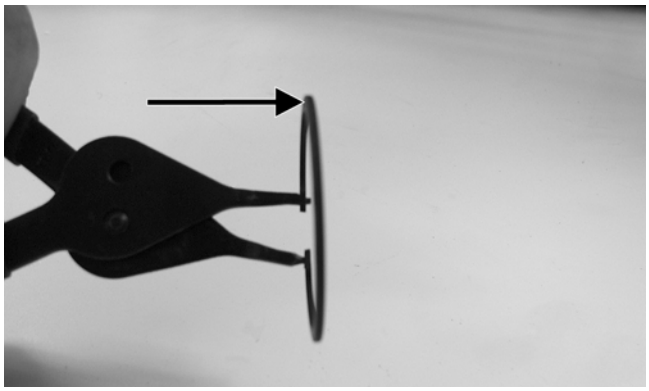
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the "sharp side" is directed away from the bearing.



MS007A

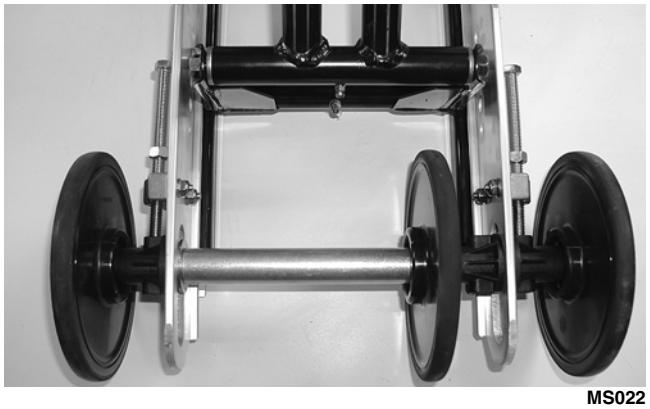
E. Install the insert (if applicable).



MS008

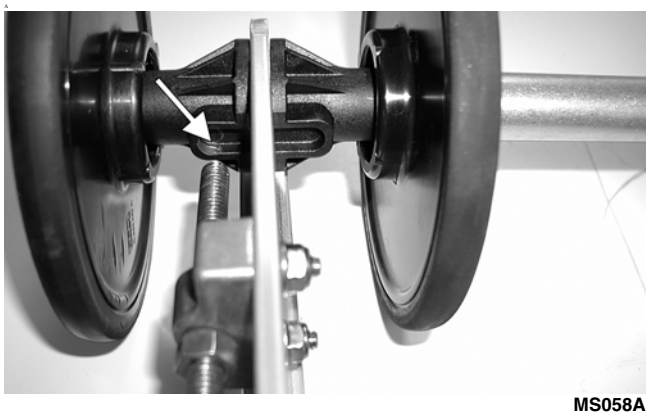
ASSEMBLING

1. In order from the right-hand side, slide the axle through the slide rail axle slot; then place a bushing, inner idler wheel with insert (if applicable), and long spacer with a flat washer on the axle. Slide the axle through the opposite slide rail axle slot. Place the plastic adjuster bushings on the axle (on the outside of each axle slot).



MS022

■ NOTE: Make sure the slot in the adjuster bushing is aligned directly with the adjusting bolt.



MS058A

2. Place the outer idler wheels on the axle (with the large flat of the insert directed inward) and secure with two cap screws (coated with blue Loctite #243) and large flat washers. Tighten cap screws only until snug.

■**NOTE: It is advisable to tighten the rear idler wheel axle only until snug until the skid frame has been installed and track tension has been adjusted; then the axle assembly must be tightened to specifications.**



MS212

3. Install the skid frame (see Installing Skid Frame in this sub-section).

■**NOTE: It is advisable to install the rear arm springs onto the adjuster blocks after the skid frame has been installed.**

4. Adjust track alignment (see Track Alignment in this sub-section).

5. Adjust track tension deflection (see Track Tension in this sub-section).

Idler Arm/Rear Arm

■**NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section).**

DISASSEMBLING

1. Remove the rear upper idler wheels and springs (see Rear Upper Idler Wheels/Rear Springs in this sub-section).

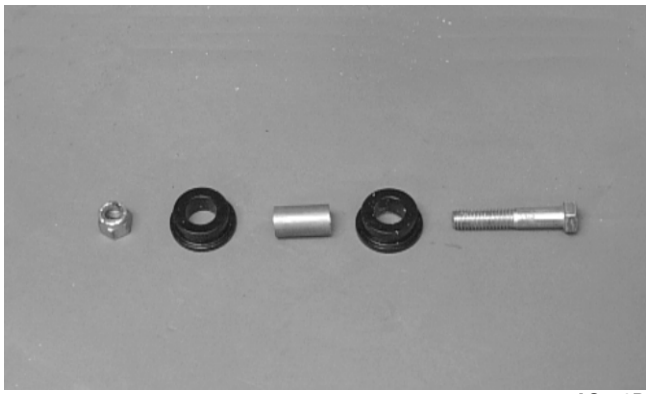


MS074

2. Remove the cap screw and lock nut securing the upper shock eyelet to the idler arm. Account for a spacer, lock nut, and bushings.



MS075A



AG553D

■**NOTE: Mark the hole that the upper shock links are mounted in for assembly purposes.**

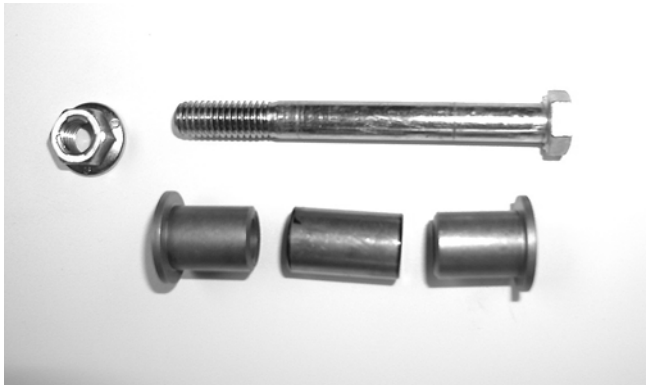


MS076

3. Remove the cap screw and lock nut securing the upper shock links to the idler arm. Account for a lock nut, spacer, and axle links.

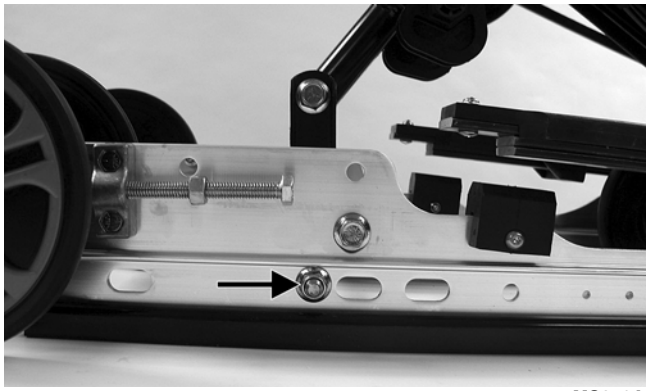


MS081

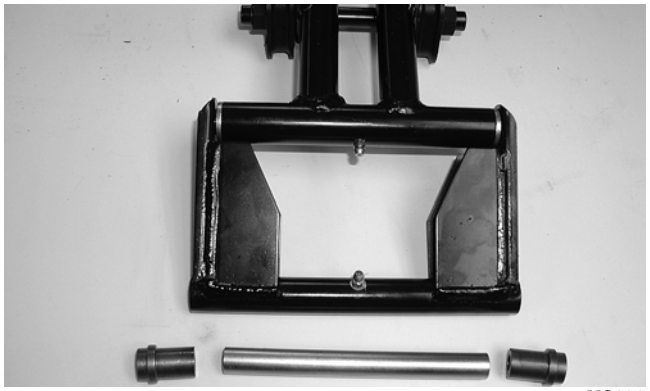


MS031

4. Remove the cap screw, washer, and lock nut securing the rear arm to the slide rail. Account for the serrated axles and axle tube.



MS078A



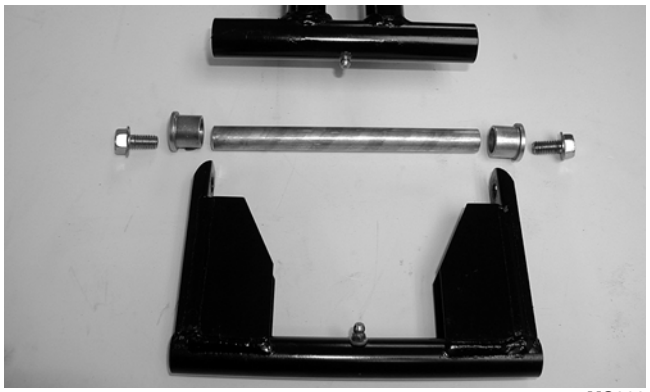
MS028

■**NOTE: At this point on the Bearcat 570, remove the rear arm limiter strap.**

5. Remove the cap screw and lock nut securing the rear arm to the idler arm. Account for the aluminum axle and bushing assemblies.



MS029A



MS030

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Closely inspect the rear arm/idler arm tubing and brackets for cracks or unusual bends.
2. Clean the bearings with a clean cloth.
3. Inspect each idler wheel for cracks or damage.
4. Inspect the bushings (located in the arm pivot area) for wear or damage.
5. Inspect all welds and the tubing of the upper arm for cracks or unusual bends.
6. Inspect the two adjusting cams for damage.
7. If a bearing must be replaced, use this procedure.

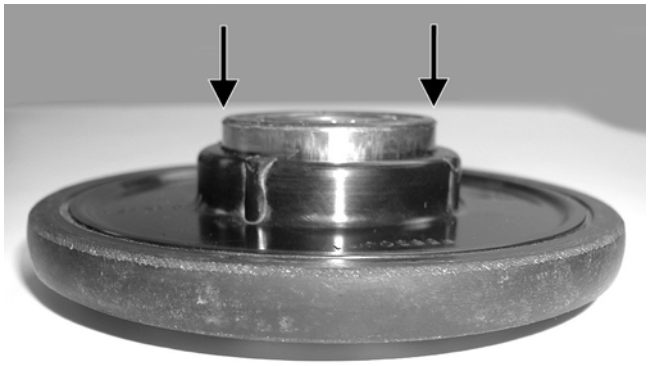
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert (if applicable) and the snap ring.

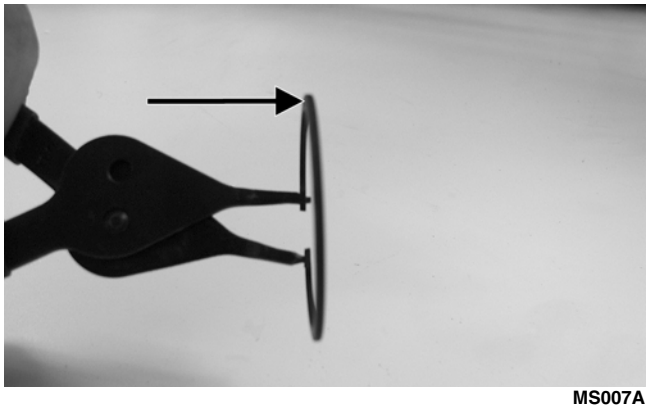
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

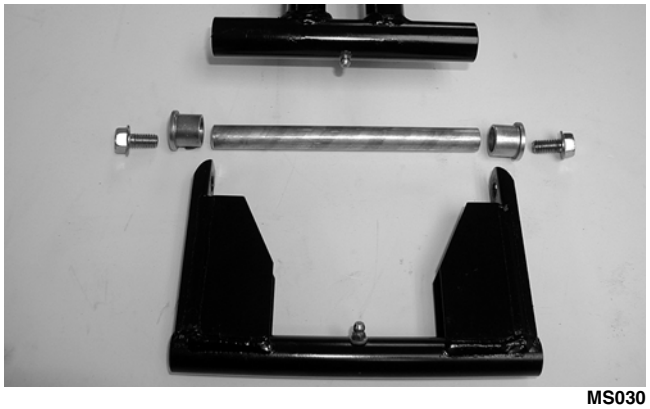
E. Install the insert (if applicable).



MS008

ASSEMBLING

1. Install the rear arm onto the idler arm with an aluminum axle, bushing assemblies, two cap screws (coated with blue Loctite #243), and a lock nut. Tighten only until snug.



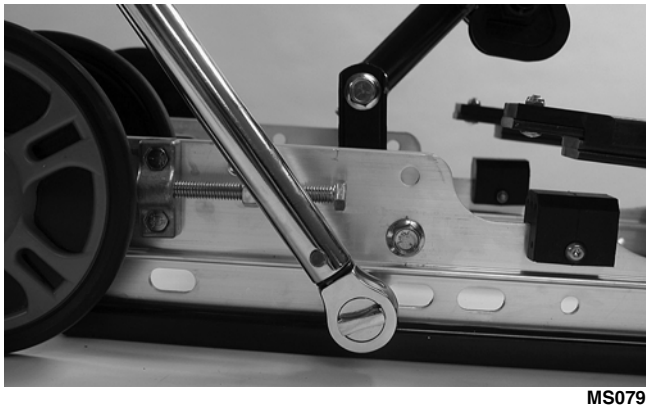
MS030



MS029A

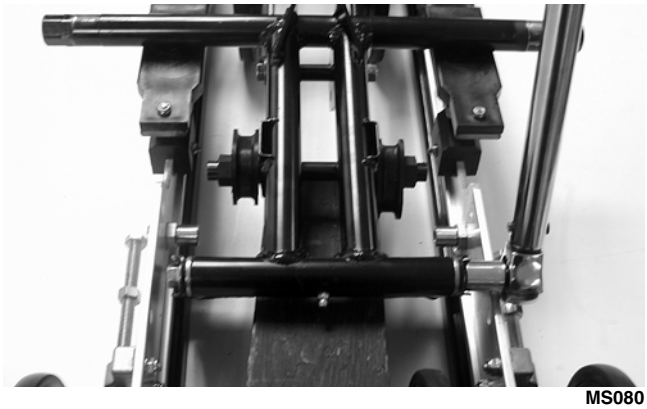
■ **NOTE: At this point on the Bearcat 570, install the rear arm and the idler arm; then secure with the cap screws, flat washers, and lock nuts. Tighten to 1.4 kg-m (10 ft-lb).**

2. Place the rear arm assembly into position. Secure with a cap screw, washer, and lock nut. Tighten to specifications.



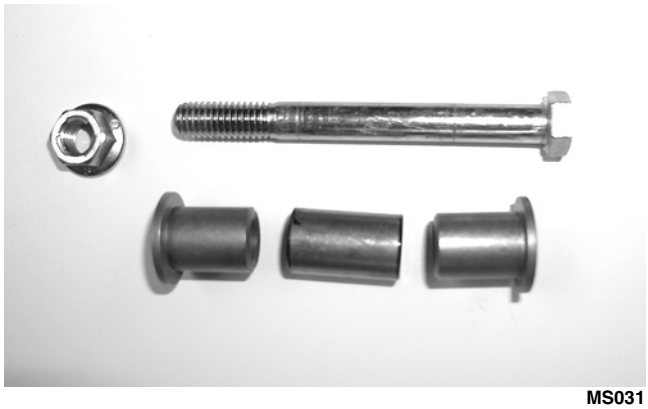
MS079

3. Place a support beneath the rear arm; then tighten the cap screws (from step 1) to specifications.



MS080

4. Position the shock links in the appropriate holes of the idler arm brackets (see Chassis and Skid Frame Mounting Locations in this section). Place a spacer between the center of the brackets. Insert the axle links into the upper shock link eyelets; then insert the cap screw through the eyelets. Secure with a cap screw, washer, and lock nut. Tighten securely.

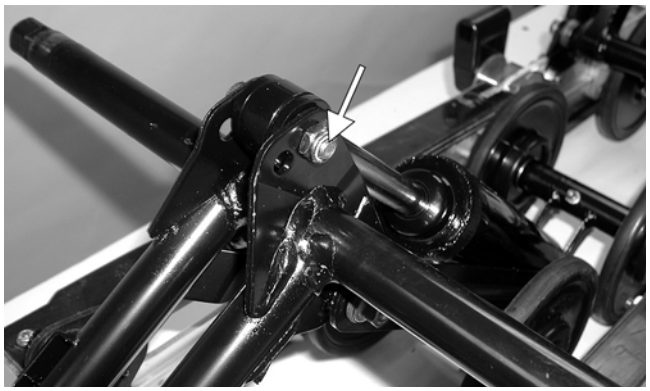


MS031



MS081

5. Place the upper shock eyelet with bushings between the idler arm brackets making sure the spacer is properly positioned between the brackets. Secure with a cap screw and lock nut. Tighten securely.



MS075A

■ **NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.**

6. Grease the idler arm and rear arm grease fittings with a low-temperature grease.

7. Install the rear upper idler wheels, rear springs, and offset pivot idler (see Rear Upper Idler Wheels/Rear Springs in this sub-section).

8. Install the skid frame (see Installing Skid Frame in this sub-section).

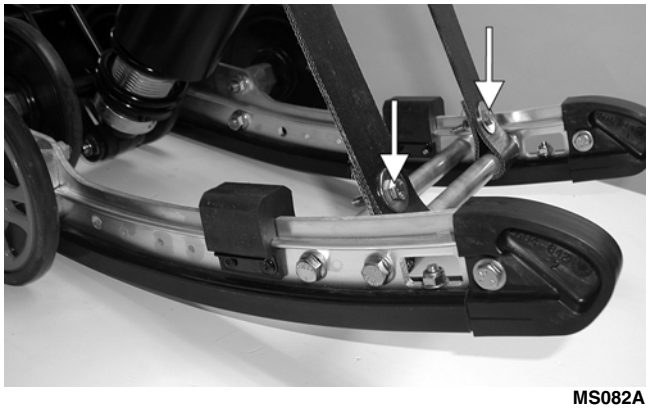
■ **NOTE: It is advisable to install the rear arm springs onto the adjuster blocks after the skid frame has been installed.**

Front Arm/Front Shock Absorber/Front Inner Idler Wheels

■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section), and the rear springs must be removed from the adjusting cams.**

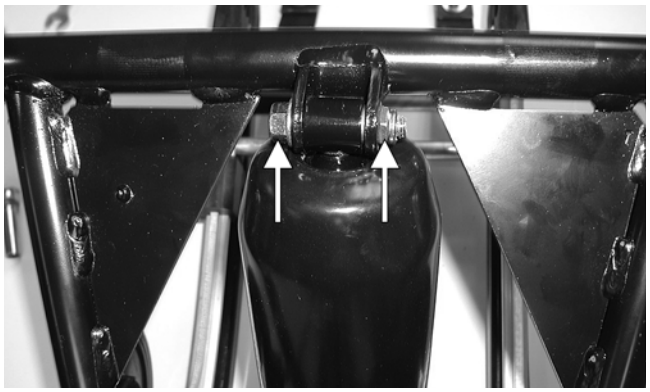
REMOVING

1. Remove the lower cap screws and lock nuts securing the limiter straps to the rail support. Account for flat washers.



MS082A

2. Remove the cap screw and lock nut securing the upper front shock absorber eyelet to the front arm. Pull the shock eyelet free of the bracket. Account for a serrated axle.



MS039A

3. Remove the cap screw and lock nut securing the front arm to the front arm mounting brackets.



MS083A

4. Remove the front arm and account for the serrated axles, bushings, and an axle tube.



MS036

5. Remove the cap screw and lock nut securing the front inner idler wheels to the slide rail.



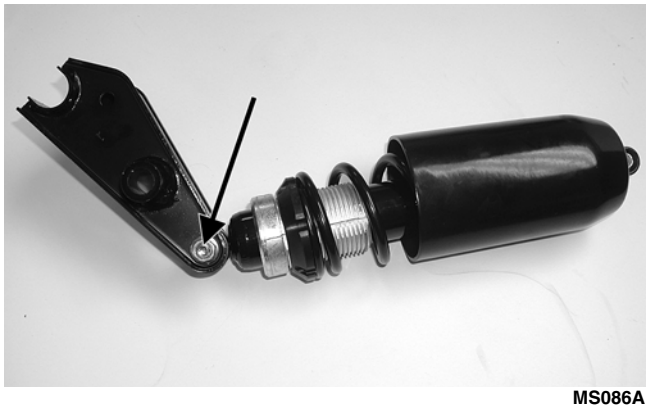
MS084A

6. From one side, tap the idler assembly rearward until the mounting blocks clear the slide rail; then remove the assembly.

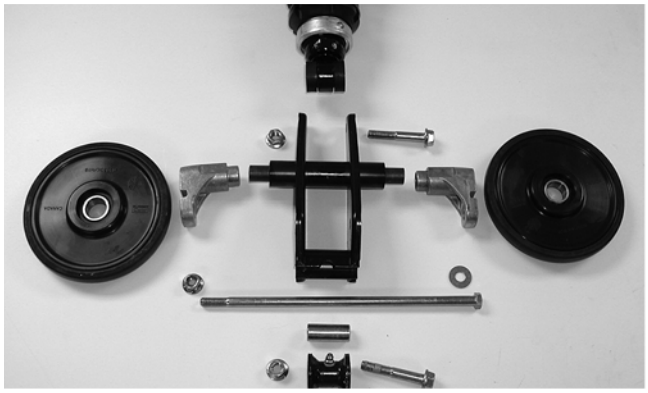


MS085

7. Remove the mounting blocks and slide the axle out of the shock bracket; then remove the cap screw and lock nut securing the shock absorber to the bracket.



MS086A



MS042A

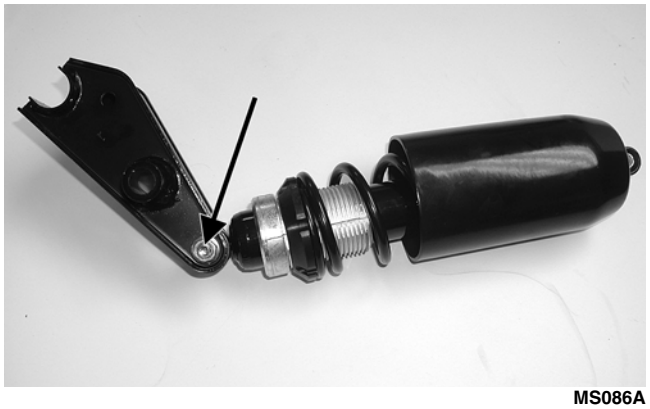
INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect all front arm weldments for cracks or unusual bends.
2. Closely inspect all tubing for cracks or unusual bends.
3. Inspect the bearings, bushings, front arm spacers, and mounting blocks for wear or damage.
4. Inspect the shock absorber for any signs of oil leakage especially at the point where the shock shaft enters the shock body.
5. Inspect the shock absorber eyelet welds (at each end) for any cracks, signs of separation, or for unthreading.

INSTALLING

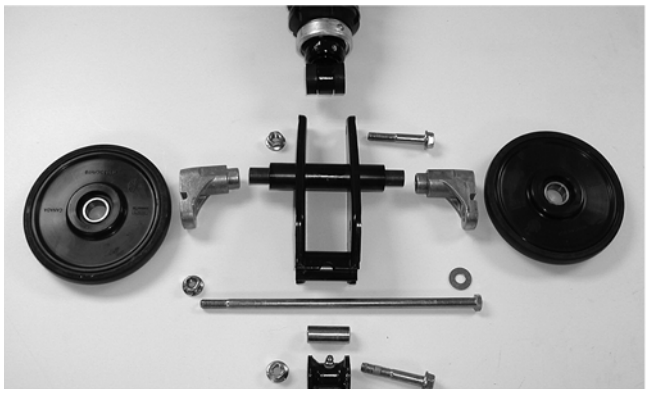
1. Secure the shock absorber to the shock bracket with the cap screw and lock nut. Tighten securely.



MS086A

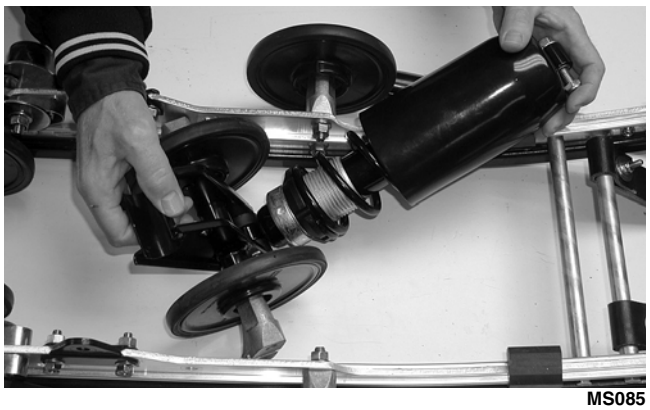
■ NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.

2. Apply grease to the axle; then install the axle into the shock bracket. Install the mounting blocks to the axle.



MS042A

3. Place the idler wheel assembly into position on the skid frame making sure the mounting blocks are properly positioned. Secure with the cap screw, washer, and a new lock nut. Tighten only until snug.



MS085

4. Position the front arm into the mounting brackets. Secure with cap screws and lock nuts. Tighten to specifications.



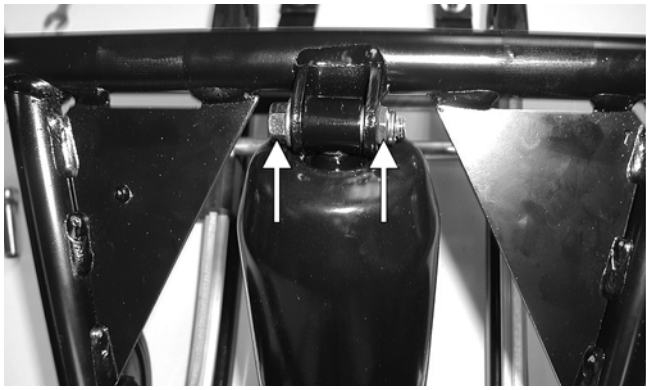
MS087

■**NOTE: At this point, tighten the lock nut (from step 3) to specifications.**



MS088

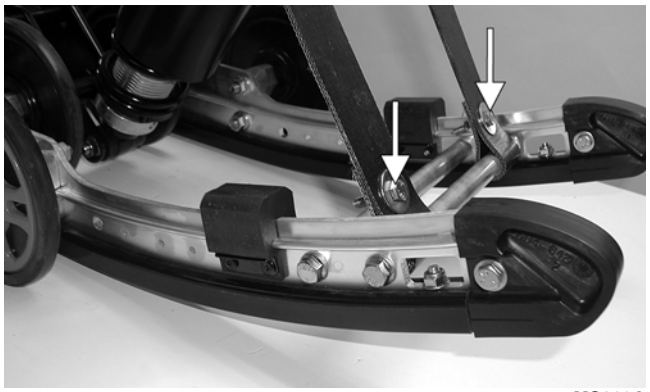
5. Secure the upper shock eyelet and serrated axle in the mounting hole of the front arm. Secure with a cap screw and lock nut. Tighten securely.



MS039A

■**NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.**

6. Secure the limiter straps to the rail supports with cap screws, washers, and lock nuts. Tighten to specifications.



MS082A

7. Install the skid frame (see Installing Skid Frame in this sub-section).

■**NOTE: It is advisable to install the rear arm springs onto the adjuster blocks after the skid frame has been installed.**

Rear Shock Absorber and Shock Links

■**NOTE: Before removing the skid frame by using the Rear Suspension Spring Tool (p/n 0144-311), remove the spring from the adjusting cam.**

⚠ CAUTION

Care must be taken when removing the spring from the adjusting cam or damage or injury could result.

■**NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section).**

DISASSEMBLING

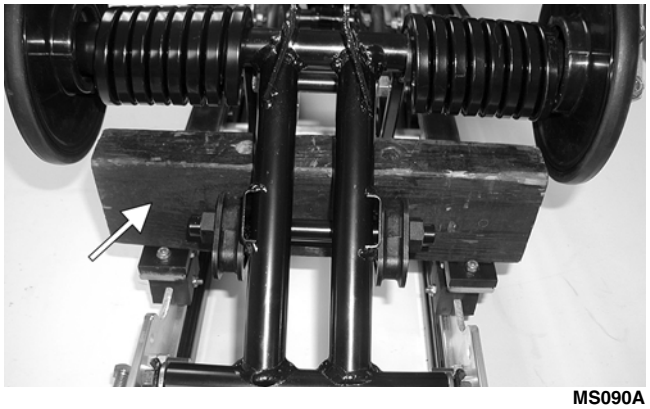
■**NOTE: When removing center components from the skid frame, it is advisable to loosen all cap screws/lock nuts from one side of the slide rail to make removing easier.**

1. Disengage the shock absorber at the upper eyelet and remove the shock absorber. Account for a sleeve, cap screw, lock nut, and bushings.



MS089A

■ **NOTE: For ease of disassembling, it is advisable at this point to place a block of wood between the idler arm and the overload springs.**



MS090A

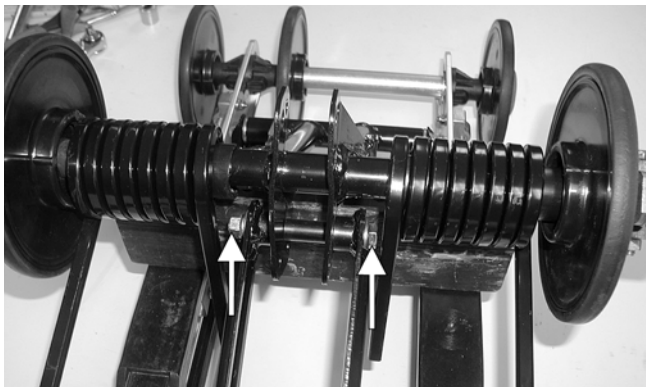


MS091

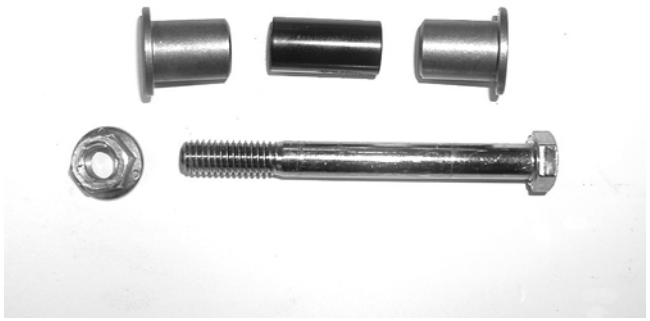
2. Mark the hole that the upper shock links are mounted in for assembly purposes; then remove the cap screw and lock nut securing the shock links to the upper arm bracket. Account for all mounting hardware.



MS076

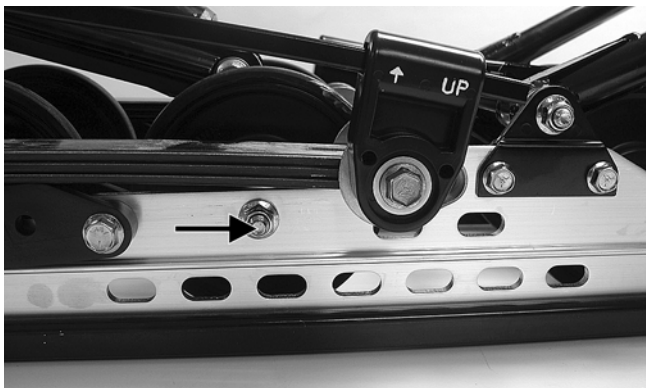


MS092A



MS093

3. Note the hole location that the center inner idler wheel/pivot assembly is in; then remove the cap screw, flat washer, and lock nut securing the assembly to the rails.



MS094A

4. Tap one side of the idler wheel/pivot assembly forward until it clears the slide rails; then lift the assembly upward and out from between the rails.

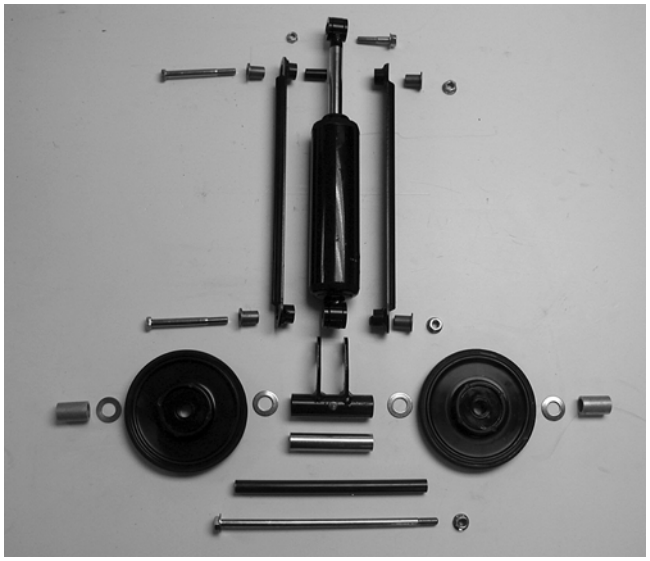


MS095

■**NOTE: Lay components out in order as they are removed.**

5. With the idler wheel/pivot assembly removed, remove the three spacers, an axle, and washers from the pivot bracket.

6. Remove the cap screw, lock nut, and washer securing the shock rod links to the pivot arm. Account for all components and mounting hardware.



MS097

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean shock pivot and idler wheel axle in part-cleaning solvent. Dry with compressed air.

⚠ WARNING

Always wear an approved pair of safety glasses when using compressed air.

2. Clean the idler wheel bearings with a clean cloth.

3. Closely inspect the pivot bracket arm and axles for wear, bends, or damaged splines at either end.

4. Inspect the idler wheels for signs of cracking, wear, or outer rubber separation from plastic wheel.

5. Rotate the idler wheel bearings (by hand) and inspect for any signs of binding or roughness.

6. If a bearing must be replaced, use this procedure.

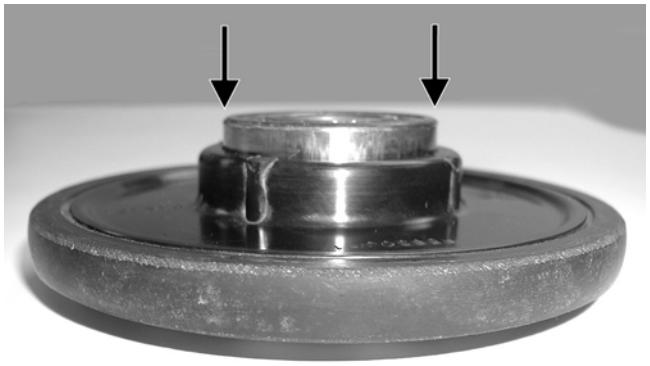
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the snap ring.

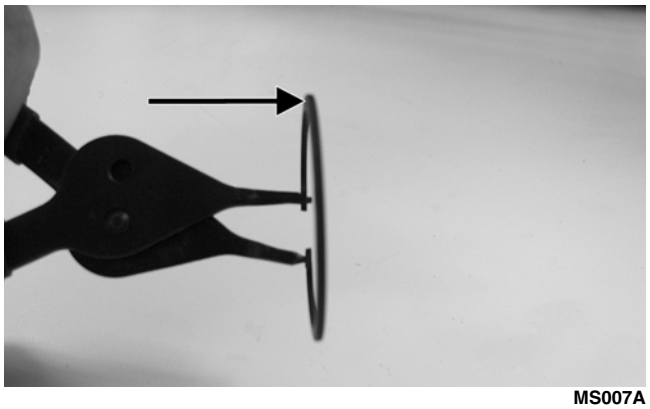
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

7. Inspect the shock absorber for any signs of oil leakage especially at the point where the shock shaft enters the shock body.

8. Inspect the rubber shock bushings located in the shock absorber eyelets for cracks or deterioration.

9. Inspect the shock absorber eyelet welds (at each end) for any cracks or signs of separation.

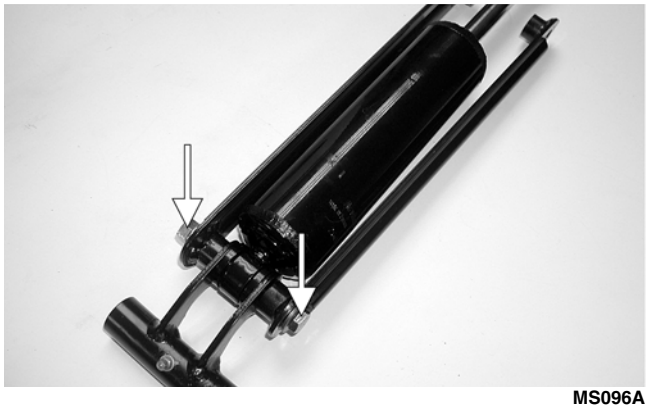
10. Inspect the welds securing the eyelets of the shock links for cracks or signs of separation. If either condition exists, replace the shock link.

11. Inspect the axle surfaces for any signs of corrosion. If corrosion is found, lightly buff the surface of the axle with #400 wet-or-dry sandpaper; then apply a light coat of grease.

12. Inspect the pivot assembly for signs of cracks or elongated holes.

ASSEMBLING

1. Secure the shock rod links (with axles) and the lower end of the shock absorber to the idler wheel/pivot assembly with the cap screw and lock nut. Tighten securely.



MS096A

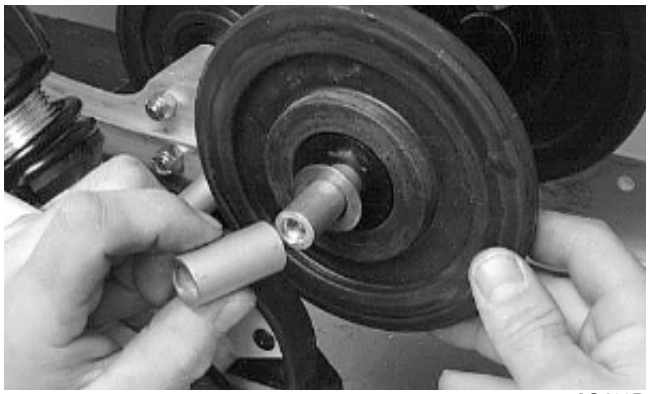
■ **NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.**

2. Apply a thin coat of low-temperature grease to the axle and slide the axle and spacer into the shock pivot bracket. Have equal amounts of the axle exposed on either side of the pivot bracket tube.



FC189

3. From each side of the pivot, install a washer, idler wheel, washer, and spacer.



AG492D

4. Lower the idler wheel/pivot assembly down between the rails. Align the axle with the mounting hole (as noted during disassembly). Secure with the cap screw and a new lock nut. Tighten to specifications.



MS095



MS101

5. Position the shock links in the appropriate holes of the idler arm brackets (as marked during disassembling). Place a spacer between the center of the brackets; then insert the link axles into the upper shock link eyelets. Secure with a cap screw, washer, and lock nut. Tighten securely.



MS081

6. Secure the shock absorber to the idler arm with bushings, sleeve, lock nut, and a cap screw. Tighten securely.



MS100

■**NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.**

7. Install the skid frame (see Installing Skid Frame in this sub-section).

■**NOTE: It is advisable to install the rear arm springs onto the adjuster blocks after the skid frame has been installed.**

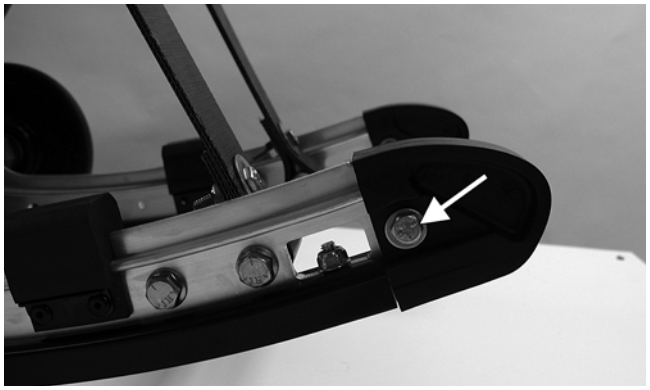
Slide Rails

■**NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section).**

REMOVING

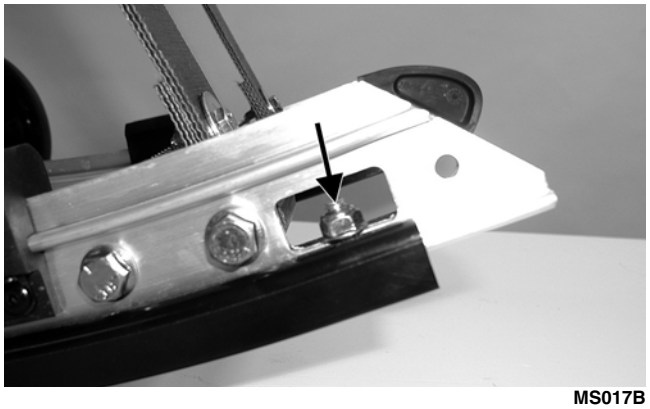
■**NOTE: When it is necessary to replace one or both slide rails, it is recommended that one slide rail be removed at a time. The remaining slide rail will then hold the rail supports, axles, and brackets in their correct assembly order. Always mark the mounting hole locations during disassembly to speed up the assembly process and to prevent any damage. This method is much quicker than to completely disassemble the entire skid frame. To replace either rail, use the following procedure.**

1. Remove the end cap from the slide rail. Account for a cap screw, lock nut, and two flat washers.



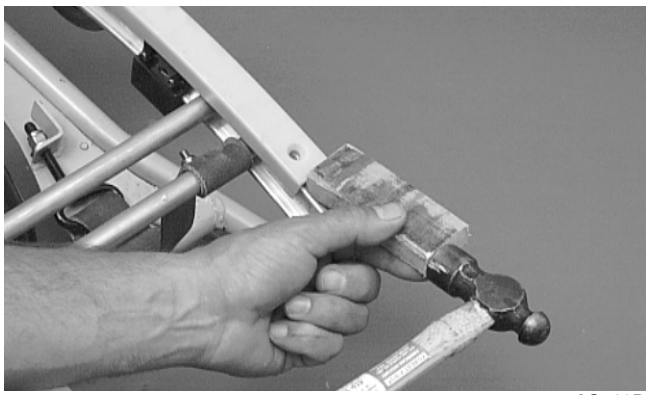
MS016A

2. Remove the machine screw and lock nut securing the wear strip to the front of the slide rail.



MS017B

3. Using a suitable driving tool, drive the wear strip off the rail.

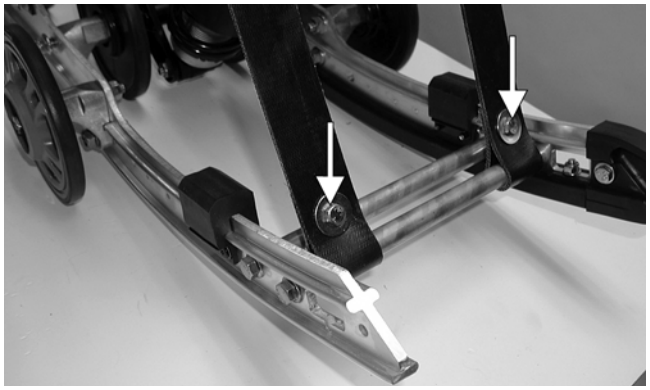


AG510D

■**NOTE: If binding of the wear strip occurs, use a pipe wrench, start from either end, and hook the edge of the wear strip with the pipe wrench jaw and twist the wear strip off the slide rail. Move the pipe wrench 7.5 cm (3 in.) and again twist the wear strip off the rail. Repeat this procedure until the wear strip is free of the rail.**

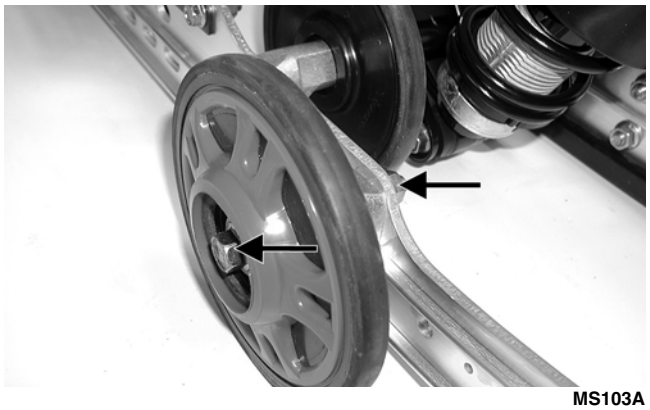
4. Remove the cap screws and lock nuts securing the front arm limiter straps to the rail support.

5. Remove the cap screws securing the rail supports to the slide rail.

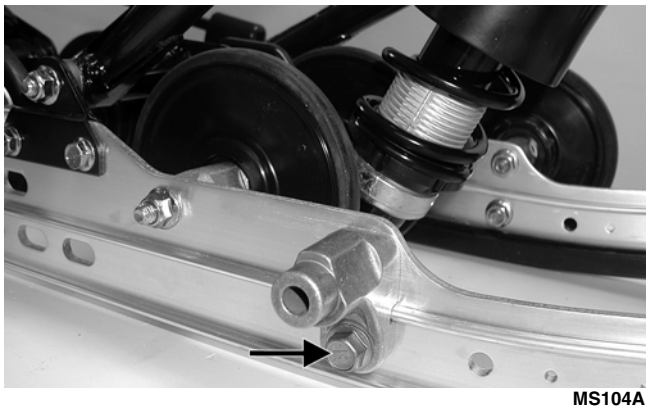


MS102A

6. Remove the cap screws and lock nuts securing the front outer idler wheel and the idler wheel mounting block. Account for flat washers.



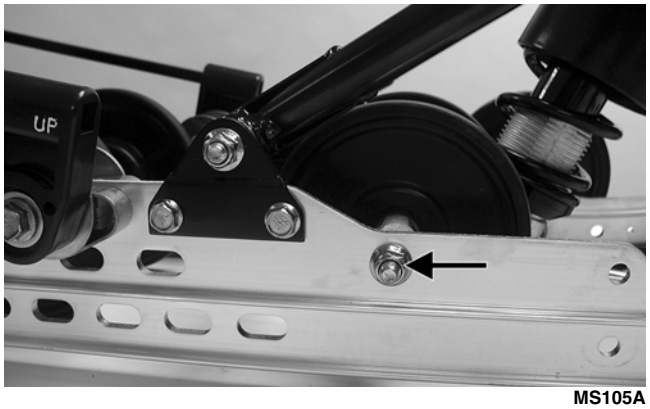
MS103A



MS104A

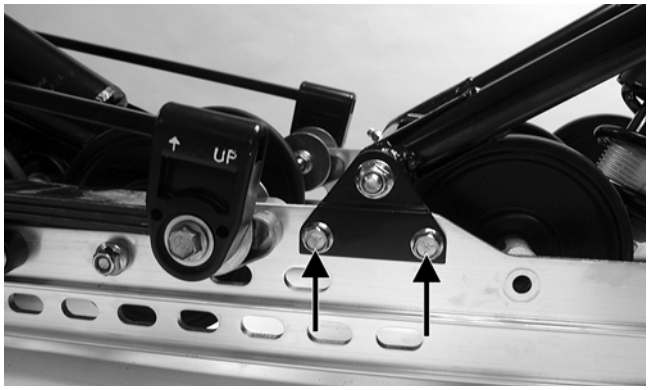
■NOTE: If not already done, remove the short spring leg from the adjusting cam. Also, it is recommended that the cap screw be removed from the front shock absorber to the front arm to aid in slide rail installing.

7. Remove the cap screw and lock washer securing the front inner idler wheel assembly to the slide rail.



MS105A

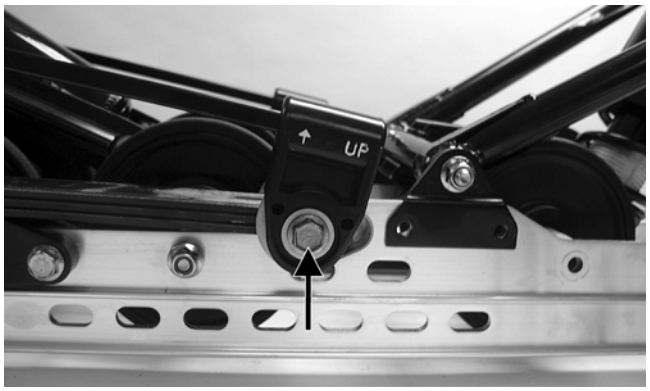
8. Note the mounting position of the front arm mounting bracket; then remove the cap screws securing the front arm mounting bracket. Account for lock nuts.



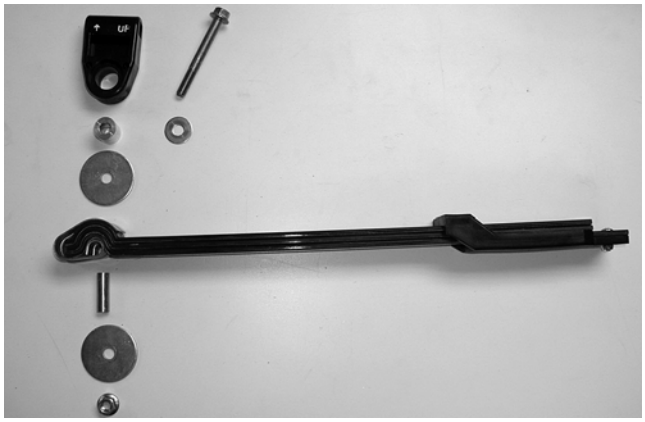
MS106A

■NOTE: If it is necessary to remove the cap screw for replacing the slide rail, install the cap screw from the opposite side into the assembly to secure the components and aid in replacing the slide rail.

9. Remove the cap screw and flat washer securing the spring slide and overload spring to the rail. Account for a spacer, the slide block, overload spring, retainer clips, bushing, one small washer, and two large washers.

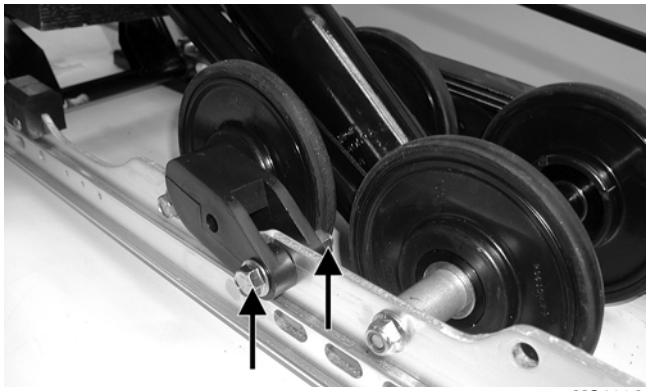


MS107A



MS108

10. Remove the cap screw and lock nut securing the overload spring tension block to the slide rail.



MS109A

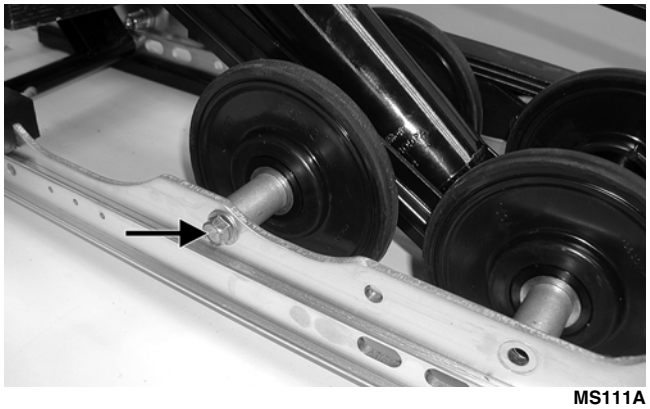
11. Remove the cap screw and lock nut securing the center inner idler wheel/pivot assembly to the slide rail.



MS110A

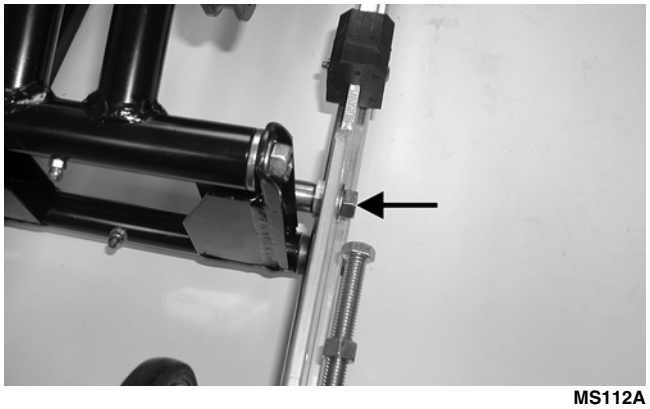
■ NOTE: If it is necessary to remove the cap screw for replacing the slide rail, install the cap screw from the opposite side into the assembly to secure the components and aid in replacing the slide rail.

12. Remove the cap screw and lock nut securing the rear inner idler wheel assembly to the rail.



MS111A

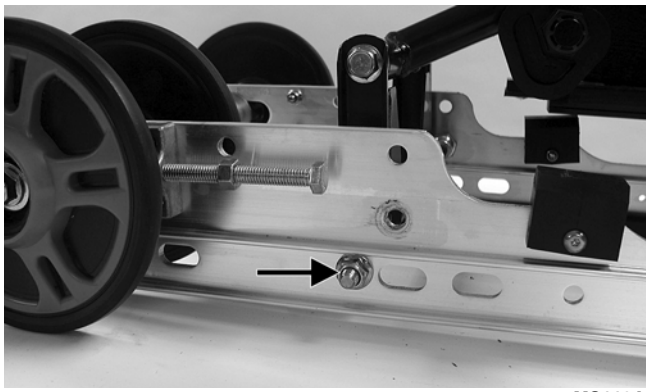
13. Remove the cap screw from the rear arm stop.



MS112A

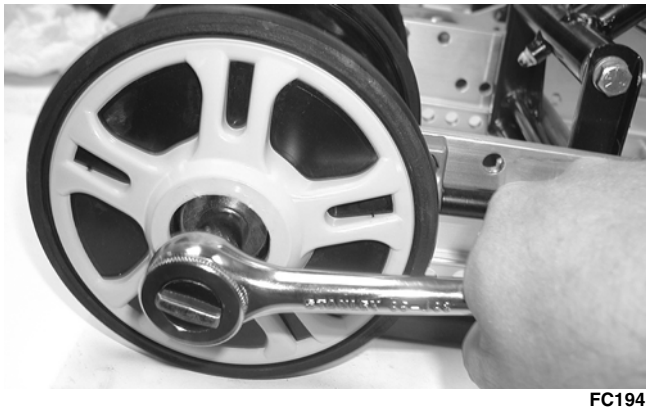
14. Remove the cap screw and lock nut securing the rear arm to the rail.

■ NOTE: If it is necessary to remove the cap screw for replacing the slide rail, install the cap screw from the opposite side into the assembly to secure the components and aid in replacing the slide rail.

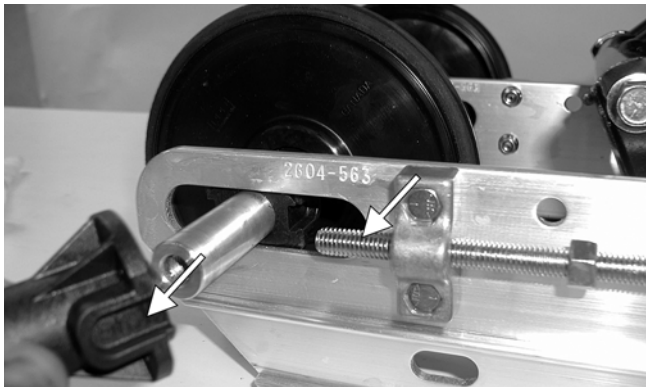


MS113A

15. Remove the idler wheel cap; then remove the cap screw and flat washer securing the rear idler wheel. Remove the idler wheel; then remove the adjuster bushing.



FC194



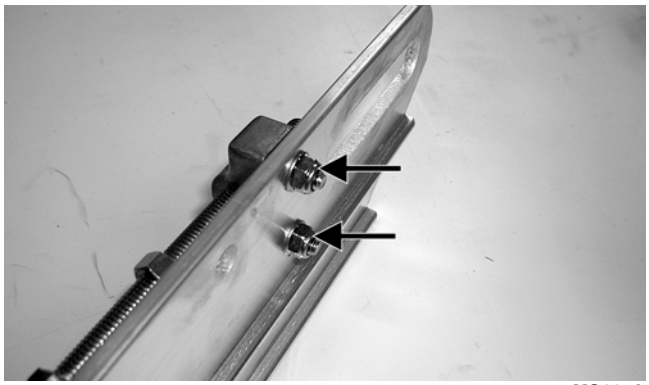
MS114A

■ **NOTE: The adjusting bolt may have to be loosened to remove the adjuster bushing.**

■ **NOTE: At this point, the slide rail should be free of the skid frame components and can be removed.**

■ **NOTE: If applicable, remove the cap screw and lock nut securing the coupler block to the slide rail.**

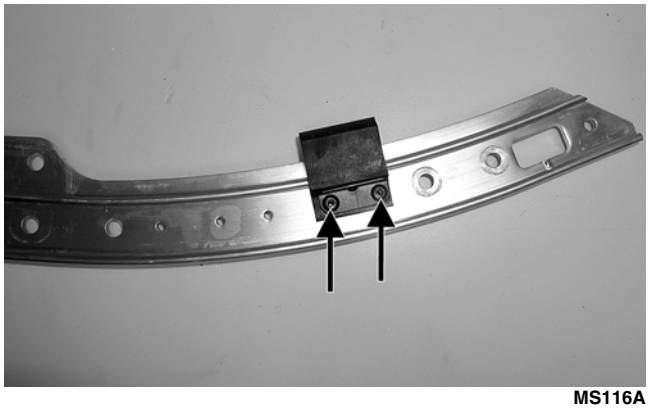
16. Remove the cap screws and lock nuts securing the track adjuster bracket.



MS115A

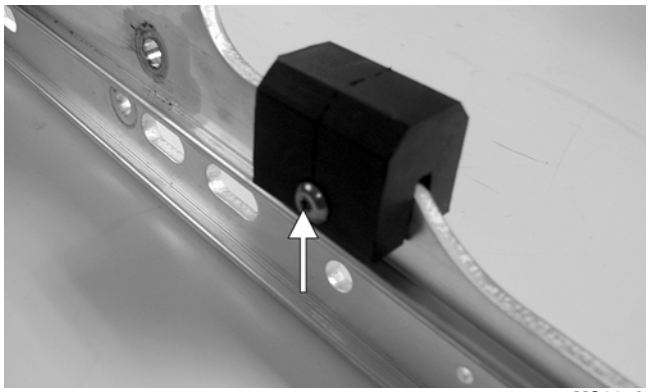
■ **NOTE: The shock pads should be removed only if being replaced.**

17. On the front shock pads using a drill and a 3/16-in. drill bit, drill out the rivets and remove the shock pads. Note the shock pad location for installation. Account for the retaining brackets.



MS116A

18. On the rear shock pads, remove the torx-head screws and lock nuts securing the shock pads to the rails.

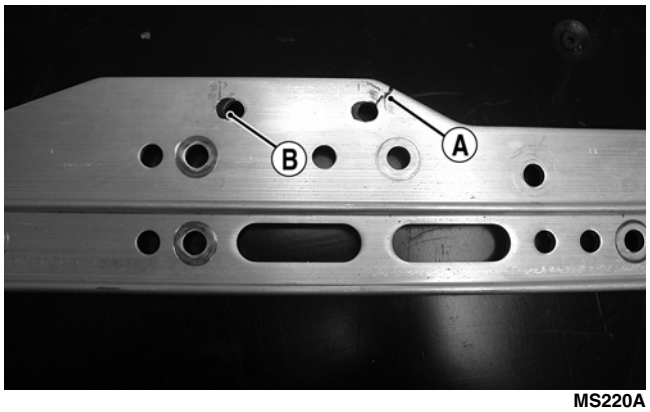


MS117A

INSPECTING

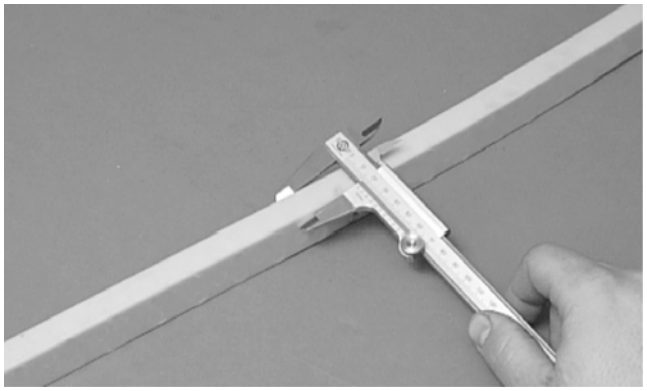
■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the slide rail for cracks (A), elongated holes (B), or unusual bends.

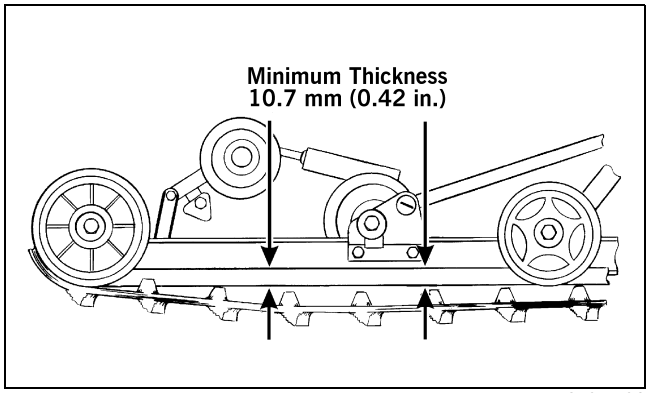


MS220A

2. Inspect the wear strip for wear. The wear strip must be 10.7 mm (0.42 in.) thick or thicker. If the wear strip measurement is less than specified, replacement of both wear strips is necessary.



AG530D

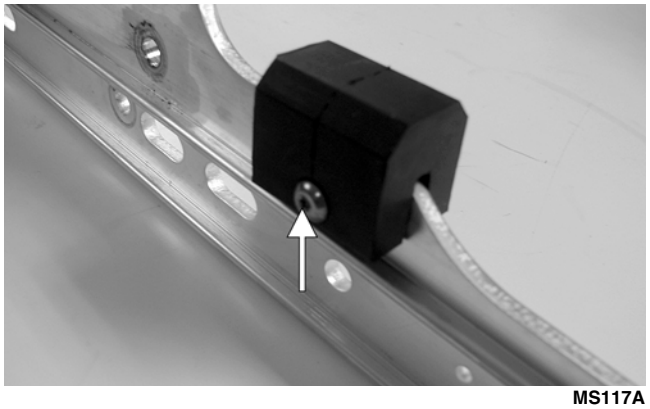


0727-726

INSTALLING

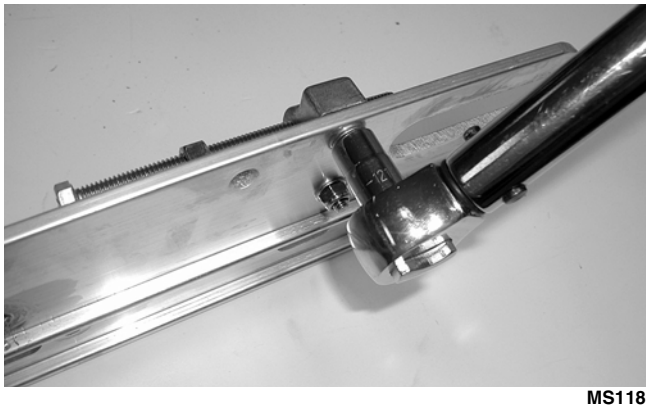
1. Install the front shock pads and retaining brackets; then secure with rivets.

2. Install the rear shock pads and secure with the torx-head screws and lock nuts.



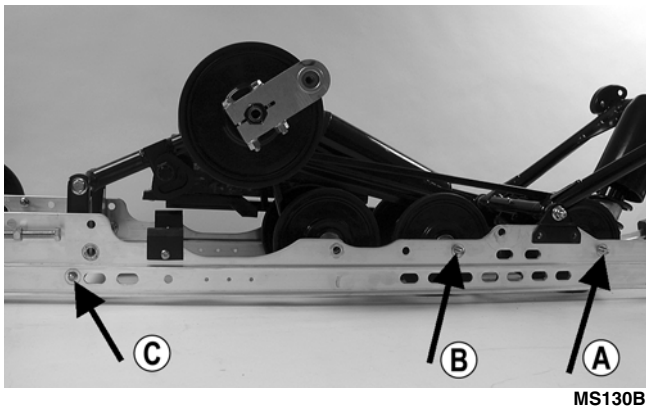
MS117A

3. Secure the track adjuster bracket with the cap screws and lock nuts. Tighten to specifications.



MS118

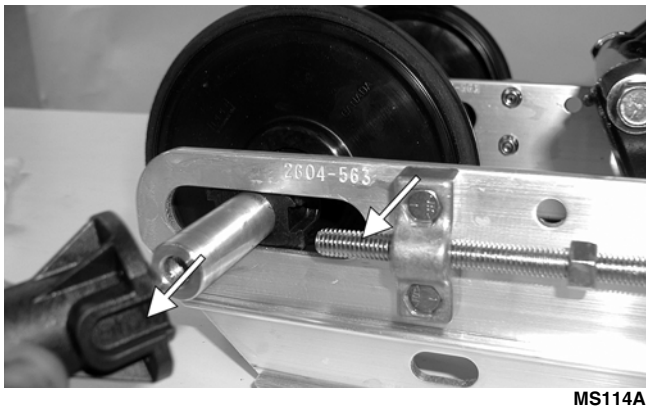
4. Place the slide rail into position; then install the cap screws securing the front inner idler wheel assembly (A), the center inner idler wheel/pivot assembly (B), and the rear arm assembly (C) into the proper holes in the slide rail. Install the lock nuts and tighten only until snug.



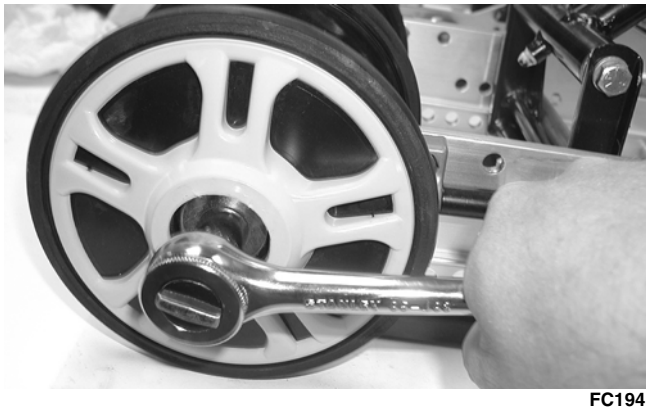
MS130B

■ **NOTE: Take care that all the shim washers and spacers are in place on the center components of the slide rail.**

5. Install the adjuster bushing and rear idler wheel. Secure with a cap screw (coated with blue Loctite #243) and flat washer. Tighten only until snug.

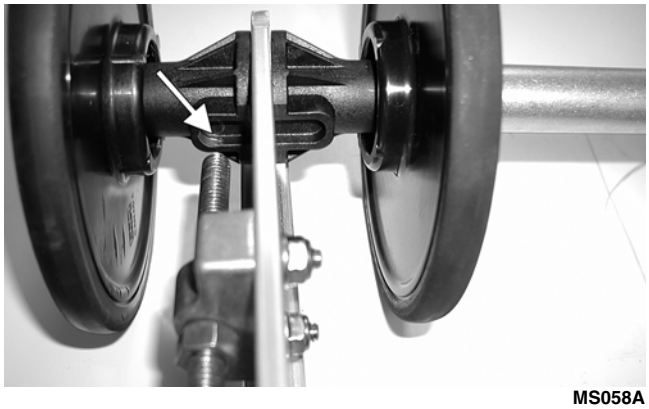


MS114A



FC194

■**NOTE: Care must be taken that the adjuster bushing slot is aligned properly with the adjuster bolt.**

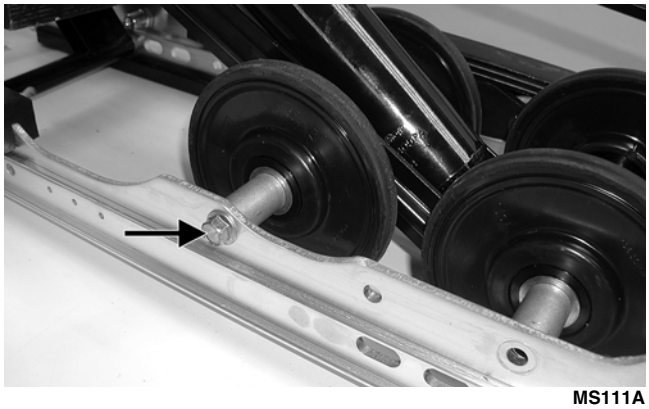


MS058A

■**NOTE: If applicable, install coupler block w/ bushing. Secure with cap screws and lock nuts. Tighten securely.**

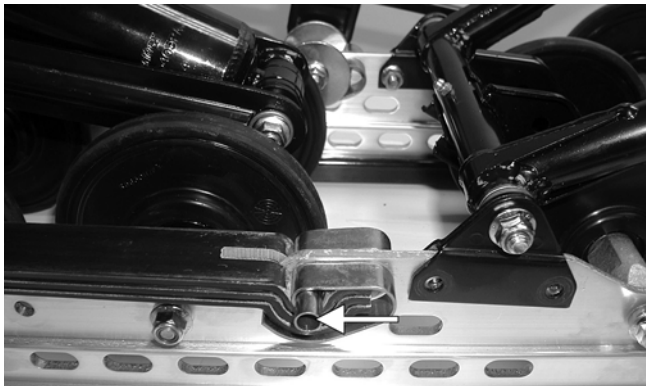
6. Install the cap screw (coated with blue Loctite #243) securing the rear inner idler wheel assembly to the slide rail. Tighten only until snug.

■**NOTE: On the Bearcat 570, also install a cap screw (coated with blue Loctite #243) securing the rear-most inner idler wheel assembly to the slide rail. Tighten only until snug.**



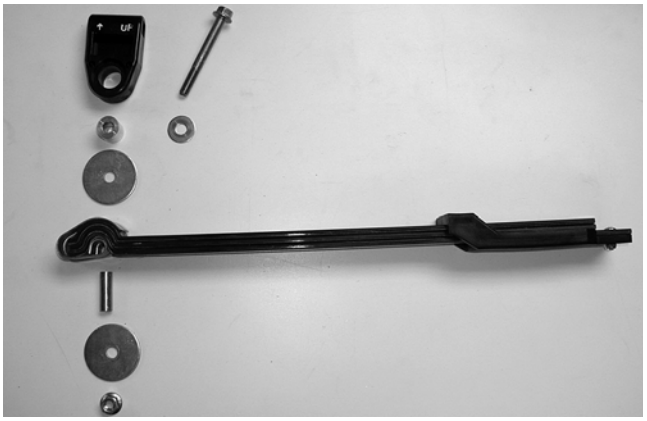
MS111A

7. Place the overload spring with retaining clips and bushing to the proper hole in the slide rail.

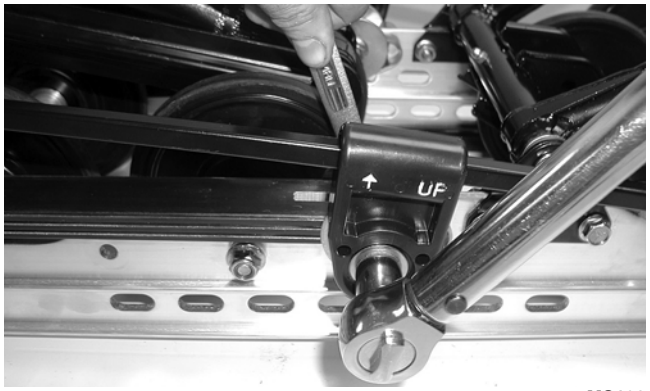


MS119A

8. Place the spring into the slide blocks; then place the spring slide and slide block assembly into position on the slide rail. Secure with a cap screw, washer, spacer, two large flat washers, and a lock nut. Tighten to specifications.

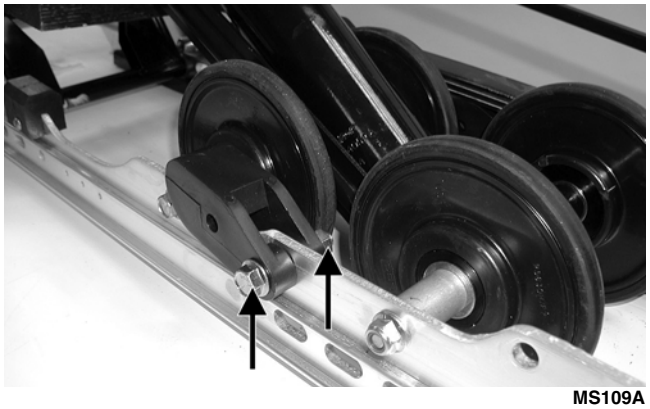


MS108



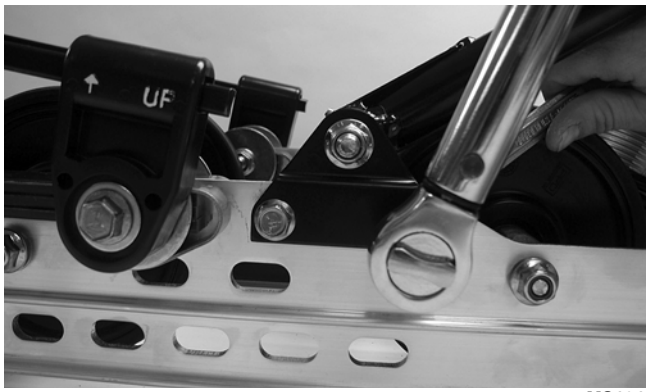
MS120

9. Install the overload spring tension block with a cap screw and lock nut. Tighten securely.



MS109A

10. Secure the front arm mounting bracket with the cap screws and lock nuts. Tighten to specifications.

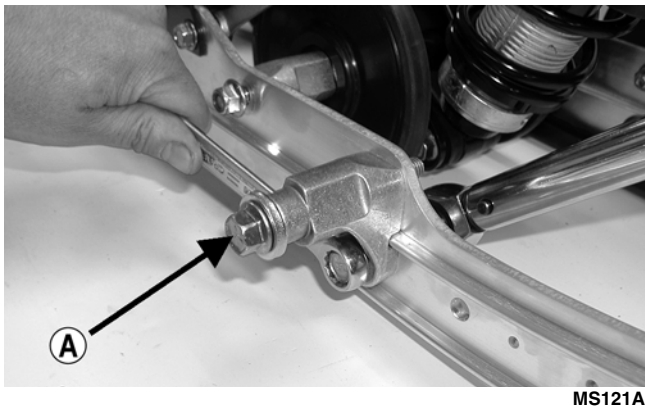


MS121

■ **NOTE: At this point if the front arm shock absorber was removed from the front arm, install it and tighten securely.**

11. Secure the outer idler wheel mounting block with the cap screw and lock nut. Tighten to specifications.

■ **NOTE: When tightening the mounting block lock nut, it is recommended that idler wheel cap screw (A) be installed to maintain proper alignment.**



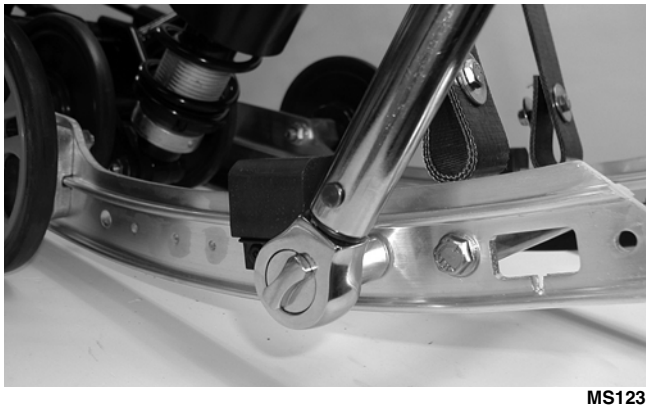
MS121A

12. Secure the outer idler wheel to the mounting block with a cap screw, flat washers, idler wheel, and a lock nut. Tighten to specifications.



MS122

13. Secure the front rail supports with cap screws (coated with blue Loctite #243). Tighten to specifications.



MS123

14. Install the rear arm stop with a cap screw (coated with blue Loctite #243). Tighten to specifications.



MS125

15. Tighten the cap screw and lock nut securing the rear arm assembly (from step 4) to specifications.



MS126

16. Tighten the cap screw securing the rear inner idler wheel assembly (from step 6) to specifications.

■ NOTE: On the Bearcat 570, also tighten the rear-most inner idler wheel assembly to the slide rail to specifications.



MS127

17. Tighten the center inner idler wheel/pivot assembly (from step 4) to specifications.



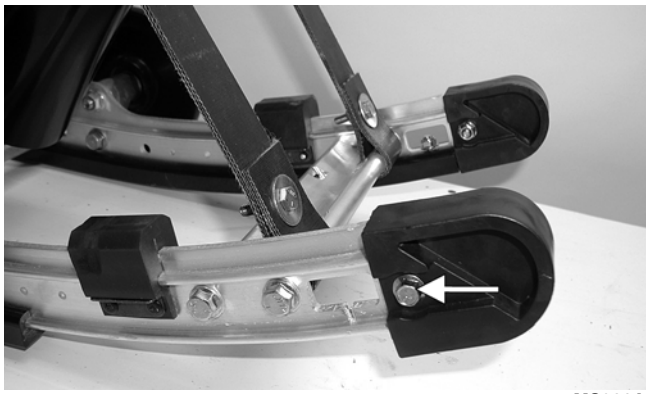
MS128

18. Tighten the front inner idler wheel assembly cap screw (from step 4) to specifications.



MS129

19. Secure the end cap onto the slide rail using a cap screw, flat washers, and a lock nut. Tighten to specifications.



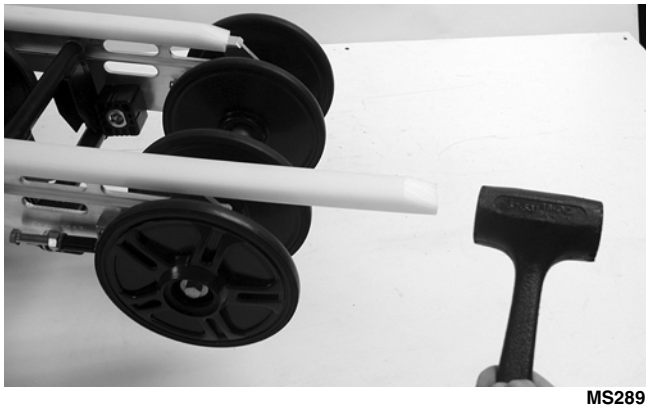
MS206A

■ NOTE: Apply a light coat of grease to the slide rail surface to aid in installing a new wear strip. If there are any sharp edges on the lower portion of the rail, use a file to remove them.



MS288

20. From the back, start the wear strip onto the rail; then using a soft hammer, drive the wear strip forward into position. Secure with a machine screw and lock nut. Tighten to specifications.



MS289



MS016B

21. Install the skid frame (see Installing Skid Frame in this sub-section).

■ NOTE: It is advisable to install the rear arm springs onto the adjuster blocks after the skid frame has been installed.

22. Adjust track tension deflection (see Track Tension in this sub-section) and track alignment (see Track Alignment in this sub-section).

Installing Skid Frame

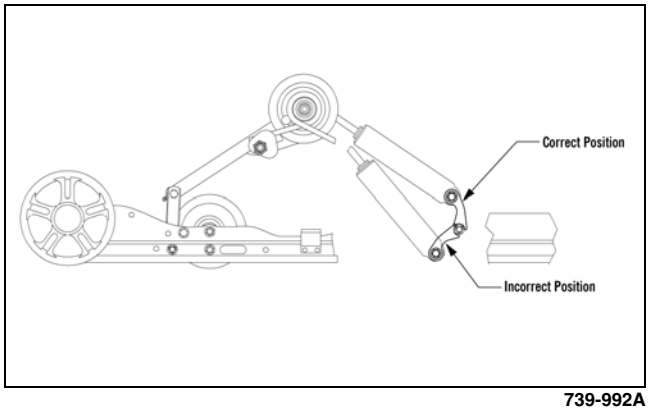
1. Place a piece of cardboard on the floor to protect against scratching and tip the snowmobile onto one side.

2. Pull the track away from the tunnel and spread open; then place the skid frame into the track.

3. Position the front of the skid frame into the tunnel and align the front arm with the appropriate mounting hole in the tunnel. Insert the cap screw with washers through the tunnel mounting hole and through the front arm. DO NOT TIGHTEN AT THIS TIME. Repeat this procedure on the other side.

⚠ CAUTION

When installing the skid frame, make sure the rear arm shock mounting location on the pivot/axle is positioned correctly above the axle or component damage will occur.



739-992A

■ NOTE: To aid in centering the front arm with the hole in the tunnel, position the skid frame and track at a 45° angle to the bottom of the tunnel.

4. Elevate the rear of the skid frame and the track into position in the tunnel.

5. Align the pivot idler arm assembly with the appropriate hole in the tunnel. Secure the pivot idler arm assembly with a cap screw (coated with red Loctite #271), lock washer, and flat washer. DO NOT TIGHTEN AT THIS TIME.

■ NOTE: Do not install the short legs of the rear springs onto the adjusting cams at this time.

6. At this time, tighten all four skid frame mounting cap screws securely.

7. Using the Rear Suspension Spring Tool (p/n 0144-311), install the short legs of the rear springs onto the adjusting cams making sure the cams are in the same adjustment positions.

8. Tighten the two track tension adjusting bolt evenly until track deflection is within specifications; then lock the jam nuts to secure the adjustment.

9. Check track tension deflection and alignment; adjust if necessary (see Track Tension and Track Alignment in this sub-section).

Track Tension

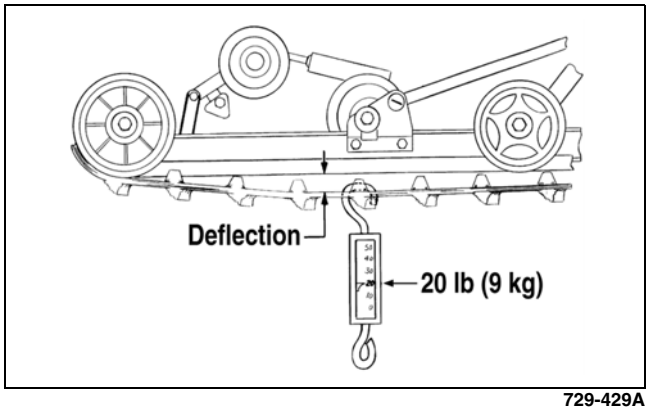
⚠ WARNING

Deactivate all switches.

CHECKING DEFLECTION

1. Tip the snowmobile on its side.
2. Hook a spring scale around a track clip at mid-span; then pull the track down with the scale to 9 kg (20 lb) and measure the distance between the bottom of the wear strip and the inside surface of the track. Track deflection must be within specifications.

Rear Suspension Style	Setup Tension	After Break-In Tension
FasTrack w/Torque Sensing Link (136 in., 156 in. Track)	44-51 mm (1 3/4-2 in.)	51-57 mm (2-2 1/4 in.)

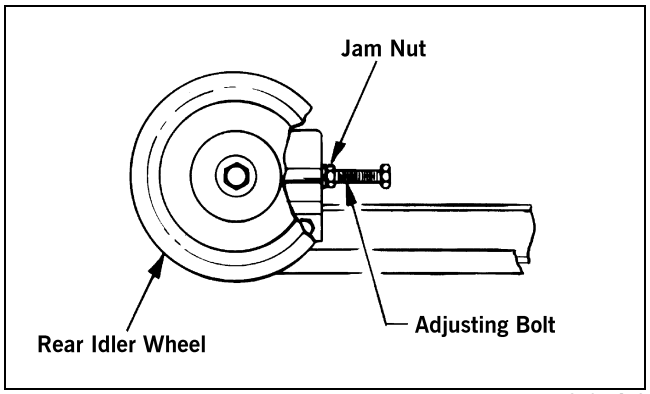


729-429A

■ NOTE: If the track is new, it will stretch slightly and take a "set" within the first 300 to 500 miles of operation.

ADJUSTING DEFLECTION

1. Place the snowmobile up on a shielded safety stand. Check to make sure the track is 2-3 in. off the floor.
2. If the measurement is not as specified, loosen the jam nuts of the adjusting bolts.



0727-456

3. If the measurement obtained in step 2 is more than specified, tighten the adjusting bolts. If the measurement obtained is less than specified, loosen the adjusting bolts. When the measurement is within specification range, lock the adjustment by bottoming the jam nuts against the axle housings.

■ NOTE: If the track tension must be loosened, it may be necessary to loosen the rear axle assembly slightly.

■ NOTE: Vigorously push the underside of the track up and down. Track must not hit the top of the tunnel or slap the skid frame.

4. After correct track tension is obtained, check track alignment (see Track Alignment in this subsection).

■ NOTE: Track tension and track alignment are interrelated; always check both even if only one adjustment seems necessary. Always establish correct track tension before checking and/or adjusting alignment.

⚠ CAUTION

After proper track tension and alignment have been attained, make certain that the rear axle assembly is tightened to specifications or component damage will occur.

Track Alignment

■ **NOTE: Proper track alignment is when the rear idler wheels are equidistant from the inner drive lugs on the inside surface of the track.**

CHECKING

1. Using a shielded safety stand, raise the rear of the snowmobile off the floor making sure the track is free to rotate.

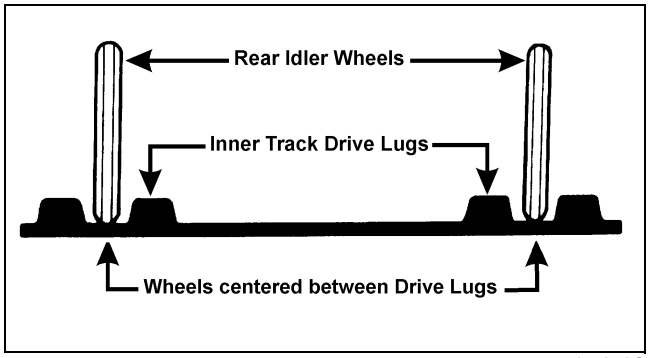
⚠ WARNING

The tips of the skis must be positioned against a wall or similar object for safety. Keep hands, feet, and clothing away from moving components.

2. Start the engine and accelerate slightly. Use only enough throttle to rotate the track several revolutions. SHUT THE ENGINE OFF.

■ **NOTE: Allow the track to coast to a stop. Do not apply the brake because it could produce inaccurate alignment conditions.**

3. When the track stops rotating, check the relationship of the rear idler wheels and the inner track drive lugs. If the distance from the idler wheels to the inner drive lugs is the same on both sides, no adjustment is necessary.



725-070A

4. On the side of the track, which has the inner drive lugs closer to the rear idler wheel, loosen the adjusting bolt jam nut; then rotate the adjusting bolt clockwise 1-1 1/2 turns.

5. Continue to check the track alignment and make the necessary adjustments until proper alignment is obtained.

6. After proper track alignment is obtained, lock the jam nut against the axle housing.

■ **NOTE: Make sure correct track tension is maintained after adjusting track alignment.**

⚠ CAUTION

After proper track tension and alignment have been attained, make certain that the rear axle assembly is tightened to specifications or component damage will occur.

■ **NOTE: Field test the track under actual conditions and after the field test, check track alignment and track tension; adjust as necessary.**

Repair Procedure 3 - Track/Rear Suspension

This Track/Rear Suspension sub-section (Repair Procedure 3) has been organized so each procedure can be completed individually and efficiently. Each sub-section has (as necessary) Removing, Disassembling, Cleaning and Inspecting, Assembling, and Installing procedures. Some components may vary from model to model. The technician should use discretion and sound judgment when removing and installing components.

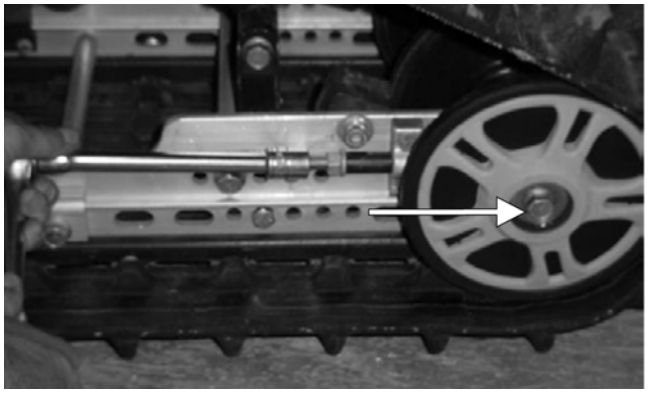
■ **NOTE: Critical torque specifications are located on page 174 of this section.**

■ **NOTE: Some illustrations and photographs used in this sub-section are used for clarity purposes only and are not designed to depict actual conditions.**

Removing Skid Frame

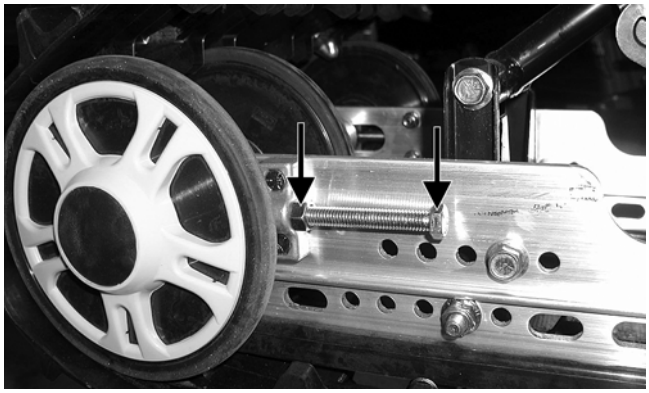
■ **NOTE: Many service procedures can be performed without removing the skid frame. Closely observe the note introducing each sub-section for this important information.**

1. To avoid having the adjuster bushings binding during loosening of the track, remove the rear idler wheel caps and loosen the cap screws on the rear axle.



FS082A

2. Loosen the jam nuts and two track-tension adjusting bolts.



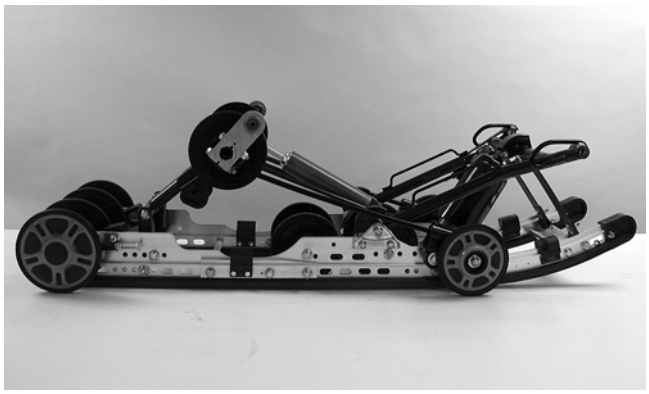
MS062A

3. Place a support stand under the rear bumper; then while holding the flared bushing, remove the rear cap screws securing the skid frame to the tunnel. Account for lock washers and flat washers.

■ **NOTE: The support stand should hold the snowmobile level but not raised off the floor.**

4. Remove the front cap screws securing the skid frame to the tunnel. Account for a flat washer and a lock washer.

5. Remove the support stand; then tip the snowmobile onto one side using a piece of cardboard to protect against scratching. Remove the skid frame.



MS132

Wear Strips

REMOVING

■ NOTE: The skid frame does not have to be removed for this procedure; however, if wear strip binding or slide rail damage has occured, the skid frame should be removed for this procedure (see Removing Skid Frame in this sub-section).

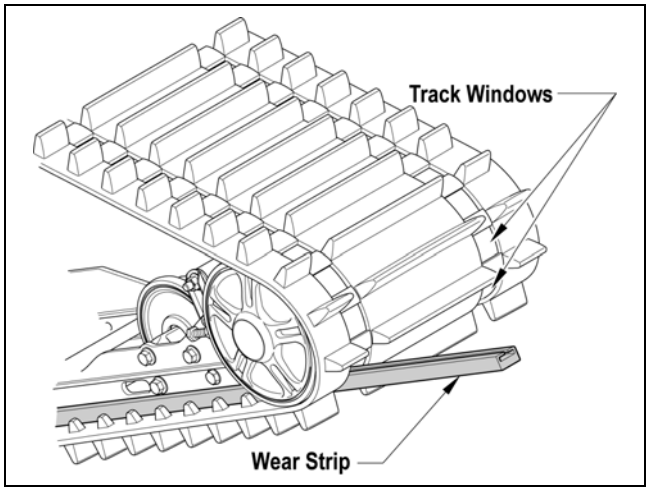
1. Remove the machine screw and lock nut securing the wear strip to the front of 179the slide rail.



MS016B

■ NOTE: If the skid frame has been removed due to difficulty in removing the wear strip, it may be necessary to use a pipe wrench, start from either end, and hook the edge of the wear strip with the pipe wrench jaw and twist the wear strip off the slide rail. Move the pipe wrench 7.5 cm (3 in.) and again twist the wear strip off the rail. Repeat this procedure until the wear strip is free of the rail.

2. Align the wear strip with the openings (windows) in the track; then using a suitable driving tool, drive the wear strip rearward off the slide rail.



739-884A

CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

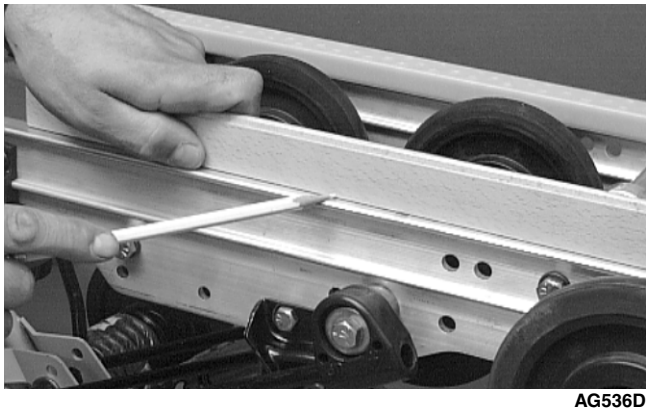
1. Clean the slide rail using parts-cleaning solvent and compressed air.

⚠ WARNING

Always wear an approved pair of safety glasses when using compressed air.

2. Inspect the slide rail for cracks. If any cracks are found, replace the slide rail.

3. Using a straightedge, inspect the slide rail for any unusual bends. With the slide rail removed, place the straightedge along the bottom surface of the slide rail. If the rail is found to be bent, it must be replaced.

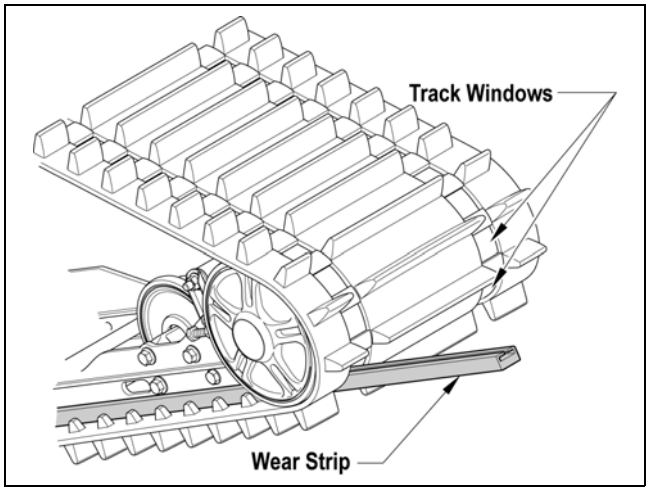


AG536D

INSTALLING

■ NOTE: Apply a light coat of grease to the slide rail surface to aid in installing a new wear strip. If there are any sharp edges on the lower portion of the rail, use a file to remove them.

1. Align the wear strip with the openings (windows) in the track and from the back, start the wear strip onto the rail; then using a block of wood and a hammer, drive the wear strip forward into position.



739-884A

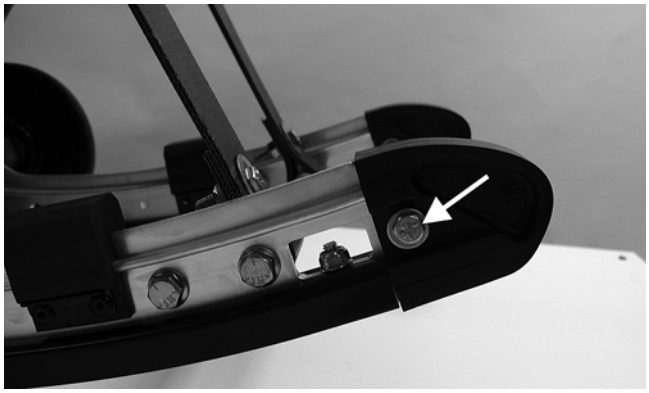
2. Secure with a machine screw and lock nut. Tighten to specifications.

End Caps

■**NOTE: The skid frame does not have to be removed for this procedure.**

REMOVING

1. Remove the lock nut, washers, and cap screw securing the end cap.



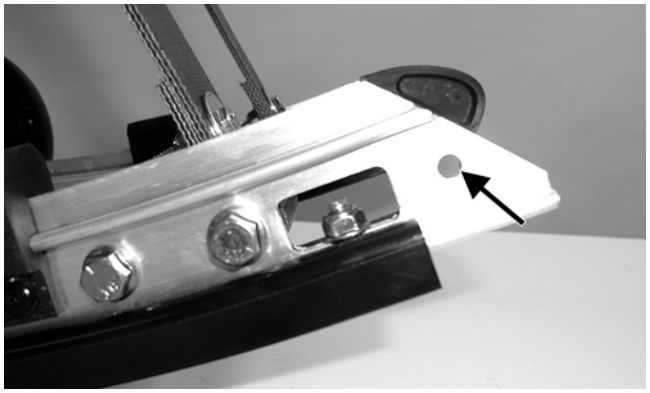
MS016A

2. Using a hammer, tap the end cap off the rail.

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the end cap area of the slide rail for cracks and wear.



MS017A

2. Inspect the end cap for any signs of cracking or wear.



MS290A

3. Clean both the slide rail area and the end cap. Using compressed air, clean the areas of dirt and gravel.

⚠ WARNING

Always wear an approved pair of safety glasses when using compressed air.

4. Inspect the cap screw for cracked, stretched, or damaged threads. Use a new lock nut when assembling.

INSTALLING

1. Position the end cap on the slide rail; then align the hole in the end cap with the hole in the slide rail.

2. Secure with a cap screw, washers, and lock nut. Tighten to specifications.

Shock Pads

■**NOTE: The skid frame does not have to be removed for this procedure.**

REMOVING

■**NOTE: The shock pads should be removed only if being replaced.**

1. Using a 3/16-in. drill bit, drill out the rivets securing the front shock pads to the slide rail. Account for the retaining brackets.
2. Twist the push nuts off the solid rivets securing the rear shock pads.
3. Remove the shock pads.

INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the pads for damage or wear.
2. Inspect the rivet holes in the slide rail for damage or elongation.

INSTALLING

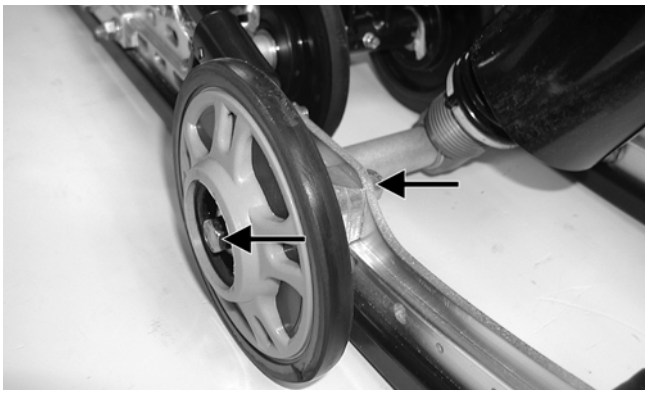
1. Place the rear pads into position on the slide rail.
2. Secure the rear pads with new push nuts.
3. Place the front pads and retaining brackets into position on the slide rail.
4. Secure the front pads with rivets.

Front Outer Idler Wheels

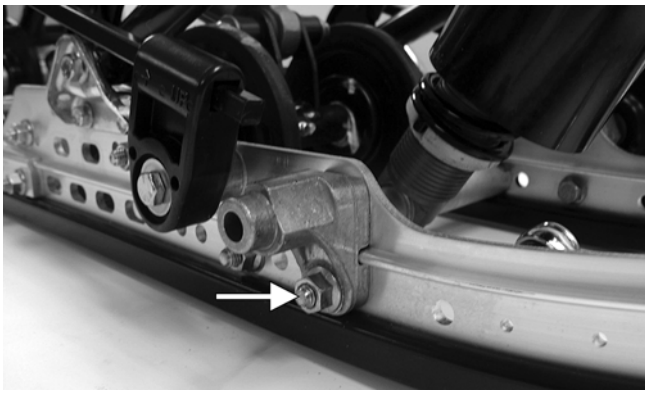
■**NOTE: The skid frame does not have to be removed for this procedure.**

REMOVING

1. Remove the cap screw and lock nut securing the front outer idler wheel and the idler wheel mounting block. Account for flat washers and spacers.

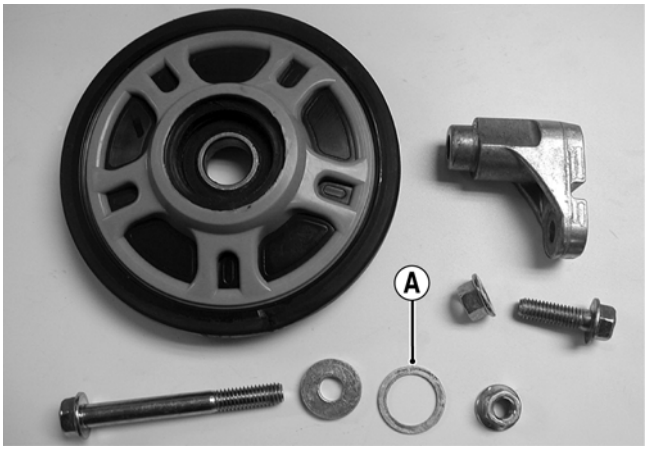


MS133A



MS134A

2. Note the location of the spacer (A) on standard models for assembly purposes. The spacer is to be installed to the inside of the idler wheel.



MS135A

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearing with a clean cloth.
2. Inspect each idler wheel and each plastic hub for cracks or damage.
3. Rotate the idler wheel bearing (by hand) and inspect for binding or roughness.

4. If a bearing must be replaced, use this procedure.

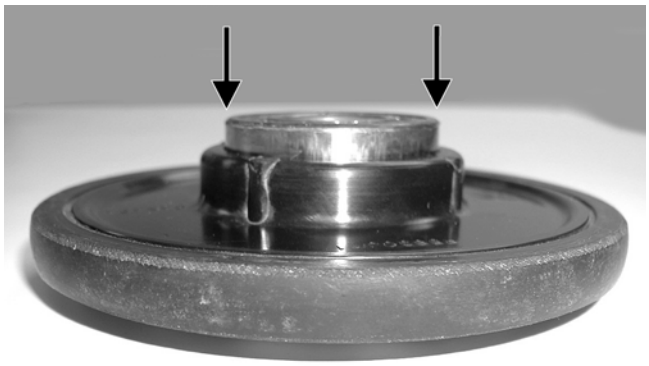
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert (if applicable) and the snap ring.

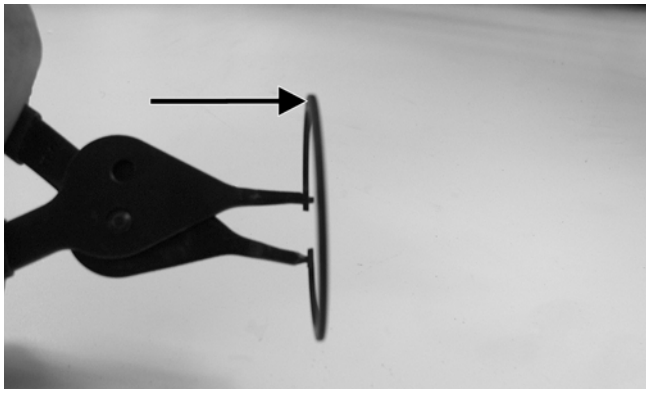
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

E. Install the insert (if applicable).

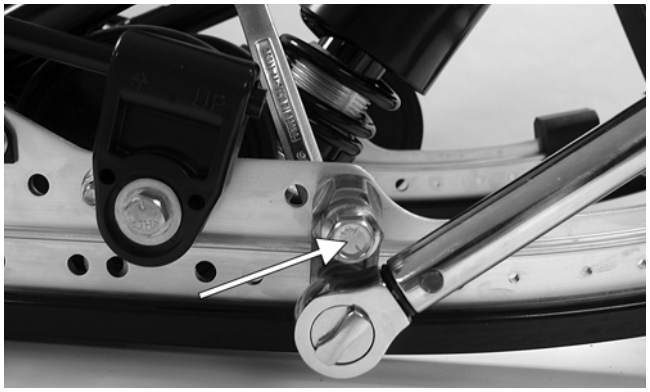


MS008

INSTALLING

1. Secure the mounting block on the slide rail with a cap screw and lock nut. Tighten to specifications.

■ NOTE: For proper alignment, it is advisable to install an idler wheel cap screw into the top mounting block hole prior to tightening.



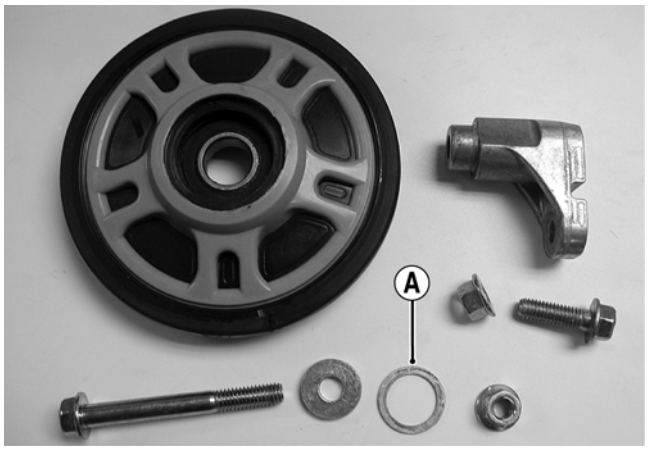
MS009A

2. Place the idler wheel to the mounting block; then secure the idler wheel assembly with a cap screw, flat washer, and a lock nut. Tighten to specifications.



MS136

■ NOTE: On standard models, spacer (A) must be installed to the inside of the idler wheel.



MS135A

Rear Inner Idler Wheels

■**NOTE: The skid frame does not have to be removed for this procedure.**

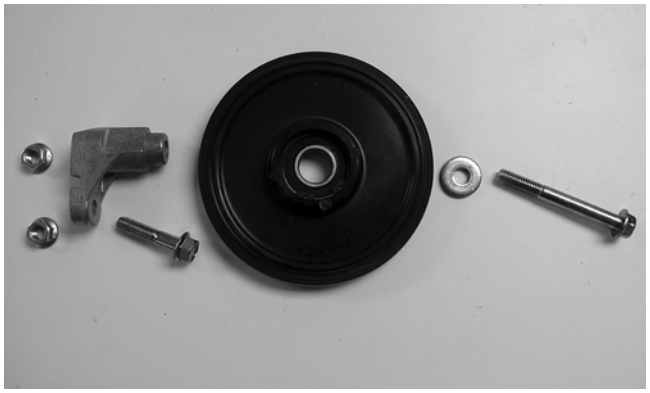
REMOVING

1. Remove the cap screws, washers, and lock nuts securing the rear inner idler wheel and the idler wheel mounting block. Account for all mounting hardware.



MS137

2. Note the locations of the flat washer for assembly purposes.



MS138

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearing with a clean cloth.
2. Inspect each idler wheel and plastic hub for cracks or damage.
3. Rotate the idler wheel bearings (by hand) and inspect for binding or roughness.
4. If a bearing must be replaced, use this procedure.

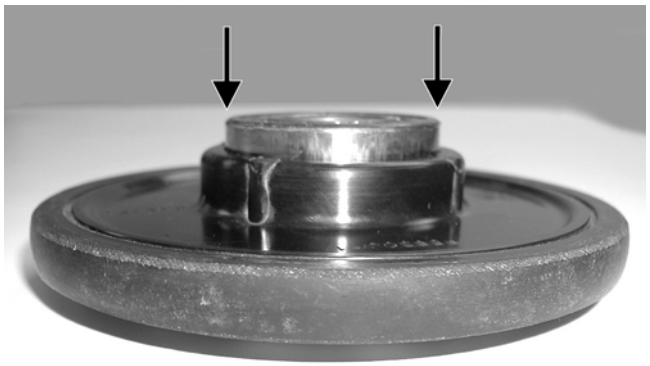
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert (if applicable) and the snap ring.

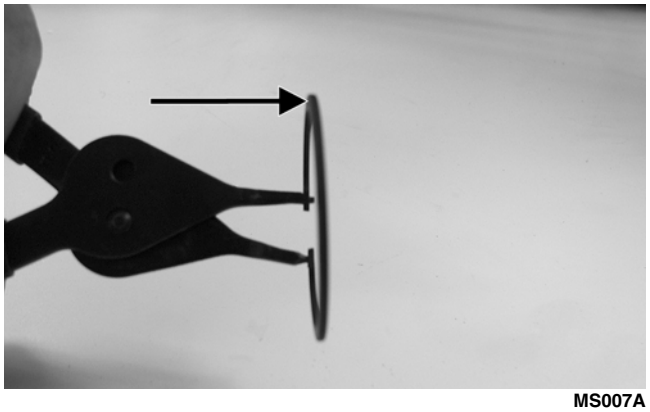
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

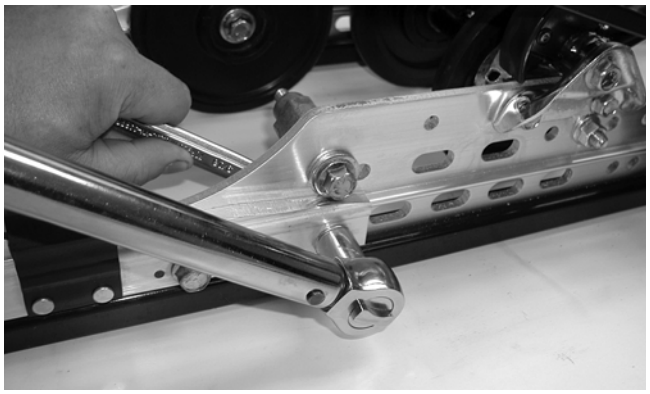
E. Install the insert (if applicable).



MS008

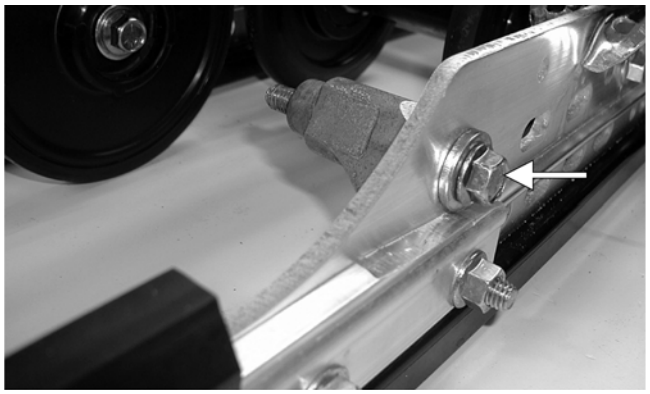
INSTALLING

1. Secure the mounting block on the slide rail with a cap screw and lock nut. Tighten to specifications.



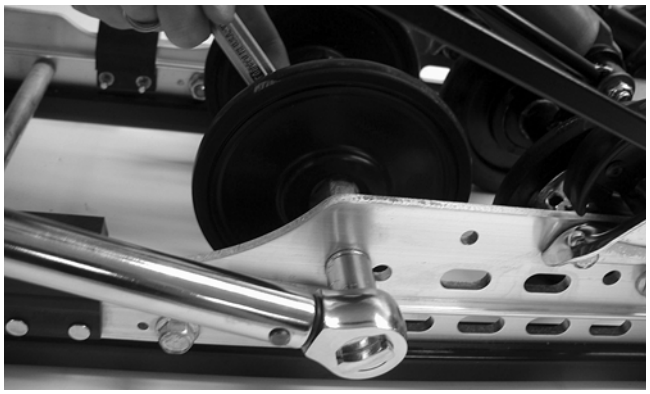
MS139

■ **NOTE: For proper alignment, it is advisable to install an idler wheel cap screw into the top mounting block hole prior to tightening.**



MS140A

2. Place the idler wheel into position against the mounting block making sure there is a flat washer on the cap screw. Tighten to specifications.



MS141

Rear Upper Idler Wheels/Rear Springs

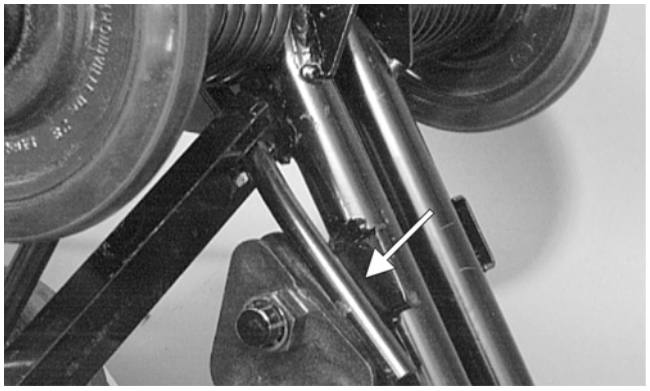
■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this subsection).**

REMOVING

1. Using the Rear Suspension Spring Tool (p/n 0144-311), remove the spring from the adjusting cam.

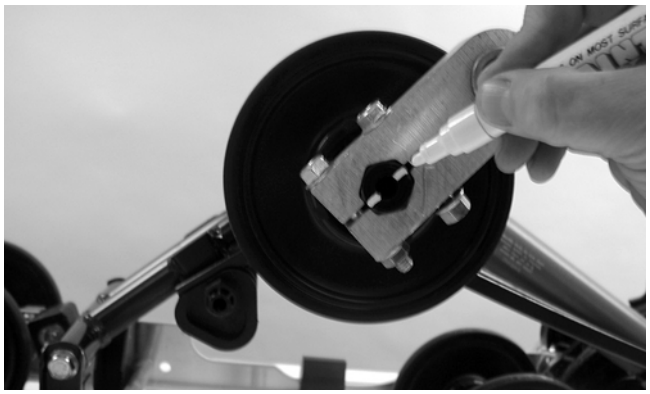
⚠ WARNING

Care must be taken when removing the spring or damage or injury could result.



AG624DA

2. Mark the offset pivot idler and the idler arm for assembly purposes.



MS142

3. Remove the cap screws securing the offset pivot idler arm assembly to the idler arm; then remove the offset pivot arm idler assembly. Account for a flanged axle, flared bushing, idler spacer collar, and lock nuts.



MS064

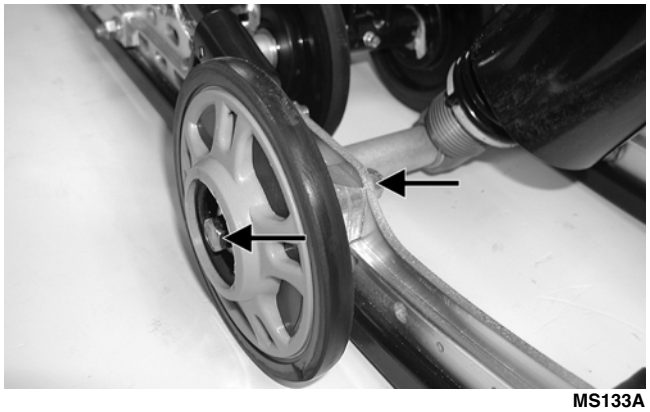
4. Remove the idler wheel.

■ NOTE: Use Idler Wheel Puller Kit (p/n 0644-122) to remove the wheel.



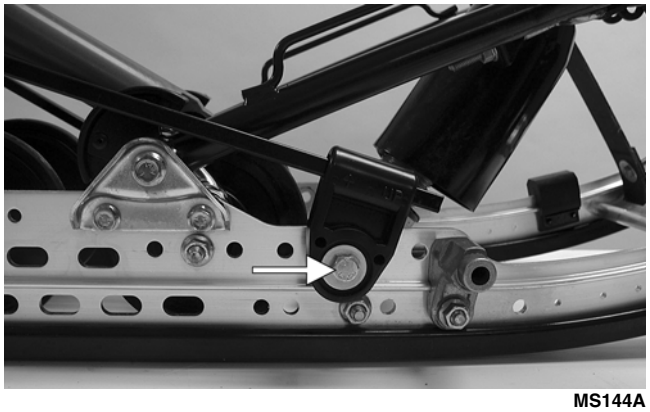
MS143

5. On standard models, remove the cap screw and flat washer securing the front outer idler wheel to the mounting block; then remove the idler wheel.



MS133A

6. Remove the cap screw, flat washer, and lock nut securing the spring slide to the slide rail. Account for the spring slide and all mounting hardware.



MS144A



MS014

7. Remove the spring and sleeve from the idler arm.



MS145

■ NOTE: On Sno Pro models if it is necessary to remove the spring slides, the cap screw and lock nut securing the front inner idler wheel assembly must be removed.



MS994A

■**NOTE: Use the same procedure for the other side.**

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearing with a clean cloth.
2. Inspect each idler wheel and plastic hub for cracks or damage.
3. Rotate the idler wheel bearings (by hand) and inspect for binding or roughness.
4. If a bearing must be replaced, use this procedure.

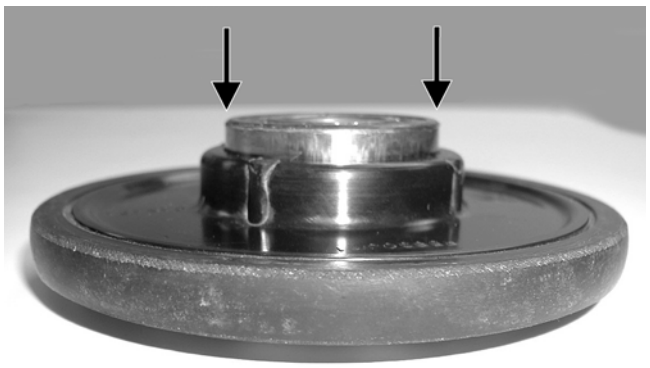
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert (if applicable) and the snap ring.

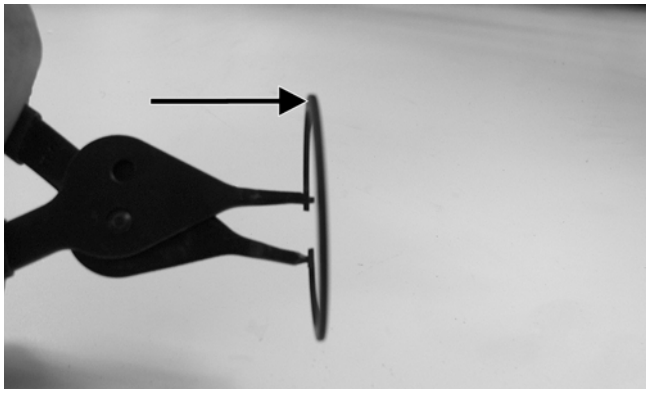
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

E. Install the insert (if applicable).



MS008

5. Inspect the spring, spring slide, sleeve, washers, slide block insert, and shaft area for wear.
6. Inspect the adjusting cams and arms for cracks.

INSTALLING

1. Slide the sleeve and spring onto the idler arm.



MS145

2. Place the spring slide and slide block (with spring in slide block) into position on the slide rail. Secure with a cap screw and washer. Tighten to specifications.

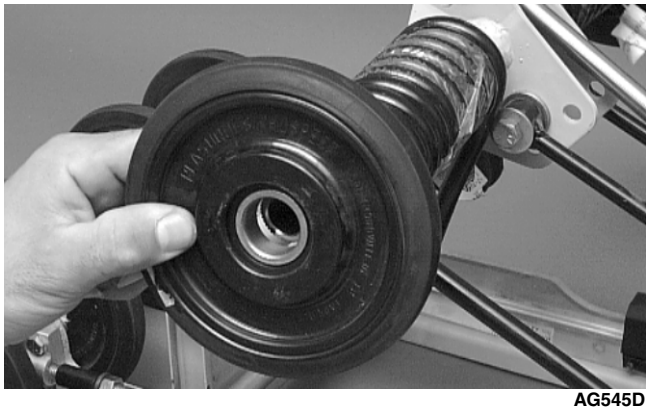


MS014



MS015

3. Install the rear upper idler wheel on the idler arm.



AG545D

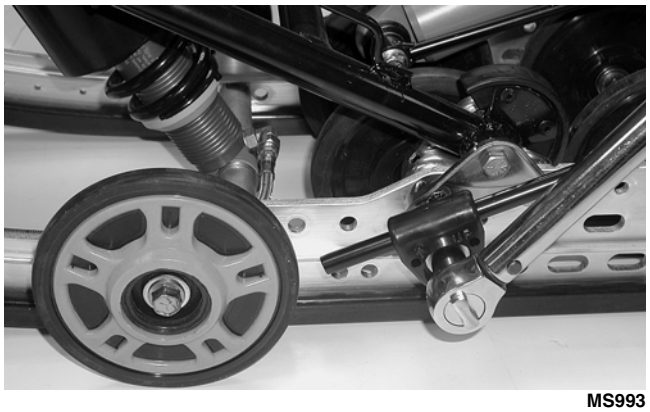
⚠ CAUTION

When driving the idler wheel onto the idler arm, use a tool to contact the inside race of the bearing or damage to the wheel or bearing may occur.



MS072A

■ NOTE: On Sno Pro models, install the spring slide block assembly with the cap screw and lock nut securing the front inner idler wheel assembly. Tighten to specifications.



MS993

4. Install the idler spacer collar onto the idler arm.

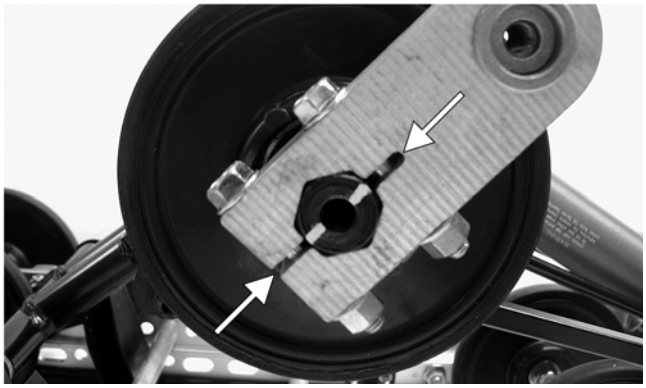


MS064

5. Place the flared bushing with a thin flat washer through the notched side of the offset pivot idler arm assembly.

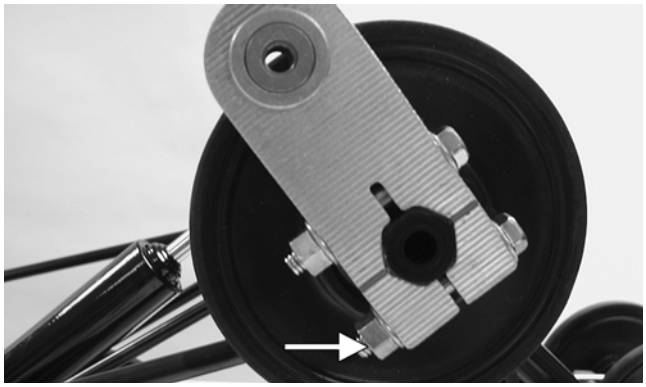
■ NOTE: If the flared bushing in the offset pivot idler arm is loose, it must be cleaned and green Loctite #609 must be applied to it prior to installation.

6. Align the marks on the idler arm to the centerline of the offset pivot idler arm assembly. Secure the offset pivot idler arm to the idler arm with cap screws and lock nuts. Tighten to specifications.



MS146A

■ **NOTE: When tightening the pivot idler arm lock nuts, tighten the lower lock nut first or binding may occur.**



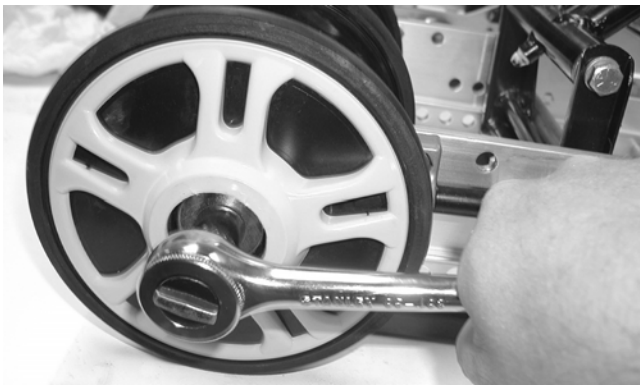
MS019B

Rear Axle and Idler Wheels

■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this subsection).**

DISASSEMBLING

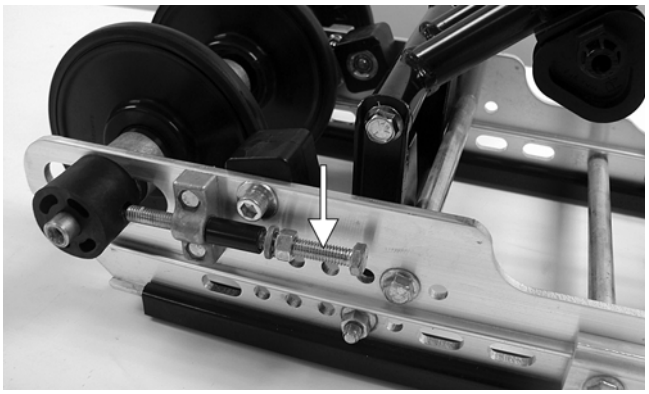
1. Remove the cap screw and large flat washer securing the outer rear idler wheel. Remove the outer idler wheel from the shaft.



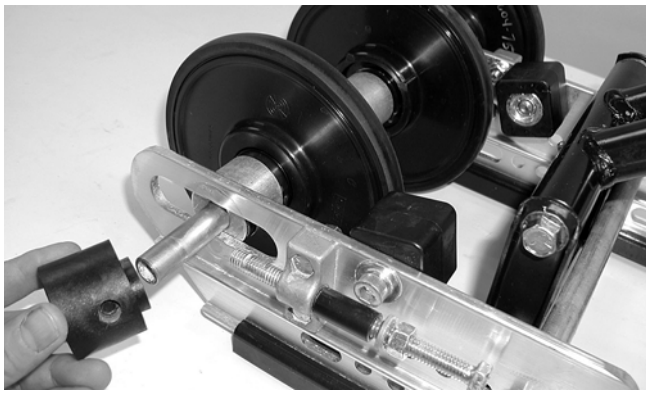
FC194

■ **NOTE: The large flat side of the wheel insert is positioned next to the inner plastic adjuster bushing. The idler wheel must be installed with the wheel insert properly positioned.**

2. Loosen the track adjusting bolts. Slide the outer adjuster bushings off the axle.



MS147A



MS148

3. Carefully slide the shaft out from the inner idler wheels and note the position of the spacers and washers.



MS149

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean the bearings with a clean cloth.
2. Inspect all idler wheel inserts (inner and outer) for any cracks.
3. Inspect the outer rubber portion of the idler wheels for cracks and poor bonding.
4. Inspect the plastic insert of each idler wheel for cracks.
5. Inspect the shaft for wear and damaged threads.
6. Inspect all idler wheel bearings. Turn each bearing (by hand) and if any roughness or binding is noted, replace the bearing.
7. If a bearing must be replaced, use this procedure.

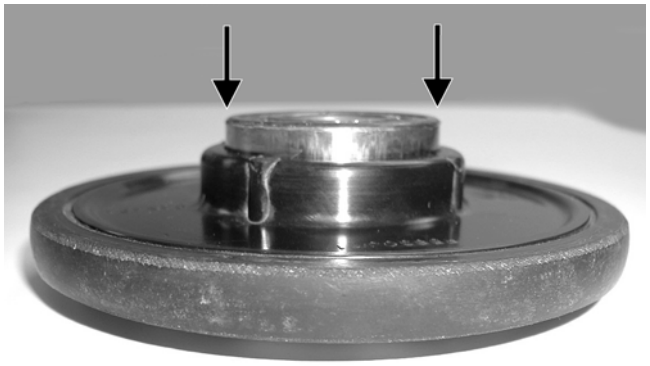
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert (if applicable) and the snap ring.

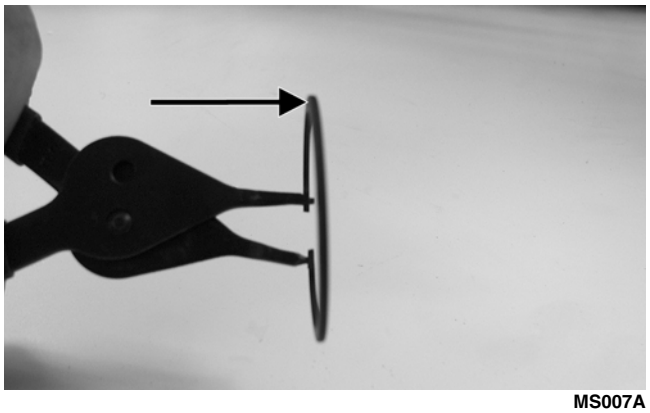
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

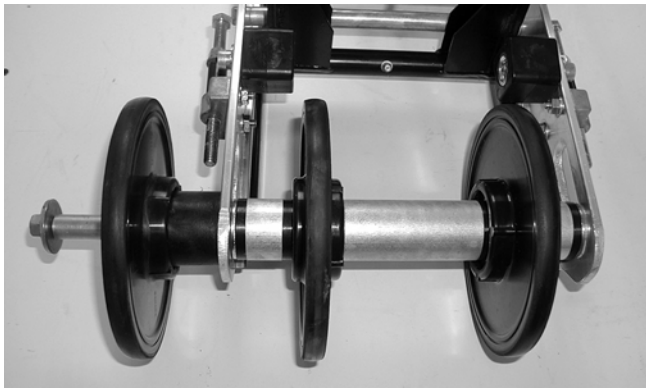
E. Install the insert (if applicable).



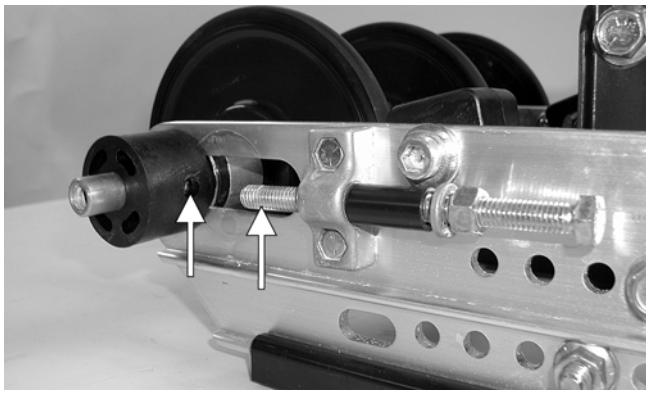
MS008

ASSEMBLING

1. In order from one side, slide the axle through the slide rail; then place a flat washer, short spacer with bushings, inner idler wheel with insert (if applicable), long spacer with bushings, and flat washer on the axle. Slide the axle through the opposite slide rail axle bracket. Place the plastic adjuster bushings on the axle (on the outside of each axle bracket). Make sure the hole in the adjuster bushing is aligned directly with the adjusting bolt.

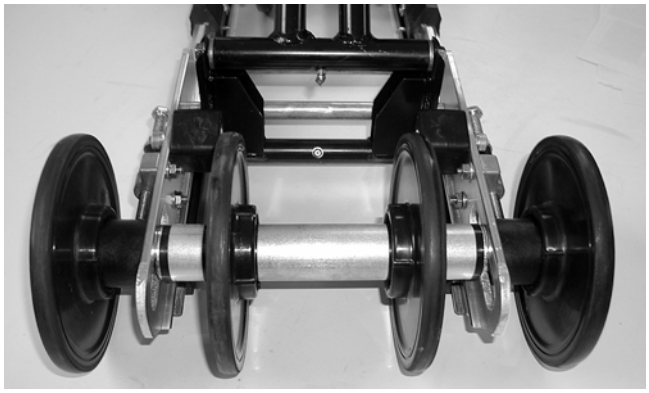


MS150



MS151A

2. Place the outer idler wheels on the axle and secure with two cap screws (coated with blue Loctite #243) and large flat washers. Tighten cap screws only until snug.



MS152

■ **NOTE: It is advisable to tighten the rear idler wheel axle only until snug until the skid frame has been installed and track tension has been adjusted; then the axle assembly must be tightened to specifications.**

3. Install the skid frame (see Installing Skid Frame in this sub-section).
4. Adjust track alignment (see Track Alignment in this sub-section).
5. Adjust track tension deflection (see Track Tension in this sub-section).

Rear Arm/Idler Arm

■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section).**

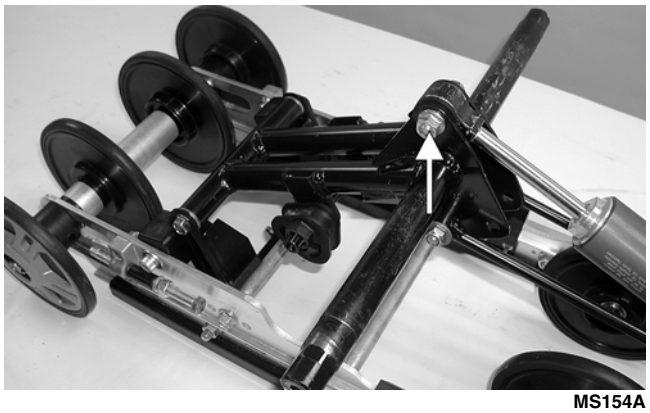
DISASSEMBLING

1. Remove the rear upper idler wheels and springs (see Rear Upper Idler Wheels/Rear Springs in this sub-section).



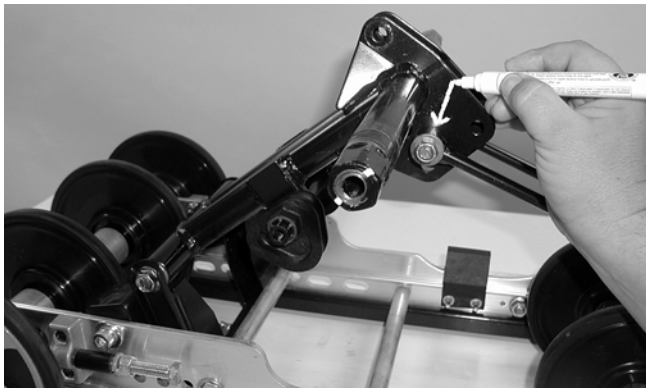
MS153

2. Remove the cap screw and lock nut securing the upper shock eyelet to the idler arm. Account for a spacer, cap screw, and lock nut.



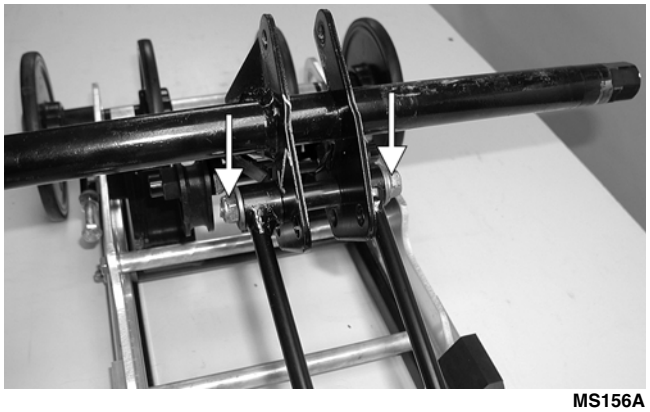
MS154A

■ **NOTE: Mark the hole that the upper shock links are mounted in for assembly purposes.**

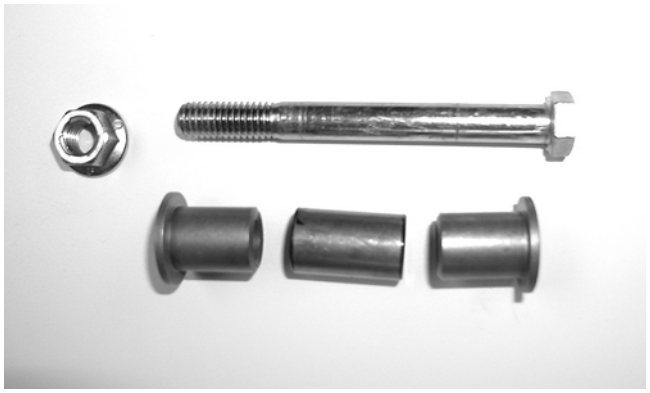


MS155

3. Remove the cap screw and lock nut securing the upper shock links to the idler arm. Account for a cap screw, lock nut, spacer, and axle links.

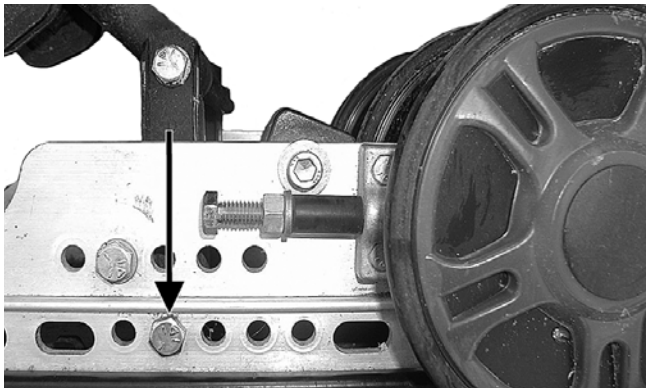


MS156A



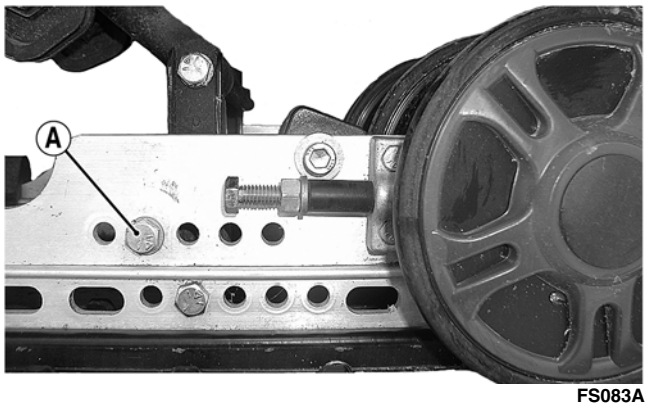
MS031

4. Remove the cap screw and lock nut securing the rear arm to the slide rail. Account for the serrated axles and axle tube.



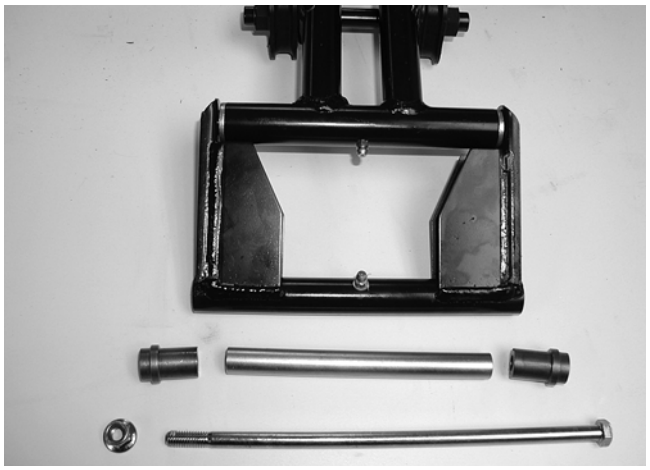
FS083D

■ **NOTE: To remove the rear arm, it may be necessary to loosen the rear arm limiter (A).**



FS083A

■ **NOTE: Note the mounting hole from which the rear arm was removed for assembly purposes.**

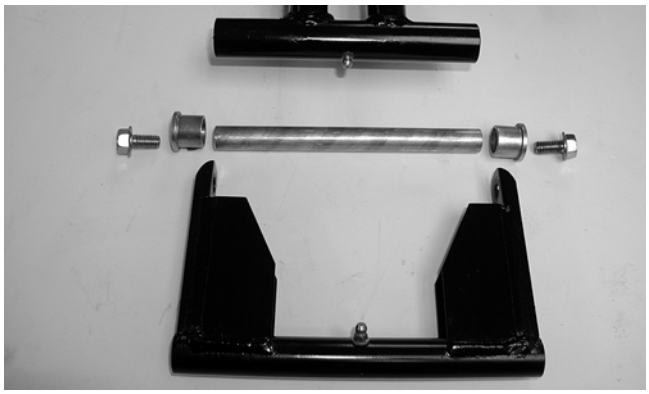


MS028

5. Remove the cap screw and lock nut securing the rear arm to the idler arm. Account for the aluminum axle and bushing assemblies.



MS029A



MS030

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearings with a clean cloth.
2. Inspect each idler wheel for cracks or damage.
3. Inspect the bushings (located in the arm pivot area) for wear or damage.
4. Inspect all welds and the tubing of the upper arm for cracks or unusual bends.
5. Inspect the two adjusting cams for damage.
6. Rotate the idler wheel bearings (by hand) and check for binding or roughness.
7. If a bearing must be replaced, use this procedure.

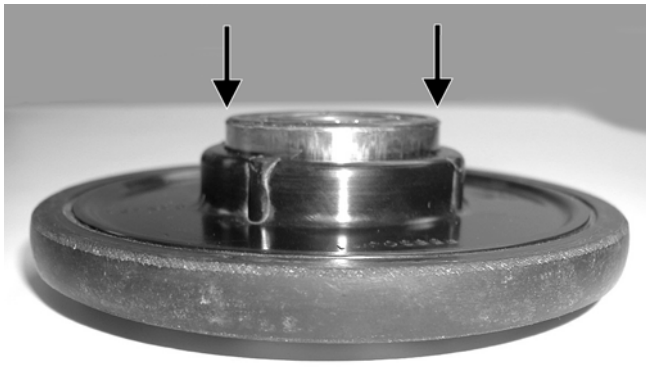
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel snap ring.

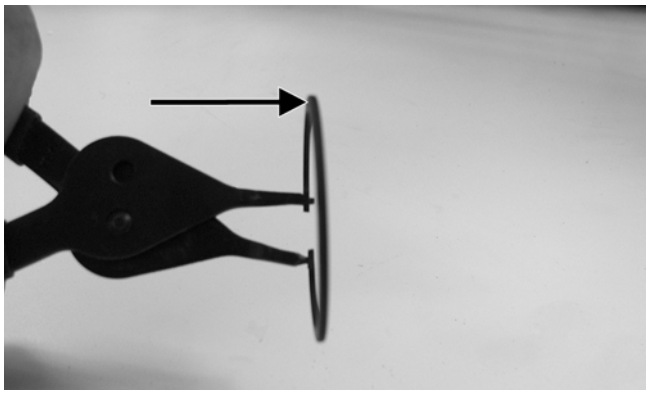
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

ASSEMBLING

1. Install the rear arm onto the idler arm with an aluminum axle, bushing assemblies, and two cap screws (coated with blue Loctite #243). Tighten only until snug.



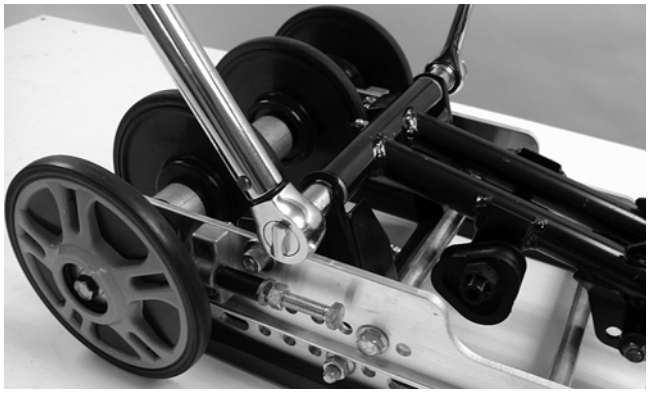
MS029A

2. Place the rear arm assembly into position between the slide rails. Secure with a cap screw and lock nut. Tighten to specifications.



MS157

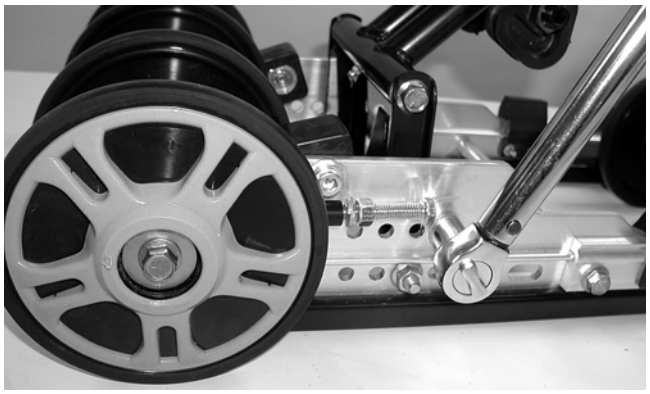
3. With the rear arm secured to the slide rails, tighten the two cap screws (from step 1) to specifications.



MS159

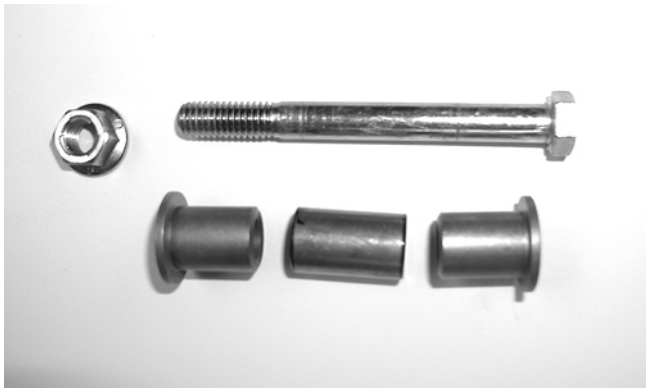
■ **NOTE: Install the rear arm assembly into the appropriate mounting hole as noted during disassembly.**

■ **NOTE: If the rear arm limiter was loosened (after step 4 of disassembling), treat the threads of the cap screw with blue Loctite #243 and tighten to specifications.**

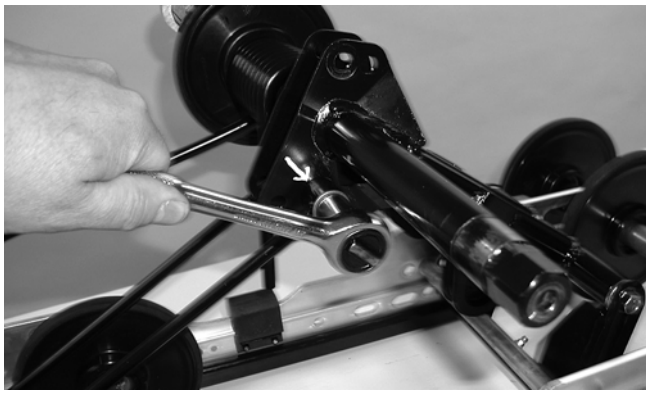


MS158

4. Position the shock links in the appropriate holes of the idler arm brackets (see Chassis and Skid Frame Mounting Locations in this section). Place a spacer between the center of the brackets; then place a flat washer on the cap screw. Insert the axle links into the upper shock link eyelets; then insert the cap screw through the eyelets. Secure with a cap screw and lock nut. Tighten securely.



MS031



MS026

5. Place the upper shock eyelet with bushings between the idler arm brackets making sure the spacer is properly positioned between the brackets. Secure with a cap screw and lock nut. Tighten securely.

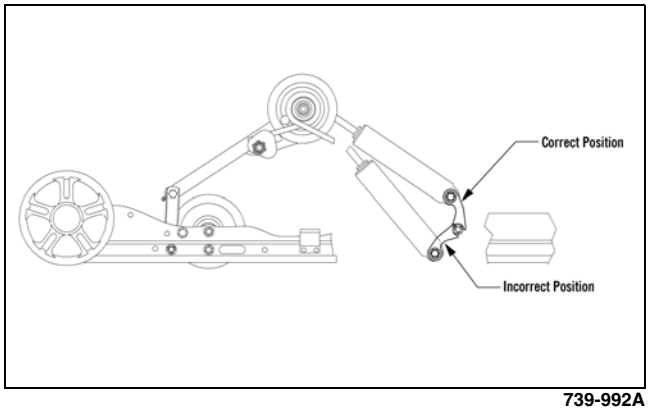


MS160

■ **NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.**

⚠ CAUTION

Make certain that the shock pivot assembly is properly positioned prior to securing the shock absorber to the idler arm.



739-992A

■**NOTE: It is advisable to install the rear arm springs onto the adjuster blocks after the skid frame has been installed.**

6. Grease the idler arm and rear arm grease fittings with a low-temperature grease.
7. Install the rear upper idler wheels, rear springs, and offset pivot idler (see Rear Upper Idler Wheels/Rear Springs in this sub-section).

Front Arm/Front Arm Brackets/Front Shock Absorber

■**NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section), and the rear springs must be removed from the adjusting cams.**

REMOVING

1. Remove the lower cap screws and lock nuts securing the limiter straps to the rail support. Account for flat washers.



MS161A

■**NOTE: On models with remote reservoir, cut the cable ties securing the front shock absorber hose to the front arm; then loosen the two clamps securing the remote reservoir with hoses.**



FC179

⚠ CAUTION

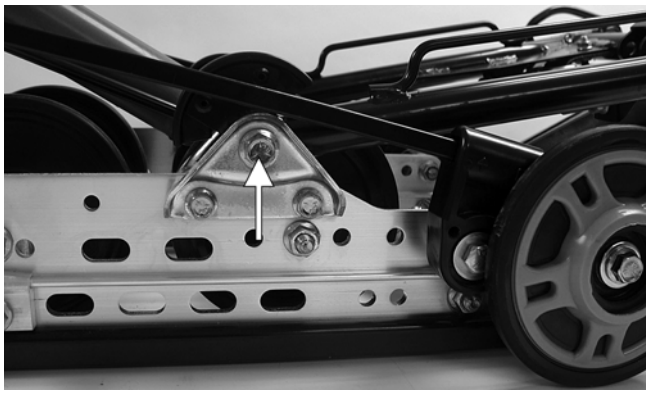
Care must be taken when removing the remote reservoir that the hoses are not kinked or damaged.

2. Remove the cap screw and lock nut securing the upper front shock absorber eyelet to the front arm. Pull the shock eyelet free of the bracket. Account for a serrated axle.



MS162A

3. Remove the cap screws and lock nuts securing the front arm to the front arm mounting brackets.



MS163A



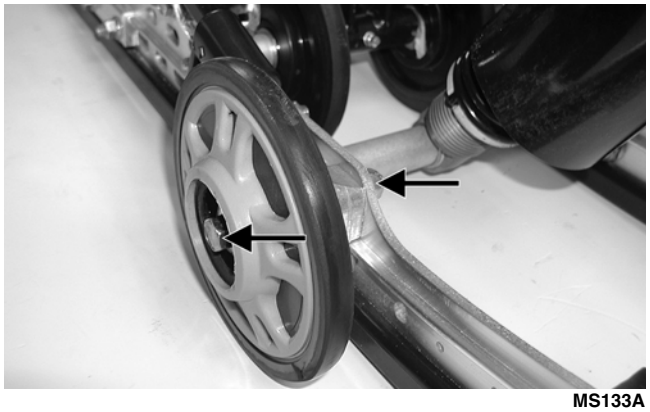
MS992A

4. Remove the front arm and account for the two front arm spacers.



MS164

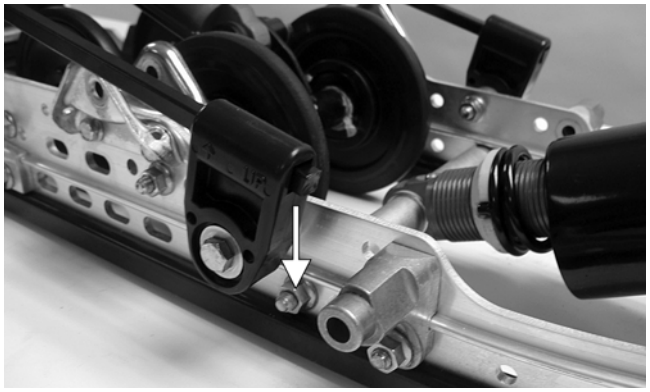
5. Remove the cap screws securing the front outer idler wheels to the idler wheel mounting block. Account for lock nuts, cap screws, shim washers (if applicable), and flat washers.



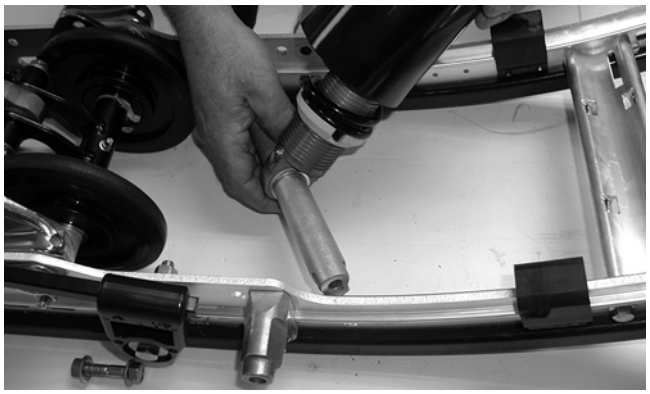
MS133A

6. Remove the cap screw, washer, and lock nut from the front shock axle; then from one side, tap the assembly rearward far enough for the axle assembly to clear the slide rails. Account for an axle, two spacers, and two shim washers.

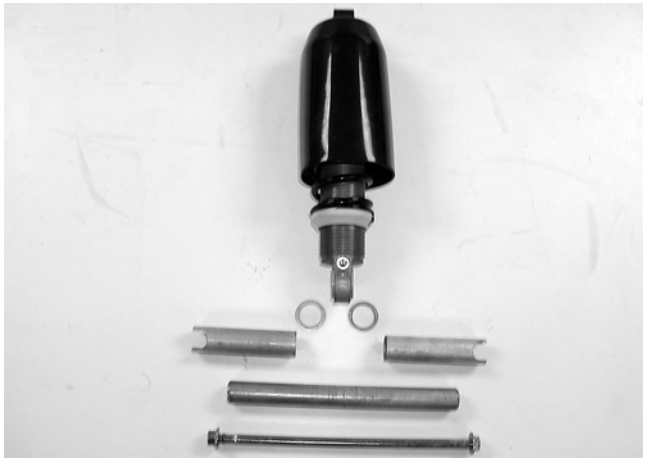
■ **NOTE: It is advisable to loosen the front rail support cap screws enough to gain clearance to remove the front shock axle.**



MS165A

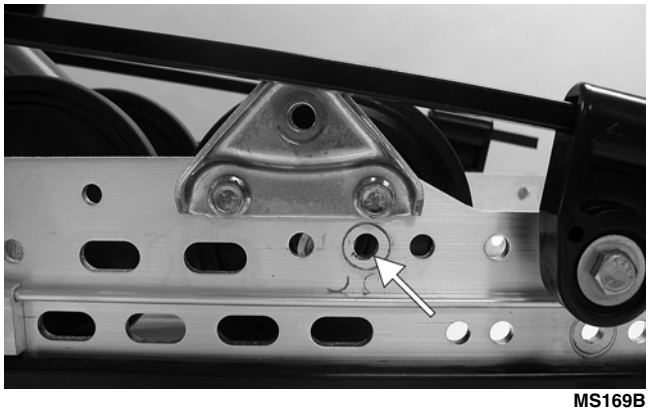


MS166



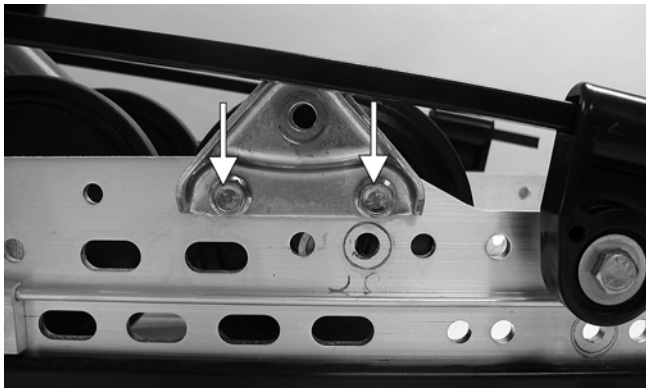
MS167

7. Remove the lock nut and cap screw securing the rear shock pivot/inner idler wheel assembly to the slide rail.



MS169B

8. Move the assembly rearward far enough to gain access to the front arm mounting bracket lock nuts; then remove the cap screws and lock nuts securing the brackets to the slide rails.



MS169A

INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect all front arm weldments for cracks or unusual bends; then inspect the front arm mounting brackets for cracks and for elongated holes.
2. Closely inspect all tubing for cracks or unusual bends.
3. Inspect the bearings, bushings, and front arm spacers for wear or damage.
4. Inspect the shock absorber for any signs of oil leakage especially at the point where the shock shaft enters the shock body.
5. Inspect the shock absorber eyelet welds (at each end) for any cracks, signs of separation, or for unthreading.
6. Inspect the shock absorber and reservoir hoses (on models with remote adjuster) for damage.

INSTALLING

1. Install the front arm mounting brackets to the slide rails. Secure with cap screws and lock nuts tightened to specifications.

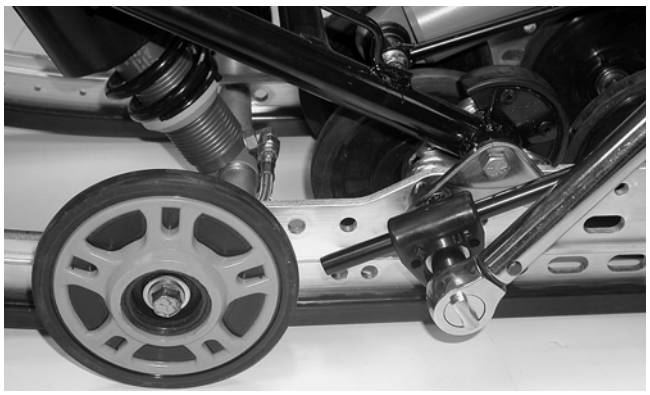


MS170

2. Move the rear shock pivot/inner idler wheel assembly to the appropriate mounting location. Secure with cap screws and lock nuts tightened to specifications.

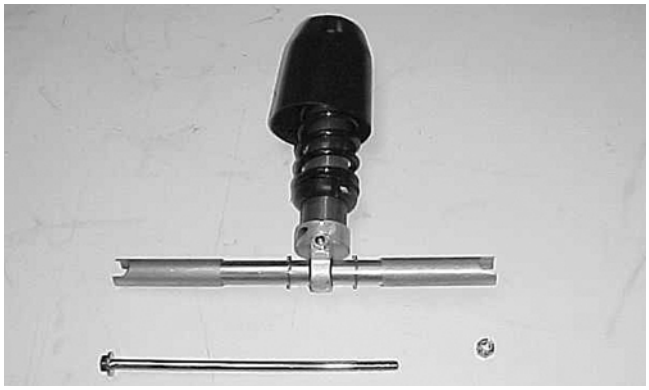


MS171



MS993

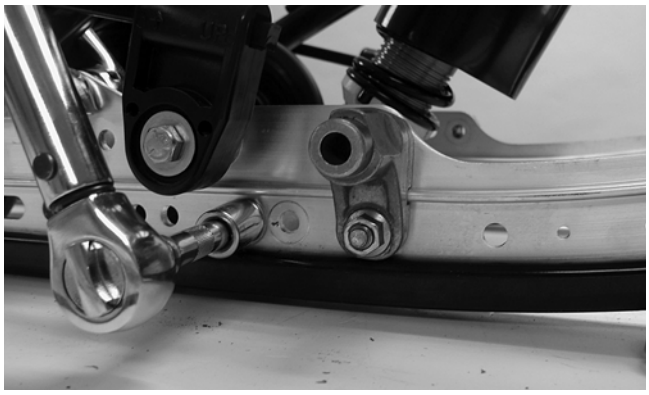
3. Install the axle into the lower shock eyelet bushing assembly; then install the two spacers and the two shim washers.



FC178

4. Place the front arm shock axle assembly into position on the skid frame making sure the spacers and washers are properly positioned. Secure with the cap screw, washer, and a new lock nut. Tighten to specifications.

■ **NOTE: If the front rail support cap screws were loosened (after step 6), treat the threads with blue Loctite #243 and tighten to specifications.**



MS172

5. Position the front arm with spacers into the mounting brackets. Secure with cap screws and lock nuts. Tighten to specifications.



MS173



MS991

6. Secure the upper shock eyelet and serrated axle in the appropriate mounting hole of the front arm (standard arm mounting position). Secure with a cap screw and lock nut. Tighten securely.



MS174

■ **NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.**

■ **NOTE: On models with a remote reservoir, place the remote reservoir into position making sure the hose is directed to the left-side of the skid frame. Secure with clamps; then secure the shock hose to the left-side slide rail using cable ties.**



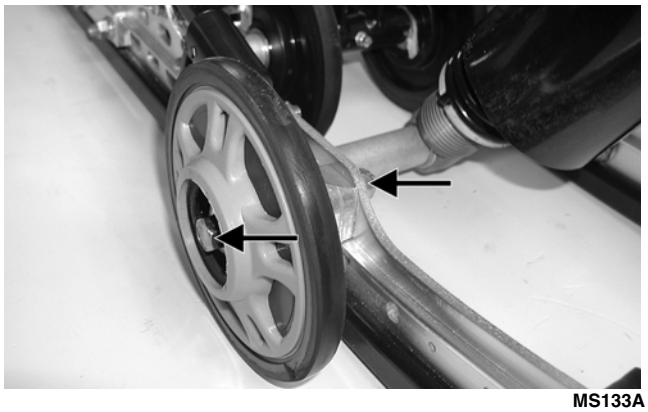
FC179

7. Secure the limiter straps with cap screws, washers, and lock nuts. Tighten to specifications.



MS161A

8. Secure the front outer idler wheels to the idler wheel mounting blocks with cap screws, flat washers, shim washers (if applicable), axles, and lock nuts. Tighten to specifications.



MS133A

Rear Shock Absorber and Shock Links/Front Inner Idler Wheel Assembly

■ **NOTE: Before removing the skid frame by using the Rear Suspension Spring Tool (p/n 0144-311), remove the spring from the adjusting cam.**

⚠ CAUTION

Care must be taken when removing the spring from the adjusting cam or damage or injury could result.

■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this subsection).**

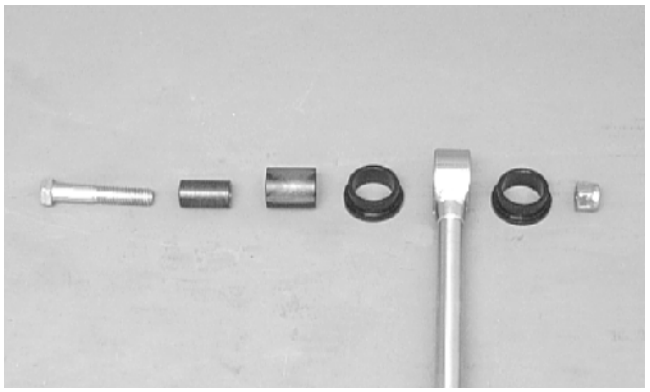
DISASSEMBLING

■ **NOTE: When removing center components from the skid frame, it is advisable to loosen all cap screws/lock nuts from one side of the slide rail to make removing easier.**

1. Disengage the shock absorber at the upper eyelet and remove the shock absorber. Account for a sleeve, cap screw, lock nut, and bushings.

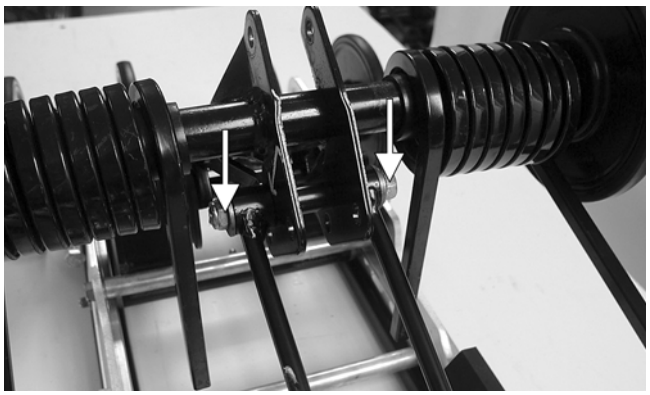


MS175A



AG665D

2. Remove the cap screw and lock nut securing the shock rod links to the idler arm. Account for a spacer and two axle links.



MS176A

■ **NOTE: Mark the hole that the upper shock links are mounted in for assembling purposes.**

9



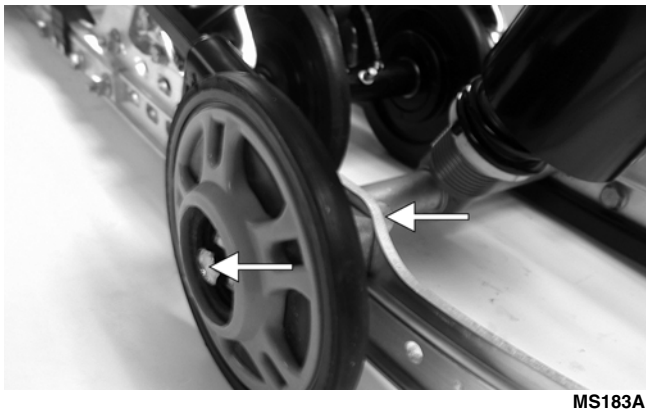
MS025

3. Remove the cap screw and lock nut securing the front inner idler wheel assembly to the slide rails; then from one side, tap the assembly rearward far enough to clear the slide rails and mounting brackets. Remove the assembly.



MS178

■ **NOTE: On standard models to access the front inner idler wheel assembly, the front outer idler wheels must be removed.**



MS183A

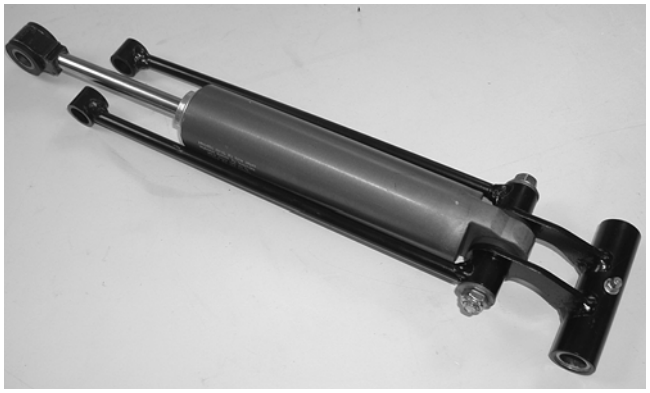
4. Remove the axle from the shock pivot. Account for an axle, three spacers, and four washers.



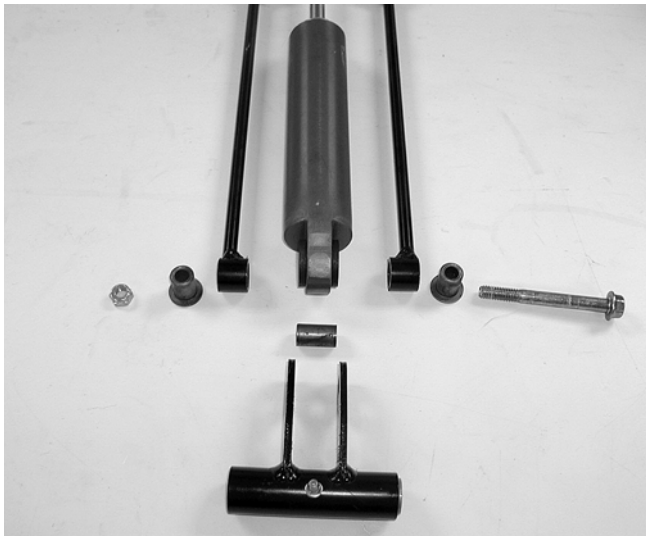
MS179

■ **NOTE: Lay components out in order as they are removed.**

5. With the pivot assembly removed, remove the cap screw and lock nut securing the lower shock eyelet and links to the pivot bracket. Account for a spacer and two link axles.



MS180



MS181

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean shock pivot and idler wheel axle in part-cleaning solvent. Dry with compressed air.

⚠ WARNING

Always wear an approved pair of safety glasses when using compressed air.

2. Clean the idler wheel bearings with a clean cloth.
3. Closely inspect the torque link arm and axles for wear, bends, or damaged splines at either end.
4. Inspect the idler wheels for signs of cracking, wear, or outer rubber separation from plastic wheel.
5. Rotate the idler wheel bearings (by hand) and inspect for any signs of binding or roughness.
6. If a bearing must be replaced, use this procedure.

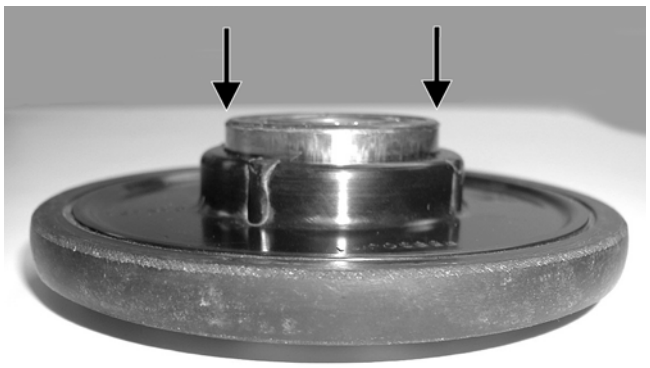
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove wheel insert (if applicable) and the snap ring.

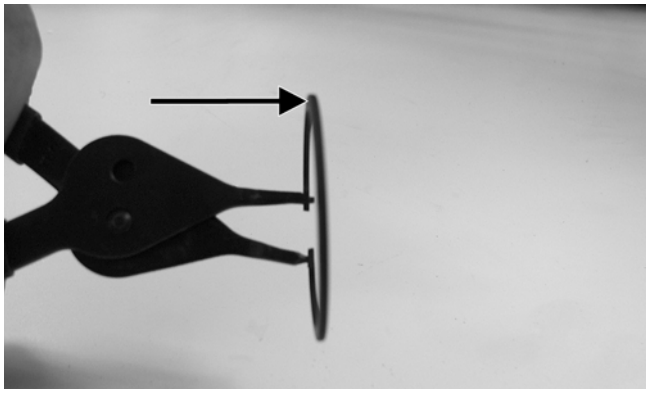
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

E. Install the insert (if applicable).

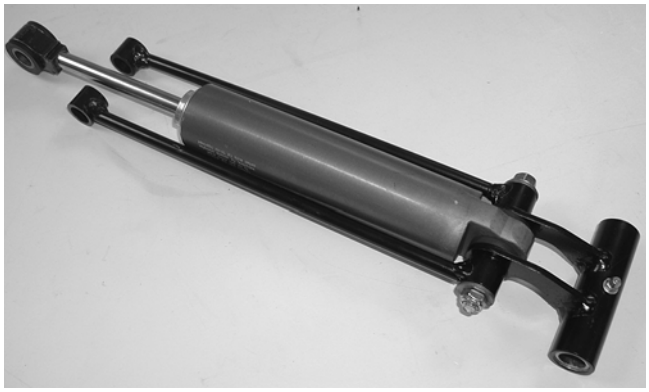


MS008

7. Inspect the shock absorber for any signs of oil leakage especially at the point where the shock shaft enters the shock body.
8. Inspect the rubber shock bushings located in the shock absorber eyelets for cracks or deterioration.
9. Inspect the shock absorber eyelet welds (at each end) for any cracks or signs of separation.
10. Inspect the welds securing the eyelets of the shock links for cracks or signs of separation. Either weld the eyelet or replace the shock link.
11. Inspect the axle surfaces for any signs of corrosion. If corrosion is found, lightly buff the surface of the axle with #400 wet-or-dry sandpaper; then apply a light coat of grease.

ASSEMBLING

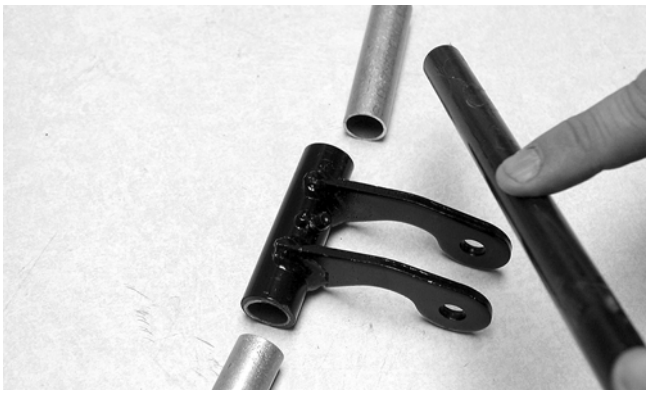
1. Secure the shock rod links (with axles) and the lower end of the shock absorber to the pivot assembly with the cap screw and lock nut. Tighten securely.



MS180

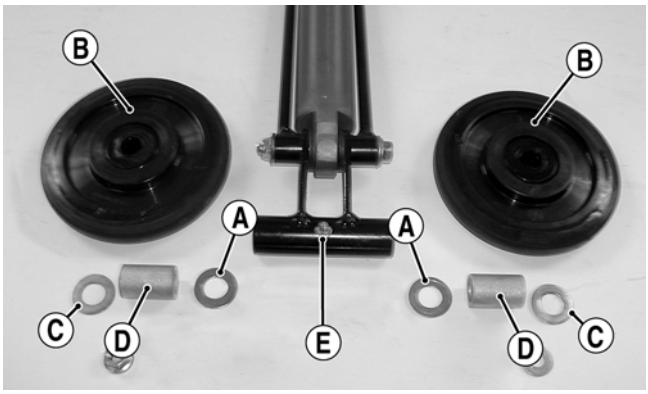
■**NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.**

2. Apply a thin coat of low-temperature grease to the axle and slide the axle into the shock pivot bracket. Have equal amounts of the axle exposed on either side of the bracket tube.



FC189

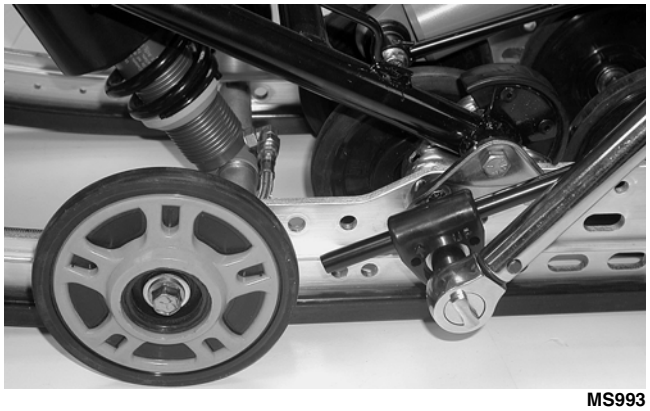
3. Install a washer (A), idler wheel (B), washer (C), and spacer (D) to each side of the pivot bracket (E).



MS179A

4. Lower the pivot assembly down between the rails. Align the axle with the mounting hole (as noted during disassembly). Secure with the cap screw and a new lock nut. Tighten to specifications.

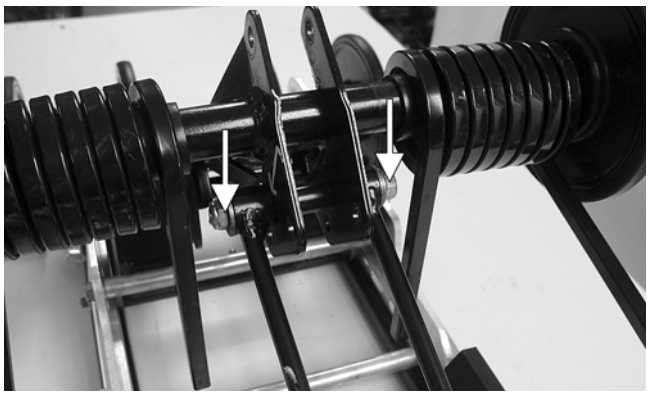
■**NOTE: On Sno Pro models to install the spring slide blocks, include them in step 4.**



MS993

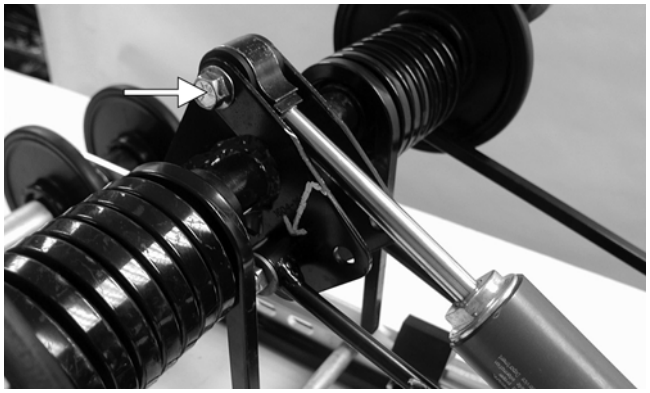
5. Position the rear arm/idler arm so the rear springs can be installed into the slide blocks.

6. Position the shock links in the appropriate holes of the idler arm brackets (as noted in disassembling). Place a spacer between the center of the brackets; then insert the link axles into the upper shock link eyelets. Secure with a cap screw, washer, and lock nut. Tighten securely.



MS176A

7. Secure the shock absorber to the idler arm with bushings, sleeve, lock nut, and a cap screw. Tighten securely.

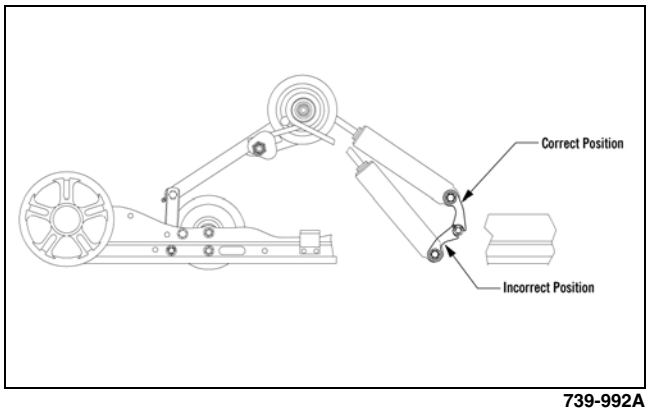


MS175A

■**NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.**

⚠ CAUTION

When installing the shock and shock rod links to the idler arm, make certain that the pivot assembly is positioned correctly (in the UP position).



739-992A

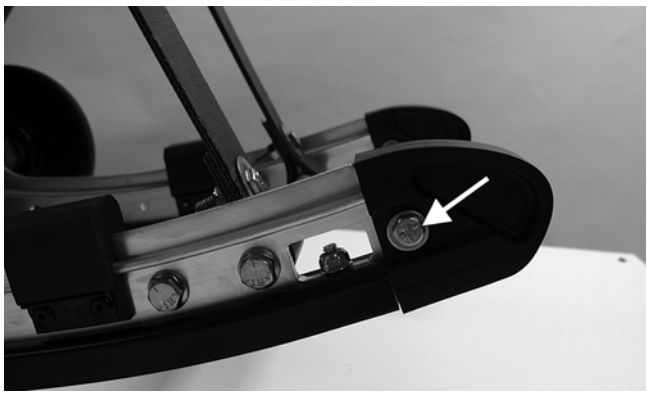
Slide Rails

■**NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this subsection).**

REMOVING

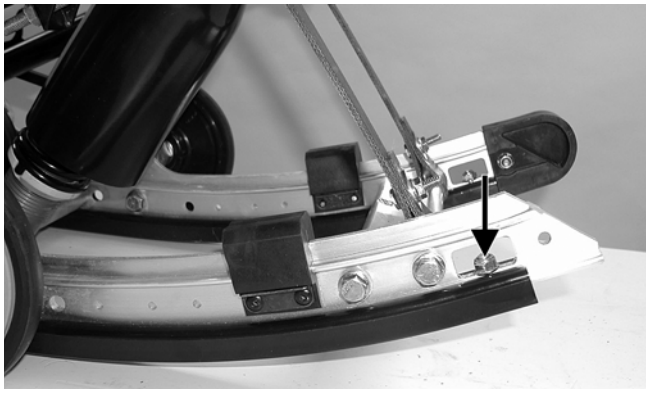
■**NOTE: When it is necessary to replace one or both slide rails, it is recommended that one slide rail be removed at a time. The remaining slide rail will then hold the crossbraces, axles, and brackets in their correct assembly order. Always mark the mounting hole locations during disassembly to speed up the assembly process and to prevent any damage. This method is much quicker than to completely disassemble the entire skid frame. To replace either rail, use the following procedure.**

1. Remove the end cap from the slide rail. Account for a cap screw, lock nut, and two flat washers.



MS016A

2. Remove the machine screw and lock nut securing the wear strip to the front of the slide rail.



MS213A

3. Align the wear strip with the openings (windows) in the track; then using a suitable driving tool, drive the wear strip rearward off the slide rail.

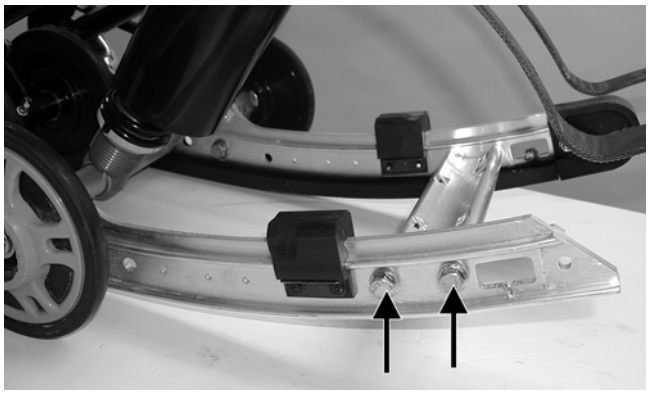
■**NOTE: If binding of the wear strip occurs, it may be necessary to use a pipe wrench, start from either end, and hook the edge of the wear strip with the pipe wrench jaw and twist the wear strip off the slide rail. Move the pipe wrench 7.5 cm (3 in.) and again twist the wear strip off the rail. Repeat this procedure until the wear strip is free of the rail.**

4. Remove the cap screws and lock nuts with flat washers from the lower limiter straps.



MS161A

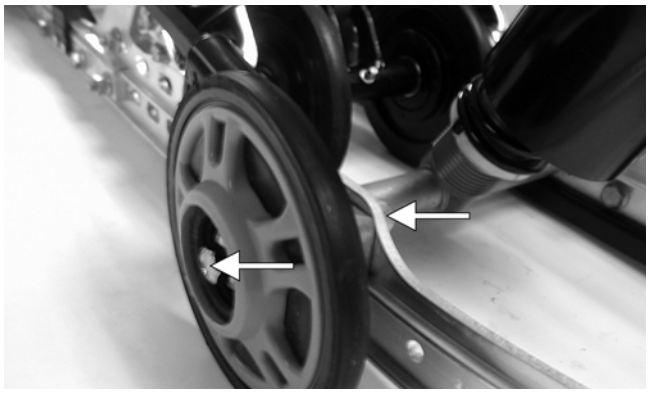
5. Remove the cap screws securing the rail support to the slide rail.



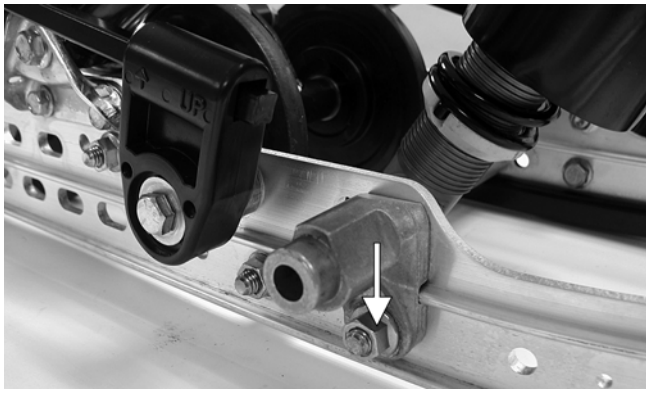
MS182A

6. Remove the cap screws and lock nuts securing the front outer idler wheels and the idler wheel mounting blocks. Account for flat washers and spacer washers.

■ NOTE: The idler wheel mounting block should be removed only from the slide rail being replaced.

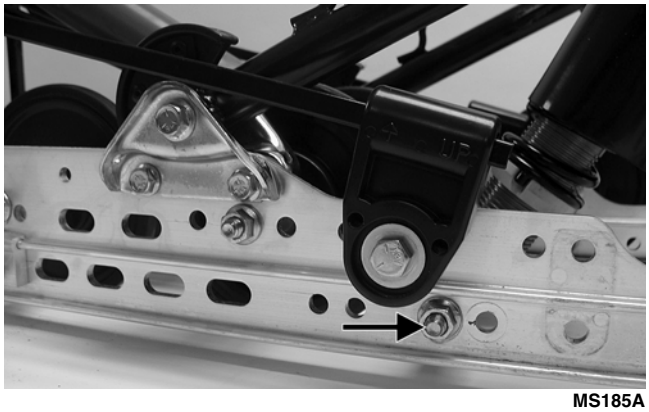


MS183A



MS184A

7. Remove the cap screw, washers, and lock nut securing the front shock mount axle.

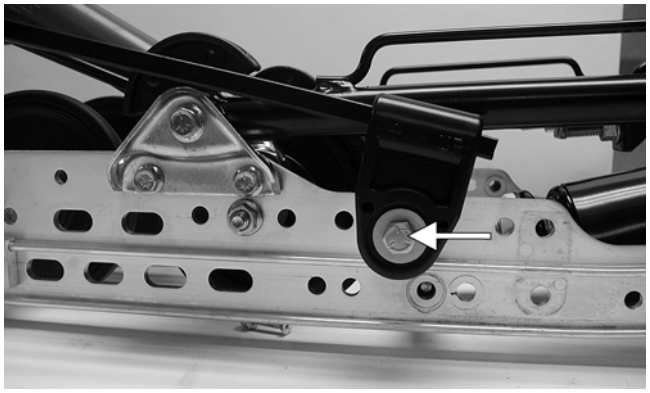


MS185A

■ NOTE: If it is necessary to remove the cap screw for replacing the slide rail, install the cap screw from the opposite side into the assembly to secure components and aid in replacing the slide rail.

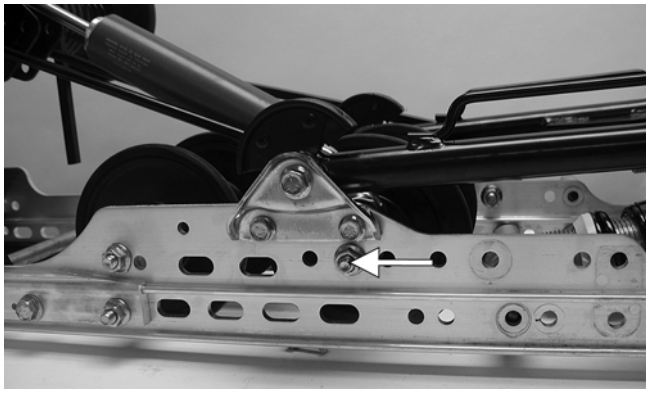
■ NOTE: If not already done, remove the short spring leg from the adjusting cam. Also, it is recommended that the top cap screw be removed from the front shock absorber to aid in slide rail installing.

8. On standard models, remove the cap screw and flat washer securing the spring slide to the rail. Account for a spacer and the slide block.



MS186A

9. Note the mounting location for installing purposes; then remove the cap screw and lock nut securing the front inner idler wheel assembly to the slide rails.



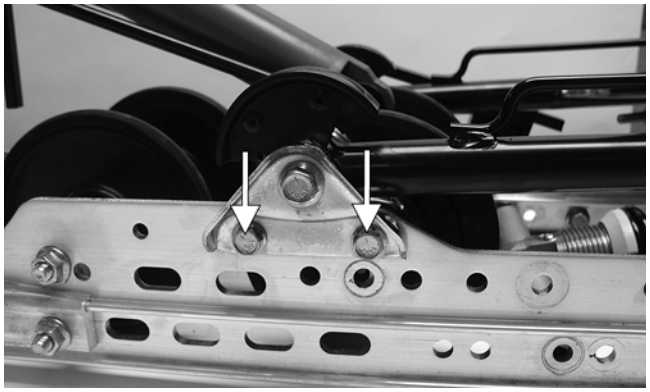
MS187A

■ NOTE: On Sno Pro models, the spring slide block will come off along with the assembly.



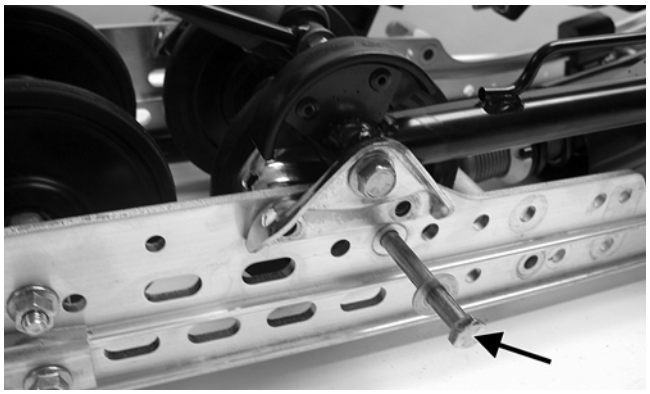
MS990A

10. Note the mounting position of the front arm mounting bracket; then remove the cap screws securing the front arm mounting bracket. Account for lock nuts.



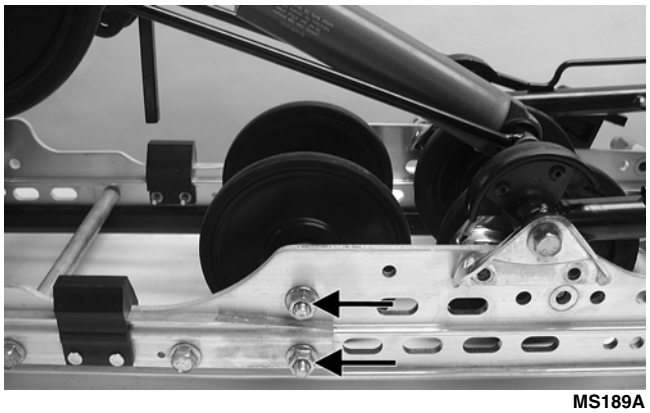
MS188A

■ **NOTE: After removing the mounting bracket cap screw, install the front inner idler wheel assembly cap screw from the opposite side slide rail (not being replaced) to hold center components in place.**



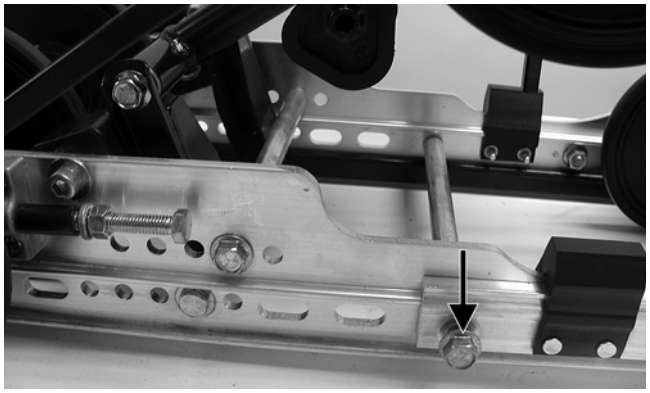
MS190A

11. Note the mounting location for installing purposes; then remove the cap screw and lock nut securing the rear inner idler wheels and mounting block.



MS189A

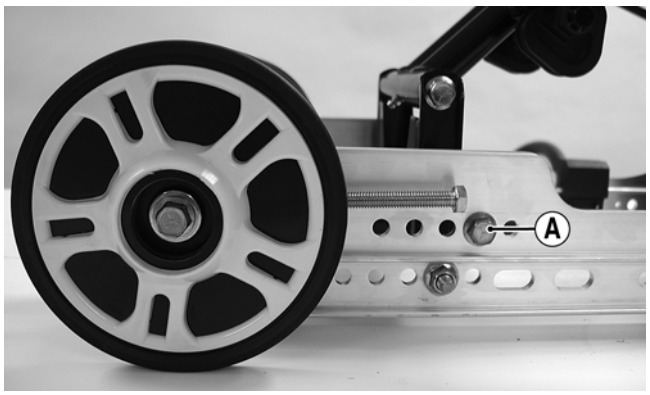
12. Remove the cap screw securing the rail support to the slide rail.



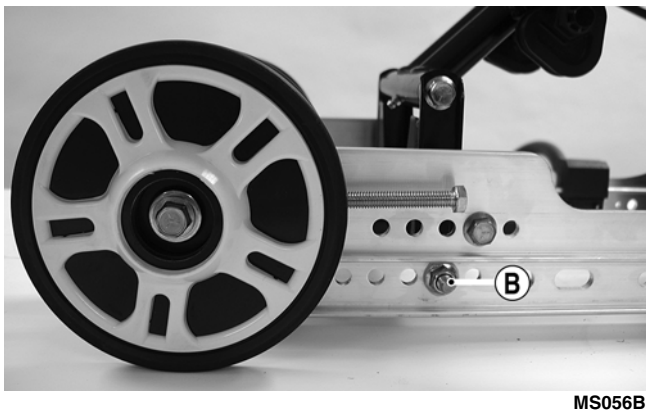
MS191A

■ **NOTE: On the Sno Pro models, there are two rail supports.**

13. Note the mounting positions of the rear arm limiter (A) and rear arm (B); then remove the cap screws, lock washers, and lock nuts from the rear arm limiter and rear arm.

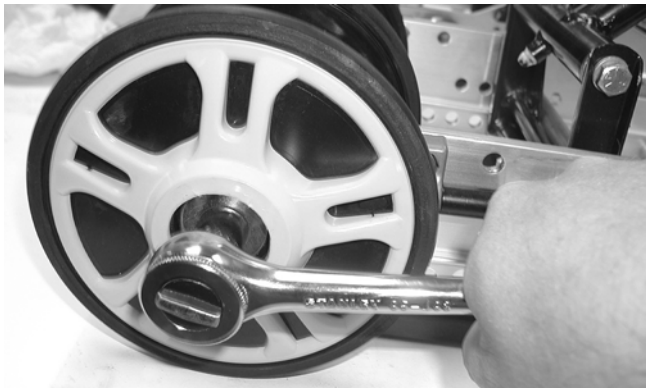


MS056A

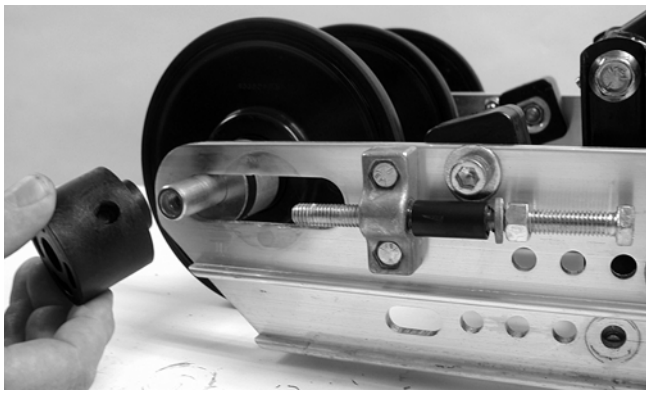


MS056B

14. Remove the idler wheel cap; then remove the cap screw and flat washer securing the rear idler wheel. Remove the idler wheel; then remove the adjuster bushing.



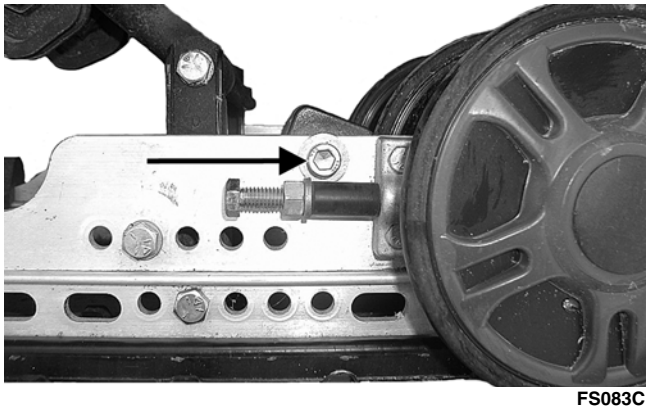
FC194



MS192

■ **NOTE: The adjusting bolt may have to be loosened to remove the adjuster bushing.**

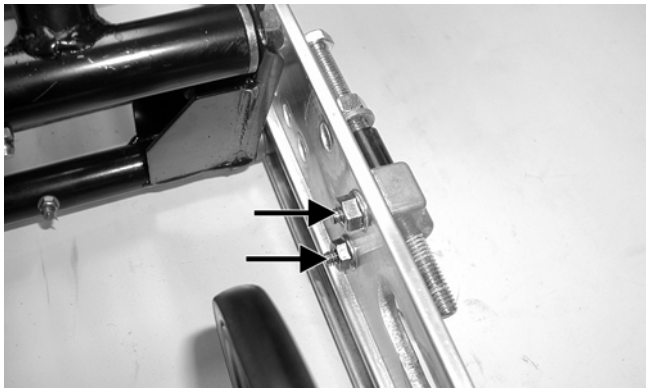
15. Mark the location of the rear coupler block (if applicable); then remove the block. Account for the block, bushing, cap screw, and lock nut.



FS083C

■ **NOTE: At this point, the slide rail should be free of the skid frame components and can be removed.**

16. Remove the cap screws and lock nuts securing the track adjuster bracket.



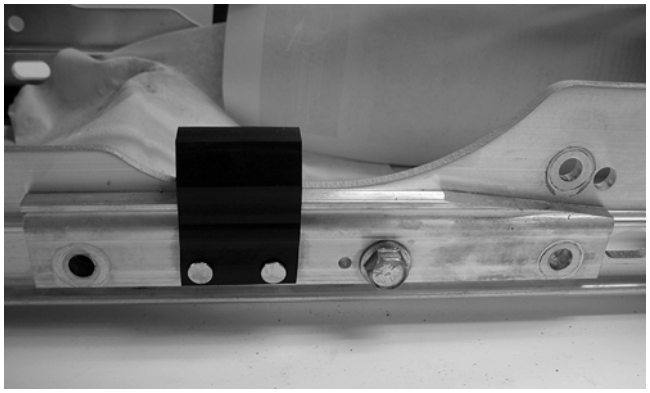
MS193A

17. Using a drill and a 3/16-in. drill bit, drill out the rivets and remove the front shock pads. Note the shock pad locations for installation. Account for the retaining brackets.

18. Twist the push nuts off the solid rivets securing the rear shock pads; then remove the pads.

■ **NOTE: The shock pads should be removed only if being replaced.**

19. Remove the cap screw and lock nut securing the brace to the slide rail.

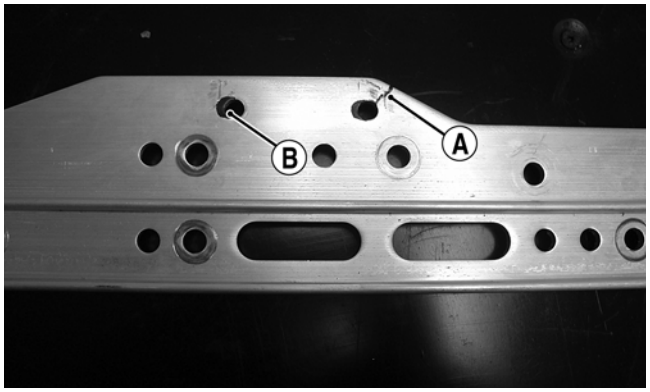


MS194

INSPECTING

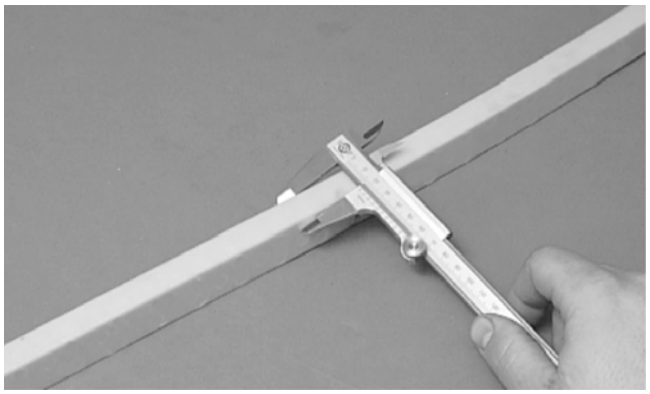
■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

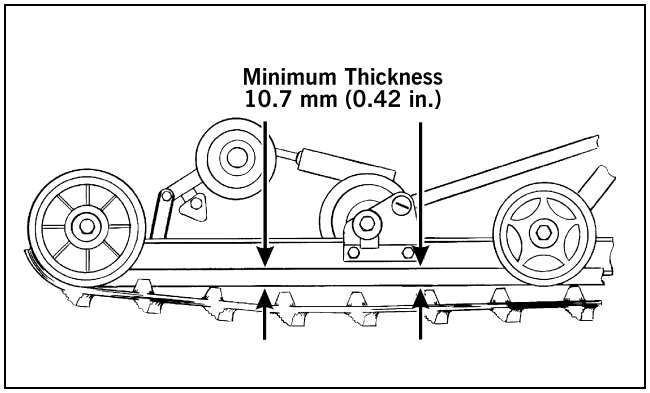
1. Inspect the slide rail for cracks (A), elongated holes (B), or unusual bends.



MS220A

2. Inspect the wear strip for wear. The wear strip must be 10.7 mm (0.42 in.) thick or thicker. If the wear strip measurement is less than specified, replacement of both wear strips is necessary.


AG530D

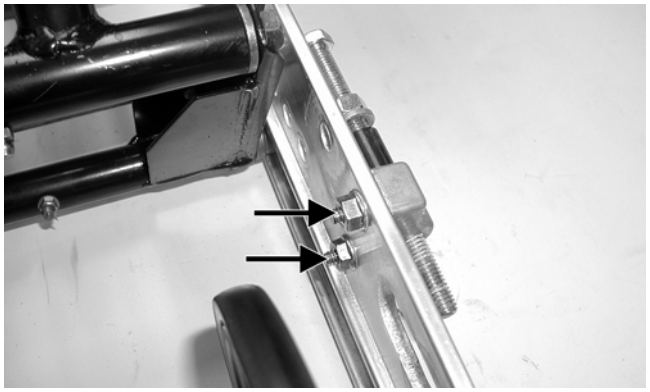


0727-726

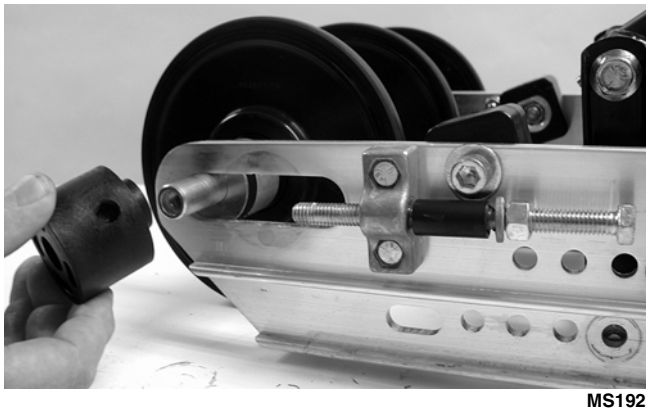
INSTALLING

1. Install the shock pads and secure with rivets (front) or with new push nuts (rear).

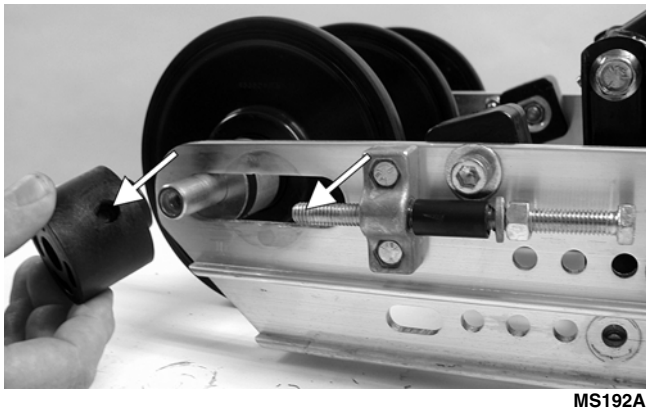
2. Secure the track adjuster bracket with the cap screws and lock nuts. Tighten to specifications.


MS193A

3. Place the rail into position; then install the adjuster bushing and rear idler wheel. Install a cap screw and flat washer. Tighten only until snug.


MS192

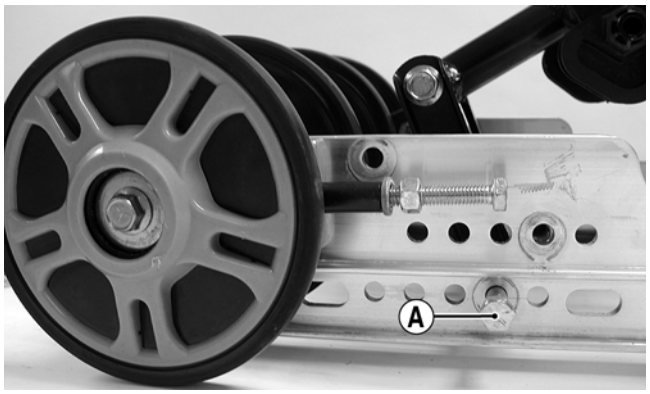
■ **NOTE: Make certain the adjuster bushing is properly positioned.**


MS192A

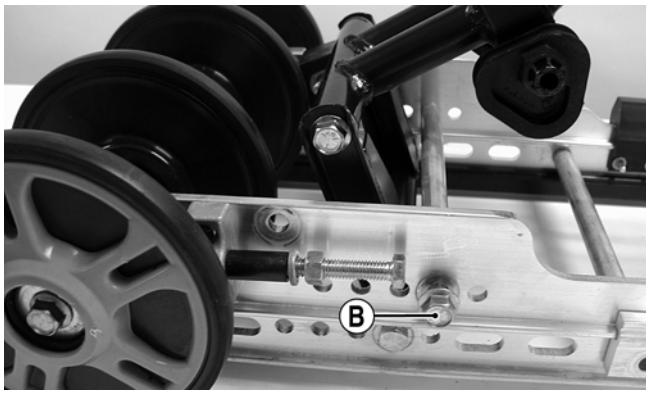

FC194

■**NOTE: It is advisable to tighten the rear idler wheel axle only until snug until the skid frame has been installed and track tension has been adjusted; then the axle assembly must be tightened to specifications.**

4. Install the rear arm cap screw (A) in the appropriate hole (as noted during disassembly); then install the rear arm limiter cap screw (B) in the appropriate hole as noted during disassembly. Tighten only until snug.

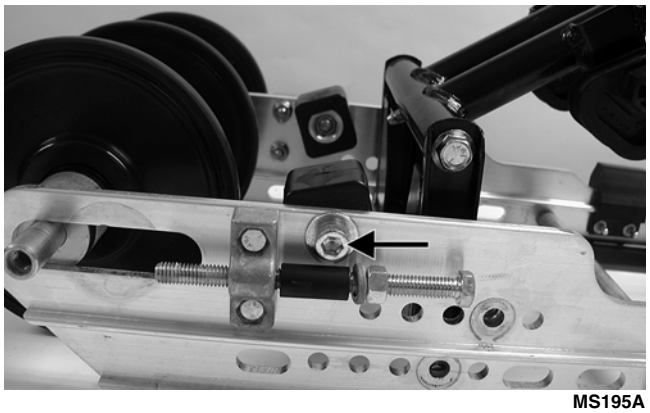


MS199A



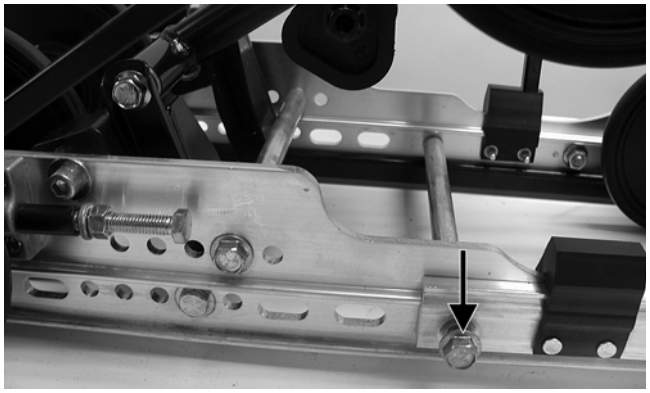
MS200A

5. Install coupler block w/bushing. Secure with cap screw and lock nut. Tighten securely.



MS195A

6. Install the cap screw securing the rail support to the slide rail. Tighten only until snug.

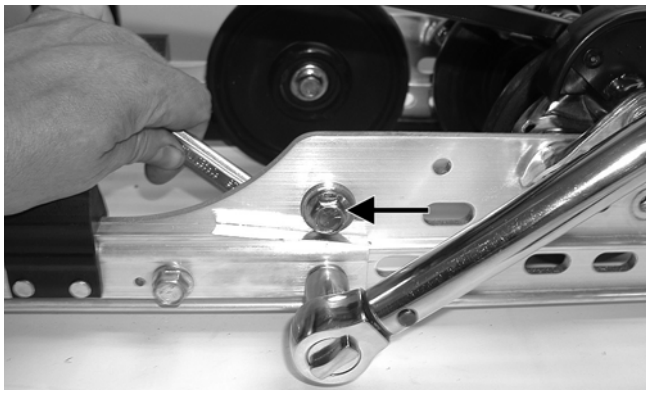


MS191A

■**NOTE: The Sno Pro models have two rail supports.**

7. Install the rear inner idler wheel mounting block in the appropriate holes as noted during disassembly and secure with cap screw and lock nut. Tighten to specifications.

■**NOTE: For proper alignment, it is advisable to install an idler wheel cap screw into the top mounting block hole prior to tightening.**



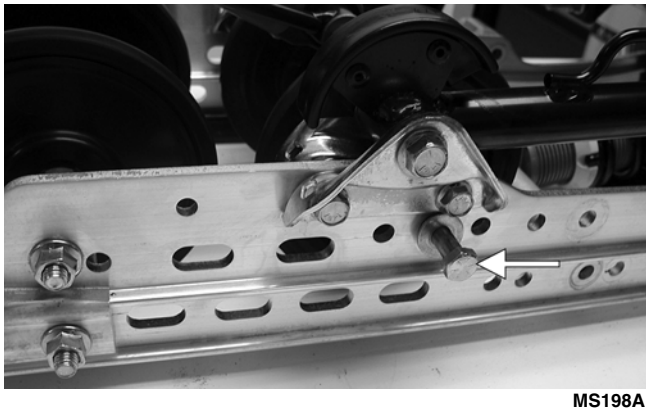
MS196A

8. Secure the front arm mounting bracket with the cap screws and lock nuts. Tighten to specifications.



MS197

9. Install the cap screw (if removed) and lock nut securing the front inner idler wheel assembly to the slide rails. Tighten only until snug.



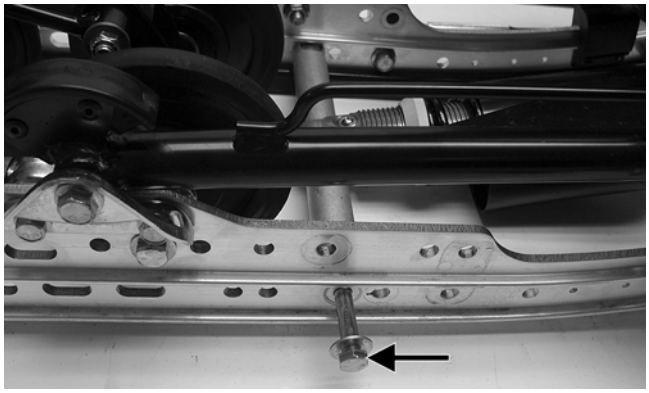
MS198A

■ **NOTE: On Sno Pro models to install the spring slide blocks, include them in step 9.**



MS994B

10. On standard models, install the front arm shock axle to the proper hole as noted in removing; then secure with the cap screw, washers, and the lock nut. Tighten only until snug.



MS201A

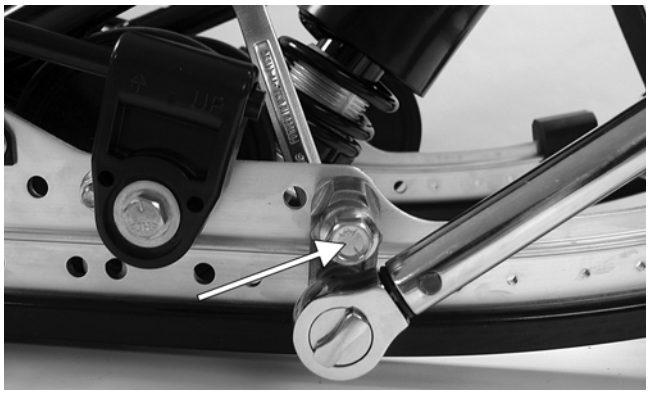
11. On standard models, position the rear arm spring to the rear arm and place the spring into the slide block; then place the spring slide and slide block assembly into position on the slide rail. Secure with a cap screw and washer. Tighten to specifications.



MS202

12. Secure the outer idler wheel mounting block with the cap screw and lock nut. Tighten to specifications.

■ **NOTE: To obtain proper alignment for the idler wheel cap screw, place the cap screw in the top hole through the rail and mounting block prior to tightening.**



MS009A

13. Secure the outer and inner idler wheels to the mounting blocks with existing hardware. Tighten to specifications.



MS204

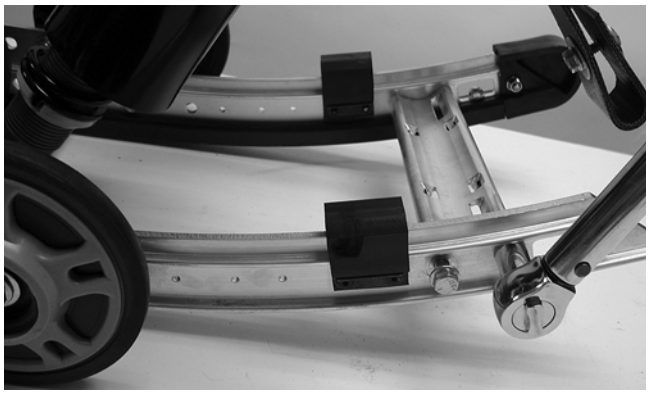
14. Install the upper shock mount to the front arm. Tighten securely.



MS162A

■ **NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.**

15. Secure the rail supports with cap screws (coated with blue Loctite #243). Tighten to specifications.



MS205

■ **NOTE: At this point, tighten the mounting hardware from the following steps to specifications: 4, 6, 9, and 10.**

16. Install the front arm limiter straps to the front rail supports. Tighten to specifications.



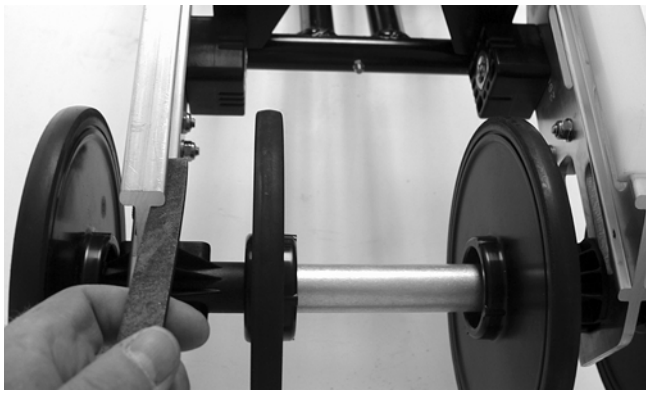
MS161A

17. Secure the end cap onto the slide rail using a cap screw, flat washers, and a lock nut. Tighten to specifications.



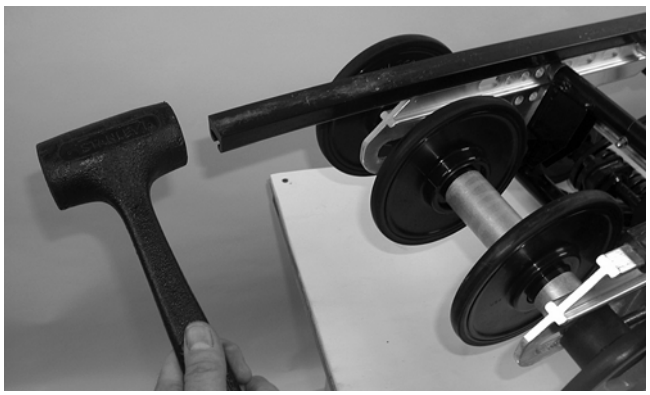
MS206A

■ **NOTE: Apply a light coat of grease to the slide rail surface to aid in installing a new wear strip. If there are any sharp edges on the lower portion of the rail, use a file to remove them.**



MS288

18. From the back, start the wear strip onto the rail; then using a soft hammer, drive the wear strip forward into position. Secure with a machine screw and lock nut. Tighten to specifications.



MS207



MS016B

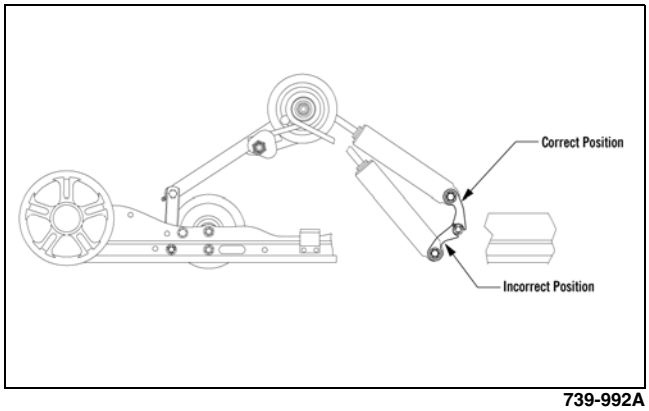
19. After the skid frame has been installed, adjust track tension deflection (see Track Tension in this sub-section) and track alignment (see Track Alignment in this sub-section).

Installing Skid Frame

1. Place a piece of cardboard on the floor to protect against scratching and tip the snowmobile onto one side.
2. Pull the track away from the tunnel and spread open; then place the skid frame into the track.
3. Position the front of the skid frame into the tunnel and align the front arm with the appropriate mounting hole in the tunnel. Insert the cap screw with washers through the tunnel mounting hole and through the front arm. DO NOT TIGHTEN AT THIS TIME. Repeat this procedure on the other side.

⚠ CAUTION

When installing the skid frame, make sure the rear arm shock mounting location on the pivot/axle is positioned correctly above the axle or component damage will occur.



739-992A

■NOTE: To aid in centering the front arm with the hole in the tunnel, position the skid frame and track at a 45° angle to the bottom of the tunnel.

4. Elevate the rear of the skid frame and the track into position in the tunnel.
5. Align the pivot idler arm assembly with the appropriate hole in the tunnel. Secure the pivot idler arm assembly with a cap screw (coated with red Loctite #271), lock washer, and flat washer. DO NOT TIGHTEN AT THIS TIME.

■NOTE: Do not install the short legs of the rear springs onto the adjusting cams at this time.

6. At this time, tighten all four skid frame mounting cap screws securely.
7. Using the Rear Suspension Spring Tool (p/n 0144-311), install the short legs of the rear springs onto the adjusting cams making sure the cams are in the same adjustment positions.
8. Tighten the two track tension adjusting bolt evenly until track deflection is within specifications; then lock the jam nuts to secure the adjustment.
9. Check track tension deflection and alignment; adjust if necessary (see Track Tension and Track Alignment in this sub-section).

Track Tension

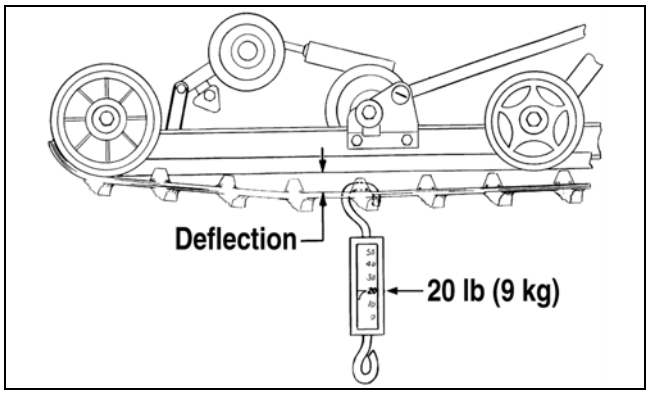
⚠ WARNING

Deactivate all switches.

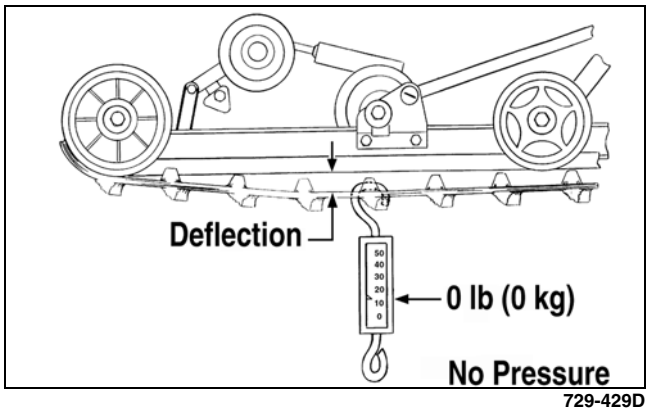
CHECKING DEFLECTION

1. Tip the snowmobile on its side.
2. Hook a spring scale around a track clip at mid-span; then pull the track down with the scale and measure the distance between the bottom of the wear strip and the inside surface of the track clip. Track deflection must be within specifications.

Rear Suspension Style	Setup Tension	After Break-In Tension
FasTrack w/Torque Sensing Link (121 in. Track) @ 20 lb	32-38 mm (1 1/4-1 1/2 in.)	38-44 mm (1 1/2-1 3/4 in.)
FasTrack w/Torque Sensing Link (162 in. Track) @ 0 lb	51-64 mm (2-2 1/2 in.) No pressure	51-64 mm (2-2 1/2 in.) No pressure
FasTrack w/Torque Sensing Link (136 in. Track) @ 20 lb	44-51 mm (1 3/4-2 in.)	51-57 mm (2-2 1/4 in.)



729-429A



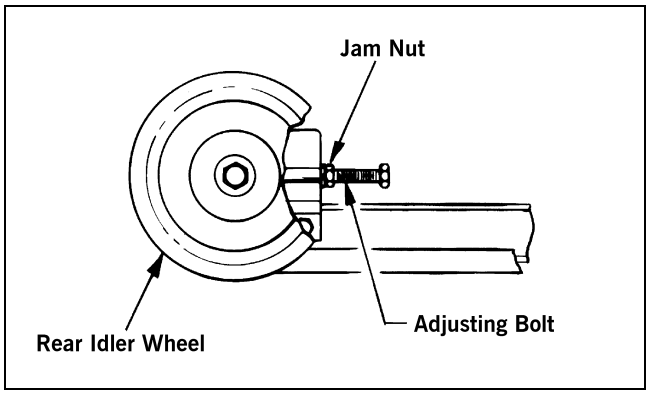
729-429D

■ NOTE: If the track is new, it will stretch slightly and take a "set" within the first 300 to 500 miles of operation.

ADJUSTING DEFLECTION

1. Place the snowmobile up on a shielded safety stand. Check to make sure the track is 2-3 in. off the floor.

2. If the measurement is not as specified, loosen the jam nuts of the adjusting bolts.



0727-456

3. If the measurement obtained in step 2 is more than specified, tighten the adjusting bolts. If the measurement obtained is less than specified, loosen the adjusting bolts. When the measurement is within specification range, lock the adjustment by bottoming the jam nuts against the axle housings.

■ NOTE: If the track tension must be loosened, it may be necessary to loosen the rear axle assembly slightly.

■ NOTE: Vigorously push the underside of the track up and down. Track must not hit the top of the tunnel or slap the skid frame.

4. After correct track tension is obtained, check track alignment (see Track Alignment in this subsection).

■ NOTE: Track tension and track alignment are interrelated; always check both even if only one adjustment seems necessary. Always establish correct track tension before checking and/or adjusting alignment.

⚠ CAUTION

After proper track tension and alignment have been attained, make certain that the rear axle assembly is tightened to specifications or component damage will occur.

Track Alignment

■ NOTE: Proper track alignment is when the rear idler wheels are equidistant from the inner drive lugs on the inside surface of the track.

CHECKING

1. Using a shielded safety stand, raise the rear of the snowmobile off the floor making sure the track is free to rotate.

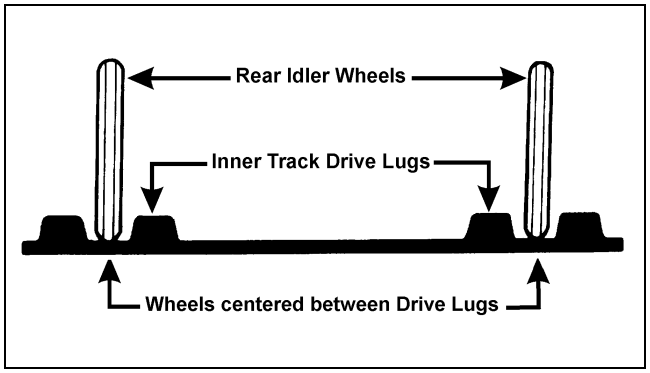
⚠ WARNING

The tips of the skis must be positioned against a wall or similar object for safety. Keep hands, feet, and clothing away from moving components.

2. Start the engine and accelerate slightly. Use only enough throttle to rotate the track several revolutions. SHUT THE ENGINE OFF.

■ NOTE: Allow the track to coast to a stop. Do not apply the brake because it could produce inaccurate alignment conditions.

3. When the track stops rotating, check the relationship of the rear idler wheels and the inner track drive lugs. If the distance from the idler wheels to the inner drive lugs is the same on both sides, no adjustment is necessary.



725-070A

4. On the side of the track which has the inner drive lugs closer to the rear idler wheel, loosen the adjusting bolt jam nut; then rotate the adjusting bolt clockwise 1-1 1/2 turns.

■ **NOTE: If the track tension must be loosened, it may be necessary to loosen the rear axle assembly slightly.**

5. Continue to check the track alignment and make the necessary adjustments until proper alignment is obtained.

6. After proper track alignment is obtained, lock the jam nut against the axle housing.

■ **NOTE: Make sure correct track tension is maintained after adjusting track alignment.**

⚠ CAUTION

After proper track tension and alignment have been attained, make certain that the rear axle assembly is tightened to specifications or component damage will occur.

■ **NOTE: Field test the track under actual conditions and, after the field test, check track alignment and track tension; adjust as necessary.**

Repair Procedure 4 - Track/Rear Suspension

This Track/Rear Suspension sub-section (Repair Procedure 4) has been organized so each procedure can be completed individually and efficiently. Each sub-section has (as necessary) Removing, Disassembling, Cleaning and Inspecting, Assembling, and Installing procedures. Some components may vary from model to model. The technician should use discretion and sound judgment when removing and installing components.

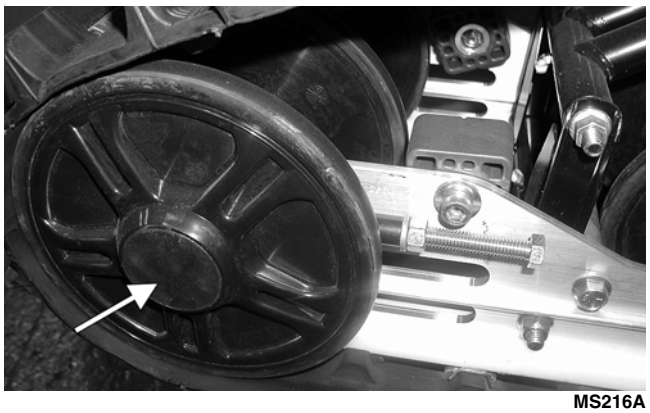
■ **NOTE: Critical torque specifications are located on page 174 of this section.**

■ **NOTE: Some illustrations and photographs used in this sub-section are used for clarity purposes only and are not designed to depict actual conditions.**

Removing Skid Frame

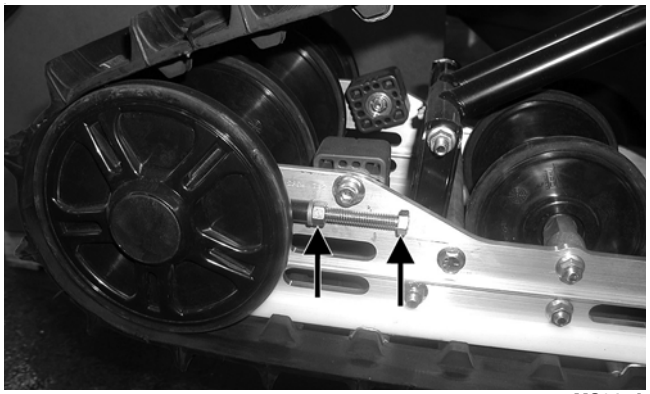
■ **NOTE: Many service procedures can be performed without removing the skid frame. Closely observe the note introducing each sub-section for this important information.**

1. To avoid having the adjuster bushings binding during loosening of the track, remove the rear idler wheel caps and loosen the cap screws on the rear axle.



MS216A

2. Loosen the jam nuts and two track-tension adjusting bolts.



MS217A

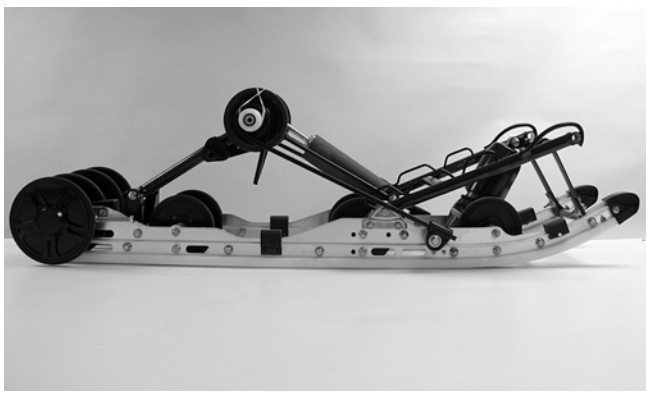
3. Place a support stand under the rear bumper; then remove the rear cap screws securing the skid frame to the tunnel. Account for lock washers and flat washers.

■ **NOTE: The support stand should hold the snowmobile level but not raised off the floor.**

4. Remove the front cap screws and lock nuts securing the skid frame to the tunnel. Account for a flat washer and a lock washer.

5. Remove the support stand; then tip the snowmobile onto the left side using a piece of cardboard to protect against scratching. Remove the skid frame.

■ NOTE: Avoid tipping the snowmobile onto the right side. If left on the right side for more than five minutes, air may get into the oil line. If air is apparent in an oil hose, the system will eventually have to be bled (see Section 4 - Bleeding Oil-Injection System).



MS215

Wear Strips

REMOVING

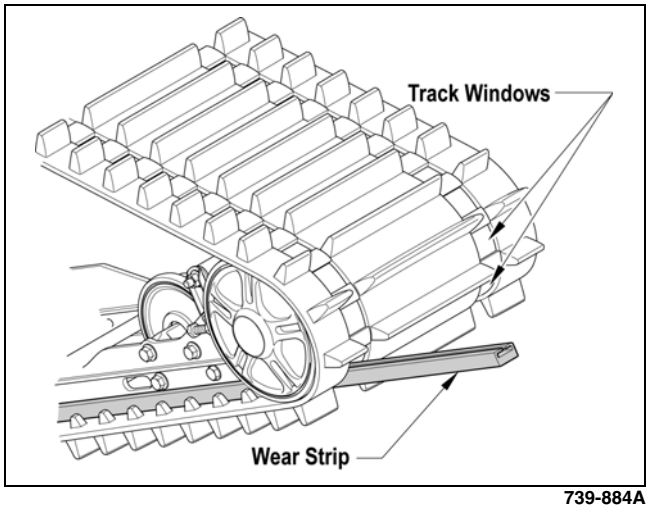
■ NOTE: If the skid frame has been removed due to difficulty in removing the wear strip, it may be necessary to use a pipe wrench, start from either end, and hook the edge of the wear strip with the pipe wrench jaw and twist the wear strip off the slide rail. Move the pipe wrench 7.5 cm (3 in.) and again twist the wear strip off the rail. Repeat this procedure until the wear strip is free of the rail.

1. Remove the machine screw and lock nut securing the wear strip to the front of the slide rail.



MS218A

2. Align the wear strip with the openings (windows) in the track; then using a suitable driving tool, drive the wear strip rearward off the slide rail.



739-884A

CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean the slide rail using parts-cleaning solvent and compressed air.

⚠ WARNING

Always wear an approved pair of safety glasses when using compressed air.

2. Inspect the slide rail for cracks. If any are found, replace the slide rail.

3. Using a straightedge, inspect the slide rail for any unusual bends. Place the straightedge along the bottom surface of the slide rail. If the rail is found to be bent, it must be replaced.

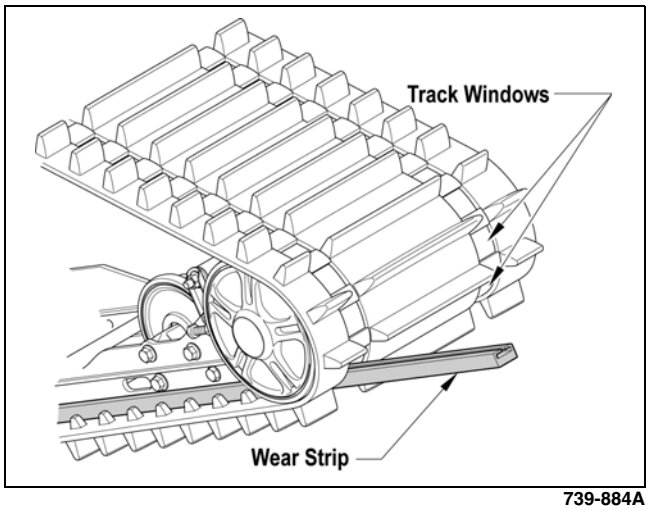


MS221A

INSTALLING

■ NOTE: Apply a light coat of grease to the slide rail surface to aid in installing a new wear strip. If there are any sharp edges on the lower portion of the rail, use a file to remove them.

1. Align the wear strip with the openings (windows) in the track and from the back, start the wear strip onto the rail; then using a soft hammer, drive the wear strip forward into position.



739-884A

2. Secure with a machine screw and lock nut. Tighten to specifications.

End Caps

■NOTE: The skid frame does not have to be removed for this procedure.

REMOVING

1. Remove the lock nut, washers, and cap screw securing the end cap.

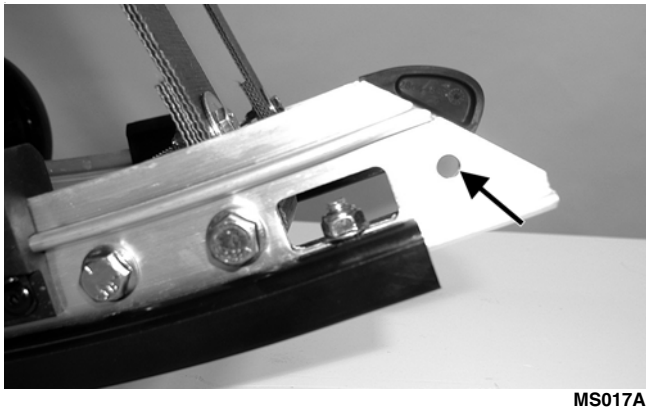

MS222A

2. Using a hammer, tap the end cap off the rail.

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect the end cap area of the slide rail for cracks and wear.


MS017A

2. Inspect the end cap for any signs of cracking or wear.



MS290A

3. Clean both the slide rail area and the end cap. Using compressed air, clean the areas of dirt and gravel.

⚠ WARNING

Always wear an approved pair of safety glasses when using compressed air.

4. Inspect the cap screw for cracked, stretched, or damaged threads. Use a new lock nut when assembling.

INSTALLING

1. Position the end cap on the slide rail; then align the hole in the end cap with the hole in the slide rail.

2. Secure with a cap screw, washers, and lock nut. Tighten to specifications.

Shock Pads

■NOTE: The skid frame does not have to be removed for this procedure.

REMOVING

■NOTE: The shock pads should be removed only if being replaced.

1. Twist the push nuts off the solid rivets securing the front shock pads; then remove the pads.
2. Using a 3/16-in. drill bit, drill out the rivets securing the rear shock pads; then account for the retaining brackets. Remove the rear shock pads.

INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect the pads for damage or wear.
2. Inspect the rivet holes in the slide rail for damage or elongation.

INSTALLING

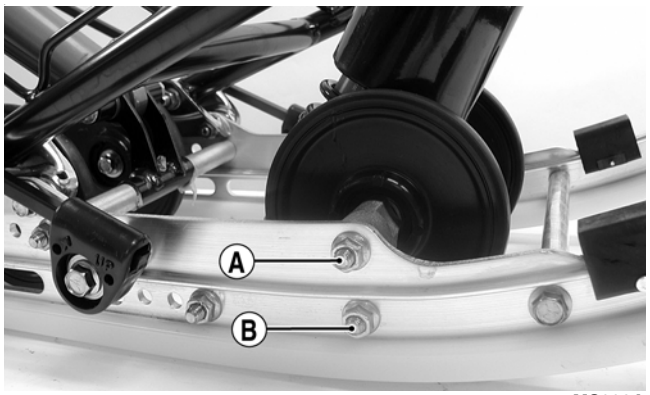
1. If removed, place the pads into position on the slide rails.
2. Secure the front pad assembly with rivets and new push nuts.
3. Secure the rear pads with rivets.

Idler Wheels

■NOTE: The skid frame does not have to be removed for this procedure.

REMOVING

1. Remove the cap screws and lock nuts securing the idler wheel (A) and the idler wheel mounting block (B). Account for a flat washer.



MS223A

2. Note the location of the flat washer for installing purposes. The washer must be installed next to the head of the cap screw.



FC152

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean the bearing with a clean cloth.
2. Inspect each idler wheel for cracks or damage.
3. Rotate the idler wheel bearing (by hand) and inspect for binding or roughness.
4. If a bearing must be replaced, use this procedure.

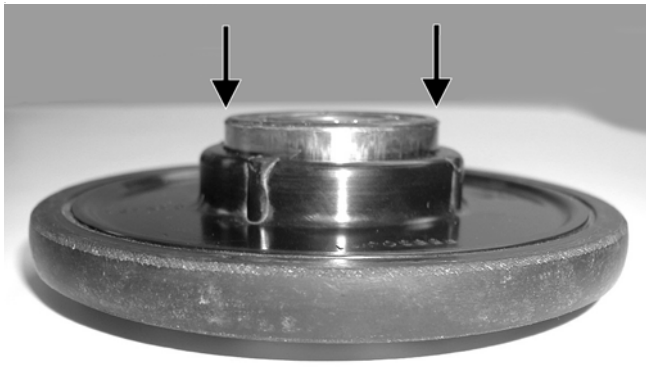
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert (if applicable) and the snap ring.

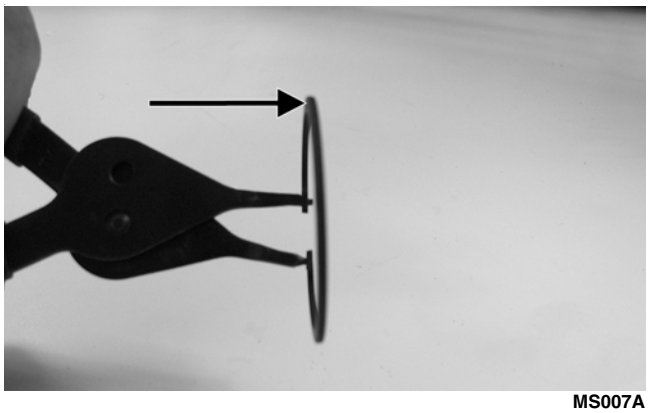
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

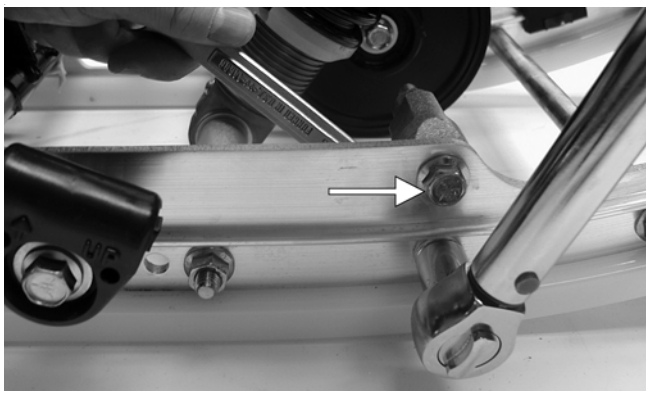
D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

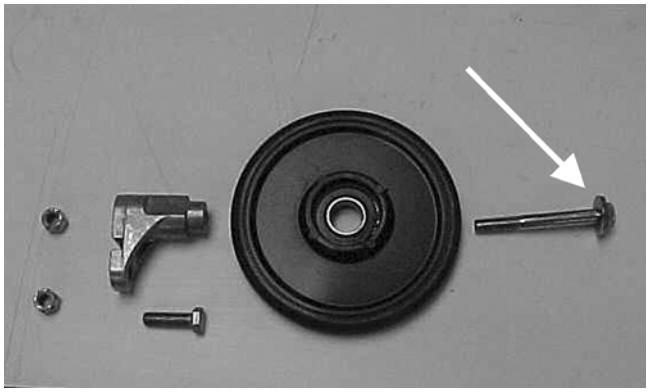
INSTALLING

1. Secure the mounting block on the slide rail with a cap screw and lock nut. Tighten to specifications.



MS224A

2. Place the idler wheel to the mounting block making sure there is a flat washer against the head of the cap screw on the outside of the idler wheel.



FC152A

3. Secure the idler wheel assembly with a cap screw and a lock nut. Tighten cap screws to specifications.

Rear Upper Idler Wheels/Rear Springs

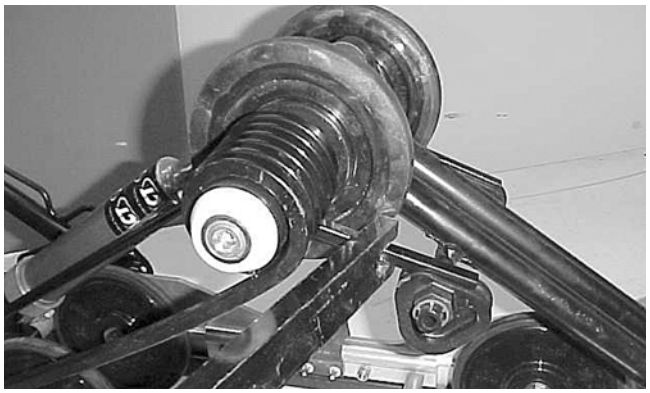
■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this subsection).**

REMOVING

1. Using the Rear Suspension Spring Tool (p/n 0144-311), remove the spring from the adjusting cam.

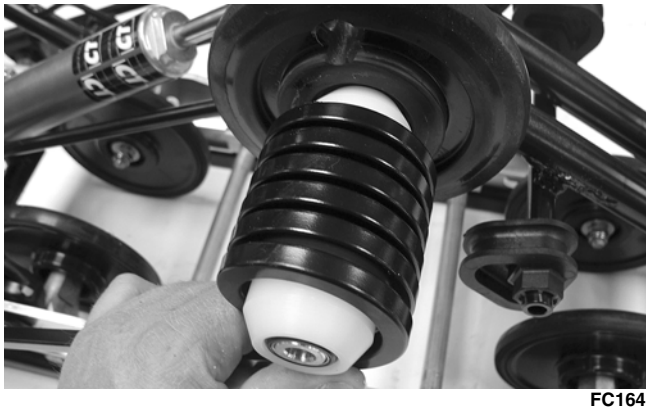
⚠ WARNING

Care must be taken when removing the springs or damage or injury could result.



FC159

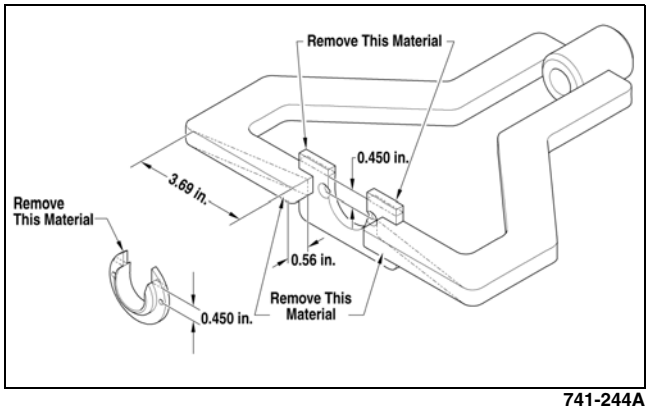
2. Remove the spring and sleeve from the idler arm.



FC164

3. Using Idler Wheel Puller Kit (p/n 0644-400), remove the idler wheel.

■ **NOTE: On the Firecat/Sabercat models when using the idler wheel puller from the kit, the configuration of two components must be altered to fit the larger idler wheels.**



741-244A

4. Remove the cap screw and flat washer securing the spring slide to the rail. Account for a slide block and washer.



FC158

■**NOTE: Use the same procedure for the other side.**

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearing with a clean cloth.
2. Inspect each idler wheel for cracks or damage.
3. Rotate the idler wheel bearings (by hand) and inspect for binding or roughness.
4. If a bearing must be replaced, use this procedure.

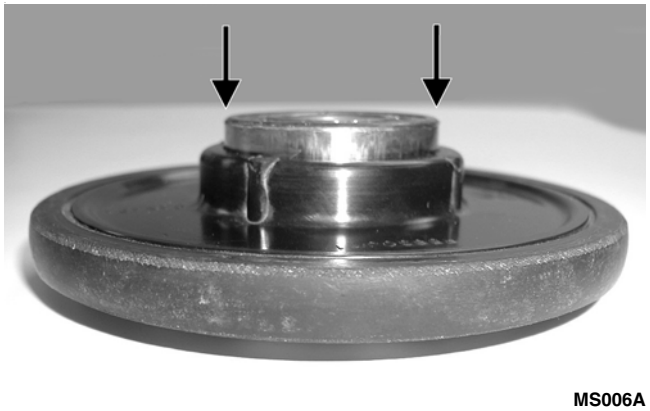
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel snap ring.

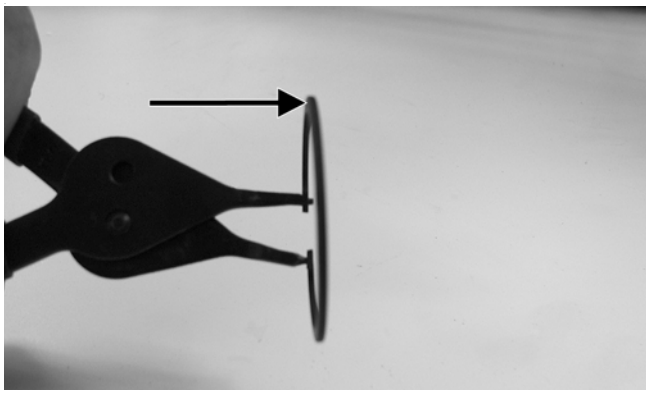
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

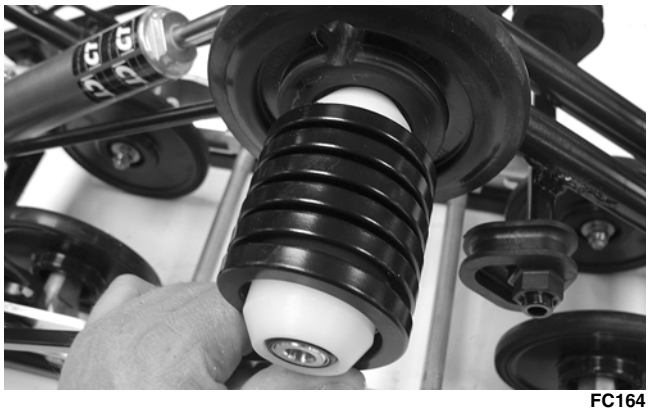
5. Inspect the spring, spring slide, sleeve, washers, slide block insert, and shaft area for wear.
6. Inspect the adjusting cams and arms for cracks.

INSTALLING

1. Install the idler wheel.
2. Slide the sleeve and spring onto the idler arm.

⚠ CAUTION

When driving the idler wheel onto the idler arm, use a tool to contact the inside race of the bearing or damage to the wheel or bearing may occur.



FC164

3. Place the spring slide and slide block (with spring in slide block) into position on the slide rail. Secure with a cap screw and washer. Tighten securely.

■ NOTE: Install the washer to the head of the cap screw.



FC158

■ NOTE: It is advisable to install the rear arm springs onto the adjuster blocks after the skid frame has been installed.

Rear Axle and Idler Wheels

■ NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this subsection).

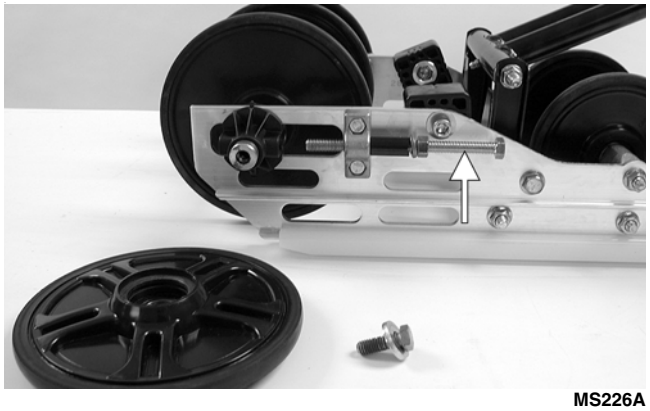
DISASSEMBLING

1. Remove the cap screw and large flat washer securing the outer rear idler wheel. Remove the idler wheel from the shaft.



MS225A

2. Loosen the track adjusting bolts. Slide the outer adjuster bushings off the axle.



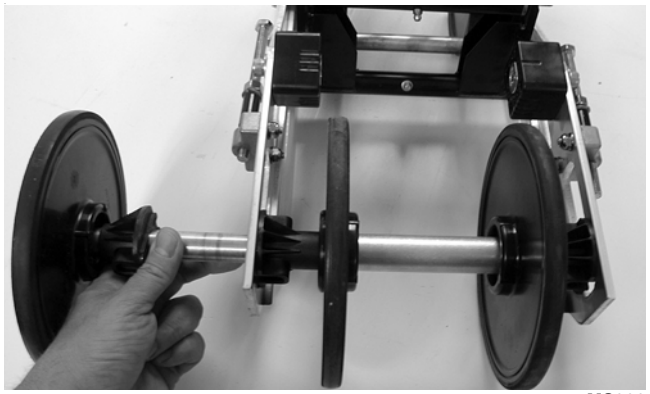
MS226A



MS227

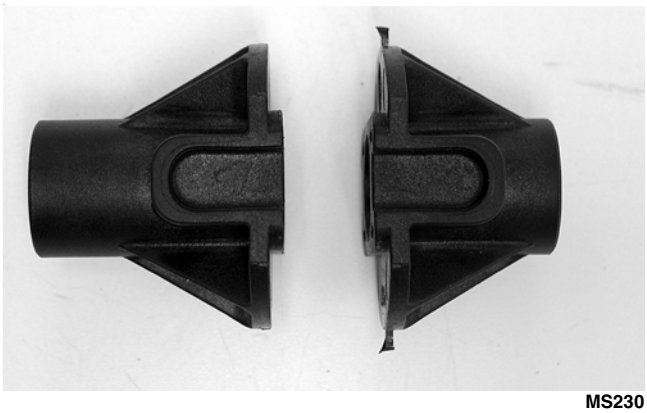
■ NOTE: The large flat side of the wheel insert is positioned next to the inner plastic adjuster bushing. The idler wheel must be installed with the wheel insert properly positioned.

3. Remove the rear axle, idler wheels, spacer, and track adjuster bushings; then account for a spacer and four adjuster bushings.



MS228

■ NOTE: Note the position of the opening in the adjuster bushings for assembling purposes.



MS230

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearings with a clean cloth.
2. Inspect the outer rubber portion of the idler wheels for cracks and poor bonding.
3. Inspect the shaft for wear and damaged threads.
4. Inspect all idler wheel bearings. Turn each bearing (by hand) and if any roughness or binding is noted, replace the bearing.
5. If a bearing must be replaced, use this procedure.

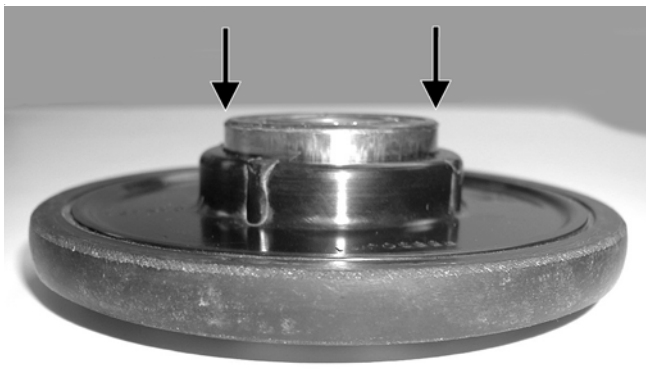
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel snap ring.

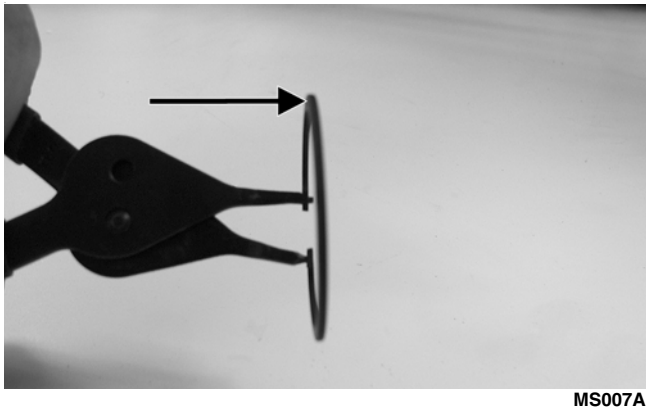
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

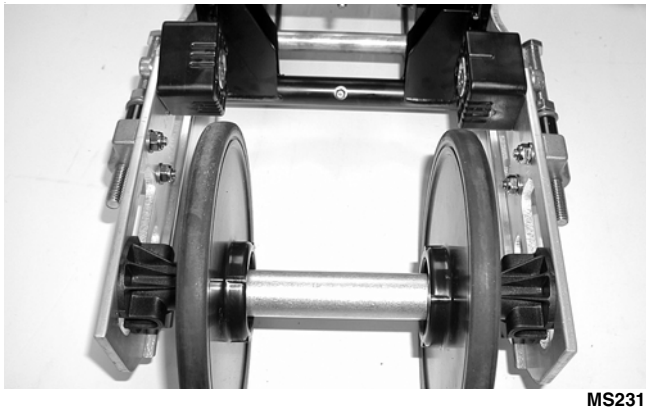
D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

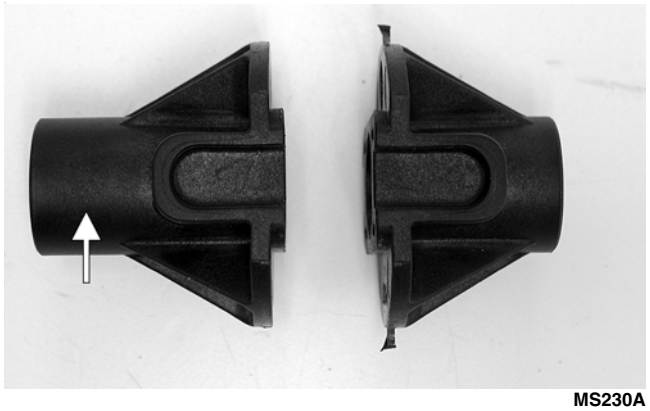
ASSEMBLING

1. Place the two inner adjuster bushings, idler wheels, and center spacer into position between the slide rails.



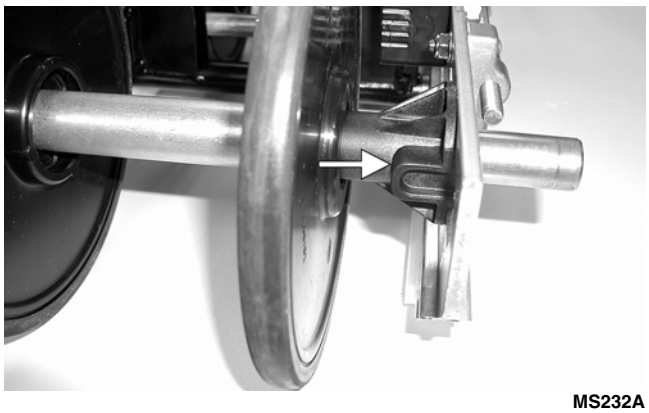
MS231

■ **NOTE: The adjuster bushing with the longer sleeve must be installed inside the slide rails.**



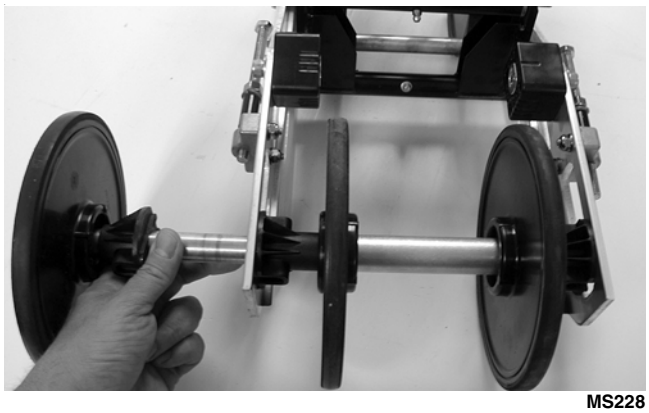
MS230A

■ **NOTE: Make certain the inner adjuster bushings are properly positioned to the axle openings in the slide rails.**



MS232A

2. From one side, slide the axle through the slide rail and center components far enough to install the outside adjuster bushings and idler wheels.



MS228

3. Install the outside adjuster bushings and idler wheels with cap screws (coated with blue Loctite #243). Tighten only until snug.

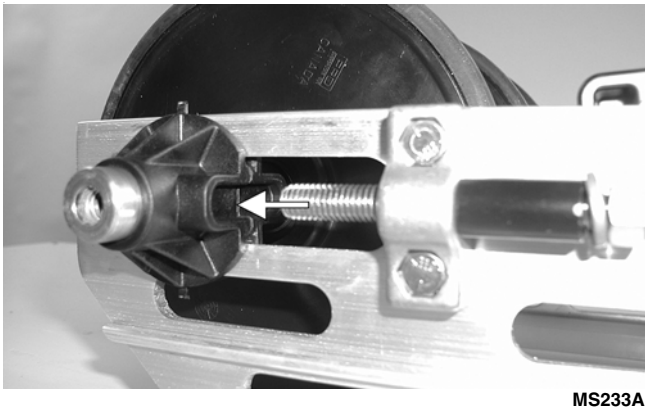


MS227



MS225A

■ **NOTE: Make certain the slots in the adjuster bushings are aligned with the adjusting bolts.**



MS233A

■ **NOTE: It is advisable to tighten the rear idler wheel axle only until snug until the skid frame has been installed and track tension has been adjusted; then the axle assembly must be tightened to specifications.**

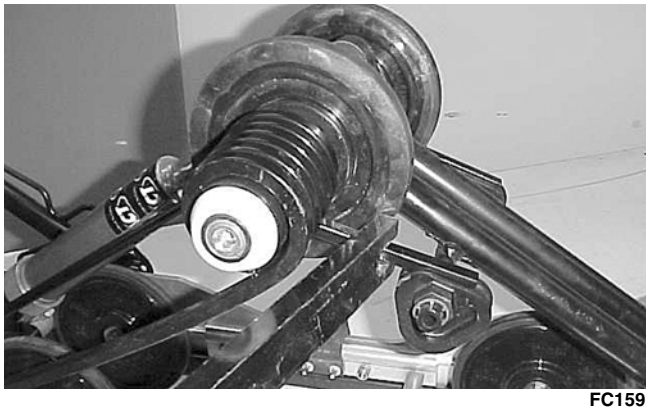
4. Install the skid frame (see Installing Skid Frame in this sub-section).
5. Adjust track alignment (see Track Alignment in this sub-section).
6. Adjust track tension deflection (see Track Tension in this sub-section).

Rear Arm/Idler Arm

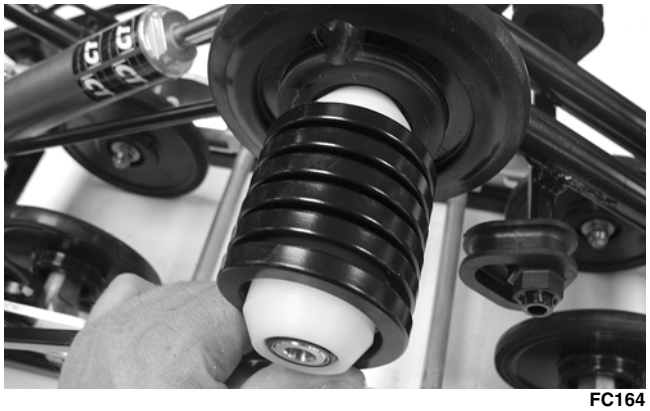
■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section).**

DISASSEMBLING

1. Remove the spring and sleeve from the idler arm.



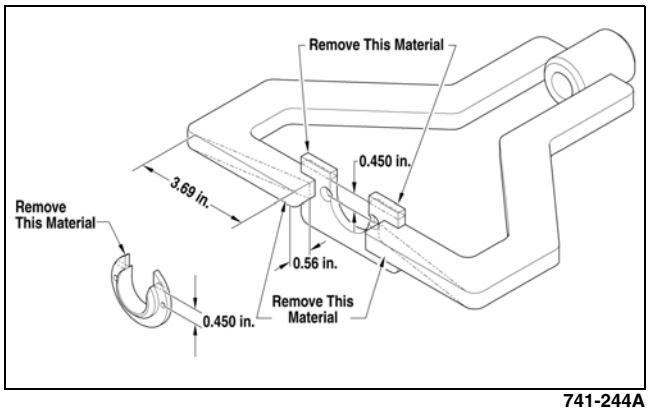
FC159



FC164

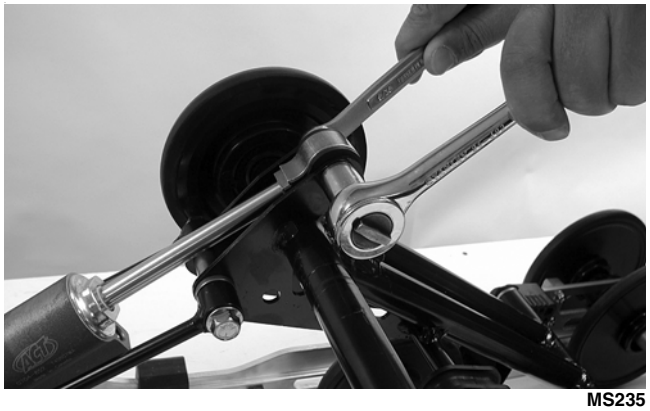
2. Using Idler Wheel Puller Kit (p/n 0644-400), remove the idler wheels from the upper arm.

■ NOTE: On the Firecat/Sabercat models when using the idler wheel puller from the kit, the configuration of two components must be altered to fit the larger idler wheels.



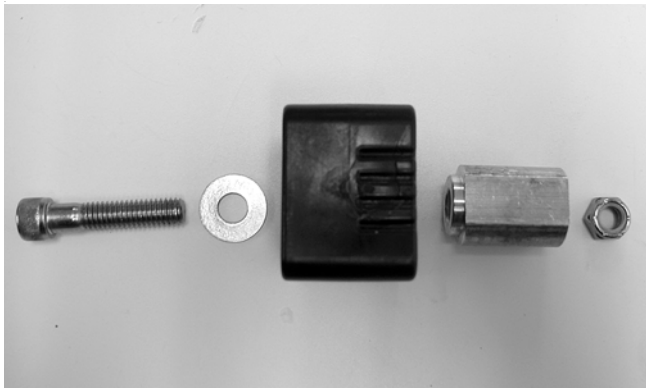
741-244A

3. Remove the cap screw and lock nut securing the upper shock eyelet to the idler arm. Account for a spacer, cap screw, and lock nut.



MS235

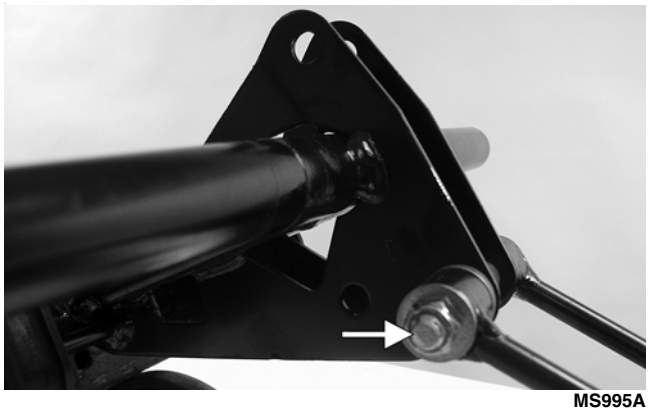
4. Remove the two Allen-head cap screws securing the coupler blocks.



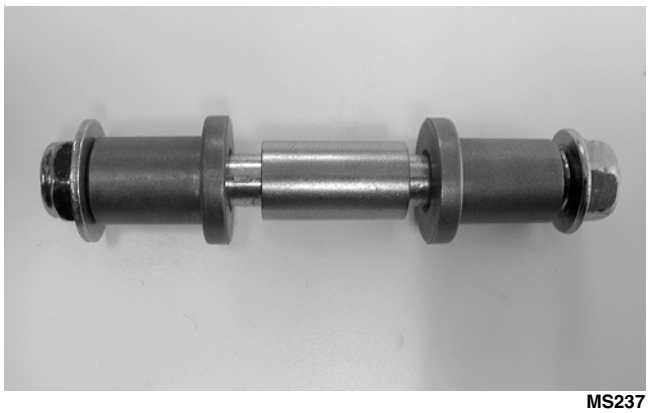
MS234

5. Noting the mounting location for assembling purposes, remove the cap screw and lock nut securing the upper shock links to the idler arm. Account for a lock nut, spacer, flat washer, and axle links.

■ NOTE: It is advisable to place a support block between the idler arms and idler wheels.

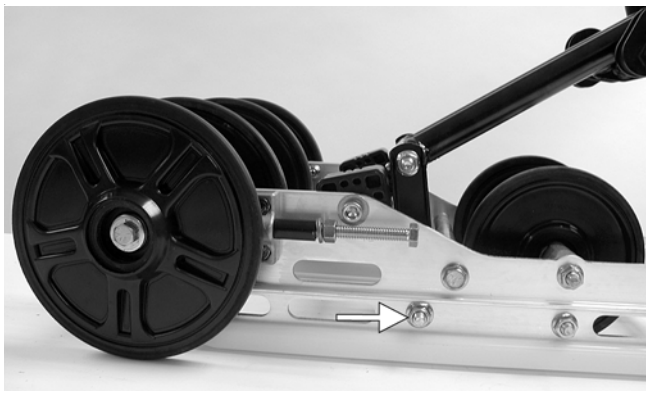


MS995A

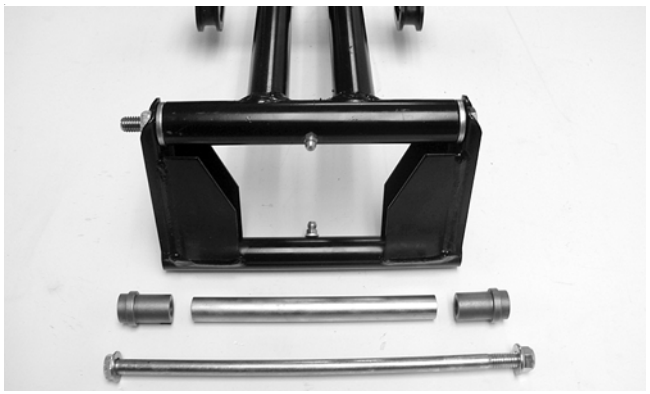


MS237

6. Remove the cap screw and lock nut securing the rear arm to the slide rail. Account for the serrated axles and axle tube.



MS238A



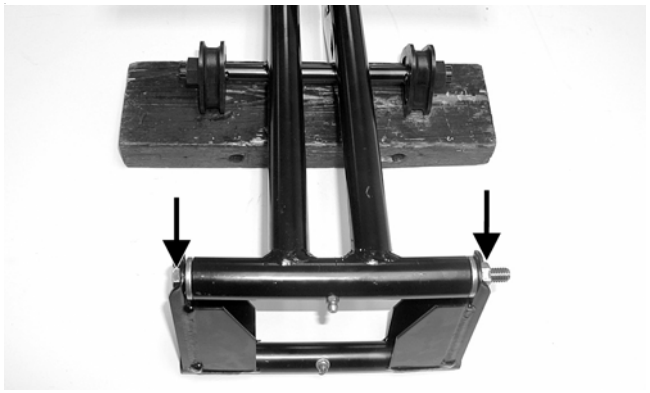
MS239

■**NOTE: It may be necessary to loosen the rear arm limiter to remove the rear arm from the slide rails.**

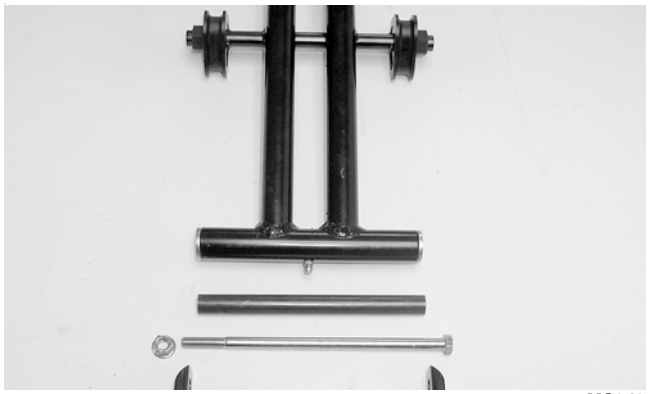


MS238B

7. Remove the cap screw and lock nut securing the rear arm to the idler arm. Account for the aluminum axle and bushing assemblies.



MS240A



MS242

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearings with a clean cloth.
2. Inspect each idler wheel for cracks or damage.
3. Inspect the bushings (located in the arm pivot area) for wear or damage.
4. Inspect all welds and the tubing of the upper arm for cracks or unusual bends.
5. Inspect the two adjusting cams for damage.

6. Rotate the idler wheel bearings (by hand) and check for binding or roughness.

7. If a bearing must be replaced, use this procedure.

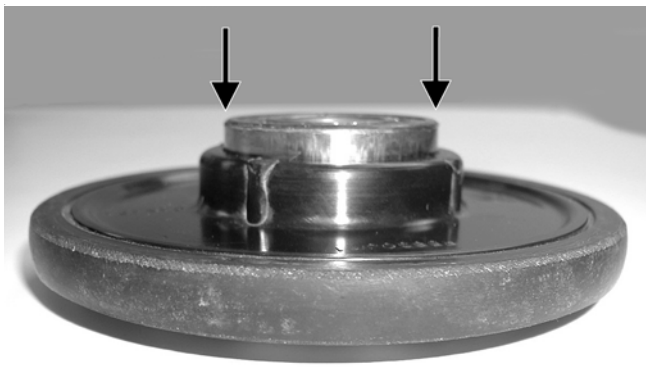
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert (if applicable) and the snap ring.

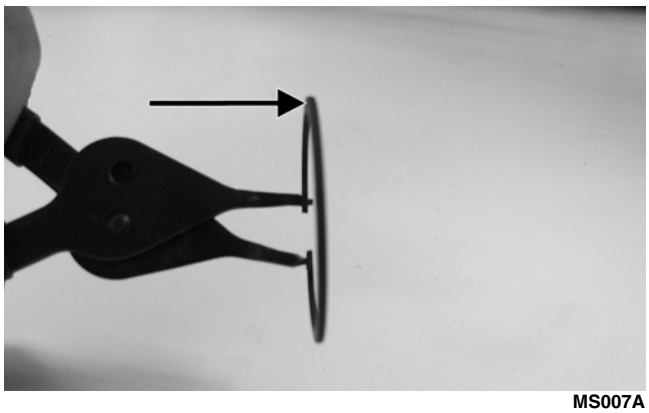
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

E. Install the wheel insert (if applicable).



MS005

ASSEMBLING

1. Install the rear arm onto the idler arm with an aluminum axle, bushing assemblies, cap screw, and a lock nut. Tighten to specifications.



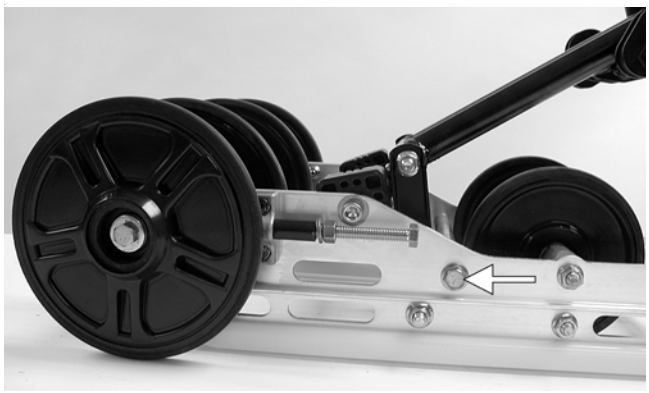
MS241

2. Place the rear arm assembly into position (with the grease fittings directed toward the rear idler wheels) between the slide rails. Secure with a cap screw and lock nut. Tighten to specifications.



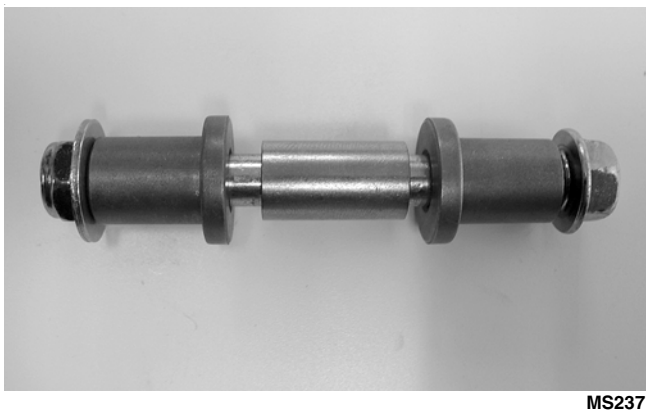
MS238A

■ **NOTE: If the rear arm limiter was loosened for removing of the rear arm, tighten the cap screws to specifications.**

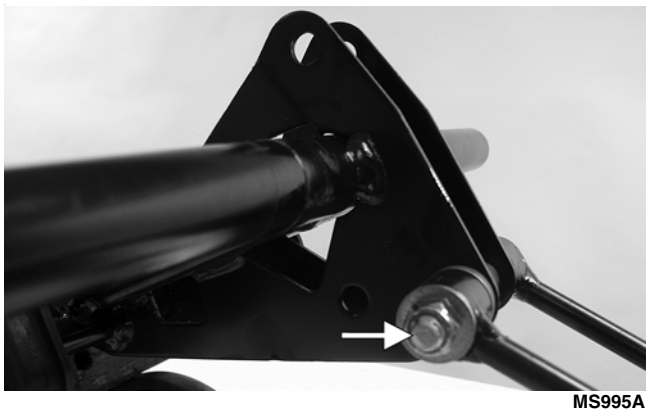


MS238B

3. Position the shock links in the appropriate holes of the idler arm brackets (see Chassis and Skid Frame Mounting Locations in this section). Place a spacer between the center of the brackets; then place a flat washer on the cap screw. Insert the axle links into the upper shock link eyelets; then insert the cap screw with washer through the eyelets. Secure with a cap screw, washer, and lock nut. Tighten securely.



MS237



MS995A

4. Place the upper shock eyelet with bushings between the idler arm brackets making sure the spacer is properly positioned between the brackets. Secure with a cap screw and lock nut. Tighten to securely.

■ **NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.**

5. Grease the idler arm and rear arm grease fittings with a low-temperature grease.

6. Install the rear upper idler wheels, rear spring, and sleeve (see Rear Upper Idler Wheels/Rear Springs in this sub-section).

Front Arm/Front Shock Absorber/Front Inner Idler Wheels

■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section), and the rear springs must be removed from the adjusting cams.**

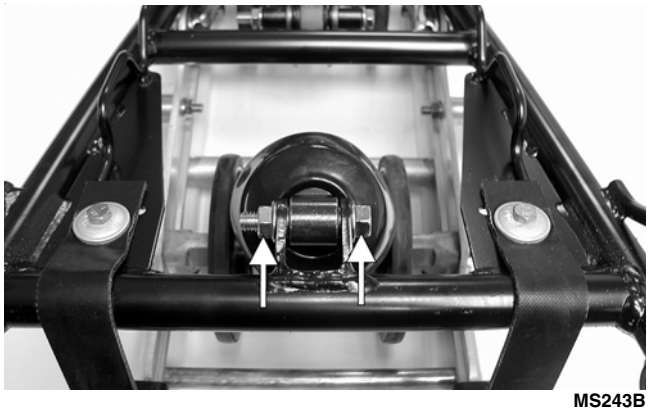
REMOVING

1. Remove the cap screws and lock nuts securing the limiter straps to the front arm. Account for flat washers.



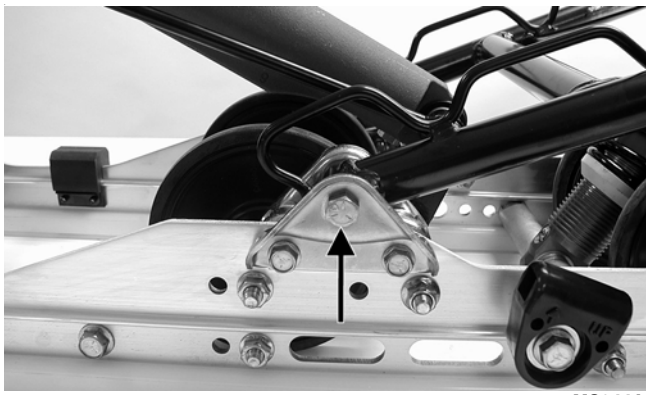
MS243A

2. Remove the cap screw and lock nut securing the upper front shock absorber eyelet to the front arm. Pull the shock eyelet free of the bracket. Account for a bushing.



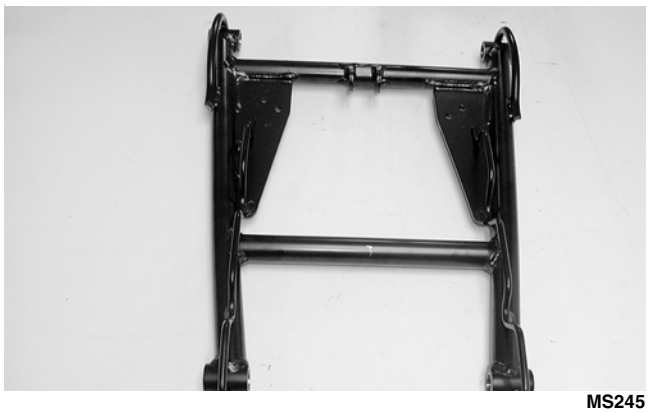
MS243B

3. Remove the cap screws and lock nuts securing the front arm to the front arm mounting brackets.



MS244A

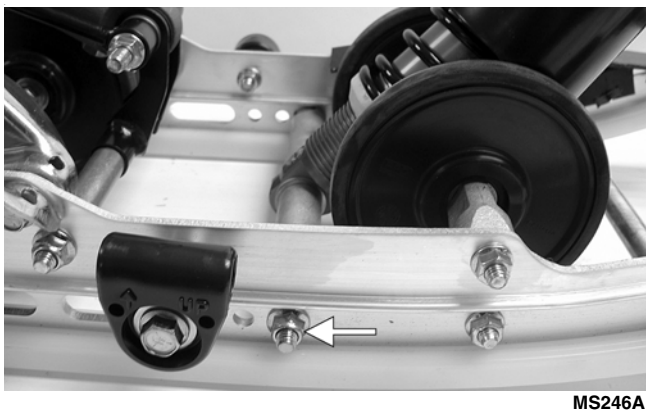
4. Remove the front arm and account for the two front arm spacers.



MS245

5. Remove the cap screw, lock nut, and washer securing the shock mount axle.

■ NOTE: New lock nuts must be used when installing the shock mount axle.



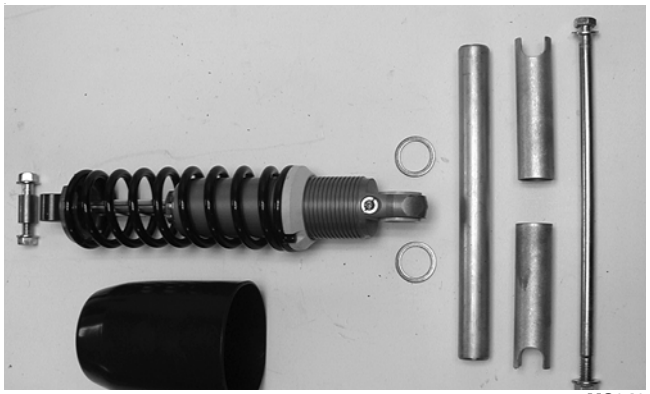
MS246A

6. Tap the shock mount axle assembly from one side until there is room enough to remove it from between the slide rails.



MS247

7. Using a plastic mallet, tap the axle from the lower shock eyelet. Account for spacers and shim washers.



MS248

INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect all front arm weldments for cracks or unusual bends.
2. Closely inspect all tubing for cracks or unusual bends.
3. Inspect the bearings, bushings, and front arm spacers for wear or damage.
4. Inspect the shock absorber for any signs of oil leakage especially at the point where the shock shaft enters the shock body.
5. Inspect the shock absorber eyelet welds (at each end) for any cracks, signs of separation, or for unthreading.

INSTALLING

1. Install the axle into the lower shock eyelet bushing assembly. Apply grease to the axle; then install the spacers.

2. Place the shock mount axle into position between the slide rails making sure the spacers and washers are properly positioned. Secure with a cap screw, washers, and new lock nut. Tighten to specifications.



MS247



MS249

3. Position the front arm with spacers into the mounting brackets. Secure with cap screws and lock nuts. Tighten to specifications.



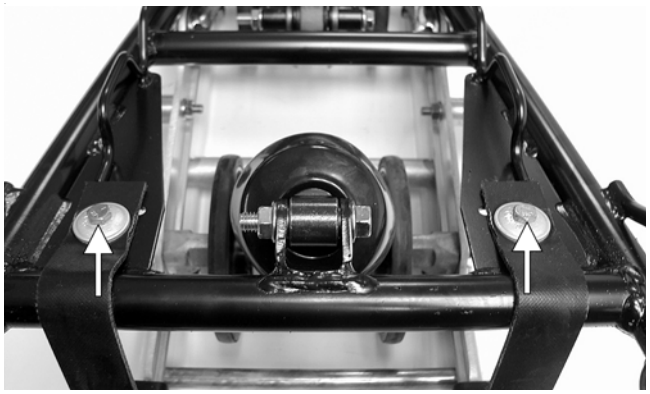
MS250

4. Secure the upper shock eyelet and serrated axle in the mounting hole of the front arm. Secure with a cap screw and lock nut. Tighten securely.



MS251

5. Secure the limiter straps with cap screws, washers, and lock nuts. Tighten to specifications.



MS243A

Rear Shock Absorber and Shock Links

■ NOTE: Before removing the skid frame by using the Rear Suspension Spring Tool (p/n 0144-311), remove the spring from the adjusting cam.

⚠ CAUTION

Care must be taken when removing the spring from the adjusting cam or damage or injury could result.

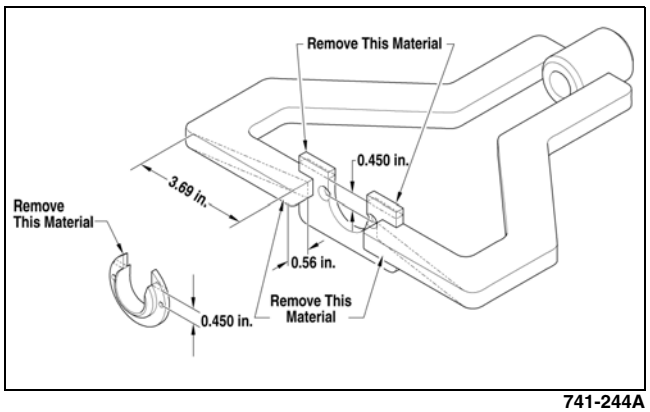
■ NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this subsection).

■ NOTE: When removing center components from the skid frame, it is advisable to loosen all cap screws/lock nuts from one side of the slide rail to make removing easier.

DISASSEMBLING

■ **NOTE: Using Idler Wheel Puller Kit (p/n 0644-400), remove the idler wheel from the side from which the cap screw for the shock rod links must be removed.**

■ **NOTE: On the Firecat/Sabercat models when using the idler wheel puller from the kit, the configuration of two components must be altered to fit the larger idler wheels.**

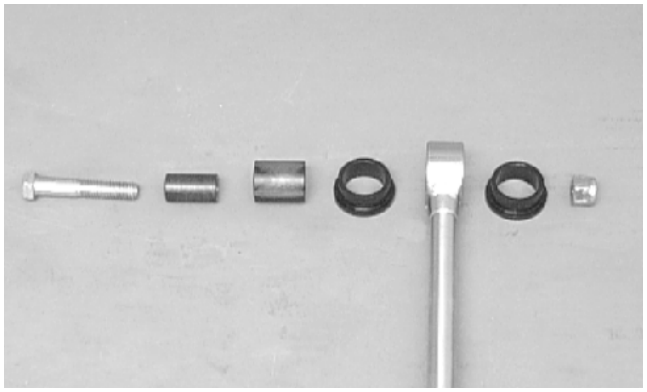


741-244A

1. Disengage the shock absorber at the upper eyelet and remove the shock absorber. Account for a sleeve, cap screw, lock nut, and bushings.



MS252A



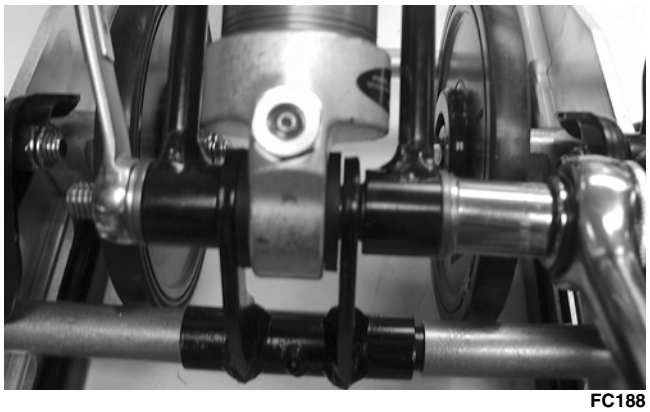
AG665D

2. Noting the hole location for assembling purposes, remove the cap screw, lock nuts, and washers securing the shock rod links to the rear arm of the skid frame. Account for a spacer and two link axles.



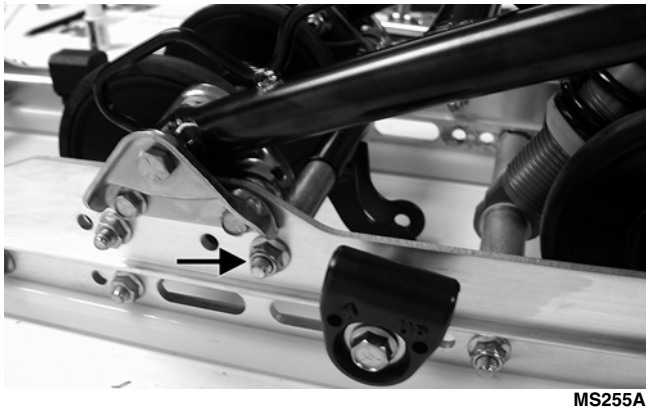
MS253A

3. Disengage the shock absorber and rod links at the pivot assembly. Account for washers, link axles, bushings, shock sleeve, cap screw, and a lock nut.



FC188

4. Note the hole location for assembling purposes; then remove the cap screw and lock nut securing the pivot assembly to the slide rails.



MS255A

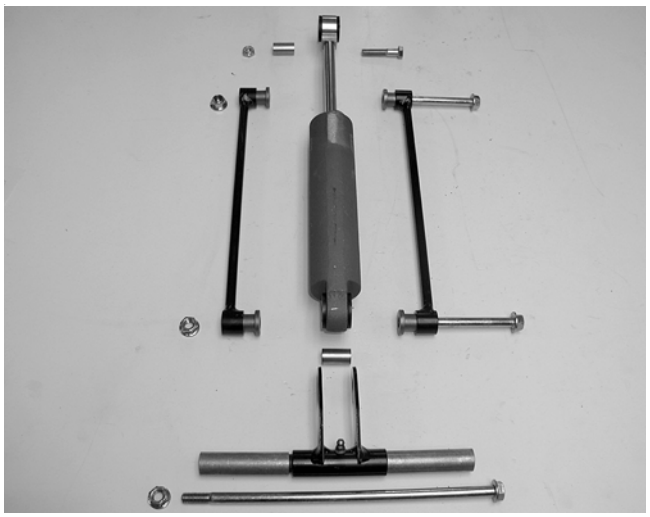
5. Tap the shock pivot assembly forward until it clears the mounting brackets; then lift the assembly upward until the shaft clears the rails.



FC186

■**NOTE: Lay components out in order as they are removed.**

6. With the pivot assembly removed, account for the two spacers, an axle, and the pivot bracket.



MS256

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean shock pivot and idler wheel axle in part-cleaning solvent. Dry with compressed air.

⚠ WARNING

Always wear an approved pair of safety glasses when using compressed air.

2. Clean the idler wheel bearings with a clean cloth.
3. Closely inspect the torque link arm and axles for wear, bends, or damaged splines at either end.
4. Inspect the idler wheels for signs of cracking, wear, or outer rubber separation from plastic wheel.
5. Rotate the idler wheel bearings (by hand) and inspect for any signs of binding or roughness.
6. If a bearing must be replaced, use this procedure.

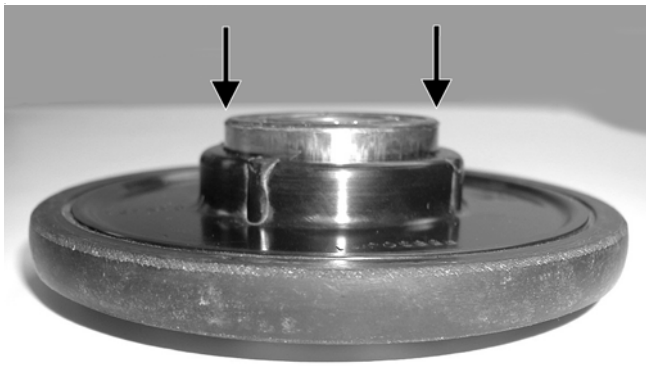
⚠ CAUTION

Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel snap ring.

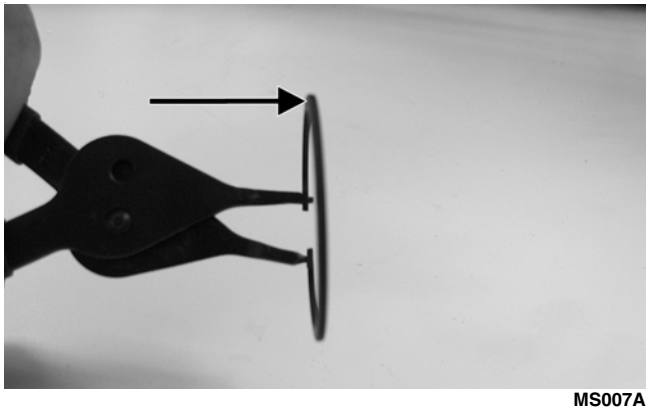
B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.



MS006A

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.



MS007A

7. Inspect the shock absorber for any signs of oil leakage especially at the point where the shock shaft enters the shock body.
8. Inspect the rubber shock bushings located in the shock absorber eyelets for cracks or deterioration.
9. Inspect the shock absorber eyelet welds (at each end) for any cracks or signs of separation.
10. Inspect the welds securing the eyelets of the shock links for cracks or signs of separation. Either weld the eyelet or replace the shock link.

11. Inspect the axle surfaces for any signs of corrosion. If corrosion is found, lightly buff the surface of the axle with #400 wet-or-dry sandpaper; then apply a light coat of grease.

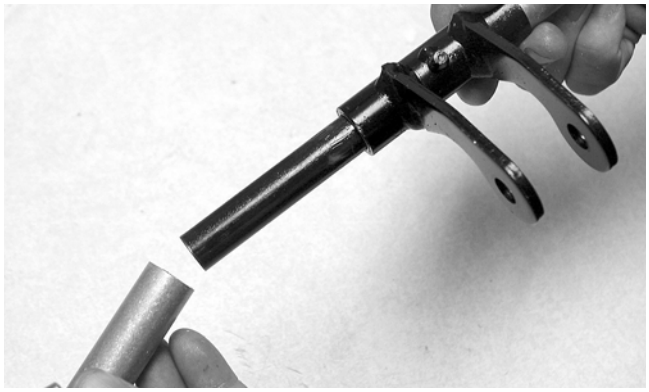
ASSEMBLING

1. Apply a thin coat of low-temperature grease to the axle and slide the axle into the shock pivot bracket. Have equal amounts of the axle exposed on either side of the bracket tube.



FC189

2. Slide the shim washers and spacers onto the axle from each side of the pivot.



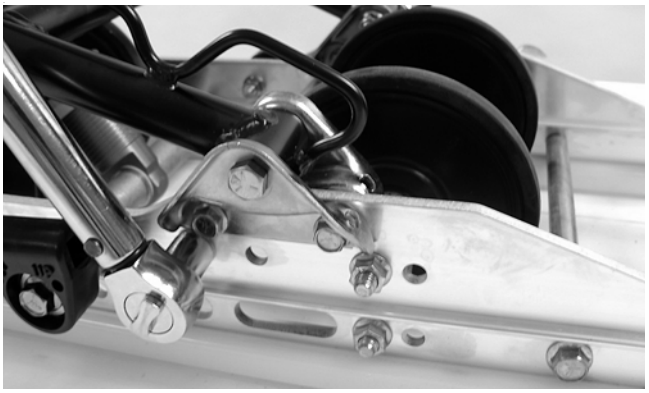
FC190

3. Lower the pivot assembly down between the rails; then align the axle with the mounting hole just below and forward of the front arm mounting brackets.



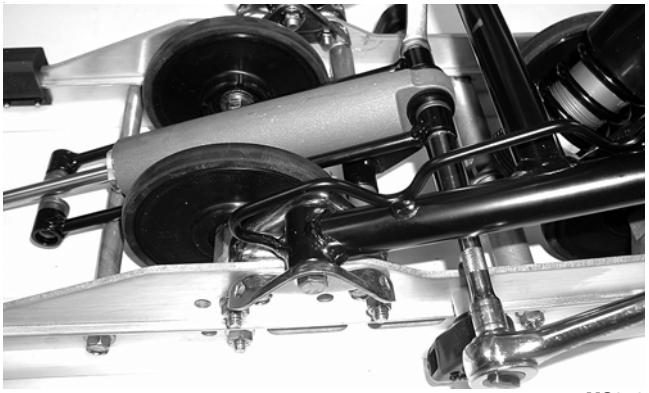
FC186

4. Install the cap screw and lock nut securing the pivot assembly to the slide rails. Tighten to specifications.



MS257

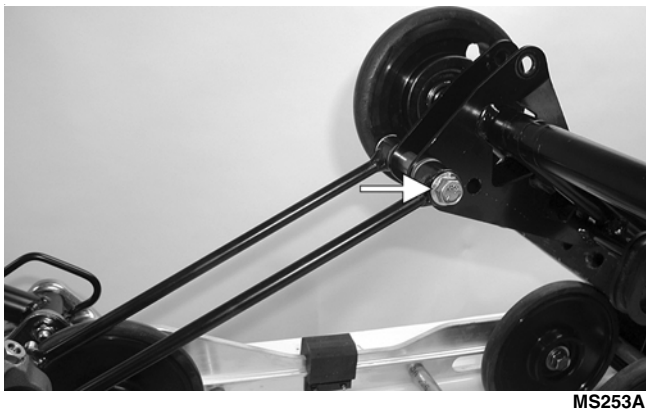
5. Secure the shock rod links (with axles) and the lower end of the shock absorber to the pivot assembly with the cap screw and lock nuts. Tighten securely.



MS258

■ **NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.**

6. Position the shock links in the appropriate holes of the idler arm brackets (see Chassis and Skid Frame Mounting Locations in this section). Place a spacer between the center of the brackets. Insert the link axles into the upper shock link eyelets; then insert the cap screw through the eyelets. Secure with a cap screw, washer, and lock nut. Tighten securely.



MS253A

7. Secure the shock absorber to the idler arm with bushings, sleeve, lock nut, and a cap screw. Tighten securely.



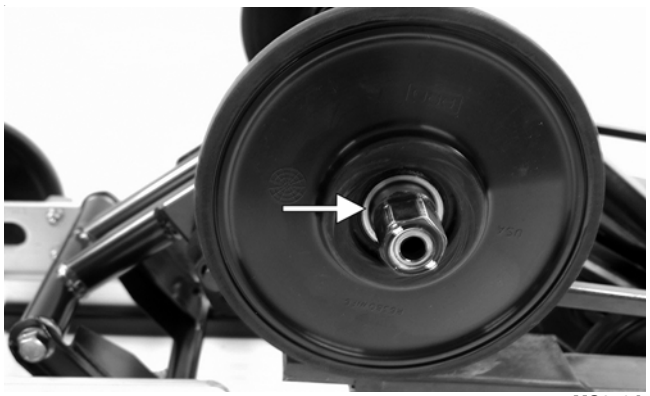
MS252A

■**NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.**

8. Install the idler wheel removed in disassembling.

⚠ CAUTION

When driving the idler wheel onto the idler arm, use a tool to contact the inside race of the bearing or damage to the wheel or bearing may occur.



MS072A

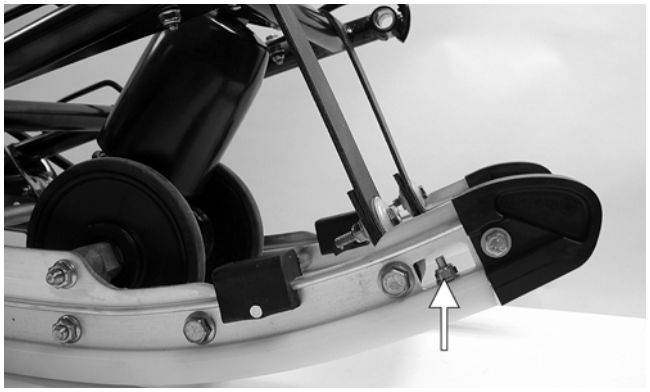
Slide Rails

■**NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this subsection).**

REMOVING

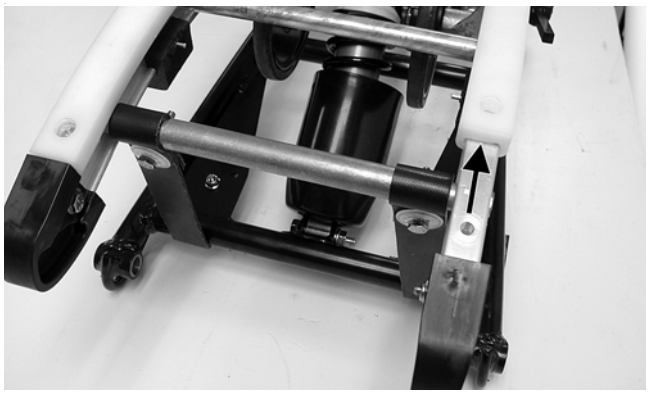
■**NOTE: When it is necessary to replace one or both slide rails, it is recommended that one slide rail be removed at a time. The remaining slide rail will then hold the crossbraces, axles, and brackets in their correct assembly order. Always mark the mounting hole locations during disassembly to speed up the assembly process and to prevent any damage. This method is much quicker than to completely disassemble the entire skid frame. To replace either rail, use the following procedure.**

1. Remove the machine screw and lock nut securing the wear strip to the front of the slide rail; then using a suitable driving tool, drive the wear strip rearward off the slide rail.



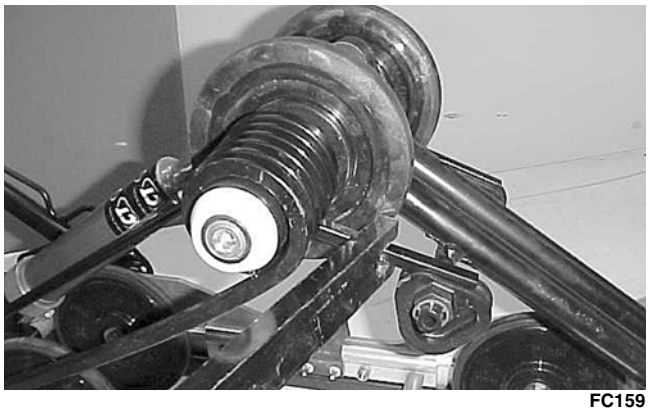
MS218A

■**NOTE: If binding of the wear strip occurs, it may be necessary to use a pipe wrench, start from either end, and hook the edge of the wear strip with the pipe wrench jaw and twist the wear strip off the slide rail. Move the pipe wrench 7.5 cm (3 in.) and again twist the wear strip off the rail. Repeat this procedure until the wear strip is free of the rail.**



MS219A

■**NOTE: If not already done, remove the short spring leg from the adjusting cam. Also, it is recommended that the cap screw be removed from the front shock absorber to the front arm to aid in slide rail installing.**



FC159

2. Remove the end cap from the slide rail. Account for a cap screw, lock nut, and two flat washers.



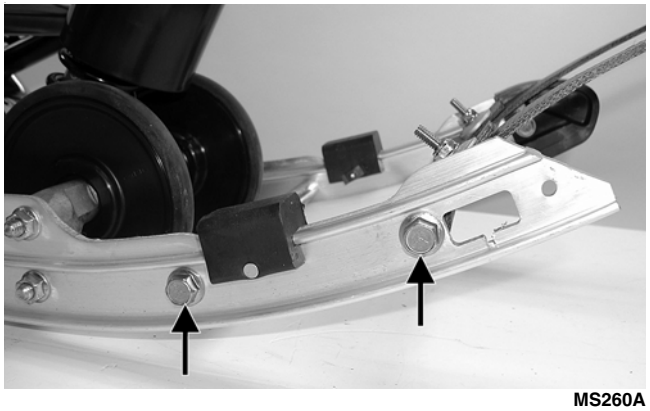
MS259

3. Remove the cap screws and lock nuts securing the limiter straps to the front arm.

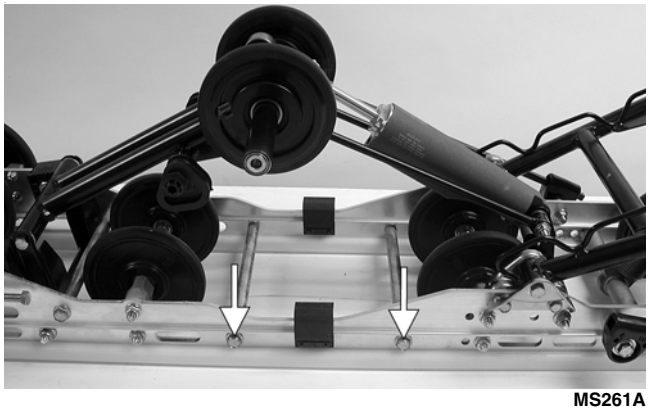


MS243A

4. Remove the cap screws securing the rail supports to the slide rail.



MS260A



MS261A

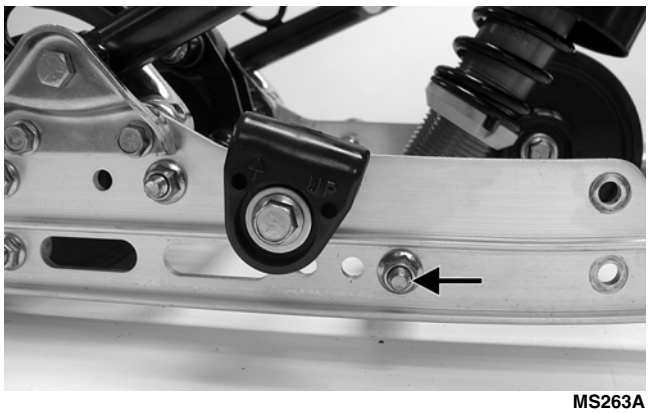
5. Remove the cap screws and lock nuts securing the inner idler wheel and the mounting block. Account for cap screws, washers, and lock nuts.



MS262A

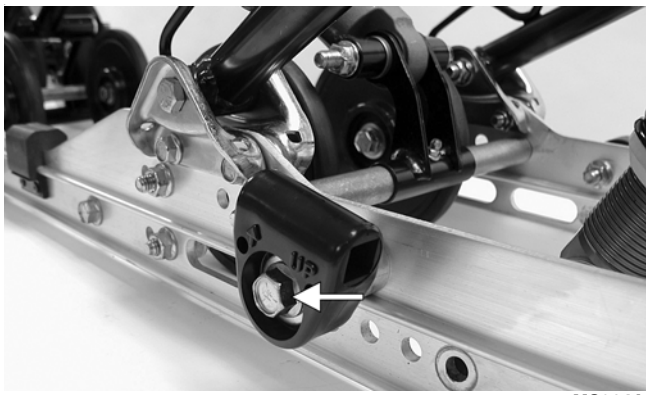
6. Remove the cap screw and lock nut securing the front shock mount axle.

■**NOTE: If it is necessary to remove the cap screw for replacing the slide rail, install the cap screw from the opposite side into the assembly to secure components and aid in replacing the slide rail.**



MS263A

7. Remove the cap screw and flat washer securing the spring slide to the rail. Account for a spacer and the slide block.

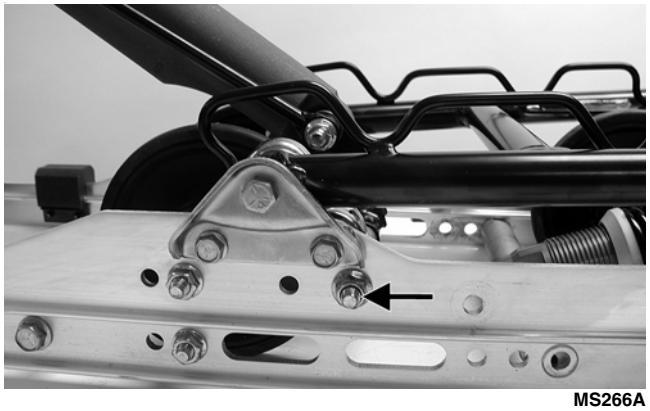


MS264A



MS265

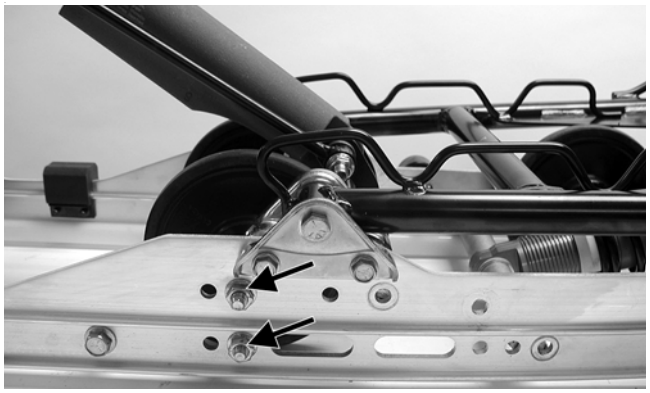
8. Remove the cap screw and lock nut securing the rear shock pivot assembly to the slide rail.



MS266A

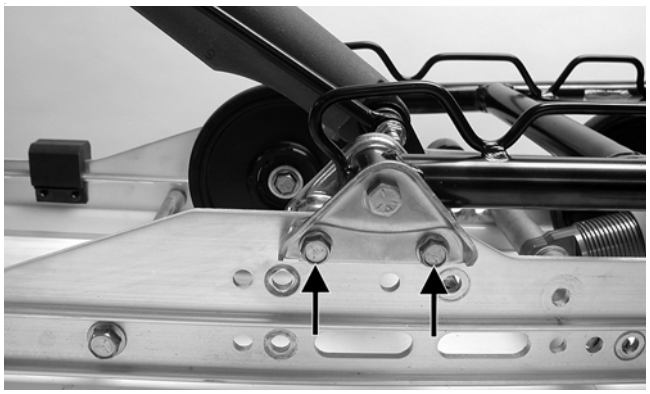
■ **NOTE: If it is necessary to remove the cap screw for replacing the slide rail, install the cap screw from the opposite side into the assembly to secure components and aid in replacing the slide rail.**

9. Noting the locations for installing purposes, remove the cap screws and lock nuts securing the center inner idler wheel and mounting block. Account for cap screws, flat washers, and lock nuts.



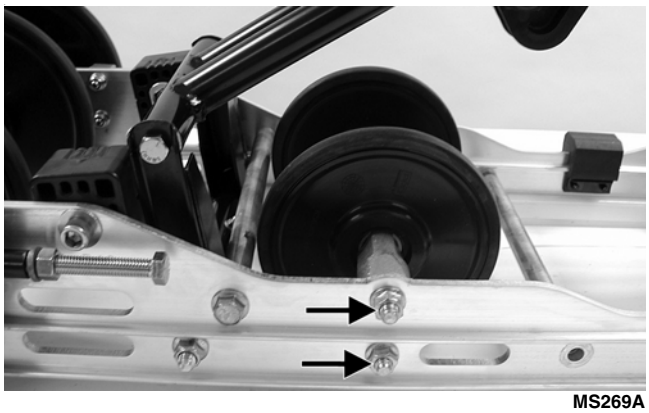
MS267A

10. Noting the position of the front arm mounting bracket, remove the cap screws securing the bracket to the slide rail. Account for lock nuts.



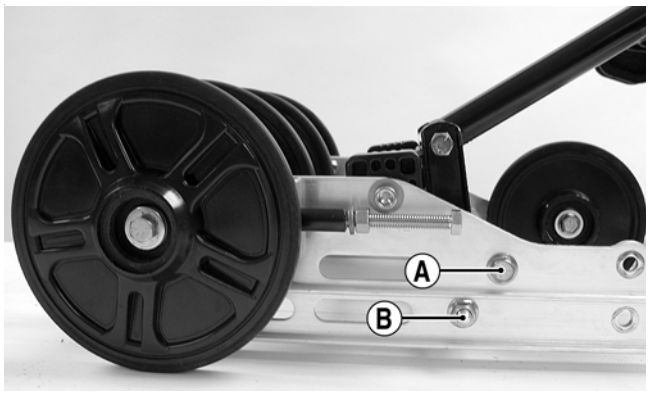
MS268A

11. Noting the locations for installing purposes, remove the cap screws and lock nuts securing the rear inner idler wheels and mounting blocks.



MS269A

12. Remove the cap screws, lock washers, and lock nuts from the rear arm limiter (A) and rear arm (B).



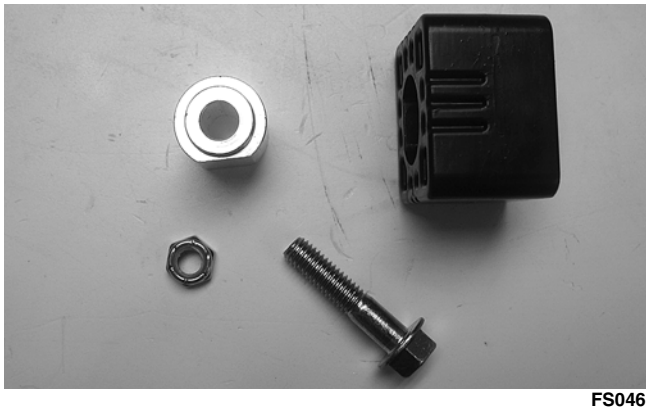
MS270A

■ **NOTE: If it is necessary to remove the cap screw for replacing the slide rail, install the cap screw from the opposite side into the assembly to secure components and aid in replacing the slide rail.**

13. Remove the coupler block. Account for the block, bushing, cap screw, and lock nut.



MS271A

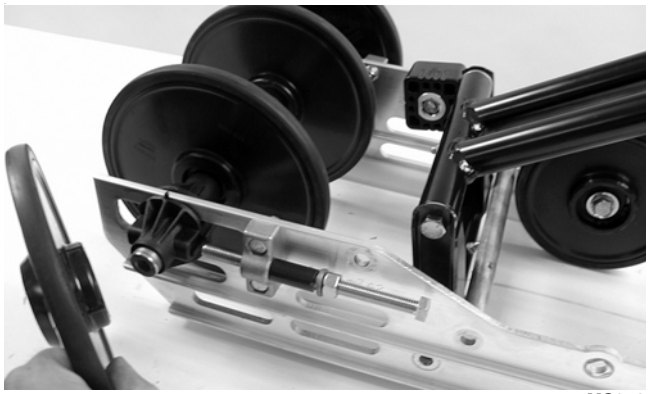


FS046

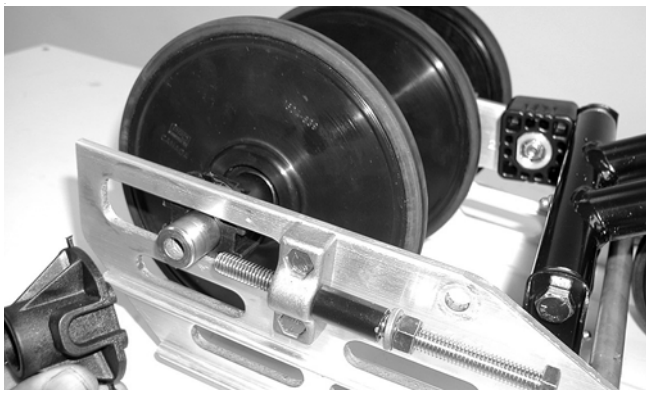
14. Remove the cap screw and flat washer securing the rear idler wheel. Remove the idler wheel; then remove the adjuster bushing.



MS272A

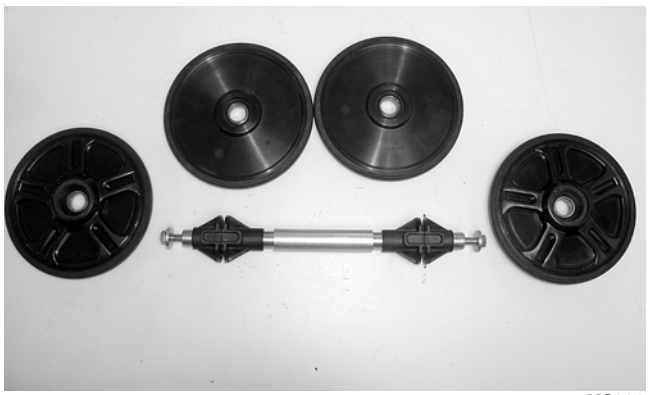


MS273



MS274

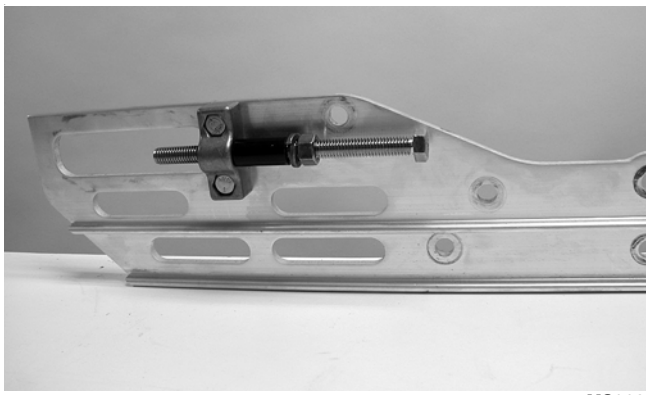
15. Remove the idler wheel assembly. Place all components in order for installing purposes.



MS229

■ **NOTE: At this point, the slide rail should be free of the skid frame components and can be removed.**

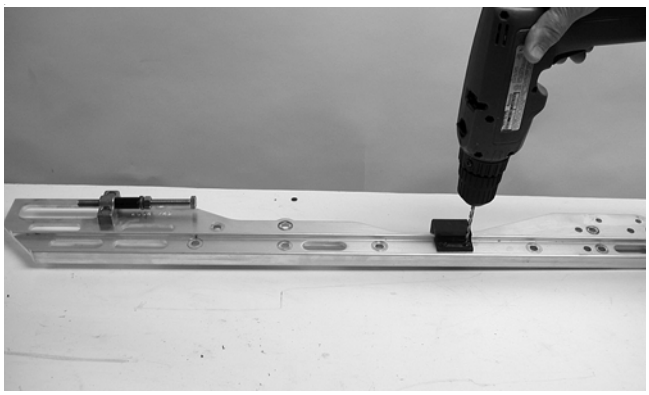
16. Remove the cap screws and lock nuts securing the track adjuster bracket.



MS283

17. Twist the push nuts off the solid rivets securing the front shock pads; then remove the pads.

18. Using drill and a 3/16-in. drill bit, drill out the rivets and remove the rear shock pads. Account for the retaining brackets.



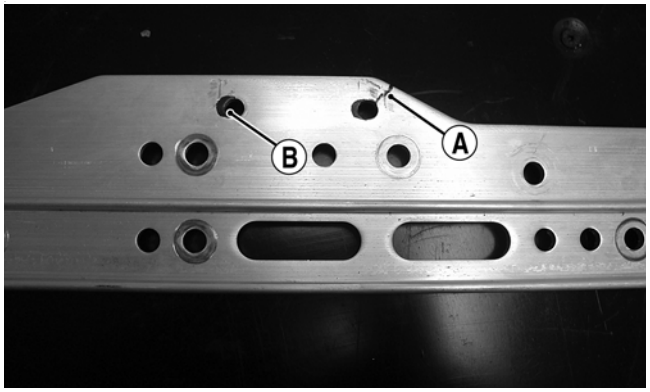
MS275

■ **NOTE: The shock pads should be removed only if being replaced.**

INSPECTING

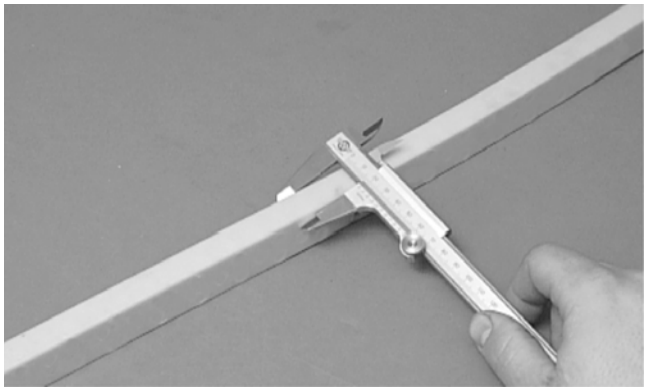
■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the slide rail for cracks (A), elongated holes (B), or unusual bends.

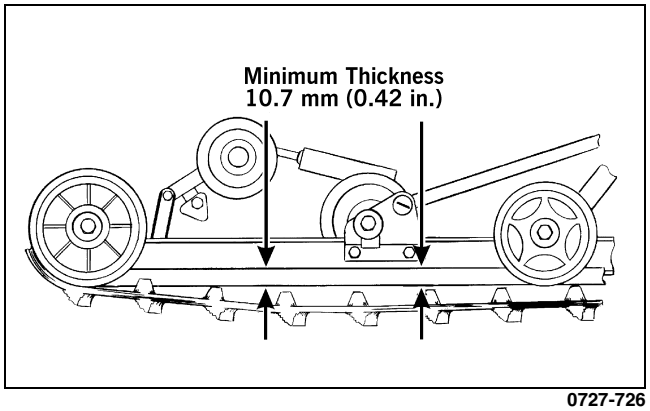


MS220A

2. Inspect the wear strip for wear. The wear strip must be 10.7 mm (0.42 in.) thick or thicker. If the wear strip measurement is less than specified, replacement of both wear strips is necessary.



AG530D

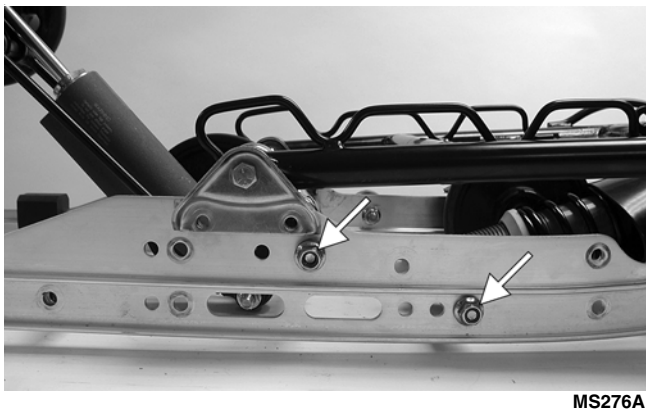


0727-726

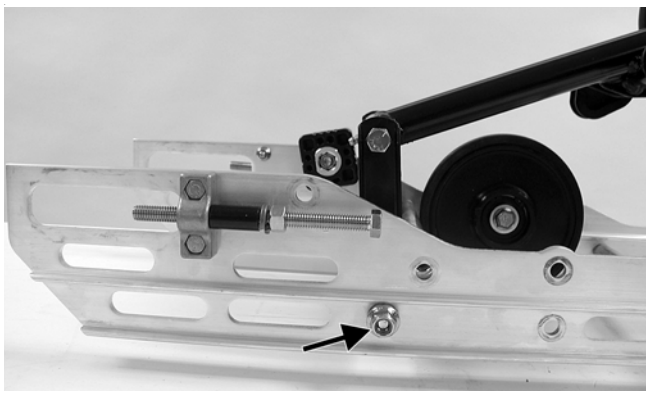
INSTALLING

1. If removed, install the shock pads; then secure with rivets and new push nuts.

2. Position the slide rail into the front arm mounting bracket; then align the front shock axle, rear shock pivot axle, and the rear arm with the appropriate mounting holes. Install the lock nuts. Tighten only until snug.



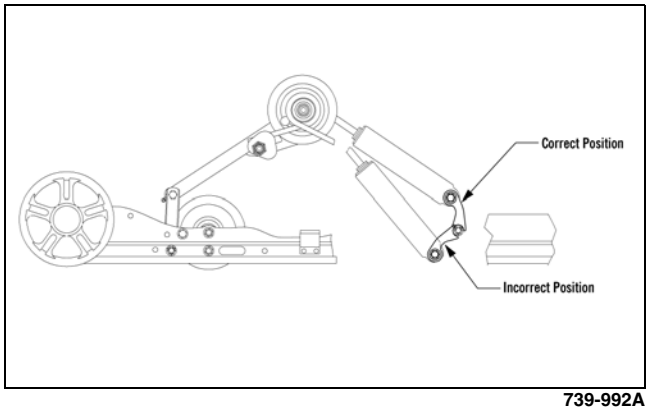
MS276A



MS277A

⚠ CAUTION

When installing the slide rail, make sure the rear arm shock mounting location on the pivot/axle is positioned correctly above the axle or component damage will occur.



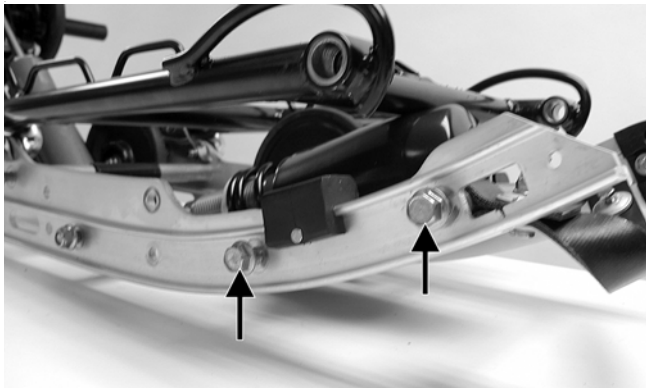
739-992A

3. Secure the front arm mounting bracket with the cap screws and lock nuts. Tighten to specifications.

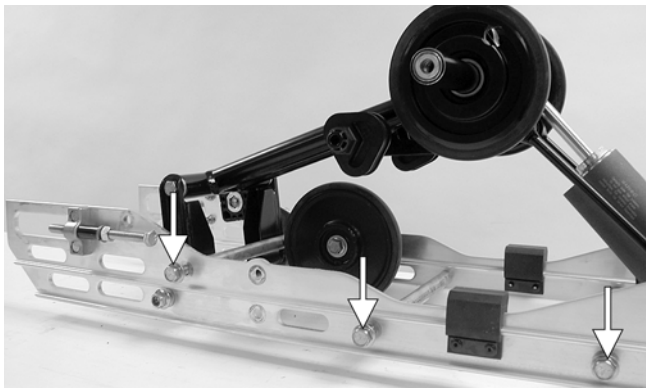


MS278

4. Secure the four rail supports and rear arm limiter with cap screws. Tighten to specifications.



MS280A



MS279A

5. At this point, tighten the lock nuts (from step 2) to specifications.

6. Install the upper shock eyelet to the front arm with the cap screw and lock nut; then tighten securely.

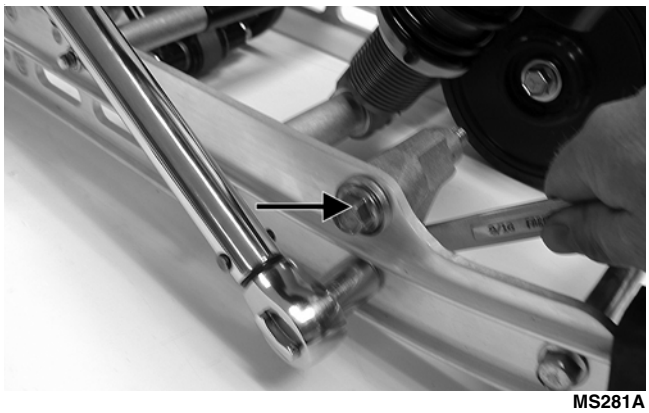


MS251

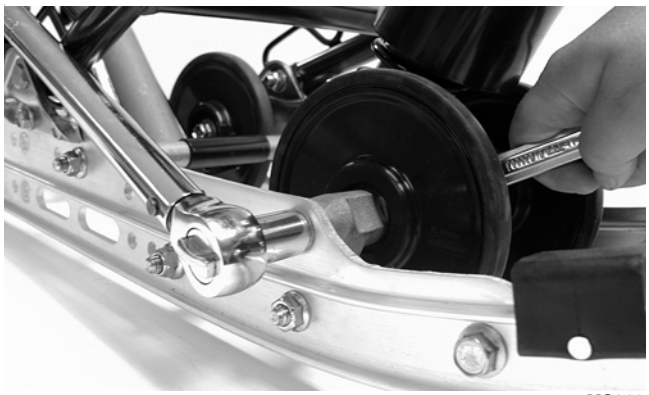
■**NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.**

7. Install the inner idler wheel mounting blocks in the appropriate hole as noted during disassembly and secure with cap screws and lock nuts. Tighten to specifications.

■**NOTE: To obtain proper alignment for the idler wheel cap screw, place the cap screw in the top hole through the rail and mounting block prior to tightening.**



MS281A



MS282

8. Place the spring slide and slide block into position on the slide rail. Secure with a cap screw and washer. Tighten to specifications.

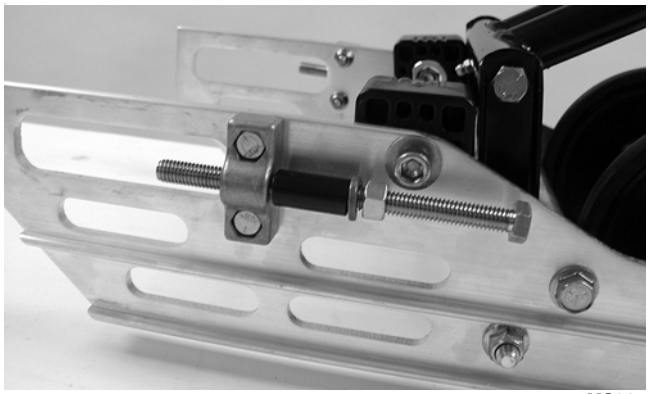


MS265



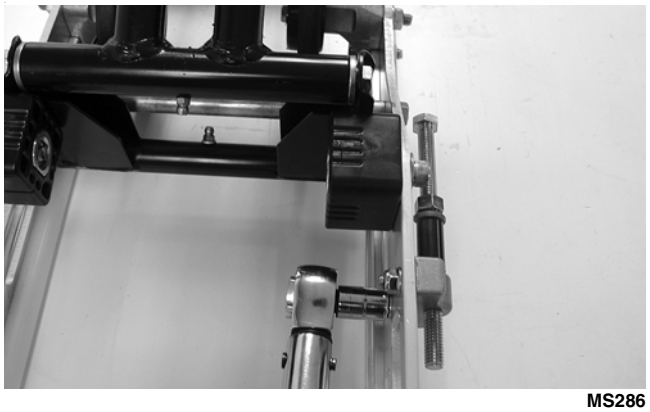
MS284

9. Install coupler block w/bushing. Secure with cap screws and lock nuts. Tighten securely.



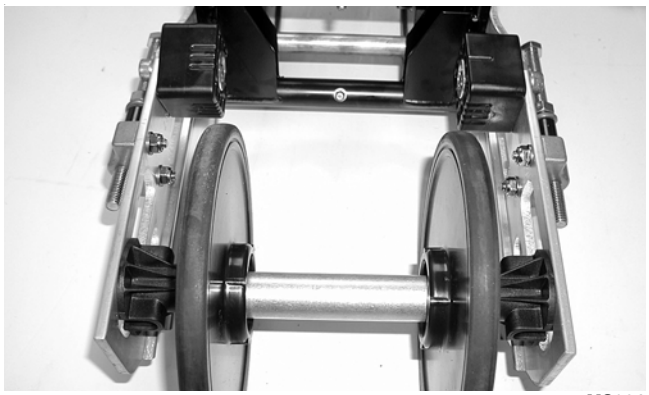
MS285

10. Install the track adjuster bolts and lock nuts w/ washers. Tighten to specifications.



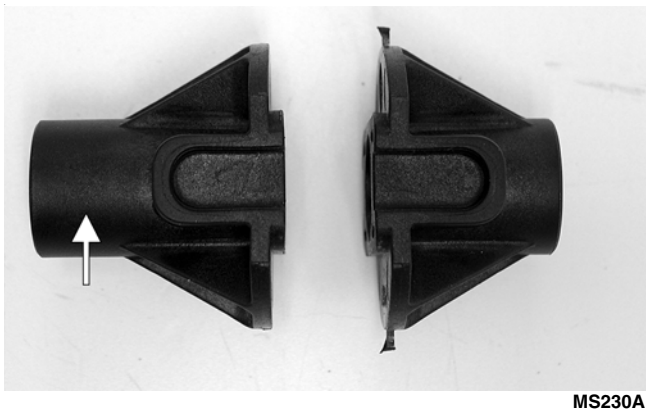
MS286

11. Place the two inner adjuster bushings into position between the slide rails.



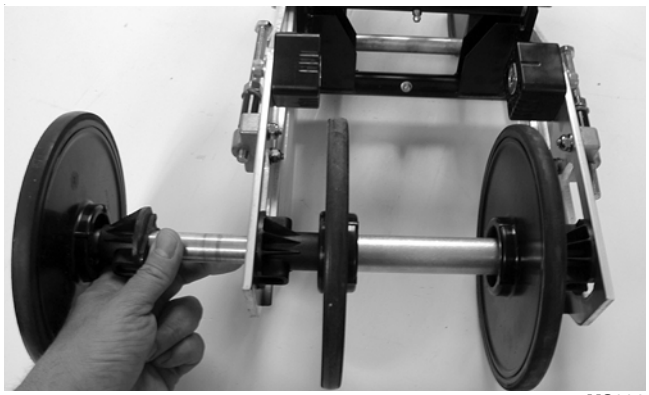
MS231

■ **NOTE: The adjuster bushing with the longer sleeve must be installed to the inside of the slide rail.**



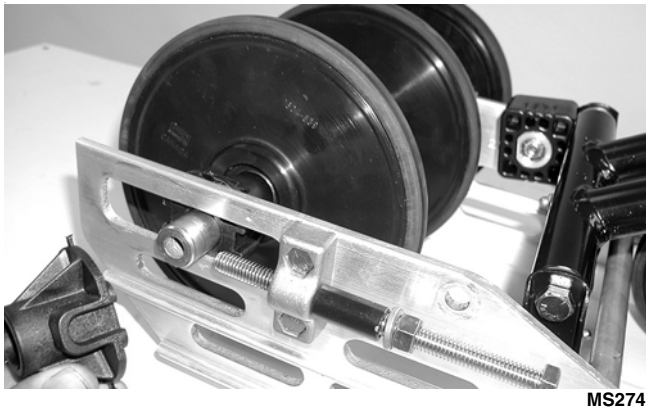
MS230A

12. From one side, slide the axle through the slide rail and center components far enough to install the outside adjuster bushings and idler wheels.



MS228

13. Install the outside adjuster bushings and idler wheels with cap screws (coated with blue Loctite #243). Tighten only until snug.



MS274

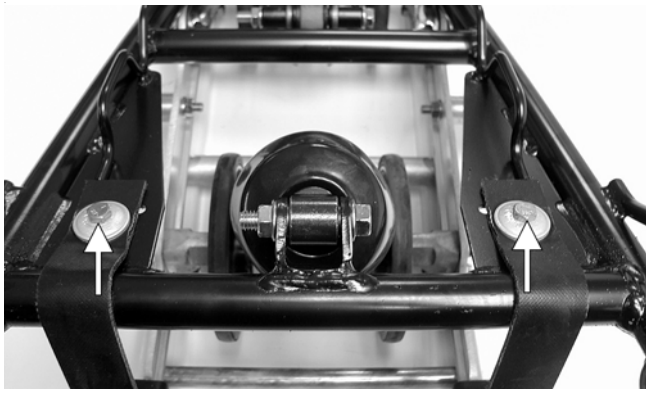
■ **NOTE: Make certain the slot in the adjuster bushing is aligned with the adjusting bolt.**



MS287A

■ **NOTE: It is advisable to tighten the rear idler wheel axle only until snug until the skid frame has been installed and track tension has been adjusted; then the axle assembly must be tightened to specifications.**

14. Secure the limiter straps to the front arm with cap screws, lock nuts, and washers. Tighten to specifications.



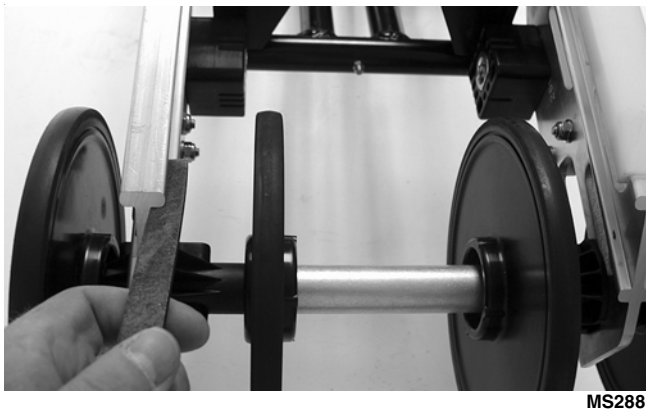
MS243A

15. Secure the end cap onto the slide rail using a cap screw, flat washers, and a lock nut. Tighten to specifications.



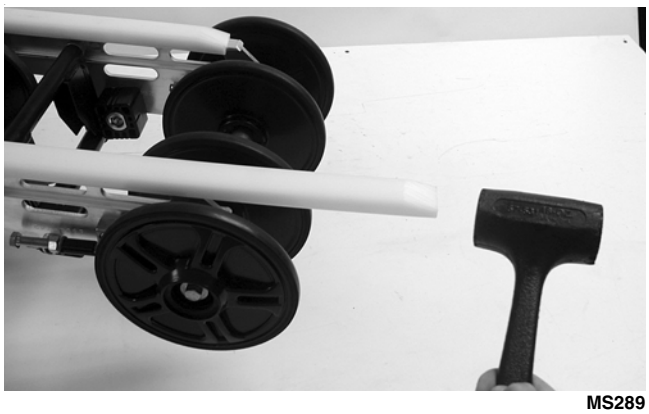
MS259A

■ **NOTE: Apply a light coat of grease to the slide rail surface to aid in installing a new wear strip. If there are any sharp edges on the lower portion of the rail, use a file to remove them.**



MS288

16. From the back, start the wear strip onto the rail; then using a soft hammer, drive the wear strip forward into position. Secure with a machine screw and lock nut. Tighten to specifications.



MS289



FS048

17. Place the spring into the slide blocks; then place the spring into position on the slide rail and rear arm.



FC164

■ **NOTE: It is advisable to install the rear arm springs onto the adjuster blocks after the skid frame has been installed.**

18. After the skid frame has been installed, install the short spring leg onto the adjusting cam; then adjust track tension deflection (see Track Tension in this sub-section) and track alignment (see Track Alignment in this sub-section).

Installing Skid Frame

1. Place a piece of cardboard on the floor to protect against scratching and tip the snowmobile onto the left side.

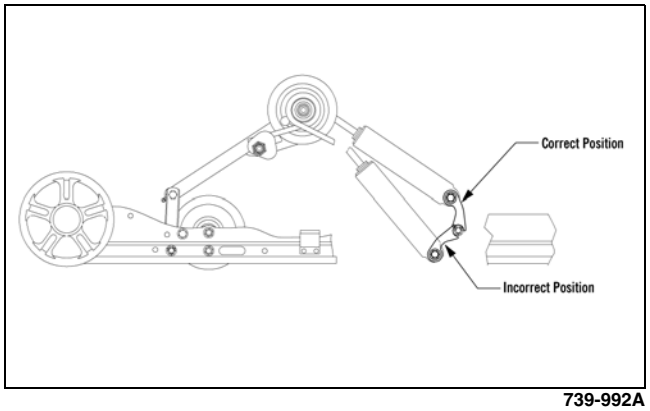
■ **NOTE: Avoid tipping the Firecat/Sabercat models onto the right side. If left on the right side for more than five minutes, air may get into the oil line. If air is apparent in an oil hose, the system will eventually have to be bled (see Section 4 - Bleeding Oil-Injection System).**

2. Pull the track away from the tunnel and spread open; then place the skid frame into the track.

3. Position the front of the skid frame into the tunnel and align the front arm with the appropriate mounting hole in the tunnel. Insert the cap screw with washers through the tunnel mounting hole and through the front arm. DO NOT TIGHTEN AT THIS TIME.

⚠ CAUTION

When installing the skid frame, make sure the rear arm shock mounting location on the pivot/axle is positioned correctly above the axle or component damage will occur.



739-992A

■ NOTE: To aid in centering the front arm with the hole in the tunnel, position the skid frame and track at a 45° angle to the bottom of the tunnel.

4. Elevate the rear of the skid frame and the track into position in the tunnel.

5. Secure the rear arm to the tunnel with a cap screw (coated with red Loctite #271); then tip the snowmobile onto the opposite side, align the front arm with the appropriate mounting hole in the tunnel, and install the cap screw (coated with red Loctite #271). DO NOT TIGHTEN AT THIS TIME.

■ NOTE: Do not install the short legs of the rear springs onto the adjusting cams at this time.

6. At this time, tighten all skid frame mounting cap screws securely.

7. Using the Rear Suspension Spring Tool (p/n 0144-311), install the short legs of the rear springs onto the adjusting cams making sure the cams are in the same adjustment positions.

8. Tighten the two track tension adjusting bolts evenly until track deflection is within specifications; then lock the jam nuts to secure the adjustment.

9. Tighten the rear axle assembly (threads coated with blue Loctite #243) to specifications.

10. Check track tension deflection and alignment; adjust if necessary (see Track Tension and Track Alignment in this sub-section).

Track Tension

⚠ WARNING

Deactivate all switches.

CHECKING DEFLECTION

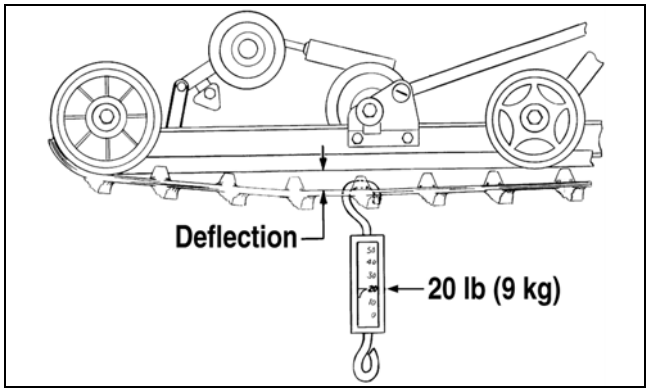
1. Tip the snowmobile on its side.

■ NOTE: Avoid tipping the Firecat/Sabercat models onto the right side. If left on the right side for more than five minutes, air may get into the oil line. If air is apparent in an oil hose, the system will eventually have to be bled (see Section 2 - Bleeding Oil-Injection System).

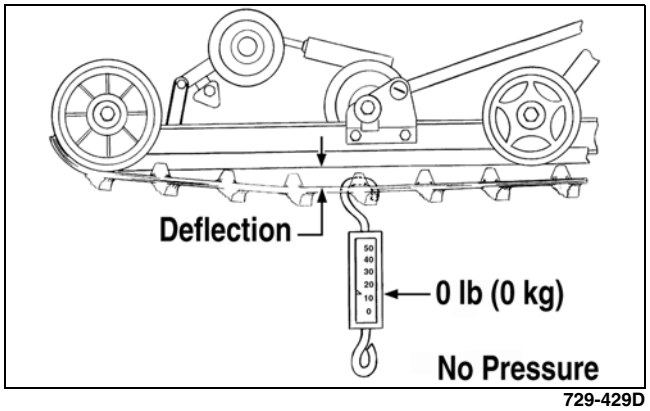
2. Hook a spring scale around a track clip at mid-span; then pull the track down with the scale and measure the distance between the bottom of the wear strip and the inside surface of the track clip. Track deflection must be within specifications.

Rear Suspension Style	Setup Tension	After Break-in Tension
FasTrack w/o Torque Sensing Link (128 in. Track) @ 20 lb	25-32 mm (1-1 1/4 in.)	32-38 mm (1 1/4-1 1/2 in.)
FasTrack w/Torque Sensing Link (136 in. Track) @ 20 lb	44-51 mm (1 3/4-2 in.)	51-57 mm (2-2 1/4 in.)
FasTrack w/o Torque Sensing Link (144 in. Track) @ 20 lb	44-51 mm (1 3/4-2 in.)	51-57 mm (2-2 1/4 in.)
FasTrack w/Torque Sensing Link (144, 153, 162 in. Track) @ 0 lb	51-64 mm (2-2 1/2 in.) No Pressure	51-64 mm (2-2 1/2 in.) No Pressure

■ NOTE: On the M-Series, measurement is from the bottom of the wear strip at the point of the shock pad on the slide rail.



729-429A



729-429D

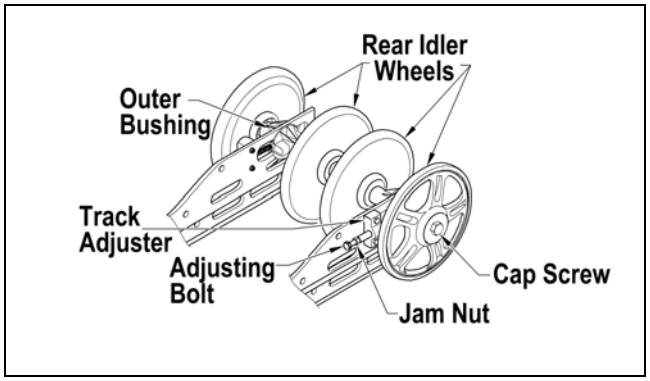
■**NOTE: If the track is new, it will stretch slightly and take a "set" within the first 300 to 500 miles of operation.**

ADJUSTING DEFLECTION

1. Place the snowmobile up on a shielded safety stand. Check to make sure the track is 2-3 in. off the floor.

2. If the measurement is not as specified, loosen the jam nuts of the adjusting bolts.

■**NOTE: The axle nut must be loosened for this procedure.**



739-636A

3. If the measurement obtained in step 2 is more than specified, tighten the adjusting bolts. If the measurement obtained is less than specified, loosen the adjusting bolts. When the measurement is within specification range, lock the adjustment by bottoming the jam nuts against the axle housings.

■**NOTE: Vigorously push the underside of the track up and down. Track must not hit the top of the tunnel or slap the skid frame.**

4. After correct track tension is obtained, check track alignment (see Track Alignment in this subsection).

■**NOTE: Track tension and track alignment are interrelated; always check both even if only one adjustment seems necessary. Always establish correct track tension before checking and/or adjusting alignment.**

⚠ CAUTION

After proper track tension and alignment have been attained, make certain that the rear axle assembly is tightened to specifications or component damage will occur.

Track Alignment

■**NOTE: Proper track alignment is when the rear idler wheels are equidistant from the inner drive lugs on the inside surface of the track.**

CHECKING

1. Using a shielded safety stand, raise the rear of the snowmobile off the floor making sure the track is free to rotate.

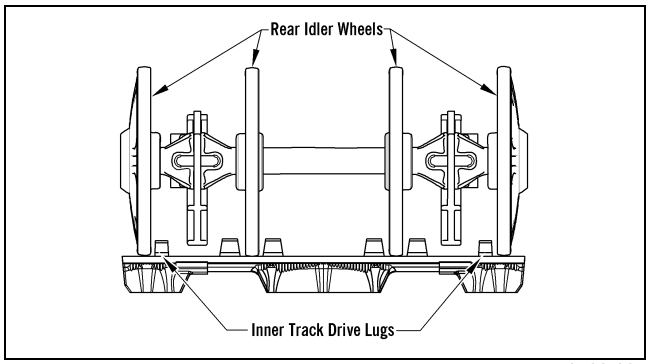
⚠ WARNING

The tips of the skis must be positioned against a wall or similar object for safety. Keep hands, feet, and clothing away from moving components.

2. Start the engine and accelerate slightly. Use only enough throttle to rotate the track several revolutions. SHUT THE ENGINE OFF.

■**NOTE: Allow the track to coast to a stop. Do not apply the brake because it could produce inaccurate alignment conditions.**

3. When the track stops rotating, check the relationship of the rear idler wheels and the inner track drive lugs. If the distance from the idler wheels to the inner drive lugs is the same on both sides, no adjustment is necessary.



0739-637

4. On the side of the track which has the inner drive lugs closer to the rear idler wheel, loosen the adjusting bolt jam nut; then rotate the adjusting bolt clockwise 1-1 1/2 turns.

5. Continue to check the track alignment and make the necessary adjustments until proper alignment is obtained.

6. After proper track alignment is obtained, lock the jam nut against the axle housing.

7. Tighten the rear axle assembly (threads coated with blue Loctite #243) to specifications.

⚠ CAUTION

After proper track tension and alignment have been attained, make certain that the rear axle assembly is tightened to specifications or component damage will occur.

■ NOTE: Make sure correct track tension is maintained after adjusting track alignment.

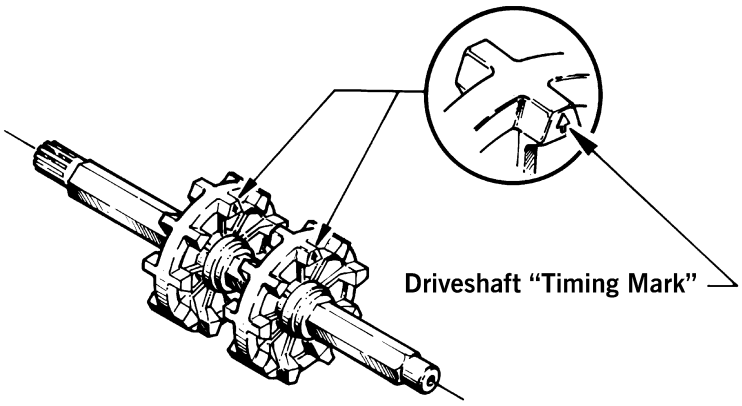
■ NOTE: Field test the track under actual conditions and, after the field test, check track alignment and track tension; adjust as necessary.

Drive Sprocket Locations

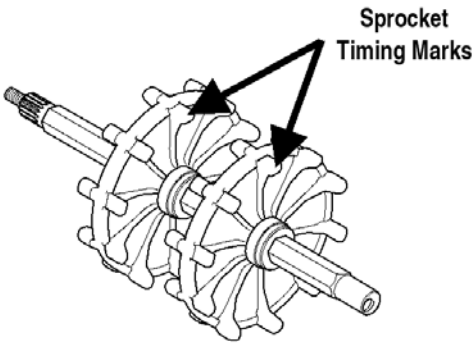
The following illustrations will provide all necessary information to relocate sprockets on the driveshaft.

When information is required to assemble the driveshaft, refer to the parts manual for model being worked on; then refer to the following illustrations using the part number listed in the parts manual as a reference.

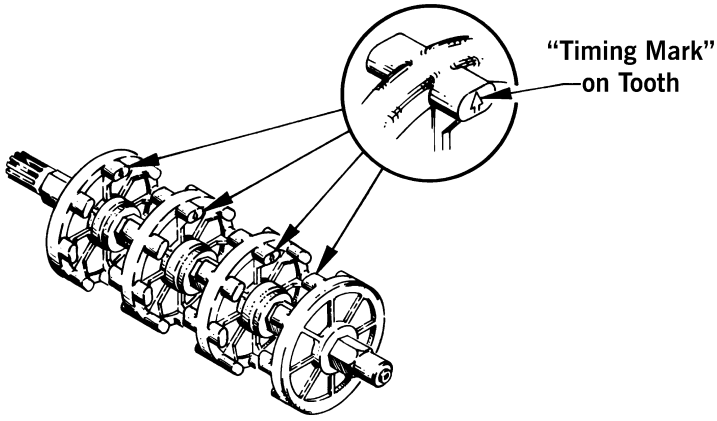
When pressing new sprockets on the driveshaft, remember to align the sprocket alignment marks or the sprockets won't be timed correctly. See following illustrations.



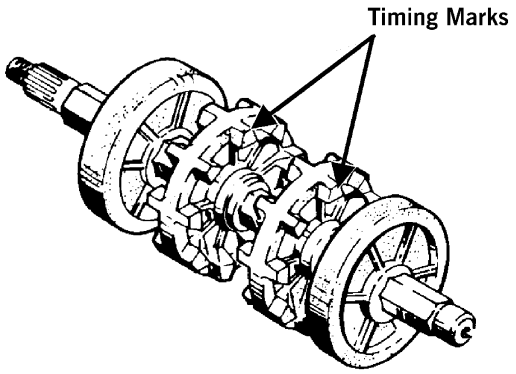
0728-351



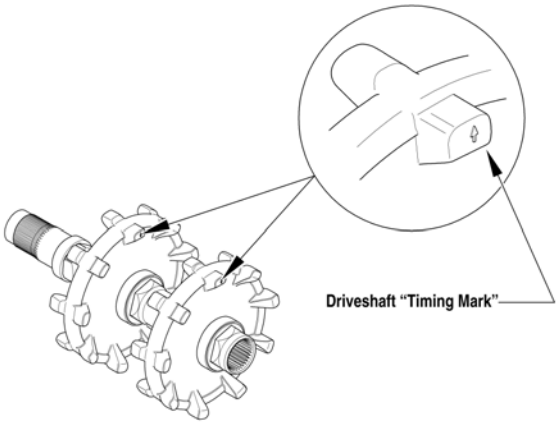
737-870A



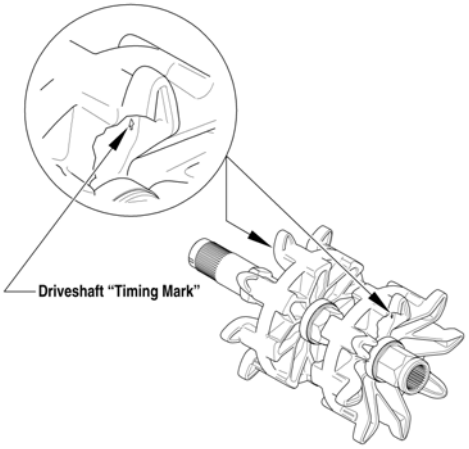
0727-829



727-829B



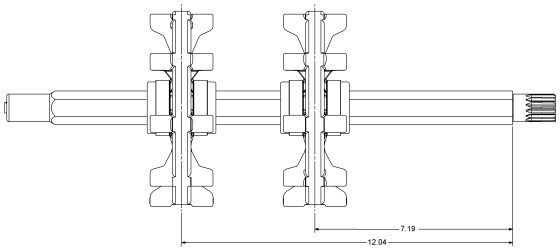
740-043A



740-044A

0728-065

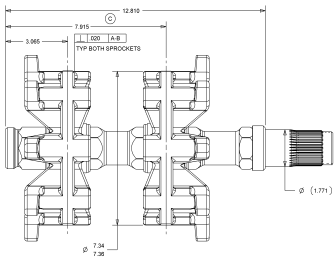
Bearcat 570
Panther 370 r/570
Z 370/LX
Z 440 LX
Z 570/LX



0738-355

0728-113

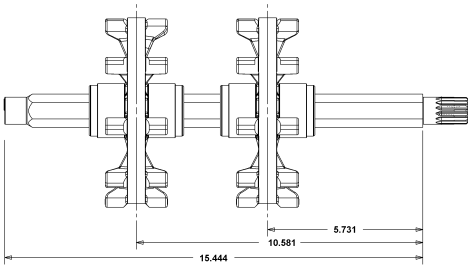
M-Series



0740-041

0728-114

Firecat r
Sabercat

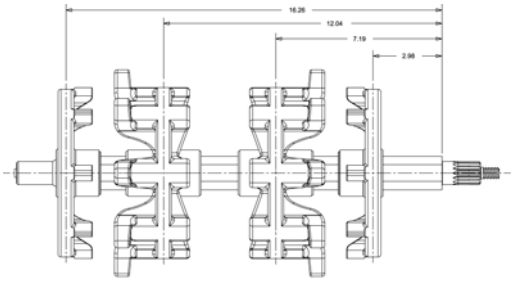


0739-221

9

King Cat 900 EFI

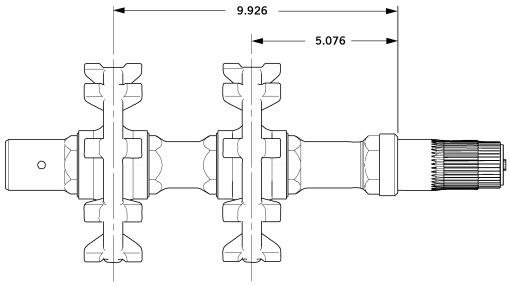
0728-126



0741-102

ZR 900 EFI

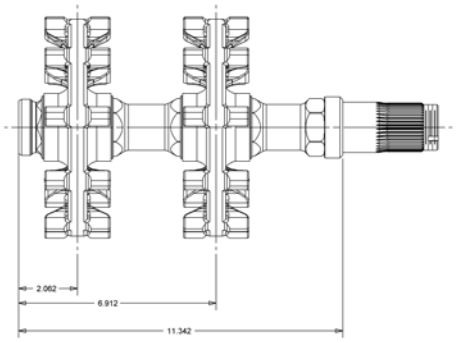
0728-127



0739-397

Firecat (except r)

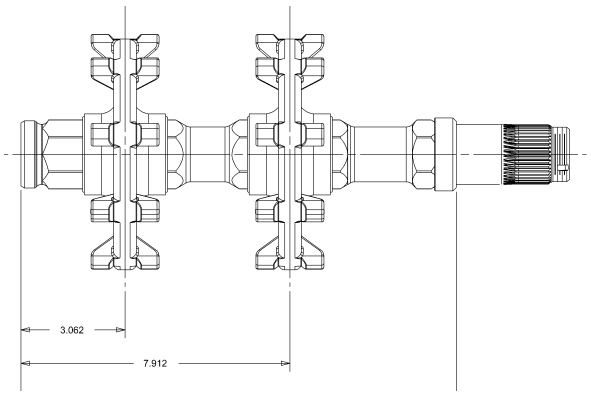
0728-131



0740-042

Crossfire

0728-159



0741-095

Drive Track Usage Chart

Below is a listing of drive tracks for Arctic Cat snowmobiles. This chart lists each track with its specifications such as length, pitch, width, rail centers, and bar grip design.From the information provided in this chart, note what other tracks can be substituted as a replacement track if a recommended track isn't available. Pay close attention to all critical specifications when choosing an alternative track.

P/N	Length	Width	Rail Center	Bar Design	Lug Height
0602-153	115"	16"	8.84"	Full Block	.850"
0602-249	131"	15"	N/A	N/A	
0602-754/755	136"	15"	8.84"	Full Block	.725"
0602-725	156"	16"	8.84"	Full Block	.725"
0602-680	136"	15"	8.84"	Conical Stud	1.25"
0602-758	136"	15"	8.84"	Wave	.920"
0602-677	121"	15"	8.84"	Full Block	.725"
0602-752/753	121"	15"	8.84"	Full Block	.725"
0602-756	136"	15"	8.84"	Full Block	.725"
0602-759	136"	15"	8.84"	Wave	.920"
0602-762	156"	16"	8.84"	Full Block	.725"
0602-798	121"	15"	8.84"	Full Block	.725"
0602-805	136"	15"	8.84"	Deep Lug	1.40"
0602-925	121"	15"	8.84"	Deep Lug	1.60"
0602-942	121"	15"	8.84"	Wave	1.25"
0602-861	156"	20"	13.50"	Full Block	.850"
0602-868	121"	15"	8.84"	Full Block	.725"
0602-869	136"	15"	8.64"	Deep Lug	1.40"
0602-904	136"	15"	8.84"	Deep Lug	1.60"
0602-905	136"	15"	8.84"	Deep Lug	2.00"
0602-921/922	121"	15"	8.84"	Full Block	.725"
0602-824	121"	15"	8.84"	N/A	1.40"
0602-923	121"	15"	8.84"	Full Block	.850"
0602-928	121"	15"	8.84"	Full Block	.725"
0602-935	156"	16"	8.84"	Full Block	1.00"
0602-962	156"	20"	13.50"	Full Block	1.00"
1602-004/005	121"	15"	8.84"	Full Block	.850"
1602-129	121"	15"	8.84"	Conical Stud	1.00"
1602-033	121"	15"	8.84"	Full Block	.850"
1602-008	121"	15"	8.84"	Aggressive Wave	1.25"
1602-015	68"	11"	8.84"	Wave	.690"
1602-093	136"	15"	8.84"	Full Block	.850"
1602-120	121"	15"	8.84"	Conical Stud	1.00"
1602-089	121"	15"	8.84"	Full Block	.850"
1602-124	121"	15"	8.84"	Full Block	.850"
1602-141	121"	15"	8.84"	Full Block	.850"
1602-137	144"	15"	8.84"	Deep Lug	2.00"
1602-080	144"	15"	8.84"	Deep Lug	2.00"
1602-130	144"	15"	8.84"	Full Block	1.25"
1602-135	156"	15"	8.84"	Deep Lug	2.00"
1602-136	151"	15"	8.84"	Deep Lug	2.00"
1602-139	151"	15"	8.84"	Deep Lug	2.00"
1602-149	121"	15"	8.84"	Wave	.850"
1602-154	121"	15"	8.84"	Aggressive Wave	1.375"
1602-160	136"	15"	8.84"	Deep Lug	1.375"
1602-161	121"	15"	8.84"	Conical Stud	1.25"
1602-176	121"	15"	8.84"	Full Block	.850"
1602-188	136"	15"	8.84"	Wave	.725"

Drive Track Usage Chart (cont)

P/N	Length	Width	Rail Center	Bar Design	Lug Height
1602-191	144”	15”	8.84”	Aggressive Wave	1.25”
1602-225	151”	15”	8.84”	Aggressive Wave	1.25”
1602-226	121”	15”	8.84”	Aggressive Wave	1.00”
1602-231	121”	15”	8.84”	Full Block	.850”
1602-235	136”	15”	8.84”	Conical Stud	1.00”
1602-236	144”	15”	8.84”	Deep Lug	2.00”
1602-237	151”	15”	8.84”	Deep Lug	2.00”
1602-238	128”	13.5”	8.84”	Full Block	1.375”
1602-258	128”	13.5”	8.84”	Full Block	1.00”
1602-262	136”	15”	8.84”	Conical Stud	2.25”
1602-263	144”	15”	8.84”	Conical Stud	2.25”
1602-264	151”	15”	8.84”	Aggressive Wave	2.25”
1602-302	144”	15”	8.84”	Aggressive Wave	2.00”
1602-303	151”	15”	8.84”	Aggressive Wave	2.00”
1602-326	136”	15”	8.84”		2.00”
1602-330	128”	13.5”	8.84”	Full Block	.725”
1602-336	159”	15”	8.84”	Aggressive Wave	2.00”
1602-359	136”	15”	8.84”		1.00”
1602-397	144”	13.5”	8.84”		1.50”
1602-398	151”	13.5”	8.84”		1.50”
1602-406	156”	15”	8.84”	Deep Lug	2.00”
1602-410	128”	13.5”	8.84”	Deep Lug	1.50”
1602-411	128”	13.5”	8.84”	Deep Lug	1.65”
1602-433	144”	13.5”	8.84”		1.25”
1602-444	128”	13.5”	8.84”	Full Block	1.00”
1602-445	128”	13.5”	8.84”	Full Block	1.375”
1602-454	128”	13.5”	8.84”	Aggressive Wave	1.00”
1602-476	136”	15”	8.84”	Full Block	1.00”
1602-478	162”	15”	8.84”	Aggressive Wave	3.00”
1602-490	144”	15”	8.84”	Deep Lug	2.25”
1602-491	151”	15”	8.84”	Deep Lug	2.25”
1602-500	128”	13.5”	8.84”	Full Block	1.00”
1602-501	128”	13.5”	8.84”	Aggressive Wave	1.375”
1602-502	128”	13.5”	8.84”	Full Block	1.00”
1602-503	128”	13.5”	8.84”	Aggressive Wave	1.375”
1602-504	121”	15”	8.84”	Full Block	1.00”
1602-506	121”	15”	8.84”	Deep Lug	1.375”
1602-519	144”	13.5”	8.84”	Aggressive Wave	2.25”
1602-520	151”	13.5”	8.84”	Aggressive Wave	2.25”
1602-524	141”	15”	8.84”		2.25”
1602-525	153”	15”	8.84”		2.25”
1602-546	128”	13.5”	8.84”	Aggressive Wave	1.70”
1602-607	141”	15”	8.84”		1.60”
1602-640	144”	13.5”	8.84”		1.75/2.25”
1602-750	144”	13.5”	8.84”		1.25”
1602-752	121”	15”	8.84”		1.25”
1602-756	121”	15”	8.84”		.850”
1602-767	129”	13.5”	8.84”		1.70”
1602-809	141”	15”	8.84”		1.25”
1602-810	162”	15”	8.84”	Aggressive Wave	2.00”
1602-831	150”	15”	8.84”		1.70”
1602-865	136”	15”	8.84”		1.25”

Drive Track Usage Chart (cont)

P/N	Length	Width	Rail Center	Bar Design	Lug Height
1602-886	128”	13.5”	8.84”		1.00”
1602-890	144”	15”	8.84”		2.25”
1602-891	153”	15”	8.84”		2.25
1602-892	162”	15”	8.84”		2.25”
6799-657	128”	13.5”	8.84”	Aggressive Wave	1.70”
6799-800	136”	15”	8.84”	Wave	1.50”
6799-841*	121”	15”	8.84”	Deep Lug	2.00”
6799-842	136”	15”	8.84”	Deep Lug	2.00”
6909-819	136”	15”	8.84”	Wave	1.25”
7009-851	121”	15”	8.84”	Aggressive Wave	1.25”

Drive Track Lug Patterns

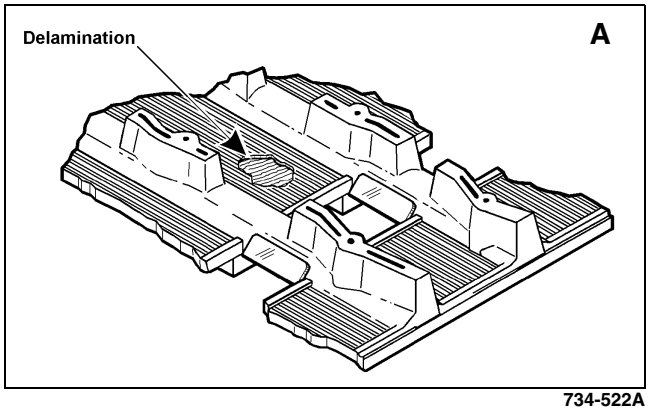
Below are illustrations of the lug patterns available on Arctic Cat drive tracks. These patterns are representative samples only, and the actual patterns may vary.



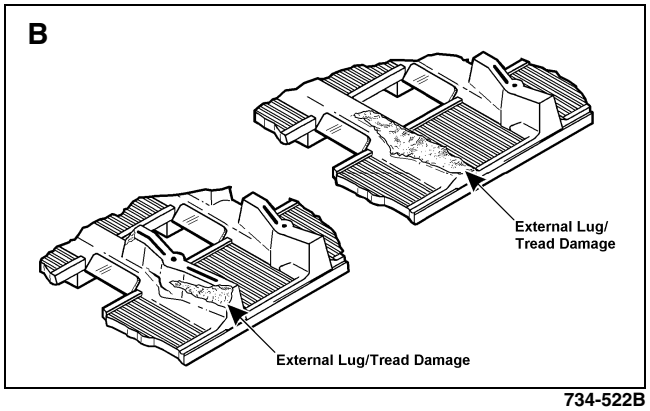
TRACK01

Track Warranty Guidelines

Failure Mode	Description	Cause	Warranty
Delamination (A)	Condition in which the track fabric cleanly separates or spreads apart from the rubber.	Result of poor adhesion between fabric and rubber material	Covered
Tread/External Lug Damage (B)	Condition in which the lugs are torn, cracked, worn, or separated.	Most often a result of riding/spinning on rugged terrain . . . -rocks, -jagged ice, -metal objects, -gravel roads. High speed running with poor lubrication may produce gummy external track lugs leading to separation.	Not Covered
Edge Tearing (C)	A track failure that occurs along the side of the track in which tearing occurs either parallel or perpendicular to the track edge.	Rods out of center. If a rod is positioned off-center during track manufacturing, tearing along the side of the track may occur ± 1/2 in. from the edge.	Covered
Traction Product and Clip Damage	Cutting that occurs where a stud or pick is attached to the track. This includes tearing due to stud pull-through as well as track clips that are torn off.	Often the result of contact having been made with a solid or jagged object (e.g. rocks, ice, metal, gravel, etc.).	Not Covered
Internal Lug Damage	Condition in which internal lugs are torn, worn, or cracked.	Result of contact being made with a foreign object. Track derailment can also cause this damage.	Not Covered
Broken Rods/ Missing Clip (D)	Condition in which tracks are found to have broken rods. Gummy tread sometimes accompanies broken rods. Wear clip and rod section broken out and missing.	Typically, results from track impacts and overheating. Overheating of the rod can result from friction buildup due to poor lubrication or riding at high continuous speeds for long periods of time in minimal snow conditions. Gummy tread and brown or dark brown rod color at the center sometimes accompanies this failure. Signs of wear strip material melted and sticking to the edges of the wear clip. Also, wear clips that have started to turn blue in color from overheating are all signs of operating the snowmobile on minimal snow.	Not Covered
Large Deformities of the Track or Air Bubbles	Condition in which a track has large deformities which may include air bubbles/pockets/voids within the track.	Manufacturing flaw.	Covered
Lugs Torn Off Outer Belt (B)	Condition normally found on deep lug tracks.	Typically, the result of operating a deep lug track on minimal snow at high rates of speed. This track is designed for deep snow mountainous areas only.	Not Covered

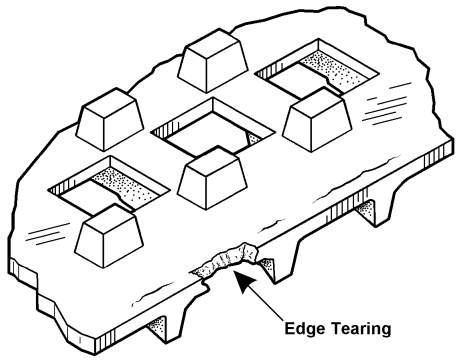


734-522A



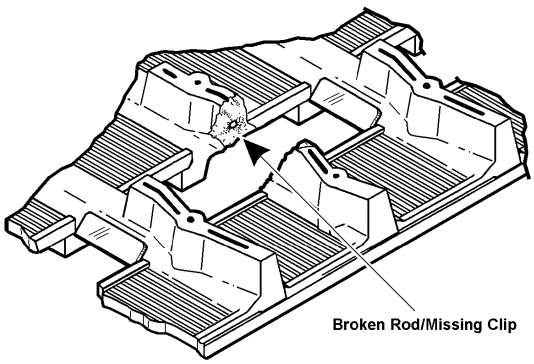
734-522B

C



734-522C

D



734-522D

Idler Wheel Selection Chart

P/N	Diameter	I.D.	Insert Part Number		Width	Color Spoke
0114-240	5.63 in.	0.625 in.	0104-340	0104-341	1.00 in.	Not spoked
0107-137	7.625 in.	0.750 in.	0104-342	0104-343	1.00 in.	Not spoked
1604-837	5.630 in.	0.787 in.				Not spoked
1604-838	6.380 in.	0.787 in.				Not spoked
1604-839	7.120 in.	0.787 in.				Not spoked
1604-745	7.125 in.	0.625 in.	1604-774		1.44 in.	Green
1604-765	6.38 in.	0.625 in.	1604-774		1.44 in.	Orange
1604-744	6.38 in.	0.625 in.	1604-774		1.44 in.	Black
1604-766	6.38 in.	0.625 in.	1604-774		1.44 in.	Purple
1604-767	6.38 in.	0.625 in.	1604-774		1.44 in.	Red
1604-683	7.125 in.	0.625 in.	1604-774		1.44 in.	Black
1604-776	7.125 in.	0.625 in.	1604-774		1.44 in.	Orange
1604-777	7.125 in.	0.625 in.	1604-774		1.44 in.	Purple
1604-778	7.125 in.	0.625 in.	1604-774		1.44 in.	Red
1604-686	7.125 in.	0.625 in.	1604-772	1604-773	1.19 in.	Not spoked
1604-685	6.38 in.	0.625 in.	1604-772	1604-773	1.19 in.	Not spoked
1604-694	6.38 in.	0.625 in.	1604-774		1.44 in.	Silver
1604-692	6.38 in.	0.625 in.	1604-774		1.44 in.	Green
1604-684	5.63 in.	0.625 in.	1604-772	1604-773	1.14 in.	Not spoked
1604-690	5.63 in.	0.625 in.	NONE		1.14 in.	Not spoked
1604-691	5.63 in.	0.625 in.	1604-772	1604-773	1.22 in.	Green
1604-693	5.63 in.	0.625 in.	1604-772	1604-773	1.22 in.	Silver
1604-848	6.38 in.	0.625 in.	1604-774		1.19 in.	Not spoked
1604-971	7.120 in.	0.625 in.	1604-774		1.44 in.	Black
1604-987	5.630 in.	0.375 in.	1604-501		1.22 in.	Green
1704-387	7.125 in.	0.787 in.				Silver
1704-388	7.125 in.	0.787 in.				Black
1704-389	7.125 in.	0.787 in.				Black
1704-390	8.00 in.	0.787 in.				Silver
1704-391	8.00 in.	0.787 in.				Black
1704-392	8.00 in.	0.787 in.				Black
2604-037	5.630 in.	1.00 in.			1.22 in.	Orange
2604-117	7.125 in.	0.984 in.			1.07 in.	Not spoked - Black
2604-122	5.630 in.	0.625 in.	1604-772	1604-773	1.22 in.	Yellow
2604-123	6.380 in.	0.625 in.	1604-774		1.44 in.	Yellow
2604-124	7.120 in.	0.625 in.	1604-774		1.44 in.	Yellow
2604-143	5.350 in.	0.984 in.			1.00 in.	Not spoked - Black
2604-150	6.380 in.	0.787 in.			1.49 in.	Green
2604-524	8.00 in.	0.787 in.			1.49 in.	Spoked - Black
2604-525	8.00 in.	0.787 in.			1.49 in.	Spoked - Green
2604-533	5.620 in.	0.787 in.			1.34 in.	Spoked - Gold
2604-534	6.380 in.	0.787 in.			1.49 in.	Not spoked

Idler Wheel Selection Chart (cont)

P/N	Diameter	I.D.	Insert Part Number		Width	Color Spoke
2604-547	5.630 in.	0.787 in.			1.34 in.	Purple
2604-551	6.380 in.	0.787 in.			1.49 in.	Purple
2604-555	7.120 in.	0.787 in.			1.49 in.	Purple
2604-576	5.630 in.	0.787 in.			1.34 in.	Spoked - Taupe Blue
2604-577	6.380 in.	0.787 in.			1.49 in.	Spoked - Taupe
2604-699	6.380 in.	0.984 in.			1.19 in.	Black
2604-735	5.630 in.	0.787 in.			1.34 in.	Spoked - Copper
2604-736	6.380 in.	0.787 in.			1.49 in.	Spoked - Copper
2604-750	6.380 in.	0.625 in.		1604-774	1.44 in.	Spoked - Red
2604-752	6.380 in.	0.787 in.			1.49 in.	Pearl Cat Green
2604-760	7.120 in.	0.787 in.			1.49 in.	Spoked - Black
2604-982	5.630 in.					Green
2604-983	5.630 in.					Orange
2604-992	5.350 in.	0.625 in.				
2604-997	6.380 in.	0.787 in.				Pearl Cat Green
2639-478	5.630 in.	0.625 in.	1604-772	1604-773	1.22 in.	Orange
2639-479	5.630 in.	0.625 in.	1604-772	1604-773	1.22 in.	Purple
2639-480	5.630 in.	0.625 in.	1604-772	1604-773	1.22 in.	Red
3604-038	5.630 in.	0.787 in.			1.340 in.	Spoked - Red
3604-039	5.630 in.	0.787 in.	0623-946		1.010 in.	Not spoked - Black
3604-040	5.630 in.	0.787 in.			1.340 in.	Spoked - Yellow
3604-042	5.630 in.	0.787 in.			1.340 in.	Spoked - Green
3604-043	5.630 in.	0.787 in.			1.340 in.	Spoked - Platinum
3604-044	5.630 in.	0.787 in.			1.340 in.	Spoked - Fire Red
3604-045	5.630 in.	0.787 in.			1.340 in.	Spoked - Taupe
3604-046	5.630 in.	0.787 in.			1.340 in.	Spoked - Gold
3604-047	5.630 in.	0.787 in.			1.340 in.	Spoked - Cat Green
3604-048	5.630 in.	0.787 in.			1.340 in.	Spoked - Orange
3604-049	6.380 in.	0.787 in.			1.010 in.	Not spoked - Black
3604-050	6.380 in.	0.787 in.			1.490 in.	Spoked - Gold
3604-051	6.380 in.	0.787 in.			1.490 in.	Spoked - Taupe Blue
3604-052	6.380 in.	0.787 in.			1.490 in.	Spoked - Fire Red
3604-053	6.380 in.	0.787 in.			1.490 in.	Spoked - Pearl Cat Green
3604-054	6.380 in.	0.787 in.			1.490 in.	Spoked - Orange
3604-055	6.380 in.	0.787 in.			1.490 in.	Spoked - Silver
3604-059	6.380 in.	0.787 in.			1.490 in.	Spoked - Yellow
3604-060	7.120 in.	0.787 in.			1.010 in.	Not spoked - Black
3604-061	7.120 in.	0.787 in.			1.490 in.	Spoked - Green
3604-062	7.120 in.	0.787 in.			1.490 in.	Spoked - Platinum
3604-063	7.120 in.	0.780 in.			1.490 in.	Spoked - Black
3604-064	7.120 in.	0.780 in.			1.490 in.	Fire Red
3604-065	7.120 in.	0.780 in.			1.490 in.	Spoked - Orange

Idler Wheel Selection Chart (cont)

P/N	Diameter	I.D.	Insert Part Number		Width	Color Spoke
3604-066	7.120 in.	0.780 in.			1.490 in.	Spoked - Pearl Cat Green
3604-068	7.120 in.	0.780 in.			1.490 in.	Yellow
3604-069 *	8.000 in.	0.780 in.			1.490 in.	Spoked - Yellow
3604-070 *	8.000 in.	0.780 in.			1.490 in.	Spoked - Green
3604-071 *	8.000 in.	0.780 in.			1.490 in.	Spoked - Orange
3604-072 *	8.000 in.	0.780 in.			1.490 in.	Spoked - Red
3604-073 *	8.000 in.	0.780 in.			1.490 in.	Spoked - Black
3604-074 *	8.000 in.	0.780 in.			1.490 in.	Spoked - Fire Red
3604-075 *	8.000 in.	0.780 in.			1.490 in.	Spoked - Pearl Cat Green
3604-076 *	8.000 in.	0.780 in.			1.490 in.	Spoked - Silver
3604-077 *	8.000 in.	0.780 in.			1.490 in.	Spoked - Yellow
3604-198	5.630 in.	0.787 in.			1.340 in.	Spoked - Green
3604-251	6.380 in.	0.787 in.			1.490 in.	Spoked - Silver
3604-550	6.380 in.	0.787 in.			1.490 in.	Spoked - Red

* 8.00 in. idler wheel cannot be used with standard slide rails.

Torque Specifications

ITEM		TORQUE	ITEM		TORQUE
End Cap	ft-lb kg-m	7 1.0	Front Rail Support* (ZR)	ft-lb kg-m	30 4.2
Wear Strip/Rail	ft-lb kg-m	5 0.7	Front Arm/Mounting Brackets (Bearcat/Panther/Z)	ft-lb kg-m	40 5.5
Idler Wheel/Mounting Block	ft-lb kg-m	34 4.7	Front Arm/Mounting Brackets (Crossfire/Firecat/M-Series/Sabercat/ZR)	ft-lb kg-m	34 4.7
Spring Slide Block/Rail	ft-lb kg-m	34 4.7	Limiter Straps	ft-lb kg-m	10 1.4
Pivot Idler/Idler Arm	ft-lb kg-m	18 2.5	Rail Support/Rail*	ft-lb kg-m	50 6.9
Rear Arm/Rail	ft-lb kg-m	40 5.5	Rear Arm/Idler Arm (Crossfire/Firecat/King Cat/M-Series)	ft-lb kg-m	34 4.7
Rear Arm/Idler Arm* (Bearcat/M-Series/Panther/Z/ZR)	ft-lb kg-m	45 6.2	Track Adjuster Bracket/Rail	ft-lb kg-m	10 1.4
Rear Axle/Idler Wheel*	ft-lb kg-m	50 6.9	Rear Arm Limiter/Rail*	ft-lb kg-m	50 6.9
Front Arm Mounting Bracket/Rail	ft-lb kg-m	30 4.2	Front Arm Shock Axle/Rail	ft-lb kg-m	40 5.5
Front Arm Mounting Bracket/Rail (M-Series)	ft-lb kg-m	50 6.9	Front Shock Pivot Axle	ft-lb kg-m	40 5.5
Front Inner Idler Wheel Assy (Bearcat/King Cat/Panther/Z)	ft-lb kg-m	40 5.5			

* w/Blue Loctite #243

2006 Shock Absorber Usage Guide

Below is a list of shock absorbers used on the front and rear suspensions of many Arctic Cat snowmobiles.

Specifications given for each shock absorber include collapsed and extended length, stroke, and both rebound and compression valving ratings.

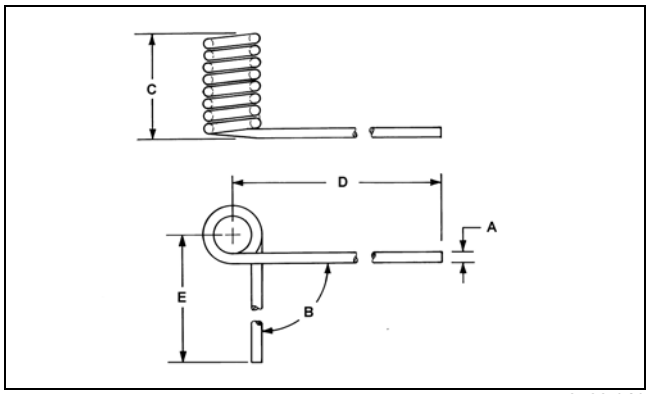
When using the shock absorber guide, always select a shock absorber with the same length, both collapsed and extended. Shock valving selection will depend on personal preference.

P/N	Collapsed Length	Extended Length	Stroke
0704-852	9.970”	14.630”	4.66”
1603-253	10.840”	16.300”	5.46”
1603-910	11.010”	15.750”	5.34”
1604-369	8.420”	12.490”	4.07”
1604-455	9.560”	15.010”	5.45”
1604-995	8.420”	12.490”	4.07”
1703-494	10.900”	15.800”	4.90”
1703-657	11.490”	17.950”	6.46”
1703-690/691	11.470”	17.990”	6.52”
1703-716	12.000”	17.550”	5.55”
1703-783	11.560”	17.550”	5.99”
1703-795	12.600”	18.700”	6.11”
1703-940	12.660”	18.860”	6.20”
1703-966	13.000”	18.800”	5.80”
1704-116	7.860”	11.210”	3.35”
1704-139	9.970”	14.630”	4.66”
1704-117	9.890”	14.530”	4.64”
1704-142	7.860”	11.210”	3.35”
1704-255	7.860”	11.210”	3.35”
1704-257	9.890”	14.380”	4.64”
1704-265	7.340”	10.860”	3.52”
1704-266	9.890”	14.530”	4.64”
1704-294	7.860”	11.210”	3.35”
1704-298	9.890”	14.380”	4.49”
1704-308	8.000”	11.290”	3.29”
1704-318	8.110”	11.250”	3.14”
1704-362	10.130”	14.530”	4.40”
1704-453	8.000”	10.790”	2.79”
1704-454	9.880”	14.370”	4.49”
1704-463	7.860”	11.210”	3.35”
1704-468	9.880”	14.370”	4.48”
1704-482	8.000”	10.790”	2.79”
1704-484	10.130”	14.530”	4.40”
2603-385	11.170”	17.740”	6.57”
2604-161	9.770”	14.380”	4.61”
2604-200	9.910”	16.540”	5.78”
2604-614	10.760”	16.540”	5.78”
2604-741	7.830”	11.280”	3.45”
2703-008	12.600”	18.700”	6.11”
2703-024	12.600”	18.800”	6.20”

2006 Rear Spring Selection Chart

Following is a list of rear suspension springs and specifications. This chart was compiled to assist technicians in fine-tuning the Arctic Cat rear suspension when the original springs are not satisfactory and a softer or firmer ride is desired.

A longer spring in areas (D) and (E) can be selected if cut off to match the original spring. The replacement spring must match the original spring in areas (D) and (E).



0730-218

P/N	Wire Diameter (A)	Angle (B)	Number of Coils	Coil Width (C)	Length (D)	Length (E)
0704-888/889*	.437	75°	8.75	4.60	18.50	5.50
0704-938/939	.452	90°	8.75	4.53	16.00	5.70
0704-902/901**	.405	80°	7.75	3.92	19.00	5.50
0704-926/927**	.375	80°	5.75	3.00	18.50	5.12
0704-934/935**	.405	90°	5.75	3.00	18.50	5.12
1704-044/045	.405	75°	8.75	4.32	19.00	5.50
1704-354/355	.375	75°	8.75	4.32	18.50	5.50
2604-898/899***	.465	80°	4.75	3.40	18.75	5.50
2604-566/567***	.490	85°	5.75	4.00	18.75	5.50

*Short leg of spring is bent inward **Square wire ***Titanium

■ **NOTE: The wire diameter and length of the spring have a large influence over the valving of the shocks.**

2006 Front Suspension Ski Springs

PART NUMBER	WIRE DIAMETER	FREE LENGTH INCHES	RATE LB/INCH	# OF COILS	TAB
1603-938[6]	.312	14.13	8/120 Dual Rate	17.0	YES
1703-354[5]	.343	14.25	50	18.5	YES
1703-658[2]	.312	14.25	50	17*/19**	YES
1703-665[9]	.312	14.25	50	17*/19**	YES
1703-692[8]	.312	14.13	80-120 Dual Rate	17.0	YES
1703-768[8]	.331	11.40	60/175	11*/14**	YES
1703-769[7]	.312	14.25	50	17*/19**	YES
1703-787[3]	.331	12.00	120	12.75	YES
1703-818[9]	.331	9.50	110	8*/10**	NO
1703-854[10]	.312	9.50	110	11.0	YES
1703-858[1]	.312	9.36	90	6.5*/8.5**	NO
1703-860[3]	.312	9.36	90	6.5*/8.5*	NO
1703-873[3]	.331	9.50	110	8*/10**	NO
1703-890[1]	.331	12.00	120	12.75	YES
1703-932[1]	.312	14.25	60/90/130	16*18**	YES
1703-933[2]	.312	14.25	60/90/130	16*18**	YES
2603-304[4]	.312	14.13	80/120 Dual Rate	18.5	YES
2703-016[2]	.331	13.00	120	14	NO
2703-018[1]	.331	13.00	120	14	NO

[1] Orange Color
[2] Green Color
[3] Pearl Green Color
[4] Platinum Color
[5] Siliver Color
[6] Yellow Color
[7] Red Color
[8] Red/Black Color
[9] Fire Red Color
[10] Blue Color
[*] Active Coils
[**] Total Coils

2006 Front Suspension Sway Bar

PART NUMBER	DESCRIPTION	PART NUMBER	DESCRIPTION
0703-185	3/8” diameter	1703-144	1/2” diameter
0703-202	7/16” diameter	1703-145	5/8” diameter
0703-193	1/2” diameter	1703-146	7/16” diameter
0703-194	5/8” diameter	1703-616	1/2” diameter
0703-190	Chrome Moly	1703-618	7/16” diameter
0703-189	5/8 hex	1703-622	7/16” diameter
1703-143	3/8” diameter		

2006 Rear Suspension (Front Arm Springs)

PART NUMBER	FREE LENGTH INCHES	RATE LB/INCH
0603-860*	9.5	110
1603-018*	9.5	90
0704-855**	7.0	180 (.360 wire dia.)
0704-936	7.0	170
0704-523	8.0	110
1704-259	7.4	110
1704-461	7.75	135
1704-491	8.0	190
2604-565	8.0	110

* Tab on Bottom
**This spring only fits shock (p/n 1604-480), non-adjuster sleeve shock

Suspension Stiffening Kits (Crossfire/Firecat Models)

The front and rear suspensions have been calibrated for a rider weight range of 180 to 200 lb. If a firmer ride is desired, there are two kits available to stiffen the suspensions on these models by 20 percent. It is important to order the correct kit because these kits do not interchange. Do not use the standard model kit on the Sno Pro model because the shocks are different on these two models. The two stiffening kits include everything required and the part numbers are as follows:

Model	p/n
Standard	3639-064
Sno Pro	3639-065

Standard Shock & Spring Chart - 2006 Models

Models	Front Suspension		Rear Suspension				Sway Bar
	Ski Shock (Right/Left)	Ski Shock Spring	Front Arm Shock	Front Arm Shock Spring	Rear Arm Shock	Rear Arm Spring (Right/Left)	
BEARCAT 570	1603-910	1703-854	1604-369	0603-860	2604-200	1704-044/045	N/A
CROSSFIRE (STD)	2703-008	2703-016 (G) 2703-018 (O)	1704-463	1704-461	1704-117	1704-044/045	1703-622
CROSSFIRE SNO PRO	2703-024	N/A	1704-482	1704-491	1704-484	1704-044/045	1703-622
PANTHER 370	1603-253	1703-818	1604-369	0603-860	2604-614	1704-044/045	N/A
PANTHER 570	1603-253	1703-665	1604-369	0603-860	2604-614	1704-044/045	1703-618
KING CAT 900 EFI	1703-494	N/A	1704-294	2604-565	1704-298	2604-566/567	N/A
M5 EFI	2603-385	1703-890	2604-741	1704-259	2604-161	1704-354/355	N/A
M6 EFI	1703-783	1703-890 (O) 1703-787 (G)	1704-318	0704-523	1704-468	1704-354/355	N/A
M7 MODELS	1703-783	1703-890 (O) 1703-787 (G)	1704-318	0704-523	1704-468 1704-467 (162)	1704-354/355	N/A
M7 EFI LE	1703-716	N/A	1704-318	2604-565	1704-468 1704-467 (162)	2604-898/899	N/A
Z 370/370 LX	1603-253	1703-873	1604-995	1603-018	1604-455	0704-888/889	N/A
Z 440 LX	1603-253	1703-873	1604-995	1603-018	1604-455	0704-888/889	N/A
Z 570/570 LX	1603-253	1703-860 (G) 1703-858 (O)	1604-995	1603-018	1604-455	0704-888/889	1703-618
SABERCAT 500 EFI	1703-795	1703-354	1704-142	0704-523	0704-852	0704-926/927	1703-616
SABERCAT 600 EFI/700 EFI	1703-795	1703-354	1704-142	0704-523	0704-852	0704-926/927	1703-616
SABERCAT EXT	1703-795	2603-304	1704-142	0704-523	1704-139	0704-926/927	1703-616
FIRECAT (STD)	1703-940	1703-941 (G) 1703-942 (O)	1704-453	0704-523	1704-454	0704-926/927	1703-616
FIRECAT SNO PRO	1703-966	N/A	1704-308	0704-936	1704-362	0704-934/935	1703-616
ZR 900 EFI	1703-657	1703-768	1704-255	0704-523	1704-257	0704-901/902	1703-618
ZR 900 EFI SNO PRO	1703-690/691	1703-692	1704-265	0704-855	1704-266	0704-938/939	1703-618

Optional Rear Arm Spring Chart - 2006 Models

■ **NOTE: Optional rear arm springs (L = Light; H = Heavy) marked with the * must have the legs cut to size. Always cut the optional spring legs to the same length as the standard spring legs.**

Model	Rear Arm Spring (Right/Left)	Rear Arm Spring Type
Bearcat 570	L 1704-354/355 H 1704-134/135*	Square Round
Crossfire Models	L 0704-901/902 H 1704-146/147*	Square Square
M5 EFI/M6 EFI/M7 Models	N/A H 1704-260/261*	 Square
M7 EFI LE	L 1604-608/609* N/A	Round
King Cat 900 EFI	L 2604-898/899 H 1604-224/225*	Round Round
Z Models	L 1604-146/147* H 0704-944/945*	Round Round
Sabercat Models	N/A H 0704-934/935	 Square
Firecat (STD)	N/A H 0704-934/935	 Square
Firecat Sno Pro	L 0704-926/927 H 0704-968/969	Square Square
ZR 900 EFI	L 0704-892/893 H 1704-146/147*	Square Square
ZR 900 EFI Sno Pro	L 1604-739/740 H 1604-194/195*	Round Round

* These springs must be cut off or damage to the track may occur

Rebuildable Shock Tools Required

Part Number	Shock Tool
0644-268	Bearing Cap Installation Tool
0644-057	Shock Spring Removal Tool
0744-020	Inflation Needle
0644-334	Gas Shock Retaining Blocks
0644-162	Replacement Needle
0644-169	Shock Piston Location Tool
0644-151	Nitrogen Regulator
0744-021	Shock Rod Clamping Tool
0644-348	IFP Removal Tool
0644-350	IFP Depth Setting Tool
0644-402	Floating Piston Removal Tool Kit
0644-403	Bearing Cap Seal Protector (1/2-in.)
0644-404	Bearing Cap Seal Protector (5/8-in.)
0644-425	Gas Shock Rod/Body Clamping Tool
0644-453	Spanner Wrench - Fox Float Shock
2603-324	Air Pump - Shock Absorber

Rebuildable Shock Rebuild Kits

Part Number	Shock Rebuild Kit
1639-769	IFP
1639-770	Front Arm Quick-Adjust
1639-771	Clicker Shock
3639-111	Ski/Front/Rear Suspension Shocks (Firecat)

2006 Rebuildable Shock Specifications

Ski Shock (p/n 1703-795)
Sabercat/Sabercat EXT

Compression:	Rebound:
8. 1.30 x .006	1. 1.25 x .006
7. .800 x .006	2. 1.25 x .006
6. .700 x .015	3. .900 x .006
5. 1.25 x .008	4. 1.25 x .010
4. 1.10 x .010	5. 1.10 x .010
3. 1.00 x .010	6. 1.00 x .010
2. .900 x .010	7. .900 x .010
1. .800 x .010	8. .800 x .010
1.125 x .093 Top Out	.620 x .093 Backup

Piston Depth 7.50 in./Piston Orifice .120 in.

Extended Length 18.70 in./Collapsed Length 12.62 in.

Front Arm Shock (p/n 1704-142)
Sabercat

Compression:	Rebound:
5. 1.30 x .008	1. 1.25 x .010
4. 1.10 x .008	2. 1.10 x .010
3. 1.00 x .010	3. 1.00 x .010
2. .900 x .010	4. .900 x .010
1. .800 x .010	5. .800 x .010
1.125 x .093 Top Out	.620 x .093 Backup

Piston Depth 4.26 in./Piston Orifice .093 in.

Extended Length 11.22 in./Collapsed Length 7.87 in.

Rear Arm Shock (p/n 0703-852)
Sabercat (STD)

Compression:	Rebound:
6. 1.30 x .008	1. 1.25 x .012
5. 1.25 x .008	2. 1.25 x .012
4. 1.10 x .008	3. 1.10 x .012
3. 1.00 x .008	4. 1.00 x .012
2. .900 x .008	5. .900 x .010
1. .800 x .008	6. .800 x .010
1.125 x .093 Top Out	.620 x .093 Backup

Piston Depth 5.90 in./Piston Orifice .039 in.

Extended Length 14.63 in./Collapsed Length 9.97 in.

Rear Arm Shock (p/n 1704-139)
Sabercat EXT

Compression:	Rebound:
6. 1.30 x .010	1. 1.25 x .015
5. 1.25 x .010	2. 1.25 x .012
4. 1.10 x .010	3. 1.25 x .012
3. 1.00 x .010	4. 1.10 x .010
2. .900 x .010	5. 1.00 x .010
1. .800 x .010	6. .900 x .010
1.125 x .093 Top Out	7. .800 x .010
	.620 x .093 Backup

Piston Depth 5.90 in./Piston Orifice .039 in.

Extended Length 14.63 in./Collapsed Length 9.97 in.

Ski Shock (p/n 2703-008)
Crossfire (STD)

Compression:	Rebound:
8. 1.30 x .006	1. 1.25 x .010
7. .800 x .006	2. .800 x .008
6. .700 x .015	1.125 x .093 Backup
5. 1.25 x .008	
4. 1.10 x .010	
3. 1.00 x .010	
2. .900 x .010	
1. .800 x .010	
1.125 x .094 Top Out	

Piston Depth 7.500 in./Piston Orifice .120 in.

Extended Length 18.70 in./Collapsed Length 12.60 in.

Front Arm Shock (p/n 1704-463)
Crossfire (STD)

Compression:	Rebound:
5. 1.30 x .012	1. 1.25 x .010
4. 1.10 x .012	2. 1.10 x .010
3. 1.00 x .012	3. 1.00 x .010
2. .900 x .008	4. .900 x .010
1. .800 x .008	5. .800 x .010

Piston Depth 4.26 in./Piston Orifice .093 in.

Extended Length 11.22 in./Collapsed Length 7.87 in.

Rear Arm Shock (p/n 1704-117)
Crossfire (STD)

Compression:	Rebound:
8. 1.30 x .010	1. 1.25 x .012
7. 1.10 x .008	2. 1.25 x .012
6. .900 x .010	3. 1.10 x .012
5. .700 x .004	4. 1.00 x .012
4. 1.25 x .010	5. .900 x .010
3. 1.10 x .010	6. .800 x .010
2. 1.00 x .010	.620 x .093 Backup
1. .900 x .010	

1.125 x .093 Top Out

Piston Depth 5.80 in./Piston Orifice .039 in.

Extended Length 14.53 in./Collapsed Length 9.89 in.

Ski Shock (p/n 2703-024)
Crossfire Sno Pro
(Air Chamber 65 psi/10 cc of Shock Oil)

Compression:	Rebound:
8. 1.30 x .008	1. 1.25 x .006
7. 1.10 x .008	2. 1.25 x .006
6. .900 x .006	1.125 x .093 Backup
5. .700 x .008	
4. 1.25 x .010	
3. 1.00 x .008	
2. .900 x .010	
1. .800 x .010	

1.125 x .093 Top Out

Piston Depth 6.970 in./Piston Orifice .093 in.

Extended Length 18.80 in./Collapsed Length 12.60 in.

Front Arm Shock (p/n 1704-482)
Crossfire Sno Pro

Compression:	Rebound:
4. 1.30 x .015	1. 1.25 x .010
3. 1.10 x .015	2. .900 x .006
2. 1.00 x .012	3. .800 x .006
1. .900 x .012	1.125 x .093 Backup

1.125 x .093 Top Out

Piston Depth .620 in./Piston Orifice .055 in.

Extended Length 10.79 in./Collapsed Length 8.00 in.

Rear Arm Shock (p/n 1704-484)
Crossfire Sno Pro

Compression:	Rebound:
10. 1.60 x .010	1. 1.42 x .015
9. 1.60 x .010	2. 1.42 x .012
8. 1.60 x .010	3. 1.30 x .012
7. .900 x .008	4. 1.10 x .012
6. 1.60 x .010	5. 1.00 x .012
5. 1.60 x .010	6. .900 x .015
4. 1.42 x .010	7. .800 x .015
3. 1.30 x .010	.620 x .093 Backup
2. 1.00 x .010	
1. .900 x .010	

1.57 x .093 Top Out

Piston Depth 5.70 in./Piston Orifice .055 in.

Extended Length 14.53 in./Collapsed Length 10.13 in.

Ski Shock (p/n 1703-783)
M6 EFI/M7/M7 EFI

Compression:	Rebound:
8. 1.30 x .006	1. 1.25 x .008
7. 1.10 x .006	2. 1.25 x .010
6. .900 x .010	3. 1.10 x .008
5. .800 x .010	4. 1.00 x .010
4. 1.25 x .008	5. .900 x .010
3. 1.10 x .008	6. .800 x .010
2. 1.00 x .010	.620 x .094 Backup
1. .900 x .010	

1.125 x .094 Top Out

Piston Depth 1.25 in./Piston Orifice .093 in.

Extended Length 17.575 in./Collapsed Length 12.00 in.

Front Arm Shock (p/n 1704-318)
M-Series

Compression:	Rebound:
5. 1.30 x .012	1. 1.25 x .010
4. 1.10 x .012	2. 1.10 x .010
3. 1.00 x .012	3. 1.00 x .012
2. .900 x .010	4. .900 x .010
1. 1.25 x .010	5. .800 x .010
1.125 x .093 Top Out	.620 x .093 Backup

Piston Depth .650 in./Piston Orifice .059 in.

Extended Length 11.25 in./Collapsed Length 8.11 in.

Rear Arm Shock (p/n 1704-468)
M6 EFI/M7/M7 EFI/M7 EFI LE (141/153 in.)

Compression:	Rebound:
7. 1.30 x .010	1. 1.25 x .012
6. .700 x .010	2. 1.10 x .010
5. 1.25 x .010	3. 1.00 x .010
4. 1.10 x .010	4. .900 x .010
3. 1.00 x .010	5. .800 x .010
2. .900 x .010	.620 x .094 Backup
1. .800 x .010	

1.125 x .094 Top Out

Piston Depth .900 in./Piston Orifice .039 in.

Extended Length 14.37 in./Collapsed Length 7.88 in.

Ski Shock (Fox Air) (p/n 1703-716)
M7 EFI LE

(Air Chamber 60 psi/10 cc of Shock Oil)

Compression:	Rebound:
10. 1.30 x .008	1. 1.25 x .008
9. 1.10 x .006	2. 1.25 x .008
8. .900 x .010	3. 1.10 x .008
7. .800 x .010	4. 1.00 x .010
6. 1.25 x .008	5. 1.00 x .010
5. 1.25 x .006	6. .900 x .010
4. 1.10 x .008	7. .800 x .010
3. 1.00 x .010	.620 x .093 Backup
2. .900 x .010	
1. .800 x .010	

1.125 x .093 Top Out

Piston Depth 6.68 in./Piston Orifice .093 in.

Extended Length 17.55 in./Collapsed Length 12.00 in.

Rear Arm Shock (p/n 1704-467)
M6 EFI/M7/M7 EFI/LE (162 in.)

Compression:	Rebound:
7. 1.30 x .010	1. 1.25 x .012
6. .700 x .010	2. 1.25 x .006
5. 1.25 x .010	3. 1.10 x .010
4. 1.10 x .010	4. 1.00 x .010
3. 1.00 x .010	5. .900 x .010
2. .900 x .010	6. .800 x .010
1. .800 x .010	.620 x .094 Backup

1.125 x .094 Top Out

Piston Depth .900 in./Piston Orifice .039 in.

Extended Length 14.37 in./Collapsed Length 9.88 in.

Ski Shock (p/n 1703-494)
King Cat 900 EFI

(Air Chamber 50 psi/8 cc of Shock Oil)

Compression:	Rebound:
10. 1.30 x .008	1. 1.25 x .008
9. 1.10 x .006	2. 1.25 x .008
8. .900 x .010	3. 1.10 x .008
7. .800 x .010	4. 1.00 x .010
6. 1.25 x .008	5. 1.00 x .010
5. 1.25 x .006	6. .900 x .010
4. 1.10 x .008	7. .800 x .010
3. 1.00 x .010	.620 x .094 Backup
2. .900 x .010	
1. .800 x .010	

1.125 x .094 Top Out

Piston Depth 5.750 in./Piston Orifice .093 in.

Extended Length 15.80 in./Collapsed Length 10.90 in.

Front Arm Shock (p/n 1704-294)
King Cat

Compression:	Rebound:
6. 1.30 x .012	1. 1.25 x .010
5. 1.10 x .012	2. 1.10 x .010
4. 1.00 x .012	3. 1.00 x .010
3. .900 x .010	4. 1.00 x .010
2. .800 x .010	5. .900 x .010
1. 1.25 x .010	6. .800 x .010

Piston Depth .650 in./Piston Orifice .059 in.

Extended Length 11.22 in./Collapsed Length 7.87 in.

Rear Arm Shock (p/n 1704-322)
King Cat 900 EFI

Compression:	Rebound:
7. 1.30 x .010	1. 1.25 x .015
6. 1.10 x .010	2. 1.25 x .015
5. .900 x .006	3. 1.25 x .015
4. 1.25 x .010	4. 1.10 x .015
3. 1.10 x .012	5. 1.10 x .015
2. 1.00 x .012	6. 1.00 x .012
1. .900 x .010	7. .900 x .012

Piston Depth .900 in./Piston Orifice .039 in.

Extended Length 14.37 in./Collapsed Length 9.88 in.

Ski Shock (p/n 1703-940)
Firecat (STD)

Compression:	Rebound:
8. 1.30 x .006	1. 1.25 x .010
7. .800 x .006	2. .800 x .010
6. .700 x .015	1.125 x .093 Backup
5. 1.25 x .008	
4. 1.10 x .010	
3. 1.00 x .010	
2. .900 x .010	
1. .800 x .010	

1.125 x .093 Top Out

Piston Depth 1.800 in./Piston Orifice .120 in.

Extended Length 18.80 in./Collapsed Length 12.62 in.

Front Arm Shock (p/n 1704-453)
Firecat (STD)

Compression:	Rebound:
5. 1.30 x .012	1. 1.25 x .010
4. 1.10 x .012	2. 1.10 x .010
3. 1.00 x .010	3. 1.00 x .010
2. .900 x .010	4. .900 x .010
1. .800 x .010	5. .800 x .010
1.125 x .093 Top Out	.620 x .093 Backup

Piston Depth .675 in./Piston Orifice .093 in.

Extended Length 10.72 in./Collapsed Length 7.87 in.

Rear Arm Shock (p/n 1704-454)
Firecat (STD)

Compression:	Rebound:
8. 1.30 x .010	1. 1.25 x .010
7. 1.10 x .008	2. 1.10 x .010
6. .900 x .010	3. 1.00 x .010
5. .700 x .004	4. .900 x .010
4. 1.25 x .010	5. .800 x .010
3. 1.10 x .010	.620 x .093 Backup
2. 1.00 x .010	
1. .900 x .010	

1.125 x .093 Top Out

Piston Depth .900 in./Piston Orifice .046 in.

Extended Length 14.37 in./Collapsed Length 9.88 in.

Ski Shock (p/n 1703-966)
Firecat Sno Pro
(Air Chamber 65 psi/10 cc of Shock Oil)

Compression:	Rebound:
10. 1.30 x .008	1. 1.25 x .010
9. 1.10 x .008	2. .800 x .010
8. .900 x .006	1.125 x .093 Backup
7. .700 x .008	
6. 1.25 x .008	
5. 1.25 x .008	
4. 1.10 x .008	
3. 1.00 x .008	
2. .900 x .010	
1. .800 x .010	

1.125 x .093 Top Out

Piston Depth 6.970 in./Piston Orifice .093 in.

Extended Length 18.80 in./Collapsed Length 12.60 in.

Front Arm Shock (p/n 1704-308)
Firecat Sno Pro

Compression:	Rebound:
6. 1.30 x .012	1. 1.25 x .012
5. 1.10 x .012	2. 1.25 x .010
4. 1.00 x .012	3. 1.10 x .010
3. .90 x .010	4. 1.00 x .010
2. .80 x .010	5. 1.00 x .010
1. 1.25 x .010	6. .900 x .010
1.125 x .093 Top Out	7. .800 x .010
	.620 x .093 Backup

Piston Depth .621 in./Piston Orifice .055 in.

Extended Length 11.29 in./Collapsed Length 8.00 in.

Rear Arm Shock (p/n 1704-362)
Firecat Sno Pro

Compression:	Rebound:
11. 1.60 x .010	1. 1.42 x .015
10. 1.60 x .010	2. 1.42 x .012
9. 1.60 x .010	3. 1.30 x .012
8. .900 x .008	4. 1.10 x .012
7. .800 x .008	5. 1.00 x .012
6. 1.60 x .010	6. .900 x .015
5. 1.60 x .010	7. .800 x .015
4. 1.42 x .010	.620 x .093 Backup
3. 1.30 x .010	
2. 1.00 x .010	
1. .900 x .010	

1.57 x .093 Top Out

Piston Depth 5.70 in./Piston Orifice .055 in.

Extended Length 14.53 in./Collapsed Length 10.13 in.

Ski Shock (p/n 1703-657)
ZR 900 EFI

Compression:	Rebound:
9. 1.30 x .006	1. 1.25 x .006
8. 1.00 x .006	2. 1.25 x .006
7. .900 x .006	3. .900 x .006
6. .700 x .008	4. 1.25 x .010
5. 1.25 x .010	5. 1.10 x .010
4. 1.10 x .008	6. 1.00 x .010
3. 1.00 x .008	7. 1.00 x .010
2. .900 x .010	8. .900 x .010
1. .800 x .010	9. .800 x .010
1.125 x .094 Top Out	.620 x .094 Backup

Piston Depth 7.25 in./Piston Orifice .093 in.

Extended Length 17.95 in./Collapsed Length 11.49 in.

Front Arm Shock (p/n 1704-255)
ZR 900 EFI

Compression:	Rebound:
5. 1.30 x .012	1. 1.25 x .010
4. 1.10 x .012	2. 1.10 x .010
3. 1.00 x .012	3. 1.00 x .010
2. .900 x .010	4. .900 x .010
1. .800 x .010	5. .800 x .010
1.125 x .094 Top Out	.620 x .094 Backup

Piston Depth 4.26 in./Piston Orifice .093 in.

Extended Length 11.22 in./Collapsed Length 7.97 in.

Rear Arm Shock (p/n 1704-257)
ZR 900 EFI

Compression:	Rebound:
9. 1.30 x .006	1. 1.25 x .010
8. 1.00 x .006	2. 1.10 x .010
7. .900 x .008	3. 1.00 x .010
6. .800 x .008	4. .900 x .010
5. 1.25 x .010	5. .800 x .010
4. 1.10 x .010	6. .700 x .010
3. 1.00 x .010	.620 x .094 Backup
2. .900 x .010	
1. .800 x .010	
1.125 x .094 Top Out	

Piston Depth 5.80 in./Piston Orifice .046 in.

Extended Length 14.38 in./Collapsed Length 9.89 in.

Ski Shock (p/n 1703-690/691)
ZR 900 EFI Sno Pro

Compression:	Rebound:
10. 1.30 x .006	1. 1.25 x .006
9. 1.00 x .006	2. 1.25 x .006
8. .900 x .006	3. 1.25 x .008
7. .700 x .008	4. 1.25 x .008
6. 1.25 x .006	5. 1.10 x .010
5. 1.25 x .006	6. 1.00 x .010
4. 1.10 x .008	7. .900 x .010
3. 1.00 x .008	8. .800 x .010
2. .900 x .010	
1. .800 x .010	

Piston Depth 3.00 in./Piston Orifice .081 in.

Extended Length 17.99 in./Collapsed Length 11.47 in.

Front Arm Shock (p/n 1704-265)
ZR 900 EFI Sno Pro

Compression:	Rebound:
5. 1.30 x .010	1. 1.25 x .010
4. 1.10 x .012	2. 1.25 x .010
3. 1.00 x .012	3. 1.10 x .010
2. .900 x .010	4. 1.00 x .010
1. .800 x .010	5. .900 x .010
	6. .800 x .010

Piston Depth 2.50 in./Piston Orifice .059 in.

Extended Length 10.86 in./Collapsed Length 7.34 in.

Rear Arm Shock (p/n 1704-266)
ZR 900 EFI Sno Pro

Compression:	Rebound:
4. 1.25 x .010	1. 1.25 x .012
3. 1.10 x .010	2. .800 x .004
2. .900 x .010	3. 1.25 x .015
1. .700 x .008	4. 1.25 x .015
1.125 x .094 Top Out	5. 1.10 x .015
	6. .800 x .006
	.620 x .094 Backup

Piston Depth 5.85 in./Piston Orifice .070 in.

Extended Length 14.53 in./Collapsed Length 9.89 in.

Servicing IFP Style Shocks

■ **NOTE: Some illustrations and photographs used in the following sub-sections are used for clarity purposes and are not designed to depict actual conditions.**

⚠ WARNING

Before servicing a gas shock absorber, first discharge all pressure from the shock. Remove the screw from the bottom of the shock and insert the Inflation Needle (p/n 0744-020). Open valve until all pressure is released. Failure to do this may cause personal injury.

DISASSEMBLING

1. Remove the shock from the snowmobile.
2. Wash the shock body in parts cleaner; then dry with compressed air to remove sand and dirt.

⚠ WARNING

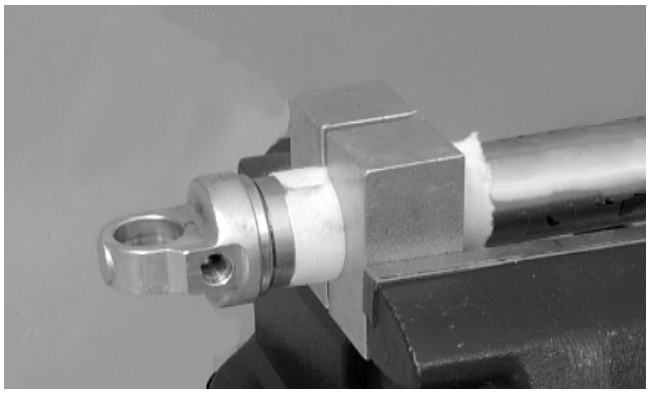
When using compressed air to dry components, always wear safety glasses.

3. Place the shock into the Gas Shock Retaining Blocks (p/n 0644-334); then remove shock eyelet mounting axle and bushings from end cap.

⚠ CAUTION

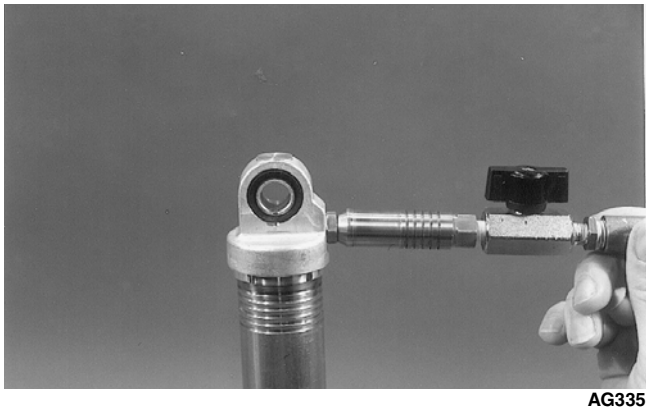
It is important that the Gas Shock Retaining Blocks (p/n 0644-334) are used during both disassembly and assembly. Any other method of securing the shock body during these procedures may deform the shock body cylinder.

■ **NOTE: A paper shop towel between the shock body and retaining blocks will help prevent scuffing of the shock body.**



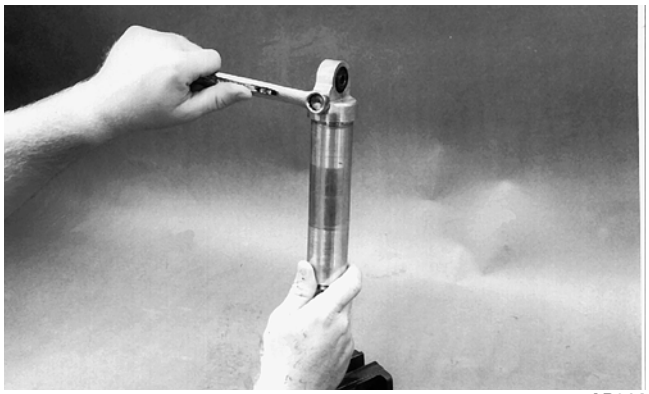
AP110DA

4. Remove the screw from the bladder housing on the bottom of the shock. Discharge all the pressure from the shock using the Inflation Needle (p/n 0744-020). Open the valve in filler handle until all pressure is released.



AG335

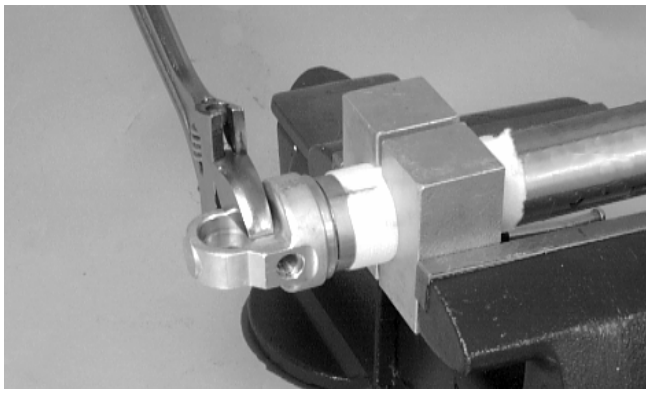
5. Using a 9/16-in. wrench, remove the brass bladder housing from the lower end cap. Account for an O-ring.



AP014

6. Using a large adjustable wrench (12-in. or 14-in.), remove the end cap.

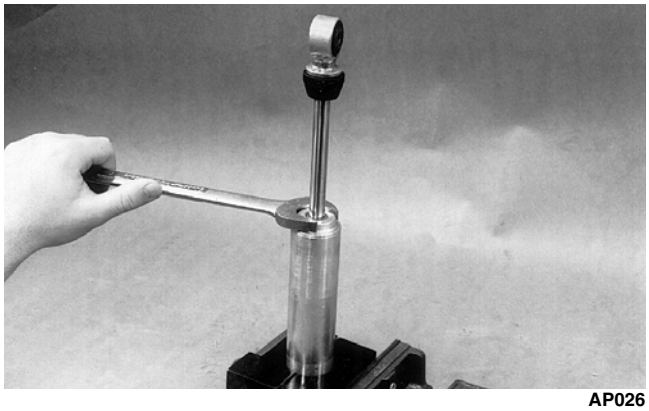
■ **NOTE: 1994 and older shocks have Loctite on the lower end cap. Heating the lower end cap may be necessary. Use care not to overheat.**



AP016DA

7. Using a 1-in. open end wrench, loosen the shock shaft bearing cap a couple of turns.

■**NOTE: Do not remove the bearing cap at this time.**



AP026

8. Turn the shock so that the open end is up. Then remove the Allen-head screw located in the center of the floating piston. Account for a small O-ring.



AP022

9. Using a pair of pliers, pull the floating piston assembly out of the shock body. Account for a piston ring and an O-ring.
10. Pour the oil out of the shock body.
11. Unscrew the shaft bearing cap and lift the shaft assemble from the shock body.



AP027

12. Clean the inside of the shock body using clean parts-cleaning solvent. Blow dry using compressed air.

■**NOTE: Do not lay shock parts on a rag as it may transfer lint to the parts causing internal shock problems.**

⚠ WARNING

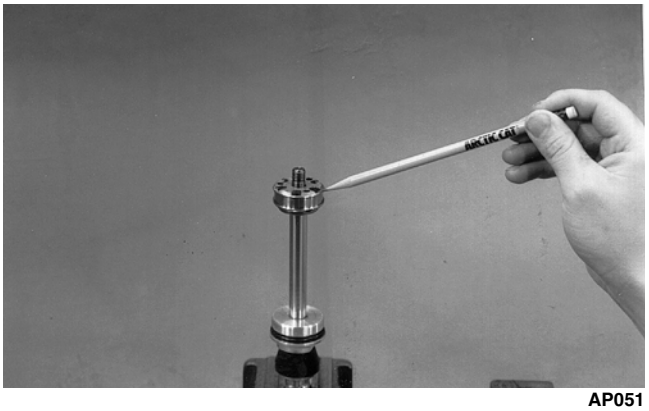
When using compressed air to dry components, always wear safety glasses.

13. Remove the piston ring from the piston. Loosen (but do not remove) the lock nut from the bottom of the shock shaft; then clean the piston area with clean parts-cleaning solvent to remove dirt or foreign material from between the valves. Dry the piston and valves completely using compressed air.

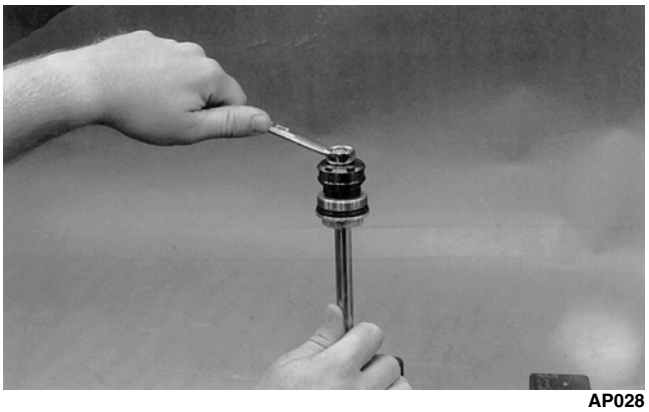
⚠ WARNING

When using compressed air to dry components, always wear safety glasses.

■**NOTE: If for some reason the piston must be removed from the shock shaft, it must be installed with its large seven slots located next to the lock nut side of the shock shaft.**



AP051



AP028

■**NOTE: If shock valving must be removed for cleaning, remove all valving as a complete assembly and place on a 5/16 x 3-in. cap screw to keep in proper order. Note which side is the top side for assembly purposes.**



AP032

14. Items to inspect:
    A. Shock shaft for straightness, nicks, or burrs.
    B. Shaft bearing end cap — clean, inspect, or replace.
    C. Inside of shock body for scratches, burrs, or excessive wear.
    D. Piston rings for cuts, chipped or nicked edges, or excessive wear.
    E. O-rings for nicks, cuts, or cracks.
    F. Valves for kinks or waves.
    G. Rubber damper (ski shocks only) for chipping, cracking, or being missing.
15. Items to replace:
    A. Bleed screw O-ring on the floating piston.
    B. Shock shaft bearing cap if any signs of oil leaks or damage.
    C. Any part worn or damaged.

■ **NOTE: For shaft, shaft eyelets, or shaft bearing cap replacement, see Shaft Eyelet or Bearing Cap and Shaft Seal sub-section.**

ASSEMBLING

1. Place the shock shaft eyelet into the vise; then assemble valves and piston and tighten the lock nut to 2.1-2.8 kg-m (15-20 ft-lb).

⚠ CAUTION

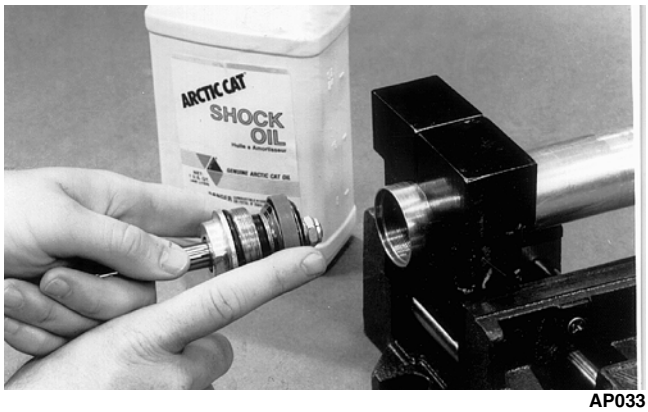
DO NOT OVER-TIGHTEN. If excessive torque is applied, damage to the piston and valves will occur.

2. Place the shock body between the two Gas Shock Retaining Blocks (p/n 0644-142) and secure in a vise.

⚠ CAUTION

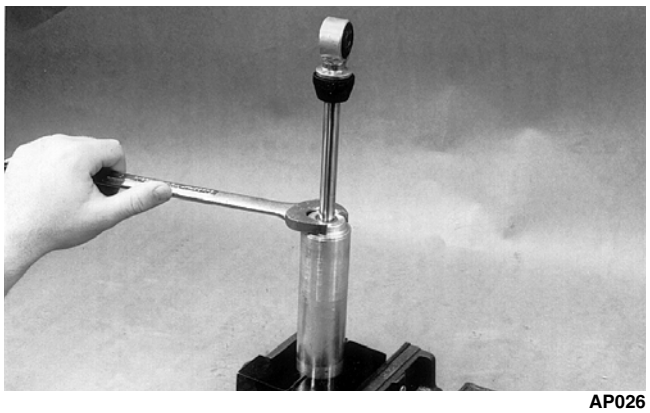
It is important that the Gas Shock Retaining Blocks (p/n 0644-334) are used during both disassembly and assembly. Any other method of securing the shock body during these procedures may deform the shock body cylinder.

3. Apply a light coat of oil on the O-ring and piston ring and install piston into shock body.



AP033

4. Place the shaft bearing cap into the body and tighten securely.



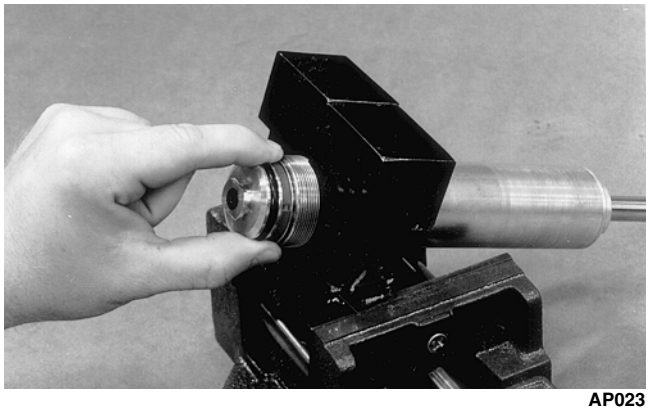
AP026

5. Loosen vise and reposition the shock body and retaining blocks so the bottom of the shock body is “up” and in a vertical position. Extend the shock shaft fully and fill the shock body with Shock Oil (p/n 1639-245) to within 1-1 1/2 in. from the top.

6. Slowly move the shock shaft up and down a few times keeping the piston under oil at all times. This is to remove the air from under the piston. Extend the shock shaft fully; then fill the shock body with oil to within 1/2-3/4 in. from the top.

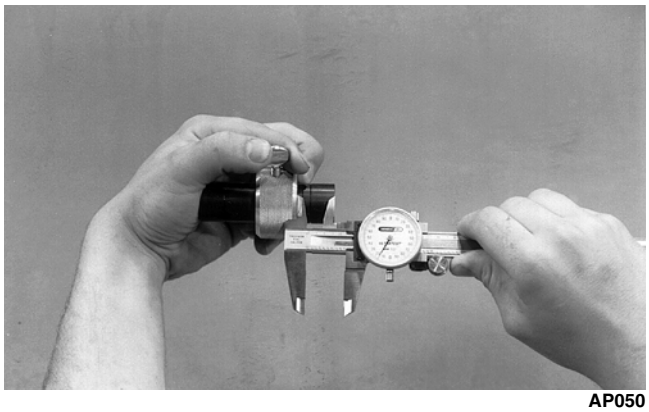
■ NOTE: After filling the shock body with oil, allow 5 minutes for all air bubbles to rise to the top.

7. Apply a light coat of oil on the floating piston ring and O-ring and install the floating piston in the shock body.



AP023

■ NOTE: Depending on which shock absorber is being worked on, adjust the piston location tool to the specification indicated in the Rebuildable Shock Specifications sub-section in this section.



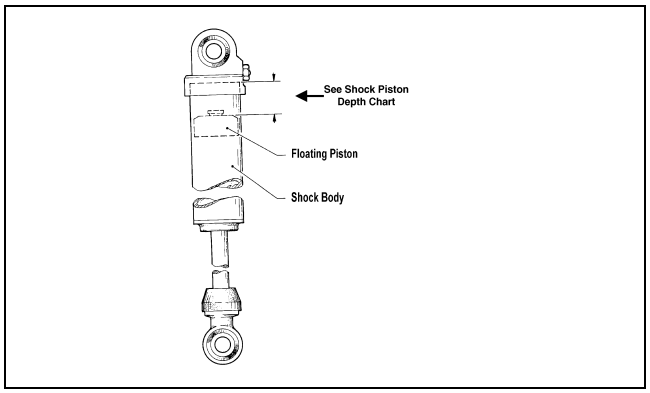
AP050

8. Attach the IFP Depth Setting Tool (p/n 0644-350) to the piston by placing its slotted end over the flats on the top of the piston and giving the tool a quarter turn. Pull gently on the tool to make sure it is secure to the piston.



AG339

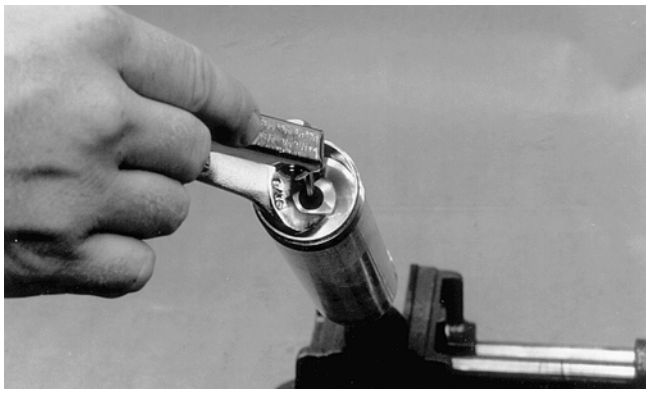
9. Using the tool as a handle, push the piston down into the shock body until the adjustment knob comes in contact with the shock body. Give the tool a quarter turn to free it from the piston. The piston should now be located correctly.



729-085C

■ NOTE: As the floating piston is pushed into the shock absorber body, air and excess oil will come out through the hole in the piston. If no oil comes out through the hole in the piston, remove the piston and add more oil to the shock body.

10. Install the Allen-head screw and O-ring into the bottom of the floating piston. While securing the piston with a 9/16-in. wrench, tighten the Allen-head screw.

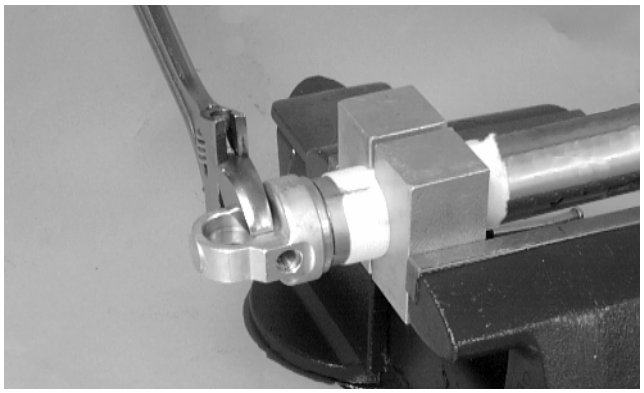


AP020

11. Pour out the excess oil from the shock body.

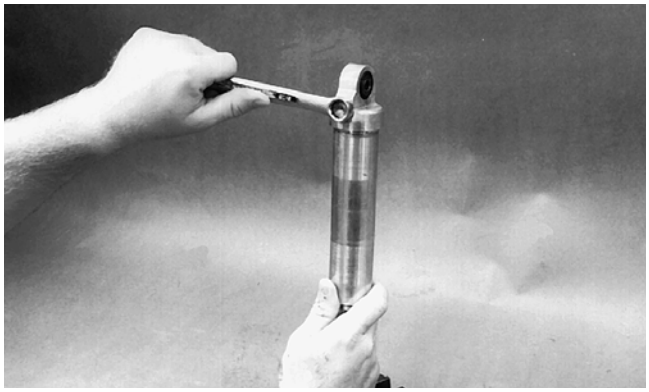
12. Install the lower end cap on the shock body.

13. Using Shock Retaining Blocks (p/n 0644-334) to hold the shock in place and using an adjustable wrench, tighten the end cap securely.



AP016DA

14. Apply a light coat of oil on the bladder housing O-ring; then install the brass bladder housing into the lower end cap. Tighten securely.



AP014

15. Pressurize the shock (see Pressurizing Rebuildable Shocks section). After shock has been pressurized, install screw into bladder housing. Tighten securely.

16. Install shock eyelet bushings and axle.

Servicing Position Sensitive Shock

⚠ WARNING

Before any service is performed on the gas shock absorber, first discharge all pressure from the shock remote reservoir. Remove the valve screw from the pressure valve and insert the Inflation Needle (p/n 0744-020). Open valve until all pressure is released. Failure to do this may cause personal injury.

REMOVING/CLEANING

1. Remove the shock from the snowmobile.

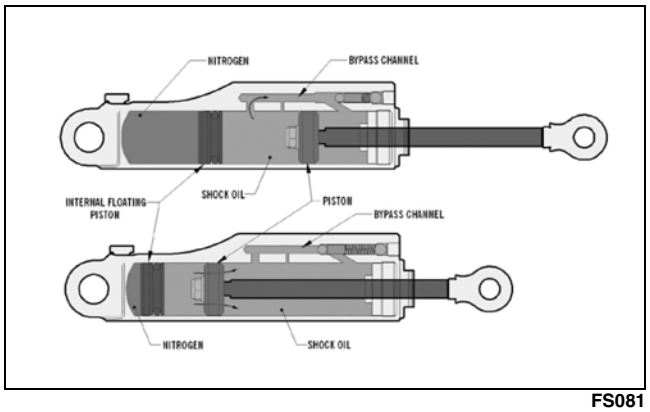
2. Wash the shock body in parts-cleaning solvent; then dry with compressed air to remove sand and dirt.

⚠ WARNING

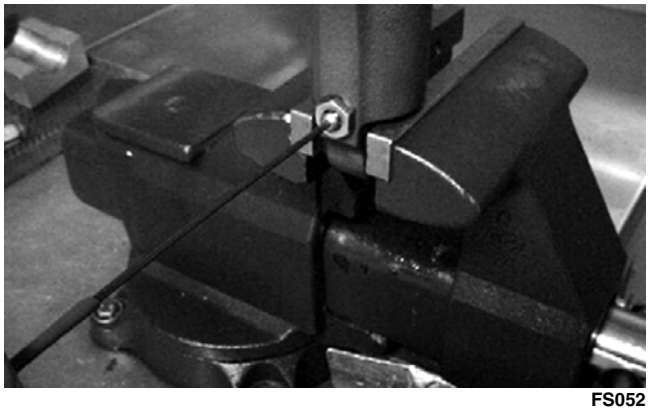
When using compressed air to dry components, always wear safety glasses.

DISASSEMBLING

1. Remove the screw from the bladder housing on the bottom of the shock. Discharge all the pressure from the shock using the Inflation Needle (p/n 0744-020). Open the valve in filler handle until all pressure is released.



FS081



FS052

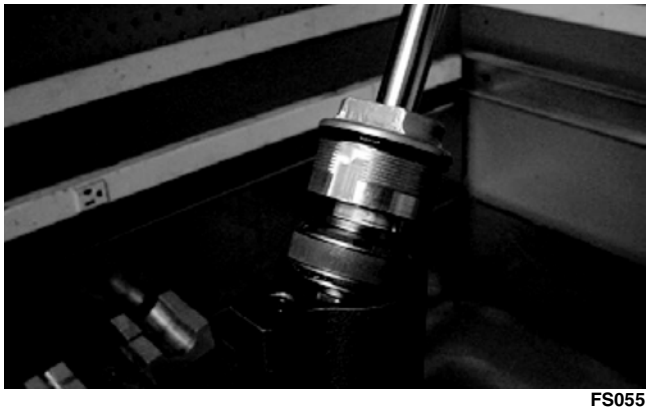


FS053

2. Using a 1-in. wrench, loosen the end cap and remove the shock rod and valve assembly from the shock body.



FS054



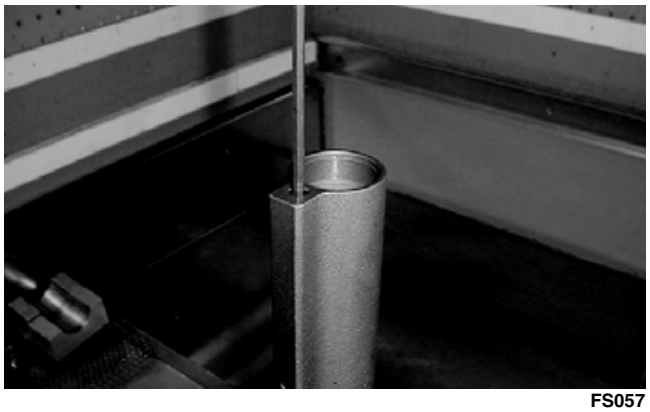
FS055

3. Pour the oil from the shock body into a suitable container.

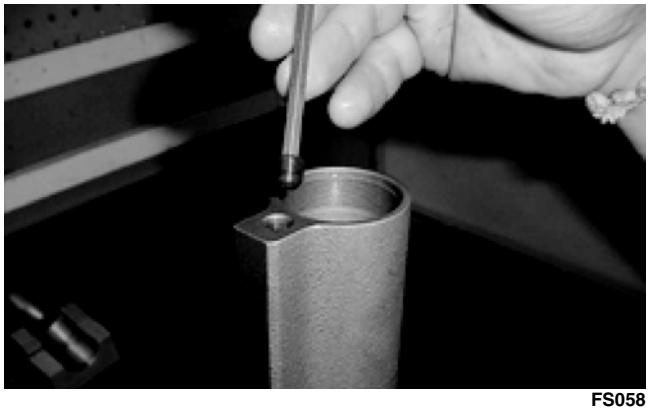


FS056

4. Using a 3/16-in. Allen wrench, remove the set screw.

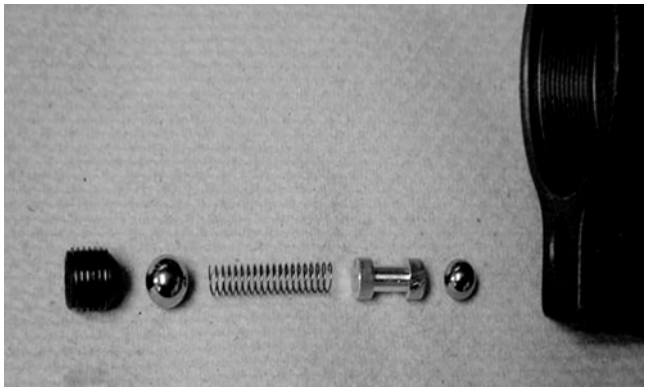


FS057



FS058

■ **NOTE: Account for a set screw, 5/16-in. ball, spring, spring rod, and a 1/4-in. ball.**



FS059

5. Remove the pressure valve assembly. Account for the O-ring.



FS060

6. Using IFP Removal Tool (p/n 0644-348), remove the floating piston.



FS061

7. Items to inspect:

   A. Shock shaft for straightness, nicks, or burrs.

   B. Shaft bearing end cap — clean, inspect, or replace.

   C. Inside of shock body for scratches, burrs, or excessive wear.

   D. Piston strap for cuts, chipped or nicked edges, or excessive wear.

   E. O-rings for nicks, cuts, or cracks.

   F. Valves for kinks or waves.

   G. Rubber damper (ski shocks only) for chipping, cracking, or being missing.

8. Items to replace:

   A. Bleed screw O-ring and floating piston O-ring.

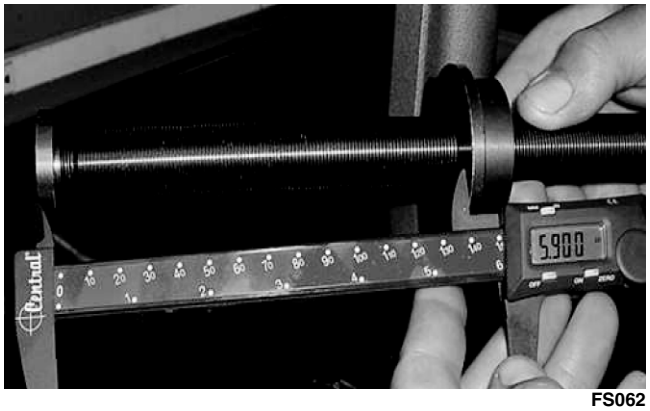
   B. Shock shaft bearing cap if any signs of oil leaks or damage.

   C. Any part worn or damaged.

■ NOTE: For shaft, shaft eyelets, or shaft bearing cap replacement, see Shaft Eyelet or Bearing Cap and Shaft Seal sub-section.

ASSEMBLING

1. Set Floating Piston Installation/Location Tool (p/n 0644-402) to 5.90 in.



FS062

2. Lubricate the O-ring and Teflon strap on floating piston; then press the floating piston into shock until flush with the top of the body.

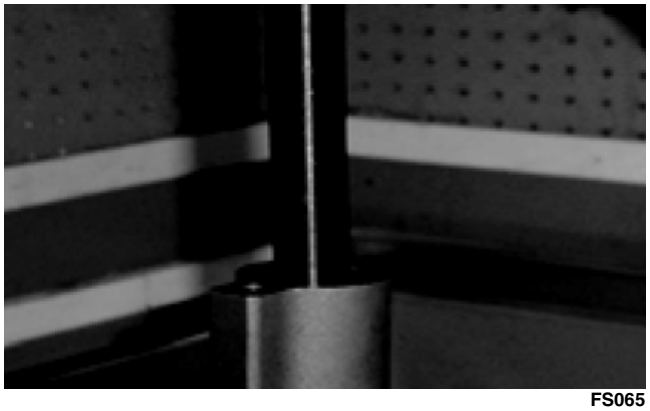


FS063



FS064

3. Install floating piston tool onto floating piston; then press floating piston into shock body 5.90 in.

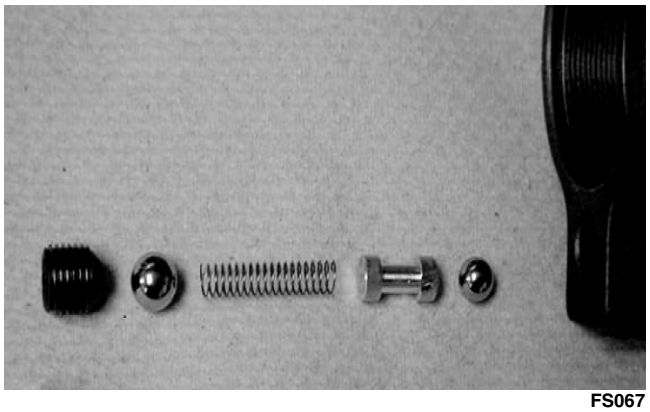


FS065



FS066

4. Install bladder assembly and tighten to 2.1-2.5 kg-m (15-18 ft-lb).



FS067

5. Fill shock body with lightweight synthetic Shock Oil (p/n 2639-151) to bottom of threads.



FS068

6. Install by-pass components: 1/4-in. ball, spring rod, spring, and 5/16-in. ball.



FS069



FS070

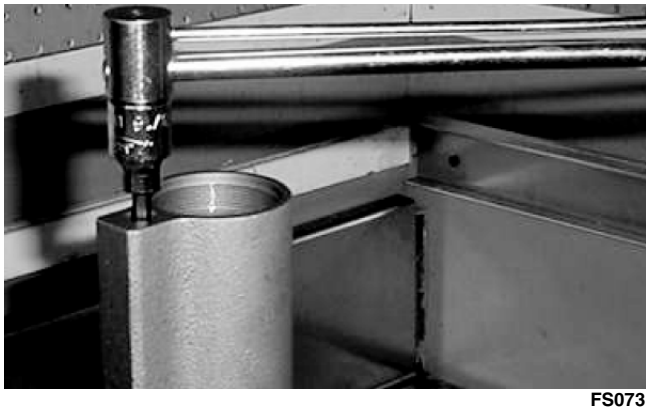


FS071



FS072

7. Install the set screw and tighten to 1.0 kg-m (7 ft-lb).



FS073

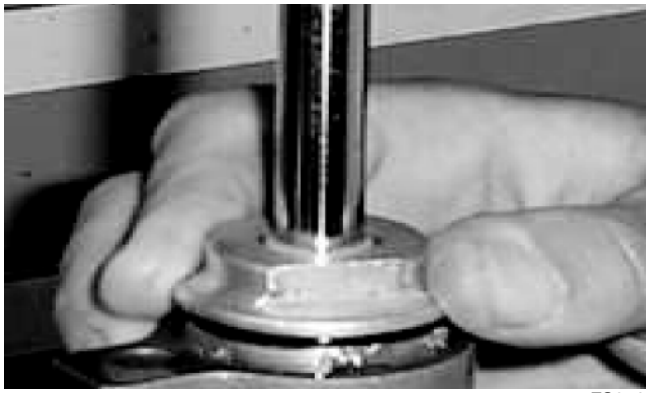
8. Install shock rod/piston assembly into body.

■ **NOTE: End cap should be down to piston assembly (rod fully extended).**



FS074

9. While holding up on the eyelet, screw end cap into the body.



FS076

■ **NOTE: Air will bleed out of flat area on end cap.**



FS075A

10. Using a 1-in. wrench, tighten end cap.



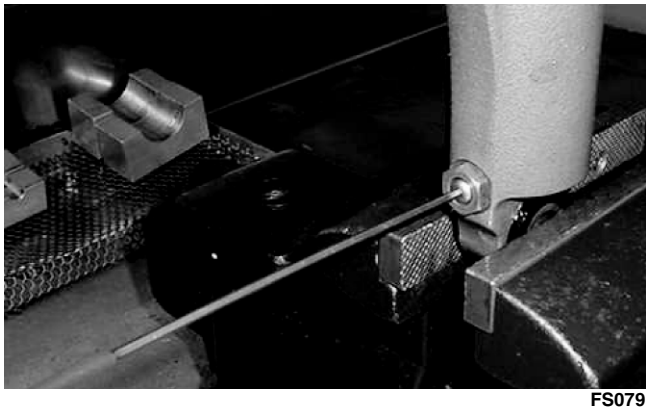
FS077

11. Pressurize the shock with nitrogen to 200 psi (see Pressurizing Rebuildable Shocks sub-section).



FS078

12. Install the set screw (with O-ring) into the bladder housing.



FS079

13. Test operation of the shock.

■ **NOTE: Shock should feel soft on compression; constant on rebound.**



FS080

INSTALLING

1. Place the shock into position on the snowmobile.
2. Secure with existing hardware. Tighten to 3.2 kg-m (23 ft-lb).

Rebuilding/Recharging Fox Air Shocks

⚠ WARNING

Always wear latex or rubber gloves when servicing a shock absorber with shock oil.

DISASSEMBLING

1. Remove the valve cap; then bleed the air from the air chamber.



FS141

2. While holding the end cap; unscrew the air chamber.



FS142

■ **NOTE: The air chamber should only be hand-tight.**

3. Drain the oil from the air chamber.



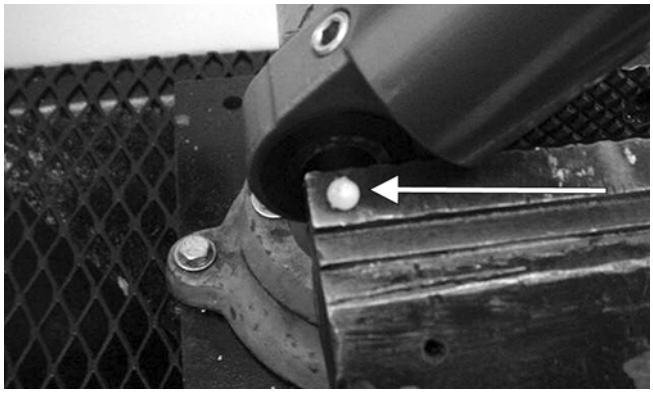
FS143

4. Remove the air chamber from the bottom of the shock body.



FS144

5. Using a pick, remove the nylon pellet from the nitrogen bladder.



FS145A

6. Using a 3/16-in. Allen-wrench, loosen the nitrogen bladder ½ turn.



FS146

7. Using Inflation Needle (p/n 0744-020), remove all the nitrogen from the shock.



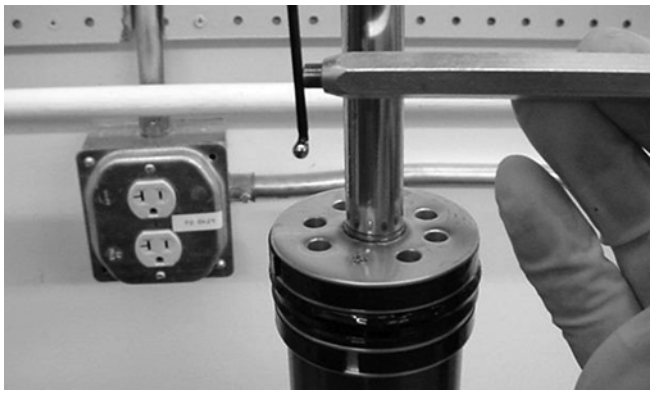
FS147

8. Using a 5/64-in. Allen-wrench, remove the set screw from the bearing cap.



FS148

9. Using a magnet on an Allen-wrench, remove the check ball.



FS149

10. Using Spanner Wrench (p/n 0644-453), loosen the bearing cap.



FS150

11. Remove the shock rod from the shock body.



FS151

12. Drain the oil from the shock body into a suitable container.

13. Using Floating Piston Removal Tool (p/n 0644-402), remove the floating piston.



FS152

■ **NOTE: For ease in removing the piston, use the inflation needle to help vent the shock body.**

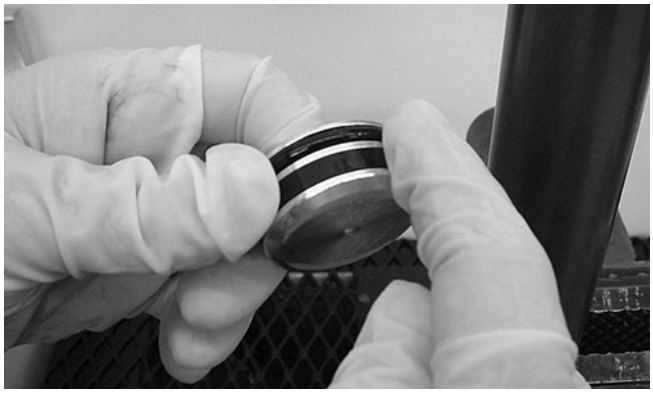


FS153

14. Clean and inspect all components.

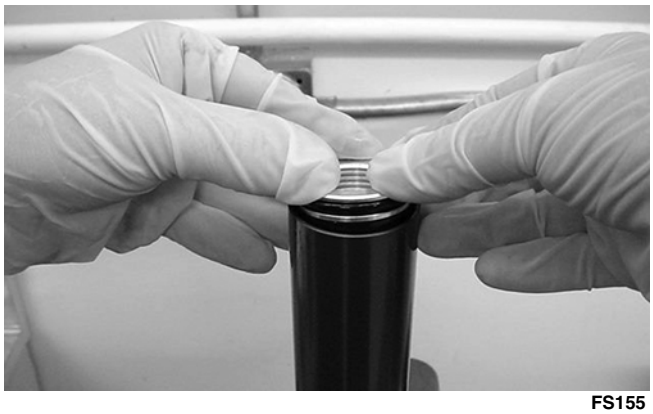
ASSEMBLING/CHARGING

1. Lubricate the O-ring and wiper on the floating piston with shock oil.



FS154

2. Carefully install the floating piston into the shock body until it is below the threads.



FS155

3. Using Floating Piston Installation Tool (p/n 0644-402), install the floating piston while using the inflation needle to vent the shock body.

■ **NOTE: Refer to the 2006 Rebuildable Shock Specifications sub-section in this section.**



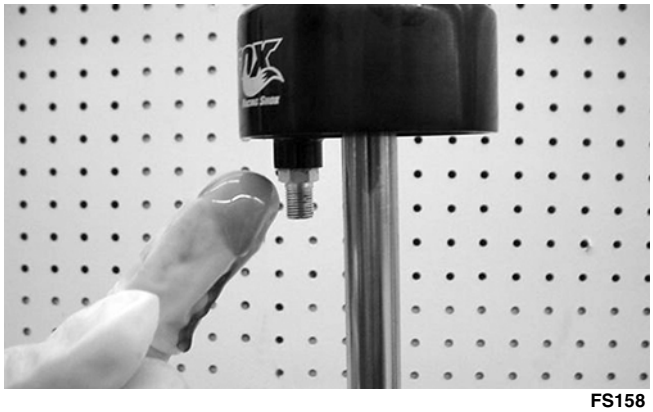
FS156

4. Using standard Arctic Cat Shock Oil, fill the shock body to the bottom of the threads; then, allow to sit 1-2 minutes to ensure no air is in the oil.



FS157

5. Lubricate the O-ring on the underside of the end cap with shock oil.



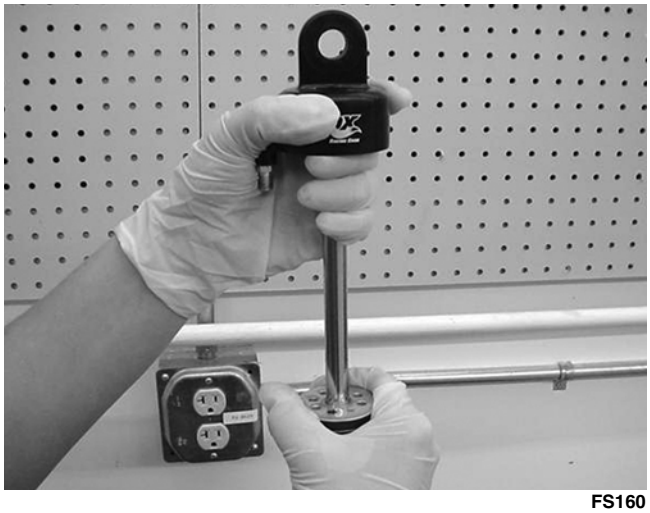
FS158

6. Lower the shock rod into the shock body until the piston is submerged in oil.



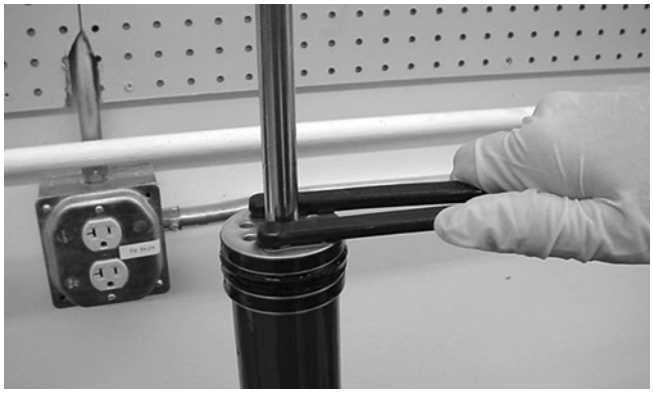
FS159

7. While keeping the shock rod fully extended, thread the bearing cap into position.



FS160

8. Using Spanner Wrench (p/n 0644-453), tighten the bearing cap.



FS161

■ **NOTE: When tightening the bearing cap, note air and excess oil being bled from the hole in the cap.**

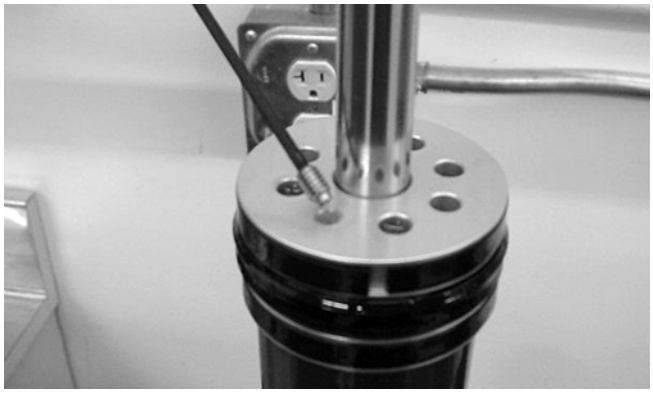


FS150A

9. Install the check ball and set screw into the bearing cap.

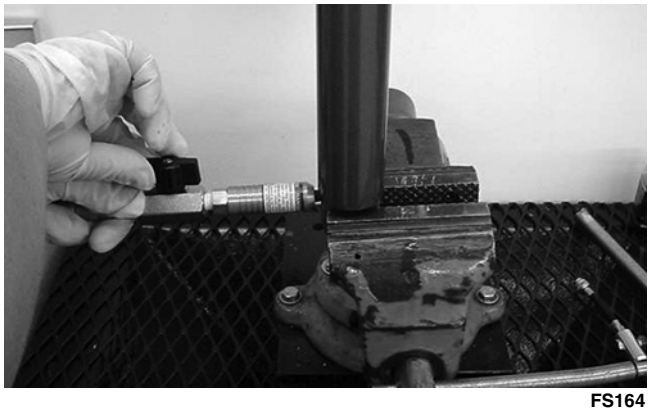


FS162



FS163

10. Charge the shock with nitrogen to 200 psi.



FS164

11. Using a 3/16-in. Allen-wrench, tighten the nitrogen bladder.



FS165

12. Install the nylon pellet by gently tapping it with a plastic mallet.



FS166

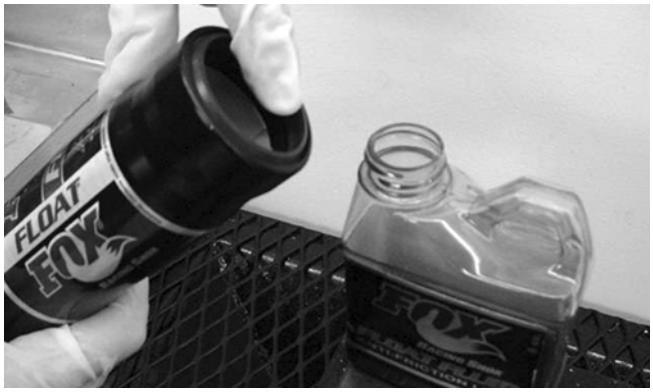
13. Test the shock for proper operation.

14. Using compressed air, blow all oil from the holes in the bearing cap.



FS167

15. Lubricate the seal on the air chamber with Fox Float Fluid (p/n 4639-012).



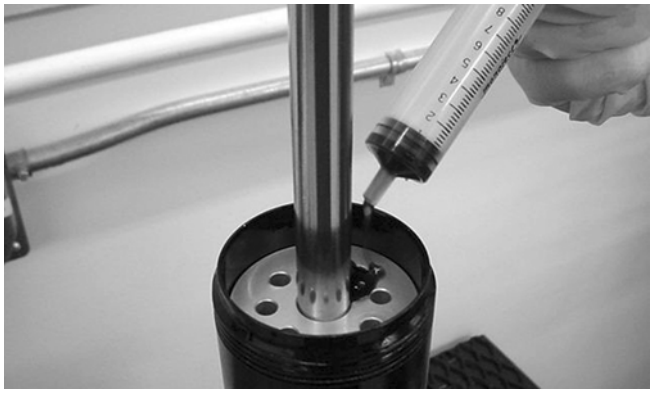
FS168

16. Slide the air chamber onto the shock body.



FS169

17. Add 10 cc of Fox Float Fluid (p/n 4639-012) into the chamber for Crossfire/Firecat/M-Series models or 8 cc for the King Cat.


FS170

18. Thread the air chamber into the end cap until hand-tight.



FS171

19. Invert the shock and secure by the end cap to assure the air chamber is tight.



FS172

20. Using a hand pump, inflate the air chamber to 50 psi for the King Cat, 60 psi for the M-Series models, or 65 psi for the Crossfire/Firecat models.



FS173

21. Install the valve cap.



FS174

Servicing Fox Zero Pro Shock Absorbers

This procedure shows the proper methods for disassembling, rebuilding, and assembling the pro shock absorbers with no external damping adjustments.

⚠ WARNING

Before starting, read through all of these instructions first to become familiar with the procedure. Make sure the work area is clean and all of the necessary tools are available. These shocks contain high pressure nitrogen gas. Always use proper safety equipment such as latex gloves and safety glasses when working on shock absorbers.

■NOTE: Some illustrations and photographs used in the following sub-sections are used for clarity purposes and are not designed to depict actual conditions.

DISASSEMBLING

1. Remove the steel sleeve and polyurethane bushings from the eyelets on both ends of the shock.
2. Clean the entire shock assembly with soapy water. Dry the shock assembly with compressed air.

⚠ CAUTION

Use a soft-bristle brush to remove as much dirt and debris as possible. Do not pressure wash the shock as this can force water and debris inside causing damage to the seals.

⚠ WARNING

When using compressed air to dry components, always wear safety glasses.

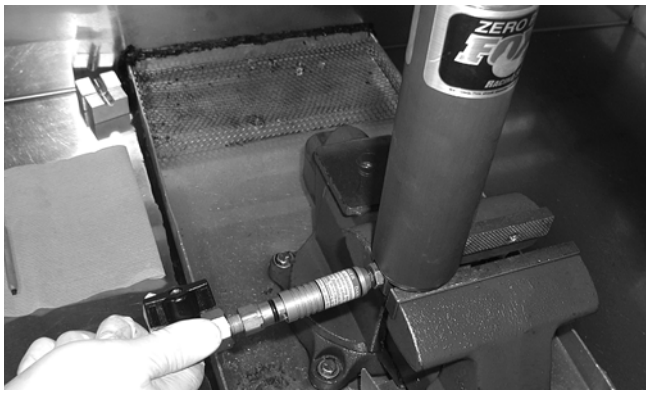
■NOTE: If compressed air is not available, use clean towel to dry the shock assembly.

3. Clamp the body eyelet of the shock securely in vise with shaft side up.
4. Remove the button-head screw from the nitrogen valve in the shock body.



FS040

5. Insert the needle squarely into center of the nitrogen valve to release the pressure.



FS016

⚠ WARNING

Point the nitrogen valve away from face and body to avoid injury when discharging or charging the shock.

6. When the shock is fully discharged, pull the needle away from the reservoir in a straight, smooth motion.
7. Loosen (but do not remove) the bearing bleed screw.



FS013

8. Loosen and unscrew the bearing assembly from the shock body.



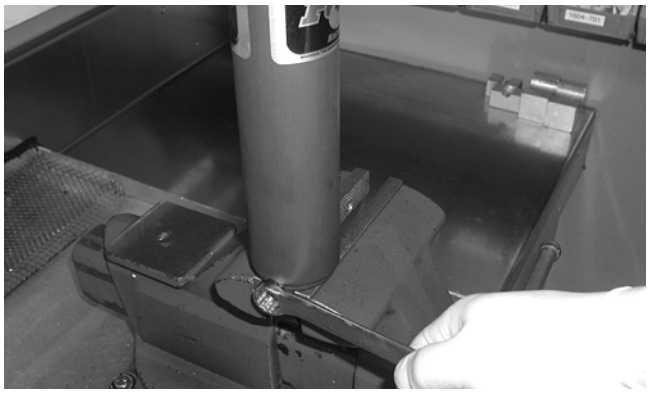
FS006

9. Remove the shaft assembly from the body tube and place it on a clean, lint-free paper towel.

10. Remove the shock from the vise and pour shock oil from body tube into a proper disposal container. DO NOT REUSE OLD SHOCK OIL.

11. Clamp the body cap of the shock securely in vise with the open end of the body tube pointing up.

12. Loosen and remove the nitorgen valve from the body.



FS014

13. Remove the shock body from the vise; then invert the shock body and place it on a folded shop towel open end down.

14. Using compressed air (NEVER USE HIGH PRESSURE NITROGEN), insert the air gun nozzle into the nitrogen valve port and blow the IFP out of the shock body and onto the folded shop towel.



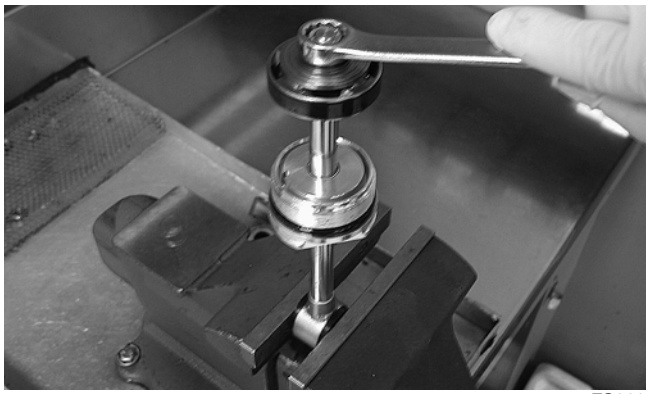
FS012

15. Clean the body tube, reservoir tube, and the IFP with solvent. Dry with compressed air in a well ventilated area.

16. Set body assembly aside on a clean, lint-free towel.

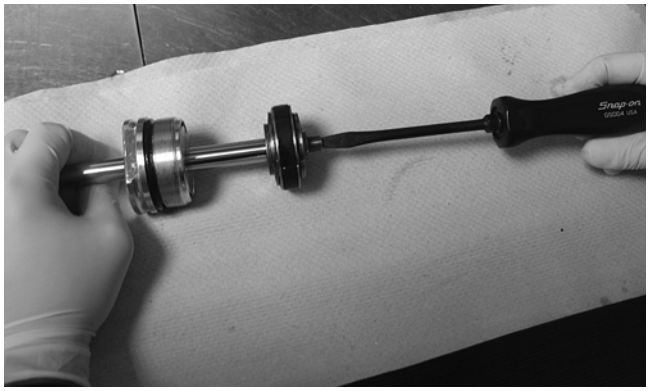
17. Clamp the shaft eyelet securely in vise with the piston end up.

18. Remove the piston lock nut from the end of the shaft.



FS008

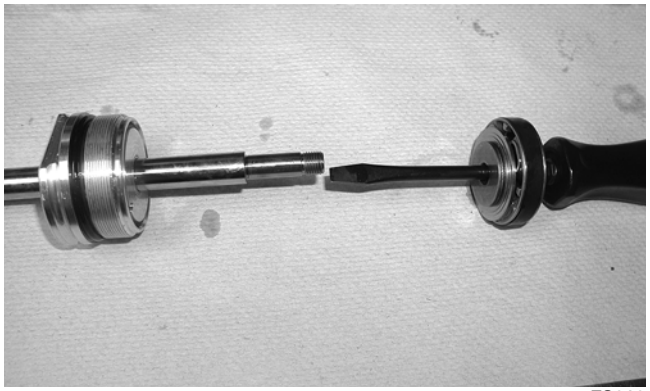
19. Hold the tip of a screwdriver against the end of shaft; then hold the piston assembly under the top-out plate and lift upwards.



FS009

■ **NOTE: Keeping the components in order is critical for proper performance of the shock absorber. Doing steps 20-21 properly ensures that proper order is kept.**

20. Slide the piston assembly onto the shaft of the screwdriver. Pull the screwdriver away from shock shaft while supporting the piston assembly and set this on a clean, lint-free towel.



FS010

21. Slide bearing assembly off of shaft.

⚠ CAUTION

Use care when passing the bearing over the shaft threads not to scratch the inside of the bearing assembly.

22. Remove the bleed screw from the bearing and set them both on a clean, lint-free towel.

REBUILDING

1. Using a pair of snap ring pliers, remove the snap ring from the bearing housing. Using fingers, remove the FIST scraper from the housing. Using a scribe, remove the O-ring from the inside of the FIST scraper by "spearing" the seal with the point of the scribe and pulling it out.



FS011

⚠ CAUTION

Care must be taken when using a scribe to remove a seal. Always spear the seal with the point of the scribe. Do not attempt to wedge the scribe behind the seal as this could cause damage to the seal groove and compromise the performance of the shock.

2. Using a scribe, remove the U-cup wiper and O-ring seals from the bearing housing.

3. Thoroughly clean the FIST bearing, bearing housing, and piston assembly with solvent. Dry with compressed air in a well ventilated area.

4. Using a scribe, remove the O-ring seal from the IFP.

5. Install the new, well lubricated O-ring into the FIST bearing. Check to make sure the O-ring is properly seated and is not twisted.

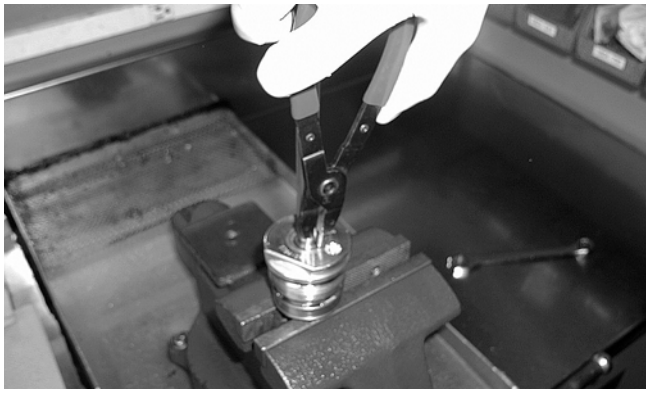
■ **NOTE: To aid in proper seating of the O-ring, it may be advisable to use a soft, blunt object (non-writing end of a pen, etc.) to push it in.**

6. Install the new, well lubricated O-rings into the bearing housing making sure the shaft O-ring is in the groove next to the DU bushing and that the O-rings are properly seated and not twisted. It may be advisable to use a soft, blunt object to push it in.

7. Install the new U-cup seal into bearing. U-cup should be installed so the cupped end is facing the DU bushing inside of bearing. Check to make sure seal is properly seated. It may be advisable to use a soft, blunt object to push it in.

8. Install FIST bearing into housing. Check for proper orientation of the FIST bearing. The stepped side of the FIST bearing should be visible.

9. Using a pair of snap ring pliers, install the snap ring into the bearing housing. Check for proper orientation of the snap ring. The flat side of the snap ring should be visible. Check to make sure the snap ring is properly seated.



FS007

10. Install the new, well greased O-ring onto the IFP.

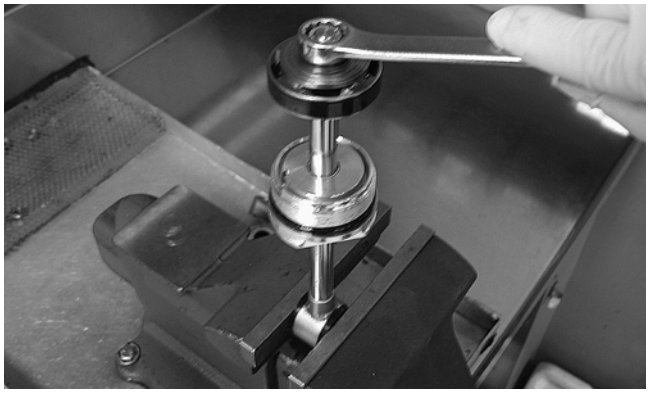
11. Replace the bearing bleed screw O-ring.

ASSEMBLING

1. Clamp shaft eyelet securely in vise and place a seal tool on end of shaft.

2. Lubricate the bearing assembly seals with an assembly lube. Slide the bearing assembly onto shaft with the FIST bearing facing the eyelet. This should be done in a single smooth motion to avoid damaging the seals.

3. Hold the piston assembly from underneath the top-out plate and place the end of the screwdriver onto the end of the shock shaft. Slide the piston assembly onto the shaft end. Check to make sure the piston assembly is seated properly and install the piston lock nut. Tighten nut to 2.5 kg-m (18 ft-lb). Remove shaft assembly from vise and set it aside on a clean, lint-free paper towel.



FS008

4. Clamp the body of the shock securely in the vise with the open end of the body facing up.

5. Lubricate the IFP O-ring with assembly lube and wrap a new piston ring around it.

6. Insert the IFP into the shock body (with the dished side facing up toward the open end of the shock body) to just below the bearing threads.



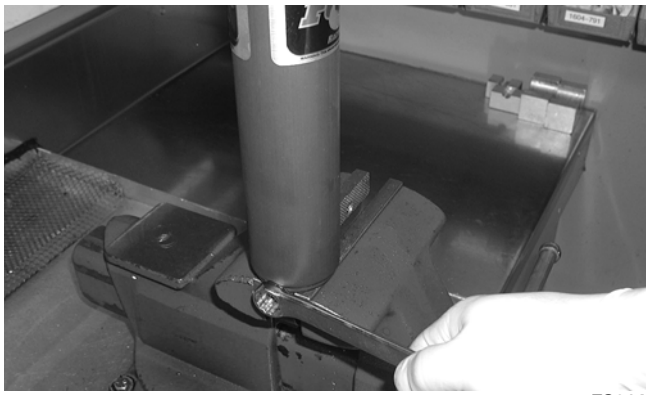
FS015

7. Using Location Gauge (p/n 0644-417) from the Floating Piston Removal Tool Kit (p/n 0644-402), install the floating piston while using the inflation needle to vent the shock body.

■ NOTE: Refer to the 2006 Rebuildable Shock Specifications sub-section in this section.

■ NOTE: Depth is measured from the edge of the body opening to the outside edge of the IFP (not the center depression of the IFP).

8. Lubricate the O-ring on the nitrogen valve with assembly lube and thread it into the body. Tighten securely.



FS014

9. Fill the body tube with oil to the bottom of the bearing threads. Wrap the new piston band around the piston making sure the rounded edges face out. Insert the shaft assembly into the body tube. Slowly push shaft into body until piston assembly is approximately 12.7 mm (0.5 in.) below the oil surface.

10. Slowly stroke the shaft assembly up and down over about a 1-inch range two to three times being very careful not to pull the piston assembly out of the oil.

■ NOTE: At this point, there should be no air bubbles rising from the piston assembly.

11. Top off the shock body with oil and slowly pull the shaft up until the piston assembly is about in the middle of the bearing threads.

12. Holding the shaft in that position, slide the bearing assembly down the shaft and start threading it into the body by hand. Oil should flow out of the bearing bleed hole.

13. As the bearing assembly is being threaded down, it will contact the damping piston assembly and pull it down into the shock body with it. As the bearing is being threaded in from this point, be sure the damping piston assembly stays in contact with the bearing.

14. When the bearing is threaded all the way down, thread the bleed screw into the bearing assembly and tighten it securely.



FS013

15. Tighten the bearing assembly into the body.



FS006

16. Push the shaft all the way down until the eyelet lightly contacts the FIST scraper on the bearing assembly. It should go all the way down without any feeling of contact or interference.

■ **NOTE: At this point, DO NOT attempt to pull the shaft up out of the body.**

17. If there is any interference while pushing the shaft into the body, the IFP is in the wrong location.

⚠ WARNING

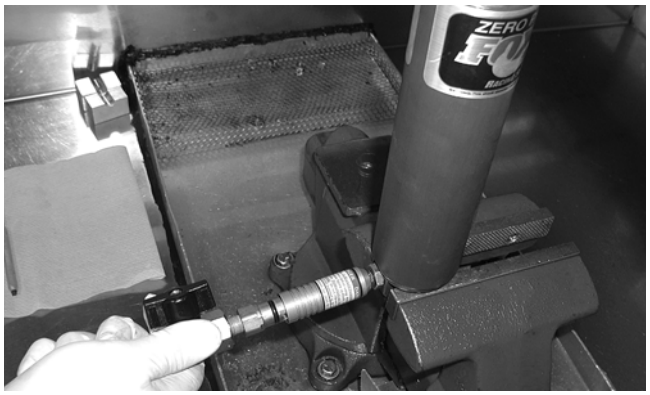
If there is interference, unthread the bearing assembly from the body and repeat steps 4-16 of Assembling. Failure to repeat the steps and rid the shock of the interference may cause damage to the shock resulting in improper shock performance and could cause operator injury.

18. If there is no interference, proceed to step 19.

19. Maintain the shock in the vise.

20. Make sure the nitrogen valve is directed outward.

21. Insert the needle squarely into the center of the nitrogen valve (taking care that the valve is directed away from face and body) and pressurize the reservoir to 200 psi. The shock shaft should be fully extended from the pressure before the final pressure reading is taken. Continue charging while pulling the reservoir away from the needle using a smooth, straight motion. Keep the reservoir as straight as possible to prevent the needle from bending. As the reservoir and needle separate, a "popping" sound should be heard.



FS016

⚠ WARNING

Charge the shock using nitrogen gas only. DO NOT CHARGE WITH ANY OTHER TYPE OF GAS. Doing so will compromise the performance of the shock and may be EXTREMELY DANGEROUS.

22. Install the button-head screw into the nitrogen valve.



FS040

23. Clean all oil residue from the shock and reservoir with solvent and dry with compressed air in a well ventilated area.

24. Install the polyurethane bushings and steel sleeves into the eyelets.

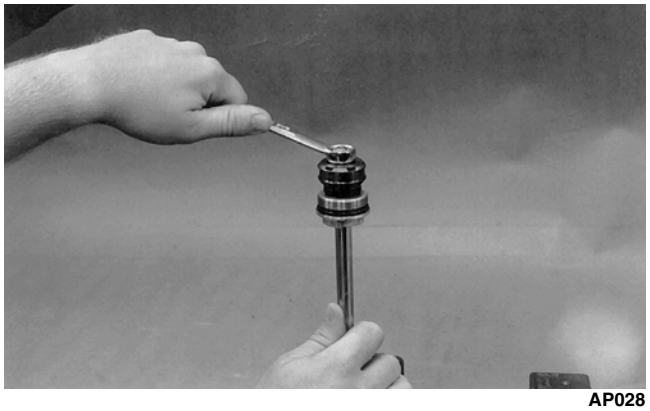
Installing Internal Travel Limiting Spacers

These spacers are used to shorten the travel of the shock absorber to fine tune the suspension to the operator's driving style.

If installing the spacers in the internal floating piston shock absorbers, follow these steps.

1. Disassemble the shock absorber as covered in this manual.

2. Place the shock shaft eyelet into a vise and remove the nut securing the piston to the shock shaft.



AP028

3. Carefully remove the piston and its valving plates stacked on either side of the piston from the end of the shock shaft.

■NOTE: When removing the piston and valve plates from the shock shaft, place the piston assembly on a 5/16 x 3-in. cap screw and secure with a nut to keep the assembly in its proper order.

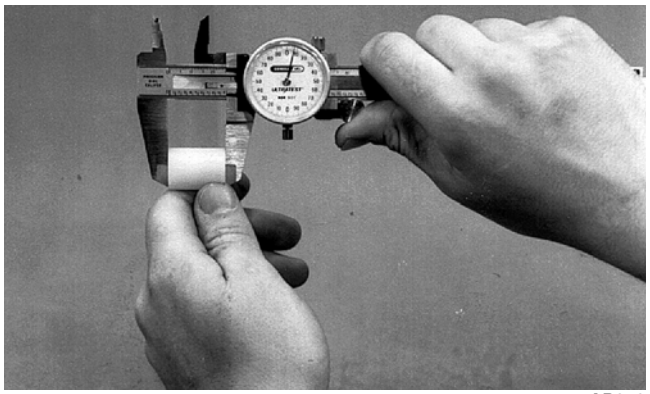


AP032

■NOTE: If the piston assembly should become mixed, the large slots of the piston must be located next to the lock nut of the shaft. Refer to the appropriate Illustrated Parts Manual for valve plate location.

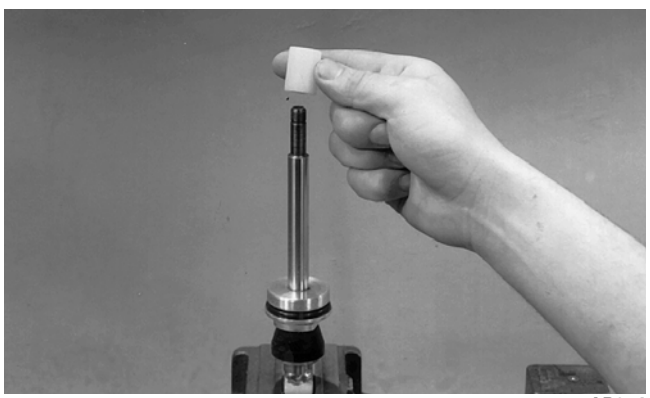
■NOTE: If a rubber washer is found on the shock shaft next to the bottom side of the bearing cap, it must be removed before installing the limiting spacers. The rubber washer must not be used with the spacers installed.

4. Measure the length of the limiting spacer(s) that are being installed on the shock shaft. Write down this measurement as it will be required to properly calculate the floating piston depth later in the assembly process.



AP053

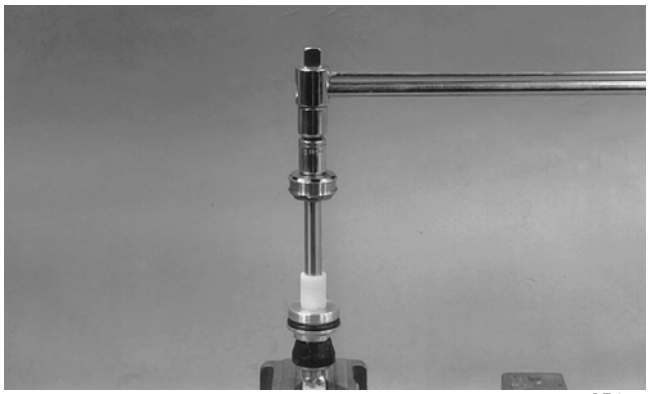
5. Install the desired number of limiting spacers on the shock shaft.



AP054

6. Install the heavy spacer washer and then the piston with valve plates located on either side onto the shock shaft. Check to make sure the piston has been installed with its large slots positioned next to the lock nut which secures the assembly to the shaft.

7. Install the lock nut and tighten to 2.1-2.8 kg-m (15-20 ft-lb).



AP055

⚠ CAUTION

Do not over-tighten the lock nut. If excess torque is applied, damage to the piston and valves will occur.

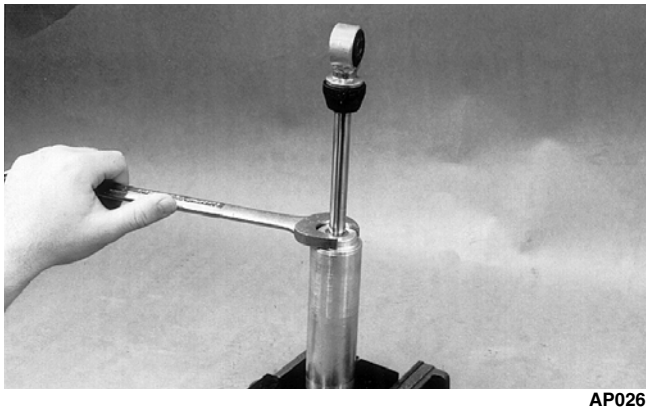
■ NOTE: For installing spacers on an IFP shock, proceed to step 8. For installing spacers on a remote reservoir shock, proceed to the appropriate assembly procedure for the type of shock being serviced.

8. Apply a light coat of oil on the O-ring and piston ring. Install piston and the shock shaft assembly into the shock body.



AP033

9. Place the shaft bearing cap into the shock body and tighten securely.



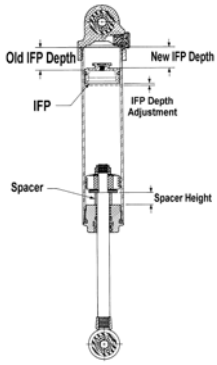
AP026

10. Remove the shock body from the vise and re-position the shock body and holding blocks in the vise so its open end is "up." Extend the shock shaft fully out; then fill the shock body with Shock Oil (p/n 1639-245) to within 1-in. from the top. Slowly stroke the shaft up and down to remove air from under the piston. Oil may need to be added to keep the shock full. Fill shock to within 1/4-in. from the top. Allow 5 minutes for all air bubbles to rise to the top.

■ NOTE: Before installing the internal floating piston, refer to the illustration below and calculate the new piston depth using the measurement taken earlier of the spacer(s) installed and the formula provided in the illustration.

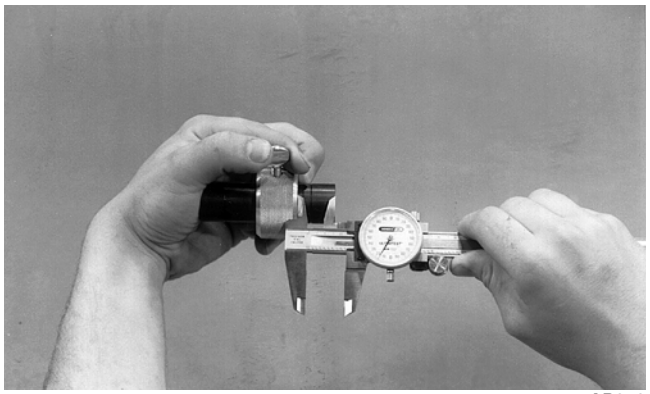
When using shock internal travel limiting spacers on rebuildable shocks with IFP's (Internal Floating Piston), the IFP depth setting must be reduced to compensate for the spacer height. Use the following formula to adjust your shock depth setting.

Example:
Spacer height = .500 in.
Old IFP depth = .750 in.
IFP Depth Adjustment = .1165 x .500 = .058 in.
New IFP depth = .750 - .058 = .692 in.



0730-266

11. After calculating the new piston depth, measure out this distance on the shock piston location tool; then adjust and secure the location knob.



AP050

12. Apply a light coat of oil on the floating piston ring and O-ring and install the floating piston in the shock body.



AG850

13. Using a long needle-nose pliers, insert the floating piston into the adjuster body until the piston is flush with the top of the body; then using the piston location tool as a handle, push the piston down into the adjuster body until the adjustment stop of the tool comes in contact with the adjuster body. The piston should now be located correctly.



AG339

■ **NOTE: As the floating piston is pushed into the shock absorber body, air and excess oil will come out through the hole in the piston. If no oil comes out through the hole in the piston, remove the piston and add more oil to the shock body.**

14. Install the Allen-head screw and O-ring into the bottom of the floating piston. Tighten the Allen-head screw.

15. Pour out the excess oil from the shock body.

16. Install the lower end cap on the shock body.

17. Using Shock Retaining Blocks (p/n 0644-334), hold the shock body in place and tighten the end cap using an adjustable wrench. Pressurize the shock following the shock pressurizing procedure.

Servicing Rebuildable Shocks & Remote Reservoir

⚠ WARNING

Before servicing a gas shock absorber, first discharge all pressure from the reservoir. Remove the screw from the top of the reservoir and insert the Inflation Needle (p/n 0744-020). Open valve until all pressure is released. Failure to do this may cause personal injury.

REMOVING AND DISASSEMBLING

1. Remove the shock absorber from the snowmobile. Remove the mounting bushings and bearings from the shock.

2. Wash the shock body and reservoir in parts-cleaning solvent; then dry with compressed air to remove sand and dirt.

⚠ WARNING

When using compressed air to dry components, always wear safety glasses.

⚠ WARNING

When working with Shock Inflation Needle (p/n 0644-158), use extreme care. Misuse of this tool may cause personal injury or death. Avoid puncturing skin with needle. Pressurized air injected through the skin may be fatal. Do not release safety mechanism unless red nose piece is inserted in shock absorber air valve.

3. Remove the screw from the bladder housing on bottom of shock reservoir; then discharge all pressure from the shock reservoir using Inflation Needle (p/n 0744-020). Open valve in filler handle until all pressure is released.



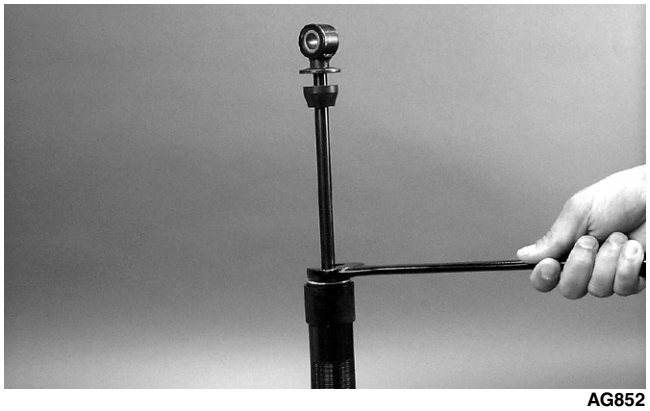
AG851

⚠ WARNING

Failure to remove pressure from shock reservoir may result in personal injury.

4. Clamp the shock body eyelet in a vise; then using a 1-in. wrench, unscrew the shaft bearing cover.

■ NOTE: If the shock body turns in lower end cap, use shock blocks to hold the shock.



AG852

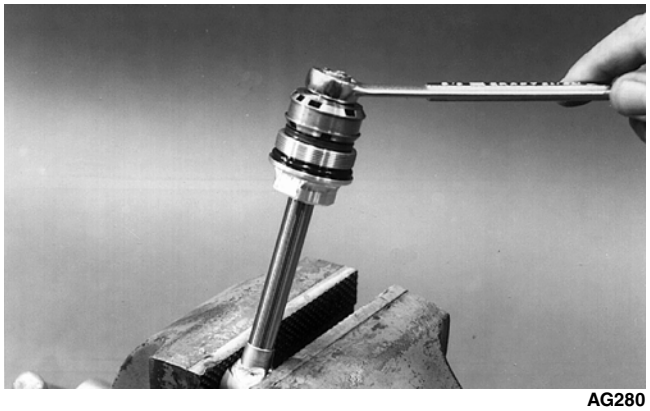
5. With the bearing cover loosened, lift the shaft assembly from the shock body.



AG853

6. Remove the piston ring from the piston.

7. Loosen (BUT DO NOT REMOVE) the self-locking nut from the bottom of the shock shaft; then clean the piston area with clean parts cleaner to remove any dirt or foreign material from between the valves. Dry the piston and valves completely using compressed air. Tighten self-locking nut to 2.1-2.8 kg-m (15-20 ft-lb). Do not over-tighten! If excess torque is applied, the piston and valves will be damaged.



AG280

■ NOTE: Do not remove the self-locking nut from the bottom of the shock rod unless piston or piston valve changes are needed as it is very important the valving on either side of the piston stay in the proper position.

8. Install the piston ring on the piston.

9. Push down on the reservoir end cap compressing it 2.5 cm (1 in.) into the reservoir; then remove the reservoir cap retainer ring. Use care not to scratch the inside of the reservoir.



AG854

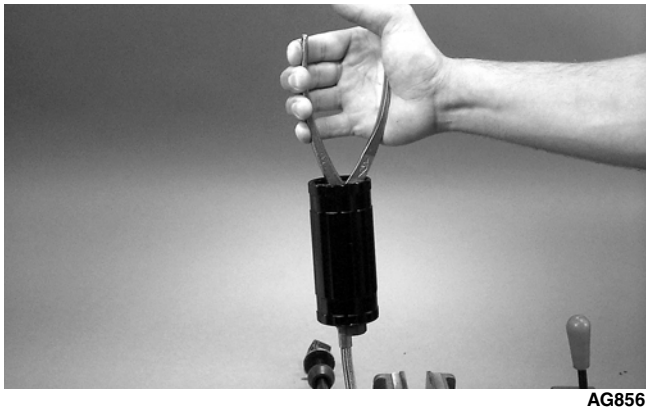
■ NOTE: With the retainer ring removed, wipe the ring area clean to remove any foreign materials.

10. Remove the reservoir end cap by grasping the bladder housing with a pliers and pulling the cap slowly out of the reservoir body.



AG855

11. Remove the Allen-head screw and O-ring from the center of the piston. Remove the piston from the reservoir by grasping the raised area of the piston using a pliers. Pull the piston from the reservoir and account for the piston ring.



AG856

12. Pour the oil out of the shock and reservoir; then clean the inside of the reservoir and shock body using clean parts washer solvent. Blow dry using compressed air.

⚠ WARNING

When using compressed air to dry components, always wear safety glasses.

■ NOTE: If the shock bearing cap does not show signs of leakage or damage, do not remove from the shaft.

13. Inspect shock shaft for straightness, nicks, or burrs. Inspect shock and reservoir bodies for dents or scratches. Inspect piston valves for bending or cracking. Inspect all O-rings and seals for nicks, cuts, or cracking. Inspect rubber bottom-out bumpers for wear or damage. Replace any worn or damaged parts.

■ NOTE: If changing or removing shock shaft seal, bearing cap, eyelet, or bottom-out bumper, refer to those sub-sections.

ASSEMBLING

1. Place the shock into a vise at a slight angle and fill the shock reservoir with Shock Oil (p/n 1639-245).



AG857

■ NOTE: If filling shock with a remote reservoir, hold the reservoir lower than the shock. By holding the reservoir low as oil is added to the reservoir, air in the hose will be forced into the shock body and out of the system.

2. With the Allen-head screw and O-ring installed in the reservoir piston and the reservoir full of shock oil, compress the piston ring into position with fingers and slowly push the piston down into the reservoir until the O-ring is down in the reservoir housing.



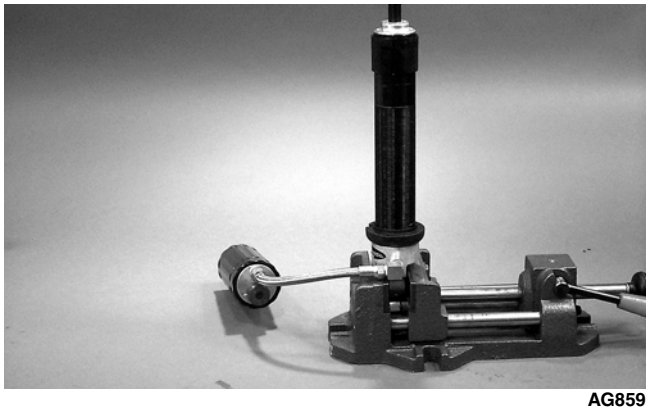
AG858

3. Let the reservoir hang down for a few minutes to let air bubbles rise to the top and into shock body.

4. Using a clean pair of pliers, grasp the hex area at the center of the piston and slowly push the piston down into the reservoir until it bottoms in the reservoir. Once the piston has bottomed out in the reservoir, slowly pull up on the piston approximately ½ in. Next, slowly push the piston back down until it once again bottoms. Repeat this procedure several times until no air bubbles are seen rising in the oil in the shock body.

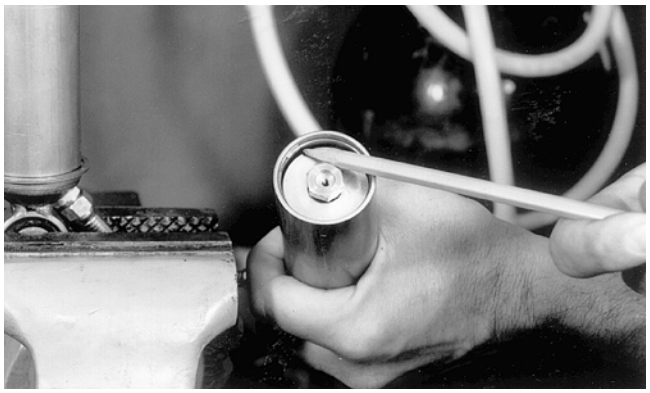
■ NOTE: The oil in the reservoir will remove any air in the hose or passageway between the reservoir and shock body.

5. Once all air has been removed from the reservoir body, bottom the piston in the reservoir and then pull the piston upward approximately 1/8 in. Allow the reservoir to hang down below the shock absorber in the vise to permit any air that might remain in the reservoir to rise into the shock body.



AG859

6. Install the reservoir end cap and O-ring down into the reservoir approximately 2.5 cm (1 in.). Install the retainer ring making sure it is firmly in place.



AP011

7. Grasp the bladder housing with a pliers and pull it up into place against the retainer ring.

8. Slowly pour oil into the shock body until it is 1/4 in. from the top of the shock body. Again, allow five minutes to elapse before proceeding.

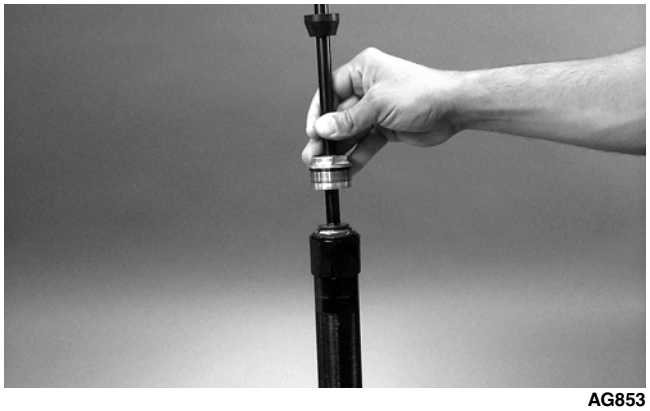
9. Space the bottom edge of the bearing cap approximately 1/2 to 1 in. away from the piston assembly.

10. To install the shock rod, align the valve piston wear ring end gap with the low-speed orifice cutaway positioning the cutaway so it faces the upward angle of the shock body which will allow air to escape.



AG860

11. Compress the piston ring into position with fingers and slowly start the piston assembly down into the shock body.

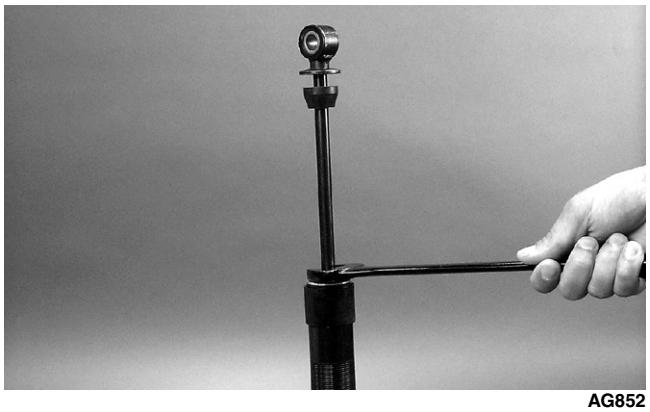


AG853

12. Give the end of the shock rod a few light taps with the palm of the hand to help release air bubbles from the piston valves.

■ NOTE: Be careful not to damage the piston ring and watch that the piston ring ends are overlapped and in place as the piston is installed.

13. Install the end cap very slowly to allow excess air and oil to come out the threads; then using a 1-in. wrench, tighten the bearing cap firmly down in place. Do not push down on the shock shaft until the reservoir has been pressurized. Pressurize the reservoir.



AG852

14. Discharge all pressure from the shock reservoir using Inflation Needle (p/n 0744-020). Open valve in filler handle until all pressure is released.

15. Push down on the reservoir end cap compressing it 2.5 cm (1 in.) into the reservoir; then remove the reservoir cap retainer ring. Use care not to scratch the inside of the reservoir.

16. Measure the piston depth from the top of the reservoir body to the top of the floating piston. Measurement should be within specification (see Rebuildable Shock Specifications in this section). If measurement is not correct, pour 1 inch of shock oil on top of the piston. Remove the Allen-head screw; then move the piston to the proper depth and install Allen-head screw with O-ring.

17. Install the reservoir end cap and O-ring down into the reservoir approximately 2.5 cm (1 in.). Install the retainer ring making sure it is firmly in place.

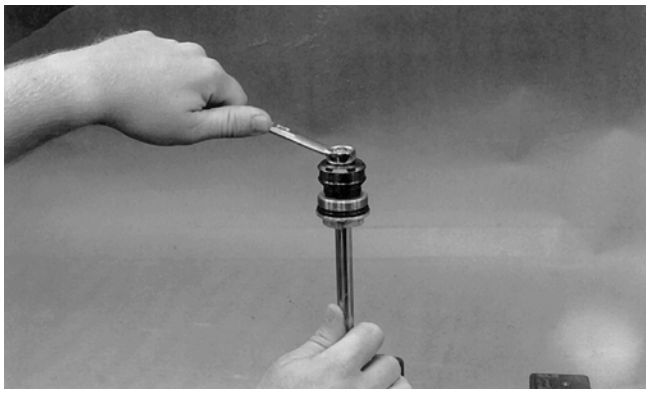
18. Pressurize the reservoir.

19. Install the shock mounting bushings and bearings in eyelets.

Bearing Cap and Shaft Seal

REMOVING AND DISASSEMBLING

1. With shaft assembly removed from shock body, clamp shaft eyelet in vise and remove the lock nut.



AP028

2. Lift the piston valve assembly.

■NOTE: When removing the piston and valve plates from the shock shaft, place the piston assembly on a 5/16 x 3-in. cap screw and secure with a nut to keep the assembly in its proper order.



AP032

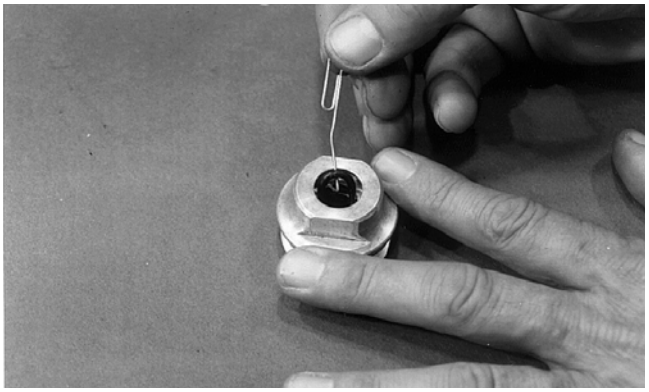
3. Remove the bearing cap (on front arm adjuster shocks, remove the adjuster piston and a spacer washer first).

4. Remove the outer plastic wiper; then remove the inner rubber wiper from the bearing cap.



AG257

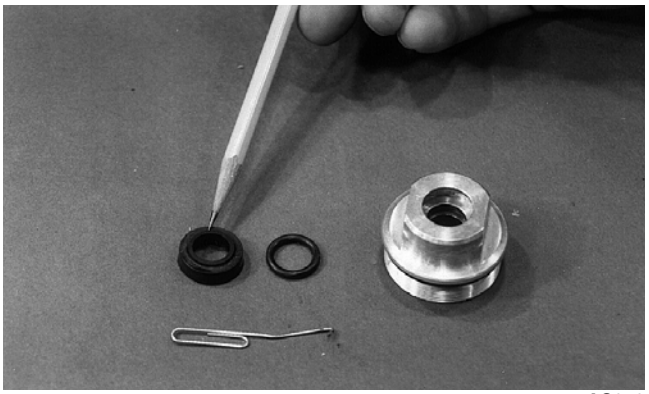
5. Using a small paper clip bent on one end, remove the inner O-ring.



AG258

ASSEMBLING AND INSTALLING

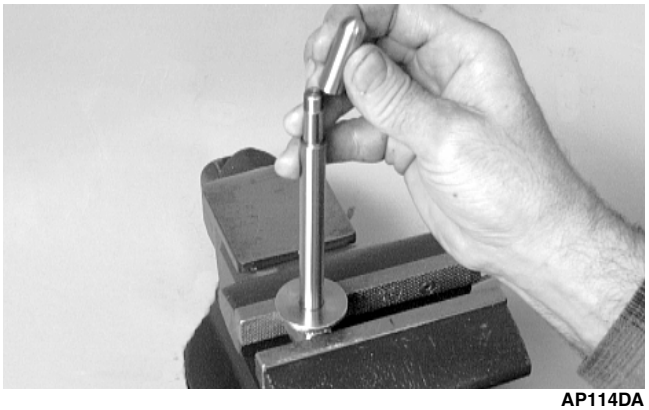
1. Install new O-ring and inner rubber wiper into the shaft bearing cap; then install outer plastic wiper.



AG259

2. Inspect the shoulder or step of the shaft for sharp edges or a burr. Smooth up with #400 grit sand paper or emery cloth.

3. Put Bearing Cap Installation Tool (p/n 0644-268) over the threaded end of the shaft.



AP114DA

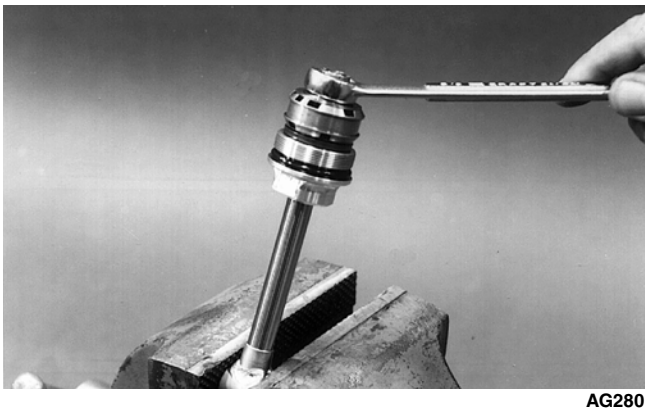
4. Put a small amount of light grease on the seal and slide the bearing cap over the tool and onto the shaft.



AP115DA

5. On a front arm adjuster shock, install the spacer washer on shaft and install adjuster piston in the same manner as bearing cap; then remove the installation tool.

6. Install piston valve assembly. Tighten the self-locking nut to 2.1-2.8 kg-m (15-20 ft-lb).



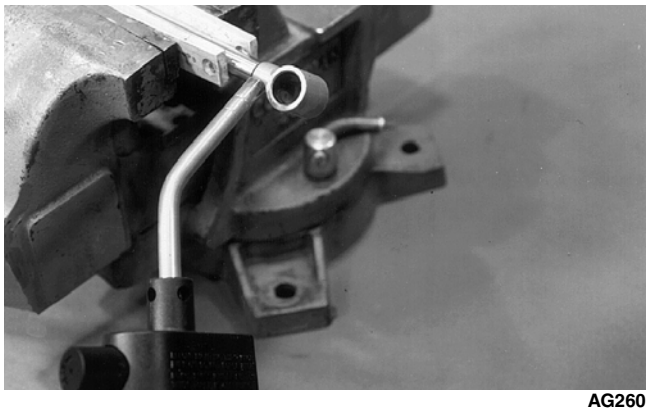
AG280

Shaft Eyelet

REMOVING

1. Using Shock Rod Clamping Tool (p/n 0744-021) to prevent damage to the shaft surface, place the shock shaft into a vise.

2. Heat the shaft eyelet with a torch to soften the Loctite.



AG260

■ **NOTE: The eyelet must be heated up to 300° for the Loctite to soften.**

3. Using a wrench, unscrew the eyelet from the shaft.



AG261

INSTALLING

1. Clean shaft threads and eyelet threads.

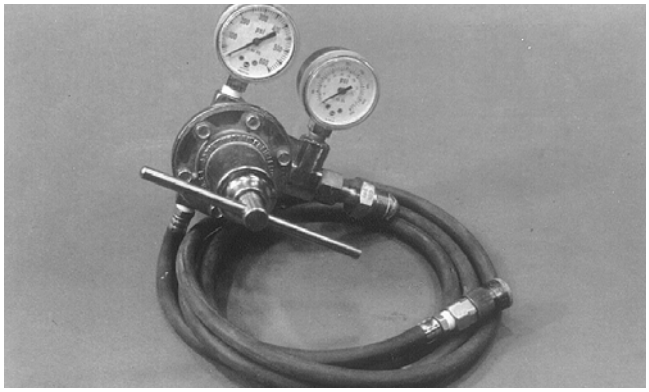
2. Apply red Loctite #271 to both threads, install the eyelet, and tighten securely.

Ski Shocks Bottom-Out Bumper

Bottom-out bumper can be replaced by removing shock eyelet or by removing piston valving assembly and bearing cap.

Pressurizing Rebuildable Shocks

To pressurize the gas shock absorber, a regulator system and a nitrogen tank will be needed.



AG271

⚠ WARNING

Never have a nitrogen bottle in the area without having it chained or secured. If the bottle should tip over and the regulator break off, the gas inside it is under 1800 lb of pressure and personal injury may result.

⚠ WARNING

Always rotate the regulator T-handle to its loose position each time when finished using the system. Each time before the nitrogen tank valve is opened, check to make sure the regulator T-handle is turned out. When opening the nitrogen tank valve, never stand in front of the regulator in case there should be a problem.

■ NOTE: Before inserting the needle into the bladder, lubricate the needle with light oil to make installation easier.

1. Insert the Inflation Needle (p/n 0744-020) into the shock bladder; then open the valve on the filler handle.



FS079

2. Turn the nitrogen tank valve open and slowly rotate the regulator T-handle inward until the gauge reads 200 lb of pressure; then close filler valve and remove inflation needle.

■ NOTE: On remote reservoir shocks, use a needle nose vise grips to hold the bladder housing to keep the end cap from pushing into the reservoir when inserting the inflation needle.



AG851

3. Install the screw into the bladder housing and tighten securely.

4. With the reservoir pressurized, push down on the shock shaft until it nearly bottoms and release it. The shaft should return to its extended position smoothly.

■ NOTE: If a soft spot or a mushy area is felt as the shaft is pushed down, this would indicate air in the shock body. If there is air in the shock body, discharge the reservoir gas pressure. Disassemble the shock to the point that the "filling with oil" and the "bleeding air" procedures can be redone. Assemble and repeat the pressurizing procedure. To test the shock absorber for nitrogen gas leaks, submerge in water.

Troubleshooting Track

Problem: Track Edge Frayed — Drive Lugs Worn	
Condition	**Remedy**
1. **Track alignment** adjusted incorrectly	1. Align — replace track
Problem: Track Worn Adjacent to Outer Drive Lugs	
Condition	**Remedy**
1. **Track tension** adjusted incorrectly 2. **Rear idler wheels** dirty — damaged	1. Adjust track tension 2. Clean — replace idler wheels
Problem: Track Ratchets — Slaps Tunnel	
Condition	**Remedy**
1. **Track tension** adjusted incorrectly (too loose) 2. **Drive sprockets** misaligned — damaged	1. Adjust track tension (tighten) 2. Align — replace sprockets
Problem: Wear-Strip Wear Excessive	
Condition	**Remedy**
1. **Slide rail** bent — broken — damaged 2. **Track alignment** adjusted incorrectly	1. Repair — replace slide rail 2. Adjust track alignment