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2018 SERVICE MANUAL



ZR® 200

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2018 ZR 200 Service Manual
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ISMA
International Snowmobile Manufacturers Association

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General Information/ Foreword

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

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

This Arctic Cat Service Manual contains service and maintenance information for the 2018 Arctic Cat ZR 200 Snowmobile. The 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.

This service manual is designed primarily for use by an Arctic Cat CatMaster Basic Level technician. The procedures found in this manual are of varying difficulty, and certain service procedures in this manual require one or more special tools to be completed. The technician should use sound judgment when determining which procedures can be completed based on their skill level and access to appropriate special tools.

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. A **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.

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SPECIAL TOOLS

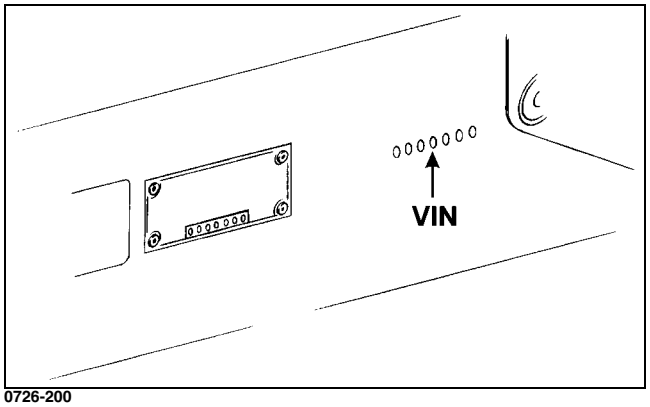
A number of special tools must be available to the technician when servicing this snowmobile.

Description	p/n
V Blocks	0644-535
Surface Plate	0644-016
Ball Hone	0644-290
Shock Spring Removal Tool	0644-057
Fluke Model 88 Multimeter	0644-559
Fuel Hose Clamp Tool	0644-545
Clutch Alignment Bar Tool	0644-624
Engine Alignment Tool	0644-643
Drive Clutch Holder Tool	0644-644
Hayes Brake Bleed Kit	3602-074

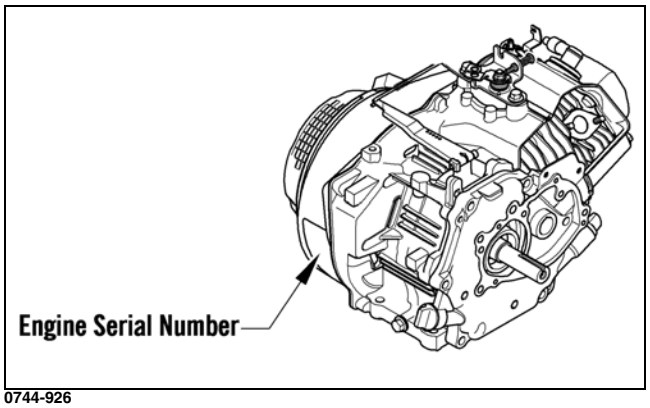
■NOTE: Special tools are available from the Arctic Cat Service Parts Department.

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 on a decal placed on the front side of the recoil cover.



0726-200



0744-926

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.

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Recommended Gasoline and Oil

RECOMMENDED GASOLINE

CAUTION

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

The recommended gasoline to use in these snowmobiles is 87 octane regular unleaded.

■**NOTE: In many areas, oxygenates are added to the gasoline. Oxygenated gasolines containing up to 10% ethanol 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 77.5 main jet is recommended for regular unleaded gasoline, an 80 main jet must be installed if using an oxygenated gasoline.**

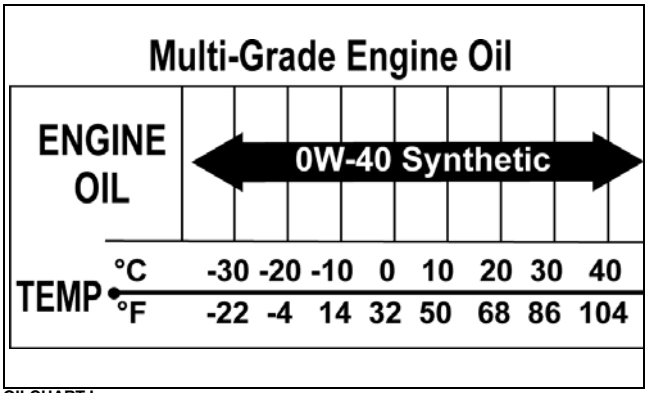
When using ethanol-blended gasoline, adding a gasoline antifreeze is not necessary since ethanol will prevent the accumulation of moisture in the fuel system.

RECOMMENDED OIL

The recommended oil to use in the engine is 0W-40 Synthetic oil. See the viscosity chart for details.

CAUTION

Any oil used in place of the recommended oil may cause serious engine damage.



OILCHARTJ

Break-In Procedure

The Arctic Cat engine requires a short break-in period (approximately 10 operating hours) before being subjected to heavy load conditions or full-throttle operation. Strict adherence to the break-in procedure will contribute to optimum performance and longevity of the engine.

During break-in, a maximum of 1/2 throttle is recommended; however, brief full-throttle accelerations and variations in driving speeds contribute to good engine break-in. After the 10-hour break-in period, the snowmobile may be taken to an authorized Arctic Cat Snowmobile dealer for a checkup and oil change at the discretion and expense of the snowmobile owner.

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.

Preparation for Storage

Prior to storing the snowmobile, it is extremely important that it be properly serviced to prevent corrosion and component deterioration. Arctic Cat recommends the following procedure to prepare the snowmobile for storage.

1. Clean the seat cushion with vinyl protectant and a damp cloth.
2. Clean the snowmobile thoroughly by hosing dirt, oil, grass, and other foreign matter from the undercarriage, tunnel, hood, and belly pan. Allow the snowmobile to dry thoroughly. DO NOT get water into any part of the engine.
3. Drain all gas from the gas tank. Drain the gasoline from the carburetor by loosening the drain screw on the carburetor float chamber.
4. Plug the muffler outlet with a clean cloth.
5. With the ignition key in the OFF position:

A. Disconnect the spark plug cap from the spark plug; then remove the spark plug.

B. Pour 10 ml (approximately two teaspoons) of petroleum-based oil into the spark plug hole; then pull the recoil starter handle slowly about five times.

CAUTION

Never crank the engine over without grounding the spark plug. Damage to the transistorized ignition may result.

C. Install the spark plug and connect the spark plug cap.

6. Change the oil.
7. Tighten all screws, nuts, and cap screws securely.
8. Make sure all rivets holding components together are tight. Replace all loose rivets.
9. Clean and polish the hood, console, and chassis with Cat Cleaner (p/n 4639-371). DO NOT USE SOLVENTS. THE PROPELLANT WILL DAMAGE THE FINISH.

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10. If possible, store the snowmobile indoors. Raise the rear of the snowmobile off the floor and block up the rear end. Cover the snowmobile with a snowmobile cover to protect it from dirt and dust.
11. If the snowmobile must be stored outdoors, block the entire snowmobile off the ground and cover it with a snowmobile cover to protect it from dirt, dust, and rain.

CAUTION

Avoid using a plastic cover as moisture will collect on the snowmobile causing corrosion.

Preparation After Storage

Taking the snowmobile out of storage and correctly preparing it for operation will ensure many miles and hours of trouble-free snowmobiling. Arctic Cat recommends the following procedure to prepare the snowmobile:

1. Clean the snowmobile thoroughly. Polish the exterior of the snowmobile using Cat Cleaner.
2. Clean the engine cooling fins and the recoil starter vents. Remove the cloth from the muffler.
3. Check 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. Check brake-lever travel distance, all controls, ski alignment, track tension, track alignment, brake band, and ski wear bars; adjust or replace as necessary.
5. Examine the in-line fuel filter and clean or replace if necessary.
6. Fill the gas tank.
7. Clean the seat cushion with the vinyl protectant.
8. Check the spark plug (clean, gap, and/or replace as necessary); then start the engine and ensure proper carburetor adjustments.

Torque Conversions (ft-lb/N-m)

ft-lb	N-m	ft-lb	N-m	ft-lb	N-m	ft-lb	N-m
1	1.4	26	35.4	51	69.4	76	103.4
2	2.7	27	36.7	52	70.7	77	104.7
3	4.1	28	38.1	53	72.1	78	106.1
4	5.4	29	39.4	54	73.4	79	107.4
5	6.8	30	40.8	55	74.8	80	108.8
6	8.2	31	42.2	56	76.2	81	110.2
7	9.5	32	43.5	57	77.5	82	111.5
8	10.9	33	44.9	58	78.9	83	112.9
9	12.2	34	46.2	59	80.2	84	114.2
10	13.6	35	47.6	60	81.6	85	115.6
11	15	36	49	61	83	86	117
12	16.3	37	50.3	62	84.3	87	118.3
13	17.7	38	51.7	63	85.7	88	119.7
14	19	39	53	64	87	89	121
15	20.4	40	54.4	65	88.4	90	122.4
16	21.8	41	55.8	66	89.8	91	123.8
17	23.1	42	57.1	67	91.1	92	125.1
18	24.5	43	58.5	68	92.5	93	126.5
19	25.8	44	59.8	69	93.8	94	127.8
20	27.2	45	61.2	70	95.2	95	129.2
21	28.6	46	62.6	71	96.6	96	130.6
22	29.9	47	63.9	72	97.9	97	131.9
23	31.3	48	65.3	73	99.3	98	133.3
24	32.6	49	66.6	74	100.6	99	134.6
25	34	50	68	75	102	100	136

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Torque Specifications

■**NOTE: Torque specifications have the following tolerances:**

Torque (ft-lb)	Tolerance
0-15	±20%
16-39	±15%
40+	±10%

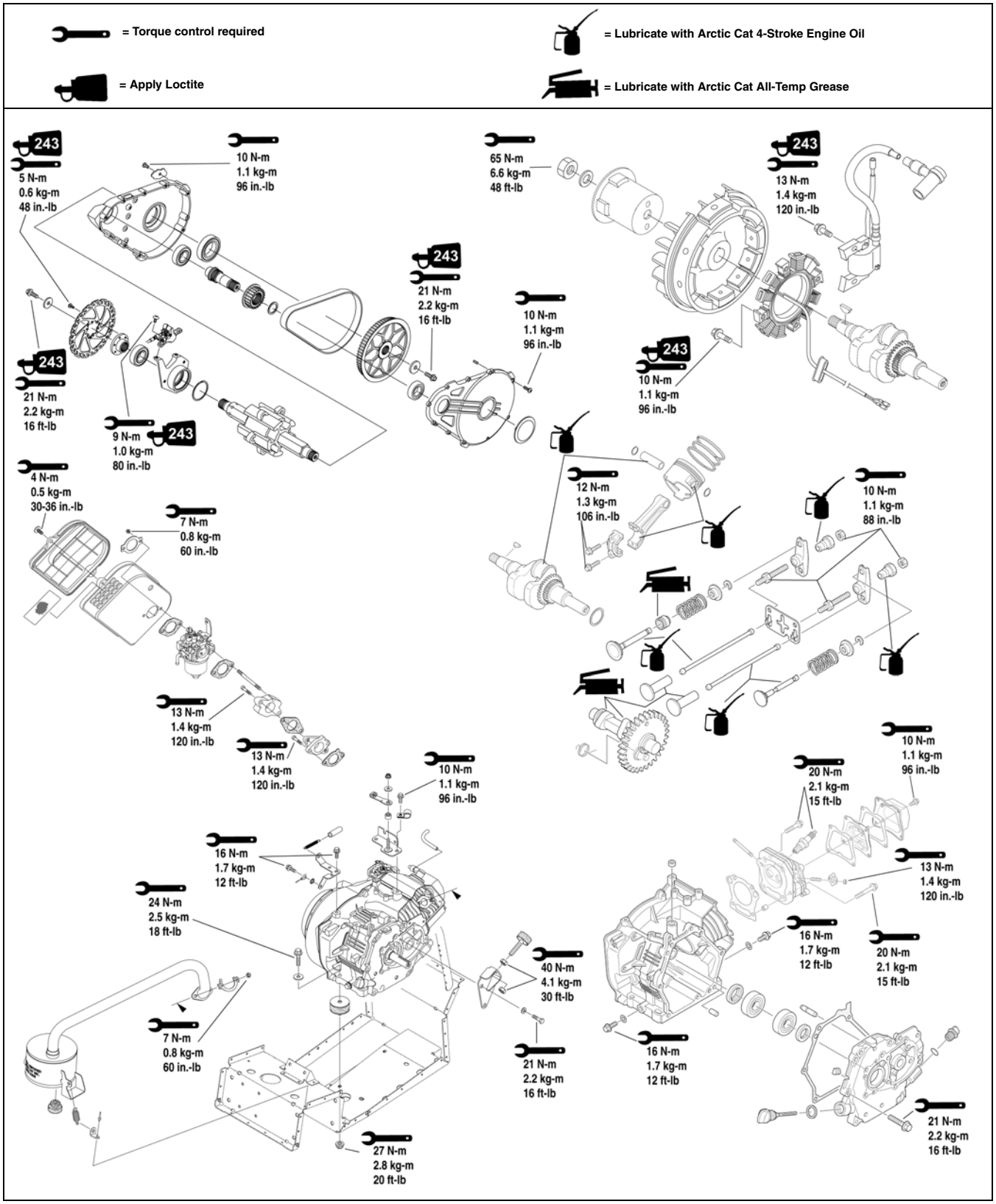
Item	Secured to	Torque ft-lb
DRIVE SYSTEM		
Drive Clutch	Engine	20
Driven Clutch	Driven Shaft	40
Brake Bracket Bearing Holder	Chassis	60 in.-lb
Drop Case Sprocket	Driveshaft	16
Drop Case	Chassis	96 in.-lb
Torque Bumper Bracket	Chassis	16
Brake Caliper*	Chassis	80 in.-lb
Brake Disc*	Brake Hub	48 in.-lb
Brake Manifold	Steering Support	72 in.-lb
Brake Disc*	Driveshaft	16
MC Mount	Master Cylinder	30 in.-lb
STEERING/FRONT SUSPENSION/CHASSIS		
Ski	Spindle	16
Ski	Wear Bar	50 in.-lb
Ski	Ski Handle	50 in.-lb
Steering Post*	Chassis	96 in.-lb
Steering Tie Rod*	Steering Post	20
Tie Rod*	Spindle Arm	15
Steering Support	Spar	96 in.-lb
Steering Support	Upper Console	96 in.-lb
A-Arm	Chassis	30
A-Arm	Spindle	20
Shock Absorber	Spindle	16
Shock Absorber	Chassis	16
REAR SUSPENSION		
Rail*	Crossbrace Axle	20
Crossbrace Axle (Shock)*	Rail	20
Support Bracket	Rail	20
Support Bracket	Front Arm	20
Rear Axle Housing*	Rail	20
Rear Wheels	Rear Axle Housing	34
Track Adjuster	Rear Axle Housing	96 in.-lb
Limiter Strap	Limiter Strap	40 in.-lb
End Cap	Rail	45 in.-lb
Wear Strip	Rail	50 in.-lb

* w/Blue Loctite #243

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Engine Torque Diagram

■**NOTE: Before engine assembly, ensure all threaded areas are clean to ensure an accurate torque value is achieved.**



200-ENG-18-1

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Engine Specifications

Engine Model Number		7DHJ
Displacement		192 cc
No. of Cylinders		1
Bore x Stroke		70 x 50 mm
Compression Ratio		8.4:1
Cooling System		Air
Spark Plug (NGK)		BPR4ES
Spark Plug Gap		0.028-0.031"
Piston Skirt/Cylinder Clearance		0.0012-0.0018"
Piston Pin Diameter		0.6297-0.6299"
Piston Pin Bore Diameter (max)		0.6300"
Piston Pin/Connecting Rod Small End Clearance		0.008-0.024"
Piston Ring End Gap	(1st/2nd) (oil)	0.008-0.016" 0.008-0.028"
Piston Ring/Groove Clearance	(1st) (2nd)	0.0016-0.0031" 0.0008-0.0024"
Piston Ring Thickness	(1st/2nd) (oil)	0.059" 0.098”
Piston Diameter (10 mm from skirt edge) (min)		2.752"
Cylinder/Head Distortion (max)		0.004"
Connecting Rod Small End Bore Inside Diameter		0.6302-0.6307"
Connecting Rod Big End Inside Diameter		1.1024-1.1030"
Connecting Rod Big End Side Clearance		0.008-0.024"
Cam Lobe Height		1.050-1.059"
Crank Pin Diameter (min)		1.1011-1.1017"
Crank Pin/Connecting Rod Clearance		0.0006-0.0018"
Crankshaft Rod Journal (Out-of-Round/Taper)		0.004"
Crankshaft Runout (t.i.r.)		0.0016"
Valve Guide Inside Diameter (max)		0.22"
Valve Guide/Stem Clearance (max)	(Int) (Exh)	0.0016-0.0024" 0.0024-0.0031"
Valve Face Width (min)		0.028"
Valve Face Runout (max)		0.0012"
Valve Clearance — Cold (59°-77° F)	(Int/Exh)	0.004"
Valve Seat Contact Width (min)	(Int/Exh)	0.067"
Valve Stem Diameter (min)	(Int/Exh)	0.022"
Valve Stem Runout (max)		0.0004"
Valve Spring Free Length (max)		1.245"
Camshaft End Running Surface (max)		0.592”
Camshaft End Play (max)		0.002”
Vibration — Hand/Arm		3.8 m/s
Vibration — Seat		< 0.5 m/s

Carburetor Specifications

Main Jet	Pilot Jet	Idle Fuel Adjuster Screw (Turns Out)	Float Height
100	37.5	1	0.63"

Carburetor Jet Chart for: 200

Altitude		Main Jet (Pilot Jet) Pilot screw to be set fully counterclockwise to stop					
Feet	(Meters)						
6000+	(1829+)	100 (37.5)	98.8 (37.5)	97.5 (36.3)	97.5 (36.3)	96.3 (35)	95 (35)
4000	(1219)	100 (37.5)	98.8 (37.5)	97.5 (36.3)	97.5 (36.3)	96.3 (35)	95 (35)
2000	(610)	101.3 (38.8)	100 (37.5)	98.8 (37.5)	97.5 (36.3)	97.5 (36.3)	96.3 (35)
0	(0)	101.3 (38.8)	100 (37.5)	98.8 (37.5)	97.5 (36.3)	97.5 (36.3)	96.3 (35)
Temperature F		-22 to -4	-4 to 14	14 to 32	32 to 50	50 to 68	68 to 86
Temperature C		(-30 to -20)	(-20 to -10)	(-10 to 0)	(0 to 10)	(10 to 20)	(20 to 30)

Track Specifications

Length	Width	Lug Height	Tension @ 20 lb
93"	10"	1.00"	2"

Front/Rear Shock Spring

Free Length	Wire Diameter	Rate LB/Inch	# of Coils
6.97”	0.235”	85	9.58
6.75”*	0.243”*	85*	8.06*

* Optional Heavier Spring

Rear Suspension Spring

Wire Diameter	Angle	#of Coils	Coil Width	Length	Length
0.375"	0°	4.50	2.43"	6.16"	4.57"
0.406"*	6°*	4.48*	2.45"*	6.03"*	4.57"*

* Optional Heavier Spring

Front Shock Absorber

Collapsed Length	Extended Length	Stroke	Piston Depth
7.78”	9.49”	1.71”	N/A

Rear Shock Absorber

Collapsed Length	Extended Length	Stroke	Piston Depth
6.50”	8.60”	2.1”	N/A

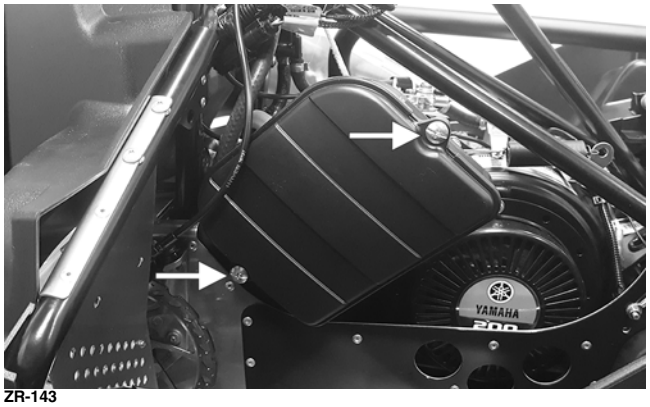
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Engine

This engine section has been organized into sub-sections showing a progression for the complete servicing of the Arctic Cat 200 cc engine. For consistency purposes, this section shows a complete and thorough progression; however, for efficiency it may be preferable to remove and disassemble only those components needing to be addressed and to service only those components. Also, some components may vary. The technician should use discretion and sound judgment.

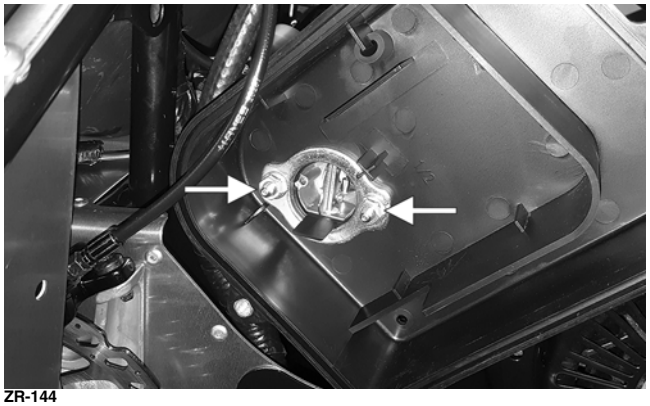
Removing

1. Remove the screws securing the air cleaner cover to the air cleaner case and account for the filter and retaining plate.

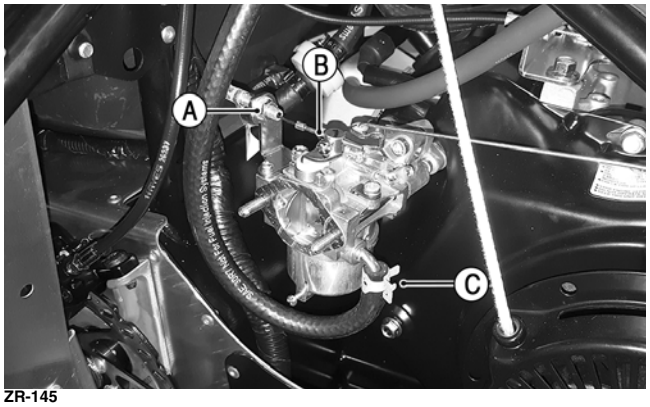


ZR-143

2. Remove the flanged nuts securing the air cleaner assembly to the carburetor and engine. Account for the plate.

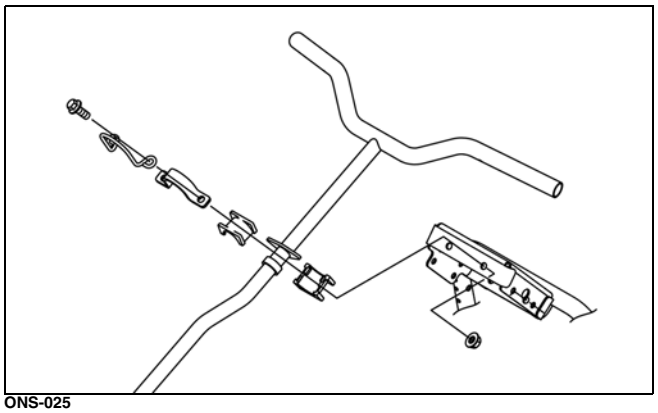

ZR-144

3. Remove the air cleaner case from the carburetor and engine. Account for the gasket.
4. Remove the nut (A) and screw (B) securing the choke cable to the carburetor; then remove the fuel hose (C) from the carburetor. Remove the carburetor from the engine.

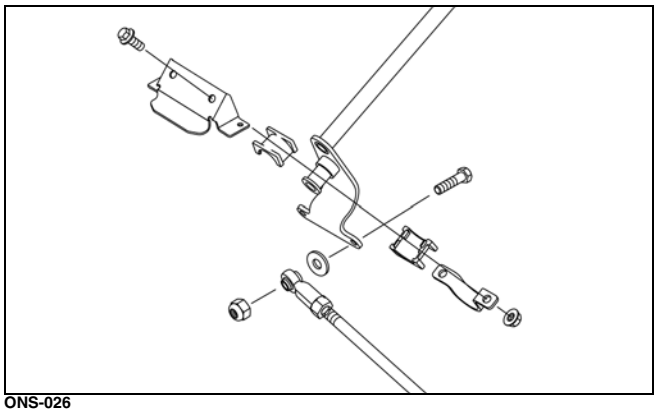


ZR-145

5. Remove the two cap screws and lock nuts securing the upper steering post bearings and retainers; then remove the retainers and bearings.


ONS-025

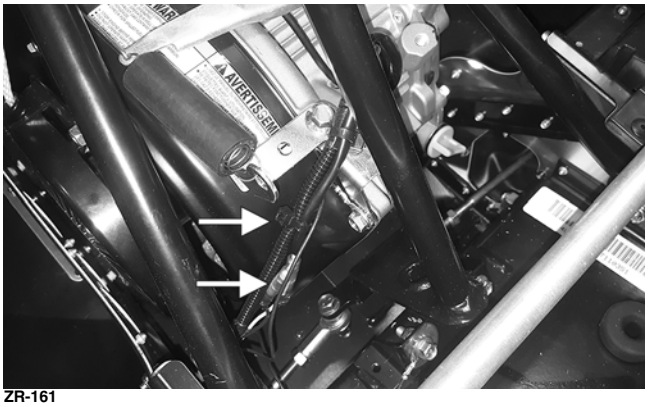
6. Remove the cap screws, washers, and lock nuts securing the tie rods to the steering post; then remove the cap screws and lock nuts securing the steering post to the chassis. Account for a washer, ground wire, bearings, and the retainer.


ONS-026

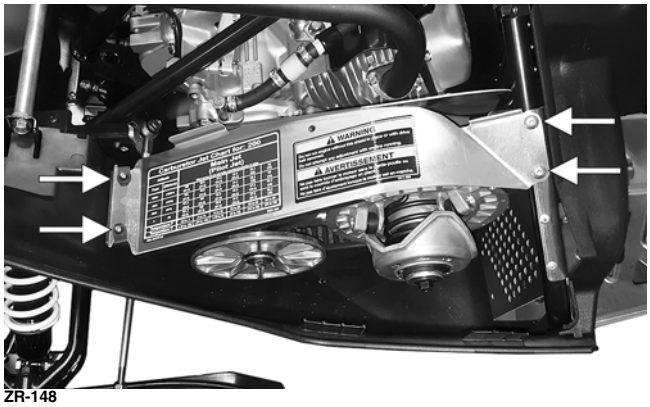
■NOTE: Use an additional wrench to keep the tie rod end shaft from turning while removing the tie rod lock nut.

7. Remove the steering post from the engine compartment.
8. Cut the cable tie; then disconnect the coil and two magneto wires at the front of the engine. Route them out of the way.

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ZR-161

9. Remove the screws securing the clutch guard; then remove the guard.


ZR-148

10. While pulling up on the drive belt between the clutches, rotate the driven clutch to help the driven clutch open.

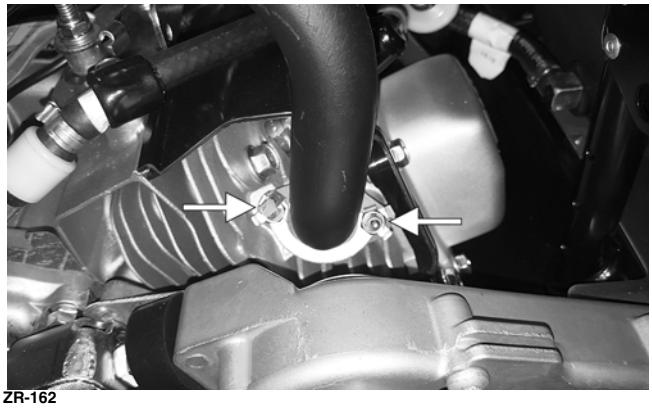

ZR-126

11. Remove the drive belt by pulling it up and over the sheave.

12. Install the drive clutch retention tool over the drive clutch sheaves; then remove the cap screw and washer securing the drive clutch to the crankshaft. Account for a spacer on the crankshaft.


ZR-125

13. Using a flat-blade screwdriver, press the tabs on the lock washer covering the nuts securing the muffler to the engine. Remove the nuts and springs securing the muffler. Remove the muffler.


ZR-162

14. Pull the recoil starter rope out for enough to tie a slip-knot in the starter rope below the steering support and allow the rope to slowly retract against the recoil starter.

15. Remove the knot at the handle and remove the handle; then thread the rope through the bushing in the console.

16. Using a flat-blade screwdriver, remove the four belly pan plugs covering the engine mounting cap screws; then remove the cap screws and lock nuts.

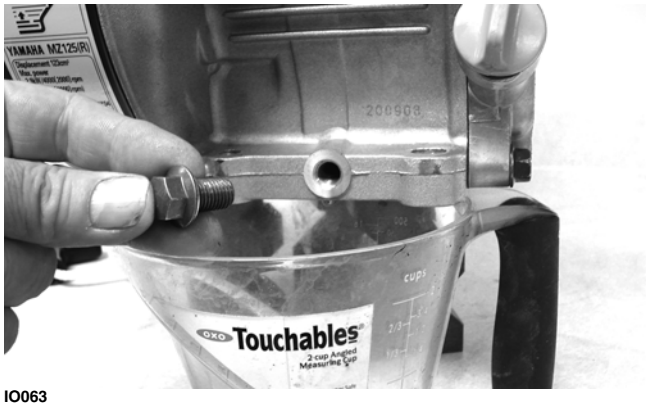
■**NOTE: The front center plug is to access the oil drain plug.**

17. Remove the engine from the engine compartment.

Disassembling

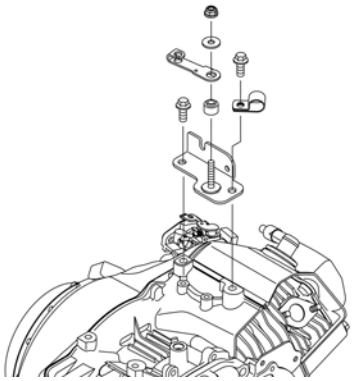
1. Remove the oil drain plug and drain the oil; then install the oil plug and tighten securely.

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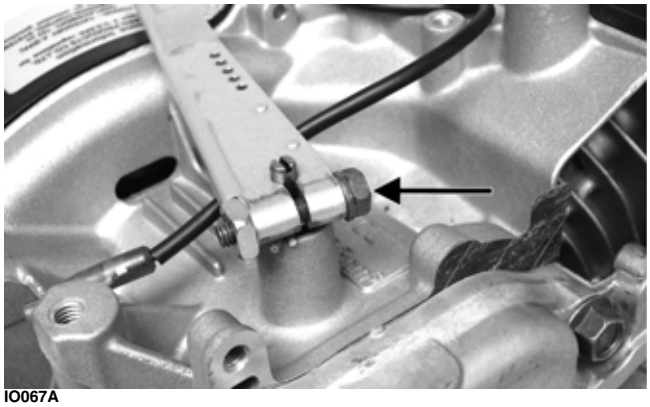
IO063

2. Remove the spring and hose from the governor arm.
3. Remove the throttle cable and retaining bracket from the engine; then remove the governor arm rod from the bracket.



ONS-039

4. Loosen the governor arm cap screw and remove the arm; then disconnect the rod from the carburetor.



IO067A

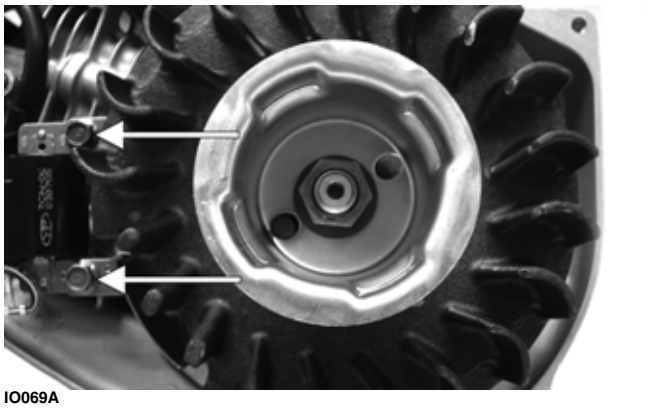
5. Slide the intake tube and carburetor off the mounting studs. Account for three gaskets and an insulator block.



IO068

■NOTE: If the cylinder head will be replaced, the carburetor studs may be removed by tightening the two nuts against each other; then using a wrench on the inside nut, remove the stud.

6. Remove the recoil starter/fan housing assembly.
7. Remove the spark plug wire from the spark plug and remove the spark plug; then remove the cap screws securing the ignition coil to the crankcase housing and remove the coil.



IO069A

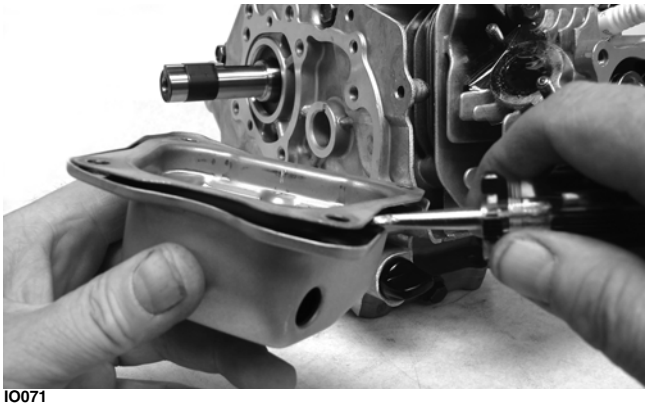
8. Remove the cylinder head cover; then remove the air shroud.



IO070A

9. Remove the air breather body from the cylinder head cover. Account for a gasket.

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IO071

10. Remove the lock nuts and rocker arm pivots securing the rocker arms to the cylinder head.
11. Remove the push rods; then remove the push rod guide plate.



IO072A

12. Remove the cap screws securing the head to the cylinder; then remove the head and account for a gasket and the location of the two dowel pins.



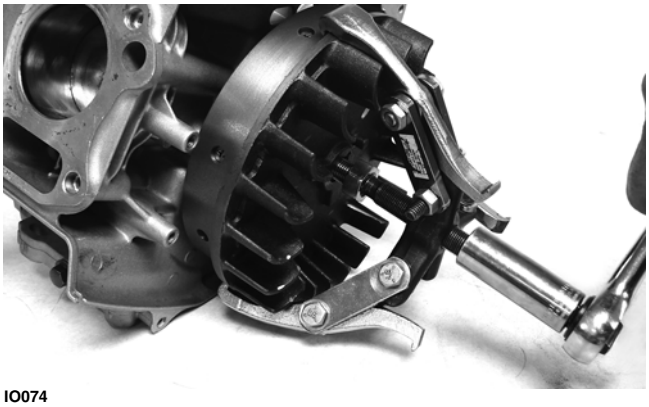
IO073

13. Remove the nut securing the flywheel to the crankshaft and starter pulley.



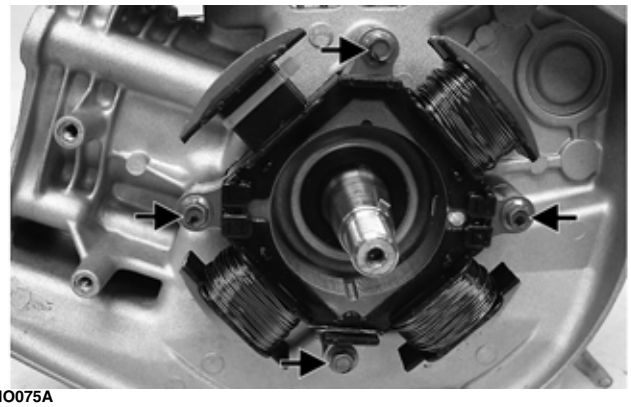
IO069B

14. Using a flywheel puller, remove the flywheel.



IO074

15. Remove the cap screws securing the stator to the crankcase; then route the stator harness out through the slot in the crankcase and remove the stator.



IO075A

16. Remove the cap screws securing the crankcase side cover to the crankcase. Account for dowel pins, gasket, and a crankshaft shim.

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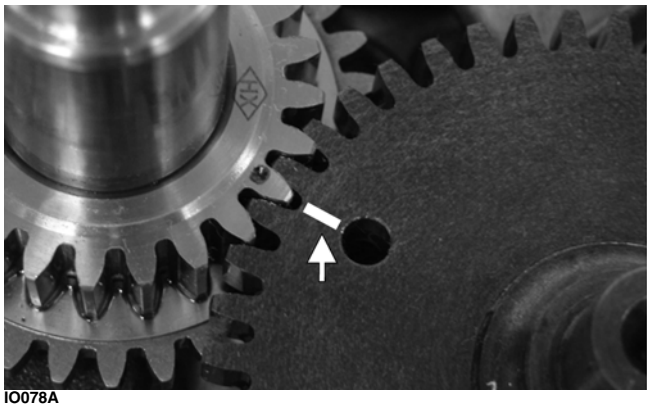


IO094B



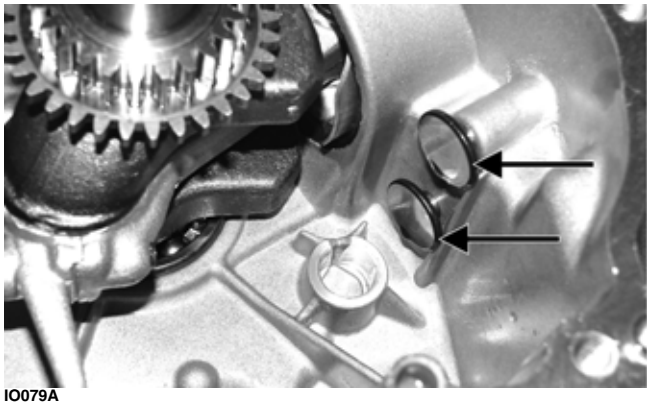
IO077

17. With the piston at TDC, scribe an alignment mark on the gear of the camshaft directly in-line with the alignment dot on the crankshaft gear.



IO078A

18. Remove the camshaft; then remove the tappets. Identify the tappets for proper installation.



IO079A

19. Rotate the crankshaft until the connecting rod cap screws are accessible.



IO080A

20. Note the relation of the connecting rod journal to the crankshaft and mark the connecting rod and end cap for reference during installation; then remove the cap screws and connecting rod end cap.



IO081A

21. Carefully work the connecting rod/piston up and out of the cylinder; then remove the crankshaft.

■**NOTE: For assembling purposes, note the arrow mark on the dome of the piston is directed to the push rod opening of the cylinder.**

22. Remove the hairpin clip from the governor control shaft; then remove the shaft and account for the washer.



IO082A

23. Inspect the crankshaft and governor control shaft oil seals for cracks or deterioration; then inspect the crankshaft bearings for roughness or discoloration and replace if necessary.

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■NOTE: If the seals or bearings of the crankshaft need to be replaced, see Crankshaft Bearings in Servicing Components.

Servicing Components

Thoroughly clean all non-electrical components in parts-cleaning solvent; then remove any carbon buildup from the cylinder head, piston dome, valves, and valve seats.

Visually inspect all engine components for wear or damage.

CYLINDER HEAD/VALVE ASSEMBLY

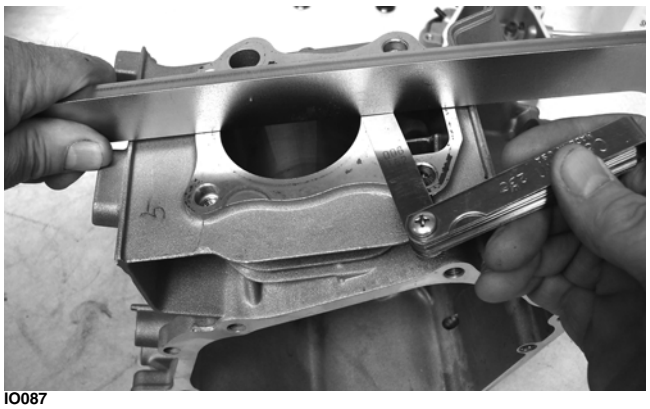
■NOTE: Remove the valves by pressing down on the spring retainer and removing the valve keeper. Account for valve springs, spring retainers, and valve keepers. Keep all valves and related components as a set.

When servicing valves and cylinder head assembly, inspect valve seats, head warpage, valve stems, valve faces, and valve stem ends for pits, burn marks, or other signs of abnormal wear. Never reuse the intake valve seal. Always replace the seal.

■NOTE: Discard any valve that fails the listed inspections. Do not grind the valves. If a valve or cylinder head is damaged, it must be replaced.

Measuring Cylinder Head Distortion

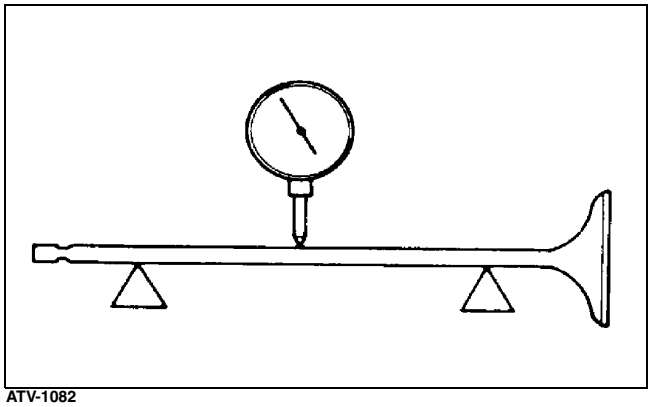
1. Using a non-metallic carbon removal tool, remove any carbon buildup from the combustion chamber being careful not to nick, scrape, or damage the combustion chamber or the sealing surfaces.
2. Inspect the spark-plug hole for any damaged threads. Repair damaged threads using a heli-coil insert.
3. Inspect the cylinder head for flatness using a straightedge and a feeler gauge. Acceptable distortion must not exceed 0.004".



IO087

Measuring Valve Stem Runout

1. Support each valve stem end with V Blocks; then check the valve stem runout using a dial indicator.

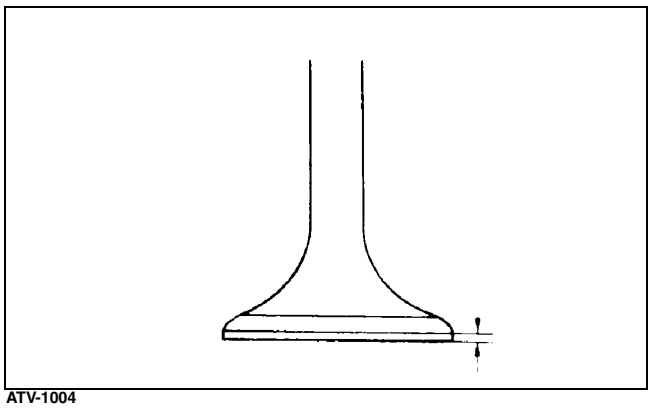


ATV-1082

2. Maximum runout must not exceed 0.0004" for both valves.

Measuring Valve Face Width

1. Using a micrometer, measure the width of the valve face.

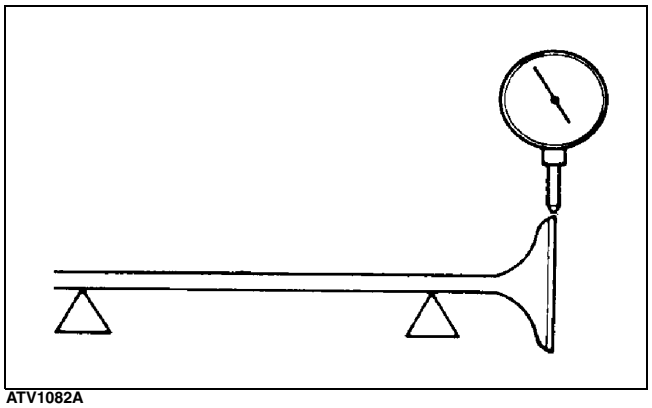


ATV-1004

2. Acceptable valve face width must be at least 0.030".

Measuring Valve Face Runout

1. Mount a dial indicator on a surface plate; then place the valve stem on a set of V blocks.
2. Position the dial indicator contact point on the outside edge of the valve face; then zero the indicator.



ATV1082A

3. Rotate the valve in the V blocks.
4. Maximum runout must not exceed 0.0012".

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Measuring Valve Guide/Valve Stem Clearance

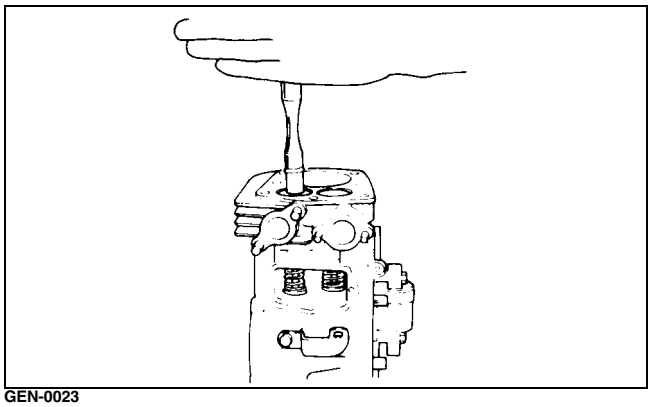
1. Using a micrometer and small bore gauge, take diameter readings on the valve stems and inside the guides.
2. The stem clearance inside the guide must be within 0.0016-0.0020" for the intake and 0.0020-0.0030" for the exhaust.

■NOTE: Be sure to take readings at more than one place along the length of each stem and guide.

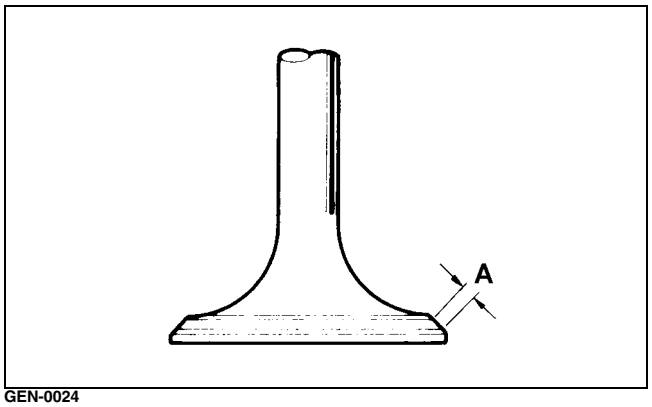
Lapping Valves

■NOTE: Ensure that all carbon has been removed from the valves.

1. Using a valve lapper, produce a contact pattern on each valve face by applying a uniform coat of valve lapping compound to the valve seat and by rotating and tapping the valve head.
2. Acceptable width of valve seat contact width (measurement A) must be at least 0.03".



GEN-0023



GEN-0024

■NOTE: Do not grind the valves. If a valve is damaged, it must be replaced.

3. Lubricate each valve stem with lightweight oil; then apply a small amount of valve lapping compound to the entire seating face of each valve.
4. Attach the suction cup of a valve lapping tool to the head of the valve.
5. Rotate the valve until the valve and seat are evenly polished.
6. Clean all compound residue from the valve and seat.

Valve Springs

1. When the valve springs are weak, the valve and valve seat fail to form a good seal, thus allowing gas to leak past the valve seat causing a loss of power. Whether or not a valve spring is weak can be determined by its free length.



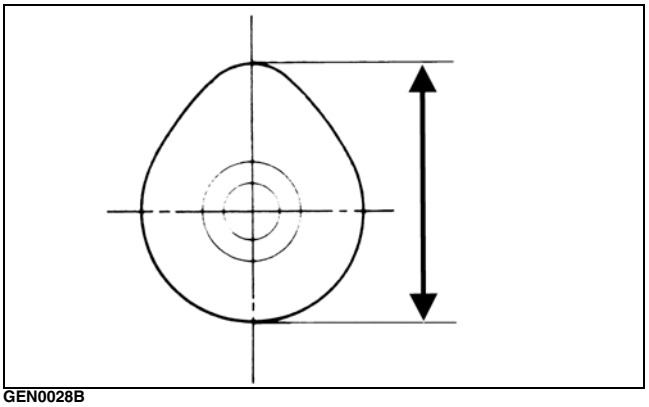
GM128D

2. Minimum valve spring free length must not exceed 1.04".

■NOTE: With the crankshaft at top dead center on the compression stroke, install the valve springs and spring retainers; then compress the valve springs and install the valve keepers.

CAM LOBE WEAR

Worn cam lobes result in reduced power output. The limit of cam lobe wear is specified for both intake and exhaust lobes in terms of cam height to be measured with a micrometer. Replace the camshaft if not within 1.048-1.052".



GEN0028B

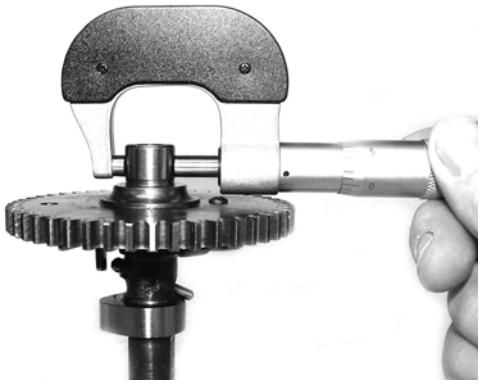


IO088

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Measuring Camshaft End Running Surfaces

1. Using an outside micrometer, measure the running surfaces of each end of the camshaft. The measurement should be at least 0.592".



IO089

2. Inspect the camshaft bosses of the crankcase and crankcase cover for cracks, discoloration, and wear.

PISTON ASSEMBLY

■NOTE: Oversized pistons are available allowing the cylinder to be bored oversized.

■NOTE: Whenever a piston, rings, or pins are out of tolerance, they must be replaced.

Cleaning/Inspecting Piston

1. Using a non-metallic carbon removal tool, remove any carbon buildup from the dome of the piston.
2. Inspect the piston for cracks in the piston pin, dome, and skirt areas.
3. Inspect the piston for seizure marks or scuffing.

■NOTE: If seizure marks or scuffing is detected, the piston must be replaced.

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

Removing Piston Rings

1. Starting with the top ring, slide one end of the ring out of the ring-groove.
2. Remove each ring by working it toward the dome of the piston while rotating it out of the groove.

■NOTE: Note the location of each ring for proper installation. When installing new rings, install as a complete set only.

Cleaning/Inspecting Piston Rings

■NOTE: Make a ring-groove cleaning tool by taking an old piston ring and snapping it into two pieces; then grind the end of the old ring to a 45° angle and to a sharp edge.

Using a ring-groove cleaning tool, clean carbon from the ring-grooves. Be sure to position the ring with its tapered side up.

CAUTION

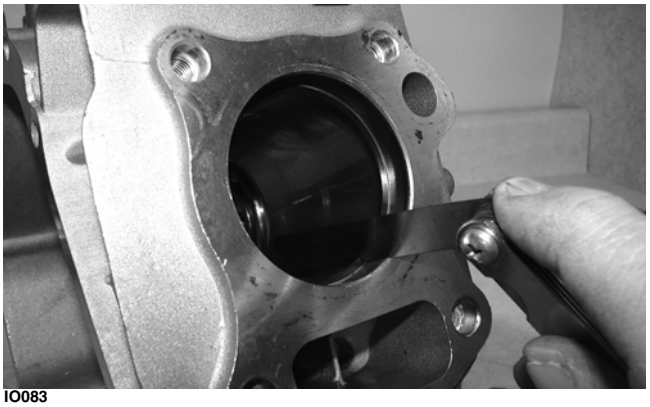
Improper cleaning of the ring-grooves by the use of the wrong type of ring-groove cleaner will result in severe damage to the piston.

Measuring Piston-Ring End Gap (Installed)

1. Place each piston ring in the wear portion of the cylinder. Use the piston to position each ring squarely in the cylinder.

■NOTE: When measuring a piston ring, it should be placed into the area of the cylinder where wear is least (the area is about 0.12" from the upper or lower edge of the cylinder).

2. Using a feeler gauge, measure each piston-ring end gap. Acceptable ring end gap must be within 0.008-0.016" (1st and 2nd rings) or within 0.0079-0.0157" (oil ring).



IO083



IO090

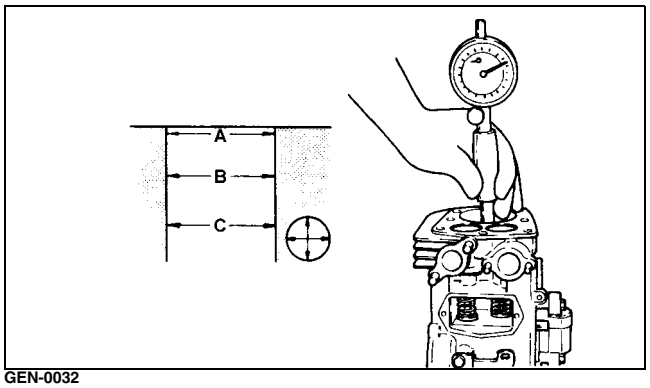
Piston Ring/Groove Clearance

1. Using a thickness gauge, measure the side clearances of the 1st and 2nd rings.
2. If the measurements are not within 0.0016- 0.0030" (1st ring) or 0.0008-0.0024" (2nd ring), replace both piston and piston rings.

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Measuring Piston Skirt/Cylinder Clearance

1. Measure the cylinder front to back in six places using a cylinder bore gauge. The amount of wear is the difference between the largest and smallest readings. If the determined wear exceeds the limit indicated, bore to the next oversize by using a boring machine or replace the cylinder.



GEN-0032

2. Measure the corresponding piston diameter at a point 10 mm above the piston skirt at a right angle to the piston-pin bore. Piston diameter must be at least 2.205".



IO085

3. Piston skirt to cylinder clearance must be within 0.0006-0.0016".
4. If the piston/cylinder clearance exceeds the limit, bore the cylinder and use an oversized piston or replace both cylinder and piston.

Installing Piston Rings

1. Place the oil ring expander into the bottom groove of the piston allowing the ends to contact each other.

CAUTION

Never allow the ends of the oil ring expanders to overlap. This allows a loss of oil control and incorrect tension of the ring.

2. Place one end of the thin oil ring between the top of the oil ring expander and the ring groove; then wind the ring around the piston until the ring is properly seated into the ringland of the piston. Repeat this procedure for the lower thin oil ring.
3. Position the thin oil ring gaps 90° from the gap of the oil ring expander and 180° from each other.
4. Install the middle and top compression ring with the I.D. mark directed toward the dome of the piston.

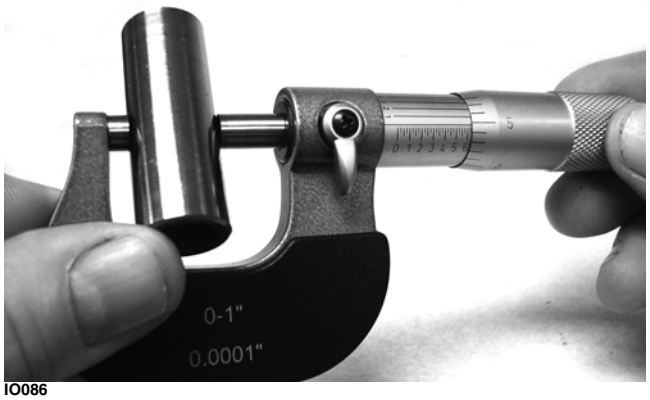
■NOTE: The top compression ring can be identified by the chrome (silver) face of the ring.

CAUTION

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

Measuring Piston Pin Diameter

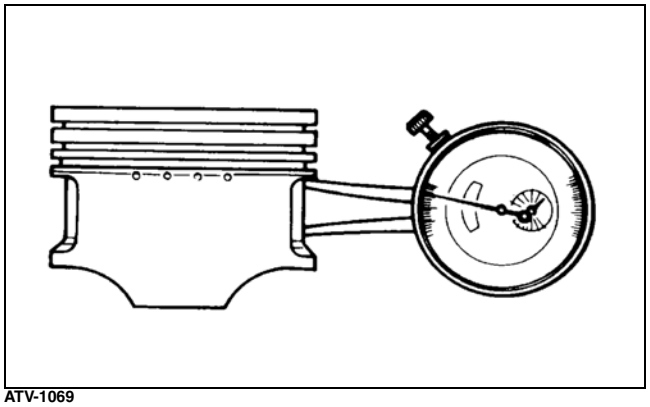
1. Measure the piston pin diameter at each end and in the center. If measurement is less than minimum specifications, the piston pin must be replaced.
2. Piston pin diameter must be within 0.6297-0.6299".



IO086

Measuring Piston Pin Bore Diameter

1. Insert an inside dial indicator into the piston-pin bore. Take two measurements to ensure accuracy.
2. Piston pin bore must not exceed 0.433".


ATV-1069

CYLINDER/CYLINDER HEAD

■NOTE: If the cylinder/cylinder head assembly cannot be trued, they must be replaced.

Cleaning/Inspecting Cylinder Head

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

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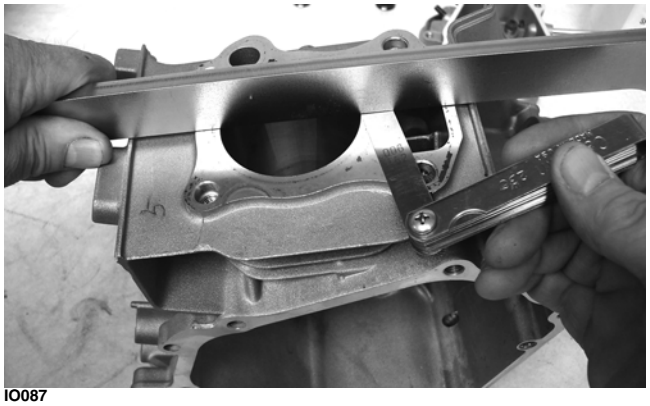
2. Inspect the spark plug hole for any damaged threads. Repair damaged threads using a “heli-coil” insert.
3. Place the cylinder head on the Surface Plate covered with #400 grit wet-or-dry sandpaper. Using light pressure, move the cylinder head in a figure-eight motion. Inspect the sealing surface for 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.

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.

Cleaning/Inspecting/Measuring Cylinder Distortion

1. Wash the cylinder in parts-cleaning solvent.
2. Check the gasket surface of the cylinder for distortion with a straightedge and thickness gauge taking a clearance reading at several places. If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder.
3. Maximum cylinder distortion must not exceed 0.004".



IO087

4. Inspect the cylinder for pitting, scoring, scuffing, warpage, and corrosion. If marks are found, repair the surface using the Ball Hone (see Honing Cylinder sub-section).
5. Place the cylinder on the surface plate covered with #400 grit wet-or-dry sandpaper. Using light pressure, move the cylinder 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 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.

Honing Cylinder

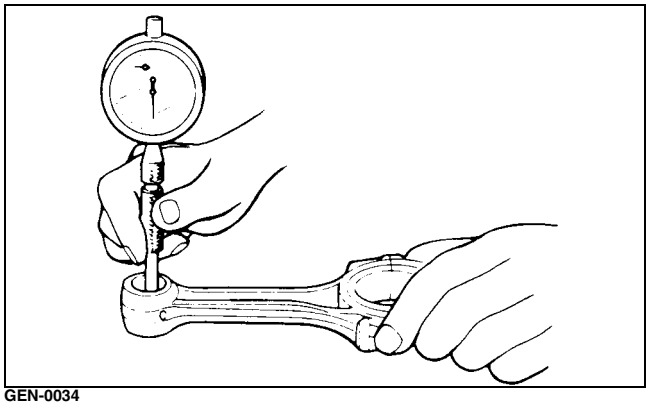
1. Wash the cylinder in parts-cleaning solvent.
2. Inspect the cylinder for pitting, scoring, scuffing, and corrosion. If marks are found, repair the surface using the Ball Hone.

■NOTE: To produce the proper 45° crosshatch pattern, maintain a low drill RPM. If honing oil is not available, use a lightweight, petroleum-based oil. Thoroughly clean the cylinder after honing using detergent soap and hot water and dry with compressed air; then immediately apply oil to the cylinder bore. If the bore is severely damaged or gouged, the cylinder must be replaced.

3. If the cylinder bore measurement exceeds the limit, hone the cylinder and install an oversized piston or replace the cylinder.

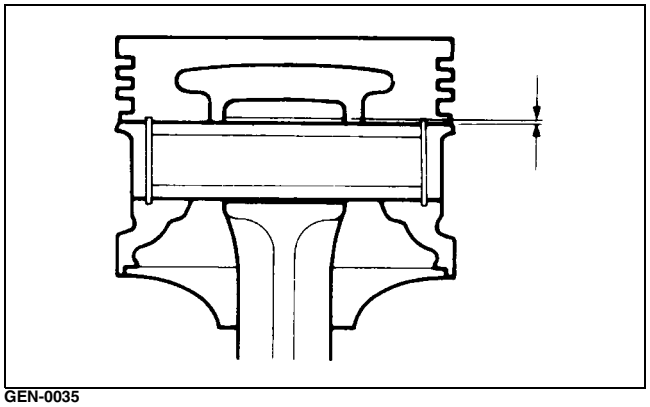
MEASURING CONNECTING ROD SMALL END BORE INSIDE DIAMETER

1. Using a small bore gauge, measure the connecting rod small end bore inside diameter.
2. Measurement must be within 0.6301-0.6307".



GEN-0034

3. If the difference between the connecting rod small end bore inside diameter and the piston pin outside diameter exceeds the limit, replace both connecting rod and piston pin. The measurements must be within 0.0001-0.0002" of each other.



GEN-0035

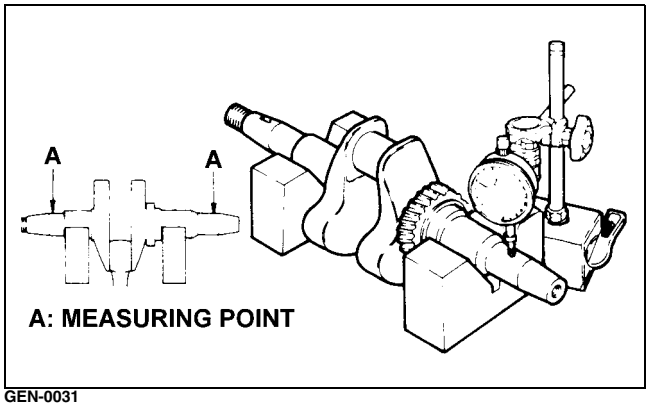
CRANKSHAFT RUNOUT

1. Support the crankshaft using a set of V blocks; use a dial indicator to read crankshaft runout.

■NOTE: The contact point of the dial indicator should be on the seal area of the crankshaft.

2. Total indicator reading must not exceed 0.0008".

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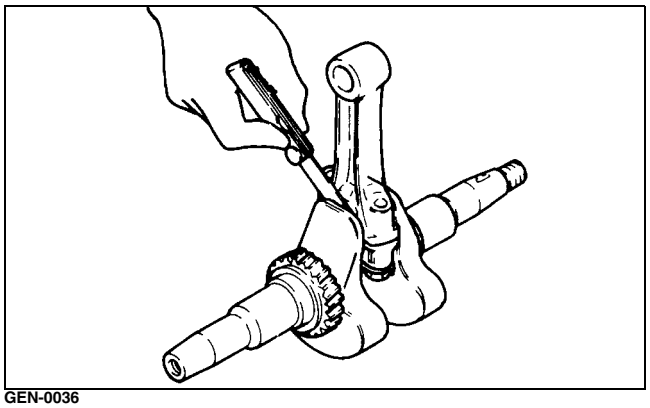


GEN-0031

3. If not within specification, either straighten the crankshaft or replace it.

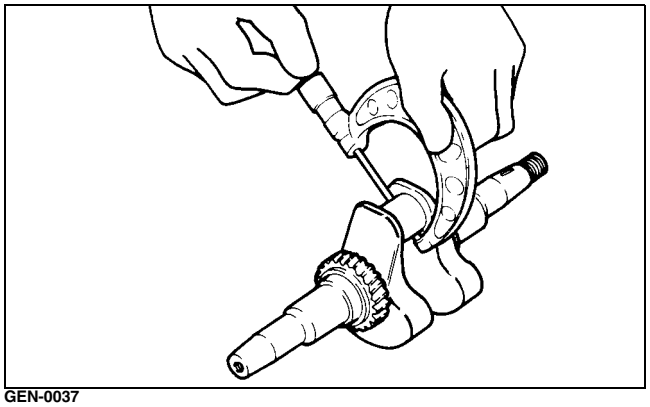
MEASURING CONNECTING ROD BIG END SIDE CLEARANCE

1. Check the connecting rod side clearance by using a thickness gauge. If the clearance exceeds the limit, replace the connecting rod or crankshaft.
2. Clearance measurement must be within 0.008-0.024".

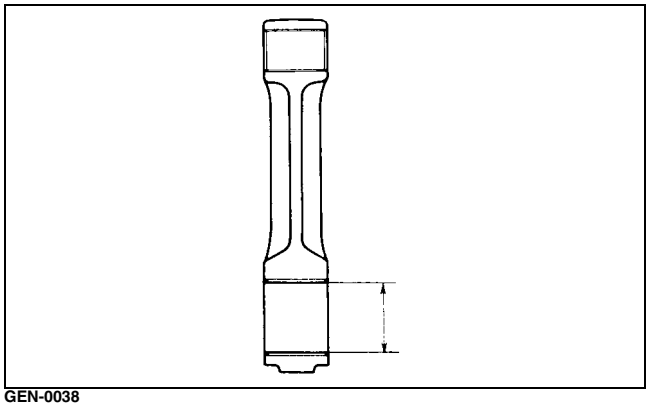

GEN-0036

MEASURING CRANK PIN/ CONNECTING ROD CLEARANCE

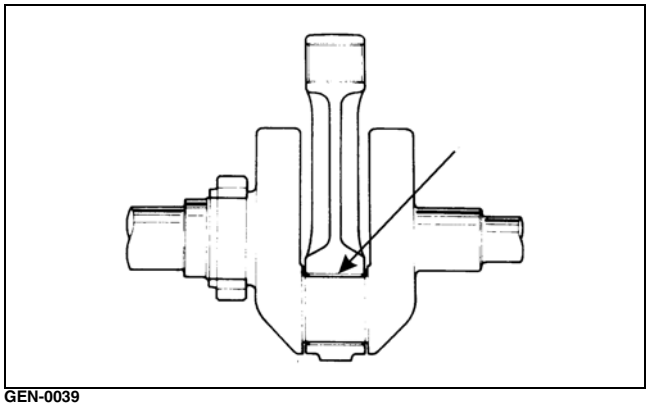
1. Measure the crank pin diameter. Measurement must be at least 1.102".


GEN-0037

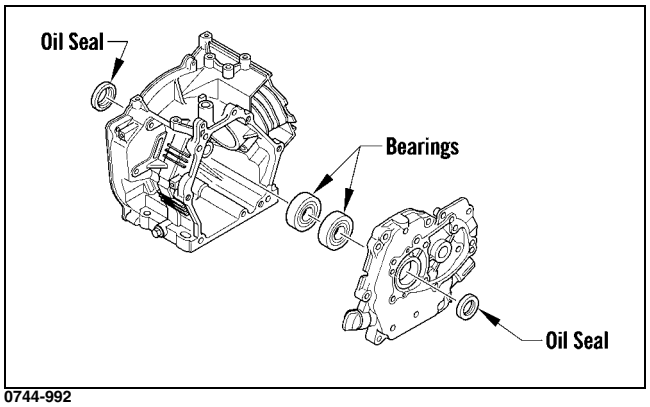
2. Measure the connecting rod big end bore inside diameter. Measurement must be within 1.1023-1.1029".


GEN-0038

3. Measure the crank pin/connecting rod clearance. Measurement must be within 0.0002-0.0008".


GEN-0039

CRANKSHAFT BEARINGS



0744-992

Removing

1. Using a flat-blade screwdriver, carefully work the oil seal from side-to-side out of the crankcase and cover.
2. Using a suitable press and with the crankcase or crankcase cover secured into position, carefully heat the case; then press the bearings out of the case.

CAUTION

Never reuse the crankshaft bearings. If the bearings have been pressed out of the crankcase or crankcase cover, they must be discarded.

■NOTE: Thoroughly clean the bearing areas of the crankcase and crankcase cover and inspect for any nicks or imperfections of the bearing bosses of the case.

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Installing

1. Secure the crankcase and press the new bearing into the boss of the crankcase and crankcase cover.

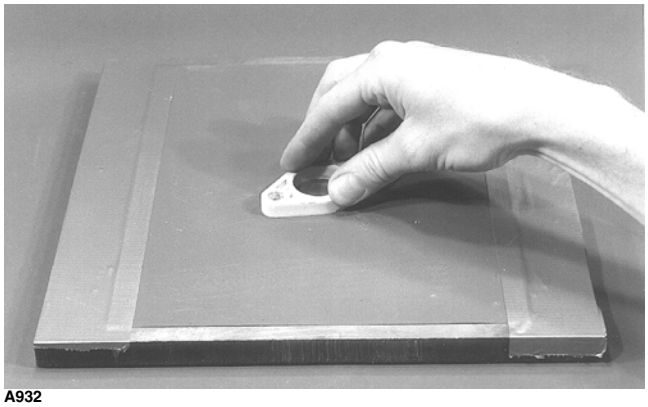
CAUTION

When installing the new bearings, always press against the outside race of the bearing.

2. With the bearings installed and using a suitable seal driver, install the oil seals with the spring side of the seal facing the bearing; then coat the wear surfaces of the seals with a film of grease.

CARBURETOR INSULATOR PLATE

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 surfaces for any indication of high spots or warping. Correct highs spots by continuing to move each side in a figure-eight motion. Warped components must be replaced.



A932

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.

Assembling

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

■NOTE: Prior to assembling the engine, use parts cleaning solvent and compressed air and thoroughly clean the threaded holes of the crankcase and cylinder and head to properly tighten.

⚠ WARNING

Always wear safety glasses when drying components with compressed air.

■NOTE: When the use of a lubrication is indicated, use clean engine oil.

1. Lubricate the piston pin, connecting rod, and piston pin bore with engine oil; then install the piston to the connecting rod and secure the piston pin with the circlips directed either up or down.



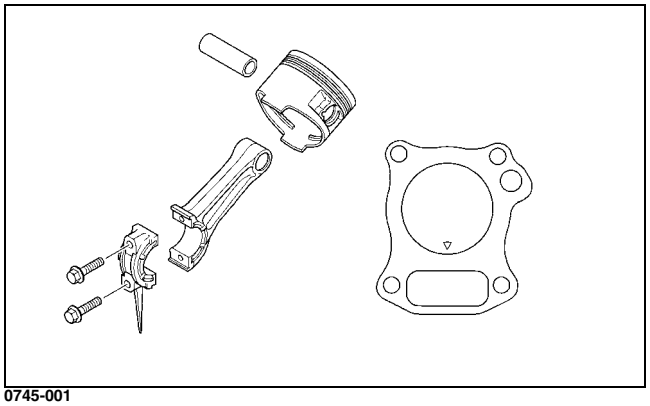
IO091A

■NOTE: Coat the cylinder wall, connecting rod bearing surface, and the crankshaft with engine oil.

2. Install the crankshaft into the crankcase; then with the piston rings properly oriented (end gap 120° apart), compress the piston rings and install the piston and connecting rod assembly taking care not to damage the crankshaft and connecting rod.

CAUTION

The arrow of the piston must be directed toward the push rod opening of the cylinder.



0745-001

3. Note the marks on the connecting rod and end cap made during disassembly.



IO081A

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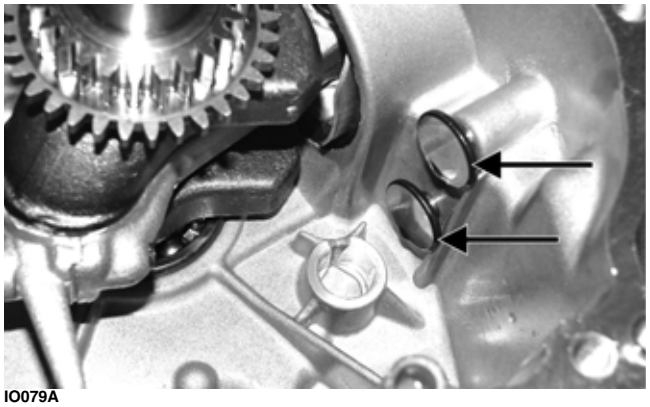
■**NOTE: When installing the connecting rod to the crankshaft, rotate the crankshaft so the rod journal is in the 6 o'clock position to allow access for installing the rod end cap.**

4. With the connecting rod, end cap, and crankshaft journal lubricated with engine oil, install the connecting rod and rod end cap to the crankshaft and secure with the cap screws. Tighten evenly to 106 in.-lb.



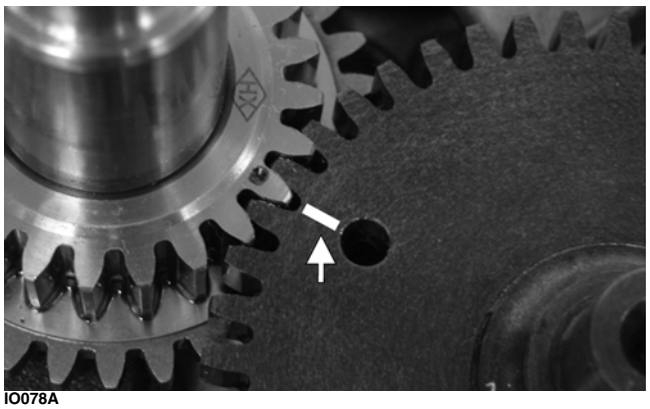
IO080A

5. Apply lightweight oil to the tappets; then install the tappets to the proper guides as noted during disassembly.



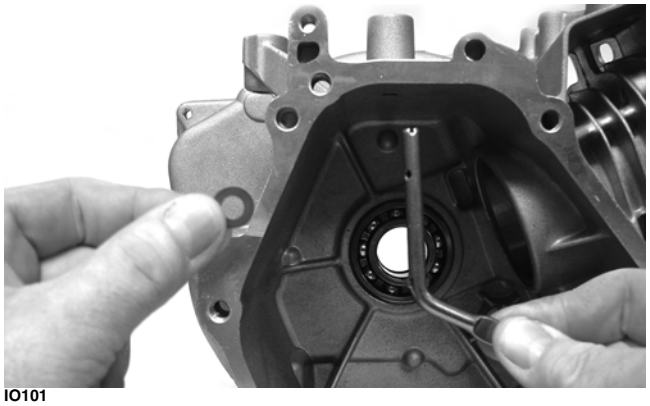
IO079A

6. Apply oil to the camshaft lobes and running surfaces on each end of the shaft; then with the crankshaft/piston rotated to TDC and the timing marks of the crankshaft gear in-line with the camshaft gear, install the camshaft.



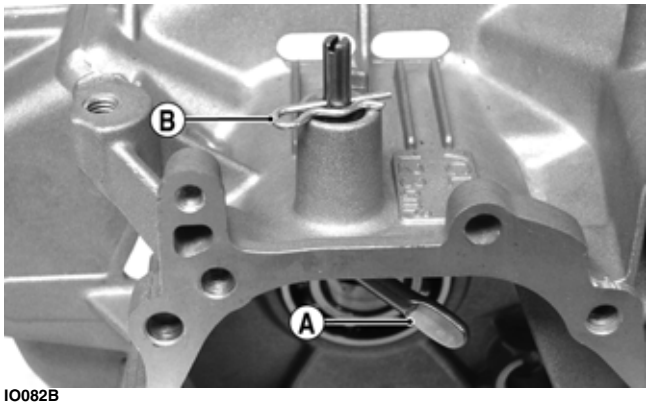
IO078A

7. Install the washer onto the governor control shaft and slide the shaft up into position from inside the crankcase far enough to install the hairpin clip.

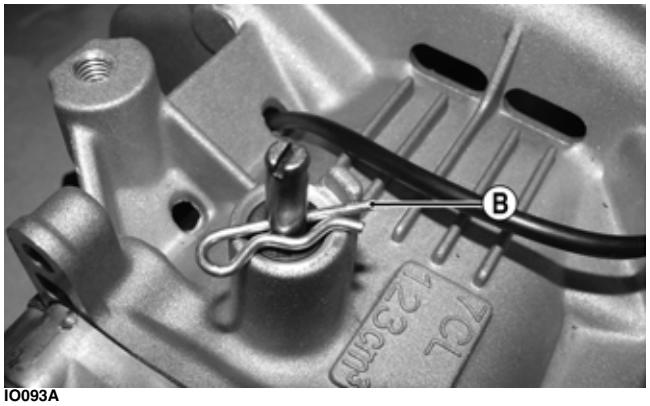


IO101

■**NOTE: When installing the governor control shaft, position the shaft so the flat end (A) of the shaft is directed to the cylinder (3 o'clock position) and the hairpin clip (B) is in contact with the crankcase. This limits the inward movement of the control shaft.**



IO082B



IO093A

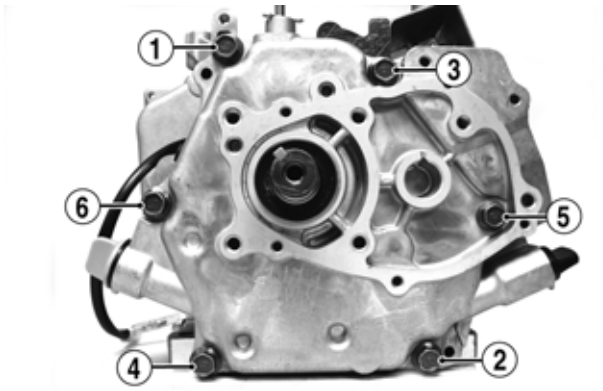
8. Install the shim washer to the crankshaft and place the dowel pins and a gasket into position.

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IO077

9. Secure the crankcase side cover to the crankcase with the cap screws. Tighten to 16 ft-lb using the following pattern.



IO094A

■**NOTE: Before installing the side cover, verify the governor gear assembly operates properly.**

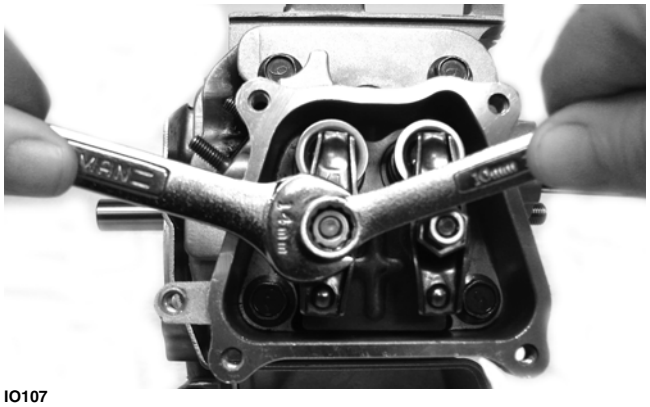
10. Install the dowel pins and a new gasket; then secure the head to the cylinder with the cap screws. Tighten to 15 ft-lb using a crisscross pattern.



IO073

11. Apply lightweight oil to the ends of the push rods; then install the rods.

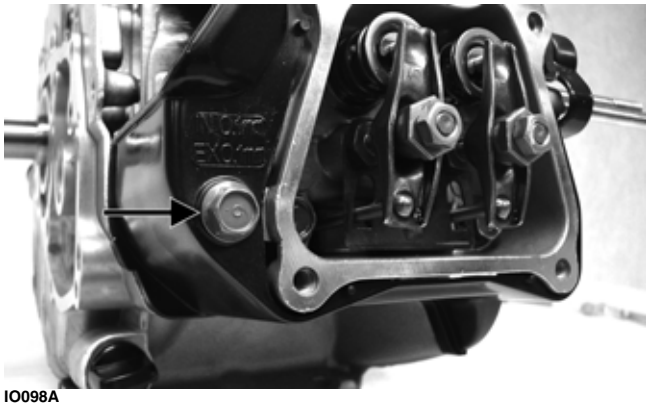
12. Loosely secure the rocker arms to the cylinder head with the pivots and lock nuts; then rotate the crankshaft until the piston is at the top of the compression stroke.



IO107

13. Set the valve clearance to the recommended setting with a feeler gauge, and while holding the adjustment nut, tighten the rocker arm lock nuts to 88 in.-lb. Verify valve clearance is 0.004".

14. Install the air shroud to the cylinder head and secure the shroud with cap screw. Tighten to 96 in.-lb.



IO098A

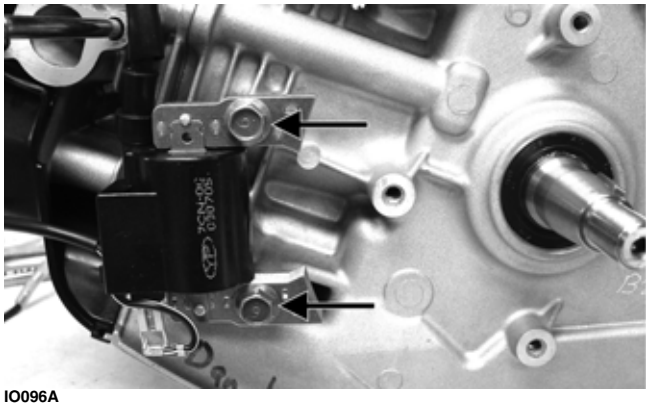
15. Place the air breather body assembly with gasket onto the cylinder head cover; then install the valve cover with gasket. Tighten to 96 in.-lb using a crisscross pattern.



IO070A

16. Install the ignition coil to the mounting location of the crankcase with the cap screws (coated with blue Loctite #243); then adjust the ignition coil to the farthest position from the flywheel and tighten the cap screws until snug.

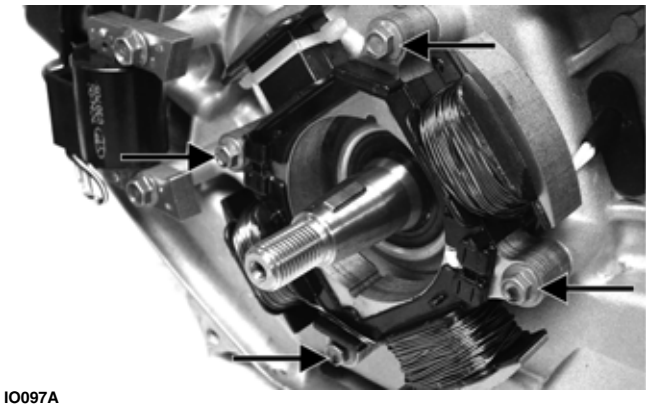
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IO096A

■**NOTE: Adjust spark plug gap to specification; then install and tighten the plug to 15 ft-lb.**

17. Connect the high tension lead to the spark plug and secure with the two wire forms.
18. Install the stator with the four cap screws (coated with blue Loctite #243) and in a crisscross pattern, tighten to 96 in.-lb.



IO097A

■**NOTE: Route the stator harness through the slot in the crankcase above the flywheel.**

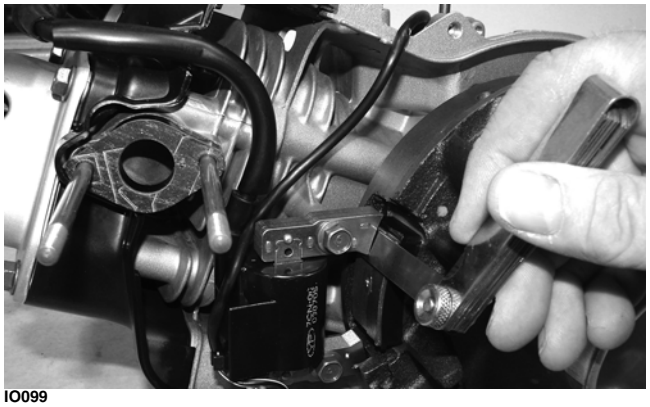
19. With the flywheel key in the crankshaft, install the flywheel and starter pulley; then secure with the nut. Tighten to 48 ft-lb.



IO069B

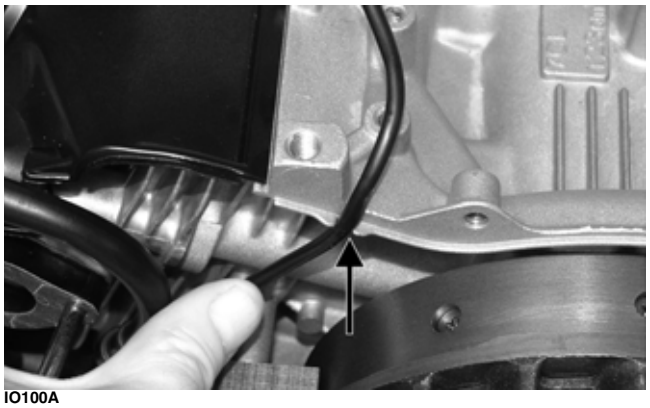
■**NOTE: Before installing the flywheel, make sure the taper of the crankshaft and flywheel are clean.**

20. Rotate the flywheel until the magnet of the flywheel is under the legs of the ignition coil; then insert a flat 0.020" feeler gauge between the lower leg of the coil and the flywheel.



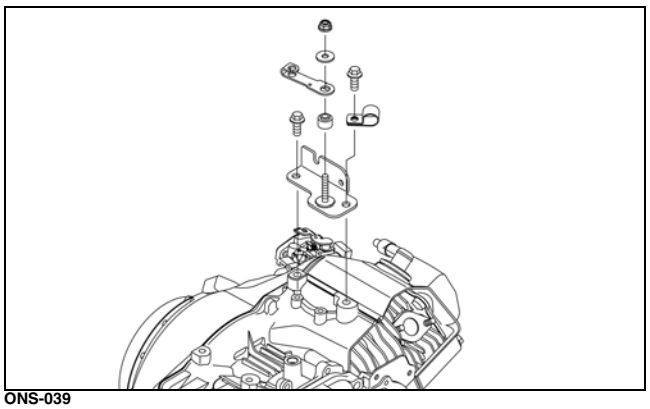
IO099

21. Loosen the ignition coil mounting cap screws (from step 16) enough to allow the coil to draw against the feeler gauge. Tighten the cap screw enough to hold the position of the coil; then repeat the procedure for the other cap screw when an air gap of 0.015-0.023" is obtained. Tighten the coil cap screws to 120 in.-lb.
22. Install the recoil starter/fan housing assembly with cap screws and tighten to 96 in.-lb.



IO100A

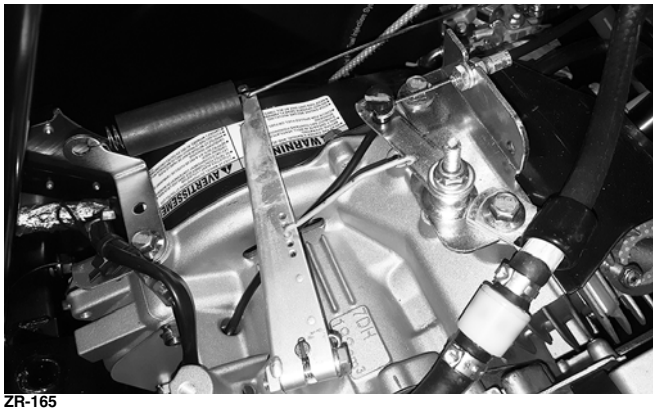
23. Install the throttle cable mounting bracket and secure the bracket with two cap screws to the crankcase. Tighten to 120 in.-lb.



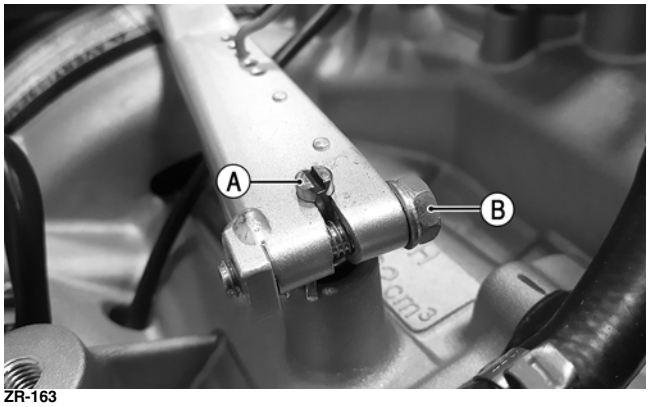
ONS-039

24. Install the link rod into the throttle cable lever; then install into the middle hole in the governor arm.
25. Install the governor arm onto the governor control shaft.

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ZR-165

■**NOTE: When securing the governor control shaft (A), turn it clockwise until it stops; then tighten the control arm cap screw (B) to 72 in.-lb.**

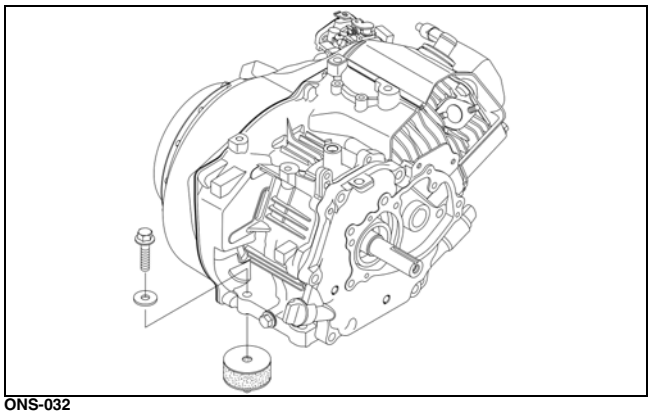


ZR-163

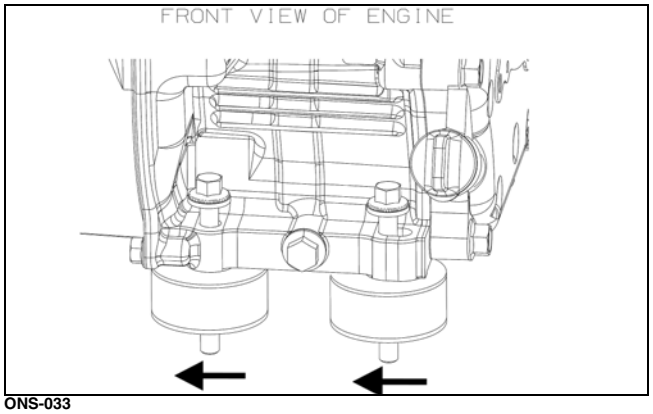
26. Add 600 ml (20.3 fl oz) of the recommended engine oil to the engine.

Installing

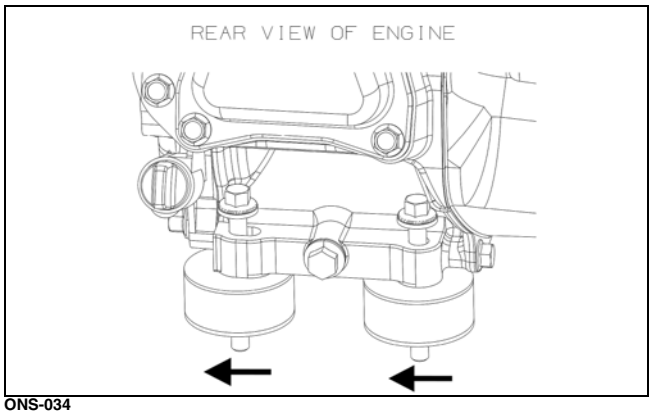
1. Secure the engine mounts to the bottom of the engine using the four cap screws (threads coated with blue Loctite #243) and washers. Tighten to 18 ft-lb.


ONS-032

■**NOTE: The cap screws must be positioned to the arrow side of the holes in the crankcase.**

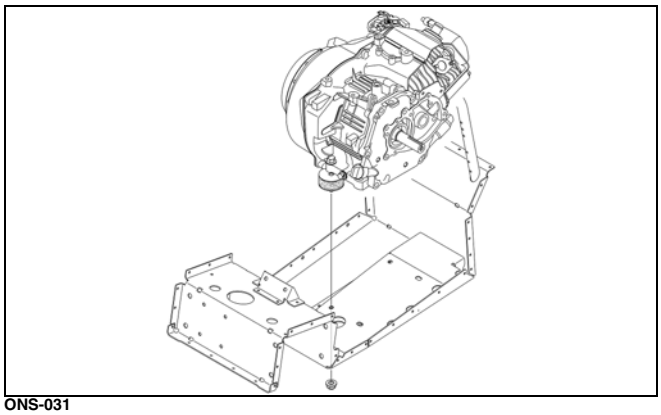


ONS-033



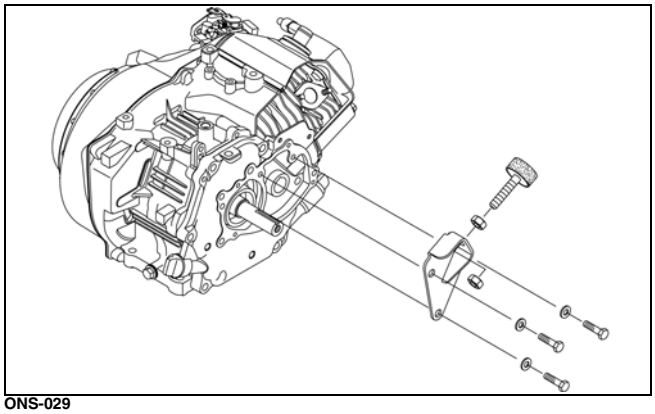
ONS-034

2. Place the engine assembly into position in the engine compartment.
3. Loosely secure the engine to the chassis using new lock nuts. Do not tighten at this time.

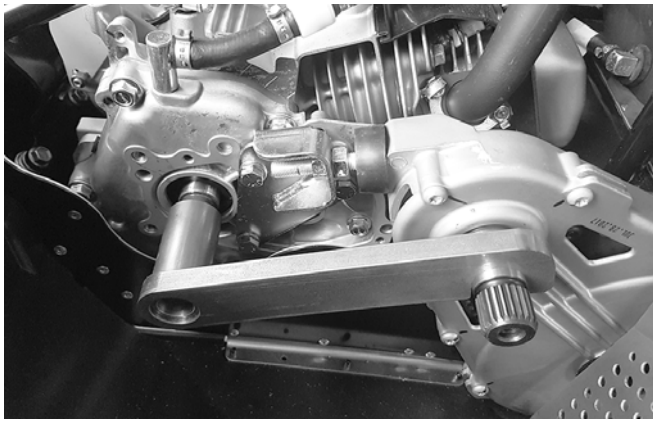

ONS-031

4. Loosely secure the torque bumper assembly to the engine using existing three cap screws and three washers. Do not tighten at this time.

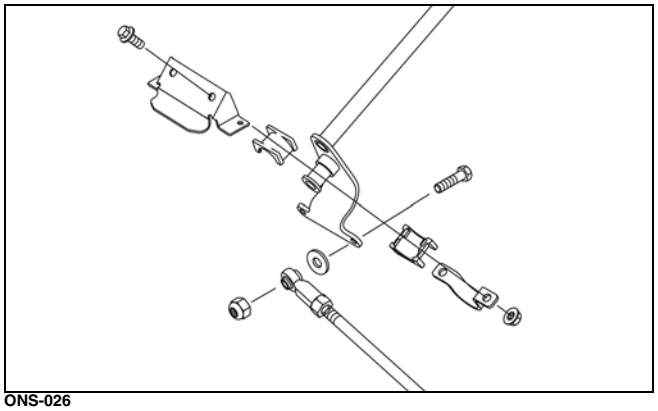
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ONS-029

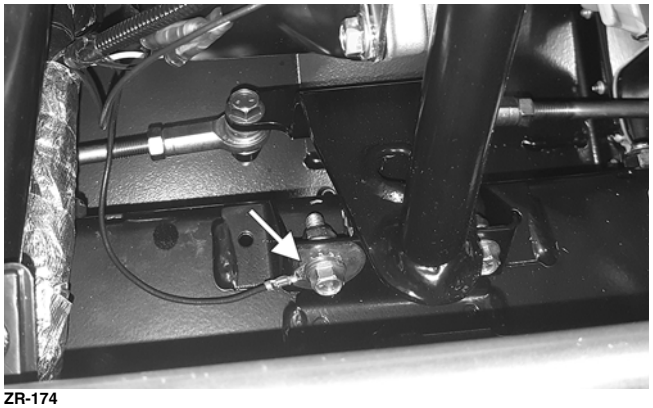
5. Position the engine alignment tool onto the crankshaft and install over the driven shaft on the dropcase. Forcing the tool onto the driven shaft may be necessary.


ZR-176

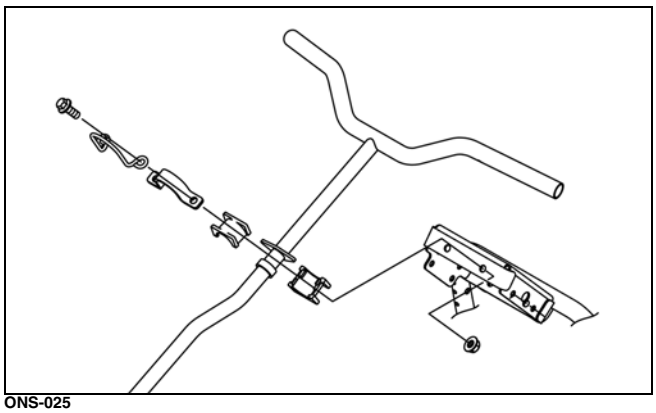
6. Leaving the engine alignment tool in position, tighten the four lock nuts securing the engine to the chassis to 20 ft-lb.
7. Tighten the cap screws and washers securing the torque bumper assembly to the engine. Tighten to 16 ft-lb.
8. Install the four mounting cap screw plugs in the front end.
9. Install the engine alignment tool onto the crankshaft again and install over the driven shaft. Adjust the torque bumper nuts until the tool falls onto the driven shaft under its own weight. Tighten the torque bumper nuts to 30 ft-lb.
10. Thread the recoil starter rope through the bushing in the steering support and the handle; then tie a knot at the end of the rope and pull the handle up and onto the knot.
11. Untie the slip-knot at the starter case and allow it to slowly rewind into the case.
12. Position the tie rods on the steering post; then secure using the existing cap screws, washers, and lock nuts (threads coated with blue Loctite #243). Tighten to 20 ft-lb.
13. Position the bearings on each side of the steering post; then secure the steering post to the chassis using the existing cap screws, retainer, and lock nuts. Tighten to 96 in.-lb.


ONS-026

■NOTE: Make sure the ground wire is routed so it does not come in contact with the steering post when turning the steering post.

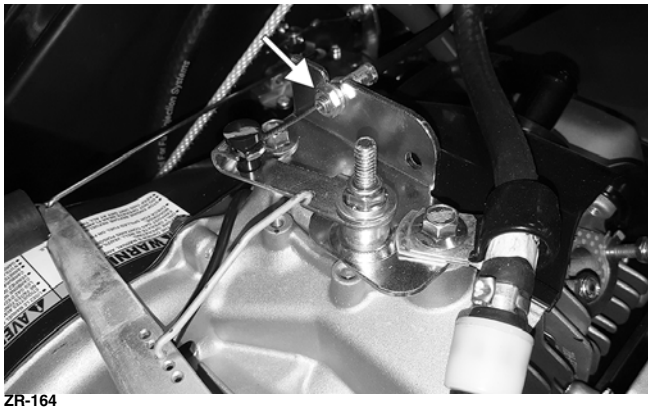

ZR-174

14. Place the upper steering post bearings into position on the steering post and support; then secure with the bearing retainer, cap screws, and lock nuts. Tighten to 96 in.-lb.

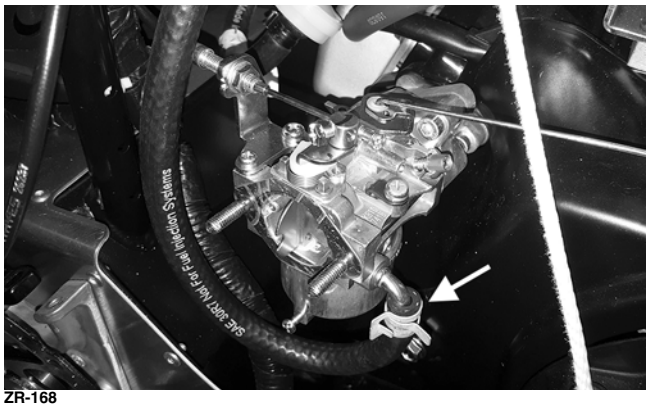

ONS-025

15. Position the throttle cable in the bracket; then connect the cable to the throttle lever. Tighten the adjustment jam nuts securely.

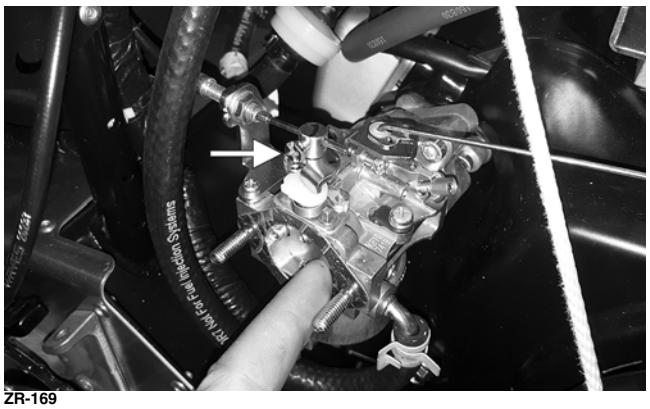
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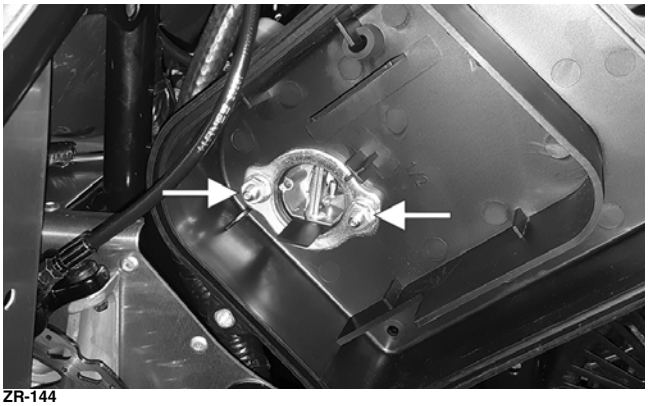
16. Install the fuel supply hose on the carburetor using the clamp.


ZR-168

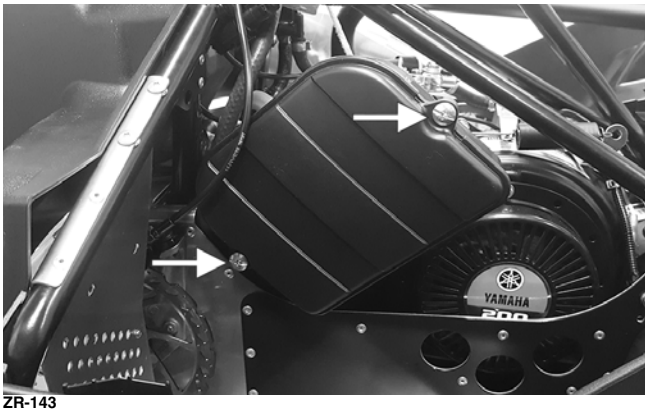
17. Pull the choke cable knob out completely; then hold the butterfly closed in the carburetor. Tighten the set screw to 6 in.-lb.


ZR-169

18. Place the gasket, air cleaner assembly, and plate into position on the carburetor; then secure with the flanged nuts. Tighten to 96 in.-lb.


ZR-144

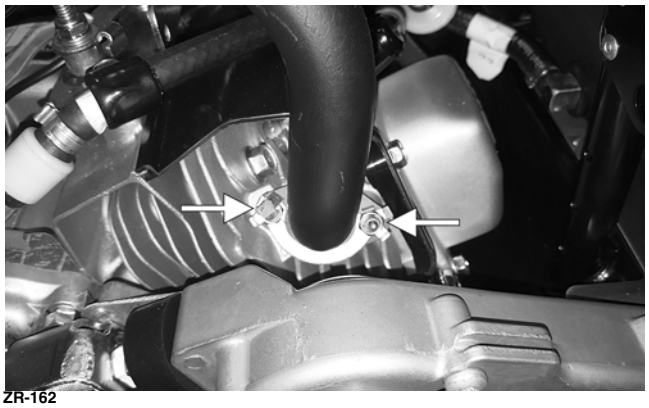
19. Secure the air cleaner cover to the air cleaner with the screws. Tighten to 30-36 in.-lb.



ZR-143

20. Install the exhaust gasket onto the studs of the engine; then install the muffler assembly over the studs. Secure using a new lock washer, existing nuts, and springs. Tighten the nuts to 60 in.-lb; then using a medium sized needle nose pliers, bend the best fitting tabs tight against the nuts.

■NOTE: The long tab on the lock washer should be installed toward the front of the snowmobile and bent all the way over the nut.


ZR-162

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

21. Install the spacer onto the crankshaft; then install the drive clutch assembly onto the shaft.

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22. Secure using the cap screw and washer. Tighten to 20 ft-lb.

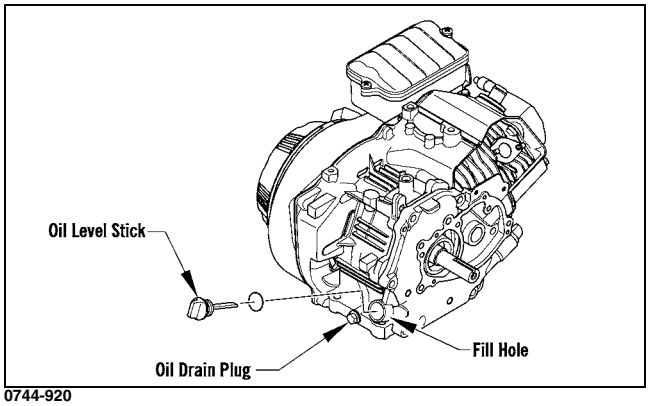
CAUTION

When installing the drive clutch, do not tighten the cap screw with any kind of impact tool. Tighten cap screw using a hand torque wrench only. Failure to do so could result in sheave damage.

23. Set the brake lever lock.
24. With the existing shims installed on the driven shaft, install the driven clutch onto the driven shaft. Secure using the existing cap screw and washer. Tighten to 40 ft-lb.
25. Install the drive belt; then check drive clutch/driven clutch alignment.
26. Install the clutch guard using the four screws.

Changing Oil

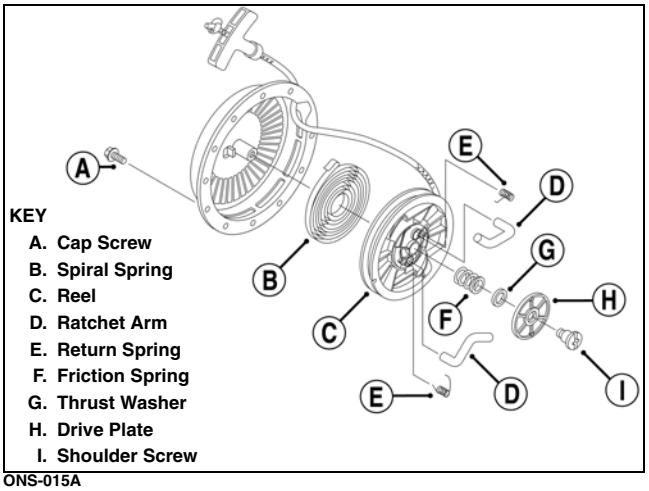
■NOTE: The front of the snowmobile must be elevated until the bottom of the front bumper is approximately 18.5" from the floor so the engine is in a level position when checking/changing the oil. Also, ensure the engine is "cooled down" to room temperature to allow the oil to drain into the sump.



0744-920

1. Remove the access plug; then place a drain pan beneath the engine.
2. Release the two hold-down straps and open the hood.
3. Loosen the oil level stick; then remove the oil drain plug from the crankcase and allow the oil to drain.
4. Install the drain plug; then tighten to 12 ft-lb.
5. Remove the oil level stick; then pour 600 ml (20.3 fl oz) of recommended oil into the fill hole.
6. Install the oil level stick; then install the access plug.
7. Close the hood and secure with the straps and latch.

Recoil Starter



ONS-015A

■NOTE: The engine must be removed to access the recoil starter (see Engine section).

REMOVING/DISASSEMBLING

⚠ WARNING

Always wear safety glasses when servicing the recoil starter.

1. Remove the cap screws securing the recoil starter to the engine cover.
2. Pull the rope out of the housing (noting the direction in which the rope is wound for assembling) and align with the notch in the roller; then release the spring pressure on the reel.
3. Remove the knot from the end of the rope; then remove the shoulder screw securing the drive plate to the reel and remove the plate.
4. Mark the ratchet arms for assembling purposes; then remove the ratchets and account for the friction spring.

■NOTE: The ratchet arms must be installed in their respective positions.

5. Slowly remove the reel. Account for the spiral spring.

⚠ WARNING

Exercise extreme caution when removing as the spiral spring may disengage and cause severe injury.

INSPECTING

1. Inspect the spring retaining notch in the recoil housing and inspect the loop of the spring for wear or cracking.

■NOTE: Note the orientation of the spring for assembling purposes.

2. Inspect the flat areas of the reel for wear.

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ASSEMBLING/INSTALLING

1. Install the reel assembly with rope wound in the appropriate direction (noted during disassembling).

⚠ WARNING

Exercise extreme caution when installing as the spiral spring may disengage and cause severe injury.

2. Install the ratchet arms; then install the drive plate and secure it with the shoulder screw. Tighten to 57 in.-lb.
3. Route the recoil rope through the rope guide of the recoil housing and through the recoil handle; then tie a knot in the rope.
4. Wind the rope counterclockwise 3-4 turns around the reel; then secure the recoil starter to the engine cover. Tighten to 96 in.-lb.

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Troubleshooting Engine

Problem: Engine Does Not Start (No Spark at Spark Plug)	
Condition	**Remedy**
1. **Ground connections** dirty — loose 2. **Wiring harness** shorting — disconnected 3. **Emergency stop switch** in DOWN position — malfunctioning 4. **Spark plug** fouled — damaged 5. **RPS/idle switch** — malfunctioning 6. **Ignition key switch** in the OFF position	1. Check all ground connections — clean and tight 2. Repair — replace — connect wiring harness 3. Move switch to UP position — test/replace ignition key switch/emergency stop switch 4. Clean — replace spark plug 5. Fully seat cable in control housing — adjust throttle cable tension — replace faulty switch 6. Turn ignition key switch to the ON position
Problem: Engine Does Not Start (No Fuel at Cylinder)	
Condition	**Remedy**
1. **Gas tank** empty 2. **Gasoline** contaminated 3. **Fuel hose** broken — pinched 4. **Gas-tank vent** — **hose** obstructed 5. **Compression** absent	1. Fill tank 2. Replace gasoline 3. Replace — service hose 4. Remove obstruction — replace vent — hose 5. Repair — replace damaged — worn engine components
Problem: Engine Does Not Start (Fuel Does Not Ignite)	
Condition	**Remedy**
1. **Valve clearance** poor 2. **Spark** absent 3. **Compression** low 4. **Engine** flooded 5. **Gasoline** contaminated	1. Inspect valves 2. Check for spark — see No Spark at Spark Plug sub-section 3. Service engine 4. Clear engine (using a shielded safety stand, elevate the rear of the snowmobile and hold throttle full-open) 5. Clean tank and entire fuel system
Problem: Engine Does Not Idle	
Condition	**Remedy**
1. **Throttle stop screw** turned out too far 2. **Idle fuel adjuster screw** out of adjustment 3. **Air silencer** obstructed 4. **Drive clutch** dirty	1. Adjust throttle stop screw 2. Adjust idle fuel adjuster screw 3. Clean air silencer 4. Clean drive clutch
Problem: Engine Loses Power	
Condition	**Remedy**
1. **Spark plug** fouled 2. **External coil** faulty 3. **Gas tank vent — hose** obstructed 4. **Compression** low 5. **Muffler** restricted	1. Replace spark plug 2. Service — replace coil 3. Service — replace vent hose 4. Service engine 5. Inspect muffler
Problem: Engine Overheats	
Condition	**Remedy**
1. **Drive system** adjusted incorrectly — worn — damaged 2. **Rings/grooves** carboned 3. **Exhaust** obstructed 4. **Compression** low — absent 5. **Engine shroud** obstructed	1. Troubleshoot — adjust drive system 2. Clean — replace rings — pistons 3. Remove obstruction 4. Repair — replace damaged — worn engine components 5. Clean shroud
Problem: Engine Backfires	
Condition	**Remedy**
1. **Spark plug** fouled — damaged 2. **RPS/idle switch** — malfunctioning	1. Clean — replace spark plug 2. Fully seat cable in control housing — adjust throttle cable tension — replace faulty switch
Problem: Engine Stops Suddenly	
Condition	**Remedy**
1. **Gas tank** empty 2. **Spark** absent 3. **Fuel filter** obstructed 4. **Fuel hose** obstructed — broken — pinched 5. **Ignition coil** faulty 6. **Engine** seized 7. **Oil level** low 8. **RPS/idle switch** — malfunctioning 9. **Wiring harness shorting** — disconnected	1. Fill tank 2. See No Spark at Spark Plug sub-section 3. Replace filter 4. Remove obstruction — repair — replace fuel hose 5. Replace ignition coil 6. Overhaul engine 7. Add recommended oil 8. Fully seat cable in control housing — adjust throttle cable tension — replace faulty switch 9. Repair — replace — connect wiring harness

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Fuel System

This section has been organized for servicing the fuel system. The technician should use discretion and sound judgment when removing/disassembling and assembling/installing components.

⚠ WARNING

Whenever any maintenance or inspection is made on a fuel system when there may be fuel leakage, there should be no welding, smoking, open flames, etc., in the area.

In-Line Fuel Filter

⚠ WARNING

Whenever any maintenance or inspection is made on a fuel system when there may be fuel leakage, there should be no welding, smoking, open flames, etc., in the area.

Arctic Cat recommends that the in-line fuel filter be checked once a month. The filter is located in the fuel hose between the gas tank and fuel pump. The only cleaning possible is to back-flush the filter using clean gasoline. To check, clean, or replace the filter, use the following procedure:

1. Using a suitable hose clamping pliers, pinch off the fuel hose between the gas tank and the filter.
2. Remove and discard the clamps; then slowly remove the fuel hoses from the fuel filter. Dispose of the excess fuel from the filter properly.
3. Install the in-line fuel filter in the fuel hose so the arrow on the filter points toward the fuel pump. Make sure the fuel hoses fit tightly on the filter. If a fuel hose does not fit tightly, cut 6 mm (1/4 in.) from the end of the fuel hose; then install on the filter. Install new clamps and remove the clamping pliers.

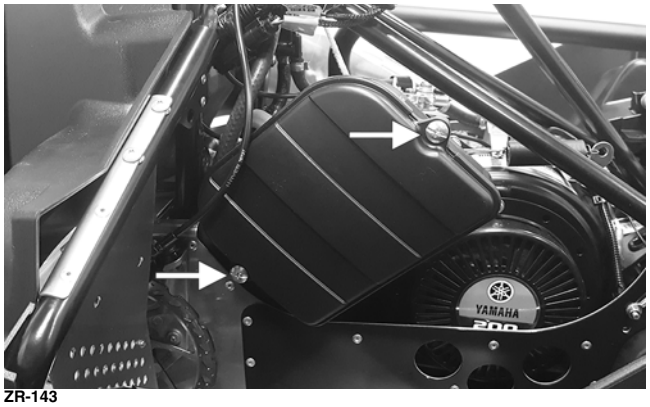
CAUTION

The fuel hoses must fit tightly on the fuel filter. If the fuel hose length doesn't permit this procedure, replace the fuel hose. Also, after installing the fuel hoses on the filter, check to be sure that the fuel hoses do not contact any hot or rotating components.

Carburetor

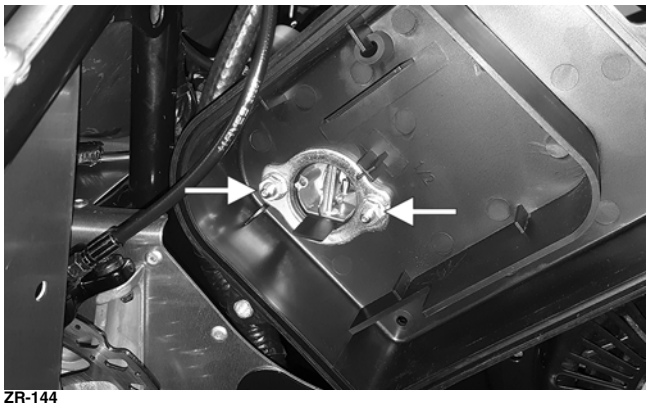
REMOVING

1. Remove the screws securing the air cleaner cover to the air cleaner case and account for the filter and retaining plate.

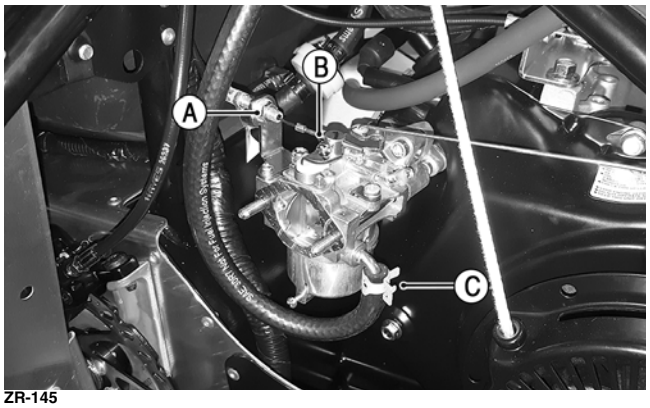


ZR-143

2. Remove the flanged nuts securing the air cleaner assembly to the carburetor and engine. Account for the plate.


ZR-144

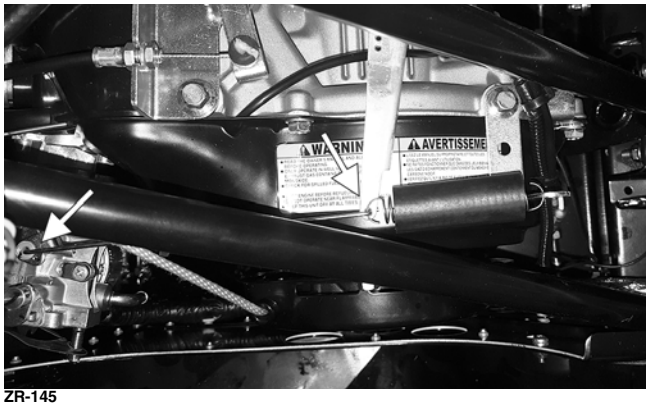
3. Remove the air cleaner case from the carburetor and engine. Account for the gasket.
4. Remove the nut (A) and screw (B) securing the choke cable to the carburetor; then remove the fuel hose (C) from the carburetor. Remove the carburetor from the engine.



ZR-145

5. Disconnect the rod from the carburetor; then remove the spring and hose from the governor arm.

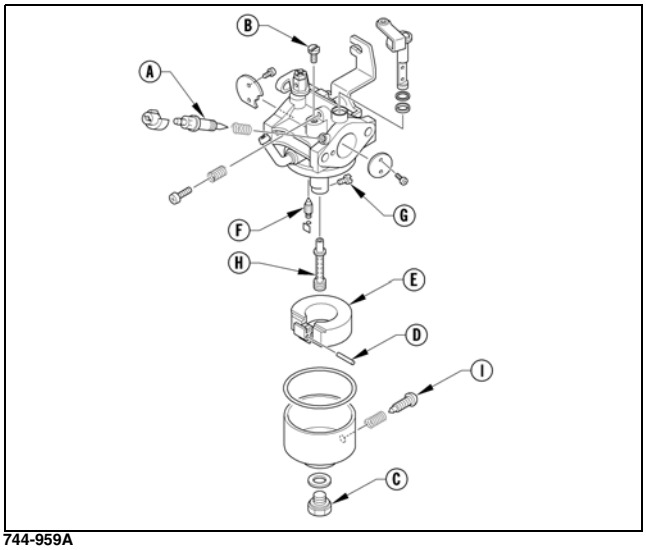
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ZR-145

6. Slide the carburetor off the mounting studs. Account for a gasket.

DISASSEMBLING



744-959A

1. Carefully remove the plastic cap from the idle fuel adjuster screw (A); then rotate the screw clockwise while noting the number of rotations (for assembling purposes) until lightly seated. Remove the screw.

CAUTION

Do not force the idle fuel adjuster screw when rotating it clockwise; damage to the screw taper and carburetor orifice may result.

2. Remove the pilot jet (B) from the carburetor.
3. Remove the cap screw (C) securing the float chamber to the carburetor; then remove the chamber and account for the rubber gasket.
4. Remove the float pin (D) securing the float (E) to the carburetor body; then remove the float and needle jet assembly (F).
5. Remove the main jet (G) and the nozzle (H) from the carburetor tower.

CLEANING

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

1. Inspect the mixing body and jet orifices for cracks, nicks, stripped threads, and any other imperfections in the casting.
2. Inspect the float for perforations or damage.
3. Inspect the gaskets for distortion, tears, or noticeable damage.
4. When applicable, inspect the idle fuel adjuster screw, needle jet assembly, and pilot jet for wear, damage, or distortion.
5. Inspect the nozzle and main jet for obstructions or damage.
6. Inspect the carburetor insulator for damage, cracks, and tightness.

CAUTION

An air leak between the carburetor and engine will cause a lean condition and poor engine performance.

7. Place the carburetor insulator on a surface plate covered with #400 grit wet-or-dry sandpaper. Move the insulator over the surface plate using a figure-eight motion. The motion should produce an even wear pattern over the entire sealing area.

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.

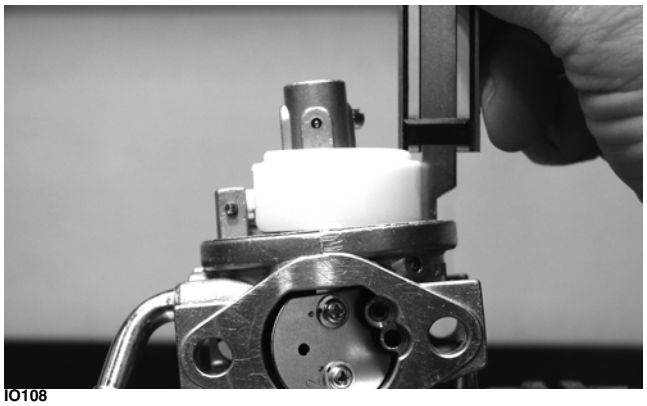
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A739

8. Inspect the condition of the throttle return spring.

CHECKING FLOAT HEIGHT

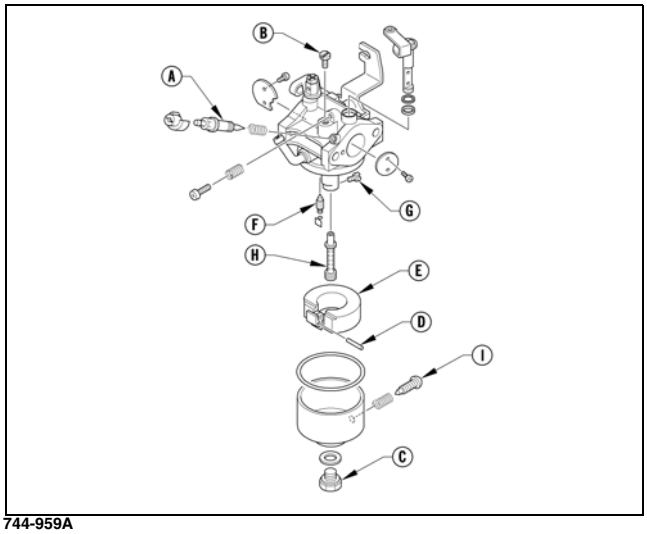
1. Remove the cap screw securing the float chamber; then remove the float chamber from the carburetor and account for the rubber gasket.
2. With the carburetor in an upside-down position, lift the float so the tip of the float lightly contacts the float arm; then measure the float height from the body of the carburetor and underside of the float. Measurement should be 0.63".


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CAUTION

Do not bend the float in an attempt to adjust the height. Correct float height is obtained by replacing the needle jet assembly and/or the float.

ASSEMBLING



744-959A

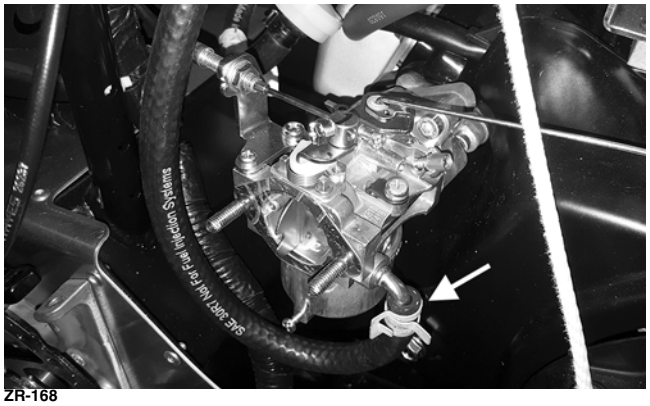
1. Install the nozzle (H) and main jet (G) into the carburetor tower.
2. Place the needle jet assembly (F) and the float (E) into position and secure to the carburetor body with the float pin (D).
3. Secure the float chamber w/rubber gasket to the carburetor with the cap screw (C).
4. Install the pilot jet (B).
5. Install the idle fuel adjuster screw (A) and rotate the screw clockwise until lightly seated; then rotate the screw counterclockwise the proper number of rotations as noted during disassembling. Install the plastic cap.

CAUTION

Do not force the idle fuel adjuster screw when rotating it clockwise; damage to the screw taper and carburetor orifice may result.

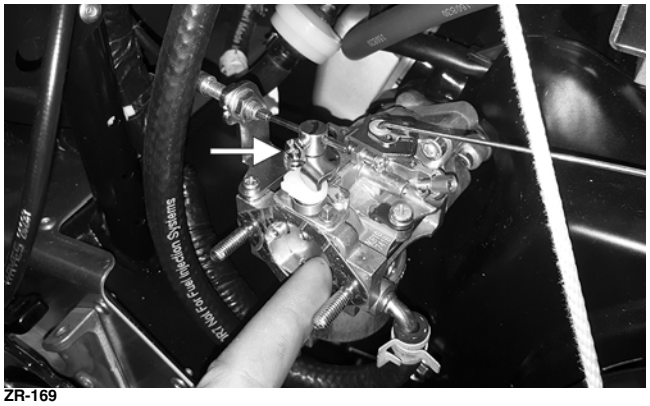
INSTALLING

1. Install the gasket; then with the governor rod installed on the carburetor, place the carburetor into position on the mounting studs.
2. Install the fuel supply hose on the carburetor using the clamp.

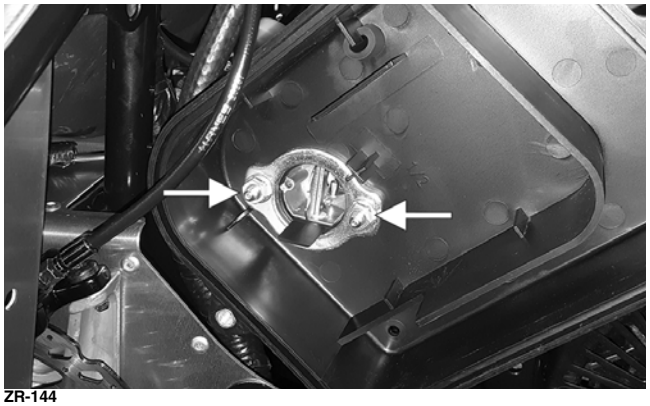

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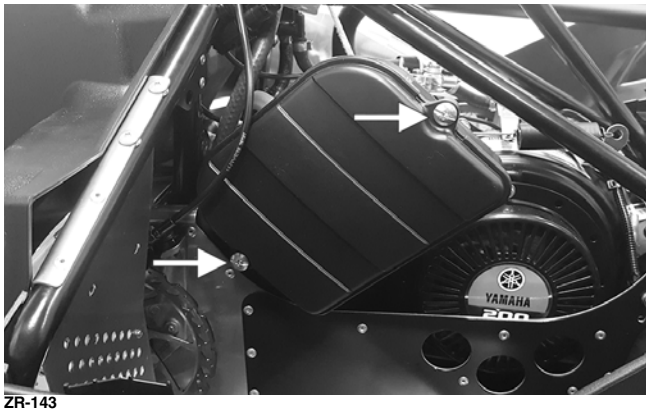
3. Pull the choke cable knob out completely; then hold the butterfly closed in the carburetor. Tighten the set screw to 6 in.-lb.


ZR-169

4. Place the gasket, air cleaner assembly, and plate into position on the carburetor; then secure with the flanged nuts. Tighten to 96 in.-lb.


ZR-144

5. Secure the air cleaner cover to the air cleaner with the screws. Tighten to 30-36 in.-lb.

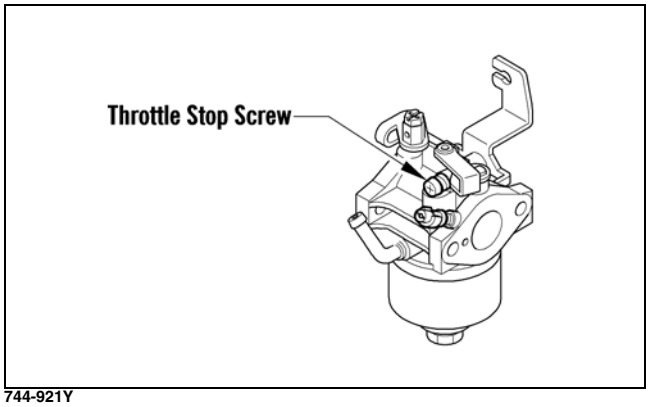


ZR-143

6. Adjust the carburetor (see ADJUSTING sub-section).

ADJUSTING

The carburetor has been calibrated for average riding conditions; however, altitude, temperature, and general wear may necessitate certain carburetor adjustments. Since carburetor adjustments critically affect engine performance, two external adjustments can be made on the carburetor. These are the throttle stop screw and throttle cable.



744-921Y

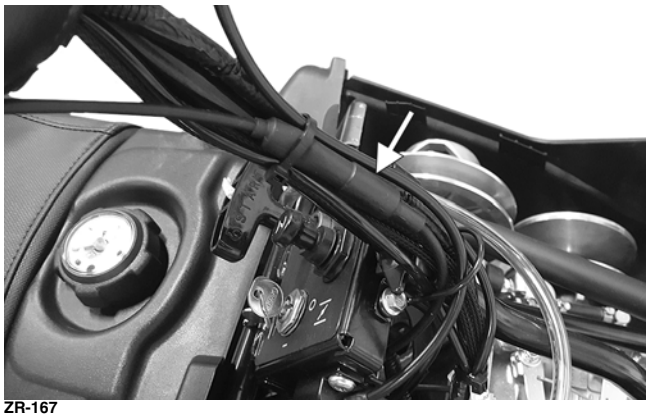
Throttle Stop Screw

This screw controls the seating position of the throttle valve which in turn determines the proper idle speed. Rotate the screw clockwise to increase engine idle speed and counterclockwise to decrease engine idle speed.

Throttle Cable

The correct throttle cable adjustment is when (with the engine OFF) the carburetor throttle is completely open (against its limit) while the throttle lever lightly contacts the handlebar grip. The throttle arm on the carburetor should also contact the speed control screw when the throttle lever is released.

1. If throttle cable free-play is incorrect, locate and adjust the in-line throttle cable adjuster until free-play is within specification.


ZR-167

⚠ WARNING

Do not attempt to adjust the throttle cable with the engine running. Personal injury could result.

2. Tighten the throttle cable jam nut against the adjuster. Tighten securely.

⚠ 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.

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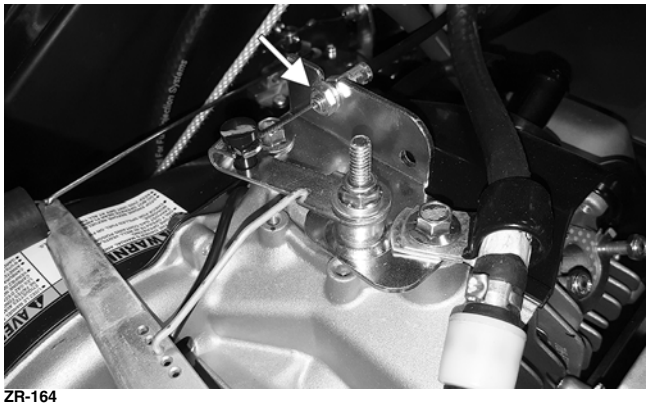
Throttle Cable

REMOVING AND INSPECTING

1. Compress the throttle lever to the WOT position; then using a small pliers, remove the throttle cable from the lever.
2. Remove the C-clip securing the throttle cable to the control; then remove the throttle cable.
3. Cut the cable ties securing the throttle cable to the steering post.

■NOTE: Note the location of the cable tie for assembly.

4. Rotate the throttle cable lever of the governor control arm to the wide-open position and route the cable end out of the arm; then loosen the throttle cable jam nuts and remove the throttle cable.



ZR-164

5. Inspect the throttle cable for damage or fraying.

INSTALLING

1. Route the throttle cable through the slot in the throttle control and insert the cable end into the throttle control. Secure the cable with a C-clip.
2. Seat the drum into its lever recess; then secure the lever with a pin and push nut.
3. Place the throttle cable into the throttle cable bracket and secure with jam nuts.
4. Slide the end of the throttle cable into the throttle cable lever.
5. Secure the throttle cable to the steering post with a cable tie; then install the handlebar pad.
6. Open and close the throttle lever to make sure of no binding or sticking.

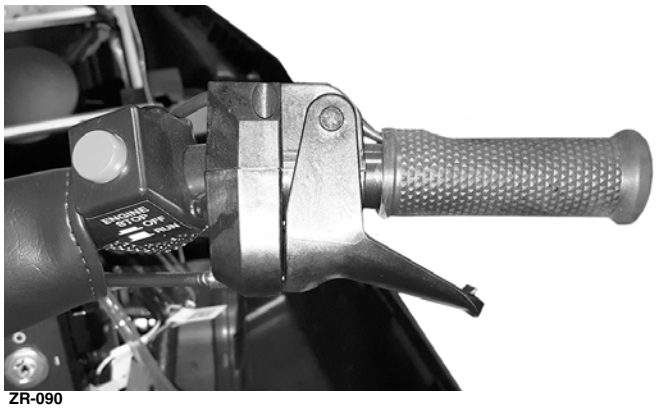
ADJUSTING

■ NOTE: Ensure that the throttle cable is properly seated in the throttle control housing.

1. Verify when releasing the throttle lever that the round switch in the control housing is compressed. If the switch is not compressed the engine will shut down when the throttle lever is released.



ZR-089A



ZR-090

2. If the throttle cable needs to be adjusted, locate the throttle cable in-line adjuster next to the steering post; then adjust the in-line adjuster until the governor arm (A) starts to move.



ZR-090A

3. Tighten nut against the in-line adjuster and cover the adjuster with rubber boot.

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Troubleshooting Fuel System

Problem: Carburetor Too Rich (0-1/4 Opening)	
Condition	**Remedy**
1. **Choke valve** will not seat 2. **Idle fuel adjuster screw** out of adjustment 3. **Float/needle jet** obstructed — damaged — adjusted incorrectly 4. **Pilot jet** loose	1. Adjust — service — replace choke cable — assembly 2. Adjust idle fuel adjuster screw 3. Remove obstruction — replace needle jet — float 4. Tighten pilot jet
Problem: Carburetor Too Rich (1/4-3/4 Opening)	
Condition	**Remedy**
1. **Pilot jet** too large 2. **Float/needle jet** obstructed — damaged — adjusted incorrectly 3. **Main jet** loose — too large 4. **Primary air passage** obstructed	1. Replace pilot jet 2. Remove obstruction — replace needle jet — float 3. Tighten — replace main jet 4. Remove obstruction
Problem: Carburetor Too Rich (3/4-WOT Opening)	
Condition	**Remedy**
1. **Main jet** loose — too large 2. **Float/needle jet** obstructed — damaged — adjusted incorrectly	1. Tighten — replace with smaller main jet 2. Remove obstruction — replace needle jet — float
Problem: Carburetor Too Lean (0-1/4 Opening)	
Condition	**Remedy**
1. **Choke valve** hanging open 2. **Pilot jet — outlet** obstructed 3. **Float/needle jet** obstructed — damaged — adjusted incorrectly	1. Adjust — service choke cable — valve assembly 2. Remove obstruction 3. Remove obstruction — replace needle jet — float
Problem: Carburetor Too Lean (1/4-3/4 Opening)	
Condition	**Remedy**
1. **Pilot jet — outlet — main jet** obstructed 2. **Float/needle jet** obstructed — damaged — adjusted incorrectly	1. Remove obstruction 2. Remove obstruction — replace needle jet — float
Problem: Carburetor Too Lean (3/4-WOT Opening)	
Condition	**Remedy**
1. **Main jet** obstructed — too small 2. **Float/needle jet** obstructed — damaged — adjusted incorrectly	1. Remove obstruction — replace with larger main jet 2. Remove obstruction — replace needle jet — float
Problem: General Fuel System (Engine Cuts Out at High RPM)	
Condition	**Remedy**
1. **Fuel delivery** inadequate 2. **In-line fuel filter** obstructed — damaged 3. **Gasoline** contaminated 4. **Gas-tank vent — hose** obstructed	1. Repair — replace hose 2. Remove obstruction — replace in-line fuel filter 3. Replace gasoline — de-ice — clean carburetor 4. Remove obstruction — replace vent — hose

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Electrical System

TESTING COMPONENTS

Following are testing procedures for specific electrical components. All tests of the electrical components should be made using the digital Fluke Model 88 Multimeter. Replace any component that does not have a test value within specifications.

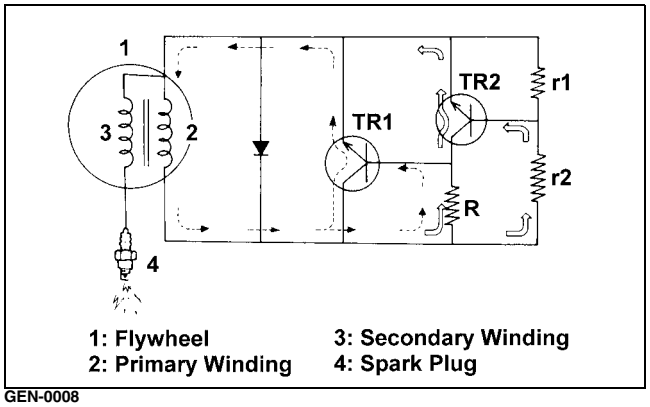
■NOTE: Whenever using a digital-style tester, "open (infinite resistance)" denotes an overload and the meter reading will be OL since the meter is not calibrated to register resistance values of that magnitude.

■NOTE: Always check the appropriate fuse before testing a component for failure.

Transistorized Ignition System

The transistorized ignition system has no contact points. Therefore, this ignition system does not require periodic reconditioning of contact point surfaces or point gap adjustment. As a result, a strong spark is produced even at low speeds so maximum reliability can be ensured.

OPERATION



GEN-0008

When the recoil starter handle is pulled, the flywheel is turned. An electromotive force generated in the primary winding of the ignition coil makes the transistor (TR1) conduct through the resistor (R) and forms the primary circuit (indicated by dashed lines).

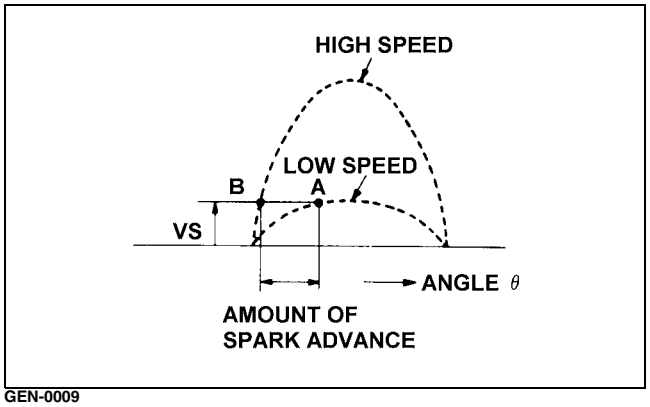
As the flywheel turns faster, the primary current increases, and the terminal voltage of the circuit consisting of the resistor (R) and the transistor (TR1) increases. This increases the working voltage at the connection of the series circuit (r1 + r2) connected in parallel to the primary circuit. As the flywheel turns further, the terminal voltage of the resistor (r2) in the resistor circuit (r1 + r2) rises to the level of working voltage of the transistor (TR2) when the ignition timing approaches the rated RPM, and, thus, the transistor (TR2) is turned on. As a result, the base current of (TR1) flowing through the resistor (R) is by-passed, and the transistor (TR1) is turned off from the conductive state.

The current flowing through the primary winding (2) is thus interrupted, and rapid change occurs in the magnetic flux across the ignition coil. The result is a high surge voltage in the secondary winding (3).

SPARK ADVANCE CHARACTERISTIC

As noted above, the unit circuit detects a voltage and makes switching to produce a high voltage required to produce a spark. On the other hand, the wave form of the voltage generated in the primary winding changes as the flywheel turns.

The working voltage (VS) of the unit circuit is at level A when the engine is started, but as the engine speed increases, the wave form of the voltage changes and advances to level B.



GEN-0009

TROUBLESHOOTING

1. Remove the spark plug and visually check its condition. Replace if fouled. Adjust spark plug gap to 0.711-0.787 mm (0.028-0.031"). Attach the high tension lead to the spark plug and ground the plug on the cylinder head.

■NOTE: Make sure the emergency stop switch is in the ON (UP) position, the ignition switch is in the RUN position.

2. Crank the engine over and check for a spark. If no spark is present, disconnect the main wiring harness from the engine. Crank the engine over. If spark is now present, the problem is either one or more of the following items:

A. Throttle cable adjustment

B. Defective RPS/idle switch

C. Defective ignition switch

D. Defective emergency stop switch

E. Defective wiring harness

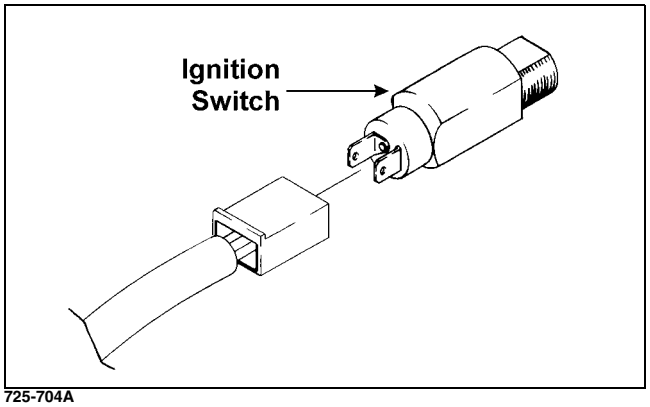
F. Defective tether (if applicable)

Testing Ignition Switches

1. Disconnect the engine wires from the main wiring harness.

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2. At the main wiring harness engine connector, connect the red tester lead to the violet wire; then connect the black tester lead to the engine ground (brown wire).
3. With the ignition switch in the RUN position, the emergency stop switch in the ON position, and the tether cord connected, the meter must read OL (infinite resistance). If the meter does not read OL (infinite resistance), disconnect the RPS and idle switch from the harness. If the meter now reads OL (infinite resistance), refer to Testing RPS Switch and Testing Idle Switch sections.



725-704A

4. If the meter does not read OL (infinite resistance) with the RPS and idle switch disconnected, disconnect the ignition switch from the main wiring harness. If the meter now reads OL (infinite resistance), replace the ignition switch.
5. If the meter does not read OL (infinite resistance) with the RPS, idle, and ignition switch disconnected, disconnect the emergency stop switch. If the meter now reads OL (infinite resistance), replace the emergency stop switch.
6. If the meter continues to not read OL (infinite resistance) with the RPS, idle, ignition switch and the emergency stop switch disconnected, disconnect the wires to the tether switch (if applicable). If the meter now reads OL (infinite resistance), replace the tether switch.
7. If the meter continues to read resistance with all switches disconnected, replace the main wiring harness.

Testing Electrical Resistances

■NOTE: The following test procedure starts by testing the resistance for the spark plug cap and working back to the stator under the flywheel. Replace any component that does not have a test value within specifications.

SPARK PLUG CAP

1. Remove the spark plug cap from the high tension lead by rotating it counterclockwise.
2. Set the selector in the OHMS position.
3. Connect one tester lead to one end of the cap and the other tester lead to other end of the cap.


B170

4. Spark plug cap resistance must be between 4000-6000 ohms.

MAGNETO

1. Disconnect the two white wires from the main harness.
2. Set the meter selector to the OHMS position; then connect the red and black tester leads to each of the two white wires.
3. The meter must show less than 1 ohm.

COIL

Primary

1. Disconnect the single black/white wire lead of the coil from the main harness.
2. Set the meter selector to the OHMS position; then connect the red tester lead to the black/white wire and the black tester lead to the metal post of the coil.
3. Resistance must be within 11.25-11.75k ohms.

Secondary

1. Remove the spark plug end cap from the high tension lead of the coil.
2. Set the meter selector to the OHMS position; then connect the red lead of the tester to the high tension lead to the coil and the black tester lead to ground.
3. Resistance must be within 6000-7000 ohms.

LIGHTING COIL

1. Disconnect the two yellow wires from the main wiring harness.
2. Set the selector to the OHMS position.
3. Connect the tester leads to the two yellow leads on the engine-side connectors.
4. Lighting coil resistance must be between 0.46-0.68 ohm.

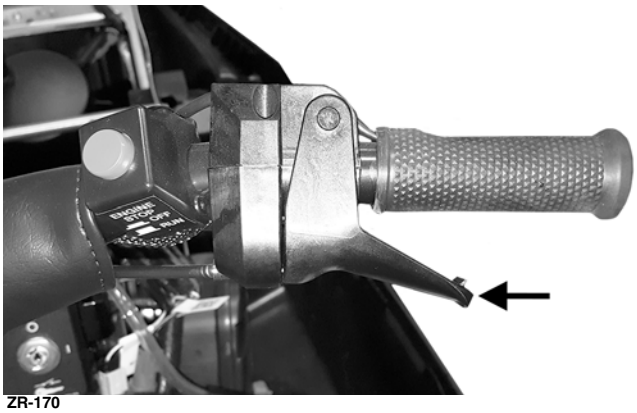
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Testing RPS Switch

1. Disconnect the RPS switch connector coming out from the rear throttle control housing; then connect the ohmmeter leads to the yellow wire and black wire.
2. With the throttle lever in the idle position, the meter must read less than 1 ohm. If the meter reads OL (infinite resistance), replace the control assembly.
3. Move the throttle lever to the wide-open position. The meter must read OL (infinite resistance). If the meter reads less than 1000 ohms, replace the rear throttle control assembly.

Testing Idle Switch

1. Disconnect the idle switch connector coming out from the front throttle control housing; then connect the ohmmeter leads to the red wire and black wire.
2. With the throttle lever in the idle position, the meter must read OL (infinite resistance). If the meter reads less than 1000 ohms, verify the switch is being compressed by the throttle lever by putting pressure on the end of the throttle lever in the direction of the arrow.



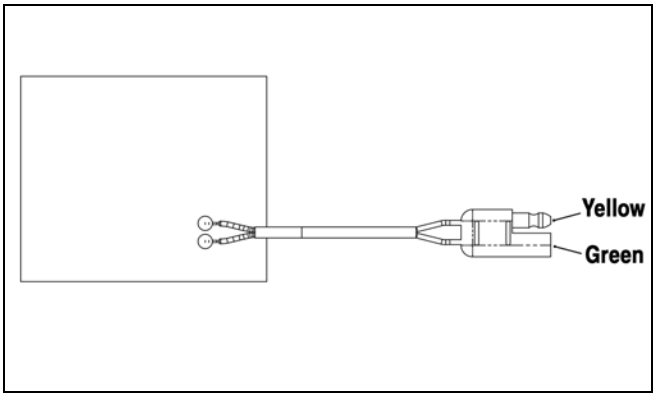
ZR-170

3. If the meter now reads OL (infinite resistance) with pressure on the throttle, the throttle cable will need to be adjusted. Refer to the throttle cable section in the service manual. If the meter still reads less than 1000 ohms, replace the front throttle control assembly.
4. Move the throttle lever to the wide-open position. The meter must read less than 1 ohm. If the meter reads OL (infinite resistance), replace the front throttle control assembly.

Testing Handlebar Warmer Elements

■NOTE: Resistance will vary due to temperature; therefore, this test should be made at room temperature of 22° C (72° F).

1. Open the hood; then disconnect the handlebar warmer two-wire connector.
2. Connect one ohmmeter lead to the yellow lead; then connect the other ohmmeter lead to the green lead.

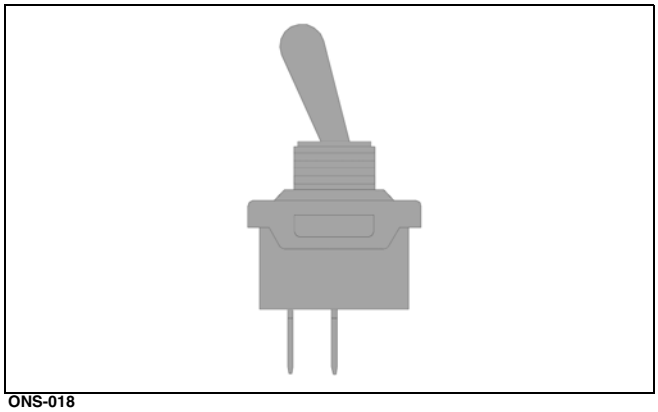


ONS-019

3. The meter must read 14.4 ± 10% ohms.
4. Replace any element measuring less than or more than the specified amount.
5. Repeat test for the other element; then connect the leads. Close and latch the hood.

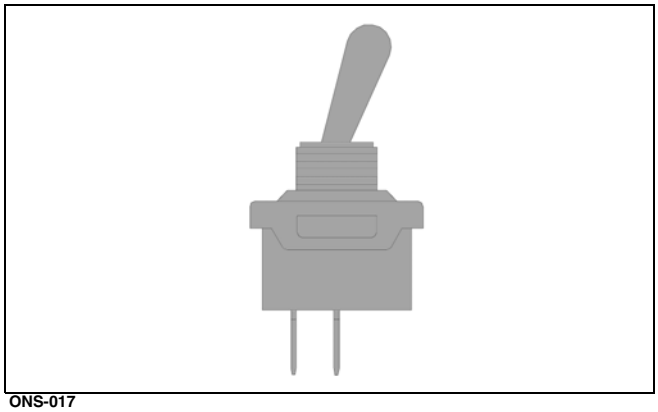
Testing Handlebar Warmer Switch

1. Open the hood; then disconnect the main harness wires from the switch.
2. With the handwarmer toggle in the OFF position, connect one ohmmeter lead to pin and the other ohmmeter lead to pin. The meter must read OL (infinite resistance).


ONS-018

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3. With the handwarmer toggle in the ON position, connect one ohmmeter lead to pin and the other ohmmeter lead to pin. The meter must read 1 ohm or less resistance.

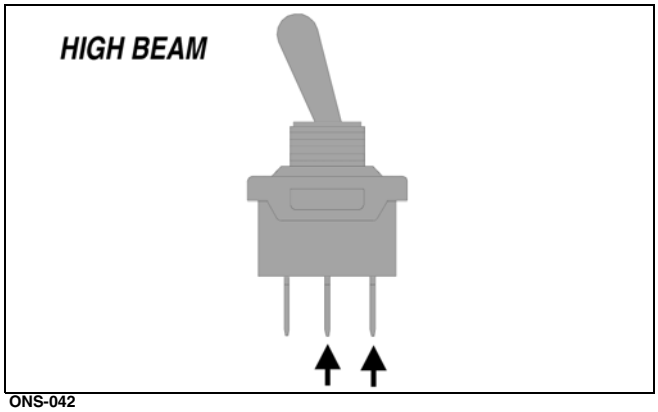


ONS-017

4. Connect the green/white wire to the bottom terminal and the brown wire to the top terminal on the switch. Close and latch the hood.

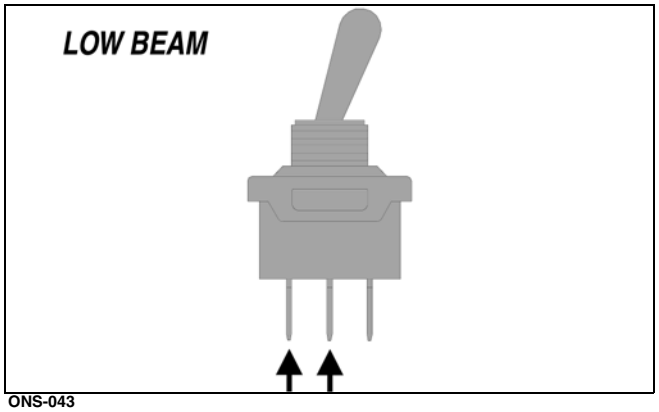
Testing Headlight Switch

1. Open the hood; then disconnect the main harness wires from the switch.
2. With the headlight toggle in the HIGH BEAM position, connect one ohmmeter lead to pin and the other ohmmeter lead to pin. The meter must read 1 ohm or less resistance.



ONS-042

3. With the headlight toggle in the LOW BEAM position, connect one ohmmeter lead to pin and the other ohmmeter lead to pin. The meter must read 1 ohm or less resistance.



ONS-043

4. Connect the white wire to the bottom terminal (LOW BEAM), the yellow wire to the middle terminal and the blue wire to the top terminal (HIGH BEAM) on the switch. Close and latch the hood.

Testing Key Switch

1. Open the hood; then disconnect the main harness wires from the key switch.
2. With the key in the OFF position, connect one ohmmeter lead to pin and the other ohmmeter lead to pin. The meter must read 1 ohm or less resistance.
3. With the key in the ON position, connect one ohmmeter lead to pin and the other ohmmeter lead to pin. The meter must read more than 10,000 ohms.

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Drive Train/Track/Brake Systems

This section has been organized into sub-sections for servicing drive train, track, 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: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

SPECIAL TOOLS

A number of special tools must be available to the technician when servicing the drive train, track, and brake systems.

Description	p/n
Clutch Alignment Bar	0644-624
Drive Clutch Retention Tool	0644-644
Engine Alignment Tool	0644-643

■NOTE: Special tools are available from the Arctic Cat Service Parts Department.

Drive Belt

REMOVING

1. Set the brake lever lock; then open the hood.
2. Remove the screws securing the clutch guard; then remove the guard.


ZR-148

3. While pulling up on the drive belt between the clutches, rotate the driven clutch to help the driven clutch open.


ZR-126

4. Remove the drive belt by pulling it up and over the sheave.

INSTALLING

1. Place the belt (so the part number can be read) between the sheaves of the driven clutch; then rotate the driven clutch to help the driven clutch open.



ZR-127

2. With the sheaves apart, roll the belt over the drive clutch.
3. Release the brake lever lock, and roll the belt back and forth to allow the driven clutch sheaves to fully close.
4. After the belt is installed properly, secure the clutch guard using the existing screws. Tighten to 30 in.-lb.
5. Close and latch the hood.

Drive Clutch

CHANGING ROLLERS/SPRING

Removing

1. Install the drive clutch retention tool over the drive clutch sheaves; then remove the cap screw washer securing the drive clutch to the crankshaft. Account for a spacer on the crankshaft.

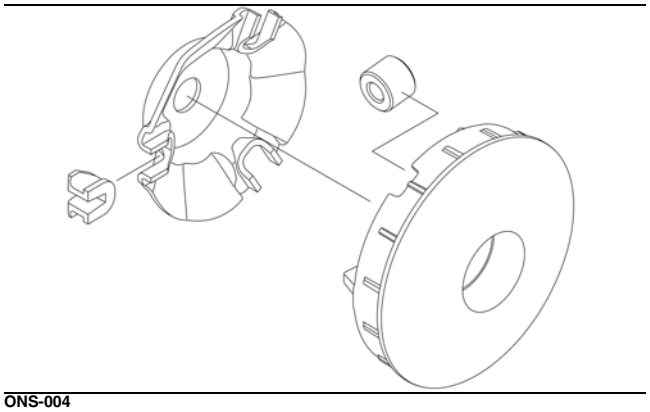
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ZR-125

Disassembling

1. While holding the clutch sheaves together; remove the retention tool from the clutch.
2. Remove the movable sheave from the stationary sheave; then remove the spring.
3. Remove the movable sheave cover and the six roller weights. Account for the three sliders.



ONS-004

■NOTE: The idler bearing is not serviceable. If the bearing is defective, the drive clutch will have to be replaced.

Cleaning and Inspecting

1. Using parts-cleaning solvent, wash grease, dirt, and foreign matter off all components; dry with compressed air.

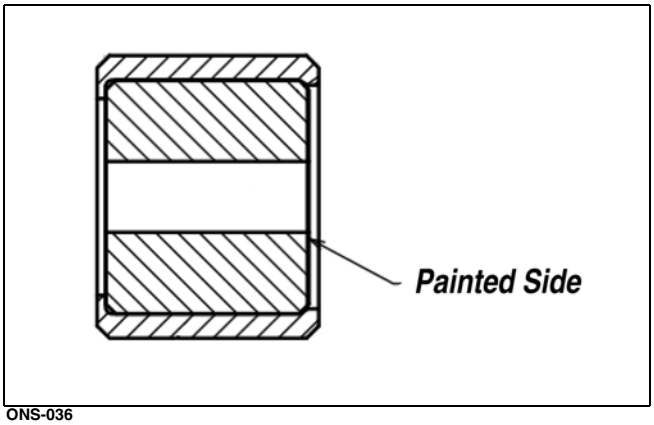
⚠ WARNING

Always wear safety glasses when using compressed air to dry components.

2. Remove any drive belt dust accumulation from the stationary sheave, movable sheave, and bushings using parts-cleaning solvent only.
3. Inspect stationary sheave, movable sheave, and cover for cracks or imperfections in the casting.
4. Inspect the spring for distortion, cracks, or wear.
5. Inspect roller weights for damage or wear (flat spots).
6. Inspect sliders for damage or wear.

Assembling

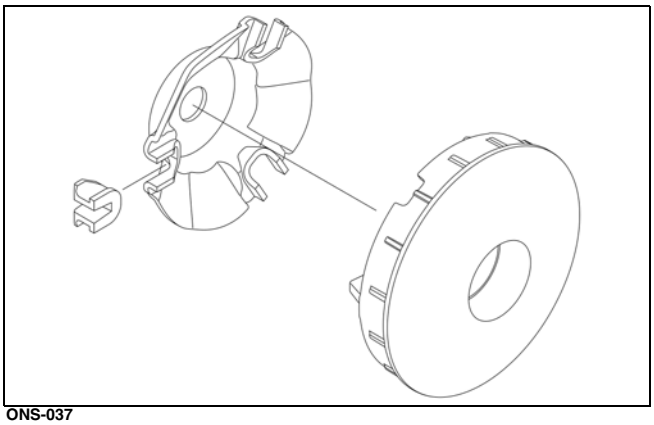
1. Starting at the top of the movable sheave, install the rollers with the painted side to the right and continue around the sheave adding all six rollers in the same orientation.



ONS-036

■NOTE: Available roller weight kits from Arctic Cat are p/n 0646-987 (18g — Blue), p/n 0646-988 (14g — Red) and p/n 0646-989 (10g — Black).

2. Install the four sliders into the cover; then install the cover onto the movable sheave.



ONS-037

3. Install the spring onto the stationary sheave; then install the movable sheave over the stationary sheave and secure using the drive clutch retention too.

Installing

1. Install the spacer onto the crankshaft; then install the drive clutch assembly onto the shaft.
2. Secure using the cap screw and washer. Tighten to 20 ft-lb.

CAUTION

When installing the drive clutch, do not tighten the cap screw with any kind of impact tool. Tighten cap screw using a hand torque wrench only. Failure to do so could result in sheave damage.

3. Check alignment between the drive clutch and driven clutch.

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4. Install the drive belt.

⚠ WARNING

Never operate the engine without the belt guard/access panel secured.

5. Start the engine and let the engine idle for 1-2 minutes; then shut the engine off and torque the cap screw again to 20 ft-lb.

Driven Clutch

REMOVING

1. Open the hood; then remove the drive belt.
2. Remove the cap screw and washer securing the driven clutch. Remove the driven clutch from the driven shaft.

DISASSEMBLING

1. Compress the clutch by pressing down on the driven clam; then while holding down the cam, remove the snap ring securing the driven cam.



ZR-121

2. Remove the driven cam and the spring.

CLEANING AND INSPECTING

1. Using parts-cleaning solvent, wash grease, drive belt dust, and foreign matter off all components.

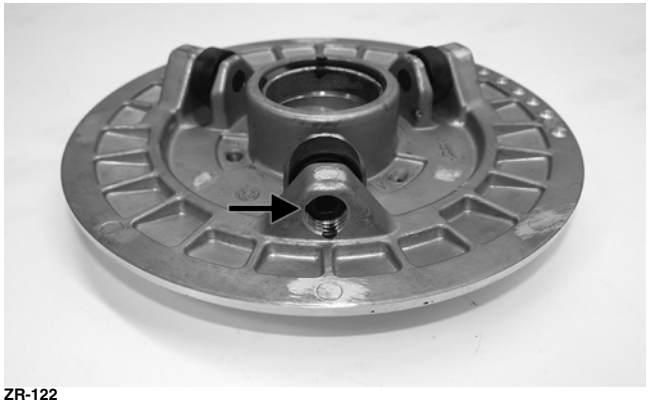
CAUTION

Do not use steel wool or a wire brush to clean driven clutch 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 driven cam for cracks or damage. The ramp portions of the cam must be free of gouges and damage.
5. Inspect spring for distortion, crystallization, or breaks.
6. Inspect the driven cam and movable sheave bearings for wear. If wear is present, replace the bracket or sheave.

REPLACING ROLLERS

1. With the driven cam removed, remove the roller screws securing the rollers in the movable sheave.



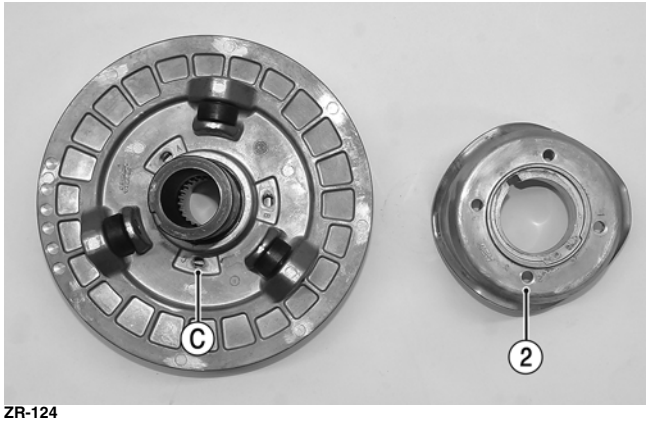
ZR-122

2. Place a new roller into position and secure with the existing roller screws. Tighten to 8 ft-lb.

ASSEMBLING

■NOTE: The driven spring rate will increase 1 to 3 and A to C. Increasing driven spring rate will slow up shift and speed up back shift.

1. Install the spring into the sheave making sure the tab is placed into notch (C).
2. Install the driven cam over the spring making sure the spring tab is installed into notch (2).



ZR-124

3. Press down on the driven cam and install the key aligning the stationary sheave and the cam. Secure the cam using the existing snap ring making sure the snap ring is installed into the groove in the top of the cam.

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ZR-121

INSTALLING

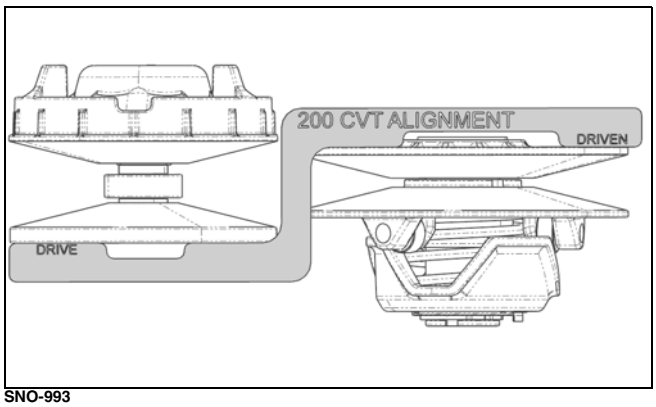
1. Set the brake lever lock.
2. With the existing shims installed on the driven shaft, install the driven clutch onto the driven shaft. Secure using the existing cap screw and washer. Tighten to 40 ft-lb.
3. Install the drive belt; then check drive clutch/driven clutch alignment.

Drive Clutch/Driven Clutch

If premature drive belt wear is experienced or if drive belt turns over, check offset. Also, offset must be checked whenever either drive clutch or driven clutch is serviced. To check offset, use appropriate Clutch Alignment Bar.

Checking offset

1. Open the hood; then remove the clutch guard and the drive belt.
2. Place Alignment Bar onto the back side of the driven clutch and the front side of the drive clutch. The bar should be flat against both clutches.



SNO-993

Correcting Offset

1. Remove the cap screw and washer securing the driven clutch to the driven shaft; then remove the driven clutch.
2. To move the stationary sheave inward on the shaft, remove alignment washers located on driven shaft.
3. To move the driven clutch outward on the shaft, add alignment washers to the driven shaft.

■NOTE: Available shim washers from Arctic Cat are p/n 0648-835 (0.039 in.) and (p/n 0648-836 (0.020 in.).

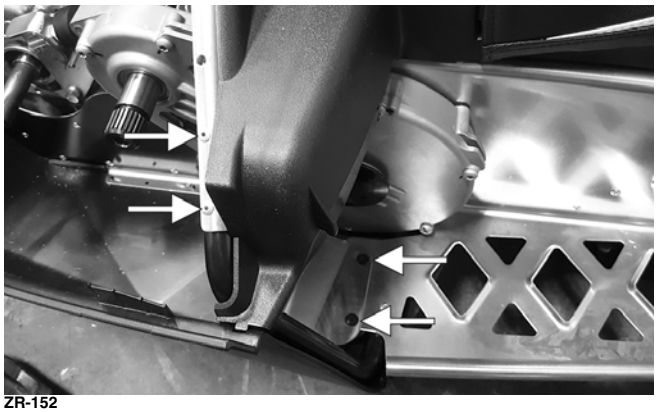
4. Arrange washers to obtain the correct offset; then install driven clutch and belt and secure using the cap screw and washer. Tighten to 40 ft-lb.
5. Install the belt, close and latch the hood.

Dropcase

REMOVING

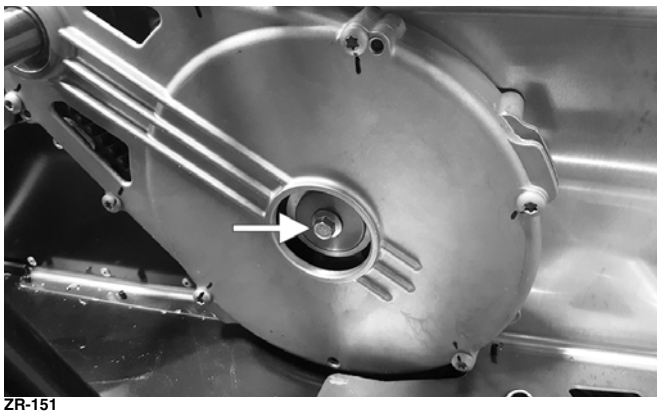
■NOTE: The engine and skid frame assemblies will have to be removed in order to remove the dropcase from the chassis.

1. Remove the rivets securing the left-side footrest to the chassis; then remove the footrest.



ZR-152

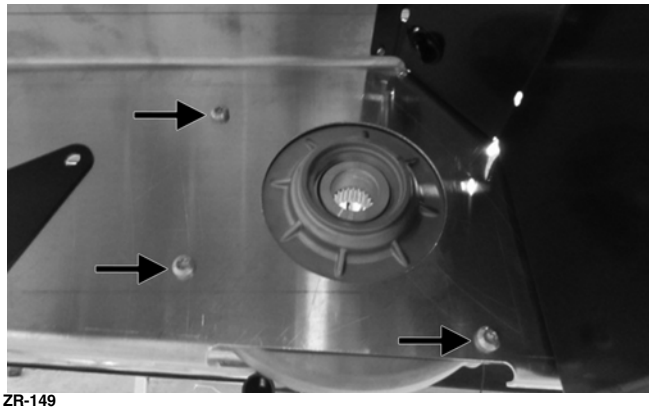
2. Remove the plastic plug from the dropcase; then remove the cap screw and washer securing the dropcase to the driveshaft.



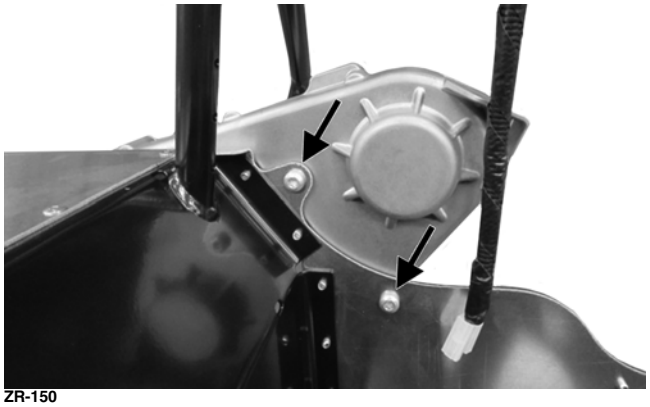
ZR-151

3. Remove the five screws securing the dropcase to the tunnel; then remove the dropcase from the chassis.

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ZR-149

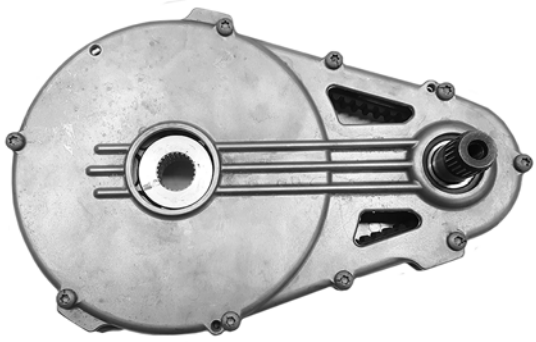


ZR-150

DISASSEMBLING

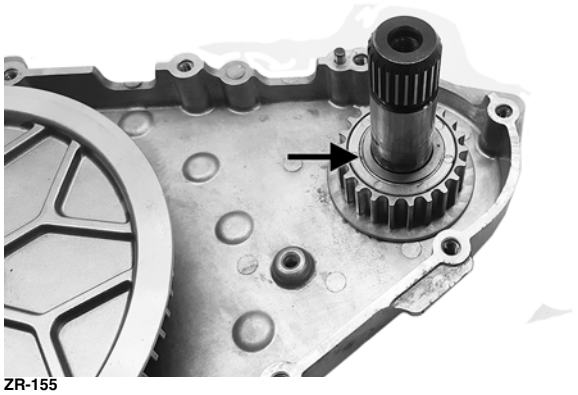
■NOTE: The bearings within the dropcase and the dropcase cover are not serviceable. If a bearing is damaged, the cover or case assemblies will have to be replaced.

1. Remove the screws securing the dropcase cover to the dropcase; then remove the cover. Account for two alignment pins.



ZR-153

2. Remove the belt from the upper pulley; then carefully remove the belt.
3. Remove the thrust washer and the upper pulley from the driven shaft; then remove the driven shaft from the upper bearing.



ZR-155

4. Place the dropcase downward bracing only the case and not the lower pulley; then apply heat to the case around the lower pulley.
5. Using a suitable press or an adequate press tool, press the lower pulley from the bearing.

ASSEMBLING

■NOTE: The bearings within the dropcase and the dropcase cover are not serviceable. If a bearing is damaged, the cover or case assemblies will have to be replaced.

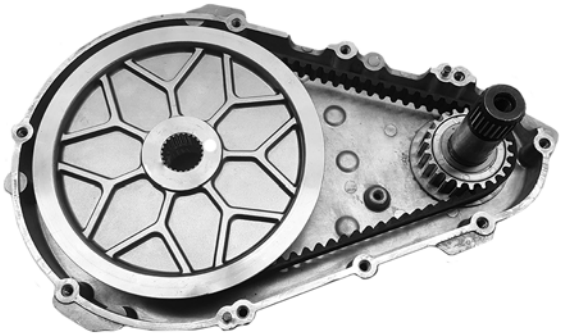
1. With the bearing clean and free of debris, press the lower pulley into the lower dropcase bearing making sure it is fully pressed into the bearing.
2. With the bearing clean and free of debris, position the driven shaft into the upper dropcase bearing.



ZR-156

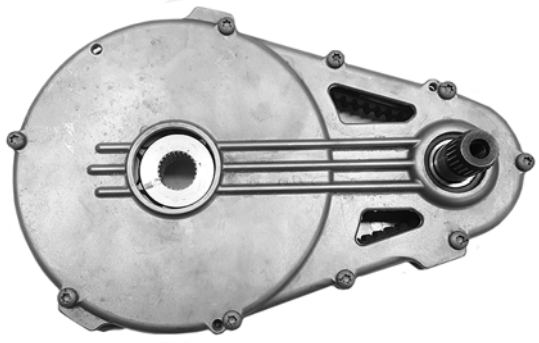
3. Position the upper pulley onto the driven shaft; then install the thrust washer onto the pulley. Install the belt over the lower pulley and then over the upper pulley.

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ZR-154

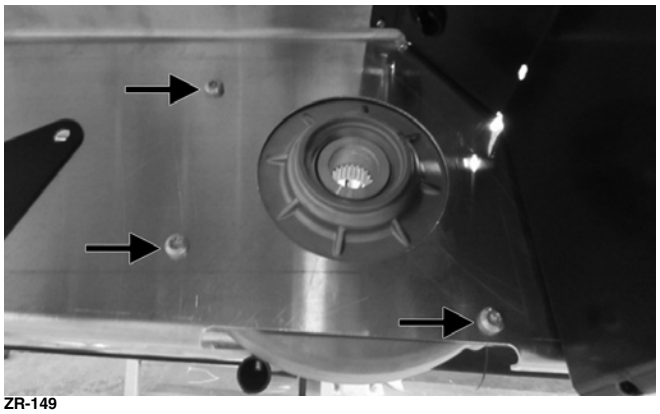
4. Install the dropcase cover and secure using the existing screws. Tighten to 10 ft-lb using a crisscross pattern.



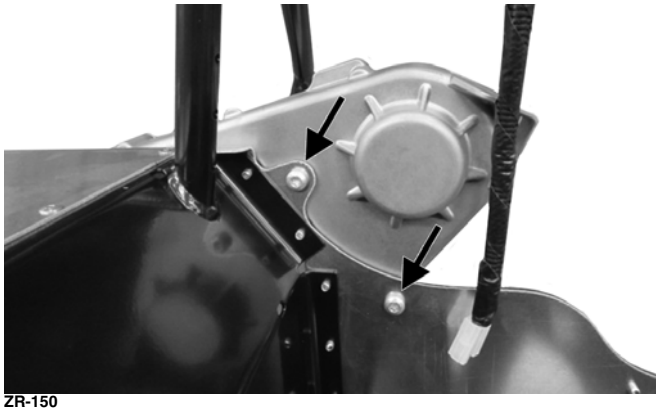
ZR-153

INSTALLING

1. Position the dropcase assembly over the driveshaft and aligning with the mounting locations in the chassis.
2. Secure the dropcase assembly to the tunnel using the existing screws. Tighten to 96 in.-lb.



ZR-149



ZR-150

3. Secure the dropcase to the driveshaft using the existing cap screw and washer. Tighten to 16 ft-lb.



ZR-151

4. Install the plastic plug over hole in the dropcase.
5. Install the skid frame assembly and the engine.

Track

TRACK TENSION

■NOTE: Track tension and track alignment are interrelated; therefore, always check both, even if only one adjustment seems necessary.

Track tension is directly related to the overall performance of the snowmobile. If the track is too loose, it may slap against the tunnel causing wear, or it may ratchet on the track drive sprockets. Arctic Cat recommends that the track tension be checked once a month and adjusted accordingly.

⚠ WARNING

Track tension must be properly maintained. Personal injury could result if a track is allowed to become excessively loose.

Checking Track Tension

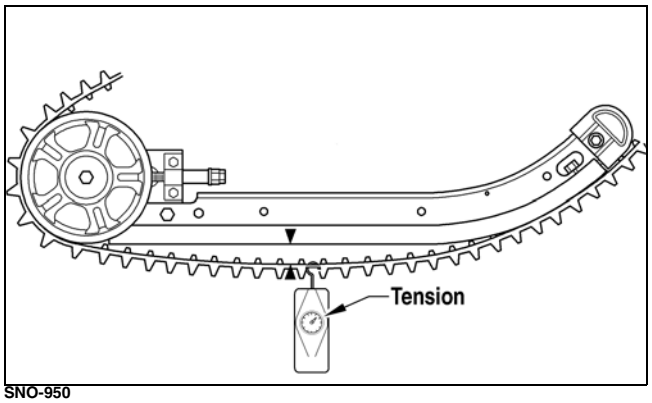
⚠ WARNING

DO NOT attempt to check or adjust track tension with engine running. Turn ignition key to the OFF position. Personal injury could result from contact with a rotating track.

1. Place the rear of the snowmobile up on a safety stand high enough so the track is free of the floor.

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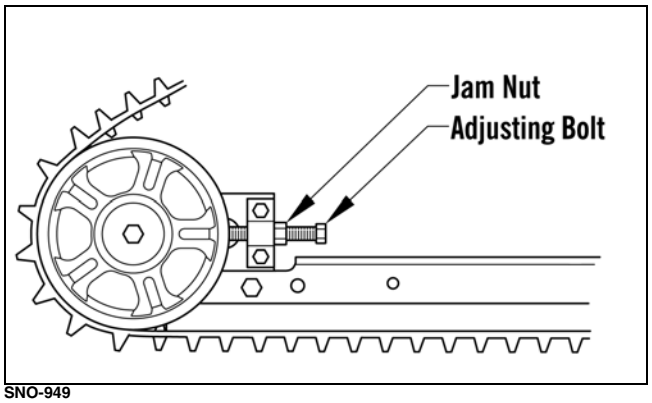
2. At the lower mounting position of the rear shock, hook a spring scale around a track clip; then pull down on the scale to 9 kg (20 lb). Measure the deflection (distance) between the bottom of the wear strip and the running surface of the track clip. The measurement should be 50 mm (2 in.).



SNO-950

Adjusting Track Tension

1. Loosen the idler wheel cap screws.
2. Loosen the rear idler wheel adjusting bolt jam nuts.



SNO-949

■NOTE: To ensure proper track tension adjustment, perform all adjustments on both sides of the snowmobile.

3. If the deflection (distance between the bottom of the wear strip and the inside of the track) exceeds specifications, tighten the adjusting bolts to take up excessive slack in the track.
4. If the distance between the bottom of the wear strip and the inside surface of the track is less than specified, loosen the adjusting bolts to increase the slack in the track.
5. Check track alignment.
6. When proper track tension is obtained, tighten the adjusting bolt jam nuts against the axle housings.
7. Tighten idler wheel cap screws to 34 ft-lb.

■ NOTE: Since track tension and track alignment are interrelated, always check both even if only one adjustment seems necessary.

⚠ WARNING

If jam nuts are not tightened properly, the adjusting bolts could loosen causing the track to become extremely loose and, under some operating conditions, allow the idler wheels to climb over the track lugs forcing the track against the tunnel causing the track to "lock." If a track "locks" during operation, severe personal injury could result.

TRACK ALIGNMENT

Proper track alignment is obtained when the outside of the rear idler wheels are equal distance from the edge of the track. Excessive wear to the idler wheels, drive lugs, and track will occur if the track is improperly aligned. Arctic Cat recommends that the track alignment be checked once a week or whenever the track tension is adjusted.

Checking Track Alignment

⚠ WARNING

Make sure the ignition key is in the OFF position and the track is not rotating before checking or adjusting track alignment. Personal injury could result if contact is made with a rotating track.

1. Position the tips of the skis against a wall; then 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.

2. Start the engine and accelerate slightly. Use only enough throttle to turn the track several revolutions. SHUT ENGINE OFF.

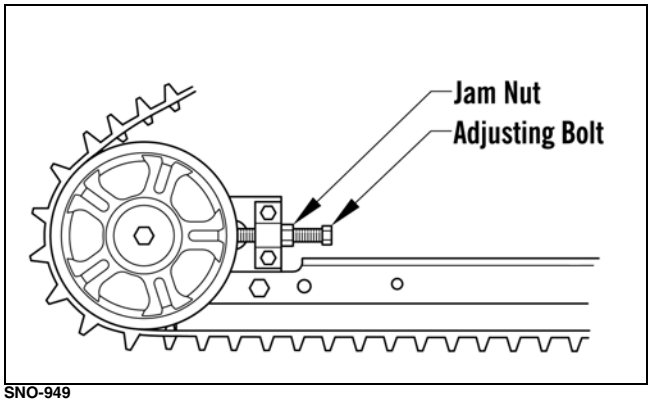
■ NOTE: Allow the track to coast to a stop. DO NOT apply the brake because it could produce an inaccurate alignment condition.

3. When the track stops rotating, check the relationship of the idler wheels and the edge of the track. If the distance from the rear idler wheels to the edge of the track is the same on both sides, no adjustment is necessary.
4. If the distances from the idler wheels to the edge of the track are not the same on both sides, an adjustment is necessary.

Adjusting Track Alignment

1. On the side of the track which has the edge of the track furthest to the outside of the rear idler wheel, loosen the idler wheel cap screw and the adjusting bolt jam nut; then rotate the adjusting bolt clockwise 1 to 1 1/2 turns.

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SNO-949

2. Check track alignment and continue adjustment until proper alignment is obtained.

■ **NOTE: Make sure correct track tension is maintained after adjusting track alignment (see TRACK TENSION section).**

3. After proper track alignment is obtained, tighten both the adjusting bolt jam nut and the idler wheel cap screw securely.

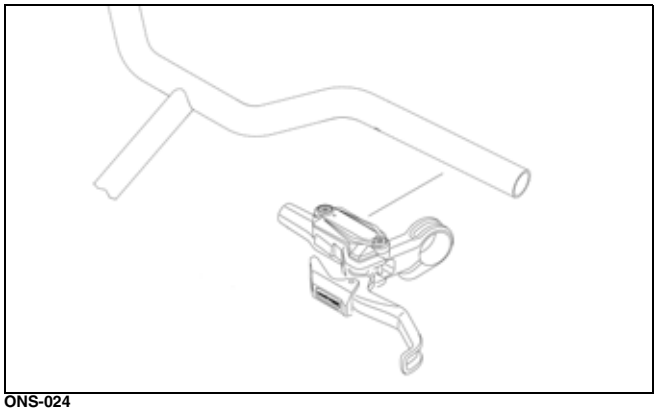
⚠ WARNING

If a jam nut is not tightened properly, the adjusting bolt could loosen causing the track to become dangerously loose.

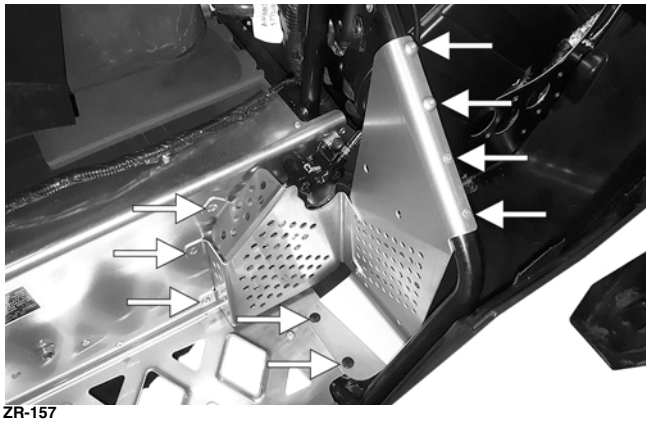
Brake System

REMOVING AND INSPECTING

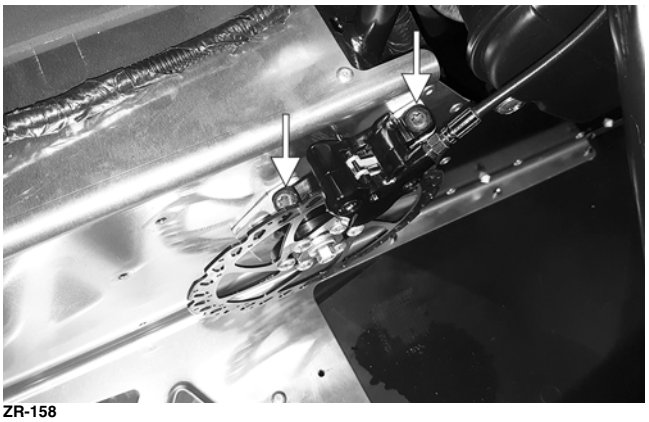
1. Remove the screw securing the brake lever assembly to the handlebar. Remove the assembly.


ONS-024

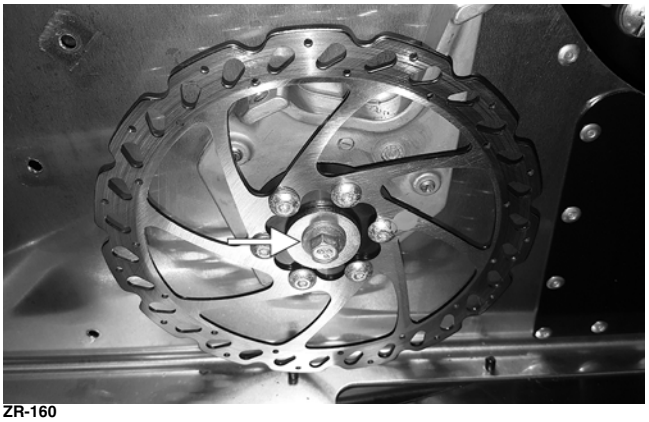
2. Remove the screws, rivets, and washers securing the brake disc guard and the right-side footrest to the chassis; then remove them as an assembly.


ZR-157

3. Remove the two screws securing the brake caliper assembly


ZR-158

4. Remove the cap screw and washer securing the brake disk assembly to the driveshaft; then remove the brake disc.


ZR-160

5. Remove the six screws securing the brake disc to the brake hub.

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ZR-159

■**NOTE: If the hub assembly needs to be removed, remove the skid frame; then remove the screws securing the hub to the tunnel.**

INSTALLING

■**NOTE: If the hub assembly was removed, secure it to the tunnel using the existing screws. Tighten to 60 in.-lb.**

1. Secure the brake disc to the brake hub using the existing screws. Tighten to 48 in.-lb.

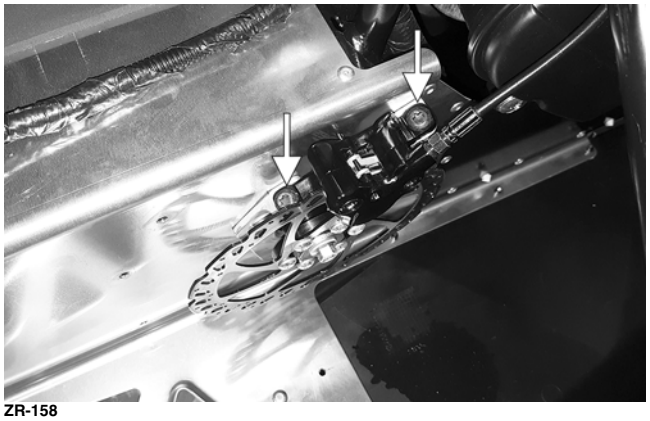

ZR-159

2. Position the brake disc assembly onto the driveshaft; then secure the assembly to the shaft using the existing cap screw and washer (threads coated with blue Loctite #243). Tighten to 16 ft-lb.

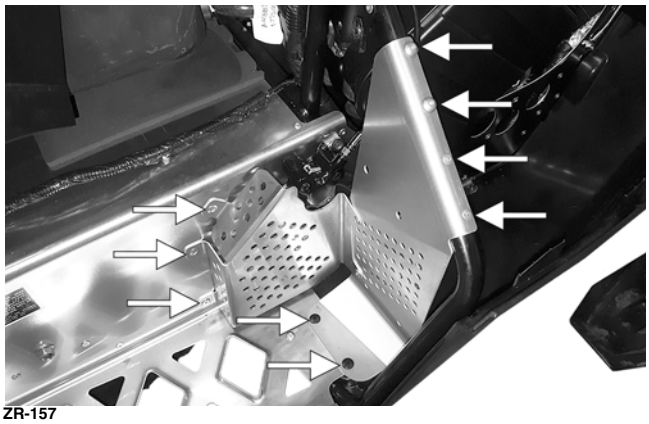

ZR-160

3. Position the brake caliper in its location on the disc and loosely secure at this time leaving them loose enough to allow the caliper to move.

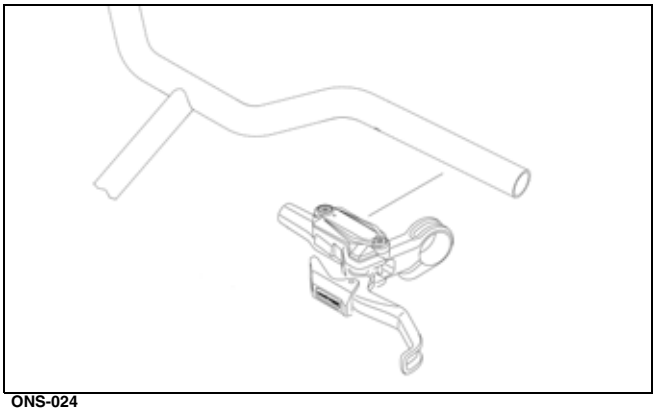
4. Squeeze the brake lever. This will center the caliper on the disc. Tighten the cap screws (threads coated with blue Loctite #243) to 80 in-lb. Release the brake lever and verify that the caliper is centered over the disc. If the caliper is not centered, adjust the mounting location as needed.


ZR-158

5. Secure the footrest and brake disc guard to the chassis using new rivets, washers, and the existing screws.


ZR-157

6. Position the brake lever assembly onto the handlebar and secure using the exiting screw. Tighten securely.


ONS-024

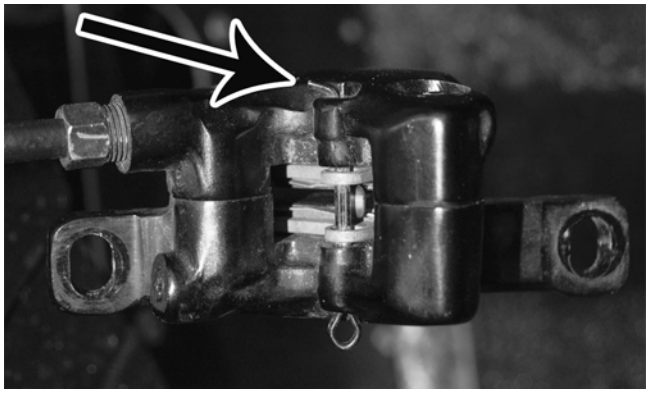
Bleeding the Brake System

■**NOTE: A video of the bleed procedure has been created by Hayes:**
https://www.youtube.com/watch?v=bAsO35FWvpg

■ **NOTE: During the bleed process, always keep the brake caliper below the master cylinder.**

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1. Open the hood; remove the four screws securing the console/seat assembly and slide the console/seat rearward and out of the way.
2. Remove the pin securing the brake pads; then remove the pads. Account for the brake pad clip.


ZR-101

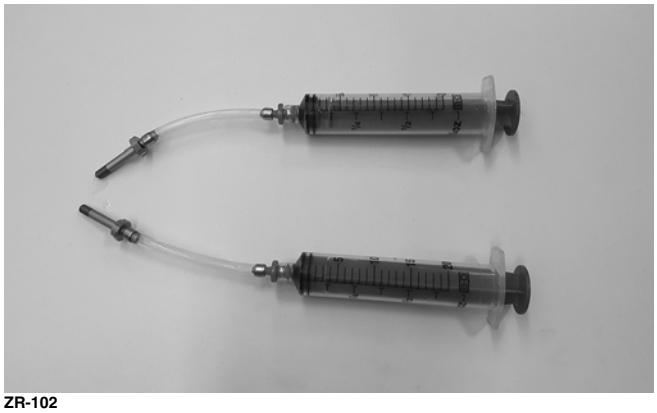
3. Insert the bleed block (included with the bleed kit) into the caliper. This will hold the pistons in place.


ZR-094

4. Loosen the screw securing the master cylinder to the handlebar; then rotate it downward.


ZR-095

5. Attach the appropriate fittings to the syringes; then fill the syringe that will be installed into the master cylinder 1/4 full of DOT 4 or 5 brake fluid. Fill the other syringe 3/4 full.


ZR-102

■ **NOTE: Purge all air from the syringes and fittings before proceeding.**

6. With the caliper below the master cylinder, remove the bleed port screw from the master cylinder and attach the syringe.


ZR-096

7. Remove the bleed port screw from the caliper and attach the other syringe (that is 3/4 full).


ZR-097

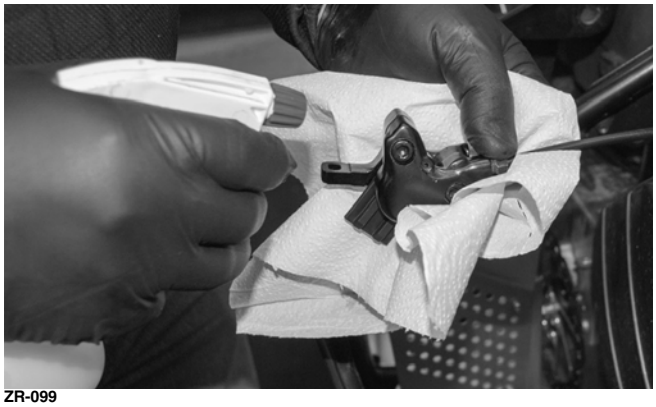
8. While holding a syringe in each hand and in a vertical position, apply pressure to the caliper syringe while pulling back the master cylinder syringe. Reverse the process several times until air is no longer in the system.

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ZR-098

■ **NOTE: Do not allow either of the syringes to bottom out. This could introduce air into the system.**

9. Apply light pressure to the syringe on the caliper and remove the syringe from the fitting. Place a rag under the caliper in your hand and remove the bleed fitting. Quickly replace the bleed plug. Tighten to 12 in.-lb.
10. Clean any excess brake fluid from the caliper using isopropyl alcohol.


ZR-099

11. With the master cylinder still in the downward position, apply light pressure to the syringe before removing the syringe from the fitting. Remove the bleed fitting. Quickly replace the bleed port screw. Tighten to 12 in.-lb. Clean any excess brake fluid from the caliper using isopropyl alcohol.
12. With the bleed block still in the caliper, squeeze on the lever to verify proper brake feel. If the desired feel has been attained, the master cylinder can be positioned to the desired location and secured.
13. Remove the bleed block and install the brake pads and the clip; then secure the pads using the pin. Spread to secure.


ZR-100

14. Position the brake caliper in its location on the disc and loosely secure at this time leaving them loose enough to allow the caliper to move.
15. Squeeze the brake lever. This will center the caliper on the disc. Tighten the cap screws to 80 in-lb. Release the brake lever and verify that the caliper is centered over the disc. If the caliper is not centered, adjust the mounting location as needed.
16. Install the gas tank and the console/seat; then close and secure the hood.

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

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Rear Suspension

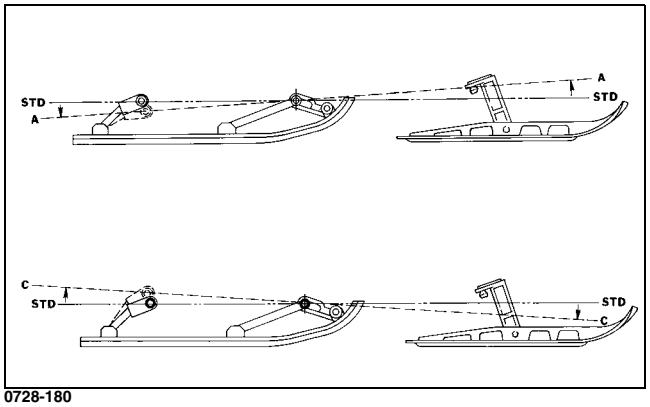
GENERAL INFORMATION

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.

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.

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.

REAR ARM SPRING TENSION

The rear spring tension is adjusted for the weight of the driver. Three possible adjustments exist.

1st block position — light operator

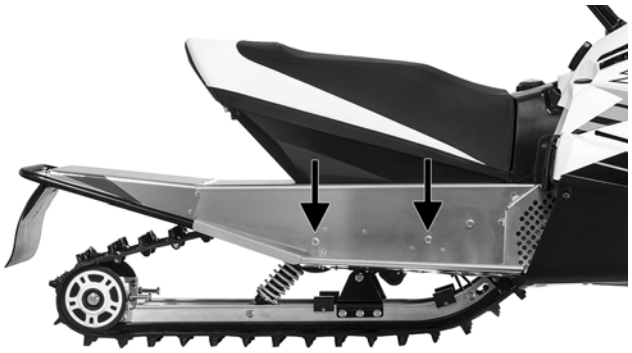
2nd block position — medium operator

3rd block position — heavy operator

This section has been organized so each procedure can be completed individually and efficiently. The technician should use discretion and sound judgment when removing and installing components.

Removing Skid Frame

1. Place a support stand under the rear bumper; then remove the two cap screws securing the upper idler wheel assembly to the tunnel.
2. Remove the cap screws securing the rear arm upper axle to the tunnel; then remove the two cap screws securing the rear shock axle to the tunnel.



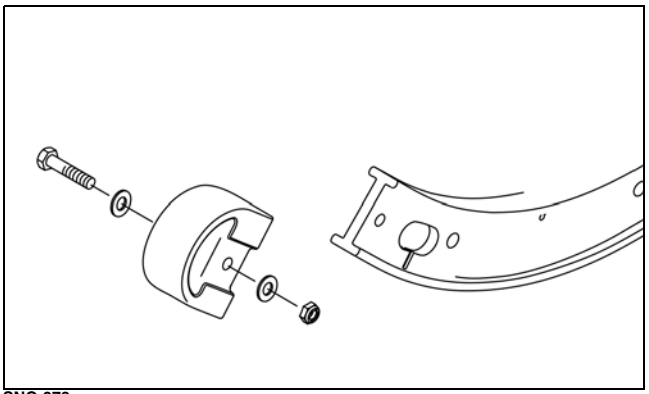
ZR-118

3. Raise the rear of the snowmobile high enough to allow the skid frame assembly to drop out from the tunnel. Remove the skid frame assembly.

End Cap

REMOVING

1. Remove the lock nut, washers, and cap screw securing the end cap.



SNO-973

2. Using a hammer, tap the end cap off the rail.

CLEANING AND INSPECTING

1. Inspect the end cap area of the slide rail for cracks and wear.
2. Inspect the end cap for any signs of cracking or wear.

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3. Clean both the slide rail area and the end cap. Using compressed air, clean the areas of dirt and gravel.

⚠ WARNING

Always wear 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

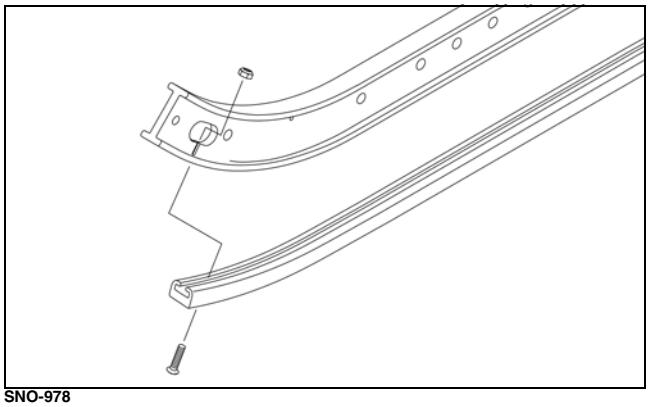
1. Position the end cap on the slide rail; then align the hole in the end cap with the hole in the slide rail.
2. Secure with a cap screws, washers, and new lock nut. Tighten to 80 in.-lb.

Wear Strip

REMOVING

■NOTE: Prior to removing the wear strips, inspect each wear strip for wear. The wear strip must be 0.42" thick or thicker. If the wear strip measurement is less than specified, replacement of both wear strips is necessary.

1. With the skid frame removed, remove the machine screw and lock nut securing the wear strip to the front of the slide rail.



SNO-978

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.

CLEANING AND INSPECTING

1. Clean the slide rail using parts-cleaning solvent and compressed air.

⚠ WARNING

Always wear safety glasses while 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. Place the straightedge along the bottom surface of the slide rail. If the rail is found to be bent, it must be replaced.
4. Place the straightedge along the side of the slide rail. If rail is found to be bent, it must be replaced.

INSTALLING

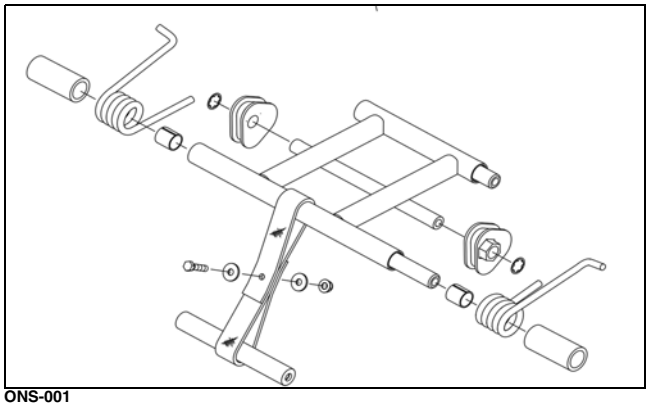
■NOTE: Use a file to remove any sharp edges on the lower portion of the rail.

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.
2. Secure with a machine screw and lock nut. Tighten to 50 in.-lb.

Rear Suspension Arm/Rear Springs

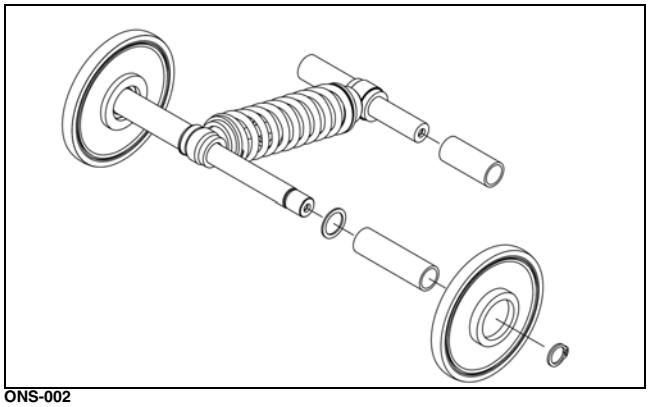
DISASSEMBLING

1. With the skid frame removed, remove the cap screws securing the rear arm to the support bracket and rail; then remove the rear arm. Account for and note the location of all hardware.
2. Remove the rear springs and sleeves from the rear arm.



ONS-001

3. Remove the cap screws securing the rear spring assembly to the rails; then remove the retaining rings securing the upper idler wheels to the axle. Remove the wheels, spacers, and washers. Remove the shock.



ONS-002

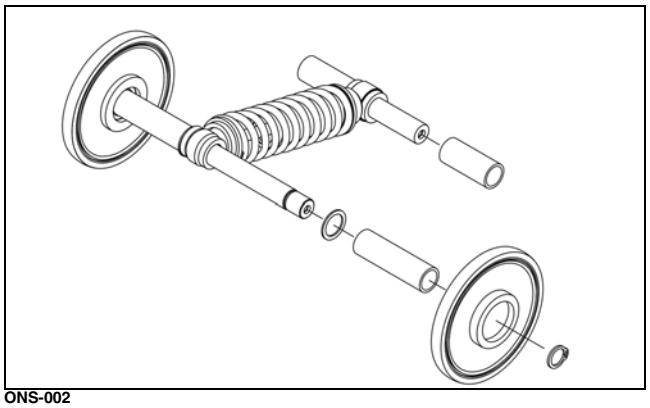
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INSPECTING

1. Inspect all rear arm weldments for cracks or unusual bends.
2. Inspect all tubing for cracks or unusual bends.
3. Inspect the axles for wear or damage.
4. Inspect the upper and lower bearings for wear or damage.
5. Inspect the two spring adjuster blocks for damage.
6. Inspect the springs for excessive wear, cracks, or imperfections.

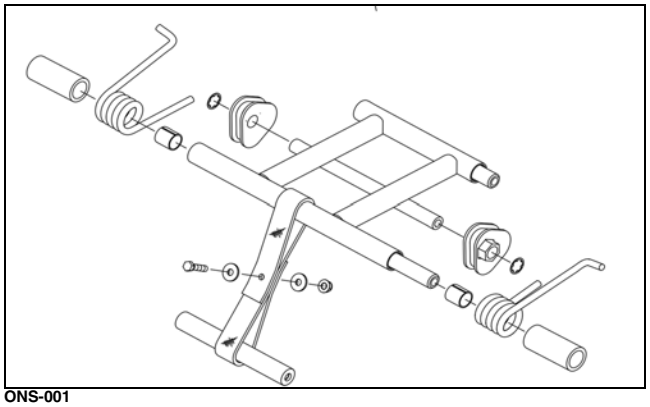
ASSEMBLING

1. Apply a light coat of grease to the axles and the bushing areas.
2. Install the axles into the rear shock assembly; then install the washers and spacers over the axles.
3. Install the upper idler wheels onto the upper axle and secure using the retaining rings.



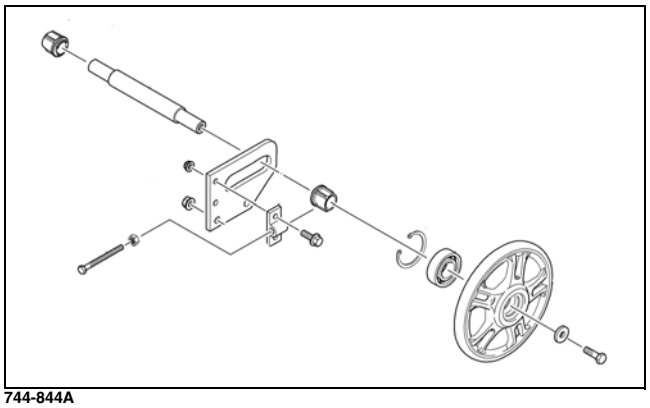
ONS-002

4. Apply a light coat of grease to the axles and the bushing areas.
5. Place the rear arm into position on the support bracket and rail; then secure with cap screws (threads coated with blue Loctite #243). Tighten to 20 ft-lb.



ONS-001

Rear Idler Wheels and Axle



744-844A

DISASSEMBLING

1. With the skid frame removed, remove the cap screws and flat washers securing the outer idler wheels. Remove the idler wheels from the axle and account for the adjuster bushings.
2. Slide the axle out of the rear axle housing and the rear spacer.

CLEANING AND INSPECTING

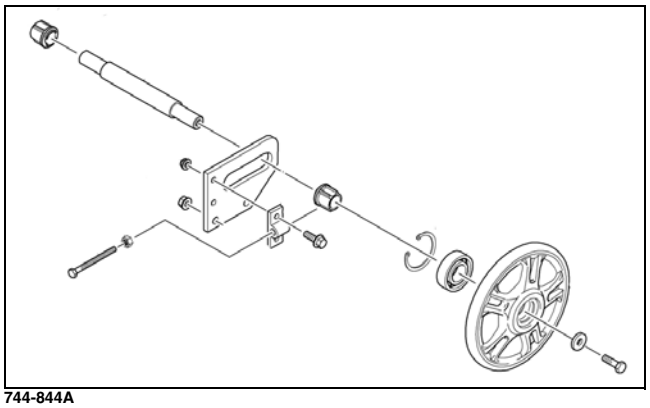
1. Clean the bearings with a clean cloth.
2. Inspect all idler wheel bearings. Rotate each bearing (by hand) and if any roughness or binding is noted, replace the idler wheel assembly.
3. Inspect the outer rubber portion of the idler wheels for cracks and poor bonding.
4. Inspect the plastic hub of each idler wheel for cracking.
5. Inspect the axle for wear and damaged threads. Damaged threads may be repaired with a 3/8 x 16 tap.

ASSEMBLING

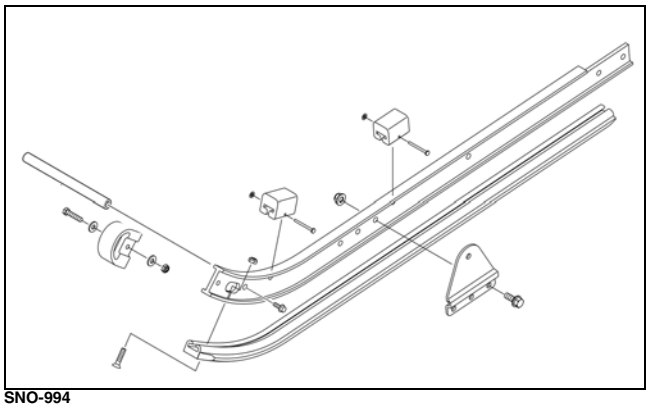
1. In order, slide the axle through the rear axle housing; then place a spacer on the axle. Slide the axle through the opposite axle housing.
2. Place the adjuster bushings on the axle (on the outside of each axle housing). Make sure the adjuster bushing is positioned properly toward the adjusting cap screw.
3. Place the rear idler wheels on the axle and secure with two cap screws (coated with blue Loctite #243) and washers. Tighten to 20 ft-lb.

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Slide Rail



744-844A

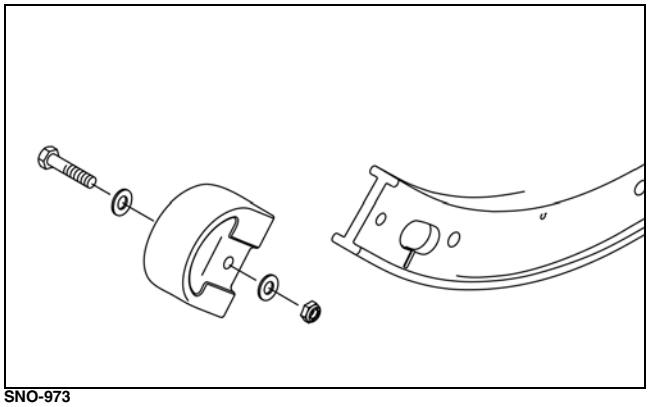


SNO-994

REMOVING

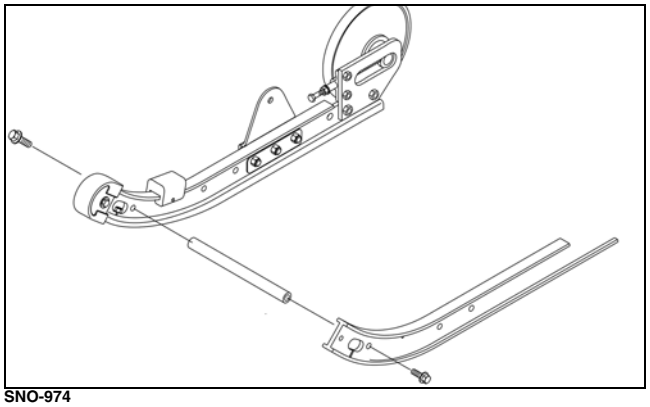
■**NOTE: When replacing one or both slide rails is necessary, remove one slide rail at a time. The remaining slide rail will then hold the crossbraces and brackets in their correct assembly order which is much quicker than to completely disassemble the entire skid frame.**

1. With the skid frame removed, remove the cap screw, washers, and lock nut securing the end cap to the slide rail. Remove the end cap from the slide rail.



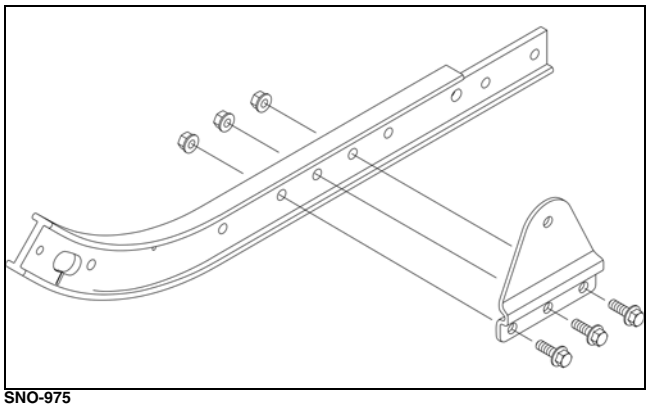
SNO-973

2. Remove the cap screw securing the cross-brace axle to the slide rail.



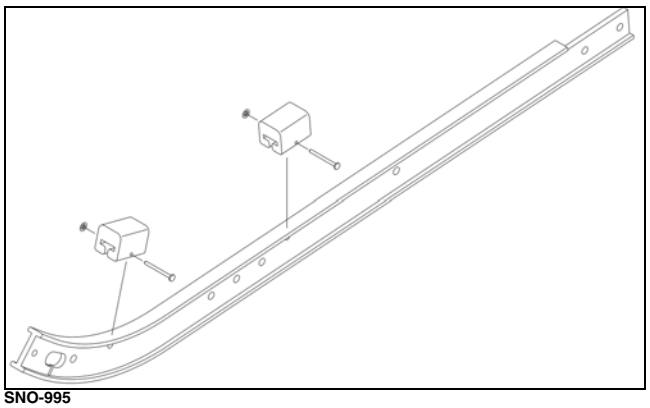
SNO-974

3. Remove the cap screw securing the rear suspension arm to the support bracket.
4. Remove the cap screws and lock nuts securing the rear suspension arm support bracket.



SNO-975

5. Remove the cap screw and washer securing the rear idler wheel to the axle. Slide the wheel off the axle and account for the adjuster bushing.
6. Remove the two cap screws and lock nuts securing the rear axle housing; then remove the housing.
7. Remove the push nuts and solid rivets securing the shock pads to the slide rail. Remove the shock pads.



SNO-995

8. Remove the slide rail from the skid frame.

INSPECTING

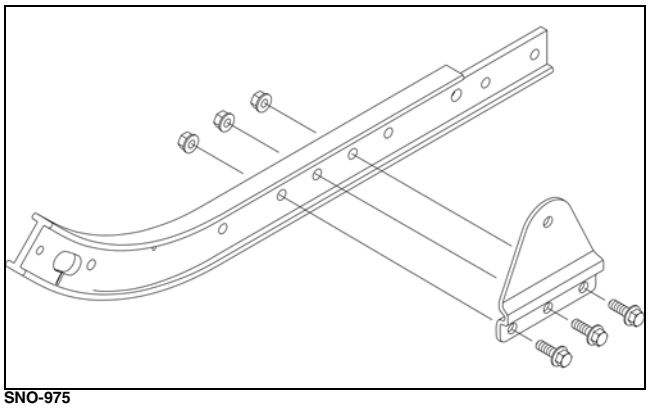
1. Inspect the slide rail for cracks or unusual bends.

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2. Inspect the wear strip for wear. The wear strip must be 0.42" thick or thicker. If the wear strip measurement is less than specified, replacement of both wear strips is necessary.

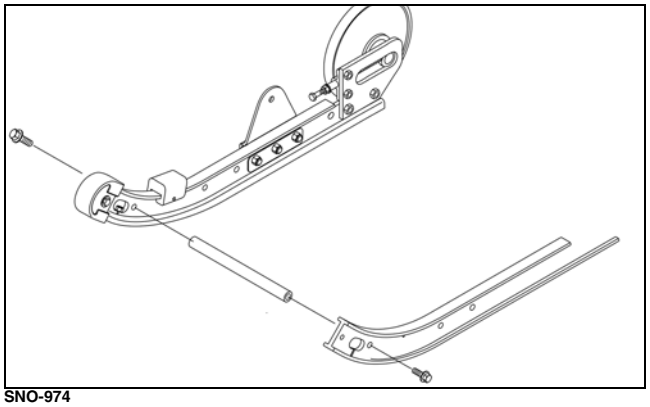
INSTALLING

1. Install the rear axle housing and adjuster bushing; then secure with cap screws and lock nuts. Tighten to 20 ft-lb.
2. Install the rear idler wheel and secure the rear idler wheel with a cap screw (coated with blue Loctite #243) and washer. Tighten to 20 ft-lb.
3. Secure the rear suspension arm support bracket to the slide rail with cap screws and lock nuts. Tighten to 20 ft-lb.



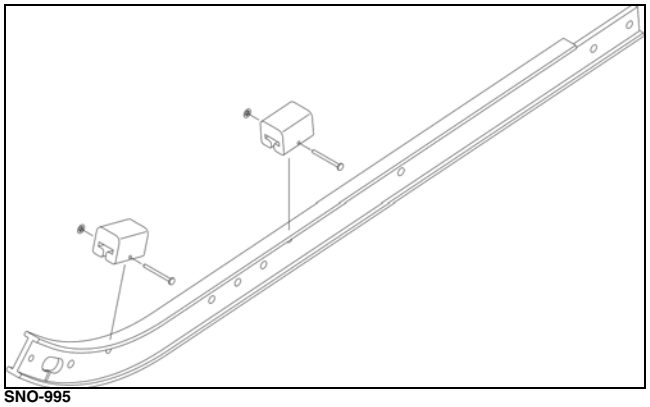
SNO-975

4. Secure the rear arm to the support bracket with the cap screw. Tighten to 20 ft-lb.
5. Secure the cross-brace axle to the slide rail with the cap screw (threads coated with blue Loctite #243). Tighten to 20 ft-lb.



SNO-974

6. Place the shock pad into position and secure with a solid rivet and push nut.



SNO-995

7. Place the end cap onto the rail and secure with the cap screw, washers, and lock nut. Tighten to 80 in.-lb.

Installing Skid Frame

1. Pull the track away from the tunnel and spread open; then place the skid frame into the track.
2. Position the skid frame into the tunnel and align the four mounting locations with the appropriate mounting holes in the tunnel. Secure using the existing cap screws (coated with blue Loctite #243). Thread the cap screws in only half way. DO NOT TIGHTEN AT THIS TIME.
3. Securely tighten all mounting hardware to 20 ft-lb.
4. Check track tension; adjust as necessary.

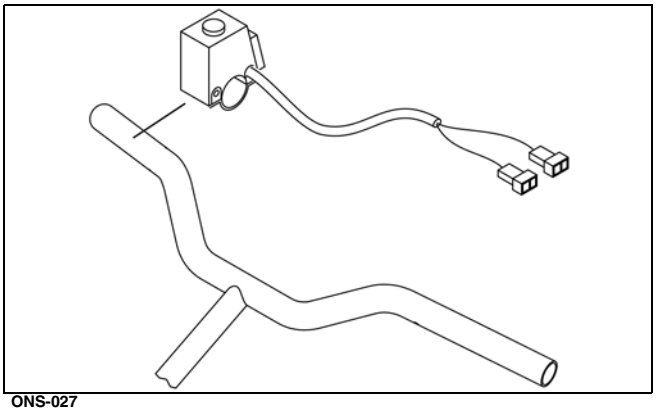
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Steering and Body

Steering Post

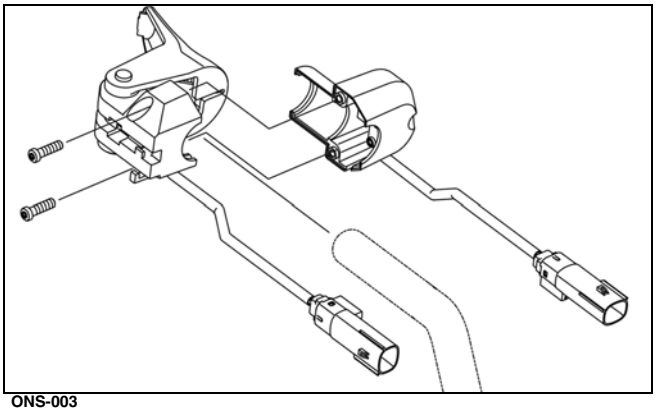
REMOVING

1. Remove the handlebar pad.
2. Remove the screw securing the emergency stop switch to the handlebar; then remove the switch.



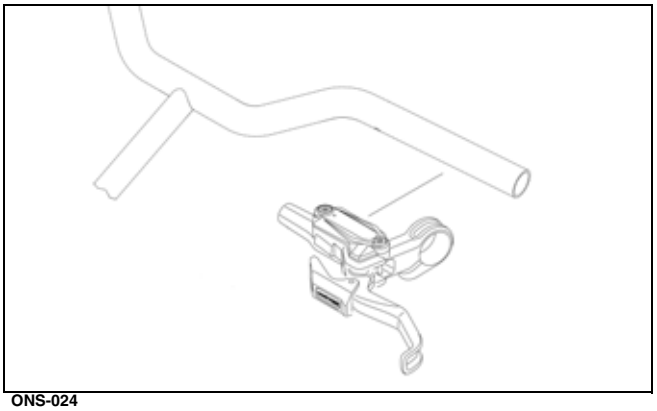
ONS-027

3. Remove the clip securing the throttle lever pin in the throttle control; then remove the pin and lever.
4. Remove the two Torx screws securing the rear throttle control to the front throttle control. Remove the controls from the handlebar.



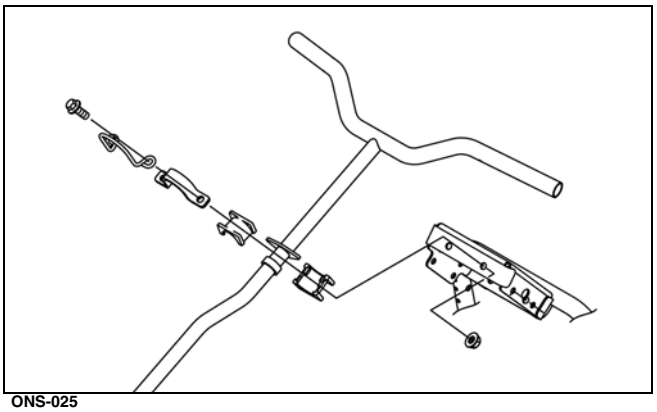
ONS-003

5. Disconnect the throttle cable from the lever; then slide the cable out of the lever.
6. Remove the C-clip securing the throttle cable to the control; then remove the throttle cable.
7. Remove the screw securing the brake lever assembly to the handlebar. Remove the assembly.



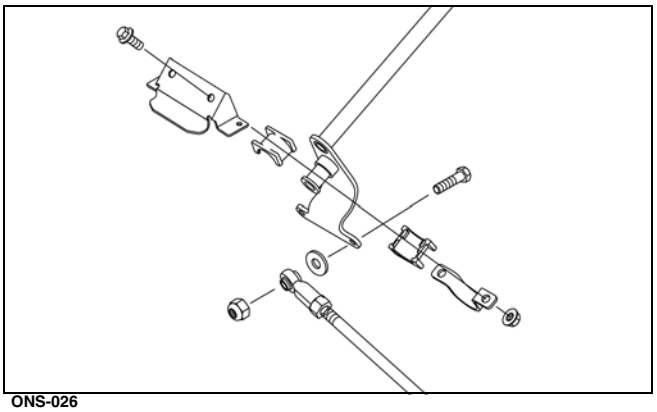
ONS-024

8. Cut the cable ties securing the cables to the steering post.
9. Using a sharp knife, cut the grips off the handlebar; then remove the hand warmers.
10. Using a solvent, clean the old adhesive from the handlebar.
11. Loosen the screw securing the emergency stop switch to the handlebar; then remove the stop switch.
12. Remove the two cap screws and lock nuts securing the upper steering post bearings and retainers; then remove the retainers and bearings.



ONS-025

13. Remove the cap screws, washers, and lock nuts securing the tie rods to the steering post; then remove the cap screws and lock nuts securing the steering post to the chassis. Account for a washer, ground wire, bearings, and the retainer.



ONS-026

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■NOTE: Use additional wrench to keep tie rod end shaft from turning while removing the tie rod lock nut.

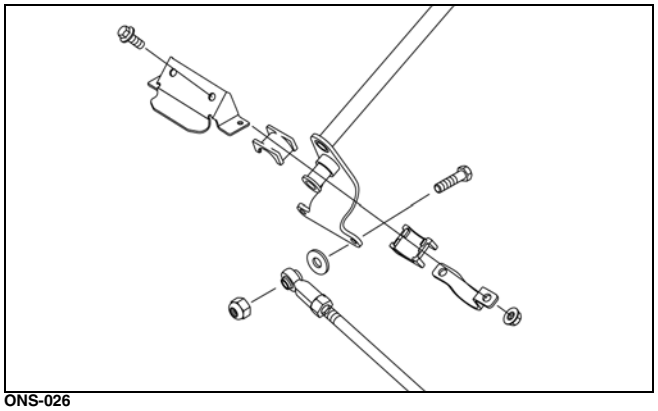
14. Remove the steering post from the engine compartment.

INSPECTING

1. Inspect all welded areas for cracks or deterioration.
2. Inspect the steering post and bearing retainers for cracks, bends, or wear.
3. Inspect the steering post bearings for wear, cracks, or deterioration.
4. Inspect the tie rod ends for wear or damage.

INSTALLING

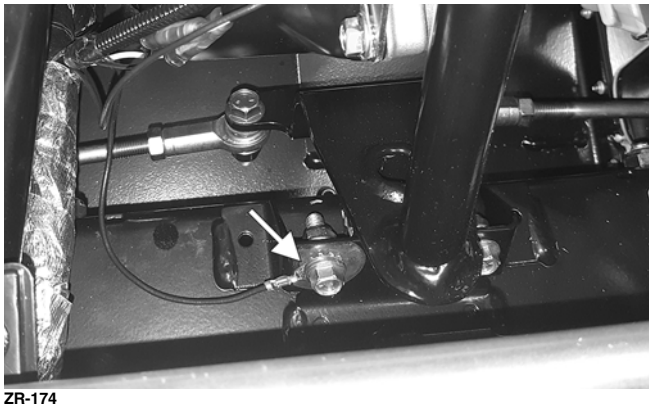
1. Place the lower steering post bearings and retainer into position on the lower portion of the steering post; then place the steering post into position and loosely secure with cap screws, washer, and lock nuts.
2. Secure the inner tie rods to the steering post with the existing cap screws, washers, and lock nuts (coated with blue Loctite #243). Tighten to 20 ft-lb.



ONS-026

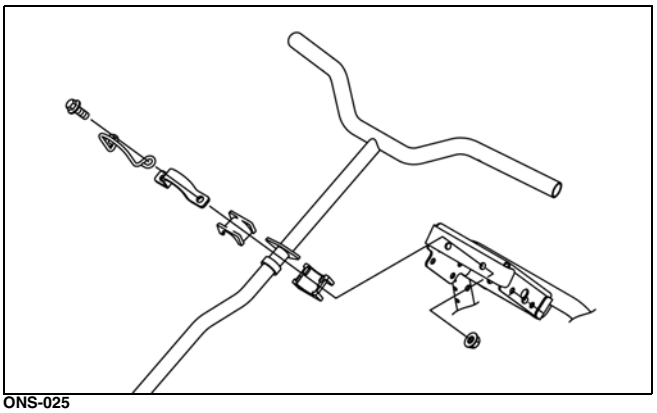
■NOTE: Use an additional wrench to keep the tie rod end shaft from turning while tightening the tie rod lock nut.

■NOTE: Make sure the ground wire is routed so it does not come into contact with the steering post when turning the steering post.



ZR-174

3. Place the upper steering post bearings into position on the steering post and secure the steering post/bearing assembly to the support with the bearing retainer, cap screws, harness guide, supports, and lock nuts.
4. Tighten the four cap screws and nuts securing the steering post to 96 in.-lb.



ONS-025

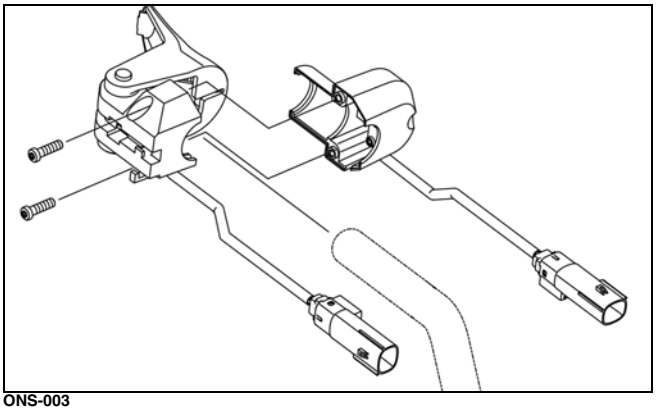
■NOTE: Check all fasteners to ensure they are tight. Turn the handlebar full-left and full-right several times to ensure free movement.

5. Install new hand warmers only the handlebar making sure the connector is in the front.
6. Apply handlebar adhesive to the bore of the handlebar grip; then using a rubber hammer, drive the grip into position.

⚠ WARNING

The handlebar adhesive is extremely flammable. This product contains acetone. The vapors 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.

7. Place the emergency stop switch onto the right handlebar and secure with the screw.
8. Position the throttle control onto the handlebar and secure using the exiting screws. Tighten securely.



ONS-003

9. Route the throttle cable through the slot in the throttle control and insert the cable end into the throttle control. Secure the cable with a C-clip.

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10. Seat each cable drum into its lever recess; then secure the lever with a pin and push nut.
11. Install the brake assembly onto the handlebar and secure using the screw. Tighten securely.

Ski

REMOVING

1. Elevate the front of the snowmobile and secure on a support stand.
2. Remove and discard the cotter pin; then remove the nut and cap screw securing the ski to the spindle.

■NOTE: Note the orientation of the damper for installation purposes.

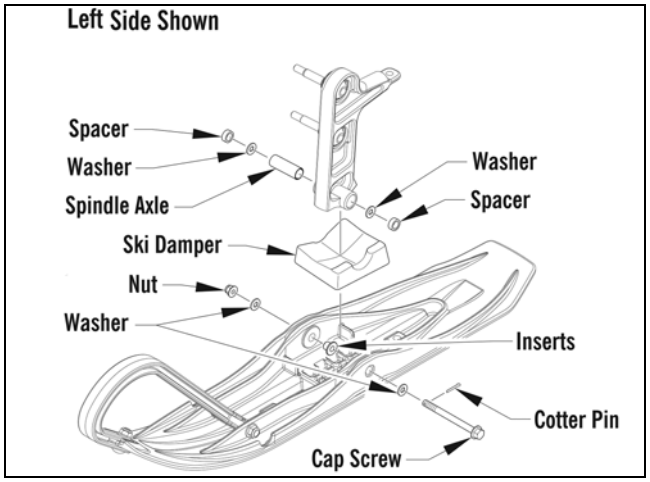
3. Remove the ski. Account for the rubber damper, spacers, and washers.

INSPECTING

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

1. Slide a washer onto the cap screw used to secure the ski; then apply all-temperature grease to the shaft portion of the cap screw and spindle axle.
2. Install the spindle axle into the spindle; then position the washers on the outside of the spindle and the spacers on the outside of the washers. Position the ski damper under the spindle.



0750-989

■NOTE: The ski damper must be positioned in the ski so it is directly under the spindle.

3. With the cap screw hole of the ski centered with the spindle axle, slide the cap screw with washer through the outside of the ski and spindle assemblies.

■NOTE: Install the cap screw so the lock nut will be located to the inside of the ski and the cotter pin slot in the cap screw will be horizontal with the ski.

4. Install the remaining washer and lock nut; then tighten the lock nut to 16 ft-lb.

■NOTE: Ensure that the cotter pin slot in the cap screw is still horizontal with the ski.

5. Install a new cotter pin from the back side of 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. Using a suitable stand or lift, raise the front of the snowmobile off the floor; then remove the lock nuts securing the wear bar to the ski.
2. 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.
3. Remove the wear bar.

INSTALLING

1. Insert the front of the wear bar into the hole at the front of the ski and swing the wear bar upward; then insert the wear bar studs into the holes in the ski.

⚠ 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. Center the wear bar studs in the holes and install the lock nuts. Tighten lock nuts securely.

Tie Rods

■NOTE: The tie rod boot does not need to be removed for this procedure.

REMOVING AND DISASSEMBLING

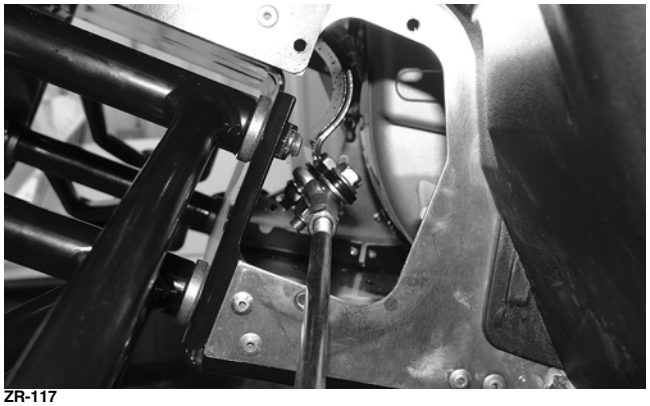
1. Remove the tie rod from the spindle.

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ZR-116

2. Open the hood; then remove the tie rod from the steering post.



ZR-117

3. Slide the tie rod from the steering boot. Loosen the jam nuts securing the tie rod; then remove the ball joints from the tie rod.

CLEANING AND INSPECTING

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 joint in parts-cleaning solvent. Dry with compressed air. Inspect the ball joint pivot area for wear. Apply an all-temperature grease to the ball joint.

⚠ WARNING

Always wear safety glasses when using compressed air.

ASSEMBLING AND INSTALLING

1. Install the jam nuts and thread the ball joints onto the tie rod; then Slide the tie rod through the steering boot.

■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 inner tie rod to the steering post with washers and new lock nuts. Tighten to 20 ft-lb.
3. Secure the outer tie rod to the spindle with a washer and new lock nut (coated with blue Loctite #243). Tighten to 15 ft-lb.



ZR-116

4. Lock the jam nuts against the tie rod; then adjust ski alignment (see Ski Alignment sub-section).

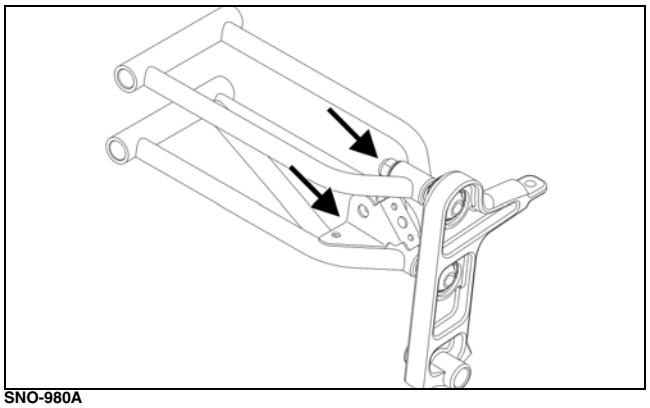
⚠ WARNING

Neglecting to lock the jam nuts against the tie rod may cause loss of snowmobile control and possible personal injury.

Spindle

REMOVING

1. Position the front of the snowmobile up onto a safety stand.
2. Remove the ski.
3. Remove the lock nut securing the tie-rod ball joint to the spindle (account for the washer); then remove the ball joint from the spindle.
4. Remove the two lock nuts securing the spindle to the A-arms.



SNO-980A

5. 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

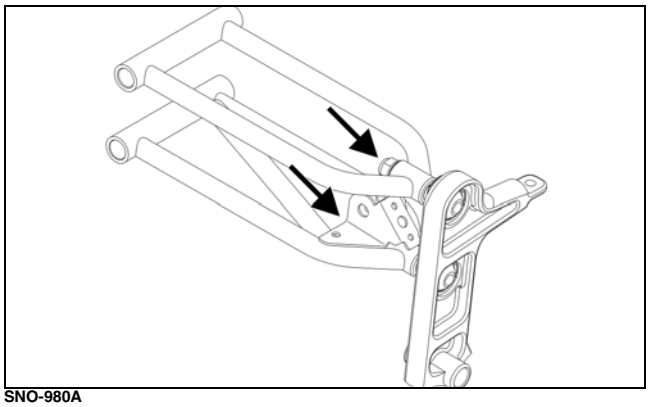
1. Inspect the spindle for excessive wear, cracks, bends, or imperfections.

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■**NOTE: The spindle should not be disassembled. It will only be sold as an assembly.**

INSTALLING

1. Install the spindle assembly into the upper and lower A-arms and secure using two new lock nuts. Tighten (head-side) to 20 ft-lb.



SNO-980A

2. Place the tie-rod ball joint into position on the bottom side of the spindle arm and secure with a lock nut (threads coated with blue Loctite #243) tightened to 15 ft-lb.
3. Install the ski.
4. Remove the safety stand from beneath the front frame assembly.

Ski Alignment

■**NOTE: Prior to checking/adjusting ski alignment, verify that the handlebar has been centered and is in the straight-ahead position.**

CHECKING

■**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.).**

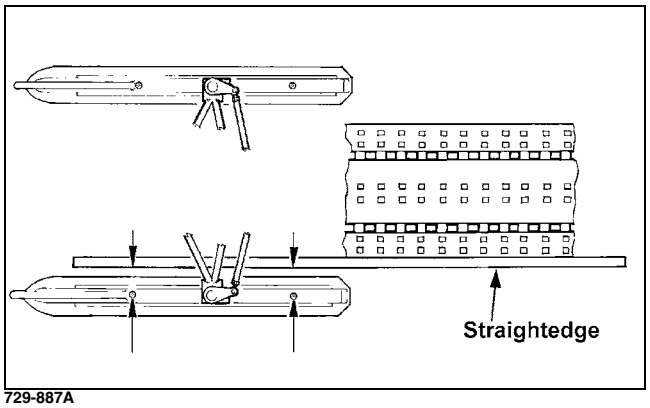
1. Center the handlebar to the straight-ahead position.
2. With the handlebar in the straight-ahead position, secure the handlebar to prevent handlebar alignment from becoming disturbed during the remainder of the alignment procedure.

■**NOTE: Track tension and alignment must be properly adjusted prior to placing the straightedge against the outside edge of the track.**

3. Place a long straightedge against the outside edge of the track so it lies near the inside edge of the left-side ski.

■**NOTE: The straightedge should be long enough to extend from the back of the track to the front of the ski.**

4. 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

5. Place the straightedge against the outside edge of the track so it lies near the inside edge of the right-side ski.
6. Measure the distance from the straightedge to the right-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.).

7. 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.**

⚠ WARNING

Neglecting to lock the tie rod by tightening the jam nuts may cause loss of snowmobile control and possible personal injury.

1. With the handlebar secured in the straight-ahead position, loosen both spindle tie rod jam nuts on the same side as the ski to be aligned.

■**NOTE: To access the spindle tie rod inner jam nuts, the belly pan and tie rod boots must be removed.**

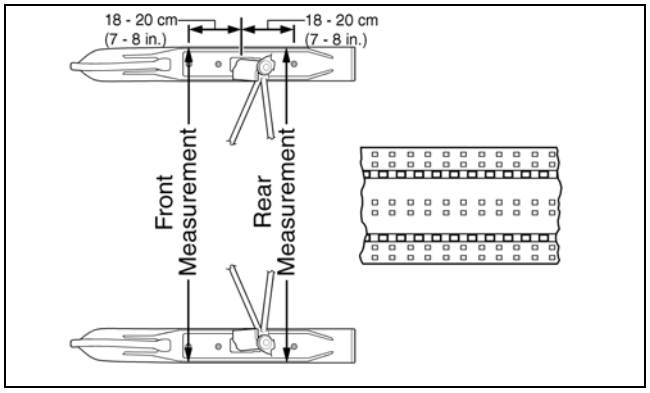
2. Using a wrench on the spindle tie rod "flats," rotate the spindle tie rod until recommended specification is attained.
3. Apply blue Loctite #243 to each jam nut thread area; then securely lock the jam nuts against the spindle tie rod.

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■**NOTE: Repeat this procedure on each side (if necessary) until ski toe-out is within specification.**

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 7-8 in. in front of the spindle and 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 be greater than the rear measurement by 1/16 in. but must not exceed the rear measurement by 1/4 in.



0734-408

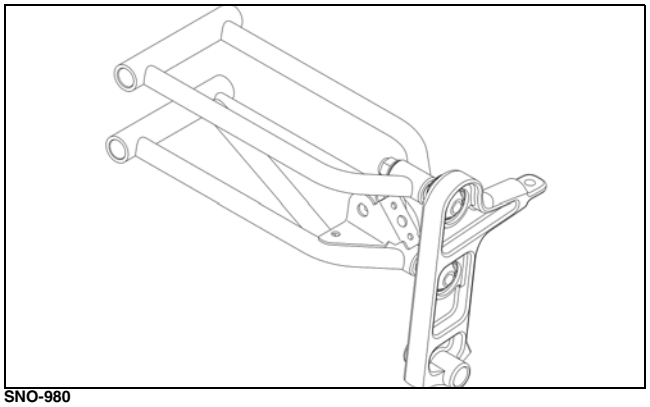
⚠ WARNING

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 A-Arms

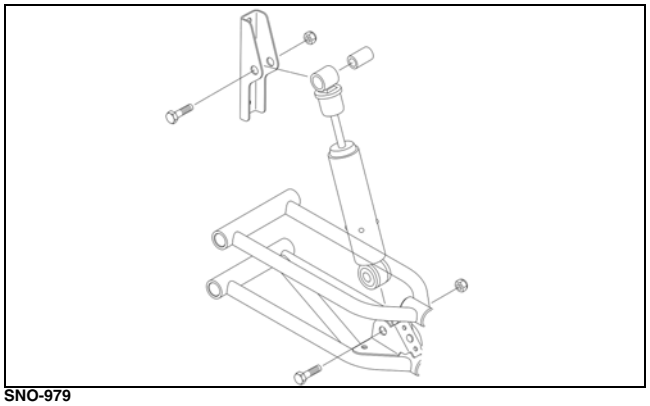
REMOVING

1. Position the front of the snowmobile up onto a safety stand; then remove the two nuts securing the spindle to the A-arms. Remove the spindle and ski as an assembly.



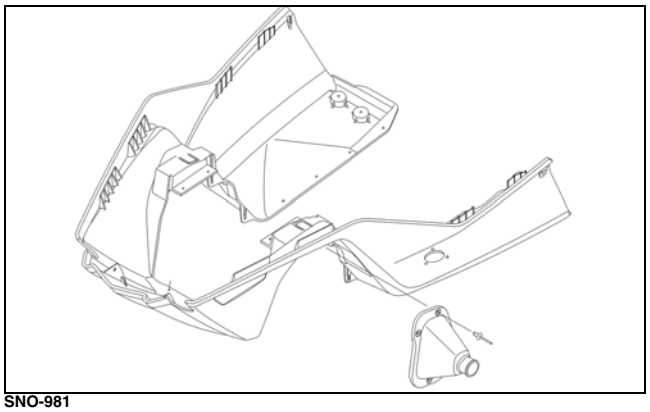
SNO-980

2. Remove the cap screws and lock nuts securing the shock to the chassis bracket and the lower A-arm; then remove the shock. Account for the upper shock bushing.



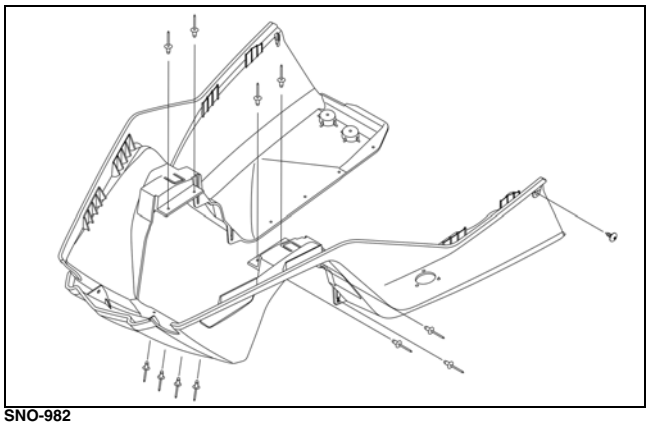
SNO-979

3. Remove the rivets securing the tie-rod boots to the chassis making sure not to drill into the boots; then slide the boots off the tie-rods.



SNO-981

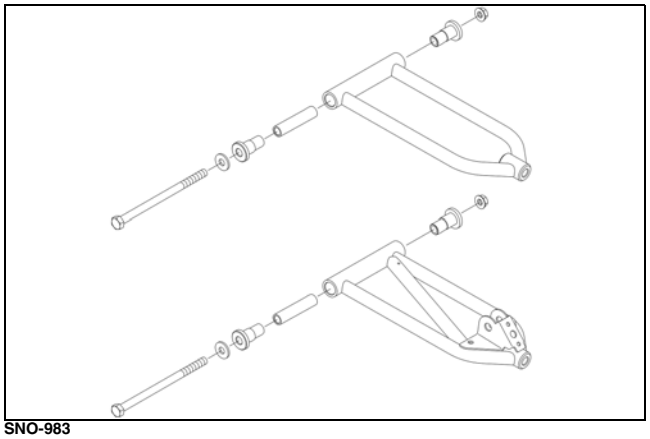
4. Remove the rivets securing the front of the belly pan to the chassis; then remove the rivets securing the belly panel to the chassis around the A-arms.



SNO-982

5. Remove the lock nuts securing the A-arms to the chassis; then push the cap screws and washers as far forward as possible. Remove the A-arms and account for two outer axles and an inner axle for each arm.

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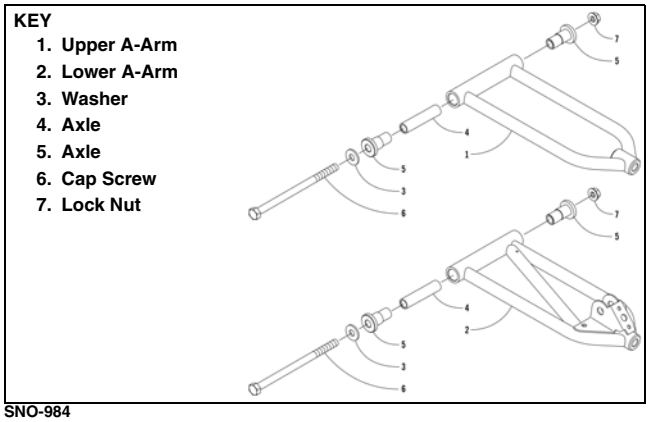


SNO-983

INSPECTING

1. Inspect the A-arm welded areas for cracks or any signs of deterioration.
2. Inspect the axles for wear or damage.
3. Inspect the tubing for signs of being twisted or bent.

INSTALLING

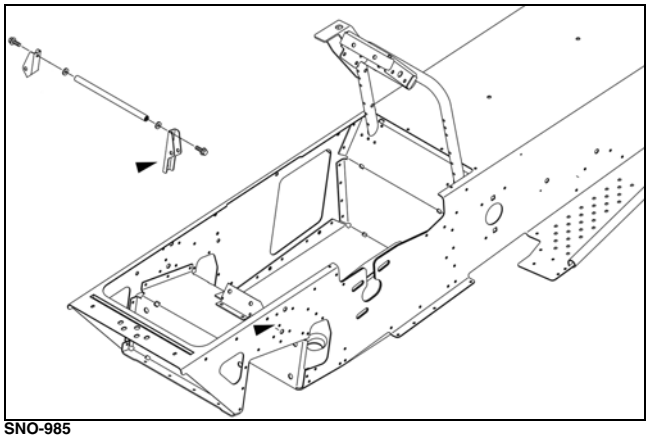


SNO-984

1. Install the inner and outer axles into the upper and lower A-arms; then position the arms with the mounting locations in the chassis; then secure with the existing cap screws, washers, and new lock nuts. Tighten to 30 ft-lb.

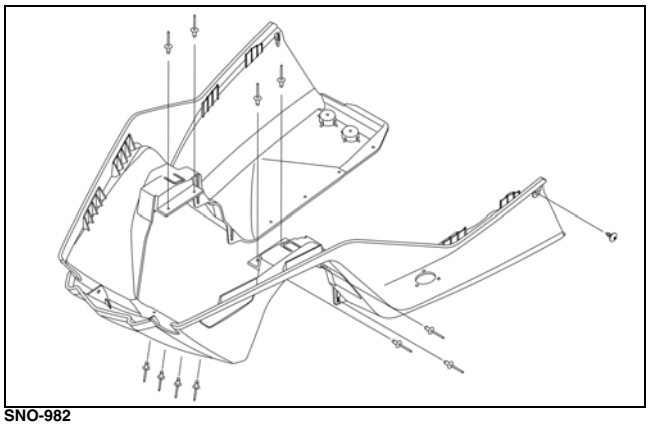
■NOTE: If replacing the right- and left-side A-arms, do not rivet the belly pan to the chassis until all arms are replaced.

2. Install the upper shock bracket to the chassis using the existing cap screws and nuts. Tighten to 20 ft-lb.
3. Secure the idler axle to the shock brackets using the existing cap screws and washers. Tighten to 20 ft-lb.



SNO-985

4. Secure the belly pan to the chassis using new rivets; then secure the tie-rod boots to the chassis using new rivets.



SNO-982

5. Install the shock to the shock bracket and the lower A-arm using the existing upper axle, cap screws, and new lock nuts. Tighten to 16 ft-lb.
6. Install the spindle and ski assembly to the A-arms and secure using new lock nuts. Tighten to 20 ft-lb (torque head-side).

Belly Pan

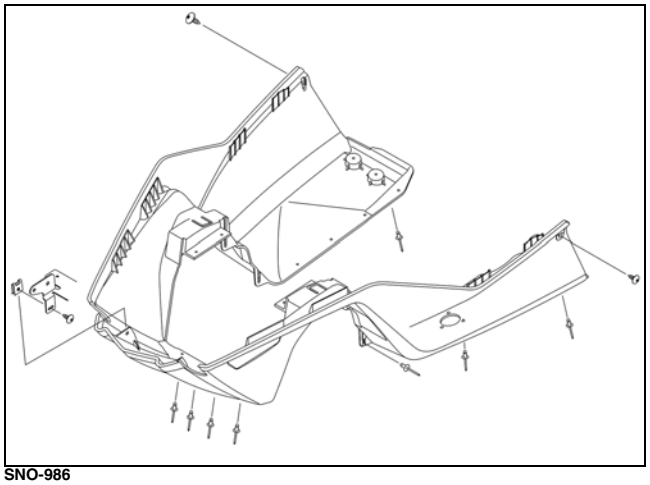
REMOVING

1. Remove the hood.
2. Remove the two screws securing the belly pan to the front end.
3. Remove the two Phillips-head screws securing the belly pan to the footrest supports.

■NOTE: Always tip the snowmobile onto the left side to avoid oil from draining into the air intake.

4. Using a piece of cardboard to protect the finish, tip the snowmobile onto the left side and using a #20 drill bit, drill out the belly pan rivets.

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SNO-986

■**NOTE: The tie rod boots do not need to be removed.**

5. With all belly pan rivets removed, return the snowmobile to the upright position; then slide the belly pan forward and up until it clears the front end.

INSPECTING

1. Inspect for gouges, cuts, and tears.
2. Inspect the two belly pan threaded bosses and ensure they are in good shape.

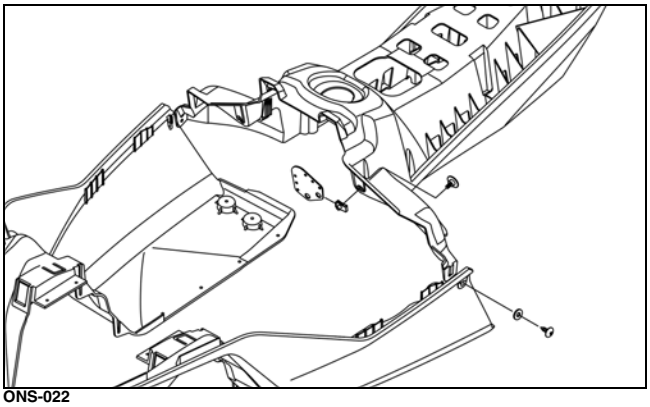
INSTALLING

1. Slide the belly pan into position on the front end; then secure with the existing screws.
2. Install the belly pan rivets in each ski-well.
3. Using a piece of cardboard to protect the finish, tip the snowmobile onto the left side and install the remaining belly pan rivets; then return the snowmobile to the upright position.
4. Install the hood.

Seat Assembly

REMOVING

1. Open the hood; then remove the shoulder screws securing the seat base to the chassis. Remove the two screws, washers, and nuts securing the rear of the belly pan and the seat base to the chassis.

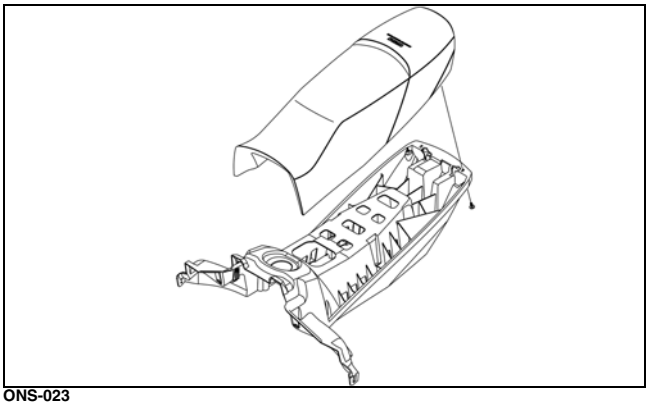


ONS-022

CAUTION

When removing the rear portion of the seat base from the tunnel, use caution not to break the tabs on the bottom of the seat base.

2. Remove the gas cap from the gas tank; then carefully slide the seat base rearward.
3. Disconnect the taillight harness from the main harness.
4. Remove the screws securing the seat assembly to the seat; then remove the seat cover outer edge from the seat base. Remove the seat.

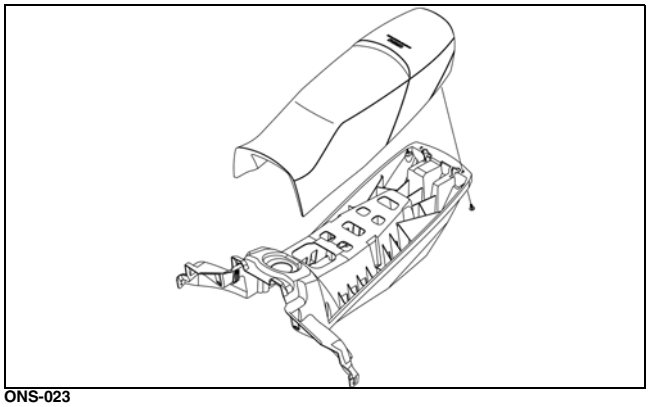


ONS-023

INSTALLING

1. 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 and into the base.
2. Secure the seat to the seat base using the existing screws. Do not over-tighten.

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ONS-023

3. Place the seat assembly into position over the gas tank and connect the taillight wiring harness.

CAUTION

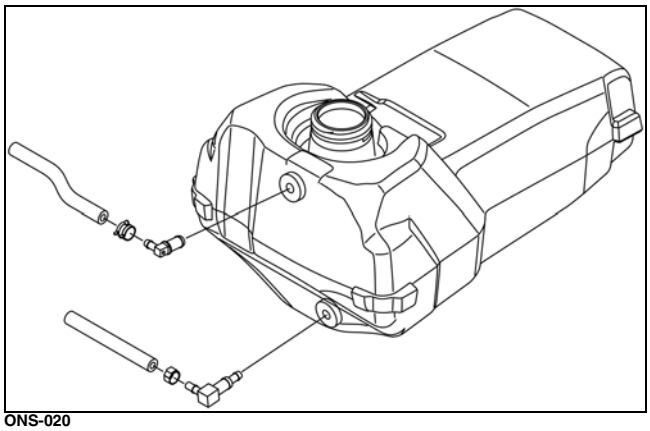
When installing the rear portion of the seat base to the tunnel, use caution not to break the tabs on the bottom of the seat base.

4. Align the tabs on the bottom of the seat base with the holes in the tunnel; then carefully slide the seat base and gas tank forward and align the front mounting locations.
5. Secure the front of the seat base using the existing hardware. Tighten securely.
6. Install the gas cap; then close and latch the hood.

Gas Tank/Fuel Pump Assembly

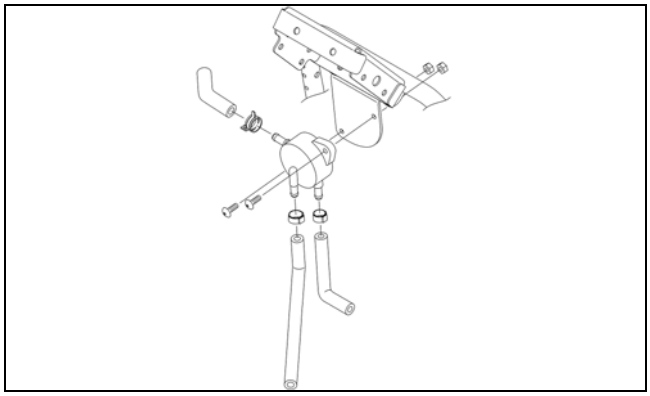
REMOVING

1. Open the hood; then remove the gas cap from the gas tank.
2. Remove the seat base and seat assembly from the chassis.
3. Remove the clamps securing the gas hose to the brass elbow and the vent hose to the plastic elbow.



ONS-020

4. Remove the clamps securing the gas hoses from the fuel pump; then remove the two screws and nuts securing the pump to the chassis.



ONS-021

WARNING

Since the gas hose may be under pressure, remove it slowly to release the pressure. Place an absorbent towel around the connection to absorb gasoline; then remove the hose slowly to release the pressure. Always wear safety glasses when removing the fuel hoses.

INSTALLING

1. Secure the fuel pump to the chassis using the existing screws and nuts. Tighten securely.
2. Secure the gas hoses to the pump using new clamps.
3. Use Fuel Hose Clamp Tool to make sure the hose clamps are tight by crimping the clamps until the two clamp areas touch.



XM282

4. Secure the vent hose to the plastic elbow and secure using the existing clamp; then secure the gas hose to the gas tank elbow using a new clamp.
5. Use Fuel Hose Clamp Tool to make sure the hose clamp is tight by crimping the clamps until the two clamp areas touch.
6. Place the seat assembly into position over the gas tank.

CAUTION

When installing the rear portion of the seat base to the tunnel, use caution not to break the tabs on the bottom of the seat base.

7. Align the tabs on the bottom of the seat base with the holes in the tunnel; then carefully slide the seat base and gas tank forward and align the front mounting locations.

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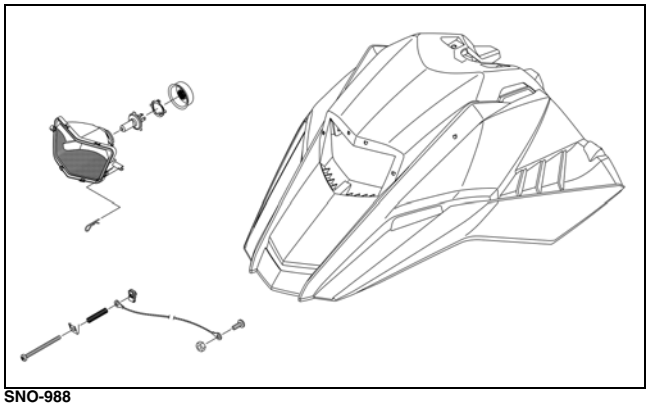
8. Secure the front of the seat base using the existing hardware. Tighten securely.
9. Install the gas cap; then close and latch the hood.

Headlight Assembly

REMOVING

■ **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. Disconnect the harness from the back of the bulb; then remove the rubber boot.
2. Rotate the spring retainer securing the bulb in the headlight; then carefully remove the bulb.
3. Remove the two pins securing the outer portion of the headlight; then remove the screw securing the lower portion of the headlight. Remove the headlight from the hood.



SNO-988

INSTALLING

1. Install the headlight assembly into the hood tabs and secure using the existing pins and screw.

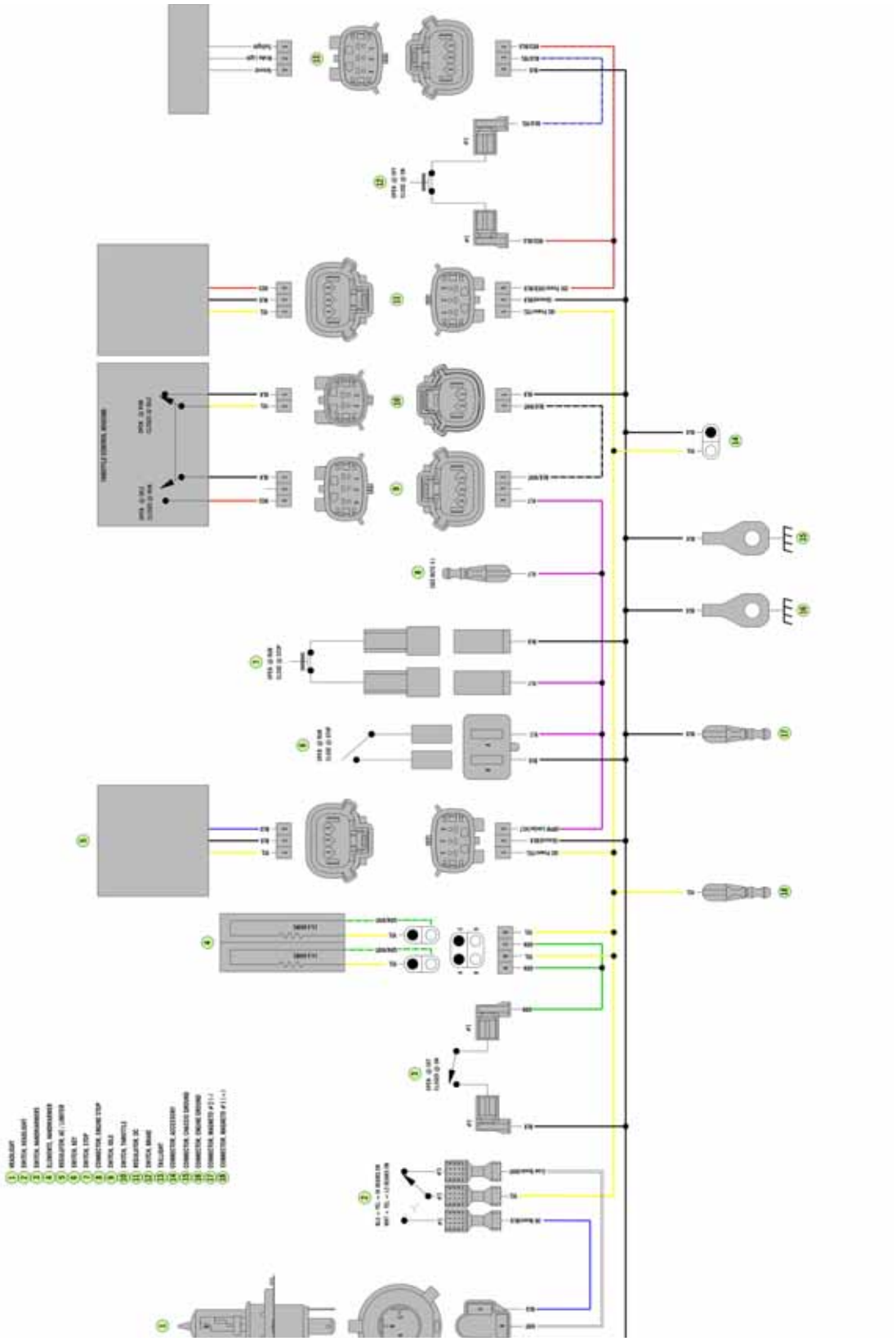
■**NOTE: The hood cable is secured with the lower adjustment screw.**

2. Insert the headlight bulb into the headlight assembly; then install the spring retainer. Install the rubber boot and connect the harness to the bulb.

■**NOTE: To adjust headlight aim, adjust the adjustment screw until maximum illumination for the operator is apparent.**

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Wiring Diagram



0752-220

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NOTES

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