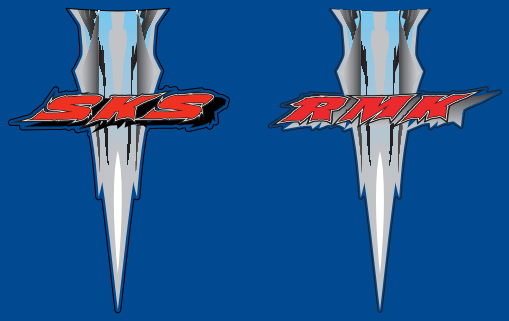
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POLARIS®
The Way Out.

INDY TRAIL RMK
INDY 500 RMK
INDY 500 SKS EURO
600 EDGE RMK
INDY 700 SKS / (EURO SKS)
700 EDGE RMK
800 EDGE RMK



2002 DEEP SNOW SERVICE MANUAL

PART NUMBER 9917366

2002 DEEP SNOW SERVICE MANUAL

PN 9917366
Printed in U.S.A.

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POLARIS®
The Way Out.



DEEP SNOW SERVICE MANUAL

Foreword

This manual is designed primarily for use by Polaris snowmobile service technicians in a properly equipped shop. Persons using this manual should have a sound knowledge of mechanical theory, tool use, and shop procedures in order to perform the work safely and correctly. The technician should read the text and be familiar with service procedures before starting the work. Certain procedures require the use of special tools. Use only the proper tools, as specified. Cleanliness of parts and tools as well as the work area is of primary importance.

All references to left and right side of the vehicle are from the operator's perspective when seated in a normal riding position.

This manual includes procedures for maintenance operations, component identification and unit repair, along with service specifications for the Polaris Indy (500 Euro) / 700 SKS , Trail RMK, 500 RMK, 600 EDGE RMK, 700 EDGE RMK, 800 EDGE RMK snowmobiles. A table of contents is placed at the beginning of each chapter, and an alphabetic index is provided at the end of the manual for location of specific page numbers and service information. Keep this manual available for reference in the shop area.

At the time of publication all information contained in this manual was technically correct. However, all materials and specifications are subject to change without notice.

Comments or suggestions about this manual may be directed to: Polaris Sales Inc., Service Publications Department, 2100 Hwy 55 Medina, Minnesota 55340.

Deep Snow Snowmobile Service Manual (PN 9917366)

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UNDERSTANDING SAFETY LABELS AND INSTRUCTIONS

Throughout these instructions, important information is brought to your attention by the following symbols:



The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

⚠ DANGER

Failure to follow DANGER instructions will result in severe injury or death to the operator, bystander or person inspecting or servicing the snowmobile.

⚠ WARNING

Failure to follow WARNING instructions could result in severe injury or death to the operator, bystander or person inspecting or servicing the snowmobile.

CAUTION:

A CAUTION indicates special precautions that must be taken to avoid personal injury, or snowmobile or property damage.

NOTE:

A NOTE provides key information to clarify instructions.

Trademarks

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GENERAL INFORMATION

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2002 Publication Numbers

Model	Model No.	Owner's Manual Supplement	Parts Manual	Parts Microfiche
Indy Trail RMK	S02SR5BS	9916935	9916936	9916937
Indy 500 RMK	S02SR5AS	9916932	9916933	9916934
Indy 500 SKS Euro	S02SS5AE	9916941	9916942	9916943
Indy 600 EDGE RMK	S02NJ6ES	9916944	9916945	9916946
Indy 700 SKS (Euro)	S02SS7CS (S02SS5AE)	9916938	9916939	9916940
700 EDGE RMK - 136″	S02NJ7CSA	9917055	9917056	9917057
700 EDGE RMK - 144″	S02NK7CS	9916953	9916954	9916955
700 EDGE RMK – 151”	S02NL7CS	9917061	9917062	9917063
800 EDGE RMK - 144″	S02NK8CS	9917058	9917059	9917060
800 EDGE RMK - 151″	S02NL8CS	9916950	9916952	9916953
800 EDGE RMK - 156″	S02NM8CS	9917064	9917065	9917066

2000 Snowmobile Owner's Manual (All) - PN 9916649
Snowmobile Assembly Manual - PN 9916508

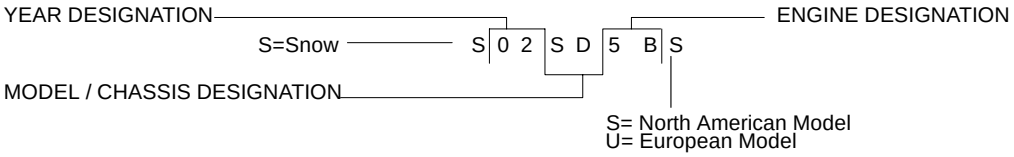
2002 Service Manuals

120 XC SP	9917361
Trail Sport Super Sport, Indy 500, 340 Delux	9917362
Two-Up / Touring Wide Trak LX, 340 Touring, Sport Touring, Trail Touring, 500 Classic Touring, 600 Classic Touring	9917364
Trail Luxury 500 Classic, 550 Classic, 600 Classic, 700 Classic	9917363
Deep Snow Trail RMK, 500 RMK, 500 SKS Euro, 700 SKS, Trail RMK, 600/700/800 EDGE RMK	9917366
Performance 500 XC, 500/600/700/800 XC SP, 800 XCR	9917367
High Performance 440 XCF SP, 440 XC SP, 500/600/700/800 XC SP, 600/700/800 RMK, 800 XCR	9917365
Wallcharts	9917369

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MODEL NUMBER IDENTIFICATION

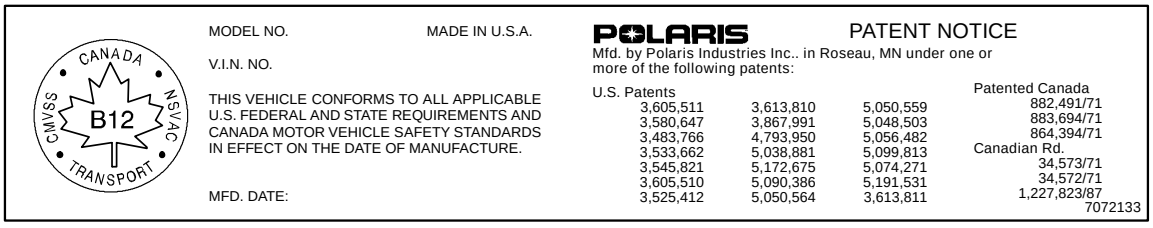
2002 MODEL DESIGNATION



MODEL LINE (4TH DIGIT)	MODEL TYPE (5TH DIGIT)
S=Gen II	A= Feature Option
L= Lite	B= Basic
N= EDGE	C= Feature Option
W=Mini Indy	D= Deluxe
	E= Feature Option M-10
	F= Feature Option
	J= 136 RMK (Edge)
	K= 144 RMK (Edge)
	L= 151 RMK (Edge)
	M= 156 RMK (Edge)
	P= Performance
	R= RMK (Gen II)
	S= SKS
	T= Touring
	U= Utility
	X= Racer

2002
ENGINE DESIGNATION
NUMBERS
1A - 121 F/C OHV 4 cycle Fuji
3A - 340 F/C Piston Port Fuji
4A - 440 F/C Cylinder Reed Fuji
4B - 488 L/C Piston Port Fuji
4C - 440VES L/C Case Reed (domestic)
4D – 440 F/C Piston Port
4E - 488 F/C Piston Port Fuji
5A - 497 L/C Case Reed 2 Cyl (domestic)
5B - 544 F/C Cylinder Reed
5C - 500 VES L/C Case Reed 2 Cylinder (domestic)
6D - 600/700 L/C Case Reed 2 Cylinder (domestic)
6E - 600/440 VES L/C Case Reed 2 Cylinder (domestic)
7A - 700 L/C Case Reed 2 Cylinder (domestic)
7C – 700 VES L/C Case Reed 2 Cyl (domestic)
8A - 800 VES L/C Case Reed 3 Cylinder Fuji
8B - 800 L/C Case Reed 2 Cylinder (domestic)
8C – 800 VES L/C Case Reed 2 Cyl (domestic)

TUNNEL DECAL



These numbers should be referred to in any correspondence regarding warranty, service or replacement parts.
The machine model and serial number identification decal is located on the right front side of the tunnel. The serial number is permanently stamped into the tunnel. The model number is embossed on the decal.

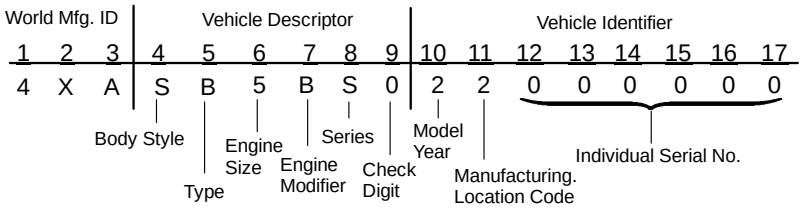
Whenever corresponding about an engine it is important that the engine model and serial numbers be called out. Laser engraved model and serial numbers are located on the crankcase (intake side).

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Vehicle Identification Number

Current snowmobiles have a 17 digit Vehicle Identification Number (VIN). The VIN is organized as follows: Digits 1-3: World Manufacturer Identifier. For Polaris, this is 4XA. Digits 4-9: Vehicle Descriptor Section. Digits 10-17: Vehicle Indicator Section. Digits 4-8 of the VIN identify the body style, type, engine type, and series. The VIN and the model number must be used with any correspondence regarding service or repair.

Example of Current VIN Number



Vehicle Identification Number / Model Number Key

Body Style	Type	Engine Size	Engine Modifier	Series
L=Lite	B=Base Model	1=100-199 cc	A=Fan	S=Domestic
N=Edge	D=Deluxe	2=200-299 cc	B=Liquid Twin	U=Europe
S=Gen II	P=Performance	3=300-399 cc	C=Case Reed Twin	
W=Mini	R=RMK	4=400-499 cc	D=Liquid Triple	
	S=SKS	5=500-599 cc	E=Case Reed Triple	
	T=Touring	6=600-699 cc		
	U=Utility	7=700-799 cc		
	X=Racer	8=800-899 cc		

Year / Letter Identification

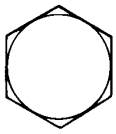
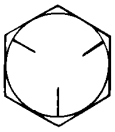
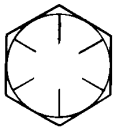
The tenth digit of a 17 digit VIN is the model year of the vehicle. Example: W = 1998; X = 1999 etc. Refer to the listing below.

1 = 2001
2 = 2002
3 = 2003

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Standard Torque Specifications

The following torque specifications are to be used as a general guideline when torque value is not specified. There are exceptions in the steering, suspension, and engine areas. Always consult the torque chart and the specific manual section for torque values of fasteners.

Bolt Size	Threads/In (MM/Thread)	Grade 2	Grade 5	Grade 8
		Torque in. lbs. (Nm)		
#10 -	24	27 (3.1)	43 (5)	60 (6.9)
#10 -	32	31 (3.6)	49 (5.6)	68 (7.8)
		Torque ft. lbs. (Nm)*		
1/4 -	20	5 (7)	8 (11)	12 (16)
1/4 -	28	6 (8)	10 (14)	14 (19)
5/16 -	18	11 (15)	17 (23)	25 (35)
5/16 -	24	12 (16)	19 (26)	29 (40)
3/8 -	16	20 (27)	30 (40)	45 (62)
3/8 -	24	23 (32)	35 (48)	50 (69)
7/16 -	14	30 (40)	50 (69)	70 (97)
7/16 -	20	35 (48)	55 (76)	80 (110)
1/2 -	13	50 (69)	75 (104)	110 (152)
1/2 -	20	55 (76)	90 (124)	120 (166)

*To convert ft. lbs. to Nm multiply foot pounds by 1.356.
*To convert Nm to ft. lbs. multply Nm by .7376.

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1/64	.0156	
1/32	.0312	1 mm = .0394″
3/64	.0469	
1/16	.0625	
5/64	.0781	2 mm = .0787″
3/32	.0938	
7/64	.1094	3 mm = .1181″
1/8	.1250	
9/64	.1406	
5/32	.1563	4 mm = .1575″
11/64	.1719	
3/16	.1875	5 mm = .1969″
13/64	.2031	
7/32	.2188	
15/64	.2344	6 mm = .2362″
1/4	.25	
17/64	.2656	7 mm = .2756″
9/32	.2813	
19/64	.2969	
5/16	.3125	8 mm = .3150″
21/64	.3281	
11/32	.3438	9 mm = .3543″
23/64	.3594	
3/8	.375	
25/64	.3906	10 mm = .3937″
13/32	.4063	
27/64	.4219	11 mm = .4331″
7/16	.4375	
29/64	.4531	
15/32	.4688	12 mm = .4724″
31/64	.4844	
1/2	.5	13 mm = .5118
33/64	.5156	
17/32	.5313	
35/64	.5469	14 mm = .5512″
9/16	.5625	
37/64	.5781	15 mm = .5906″
19/32	.5938	
39/64	.6094	
5/8	.625	16 mm = .6299″
41/64	.6406	
21/32	.6563	17 mm = .6693″
43/64	.6719	
11/16	.6875	
45/64	.7031	18 mm = .7087″
23/32	.7188	
47/64	.7344	19 mm = .7480″
3/4	.75	
49/64	.7656	
25/32	.7813	20 mm = .7874″
51/64	.7969	
13/16	.8125	21 mm = .8268″
53/64	.8281	
27/32	.8438	
55/64	.8594	22 mm = .8661″
7/8	.875	
57/64	.8906	23 mm = .9055″
29/32	.9063	
59/64	.9219	
15/16	.9375	24 mm = .9449″
61/64	.9531	
31/32	.9688	25 mm = .9843
63/64	.9844	

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SAE Tap Drill Sizes

Thread Size	Drill Size	Thread Size	Drill Size
#0-80	3/64	1/2-13	27/64
#1-64	53	1/2-20	29/64
#1-72	53	9/16-12	31/64
#2-56	51	9/16-18	33/64
#2-64	50	5/8-11	17/32
#3-48	5/64	5/8-18	37/64
#3-56	45	3/4-10	21/32
#4-40	43	3/4-16	11/16
#4-48	42	7/8-9	49/64
#5-40	38	7/8-14	13/16
#5-44	37	1-8	7/8
#6-32	36	1-12	59/64
#6-40	33	1 1/8-7	63/64
#8-32	29	1 1/8-12	1 3/64
#8-36	29	1 1/4-7	1 7/64
#10-24	24	1 1/4-12	1 11/64
#10-32	21	1 1/2-6	1 11/32
#12-24	17	1 1/2-12	1 27/64
#12-28	4.6mm	1 3/4-5	1 9/16
1/4-20	7	1 3/4-12	1 43/64
1/4-28	3	2-4 1/2	1 25/32
5/16-18	F	2-12	1 59/64
5/16-24	I	2 1/4-4 1/2	2 1/32
3/8-16	O	2 1/2-4	2 1/4
3/8-24	Q	2 3/4-4	2 1/2
7/16-14	U	3-4	2 3/4
7/16-20	25/64		

Metric Tap Drill Sizes

Tap Size	Drill Size	Decimal Equivalent	Nearest Fraction
3 x .50	#39	0.0995	3/32
3 x .60	3/32	0.0937	3/32
4 x .70	#30	0.1285	1/8
4 x .75	1/8	0.125	1/8
5 x .80	#19	0.166	11/64
5 x .90	#20	0.161	5/32
6 x 1.00	#9	0.196	13/64
7 x 1.00	16/64	0.234	15/64
8 x 1.00	J	0.277	9/32
8 x 1.25	17/64	0.265	17/64
9 x 1.00	5/16	0.3125	5/16
9 x 1.25	5/16	0.3125	5/16
10 x 1.25	11/32	0.3437	11/32
10 x 1.50	R	0.339	11/32
11 x 1.50	3/8	0.375	3/8
12 x 1.50	13/32	0.406	13/32
12 x 1.75	13/32	0.406	13/32

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Unit of Measure	Multiplied by	Converts to
ft. lbs.	x 12	= in. lbs.
in. lbs.	x .0833	= ft. lbs.
ft. lbs.	x 1.356	= Nm
in. lbs.	x .0115	= kg-m
Nm	x .7376	= ft. lbs.
kg-m	x 7.233	= ft. lbs.
kg-m	x 86.796	= in. lbs.
kg-m	x 10	= Nm
in.	x 25.4	=mm
mm	x .03937	= in.
in.	x 2.54	= cm
mile (mi.)	x 1.6	= km
km	x .6214	= mile (mi.)
Ounces (oz)	x 28.35	= Grams (g)
Grams (g)	x 0.035	= Ounces (oz)
cc	x .03381	= Fluid Ounces (oz)
lb.	x .454	= kg
kg	x 2.2046	= lb.
Cubic inches (cu in)	x 16.387	= Cubic centimeters (cc)
Cubic centimeters (cc)	x 0.061	= Cubic inches (cu in)
Imperial pints (Imp pt)	x 0.568	= Liters (l)
Liters (l)	x 1.76	= Imperial pints (Imp pt)
Imperial quarts (Imp qt)	x 1.137	= Liters (l)
Liters (l)	x 0.88	= Imperial quarts (Imp qt)
Imperial quarts (Imp qt)	x 1.201	= US quarts (US qt)
US quarts (US qt)	x 0.833	= Imperial quarts (Imp qt)
US quarts (US qt)	x 0.946	= Liters (l)
Liters (l)	x 1.057	= US quarts (US qt)
US gallons (US gal)	x 3.785	=Liters (l)
Liters (l)	x 0.264	= US gallons (US gal)
Pounds - force per square inch (psi)	x 6.895	= Kilopascals (kPa)
Kilopascals (kPa)	x 0.145	= Pounds - force per square inch (psi)
Kilopascals (kPa)	x 0.01	= Kilograms - force per square cm
Kilograms - force per square cm	x 98.1	= Kilopascals (kPa)

°C to °F: 9 (°C + 40) ÷ 5 – 40 = °F
°F to °C: 5 (°F + 40) ÷ 9 – 40 = °C

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Description	Part Number
Chaincase Lubricant - Quart	2871280
Chaincase Lubricant - Gallon	2870464
Chaincase Lubricant - 2.5 Gallon	2872281
Fuel System Deicer (Isopropyl)	2870505
Loctite Primer T - 6 Oz. Aerosol	2870585
Loctite RC 680 - 10cc Retaining Compound	2870584
Loctite/Chisel – Gasket Remover - 18 Oz.	2870601
Metal Polish - 8 Oz.	2870632
DOT 3 Brake Fluid	2870990
Fogging Oil	2870791
Nyogel t Grease	2871329
Fox Shock Oil	2870995
Premium All Season Grease (14 oz)	2871423
Premium All Season Grease (3 oz)	2871322
Premium 60/40 Anti-Freeze/Coolant	2871323
Premium Carbon Clean Fuel System Additive	2871326
Polaris Battery Tender	2871076
Carbon Clean Fuel System Additive	2871326
T-9 Metal Protectant	2871064
Crankcase Sealant 3 Bond 1215	2871557

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ACS: Alternator control switch.

ACV: Alternating current voltage.

Air Gap Spark Test: A good check for ignition voltage and general ignition system condition. Spark should arc 3/8" (1 cm) minimum from end of high tension lead to ground. Several testers are available commercially.

Alternator: Electrical generator producing alternating current voltage.

Bore: Diameter of cylinder.

BTDC: Before Top Dead Center.

Bump Steer: When skis toe in and toe out through suspension travel.

CDI: Capacitor Discharge Ignition. Ignition system which stores voltage generated by the stator plate exciter coil in a capacitor or condenser (in CDI box). At the proper moment a voltage generated by the stator plate pulser coil closes an electronic switch (thyristor) in the CDI box and allows the voltage in the capacitor to discharge into the primary windings of the ignition coil.

Center Cylinder: On three cylinder engines, the cylinder between Mag and PTO ends.

Center Distance: Distance between center of crankshaft and center of driven clutch shaft.

Chain Pitch: Distance between chain link pins (No. 35 = 3/8" or 1 cm). Polaris measures chain length in number of pitches.

Clutch Buttons: Plastic bushings which transmit rotation of the clutch to the movable sheave in the drive and driven clutch.

Clutch Offset: Drive and driven clutches are offset so that drive belt will stay nearly straight as it moves along the clutch face as the engine torques back.

Clutch Weights: Three levers in the drive clutch which relative to their weight, profile and engine RPM cause the drive clutch to close.

Coil: A winding of wire around an iron core which has the ability to generate an electrical current when a magnetic field passes through it.

Combustion Chamber: Space between cylinder head and piston dome at TDC.

Compression: Reduction in volume or squeezing of a gas.

Condenser/Capacitor: A storage reservoir for electricity, used in both E.T. and CDI systems.

Crankshaft Run-Out: Run-out or "bend" of crankshaft measured with a dial indicator while crankshaft is supported between centers on V blocks or resting in lower half of crankcase. Measure at various points especially at PTO. Maximum allowable run-out is .006" (.02 cm).

DCV: Direct current voltage.

Detonation: The spontaneous ignition of the unburned fuel/air mixture after normal spark ignition. Piston looks "hammered" through, rough appearance around hole. Possible causes: 1) lean fuel/air mixture; 2) low octane fuel; 3) over-advanced ignition timing; 4)compression ratio too high for the fuel octane.

Dial Bore Gauge: A cylinder measuring instrument which uses a dial indicator. Good for showing taper and out-of-round in the cylinder bore.

Displacement: The volume of the cylinder displaced by the piston as it travels from BDC to TDC. The formula is:

$$\frac{\text{Bore}^2 \times \text{Stroke} \times 3.1416}{4} = \text{Displacement in CCs}$$

Effective Compression Ratio: Compression ratio measured from after the piston closes the exhaust port.

Electrical Open: Open circuit. An electrical circuit which isn't complete. (i.e. poor connections or broken wire at hi-lo beam switch resulting in loss of headlights.

Electrical Short: Short circuit. An electrical circuit which is completed before the current reaches the intended component. (i.e. a bare wire touching the snowmobile chassis under the seat resulting in loss of taillights and brake lights).

End Seals: Rubber seals at each end of the crankshaft.

Engagement RPM: Engine RPM at which the drive clutch engages to make contact with the drive belt.

 Flat Head Bolt: To be used where finished surfaces require a flush fastening unit. Countersunk.

Foot Pound: Ft. lb. A force of one pound at the end of a lever one foot in length, applied in a rotational direction.

g: Gram. Unit of weight in the metric system.

Head Volume: Cylinder head capacity in cc, head removed from engine with spark plug installed.

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Heat Exchanger: A device used to transfer heat. They dissipate engine heat to the atmosphere.



Hex Head Bolt: Standard type of wrench-applied hexagon head, characterized by clean, sharp corners trimmed to close tolerances. Recommended for general commercial applications.

Hi-Fax: Trademark of Himont Advanced Materials. The special slide material which fits onto the bottom of the suspension rails.

High Side: Sled pushes or tips up toward outside of turn.

High Tension Wire: The heavy insulated wire which carries the high secondary voltage from the coil to the spark plug.

Hole Shot: A term used when machine starts a race from a dead stop.

Holed Piston: Piston in which a hole has formed on the dome. Possible causes: 1) detonation; 2) pre-ignition.

Ignition Coil: A type of transformer which increases voltage in the primary windings (approx. 200V) to a higher voltage in the secondary windings (approx. 14KV - 32KV) through inductions. Secondary voltage is high enough to arc the air gap at the spark plug.

Ignition Generating Coil: Exciter coil or primary charge coil. Stator plate coil which generates primary ignition voltage. CDI system uses one ignition generating coil.

Inch Pound: In. lb. 12 in. lbs. = 1 ft. lb.

Kg/cm2: Kilograms per square centimeter. Metric equivalent of PSI.

Keystone Ring: A piston ring with bevel on upper surface.

Kilogram/meter: A force of one kilogram at the end of a lever one meter in length, applied in a rotational direction. Metric equivalent of ft. lbs.

L Ring: A wide face piston ring with an ”L” shaped cross section. Leg of ”L” goes up when installing on piston.

Labyrinth Seal: A pressure type center seal identified by series of grooves and lands. Polaris engines us this type of seal to separate the cylinders in the crankcase halves.

Left Side: Always referred to based on normal operating position of the driver.

Lighting Coil: Generates voltage for lights, battery charging, etc by electromagnetic induction.

Loose: When the rear of the vehicle slides outward in a turn. The track does not grab sufficiently.

mm: Millimeter. Unit of length in the metric system. 1mm = .040”.

Mag End: Flywheel side of engine.

Magnetic Induction: As a conductor (coil) is moved through a magnetic field, a voltage will be generated in the windings. This is how mechanical energy in our engines is converted to electrical energy in the lighting coil, ignition generating coils and trigger coil.

Ohm: The measurement of electrical resistance opposing current flow.



Oval Head Screw: Fully specified as ”oval countersunk”, this head is identical to the standard flat head, but possesses a rounded upper surface for attractiveness of design.

PTO End: Power Take Off drive (clutch side).



Pan Head Screw: Provides a low, large diameter head, but with characteristically high outer edges along the outer edge of the head where driving action is most effective. Slightly different head contour when supplied with Phillips Recess. See dotted line.

Piston Clearance: Total distance between piston and cylinder wall.

Piston Erosion: Piston dome melts. Usually occurs at the exhaust port area. Possible causes: 1) lean fuel/air mixture; 2) improper spark plug heat range; 3) Poor fuel.

Pre-Ignition: A problem in combustion where the fuel/air mixture is ignited before normal spark ignition. Piston looks melted at area of damage. Possible causes: 1)incorrect spark plug heat range; 2) spark plug not properly torqued; 3) “glowing” piece of head gasket, metal burr or carbon in the combustion chamber; 4) lean fuel/air mixture; 5) Incorrect ignition timing.

Primary Circuit: This circuit is responsible for the voltage build up in the primary windings of the coil. In the CDI system the parts include the exciter coil, the trigger coil, the wires from stator plate to CDI box and to the low resistance primary windings in the ignition coil.

Primary Clutch: Drive clutch on engine.

Primary Compression: Pressure built up in the crankcase of a two stroke engine.

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psi.: Pounds per square inch.

Pushing: When the front of the vehicle does not steer as much as the driver desires. The skis do not grab sufficiently.

R & R: Remove and replace.

RFI: Radio Frequency Interference. Caused by high voltage from the ignition system. There are special plug caps and spark plugs to help eliminate this problem. Mandated in Canada.

RPM: Revolutions Per Minute.

Resistance: In the mechanical sense, friction or load. In the electrical sense, ohms. Both result in energy conversion to heat.

Right Side: Always referred to based on normal operating position of the driver.



Round Head Screw:The familiar head most universally used for general application. Good slot depth, ample underhead bearing surface and finished appearance are characteristic of this head.

Running Time: Ignition timing at specified RPM.

Secondary Circuit: This circuit consists of the large secondary coil windings, high tension wire and ground through the spark plug air gap.

Secondary Clutch: Driven clutch on chaincase or jackshaft.

Seized Piston: Galling of the sides of a piston. Usually there is a transfer of aluminum from the piston onto the cylinder wall. Possible causes: 1) improper lubrication; 2) excessive temperatures; 3) insufficient piston clearance; 4) stuck piston rings.

Self Steer: Pulling the machine to the inside of the track.

Spark Plug Reach: Length of threaded portion of spark plug. Polaris uses 3/4" (2 cm) reach plugs.

Static Timing: Ignition timing when engine is at zero RPM.

Stator Plate: The plate mounted under the flywheel supporting the primary ignition components and lighting coils.

Stroke: The maximum movement of the piston from bottom dead center to top dead center. It is characterized by 180° of crankshaft rotation.

Surge Tank: The fill tank in the liquid cooling system.

TDC: Top Dead Center. Piston's most outward travel from crankshaft.

Transfer: The movement of fuel/air from the crankcase to the combustion chamber in a two stroke engine.

Trigger Coil: Pulser coil. Generates the voltage for triggering (closing) the thyristor and timing the spark in CDI systems. Small coil mounted at the top of the stator plate next to the ignition generating coil, or on the outside of the flywheel.

V Regulator: Voltage regulator. Maintains maximum lighting coil output at approx. 14.5 ACV as engine RPM increases.

Venturi: An area of air constriction. A venturi is used in carburetors to speed up air flow which lowers pressure in venturi to below atmospheric pressure, causing fuel to be pushed through jets, etc., and into the venturi to be mixed with air and form a combustible air/fuel mixture.

Volt: The unit of measure for electrical pressure of electromotive force. Measured by a voltmeter in parallel with the circuit.

Watt: Unit of electrical power. Watts = amperes x volts.

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In order to perform service work efficiently and to prevent costly errors, the technician should read the text in this manual, thoroughly familiarizing him/herself with procedures before beginning. Photographs and illustrations have been included with the text as an aid. Notes, cautions and warnings have also been included for clarification of text and safety concerns. However, a knowledge of mechanical theory, tool use and shop procedures is necessary to perform the service work safely and satisfactorily. Use only genuine Polaris service parts.

⚠ Cleanliness of parts and tools as well as the work area is of primary importance. Dirt and foreign matter will act as an abrasive and cause damage to precision parts. Clean the snowmobile before beginning service. Clean new parts before installing.

⚠ Watch for sharp edges which can cause personal injury, particularly in the area of the tunnel. Protect hands with gloves when working with sharp components.

⚠ If difficulty is encountered in removing or installing a component, look to see if a cause for the difficulty can be found. If it is necessary to tap the part into place, use a soft face hammer and tap lightly.

⚠ Some of the fasteners in the snowmobile were installed with locking agents. Use of impact drivers or wrenches will help avoid damage to fasteners.

⚠ Always follow torque specifications as outlined throughout this manual. Incorrect torquing may lead to serious machine damage or, as in the case of steering components, can result in injury or death for the rider(s).

⚠ If a torquing sequence is indicated for nuts, bolts or screws, start all fasteners in their holes and hand tighten. Then, following the method and sequence indicated in this manual, tighten evenly to the specified torque value. When removing nuts, bolts or screws from a part with several fasteners, loosen them all about 1/4 turn before removing them.

⚠ If the condition of any gasket or O-Ring is in question, replace it with a new one. Be sure the mating surfaces around the gasket are clean and smooth in order to avoid leaks.

⚠ Some procedures will require removal of retaining rings or clips. Because removal weakens and deforms these parts, they should always be replaced with new parts. When installing new retaining rings and clips use care not to expand or compress them beyond what is required for installation.

⚠ Because removal damages seals, replace any oil or grease seals removed with new parts.

⚠ Polaris recommends the use of Polaris lubricants and greases, which have been specially formulated for the top performance and best protection of our machines. In some applications, such as the engine, warranty coverage may become void if other brands are substituted.

⚠ Grease should be cleaned from parts and fresh grease applied before reassembly of components. Deteriorating grease loses lubricity and may contain abrasive foreign matter.

⚠ Whenever removing or reinstalling batteries, care should be taken to avoid the possibility of explosion resulting in serious burns. Always disconnect the negative (black) cable first and reconnect it last. Battery electrolyte contains sulphuric acid and is poisonous! Serious burns can result from contact with the skin, eyes or clothing. ANTIDOTE: External - Flush with water. Internal - Drink large quantities or water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil. Call physician immediately. Eyes - Flush with water for 15 minutes and get prompt medical attention.

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Notes

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MODEL: . . . . . INDY 500 SKS EUROPEAN
MODEL NUMBER: . E02SS5AE
ENGINE MODEL: . . S2209-5044PL5A

CARBURETION

Type . . . . . TM 38 Mikuni
Main Jet 370
Pilot Jet 45
Jet Needle 9FH4-57/3
Needle Jet P-6
Cutaway 1.5
Fuel Mixture Screw . . . 2 Turns
Valve Seat 1.5
Fuel Octane (R+M/2) . 87 Non-Oxygenated
89 Oxygenated
Throttle Gap
Under Cutaway . . . . . 0.098″ (2.5mm)
Starter Jet 155
Pilot Air Jet 1.0

JETTING CHART

Altitude		AMBIENT TEMPERATURE					
		Below -30°F Below -34°C	-30_ to -10_F -34_to -23_C	-10_to +10_F -23_ to -12_C	+10_to +30_F -12_to -1_C	+30_to +50_F -1_to +10_C	Above +50_F Above +10_C
Meters (Feet)	0-600 (0-2000)	390 #3	380 #3	360 #3	350 #3	330 #3	320 #3
	600-1200 (2000-4000)	370 #3	360 #3	340 #3	330 #3	310 #3	300 #2
	1200-1800 (4000-6000)	350 #3	330 #3	320 #3	300 #3	290 #2	280 #2
	1800-2400 (6000-8000)	330 #3	310 #3	300 #3	290 #2	370 #2	250 #2
	2400-3000 (8000-10000)	300 #3	290 #3	280 #2	260 #2	250 #2	230 #1
	3000-3700 (10000-12000)	280 #3	270 #2	250 #2	240 #2	220 #2	210 #2

XXX
#X
- # refers to the clip position from top of jet needle.

CLUTCH

Type . . . . . P 85
Belt 3211074
Belt Width (Projected) . 1.438″
Side Angle (Overall) . . 28°
Outside Circumference 47.625″
Center Distance . . . . . 12.00″
Shift Weights . . . . . 10-56 Bushed
Primary Spring . . . . . Dark Blue / White
Secondary Spring . . . . Silver
Driven Helix . . . . . R32 #2

CLUTCH CHART

Altitude		DRIVE		DRIVEN		
		Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Chaincase Gearing
Meters (Feet)	0-900 (0-3000)	10-56 Bushed	Dark Blue / White	Silver	R32 #2	18-41-68P HYVO
	900-1800 (3000-6000)	10-AL Bushed	Almond / Round	Silver	R32 #2	18-41-68P HYVO
	1800-2700 (6000-9000)	10 Bushed	Almond / Round	Silver	R32 #2	18-41-68P HYVO
	2700-3700 (9000-12000)	10M5 Bushed	Almond / Round	Silver	R32 #2	18-41-68P HYVO

- Production Setting

ENGINE

Type . . . . . Liquid Cooled Case Reed Twin
Displacement 500cc
Bore . . . . . 2.776″″ (70.5mm)
Stroke . . . . . 2.520″″ (64mm)
Piston / Cylinder Clearance . . . 0.0045″ - 0.0063″ (0.11 - 0.16mm)
Service Limit . . . . . N/A
Piston Marking 3021038
Piston Ring Marking . . . . . N/A
Piston Ring End Gap . . . . . 0.012″ - 0.018″ (.30 - .46mm)
Head ccs (Uninstalled) . . . . . 27.5±.50cc
Head ccs (Installed) 25cc
Operating RPM±200 . . . . . 8000 RPM
Idle RPM±200 . . . . . 1500 RPM
Engagement RPM±300 . . . . . 4200 RPM
Cylinder Head Torque . . . . . 20-24 ft.lbs. (28-33Nm)
Cylinder Base Nut Torque . . . . 30-34 ft.lbs. (41-47 Nm)
Crankcase Torque (8mm) . . . . . 20-24 ft.lbs. (28-33 Nm)
Crankcase Torque (10mm) . . . N/A
Flywheel Torque . . . . . 90 ft.lbs. (124 Nm)

Fuel Pump Manuf. . . . . N/A
Fuel Pump Mark . . . . . N/A
Oil Pump Manuf. . . . . Mikuni
Oil Pump Mark 2540051
Cylinder Head Mark 3021048

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MODEL: . . . . . INDY 500 SKS EUROPEAN
MODEL NUMBER: . E02SS5AE
ENGINE MODEL: . . S2209-5044PL5A

ELECTRICAL

Flywheel I.D. 4010523
CDI Marking 4010584
Alternator Output . . . 280 Watts
Ignition Timing . . . . . 12° BTDC@22500 RPM
0.0327″ BTDC
0.8294mm BTDC
Spark Plug / Gap . . . Champion RN2C / 0.028″ (0.7mm)
Voltage Regulator . . LR7
Electric Start . . . . . Option
LR7= Full wave voltage regulator
Magneto Pulses 6

CAPACITIES

Fuel Tank . . . . . 11.8 gallons (44.7 liters)
Oil Tank . . . . . 3 quarts (2.8 liters)
Coolant . . . . . 5 quarts (4.7 liters)
Chaincase Oil . . . . . 11 fl. oz. (325cc)

SUSPENSION / CHASSIS

Body Style . . . . . Gen II
Front Suspension . . Indy XC 10
Front Shocks . . . . . Indy Select
IFS Spring Rate . . . . 100#/in.
Front Spring Preload 3/4″ Thread Adjust
Front Vertical Travel 9.6″ (24.4cm)
Rear Suspension . . . XTRA-10 EURO
Rear Axle Travel . . . 9.5″ (24.1cc)
Front Track Shock . . Nitrogen Cell
Spring Rate . . . . . 190#/in. variable
Rear Track Shock . . Indy Select
Rear Springs . . . . . .405″ (sq.) / 77°
Track Type . . . . . 15″x136″x1.25″ (38.1x345.44x3.175cm)
Track Tension . . . . . 3/8″ - 1/2″ (1-1.3 cm) slack with 10# (4.54kg) weight 16″ (40.64cm) ahead of rear idler shaft.
Overall Snowmobile Length . . . . . 116″ (295cm)
Overall Snowmobile Height . . . . . 45″ (114cm)
Maximum Snowmobile Width . . . . . 43.5″ (110.5cm)

CHAINCASE

Sprockets / Chain . . . 18-41, 68P HYVO
Reverse . . . . . Option
Brake Pads . . . . . Type 81, Large
Chaincase Center Dist. 7.05″ (17.91cm)
Driveshaft Sprockets . 2 Drivers Wide
Brake Type . . . . . Polaris HPB

OPTIONAL REAR TORSION SPRINGS

(STD)
.405″(Sq.) Diameter x 77°
L.H. 7041655-067
R.H 7041655-067

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MODEL: . . . . . INDY 500 RMK
MODEL NUMBER: . S02SR5AS
ENGINE MODEL: . . S2186-5044PL5A

CARBURETION

Type . . . . . TM38 Mikuni
Main Jet 270
Pilot Jet 45
Jet Needle 9FH4-57-2
Needle Jet P-6
Cutaway . . . . . 1.5 Notched
Fuel Screw . . . . . 0.5 Turns
Valve Seat . . . . . 1.5 Viton
Fuel Octane (R+M/2) . 87 Non-Oxygenated
89 Oxygenated
Throttle Gap
Under Cutaway . . . . . 0.130″ (3.3mm)
Starter Jet 155
Pilot Air Jet . . . . . 0.7 Long

JETTING CHART

Altitude		AMBIENT TEMPERATURE					
		Below -30°F Below -34°C	-30_ to -10_F -34_to -23_C	-10_to +10_F -23_ to -12_C	+10_to +30_F -12_to -1_C	+30_to +50_F -1_to +10_C	Above +50_F Above +10_C
Meters (Feet)	0-600 (0-2000)	440 #3	420 #3	410 #3	390 #3	380 #3	370 #3
	600-1200 (2000-4000)	390 #3	380 #3	370 #3	350 #3	340 #2	320 #2
	1200-1800 (4000-6000)	350 #2	330 #2	320 #2	310 #2	300 #2	290 #2
	1800-2400 (6000-8000)	300 #2	290 #2	280 #2	270 #2	260 #2	250 #2
	2400-3000 (8000-10000)	280 #2	270 #2	260 #2	250 #2	240 #2	230 #2
	3000-3700 (10000-12000)	260 #2	250 #2	240 #2	230 #2	220 #2	210 #2

XXX
#X
- # refers to the clip position from top of jet needle.

CLUTCH

Type P-85
Belt 3211074
Belt Width (Projected) . 1.438″ (36.52mm)
Side Angle (Overall) . . 28°
Outside Circumference 47.625″ (121cm)
Center Distance . . . . . 12.00″
Shift Weights . . . . . 10 Bushed
Primary Spring . . . . . Almond Round
Secondary Spring . . . . Silver / Blue
Driven Helix . . . . . R-32 #3

CLUTCH CHART

Altitude		DRIVE		DRIVEN		
		Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Chaincase Gearing
Meters (Feet)	0-900 (0-3000)	10-56 Bushed	Almond Round	Silver / Blue	R-32 #3	18-41-68P HYVO
	900-1800 (3000-6000)	10-AL Bushed	Almond Round	Silver / Blue	R-32 #3	18-41-68P HYVO
	1800-2700 (6000-9000)	10 Bushed	Almond Round	Silver / Blue	R-32 #3	18-41-68P HYVO
	2700-3700 (9000-12000)	10M Bushed	Almond Round	Silver / Blue	R-32 #3	18-41-68P HYVO

- Production Setting

ENGINE

Type . . . . . Liquid Cooled Case Reed Twin
Displacement 500cc
Bore . . . . . 2.776″ (70.5mm)
Stroke . . . . . 2.520″ (64mm)
Piston / Cylinder Clearance . . . 0.0045″ - 0.0063″ (0.11 - 0.16mm)
Service Limit . . . . . 0.0063” (0.16mm)
Piston Marking . . . . . N/A
Piston Ring Marking . . . . . N/A
Piston Ring End Gap . . . . . 0.012″ - 0.018″ (0.30 - 0.46mm)
Head ccs (Uninstalled) . . . . . 27.5±0.5cc
Head ccs (Installed) 25.0cc
Operating RPM±200 . . . . . 8000 RPM
Idle RPM±200 . . . . . 1500 RPM
Engagement RPM±300 . . . . . 4500 RPM
Cylinder Head Torque . . . . . 20-24 ft.lbs. (28-33 Nm)
Cylinder Base Nut Torque . . . . 30-34 ft.lbs. (41-47 Nm)
Crankcase Torque (8mm) . . . . . 20-24 ft.lbs. (28-33 Nm)
Crankcase Torque (10mm) . . . N/A
Flywheel Torque . . . . . 90 ft.lbs. (124 Nm)

Fuel Pump Manuf. . . . . Walbro
Fuel Pump Mark FPA-3
Oil Pump Manuf. . . . . Mikuni
Oil Pump Mark 2540051
Cylinder Head Mark 3021048

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MODEL: . . . . . INDY 500 RMK
MODEL NUMBER: . S02SR5AS
ENGINE MODEL: . . S2186-5044PL5A

ELECTRICAL

Flywheel I.D. . . . . Kokusan 4060223
CDI Marking 4010259
Alternator Output . . . 280 Watts
Ignition Timing . . . . . 22° BTDC@3000RPM±1.5°
0.1139″ BTDC (±0.0175″)
2.8927mm BTDC (±0.48mm)
Spark Plug / Gap . . . Champion RN2C / 0.025″ (0.64mm)
Voltage Regulator . . LR7
Electric Start . . . . . Option
LR7= Full wave voltage regulator
Magneto Pulses 6

CAPACITIES

Fuel Tank . . . . . 11.8 gallons (44.7 liters)
Oil Tank . . . . . 3 quarts (2.8 liters)
Coolant . . . . . 5 quarts (4.7 liters)
Chaincase Oil . . . . . 9 fl. oz.(266cc)

SUSPENSION / CHASSIS

Body Style . . . . . Gen II
Front Suspension . . Indy X-10 38″ CRC
Front Shocks . . . . . Nitrogen Cell
IFS Spring Rate . . . . 100#/in.
Front Spring Preload 1/8″ Thread Adjust
Front Vertical Travel 8.05 in.(21cm)
Rear Suspension . . . XTRA-Lite 136″
Rear Axle Travel . . . 12″ (30.5cm)
Front Track Shock . . Nitrogen Cell
Spring Rate . . . . . 200#/in. variable
Rear Track Shock . . Indy Select
Rear Springs . . . . . .347″ (sq.) / 77°
Track Type . . . . . 15″x136″x1.5″ (38.1x345.44x3.81cm)
Track Tension . . . . . 3/8″ - 1/2″ (1-1.3 cm) slack with 10# (4.54kg) weight 16″ (40.64cm) ahead of rear idler shaft.
Overall Snowmobile Length . . . . . 116″ (295cm)
Overall Snowmobile Height . . . . . 45″ (114cm)
Maximum Snowmobile Width . . . . . 43.5″ (110.4cm)

CHAINCASE

Sprockets / Chain . . . 18-41, 68P HYVO
Reverse . . . . . Option
Brake Pads . . . . . Type 81, Large
Chaincase Center Dist. 7.05″ (17.91cm)
Driveshaft Sprockets . 2 Drivers Wide
Brake Type . . . . . Polaris HPB

OPTIONAL REAR TORSION SPRINGS

(STD)	FIRM
.347″(Sq.) Diameter x 77°	.375” (Sq.) Diameter x 77_
L.H. 7041627-067	L.H. 7041631-067
R.H 7041628-067	R.H. 7041632-067

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MODEL: . . . . . INDY TRAIL RMK
MODEL NUMBER: . S02SR5BS
ENGINE MODEL: . . EC55PM024

CARBURETION

Type . . . . . VM34SS Mikuni w/ACCS
Main Jet 270
Pilot Jet 35
Jet Needle 6DEH11-3
Needle Jet Q-0 (480)
Cutaway 3.0
Air Screw . . . . . 1.5 Turns
Valve Seat . . . . . 1.5 Viton
Fuel Octane (R+M/2) . 87 Non-Oxygenated
Throttle Gap 89 Oxygenated
Under Cutaway . . . . . .218″ (5.54mm)

JETTING CHART

Altitude		AMBIENT TEMPERATURE					
		Below -30°F Below -34°C	-30_ to -10_F -34_to -23_C	-10_to +10_F -23_ to -12_C	+10_to +30_F -12_to -1_C	+30_to +50_F -1_to +10_C	Above +50_F Above +10_C
Meters (Feet)	0-600 (0-2000)	300 #3	290 #3	280 #3	270 #3	260 #3	250 #3
	600-1200 (2000-4000)	300 #3	290 #3	280 #3	270 #3	260 #3	250 #3
	1200-1800 (4000-6000)	300 #3	290 #3	280 #3	270 #3	260 #3	250 #3
	1800-2400 (6000-8000)	300 #3	290 #3	280 #3	270 #3	260 #3	250 #3
	2400-3000 (8000-10000)	300 #3	290 #3	280 #3	270 #3	260 #3	250 #3
	3000-3700 (10000-12000)	300 #3	290 #3	280 #3	270 #3	260 #3	250 #3

XXX
#X - # refers to the clip position from top of jet needle.

CLUTCH

Type P-85
Belt 3211070
Belt Width (Projected) . 1.375″ (34.93)
Side Angle (Overall) . . 28°
Outside Circumference 47.250″ (120cm)
Center Distance . . . . . 12.00″
Shift Weights . . . . . 10-56 Bushed
Primary Spring . . . . . Dark Blue / White
Secondary Spring . . . . Silver / Blue
Driven Helix . . . . . R-32 #2

CLUTCH CHART

Altitude		DRIVE		DRIVEN		
		Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Chaincase Gearing
Meters (Feet)	0-900 (0-3000)	10-62 Bushed	Dark Blue / White	Silver/ Blue	R-32 #2	18-41-68P HYVO
	900-1800 (3000-6000)	10-58 Bushed	Dark Blue / White	Silver/ Blue	R-32 #2	18-41-68P HYVO
	1800-2700 (6000-9000)	10-56 Bushed	Dark Blue / White	Silver/ Blue	R-32 #2	18-41-68P HYVO
	2700-3700 (9000-12000)	10-54 Bushed	Dark Blue / White	Silver/ Blue	R-32 #2	18-41-68H YVO

- Production Setting

ENGINE

Type . . . . . Fan Cooled Reed Assist Twin
Displacement 544cc
Bore . . . . . 2.874″ (73mm)
Stroke . . . . . 2.559″ (65mm)
Piston / Cylinder Clearance . . . 0.0035″ - 0.0049″ (0.09 - 0.125mm)
Service Limit . . . . . 0.0078″ (0.20mm)
Piston Marking 5MB
Piston Ring Marking . . . . . N
Piston Ring End Gap . . . . . 0.016″ - 0.022″ (0.40 - 0.55mm)
Head ccs (Uninstalled) . . . . . 33.8±0.4cc
Head ccs (Installed) 27.7cc
Operating RPM±200 . . . . . 6800 RPM
Idle RPM±200 . . . . . 1600 RPM
Engagement RPM±300 . . . . . 3800 RPM
Cylinder Head Torque . . . . . 18-19.5 ft.lbs. (25-27 Nm)
Cylinder Base Nut Torque . . . . 24-28 ft.lbs. (33-39 Nm)
Crankcase Torque (8mm) . . . . . 16.6-18 ft.lbs. (23-35 Nm)
Crankcase Torque (10mm) . . . N/A
Flywheel Torque . . . . . 60-65 ft.lbs. (83-90 Nm)

Fuel Pump Manuf. . . . . Taiyo
Fuel Pump Mark FJP-3-100
Oil Pump Manuf. . . . . Mikuni
Oil Pump Mark 55MB
Cylinder Head Mark EC55PM

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MODEL: . . . . . INDY TRAIL RMK
MODEL NUMBER: . S02SR5BS
ENGINE MODEL: . . EC55PM024

ELECTRICAL

Flywheel I.D. . . . . Mitsubishi
CDI Marking 17620111
Alternator Output . . . 240 Watts
Ignition Timing . . . . . 27° BTDC@3500RPM±1.5°
0.175″ BTDC (±0.157″ - 0.195″)
4.45mm BTDC (±3.97 - 4.93mm)
Spark Plug / Gap . . . NGK BR9ES / 0.028″ (0.7mm)
Voltage Regulator . . LR7
Electric Start . . . . . Option
LR7= Full wave voltage regulator
Magneto Pulses 6

CAPACITIES

Fuel Tank . . . . . 11.8 gallons (44.7 liters)
Oil Tank . . . . . 3 quarts (2.8 liters)
Coolant . . . . . N/A
Chaincase Oil . . . . . 9 fl. oz.(266cc)

SUSPENSION / CHASSIS

Body Style . . . . . Gen II
Front Suspension . . Indy XTRA 38″
Front Shocks . . . . . Nitrogen Cell
IFS Spring Rate . . . . 80#/in.
Front Spring Preload 5/16″ Thread Adjust
Front Vertical Travel 8.25″ (21cm)
Rear Suspension . . . XTRA-Lite 136″
Rear Axle Travel . . . 12″ (30.5cm)
Front Track Shock . . Nitrogen Cell
Spring Rate . . . . . 181#/in.
Rear Track Shock . . Indy Select
Rear Springs . . . . . .347″ (sq.) / 77°
Track Type . . . . . 15″x136″x.1.25″ (38.1x345.44x3.175cm)
Track Tension . . . . . 3/8″ - 1/2″ (1-1.3 cm) slack with 10# (4.54kg) weight 16″ (40.64cm) ahead of rear idler shaft.
Overall Snowmobile Length . . . . . 116″ (295cm)
Overall Snowmobile Height . . . . . 45″ (114cm)
Maximum Snowmobile Width . . . . . 43.5″ (110.5cm)

CHAINCASE

Sprockets / Chain . . . 18-41, 68P HYVO
Reverse . . . . . Option
Brake Pads . . . . . Type 81, Small
Chaincase Center Dist. 7.05″ (17.9cm)
Driveshaft Sprockets . 2 Drivers
Brake Type . . . . . Polaris HPB

OPTIONAL REAR TORSION SPRINGS

SOFT	MEDIUM(STD)	FIRM
	.347″(Sq.) Diameter x 77°	.375″(Sq.) Diameter x 77°
L.H .	L.H. 7041627-067	L.H. 7041631-067
R.H.	R.H. 7041628-067	R.H. 7041632-067

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MODEL: . . . . . 600 EDGE RMK
MODEL NUMBER: . S02NJ6ES
ENGINE MODEL: . . S2187-6044PL6E

CARBURETION

Type . . . . . TM 38 w/TPS Mikuni
Main Jet 310
Pilot Jet 45
Jet Needle 9DGI1-60-2
Needle Jet P-8 (825)
Cutaway . . . . . 1.5 Notched
Fuel Screw . . . . . 2.0 Turns
Valve Seat 1.5
Fuel Octane (R+M/2) . Key Switch Adj.
Premium 91
Regular 87 Non-Oxy.
Throttle Gap
Under Cutaway . . . . . 0.102″ (2.6mm)
Starter Jet 140
Pilot Air Jet . . . . . N/A
Exhaust Spring Green/White
Low Elevation Exhaust
Valve Spring . . . . . Pink

JETTING CHART

Altitude		AMBIENT TEMPERATURE					
		Below -30°F Below -34°C	-30_ to -10_F -34_to -23_C	-10_to +10_F -23_ to -12_C	+10_to +30_F -12_to -1_C	+30_to +50_F -1_to +10_C	Above +50_F Above +10_C
Meters (Feet)	0-600 (0-2000)	450 #4	430 #4	420 #3	400 #3	380 #3	370 #3
	600-1200 (2000-4000)	410 #4	390 #3	380 #3	360 #3	340 #3	330 #2
	1200-1800 (4000-6000)	380 #3	360 #3	350 #3	330 #3	320 #2	300 #2
	1800-2400 (6000-8000)	360 #3	430 #3	320 #3	310 #2	290 #2	280 #2
	2400-3000 (8000-10000)	340 #3	320 #3	300 #2	290 #2	270 #2	260 #2
	3000-3700 (10000-12000)	330 #2	310 #2	290 #2	280 #2	260 #2	240 #2

XXX #X - # refers to the clip position from top of jet needle.

CLUTCH

Type P-85
Belt 3211080
Belt Width (Projected) . 1.438″ (36.53mm)
Side Angle (Overall) . . 28°
Outside Circumference 48.375″ (122.87cm)
Center Distance . . . . . 11.5″
Shift Weights . . . . . 10-56 Bushed
Primary Spring . . . . . Black/Green
Secondary Spring . . . . Silver / Blue
Driven Helix . . . . . R-32#3

CLUTCH CHART

Altitude		DRIVE		DRIVEN		
		Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Chaincase Gearing
Meters (Feet)	0-900 (0-3000)	10-60 Bushed	Black/ Green	Silver / Blue	R-32 #3	19-39 72P HYVO
	900-1500 (3000-6000)	10-58 Bushed	Black/ Green	Silver / Blue	R-32 #3	19-39 72P HYVO
	1500-2100 (6000-9000)	10-56 Bushed	Black/ Green	Silver / Blue	R-32 #3	19-39 72P HYVO
	2100-2700 (7000-9000)	10 54 Bushed	Black/ Green	Silver / Blue	R-32 #3	19-39 72P HYVO
	2700-3350 (9000-11000)	10AL Bushed	Black/ Green	Silver / Blue	R-32 #3	19-39 72P HYVO
	3350-4000 (11000-13000)	10 Bushed	Black/ Green	Silver / Blue	R-32 #3	19-39 72P HYVO

- Production Setting

ENGINE

Type . . . . . Liquid Cooled Case Reed w/TPS
Displacement 593cc
Bore . . . . . 2.9930″ 3.041″ (77.25mm)
Stroke 2.520 (64mm)
Piston / Cylinder Clearance . . . 0.0044″ - 0.0058″ (0.11 - 0.15mm)
Service Limit . . . . . .0059” (0.15mm)
Piston Marking 3021088
Piston Ring Marking . . . . . N/A
Piston Ring End Gap . . . . . 0.012″ - 0.018″ (0.30 - 0.46mm)
Head ccs (Uninstalled) 36.0cc
Head ccs (Installed) 29.0cc
Operating RPM±200 . . . . . 8000 RPM
Idle RPM±200 . . . . . 1500 RPM
Engagement RPM±300 . . . . . N/A RPM
Cylinder Head Torque . . . . . 18-22 ft.lbs. (25-30 Nm)
Cylinder Base Nut Torque . . . . 30-34 ft.lbs. (41-47 Nm)
Crankcase Torque (8mm) . . . . . 20-24 ft.lbs. (28-33 Nm)
Crankcase Torque (10mm) . . . 26-30 ft.lbs. (36-41 Nm)

Fuel Pump Manuf. . . . . Walbro
Fuel Pump Mark . . . . . N/A
Oil Pump Manuf. . . . . Mikuni
Oil Pump Mark 2540097
Cylinder Head Mark 3022057

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MODEL: . . . . . 600 EDGE RMK
MODEL NUMBER: . S02NJ6ES
ENGINE MODEL: . . S2187-6044PL6E

ELECTRICAL

Flywheel I.D. 4010629
CDI Marking 4010554
Alternator Output . . . 280 Watts
Ignition Timing . . . . . 24_@3500RPM±500°
With TPS Unplugged.
.1350″ BTDC
3.43mm BTDC
Spark Plug / Gap . . . Champion RN57YCC / 0.025″ (0.64mm)
Voltage Regulator . . T1
Electric Start . . . . . Option
Magneto Pulses 6

CAPACITIES

Fuel Tank . . . . . 11.8 gallons (44.7 liters)
Oil Tank . . . . . 3.25 quarts (3.07 liters)
Coolant . . . . . 4.3 quarts (4.07 liters)
Chaincase Oil . . . . . 11 fl. oz.(325cc)

SUSPENSION / CHASSIS

Body Style . . . . . EDGE RMK
Front Suspension . . EDGE RMK
Front Shocks . . . . . Nitrex
IFS Spring Rate . . . . 100#/in.
Front Spring Preload 3/4″ Thread Adjust
Front Vertical Travel 7.2″ - 7.6″ (18.3 - 19.3cm)
Rear Suspension . . . EDGE RMK
Rear Axle Travel . . . 13.8″ (35cm)
Front Track Shock . . Nitrex
Spring Rate . . . . . 170#/in.
Rear Track Shock . . Indy Select
Rear Springs . . . . . .375″ (sq.) / 77°
Track Type . . . . . 15″x136″x1.75″ (38.1x345.44x4.45cm)
Track Tension . . . . . 3/8″ - 1/2″ (1-1.3 cm) slack with 10# (4.54kg) weight 16″ (40.64cm) ahead of rear idler shaft.
Overall Snowmobile Length . . . . . 102.5″ (306cm)
Overall Snowmobile Height . . . . . 47.5″ (120.7cm)
Maximum Snowmobile Width . . . . . 47.25″ (120cm)

CHAINCASE

Sprockets / Chain . . . 19-39 72P HYVO
Reverse . . . . . Option
Brake Pads . . . . . Type 81, Large
Chaincase Center Dist. 7.92″ (20.12cm)
Driveshaft Sprockets . 2 Drivers Wide, XHS
Brake Type . . . . . Polaris HPB Liquid Cooled

OPTIONAL REAR TORSION SPRINGS

SOFT	(STD)	FIRM
-	.347″(Sq.) Diameter x 77°	.359″(Sq.) Diameter x 77°
N/A	L.H.(136”) 7041627-067	L.H.(136”) 7041629-067
N/A	R.H.(136”) 7041628-067	R.H.(136”) 7041630-067
.347″(Sq.) Diameter x 47°	.359″(Sq.) Diameter x 47°	.375″(Sq.) Diameter x 47°
L.H.(144”/151”) 7042081-067	L.H.(144”/151”) 7042068-067	L.H.(144”/151”) 7042079-067
R.H.(144”/151”) 7042082-067	R.H.(144”/151”) 7042069-067	R.H.(144”/151”) 7042080-067

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MODEL: . . . . . INDY 700 SKS / (EUROPEAN MODEL)
MODEL NUMBER: . S02SS7CS / (E02SS7CE)
ENGINE MODEL: . . S2189-7070PL7C

CARBURETION

Type . . . . . TM40 Mikuni
Main Jet 420
Pilot Jet 38
Jet Needle . . . . . 9DFH10-57 / 3
Needle Jet P-8
Cutaway 1.5
Air Screw . . . . . N/A
Valve Seat 1.8
Fuel Octane (R+M/2) . 87 Non-Oxygenated
89 Oxygenated
Throttle Gap
Under Cutaway . . . . . (2.0mm)
Starter Jet 145
Pilot Air Jet 1.1Long
Exhaust Valve Spring . Green/Yellow

JETTING CHART

Altitude		AMBIENT TEMPERATURE					
		Below -30°F Below -34°C	-30_ to -10_F -34_to -23_C	-10_to +10_F -23_ to -12_C	+10_to +30_F -12_to -1_C	+30_to +50_F -1_to +10_C	Above +50_F Above +10_C
Meters (Feet)	0-600 (0-2000)	450 #3	440 #3	420 #3	400 #3	390 #2	370 #2
	600-1200 (2000-4000)	430 #3	410 #3	390 #3	380 #3	360 #2	340 #2
	1200-1800 (4000-6000)	400 #3	390 #3	370 #3	350 #2	340 #2	320 #1
	1800-2400 (6000-8000)	380 #3	360 #3	340 #2	330 #2	310 #1	290 #1
	2400-3000 (8000-10000)	350 #3	340 #2	320 #2	300 #1	290 #1	270 #1
	3000-3700 (10000-12000)	330 #2	310 #2	290 #1	280 #1	260 #1	240 #1

XXX
#X
- # refers to the clip position from top of jet needle.

CLUTCH

Type P-85
Belt 3211065
Belt Width (Projected) . 1.438″ (3.63cm)
Side Angle (Overall) . . 28°
Outside Circumference 48.375″ (122.87cm)
Center Distance . . . . . 12.50″
Shift Weights . . . . . 10-58 Bushed
Primary Spring . . . . . Black/Green
Secondary Spring . . . . Silver / Blue
Driven Helix . . . . . R8 #2

CLUTCH CHART

Altitude		DRIVE		DRIVEN			
		Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Chaincase Gearing	Chaincase Gearing European
Meters (Feet)	0-900 (0-3000)	10-58 Bushed	Black / Green	Silver / Blue	R8 #2	23-40-70P HYVO	23-40-70P HYVO
	900-1800 (3000-6000)	10-56 Bushed	Black / Green	Silver / Blue	R8 #2	23-40-70P HYVO	23-40-70P HYVO
	1800-2700 (6000-9000)	10-54 Bushed	Black / Green	Silver / Blue	R8 #2	21-41-70P HYVO	21-41-70P HYVO
	2700-3700 (9000-12000)	10-AL Bushed	Black / Green	Silver / Blue	R8 #2	21-41-70P HYVO	21-41-70P HYVO

- Production Setting

ENGINE

Type . . . . . Liquid Cooled Case Reed Twin
Displacement 701cc
Bore . . . . . 3.1889″ (81mm)
Stroke . . . . . 2.6772″ (68mm)
Piston / Cylinder Clearance . . . 0.0044″ - 0.0058″ (0.11 - 0.15mm)
Service Limit . . . . . 0.0060”
Piston Marking 3021041
Piston Ring Marking . . . . . N/A
Piston Ring End Gap . . . . . 0.014″ - 0.020″ (.36 - .51mm)
Head ccs (Uninstalled) . . . . . 37.5±.50cc
Head ccs (Installed) 33.5cc
Operating RPM±200 . . . . . 8250 RPM
Idle RPM±200 . . . . . 1500 RPM
Engagement RPM±300 . . . . . 4000 RPM
Cylinder Head Torque . . . . . 18-22 ft.lbs. (25-30 Nm)
Cylinder Base Nut Torque . . . . 30-34 ft.lbs. (41-47 Nm)
Crankcase Torque (8mm) . . . . . 20-24 ft.lbs. (28-33 Nm)
Crankcase Torque (10mm) . . . 26-30 ft.lbs. (36-42 Nm)
Flywheel Torque . . . . . 90 ft.lbs. (124 Nm)

Fuel Pump Manuf. . . . . Walbro
Fuel Pump Mark FPA-4
Oil Pump Manuf. . . . . Mikuni
Oil Pump Mark 03A
Cylinder Head Mark 3021022

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MODEL: . . . . . INDY 700 SKS / (EUROPEAN MODEL)
MODEL NUMBER: . S02SS7CS / (E02SS7CE)
ENGINE MODEL: . . S2189-7070PL7C

ELECTRICAL

Flywheel I.D. 4010523
CDI Marking 4010587
Alternator Output . . . 280 Watts
Ignition Timing . . . . . 18° @3000RPM±500
0.0815″ BTDC
2.075mm BTDC
Spark Plug / Gap . . . Champion RN57YCC / 0.025″ (0.64mm)
Voltage Regulator . . LR7
Electric Start . . . . . Option
LR7= Full wave voltage regulator
Magneto Pulses 6

CAPACITIES

Fuel Tank . . . . . 11.8 gallons (44.7 liters)
Oil Tank . . . . . 3 quarts (2.8 liters)
Coolant . . . . . 5.5 / 6 quarts (5.2 / 5.7 liters)
Chaincase Oil . . . . . 9 / 11 fl. oz.(266 / 325cc)

SUSPENSION / CHASSIS

Body Style . . . . . Gen II
Front Suspension . . Indy XC 10
Front Shocks . . . . . Indy Select
IFS Spring Rate . . . . 100#/in.
Front Spring Preload 3/4″ Thread Adjust
Front Vertical Travel 9.6″ (24.4cm)
Rear Suspension . . . XTRA-10 136″, (XTRA 10 European)
Rear Axle Travel . . . 9.5 in.(24.1cm)
Front Track Shock . . Nitrogen Cell
Spring Rate . . . . . 200#/in. variable
Rear Track Shock . . Indy Select
Rear Springs . . . . . .359″ (sq.) / 77°
Track Type . . . . . 15″x136″x1.25″ (38.1x345.44x3.175cm)
Track Tension . . . . . 3/8″ - 1/2″ (1-1.3 cm) slack with 10# (4.54kg) weight 16″ (40.64cm) ahead of rear idler shaft.
Overall Snowmobile Length . . . . . 116″ (295cm)
Overall Snowmobile Height . . . . . 45″ (114cm)
Maximum Snowmobile Width . . . . . 48″ (122cm)

CHAINCASE

Sprockets / Chain . . . 23-40-70P HYVO
Reverse . . . . . Option
Brake Pads . . . . . Type 81, Large
Chaincase Center Dist. 7.05″ (17.91cm)
Driveshaft Sprockets . 2 Drivers Wide
Brake Type . . . . . Polaris HPB, Liquid Cooled

OPTIONAL REAR TORSION SPRINGS (700 SKS)

SOFT	MEDIUM(STD)	FIRM
.347”(Sq.) Diameter x 77_	.359″(Sq.) Diameter x 77_	.405”(Sq.) Diameter x 77_
L.H. 7041627-067	L.H. 7041629-067	L.H. 7041655-067
R.H. 7041628-067	R.H. 7041630-067	R.H. 7041656-067

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MODEL: . . . . . 700 EDGE RMK 136”, 144”, 151”
MODEL NUMBER: . S02NJ7CS, S02NK7CSA, S02NK7CS, S02NL7CS
ENGINE MODEL: . . S2190–7070PL7C

CARBURETION

Type . . . . . TM 40 w/TPS Mikuni
Main Jet 350
Pilot Jet 45
Jet Needle 9DGJ2–57–2
Needle Jet P-8 (825)
Cutaway 2.0
Air Screw . . . . . 1.0 Turns
Valve Seat 1.8
Fuel Octane (R+M/2) . Key Switch Adjustable
Throttle Gap
Under Cutaway . . . . . 0.984″ (2.5mm)
Starter Jet 145
Pilot Air Jet . . . . . 0.9 Long
Fuel Screw . . . . . 2.0 Turns out
Exhaust Valve Spring Orange
Low Elevation Exhaust
Valve Spring . . . . . Green/Yellow

JETTING CHART

Altitude		AMBIENT TEMPERATURE					
		Below -30°F Below -34°C	-30_ to -10_F -34_to -23_C	-10_to +10_F -23_ to -12_C	+10_to +30_F -12_to -1_C	+30_to +50_F -1_to +10_C	Above +50_F Above +10_C
Meters (Feet)	0-600 (0-2000)	490 #4	480 #4	460 #3	440 #3	420 #3	400 #3
	600-1200 (2000-4000)	470 #4	450 #3	430 #3	410 #3	390 #3	380 #2
	1200-1800 (4000-6000)	440 #3	420 #3	400 #3	380 #3	370 #2	350 #2
	1800-2400 (6000-8000)	410 #3	390 #3	370 #3	350 #2	340 #2	320 #2
	2400-3000 (8000-10000)	380 #3	360 #3	340 #2	320 #2	310 #2	290 #2
	3000-3700 (10000-12000)	350 #3	330 #2	320 #2	300 #2	280 #2	260 #2

XXX #X - # refers to the clip position from top of jet needle.

CLUTCH

Type P-85
Belt 3211080
Belt Width (Projected) . 1.438″ (36.53mm)
Side Angle (Overall) . . 28°
Outside Circumference 46.625″
Center Distance . . . . . 11.5″
Shift Weights . . . . . 10-56 Bushed
Primary Spring . . . . . Black/Green
Secondary Spring . . . . Silver / Blue
Driven Helix . . . . . R-8 #3

CLUTCH CHART

Altitude		DRIVE		DRIVEN			
		Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Chaincase Gearing (136”)	Chaincase Gearing (144”,151”)
Meters (Feet)	0-900 (0-3000)	10-62 Bushed	Black / Green	Silver / Blue	R-8 #3	21-41 74P HYVO	19-39 72P HYVO
	900-1500 (3000-5000)	10-60 Bushed	Black / Green	Silver / Blue	R-8 #3	21-41 74P HYVO	19-39 72P HYVO
	1500-2100 (5000-7000)	10-58 Bushed	Black / Green	Silver / Blue	R-8 #3	21-41 74P HYVO	19-39 72P HYVO
	2100-2700 (7000-9000)	10-56 Bushed	Black / Green	Silver / Blue	R-8 #3	21-41 74P HYVO	19-39 72P HYVO
	2700-3350 (9000-11000)	10-54 Bushed	Black / Green	Silver / Blue	R-8 #3	21-41 74P HYVO	19-39 72P HYVO
	3350-4000 (11000-13000)	10-AL Bushed	Black / Green	Silver / Blue	R-8 #3	21-41 74P HYVO	19-39 72P HYVO

- Production Setting

ENGINE

Type . . . . . Liquid Cooled Case Reed w/TPS
Displacement 701cc
Bore . . . . . 3.1889″ (81mm)
Stroke . . . . . 2.6772″ (68mm)
Piston / Cylinder Clearance . . . 0.0043″ - 0.0057″ (0.11 – 0.14mm)
Service Limit . . . . . .0058”
Piston Marking 3021041
Piston Ring Marking . . . . . N/A
Piston Ring End Gap . . . . . 0.014″ - 0.020″ (0.36 - 0.51mm)
Head ccs (Uninstalled) . . . . . 37.2±.50cc
Head ccs (Installed) . . . . . 33.5 – 34.5cc
Operating RPM±200 . . . . . 8100 RPM
Idle RPM±200 . . . . . 1500 RPM
Engagement RPM±300 . . . . . 3900 RPM
Cylinder Head Torque . . . . . 18-22 ft.lbs. (25-30 Nm)
Cylinder Base Nut Torque . . . . 30-34 ft.lbs. (41-47 Nm)
Crankcase Torque (8mm) . . . . . 20-24 ft.lbs. (28-33 Nm)

Fuel Pump Manuf. . . . . Walbro
Fuel Pump Mark FPA-4
Oil Pump Manuf. . . . . Mikuni
Oil Pump Mark 03A
Cylinder Head Mark 3021022

Flywheel Torque90 ft.lbs. (124 Nm)

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MODEL: . . . . . 700 EDGE RMK 136”, 144”, 151”
MODEL NUMBER: . S02NJ7CS, S02NK7CSA, S02NK7CS, S02NL7CS
ENGINE MODEL: . . S2190-7070PL7C

ELECTRICAL

Flywheel I.D. . . . . Kokusan 4010629
CDI Marking 4010553
Alternator Output . . . 280 Watts
Ignition Timing . . . . . 18° BTDC@2500RPM±500
With TPS Unplugged.
0.0815″ BTDC
2.0705mm BTDC
Spark Plug / Gap . . . Champion RN57YCC / 0.025″ (0.64mm)
Voltage Regulator . . LR7
Electric Start . . . . . Option
LR7= Full wave voltage regulator
Magneto Pulses 6

CAPACITIES

Fuel Tank . . . . . 11.8 gallons (44.7 liters)
Oil Tank . . . . . 3.25 quarts (3.1 liters)
Coolant . . . . . 4.3 quarts (4.1 liters)
Chaincase Oil . . . . . 11 fl. oz.(325cc)

SUSPENSION / CHASSIS

Body Style . . . . . EDGE
Front Suspension . . EDGE
Front Shocks . . . . . Nitrogen Cell
IFS Spring Rate . . . . 100#/in.
Front Spring Preload 3/4″ Thread Adjust
Front Vertical Travel 7.2″ - 7.6″ (18.3 - 19.3cm)
Rear Suspension . . . EDGE RMK 136”, 144″ or 151”
Rear Axle Travel . . . 13.8″ (35cm)-(136), 17”(43cm)-(144, 151)
Front Track Shock . . Nitrex (136, 144), Ryde FX IFP (151)
Spring Rate . . . . . 170#/in.
Rear Track Shock . . Indy Select (136, 144) Ryde FX IFP (151)
Rear Springs . . . . . .347”sq./47° (136), .359″ (sq.) / 77°(144, 151)
Track Type . . . . . 15″x136″x1.75″ (38.1x345.44x4.44cm) or 15″x144″x2.0″ (38.1x365.76x5.08cm)
Track Tension . . . . . 3/8″ - 1/2″ (1-1.3 cm) slack with 10# (4.54kg) weight 16″ (40.64cm) ahead of rear idler shaft.
Overall Snowmobile Length . . . . . 136″ Track= 116″ (295cm) 144″ Track= 119.75″ (304.2cm)
Overall Snowmobile Height . . . . . 45″ (114cm)
Maximum Snowmobile Width . . . . . 44.25″ (122cm)

CHAINCASE

Sprockets / Chain . . . 21-41 74P HYVO(136)
19-39 72P HYVO (144, 151)
Reverse . . . . . Option
Brake Pads . . . . . Type 81, Large
Chaincase Center Dist. 7.05″ (17.91cm)
Driveshaft Sprockets . 2 Drivers Wide, XHS
Brake Type . . . . . Polaris HPB Liquid Cooled

OPTIONAL REAR TORSION SPRINGS

SOFT	(STD)	FIRM
-	.347″(Sq.) Diameter x 77°	.359″(Sq.) Diameter x 77°
N/A	L.H.(136”) 7041627-067	L.H.(136”) 7041629-067
N/A	R.H.(136”) 7041628-067	R.H.(136”) 7041630-067
.347″(Sq.) Diameter x 47°	.359″(Sq.) Diameter x 47°	.375″(Sq.) Diameter x 47°
L.H.(144”/151”) 7042081-067	L.H.(144”/151”) 7042068-067	L.H.(144”/151”) 7042079-067
R.H.(144”/151”) 7042082-067	R.H.(144”/151”) 7042069-067	R.H.(144”/151”) 7042080-067

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MODEL: . . . . . 800 EDGE RMK 144”, 151”, 156”
MODEL NUMBER: . S02NM8CS
ENGINE MODEL: . . S2188-8070PL8C

CARBURETION

Type . . . . . TM 40 w/ TPS
Main Jet 390
Pilot Jet 45
Jet Needle 9DGJ3-57/2
Needle Jet P-8 (825)
Cutaway 2.0
Fuel Screw . . . . . 2.0 Turn
Air Screw 1.0 Turn
Valve Seat 1.8
Fuel Octane (R+M/2) . Key Switch Adj.
91 Premium
89 Regular
Throttle Gap
Under Cutaway . . . . . 0.102″ (2.6mm)
Starter Jet 145
Pilot Air Jet . . . . . N/A
Exhaust Valve Spring . Pink
Low Elevation Exhaust
Valve Spring . . . . . Purple/White

JETTING CHART

Altitude		AMBIENT TEMPERATURE					
		Below -30°F Below -34°C	-30_ to -10_F -34_to -23_C	-10_to +10_F -23_ to -12_C	+10_to +30_F -12_to -1_C	+30_to +50_F -1_to +10_C	Above +50_F Above +10_C
Meters (Feet)	0-600 (0-2000)	560N #4	540N #4	520N #4	500 #4	480 #3	460 #3
	600-1200 (2000-4000)	520N #4	500 #4	480 #4	460 #3	440 #2	420 #2
	1200-1800 (4000-6000)	490 #4	470 #4	450 #3	430 #3	410 #2	390 #2
	1800-2400 (6000-8000)	450 #4	430 #3	410 #3	390 #2	370 #2	350 #2
	2400-3000 (8000-10000)	410 #3	390 #3	370 #2	350 #2	330 #2	310 #2
	3000-3700 (10000-12000)	360 #3	340 #2	330 #2	320 #2	300 #2	290 #1

XXX
#X
- # refers to the clip position from top of jet needle.

CLUTCH

Type P-85
Belt 3211080
Belt Width (Projected) . 1.438″
Side Angle (Overall) . . 28°
Outside Circumference 46.625″
Center Distance . . . . . 11.50″
Shift Weights . . . . . 10-60 Bushed
Primary Spring . . . . . Black/Green
Secondary Spring . . . . Silver / Blue
Driven Helix . . . . . R-11 #3

CLUTCH CHART

Altitude		DRIVE		DRIVEN			DRIVEN
		Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Chaincase Gearing (144, 151)	Chaincase Gearing (156)
Meters (Feet)	0-900 (0-3000)	10-64	Black Green	Silver / Blue	R-11 #2	21-41 74P HYVO	19-39 72P HYVO
	900-1500 (3000-5000)	10-64	Black Green	Silver / Blue	R-11 #3	21-41 74P HYVO	19-39 72P HYVO
	1500-2100 (5000-7000)	10-62	Black Green	Silver / Blue	R-11 #3	21-41 74P HYVO	19-39 72P HYVO
	2100-2700 (7000-9000)	10-60	Black Green	Silver / Blue	R-11 #3	21-41 74P HYVO	19-39 72P HYVO
	2700-3300 (9000-11000)	10-58	Black Green	Silver / Blue	R-11 #3	21-41 74P HYVO	19-39 72P HYVO
	3300-3900 (11000-13000)	10-56	Black Green	Silver / Blue	R-11 #3	21-41 74P HYVO	19-39 72P HYVO

ENGINE

Type . . . . . Liquid Cooled Case Reed w/TPS
Displacement 794cc
Bore . . . . . 3.3464″ (85mm)
Stroke . . . . . 2.7559″ (70mm)
Piston / Cylinder Clearance . . . 0.006″ - 0.0074″ (0.15 - 0.188mm)
Service Limit . . . . . N/A
Piston Marking 3021184
Piston Ring Marking . . . . . N/A
Piston Ring End Gap . . . . . 0.016″ - 0.022″ (0.41 - 0.56mm)
Head ccs (Uninstalled) . . . . . 46 - 47cc
Head ccs (Installed) . . . . . 33 - 33cc
Operating RPM±200 . . . . . 8000RPM
Idle RPM±200 . . . . . 1500 RPM
Engagement RPM±300 . . . . . 4000 RPM
Cylinder Head Torque . . . . . 18-22 ft.lbs. (25-30 Nm)
Cylinder Base Nut Torque . . . . 30-34 ft.lbs. (41-47 Nm)
Crankcase Torque (8mm) . . . . . 29-24 ft.lbs. (28-33 Nm)
Crankcase Torque (10mm) . . . 26-30 ft.lbs. (36-41 Nm)
Flywheel Torque . . . . . 90 ft.lbs. (124 nm)

Fuel Pump Manuf. . . . . Walbro
Fuel Pump Mark . . . . . N/A
Oil Pump Manuf. . . . . Mikuni
Oil Pump Mark 2540053
Cylinder Head Mark 3021294

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MODEL: . . . . . 800 EDGE RMK 144”, 151”, 156”
MODEL NUMBER: . S02NM8CS
ENGINE MODEL: . . S2188-8070PL8C

ELECTRICAL

Flywheel I.D. . . . . Kokusan 4010629
CDI Marking 4010522
Alternator Output . . . 280 Watts
Ignition Timing . . . . . 29° BTDC@4000RPM±500
0.2146″ BTDC
5.4510mm BTDC
Spark Plug / Gap . . . Champion RN57YCC / 0.025″ (0.64mm)
Voltage Regulator . . LR7
Electric Start . . . . . Option
LR7= Full wave voltage regulator
Magneto Pulses 6

CAPACITIES

Fuel Tank . . . . . 11.8 gallons (44.7 liters)
Oil Tank . . . . . 3.5 quarts (3.3 liters)
Coolant . . . . . 4.3 quarts (4.1 liters)
Chaincase Oil . . . . . 11 fl. oz.(325cc)

SUSPENSION / CHASSIS

Body Style . . . . . EDGE
Front Suspension . . EDGE CRC
Front Shocks . . . . . Nitrex or Ryde FX IFP
IFS Spring Rate . . . . 100#/in.
Front Spring Preload Nitrex 3/4″ Thread Adjust
Ryde FX IFP 3 13/16” Thread Adj.
Front Vertical Travel 7.2″ - 7.6″ (18.3 - 19.3cm)
Rear Suspension . . . EDGE RMK
Rear Axle Travel . . . 144” – 17”(43cm) 151” – 17.5”(44.5cm) 156” – 18”(46cm)
Front Track Shock . . Nitrex or Ryde FX IFP
Rear Track Shock . . Select or Ryde FX IFP
Spring Rate . . . . . 170#/in. All Models.
Rear Springs . . . . . .359″ (sq.) / 47° All Models.
Track Type . . . . . 15″x144″x2.0″ (38.1x365.76x5.08cm) or 15″x151″x2.0″ (38.1x383.40x5.08cm) or 15”x156”x2.0” (38.1x396.24x5.08cm)
Track Tension . . . . . 3/8″ - 1/2″ (1-1.3 cm) slack with 10# (4.54kg) weight 16″ (40.64cm) ahead of rear idler shaft.
Overall Snowmobile Length . . . . . 144″ Track 119.75″ (304.2cm) / 151″ Track= 123.5″ (314cm)
156” Track N/A
Overall Snowmobile Height . . . . . 48.5″ (123cm)
Maximum Snowmobile Width . . . . . 47.25″ (120cm)

CHAINCASE

Sprockets / Chain . . . 144”/151”-21:41 74P
156”-19:39 72P
Reverse . . . . . Option
Brake Pads . . . . . Type 81, Large
Chaincase Center Dist. 7.05″ (17.91cm)
Driveshaft Sprockets . 2 Drivers Wide
Brake Type . . . . . Polaris HPB Liquid Cooled

OPTIONAL REAR TORSION SPRINGS

SOFT	MEDIUM(STD)	FIRM
.347″(Sq.) Diameter x 47°	.359″(Sq.) Diameter x 47°	.375″(Sq.) Diameter x 47°
L.H. 7042081-067	L.H.7042068-067	L.H.7042079-067
R.H. 7042082-067	R.H. 7042069-067	R.H. 7042080-067

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CHAPTER 2
MAINTENANCE AND TUNE UP

2

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1500 Mile (2400 km) Maintenance Inspection

__1. Check cylinder head and base area for signs of exhaust or coolant leaks.
__2. Re-torque cylinder heads & cylinder base nuts (cold).
__3. Check compression and record readings.
__4. Check ignition timing.
_____ observed BTDC
_____ corrected BTDC
__5. Inspect recoil starter rope..
__6. Check drive to driven clutch offset (belt removed).
__7. Remove clutches, disassemble & inspect all wear surfaces. Clean sheaves, repair clutch as necessary, reassemble clutches and torque to specifications.
__8. Check belt condition.
__9. Check and adjust belt deflection.
__10. Inspect rubber engine mounts.
__11. Torque engine mounting plate to chassis fasteners.
__12. Adjust engine torque stop (if equipped) (0.10"-0.30").
__13 Carburetor Inspections.
A. Adjust choke plungers.
B. Adjust pilot air screw.
C. Synchronize carburetor slide valves at idle. and off idle.
D. Adjust engine idle RPM.
E. Adjust throttle lever free play.
F. Synchronize oil pump lever.
G. Inspect Choke/Throttle Cables.
H. Inspect vent lines for wear or kinking.
__14. Remove chaincase cover, flush chaincase, inspect. and adjust chain, refill with new chaincase oil.
__15. Change primary fuel filter and oil filter.
__16. Check fuel and oil line condition and routing.
__17 Inspect fuel and oil tank vent lines/routing.
__18. Inspect airbox fit/air filter. Clean or replace.
__19. Change shock oil (Fox) annually before storage.
__20. V.E.S (Variable Exhaust System) - if applicable.
A. Disassemble and clean components.
__21. ACCS
A. Inspect vent lines.

Polaris Service Technician: _____
Authorized Dealer: _____
Base Inspection Price: _____
Date: _____ Parts: _____ Labor: _____

__21a. Brakes-Hydraulic
A. Check brake fluid level.
B. Check for proper hose routing; tighness of banjo bolts and line fasteners.
C. Check for system fluid leaks.
D. Visually inspect pads for wear damage or looseness.
E. Check security and surface condition of brake disc.
F. Flush brake fluid and change every two years.
__21b. Brake-Mechanical
A. Check cable conditions / routing.
B. Check brake pad and brake disc condition and mounting.
C. Adjust brake to proper specifications.
__22. Check auxiliary shut-off switch & perform throttle safety switch tests.
__23. Inspect brake light, tail light, oil light and all electrical accessories.
__24. Inspect Hi/Lo beam operation and aim headlight; check fasteners.
__25. Liquid cooled models:
A. Check coolant level and specific gravity.
B. Check water pump drive belt condition & deflection (where applicable).
C. Check coolant hose, routing and clamps.
D. Inspect heat exchangers condition and fasteners.
E. Check cooling system for proper coolant circulation.
F. Replace recovery line filter: NOTE: Must use correct filter.
G. Check coolant recovery line one way check valve (must hold pressure) where applicable.
H. Pressure test cooling system.
__26. Fan Cooled: Inspect cooling fins and shrouds.
__27. Remove chaincase cover, flush chaincase, inspect chain & sprockets and adjust chain. Inspect chaincase seals.
__28. Check condition of drive shaft and jackshaft bearings. Lubricate greaseable bearings with Premium All Season grease.
__29. Inspect and adjust reverse cable (if applicable).
__30. Remove ski pivot bushings and lubricate.
__31. Inspect ski wear bars.
__32. Check camber alignment and lubricate spindles.
__33. Remove radius rod end bushings, lubricate and reinstall, inspect all radius rod ends.
__34. Reinstall skis and inspect/adjust toe alignment.
__35. Check handlebar centering and lubricate all steering pivots.
__36. Torque tie rod end bolts and jam nuts.
__37. Inspect steering arms and torque bolts. Inspect handlebar bolt torque.
__38. Lubricate rear suspension pivot shafts.
__39. Torque suspension mounting bolts and check all rear suspension fasteners and components.
__40. Inspect rear suspension wheels, bearings and hi-fax.
__41. Inspect track for damage. Adjust tension and alignment.

For optimum performance and reliability, repeat the above maintenance and inspections annually (preferably before off-season storage) or every 1000 miles, except where noted.

RECOMMENDATION: _____

_____

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Recommended Maintenance Products

ENGINE OIL		
Part #	Description	Packaging (size / quantity)
2871721	Synthetic 2-Cycle Premium Gold	Quarts/ 6
2871722	Synthetic 2-Cycle Premium Gold	Gallon / 4
2871723	Synthetic 2-Cycle Premium Gold	16 Gallon Drum
2871884	Synthetic 2 Cycle Premium Gold	55 Gallon Drum
2871098	Premium 2-Cycle Oil (TC-W3)	Quart Cans / 12
2871097	Premium 2-Cycle Oil (TC-W3)	Gallon / 6
2871240	Premium 2-Cycle Oil (TC-W3)	2.5 Gallon / 2
2871566	Premium 2-Cycle Oil (TC-W3)	16 Gallon Drum
2871385	Premium 2-Cycle Oil (TC-W3)	30 Gallon Drum
2871096	Premium 2-Cycle Oil (TC-W3)	55 Gallon Drum
2872927	VES 2 Cycle Synthetic Oil	Quart
2872925	VES 2 Cycle Synthetic Oil	Gallon
2872924	VES 2 Cycle Synthetic Oil	55 Gallon Drum
2872607	Nature Oil (TC-W3)	Gallon
2872926	Nature Oil (TC-W3)	55 Gallon Drum
MAINTENANCE PRODUCTS		
2872435	Cross Shaft Break-in Lube	8 oz / 12
2872436	Cross Shaft Break-in Lube	2.5 Gal / 2
2871326	Carbon Clean Plus	12 oz / 12
2871280	Premium Chaincase Lubricant	Quart / 12
2870464	Premium Chaincase Lubricant	Gallon / 4
2872281	Premium Chaincase Lubricant	2.5 Gallon / 2
2872951	Synthetic Chaincase Lubricant	12 oz.
2873105	Synthetic Chaincase Lubricant	Quart
2873106	Synthetic Chaincase Lubricant	Gallon
2872952	Synthetic Chaincase Lubricant	2.5 Gallon
2871323	Premium Antifreeze 60/40 Premix	Gallon / 6
2871534	Premium Antifreeze 60/40 Premix	Quart / 12
2870995	Premium Gas Shock Oil	Quart / 6
2872279	Premium Gas Shock Oil	2.5 Gallon / 2
2870990	Premium Brake Fluid DOT-3	12oz / 12
2870791	Premium Fogging Oil (spray)	12/12 oz
2871517	Premium Fogging Oil (liquid with spout)	Quart / 12
2871518	Premium Fogging Oil (liquid)	Gallon / 6
2871312	Grease Gun Kit (All Season)	3 oz / 4
2871322	Premium All Season Grease	24oz / 10
2871423	Premium All Season Grease	14 3 oz /
2871460	Premium Starter Grease	2 oz / 12
2871592	Barrel Pump (for 16/30/55 gal. drums)	Each
2871285	Flex Spout (fits gal. and 2.5 gal. jugs)	25
2870505	Isopropyl	10 oz / 24

RETAINING/SEALING PRODUCTS		
Part #	Description	Packaging (size/quantity)
2870652	Fuel Stabilizer	16 oz / 12
2872280	Fuel Stabilizer	2.5 Gallon / 2
2871329	Nyogel t Grease	2 oz
2871064	T-9 Metal Protectant	each
2870632	Metal Polish	10 oz / each
2871076	Battery Tender t	each
2870585	Primer N, Aerosol	25 gr / 1
2870584	680 Retaining Compound	10cc / each
2871949	Threadlock 242	50cc / 10
2871950	Threadlock 242	6cc / 12
2871951	Threadlock 262	50cc / 10
2871952	Threadlock 262	6cc / 12
2871953	Threadlock 271	6cc / 12
2871954	Threadlock 271	36cc / 6
2871955	Instant Adhesive: Prism 401	3cc / 30
2871956	Pipe Sealant 565	50cc / 6
2871957	Silicone, Black RTV	3 oz tube / 12
2871958	Silicone, Black RTV	11 oz Cartridge/12
2871959	Ultra Blue RTV	3.35 oz / 12
2871960	Ultra Blue RTV	13 oz Cartridge/12
2871961	518 Flange Sealant	50cc / 10
CRANKCASE SEALANTS		
2871557	3 Bond 1215	5oz
VALUE PACKS		
2871967	Synthetic Lube Value Pack	4 / Value pack
2871593	TC-W3 Lube Value Pack	4 / Value pack
WAX AND POLISH		
2871589	Revival/Detailing Kit	6 / Kit
2871966	Restore polish/scuff remover	12 / 12 oz.
2871965	Reflect Wax Final Finish	12 / 12 oz.
2871964	Renew vinyl rubber protector	12 / 12 oz.
RACING FUELS		
2873019	100 Octane	5 Gallon
2872980	100 Octane	16 Gallon Drum
2872981	100 Octane	55 Gallon Drum
2873019	110 Octane	5 Gallon
2872982	110 Octane	16 Gallon Drum
2872983	110 Octane	55 Gallon Drum

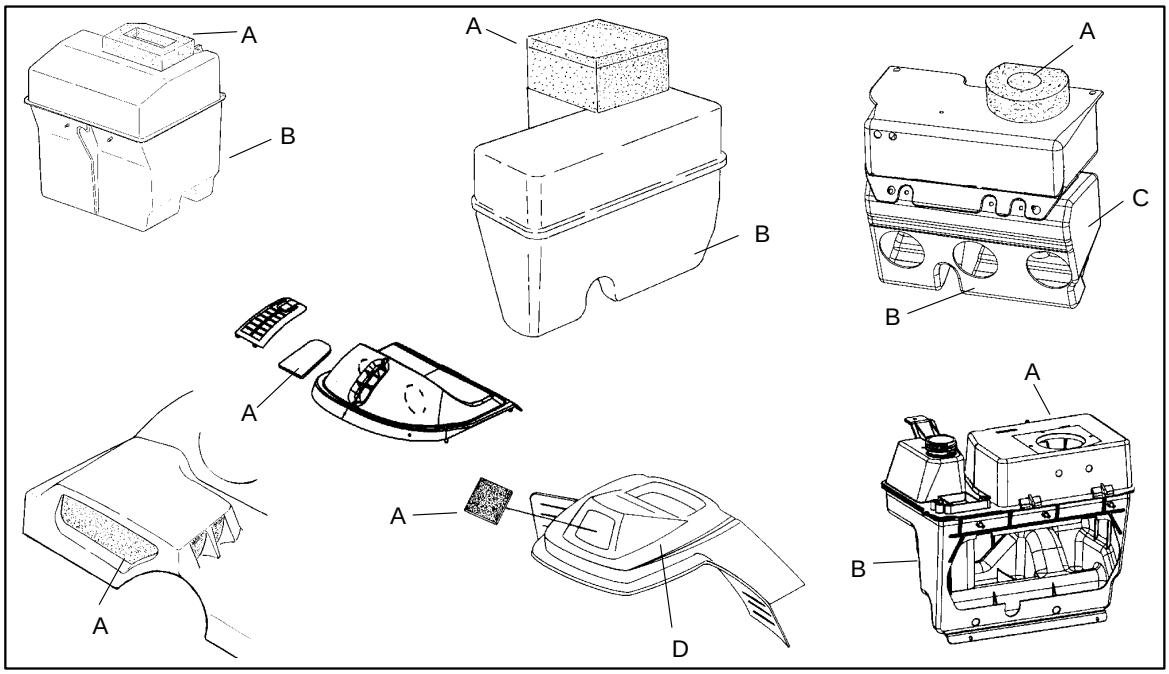
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Air Filter Maintenance

The intake foam filter limits snow ingestion into the intake system. When operating in loose powder snow, check top of foam filter periodically to remove any accumulation of snow.

CAUTION:

Do not operate machine with the intake filters removed. This can cause carburetor icing resulting in poor fuel economy or carburetor malfunction.



Key Components

A Intake Foam Filter

B Air Intake Box

C Air Plenum

D Dash Cowl

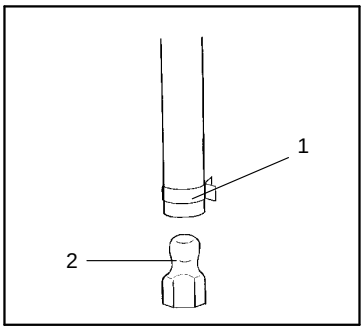
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Water / Sediment Trap Maintenance

Most Polaris snowmobile incorporate patented carburetor bowl water / sediment traps which are located at the bottom of each carburetor. The trap consists of a hose with a plug which should be inspected for contamination at least every 2000 miles (3200 km).

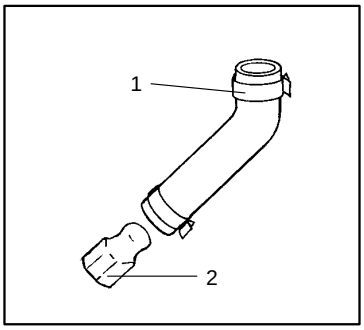
Cleaning Procedure - Plug

1. Turn the fuel tank supply valve off.
2. Position a container or shop towels to catch the contaminated gasoline.
3. Slide the clamp (1) away from the drain plug (2) and remove the drain plug from the sediment tube.
4. Wipe off residue from plug and reinstall with clamps. Continue until all the traps have been emptied.



⚠WARNING

When draining the traps, fuel spillage will occur. Be sure to work in a well ventilated area away from anything which may cause the fuel to ignite such as open flames, sparks, heaters, trouble lights, cigarettes, etc.



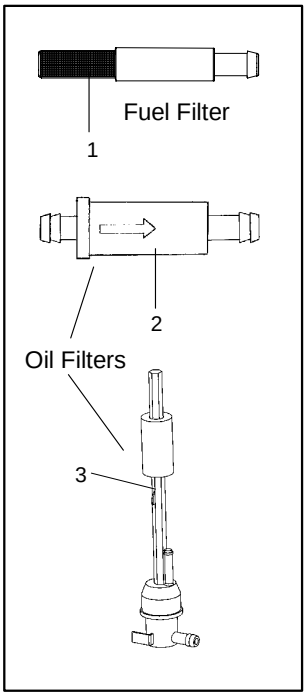
Oil Filter / Fuel Filter Maintenance

Most models use an oil filter (2) which is of a special design and must not be substituted. This filter should be changed annually or every 1200 miles (1920 km). Inspect oil line condition at 2000 miles (3200 km).

NOTE: The direction of the arrows indicates the direction of the flow through the filters.

Edge models utilize a special oil filter (3) that is built into the oil sending unit located in the bottom of the oil tank. It should be replaced every other season.

NOTE: After changing the oil filter, the oil injection system must be bled of all trapped air. See your dealer for instructions or have your dealer perform the filter change and bleeding operation for you.



⚠CAUTION

The in tank fuel filter (1) and fuel lines should be inspected regularly. Special attention should be given to the system's fuel line condition after periods of storage. Normal deterioration from weather and fuel compounds can occur.

Do not use pliers or a similar tool to remove fuel lines. Damage could occur.

Do not kink the fuel line. Damage could occur. If a fuel has been damaged or kinked, replace it.

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ACCS (Altitude Compensating Carburetor System) Maintenance

Some models are equipped with Polaris ACCS. The ACCS is designed to compensate automatically for changes in altitude without having to change carburetor jets.

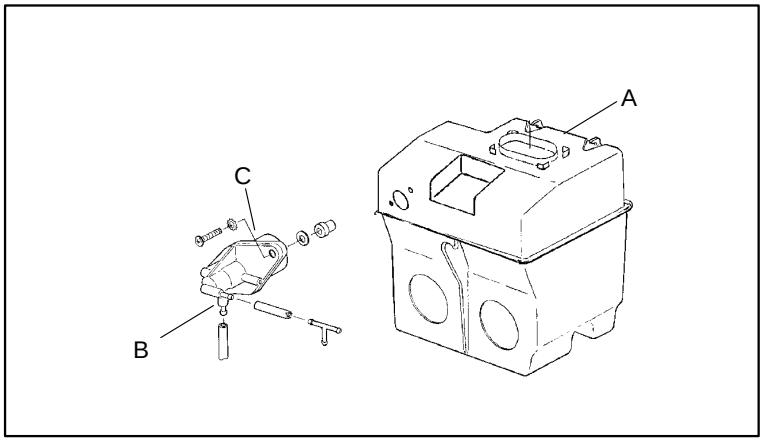
ACCS does not require peroidic maintenance. See your dealer for ACCS service or adjusment.

NOTE: Tampering or adjustments to the ACCS may cause severe engine damage.

A. Airbox

B. Vent Line Attachment

C. ACCS Valve



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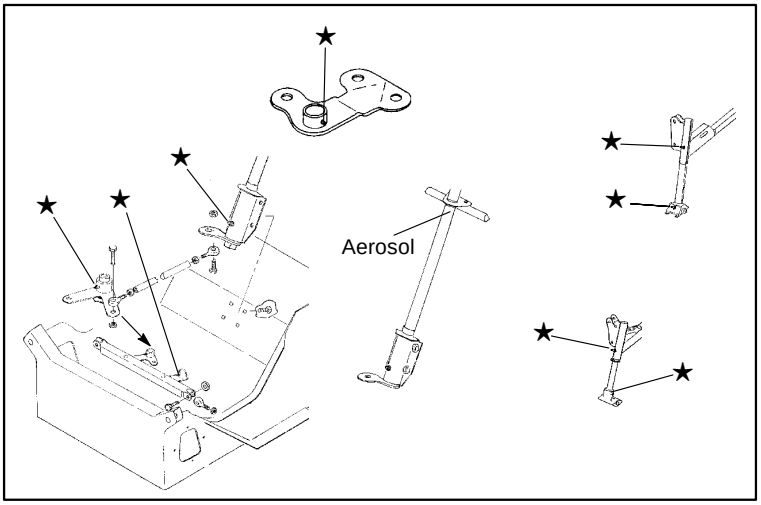
Lubricate the following fittings with Polaris Premium All Season grease annually or approximately every 1000 miles (1600 km). Remove weight from the component being greased to permit better penetration and flushing of the joint.

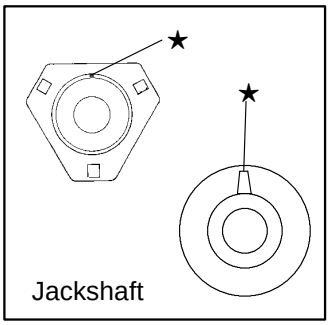
- Spindles, left and right.
- Rear suspension pivot shafts.
- Lubricate both front ski pivots at fitting as shown using Polaris All Season grease.
- Grease jackshaft and driveshaft (clutch side) bearings.
- Use an aerosol lubricant on the steering post support bracket.
- Grease steering post lower pivot.
- Grease center steering arm (bell crank), pitman arm, and idler arm (where applicable).

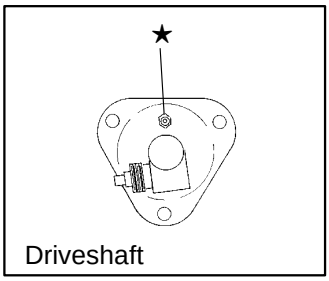
Polaris Premium All Season Grease
14 oz. PN 2871423

Grease Gun Kit PN 2871312

NOTE: A grease gun kit complete with grease and adaptors is available to lubricate all fittings on Polaris snowmobiles.







Jackshaft Bearing Greasing

Loosen driven clutch retaining bolt and pull clutch outward to expose bearing. Use a point type grease gun fitting to inject grease through hole in flangette into bearing until grease purges out inside or outside bearing seal. Push clutch back onto shaft and replace clutch retaining bolt.

Grease Gun Adapter: 2871174
Point Type

Driveshaft Bearing Greasing

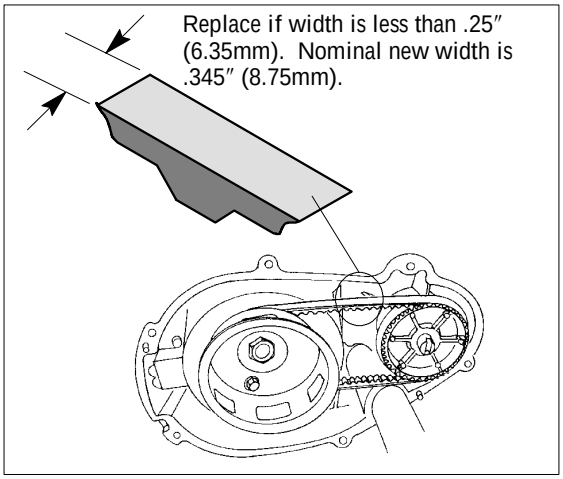
Inject grease into fitting on speedometer drive adaptor until grease purges out inside or outside bearing seal.

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Water Pump Belt Tension -
700 and 800 Domestic big block Twins.

The water pump belt on 600 RMK, 700 RMK and 800 RMK domestic big block twin snowmobile engines should be inspected every 1500 miles. Belts should be inspected by measuring the width at several locations around the belt. Belt width at any location should not be thinner than .250″ (6.35mm). Replace the belt if you notice any loose cords, broken cracked or missing cogs, and variations in width. If the water pump belt fails, serious engine damage could result. Nominal thickness of a new belt should be approximately .345″ (8.75mm).

Check belt tension by rotating crankshaft 1/8 turn at a time. The tension should be equal at all points of rotation.



1. A weight is needed to test belt deflection. Construct a weight out of wire and weights such as thick washers. Use the illustration to assist you . The finished weight should weigh 2 lbs.

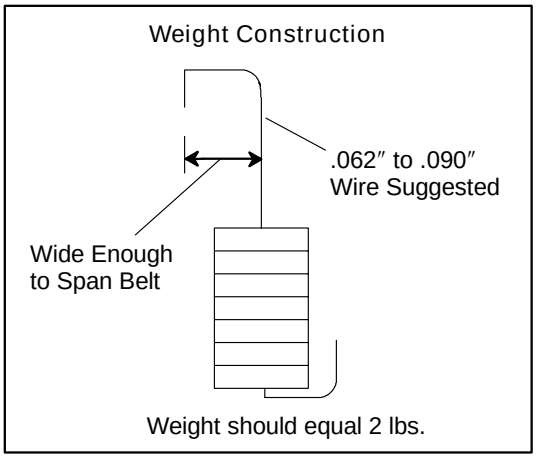
2. Measure the belt deflection using the following procedure:

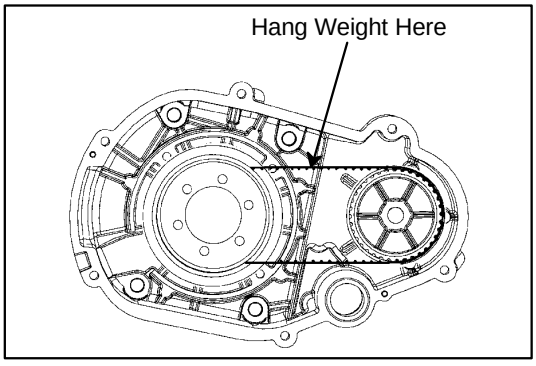
   a. Hang weight midway between pulleys. Weight must hang free and not rest on any part of machine.

   b. Lay a straight edge or straight piece of stiff material (steel is suggested) across the top of both pulleys. The straight edge should measure approximately 1/8″ x 8″ x 1″.

   c. Measure the gap between the belt and the straight edge at the point where the weight is hanging.

   d. Measured distance must be between .1″ and .25″. If the measured distance is more than the specification, try another waterpump belt.





NOTE: Do not use tools to assemble belt on pulleys. Damage can occur which could shorten belt life. Before installing new belt, check pulley teeth, remove all foreign material, dirt, and oil. Never install a used belt on a different engine. Install belt so writing on the belt can be read from the right side of the machine.

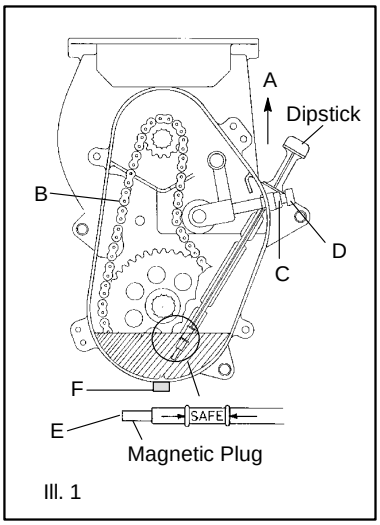
Oil Pump Adjustment

Refer to Chapter 3 for oil pump adjustment procedures.

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Chaincase Oil Level

The drive chain is continuously immersed in oil. Proper oil level is determined by checking the level on the dipstick with machine placed on a level surface. The oil level should be between the “safe” marks on the dipstick. Add oil through dipstick opening to maintain proper level. Use Polaris chaincase oil. Do not overfill.



Ill. 1

Polaris Chaincase Lubricant
Quart PN 2871280
Gallon PN 2870464
2.5 Gallon PN 2872281

CAUTION:

Do not mix or use other types of lubricant. Excessive wear to chain, sprockets and bearings may result.

Drive Chain Tension - Chaincase cover installed

To obtain correct chain tension:

1. Elevate rear of machine so track is off floor.
2. Rotate driven clutch counterclockwise to move all chain slack to the tensioner side. Lock the brake lever.
3. Loosen adjuster bolt jam nut.
4. Finger tighten adjuster bolt until it can no longer be adjusted by hand.
5. Back off adjuster bolt 1/4 turn.
6. Tighten jam nut while holding adjuster bolt.
7. The chain is now tensioned. Release brake lever lock.

Drive Chain Tension - Chaincase cover removed

To obtain correct chain tension:

1. Remove drain plug (F) and drain oil into a suitable container. Dispose of properly.
2. Remove the chaincase cover.
3. While putting a slight reverse tension on the chain by turning brake disc as indicated by the arrow (A), there should be approximately 1/4-3/8″ (.6-1 cm) deflection on the chain at point (B). Refer to illlustration 1.
4. The chain is adjusted by loosening the adjusting bolt locknut (C) and turning adjusting bolt (D) until correct chain deflection is obtained.
5. Lock the adjusting bolt locknut (C) while holding a wrench on the adjusting bolt (D) to prevent it from turning.
6. Reinstall the chaincase cover and drain plug. Add Polaris synthetic chaincase lubricant (PN 2871478) through the dipstick opening to the level described above.

NOTE: Clean the magnetic plug (E) every 500 miles (800 km) and whenever checking or changing lubricant.

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Suspension Lubrication

To maintain rider comfort and to retard wear of the pivot shafts, the suspension pivot shafts should be lubricated with Polaris Premium All Season Grease, PN 2871423, at 500 miles (800 km) initially; 1000 miles (1600 km) and before summer storage each year. The riding characteristics of the snowmobile will be affected by lack of lubrication of these shafts. NOTE: A grease gun kit complete with grease and adaptors is available to lubricate all fittings on Polaris snowmobiles. Order PN 2871312.

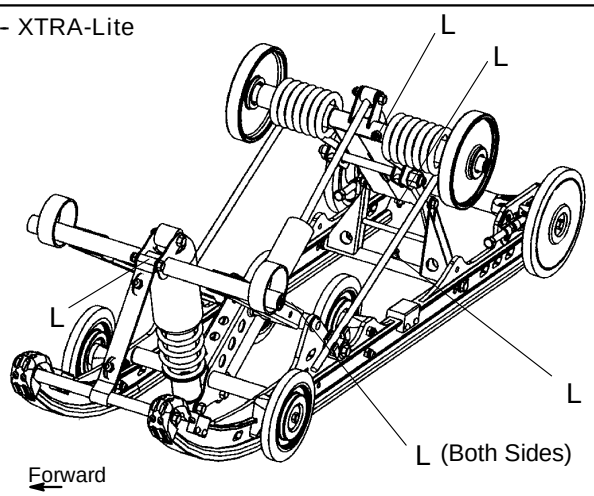
Suspension Lubrication

Polaris Premium Grease PN 2871423
Grease Gun Kit PN 2871312

XTRA Lite Style

L LUBRICATION POINTS - XTRA-Lite

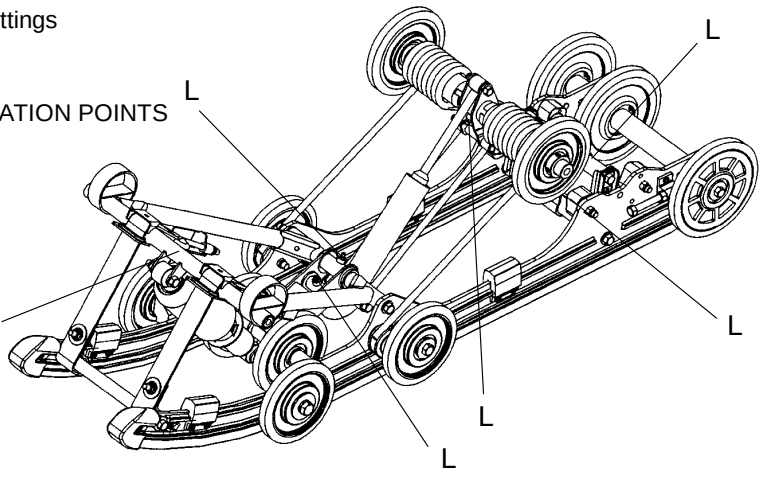
Grease all fittings



XTRA 10 Style

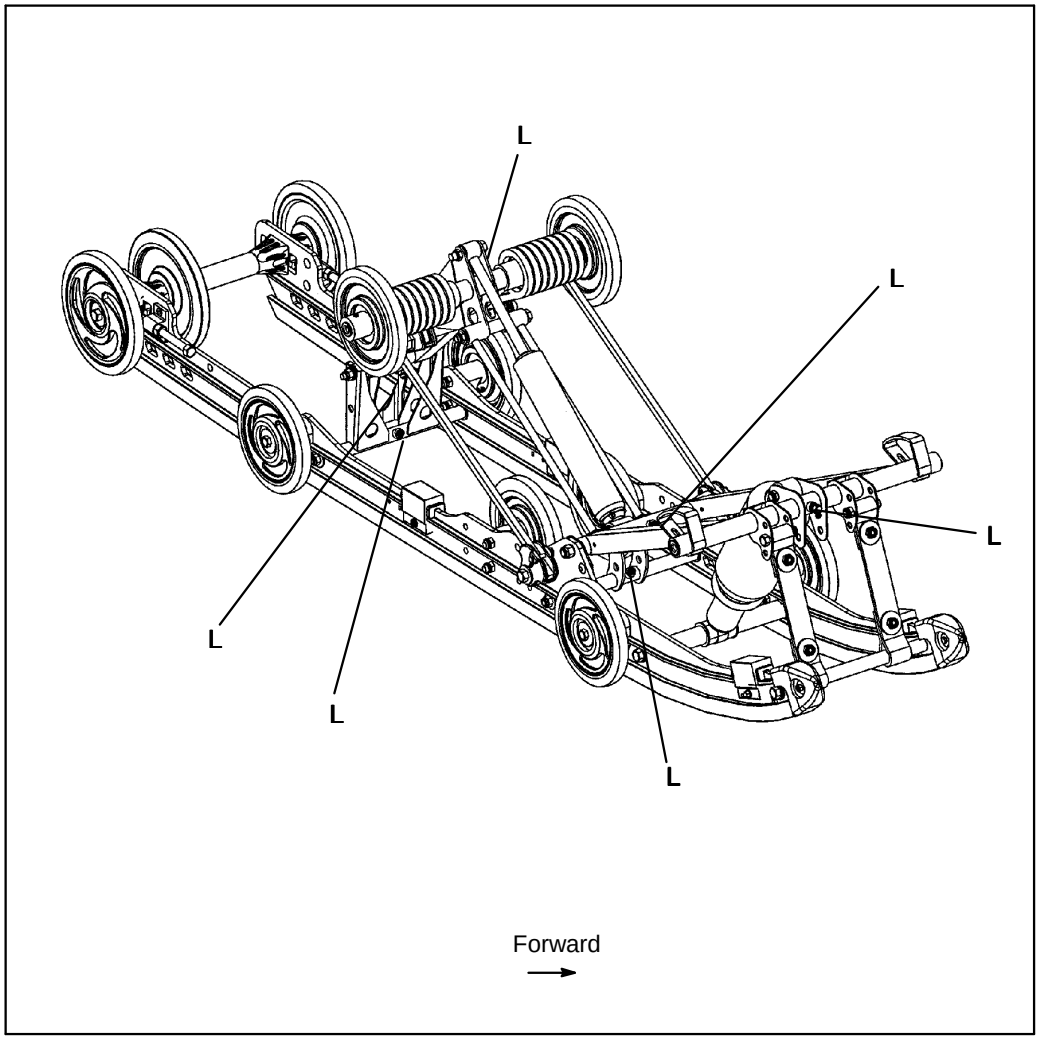
Grease at fittings

L LUBRICATION POINTS



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EDGE RMK Style



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⚠ WARNING

Never remove the pressure cap when the engine is warm or hot. If the pressure cap is to be removed, the engine must be cool. Severe personal injury could result from steam or hot liquid.

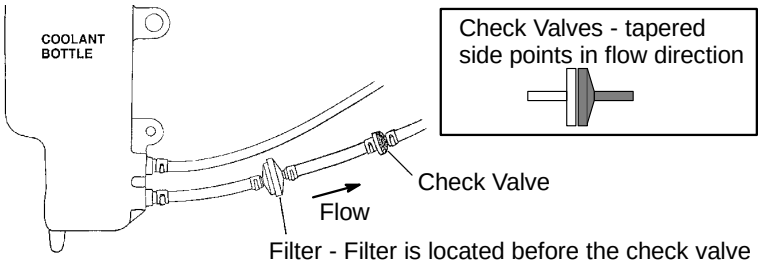
Use of a non-standard pressure cap will not allow the recovery system to function properly. If the cap should need replacement, install the correct Polaris cap with the same pressure rating. Refer to the appropriate parts manual.

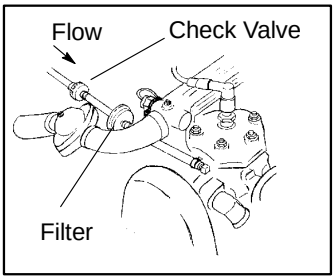
Coolant Level

Coolant level in the reservoir or surge tank must be maintained between the minimum and maximum levels to prevent overheating and serious engine damage.

Recommended Coolant

Use a 50/50 or 60/40 mixture of antifreeze and distilled water depending on the freeze protection required for your area. Do not use tap water in the system or reduced cooling or filter contamination may result. Replace coolant every 2 years or if contaminated. Inspect coolant filter annually for contamination and replace if necessary.

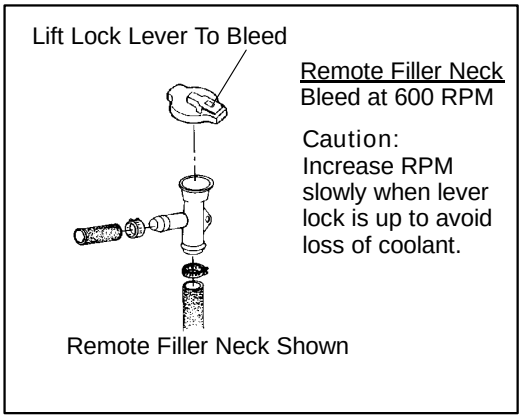




Bleeding the Cooling System - Pressure Caps

If the cooling system should become low in the tank and/or filler neck, the system should be bled of any trapped air using the following procedure:

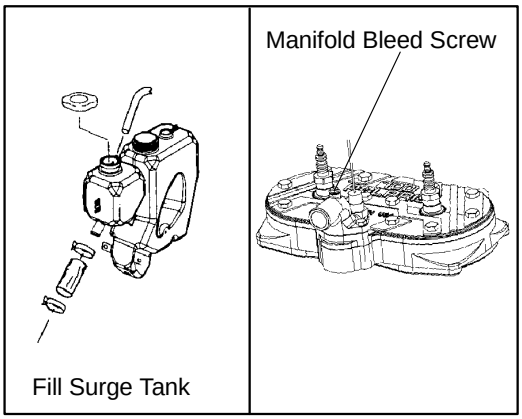
1. Allow the system to cool completely. Fill the reservoir with coolant to the maximum indicated mark.
2. With pressure cap removed, add coolant and fill to the top of the filler neck.
3. Install the pressure cap with the lever lock up in its release position and run the engine at low idle RPM (600±100) to allow all air to purge and prevent trapped air which can lead to overheating. Reset idle to specified RPM after bleeding.



Bleeding the Cooling System - Surge Tanks

If the cooling system should become low in the surge tank, the system must be bled of any trapped air using the following procedure:

1. Allow the system to cool completely. Fill the surge tank with coolant to the maximum indicated mark.
2. Start the engine and loosen the bleed screw on the top of the water pump until trapped air has been purged. Tighten the bleed screw.
3. Loosen the bleed screw at the end and top of the water outlet manifold until trapped air has been purged. Tighten the bleed screw.
4. Recheck the surge tank coolant level and add coolant again if necessary.



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⚠ WARNING

When performing the following checks and adjustments, stay clear of all moving parts to avoid serious personal injury.

Track Maintenance

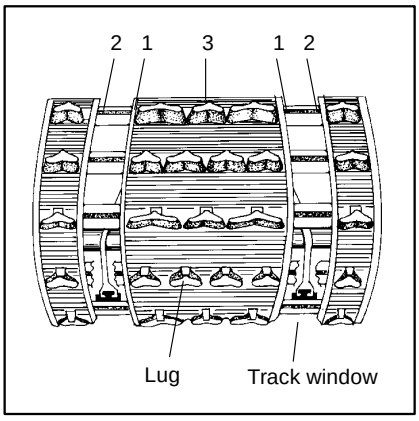
⚠ WARNING

Never make this maintenance check with the engine running as serious personal injury can result.

Using a hoist, safely lift and support the rear of the snowmobile off the ground. Rotate the track by hand to check for any possible damage.

To inspect track rods, carefully examine the track along the entire length of each rod, bending the track and inspecting for breakage. The three most common places where breakage occurs are shown in the illustration.

If any rod damage is found, the track should be replaced.



⚠ WARNING

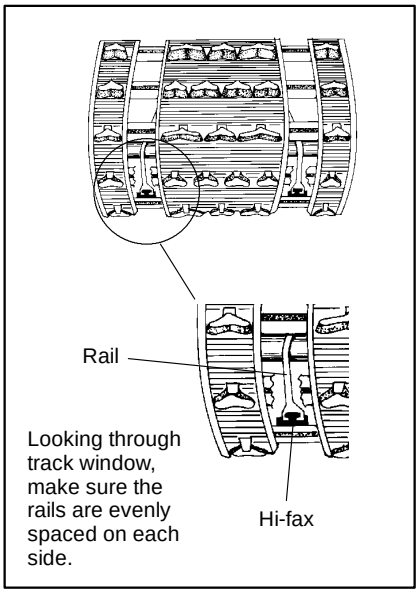
Broken track rods are a serious hazard, since they can cause a rotating track to come off the machine. Never operate or rotate a torn or damaged track under power. Serious personal injury or death may occur.

Track Alignment

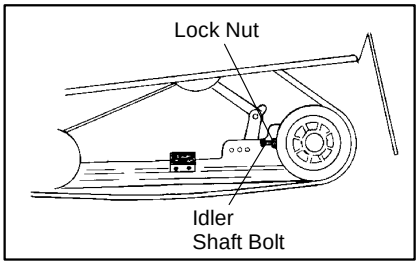
Track alignment affects track tension. Misalignment will cause excessive wear to the track, hifax, and slide rail.

A periodic check should be made to see that the track is centered and running evenly on the slide rails. NOTE: If excessive hi-fax wear occurs due to poor snow conditions, additional wheel kits are available.

1. Safely support the rear of the machine with the track off the ground.
2. Start the engine and apply a small amount of throttle until the track turns slowly at least five complete revolutions. Stop the engine.
3. Inspect track alignment by looking through the track window to make sure the rails are evenly spaced on each side. If the track runs to the left, loosen left locknut and tighten the left adjusting bolt. If the track runs to the right, loosen right locknut and tighten the right adjusting bolt.
4. After adjustments are complete, be sure to tighten locknuts and idler shaft bolts. Torque to specification.



Idler Shaft Bolt Torque -
35 - 40 ft. lbs. (48 - 55 Nm)



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Track Tension Data

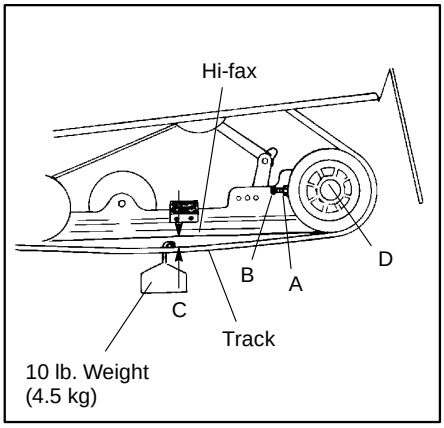
Suspension	Weight	Measurement Location	Measurement
XTRA 10 121″, 133″, 136″	10 lbs. (4.54 kg)	16″ ahead of rear idler shaft	3/8 - 1/2″ (1 - 1.3 cm)
XTRA Lite 136″	10 lbs (4.54 kg)	16″ ahead of rear idler shaft	3/8 - 1/2″ (1 - 1.3 cm)
EDGE RMK 136”	10 lbs (4.54 kg)	16″ ahead of rear idler shaft	3/8 - 1/2″ (1 - 1.3 cm)
EDGE RMK 144”/151”/156”	10 lbs (4.54 kg)	16″ ahead of rear idler shaft	3/8 - 1/2″ (1 - 1.3 cm)

⚠ WARNING

When performing the following checks and adjustments, stay clear of all moving parts to avoid serious personal injury.

Track Tension - XTRA Lite / Xtra 10 / EDGE RMK

1. Turn the machine off.
2. Lift the rear of the machine and safely support it off the ground.
3. Place a 10 lb. (4.5 kg) weight on the track at a point approximately 16″ (40.6 cm) ahead of the center of the rear idler wheel.
4. Check for proper slack between the track clip wear surface and the hi-fax (C). NOTE: Measure at the point where the weight is hanging.



If the track needs adjustment:

5. Loosen rear idler shaft bolts (D) on both sides of the machine.
6. Loosen track adjusting bolt locknuts (A).
7. Tighten or loosen the track adjusting bolts (B) evenly as necessary to obtain proper track tension.
8. Tighten idler shaft bolts and adjuster bolt locknuts.

NOTE: Track alignment affects track tension. Misalignment will cause excessive wear to the track and slide rail. Excessive Hi Fax wear will appear on units with track tension set too tight.

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Spark Plug Selection

Original equipment parts or their equivalent should always be used. However, the heat range of spark plugs is of utmost importance. A spark plug with a heat range which is too high will cause engine damage. A spark plug with a heat range which is too low will cause excessive fouling.

In selecting a spark plug heat range for production, a manufacturer is forced to assume that the engine is going to be operated under extreme heavy duty conditions. This protects the engine from internal damage in the event that the purchaser actually does operate the engine in this manner. This selection however, could cause the customer who normally operates the engine under medium or light duty to experience spark plug failure.

CAUTION:

A plug with a heat range which is too high may cause engine damage if the engine is operated in conditions more severe than that for which the spark plug was intended.

A new engine can cause temporary spark plug fouling even though the heat range is correct, due to the preservative which has been added during assembly of the engine to combat rust and corrosion. Avoid prolonged idle speeds, as plug fouling and carbonization will result. Always use resistor type spark plugs.

NOTE: Incorrect fuel mixture can often cause a spark plug to appear to be too dark or too light in color. Before changing spark plug heat ranges, be sure the correct jetting is installed in the carburetors and proper carburetor function is verified.

The spark plug and its condition is indicative of engine operation. The spark plug firing end condition should be read after the engine is warmed up and the vehicle is driven at higher speeds. Immediately check the spark plug for correct color.

Normal

The insulator tip is gray, tan, or light brown. There will be a few combustion deposits. The electrodes are not burned or eroded. This indicates the proper type and heat range for the engine and the service.

NOTE: The tip should not be white. A white insulator tip indicates overheating, caused by use of an improper spark plug or incorrect carburetion adjustments.

Wet Fouled

The insulator tip is black. A damp oily film covers the firing end. There may be a carbon layer over the entire nose. Generally, the electrodes are not worn. General causes are excessive oil, use of non-recommended injection oil, excessive idling, idle too low or too rich, or weak ignition output.

1. Inspect electrodes for wear and carbon buildup. Look for a sharp outer edge with no rounding or erosion of the electrodes.
2. Clean with electrical contact cleaner or a glass bead spark plug cleaner only.

CAUTION:

A wire brush or coated abrasive should not be used.

3. Measure gap with a wire gauge and adjust to specifications by bending ground electrode carefully.
4. Coat spark plug threads with a small amount of anti-seize compound.
5. Install spark plug and torque to specification.

Spark Plug Torque:
12-14 Ft. Lbs (16.6-19.3 Nm)

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Drive Belt

⚠ WARNING

Inspect the condition of the drive belt. Inspect clutch sheaves for damage, wear, or belt residue. Clean with non-oil base cleaner such as isopropyl alcohol.

To ensure belt life, install belts so they operate in the same direction of rotation. Position the identification numbers so that you can read them standing on left side of machine. This will keep the belt rotating in the same direction. If belt has been operated with numbers readable from right side of machine, re-install belt in this direction.

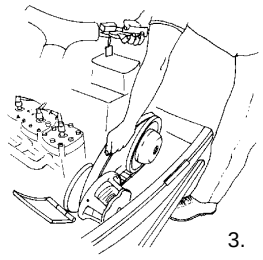
Belt Removal

1. Be sure key switch is off and engine has come to a complete stop. Remove the retaining knob or pin and open the clutch guard.
2. Apply brake (or lock parking brake if so equipped).
3. Grasp belt firmly midway between clutches and pull upward and rearward to open the driven clutch sheaves. Remove the belt from the driven clutch and then from the drive clutch.

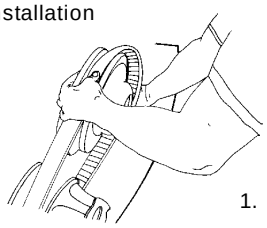
Belt Installation

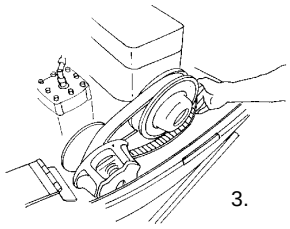
1. Drop the drive belt over the drive clutch and pull back the slack.
2. Turn the driven clutch moveable sheave clockwise while at the same time pushing inward and forcing the belt down between the sheaves.
3. Hold the belt down between the sheaves and roll the bottom portion over the outer clutch sheave. Once installed, be sure to work the belt to the outer edge of the sheave. Be sure to release parking brake if applied.
4. Close the clutch guard and reinstall the retaining knob or pin.

Removal



Installation

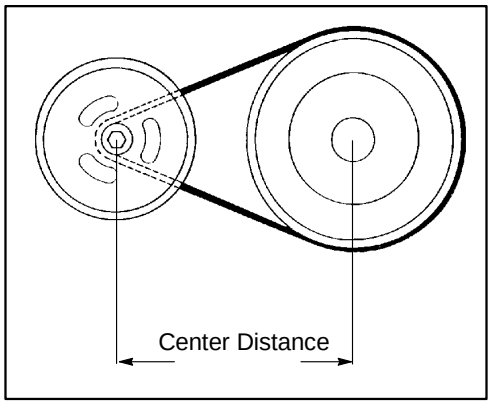




Belt Inspection

5. Refer to PVT Section for belt inspection and width measurement.
6. Measure belt length with a tape measure around the outer circumference of the belt. Belts which measure shorter or longer than a nominal length may require driven clutch or engine adjustment to obtain proper belt deflection.
7. Replace belt if worn past the service limit. Belts with thin spots, burn marks, etc., should be replaced to eliminate noise, vibration, or erratic operation. See Troubleshooting Chart at the back of this chapter for possible causes. NOTE: If a new belt is installed, check belt deflection. Install so part numbers are easily read from left side of machine.

Refer to the specification charts for belt specifications and measurement procedures.

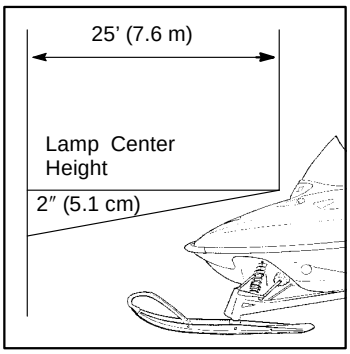


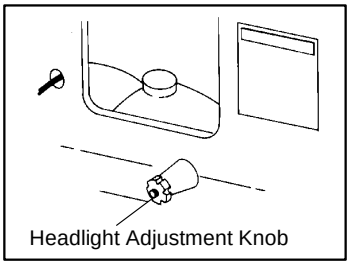
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Headlight Adjustment

The headlight can be adjusted for vertical aim using the following procedure:

1. Place the snowmobile on a level surface with the headlight approximately 25' (7.6 m) from a wall.
2. Measure the distance from the floor to the center of the headlight and make a mark on the wall.
3. Start the engine and turn the headlight switch to high beam.
4. Observe the headlight aim. The most intense part of the headlight beam should be aimed 2″ (5.1 cm) below the mark placed on the wall in Step 2. NOTE: Rider weight must be included on the seat.
5. If necessary, the headlight aim can be adjusted by turning the adjustment knob located inside the hood just below the headlamp opening. Turn knob in or out as needed for proper aim.

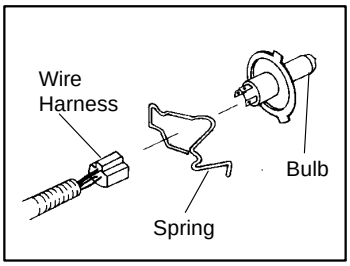




Removing Halogen Bulbs - Low Beam

NOTE: Do not touch a halogen bulb with bare fingers. Oil from skin leaves a residue, causing a hot spot which will shortend the life of the lamp.

1. PInch ends of spring together and lift until it releases from spring retainer.
2. Lift spring carefully around wire harness and flip to outside of housing.
3. With wire harness attached to bulb, withdraw bulb from housing.
4. Grasp bulb by metal base and carefully separate bulb from harness.

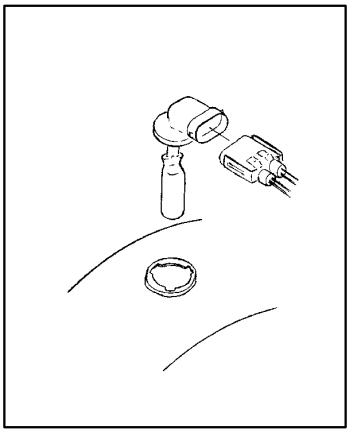


Installing Low Beam Bulb

1. Hold bulb by metal base only and install into wire harness.
2. Insert bulb into housing.
3. Carefully flip spring back into housing placing it around wire harness.
4. Squeeze spring together until it is over spring retainer and release.
5. Verify headlight aim.

Removing and Installing Halogen Bulbs - High Beam

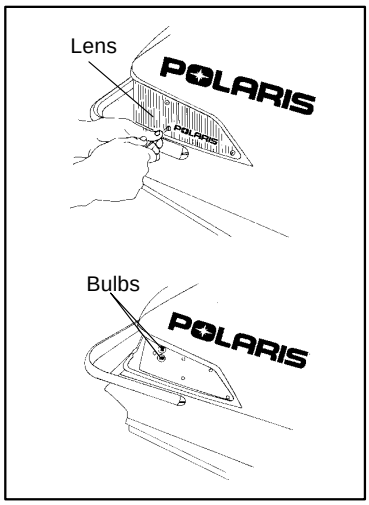
1. Remove wire harness.
2. Grasp bulb firmly and twist it 1/2 turn counterclockwise.
3. Remove bulb from housing and replace with new bulb.
4. Place bulb and housing back inside hole and turn housing 1/2 turn clockwise to lock into place.
5. Reinstall wire harness to housing.



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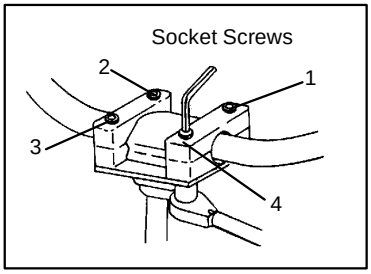
Taillight Bulb Replacement

1. Remove (5) Phillips screws from taillight lens.
2. Working from front to back, carefully pry lens away from housind and remove.
3. Pull bulb straight out from socket and insert new bulb.
4. Reinstall lens.



Handlebar Adjustment

1. Remove handlebar cover.
2. Using a 7/16″ (11 mm) wrench, loosen four nuts on bottom of adjuster block. NOTE: Turn handlebar to left or right for access to back nuts.
3. Adjust handlebar to the desired height. Be sure that handlebars, brake lever and throttle lever operate smoothly and do not hit the gas tank, windshield or any other part of the machine when turned fully to the left or right.
4. Torque the handlebar adjuster block bolts to specification. Maintain an equal gap at front and rear of block.
5. Replace handlebar cover.



Handlebar Adjuster Block Bolt Torque -

11 - 13 ft. lbs. (15 - 18 Nm)

⚠ WARNING

Improper adjustment of the handlebars, or incorrect torquing of the adjuster block tightening bolts can cause limited steering or loosening of the handlebars, resulting in loss of control.

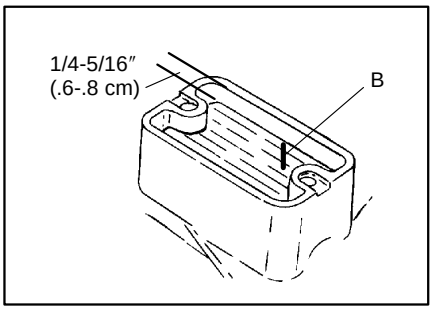
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Replenishing Brake Fluid

Remove brake fluid master cylinder reservoir cover. Add Polaris brake fluid as required to bring the level up to the top of the fluid level mark on the inside of the reservoir (B). The proper fluid level is 1/4-5/16″ (.6-.8 cm) below the lip of the reservoir opening.

NOTE: On some models, the brake fluid level can be seen through the plastic reservoir. The fluid should be maintained between the minimum and maximum marks on the reservoir for those models.

Inspect the reservoir to be sure it contains the correct amount of fluid. Use only Polaris DOT 3 high temperature brake fluid. Change fluid every 2 years or whenever the fluid is dark or contamination is suspected.



Master Cylinder Fluid Level
1/4 - 5/16″ (.6 - .8 cm) below lip of reservoir opening

Polaris DOT 3 High Temp Brake Fluid
PN 2870990

⚠ WARNING

Do not over fill the master cylinder. Fluid expansion could cause brakes to lock, resulting in serious injury or death. Once a bottle of brake fluid is opened, use what is necessary and discard the rest. Do not store or use a partial bottle of brake fluid. Brake fluid is hygroscopic, meaning it rapidly absorbs moisture from the air. This causes the boiling temperature of the brake fluid to drop, leading to early brake fade and the possibility of serious injury.

Bleeding the Hydraulic Brake System

Air in the hydraulic brake system will cause a springy or spongy brake lever action. Bleeding is necessary to remove air from the system.

1. Remove brake fluid master cylinder reservoir cover and gasket.

CAUTION: Brake fluid is a hazardous material. Contact with decals, paint, and many plastics will cause damage. Use proper precautions when handling brake fluid.

2. Fill the master cylinder reservoir and replace gasket and cover. Keep the fluid level 1/4-5/16″ (.6-.8 cm) below lip of reservoir opening.
3. Slip a rubber tube over the ball of the bleeder valve and direct the flow of fluid into a container.

⚠ WARNING

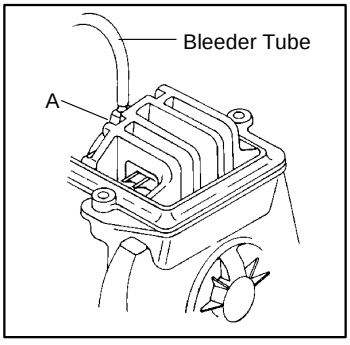
Never re-use brake fluid. Brake fluid is hygroscopic, meaning it rapidly absorbs moisture from the air. This causes the boiling temperature of the brake fluid to drop, leading to early brake fade and the possibility of serious injury.

4. Squeeze brake lever a full stroke. Then unscrew bleeder valve (A) 3/4 of a turn to release air.
5. Close bleeder valve first and then release brake lever.

Repeat steps 4 and 5 until fluid flows from bleeder valve in a solid stream free of air bubbles. Do not allow reservoir to run dry or air will be drawn into system.

6. Re-fill reservoir to proper level after bleeding operation. Do not overfill the master cylinder.
7. Replace gasket and cover.

During the bleeding procedure make sure to keep the reservoir as level as possible to minimize the possibility of air entering the system.

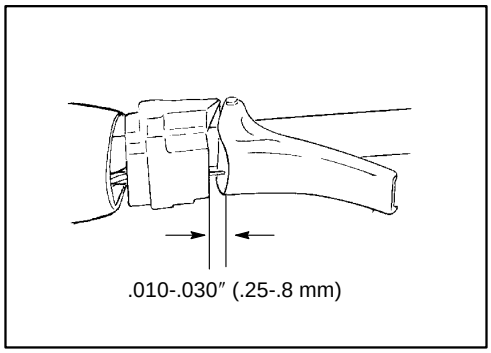


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Throttle Lever Free Play

Throttle lever free play must always provide a specified clearance between throttle lever and throttle block. This clearance is controlled by the throttle cable sleeve(s) and the idle speed screw(s).

Throttle Lever Freeplay -
.010 - .030″ (.25 - .8 mm)



If the idle speed screw(s) is adjusted inward and the cable sleeve(s) is not adjusted to take up the throttle lever to throttle block clearance, the engine may misfire or kill upon initial throttle opening.

CAUTION:

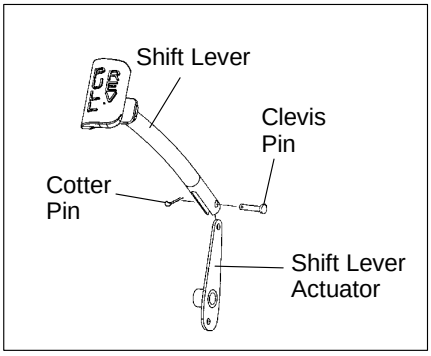
After any idle speed adjustments are made, the throttle lever to throttle block clearance and oil pump adjustment must be checked and adjusted.

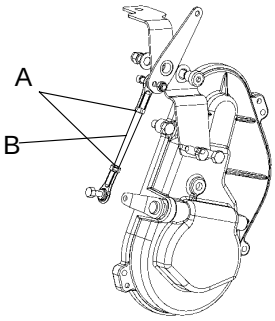
NOTE: When adjustments are made on models which have more than one carburetor, refer to Section 6, Carburetion, for proper carburetor synchronization adjustments.

Reverse Adjustment

Due to break-in or replacement of components, the reverse shift mechanism may require adjustment.

1. Loosen jam nuts on linkage rod (A).
2. Turn the threaded linkage rod (B) to lengthen or shorten the throw until reverse engages fully.
3. Tighten jam nuts and re-check adjustment.





Chaincase Cover Assembly

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Cleaning And Preservation Of Hood, Chassis And Trim

Proper storage starts by cleaning, washing and waxing the hood, chassis, upholstery and plastic parts. Clean and touch up with paint any rusted or bare metal surfaces. Ensure that all corrosive salt and acids are removed from surfaces before beginning preservation with waxes and rust inhibitors (grease, oil, or paint).

If the machine is equipped with a battery, disconnect the battery cables and clean the cables and battery posts. Fill battery to proper level with distilled water and charge to full capacity. Remove and store the battery in a cool dry place.

The machine should be stored in a dry garage or shed out of the sunlight and covered with a fabric snowmobile cover. Do not use plastic to cover the machine; moisture will be trapped inside causing rust and corrosion problems.

Controls And Linkage

All bushings, spindle shafts and tie rod ends should be coated with a light coat of oil or grease. Throttle controls and cables should be lubricated. Force a small amount of lubricant down cables.

Electrical Connections

Separate electrical connector blocks and clean corrosive build-up from connectors. Lubricate or pack connector blocks with Nyogel t grease and reconnect. Replace worn or frayed electrical wire and connectors.

Nyogel t Grease PN 2871329

Clutch And Drive System

Remove drive belt and store in a cool dry location. Lubricate sheave faces and ramps of drive and driven clutches with light oil or rust inhibitor. All lubrication applied as a rust preventative measure must be cleaned off before installing belt for service and operating machine.

Chaincase Lubricant

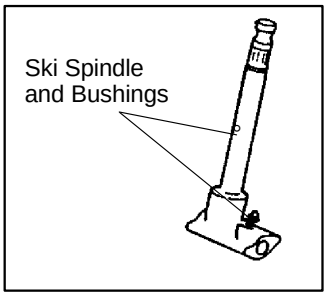
Change chaincase lubricant as outlined in this section. Remove the outer cover and clean the chaincase thoroughly.

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Lubrication

Refer to page 2.5-2.10 for complete lubrication information.

To prevent corrosion, always grease jackshaft and drive shaft (clutch side) bearings with premium all season grease. Loosen driven clutch retaining bolt and pull clutch outward to expose bearing. Use a point type grease gun fitting to inject grease through hole in flangette into bearing until grease purges out inside or outside bearing seal. Push clutch back on shaft and replace clutch retaining bolt. Inject grease into fitting on speedometer drive adaptor until grease purges out inside or outside bearing seal. Lubricate both front ski pivots at bushings and spindles. See Ill.1 and 2.



Ill. 1

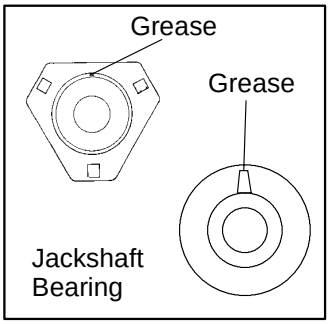
Polaris Premium All Season Grease PN 2871423 14 oz.

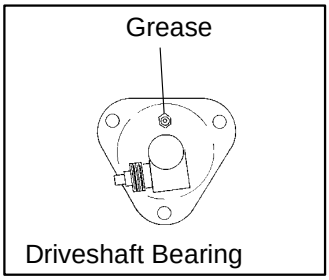
Grease Gun Adapter: 2871174 Point Type

Use T-9 Metal Protectant (or equivalent) on shock absorber shafts to help prevent corrosion.

T-9 Metal Protectant PN 2871064

Under normal conditions moderate track tension should be maintained during summer storage. Rubber track tension should be maintained at the prescribed normal operating tension specified in this manual. The rear of the machine should be supported off the ground to allow free hanging of track.





Ill. 2

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Engine and Carburetor

Fog engine with Polaris Fogging Oil (aerosol type) according to directions on can. On models with carburetor vacuum fittings the fogging oil can be sprayed through the fitting.



Polaris Fogging Oil PN 2870791

Carbon Clean PN 2871326

Treat the fuel system with Polaris Carbon Clean.

If Polaris Carbon Clean is not used, fuel tank, fuel lines, and carburetor should be completely drained of gasoline.

Battery

Disconnect and remove battery. Fill with distilled water. Clean terminals and cables. Apply dielectric grease. Charge until specific gravity is at least 1.270 (each cell). If machine is to be stored for one month or longer, fill and charge battery monthly using Polaris Battery Tender, or a 1 amp trickle charger to maintain at 1.270 specific gravity.

Polaris Battery Tender

PN 2871076

Exhaust System

At approximately 2000 miles, or in preparation of off season storage, it is a good idea to check the exhaust system for wear or damage. To inspect, allow the engine and exhaust system to cool completely. Open the hood and inspect the muffler and pipes for cracks or damage. Check for weak or missing retaining springs or damper/support grommets.

⚠ WARNING

Exhaust system temperatures can exceed 900° F (500° C). Serious burns may occur if this inspection is performed without allowing adequate time for the exhaust system to cool. Never perform this procedure with the engine running.

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Notes

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CHAPTER 3
ENGINES

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Engine Torque Specifications

When tightening bolts, nuts, or screws, a torque pattern should be followed to ensure uniform equal tension is applied to all fasteners. Proper torque application prevents fasteners from loosening or breaking in critical service. It also minimizes wear and eliminates premature or needless repair costs. Following uniform torque application sequence patterns ensures optimum performance from precision machined, close tolerance assemblies.

The most common units of torque in the English system are ft. lb. and in. lb. In the Metric system, torque is commonly expressed in units of kg-m or Nm (Newton Meters). Multiply foot pounds by .1383 to obtain kg-m. Move decimal point one place to the right to obtain Nm from kg-m.

Engine	Cylinder Head	Cylinder Base Nuts	Crankcase 8 mm	Crankcase 10 mm	Flywheel
550 Fan Cooled Twin Cylinder EC55	18-19.5 ft.lbs. (25-27 Nm)	24-28 ft.lbs. (33-39 Nm)	16.6-18 ft.lbs. (22-25 Nm)	N/A	60-65 ft.lbs. (83-90 Nm)
SN50**	20-24 ft.lbs. (29 - 33 Nm)	30-34 ft.lbs (41-47 Nm)	20-24 ft.lbs. (28 - 33 Nm)	N/A	90 ft. lbs. (124 Nm)
SN60-70** SN70** SN80**	18-22 ft. lbs. (25 - 30 Nm)	30-34 ft.lbs (42-47 Nm)	20-24 ft.lbs. (28 - 33 Nm)	26-30 Ft lbs (36-41 Nm)	90 ft. lbs. (124 Nm)

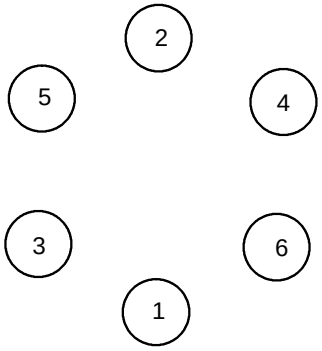
** Torque head bolts prior to torquing cylinder base nuts.. Apply Loctite t 242.

All 6mm Crankcase Bolts . . . . . 108 in. lbs. (12.4 Nm)

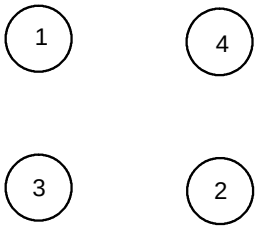
All 7/16-14 Engine Mount Strap Bolts . . . . . 44-48 ft. lbs. (60-66.3 Nm)

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Torque Sequences - EC55 Engines



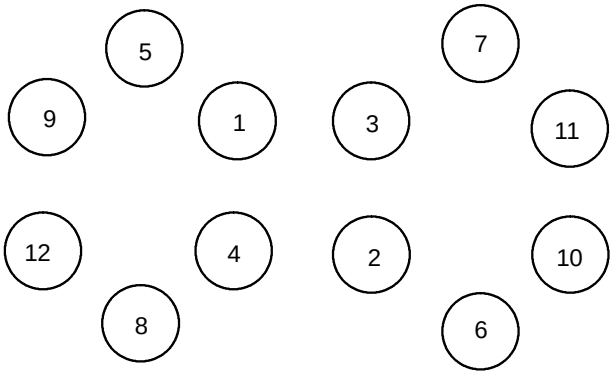
CYLINDER HEAD



PTO SIDE

MAG SIDE

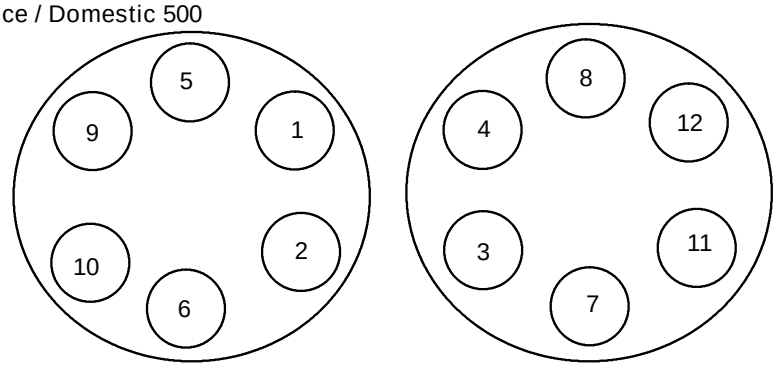
CYLINDER BASE



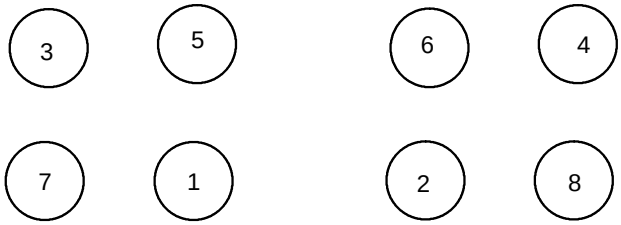
CRANKCASE - TWIN CYLINDER - Fuji

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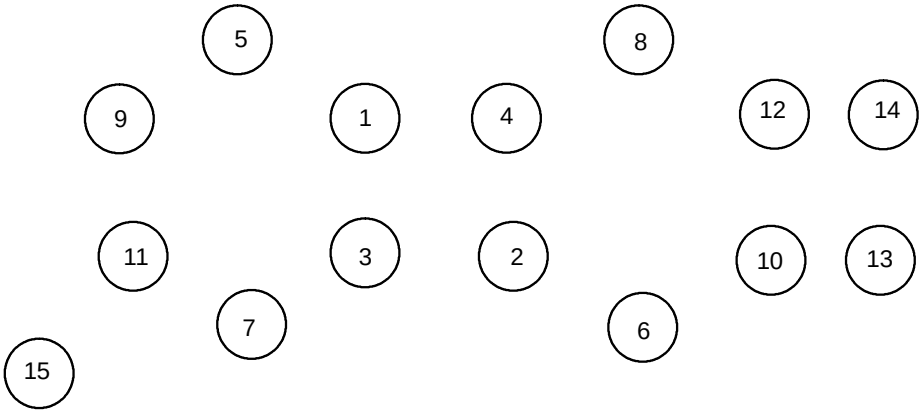
Torque Sequence / Domestic 500



CYLINDER HEAD
Domestic 500



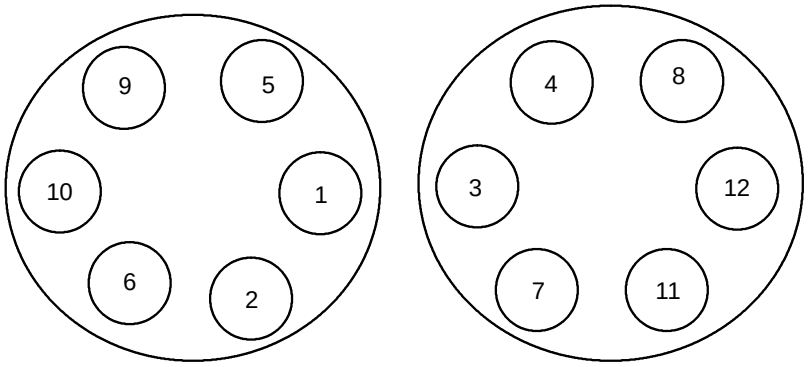
CYLINDER BASE
Domestic 500



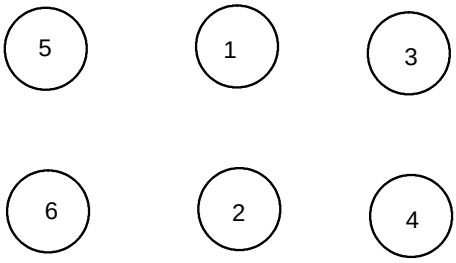
CRANKCASE
Domestic 500

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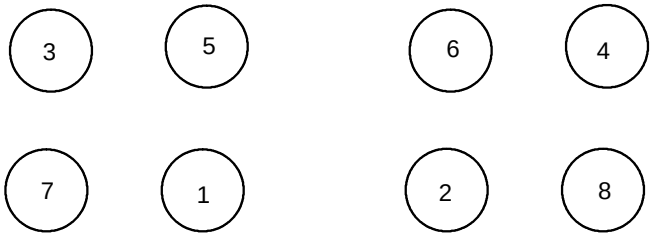
Torque Sequence / Domestic 600 / 700 / 800



CYLINDER HEAD
Domestic Twins 600 / 700 / 800



CRANKCASE
Domestic Twins 600 / 700 / 800



CYLINDER BASE
Domestic Twins 600 / 700 / 800

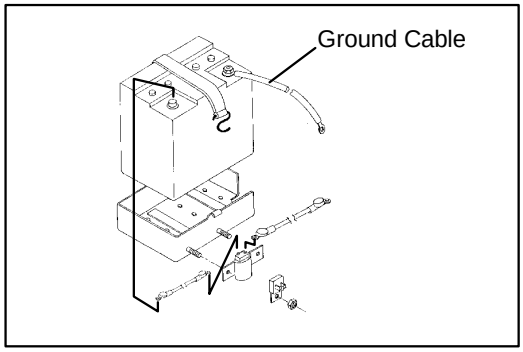
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Engine Removal, Typical

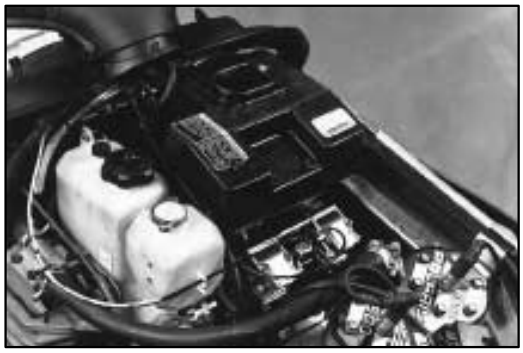
1. On some models, it may be necessary to remove the hood for easier access to engine components or to prevent damage.



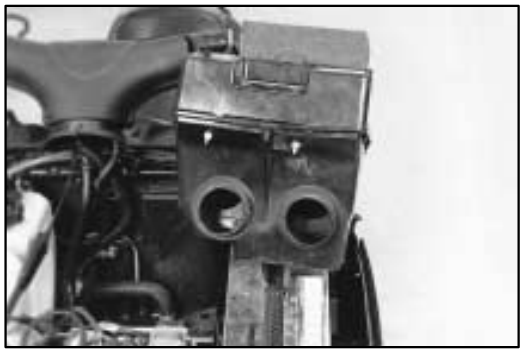
2. Disconnect battery ground (-) from battery (if applicable). Shut off fuel.



3. Remove fuel pump or CDI from airbox if applicable.



4. Remove airbox.



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Engine Removal, Typical-Cont.

5. Free recoil rope from chassis.

NOTE:Be sure to tie a knot in recoil rope upon removal so rope doesn't wind up into recoil housing.



6. Loosen clamps at carburetor mounting flange. Pull carbs from adaptors and secure out of the way. Note routing of all cables and hoses for reassembly.



7. Disconnect oil pump control cable.



8. Disconnect and plug oil supply line.

TIP: A bolt or spare water trap plug can be used to plug the oil line from the oil reservoir.



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Engine Removal, Typical-Cont.

9. Remove drive belt.

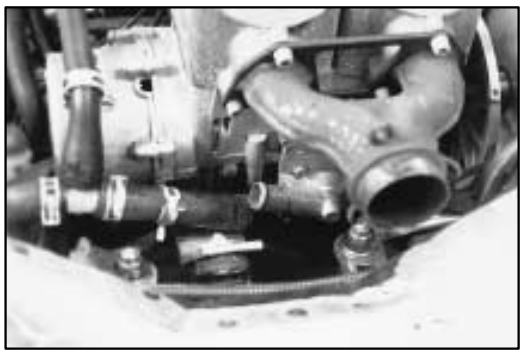
NOTE:If drive clutch removal is necessary, it may be done at this time. Refer to Chapter 5, clutches.



10. Remove exhaust system.



11. Disconnect coolant supply hoses as necessary at the most convenient location on liquid cooled models. Drain coolant into suitable container.



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Engine Removal, Typical-Cont.

12. Disconnect electrical connections from stator and starter motor (where applicable).



13. Remove two front and two rear engine mount bolts (nuts) that secure engine mount plate (straps) to chassis.



14. Remove engine from chassis.

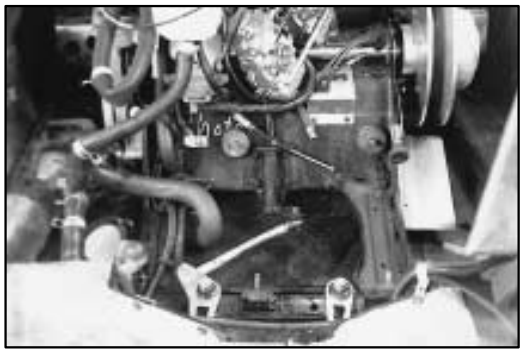


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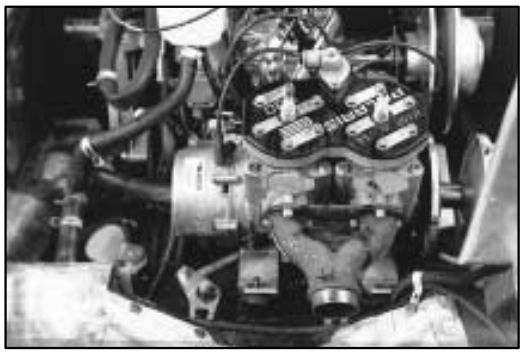
Engine Installation, Typical

1. Prepare chassis for engine installation by moving hoses and wiring out of the way.
2. If model is equipped with a torque stop, loosen locking screw and turn torque stop in to gain clearance when installing engine.

NOTE: Torque stop must be adjusted properly after clutch alignment (see chapter 5, clutches)



3. Check condition of bonded rubber engine mounts. Be sure mounts are tight before installing engine. With engine mounting plate or mount straps installed on engine, set engine on rubber mounts and loosely install mounting bolts and nuts.



4. Install drive belt (and clutch if removed) and check clutch offset/alignment. Adjust torque stop (where applicable). Refer to chapter 5, clutches, for torque stop adjustment procedure.



5. Tighten engine mounting bolts to specification.

Engine Mounting Bolt Torque-
Front - 28 Ft lbs (67 Nm) Rear - 28 Ft lbs (67 Nm)

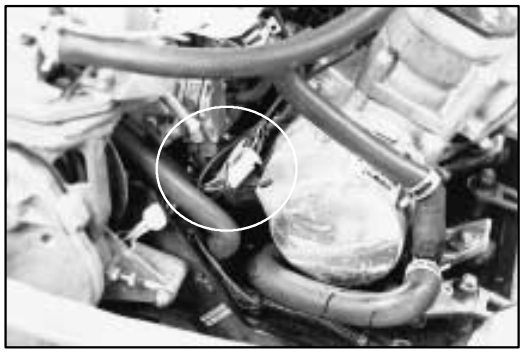


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Engine Installation, Typical-Cont.

6. Apply a light film of Polaris dielectric grease to all connections. Connect all stator connections and temperature switch.

Nyogel t grease- PN 2871329 - 1/4 oz.



7. Connect oil supply line to oil pump. Bleed oil pump by opening bleed screw until oil flows steadily. Tighten bleed screw securely. Install throttle cable to oil pump and check adjustment. Refer to General Inspection Procedures in this chapter for oil pump adjustment procedure.



8. Install carburetors and tighten clamps. Make sure hoses and cables are routed correctly.



9. Connect oil lines to carburetors

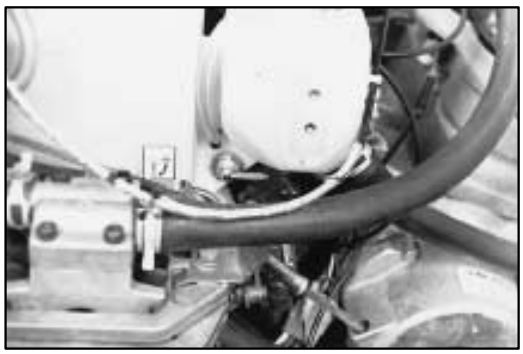
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Engine Installation, Typical-Cont.

10. Install coolant hoses where applicable. Make sure hoses are routed properly and hose clamps are positioned and tightened securely.

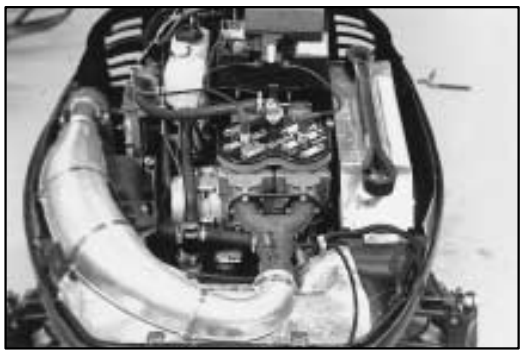


11. Route and install recoil rope to chassis.



12. Install starter and starter cables (electric start models).

13. Install exhaust system in reverse order of disassembly.



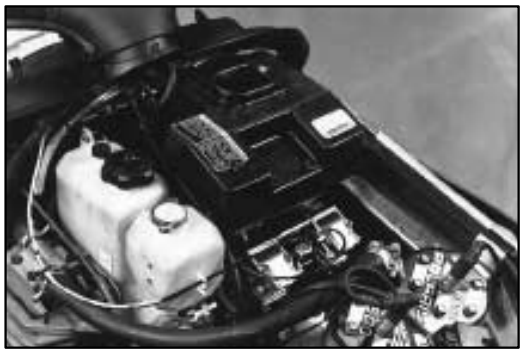
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Engine Installation, Typical-Cont.

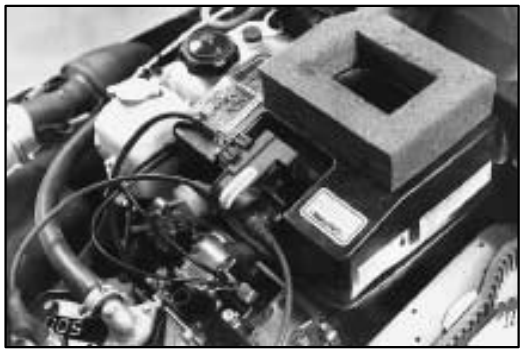
14. Install hood if previously removed.



15. Install airbox.



16. Secure fuel pump and CDI box.



17. Fill cooling system (liquid models) with Polaris Premium Antifreeze 60/40 premix.

Polaris Premium Antifreeze 60/40 premix Quart PN 2871534 Gallon PN 2871323



18. Add a full tank of premix fuel (50:1) to fuel tank.
19. Start engine and check operation. Bleed cooling system on liquid models. See Cooling System Bleeding Procedures in this chapter.

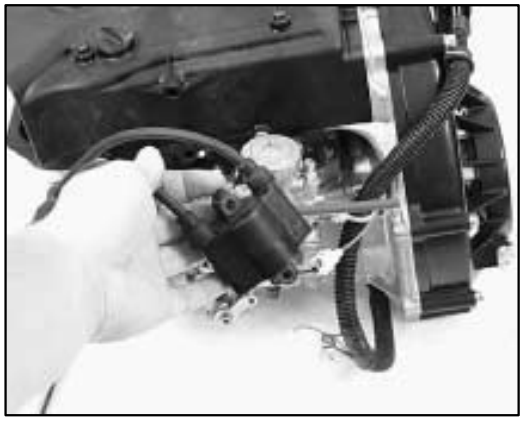
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Engine Disassembly / Assembly - Fuji 550 Fan Cooled Engines

NOTE: Inspect all parts for wear or damage during disassembly. Replace all seals, O-rings, and gaskets with Genuine Polaris parts during assembly. Refer to pages 3.47-3.56 for general inspection procedures.

Disassembly

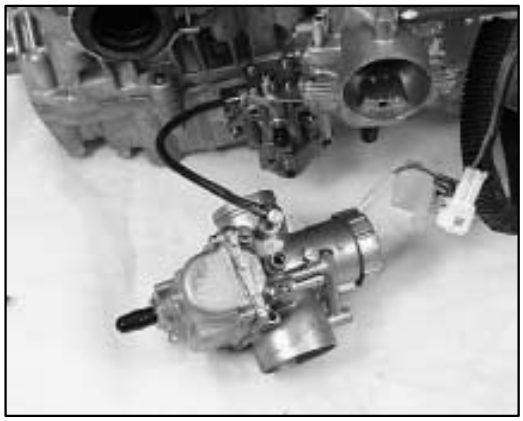
1. Remove coil pack from fan shroud, and disconnect it from the wiring harness.



2. Loosen carburetor clamps and remove each carburetor.



3. Using a pliers, detach the oil lines from the carburetors.



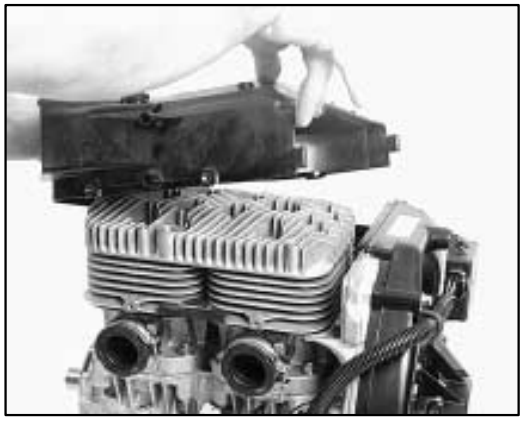
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Disassembly - Continued

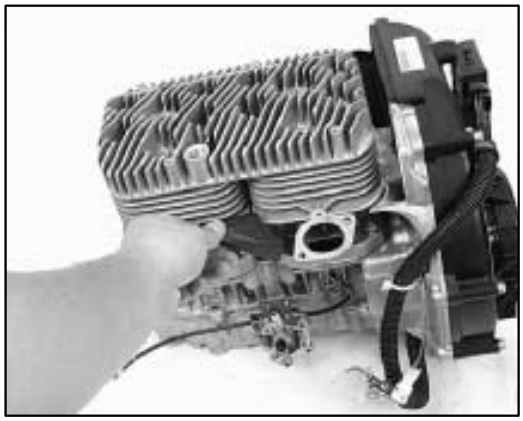
4. Remove the carburetor mounting boots using a allen wrench.



5. Remove both the cylinder head and exhaust side fan shroud s from the engine assembly.



6. After removing the fan shrouds, take note of the vibration dampener located between the two intake ports.



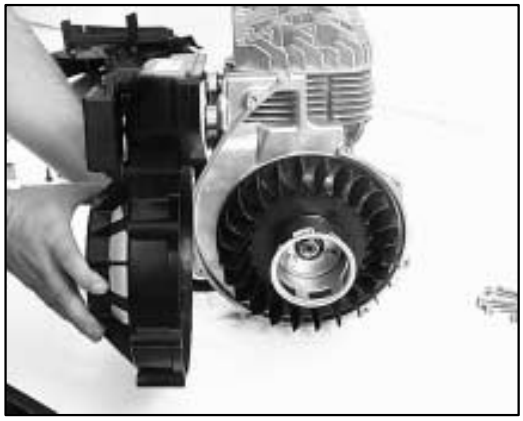
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Disassembly - Continued

7. Remove the CDI module from the flywheel cover.



8. Remove the flywheel cover.



9. Prior to removing the flywheel, insert a piece of nylon rope or cord into a spark plug hole. Rotate the crankshaft counter-clockwise until it will no longer turn over.



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Disassembly - Continued

10. Remove the recoil cam.



11. Loosen and remove the flywheel nut.



12. Using a flywheel puller, remove the flywheel from the engine. Do not install puller bolts more than 5/16″ (7mm) into flywheel threads or stator damage may result.

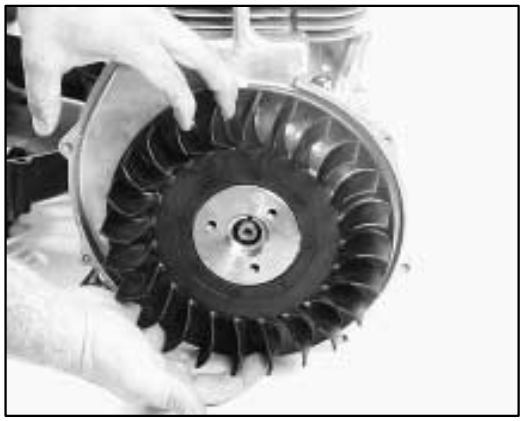
Flywheel Puller PN 2871043



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Disassembly - Continued

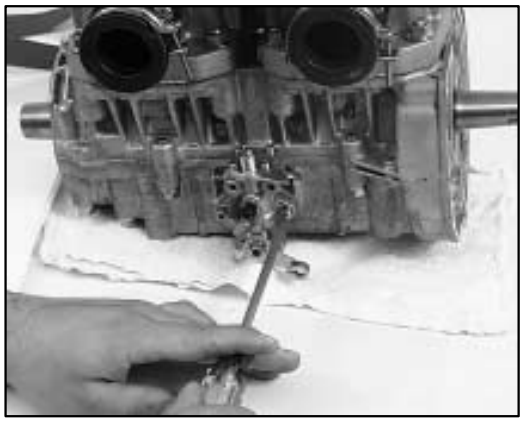
13. Remove the flywheel.



14. The stator plate can be removed without taking off the stator.



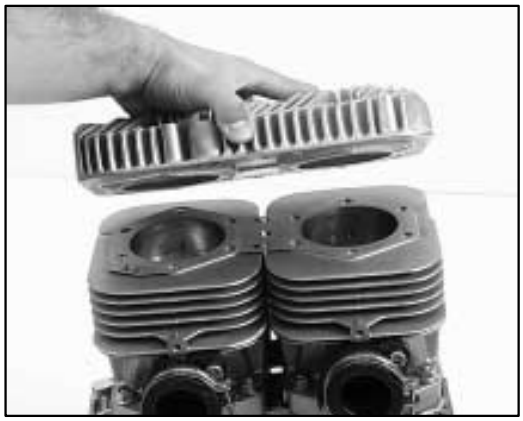
15. Remove the oil pump taking note of the o-ring and shim(s).



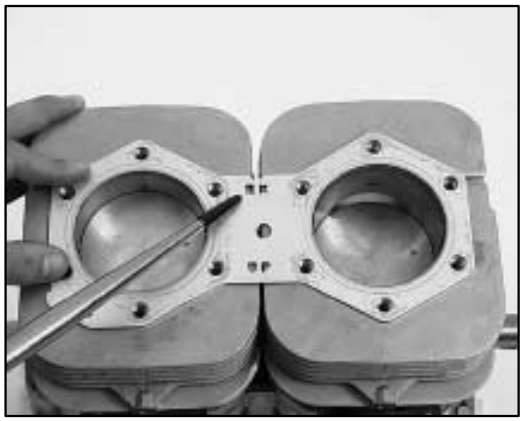
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Disassembly - Continued

16. Remove the cylinder head.



17. Remove the head gasket. During removal, note that the head gasket is stamped with “EX” and “UP”.



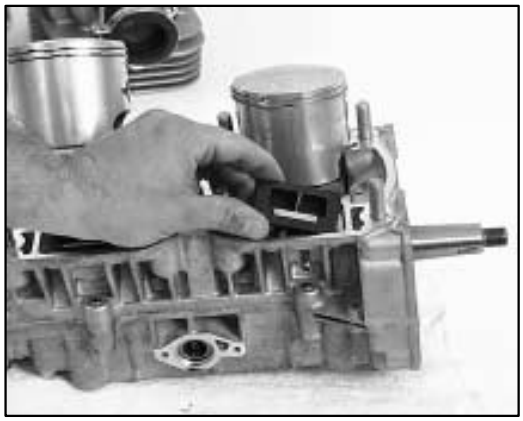
18. Loosen and remove each cylinder.



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Disassembly - Continued

19. Remove the reed valves from the crankcase.

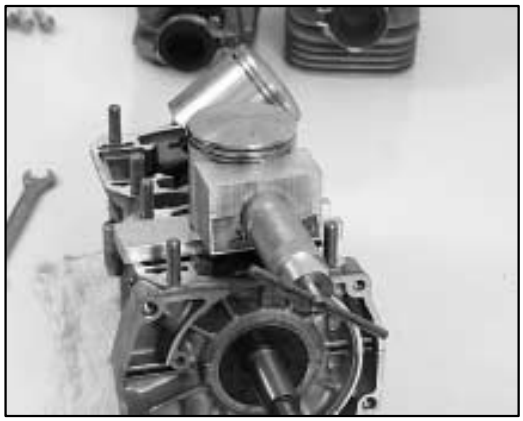


20. Using an awl and piston pin puller, remove the pistons.

CAUTION:

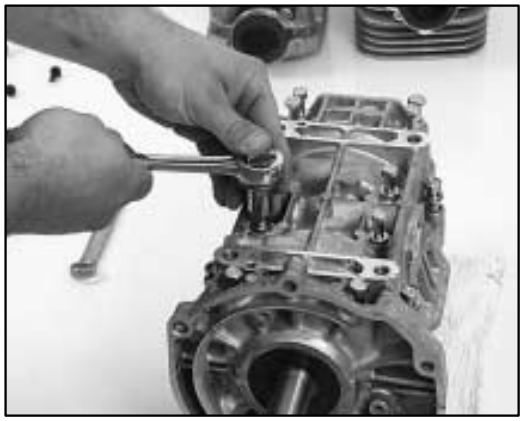
Wear eye protection during piston c-clip removal to prevent eye injury.

Piston Pin Puller PN 2870386



21. Turn crankcase over and remove the crankcase bolts. Turn over and separate the case halves.

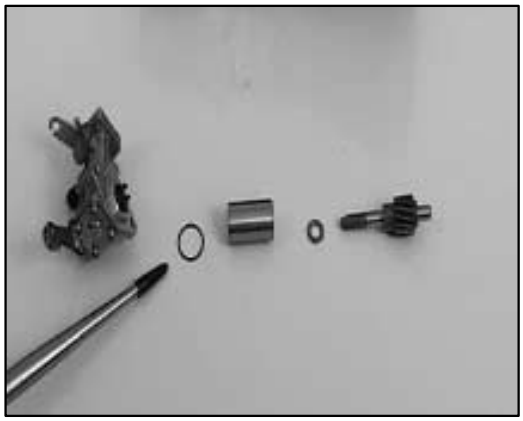
22. Refer to General Inspection section for crankshaft inspection and measurement procedures.



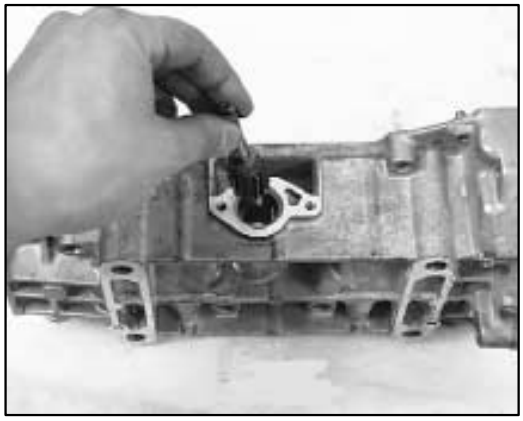
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Engine Assembly

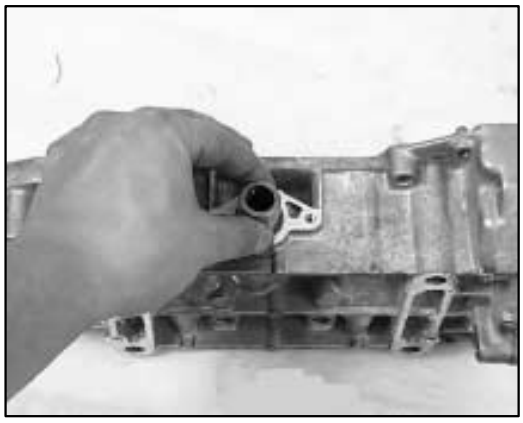
1. Prior to assembly, make sure that you have all of the oil pump shims when the oil pump was removed, and that the shims are installed in the correct order.



2. Insert oil pump drive gear.



3. Insert oil pump driveshaft spacer.

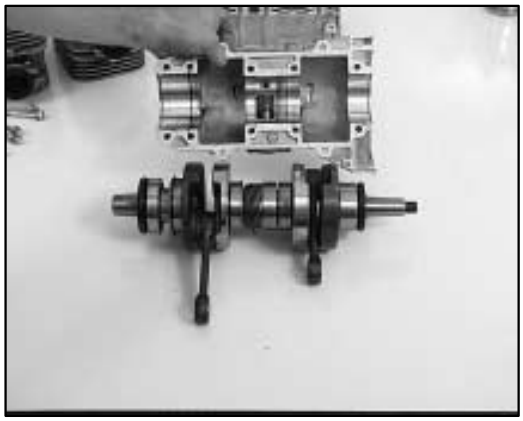


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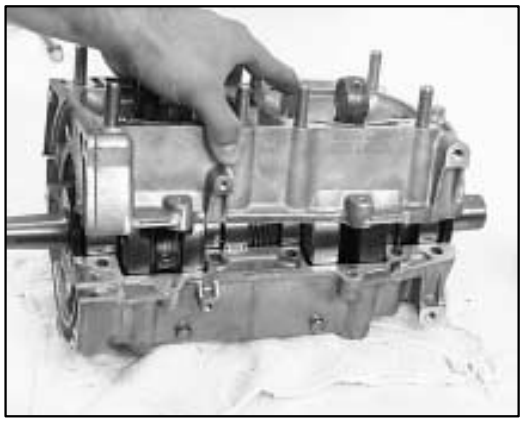
Engine Assembly - Continued

4. Lay crankshaft into the lower case half. Make sure that the crankshaft rotates smoothly and does not bind. Rotate the bearings so that the anti-rotation pins rest in their appropriate galleries.
5. Apply 3-Bond™ sealer to top half of crankcase. Lubricate oil pump drive gear.

3-Bond ™ 1215 PN 2871557 120 Gram Tube

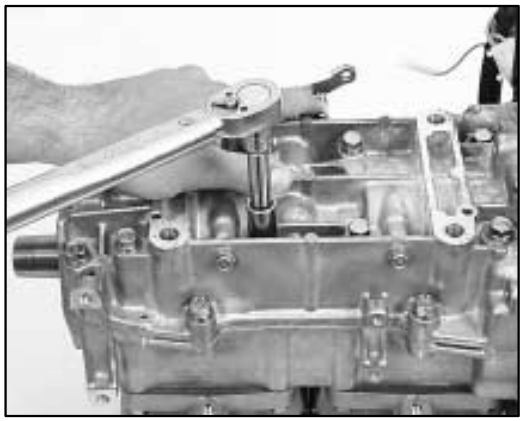


6. Install the upper case half.



7. Turn the crankcase over and torque the case bolts in sequence illustrated in beginning of chapter.

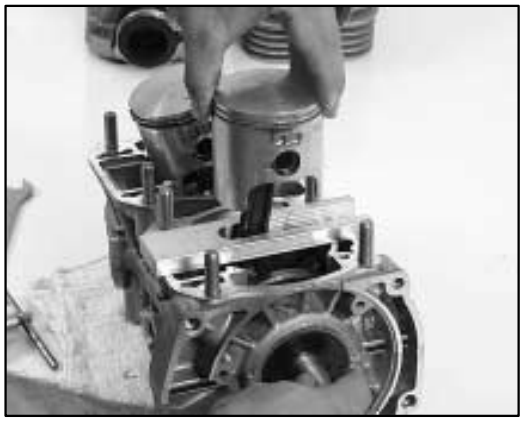
Crankcase Bolt Torque 16.6 - 18 ft.lbs. (22 - 25 Nm)



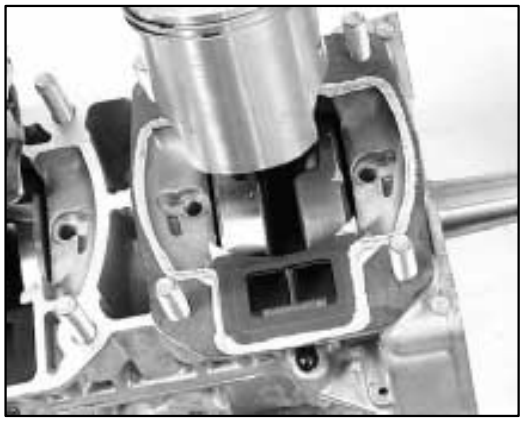
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Engine Assembly - Continued

8. Install pistons with arrow (") on piston facing flywheel, with locating pins to intake side. Install C-clips securely in piston groove.
9. Lubricate rings and pistons with two stroke oil. Install rings with letter, mark, or beveled side facing upward.



10. Install the reed valves in the crankcase. After installing the reed valves, insert the base gaskets.



11. Install each cylinder. Torque cylinder base nuts in sequence illustrated in beginning of chapter.

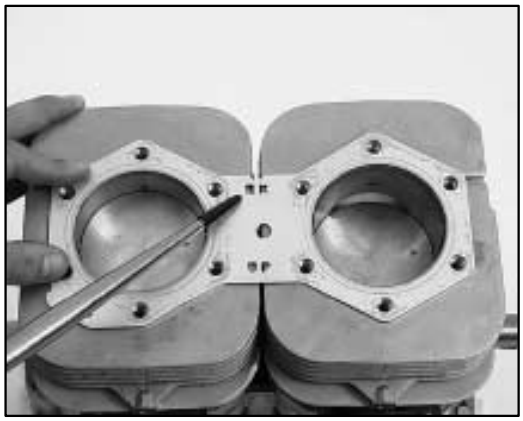
Cylinder Base Nut Torque 24 - 28 ft.lbs. (33 - 39 Nm)



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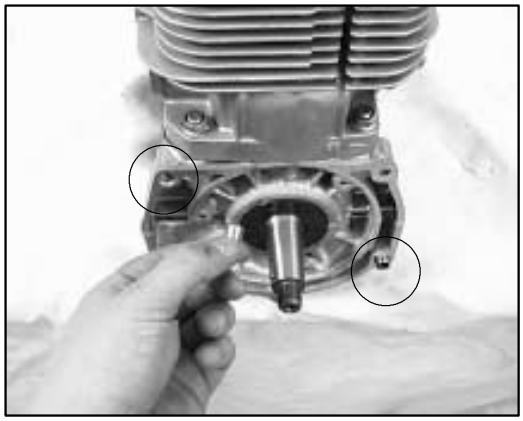
Engine Assembly - Continued

12. Install the cylinder head gasket with the “EX” on the exhaust side, and “UP” on the intake side of the engine.



13. Insert the dowels into the flywheel housing.

NOTE: Refer to picture for proper installation of alignment dowels.



14. Tighten flywheel housing to crankcase.



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Engine Assembly - Continued

15. Install the flywheel and insert the lock washer.



16. Torque the flywheel nut. During the procedure, use a flywheel holding wrench to prevent the flywheel from rotating.



Flywheel Holding Wrench-
PN 8700229

Flywheel Nut Torque
60 - 65 ft.lbs. (83 - 90 Nm)

17. Reinstall the flywheel cover and CDI module.



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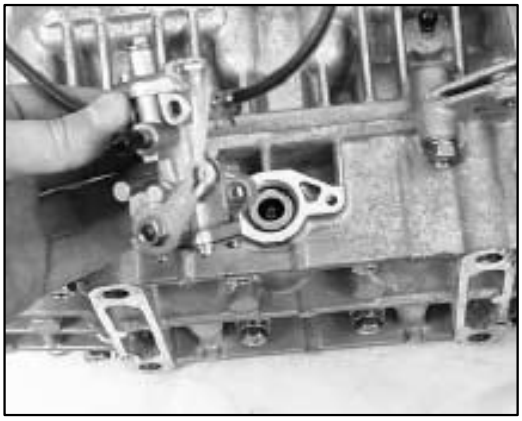
Engine Assembly - Continued

18. Insert the vibration dampener into the cooling fins between the intake ports. Reinstall the two fan shrouds making sure that they interlock before fastening tightly.



19. Using a new o-ring, reinstall the oil pump.

Oil Pump Mounting Screw Torque:
48 - 72 in.lbs. (5.5 - 8.3 Nm)



20. Install each carburetor and torque the carburetor mounting clamps Reinstall oil lines on the oil pump.



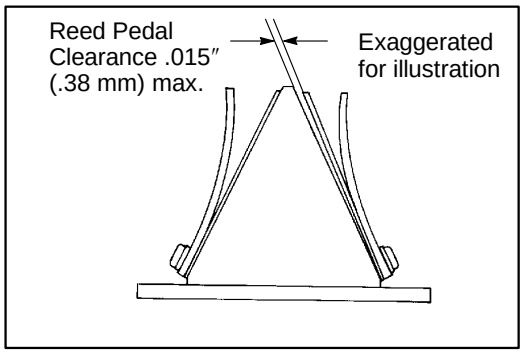
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Engine Disassembly / Assembly – Domestic 500 / 600 Engine

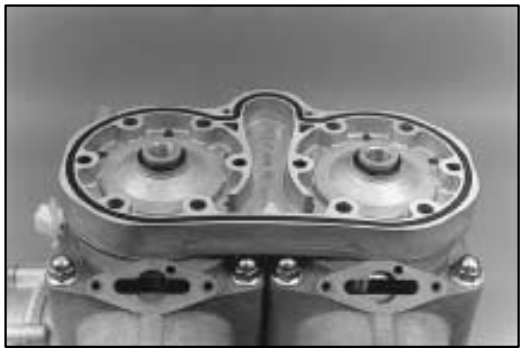
NOTE: Inspect all parts for wear or damage during disassembly. Replace all seals, O-rings, and gaskets with Genuine Polaris parts during assembly. Refer to pages 3.47-3.56 for general inspection procedures.

Disassembly

1. Remove carburetor mount adaptors, reed cages, stuffers, and oil pump. Note position of stator wire guide.
   Measure air gap between fiber reed and reed block as shown. The air gap should not exceed .015″ (.4 mm). If clearance is excessive DO NOT attempt to reverse the reeds to reduce the air gap. Always replace them if damaged. Check each fiber reed for white stress marks or missing material. Replace if necessary.



2. Remove cylinder head cover and inspect O-rings and sealing surfaces for damage or debris. Use new O-rings upon assembly.



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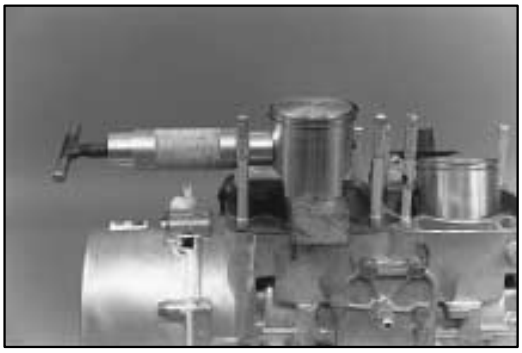
Disassembly, Cont.

3. Remove cylinder base nuts. Note location of acorn nuts on exhaust side (where applicable).
4. Carefully remove cylinders while supporting pistons and connecting rods to prevent piston damage. Refer to General Inspection Procedures in this chapter.
5. Remove outer piston pin C-clips using a scribe through access slot in piston.

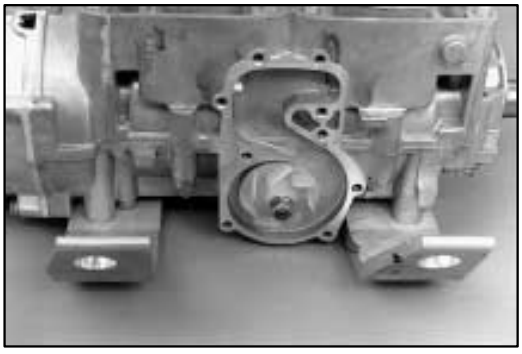


6. Place support block under piston and remove piston pins using pin puller.

Piston Pin Puller	PN 2870386
Support Block	PN 2870390



7. Remove water pump cover from front of engine.



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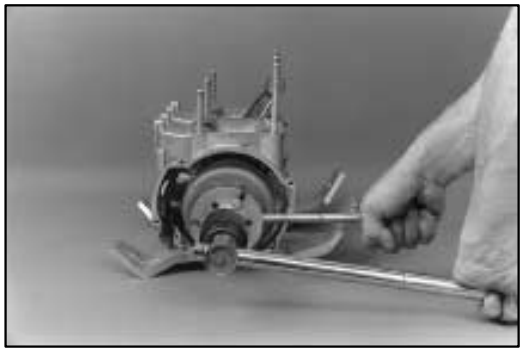
Disassembly, Cont.

8. Remove recoil housing and drive hub.

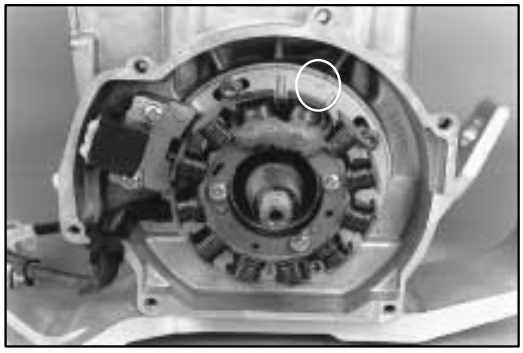


9. Remove flywheel using heavy-duty flywheel puller. Use drive clutch puller T-handle or a wrench to hold puller.

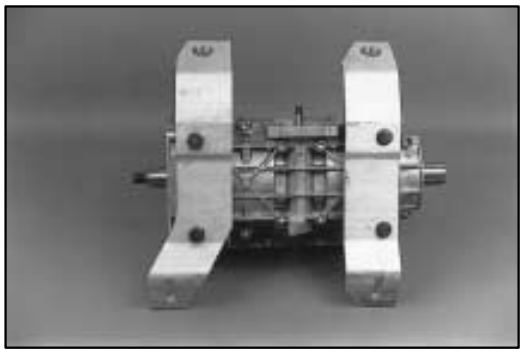
Flywheel Puller	PN 2871043
T-Handle	PN 5020326



10. Before removing stator plate, note where ignition timing marks are located, or scribe additional marks for reference upon reassembly.



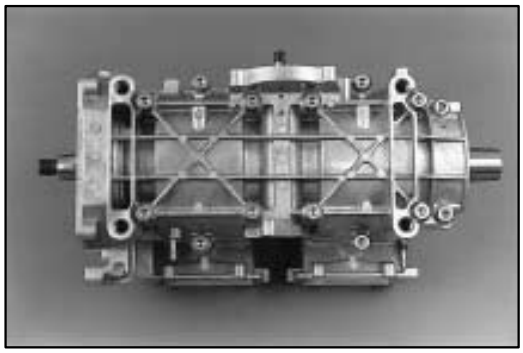
11. Mark or note location of engine mount straps and remove.



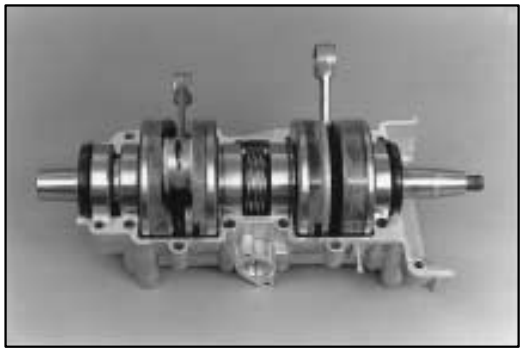
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Disassembly, Cont.

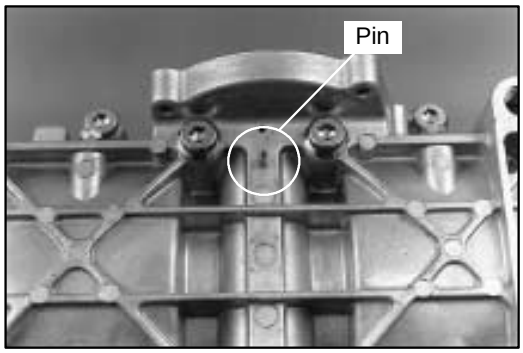
12. Remove bolts and separate case halves. Keep bolts in order for assembly.



13. To prevent damage to snap-ring grooves, lift crankshaft straight upward and out of lower case.



14. If pump shaft removal is necessary, remove retaining pin from crankcase using a diagonal cutter or similar tool.



15. Tap out the drive shaft using a center punch and hammer. Locate the center punch in the centering hole on the oil pump end of the shaft. Be careful not to damage the bearing. This will remove the oil seal and the mechanical seal from the crankcase.



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Assembly

1. Insert bushing into case on oil pump side of case. Press in until firmly seated in case.

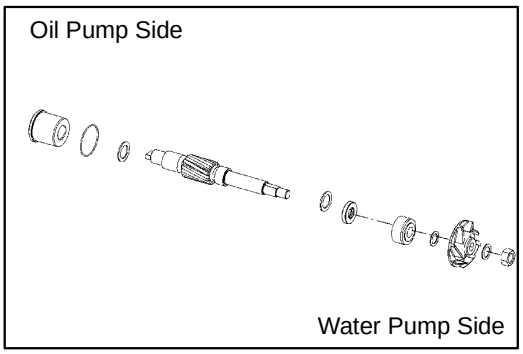
2. Install the bearing washer to the oil pump end of the shaft.
   - Lubricate shaft, insert shaft through the case on water pump side into the bushing on oil pump side.

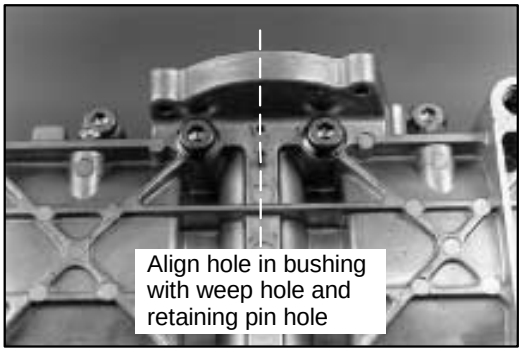
3. Lubricate and install bearing washer and brass bushing onto the shaft on waterpump side.

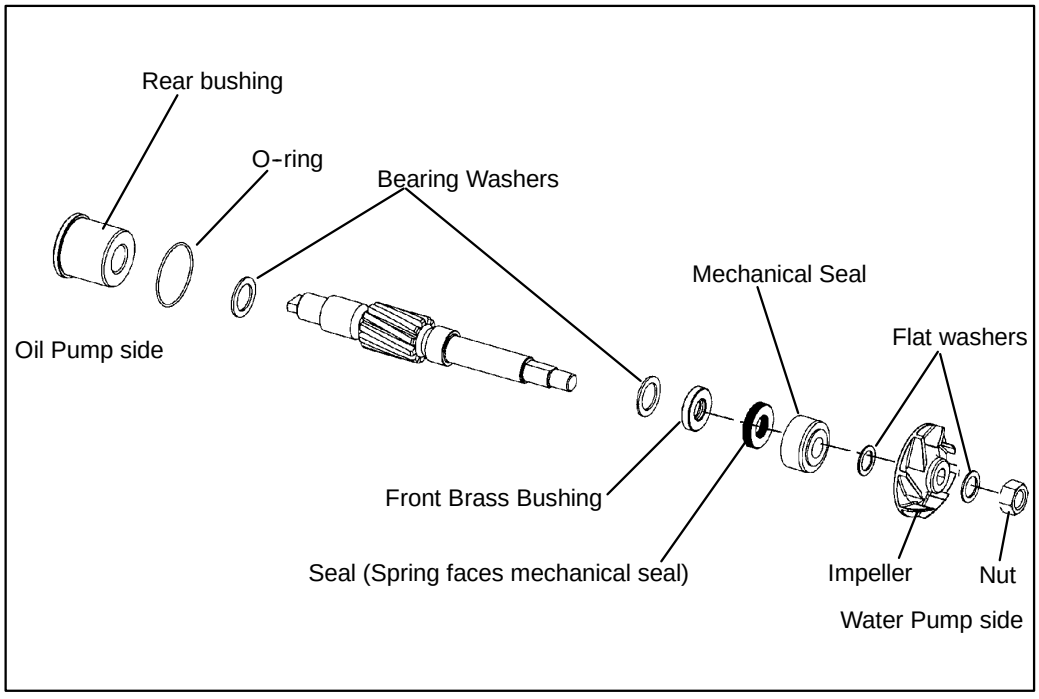
NOTE: If front bushing is replaced it may be necessary to drill a retaining pin hole in the new bushing. If there is no hole in the bushing:

- Measure depth of the retaining pin hole in the old bushing.
- Using the retaining pin hole as a guide, carefully drill a hole in the new bushing to the same depth and diameter as the hole in the old bushing. Be careful not to enlarge the retaining pin hole, or drill too deep.
- Install new retaining pin.

4. Lubricate and install oil seal with seal lip out (towards you) until it is against the bushing.







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Assembly, Cont.

5. Lubricate and install new mechanical seal using the Mechanical Seal Guide Tool PN 2872010.

> Mechanical Seal Guide Tool
> 500 / 600 V.E.S domestic engines 8.4mm: PN 2872010

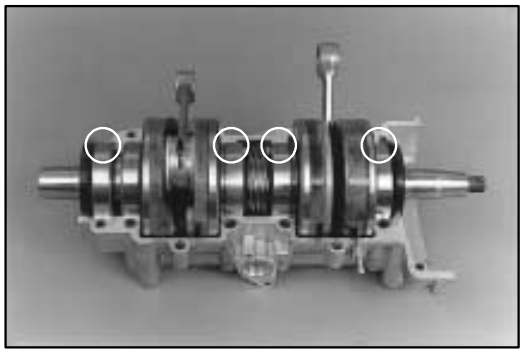


6. Press a new mechanical seal into case until fully seated.

7. Lubricate all crankshaft bearings with Premium 2-Cycle or Premium Gold Engine Lubricant.

8. Apply 1/3 oz. (10 cc) cross shaft break-in lube to oil pump gears.

> Oil Pump Cross Shaft
> Break-in Lube:
> PN 2872435 - 8 oz.
> PN 2872436 - 2.5 Gallon

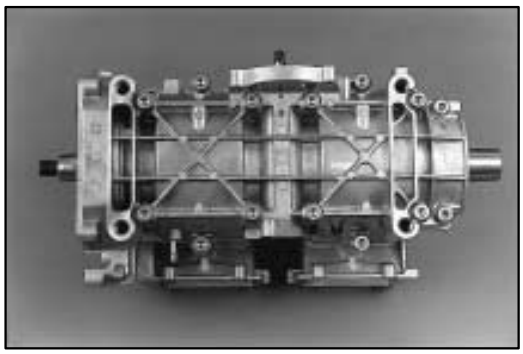


9. Install seals on crankshaft with spring facing inward (toward crankshaft).

10. Clean and de-grease lower crankcase and install crankshaft assembly, aligning seals and snap ring with grooves in case.

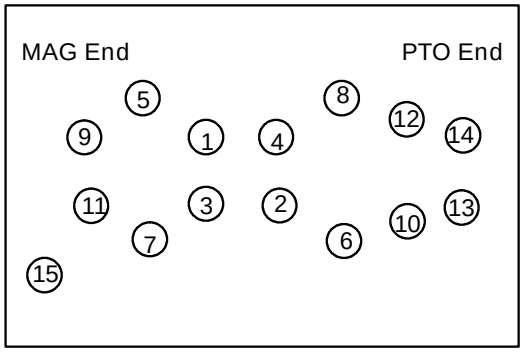
11. Apply a thin coating of 3-Bond 1215 sealant to lower crankcase mating surface.

12. Install upper crankcase on lower crankcase.



13. Apply Loctite 242 to threads of bolts and install. Torque bolts in three steps to specification outlined in beginning of this chapter following the sequence shown at right

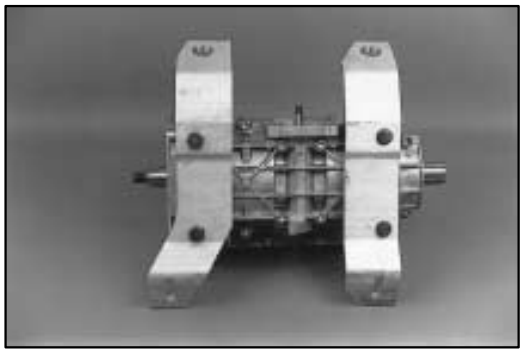
14. Install oil pump, being careful to engage pump shaft in drive shaft location, after case is assembled.



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Assembly, Cont.

15. Assemble engine mount straps to crankcase.



Engine Mount Strap Torque:
44-48 ft. lbs. (60-66 Nm)

16. Lubricate main bearing oil holes with Polaris Premium 2 Cycle or Premium Gold engine oil and rotate crankshaft to distribute oil evenly.

17. Install a new C-clip in both pistons (inside) with gap facing down. Be sure clip is fully seated in groove.

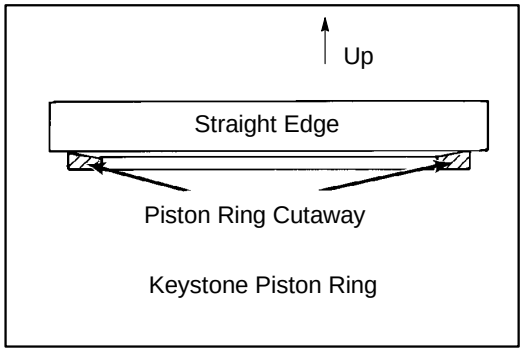
18. Lubricate and install new connecting rod small end bearing in rod.

19. Install piston with arrow facing exhaust (ring locating pins should be facing intake). Warming the piston may help to ease installation of pin.

20. Install remaining C-clip with gap down. Be sure both clips are fully seated in the groove.

21. Install new base gasket. Be sure gasket surface is clean and free of nicks, burrs, or scratches.

22. Lubricate and install piston rings on piston with mark on end of ring facing upward.



23. Place piston support under skirt and lubricate pistons and cylinders thoroughly.

24. Align ring end gaps with locating pins and compress rings. Install cylinder carefully with a gentle front to rear rocking motion. Install cylinder base nuts loosely. Do not tighten them at this time. Repeat Steps 22-25 for other cylinder.

CAUTION:

Do not twist or force cylinder during installation.



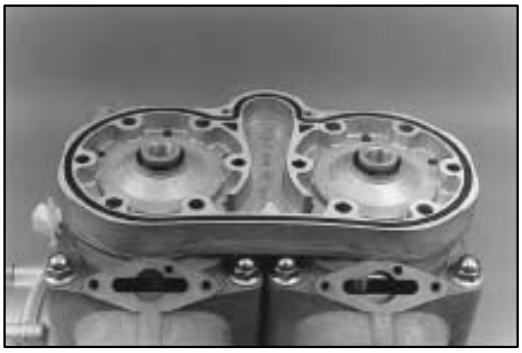
25. Install new cylinder head O-rings and install cylinder head. Make sure O-rings are properly seated in grooves. Apply a light film of grease to hold O-rings in place if necessary.

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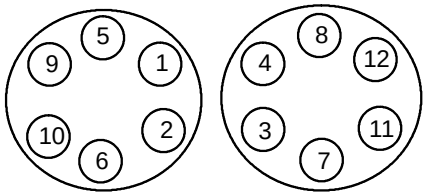
Assembly, Cont.

26. Install new cylinder head cover O-rings and install cylinder head cover. Make sure O-rings are properly seated in grooves. Apply a light film of grease to hold O-rings in place if necessary.

27. Loctite 242 to threads of head bolts and install.

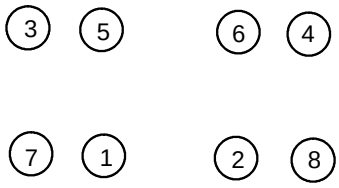


28. Torque head bolts to specification outlined in beginning of this chapter in proper sequence.



Cylinder Head

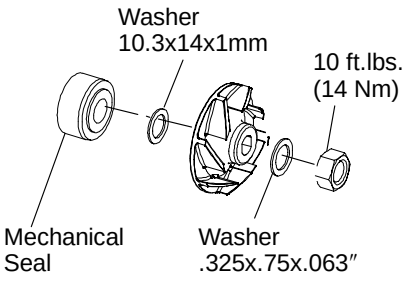
29. Torque cylinder base nuts outlined in beginning of this chapter in proper sequence.



Cylinder Base

30. Install washers and water pump impeller as shown and torque nut to 10 ft. lbs. (14 Nm).

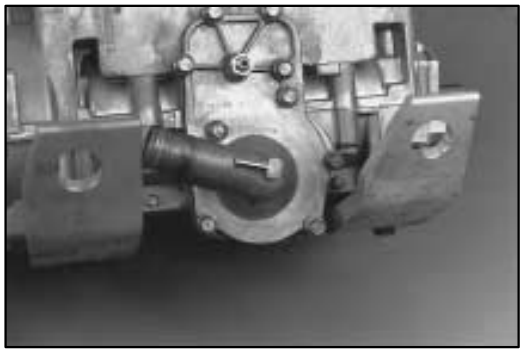
Impeller Nut Torque:
10 Ft lbs (14 Nm)



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Assembly, Cont.

31. Install water pump cover with new gasket.



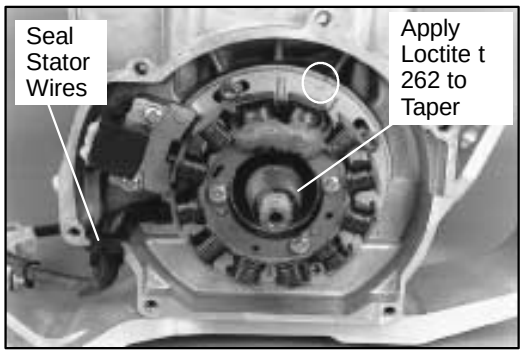
Water Pump Cover Bolt Torque:
9 Ft lbs (12.5 Nm)

32. Install new exhaust manifold gaskets and manifold.

Exhaust Manifold Bolt Torque:
16 Ft lbs (22 Nm)

33. Install reed valves, stuffers, and carburetor adaptors. Place stator wire guide on Mag side carburetor adaptor bolt.

34. Install stator assembly, aligning timing marks or marks made upon disassembly. Seal stator wires with high temperature silicone sealant. Install and tighten stator screws to specification.



35. Measure trigger (pulse) coil gap and compare to specification.

Stator Screw Torque
60 in. lbs. (7 Nm)

Trigger (Pulse) Coil Gap	
Minimum:	.020″ (.5mm)
Maximum:	.040″ (1.0mm)

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Assembly, Cont.

36. Apply Loctite t 262 evenly to the flywheel mounting taper on crankshaft. Install woodruff key.

37. Install flywheel. Apply Loctite t 242 to crankshaft threads. Install washer and nut.

38. Use flywheel holder to hold flywheel and torque nut to specification found in beginning of this chapter.

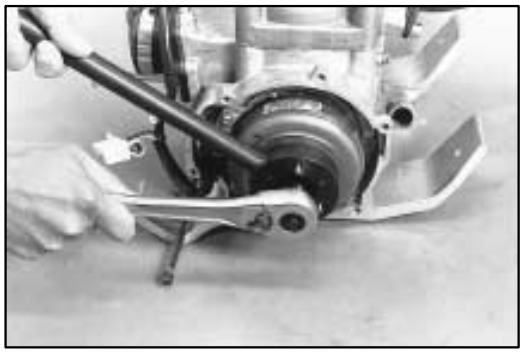
Flywheel Holder: PN 8700229

39. Install recoil hub and recoil housing. Torque bolts to specification.

Recoil Hub and Housing Bolt Torque: 108 in. lbs. (12.5 Nm)

40. Install engine in chassis and align clutches.

41. Refer to General Inspection Procedures in this chapter to fill and bleed cooling system and oil pump.





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Engine Disassembly / Assembly – Domestic 700 / 800 Engines

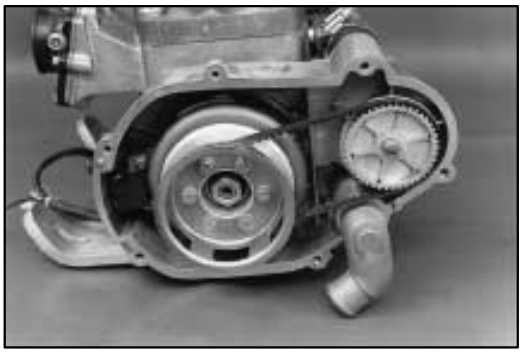
NOTE: Inspect all parts for wear or damage during disassembly. Replace all seals, O-rings, and gaskets with Genuine Polaris parts during assembly. Refer to pages 3.47-3.56 for general inspection procedures.

Disassembly

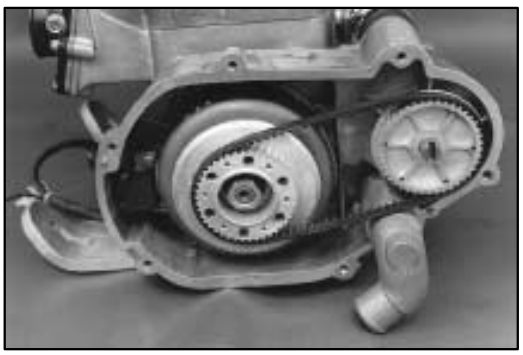
1. Remove oil pump.



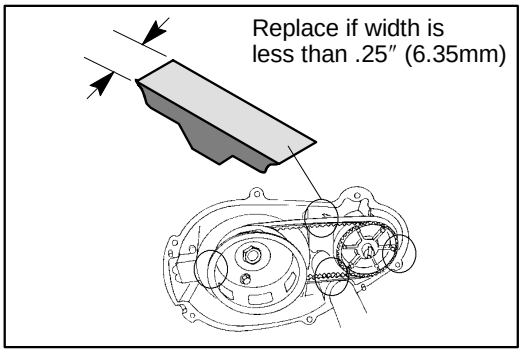
2. Remove recoil housing.



3. Remove recoil hub. Inspect waterpump drive belt for missing, cracked, or broken drive cogs. Replace if worn.



Measure the belt at 4 different points as shown. Replace if width is less than .250″, (6.35mm). Nominal new width is .345″, (8.75mm). Refer to Chapter 2, Maintenance for water pump belt installation.



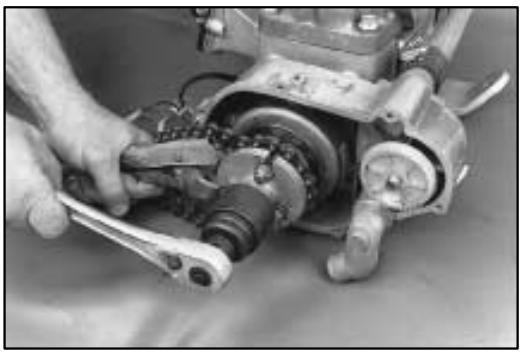
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Disassembly, Cont.

4. Remove drive gears and belt.

5. Remove flywheel nut using flywheel holder.

Flywheel Holder PN 8700229



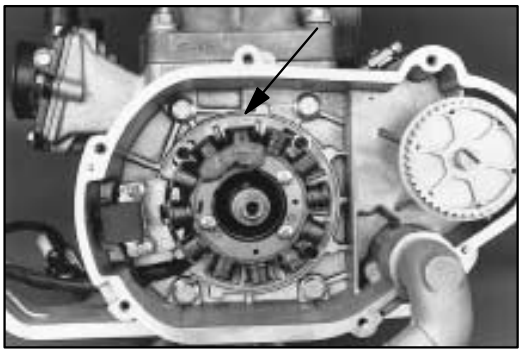
6. Remove flywheel using flywheel puller.

Flywheel Puller PN 2871043

7. Note the ignition timing strip on the flywheel.



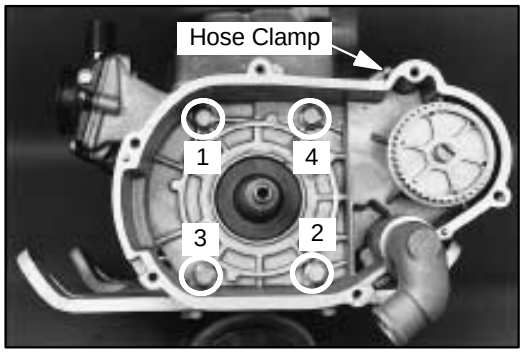
8. Before removing stator plate, mark the plate and crankcase for reference upon assembly.



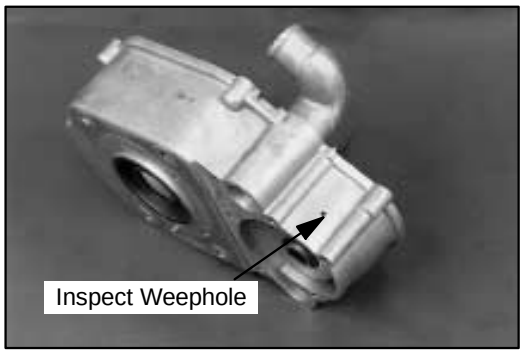
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Disassembly, Cont.

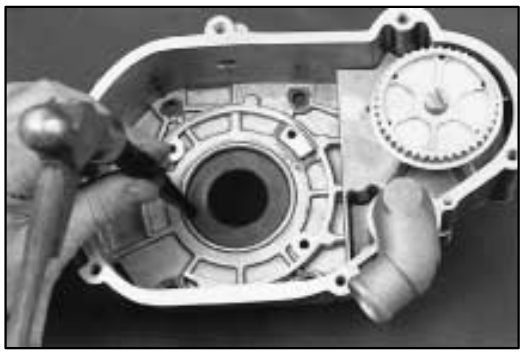
9. Remove bolts holding water pump housing to crankcase. Loosen hose clamp and remove housing.



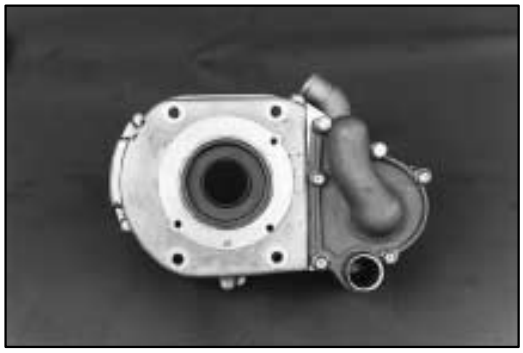
10. Inspect water pump weep hole for signs of leakage or blockage.



11. Remove crankshaft seal from housing by driving seal to inside of housing. Replace seal if removed.



12. Remove water pump cover bolts.



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Disassembly, Cont.

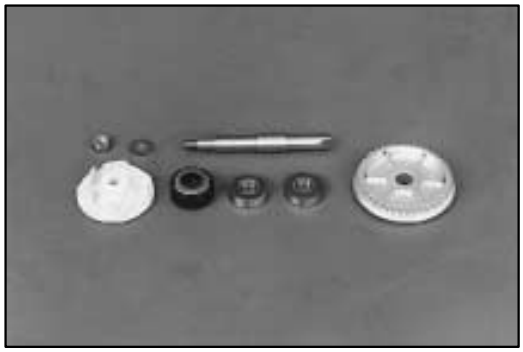
13. Remove impeller nut.



14. Slide shaft out back side.



15. Inspect bearings. Replace if necessary. Replace mechanical seal using the special tools listed below. Use the seal press to install a new mechanical seal in cover with spring sleeve toward impeller housing. Install seal guide over end of shaft and apply a light film of grease to seal guide. Carefully install shaft and bearings in cover. Assemble 10x14mm washer, impeller, washer, and nut. Torque impeller nut to specification.



Water Pump Mechanical Seal Installation Tool - 600/700/800 RMK domestic engines: 8.9mm.
PN 2872389

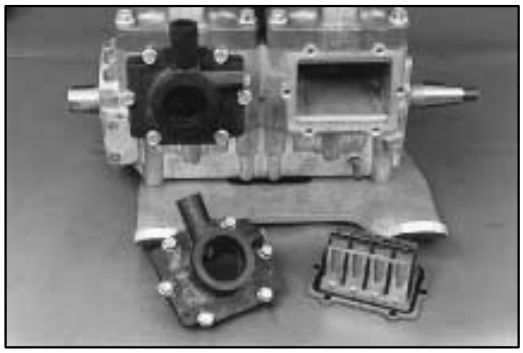
Impeller Nut Torque

10 ft. lbs. (14 Nm)

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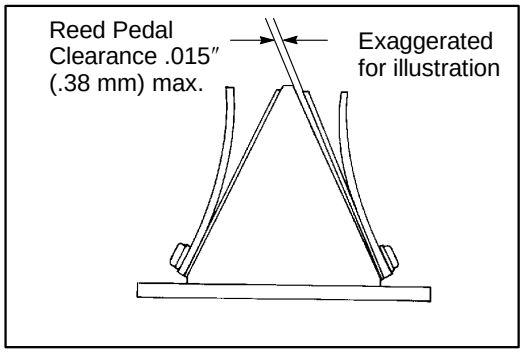
Disassembly, Cont.

16. Remove reed cover, reed stuffers, and reeds.



Reed Valve Inspection

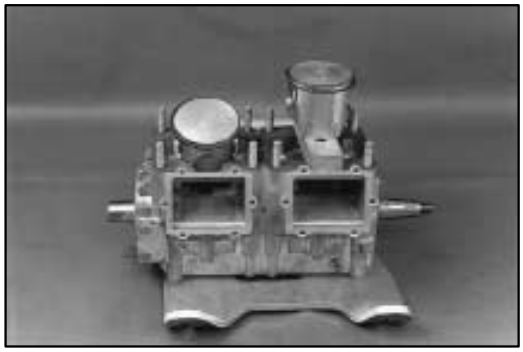
17. Measure air gap between fiber reed and reed block as shown. The air gap should not exceed .015″ (.4 mm). If clearance is excessive DO NOT attempt to reverse the reeds to reduce the air gap. Always replace them if damaged. Check each fiber reed for white stress marks or missing material. Replace if necessary.



18. Remove cylinder head. Note condition and placement of both cylinder head O-rings.



19. Loosen cylinder base nuts and remove cylinders.



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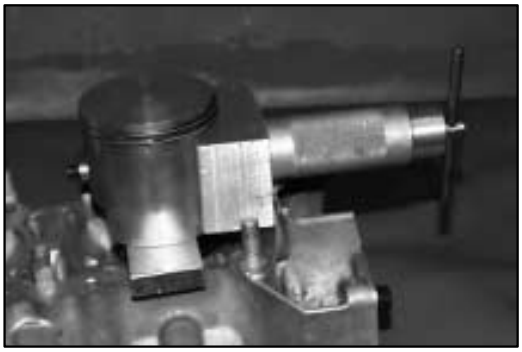
Disassembly, Cont.

20. Carefully remove C-clip holding piston pin in place.

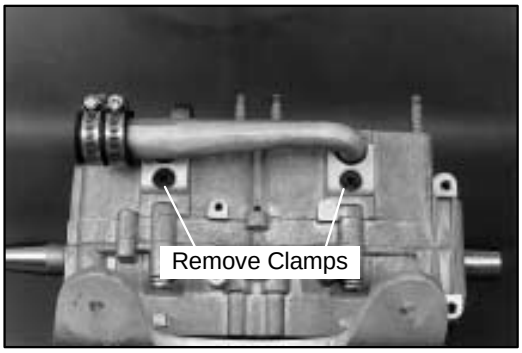


21. Remove piston pin using piston pin puller and adaptor.

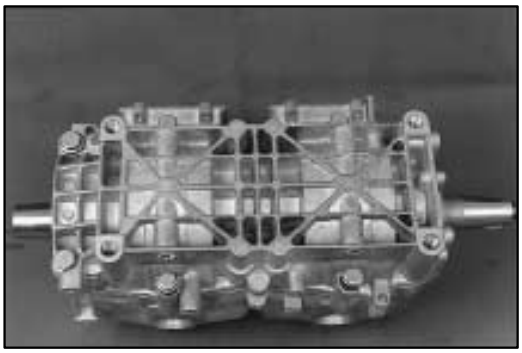
Piston Pin Puller PN 2870386
Adaptor PN 5130971



22. Remove water manifold by removing both retainer brackets.



23. Remove bottom crankcase bolts and separate crankcase halves.

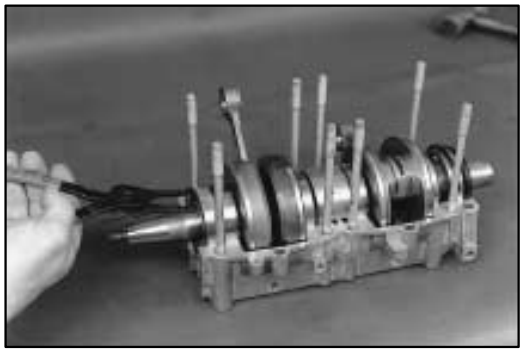


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Disassembly, Cont.

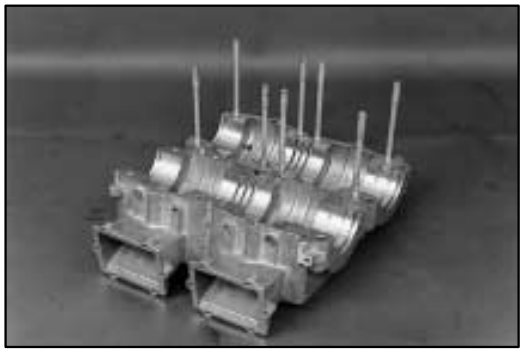
24. Remove snap rings and crankshaft seals.

25. Clean thoroughly to remove all grease, oil, dirt, and old sealant.



Assembly

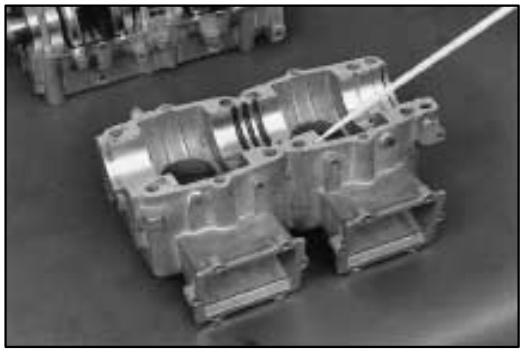
1. Clean all parts with solvent and dry with compressed air.



2. Apply 3-Bond™ 1215 sealant to upper crankcase half.

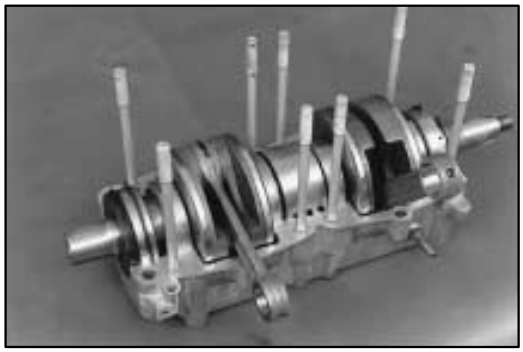
NOTE:Use only 3-Bond™ 1215 sealant. Curing time and film thickness are critical for proper bearing clearance.

3-Bond ™ 1215
PN 2871557 120 Gram Tube



3. Set crankshaft in lower crankcase. Lubricate seal lips with Premium All Season Grease. Make sure seals are positioned properly with lip and spring facing inward toward crankshaft. Install snap rings with gap facing upward toward upper case half.

NOTE:When installing a crankshaft on a 800 twin engine, apply Loctite t 609 to the PTO bearing surfaces and bearing seats. Allow for 12 to 24 hours for the Loctite t to cure before running the engine.



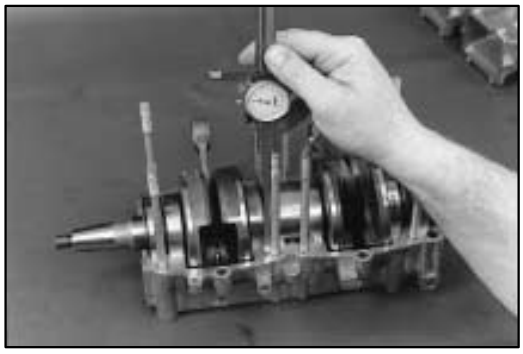
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Assembly, Cont.

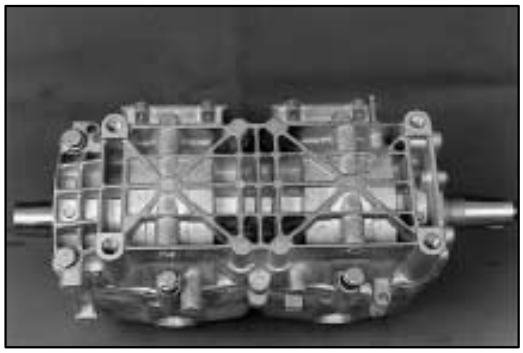
4. If studs were removed or new crankcase installed, apply Loctite™ 242 to threads of studs and screw in until bottomed. Tighten securely.

5. Measure installed length of stud bolt. This is the length necessary to allow cylinder installation.

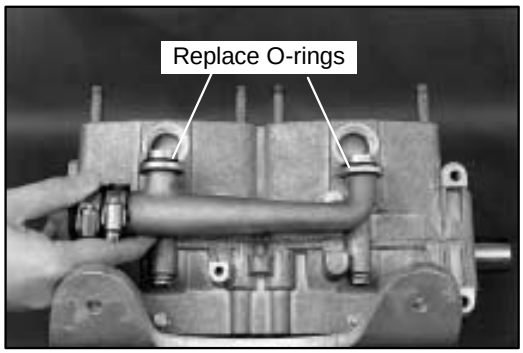
Lower Crankcase Stud Height
121-124 mm (4.76-4.88″) from crankshaft parting line.



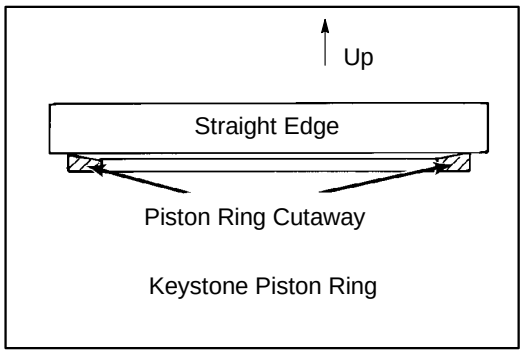
6. Install crankcase halves together. Torque bottom crankcase bolt to specification in the proper sequence found in the beginning of this chapter.



7. Install new O-rings on water manifold. Grease O-rings and install manifold.



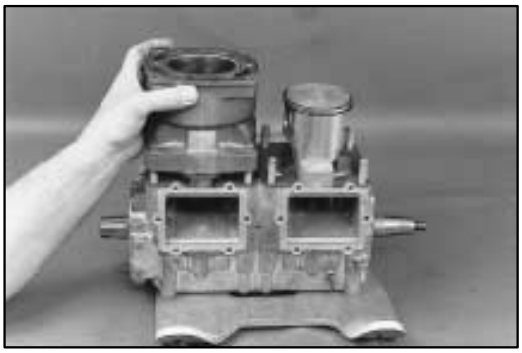
8. Install pistons and rings. Make sure C-clips are firmly seated in grooves. NOTE: Keystone ring bevel must be up. Marking near ring end gap faces upward.



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Assembly, Cont.

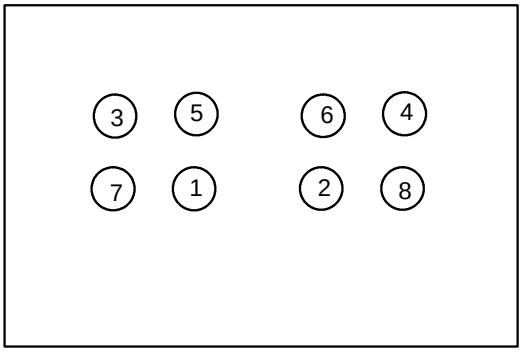
9. Lubricate pistons, rings, upper rod bearing, and cylinders with two stroke oil and install cylinders. Align ring end gaps with locating pins and compress rings. Install cylinder carefully with a gentle front to rear rocking motion. Loosely install cylinder nuts.



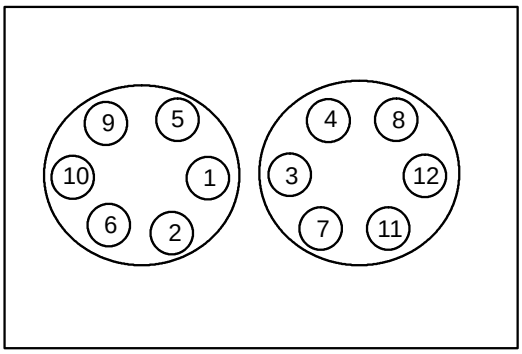
10. Install new cylinder head O-ring and install cylinder head. Make sure O-ring is properly seated in groove.



11. Torque cylinder base bolts in proper sequence. Refer to specifications in the beginning of this chapter.



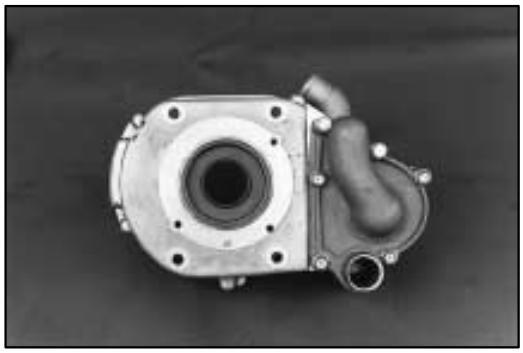
12. Torque head bolts in proper sequence. Refer to specifications in the beginning of this chapter.



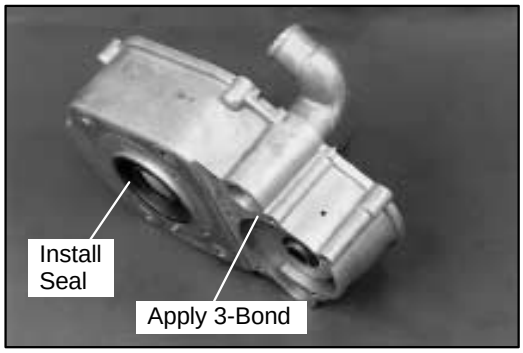
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Assembly, Cont.

13. Reassemble water pump carefully installing seal.

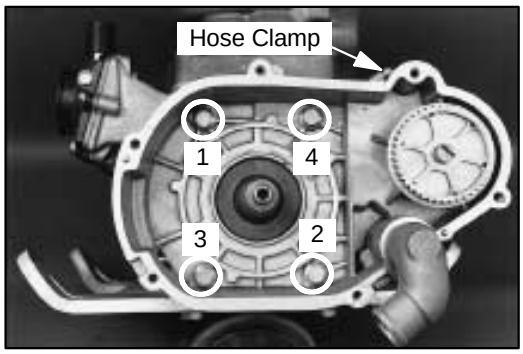


14. Install crankcase seal to ignition/water pump housing from inside toward outside until bottomed on housing. Spring and seal lip must face inward toward crankshaft.

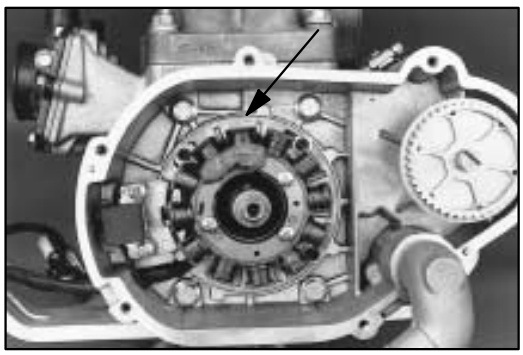


15. Apply 3 Bond™ sealant to pump housing crankcase mating surface and carefully install onto crankcase. Tighten water pump to engine hose clamp and torque bolts to specification.

Ignition/Water Pump Housing Torque
22 Ft. lbs (30.4 Nm)



16. Align timing marks and install stator.



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Assembly, Cont.

17. Install flywheel and torque flywheel nut to specification found in the beginning of this chapter.

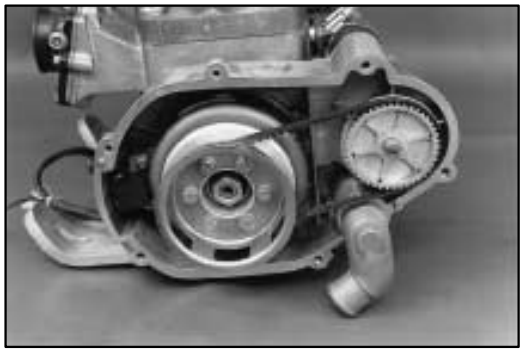


Flywheel Holder

PN 8700229

18. Install water pump belt and recoil hub.

NOTE: See domestic twin water pump belt installation in chapter 2, Maintenance, for correct belt installation



Recoil Hub Bolt Torque -

96-108 in. lbs. (11 - 12.5 Nm)

19. Install recoil cover and oil pump. Make sure oil pump drive slot mates properly with water pump shaft.

20. Install reed valve, reed stuffer, and reed cover.



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Disassembly, Cleaning, Inspection - VES

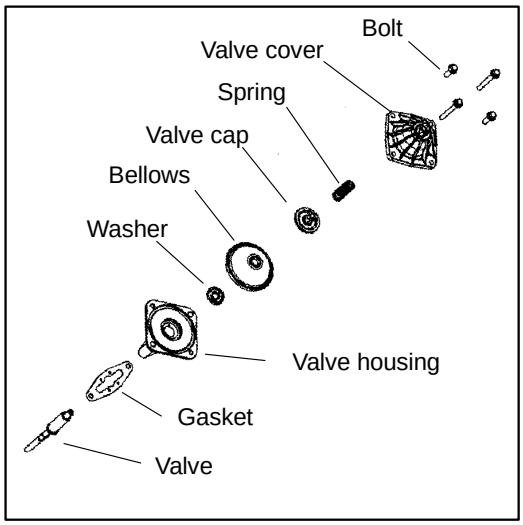
1. Clean O-ring and bellows in warm water and mild detergent. Inspect bellows for holes, distortion or damage. Replace if necessary. Inspect O-ring for damage.

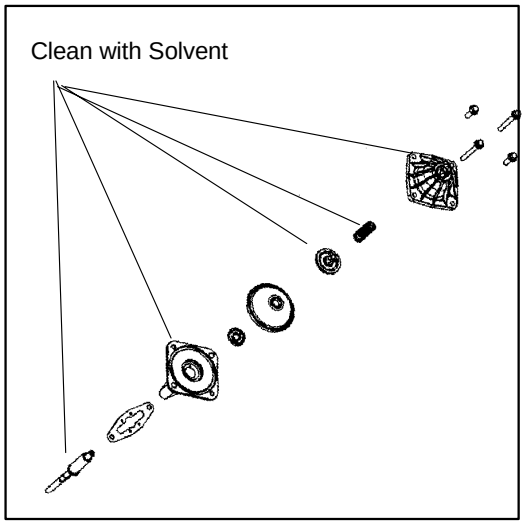
2. Clean all other parts with solvent. Be sure all parts are thoroughly clean.

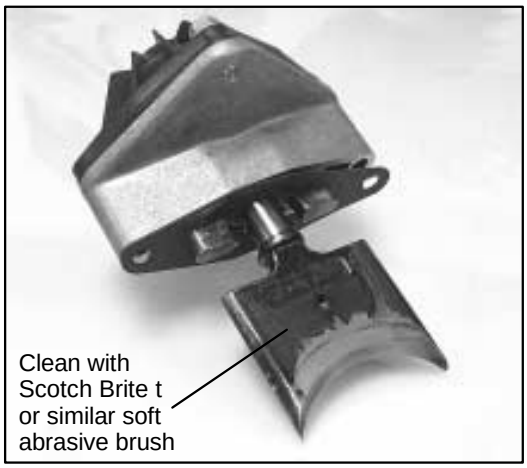
3. Inspect the actuator port in cylinder and valve housing. Be sure it is clear and not obstructed by debris or carbon.

4. Carbon deposits can be removed from valve with a Scotch Brite t pad or similar soft abrasive brush.

5. Lubricate exhaust valve with Polaris Premium Gold 2-cycle engine lubricant. Install valve in cylinder and move it through the entire travel range to check for free movement without binding. If the valve sticks anywhere in the travel range, check the valve and valve bore in the cylinder for carbon deposits and clean if necessary.







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Variable Exhaust System (V.E.S.)

V.E.S. Assembly

1. Insert exhaust valve into valve housing. Replace housing gasket.



2. Install washer, beveled side out, and bellows.



3. Apply Loctite t 262 to threads of valve and install valve cap. Torque to specification.

Valve Cap Torque:
6 Ft lbs (8.3 Nm)



4. Install spring, valve cover, and adjuster nut. Torque exhaust valve cover bolts to specification.

Valve Cover Bolt Torque:
4 Ft lbs (5.5 Nm)

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Variable Exhaust System (V.E.S.)

5. Install V.E.S. assembly onto cylinder and torque V.E.S. housing bolts to specification. Set spring adjuster screw to desired specification.



V.E.S. Housing Bolt Torque:
9 Ft lbs (12 Nm)

V.E.S. Adjustment

The RPM at which the exhaust valves open and close can be tuned by turning the spring adjuster in or out for the desired valve characteristics.

1. Turning spring adjuster in:
   - Creates more spring pressure
   - Allows exhaust valve to open at slower rate
   - For applications such as drag racing
2. Turning spring adjuster out:
   - Creates less spring pressure
   - Allows exhaust valve to open at faster rate
   - For applications such as trail riding

Riders can fine tune the VES to suit their riding conditions and power delivery characteristics. Base setting is with adjuster screw flush with housing.

CAUTION: Do not turn spring adjuster too far. The spring adjuster is turned out to its maximum when the adjuster is flush with top of housing.

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Polaris Variable Exhaust System Springs

Spring PN	COLOR	Load @ 1.0 In. (LBS.) ± 0.4	Load @ .630 In. (LBS.) ± 0.5	Free Length	Wire Dia. (In.)
7041786-01	RED/WHITE	3.0	4.3	1.854	.041
7041786-02	BLUE/WHITE	4.0	6.0	1.740	.045
7041786-03	GREEN/WHITE	5.0	7.0	1.930	.045
7041786-04	YELLOW/WHITE	5.0	8.0	1.620	.045
7041786-05	ORANGE/WHITE	7.0	9.0	2.300	.046
7041786-06	PINK/WHITE	6.0	8.0	2.110	.046
7041786-07	PURPLE/WHITE	9.0	11.0	2.670	.049
7041786-08	GREEN/YELLOW	8.0	10.0	2.400	.049
7041786-09	RED/YELLOW	3.0	3.7	2.586	.037
7041704-01	BLUE	4.0	6.0	1.752	.0475
7041704-02	ORANGE	5.5	8.3	1.729	.0475
7041704-03	PINK	4.7	7.1	1.734	.046
7041704-04	PURPLE	3.1	4.7	1.726	.040
7041704-05	YELLOW	2.4	3.6	1.734	.037
7041705-06	WHITE	1.6	2.8	1.537	.036

These springs will change the timing characteristics of the exhaust valve opening. A heavier spring will keep the valve in the closed position longer, while a lighter spring will allow the valve to open sooner. NOTE: If making any changes to the valve springs make sure to change all springs so that each valve spring is the same.

Exhaust Valve Springs for Low Elevation

If you are setting up a RMK for low elevation, use the springs for the XC SP's corrisponding to engine size.

600 RMK Low Elevation Exhaust Valve Spring	700 RMK Low Elevation Exhaust Valve Spring	800 RMK Low Elevation Exhaust Valve Spring
PINK	GREEN/YELLOW	PURPLE/WHITE

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Cylinder Honing

The cylinder bore must be de-glazed whenever new piston rings are installed. A light honing with fine stones removes only a very small amount of material. A proper crosshatch pattern is important to provide a surface that will hold oil, and allow rings to seat properly. If the crosshatch is too steep, oil retention will be reduced. A cross-hatch angle which is too shallow will cause ring vibration, poor sealing, and overheating of the rings due to blow-by and reduced contact with the cylinder wall. Service life of the pistons and rings will be greatly reduced.

Cylinder Hone Selection

Selecting a hone which will straighten as well as remove material from the cylinder is very important. Honing a cylinder with a spring loaded glaze breaker is never advised. Polaris recommends using a rigid type hone which also has the capability of oversizing. These hones are manufactured by such companies as Sunnen Products Company of St. Louis, Missouri; and Ammco Tools, Inc., of North Chicago, Illinois.

De-glazing

If cylinder wear or damage is minimal, hone the cylinder lightly with finish stones following the procedure outlined on page 3.52

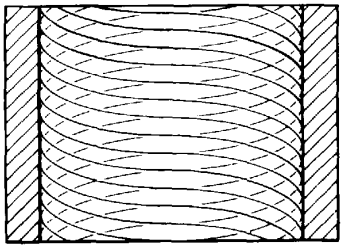
Honing To Oversize

If cylinder wear or damage is excessive, it will be necessary to oversize the cylinder using a new oversize piston and rings. This may be accomplished by either boring the cylinder and then finish honing to the final bore size, or by rough honing followed by finish honing.

NOTE:Portable rigid hones are not recommended for oversizing cylinders, cylinder boring, and finish honing. The use of an arbor type honing machine is recommended.

For oversize honing always wet hone using honing oil and a coarse roughing stone. Measure the new piston at room temperature (see piston measurement) and rough hone to the size of the piston or slightly larger. Always leave .002 - .003″ (.05 - .07 mm) for finish honing. Complete the sizing with fine grit stones to provide the proper cross-hatch finish and required piston clearance.

Inspect cylinder for taper and out-of-round. Taper or out-of-round on the finished bore should not exceed .0004″ (.002mm).



EXAMPLE OF CROSS HATCH PATTERN

NOTE:Always check piston to cylinder clearance and piston ring installed gap after boring/honing is complete!

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Honing Procedure

1. Wash cylinder with solvent. Clamp cylinder in a soft jawed vise by the exhaust port studs.

2. Place hone in cylinder and tighten stone adjusting knob until stone contacts the cylinder walls (DO NOT OVERTIGHTEN). Cylinders may be wet or dry honed depending on the hone manufacturer's recommendations. Wet honing removes more material faster and leaves a more distinct pattern in the bore. Using a 1/2 I (13 mm) drill motor rotating at a speed of 300-500 RPM, run the hone in and out of the cylinder rapidly until cutting tension decreases. Remember to keep the hone drive shaft centered to prevent edge loading and always bring the stone approximately 1/2 I (1.3 cm) beyond the bore at the end of each stroke. Release the hone at regular intervals to inspect bore size and finish.

Port Chamfering

Remove the sharp edges at the bottom and top of each port whenever boring or honing is performed. Make sure there are no sharp edges.

IMPORTANT:

Cleaning the Cylinder After Honing

It is very important that the cylinder be thoroughly cleaned after honing to remove all grit material. Wash the cylinder in a solvent, then in hot soapy water. Pay close attention to areas where the cylinder sleeve meets the aluminum casting (transfer port area). Use electrical contact cleaner if necessary to clean these areas. Rinse thoroughly, dry with compressed air, and oil the bore immediately with Polaris Premium 2 Cycle Lubricant.

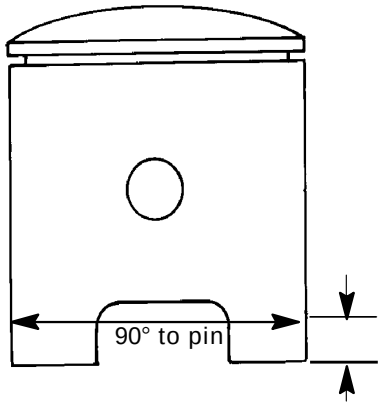
NOTE:Always check piston to cylinder clearance and piston ring installed gap after boring/honing is complete!

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Piston Measurement

Whenever cylinders are honed or bore clearance is checked, it is important to measure piston diameter properly to arrive at its major dimension. Measurements should be taken with piston at room temperature, and at right angles to the pin as shown. Determine the largest diameter within this area and refer to the chart below for clearance specifications.

Cylinder bore must be straight and concentric. Refer to honing information outlined in this chapter for specific procedures. Refer to the specifications section in chapter 1 for Target Clearance when re-boring cylinder, or Service Limit specifications (to determine if piston requires replacement).



FUJI ENGINES - Measure 1/2″ (12.7mm) up from bottom of skirt.
DOMESTIC ENGINES – Measure 3/8” (10.0mm.) up from bottom of skirt.

Piston to Cylinder Clearance

Refer to specifications in chapter 1 for specific models.

Piston Ring Installed Gap

Refer to specifications in chapter 1 for specific models.

Important! Always verify piston to cylinder clearance and piston ring installed gap prior to assembling an engine.

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Crankcase Inspection / Bearing Fit

Any time crankshaft bearing failure occurs and the case is to be reused, Polaris recommends checking the bearing fit into the case halves using the following procedure.

1. With case halves cleaned, press a replacement bearing into each of the main bearing journals to determine a basic amount of press fit. NOTE: Do a comparison check of all journals by manually forcing the bearing into the bearing seats noting if any are noticeably loose or tight. Normal hand installation will be an indication of the recommended interference fit. If the bearing falls out of the case when the case is inverted, or if the crankcase bearing surface is severely galled or damaged, the case should be replaced.



Crankcase Bearing Interference Fit:

C-3 - .0006″ (.015mm)
C-4 - .001″ (.025mm)

Crankshaft Main Bearing Inspection

1. Clean crankshaft thoroughly and oil main and connecting rod bearings with Polaris Premium 2 engine oil. Carefully check each main bearing on the shaft.

NOTE:Due to extremely close tolerances, the bearings must be inspected visually, and by feel. Look for signs of discoloration, scoring or galling. Turn the outer race of each bearing. The bearings should turn smoothly and quietly. The inner race of each bearing should fit tightly on the crankshaft. The outer race should be firm with minimal side to side movement and no detectable up and down movement. Replace any loose or rough bearings.

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Connecting Rod (Big End) Bearing Inspection

1. Measure connecting rod big end side clearance with a feeler gauge. Clearance should be equal on all rods (within .002″). Rotate rod on crankshaft and check for rough spots. Check radial end play in rod by supporting rod against one thrust washer and alternately applying up and down pressure. Replace bearing, pin, and thrust washers if side clearance is excessive or if there is any up and down movement detectable in the big end bearing.



NOTE: Specialized equipment and a sound knowledge of crankshaft repair and straightening is required to perform crankshaft work safely and correctly. Crankshaft repair should be performed by trained Polaris service technicians in a properly equipped shop.



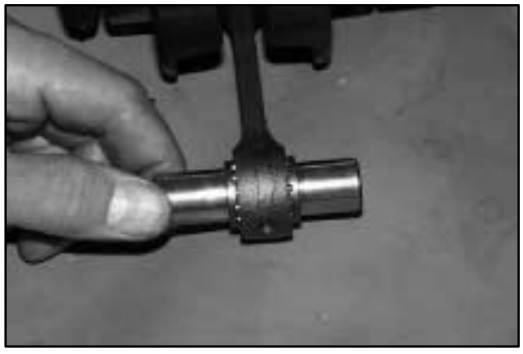
Piston Pin / Needle Bearing Inspection

1. Clean needle bearing in solvent and dry with compressed air.
2. Inspect needle cage carefully for cracks or shiny spots which indicate wear. Replace needle bearings if worn or cracked, and always replace them if piston damage has occurred.
3. Visually inspect piston pin for damage, discoloration, or wear. Run your fingernail along the length of the pin and replace it if any rough spots, galling or wear is detected.



Connecting Rod Small End Inspection

1. Clean small end of connecting rod and inspect inner bore with a magnifying glass. Look for any surface irregularities including pitting, wear, or dents.
2. Run your fingernail around the inside of the rod and check for rough spots, galling, or wear.
3. Oil and install needle bearing and pin in connecting rod. Rotate pin slowly and check for rough spots or any resistance to movement. Slide pin back and forth through bearing while rotating and check for rough spots.
4. With pin and bearing centered in rod, twist ends back and forth in all directions to check for excessive axial play. Pull up and down evenly on both ends of pin to check for radial play. Replace pin and bearing if there is any resistance to rotation or excessive axial or radial movement. If play or roughness is evident with a new pin and bearing, replace the connecting rod.



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Crankshaft Truing

Lubricate the bearings and clamp the crankshaft securely in the holding fixture. On three cylinder crankshafts, straighten one of the ends (Magneto or PTO) and then straighten the center section. Place the center section in the holding fixture and then straighten the remaining end. If truing the crankshaft requires striking with a hammer, always be sure to re-check previously straightened areas to verify truing. Refer to the illustrations below.

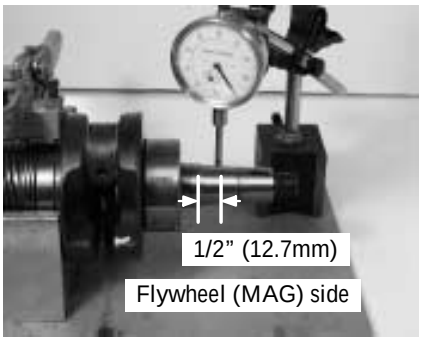
Crankshaft Alignment Fixture
PN 2870569

Crankshaft Runout Inspection

When checking the crankshaft runout, it is important to measure with a dial indicator in the correct position.

When measuring on the flywheel side:

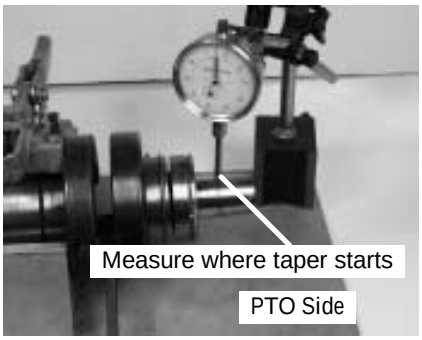
- Measure runout 1/2" (12.7mm) from the bearing flat.



When measuring from the PTO side:

- Measure runout where the taper starts after the bearing flat.

Refer to the illustrations. Acceptable crankshaft runout is .000-.004" (0-.10mm) for all Polaris crankshafts.

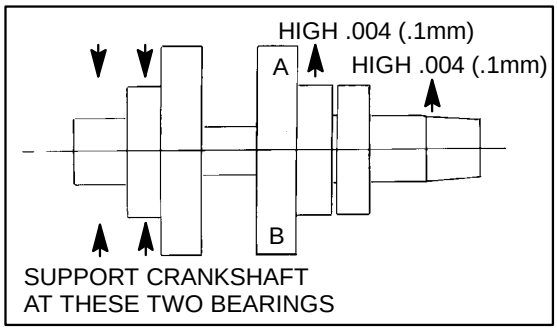


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Crankshaft Truing Cont.

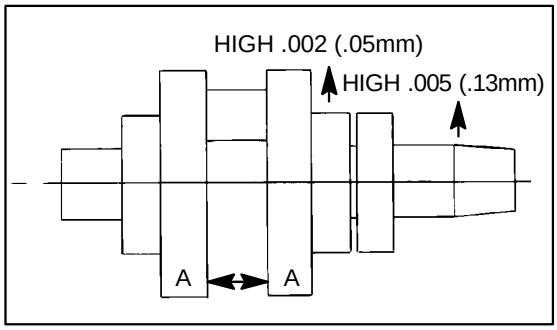
NOTE:The rod pin position in relation to the dial indicator position tells you what action is required to straighten the shaft.

5. To correct a situation like the one shown in the illustration at right, strike the shaft at point A with a brass hammer.



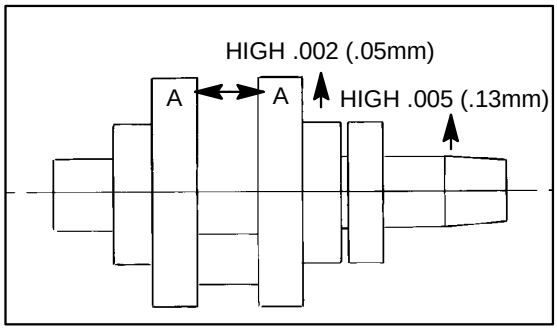
NOTE:The rod pin position in relation to the dial indicator position tells you what action is required to straighten the shaft.

6. To correct a situation like the one shown in the illustration at right, squeeze the crankshaft at point A. (Use tool from alignment kit).



7. If the crank rod pin location is 180_ from the dial indicator (opposite that shown above), it will be necessary to spread the crankshaft at the A position as shown in the illustration at right. When rebuilding and straightening a crankshaft, straightness is of utmost importance. Runout must be as close to zero as possible.

NOTE:Maximum allowable runout is .004 I (.1 mm).



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Crankshaft Indexing

Polaris crankshafts are pressed together or “indexed” so the connecting rod journal center lines are 180° (twins) or 120° (triples) apart from each other.

It is sometimes necessary to check multi-cylinder crankshafts to verify that one cylinder has not been forced out of position relative to the other cylinder or cylinders. Causes for out-of-index crankshafts include but are not not limited to:

- Hydrolock from water or fuel;
- Impact to drive clutch from foreign object or accident;
- Abrupt piston or other mechanical failure;
- Engine lock-up due to drive belt failure;

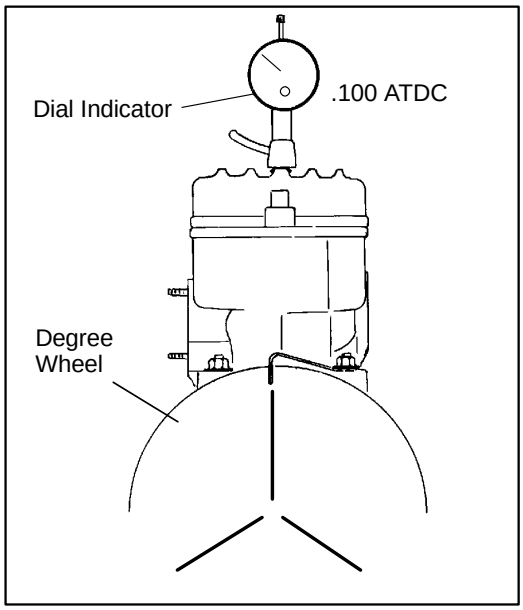
Following is a method of checking:

CAUTION:

Disconnect battery ground cable and all spark plug high tension leads; ground high tension leads to engine. Disconnect lanyard from engine stop switch before proceeding with the following steps.

1. Securely fasten a degree wheel on the flywheel or PTO end of crankshaft. Use a large degree wheel for more accuracy, and make sure it is mounted concentrically with the crankshaft center line.
2. Sharpen a coat hanger or section of welding rod and anchor it to a convenient spot. Point the sharpened end at the outer perimeter of the degree wheel.
3. Install a dial indicator into the magneto end cylinder spark plug hole (front) (#1). (The ignition timing is referenced by the magneto end.)
4. Rotate the engine to bring the piston to top dead center (TDC) on the cylinder with the indicator installed.
5. Locate TDC as accurately as possible by finding the center of the point where there is no piston movement. “Zero” the dial indicator at this point. Continue to rotate the crankshaft in the normal direction of rotation until the dial indicator reads .100″ (2.54mm) after top dead center (ATDC).

   IMPORTANT: Do not allow the crankshaft to move from this position.



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Crankshaft Indexing (Continued)

6. Bend the pointer or move the degree wheel until the pointer aligns with the 180 or 120° mark on the degree wheel.

7. With the pointer aligned, make sure the degree wheel and pointer are secured and will not move out of position. Re-check accuracy of this location by repeating steps 4. and 5. . The pointer should align with the 180 or 120° mark when the dial indicator reads .100″ (2.54mm) ATDC.

IMPORTANT: Do not move the degree wheel or pointer after the initial setting on the mag end cylinder - simply read the wheel and dial indicator.

8. Remove the dial indicator and install in cylinder #2 or center cylinder. Repeat steps 4. and 5. Note the degree wheel indication when the dial indicator reads .100″ ATDC. It should be 180 or 120° (± 2°) from cylinder #1. Repeat procedure on PTO cylinder (#3) where applicable. Cylinder #3 should also be 120°⟨± 2°) from cylinder #1.

Symptoms of an out of index crankshaft can include:

- Difficulty calibrating carburetor (repetitive plug fouling on one cylinder with no other cause);
- Unexplained piston failure on one cylinder (i.e. severe detonation, broken ring lands, piston holing);
- Excessive vibration of engine, backfiring, etc.;
- Rough idle, poor top speed.

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Cylinder Head Inspection

1. Inspect each cylinder head for warping. Replace cylinder head if warp exceeds service limit.

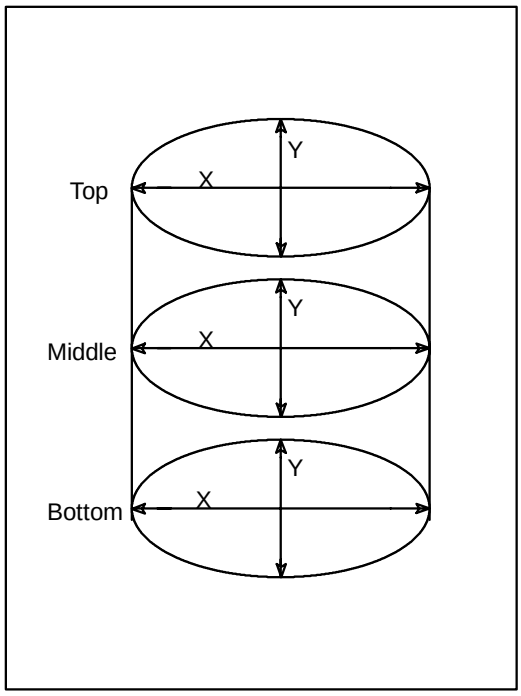
Cylinder Head Warp
Service Limit: .003″ (.08mm)



Cylinder Measurement

1. Inspect each cylinder for wear, scratches, or damage. If no damage is evident, measure the cylinder for taper and out of round with a telescoping gauge or a dial bore gauge. Measure the bore 1/2″ from the top of the cylinder; in line with the piston pin and 90° to the pin to determine if the bore is out of round. Repeat the measurements at the middle of the cylinder and the bottom of the cylinder to determine taper or out of round at the bottom. Record all measurements.

Cylinder Taper Limit: .002 Max. Cylinder Out of Round Limit: .002 Max.



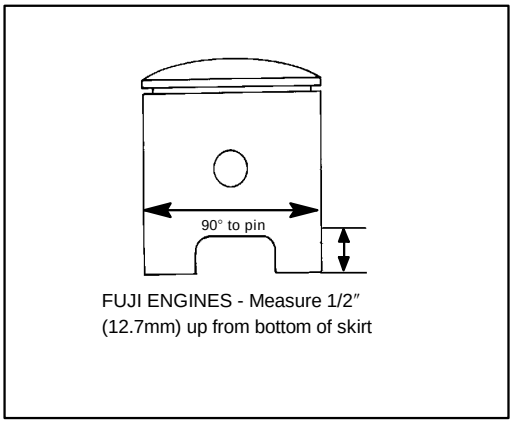
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Piston Inspection/Measurement

1. Check piston for scoring or cracks in piston crown or pin area. Excessive carbon buildup below the ring lands is an indication of piston, ring or cylinder wear.
2. Measure piston outside diameter at a point 10 mm (3/8″) up from the bottom of the skirt at a 90° angle to the direction of the piston pin (domestic engines). For Fuji engines, measure 1/2″ (12.7mm) up from the bottom of the piston skirt. Record the measurement for each piston.

NOTE: The piston must be measured at this point to provide accurate piston-to-cylinder clearance measurement.

3. Subtract this measurement from the minimum cylinder measurement recorded previously. If clearance exceeds the service limit, the cylinder should be re-bored and new pistons and rings installed.



FUJI ENGINES - Measure 1/2″ (12.7mm) up from bottom of skirt

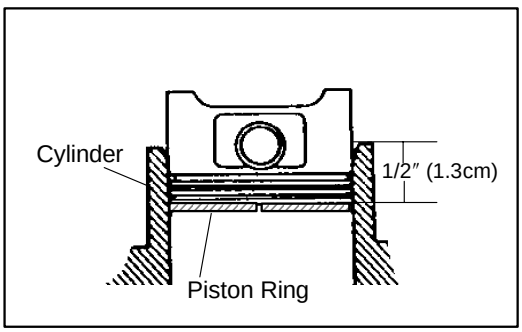
Piston Ring Installed Gap

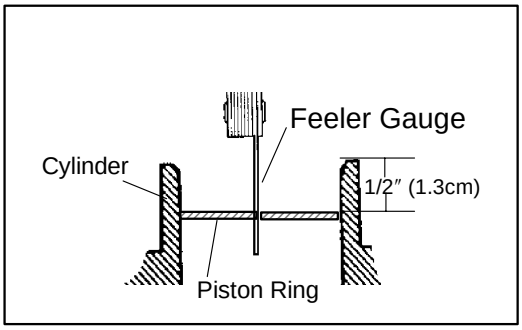
1. Position ring 1/2 I (1.3 cm) from the top of the cylinder using the piston to push it squarely into place. Measure installed gap with a feeler gauge at both the top and bottom of the cylinder.

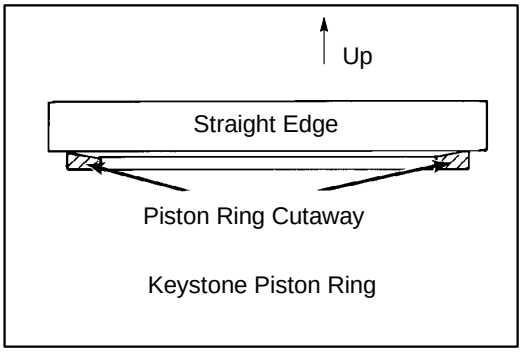
NOTE: A difference in end gap indicates cylinder taper. The cylinder should be measured for excessive taper and out of round. Replace rings if the installed end gap exceeds the service limit.

NOTE: Always check piston ring installed gap after re-boring a cylinder or when installing new rings.

NOTE: Piston rings are installed with marking or beveled side up.







Keystone Piston Ring

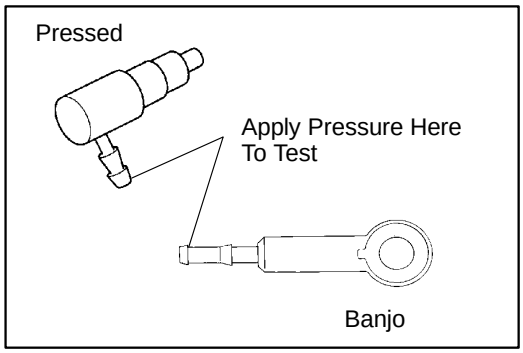
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Oil Pump Operation and Troubleshooting

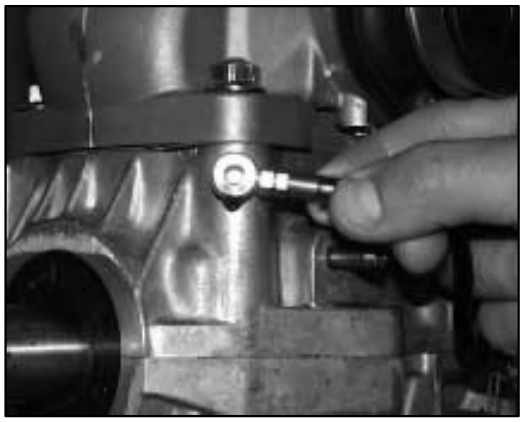
Any time the engine is disassembled or repaired, it is important that the oil supply from the pump to the engine be checked.

NOTE: Banjo type or pressed in valves should open with 2 to 7 lbs. of pressure. Perform this test with 40:1 premix in fuel tank.

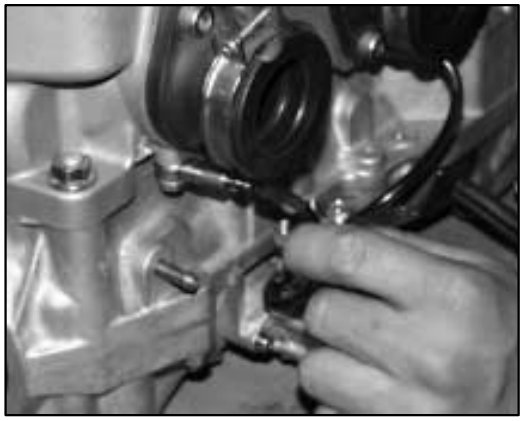
1. With engine in chassis, oil reservoir full, and pump bled, remove two oil feed line banjo bolts (A) from their location on the manifold or carburetors. NOTE: Install new sealing washers upon installation on either side of the banjo check valve.
2. Loosely thread only the banjo bolts back into the manifold or carburetors.
3. Place oil feed lines with their check valves away from the clutch area. Start the engine and let it idle at normal idle RPM.



4. Lift oil pump control lever up to its maximum flow position.
5. Drops of oil should be visible from the banjo check valves after the engine is idled one to two minutes, with a drop occurring approximately every few seconds.



6. If oil does not flow from one of the check valves, remove oil line from check valve and again idle engine. If oil then flows, the check valve is defective and must be replaced.
7. If oil does not flow with check valves removed from their feed lines, the malfunction is one of the following:
   - Inline filter blocked
   - Air not bled from oil pump
   - Feed lines leaking
   - Oil tank vent restricted or kinked
   - Defective pump.

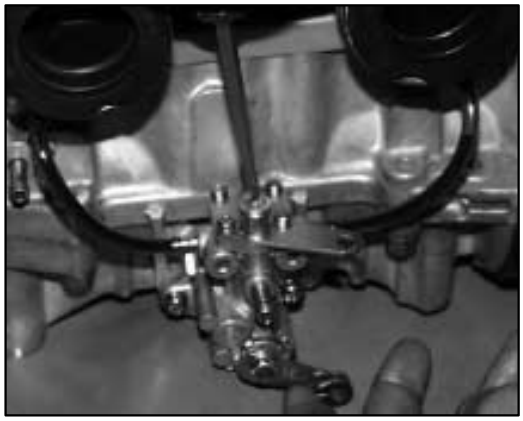


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Oil Pump Bleeding

The oil pump must always be bled following any service to the injector system or engine which allows the loss of oil and subsequent entrapped air during reassembly.

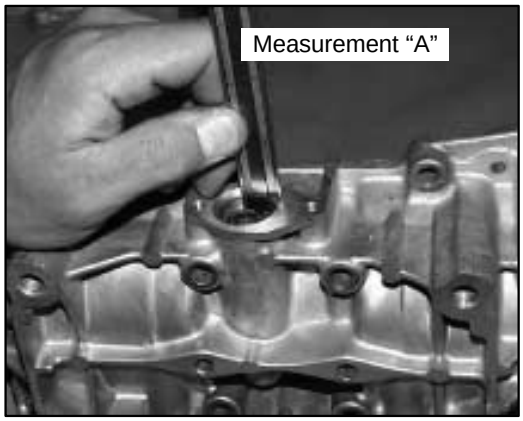
1. Fill oil reservoir with Polaris injector oil.
2. Loosen bleed screw. After a short time oil should flow from beneath the screw head to indicate the pump is free of air.
3. Tighten bleed bleed screw securely.



Oil Pump Bushing End Play Adjustment - Fuji

If the oil pump, crankcase, or any pump drive component is replaced, inspect the drive gear bushing end play using the following procedure:

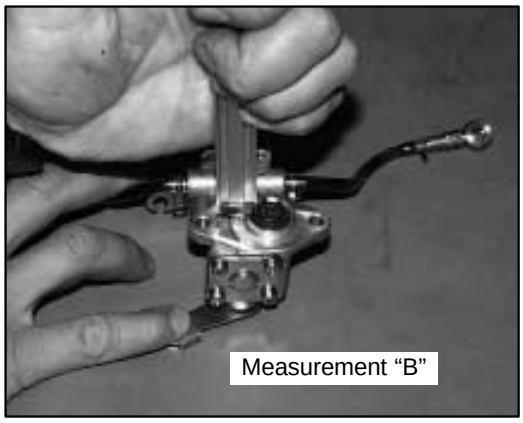
1. Assemble oil pump drive gear assembly. Be sure the bushing is fully seated in the crankcase.
2. Measure distance from oil pump mounting surface to bushing. Call this measurement “A”.



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Oil Pump Bushing End Play Adjustment - Fuji, continued

3. Measure distance from oil pump mounting flange surface to end of seal flange as shown. Call this measurement “B”.
4. Subtract measurement “B” from “A” to determine total bushing end play.



5. Measure thickness of existing shims and subtract from total bushing end play determined in step 3.
6. Add or subtract shims as required to provide specified end play.
7. Lightly grease a new O-ring and install it on the pump. Install pump, engaging slot in shaft with drive gear. Apply Loctite™ 242 to bolts and torque evenly to 78 in. lbs. (9 Nm).



End Play

.008 - .016″ (.203 - .406 mm)

Optional Shims:

PN 3083671 = .006″(.15mm)
PN 3083672 = .012″ (.3mm)
PN 3083673 = .024″ (.6mm)

Oil Pump Mounting Bolt Torque
(Loctite t 242 Blue)

78 in. lbs (9 Nm)

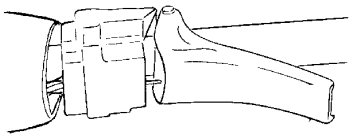
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Oil Pump Adjustment Procedure

Roundslide Carburetors

1. Synchronize carburetors as outlined in chapter four. Set engine idle speed as outlined in each model's specification chart listed in chapter one.

2. Adjust throttle cable freeplay to .010″ - .030″ (.25 - .8mm). See figure 1.



.010-.030″ (.25-.8 mm)

Figure 1

3. Verify that carburetor slides leave their respective resting positions upon opening within .01″ to .03″ of throttle cable movement, not throttle lever movement. See figure 2.

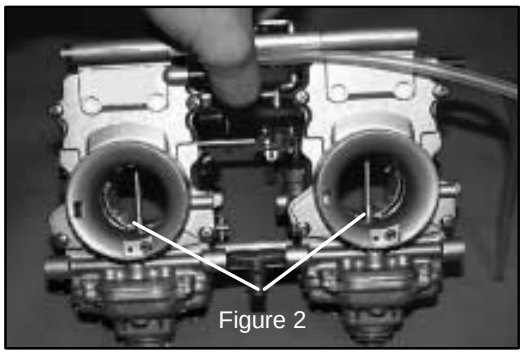


Figure 2

4. Verify that the oil pump alignment lines are aligned at the point where the carburetor slides begin to raise from their resting positions. Note: Marks may not line up without throttle engagement. See figures 3 and 4.

5. Torque cable locknuts to 10 - 20 in.lbs.

NOTE: Use a mirror when aligning the oil pump marks whenever the oil pump is difficult to view.

Mikuni Flatslide Carburetors

1. Verify that carburetor slides are within 1/16″ of each other when passing the top of the carburetor throat. See figure 2.

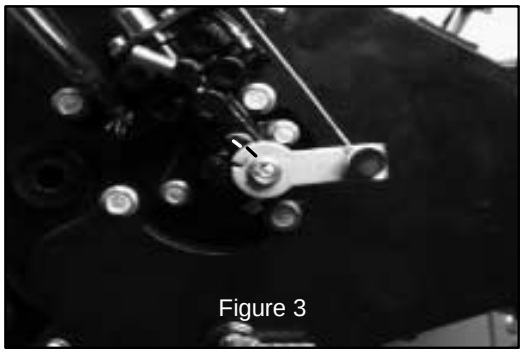


Figure 3

2. Set engine idle speed as outlined in the specifications listed in chapter one.

3. Adjust throttle cable freeplay to .010″ - .030″, (.25 - .8mm). See figure 1.

4. Verify that carburetor slides leave their resting position within .01″ to .03″ of throttle cable movement, not throttle lever movement.

5. Verify that oil pump alignment lines are aligned at the point where the carburetor slides begin to rise from their resting positions. See figures 3 and 4.

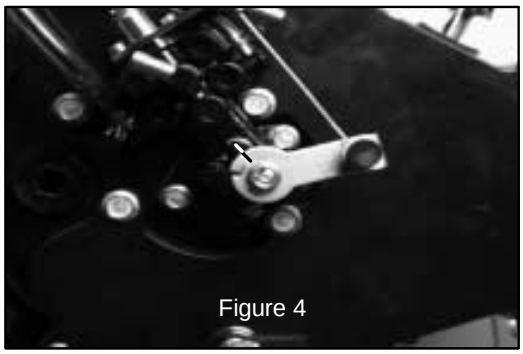


Figure 4

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Cooling System

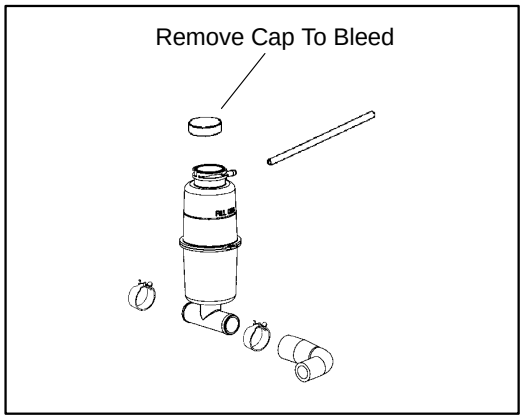
⚠ WARNING

Never remove the pressure cap when the engine is warm or hot. If the pressure cap is to be removed, the engine must be cool. Severe personal injury could result from steam or hot liquid.Use of a non-standard pressure cap will not allow the recovery system to function properly. If the cap should need replacement, install the correct Polaris cap with the same pressure rating. Refer to the appropriate parts manual.

NOTE: Always use Polaris premium antifreeze 60/40 premix. Bleed system at specified RPM or air will remain trapped in system, which may result in overheating.

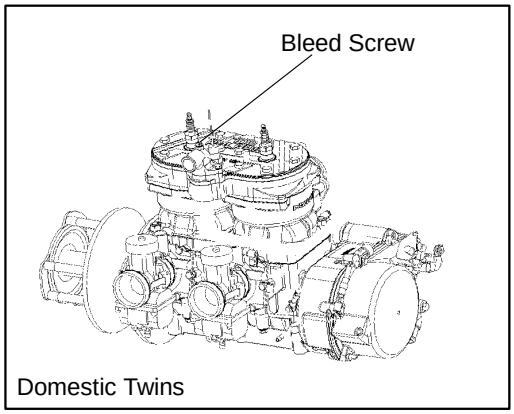
Filling and Bleeding Procedure

If the cooling system should become low in the reservoir tank and/or filler neck, the system should be bled of any trapped air using the following procedure.



Domestic Twins Bleeding Procedure

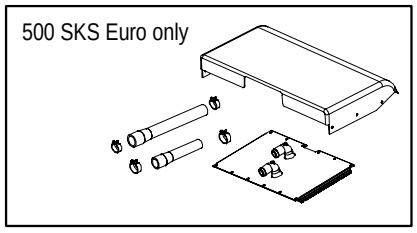
1. Fill cooling system . Leave pressure cap off.
2. With engine running at specified idle speed, loosen bleed screw on thermostat housing.
3. Continue adding antifreeze mixture to reservoir until system is purged of air.
4. Close bleed screw and tighten securely.
5. Fill reservoir bottle until coolant level is between the minimum and maximum fill marks.
6. Replace pressure cap.
7. Start engine and test for leaks.

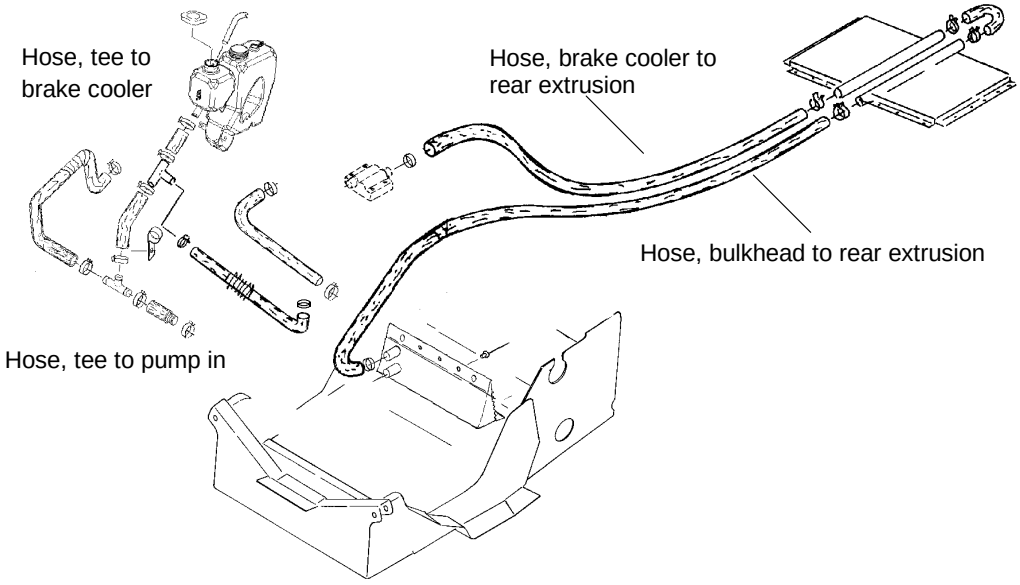


Domestic Twins

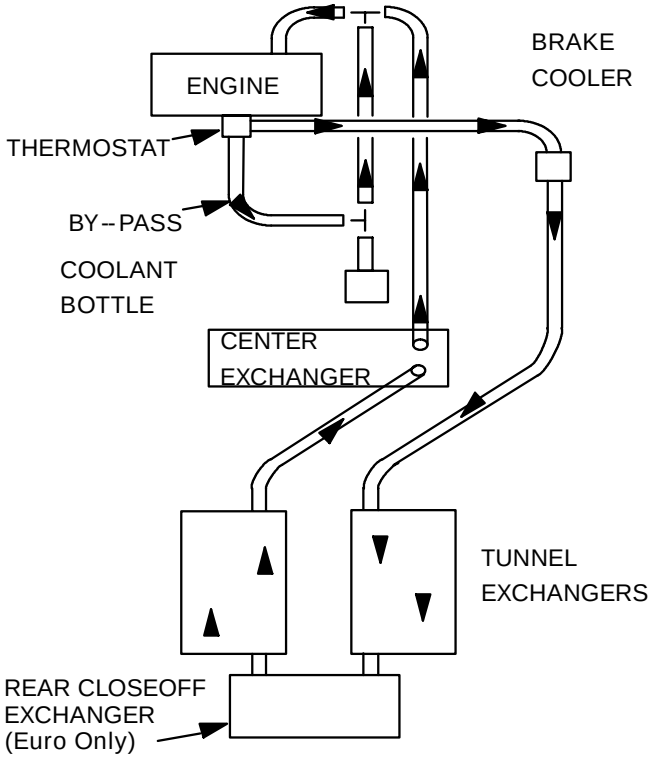
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Cooling System 500 RMK / 500 SKS (Euro)



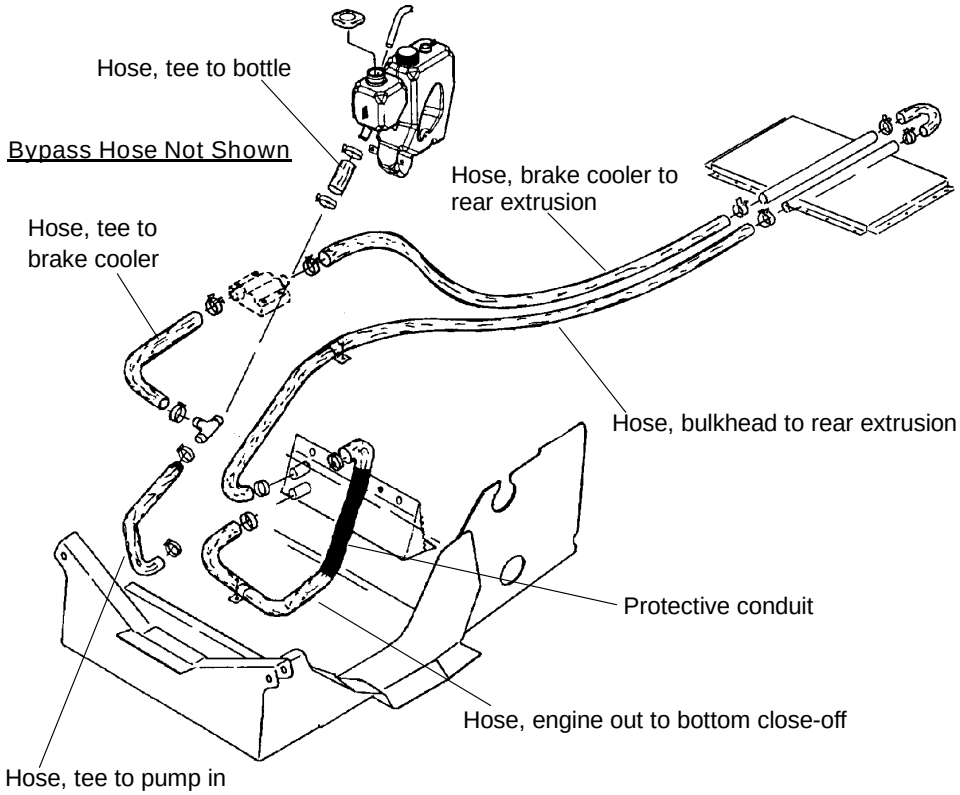


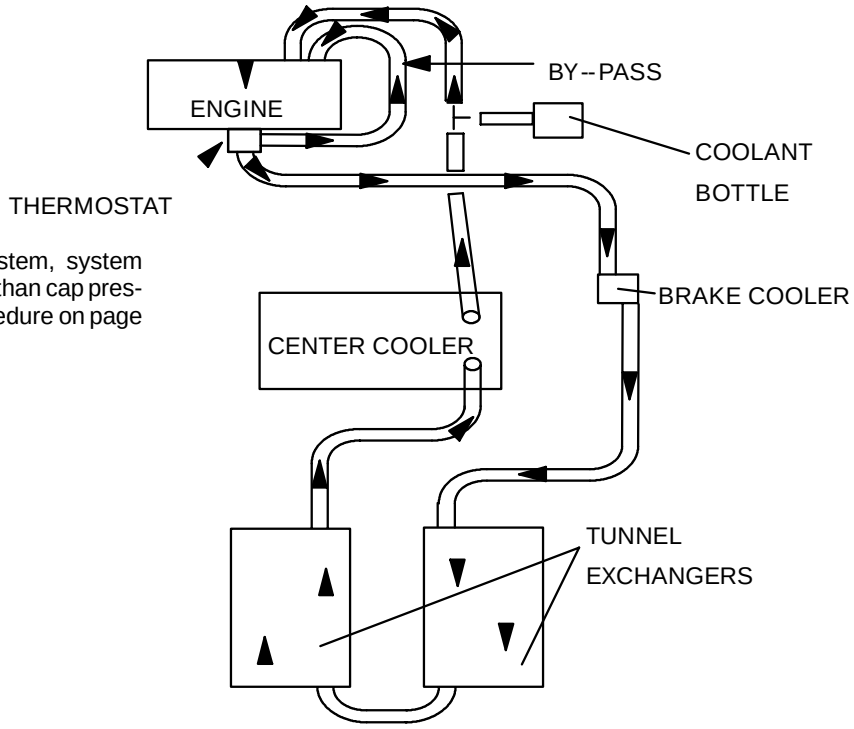
NOTE:When leak testing cooling system, system pressure should not exceed 2 lbs. less than cap pressure. Refer to filling and bleeding procedure on page 3.61.



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Cooling System - 700 SKS (Euro)

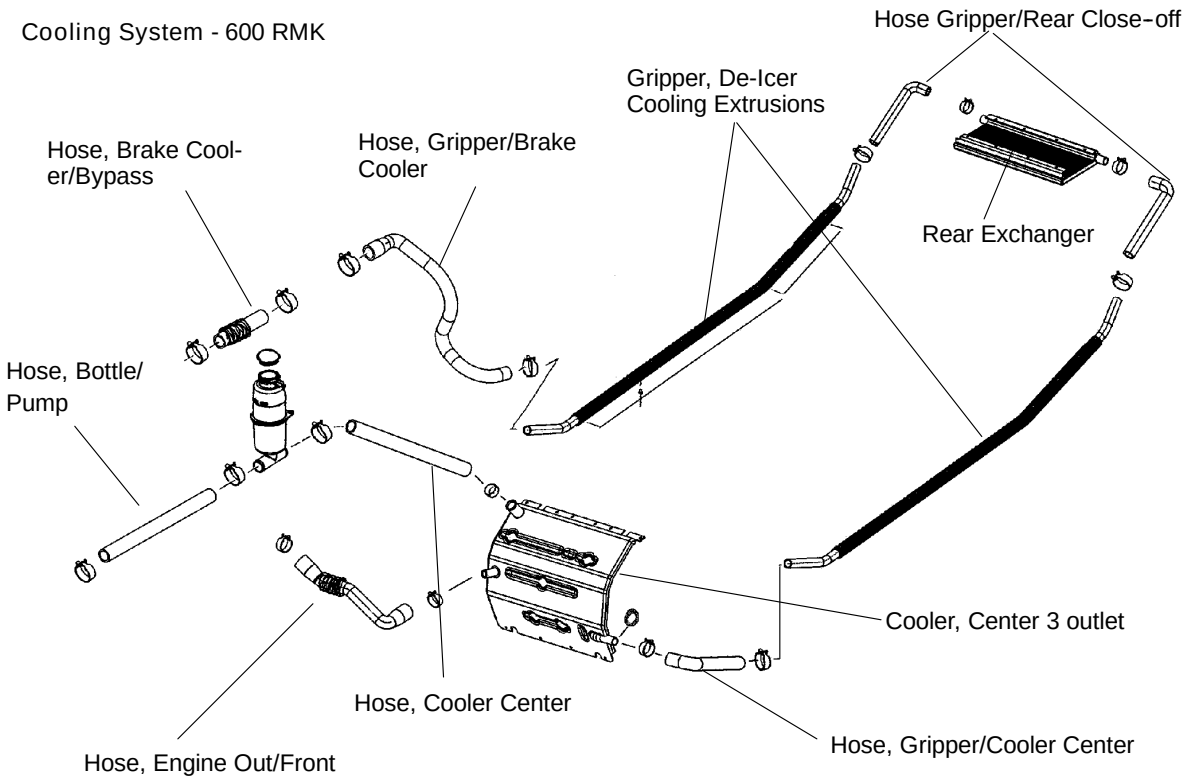




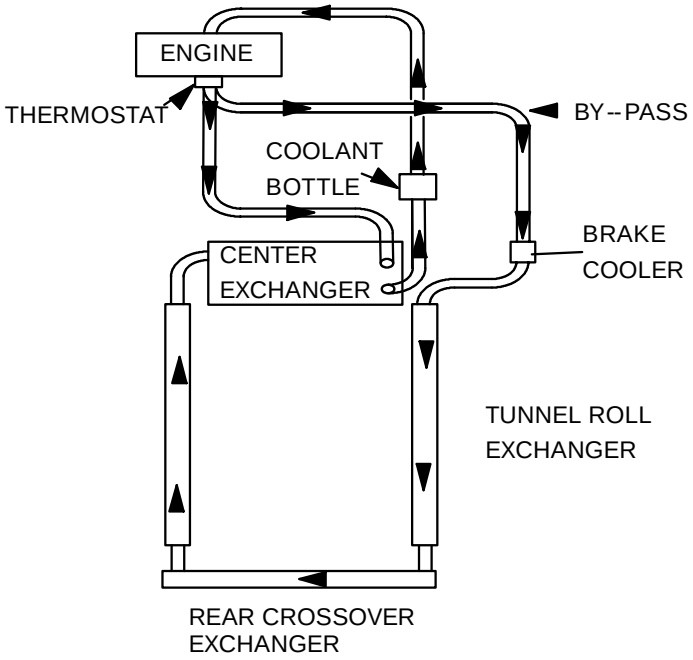
NOTE:When leak testing cooling system, system pressure should not exceed 2 lbs. less than cap pressure. Refer to filling and bleeding procedure on page 3.61.

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Cooling System - 600 RMK

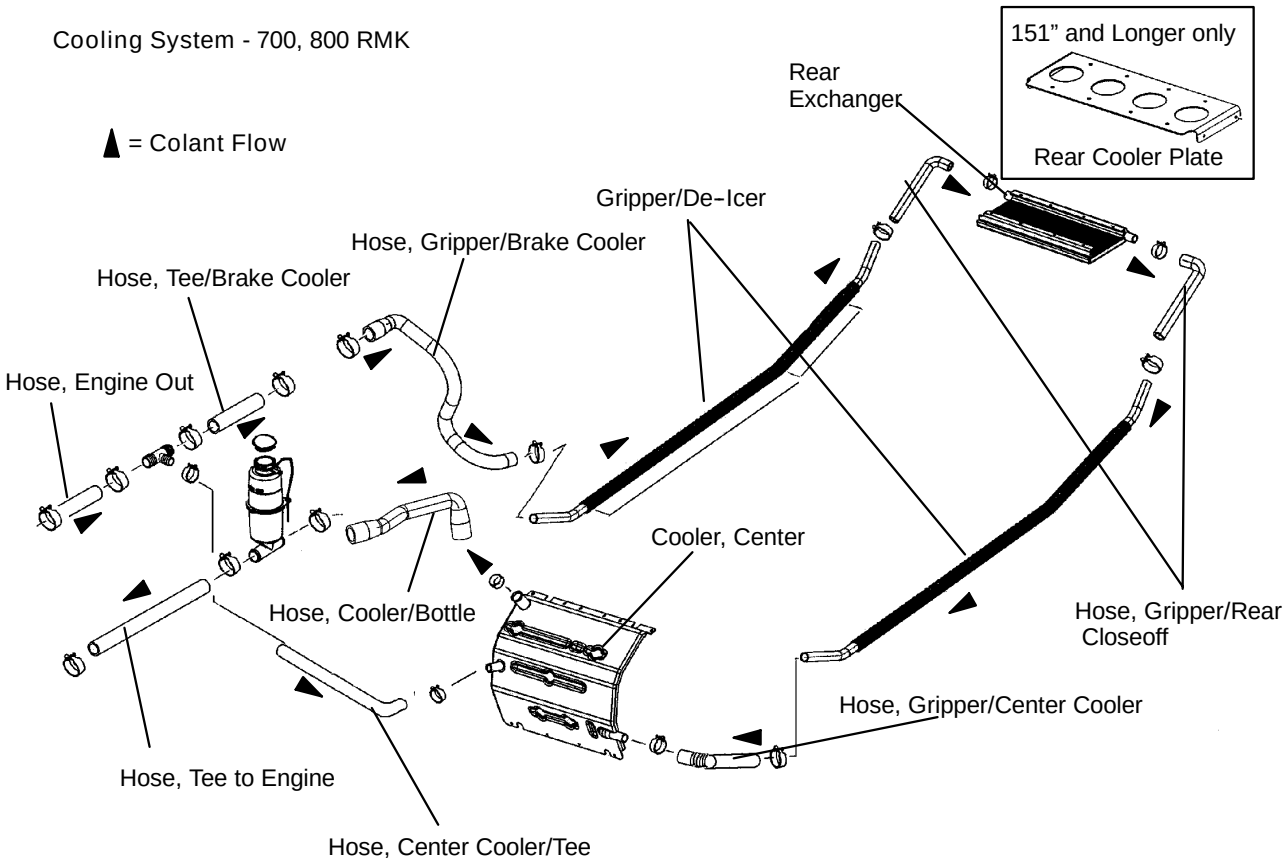


NOTE:When leak testing cooling system, system pressure should not exceed 2 lbs. less than cap pressure. Refer to filling and bleeding procedure on page 3.61.

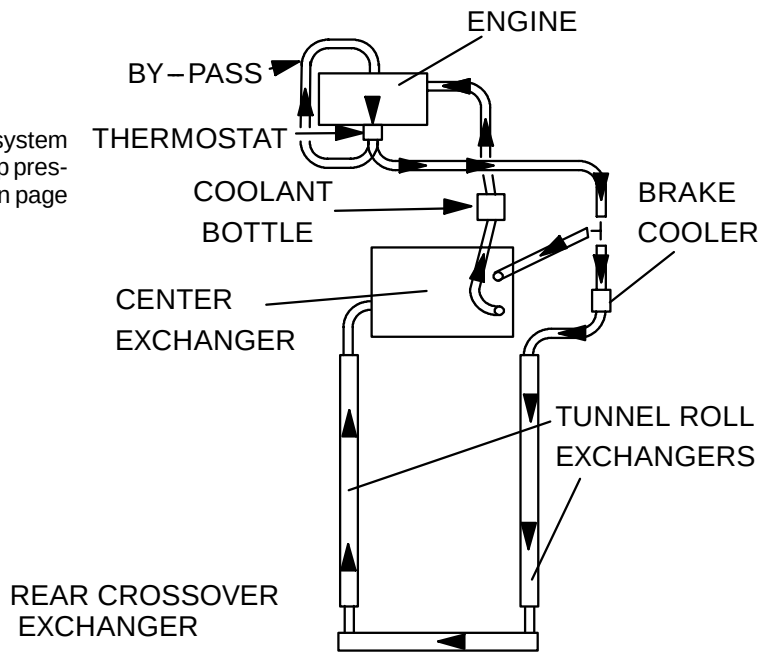


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Cooling System - 700, 800 RMK



NOTE:When leak testing cooling system, system pressure should not exceed 2 lbs. less than cap pressure. Refer to filling and bleeding procedure on page 3.61.



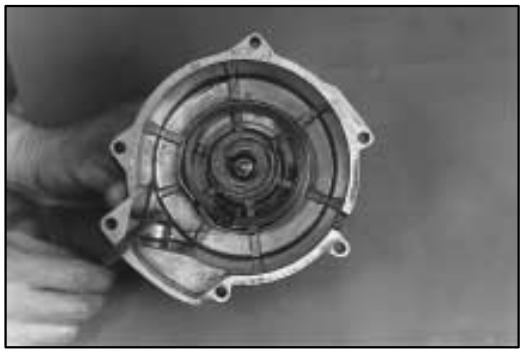
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Recoil Disassembly

CAUTION:

Wear eye protection when servicing recoil. Spring can unwind suddenly and unexpectedly if dislodged.

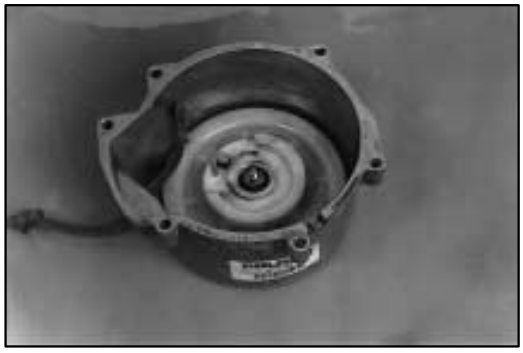
1. Remove recoil handle and allow rope to retract and spring to unwind completely.
2. Remove retaining nut, friction plate, and ratchet pawl from reel face.
3. Lift reel assembly straight up, out of housing. NOTE: If spring tension is relieved and the reel is lifted straight out, the spring will most likely remain in the housing; however,-be sure to heed caution above.



Assembly

1. If the spring was removed, reinstall it by spiraling counterclockwise toward the center.
2. Lubricate center shaft and spring with grease.

Premium All Season Grease PN 2871423 (14 oz.)



3. Wind rope in a counterclockwise direction around outside of reel, as viewed from ratchet side of reel.
4. Pass end of rope through rope guide and slide reel down onto shaft and spring. NOTE: Make sure reel tab engages hook on end of spring.
5. Reinstall ratchet pawl onto reel face. NOTE: Ratchet spring must hold ratchet in retracted position.
6. Reinstall friction plate with one end of friction spring in hole on end of ratchet pawl.
7. Reinstall flange nut and torque to 5 ft. lbs. (6.9 Nm).
8. Pull recoil rope to full extension and align notch on outside edge of reel with housing rope guide hole.
9. Using a needle nose pliers or hooked wire, pull a loop of rope through the notch into center of housing.
10. Holding side of rope loop attached to reel, wind reel counterclockwise until coil bind is felt. Then unwind reel between one and two turns.
11. Pull loop to outside of housing by pulling on rope handle.
12. Allow rope to fully retract and check for normal recoil and ratchet operation.



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Engine Troubleshooting

PROBLEM	PROBABLE CAUSE
Will not start/ hard starting	-Check ignition switch for run position, moisture contamination -Check auxiliary shut-off switch operation -Check fuel supply -Check wiring from engine to coil(s) or spark plug(s) -Check spark plug(s) -Disconnect engine connector to eliminate any shorts that might be in the system -If starter won't work (electric models), check wires from starter solenoid and battery or check battery and battery cables -Open or broken reed valves
Low compression	-Crankcase plug is out -Head gasket faulty -Poor ring sealing, piston damage
No spark	-Spark plug fouled -Secondary coil faulty or wires disconnected; poor ground on secondary coil mount -Primary coil shorted or open -Ignition switch shorted, contaminated with moisture -Auxiliary switch shorted or contaminated with moisture
Engine idles but no acceleration	-Restricted fuel flow/air flow -Clogged main jet -Timing -Clutching -Engine not running on all cylinders
Engine runs but fails to reach maximum RPM	-Clogged fuel filter -Incorrect track tension -Incorrect main jet -Throttle slides not fully open -Chain too tight -Clutching -Excessive driveline friction (HiFax overheating) -Engine not running on all cylinders
Engine runs but fails to idle	-Incorrect air mixture setting -Throttle stop screw incorrectly adjusted -Restricted pilot jet -Low compression -Tight belt -Piston damage -Enricher plunger not seating properly
Engine runs, but overloads with fuel	-Enricher plunger are not seating properly -Fuel pump diaphragm is ruptured (caused by engine backfiring) -Carburetor slides are not synchronized -Main jet too large -Needle and seat not seating properly -Incorrect float level -Check reed valve condition
Carburetion and plug fouling	-Verify all tune up adjustments: carb sync, oil pump adjustment, pilot screw setting, spark plug type and gap, venting for carbs, proper jetting for altitude and temperature, belt tension, clutch operation. If tune up items are correct, check: float level, jet needle position, jet needle wear, inlet needle and seat wear, spark quality, etc.
Engine runs but overheats	-Coolant level low or air in cooling system -Incorrect main jet -Incorrect timing -Incorrect spark plug -Water pump belt loose or broken -Cooling restriction -Inadequate snow for cooling (ice and/or marginal conditions)
Battery will not charge (battery equipped models only)	-Check for faulty connections -Check alternator output -Check diodes (rectifier) -Sulphated battery -Battery electrolyte overfilled or low -Refer to alternator testing in chapter 9, electrical

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Engine Troubleshooting

PROBLEM	PROBABLE CAUSE
Lights don't work	-Engine must be running -Check wiring harness connector -Check for burned out bulbs -Check wiring for shorts or loose connections -Disconnect taillight if headlight works, short is in taillight wiring or taillight
Unit fails to propel itself	-Check belt (center distance) -Check clutch -Check chain -Check drive sprocket assembly -Track frozen or stuck
Track wears unevenly	-Check tension -Check for proper alignment -Check for loose, bent, or broken suspension parts
Chaincase overheating	-Check oil level -Check chain tension and -Check track tension for over-tightness

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CHAPTER 4
FUEL SYSTEM / CARBURETION

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Whenever servicing the carburetor or fuel system, it is important to heed the following warnings.

⚠ WARNING

Gasoline is extremely flammable and explosive under certain conditions.

- Always stop the engine and refuel outdoors or in a well ventilated area.
- Do not smoke or allow open flames or sparks in or near the area where refueling is performed or where gasoline is stored or used.
- Do not overfill the tank. Do not fill the tank neck.
- If you get gasoline in your eyes or if you swallow gasoline, see your doctor immediately.
- If you spill gasoline on your skin or clothing, immediately wash it off with soap and water and change clothing.
- Never start the engine or let it run in an enclosed area. Gasoline powered engine exhaust fumes are poisonous and can cause loss of consciousness and death in a short time.

Jet Part Numbers

The following chart lists main and pilot jets and the part number of each that are presently available.

Mikuni

PILOT JET NO.	PART NO.
25	3130064
30	3130065
35	3130066
40	3130067
45	3130068
50	3130629
55	3130070

Mikuni

PILOT JET NO.	PART NO.
60	3130071

Mikuni

HEX HEAD MAIN JET NO.	PART NO.
80	3130099
85	3130100
90	3130101
95	3130102
100	3130103
105	3130104
110	3130105
115	3130106
120	3130107
125	3130108
130	3130109
135	3130110
140	3130111
145	3130112
150	3130113
155	3130114
160	3130115
165	3130116
170	3130117
175	3130118
180	3130119
185	3130120
190	3130121
195	3130122
200	3130123
210	3130124
220	3130125
230	3130126
240	3130127

Mikuni

HEX HEAD MAIN JET NO.	PART NO.
250	3130128
260	3130129
270	3130130
280	3130131
290	3130132
300	3130133
310	3130134
320	3130135
330	3130136
340	3130137
350	3130138
360	3130139
370	3130290
380	3130140
390	3130480
400	3130141
410	3130599
420	3130142
430	3130143
440	3130144
450	3130145
460	3130146
470	3130147
490	3130148
500	3130149
530	3130150
560	3130151
590	3130152
620	3130153

510N	3131400
520N	3131401
530N	3131402
540N	3131408
550N	3131409
560N	3131410

The “N” series jets have the same flow characteristics as the following.
510N = 540
520N = 580
530N = 600
540N = 620
550N = 660
560N = 700

For Example:Do NOT substitute a 530 Main Jet in place of a 530N . Main Jet, A regular 530 will have a leaner effect than a 530N.

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Jet Needle Part Numbers (Mikuni)

JET NEEDLE NO.	PART NO.
5DP7	3130155
5DT49	3130154
5DP10	3130333
5DP10	3130310
5DT2	3130473
5D78	3130667
5F81	3130528
6CEY6	3130476
6CF1	3130725
6CGY3	3130484
6CGY6	3130652
6DH3	3130470
6DH4	3130402
6DH5	3130391
6DH7	3130329
6DH8	3130645
6DH29	3130462
6DP1	3130156
6DP17	3130374
6EJ26	3130423
6EJ3	3130680
6F4	3130319
6F9	3130378

Needle Jet Part Numbers (Mikuni)

NEEDLE JET NO	PART NO.
P-4 (159)	3130162
P-2 (166)	3130460
P-4 (166)	3130348
P-4 (166)	3130499
P-6 (166)	3130160
P-8 (166)	3130421
Q-2 (166)	3130376
O-4 (169)	3130166
O-4 (169)	3130409
O-6 (169)	3130358
O-6 (169)	3130469
O-8 (169)	3130453
O-8 (171)	3130035
P-0 (225)	3130579
P-2 (255)	3130608
P-2 (259)	3130161
P-0 (247)	3130671
P-2 (247)	3130672
P-4 (247)	3130641
P-6 (247)	3130655
P-8 (247)	3130382
Q-0 (247)	3130414
Q-2 (247)	3130165
Q-4 (247)	3130603
Q-8 (247)	3130485
R-0 (247)	3130477
P-0 (286)	3130607
P-2 (286)	3130608
O-4 (286)	3130635
O-6 (480)	3130429
O-8 (480)	3130683
P-2 (480)	3130675
P-4 (480)	3130639
Q-6 (480)	3130618
P-8 (513)	3130510

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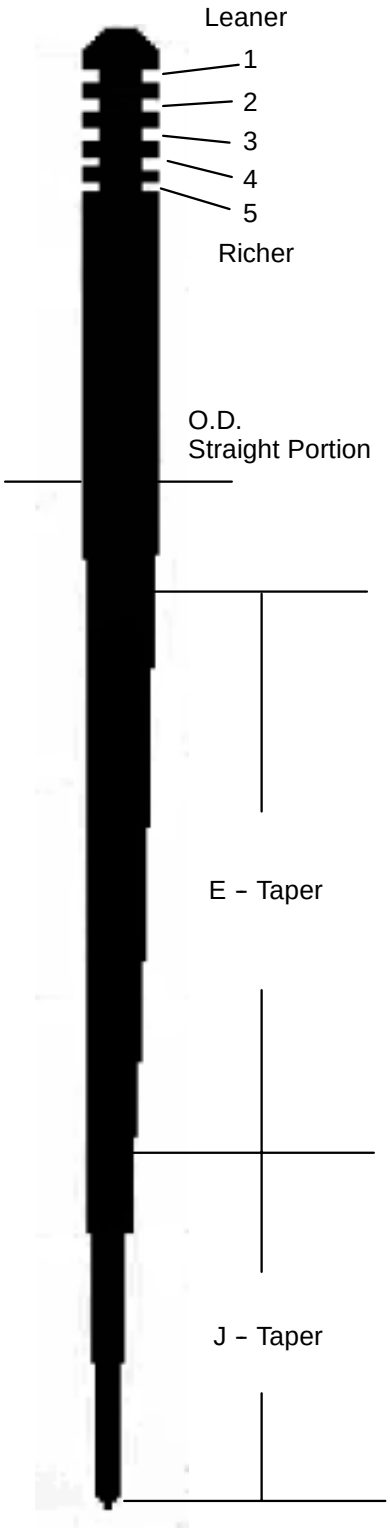
Mikuni TM 38 / TM 40 Jet Part Numbers

DESCRIPTION	PART NUMBER	DESCRIPTION	PART NUMBER
Jet Needles		Pilot Air Jets Cont.	
Jet Needle J8-9FH04-57	3130794	Pilot Air Jet 1.0	3131257
Jet Needle J8-9EH01-57	3130795	Pilot Air Jet 1.1	3131258
Jet Needle J8-9DH01-54	3130796	Pilot Air Jet 1.2	3131259
Jet Needle J8-9CJB01-50	3130797	Pilot Air Jet 1.3	3131260
Jet Needle J8-8BEY01	3131250	Pilot Air Jet 1.4	3131261
Jet Needle J8-9DFH06-57	3131253	Pilot Air Jet 1.5	3131262
Jet Needle J8-9DFH07-60	3131268	Pilot Air Jet 1.6	3131263
Jet Needle J8-9DFH10-57	3131313	Pilot Air Jet 1.7	3131264
Jet Needle J8-9DGI01-60	3131377	Pilot Air Jet 1.8	3131265
Jet Needle J8-9DGJ02-57	3131378	Pilot Air Jet 1.9	3131266
Jet Needle J8-EFH01-60	3131207	Pilot Air Jet 2.0	3131267
Jet Needle J8-9EFY02-61	3131202	Piston Valves	
Pilot Air Jets (Short)		Piston Valve 1.5	3130940
Pilot Air Jet 0.5	3130773	Piston Valve 2.0	3130789
Pilot Air Jet 0.6	3130774	Piston Valve 2.5	3130790
Pilot Air Jet 0.7	3130775	Piston Valve 3.0	3130791
Pilot Air Jet 0.8	3130776	Piston Valve 3.5	3130792
Pilot Air Jet 0.9	3130777	Piston Valve 4.0	3130793
Pilot Air Jet 1.0	3130778	New Main Jets	
Pilot Air Jet 1.1	3130779	Main Jet 510N	3131400
Pilot Air Jet 1.2	3130780	Main Jet 520N	3131401
Pilot Air Jet 1.3	3130781	Main Jet 530N	3131402
Pilot Air Jet 1.4	3130782	"N" Series main jets are designated "N" for the flow characteristics.	
Pilot Air Jet 1.5	3130783	The 510N flows the same as the 540 main jet.	
Pilot Air Jet 1.6	3130784	The 520N flows the same as the 560 main jet.	
Pilot Air Jet 1.7	3130785	The 530N flows the same as the 600 main jet.	
Pilot Air Jet 1.8	3130786	For Example: You should NOT substitute a 530 Main Jet for a 530N, a regular 530 will have a leaner effect than the 530N.	
Pilot Air Jet 1.9	3130787	Starter Jets	
Pilot Air Jet 2.0	3130788	Starter Jet 130	3130805
Pilot Air Jets (Long)		Starter Jet 135	3130767
Pilot Air Jet 0.5	3131255	Starter Jet 140	3130768
Pilot Air Jet 0.6	3131249	Starter Jet 145	3130769
Pilot Air Jet 0.7	3131256	Starter Jet 150	3130770
Pilot Air Jet 0.8	3131254	Starter Jet 155	3130771
Pilot Air Jet 0.9	3131203	Starter Jet 160	3130772

The part numbers for main jets and pilot jets are the same as Mikuni VM round slide carburetors.

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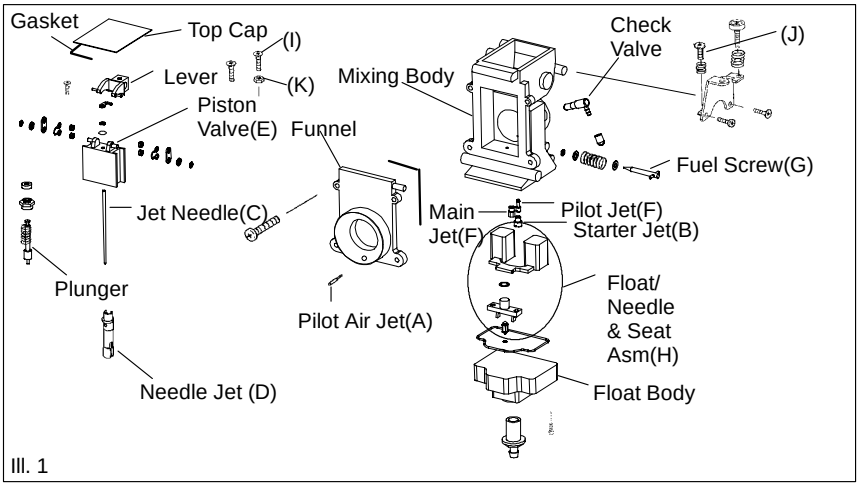
Mikuni TM 38 / TM 40 Jet Needle Overview



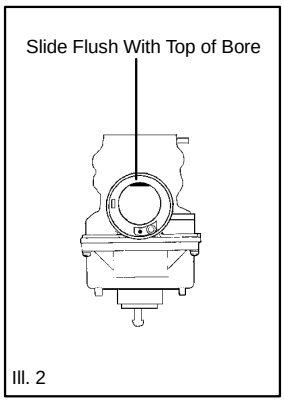
This needle (example) is a 9DH01–57. The first number is the approximate overall length in 10mm increments of the jet needle. The 9 indicated the needle is approximately 90mm but less that 100mm in length. The letters on the jet needle indicate the angle of both tapers. The first letter designates the taper angle of the top section (closest to the grooves) and the second letter designates the angle of the bottom taper. The taper angles are graduated in 15” (15 minute) increments. The jet needle marked 9DH01–57 would have a top taper of 1_0” and a bottom taper of 2_0’. The number following the letters on the jet needle is the manufacture’s lot number and it varies with individual jet needles. The last number, 57, indicates that the outside diameter is 2.57mm. The smaller the O.D., the richer the mixture.

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Mikuni TM 38 / TM 40 Overview



Ill. 1



Ill. 2

The part numbers for main jets and pilot jets are the same as Mikuni VM round slide carburetors.

The advantages of the TM flatslide system include improved throttle response and a significant reduction in throttle effort due to rack style carbs and the use of cable cam. The following are the main components of TM carburetors and the functions of each.

Pilot Air Jet (A): The pilot air jet controls the amount of air entering the engine in the idle circuit. The pilot air jet size is imprinted on it. Bigger pilot air jets allow more air to enter, leaning the idle mixture. If engine loads up at idle, first try turning fuel screw in. If not correct, try larger pilot air jet.

Starter Jet (B): The starter jet's function is to meter fuel entering the engine when choked. Larger numbered starter jets pass more fuel, therefore more fuel will enter the system when jetting to a larger size. Like the pilot air jet, the jet size is imprinted.

Jet Needle (C): The jet needle performs the same functions as on Mikuni VM carburetors. However, the needles in the TM-38 carburetors are longer and are not interchangeable with VM needles. To raise or lower the needle, remove the top cap (D) and loosen the 2.5mm allen screw holding the needle in place. Reach inside with a long nose pliers and pull the needle out. The C-clip can then be adjusted for the desired effect. There is a 1mm thick white washer on top of jet needle that is staked in the throttle slide.

Needle Jet (D): The needle jet is press fit into carbs and is not replaceable.

Piston Valve(E): The piston valve operates in the same manner as Mikuni VM carburetor round slide valves.

Main Jet and Pilot Jet(F): The main jets (hex) and pilot jets (air bleed type) are identical in style and function as the Mikuni VM carbs. There is washer on main jet. Do not lose washer upon disassembly.

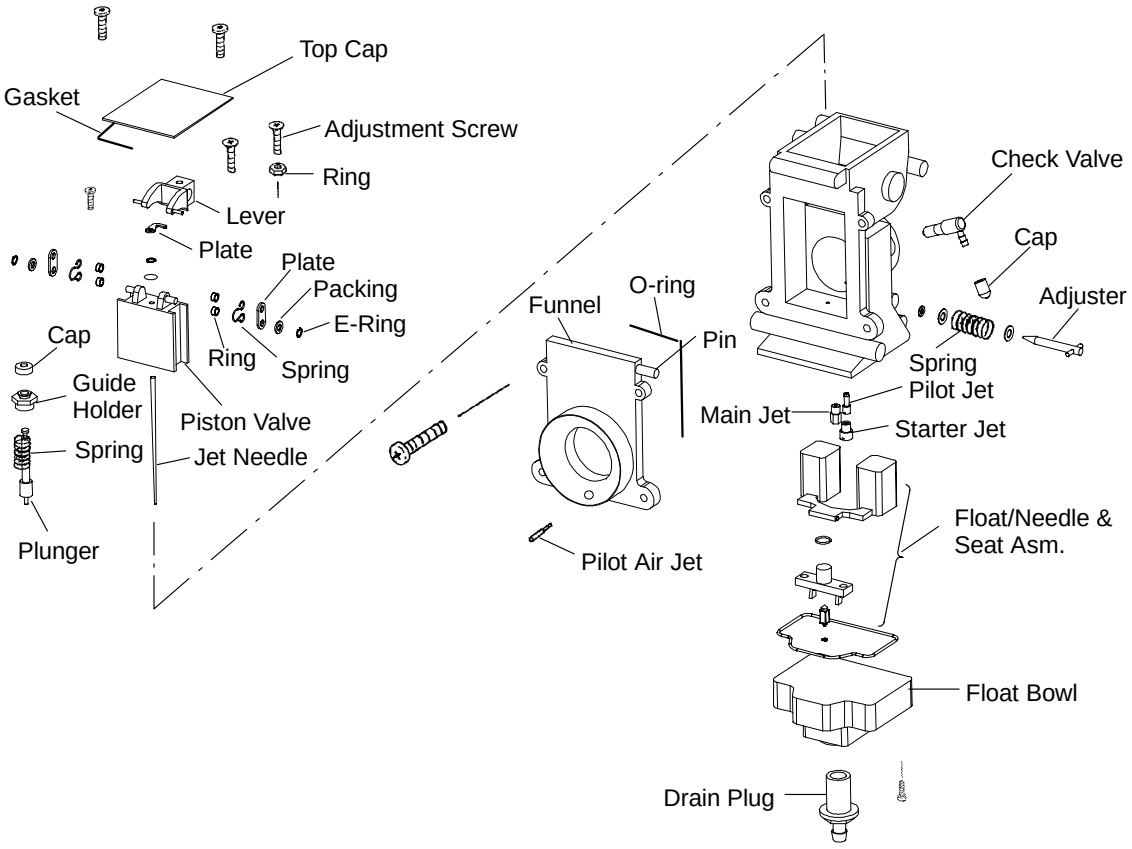
Fuel Screw(G): The fuel screw controls the low speed air/fuel mixture at idle. Turning the fuel screw out makes the mixture richer and can be adjusted up to five turns out.

Float/Needle & Seat Assembly(H): The float/needle & seat are sold as an assembly and cannot be replaced as individual components. The float level is pre-set in the molding and cannot be adjusted. WARNING: DO NOT pressurize the fuel system by forcing compressed air through the fuel tank. Forcing air through the needle and seat will cause damage and the float/needle & seat assembly will have to be replaced.

Carburetor Synchronization: Remove the top caps on all carburetors. In the body of the carburetors, there is a phillips head set screw(I) that connects the slide lever to the throttle lever shaft. The carburetor with the fixed set screw is the base carb (middle carb on triples, PTO carb on twins) and the remaining carbs are synchronized to it. Carburetor synchronization is measured at wide open throttle. Open the throttle to wide open. The bottom of the slide should be flush with the top of the throttle bore (see Ill. 2). If it is not flush, locate the wide open throttle stop screw(J) and turn it until the base carburetor is set flush. Loosen the phillips head set screw in the remaining carburetor(s). Turn the adjusting nut(K) that surrounds the set screw until the throttle slide is set the same as the base carburetor. Tighten all set screws and replace the top caps making sure gaskets are properly positioned.

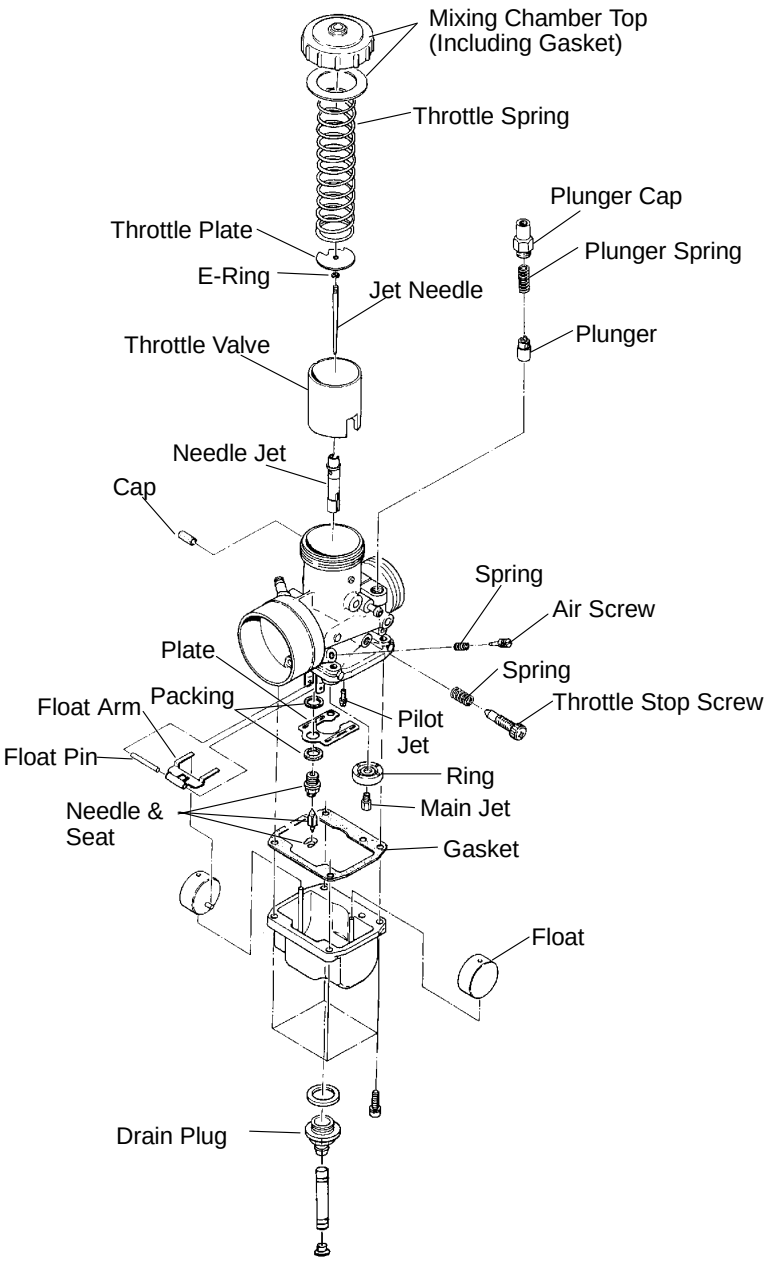
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Mikuni TM 38 / TM 40 Exploded View



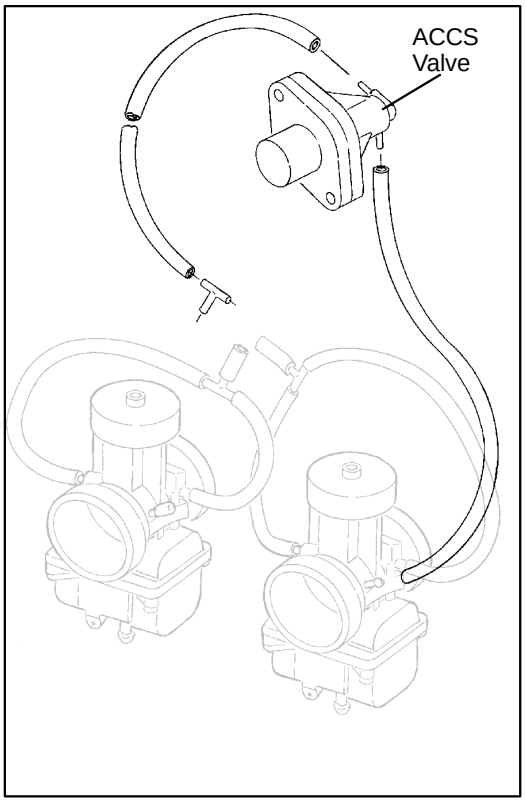
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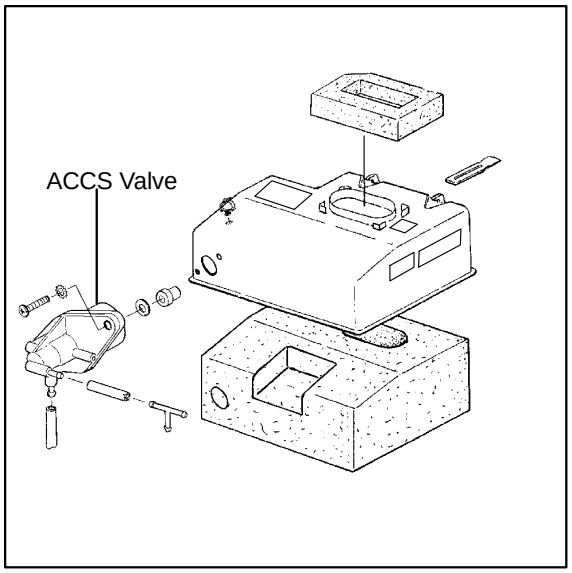
Mikuni VM 34SS Exploded View



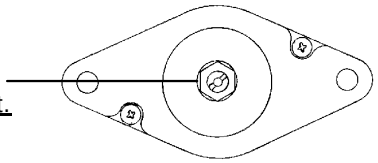
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Altitude Compensating Carburetor System (ACCS)





Do not change calibration setting
or serious engine damage may result.



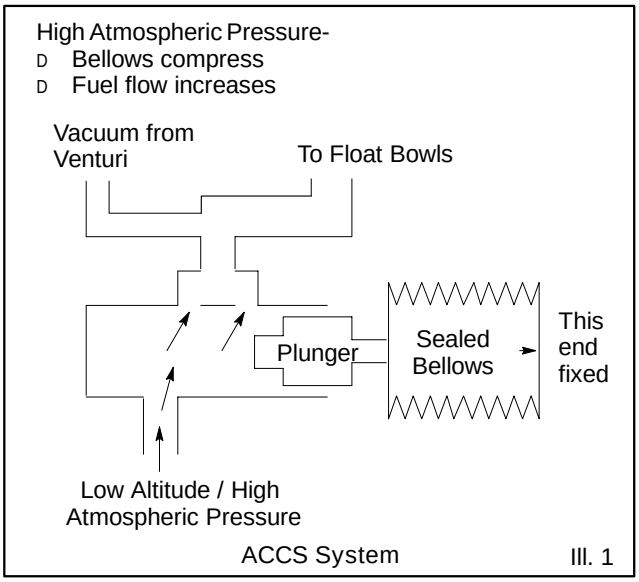
ACCS valves cannot be interchanged between models. When replacing a faulty valve, be sure the identification number stamped on the valve body is correct.

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Altitude Compensating Carburetor System (ACCS)

The Altitude Compensating Carburetor System (ACCS) is designed to automatically compensate for changes in altitude. This allows the snowmobile to operate in changing elevations without having to change jets, although extreme temperatures may require re-jetting for optimum performance. Refer to the jetting compensation chart in the specifications sections.

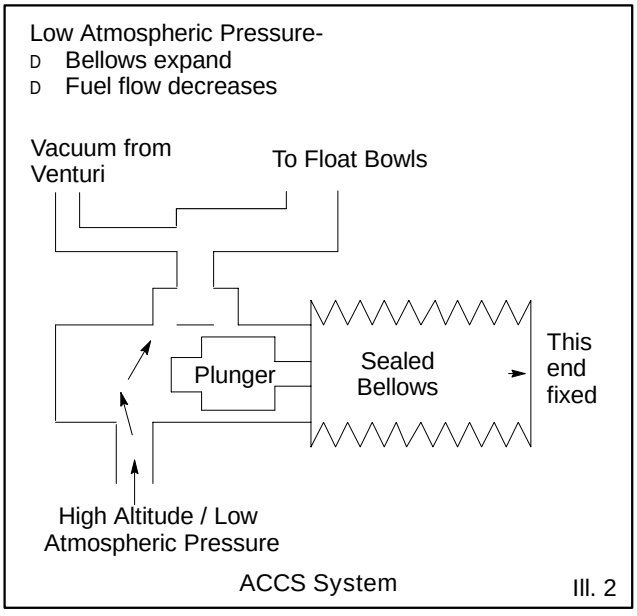
A vacuum line is connected to the float bowl. The ACCS valve is connected to this line via the 4-way manifold. At low altitude the ACCS valve supplies atmospheric pressure to the vacuum line and the float bowl (see Ill. 1).



Ill. 1

At high altitudes the bellows expand, moving the plunger to the left and closing off some of the passageways through the ACCS valve (see Ill. 2). This prevents atmospheric pressure from reaching the float bowl, allowing the vacuum line to reduce the pressure in the float bowl. This reduces the amount of fuel supplied through the carburetor, preventing the mixture from becoming too rich.

NOTE: The ACCS valve is calibrated specifically for the model it was intended. There are no adjustments for the valve, and it should not be tampered with in any way.



Ill. 2

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Explanation of Gasoline Volatility

One of the sometimes misunderstood properties of gasoline is its volatility, or ability to vaporize at different ambient temperatures and altitudes during the year.

When gasoline is blended, it is given a Reed Vapor Pressure (RVP) number which reflects its ability to vaporize or mix with air at a given temperature range. Gasoline vapor pressure is measured by putting a sample of fuel inside a closed container and applying a specified amount of heat to the container for a certain amount of time. RVP will vary from about 7.0 PSI during the summer to approximately 13.5 PSI during the colder months. Service stations selling a large volume of fuel will normally have the correct blend to work well at all times throughout the year in their local area.

When the weather is very cold, gasoline must be able to vaporize very quickly in order for an engine to start and warm up properly. If summer blend fuel is being used in the winter, little or no vaporization will occur. Droplets will form causing flooding and very hard starting.

If winter blend fuel is being used during the summer months, it may cause vapor lock (boiling fuel) inside the fuel lines, fuel pump, or carburetor. This will cause warm engine driveability problems and hard starting when warm. Some states are limiting the Reid Vapor number to 9.0 PSI year around to help meet evaporative emissions standards.

Warm Weather



Cold Weather

Maximum Reid Vapor		Ambient Air Temp. Range	
Class	Pressure	Low	High
A	7.0 PSI	60° F	110° F +
B	9.0 PSI	50° F	110° F
C	10.5 PSI	40° F	97° F
D	12.0 PSI	30° F	85° F
E	13.5 PSI	20° F	69° F

Low Vaporization Rate



High Vaporization Rate

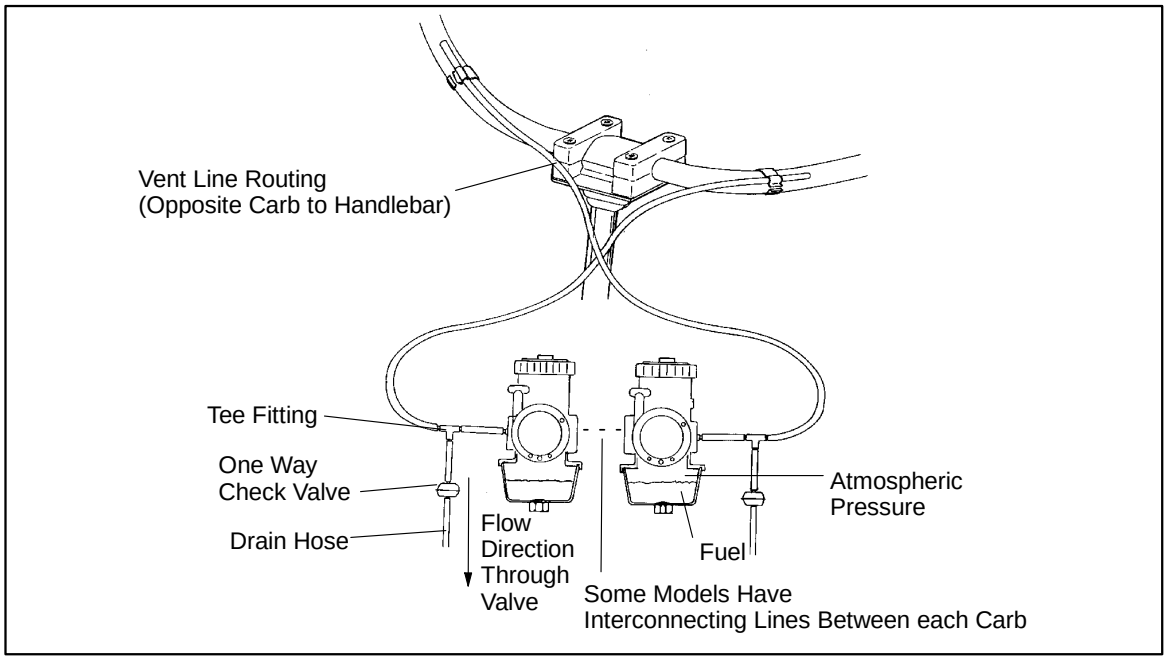
Add 2.4° F for each 1000 feet above seal level.

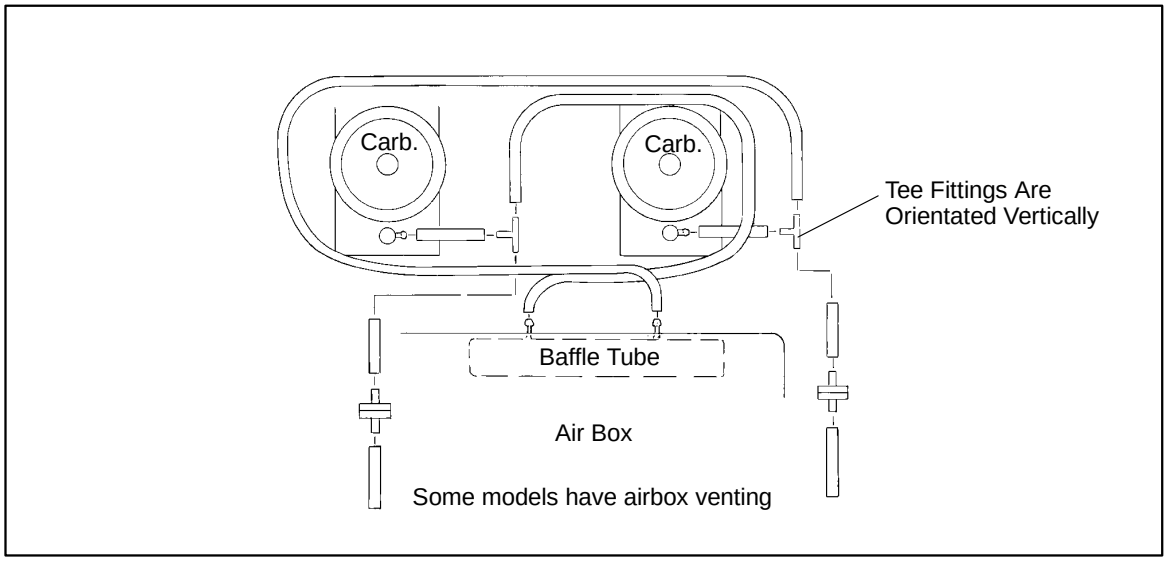
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Float Chamber Venting

Fuel flows through a carburetor by creating a pressure difference between the venturi and the float bowl. The greater the pressure difference, the greater the fuel flow. On some models the float bowl is vented to the handlebars. This provides consistent atmospheric pressure for a consistent fuel flow. If the vent lines become kinked, plugged, or exposed to fluctuating pressures (under hood) the pressure difference will change, causing erratic fuel flow.

Polaris has airbox venting on some models. The vent lines are connected to a baffle inside the airbox. This provides a more consistent pressure difference between the carburetor venturi and the float bowl as the vacuum inside the airbox changes. For example, if the airbox foam filter becomes restricted with snow when riding in powder, the airbox vacuum increases. Without airbox venting, the pressure difference would increase substantially, choking or flooding the engine. With airbox venting, the pressure difference remains the same, creating a slightly leaner mixture to compensate for reduced air flow.





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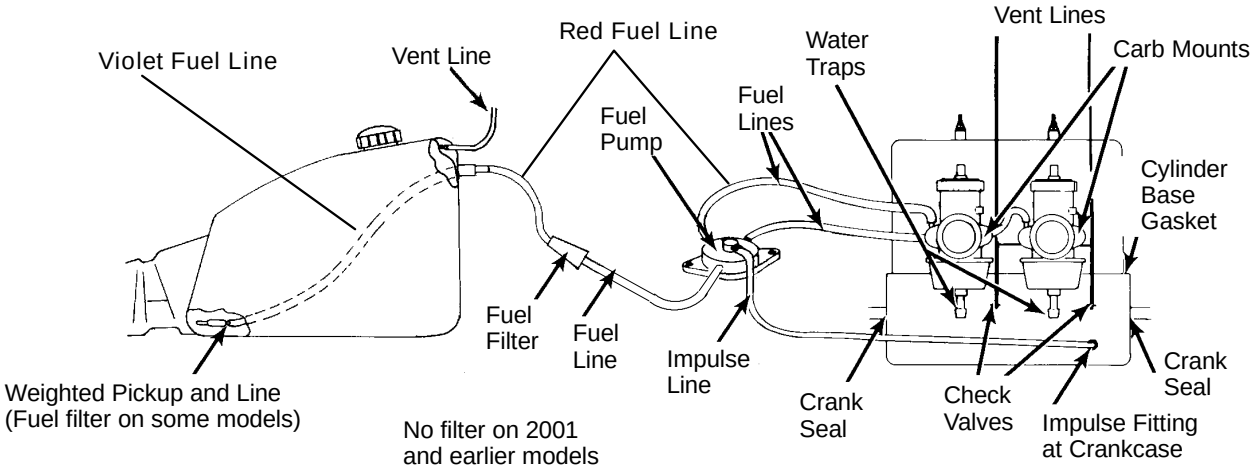
Fuel Delivery System - Typical

The fuel system contains many components which directly affect fuel mixture and driveability. When performing diagnosis or carburetor maintenance, the entire fuel delivery system should be inspected. The illustration below shows parts of the system requiring periodic maintenance to ensure there is no fuel or air leaks present.

Fuel filters should be replaced at least once per season. More often if any contamination is suspected.

Fuel lines should be replaced every other season. More often if they become brittle or swollen. Fittings should be inspected for cracks or leaks. Do not use pliers or other tools that may damage fuel lines when installing or removing fuel lines.

Test run and check the fuel system for leaks any time parts are replaced. Verify that all lines are routed correctly and away from any moving parts.



NOTE:Some models use fuel filters are located inside the fuel tank. To inspect/replace filter:

- Remove fuel cap.
- Using a long clean wire, bend into a fish hook shape. Pull the fuel line that is inside of the tank up through the filler hole.
- Inspect filter on end of fuel pick up line. Replace if worn or clogged.

Red fuel line is the exterior line for outside the tank. The violet line is the interior line for inside the fuel tank. They cannot be interchanged!

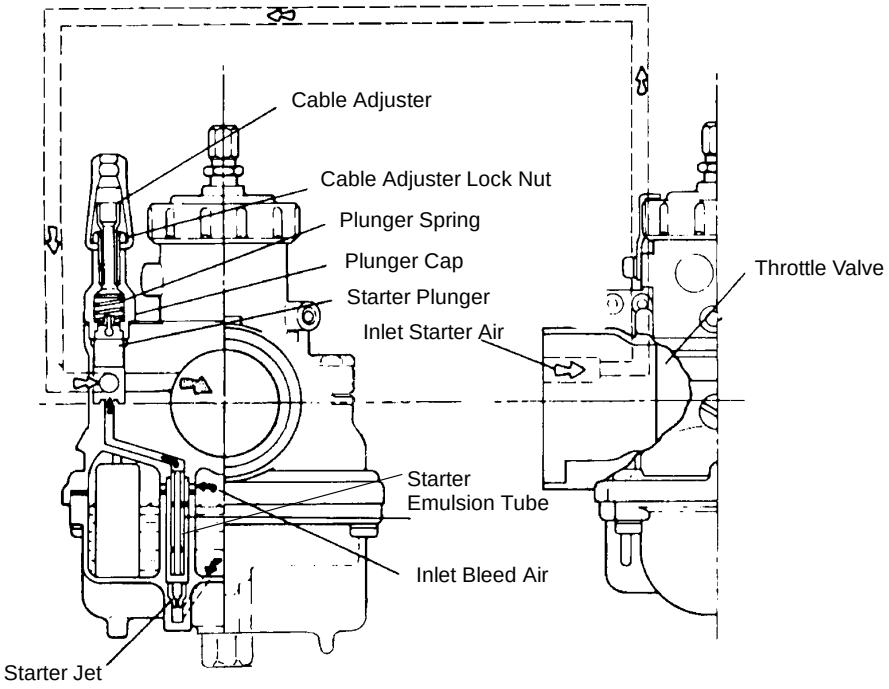
NOTE: The violet line used inside the tank will fade and turn clear after a relatively short time. This does not affect the function or durability of the line.

When replacing fuel line, be sure to use the correct color line for inside or outside the fuel tank. Also, be very careful not to bend fuel line to a point of kinking it. If it becomes kinked, it must be replaced. Always inspect fuel lines when replacing, or if carbs, carb racks, or fuel pumps are removed from chassis.

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Mikuni VM Carburetor

Mikuni carburetors use a starter enricher system rather than a choke. In this type of carburetor, fuel and air for starting the engine are metered with entirely independent jets. The fuel metered in the starter jet is mixed with air and is broken into tiny particles in the emulsion tube. The mixture then flows into the plunger area, mixes again with air coming from the air intake port for starting and is delivered to the engine through the fuel discharge nozzle in the optimum air/fuel ratio. The starter is opened and closed by means of the starter plunger. The starter type carburetor is constructed to utilize the negative pressure of the inlet pipe, so it is important that the throttle valve is closed when starting the engine.

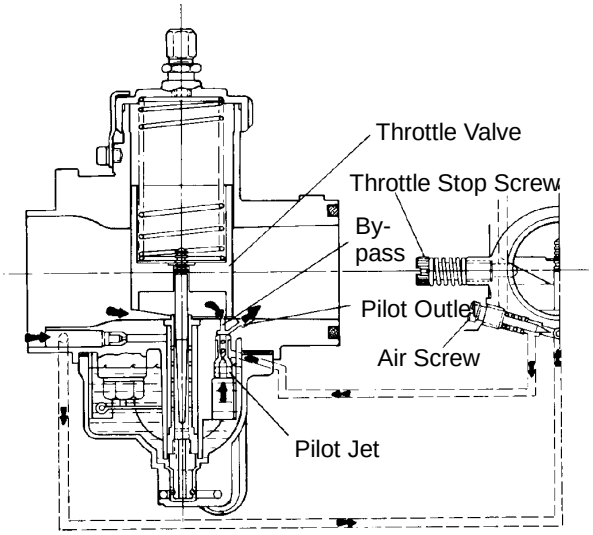


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The pilot system's main function is to meter fuel at idle and low speed driving. Though its main function is to supply fuel at low speed, it does feed fuel continuously throughout the entire operating range.

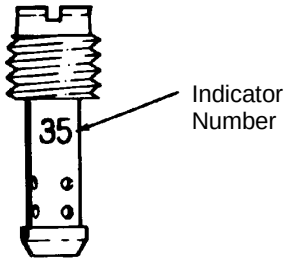
Fuel for the pilot jet is drawn from the float bowl, mixed with air regulated by the air screw, and delivered to the engine through the pilot outlet.

The mixture is regulated to some degree by adjusting the air screw. When the air screw is closed, the fuel mixture is made richer as the amount of air is reduced. When the air screw is opened, the mixture is made more lean as the amount of air is increased.



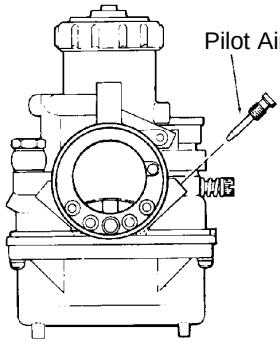
Pilot Jet

From idling to low speeds, the fuel supply is metered by the pilot jet. There are several air bleed openings in the sides of the pilot jet which reduce the fuel to mist. The number stamped on the jet is an indication of the amount of fuel in cc's which passes through the jet during a one minute interval under a given set of conditions.



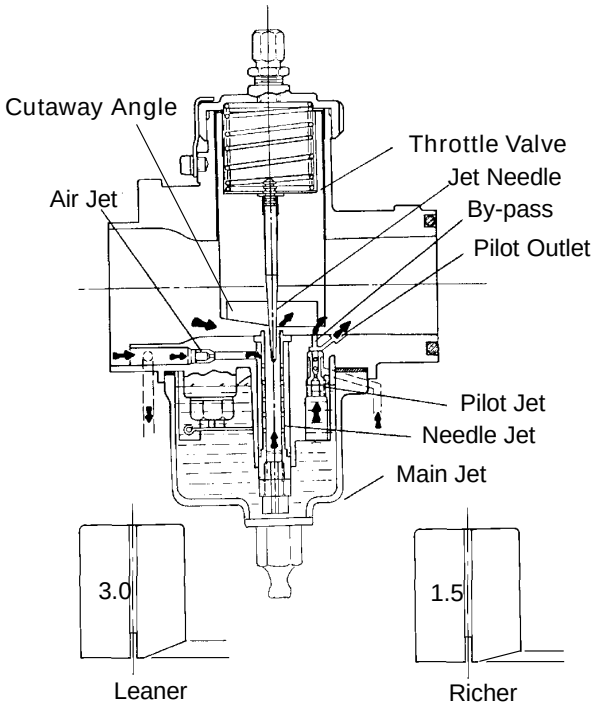
Pilot Air Screw

The pilot air screw controls the fuel mixture from idle to low speeds. The tapered tip of the air screw projects into the air passage leading to the pilot jet air bleeds. By turning the screw in or out, the cross sectional area of the air passage is varied, in turn varying the pilot jet air supply and changing the mixture ratio.



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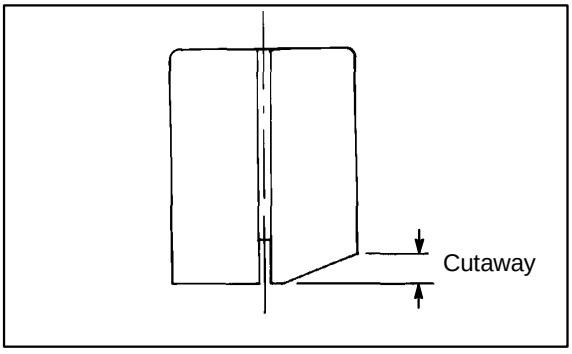
Throttle valve cutaway effect is most noticeable at 1/4 throttle opening. The amount of cutaway is pre-determined for a given engine to maintain a 14:1 air/fuel ratio at part throttle. A steep angle would indicate a fairly lean mixture because there is less resistance to air flow. A flat angle would provide a much richer mixture because there is more resistance to air flow. The venturi shape can be adjusted for each engine's breathing characteristics by using a different valve cutaway angle. A number will be stamped into the bottom of the valve (e.g. 2.5) indicating the size of the cutaway. The higher the number, the steeper the angle. (Leaner mixture).



Throttle Valve

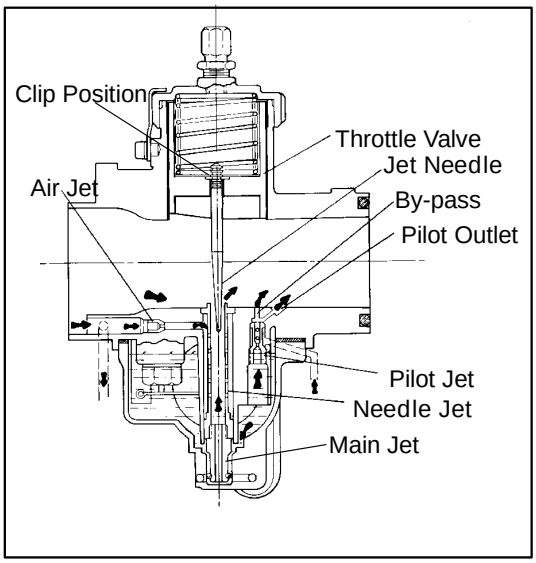
The throttle valve controls the rate of engine air intake by moving up and down inside the main bore. At small throttle openings, air flow control is performed chiefly by the cutaway. By controlling air flow the negative pressure over the needle valve is regulated, in turn varying the fuel flow.

The throttle valves are numbered 1.0, 1.5, 2.0, etc., according to the size of the cutaway. The higher the number, the leaner the gasoline/air mixture.



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The jet needle and needle jet have the most effect between 3/8 and 3/4 throttle opening. Some mixture adjustment can be accomplished by changing the location of the "E" clip on the needle. Moving the clip down raises the needle in the jet passage and richens the mixture. Moving the clip up lowers the needle in the jet passage and leans the mixture. Letter and number codes are stamped into the needle and the jet indicating sizes and tapers (needles only) of each.



Jet Needle / Needle Jet - Fig. 1

The jet needle tapers off at one end and the clearance between the jet needle and the needle jet increases as the throttle valve opening gets wider. The air/fuel mixture ratio is controlled by the height of the "E" ring inserted into one of the five slots provided in the head of the jet needle. The chart at right shows the variation of fuel flow based on the height of the "E" ring.

Needle Jet - Fig. 2

The needle jet works in conjunction with the jet needle to regulate fuel flow rate. An air bleed opening in the side of the needle jet brings in air measured by the air jet. This air initiates the mixing and atomizing process inside the needle jet. Mixing is augmented by a projection at the needle jet outlet, called the primary choke. The letter number code stamped on the jet indicates jet inside diameter.

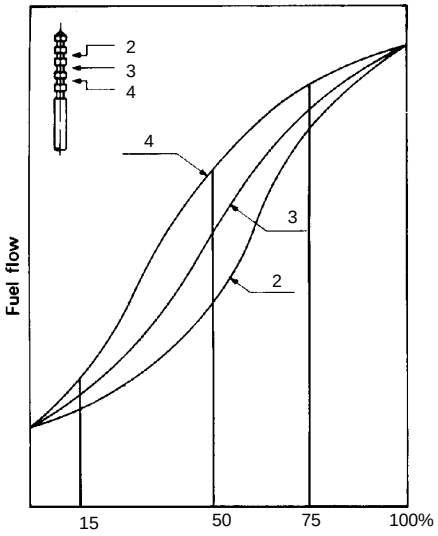


Fig. 1

Throttle Opening vs. Fuel Flow - Fig. 3

In a full throttle condition the cross sectioned area between the jet needle and the needle jet is larger than the cross sectioned area of the main jet. The main jet therefore has greater control over fuel flow.

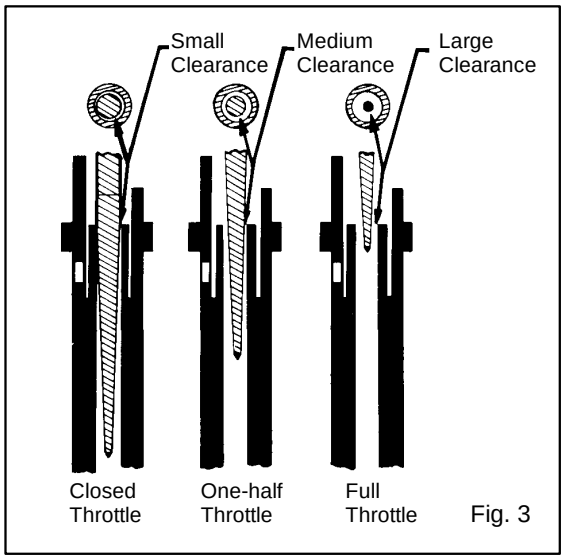


Fig. 3

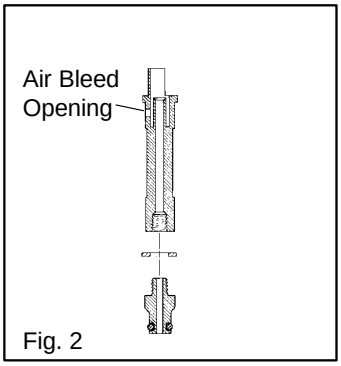
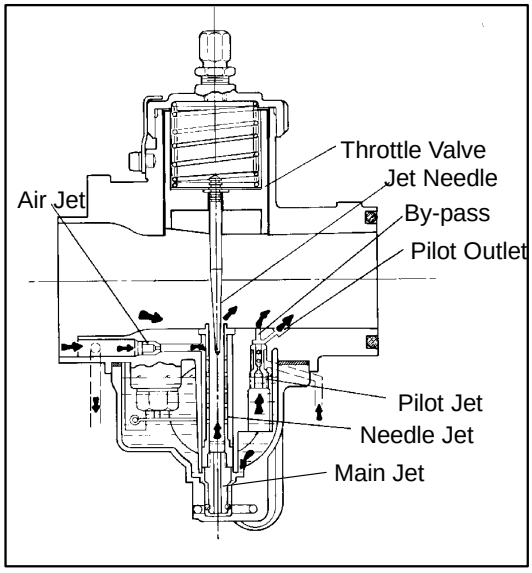


Fig. 2

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The main system is designed to deliver fuel between low speed and high speed operation. This system is made up of the jet needle, needle jet, and main jet. The main system begins to take effect as soon as there is enough air flow into the carburetor venturi to draw fuel up through the main jet and needle jet assembly. This system works in conjunction with the needle jet system.

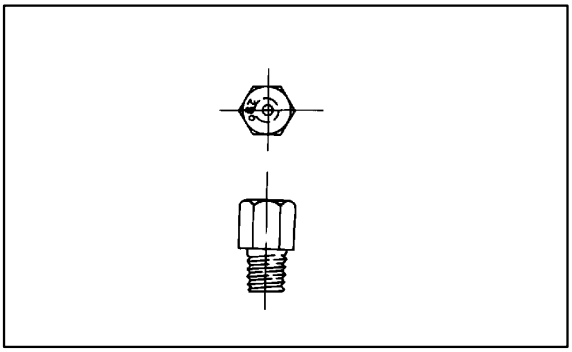
During low speed driving, there is very little clearance between the jet needle and the needle jet; therefore, very little fuel from the main jet can pass between the jet needle and the needle jet. As the throttle valve opening is increased, the tapered jet needle is raised farther out of the needle jet, allowing greater fuel flow. Under full throttle opening, the cross sectioned area of clearance between the jet needle and the needle jet becomes greater than the cross sectioned area of the main jet. Thus the main jet is now controlling the amount of fuel flow.



Main Jet

When the throttle opening becomes greater and the area between the needle jet and jet needle increases, fuel flow is metered by the main jet. The number on the jet indicates the amount of fuel CCs which will pass through it in one minute under controlled conditions. Larger numbers give a greater flow, resulting in a richer mixture.

Main jets are screwed directly into the needle jet base.



Jetting Guidelines

Changes in altitude and temperature affect air density, which is essentially the amount of oxygen available for combustion. In low elevations and cold temperatures, the air has more oxygen. In higher elevations and higher temperatures, the air is less dense.

Carburetors on most Polaris models are calibrated for an altitude of 0-3000 ft (0-900 meters) and ambient temperatures between -20° to +10° F (-29° to -12° C). All carburetors must be re-calibrated if operated outside the production temperature and/or altitude range. The main jet installed in production is not correct for all altitudes and/or temperatures.

CAUTION:

A main jet that is too small will cause a lean operating condition and may cause serious engine damage. Jet the carburetors carefully for elevation and temperature according to the jetting charts in this manual.

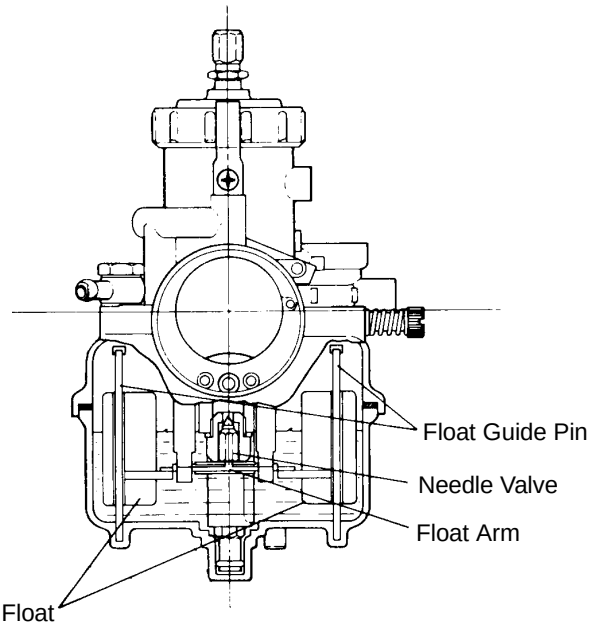
NOTE: It is the owner's responsibility to ensure that the correct jets are installed in the machine for a geographical area. Be very careful when jetting down in warm weather. As the weather turns colder it will be necessary to re-jet upward to prevent engine damage. When selecting the proper main jet always use the lowest elevation and temperature that is likely to be encountered.

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The function of a carburetor is to produce a combustible air/fuel mixture by breaking fuel into tiny particles in the form of vapor, to mix the fuel with air in a proper ratio, and to deliver the mixture to the engine. A proper ratio means an ideal air/fuel mixture which can burn without leaving an excess of fuel or air. Whether the proper mixture ratio is maintained or not is the key to efficient engine operation.

The engine of a vehicle is operated under a wide range of conditions, from idling with the throttle valve remaining almost closed, to full load or maximum output with the throttle valve fully opened. In order to meet the requirements for the proper mixture ratio under these varying conditions, a low speed fuel system, or pilot system, and a main fuel system are provided in Mikuni VM type carburetors.

The Mikuni carburetor has varying operations depending upon varying driving conditions. It is constructed of a float system, pilot system, main system, and starter system or initial starting device.

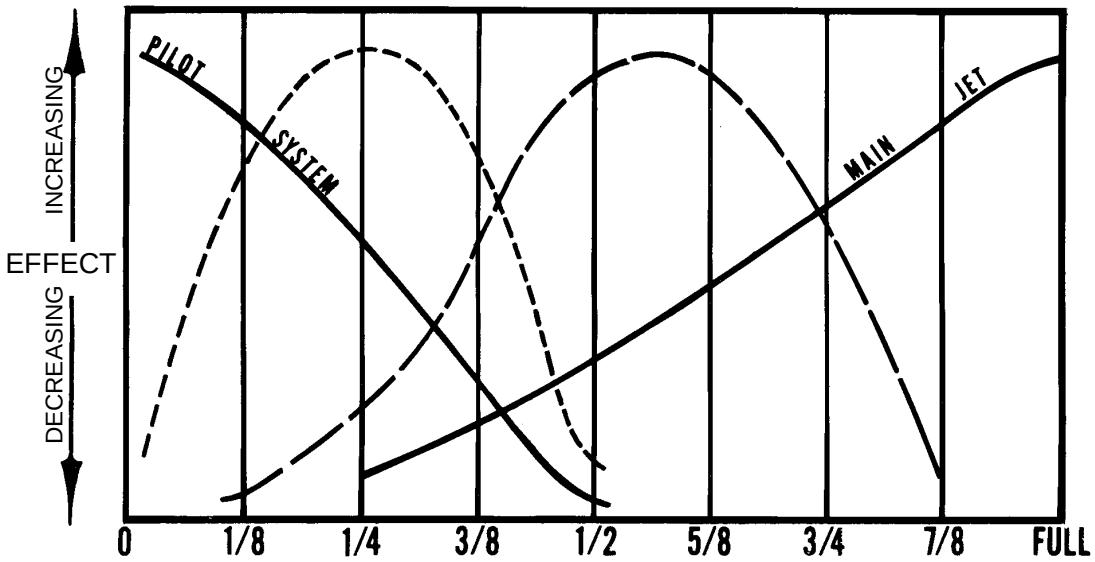


Float System

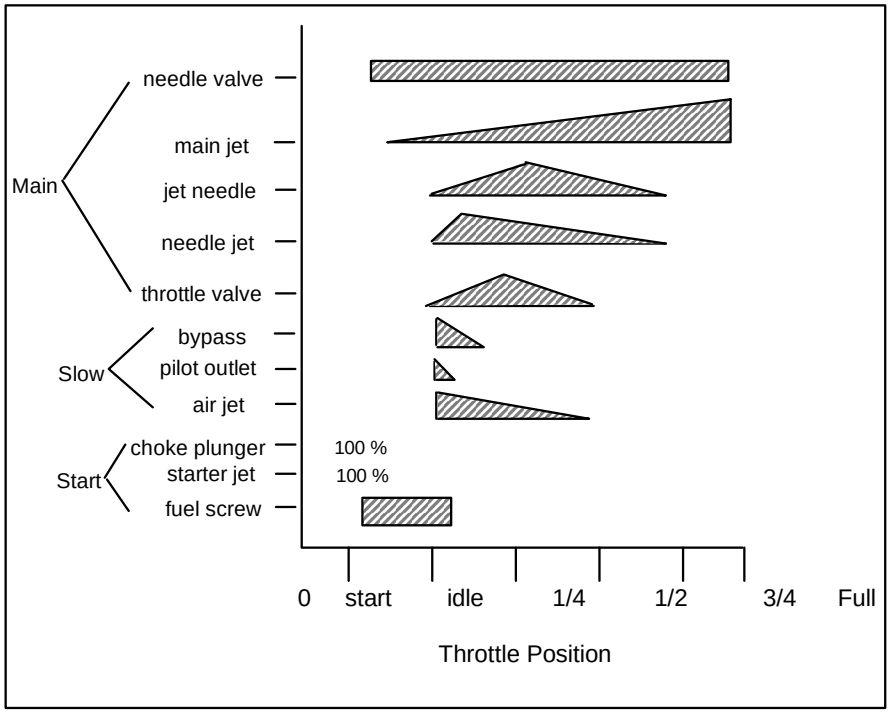
The float system is designed to maintain a constant height of gasoline during operation. When the fuel flowing from the fuel pump into the float chamber through the needle valve reaches the constant fuel level, the floats rise. When the buoyancy of the float and the fuel pressure of the fuel pump balance, the needle valve sticks fast to the needle seat, preventing further delivery of gasoline, thereby holding the standard level of gasoline.

The fuel level in the bowl assists in controlling the amount of fuel in the fuel mixture. Too high a level allows more fuel than necessary to leave the nozzle, enriching the mixture. Too low a level results in a leaner mixture, since not enough fuel leaves the nozzle. Therefore, the predetermined fuel level should not be changed arbitrarily.

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Polaris TM-38 / TM 40 Mikuni component effect versus throttle opening chart.



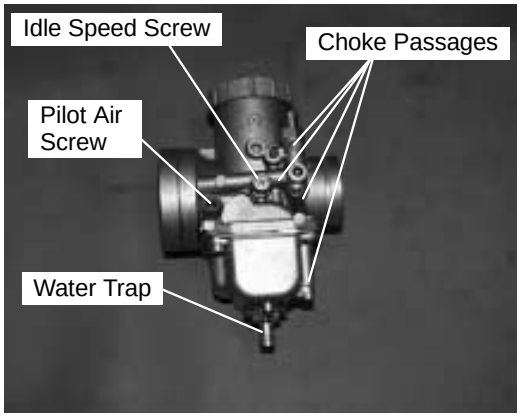
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CAUTION:

Wear eye protection when using compressed air or cleaning solvents. Review all fuel system warnings found on page 4.1 before proceeding.

Carburetor Removal, Disassembly, and Inspection (Typical VM Mikuni)

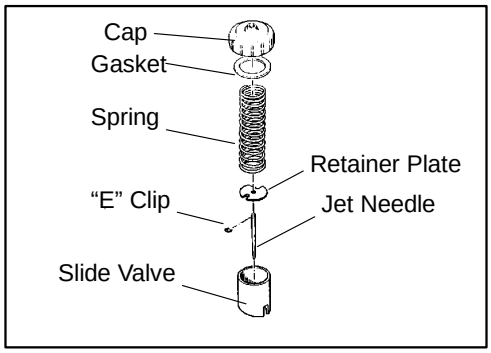
1. Remove carburetor from engine. Before disassembling, clean outside of carburetor thoroughly with solvent.



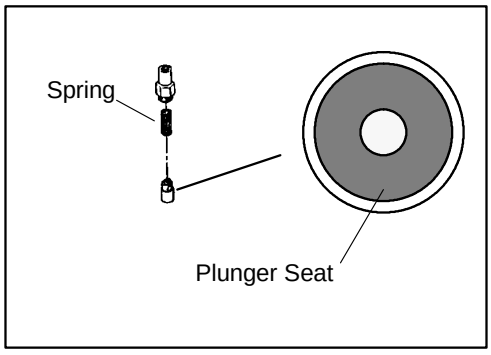
CAUTION:

Do not use compressed air to dry at this time. The float chamber could become pressurized resulting in damage to the floats or inlet needle and seat..

2. Remove slide valve. Inspect for nicks or burrs which may cause sticking.
3. Remove jet needle by compressing return spring toward top cap and removing throttle plate which rests on top of needle “E” clip. Note the “E” clip position and inspect needle taper for wear. An indication of wear would be an hourglass shape or polished spots somewhere along the taper.



4. Remove enricher (choke) plunger. Check condition of seal on tip of plunger. Any nicks or cuts will cause leakage and a rich fuel condition, usually most evident at idle and low speeds. Inspect the plunger seat for damage or foreign material.
5. Check choke cable movement. Plungers and springs should move back and forth freely, without binding.

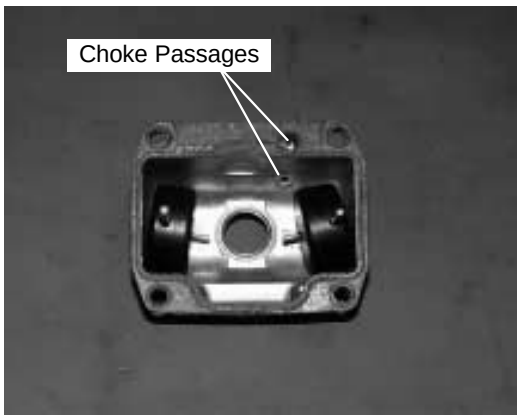


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Carburetor Disassembly and Inspection

6. Remove water trap assembly from float bowl and inspect O-ring, hose and clamp condition. Refer to exploded view corresponding with carburetor being serviced.

7. Inspect enricher (choke) fuel supply passage in bowl for obstruction.



8. Use a spring loaded automatic center punch to remove float arm pin. Remove inlet needle and seat assembly.



9. Inspect needle for wear and replace sealing washers upon reassembly.

CAUTION:

Do not bend float arm during disassembly. Do not use excessive force to remove float arm pin. The float pin tower castings are very easily damaged and are not repairable.

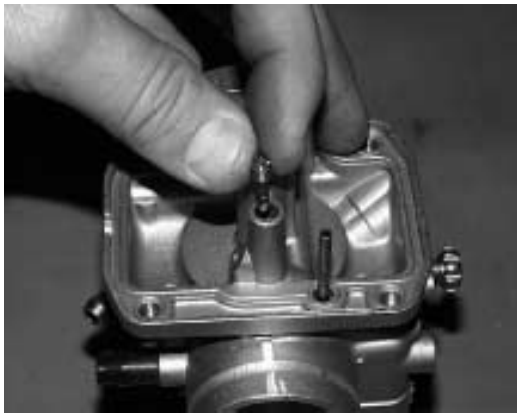


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10. Remove main jet and washer (or spacer ring) and push needle jet into the slide valve chamber to remove. Clean air bleed hole in needle jet.



11. Remove pilot jet.



CAUTION:

Wear eye protection when using compressed air or cleaning solvents. Review all fuel system warnings found on page 4.1 before proceeding.

12. Remove pilot air screw and clean all passages in the carburetor body with carburetor cleaner. Dry all passages and jets with compressed air. Replace gaskets and any parts which show wear or damage.

13. Reassemble carburetor, adjusting float level before installing float bowl.

Refer to page 4.23 for float level adjustment and leak testing procedures.

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Float Level Adjustment

1. Remove float bowl.
2. With carburetor in an inverted position, float arms (A) should be parallel with body (B). See illustration at right. Arms must be parallel to each other.
3. To adjust float arm, bend tang contacting inlet needle.



CAUTION:

Never bend the float arm itself.

Leak Testing Needle and Seat

1. Be sure float level is adjusted properly.
2. Invert carburetor.
3. Install float chamber and connect pressure tester PN 2870975 to fuel inlet fitting.



Pressure Tester PN 2870975

4. Apply approximately 5 PSI pressure and wait for one minute. The needle and seat should hold pressure indefinitely. If the pressure drops rapidly replace the needle and seat assembly and/or sealing washers.

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Throttle Synchronization Procedure

1. Remove air box, noting position of throttle cable junction block. Reposition throttle cable and junction block in same position when air box is reinstalled.

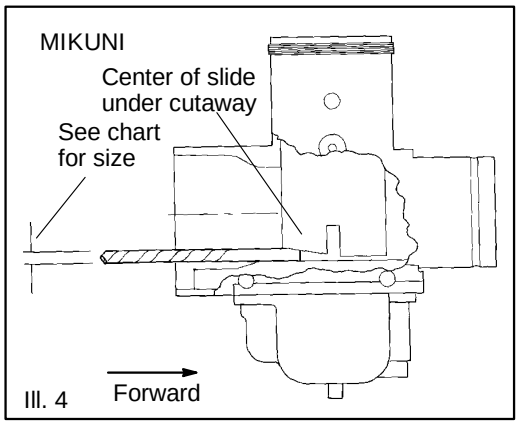
Throttle Cable Synchronization (Throttle Gap)

2. Referring to specification section in chapter 1, select correct diameter Throttle Gap synchronization drill gauge for your engine.
3. Back out idle screws about three turns.
4. Slightly lift throttle slides with throttle lever and insert tool or drill gauge under throttle slide. Allow throttle slides to return.
5. Loosen lock nut and turn throttle cable adjuster (on top of carburetor) in (clockwise) or out (counterclockwise) as required until a slight drag can be felt on the gauge or tool.
6. Securely tighten throttle cable synchronization lock nut.
7. Repeat steps 3 through 5 on remaining carburetor.

Idle Gap Synchronization

8. Referring to chart in the Specifications section, chapter 1, select correct diameter Idle Gap drill gauge for the engine.
9. Slightly lift throttle slides with throttle lever and insert idle gap drill gauge under throttle slide. Allow throttle slides to return.
10. Turn idle adjustment screw in as required until only a slight drag can be felt on the gauge.
11. Repeat steps 8 through 10 for remaining cylinders.
12. Verify proper throttle lever free play and adjust if necessary, by loosening cable adjuster locknuts and turning adjusters out equally until throttle lever freeplay is correct.

Throttle Free Play -
0.010 - 0.030″ (.25-.76mm)



Ill. 4

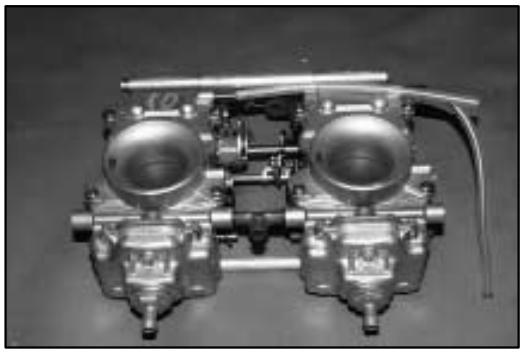
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CAUTION:

Wear eye protection when using compressed air or cleaning solvents. Review all fuel system warnings found on page 4.1 before proceeding.

Carburetor Removal, Disassembly, and Inspection

1. Remove carburetor rack from engine. Before disassembling, clean outside of carburetor thoroughly with solvent.



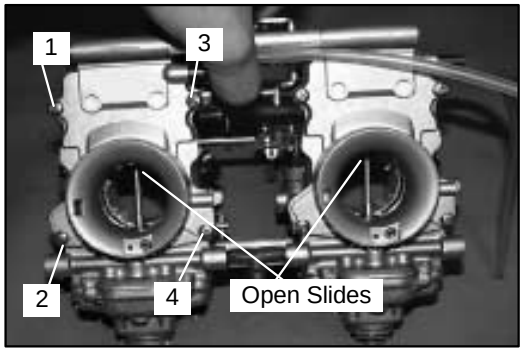
CAUTION:

Do not use compressed air to dry at this time. The float chamber could become pressurized resulting in damage to the floats or inlet needle and seat. Do not soak carburetors in carb cleaner. Clean only with aerosol cleaner.

2. Remove top caps.



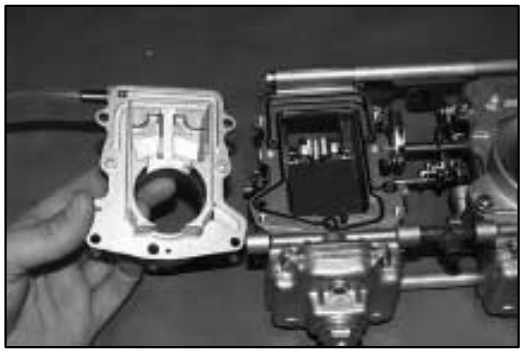
3. Remove four screws on funnel.



4. Turn throttle shaft so slide opens all the way.

NOTE: You may have to turn out slide stop screw for slide to move farther up body.

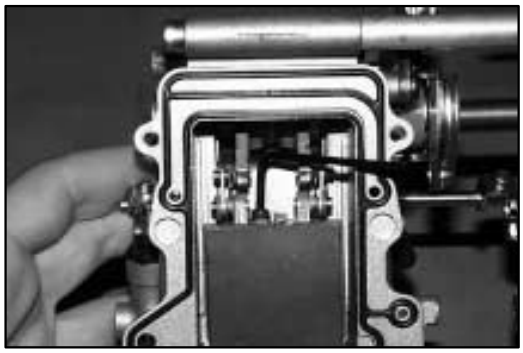
5. With slide fully open, pull funnel out bottom first.



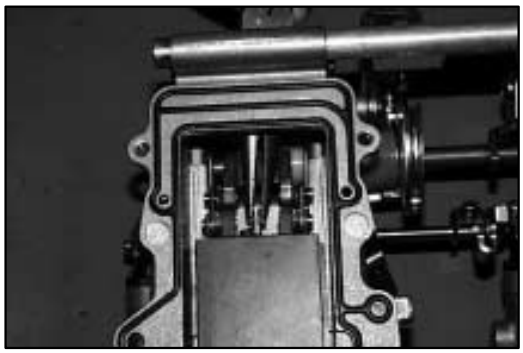
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Disassembly Cont.

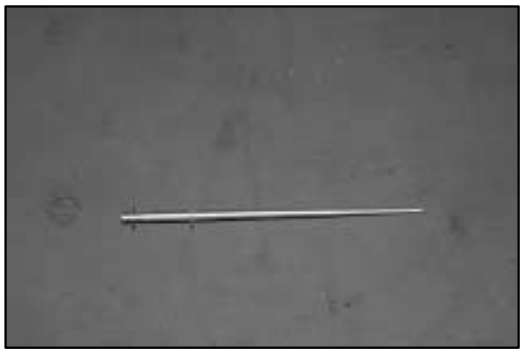
6. From top of carb, loosen allen head screw holding needle in position. Slide holding plate to side.



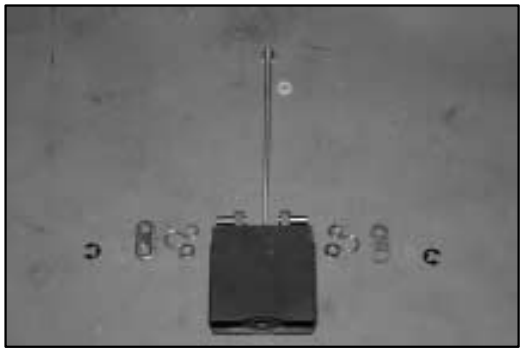
7. Reach into top of carb with a long nose pliers and remove needle.



8. Inspect needle for wear.



9. Remove E-rings, packing, plate, spring, and rings connecting slide to lever.



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Carburetor Disassembly Cont.

10. Remove water trap/drain plug (17 mm) and single screw on bottom of carb.

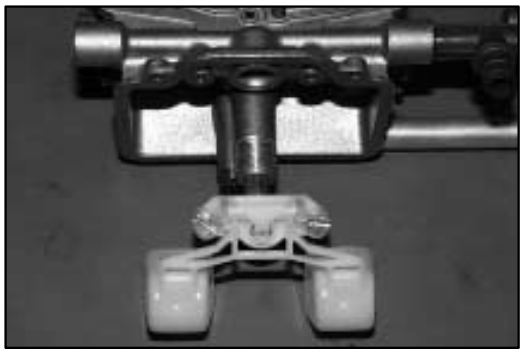


11. Remove float body

NOTE:Float body will not come off unless water trap/drain plug, which is threaded and screws into main jet housing, is removed.

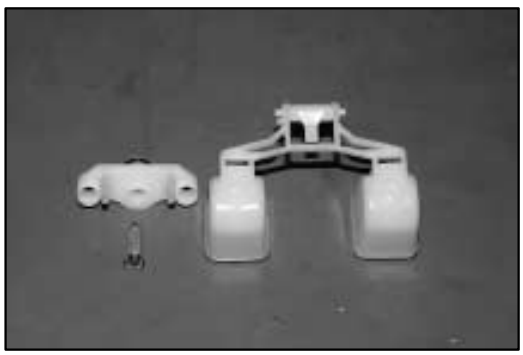


12. Remove 2 screws holding float/needle & seat assembly in position. Remove float/needle & seat assembly.



13. Inspect needle for wear.

NOTE:Needles are not available separately. If needle is worn or damaged, you must replace float/needle & seat assembly.



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Carburetor Disassembly

1. Remove main jet, starter jet, pilot jet, and idle screw.



2. Clean all passages in carburetor body with carburetor cleaner. Dry all passages and jets with compressed air. Replace gaskets and any parts which show wear or damage.



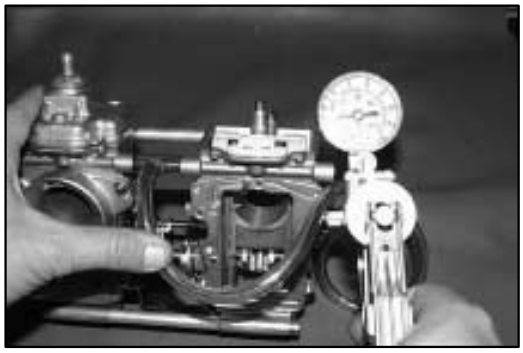
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Carburetor Assembly

1. Install pilot jet, main jet, starter jet, and idle screw.

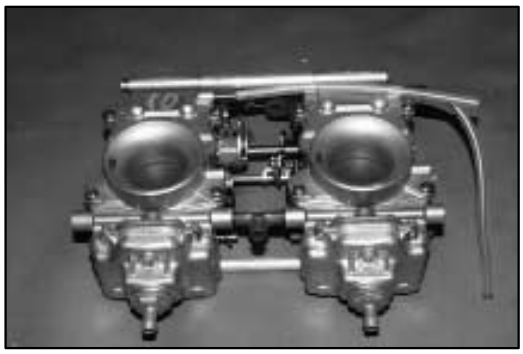


2. Install float/needle & seat assembly.
3. Place carburetor in an inverted position.
4. Connect pressure tester to fuel inlet fitting. Apply 5 psi pressure and observe for one minute. The needle and seat should hold pressure indefinitely. If the pressure drops, carefully inspect the needle and the needle seat. The needle can be replaced (needle comes with float and seat).



Pressure Tester PN 2870975

5. Carefully inspect float bowl gasket and replace if necessary. Install float bowl on carburetor.
6. Install float body.
7. Install air adjusting screw.
8. Install throttle slide.
9. Install jet needle.
10. Install funnel.
11. Install carburetors on snowmobile.
12. Synchronize carbs as outlined on pages 4.29 - 4.30.
13. Replace top caps.



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Throttle Synchronization Procedure- Mikuni TM-38 Flatslide Carburetors

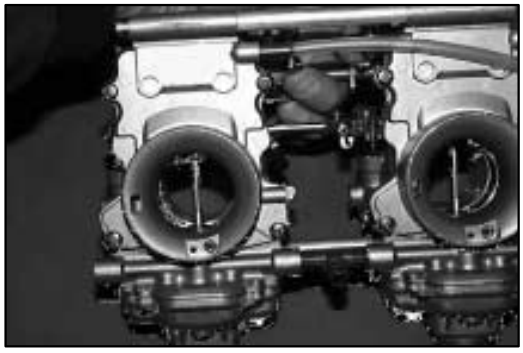
Mikuni TM-38 carburetors are synchronized at wide open throttle without the engine running. The middle carburetor on triples, and the PTO side carburetor on twins have a non-adjustable set screw on the throttle shaft. This carburetor is what the other carb(s) is synchronized to.

1. Remove airbox

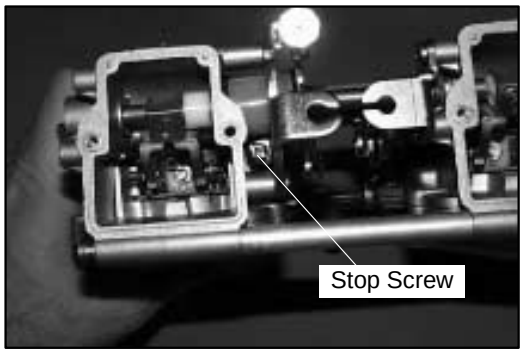
2. Remove top caps on all carburetors



3. Hold throttle wide open and view position of carburetor slide on base carburetor. (Middle carb on triples, PTO carb on twins.)



4. With throttle held wide open, turn the slide stop screw with screwdriver until slide is flush with top of base carb opening.



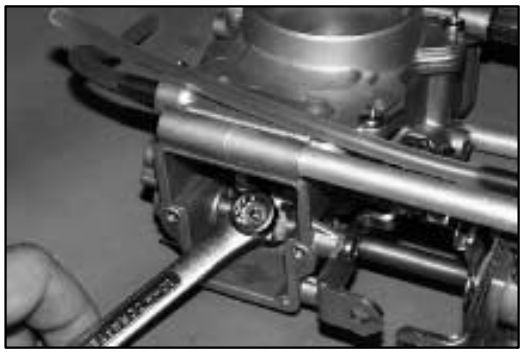
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Throttle Synchronization Procedure- Mikuni TM-38 Flatslide Carburetors

5. On remaining carb(s), loosen phillips head screw inside the offset nut.



6. When screw is loose, hold throttle to wide open. Turn offset nut clockwise to raise or counterclockwise to lower,until throttle slide is in same position as base carburetor.



7. Tighten phillips head screw.



8. Replace top caps.



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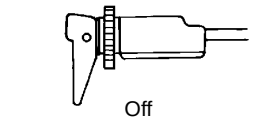
Choke Adjustments

With the dash mounted choke control toggle flipped to the full off position, the choke plunger must be seated on the fuel passage way in the carburetor. If the plunger is not seated on the passage way, the engine will flood or run too rich, causing plug fouling and very poor engine performance.

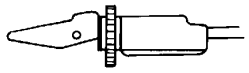
If cable slack is too great there will be excessive toggle free play resulting in hard starting. Also, the half on position used for intermittent applications will not function.

If the choke lever assembly becomes damaged, a lever kit is available. This allows replacement of the lever assembly rather than the entire cable assembly. Installation instructions are included with the kit.

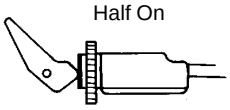
Choke Toggle Position



Off



Half On



Full On

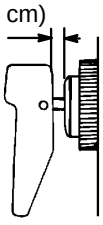
Adjustment Procedure

1. Flip choke toggle to full off position.
2. Loosen adjustment locknut (A) on carburetor(s).
3. Turn cable sleeve adjusting nut (B) clockwise on carburetor(s) until 1/4″ (.6 cm) or more choke toggle free play is evident.
4. Turn cable sleeve adjusting nut counterclockwise on one carburetor until toggle has zero free play, then rotate it clockwise until 1/8″-1/4″ (.3-.6 cm) toggle free play is evident.
5. Tighten adjustment locknut (A).
6. Repeat steps 4 and 5 for remaining carburetor(s).

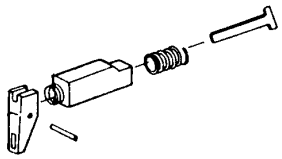
Choke Lever Freeplay -

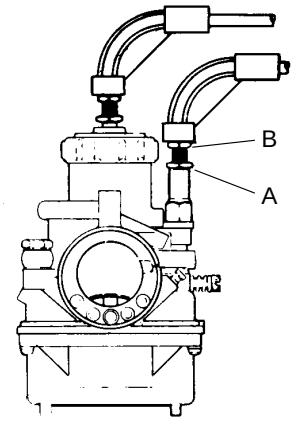
1/8 - 1/4″ (.3 - .6 cm)

1/8-1/4″ (.3-.6 cm)
Freeplay



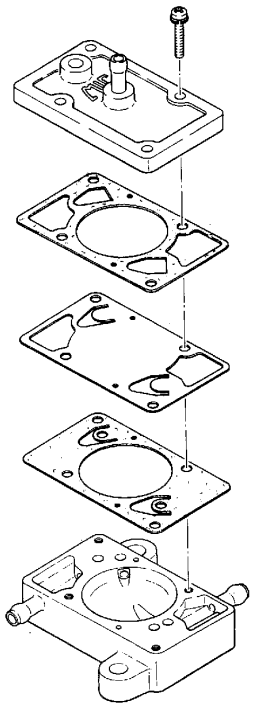
Contents of Lever Kit





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The fuel pumps on all Polaris engines are basically the same. The differences are in the size and location of the pumps. Pumps may be mounted to the engine or to the chassis.



In the two cycle engine, the pressure in the crankcase changes with the up and down stroke of the piston. The amplitudes of pressure vary according to the RPM and degree of throttle opening. Whether idling or at full throttle, the pressure built up in the crankcase has enough amplitude to operate the pump.

When the piston is on the upstroke, crankcase pressure in that cylinder becomes less positive. The diaphragm in the fuel pump moves toward the engine, causing a negative pressure or suction in the pump chamber. This causes the inlet valve from the fuel supply to open and permits fuel to enter the chamber. This same suction causes the outlet valve (to the carburetor) to close so that fuel cannot return form the carburetor.

When the piston begins its downward stroke, the pressure from the crankcase becomes positive, causing the fuel pump diaphragm to move in the opposite direction and reversing the pressure in the fuel pump chamber. This causes the inlet valve in the pump to close and the outlet valve to open, filling the float bowl in the carburetor. When the float level in the carburetor reaches its standard level, the needle valve will close, preventing more fuel from entering the carburetor, even though the fuel pump continues to try to provide the carburetor with fuel.

Maintenance

The impulse operated diaphragm fuel pump does not require any specific scheduled maintenance. However, the following procedures should be observed.

Operation:

- The pump may be checked for operation by removing the fuel supply line from the carburetor and placing it into a container. With the engine idling at approximately 2000 RPM, a steady flow of fuel should be visible.

Cleaning:

- The pump and impulse line must be disassembled and cleaned of foreign material in the event of piston or other internal engine part failures which produce fragments.

Inspection:

- Disconnect impulse line from pump. Connect Mity Vac™ to impulse fitting (or line) and apply 4-6 PSI pressure. Diaphragm should hold pressure indefinitely.
- The diaphragms and check valves must be carefully examined for cracks, holes, or other damage. If in doubt as to the condition of any internal parts, replace all diaphragms, check valves, and gaskets.

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WARNING

Fuel spillage will occur during this installation. Gasoline is extremely flammable and explosive under certain conditions.

Do not smoke or allow open flames or sparks in or near the area where refueling is performed or where gasoline is stored.

Do not weld or operate a torch near the fuel system. Remove fuel tank before any chassis welding is performed.

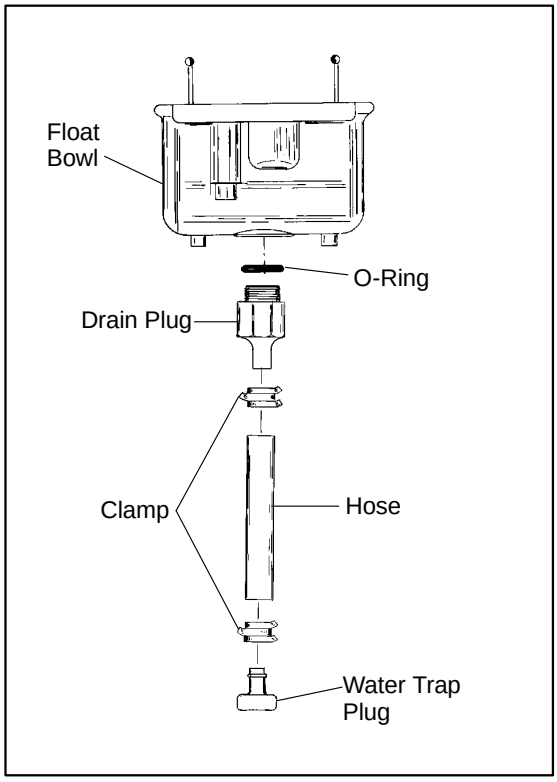
If you get gasoline in your eyes or if you swallow gasoline, see your doctor immediately.

If you spill gasoline on your skin or clothing, immediately wash it off with soap and water and change clothing.

Never start the engine or let it run in an enclosed area. Gasoline powered engine exhaust fumes are poisonous and can cause loss of consciousness and death in a short time.

1. Turn fuel valve off.
2. Remove air silencer.
3. Position a shop cloth or container below drain plug and water trap plug.
4. Remove drain plug and sealing O-Ring, or slide clamp upward and remove water trap plug.
5. Drain water/fuel. Clean trap with electrical contact cleaner and dry with compressed air.
6. Lightly grease O-ring and install water trap assembly into bottom of float bowl, or reinstall trap plug in hose and position. Tighten securely.
7. Turn fuel on, start engine and check for possible fuel leaks.
8. Reinstall air box.

The water traps should be periodically inspected and drained. Draining frequency will depend upon fuel supply, riding conditions, and fuel handling precautions.



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Fuel system diagnosis should follow a specific path, first examining the fuel tank, then the filters, fuel lines, vent lines, fuel pump, impulse hose, air box, exhaust system and finally the carburetors.

The following troubleshooting information assumes that the general mechanical condition of the engine (pistons, rings, bearings, etc.) is good.

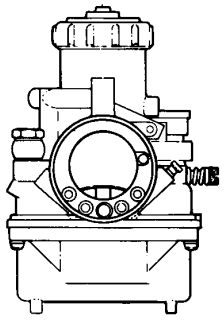
When the fuel/air mixture is diagnosed as improper due to spark plug readings, clean the carburetor and blow its passages clear with compressed air. Use the spark plug firing end condition as a guide for further determination of whether the mixture is too rich or too lean.

Use the throttle lever to determine at what degree of throttle valve opening the problem exists.

CONDITION	SYMPTOMS
Mixture Too Rich	-Black spark plug tip; plug fouling -Heavy exhaust smoke -Engine runs worse after warm up -Engine “loads up”
Mixture Too Lean	-Spark plug electrodes white -Fluctuation in engine speed -Power loss -Engine overheats -Cylinder scoring / Holing pistons -Backfiring - detonation -Throttle diagnostic opening check points
Poor Fuel Mileage	-Incorrect ignition timing -Improper track tension (too tight) -Incorrect carburetor jetting -Fuel leaks (lines, fittings, fuel pump) -Needle and seat leaks -Plugged exhaust -Carburetor vent line problems -Clutching incorrect for conditions / worn belt

Troubleshooting Tips, 0-1/4 Throttle:

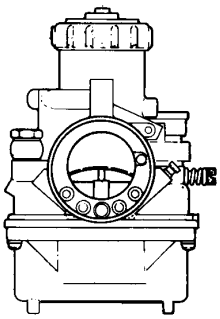
- Pilot air screw misadjusted
- Pilot jet of wrong size, loose, or obstructed
- Obstruction of pilot jet
- Pilot jet loose
- Choke plunger not seating (rich)
- Carburetor mounting air leak (lean)
- Crankshaft seal air leak (lean)
- Fuel pump diaphragm damaged (rich)
- Float level incorrect
- Air bleed obstructed



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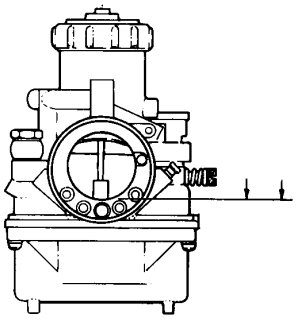
Troubleshooting Tips, 1/4-3/8 Throttle:

- Obstruction in main jet or needle jet
- Jet needle worn or out of adjustment
- Pilot system malfunction
- Incorrect throttle valve cutaway



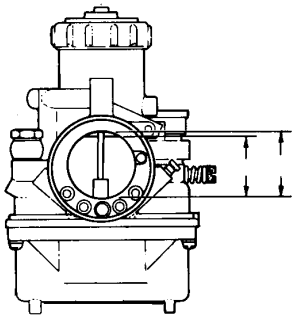
Troubleshooting Tips, 3/8-3/4 Throttle:

- Main jet incorrect size or clogged (lean)
- Needle jet damaged or loose
- Needle jet/jet needle worn (rich)
- E-clip position incorrect for altitude and temperature



Troubleshooting Tips, Full Throttle:

- Main jet size (rich or lean)
- Fuel filter blocked (lean)
- Fuel vent lines or check valves plugged
- Exhaust system plugged
- Air box restricted
- Fuel pump weak
- Exhaust leaking into engine compartment (rich)
- Water in float bowl (lean)



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CHAPTER 5
DRIVE / DRIVEN CLUTCHES

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Clutch Alignment and Inspection 5.34
Drive Belt-to-Sheave Clearance 5.35
Clutch Bushing Replacement . . . . . 5.36 - 5.41
Drive / Driven Clutch Troubleshooting . . . . . 5.42 - 5.43
Belt Wear Troubleshooting 5.44

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⚠ WARNING

All drive clutch maintenance, disassembly and assembly must be performed only by an authorized Polaris dealer who has attended current model Dealer Service Seminars, has received a certificate of completion, and displays the Polaris Servicing Dealer decal.

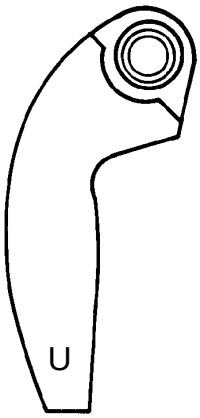
Because of the critical nature and precision balance incorporated into the drive clutch, it is absolutely essential that no attempt at clutch disassembly and/or repair be made without factory authorized tools and service procedures.

Essential Drive Clutch Tools

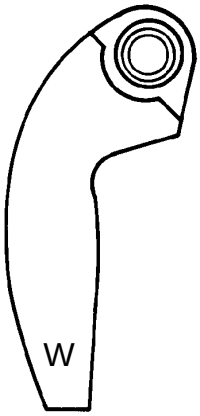
Refer to the Service Tool Catalog (PN 9914681) for photos and descriptions of all tools. A tool catalog update is available through the Polaris parts department. The part number is 9915235.

Description	Part Number
Offset Alignment Tool - 21/32” (1.7 cm) P-90 Clutches	2870914
Offset Alignment Tool - 5/8” (1.6 cm) P-85 Clutches	2870426
T-Handle Drive Clutch Puller (Large Shaft ID)	2870506
Drive Clutch Puller - 550 Fuji Engines	2872084
Strap Wrench	2870336
Replacement Strap for 2870336	2870389
Spider Spanner Nut Driver (Jam Nut)	2870338
Spider Removal / Installation Tool	2870341
Holding Fixture	2871358
Holding Fixture Tab	5130518
Tapered Reamer	2870576
Spider Button Tool	2870985
Clutch Bushing Rebuild Tool Kit (P-85/P90)	2871025
P-85 Drive Clutch Compression Tool	2870984
Driven Clutch Puller (P-90)	2871056
Torque Wrench, 250 ft. lb.	Commercially Available
Torque Wrench, 0-200 in. lb.	Commercially Available
Clutch Compression Tool	8700220
Clutch Holding Wrench	9314177
SLP Button Tool	8716010
SLP Clutch Sheave Clamp Tool	8716020

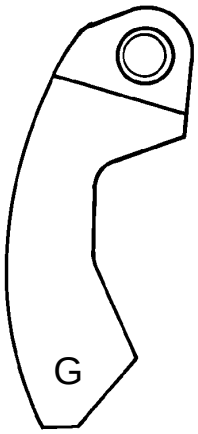
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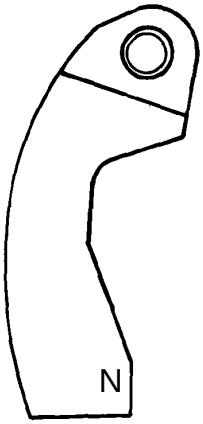
U
Gram Weight: 34 ğ 1
PN 5630107



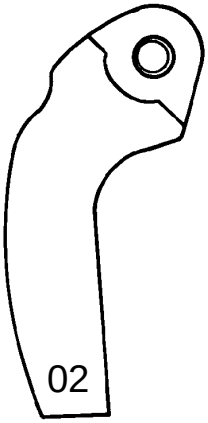
W
Gram Weight: 37.5 ğ 1
PN 5630109



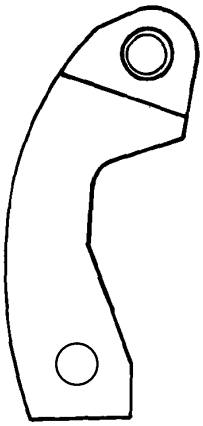
G - (B Modified)
Gram Weight: 41.5 ğ 1
PN 5630063



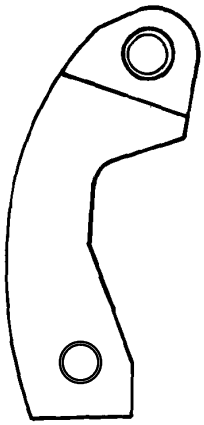
A
Gram Weight: 47.5 ğ 1
PN 5630080



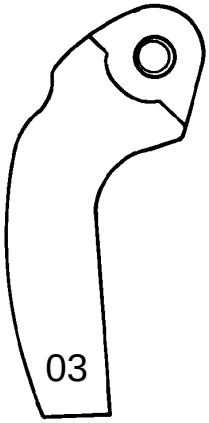
02
Gram Weight: 49 ğ 1
PN 5630225



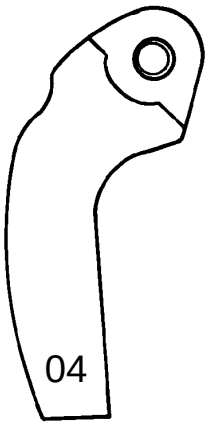
O
Gram Weight: 51
PN 5610088



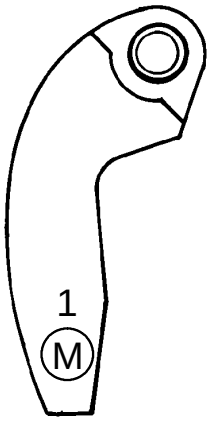
Gram Weight: 53 ğ 1
PN 5630174



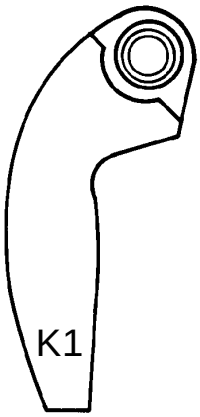
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Gram Weight: 32.5 ğ 1
PN 5630227



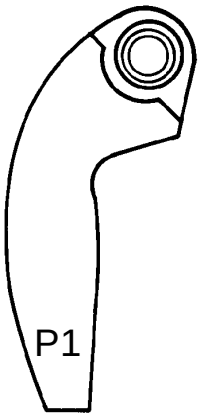
04
Gram Weight: 57.5 ğ 1
PN 5630229



M1 (Modified)
Gram Weight: 46.0 ğ 1
PN 5630301

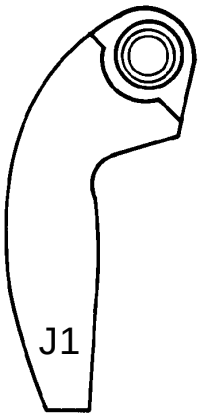


K1
Gram Weight: 39 ğ 1
PN 5630144

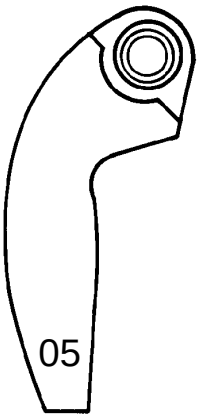


P1
Gram Weight: 42 ğ 1
PN 5630089

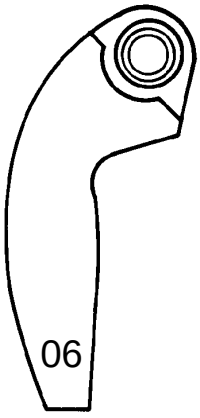
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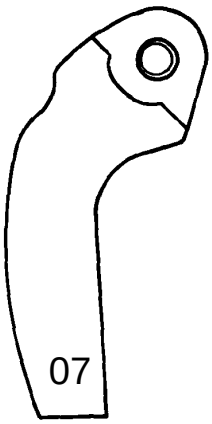
J1
Gram Weight: 44 ğ 1
PN 5630065



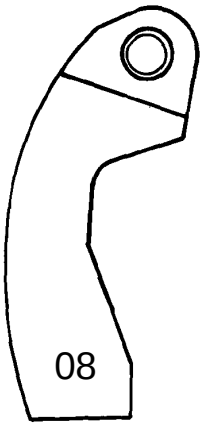
05
Gram Weight: 53.5 ğ 1
PN 5630234



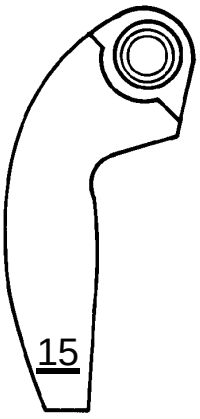
06
Gram Weight: 50 ğ 1
PN 5630243



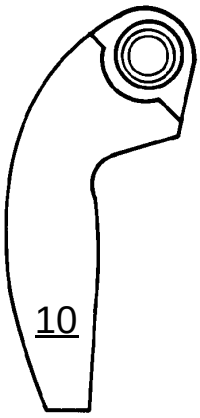
07
Gram Weight: 52 ğ 1
PN 5630244



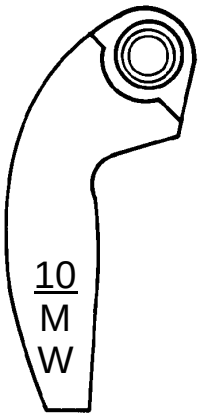
08
Gram Weight: 47.5 ğ 1
PN 5630245



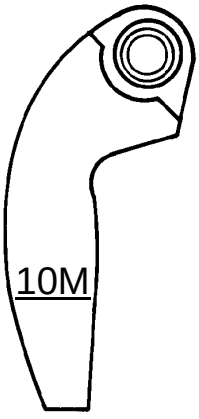
15
Gram Weight: 55.5 ğ 1
PN 5630274



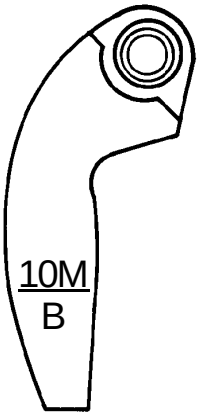
10 Bushed
Gram Weight: 51.5 ğ 1
PN 1321526



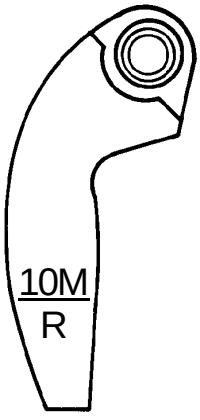
10M-W Bushed
Gram Weight: 46 ğ 1
PN 1321527



10M Bushed
Gram Weight: 49.5 ğ 1
PN 1321528

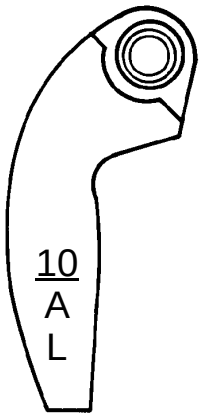


10M Blue Bushed
Gram Weight: 47.5 ğ 1
PN 1321529

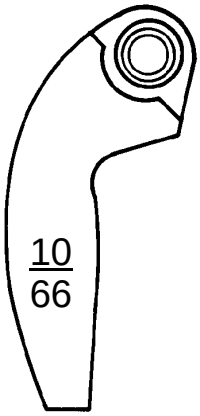


10M Red Bushed
Gram Weight: 44 ğ 1
PN 1321530

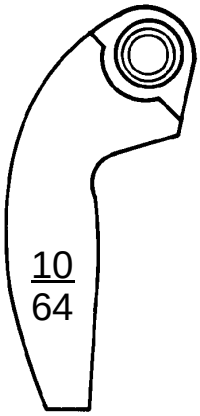
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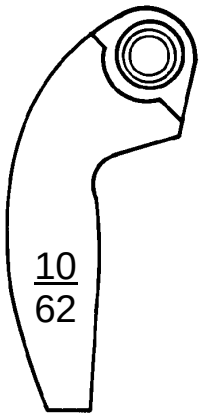
10-AL Bushed
Gram Weight: 53 ğ 1
PN 1321531



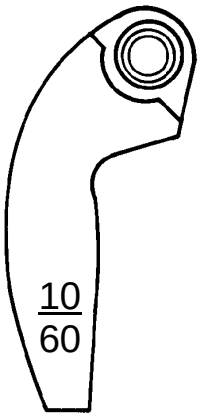
10-66 Bushed
Gram Weight: 66
PN 1321584



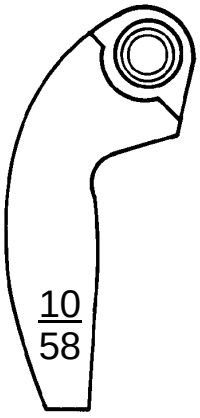
10-64 Bushed
Gram Weight: 64
PN 1321585



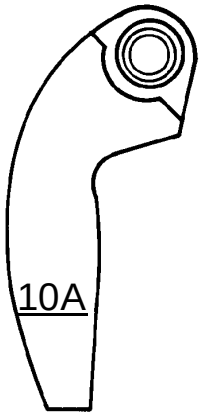
10-62 Bushed
Gram Weight: 62
PN 1321586



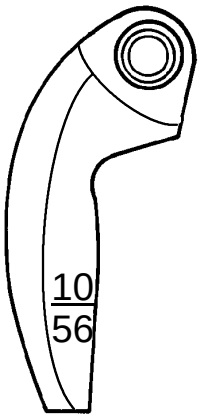
10-60 Bushed
Gram Weight: 60
PN 1321587



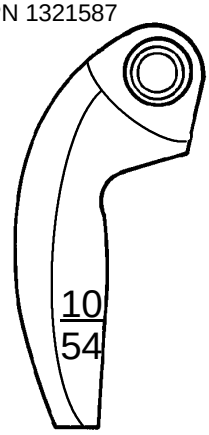
10-58 Bushed
Gram Weight: 58
PN 1321588



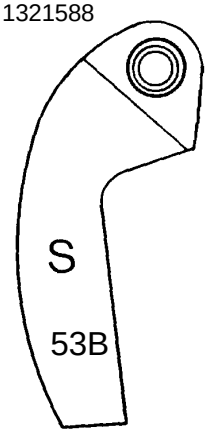
10A Bushed
Gram Weight: 55
PN 1321589



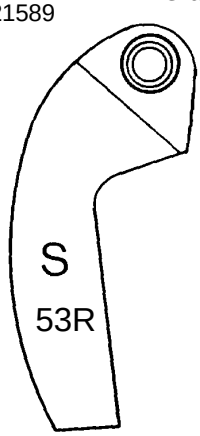
10-56 Bushed
Gram Weight: 56±1
PN 1321684



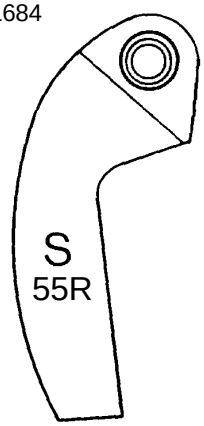
10-54 Bushed
Gram Weight: 54±1
PN 1321685



S53B
Gram Weight:49 ±1
PN 1321730



S53R
Gram Weight:51 ±1
PN 1321731



S55R
Gram Weight:53 ±1
PN 1321759

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PART NUMBER	COLOR CODE	WIRE DIAMETER	FREE LENGTH +/- .125″	Force lbs. @ 2.50”-1.19” (+/- 12lbs.)
7041021	Clear	.157″	4.38″	70-130
7041022	Black	.140″	4.25″	44-77
7041063	Purple	.168″	4.37″	75-135
7041062	Silver	.208″	3.12″	75-243
7041065	Pink	.177″	4.69″	112-200
7041060	Orange	.196″	3.37″	70-199
7041080	Blue/Gold	.207″	3.50″	120-300
7041083	Red	.192″	3.77″	120-245
7041102	Yellow	.192″	2.92″	44-185
7041061	Brown	.200″	3.06″	69-212
7041132	White	.177″	2.92″	34-141
7041168	Green	.177″	3.05″	42-142
7041148	Gold	.207″	3.25″	100-275
7041150	Red/White	.192″	3.59″	100-220
7041286	Silver/Gold	.218″	3.05″	77-240
7041080	Blue	.207″	3.55″	120-300
7041526	Dark Blue	.218″	3.52″	120-310
7041781	Dark Blue/White	.225″	3.52″	120-310
7041566	Almond	.207″	3.65″	140-330
7041645	Almond/Gold	.207″	4.00″	150-290
7041818	Black/White	.218″	3.52″	140-320
7041816	Almond/Black	.200″	3.75″	165-310
7041922	Almond/Blue	.218″	3.75″	150-310
7041988	Almond/Red	.207″	4.29″	165-310
7042083	Black/Green	.218”	3.38”	120-340

CAUTION:

Never shim a drive clutch spring to increase its compression rate. This may result in complete stacking of the coils and subsequent clutch cover failure.

Maximum efficiency of the variable speed drive system is dependent upon many factors. Included in these are converter offset and alignment, belt tension, belt to sheave clearance, and internal condition of the drive and driven clutch components. One of the most critical and easily serviced parts is the drive clutch spring. Due to the severe stress the spring is subject to during operation, it should always be inspected and checked for tolerance limits during any clutch operation diagnosis or repair.

With the spring resting on a flat surface, measure free length from outer coil surfaces as shown. Refer to the chart above for specific free length measurements and tolerances.

In addition to proper free length, the spring coils should be parallel to one another when placed on a flat surface. Distortion of the spring indicates stress fatigue. Replacement is required.

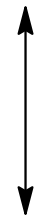


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Driven Clutch Springs

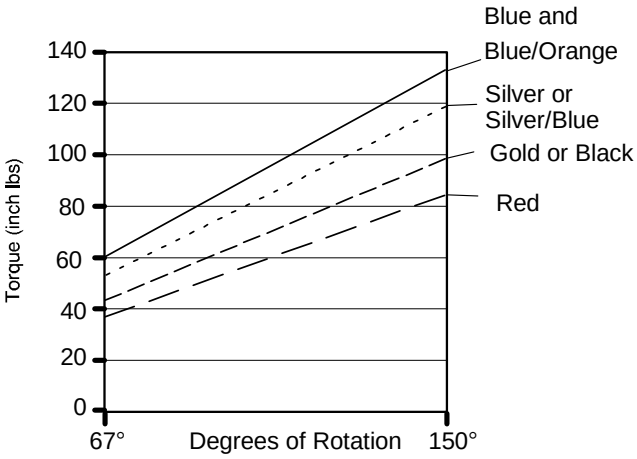
Part Number	Description
7041198	Red
7041782	Black-5 Coil
7041501	Gold-6 Coil
7041296	Blue
7041499	Silver
7041646	Silver/Blue
7042022	Blue/Orange

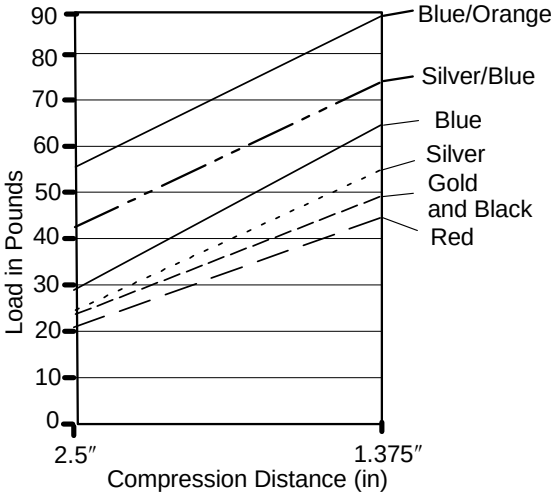
Soft



Firm

Driven Spring Charts





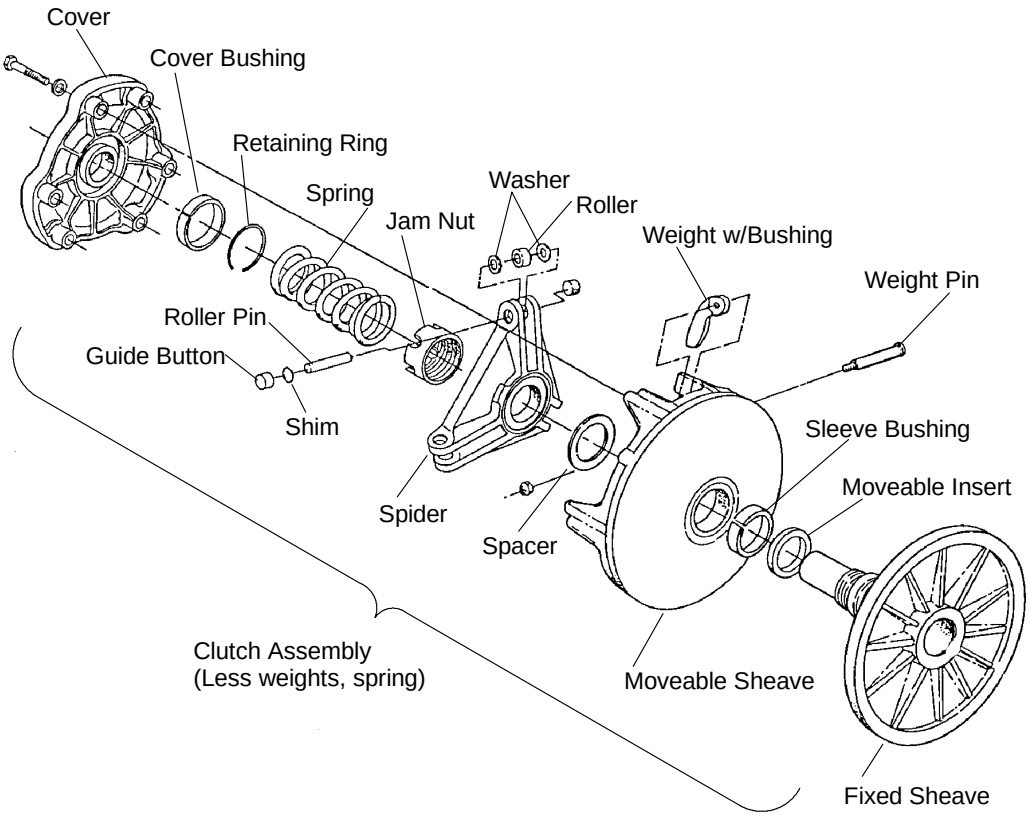
Driven Clutch Spring Data

Part Number	Description	Wire Dia.	Free Length	Load at 2.50″ (lbs.)	Load at 1.375″ (lbs.)	Moment at 67° Rotation (in #s)	Moment at 150° Rotation (in #s)
7041198	Red	0.170	4.00	21	45	38	85
7041296	Blue	0.192	3.43	29	64	60	133
7041499	Silver	0.188	3.45	25	54.5	53	119
7041646	Silver/Blue	0.183	3.45	42	75	53	119
7041782	Black	0.177	3.60	24	49	44	99
7041501	Gold	0.188	3.60	24	49	44	99
7042022	Blue/Orange	0.192	3.50	56	90	60	133

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P-85 Drive Clutch

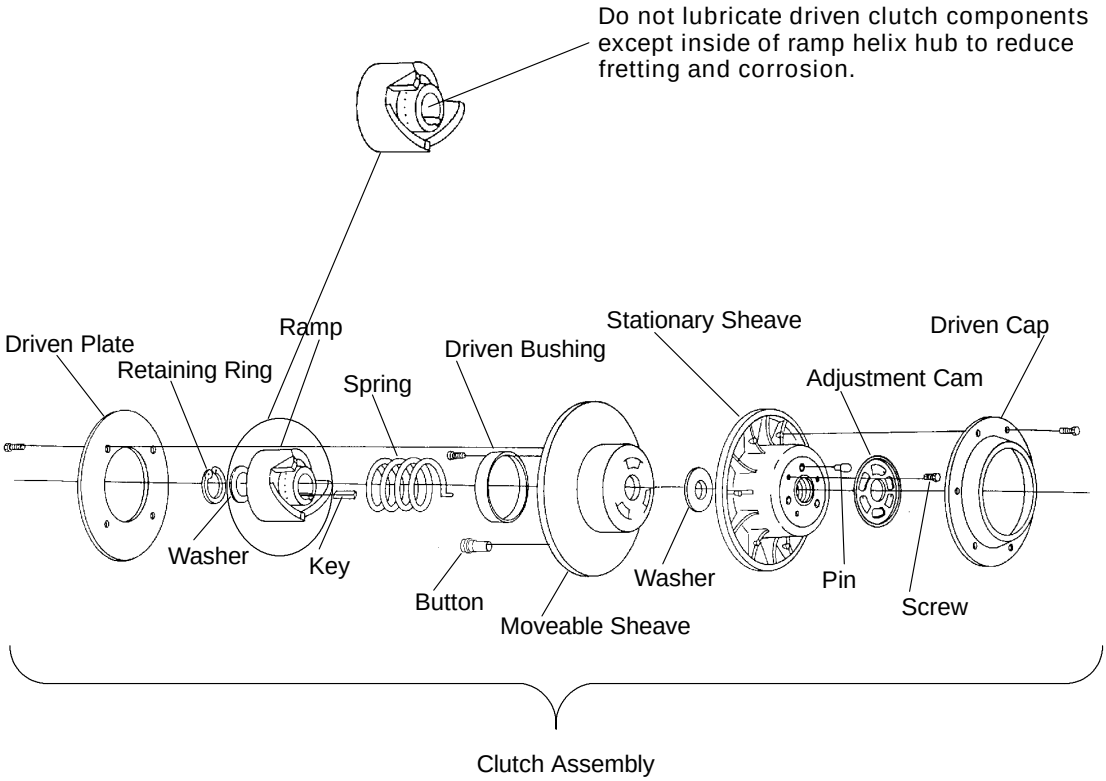
Do not lubricate drive clutch components



Replacement clutches come complete and balanced without clutch weights and clutch spring. The clutch cover, spider, and sheaves cannot be purchased separately as replacement parts.

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P-85 Driven Clutch



Replacement driven clutches come complete with ramp and spring. The moveable and stationary sheaves cannot be ordered as separate service parts.

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The Polaris drive system is a centrifugally actuated variable speed belt drive unit. The drive clutch, driven clutch, and belt make up the torque converter system. Each clutch comes from the factory with the proper internal components installed for its specific engine model. Therefore, modifications or variations of components at random are never recommended. Proper converter setup and adjustments of existing components must be the primary objective in converter operation diagnosis.

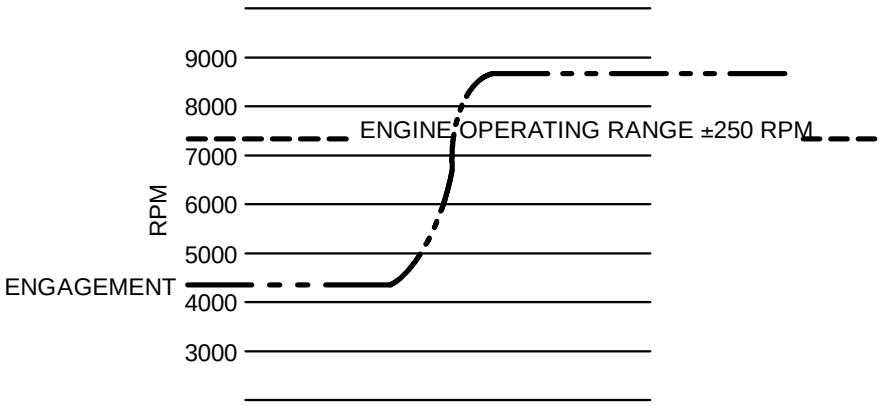
CAUTION:

All converter maintenance repairs must be performed only by an authorized Polaris service technician who has attended a Polaris sponsored service training seminar and understands the proper procedures as outlined in this manual. Because of the critical nature and precision balance incorporated into the drive clutch, it is absolutely essential that no attempt at clutch disassembly and/or repair be made without factory authorized special tools and service procedures. Any unauthorized modifications to clutches, such as adding or removing weights, will void the warranty.

Relationship Between Drive Clutch Weights And Spring In Maintaining Operating RPM

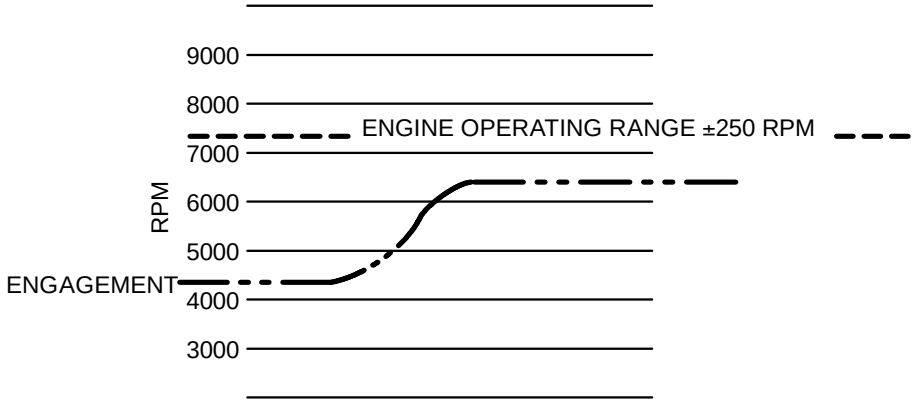
The drive clutch is an RPM and torque sensing unit designed to transfer the maximum amount of horsepower from the engine to the ground. This is accomplished by weights and a spring inside the unit which react to the centrifugal force from the engine RPM.

The spring and weights work in combination. In a properly set up clutch, the maximum desired operating RPM will be reached immediately after clutch engagement, under full throttle conditions. To gain optimum power this RPM should be maintained. As centrifugal force pushes the weights against the rollers, the moveable sheave will force the belt to climb up the drive clutch sheave and increase vehicle speed.

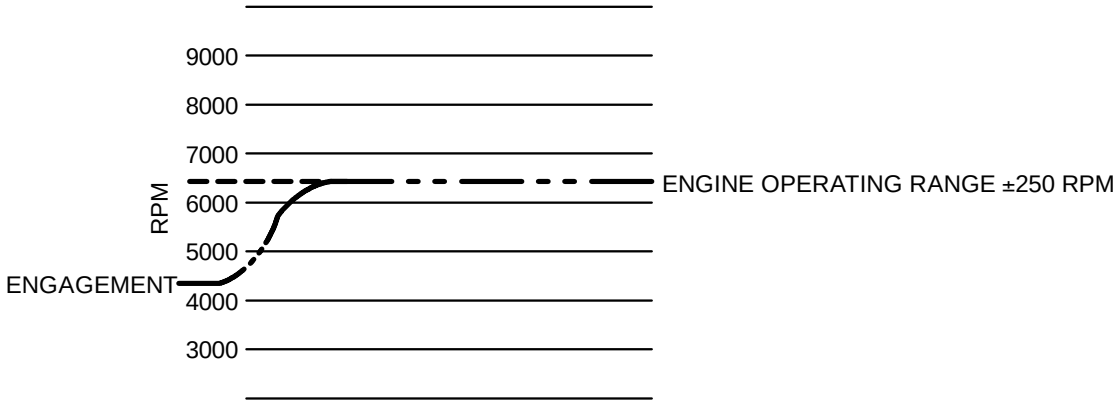


If the weights are too light, or the spring rate too high, the maximum RPM will be too great and the drive belt will not move into high gear at the top of the clutch.

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If the weights are too heavy, or spring rate too low, the engine RPM will be low and the drive clutch will upshift too fast, keeping the engine out of its power band.



If the weights and spring are matched properly, the engine RPM will go to the desired range and remain there on both upshift and backshift.

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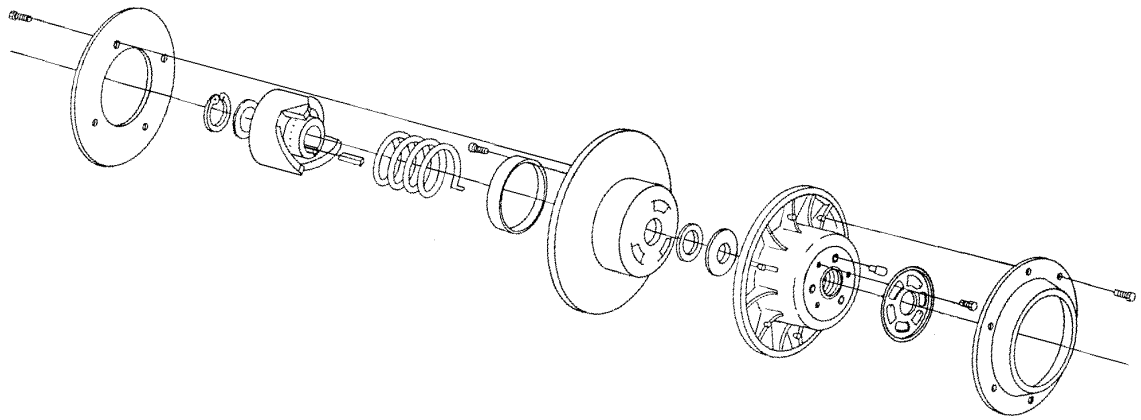
The driven clutch operates in conjunction with the drive clutch. Its function is to maintain drive belt tension preventing slippage, and sense variations in load requirements necessary to maintain optimum engine torque output and load requirements from the track. Output torque is transmitted through the chaincase jackshaft and chaincase to the front drive shaft and track.

When the load on the driven clutch is increased and becomes greater than the torque delivered from the engine, the driven clutch becomes dominant and overrides the drive clutch. The driven clutch downshifts into a ratio which will match the increased load.

Because the driven clutch can sense and shift into the proper ratio, engine RPM will remain within the specified range.

Driven Clutch Adjustments

The driven clutch has a provision for varying the torque required to change its ratio. It can be readjusted by relocating the spring in the helix which in turn increases or decreases the amount of load required to change the ratio.



Driven Clutch (Typical P-85)

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Removal

1. Hold clutch with strap wrench. Remove drive clutch retaining bolt, grease puller thread and tip lightly and install puller into clutch. Tighten puller with a wrench, or strike t-bar with a hammer until clutch is removed.



Strap Wrench PN 2870336

Clutch Puller PN 2870506- 3/4-16 ID Clutch
Clutch Puller PN 2872084 - 550 Fan

2. Slight galling or scoring of bore taper can usually be corrected using a tapered reamer. Place reamer in a vise and lubricate with cutting oil. Clean clutch taper by manually rotating clutch clockwise. Do not ream taper more than required to remove galling or scoring. Never use power tools to ream taper of drive clutch.



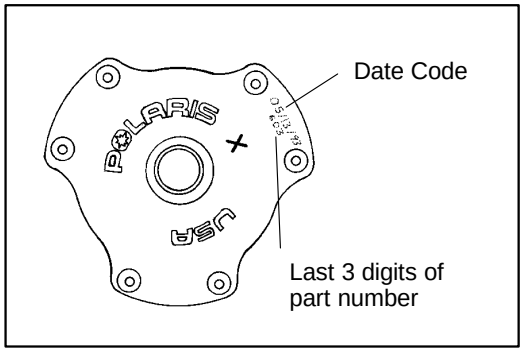
Tapered Reamer PN 2870576

CAUTION:

Never use an air impact wrench for installing or removing a drive clutch. It will loosen the spider torque value and could cause engine crankshaft damage.

Identification

This number indicates internal clutch component variation for individual engines. For easy identification, refer to the three numbers behind date code on clutch cover plate. These numbers are the last three digits of the clutch part number.



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Disassembly and Inspection

1. Install drive clutch in clutch compression tool (8700220). Mark both moveable and fixed sheave, cover, and spider with a permanent marker.



CAUTION:

Sheaves must be marked to provide a reference point for clutch balance and spider indexing. If the sheaves are not marked, and spider shim washers are changed or misplaced, the clutch will be out of balance and must be replaced. See page 5.21 for indexing procedure.

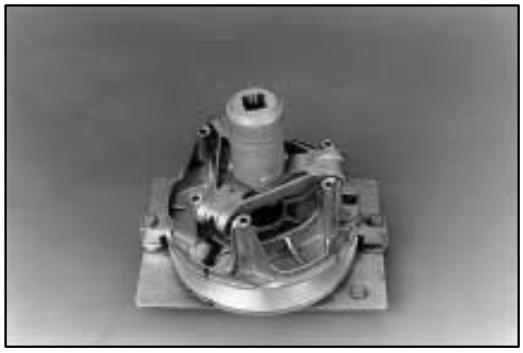
2. Carefully and evenly remove cover attaching bolts. Do not allow side loading or misalignment of cover or bushing may be damaged. Remember there is spring tension on the cover. Inspect cover bushing for wear. See page 5.36 for inspection and repair procedure.



Drive Clutch Compression Tool
PN 8700220

Drive Clutch Holding Fixture
PN 2871358

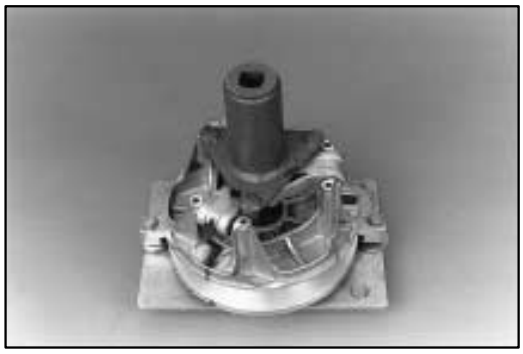
3. Mount drive clutch securely in the holding fixture. On models equipped with a spider jam nut (P-85 Clutches), remove jam nut in a counterclockwise direction (standard thread) using the special tool.



Spider Spanner (Jam Nut) Tool

PN 2870338

4. Install spider removal tool and remove spider in a counterclockwise direction (standard thread).



Spider Removal Tool

PN 2870341

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Disassembly, Cont.

5. Measure the total thickness of the spacer washers installed beneath spider and record.



CAUTION:

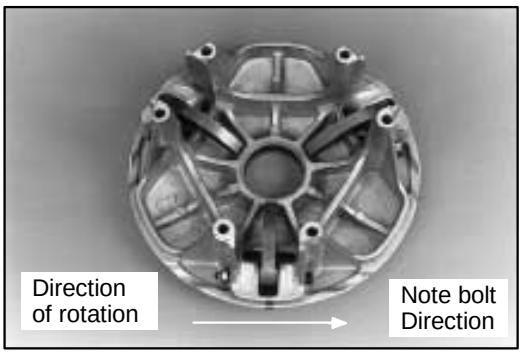
NOTE: In order to maintain proper belt-to-sheave clearance and clutch balance, the same washers (or equivalent total thickness) must be reinstalled during assembly. If sheaves are not marked, or if total thickness of existing shim washers under spider is not recorded, clutch will be out of balance when reassembled and must be replaced. Be sure to follow indexing procedure on page 5.21 if belt-to-sheave clearance is being adjusted.

6. Inspect both sheave surfaces for wear or damage. Inspect movable sheave bushing. See page 5.38 for inspection and repair procedure.



7. Using an 1/8″ Allen wrench with a 3/8″ combination wrench, remove drive clutch fly weights. Note direction of weight pin with nut on trailing side. Inspect each weight. Surface should be smooth, with no waves or galling. Place bolt inside weight to check flyweight bushing and pin surface for wear.

NOTE: The weight bushing is not a service part and both weight and pin must be replaced if worn.



8. Inspect all rollers, bushings and roller pins by pulling a flat metal rod across the roller. Roller can also be inspected by rolling with finger to feel for flat spots, roughness, or loose bushing. Also inspect to see if roller and bushing are separating. Bushing must fit tightly in roller. Replace roller and pin if roller fails to roll smoothly (flat spots) or if bushing is loose.



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Spider Roller Removal

1. Remove spider buttons using button removal tool. Remove shims (if any are installed) and note location.

Spider Button Removal Tool

PN 2870985

2. Place spider on a vise or in an arbor press. Using a pin punch, drive out the roller pin.

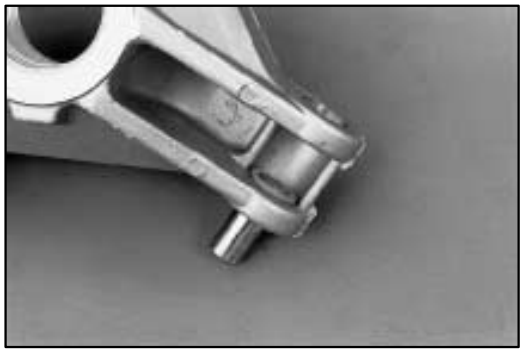


Roller Installation

1. Start a replacement roller on each leg, driving a pin in .100″-.125″ (.25-.32 cm) beyond the first land of the spider leg (A). Remove any aluminum burrs from pin protruding from spider.



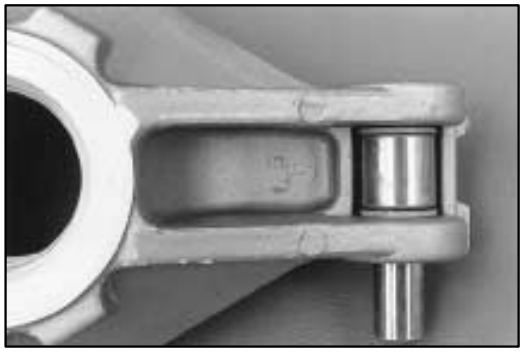
2. Install one washer onto pin.



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Roller Installation, Cont.

3. Place roller on pin as it protrudes from first land.
4. Place a second washer on other side of roller.



5. Install service tool as shown.

6. Place spider on a vise anvil and drive roller pin through to second land of spider.



CAUTION:

Use care to start the pin straight. Aluminum burrs could pass through into the roller bushing causing it to bind and stick. Also use care to make sure the roller remains aligned when the pin is driven through. The roller bushing could be damaged causing premature wear and roller failure.

Spider Button Shimming

1. Determine how many shims are to be used.

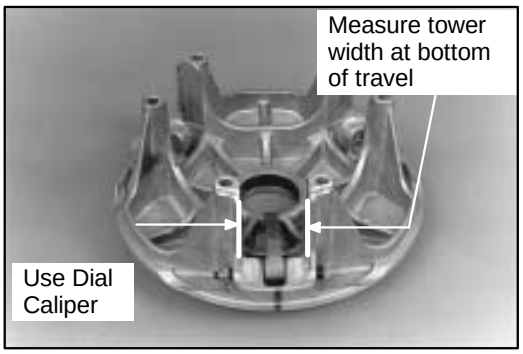
NOTE:A shim kit is available which contains an assortment of shims, including .002″, .005″, and .010″.

Shim Kit PN 2200387

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Spider Button Shimming, Cont.

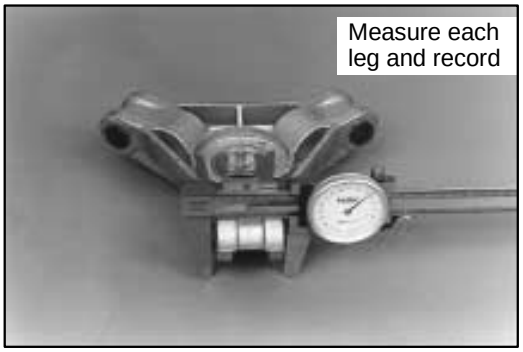
2. Measure the dimension between towers at the lower half of the towers as shown.



3. Install spider buttons using a soft face hammer.



4. Record width of spider buttons on each leg.



5. Add shims beneath trailing side spider button to obtain specified button-to-tower clearance when assembled.

Button to Tower Clearance -
P-85 / P-90 = .002″ (.05 mm)



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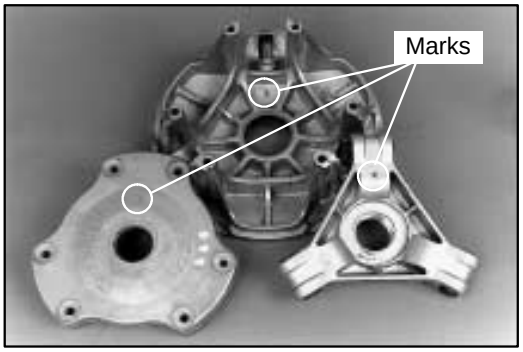
Drive Clutch Assembly

1. Place the correct number of spacer washers beneath the spider.



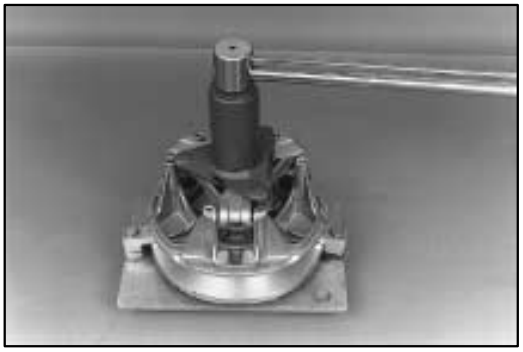
2. Assemble clutch making sure “X” marks on movable sheave and spider, or reference marks made before disassembly are aligned to achieve proper balance.

NOTE:If belt to sheave clearance is being changed by adding or removing washers from under the spider, and the sheaves were marked before disassembly, follow indexing procedure on page 5.21.



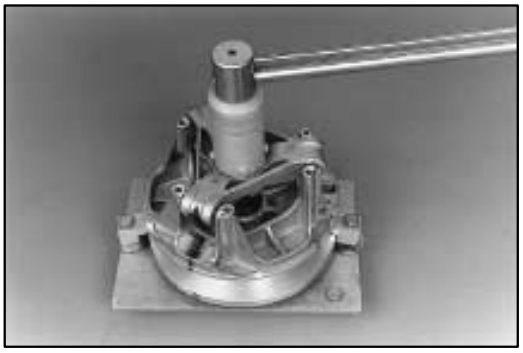
3. Torque spider to specification.

Spider Torque - P85 and P90 200 ft. lbs. (276 Nm)
Spider Removal Tool PN 2870341



4. Torque jam nut to specification (P-85 Clutches). Install weights with weight pin nut on trailing side. Use new nuts to ensure proper retention. Torque nut to 30 in. lbs.

Jam Nut Torque - P85 models only 235 ft. lbs. (324.3 Nm)
Jam Nut Tool PN 2870338
Weight Pin Nut Torque 30 In. Lbs. (3.4 Nm)



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Assembly, Cont.

5. Install spring and cover. Torque cover bolts evenly to specification.

CAUTION: Carefully align bushing with shaft during installation of cover to prevent bushing damage. Maintain alignment by tightening cover bolts evenly and carefully.

Spider Cover Bolt Torque - 90 in. lbs. (10.3 Nm)

Installation

1. Slight galling or scoring of the bore taper can usually be corrected using a tapered reamer. Place reamer in a vise and lubricate with cutting oil. Clean taper by manually rotating clutch clockwise.

Tapered Reamer PN 2870576



2. Check crankshaft taper for galling or scoring. If necessary clean taper evenly with 200 grit emery cloth.



3. Both clutch taper and crankshaft taper should be clean and dry.

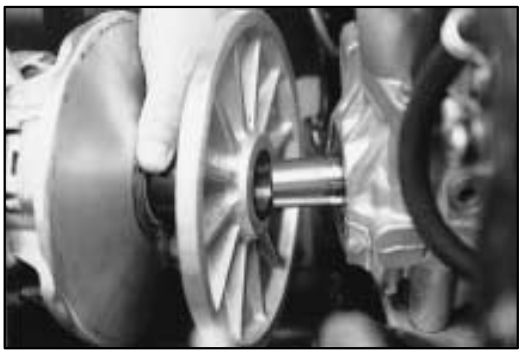
NOTE:Do not use harsh cleaners which may cause clutch taper to corrode during use. This will cause difficulty when removing clutch in future. Clean clutch taper with lacquer thinner or isopropyl alcohol.



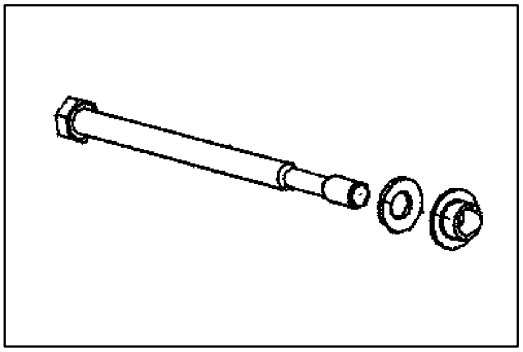
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Installation, Cont.

4. Slide clutch fully onto crankshaft taper.



5. Install retaining bolt with any spacers, washers or O-rings. See appropriate parts manual for type and placement of retaining bolt components.



6. Torque retaining bolt to specifications. Hold clutch with strap wrench.

Drive Clutch Bolt Torque (Large ID Shaft)- (3/4″) 40 - 45 ft. lbs (55.2 - 62.1 Nm) Drive Clutch Bolt Torque (Small ID Shaft)- (14mm / 7/16″) 50 ft lbs. (69 Nm)

NOTE: Re-torque clutch to specification after first period of operation (such as a test ride).



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Spider Indexing



NOTE: Spider indexing affects clutch balance and belt to sheave clearance. Read procedures carefully before proceeding.

1. Before disassembling drive clutch, mark spider, cover, moveable sheave, and stationary sheave in line with a permanent marker as shown.
2. Disassemble drive clutch as described starting on page 5.13. Take care to note the amount and thickness of the shim washers under the spider.



3. Add or remove spider washers as required to achieve desired belt to sheave clearance.
   - For example: If belt to sheave clearance is .020″ too large, removing one .020″ shim will position the movable sheave closer to the fixed sheave reducing belt to sheave clearance by .020″.

NOTE: The following washers are available for fine tuning:

Washers:	
PN 5210754	.050″
PN 5210753	.032″
PN 5210752	.020″



4. Install spider washer(s) and spider aligning Xs. Notice as the spider seat location is changed, the sheave marks made before disassembly no longer align. There are two ways to bring the sheave marks into alignment.
   - Vary the amount and thickness of spacer washers (Washer thickness may vary slightly).
   - Re-index marked spider leg to another tower. This can be done because spider has little effect on overall clutch balance.

Re-indexing the spider 1/3 turn clockwise, or 1 leg, will allow the realignment of the moveable and stationary sheaves as previously marked. For example:

- .020″ or .032″ washer removed - re-index spider clockwise 1/3 turn
- .050″ or .064″ washer removed - re-index spider clockwise 1/3 turn
- Two .050″ or .064″ washers removed - re-index clockwise 2/3 turn

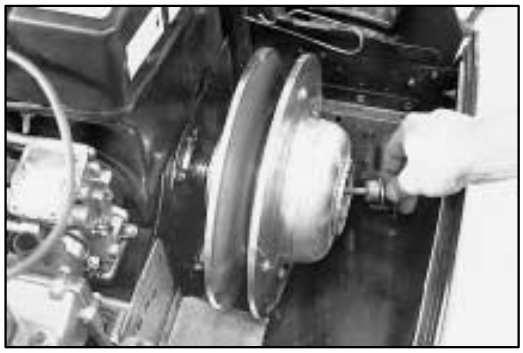


NOTE: Alignment marks should be within 1″ (25 mm) after final assembly and torquing.

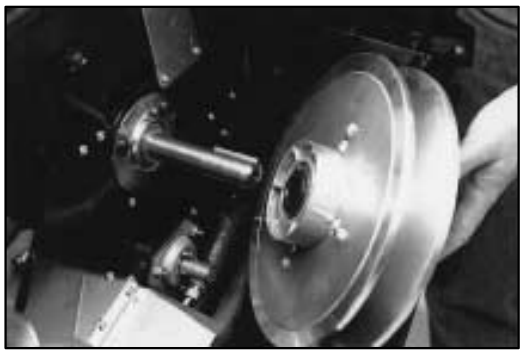
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Driven Clutch Removal

1. Remove driven clutch retaining bolt.



2. Slide driven clutch off jackshaft. It may be necessary to use a puller on some driven clutches. P-85 clutches (externally adjustable) can be removed using a 3-point flywheel or steering wheel puller and the 1/4-20 adjustment bolt holes. Use a suitable spacer on the end of the jackshaft.



3. Inspect jackshaft keyway for wear or damage.

NOTE: Notice the number and thickness of shim washers between driven clutch and jackshaft bearing. These must be replaced to maintain proper offset/alignment.



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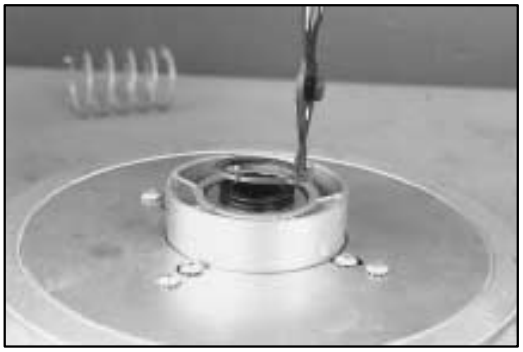
Disassembly

1. Place clutch on bench.

CAUTION: Wear eye protection during disassembly and assembly of driven clutch.



2. Hold fixed sheave and turn movable sheave 1/4 turn. Hold movable in place tap helix down with a soft faced hammer. Remove snap ring and washer.)



3. Allow sheaves to return and force the helix out. Before removing helix, note driven clutch spring position. Remove helix.



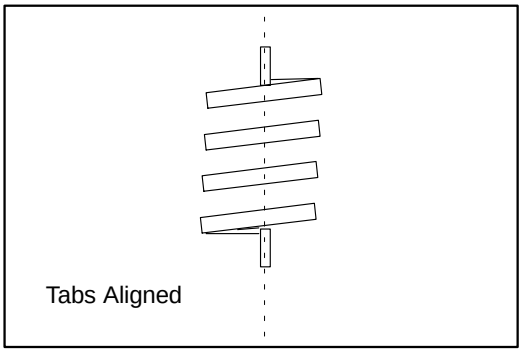
4. Inspect helix ramps and movable buttons and for wear or damage. P-85 buttons can be removed by applying heat to the button housing or drill button with an 1/8″ drill bit. The ramp buttons should be replaced when worn. See Maintenance section for inspection intervals.



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Disassembly, Cont.

5. Remove driven clutch spring. Both spring tabs should line up. If not spring is fatigued and should be replaced.



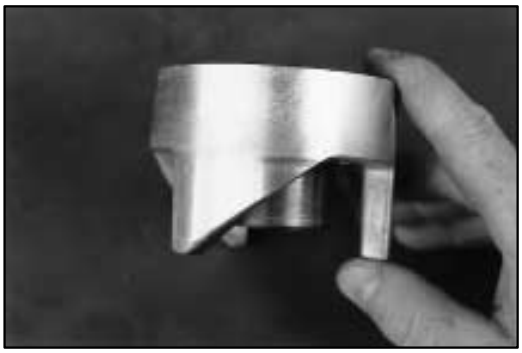
6. Slide moveable sheave off and inspect sheave surfaces for wear or grooving. Note size and number of shim washers between sheaves.



7. Note condition of moveable sheave bushing. Install helix into bushing. It should slide freely without binding. See page 5.39 for bushing replacement.



8. Polish helix with a fine emery cloth to remove any sharp edges or build up which may cause sticking.



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Assembly

1. Install appropriate washer(s) on fixed shaft.

Optional Thin Adjustment Washer (P-85)
.048″ - PN 7555899

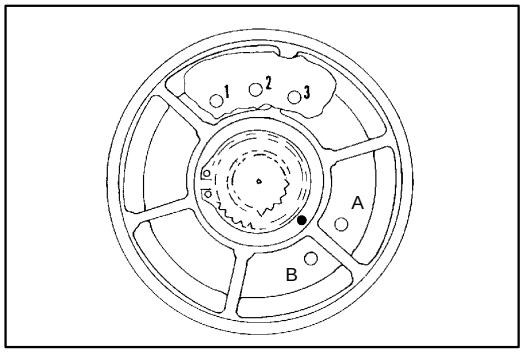


2. Slide moveable sheave on fixed shaft.

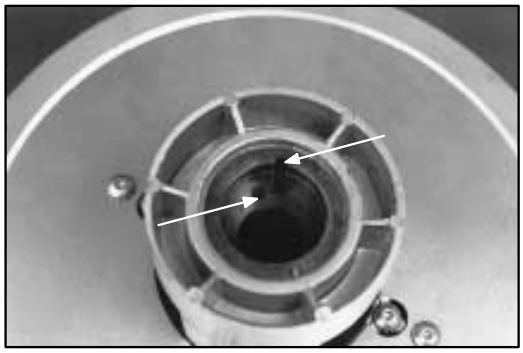


3. Install driven clutch spring. Be sure spring tab is seated in hole in moveable sheave. Refer to specifications in front of this section for driven spring setting.
   - P-85 driven clutches have 1 spring locating hole in the movable sheave and 4 holes in the helix.

NOTE: The driven clutch helix/moveable assembly has several different spring locations which affect clutch shifting and RPMs. Tighter spring tension will raise engine RPMs during clutch upshift and allow quicker downshift when pulling or negotiating a hill. The lighter tension positions will tend to have a slower downshift and a harder upshift.



4. Align inner keyway between the helix and movable sheave. With the spring in place, slide helix onto shaft .5″ (12mm).



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Assembly, Cont.

Helix Angles and Effects

The driven clutch helix was selected for overall performance in relation to the other driven system components. In fine tuning situations requiring a slight adjustment of engine operating RPM or improved backshift, we recommend trying a helix change before changing other components.

Polaris has several helix angles available for the P-85 and P-90 driven clutch. Refer to the chart below for specific angle effects and identification.

Helix Ramps*

Description	PN	Degrees	Type
34	5130896	34	P85
34M*	5130751	34	P85
36	5130895	36	P85
36M*	5130717	36	P85
38	5130723	38	P85
40	5130724	40	P85
42	5130725	42	P85
44	5130726	44	P85
40-36*	5130898	40-36	P85
R1*	5131287	40-32	P85
R2*	5131288	42-32	P85
R3*	5131289	45-32	P85
R4*	5131290	50-32	P85
R5*	5131291	40-34	P85
R6*	5131292	42-34	P85
R7*	5131293	45-34	P85
R8*	5131294	50-34	P85
R9*	5131295	40-36	P85
R10*	5131296	42-36	P85
R11*	5131297	45-36	P85
R32*	5131623	50-34	P85
R12*	5131298	50-36	P85
T-1*	5131013	42-36-34	P-85
36.5	5130383	36.5	P90
40-38-36	5131161	40-38-36	P90
38-36	5131162	38-36	P90
38-36-34	5131163	38-36-34	P90
34	5131164	34	P90

The helix spring should always be adjusted within its limits before a helix change is performed. The normal rate of change between helix angle steps is 250 RPM under full throttle. This is approximately the same result as in going from the No. 1 to No. 4 spring position (P-85).

NOTE: Increasing spring tension increases engine RPM. RPM changes may not be evident if other drive or driven clutch components are substandard.

* NOTE: All R-Series, Mod(M), T1, and 40-36 helix ramps are cut 0.060″ deeper in the snap ring pocket. These are made so the driven clutch can open far enough for full shift out with wide 1 7/16″ belts..

If these helix ramps are used with narrow belts, 2 (two) additional (for a total of three) .030″ /.8 mm washers (PN 7556804) should be installed under the snap ring to prevent the belt from touching the inner hub at full shift which can cause belt failure.

Wide belt models use only the existing washer under the snap ring.





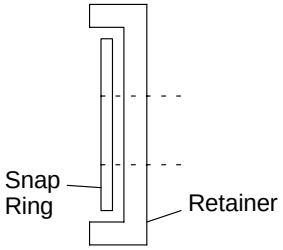
5. Hold fixed sheave and turn movable sheave 1/4 turn counterclockwise.

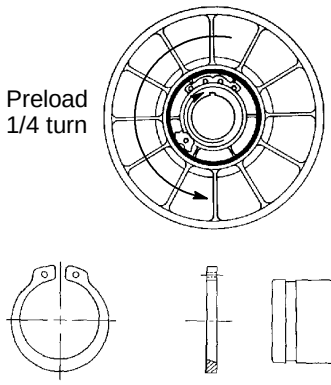
6. Force helix down into place, exposing snap ring groove.

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Assembly, Cont.

7. Install retainer spacer washer(s), and snap ring. Snap ring should be installed with flat (machined) side up or toward jackshaft bearing. NOTE: On models equipped with snap ring retainers as shown below, retainer may stay on back of snap ring when clutch is removed. Pry lightly to remove retainer and gain access to snap ring. (Refer to illustration below.)





NOTE: Always install snap ring with chamfer towards helix (sharp edge outward)

8. Allow sheaves to close. Test clutch by pre-loading movable sheave 1/4 turn counterclockwise and releasing. Sheave should open and close smoothly with a positive stop. Some helix ramps have more than one washer beneath the snap ring.



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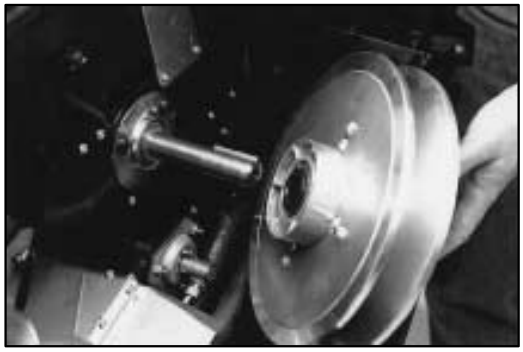
Installation

1. Install proper number of spacer washers on jackshaft between clutch and jackshaft bearing.
   Inspect Jackshaft Bearing
   Excessive vibration or abnormal drive belt wear can be caused by a worn bearing or jackshaft on the driven clutch side. To inspect bearing fit, watch the bearing area closely as you try to force the jackshaft up and down. If movement is detected, disassemble to determine which parts are worn. Replace the jackshaft if the new bearing is loose on the shaft. The bearing should be greased at 1000 mile (1600 km) intervals and before storage.



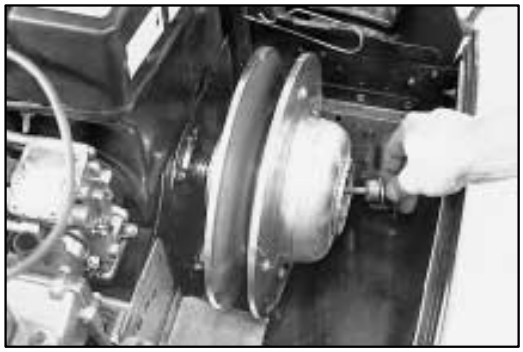
NOTE:Spacer washers between driven clutch and jackshaft bearing set the offset. Refer to adjustment procedure on page 5.33 to adjust offset between the drive and driven clutch.

2. Lightly grease jackshaft keyway or spline. With square key in place (P-85s) slide clutch onto jackshaft.



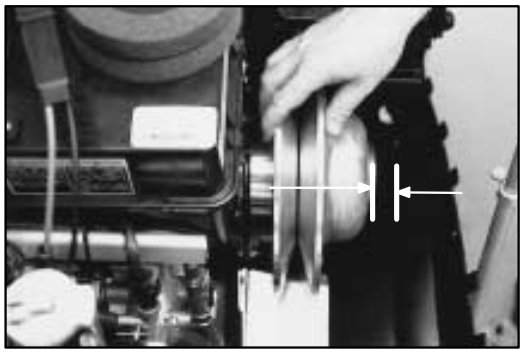
3. Install spacer, bolt and washer to hold driven clutch in place.

Driven Clutch Retaining Bolt Torque-
15 ft. lbs. (20.8 Nm)



4. P-85 driven clutches should float from side to side (.040-.080″ (1-2 mm)). Without a slight free float, jackshaft bearings could be side loaded, causing premature bearing failure.

Driven Clutch Torque/Float
P-85 .040-.080″ (1-2 mm)



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Drive Belt

Part No.	Belt Width* (Projected)	Side Angle Overall*	Center to Center* +.100″ – .000″	Outer Circum-ference*	Notes
3211042	1.375″ (34.93mm)	32°	12.00″	47.250″	Common production belt for P-85 systems
3211045	1.375″ (34.93mm)	32°	12.00″	47.125″	Close tolerance version of 3211042
3211058	1.250″ (31.75mm)	28°	11.00″	43.313″	Indy Lite belt (P-90)
3211059	1.250″ (31.75mm)	28°	12.00″	45.125″	Longer Indy Sport Belt (P-90)
3211061	1.375″ (34.93mm)	32°	12.00″	47.188″	CVT version of 3211045
3211065	1.438″ (36.53mm)	28°	12.50″	48.375″	CVT Double Cog Storm belt
3211066	1.375″ (34.93mm)	28°	12.00″	47.250″	Double cog - CVT - thicker than 3211070. Pro-duction on higher horsepower snowmobiles.
3211067	1.375″ (34.93mm)	28°	12.00″	47.250″	Double cog–Good for short runs on higher horsepower engines (Drag Racers) - Good for lower horsepower trail riding
3211070	1.375″ (34.93mm)	28°	12.00″	47.250″	Common production belt for late model P-85 systems 1997-current.
3211073	1.438″ (36.52mm)	28°	12.50″	48.375″	Double cog–Good for short runs on higher horsepower engines (Drag Racers) - Good for lower horsepower trail riding
3211074	1.438″ (36.52mm)	28°	12.00″	47.625″	Double cog–Good for short runs on higher horsepower engines (Drag Racers) - Good for lower horsepower trail riding
3211075	1.438″ (36.52mm)	28°	12.00″	47.625″	Double cog - CVT
3211080	1.438″ (36.52mm)	28°	11.50″	46.625″	Double cog - CVT version of PN 3211078.
3211078	1.438″ (36.52mm)	28°	11.50″	46.625″	Standard Drive Belt

*± Belt dimensions given are nominal dimensions. There is a ± variance for all critical dimensions. Clutch set-up must be inspected when a new belt is installed and, If necessary, clutch set-up must be adjusted.

The drive belt is an important component of the converter system. In order to achieve maximum efficiency from the converter, drive belt tension (deflection), clutch offset, and alignment must be adjusted properly.

General Belt Selection Guidelines

NOTE:Refer to appropriate parts manual for proper belt. Production belt is recommended unless tuning for a specific application.

CVT

- Increased service life for high horsepower and extended high speed running
- Need 1-2 grams heavier drive clutch weight
- Good for prolonged high speed running.
- Good for aggressive riders

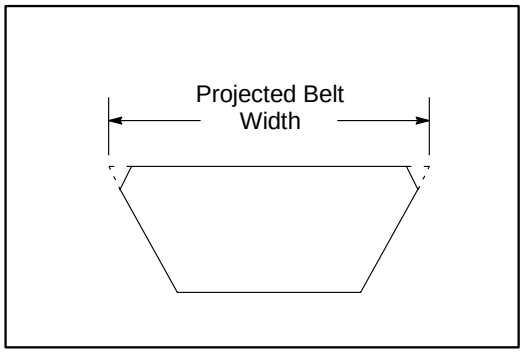
Standard Compound

- More aggressive at low speeds
- Reduced heat and drive clutch sheave wear
- Used for short, higher horsepower runs (Drag Racing)
- Good trail belt for lower horsepower engines.

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Drive Belt Inspection

1. Measure belt width and replace if worn severely. Generally, belt should be replaced if clutches can no longer be adjusted to provide proper belt deflection.
   - S The top edges have been trimmed on some drive belts. It will be necessary to project the side profiles and measure from corner to corner.
   - S Place a straight edge on each side of the drive belt.
   - S Place another straight edge on top of belt.
   - S Measure the distance where the side straight edges intersect the top, as shown in the illustration at right.
2. Inspect belt for loose cords, missing cogs, cracks, abrasions, thin spots, or excessive wear. Replace if necessary.
3. Inspect belt for hour glassing (extreme circular wear in at least one spot and on both sides of the belt). Hour glassing occurs when the drive train does not move and the drive clutch engages the belt.



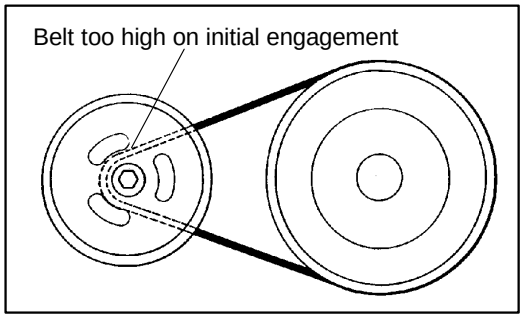
Belt Wear / Burn Diagnosis

Belt Wear / Burn Diagnosis	
Possible Cause Of Wear Or Burning	**Solution**
Driving at or about engagement RPM for extended periods in all types of conditions	Drive at higher RPM if possible. Gear the machine down. Make sure belt deflection is at 1.25″ to achieve optimum starting ratio
Cold weather startups	Be patient. Warm up engine at least 5 minutes or until it readily responds to throttle input. For the quickest most efficient driveaway in extreme cold weather, take drive belt off machine and bring it in to a warm environment. Break skis and track loose from the snow. Engage throttle aggressively for short durations for initial cold driveaway
Towing another machine at or about engagement RPM	When possible, do not go in deep snow when towing another machine. Use fast, effective throttle to engage the clutch. Not all machines are intended for pulling heavy loads or other machines.
Spinning track while vehicle is stuck (high RPM, low vehicle speed, high ambient temp. Example: 8000 RPM, 10mph vehicle speed, 60 mph indicated on speedometer.	Lower the gear ratio. Remove windage plates from driven clutch. If possible, move to better snow conditions and reduce RPM. Avoid riding in very high ambient temperatures.
Ice and snow piled up between track and tunnel overnight or after stopping for a long period of time (enough to re-freeze the snow).	Break loose snow and ice under tunnel. Allow longer than normal warmup. Allow belt to warm sufficiently and increase grip ability on clutch sheaves. Use fast, effective throttle when engaging clutch.
Poor running engine (Bog, Miss, Backfire, etc.)	Maintain good state of tune including throttle and choke synchronization. Check for fouled spark plug(s). Check for foreign material in carbs. Make sure no water or ice in fuel tank, lines, or carburetors.
Loading machine on trailer	Use caution when loading machine. Carbide skags may gouge into trailer and prevent drive train from spinning freely. Use enough speed to drive completely onto trailer. If machine cannot be driven completely onto trailer, it may need to be pulled or pushed to avoid belt wear / burning.
Clutch malfunction	Check for correct clutch components.
Slow, easy belt engagement - easing on the throttle	Use fast, effective throttle to engage the clutch.

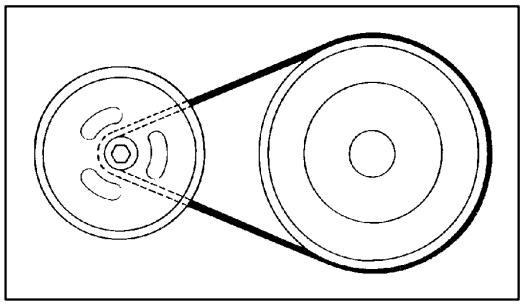
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Belt Deflection

Too much belt deflection - If the belt is too long or the center distance too short, the initial starting ratio will be too high, resulting in performance loss. This is due to the belt rising too high in the drive clutch sheaves upon engagement.



Not enough belt deflection (belt too tight) - If the drive belt is too short or the center distance too long, the ratio will again be incorrect. In addition, the machine may creep when the engine idles, causing damage to the internal face of the drive belt.



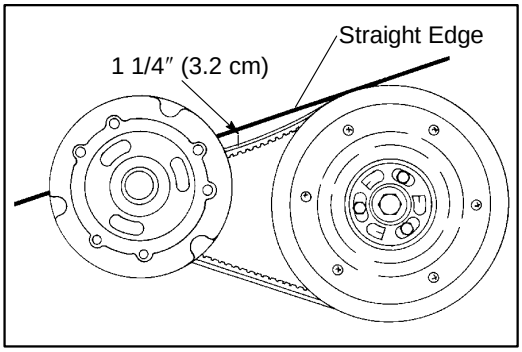
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Measuring Belt Deflection

IMPORTANT NOTE: Do not apply excessive pressure to force belt into driven sheaves. This will result in an improper measurement. If belt deflection cannot be adjusted within specification using methods below, inspect center distance and compare to specifications on page 5.32.

1. Measure belt deflection with both clutches at rest and in their full neutral position.
2. Place a straight edge on the belt and apply downward pressure while measuring at the point shown.

Belt Deflection -
1 1/4″ (3.2 cm)



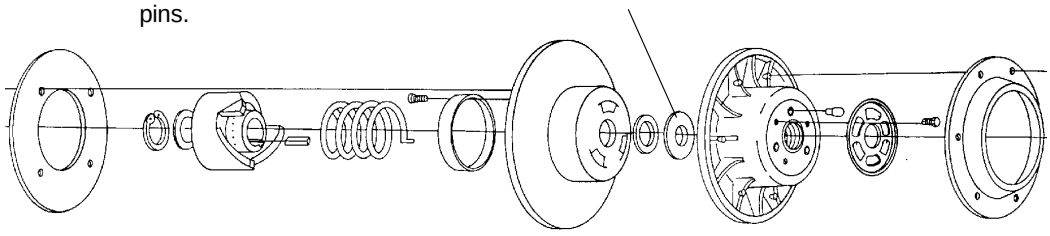
Adjusting Belt Deflection (P-85)

Belt deflection can be adjusted without removing the clutch from the jackshaft.

1. Pull belt into driven clutch to slightly open sheaves.
2. Loosen three bolts on adjustment cam.
3. Turn cam counterclockwise to reduce distance between sheaves. Do not rotate past #1 position.
4. Torque bolts to specification.

Optional Thin Adjustment Washer (P-85)
.048″ - PN 7555899

Production washer is usually .075″ thick with other .020 or .030 washers as required. May use optional, thinner (.048″) washer PN 7555899 if required to obtain proper sheave width. Either the .075″ or .048″ washer must be installed in this location to provide support for the adjustment pins.



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Clutch Offset Inspection

NOTE:Proper offset aligns the fixed sheaves of both clutch assemblies. This allows the clutches to be aligned throughout the shift range.

1. Remove drive belt. Belt deflection adjustments affect offset. Set belt deflection first.
2. Install proper alignment tool, depending on type of clutch, as shown in Ill. 1.
3. Rear of driven clutch moveable sheave should just contact tool when clutch is pushed inward on jackshaft.

Clutch Alignment (Tools) -

P85 - 5/8″Offset (PN 2870426)

P85 Electric Start -
1″ Offset (straight edge)

Clutch Offset Adjustment

1. Determine direction driven clutch needs to be adjusted. (Refer to Clutch Offset Inspection procedure above).
2. Remove driven clutch retaining bolt, and remove driven clutch.
3. Add or take out washers on jackshaft between the driven clutch and jackshaft bearing to achieve proper offset.
4. Most models require the driven clutch to float on the jackshaft. After adjusting offset, add or remove shim washers from the retaining bolt to provide a .030″-.060″ (.75-1.5mm) of float on jackshaft. This will prevent side loads on the jackshaft bearing.

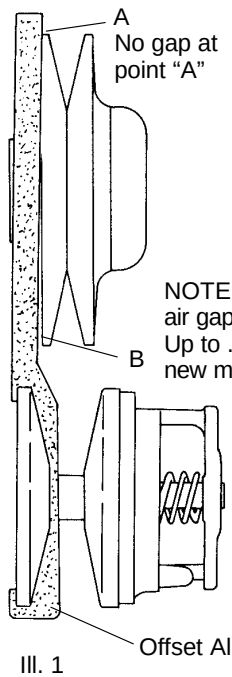
NOTE:On models with driven clutch snap ring retainer the clutch is mounted firmly on the shaft without float.

NOTE:When checking electric start models, use a straight edge as shown in Ill. 2. If alignment is off, loosen the engine mounts and shift engine as required to obtain the proper offset and alignment.

Driven Clutch Bolt Torque -

12 ft. lbs. (16.6 Nm)

Offset - Non-Electric Start Models

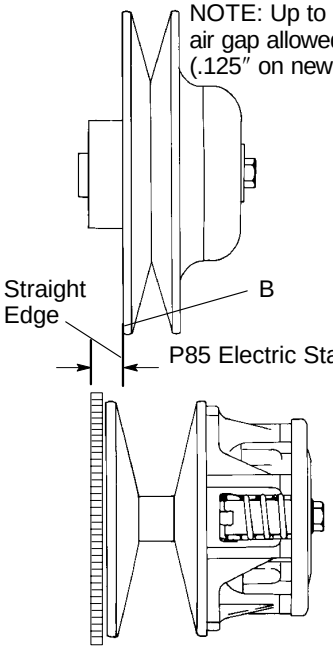


5/8″ Offset
All models with P85 driven clutch

NOTE: Up to .060″ (1.5mm) air gap allowed at point “B”. Up to .125″ is acceptable on new machines.

Ill. 1

Offset -Electric Start Models



NOTE: Up to .060″ (1.5mm) air gap allowed at point “B”. (.125″ on new machines)

Ill. 2

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Clutch Alignment Inspection

NOTE:Drive clutches are purposely misaligned slightly forward to compensate for the engine shifting on it's mounts. Under load, the engine will pull back slightly so both clutches are in alignment.

1. After clutch offset has been verified, inspect alignment.
2. Install proper alignment tool, depending on type of clutch, as shown in Ill. 1 page 5.33.
3. There should be a .060″ - .090″ (1.5 - 2.25 mm) gap between front of driven clutch and tool, with the tool just touching at the rear. Up to .125″ (3.1 mm) gap is acceptable in the front on new machines.

Clutch Alignment Adjustment

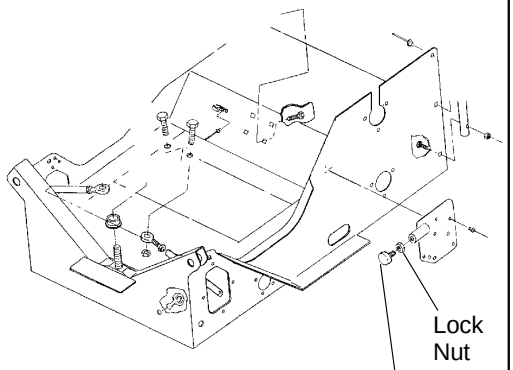
1. Loosen all 4 engine mounting bolts.
2. Adjust engine torque stop until clutches are in proper alignment.
3. Tighten engine mounts securely.
4. Recheck both clutch offset and alignment.
5. Verify proper torque stop adjustment.

Torque Stop Adjustment

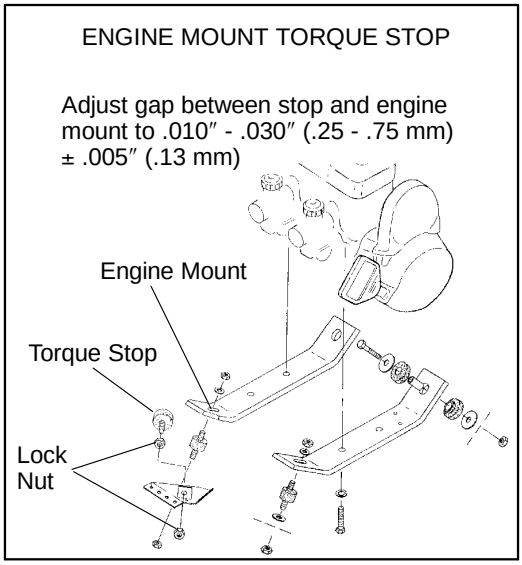
NOTE:There are two types of torque stops currently used. Refer to the illustrations below for adjustment of each type.

1. After aligning clutches, adjust torque stop by loosening lock nut and rotating stop to proper clearance as shown. Hold torque stop and tighten jam nut to 15-17 ft. lbs. (20.7-23.5 Nm).

CRANKCASE TORQUE STOP



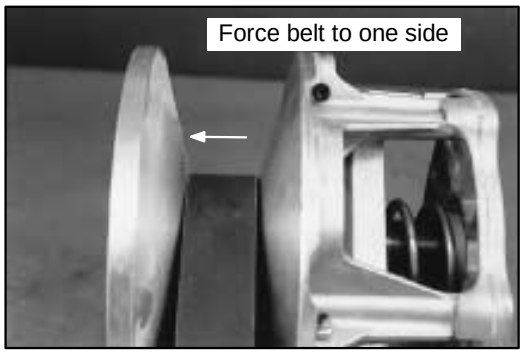
ENGINE MOUNT TORQUE STOP



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Belt to Sheave Clearance Inspection

NOTE:The distance between the belt and the moveable sheave on the drive clutch is very important. This distance controls the starting ratio (lowest starting ratio is most preferable) and the position of the clutch weight to engine RPM. The distance between the belt and moveable sheave should be as close to .020″ (.5 mm) as possible without creating a drag on the belt, when positioned around the hub at the bottom of the sheaves.



1. Force belt to one side of drive clutch. NOTE: Measure total belt to sheave clearance with a new belt.



2. Install feeler gage between other sheave and belt.

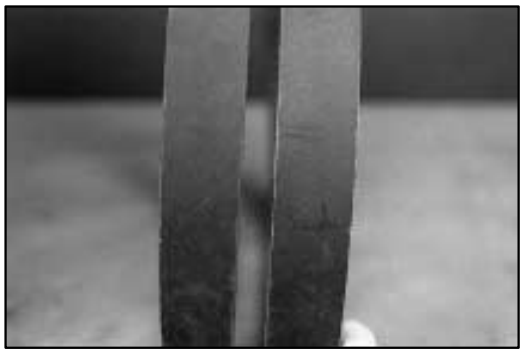
Belt to Sheave Clearance -
.020″ ±.015″(.5 mm±.4mm)

Belt to Sheave Clearance Adjustment

Belt to sheave clearance can be adjusted in two ways.

1. Try several new belts to achieve proper clearance.
2. Can add or remove shims from under the spider to increase or decrease belt to sheave clearance. See Spider indexing on page 5.21.

NOTE:Spider indexing affects clutch balance and belt to sheave clearance. Read procedures carefully before proceeding.



NOTE:Belts with various widths will also affect belt deflection since they will fit differently in the driven clutch. Deflection should be checked per procedure on page 5.32.

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Kit PN 2871025

Item	Qty.	Part Description	Part No.
1	1	P-85 Drive Clutch Moveable Bushing Removal and Installation Tool	5020627
2	1	P-90 Drive Clutch and Driven Clutch Bushing Installation Tool	5020628
3	1	Drive Clutch Cover Bushing Removal and Installation Tool (for all drive clutches)	5020629
4	1	P-85 Driven Clutch DU Split Bushing Installation Tool	5020630
5	1	P-90 Driven Clutch Bushing Removal Tool	5020631
6	1	P-85 Driven Moveable Sheave Removal Tool	5130862
7	1	P-85 Driven Moveable Sheave Removal Bridge	5222768
8	1	Main Puller Adapter	5020632
9	1	Adapter Reducer	5010279
10	1	Number Two Puller Adapter	5020633
11	1	Instruction	9912260

You will need to supply:

Piston pin puller (PN 2870386)
Bench vise
Soft face hammer (for P-85 Driven Moveable)
Small scribe or pick (for Cover Bushing Removal)
Hand held propane torch (for P-90 Driven)
Loctite RC 680 Retaining Compound (2870584)

P-85 Drive Clutch Cover Bushing Removal

1. Disassemble clutch as outlined in this section.
2. Inspect or measure bushing and replace if worn beyond service limit. Note: Bushing must be installed in cover. Refer to the following specifications.

Cover Bushing Inspection:
Garmax™ Style (Installed Dimension)
Nominal Bearing Bore: 1.125″ (28.57mm)
Service Limit: 1.140″ (28.95mm)

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P-85 Drive Clutch Cover Bushing Removal Cont.

3. On models equipped with snap ring, remove round wire snap ring from inside of clutch cover using a small scribe or pick and set aside.
4. Install main adapter on puller.
5. From outside of clutch cover, insert removal tool into cover bushing.
6. With inside of cover toward vise, slide cover onto puller.
7. Install nut onto puller rod and hand tighten. Turn puller barrel to increase tension as needed.
8. Turn clutch cover counterclockwise on puller rod until bushing is removed.
9. Remove nut from puller rod and set aside.
10. Remove bushing and bushing removal tool from puller. Discard bushing.





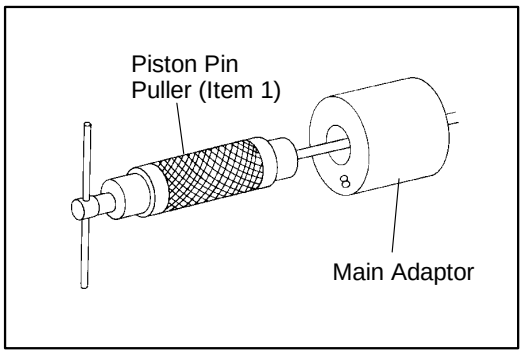
P-85 Drive Clutch Cover Bushing Installation

1. On Garmax™ style bushings (PN 3576516) apply Loctite 680 retaining compound (PN 2870584) to the outer surface of the bushing. Do not lubricate bushings, or premature wear will result.
2. Working from inside of cover, insert bushing and bushing installation tool into center of clutch cover.
3. With main adapter on puller, insert cover onto puller rod, placing outside of cover toward vise.
4. Install nut on rod and hand tighten. Turn puller barrel to apply more tension if needed.
5. Turn clutch cover counterclockwise on puller rod until bushing is seated.
6. Remove nut from puller rod and take installation tool and clutch cover off rod.
7. Squeezing ends of snap ring, gently fit ring into clutch cover.



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P-85 Drive Clutch Movable Sheave Bushing Removal



Ill. 1

1. Inspect bushing and replace if excessively worn.
2. Install handle end of piston pin puller (PN 2870386) securely into bench vise and lightly grease puller threads.
3. Remove nut from puller rod and set aside.
4. Install main adapter (Item 8) onto puller. See Ill. 1.
5. Working from inside of moveable sheave, insert removal tool (Item 1) into center of sheave. With towers pointing away from vise, slide sheave onto puller rod.
6. Install nut removed in step 2 onto end of puller rod and hand tighten. Turn puller barrel to increase tension on sheave if needed.
7. Turn sheave counterclockwise on puller rod until it comes free.
8. Remove nut from puller rod and set aside.
9. Pull bushing removal tool and adapter from puller rod. Remove bushing from tool and discard.
10. Remove retaining ring from inside adapter and set aside.

P-85 Drive Clutch Movable Sheave Bushing Installation

1. Place main adapter (Item 8) on puller.
2. Push new bushing into center of sheave by hand.
3. Insert installation tool (Item 1) into center of sheave and with towers pointing toward vise, slide sheave onto puller rod.
4. Install nut on puller rod and hand tighten. Turn barrel to apply additional tension if needed.
5. Turn sheave counterclockwise until bushing is seated.
6. Remove nut from puller rod and set aside.
7. Remove sheave from puller.
8. Remove installation tool.
9. Insert retaining ring removed in step 9 and installation tool into center of sheave.
10. With towers pointing toward vise, install sheave onto puller rod.
11. Install nut on puller rod and hand tighten. Turn barrel to apply additional tension if needed.
12. Turn sheave counterclockwise until ring is seated.
13. Remove nut from puller rod and set aside.
14. Remove sheave from puller.
15. Remove installation tool. Do not lubricate bushings, or premature wear will result.

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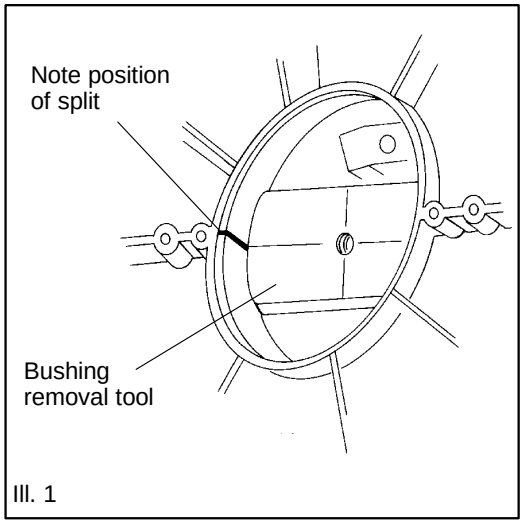
P-85 Driven Clutch Movable Sheave Large Bushing Removal

NOTE: The P-85 driven moveable has a split bushing. Note the position of this split during bushing removal. See Ill. 1.

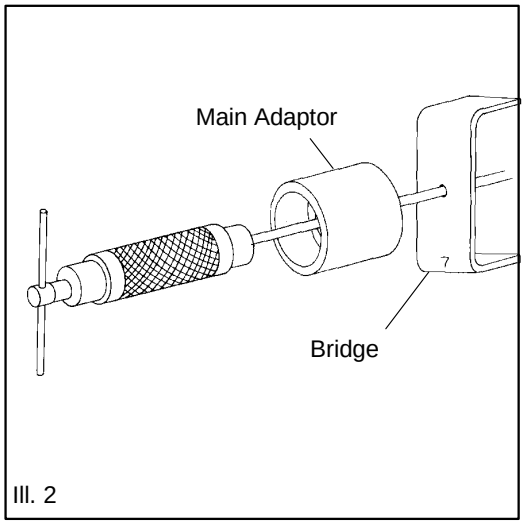
Moveable Sheave Bushing Inspection:

Replace the cover bushing if more brass than Teflon™ is visible on the bushing.

1. Inspect bushing and replace if excessively worn.
2. Insert bushing removal tool (Item 6) into sheave, centering split on tool. NOTE: The split must be touching the tool. See Ill. 1.
3. Install main adapter as illustrated. Install bridge (Item 7) onto puller with legs pointing toward clutch. See Ill. 2.
4. From the outside, insert thumb through center of sheave. Using downward pressure, hold bushing removal tool tightly in place.
5. With back side toward vise, slide sheave onto puller.
6. Install nut onto puller rod and hand tighten. Slowly align clutch with bridge and turn puller barrel to increase tension if needed.
7. Turn sheave counterclockwise until bushing is removed and sheave comes free.
8. Remove nut from puller and set aside.
9. Remove tool and bushing from puller. Discard bushing.
10. Remove bridge and adapter from puller.



Ill. 1



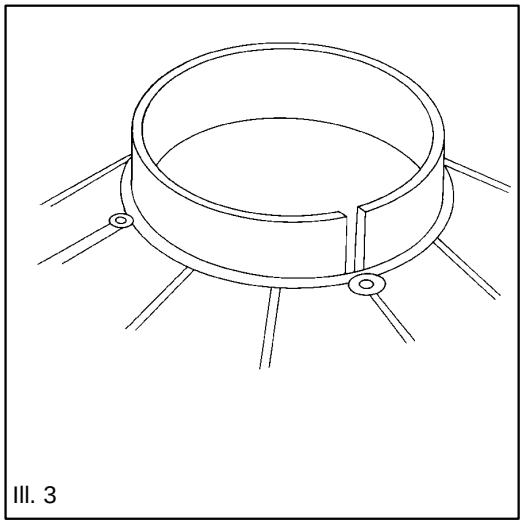
Ill. 2

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P-85 Driven Clutch Movable Sheave Large Bushing Installation

NOTE: The P-85 driven moveable has a split bushing. The bushing is held in place after installation by screws.

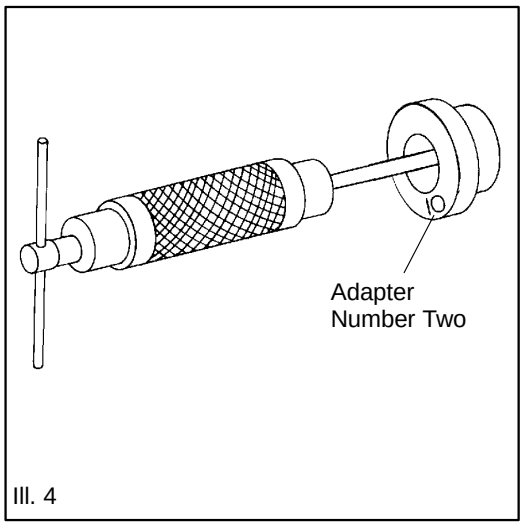
11. Insert bushing (PN 3569803) into clutch and tap lightly with a soft face hammer.



Ill. 3

12. Install adapter number two (Item 10) onto puller. See Ill. 4.
13. Slide clutch sheave onto puller with back side away from vise.
14. Turn puller barrel until rod extends past back side of sheave.
15. Insert large installation tool for DU bushing onto rod.
16. Install nut onto puller rod and hand tighten. Turn puller barrel to increase tension as needed.
17. Turn clutch sheave counterclockwise until bushing is seated.
18. Remove nut from puller rod and set aside.
19. Remove installation tool and slide clutch sheave from puller.

NOTE: The screws hold the bushing in place.



Ill. 4

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Drive / Driven Clutches Troubleshooting

SYMPTOMS	PROBABLE CAUSE	REMEDY
Harsh drive clutch engagement	-Drive belt worn too narrow	-Replace
	-Excessive belt to sheave clearance with new belt (high performance version without detent shift weight)	-Perform belt to sheave clearance adjustment with shim washers beneath spider
Drive belt turn over	-Wrong belt for application	-Replace
	-Clutch alignment out of spec	-Adjust alignment offset
	-Engine mount broken or loose	-Inspect, adjust or replace
	-Driven clutch sheaves have excessive runout, are bent or damaged	-Measurement should be taken .25″ in from outer circumference on sheave face. Maximum allowable tolerance is .015″ (.6 mm).
Noise in drive system	-Broken drive clutch components	-Inspect/replace
	-Excessive drive clutch button - tower clearance	-Install new buttons or shim out existing buttons
	-Bearing failure/ chaincase, jackshaft or front drive shaft	-Inspect/replace
	-Drive chain loose or worn, sprocket teeth broken	-Inspect/adjust or replace
	-Driven clutch bushing worn excessively or spring broken	-Inspect/replace
	-Drive chain adjustment too tight/too loose	-Inspect/replace
	-Drive belt surface flat spots	Inspect/adjust
Over rev during initial acceleration or during heavy pulling at low ground speeds.	-Spider roller position remaining in detent	Inspect/replace
		-Add spider shim washers
		-Add driven washers
Engine bogs after engagement.	-Improper driven clutch setup	-Reduce gear ratio (chaincase models)
	-Worn belt	-Replace
	-Excessive belt deflection	-Subtract driven clutch washers
	-Improper offset/alignment	-Inspect/adjust
	-Broken or misadjusted torque stop	-Inspect/adjust/replace
	-Broken motor mount	-Inspect/replace
	-Jackshaft bearing seizure	-Replace

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Drive / Driven Clutches Troubleshooting

SYMPTOMS	PROBABLE CAUSE	REMEDY
Engine RPM below specified operating range, although engine is properly tuned	a) Wrong or broken drive clutch spring b) Drive clutch shift weight too heavy c) Driven clutch spring broken or installed in wrong helix location d) Drive belt too long e) Improper driven clutch setup	a) Replace with recommended spring b) Install correct shift weight kit to match engine application c) Replace spring; refer to proper installation location d) Install new belt and/or adjust belt tension e) Install correct parts and/or adjust to match engine application and machine use
Erratic engine operating RPM during acceleration or load variations	Drive clutch binding or driven clutch malfunction Converter sheaves greasy; belt slippage	-Disassemble drive clutch; inspect shift weights for wear and free operation Clean clutches; install new belt -Clean and polish stationary shaft hub; reassemble clutch without spring to determine problem area -Replace ramp buttons -Inspect moveable sheave for excessive bushing clearance/replace
Engine RPM above specified operating range	a) Incorrect drive clutch spring (too high spring rate) b) Drive clutch shift weights incorrect for application (too light) c) Drive clutch binding d) Driven clutch binding e)Converter sheaves greasy; belt slippage f)Improper driven clutch setup	a) Install proper spring b) Install proper shift weights c) Disassemble and clean clutch, inspecting shift weights and buttons. Reassemble without the spring to determine probable cause. d)-Disassemble, clean and inspect driven clutch, noting worn sheave bushing and ramp buttons and helix spring location e) Clean clutches; install new belt f) Install correct parts and/or adjust to match engine application and machine use
Burnt Belts / Premature Wear Also see Belt Wear / Burning Diagnosis Chart on page 5.45.	a) Wrong or broken drive clutch spring b) Drive clutch shift weight too heavy c) Driven clutch spring broken or installed in wrong helix location d) Drive belt too long e) Converter sheaves greasy; belt slippage. f) Improper driven clutch setup	a) Replace with recommended spring b) Install correct shift weight kit to match engine application c) Replace spring; refer to proper installation location d) Install new belt and/or adjust belt tension e) Clean clutches; install new belt f) Install correct parts and/or adjust to match engine application and machine use

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Belt Wear / Burn Diagnosis	
Possible Cause Of Wear Or Burning	Solution
Driving at or about engagement RPM for extended periods in all types of conditions	Drive at higher RPM if possible. Gear the machine down. Make sure belt deflection is at 1.25″ to achieve optimum starting ratio
Cold weather startups	Be patient. Warm up engine at least 5 minutes or until it readily responds to throttle input. For the quickest most efficient driveaway in extreme cold weather, take drive belt off machine and bring it in to a warm environment. Break skis and track loose from the snow. Engage throttle aggressively for short durations for initial cold driveaway
Towing another machine at or about engagement RPM	When possible, do not go in deep snow when towing another machine. Use fast, effective throttle to engage the clutch. Not all machines are intended for pulling heavy loads or other machines.
Spinning track while vehicle is stuck (high RPM, low vehicle speed, high ambient temp. Example: 8000 RPM, 10mph vehicle speed, 60 mph indicated on speedometer.	Lower the gear ratio. Remove windage plates from driven clutch. If possible, move to better snow conditions and reduce RPM. Avoid riding in very high ambient temperatures.
Ice and snow piled up between track and tunnel overnight or after stopping for a long period of time (enough to re-freeze the snow).	Break loose snow and ice under tunnel. Allow longer than normal warmup. Allow belt to warm sufficiently and increase grip ability on clutch sheaves. Use fast, effective throttle when engaging clutch.
Poor running engine (Bog, Miss, Backfire, etc.)	Maintain good state of tune including throttle and choke synchronization. Check for fouled spark plug(s). Check for foreign material in carbs. Make sure no water or ice in fuel tank, lines, or carburetors.
Loading machine on trailer	Use caution when loading machine. Carbide skags may gouge into trailer and prevent drive train from spinning freely. Use enough speed to drive completely onto trailer. If machine cannot be driven completely onto trailer, it may need to be pulled or pushed to avoid belt wear / burning.
Clutch malfunction	Check for correct clutch components.
Slow, easy belt engagement – easing on the throttle	Use fast, effective throttle to engage the clutch.

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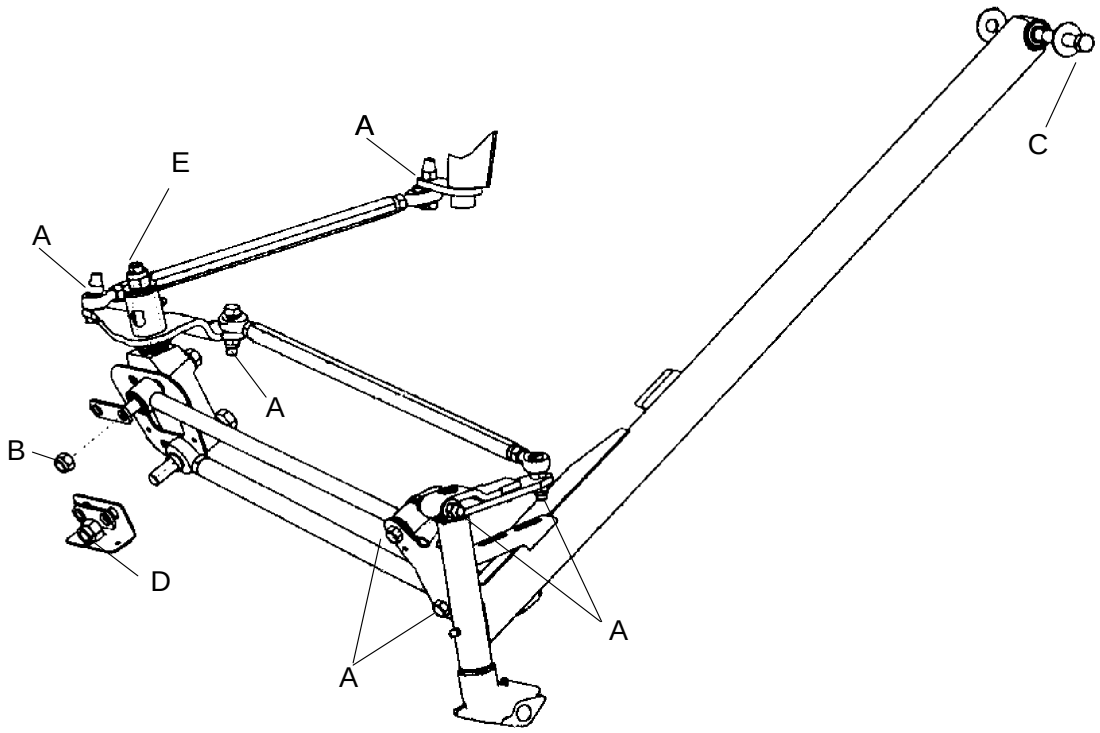
CHAPTER 6
BODY AND STEERING

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Steering Assembly - Indy Trail RMK



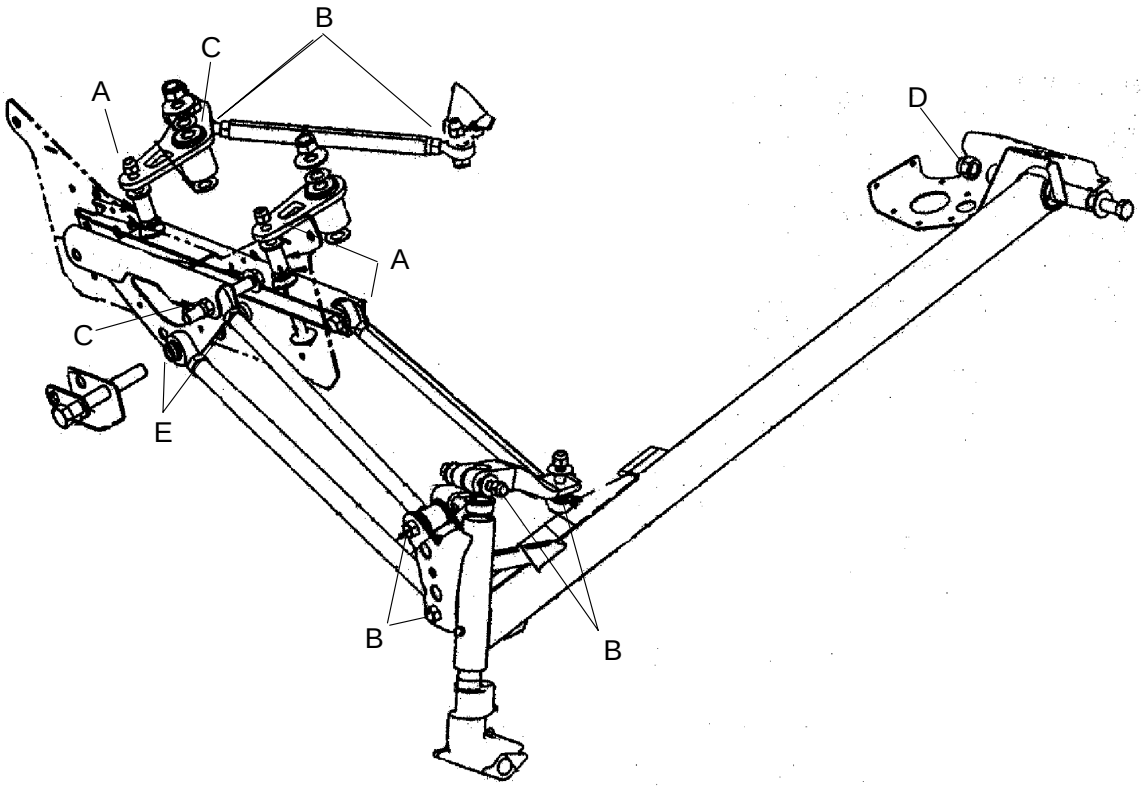
Torque Specifications	
A	28-30 ft.lbs (38-41 Nm)
B	35-40 ft.lbs (47-54 Nm)
C	40–45 ft.lbs. (45–62 Nm)
D	45-50 ft.lbs (61-68 Nm)
E	55–60 ft.lbs. (76–83 Nm)

Apply Premium All Season Grease, PN2871322 (3oz.), to all grease zerks located on suspension assemblies.

z Replace locking fasteners if removed.

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Steering Assembly - Indy 500 SKS European



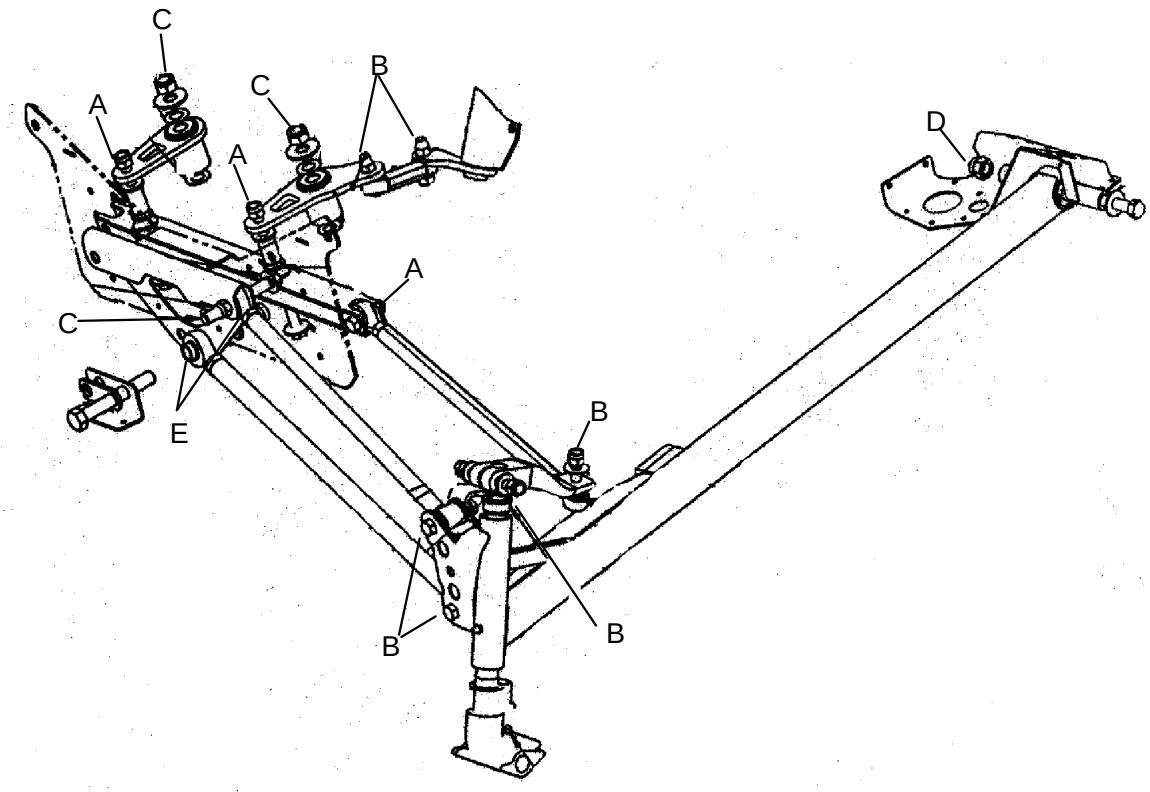
Torque Specifications	
A	17–19 ft.lbs (24–26 Nm)
B	28–30 ft.lbs (39–41 Nm)
C	35–40 ft.lbs (48–55 Nm)
D	40–45 ft.lbs. (55–62 Nm)
E	45–50 ft.lbs. (62–69 NM)

Apply Premium All Season Grease, PN2871322 (3oz.), to all grease zerks located on suspension assemblies.

- Replace locking fasteners if removed.

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Steering Assembly - Indy 700 SKS / 700 SKS European

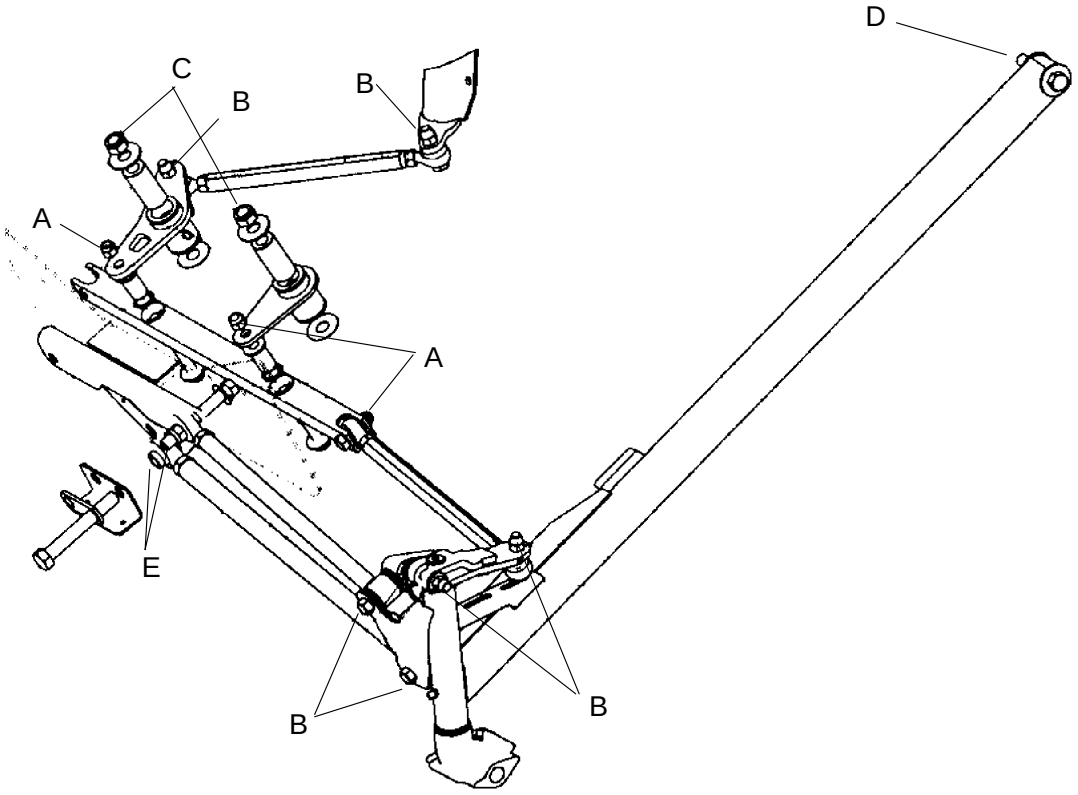


Torque Specifications	
A	17–19 ft.lbs (24–26 Nm)
B	28–30 ft.lbs (39–41 Nm)
C	35–40 ft.lbs (48–55 Nm)
D	40–45 ft.lbs. (55–62 Nm)
E	45–50 ft.lbs. (62–69 NM)

Apply Premium All Season Grease, PN2871322 (3oz.), to all grease zerks located on suspension assemblies.

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Steering Assembly - Indy 500 RMK



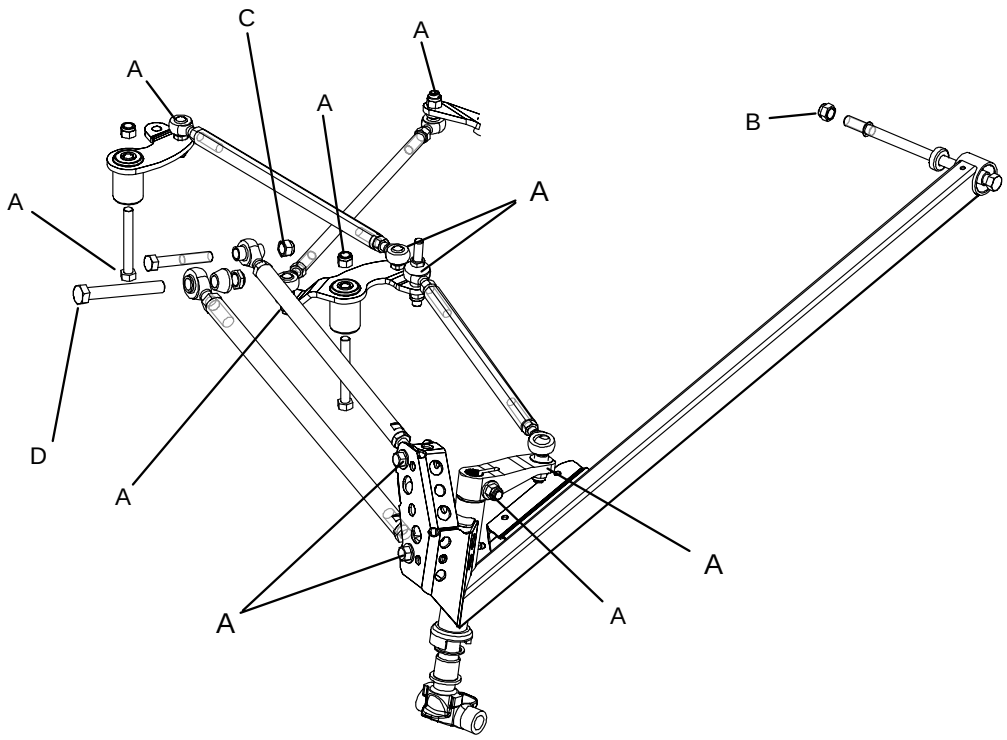
Torque Specifications	
A	17-19 ft.lbs. (23-26 Nm)
B	28-30 ft.lbs (38-41 Nm)
C	35-40 ft.lbs (47-54 Nm)
D	40–45 ft.lbs (55–62 Nm)
E	45-50 ft.lbs (61-68 Nm)

Apply Premium All Season Grease, PN2871322 (3oz.), to all grease zerks located on suspension assemblies.

- Replace locking fasteners if removed.

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Steering Assembly - EDGE RMK 600 / 700 / 800



Torque Specifications	
A	28-30 ft.lbs (38-41 Nm)
B	35-40 ft.lbs (47-54 Nm)
C	54–66 ft.lbs (75–91 Nm)
D	135-165 ft.lbs (187–228 Nm)

Apply Premium All Season Grease, PN2871322 (3oz.), to all grease zerks located on suspension assemblies.

z Replace locking fasteners if removed.

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Inspection

Prior to performing steering alignment, inspect all steering and suspension components for wear or damage and replace parts as necessary. Refer to steering assembly exploded views in this chapter for identification of components and torque values of fasteners. While disassembling, make notes of what direction a bolt goes through a part, what type of nut is used in an application, in which direction do the steering arms go on - weld up or weld down, etc.

Some of the fasteners used in the IFS are special and cannot be purchased at a hardware store. Always use genuine Polaris parts and hardware when replacing front end components. Review steering adjustment guidelines on page 6.8 before making adjustments.

The following components must be inspected at this time:

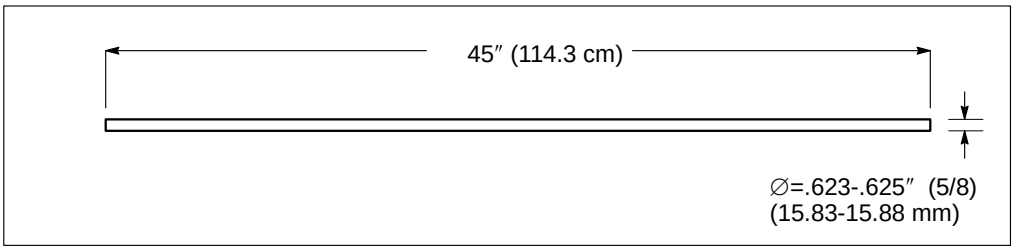
NOTE: Always follow rod end engagement guidelines found on page 6.7. Maximum setup width must be checked whenever front suspension components are adjusted or replaced.

- Tie rods and tie rod ends
- Radius rods and radius rod ends
- Torsion bar and bushings / linkage (where applicable)
- Handlebars and steering post assembly
- Spindles and bushings
- Trailing arms and bushings
- Skis and skags
- Bell crank / Pitman arm / Idler arm
- Steering arms
- Shock absorbers, shock mounts, springs
- All related fasteners - check torque. Refer to steering exploded views at the beginning of this section.
- Grease all fittings.

Alignment Bar Specifications

Material:	C-1018
Diameter:	.623″ - .625″ (5/8″) (15.82 - 15.87 mm)
Length:	45″ (114.3 cm)

PN 8700231 See Service Tool Catalog for ordering information.

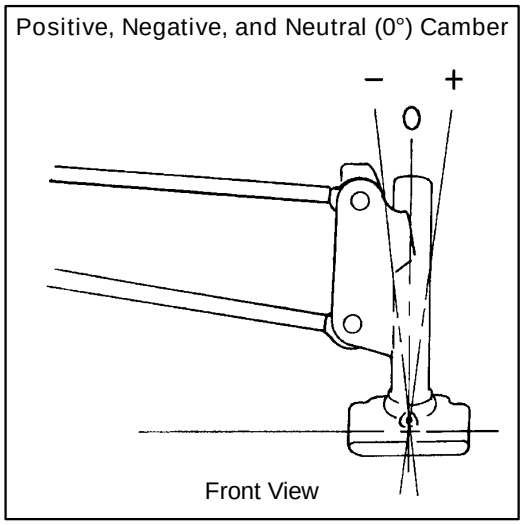


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Camber Definition - All IFS

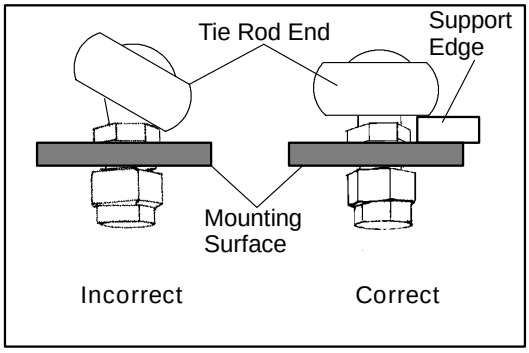
The following definitions of camber use automotive terminology to describe positive and negative positions. Refer to the illustration at right.

- 0 (Neutral) Camber - Spindle is 90° (perpendicular) to ground
- + (Positive) Camber - Spindle bottom is canted inward toward chassis
- – (Negative) Camber - Spindle bottom is canted outward from chassis



Radius Rod and Tie Rod End Torque Procedure

Radius rod and tie rod ends must be parallel to their respective mounting surface after tightening jam nut as shown at right. Hold tie rod or radius rod and tighten jam nut. If possible, support the edge of the rod end as shown to keep it from rotating out of position until jam nut is tight. When tie rod ends are properly tightened, the tie rod should rotate freely approximately 1/8 turn.

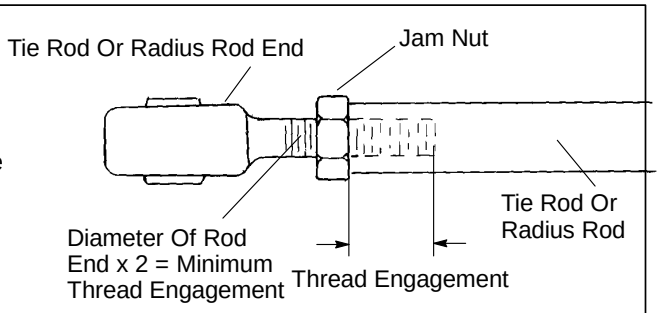


Rod End Engagement Guidelines - All IFS

Tie Rod Or Radius Rod End Must Engage Rod A Minimum Of 2x Thread Diameter When Adjustment Is Complete

EXAMPLE
7/16″ Rod End x 2 = 7/8″
Minimum Thread Engagement =7/8″

11mm x 2 = 22mm
Minimum Thread Engagement =22mm



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2002 IFS Steering Alignment Specifications

The following information is to be used for 2002 Polaris Snowmobile front suspension setup. The data in the following table is based on the 2002 Polaris factory settings. Maximum Width and Camber measurements are to be taken with the front end elevated and shocks at full extension. Toe alignment is measured at ride height.

Suspension Type	Maximum Setup Width ± 1/4″ (6mm)	Camber	Toe Out (At Ride Height)
42.5" EDGE 500, 600, 700, 800 XC SP 500 Indy, Supersport, 550 500, 600, 700 Classic, Frontier	40.48" (102.82cm)	.5/8″ ± 5/16″(1.64 ± .80cm)	ALL MODELS 1/8" – 3/8" TOE OUT At Normal Ride Height
38" Indy Xtra Trail RMK	36.75" (93.35cm)	0″ ± 5/16″(0 ± .80cm)	
38 Xtra-10, CRC 500 RMK	36.94" (93.83cm)	11/32″ ± 5/16″(.86 ± .80cm)	
39.5" EDGE RMK 600, 700, 800 Edge RMK	39.49" (100.30cm)	1" ± 5/16″(2.62 ± .80cm)	
41 EDGE RMK 600, 700, 800 Edge RMK	40.95" (104.01cm)	13/16 ± 5/16″(2.11 ± .80cm)	
38 X 7 Widetrak LX	37.60" (95.50cm)	13/16 ± 3/4″(2.08 ± .80cm)	
41" Indy Xtra Sport Tour, Sport Tour E/S, Sport Tour Euro	39.10" (99.31cm)	0″± 5/16″(0 ± .80cm)	
42.5″ Indy Xtra 50 Classic Touring, Trail Touring	40.44" (102.72cm)	0″ ± 5/16″(0 ± .80cm)	
42.5" X-10 CRC 600 Classic Touring	40.85" (103.76cm)	3/4″ ± 5/16″(1.96 ± .80cm)	
Lite IFS 340 Deluxe, 340 Touring	40.18" (102.06cm)	1/2″ ± 5/16″(1.22 ± .80cm)	
42.5" XC-10 CRC 700 SKS, 500, 700 Euro SKS, 800 XCR	40.73" (103.45cm)	7/8″ ± 5/16″(2.29 ± .80cm)	

WIDTH NOTE: Width is measured in inches from the center of the spindles near the grease fitting for the ski mount bolt located at the base of the spindle. The tolerance on this measurement is ± 1/4″.

TOE ADJUSTMENT NOTE: Toe is measured in inches with the machine on the ground and resting at normal ride height - not full rebound. Measure at a point 10″ (254mm) forward of the ski mount bolt and 10″ behind the ski mount bolt, preferably on the centerline of carbide skags. Note: Measurements to points on the skis may be inaccurate.

NOTE: Camber measurement is taken in inches from top of alignment bar to the top of ski mount hole in the spindle (bushing removed).

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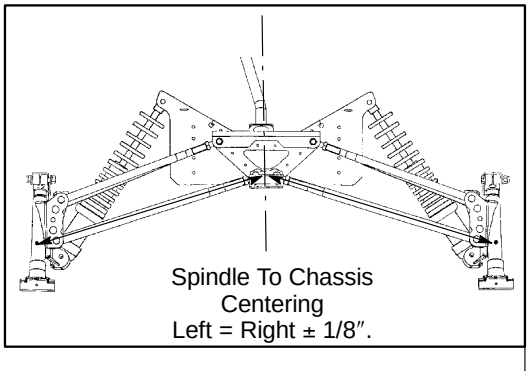
Prior to performing steering alignment, the suspension should be inspected for damage or wear and replacement parts installed as required. See inspection on page 6.6.

⚠ WARNING

A maximum set up width is listed in the chart on page 6.8. Maximum set up width is the maximum allowable distance between ski spindle centers with front end of vehicle off the ground and suspension fully extended. The Maximum Set Up Width specifications are maximum width measurements, and are critical to ensure adequate torsion bar engagement with the trailing arm. If the suspension is set too wide , the torsion bar can come loose and interfere with steering. Do not attempt to set the suspension wider than the specified Maximum Set Up Width.

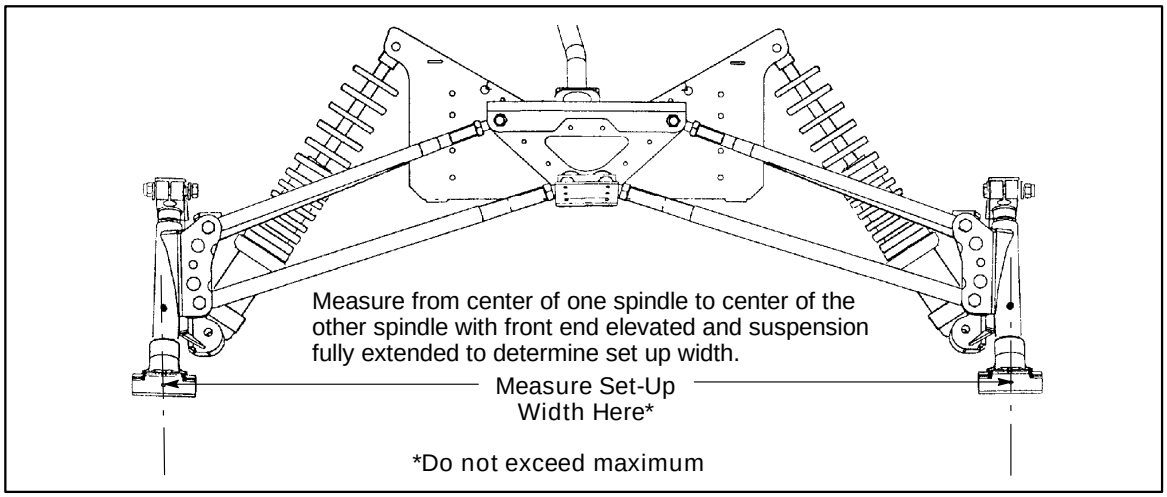
Spindle Centering / Set Up Width

1. Make sure the track is properly aligned. Refer to Maintenance Chapter for procedure. This will be used as a reference point for final toe out measurement.
2. Support the front of the machine 1-2″ (2.5-5.1 cm) off the floor.
3. Remove skis and ski pivot bushings.
4. Disconnect adjustable torsion bar linkage where applicable.
5. Measure spindle to chassis centering as shown and record measurement. Both spindles should be an equal distance ±1/8″ (3 mm) from the center of the chassis after adjusting camber, width, and toe alignment. This measurement is controlled by adjusting radius rod length.



Spindle To Chassis Centering
Left = Right ± 1/8″.

6. Measure set up width and record. This measurement is controlled by adjusting radius rod length, and must not exceed the Maximum Setup Width listed in the appropriate table (at the front of this section) after all steering adjustments are complete. See illustration below for procedure.

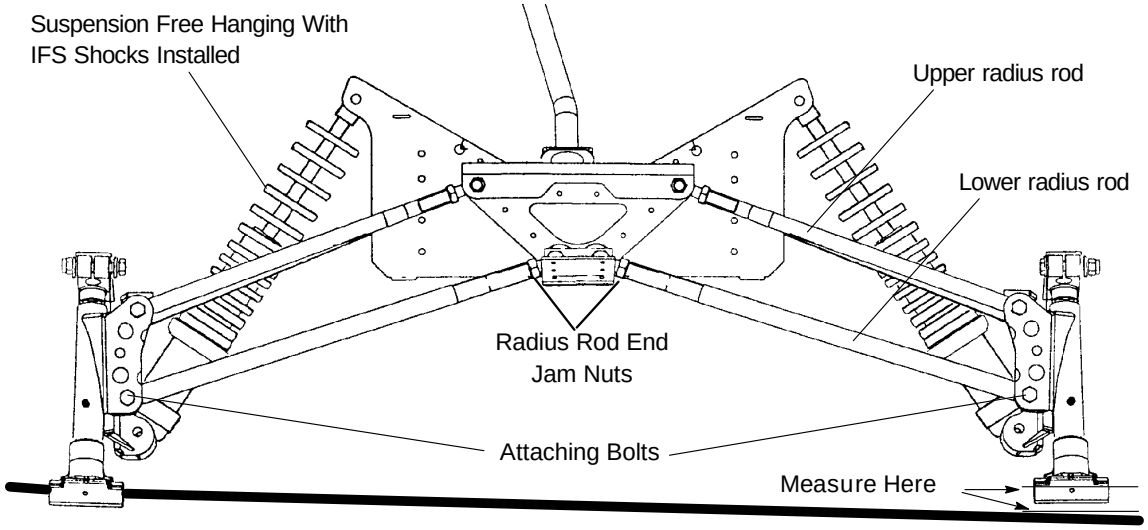


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CAMBER INSPECTION

All Models - Elevate Front End - Shocks Installed

Typical CRC Shown - Style varies by model



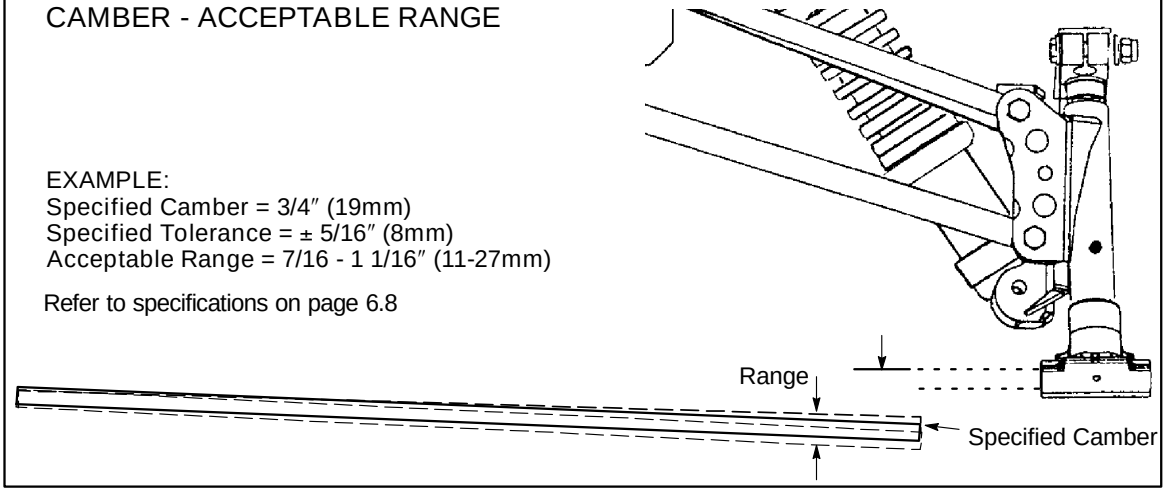
Refer to specifications for:
- IFS type
- Specified amount of camber

- To adjust, lengthen or shorten appropriate lower radius rod until top of bar is within specified camber distance. Measurement should be taken from top of alignment bar to top of ski pivot bushing hole in spindle (bushing removed). Radius rod must be re-attached to trailing arm before measuring.

CAMBER - ACCEPTABLE RANGE

EXAMPLE:
Specified Camber = 3/4″ (19mm)
Specified Tolerance = ± 5/16″ (8mm)
Acceptable Range = 7/16 - 1 1/16″ (11-27mm)

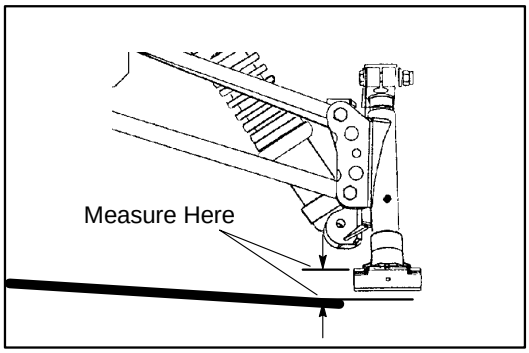
Refer to specifications on page 6.8



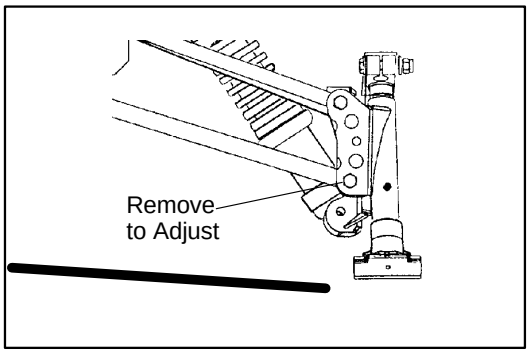
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Camber Adjustment

1. Determine which spindle requires the greatest amount of correction by installing the alignment bar through one side to the opposite spindle. Remove the bar and install it through the other side to the opposite spindle.



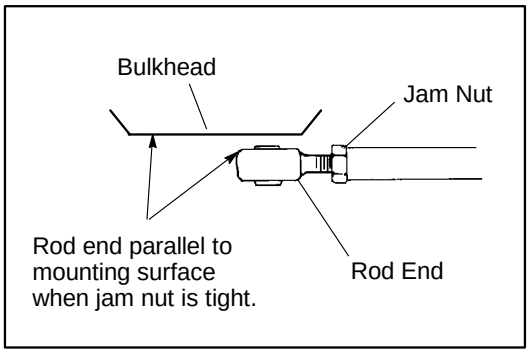
2. Using a 3/8″ (1 cm) drive 11/16″ (1.7 cm) crow foot wrench and 20″ (51 cm) long 3/8″ (1 cm) drive extension, loosen the radius rod end jam nut. Remove the lower radius rod bolt from the spindle requiring the most camber correction. Adjust the opposite side next.
3. To adjust camber, change lower radius rod length until alignment bar measurement is within specified range for each spindle. Refer to charts on page 6.8 for camber specifications. On models with neutral camber (0) the bar should slide freely through both spindles (± tolerance).



CAUTION:

Radius rod ends must remain parallel to the bulkhead after rod end jam nuts are tightened to specified torque. See illustration at right.

4. Tighten all jam nuts. Torque radius rod attaching bolts to specification.



⚠ WARNING

After camber adjustment is complete, be sure to measure set up width outlined on page 6.9 and compare to specifications listed on page 6.8. Do not attempt to set suspension wider than the specified maximum set up width. If set up width exceeds maximum, adjust upper and lower radius rods equally to maintain camber adjustment.

Radius Rod End Jam Nut Torque -

8-14 ft. lbs. (11-19 Nm)

Radius Rod Attaching Bolt Torque -

3/8″(outer) 28-30 ft. lbs. (39-41 Nm)
7/16″ (inner top) 35-40 ft. lbs. (48-55 Nm)
1/2″ (inner bottom) 40-50 ft. lbs. (55-69 Nm)

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Handlebar Centering

5. With alignment bar installed through spindles (on 0 camber models), center handlebars by adjusting drag link length (Fig I). On models with negative camber, the alignment bar cannot be installed through spindles. On these models, the pitman and idler arm (Fig II) (or bellcrank on non-CRC models) should be pointed straight forward.
6. Lubricate ski pivot bushings with Polaris Premium All Season Grease and install in spindle. Torque ski bolts to specification. Install new cotter pin in castle nut.
7. Perform Toe Adjustment on page 6.13.

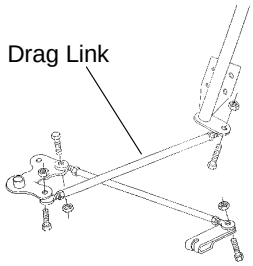


Fig. I

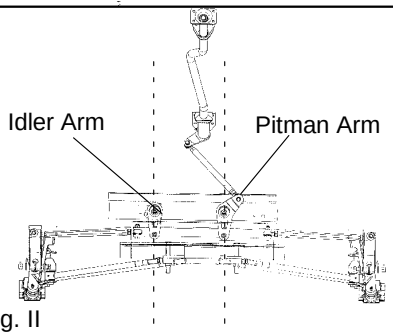


Fig. II

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Toe Adjustment, All Models

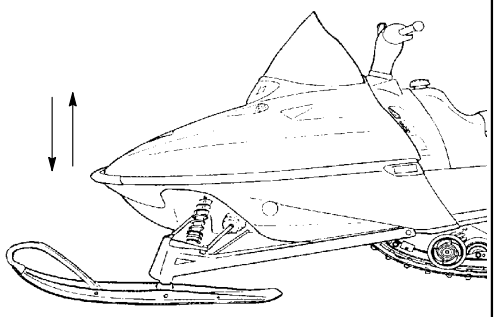
Toe adjustment on all models must be performed with the vehicle weight on the suspension (no rider), at Normal Ride Height.

1. Make sure the track is properly aligned. This will be used as a reference point for toe out measurement.

2. To obtain normal ride height of the front suspension, lift the front end 3-5″ (7.6-12.7 cm) with the front bumper. Lift the machine several times, working the suspension and front skis until an average is obtained.

NOTE: To prevent carbide skags from grabbing, make sure the surface under the skis will allow full side-to-side movement. Avoid rough concrete, asphalt, or carpet which may cause carbide skags to grab or catch and restrict movement.

Lift 3-5″ (7.6-12.7 cm) and work suspension to find average



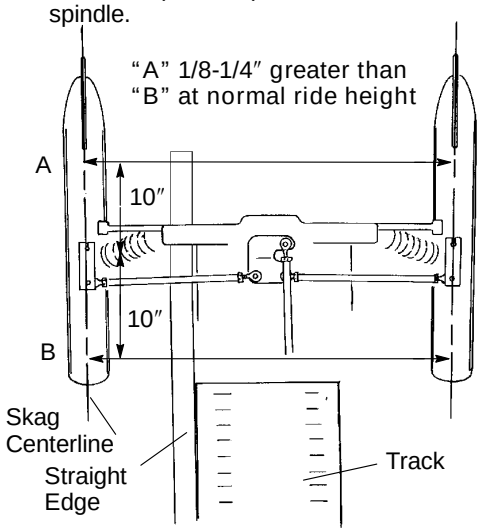
Toe Adjustment
Normal Ride Height

SERVICE HINT: Before final measurement is taken, skis should be pushed together lightly at the tips to remove play in the steering components. This will help achieve accurate measurement. If a strap is used be sure it is not too tight or it will alter measurement (this is most important on models with composite skis).

Toe Alignment: All Models

Measurement “A” should be 1/8″ - 1/4″ (3.17 - 6.35 mm) greater than measurement “B” at normal ride height (toe out).

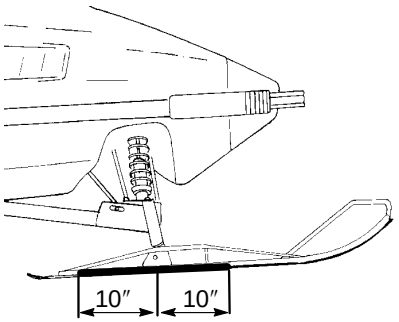
NOTE: Measurements A&B should be taken 10″ (254 mm) from center of ski spindle.



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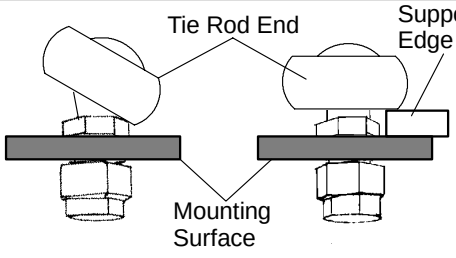
Toe Adjustment - XTRA CRC and XC-10 CRC, cont.

3. To adjust toe, hold tie rod flats or support edge of tie rod end with a wrench or flat stock to keep it from rotating. Loosen jam nuts on each end of both tie rods. Turn tie rod as required to adjust toe.



Toe Measurement - CRC

4. Hold tie rod and tighten jam nuts. Be sure to position inner and outer tie rod ends parallel to their respective mounting surface as shown. When tie rod ends are properly tightened, the tie rod should rotate freely approximately 1/8 turn.



Tie Rod Jam Nut Torque -

8-14 ft. lbs. (11-19 Nm)

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XTRA CRC and XC-10 CRC Steering Alignment

The following steering alignment procedure can be performed on XTRA CRC or XC-10 CRC front suspensions only, and should not be used for 38-RMK CRC or non-CRC front suspensions.

General Set Up Tips

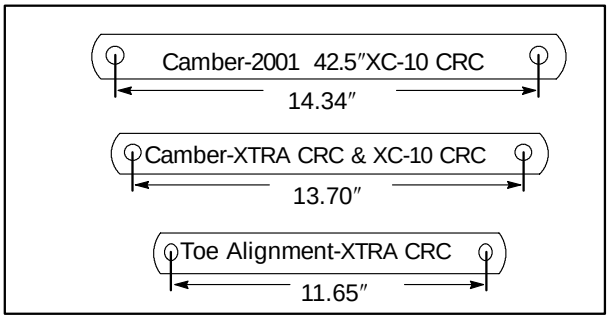
Before adjustments are performed on CRC steering, inspect all front suspension and steering components. While disassembling, make notes of which direction a bolt goes through a part, what type of nut is used in the application, and which direction do the steering arms go on - weld up or weld down, etc.

Some of the bolts used in the IFS are special, and cannot be purchased at a hardware store. Always use genuine Polaris parts and hardware when replacing front end components.

Tools

Tools required:

- 5/8″ alignment bar
- 6' tape measure
- Travel location bars -13.70″ long (PN 5211714)
- Travel location bars -11.65″ long (PN 5211822)
- Travel location bars - 14.34″ long (PN 5244554)
- Chassis stand or blocking



NOTE: The CRC Travel Location Bars are included in kit PN 2871537, along with a 45″ alignment bar, and assorted hardware. Supplemental kit PN 2872949 includes 14.34″ travel location bars that fit 2000 XC-10 CRC models. Kit components are also available separately. See tool catalog for tool ordering information.

Refer to the chart below for travel bar application for width, camber, and toe adjustments on XTRA CRC and XC-10 CRC models. See text on following pages for specific procedures.

XTRA CRC and XC-10 CRC Models			
	When Measuring Set Up Width	To Inspect / Adjust Camber	To Inspect / Adjust Toe
Travel Location Bar Length	Suspension Fully Extended - Shocks Installed	Install 13.70 Bars Install 14.34″ Bars for 42.5″ wide XC-10 CRC models	Install 11.65 Bars (XTRA CRC ONLY); Set Toe w/Shocks Installed on XC-10 models

⚠ WARNING

Maximum set up width is the maximum allowable distance between ski spindle centers with front end of vehicle off the ground and suspension fully extended. The Maximum Set Up Width specifications listed on page 7.3 are maximum width measurements, and are critical to ensure adequate torsion bar engagement with the trailing arm. If the suspension is set too wide, the torsion bar can come loose and interfere with steering. Do not attempt to set the suspension wider than the specified Maximum Set Up Width.

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CRC Steering Adjustment

To ensure accurate adjustment of the CRC steering mechanism, all steps listed below must be performed in sequential order.

- Spindle to Chassis Centering (must also be checked after adjustment)
- Set-Up Width adjustment(must also be checked after adjustment)
- Camber Adjustment
- Handlebar Centering
- Toe Adjustment
- Verify Spindle to Chassis Centering and Set-up width are within limits

1. Securely support the front of the machine high enough to remove the skis. Make sure machine is level.
2. Remove skis.

Spindle to Chassis Centering

3. Follow procedure on page 6.9.

Set Up Width Measurement

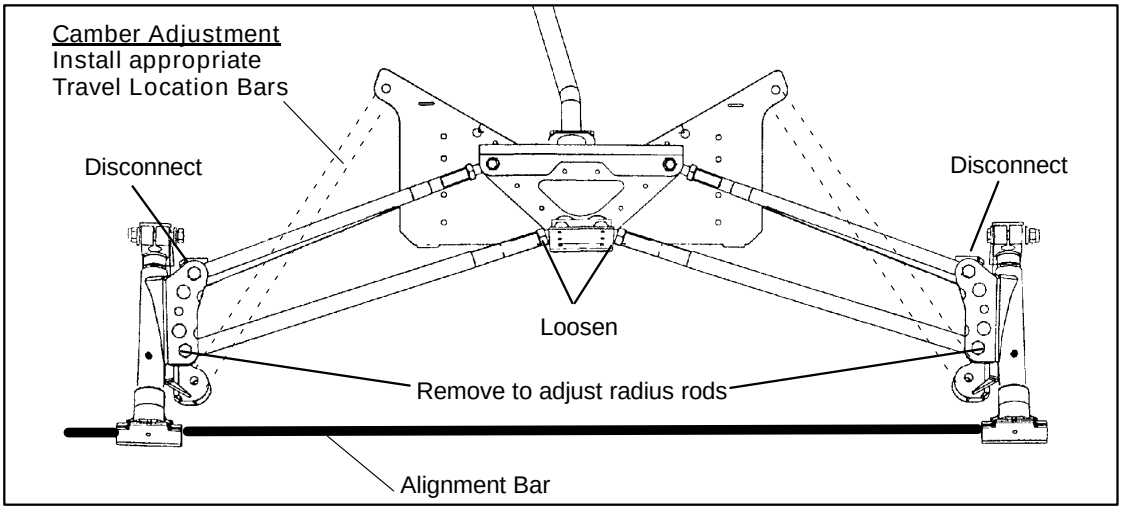
4. Follow procedure on page 6.9.

⚠ WARNING

This is the maximum allowable distance between ski spindle centers with front end of vehicle off the ground and suspension fully extended. The maximum set up width specifications listed on page 6.9 are maximum width measurements, and are critical to ensure adequate thread engagement of steering tie rod and radius rod ends. If the suspension is set too wide, the torsion bar can come loose and interfere with steering. Do not attempt to set the suspension wider than the specified Maximum Set Up Width.

Camber Adjustment - XTRA CRC and XC-10 CRC

5. Remove IFS shocks and install appropriate travel location bars. The travel location bars will locate the IFS at a given point of travel where the camber should be neutral (0°).
6. Disconnect tie rods from steering arms. NOTE: If toe adjustment is correct, the spindles will not be horizontally aligned with the travel location bars installed. Therefore the alignment bar will not slide through both spindles. Disconnecting the tie rods will eliminate bind on the alignment bar and allow for more precise camber adjustment. It may also be helpful to secure the tie rods so they don't interfere with inspection or adjustment.
7. Determine which spindle requires the greatest amount of correction by installing the alignment bar through one side to the opposite spindle, then remove the bar and install it through the other side to the opposite spindle.



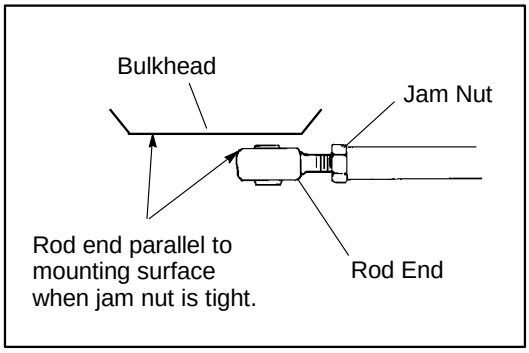
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Camber Adjustment - XTRA CRC and XC-10 CRC, (Cont.)

8. Using a 3/8″ drive 11/16″ (1.7 cm) crow foot wrench and 20″ (51 cm) long 3/8″ (1 cm) drive extension, loosen the radius rod end jam nut and remove the lower radius rod bolt from the spindle requiring the most camber correction. Adjust the opposite side next. Change radius rod length until alignment bar slides freely through both spindles.
9. When adjustment is correct, tighten jam nuts to 24-25 ft. lbs. (33-35 Nm). Torque radius rod attaching bolts to 28-30 ft. lbs. (39-41 Nm).

CAUTION:

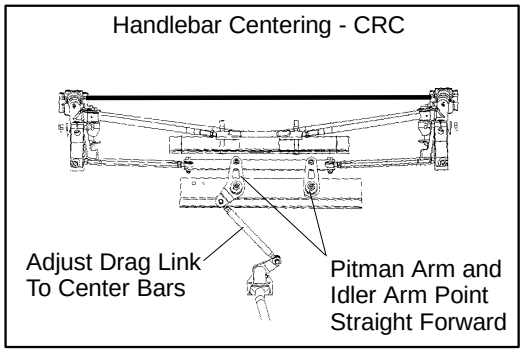
Radius rod ends must remain parallel to the mounting brackets after the rod end jam nuts are tightened to the specified torque. See illustration at right.



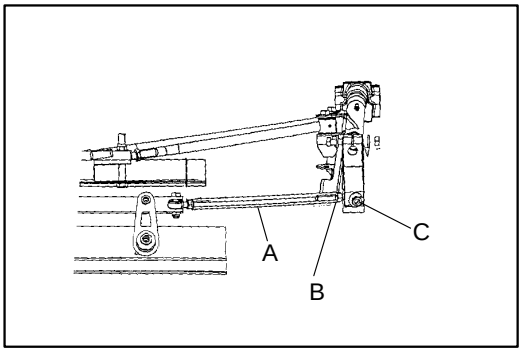
10. Tighten all jam nuts. Torque radius rod attaching bolts to specification.
11. Re-check set up width and compare to specifications.

Handlebar Centering-CRC

12. With alignment bar in spindles and tie rod ends disconnected, center the steering rack by pointing the pitman arm and idler arm straight forward.
13. Center the handlebars by adjusting drag link length. Tighten jam nuts to 24-25 ft. lbs. (33-35 Nm).
14. The steering arms should be parallel to the ski centerline or slightly inward.



15. Re-attach steering tie rod ends (C) to steering arms. It may be necessary to loosen the tie rod adjustment jam nuts (B) and adjust tie rod length (A) as required until rod end studs can be installed in steering arm. Torque tie rod end attaching nuts to 28-30 ft. lbs. (39-41 Nm). If tie rod adjustment was necessary, do not tighten them until toe adjustment is complete.

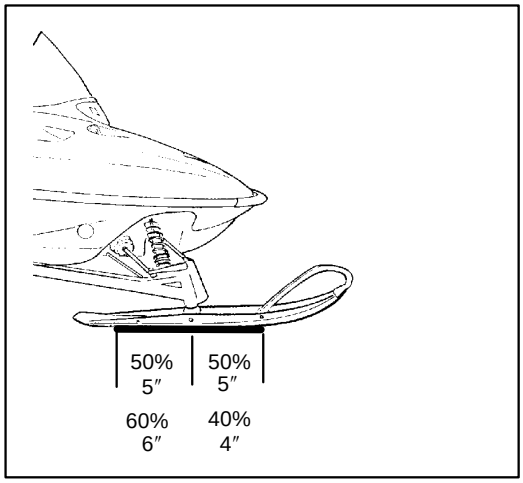


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Carbide to Ski Placement

A good starting point for placement of carbide is 50/50 (50% forward and 50% behind the ski mounting bolt). This can be varied depending on the aggressiveness of the carbide and the strength of the driver. Make sure the leading edge of the carbide has a small chamfer.

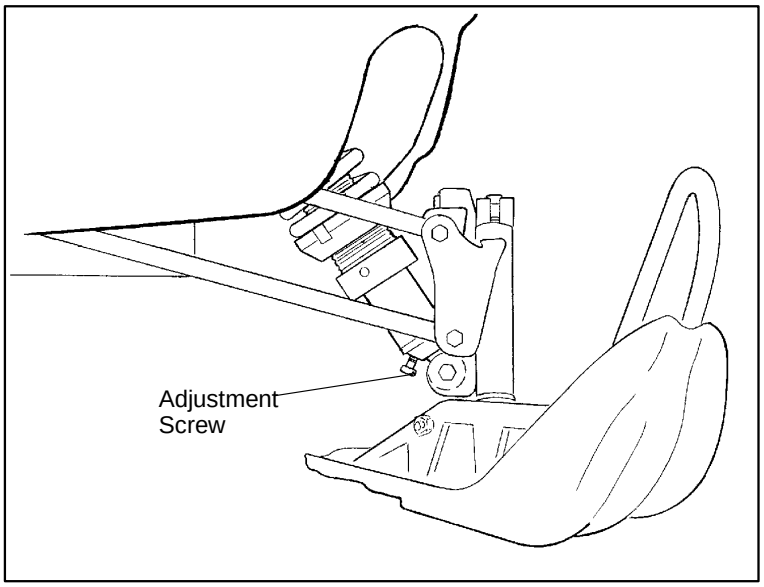
More carbide trailing will cause the machine to track straighter, but steering effort will increase.



Indy Select / Ryde AFX IFS Shock

Snowmobiles equipped with adjustable compression damping IFS shocks, will allow the driver to make adjustments to the compression valving of the front shocks by turning the screws located near the base of the shocks.

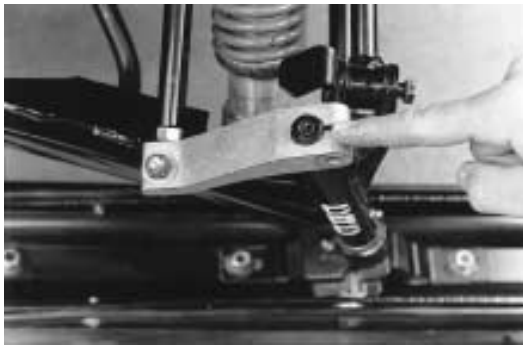
By turning the screw clockwise, the compression of the shock is increased, stiffening the ride. By turning counter clockwise, the compression is decreased, softening the ride. The factory setting is in the softest position. (Screw all the way out - counterclockwise). If bottoming occurs, the compression damping should be used in conjunction with the spring preload to achieve the desired ride affect. 1/2 of a turn will affect the ride considerably. There are approximately 3 turns of adjustment available.



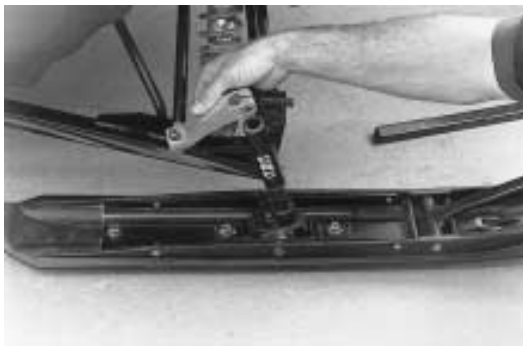
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Ski Spindle Bushing Removal

1. Using a a scribe, center punch, or paint, mark the spindle and steering arm for reference during reassembly. Note direction of steering arm bolt and remove.



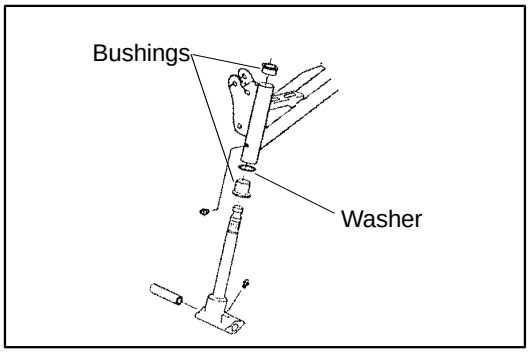
2. Remove steering arm.



3. Slide spindle and ski assembly out bottom of trailing arm. Inspect spindle for wear or damage.



4. Remove old bushings and washer from bottom of spindle tube with a drift punch. Inspect condition of washer and replace if worn. Install new bushings, tapered end first.



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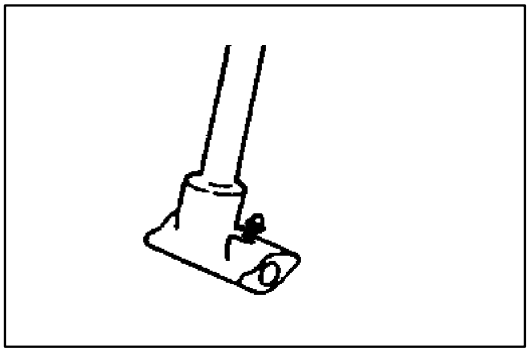
Ski Spindle Bushing Installation

5. Grease spindle shaft and new bushings with Polaris All Season Grease.

All Season Grease
PN 2871322 (3 oz.) PN 2871423 (14 oz.)



6. Install spindle into trailing arm with grease fitting facing rearward.



7. With ski facing straight forward, attach steering arm. Align with marks made in step 1.

8. Install steering arm bolt and torque to specification.

Spindle Bolt Torque
28-30 ft. lbs. (38.6-41.4 Nm)



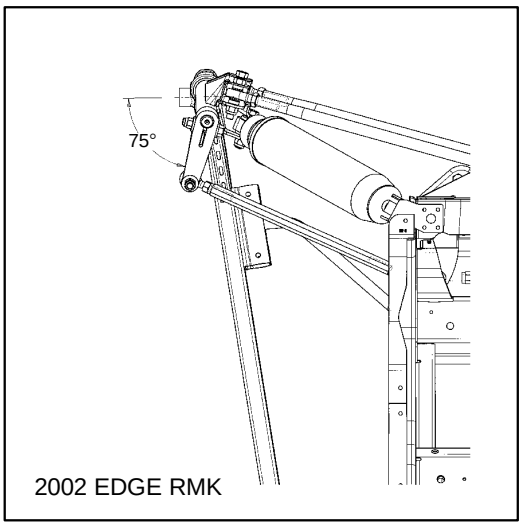
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Steering Arm Orientation

⚠ WARNING

Steering arm orientation is important to ensure proper steering tie rod end thread engagement and steering performance. Always mark steering arms and spindles before removal for reference upon reassembly. When installing new parts or after steering arm installation, refer to the illustrations and text below. Always verify proper steering operation after completing adjustments or repairs.

1. Reinstall torsion bar linkage (where applicable). Torque attaching bolts to specification.



2002 EDGE RMK

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When performing normal maintenance or tune-up, check the ski skags for wear. To prevent damage to the skis, and for greater steering control, replace all skags which are half worn or greater.

Ski Skag Removal

1. Remove retaining nuts as shown.
2. Push bolt down through ski.
3. Pull rear of skag from ski as shown. This frees the skag for removal from the ski.

Ski Skag Installation

1. Push skag forward, then up into position.
2. Reinstall nuts and torque to specification.

Ski Skag Retaining Nut Torque -
Steel Ski, Steel - 15 ft. lbs. (21 Nm)
Plastic Ski - 20-25 ft. lbs. (27.6-34.5 Nm)

Ski Skag Removal - EZ Steer

1. Remove the three nuts from the skag.
2. Pull down and rearward to remove the skag.

Ski Skag Installation - EZ Steer

1. Install flat bar as shown.
2. Install IFS carbide skag.
3. Reinstall nuts and torque to specification.

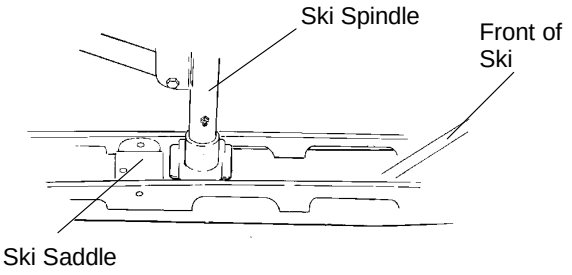
Ski Skag Retaining Nut Torque -
15 ft. lbs. (21 Nm)

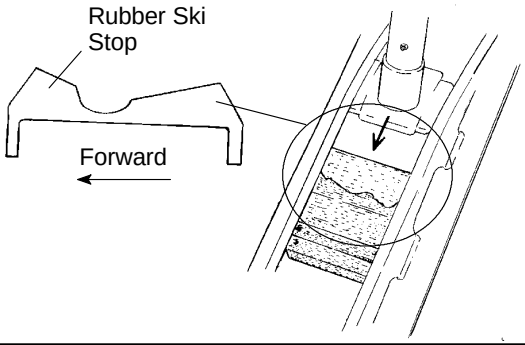
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Ski Installation

METAL SKI INSTALLATION

- Install ski over spindle, slightly in front of ski saddle with ski pointing outside.
- Slide ski forward until spindle is just behind ski saddle and turn to the forward position.
- Slide ski forward so spindle is behind ski saddle.
- Apply soapy water solution to the rear portion of the rubber ski stop. Install ski stop on top of ski saddle with large portion forward.
- Push ski back to slide spindle into place. From outside of ski, install bolt and castle nut. Torque to 36 ft. lbs. Install cotter pin and bend both legs





PLASTIC SKI INSTALLATION

- Install metal support onto ski stop. Install ski stop with tall portion toward rear of ski.
- Install cotter pin and bend both legs.

RMK models with this type of ski stop will not require the use of the metal support. The 90_ flat portion of stop should face toward the front of the ski.



- Ensure retainer is pushed as far forward in the ski as possible. If adjustments are necessary, re-torque screws to 18-20 ft. lbs. (2.48 - 2.76 kg-m)
- Long saddle skis with this type of ski stop will require the metal support. The 90_ flat portion of stop should face toward the front of the ski.
- Install Ski to spindle. From outside of ski, install bolt, washers and castle nut. Torque to 36 ft. lbs. (4.97 kg-m).
- Carefully lower machine

NOTE: On RMKs the side of the ski with the lip goes to the inside.

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Torsion Bar Removal

1. Remove trailing arm assembly.
2. Using a small pin punch, tap out the rivet mandrels in the center of the torsion bar support rivets.
3. Using a 1/4″ bit, drill out the center portion of the rivets.
4. Punch out the rivet body.
5. Remove support and torsion bar.
6. Repeat procedure for second torsion bar.

Torsion Bar Installation

1. Rivet support in place using Polaris PN 7621449 rivets. NOTE: These high strength “Q” rivets are the only replacement rivets recommended for this application.

Torsion Bar Support Rivets
PN 7621449

2. Reinstall torsion bar.
3. Reinstall trailing arm assembly.
4. Check camber and toe adjustments.

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Handlebar Torque and Sequence

1. Remove handlebar cover.

2. Using a 7/16″ (11 mm) wrench, loosen four nuts on bottom of adjuster block. NOTE: Turn handlebar to left or right for access to back nuts.

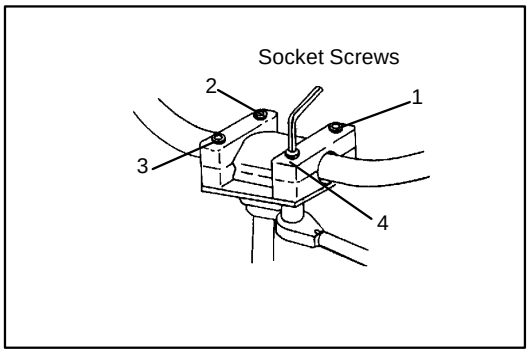
3. Adjust handlebar to the desired height. Be sure that handlebars, brake lever and throttle lever operate smoothly and do not hit the fuel tank, windshield or any other part of the machine when turned fully to the left or right.

IMPORTANT: When adjusting the handlebar, be sure the serrations in handlebar and adjuster block match before torquing.

4. Torque the handlebar adjuster block bolts to specification following sequence shown. The gap should be equal at front and rear.

Handlebar Adjuster Block Bolt Torque - 11-13 ft. lbs. (15 - 18 Nm)

5. Replace handlebar cover.



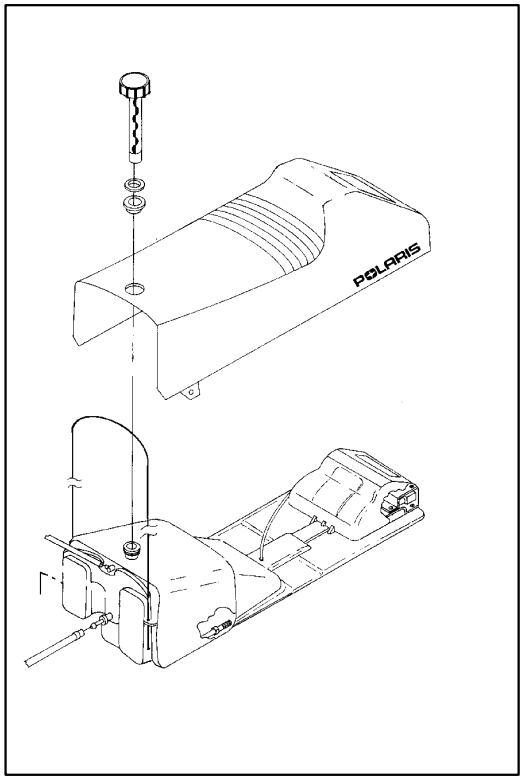
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⚠ WARNING

Gasoline is extremely flammable and explosive under certain conditions. Do not smoke or allow open flames or sparks in or near the area where work is being performed. If you should get gasoline in your eyes or if you should swallow gasoline, see your doctor immediately. If you should spill gasoline on your skin or clothing, immediately wash if off with soap and water and change clothing. Prolonged exposure to petroleum based products may cause paint failures. Always protect finished surfaces and wipe up any spills immediately.

Two Piece Fuel Tank/Seat Removal

1. Remove tank cover by disconnecting snaps.
2. Remove vent line at front LH side of tank.
3. Remove gas cap and rubber grommet.
4. Remove air silencer box.
5. Disconnect fuel line from fuel pump and plug line to prevent fuel spillage from tank. See photo one at right.
6. Roll front tank hold-down spring forward off tank saddle.
7. If machine is equipped with a fuel gauge connector, this should be unplugged.
8. Remove two bolts holding rear of seat to tunnel.
9. Slide seat rearward enough to gain access to taillight connector at RH side of fuel tank. Unplug connector. Slide seat off machine and set aside.
10. Fuel tank can now be removed from chassis by disconnecting two springs at center of fuel tank.



One Piece Fuel Tank/Seat Removal

1. Remove front tank retaining spring located behind driven clutch area.
2. Remove fuel cap and grommet.
3. Remove fuel lines.
4. If machine is equipped with gauges, unplug gauge wires.
5. Remove two bolts in tool box.
6. Disconnect taillight wiring.
7. Remove two console bolts attaching console to tunnel.
8. Remove two console bolts located under hood.
9. Remove fuel cap and lift console up. Replace fuel cap.
10. Lift up at rear of seat and slide out.

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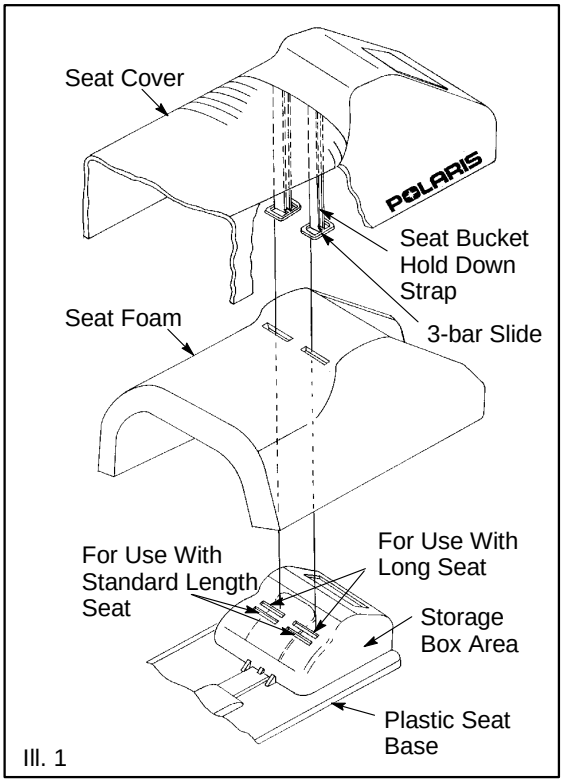
Seat Cover Replacement

1. Remove seat assembly as outlined on page 6.26.
2. Remove seat and seat covering to be replaced. Carefully remove staples by loosening with a small flat blade screwdriver. Pull each staple straight out with a pliers.
3. On some models, it will be necessary to drill out the rivets holding the strap buckles. Reach inside the tool box and rotate the "D" ring buckle which secures the center hold down strap. Push the "D" ring through the slot in the tool box and carefully pull it through the foam cushion.

Reassembly Note: For ease of assembly, hook a wire to the center strap. This will allow you to pull the center strap back through the foam and into the storage box.

4. Place the seat foam on the seat base assembly as shown in Ill. 1.
5. Drape the seat cover over the seat foam.
6. Insert and pull the two seat bucket hold down straps, attached to the seat cover, through the two holes in the seat foam and the routed-out holes located in the storage box area on the plastic seat base. HINT: A stiff wire attached to the 3 bar slide on the hold down strap will aid in this process.

NOTE: Use the rear two holes for a longer length seat and the forward two holes for the standard length seat.



Ill. 1

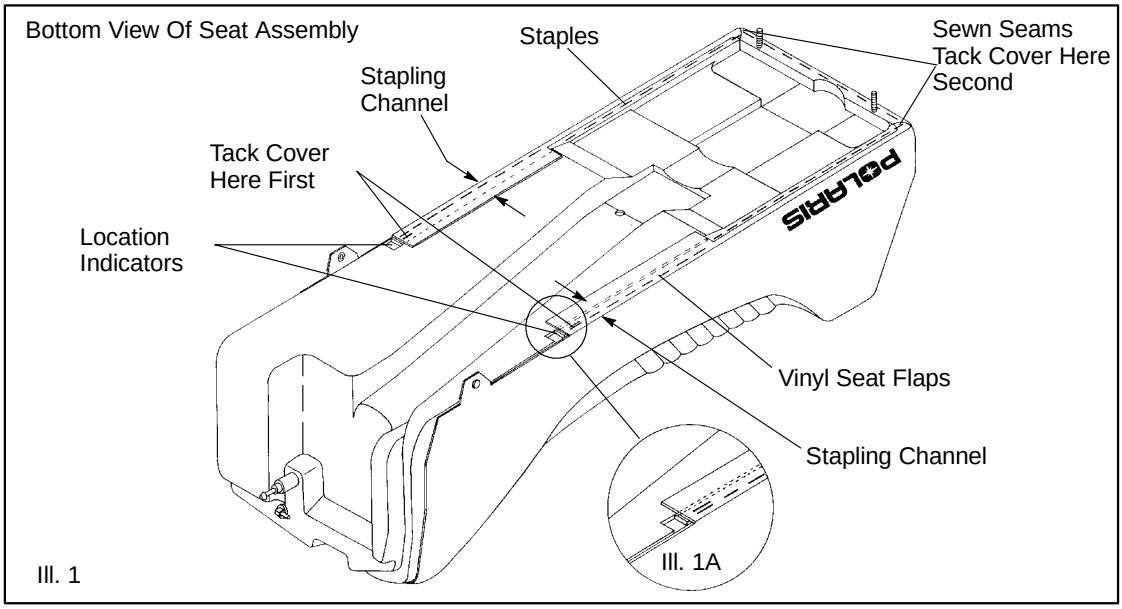
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7. Turn the assembly over and begin upholstering by lining up the seat cover vinyl side flaps with the indented square location indicators located on the plastic seat base as shown in Ill. 1A.

CAUTION:

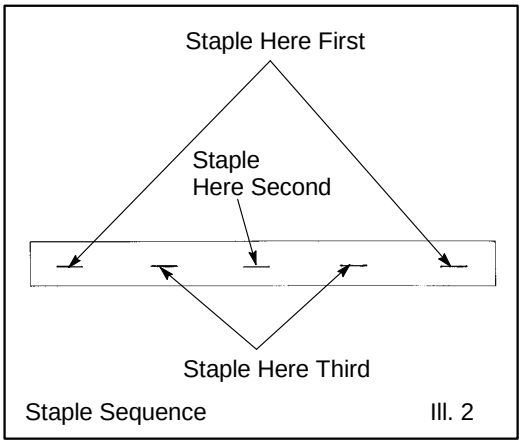
Apply staples in the stapling channel only. See Ill 1. If you apply staples outside the channel, you will damage the fuel tank reservoir in the seat base. If this happens you must replace the entire seat base assembly.

8. Using a staple gun, tack each side of the vinyl cover in place using two staples. If cover has a Polaris emblem carefully align emblem with bottom edge of seat. This will help ensure that the cover is positioned properly.
9. Align the two sewn seams located at the rear of the seat cover with the two back corners of the seat base. See Ill. 1. Pull the vinyl tight and tack the seat cover to the plastic seat base in each corner. Use two or three staples per corner.
10. Now that the seat cover is correctly positioned, and tacked to the plastic seat base in four places, turn the assembly over and inspect it. If the seat cover seems to fit correctly and everything looks straight, including the tool compartment flap, continue with step 11.



Ill. 1

11. Staple the remainder of the unattached seat cover to the plastic seat base as shown in Ill. 1. HINT: Always staple between two existing staples and follow this procedure until the seat cover is completely stapled to the seat base. See Ill. 2.
12. Turn the seat cushion assembly over and inspect for wrinkles or imperfections. If imperfections are visible, remove the staples in the affected area and staple correctly.

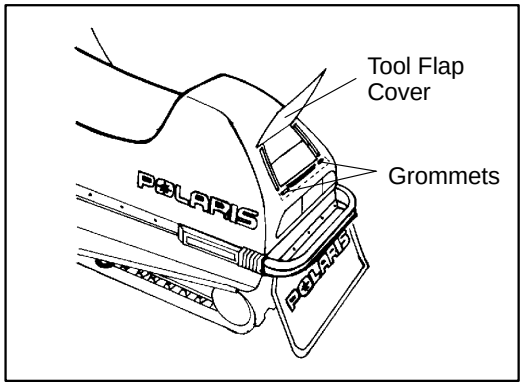


Staple Sequence Ill. 2

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Models With Grommets In Tool Flap

13. Close tool flap cover, making sure it is aligned properly, and mark grommet holes.
14. Align twist lock with mark from step 13. Verify alignment with grommet in tool flap.
15. Using twist lock as a template, drill two .160″ to .164″ holes through vinyl and seat base.
16. Rivet twist lock to seat base using rivets provided.

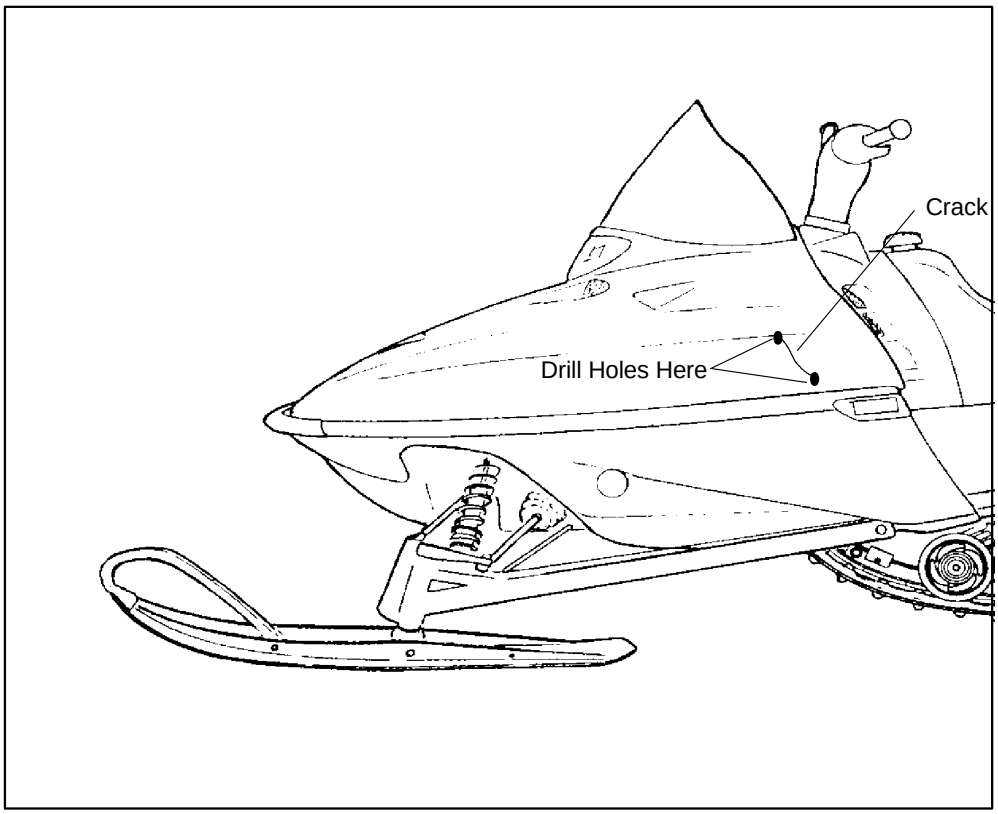


All Models

17. Trim excess vinyl from the bottom around the back of the seat area only after a satisfactory fit is obtained.
18. Reinstall seat by reversing disassembly steps as they apply to your particular model.

Hood Repair

Currently there is no procedures or materials recommended by Polaris for repairing hoods. Hoods for 2001 model snowmobiles are made of Thermoplastic Olefin (TPO) and cannot be repaired. If a hood is broken it must be replaced. For small cracks you may drill a small hole on both ends of the crack to limit spreading.



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Taillight Assembly Replacement

1. After removal of seat cover, drill out three rivets from top of taillight.
2. Remove taillight assembly and wire harness.
3. Install new taillight assembly and rivet into place.
4. Connect taillight wire harness. NOTE: Taillight harness wires must be routed away from any possible contact with seat cover staples to prevent electrical shorts.
5. Pull seat cover tightly and evenly into position and re-staple to seat pan.
6. Inspect cover for a wrinkle-free finish before reinstalling on the snowmobile.

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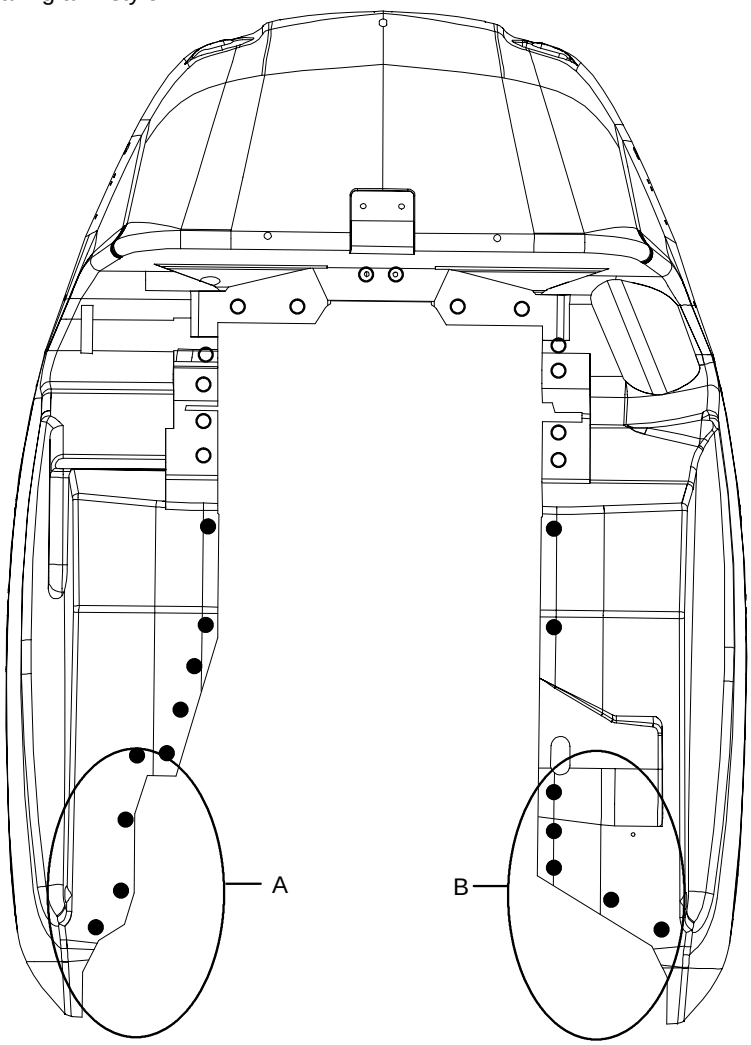
Nosepan Replacement Procedure - Gen II XTRA-10

IMPORTANT: When installing a replacement nosepan, the open circles represent rivets installed from inside the nosepan through the bottom. The filled in circles represent rivets installed from the under side of nosepan through to the top.

NOTE: The rivet for polyethylene nosepans is PN 7621467.

NOTE: Rivet holes may require drilling into the bulkhead.

Non-tipped in trailing arm style



NOTE:

1. When transfer drilling holes do not force pan into a position which is not uniform with the other side. (Use the same method to drill both sides)
2. Rivet holes across from one another in unison.
3. Liquid cooled models will have recesses on both sides like reference A. Fan cooled models will not have recesses and will look like reference B on both sides.

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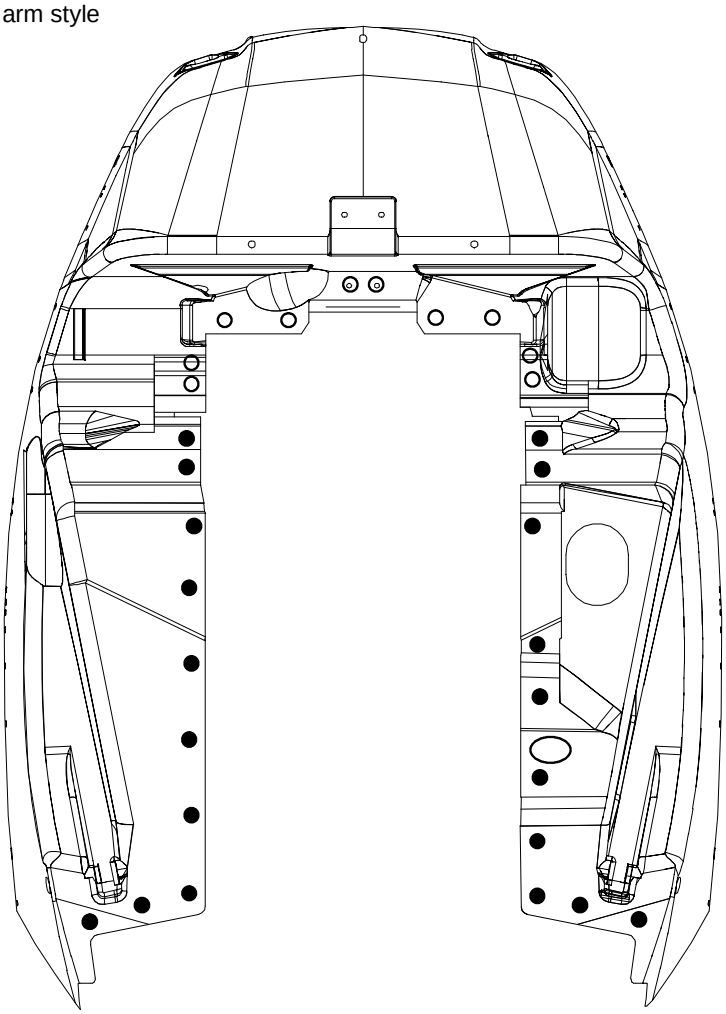
Nosepan Replacement Procedure - Gen II XC-10

IMPORTANT: When installing a replacement nosepan, the open circles represent rivets installed from inside the nosepan through the bottom. The filled in circles represent rivets installed from the under side of nosepan through to the top.

NOTE: The rivet for polyethylene nosepans is PN 7621467.

NOTE: Rivet holes may require drilling into the bulkhead.

Tipped In trailing arm style



NOTE:
1. When transfer drilling holes do not force pan into a position which is not uniform with the other side. (Use the same method to drill both sides)

2. Rivet holes across from one another in unison.

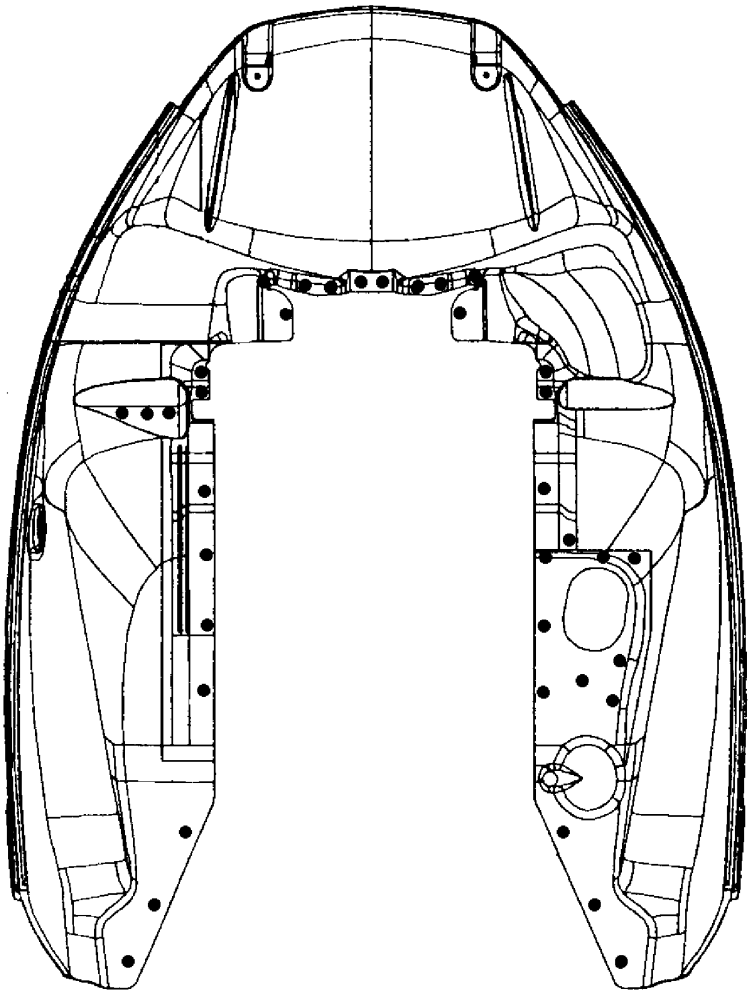
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Nosepan Replacement Procedure - EDGE RMK

IMPORTANT: When installing a replacement nosepan, the open circles represent rivets installed from inside the nosepan through the bottom. The filled in circles represent rivets installed from the under side of nosepan through to the top.

NOTE: The rivet for polyethylene nosepans is PN 7621467.

NOTE: Rivet holes may require drilling into the bulkhead.



NOTE:

1. When transfer drilling holes do not force pan into a position which is not uniform with the other side. (Use the same method to drill both sides)

2. Rivet holes across from one another in unison.

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Decal Removal

1. Before removing old decal, it is important to note its position by marking it in several locations.
2. Remove old decal completely. NOTE: A small amount of solvent will aid in removing the old decal.
3. The decals are UV based. If heat will not remove decal, gently buff area with a mild abrasive. Use 3M Scotch Brite™ Graphics Removal Discs with a No. 1 Roloc and holder, or an equivalent low RPM buffing disc.

CAUTION:

Maintain 2500-3500 RPM to prevent damage to hood caused by excessive heat.

4. Remove any remaining decal adhesive with a citrus based cleaner or equivalent non-solvent based cleaner.
5. Thoroughly clean area where the new decal will be installed using a solution of mild soap (such as dishwasher liquid) and clean water. NOTE: Use approximately four ounces soap to one gallon water.

3M Scotchbrite™ Graphics Removal Disc
3M PN 048011-16855

No. 1 Roloc and holder
3M PN 048011-15408

Decal Installation

1. Apply a solution of mild soap mixed with clean water to the area where the new decal is to be applied. Do not wipe off.
2. Carefully remove decal backing and apply new decal.
3. If decal does not have a pre-mask, apply additional soapy water solution to top of decal after it is in position.
4. Holding decal in position, remove all trapped air and soapy water solution from under decal using a clean, soft rubber squeegee to prevent scratching of decal surface.
5. If decal has a pre-mask, carefully remove.

NOTE: If the decal being applied needs to be stretched around a radius, follow these recommendations:

6. Fasten a straight edge to tail end of decal.
7. Pull or stretch remaining portion of decal around radius and into position. NOTE: A small amount of heat applied to the decal will aid in forming it to the radius. The mass of the decal which was secured in previous steps will hold it in position while pulling.
8. Again, apply soapy water solution to top of decal and remove trapped air using a clean, soft rubber squeegee. Use care to prevent scratching the decal surface.
9. Apply a small amount of heat to the decal to fasten it securely.
10. Carefully remove excess decal material.

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Problem	Possible Cause	Solution
*Machine darts from side to side	-Incorrect ski toe alignment	-Adjust to correct toe alignment
	-Incorrect camber	-Adjust to correct camber
	-Loose or worn steering components or fasteners	-Tighten or replace
	-Cracked or broken skis, skags, or carbides	-Replace if necessary
Tie rod hits trailing arm	-Steering arm installed incorrectly	-Index correctly in relation to -spindle
	-Tie rod ends worn	-Replace if necessary
Steering has excessive freeplay	-Steering bellcrank bushing worn or loose	-Tighten or replace if necessary
	-Drag link worn or loose	-Tighten or replace if necessary
	-Steering post loose	-Tighten as needed
	-Steering post bushings worn	-Replace if necessary
	-Tie rod ends worn	-Tighten as needed
	-Spindle bushings worn	-Replace if necessary
Front end bounces or sags	-IFS shock spring preload too soft	-Adjust spring tension on shocks
	-Improper shock charge or valving (if so equipped)	-Recharge, service, or replace -shocks

*Some machines with a wide front end may experience darting while following narrower machines on a trail. This is caused by the skis moving in and out of the narrower track left by the previous machine.

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CHAPTER 7
SUSPENSIONS

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Refer to Specifications Section in Chapter 1 for Suspension Type / Model Application

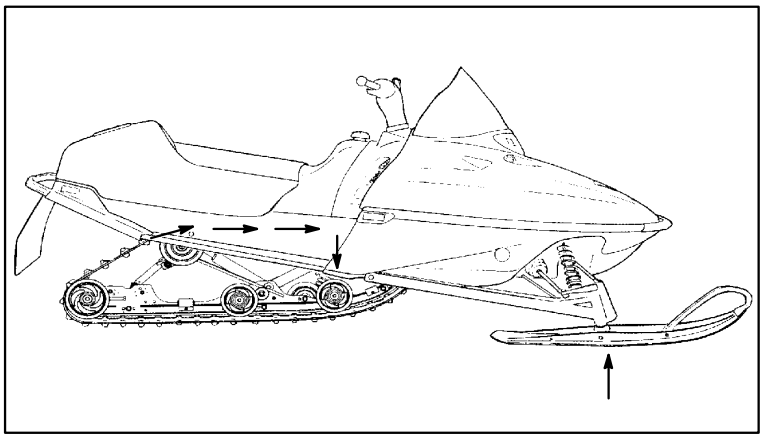
Rear Suspension Operation

The primary function of the rear suspension is to provide a comfortable ride in all types of riding conditions. It separates the rider from the ground, while allowing for complete vehicle control. The rear suspension also must provide weight transfer and maintain track tension.

The rear suspension has many adjustable features for fine tuning to achieve optimum comfort. The suspension can be adjusted to suit rider preference and deliver excellent performance for a given set of conditions. It should be noted, however, that suspension adjustments involve a compromise or trade off. A machine set up to perform well in the moguls would not suit the preference of a groomed trail rider.

Weight Transfer

The shifting of weight from the skis to the track is called weight transfer. As engine torque is applied to the drive axle the torque is transferred to the track, pulling it forward. This energy also tries to pull the suspension forward. The front torque arm reacts to this force by pushing down on the front of the track, in effect applying more weight to the front of the track and reducing the weight on the skis. It is important to note that energy used to lift the front of the machine is not available to push the vehicle forward.



Changing the angle of the front torque arm changes the suspension's reaction to the force. Adjusting the length of the limiter strap will change the front torque arm angle. Shortening the strap limits the extension of the front of the suspension; reducing the angle of the torque arm and increasing ski pressure during acceleration. Lengthening the strap allows the front of the suspension to extend further; increasing the angle of the torque arm and decreasing ski pressure during acceleration. Limiter strap adjustment has a great affect on weight transfer. LImiter straps only affect acceleration. It is important to check track tension whenever limiter strap length is changed.

Front track shock spring preload also affects weight transfer. A stiffer spring and/or more preload on the spring transfers more weight to the track. A softer spring and/or less preload keeps more weight on the skis. Keep your riding application in mind when choosing springs and setting spring preload. Soft springs/preload will increase ski pressure, but may bottom out. Stiff springs/preload will provide more track pressure (reduced ski pressure), but may result in a less comfortable ride.

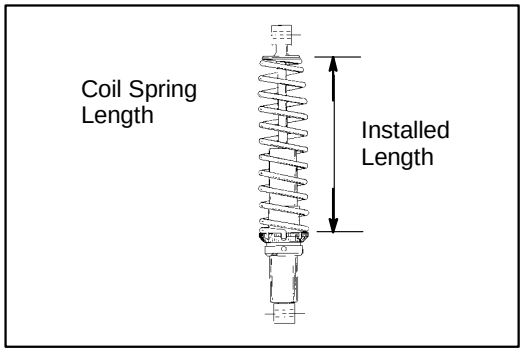
During acceleration, the rear of the suspension will compress and the IFS will extend, pivoting the machine about the front torque arm. Because of this pivoting effect, rear spring and spring preload also have some effect on weight transfer. Softer rear springs, or less preload, allow more weight transfer to the track and reduce ski pressure. Stiffer rear springs, or increased preload, allow less weight transfer to the track and increase ski pressure. The main function of the rear torque arm is to support the weight of the vehicle and rider, as well as to provide enough travel to absorb bumps and jumps.

Shock valving also has an effect on weight transfer. Refer to shock tuning information in this chapter.
Scissor stops also affect weight transfer. See scissor stop information in this chapter.

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Springs

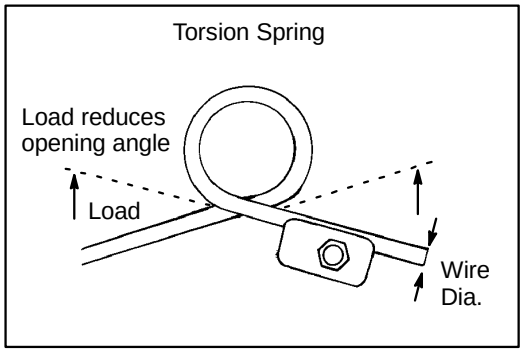
Two types of springs are employed in Polaris suspensions, coil springs and torsion springs. Following is some of the terminology used when referring to coil springs.



- Free length - the length of a coil spring with no load applied to the spring
- Installed length - the length of the shock absorber between the spring retainers. If the installed length of the spring is less than the free length, it will be pre-loaded.
- Spring rate - the amount of force required to compress a coil spring one inch. For example, if 150 pounds of force are required to compress a spring 1 inch, the spring rate would be 150 #/in.
- Straight rate spring - the spring requires the same amount of force to compress the last one inch of travel as the first one inch of travel. For example, if a 150 #/in. spring requires 150 pounds of force to compress it one inch, 300 pounds of force would compress it two inches, 450 pounds of force would compress it three inches, etc.
- Progressively wound spring - the rate of the spring increases as it is compressed. For example, a 100/200 #/in. rate spring requires 100 pounds of force to compress the first one inch, but requires 200 additional pounds to compress the last one inch.

When a bump is encountered by the suspension, the force of the bump compresses the spring. If the force were 450 pounds, a 100 #/in. spring would compress 4.5 inches. A 150 #/in. spring would only compress 3 inches. If the suspension had 4 inches of spring travel the 100 #/in. spring would bottom out, while the 150 #/in. spring would have one inch of travel remaining.

Torsion springs are much like coil springs, although shaped differently. The rate of the torsion spring is controlled by the free opening angle, the installed opening angle, the wire diameter of the spring, and the number of coils.



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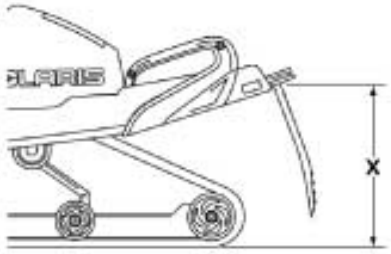
Suspension Overview

Many factors influence the overall handling characteristics of snowmobile suspensions. Rider weight, riding style, course conditions, and the condition of suspension components are some of the things that you have to consider when tuning a suspension.

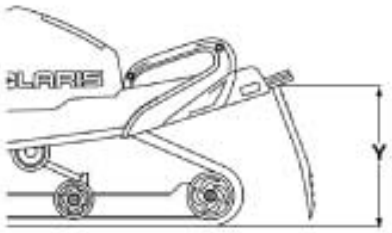
On new machines, or whenever new suspension parts are installed, the sled should be ridden for at least one tank of fuel to allow moving parts in the shocks and suspension to wear in. The shock springs will also take their initial set and the setup will be more accurate.

REAR SUSPENSION SET UP

This chart is only a guideline to be used for initial suspension set up. Your set up may vary based on your desired riding style.



WITHOUT RIDER



WITH RIDER

SETTING INITIAL TORSION SPRING PRELOAD (SAG METHOD)

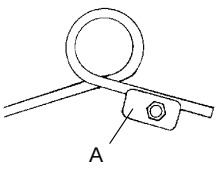
To set up the EDGE RMK rear suspension torsion spring preload, measure the distance between the ground and rear bumper (see illustration). This measurement should be taken with no rider and the rear suspension at full extension. This measurement, from the ground to the rear bumper is dimension "X". NOTE: SAG measurements should be taken with suspension moving freely in a warm shop or after a short warmup ride. Rear of machine may need to be lifted slightly to achieve full extension of rear suspension.

Next, have the rider drop down hard on the seat and bounce up and down several times, working the rear suspension. With the rider seated, measure the distance between the ground and the rear bumper (at the exact same location as used for dimension "X"). This is dimension "Y".
To determine Sag, which is commonly referred to as "ride in", subtract dimension Y from dimension X. Therefore Sag=X-Y. Sag is adjusted by rotating the torsion spring preload cams located on the rear torque arm (see Fig. 1). The ideal amount of Sag for the EDGE RMK rear suspension is 4" (X-Y=4").

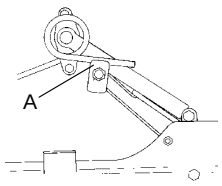
If the rear suspension rides in less than 3" or more than 5" with the torsion spring preload cams at their maximum range of adjustment, optional torsion springs (softer or stiffer respectively) may be required. Remember this is only an initial setup and final spring preload may vary based on rider preference and riding conditions.

OPTIONAL TORSION SPRINGS

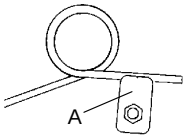
TRACK	SOFT	STANDARD	FIRM
136"	NOT APPLICABLE	7041627-067 7041628-067 .347 77	7041629-067 7041630-067 .359 77
144", 151", 156"	7042081-067 7042082-067 .347 47	7042068-057 7042069-067 .359 47	7042079-067 7042080-067 .375 47



Soft Tension Long End to Front



Medium Tension (Short End Up)

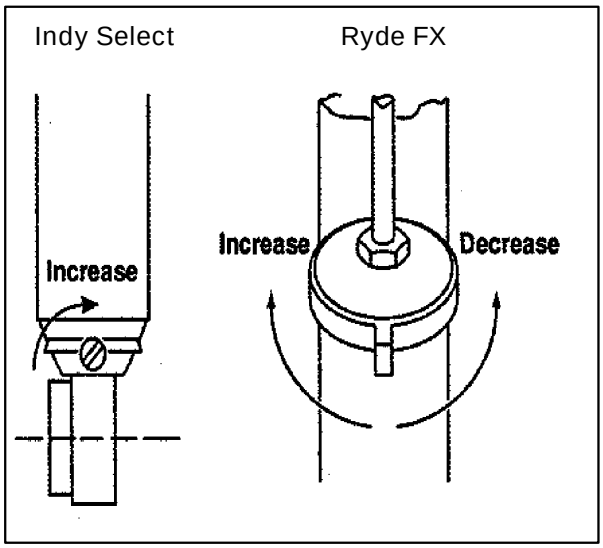


Firm Tension (Long End Up)

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Shock Tuning

The shocks work in two directions. Compression damping prevents the shock from bottoming hard while rebound damping keeps the shock from springing back too fast. Both compression and rebound damping can be adjusted for high and low speed damping characteristics. On Indy Select shocks, the compression damping can be changed by turning the adjuster screw. On Ryde FX shocks, the compression damping can be changed by adjusting the adjustment cam to the left or right. Refer to shock section in this chapter for adjustment. NOTE: When we refer to high and low speed, we are referring to the speed of the shock shaft or valve, not vehicle speed.



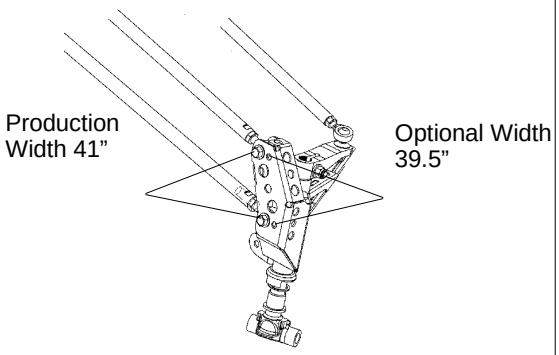
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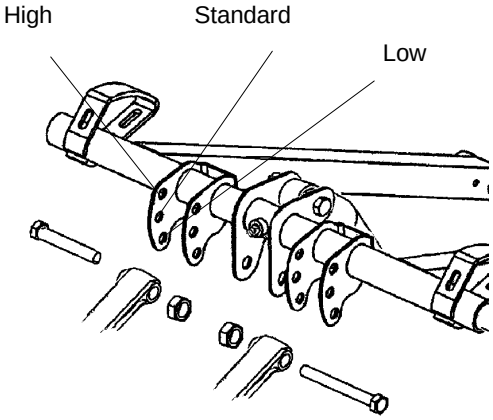
Overall Suspension Setup for Optimal Performance

Set Up Recommendations for Optimum Performance*

Deep Powder Snow	Powder - Hardpack	Hardpack
n Front Torque Arm - low position for maximum lift and floatation. n Ski Stance - Narrow position for maximum maneuverability	n Front Torque Arm - standard position for overall handling and speed over snow n Ski Stance - Set to rider preference	n Front Torque Arm - High position for increased control and less transfer. n Ski Stance - Wide position for maximum stability.

* More detailed instructions and options are found on troubleshooting and set-up decals under the hood.





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Hi-Fax Replacement - All Models

Hi-Fax replacement on all Polaris models is similar. When any area of the Hi-Fax is worn to 1/8″ (.3 cm), it should be replaced. This will save wear on other vital components.

The slide rail is designed to operate in conditions with adequate snow cover to provide sufficient lubrication. Excessive wear may be due to improper alignment, improper track adjustment or machine operation on surfaces without snow.

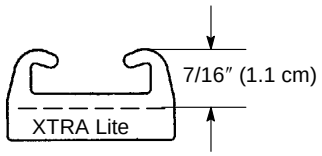
Replace Hi-Fax when worn to 3/8″ (.95 cm) on XTRA 10 and 7/16″ (1.1 cm) on EDGE RMK and XTRA Lite style suspensions.

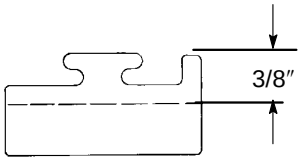
Suggested Hi Fax Wear Limit:

XTRA Lite - 7/16″ (1.1 cm)

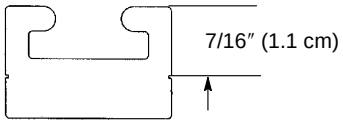
EDGE RMK – 7/16” (1.1cm.)

Hi Fax Wear Limit





All XTRA 10/12 PN 5521452



2002 Edge RMK PN 5521581

*2002 Edge RMK HyFax will NOT fit on 2001 units.

Hi-Fax Removal

1. Remove suspension from machine.

NOTE:Some models may allow Hi Fax to be removed by sliding it through track windows with the suspension mounted in the machine.

2. Remove front Hi-Fax retaining bolt.

3. Use a block of wood or a drift punch and hammer to drive Hi-Fax rearward off the slide rail.

4. With Hi-Fax material at room temperature, install new Hi-Fax by reversing steps 1 - 3.

NOTE:Lightly coat Hi-Fax track clip area with a lubricant such as LPS2 or WD-40 to ease installation.

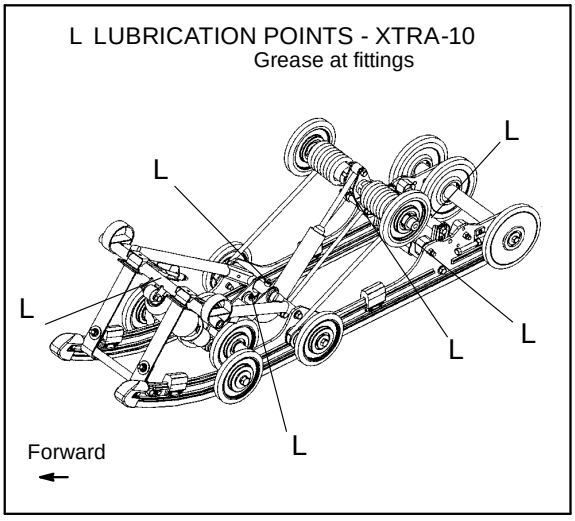
NOTE:Wide Hi-Fax should be narrowed on the leading sides to allow it to fit through narrow windows.

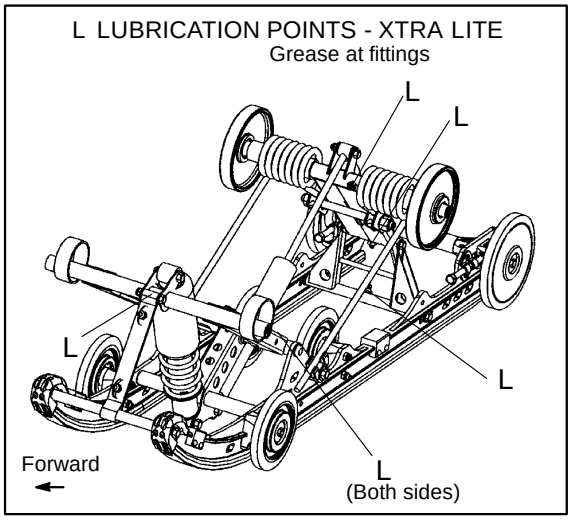
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Xtra 10/Xtra Lite – Torque Specifications, Suspension Mounting and Lubrication Points

3/8″ top shock mounting bolts	28-30 ft. lbs. (39 - 41 Nm)
3/8″ suspension mounting bolts	35 - 40 ft. lbs. (49 - 55 Nm)
7/16″ suspension mounting bolts	55 - 60 ft. lbs. (76 - 83 Nm)
Shock rod bolts (do not over torque)	12 ft. lbs. (17 Nm)

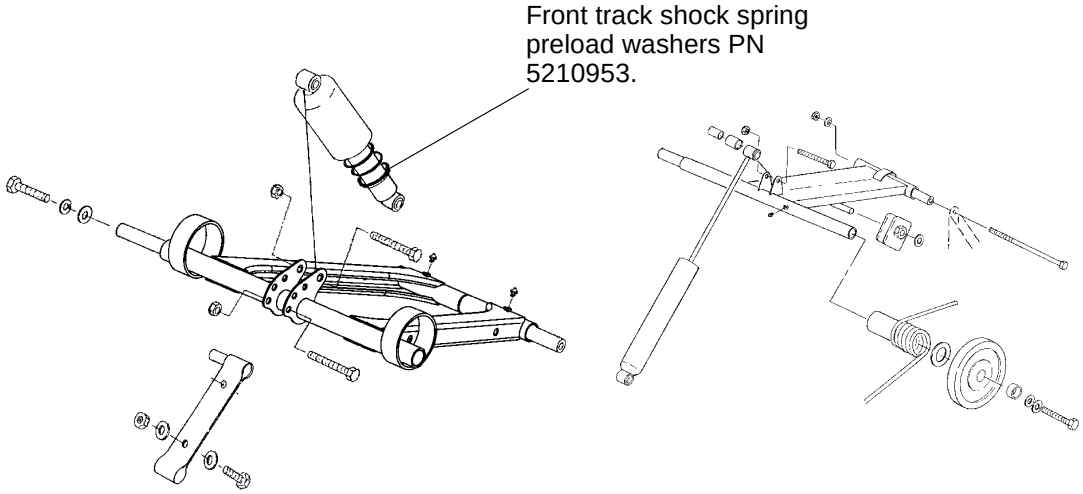
* Shock rods must pivot freely after torquing





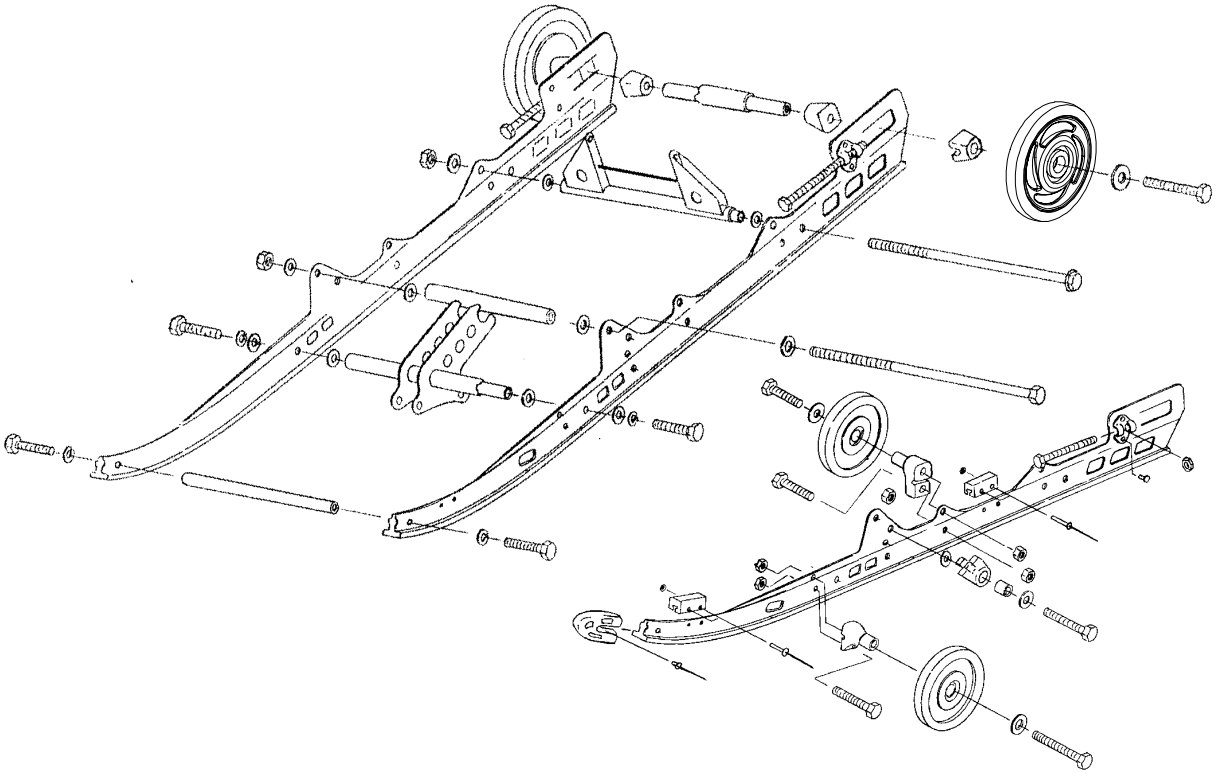
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Rear Suspension Exploded View / XTRA Lite



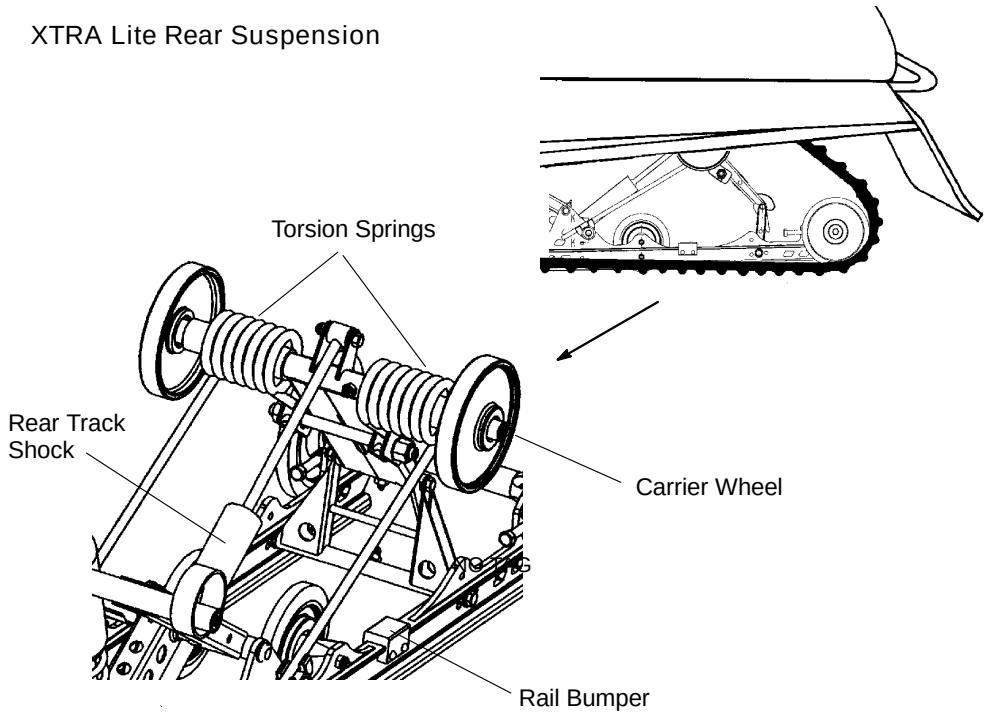
Front Torque Arm

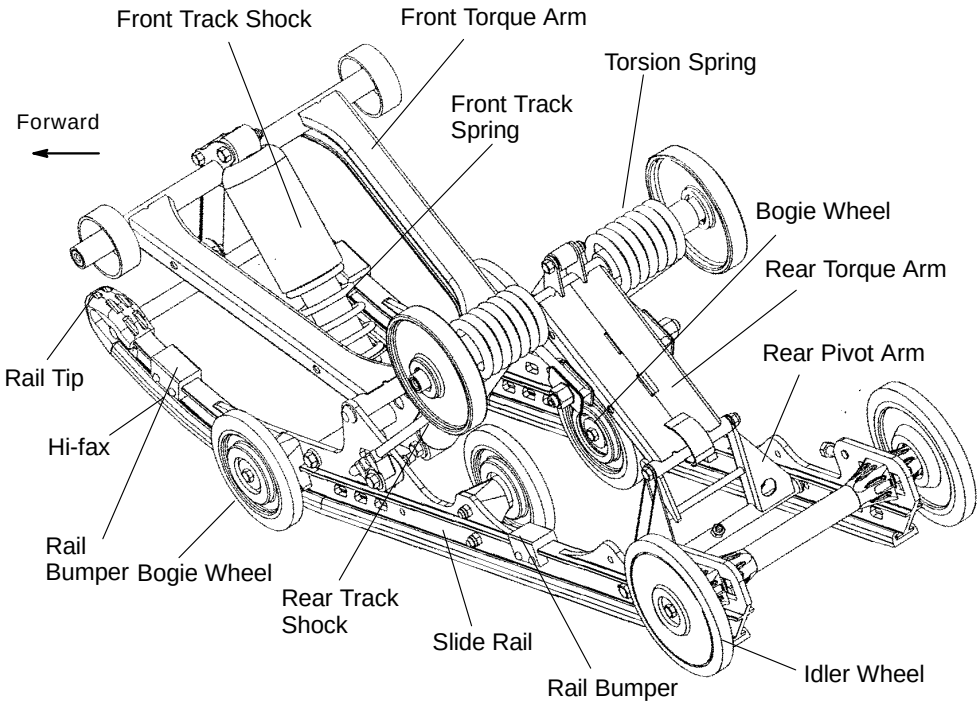
Rear Torque Arm



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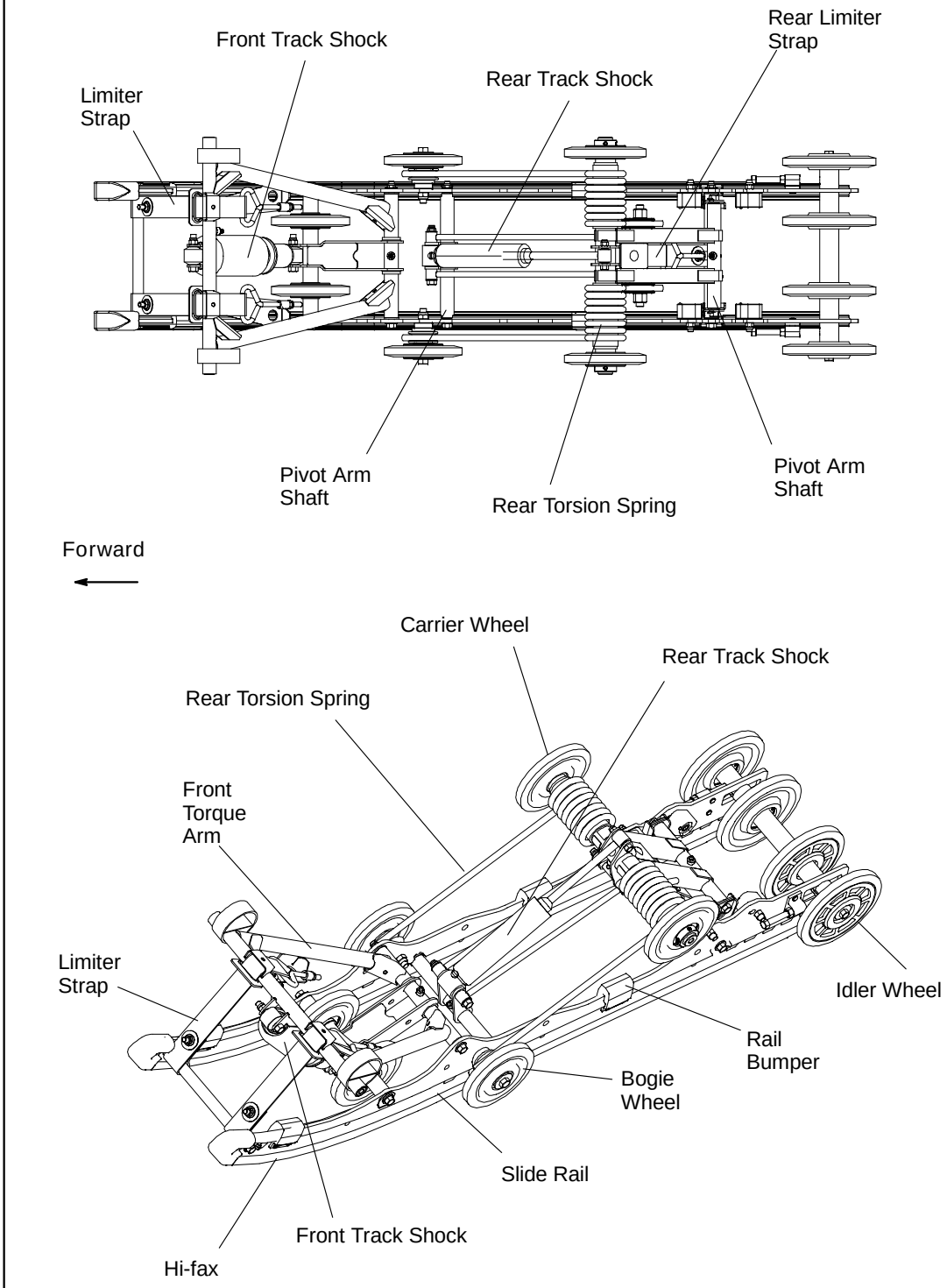
XTRA Lite Rear Suspension





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XTRA 10 Rear Suspension



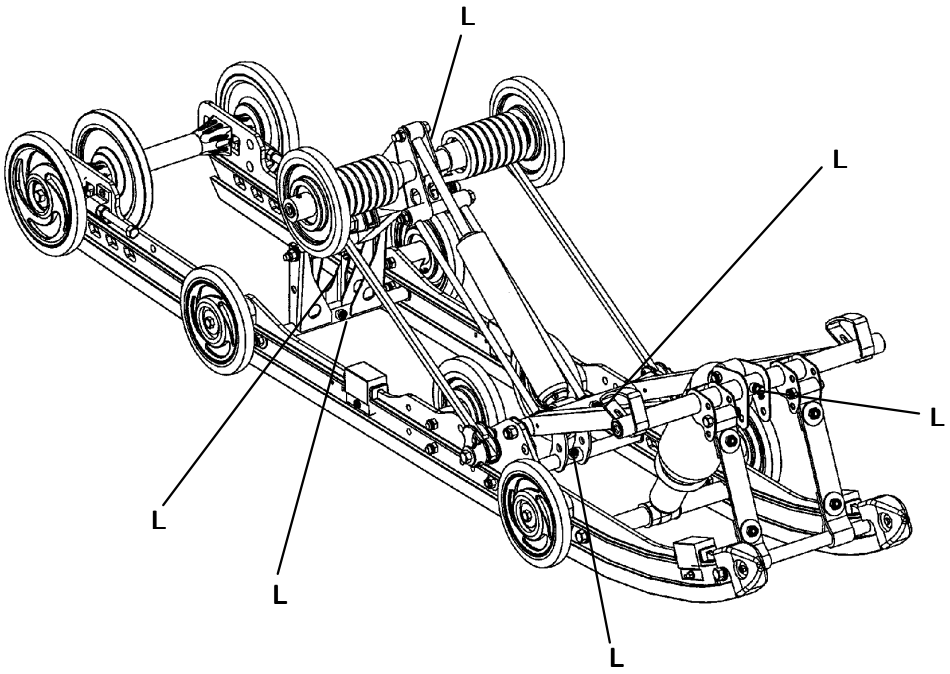
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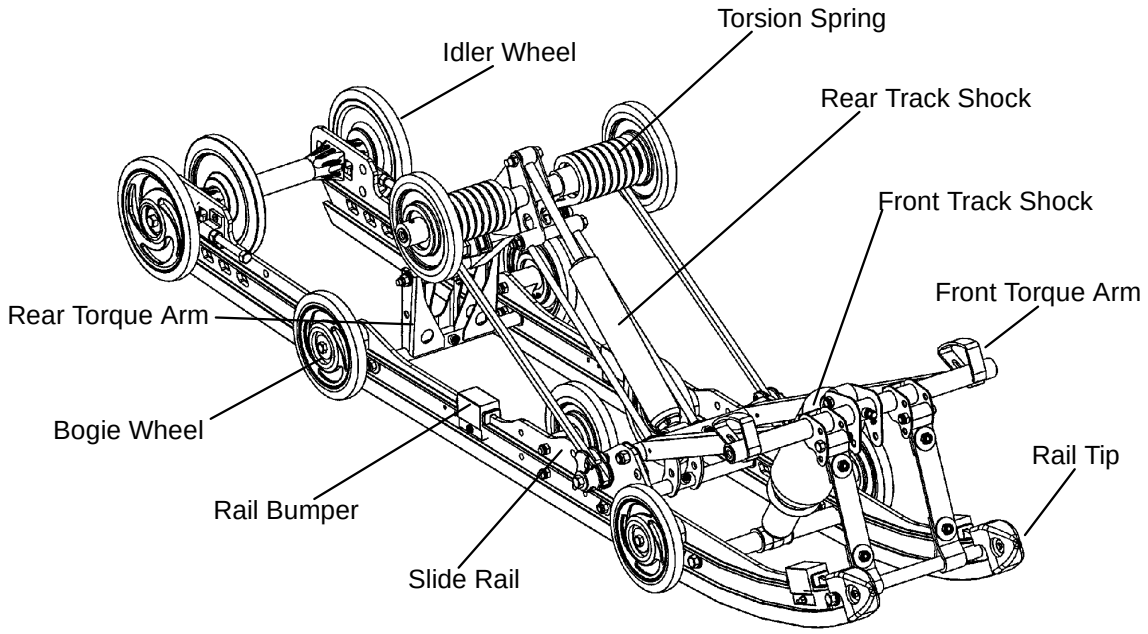
EDGE RMK Torque Specifications, Suspension Mounting and Lubrication Points

3/8″ suspension mounting bolts . . . . . 35 - 40 ft. lbs. (49 - 55 Nm)

Shock rod bolts (do not over torque) . . . . . 12 ft. lbs. (17 Nm)

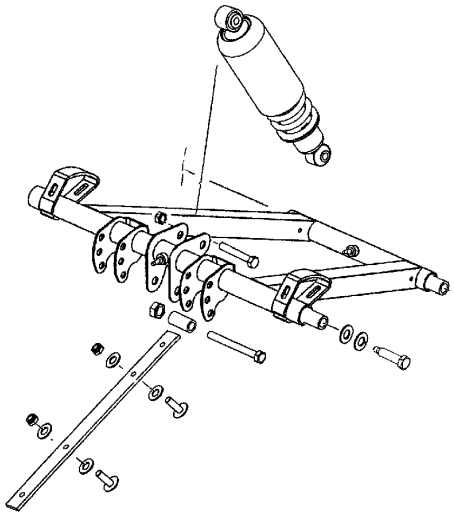
* Shock rods must pivot freely after torquing





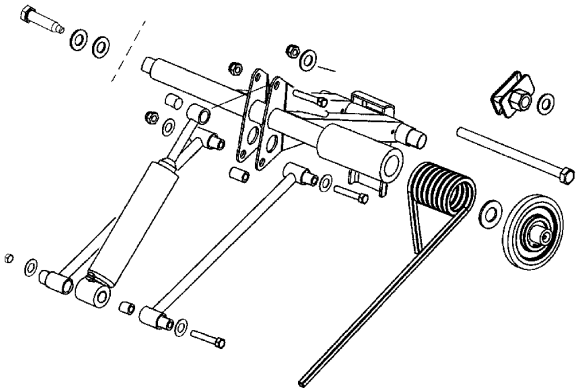
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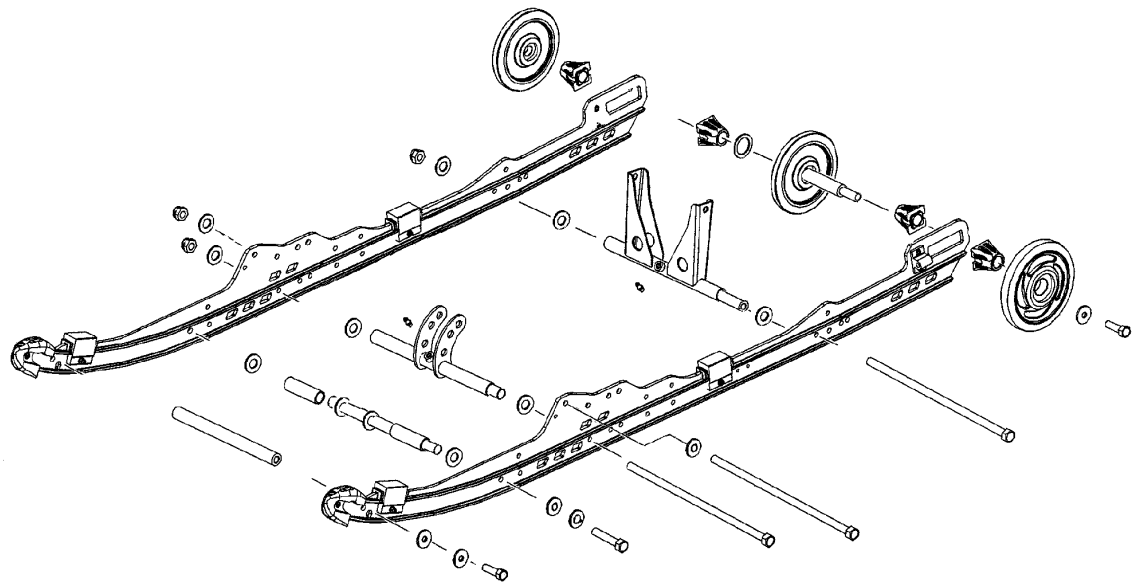
EDGE RMK Exploded view



Front Torque Arm

Rear Torque ARm





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Suspension Adjustment

The EDGE RMK and XTRA Lite suspension has been designed and set up to deliver a soft ride under average riding conditions. Rider weight, riding styles, trail conditions, and vehicle speed each affect suspension action.

The suspension can be adjusted to suit rider preference and deliver excellent performance for a given set of conditions. It should be noted, however, that suspension adjustments involve a compromise or trade off. A machine set up to perform well in the moguls would not suit the preference of a groomed trail rider.

Adjustable Features and Adjustment Options

- Rear torsion spring preload
- Optional coil springs for front track shock and spring preload washers or threaded collar
- Optional torsion springs
- Front limiter strap
- Optional coil springs for IFS shocks
- Adjustable Compression damping on Ryde FX or Indy Select rear track shock

Adjustment Procedures

It is a good idea to break the suspension in for approximately 150 miles (240 km) and re-grease all suspension parts before fine tuning adjustments are made.

All settings will vary from rider to rider, depending on rider weight, vehicle speed, riding style, and trail conditions. We recommend starting with factory settings and then customizing each adjustment individually to suit rider preference. The machine should be methodically tested under the same conditions after each adjustment (trail and snow conditions, vehicle speed,riding position, etc.) until a satisfactory ride is achieved. Adjustments should be made to one area at a time, in order to properly evaluate the change.

The purpose of the front track shock coil spring is to control ride height and front IFS preload. If you find that in order to obtain the desired ride effect the spring preload is over four additional washers (total of five), consider removing the existing spring and installing the next highest rate spring.

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The XTRA™ 10 suspensions have been designed and set up to deliver a soft ride under average riding conditions. Rider weight, riding styles, trail conditions, and vehicle speed each affect suspension action.

The suspension can be adjusted to suit rider preference and deliver excellent performance for a given set of conditions. It should be noted, however, that suspension adjustments involve a compromise or trade off. A machine set up to perform well in the moguls would not suit the preference of a groomed trail rider.

Adjustable Features and Adjustment Options

Independent Front Suspension (IFS)

- Front shock spring preload (some models require washers)
- Optional springs
- Indy Select shock (on some models)

Rear Suspension

- Rear torsion springs
- Front rear scissor stop (FRSS)
- Rear rear scissor stop (RRSS)
- Optional coil springs for front track shock and spring preload (some models require washers)
- Optional torsion springs
- Indy Select rear track shock (on some models)
- Limiter straps - front and rear

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Adjustment Procedures

It is a good idea to have customers break the suspension in for approximately 150 miles (240 km) before fine tuning adjustments are made.

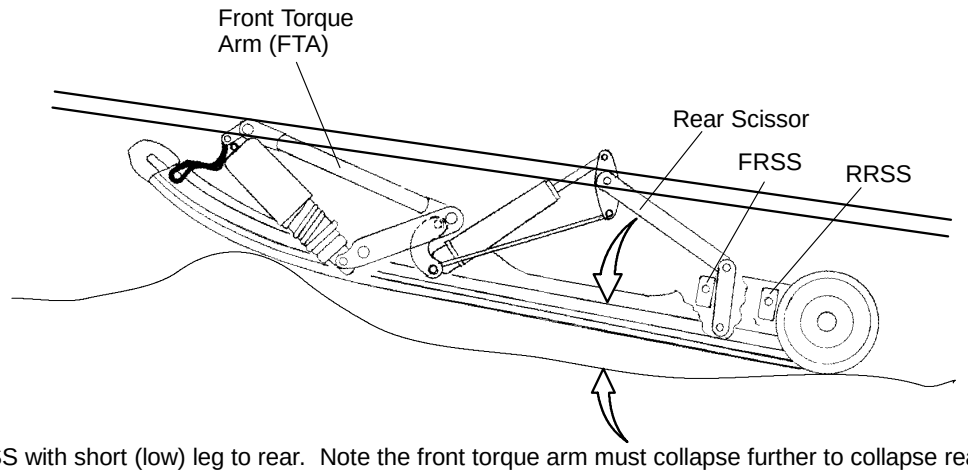
All settings will vary from rider to rider, depending on rider weight, vehicle speed, riding style, and trail conditions. We recommend starting with factory settings and then customizing each adjustment individually to suit rider preference. The machine should be methodically tested under the same conditions after each adjustment (trail and snow conditions, vehicle speed,riding position, etc.) until a satisfactory ride is achieved. Adjustments should be made to one area at a time, in order to properly evaluate the change.

The purpose of the front rear scissor stop (FRSS) is to control the bump attitude of the rear suspension. As the front torque arm (FTA) hits the bump, it forces the rear scissor to collapse a predetermined amount, depending on the FRSS block position.

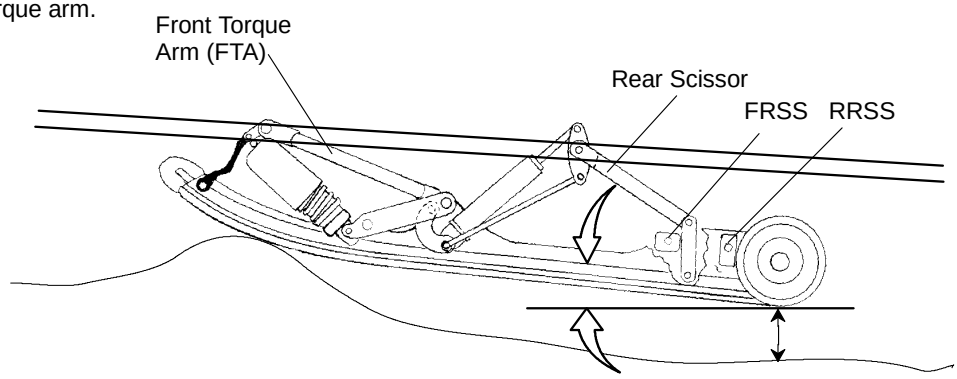
This accomplishes two important things, it allows a lighter spring rate on the FTA because it can borrow spring rate from the rear torsion springs; and it prepares the rear portion of the suspension for the bump, reducing secondary kick back.

The FRSS is made of a resilient material allowing smooth action and preventing any suspension component damage.

This unique feature is applied to the XTRA t 10 rear suspension. Patents are pending.



FRSS with short (low) leg to rear. Note the front torque arm must collapse further to collapse rear torque arm.

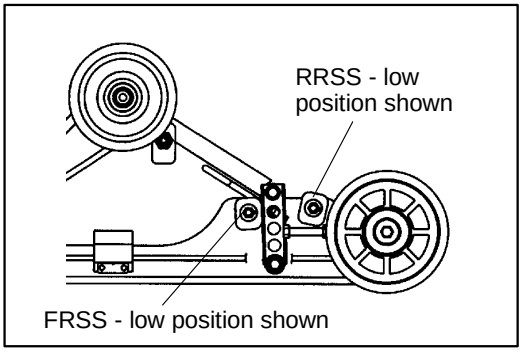


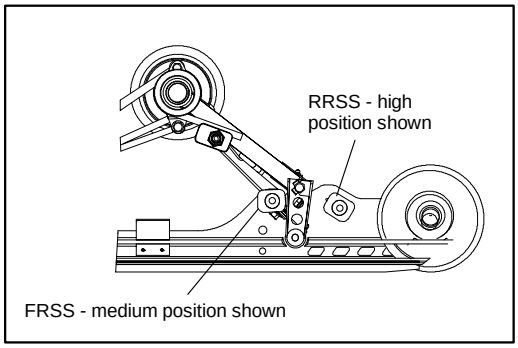
FRSS with long (high) leg to rear. Note this forces rear scissor to collapse with less front torque arm movement than when in short position. This keeps the rails more parallel to the chassis.

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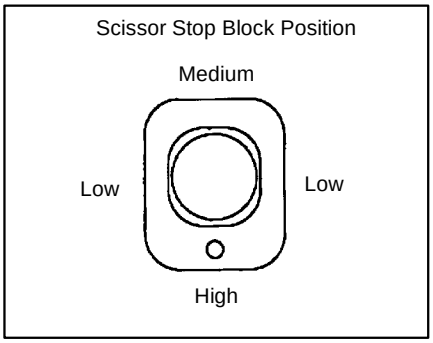
The RRSS controls weight transfer from the rear suspension to the skis. It also influences the stiffness of the ride by controlling the amount of coupling action between the front and rear torque arms. To increase the stiffness of the suspension, the RRSS should be set in the high position.

NOTE: On XTRA-10 and EDGE models only, the RRSS can be totally removed for maximum weight transfer. However, unless the torsion springs and rear shock valving are changed, the ride will be compromised. Always maintain equal adjustment on both sides.



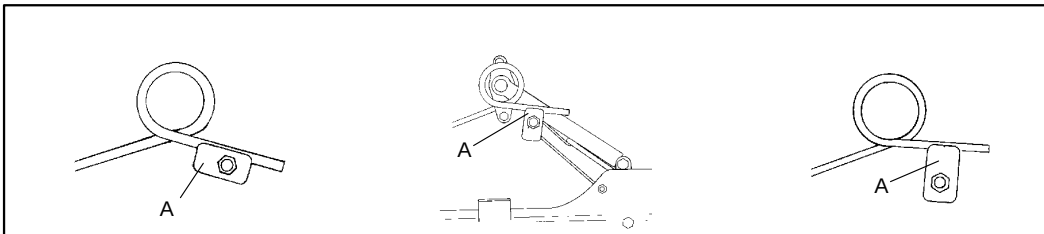


Be sure rear scissor stop face is square with the face of the scissor arm to ensure complete contact.



Rear Spring Tension

Rear spring tension adjustments are made by rotating the eccentric spring block (A) as shown with the engine spark plug tool. The block provides three spring tension positions. This adjustment is easier if the long spring leg is lifted over the roller and replaced after the block is properly positioned. Always maintain equal adjustment on both sides.



Soft Tension Long End to Front

Medium Tension (Short End Up)

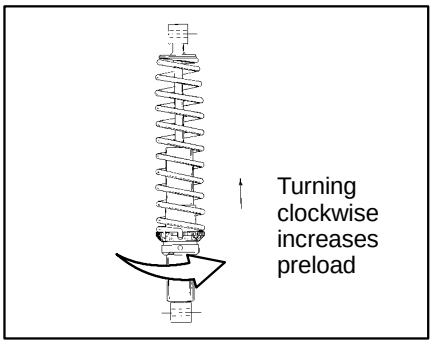
Firm Tension (Long End Up)

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Front Suspension Setup and Adjustments

Spring preload is one of the adjustment options which affects ride. Preload is the amount of pressure at which the spring is held. The longer the installed length of the spring, the less the amount of pre-load; the shorter the installed length of the spring, the more the amount of pre-load. An increase in IFS shock spring pre-load will result in an increase in ski pressure.

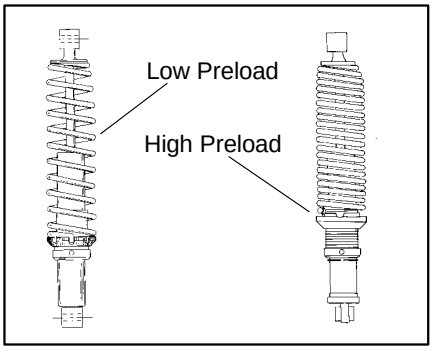
To adjust front spring preload on threaded adjust models, grasp the spring and turn in a clockwise direction (as viewed from the bottom of the shock) to increase the preload. Turn in a counter-clockwise direction to decrease preload.



In the adjacent illustration, high preload and low preload positions are depicted.

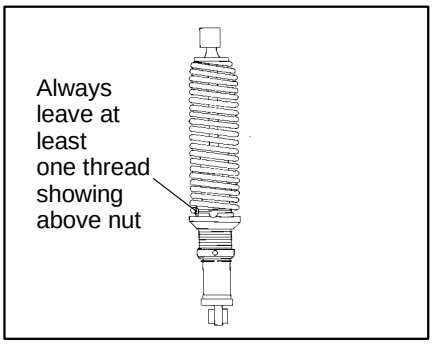
When adjusting, be sure springs on both the left and right sides of the machine are at the same adjustment.

For the best ride the spring preload should be as low as possible. Set the preload to use the full travel of the ski shock with occasional light bottoming.



CAUTION:

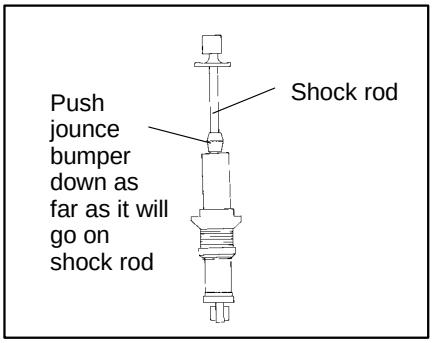
If the plastic nut is unscrewed from the threaded body the nut will break. Always leave one thread showing above the plastic nut or the spring coils will stack, resulting in damage.



For the best ride the spring preload should be as low as possible. Set the preload to use the full travel of the ski shock with occasional light bottoming. To determine if your machine is using full travel, push the shock jounce bumper down as far as it will go on the shock rod and test ride the machine.

The bumper will move up on the rod in direct relation to the amount of travel. For example, if the shock travel is full, the bumper will be seated at the top of the shock.

- Remove the existing spring and install the next highest rate spring, or
- Reduce the preload on the existing spring and change the shock valving to obtain the desired effect. NOTE: Shock valving can only be adjusted or changed on models equipped with Ryde FX t , Indy Select or Fox t shocks.



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⚠ WARNING

Changing shock valving on models equipped with Ryde FX t or Fox t shocks requires special tools and a sound knowledge of mechanical theory, tool use, and shop procedures in order to perform the work safely and correctly. Shocks contain high pressure nitrogen gas. Extreme caution should be observed when handling and working with high pressure service equipment. See Ryde FX t and Fox t Shock rebuilding information later in this chapter.

Always verify ski alignment before making adjustments to the IFS. If the skis are misaligned, we recommend the camber adjustment be checked as this may also be affected.

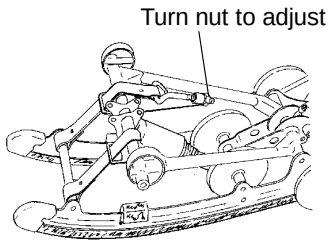
Front Torque Arm Limiter Strap Adjustment - XTRA-10

One method of changing ski-to-snow pressure is to change the length of the front torque arm limiter straps. The limiter strap is normally mounted in the fully extended position.

- Lengthening the straps decreases ski pressure under acceleration.
- Shortening the straps increases ski pressure under acceleration.

To adjust models with quick adjust front limiter straps,turn the eyebolt nut to lengthen or shorten the straps. To shorten the strap, turn the nut clockwise. To lengthen the strap, turn the nut counterclockwise.

NOTE:Both limiter straps must be adjusted evenly and remain equal in length to avoid improper Hi-Fax and track wear.



Turning clockwise shortens strap. Turning counterclockwise lengthens strap.

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Compression Damping Adjustable Shocks

Snowmobiles equipped with the Indy Select or Ryde FX t shocks allow the driver to make adjustments to the compression valving by turning the screw located near the base of the shock.

Adjustment

Locate the adjustment screw near the base of the shock. NOTE: This adjustment is easiest to make with the machine tipped on its side.

⚠ WARNING

Be sure to shut off the fuel supply before tipping the machine to prevent fuel spillage and flooding of the carburetors.

By turning the screw clockwise (a small screwdriver or dime work well), the compression valving is increased, stiffening the ride. To soften the ride, reduce the compression by turning the screw counter-clockwise. A great deal of ride performance is accomplished with a mere 1/2 to 1 turns. There are approximately 3 full turns of adjustment available.

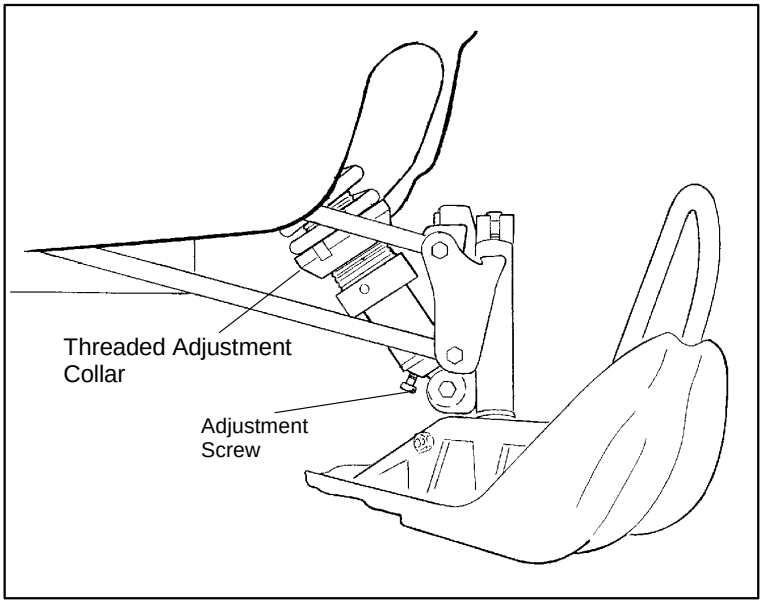
How to Adjust IFS

If the suspension is "bottoming," tighten the compression screw clockwise in 1/2 turn increments until the bottoming stops. Backing off 1/4 turn counter-clockwise at this point should give you the best possible ride ensuring use of the full travel of the suspension. The opposite procedure should be used if the suspension is too stiff upon initial set-up.

If bottoming continues after the screw is turned in full clockwise, the compression spring should be adjusted with the threaded adjustment collar. Back the screw out to the original starting position after the compression spring has been adjusted.

Riding conditions are ever changing. Keep in mind the compression damping adjustable screw can be adjusted at any time to achieve the best possible ride in any condition.

NOTE:Whenever shocks are replaced or reinstalled for any reason, the adjustment screw should be located toward the inside of the suspension. Access to the adjuster is not possible if reversed. Fox™ Shocks should be installed with the charge fitting up.



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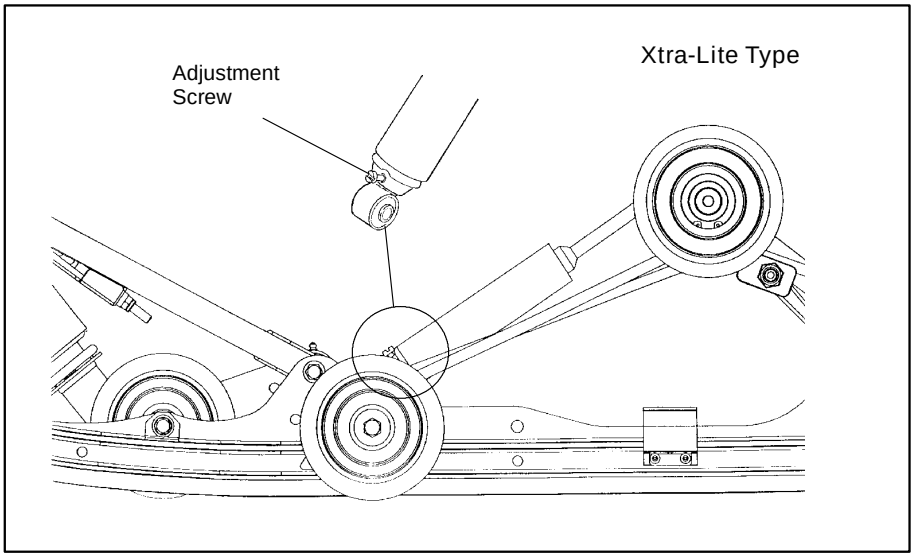
How to Adjust Rear Suspension

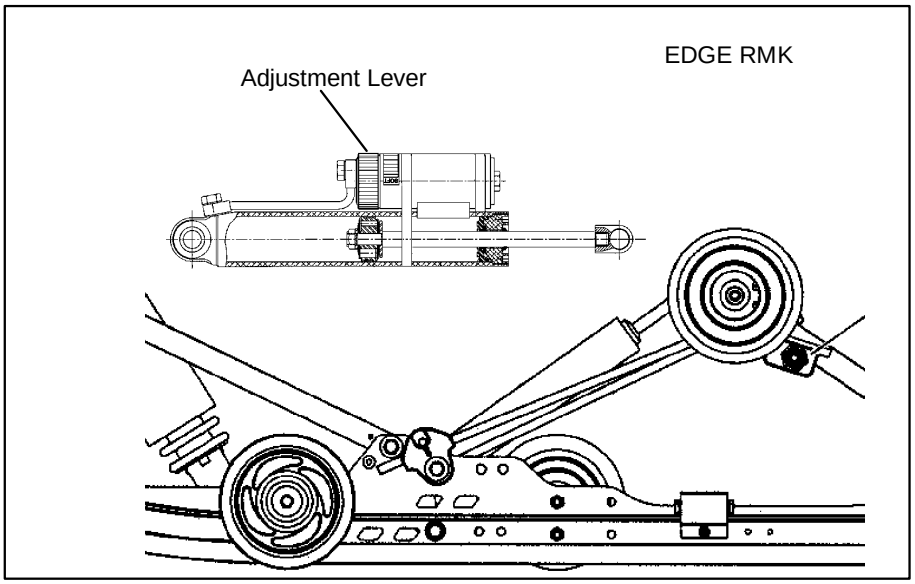
If the suspension is "bottoming," tighten the compression screw clockwise in 1/2 turn increments until the bottoming stops or on Ryde FX equipped suspensions, turn the adjusting lever towards the FIRM or SOFT settings. Backing off 1/4 turn counter-clockwise at this point should give you the best possible ride ensuring use of the full travel of the suspension. The opposite procedure should be used if the suspension is too stiff upon initial set-up.

If bottoming continues after the screw is turned in full clockwise, the torsion spring should be adjusted using the adjustment block. Back the screw out to the original starting position after torsion spring preload has been increased.

Riding conditions are ever changing. Keep in mind the Indy Select / Ryde FX shocks can be adjusted at any time to achieve the best possible ride in any condition.

NOTE:Whenever shocks are replaced or reinstalled for any reason, the adjustment screw should be located toward the forward right side of the suspension. Access to the adjuster is not possible if reversed.





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Following is a list of all available springs for the rear suspension. These springs can be used to better suit individual riding preference.

Xtra Lite/136" Optional Suspension Set Ups, See Suspension Tuning Decal Under Hood.

Torsion Spring Part No.	Wire Dia./Degrees
7041629-067 LH	.359" (Sq.) Diameter x 77_
7041630-067 RH	.359" (Sq.) Diameter x 77_
7041631-067 LH	.375" (Sq.) Diameter x 77_
7041632-067 RH	.375" (Sq.) Diameter x 77_

144"/151"/156" EDGE RMK Optional Suspension Set Ups, See Suspension Tuning Decal Under Hood.

Torsion Spring Part No.	Wire Dia./Degrees
7042081-067 L.H.	.347" (Sq.) Diameter x 47_
7042082-067 R.H.	.347" (Sq.) Diameter x 47_
7042068-067 L.H.	.359" (Sq.) Diameter x 47_
7042069-067 R.H.	.359" (Sq.) Diameter x 47_
7042079-067 L.H.	.375" (Sq.) Diameter x 47_
7042080-067 R.H.	.375" (Sq.) Diameter x 47_

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IFS Shock Springs Xtra 10 / Xtra Lite / EDGE RMK

Part Number	Total # of Coils	Active # of Coils	Rate (#/in)	Free Length	Wire Dia.	End Dia #1	End Dia #2	O.D.”	Tabbed	Application
7041396-067	13.35	11.35	50.00	11.88”	.283”	1.89”	2.25”	2.82	Yes	Ryde FX
7041398-067	12.72	10.72	75.00	11.88”	.312”	1.89”	2.25”	2.88	Yes	Ryde FX
7041405-067	13.40	11.40	65.00	11.88”	.306”	1.89”	2.25”	2.82	Yes	Ryde FX
7041489-067	14.70		74/120	11.30”	.312”	1.89”	1.89”	2.75	Yes	Fox
7041491-067	13.00	11.00	185.00	13.50”	.438”	1.90”	2.48”	3.60	Yes	
7041520-067	10.60	8.60	90.00	10.50”	.283”	1.89”	1.89”	2.57	No	
7041528-067	17.57		74/160 var	11.30”	.306”	1.89”	1.89”	2.53	Yes	
7041529-067	19.39		50/140 var	11.30”	.283”	1.89”	1.89”	2.50	Yes	
7041530-067	14.42		70/105 var	10.50”	.283”	1.89”	1.89”	2.50	Yes	
7041549-067	9.17		140.00	10.75”	.331”	1.89”	2.25”	2.75	Yes	Ryde FX
7041550-067	8.29		120.00	10.80”	.306”	1.89”	2.25”	2.75	Yes	Ryde FX
7041551-067	9.55		100.00	10.75”	.306”	1.89”	2.25”	2.75	Yes	Ryde FX
7041552-067	9.09		80.00	10.75”	.283”	1.89”	2.25”	2.75	Yes	Ryde FX
7041553-067	11.46		60.00	11.33”	.283”	1.89”	2.25”	2.75	Yes	Ryde FX
7041554-067	9.09		80.00	10.75”	.283”	1.89”	1.89”	2.75	Yes	Fox
7041571-067	10.40	8.40	70.00	10.50”	.263”	1.89”	1.89”	2.53	No	
7041573-067	9.28		160.00	10.00”	.331”	1.89”	1.89”	2.91	Yes	Fox
7041574-067	10.32		140.00	10.25”	.331”	1.89”	1.89”	2.91	Yes	Fox
7041575-067	10.36		120.00	11.42”	.331”	1.89”	1.89”	2.87	Yes	Fox
7041576-067	9.55		100.00	10.80”	.306”	1.89”	1.89”	2.86	Yes	Fox
7041591-067	12.79		80.00	12.25”	.306”	1.89”	1.89”	2.75	Yes	
7041598-067	9.71		105.00	9.33”	.312”	1.89”	2.25”	2.894	Yes	
7041613-067	14.01		75.00	11.88”	.295”	1.89”	1.89”	2.62	Yes	Fox
7041668-067	6.94		70.00	4.00”	.219”	1.89”	1.89”	2.34	No	
7041669-067	6.27		80.00	4.00”	.218”	1.89”	1.89”	2.33	No	
7041670-067	6.28		90.00	4.00”	.225”	1.89”	1.89”	2.35	No	
7041671-067	11.71		160.00	9.00”	.331”	1.89”	1.89”	2.56	No	Fox
7041672-067	10.63		180.00	9.00”	.331”	1.89”	1.89”	2.56	No	Fox
7041673-067	12.72		200.00	9.00”	.362”	1.89”	1.89”	2.62	No	Fox
7041674-067	12.72		220.00	9.00”	.362”	1.89”	1.89”	2.62	No	Fox
7041677-067	10.43		140.00	9.00”	.306”	1.89”	1.89”	2.52	No	Fox
7041678-067	8.65		100.00	7.00”	.262”	1.89”	1.89”	2.43	No	
7041683-067	12.12		80.00	11.88”	.312”	1.89”	1.89”	2.87	Yes	Ryde FX
7041698-067	5.84		100.00	4.00”	.225”	1.89”	1.89”	2.35	No	Fox
7041699-067	5.75		120.00	4.00”	.235”	1.89”	1.89”	2.37	No	Fox
7041701-067	10.57		120.00	9.00”	.295”	1.89”	1.89”	2.49	No	Fox
7041820-067	5.98		140.00	4.00”	.250”	1.89”	1.89”	2.43	No	Fox
7041821-067	5.91		160.00	4.00”	.262”	1.89”	1.89”	2.49	No	Fox
7041826-067	9.19		160.00	7.00”	.306”	1.89”	1.89”	2.54	No	Fox
7041826-067	8.85		180.00	7.00”	.312”	1.89”	1.89”	2.54	No	Fox
7041828-067	9.61		200.00	7.00”	.331”	1.89”	1.89”	2.59	No	Fox
7041829-067	8.92		220.00	7.00”	.331”	1.89”	1.89”	2.59	No	Fox

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Stock Valving Listed By Shock Part Number

IFS Shock Valving

Shock PN		7042059 Ryde FX	7041801 Fox
Compress. Stack	10C	–	–
	9C	–	–
	8C	.700x.012	–
	7C	.900x.010	1.300x.008
	6C	1.000x.008	1.000x.006
	5C	1.100x.012	1.300x.008
	4C	1.250x.015	1.100x.008
	3C	.900x.008	1.00x.008
	2C	1.00x.006	.800x.008
	1C	1.300x.006	1.250x.010
Orifice		.086	.086
Rebound Stack	1R	1.250x.010	1.250x.010
	2R	1.100x.010	1.000x.008
	3R	1.000x.008	.900x.008
	4R	.900x.008	.800x.008
	5R	.800x.008	.700x.008
	6R	–	–
	7R	–	–

Front Track Shock Valving

Shock PN		7042084 Ryde FX	7041810 Fox
Compress. Stack	10C	–	
	9C	–	1.125x.093 Top out
	8C	–	1.250x.010
	7C	.700x.012	.800x.012
	6C	.800x.008	.900x.012
	5C	.600x.010	1.000x.010
	4C	1.100x.008	1.100x.010
	3C	1.250x.012	1.300x.012
	2C	.900x.008	.900x.006
	1C	1.300x.006	1.300x.012
Orifice		.070	.076
Rebound Stack	1R	1.250x.010	1.250x.012
	2R	1.100x.012	1.100x.010
	3R	1.000x.010	1.000x.010
	4R	.900x.010	.900x.010
	5R	.800x.010	.800x.010
	6R	.700x.010	.700x.010
	7R	-	.620x.093 Back up

Rear Track Shock Valving

Shock PN		7041968 Ryde FX
Compress. Stack	10C	
	9C	
	8C	.700x.012
	7C	.800x.008
	6C	.900x.008
	5C	1.100x.008
	4C	1.250x.006
	3C	1.000x.006
	2C	1.100x.006
	1C	1.250x.006
Orifice		0.094
Rebound Stack	1R	1.250x.012
	2R	1.250x.012
	3R	1.100x.015
	4R	1.000x.012
	5R	.900x.012
	6R	.800x.012
	7R	.700x.012

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Ryde FX t Shock Chart

Front Track Shocks

Front Track Shocks							
Shock PN	Extended Length(in)	Collapsed-Length (in)	Stroke(in)	Shock Rod (in)	IFP Depth (in)	Shaft Part #	PSI
7042084	12.51	8.92	3.59	0.49	4.77	1700182	200
7041980	10.85	7.79	3.06	0.49	4.13	1700028	200
7041975	12.10	8.60	3.50	0.49	3.50	1700026	200

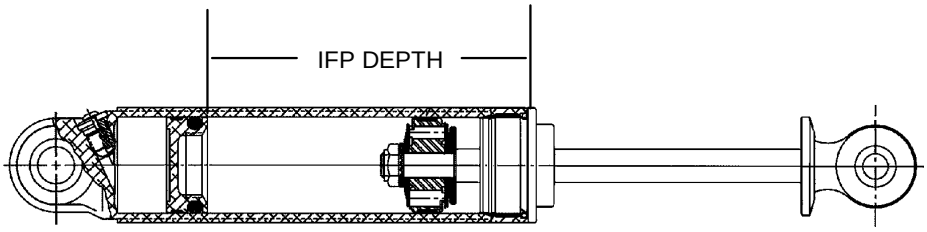
Rear Track Shocks

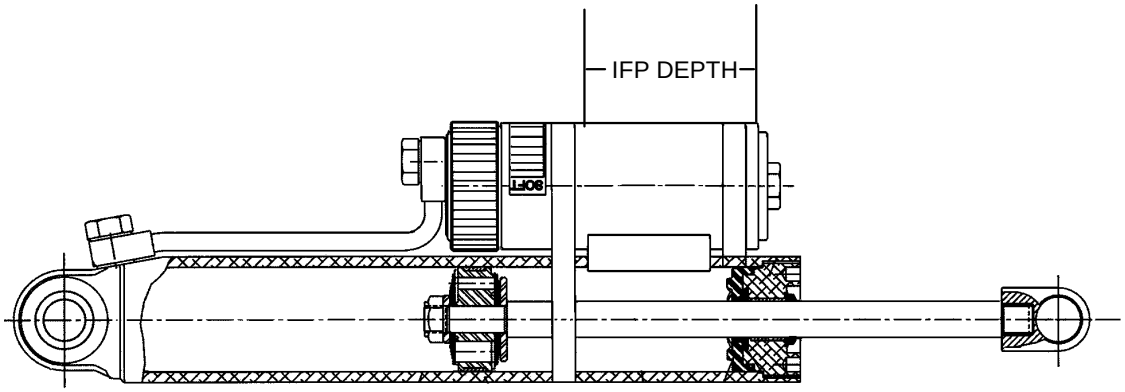
Rear Track Shocks							
Shock PN	Extended Length(in)	Collapsed-Length (in)	Stroke(in)	Shock Rod (in)	IFP Depth (in)	Shaft Part #	PSI
7041968	16.61	10.97	5.64	0.49	2.25	1700183	200
7041982	16.61	10.97	5.64	0.49	6.71	-	200

IFS Shocks

IFS Track Shocks							
Shock PN	Extended Length(in)	Collapsed-Length (in)	Stroke(in)	Shock Rod (in)	IFP Depth (in)	Shaft Part #	PSI
7041976	16.25	11.00	5.25	0.49	6.56	1700010	280
7041978	16.17	10.75	5.42	0.49	6.52	1700154	200
7042059	17.25	12.00	5.25	0.49	7.46	1700010	200
7041801	15.70	-	-	0.49	1.110	1500290	-

IFP position is measured from the top if the Cylinder or Reservoir to the top if the IFP





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Fox™ Shock Maintenance

Changing oil on Fox™ Shocks is recommended annually and should be included when performing end of season storage preparation. This oil change is necessary to avoid any chance of corrosion which could be caused by moisture contamination. For competition use, shocks should be disassembled, inspected and serviced more frequently.

When performing maintenance on Fox™ Shocks, use Gas Shock Recharging Kit PN 2200421. It consists of the necessary valves, pressure gauge, and fittings to deflate and pressurize the shocks. The Body Holder Tool, Internal Floating Piston (IFP), and Shock Rod Holding Tool are not included in the Recharging Kit and must be ordered separately. Refer to your Victor Specialty Tool catalog for part numbers.

Gas Shock Recharging Kit

PN 2200421

⚠ WARNING

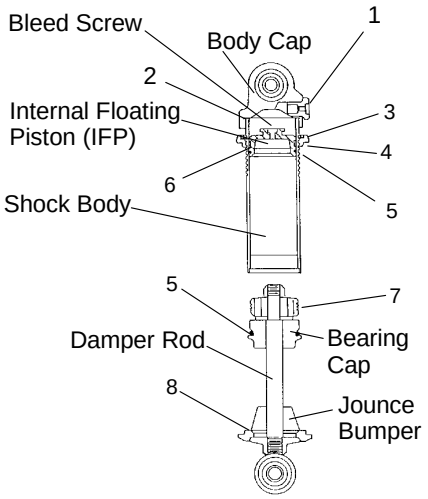
Extreme caution should be observed while handling and working with high pressure service equipment. Wear a face shield, safety glasses, and ear protection during service of these shocks.

Care should be observed while handling the inflater needle and pressure gauges. Maintain your equipment and keep it in good condition. If injury should occur, consult a physician immediately.

Extreme cleanliness is of utmost importance during all disassembly and reassembly operations to prevent any dirt or foreign particles from getting into the shocks.

Keep the parts in order as they are disassembled. Note the direction and position of all internal parts for reassembly.

Ref. #	Qty.	Description
1	1	Pressure Valve
2	2	O-Ring
3	1	Retaining Ring
4	1	Spring Retainer Body
5	2	O-Ring
6	1	Piston Ring (Floating)
7	1	Piston Ring (Damping)
8	1	Spring Retainer, Slotted



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2002 Fox Optional Valving Listed By Shock Part Number

Refer to the appropriate parts manual for a complete listing of Fox shock parts. Fox, Registered Trademark of FOX Shox.

Shock Travel Limiting Spacer (1/4″) - Part Number 5431355

Valve Washer Part Numbers

Part No.	Description
1500052	1.300 x 0.006
1500050	1.250 x 0.006
1500049	1.100 x 0.006
1500048	1.000 x 0.006
1500053	0.900 x 0.006
1500054	0.800 x 0.006
1500055	0.700 x 0.006
1500030	1.300 x 0.008
1500051	1.250 x 0.008
1500031	1.100 x 0.008
1500032	1.000 x 0.008
1500033	0.900 x 0.008
1500028	0.800 x 0.008
1500029	0.700 x 0.008
1500062	1.300 x 0.010
1500026	1.250 x 0.010
1500027	1.100 x 0.010
1500045	1.000 x 0.010
1500046	0.900 x 0.010
1500047	0.800 x 0.010
1500044	0.700 x 0.010
1500079	1.300 x 0.012
1500078	1.250 x 0.012
1500060	1.100 x 0.012
1500059	1.000 x 0.012
1500058	0.900 x 0.012
1500057	0.800 x 0.012
1500056	0.700 x 0.012
1500087	1.300 x 0.015
1500086	1.250 x 0.015
1500085	1.100 x 0.015
1500084	1.000 x 0.015
1500083	0.900 x 0.015
1500082	0.800 x 0.015
1500081	0.700 x 0.015

Note: Subtract .029″ from IFP depth for each 1/4 inch spacer added to the shock damper rod for limiting.

For example: If standard (full shock travel) IFP depth is .835″, and 6 spacers are added to reduce shock travel by 1.5 inches, multiply .029 x 6 to calculate the amount to subtract from IFP depth.
.835 – .174 = .661 (± .025″) New IFP Depth

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Fox™ Shock Maintenance

Disassembly

1. Remove spring and bushings from shock eyes. Thoroughly wash shocks in a parts washer or with soap and water to remove dirt and other debris. Dry thoroughly with compressed air. Position and clamp body cap of shock in soft jaws (aluminum or brass) of vise. Remove Allen screw from pressure valve.



2. With valve outlet pointed in a safe direction, insert red tip of safety needle assembly into recess in shock pressure valve. Depress safety pin on safety needle and push gauge and needle assembly slowly toward shock, inserting needle. Be sure to push needle completely into shock valve. Release nitrogen in a safe direction away from everyone by turning T-handle clockwise (if equipped) or by depressing Schrader valve pin.



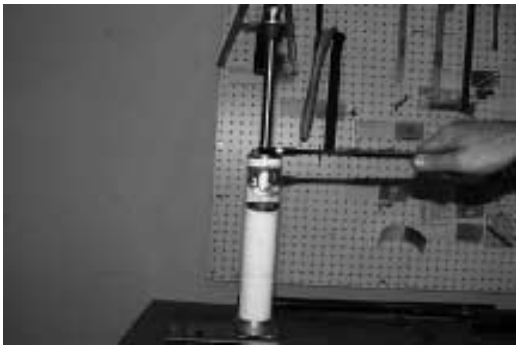
CAUTION:

It is possible for some residual pressure to remain in the shock regardless of the gauge reading. Always completely remove valve from body cap before further disassembly of shock.

3. Remove valve and sealing O-ring from body cap.



4. Extend shock shaft by pulling up on shock eyelet. Using a 1″ (25 mm) wrench, loosen shaft bearing cap.



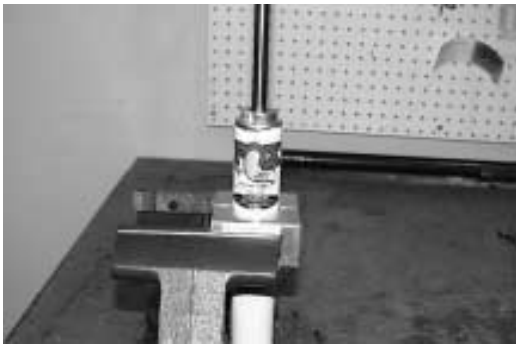
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Fox™ Shock Maintenance

Disassembly, Cont.

5. If body of shock starts to unscrew from body, tighten and try again. To keep body from turning, it may be necessary to use Body Clamp Tool clamped lightly around body in soft jaws of vise as shown.

NOTE:Position body clamp at least 1 1/2″ below bearing cap.



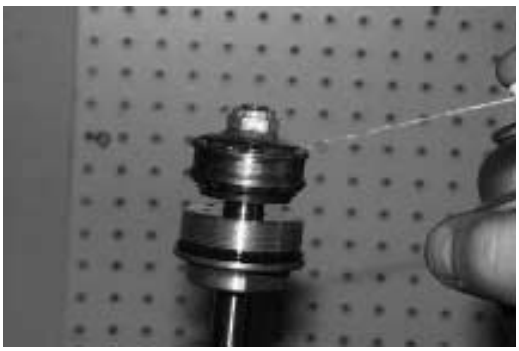
Shock Body Clamp Tool PN 2871071



6. Pull shock rod and piston straight out to avoid seal or valve damage. Be prepared to catch piston ring when removing the damper rod/valve piston.



7. Remove shock from vise and dispose of used oil properly in suitable container. Set shock body aside.



8. Mount damper rod in soft-jawed vise. Loosen valve nut and clean the valve piston and valving washers with electrical contact cleaner. Dry thoroughly with compressed air. Tighten nut and torque to 12 ft. lbs. (17 Nm).

Valve Nut Torque - 12 ft. lbs. (17 Nm)

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Fox™ Shock Maintenance

9. If bearing cap and/or seals are to be replaced, remove nut, washer, and valve piston with valving washers and set aside. Keep washers in order and note orientation of slots in piston for proper re-installation. The side with the greater number of slots must face the damper rod nut (toward IFP).



Seal Replacement

1. Remove bearing cap from damper rod. Inspect seals, o-ring, and bushing inside cap. Inspect cap O-ring and replace if torn or damaged.

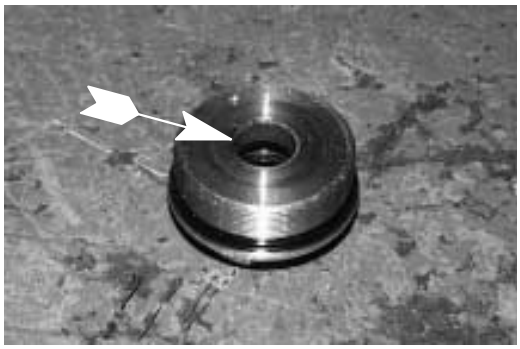
2. Using a small screwdriver or scribe pry upper seal, main seal, and O-ring out of bearing cap. Use care to avoid scratching the seal cavity.



3. Clean seal cavity and inspect bushing for wear or damage and replace bearing cap if necessary.

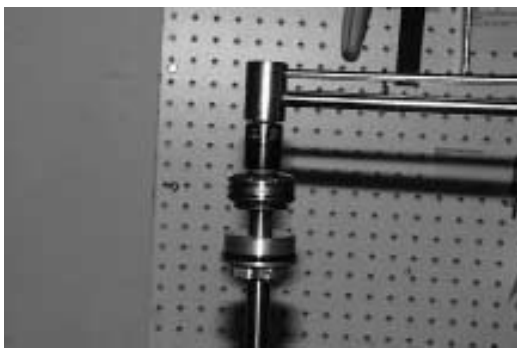
4. Lubricate new seals and O-ring with Polaris shock oil and install. Be sure the seals are seated completely in the seal cavity.

5. Inspect jounce bumper (where applicable) and replace if damaged.



6. Inspect damper rod for nicks, scratches or abrasion. Install bearing cap and thick backing washer on damper rod. Install compression valve washer stack in same order as disassembly. Install valve piston with greater number of slots facing damper rod nut (toward IFP). Install rebound stack, washer, and a new nut. Torque nut to 12 ft. lbs.

Valve Nut Torque -
12 ft. lbs. (17 Nm)



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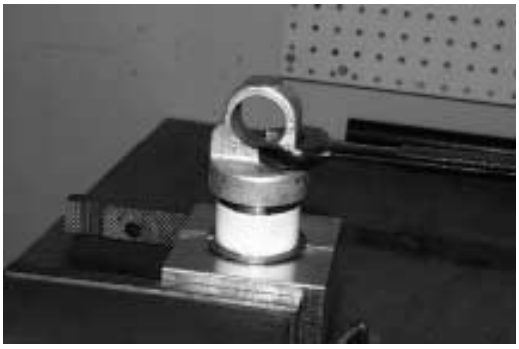
Fox™ Shock Maintenance

Seal Replacement, Cont.

7. Inspect valve piston ring for wear. The outer surface of the ring should be even in color. Set aside damper rod assembly for reinstallation.



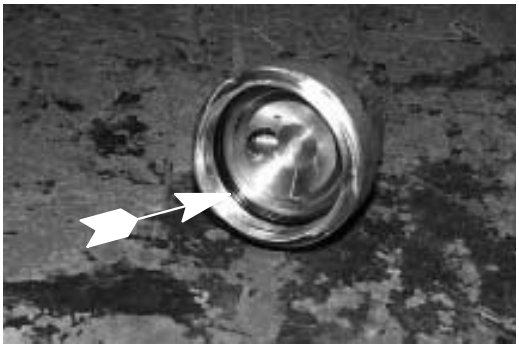
8. Position shock in vise with Body Clamp Tool positioned as shown. Clean body clamp tool before installing.



Shock Body Clamp Tool
PN 2871071

9. Using an open end or large adjustable wrench, unscrew the body cap from the body.

10. Inspect O-ring in body cap for damage.



11. Note location of Allen screw in internal floating piston (IFP) for reassembly in body tube. Remove IFP through body cap end (external threaded end) using IFP tool. Be prepared to catch piston ring and piston as it comes out. Remove Allen screw from center of piston. Inspect bleeder screw O-ring and IFP sealing O-ring for wear or damage. Replace O-rings upon reassembly.



12. Carefully clean all parts thoroughly with electrical contact cleaner or solvent and dry with compressed air. Inspect shock body for scratches or wear.

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Fox™ Shock Maintenance

Assembly

1. Install bleeder screw in IFP until O-ring is lightly seated.

NOTE:Bleeder screw must be positioned toward body cap (externally threaded) end of shock body.



2. Compress flexible piston ring around valve piston and install piston into shock body.



3. Screw in bearing cap by hand until O-ring is fully seated.



4. Invert shock and mount bearing cap flats lightly in vise. Caution: Be sure damper rod is fully extended.

5. Fill with shock fluid to approximately 1″ (2.54cm) from end of body.



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Fox™ Shock Maintenance

Assembly, Cont.

6. Insert IFP.

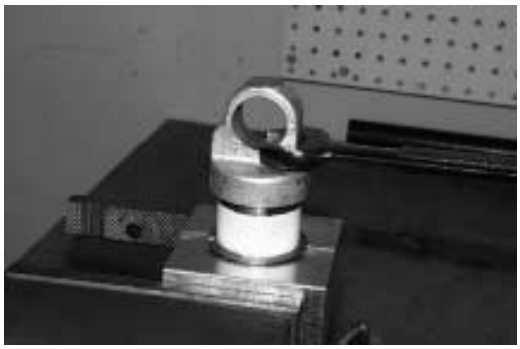


7. Install body cap until O-ring is lightly seated.

8. Mount shock in vise by top eyelet as shown. Support shock and strike body cap end 2-3 times with a soft faced hammer to remove all air trapped inside the valve piston. Allow shock to stand for 3-5 minutes.

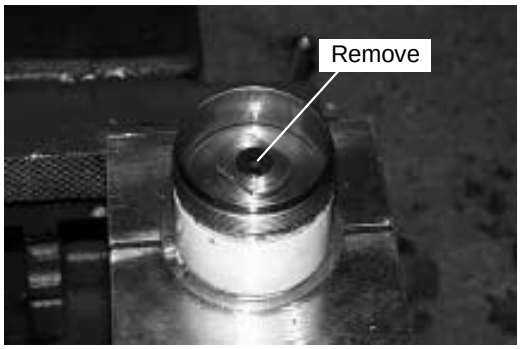
CAUTION:

Do not over-tighten vise or bearing cap may be damaged.



9. Unscrew body cap and remove.

10. Remove IFP bleeder screw.



11. Set IFP tool to specified depth with a dial caliper as shown.

IFP Tool PN 2871351



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Fox™ Shock Maintenance

Assembly, Cont.

12. Place a shop towel over the end of IFP tool and slowly push IFP to specified depth.



13. With the IFP set and the bleeder screw removed, slowly stroke shock to force air through piston oriface. Move the shock body slowly to prevent aeration of the oil. Allow all air to purge through the bleeder screw hole.



14. Install the bleeder screw with a new O-ring and tighten securely using the flats on the tool to prevent the IFP from turning. Pour out excess oil. It is not necessary to completely clean all oil from the nitrogen chamber, a small amount of oil will lubricate the IFP. Verify the proper IFP depth to within ± .025″ (.63mm) with a dial caliper. Be sure to measure to the flat portion of the IFP, not to the tapered outer edge.



15. Reinstall body cap with a new O-ring and tighten by hand. Mount shock with body cap end down in the soft jaws of a vise. Torque bearing cap to 8-10 ft. lbs. (11-14 Nm). This will also tighten the body into the body cap.

CAUTION:

Do not over tighten or damage to the bearing may result.

Bearing Cap Torque -
8-10 ft. lbs. (11-14 Nm)

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Fox™ Shock Maintenance

Assembly, Cont.

16. Install pressurizing valve with new O-ring and tighten securely.



17. Set the nitrogen tank pressure regulator to 200 - 205 PSI.



18. Insert the Fox™ Safety Needle and charge with nitrogen to 200 PSI. Pull the needle straight outward and remove from the pressurizing valve while holding the pressure hose on the fitting. Do not insert the needle again to check pressure as the volume inside the gauge will reduce pressure in the shock.



19. As a final check, push the damper rod through a full stroke. The damper rod must bottom out at full travel, and then slowly rise to full extension. Shaft movement must be smooth and consistent throughout the entire compression and rebound stroke, without binding or loss of damping.



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Fox™ Shock Maintenance

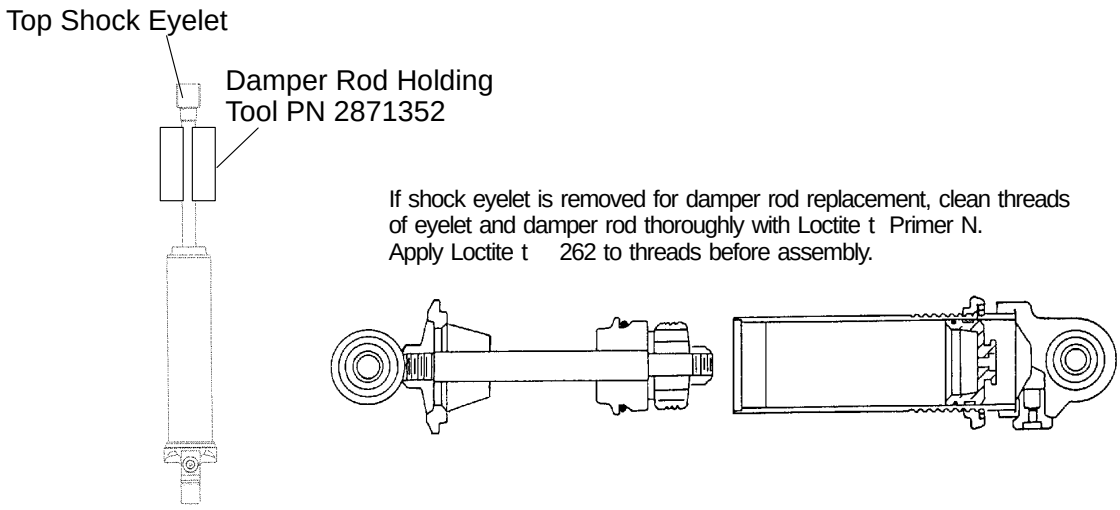
Assembly, Cont.

20. To check for leaks, submerge the shock in water and look for bubbles or oil seepage around the bearing and body caps.

21. When reinstalling shocks on the machine, torque only to required specifications. If the shock is over tightened it will not pivot, possibly resulting in damage to shaft and seals.

22. When installing IFS shocks, tighten top mount first. Pivot shock body into lower mount and determine if spacer washers are necessary to prevent twist or side loading of shock. Suspension assemblies should always be moved through entire travel without springs to verify free movement and proper alignment of all components.

Shock Eyelet Replacement



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Ryde FX **t** Valve Washer Part Numbers. Fox **t** Part Numbers can be found on pg 7.26.

Polaris #	Thickness	Diameter
1700080	0.004	.700
1700081	0.006	.700
1700082	0.008	.700
1700083	0.010	.700
1700084	0.012	.700
1700085	0.015	.700
1700086	0.004	.800
1700087	0.006	.800
1700088	0.008	.800
1700089	0.010	.800
1700090	0.012	.800
1700091	0.015	.800
1700092	0.004	.900
1700093	0.006	.900
1700094	0.008	.900
1700095	0.010	.900
1700096	0.012	.900
1700120	0.015	.900
1700121	0.006	1.000
1700122	0.008	1.000
1700126	0.010	1.000
1700127	0.012	1.000
1700128	0.015	1.000
1700129	0.006	1.100
1700130	0.008	1.100
1700131	0.010	1.100
1700132	0.012	1.100
1700133	0.015	1.100
1700134	0.006	1.250
1700135	0.008	1.250
1700136	0.010	1.250
1700137	0.012	1.250
1700138	0.015	1.250
1700139	0.006	1.300
1700140	0.008	1.300
1700141	0.010	1.300
1700142	0.012	1.300
1700143	0.015	1.300

Tool Part numbers:		
	Gas Fill Tool and Gague (Incl. 5 needles)	PS45259
	Gas Fill Needles replacement pack	PS45259-1
	Gas Fill Gague (replacement)	PS45259-2
	Lower Retainer Wrench	PS45260
	IFP Positioning / Extraction tool	PS45261
	Cylinder Head Wrench	PS45262
	Wear Band Tool	PS45263
	Arvin Shock Body Holder	PS45629

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Ryde FX™ Shock Maintenance

Procedures for the proper disassembly and assembly of RydeFX gas charged IFP and emulsion mono–tube shock absorbers. Polaris PN 7041990, 7041992, 7042059

WARNING: Before servicing a gas shock it is important that all the gas pressure be discharged from the unit. Refer to the instructions listed below for the proper procedure of discharging the gas pressure from a shock. Protective eyewear should be worn to avoid risk of injury while servicing RydeFX gas charged mono–tube shocks.

Remove the shock from the vehicle.

- If shock incorporates spring; remove spring and collateral retainers.

NOTE: Before unscrewing pre–load springs, measure the compressed length of the installed spring and mark position for reinstallation. (PICTURE 1)


1

CAUTION: When removing the spring from a shock that utilizes a fixed lower retainer; the use of a proper spring compressor should be used to avoid risk of bodily injury.

Wash the shock body in parts cleaner; then dry with compressed air to remove sand and dirt.

WARNING: When using compressed air to dry components, protective eyewear should be worn to avoid risk of injury.


2

Remove bearing, sleeve and/or bushings from lower shock mount eyelet. Secure the lower mount of the shock in a vise. The use of soft jaws is recommend to prevent damage or marks to the shock. (PICTURE 2)

CAUTION: It is important that the gas shock be retained in the vise by the lower mount. Any other method of securing the shock body during these procedures may deform the shock body cylinder.


3

Remove the small button head screw from the pressure valve assembly. (PICTURE 3)

Depressurizing shock:

A) Internal Floating Piston Shocks (P/N: 7041990): Using a slotted screwdriver, loosen the pressure valve assembly counter–clockwise two full revolutions allowing the gas pressure to fully escape past the pressure valve assembly O–ring.

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B) Emulsion Shocks (P/N: 7041992): With the shock inverted and the piston rod fully extended, secure the lower mount of the shock in a vise. Allow a couple of minutes for the gas pressure to separate from the oil and rise to the top. Using a rag as a shield to prevent spraying gas and oil; place rag over top the pressure valve assembly and slowly loosen the valve assembly with slotted screw driver three full revolutions, allowing all the gas pressure to escape past the pressure valve assembly O−ring.

WARNING: Nitrogen gas is under extreme pressure. Use caution when releasing nitrogen gas from shock. Protective eyewear should be worn to avoid risk of injury.

CAUTION: Allow all the gas pressure to escape before proceeding with the removal of the pressure valve assembly. Pressurized gas and shock oil could eject the valve assembly from the cylinder resulting in bodily injury.

Using a slotted screwdriver, remove the pressure valve assembly from the lower end mount. Account for an O−ring. (PICTURE 5)


5


6

Using an adjustable face spanner(PN PS45262), fully loosen and remove cylinder head assembly. (PICTURES 6 , 7)

Pour the oil out of the shock body. Discard old oil into an approved storage container and dispose appropriately. Never reuse damper oil during shock rebuild.


7

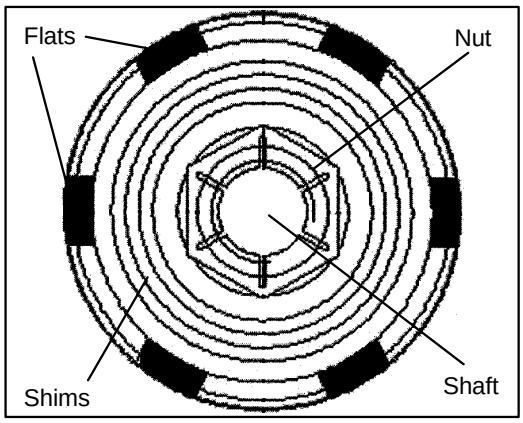
Using the I.F.P extraction tool thread the tool into the I.F.P and pull upwards, removing the I.F.P from the shock body. Account for wear band and an O−ring. (PICTURE 8) Note: Not applicable for emulsion shock P/N 7041992

Clean the inside of the shock body using clean parts−cleaning solvent and blow dry using compressed air.


8

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Place the shock piston rod upper mount in bench vise, begin piston and valve removal. Arrange parts removed in the sequence of disassembly. The piston should have the flat slots facing the nut end (as highlighted in black). (PICTURE 9)



Items to inspect: Piston rod for straightness, nicks or burrs. Cylinder Head Assembly / DU Bearing clean, inspect, or replace. Inside of shock body for scratches, burrs or excessive wear. Teflon piston and I.F.P wear band for cuts, chipped or nicked edges, or excessive wear. O-rings for nicks, cuts, or cracks. Cap and rod seals for nicks, cuts or cracks. Valve discs for kinks or waves. Compression bumpers (ski shocks only) for chipping, cracking or being missing.

Should any of these items be in question replacement is recommended.

ASSEMBLY:

Place the piston rod upper mount into the vise. Reassemble damper rod assembly in the reverse order of disassembly. Special attention should be paid the order of the Rebound and Compression disc (shim) stacks, ensuring that they are in the same order prior to disassembly. Tighten the lock nut to 15-20 ft-lb of torque. (PICTURE 10)


10

CAUTION: DO NOT OVER-TORQUE. If excessive torque is applied, damage to the piston and valves will occur.

Secure the shock body by its lower mount in vise. The use of soft jaws is recommend to prevent damage or marks to the shock. (PICTURE 11)


11

CAUTION: It is important that the gas shock be retained in the vice by the lower mount. Any other method of securing the shock body during these procedures may deform the shock body cylinder.

Note: The next points on IFP are not applicable for emulsion shocks (P/N: 7041992) Proceed to assembly of the pressure valve on next page.

Thread the positioning head onto the I.F.P locator tool and adjust the top of the value indicator to the appropriate measurement. (PICTURE 12)


12

NOTE: Depending on which shock absorber is being worked on, adjust the piston location tool to the specified depth indicated in the shock specification chart.

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Apply a thin film of oil onto the floating wear band and O-ring and install the floating piston into the top of the shock body, positioning it below the counterbore. (PICTURE 13)


13

Using the tool as a handle, push the floating piston down into the shock body, being careful not to damage I.F.P wear band and O-ring, until the value indicator knob comes in contact with the shock body. The piston should now be located correctly. (PICTURE 14)


14

Apply of light film of grease to the pressure valve port counter bore through 360 Degrees, where the pressure valve assembly O-ring meets.

Screw the pressure valve assembly into the valve port by hand with a slotted head screwdriver; and tighten to 100-110 in.lb of torque. (PICTURE 15)


15

Fill the shock body with shock oil:

A) Internal Floating Piston Shocks: Fill the shock body with shock oil to the bottom of the thread within the cylinder.

B) Emulsion Shocks (P/N: 7041992): Fill shock body with 110cc of oil. This will allow for the required air space to properly gas charge the shock with nitrogen gas.

NOTE: - After filling the shock body with oil, allow a couple of minutes for all air bubbles to rise to the top.

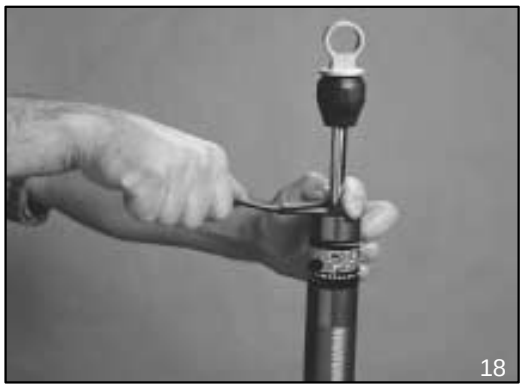
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With the cylinder head assembly pushed down against the piston, carefully, insert the piston rod and assembly into the cylinder; Slightly oscillating the piston rod to allow piston to enter shock body bore. A light coating of oil on the piston wear band will ease installation. (PICTURE 17)


17

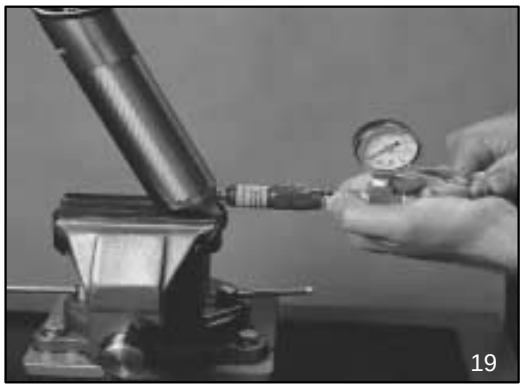
Slowly push the piston rod and assembly into shock body until the cylinder head assembly bottoms on the cylinder counterbore. Slight up and down movement may be required to allow all air to pass through piston assembly.

NOTE: During installation, some shock oil will overflow. Wrap a shop cloth around shock body to catch possible oil overflow. Fast installation of the piston rod and assembly may displace the floating piston from its original position. This must not occur if the damper is expected to perform as designed


18

Using an open face spanner wrench tighten cylinder head securely into the shock cylinder. (PICTURE 18)

Pressurize the shock, through the pressure valve, with nitrogen gas to the specified pressure. (PICTURE 19)


19

If using RydeFX inflation tool Refer to Procedures for use of replaceable inflation needle instruction manual found in the RydeFX inflation tool case.

NOTE: After being compressed, the piston rod should fully extend from the shock body once the shock has been pressurized.

Install the small button head screw in the pressure valve assembly and tighten securely. (PICTURE 20)


20

Reinstall sleeve and bushings in lower shock mount.

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Ryde FX 7041968 GENERAL REBUILD PROCEDURES

WARNING: Before servicing a gas shock it is important that all the gas pressure be discharged from the unit. Refer to the instructions listed below for the proper procedure of discharging the gas pressure from a shock. Protective eyewear should be worn to avoid risk of injury while servicing RydeFX gas charged mono–tube shocks.

Remove the shock from the vehicle. (Account for inner–sleeve in lower shock mount)

Wash the shock body in parts cleaner; then dry with compressed air to remove sand and dirt.

WARNING: When using compressed air to dry components, protective eyewear should be worn to avoid risk of injury.

Remove inner sleeve and bushings from lower shock mount eyelet. Secure the lower mount of the shock in a vise. The use of soft jaws is recommend to prevent damage or marks to the shock.

CAUTION: It is important that the gas shock be retained in the vise by the lower mount. Any other method of securing the shock body during these procedures may deform the shock body cylinder.

Remove the small button head screw from the pressure valve, located on top of reservoir.

Using a 9/16 wrench, discharge all gas pressure from the shock by loosening the pressure valve assembly three (3) full turns counter–clockwise.

WARNING: Nitrogen gas is under extreme pressure. Use caution when releasing nitrogen gas from shock. Protective eyewear should be worn to avoid risk of injury.

CAUTION: Allow all the gas pressure to escape before proceeding with the removal of the pressure valve assembly. Pressurized gas could eject the valve assembly from the cylinder, resulting in bodily injury.

Once the shock is completely discharged of gas pressure, remove the pressure valve assembly from the reservoir cylinder.

With your two thumbs, depress the reservoir end cap 1/2” and remove retaining circlip. Use care not to scratch the inside of the reservoir.

Reinstall pressure valve assembly partway into the end cap. Using pliers, grasp the end cap by the pressure valve assembly and extract the end cap slowly from the reservoir by pulling straight out.

Using either an adjustable face spanner or cylinder head socket, fully loosen cylinder head and remove rod assembly, placing it on a clean shop towel.

Using the I.F.P (Internal Floating Piston) extraction tool thread the tool into the I.F.P and pull upwards, removing the I.F.P from the reservoir. Account for wear band and an O–ring.

Pour the oil out of the shock reservoir and main cylinder body into waste container. Discard old oil into an approved storage container and dispose appropriately. Never reuse damper oil during shock rebuild.

Clean the inside of the shock body using clean parts–cleaning solvent and blow dry using compressed air.

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WARNING: When using compressed air to dry components, protective eyewear should be worn to avoid risk of injury.

Place the shock piston rod upper mount in bench vise, begin piston and valve removal. Arrange parts removed in the sequence of disassembly.

Items to inspect:
Piston rod for straightness, nicks or burrs.
Cylinder Head Assembly / DU Bearing / Seals and Scraper clean, inspect, or replace.
Inside of shock body for scratches, burrs or excessive wear.
Teflon piston and I.F.P wear band for cuts, chipped or nicked edges, or excessive wear.
O–rings for nicks, cuts, or cracks.
Valve discs for kinks or waves.
Hard line and fittings for leaks, kinks, worn of loose threads.

Should any of these items be in question replacement is recommended.

ASSEMBLY:

Place the piston rod upper mount into the vise. Reassemble damper rod assembly in the reverse order of disassembly. Special attention should be paid to the order of the Rebound and Compression disc (shim) stacks, ensuring that they are in the same order prior to disassembly. Tighten the lock nut to 15–20 ft–lb of torque.

CAUTION: DO NOT OVER–TORQUE. If excessive torque is applied, damage to the piston and valves will occur.

Secure the lower mount of the shock in a vise. The use of soft jaws is recommend to prevent damage or marks to the shock.

CAUTION: It is important that the gas shock be retained in the vise by the lower mount. Any other method of securing the shock body during these procedures may deform the shock body cylinder.

Apply a thin film of oil onto the floating piston wear band and O–ring and set aside ready for use.

Fill the reservoir to its top with shock oil. Once filled, immediately install floating piston into reservoir and slowly push straight down to specified depth.

CAUTION: Care must be taken to ensure that air is not trapped between floating piston and top of oil level. Any air trapped in the oil will cause a lag in the shock absorbers damping ability.

Apply a light film of oil onto reservoir end cap O–ring and then install reservoir end cap and o–ring down into the reservoir approximately 1/2”. Install retaining circlip making sure it is firmly in place

Tighten down the remaining portion of the pressure valve assembly. With pliers, grasp the end cap by the pressure valve assembly and pull it up into place against the retainer cir–clip.

Fill the main shock body with shock oil to the bottom of the thread within the cylinder.

With the cylinder head assembly pushed down against the piston, carefully, insert the piston rod and assembly into the cylinder; Slightly oscillating the piston rod to allow piston to enter shock body bore. A light coating of oil on the piston wear band will ease installation.

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Slowly push the piston rod and assembly into shock body until the cylinder head assembly bottoms on the cylinder counterbore. Slight up and down movement may be required to allow all air to pass through piston assembly.

NOTE:
During installation, some shock oil will overflow. Wrap a shop cloth around shock body to catch possible oil overflow.
Fast installation of the piston rod and assembly may displace the floating piston from its original position. This must not occur if the damper is expected to perform as designed.

Using an open face spanner tighten cylinder head securely into the shock cylinder.

Pressurize the shock reservoir through the pressure valve with nitrogen gas to the specified gas pressure.

NOTE:
Adjust gas pressure to 200psi
After being compressed, the piston rod should fully extend from the shock once the shock has been pressurized.

With the gas pressure pushing against the pressure valve end cap firmly tighten the pressure valve assembly and re–install the small button head screw.

Re–install any bearing sleeves and/or bushings in the lower shock mount.

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Suspension Troubleshooting - XTRA Lite Style

Problem	Solution
Rear suspension bottoms too easily	-Increase torsion spring preload -Increase rear shock compression valving by turning screw clockwise (if equipped with optional Indy Select shock)
Rides too stiff in rear	-Check for binding suspension shafts and grease all pivot points -Decrease torsion spring preload adjustments -Decrease rear shock compression valving by turning screw counterclockwise (if equipped with optional Indy Select shock)
Machine darts from side to side	-Make sure skis are aligned properly (straight forward with rider on machine) -Make sure spindles and all steering components are free turning -Make sure skags are straight on skis -Check hi-fax and replace if worn -Reduce ski pressure: DIncrease front track spring preload DReduce IFS spring preload if shims have been added DReduce rear torsion spring preload
Front end pushes	-Check for worn skags -Check for binding suspension shafts and grease all pivot points -Increase IFS spring preload by adding shims
Steering is heavy	-Check ski alignment -Check skags and skis for damage -Reduce ski pressure: DIncrease front track spring preload DReduce IFS spring preload if shims have been added DReduce rear torsion spring preload
Setting up for deep snow operation	-Change worn hi-fax -Lower front and rear torque arms (see Performance section at the back of this manual)

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Suspension Troubleshooting - XTRA 10 Style

Problem	Solution
Rear suspension bottoms too easily	-Increase torsion spring preload -Increase rear shock compression valving by turning screw clockwise (if equipped with optional Indy Select shock) or refer to optional valving on Suspension Wall-chart for Fox equipped models -Change RRSS to highest setting
Rides too stiff in rear	-Check for binding suspension shafts and grease all pivot points -Decrease torsion spring preload adjustments -Decrease rear shock compression valving by turning screw counterclockwise (if equipped with optional Indy Select shock) or refer to optional valving on Suspension Wallchart for Fox equipped models -Set RRSS to lowest position or totally remove
Machine darts from side to side	-Make sure skis are aligned properly (straight forward with rider on machine) -Make sure spindles and all steering components are free turning -Make sure skags are straight on skis -Check hi-fax and replace if worn -Reduce ski pressure: DIncrease front track spring preload (requires shims) DReduce IFS spring preload by adjusting cam DReduce rear torsion spring preload DLengthen front limiter strap
Front end pushes	-Check for worn skags -Check for binding suspension shafts and grease all pivot points -Increase IFS spring preload by adjusting cam or adding washers -Shorten front limiter strap
Steering is heavy	-Check ski alignment -Check skags and skis for damage -Reduce ski pressure: DIncrease front track spring preload DReduce IFS spring preload by adjusting cam DReduce rear torsion spring preload
Setting up for deep snow operation	-Change worn hi-fax -Lower rear torque arms (see Performance section at the back of this manual) -Increase front limiter strap length -Based on rider preference, RRSS may be removed to increase weight transfer

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Suspension Troubleshooting - EDGE RMK

Suspension Troubleshooting: Only perform one change at a time.

Problem	Solution
Rear suspension bottoms too easily	- Check the sag dimension given on the set-up decal and adjust torsion spring blocks accordingly or install optional torsion springs to achieve correct sag dimensions * - Increase shock compression damping by turning screw clockwise (RMK) or rotating knob towards right side of machine (Vertical Edge) *Fig. 3,4
Rear suspension rides too stiff	- Check for binding suspension components and grease all pivot points - Check the sag dimension given on the set-up decal and adjust torsion spring blocks accordingly or install optional torsion springs to achieve correct sag dimensions * - Decrease shock compression damping by turning screw counter clockwise (RMK) or rotating knob towards left side of machine (Vertical Edge) *Fig. 3,4
Too much weight transfer when climbing	- Check the sag dimension given on the set-up decal and adjust torsion spring blocks accordingly or install optional torsion springs to achieve correct sag dimensions * - Move limiter strap on front torque arm to high position *Fig. 2
Too little weight transfer when climbing	- Check the sag dimension given on the set-up decal and adjust torsion spring blocks accordingly or install optional torsion springs to achieve correct sag dimensions * - Move limiter strap on front torque arm to low position *Fig. 2
Front end pushes	- Check for worn skags - Check for binding front suspension and steering components, grease all pivot points (elevate front of machine) - Check the sag dimension given on the set-up decal and adjust torsion spring blocks accordingly or install optional torsion springs to achieve correct sag dimensions * - Increase IFS preload by turning spring collar to the right (clockwise) - Move limiter strap on front torque arm to high position *Fig. 2
Steering is heavy	- Check skags and skis for damage - Check for binding front suspension and steering components, grease all pivot points (elevate front of machine) - Check the sag dimension given on the set-up decal and adjust torsion spring blocks accordingly or install optional torsion springs to achieve correct sag dimensions * - Decrease IFS preload by turning spring collar to the left (counter clockwise)
Machine darts from side to side	- Make sure skis are aligned properly (see your owners manual) - Check for binding front suspension and steering components, grease all pivot points (elevate front of machine) - Make sure skags are straight on skis - Install e-z steer skags 7170043

* See rear suspension set up decal located under hood

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CHAPTER 8
BRAKES / FINAL DRIVE

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2002 Tracks

Model	Length x Width	Lug Height
Indy 500 SKS	15″ x 136″	1.25″
Indy 700 SKS	15″ x 136″	1.25″
Indy Trail RMK	15″ x 136″	1.25″
Indy 500 RMK	15″ x 136″	1.50″
Indy 600 EDGE RMK	15″ x 136″	1.75″
Indy 700 EDGE RMK	15″ x 136″ 15″ x 144″ 15” x 151”	1.75″ 2.0″ 2.0″
Indy 800 EDGE RMK	15″ x 144″ 15″ x 151″ 15” x 156”	2.0″ 2.0″ 2.0″

2002 Chaincases

Model	Chaincase Version
Indy 500 SKS	7.05″ (17.91cm.)
Indy 700 SKS	7.05″ (17.91cm.)
Indy Trail RMK	7.05″ (17.91cm.)
Indy 500 RMK	7.05″ (17.91cm.)
Indy 600 EDGE RMK	7.92″ (20.12cm)
Indy 700 EDGE RMK	7.92″ (20.12cm)
Indy 800 EDGE RMK	7.92″ (20.12cm)

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RPM Ratio

Engine RPM						Pitch 2.52	Teeth 9	Clutch Ratio 1:1													
Top Gear-->	25	25	25	25	25	25	25	24	24	24	24	24	24	24	23	23	23	23	23	23	23
Bottom Gear->	37	38	39	40	41	42	43	37	38	39	40	41	42	43	37	38	39	40	41	42	43
6.625 Chaincase Chain	NR	68	68	NR	NR	70	70	NR	NR	68	68	NR	70	70	66	NR	NR	68	68	NR	70
7.05 Chaincase Chain	70	70	70	NR	72	72	72	NR	70	70	70	NR	72	72	68	NR	70	70	70	NR	72
7.92 Chaincase Chain	74	74	NR	76	76	NR	NR	74	74	74	NR	76	76	NR	NR	74	74	NR	NR	76	76
Gear Ratio-->	1.48	1.52	1.56	1.60	1.64	1.68	1.72	1.54	1.58	1.63	1.67	1.71	1.75	1.79	1.61	1.65	1.70	1.74	1.78	1.83	1.87
Jackshaft RPM	MILES PER HOUR																				
6000	87.1	84.8	82.6	80.6	78.6	76.7	74.9	83.6	81.4	79.3	77.3	75.4	73.6	71.9	80.1	78.0	76.0	74.1	72.3	70.6	68.9
6250	90.7	88.3	86.1	83.9	81.9	79.9	78.1	87.1	84.8	82.6	80.6	78.6	76.7	74.9	83.5	81.3	79.2	77.2	75.3	73.5	71.8
6500	94.3	91.9	89.5	87.3	85.1	83.1	81.2	90.6	88.2	85.9	83.8	81.7	79.8	77.9	86.8	84.5	82.3	80.3	78.3	76.5	74.7
6750	98.0	95.4	92.9	90.6	88.4	86.3	84.3	94.0	91.6	89.2	87.0	84.9	82.9	80.9	90.1	87.8	85.5	83.4	81.3	79.4	77.6
7000	101.6	98.9	96.4	94.0	91.7	89.5	87.4	97.5	95.0	92.5	90.2	88.0	85.9	83.9	93.5	91.0	88.7	86.5	84.3	88.2	80.4
7250	105.2	102.5	99.8	97.3	95.0	92.7	90.5	101.0	98.4	95.8	93.4	91.2	89.0	86.9	96.8	94.3	91.8	89.5	87.4	85.3	83.3
7500	108.9	106.0	103.3	100.7	98.2	95.9	93.7	104.5	101.7	99.1	96.7	94.3	92.1	89.9	100.1	97.5	95.0	92.6	90.4	88.2	86.2
7750	112.5	109.5	106.7	104.0	101.5	99.1	96.8	108.0	105.1	102.4	99.9	97.4	95.1	92.9	103.5	100.8	98.2	95.7	93.4	91.2	89.0
8000	116.1	113.1	110.2	107.4	104.8	102.3	99.9	111.5	108.5	105.7	103.1	100.6	98.2	95.9	106.8	104.0	101.3	98.8	96.4	94.1	91.9
8250	119.7	116.6	113.6	110.8	108.1	105.5	103.0	114.9	111.9	109.1	106.3	103.7	101.3	98.9	110.2	107.3	104.5	101.9	99.4	97.0	94.8
8500	123.4	120.1	117.0	114.1	111.3	108.7	106.2	118.4	115.3	112.4	109.5	106.9	104.3	101.9	113.5	110.5	107.7	105.0	102.4	100.0	97.7
8750	127.0	123.7	120.5	117.5	114.6	111.9	109.3	121.9	118.7	115.7	112.8	110.0	107.4	104.9	116.8	113.8	110.8	108.1	105.4	102.9	100.5
9000	130.6	127.2	123.9	120.8	117.9	115.1	112.4	125.4	122.1	119.0	116.0	113.2	110.5	107.9	120.2	117.0	114.0	111.2	108.4	105.9	103.4
9250	134.3	130.7	127.4	124.2	121.2	118.3	115.5	128.9	125.5	122.3	119.2	116.3	113.5	110.9	123.5	120.3	117.2	114.2	111.5	108.8	106.3
9500	137.9	134.3	130.8	127.5	124.4	121.5	118.6	132.4	128.9	125.6	122.4	119.4	116.6	113.9	126.8	123.5	120.3	117.3	114.5	111.7	109.1
9750	141.5	137.8	134.3	130.9	127.7	124.7	121.8	135.8	132.3	128.9	125.7	122.6	119.7	116.9	130.2	126.8	123.5	120.4	117.5	114.7	112.0
10000	145.1	141.3	137.7	134.3	131.0	127.9	124.9	139.3	135.7	132.2	128.9	125.7	122.7	119.9	133.5	130.0	126.7	123.5	120.5	117.6	114.9

NR=Not Recommended

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RPM Ratio

Engine RPM																					
Top Gear-->	22	22	22	22	22	22	22	21	21	21	21	21	21	21	20	20	20	20	20	20	20
Bottom Gear->	37	38	39	40	41	42	43	37	38	39	40	41	42	43	37	38	39	40	41	42	43
6.625 Chaincase Chain	66	66	NR	68	68	68	NR	NR	66	66	NR	68	68	68	NR	66	66	66	NR	68	68
7.05 Chaincase Chain	68	68	NR	70	70	NR	NR	68	68	NR	NR	70	70	NR	NR	68	68	NR	NR	70	70
7.92 Chaincase Chain	72	NR	74	74	NR	NR	76	72	NR	NR	74	74	NR	76	72	72	NR	NR	74	74	NR
Gear Ratio-->	1.68	1.73	1.77	1.82	1.86	1.91	1.95	1.76	1.81	1.86	1.90	1.95	2.00	2.05	1.85	1.90	1.95	2.00	2.05	2.10	2.15
Jackshaft RPM	MILES PER HOUR																				
6000	76.6	74.6	72.7	70.9	69.2	67.5	65.9	73.1	71.2	69.4	67.7	66.0	64.4	62.9	69.7	67.8	66.1	64.4	62.9	61.4	59.9
6250	79.8	77.7	75.7	73.8	72.0	70.3	68.7	76.2	74.2	72.3	70.5	68.8	67.1	65.6	72.6	70.7	68.8	67.1	65.5	63.9	62.4
6500	83.0	80.8	78.8	76.8	74.9	73.1	71.4	79.2	77.2	75.2	73.3	71.5	69.8	68.2	75.5	73.5	71.6	69.8	68.1	66.5	64.9
6750	86.2	83.9	81.8	79.7	77.8	75.9	74.2	82.3	80.1	78.1	76.1	74.3	72.5	70.8	78.4	76.3	74.4	72.5	70.7	69.0	67.4
7000	89.4	87.1	84.8	82.7	80.7	78.8	76.9	85.3	83.1	81.0	78.9	77.0	75.2	73.4	81.3	79.1	77.1	75.2	73.3	71.6	69.9
7250	92.6	90.2	87.8	85.7	83.6	81.6	79.7	88.4	86.1	83.9	81.8	79.8	77.9	76.1	84.2	82.0	79.9	77.9	76.0	74.2	72.4
7500	95.8	93.3	90.9	88.6	86.4	84.4	82.4	91.4	89.0	86.7	84.6	82.5	80.6	78.7	87.1	84.8	82.6	80.6	78.6	76.7	74.9
7750	99.0	96.4	93.9	91.6	89.3	87.2	85.2	94.5	92.0	89.6	87.4	85.3	83.2	81.3	90.0	87.6	85.4	83.2	81.2	79.3	77.4
8000	102.2	99.5	96.9	94.5	92.2	90.0	87.9	97.5	95.0	92.5	90.2	88.0	85.9	83.9	92.9	90.4	88.1	85.9	83.8	81.8	79.9
8250	105.4	102.6	100.0	97.5	95.1	92.8	90.7	100.6	97.9	95.4	93.0	90.8	88.6	86.5	95.8	93.3	90.9	88.6	86.4	84.4	82.4
8500	108.6	105.7	103.0	100.4	98.0	95.6	93.4	103.6	100.9	98.3	95.9	93.5	91.3	89.2	98.7	96.1	93.6	91.3	89.1	86.9	84.9
8750	111.8	108.8	106.0	103.4	100.9	98.5	96.2	106.7	103.9	101.2	98.7	96.3	94.0	91.8	101.6	98.9	96.4	94.0	91.7	89.5	87.4
9000	114.9	111.9	109.1	106.3	103.7	101.3	98.9	109.7	106.8	104.1	101.5	99.0	96.7	94.4	104.5	101.7	99.1	96.7	94.3	92.1	89.9
9250	118.1	115.0	112.1	109.3	106.6	104.1	101.7	112.8	109.8	107.0	104.3	101.8	99.3	97.0	107.4	104.6	101.9	99.3	96.9	94.6	92.4
9500	121.3	118.1	115.1	112.2	109.5	106.9	104.4	115.8	112.8	109.9	107.1	104.5	102.0	99.7	110.3	107.4	104.6	102.0	99.5	97.2	94.9
9750	124.5	121.2	118.1	115.2	112.4	109.7	107.2	118.9	115.7	112.8	110.0	107.3	104.7	102.3	113.2	110.2	107.4	104.7	102.2	99.7	97.4
10000	127.7	124.4	121.2	118.1	115.3	112.5	109.9	121.9	118.7	115.7	112.8	110.0	107.4	104.9	116.1	113.1	110.2	107.4	104.8	102.3	99.9

NR=Not Recommended

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RPM Ratio

Engine RPM																					
Top Gear-->	19	19	19	19	19	19	19	18	18	18	18	18	18	18	17	17	17	17	17	17	17
Bottom Gear->	37	38	39	40	41	42	43	37	38	39	40	41	42	43	37	38	39	40	41	42	43
6.625 Chaincase Chain	64	NR	66	66	66	NR	68	64	64	NR	66	66	NR	NR	64	64	64	NR	66	66	NR
7.05 Chaincase Chain	66	NR	68	68	NR	70	70	66	NR	NR	68	68	NR	70	66	66	NR	68	68	68	NR
7.92 Chaincase Chain	NR	72	72	NR	74	74	74	NR	NR	72	72	NR	74	74	70	NR	72	72	72	NR	74
Gear Ratio-->	1.95	2.00	2.05	2.11	2.16	2.21	2.26	2.06	2.11	2.17	2.22	2.28	2.33	2.39	2.18	2.24	2.29	2.35	2.41	2.47	2.53
Jackshaft RPM	MILES PER HOUR																				
6000	66.2	64.4	62.8	61.2	59.7	58.3	56.9	62.7	61.0	59.5	58.0	56.6	55.2	53.9	59.2	57.7	56.2	54.8	53.4	52.2	51.0
6250	68.9	67.1	65.4	63.8	62.2	60.7	59.3	65.3	63.6	62.0	60.4	58.9	57.5	56.2	61.7	60.1	58.5	57.1	55.7	54.3	53.1
6500	71.7	69.8	68.0	66.3	64.7	63.2	61.7	67.9	66.1	64.4	62.8	61.3	59.8	58.4	64.1	62.5	60.9	59.3	57.9	56.5	55.2
6750	74.5	72.5	70.6	68.9	67.2	65.6	64.1	70.5	68.7	66.9	65.2	63.7	62.1	60.7	66.6	64.9	63.2	61.6	60.1	58.7	57.3
7000	77.2	75.2	73.3	71.4	69.7	68.0	66.4	73.1	71.2	69.4	67.7	66.0	64.4	62.9	69.1	67.3	65.5	63.9	62.3	60.9	59.4
7250	80.0	77.9	75.9	74.0	72.2	70.4	68.8	75.8	73.8	71.9	70.1	68.4	66.7	65.2	71.6	69.7	67.9	66.2	64.6	63.0	61.6
7500	82.7	80.6	78.5	76.5	74.7	72.9	71.2	78.4	76.3	74.4	72.5	70.7	69.0	67.4	74.0	72.1	70.2	68.5	66.8	65.2	63.7
7750	85.5	83.2	81.1	79.1	77.1	75.3	73.6	81.0	78.9	76.8	74.9	73.1	71.3	69.7	76.5	74.5	72.6	70.7	69.0	67.4	65.8
8000	88.2	85.9	83.7	81.6	79.6	77.7	75.9	83.6	81.4	79.3	77.3	75.4	73.6	71.9	79.0	76.9	74.9	73.0	71.3	69.6	67.9
8250	91.0	88.6	86.3	84.2	82.1	80.2	78.3	86.2	83.9	81.8	79.7	77.8	75.9	74.2	81.4	79.3	77.2	75.3	73.5	71.7	70.1
8500	93.8	91.3	88.9	86.7	84.6	82.6	80.7	88.8	86.5	84.3	82.2	80.2	78.2	76.4	83.9	81.7	79.6	77.6	75.7	73.9	72.2
8750	96.5	94.0	91.6	89.3	87.1	85.0	83.0	91.4	89.0	86.7	84.6	82.5	80.6	78.7	86.4	84.1	81.9	79.9	77.9	76.1	74.3
9000	99.3	96.7	94.2	91.8	89.6	87.5	85.4	94.0	91.6	89.2	87.0	84.9	82.9	80.9	88.8	86.5	84.3	82.2	80.2	78.2	76.4
9250	102.0	99.3	96.8	94.4	92.1	89.9	87.8	96.7	94.1	91.7	89.4	87.2	85.2	83.2	91.3	88.9	86.6	84.4	82.4	80.4	78.6
9500	104.8	102.0	99.4	96.9	94.6	92.3	90.2	99.3	96.7	94.2	91.8	89.6	87.5	85.4	93.8	91.3	88.9	86.7	84.6	82.6	80.7
9750	107.5	104.7	102.0	99.5	97.1	94.7	92.5	101.9	99.2	96.7	94.2	91.9	89.8	87.7	96.2	93.7	91.3	89.0	86.8	84.8	82.8
10000	110.3	107.4	104.6	102.0	99.5	97.2	94.9	104.5	101.7	99.1	96.7	94.3	92.1	89.9	98.7	96.1	93.6	91.3	89.1	86.9	84.9

NR=Not Recommended

HYVO t Sprocket Part Numbers

Top Sprockets For 3/4″ HYVO t Drive Systems

17T	3221084
18T	3221085
19T	3221086
20T	3221087
21T	3221088
22T	3221089
23T	3221090
24T	3221091
25T	3221092

HYVO t Drive Chain

Chain Length (Pitch)	Part Number
66P	3224071
68P	3224070
70P	3224069

Bottom Sprockets For 3/4″ HYVO t Drive Systems

Standard Bottom Sprockets		Reverse Sprockets	
37T	2900010		
38T	2900011		
39T	2900012	39T	1341243
40T	2900013	40T	1341227
41T	2900014	41T	1341228
42T	2900015		
43T	2900016		

*HYVO Lightweight Cut Metal Gears are also avaiable. Please look these Part Numbers up in your High Performance Manual (PN 9917367) or the Quick Reference Manual (PN 9914898).

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Sprocket / Chain Combinations – 7.05″ Center Distance Chain Case

Acceptable gearing / chain combinations are listed below for the 7.05″ (center distance) chaincase. Refer to page 8.1 for chaincase center distance by model. Combinations listed as “not recommended” should not be installed.

Upper Sprocket (# of Teeth)	Lower Sprocket (# of Teeth)	Chain Length	
16	35	64	
16	37	66	NOT RECOMMENDED
16	39	66	
16	40	68	NOT RECOMMENDED
16	41	68	
17	35	64	NOT RECOMMENDED
17	37	66	
17	39	68	NOT RECOMMENDED
17	40	68	
17	41	68	
18	35	66	NOT RECOMMENDED
18	37	66	
18	39	68	NOT RECOMMENDED
18	40	68	
18	41	68	
19	35	66	
19	37	66	NOT RECOMMENDED
19	39	68	
19	40	68	
19	41	70	NOT RECOMMENDED
20	35	66	
20	37	68	NOT RECOMMENDED
20	39	68	
20	40	70	NOT RECOMMENDED
20	41	70	NOT RECOMMENDED
21	35	66	
21	37	68	
21	39	70	NOT RECOMMENDED
21	40	70	NOT RECOMMENDED
21	41	70	
22	35	68	NOT RECOMMENDED
22	37	68	
22	39	70	NOT RECOMMENDED
22	40	70	
22	41	70	
23	35	68	
23	37	68	
23	39	70	
23	40	70	
23	41	70	NOT RECOMMENDED
24	39	70	
24	40	70	
24	41	72	NOT RECOMMENDED
25	39	70	
25	40	72	NOT RECOMMENDED
25	41	72	

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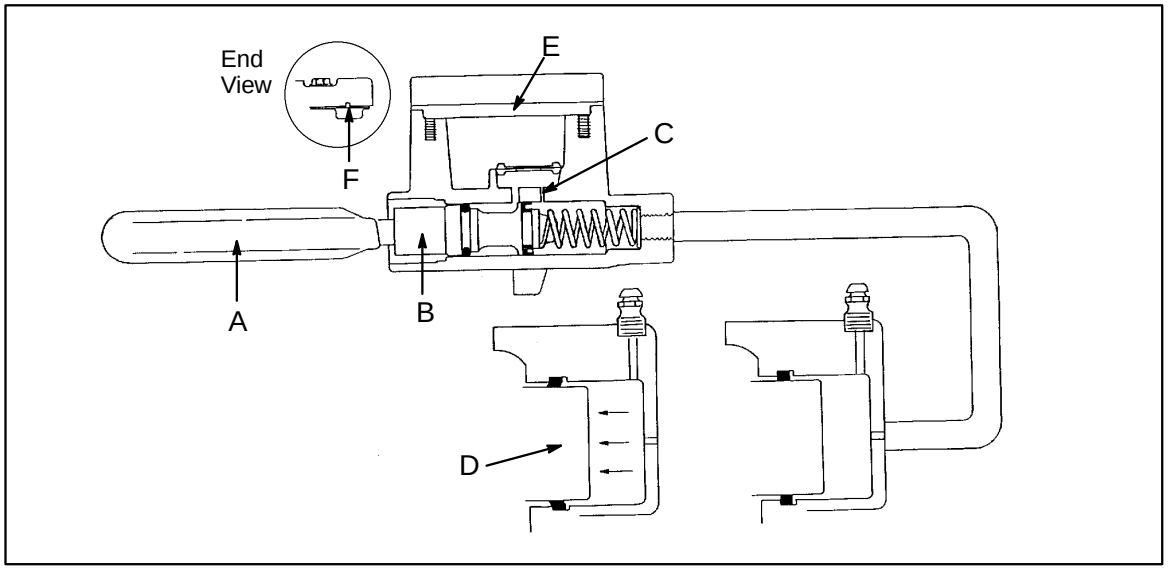
Sprocket / Chain Combinations – 7.92″ Chain Case

Acceptable gearing / chain combinations are listed below for the 7.92″ (center distance) chaincase. Do not use this chart for models with 6.625″ or 7.05″ chaincase. Refer to page 8.1 for chaincase center distance by model. Combinations listed as “not recommended” should not be installed.

Upper Sprocket (# of Teeth)	Lower Sprocket (# of Teeth)	Chain Length	
16	35	70	NOT RECOMMENDED
16	37	70	
16	39	72	NOT RECOMMENDED
16	40	72	
16	41	72	
17	35	70	NOT RECOMMENDED
17	37	70	
17	39	72	
17	40	72	
17	41	72	
18	35	70	
18	37	72	NOT RECOMMENDED
18	39	72	
18	40	72	
18	41	74	NOT RECOMMENDED
19	35	70	
19	37	72	NOT RECOMMENDED
19	39	72	
19	40	74	NOT RECOMMENDED
19	41	74	
20	35	70	
20	37	72	
20	39	74	NOT RECOMMENDED
20	40	74	
20	41	74	
21	35	72	NOT RECOMMENDED
21	37	72	
21	39	74	NOT RECOMMENDED
21	40	74	
21	41	74	
22	35	72	
22	37	72	
22	39	74	
22	40	74	
22	41	76	NOT RECOMMENDED
23	35	72	
23	37	74	NOT RECOMMENDED
23	39	74	
23	40	76	NOT RECOMMENDED
23	41	76	NOT RECOMMENDED
24	39	74	
24	40	76	NOT RECOMMENDED
24	41	76	
25	39	76	NOT RECOMMENDED
25	40	76	
25	41	76	

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Hydraulic Brake System Overview



The Polaris snowmobile hydraulic brake system consists of the following components or assemblies: brake lever, master cylinder, hydraulic hose, brake caliper (slave cylinder), brake pads, and a brake disc which is secured to the drive line.

When the hand activated brake lever (A) is applied, it contacts a piston (B) within the master cylinder. As the master cylinder piston moves inward it closes a small opening called a compensating port (C) within the cylinder and starts to build pressure within the brake system. As the pressure within the system is increased, the piston (D) located in the brake caliper moves outward and applies pressure to the moveable brake pad. This pad contacts the brake disc, moves the caliper in its floating bracket and pulls the stationary pad into the brake disc. As the lever pressure is increased, the braking effect is increased.

The friction applied to the brake pads will cause the pads to wear. As the pads wear, the piston within the caliper self-adjusts and moves further outward.

Brake fluid level is critical to proper system operation. A low fluid level allows air to enter the system causing the brakes to feel spongy.

Compensating Port

Located within the master cylinder is a small compensating port (C) which is opened and closed by the master cylinder piston assembly. The port is open when the brake lever is released and the piston is outward. As the temperature within the hydraulic system changes, this port compensates for fluid expansion caused by heat, or contraction caused by cooling. During system service, be sure this port is open. Due to the high temperatures created within the system during heavy braking, it is very important that the master cylinder reservoir have adequate space to allow for the brake fluid to expand. Master cylinder reservoirs should be filled to the top of the fluid level mark on the inside of the reservoir, 1/4″ - 5/16″ (.6 - .8 cm.) below lip of reservoir opening.

⚠ WARNING

Never overfill the reservoir. This could alter brake function, resulting in system component damage or sever personal injury or death.

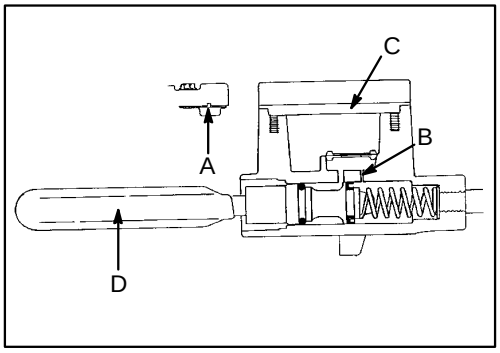
This system also incorporates a diaphragm (E) as part of the cover gasket and a vent port (F) located between the gasket and the cover. The combination diaphragm and vent allow for the air above the fluid to equalize pressure as the fluid expands or contracts. Be sure the vent is open and allowed to function. If the reservoir is overfilled or the diaphragm vent is plugged, the expanding fluid may build pressure in the brake system and lead to brake failure.

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Brake Bleeding - Fluid Change

This procedure should be used to change fluid or bleed brakes during regular maintenance, or after complete brake service. Brake fluid may damage painted or plastic surfaces. Take care not to spill, and wipe up any spills immediately. Cover parts to avoid damage.

1. Clean reservoir cover thoroughly.
2. Remove screws, cover, and diaphragm from reservoir.
3. Inspect vent slots (A) in cover and remove any debris or blockage.
4. If changing fluid, remove fluid from reservoir with a Mity Vac™ pump or similar tool.



NOTE: Do not remove brake lever when reservoir fluid level is low.

Mity Vac™ PN 2870975

5. Add brake fluid to within 1/4-5/16″ (.6-.8 cm.) of reservoir top.

Polaris DOT 3 Brake Fluid PN 2870990

6. Install a box end wrench on caliper bleeder screw fitting. Attach a clean, clear hose to fitting and place the other end in a clean container. Be sure the hose fits tightly on fitting.

NOTE: Fluid may be forced from compensation port (B) when brake lever is pumped. Place diaphragm (C) in reservoir to prevent spills. Do not install cover.

7. Slowly pump lever (D) until pressure builds and holds.
8. While maintaining lever pressure, open bleeder screw. Close bleeder screw and release brake lever. Do not release lever before bleeder screw is tight or air may be drawn into caliper.
9. Repeat procedure until clean fluid appears in bleeder hose and all air has been purged. Add fluid as necessary to maintain level in reservoir.

CAUTION:

Maintain at least 1/2″ (1.27 cm.) of brake fluid in the reservoir to prevent air from entering the master cylinder.

10. Tighten bleeder screw securely and remove bleeder hose.
11. Add brake fluid to the proper level.
12. Install diaphragm, cover, and screws. Tighten screws to specification.

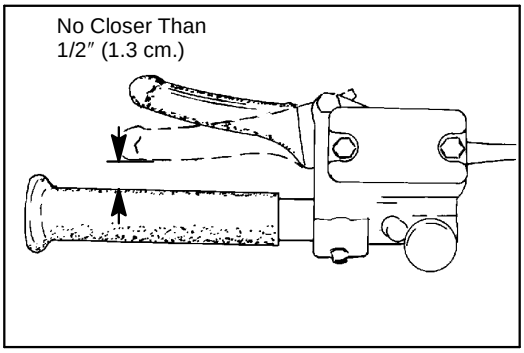
Reservoir Cover Torque - 15-18 in. lbs. (1.7-.2.1 Nm)

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Brake Bleeding - Fluid Change, Cont.

13. Field test machine before putting into service. Check for proper braking action and lever reserve. With lever firmly applied, lever reserve should be no less than 1/2″ (1.3 cm.) from handlebar.

Brake Lever Reserve Limit
Not less than 1/2″ (1.3 cm.) from handlebar

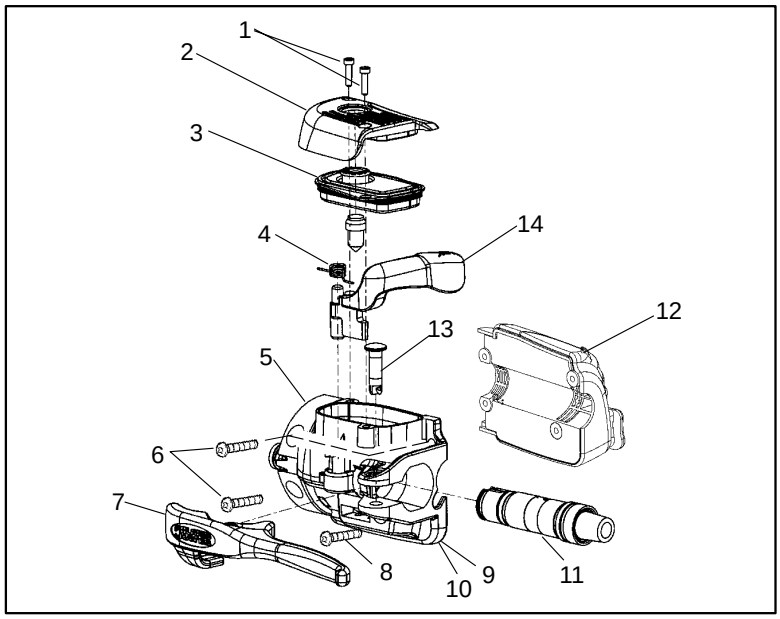


14. Check brake system for fluid leaks.

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Hayes t Master Cylinder

1. Cover Screw Kit
2. Cover Asm. Kit (Incl. 1,3)
3. Cover Gasket
4. Parking Lever Spring
5. Master Cylinder Assembly
6. Screw
7. Lever and Pivot Pin Kit
8. Screw
9. Body/Reservoir Clamp Kit
10. Brakelight Switch
11. Cartridge Kit
12. LH Control Asm
13. Pivot Pin Kit
14. Parking Lever and Spring Kit



Park Brake Lever Lock

⚠ WARNING

Release park brake lock before driving or brake system failure or fire may result. Apply brake lever to release.

Hayes t Master Cylinder Removal

1. Position clean shop cloths to catch spilled fluid.

CAUTION:

Brake fluid will damage finished surfaces. Do not allow brake fluid to come in contact with finished surfaces.

2. Remove the handlebar protector pad from the outlet end of the handlebar master cylinder to access the brake fluid line connector.
   - Remove handlebar cover strips
   - Remove two screws
   - Remove holding clip in front of cover
   - Remove handlebar pad
3. Loosen the connector approximately 1/4 to 1/2 turn.
4. Loosen and remove the four switch pack and handlebar master cylinder mounting screws. Put screws aside for later installation.





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5. Remove master cylinder from switch pack and handlebar.



CAUTION:

Remove switch pack wires from the master cylinder housing with extreme care and note where they are routed for later installation.

6. Remove master cylinder cover screws and cover. Pour out the fluid in the reservoir into a container. Unscrew the brake fluid line from the master cylinder outlet using a shop cloth to catch the remaining fluid. Drain the fluid from the brake line into the aforementioned container and discard the fluid.



Inspection

NOTE: Due to the critical nature of these parts and procedures, be sure you have thoroughly read and understand Hydraulic Brake Operation, page 8.8.

1. Thoroughly clean all brake parts with isopropyl alcohol and either wipe dry with a clean lint free cloth or lightly blow dry with an air hose. Examine all parts carefully for signs of excessive wear, damage, or corrosion. Replace any parts found to be damaged. Check park lever spring for breakage.



Replacing Cartridge Subassembly

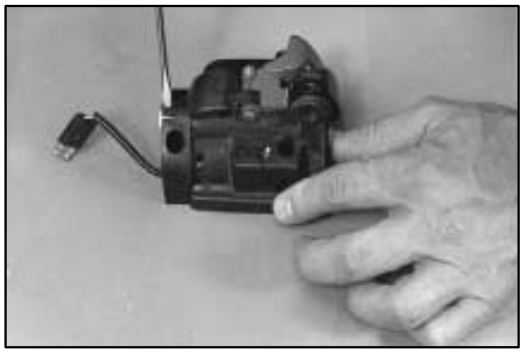
1. Remove master cylinder assembly as described previously.
2. To remove the lever from the housing, squeeze the lever handle and actuate the parking brake lever enough distance for the head of the pivot pin to clear the park brake lever.



3. Squeeze the two spring tabs on the end of the pivot pin at the same time pushing the pivot pin up through the hole. Remove the pivot pin and the lever.

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4. Lift the housing tab on the outlet end of the housing to release the cartridge assembly, allowing the cartridge to be pushed out the back of the housing.



5. Clean housing bore with alcohol. Inspect bore for scratches, dents, cuts, or digs that might cause a leak. Replace housing if severe damage is found.

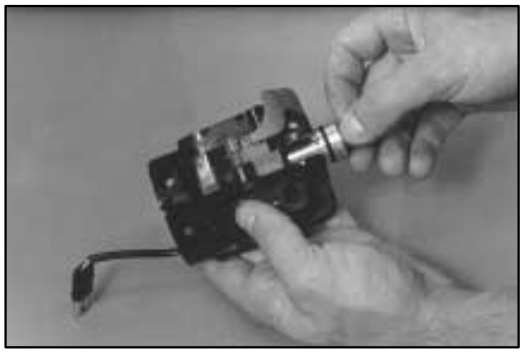


6. Paint housing bore and cartridge o-rings with D.O.T. 3 brake fluid.

Polaris DOT 3 Brake Fluid PN 2870990



7. Align slots in cartridge with tabs in housing bore and insert cartridge. Push cartridge through until outlet end of cartridge snaps into place.



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8. Install the lever and pivot pin by actuating the parking brake lever enough distance for the head of the pivot pin to clear the park brake lever.



9. Align the lever pivot hole with the housing pivot hole. Squeeze the two spring tabs on the end of the pivot pin at the same time pushing the pivot pin down through the pivot hole until the pivot pin snaps into place.



10. Apply thread sealant, install brake line and tighten snug.



11. Mount the master cylinder and switch pack to the handlebars making sure the wires are not pinched or twisted.

NOTE: Start all four screws prior to tightening. Tighten top two screws first, followed by bottom two. Do not over tighten. This will create a gap approximately .050-.100″ between LH control and master cylinder at the bottom of the assembly. There should not be a gap at the top when correct tightening/torque sequence has been followed. Torque to 24-28 in.lbs.(2.7-3.2 Nm).



Master Cylinder Control Torque -
24-28 in. lb. (2.7-3.2 Nm)

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12. Tighten brake line connector at outlet to 1 ft.lbs. plus two turns.



Brake Line Torque -

1 ft. lb. (1.4 Nm) plus 2 turns

13. Fill reservoir with clean D.O.T. 3 brake fluid.



Polaris DOT 3 Brake Fluid

PN 2870990

14. Bleed brakes as outlined on pages 8.10 and 8.11. Check entire system for leaks and fill reservoir to fluid level line.

15. Install master cylinder reservoir cover and gasket. Torque screws to 15-18 in.lbs. (1.7-2.0 Nm.)



Cover Screw Torque -

15-18 in. lb. (1.7-2.0 Nm)

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Lever and/or Pivot Pin Removal

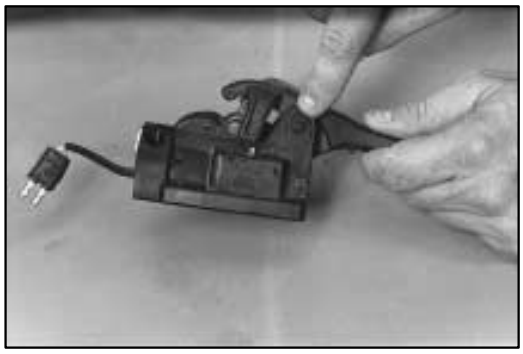
1. For ease of service, remove master cylinder assembly as outlined on pages 8.11 and 8.12.



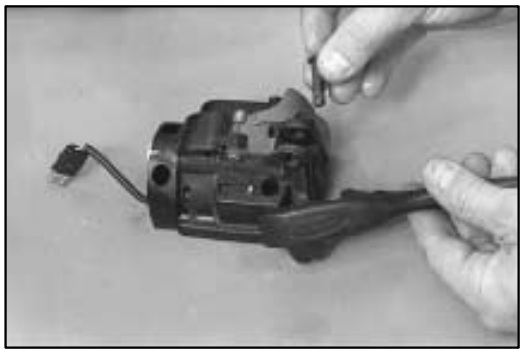
2. Squeeze the lever handle and actuate the parking brake lever enough distance for the head of the pivot pin to clear the park brake lever.



3. Squeeze the two spring tabs on the end of the pivot pin at the same time pushing the pivot pin up through the hole.



4. Remove the pivot pin and the lever.



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Lever and/or Pivot Pin Installation

1. Install the new lever by actuating the parking brake lever enough distance for the head of the pivot pin to clear the park brake lever.

2. Align the lever pivot hole with the housing pivot hole.



3. Squeeze the two spring tabs on the end of the pivot pin at the same time pushing the pivot pin down through the hole until the pivot pin snaps into place.



4. Reinstall master cylinder assembly.



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Park Brake Lever and/or Spring Removal

1. Remove master cylinder cover screws and cover.



CAUTION:

Brake fluid will damage finished surfaces. Do not allow brake fluid to come in contact with finished surfaces.

2. Using a small screwdriver, lift long spring arm out of its notch in the housing.

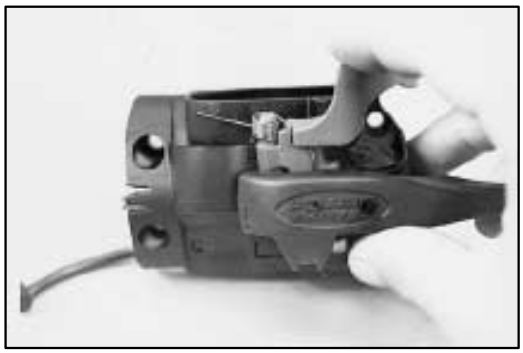


3. While pulling in an upward direction with the brake lever slightly activated, gently wiggle the park brake lever and spring from its pivot hole.



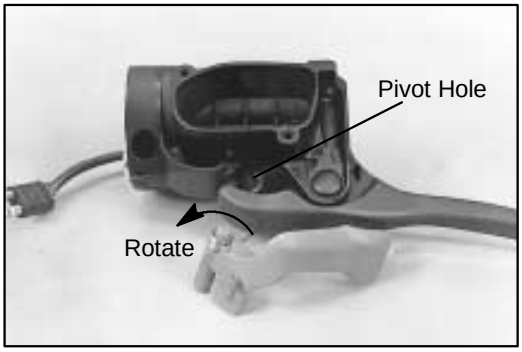
Park Brake Lever and/or Spring Installation

1. Place the spring on the upper pivot post of the park lever with the formed spring arm fit into its position on the outer part of the park lever. The straight spring arm will be pointing towards the back.



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2. Rotate the straight spring arm counterclockwise while tilting the park lever down and inserting the pivot post into the pivot hole.



3. Release the straight arm of the spring and push the park lever pivot post down into position.



4. With a small screwdriver, push the straight spring arm down until it snaps into the notch in the housing.



5. Fill reservoir. Replace the master cylinder cover and screws. Torque screws to 15-18 in.lbs. (1.7-2.0 Nm).



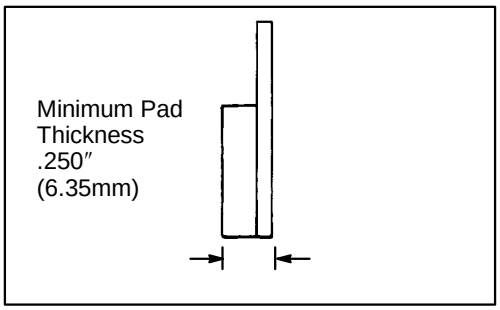
Cover Screw Torque -
15-18 in. lb. (1.7-2.0 Nm)

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The caliper assembly is mounted on the chaincase, which allows ease of brake pad and caliper service. Measure brake pads from the back of the backing plate to the surface of the friction material as shown in illustration.

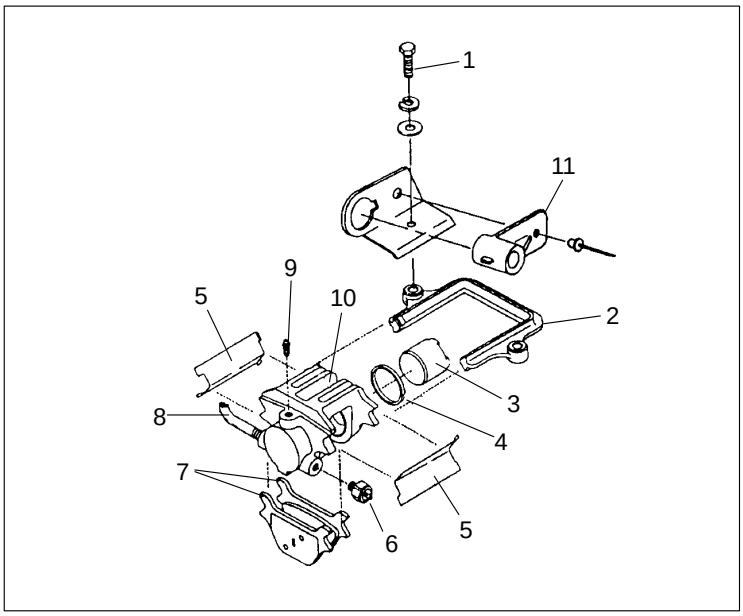
NOTE: Replace pads when worn beyond service limit.

Brake Pad Thickness -
Service Limit .250″ (6.35mm)



Friction Pad Replacement

1. Carrier Bracket Attaching Bolts
2. Carrier Bracket
3. Piston
4. Piston Seal
5. Spring Clip
6. Stop Light Switch
7. Brake Pads
8. Brake Line
9. Bleeder Screw
10. Caliper
11. Rope Guide



⚠ WARNING

The rider's safety depends on correct installation. Follow procedures carefully.

CAUTION:

Protect eyes from brake fluid.

1. Clean any dirt from mount bracket and bolts. Brake cleaner may be used to aid in cleaning of components.
2. With a 9/16″ socket, remove two 3/8 hex bolts and washers from bracket. Remove rope guide. NOTE: Do not disconnect brake line.
3. Lift bracket and brake assembly off vehicle. Remove all dirt from caliper assembly using brake cleaner and clean shop cloths.
4. Use a drop cloth to protect surfaces from brake fluid spillage. Remove reservoir cover from master cylinder assembly. Using a large hardwood dowel, or a C clamp vise grip on the center of the old pads, apply pressure toward the caliper piston. Compress piston back into caliper assembly. Apply pressure slowly to prevent excessive spillage from master cylinder assembly.

NOTE: Pushing the piston back into the bore will cause the fluid level to rise in the reservoir and possibly overflow. Remove excess fluid and discard.

CAUTION:

Piston must not be forced back into the caliper at an angle or bore damage may occur.

5. Slide caliper and brake pads out of bracket. Discard old pads and clips.

NOTE: Pad and holders must be replaced as a set.

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Friction Pad Replacement, Cont.

6. Place new pads with friction material facing each other into housing. Hold in place using clips. See illustration on page 8.20.
7. Slide brake assembly into bracket until both clips snap into grooves in bracket.
8. Clean brake mount on top of chaincase.
9. Separate pads for installation over disc. If brake assembly does not slide easily over the disc with loose pads, the piston is not compressed far enough into the caliper. Caliper assembly must fit freely onto disc and chaincase.
10. Replace 3/8 bolts, washers, and rope guide. Torque to specification.

Caliper Bolt Torque - 25-30 ft. lbs. (34.5-41.4 Nm)

11. Actuate brake several times to set brake pads to proper operating position.
12. Check for proper fluid level in master cylinder and replace cover Torque cover bolts to specification.

Reservoir Cover Torque - 15-18 in. lbs. (1.7-2.0 Nm)

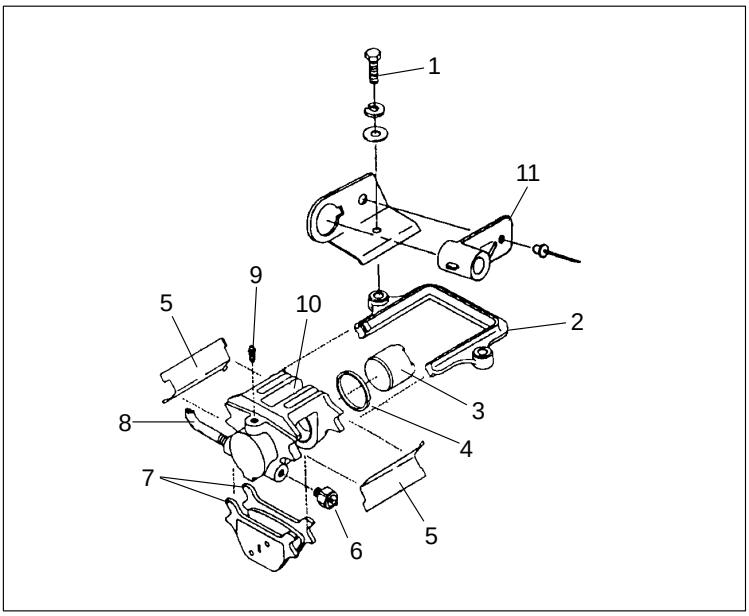
13. Inspect entire system for leaks and repair if necessary.

14. Field test at low speeds and verify proper brake action. If pads drag on disc, check caliper and pad assembly.

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Hydraulic Caliper Disassembly

1. Carrier Bracket Attaching Bolts
2. Carrier Bracket
3. Piston
4. Piston Seal
5. Spring Clip
6. Stop Light Switch
7. Brake Pads
8. Brake Line
9. Bleeder Screw
10. Caliper
11. Rope Guide



⚠ WARNING

The rider's safety depends on correct installation. Follow procedures carefully.

Refer to the exploded view above while performing the following steps.

1. Remove bracket bolts.
2. Disconnect brake line. Drain brake fluid into appropriate container and dispose of properly.
3. Disassemble on a clean bench.
4. Open bleeder screw and drain brake fluid from caliper assembly into appropriate container. Dispose of properly.

CAUTION:

Protect eyes from brake fluid at all times.

5. Slide brake assembly out of bracket and remove old pads and clips.
6. Place caliper on bench with piston down.
7. Remove piston from caliper using a caliper piston pliers (commercially available) or by covering the piston with a shop cloth and applying compressed air to the hydraulic inlet port.

CAUTION:

Use only enough air to remove piston. Too much pressure may damage piston or bore.

8. Using a small wooden or plastic stick, work piston seal out from its groove in the piston bore.

CAUTION:

To avoid scratching bore or burring edge of seal groove, do not use a metal tool such as a screwdriver.

9. Discard old seal.

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Hydraulic Brake Cleaning and Inspection

Check all parts for wear or damage and replace as required. Always replace caliper piston seal and dust seal (where applicable).

1. Clean all parts with denatured alcohol and wipe dry with a clean, lint free cloth.
2. Using compressed air, blow out the drilled passages and piston bore. Be sure piston seal groove is thoroughly clean and free from corrosion or brake fluid build up.
3. Inspect piston bore for scoring, pitting or corrosion. A corroded or deeply scored casting should be replaced. Light scores and stains may be removed by polishing with a crocus cloth only. Use finger pressure and rotate the crocus cloth in the cylinder bore. Do not slide the cloth in and out of the bore under pressure. Do not use any other kind of abrasive cloth.
4. Check piston to see if it is pitted, scored or worn. If so, discard and replace the piston.

CAUTION:

Do not attempt to polish or sand piston.

5. Clean piston with denatured alcohol and wipe dry with a clean, lint free cloth. Using compressed air, blow dry.
6. Check inlet and bleeder hole threads for damage. Be sure bleeder screw is clear.
7. Inspect brake line seat for damage and replace caliper if necessary.

Hydraulic Brake Assembly

1. Reassemble by reversing disassembly process. Be sure all parts are clean and serviceable before reassembling the unit.
2. Coat a new piston seal in clean DOT 3 brake fluid and place in groove in the caliper piston bore. Seal should be positioned at one point in groove and then gently worked around the groove by hand until properly seated.

CAUTION:

Never reuse an old seal.

3. Coat piston thoroughly with brake fluid and work down into bore carefully with a rotating motion until bottomed.

CAUTION:

Apply even pressure to avoid cocking the piston in the bore.

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Hydraulic Brake Assembly, Cont.

4. Examine pads for wear or damage. If pad thickness is less than 1/32″ (.08 cm.) install new pad holder assemblies. If pads are not worn or damaged, they may be reused. Be sure pads are reinstalled in their original positions. If pads are replaced, replace in sets and make sure the new pads have the same friction material type code number as the old set.
5. Connect hose or line to caliper.
6. Place new pads with friction material facing each other into housing. Hold in place using clips.
7. Slide brake assembly into bracket until both clips snap into grooves in bracket.
8. Separate pads for installation over disc.
9. Place brake assembly over disc and push bracket into chaincase.
10. Replace 3/8″ bolts, rope guide, and washers. Torque to specification.

Caliper Bolt Torque - 25-30 ft. lbs. (34.5-41.4 Nm)

11. Perform brake bleeding procedure as outlined after System Rebuild, page 8.10-8.11.

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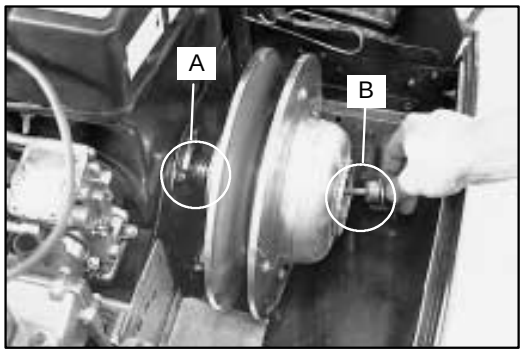
Drive System Disassembly

The Type 3 drive system is used on all models except the WideTrak. This system consists of a right side mounted chaincase with right side mounted brake assembly.



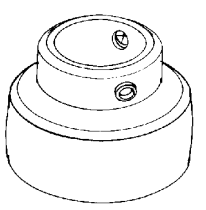
Rear Suspension Removal

1. Mark hood hinges for ease of alignment when reassembling. Remove hood (to prevent damage), air silencer, exhaust system and battery, if so equipped. Place drip pan under chaincase and remove drain plug. Dispose of used chaincase oil properly.
2. Turn fuel valve off.
3. Remove drive belt and driven clutch. Note position of washers for controlling drive to driven offset (A) and washers to control clutch free floating (B).

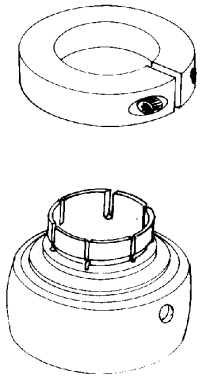


4. Loosen jackshaft bearing lock set screws (if equipped).

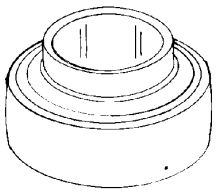
NOTE: Some models are equipped with set screw or Skwez-loc t style jackshaft bearings. Some models are equipped with press-fit bearings which have no locking device.



Set Screw Bearing



Skwez-loc™ Bearing



Press On Bearing

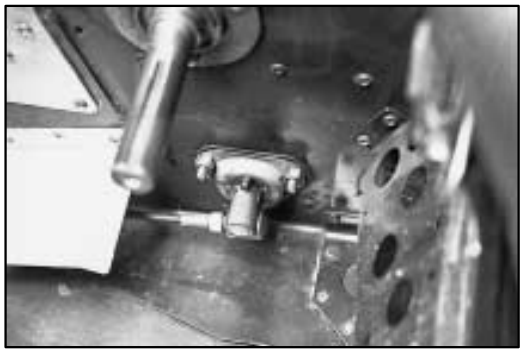
5. Remove two upper flangette attaching bolts.

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Rear Suspension Removal, Cont.

6. Remove three bolts, nuts, and washers securing angle drive and bearing flangettes. Remove and discard adaptor key.
7. Remove four suspension mounting bolts.
8. Place a protective mat on floor and tip machine onto left side.
9. Remove rear suspension by pulling rear of track outward and sliding suspension forward. Lift out rear of suspension first.

NOTE: Unhook the rear torsion springs to relieve pressure on the torque arm for ease of removal. Loosen rear shaft bolts and adjuster bolts, slide rear shaft forward for ease of removal.





Chaincase Removal

1. Remove third jackshaft flangette attaching bolt.

Tip machine back to upright and support rear with jackstand.

2. Remove chaincase cover attaching bolts and remove cover.
3. Remove cotter pin and nut.
4. Loosen chain adjustment bolt and remove chain tensioner assembly.
5. Remove bottom sprocket attaching bolt, chain and sprockets.
6. Remove two bolts securing caliper carrier bracket to chaincase.

NOTE: Inspect brake pad condition and replace if worn to less than 1/2 the original thickness. See Brake Pad Replacement in this chapter.



7. Remove three chaincase to bulkhead attaching nuts and bolts. The front bolt is a through bolt, rear and bottom bolts are carriage bolts.

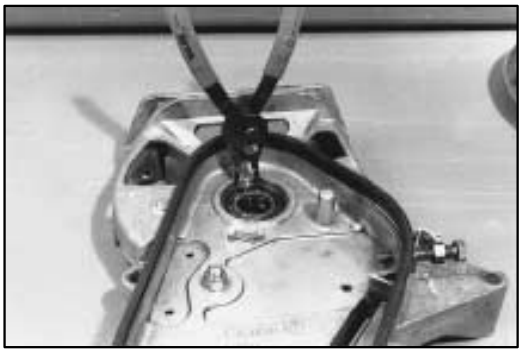
NOTE: On some machines it may be necessary to remove the rear exhaust bracket prior to lifting chaincase or removing drive shaft assembly.



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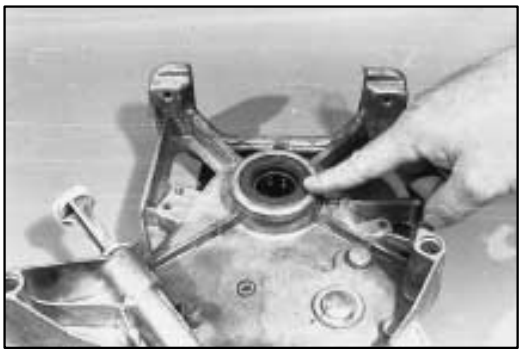
Chaincase Removal, Cont.

8. Tap on end of driveshaft with a soft face hammer and slide the chaincase off of the driveshaft. Remove chaincase.



Chaincase Bearing Removal

1. Remove bearing retaining snap rings.
2. Pry out old seal from back side of chaincase.
3. Press out old bearing from side shown. If bearing appears tight, use heat to expand chaincase bore. Always press bearing toward snap ring side of chaincase when removing. Inspect chaincase for any damage and replace if required.



Jackshaft Removal

1. Remove O-Ring, seal sleeve and brake disc by tapping on jackshaft end with a soft face hammer.
2. Remove jackshaft.
3. For set screw and Skwez-loc bearings, inspect drive shaft and jackshaft in bearing contact area. If diameter is .001″ (.025 mm) less than non-contact area, shafts should be replaced.



Jackshaft and Driveshaft Service Limit - .001″ (.025 mm)

NOTE: On models with pressed bearing on jackshaft, shaft will have to be brought through bulkhead slot in order to remove from unit.

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Driveshaft Removal

1. Tip machine back on left side.
2. Remove driveshaft by pushing through bearing hole on the bulkhead, then pulling driveshaft toward you.



3. After drive shaft has been removed, inspect condition of drive sprockets and replace if required.

NOTE: On models with pressed bearings on drive shaft:
S If bearings are loose internally or rough they should be replaced.
S If bearings are loose on the shaft the shaft must be replaced.



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Chaincase Assembly

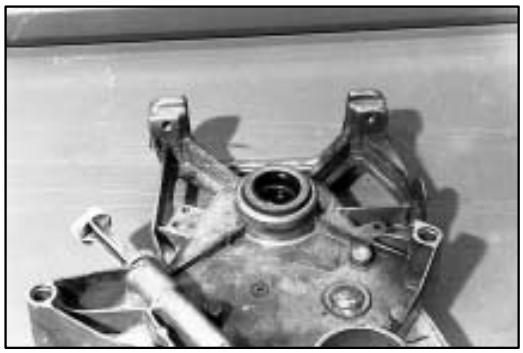
1. Apply Loctite 680 to outer race of new bearing and press into position. Press on outer race only, or bearing damage may result.



Loctite™ 680

PN 2870584

2. Reinstall snap rings.
3. Press new seals in until outer edge is flush with chaincase shoulder. New seals must be installed from outside of case with lip side in.



4. Install chaincase.

NOTE: Do not tighten chaincase bolts at this time.

Jackshaft Installation

1. Replace seal sleeves and O-Rings with new and grease.
2. Install jackshaft installation tool on the threads of the jackshaft

Jackshaft Installation Tool

PN 2870974 - 13 Tooth Jackshafts
PN 2871296 - 15 Tooth Jackshafts



3. Insert jackshaft through bearing in chaincase
4. Install jackshaft alignment tool and secure with castle nut and flat washer. Tighten jackshaft nut securely to ensure positive bearing and jackshaft seating to chaincase.

NOTE: Use of a standard nut and flat washer for this alignment process will simplify the process as well as preserve the locking features of the lock nut for reassembly.



Jackshaft Alignment Tool

PN 2870399 - 13 Tooth Jackshafts
PN 2871535 - 15 Tooth Jackshafts

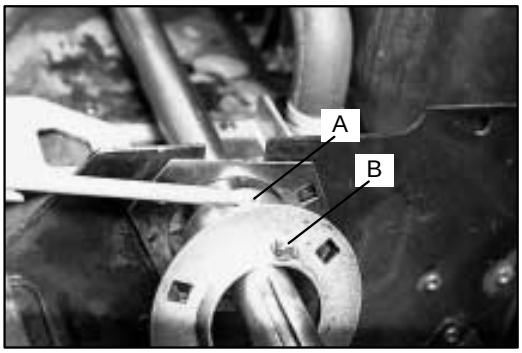
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Jackshaft Installation, Cont.

5. If shaft is not centered, tap shaft with a soft faced hammer until centered. This will align the upper chaincase bearing in the chaincase bore.

6. Once correct jackshaft alignment has been achieved, install lock nuts on chaincase mounting bolts and torque to specification. Remove alignment tool from chaincase.

7. Install jackshaft flangette gasket and bolts. Align grease hole (A) in bearing with hole or fitting in flangette (B) to within .100″ to ensure greasability. Torque nuts to specification. Do not lock set screws on retainer ring (if so equipped).



Chaincase Mounting Bolt Torque -

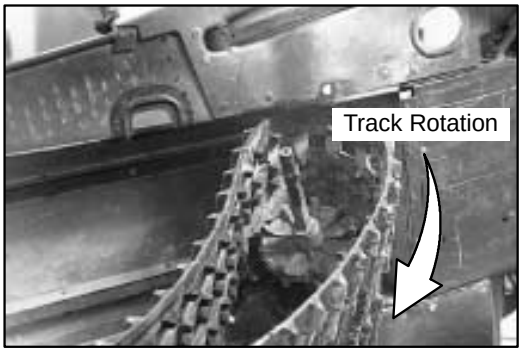
28-30 ft. lbs. (38.6 - 41.4 Nm)

Flangette Nut Torque -

15 - 17 ft. lbs. (20.7 - 23.5 Nm)

Driveshaft Installation

1. Tip machine back on its left side. Set track into machine making note of correct direction of travel. Most tracks have an arrow pointing which direction the track turns.



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Driveshaft Installation, Cont.

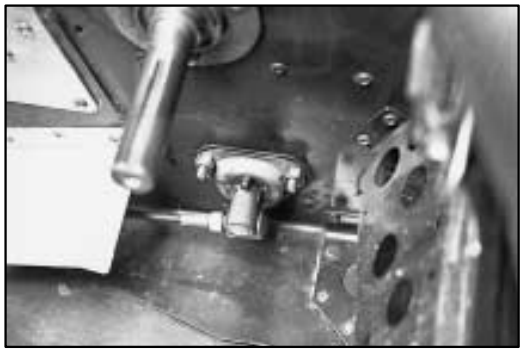
2. Insert driveshaft through bearing hole in bulkhead. Place inner driveshaft bearing flange bolts in the bulkhead.

3. Insert chaincase side of driveshaft through bottom chaincase bearing.

4. Tip machine upright. Replace speedometer key with a new one and install angle drive. Torque nuts to specification.

Speedometer Angle Drive Mounting Nut Torque -
15 - 17 ft. lbs. (20.7 - 23.5 Nm)





5. Link together the upper and lower chaincase sprockets with the chain. Install both the upper and lower sprockets and chain at the same time. Finger tighten the top sprocket nut and turn in bottom sprocket bolt until snug.

NOTE: On Hyvo t sprockets, the beveled side goes toward the chaincase bearing.

6. Install chain tensioner. Finger tighten adjustment bolt.

7. Install brake caliper assembly in chaincase.

CAUTION:

On models with hydraulic brakes, make sure caliper piston is fully retracted into caliper to prevent brake binding from preload of pads. On models equipped with mechanical brakes make sure cam is fully retracted.



8. Torque caliper mounting bolts to specification.

Caliper Mounting Bolt Torque -
28 - 30 ft. lbs. (38.6 - 41.4 Nm)



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Track Installation

1. Tip machine back onto left side. Insert suspension, rear first, into the track.

2. Move the suspension back and forth until front torque arm mounting bolts can be started. Tighten finger tight.

3. Rotate the suspension until the rear mount bolts can be installed in the same manner as the front.

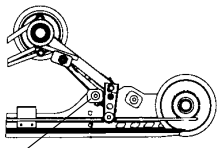
NOTE: For ease of installation, turn the front rear scissor stops (FRSS) to low position. This allows the rear torque arm to move forward more to line up holes.





4. Torque suspension mounting bolts to specification.

5. Return front rear scissor stops (FRSS) to original position.



FRSS (Front Rear Scissor Stop)
XTRA-10 Shown

6. Install suspension springs.

7. Align track (outlined in suspension section) and tighten adjuster and rear shaft bolts to specification.

3/8″ Suspension Bolt Torque -
35-40 ft. lbs (48.3-55.2 Nm)

7/16″ Suspension Bolt Torque -
45-50 ft. lbs. (62.1-69 Nm)

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Final Assembly

1. Check speedometer cable routing.

2. Grease angle drive and bearing with Polaris grease.

Polaris Premium All Season Grease PN 2871423

3. Torque bottom chaincase sprocket bolt to specification.

Bottom Chaincase Sprocket Bolt Torque - 19 ft. lbs. (26.2 Nm)

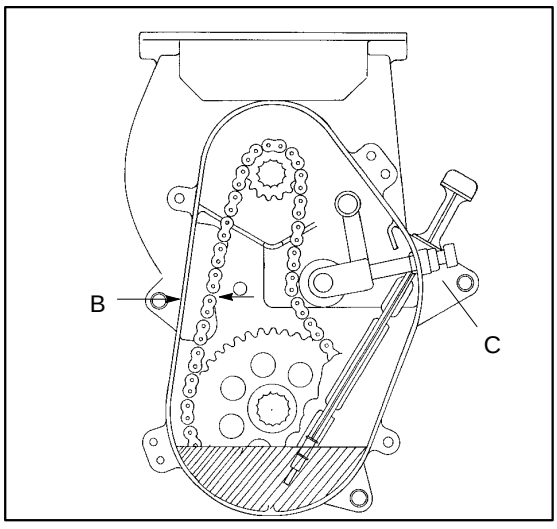
4. Torque jackshaft nut to specification. On models with castle nut, if cotter pin does not align, tighten nut until it does. Apply brake to hold jackshaft while torquing.

Jackshaft Castle Nut Torque - 50 ft. lbs. (69 Nm)

5. To obtain correct chain tension, place a slight reverse tension on the chain as indicated in the illustration at right.

6. There should be approximately 1/4-3/8″ (.6-.95 cm) total deflection on the chain at point (B). Loosen adjuster bolt locknut and turn adjuster bolt (C) until correct chain deflection is obtained.

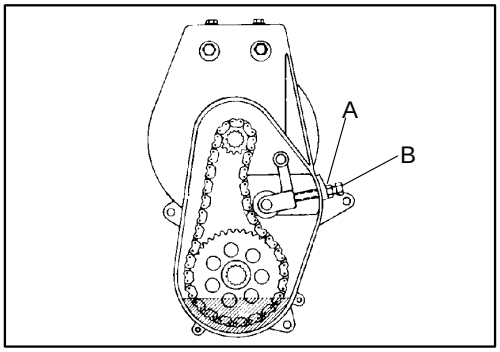
Chain Deflection - 1/4-3/8″ (.6 - .95 cm)



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Final Assembly, Cont.

7. Tighten adjuster bolt locknut (A) securely while holding the adjuster bolt (B).



8. Install chaincase cover gasket in chaincase with gap at the top. Install chaincase cover and torque cover bolts to specification.

Chaincase Cover Bolt Torque -

8 - 10 ft. lbs. (11 - 14 Nm)

9. Add 9 oz. (11 oz. on models equipped with reverse) of Polaris chaincase oil to the chaincase. Verify proper level with dipstick.

Polaris Synthetic Gearcase Lube
PN 2871477 (Gallon)
PN 2871478 (12 ounces)

10. Torque jackshaft bearing set screws to specification (if so equipped).

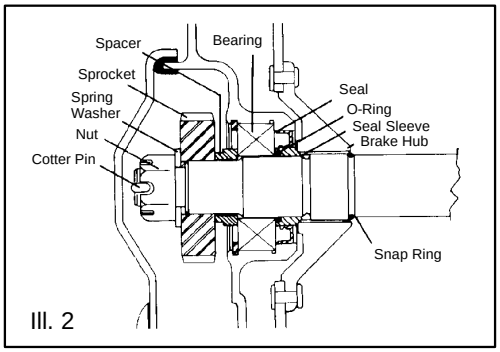
Driveshaft and Jackshaft Bearing
Set Screw Torque -

80 in. lbs. (9.2 Nm)

11. Lubricate bearings with Polaris Premium All Season grease.

Polaris Premium All Season Grease

PN 2871423



Ill. 2

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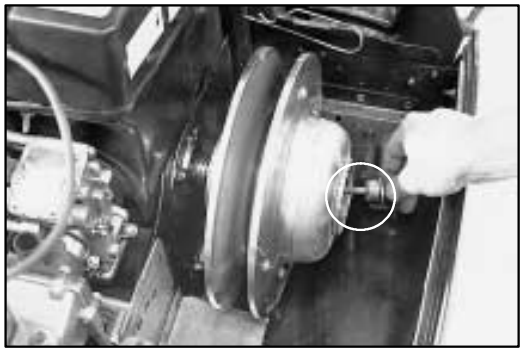
Final Assembly, Cont.

12. Reinstall clutch offset washers on jackshaft and install driven clutch. Using the clutch alignment tool adjust driven clutch to achieve proper offset.

Clutch Alignment Tool P90 - PN 2870914 P85 - PN 2870426

P90 Offset 21/32″: P90 Electric Start Off-set: 1.28″ (straight edge) P85 Offset 5/8″: P85 Electric Start Off-set: 1″ (straight edge)

13. With proper offset achieved, the driven clutch must float on the jackshaft. This is done by adding or subtracting spacer washers (PN 7555734) to the clutch retaining bolt. When properly adjusted, the driven clutch will have .020 - .100″ (.5 - 2.5 mm) float.



CAUTION:

Incorrect float can cause jackshaft bearings to be side loaded, resulting in premature bearing failure.

14. Torque driven clutch retaining bolt to specification.

Driven Clutch Retaining Bolt Torque - 12 ft. lbs. (16.6 Nm)

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Final Assembly, Cont.

15. Reinstall air box, adjusting box properly.
16. Reinstall battery (if so equipped). Always attach ground cable last to prevent sparks.
17. Replace exhaust system.
18. Install hood, (if removed) aligning with marks made during disassembly. Ensure proper hood closure and readjust if necessary.



Hood Bolt Torque -
8-10 ft. lbs. (11-14 Nm)

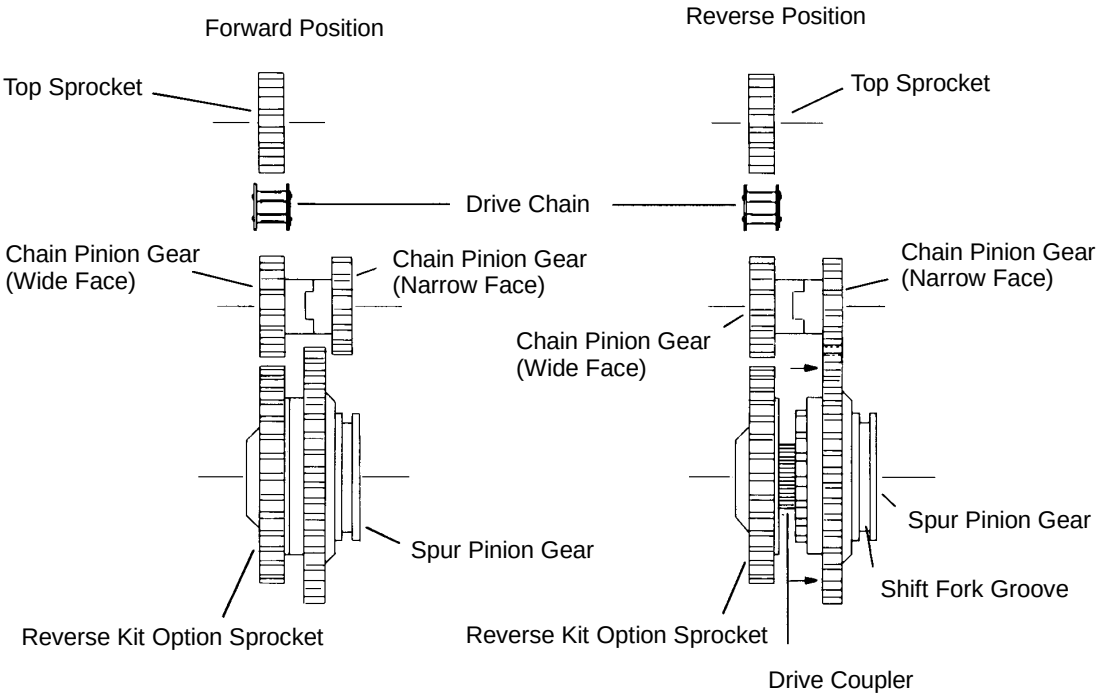
19. Test ride the unit to ensure all components are functioning properly before putting into service.

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The following illustration indicates sprocket position with the Polaris Reverse Kit in the forward and reverse selection.

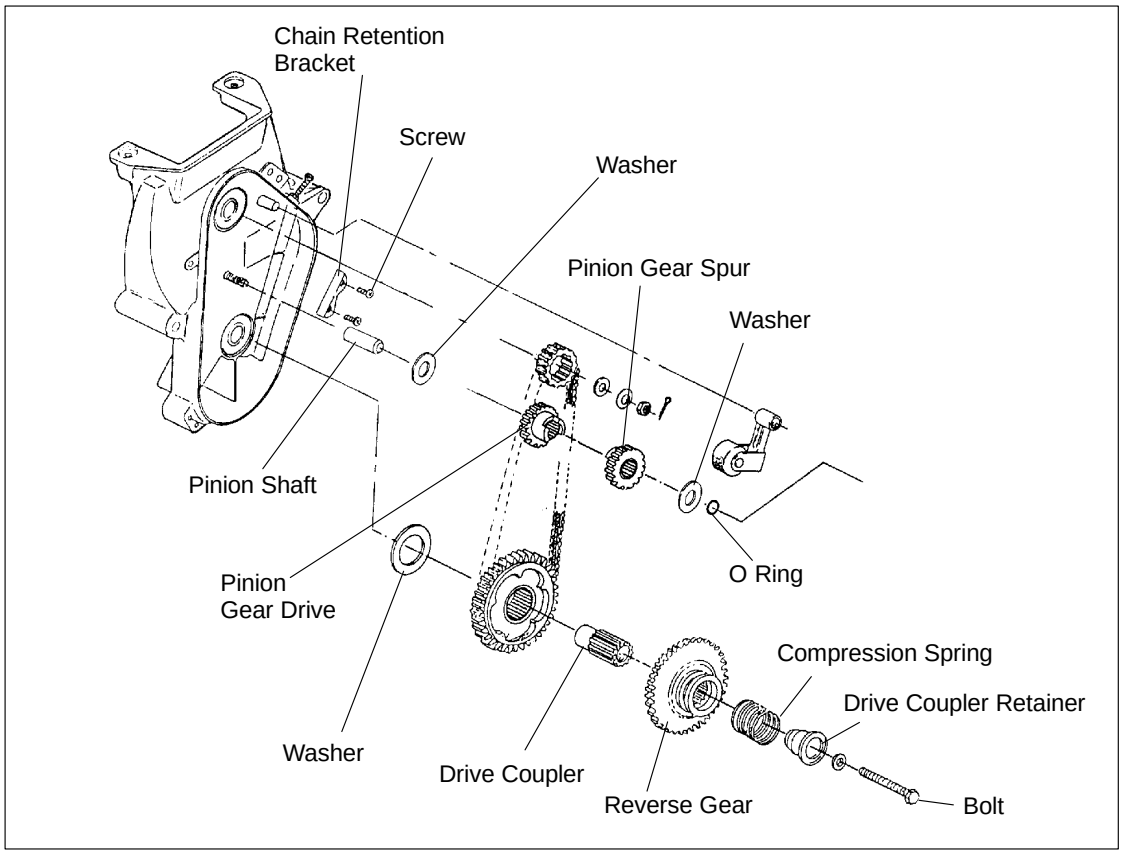
Reverse Installation Tips (Refer to Illustration on page 8.38)

- When installing pinion shaft, be sure the chamfered end of pinion shaft is toward case cover.
- Install chain, top sprocket, bottom option sprocket and wide face pinion gear into case at the same time.
- When installing case cover, be sure that shift fork has slipped into fork groove of reverse gear.



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Reverse System Maintenance



Chain Tension Adjustment

1. Elevate the rear of machine and support so track is off the floor.
2. Loosen adjuster bolt lock nut.
3. Loosen adjuster bolt slightly (about one turn out).
4. Tighten adjuster to specified torque.

Adjuster Bolt Torque -
20 in. lbs. (2.3 Nm)

5. Loosen adjuster bolt 1/2 turn.
6. Hold adjuster bolt in position and tighten locknut securely.

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Oil Change

1. Change annually, prior to off season storage.

Oil Level

1. Using Polaris chaincase lubricant, maintain proper oil level. Proper level is checked by removing dipstick.
2. Wipe off any metal particles from the dipstick. Small amounts of particles will be common.
3. Add lubricant until the level is in the “safe” zone on the dipstick (11 oz.) Do not mix or use other types of lubricant.

Polaris Chaincase Lube
PN 2871280 - Quart
PN 2870464 - Gallon
PN 2872281 - 2.5 Gallon

Adjustment

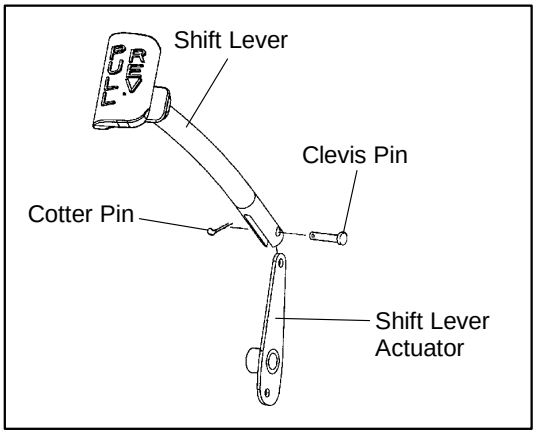
Due to break-in or replacement of components, the reverse shift mechanism may require adjustment. Adjust with the shifter in the forward position.

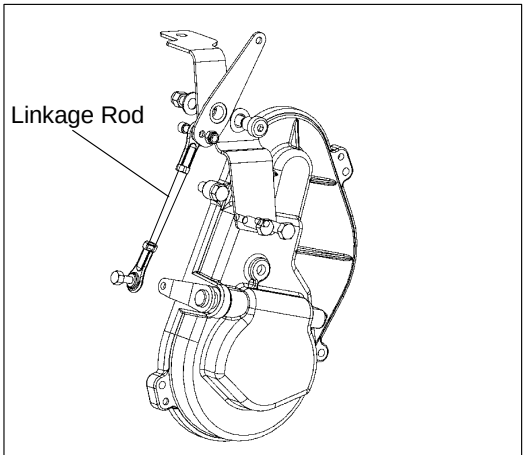
1. Pull shift lever slowly while observing shift arm on transmission.
2. If adjustment is correct, the sprockets will mesh fully when the lever is pulled and no grinding will occur indicating incomplete engagement. If incomplete engagement is suspected perform the following steps.

1. Move lever to forward position.
2. Loosen jam nuts on linkage rod.
3. Adjust linkage rod until endplay movement is 1/32″ (.08 cm). Do not adjust beyond this point.
4. Tighten jam nuts and re-check adjustment.

Reverse Linkage Rod End Play -

1/32″ (.08 cm)





Chaincase Cover Assembly

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CHAPTER 9
ELECTRICAL

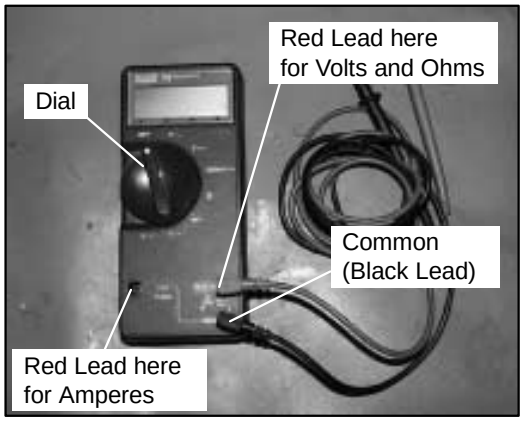
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Multimeter Usage

The easiest and most accurate method for testing modern electrical components is with a digital multitester. Any good quality multitester will work. However, due to ease of operation and durability, Polaris recommends the Fluke Model 73 (PN 2870659), or Tektronix DMM155. See photo at right. This instrument will provide a digital readout of the measured value of the test being performed.

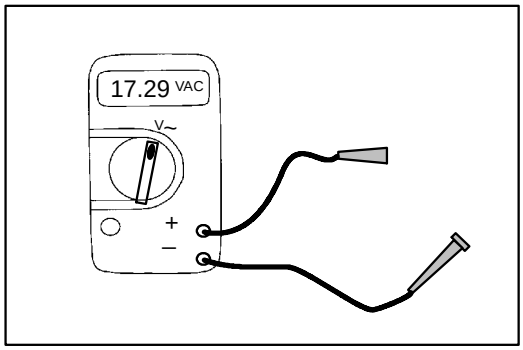


Listed below are the dial symbols, their meaning and what the dial setting can be used for.

Off = Instrument Off

V ~ = Volts AC - measuring alternator output

Used to measure AC voltage in an electrical system. AC voltage is produced from every coil on the stator plate when a magnet is passed by it.



Test Method

1. Connect black lead to Com (-) meter terminal.
2. Connect red lead to VΩ (+) meter terminal.
3. Turn selector dial to V ~ setting.
4. Connect test leads parallel with test component. The polarity of the leads is not important.

Usage

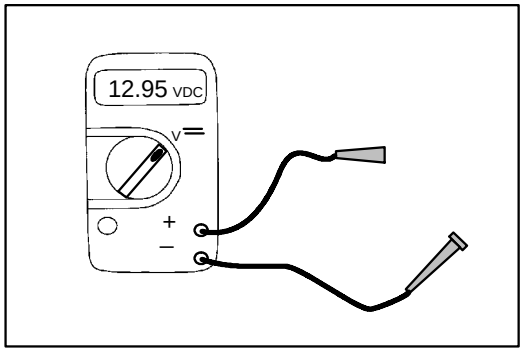
- Test unregulated voltage output of a stator coil
- Test regulated voltage to the lights and handwarmers

V ⎓ = Volts DC - measuring battery voltage, volt drop, etc.

Used to measure DC voltage produced by a battery or rectifier.

Test Method

1. Connect black lead to Com (-) meter terminal
2. Connect red lead to VΩ (+) meter terminal.
3. Turn selector dial to V ⎓ setting.
4. Connect test leads parallel with test component. Observe polarity.



Usage

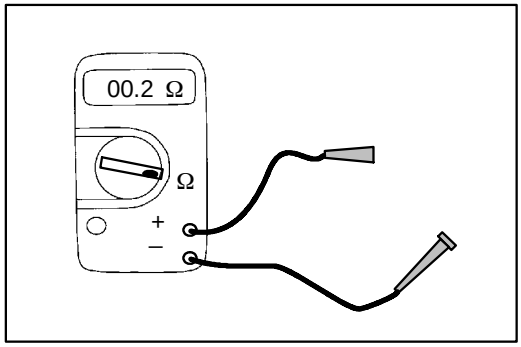
- Test battery voltage
- Test DC regulator
- Test voltage drop for bad connections
- Test supply voltage to electric fuel gauge

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Multimeter Usage

Ω = Ohms, resistance - measuring component resistance values - testing coils, wiring, etc.

Used to test resistance to the flow of electricity in a circuit or component. A reading of OL means an open circuit or infinite resistance. Sometimes the leads themselves will have some resistance. Touch the leads together and subtract this resistance from the component reading to achieve the actual reading.



Test Method

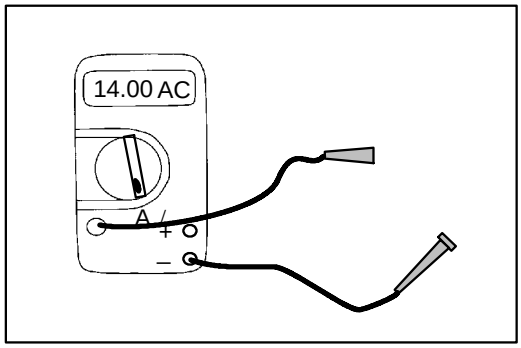
1. Connect black lead to Com (–) meter terminal
2. Connect red lead to VΩ (+) meter terminal.
3. Turn selector dial to Ω setting.
4. Isolate test component from the rest of the electrical circuit by disconnecting wires from harness.
5. Connect test leads to the circuit to be tested.

Usage

- Testing coil resistance
- Testing switch operation
- Testing wire continuity

A ⁄ = Amps AC - used to test lighting coil output

Used to test the power of an alternator coil.



Test Method

1. Connect black lead to Com (–) meter terminal
2. Connect red lead to 10A (+) meter terminal.
3. Disconnect engine harness from system.
4. Connect across the specified coil wires.
5. Start engine and let it idle.
6. Readings should be above 5 Amps at any RPM. NOTE: It is not necessary to increase RPM. The reading can be obtained at idle.

Usage

- Testing stator coil power output.

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Multimeter Usage

A ⎓ = Amps DC - used to check battery charge rate, system draws, etc.

Used to check the current flow to and from the battery.

Test Method

1. Make sure red lead is in the 10A terminal of the meter and the black lead is in the Com (–) terminal of the meter.
2. Disconnect battery ground wire(s) from battery (–) terminal.
3. Connect red meter lead to battery (–) terminal.
4. Connect black meter lead to harness ground wires and cable.

CAUTION:

Do not operate electric starter (if equipped) or meter damage may occur.

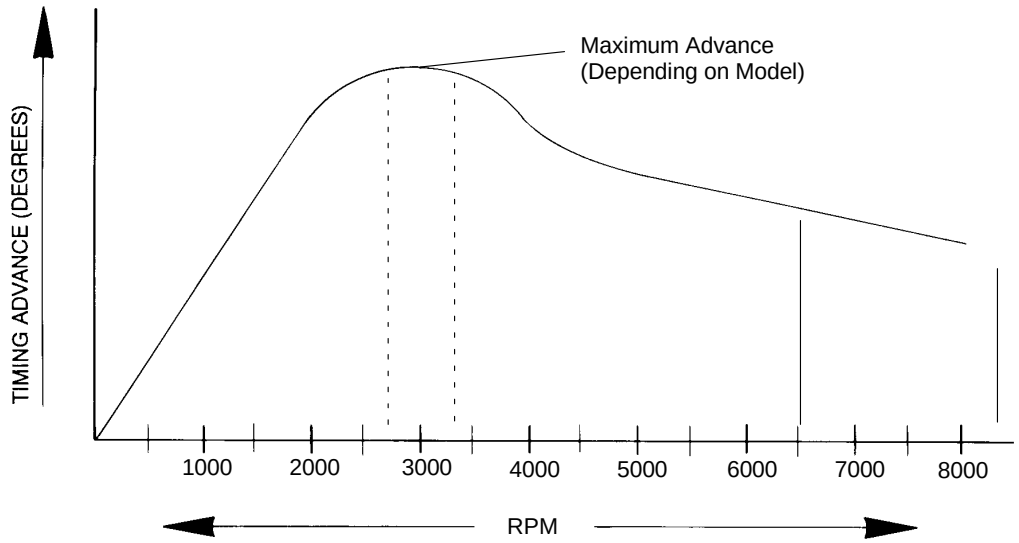
Usage

- Testing key off current draw
- Testing key on current draw
- Testing charging system break even RPM
- Testing DC current flow (direction), is battery charging?

NOTE: When using the DC Amp settings, the red test lead must be moved to the 10A socket on the front of the instrument.

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Ignition Timing



NOTE: Always verify timing of engine at room temperature only (68° F / 20° C) and at the proper RPM.

To obtain the best ignition timing accuracy and reduce the chance of error, the ignition timing specification is given at a “flat” portion of the advance curve. This flat portion on the curve is where the ignition timing is specified. Refer to chart on page 9.5. Ignition timing must be checked at the specified RPM, or inaccurate timing will result. Refer to timing specifications at the beginning of this chapter.

Dial Indicating The Timing Marks

Due to differences between engines, it is necessary to dial indicate the timing marks on all engines before attempting to adjust the ignition timing. To indicate the marks:

1. Remove the mag (RH) cylinder spark plug and install the dial indicator.
2. Rotate the crankshaft by hand while observing the dial indicator. As the piston touches the indicator plunger, the dial will begin to rotate. Find the point where the pointer stops rotating and reverses direction. This will be TDC (Top Dead Center).
3. While holding the crankshaft with the piston at TDC, zero the indicator by rotating the bezel until the 0 on the dial and the pointer align.
4. Rotate the crankshaft opposite the direction of rotation about .250 BTDC (2 1/2 pointer revolutions).
5. Determine the correct ignition timing position from the ignition data charts and rotate the crankshaft in the normal direction of rotation to that position. (Example: If engine timing is .150 BTDC, the crankshaft must be rotated in the normal direction of rotation so that the dial indicator pointer does one complete revolution and stops on 50. This should be 1 1/2 pointer revolutions before top center, or .150 BTDC.
6. While holding the crankshaft at the correct timing position, mark the flywheel (with chalk or a white marker) directly in-line with the stationary pointer (or line) on the fan or recoil housing through the timing inspection window.

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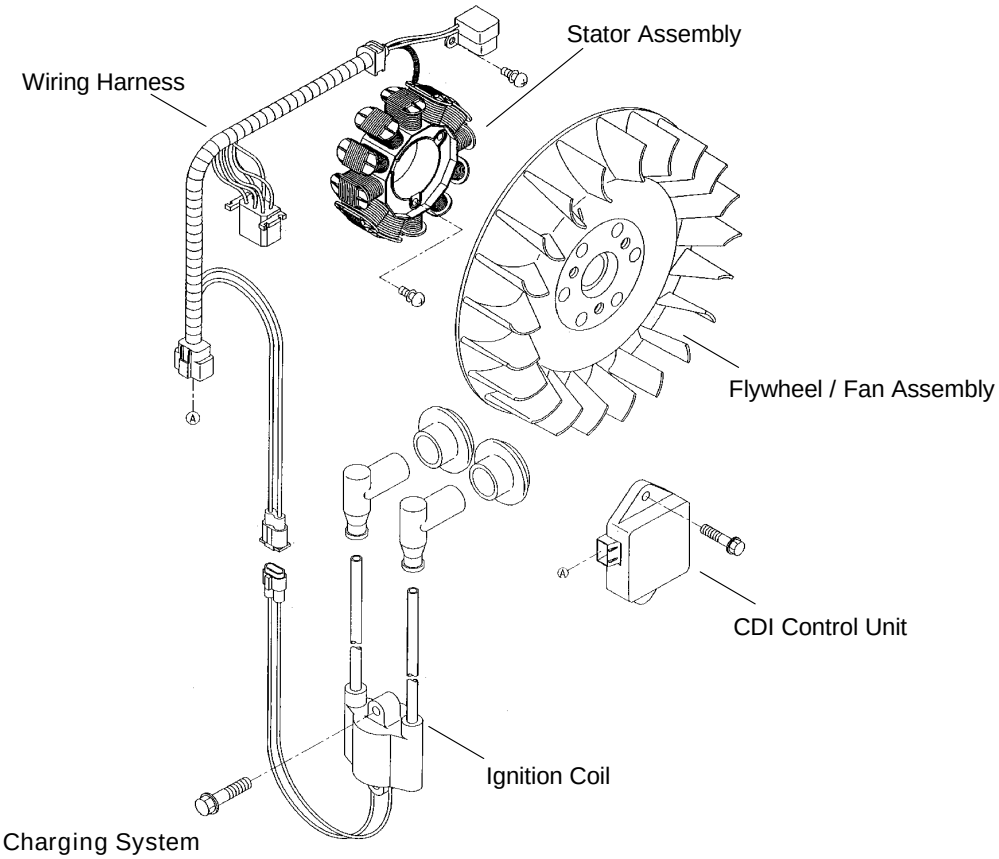
Degrees to Piston Position – BTDC Conversion Chart

'If the ignition timing specification is listed in degrees only, convert to either inches or mm BTDC and use a dial indicator to verify timing marks. NOTE: Due to differing rod lengths and engine strokes, consult the engine model list for correct engine.

	EC40PL EC44-2PM EC44-3PM EC45PL EC50PL EC60PL EC58PL EC65PL	EC45PM EC55PM	EC59PL EC68PL EC70PL EC75PL EC79PL EC80PL	EC34-2PM	EC25PF EC25PS EC44PT EC44PQ EC44PM	Domestic 440 Domestic 500 Domestic 600 (with V.E.S.)	Domestic 600 (without V.E.S.) Domestic 700	Domestic 800
DEG. BTDC	112 MM ROD 60 MM STROKE	120 MM ROD 65 MM STROKE	125 MM ROD 65 MM STROKE	103 MM ROD 55.6 MM STROKE	120 MM ROD 60 MM STROKE	128 MM ROD 64 MM STROKE	136 MM ROD 68 MM STROKE	136 MM ROD 70 MM STROKE
	MM INCHES	MM INCHES	MM INCHES	MM INCHES	MM INCHES	MM INCHES	MM INCHES	MM INCHES
1	0.0058 0.0002	0.0063 0.0002	0.0062 0.0002	0.0054 0.0002	0.0057 0.0002	0.0061 0.0002	0.0065 0.0003	0.0067 0.0003
2	0.0232 0.0009	0.0252 0.0010	0.0249 0.0010	0.0215 0.0008	0.0228 0.0009	0.0244 0.0010	0.0259 0.0010	0.0268 0.0011
3	0.0521 0.0021	0.0566 0.0022	0.0561 0.0022	0.0484 0.0019	0.0514 0.0020	0.0548 0.0022	0.0582 0.0023	0.0603 0.0024
4	0.0926 0.0036	0.1006 0.0040	0.0997 0.0039	0.0860 0.0034	0.0913 0.0036	0.0974 0.0038	0.1035 0.0041	0.1072 0.0042
5	0.1447 0.0057	0.1571 0.0062	0.1558 0.0061	0.1343 0.0053	0.1426 0.0056	0.1522 0.0060	0.1617 0.0064	0.1674 0.0066
6	0.2083 0.0082	0.2261 0.0089	0.2242 0.0088	0.1933 0.0076	0.2053 0.0081	0.2190 0.0086	0.2327 0.0092	0.2410 0.0095
7	0.2833 0.0112	0.3076 0.0121	0.3050 0.0120	0.2630 0.0104	0.2793 0.0110	0.2979 0.0117	0.3166 0.0125	0.3278 0.0129
8	0.3698 0.0146	0.4016 0.0158	0.3981 0.0157	0.3432 0.0135	0.3646 0.0144	0.3889 0.0153	0.4132 0.0163	0.4279 0.0168
9	0.4677 0.0184	0.5079 0.0200	0.5036 0.0198	0.4341 0.0171	0.4612 0.0182	0.4919 0.0194	0.5226 0.0206	0.5412 0.0213
10	0.5770 0.0227	0.6265 0.0247	0.6212 0.0245	0.5355 0.0211	0.5689 0.0224	0.6068 0.0239	0.6448 0.0254	0.6676 0.0263
11	0.6976 0.0275	0.7575 0.0298	0.7510 0.0296	0.6474 0.0255	0.6878 0.0271	0.7336 0.0289	0.7795 0.0307	0.8071 0.0318
12	0.8294 0.0327	0.9006 0.0355	0.8930 0.0352	0.7698 0.0303	0.8178 0.0322	0.8723 0.0343	0.9268 0.0365	0.9597 0.0378
13	0.9724 0.0383	1.0559 0.0416	1.0470 0.0412	0.9025 0.0355	0.9588 0.0377	1.0227 0.0403	1.0867 0.0428	1.1251 0.0443
14	1.1265 0.0444	1.2232 0.0482	1.2129 0.0478	1.0456 0.0412	1.1108 0.0437	1.1849 0.0466	1.2589 0.0496	1.3035 0.0513
15	1.2917 0.0509	1.4026 0.0552	1.3908 0.0548	1.1989 0.0472	1.2737 0.0501	1.3586 0.0535	1.4435 0.0568	1.4946 0.0588
16	1.4678 0.0578	1.5938 0.0627	1.5804 0.0622	1.3624 0.0536	1.4474 0.0570	1.5439 0.0608	1.6404 0.0646	1.6984 0.0669
17	1.6548 0.0652	1.7969 0.0707	1.7818 0.0701	1.5359 0.0605	1.6318 0.0642	1.7406 0.0685	1.8494 0.0728	1.9149 0.0754
18	1.8526 0.0729	2.0117 0.0792	1.9948 0.0785	1.7195 0.0677	1.8269 0.0719	1.9487 0.0767	2.0705 0.0815	2.1436 0.0844
19	2.0611 0.0811	2.2380 0.0881	2.2193 0.0874	1.9130 0.0753	2.0326 0.0800	2.1681 0.0854	2.3036 0.0907	2.3851 0.0939
20	2.2802 0.0898	2.4759 0.0975	2.4552 0.0967	2.1163 0.0833	2.2487 0.0885	2.3986 0.0944	2.5485 0.1003	2.6386 0.1039
21	2.5098 0.0988	2.7252 0.1073	2.7024 0.1064	2.3294 0.0917	2.4752 0.0974	2.6402 0.1039	2.8052 0.1104	2.9043 0.1143
22	2.7497 0.1083	2.9857 0.1175	2.9608 0.1166	2.5521 0.1005	2.7119 0.1068	2.8927 0.1139	3.0735 0.1210	3.1820 0.1253
23	3.0000 0.1181	3.2574 0.1282	3.2303 0.1272	2.7843 0.1096	2.9587 0.1165	3.1560 0.1243	3.3532 0.1320	3.4717 0.1367
24	3.2603 0.1284	3.5401 0.1394	3.5107 0.1382	3.0260 0.1191	3.2156 0.1266	3.4300 0.1350	3.6444 0.1435	3.7730 0.1485
25	3.5307 0.1390	3.8336 0.1509	3.8019 0.1497	3.2769 0.1290	3.4824 0.1371	3.7146 0.1462	3.9467 0.1554	4.0860 0.1609
26	3.8110 0.1500	4.1379 0.1629	4.1038 0.1616	3.5370 0.1393	3.7590 0.1480	4.0096 0.1579	4.2602 0.1677	4.4104 0.1736
27	4.1010 0.1615	4.4528 0.1753	4.4161 0.1739	3.8062 0.1498	4.0452 0.1593	4.3149 0.1699	4.5846 0.1805	4.7462 0.1869
28	4.4007 0.1733	4.7782 0.1881	4.7389 0.1866	4.0843 0.1608	4.3410 0.1709	4.6303 0.1823	4.9197 0.1937	5.0931 0.2005
29	4.7098 0.1854	5.1138 0.2013	5.0719 0.1997	4.3712 0.1721	4.6461 0.1829	4.9558 0.1951	5.2655 0.2073	5.4510 0.2146
30	5.0282 0.1980	5.4595 0.2149	5.4149 0.2132	4.6667 0.1837	4.9604 0.1953	5.2911 0.2083	5.6218 0.2213	5.8197 0.2291
31	5.3559 0.2109	5.8152 0.2289	5.7679 0.2271	4.9708 0.1957	5.2839 0.2080	5.6361 0.2219	5.9864 0.2358	6.1991 0.2441
32	5.6926 0.2241	6.1807 0.2433	6.1306 0.2414	5.2832 0.2080	5.6163 0.2211	5.9907 0.2359	6.3651 0.2506	6.5889 0.2594
33	6.0381 0.2377	6.5559 0.2581	6.5028 0.2560	5.6039 0.2206	5.9575 0.2345	6.3546 0.2502	6.7518 0.2658	6.9891 0.2752
34	6.3924 0.2517	6.9405 0.2732	6.8845 0.2710	5.9326 0.2336	6.3073 0.2483	6.7278 0.2649	7.1482 0.2814	7.3993 0.2913
35	6.7552 0.2660	7.3343 0.2888	7.2754 0.2864	6.2693 0.2468	6.6656 0.2624	7.1099 0.2799	7.5543 0.2974	7.8195 0.3079
36	7.1263 0.2806	7.7372 0.3046	7.6753 0.3022	6.6138 0.2604	7.0322 0.2769	7.5010 0.2953	7.9698 0.3138	8.2494 0.3248
37	7.5057 0.2955	8.1491 0.3208	8.0840 0.3183	6.9658 0.2742	7.4069 0.2916	7.9007 0.3111	8.3945 0.3305	8.6888 0.3421
38	7.8931 0.3108	8.5696 0.3374	8.5015 0.3347	7.3253 0.2884	7.7896 0.3067	8.3089 0.3271	8.8282 0.3476	9.1375 0.3597
39	8.2883 0.3263	8.9986 0.3543	8.9274 0.3515	7.6920 0.3028	8.1801 0.3221	8.7254 0.3435	9.2708 0.3650	9.5954 0.3778
40	8.6912 0.3422	9.4360 0.3715	9.3616 0.3686	8.0659 0.3176	8.5782 0.3377	9.1501 0.3602	9.7220 0.3828	10.0622 0.3961

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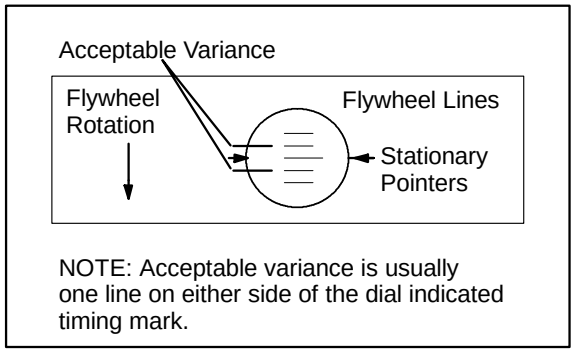
Indy Trail RMK



240 Watt Charging System

NOTE: Always verify timing of engine at room temperature only (68° F/20° C).

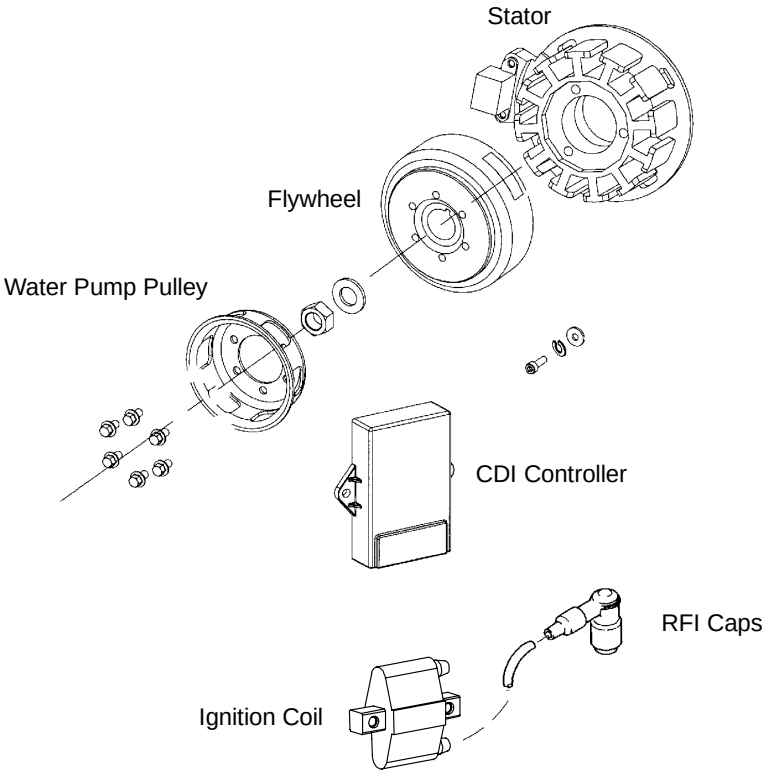
Refer to ignition timing procedure on page 9.9.



NOTE: Acceptable variance is usually one line on either side of the dial indicated timing mark.

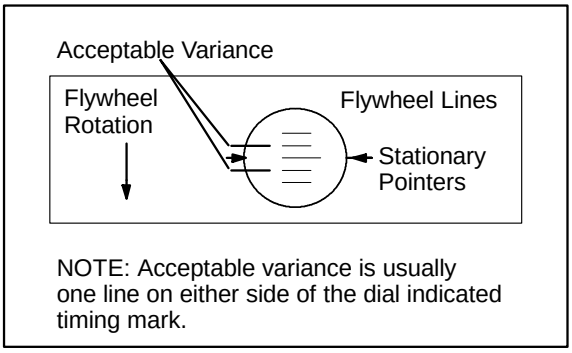
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Indy 500 RMK (SKS Euro) / 600 EDGE RMK



NOTE: Always verify timing of engine at room temperature only (68° F/20° C).

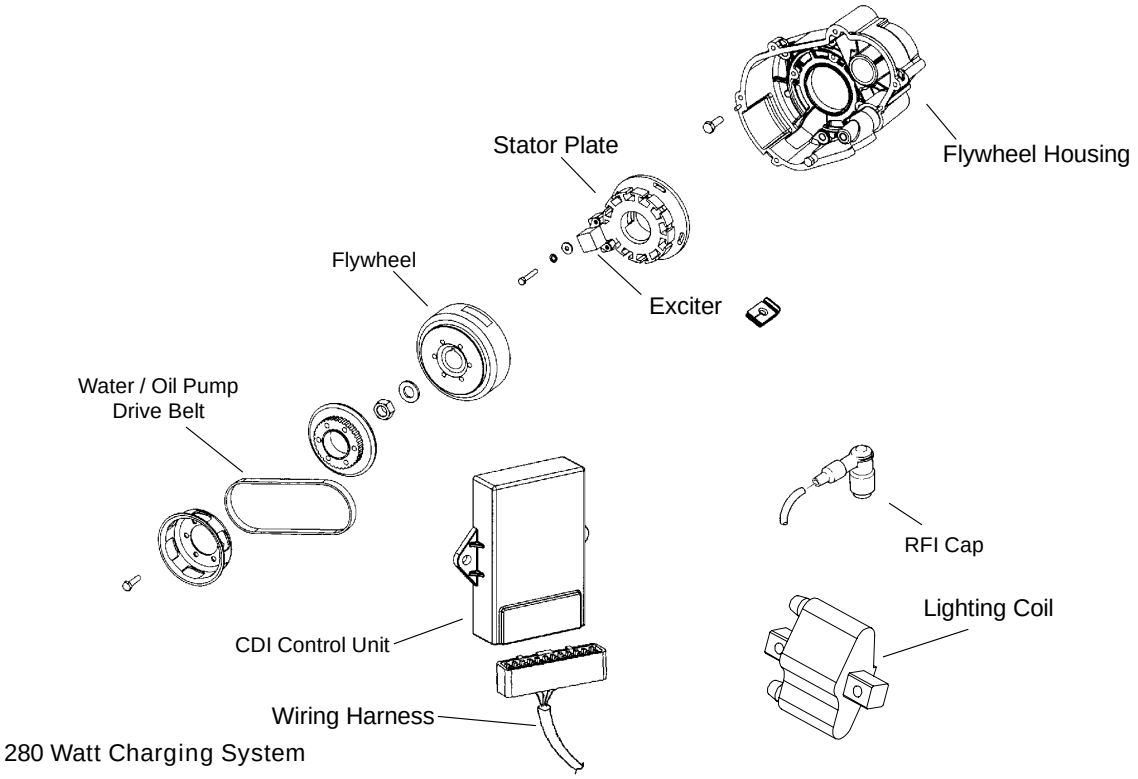
Refer to ignition timing procedure on page 9.9



NOTE: Acceptable variance is usually one line on either side of the dial indicated timing mark.

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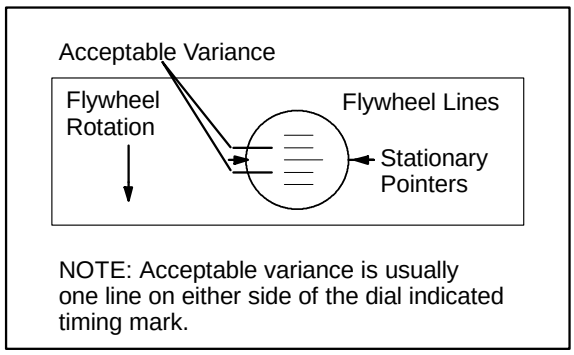
I700 / 800 EDGE RMK



280 Watt Charging System

NOTE: Always verify timing of engine at room temperature only (68° F/20° C).

Refer to ignition timing procedure on page 9.9.



NOTE: Acceptable variance is usually one line on either side of the dial indicated timing mark.

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Timing Procedure - All Models

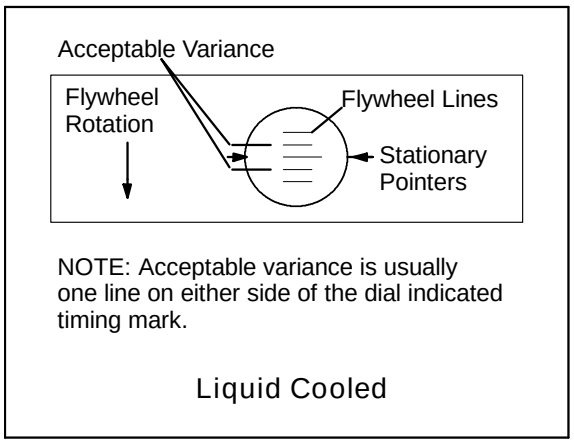
NOTE: Always check ignition timing with the engine at room temperature only (20_C/68_F).

1. Refer to the timing specification charts at the beginning of this section to determine the proper ignition timing for the engine you are working on.
2. Use a dial indicator to place the piston in the proper timing position and mark the flywheel at this point (follow procedure on page 9.4).
3. Connect an accurate tachometer and a good quality timing light to the engine according to manufacturer's instructions. Disconnect the TPS (Throttle Position Sensor) connector from carburetors on models with TPS.
4. Start engine and increase RPM to the point specified in the timing specifications in Chapter 1. Hold the throttle to maintain specified timing RPM.
5. Point the timing light at the timing inspection hole.
6. With your head positioned so there is a straight line between your eye, the stationary pointer and the crankshaft center line, note the relative position between the marked flywheel line and the stationary pointer. If the stationary pointer is aligned with the mark made in Step 2, (or within the acceptable ± variance) the timing is correct.
7. If the pointer is outside the variance, the stator will have to be rotated either with crankshaft rotation (to retard the timing) or against rotation to advance it.

NOTE:Rotate stator plate approximately the same distance as the marks must move.

NOTE:In most cases, the recoil starter housing, recoil drive hub, and flywheel must be removed to loosen the stator bolts and change the timing. On some engines, the stator plate retaining screws can be accessed through the flywheel.

8. Torque stator plate screws and flywheel nut to specified torque. Apply Loctite 262 (red) to crankshaft flywheel taper if required. Refer to the Specifications section for torque specifications and flywheel installation procedure for engine type.



NOTE: Acceptable variance is usually one line on either side of the dial indicated timing mark.

Liquid Cooled

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Preparing a New Battery for Service

To ensure maximum service life and performance from a battery, it must have proper initial servicing. To service a new battery, the following steps must be taken. NOTE: Do not service the battery unless it will be put into regular service within 30 days.

1. Remove vent plug from vent fitting.
2. Fill battery with electrolyte to the upper level marks on the case.
3. Set battery aside and allow it to cool and stabilize for 30 minutes.
4. Add electrolyte to bring the level back to the upper level mark on the case. NOTE: This is the last time that electrolyte should be added. If the level becomes low after this point, add only distilled water.
5. Charge battery at 1/10 of its amp/hour rating.
   Example:1/10 of 9 amp battery = .9 amps, 1/10 of 14 amp battery = 1.4 amps, 1/10 of 18 amp battery = 1.8 amps (recommended charging rates).
6. Check specific gravity of each cell with a hydrometer to ensure each has a reading of 1.270 or higher.

Battery Testing

There are three easy tests which can determine battery condition. Whenever the complaint is related to either the starting or charging systems, the battery should be checked first.

Lead-acid batteries should be kept at or as near full charge as possible. If the battery is stored or used in a partially charged condition, hard crystal sulfation will form on the plates, reducing their efficiency and possibly ruining the battery.

Open Circuit Voltage Test (OCV)

Battery voltage should be checked with a digital multitester. Readings of 12.6 or less require further battery testing and charging.

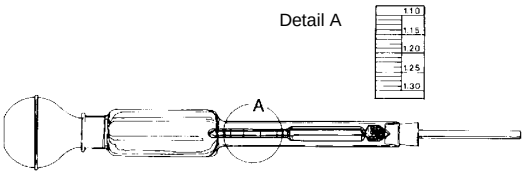
Specific Gravity Test

A tool such as the battery hydrometer (PN 2870836) can be used to measure electrolyte strength or specific gravity. As the battery goes through the charge/discharge cycle, the electrolyte goes from a heavy , more acidic state at full charge to a light, more water state when discharged. The hydrometer can measure state of charge and differences between cells in a multi-cell battery. Readings of 1.270 or greater should be observed in a fully charged battery. Differences of more than .025 between the lowest and highest cell readings indicate a need to replace the battery.

State Of Charge	Conventional Lead-acid	Yumacron Type
100% Charged	12.60V	12.70V
75% Charged	12.40V	12.50V
50% Charged	12.10V	12.20V
25% Charged	11.90V	12.0V
0% Charged	Less Than 11.80V	Less Than 11.9V

State Of Charge*	Conventional Lead-acid	Yumacron Type
100% Charged	1.265	1.275
75% Charged	1.210	1.225
50% Charged	1.160	1.175
25% Charged	1.120	1.135
0% Charged	Less Than 1.100	Less Than 1.115

*at 80° F



NOTE: Subtract .01 from the specific gravity for electrolyte at 40° F and compare these values to the chart.

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Load Test

NOTE:This test can only be performed on machines equipped with electric start. This test cannot be performed if the engine or starting system is not working properly.

A battery may indicate a fully charge condition on the OCV test and the specific gravity test, but still not have the storage capacity necessary to properly function in the electrical system. For this reason, a battery capacity or load test should be conducted whenever poor battery performance is encountered.

To perform the test, hook a multitester to the battery in the same manner as in the OCV test. The reading should be 12.6 volts or greater. Engage the electric starter and view the registered battery voltage while cranking the engine. Continue the test for 15 seconds. During this cranking period, the observed voltage should not drop below 9.5 volts. If the beginning voltage is 12.6 or higher and the cranking voltage drops below 9.5 volts during the test, replace the battery.

Refilling a Low Battery

The normal charge/discharge cycle of a battery causes the cells to give off gases. These gases, hydrogen and oxygen, are the components of water. Because of the loss of these gases and the lowering of the electrolyte level, it will be necessary to add pure, clean distilled water to bring the fluid to the proper level. After filling, charge the battery to raise the specific gravity to1.270 or greater.

Off Season Storage

To prevent battery damage during extended periods of non-use, the following basic maintenance items must be performed.

1. Remove battery from machine and wash the case and battery tray with a mild solution of baking soda and water. Rinse with lots of fresh water after cleaning. CAUTION: Do not allow any of the baking soda solution to enter the battery or the acid will be neutralized.
2. Using a wire brush or knife, remove any corrosion from the cables and terminals.
3. Make sure the electrolyte is at the proper level. Add distilled water if necessary.
4. Charge at a rate no greater than 1/10 of the battery's amp/hr capacity until the electrolyte's specific gravity reaches 1.270 or greater.
5. The battery may be stored either in the machine with the cables disconnected, or on a piece of wood in a cool place. NOTE: Stored batteries lose their charge at the rate of 1% per day. They should be fully recharged every 30 to 60 days during a non-use period. If stored during winter months, the electrolyte will freeze at higher temperatures as the battery discharges. The chart indicates freezing points by specific gravity.

Specific Gravity of Electrolyte	Freezing Point
1.265	-75° F
1.225	-35° F
1.200	-17° F
1.150	+5° F
1.100	+18° F
1.050	+27° F

Charging Procedure

Charge battery with a charger no larger than 1/10 of the battery's amp/hr rating for as many hours as needed to raise the specific gravity to 1.270 or greater.

⚠ WARNING

The gases given off by a battery are explosive. Any spark or open flame near a battery can cause an explosion which will spray battery acid on anyone close to it. If battery acid gets on anyone, wash the affected area with large quantities of cool water and seek immediate medical attention.

⚠ WARNING

Battery electrolyte is poisonous. It contains acid!

Serious burns can result from contact with the skin, eyes, or clothing.

ANTIDOTE:

EXTERNAL: Flush with water.

INTERNAL: Drink large quantities of water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil. Call physician immediately.

EYES: Flush with water for 15 minutes and get prompt medical attention.

Batteries produce explosive gases. Keep sparks, flame, cigarettes, etc. away. Ventilate when charging or using in closed space. Always shield eyes when working near batteries.

KEEP OUT OF REACH OF CHILDREN.

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Dynamic Testing of the Electric Starting System

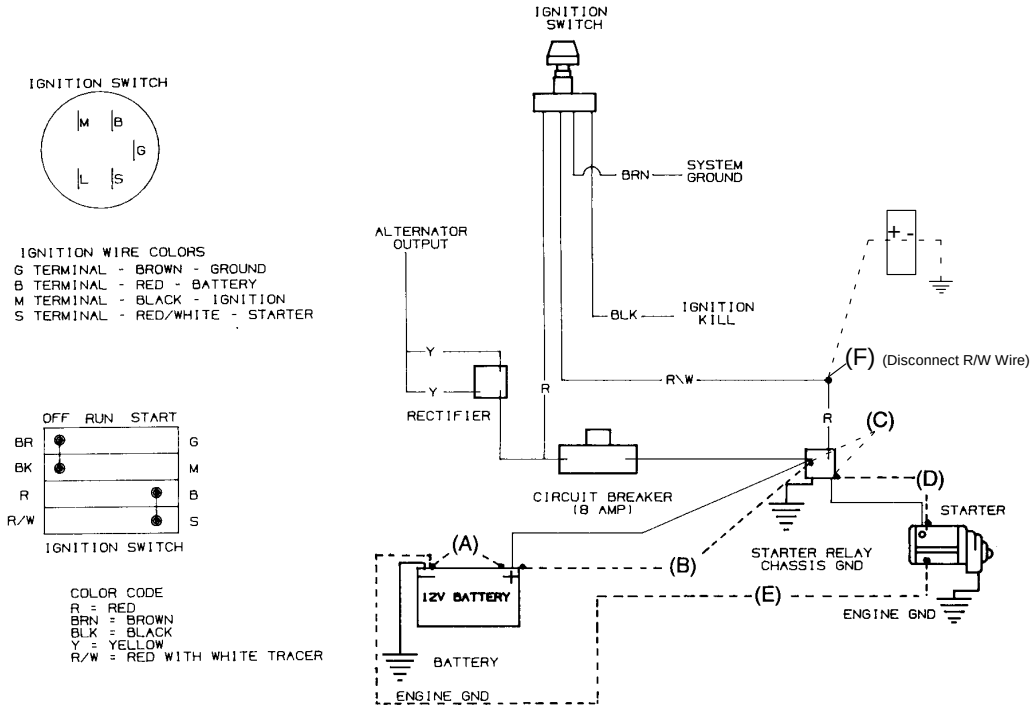
Condition: Starter fails to turn motor or motor turns slowly.

NOTE: Be sure the engine crankshaft is free to turn before proceeding. For this test a digital multitester must be used. Meter connections are shown on page 9.15.

With tester on VDC, place tester black lead on battery negative (-) terminal and tester red lead on battery positive (+) terminal. (A) Page 9.13. Reading should be 12.6V or greater. Is it? No ! Yes#	Remove battery, test and/or service. Install a fully charged shop battery to continue the test. (Continue with left column)
Disconnect red engagement coil wire from start solenoid. Connect black tester wire to an appropriate ground and red lead to red harness wire at solenoid. (F) page 9.13. Rotate ignition key to the start position. Meter should read battery voltage. Does it? No ! Yes#	With black tester lead on ground, check for voltage at large relay in terminal,, circuit breaker in and out terminals, and across both sides (red and red/white) of the ignition switch with switch on start. Repair or replace any defective parts.
Reconnect solenoid, connect tester black lead to battery positive terminal and red tester lead to solenoid end of battery to solenoid cable. (B) Page 9.13. Turn key to start position. The reading must be less than .1V DC. Is it? No ! Yes#	Clean battery to solenoid cable ends or replace cable.
Connect black tester lead to solenoid end of battery to solenoid cable and red tester lead to solenoid end of solenoid to starter cable. (C) Page 9.13. Turn key to start position. The reading must be less than .1V DC. Is it? No ! Yes#	Replace starter solenoid.
Connect black tester lead to solenoid end of solenoid to starter cable and red tester lead to starter end of same cable. (D) Page 9.13. Turn key to start position. The reading must be less than .1V DC. Is it? No ! Yes#	Clean solenoid to starter cable ends or replace cable.
Connect black tester lead to starter frame. Connect red tester lead to battery negative (-) terminal. (E) Page 9.13. Turn key to start position. The reading should be less than .1V DC. Is it? No ! Yes#	Clean ends of engine to battery negative cable or replace cable.
If all these tests indicate a good condition, yet the starter still fails to turn, or turns slowly, the starter must be remove for static testing and inspection.	

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Starter Motor Static Testing



1. Remove starter motor and disassemble. (See page 9.14 for exploded view) Mark end covers and housing for proper reassembly.
2. Remove pinion retaining snap ring, spring and pinion gear.
3. Remove brush end bushing dust cover.
4. Remove housing through bolts.
5. Slide brush end frame off end of starter. NOTE: The electrical input post must stay with the field coil housing.
6. Slide positive brush springs to the side, pull brushes out of their guides and remove brush plate.
7. Clean and inspect starter components. NOTE: Some cleaning solvents may damage the insulation in the starter. Care should be exercised when selecting an appropriate solvent. The brushes must slide freely in their holders. If the commutator needs cleaning, use only an electrical contact cleaner and/or a non-metallic grit sandpaper. Replace brush assembly when worn to 5/16″ (.8 cm) or less.

Starter Housing and Field Coil Inspection

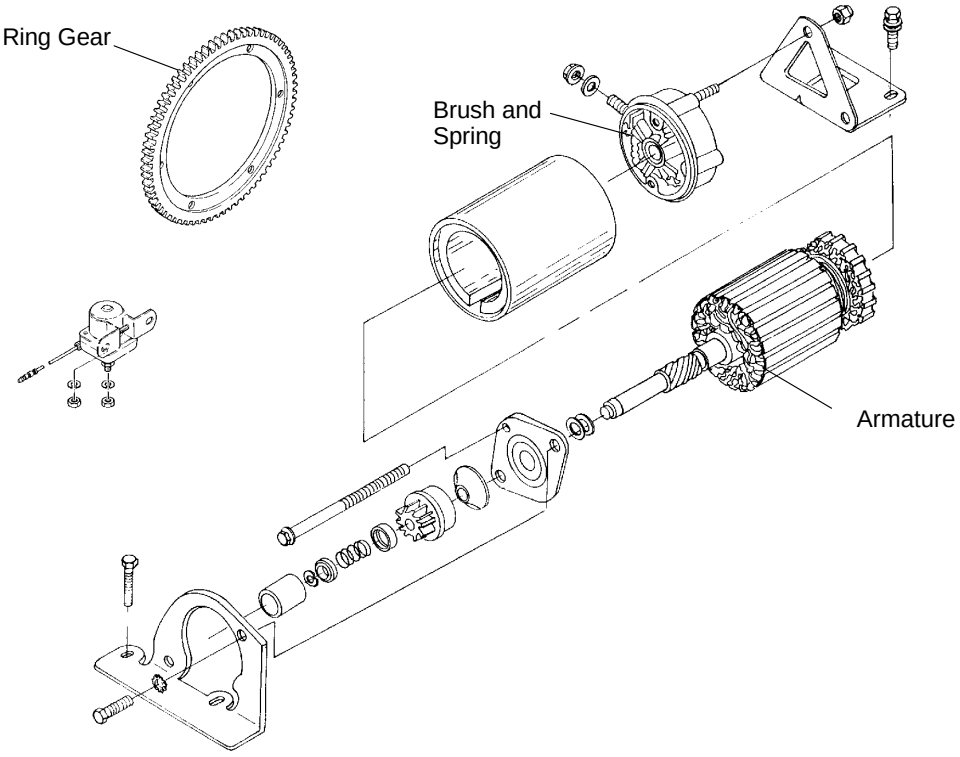
1. Using a digital multitester, measure resistance between starter input terminal and insulated brushes. The reading should be .3 ohms or less.
2. Measure resistance between insulated brushes and field coil housing. The reading should be infinite.
3. Inspect insulated brush wire and field coil insulation for damage. Repair or replace components as required.

Armature Testing

1. Using a digital multitester, measure resistance between each of the segments of the commutator. The reading should indicate .3 ohms or less.
2. Measure resistance between commutator and armature shaft. Reading should be infinity.
3. Place armature in a growler. With the growler on, position a hacksaw blade lengthwise 1/8″ (.03 cm) above armature coil laminates. Rotate armature 360°. If hacksaw blade is drawn to the armature on any pole, the armature is shorted and must be replaced.

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Starter Assembly

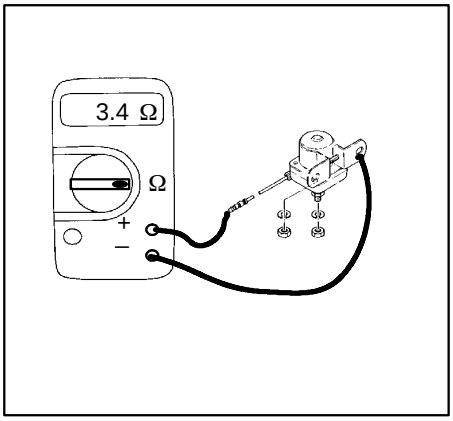


1. Slide armature into field coil housing.
2. Lightly grease drive end bushing and install drive end frame on armature.
3. Mount starter vertically in a vice with brush end up.
4. While holding negative brushes out against their springs, slide brush plate down onto the commutator.
5. While holding positive brush springs to the side, slide positive brushes into their holders and correctly position the springs on top of the brushes.
6. Using a non-petroleum grease, lubricate brush end bushing and slide it onto end of armature.
7. Align threaded holes in brush plate and install dust cover and screws.
8. Reinstall through bolts and properly tighten all screws.
9. Lightly grease pinion shaft and install pinion, spring stopper and snap ring.

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Starter Solenoid Bench Test

The only test which can be done on the bench is the pull in coil resistance, which should be 3.4 ohms.



Starter Installation

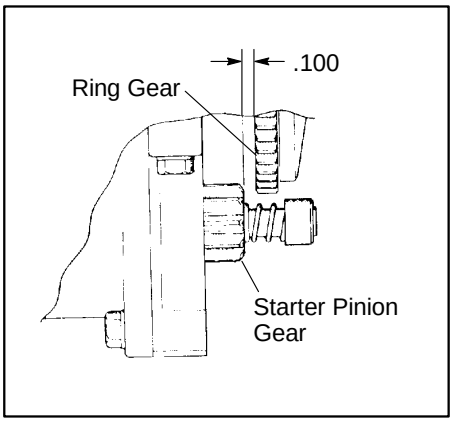
1. Position starter motor so there is no less than .100″ clearance between the ring gear and the starter motor pinion gear.
2. Torque through bolt mount bracket nuts to specification.
3. Torque 8mm (drive end) mount bolts to specification.
4. Torque 6mm (brush end) bracket to specification.

8mm Drive End Mount Bolt Torque - 15 ft. lbs. (21 Nm)

6mm Drive End Mount Bolt Torque - 5 ft. lbs. (6.9 Nm)

Mounting Bracket Nut Torque -

30-42 in. lbs. (3.4-4.8 Nm)



Unregulated Voltage

1. Test resistance of lighting coil and compare to specifications in the model specific wiring diagram. Reminder: Meter resistance must be subtracted from reading.

NOTE: 0.3 to 0.5 ohms may be less than the internal resistance of your meter leads or meter. Before measuring the stator resistance, short the meter leads together and read the display and record this measurement. Subtract this reading from the stator resistance readings.

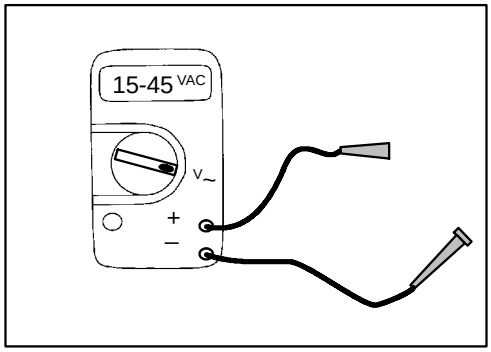
EXAMPLE: Short meter leads together, meter reads 0.7 ohms. Measure stator resistance, meter reads 1.10 ohms. Subtract 0.7 ohms (meter/lead resistance) from 1.10 ohms (reading obtained when checking yellow lead to brown lead). True reading is: 1.10 ohms (observed reading when checking stator)

–0.7 ohms (meter/lead resistance)

= 0.4 ohms (true stator resistance)

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Unregulated Voltage - continued



2. Turn the multitester dial to the Volts AC (V µ) position.
3. Disconnect the alternator to main harness connector at engine.
4. Connect one of the tester leads to the yellow alternator wire and the other lead to the brown alternator wire. NOTE: On floating alternators, the yellow/red stator wire should connect to the brown stator wire. If it does not, the system will not have a ground and will not operate.
5. Start the engine. While observing the voltage reading, increase the engine speed to about 3000 RPM. Readings of between 15 and 45 VAC are considered normal.

Short Circuit Current (AC Amp Test)

1. Turn multitester dial to A µ.
2. Connect red lead to 10A terminal.
3. Connect black lead to Com (–) meter terminal.
4. Disconnect lighting/charge coil wires from system. Connect meter leads to coil wires leading to stator coils.
5. Start and idle engine. Readings should be above 5 amps. Refer to Amps AC on page 9.2.

Regulated Voltage

1. Connect the alternator to main harness connector.
2. Insert one of the tester leads along the side of the yellow regulator wire connector between the insulation and the terminal.
3. Ground the other tester lead.
4. Start engine and observe headlight output. Increase engine RPM. If the headlights seem dim above 3500 RPM, let the engine return to idle and disconnect the yellow wire from the regulator. Carefully observe the voltage reading. Do not allow voltage to increase above 14.0 volts.
5. Slowly increase RPM. Voltage above 12 volts at 2500 - 3000 and a bright headlight, indicates a good lighting coil. Voltage below 10 volts at 3000 indicates excessive system loads, poor flywheel magnets, lighting coil problems, or wires harness problems. Check for partially grounded (shorted) yellow wire.
6. Reconnect the yellow regulator wire and increase the RPM. If the headlight was bright with the regulator disconnected and dim when connected at the same RPM, the regulator or regulator ground is at fault.

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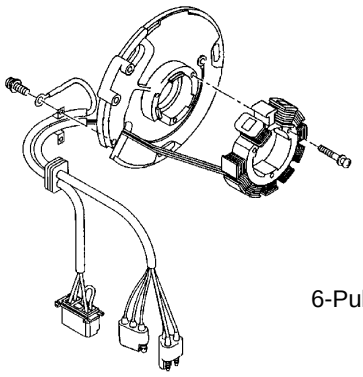
2-Pulse and 6 Pulse Alternators

The difference between a 2 pulse and 6 pulse alternator system is the number of AC sine waves created by the alternator in one revolution of the crankshaft. For example, on a 6 pulse system, the alternator will create 6 pulses, or 6 complete AC sine waves, in one crankshaft revolution. The tachometer reads these sine waves, therefore giving you accurate RPM readings. Refer to the following text for applications.

Polaris Snowmobiles:

Polaris Domestic twin cylinder engines . . . . . 6 pulse

800 Fuji twin cylinder . . . . . 6 pulse



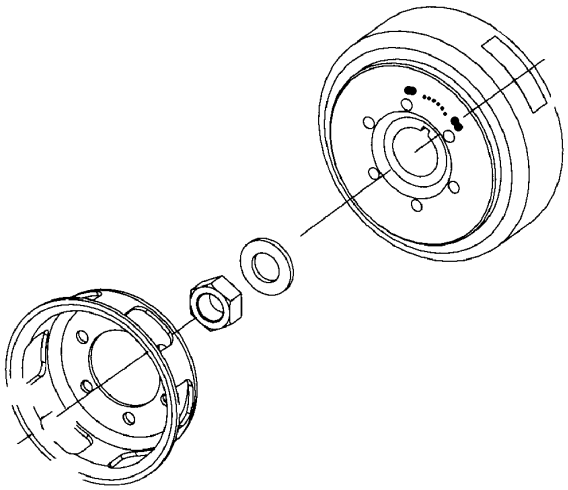
6-Pulse

Tachometers:

Tachometers for snowmobiles will have an identification marking on the back side. For example: The tachometer for a 600 RMK will have “6 pulse” (or 6P) written on it.

2002 Flywheels

The flywheels used on model year 2002 snowmobiles will not work correctly if used on earlier build models. The 2002 flywheel is calibrated specifically for 2002 CDI boxes and will not fit on earlier snowmobiles if installed on earlier snowmobiles the flywheel may cause CDI failure. The 2002 flywheel will be stamped with two red dots and “14 ONLY”, this means that this flywheel will only work with 14 degree CDI boxes. These flywheels were used on the 2001 440 Pro X and the 2001 700 XC SP with Exhaust Valves.



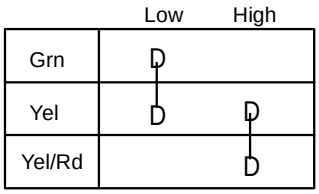
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Headlight Bulb Filament Continuity Test

1. Turn the Multitester dial to the ohms (Ω) position.
2. Disconnect the wire harness from the headlight bulb.
3. Viewing the back of the bulb with the terminal blades at the 9, 12 and 3 o'clock position, connect the black multitester lead to the 9 o'clock blade.
4. Touch the red tester lead to the 12 o'clock terminal and then to the 3 o'clock terminal, noting the resistance value of each. A reading of between 2 and 5 ohms is good. An open reading indicates a bad element.

Hi/Lo Beam Switch Testing

1. Set the multitester dial to the ohms (Ω) position.
2. If the Hi/Lo switch has not been removed from the machine, disconnect the switch to harness plug-in connector.
3. With the Hi/Lo switch in the Lo beam position, check the resistance between the yellow and the green switch wires. The reading should be less than .4 ohms.
4. Turn the Hi/Lo switch to the Hi beam position and the multitester should indicate an open circuit (OL) reading.
5. Move one of the tester leads from the green to the red switch wire. The multitester should now read less than .4 ohms.
6. Turn the Hi/Lo Switch back to the Lo beam position and the meter should again read an open circuit (OL).



High/Low Switch

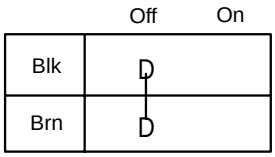
Seat Harness Troubleshooting

1. Remove the taillight lens.
2. Remove the two taillight bulbs and the brakelight bulb.
3. Separate the seat harness from the main harness by unplugging the connector at the right rear of the tank.
4. With the multitester dial set on ohms (Ω) connect either meter test lead to the brown seat harness wire.
5. Touch the other tester lead to first the yellow wire and then the orange wire. Observe the readings. Readings other than an open circuit (O.L.) indicate a shorted harness or bulb socket. NOTE: The bulb socket tangs sometimes short to ground with the bulb removed.
6. Check between the yellow and orange wires in the same manner to check for a short between the brake and running lights. If damaged wiring is found, remove the seat.
7. Tip the seat over and remove the right side seat cover staples. Locate and repair the harness problem.
8. Reinstall the staples and re-check the seat harness.

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Ignition Switch Testing (Non-Electric Start)

1. Set the multitester dial to the ohms (Ω) position. Connect one of the tester leads to either of the switch terminals and the other tester lead to the other switch terminal.
2. With the switch off, the reading should be less than .4 ohms. With the switch on, the reading must be an open circuit (OL).
3. Check the resistance between each of the switch terminals and the switch body. With the switch still in the on position, there must be an open circuit (OL) reading. Readings other than those listed indicate a defective switch.

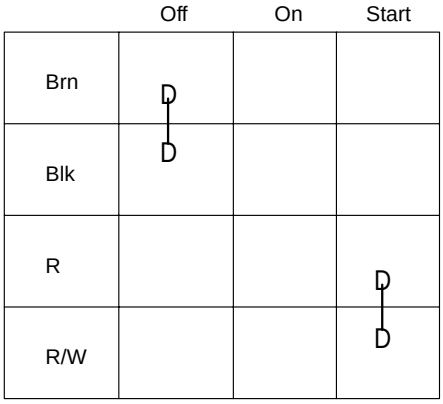


Ignition Switch

Ignition Switch Testing (Electric Start Models)

NOTE: Refer to the appropriate model and year wiring diagram for ignition switch wire colors and connections.

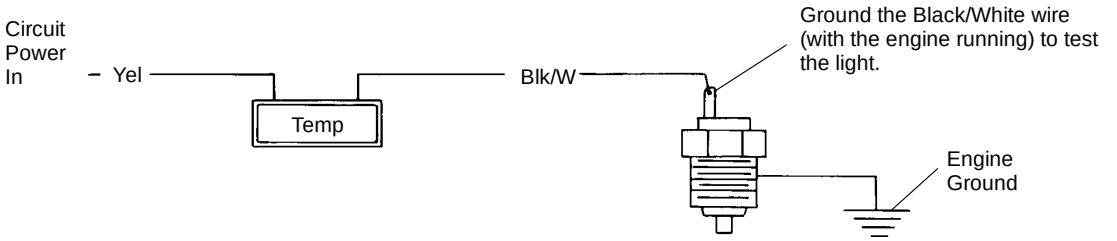
1. Disconnect wires. Set the multitester dial to the ohms (Ω) position.
2. With the key in the off position, check the resistance between the G (Ground, brown) terminal and the M (Mag, black) terminal. This reading must be less than .4 ohms.
3. Turn the key to the on position. The multitester should now read an open circuit (OL).
4. Move the tester lead from the G terminal to the switch housing and re-check the reading. It should also be an open circuit (OL).
5. Place one of the tester leads on the B (Battery, red) terminal and the other tester lead on the S (Starter, blue) terminal. With the key in the on position, there must be an open circuit (OL) reading.
6. Turn the key to the start position. The reading should be less than .4 ohms. Readings other than the ones listed indicate a defective switch.



Ignition Switch - Electric Start

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Coolant Temperature Indicator Testing



The indicator light is controlled by a temperature/warning switch installed into the engine cooling system. When engine coolant temperature reaches approximately 205° F, the switch closes, completing the circuit through the indicator light to ground. The system should be tested periodically for proper operation.

Lamp Circuit Test

1. Remove wire from temperature sensing switch located under thermostat housing.
2. With engine idling, ground wire to engine. The temperature warning lamp on the console should light. If not, replace the lamp assembly or inspect wiring for shorts or open circuit.

Temp Light Temperature Sensor Test

The temperature/warning switch is normally open.

1. Set the multitester on the ohms (Ω) scale.
2. Disconnect the lamp wire.
3. Connect one test probe to the switch terminal and the other to engine ground. The meter should show an open circuit (OL). This indicates a normally open switch. If the switch were heated to approximately 205° F, the contact in the switch would close and the reading would be less than .4 ohms.

CAUTION:

If attempting to heat the sensor to close the contacts, heat only in a water bath. Never subject the sensor to an open flame to attempt to close the contacts as sensor damage will result.

Coolant Temperature Sensor

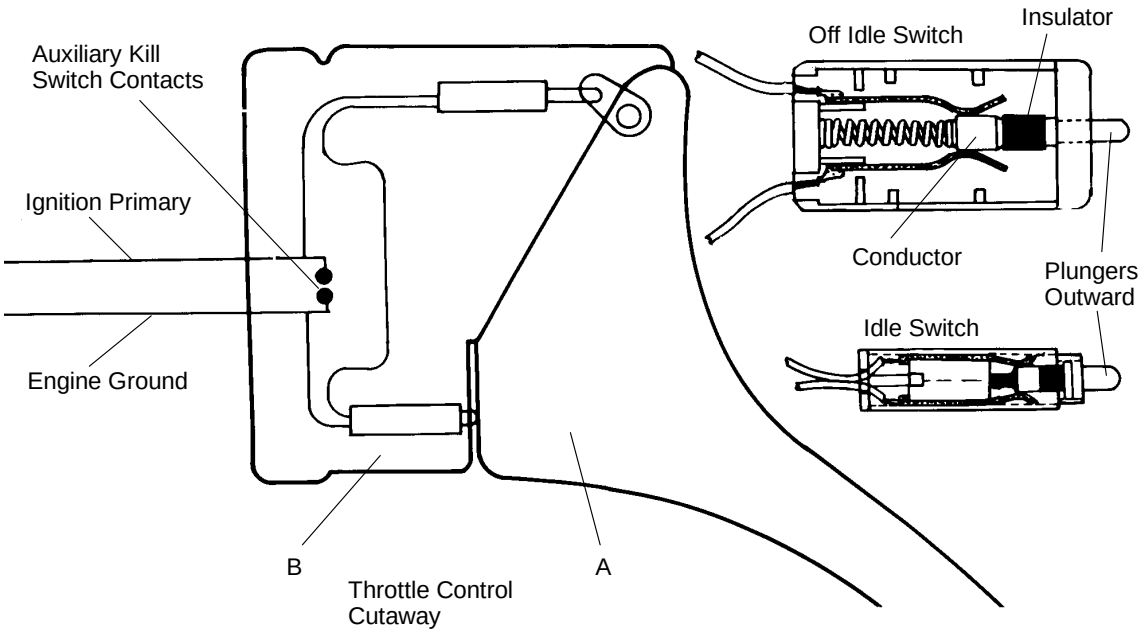
The temperature sensor works in conjunction with the throttle position sensor, (TPS), and CDI controller. The CDI has the ability to retard ignition timing whenever engine temperature exceeds a given set of parameters at specific RPM ranges.

Because of the three inputs the temperature indicator light and ignition timing depend on, there is no one given specification to when the temperature warning light or ignition limiting function will activate.

Coolant Temperature Sensor Testing

Temperature Sensor	
Temperature	Resistance
20°C / 68°F	2432±250Ω
100°C / 212°F	192±30Ω

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The speed control assurance consists of two series connected switches. If one or both switch plungers are positioned inward, the circuit is open and the engine will run.

At idle, with the throttle lever properly adjusted, the bottom switch circuit is open and the plunger is inward. The top switch circuit is closed, and the plunger is outward. The speed control circuit is open, allowing the engine to run.

As the throttle lever is actuated to an off idle position, the top switch circuit is opened (plunger in) and the bottom switch circuit is closed (plunger out). The speed control circuit is still open, allowing the engine to run.

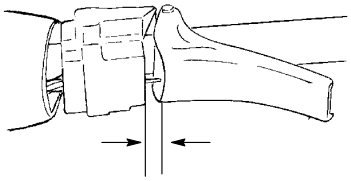
In the event the carburetor or controls malfunction and allow the throttle cable to become slack, the circuit will close (both switch plungers out), grounding the ignition system and causing the engine to stop.

Speed Control Assurance Adjustment

Throttle lever free play must always provide a specified clearance between throttle lever and throttle block. This clearance is controlled by the throttle cable sleeve(s) and the idle speed screw(s).

Throttle Lever Freeplay -

.010 - .030″ (.25 - .8 mm)



If the idle speed screw(s) is adjusted inward and the cable sleeve(s) is not adjusted to take up the throttle lever to throttle block clearance, the engine may misfire or kill upon initial throttle opening.

CAUTION:

After any idle speed adjustments are made, the throttle lever to throttle block clearance and oil pump adjustment must be checked and adjusted.

NOTE: When adjustments are made on models which have more than one carburetor, refer to Section 6, Carburetion, for proper carburetor synchronization adjustments.

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1. Set the multitester in the ohms (Ω) position.
2. Disconnect the switch harness from the main wire harness.
3. Connect the two multitester leads to the two switch wires.

Test 1 - Open Circuit - Run

With the auxiliary shut-off switch in the ON position, the multitester should read an open circuit (OL). As the throttle lever is moved from idle to off idle, the tester should continue to read an open circuit. If the tester fluctuates and the throttle lever to throttle block clearance is adjusted properly, the switch assembly must be replaced.

Test 2 - Closed Circuit - Kill

The two speed control switches must make a complete circuit to kill the engine. To check the switches, pull the throttle lever out away from the throttle block. With the switch plungers outward and the auxiliary shut-off switch in the ON position, the multitester must read less than .4 ohms resistance. Inspect wires and repair if damaged, or replace switch assembly.

Test 3 - Auxiliary Shut-Off

The multitester should read less than .4 ohms in the OFF position and an open circuit in the the ON position. Inspect wires and repair if damaged, or replace switch assembly.

Speed Control Assurance Replacement

Auxiliary shut-off and speed control assurance switches are connected and replaced as a unit from the back side of the throttle block.

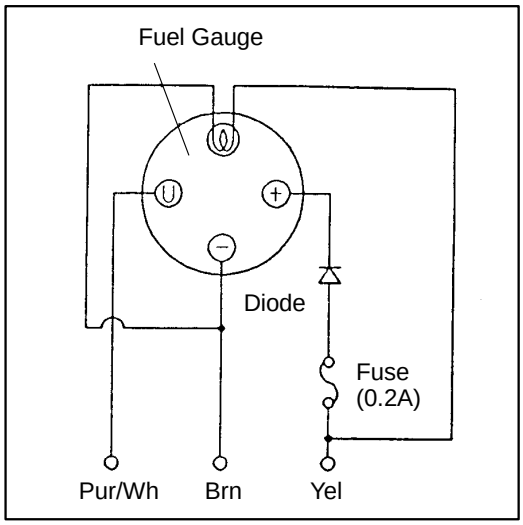
1. Remove the handlebar pad and/or throttle block backing plate.
2. Slide out the auxiliary shut-off portion of the switch.
3. Remove the two screws securing the two speed control assurance switches.
4. Remove the switches noting their placement in the throttle block.
5. Replace the assembly and check its operation.

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Use the multitester ohmmeter to test the resistance of the fuel sender.

Position	Ohms	Range
Empty	95 Ω	90 - 97.5 Ω
Full	7 Ω	4.5 - 13 Ω

The supply voltage to the gauge should be 13.5 VAC.



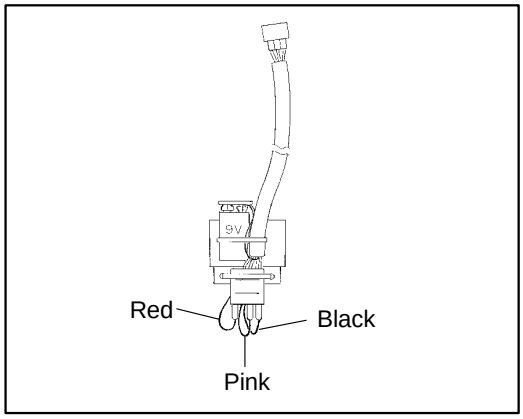
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TPS (Throttle Position Sensor)

Some Polaris snowmobiles are manufactured with Throttle Position Sensors (TPS). The TPS comes set from the factory and should not need adjustment. However, upon removal of the TPS, you must mark the TPS position on the carburetor and replace it in the exact same position as removal. Polaris has developed a TPS test kit for aid in setting the Throttle Position Sensor to specification.

TPS Testing

1. Illustration at right shows the TPS sensor kit PN 2201519.



2. Make sure your 9 volt battery is in good condition by inserting the black volt meter probe from your Fluke t meter in the black terminal and the red probe into the pink terminal. Voltage should read 4.99 to 5.01 volts. If not, try a new 9 volt battery.



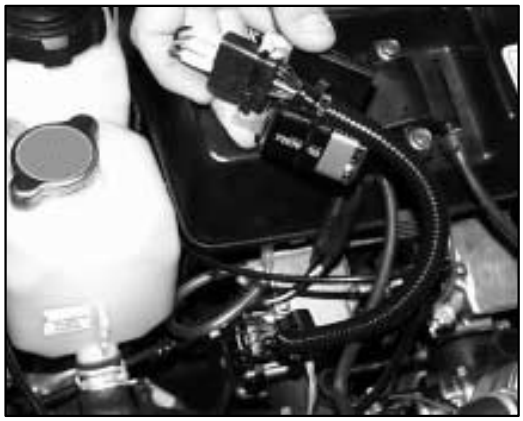
3. Remove the connector from the TPS.



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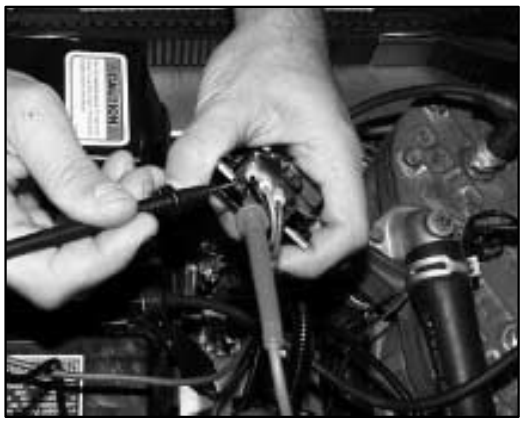
TPS Testing - Continued

4. Install test harness connector on TPS.



5. Insert red voltmeter lead into yellow terminal, and black lead to black terminal. Slowly open throttle and check for smooth voltage change.

NOTE:The fluke meter will change scales and show O.L. momentarily when throttle is opening.



6. Voltage at yellow terminal should be 4.0 to 4.2 volts at Wide Open Throttle for domestic engines, and 3.77 volts for Fuji engines (800 XCR). If not, the TPS must be adjusted to this specification.



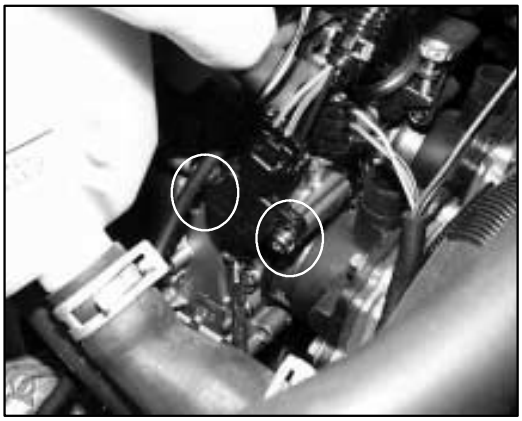
TPS Volts at Wide Open Throttle - Polaris Domestic Engines:
4.0 to 4.2 volts

TPS Volts at Wide Open Throttle - Fuji 800 XCR Engine:
3.77 Volts

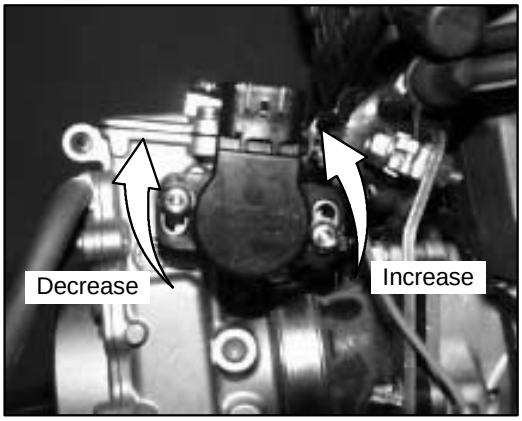
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TPS Adjustment

1. Loosen the two screws that hold the TPS on the carburetors.



2. Turn the TPS clockwise to decrease voltage, or counterclockwise to increase voltage.



3. When the TPS is set to the desired voltage, tighten the holding screws and verify voltage is 4.0 to 4.2 volts at Wide Open Throttle for Polaris domestic engines, and 3.77 volts for Fuji engines (800 XCR).



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TPS Adjustment - Continued

4. When the TPS is set and voltage is verified, remove the tester and re-install the snowmobile TPS harness.



5. When storing the TPS tester, remove the red terminal of the tester and insert it in the blank terminal of the harness.



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Condition: No Spark

Disconnect the single black (black/white) wire from the CDI Module to the ignition kill circuit. Does it have a spark? Yes ! No#	Check the ignition switch, wire harness, throttle safety switches and kill switch for proper adjustment or short to ground. Repair or replace as necessary.
Disconnect the stator to CDI module wires. Test the resistance values of the stator coils as per the wiring diagrams. Are the resistance values within specs? Yes ! No#	All except 3 cylinders: If the parts of the ignition system under the flywheel check OK, the only remaining component is the coil/CDI module assembly. Replace the module with another with the same number. (See ignition data) All 3 cylinders: Disconnect and check the secondary ignition coil resistances. Refer to the resistance values listed in wiring diagrams. If the coil resistance values are within specs, replace the CDI module.
Isolate which component's resistance is not within specs. Remove the flywheel and stator. Recheck the resistances; look for pinched or bare harness wires; or replace the coil.	

Condition: Incorrect Advance/Retard

Follow the engine timing procedure for checking running timing at recommended RPM. Is the timing within limits? No ! Yes #	Adjust the ignition timing by rotating the stator plate to correct the timing. After adjusting the recommended RPM timing, continue with operating RPM timing if poor performance exists. (Continue on with left column.)
Remove the ignition kill circuit by disconnecting the single black wire between the CDI module and the machine harness. Is the timing now correct? Yes ! No#	Check the ignition switch, throttle safety switches, kill switch and harness for damage which can cause intermittent shorting problems. Correct the problem.
Verify the correct CDI module by comparing the CU code on the box to the information listed in the ignition data charts at the beginning of this section. Is it the right module? No ! Yes#	Replace the module with the correct part and readjust the ignition timing.
Check the resistance of the coils under the flywheel. Compare these to values on wiring diagram. Are they within limits? No ! Yes#	Check the wiring connecting the coils and/or replace the coils as necessary.

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Notes

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CHAPTER 10
WIRING DIAGRAMS

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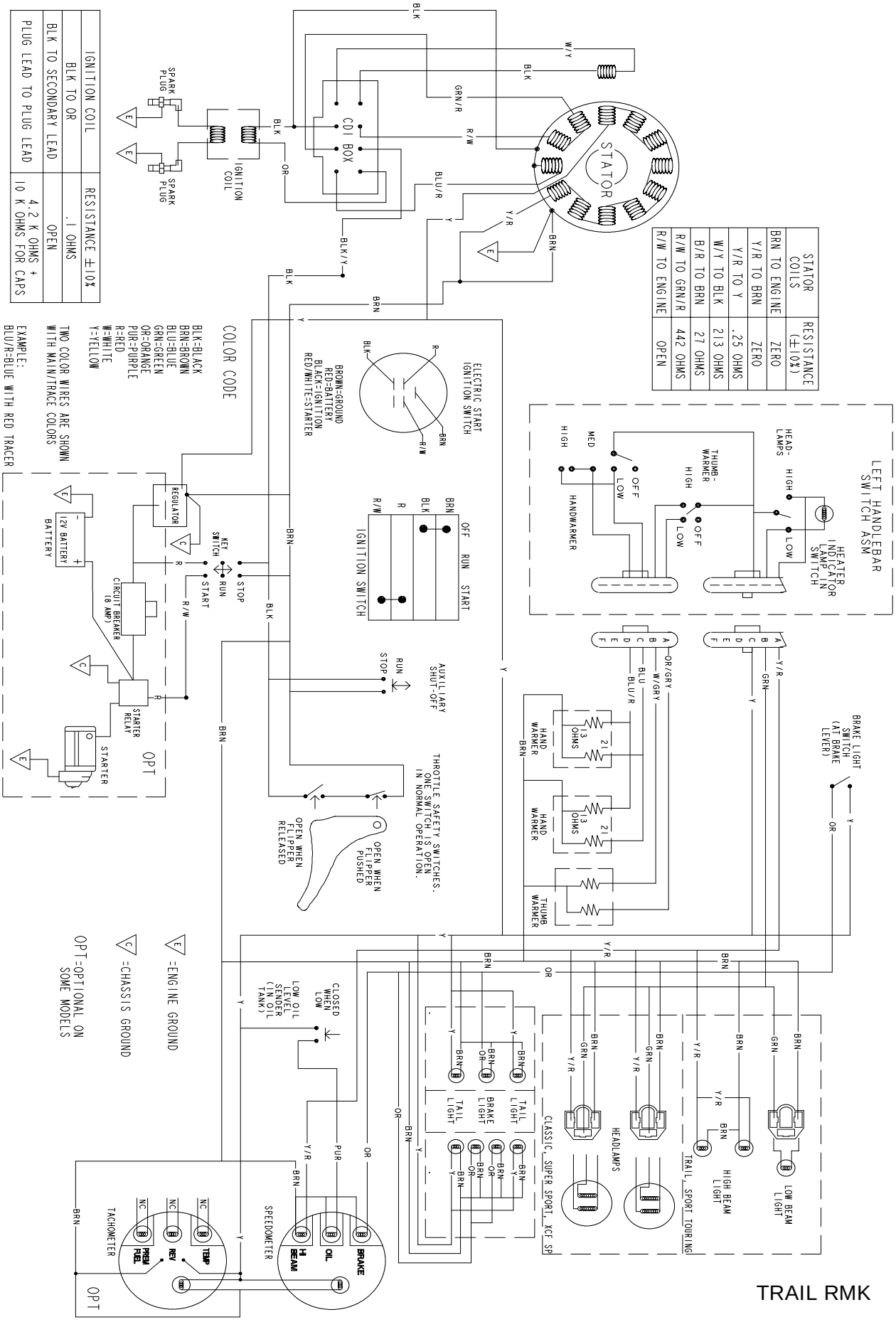
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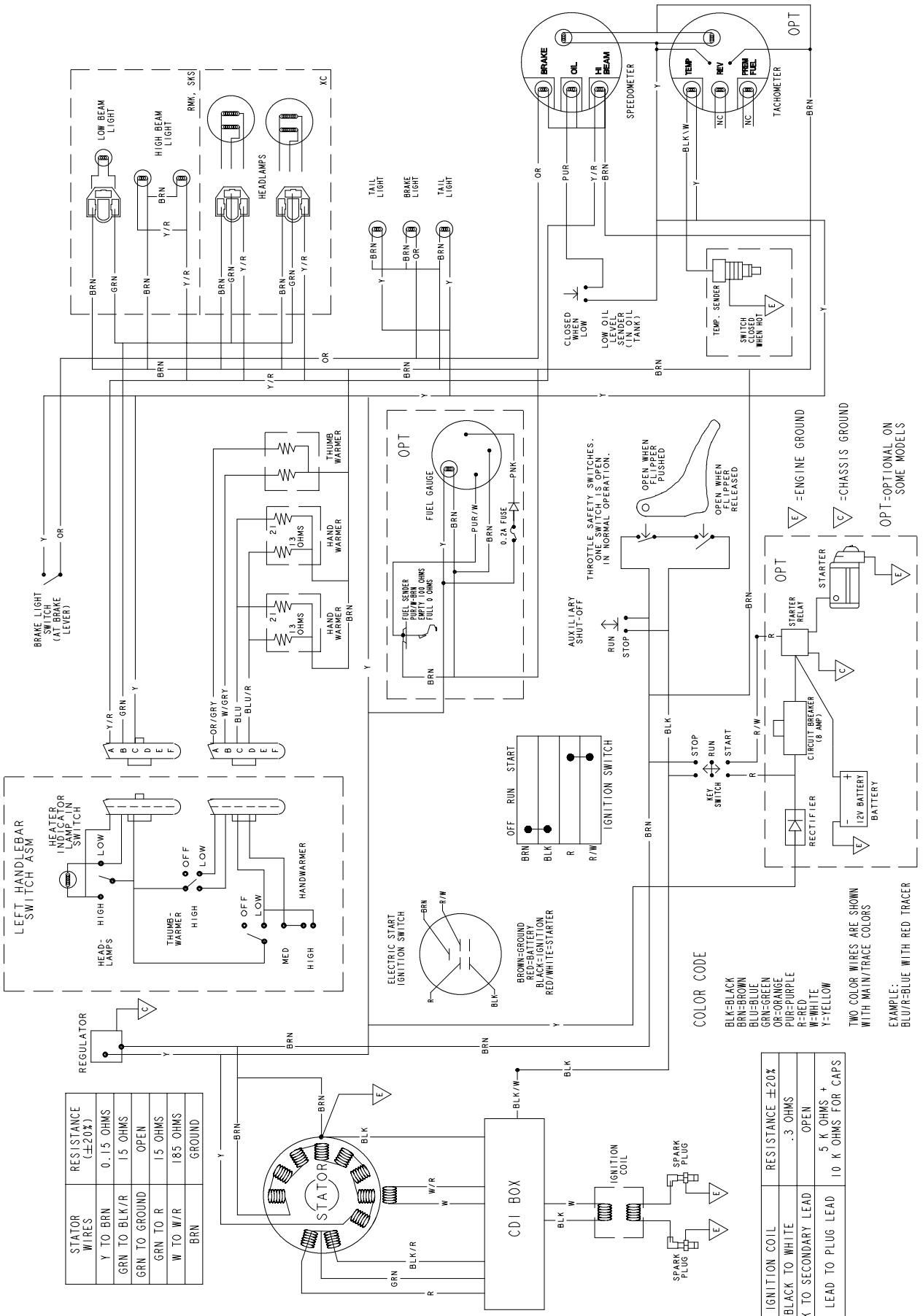
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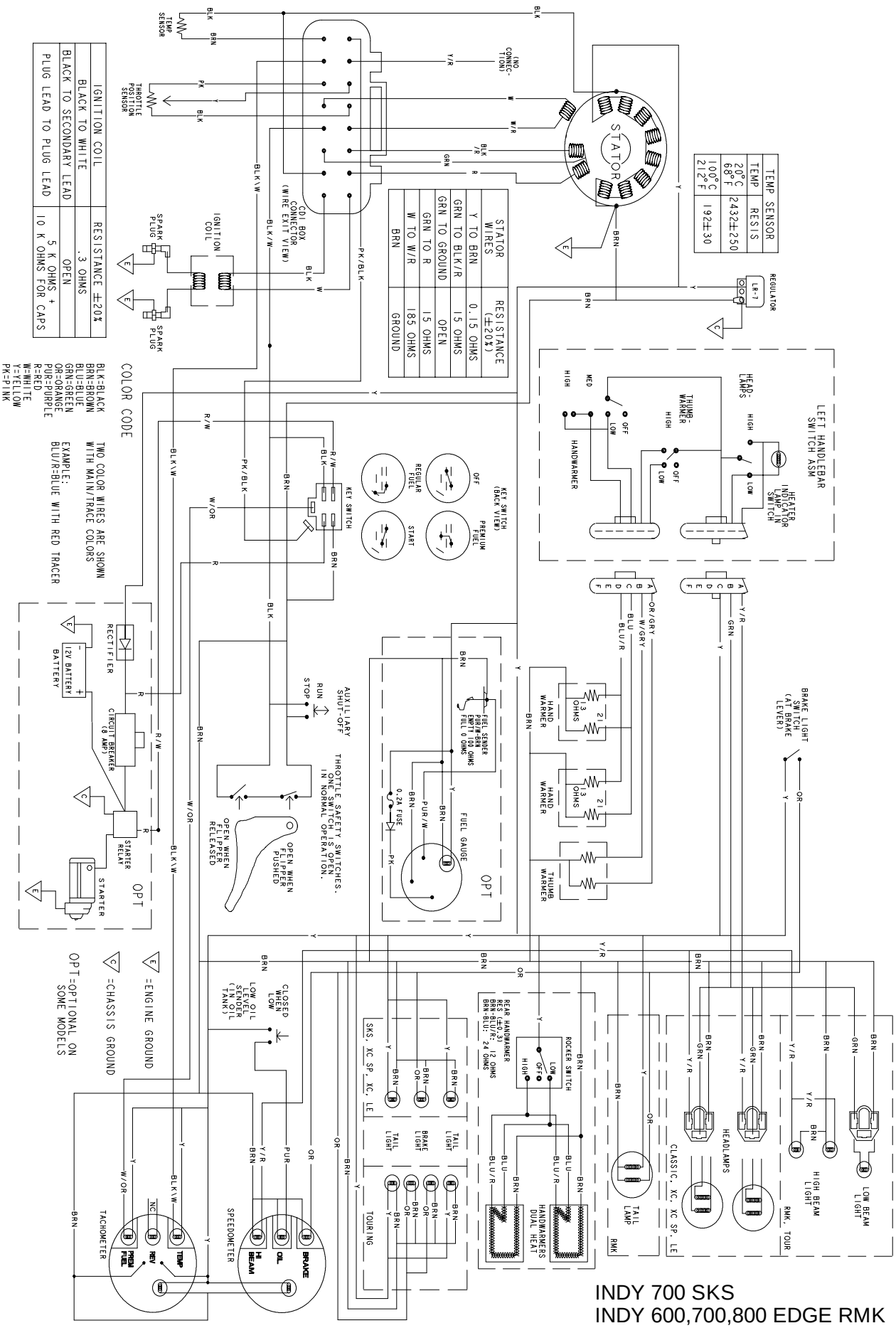
STATOR WIRES	RESISTANCE (±20%)
Y TO BRN	0.15 OHMS
GRN TO BLK/R	15 OHMS
GRN TO GROUND	OPEN
GRN TO R	15 OHMS
W TO W/R	185 OHMS
BRN	GROUND

IGNITION COIL	RESISTANCE ±20%
BLACK TO WHITE	.3 OHMS
BLACK TO SECONDARY LEAD	OPEN
PLUG LEAD TO PLUG LEAD	5 K OHMS + 10 K OHMS FOR CAPS

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