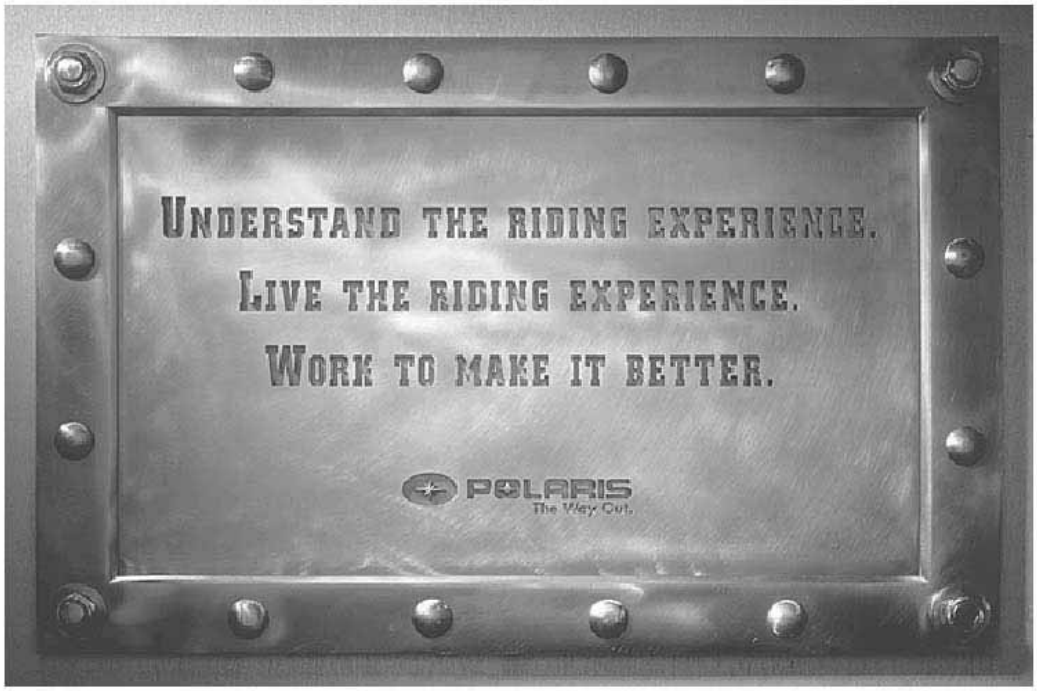
POLARIS
The Way Out.



2007 SPORTSMAN 700/800/800 X2 EFI SERVICE MANUAL

FOREWORD

This service manual is designed primarily for use by certified Polaris Master Service Dealer technicians in a properly equipped shop and should be kept available for reference. All references to left and right side of the vehicle are from the operator's perspective when seated in a normal riding position.

Some procedures outlined in this manual require a sound knowledge of mechanical theory, tool use, and shop procedures in order to perform the work safely and correctly. Technicians 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.

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

2007 Sportsman 700/800/ 800 X2 EFI Service Manual PN 9920378

UNDERSTANDING MANUAL SAFETY LABELS AND DIRECTIONS

Throughout this manual, important information is brought to your attention by the following symbols:

⚠ WARNING

SAFETY ALERT WARNING indicates a potential hazard that may result in severe injury or death to the operator, bystander or person(s) inspecting or servicing the vehicle.

⚠ CAUTION

SAFETY ALERT CAUTION indicates a potential hazard that may result in minor personal injury or damage to the vehicle.

CAUTION

CAUTION indicates special precautions that must be taken to avoid vehicle damage or property damage.

NOTE:

NOTE provides key information by clarifying instructions.

IMPORTANT:

IMPORTANT provides key reminders during disassembly, assembly and inspection of components.

TRADEMARKS

POLARIS ACKNOWLEDGES THE FOLLOWING PRODUCTS MENTIONED IN THIS MANUAL:

Loctite, Registered Trademark of the Loctite Corporation

Nyogel, Trademark of Wm. F. Nye Co.

Fluke, Registered Trademark of John Fluke Mfg. Co.

Mity-Vac, Registered Trademark of Neward Enterprises, Inc.

Torx, Registered Trademark of Textron

Hilliard, Trademark of the Hilliard Corporation

Warn, Trademark of Warn Industries

Some Polaris factory publications can be downloaded from www.polarisindustires.com, purchased from www.purepolaris.com or by contacting the nearest Polaris dealer.

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ENGINE 3

FUEL SYSTEM 4

BODY / SUSPENSION 5

CLUTCH 6

TRANSMISSION 7

FINAL DRIVE 8

BRAKES 9

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NOTES

CHAPTER 1
GENERAL INFORMATION

1

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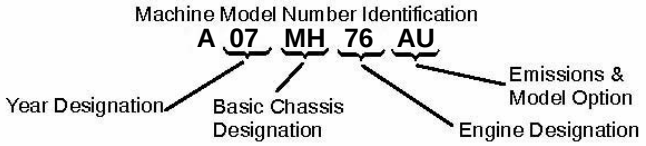
MODEL INFORMATION

Model Number

The machine model number must be used with any correspondence regarding warranty or service.

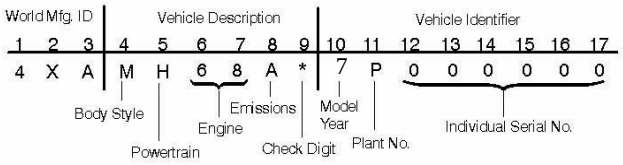


Engine Designation Numbers

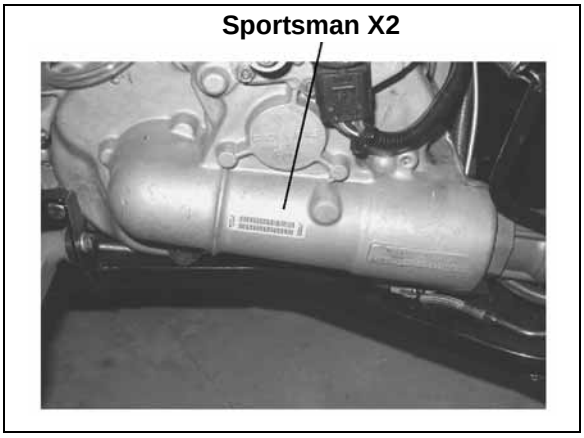
EH068OLE - Twin Cylinder, Liquid Cooled,4 Stroke, Electric Start

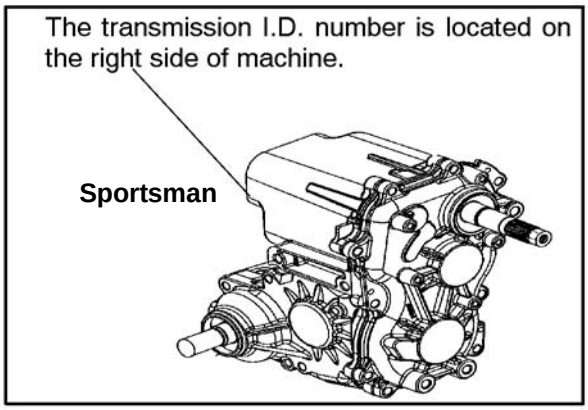
EH076OLE - Twin Cylinder, Liquid Cooled,4 Stroke, Electric Start

VIN Identification



TRANSMISSION I.D. LOCATION

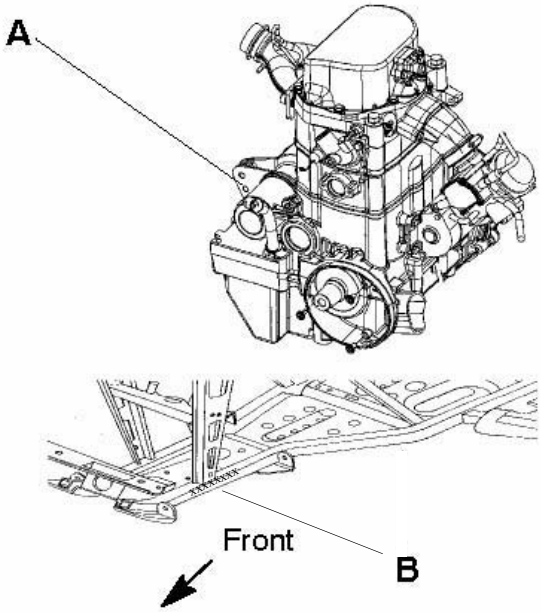




Engine and Machine Serial Numbers

Be sure to refer to the engine model number and serial number whenever corresponding about an engine.

This information can be found on the sticker applied to the top side of the crankcase (A). An additional number is stamped on the side of the crankcase beneath the cylinder coolant elbow.



The machine model number and serial number are important for vehicle identification. The machine serial number is stamped on the lower left side of the frame tube (B).

PUBLICATIONS

Table 1-1: Publications

Year	Model	Model No.	Owner's Manual PN	Parts Manual PN
2007	Sportsman 700 EFI	A07MH68A A07MN68A	9920374	9920375
2007	Sportsman 800 EFI	A07MH76A A07MN76A	9920374	9920379
2007	Sportsman X2 800 EFI	A07TH76A A07TN76A	9920632	9920903
2007	Sportsman 800 EFI International	A07MH76F	9920374	9920379

PAINT CODES

Table 1-2: Paint Codes

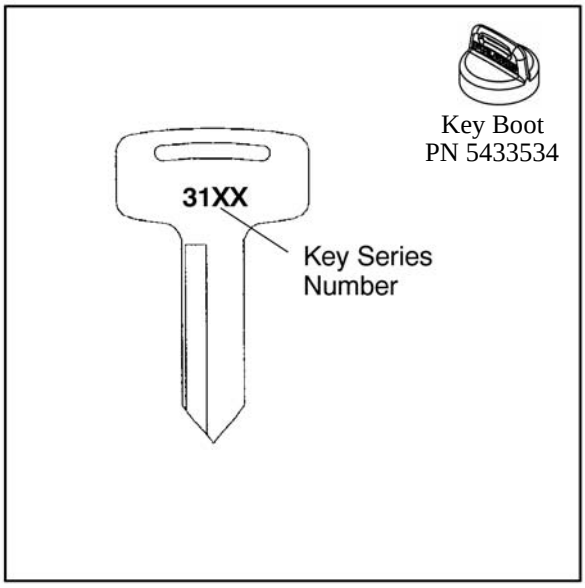
PAINTED PART	COLOR DESCRIPTION	DITZLER NUMBER	POLARIS NUMBER
Sportsman 700/800 EFI Frame	Black	9440	P-067

REPLACEMENT KEYS

Replacement keys can be made from the original key. To identify which series the key is, take the first two digits on the original key and refer to the chart to the right for the proper part number. Should both keys become lost, ignition switch replacement is required.

Table 1-3: Key Numbers

Series #	Part Number
20	4010278
21	4010278
22	4010321
23	4010321
27	4010321
28	4010321
31	4110141
32	4110148
67	4010278
68	4010278



Sportsman 'Deluxe' and 'Standard' Model Component Comparison

For Model Year 2007, a Sportsman 'Deluxe' and 'Standard' model were offered. Use the following table as a guide:

SPORTSMAN 'DELUXE' MODEL	Item Location	SPORTSMAN 'STANDARD' MODEL
Winch	1	No Winch
PXT Tires	2	Titan Tires
PVT w/EBS	3	Non-EBS (800 X2 excluded)
Rear Work Lights	4	No Work Lights
Front Drive w/ Active Descent Control (ADC)	5	No Active Descent Control (ADC)
Speed Sensor Wiring for ADC	6	No Sensor Wiring Change
Rear Rack Extension	7	No Rack Extension
Cast Aluminum Wheels	8	Steel Wheels
Dual Exhaust (*800 EFI only*)	9	Single Exhaust (*800 EFI and X2*)
Wire Harness w/ Active Descent Control (ADC)	10	Standard Wire Harness
ECU w/ Active Descent Control (ADC)	10	Standard ECU

Deluxe Model Pictured

Sportsman X2 ‘Deluxe’ and ‘Standard’ Model Component Comparison

For Model Year 2007, an X2 ‘Deluxe’ and ‘Standard’ model were offered. Use the following table as a guide:

X2 ‘DELUXE’ MODEL	Item Location	X2 ‘STANDARD’ MODEL
Winch	1	No Winch
Rear Work Lights	2	No Work Lights
Front Drive w/ Active Descent Control (ADC)	3	No Active Descent Control (ADC)
Cast Aluminum Wheels	4	Steel Wheels

Standard Model Pictured

2007 SPORTSMAN 700 EFI

MODEL NUMBER: A07MH68AX, AY, AZ
(Standard Model Only)

ENGINE MODEL: EH068OLE

Table 1-4: Sportsman 700 EFI General Specifications

Category	Dimension / Capacity
Length	83 in./205.74 cm
Width	48 in./116.8 cm
Height	48 in./119.4 cm
Seat Height	34 in./86.4 cm
Wheel Base	50.75 in./128.9 cm
Dry Weight	770 lbs./326.6 kg
Gross Vehicle Weight	1220 lbs. / 553 kg
Front Rack Capacity	100 lbs./45.4 kg
Rear Rack Capacity	200 lbs./90.7 kg
Towing Capacity	1500 lbs./680 kg
Body Style	Spirit
Hitch Tongue Capacity	150 lbs./68 kg

Table 1-5: 2007 700 EFI Specifications

ENGINE	
Platform	Polaris Twin Cylinder
Engine Model Number	EH068OLE025
Engine Displacement	683cc
Number of Cylinders	2
Bore & Stroke (mm)	80 x 68 mm
Compression Ratio	9.78:1
Compression Pressure	150-170 psi
Engine Idle Speed	1150 ± 100 RPM
Engine Max Operating Rpm	6500 Rpm ± 200 Rpm
Cooling System / Capacity	Liquid - 3.2 qt / 3 ltr
Overheat Warning	HOT on Instrument Cluster
Lubrication	Pressurized Wet Sump
Oil Requirements / Capacity	Polaris 0W-40 2 qt. / 1.9 ltr
Exhaust System	Single Pipe USFS Approved
Fuel System	
Fuel System	Electronic Fuel Injection (EFI)
Fuel Pump (in tank assembly)	25L per hr. at 39 psi
Fuel Filter(s)	30 micron in Tank - (unserviceable) 10 micron in-line (replaceable)
Fuel Injector(s)	Bosch
EFI Controller	Bosch MSE 1.1B
Fuel Capacity / Requirement	4.13 gal US / 15.6 liters 87 Octane (minimum) or 89 Oxygenated
Electrical	
Alternator Output	500 w @ 6000 RPM
Lights : Pod	50 watts
Grill	Two x 27 watts
Brake	8.26 watts
Tail	26.9 watts
Ignition System	DC/CDI Ignition
Ignition Timing	13° BTDC @ 1200 RPM
Spark plug / Gap	RC7YC / .035 in. / 0.9 mm
Battery / Amp Hr	Lead Acid / 30 Amp Hr.
Circuit Breakers	Fan 20 amp / Harness 20 amp / ECU 15 amp / Inst. Cluster / Voltage Regulator 6 amp
Starting	Electric
Instrument Cluster	Analog Speedo w/ LCD

Table 1-6: 2007 700 EFI Specifications

Drivetrain	
Transmission Type	Drumshift - H/L/N/Rev/Park
Transmission Capacity	15 oz. / 445 ml
Front Gearcase Capacity- CH	8.97 / 265 ml
Rear Gearcase Capacity	5 oz. / 150 ml
Gear Ratio : Low Rev High Front Drive Rear Drive	7.49:1 5.11:1 2.70:1 3.82:1 3.10:1
Clutch Type	PVT Non-EBS
Belt	3211113
Steering / Suspension	
Front Suspension / Shock	A-arm / MacPherson Strut
Front Travel	8.2 in. / 21 cm
Rear Suspension / Shock	Progressive Rate Independent - Coil - over shock
Rear Travel	9.5 in. / 24.13 cm
Ground Clearance	11.25 in. / 28.6 cm
Shock Preload Adjustment Front / Rear	Front -Non Adjustable. Rear - Ratchet Style- Std.
Turning Radius	76 in. / 193 cm unlocked
Toe Out	0-1/16 in / .0 - .159 mm
Wheels / Brakes	
Wheel Size / Pattern - Front	Steel 24 x 8-12 / 4-156
Wheel Size / Pattern - Rear	Steel 24 x 11-12 / 4-156
Front Tire Size	24 x 8-12
Rear Tire Size	24 x 11-12
Recommended Air Pressure	Front & Rear - 5 psi
Brake - Front	Dual Hydraulic Disc
Brake - Rear	Dual Hydraulic Disc

Table 1-7: 2007 700 EFI Clutching

Altitude Meters (Feet)		Shift Weight	Drive Clutch Spring	Driven Clutch Type (Non-Adjustable)
0-1800 (0-6000)	A07MH68 (STANDARD)	20-58 5631216	Grn/Blu 7041157	STD - 1322514
1800-3700 (6000-12000)	A07MH68 (STANDARD)	20-56 5631215	Grn/Blu 7041157	STD - 1322514

2007 SPORTSMAN 800 EFI

MODEL NUMBER: A07MH76AX, AY, AZ / A07MN76AQ, AF / A07MH76FA
(Standard) (Deluxe) (International)

ENGINE MODEL: EH076OLE

Table 1-8: Sportsman 800 EFI General Specifications

Category	Dimension / Capacity
Length	83 in./205.74 cm
Width	48 in./116.8 cm
Height	48 in./119.4 cm
Seat Height	34 in./86.4 cm
Wheel Base	50.75 in./128.9 cm
Dry Weight	770 lbs./326.6 kg
Gross Vehicle Weight	1220 lbs. / 553 kg
Front Rack Capacity	100 lbs./45.4 kg
Rear Rack Capacity	200 lbs./90.7 kg
Towing Capacity	1500 lbs./680 kg
Body Style	Spirit
Hitch Tongue Capacity	150 lbs./68 kg

Deluxe Model Shown

Table 1-9: 2007 800 EFI Specifications

ENGINE	
Platform	Polaris Twin Cylinder
Engine Model Number	EH076OLE013
Engine Displacement	760cc
Number of Cylinders	2
Bore & Stroke (mm)	80 x 76.5 mm
Compression Ratio	10:1
Compression Pressure	150-200 psi
Engine Idle Speed	1150 ± 100 RPM
Engine Max Operating Rpm	6500 Rpm ± 200 Rpm
Cooling System / Capacity	Liquid - 3.2 qt/ 3 ltr.
Overheat Warning	HOT on Instrument Cluster
Lubrication	Pressurized Wet Sump
Oil Requirements / Capacity	Polaris 0W-40 2 qt. / 1.9 liters
Exhaust System	Dual Pipe / Silencer (Deluxe) Single Pipe / Silencer (Standard)
Fuel System	
Fuel System	Electronic Fuel Injection
Fuel Pump	25L per hour at 39 PSI
Fuel Filter(s)	30 micron in Tank - (unserviceable) 10 micron in Line (replaceable)
Fuel Injector(s)	Bosch
EFI Controller	Bosch MSE 1.1B
Fuel Capacity / Requirement	4.13 gal US / 15.6 liters 87 Octane (minimum) or 89 Oxygenated
Electrical	
Alternator Output	500 w @ 6000 RPM
Lights : Pod	30 watts
Grill	Two x 27 watts
Brake	8.26 watts
Tail	26.9 watts
Worklights (Deluxe Only)	2 x 13 watts
Ignition System	DC/CDI Ignition
Ignition Timing	13°BTDC @ 1200 RPM
Spark plug / Gap	RC7YC/ .035 in. / 0.9 mm
Battery / Amp Hr	Lead Acid / 30 Amp Hr
Circuit Breakers	Fan 20 amp / Harness 20 amp / ECU 15 amp / Inst. Cluster / Voltage Regulator 6 amp
Starting	Electric
Instrument Cluster	Analog Speedo w/ LCD

Table 1-10: 2007 800 EFI Specifications

Drivetrain	
Transmission Type	Drumshift - H/L/N/Rev/Park
Transmission Capacity	15 oz. / 450ml
Front Gearcase Capacity- CH	8.97 / 265 ml
Front Gearcase Capacity- ADC	9.3 / 275 ml
Rear Gearcase Capacity	5 oz. / 150ml
Gear Ratio : Low Rev High Front Drive Rear Drive	7.49:1 5.11:1 2.70:1 3.82:1 3.10:1
Clutch Type	PVT (Std) EBS (Deluxe)
Belt	3211113
Steering / Suspension	
Front Suspension / Shock	A-arm / MacPherson Strut
Front Travel	8.2 in. / 21 cm
Rear Suspension / Shock	Progressive Rate Independent - Coil - over shock
Rear Travel	9.5 in. / 24.13 cm
Ground Clearance	11.25 in. / 28.6 cm
Shock Preload Adjustment Front / Rear	Front -Non Adjustable. Rear - Ratchet Style- Std.
Turning Radius	76 in. / 193 cm
Toe Out	0 - 1/16 in / .0 - .159 mm
Wheels / Brakes	
Wheel Size / Pattern - Front	26 x 8 - 12 / 4-156
Wheel Size / Pattern - Rear	26 x 11 - 12 / 4-156
Front Tire Size	26 x 8 - 12
Rear Tire Size	26 x 11 - 12
Recommended Air Pressure	Front - 5 psi & Rear - 5 psi
Brake - Front	Dual Hydraulic Disc
Brake - Rear	Dual Hydraulic Disc

Table 1-11: A07MH76A/A07MN76A Clutching

Altitude Meters (Feet)		Shift Weight	Drive Clutch Spring	Driven Clutch Type (Non-Adjustable)
0-1800 (0-6000)	A07MH76 (STANDARD)	20-62 5631700	Blu/Red 7043199	STD - 1322514
	A07MN76 (DELUXE) (INTERNATIONAL)	20-62 w/EBS	Grn/Blu 7041157 w/EBS	EBS - 1322550
1800-3700 (6000-12000)	A07MH76 (STANDARD)	20-60 5631698	Blu/Red 7043199	STD - 1322514
	A07MN76 (DELUXE) (INTERNATIONAL)	20-60 w/EBS	Grn/Blu 7041157 w/EBS	EBS - 1322550

2007 SPORTSMAN X2 800 EFI

MODEL NUMBER: A07TH76AU, A07TN76AF
(Standard) (Deluxe)

ENGINE MODEL: EH076OLE

Table 1-12: Sportsman X2 800 EFI General Specifications

Category	Dimension / Capacity
Length	93 in./236.22 cm
Width	48 in./116.8 cm
Height	48 in./119.4 cm
Seat Height	34 in./86.4 cm
Wheel Base	57 in./128.9 cm
Dry Weight	Standard 839 lbs./380.5 kg Deluxe 874 lbs./396 kg
Gross Vehicle Weight	1500 lbs./680.3 kg
Front Rack/ Box Capacity	90 lbs./40.8 kg
Rear Box Capacity	400 lbs./181.4 kg
Towing Capacity	1500 lbs./680 kg
Body Style	Spirit
Hitch Tongue Capacity	150 lbs./68 kg

Standard Model Shown

Table 1-13: 2007 800 X2 EFI Specifications

ENGINE	
Platform	Polaris Twin Cylinder
Engine Model Number	EH076OLE013
Engine Displacement	760cc
Number of Cylinders	2
Bore & Stroke (mm)	80 x 76.5 mm
Compression Ratio	10:1
Compression Pressure	150-200 psi
Engine Idle Speed	1150 ± 100 RPM
Engine Max Operating Rpm	6500 Rpm ± 200 Rpm
Cooling System / Capacity	Liquid - 3.4 qt/ 3.2 ltr.
Overheat Warning	HOT on Instrument Cluster
Lubrication	Pressurized Wet Sump
Oil Requirements / Capacity	Polaris 0W-40 2 qt. / 1.9 liters
Exhaust System	Single Pipe / Silencer
Fuel System	
Fuel System	Electronic Fuel Injection
Fuel Pump	25L per hour at 39 PSI
Fuel Filter(s)	30 micron in Tank - (unserviceable) 10 micron in Tank - (unserviceable) 10 micron in Line (replaceable)
Fuel Injector(s)	Bosch
EFI Controller	Bosch MSE 1.1B
Fuel Capacity / Requirement	6.0 gal US / 22.7 liters 87 Octane (minimum) or 89 Oxygenated
Electrical	
Alternator Output	500 w @ 6000 RPM
Lights : Pod	50 watts
Grill	Two x 37 watts
Tail	2 x 26.9 watts
Brake	2 x 8.26 watts
Worklights (Deluxe Only)	2 x 13 watts
Indicator Panel	1 watt
Ignition System	DC/CDI Ignition
Ignition Timing	Variable - ECU controlled
Spark plug / Gap	RC7YC/ .035 in. / 0.9 mm
Battery / Amp Hr	Lead Acid / 30 Amp Hr
Fuses	Fan 20 amp / Harness 20 amp / ECU 15 amp / Inst. Cluster / Voltage Regulator 6 amp
Starting	Electric
Instrument Cluster	Analog Speedo w/ LCD

Table 1-14: 2007 800 X2 EFI Specifications

Drivetrain	
Transmission Type	Drumshift - H/L/N/Rev/Park
Transmission Capacity	32 oz. / 946.3ml
Front Gearcase Capacity- CH	8.97 / 265 ml
Front Gearcase Capacity- ADC	9.3 / 275 ml
Gear Ratio : Low Rev High Front Drive	23.91:1 21.74:1 8.28:1 3.82:1
Clutch Type	PVT w/ EBS (Standard and Deluxe)
Belt	3211113
Steering / Suspension	
Front Suspension / Shock	A-arm / MacPherson Strut
Front Travel	8.2 in. / 21 cm
Rear Suspension / Shock	Progressive Rate Independent - Coil - over shock
Rear Travel	8.75 in. / 22.22 cm
Ground Clearance	11.25 in. / 28.6 cm
Shock Preload Adjustment Front / Rear	Front -Non Adjustable. Rear - Ratchet Style- Std.
Turning Radius	82 in. / 208.2 cm
Toe Out	0 - 1/16 in / .0 - .159 mm
Wheels / Brakes	
Wheel Size / Pattern - Front	25 x 8 - 12 / 4-156
Wheel Size / Pattern - Rear	25 x 11 - 12 / 4-156
Front Tire Size	25 x 8 - 12
Rear Tire Size	25 x 11 - 12
Recommended Air Pressure	Front - 5 psi & Rear - 5 psi
Brake - Front	Dual Hydraulic Disc
Brake - Rear	Dual Hydraulic Disc

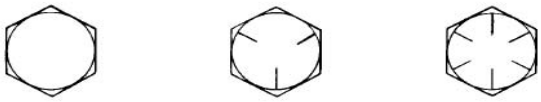
Table 1-15: 2007 800 X2 EFI Clutching

Altitude Meters (Feet)		Shift Weight	Drive Clutch Spring	Driven Clutch Type (Non-Adjustable)
0-1800 (0-6000)	A07TH76A (STANDARD) A07TN76A (DELUXE)	20-62 w/EBS	Grn/Blu 7041157 w/EBS	EBS - 1322550
1800-3700 (6000-12000)	A07TH76A (STANDARD) A07TN76A (DELUXE)	20-58 w/EBS	Grn/Blu 7041157 w/EBS	EBS - 1322550

MISC. NUMBERS/CHARTS

Standard Torque Specifications

The following torque specifications are to be used as a general guideline. FOR SPECIFIC TORQUE VALUES OF FASTENERS Refer to exploded views in the appropriate section. There are exceptions in the steering, suspension, and engine sections.



Bolt Size		Threads/In	Grade 2	Grade 5	Grade 8
			Torque in. lbs. (Nm)		
#10	-	24	27 (3.1)	43 (5.0)	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)

Metric / Torque

6 x 1.0 . . . . . 72-78 In.lbs. . . . . 8 x 1.25 14-18 ft.lbs . . . . 10 x 1.25 26-30 ft.lbs.

SPECIAL TOOLS

Special tools may be required while servicing this vehicle. Some of the tools listed or depicted are mandatory, while other tools maybe substituted with a similar tool, if available. Polaris recommends the use of Polaris Special Tools when servicing any Polaris product. Dealers may order special tools through Polaris' official tool supplier, SPX Corporation, 1-800-328-6657.

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
3x.50	#39	0.0995	3/32
3x.60	3/32	0.0937	3/32
4x.70	#30	0.1285	1/8
4x.75	1/8	0.125	1/8
5x.80	#19	0.166	11/64
5x.90	#20	0.161	5/32
6x1.00	#9	0.196	13/64
7x1.00	16/64	0.234	15/64
8x1.00	J	0.277	9/32
8x1.25	17/64	0.265	17/64
9x1.00	5/16	0.3125	5/16
9x1.25	5/16	0.3125	5/16
10x1.25	11/32	0.3437	11/32
10x1.50	R	0.339	11/32
11x1.50	3/8	0.375	3/8
12x1.50	13/32	0.406	13/32
12x1.75	13/32	0.406	13/32

Decimal Equivalents

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	. . 5mm= .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	. . 8mm= .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. . .	. . . . . 13mm = .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. .	. . . . . 16mm=. 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	
1.	1.0	

Conversion Table

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)
Fluid Ounces (fl. oz.)	x 29.57	= Cubic Centimeters (cc)
Cubic Centimeters (cc)	x .03381	= Fluid Ounces (fl. oz.)
Grams (g)	x 0.035	= 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)
π(3.14)xR^2x H (height)		= Cylinder Volume

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

Glossary Of Terms

ABDC: After bottom dead center.
ACV: Alternating current voltage.
ADC: Active Descent Control. Engages front wheels for 4-wheel EBS.
Alternator: Electrical generator producing voltage alternating current.
ATDC: After top dead center.
BBDC: Before bottom dead center.
BDC: Bottom dead center.
BTDC: Before top dead center.
CC: Cubic centimeters.
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.
CI: Cubic inches.
Clutch Buttons: Plastic bushings which aid rotation of 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.
Clutch Weights: Three levers in the drive clutch which relative to their weight, profile and engine RPM cause the drive clutch to close and grip the drive belt.
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 crankcase. Measure at various points especially at PTO.
CVT: Centrifugal Variable Transmission (Drive Clutch System)
DCV: Direct current voltage.
Dial Bore Gauge: A cylinder measuring instrument which uses a dial indicator. Good for showing taper and out-of-round in the cylinder bore.
EBS: Engine Braking System. Uses engine compression to slow the ATV without the use of hydraulic brakes.
Electrical Open: Open circuit. An electrical circuit which isn't complete.
Electrical Short: Short circuit. An electrical circuit which is completed before the current reaches the intended load. (i.e. a bare wire touching the chassis).
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.
ft.: Foot/feet.
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.
gal.: Gallon.
ID: Inside diameter.
in.: Inch/inches.
Inch Pound: In. lb. 12 in. lbs. = 1 ft. lb.
kg/cm^2: Kilograms per square centimeter.
kg-m: Kilogram meters.
Kilogram/meter: A force of one kilogram at the end of a lever one meter in length, applied in a rotational direction.
l or ltr: Liter.
lbs/in^2: Pounds per square inch.
Left or Right Side: Always referred to based on normal operating position of the driver.
m: Meter/meters.
Mag: Magneto.
Magnetic Induction: As a conductor (coil) is moved through a magnetic field, a voltage will be generated in the windings. Mechanical energy is converted to electrical energy in the stator.
mi.: Mile/miles.
mm: Millimeter. Unit of length in the metric system. 1 mm = approximately .040".
Nm: Newton meters.
OD: Outside diameter.
Ohm: The unit of electrical resistance opposing current flow.
oz.: Ounce/ounces.
Piston Clearance: Total distance between piston and cylinder wall.
psi.: Pounds per square inch.
PTO: Power take off.
qt.: Quart/quarts.
Regulator: Voltage regulator. Regulates battery charging system output at approximately 14.5 DCV as engine RPM increases.
Reservoir Tank: The fill tank in the liquid cooling system.
Resistance: In the mechanical sense, friction or load. In the electrical sense, ohms, resulting in energy conversion to heat.
RPM: Revolutions per minute.
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.
Stator Plate: The plate mounted under the flywheel supporting the battery charging coils.
TDC: Top dead center. Piston's most outward travel from crankshaft.
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.
WOT: Wide open throttle.

NOTES

CHAPTER 2
MAINTENANCE

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MAINTENANCE

Overview

Careful periodic maintenance will help keep your vehicle in the safest, most reliable condition. Inspection, adjustment and lubrication of important components are explained in the periodic maintenance chart.

Inspect, clean, lubricate, adjust and replace parts as necessary. When inspection reveals the need for replacement parts, use genuine Polaris parts available from your Polaris dealer.

NOTE: Service and adjustments are critical. If you're not familiar with safe service and adjustment procedures, have a qualified dealer perform these operations.

Maintenance intervals in the following chart are based upon average riding conditions and an average vehicle speed of approximately 10 miles per hour. Vehicles subjected to severe use must be inspected and serviced more frequently.

- Frequent immersion in mud, water or sand
- Racing or race-style high RPM use
- Prolonged low speed, heavy load operation
- Extended idle
- Short trip cold weather operation

Pay special attention to the oil level. A rise in oil level during cold weather can indicate contaminants collecting in the oil sump or crankcase. Change oil immediately if the oil level begins to rise. Monitor the oil level, and if it continues to rise, discontinue use and determine the cause.

Maintenance Chart Key

The following symbols denote potential items to be aware of during maintenance:

■ **= CAUTION: Due to the nature of these adjustments, it is recommended this service be performed by an authorized Polaris dealer.**

▶ **= SEVERE USE ITEM --If vehicle is subjected to severe use, decrease interval by 50% (Severe Use is defined as frequent vehicle immersion in mud, water or sand, racing or race-style high rpm use, prolonged low speed - heavy load operation or extended idle. More preventative maintenance is required under these conditions. Fluid changes, cable, chain and chassis lubrication are required more frequently. For engine oil, short trip cold weather riding also constitutes severe use. Pay special attention to oil level. A rising oil level in cold weather can indicate contaminants collecting in the oil sump or crankcase. Change oil immediately and monitor level. If oil level begins to rise, discontinue use and determine cause.)**

E = Emission Control System Service (California).

NOTE: Inspection may reveal the need for replacement parts. Always use genuine Polaris parts.

WARNING: Improperly performing the procedures marked with a ■ could result in component failure and lead to serious injury or death. Have an authorized Polaris dealer perform these services.

Periodic Maintenance Chart

Table 2-1: REQUIRED MAINTENANCE INTERVALS

ITEM		MAINTENANCE INTERVAL			REMARKS
		Hours	**Calendar**	**Miles (KM)**	
■	Steering	--	Pre-Ride	--	Make adjustments as needed.
▶	Front Suspension	--	Pre-Ride	--	
▶	Rear Suspension	--	Pre-Ride	--	
	Tires	--	Pre-Ride	--	
▶	ADC Fluid Level	--	Pre-Ride	--	
▶	Brake Fluid Level	--	Pre-Ride	--	
▶	Brake Lever Travel	--	Pre-Ride	--	
	Brake Systems	--	Pre-Ride	--	
	Wheels/Fasteners	--	Pre-Ride	--	
	Frame Fasteners	--	Pre-Ride	--	
▶, **E**	Engine Oil Level	--	Pre-Ride	--	
▶, **E**	Air filter, pre-filter	--	Daily	--	Inspect; clean often
▶, **E**	Air Box Sediment Tube	--	Daily	--	Drain deposits when visible
	Coolant (if applicable)	--	Daily	--	Check level daily, change coolant every 2 years
	Head lamp/tail lamp	--	Daily	--	Check operation; apply dielectric grease if replacing
▶, **E**	Air filter, main element	--	Weekly	--	Inspect; replace as needed
	Recoil housing (if applicable)	--	Weekly	--	Drain water as needed, check often if operating in wet conditions
▶, **E**	Brake Pad Wear	10 H	Monthly	60 (100)	Inspect periodically
	Battery	20 H	Monthly	125 (200)	Check terminals; clean; test
▶ = Perform these procedures more often for vehicles subjected to severe use.					
E = Emission Control System Service (California)					
■ = Have an authorized Polaris Dealer perform these services.					

Table 2-1: REQUIRED MAINTENANCE INTERVALS

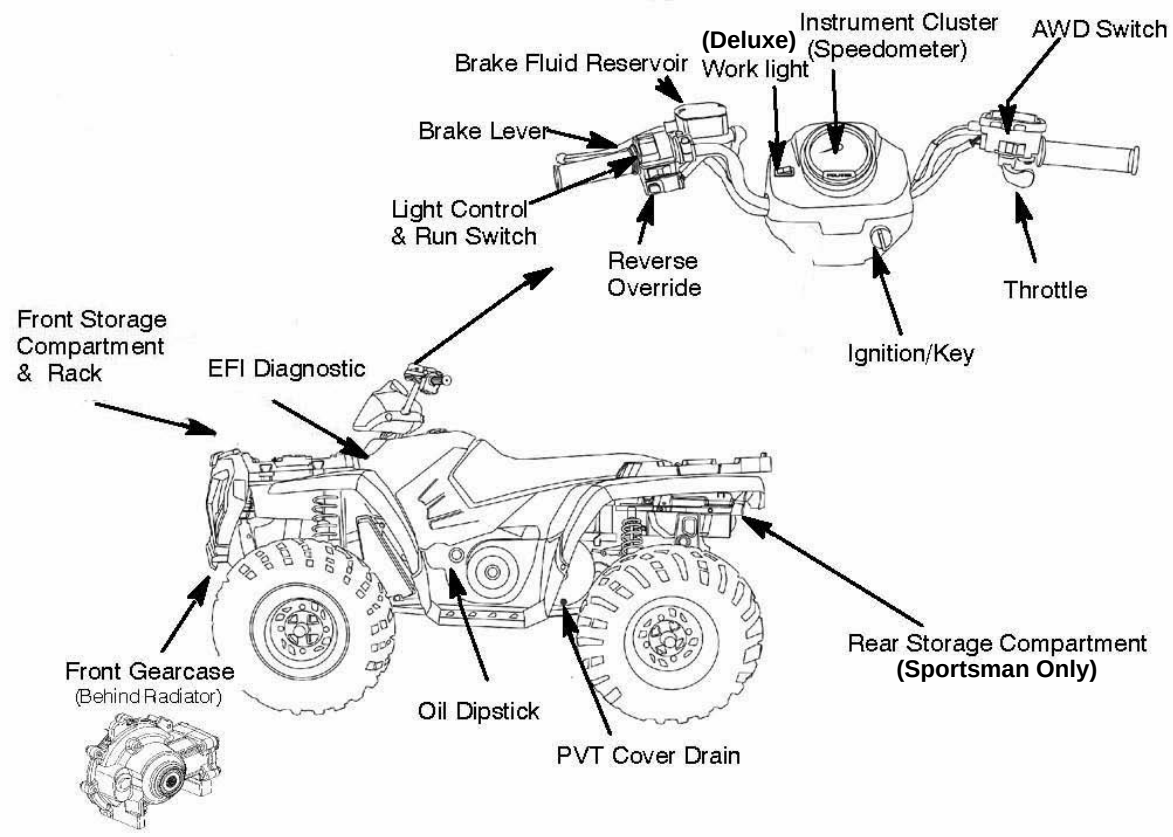
ITEM		MAINTENANCE INTERVAL			REMARKS
		Hours	Calendar	Miles (KM)	
▶	Front gearcase oil (if equipped)	25 H	Monthly	155 (250)	Inspect level; change yearly
▶	Middle gearcase oil (if equipped)	25 H	Monthly	155 (250)	Inspect level; change yearly
▶	Rear gearcase oil (if equipped)	25 H	Monthly	155 (250)	Inspect level; change yearly
▶	Transmission Oil	25 H	Monthly	155 (250)	Inspect level; change yearly
▶, **E**	Engine breather filter (if equipped)	25 H	Monthly	155 (250)	Inspect; replace if necessary
▶, **E**	Engine oil change (break-in)	25 H	1 M	155 (250)	Perform a break-in oil change at one month
▶	General lubrication	50 H	3 M	310 (500)	Lubricate all fittings, pivots, cables, etc.
	Shift Linkage	50 H	6 M	310 (500)	Inspect, lubricate, adjust
■	Steering	50 H	6 M	310 (500)	Lubricate
▶	Front Suspension	50 H	6 M	310 (500)	Lubricate
▶	Rear Suspension	50 H	6 M	310 (500)	Lubricate
■, **E**	Throttle Cable/ ETC Switch	50 H	6 M	310 (500)	Inspect; adjust; lubricate; replace if necessary
E	Air intake ducts	50 H	6 M	310 (500)	Inspect ducts for proper sealing/air leaks
	Drive belt	50 H	6 M	310 (500)	Inspect; adjust; replace as needed
	Cooling system (if applicable)	50 H	6 M	310 (500)	Inspect coolant strength seasonally; pressure test system yearly
▶, **E**	Engine Oil Change	100 H	6 M	620 (1000)	Perform a break-in oil change at 25 hours/one month
▶, **E**	Oil filter change	100 H	6 M	620 (1000)	Replace with oil change
▶, **E**	Oil tank vent hose (iff applicable)	100 H	12 M	620 (1000)	Inspect routing, condition
▶, **E**	Valve Clearance	100 H	12 M	620 (1000)	Inspect;
▶ = Perform these procedures more often for vehicles subjected to severe use.					
E = Emission Control System Service (California)					
■ = Have an authorized Polaris Dealer perform these services.					

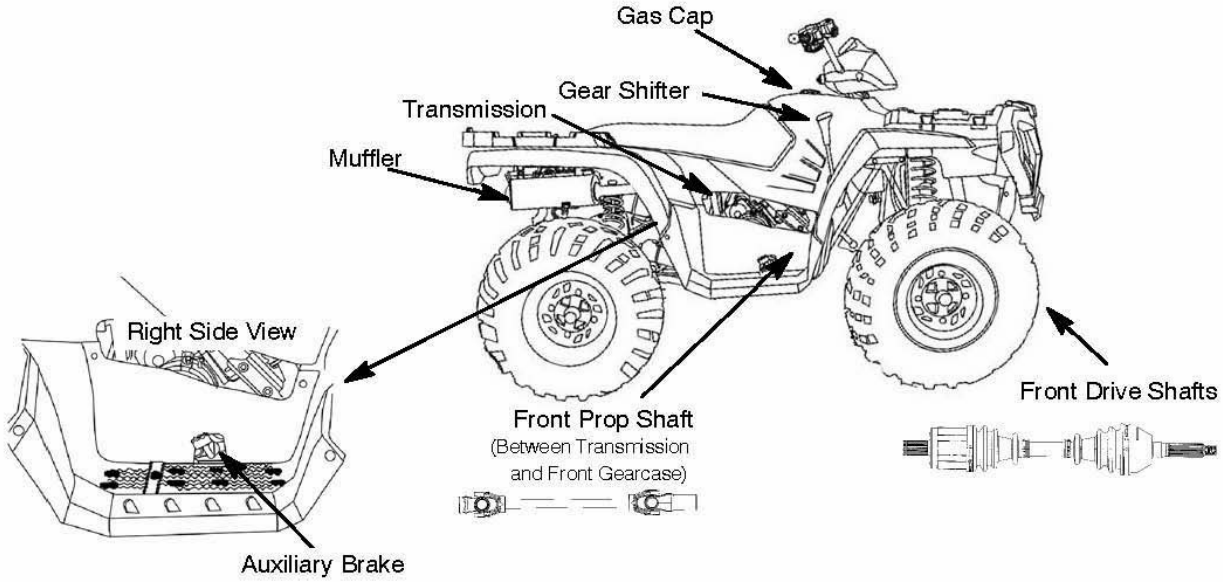
Table 2-1: REQUIRED MAINTENANCE INTERVALS

ITEM		MAINTENANCE INTERVAL			REMARKS
		Hours	**Calendar**	**Miles (KM)**	
■, **E**	Fuel system	100 H	12 M	620 (1000)	Check for leaks at tank cap, lines, fuel pump, filter, pump, injectors; replace lines every two years
■, **E**	Fuel filter	100 H	12 M	620 (1000)	Replace yearly
▶	Radiator (if applicable)	100 H	12 M	620 (1000)	Inspect; clean external surfaces
▶	Cooling hoses (if applicable)	100 H	12 M	620 (1000)	Inspect for leaks
▶	Engine mounts	100 H	12 M	620 (1000)	Inspect
	Exhaust muffler/pipe	100 H	12 M	620 (1000)	Inspect
■, **E**	Spark Plug	100 H	12 M	620 (1000)	Inspect; replace as needed
■, **E**	Ignition Timing	100 H	12 M	620 (1000)	Inspect
▶	Wiring	100 H	12 M	620 (1000)	Inspect for wear, routing, security; apply dielectric grease to connectors subjected to water, mud, etc.
■	Clutches (drive & driven)	100 H	12 M	620 (1000)	Inspect; clean; replace worn parts
■	Front wheel bearings	100 H	12 M	1000 (1600)	Inspect; replace as needed
■	Brake fluid	200 H	24 M	1240 (1000)	Change every two years
■	ADC fluid	200 H	24 M	1240 (1000)	Change every two years
	Spark arrestor	300 H	36 M	1860 (3000)	Clean out
E	Idle Speed	----			Adjust as needed
■	Toe Adjustment	----			Inspect periodically; adjust when parts are replaced
■, ▶	Auxiliary brake	----			Inspect daily, adjust as needed
	Headlight aim	----			Adjust as needed
▶ = Perform these procedures more often for vehicles subjected to severe use.					
E = Emission Control System Service (California)					
■ = Have an authorized Polaris Dealer perform these services.					

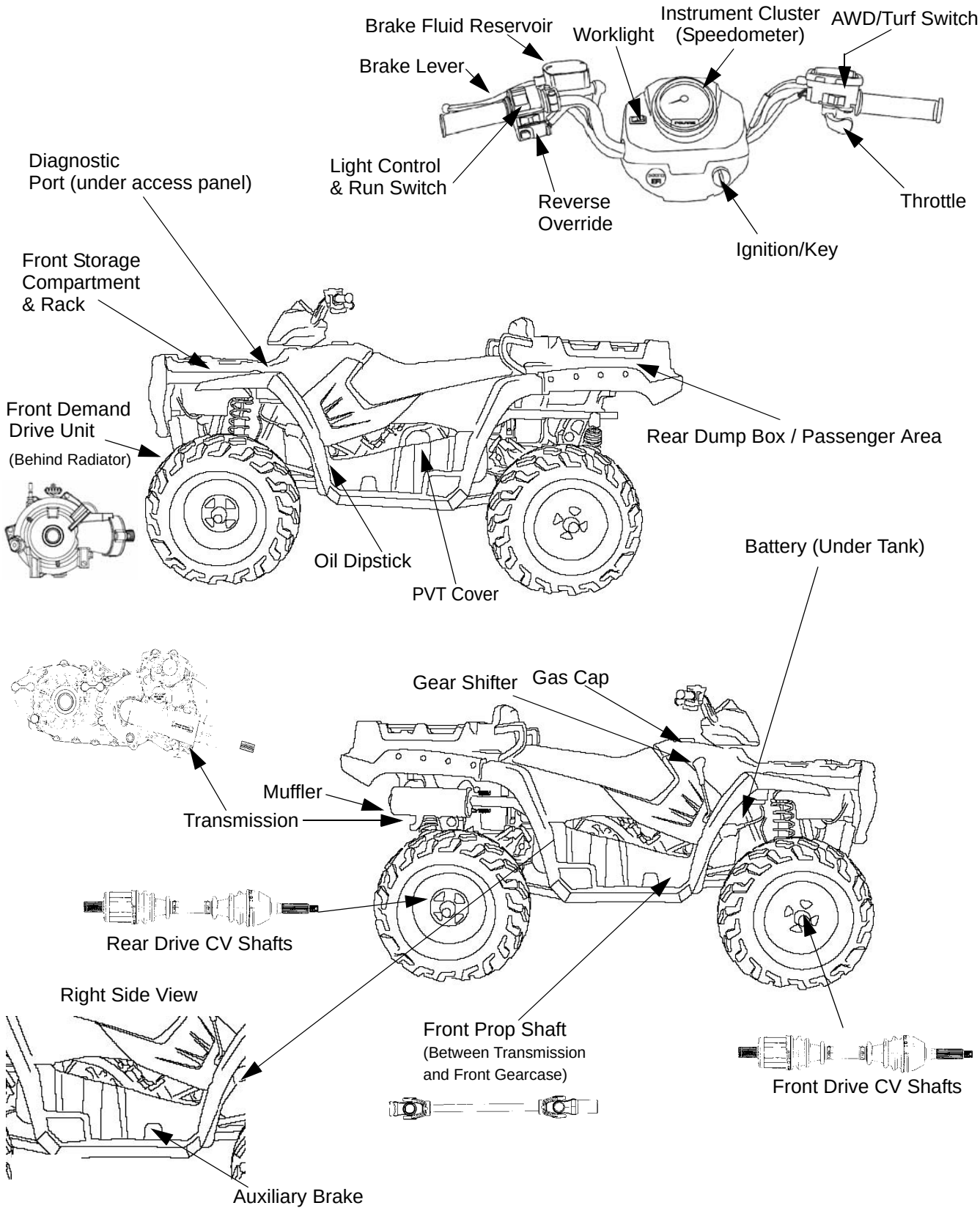
LUBRICATION / FLUIDS

SPORTSMAN Component Locations





SPORTSMAN X2 Component Locations



Polaris Lubricants, Maintenance and Service Products

Table 2-2:

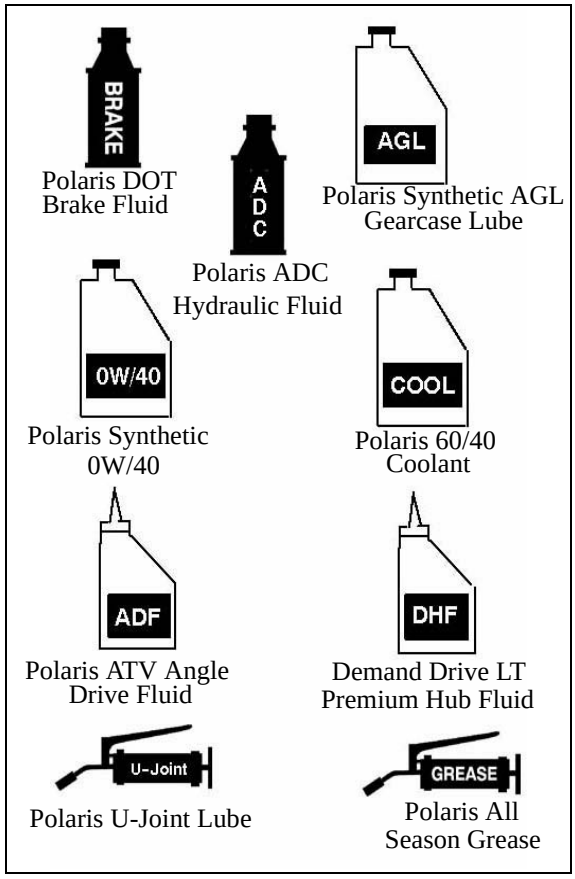
PART NUMBER	DESCRIPTION
Engine Lubricant	
2870791	Fogging Oil (12 oz. Aerosol)
2871281	Engine Oil (Quart) Premium Synthetic 0W-40 (4-cycle) (12 count)
2871844	Engine Oil (Gallon) Premium Synthetic 0W-40 (4-cycle) (4 count)
2871567	Engine Oil (16 Gallon) Premium 4 Synthetic 0W-40 (4-cycle)
Gearcase / Transmission Lubricants	
2876251	**Demand Drive LT Premium Hub Fluid**
3234438	**Polaris ADC Hydraulic Fluid**
2873602	Premium Synthetic AGL Gearcase Lube (12 oz. bottle) (12 count)
2873603	Premium Synthetic AGL Gearcase Lube (1 Gal. bottle) (4 count)
2876160	Premium ATV Angle Drive Fluid (32 oz.) (12 count)
2872276	Premium ATV Angle Drive Fluid (2.5 Gal.) (2 count)
2870465	Oil Pump for 1 Gallon Jug
Grease / Specialized Lubricants	
2871322	Premium All Season Grease (3 oz. cartridge) (24 count)
2871423	Premium All Season Grease (14 oz. cartridge) (10 count)
2871460	Starter Drive Grease (12 count)
2871515	Premium U-Joint Lube (3 oz.) (24 Count)
2871551	Premium U-Joint Lube (14 oz.) (10 count)
2871312	Grease Gun Kit
2871329	Dielectric Grease (Nyogel™)

Table 2-2:

PART NUMBER	DESCRIPTION
Coolant	
2871323	60/40 Coolant (Gallon) (6 count)
2871534	60/40 Coolant (Quart) (12 count)
Additives / Sealants / Thread Locking Agents / Misc.	
2874275	Loctite™ Primer N, Aerosol
2871956	Loctite™ Thread Sealant 565 (50 ml.) (6 count)
2871950	Loctite™ Threadlock 242 (6 ml.) (12 count)
2871951	Loctite™ Threadlock 262 (50 ml.) (10 count)
2871953	Loctite™ Threadlock 271 (6 ml.) (12 count)
2871557	3-Bond 1215 Sealant (5 oz.)
2871326	Premium Carbon Clean (12 oz.) (12 count)
2870652	Fuel Stabilizer (16 oz.) (12 count)
2871957	Black RTV Silicone Sealer (3 oz. tube) (12 count)
2871958	Black RTV Silicone Sealer (11 oz. cartridge) (12 count)
2870990	DOT 3 Brake Fluid (12 count)
2871557	Crankcase Sealant, 3 Bond 1215 (5 oz.)

Polaris Lubricant Symbol Identification

NOTE: The symbols used are for quick reference in identifying which lubricant/grease to use on each component.

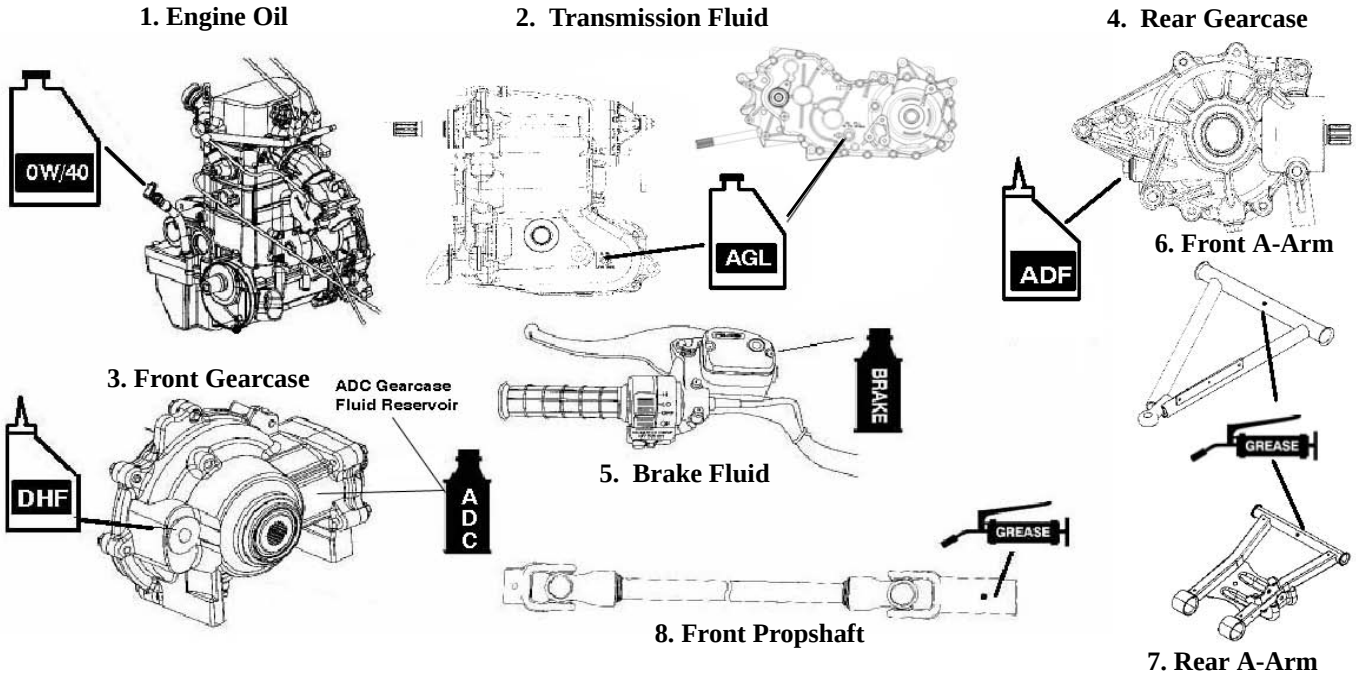


Pre-Ride / Daily Inspection

Perform the following pre-ride inspection daily, and when servicing the vehicle at each scheduled maintenance.

- Tires - check tire condition and air pressures
- Fuel and oil - fill both to their proper level; Do not overfill
- All brakes - check operation and adjustment (includes auxiliary brake)
- Throttle -check for free operation
- Headlight/Taillight/Brakelight - check operation of all indicator lights and switches
- Engine stop switch - check for proper function
- Wheels - check for loose wheel nuts and axle nuts; check to be sure axle nuts are secured by cotter pins
- Air cleaner element - check for dirt or water; clean or replace
- Steering - check for free operation, noting any unusual looseness in any area
- Loose parts - visually inspect vehicle for any damaged or loose nuts, bolts or fasteners
- Engine coolant - check for proper level at the recovery bottle
- ADC Fluid Level - check for proper level

Lubrication / Grease Points



#	ITEM	LUBE	METHOD	FREQUENCY*
1.	Engine Oil	Polaris 0W/40	Check dipstick and add to proper level.	Change after 1st month, 6 months, or 100 hours thereafter; Change more often (25-50 hours) in extremely dirty conditions, or short trip cold weather operation.
2.	Transmission	Polaris AGL Synthetic Gearcase Lube	Add lube to bottom fill hole.	Change annually ❷
3A. 3B.	Front Gearcase ADC Fluid	Demand Drive LT Premium Hub Fluid Polaris ADC Hydraulic	Drain as directed. Add specified quantity.	Gearcase - Change annually ❷ ADC - Change fluid every 2 years
4.	Rear Gearcase	ATV Angle Drive Fluid	Drain completely. Add lube to specified quantity.	Change annually ❷
5.	Brake Fluid	Polaris Dot 3 Brake Fluid	Fill master cylinder reservoir to indicated level	As required, change fluid every 2 years
6.	Front A-Arm	Polaris All Season Grease	Locate fitting and grease.	Semi-annually ❶
7.	Rear A-Arm	Polaris All Season Grease	Locate fitting and grease	Semi-annually ❶
5.	Front Propshaft	Polaris U-Joint Grease❸	Locate fitting and grease.	Semi-annually ❶

* Perform more often under severe use, such as operation in water and under severe loads.

❶Semi-annually or 50 hours of operation 9refer to Maintenance Schedule for additional information). More often under severe conditions (operating in water or hauling heavy loads.

❷Annually or 100 hours of operation (refer to Maintenance Schedule for additional information). More often under severe conditions (operating in water or hauling heavy loads.

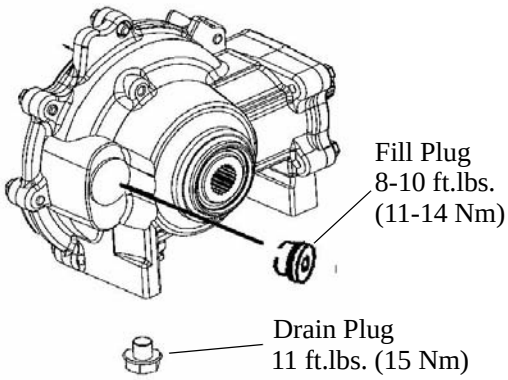
❸Grease conforming to NLGI No. 2, such as Polaris Premium All Season Grease, Conoco Superlube M, or Mobilgrease Special

Front Gearcase Lubrication

The front gearcase lubricant level should be checked and changed in accordance with the maintenance schedule.

- Be sure vehicle is level before proceeding and in PARK
- Check vent hose to be sure it is routed properly and unobstructed
- The correct front gearcase lubricant to use is Polaris Premium Demand Hub Fluid.

FRONT GEARCASE



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Specified Lubricant:
Demand Drive LT Premium Hub Fluid

CH Gearcase Capacity: 8.97 oz. (265 ml.)

ADC Gearcase Capacity: 9.3 oz. (275 ml.)

= T

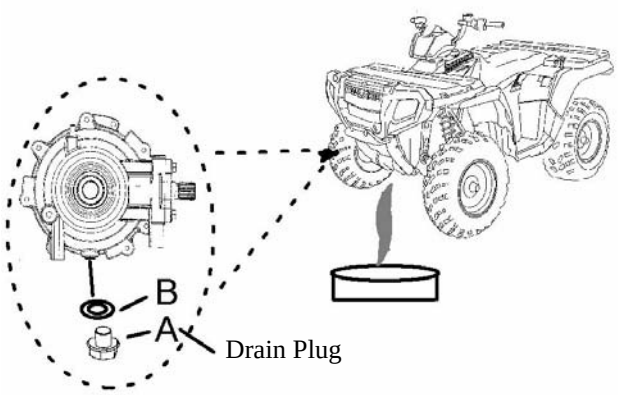
Fill Plug Torque: 8-10 ft.lbs. (11-14 Nm)

Drain Plug Torque: 11 ft.lbs. (15 Nm)

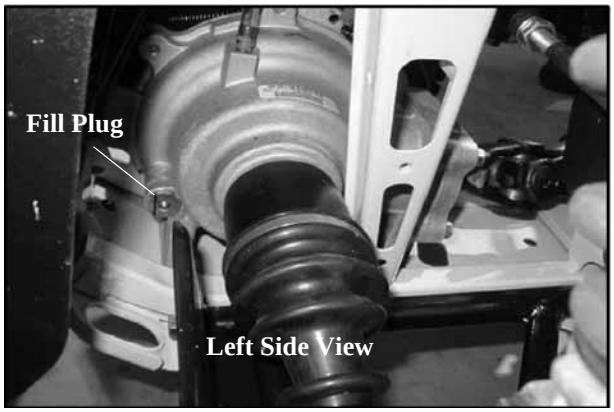
To Check the Lubricant Level:

The front and rear gearcase lubricant level cannot be checked with a dipstick. The gearcase must be drained and re-filled with the proper amount of lubricant or be filled to the bottom of the fill plug hole threads. Refer to procedures.

To Change Gearcase Lubricant:

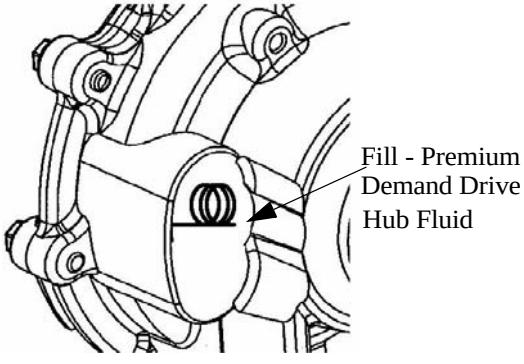


1. Remove gearcase drain plug (A) located on the bottom of the gearcase and drain oil. (The drain plug is accessible through the skid plate.) Catch and discard used oil properly.
2. Clean and reinstall drain plug (A) using a new sealing washer (B). Torque to specification.



3. Remove fill plug. Inspect the O-ring.
4. Fill with the recommended fluid amount or to the bottom of the fill plug hole threads. (See Illustration below).

Front Gearcase

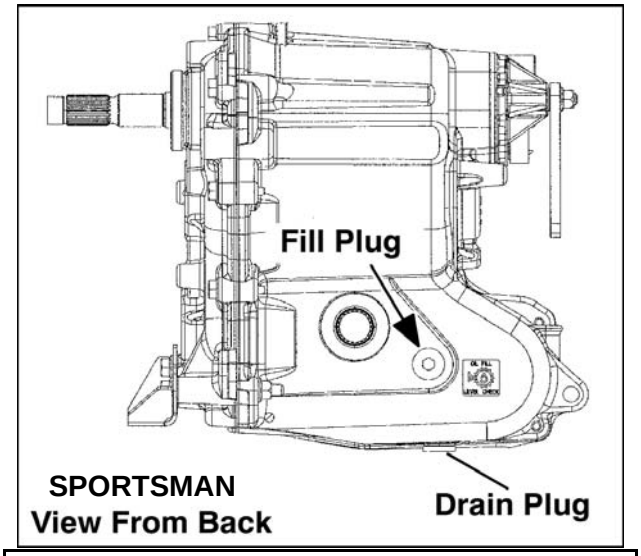


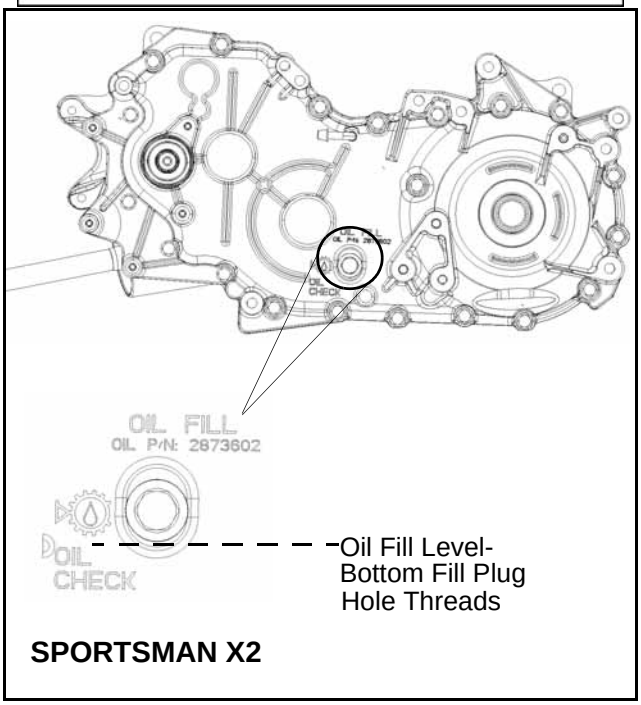
5. Install / torque fill plug and check for leaks.

Transmission Lubrication

The (transmission) lubricant level should be checked and changed in accordance with the maintenance schedule.

- Be sure vehicle is level and in Park before proceeding.
- Check vent hose to be sure it is routed properly and unobstructed.
- Follow instructions to check / change transmission lubricant.





Transmission - Specified Lubricant:
Polaris AGL Gearcase Lubricant
(Gallon - PN 2873603) (12 oz. - PN 2873602)

Sportsman - Capacity: 15 oz. (450 ml)
Sportsman X2 - Capacity: 32 oz. (948 ml)

Transmission
Sportsman - Drain / Fill Plug Torque:
14 ft.lbs. (19 Nm)

Sportsman X2 - Drain / Fill Plug Torque:
20-25 ft.lbs. (27-34 Nm)

To Check the Fluid Level:

1. Remove fill plug from the back of the transmission and visually inspect the oil level. Level is correct when it reaches the bottom of the fill hole as shown at below.

NOTE: The drain and fill plug use a 5/16" hex for removal and installation.

To Change Lubricant:

1. Remove transmission drain plug to drain the oil. Discard used oil properly.
2. Clean and reinstall the drain plug. Torque to specification.
3. Remove fill plug.
4. Add the correct amount of Polaris AGL Gearcase Lubricant.
5. Check for leaks.
6. Install fill plug. Torque to specification.

ADC Differential Hydraulic Circuit Fluid Change

1. Make sure vehicle is parked on flat ground and allowed to sit at least 30 minutes prior to bleeding hydraulic circuit.
2. Thoroughly clean area around and on remote reservoir and bleeder valves.
3. Remove reservoir cap and diaphragm assembly.
4. Make sure hydraulic oil inside reservoir is free of debris. If any debris is found, use clean rag or suction device to remove from the reservoir.

NOTE: Debris in reservoir may block porting and produce inadequate bleeding of the system. Decreased performance may be encountered with inadequate bleed of the hydraulic circuit.

5. Begin the bleeding process by filling reservoir to 'MAX' line with clean Polaris ADC hydraulic fluid. (AW ISO 10 hydraulic fluid equivalent).
6. Locate bleeder valves found on either side of differential and remove the protective caps.
7. Turn bleeder valves counter-clockwise to loosen. Loosen bleeder screw slowly, allowing oil and any trapped air to flow out of fitting.

IMPORTANT: Do not allow hydraulic fluid in reservoir to drain below minimum fill line. Close bleeder valve before oil level falls below minimum fill line. Refilling empty reservoir will result in air pockets becoming trapped.

NOTE: If empty reservoir is encountered, filling of fluid is still possible. Verify air is not trapped before proceeding with step 7.

8. Continue steps 6-8 on both sides in sequence until clean fluid is seen when bleeding occurs.
9. Re-torque both bleeder valves to specification and reinstall cover caps.

= T
Bleeder Valve Torque: **80 in. lbs. (9 Nm)**

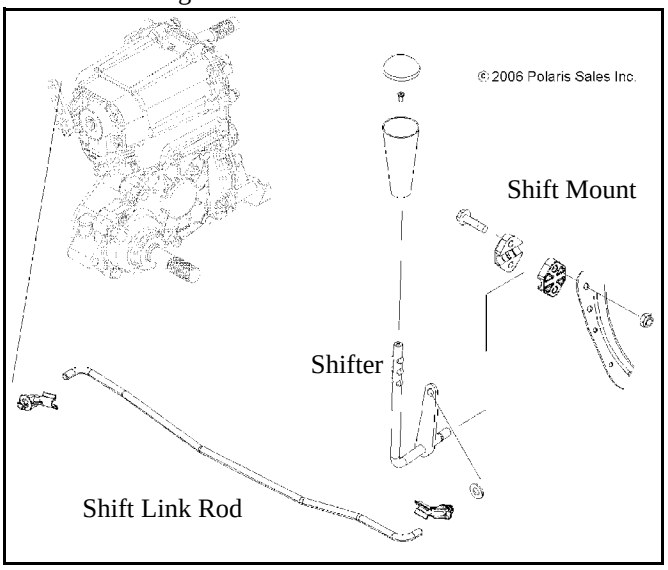
10. Fill reservoir with to a level midway between 'MAX' and 'MIN' fill lines. Verify no debris is found in reservoir oil.
11. Replace reservoir cap securely and wipe clean any residue.

VEHICLE INSPECTION

Shift Link Rod Inspection

NOTE: Shift rod is preset at time of manufacturer.

1. Inspect shift link tie rod ends and replace if worn or damaged. Lubricate pivot points with a light aerosol lubricant or grease if desired.



Throttle Inspection

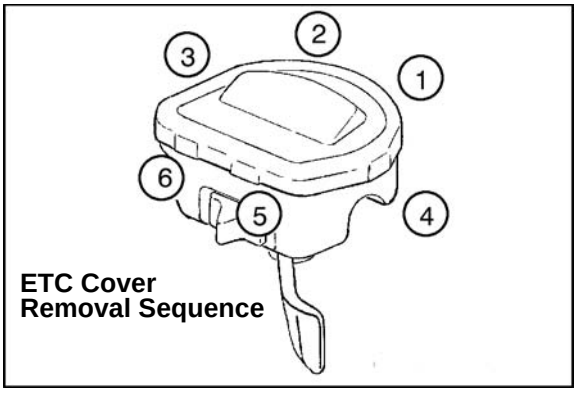
Check for smooth throttle opening and closing in all handlebar positions. Throttle lever operation should be smooth and lever must return freely without binding.

1. Place the gear selector in neutral.
2. Place shift selector in neutral and set parking brake.
3. Loosen lock nut on in-line cable adjuster (Ill. 1).
4. Turn handlebars from full right to full left. If idle speed increases at any point in the turning range, inspect throttle cable routing and condition. Adjust cable tension as needed until lock-to-lock turning can be accomplished with no rise in engine rpm.
5. Replace the throttle cable if worn, kinked, or damaged.

To Remove ETC Cover:

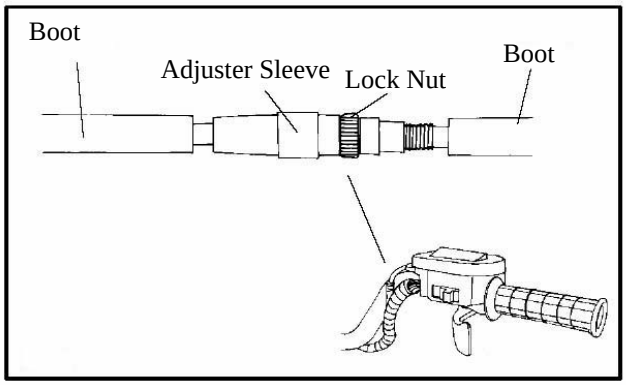
1. Use a medium flat blade screwdriver and insert blade into the pocket of the cover starting on the #1 position.
2. Twist screwdriver slightly while lifting on the cover to release snap.
3. Repeat procedure at the other five locations as shown.

NOTE: Do not attempt to remove cover until all latch points are released.

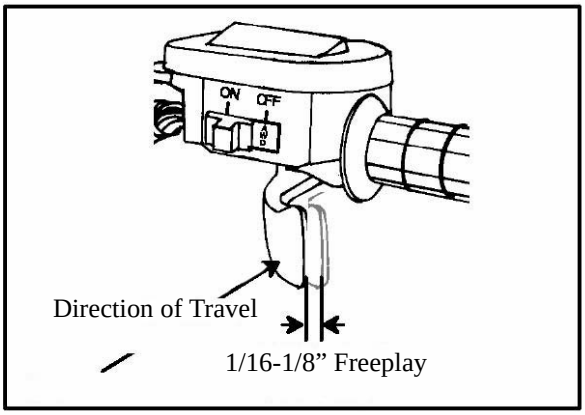


Throttle Cable / Electronic Throttle Control (ETC Switch) Adjustment

1. Slide boot off throttle cable adjuster and jam nut.
2. Place shift selector in neutral and set parking brake.
3. Loosen lock nut on in-line cable adjuster (Ill. 1).



4. Turn adjuster until specified freeplay is achieved at thumb lever. (see illustration). After making adjustments, quickly actuate the thumb lever several times and reverify freeplay.



Throttle Freeplay:
.0625 - .1250" (1.58 - 3.17mm)

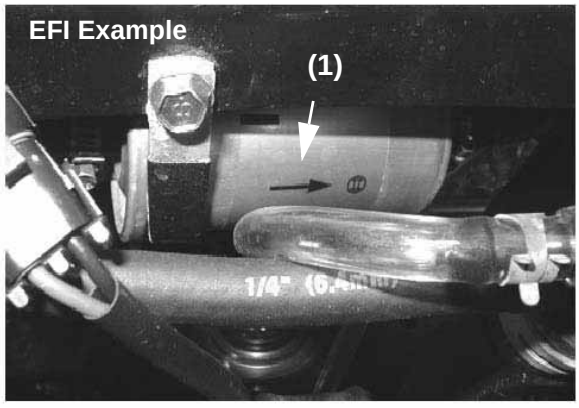
5. Tighten lock nut securely and slide boot completely in place to ensure a water-resistant seal.
6. Turn handlebars from left to right through the entire turning range. If idle speed increases, check for proper cable routing. If cable is routed properly and in good condition, repeat adjustment procedure

Fuel System

⚠ WARNING

* Gasoline is extremely flammable and explosive under certain conditions.
* EFI components are under high pressure. Verify system pressure has been relieved before disassembly.
* Never drain the fuel system when the engine is hot. Severe burns may result
* Do not overfill the tank. The tank is at full capacity when the fuel reaches the bottom of the filler neck. Leave room for expansion of fuel.
* 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.
* Do not smoke or allow open flames or sparks in or near the area where refueling is performed or where gasoline is stored.
* If you get gasoline in your eyes or if you should swallow gasoline, seek medical attention immediately.
* If you spill gasoline on your skin or clothing, immediately wash with soap and water and change clothing.
* Always stop the engine and refuel outdoors or in a well ventilated area.Keep away from open flames and electrical components when removing fuel filter.

The fuel filter (1) should be replaced in accordance with the Periodic Maintenance Chart. To replace the filter:



1. Disconnect negative battery cable.
2. Relieve the pressure on the fuel rail. (See Ch. 4)
3. Remove line locks at both ends of the filter.
4. Remove fuel lines from filter, use shop towels to catch any leaking fuel.
5. Install new filter in line with arrow pointed in direction of fuel flow.
6. Install line locks on fuel lines and verify locks are seated.
7. Start engine and inspect for leaks.

Vent Lines

Check fuel tank, oil tank, battery and transmission vent lines for signs of wear, deterioration, damage or leakage. Replace Be sure vent lines are routed properly and secured with cable ties.

CAUTION

Verify vent lines are not kinked or damaged

Compression Test

NOTE: This engine does NOT have decompression components. Compression readings will vary in proportion to cranking speed during the test. Average compression (measured) is about 150-200 psi during a compression test.

A smooth idle generally indicates good compression. Low engine compression is rarely a factor in running condition problems above idle speed. Abnormally high compression can be caused by carbon deposits in the combustion chamber or worn, damaged exhaust cam lobes. Inspect camshaft and combustion chamber if compression is abnormally high.

A cylinder leakdown test is the best indication of engine condition. Follow manufacturer's instructions to perform a cylinder leakage test. (Never use high pressure leakage testers, as crankshaft seals may dislodge and leak).

Cylinder Compression
Standard: 150-200 PSI

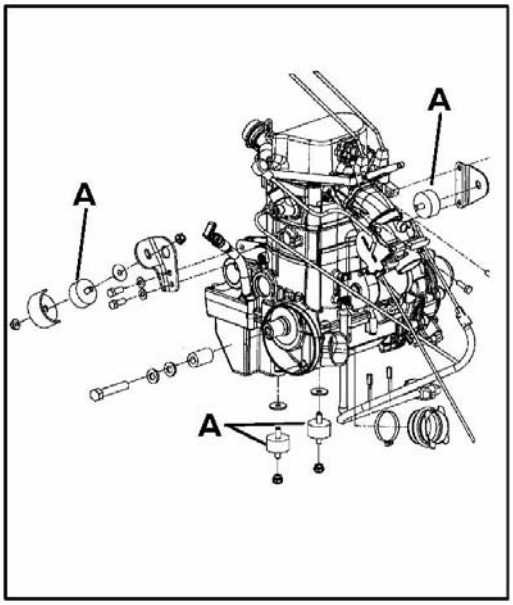
Cylinder Leakdown
Service Limit 15%

(Inspect for cause if test exceeds 15%)

Engine Mounts

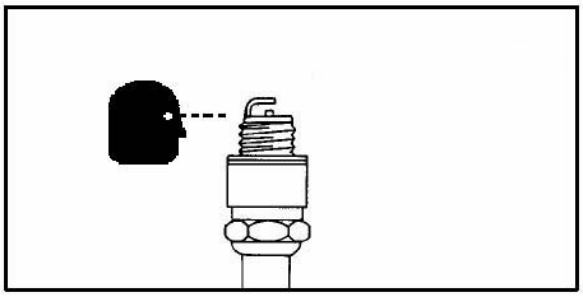
Inspect rubber engine mounts (A) for cracks or damage.

Check engine fasteners and mounts, ensure they are tight.



Spark Plug

1. Clean plug area so no dirt and debris can fall into engine when plug is removed. Remove spark plug high tension lead.
2. Remove spark plug.
3. Inspect electrodes for wear and carbon buildup. Look for a sharp outer edge with no rounding or erosion of the electrodes.

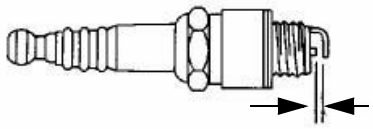


4. Clean with electrical contact cleaner or a glass bead spark plug cleaner only.

CAUTION
A wire brush or coated abrasive should not be used for cleaning sparkplugs.

5. Measure gap with a wire gauge. Refer to specifications for proper spark plug type and gap. Adjust gap if necessary by bending the side electrode carefully.

Spark Plug Gap



.036 (0.9 mm)

6. If necessary, replace spark plug with proper type.

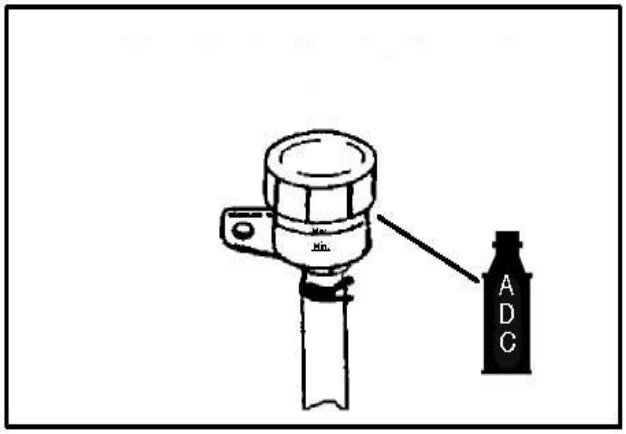
CAUTION
Severe engine damage may occur if the incorrect spark plug is used.

7. Apply a small amount of anti-seize compound to the spark plug threads.
8. Install spark plug and torque to specification.

= T
Recommended Spark Plug Refer to the Specifications page in Chapter 1 for spark plug type. **Spark Plug Torque: 18 ft.lbs. (24 Nm)**

Active Descent Control (ADC) Reservoir Level

The Active Descent Control reservoir (DELUXE Models Only) is located by the radiator fill cap. Check the level and verify it is between the 'MAX' and 'MIN' lines. Add only Polaris ADC fluid when required.



Battery Maintenance

Complete battery servicing information for both conventional and sealed batteries can be found in Chapter 10 of this manual.

⚠ WARNING

Battery electrolyte is poisonous. It contains sulfuric acid. Serious burns can result from contact with 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.

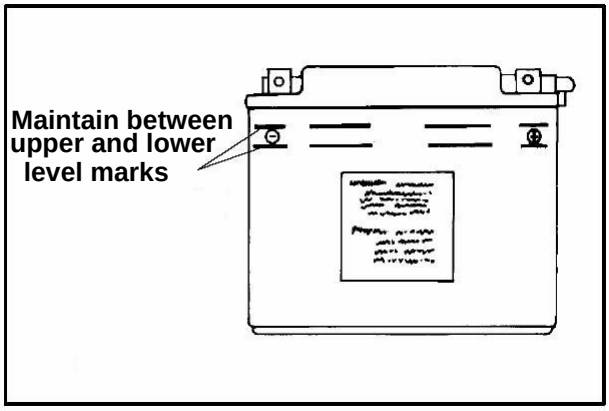
Eyes: Flush with water for 15 minutes and get prompt medical attention.

Batteries produce explosive gases. Keep sparks, flame, cigarettes, etc. away. Ventilate when charging or using in an enclosed space. Always shield eyes when working near batteries. KEEP OUT OF REACH OF CHILDREN.

NOTE: Expected battery shelf life is 6-8 months depending on storage conditions. As a general rule before placing the battery into service, check the battery condition and charge accordingly.

NOTE: New Batteries: Batteries must be fully charged before use or battery life will be reduced by 10-30% of full potential. Charge battery for 3-5 hours at a current equivalent of 1/10 of the battery's rated amp/hour capacity. Do not use the alternator to charge a new battery. (Refer to battery video PN 9917987).

(Conventional Battery Only) Inspect the battery fluid level. When the electrolyte nears the lower level, remove the battery and add distilled water only to the upper level line .



To Remove the Battery:

1. Disconnect holder strap and remove cover.
2. Disconnect battery negative (-) (black) cable first, followed by the positive (+) (red) cable.

⚠ CAUTION

To reduce the chance of sparks: Whenever removing the battery, disconnect the negative (black) cable first. When reinstalling the battery, install the negative cable last.

3. Disconnect the vent hose.
4. Remove the battery.
5. ***(Conventional Battery Only)*** Remove the filler caps and add distilled water only as needed to bring each cell to the proper level. Do not overfill the battery.

IMPORTANT: Use only distilled water. Tap water contains minerals which are harmful to a battery.

IMPORTANT: Do not allow cleaning solution or tap water to enter a battery, as it will shorten the life of the battery.

6. Fully recharge the battery.
7. Reinstall battery caps ***(Conventional Battery Only)***.
8. Clean battery cables and terminals with a stiff wire brush. Corrosion can be removed using a solution of one cup water and one tablespoon baking soda. Rinse well with clean water and dry thoroughly.
9. Reinstall battery, attaching positive (+) (red) cable first and then the negative (-) (black) cable.
10. Reattach vent hose making sure it is properly routed and not kinked or pinched.
11. Coat terminals and bolt threads with Dielectric Grease **(PN 2871329)**.
12. Reinstall battery cover and holder strap.

Cooling System

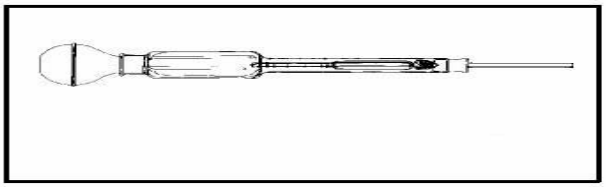
The engine coolant level is controlled or maintained by the recovery system. The recovery system components are the recovery bottle, radiator filler neck, radiator pressure cap and connecting hose.

As coolant operating temperature increases, the expanding (heated) excess coolant is forced out of the radiator past the pressure cap and into the recovery bottle. As engine coolant temperature decreases the contracting (cooled) coolant is drawn back up from the tank past the pressure cap and into the radiator.

- Some coolant level drop on new machines is normal as the system is purging itself of trapped air. Observe coolant levels often during the break-in period.
- Overheating of engine could occur if air is not fully purged from system.
- Polaris Premium 60/40 anti-freeze is premixed and ready to use. Do not dilute with water.

Coolant Strength / Type

Test the strength of the coolant using an antifreeze hydrometer.



Antifreeze Hydrometer

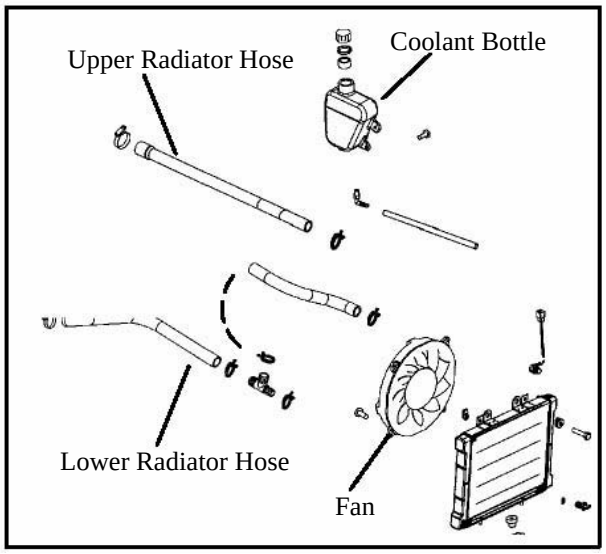
- A 50/50 or 60/40 mixture of antifreeze and distilled water will provide the optimum cooling, corrosion protection, and antifreeze protection.
- Do not use tap water, straight antifreeze, or straight water in the system. Tap water contains minerals and impurities which build up in the system.
- Straight water or antifreeze may cause the system to freeze, corrode, or overheat.

Polaris 60/40 Anti-Freeze/ Coolant

(PN 2871323)

Cooling Hoses

Inspect all hoses for cracks, deterioration, abrasion or leaks. Replace if necessary.



1. Check tightness of all hose clamps.
2. Do not over-tighten hose clamps at radiator or radiator fitting may distort, causing a restriction or leak.

Radiator

1. Check radiator external air flow passages for restrictions or damage.
2. Carefully straighten any bent radiator fins.
3. Remove any obstructions with compressed air or low pressure water.

Cooling System Pressure Test

See Chapter 3 for pressure test procedures.

Reservoir Level Inspection

⚠ WARNING

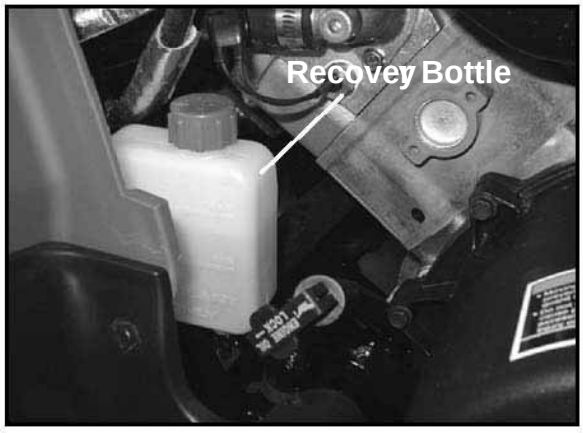
Never remove the radiator pressure cap when the engine is warm or hot. Escaping steam and fluid can cause severe burns. The engine must be allowed to cool before removing the pressure cap.

Remove any obstructions with compressed air or low pressure water.

With the engine at operating temperature, the coolant level should be between the upper and lower marks on the coolant reservoir. If it is not:

1. Remove reservoir cap. Verify the inner splash cap vent hole is clear and open.
2. Fill reservoir to upper mark with Polaris Premium 60/40 Anti Freeze / Coolant (**PN 2871323**) or a mixture of antifreeze and distilled water as required for freeze protection in your area.
3. Reinstall cap.

NOTE: If overheating is evident, allow system to cool completely and check coolant level in the radiator. Inspect for signs of trapped air in system.



Radiator Coolant Level

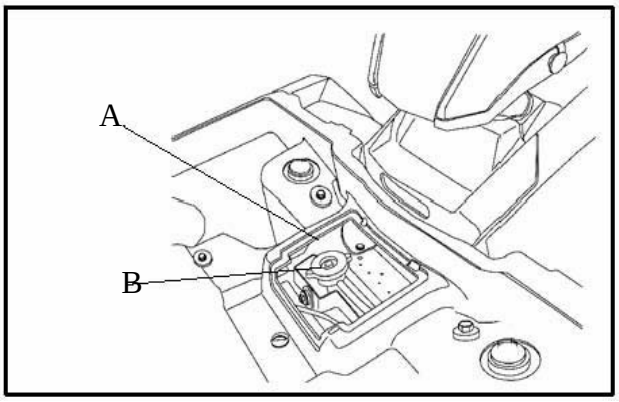
> **⚠ WARNING**
>
> Never remove the radiator pressure cap when the engine is warm or hot. Escaping steam and fluid can cause severe burns. The engine must be allowed to cool before removing the pressure cap.

NOTE: This procedure is only required if the cooling system has been drained for maintenance and/or repair. However, if the recovery bottle has run dry, or if overheating is evident, the level in the radiator should be inspected via the radiator cap first and coolant added if necessary.

NOTE: Use of a non-standard pressure cap will not allow the recovery system to function properly.

To Access the Radiator Pressure Cap:

Lift the front cargo cover. Remove access cover (A) by placing your fingers under the front of the cover and pulling upward. The radiator cap (B) is now accessible.



Air Filter Service

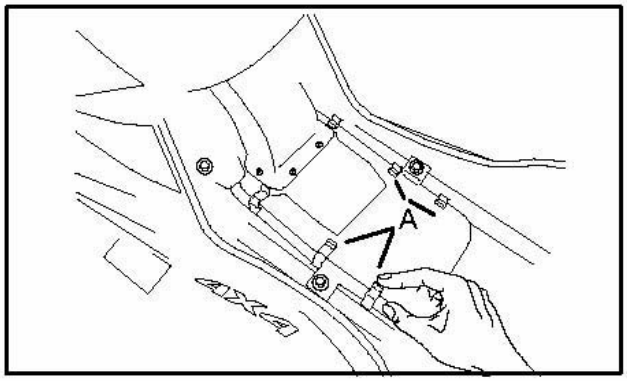
It is recommended that the air filter and pre filter be replaced annually. When riding in extremely dusty conditions, replacement is required more often.

The pre filter should be cleaned before each ride using the following procedure:

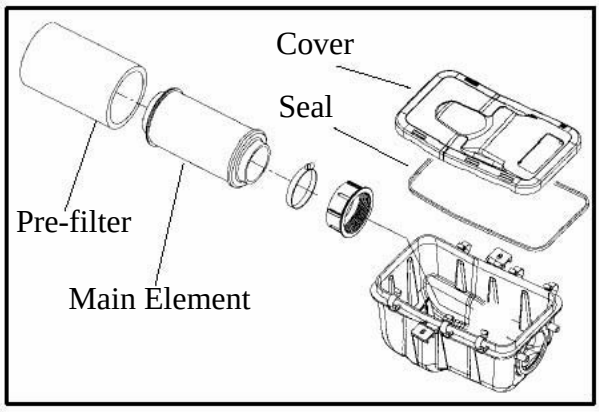
1. Lift up on the rear of the seat.
2. Pull the seat back and free of the tabs.

NOTE: When reinstalling seat, make sure the slots in the seat engage the tabs in the fuel tank.

3. Remove clips (A) from air box cover and remove cover. Inspect the gasket. It should adhere tightly to the cover and seal all the way around.



4. Loosen clamp and remove air filter assembly.



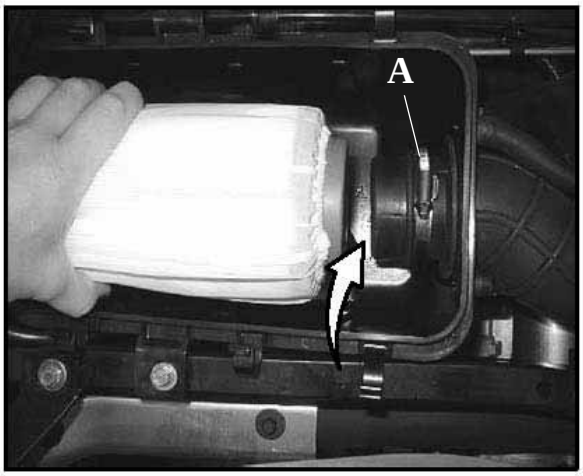
Cleaning:

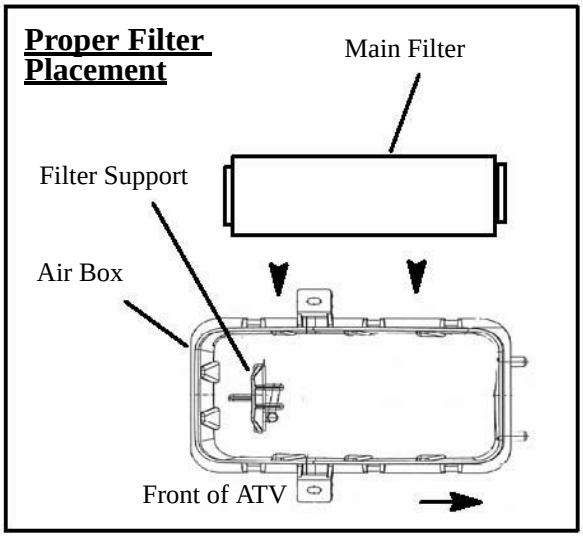
5. Slip the pre-filter element off of main element. Clean the pre filter with hot soapy water.
6. Rinse and dry thoroughly.
7. Inspect element for tears or damage.
8. Inspect main filter and replace if necessary. If the filter has been soaked with fuel or oil it must be replaced.

Installation:

9. Reinstall pre-filter element over main filter. Be sure the element covers entire surface of main filter without folds, creases, or gaps.
10. Reinstall filter on main filter mount. Place filter clamp over the assembly and tighten.

NOTE: Apply a small amount of general purpose grease to the sealing edges of the filter before reinstalling.





NOTE: The air filter should rest on the filter support. Proper placement of the air filter is important to prevent rattles and air leaks.

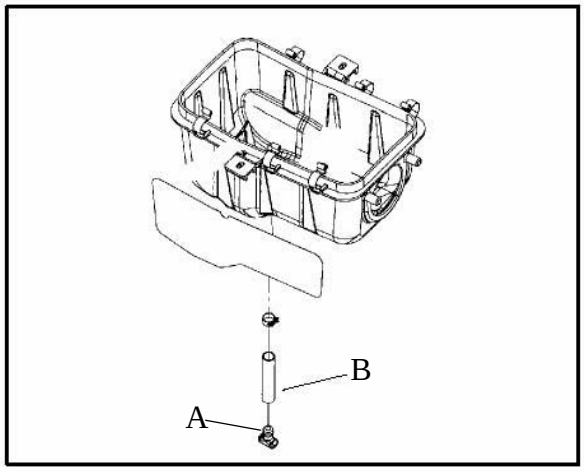
11. Install air box cover and secure with clips.

Air Box Sediment Tube

Periodically check the air box drain tube located toward the rear of the machine. Drain whenever deposits are visible in the clear tube.

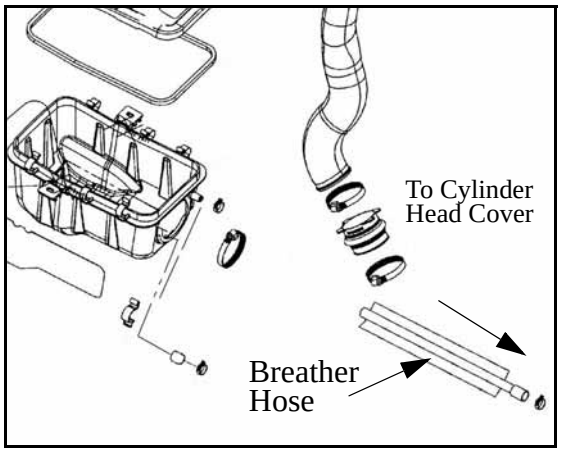
1. Remove drain plug (A) from end of sediment tube (B).
2. Drain tube.
3. Reinstall drain plug.

NOTE: The sediment tube will require more frequent service if the vehicle is operated in wet conditions or at high throttle openings for extended periods.



Engine Breather

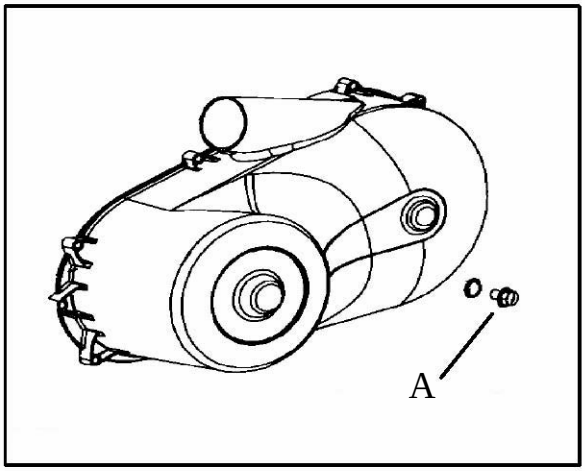
Four-cycle ATV engines are equipped with a engine breather filter. The in-line filter is similar in appearance to a fuel filter. The breather lines are located on top of the cylinder head cover, below the gas tank. Be sure breather line is routed properly and secured in place. Make sure the lines are not kinked or pinched. In-line breather filters can be installed with the arrow pointing in either direction.



PVT Inspection / Drying Procedure

NOTE: If operating the ATV in or through water, be sure to check the PVT cover and other components for water ingestion. The ATV should be checked immediately.

1. To release any water that maybe trapped in the PVT cover, simply remove the PVT drain plug and O-ring (A) located on the bottom of the PVT cover and let the water drain out. The PVT drain plug is shown below.



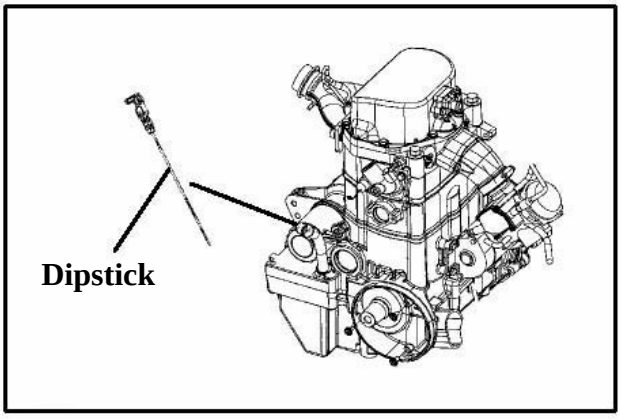
2. To further expel water from the cover and to dry out the PVT system, shift the transmission to neutral and rev engine slightly to expel the moisture and air-dry the belt and clutches. Allow engine RPM to settle to idle speed, shift transmission to lowest available range and test for belt slippage. Operate ATV in lowest available range for a short period of time until PVT system is dry.

Engine Ground

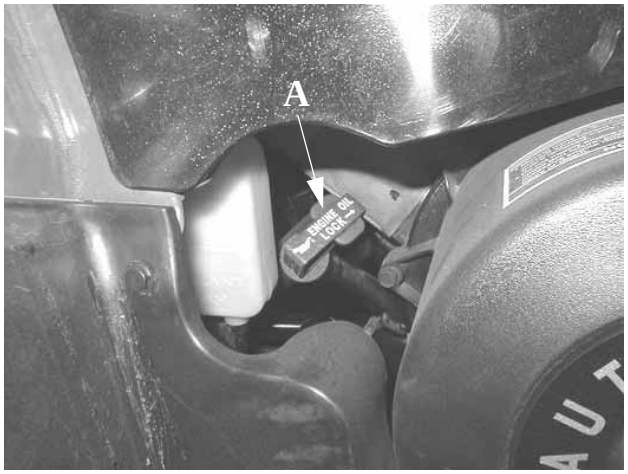
Inspect engine-to-frame ground cable connection. Be sure the connection clean and tight.

Engine Oil Level

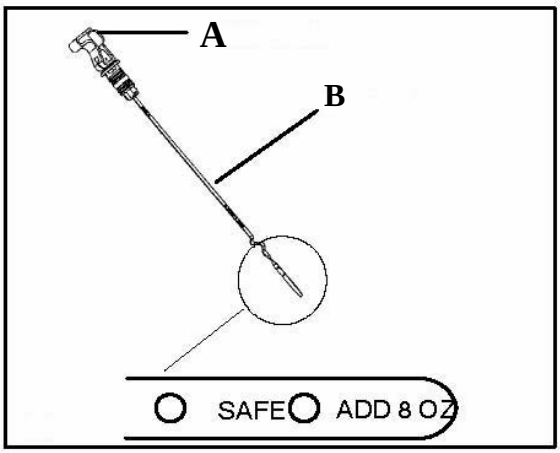
The twin engine is a wet-sump engine, meaning the oil is contained in the bottom of the crankcase. To check the oil level:



1. Set machine on a level surface.
2. Be sure the machine has sat for awhile before removing the dipstick. Do not run the engine and then check the oil level, as this will result in an incorrect reading.



3. Unlock the lever lock (A). Remove dipstick (B) and wipe dry with a clean cloth.

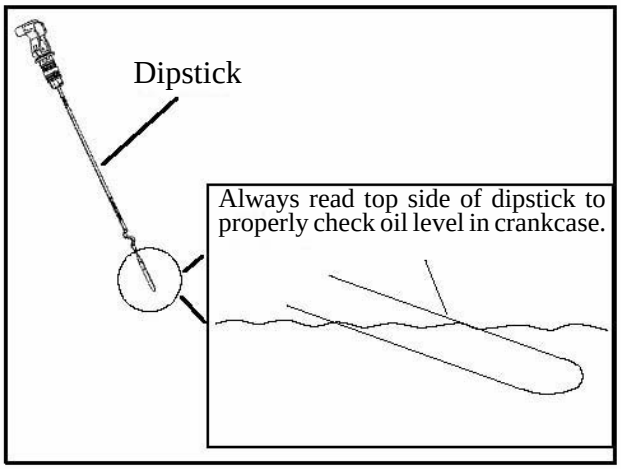


4. Reinstall dipstick and push it into place. Do not lock the dipstick.

NOTE: Make certain the dipstick is inserted all the way into the filler tube to keep the angle and depth of stick consistent. When reinstalling the dipstick, make certain to seat the lever lock.

5. Remove dipstick and check to see that the oil level is in the normal range. Add oil as indicated by the level on the dipstick. Do not overfill. (See NOTE below!)

NOTE: Due to the dipstick entry angle into the crankcase, the oil level will read higher on the bottom side of the dipstick. Proper level indication is determined on the upper side of the dipstick as it is being removed, regardless of the level marks being on top or on bottom. (See illustration)



NOTE: A rising oil level between checks in cool weather driving can indicate contaminants such as gas or moisture collecting in the crankcase. If the oil level is over the full mark, change the oil immediately.

Oil/filter Change

1. Place vehicle on a level surface.
2. Run engine two to three minutes until warm. Stop engine.
3. Clean area around drain plug at bottom of engine.
4. Place a drain pan beneath crankcase and remove drain plug.

⚠ CAUTION
Do not allow hot oil to come into contact with your skin, as serious burns may result.

5. Allow oil to drain completely.
6. Replace the sealing washer on drain plug.

NOTE: The sealing surfaces on drain plug and oil tank should be clean and free of burrs, nicks or scratches.

7. Reinstall drain plug and torque to specification.

= T
Drain Plug Torque: **15 ± 2 ft.lbs. (21.7 ± 2.7 Nm)**

8. Place shop towels beneath oil filter. Using Oil Filter Wrench PV-43527, turn filter counterclockwise to remove.

9. Using a clean dry cloth, clean filter sealing surface on crankcase.
10. Lubricate O-ring on new filter with a film of fresh engine oil. Check to make sure the O-ring is in good condition.
11. Install new filter and turn by hand until filter gasket contacts the sealing surface, then turn an additional 1/2 turn.
12. Remove dipstick and fill sump with 2 quarts (1.9 l) of Polaris Premium 4 Synthetic Oil.
13. Place gear selector in park and set the parking brake.

14. Start the engine and let it idle for one to two minutes. Stop the engine and inspect for leaks.
15. Re-check the oil level on the dipstick and add oil as necessary to bring the level to the upper mark on the dipstick.
16. Dispose of used filter and oil properly.

Recommended Engine Oil:
Polaris Premium 0W/40 Synthetic
(PN 2871281)

Oil Filter Wrench: (PV-43527)

Oil Filter Torque: Turn by hand until filter gasket contacts sealing surface, then turn an additional 1/2 turn

Steering Inspection

WARNING

Due to the critical nature of the procedures outlined in this chapter, Polaris recommends steering component repair and adjustment be performed by an authorized Polaris MSD-certified technician when replacing worn or damaged steering parts. Use only genuine Polaris replacement parts.

The steering components should be checked periodically for loose fasteners, worn tie rod ends, and damage. Also check to make sure all cotter pins are in place. If cotter pins are removed, they must not be re-used. Always use new cotter pins.

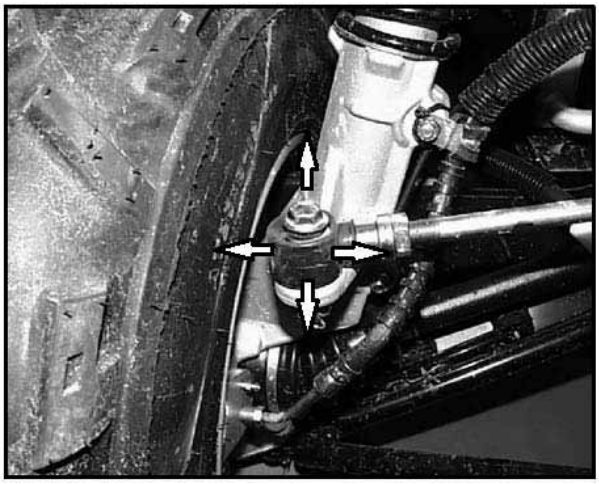
Replace any worn or damaged steering components. Steering should move freely through entire range of travel without binding. Check routing of all cables, hoses, and wiring to be sure the steering mechanism is not restricted or limited.

NOTE: Whenever steering components are replaced, check front end alignment. Use only genuine Polaris parts.

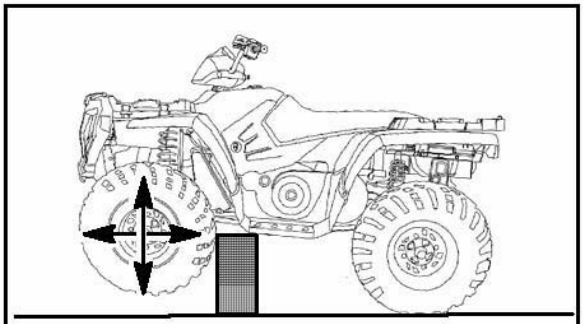
One of two methods can be used to measure toe alignment. The string method and the chalk method. If adjustment is required, refer to following pages for procedure.

Tie Rod / Steering

- To check for play in the tie rod end, grasp the steering tie rod, pull in all directions feeling for movement.
- Repeat inspection for inner tie rod end on steering post.



- Replace any worn steering components. Steering should move freely through entire range of travel without binding.
- Elevate front end of machine so front wheels are off the ground. Check for any looseness in front hub / wheel assembly by grasping the tire firmly at top and bottom first, and then at front and rear. Try to move the wheel and hub by pushing inward and pulling outward.
- If abnormal movement is detected, inspect the hub and wheel assembly to determine the cause (possible loose wheel nuts or loose front hub components).



Check for loose wheel or hub.

- Refer to the Body/Steering Chapter 5 or Final Drive Chapter 7 for service procedures.

Camber/Caster

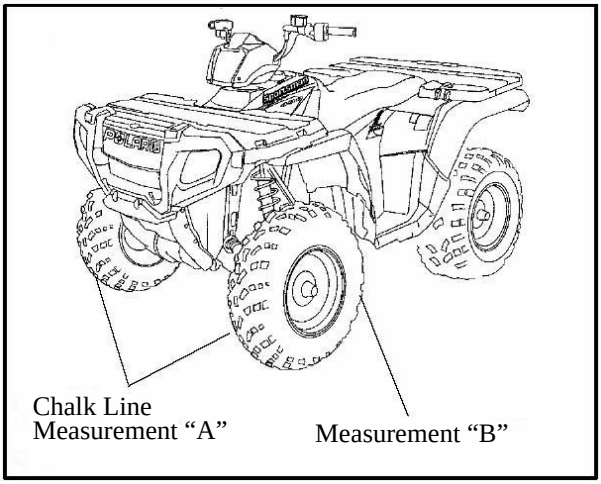
Camber and caster are non-adjustable.

Wheel Alignment

1. Place machine on a smooth level surface.
2. Set handlebars in a straight ahead position and secure handlebars in this position.
3. Place a chalk mark on the center line of the front tires approximately 10, (25.4 cm) from the floor or as close to the hub/axle center line as possible.

NOTE: It is important that the height of both marks be equally positioned in order to get an accurate measurement.

4. Measure the distance between the marks and record the measurement. Call this measurement "A".
5. Rotate the tires 180° by moving vehicle forward or backward. Position chalk marks facing rearward, even with the hub/axle centerline.
6. Again measure the distance between the marks and record. Call this measurement "B". Subtract measurement "B" from measurement "A". The difference between measurements "A" and "B" is the vehicle toe alignment. The recommended vehicle toe tolerance is 1/8, to 1/4, (.3 to .6 cm) toe out. This means the measurement at the front of the tire (A) is 1/8, to 1/4, (.3 to .6 cm) wider than the measurement at the rear (B).



= In. / mm.

Wheel Toe-Out:
(A) - (B) = 1/8 - 1/4" (.3 to .6 cm)

Toe Alignment

If toe alignment is incorrect, measure the distance between vehicle center and each wheel. This will tell you which tie rod needs adjusting.

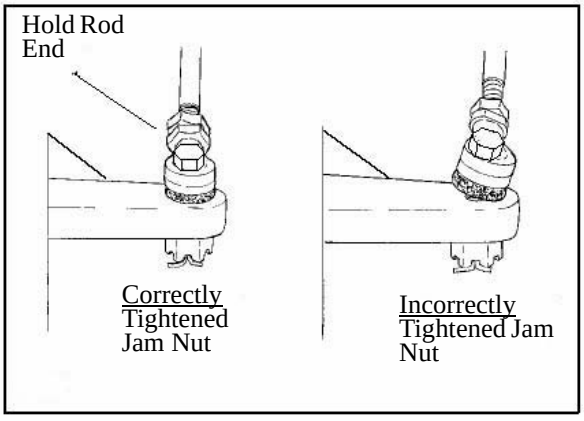
NOTE: Be sure handlebars are straight ahead before determining which tie rod(s) need adjustment.

⚠ CAUTION

During tie rod adjustment, it is very important that the following precautions be taken when tightening tie rod end jam nuts. If the rod end is positioned incorrectly it will not pivot, and may break.

To Adjust Toe Alignment:

- Hold tie rod end to keep it from rotating.
- Loosen jam nuts at both end of the tie rod.
- Shorten or lengthen the tie rod until alignment is as required to achieve the proper toe setting as specified
- **IMPORTANT:** When tightening the tie rod end jam nuts, the rod ends must be held parallel to prevent rod end damage and premature wear. Damage may not be immediately apparent if done incorrectly. See illustration above.
- After alignment is complete, torque jam nuts to specification.



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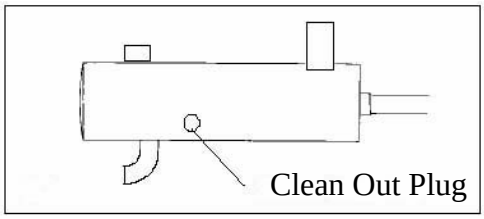
Tie Rod Jam Nut Torque:
12-14 ft. lbs. (16-19 Nm)

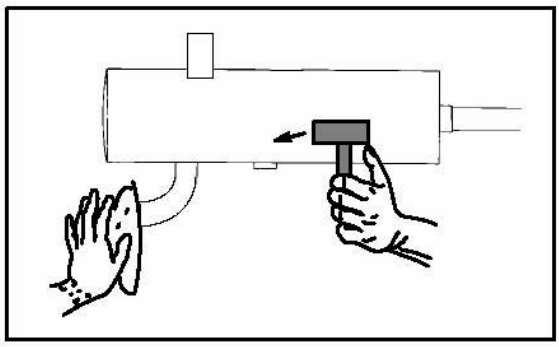
Exhaust Pipe

The exhaust pipe must be periodically purged of accumulated carbon as follows:

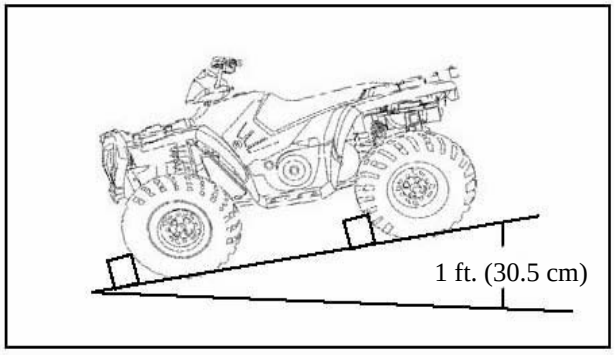
1. Remove the clean out plugs located on the bottom of the muffler as shown



2. Place the transmission in neutral and start the engine. Purge accumulated carbon from the system by momentarily revving the engine several times.
3. If some carbon is expelled, cover the exhaust outlet and rap on the pipe around the clean out plugs while revving the engine several more times.



4. If particles are still suspected to be in the muffler, back the machine onto an incline so the rear of the machine is one foot higher than the front. Set the hand brake and block the wheels. Make sure the machine is in neutral and repeat Steps 2 and 3. See WARNING in this section.
5. If particles are still suspected to be in the muffler, drive the machine onto the incline so the front of the machine is one foot higher than the rear. Set the hand brake and block the wheels. Make sure the machine is in neutral and repeat Steps 2 and 3. SEE WARNING in this section.



6. Repeat Steps 2 through 5 until no more particles are expelled when the engine is revved.
7. Stop the engine and allow the arrestor to cool.
8. Reinstall the clean out plugs.

⚠ WARNING

* Do not perform clean-out immediately after the engine has been run, as the exhaust system becomes very hot. Serious burns could result from contact with hot exhaust components.
* To reduce fire hazard, make sure that there are no combustible materials in the area when purging the spark arrestor.
* Wear eye protection.
* Do not stand behind or in front of the vehicle while purging the carbon from the spark arrestor.Never run the engine in an enclosed area.
* Exhaust contains poisonous carbon monoxide gas.
* Do not go under the machine while it is inclined. Set the hand brake and block the wheels to prevent roll back.

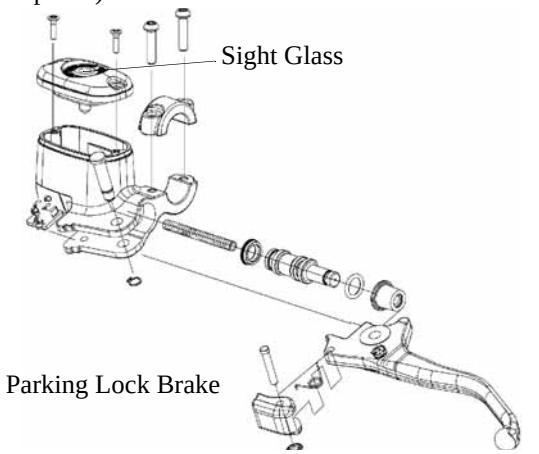
Failure to heed these warnings could result in serious personal injury or death.

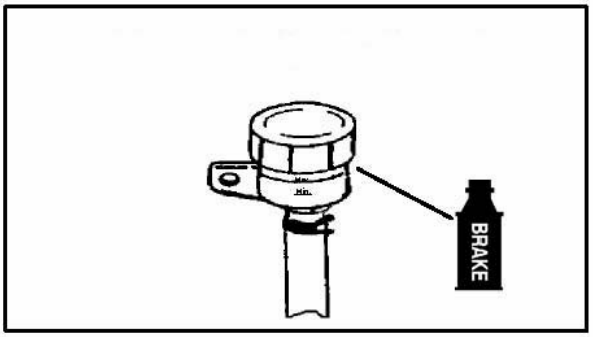
Brake System Inspection

The following checks are recommended to keep the brake system in good operating condition. Service life of brake system components depends on operating conditions. Inspect brakes in accordance with the maintenance schedule and before each ride.

- Keep fluid level in the master cylinder reservoir to the indicated level inside reservoir (See Chapter 9)
- Use Polaris DOT-approved Brake Fluid.
- Check brake system for fluid leaks, look for dust build up on lines and connections that may indicate a fluid leak
- Check brake for excessive travel or spongy feel
- Check friction pads for wear, damage or looseness (see Chapter 9)
- Check surface condition of the disc (see Chapter 9)

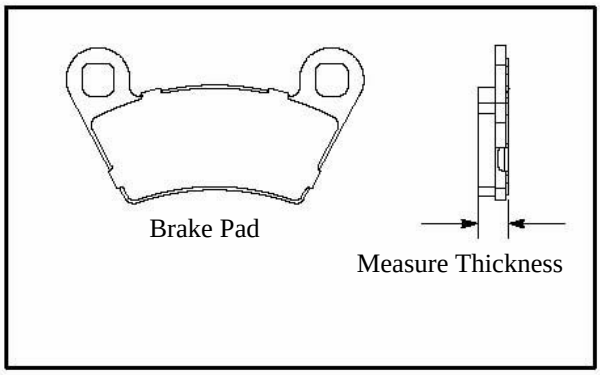
- Inspect thickness of brake pad friction material (see Chapter 9)





Brake Pads

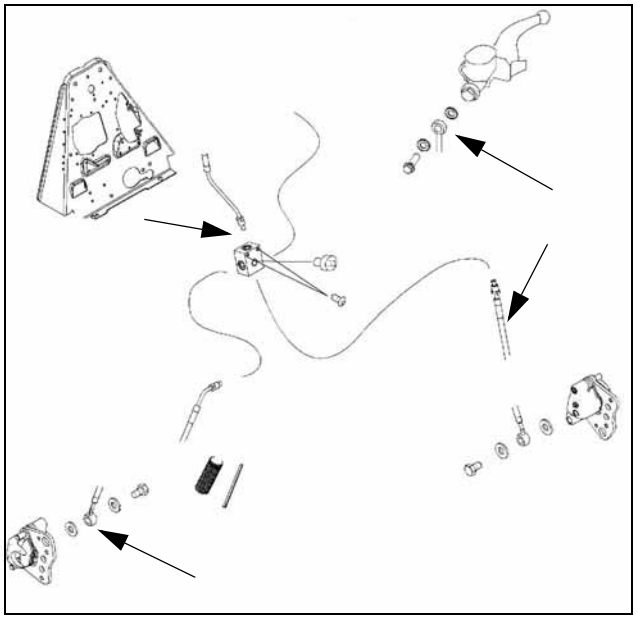
Pads should be changed when the friction material is worn beyond the service limit.



= In. / mm.
Brake Pad Service Limit: **.180" (4.6 mm)**

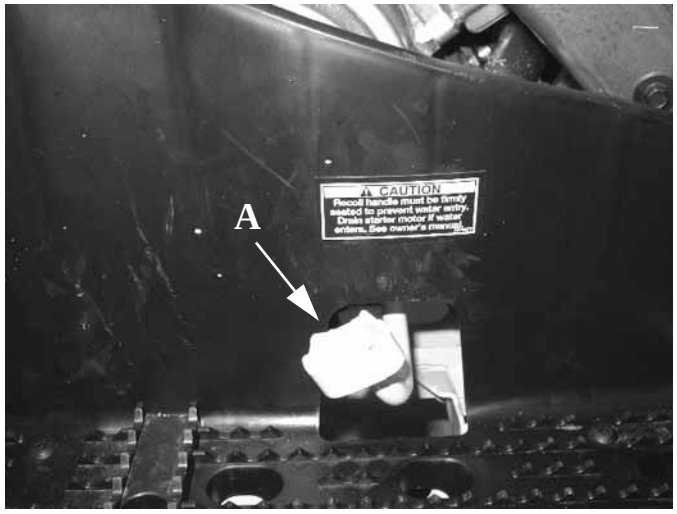
Brake Hose Inspection

Check brake system hoses and fittings for cracks, deterioration, abrasion, and leaks. Tighten any loose fittings and replace any worn or damaged parts.



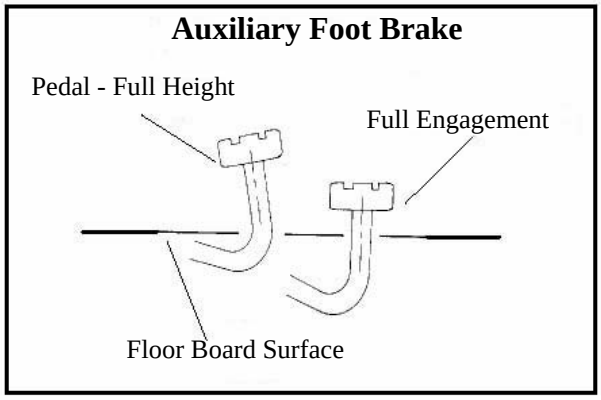
Auxiliary (Rear) Brake Test

The auxiliary brake (A) should be checked for proper function.



1. Support the rear wheels off the ground.

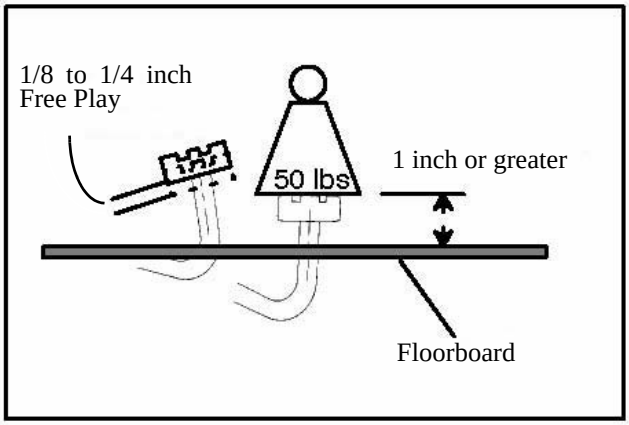
2. While turning the rear wheels by hand, apply the auxiliary foot brake. This brake should not stop the wheels from turning until the lever is half way between its rest position and bottoming on the footrest.



Auxiliary Brake Adjustment

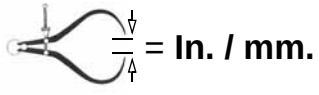
Use the following procedure to inspect the hydraulic auxiliary (foot) brake system and adjust or bleed if necessary:

First, check foot brake effectiveness by applying 50 lb. (approx.) downward force on the pedal. The top of the pedal should be at least 1 inch, (25.4mm) above the surface of the footrest.



If less than one inch, two things must be examined:

Free Play:



Foot Brake Freeplay:
1/8 - 1/4 inch (3.2 - 6.35 mm)

If free play is excessive, inspect pedal, linkage, and master cylinder for wear or damage and replace any parts as needed.

Bleeding:

If free play is correct and brake pedal travel is still excessive, air may be trapped somewhere in the system. Bleed the hydraulic auxiliary brake system in a conventional manner, following the procedure outlined in Brake Chapter 9.

Suspension: Spring Preload Adjustment

Operator weight and vehicle loading affect suspension spring preload requirements. Adjust as necessary. Use Shock Spanner Wrench (**PN 2870872**) to adjust the rear springs.

Front Suspension

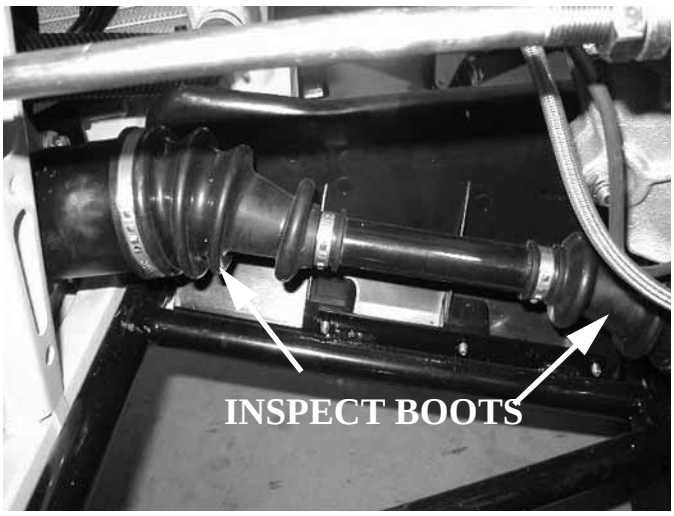
- Compress and release front suspension. Dampening should be smooth throughout the range of travel.
- Check all front suspension components for wear or damage.
- Inspect front strut cartridges for leakage.

Rear Suspension

- Compress and release rear suspension. Dampening should be smooth throughout the range of travel.
- Check all rear suspension components for wear or damage.
- Inspect shock for leakage.

CV Shaft Boot Inspection

Inspect the CV shaft boots in the front and rear of the ATV for damage, tears, wear, or leaking grease. If the rubber boot exhibits any of these symptoms, replace the boot. Refer to Chapter 7 for CV boot replacement, or have your Polaris dealer replace the boot.



ATV Controls

Check controls for proper operation, positioning and adjustment.

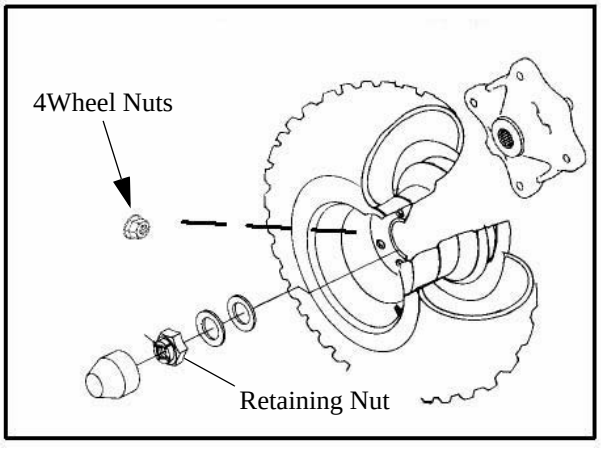
Brake control and switch must be positioned to allow brake lever to travel throughout entire range without contacting switch body.

Wheel Inspection

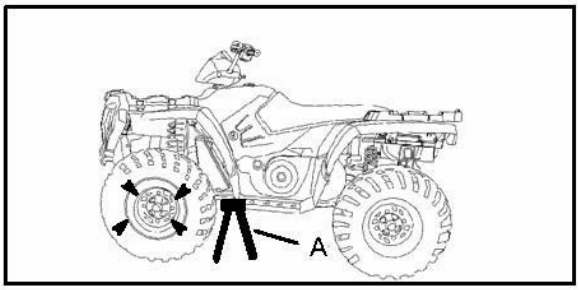
Inspect all wheels for runout or damage. Check wheel nuts and ensure they are tight. Do not over tighten the wheel nuts.

Item	Specification
Steel - Front and Rear Wheel Nuts	27 ft.lbs. (37 Nm)
Aluminum - Front and Rear Wheel Nuts	90 ft.lbs. (122 Nm)
Front Hub Retaining Nut	70 ft.lbs. (90 Nm)
Rear Hub Retaining Nut	80 ft.lbs. (108 Nm)

Wheel Removal: Front Or Rear



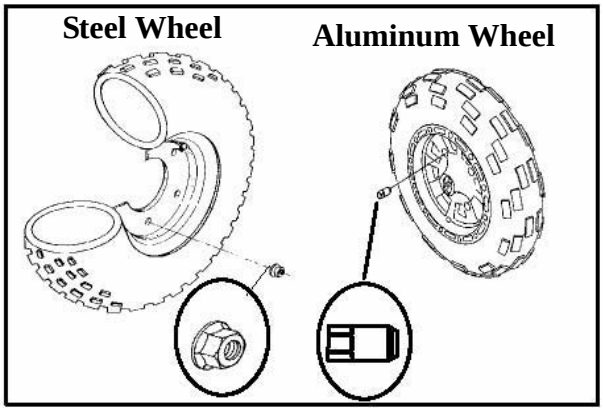
1. Stop the engine, place the transmission in gear and lock the parking brake.
2. Loosen the wheel nuts slightly.
3. Elevate the side of the vehicle by placing a suitable stand under the footrest frame.



4. Remove the wheel nuts and remove the wheel.

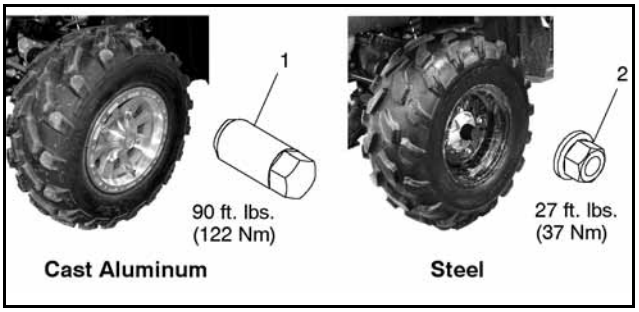
Wheel Installation

1. With the transmission in park and the parking brake locked, place the wheel in the correct position on the wheel hub. Be sure the valve stem is toward the outside and rotation arrows on the tire point toward forward rotation.
2. Attach the wheel nuts and finger tighten them.
3. Lower the vehicle to the ground.
4. Securely tighten the wheel nuts to the proper torque listed in the table .



⚠ CAUTION

Improperly installed wheels could affect vehicle handling and tire wear. On vehicles with tapered rear wheel nuts, make sure tapered end of nut goes into taper on wheel. Torque to proper specification.



Tire Pressure

⚠ CAUTION

Maintain proper tire pressure. Refer to the warning tire pressure decal applied to the vehicle.

Table 2-1:

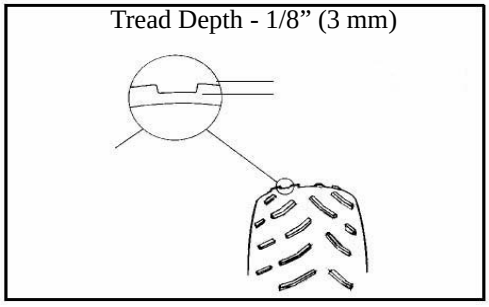
TIRE PRESSURE INSPECTION (PSI - COLD)	
Front	**Rear**
5	**5**

Tire Inspection

- Improper tire inflation may affect ATV maneuverability.
- When replacing a tire always use original equipment size and type.
- The use of non-standard size or type tires may affect ATV handling.

Tire Tread Depth

Always replace tires when tread depth is worn to 1/8, (3 mm) or less.



⚠ WARNING

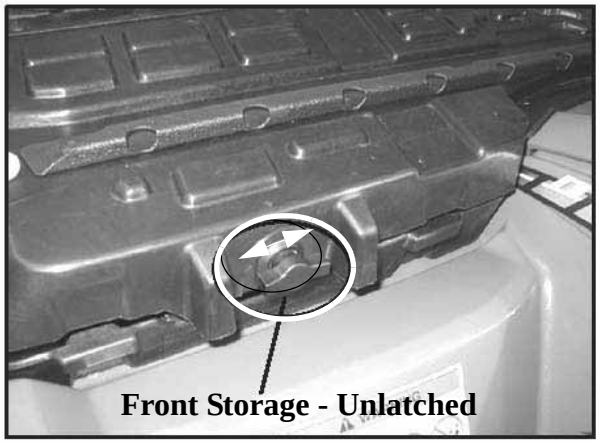
Operating an ATV with worn tires will increase the possibility of the vehicle skidding and possible loss of control.
Worn tires can cause an accident.
Always replace tires when the tread depth measures 1/8inch (.3 cm) or less.

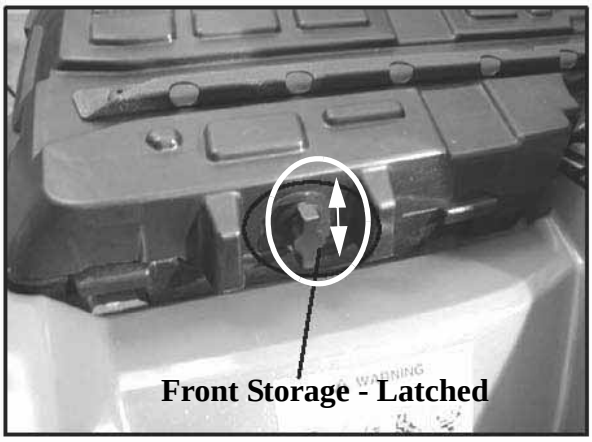
Frame, Nuts, Bolts, Fasteners

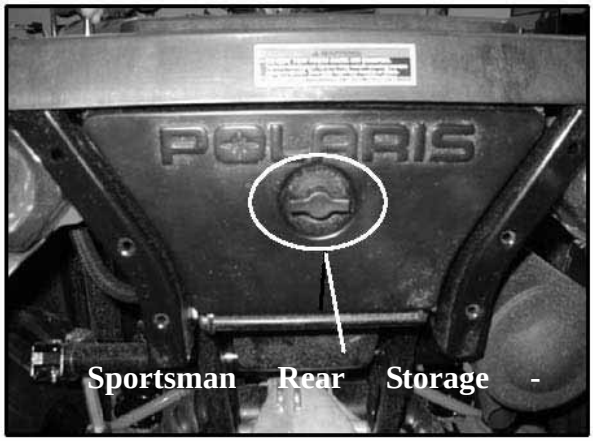
Periodically inspect the torque of all fasteners in accordance with the maintenance schedule. Check that all cotter pins are in place. Refer to specific fastener torques listed in each chapter.

Front / Rear Storage Compartments

The front and rear storage (Sportsman Only) compartments are easily accessible. To open the front compartment turn the latch handle to the horizontal position on both sides. To close the storage compartment turn the latch handles to the vertical position.







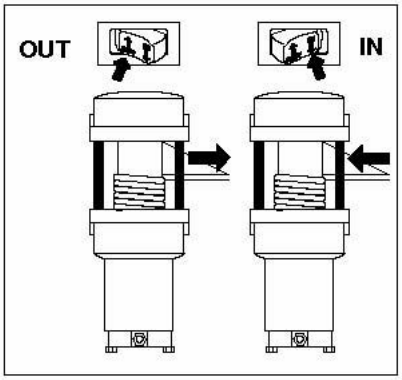
Winch Operation (If Equipped)

This information is for Sportsman models equipped with a winch in the front.

Winch Handlebar Controls

The winch is located in the front bumper area.

The mini-rocker (IN/OUT) control controls the direction of the cable for the winch. IN pulls the cable into the winch and OUT feeds the cable out of the winch.



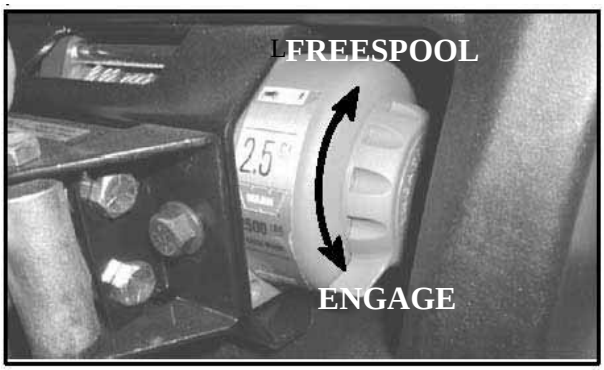
Winch Control

The winch control located on the side of the winch gives the operator easy access to switch between ENGAGED and FREESPOOL.

When the winch is ENGAGED, the winch only allows the cable to be pulled IN or released OUT via the mini-rocker switch on the handlebar.

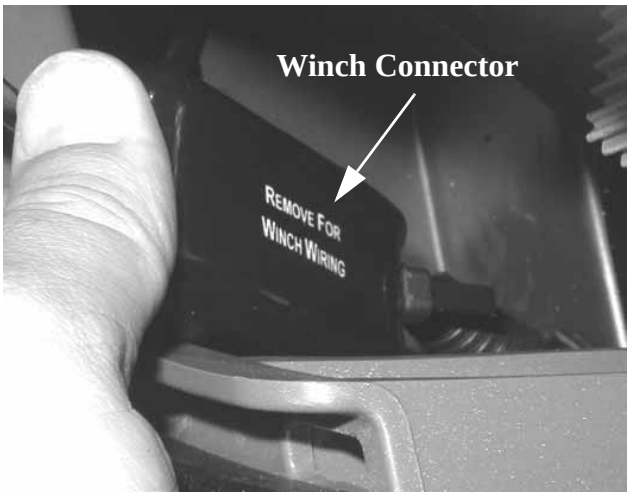
When the winch is FREESPOOL, the winch allows the cable to be pulled out freely.

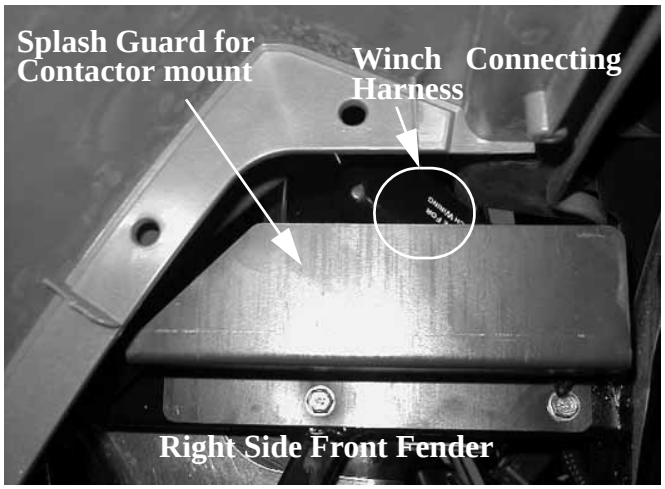
NOTE: The switch on the handlebar does not have to be in the OUT position.



Winch Wire Locations

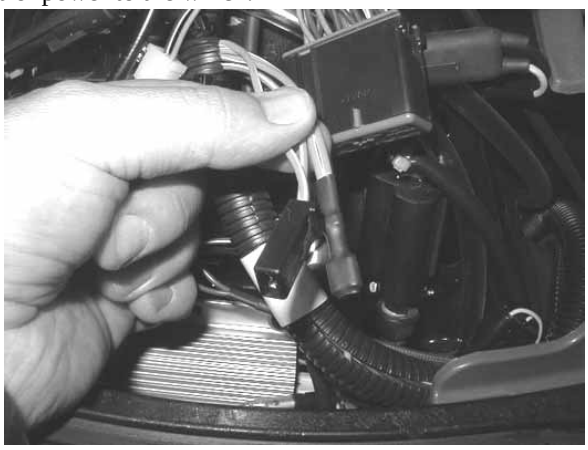
The winch wires can be located under the front cab area. Locate the wires, remove the cap and hook up to winch the Blue and Yellow (6 Ga.) wires to the winch. Refer to the installation instructions for more details.





Locate the Red wire (6 Ga.) with the yellow crimp cover is located in the rear fender area. The red wire connects to the battery.

The Orange/White wires are located under the front cover (under headlight pod). The Orange/White wires supply the control power to the winch.



Cleaning And Storage Of ATV

Cleaning the ATV

Keeping your ATV clean will not only improve its appearance but it can also extend the life of various components. With a few precautions, your ATV can be cleaned much like an automobile.

Washing the ATV

The best and safest way to clean your ATV is with a garden hose and a pail of mild soap and water. Use a professional type washing mitten, cleaning the upper body first and the lower parts last. Rinse with water frequently and dry with a chamois to prevent water spots.

NOTE: If warning and safety labels are damaged, contact your a Polaris dealer for free replacement.

Polaris does not recommend the use of a high pressure type car wash system for washing the ATV. If a high pressure system is used, exercise extreme care to avoid water damage to the wheel bearings, transmission seals, body panels, brakes and warning labels.

NOTE: Grease all zerk fittings immediately after washing, and allow the vehicle to run for a while to evaporate any water that may have entered the engine or exhaust system.

Waxing the ATV

ATVs can be waxed with any non-abrasive automotive paste wax. Avoid the use of harsh cleaners since they can scratch the body finish. Spray-on furniture polish is an acceptable alternative. Do not use old cloths or pads which may contain dirt particles that can scratch the finish. Polaris offers a detailing kit for ATVs.

CAUTION
Certain products, including insect repellents and chemicals, will damage plastic surfaces. Use caution when using these products near plastic surfaces.

Storage Tips

See the beginning of the chapter for Pure Polaris storage products.

CAUTION
Starting the engine during the storage period will disturb the protective film created by fogging. Damage could occur. Never start the engine during the storage period

Clean the Exterior

Make necessary repairs and then clean the ATV thoroughly with mild soap and warm water to remove all dirt and grime. Don't use harsh detergents or high pressure washers. Some detergents deteriorate rubber parts. Use dish soap type cleaners only. High pressure washers may force water past seals.

Stabilize the Fuel

Fill the fuel tank. Add Polaris Carbon Clean Fuel Treatment or Polaris Fuel Stabilizer. Follow the instructions on the container for the recommended amount. (Carbon clean will also reduce the possibility of bacterial growth in the fuel system.) Allow 15-20 minutes of operation for the stabilizer to disperse through the fuel in the tank and the fuel system.

Oil and Filter

Warm the engine and change the oil and filter. Follow the procedure in this chapter for proper oil change.

Air Filter / Air Box

Inspect and clean or replace the pre-cleaner and air filter. Clean the air box and drain the sediment tube.

Breather Filter

Inspect and clean or replace the breather filter.

Fluid Levels

Inspect the following fluid levels and change if necessary: front gearcase; transmission; brake fluid (change every two years or as required if fluid looks dark or contaminated).

Drain and Recoil Housing (If Applicable)

Remove the recoil housing drain plug and drain any moisture.

Fog the Engine

Use Polaris Fogging Oil, following the instructions as directed.

If you choose not to use Polaris Fogging Oil, perform the following procedure.

1. Treat the fuel system with Polaris Carbon Clean. If Polaris fuel system additive is not used, the fuel tank and fuel lines should be completely drained of gasoline.
2. To access the plug hole, use a section of clear 1/4" hose and a small plastic squeeze bottle filled with the pre-measured amount of oil.
3. Remove the spark plug(s). Rotate the piston to BDC and pour approximately two ounces of Polaris oil into the cylinder.

NOTE: Do this carefully! If you miss the plug hole, oil will drain from the spark plug cavity into the hole at the front of the cylinder head and appear to be an oil leak.

4. Apply dielectric grease to the inside of the spark plug cap and install the cap onto the plug.
5. Turn the engine over several times to ensure coverage of piston rings, cylinder walls and crankshaft bearings.

6. After storage procedures are complete, do not start the engine until unit is ready to be removed from storage. Starting the engine will remove the protective coating from the engine components.

Lubrication

Inspect all cables and lubricate with Polaris Cable Lubricant. Follow lubrication guidelines in the maintenance section of the service or owner's manual to completely grease and lubricate the entire vehicle with Polaris Premium All Season Grease.

Battery Storage

Remove the battery from the vehicle and ensure that it's fully charged before placing it in storage. See Chapter 10 for instructions.

Engine Anti-Freeze

Test engine coolant strength and change if necessary. Coolant should be replaced every two years.

Storage Area / Covers

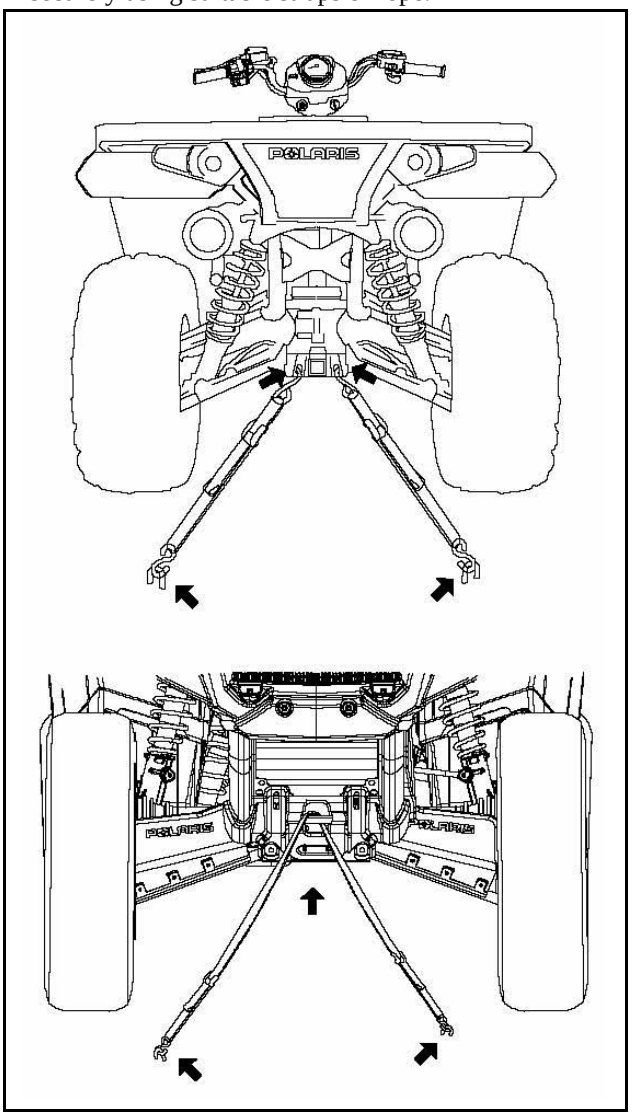
Set the tire pressure and safely support the ATV with the tires 1-2" off the ground. Be sure the storage area is well ventilated, and cover the machine with a genuine Polaris ATV cover.

NOTE: Do not use plastic or coated materials. They do not allow enough ventilation to prevent condensation, and may promote corrosion and oxidation.

Transporting the ATV

Follow these procedures when transporting the vehicle:

1. Turn off the engine and remove the key to prevent loss during transporting.
2. Always place the transmission in park and lock the parking brake.
3. Be sure the fuel cap, oil cap and seat are installed correctly.
4. Always tie the frame of the ATV to the transporting unit securely using suitable straps or rope.



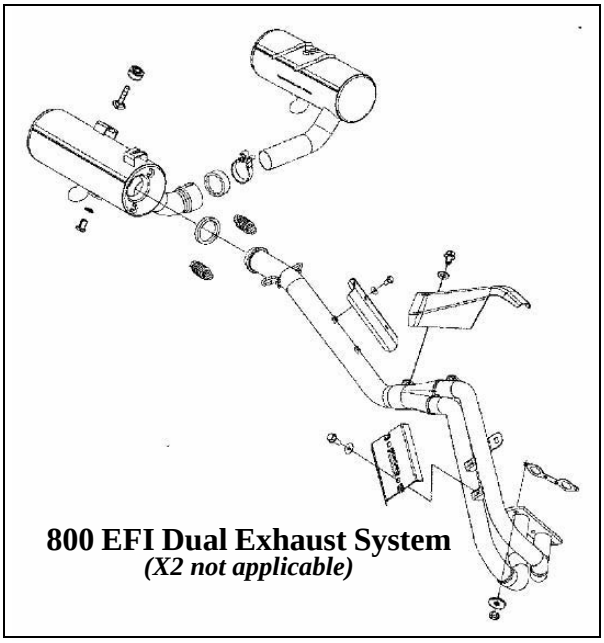
800 EFI Dual Exhaust Canister Maintenance (Sportsman Only)

The canisters on select dual exhaust Polaris Sportsman 800 EFIs *(X2 not applicable)* are silver ceramic coated. To maintain a beautiful finish and prevent corrosion, periodic maintenance is required.

CAUTION
DO NOT use caustic chemicals to clean, as they may damage the finish.

1. Wash any accumulated mud or debris from the canisters with a soft brush and soapy water.
2. Use a cleaner, such as HPC HiPerWash™ to clean away any remaining grime, salts or oils.
3. If the canisters are stained from oils or other fluids, use fine steel wool with HPC Liquid Buff™ Cleaner and Polish to remove the stain.
4. After removing the stains, polish using Liquid Buff™ and a soft cloth.

Repeat this procedure as often as desired to maintain the finish.



800 EFI Dual Exhaust System
(X2 not applicable)

Maintenance Schedule

Service Date	Hours / Miles	Service Performed	Serviced By:

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ENGINE

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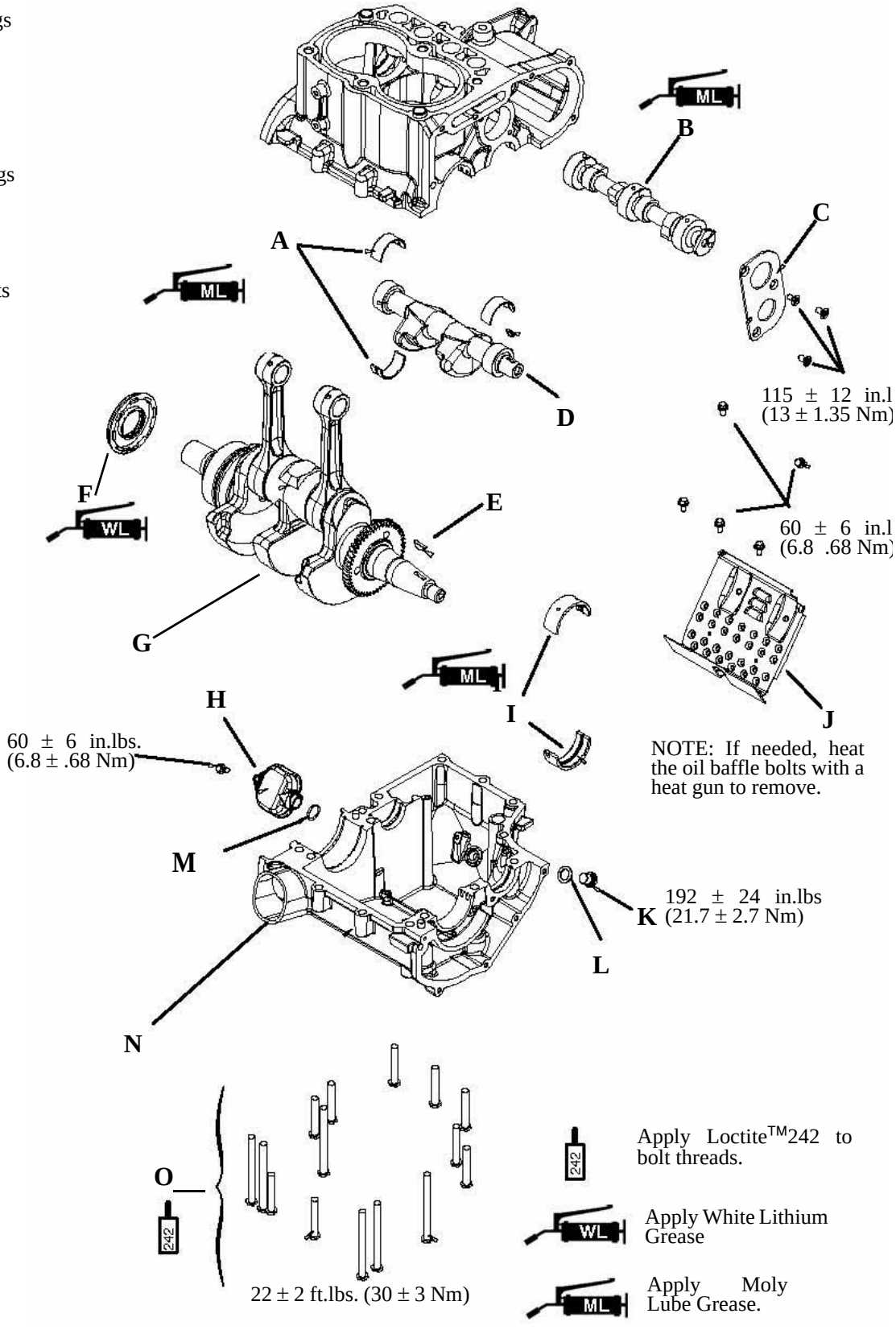
SPECIFICATIONS

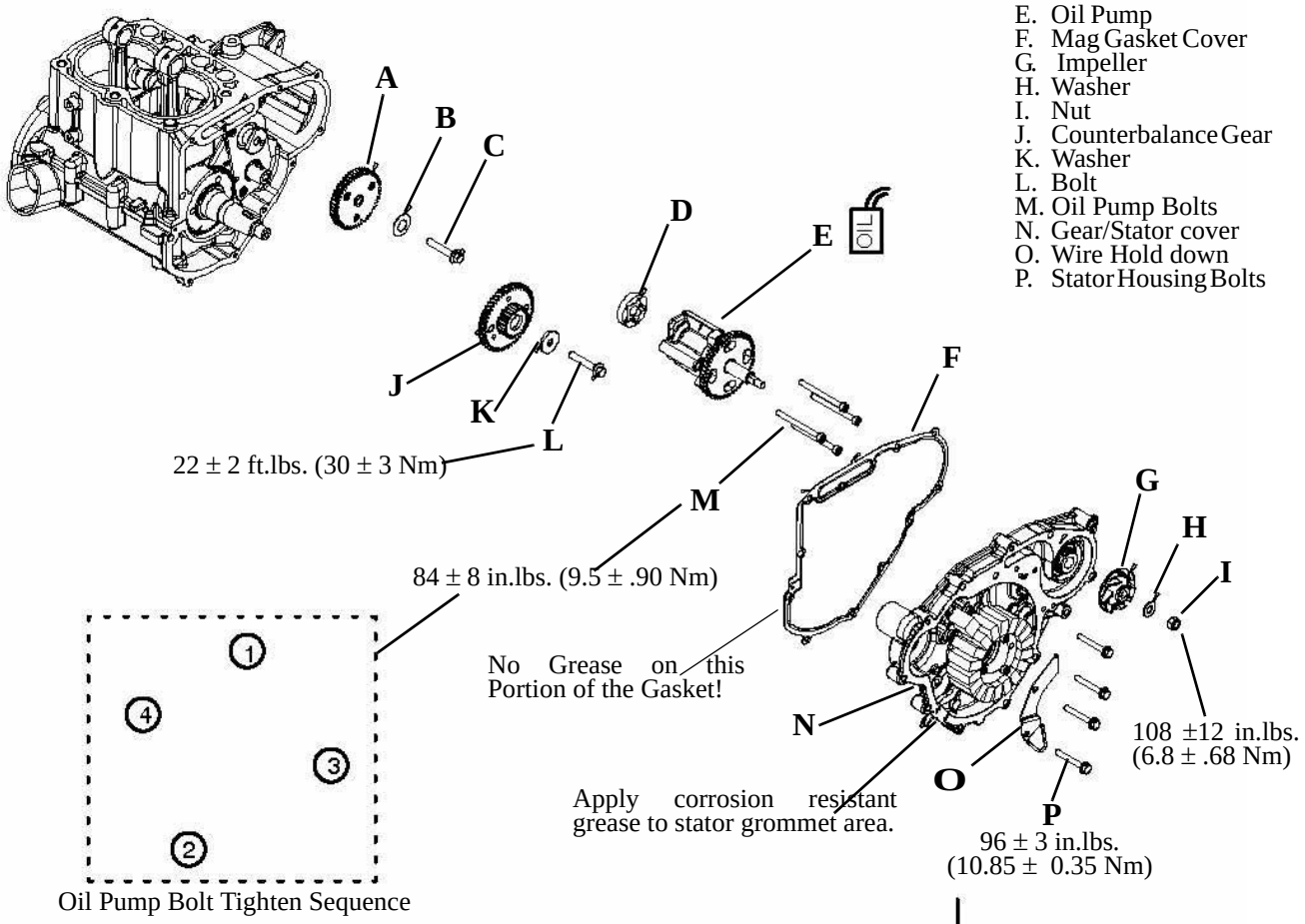
Crankcase Exploded Views

A. JournalBearings
B. Camshaft
C. Thrust Plate
D. Balance Shaft
E. Woodruff Key
F. Flange Seal
G. Crankshaft
H. Oil Pickup
I. Journal Bearings
J. Baffle
K. Oil Plug
L. Washer
M. O-ring
N. Crankcase
O. Crankcase Bolts

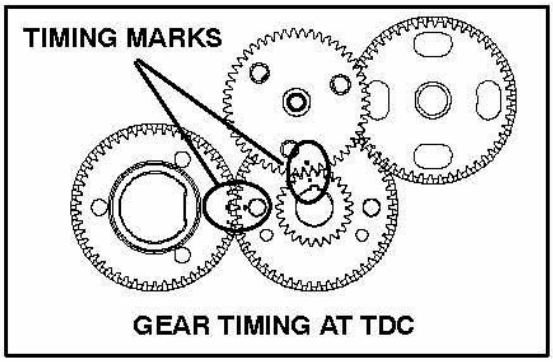


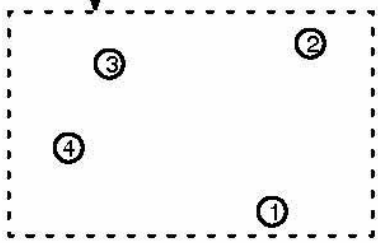
Oil / Water Pump and Timing Cover Exploded View

A. Split Gear
B. Washer
C. Bolt
D. Oil Rotor
E. Oil Pump
F. Mag Gasket Cover
G. Impeller
H. Washer
I. Nut
J. Counterbalance Gear
K. Washer
L. Bolt
M. Oil Pump Bolts
N. Gear/Stator cover
O. Wire Hold down
P. Stator Housing Bolts



Oil Pump Bolt Tighten Sequence



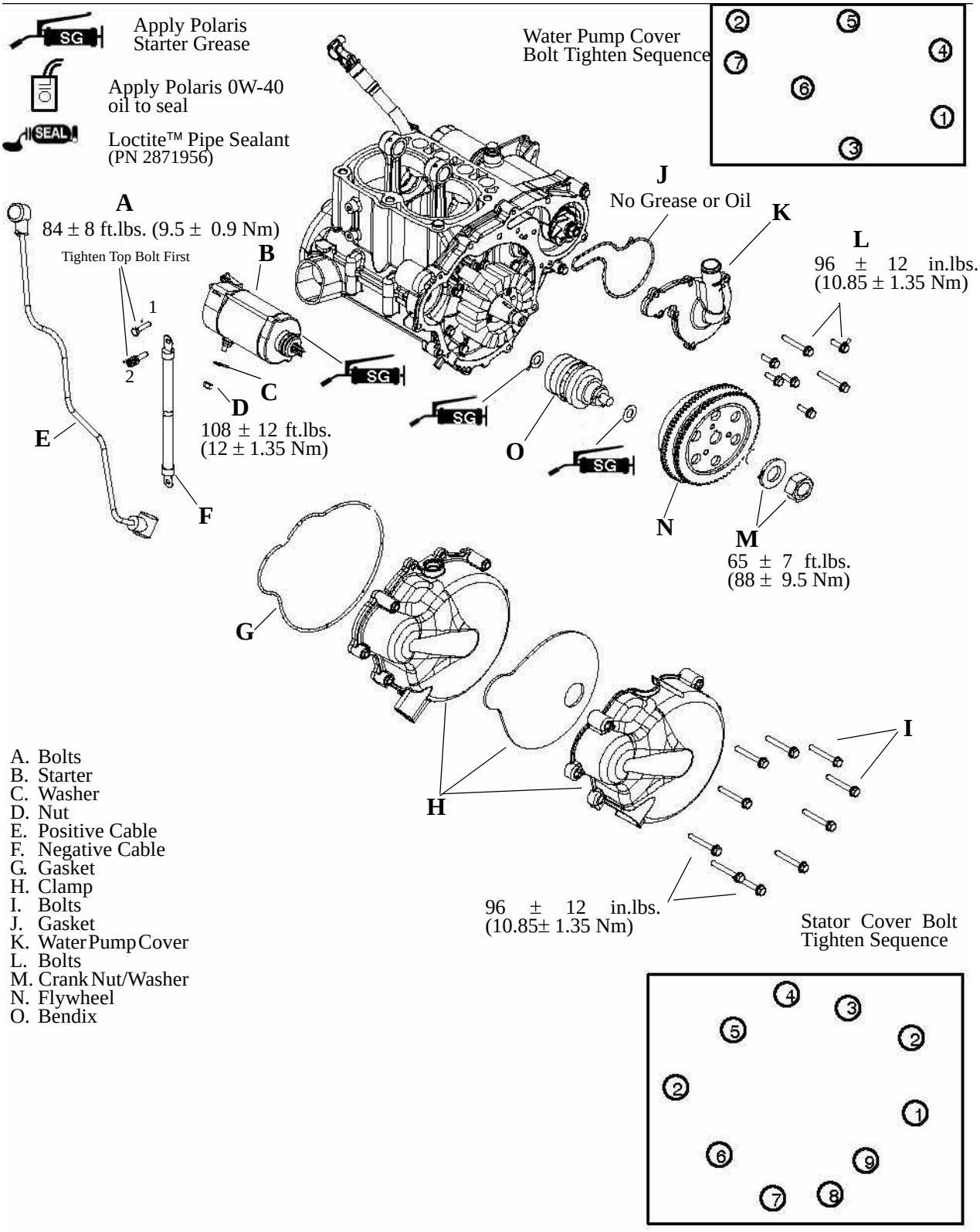


Mag Cover Bolt Tighten Sequence

OIL — Apply Polaris OW-40 oil to component

WL — Apply White Lithium Grease

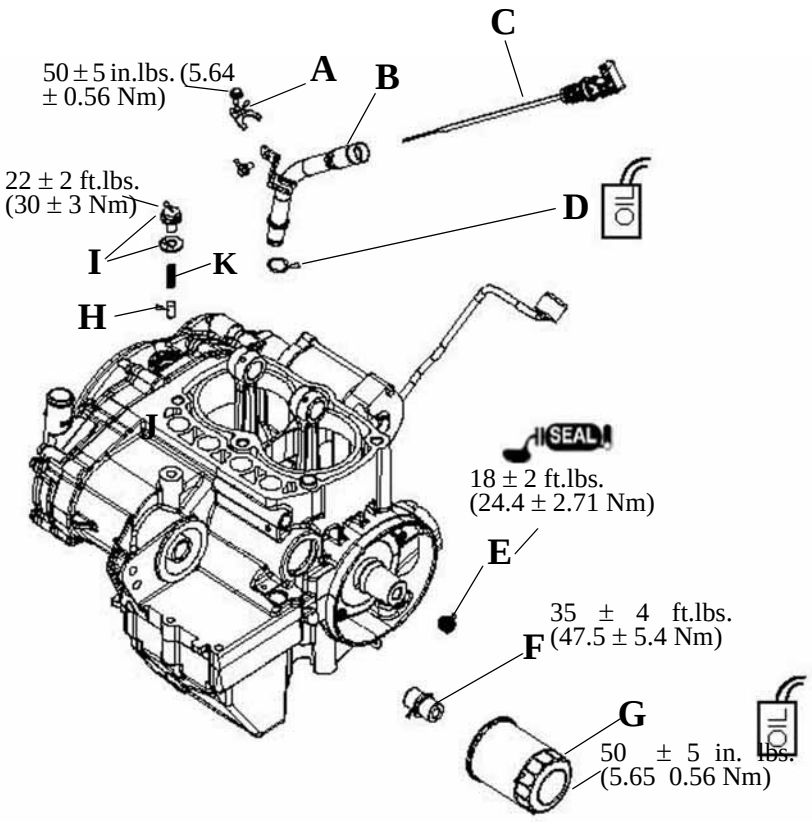
Starter / Flywheel / Water Pump Exploded View



A. Bolts
B. Starter
C. Washer
D. Nut
E. Positive Cable
F. Negative Cable
G. Gasket
H. Clamp
I. Bolts
J. Gasket
K. Water Pump Cover
L. Bolts
M. Crank Nut/Washer
N. Flywheel
O. Bendix

Oil System / Level Assembly Exploded View

A. Clamp
B. Oil Fill Tube
C. Dipstick
D. O-ring
E. Hex Plug
F. Oil Filter Nipple
G. Oil Filter
H. Dowel
I. Galley Plug
J. Nut/washer
K. Spring



Cylinder / Cylinder Head Exploded View

① Lubricate threads & between washers and underside of bolt heads with engine oil. Torque in sequence provided.

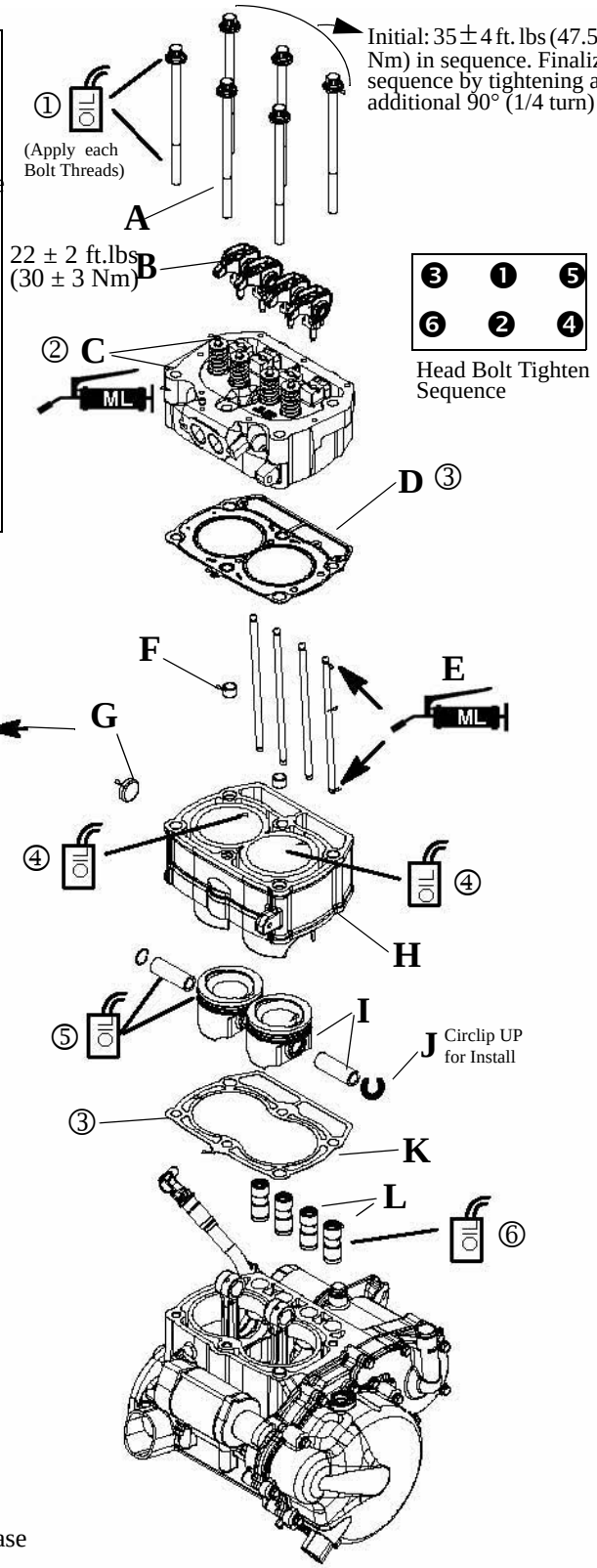
②Apply Moly Lube grease to valve tips.

③Gasket free of oil. Verify tabs are visible.

④ Apply thin film of 0W-40 to 25-55 mm of cylinder bore.

⑤ Apply 0W-40 to piston pin or pin bore.

⑥Apply 0W-40 to lifters.

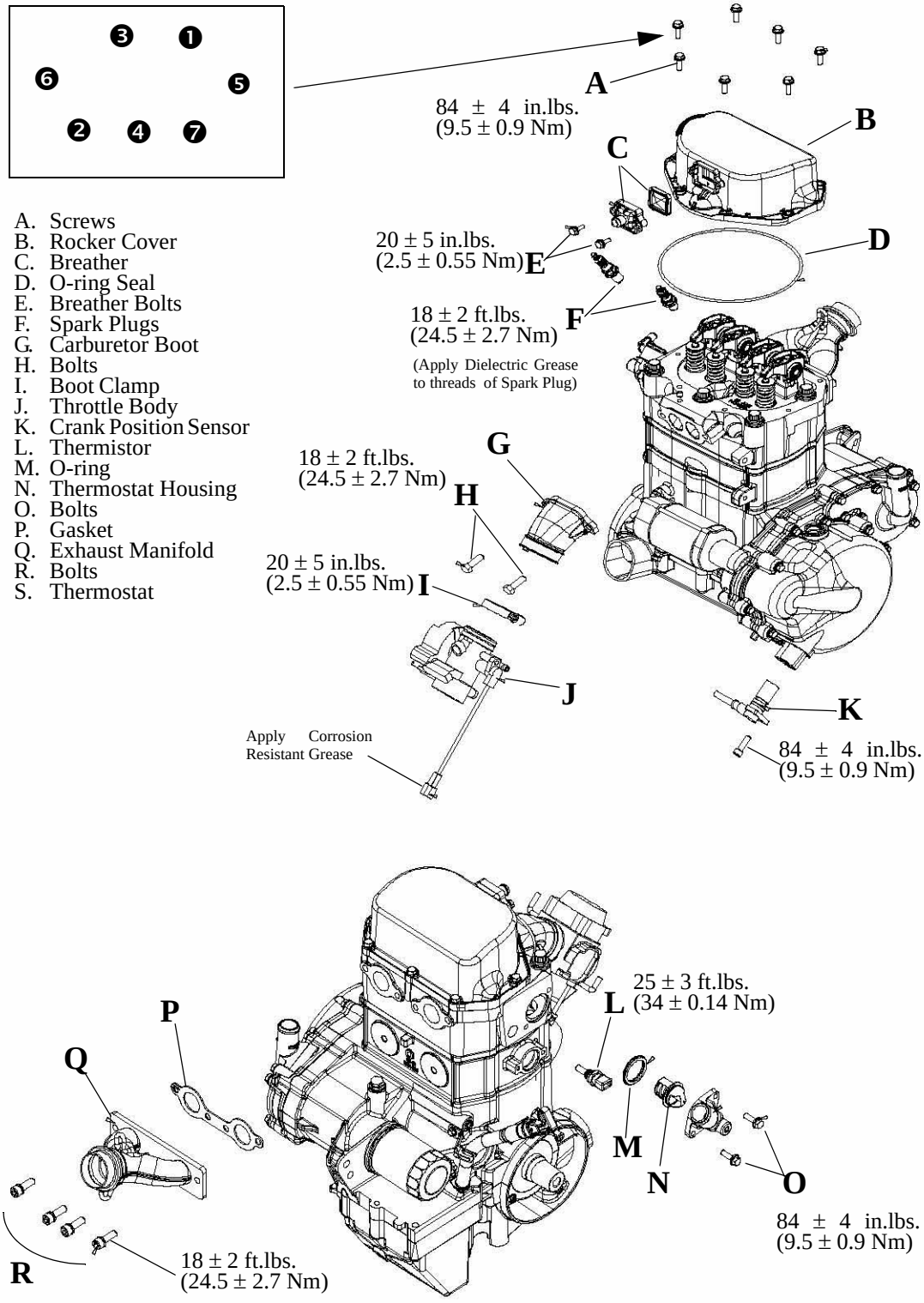


A. Head Bolts
B. Rocker Arms
C. Head Assembly
D. Gasket
E. Pushrods
F. Bushing
G. Expansion Plug
H. Cylinder
I. Piston Assembly
J. Circlip
K. Gasket
L. Hydraulic Lifter

OIL Apply Polaris 0W--40 Oil

ML Apply Moly Lube Grease

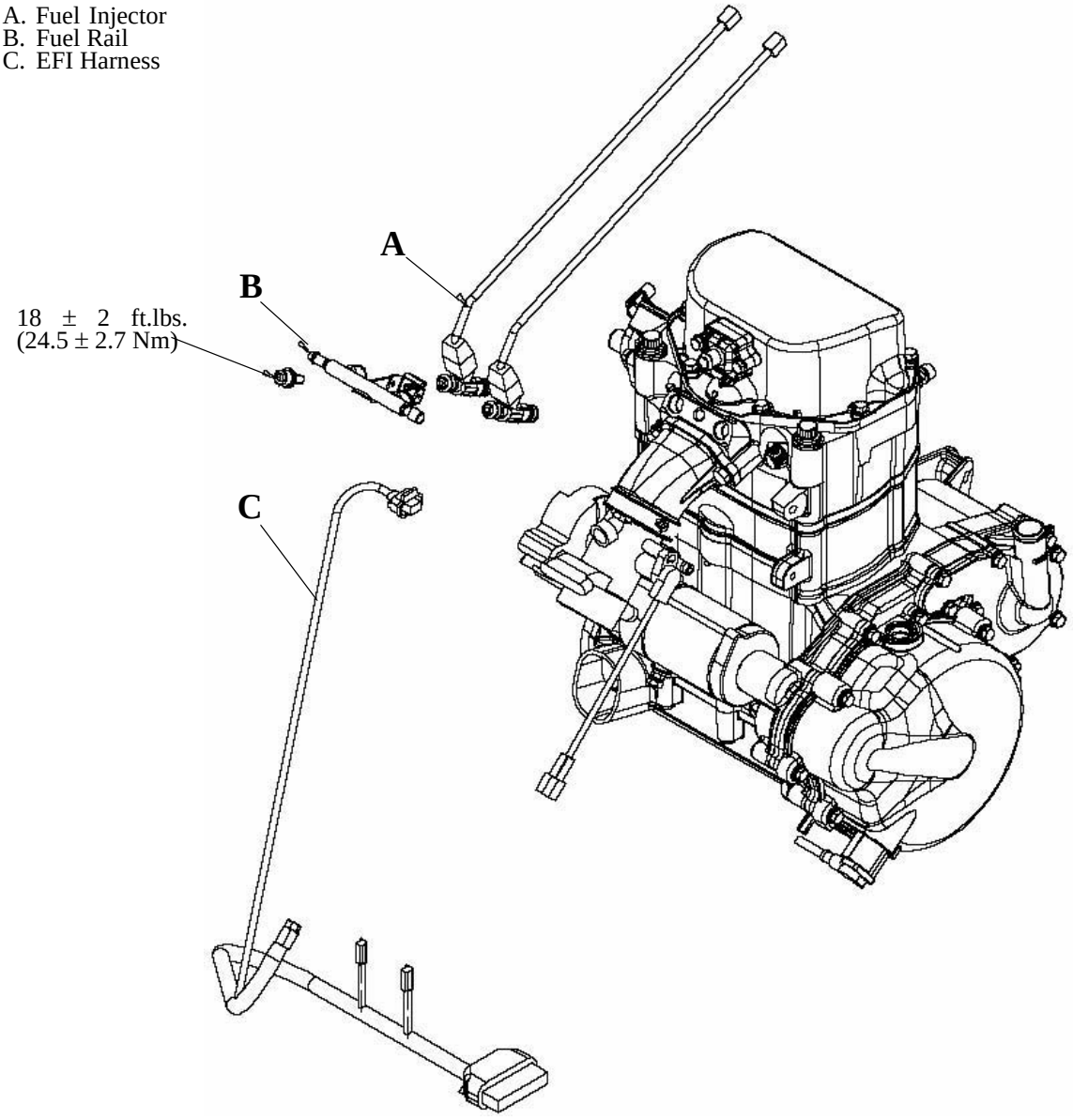
Engine Sensors & Misc. Exploded View



A. Screws
B. Rocker Cover
C. Breather
D. O-ring Seal
E. Breather Bolts
F. Spark Plugs
G. Carburetor Boot
H. Bolts
I. Boot Clamp
J. Throttle Body
K. Crank Position Sensor
L. Thermistor
M. O-ring
N. Thermostat Housing
O. Bolts
P. Gasket
Q. Exhaust Manifold
R. Bolts
S. Thermostat

EFI Harness Exploded View

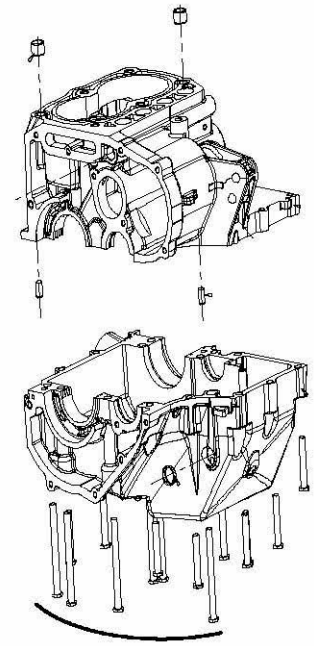
A. Fuel Injector
B. Fuel Rail
C. EFI Harness



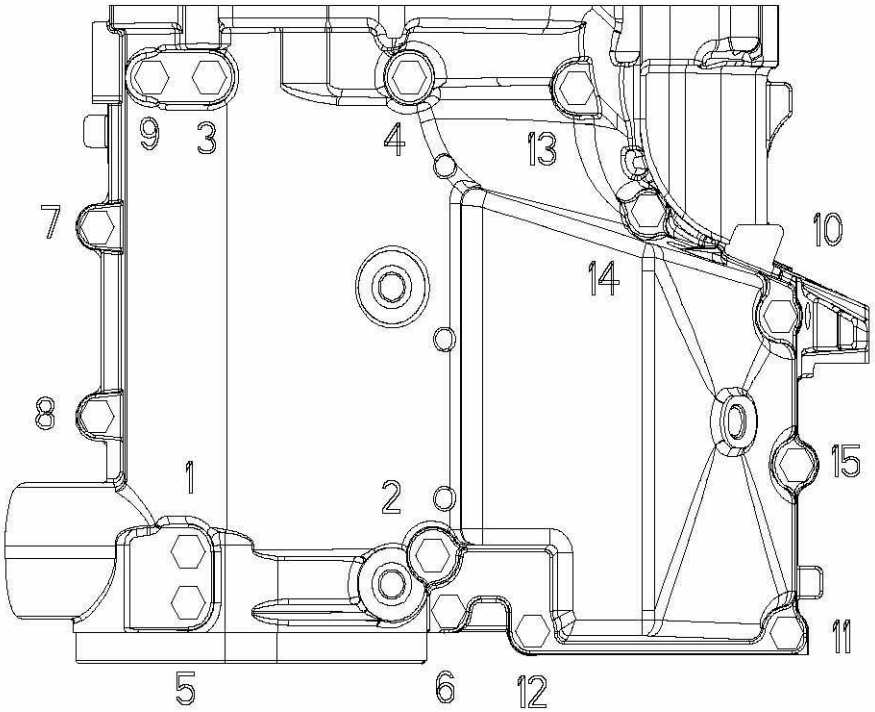
NOTE: See Chapter 4 for more information on the EFI system.

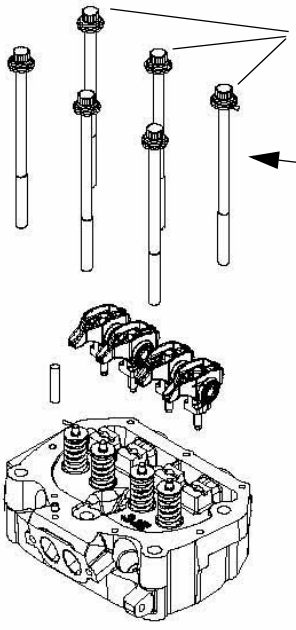
Engine Fastener Torque Patterns

Crankcase Bolt Tighten Sequence



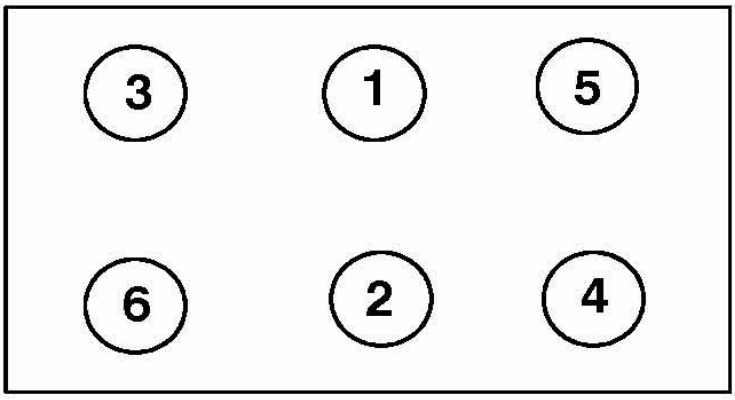
22 ± 2 ft.lbs. (30 ± 3 Nm)





Lubricate threads and between washer and underside of bolt with engine oil. Torque in sequence to spec provided, allow the gasket to set for 1 minute, then tighten in sequence 90° (1/4 turn).

35 ± 4 ft.lbs.
(47.5 ± 5.5 Nm) + 90° (1/4 turn)



Torque Specifications

Table 3-1: Engine Torque Specifications

FASTENER	SIZE	IN.LBS. (NM)	FT.LBS. (NM)
Camshaft Gear	8 mm		22 ± 2 (30 ± 3)
Camshaft Thrust Plate	6 mm	115 ± 12 (13 ± 1.35)	9.5 ± 1 (13 ± 1.35)
Carburetor Adaptor Bolts	8 mm	216 ± 24 (24.5-± 2.7)	18 ± 2 (24.5 ± 2.7)
Counterbalance Gear	8 mm		22 ± 2 (30 ± 3)
Crankcase Bolts	8 mm		* 22 ± 2 (30 ± 3)
Crankcase Breather	5 mm	20 ± 5 (2.5 ± 0.55)	-
Cylinder Head Bolts	11 mm		* 35 ± 4 (47.5 ± 5.5)
Exhaust Manifold	8 mm	216 ± 24 (24.5 ± 2.70)	18 ± 2 (24.5 ± 2.7)
Flywheel	14 mm		65 ± 7 (88 ± 9.50)
Injector Rail	8 mm	216 ± 24 (24.5 ± 2.70)	18 ± 2 (24.5 ± 2.7)
Magneto Cover	6 mm	* 96 ± 3 (10.85 ± 0.35)	-
Oil Baffle Weldment	5 mm	60 ± 6 (6.8 ± 0.68)	-
Oil Drain Bolt (Crankcase)	12 mm	192 ± 24 (21.7 ± 2.7)	16 ± (21.7)
Oil Fill Tube Bolt	5 mm	50 ± 5 (5.64 ± 0.56)	-
Oil Filter Pipe Fitting	20 mm		35 ± 4 (47.5 ± 5.4)
Oil Pick Up	5 mm	60 ± 6 (6.8 ± 0.68)	-
Oil Pressure Relief Plug	10 mm	22 ± 2 (30 ± 3)	-
Oil Pump Housing Screw	6 mm	* 84 ± 8 (9.50 ± 0.90)	-
Rocker Arm	8 mm		* 22 ± 2 (30 ± 3)
Rocker Cover	6 mm	* 84 ± 8 (9.5 ± 0.9)	-
Spark Plug	**14 mm**	**216 ± 24 (24.5 ± 2.7)**	**18 ± 2 (24.5 ± 2.7)**
Starter Motor	6 mm	* 84 ± 8 (9.5 ± 0.9)	-
Stator Assembly	6 mm	96 ± 3 (10.85 ± 0.35)	-
Stator Housing	6 mm	* 96 ± 3 (10.85 ± 0.35)	-
Temperature Switch	3/8 NPT		25 ± 3 (34 ± 4)
Thermostat Housing	6 mm	84 ± 8 (9.5 ± 0.9)	-
Timing Plug	3/4-16		7-9 (10-12 Nm)
Trigger Coil/Stator Wire Holddown	5 mm	* 96 ± 3 (10.85 ± 0.35)	-
Water Pump Housing Cover	6 mm	* 96 ± 3 (10.85 ± 0.35)	-
Water Pump Impeller Nut	8 mm	108 ± 3 (12 ± 0.35)	-

NOTE: * See exploded views for notes or torque sequences.

700/800 EFI Engine Service Specifications

Table 3-1: Engine Specifications

MAIN COMPONENT: CYLINDER HEAD		EH068OLE / EH076OLE
Camshaft	Cam Lobe Height - Intake / Exhaust	1.3334" (33.8674 mm)
	Camshaft Journal Outer Diameter - Mag	1.654" ± 0.00039" (42 ± 0.010 mm)
	Camshaft Journal Outer Diameter - Center	1.634"± 0.00039" (41.50 ± 0.010 mm)
	Camshaft Journal Outer Diameter - PTO	1.614" ± 0.00039" (41 ± 0.010 mm)
	Camshaft Journal Bore Inner Diameter - Mag	1.656" ± 0.00039" (42.07 ± 0.010 mm)
	Camshaft Journal Bore Inner Diameter - Center	1.637" ± 0.00039" (41.58 ± 0.010 mm)
	Camshaft Journal Bore Inner Diameter - PTO	1.617" ± 0.00039" (41.07 ± 0.010 mm)
	Camshaft Oil Clearance	0.00276" ± 0.00079" (0.07 ± 0.02 mm)
	Camshaft End Play	0.0167" ± 0.0098" (0.425 ± 0.25 mm)
Counter Balance	Counter Balance End Play	0.005" (0.127 mm)
Cylinder Head	Cylinder Head - Surface warp limit	0.00394" (0.1 mm)
	Cylinder Head - Standard height	3.478" (88.35 mm)
Valve Seat	Valve Seat - Contacting Width - Intake	0.0472" ± 0.00787" - 0.0039" (1.20 ± 0.20 - 0.10mm)
	Valve Seat - Contacting Width - Exhaust	0.0591" ± 0.00787" - 0.0039" (1.50 ± 0.20 - 0.10 mm)
	Valve Seat Angle	45.5° ± 0.255°
Valve Guide	Valve Guide Inner diameter	0.2367" ± 0.00029" (6.012 ± 0.007 mm)
	Valve Guide Protrusion Above Head	0.807" ± 0.0039" (20.50 ± 0.01 mm)
Valve	Valve Margin Thickness - Intake	Standard: 0.79" (20.06 mm) Max- 0.98" (24.89 mm) Min- 0.59" (14.98 mm)
	Valve Margin Thickness - Exhaust	Standard: 0.80" (20.32 mm) Max- 1.0" (25.4 mm) Min- 0.60" (15.24 mm)
	Valve Stem Diameter - Intake	0.2356" ± 0.00039" (5.985 ± 0.01 mm)
	Valve Stem Diameter - Exhaust	0.2351" ± 0.00039" (5.972 ± 0.01 mm)
	Valve Stem Oil Clearance - Intake	0.00228" ± 0.00098" (0.058 ± 0.025 mm)
	Valve Stem Oil Clearance - Exhaust	0.00275" ± 0.00098" (0.0870 ± 0.025mm)
	Valve Stem Overall Length - Intake	4.51" ± 0.01476" (114.5550 ± 0.375 mm)
	Valve Stem Overall Length - Exhaust	4.5453" ± .01496" (115.45 ± 0.38 mm)
Valve Spring	Valve Spring Overall Length - Free Length	1.735" (46.069 mm)
	Valve Spring Overall Length - Installed Height	Intake - 1.4638" (37.18 mm) Exhaust - 1.4736" (37.43 mm)

Table 3-2: Engine Specifications

MAIN COMPONENTS: CYLINDER/PISTON/ CONNECTING ROD		EH068OLE	EH076OLE
Cylinder	Cylinder - Surface warp limit (mating with cylinder head)	0.004" (0.10 mm)	0.004" (0.10 mm)
	Cylinder Bore - Standard	3.1495" (80 mm)	3.1495" (80 mm)
	Cylinder Taper Limit	0.00031" (0.008 mm)	0.00031" (0.008 mm)
	Cylinder Out of Round Limit	0.00030" (0.0075 mm)	0.00030" (0.0075 mm)
	Cylinder to Piston Clearance	.0015" ± .00059" (.040 ± .015mm)	.0015" ± .00059" (.040 ± .015mm)
Lifter	Lifter Outer Diameter Standard	0.84245" ± 0.00025" (21.39 8 ± 0.00635 mm)	0.84245" ± 0.00025" (21.39 8 ± 0.00635 mm)
	Lifter Block Bore	0.8438" ± 0.00062" (21.4322 ± 0.0157 mm)	0.8438" ± 0.00062" (21.4322 ± 0.0157 mm)
Piston	Piston - Standard	3.1477" ± .000121" (79.954 ± .003mm)	3.14803" + .00028" (79.960 + .007 mm)
	Piston Standard Inner Diameter of Piston Pin Bore	0.78789" ± .00009" (20.0125 ± 0.003 mm)	0.70902" ± .00012" (18.009 ± 0.003 mm)
Piston Pin	Piston Pin Outer Diameter	0.7874" - 0.7872" (20 - 19.995 mm)	0.70866" - 0.70846" (18 - 17.995 mm)
	Piston Pin - Standard Clearance - Piston Pin to Pin	0.00059" ± 0.0002" (0.015 ± 0.005 mm)	0.00047" ± 0.00024" (0.012 ± 0.006 mm)
	Piston Pin - Degree of Fit	Piston pin must be a push fit (by hand) at 68° F (20° C)	Piston pin must be a push fit (by hand) at 68° F (20° C)

Table 3-3: Engine Specifications

MAIN COMPONENTS: PISTON/ CONNECTING ROD			EH068OLE	EH076OLE
Piston Ring	Installed Gap	Top Ring - Standard	0.0059± 0.138" (0.15 ± 0.35mm)	0.0059 ± 0.138" (0.15 ± 0.35mm)
		Top Ring - Limit	> 15% Leakdown	> 15% Leakdown
		Second Ring - Standard	0.0098 ± 0.197" (0.25 ± 0.50mm)	0.0098 ± 0.197" (0.25 ± 0.50mm)
		Second Ring - Limit	> 15% Leakdown	> 15% Leakdown
		Oil Ring - Standard	0.0196± 0.00984" (0.50 ± 0.25mm)	0.0196± 0.00984" (0.50 ± 0.25mm)
		Oil Ring - Limit	> 15% Leakdown	> 15% Leakdown
	Ring to Groove Clearance	Top Ring - Standard	0.0024" ± 0.0008" (0.060 ± 0.020 mm)	0.0024" ± 0.0008" (0.060 ± 0.020 mm)
		Top Ring - Limit	> 15% Leakdown	> 15% Leakdown
		Second Ring - Standard	0.0028" ± 0.0008" (0.070 ± 0.020 mm)	0.0028" ± 0.0008" (0.070 ± 0.020 mm)
		Second Ring - Limit	> 15% Leakdown	> 15% Leakdown
Connecting Rod	Connecting Rod Small End I.D.		0.789"– 0.78841" (20.030 – 20.015 mm)	0.7096" – 0.70846" (18 – 17.995 mm)
	Connecting Rod Small End Radial Clearance		0.0098"± 0.00039" (0.025 ± 0.010mm)	Same
	Connecting Rod Big End Side Clearance		0.01181"± 0.00591" (0.030 ± 0.015mm)	Same
	Connecting Rod Big End Radial Clearance		0.0015"± 0.00006" (0.0038 ± 0.0015mm)	Same
Crankshaft	Crankshaft Runout Limit		0.00236" (0.060mm)	Same

Special Tools

PART NUMBER	TOOL DESCRIPTION
PV-43527	OIL FILTER WRENCH
2200634	VALVE SEAT RECONDITIONING KIT
PU-45257	VALVE SPRING COMPRESSOR
PU-45652	VALVE PRESSURE HOSE
2871043	FLYWHEEL PULLER
2870390	PISTON SUPPORT BLOCK
PU-45497-1	CAM GEAR SPRING INSTALLATION KIT
PU-45497-2	CAM GEAR TOOTH ALIGNMENT TOOL
PU-45498	CAM SPANNER WRENCH
PU-45838	GEAR HOLDER
PA-44995	WATER PUMP MECHANICAL SEAL INSTALLER
PU-45543	UNIVERSAL DRIVER HANDLE
PA-45483	MAIN SEAL INSTALLER
PU-45658	CRANKSHAFT MAIN SEAL SAVER
PA-45401	WATER PUMP SEAL SAVER
2870975	MITY VAC™ PRESSURE TEST TOOL
PU-45778	OIL SYSTEM PRIMING TOOL

GENERAL ENGINE SERVICE

Accessible Components

Following Components can be serviced or removed with the engine installed:

- Flywheel
- Alternator (Stator)
- Starter Motor/Drive
- Cylinder Head
- Cylinder
- Piston/Rings
- Camshaft
- Rocker Arms
- Oil pump/Water Pump/Oil Pump Drive Gear
- Gear Train Components

Following Components Require Engine Removal for service:

- Counterbalance Shaft or Bearings
- Connecting Rod
- Crankshaft
- Crankshaft Main Bearings
- Crankcase

Piston Identification

Four stroke engine rings have a rectangular profile. See "PISTON RING INSTALLED GAP" for ring installation. Use the information below to identify pistons and rings.

Table 3-1:

ENGINE MODEL	PISTON DIAMETER
EH068OLE EH076OLE	80 mm

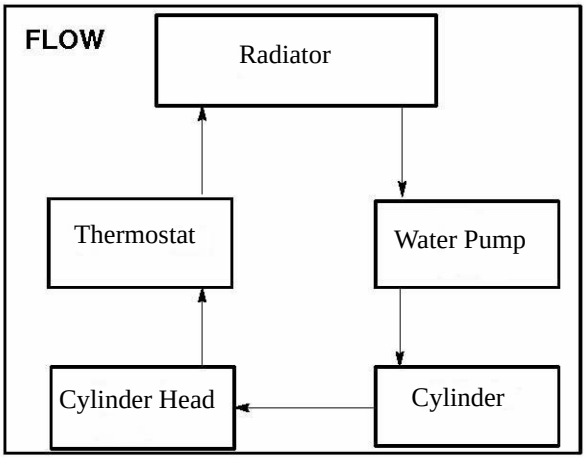
Cooling System Specifications

Table 3-2:

CONDITION	APPROX. READING (MIN.-MAX)	TEMPERATURE
Hot light ON	178Ω - 190Ω	215° F (108° C)
Fan Off	296Ω - 316Ω	180° F (82° C)
Fan On	236Ω - 251Ω	195° F (91° C)
System Capacity	Refer To Chapter 1 Specifications	
Radiator Cap Pressure Relief	13 PSI	

Recommended Coolant

Use only high quality antifreeze/coolant mixed with distilled water in a 50/50 or 60/40 ratio, depending on freeze protection required in your area. CAUTION: Using tap water in the cooling system will lead to a buildup of deposits which may restrict coolant flow and reduce heat dissipation, resulting in possible engine damage. Polaris Premium 60/40 Antifreeze/Coolant is recommended for use in all cooling systems and comes pre-mixed, ready to use.



Cooling System Pressure Test

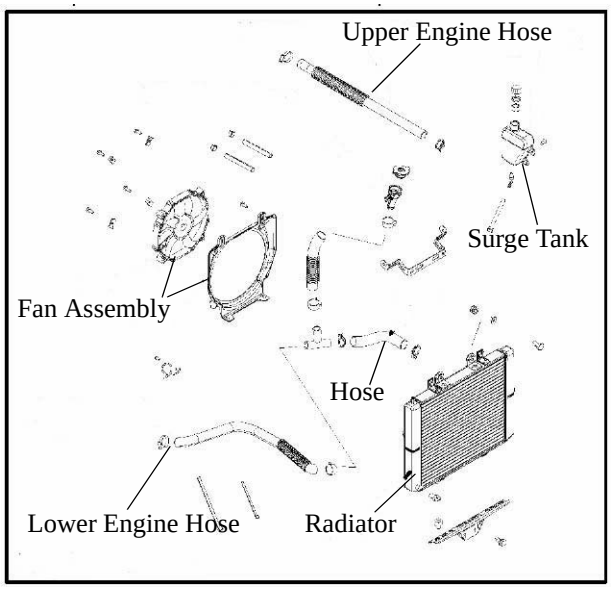
⚠ WARNING

Never remove radiator cap when engine is warm or hot. The cooling system is under pressure and serious burns may result. Allow the engine and cooling system to cool before servicing.

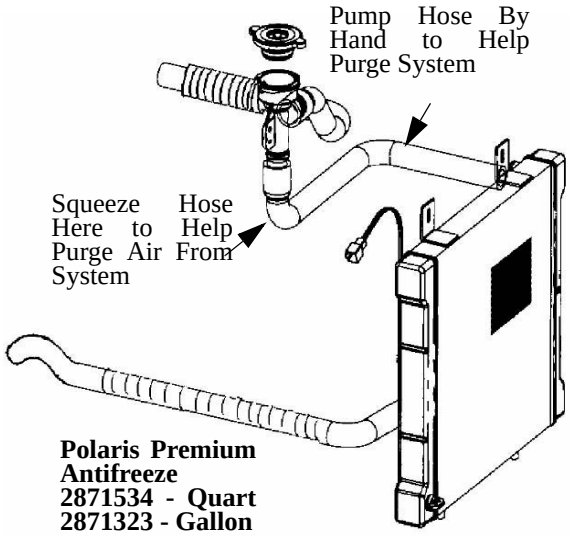
1. Remove front cover.
2. Remove recovery bottle hose from coolant filler neck.
3. Connect a Mity Vac™ (PN 2870975) to the filler neck nipple and pressurize system to 10 psi. The system must retain 10 psi for five minutes or longer. If pressure loss is evident within five minutes, check the radiator, hoses, clamps and water pump seals for leakage.

Radiator Cap Pressure Test

1. Remove radiator cap and test cap using a commercially available cap tester.
2. The radiator cap relief pressure is 13 psi. Replace cap if it does not meet this specification.



Four Stroke - Coolant Air Bleeding Procedure



Use this procedure when a unit overheats and no apparent leaks in the cooling system are found.

NOTE: If the coolant level is LOW in the radiator, or if there are leaks in the system, the coolant system will not draw coolant from the reservoir tank.

1. Park machine on a flat surface. Remove radiator cap and top off coolant. Leave the cap off of the radiator. Start and idle machine for 5-10 minutes until steam is visible in the radiator cap area.
2. Stop the engine and let cool for a few minutes or until an air bubble is seen at the filler neck, or there is a dropping of the coolant level indicating that coolant has been pulled into the system.

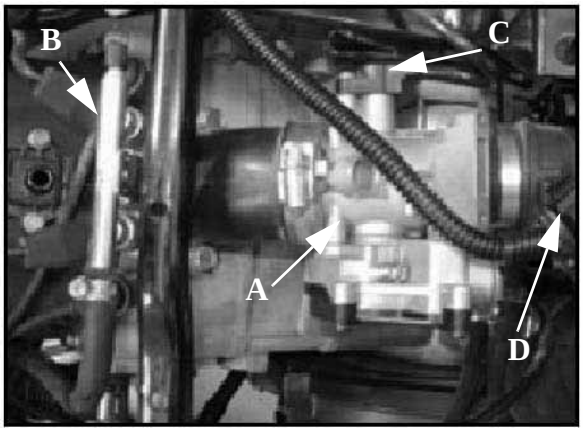
NOTE: Slowly squeezing the hose after the bend below the filler neck will aid in purging the system of air. Pump the hose using your hand several times as shown in the diagram. Elevating the rear of the ATV with a floor jack (rear tires 4-6, off the ground) also aids the purging of air from the system.

3. Always add coolant to the radiator first, filling to the top of the neck to replace air that has been purged from the system. Fill the reservoir only after you have completely filled the cooling system at the radiator filler neck.
4. Repeat Steps 1 and 2 four or five times or until no more coolant is pulled into the system.
5. In some instances, Steps 1 and 2 may have to be performed with the radiator cap on to prevent coolant loss.
6. To test, install the radiator cap and idle machine until fan comes on. Make sure the fan comes on before the hot light.

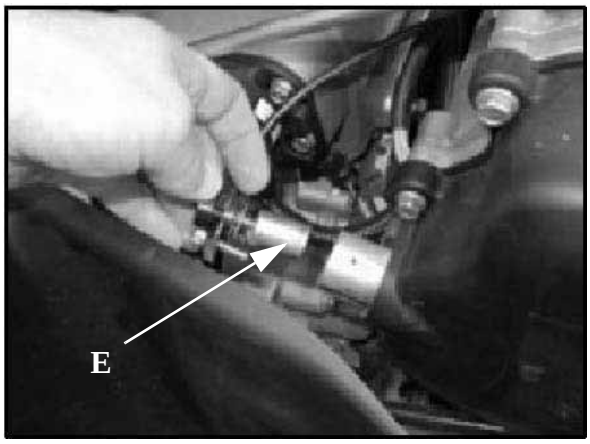
Engine Removal (Typical)

> **WARNING**
>
> Always wear safety glasses and proper shop clothing when performing the procedures in this manual. Failing to do so may lead to possible injury or death.

1. Clean work area.
2. Thoroughly clean ATV engine and chassis.
3. Disconnect battery (-) negative cable.
4. Remove the following parts as required:
   - Seat
   - Left and right side covers (refer to Chapter 5)
   - Fuel tank covers
   - Fuel tank (refer to Chapter 4)
   - Springs from exhaust pipe and remove pipe.
5. Drain coolant and engine oil.
6. Remove air pre-cleaner and duct.
7. Remove airbox.
8. Disconnect the throttle body sensor (C) and T-BAP sensor (D). Remove throttle body (A). Insert a shop towel into the engine intake to prevent dirt from entering the ports.
9. Relieve the fuel pressure in the fuel rail (refer to Chapter 4, FUEL INJECTION") for proper procedure. Carefully remove the fuel rail (B) and injectors.

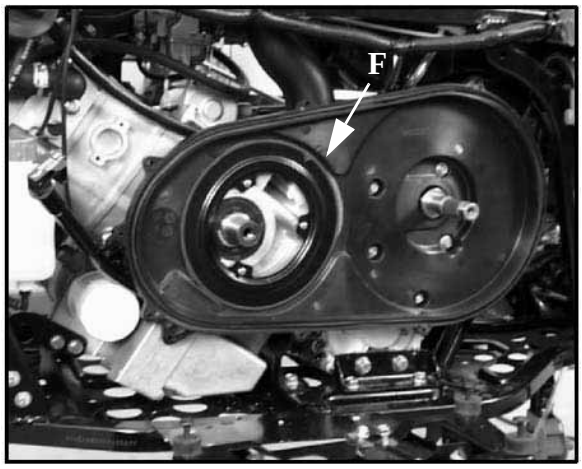


10. Disconnect spark plug high tension leads.
11. Remove the crank position sensor (E) located on the mag cover.

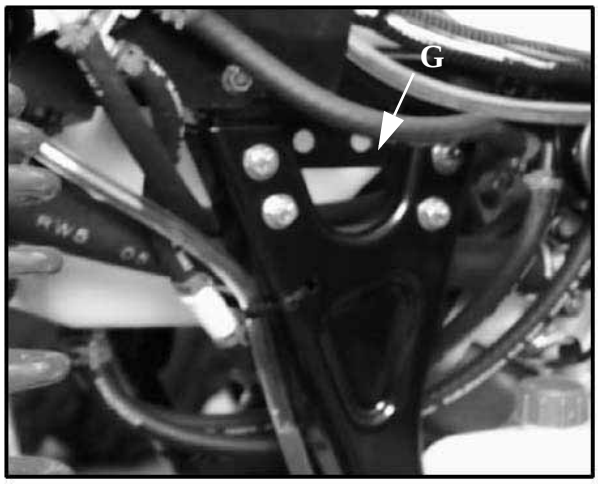


12. Remove the air breather line .
13. Disconnect the coolant hoses. Properly dispose of any antifreeze from the engine or hoses.

14. Refer to PVT System Chapter 6 to remove outer clutch cover, drive belt, drive clutch, driven clutch, and inner cover (F).



15. When removing starter cables, note and mark ground cable and positive (+) cable mounting angle and locations. Remove cables.
16. Remove transmission linkage rod from gear selector and secure out of the way.
17. Disconnect coolant temperature sensor wire located on the cylinder.
18. Remove engine to chassis ground cable.
19. Remove all engine mount nuts and / or engine mount plates. Remove the frame brace (G) from the front left side of the frame.



20. Remove the engine from the left side of the frame.

NOTE: Use caution when lifting the engine out of frame. Use an engine lift or other means if the engine is too heavy to be lifted manually.

21. For engine installation, reverse procedures.

Engine Installation Notes

After the engine is installed in the frame, review this checklist and perform all steps that apply:

General Items

1. Install previously removed components using new gaskets, seals, and fasteners where applicable.
2. Perform regular checks on fluid levels, controls, and all important areas on the vehicle as outlined in the daily pre-ride inspection checklist (refer to Chapter 2 or the Owner's Manual).

PVT System

1. Adjust center distance of drive and driven clutch. (Chapter 6)
2. Adjust clutch offset, alignment, and belt deflection. (Chapter 6)
3. Clean clutch sheaves thoroughly and inspect inlet and outlet ducts for proper routing and sealing. (Chapter 6)

Transmission

1. Inspect transmission operation and adjust linkage if necessary. Refer to Chapter 2 and Chapter 8.

Exhaust

1. Replace exhaust gaskets. Seal connections with high temp silicone sealant.
2. Check to be sure all springs are in good condition.

Bleed Cooling System

NOTE: This cooling system contains vent lines to help purge trapped air during filling. Bleeding generally should not be necessary.

1. Remove radiator cap and slowly add coolant to the bottom of filler neck.
2. Fill coolant reservoir tank to full mark.
3. Install radiator cap and gently squeeze coolant hoses to force any trapped air out of system.
4. Again, remove radiator cap and slowly add coolant to the bottom of fill neck if needed.
5. Start engine and observe coolant level in the radiator. Allow air to purge and top off as necessary. Reinstall radiator cap and bring engine to operating temperature. After engine is cool, check level in reservoir tank and add coolant if necessary.

NOTE: Should the reservoir tank become empty, it will be necessary to refill at the radiator and repeat the bleeding procedure.

Engine Break-In Period

The break-in period for a Polaris ATV engine is defined as the first ten hours of operation, or the time it takes to use two full tanks of gasoline. No single action on your part is as important as a proper break-in period. Careful treatment of a new engine will result in more efficient performance and longer life for the engine. Perform the following procedures carefully.

CAUTION

Use only Polaris Premium 0-40W All Season synthetic oil or equivalent.
Never substitute or mix oil brands. Serious engine damage and voiding of warranty can result.
Do not operate at full throttle or high speeds for extended periods during the first three hours of use. Excessive heat can build up and cause damage to close fitted engine parts.

1. Fill fuel tank with unleaded or leaded fuel which has a minimum pump octane number of 87= (R+ M)/2.
2. Check oil reservoir level indicated on dipstick. Add oil if necessary (Refer to Chapter 2, “Engine Oil Level”).
3. Drive slowly at first to gradually bring engine up to operating temperature.
4. Vary throttle positions. Do not operate at sustained idle or sustained high speed.
5. Perform regular checks on fluid levels, controls and all important bolt torques. Pull only light loads during initial break in.
6. Pull only light loads during initial break-in.
7. Change break in oil and filter at 20 hours or 200 miles.

Cylinder Hone Selection And Honing Procedure

CAUTION

A hone which will straighten as well as remove material from the cylinder is very important. Using a common spring loaded glaze breaker for honing is not advised for nicasil cylinders.
Polaris recommends using a rigid hone or arbor honing machine. Cylinders may be wet or dry honed depending upon the hone manufacturer's recommendations.
Wet honing removes more material faster and leaves a more distinct pattern in the bore.

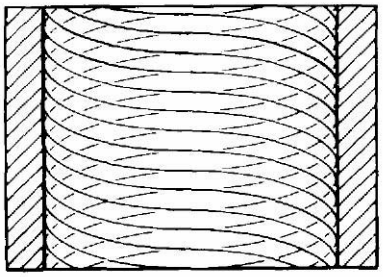
Cylinders may be wet or dry honed depending upon the hone manufacturer’s recommendations. Wet honing removes more material faster and leaves a more distinct pattern in the bore.

Honing To Deglaze

A finished cylinder should have a cross-hatch pattern to ensure piston ring seating and to aid in the retention of the fuel/oil mixture during initial break in. Hone cylinder according to hone manufacturer's instructions, or these guidelines:

- Honing should be done with a diamond hone. Cylinder could be damaged if the hone is not hard enough to scratch the nicasil lining.
- Use a motor speed of approximately 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 (or cylinder centered on arbor) and to bring the stones approximately 1/2, (1.3 cm) above and below the bore at the end of each stroke.
- Release the hone at regular intervals and inspect the bore to determine if it has been sufficiently de-glazed, and to check for correct cross-hatch. **NOTE: Do not allow cylinder to heat up during honing.**
- After honing has been completed, inspect cylinder for thinning or peeling.

If cylinder wear or damage is excessive, it will be necessary to replace the cylinder. The cylinders are lined with a nicasil coating and are not repairable. Hone only enough to de-glaze the outer layer of the cylinder bore.



Example of Cross Hatch Pattern

IMPORTANT: Clean the cylinder after honing

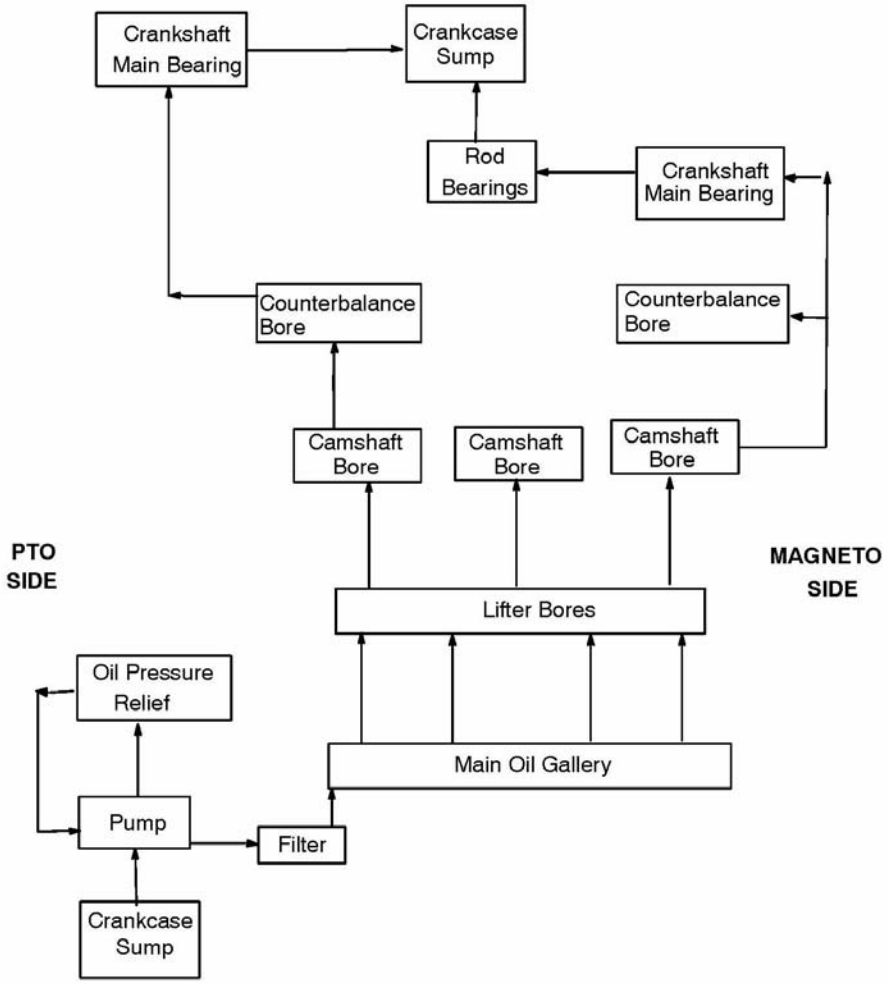
If cylinder wear or damage is excessive, it will be necessary to replace the cylinder. The cylinders are lined with a nicasil coating and are not repairable. Hone only enough to de-glaze the outer layer of the cylinder bore.

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 Lubricant.

Oil Flow Chart

This chart describes the flow of oil through the 700/800 engine. Beginning in the crankcase sump, the oil is drawn through an oil galley to the feed side of the oil pump. The oil is then pumped through the oil filter. If the oil filter is obstructed, a bypass valve contained in the filter allows oil to bypass the filter element. At this point, the oil is supplied to the main oil galley through a crankcase passage. Oil is then diverted three ways from the main oil galley, with the first path entering the camshaft bores, onto the rear balance shaft journal and then draining back into the crankcase sump. The second oil path from the main oil galley feeds the lifter bores and then drains back to the crankcase sump. The third oil path flows through a crankcase galley to the MAG side crankshaft journal and also to the front balance shaft journal and onto the crankcase sump. The oil pressure switch is fed off the main oil galley.



Engine Lubrication Specifications

=
Capacity - Approximately 2 U.S. Quarts (1.9 l) **Oil Type** - Polaris Premium 0W-40 Synthetic **Filter Wrench** - PV-43527 or equivalent **- Oil Pressure Specification -** 35-39 PSI @ 5500 RPM, Polaris 0W-40 Synthetic , Engine at operating temperature.

OIL PRESSURE TEST

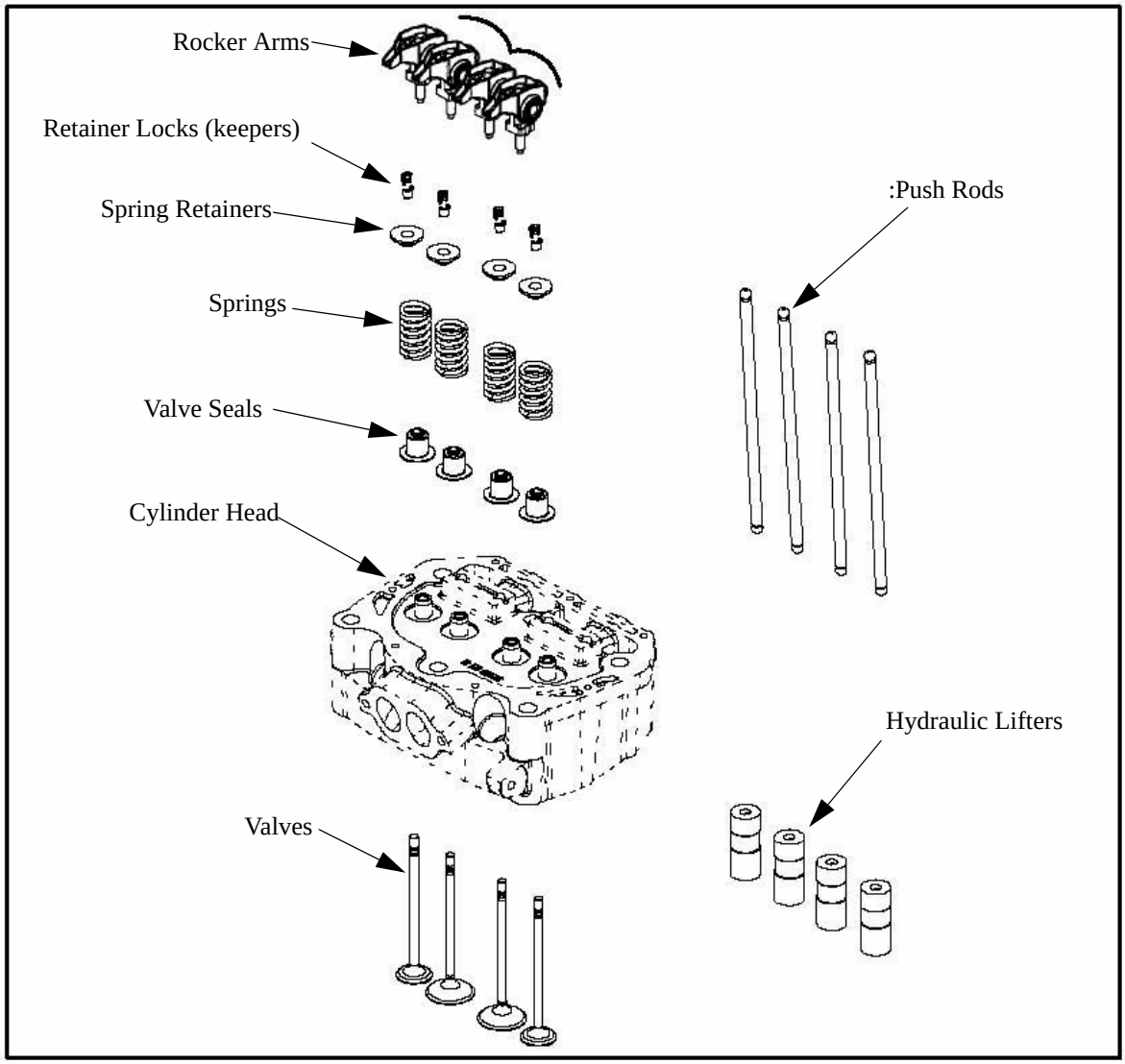
1. Remove blind plug/sender from left side of crankcase.
2. Insert a 1/8 NPT oil pressure gauge adaptor into the crankcase and attach the gauge.
3. Start engine and allow it to reach operating temperature, monitoring gauge indicator.

NOTE: Use only Polaris Premium 0W-40 Synthetic Engine Lubricant.

Oil Pressure at 5500 RPM (Engine Hot):
Standard: 39 PSI
Minimum: 35 PSI

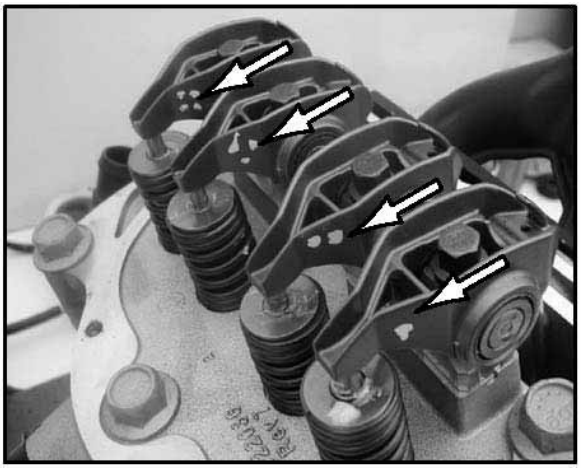
ENGINE DISASSEMBLY AND INSPECTION

Cylinder Head Assembly Exploded View



Rocker Arms

1. Mark or tag rocker arms in order of disassembly to keep them in order for reassembly.



2. Inspect the wear pad at the valve end of the rocker arm for indications of scuffing or abnormal wear. If the pad is grooved, replace the rocker arm.

NOTE: Do not attempt to true this surface by grinding.

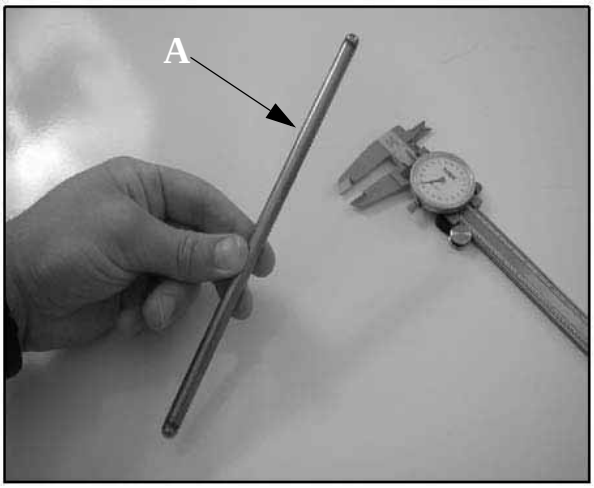
3. Check the rocker arm pad and fulcrum seat for excessive wear, cracks, nicks or burrs.

Push Rods

1. Clean push rods (A) in a suitable solvent. Blow dry push rods with compressed air.
2. Use compressed air to confirm the oil passage is clear in the center of the push rod.

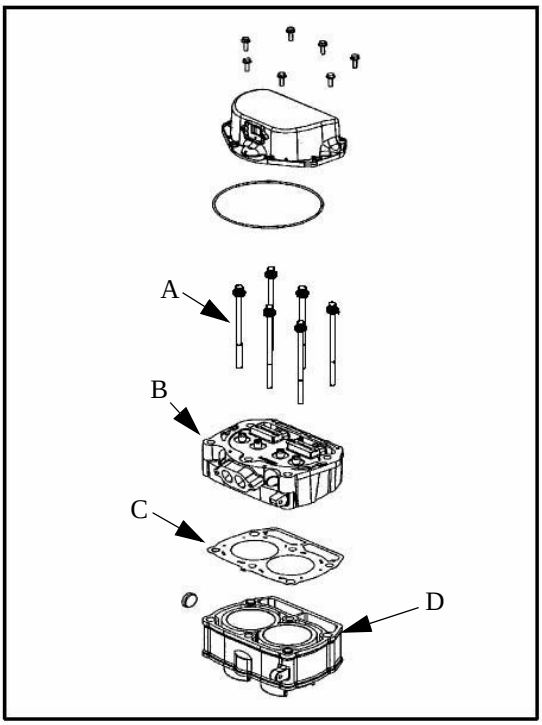
> ⚠ WARNING
>
> Always wear safety glasses when working with compressed air to prevent personal injury.

3. Check the ends of the push rods (A) for nicks, grooves, roughness or excessive wear.
4. The push rods (A) can be visually checked for straightness while they are installed in the engine by rotating them with the valve closed. Push rods can also be checked with a dial indicator or rolled across a flat surface to check for straightness.
5. If the push rod (A) is visibly bent, it should be replaced.



Cylinder Head Removal

1. Loosen the six cylinder head bolts evenly 1/8 turn each in a criss-cross pattern until loose.
2. Remove bolts (A) and tap cylinder head (B) lightly with a soft face hammer until loose. **CAUTION:** Tap only in reinforced areas or on thick parts of cylinder head casting to avoid damaging the head or cylinder.
3. Remove cylinder head (B) and head gasket (C) from the cylinder (D).



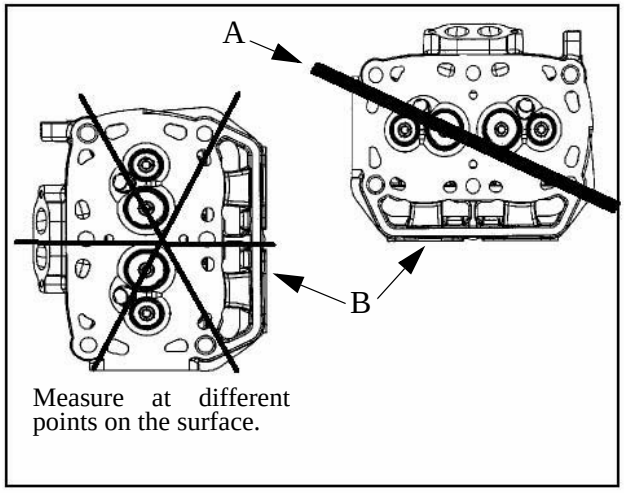
Cylinder Head Inspection

Thoroughly clean cylinder head surface to remove all traces of gasket material and carbon.

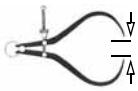
CAUTION
Use care not to damage sealing surface.

Cylinder Head Warp

1. Lay a straight edge (A) across the surface of the cylinder head (B) at several different points and measure warp by inserting a feeler gauge between the straight edge and the cylinder head surface. If warp exceeds the service limit, replace the cylinder head.



Measure at different points on the surface.

 **= In. / mm.**

Cylinder Head Warp Limit:
.004" (.1016 mm) max

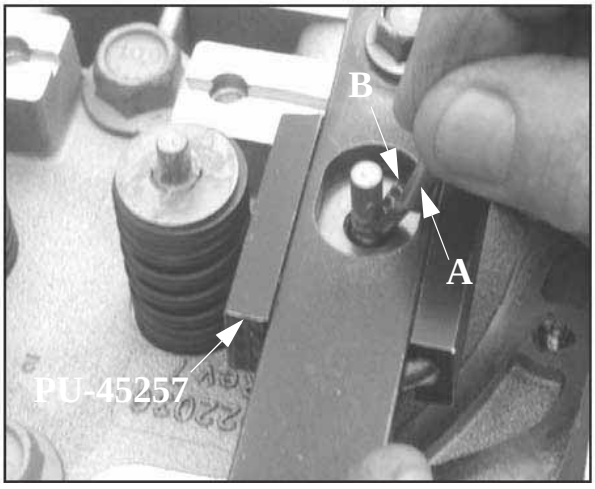
Valve Seal/Spring Service (On Engine)

NOTE: The following procedure is only for servicing the top end of the valve train when replacing valve springs or replacing valve seals.

In some cases the valve train can be serviced while the cylinder head is still on the engine. Keep all parts in order with respect to their location in the cylinder head.

⚠ WARNING
Wear eye protection or a face shield during cylinder head disassembly and reassembly.

1. Having already removed the valve cover, rocker arms and pushrods, align the cylinder to be worked on at top dead center (TDC). Install the Valve Pressure Hose **(PU-45652)** into the spark plug hole. Hook the hose to an air compressor and supply 50 to 100 psi to the hose. This will seat the valves during valve spring removal. Do not remove air from the hose at anytime until reassembly is completed.
2. Using the Valve Spring Compressor **(PU-45257)**, compress the valve spring and remove the valve keepers. NOTE: A small parts magnet (A) can aid in the removal of the retainers (B).

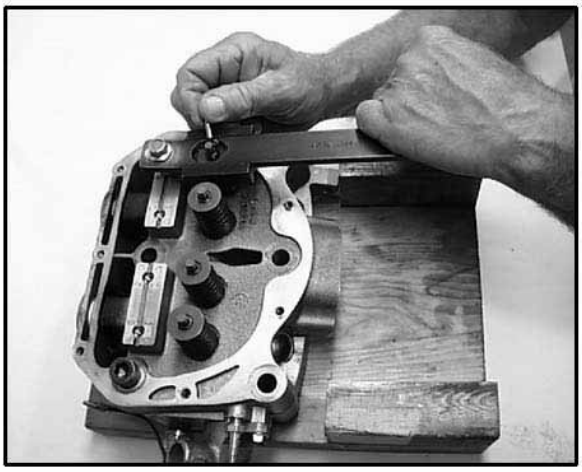


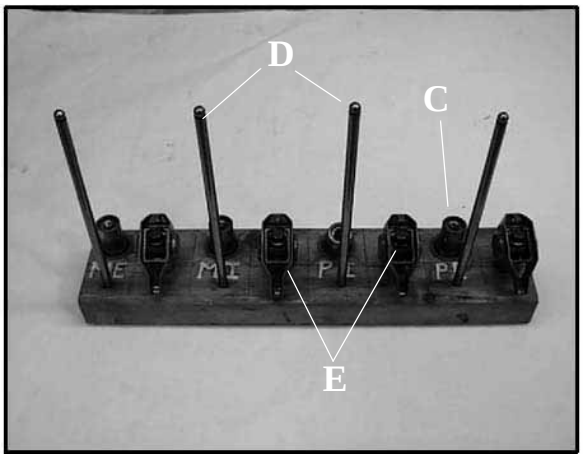
NOTE: To prevent damage to the valve seals, do not compress the valve spring more than is needed to remove the valve keepers.

3. Remove spring retainer and spring.
4. The valve seals are now serviceable.

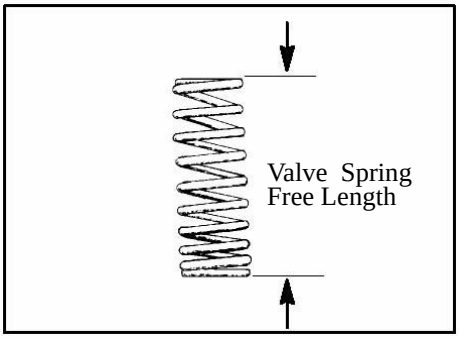
Cylinder Head Disassembly

1. Carefully remove the cylinder components. Place the hydraulic lifters (C), pushrods (D), and rocker arms (E) in a safe, clean area.





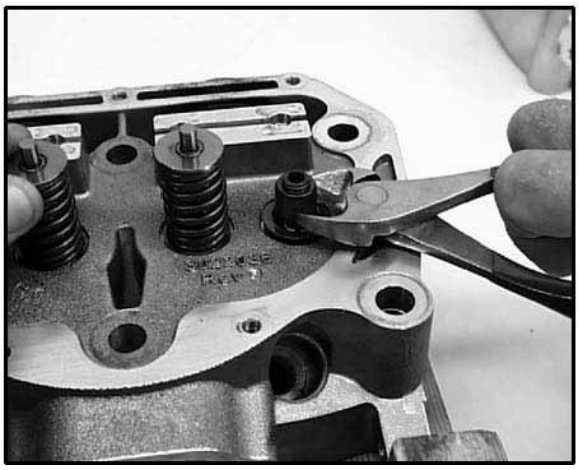
2. Measure free length of spring with a Vernier caliper. Compare to specifications. Replace spring if measurement is out of specification.



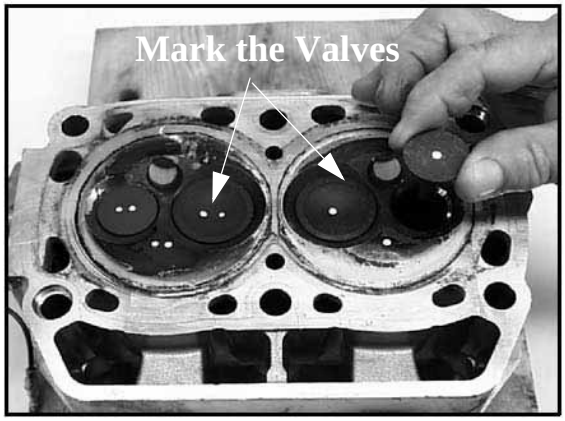
Valve Spring Free Length:
Std: 1.735" (44.069 mm)

3. Remove valve guide seals.

IMPORTANT: It is recommended to replace seals whenever the cylinder head is disassembled. Hardened, cracked or worn valve seals will cause excessive oil consumption and carbon buildup.

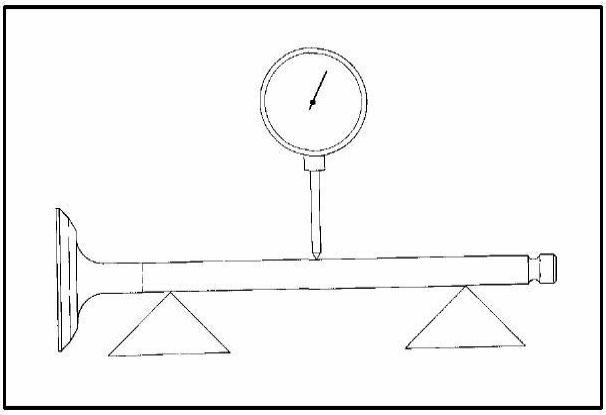


4. Mark the valves with a white pen. Remove the valves from the cylinder head. This will ensure that the valves are properly placed during engine reassembly.

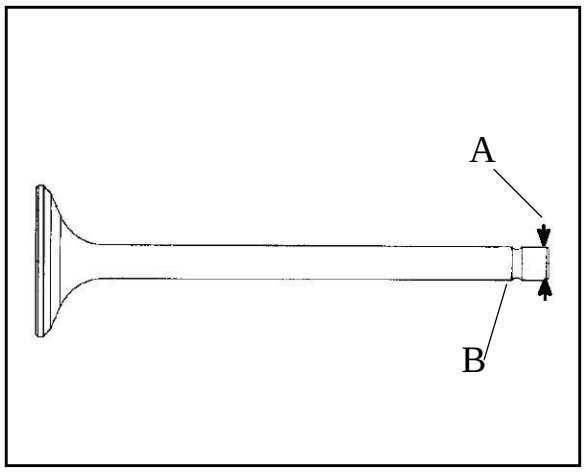


Valve Inspection

1. Remove all carbon from valves with a soft wire wheel or brush.
2. Check valve face for runout, pitting, and burnt spots. To check for bent valve stems, mount valve in a drill or use "V" blocks and a dial indicator.

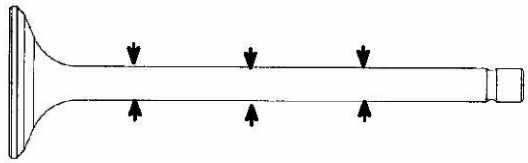


3. Check end of valve stem for flaring, pitting, wear or damage (A).



4. Inspect split keeper groove for wear or flaring of the keeper seat area (B). **NOTE:** The valves can be re-faced or end ground, if necessary. They must be replaced if extensively worn, burnt, bent, or damaged.
5. Measure diameter of valve stem with a micrometer in three places, then rotate 90 degrees and measure again (six measurements total). Compare to specifications.

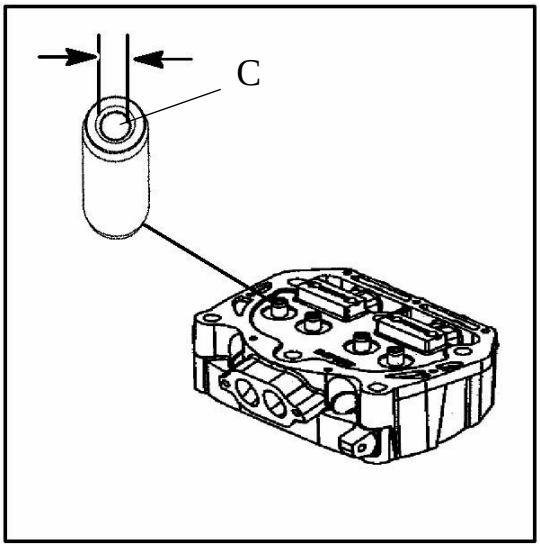
Measure valve stem in several places. Rotate the valve 90 degrees and measure for wear.



= In. / mm.

Valve Stem Diameter:
Intake: 0.2356" + 0.00039"
(5.985 + 0.01 mm)
Exhaust: 0.2351" + 0.00039"
(5.972 + 0.01 mm)

6. Measure valve guide (C) inside diameter at the top middle and end of the guide using a small hole gauge and a micrometer. Measure in two directions.



= In. / mm.

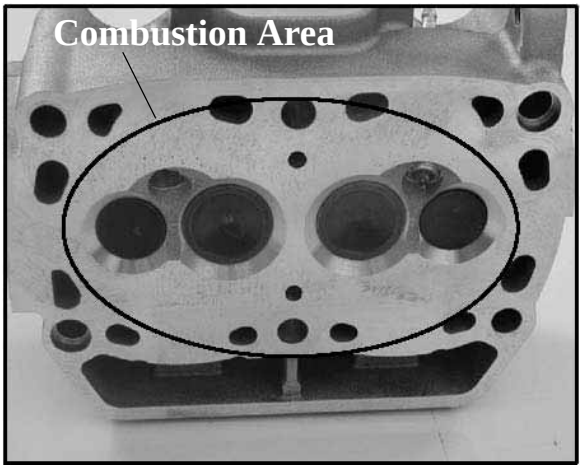
Valve Guide I.D.:
0.23672" + 0.000295"
(6.0617 + 0.0075 mm)

7. Subtract valve stem measurement from the valve guide measurement to obtain stem to guide clearance. NOTE: The valve guides cannot be replaced. Be sure to measure each guide and valve combination individually.

Combustion Chamber

1. Clean all accumulated carbon deposits from combustion chamber and valve seat area with carbon cleaner and a soft plastic scraper.

IMPORTANT: Do not use a wire brush, metal scraper, or abrasive cleaners to clean the bottom of the cylinder head. Extensive damage to the cylinder head may result. Wear safety glasses during cleaning.



Valve Seat Reconditioning

NOTE: Polaris recommends that the work be done by a local machine shop that specializes in this area.

NOTE: The cylinder head valve guides cannot be replaced.

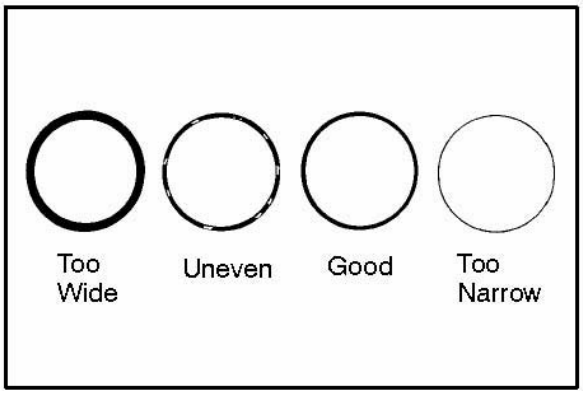
> ⚠ WARNING
>
> Wear eye protection or a face shield during cylinder head disassembly and reassembly.

Valve Seat Inspection

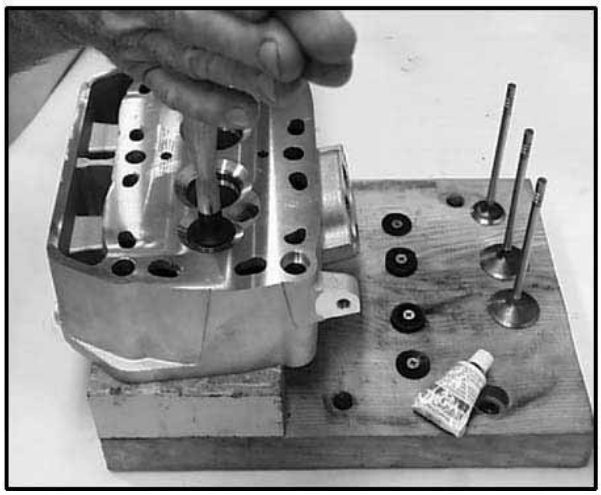
Inspect valve seat in cylinder head for pitting, burnt spots, roughness, and uneven surface. If any of the above conditions exist, the valve seat must be reconditioned. *If the valve seat is cracked the cylinder head must be replaced.*

Follow the manufacturers instructions provided with the valve seat cutters in the Cylinder Head Reconditioning Kit **(PN 2200634)**. Abrasive stone seat reconditioning equipment can also be used. Keep all valves in order with their respective seat.

NOTE: Valve seat width and point of contact on the valve face is very important for proper sealing. The valve must contact the valve seat over the entire circumference of the seat, and the seat must be the proper width all the way around. If the seat is uneven, compression leakage will result. If the seat is too wide, seat pressure is reduced, causing carbon accumulation and possible compression loss. If the seat is too narrow, heat transfer from valve to seat is reduced. The valve may overheat and warp, resulting in burnt valves.



1. Install pilot into valve guide.



2. Apply cutting oil to valve seat and cutter.
3. Place 46° cutter on the pilot and make a light cut.

4. Inspect the cut area of the seat:

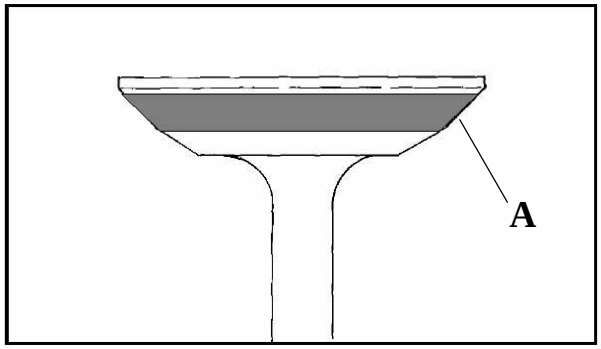
* If the contact area is less than 75% of the circumference of the seat, rotate the pilot 180° and make another light cut.

* If the cutter now contacts the uncut portion of the seat, check the pilot. Look for burrs, nicks, or runout. If the pilot is bent it must be replaced.

* If the contact area of the cutter is in the same place, the valve guide is distorted from improper installation

* If the contact area of the initial cut is greater than 75%, continue to cut the seat until all pits are removed and a new seat surface is evident. **NOTE:** Remove only the amount of material necessary to repair the seat surface.

5. To check the contact area of the seat on the valve face, apply a thin coating of Prussian Blue™ paste to the valve seat. If using an interference angle (46°) apply black permanent marker to the entire valve face (A).



6. Insert valve into guide and tap valve lightly into place a few times.
7. Remove valve and check where the Prussian Blue™ indicates seat contact on the valve face. The valve seat should contact the middle of the valve face or slightly above, and must be the proper width.

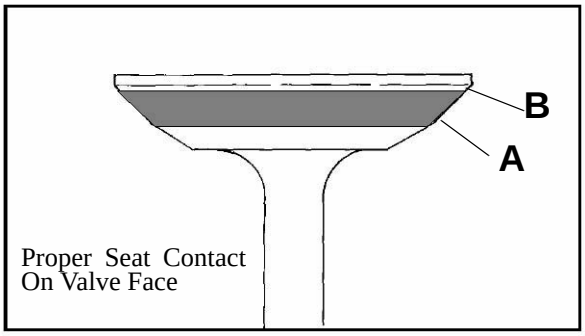
* If the indicated seat contact is at the top edge of the valve face and contacts the margin area (B) it is too high on the valve face. Use the 30° cutter to lower the valve seat.

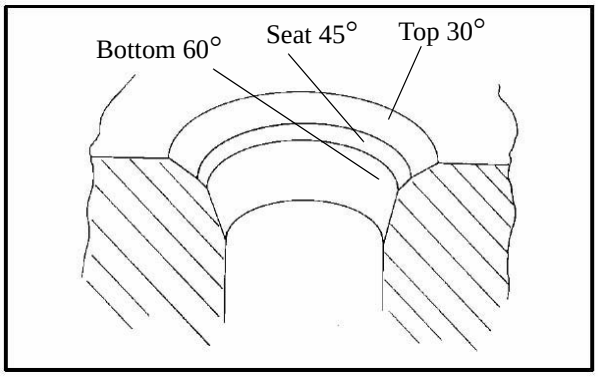
* If too low, use the 60° cutter to raise the seat. When contact area is centered on the valve face, measure seat width.

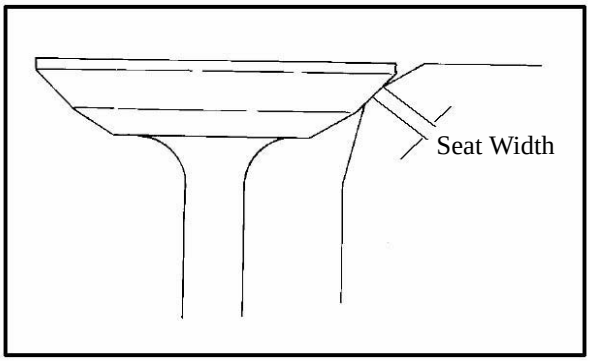
* If the seat is too wide or uneven, use both top and bottom cutters to narrow the seat.

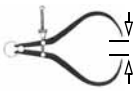
* If the seat is too narrow, widen using the 45° cutter and re-check contact point on the valve face and seat width after each cut.

NOTE: When using an interference angle, the seat contact point on the valve will be very narrow, and is a normal condition. Look for an even and continuous contact point all the way around the valve face. (B)







 **= In. / mm.**

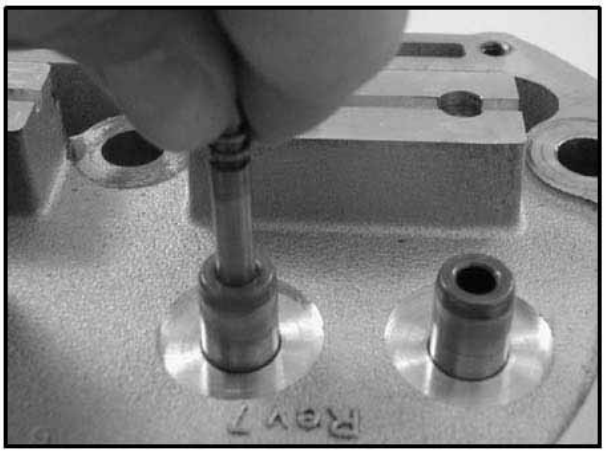
Valve Seat Width:
Intake Std: .028" (.7 mm)
Limit: .055" (1.4 mm)
Exhaust Std: .039l (1.0 mm)
Limit: .071" (1.8 mm)

8. Clean all filings from the area with hot soapy water, rinse, and dry with compressed air.

9. Lubricate the valve guides with clean engine oil, and apply oil or water based lapping compound to the face of the valve.

NOTE: Lapping is not required with an interference angle valve job.

10. Insert the valve into its respective guide and lap using a lapping tool or a section of fuel line connected to the valve stem.

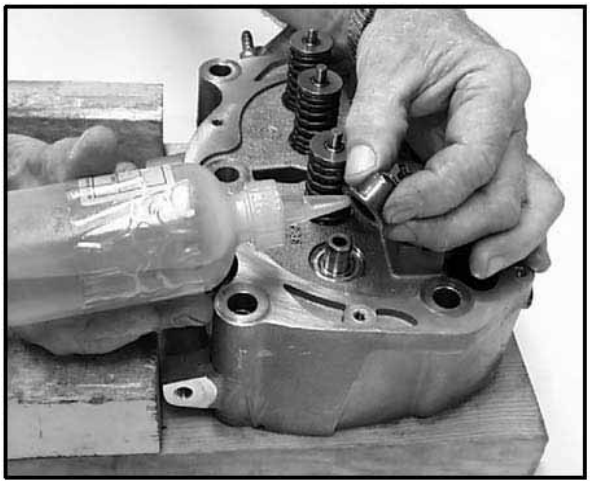


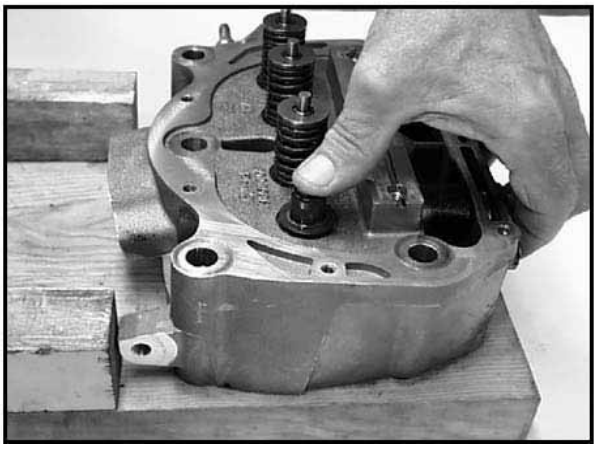
11. Rotate the valve rapidly back and forth until the cut sounds smooth. Lift the valve slightly off of the seat, rotate 1/4 turn, and repeat the lapping process. Do this four to five times until the valve is fully seated, and repeat process for the other valve(s).
12. Thoroughly clean cylinder head and valves.

Cylinder Head Reassembly

NOTE: Assemble the valves one at a time to maintain proper order.

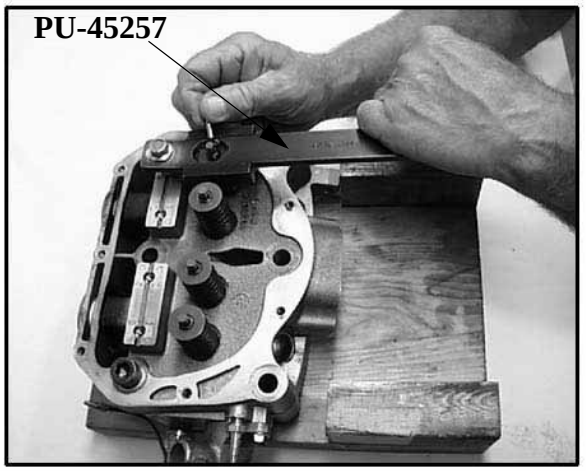
1. Apply engine oil to valve guides and seats.
2. Coat valve stem with molybdenum disulfide grease or 0W-40 Synthetic oil.
3. Install valve carefully with a rotating motion to avoid damaging valve seal.
4. Valve seals should be installed after the valves are in the head to avoid valve seal damage. Install new valve seals on valve guides.





5. Dip valve spring and retainer in clean engine oil and install.
6. Place retainer on spring and install Valve Spring Compressor **(PU-45257)**. Install split keepers with the gap even on both sides.

NOTE: A small magnet can aid in installation of the keepers.

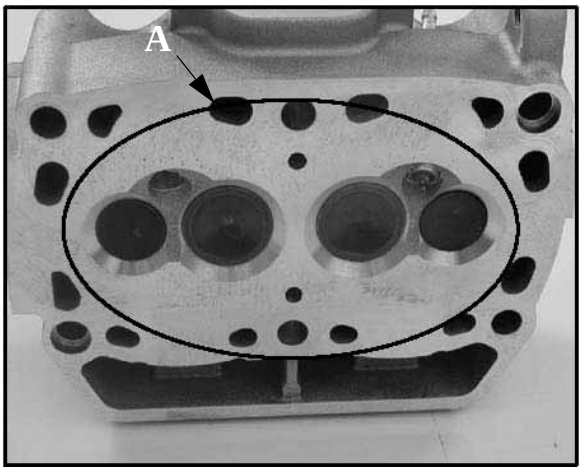


7. Repeat procedure for remaining valves. When all valves are installed, tap lightly with soft faced hammer on the end of the valves to seat the split keepers.

NOTE: To prevent damage to the valve seals, do not compress the valve spring more than necessary to install the keepers.

Valve Sealing Test

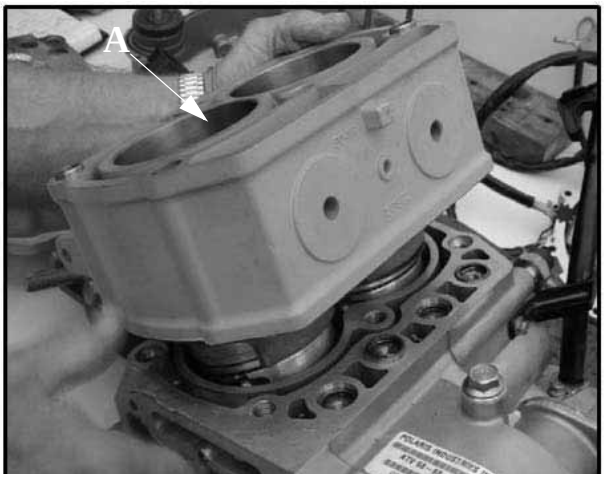
1. Clean and dry the combustion chamber area (A).



2. Pour a small amount of clean solvent onto the intake port and check for leakage around each intake valve. The valve seats should hold fluid with no seepage.
3. Repeat for exhaust valves by pouring fluid into exhaust port.

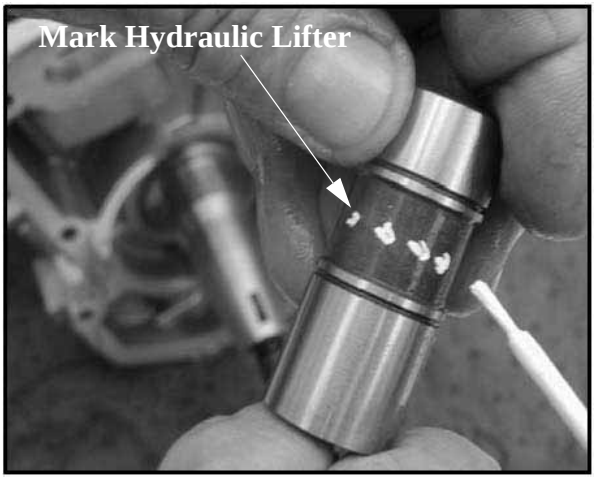
Cylinder Removal

1. Follow engine disassembly procedures to remove rocker cover and cylinder head.
2. Tap cylinder (A) lightly with a rubber mallet in the reinforced areas only until loose.
3. Rock cylinder forward and backward while lifting it from the crankcase, supporting pistons and connecting rods. Support pistons with Piston Support Block (PN 2870390).

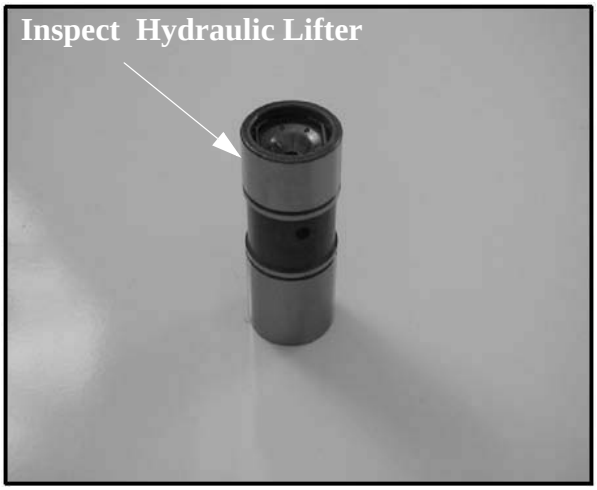


Valve Lifter Removal/Inspection

1. Remove the valve lifter's by reaching into the crankcase and pushing the lifter up through the lifter bore by hand.
2. Thoroughly clean the lifters in cleaning solvent and wipe them with a clean lint-free cloth.
3. Mark the lifters with a white pen if using the lifters for reassembly. This will ensure that the lifters are properly placed during engine reassembly.



4. Check the lifters for wear or scores.
5. Check the bottom end of lifter to make sure that it has a slight convex.
6. If the bottom surface has worn flat, it may be used with the original camshaft only.



NOTE: Lifters that are scored, worn, or if the bottom is not smooth should be replaced with new lifters and cam as an assembly. If replacing the lifters, the camshaft should also be replaced.

Piston Removal

1. Remove circlip (A). Mark the piston with a white pen to ensure proper orientation (if reused) during assembly.

NOTE: If the pistons are to be reused, reassemble the pistons in the same cylinder and direction from which they were removed.

NOTE: New pistons are non-directional and can be placed in either cylinder.

2. Remove piston circlip and push piston pin out of piston. If necessary, heat the crown of the piston slightly with a propane torch. **CAUTION:** Do not apply heat to the piston rings. The ring may lose radial tension.
3. Remove top compression ring:

***Using a piston ring pliers:** Carefully expand ring and lift it off the piston. **CAUTION:** Do not expand the ring more than the amount necessary to remove it from the piston, or the ring may break.

***By hand:** Placing both thumbs as shown, spread the ring open and push up on the opposite side. Do not scratch the ring lands.

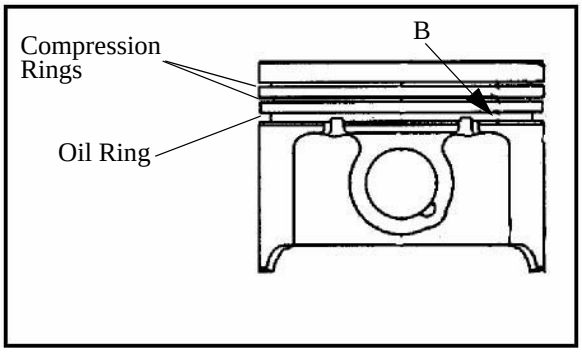
4. Repeat procedure for second ring.
5. Remove the oil control ring.

The oil control ring is a three piece design consisting of a top and bottom steel rail and a center expander section. The top rail has a locating tab on the end which fits into a notch (B) in the upper oil ring land of the piston.

To Remove:

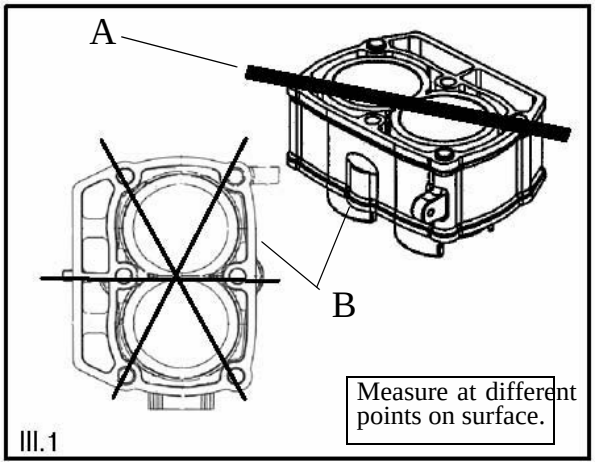
A) Remove the top rail first followed by the bottom rail.

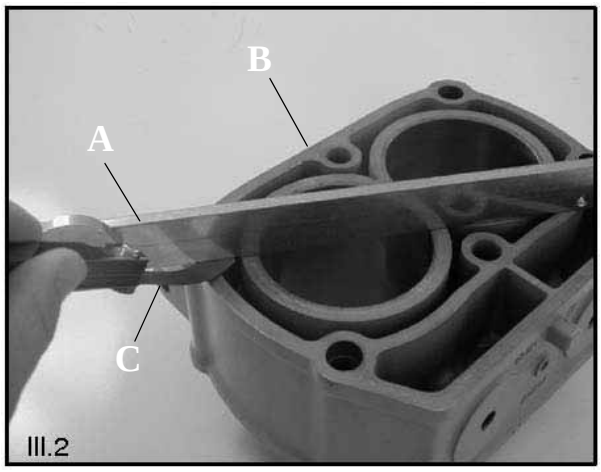
B) Remove the expander.



Cylinder Inspection

1. Remove all gasket material from the cylinder sealing surfaces.
2. Inspect the top of the cylinder (B) for warp using a straight edge (A) and feeler gauge (C). Refer to Ill. 1 and Ill. 2.

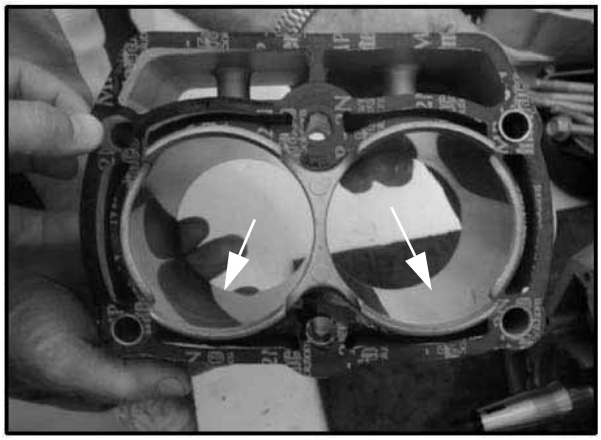




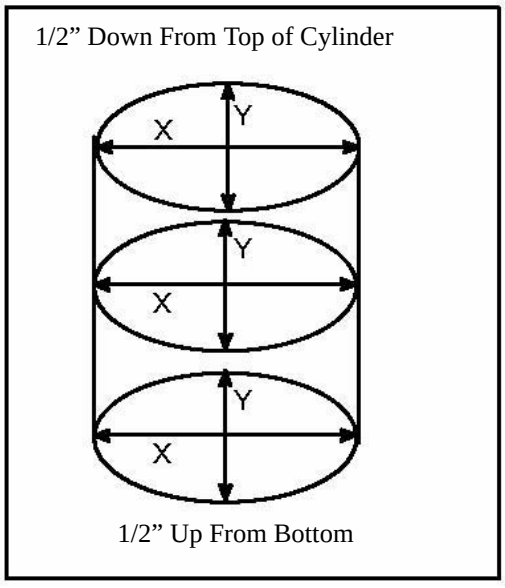
= In. / mm.

Cylinder Warp: .004" (0.1 mm) Max.

3. Inspect cylinder for wear, scratches, or damage.



4. Inspect cylinder for taper and out of round with a telescoping gauge or a dial bore gauge. Measure in two different directions, front to back and side to side, on three different levels (1/2, down from top, in the middle, and 1/2, up from bottom). Record measurements. If cylinder is tapered or out of round beyond .002", the cylinder must be replaced.



= In. / mm.

Cylinder Taper Limit:
.002" (9.05mm) Max.

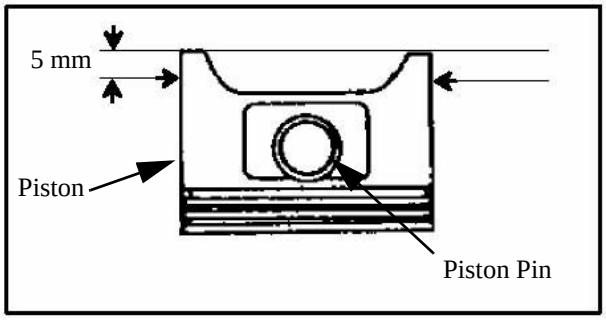
Cylinder Out of Round:
Limit: .002" (.0 mm) Max.

700/800 Standard Bore Size
(Both Cylinders): 3.1496" (80 mm)

Piston-To-Cylinder Clearance

Measure piston outside diameter at a point 5 mm up from the bottom of the piston at a right angle to the direction of the piston pin.

Subtract this measurement from the maximum cylinder measurement obtained in Step 5.

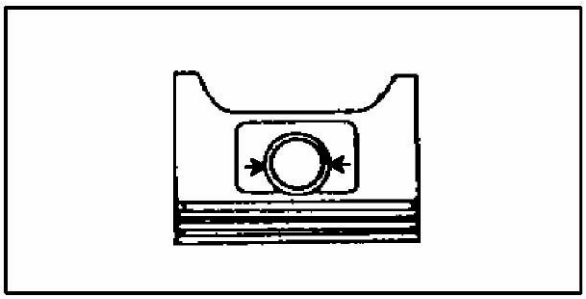


Piston to Cylinder Clearance:
See "700/800 EFI Engine Service Specifications" on page 3.11

Piston O.D.:
See "700/800 EFI Engine Service Specifications" on page 3.11

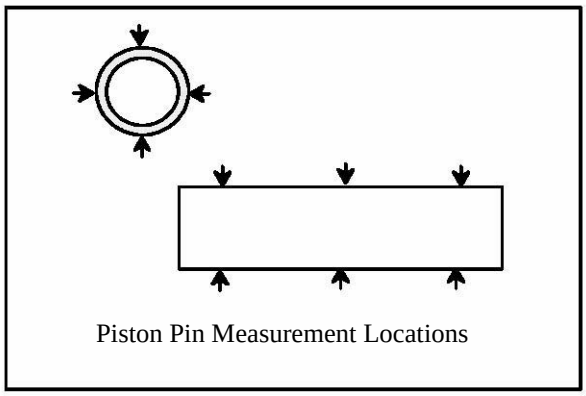
Piston/rod Inspection

1. Measure piston pin bore.



Piston Pin Bore:
See "700/800 EFI Engine Service Specifications" on page 3.11

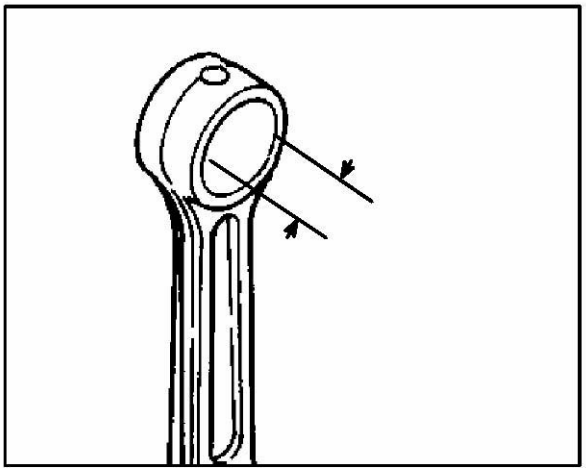
2. Measure piston pin O.D. Replace piston and/or piston pin if out of tolerance.



Piston Pin Measurement Locations

Piston Pin O.D.:
See "700/800 EFI Engine Service Specifications" on page 3.11

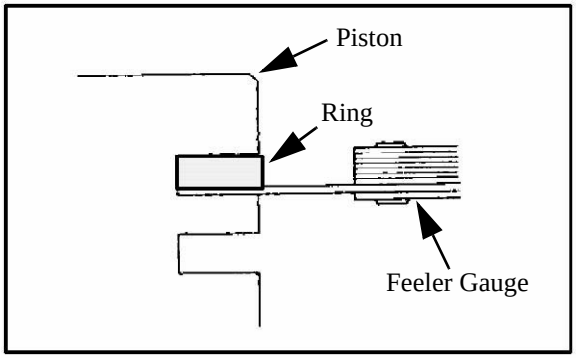
3. Measure connecting rod small end ID.



Connecting Rod Small End I.D.:
See "700/800 EFI Engine Service Specifications" on page 3.11

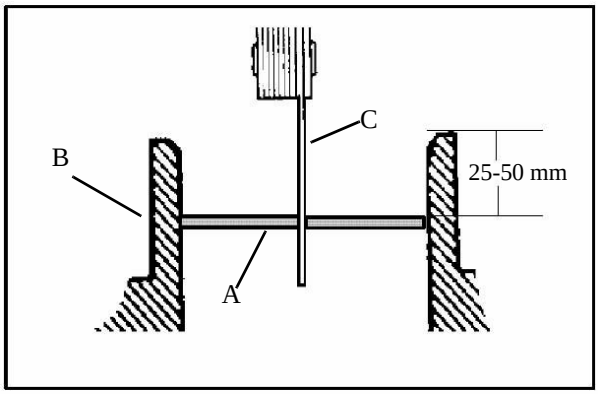
4. Measure piston ring to groove clearance by placing the ring in the ring land and measuring with a thickness gauge. Replace piston and rings if ring-to-groove clearance exceeds service limits.

See “700/800 EFI Engine Service Specifications” on page 3.11



Piston Ring Installed Gap

1. Place each piston ring (A) inside cylinder (B) using piston to push ring squarely into place as shown. (See next page)



Piston Ring Installed Gap
See “700/800 EFI Engine Service Specifications” on page 3.11

NOTE: Ring should be installed with the mark facing upward.

2. Measure installed gap with a feeler gauge (C) at both the top and bottom of the cylinder. REMINDER: A difference in end gap indicates cylinder taper. The cylinder should be measured for excessive taper and out of round.
3. If the bottom installed gap measurement exceeds the service limit, replace the rings. If ring gap is smaller than the specified limit, file ring ends until gap is within specified range.

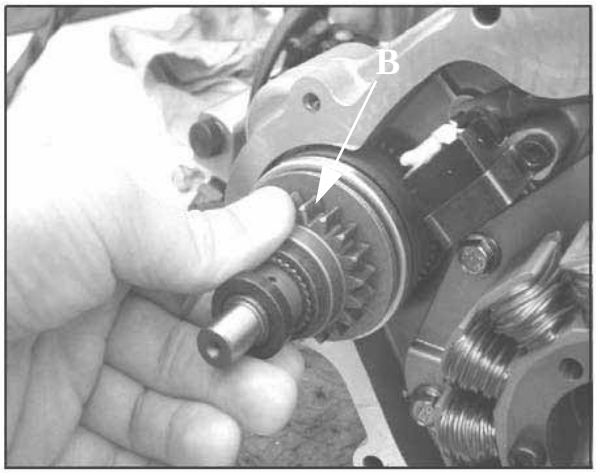
NOTE: Always check piston ring installed gap after re-boring a cylinder or when installing new rings. A re-bored cylinder should always be scrubbed thoroughly with hot soapy water, rinsed, and dried completely. Wipe cylinder bore with oil immediately to remove residue and prevent rust.

Starter Drive/Bendix Removal Inspection

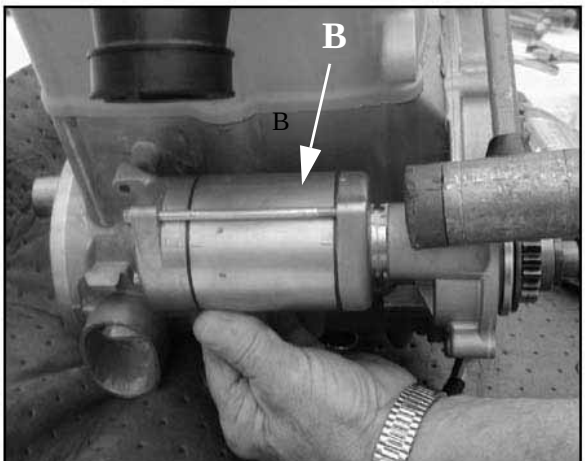
1. Remove stator housing bolts and remove housing.
2. Remove the flywheel nut and washer. Install Flywheel Puller (PN 2871043) and remove flywheel.

NOTE: Do not thread the puller bolts into the flywheel more than 1/4, or stator coils may be damaged.

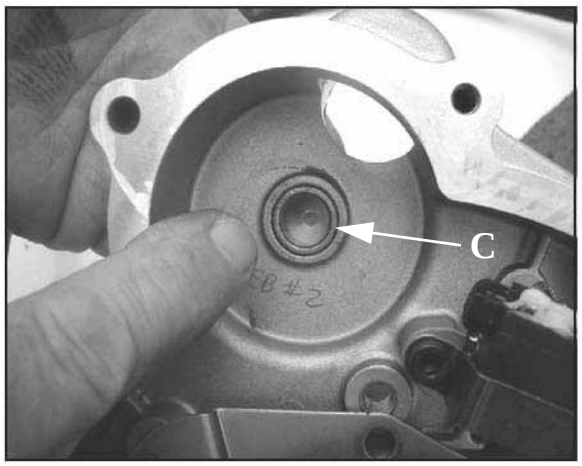
3. Remove starter bendix assembly (A). Note the thrust washers located on both sides of the bendix.



4. Inspect the thrust washer for wear or damage and replace if necessary.
5. After the bendix is removed, tap on the starter assembly with a soft faced mallet to loosen the starter from the crankcase.

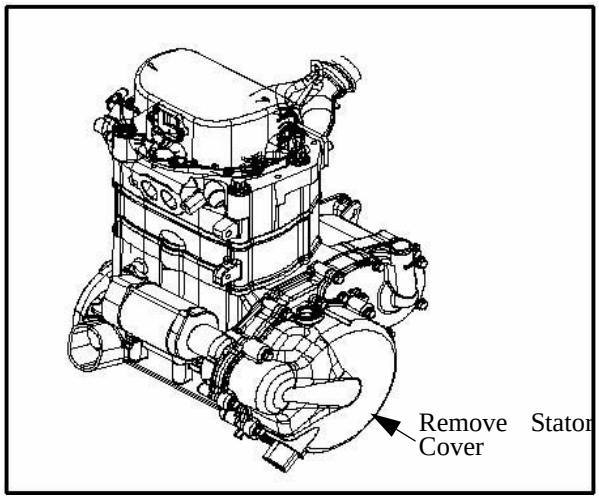


6. Inspect gear teeth on starter drive (B). Replace starter drive if gear teeth are cracked, worn, or broken.
7. Inspect the bendix bushing (C) in the mag cover for wear. Replace as needed.

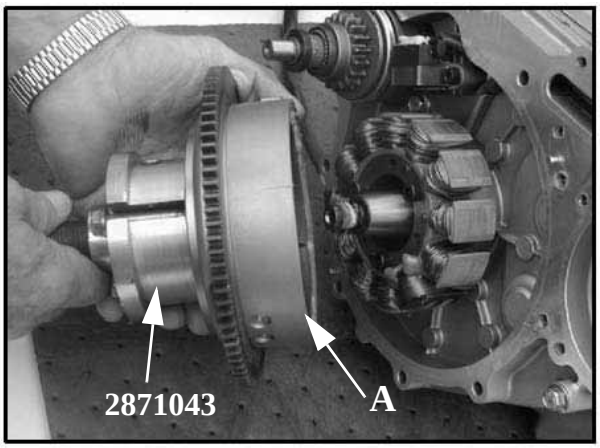


Flywheel / Stator Removal / Inspection

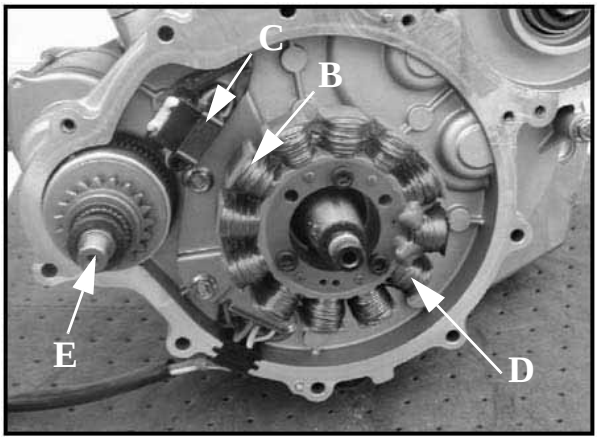
1. Remove stator housing bolts and remove housing.



2. Remove flywheel nut and washer.
3. Install Flywheel Puller **(PN 2871043)** and remove flywheel (A). **CAUTION:** Do not thread the puller bolts into the flywheel more than 1/4, or stator coils may be damaged.



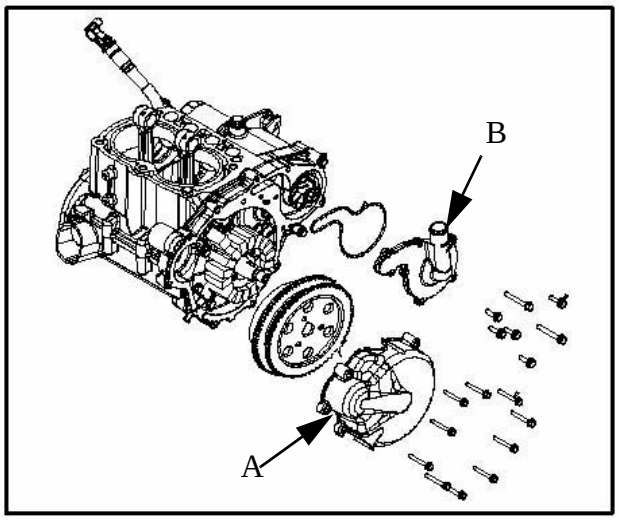
4. Use caution when removing the wire holddown (B), trigger coil (C), and the stator assembly (D). **Do not tap or bump the gear /stator housing cover or the stator.** This could cause the seal around the gear/stator housing cover and the crankcase to break, causing a leak.



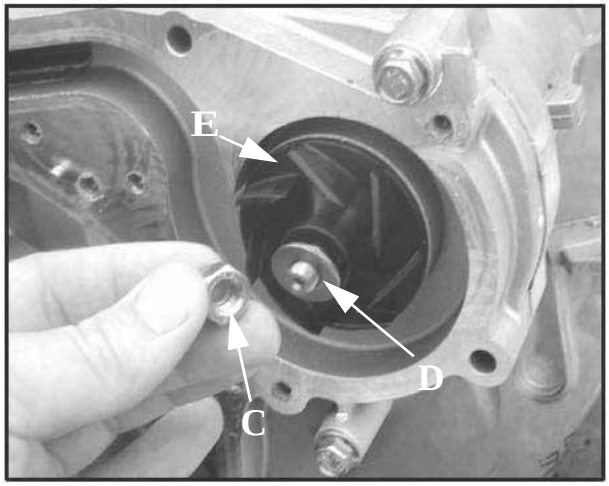
5. Remove the bendix (E) if necessary.

Engine Crankcase Disassembly / Inspection

1. Remove the stator cover (A) and water pump cover (B).

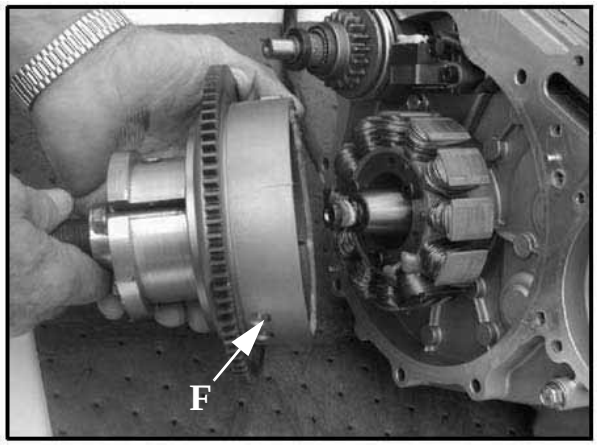


2. Remove the nylok nut (C), washer (D), and water pump impeller (E). Remove part of the water pump seal behind the impeller.

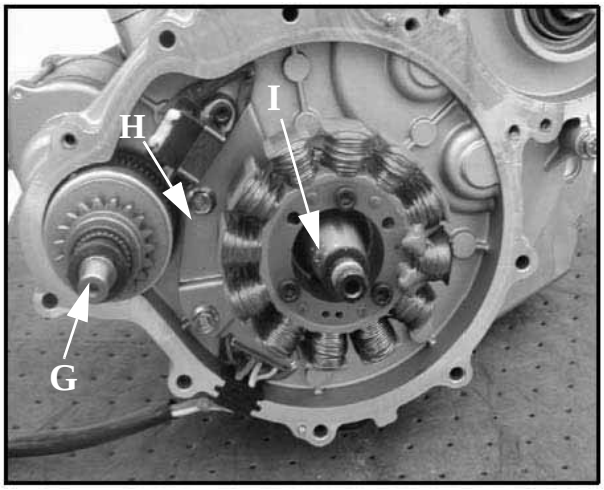


3. Remove flywheel nut and washer.

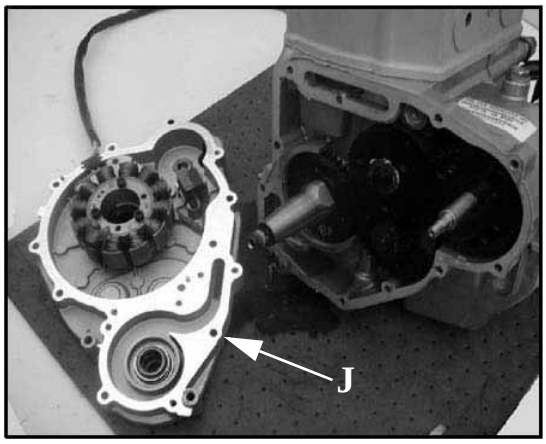
4. Install Flywheel Puller **(PN 2871043)** and remove flywheel (F). **CAUTION:** Do not thread the puller bolts into the flywheel more than 1/4, or stator coils may be damaged.



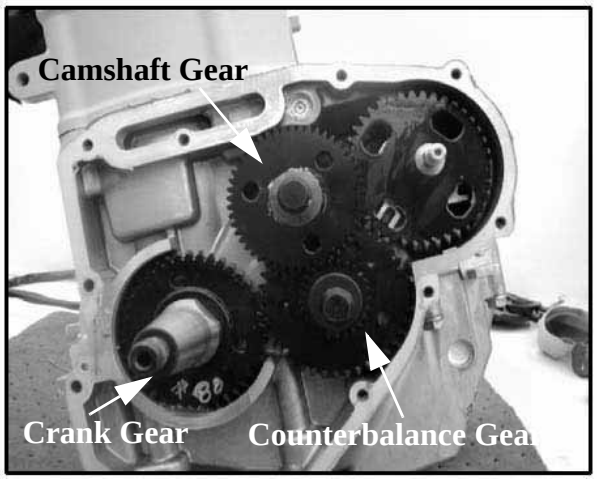
5. Remove the starter bendix (G), wire holddown plate (H), and the woodruff key (I) from the crankshaft. The stator does not have to be removed at this point.



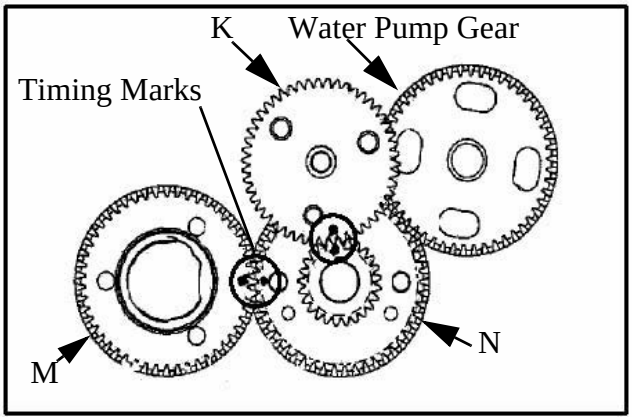
6. Remove the gear/stator housing bolts and remove the gear/stator housing cover (J) and gasket from the crankcase. Be sure to catch the excess oil from the crankcase.



7. Note the positions of the gears in the photo.



8. Use a white pen to accent the timing marks on the following gears: camshaft gear (K), crankshaft gear (M), or counterbalance gear (N) This will ensure proper gear alignment and timing during reassembly of the gears.

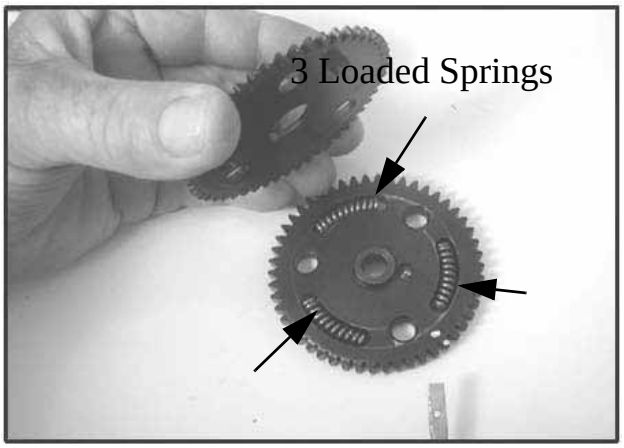


NOTE: If replacing one of the gears, it is recommended that all of the gears be replaced. A gear kit is available in the parts book.

9. Use the Cam Gear Tooth Alignment Tool (PU-45497-2) (O) to align the cam split gear assembly. With the split gear aligned, remove the bolt and cam gear assembly.

NOTE: Install the Cam Gear Tooth Alignment Tool (PU-45497-2) into the assembly hole counter clockwise from the timing mark as shown.

10. Inspect the cam gear teeth and check to make sure there is spring tension offsetting the teeth between the two gears. If there is no tension, check the springs inside of the cam gear assembly.



11. The cam gear assembly contains three loaded springs. To open the cam gear assembly:

* Place the cam gear on a flat surface with the timing mark side facing up.

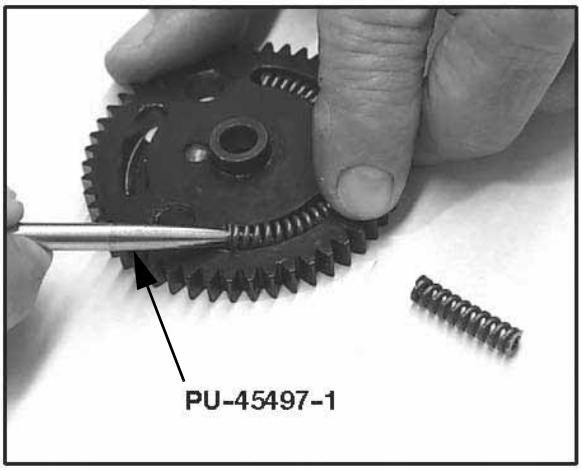
* While holding both gears together, lightly work a small flathead screwdriver between the two gears.

* Remove the top gear. The springs should stay in place.

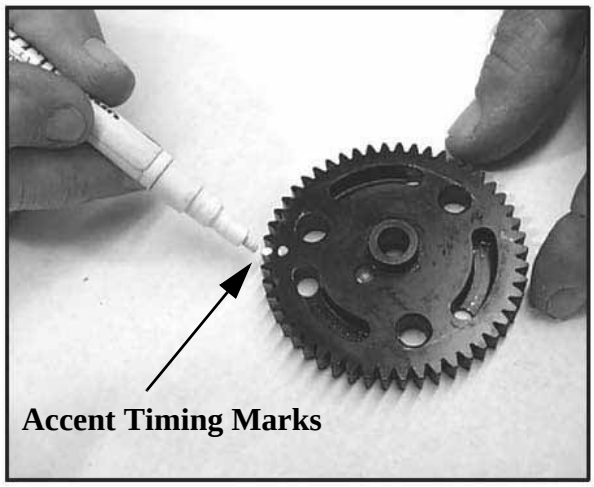
⚠ CAUTION

Wear safety glasses at all times. Use caution when working with the top gear. The springs could cause injury or become lost should they pop out.

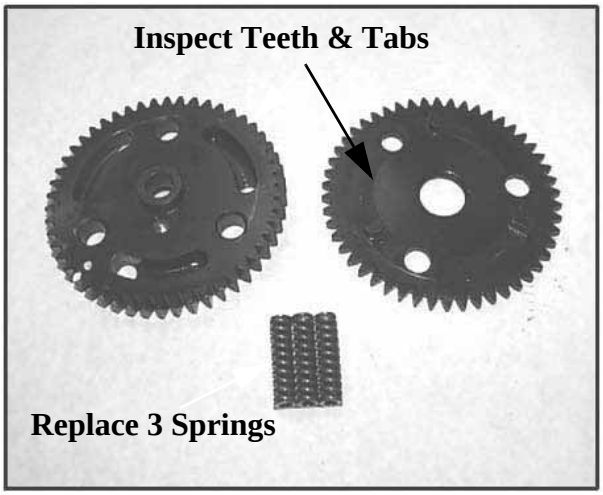
12. Remove all three springs using one of the tapered pins from the Tapered Pins **(PU-45497-1)**.



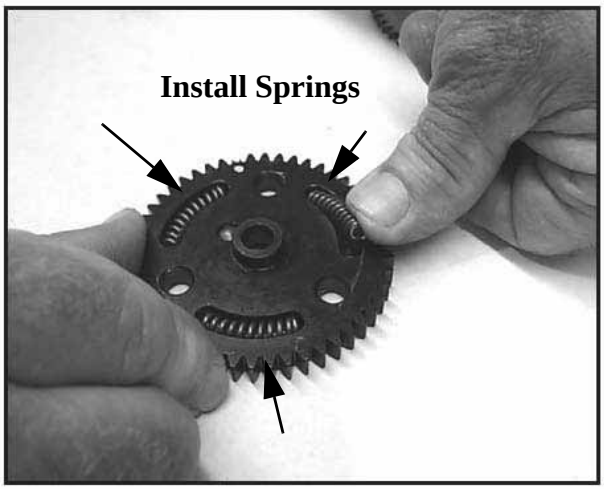
13. With a white marking pen, accent the timing mark on the gear that contains the springs.



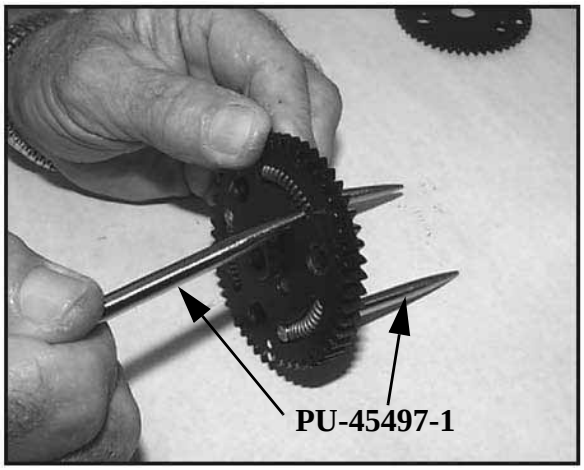
14. Inspect the gear teeth and the three tabs on the gears for wear.



15. Install the new springs into the grooves of the cam gear.



16. Insert the pointed dowels from the Tapered Pins **(PU-45497-1)** into the cam gear.



To Assemble:

* Hold the spring with one finger.

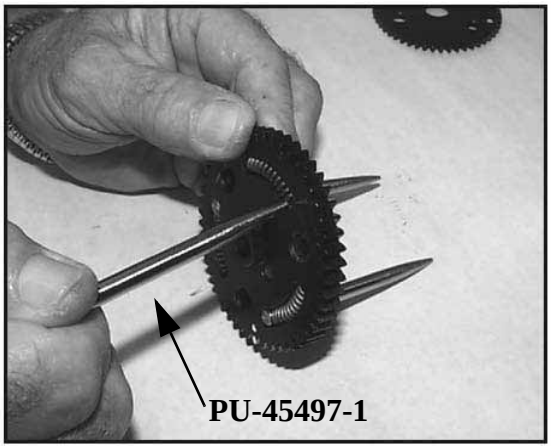
* Start the pointed end of the tapered pin into the cam gear hole and slowly push the dowel through the hole until the end of the dowel is almost flush with the spring.

* Perform this procedure with all three tapered pins.

* Do not push the pins too far through or the springs will pop out.

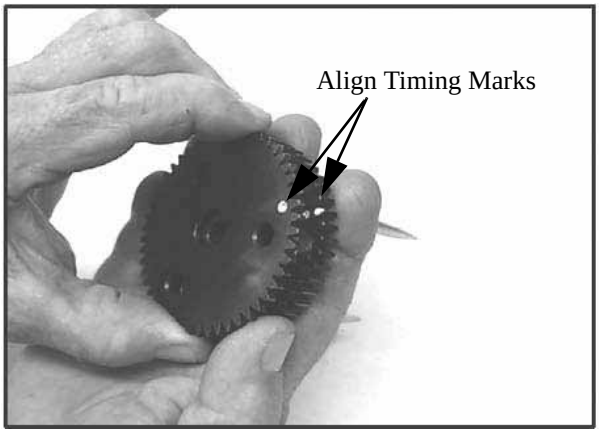
NOTE: Do not remove the tapered pins at this time.

17. Note in the photograph that the Tapered Pins **(PU-45497-1)** are below flush with end of the springs. This helps to align the three gear tabs during the next step.



Cam Gear Spring Installation Tool Kit: (PU-45497)
Tapered Pins: (PU-45497-1)
Cam Gear Tooth Align Tool: (PU-45497-2)

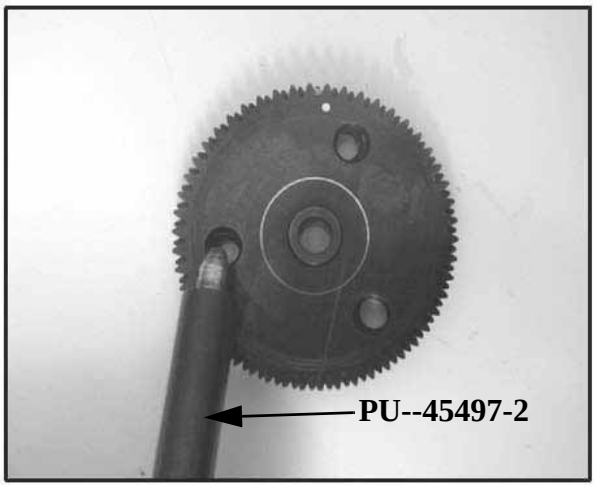
18. Line up the two gears using the timing marks and the three gear tabs that were referenced earlier. Push the gears back together, using both hands and hold securely.



19. Once the gears are pressed together, firmly hold the gears together with one hand. Carefully remove the Tapered Pins **(PU-45497-1)** by pulling them out one at a time with the other hand.

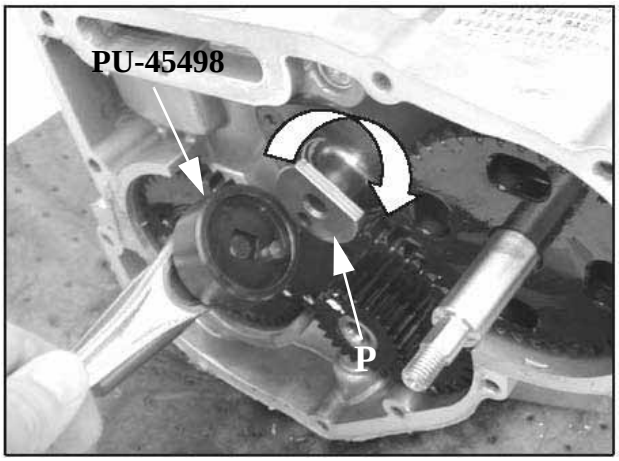
20. After the tapered pins are removed, be sure the cam gear assembly is held together tightly. Place the cam gear assembly on a flat surface. Use the Cam Gear Tooth Alignment Tool **(PU-45497-2)** to align the teeth of the cam gears, as shown in the picture.

NOTE: Install the Cam Gear Alignment Tool (PU-45497-2) into one assembly hole counter clockwise from the timing mark.



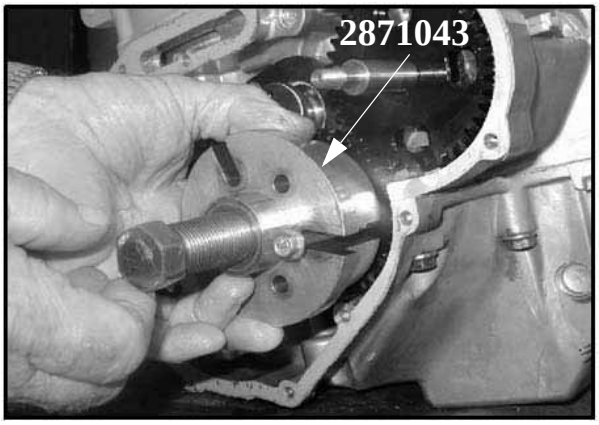
NOTE: For ease of installing the Cam Gear Alignment Tool (PU-45497-2) (R), use a twisting motion when pushing down on the tool.

21. To remove the balance shaft gear, the flat side of the camshaft (P) must face the balance shaft gear. To rotate the camshaft, use the Cam Spanner Wrench (PU-45498) to rotate the camshaft so the flat side of the camshaft faces the balance shaft gear.

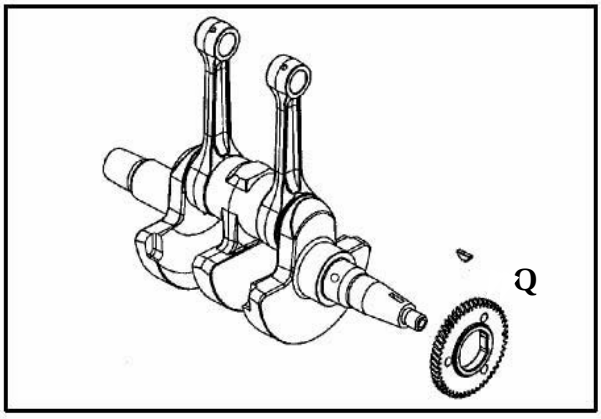


NOTE: This Cam Spanner Wrench (PU-45498) is only needed to rotate the camshaft when the entire valve train is assembled. If the rocker arms are removed, the cam-shaft can be turned by hand.

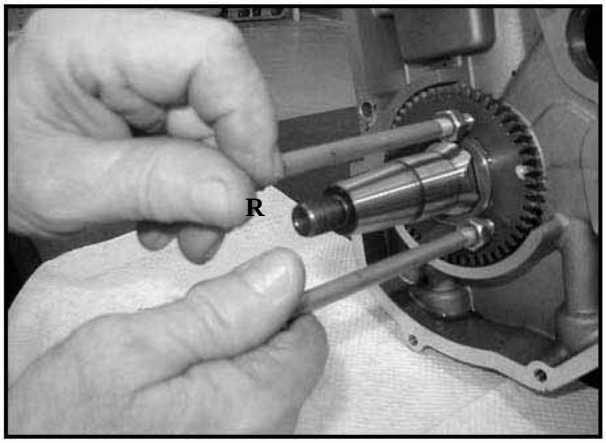
22. Remove the bolt and nut from the balance shaft gear. Try to remove the balance shaft gear. If the gear does not come off manually, use the Flywheel Puller (PN 2871043) to remove the balance shaft gear.



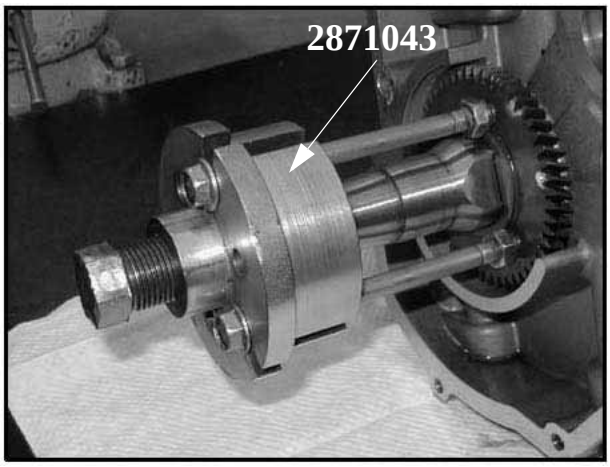
23. Inspect the crankshaft gear (Q) for broken or worn teeth. If the crankshaft gear does not need to be replaced, it does not need to be removed. If the crankshaft gear is damaged, remove the crankshaft gear with the Flywheel Puller **(PN 2871043).**



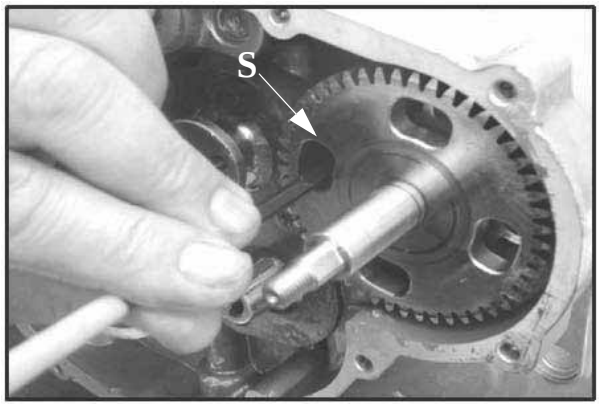
24. Install the two puller bolts (R). Tighten the puller bolts up so that the bolts are at equal length.



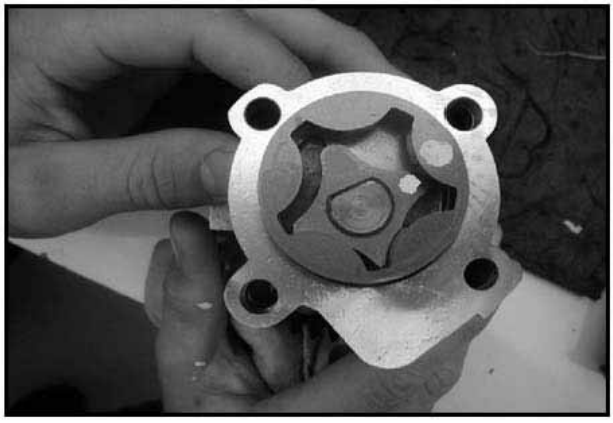
25. Install the Flywheel Puller (**PN 2871043**) and remove the crankshaft gear, if needed.



26. Rotate the water/oil pump gear (S), so that all four bolts are visible though the gear. Remove the four bolts with a hex wrench. Pull out the pump.

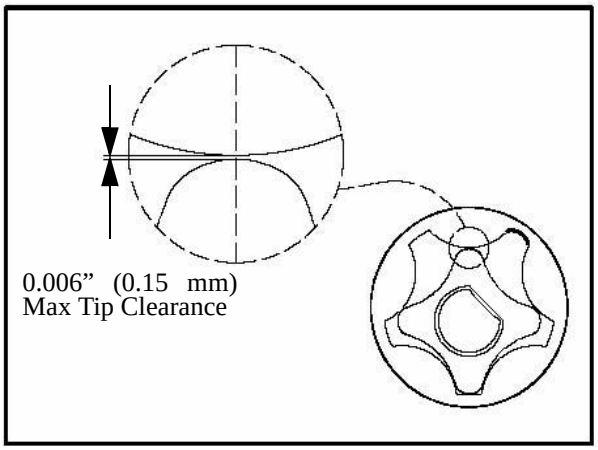


27. Inspect the oil pump rotors for wear. Mark the rotors with a white pen to ensure upon reassembly that the correct sides of the rotors are installed and mesh with the same edges as previously installed.

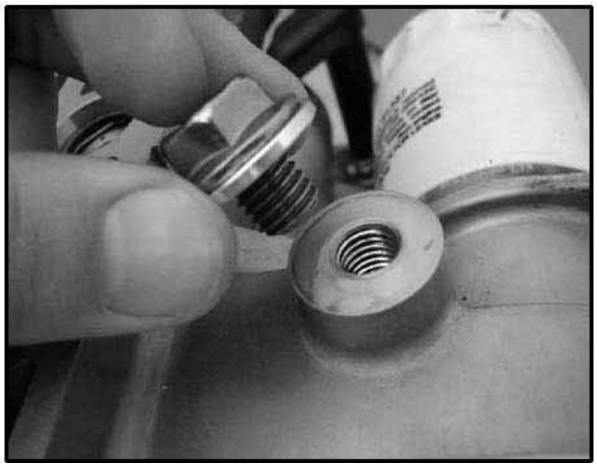


NOTE: If replacing the old rotors, new replacement rotors will fit into the old oil/water pump housing.

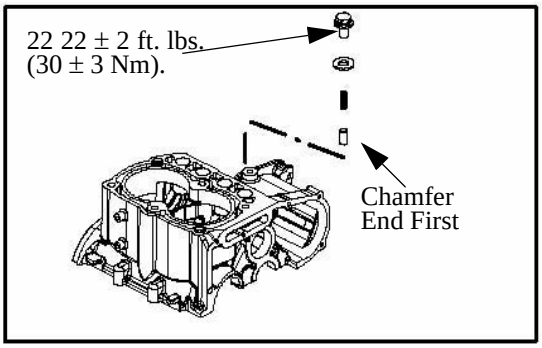
28. Use a feeler gauge to measure the clearance between the two rotors. Measure the gap between the two rotor tips as shown below. **The clearance should not exceed 0.006" (0.15 mm)**.



29. Remove the oil pressure relief. The oil pressure relief consists of a bolt, washer, spring, and valve (dowel). Inspect the valve (dowel) for signs of possible obstructions. Use compressed air to blow out any debris.



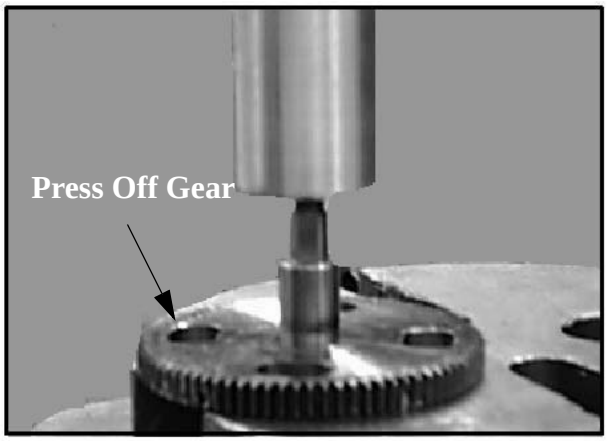
30. Reinstall the valve (dowel chamfered end first). Install the spring, washer, and bolt. Torque to specification .



= T
22 ± 2 ft. lbs. (30 ± 3 Nm)

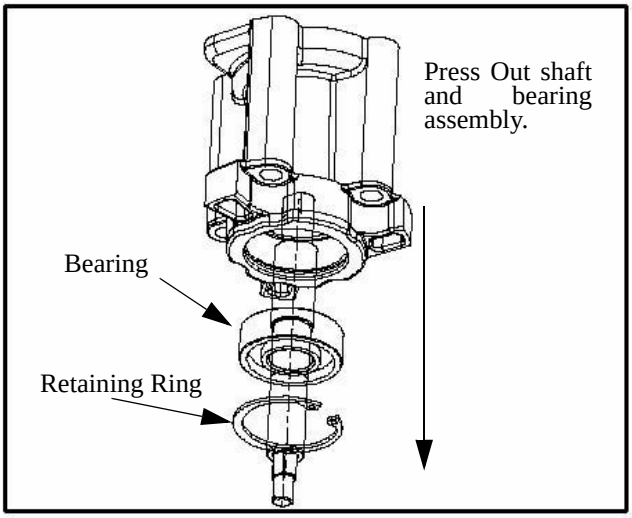
NOTE: Be sure to place the tapered end of the valve (dowel) in first. If the valve is installed incorrectly, oil pressure and oil priming problems will occur.

31. Carefully press the gear off the assembly while supporting the housing assembly.

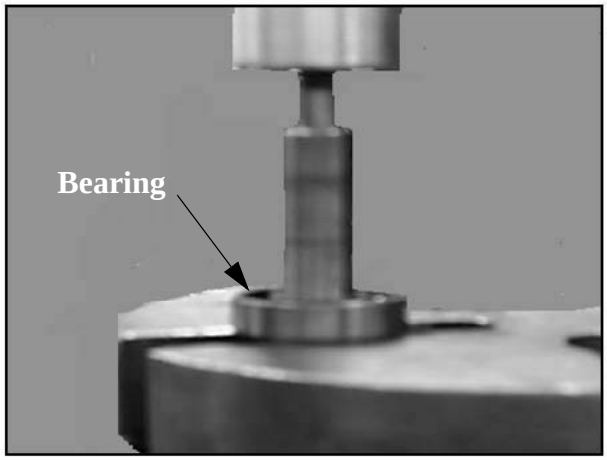


⚠ CAUTION
Wear appropriate safety gear during this procedure. Protective gloves, clothing and eyewear are required.

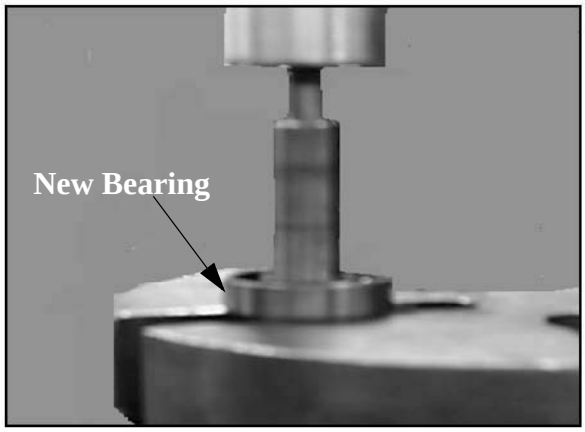
32. Remove the snap ring from the assembly. Place the housing in a support and press out the bearing/shaft assembly.



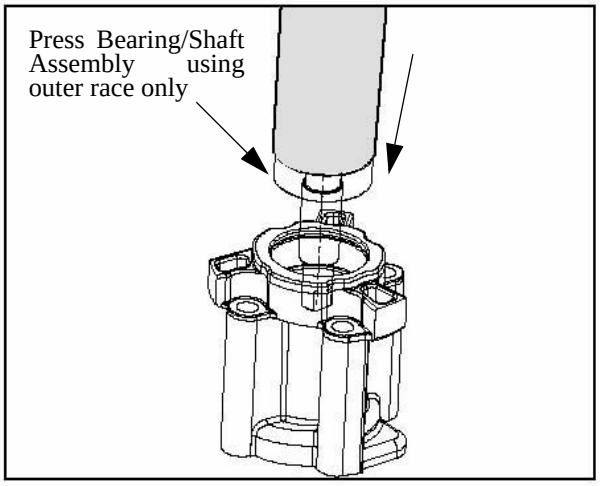
33. Place the shaft in a press to remove the bearing.



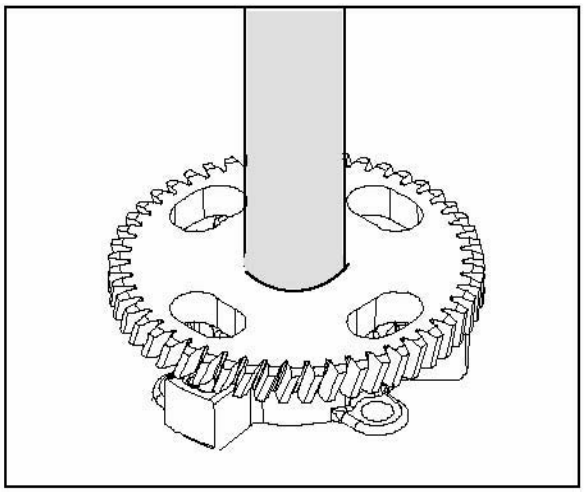
34. Press shaft into the new bearing..



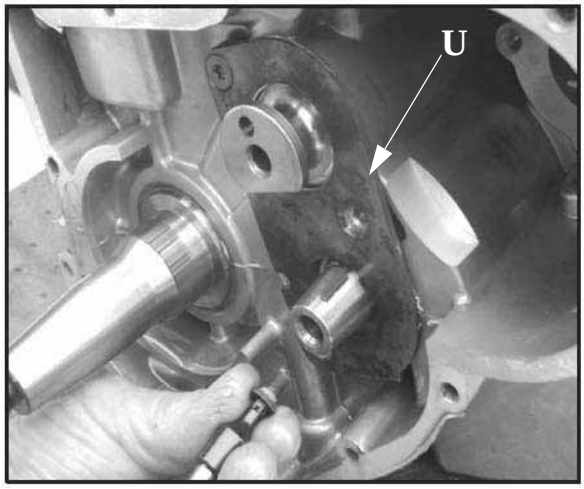
35. Press the bearing/shaft assembly using the bearing's outer race. Do not use the shaft to press the assembly into the housing, as bearing damage may result. Install retaining ring.



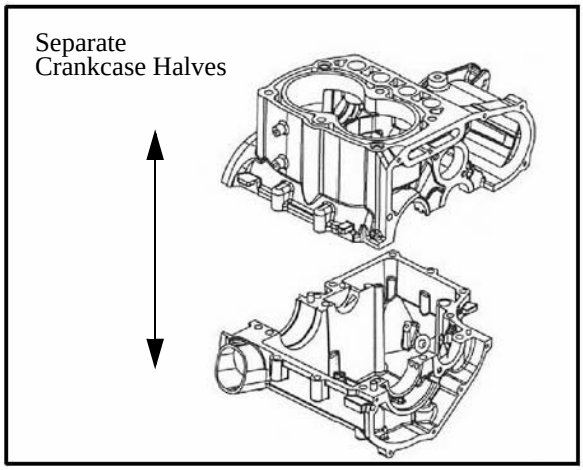
36. Press gear onto shaft while supporting the housing.



37. Remove thrust plate (U).

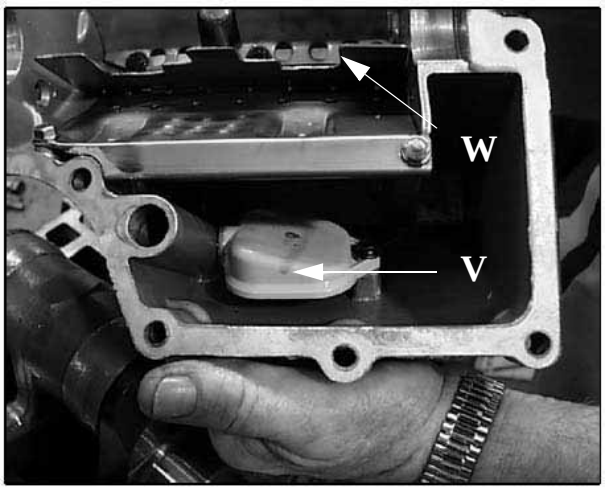


38. Remove PTO end engine mount Remove crankcase bolts. Tap on the reinforced areas on the cases using soft hammer. Carefully separate the two crankcase halves.

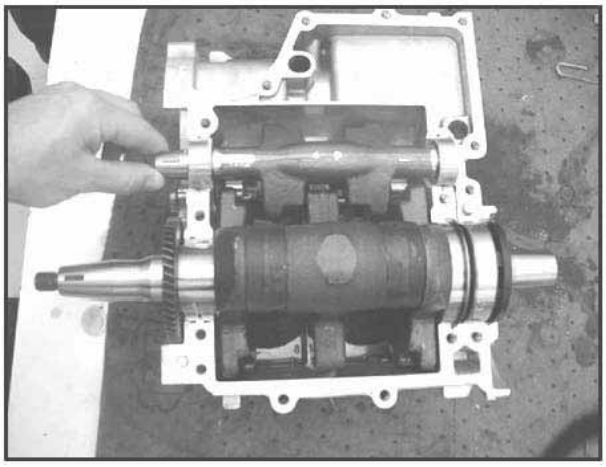


NOTE: Only remove the oil baffle if the baffle is damaged. When removing the oil baffle bolts, use a heat gun to heat the bolts and loosen the Loctite™. This will prevent any possible damage to the bolts or to the crankcase casting.

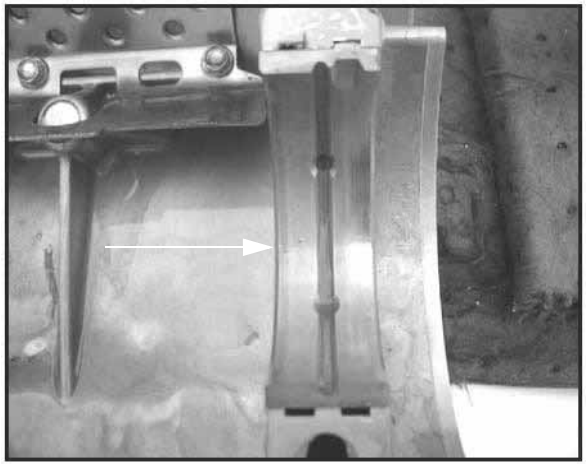
39. Remove and clean oil pick up (V) and oil baffle weldment (W).



40. Remove balance shaft and crankshaft.



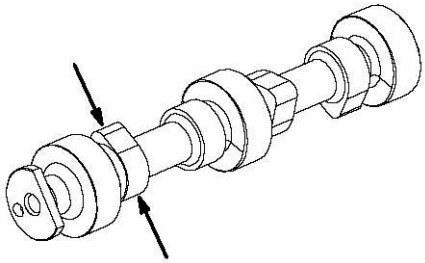
41. Remove and inspect crankshaft main journal bearings for abnormal wear. **It is recommended to replace the bearings anytime the engine is disassembled**.



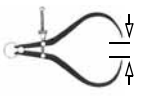
NOTE: Plain bearing clearances may be checked using a commercially available plasti-gauge material.

Camshaft Inspection

1. Thoroughly clean the cam shaft.
2. Visually inspect each cam lobe for wear, chafing or damage.
3. Measure height of each cam lobe using a micrometer. Compare to specification.



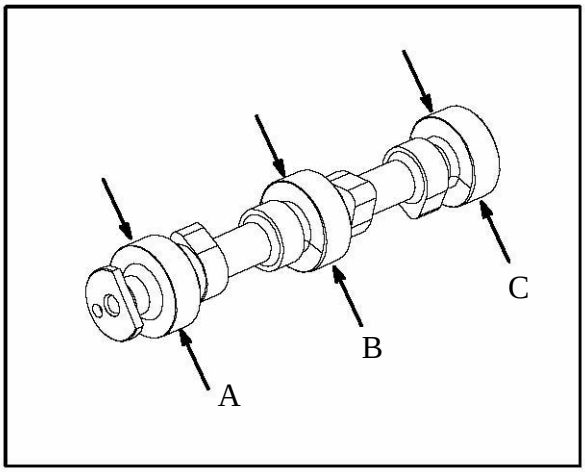
Cam Lobe Height



= In. / mm.

Cam Lobe Height
(Intake & Exhaust):
Std: 1.3334" (33.8674 mm)

4. Measure camshaft journal outside diameters (O.D.).



= In. / mm.

Camshaft Journal O.D. :
A. (Mag): 1.654" ± .00039" (42 ± .010 mm)
B. (Ctr.): 1.634" ± .00039" (41.50 ± .010 mm)
C. (PTO): 1.614" ± .00039" (41 ± .010 mm)

5. Measure ID of camshaft journal bores.

= In. / mm.

Camshaft Journal Bore I.D.:
(Mag): 1.656" ± 0.00039" (42.07± 0.010 mm)
(Ctr.) 1.637" ± 0.00039" (41.58 ± 0.010 mm)
(PTO) 1.617" ± 0.00039" (41.07 ± 0.010 mm)

6. Calculate oil clearance by subtracting journal O.D.'s from journal bore I.D.'s. Compare to specification.

= In. / mm.

Calculated Camshaft Oil Clearance:
Std: 0.0027" (.070mm)
Limit: .0039" (.10 mm)

NOTE: Replace camshaft if damaged or if any part is worn past the service limit.

NOTE: Replace engine block if camshaft journal bores are damaged or worn excessively.

ENGINE REASSEMBLY

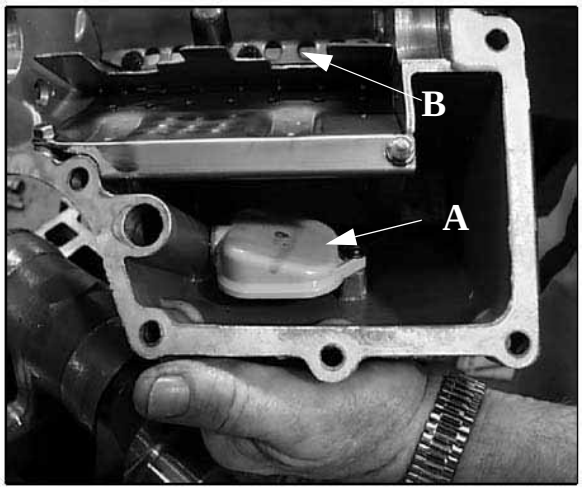
CRANKCASE REASSEMBLY

CAUTION

After any reassembly or rebuild, the engine must be primed using the Oil Priming Adapter (PU-45778) and a 3/4-full oil filter before initial start-up. Follow Steps 45-46 of this section to prime the engine and to help aid proper break-in.

NOTE: Before assembly, clean the bolts and bolt holes with Primer N (PN 2870585) to remove any debris. This will ensure proper sealing when installing bolts.

1. Install oil pick up (A), if removed. Torque to specification.



2. Install oil baffle weldment (B). Torque bolts to specification.

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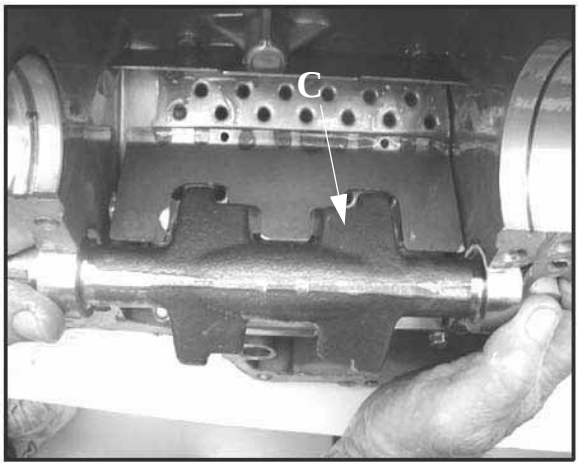
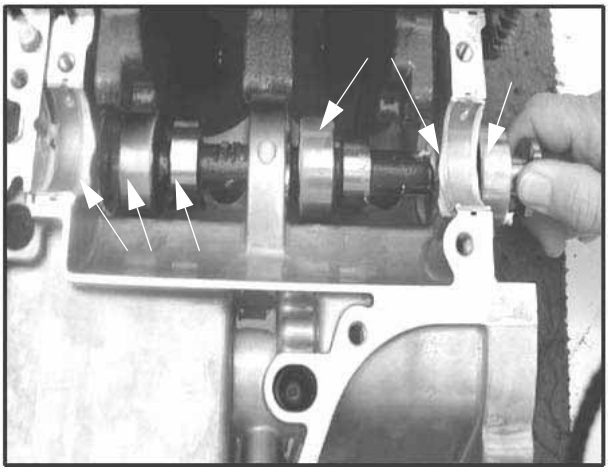
Oil Baffle Weldment &
Oil Pick Up Bolt Torque:
60 ± 6 in. lbs. (6.8 ± 0.68 Nm)

3. Install the balance shaft. Inspect balance shaft clearance (C) in both gearcase halves. Rotate balance shaft to ensure that there is clearance between it and oil baffle weldment.

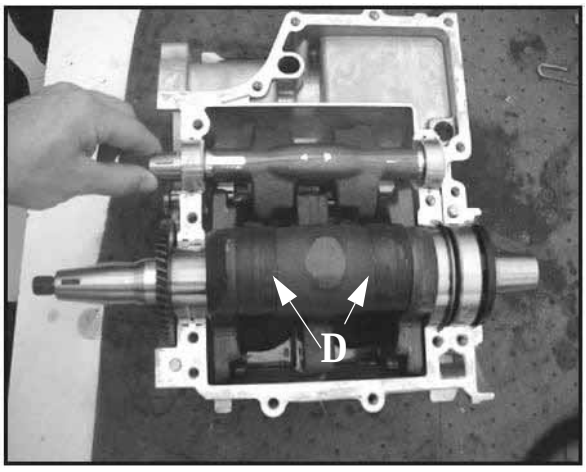
NOTE: Always install new balance shaft bearings.



4. Apply assembly lube to cam journals and balance shaft bearing surfaces of the MAG case halve. Install cam and balance shafts.

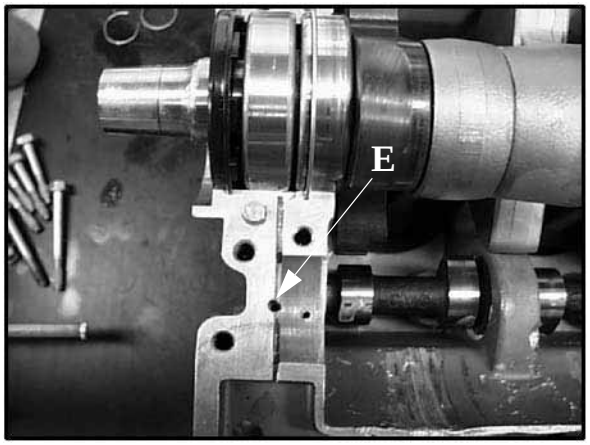


5. Install crankshaft assembly and apply engine oil to crank pins and rods (D). Apply assembly lube to the main journals and bearings.



6. Apply Crankcase Sealant **(PN 2871557)** to the top gearcase halve.

NOTE: Do not apply sealant to cam relief hole (E).



7. Assemble the crankcase halves. Apply LocTite™ 242 **(PN 2871949)** to the threads and pipe sealant to the bolt flanges. Torque bolts to specification following torque pattern at beginning of this chapter.

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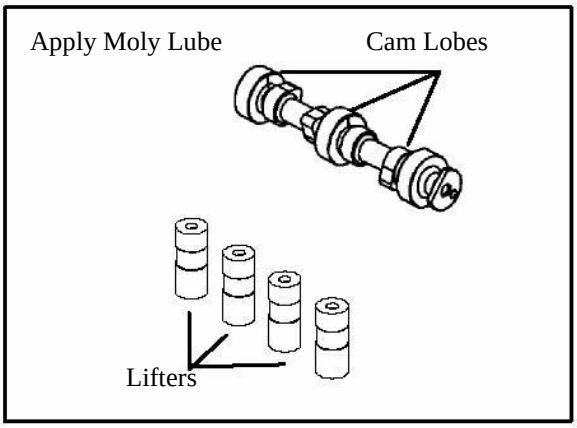
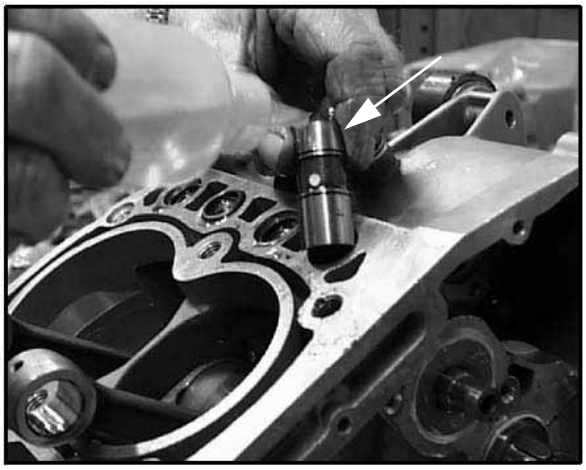
Crankcase Bolt Torque: **22 + 2 ft. lbs. (30 + 3 Nm)** Torque in sequence

8. Lubricate cam lobes and valve lifters with Moly Lube Grease.

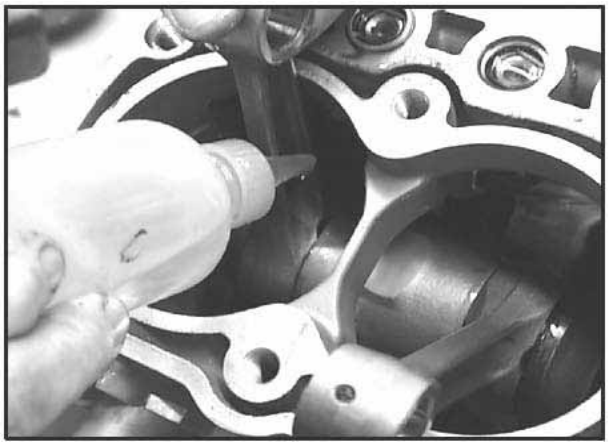


9. Lubricate lifters with engine oil and install in the original order as removed in disassembly. Apply Lubriplate or Moly Lube to the ends of the lifters.

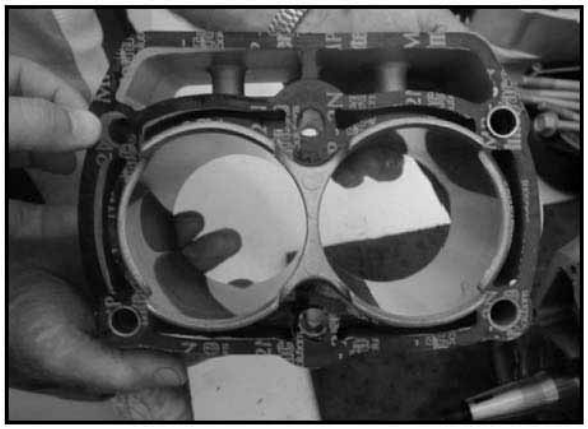
NOTE: Always replace the camshaft and lifters as a set.



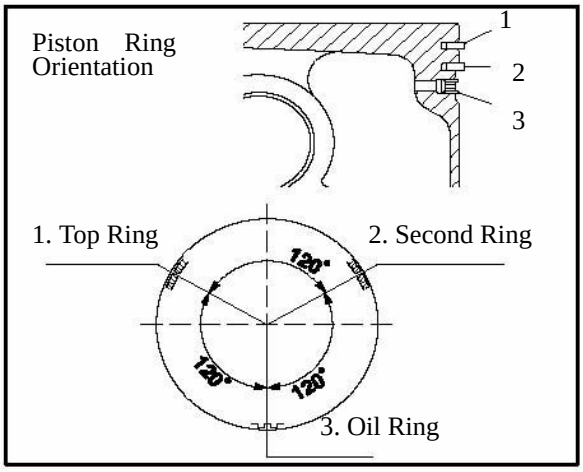
10. Lubricate connecting rods with 0W-40 engine oil.



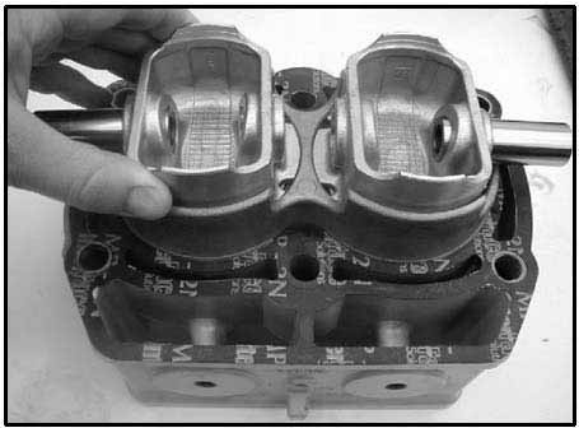
11. Install new cylinder gasket on crankcase. Align gasket on the dowel pins for proper gasket alignment.



12. Orientate the piston rings on the piston before installation into the cylinders. Set the gaps of the rings evenly 120° apart. (see illustration)

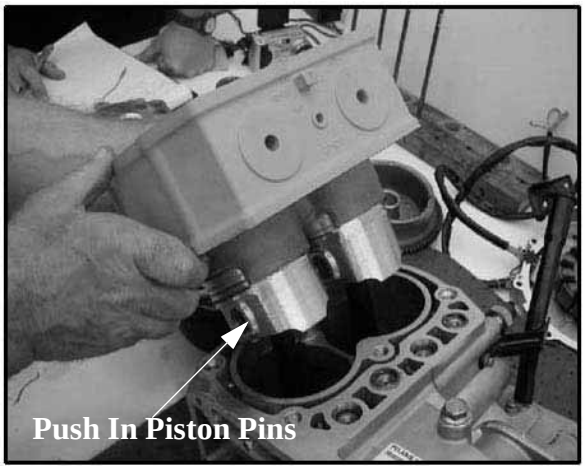


13. Install piston assemblies into cylinder aligning the piston pin holes, to ensure proper alignment of the pistons to the connecting rods upon assembly. Partially install the piston pins into the pistons.

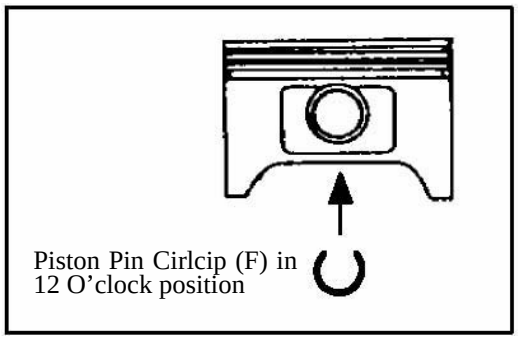


NOTE: To help align the pistons, slide a rod that is close to the same diameter as the wrist pin holes to properly align them in the cylinder.

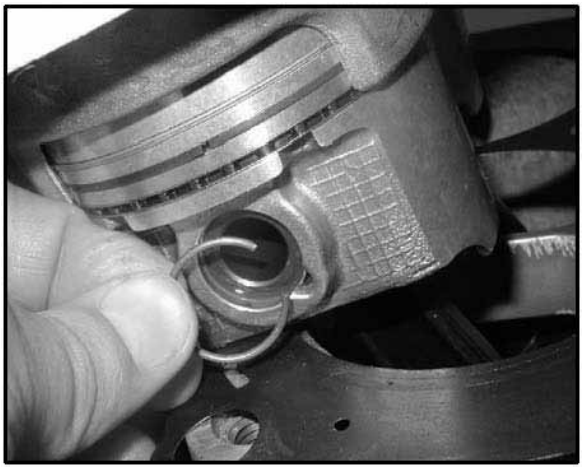
14. Position cylinder and piston assemblies onto the connecting rods and push the piston pins through the piston and connecting rods.



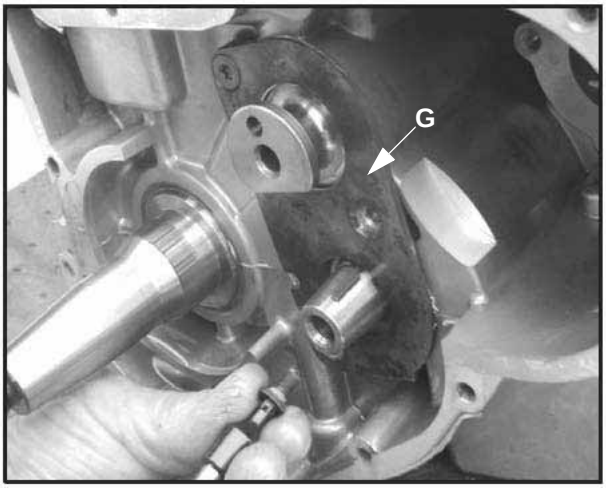
15. Install the piston pin circlips (F). The circlip ends should be installed at the 12 O'clock position.



NOTE: While installing in piston pins, cover all engine passages. The clip could fall into the engine during installation.



16. Install camshaft thrust plate (G) with new bolts. Torque bolts to specification.



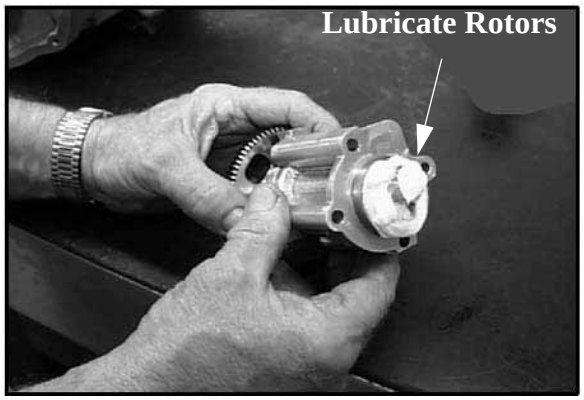
NOTE: New bolts have patch lock on the threads and do not require Loctite™.

= T
Thrust Plate Screw Torque: **115 ± 12 in.lbs. (13 ± 1.35 Nm)**

17. Assemble rotors as marked when disassembled. Use a cleaner to remove the marks previously made on the rotors.

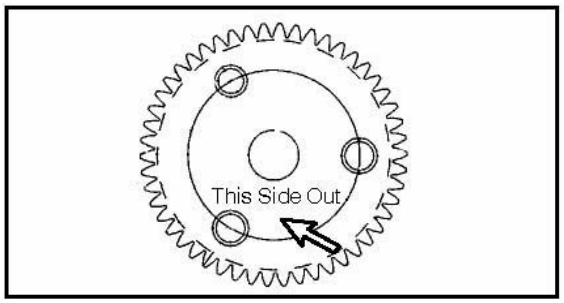
18. Apply assembly lube or oil to the rotors on the oil pump shaft.

NOTE: The application of lubrication aids in priming the oil pump during initial engine start up.



19. Align the bolt holes and install oil pump assembly into crankcase. Rotate the rotors in the housing during installation, as this checks for binding if new rotors are used.

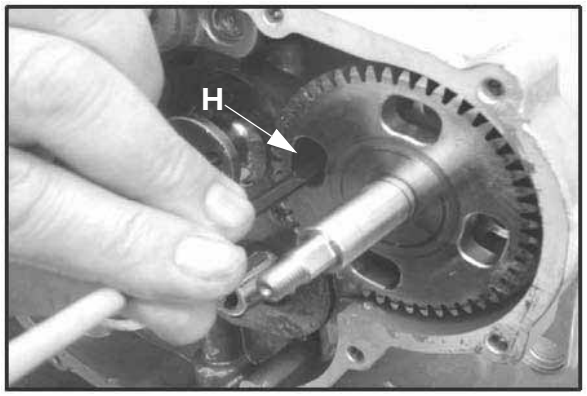
NOTE: For assembly of the gears, the cam gear and the crankshaft gear are stamped with "This Side Out." This indicates the side of the gear that faces outward or away from the case.



NOTE: Before assembly, clean the bolts and bolt holes with Primer N (PN 2870585) to remove any debris. This will ensure proper sealing when installing bolts and new Loctite™.

20. Install oil pump housing bolts (H). The new bolts contain patch lock, so Loctite™ is not needed on the new bolts. Torque bolts to specification and follow the torque sequence at beginning of the chapter.

NOTE: Occasionally spin the oil pump when installing bolts to check for binding of the rotors.



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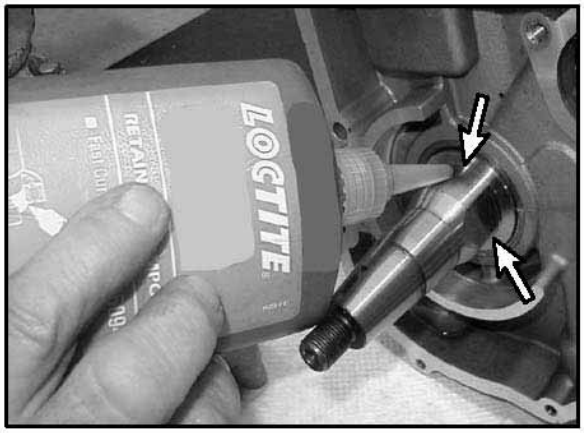
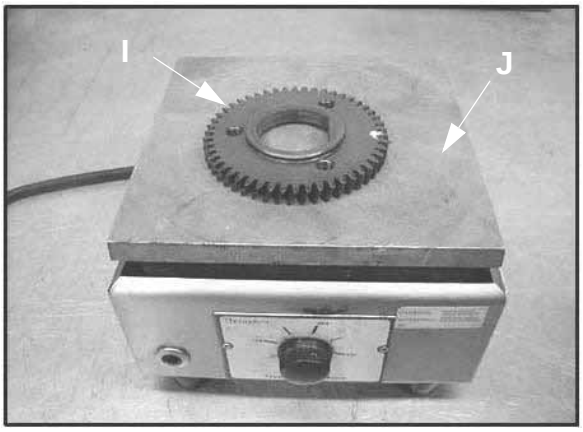
Oil Pump Bolt Torque: **84 ± 8 in.lbs. (9.50 ± 0.90 Nm)** * Torque in Sequence

21. Apply Loctite™ 242 (PN 2871949) to the crankshaft.



22. Before installing the crankshaft gear (I), heat the crankshaft gear to 250° F (121°C) on a hot plate (J).

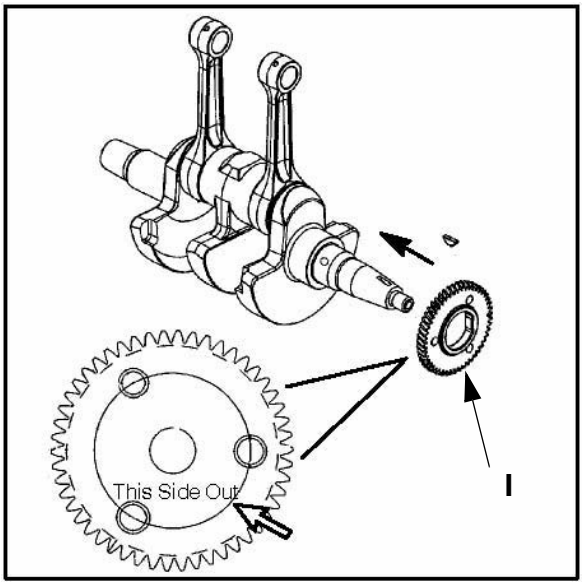


⚠ CAUTION

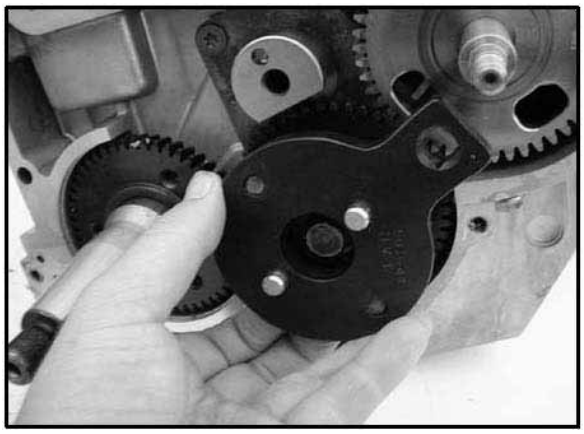
The crankshaft gear is extremely hot! Severe burns or injury can occur if the gear is not handled with extreme care and caution. Follow the procedure below to help ensure safety.

23. Use extreme caution when removing the crankshaft gear from the hot plate. Use a pair of pliers and leather gloves when handling the crankshaft gear.
24. Install the crankshaft gear (I) onto the crankshaft.

NOTE: For assembly of the gears, the cam gear and the crankshaft gear are stamped with This Side Out." This indicates the side of the gear that faces outward or away from the case.



25. Install counter balance shaft gear (J) with new key, aligning timing marks with crankshaft gear (I). Install washer and bolt. Use the Gear Holder **(PU-45838).** Torque to specification.



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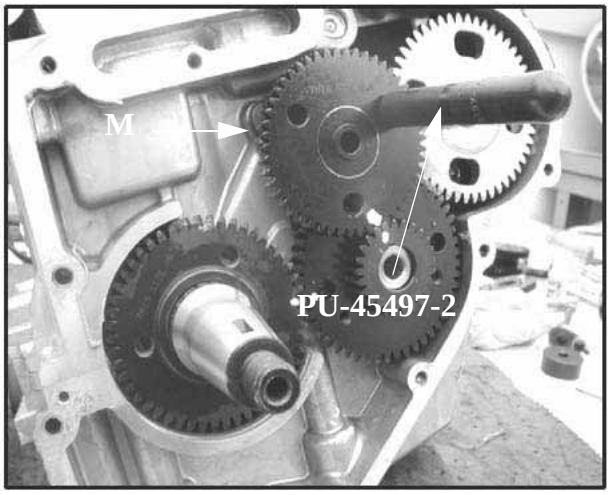
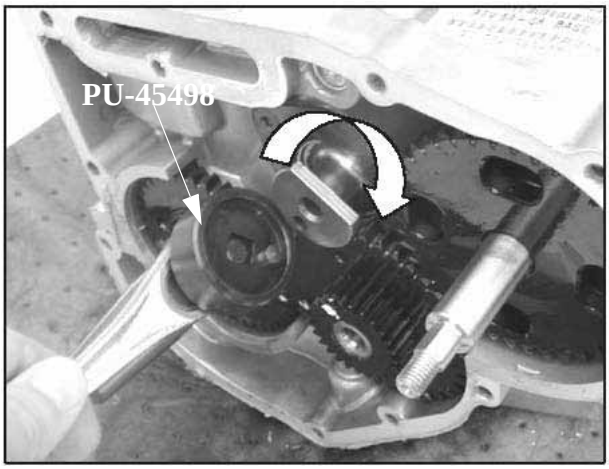
Balance Shaft Gear Bolt Torque:
22 ± 2 ft. lbs. (30 ± 3 Nm)

26. Use the Cam Gear Alignment Tool **(PU-45497-2)** to align the teeth of the cam gear (M). Install the cam gear (M) (with the Cam Gear Alignment Tool still in place) onto the camshaft. The timing marks on the camshaft gear should align with the keyway on the balance shaft gear.



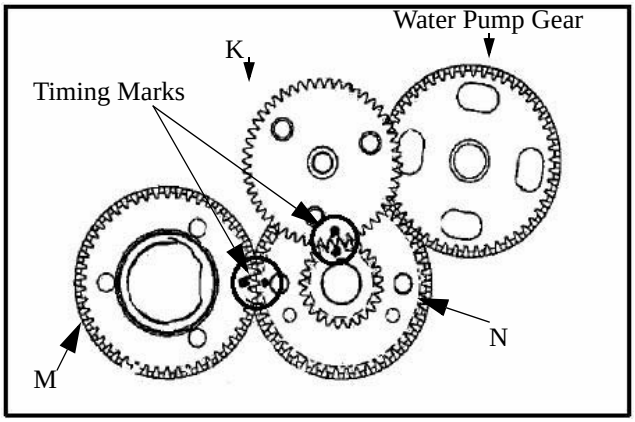
NOTE: If the timing mark on the camshaft gear does not align properly, remove the camshaft gear and tool. Use the Cam Spanner Wrench (PU-45498) to rotate the cam to the proper position.

NOTE: Cam Spanner Wrench (PU-45498) is only needed to rotate the camshaft when the entire valve train is assembled.

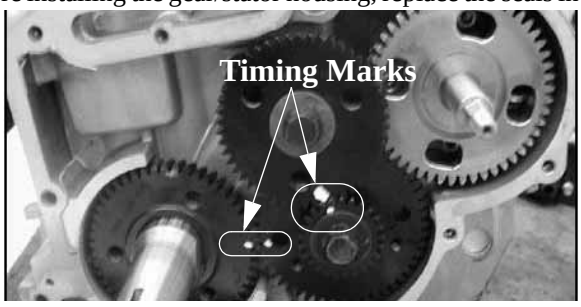


27. Reinstall the camshaft gear; so the timing marks are properly aligned. Install the washer and bolt. Torque to specification.

NOTE: Be sure all of the timing marks are properly aligned.



Before installing the gear/stator housing, replace the seals in the



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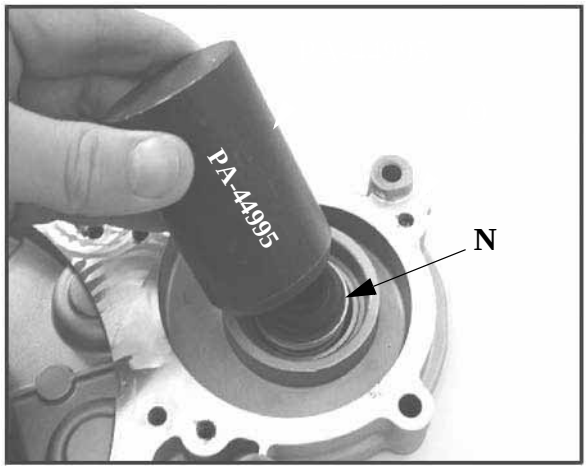
Counterbalance Gear and Camshaft Gear Bolt Torque: **22 ± 2 ft. lbs. (30 ± 3 Nm)**

cover. Install a new water pump seal (N) into the gear/stator housing (O). Use the Water Pump Mechanical Seal Installer (PA-44995) to properly install the seal to the correct depth in the cover.

Due to seal design and construction, seals MUST be

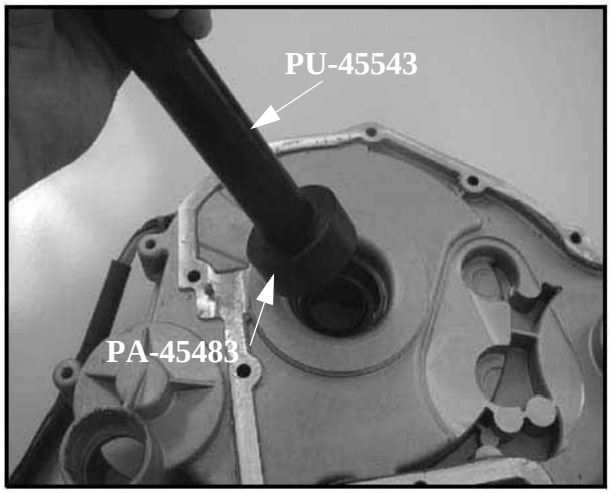


installed DRY (no lubricant) during assembly. Use of lubricants (oil, soapy water, etc.) will not allow the seal to wear-in and seal properly. Do not touch seal surface or allow seal surface to come in contact with contaminates during installation. Thoroughly clean parts, tools and hands before installation.

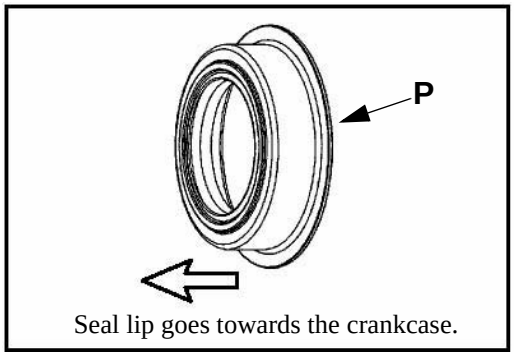
NOTE: To remove the water pump seal, the gear/ stator housing must be removed. The water pump seal cannot be removed or installed with the gear/ stator housing attached to the engine. Shaft damage will occur.

NOTE: Install the water pump seal (N) with the seal lip facing out (towards the crankcase). Use of a hydraulic press is recommended for this procedure.

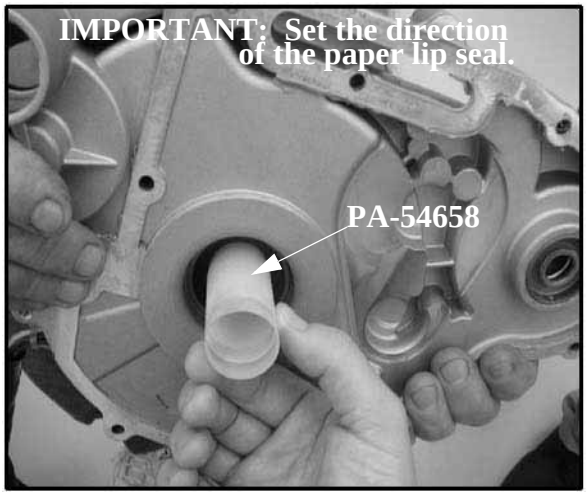
28. Install a new crankshaft seal (P) into the gear/stator housing cover (O). Use the Universal Driver Handle **(PU-45543)** and the Main Seal Installer **(PA-45483)** to seat the crankshaft seal into place.



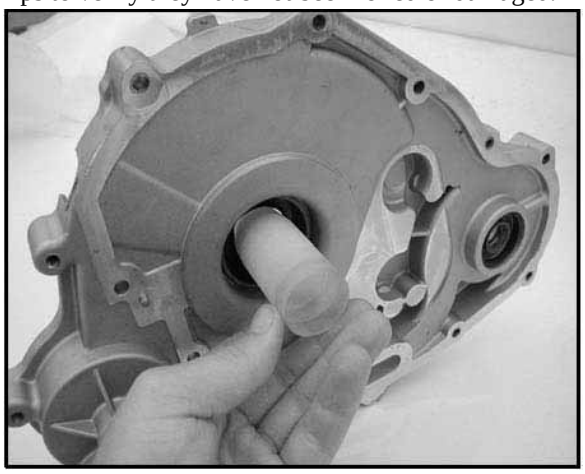
NOTE: Install the crankshaft seal (P) with the seal lip facing out (towards the crankcase).



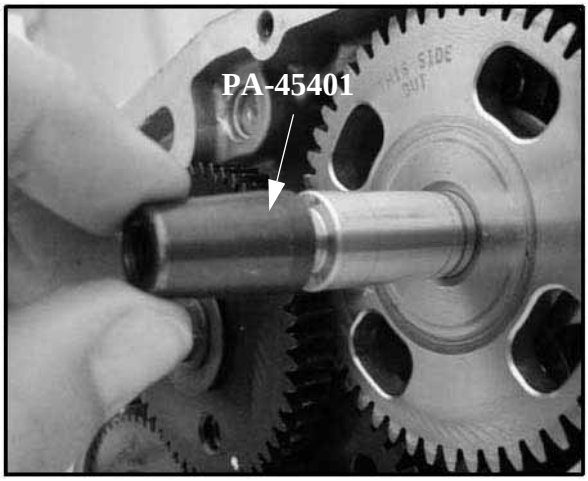
29. Once the crankshaft seal is installed into the gear/stator housing cover, set the direction of the paper lip by sliding the Main Crankshaft Seal Saver **(PA-45658)** into the crankshaft seal from the rubber lipped side to the paper lip side.(Back to Front) Remove the tool.



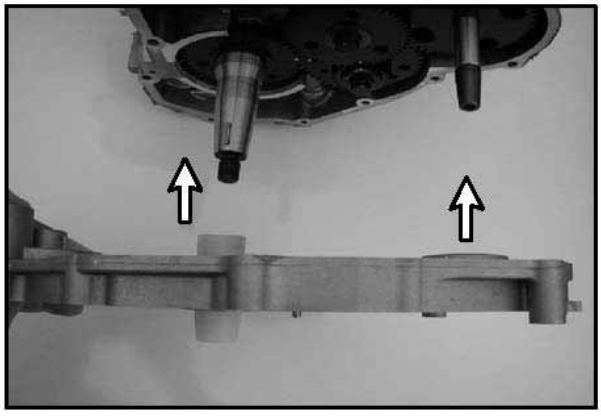
30. Carefully install the tapered end of the Crankshaft Seal Protection Tool **(PA-45658)** through the paper side of the crankshaft seal. (Back to Front) Leave the seal protector installed in the crankshaft seal. Check the crankshaft seal lips to verify they have not been rolled or damaged.



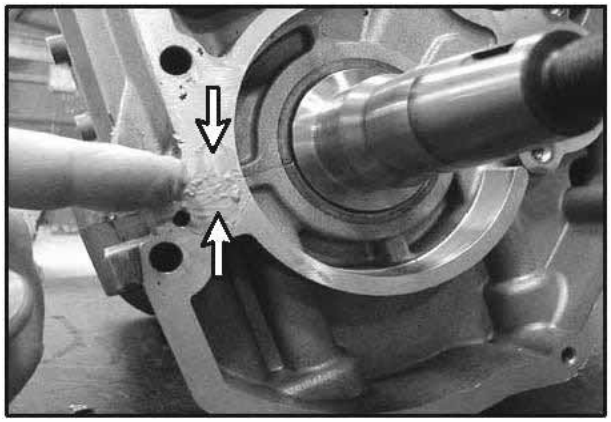
31. Before installing the gear/stator housing cover, install the Water Pump Seal Saver **(PA-45401)** onto the water pump shaft.

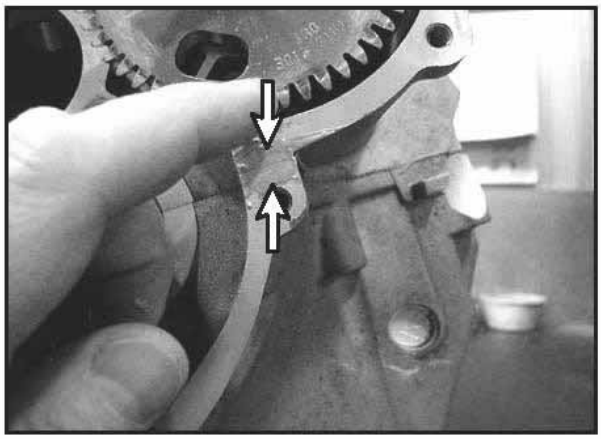


32. Install a NEW gasket to the gear/stator housing cover and crankcase. With the tools installed, carefully place the gear/stator housing cover over the protection tools.

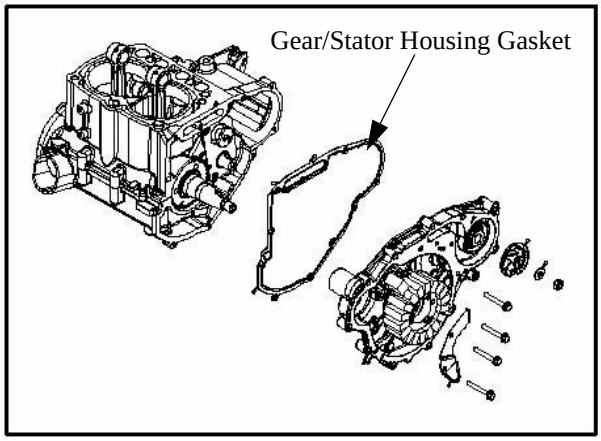


33. Apply Crankcase Sealant **(PN 2871557)** to the outside edges of the crankcase halves (See arrows), where the crankcases mate. (See photos below.) This helps to prevent coolant leakage.

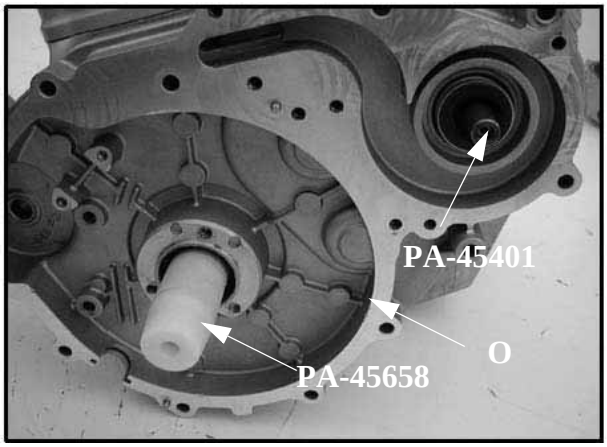




34. Install the gear/stator housing gasket onto he crankcase.



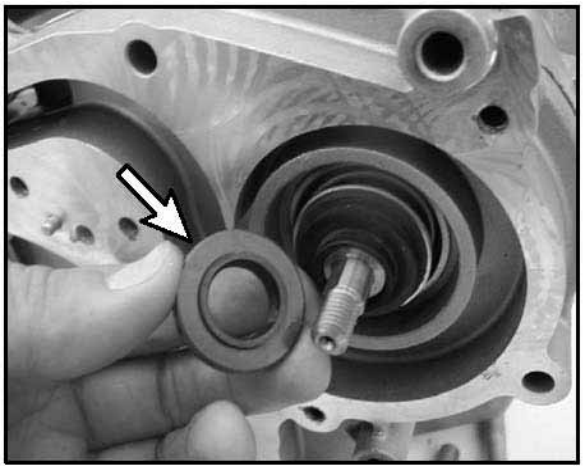
35. Secure the gear/stator housing cover (O) to the crankcase with the cover bolts. Torque bolts in proper sequence to specification. Remove seal protectors from the shaft ends once secure.



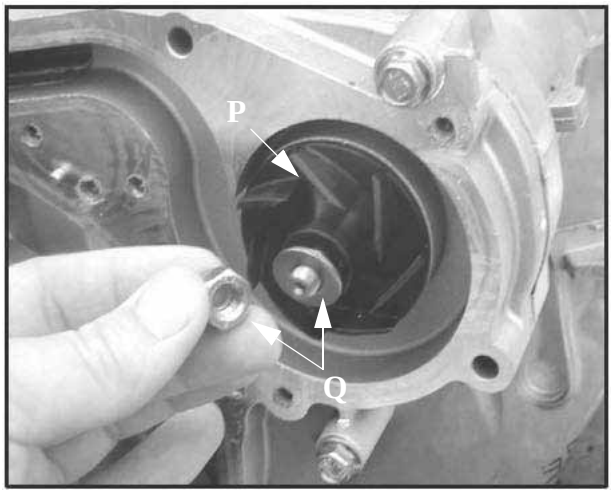
= T
Gear/Stator Housing Bolt Torque: **96 ± 3 in. lbs. (10.85 ± 0.35 Nm)** *Torque in proper sequence

NOTE: Before assembly, clean the bolts and bolt holes with Primer N (PN 2870585) to remove any debris. This will ensure proper sealing when installing bolts.

36. Install shaft seal with ceramic surface facing inward.

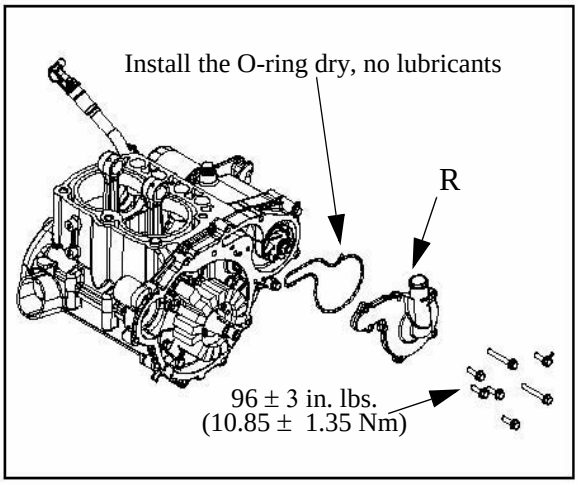


37. Install water pump impeller (P). **Secure the impeller with the washer and a new nylok nut (Q)**. Torque the nut to specification.



= T
Water Pump Impeller Nut Torque: **108 ± 6 in. lbs. (6.8 ± 0.68 Nm)**

38. Install water pump cover (R) with new O-ring seal. Torque bolts to specification in proper sequence (See front of this chapter).



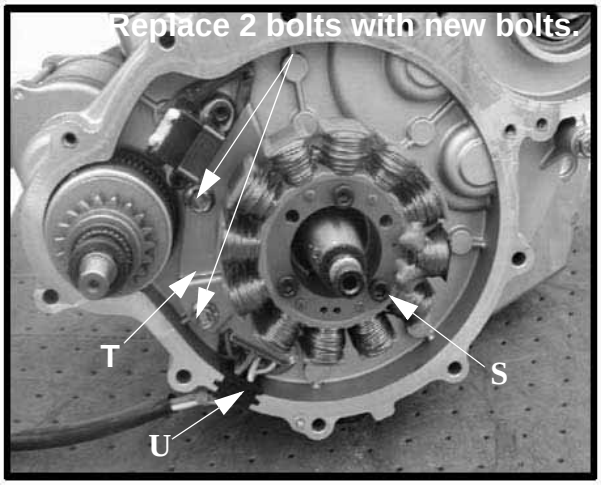
= T
Water Pump Housing Bolt Torque: **96 ± 3 in. lbs. (10.85 ± 0.35 Nm)** *Torque in proper sequence

39. Sparingly apply Starter Drive Grease **(PN 2871423)** to the starter drive. Install the starter bendix.

NOTE: There are thrust washers on both sides of starter drive.

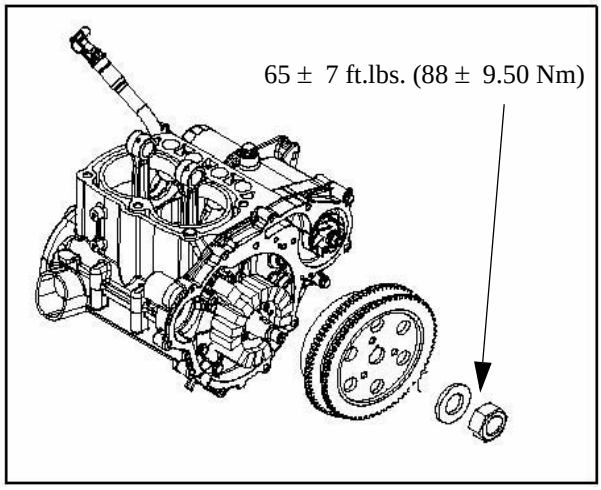
40. Install stator assembly (S) and bolts. Torque bolts to specification.
41. Install the wire hold down bracket (T). Install two new wire hold down bolts. New bolts contain patch-lock. Torque bolts to specification, following the proper bolt torque sequence. Coat the stator wire grommet (U) with Nyogel ™ Grease **(PN 2871329)**.

NOTE: Verify stator wires are routed properly under the wire hold down bracket.



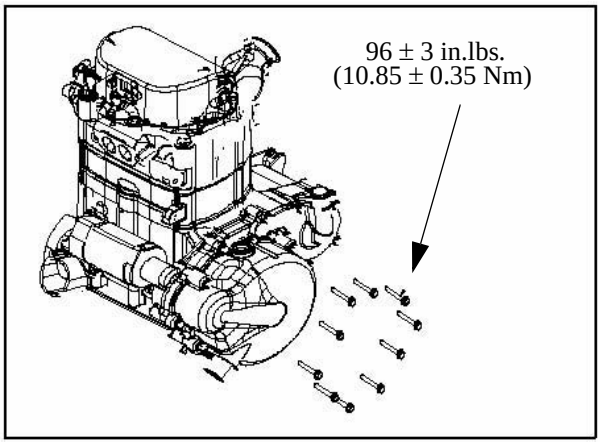
= T
Stator Assembly Bolt Torque: **96 ± 3 in.lbs. (10.85 ± 0.35 Nm)**

42. Install the flywheel, washer, nut, and key. Torque flywheel nut to specification.



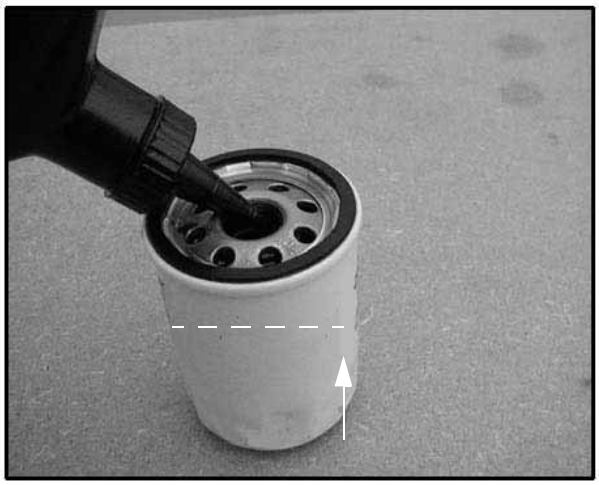
= T
Flywheel Nut Torque **65 ± 7 ft.lbs. (88 ± 9.50 Nm)**

43. Install stator housing with new o-rings. Torque the bolts to specification and follow proper bolt torque sequence at the beginning of this chapter.

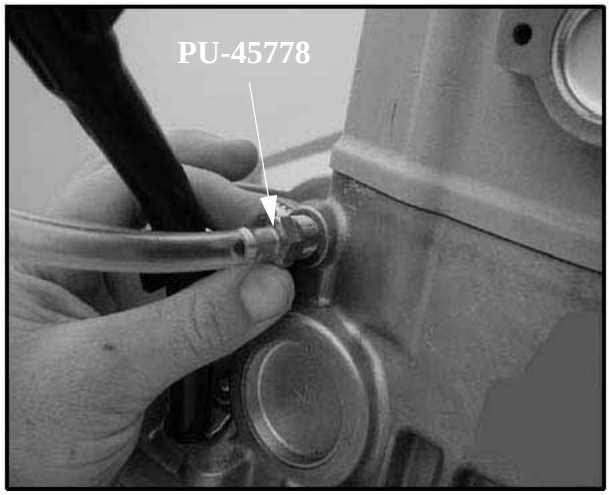


= T
Stator Housing Bolt Torque: **96 ± 3 in. lbs. (10.85 ± 0.35 Nm)**

44. After the engine is completely assembled and ready for installation, the engine must be properly primed with Polaris 0W-40 Synthetic Oil **(PN 2871281)**. Fill the oil filter three-quarters full with Polaris 0W-40 Synthetic Oil **(PN 2871281)**. Let the oil soak into the filter for 8-10 minutes. Install the filter onto the engine.



45. Remove primer plug from the engine. Install Oil System Priming Adapter **(PU-45778)** into the oil plug hole. Push 3-5 oz. (approx.) of Polaris 0W-40 into the adapter or until resistance is felt. Remove the adapter. Apply sealant to the plug threads. Install the plug and torque to specification.



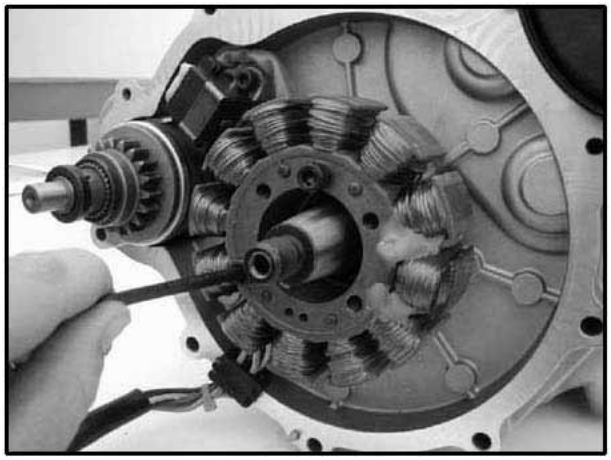
= T
Primer Plug Torque **18 ± 2 ft.lbs. (24.4 ± 2.71 Nm)**

CAUTION
After any reassembly or rebuild, the engine must be primed using the Oil Priming Adapter (PU-45778) and a 3/4-full oil filter before initial start-up. Follow the steps in this section to properly prime the engine and aid proper engine break in. Failure to perform this procedure may cause internal engine damage on initial start-up.

Flywheel / Stator Installation

NOTE: Before assembly, clean the bolts and bolt holes with Primer N (PN 2870585) to remove any debris. This will ensure proper sealing when installing bolts.

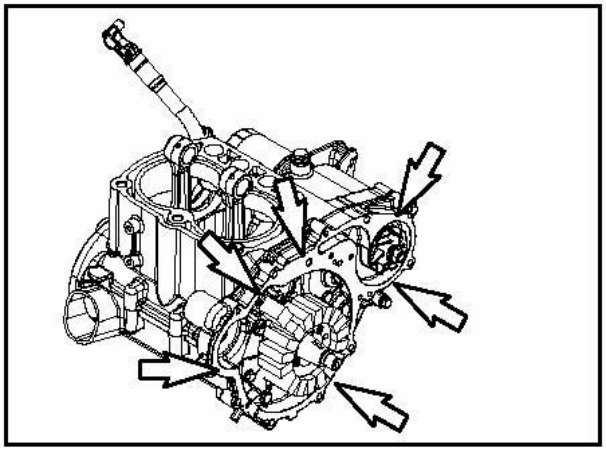
1. Carefully install the stator and trigger coil to the gear/stator housing cover. **Do not tap on the stator or the gear stator housing cover.** This may cause a leak in between the gear/stator housing cover and the crankcase.
2. Properly place the stator wires under the wire holddown and install the bolts. Inspect the bolts, if new bolts are needed, replace them with new bolts. New bolts contain patch lock, so Loctite™ is not needed. Torque bolts to specification**.**



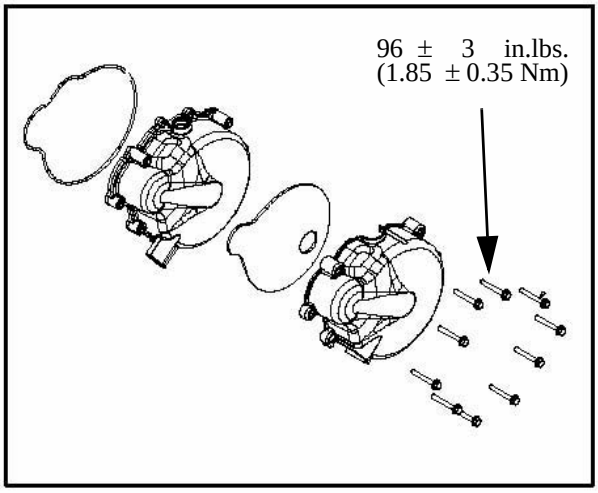
3. Install the starter bendix if removed.
4. Install woodruff key. Install the flywheel. Install the flywheel washer and nut. Torque the flywheel nut to specification**.**

= T
Flywheel Nut Torque: **65 ± 7 ft.lbs. (88 ± 9.5 Nm)**

5. Inspect the mating surface around the gear/stator housing cover and the crankcase for oil seepage. If there is seepage between the mating surfaces, then the gear/stator housing cover must be resealed. Clean the gearcase surfaces and reseal with a new gasket. Refer to the Lower Engine Disassembly section and the Lower Engine Assembly section for details. lnspect the areas pointed out in the illustration for possible oil seepage.



6. Install stator housing with new O-rings. Torque the bolts to specification. Follow bolt torque sequence on found at the beginning of this chapter.



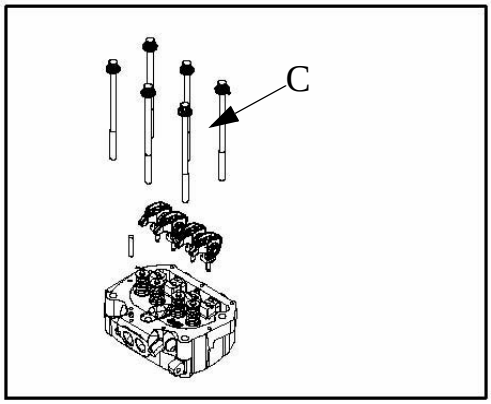
= T
Stator Housing Bolt Torque: **96 ± 3 in.lbs. (1.85 ± 0.35 Nm)** *Torque in Sequence

Cylinder Head Reassembly

NOTE: Before reassembly, clean the bolts and bolt holes with Primer N (PN 2870585) to remove any debris. This will ensure proper sealing when installing bolts.

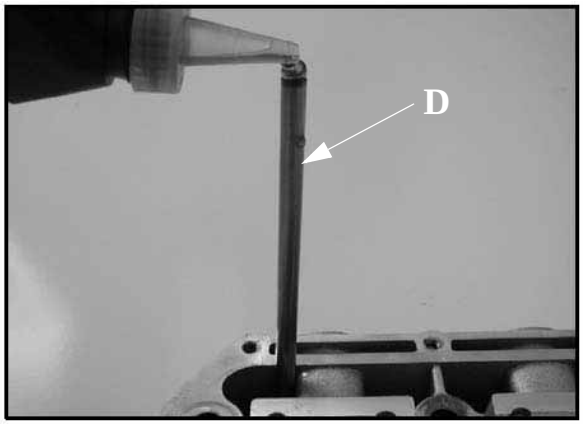
1. Install the head gasket (A) on the cylinder (B).

2. Install cylinder head on cylinder.
3. Lubricate threads and top of washers underside of bolt head with engine oil. Install head bolts (C) and torque to specification.

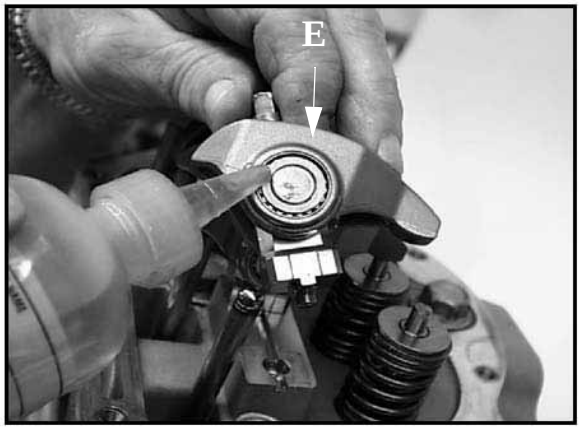


= T
Cylinder Head Bolt Torque: **Initial setting: 35± 4 ft. lbs. (47.5 ± 5.5 Nm)** **Allow to set for 1 minute, then turn additional 90° (1/4 turn)** ***Torque Bolts In Sequence**

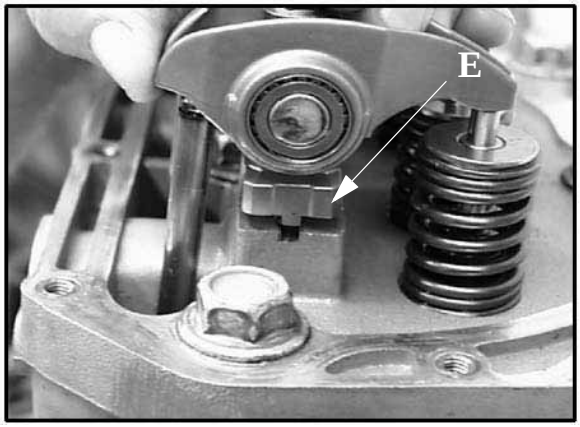
4. Lubricate push rods (D) and install into lifters.



5. Lubricate rockers (E) with engine oil.



6. Verify pushrods are engaged in lifters.
7. Install rockers. Be sure that tab of fulcrum (F) is seated in head stand-off. Torque bolts to specification.



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Rocker Arm Bolt Torque **22 + 2 ft. lbs. (30 ± 3 Nm)**

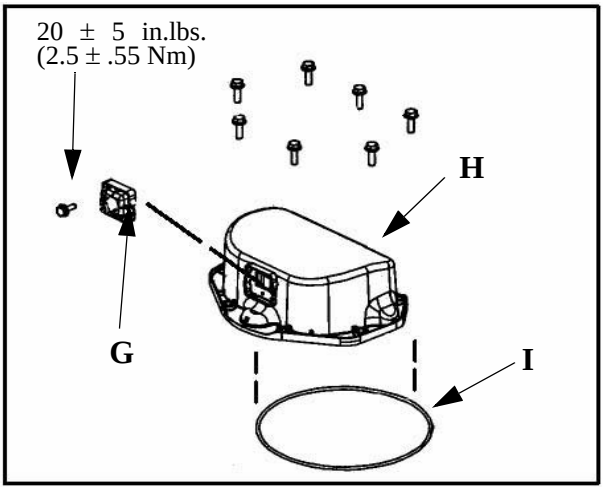
8. Install breather reed (G) into rocker cover (H). Lightly apply black RTV sealant to the outer edges of the breather reed. The reed has a tab and will assemble one-way only. Torque the breather bolts to specification.

= T
Breather Bolt Toque: **20 ± 5 in. lbs. (2.5± 0.55 Nm)**

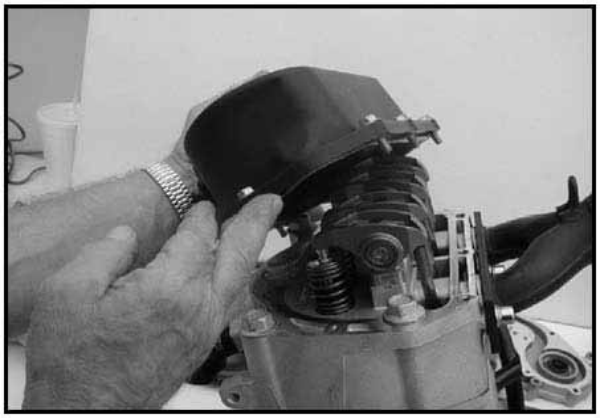
NOTE: When applying RTV, do not get any RTV inside the reed assembly.

9. Place a new seal (I) into the bottom of the cover. Be sure the seal is seated into the cover properly.

IMPORTANT: Before assembly, clean the bolts and bolt holes with Primer N (PN 2870585) to remove any debris. This will ensure proper sealing when installing bolts.

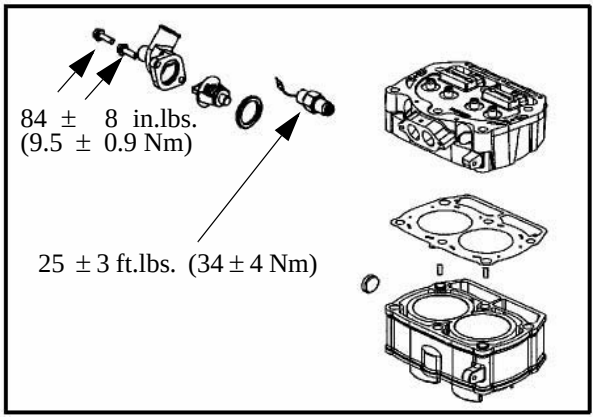


10. Install rocker cover. Torque bolts to specification.



= T
Rocker Cover Bolt Torque: **84 ± 8 in.lbs. (9.5 ± 0.9 Nm)** Torque in Sequence

11. Install thermostat (J), new O-ring, and thermostat housing. Torque to specification**.**



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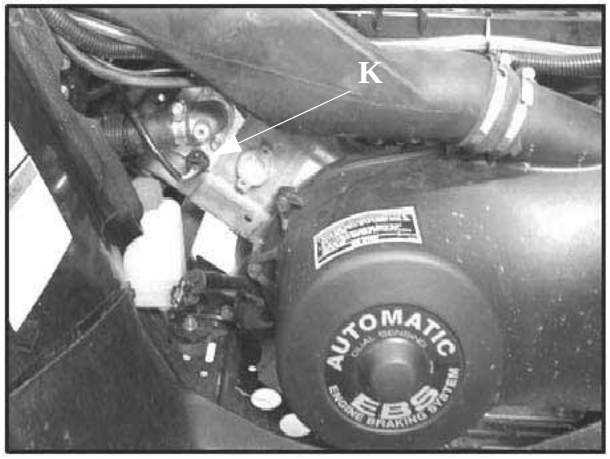
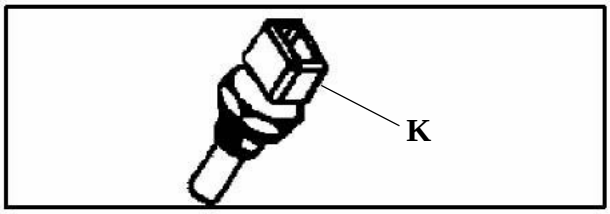
Thermostat Housing Bolt Torque: **84 ± 8 in. lbs. (9.5± 0.9 Nm)**

12. Install temperature sender (K) and torque to specification.





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Temperature Sender Torque: **25 ± 3 ft.lbs. (34 ± 4 Nm)**

TROUBLESHOOTING

Engine

Spark Plug Fouling

- Spark plug cap loose or faulty
- Incorrect spark plug heat range or gap
- PVT system calibrated incorrectly/ components worn or mis-adjusted
- Fuel quality poor (old) or octane too high
- Low compression
- Restricted exhaust
- Weak ignition (loose coil ground, faulty coil, stator, or ETC switch)
- ETC switch mis-adjusted
- Restricted air filter (main or pre-cleaner) or breather system
- Improperly assembled air intake system
- Restricted engine breather system
- Oil contaminated with fuel

Engine Turns Over But Fails To Start

- No fuel
- Dirt in fuel line or filter
- Fuel will not pass through fuel valve
- Fuel pump inoperative/restricted
- Tank vent plugged or pinched
- Engine flooded
- Low compression (high cylinder leakage)
- No spark (Spark plug fouled) ignition component failure

Engine Does Not Turn Over

- Dead battery
- Starter motor does not turn
- Engine seized, rusted, or mechanical failure

Engine Runs But Will Not Idle

- Restricted carburetor pilot system
- Low compression
- Crankcase breather restricted

Engine Idles But Will Not Accelerate

- Spark plug fouled/weak spark
- Broken throttle cable
- Obstruction in air intake
- Air box removed (reinstall all intake components)
- Incorrect or restricted carburetor jetting
- ETC switch limiting speed
- Reverse speed limiter limiting speed
- Incorrect ignition timing
- Restricted exhaust system
- Cam worn excessively

Engine Has Low Power

- Spark plug fouled
- Cylinder, piston, ring, or valve wear or damage (check compression)
- PVT not operating properly
- Restricted exhaust muffler
- Cam worn excessively

Piston Failure - Scoring

- Lack of lubrication
- Dirt entering engine through cracks in air filter or ducts
- Engine oil dirty or contaminated

Excessive Smoke and Carbon Buildup

- Excessive piston-to-cylinder clearance
- Wet sumping (Oil Level Too Full)
- Worn rings, piston, or cylinder
- Worn valve guides or seals
- Restricted breather
- Air filter dirty or contaminated

Piston Failure - Scoring

- Lack of lubrication
- Dirt entering engine through cracks in air filter or ducts
- Engine oil dirty or contaminated

Excessive Smoke and Carbon Buildup

- Excessive piston-to-cylinder clearance
- Wet sumping due to over-full crankcase
- Worn rings, piston, or cylinder
- Worn valve guides or seals
- Restricted breather
- Air filter dirty or contaminated

Low Compression

- Cylinder head gasket leak
- No valve clearance (cam wear)
- Cylinder or piston worn
- Piston rings worn, leaking, broken, or sticking
- Bent valve or stuck valve
- Valve spring broken or weak
- Valve not seating properly (bent or carbon accumulated on sealing surface)
- Rocker arm sticking

Backfiring

- ETC or speed limiter system malfunction
- Fouled spark plug or incorrect plug or plug gap
- Exhaust system air leaks
- Exhaust system air leaks
- Ignition system faulty: Spark plug cap cracked/broken, Ignition coil faulty, Ignition or kill switch circuit faulty, Ignition poor connections in ignition system
- n timing incorrect, Sheared flywheel key
- Valve sticking

Cooling System

Overheating

- Low coolant level
- Air in cooling system
- Wrong type/mix of coolant
- Faulty pressure cap or system leaks
- Restricted system (mud or debris in radiator fins causing restriction to air flow, passages blocked in radiator, lines, pump, or water jacket, accident damage)
- Lean mixture (restricted jets, vents, fuel pump or fuel valve)
- Fuel pump output weak
- Electrical malfunction
- Water pump failure/ Loose impeller
- Thermistor failure
- Cooling fan inoperative or turning too slowly (perform current draw test)
- Ignition timing mis-adjusted
- Low oil level
- Spark plug incorrect heat range
- Faulty hot light circuit
- Thermostat stuck closed or not opening completely

Temperature Too Low

- Thermostat stuck open

Leak at Water Pump Weep Hole

- Faulty water pump mechanical seal (coolant leak)
- Faulty pump shaft oil seal (oil leak)

800 EFI EXHAUST SYSTEM (DELUXE)

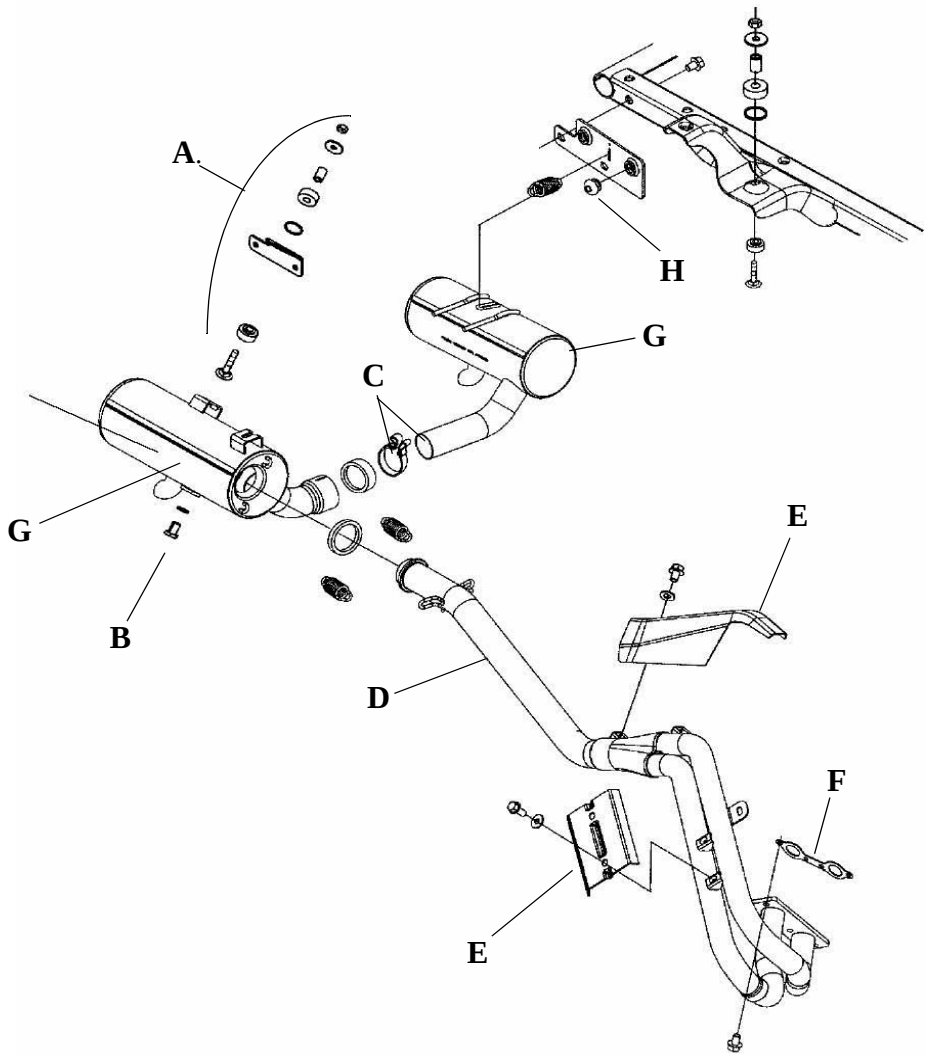
Dual Exhaust Layout

The dual exhaust canisters on select Polaris 800 EFIs are silver ceramic coated. To maintain a beautiful finish and prevent corrosion, periodic maintenance is required. **DO NOT** use caustic chemicals to clean, as they may damage the finish.

1. Wash any accumulated mud or debris from the canisters with a soft brush and soapy water.
2. Use a cleaner, such as HPC HiPerWash™ to clean away any remaining grime, salts or oils.
3. If the canisters are stained from oils or other fluids, use fine steel wool with HPC Liquid Buff™ Cleaner and Polish to remove the stain.
4. After removing the stains, polish using Liquid Buff™ and a soft cloth.
5. Repeat this procedure as often as desired to maintain the canister's finish.

NOTE: Silencer removal requires replacement of the silencer grommets, item H, as they become damaged during removal.

A. Mounting Hardware
B. Clean Out Plug
C. Exhaust Seal/Clamp
D. Dual Exhaust Pipe
E. Exhaust Shields
F. Gasket
G. Exhaust Silencers
H. Silencer Grommets



NOTES

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GENERAL INFORMATION

⚠ WARNING

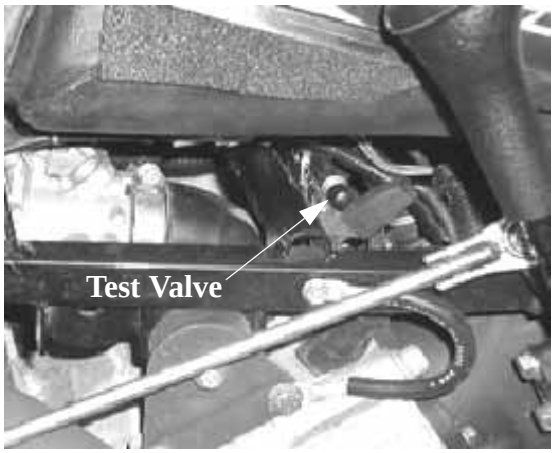
* Gasoline is extremely flammable and explosive under certain conditions.
* EFI components are under high pressure. Verify system pressure has been relieved before disassembly.
* Never drain the fuel system when the engine is hot. Severe burns may result .
* Do not overfill the tank. The tank is at full capacity when the fuel reaches the bottom of the filler neck. Leave room for expansion of fuel.
* 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.
* Do not smoke or allow open flames or sparks in or near the area where refueling is performed or where gasoline is stored.
* If you get gasoline in your eyes or if you should swallowgasoline,seekmedicalattentionimmediately.
* If you spill gasoline on your skin or clothing, immediately wash with soap and water and change clothing.
* Always stop the engine and refuel outdoors or in a well ventilated area.

Special Tools

Table 4-1:

PART NUMBER	TOOL DESCRIPTION
PU-47063	Polaris EFI Diagnostic Software (Digital Wrench™)
PU-43506	Fuel Pressure Test Kit
2201519	Throttle Position Sensor Tester
PU-47315	Throttle Body Adjustment Screwdriver (small "D" shape)

IMPORTANT: The EFI fuel system remains under high pressure, even when the engine is not running. Before attempting to service any part of the fuel system, the pressure must be relieved. The pressure adapter has an integrated relief valve. Connect to the test valve and release the pressure.



Polaris EFI Diagnostic Software (Digital Wrench™) - PU-47063

This dealer-only software installs on laptop computers equipped with a CD drive and serial port connection, and is designed to replace multiple shop tools often used to test EFI components. It also includes step-by-step diagnostic procedures to aid technician repair and troubleshooting.

Throttle Position Sensor Tester - PU-47082

This tester allows the use of a digital multi-meter to test TPS function as well perform initialization procedures.

Throttle Body Adjustment Screwdriver - PU-47315

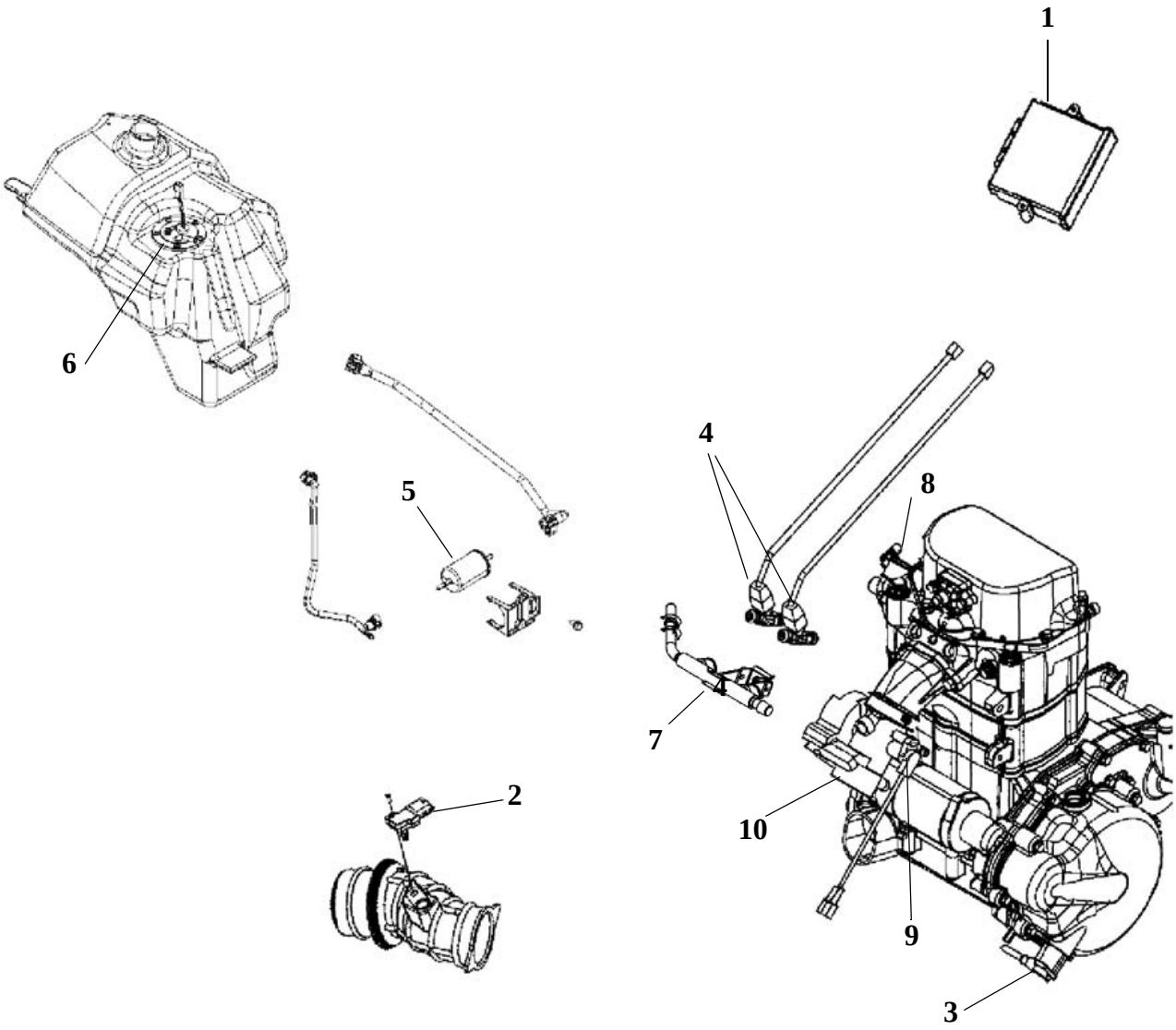
This tool has a special 'D' shaped end for adjusting the throttle stop screw during a TPS initialization procedure.

Service Notes

- For more convenient and accurate testing of EFI components, it is recommended dealers utilize the Polaris Diagnostic Software (dealer only), or testing may be done manually using the procedures provided.
- **80% of all EFI problems are caused by wiring harness connections.**
- For the purpose of troubleshooting difficult running issues, a known-good ECU from another Polaris ATV EFI of the same model may be used without damaging system or engine components.
- Never attempt to service any fuel system component while engine is running or ignition switch is "on."
- Cleanliness is essential and must be maintained at all times when servicing or working on the EFI system. Dirt, even in small quantities, can cause significant problems.
- Do not use compressed air if the system is open. Cover any parts removed and wrap any open joints with plastic if they will remain open for any length of time. New parts should be removed from their protective packaging just prior to installation.
- Clean any connector before opening to prevent dirt from entering the system.
- Although every precaution has been taken to prevent water intrusion failure, avoid direct water or spray contact with system components.
- Do not disconnect or reconnect the wiring harness connector to the control unit or any individual components with the ignition "on." This can send a damaging voltage spike through the ECU.
- Do not allow the battery cables to touch opposing terminals. When connecting battery cables attach the positive (+) cable to positive (+) battery terminal first, followed by negative (-) cable to negative (-) battery terminal.
- Never start the engine when the cables are loose or poorly connected to the battery terminals.
- Never disconnect battery while engine is running.
- Never use a battery boost-pack to start the engine.
- Do not charge battery with key switch "on."
- Always disconnect negative (-) battery cable lead before charging battery.
- Always unplug ECU from the wire harness before performing any welding on the ATV.

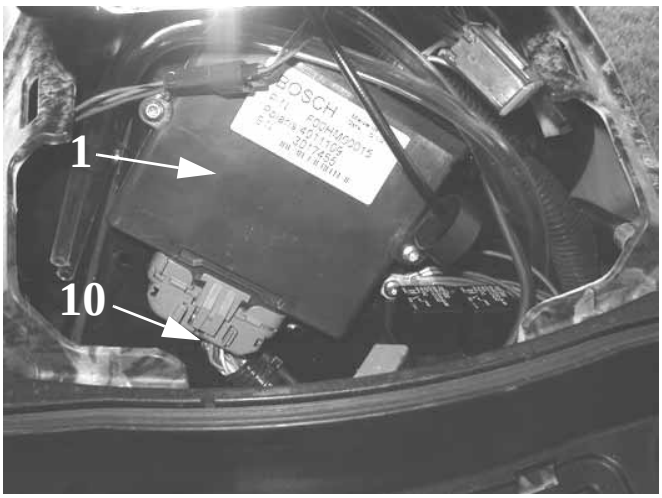
EFI System Exploded View

1. Electronic Control Unit (ECU)
2. Intake Air Temperature/Barometric Air Pressure Sensor (T-BAP)
3. Crankshaft Position Sensor (CPS)
4. Fuel Injectors
5. Fuel Filter
6. Fuel Pump/Tank Assy.
7 Fuel Rail
8. Engine Coolant Sensor (ECT)
9. Throttle Position Sensor (TPS)
10. Throttle Body

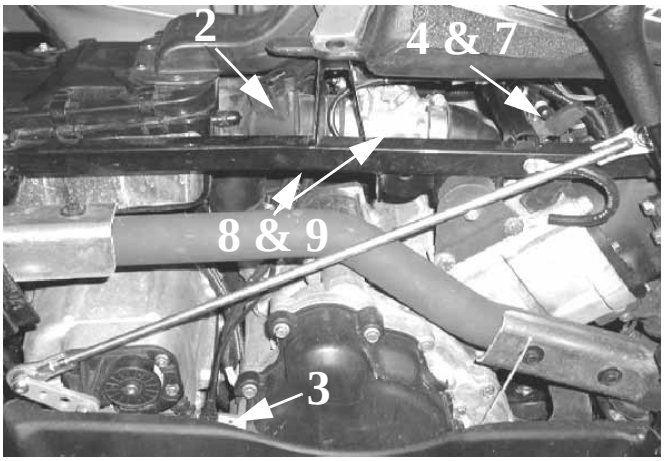


EFI System Component Locations

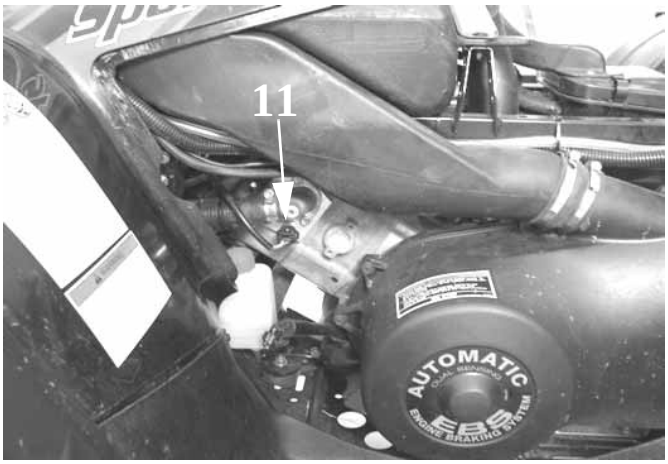
1. Electronic Control Unit (ECU)



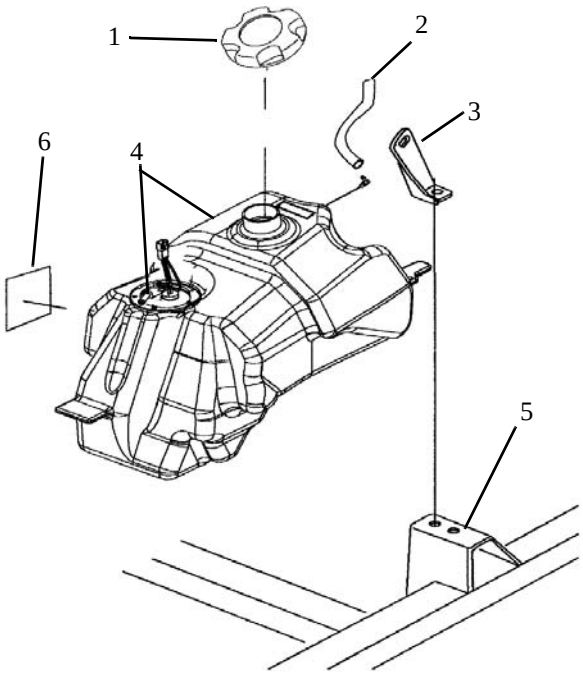
2. Intake Air Temperature and Barometric Air Pressure Sensor (T-BAP)
3. Crankshaft Position Sensor (CPS)
4. Fuel Injectors
5. 2 Fuel Filters (1 located in tank, 1 under front cab cover not pictured)
6. Fuel Pump / Regulator / Gauge Sender Assembly (located In tank as an assembly
7. Fuel Rail
8. Throttle Position Sensor (TPS)
9. Throttle Body
10. Wire Harness Assembly



11. Engine Coolant Temperature Sensor (ECT)

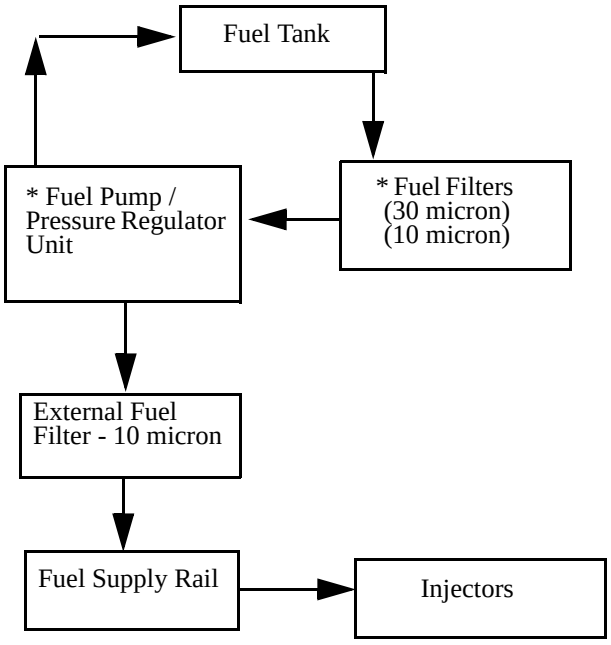


Fuel Tank Assembly



1. Cap 2. Tank Vent 3. Tank Mount 4. Fuel Pump/ Tank Assembly 5. Frame 6. Protective Foil

Fuel Flow



* component located in fuel tank

Fuel Lines - Quick Connect

Sportsman 700/800 EFI models use quick connect fuel lines. Refer to the steps below for fuel line removal.

1. Place a shop towel around the fuel line to catch any dripping fuel. Squeeze the connector tabs together and push the locking slide back.
2. Pull on the fuel line for removal.
3. To install the line, verify the connector and fuel tank nipple are clean and free of debris.
4. Snap the fuel line back over the nipple and slide the locking mechanism back into place. Verify the connector tabs snap back into place.

ELECTRONIC FUEL INJECTION

Principal Components

The Electronic Fuel Injection (EFI) system is a complete engine fuel and ignition management design. This system includes the following principal components:

- Fuel Pump
- Fuel Rail
- Fuel Line(s)
- Fuel Filter(s)
- Fuel Injectors
- Pressure Regulator
- Throttle Body / Intake Manifold
- Engine Control Unit (ECU)
- Ignition Coils
- Coolant Temperature Sensor
- Throttle Position Sensor (TPS)
- Crankshaft Position Sensor (CPS)
- Intake Air Temperature and Barometric Air Pressure Sensor (T-BAP)
- Wire Harness Assembly
- Check Engine Light (MIL)

EFI Operation Overview

The EFI system is designed to provide peak engine performance with optimum fuel efficiency and lowest possible emissions. The ignition and injection functions are electronically controlled, monitored and continually corrected during operation to maintain peak performance.

The central component of the system is the Bosch Engine Control Unit (ECU) which manages system operation, determining the best combination of fuel mixture and ignition timing for the current operating conditions.

An in-tank electric fuel pump is used to move fuel from the tank through the fuel line and in-line fuel filter. The in-tank fuel pressure regulator maintains a system operating pressure of 39 psi and returns any excess fuel to the tank. At the engine, fuel is fed through the fuel rail and into the injectors, which inject into the intake ports. The ECU controls the amount of fuel by varying the length of time that the injectors are "on." This can range from 1.5-8.0 milliseconds depending on fuel requirements. The controlled injection of the fuel occurs each crankshaft revolution, or twice for each 4-stroke cycle. One-half the total amount of fuel needed for one firing of a cylinder is injected during each injection. When the intake valve opens, the fuel/air mixture is drawn into the combustion chamber, ignited. and burned.

The ECU controls the amount of fuel being injected and the ignition timing by monitoring the primary sensor signals for air temperature, barometric air pressure, engine temperature, speed (RPM), and throttle position (load). These primary signals are compared to the programming in the ECU computer chip, and the ECU adjusts the fuel delivery and ignition timing to match the values.

During operation the ECU has the ability to re-adjust temporarily, providing compensation for changes in overall engine condition and operating environment, so it will be able to maintain the ideal air/fuel ratio.

During certain operating periods such as cold starts, warm up, acceleration, etc., a richer air/fuel ratio is automatically calculated by the ECU.

Initial Priming / Starting Procedure

NOTE: The Injection system must be purged of all air prior to the initial start up, and/or any time the system has been disassembled.

If the EFI system is completely empty of fuel or has been disassembled and repaired:

1. Cycle the key switch from “OFF” to “ON” 6 times, waiting for approximately 3 seconds at each “ON” cycle to allow the fuel pump to cycle and shut down.
2. Once step 1 is completed, turn the key switch to “START” until the engine starts or 5 seconds has passed.
3. If the engine failed to start, repeat step 1 for 2 more cycles and attempt to start the engine.

If the engine fails to start, a problem may still exist, and should be diagnosed.

NOTE: Accurate testing of EFI components is recommended utilizing the Polaris Diagnostic Software (dealer only).

ELECTRONIC CONTROL UNIT (ECU)

Operation Overview

The ECU is the brain or central processing computer of the entire EFI fuel/ignition management system. During operation, sensors continuously gather data which is relayed through the wiring harness to input circuits within the ECU. Signals to the ECU include: ignition (on/off), crankshaft position and speed (RPM), throttle position, engine coolant temperature, air temperature, intake manifold air pressure and battery voltage. The ECU compares the input signals to the programmed maps in its memory and determines the appropriate fuel and spark requirements for the immediate operating conditions. The ECU then sends output signals to set the injector duration and ignition timing.

During operation, the ECU continually performs a diagnostic check of itself, each of the sensors, and system performance. If a fault is detected, the ECU turns on the Malfunction Indicator Light (MIL) (Check Engine Light) on the speedometer and stores the fault code in its fault memory. Depending on the significance or severity of the fault, normal operation may continue, or "Fail-Safe" operation (slowed speed, richer running) may be initiated. A technician can access the stored fault code using a “blink code” diagnosis flashed out through the Instrument cluster. The ECU requires a minimum of 7.0 volts to operate. The memory in the ECU is operational the moment the battery cables are connected.

To prevent engine over-speed and possible failure, a rev-limiting feature is programmed into the ECU. If the maximum RPM limit (6500) is exceeded, the ECU suppresses the injection signals, cutting off the fuel flow. This process repeats it self in rapid succession, limiting operation to the preset maximum.

Sportsman 700 / 800 EFI RPM Limit:

Hard Limit - Injector suppression occurs

- High: 6500
- Low: 6500
- Neutral: 6500
- Reverse: 6500
- Park: 6500

Soft Limit - Timing suppression occurs

- High: None
- Low: 6300
- Neutral: 6300
- Reverse: 6300
- Park: 6300

ECU Service

Never attempt to disassemble the ECU. It is sealed to prevent damage to internal components. Warranty is void if the case is opened or tampered with in any way.

All operating and control functions within the ECU are pre-set. No internal servicing or readjustment may be performed. If a problem is encountered, and you determine the ECU to be faulty, contact the Polaris Service Department for specific handling instructions. Do not replace the ECU without factory authorization.

The relationship between the ECU and the throttle position sensor (TPS) is very critical to proper system operation. If the TPS is faulty, or the mounting position of the TPS to the throttle body is altered, the TPS must be re-initialized.

For the purpose of troubleshooting, a known-good ECU from another Polaris ATV EFI of the same model may be used without system or engine component damage.

ECU Replacement

1. Remove the retaining screws (2) holding the ECU.
2. With the Ignition turned off, disconnect the wire harness from the ECU.
3. To install, reverse the procedures, reapply a small amount of dielectric grease to the connector if desired. Tighten screws to specification.

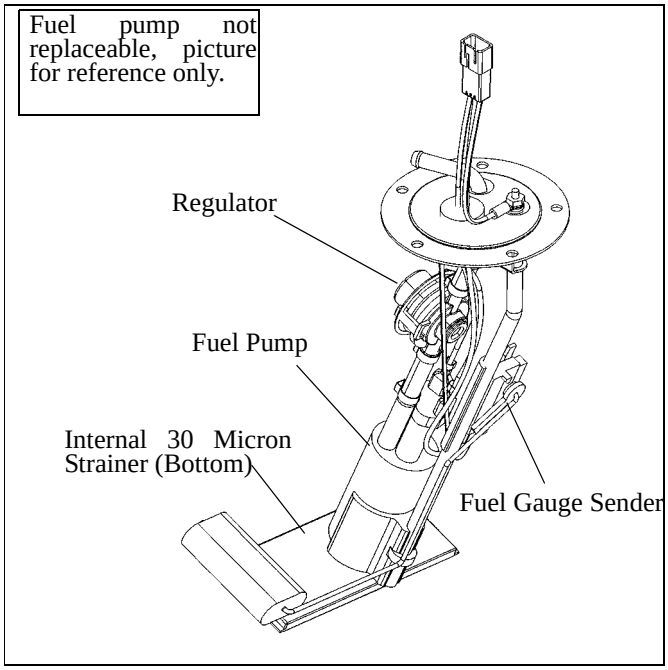
= T
ECU Retaining Screws **10 in. lbs. (1.1 Nm)**

FUEL PUMP

Operation Overview

NOTE: All EFI units utilize quick connect lines.

An electric fuel pump assembly is used to transfer fuel to the EFI system from inside the fuel tank. This assembly includes the fuel pump, regulator and fuel gauge sender. The pump is rated for a minimum output of 25 liters per hour at 39 psi and has a non-serviceable internal 30-micron filter. In addition, the pump has a replaceable 10-micron filter attached to the pump outlet, which is located under the strut mount.



When the key switch is turned to "ON", the ECU activates the fuel pump, which pressurizes the system for start-up.

The ECU switches off the pump preventing the continued delivery of fuel in these instances:

- If the key switch is not promptly turned to the "start" position.
- If the engine fails to start, or
- If the engine is stopped with the key switch "on" (as in the case of an accident)

In these situations, the “check engine” light will go on, but will turn off after 4 cranking revolutions if system function is OK. Once the engine is running, the fuel pump remains on.

Fuel Pump Test

NOTE: FUEL GAUGE SENDER TEST - To test fuel gauge sender function, refer to Chapter 10.

The fuel pump/tank assembly is non-serviceable and must be replaced if determined to be faulty. If a fuel delivery problem is suspected, make certain the filters are not plugged, that the pump is being activated through the ECU, all electrical connections are properly secured, the fuses are good, and a minimum of 7.0 volts is being supplied. If during starting the battery voltage drops below 7.0 volts, the ECU will fail to operate the system.

⚠ WARNING

Check the fuel test valve for any possible fuel seepage after performing any tests or procedures. Fuel is extremely flammable and may cause severe burns, injury, or death. Do not use any device that produces a flame or electrical devices that may spark around fuel or fuel vapors.

1. Remove the fuel test valve cap. Connect the pressure hose of the Polaris pressure tester (**PN PU-43506**) to the test valve on the fuel rail. Route the clear hose into a portable gasoline container or the equipment fuel tank.

Normal Fuel Pressure: 39 psi. ± 3

2. Turn on the key switch to activate the pump and check the system pressure on the gauge. If system pressure of 39 psi ± 3 is observed, the ignition switch, ECU, fuel pump, and pressure regulator are working properly. Turn the key switch off and depress the valve button on the tester to relieve the system pressure.

NOTE: If the pressure is too high or too low, replace the fuel tank assembly.

3. If the pump did not activate (Step 2), disconnect the plug from the fuel pump. Connect a DC voltmeter across terminals “A” and “C” in the plug, turn on the key switch and observe if a minimum of 7 volts is present. If voltage is between 7 and 14, turn key switch off and connect an ohmmeter between the terminals “A” and “C”' on the pump to check for continuity.

NOTE: If there was no continuity between the pump terminals, replace the fuel tank assembly.

NOTE: If the voltage was below 7Vdc, test the battery, ignition switch, wiring harness and ECU.

4. If voltage at the plug was good, and there was continuity across the pump terminals, reconnect the plug to the pump, making sure you have good, clean connections. Turn on the key switch and listen for the pump to activate.

NOTE: If the pump starts, repeat steps 1 and 2 to verify correct pressure.

NOTE: If the pump still does not operate, check for correct ECU operation by plugging in a known-good ECU of the same model.

NOTE: If the pump still does not operate, replace the pump/tank assembly.

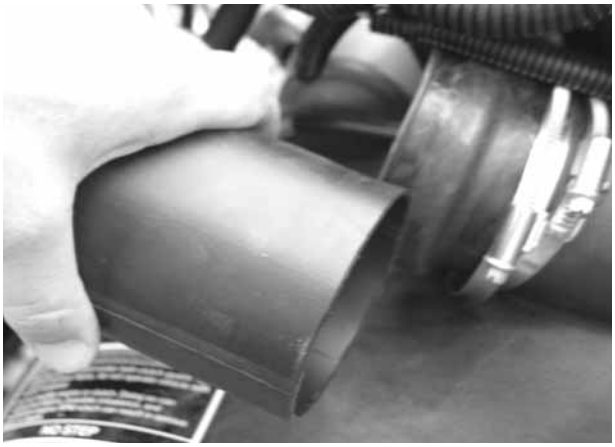
Fuel Pump / Tank Assembly Replacement

NOTE: All EFI unit utilize quick connect fuel lines.

> ⚠ WARNING
>
> Always wear safety equipment when working with high pressure or flammable fluids. Failure to do so could result in serious injury or complications.

NOTE: The fuel pump cannot be replaced as an individual part, the entire fuel pump and fuel tank is replaced as an assembly. Refer to your parts book for the proper part number.

1. Disconnect the negative battery cable.
2. Remove the side panels and front cab assembly. Refer to “COVER PANEL REMOVAL" in Chapter 5 for details.
3. Remove the clamps on the PVT intake duct and remove the PVT duct.



4. Remove the gas tank cover vent hose. Be sure to properly route the vent hose upon reassembly.

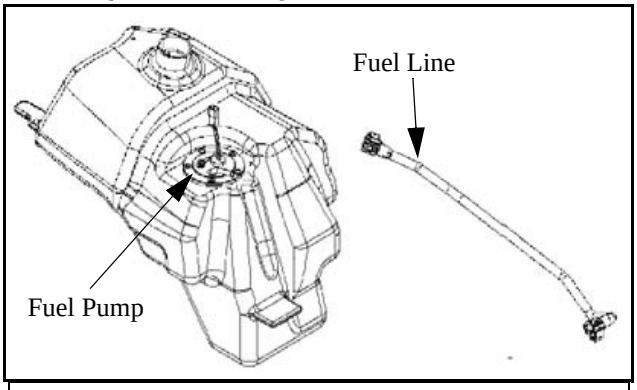
5. With all the body panels removed from the front of the ATV and the gas tank exposed, disconnect the pump wiring harness.

> ⚠ WARNING
>
> Wear safety equipment while performing this procedure, failure to do so could result in serious injuries.

6. Relieve the fuel pressure at the fuel test valve (arrow).

7. Loosen the fuel tank hose and pull the fuel line from the tank. NOTE: A small amount of fuel may come out of the fuel line or tank. Plug the fuel line and tank inlet or use a shop towel during removal.

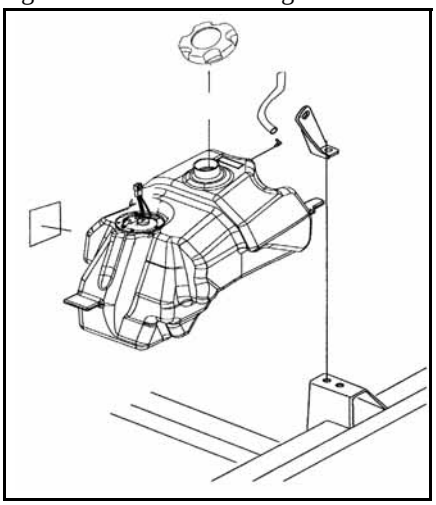
NOTE: A small amount of fuel may come out of the fuel line or tank. Plug the fuel line and tank inlet or use a shop towel during removal.



⚠ WARNING

Check the fuel test valve for any possible fuel seepage after performing any tests or procedures. Fuel is extremely flammable and may cause severe burns, injury, or death. Do not use any device that produces a flame or electrical devices that may spark around fuel or fuel vapors.

8. Remove the air box cover and remove the two gas tank mounting bolts at the rear of the gas tank.



9. Carefully pull the fuel tank out of the frame. Keep the fuel tank horizontal during removal, this will keep the fuel in the tank from spilling out the top inlet.

FUEL PUMP TANK INSTALLATION

1. Reinstall the pump/tank assembly.
2. Reconnect the sender wiring harness and route the harness properly. Install the fuel line and tighten the fuel line clamp.
3. Reinstall the two fuel tank mounting bolts at back of tank.
4. Reinstall the PVT intake duct, gas tank vent line, front cab assembly, and side panels.

NOTE: Properly route the gas tank vent line, use tape to secure the vent line in place. (See Pg. 4.10).

5. Reconnect the negative battery cable. Test the sender for proper operation.

FUEL PRESSURE REGULATOR

Operation Overview

The fuel pressure regulator maintains the required operating system pressure of 39 psi + 3psi. A rubber-fiber diaphragm divides the regulator into two separate sections-, the fuel chamber and the pressure regulating chamber. The pressure regulating spring presses against the valve holder (part of the diaphragm), pressing the valve against the valve seat. The combination of atmospheric pressure and regulating spring tension equals the desired operating pressure. Any time the fuel pressure against the bottom of the diaphragm exceeds the desired (top) pressure, the valve opens, relieving the excess pressure, returning the excess fuel back to the tank.

Fuel Pressure Regulator Test

Refer to the “FUEL PUMP TEST” procedure.

See “Fuel Pump Test” on page 4.9.

Fuel Pressure Regulator Replacement

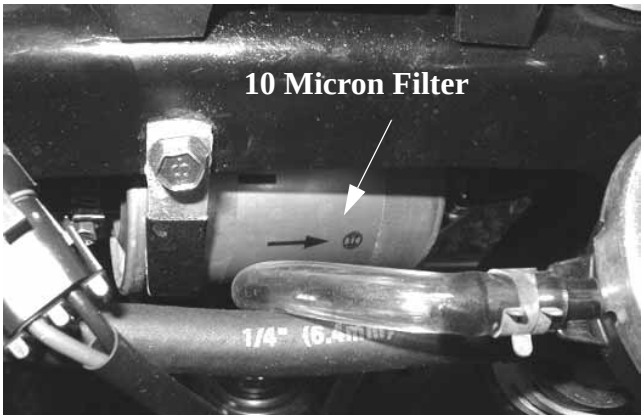
The regulator is a sealed, non-serviceable assembly. If it is faulty, the pump assembly must be replaced. Refer to the Fuel Pump/Tank Assembly Replacement procedure.

FUEL FILTERS

General Information

NOTE: All EFI units utilize quick connect fuel lines.

EFI Engines use a non-serviceable, high-volume, high-pressure, 30-micron internal fuel pump filter and a replaceable 10-micron, in-line fuel filter.



Fuel Filter Service

In line filter replacement is recommended every 2 years of operation or more frequently under extremely dusty, dirty conditions. Use only the specified filter, and install according to the directional arrows. DO NOT use an aftermarket filter, as operating performance and safety can be affected.

Fuel Filter Replacement

NOTE: When replacing the fuel filter, wet the interior of the new filter with gasoline before installation to ensure high pump pressure doesn't tear the filtering material.

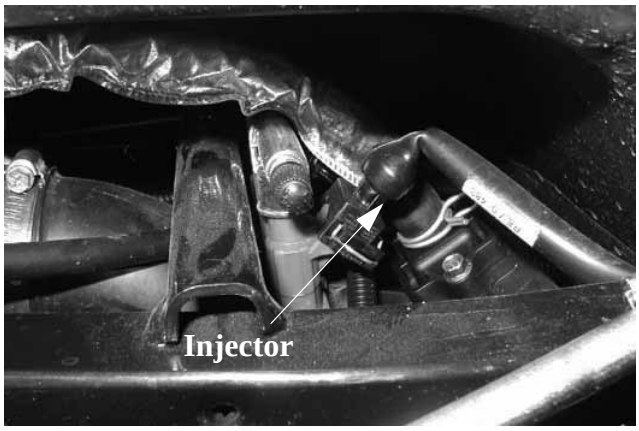
1. Relieve system pressure through the test valve in the fuel rail before servicing.
2. Loosen clamps and slide hose off the filter ends.
3. Install new filter with arrow pointing to the fuel line connected to the injector rail.

FUEL INJECTORS

Operation Overview

NOTE: All EFI units utilize quick connect fuel lines.

The fuel injectors mount into the intake manifold, and the fuel rail attaches to them at the top end. Replaceable O-Rings on both ends of the injector prevent external fuel leaks and also insulate it from heat and vibration.



When the key switch is on, the fuel rail is pressurized, and voltage is present at the injector. At the proper instant, the ECU completes the ground circuit, energizing the injector. The valve needle in the injector is opened electromagnetically, and the pressure in the fuel rail forces fuel down through the inside. The "director plate" at the tip of the injector (see inset) contains a series of calibrated openings which directs the fuel into the intake port in a cone-shaped spray pattern.

The injector is opened and closed once for each crankshaft revolution, however only one-half the total amount of fuel needed for one firing is injected during each opening. The amount of fuel injected is controlled by the ECU and determined by the length of time the valve needle is held open, also referred to as the "injection duration" or "pulse width". It may vary in length from 1.5-8 milliseconds depending on the speed and load requirements of the engine.

Fuel Injector Service

Injector problems typically fall into three general categories- electrical, dirty/clogged, or leakage. An electrical problem usually causes one or both of the injectors to stop functioning. Several methods may be used to check if the injectors are operating.

- With the engine running at idle, feel for operational vibration, indicating that they are opening and closing.
- When temperatures prohibit touching, listen for a buzzing or clicking sound with a screwdriver or mechanic's stethoscope.
- Disconnect the electrical connector from an injector and listen for a change in idle performance (only running on one cylinder) or a change in injector noise or vibration.

NOTE: Do not apply voltage directly to the fuel injector(s). Excessive voltage will burn out the injector(s). Do not ground the injector(s) with the ignition on." Injector(s) will open/turn on if relay is energized.

If an injector is not operating, it can indicate either a bad injector, or a wiring/electrical connection problem. Check as follows:

Injector leakage is very unlikely, but in rare instances it can be internal (past the tip of the valve needle), or external (weeping around the injector body). The loss of system pressure from the leakage can cause hot restart problems and longer cranking times.

Injector problems due to dirt or clogging are unlikely due to the design of the injectors, the high fuel pressure, the use of filters and the detergent additives in the gasoline. Symptoms that could be caused by dirty/clogged injectors include rough idle, hesitation/stumble during acceleration, or triggering of fault codes related to fuel delivery. Injector clogging is usually caused by a buildup of deposits on the director plate, restricting the flow of fuel, resulting in a poor spray pattern. Some contributing factors to injector clogging include; dirty air filters, higher than normal operating temperatures, short operating intervals and dirty, incorrect, or poor quality fuel. Cleaning of clogged injectors is not recommended; they should be replaced. Additives and higher grades of fuel can be used as a preventative measure if clogging has been a problem.

Fuel Injector Replacement

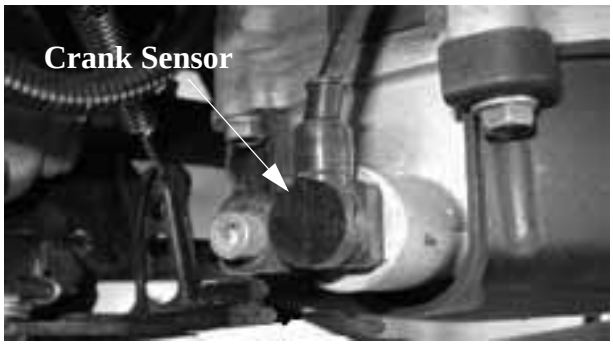
1. Engine must be cool. Depressurize fuel system through test valve in fuel rail.
2. Remove the front fender assembly and fuel tank.
3. Thoroughly clean the area around and including the throttle body/manifold and the injectors.
4. Disconnect the fuel injector harness(s) at the ECU.
5. Remove the fuel rail mounting screw and carefully loosen / pull the rail away from the injectors.
6. Reverse the procedures to install the new injector(s) and reassemble. Use new O-rings any time an injector is removed (new replacement injectors include new O-rings). Lubricate O-rings lightly with oil to aid installation. Torque the fuel rail mounting screw to specification.

= T
Fuel Rail Mount Screws **16-20 ft. lbs. (22.6-27 Nm)**

CRANKSHAFT POSITION SENSOR (CPS)

Operation Overview

The engine speed sensor is essential to engine operation, constantly monitoring the rotational speed (RPM) and position of the crankshaft.



A ferromagnetic 60-tooth ring gear with two consecutive teeth missing is mounted on the flywheel. The inductive speed sensor is mounted 1.0 ± 0.26 mm (0.059 ± 0.010 in.) away from the ring gear. During rotation, an AC pulse is created within the sensor for each passing tooth. The ECU calculates engine speed from the time interval between the consecutive pulses. The two-tooth gap creates an "interrupt" input signal, corresponding to specific crankshaft position for PTO cylinder. This signal serves as a reference for the control of ignition timing by the ECU. Synchronization of the CPS and crankshaft position takes place during the first two revolutions each time the engine is started. This sensor must be properly connected at all times. If the sensor fails or becomes disconnected for any reason, the engine will quit running.

Crankshaft Position Sensor Test

The crankshaft position sensor is a sealed, non-serviceable assembly. If fault code diagnosis indicates a problem within this area, test and correct as follows:

1. Disconnect main harness connector from ECU.
2. Connect an ohmmeter between the pin terminals. A resistance value of 560Ω ± 10% at room temperature (20° C, 68° F) should be obtained. If resistance is correct, check the mounting, air gap, toothed ring gear (damage, runout, etc.), and flywheel key.

Crankshaft Position Sensor:
560Ω ± 10% (20° C, 68° F)

3. Disconnect speed sensor connector from wiring harness. (the connector with one heavy black lead) Viewing the connector with dual aligning rails on top, test resistance between the terminals. A reading of 560Ω ± 10% should again be obtained.

NOTE: If the resistance is incorrect, remove the screw securing the sensor to the mounting bracket and replace the sensor. If the resistance in step 2 was incorrect, but the resistance of the sensor alone was correct, test the main harness circuit between the sensor connector terminals and the corresponding pin terminals in the main connector. Correct any observed problem, reconnect the sensor, and perform step 2 again.

Crankshaft Position Sensor (CPS) Replacement

1. Disconnect sensor harness connector.

2. Using a 6 mm hex wrench, remove the retaining bolt and replace the sensor, using a light coating of oil on the o-ring to aid installation.
3. Torque the retaining bolt to specification.

= T
CPS Retaining Bolt Torque: **25 in. lbs. (2.8 Nm)**

TEMPERATURE / BAROMETRIC AIR PRESSURE SENSOR (T-BAP)

Operation Overview

Mounted on the throttle body intake, the temperature and barometric air pressure sensor (T-BAP) performs two functions in one unit.

Air passing through the intake is measured by the T-BAP and relayed to the ECU. These signals, comprised of separate air temperature and barometric air pressure readings, are processed by the ECU and compared to it's programming for determining the fuel and ignition requirements during operation.

Temperature and Barometric Air Pressure Sensor Test

The temperature and barometric air pressure sensor (T-BAP) is a non-serviceable item. If it is faulty, it must be replaced. This sensor requires a 5 Vdc input to operate, therefore the T-BAP sensor should only be tested using the Polaris Diagnostic Software (dealer only). Refer to the EFI Diagnostic Software Manual for more information.

Temperature and Barometric Air Pressure Sensor Replacement

1. Disconnect sensor from engine harness.
2. Using a 10mm wrench, remove the retaining bolt and replace the sensor, using a light coating of oil on the o-ring to aid installation.
3. Torque the retaining bolt to specification.

= T
T-BAP Retaining Bolt Torque: **29 in. lbs. (3.3 Nm)**

THROTTLE POSITION SENSOR (TPS)

Operation Overview

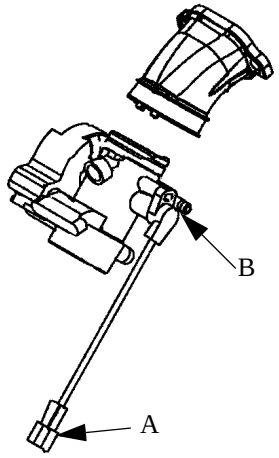
The throttle position sensor (TPS) is used to indicate throttle plate angle to the ECU.

Mounted on the throttle body and operated directly off the end of the throttle shaft, the TPS works like a rheostat, varying the voltage signal to the ECU in direct correlation to the angle of the throttle plate. This signal is processed by the ECU and compared to the internal pre-programmed maps to determine the required fuel and ignition settings for the amount of engine load.

NOTE: The correct position of the TPS is established and set at the factory. Do not loosen the TPS or alter the mounting position. If the TPS is repositioned, replaced or loosened it must be re-calibrated.

Throttle Position Sensor Replacement

The correct position of the TPS is established and set at the factory. If the TPS is repositioned, replaced or loosened it must be re-calibrated.

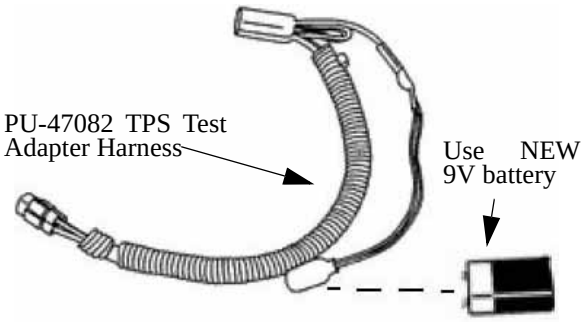


1. Remove the side panel assembly and air box.
2. Disconnect sensor (A) from the harness.
3. Loosen and rotate the throttle body (B) to gain access to the retaining screw.
4. Remove the retaining screw and replace the sensor.
5. Refer to “TPS Initialization” for setting the TPS voltage.

Throttle Position Sensor Test

The throttle position sensor (TPS) is a non-serviceable item. If it is faulty, it must be replaced. It can be tested using the following method:

- Set up the TPS Test Adapter Harness (**PU-47082**), according to the instructions. Make sure that the 9 volt battery is new. Figure 2.



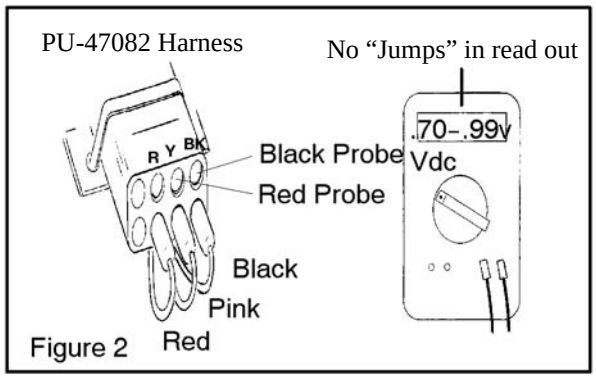


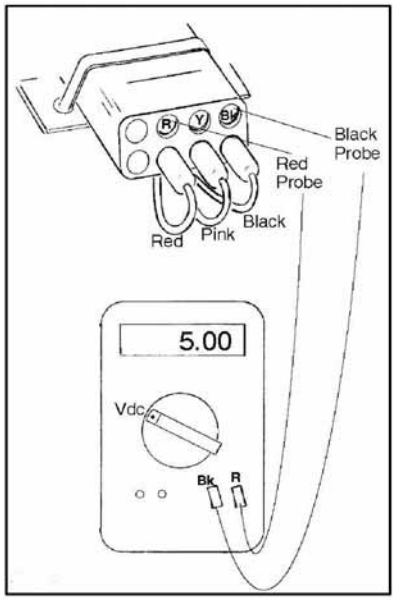
Figure 2

- With the test leads connected and the meter set, move the throttle open and closed slowly while reading the display. The voltage should increase smoothly with no "jumps" or decreases when the throttle is applied.
- If the sensor does not function correctly, replace it.

CORRECT REFERENCE VOLTAGE

A 5 volt reference voltage from the harness is required for the TPS test to be accurate. Refer to the instructions provided with the TPS Test Adapter Harness (**PU-47082**) or follow the steps below to check reference voltage.

- Harness Test: Insert black voltmeter probe into the "Bk" test port.
- Connect the red meter probe into the "R" port and verify the voltage is 4.99-5.01 Vdc. If this reading is low, verify the 9 volt battery is good or try a new 9 volt battery.

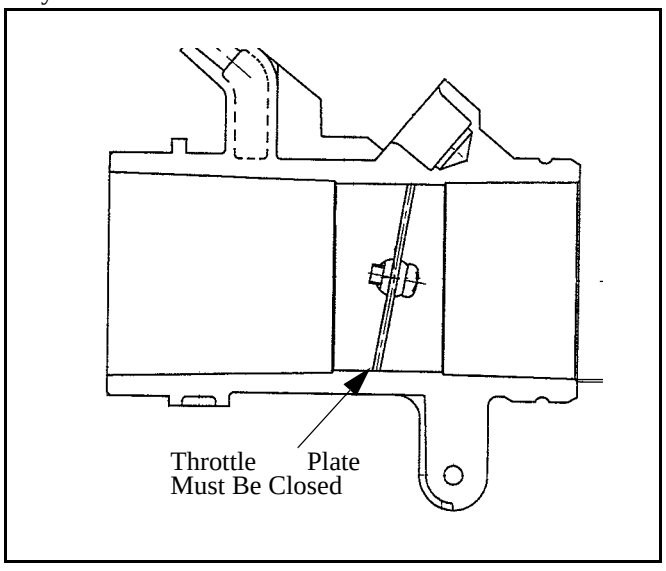


Throttle Position Sensor Initialization

NOTE: The correct position of the TPS is established and set at the factory. Use this procedure only if the TPS was repositioned, replaced or loosened.

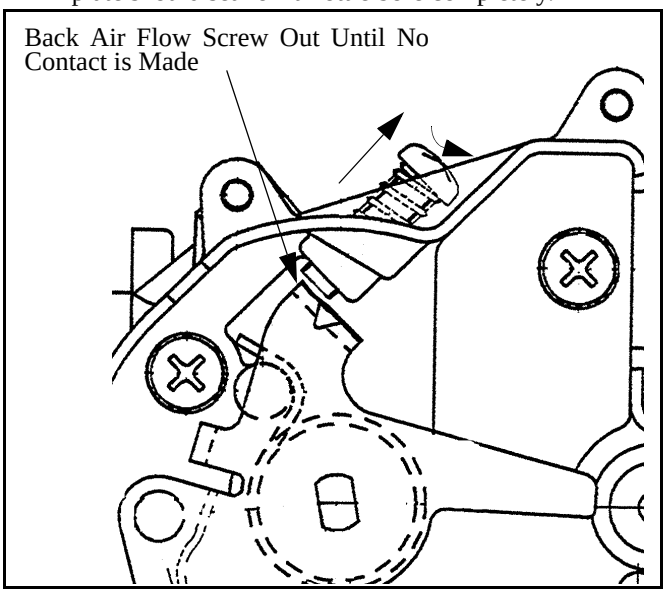
STEP 1

Establishing zero offset voltage: This step is crucial as it sets the TPS position using a fixed physical stop. This will insure that the correct offset voltage is reached once the correct throttle body flow is set.



- Remove cover and disconnect throttle cable from throttle cam.

- With engine off, back out air flow screw until it no longer is in contact with throttle plate cam. The throttle plate should seal off throttle bore completely.



- Open and close throttle plate a couple of times to ensure full throttle closing. Do not snap closed, as this could cause unnecessary throttle plate to throttle body interference and/or damage.

- Set up the TPS Test Adapter Harness (**PU-47082**) according to the instructions. Verify that the 9 volt battery is new. Figure 2.

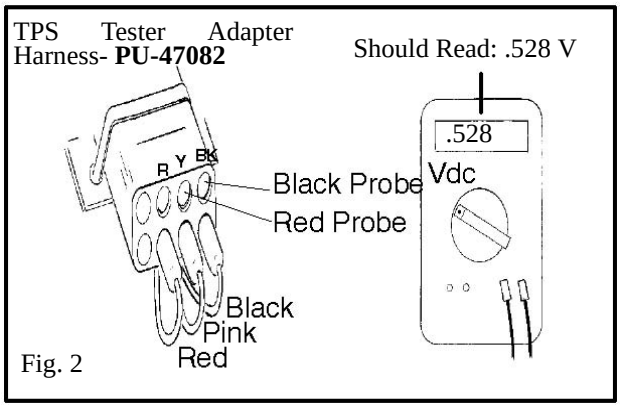


Fig. 2

- Using a voltmeter attached to the TPS Tester Harness (**PU-47082**), check the voltage output of the TPS. It should read **.528 ± .01 volts**.

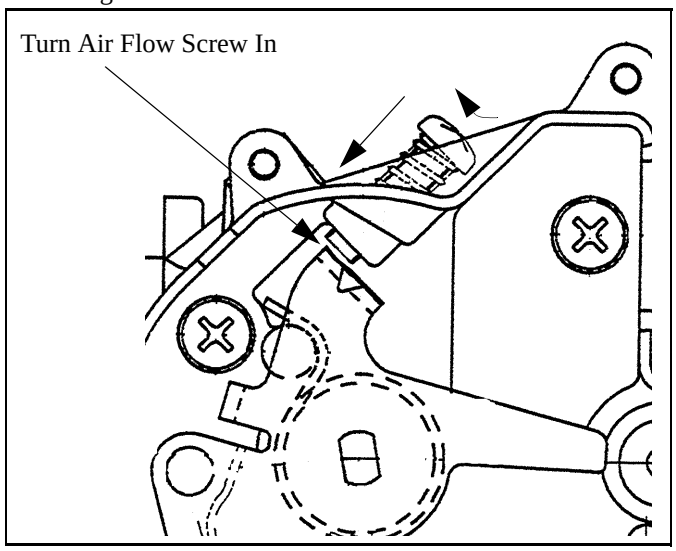
- If it does not read **.528 ± .01 volts**, loosen the screw holding the TPS to the throttle body. Rotate TPS until voltmeter reads **.528 ± .01 volts**.

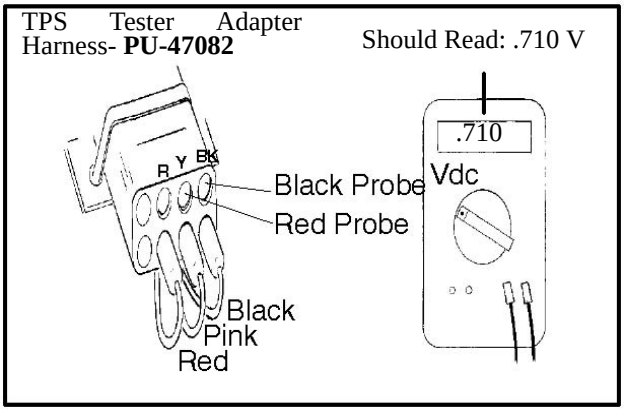
- Retighten TPS mounting screw, and verify the voltage did not change. If changed, repeat the previous steps.

STEP 2

Establishing correct flow: Now that the zero offset voltage has been set, you can now set the throttle body to the correct air flow value.

- With voltmeter still attached to the TPS Test Adapter Harness (**PU-47082**), turn the air flow adjustment screw until the voltmeter reads **.710 ± .01 volts**. The throttle body is now adjusted to the correct flow value Figure 3.





- Reconnect the TPS harness lead

- Reinstall throttle cable on throttle cam and install cover. Adjust cable freeplay.

ENGINE TEMPERATURE SENSOR

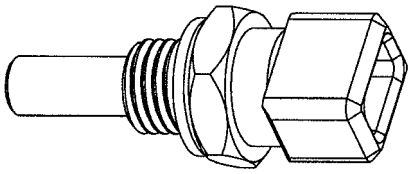
Operation Overview

Mounted on the cylinder, the engine temperature sensor measures coolant temperature. The engine temperature sensor is a Negative Temperature Coefficient (NTC) type sensor, as the temperature increases the resistance decreases.

Refer to Chapter 10 for testing. Standard resistance readings according to temperature:

Coolant passes through the cylinder and by the sensor probe, varying a resistance reading which is relayed to the ECU. This signal is processed by the ECU and compared to it's programming for determining the fuel and ignition requirements during operation. The ECU also uses this signal to determine when to activate the fan during operation. If for any reason the engine temperature sensor circuit is interrupted, the fan will default to "ON".

Engine Temperature Sensor Test



Engine Temperature Sensor

To quickly rule out other components and wiring related to the ETS, disconnect the harness from the ETS. The fan should turn on and 'HOT' should indicate on the instrument cluster. This indicates all other components are working properly.

Refer to Chapter 10 for ETS testing. Polaris dealers can also test the sensor by using the Polaris Digital Wrench' Software (dealer only). Refer to the Digital Wrench' Software Manual for more information.

Table 4-1: ETS Resistance Readings

TEMPERATURE °F (°C)	RESISTANCE
68 °F (20 °C)	2.5 kΩ ± 6%
212 °F (100 °C)	0.186 kΩ ± 2%

Engine Temperature Sensor Replacement

1. Drain coolant to level below sensor
2. Disconnect sensor from engine harness.
3. Using a wrench, remove and replace the sensor, applying a light coating of thread sealant to aid installation.
4. Torque the sensor to specification.

= T
Engine Temperature Sensor Torque: **18 ft. lbs. (25 Nm)**

TROUBLESHOOTING

Diagnostics Using "Blink Codes"

To enable the blink codes, turn the ignition from "OFF" to "ON" 3 times, leaving it 'on' the 3rd time, within 5 seconds.

Any "blink codes" stored in the ECU will display a numerical "blink code", one at a time, in numerical order, on the instrument cluster LCD. The word 'END' will display after all codes have been transmitted.

NOTE: To clear codes manually, disconnect the positive battery lead for 20 seconds.

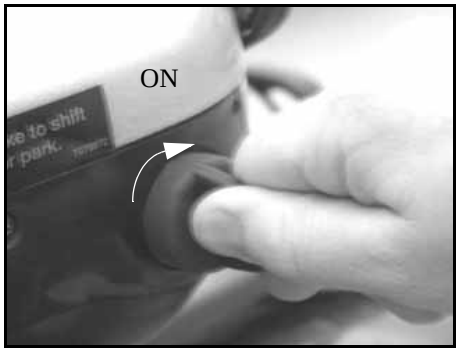


Table 4-1: DIAGNOSTIC "BLINK CODES" CHART

SAE CODE	BLINK CODE	NAME	MIL LIGHT
P0335	21	Loss of Synchronization	Yes
P0122	22	TPS Circuit: Open and Short To Ground	Yes
P0123	22	TPS Circuit: Short To Battery	Yes
P0601	23	RAM Error: Defective ECU	Yes
P0914	25	Transmission Input - Invalid Gear	Yes
P0500	26	Vehicle Speed Sensor - Implausible	Yes
P0113	41	Air Temp Sensor: Open or Short Circuit to Sensor Voltage (ECU)	Yes
P0112	41	Air Temp Sensor: Short Circuit to Ground	Yes
P0117	42	Engine Temperature Sensor Circuit: Short To Ground	Yes
P0118	42	Engine Temperature Sensor Circuit: Open or Short to Battery	Yes
P0107	45	Barometric Pressure Sensor: Circuit Low Input	Yes
P0108	46	Barometric Pressure Sensor: Circuit High Input	Yes
P1260	51	Injector 1: Open Load	Yes
P0261	51	Injector 1: Short Circuit to Ground	Yes
P0262	51	Injector 1: Short Circuit to Battery	Yes
P1263	52	Injector 2: Open Load	Yes
P0264	52	Injector 2: Short Circuit to Ground	Yes
P0265	52	Injector 2: Short Circuit to Battery	Yes
P0655	54	Engine Temperature Lamp: Open Load	Yes
P1657	54	Engine Temperature Lamp: Short Circuit to Ground	Yes
P1658	54	Engine Temperature Lamp: Short Circuit to Battery	Yes
P1651	55	Diagnostic Lamp: Open Load	Yes
P1652	55	Diagnostic Lamp: Short Circuit to Ground	Yes
P1653	55	Diagnostic Lamp: Short Circuit To Battery	Yes
P1231	56	Pump Relay Open Load	Yes
P1232	56	Pump Relay Short Circuit to Ground	Yes
P1233	56	Pump Relay Short Circuit to Battery	Yes
P1480	58	Cooling Fan: Open Load	Yes
P1481	58	Cooling Fan: Short Circuit to Ground	Yes
P1482	58	Cooling Fan: Short Circuit to Battery	Yes
--	61	End of Diagnostic Check	--

EFI Troubleshooting

Fuel Starvation / Lean Mixture

Symptoms: Hard start or no start, bog, backfire, popping through intake / exhaust, hesitation, detonation, low power, spark plug erosion, engine runs hot, surging, high idle, idle speed erratic.

- No fuel in tank
- Restricted tank vent, or routed improperly
- Fuel lines or fuel injectors restricted
- Fuel filter plugged
- Fuel pump inoperative
- Air leak in system
- Intake air leak (throttle shaft, intake ducts, airbox or air cleaner cover)
- Incorrect throttle stop screw adjustment

Rich Mixture

Symptoms: Fouls spark plugs, black, sooty exhaust smoke, rough idle, poor fuel economy, engine runs rough/ misses, poor performance, bog, engine loads up, backfire.

- Air intake restricted (inspect intake duct)
- Air filter dirty/plugged
- Poor fuel quality (old fuel)
- Fouled spark plug
- TPS setting incorrect
- Injector failure

Poor Idle

Symptom: Idle Too High (If greater than 1300 RPM when engine is warm)

- Throttle stop screw set incorrect
- Throttle cable sticking, improperly adjusted, routed incorrectly

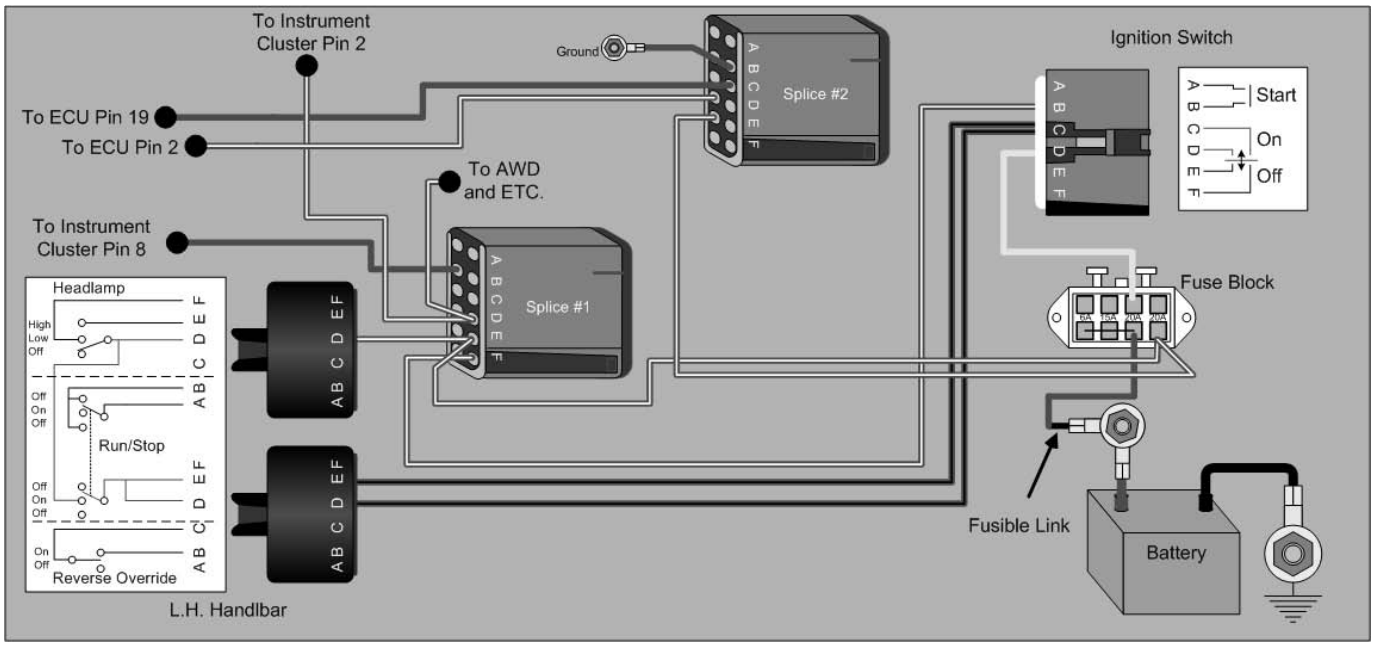
Symptom: Idle Too Low (if less than 900 RPM when engine is warm)

- Plugged air filter
- Leaking injector (rich condition)
- Belt dragging
- Throttle stop screw tampering

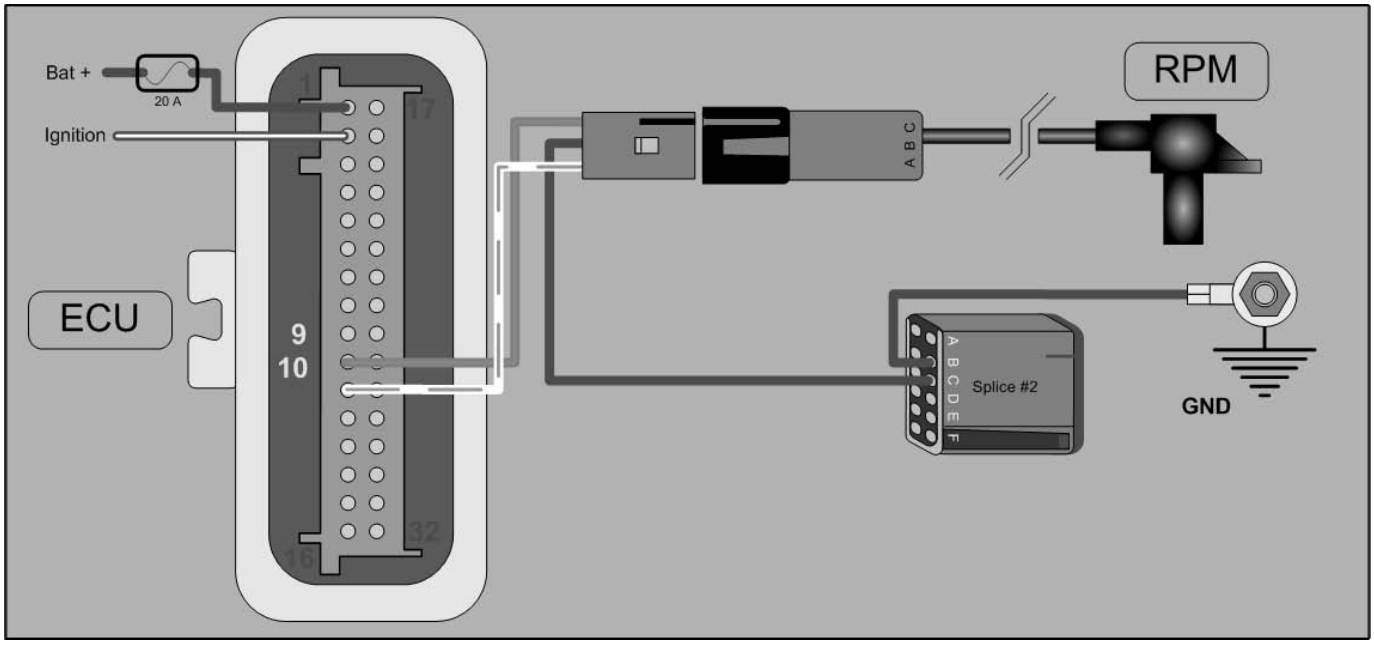
Symptom: Erratic Idle

- Throttle cable incorrectly adjusted
- Air Leaks, dirty injector
- TPS damaged or adjusted
- Tight valves
- Ignition timing incorrect
- Belt dragging
- Dirty air cleaner
- Engine worn
- Spark Plug fouled
- Throttle stop screw set incorrectly (out of sync with ECU)

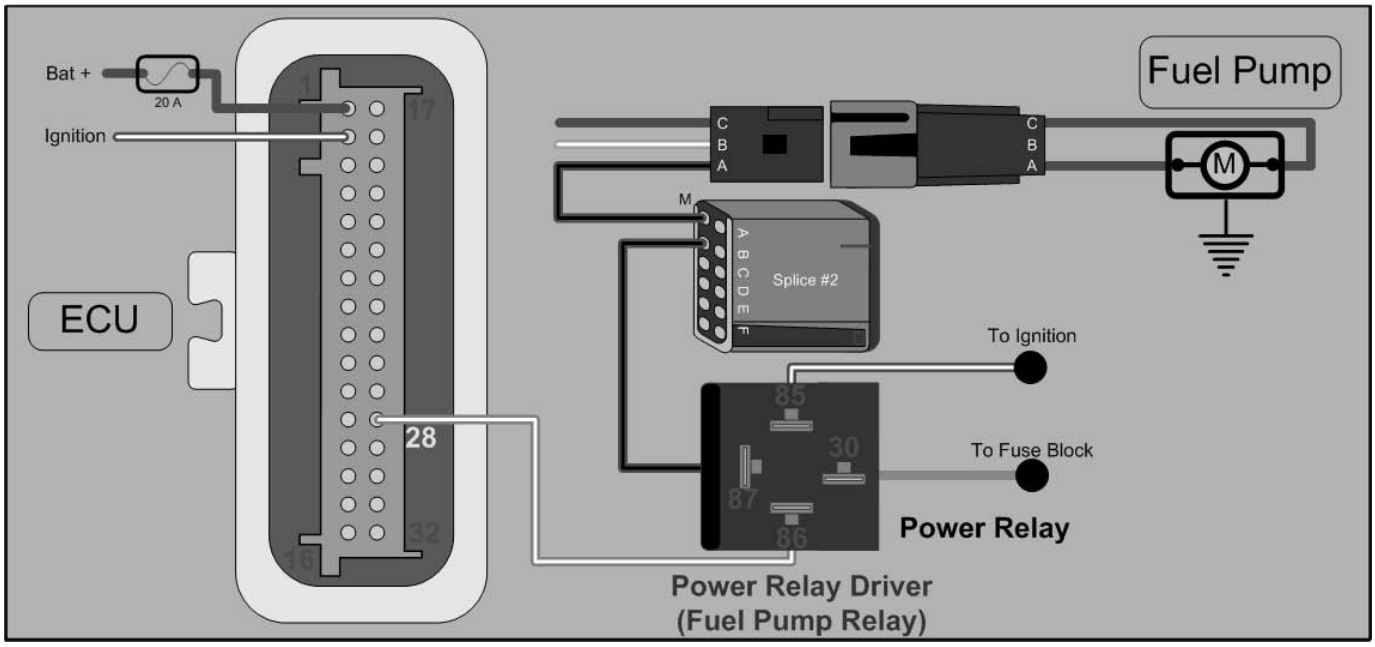
EFI CIRCUIT - Power On



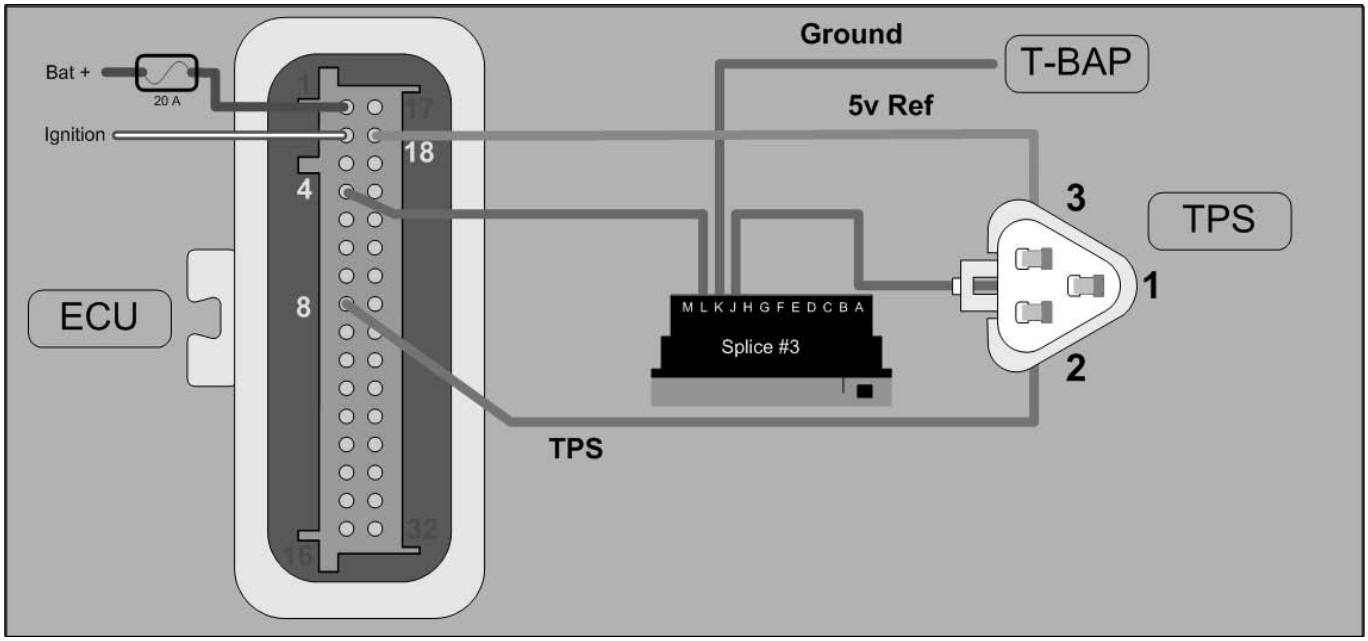
EFI CIRCUIT - Crank Position Sensor



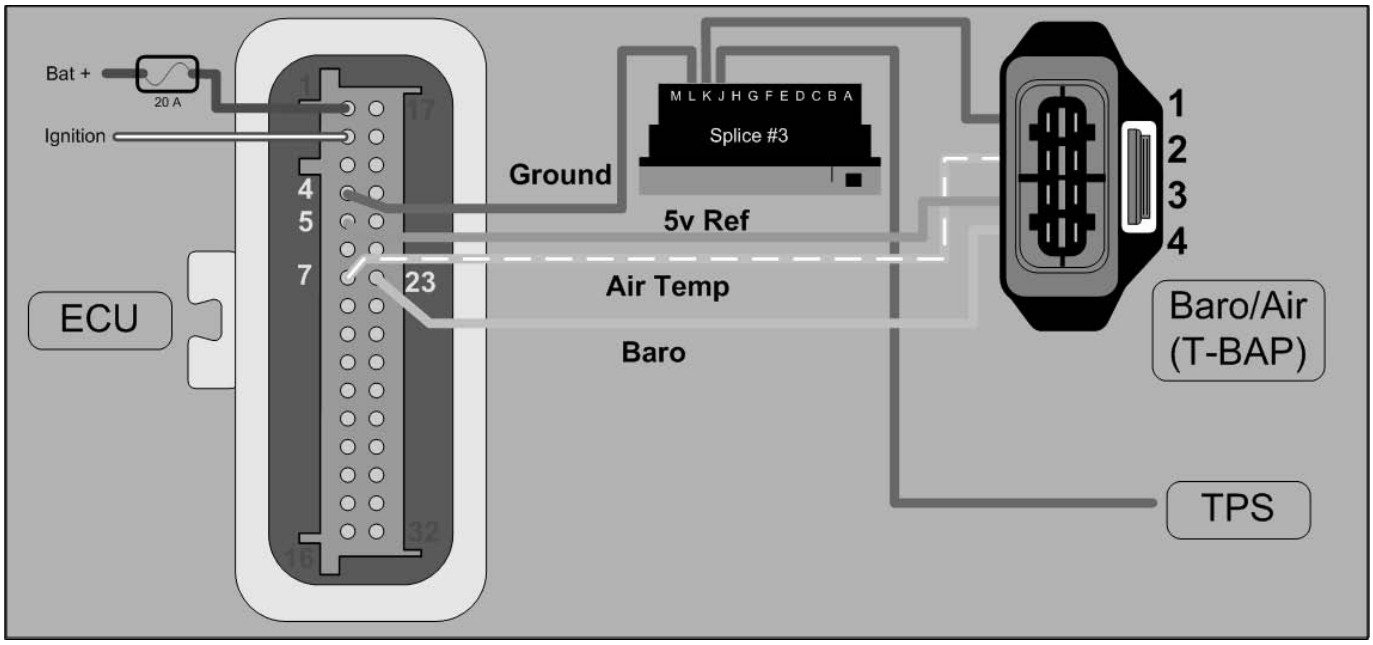
EFI CIRCUIT - Fuel Pump



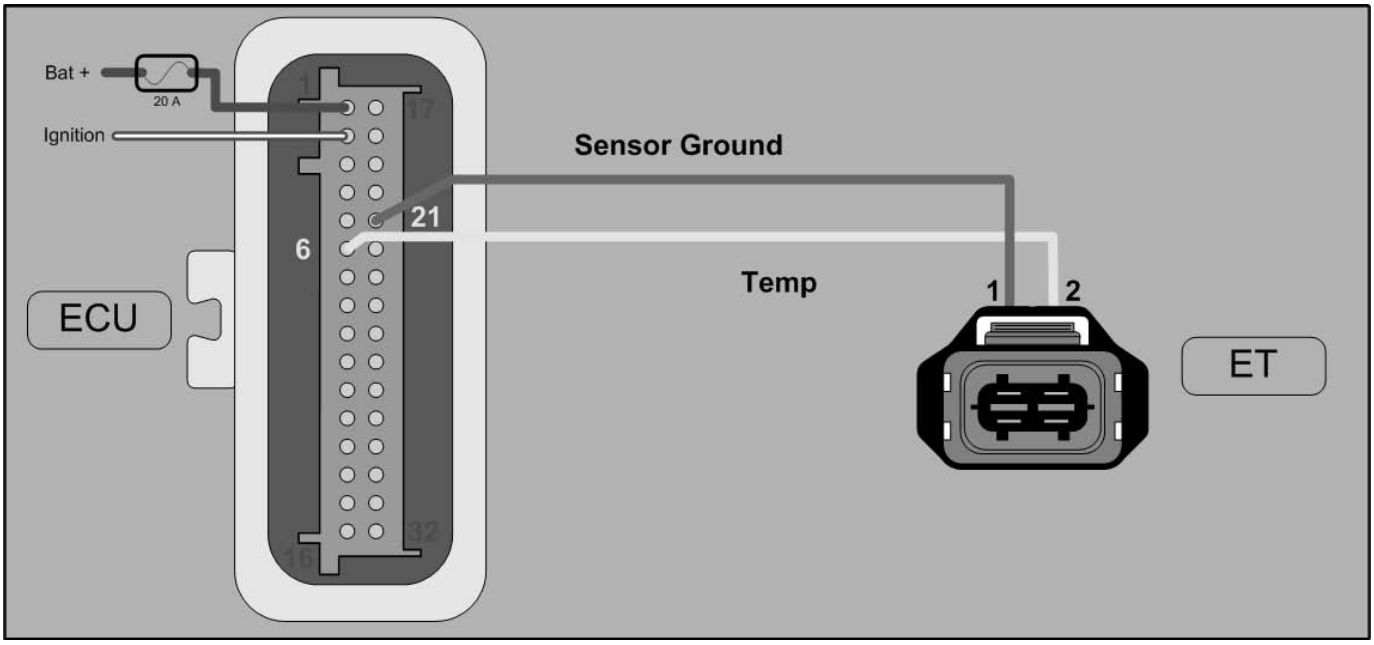
EFI CIRCUIT - Throttle Position Sensor



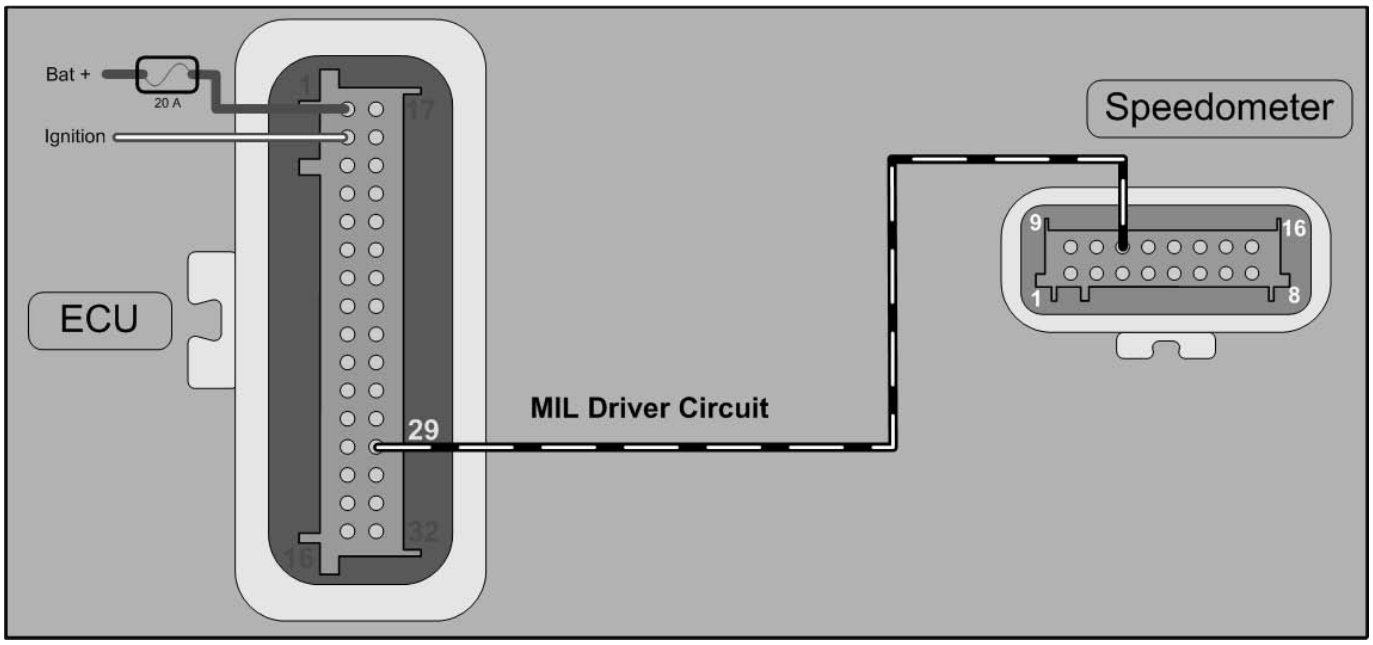
EFI CIRCUIT - Temperature - Barometric Air Pressure Sensor



EFI CIRCUIT - Engine Temperature



EFI CIRCUIT - Malfunction Indicator Light



CHAPTER 5

BODY / STEERING / SUSPENSION

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SPECIAL TOOLS 5.2
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GENERAL INFORMATION

Torque Specifications

Table 5-1:

COMPONENT	FT.LBS. (IN.LBS.)	NM
Front Hug Nut	70	95
Front A-Arm Attaching Bolt	30	41
Front A-Arm Ball Joint Stud Nut	25	35
Handlebar Adjuster Block	11-13	15-18
Master Cylinder Clamp Bolt	(45-55)	5.2-6.3
Rear Shock Bolt (Upper)	30	41
Rear Shock Bolt (Lower)	30	41
Rear Wheel Hub Nut	80	108
Upper Stabilizer Support Nuts	17	27
Upper Control Arm Mounting Bolt	35	48
Lower Wheel Bearing Carrier Bolt	50	68
Strut Rod Retaining Nut (Top)	15	21
Strut Casting Pinch Bolt	15	21
Tie Rod End Jam Nut	12-14	17-19
Tie Rod End Castle Nut	40-45	54-61
Tie Rod End Attaching Bolt	25-30	35-41

NOTE: Refer to exploded views throughout this chapter for identification and location of components.

Special Tools

Table 5-2:

PART NUMBER	DESCRIPTION
2870871	Ball Joint Replacement Tool
2870872	Shock Spanner Wrench
2870623	Shock Absorber Spring Compression Tool
2871572	Strut Rod Wrench
2871573	LH Strut Spring Compressor
2871574	RH Strut Spring Compressor
7052069	Charging Needle
2200421	Gas Shock Recharging Kit
2871352	Shock Rod Holding Tool
2871199	Seal Sleeve Installation Tool Kit
2870872	Shock Spanner Wrench
2871351	Fox™ Shock IFP Depth Tool

Decal Replacement

Flame Treating Decal Area

Plastic polyethylene material must be “flame treated" prior to installing a decal to ensure good adhesion. The flame treating procedure can often be used to reduce or eliminate the whitish stress marks that are sometimes left after a fender or cab is bent, flexed, or damaged.

⚠ WARNING

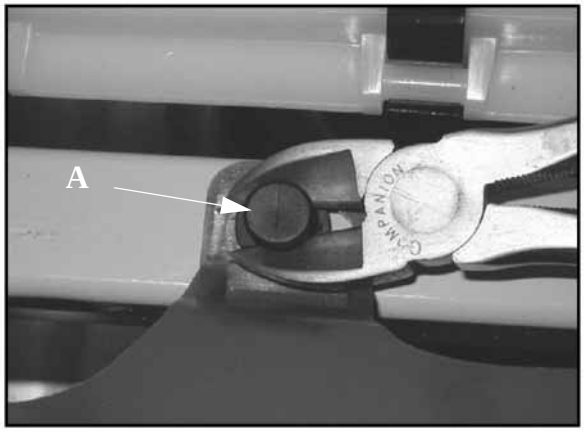
The following procedure involves the use of an open flame. Wear the appropriate safety equipment at all times. Perform this procedure in a well ventilated area, away from gasoline or other flammable materials. Verify the area to be flame treated is clean and free of gasoline or flammable residue.

1. Pass the flame of a propane torch back and forth quickly over the area where the decal is to be applied until the surface appears slightly glossy. This should occur after just a few seconds of flame treating. Do not hold the torch too close to the surface. Keep the torch moving to prevent damage.
2. Apply the decal.

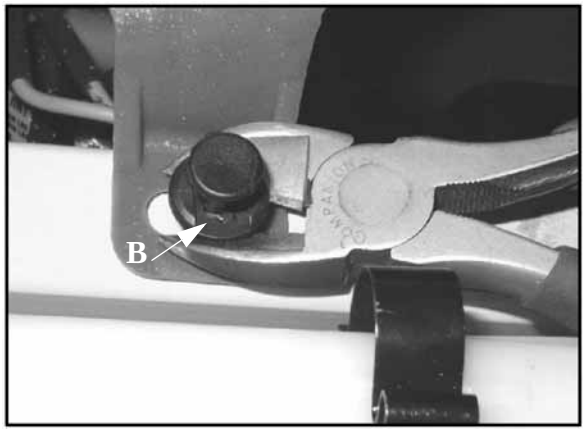
Plastic Insert Removal / Installation

Some Polaris ATVs use a two piece plastic insert in place of a metal screw. The plastic inserts are simple to remove and install.

1. Use a a pair of diagonal side cutters to lift the plastic insert (A) until you feel some slight pressure or lift the insert approximately 1/4" (6.35 mm). Apply just enough pressure on the side cutters to lift up on the insert. DO NOT apply too much pressure on the side cutters, or damage to the insert will occur.



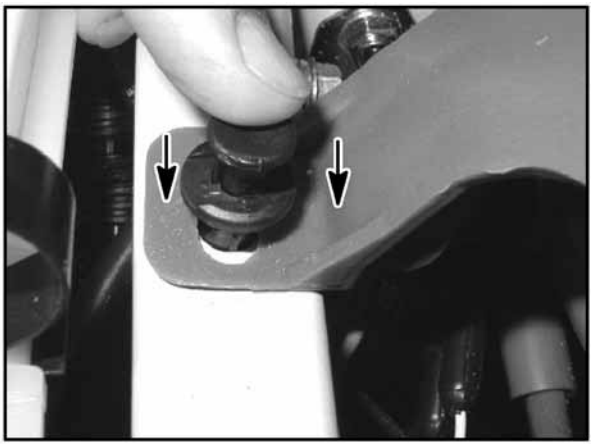
2. Next, use the diagonal side cutters under outside insert (B) to completely remove the assembly. NOTE: The inside insert (A) will still be installed in the outside insert (B).



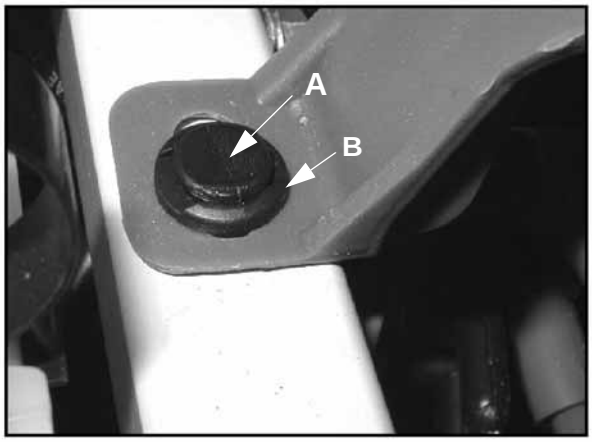
NOTE: The inside insert (A) will still be installed in the outside insert (B).

3. To install the inserts, press outside insert (B) into the hole. Press inside insert (A) until it snaps into place.

NOTE: The outside insert (B) should be flush surface after installation.



The inside insert (A) should be flush with the top of the outside insert (B).



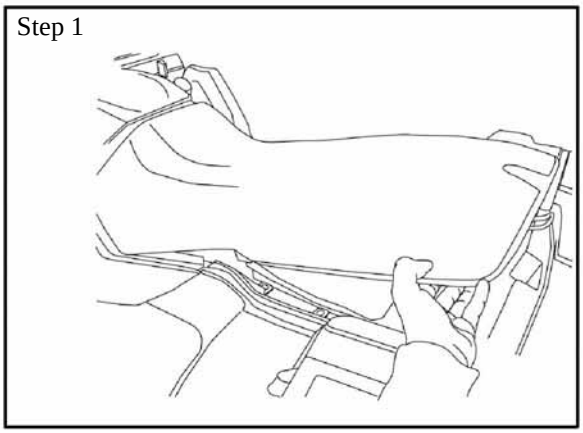
BODY

Side Panel Removal

Side panel removal is quick and easy, use the following instructions for removal and installation.

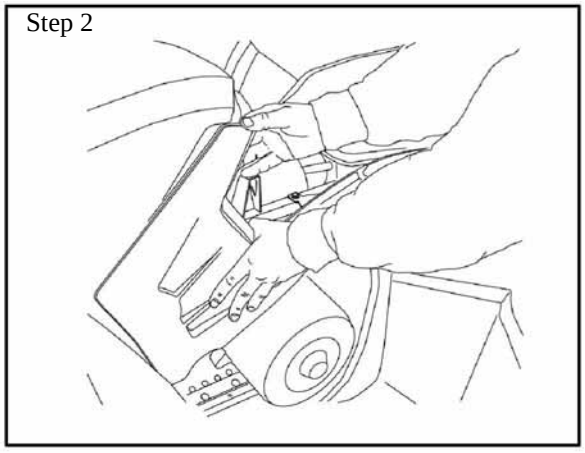
1. Remove seat by releasing the latch and lifting up on the seat.

Step 1



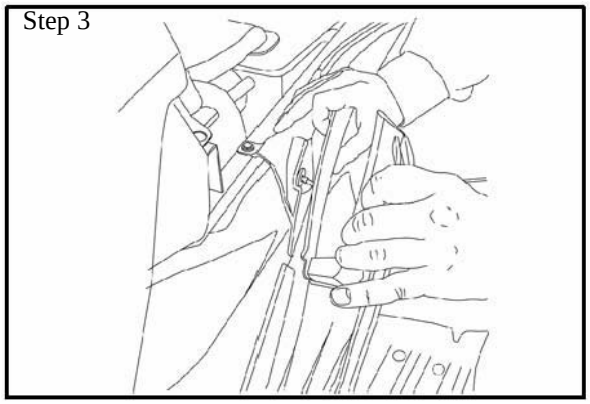
2. Grasp the rear of the side panel near the rear cab. With a firm motion, pull the panel outward to disengage the side panel from the grommet. Pull the panel downward and rearward to remove it from the ATV.

Step 2



3. Reinstall the side panel by reversing the removal procedure.

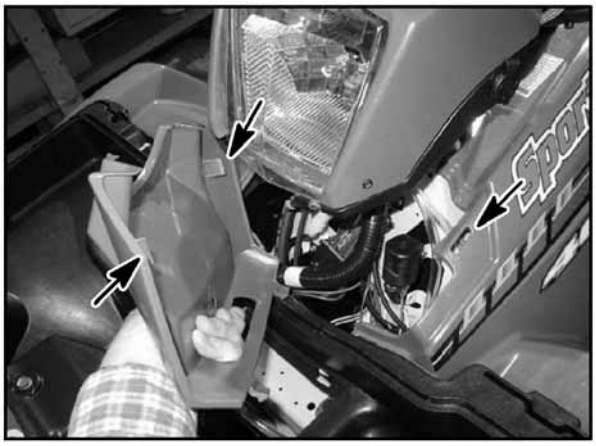
Step 3



Front Cover Removal / Installation

1. Open the front storage compartment
2. Pull up and outward on the front cover to remove the cover.

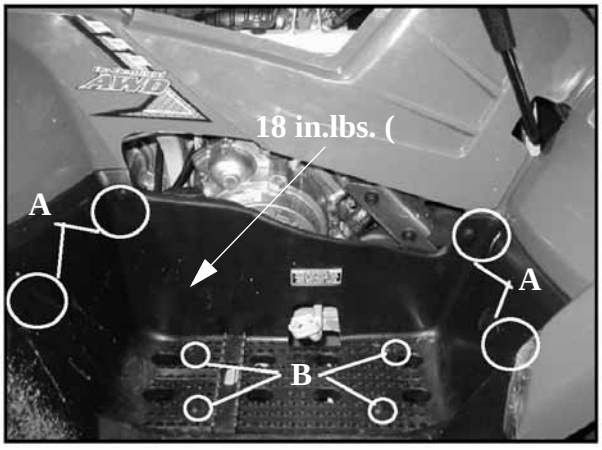
3. To install the front cover, insert the tabs of the front cover into the inserts of the cab. Make sure the tabs are aligned with the slots. Then press the rear tabs into the slots.



Foot Well Removal / Installation

1. Remove the four plastic inserts (A) that secure the wheel well to the front and rear cabs. (See “PLASTIC INSERT REMOVAL / INSTALLATION” for help).

2. Remove the four screws (B) from the bottom of the foot well. Remove the footwell.

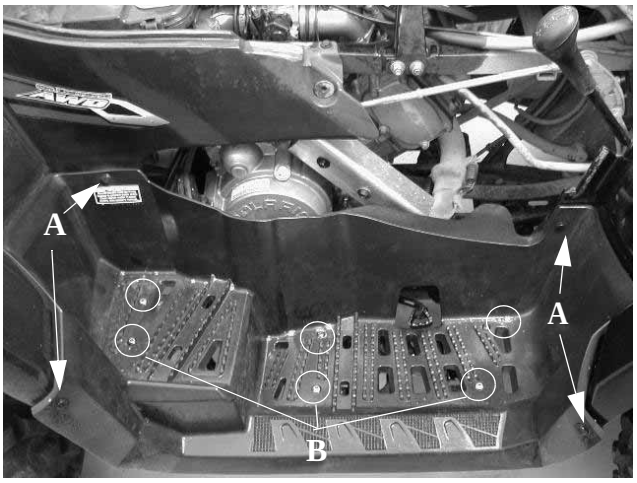


3. Reverse the removal procedures to install the foot well. Be sure to properly align the cab ends into the foot wells upon reassembly.

X2 Foot Well Removal / Installation

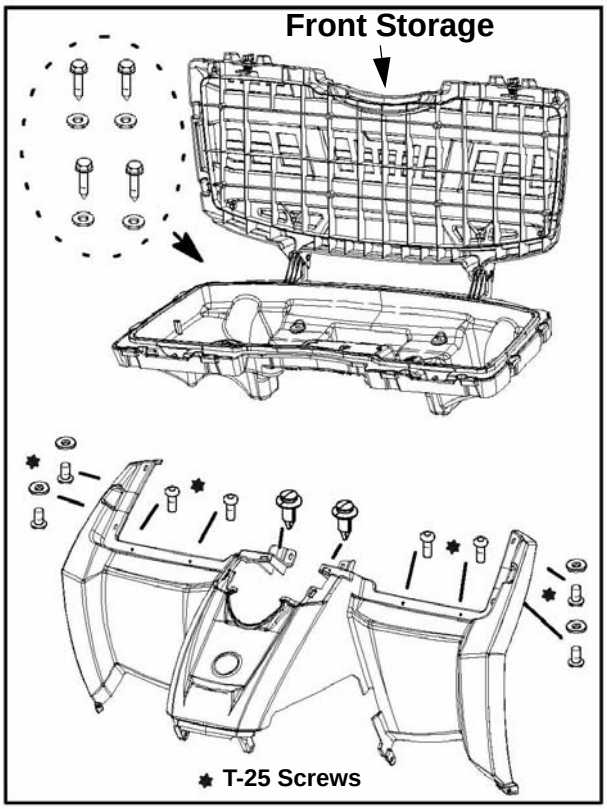
1. Remove the four plastic inserts (A) that secure the wheel well to the front and rear cabs. (See “PLASTIC INSERT REMOVAL / INSTALLATION” for help).

2. Remove the six screws (B) from the bottom of the foot well. Remove the footwell.

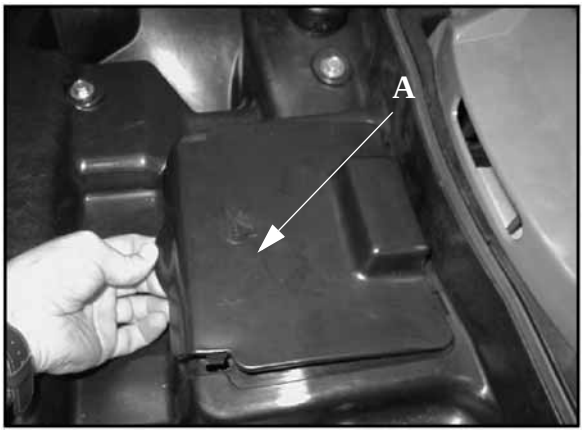


3. Reverse the removal procedures to install the foot well. Be sure to properly align the cab ends into the foot wells upon reassembly.

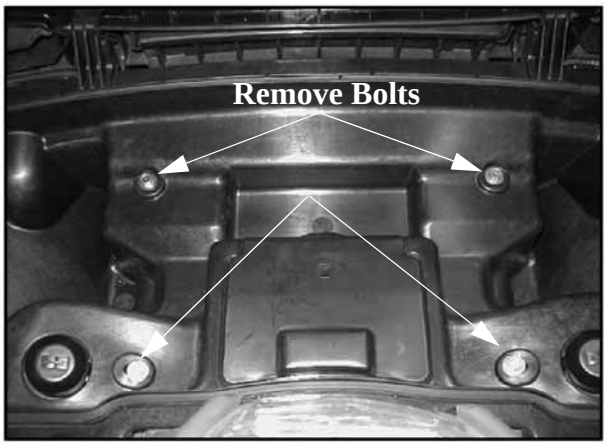
Front Storage Removal



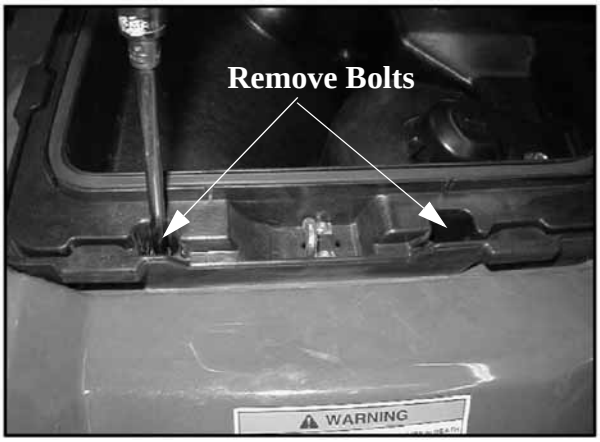
1. Remove the front radiator cap cover (A) by lifting upward on the cover.



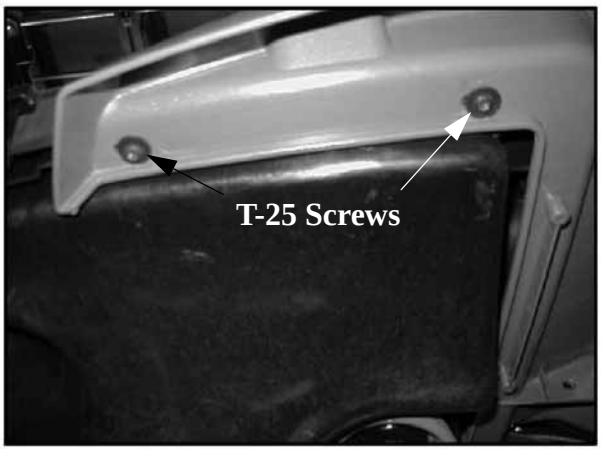
2. Remove the four bolts that secure the storage rack to the frame.



3. Remove the two (T25) screws that secure the storage box to the front fender well areas (each side).

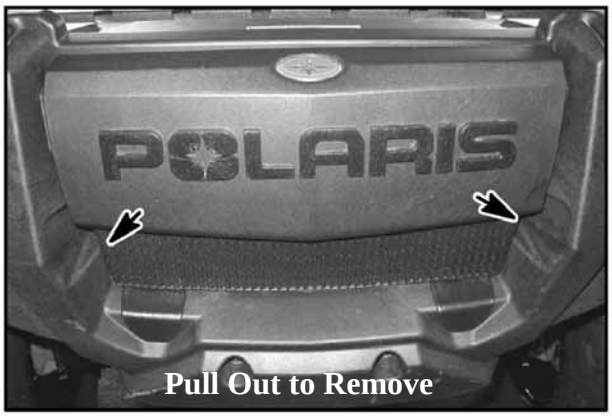


4. Remove the two (T25) screws that secure the outside of the storage box to the front fenders (each side).

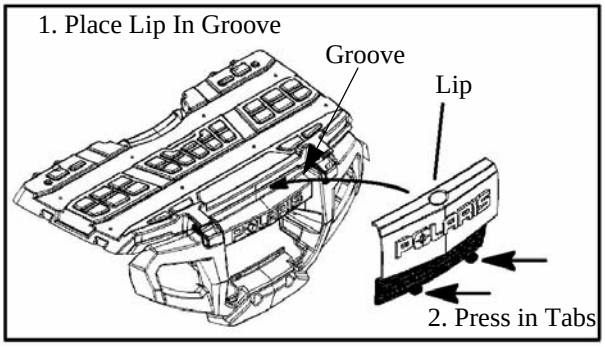


Winch Installation Area

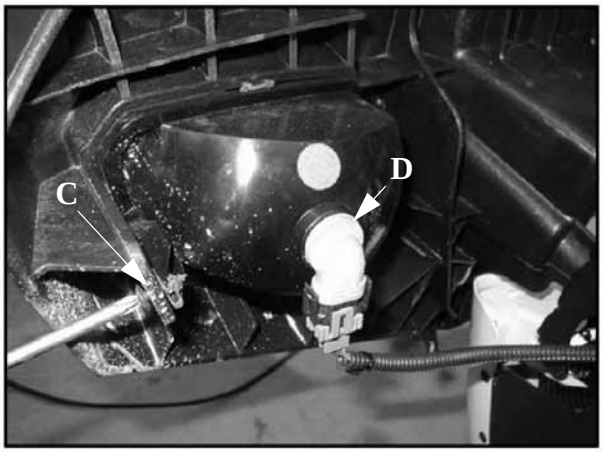
5. Remove the front cover piece by lifting up on sides of the two locking tabs as shown. Pull the tabs out of the notches and lift up on the cover piece.



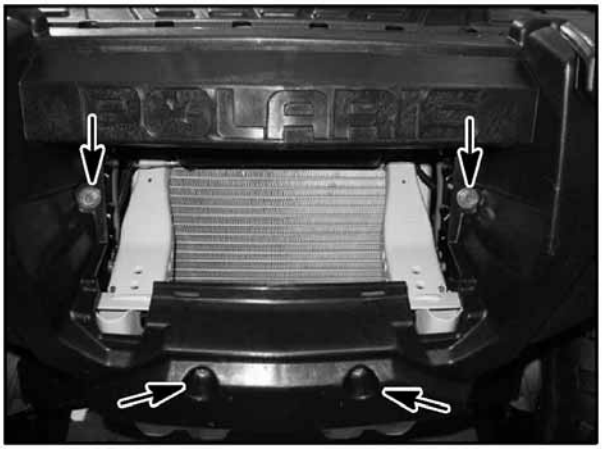
To install the front cover place top lip of the cover into and lift up to remove.



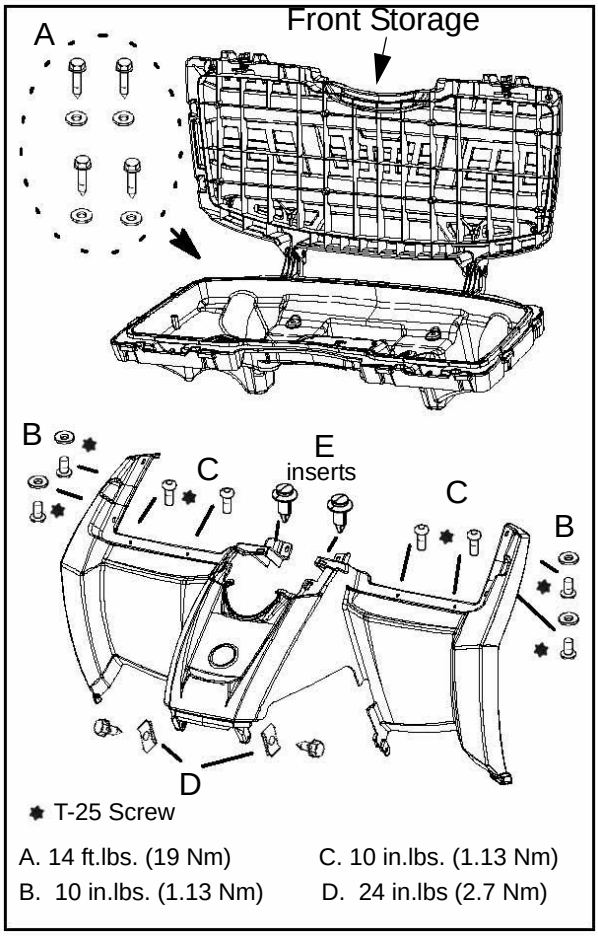
6. Remove the front headlights (C) or simply disconnect the electric connector (D) before removing the front plastic bumper.



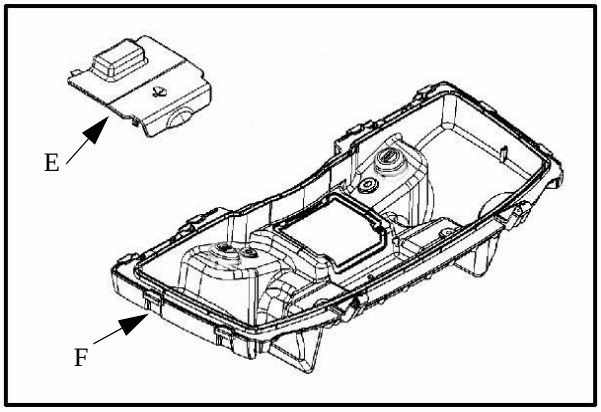
7. Remove the remaining bolts and screws that secure the front bumper section to the frame.



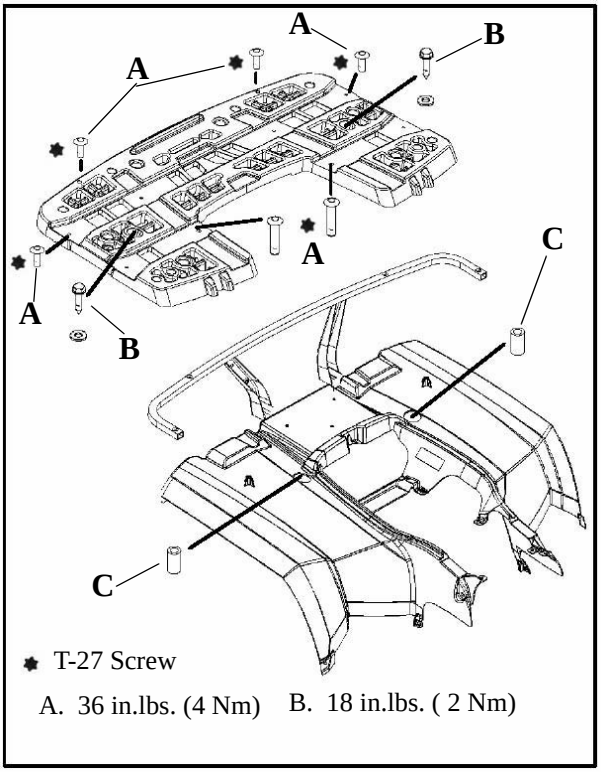
Front Storage Installation



1. Place the front storage rack onto the frame.
2. Install the four bolts (A) into the inside of the compartment hand tight.
3. Install the four screws and washers (B) (T-25) under the fender area (2 each side).
4. Install the four screws (C) (T-25) into the front fender area of the storage box (2 each side).
5. Install the two screws (D) into the rear area of the cab (if removed).
6. Install the two plastic inserts (E) into the front cab (if removed).
7. Torque all bolts and screws according to the illustration.
8. Install the front radiator cap cover (E) .

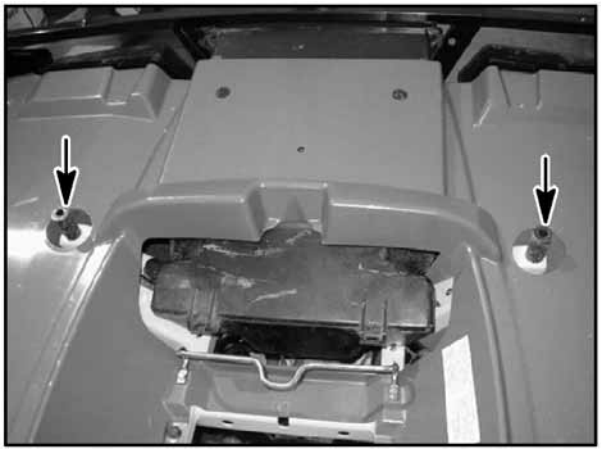


Sportsman Rear Rack Removal / Installation



1. Remove the six (A) T27 screws and two bolts (B) that secure the rear rack to the rear cab and frame.
2. Lift the rear rack from the ATV. Remove the two rack spacers (C).

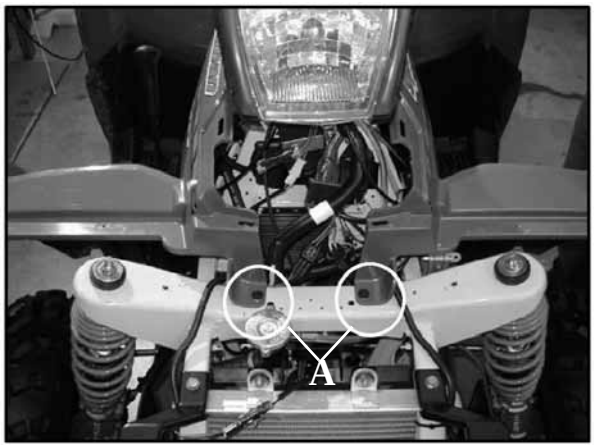
3. Place spacers on frame.



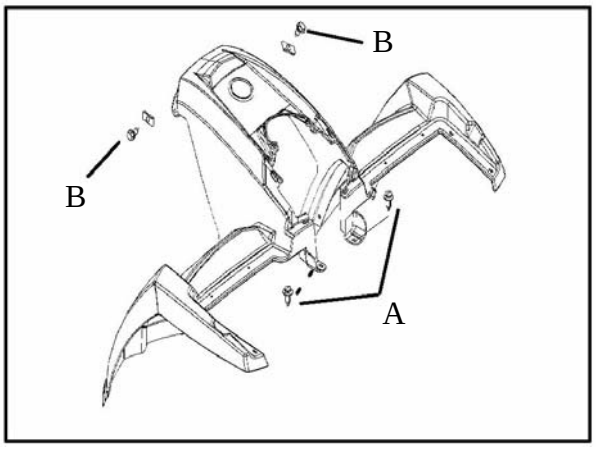
4. Install rear rack onto rear frame and cab.
5. Install the two bolts (B) and six (A) T-27 screws. Torque the bolts (A) to 18 in.lbs. (2 Nm) and six T-27 screws to 36 in.lbs. (4 Nm). Refer to the illustration for torque values.

Front Cab/Fender Removal/Installation

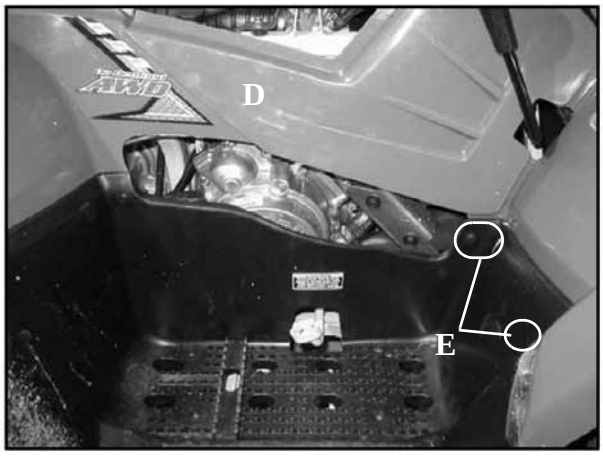
1. Follow the "FRONT RACK / BUMPER REMOVAL" section to begin removal of the front cab, rack, and bumper.
2. Remove the plastic inserts (A) that secure the front cab to the upper strut support.



3. Remove the two screws (B) that secure the front cab to the frame in the fuel tank mount area.



4. Remove the side panels (D), refer to the "SIDE PANEL REMOVAL" section.
5. Remove the plastic inserts (E) that secure the front of the foot wells to the front cab.



6. Remove the fuel cap and place a clean lint free shop towel into the tank neck to keep any debris from falling into the tank.
7. The front cab should now slide back over the fuel tank and fuel tank neck.

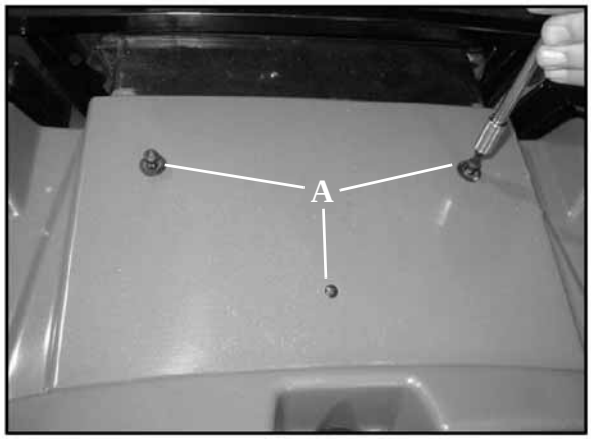
NOTE: When removing the front cab use caution so the plastic cab does not scratch or get caught on other components.

8. Reverse the removal steps for installation. Torque two front cab to frame screws to specification.

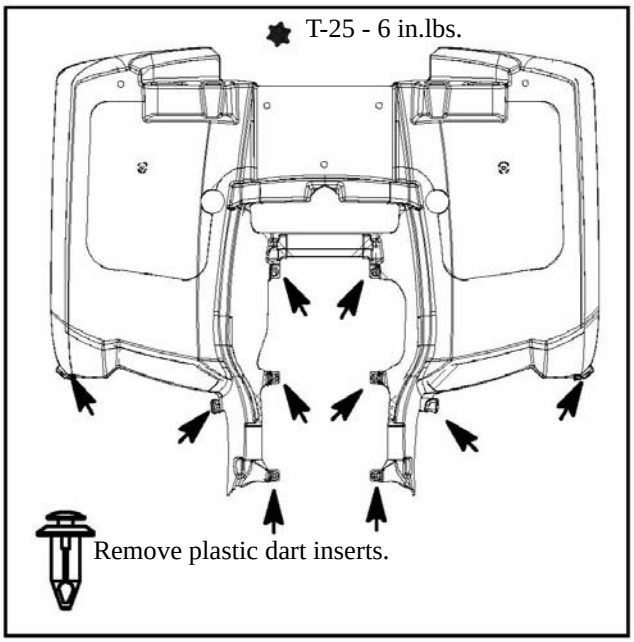
= T
Cab to Frame Screws **24 in.lbs. (2.7 Nm)**

Sportsman Rear Cab / Fender Removal / Installation

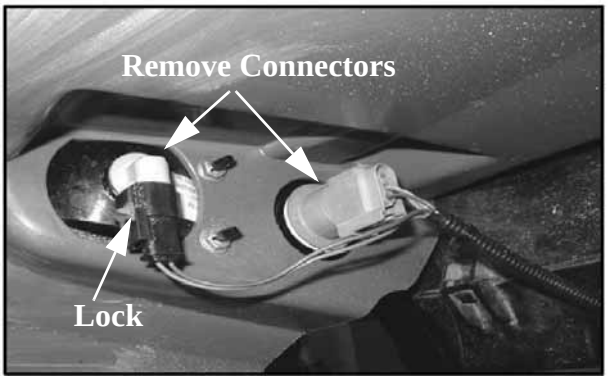
1. Follow the "REAR RACK REMOVAL" procedure to remove the rear rack.
2. Remove the three screws (A) (T-25) that secure the rear cab to the storage container.



3. Remove the ten plastic inserts that secure the rear cab to the frame and plastic.



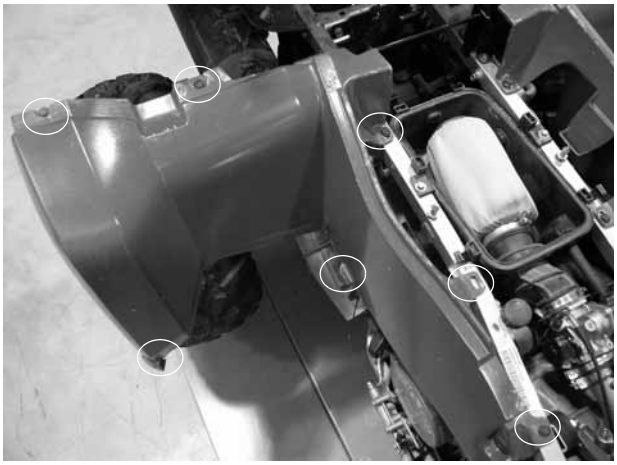
4. Disconnect the rear lights by pulling the locks on each side and removing the connectors. Lift the rear cab from the frame.



5. Reverse the removal steps for installation.

X2 Rear Quarter Panel Removal / Installation

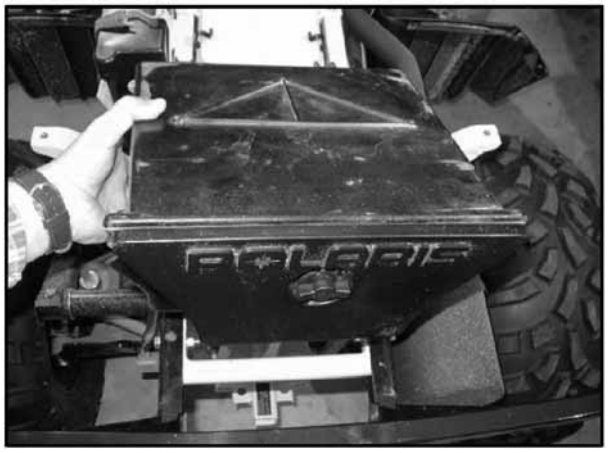
1. Remove the seat.
2. Remove the plastic inserts (circled) that secure the quarter panel to the rear footwell. (See "PLASTIC INSERT REMOVAL / INSTALLATION" for information).



3. Reverse the removal procedures to install the quarter panels. Verify panels are properly aligned to the footwell end upon reassembly.

Sportsman Rear Storage Removal / Installation

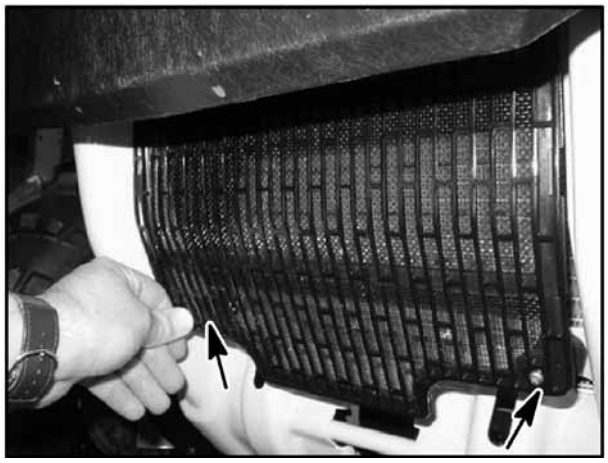
1. Follow the “REAR RACK REMOVAL” and “REAR CAB REMOVAL” procedure to remove the rear storage compartment. After the rear cab is removed the storage compartment comes out.
2. Remove the two plastic inserts that hold the rear storage compartment in place.
3. For installation, reverse the removal steps.
4. Torque the three T-25 screws that hold the rear storage to the rear cab to specification.



= T
T-25 Screw Torque **6 in. lbs. (0.70 Nm)**

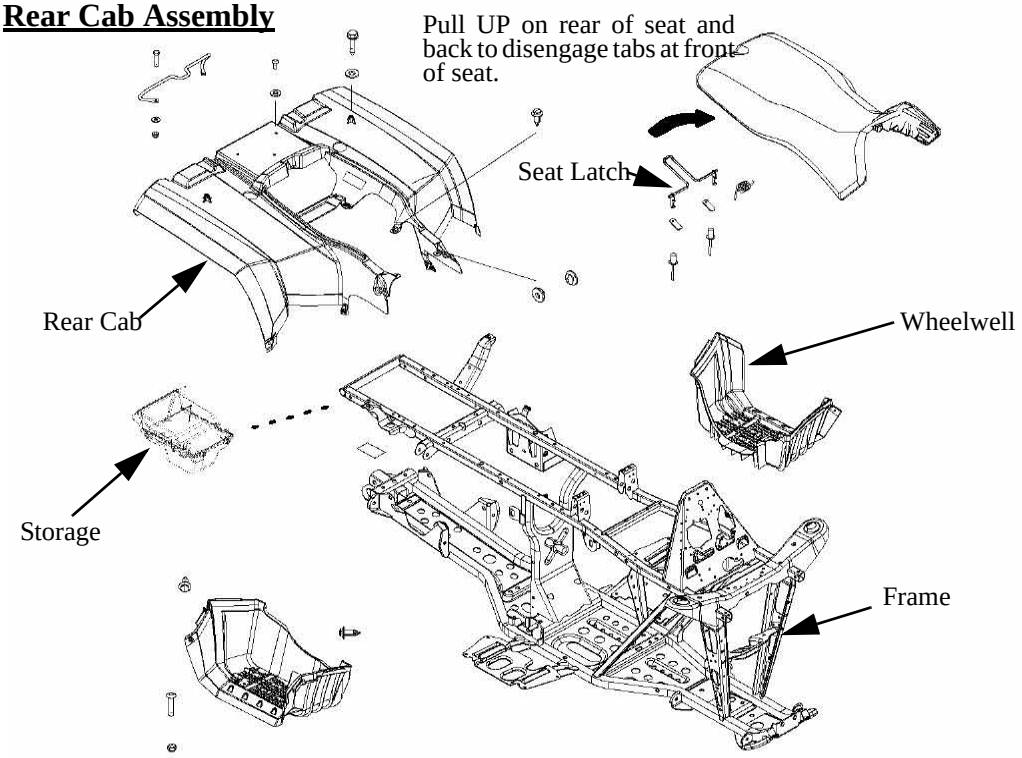
Radiator Screen Removal

1. Pull out slightly on the top of the radiator screen.
2. With the top free, pull out on the bottom of the screen to remove the screen.
3. To install the screen, simply press the tabs on the screen back into the mounting grommets. Be sure the screen is securely in place.

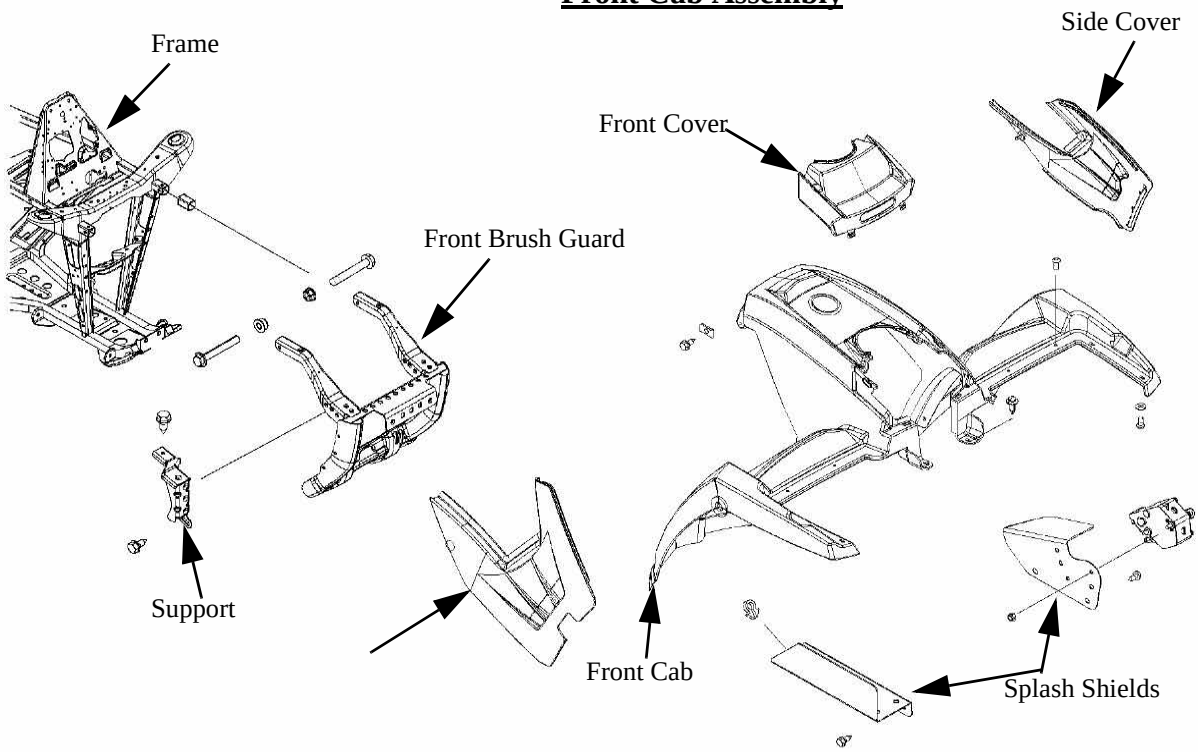


Sportsman Body Assembly Exploded View

Rear Cab Assembly

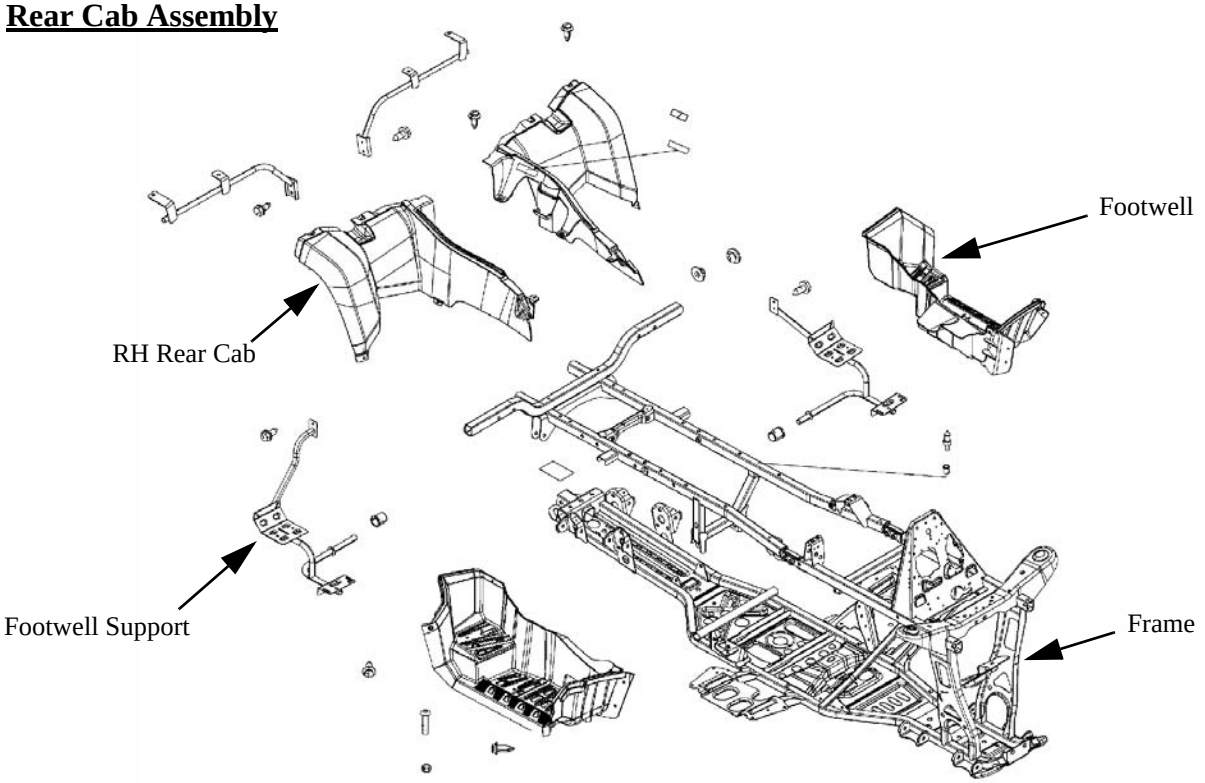


Front Cab Assembly

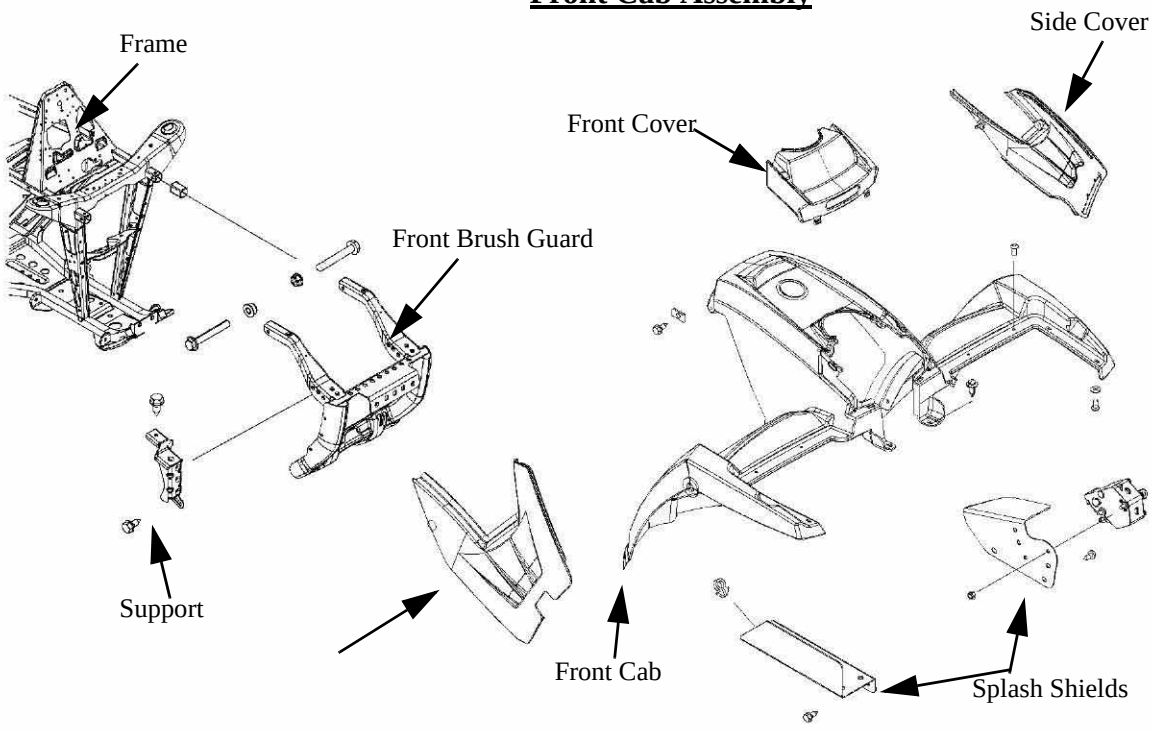


X2 Body Assembly Exploded View

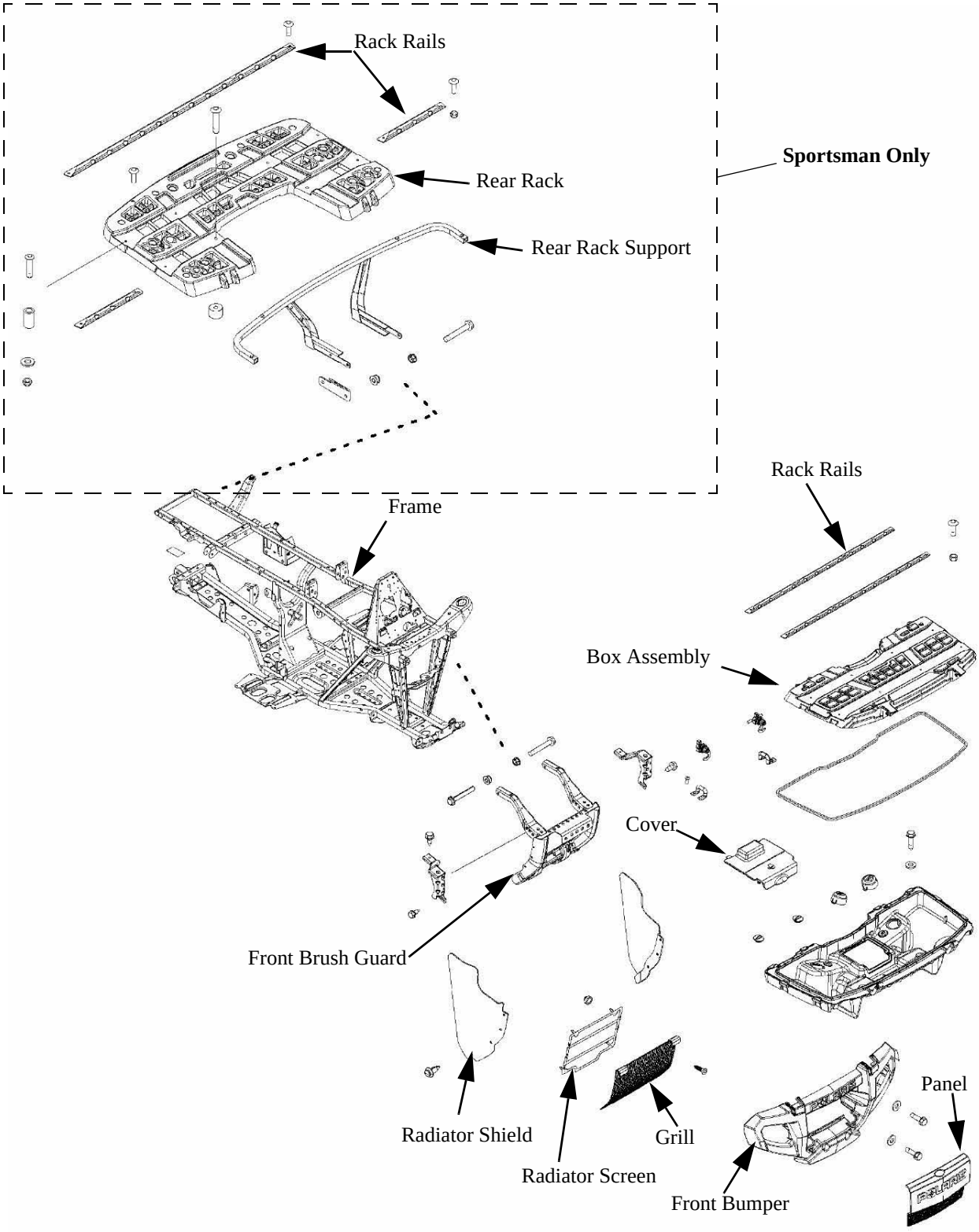
Rear Cab Assembly



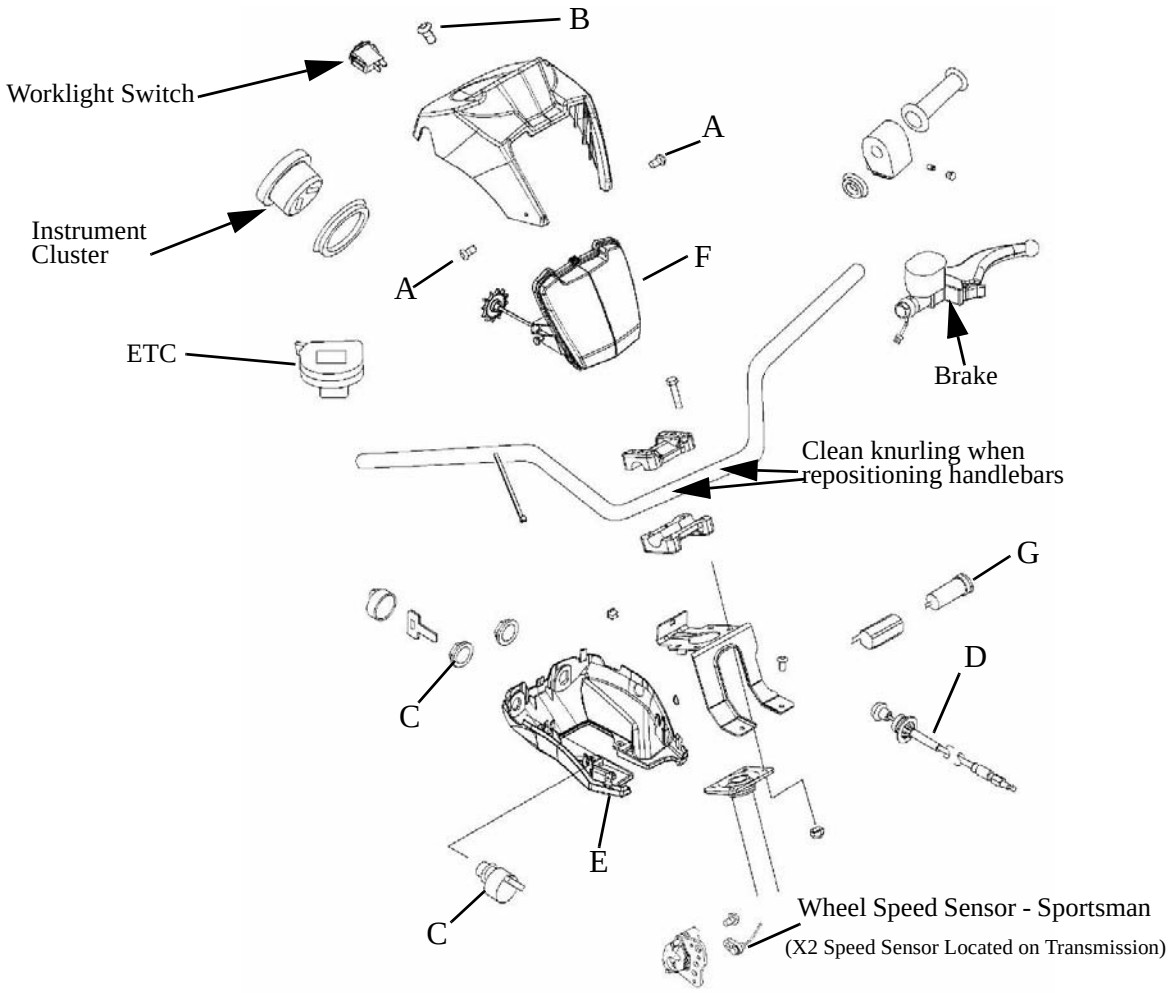
Front Cab Assembly



Body / Rack Exploded Views



Headlight Pod Exploded View



Disassembly

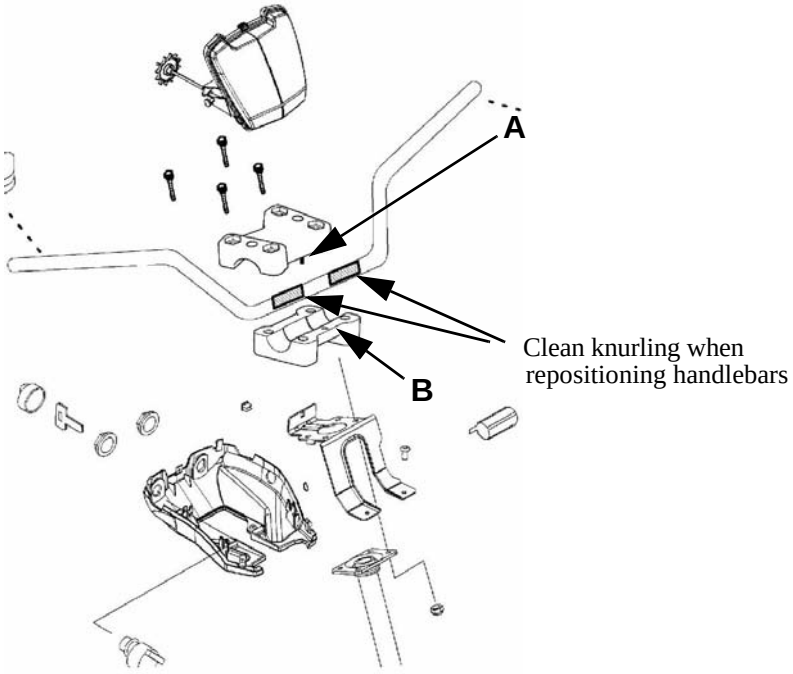
- Remove two side Phillips screws (A)
- Remove one rear Phillips screw (B)
- Lift top half of pod
- Disconnect instrument cluster wire connectors
- Disconnect work light switch connector
- Disconnect 12Vdc power plug (G)
- Disconnect headlight harness
- Remove ignition switch (C) and choke cable (D)
- Remove headlight (F) with adjuster
- Remove two screws securing bottom half of pod (E)

Assembly

- Install bottom of pod onto handlebar and secure to brackets
- Install key switch, choke cable, and headlight
- Connect 12Vdc power outlet (where applicable)
- Connect headlight
- Connect instrument cluster connectors to instrument cluster
- Install top of pod onto bottom half, making sure interlocking tabs mate properly
- Install two side Phillips screws
- Install one rear Phillips screw
- To adjust headlight, refer to procedure outlined in Chapter 2

STEERING

Handlebar Block Installation Procedure



1. The pin (A) on the bottom side of the top handlebar block faces down and to the front of the ATV.

2. The bottom handle bar block has a side with 3 holes, the side with 3 holes faces up and to the front of the ATV.

3. Align the pin (A) in the top block with the middle hole (B) in the bottom block for proper installation. The pin (A) and middle hole (B) should face the front of the ATV.

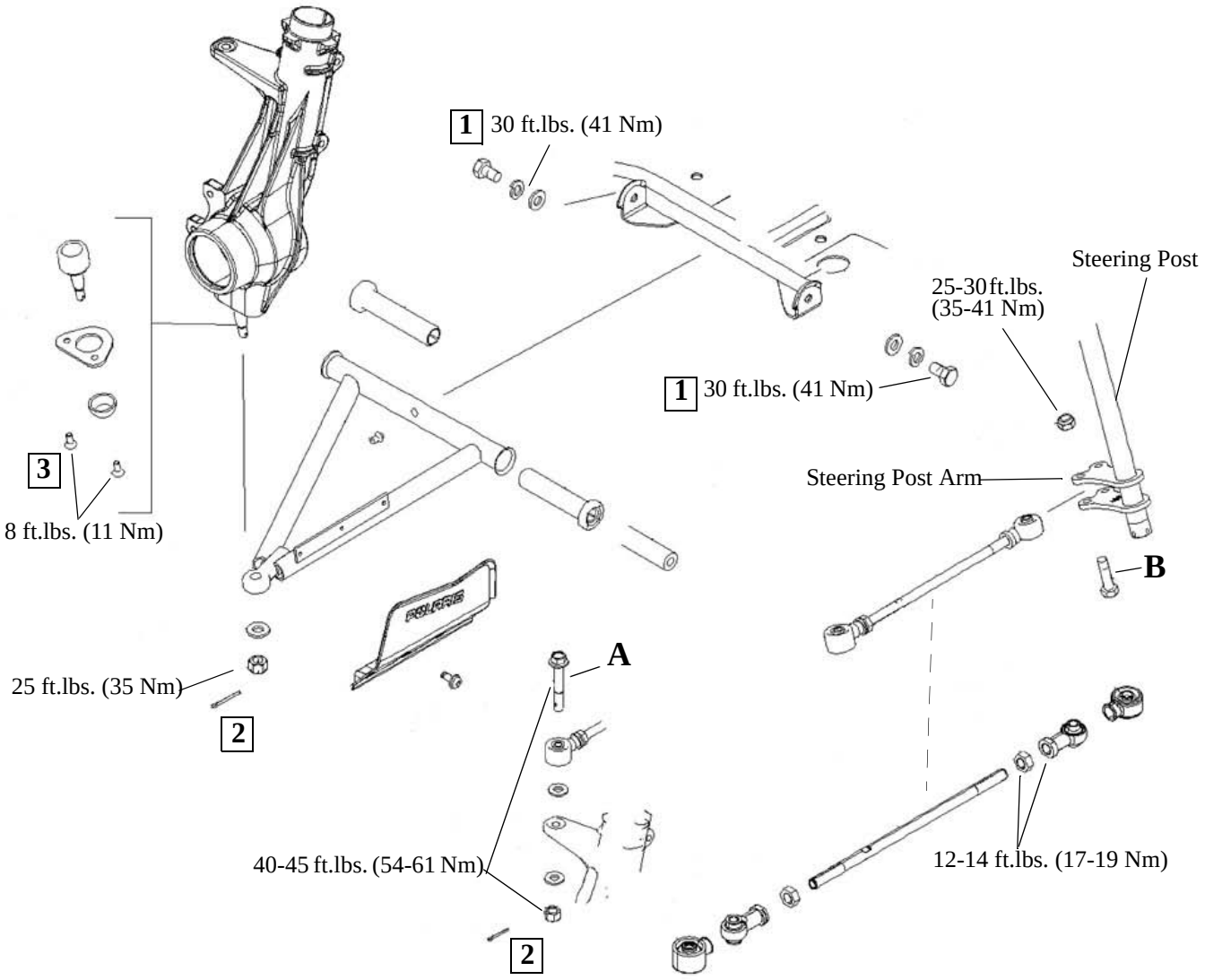
4. Install the pin side bolts first and evenly tighten the bolts down. Evenly torque the 2 front bolts to specification.

= T
Handle Bar Bolt Torque **11-13 ft.lbs.(15-18 Nm)**

5. Install the rear bolts and tighten evenly. Evenly torque the 2 rear bolts to specification.

NOTE: There will be a slight gap on the backside of the blocks after the procedure is performed.

Steering / A-arm Exploded View



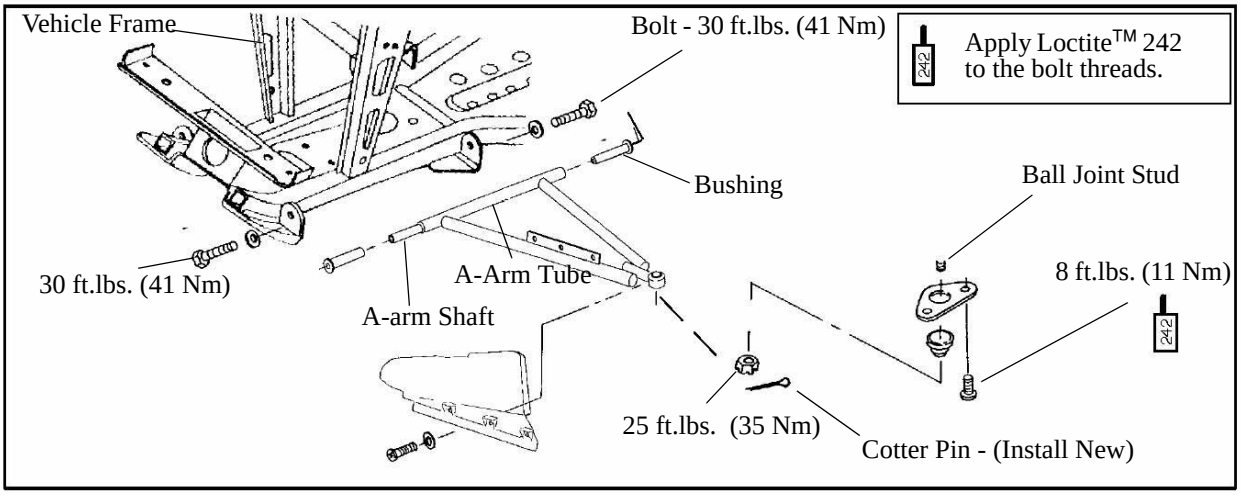
1 Always use new bolts upon reassembly.

2 Always use new cotter pins upon reassembly. Install with open end toward rear of machine.

3 Apply Loctite™ 242 to bolt threads.

NOTE: To avoid damage to tie rods and other steering components, be sure to install tie rod end bolts in the proper direction. The steering post arm bolt (B) points up; the rod end bolts (A) point down. Verify inner rod ends are placed between the steering post arms.

A-Arm Replacement



1. Elevate and safely support vehicle with weight removed from front wheel(s).
2. Remove cotter pin from ball joint stud at wheel end of A-arm and loosen nut until it is flush with end of stud.
3. Using a soft face hammer, tap nut to loosen A-arm from bolt. Remove nut and A-arm from hub strut assembly.
4. Loosen two bolts on A-arm tube by alternating each about 1/3 of the way until A-arm can be removed.
5. Examine A-arm shaft. Replace if worn. Discard hardware.
6. Insert A-arm shaft into new A-arm.
7. Install CV joint shields.
8. Install new A-arm assembly onto vehicle frame. Torque new bolts to specification.

= T
A-Arm Bolt Torque: **30 ft. lbs. (41.4 Nm)**

⚠ WARNING
The locking features on the existing bolts were destroyed during removal. DO NOT reuse old bolts. Serious injury or death could result if fasteners come loose during operation.

9. Attach A-arm to hub strut assembly. Tighten ball joint nut to specification. If cotter pin holes are not aligned, tighten nut slightly to align. Install a new cotter pin with open ends toward rear of machine. Bend both ends in opposite directions around nut

= T
Ball Joint Nut Torque: **25 ft. lbs. (35 Nm)**

⚠ WARNING
Upon A-arm installation completion, test vehicle at low speeds before putting into regular service.

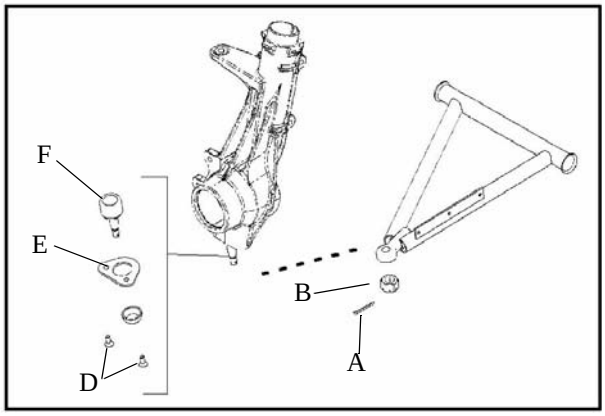
Ball Joint Replacement

NOTE: Refer to the illustration on the previous page for this procedure.

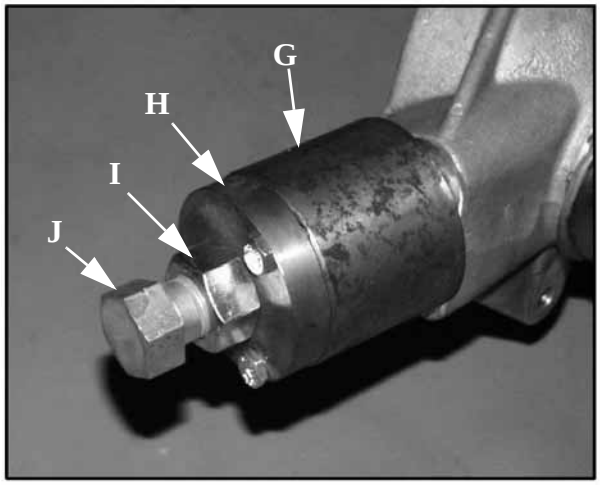
1. Loosen front wheel nuts slightly.
2. Elevate and safely support machine under footrest/frame area.

> **⚠ CAUTION**
>
> Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure.

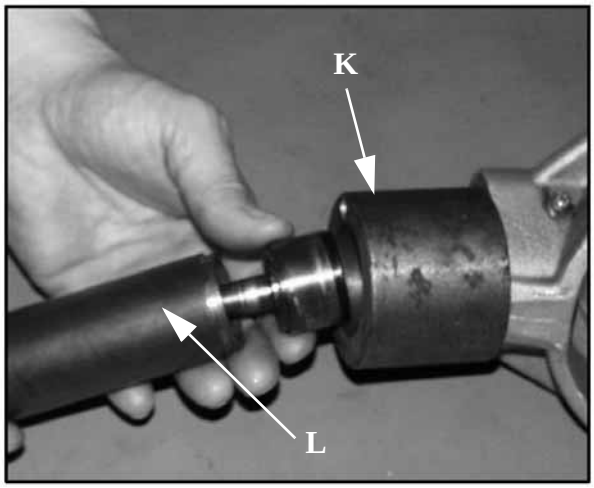
3. Remove wheel nuts and wheels.



4. Remove cotter pin (A) from ball joint castle nut (B).
5. Remove castle nut (B) and separate A-arm (C) from ball joint stud.
6. Remove screws (D) and ball joint retaining plate (E).
7. Use the Ball Joint Replacement Tool (PN 2870871), **remove** ball joint (F) from strut housing. Refer to photos.



8. Install puller guide (G) with extension cap (H).
9. Apply grease to extension cap and threads of puller bolt to ease removal.
10. Thread bolt (J) with nut (I) onto ball joint stud as shown.
11. Apply heat to ease removal.
12. Hold bolt (J) and turn nut (I) clockwise until ball joint is removed from strut housing.



13. To **install** a new ball joint, Remove extension cap and attach puller guide using short bolts provided in the kit.
14. Remove extension cap and attach puller guide using short bolts provided in the kit.
15. Insert new ball joint (K) into driver (L).
16. Slide ball joint/driver assembly into guide.
17. Apply heat to ease installation.
18. Drive new joint into strut housing until fully seated.
19. Apply Loctite™ 242 **(PN 2871949)** to threads of retaining plate screws or install new screws with pre-applied locking agent. Torque screws to specification.

= T
Retaining Screw Torque: **8 ft. lbs. (11 Nm)**

20. Install A-arm on ball joint and torque castle nut to specification.

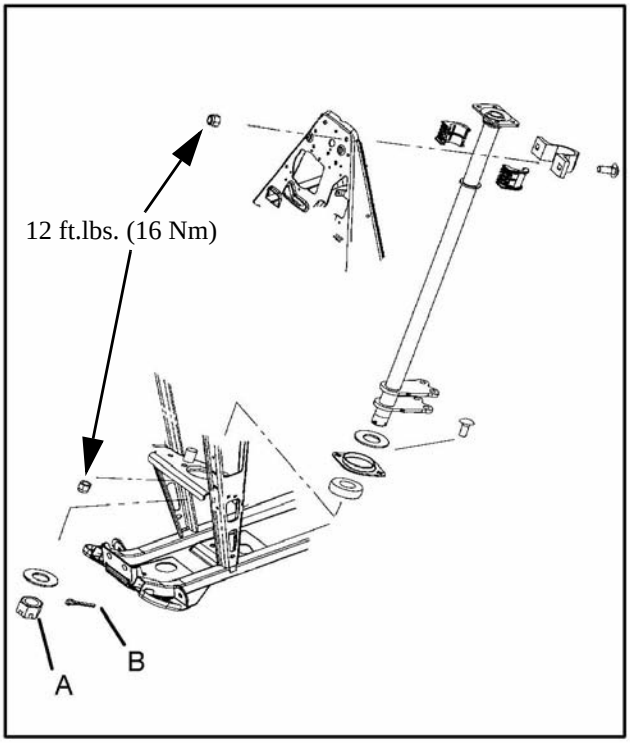
= T
Castle Nut Torque: **25 ft. lbs. (35 Nm)**

21. Reinstall cotter pin with open ends toward rear of machine.

Steering Post Removal

1. Remove the front cab.
2. Remove the handle bar pod.
3. Remove the handle bar.
4. Remove the fuel tank bracket assembly.
5. Remove the steering tie rod ends from the steering bracket. Note the orientation of the fasteners and bracket on the steering assembly.
6. Remove the steering post nut (A) at the mount plate.
7. Remove the top steering bracket .
8. Remove the steering post.

Steering Post Assembly



1. Hand tighten steering post slotted nut (A).
2. Align the cotter pin hole on the steering post slotted nut (A).
3. Install the cotter pin (B). Bend both ends of the cotter pin around the slotted nut (A) in opposite directions.
4. Check the steering, the handle bars must move freely and easily from full left to full right without binding.

SUSPENSION

Front Strut Cartridge Replacement

NOTE: Refer to illustration on following page.

1. Hold strut rod and remove top nut.
2. Remove upper strut pivot assembly.

Strut Rod Wrench:
(PN 2871572)
Strut Spring Compressor Tools:
(PN 2871573) and (PN 2871574)

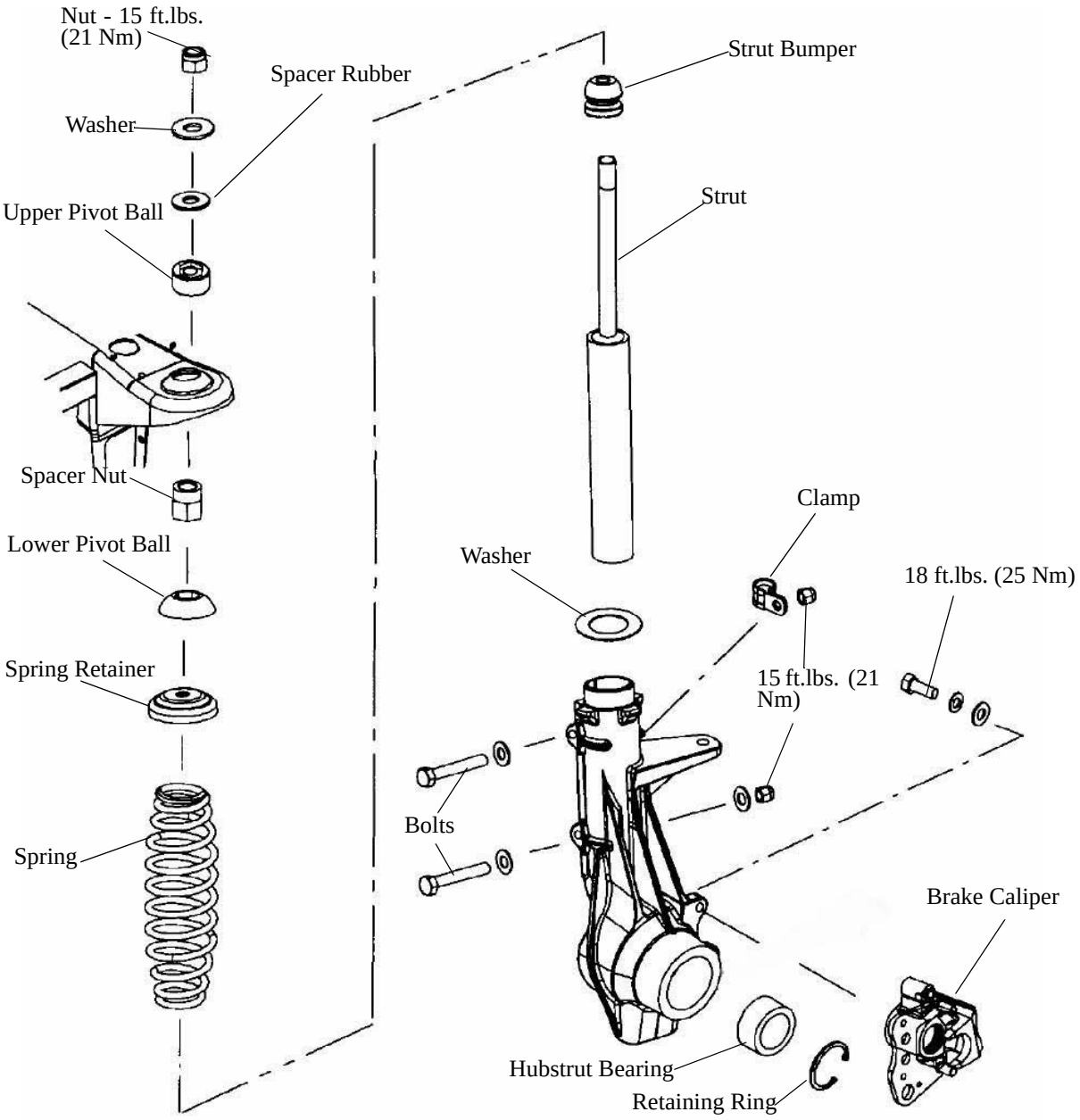
3. Compress spring using any commercially available spring compressor tool and remove the spacer nut.
4. Remove coil spring and collapse strut cartridge.
5. Remove two pinch bolts from strut casting.
6. Remove strut cartridge.
7. Install cartridge until bottomed in strut casting.
8. Install pinch bolts with wire clamp(s). Torque pinch bolts to specification.

= T
Pinch Bolt Torque: **15 ft. lbs. (21 Nm)**

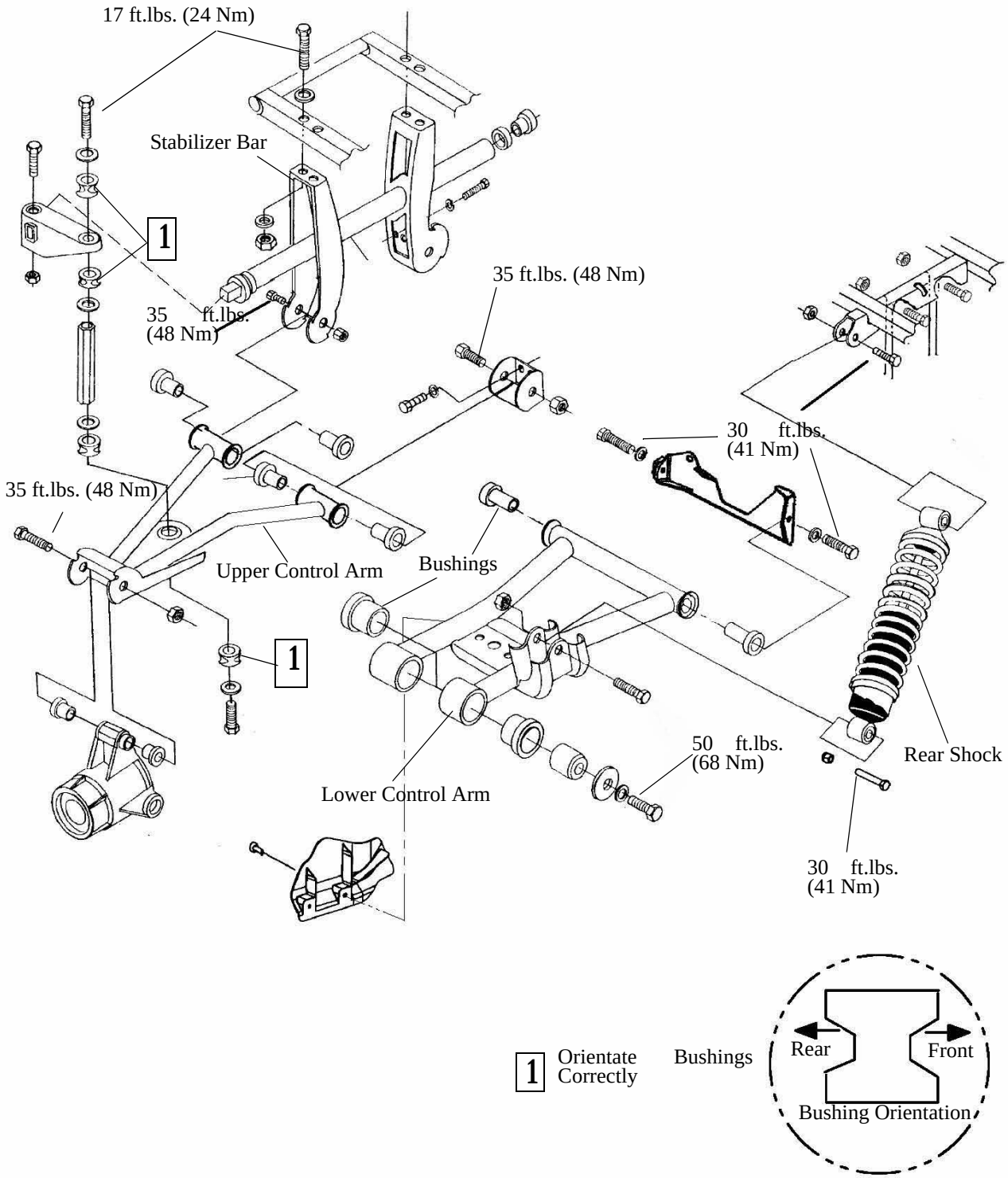
9. Reassemble spring and top pivot assembly. Be sure all parts are installed properly and seated fully.
10. Torque strut rod nut to specification. Do not over torque the nut.

= T
Strut Rod Nut Torque: **15 ft. lbs. (21 Nm)**

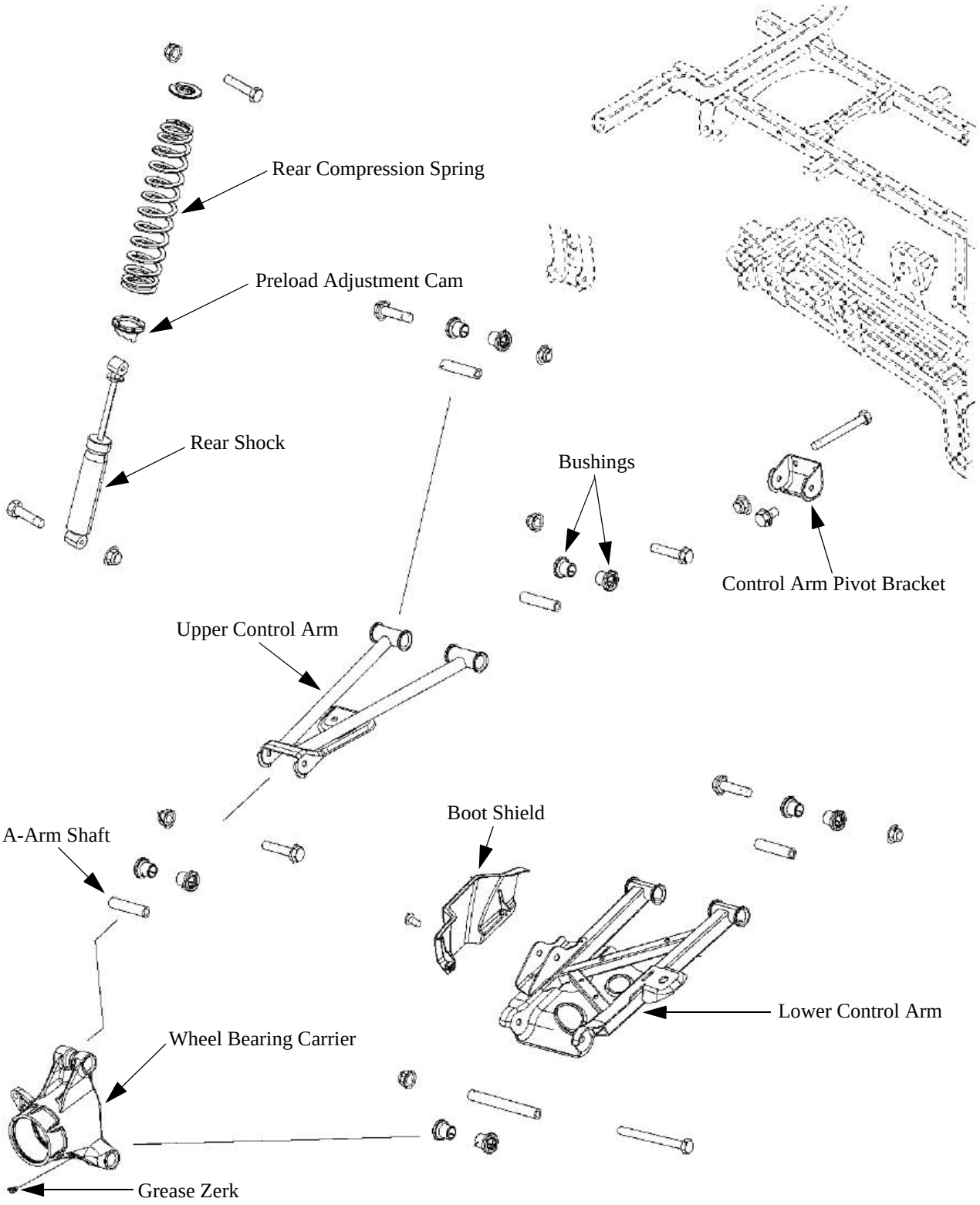
Strut Assembly



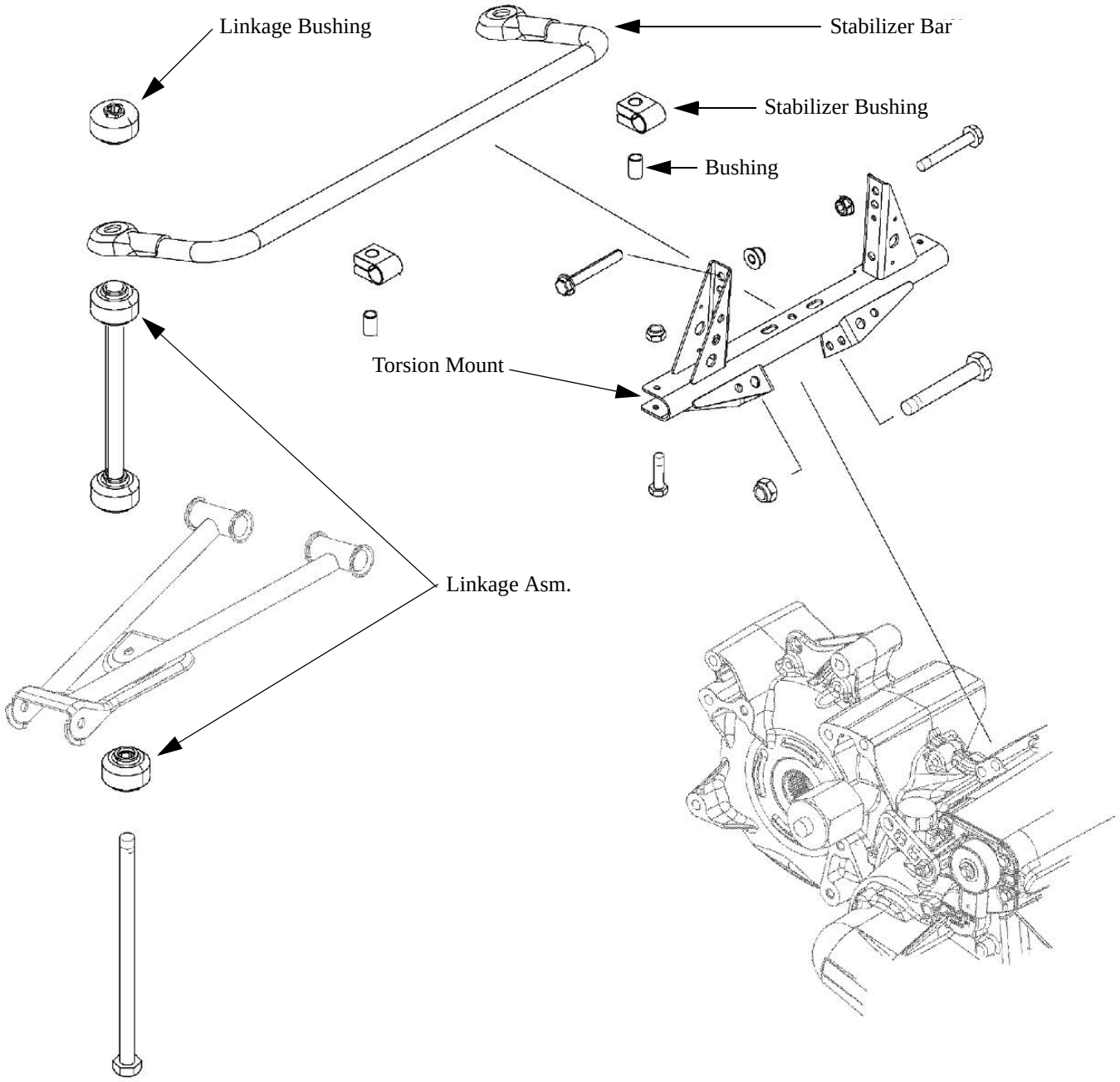
Sportsman Rear Suspension Assembly



X2 Rear Suspension Exploded View

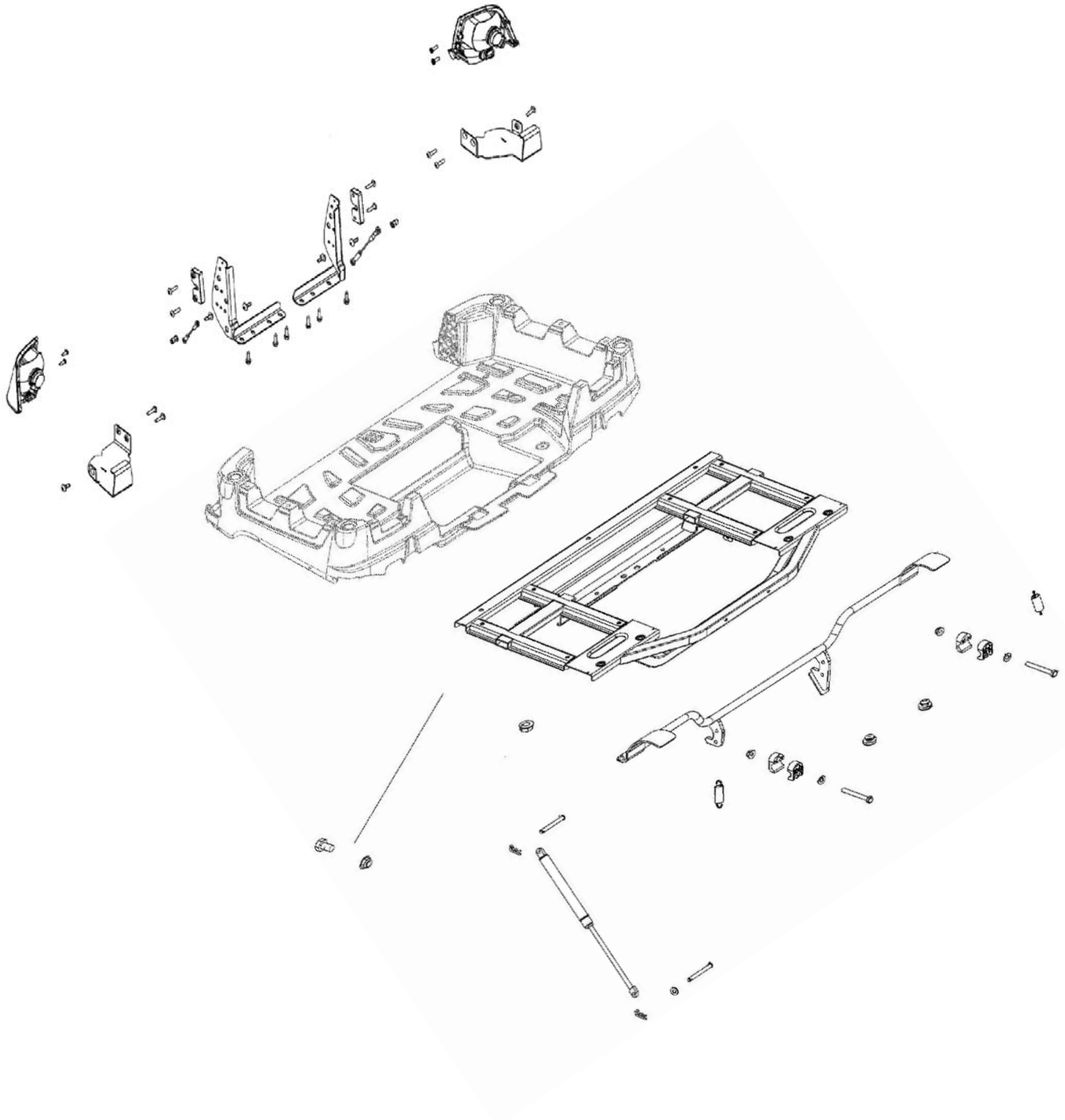


X2 Torsion Bar Exploded View



X2 CARGO BOX

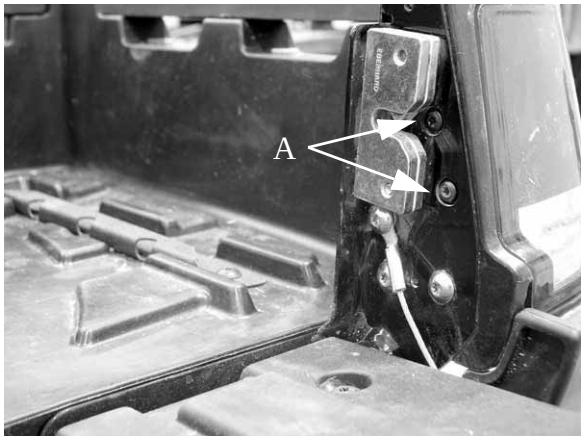
Exploded View



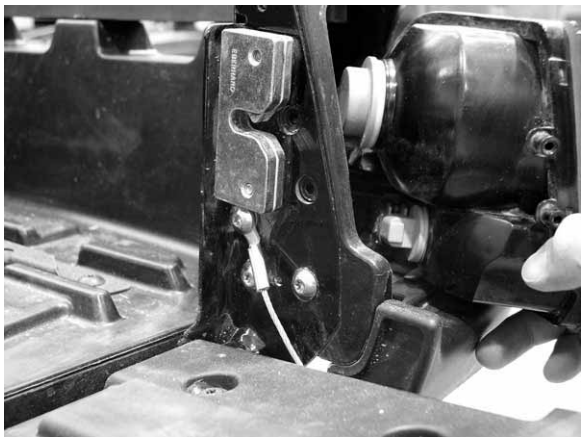
Removal / Installation

IMPORTANT: Before attempting to remove the cargo box, be sure that the cargo box is not set up for 2-UP riding. The passenger backrest should be face down in the cargo box and the driver seat backrest should be locked into position.

1. Open the tailgate and remove the 2 torx head screws (A) securing the rear taillights on each side of the cargo box as illustrated below.



2. Remove the taillight assembly from the cargo box.

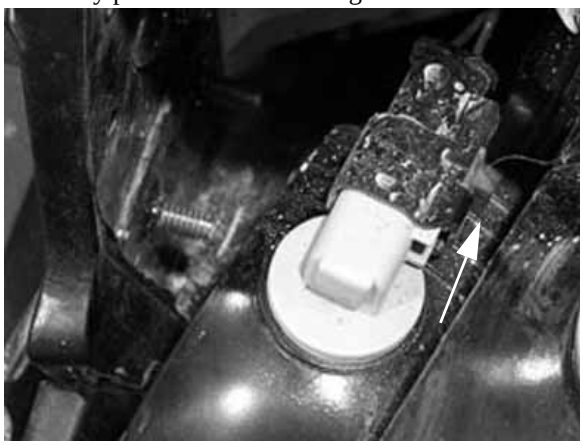


3. Disconnect the two wire harnesses connected to each of the taillights.

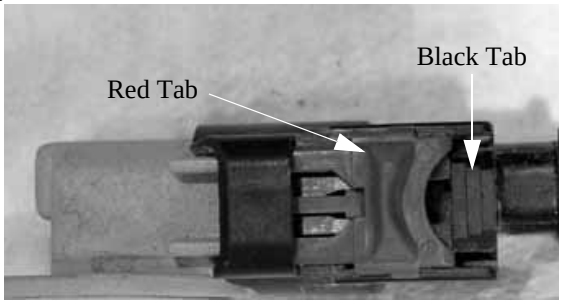
⚠ CAUTION

Use caution when disconnecting the smaller light bulb. Follow the procedure below to keep from damaging the connector. Damaging a connector may require wire harness replacement.

4. Carefully pull out the red locking tab on the connector.

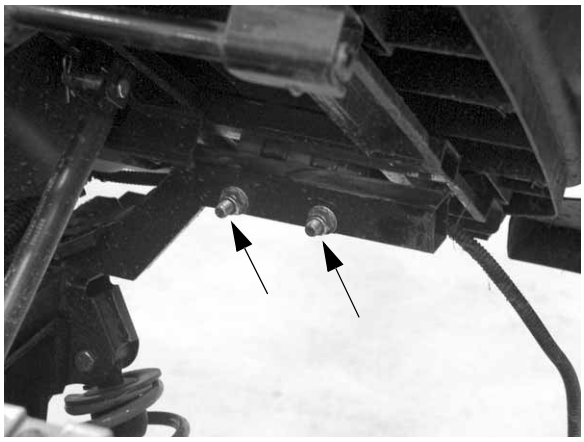


5. Once the red tab is pulled out, press in on the black tab and pull out to disconnect harness.

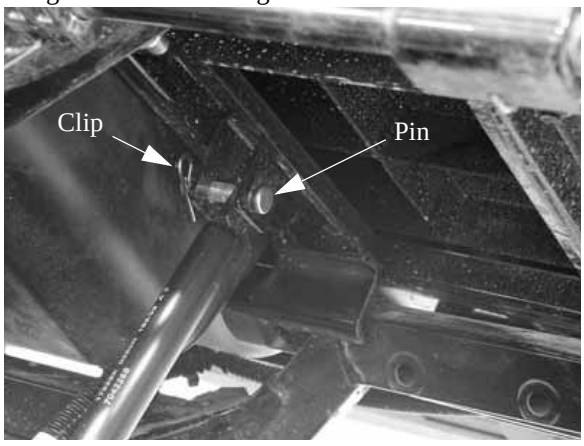


6. Lift up firmly in the cargo box release lever on either side of the ATV.

7. Remove the four bolts attaching the rear of the cargo box to the frame. There are two on each side.



8. Support the cargo box and remove the clip and pin holding the gas shock to the cargo box.



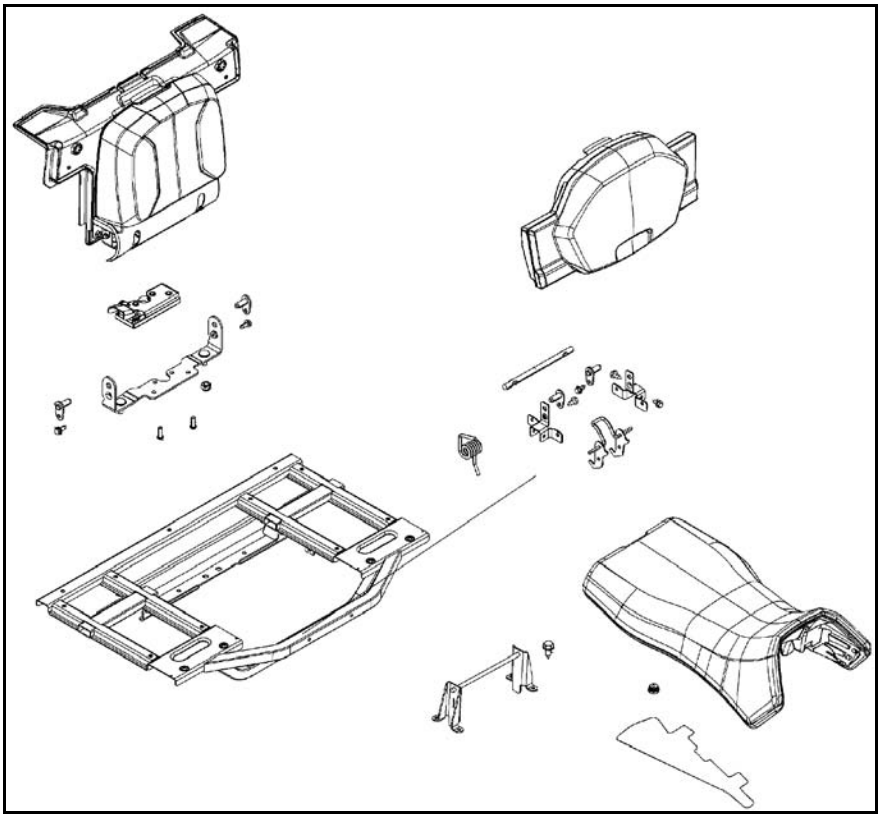
9. Carefully remove the cargo box from the ATV.

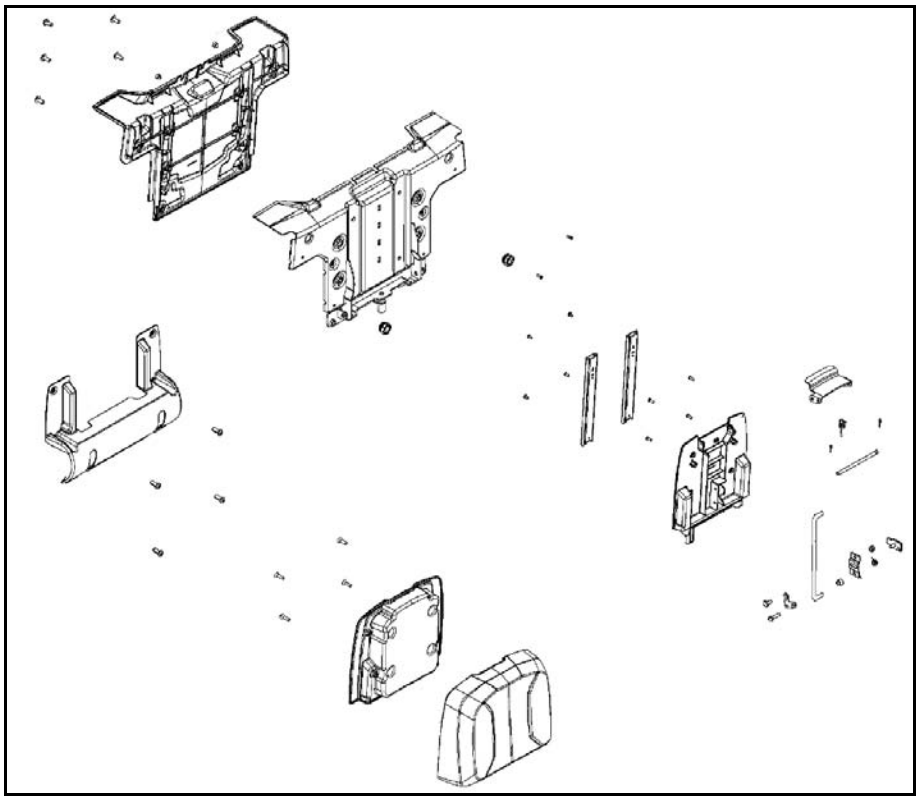
10. Reverse the removal steps to reinstall the cargo box. Refer to the standard fastener torque values in Chapter 1 during assembly.

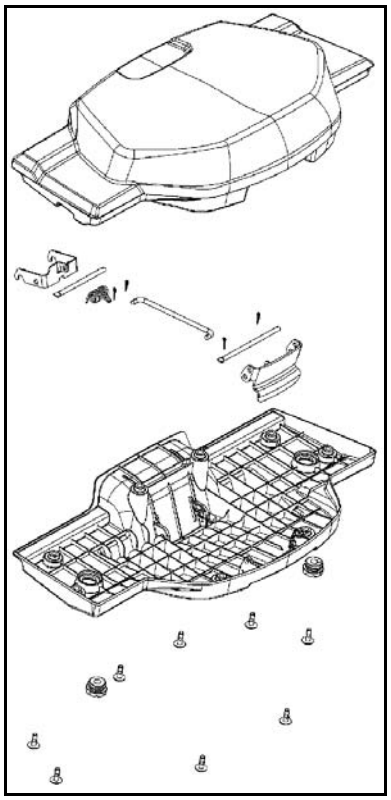
See “Standard Torque Specifications” on page 1.12.

X2 SEAT ASSEMBLY

Exploded Views



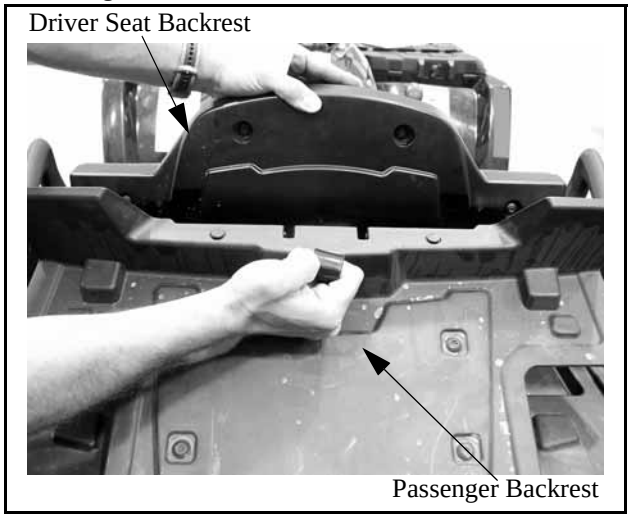




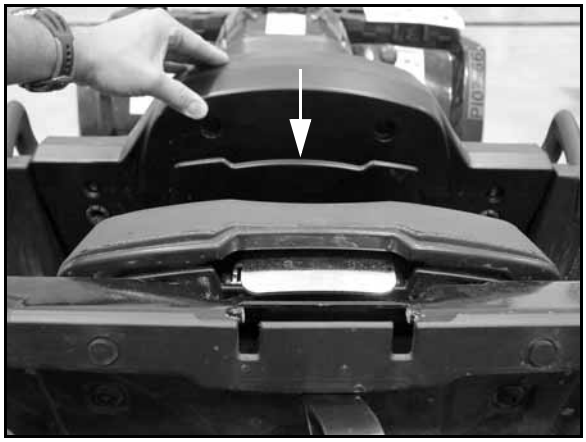
X2 Seat Operation - Configuring Cargo Box For Passenger Riding

1. Unlatch the driver seat backrest by turning the engagement knobs on each side in the directions shown below.

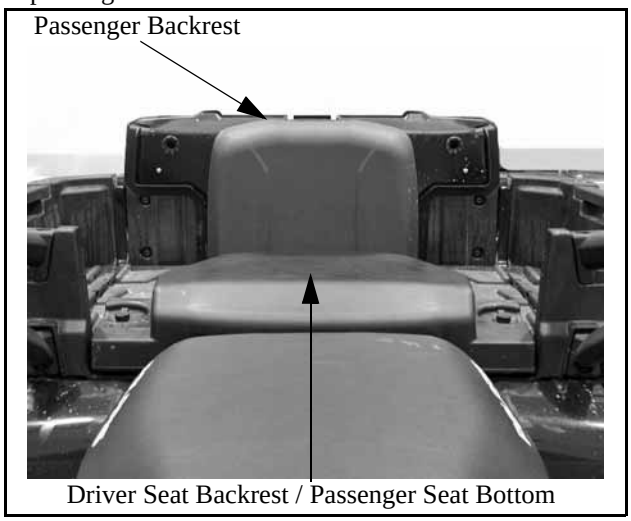
2. While pulling the backrest towards the front of the ATV, lift up on the passenger backrest loop that is face down in the cargo box.



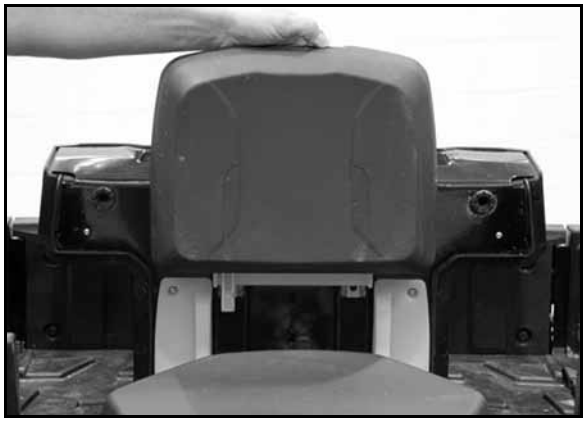
3. Lift the passenger backrest up and into place, then lay the driver seat backrest down into place



4. Fold the driver seat backrest down into place to serve as the passenger seat bottom.



5. Lift the latch on the passenger backrest to set the proper backrest height desired by the passenger.



Driver Seat Backrest Removal / Installation

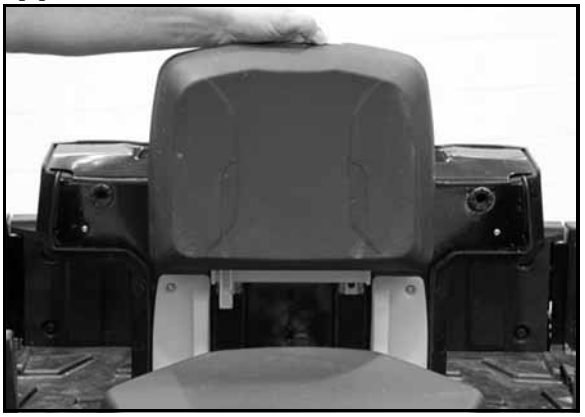
1. Configure the seating for 2-UP riding. With the passenger seat bottom in place, remove the two screws retaining the seat bottom.

2. Remove the two pivot pins holding the seat bottom to the frame and then lift up on the seat bottom to remove.

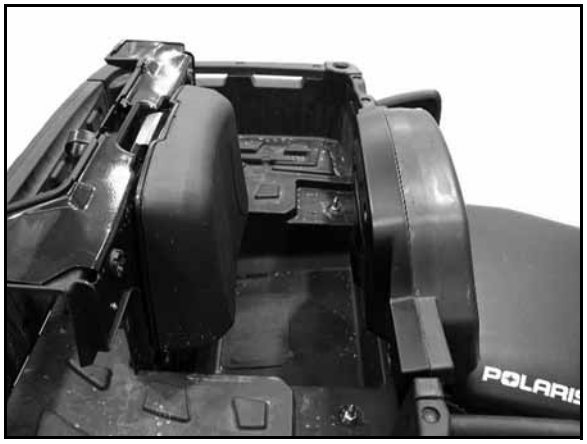
3. For installation, reverse the removal steps.

Passenger Seat Backrest Removal / Installation

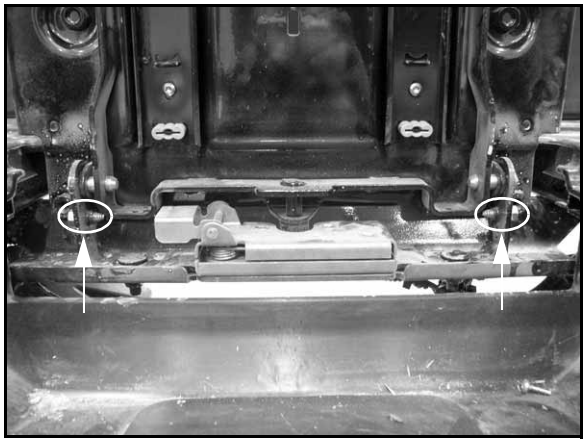
1. Configure the seating for 2-UP riding. Lift up on the latch for the passenger backrest and lift the backrest to the full up position.



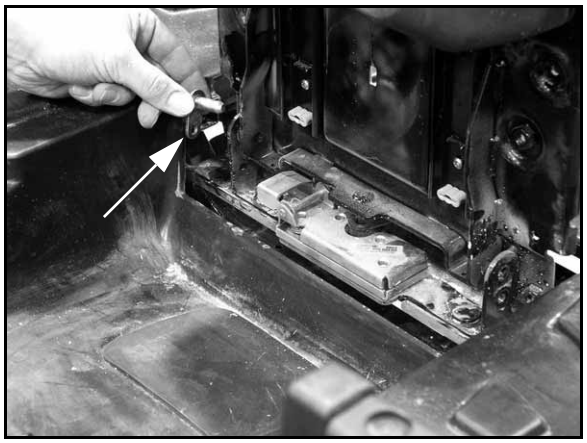
2. Lift up on the latch for the passenger seat bottom and lock it in the upright position as shown below.



3. Remove the two screws retaining the passenger backrest.



4. Remove the two pivot pins holding the backrest to the frame.



5. Lift up on the backrest latch and tilt the backrest in towards the cargo box and lift up to remove it.
6. For installation, reverse the removal steps.

CHAPTER 6
CLUTCH SYSTEM

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SPECIAL TOOLS AND SPECIFICATIONS

Special Tools

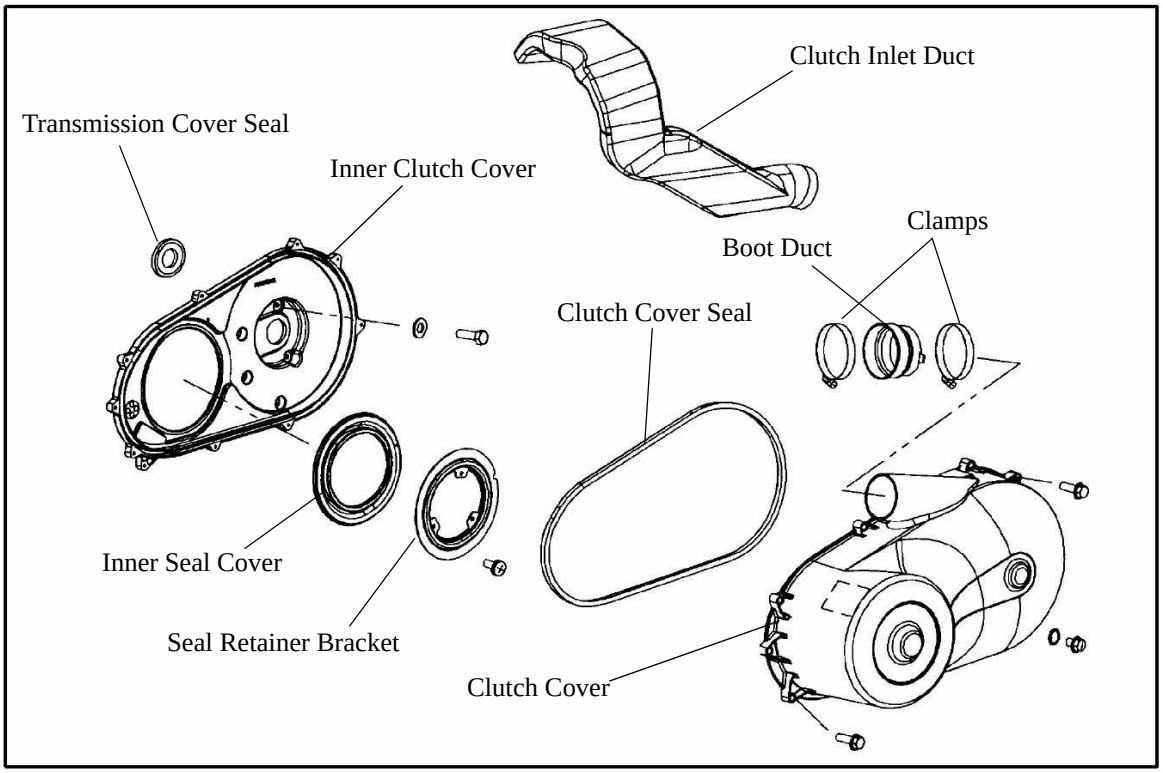
TOOL DESCRIPTION	PART NUMBER
Clutch Puller	2870506
Clutch Holding Wrench	9314177
Clutch Holding Fixture	2871358
Spider Nut Socket	2870338
Drive Clutch Spider Removal & Install Tool	2870341
Driven Clutch Puller	2870913
Roller Pin Tool	2870910
Clutch Bushing Replacement Tool Kit	2871226
Piston Pin Puller	2870386
EBS Clutch Alignment Tool	2872292
EBS Bushing Replacement Kit	2201379
Clutch Compression Tool	8700220
Clutch Bushing Replacement Tool Kit	2871025
Clutch Compression Tool Extensions	PS-45909

Component Fastener Torques

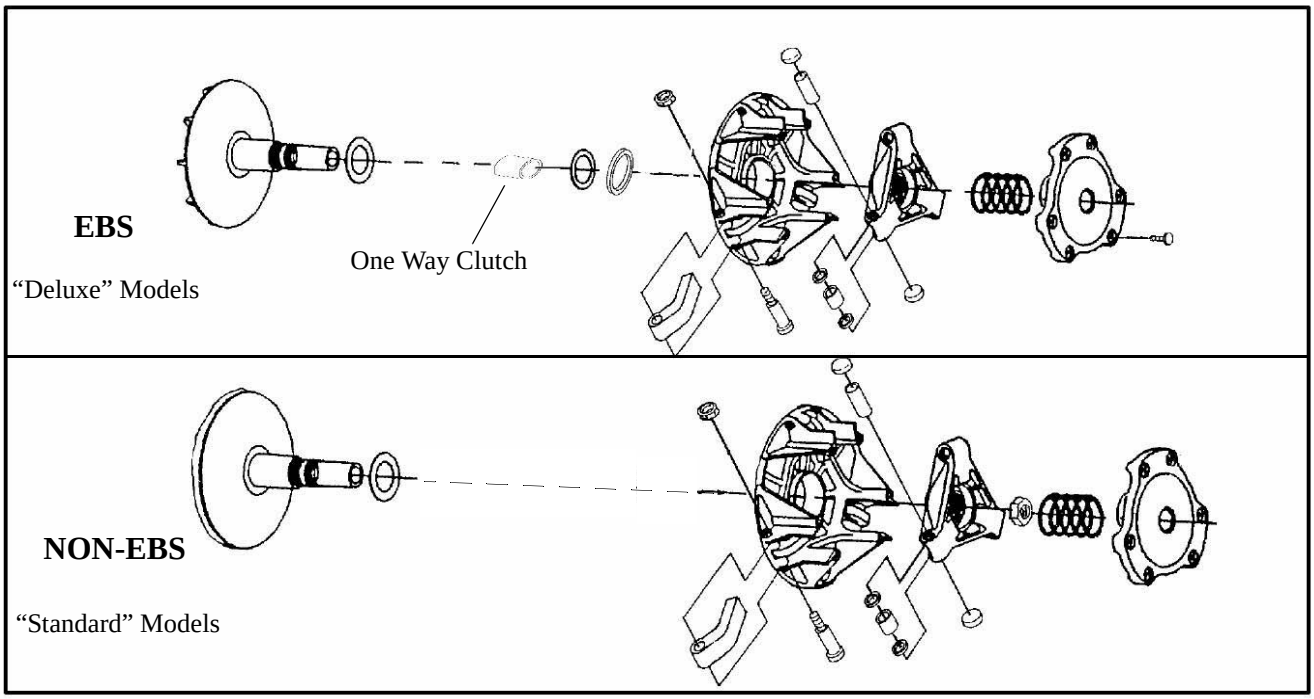
COMPONENT	FT.LBS. (IN.LBS.)	NM
Drive Clutch Retaining Bolt	40	54
Driven Clutch Retaining Bolt	17	23
PVT Inner Cover Bolts	12	16
Drive Clutch Spider EBS Clutch	200	271
Drive Clutch Spider Lock Nut	15	20.3
Drive Clutch Cover Plate	(90)	10

PVT EXPLODED VIEWS

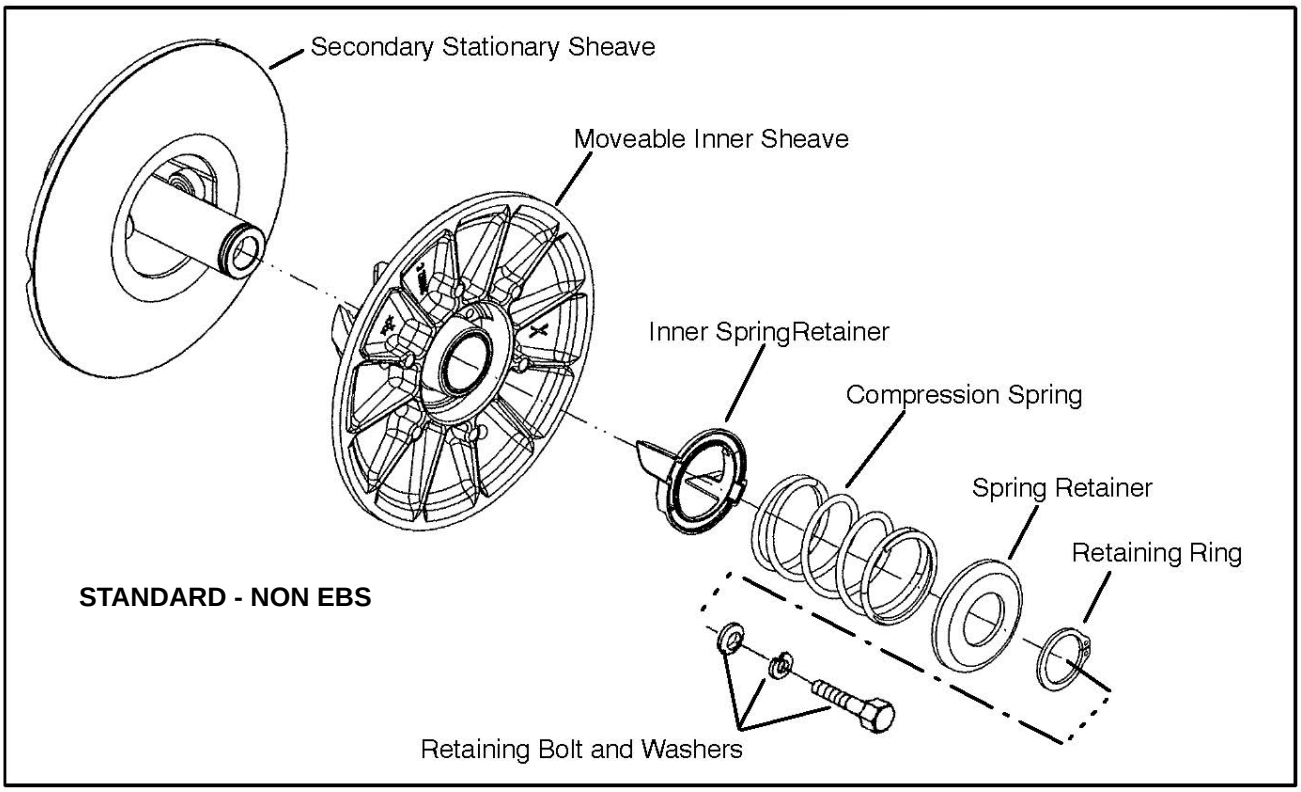
PVT Sealing And Ducting Components



Drive Clutch Exploded Views (Standard and Deluxe)

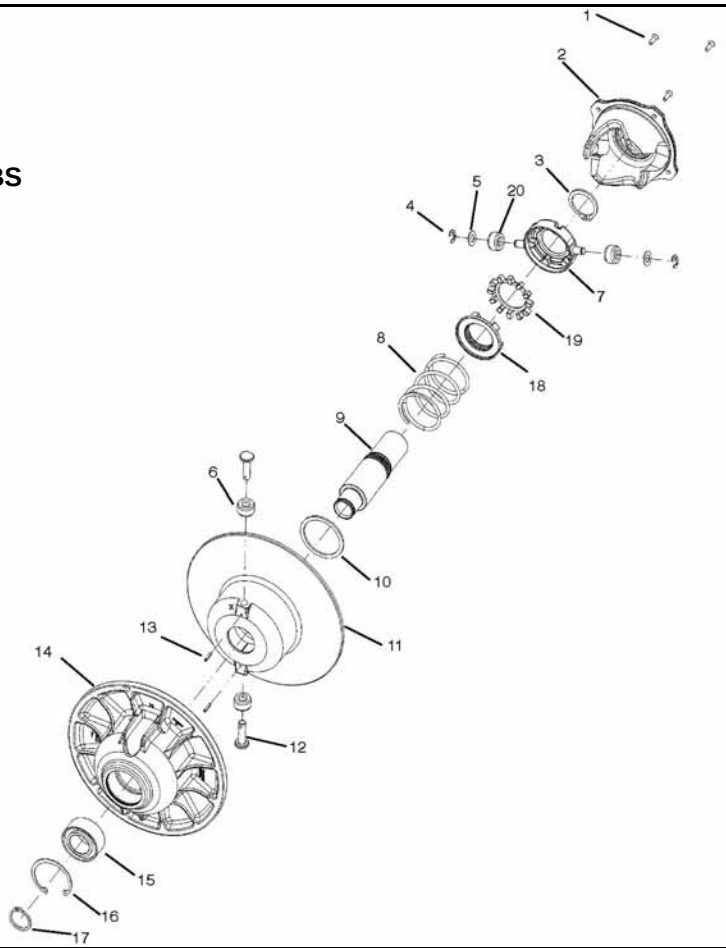


Driven Clutch Exploded Views (Standard and Deluxe)



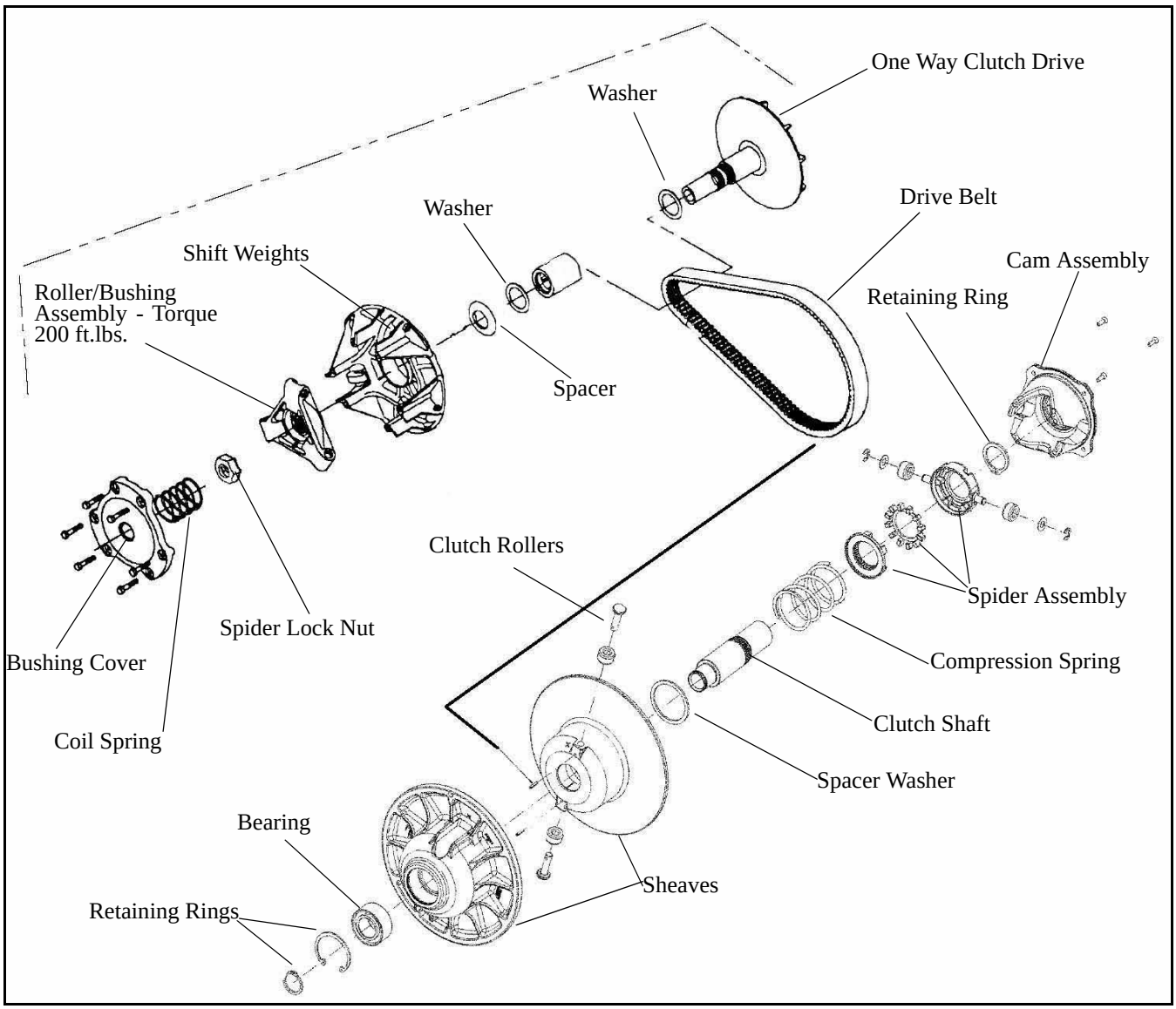
STANDARD - NON EBS

DELUXE - EBS



1. Torx Screw
2. Cam Assembly
3. Retaining Ring
4. E-clip
5. Washer
6. Roller
7. Outer Spider
8. Spring
9. Shaft
10. Thrust Washer
11. Moveable Sheave
12. Roller Pin
13. Spring Pin
14. Stationary Sheave
15. Bearing
16. Retaining Ring
17. Retaining Ring
18. Inner Spider Plate
19. Spider Dampener
20. Clutch Roller

Engine Braking System (EBS) Exploded View



PVT SYSTEM

PVT Operation Overview

⚠ WARNING

All PVT maintenance or repairs should be performed only by a certified Polaris Master Service Dealer (MSD) technician who has received the proper training and understands the procedures outlined in this manual. Because of the critical nature and precision balance incorporated into the PVT components, it is absolutely essential that no disassembly or repair be made without factory authorized special tools and service procedures.

The Polaris Variable Transmission (PVT) consists of three major assemblies: 1) The Drive Clutch; 2) The Driven Clutch; and 3) The Drive Belt. The internal components of the drive clutch and driven clutch control engagement (initial vehicle movement), clutch upshift and backshift. During the development of a Polaris ATV, the PVT system is matched first to the engine power curve; then to average riding conditions and the vehicle's intended usage. Therefore, modifications or variations of components at random are never recommended. Proper clutch setup and careful inspection of existing components must be the primary objective when troubleshooting and tuning.

Drive Clutch Operation

Drive clutches primarily sense engine RPM. The two major components which control its shifting function are the shift weights and the coil spring. Whenever engine RPM is increased, centrifugal force is created, causing the shift weights to push against rollers on the moveable sheave, which is held open by coil spring preload. When this force becomes higher than the preload in the spring, the outer sheave moves inward and contacts the drive belt. This motion pinches the drive belt between the spinning sheaves and causes it to rotate, which in turn rotates the driven clutch.

At lower RPM, the drive belt rotates low in the drive clutch sheaves. As engine RPM increases, centrifugal force causes the drive belt to be forced upward on drive clutch sheaves.

Driven Clutch Operation

Driven clutches primarily sense torque, opening and closing according to the forces applied to it from the drive belt and the transmission input shaft. If the torque resistance at the transmission input shaft is greater than the load from the drive belt, the drive belt is kept at the outer diameter of the driven clutch sheaves.

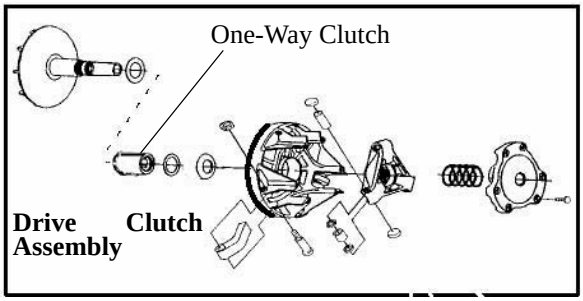
As engine RPM and horsepower increase, the load from the drive belt increases, resulting in the belt rotating up toward the outer diameter of the drive clutch sheaves and downward into the sheaves of the driven clutch. This action, which increases the driven clutch speed, is called upshifting.

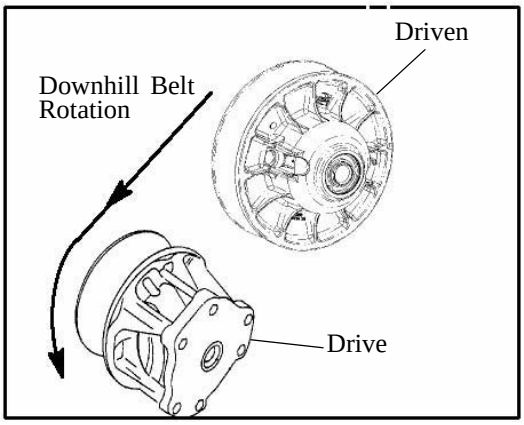
Should the throttle setting remain the same and the vehicle is subjected to a heavier load, the drive belt rotates back up toward the outer diameter of the driven clutch and downward into the sheaves of the drive clutch. This action, which decreases the driven clutch speed, is called backshifting.

In situations where loads vary (such as uphill and downhill) and throttle settings are constant, the drive and driven clutches are continually shifting to maintain optimum engine RPM. At full throttle a perfectly matched PVT system should hold engine RPM at the peak of the power curve. This RPM should be maintained during clutch upshift and backshift. In this respect, the PVT system is similar to a power governor. Rather than vary throttle position, as a conventional governor does, the PVT system changes engine load requirements by either upshifting or backshifting.

EBS Clutch Operation

This EBS driven clutch provides the same engine braking abilities as the EBS drive clutch.





When the ATV is moving the drivetrain turns in the direction of engine rotation as the clutches, belt, and one-way clutches at the same speed. When the drivetrain rotational speed exceeds the one-way clutch rotation (see exploded view of drive clutch) , the one-way clutch locks to the clutch shaft and engine braking occurs. Essentially, the driven clutch has become the driving clutch. The spider assembly with the two rollers, fixed to the transmission shaft, rotates in the pockets of the sheave, allowing the stationary sheave to rotate with the moveable sheave as the rollers move to the other side of the ramp, providing instant EBS. Engine braking (EBS) continues until the drive clutch speed exceeds the one-way clutch speed, or until the throttle is applied and the engine reaches clutch engagement speed.

⚠ CAUTION

Driven clutches must be disassembled from the helix end to reduce spring pressure. Review all information below before proceeding.

PVT Maintenance / Inspection

Under normal operation the PVT system will provide years of trouble free operation. Periodic inspection and maintenance is required to keep the system operating at peak performance. The following list of items should be inspected and maintained to ensure maximum performance and service life of PVT components. Refer to the troubleshooting checklist at the end of this chapter for more information.

1. Drive to Driven Clutch Offset, Belt Width.

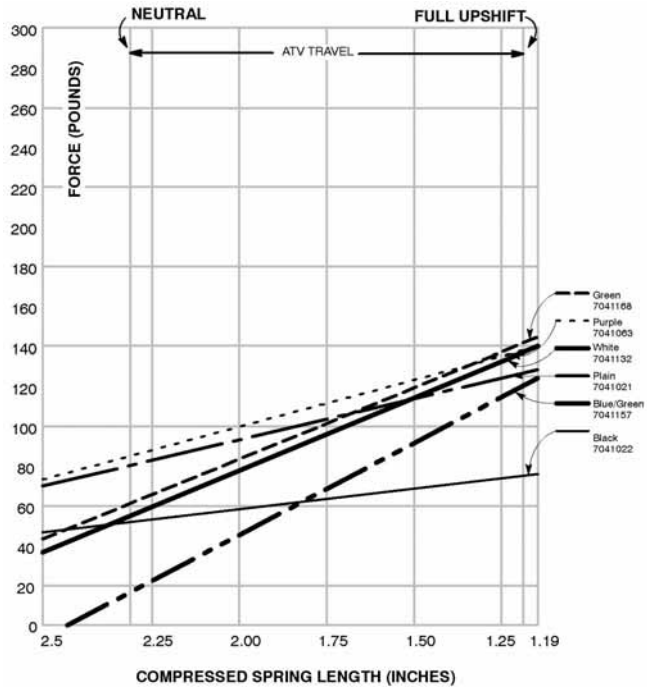
See “Clutch Alignment” on page 6.14.

2. Drive and Driven Clutch Rollers and Bushings, Drive Clutch Shift Weights and Pins, Drive Clutch Spider Rollers and Roller Pins, Drive and Driven Clutch Springs.

See “Drive Clutch Inspection” on page 6.17.

3. Sheave Faces. Clean and inspect for wear.
4. PVT System Sealing. Refer to appropriate illustrations and photos. The PVT system is air cooled by fins on the drive clutch stationary sheave. The fins create a low pressure area in the crankcase casting, drawing air into the system through an intake duct. The opening for this intake duct is located at a high point on the vehicle (location varies by model). The intake duct draws fresh air through a vented cover. All connecting air ducts, as well as the inner and outer covers, must be properly sealed to ensure clean air is being used for cooling the PVT system. This also will prevent water and other contaminants from entering the PVT area. A sealed PVT is especially critical on units subjected to frequent water forging.

Drive Clutch Spring



The drive clutch spring has two primary functions:

1. **Controls clutch engagement RPM.** The springs which have a higher rate when the clutch is in neutral will increase clutch engagement RPM.
2. **Controls the rate at which the drive belt moves upward in the drive clutch sheaves.** This is referred to as drive clutch upshift.

The drive clutch spring is one of the most critical components of the PVT system. It is also one of the easiest to service. Due to the severe stress the coil spring is subject to during operation, it should always be inspected for tolerance limits during any clutch diagnosis or repair.

There are other components which control upshift, but the spring is one of the primary components in insuring optimum performance. It is very important that the spring is of correct design and is in good condition.

⚠ CAUTION

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

Measuring Spring Length: With the spring resting on a flat surface, measure its free length from the outer coil surfaces as shown. Refer to the spring specification chart for specific free length measurements and tolerances. Also check to see that spring coils are parallel to one another. Distortion of the spring indicates stress fatigue, requiring replacement.

Table 6-1: Primary Clutch Springs

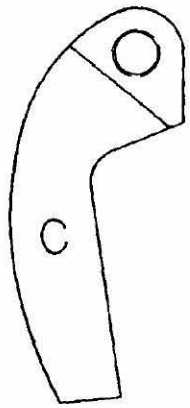
PART #	COLOR CODE	WIRE DIA.	FREE LENGTH ± .125"
7041021	Plain	.157"	4.38"
7041022	Black	.140"	4.25"
7041063	Purple	.168"	4.37"
7041132	White	.177"	2.92"
7041168	Green	.177"	3.05"
7041157	Blue/Green	.177"	2.53"

Table 6-2: Secondary Clutch Springs

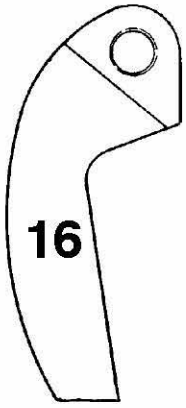
PART #	DESCRIPTION
3234199	White

Optional Shift Weights

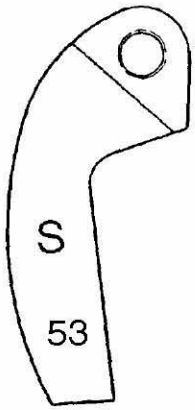
Shown below are optional shift weights which may be used in the PVT system. These shift weights have many different factors designed into them for controlling engagement RPM and shifting patterns. Shift weights should not be changed or altered without first having a thorough understanding the effects they have on belt to sheave clearance, clutch balance, engagement and shifting characteristics.



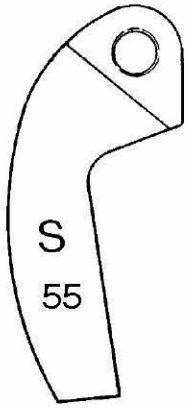
PN - NLA -
50 gr



PN 5630279
43 gr



PN - NLA -
53 gr



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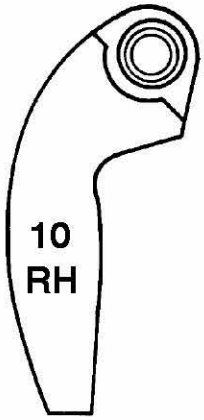
55 gr



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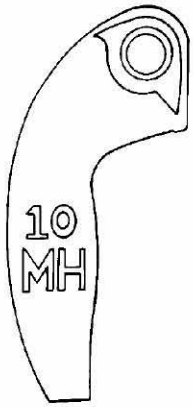

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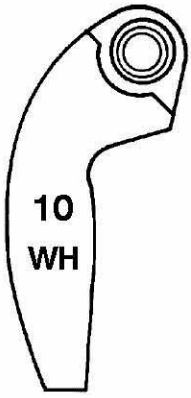
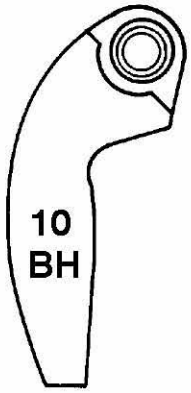
50.5 gr



PN 5630710
46 gr



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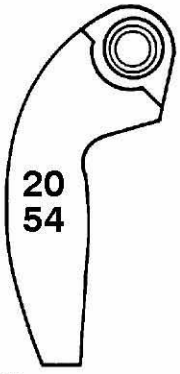
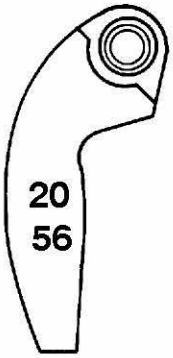
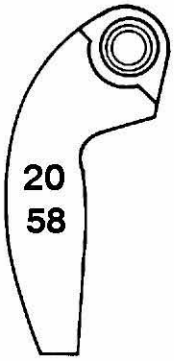
47gr



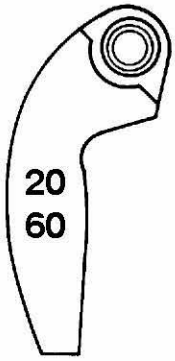
PN 5631214
54 gr



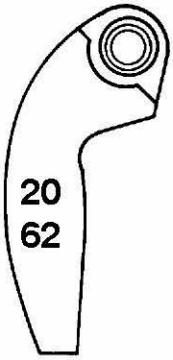
PN 5631215
56 gr



PN 5631216
58 gr



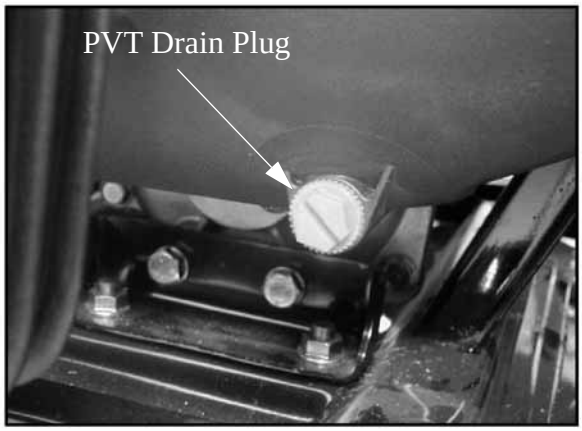
PN 5631698
60 gr



PN 5631700
62 gr

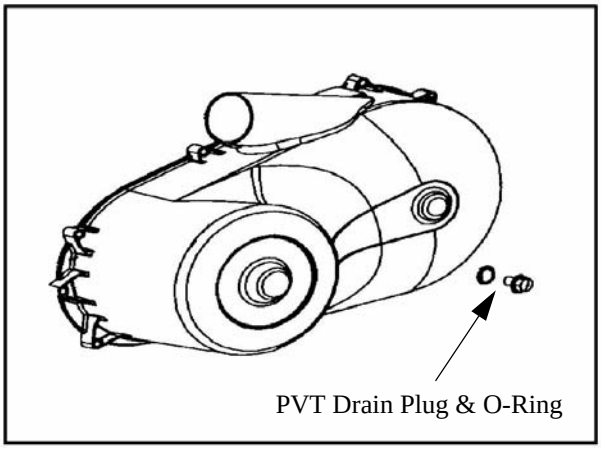
PVT Drying

IMPORTANT: If operating the ATV through water, be sure to check the PVT cover and other ATV components for water ingestion. The ATV should be checked immediately. Refer to Owner's Manual for Safe Riding Tips.



To drain any water that may be trapped inside the PVT cover, simply remove the PVT drain plug and O-ring located on the bottom of the PVT cover and let the water drain out. The PVT drain plug is shown below.

To further expel water in the PVT cover and to dry out the PVT system, shift the transmission to neutral and rev engine slightly to expel the moisture. This will also air-dry the belt and clutches. Allow engine RPM to settle to idle speed, shift transmission to lowest available range and test for belt slippage. Repeat as needed. Operate ATV in lowest available range for a short period of time until PVT system is dry.



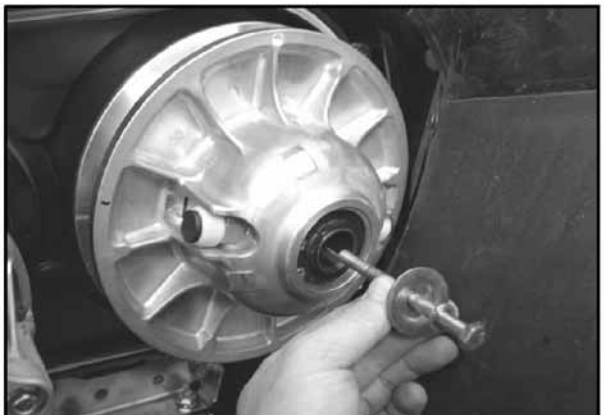
PVT Disassembly

NOTE: Some fasteners and procedures will vary. Refer to the appropriate parts manual for proper fasteners and fastener placement.

1. Remove seat.
2. Remove or loosen cab and footwell fasteners as necessary to gain access to PVT outer cover.
3. Remove PVT air outlet duct hose.
4. Remove outer PVT cover screws.
5. Mark the drive belt direction of rotation and remove drive belt. See the “DRIVE BELT REMOVAL” procedure later in this chapter.
6. Remove drive clutch retaining bolt and remove drive clutch using puller.

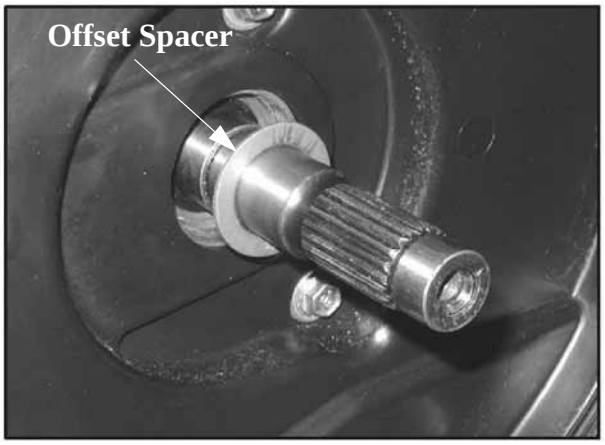
Drive Clutch Puller:	**(PN 2870506)**
Clutch Holding Wrench:	**(PN 9314177)**

7. Remove driven clutch retaining bolt and driven clutch. Use puller if necessary.

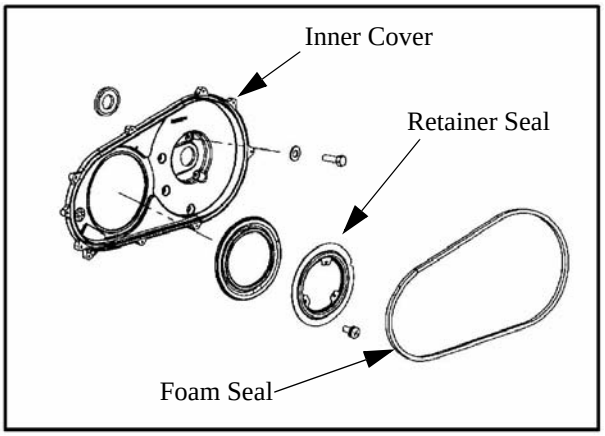


Driven Clutch Puller: (PN 2870913)

8. Remove driven clutch offset spacers from the transmission input shaft. NOTE: Remember to keep spacers in order for proper clutch offset on reassembly.



9. Remove cover screws and retainer plate.

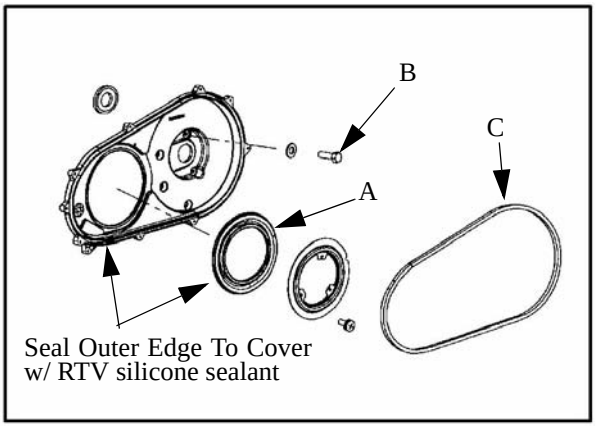


10. Remove inner cover retaining bolts at rear of cover.
11. Remove cover along with foam seal on back of cover or shaft.

PVT Installation

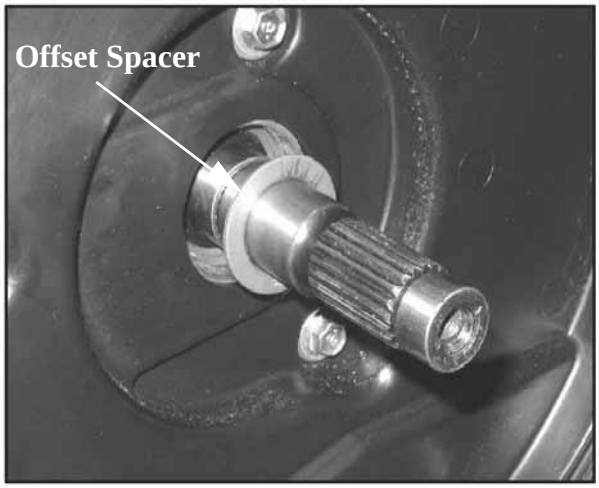
1. Inspect PVT inner cover-to-engine seal. Replace if cracked or damaged. Align the alignment mark on the cover with the mark on the engine seal.

2. Place a new seal on transmission input shaft.
3. Apply RTV silicone sealant to outside edge of inner cover-to-engine seal, to ensure a water tight fit between the seal and the cover on engine side. Surfaces must be clean to ensure adhesion of silicone sealant.
4. Reinstall cover and tighten rear cover bolts just enough to hold it in place.
5. Fit lip of inner cover seal (A) to engine. Install seal retainer plate and tighten screws securely.
6. Torque rear inner cover bolts (B) to specification.



= T
Inner Cover Bolt Torque (B): **12 ft. lbs. (16.6 Nm)**

7. Install clutch offset spacer(s) on transmission input shaft.



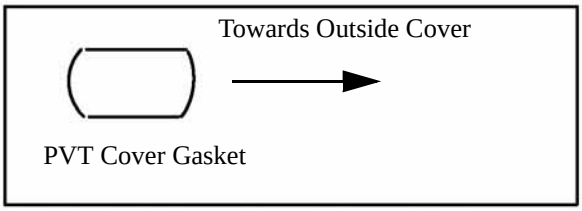
8. Clean splines inside driven clutch and on the transmission input shaft.
9. Apply a light film of grease to the splines on the shaft.
10. Install the driven clutch, washer, lock washer, and retaining bolt. Torque to specification.

= T
Driven Clutch Retaining Bolt Torque: **17 ft. lbs. (23.5 Nm)**

11. Clean end of taper on crankshaft and the taper bore inside drive clutch.
12. Install drive clutch and torque retaining bolt to specification.

= T
Drive Clutch Retaining Bolt Torque: **40 ft. lbs. (55 Nm)**

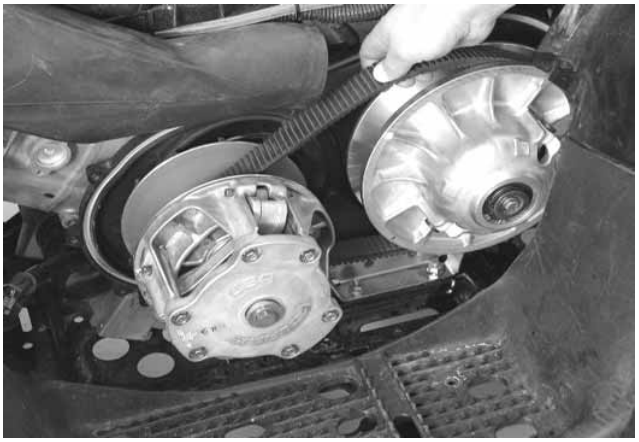
13. Reinstall drive belt noting direction of rotation. If a new belt is installed, install so numbers can be easily read.
14. Only replace PVT outer cover rubber gasket if it is damaged. Place the gasket with the narrow side out (C).

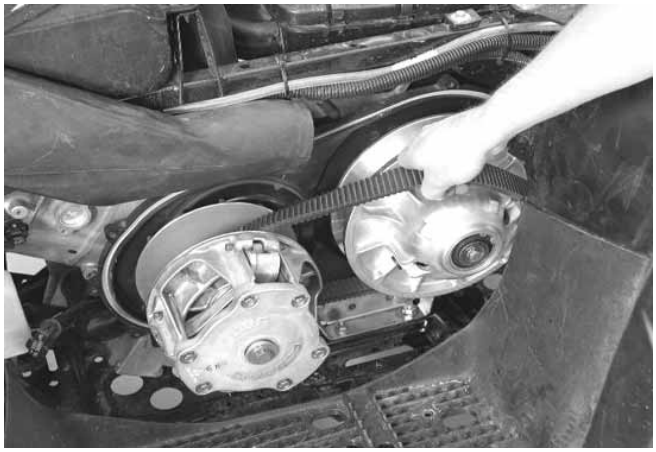


15. Reinstall PVT outer cover and secure with screws. Torque to specification.
16. Reinstall cab/footwell assembly, panel and seat.

Drive Belt Removal / Inspection

1. Remove outer PVT cover as described in PVT Disassembly.
2. Mark drive belt direction of rotation so that it can be installed in the same direction. The belt is normally positioned so part numbers are easily read.
3. To remove drive belt, apply brake, pull upward and rearward on belt while turning the back (moveable) driven sheave clockwise to open driven clutch sheaves. Pull out and down on belt to slip over the driven clutch outer sheave.



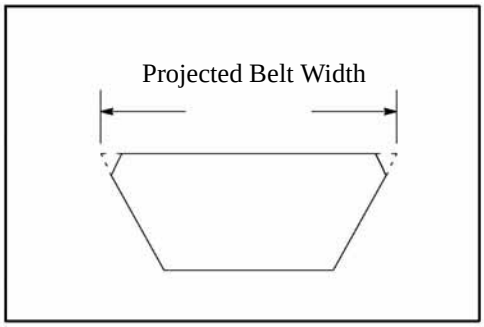


4. Measure belt width and replace if worn. Generally, belts should be replaced if clutches can no longer be adjusted to provide proper belt deflection.

NOTE: If the top edges are trimmed on some drive belts, it will be necessary to project the side profiles in order to measure from corner-to-corner.

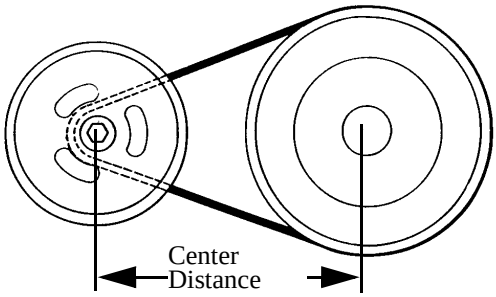
5. Place a straight edge on each side of the drive belt. Place another straight edge on top of belt.

6. Measure the distance where the side straight edges intersect the top, as shown in the illustration.



Belt Width:
Wear Limit 1.125" (2.86 cm)

7. Inspect belt for loose cords, missing cogs, cracks, abrasions, thin spots, or excessive wear. Replace if necessary.
8. 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 continuously in one spot.
9. Measure belt length with a tape measure around the outer circumference of the belt. Belts which measure longer than nominal length may require driven shimming or engine adjustment for a longer center distance to obtain proper belt deflection. Belts which measure shorter than nominal length may require driven shimming or a shorter center distance. Remember, proper belt deflection is the desired goal - not a specific center distance.
10. Replace belt if worn past the service limit. Belts with thin spots, burn marks, etc., should be replaced to eliminate noise, vibration, or erratic PVT operation. See Troubleshooting Chart at the end of this chapter for possible causes.



Clutch Center Distance:
10" ±.1 -.05 (254 ± 2.51 -.3mm)
Belt Nominal Length:
40.875" ± 3/16 (103.8 ± .48 **cm**)

DRIVE BELT INSTALLATION

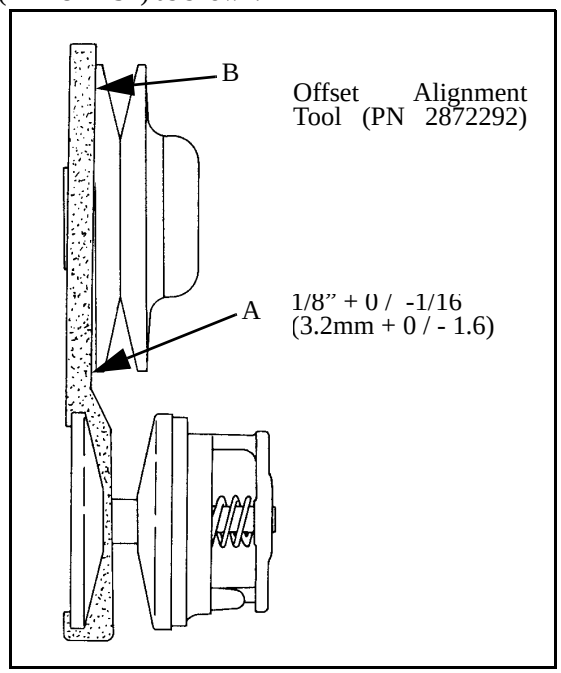
NOTE: Be sure to position belt so part number is easily read. Verify new belt is seated properly in the clutches before operating the ATV.

1. Loop belt over drive and over top of driven sheave.
2. While pushing down on top of belt, turn the back or moveable driven sheave clockwise.

3. The belt then should be able to be pushed down into and between the sheaves.
4. Install clutch cover temporarily. Verify engine is in PARK. Start engine and raise engine RPM enough to engage the clutch, rotating the belt and seating it in the clutches. Remove clutch cover and verify belt is seated properly before final cover installation.

Clutch Alignment

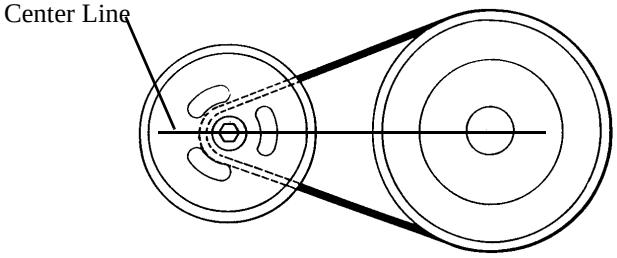
1. Remove belt and install the Clutch Offset Alignment Tool (PN 2872292) as shown.



2. With tool touching rear of driven clutch inner sheave, the distance at point "A" should be 1/8".

NOTE: If the distance is greater than 1/8, or less than 1/16,, clutch alignment must be adjusted as follows:

3. Remove drive and driven clutch. See "PVT DIASSEMBLY" at the beginning of the chapter.
4. Remove PVT inner cover.
5. Loosen all engine mounts. Move front of engine to the right or left slightly until alignment is correct.
6. Tighten engine mounts and verify alignment is correct.
7. Measure belt deflection and measure offset both above and below shaft centerlines. Adjust if necessary.



Measure Above and Below Centerline

NOTE: On some models, minor adjustments can be made by adding shims between the frame and front lower left engine mount to increase the distance at point "A". If a shim is present, it can be removed to decrease the distance at point "A".

Shim Kit (PN 2200126)

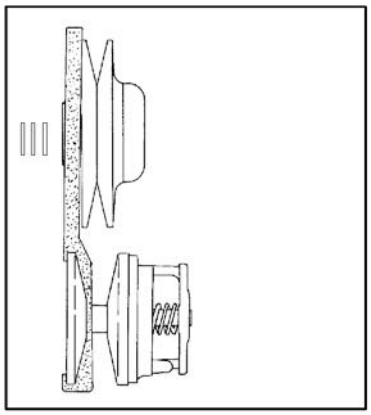
Clutch Offset

IMPORTANT: Inspect clutch alignment and center distance before adjusting offset.

Offset is correct when rear of tool contacts rear of inner sheave with driven clutch pushed completely inward, spacers installed (if required) on shaft and bolt torqued to specification.

Spacer Washer (PN 7556401)

1. Install alignment tool as shown. Remember to measure above and below the shaft centerlines.
2. Adjust offset by adding or removing spacer washers between back of driven clutch and spacer.

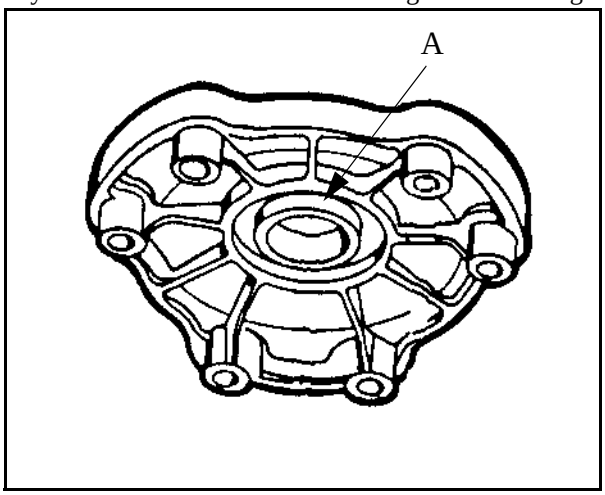


EBS DRIVE CLUTCH SERVICE

Drive Clutch Disassembly

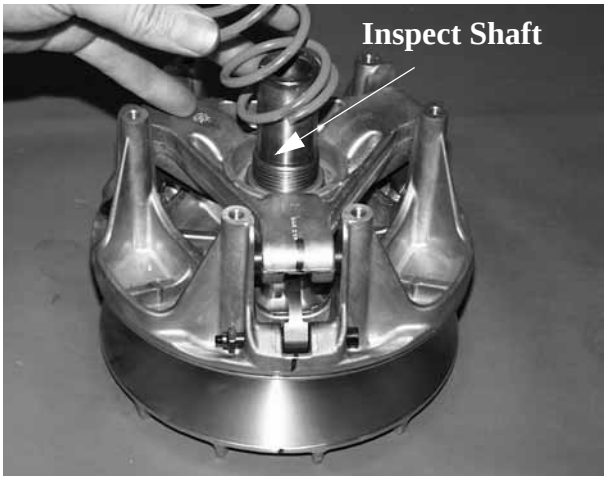
1. Using a permanent marker, mark the cover, spider, and moveable and stationary sheaves for reference, as the cast-in X's may not have been in alignment before disassembly.

2. Remove cover bolts evenly in a cross pattern and remove cover plate.
3. Inspect cover bushing (A). The outer cover bushing is manufactured with a Teflon™ coating. Wear is determined by the amount of Teflon™ remaining on the bushing.



Cover Bushing Inspection: Replace the cover bushing if more brass than Teflon™ is visible on the bushing. Refer to bushing replacement in this chapter.

4. Inspect area on shaft where bushing rides for wear, galling, nicks, or scratches. Replace clutch assembly if worn or damaged.
5. Remove and inspect spring. See "Drive Clutch Spring Specifications" for spring inspection.



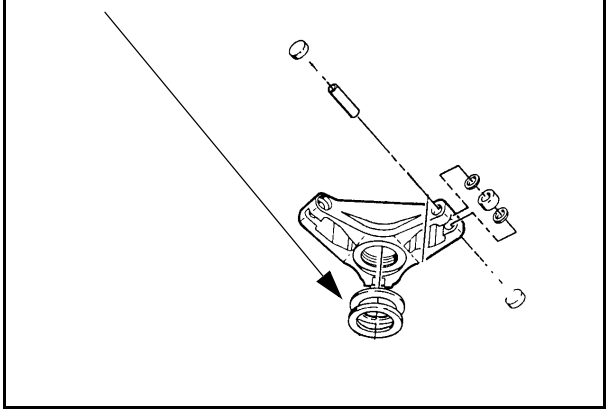
Spider Removal

1. Remove the limiter nut using the Clutch Spider Nut Socket (PN 2870338). Install clutch in holding fixture and loosen the spider (counterclockwise) using Clutch Spider Install Tool (PN 2870341).

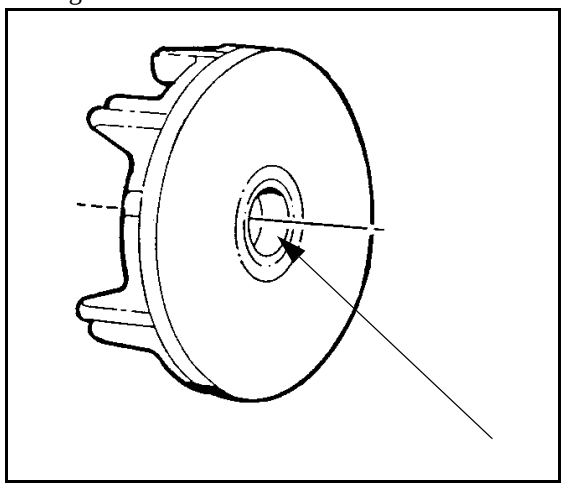
Clutch Holding Fixture: (PN 2871358)
Spider Removal Tool: (PN 2870341)

NOTE: It is important that the same number and thickness of washers are reinstalled beneath the spider during assembly. Be sure to note the number and thickness of these washers.

To maintain proper clutch balance and belt-to-sheave clearance, be sure to reinstall original quantity and thickness washers

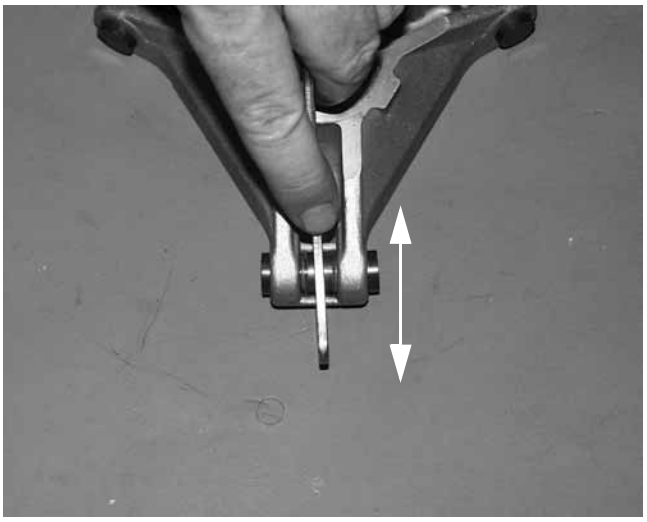


2. Inspect the Teflon™ coating on the moveable sheave bushing.



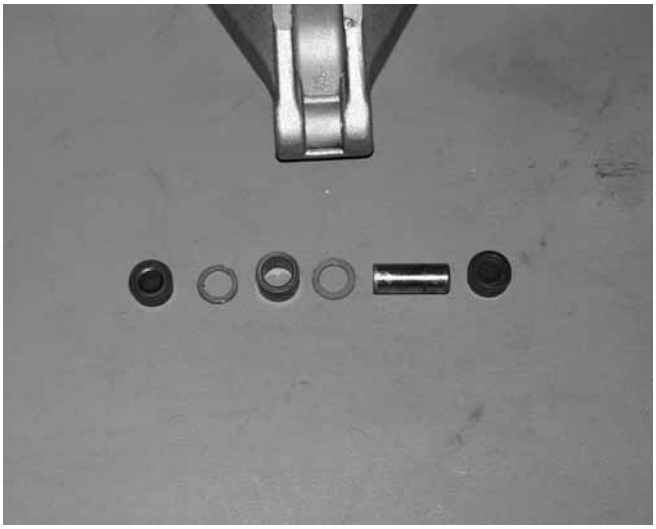
Moveable Sheave Bushing Inspection: Replace the cover bushing if more brass than Teflon™ is visible on the bushing. Refer to bushing replacement in this chapter.

3. Inspect all rollers, bushings and roller pins by pulling a flat metal rod across the roller. Turn roller with your finger. If you notice resistance, galling, or flat spots, replace rollers, pins and thrust washers in sets of three. Also inspect to see if roller and bushing are separating. Bushing must fit tightly in roller. Use the Roller Pin Tool (**PN 2870910**) to replace rollers and pins. Take care not to damage roller bushing or bearing surface of the new pin during installation.



4. Rubber-backed buttons can and should be used in all ATV clutches if the hollow roller pin is changed to a solid roller pin.

NOTE: Rubber side of the button is positioned toward the solid roller pin. It is recommended to switch all buttons to the rubber version during service (if needed).



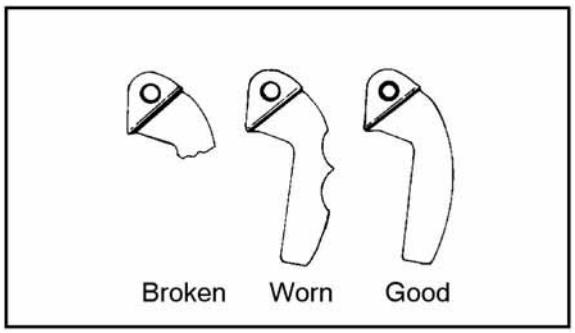
Button To Tower Clearance Inspection

1. Inspect for any clearance between spider button to tower. If clearance exists, replace all buttons and inspect surface of towers. See "Spider Removal" procedure.

2. Inspect sheave surfaces. Replace the entire clutch as an assembly if worn, damaged or cracked.

Shift Weight Inspection

1. If clutch is not disassembled, inspect as shown, using a clutch holding tool to compress the moveable sheave. The contact surface of the weight should be smooth and free of dents or gall marks. Remove shift weight bolts and weights.



2. Inspect the weight pivot bore and pivot bolts for wear or galling. If weights or bolts are worn or broken, replace in sets of three with new bolts.

NOTE: A damaged shift weight is usually caused by a damaged or stuck roller in the spider assembly. See roller inspection, see "Roller, Pin, and Thrust Washer Inspection".

⚠ WARNING

The clutch assembly is a precisely balanced unit. Never replace parts with used parts from another clutch assembly!

All PVT maintenance or repairs should be performed only by a certified Polaris Master Service Dealer (MSD) technician who has received the proper training and understands the procedures outlined in this manual.

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

Drive Clutch Inspection

NOTE: Remove cover, spring, and spider following instructions for drive clutch removal, then proceed as follows:

1. Remove moveable sheave spacer sleeve (1) and the thrust washer (2). Visually inspect the washer for damage. Measure the thickness and compare to specification. Replace if worn or damaged.

Thrust Washer Thickness
Standard: .030, (.76mm)
Service Limit: .025, (.64mm)

2. Lift one-way clutch (3) and thrustwasher (4) off shaft. Replace as an assembly if worn, damaged, or if problems were noted.

3. Inspect surface of shaft for pitting, grooves, or damage. Measure the outside diameter and compare to specifications. Replace the drive clutch assembly if shaft is worn or damaged.

= In. / mm.

Shaft Diameter:
Standard: 1.3745 - 1.375 (
Service Limit: 1.3730”

4. Visually inspect PTFE thrustwasher for damage. Measure the thickness and compare to specification. Replace if worn or damaged

= In. / mm.

PTFE Washer Thickness
Standard: .030” (.76mm)
Service Limit: .025” (.64mm)

Moveable Sheave Bushing Inspection

Inspect the Teflon™ coating (arrow) on the moveable sheave bushing. Inspect BOTH sheaves for signs of wear, grooving or cracking. De-glaze surfaces with a 3M™ pad if needed.

Moveable Sheave Bushing Inspection: Replace the cover bushing if more brass than Teflon™ is visible on the bushing. Refer to bushing replacement in this chapter.

Drive Clutch Bushing Service

NOTE: Special Tool Required: EBS CLUTCH BUSHING REMOVAL AND INSTALLATION

Table 6-1: Special Tools

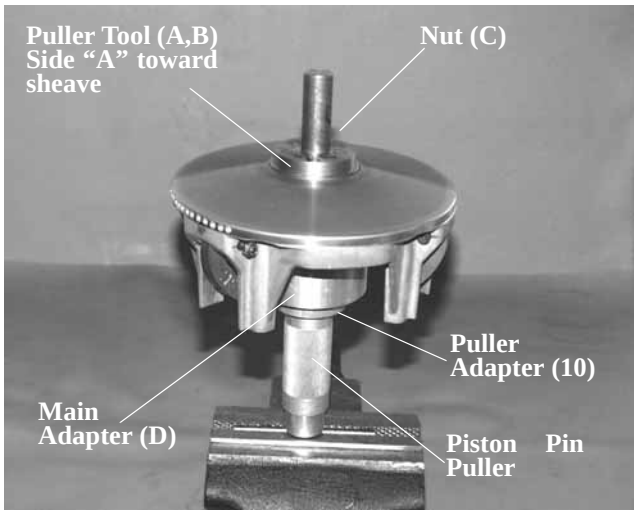
ITEM	QTY	PART DESCRIPTION	PART #
A, B	1	EBS Puller Tool	5132027
C	1	EBS Puller Nut	5132501
D	1	EBS Main Adapter	5132029
E	1	EBS Bushing Removal	5132028
--	1	Bushing Replacement Kit	2871226
--	1	Piston Pin Puller	2870386
--	1	Instructions	9915111

NOTE: Bushings are installed at the factory using Loctite™ 609. In order to remove bushings it will be necessary to apply heat evenly to the area around each bushing. Clean all residual Loctite™ from bushing bore prior to installing new bushing.

> **⚠ CAUTION**
>
> Clutch components will be hot! In order to avoid serious burns, wear insulated gloves during the removal process.

Drive Clutch Bushing Removal

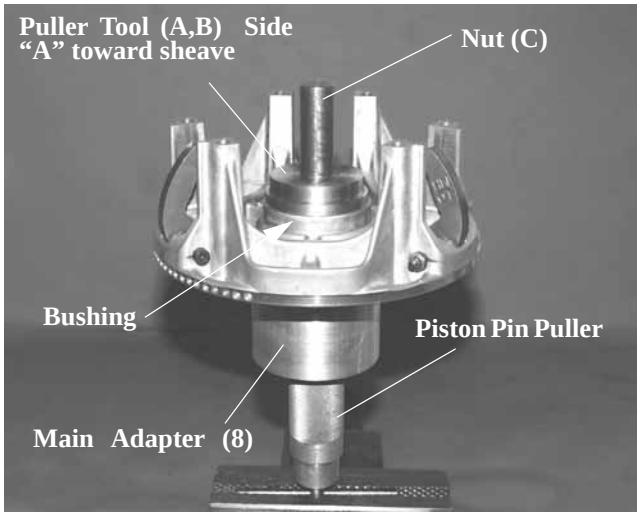
1. Remove clutch as outlined previously in this chapter.
2. Install handle end of Piston Pin Puller (**PN 2870386**) securely into bench vise and lightly grease puller threads.
3. Remove nut from puller rod and set aside.
4. Install puller adapter (Item 10 from kit **PN 2871226**).
5. Install main adapter (Item D) onto puller.



6. With towers pointing toward the vise, slide sheave onto puller rod.
7. Install removal tool (Item A/B) into center of sheave with A side" toward sheave. **NOTE:** Smooth One-way Clutch - Use **Bushing Tool PA-47336**.
8. Install nut (C) onto end of puller rod and hand tighten. Turn puller barrel to increase tension on sheave if needed. Using a hand held propane torch, apply heat around outside of bushing until tiny smoke tailings appear.
9. Turn sheave counterclockwise on puller rod until it comes free. Lift sheave off puller.
10. Remove nut from puller rod and set aside.
11. Pull bushing removal tool and adapter from puller rod. Remove bushing from tool and discard.

Drive Clutch Bushing Installation

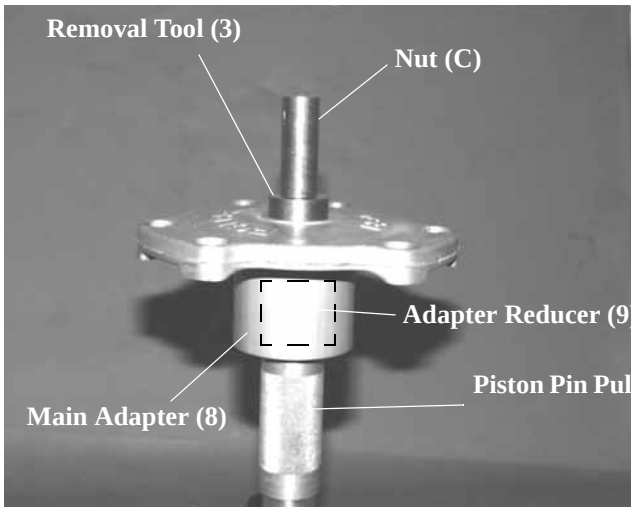
1. Place main adapter (Item 8) on puller.



2. Apply Loctite™ 609 evenly to bushing bore inside moveable sheave.
3. Set bushing in place on sheave.
4. Insert installation puller tool (Item A/B) with "A" side down, into center of bushing. **NOTE:** 800 EFI Clutch - Use **Bushing Tool PA-47336**.
5. With towers pointing upward, slide sheave, bushing and tool onto puller rod.
6. Install nut on puller rod and hand tighten. Turn barrel to apply additional tension if needed.
7. Turn sheave counterclockwise, making sure bushing is drawn straight into bore. Continue until bushing is seated.
8. Remove nut from puller rod and set aside.
9. Remove sheave from puller.
10. Remove installation tool.

Cover Bushing Removal

1. Install main adapter (Item 8) on puller.



2. Install adapter reducer (Item 9).
3. From outside of clutch cover, insert removal tool (Item 3) into cover bushing.
4. With inside of cover toward vise, slide cover onto puller.
5. Install nut onto puller rod and hand tighten. Turn puller barrel to increase tension as needed.
6. Turn clutch cover counterclockwise on puller rod until bushing is removed and cover comes free.
7. Remove nut from puller rod and set aside.
8. Remove bushing and bushing removal tool from puller. Discard bushing.

Cover Bushing Installation

1. Apply Loctite™ 609 evenly to bushing bore in cover.
2. Working from inside of cover, insert new 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. Take installation tool and clutch cover off rod.

One-Way Clutch Inspection (Drive Clutch)

1. Rotate one-way clutch clockwise (as viewed from the cover plate side). The clutch should rotate on the shaft with only slight amount of drag. Verify there is no binding or rough spots. When rotated counterclockwise, the clutch should lock to the shaft without slipping. If problems are noted in either direction, continue with disassembly.

Drive Clutch Reassembly

NOTE: It is important that the same number and thickness of washers are reinstalled beneath the spider during assembly. The Teflon bushings are self-lubricating.

⚠ CAUTION

Do not apply oil or grease to the bushings.

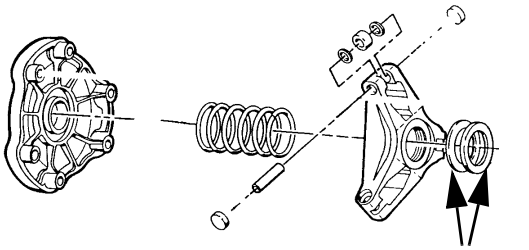
1. Reassemble drive clutch in the following sequence. Be sure the "X", or the marks that were made earlier, are aligned during each phase of assembly.

A) "X", or the marks that were made earlier on cover

B) "X" on spider, making sure spacer washers are installed underneath spider and positioned properly in recess

C) “X”, or the marks that were made earlier under weight

2. Install moveable sheave onto fixed sheave.
3. Install spider spacers. Use same quantity and thickness as were removed.
4. Compress spider buttons for each tower and install spider, making sure that “X”, or the marks that were made earlier, on spider aligns with “X”, or the marks that were made earlier on the moveable sheave.
5. Torque spider to specification using the holding fixture and spider tool. Torque with smooth motion to avoid damage to the stationary sheave.



Spacer Washers

⚠ CAUTION

Verify spider spacer washers are fully seated in the recessed area of the spider. Any misalignment will alter clutch balance. Inverting the clutch while initially tightening the spider will help position the washers.

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Spider Torque:
200 ft. lbs. (271 Nm)

6. Install limiter nut on top of spider using the Clutch Spider Nut Socket (**PN 2870338**). Torque to specification. Reinstall shift weights using new lock nuts on the bolts.

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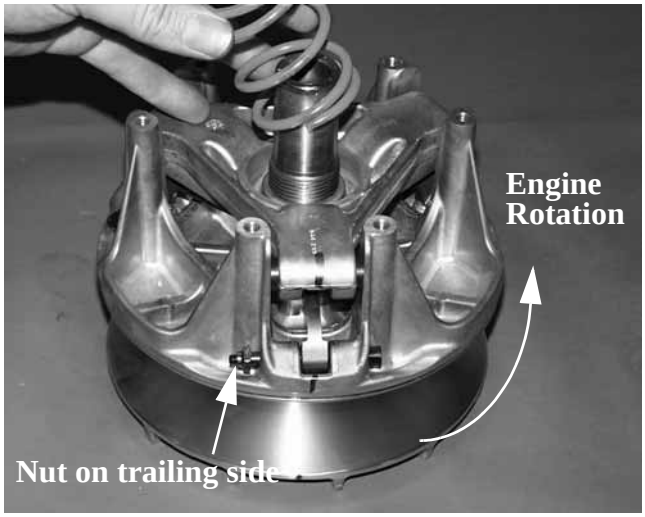
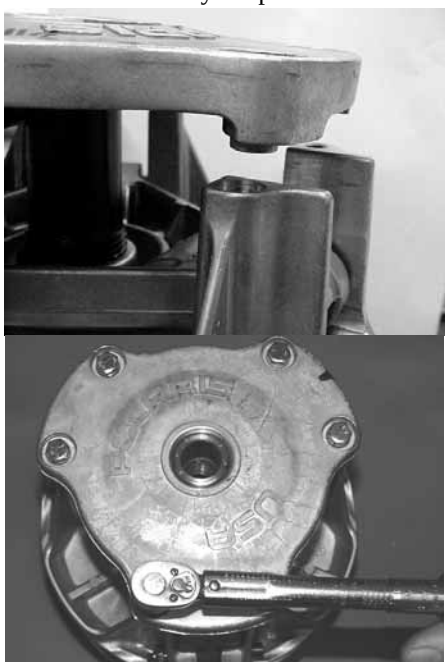
Spider Nut Torque:
15 ft. lbs. (20 Nm)

7. Reinstall clutch spring.



8. Reinstall cover, aligning bosses on the tower and cover. Torque cover bolts evenly to specification.



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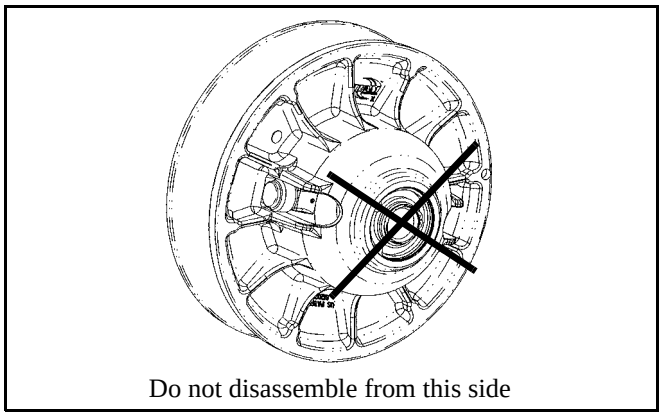
Cover Screw Torque:
90 in. lbs. (10.4 Nm)

EBS DRIVEN CLUTCH SERVICE

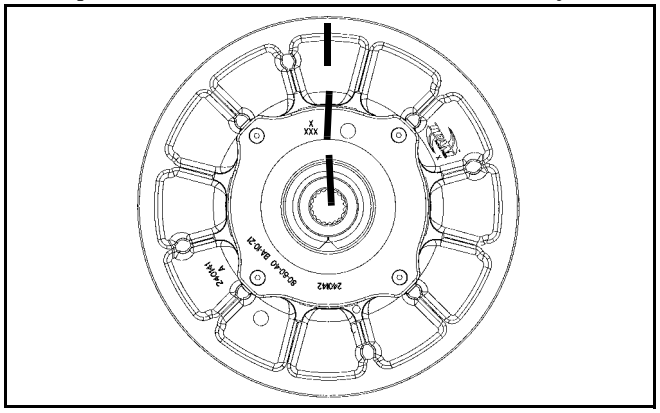
Driven Clutch Disassembly

1. Remove driven clutch from the transmission input shaft. Do not attempt disassembly of the driven clutch from the outside snap ring. The driven clutch must be disassembled from the helix side.

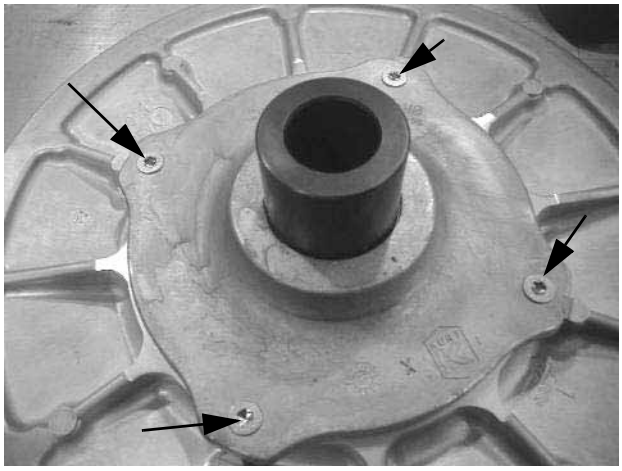


Do not disassemble from this side

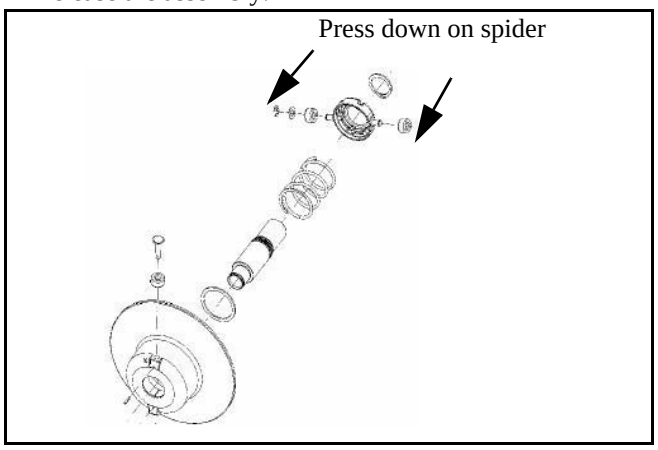
2. It is important to mark the position of the shaft, cam cover, and sheave before disassembly or use the X"s on the components for reference. This will aid in reassembly and helps to maintain clutch balance after reassembly.



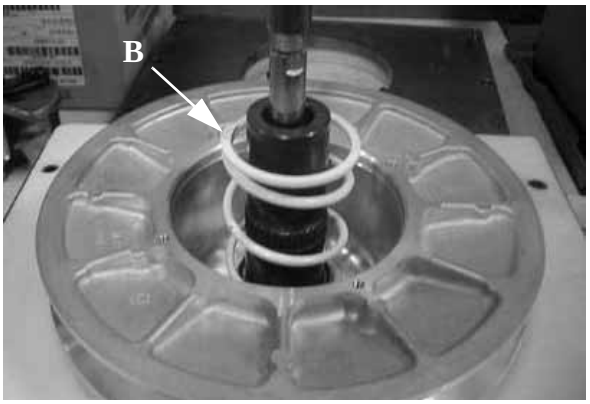
3. Remove the four torx screws that secure the cam assembly (helix) using a T25 torx.

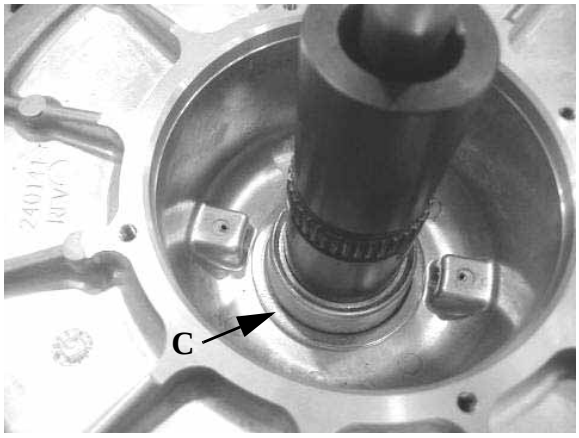


4. Place the clutch into Clutch Compression Tool **PN 8700220**. Using Compression Extensions **PN PS-45909**, Press down on top of the spider assembly, compressing the spider onto the shaft. Remove snap ring (A) and slowly release the assembly.

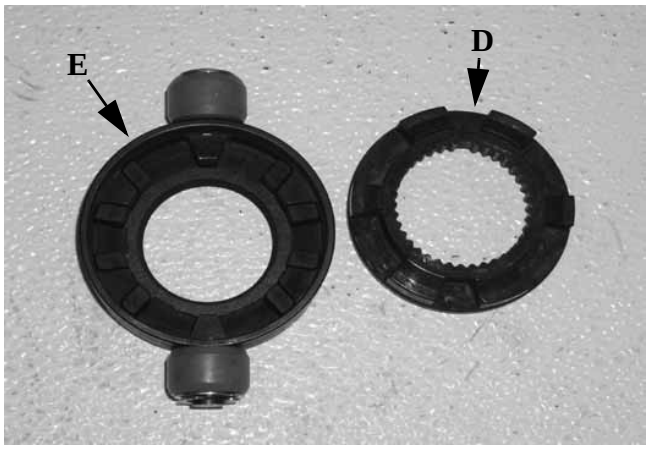


5. Remove the spider assembly, spring (B), and spacer washer (C). **NOTE:** Spring is compression only and has no torsional wind

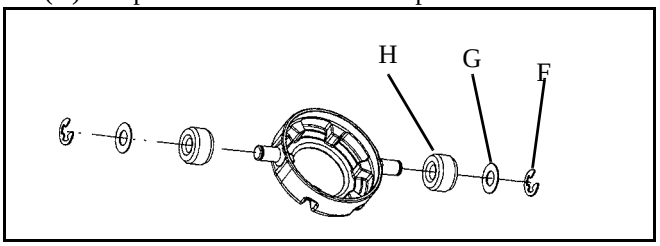




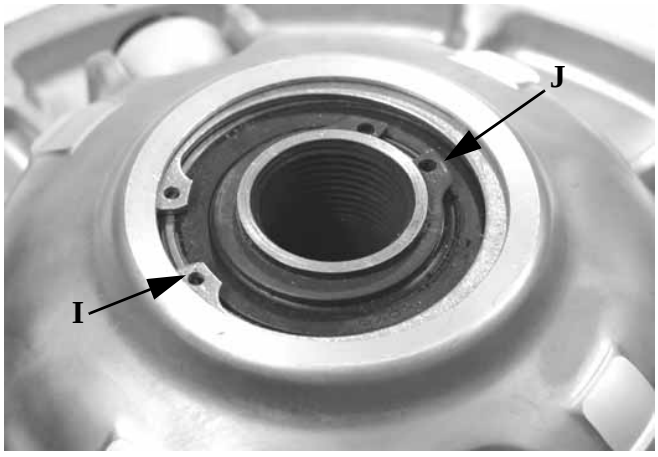
6. Remove the inside spider plate (D) and spider dampener (E). Inspect the spider dampener (E) for wear and replaced if needed.



7. Remove the E-clip (F), washer (G), and the clutch rollers (H). Inspect the rollers for wear replace if worn.

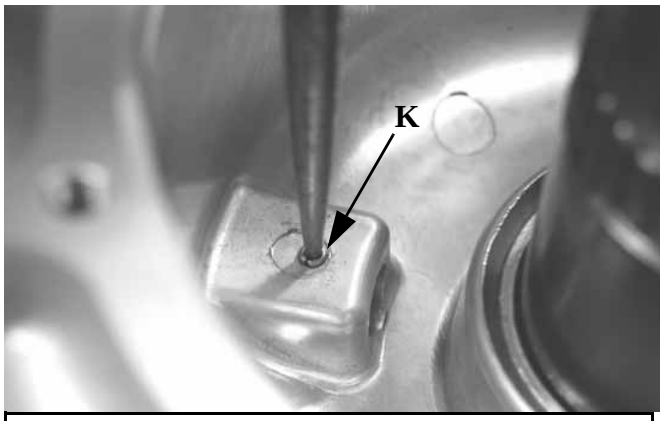


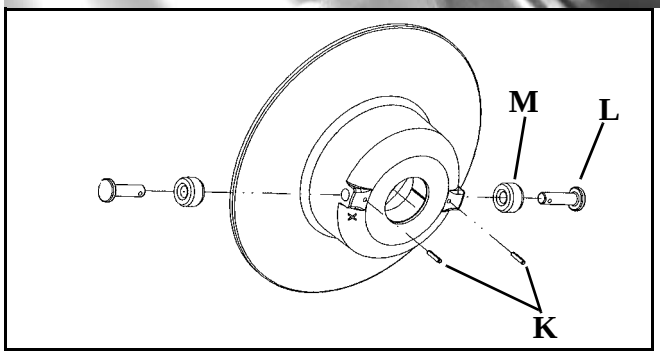
8. Remove the clutch assembly from the holding tool. Remove the large outer retaining ring (I) and the inner retaining ring (J).



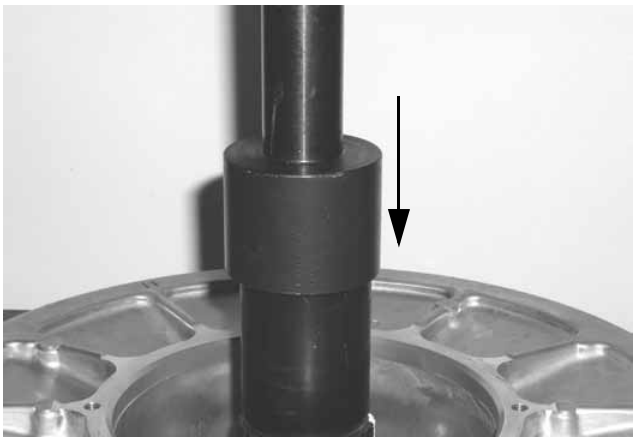
9. Press out the spring pins (K) in the inner sheave.

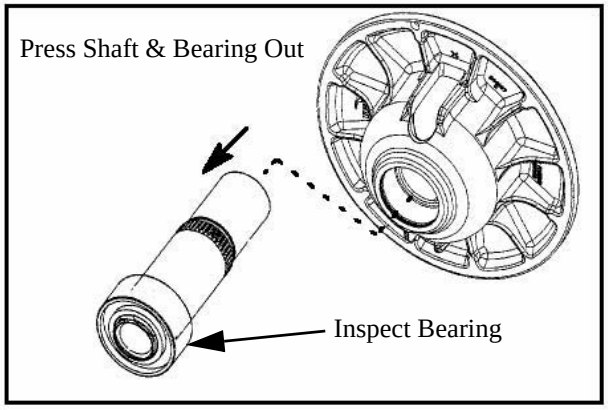
10. Pull out the clutch roller pins (L) and rollers (M).





11. Press the shaft and bearing out of the outer sheave using a press.





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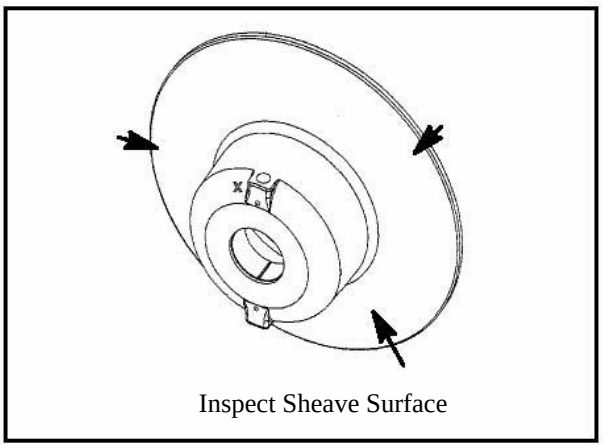
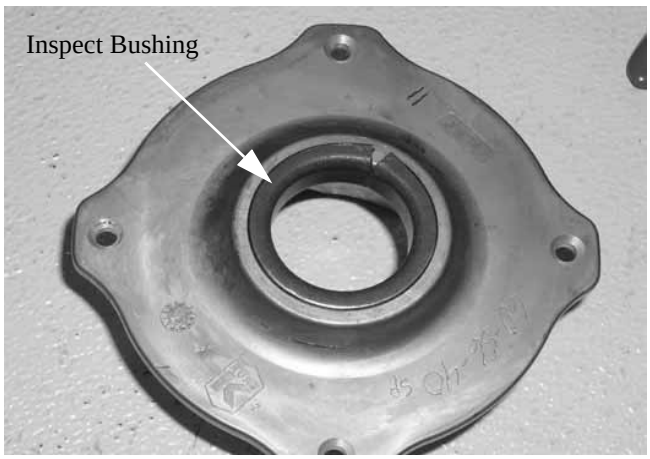
12. Inspect the bearing for wear. Spin the bearing, if the bearing does not spin smoothly replace as needed. To remove the bearing, simply press the bearing from the shaft.
13. Inspect the bearing for wear. Spin the bearing, if the bearing does not spin smoothly replace as needed. To remove the bearing, simply press the bearing from the shaft.



Inspect Sheave Surface

14. Inspect the cam assembly (helix) bushing for wear. If the bushing is worn or the shaft does not fit snug into the bushing, replace the cam assembly (cover).



DRIVEN CLUTCH BUSHING REMOVAL/ INSTALLATION

NOTE: Special Tool Required: EBS CLUTCH BUSHING REMOVAL AND INSTALLATION

Table 6-1:

ITEM	QTY	PART DESCRIPTION	PART #
A, B	1	EBS Puller Tool	5132027
C	1	EBS Puller Nut	5132501
D	1	EBS Main Adapter	5132029
E	1	EBS Bushing Removal Tool Instructions	5132028

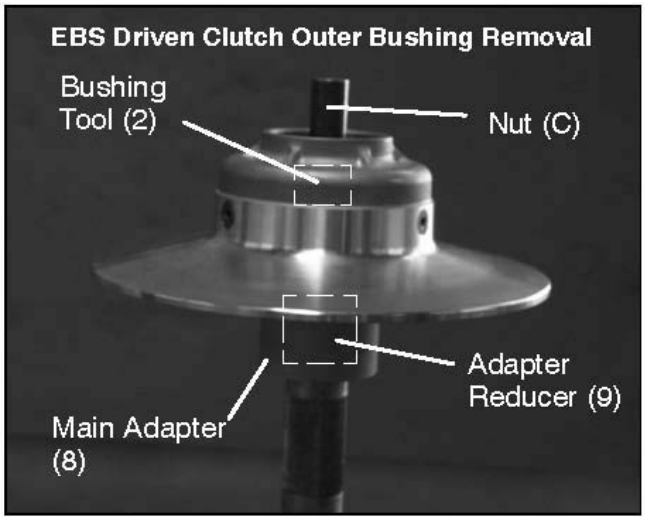
Table 6-1:

ITEM	QTY	PART DESCRIPTION	PART #
--	1	Bushing Replacement Kit	2871226
--	1	Piston Pin Puller	2870386
--	1	Instructions	9915111

NOTE: Bushings are installed at the factory using Loctite™ 609. In order to remove bushings it will be necessary to apply heat evenly to the area around each bushing. Clean all residual Loctite™ from bushing bore prior to installing new bushing.

Driven Clutch Bushing Removal

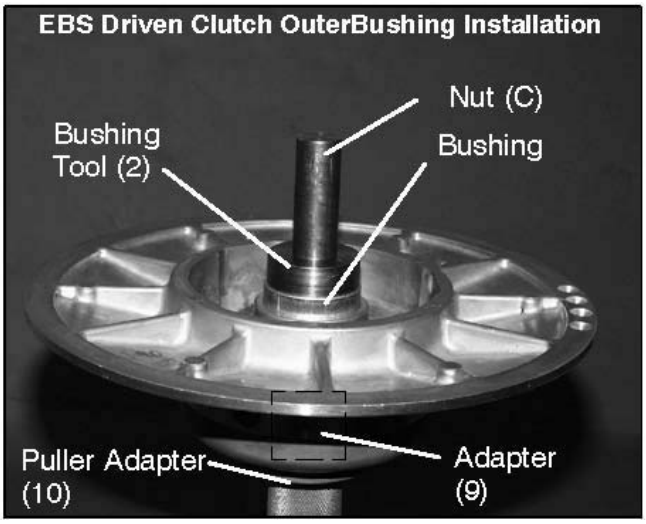
1. Install main puller adapter (Item 8) onto puller.
2. Install adapter reducer (Item 9).
3. Using a hand held propane torch, apply heat around outside of bushing until tiny smoke tailings appear.
4. Flip sheave over so bushing faces downward and install onto puller.
5. Install bushing tool (Item 2).



6. Install left hand nut (C) and spacer onto puller rod and tighten by hand. Turn puller barrel for further tension if needed.
7. Turn clutch sheave counterclockwise until bushing is removed and sheave comes free.
8. Remove nut (C) (left hand thread) from puller rod and set aside.
9. Remove adapters from puller.
10. Remove bushing and removal tool from adapters. Discard bushing.

Driven Clutch Bushing Installation

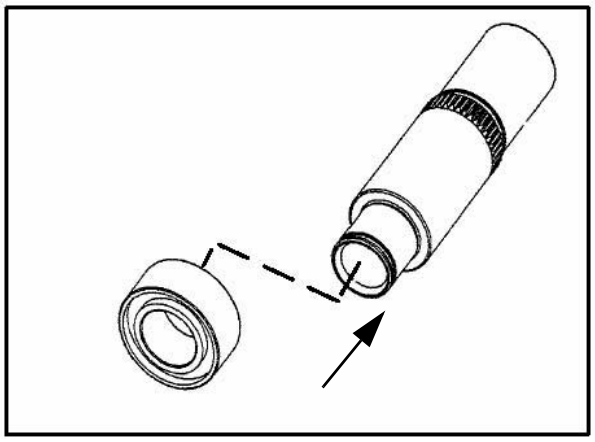
1. Install puller adapter (Item 10) onto puller.
2. Install adapter (Item 9) onto puller.



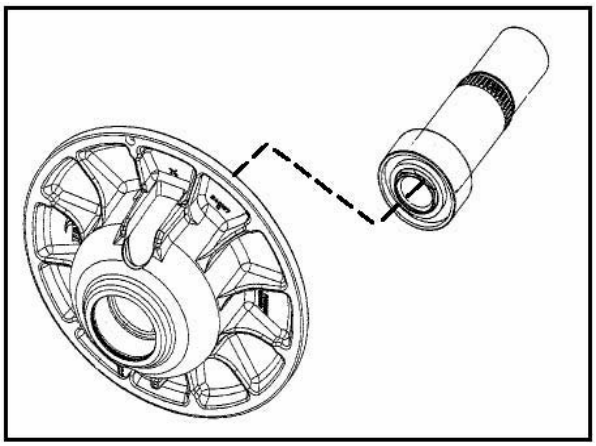
3. Apply Loctite™ 609 evenly to bushing bore inside moveable sheave.
4. Install sheave face down on puller.
5. Install new bushing on installation tool (Item 2) and install assembly into sheave.
6. Install left hand thread nut (C) onto puller rod and hand tighten against installation tool.
7. Turn clutch sheave counterclockwise, making sure bushing is drawn straight into bore. Continue until bushing is seated.
8. Remove nut (C) from puller rod and set aside.
9. Remove installation tool and clutch sheave from puller.

EBS DRIVEN CLUTCH REASSEMBLY

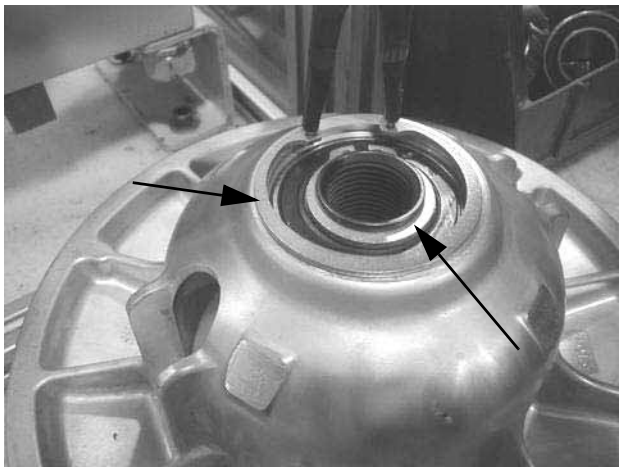
1. Press a new bearing onto the output shaft using a press.



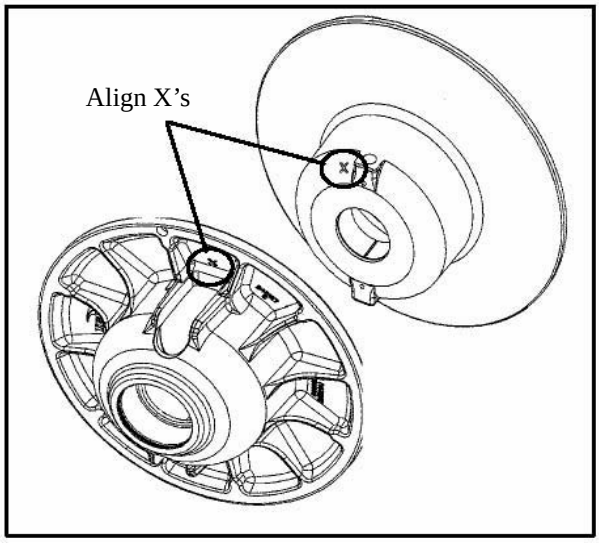
2. Install the shaft/bearing into the outer sheave.



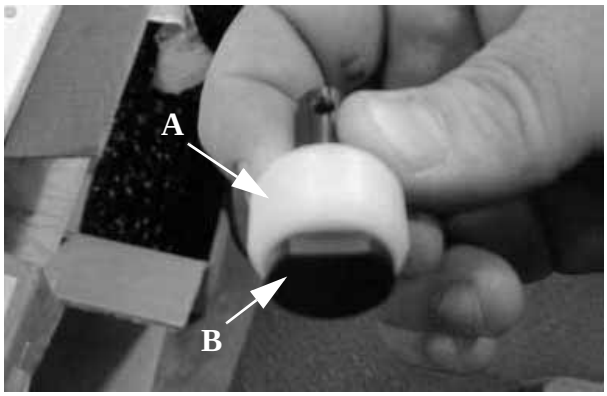
3. Install the small and large retaining rings into the outer sheave above the bearing.



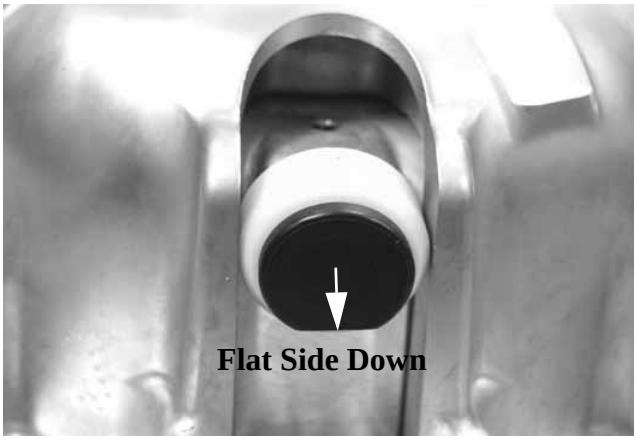
4. Line up the “X” on the moveable sheave with the “X” on the stationary sheave or use the marks previously used. Put the sheaves together.



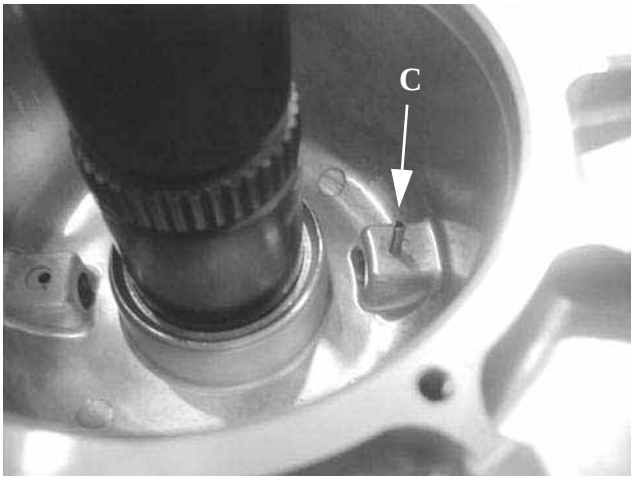
5. Install the roller (A) onto the roller pin (B). (Both Sides).



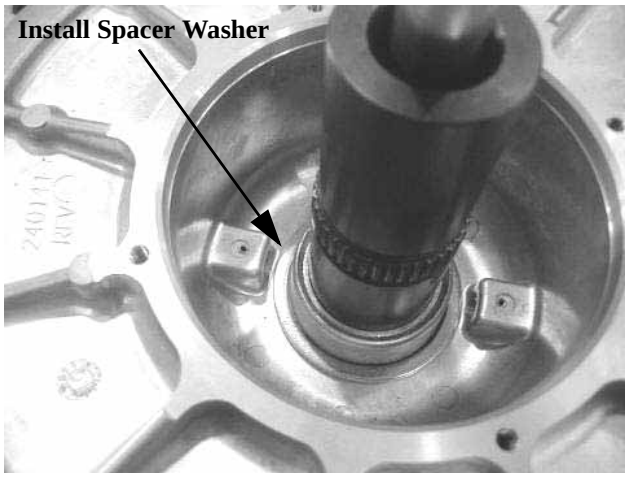
6. Install the roller pin into the sheave assembly. (Both sides). The flat side of the roller pin faces downward when the shaft side is laying flat on the bench.



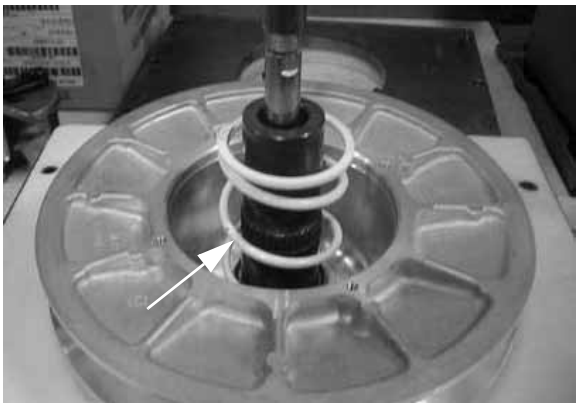
7. Install the spring pins (C) to secure the roller pins. Install until flush with sheave surface.



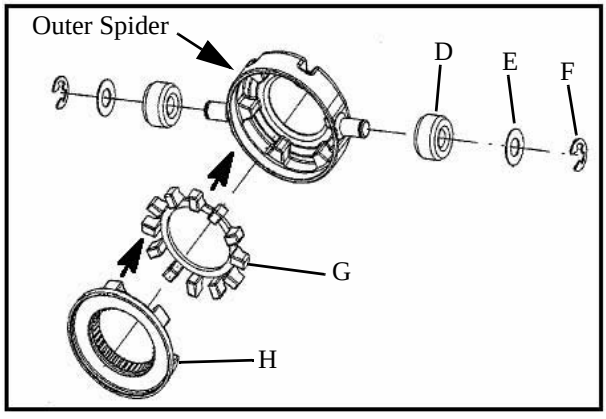
8. Install the spacer washer.



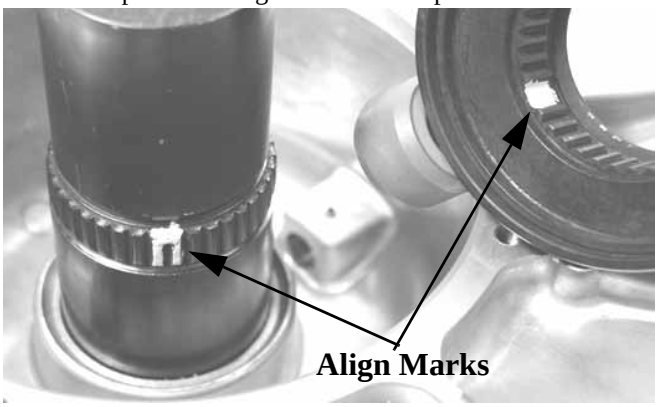
9. Install the spring over the shaft (arrow).



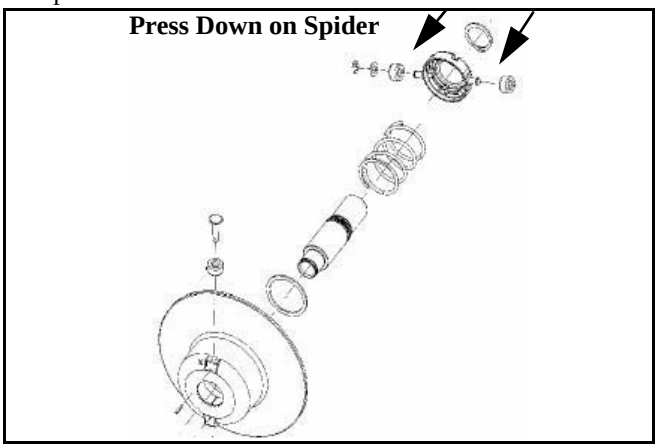
10. Install the clutch rollers (D) onto each side of the outside spider. Install the washers (E) and E-clips (F) to secure the rollers. Spin the roller, the rollers should spin freely.
11. Install the spider dampener (G) inside the outer spider and install the inside spider plate (H).



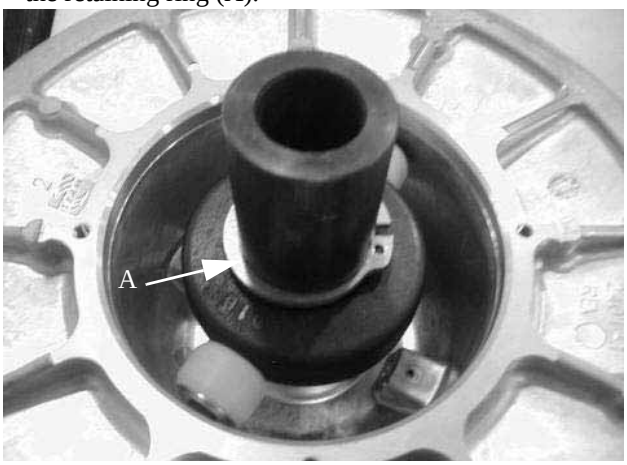
12. Install the spider assembly onto the shaft with the retaining ring on top of the spider. **NOTE:** Use the marks previously made to align the skip tooth spider, or use the "X" on top of the spider and align it with the skip tooth on the shaft.



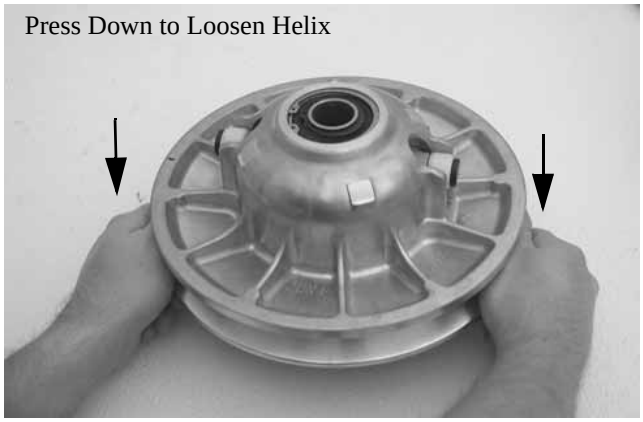
13. Place the clutch into Clutch Compression Tool **PN 8700220**. Using Compression Extensions **PN PS-45909**, Press down on the top of the spider assembly, pushing the spider onto the shaft.



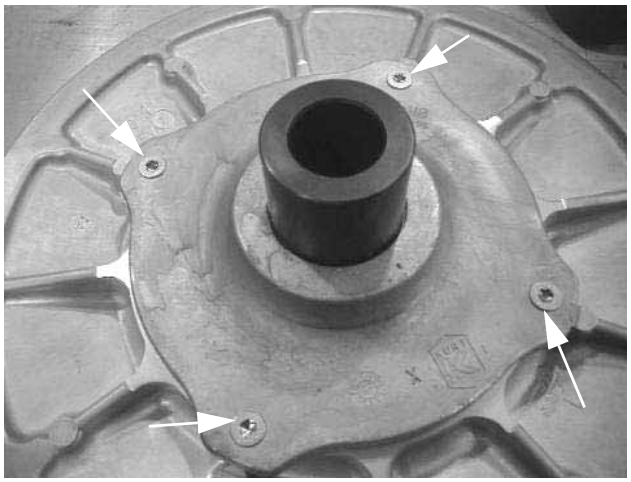
14. Slowly compress the spider into place. If the spider appears to bind while compressing, stop and make sure the skip tooth on the shaft and the spider are aligned. Once the spider passes the retaining ring notch on the shaft, install the retaining ring (A).



15. Install the cam assembly (helix) over the shaft. Line up the "X" on the cam, "X" on spider, and "X" on the stationary sheave or use the marks previously made before disassembly. **NOTE:** If the cam assembly (helix) is difficult to install, be sure the sheaves are aligned. To align the sheaves place the clutch assembly on a flat surface with the cam assembly (helix) side down. Press down on the moveable sheave belt face with both hands and the helix will release.



16. Use a T25 torx to install the four torx screws and torque to specification.



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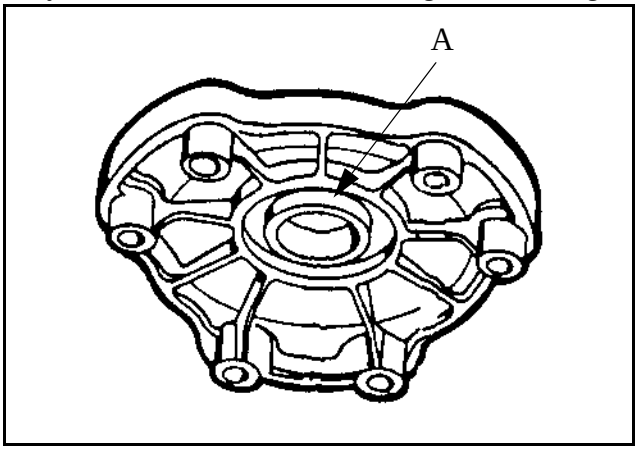
T25 Torx: **42-52 in. lbs. (4.75 - 5.88 Nm)**

STANDARD DRIVE CLUTCH

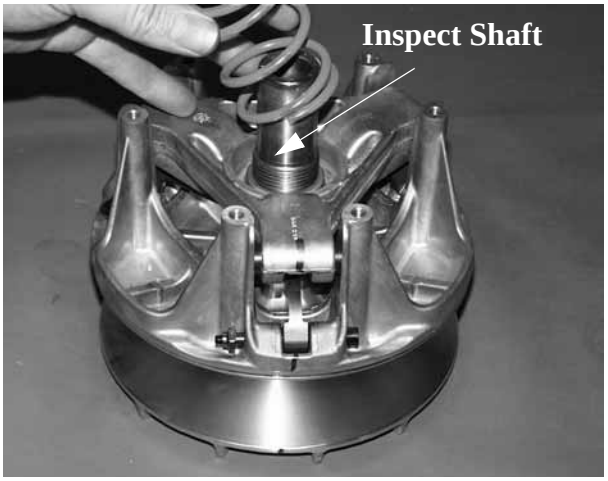
Drive Clutch Disassembly

1. Using a permanent marker, mark the cover, spider, and moveable and stationary sheaves for reference, as the previous X's may not have been in alignment before disassembly.
2. Remove cover bolts evenly in a cross pattern and remove cover plate.
3. Inspect cover bushing (A). The outer cover bushing is manufactured with a Teflon™ coating. Wear is determined by the amount of Teflon™ remaining on the bushing.



Cover Bushing Inspection: Replace the cover bushing if more brass than Teflon™ is visible on the bushing. Refer to bushing replacement in this chapter.

4. Inspect area on shaft where bushing rides for wear, galling, nicks, or scratches. Replace clutch assembly if worn or damaged.
5. Remove and inspect spring. See "Drive Clutch Spring Specifications" for spring inspection.



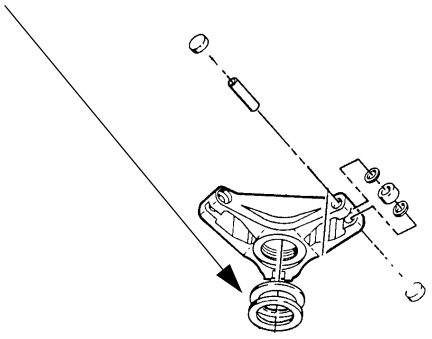
Spider Removal

1. Remove the limiter nut using the Clutch Spider Nut Socket **PN 2870338**. Install clutch in holding fixture and loosen the spider (counterclockwise) using Clutch Spider Install Tool **PN 2870341**.

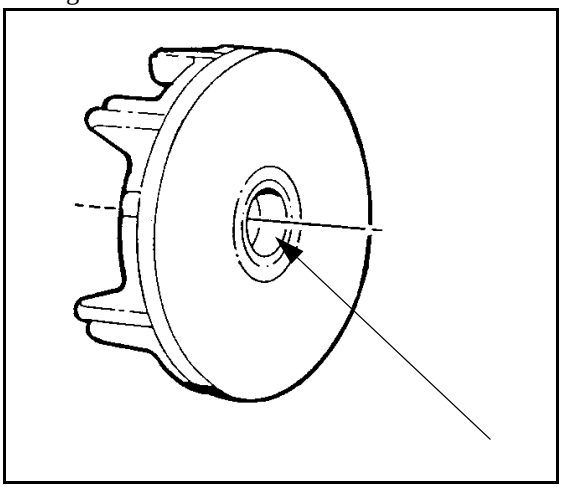
Clutch Holding Fixture: PN 2871358
Spider Removal Tool: PN 2870341

NOTE: It is important that the same number and thickness of washers are reinstalled beneath the spider during assembly. Be sure to note the number and thickness of these washers.

To maintain proper clutch balance and belt-to-sheave clearance, be sure to reinstall original quantity and thickness washers under the spider assembly.

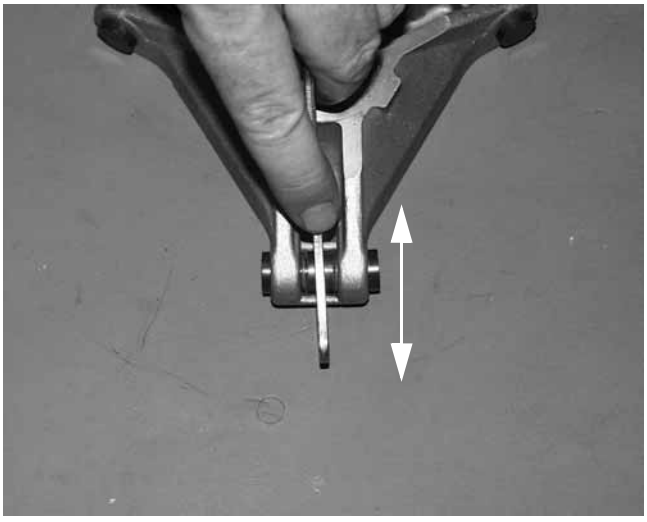


2. Inspect the Teflon™ coating on the moveable sheave bushing.



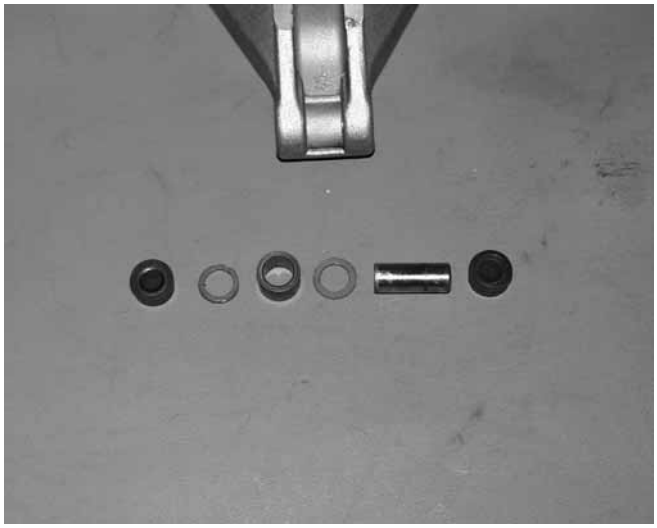
Moveable Sheave Bushing Inspection: Replace the cover bushing if more brass than Teflon™ is visible on the bushing. Refer to bushing replacement in this chapter.

3. Inspect all rollers, bushings and roller pins by pulling a flat metal rod across the roller. Turn roller with your finger. If you notice resistance, galling, or flat spots, replace rollers, pins and thrust washers in sets of three. Also inspect to see if roller and bushing are separating. Bushing must fit tightly in roller. Use the Roller Pin Tool (**PN 2870910**) to replace rollers and pins. Take care not to damage roller bushing or bearing surface of the new pin during installation.



4. Rubber backed buttons can and should be used in all ATV clutches if the hollow roller pin is changed to a solid roller pin.

NOTE: The rubber side of the button is positioned toward the solid roller pin. It is recommended to switch all buttons to the rubber version during service (if needed).



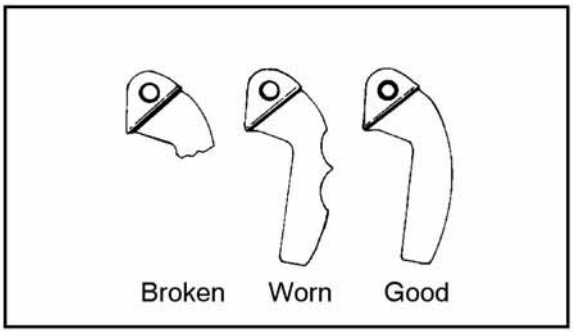
Button To Tower Clearance Inspection

1. Inspect for any clearance between spider button to tower. If clearance exists, replace all buttons and inspect surface of towers. See "Spider Removal" procedure.

2. Inspect sheave surfaces. Replace the entire clutch as an assembly if worn, damaged or cracked.

Shift Weight Inspection

1. If clutch is not disassembled, inspect as shown, using a clutch holding tool to compress the moveable sheave. The contact surface of the weight should be smooth and free of dents or gall marks. Remove shift weight bolts and weights.



2. Inspect the weight pivot bore and pivot bolts for wear or galling. If weights or bolts are worn or broken, replace in sets of three with new bolts.

NOTE: A damaged shift weight is usually caused by a damaged or stuck roller in the spider assembly. See roller inspection, see "Roller, Pin, and Thrust Washer Inspection".

⚠ WARNING

The clutch assembly is a precisely balanced unit. Never replace parts with used parts from another clutch assembly!

All PVT maintenance or repairs should be performed only by a certified Polaris Master Service Dealer (MSD) technician who has received the proper training and understands the procedures outlined in this manual.

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

Sheave / Bushing Inspection

Inspect the Teflon™ coating on the sheave bushings and cover bushing. Inspect BOTH sheaves for signs of wear, grooving or cracking. Clean sheave surfaces with a 3M™ pad if needed.

Cover / Sheave Bushing Inspection: Replace bushing if more brass than Teflon™ is visible on the bushing. Do not clean bushings.

Drive Clutch Bushing Service

NOTE: Special Tool Required: CLUTCH BUSHING REMOVAL AND INSTALLATION KIT

ITEM	QTY	PART DESCRIPTION	PART #
--	1	Bushing Replacement Kit	2871025
--	1	Piston Pin Puller	2870386

NOTE: Bushings are installed at the factory using Loctite™ 609. In order to remove bushings it will be necessary to apply heat evenly to the area around each bushing. Clean all residual Loctite™ from bushing bore prior to installing new bushing.

⚠ CAUTION

Clutch components will be hot!
In order to avoid serious burns, wear insulated gloves during the removal process.

Drive Clutch Bushing Removal

1. Remove clutch as outlined previously in this chapter.
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 puller adapter (Item 10 from kit **PN 2871226**).
5. Install main adapter onto puller.
6. With towers pointing toward the vise, slide sheave onto puller rod.
7. Install removal tool into center of sheave.
8. Install nut onto end of puller rod and hand tighten. Turn puller barrel to increase tension on sheave if needed. Using a hand held propane torch, apply heat around outside of bushing until tiny smoke tailings appear.
9. Turn sheave counterclockwise on puller rod until it comes free. Lift sheave off puller.
10. Remove nut from puller rod and set aside.
11. Pull bushing removal tool and adapter from puller rod. Remove bushing from tool and discard.

Drive Clutch Bushing Installation

1. Place main adapter on puller.
2. Apply Loctite™ 609 evenly to bushing bore inside moveable sheave.
3. Set bushing in place on sheave.
4. Insert installation puller tool into center of bushing.
5. With towers pointing upward, slide sheave, bushing and tool onto puller rod.
6. Install nut on puller rod and hand tighten. Turn barrel to apply additional tension if needed.
7. Turn sheave counterclockwise, making sure bushing is drawn straight into bore. Continue until bushing is seated.
8. Remove nut from puller rod and set aside.
9. Remove sheave from puller.
10. Remove installation tool.

Cover Bushing Removal

1. Install main adapter on puller.
2. Install adapter reducer.
3. From outside of clutch cover, insert removal tool into cover bushing.
4. With inside of cover toward vise, slide cover onto puller.
5. Install nut onto puller rod and hand tighten. Turn puller barrel to increase tension as needed.
6. Turn clutch cover counterclockwise on puller rod until bushing is removed and cover comes free.
7. Remove nut from puller rod and set aside.
8. Remove bushing and bushing removal tool from puller. Discard bushing.

Cover Bushing Installation

1. Apply Loctite™ 609 evenly to bushing bore in cover.
2. Working from inside of cover, insert new 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. Take installation tool and clutch cover off rod.

Drive Clutch Reassembly

NOTE: It is important that the same number and thickness of washers are reinstalled beneath the spider during assembly. The Teflon bushings are self-lubricating. Do not apply oil or grease to the bushings.

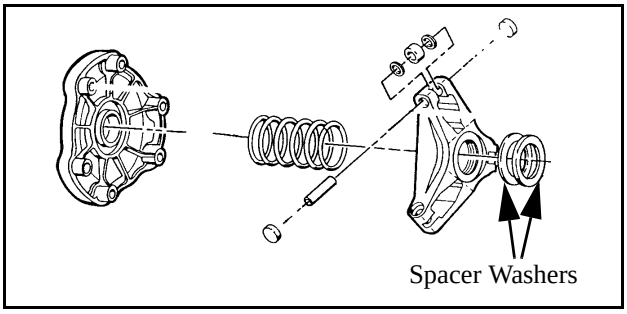
Reassemble drive clutch in the following sequence. Be sure the "X", or the marks that were made earlier, are aligned during each phase of assembly.

A) "X", or the marks that were made earlier on cover

B) "X" on spider, making sure spacer washers are installed underneath spider and positioned properly in recess

C) "X", or the marks that were made earlier under weight

1. Install moveable sheave onto fixed sheave.
2. Install spider spacers. Use same quantity and thickness as were removed.
3. Compress spider buttons for each tower and install spider towers on the moveable sheave. Verify that the alignment marks on spider align with the marks that were made on the moveable sheave.
4. Torque spider to specification using the holding fixture and spider tool. Torque with smooth motion to avoid damage to the stationary sheave.



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Spider Torque:
200 ft. lbs. (271 Nm)

CAUTION

Verify spider spacer washers are fully seated in the recessed area of the spider. Any misalignment will alter clutch balance. Inverting the clutch while initially tightening the spider will help position the washers.

5. Install limiter nut on top of spider using the Clutch Spider Nut Socket (**PN 2870338**). Torque to specification.

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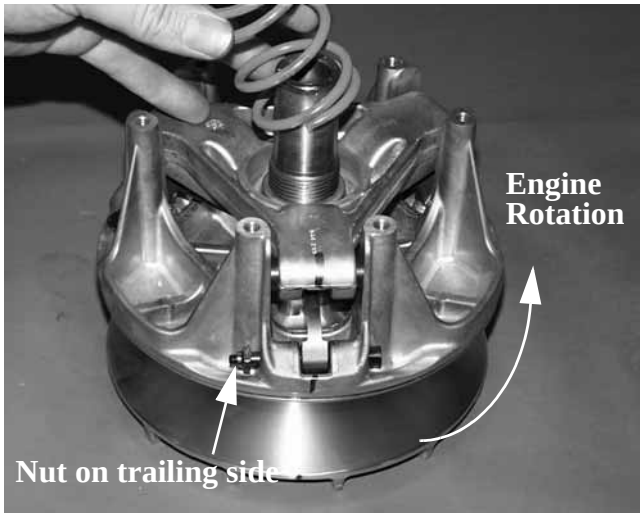
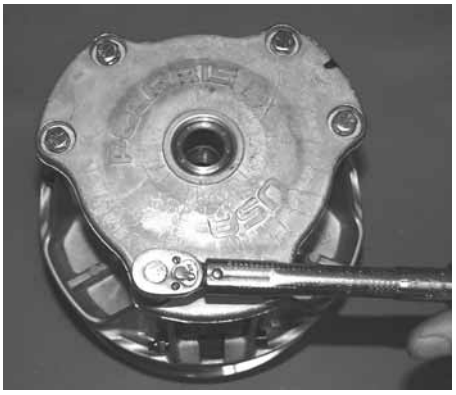
Spider Limiter Nut Torque:
15 ft. lbs. (20 Nm)

6. Reinstall shift weights using new lock nuts on the bolts.
7. Reinstall clutch spring.



8. Reinstall cover, aligning bosses on the tower and cover. Torque cover bolts evenly to specification.



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Cover Screw Torque:
90 in. lbs. (10.4 Nm)

STANDARD DRIVEN CLUTCH

Disassembly

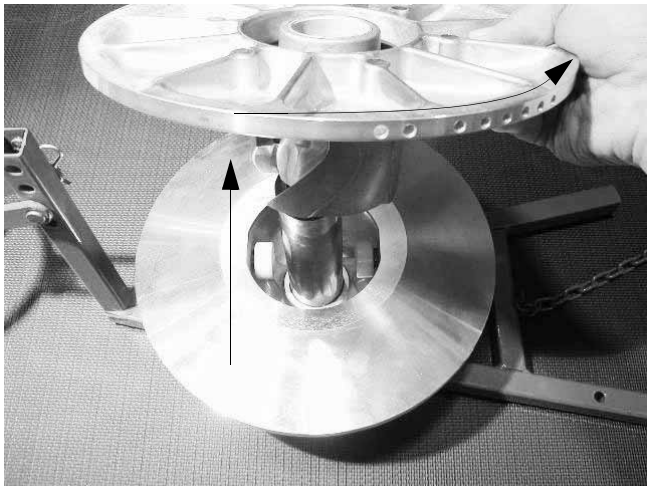
1. Using special tool **PN 8700220**, apply and hold downward pressure on the outer spring retainer and remove the snap ring (A).

⚠ CAUTION

Wear eye protection when working with spring tensioned components to avoid serious injury.

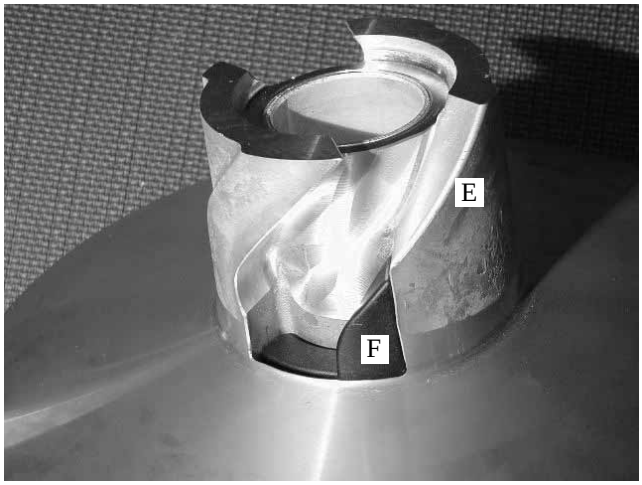
2. With snap ring (A) removed and spring pressure relieved, remove the outer retainer (B) and spring (C).

3. Separate the clutch sheaves by pulling upward while rotating the inner sheave.



Inspection

1. Inspect both the inner and outer sheave surfaces. Replace the entire clutch assembly if worn, damaged or cracked.
2. Inspect the inner sheave helix (E) and spring retainer (F) for signs of wear.



3. Remove the inner spring retainer (F) from the inner sheave and inspect for signs of wear.

4. Inspect the rollers in the stationary sheave for signs of wear.

NOTE: Rollers and helix are non-serviceable items. Replacement of clutch assembly is required if damaged beyond usable condition.

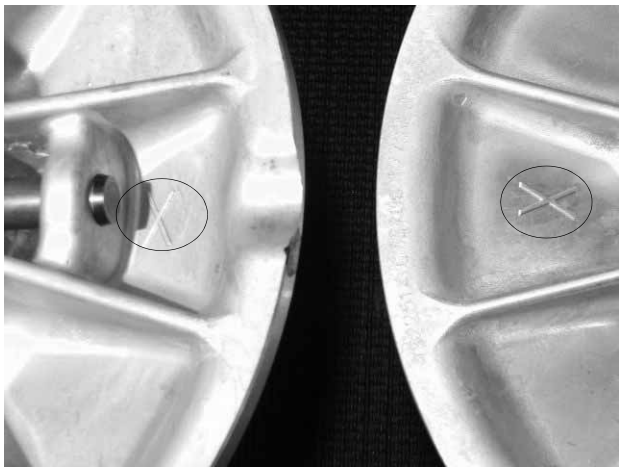
5. Inspect the bushings inside the moveable sheave. If replacement is required, use Bushing Removal Kit PN 2871226, following the instructions.

Sheave Bushing Inspection:
Replace bushing if more brass than Teflon™ is visible on the bushing. Do not clean bushings.

Assembly

1. Install inner spring retainer (if removed).
2. Install the inner sheave onto the outer sheave.

NOTE: Verify 'X' marks on each side of the sheaves are aligned upon reassembly of sheaves.



3. Install the compression spring.
4. Install the outer retainer on top of spring.
5. Using special tool **PN 8700220**, compress the outer retainer onto the shaft and install the snap ring.

⚠ CAUTION

Wear eye protection when working with spring tensioned components to avoid serious injury.

PVT TROUBLESHOOTING

Overheating

IMPORTANT: During routine maintenance or whenever PVT system overheating is evident, it's important to check the inlet and outlet ducting for obstructions. Obstructions to air flow through the ducts will significantly increase PVT system operating temperatures. The ATV should be operated in low range when pulling or plowing heavy loads, or if extended low speed operation is anticipated.

General Range Operation Guidelines

LOW RANGE: Heavy pulling, basic operational speeds less than 7 MPH, riding through rough terrain (swamps, mountains, etc..), low ground speeds.

HIGH RANGE: High ground speeds, speeds above 7 MPH.

Table 6-1: Cause and Remedy

DIAGNOSIS OF CLUTCH DRIVE BELT & COVER RELATED ISSUES:	
POSSIBLE CAUSES	**SOLUTIONS/WHAT TO DO**
Loading the ATV into a pickup or tall trailer when in high range.	Shift transmission to low range during loading of the ATV to prevent belt burning.
Starting out going up a steep incline.	When starting out on an incline, use low range, or dismount the ATV after first applying the park brake and perform the “K” turn.
Driving at low RPM or low ground speed (at approximately 3-7 MPH).	Drive at higher speed or use Low Range. The use of Low Range is highly recommended for cooler PVT operating temperatures and longer component life.
Insufficient warm-up of ATVs exposed to low ambient temperatures.	Warm engine at least 5 min., then with transmission in neutral, advance throttle to approx. 1/8 throttle in short bursts, 5 to 7 times. The belt will become more flexible and prevent belt burning.
Slow and easy clutch engagement.	Fast, effective use of the throttle for efficient engagement. Continuous operation at the point of engagement (initial vehicle movement) increases PVT temperatures and component wear.
Towing/Pushing at low RPM/low ground speed.	Use Low Range only.
Plowing snow, dirt, etc./utility use.	Use Low Range only.
Stuck in mud or snow.	Shift the transmission to Low Range, carefully use fast, aggressive throttle application to engage clutch. Warning: Excessive throttle may cause loss of control and vehicle overturn.
Climbing over large objects from a stopped position.	Shift the transmission to Low Range, carefully use fast, aggressive, throttle application to engage clutch. Warning: Excessive throttle may cause loss of control and vehicle overturn.
Belt slippage from water or snow ingestion into the PVT system.	Shift the transmission to neutral. Using the throttle, vary the engine rpm from idle to 3/4 throttle. Engage transmission in the lowest possible range and test for belt slippage Repeat several times as required. During this procedure, the throttle should not be held at the full position for more than 10 seconds. PVT seals should be inspected for damage if repeated leaking occurs.
Clutch malfunction.	Inspection/repair of clutch components should be performed by a certified Polaris MSD technician.

Problem, Cause and Remedy Chart

Table 6-2: Problem, Cause and Remedy

SITUATION	POSSIBLE CAUSE	REMEDY
Engine RPM below specified operating range although engine is properly tuned.	-Wrong or broken drive clutch spring.	-Replace with recommended spring.
	-Drive clutch shift weight too heavy.	-Install correct shift weight kit to match engine application.
	-Driven clutch spring broken or installed wrong .	-Replace spring; refer to proper installation location
Erratic engine operating RPM during acceleration or load variations.	-Drive clutch binding.	a. Disassemble drive clutch; inspect shift weights for wear and free operation.
	-Belt worn unevenly - thin/burnt spots	Replace belt
	-Driven clutch malfunction.	a. Replace ramp buttons. b. Inspect movable sheave for excessive bushing
	-Sheave face grooved.	-Replace the clutch.
Engine RPM above specified operating range.	-Incorrect drive clutch spring (too high spring rate).	-Install correct recommended spring.
	-Drive clutch shift weights incorrect for application (too light)	-Install correct recommended shift weights.
	-Drive clutch binding.	-Disassemble and clean clutch, inspecting shift weights and rollers. Reassemble without the spring
	-Driven clutch binding.	-Disassemble, clean, and inspect driven clutch, noting worn sheave bushing and ramp buttons and helix
	-Converter sheaves greasy; belt slippage.	-Clean sheaves with denatured alcohol or brake cleaner, install new belt.
Harsh drive clutch engagement.	-Drive belt worn too narrow.	-Replace belt.
	-Excessive belt/sheave clearance with new belt.	-Perform belt/sheave clearance adjustment with shim washers beneath spider.
Drive belt turns over	-Wrong belt for application.	-Replace with correct belt.
	-Clutch alignment out of spec.	-Adjust alignment offset.
	-Engine mount broken or loose	-Inspect/adjust or replace.
PVT cover overheating (melting)	-Plugged air intake or outlet	-Clear obstruction.
	-Belt slippage due to water, oil, grease, etc., rubbing on cover	-Inspect system. Clean , repair or replace as necessary. Seal PVT system ducts.
	-Clutches or weight being applied to cover while in operation	Remove weight. Inform operator.
	-Use of High vs. low range	-Instruct operator on guidelines for operation in wet terrain as outlined in Owner's Safety and Maintenance
Water Ingestion	-Cover seals or ducts leaking	-Find leak and repair as necessary.
	-Operator error	-Instruct operator on guidelines for operation in wet terrain as outlined in Owner's Safety and Maintenance
Belt Slipping	-Belt worn out	-Replace belt.
	-Water ingestion	-Inspect and seal PVT system.
	-Belt contaminated with oil or grease	-Inspect and clean.

Table 6-2: Problem, Cause and Remedy

SITUATION	POSSIBLE CAUSE	REMEDY
Belt burnt, thin spots	-Abuse (continued throttle application when vehicle is stationary, excess load)	-Caution operator to operate machine within guidelines.
	-Dragging brake	-Vehicle operated with park brake on. Inspect brake system.
	-Slow, easy clutch engagement	-Instruct firm, effective use of throttle for efficient engagement.
PVT noise	-Belt worn or separated, thin spots, loose belt	-Replace belt.
	-Broken or worn clutch components, cover hitting clutches	-Inspect and repair as necessary.
Engagement erratic or "jerks"	-Thin spots on belt, worn belt	-Replace belt. Refer to belt burnt troubleshooting and instruct operator.
	-Drive clutch bushings stick	-Inspect and repair clutches.

CHAPTER 7
FINAL DRIVE

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SPECIFICATIONS

Torque Table

COMPONENT	FT.LBS. (IN.LBS.)	NM
F/R **Steel** Wheel Nuts	30	41
F/R **Aluminum** Wheel Nuts	90	122
Front Hub Nut	70	95
Rear Hub Nut	80	109
Front Gearcase Mount Bolts	30	41
Standard Gearcase Screws	14	19
Rear Gearcase Mount Bolts	30	41
Rear Gearcase Bolts	25	34
Lower Hub Carrier Bolts	50	68
Upper Hub Carrier Bolts	35	48
ADC Pump Screws	(17-23)	1.9 - 2.5
ADC Cover Screws	7 - 11	9.4 - 14.9
ADC Bleed Valves	(80)	9

IMPORTANT: Verify which type of wheel ATV is equipped with (aluminum or steel) when torquing wheel nuts.

Special Tools

PART NUMBER	TOOL DESCRIPTION
2872608	Roller Pin Removal Tool
8700226	CV Boot Clamp Pliers
2870772	1 3/4" Straight Wrench
PA-48542	ADC Gearcase Piston Installation Tool

Gearcase Fluid / Capacity

GEARCASE	DESCRIPTION
Centralized Hilliard (Standard Models)	Demand Drive LT Premium Hub Fluid **8.97 oz. (265 ml)**
Centralized Hilliard w/ ADC (Deluxe Models)	Demand Drive LT Premium Hub Fluid **9.3 oz. (275 ml)**
ADC Gearcase Pump Reservoir	Polaris ADC or AW ISO 10 Hydraulic Fluid
Rear Gearcase	AGL Synthetic or ADF **5.0 oz. (150 ml)**

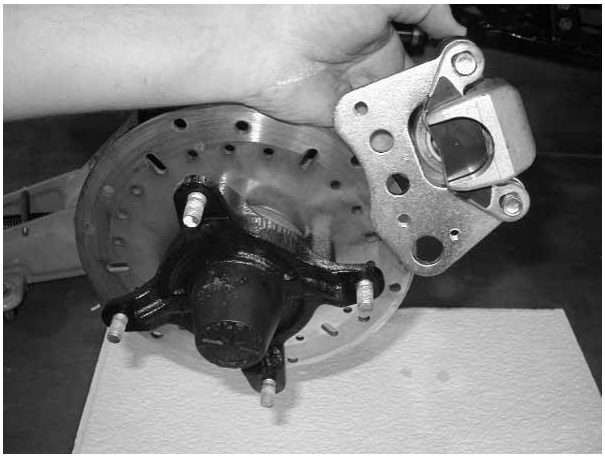
FRONT DRIVE AXLE

Removal

1. Set the ATV in park. Remove hub dust cap.
2. Remove cotter pin.
3. Loosen the hub retaining nut.
4. Loosen - but do not remove - the wheel nuts.
5. Safely lift and support the front of the ATV.

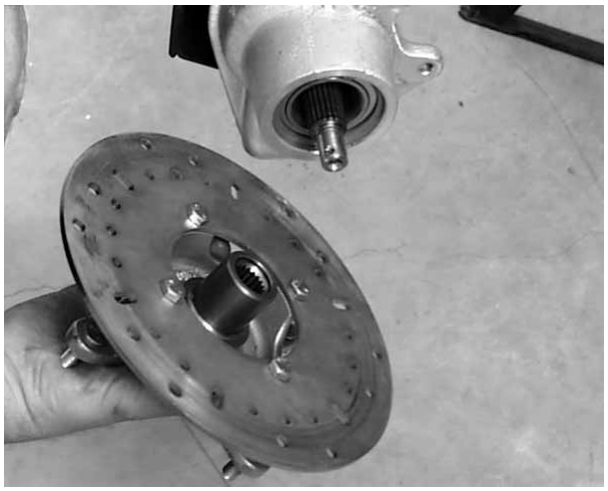
> ⚠ CAUTION
>
> Serious injury could occur if machine tips or falls.

6. Remove wheel.
7. Remove the two brake caliper attaching bolts.



> CAUTION
>
> Do not hang the caliper by the brake line. Use wire to hang the caliper to prevent possible damage to the brake line.

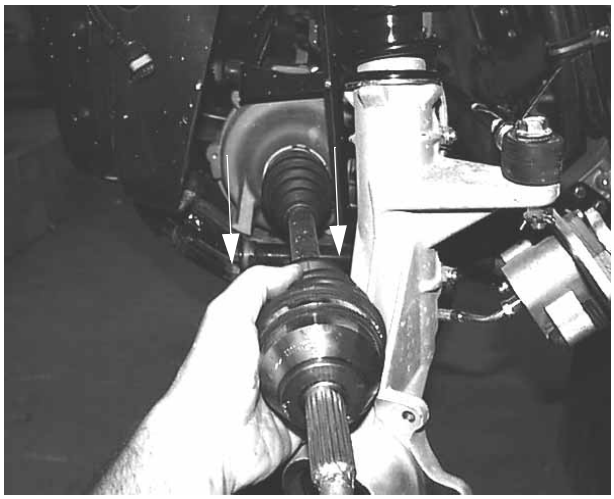
8. Remove hub.



9. Remove cotter pin and nut from lower A-arm ball joint. Remove lower A-arm from ball joint.

10. Pull strut assembly out while pivoting front drive shaft downward until it clears strut assembly.

11. Pull strut assembly out while pivoting front drive shaft downward until it clears strut assembly.



Installation

1. Install new spring ring on drive shaft. Apply an anti-seize compound to splines. Align splines of drive shaft with front gearcase and install by lightly tapping on drive shaft with rubber faced hammer.
2. Install drive shaft in strut.
3. Install lower ball joint, torque nut to specification and install new cotter pin.

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Ball Joint Retaining Nut Torque: **25 ft. lbs. (34.5 Nm)**

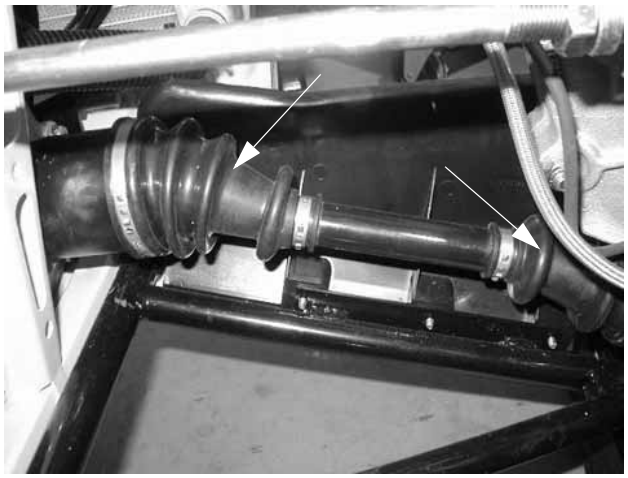
4. Install hub and tighten hub nut to specification.

= T
Front Hub Retaining Nut Torque: **70 ft. lbs. (95 Nm)**

FRONT DRIVE SHAFT (CV) BOOT

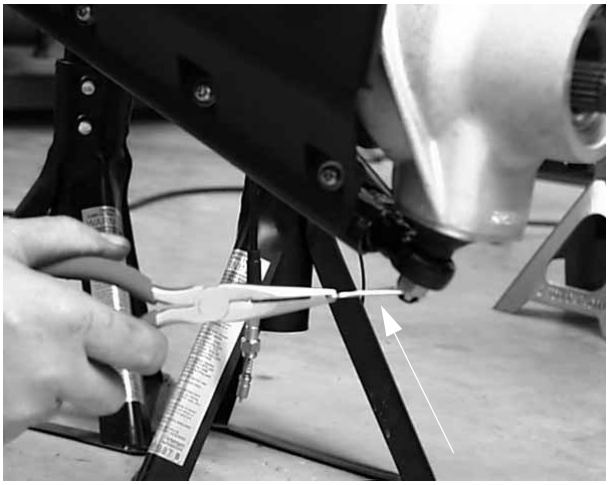
Inspection

Check the front and rear driveshaft CV boots for any tears or leaking grease. If the driveshaft boot loses all of the grease CV joint failure will occur.



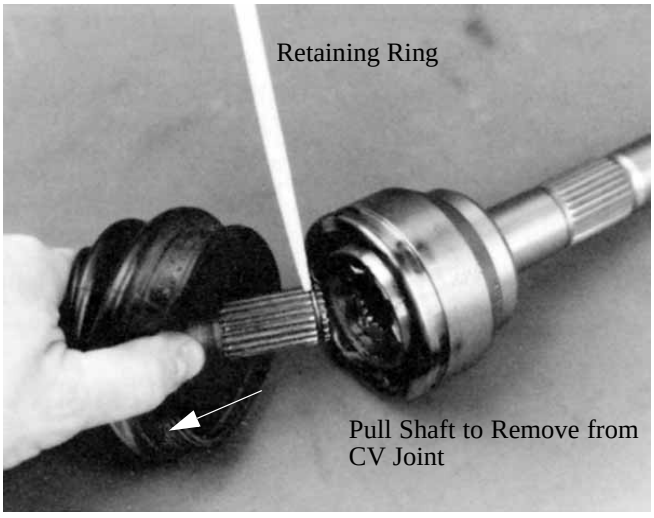
Replacement

1. Remove wheel, brake caliper, and wheel hub. Refer to "FRONT DRIVE AXLE REMOVAL" earlier in this chapter for procedure.
2. Remove cotter pin and castle nut from A-arm ball joint.



3. Disconnect A-arm from ball joint using a tie rod fork.

4. Slide strut off end of drive shaft and tie it up out of the way of the shaft.
5. Remove clamps from rubber boot using the proper boot clamp pliers.
6. Remove the large end of the boot from the CV joint, slide the boot back and separate the wheel spindle and CV joint assembly from the axle shaft by pulling the shaft sharply outward, away from the CV joint. It may be necessary to tap the CV joint assembly outward with a soft faced hammer.



7. Remove small clamp and boot from driveshaft.

NOTE: If the ATV has been operated with a damaged boot, the CV joint grease may be contaminated. Inspect the grease carefully for contamination, and clean the joint thoroughly if necessary. Front drive axle CV boot replacement requires 3.5 oz. of grease.

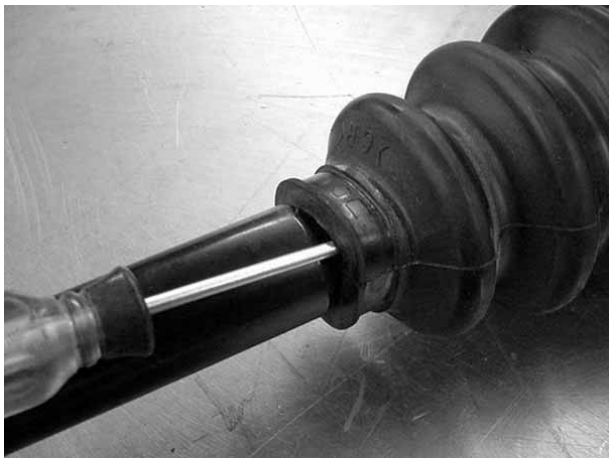
CV Joint Grease -3.5 oz.
(Refer to parts manual for boot kit)
CV Boot Clamp Pliers:
Earless Type: (PN 8700226)

Boot replacement with complete CV joint cleaning requires the entire 3.5 oz. of grease.

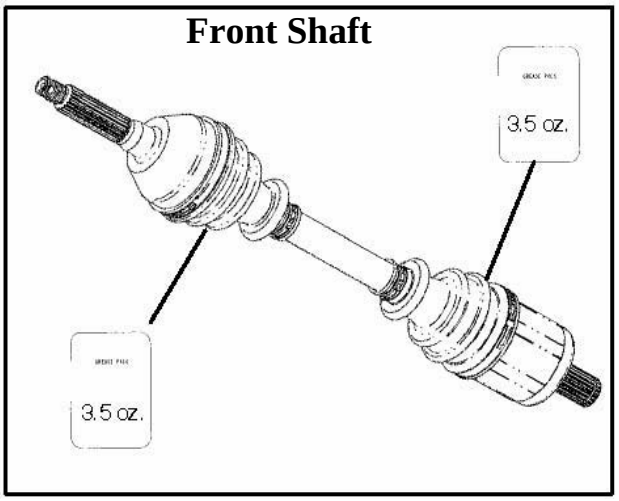
8. Before installing the new boot, remove all grease from the boot area and shaft.

NOTE: It is very important to use the correct type and quantity of grease. Use only the grease contained in the boot kit. DO NOT use a substitute grease and DO NOT overfill or under fill the CV joint.

9. Slide the new clamp and boot (small end first) over the splined shaft, then slide (tap) the CV joint into the splines of the axle.
10. Add grease through large end of boot.
11. Install a new boot onto the axle shaft and fill the CV joint and boot with the correct type and amount of grease.
12. While pulling out on the CV shaft, fully extend the CV joint and slide a straight O-ring pick or a small slotted screw driver between the small end of the boot and the shaft. This will allow the air pressure to equalize in the CV boot in the position that the joint will spend most of its life. Before you remove your instrument, be sure the small end of the boot is in its correct location on the axle. CARE MUST BE TAKEN TO AVOID DAMAGE TO THE NEWLY INSTALLED BOOT.



13. Install the small clamp on the boot.



FRONT HUB

Disassembly

1. Remove outer snap ring.

2. From the back side, tap on the outer bearing race with a drift punch in the reliefs as shown.

NOTE: Drive bearing out evenly by tapping on outer race only. Once bearing is at bottom of casting, support casting on outer edges so bearing can be removed.

3. Inspect the bearing.

NOTE: Due to extremely close tolerances and minimal wear, the bearings must be inspected visually, and by feel. While rotating bearings by hand, inspect for rough spots, discoloration, or corrosion. The bearings should turn smoothly and quietly, with no detectable up and down movement and minimal movement sideways between inner and outer race.

4. Inspect bearing housing for scratches, wear or damage. Replace housing if damaged.

Assembly

1. Support bottom of hubstrut housing.
2. Start bearing in housing.
3. Press bearing into place until outer race bottoms on housing.

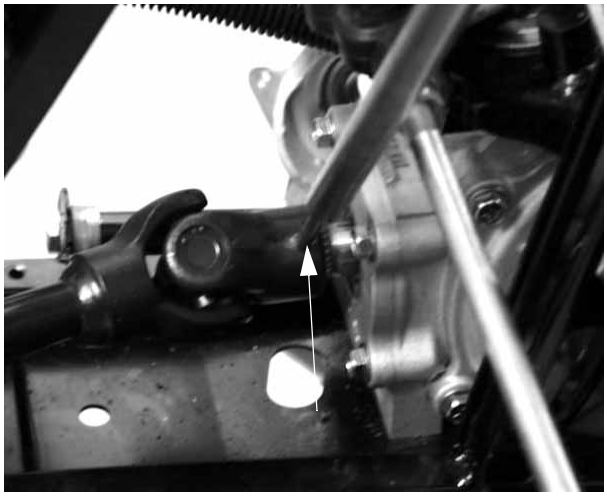
CAUTION
When using an arbor press be sure to press only on the outer race to avoid bearing damage.

4. Install snap ring into groove.

PROP SHAFT - FRONT OR REAR

Removal and Installation

1. Using Roll Pin Removal Tool (PN 2872608), remove the roll pin from prop shaft at rear of housing (front only) or transmission output shaft (rear only). Slide prop shaft back and away from housing, then pull sharply forward to remove from transmission shaft.
2. For installation, reverse the removal procedure.



NOTE: If removing rear propshaft, loosening and/or removal of rear gearcase mounting bolts may be required to gain necessary clearance for propshaft removal.

See “REAR GEARCASE” on page 7.39.

U-JOINT

Disassembly

> **⚠ CAUTION**
>
> Always wear eye protection when working with spring-tensioned components

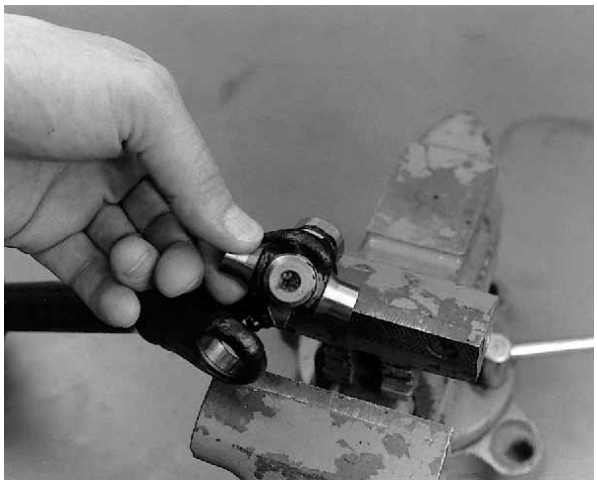
1. Remove internal or external snap ring from all bearing caps.

NOTE: If yoke or bearing is removed, cross bearing must be replaced. Note orientation of grease fitting (if equipped) and mark inner and outer yoke for correct re-positioning during installation.

2. Support inner yoke as shown and drive outer yoke down (bearing cap out) with a soft face hammer.

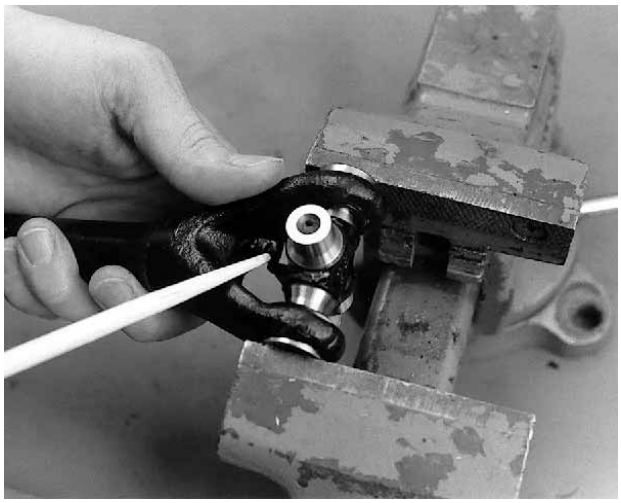
3. Support U-joint in vise as shown and drive inner yoke down to remove remaining bearing ca

4. Force U-joint cross to one side and lift out of inner yoke.

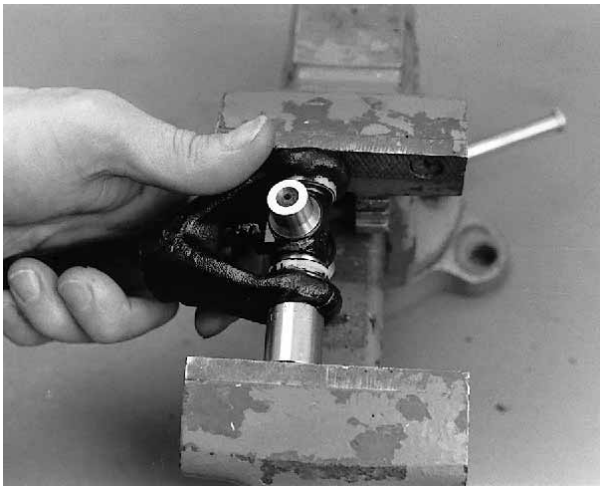


Assembly

1. Install new bearing caps in yoke by hand. Carefully install U-joint cross with grease fitting properly positioned inward toward center of shaft. Take care not to dislodge needle bearings upon installation of cross joint. Tighten vise to force bearing caps in.



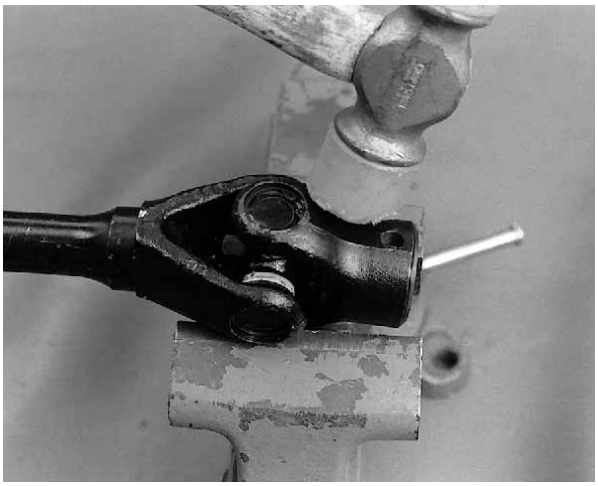
2. Using a suitable arbor, fully seat bearing cap in one side. Continually check for free movement of bearing cross as bearing caps using a suitable arbor, fully seat bearing cap in one side. Continually check for free movement of bearing cross as bearing caps are assembled. are assembled.



3. Install snap ring to contain bearing cap just installed. Repeat procedure for other side.

4. Install snap ring to contain bearing cap just installed. Repeat procedure for other side.

5. Install snap ring to contain bearing cap just installed. Repeat procedure for other side.
6. Seat all bearing caps against snap rings by supporting cross shaft and tapping on each corner as shown.



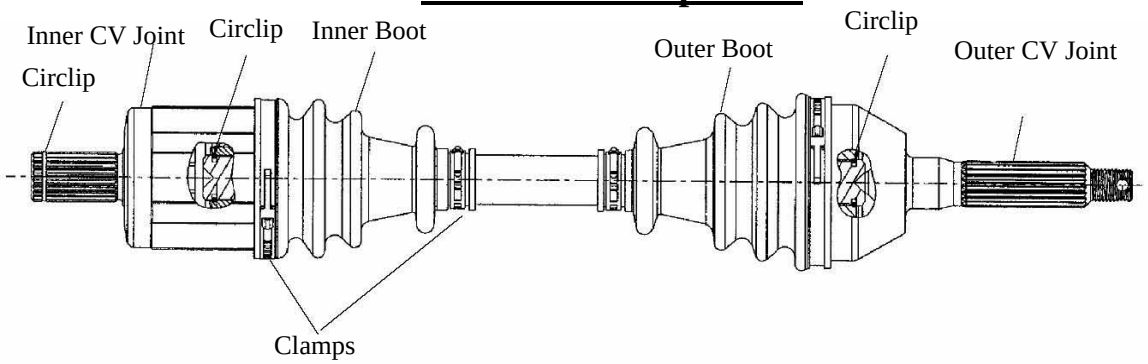
7. When installation is complete, yokes must pivot freely in all directions without binding. If the joint is stiff or binding, tap the yoke lightly to center the joint until it pivots freely in all directions.

DRIVE AXLE EXPLODED VIEWS

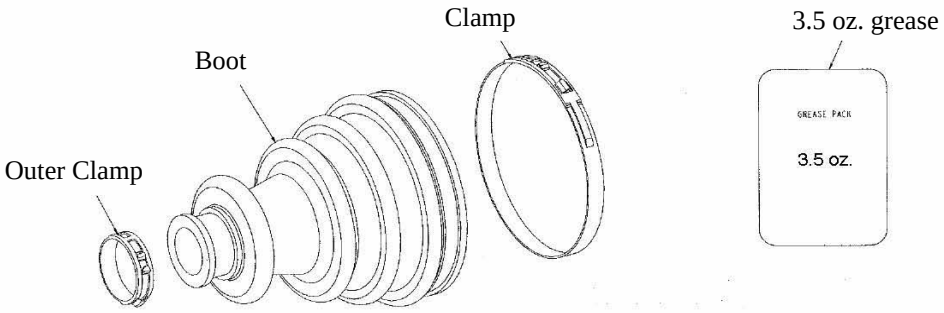
Drive Shafts and Propshafts

NOTE: Refer to your parts manual for the proper replacement parts.

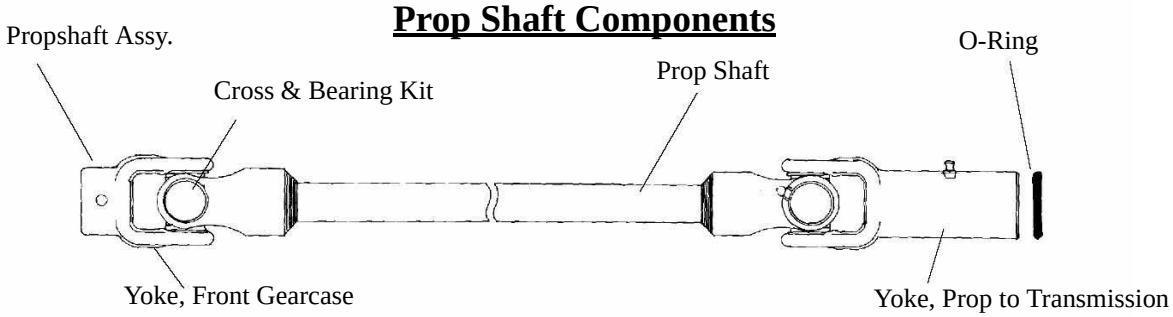
Drive Axle Components

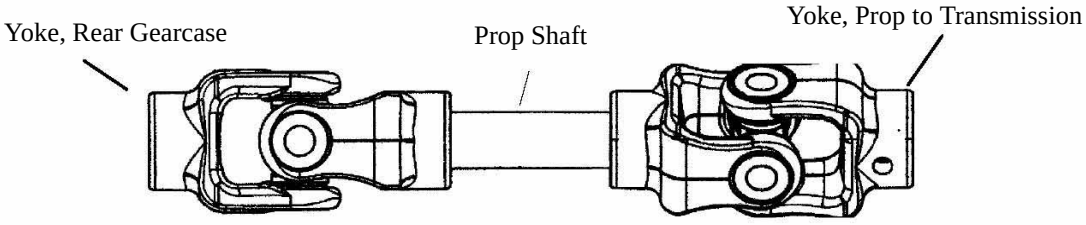


Drive Boot Replacement Kits



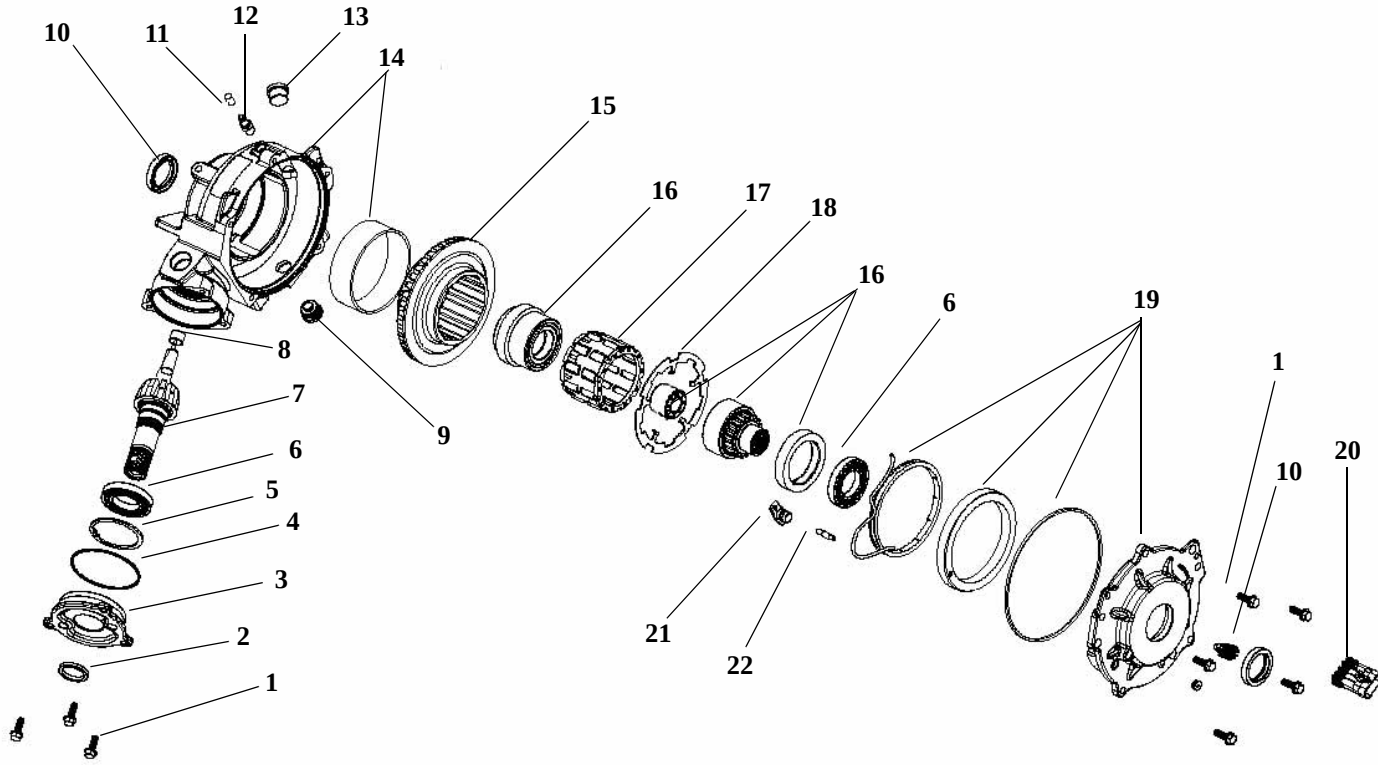
Prop Shaft Components





FRONT GEARCASE - CENTRALIZED HILLIARD (STANDARD MODELS)

Exploded View (Standard Models)



Ref. #	Description	Qty		Ref. #	Description	Qty
1	Bolt	8		12	Vent Tube	1
2	Oil Seal	1		13	Plug	1
3	Input Cover Plate Asm.	1		14	Gearcase Sub Asm.	1
4	O-Ring	1		15	Ring Gear / Clutch Housing	1
5	Retaining Ring	1		16	Output Hub Asm.	2
6	Bearing	3		17	Roll Cage Asm	1
7	Pinion Gear Asm.	1		18	Armature Plate	1
8	Pinion Bushing	1		19	Output Cover Asm	1
9	Magnetic Drain Plug	1		20	Connector Asm.	1
10	Oil Seal	2		21	Thrust Button Asm.	1
11	Plug Cap	1		22	Set Screw	1

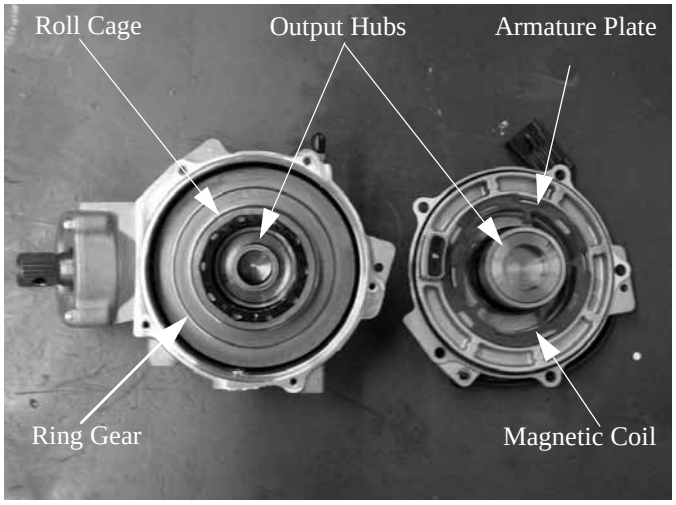
Operation

Engaging front gearcase: The AWD switch may be turned on or off while the vehicle is moving. AWD will not enable until the engine rpm is below 3100 RPM. Once enabled, the AWD remains engaged while the front gearcase is moving and will not disengage until the rear wheels regain traction.

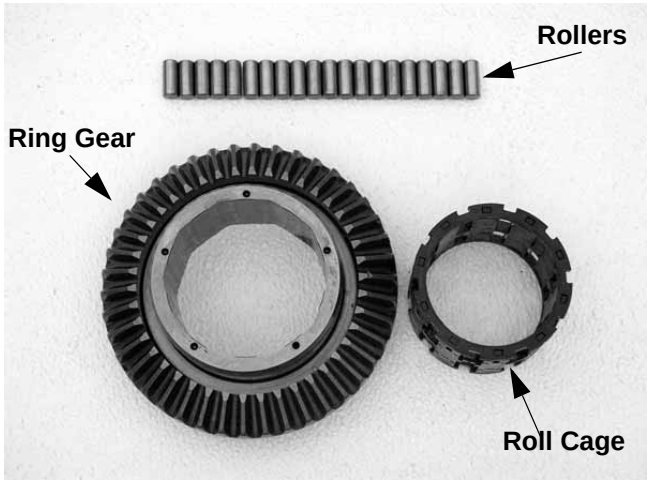
Engage the AWD switch before getting into conditions where the front wheel drive may be needed. If the rear wheels are spinning , release the throttle before switching to AWD.

> **⚠ CAUTION**
>
> Switching to AWD while the rear wheels are spinning may cause severe drive shaft and gearcase damage. Always switch to AWD while the rear wheels have traction or are at rest.

With the AWD switch off the vehicle drives only the rear wheels (2 wheel drive). When the AWD switch is activated it engages the hilliard, locking both front axles into all wheel drive when there is a loss of rear wheel traction.



4x4 Engagement: When the AWD switch is activated, a 12 Vdc current charges the central coil, creating a magnetic field. This magnetic field attracts an armature plate keyed to a roller cage that contains 14 rollers and roller cam. The difference in rpm between the input shaft and front axles forces the rollers up the external cam. The rollers engage, or "wedge" themselves between the pinion gear and output hubs that link both front axles, resulting in true all wheel drive.



> **⚠ CAUTION**
>
> If the rear wheels are spinning, release the throttle before turning the AWD switch on. If AWD is engaged while the wheels are spinning, severe drive shaft and clutch damage could result.

Disengagement: As the front and rear wheels gain equal traction, rotating very close to the same speed, the transmission shaft "overdrives" the front gearcase input. The rollers are forced outward, disengaging the AWD. The vehicle is now back to rear wheel drive until the next loss of rear wheel traction.

Gearcase Removal

1. Stop engine, place machine in Park and set parking brake.
2. Loosen left front wheel nuts slightly.
3. Elevate the machine until the front wheels are off the ground and support machine under footrest/frame area.

> **⚠ CAUTION**
>
> Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure. Wear eye protection when removing and installing bearings and seals.

4. Remove left wheel nuts and wheel.

5. Remove cotter pin, lower ball joint nut and A-arm from ball joint.

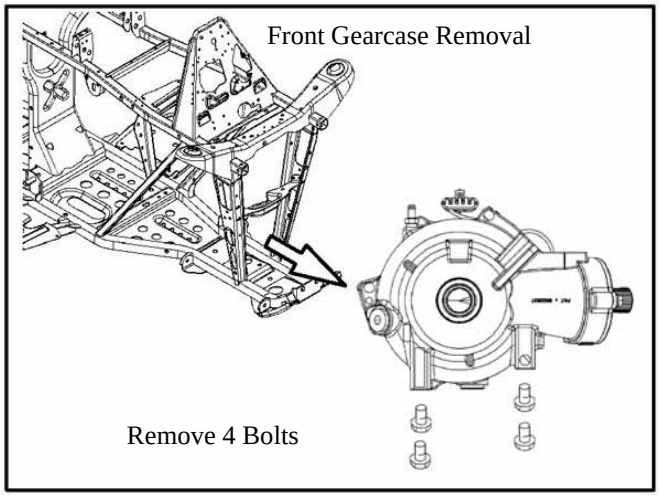
6. Pull the hub and strut assembly out and pull the drive-shaft out of the hub.

7. Remove the roller pin from the front prop shaft. Use the Roller Pin Removal Tool (**PN 2872608**).

8. Remove bolts securing the bottom of housing to the skid plate frame. Bolts and fluid drain plug are accessible through the skid plate.

9. Remove vent line.

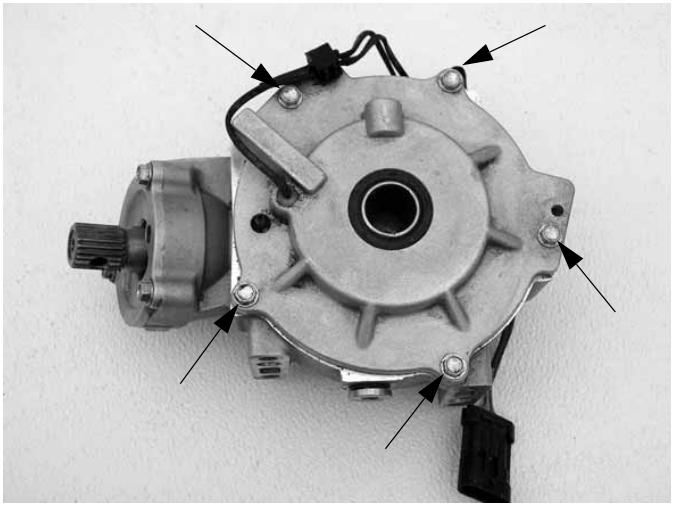
10. Remove the front gearcase from left side of frame, pulling both the remaining CV shaft and propshaft from the gearcase. Replace the circlips on the CV shaft ends prior to reassembly.



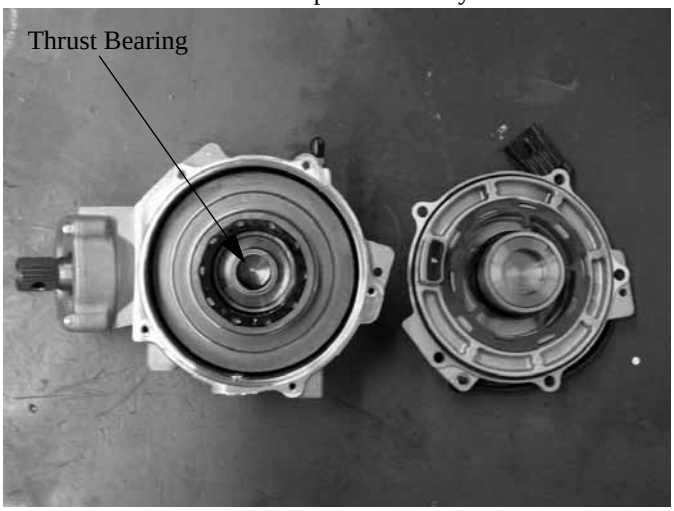
Disassembly / Inspection

1. Drain and properly dispose of used oil. Remove any metal particles from the drain plug magnet.

2. Remove bolts retaining the outer cover plate assembly.

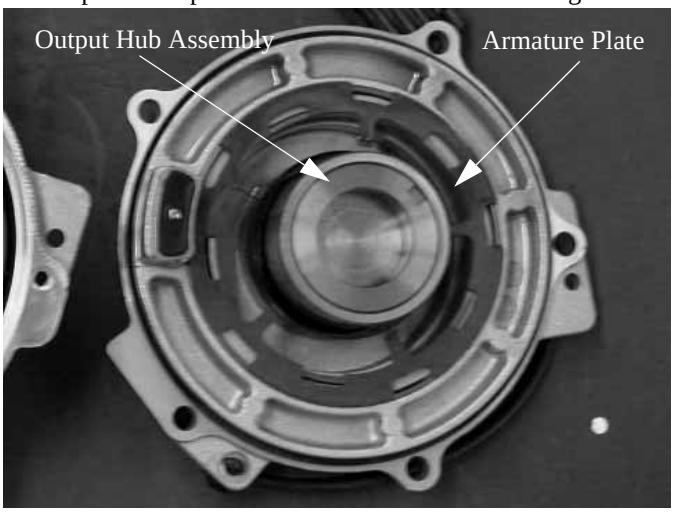


3. Remove the outer cover plate assembly.

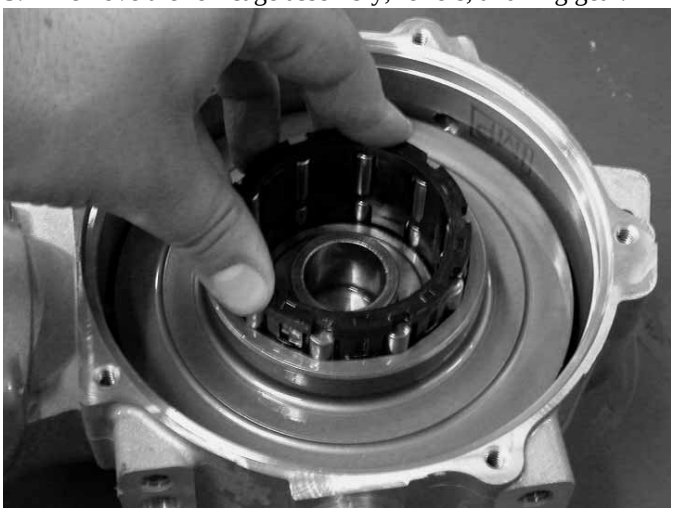


NOTE: Thrust bearing located between the two output hubs is pressed into assembly.

4. Remove the armature plate and RH output hub assembly from the outer cover plate. Inspect the bearing and contact surfaces of the output hub for signs of wear or damage. Replace component if found to be worn or damaged



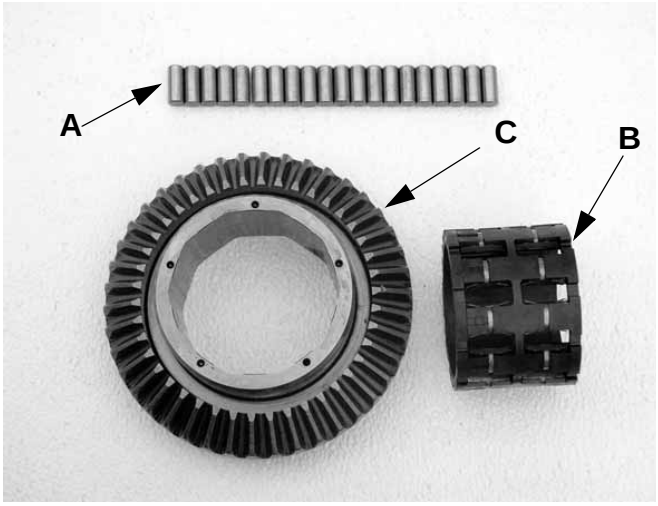
5. Remove the roll cage assembly, rollers, and ring gear.



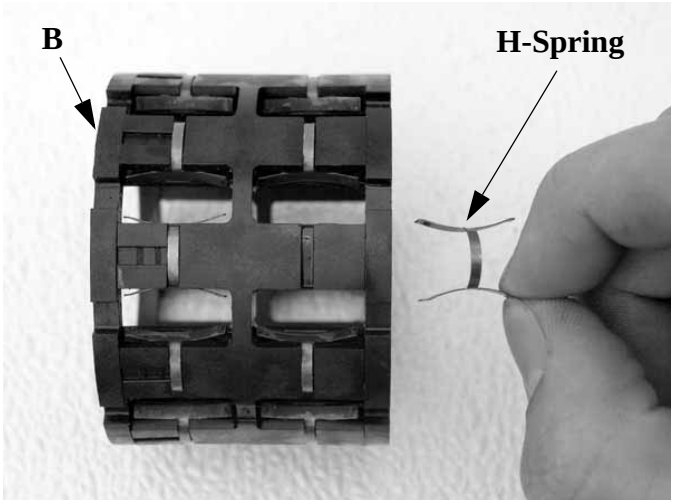
6. Remove the LH output hub. Inspect the bearing and contact surfaces of the output hub for signs of wear or damage. Replace component if found to be worn or damaged.

7. Thoroughly clean all parts. Inspect the bearing surfaces of the output hub. Inspect the rollers (A) for nicks, scratches and flat spots. Inspect the roll cage (B) for damage or cracks. The rollers must slide up and down freely within the roller cage surfaces.

8. Inspect the ring gear (C) for consistent wear patterns. The surfaces should be free of nicks or burrs.



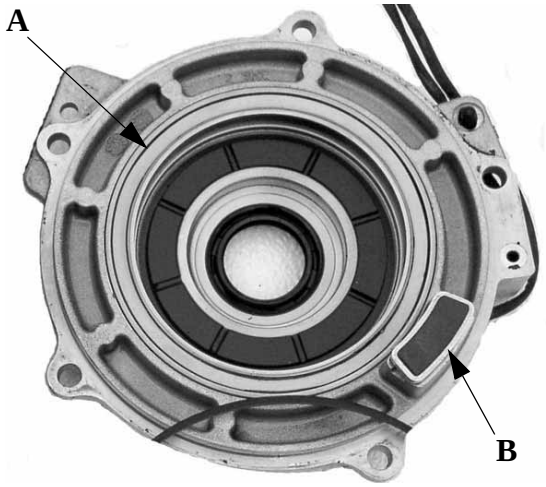
9. Inspect roll cage (B) sliding surface. This surface must be clean and free of nicks, burrs or scratches. **Inspect the H-springs but do not remove them from the roll cage**.



10. Inspect the armature plate for a consistent wear pattern. Uneven wear of the armature plate indicates a warped plate, which may cause intermittent operation.

NOTE: See "FRONT GEARCASE DIAGNOSIS" later in this chapter for more details.

11. Inspect the magnetic coil (A) in the outer cover plate assembly. Inspect the backlash pad (B) for excessive wear.

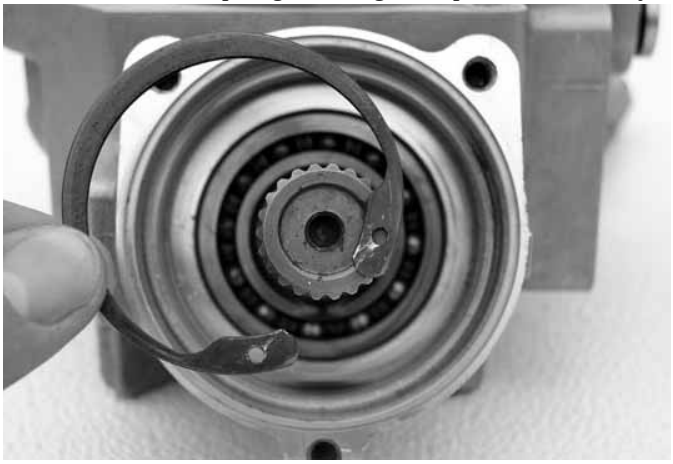


NOTE: See "FRONT GEARCASE DIAGNOSIS" later in this chapter for more details on the coil.

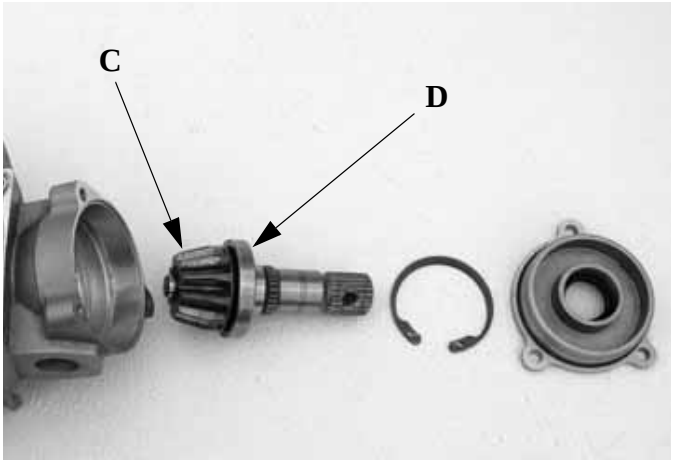
NOTE: The backlash for the centralized hilliard is set at the factory. No adjustment is required, unless the front cover needs to be replaced, or the back lash pad screw is removed. See the "FRONT GEARCASE ASSEMBLY" procedure later in this chapter for details on backlash setting.

12. Remove the bolts retaining the input shaft cover and pinion gear assembly.

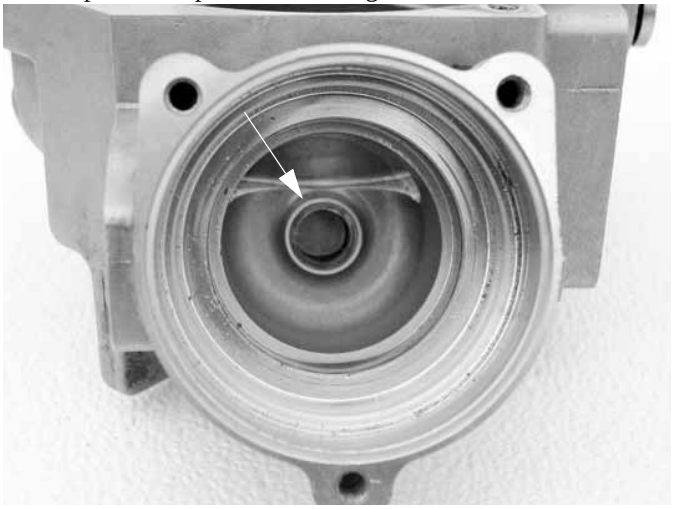
13. Remove the snap ring retaining the input shaft assembly.



14. Remove the input shaft assembly. Inspect the pinion gear (C) for chipped, broken, or missing teeth. Inspect the input shaft bearing (D) for signs of wear. Replace the input shaft cover O-ring prior to reassembly.



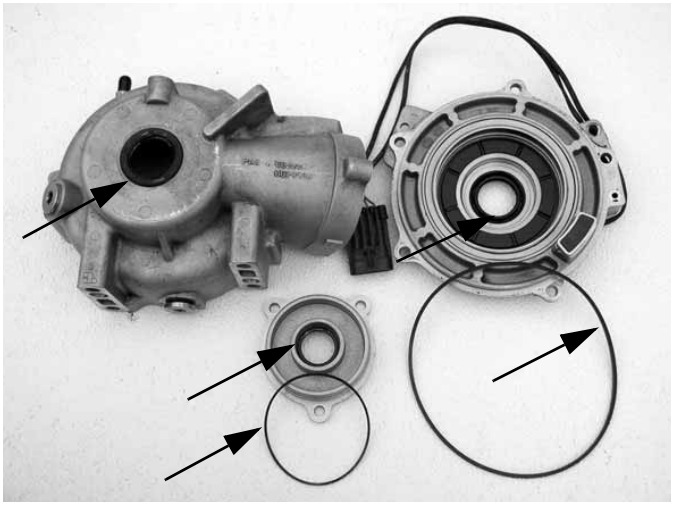
15. Inspect the input shaft bushing.



16. Thoroughly clean the gearcase components before beginning reassembly.

Reassembly / Inspection

1. Replace all O-rings, seals, and worn components.



2. Press the pinion shaft seal into the pinion cover, until the seal is flush with the sealing surface.

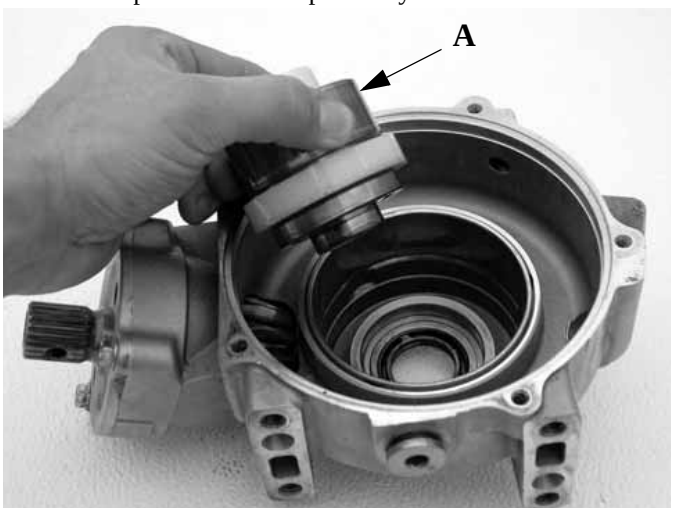
3. Inspect bearings on output and pinion shafts. To replace, press new bearing on to shaft.

NOTE: Due to extremely close tolerances and minimal wear, the bearings must be inspected visually, and by feel. While rotating bearings by hand, inspect for rough spots, discoloration, or corrosion. The bearings should turn smoothly and quietly, with no detectable up and down movement and minimal movement side to side.

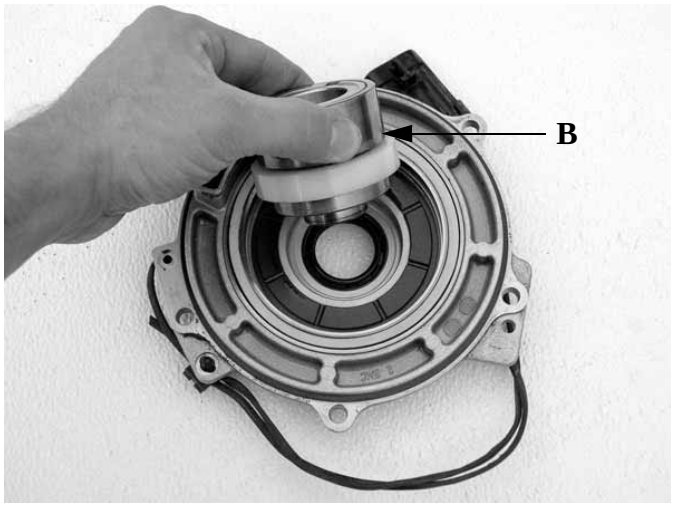
4. Install input shaft, bearing, snap ring, and input cover with new o-ring. Torque bolts to specification.

= T
Input Cover Bolt Torque **14 ft. lbs. (19 Nm)**

5. Install the LH output hub (A) into the gearcase housing. The output hub should spin freely.



6. Install the RH output hub (B) into the output cover. The output hub should spin freely.



7. Install the rollers and roll cage into the ring gear. Insert the rollers as the roll cage is installed.

8. Install the ring gear and roll cage assembly into the gearcase housing.

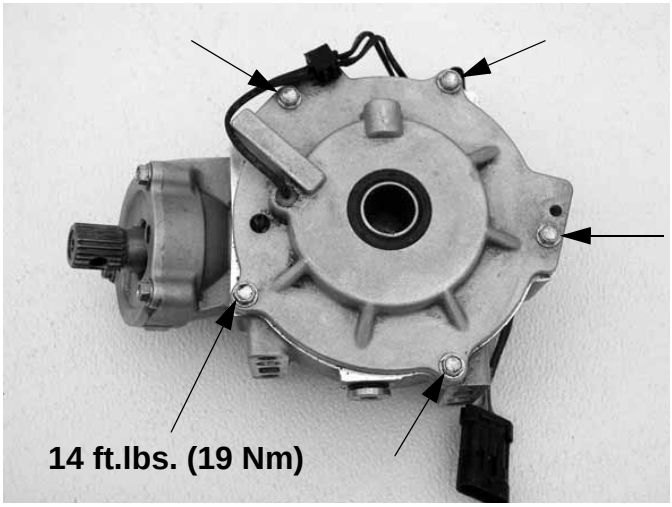
9. Install the armature plate on top of the roll cage / ring gear assembly. Be sure that the armature plate tabs are fully engaged into the roll cage assembly.

NOTE: Verify armature plate tabs are placed into the slots on roll cage. (See Photo Below)

10. Install the cover plate assembly with new o-ring onto the main gearcase.

NOTE: Verify the square O-ring is placed flat on the cover surface. If the O-ring is twisted fluid leakage may occur.

11. Torque the cover plate bolts to specification.



= T
Output Cover Bolt Torque **14 ft. lbs. (19 Nm)**

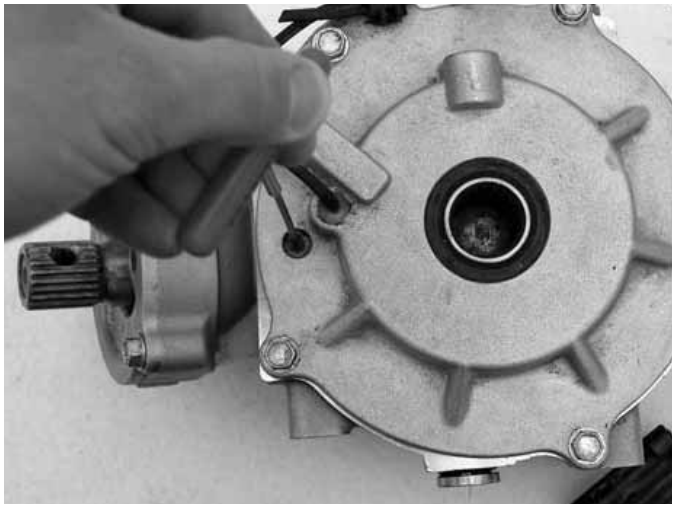
12. Lay the gearcase on the side with the output cover facing up.

Setting Ring Gear Backlash

NOTE: Ring gear backlash is set at the factory. No adjustment is required, unless the front cover is replaced or the back lash pad screw is removed.

1. The backlash screw has locking agent that holds it into place. Use a heat gun to lightly heat up the locking agent on the screw.

2. Using a 3/32 hex wrench, turn the back-lash screw out 3-4 turns. Re-apply Loctite 262™ onto the bottom screw threads.



3. Turn the screw in until it is lightly seated, then turn the screw out 1/4 turn.
4. Set the gearcase upright. Rotate the input shaft at least 4 times. This ensures the ring gear completes one full rotation.

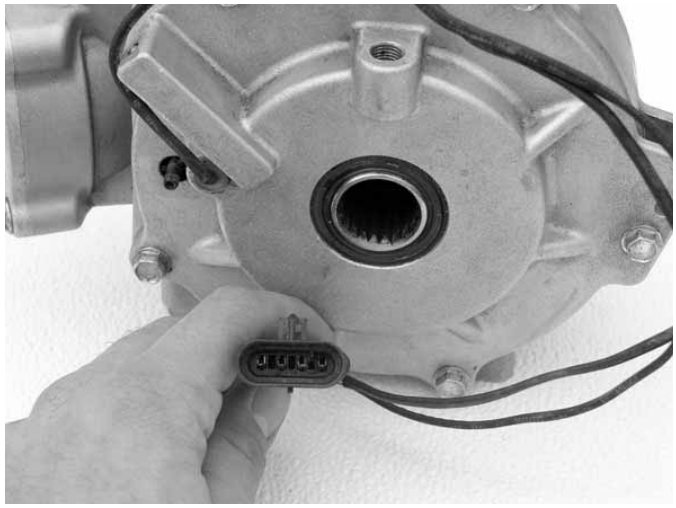
5. If a tight spot is felt during rotation, loosen the backlash screw another 1/8 turn. Perform the step 16 again. Repeat this procedure until the pinion shaft rotates smoothly 4 times (1 revolution of ring gear).

Front Gearcase Diagnosis

- Symptom: AWD Will Not Engage

1. Check the gearcase coil resistance. To test the gearcase coil resistance, use the coil harness (Grey & Brown/ White).

NOTE: To test the gearcase coil resistance, use the coil harness. The gearcase coil should measure between 22.8 ohms and 25.2 ohms.



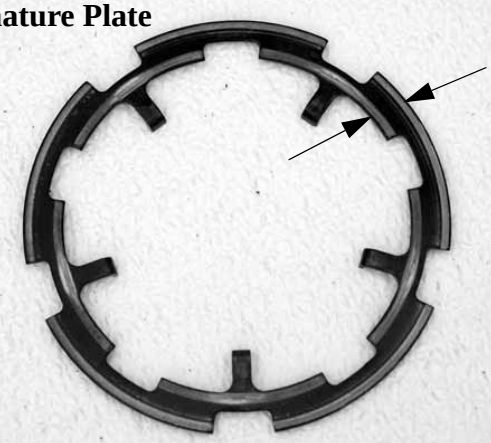
Front Gearcase Coil Resistance:
24 Ω ±10%

2. Check the minimum battery voltage at the Grey & Brown/ White wires that feed the hub coil wires. There should be a minimum of **11.80-12.0 Volts** present for proper operation.

AWD Coil Applied Battery Voltage:
11.80-12.0 Vdc

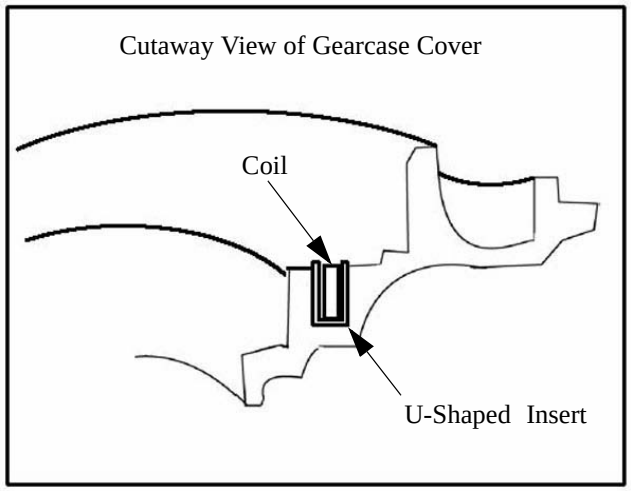
3. Inspect the armature plate for a consistent wear pattern. There should be two distinct wear bands (one band inside the other). If only one band of wear is present (or if there is wear between the two bands, inspect the coil area as indicated in Step 4. A band with an interrupted wear mark may indicate a warped plate, which may cause intermittent operation.

Armature Plate

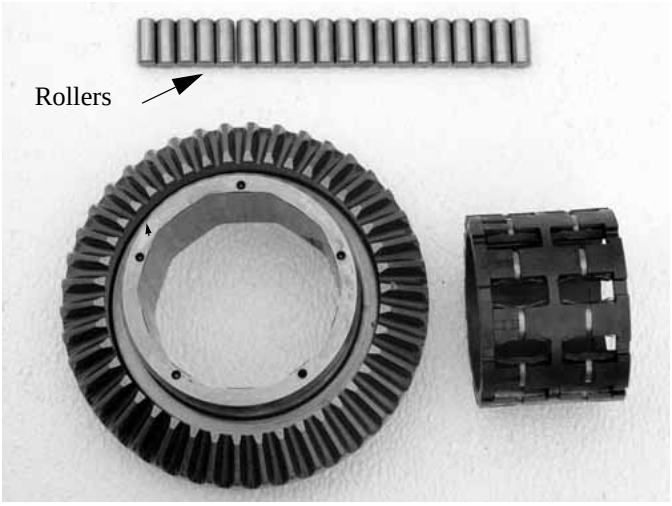


Check for Wear Bands

4. Check to make sure the coil is seated in the U-shaped insert that is pressed into the gearcase cover. The top of the coil should be seated below the U-shaped insert. The U-shaped insert controls the pole gap. If the top of the coil is above the surface of the U-shaped insert it raises the armature plate, thereby increasing pole gap. If the pole gap increases the coil will not be strong enough to engage the AWD system. If this is the cause order a new Cover Plate Assembly.

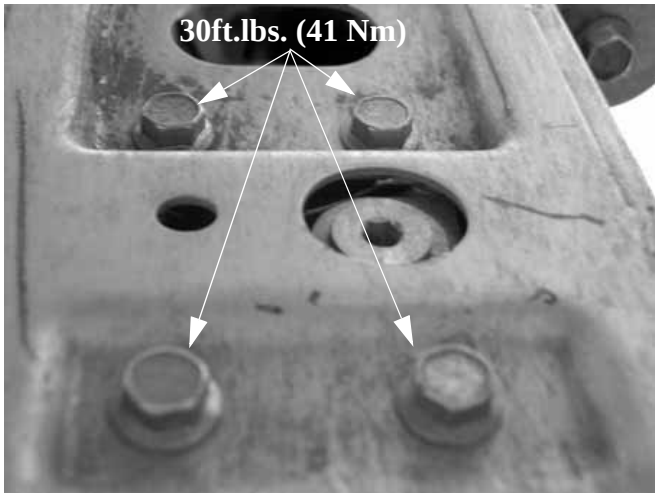


5. Inspect the rollers for nicks, scratches, and flat spots. Also inspect the roll cage for cracks and ensure the rollers are able to slide up and down and in and out freely within the roll cage sliding surfaces.



Gearcase Installation

1. To install gearcase, reverse removal procedures. Use new roll pin in front prop shaft.
2. Torque mounting bolts in skid plate to **30 ft.lbs. (41 Nm)**.



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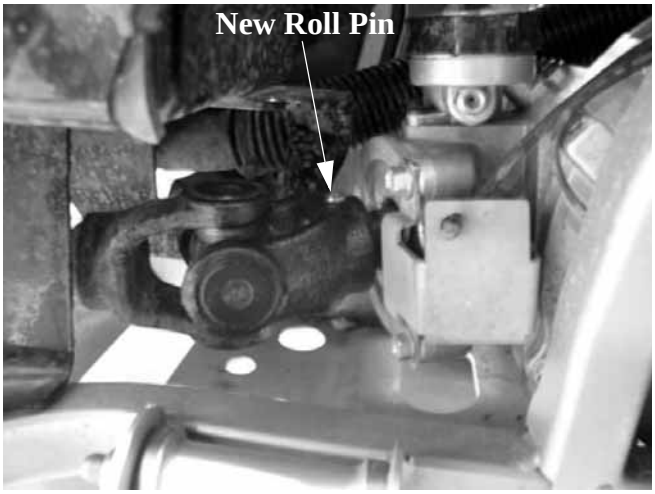
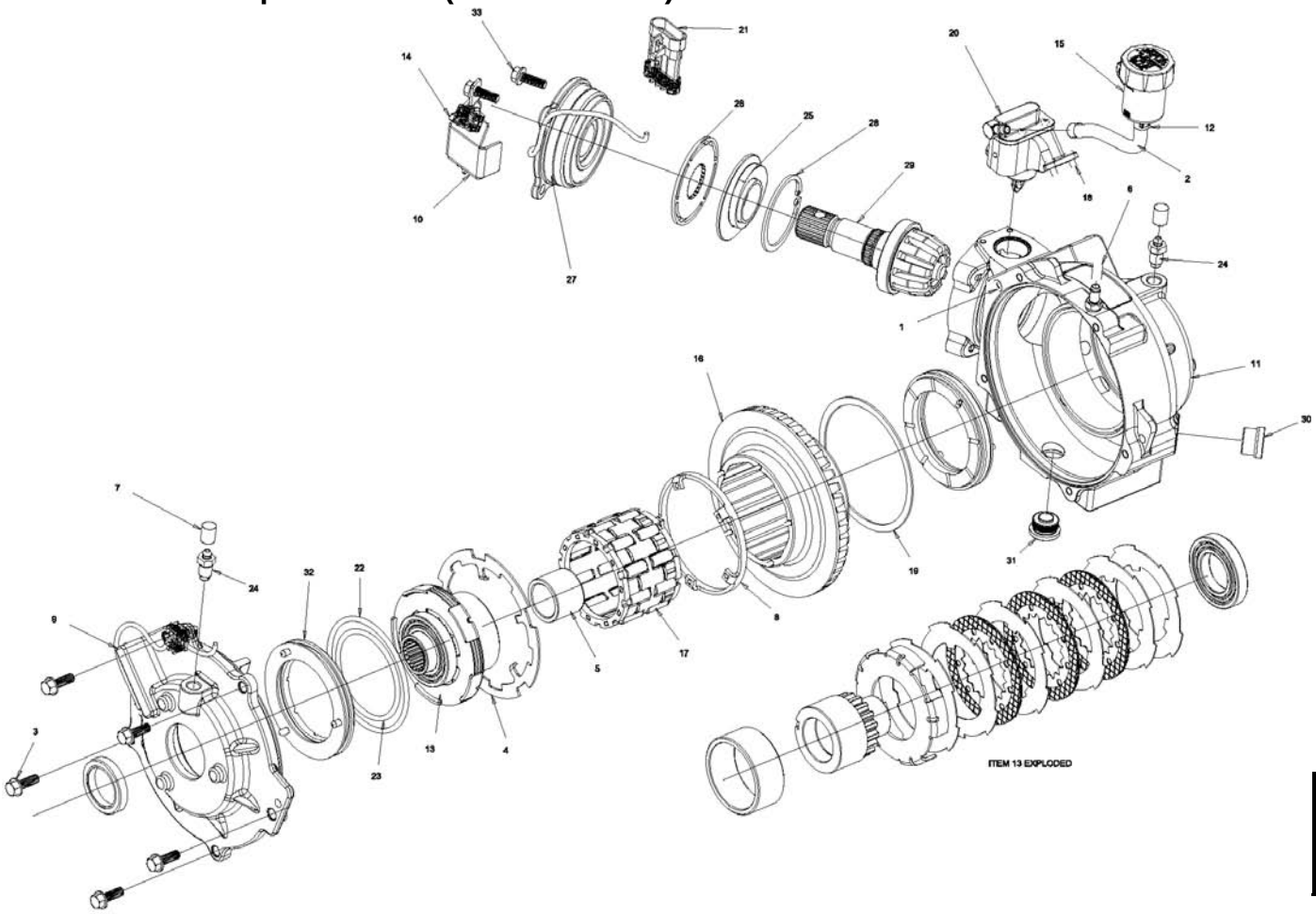
Gearcase Mounting Bolt Torque: **30ft.lbs. (41 Nm)**



3. Add the proper lubricant to the front gearcase. Check drain plug for proper torque. Refer to Chapter 2 for fluid fill and change information.

FRONT GEARCASE - ACTIVE DESCENT CONTROL (DELUXE MODELS)

ADC Gearcase Exploded View (Deluxe Models)



Ref. #	Description	Qty		Ref. #	Description	Qty
1	O-ring	2		17	Roll Cage Assembly	1
2	1/4" Tubing	1		18	8-32 x 3/8" Screws	4
3	1/4-20 Screws	5		19	Spacer, Gear	1
4	Armature Plate	1		20	Pump Assembly	1
5	Bushing	1		21	Wire Connector	1
6	Vent	1		22	O-ring, Outer	2
7	Cap, Bleed Screw	2		23	O-ring, Inner	2
8	Spacer, Clutch Basket	1		24	Bleeder Valve	2
9	Cover Assembly	1		25	Cam Assembly	1
10	Cover Bracket	1		26	Armature Plate	1
11	Gear Case Sub-Assembly	1		27	Pinion Cover Assembly	1
12	Hose Clamp	2		28	Retaining Ring	1
13	Hub Sub-Assembly	2		29	Pinion Gear Assembly	1
14	Plastic Clip	2		30	Fill Plug	1
15	Reservoir	1		31	Drain Plug	1
16	Ring Gear	1		32	Piston Assembly	2
				33	1/4-20 Screws	3

Operation

Engaging Front Gearcase: Active Descent Control (ADC) is controlled by the ECU and will not enable until the following conditions are met:

- Vehicle speed is below 15 Mph (24Kph)
- Throttle Position Sensor (TPS) is at idle position
- The AWD switch is switched to 'AWD'

Once the conditions are met for engagement, ADC remains engaged as long as the conditions are met.

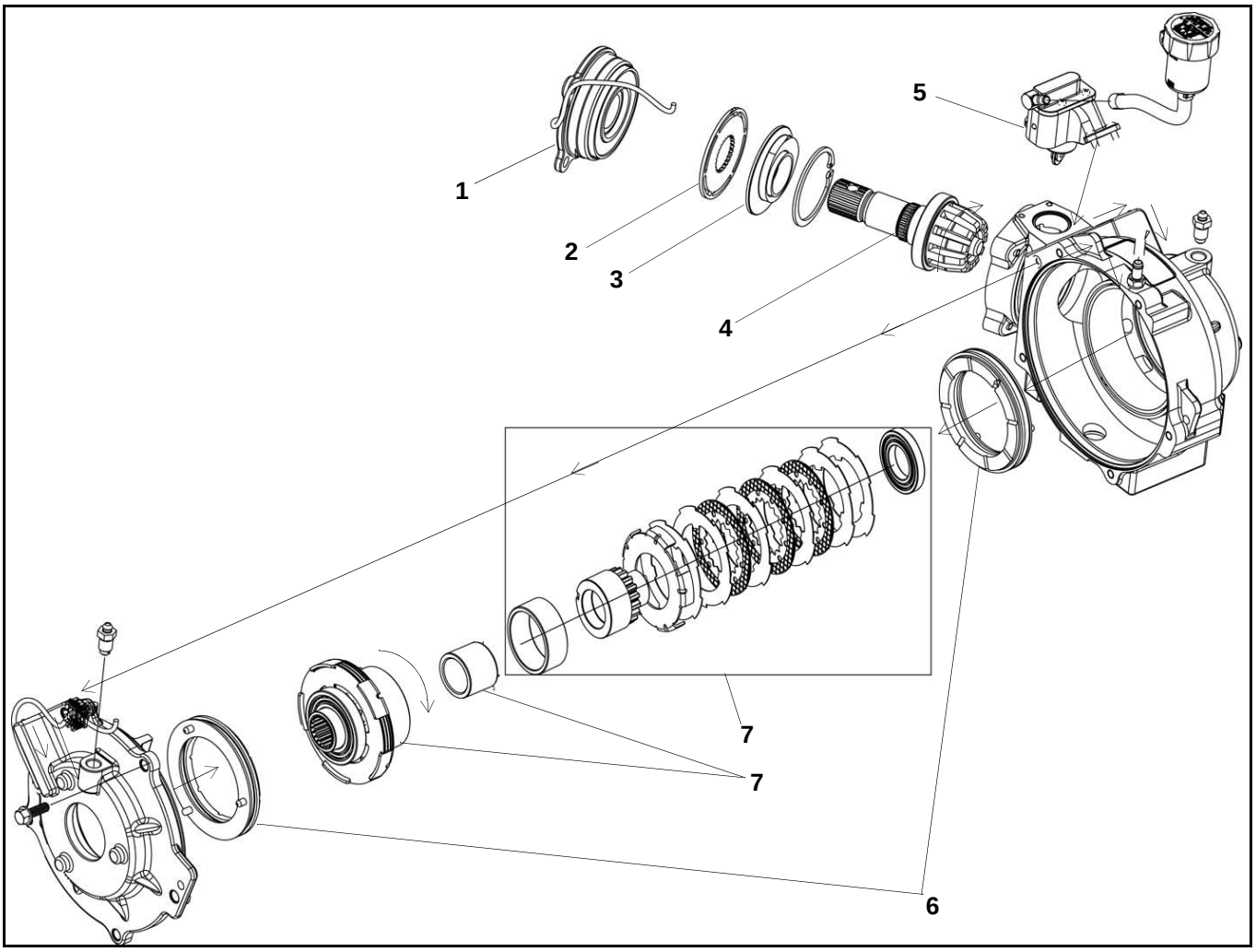
With the AWD switch off, the vehicle drives only the rear wheels (2 wheel drive). When the AWD switch is 'ON' the magnetic coils are active, the AWD coil indexes the clutch mechanism so that both front axles will engage when there is a loss of rear wheel traction. In addition to the rear wheel engine braking, the ADC coil provides front wheel engine braking at speeds less than 15 Mph (24Kph) with the TPS at idle position.

ADC Engagement: When the AWD switch is activated, a 12 Vdc current is present at the input shaft coil ***(1)***. Operation is controlled by the ECU grounding and ungrounding the coil. The coil's magnetic field attracts a splined armature plate ***(2)*** on the pinion (input) shaft ***(4)***. The energized splined armature plate attracts the unsplined eccentric cam ***(3)***, which begins to turn with the input shaft. The eccentric cam drives a hydraulic piston/pump assembly ***(5)***. The pressure created by the pump assembly forces hydraulic fluid through passages to the piston assemblies ***(6)*** located in each case half. Hydraulic pressure forces the piston assemblies inward to compress the splined clutch packs ***(7)*** forming a dynamic coupling to each front drive axle, resulting in true all-wheel EBS operation upon deceleration.

Disengagement: Current to the ADC coil is turned off by the ECU anytime the following conditions are met:

- Throttle Position Sensor (TPS) moves off idle position
- The AWD switch is switched to 'OFF'
- Vehicle speed is above 15 Mph (24Kph)

Hydraulic pressure stops and the pistons release, disengaging the ADC function. The vehicle returns to rear wheel drive until the next deceleration.



ADC Coil Testing

Refer to the following tests in Chapter 10:

See "ACTIVE DESCENT CONTROL (ADC) COIL" on page 10.15.

See "ALL WHEEL DRIVE (AWD) COIL" on page 10.15.

ADC Differential Hydraulic Circuit Bleeding

1. Make sure vehicle is parked on flat ground and allowed to sit at least 30 minutes prior to bleeding hydraulic circuit.
2. Thoroughly clean area around and on remote reservoir and hydraulic bleeders.
3. Remove reservoir cap and diaphragm assembly.
4. Make sure hydraulic oil inside reservoir is free of debris. If any debris is found, use clean rag or suction device to remove from the reservoir.

NOTE: Debris in reservoir may block porting and produce inadequate bleeding of the system. Decreased performance may be encountered with inadequate bleed of the hydraulic circuit.

5. Begin the bleeding process by filling reservoir to 'MAX' line with clean Polaris ADC oil . (AW ISO 10 hydraulic fluid equivalent).
6. Locate bleeder valves found on either side of differential and remove the protective caps.
7. Turn bleeder valves counter-clockwise to loosen. Loosen bleeder screw slowly, allowing oil and any trapped air to flow out of fitting.

IMPORTANT: Do not allow hydraulic fluid in reservoir to drain below minimum fill line. Close bleeder valve before oil level falls below minimum fill line. Refilling empty reservoir will result in air pockets becoming trapped.

NOTE: If empty reservoir is encountered, filling of fluid is still possible. Verify air is not trapped before proceeding with step 7.

8. Continue steps 6-8 on both sides in sequence until no air bubbles are seen when bleeding occurs.
9. Re-torque both bleeder valves to specification and reinstall cover caps.

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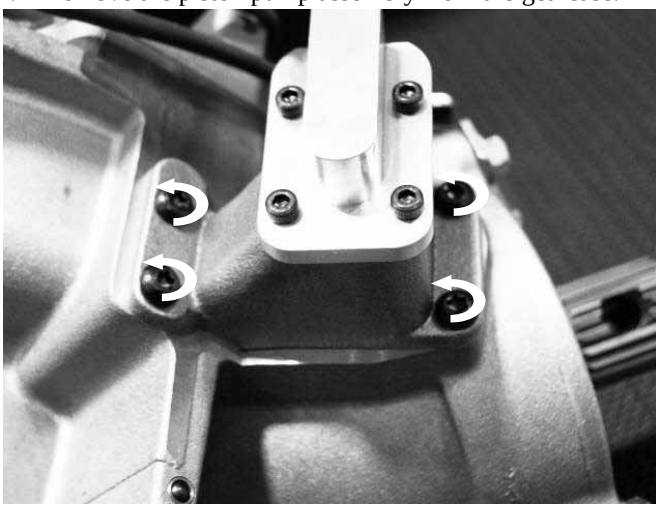
Bleeder Valve Torque: **80 in. lbs. (9 Nm)**

10. Fill reservoir with to a level midway between 'MAX' and 'MIN' fill lines. Verify no debris is found in reservoir oil.
11. Replace reservoir cap securely and wipe clean any residue.

Disassembly / Inspection

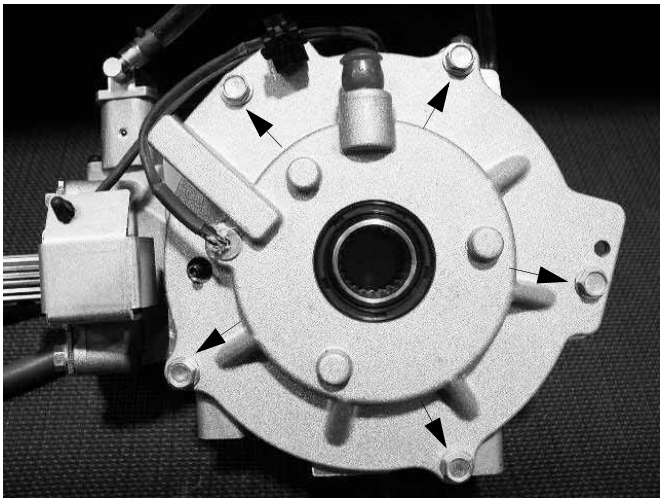
NOTE: See "Gearcase Removal" on page 7.12.

1. Drain and properly dispose of used oil. Remove any metal particles from the drain plug magnet.
2. Remove the piston pump assembly from the gearcase.

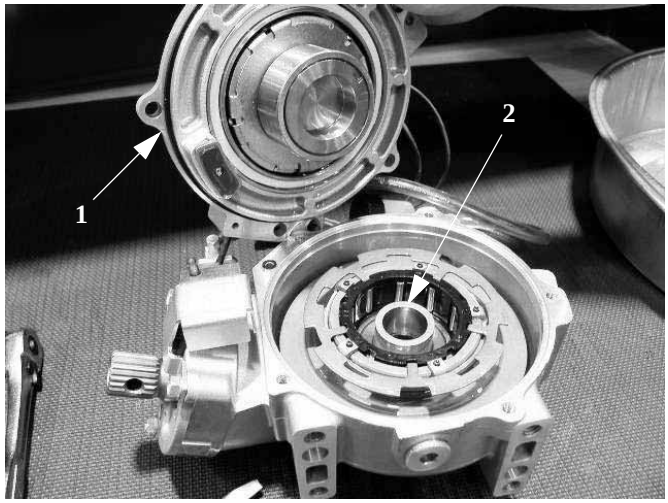


NOTE: Piston pump assembly is a non-serviceable item and should not be diassembled. Replace as an assembly if found to be damaged or non-working.

3. Remove bolts (arrows) retaining the outer cover plate assembly.



4. Remove the outer cover plate assembly. Remove and inspect the cover o-ring (1). Inspect thrust bearing (2) for wear. Replace items as required.



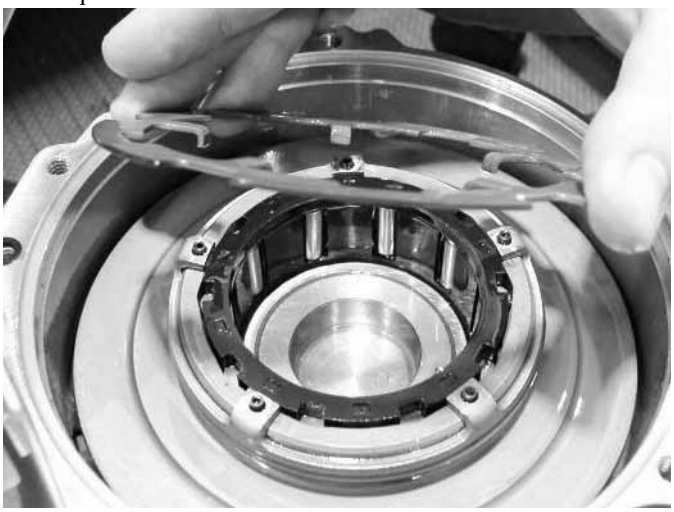
NOTE: Thrust bearing (2) located between the two output assemblies is pressed into the clutch pack and is not removable.

5. Remove the output clutch assemblies. Inspect the bearings, contact surfaces and splines of the output clutch for signs of wear or damage. Visually inspect the clutch plate area. If plates are steel-on-steel, or if the friction material is worn, the assembly should be replaced.

NOTE: Excessive debris in the oil and/or noise coming from the front drive on deceleration are key indicators of clutch pack failure. Replace clutch as an assembly if found to be worn or damaged.

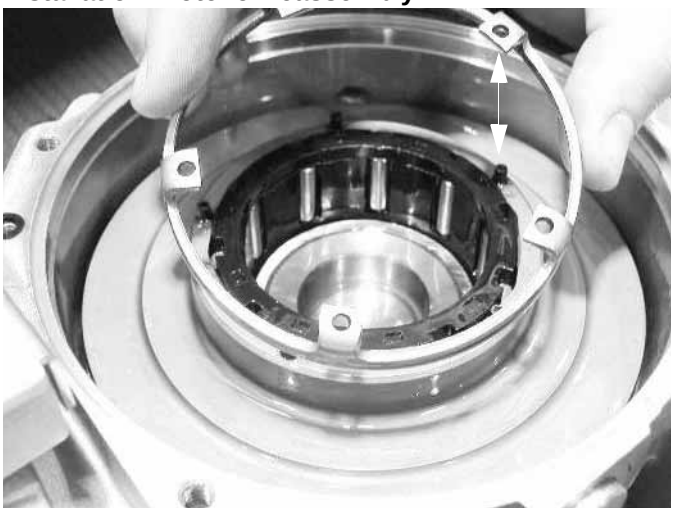
NOTE: Locating pins / holes (circle) aid installation. Note for reassembly.

6. Remove the armature plate. Inspect the armature plate for wear, distortion or other damage. Replace component as required.

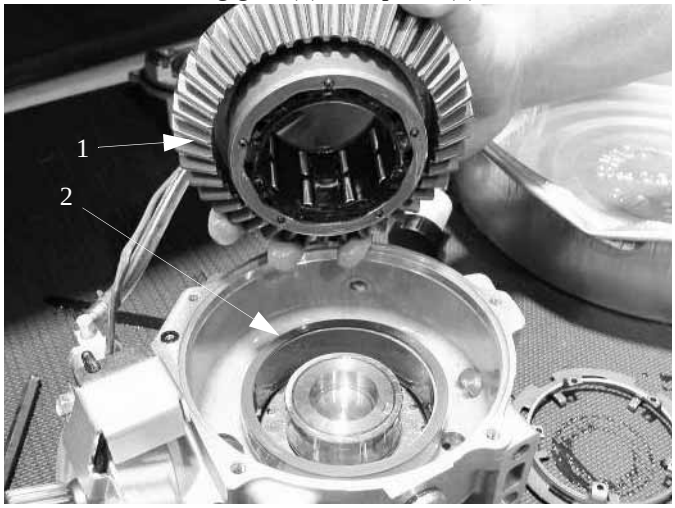


7. Remove the spacer. Inspect for signs of wear or damage. Replace component as required.

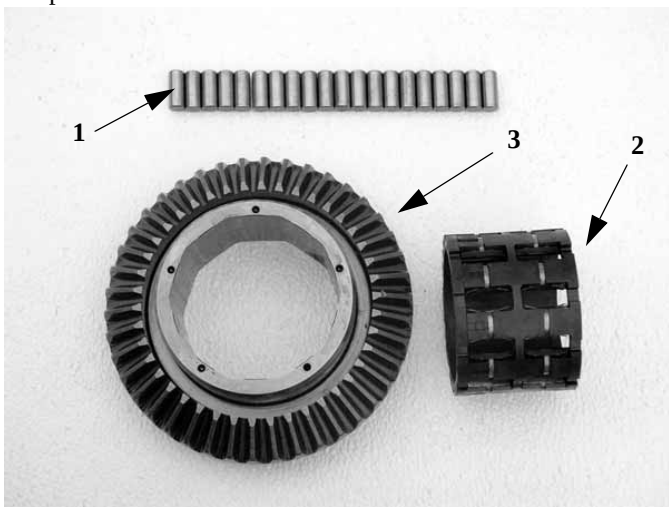
NOTE: locating pins (arrow) are for spacer installation. Note for reassembly.



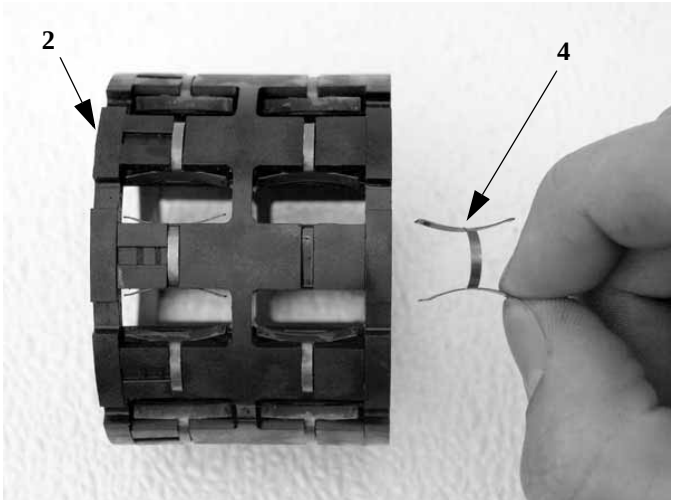
8. Remove the ring gear (1) and spacer (2).



9. Remove and inspect the bearing surfaces of the output hub.
10. Thoroughly clean all parts.
11. Inspect the rollers (1) for nicks, scratches and flat spots. Inspect the roll cage (2) for damage or cracks. The rollers must slide up and down freely within the roller cage surfaces. Inspect the ring gear (3) for consistent wear patterns. Surfaces should be free of nicks or burrs.



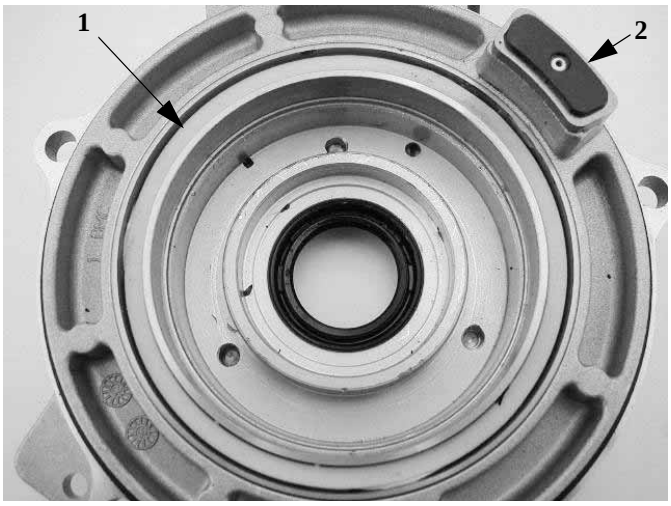
12. Inspect roll cage sliding surface (2). This surface must be clean and free of nicks, burrs or scratches. Remove and inspect the H-springs (4). Replace any components as required.



13. Inspect the armature plate for a consistent wear pattern. Uneven wear of the armature plate indicates a warped plate, which may cause intermittent operation.

NOTE: See "Front Gearcase Diagnosis" on page 7.19.

14. Inspect the magnetic coil (1) in the outer cover plate assembly. Inspect the backlash pad (2) for excessive wear.

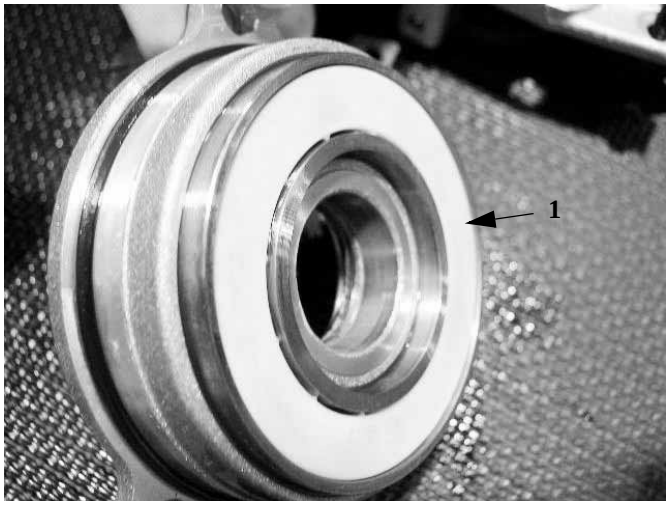


NOTE: See "FRONT GEARCASE DIAGNOSIS" in this chapter.

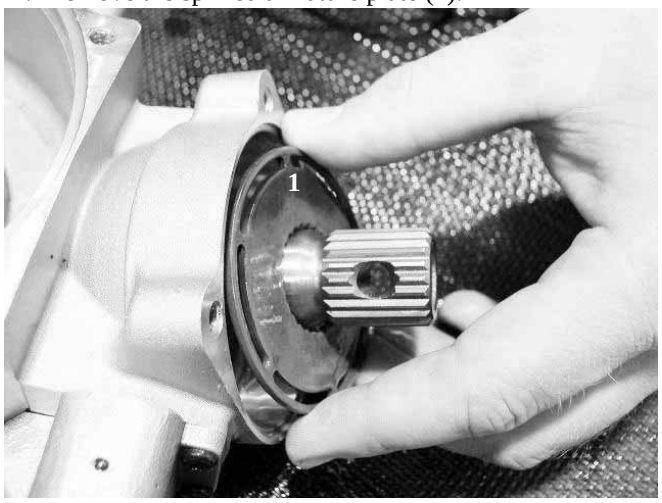
NOTE: Ring gear backlash (2) is set at the factory. No adjustment is required, unless the front cover is replaced or the back lash pad screw is removed. See the "FRONT GEARCASE ASSEMBLY" in this chapter for details on backlash setting.

15. Remove the bolts retaining the input shaft cover and pinion gear assembly.

16. Inspect the magnetic coil (1) and bushing in the input cover plate assembly. Replace the input cover seal.

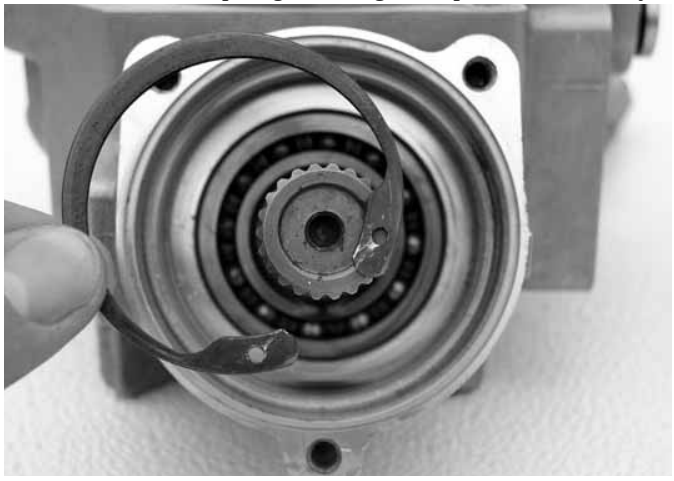


17. Remove the splined armature plate (1).

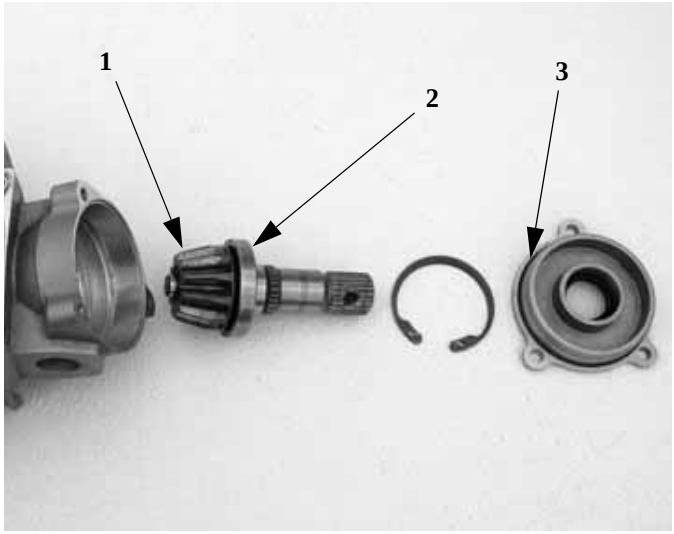


18. Remove the eccentric cam assembly. Inspect the cam (1) and bushing (2) for wear or damage. Replace component as required.

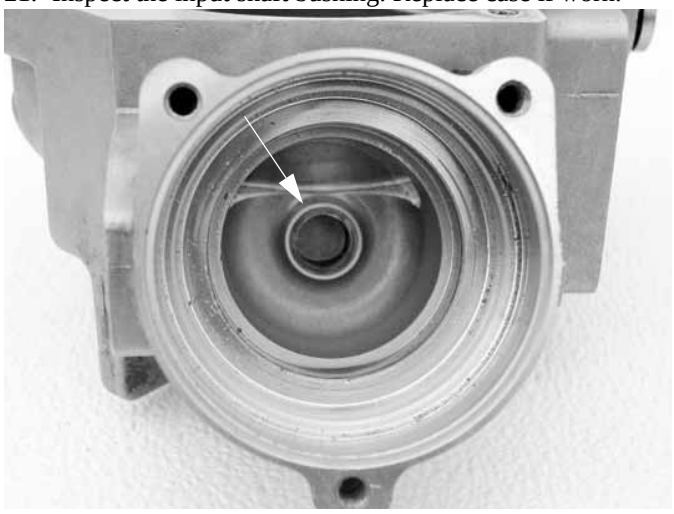
19. Remove the snap ring retaining the input shaft assembly.



20. Remove the input shaft assembly. Inspect the pinion gear (1) for chipped, broken, or missing teeth. Inspect the input shaft bearing (2) for signs of wear. Replace the input shaft cover O-ring (3) prior to reassembly.



21. Inspect the input shaft bushing. Replace case if worn.

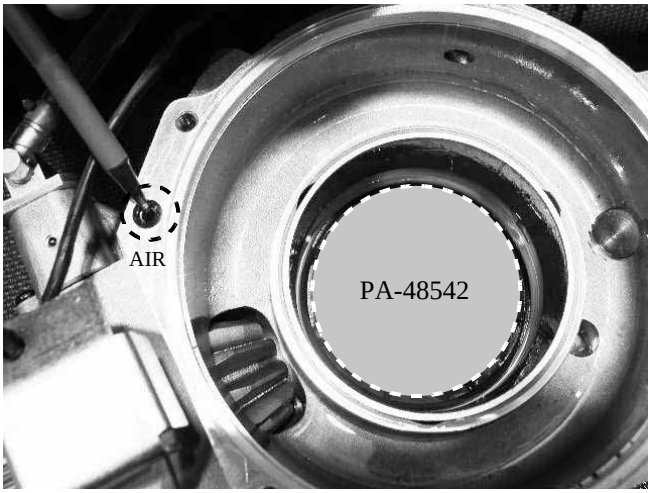


ADC Gearcase Piston Replacement Procedure

> **CAUTION**
>
> This repair procedure involves the use of compressed air. Safety glasses or a face shield are required.

1. Place ADC Piston Tool PA-48542 on top of the piston. Using moderate hand pressure, hold the tool on top of the piston while using compressed air at the gearcase passage (circled) to force piston up and out of the case. (See photo)

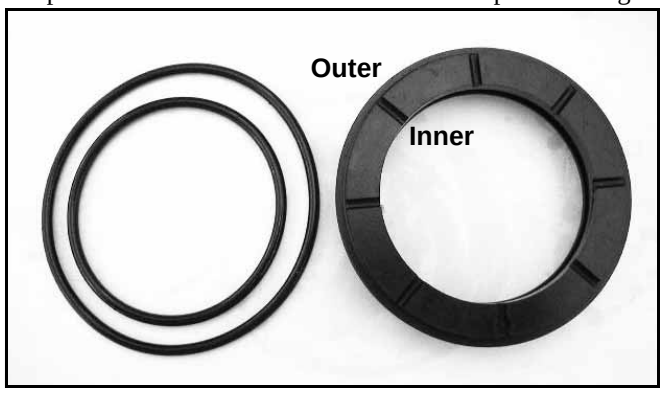
2. Repeat procedure for the other piston. (See photo)



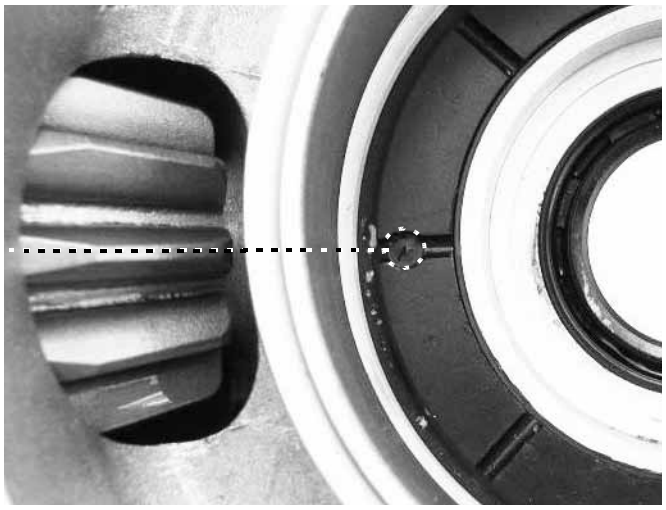
3. Remove and discard the inner and outer o-rings from the piston assembly.

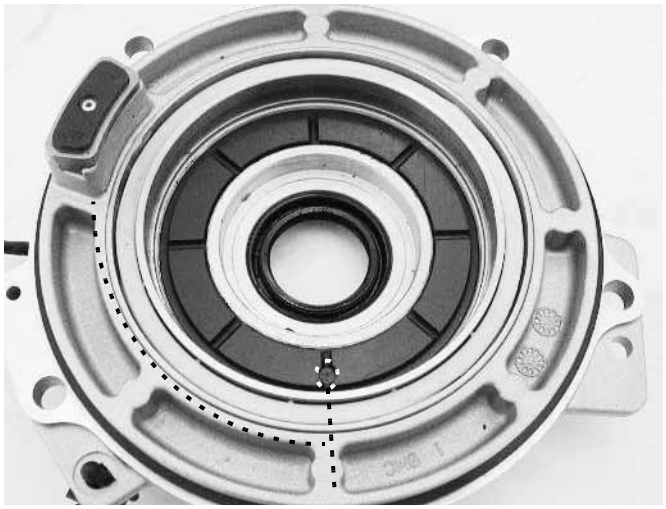
NOTE: Never re-use o-rings. Always replace with new.

4. Coat new piston and o-rings with a moderate amount of white lithium grease or assembly lube. Coat the edges of the piston cavities. Install the inner and outer piston o-rings.

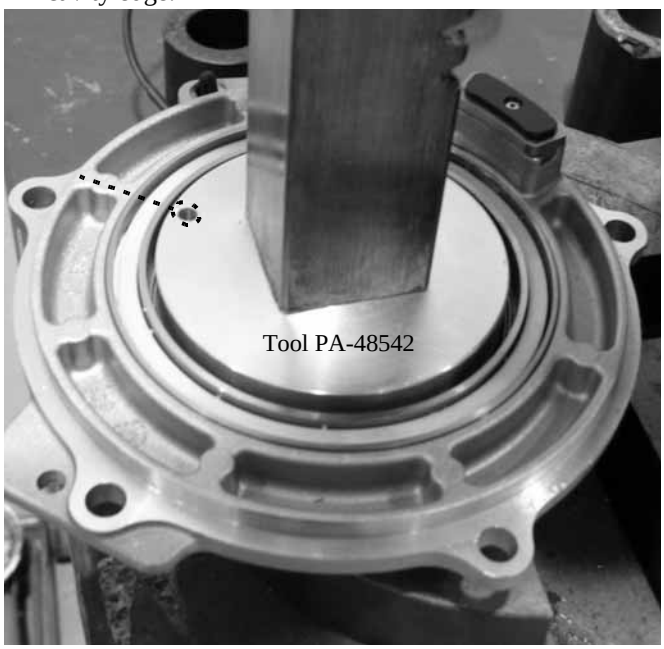


5. Place the piston in the piston cavity, aligning the pins with the pin bosses. Using the casting and piston marks as a guide as shown will aid pin alignment.





6. Place ADC Piston Tool PA-48542 on top of the piston and verify alignment of the sight hole (circled) and piston mark with the casting marks. Support the case and press the piston down evenly. The piston is fully seated and located in the pin bosses when the piston surface is just below the cavity edge.

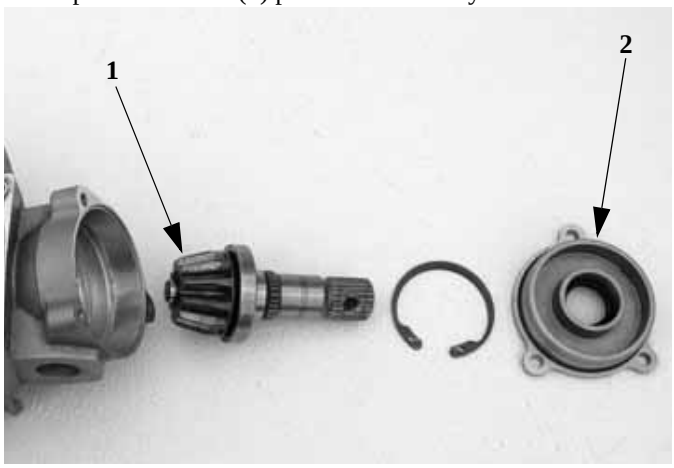


7. Repeat procedure for the other gearcase half.

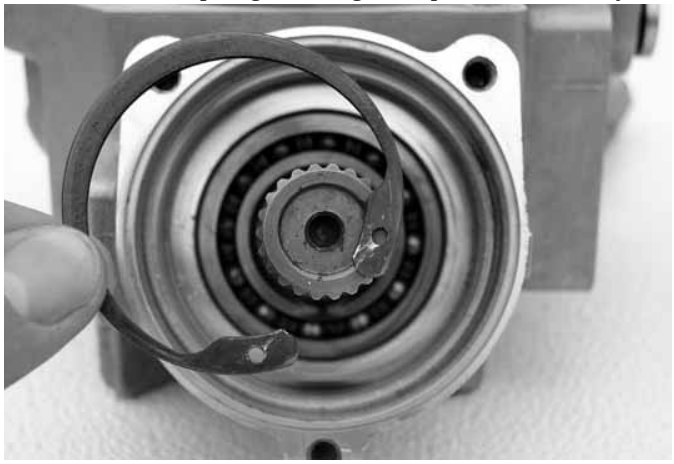
NOTE: Verify that the o-rings are seated properly and that no o-ring shavings exist outside of the piston area, which is an indication of damage during installation.

Assembly

1. Thoroughly clean the gearcase components before beginning reassembly.
2. Install a new seal in the main gearcase halve.
3. Install the input shaft assembly. Install the pinion gear/ bearing assembly (1). Install a new seal and o-ring the input shaft cover (2) prior to reassembly.

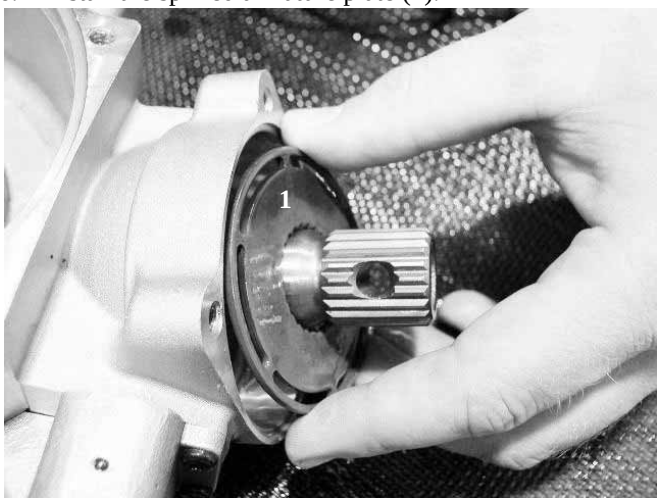


4. Install the snap ring retaining the input shaft assembly.

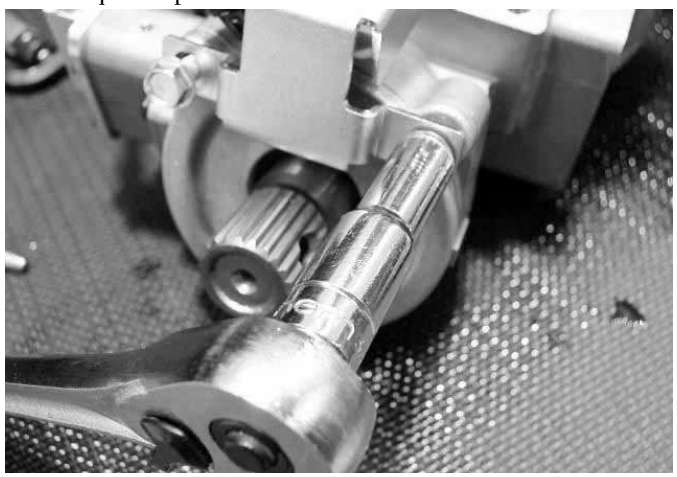


5. Install the eccentric cam assembly (1).

6. Install the splined armature plate (1).



7. Install the input shaft cover assembly, bolts and bracket. Torque to specification.



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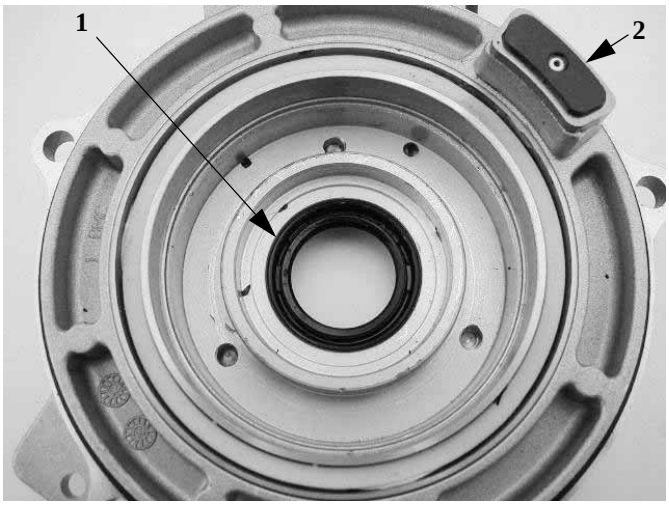
Input Cover Bolt Torque: **7-11 ft. lbs. (9.4-14.9 Nm)**

8. Install a new seal (1) in the outer cover plate assembly. Install a new o-ring on the backlash pad (2) stem .

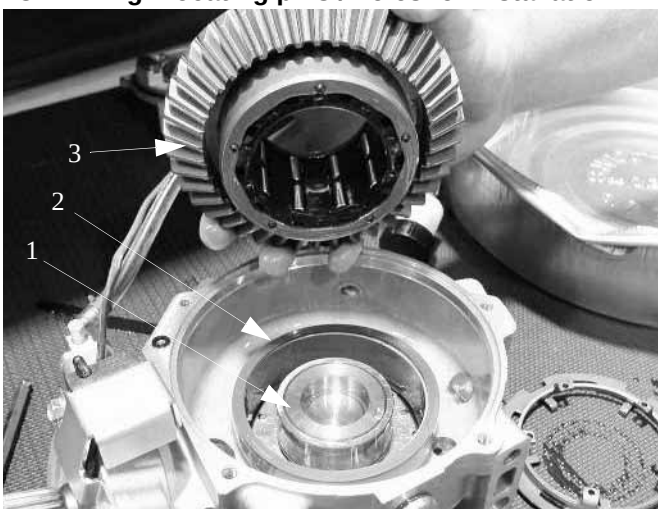


NOTE: Ring gear backlash (2) is set at the factory. No adjustment is required, unless the front cover is replaced or the back lash pad screw is removed.

9. Install the roll cage and rollers into the ring gear. Insert the rollers as the roll cage is installed.

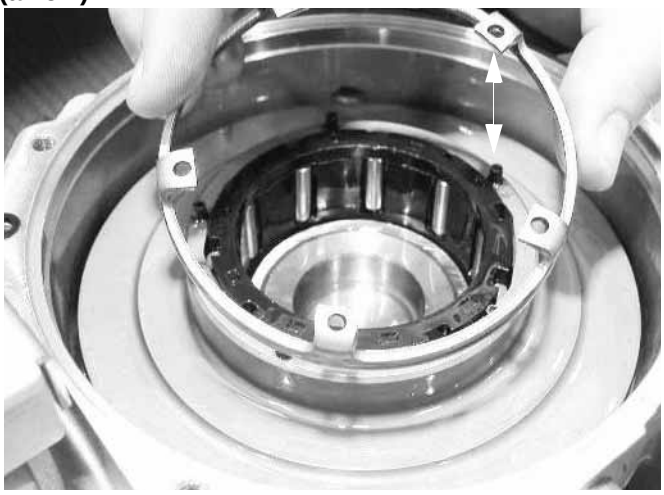
10. Install the clutch pack (1), spacer (2) and ring gear (3).

NOTE: Align locating pins / holes for installation.



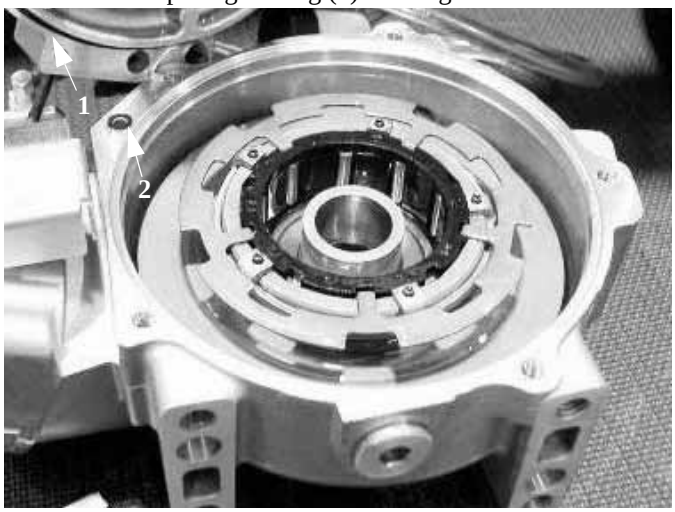
11. Install the spacer.

NOTE: Align locating pins / holes for installation (arrow).



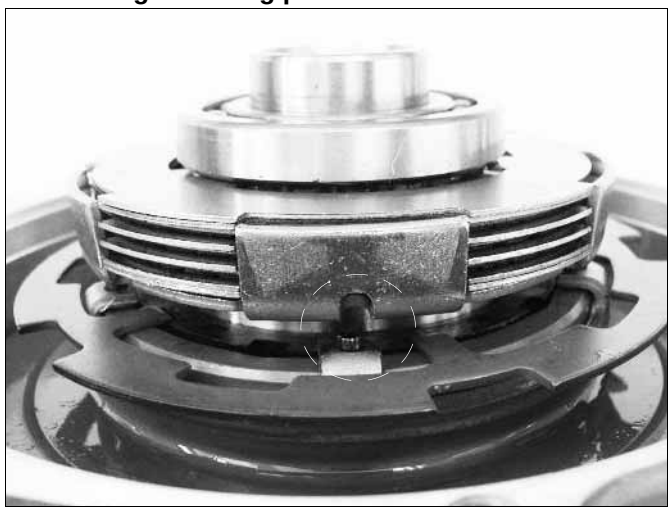
12. Install the armature plate. Verify the armature plate tabs align with tab recesses in the roll cage.

13. Install new cover o-ring (1) on the cover plate assembly and a new passage o-ring (2) on the gear case.

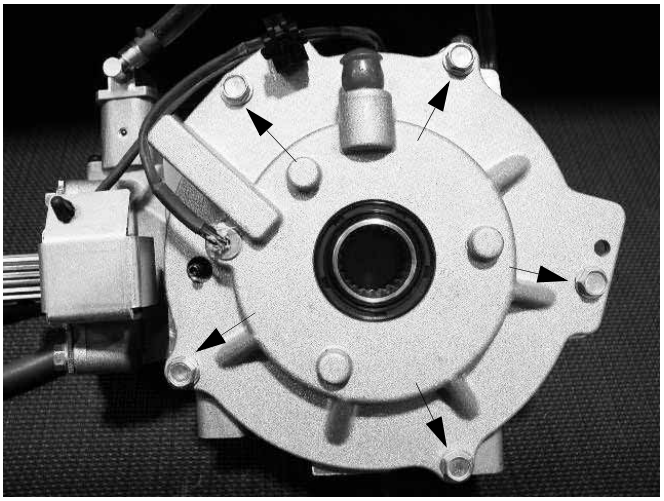


14. Install the remaining output clutch assembly.

NOTE: Align locating pins / holes for installation.



15. Place cover assembly on Install bolts (arrows) retaining the outer cover plate assembly and torque to specification.



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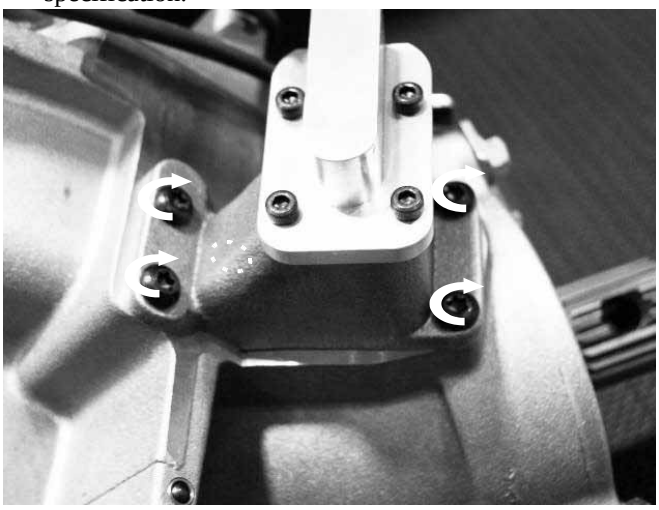
Input Cover Bolt Torque: **7-11 ft. lbs. (9.4-14.9 Nm)**

16. Install a new passage o-ring (dotted circle) on the gearcase and install the piston pump assembly. Torque the screws to specification.



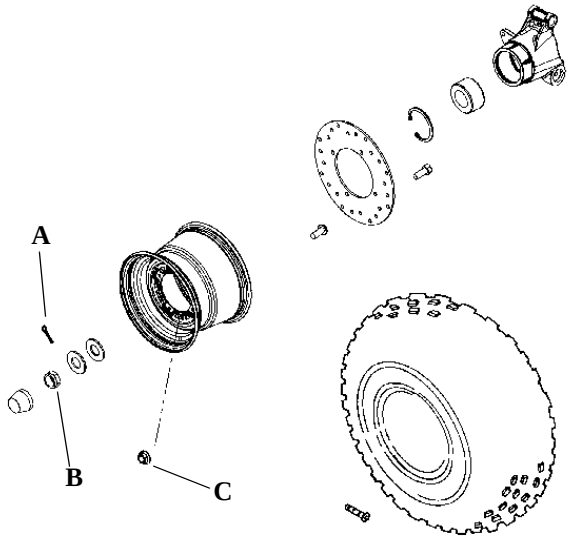
= T
Pump Assembly Screw Torque: **17-23 in. lbs. (1.9-2.5 Nm)**

NOTE: See "Gearcase Installation" on page 7.20.

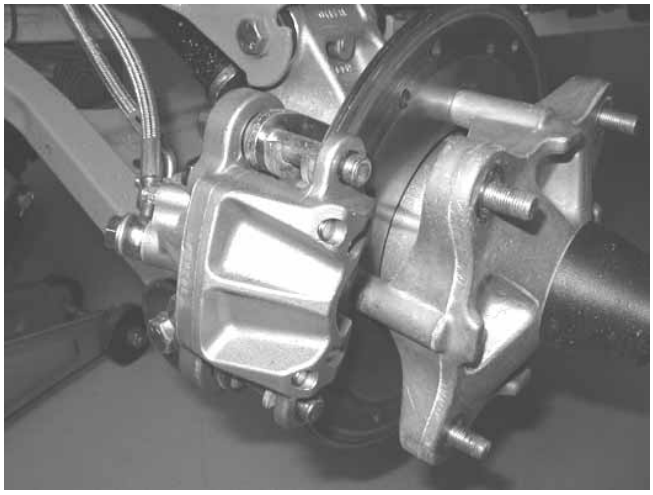
REAR HUB

Removal

1. Place the ATV in Park and lock the parking brake. Remove rear hub cap.

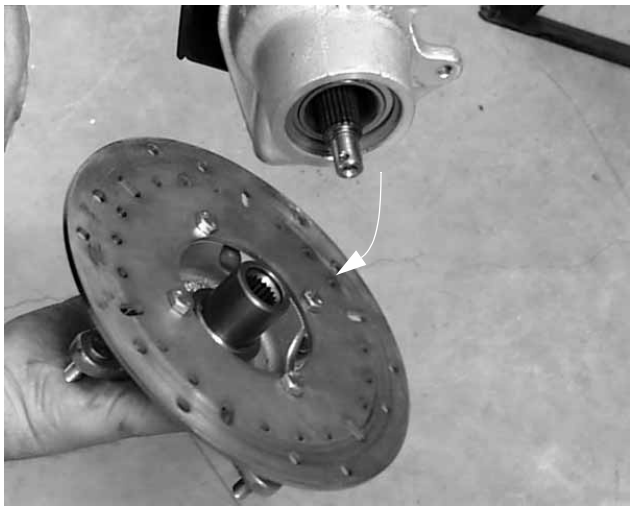


2. Remove cotter pin (A).
3. Loosen the hub retaining nut (B).
4. Loosen the wheel nuts (C).
5. Safely support the rear of the ATV.
6. Remove wheel nuts and wheel.
7. Remove the rear brake caliper and safely suspend the caliper from the frame with a piece of wire.

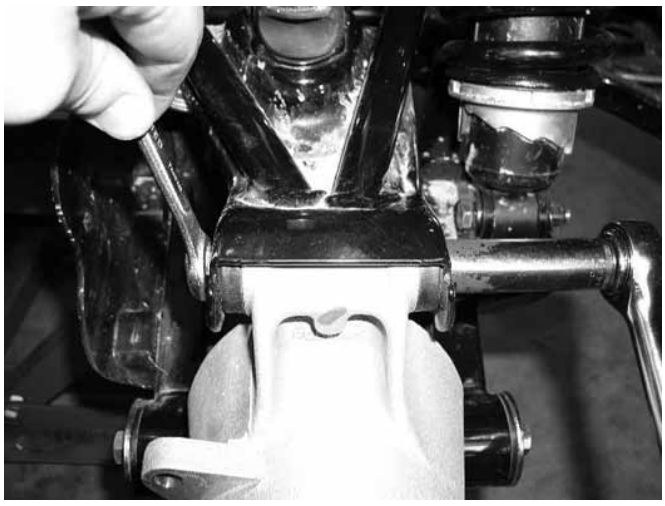


8. Remove hub nut, domed washer and flat washer.

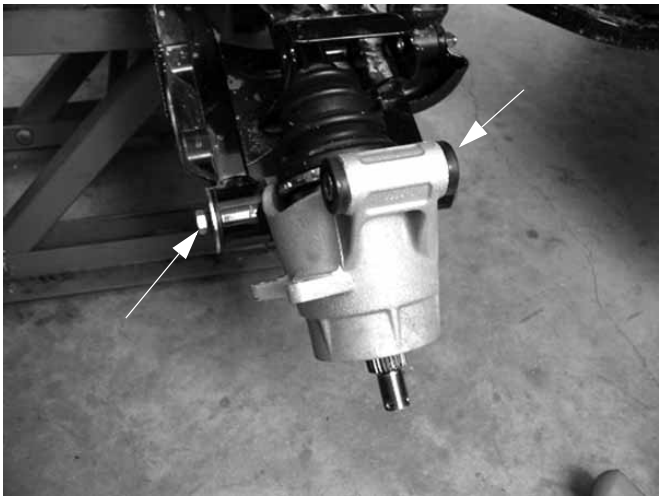
9. Remove hub.



10. Remove upper control arm bolt as shown.



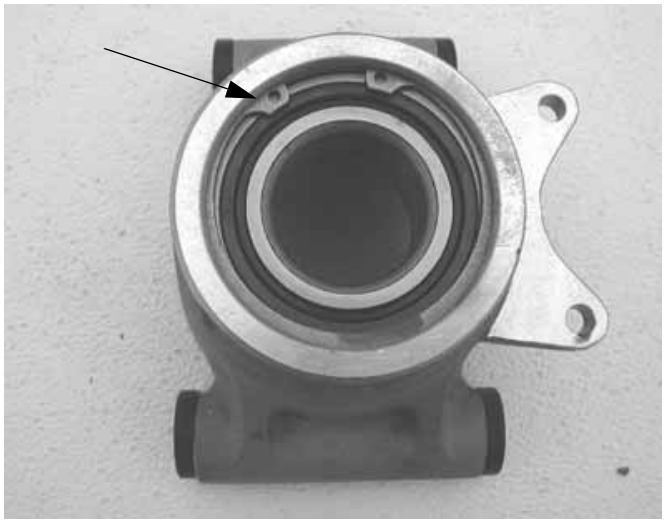
11. Remove both lower control arm bolts.



12. Remove bearing carrier.

Disassembly

1. Remove outer snap ring.



2. From the back side, tap on the outer bearing race with a drift punch in the reliefs as shown or press out using a hydraulic press.

NOTE: Drive bearing out evenly by tapping on outer race only. Once bearing is at bottom of casting, support casting on outer edges so bearing can be removed.

3. Inspect bearing.

NOTE: Due to extremely close tolerances and minimal wear, the bearings must be inspected visually, and by feel. While rotating bearings by hand, inspect for rough spots, discoloration, or corrosion. The bearings should turn smoothly and quietly, with no detectable up and down movement and minimal movement sideways between inner and outer race.

4. Inspect bearing housing for wear or damage. Replace housing if damaged.

Assembly

1. Support bottom of bearing carrier housing.

2. Start bearing in housing.

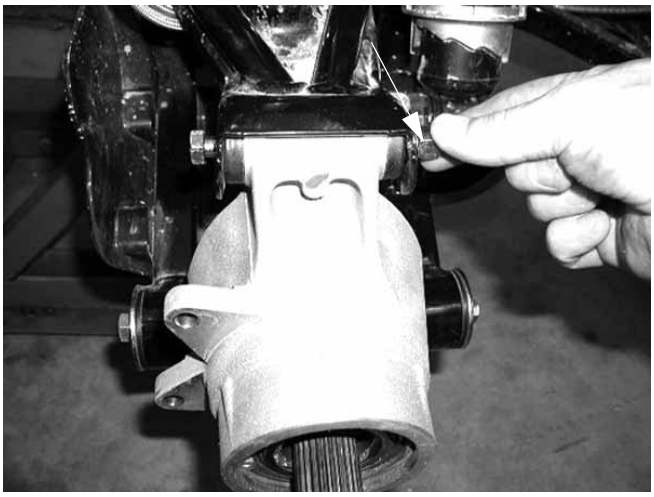
3. Press bearing into place until outer race bottoms on housing.

CAUTION
Use an arbor press only on the outer race to avoid bearing damage.

4. Install snap ring into groove.

Installation

1. Insert bearing carrier on drive shaft.
2. Align bottom of carrier housing and lower control arm. Grease and slide lower control arm bushings into place, securing corner housing.
3. Install and torque both lower control arm bolts.



= T
Upper Control Arm Bolt Torque: **35 ft. lbs. (48 Nm)**

= T
Lower Control Arm Bolt Torque: **50 ft. lbs. (68 Nm)**

4. Lift bearing carrier until top aligns with upper control arm. Install and torque upper control arm bolt and torque to specification.
5. Pull drive shaft outward and install hub onto driveshaft splines.
6. Install cone washers with domed side facing outward.
7. Install retainer nut, wheel and wheel nuts.
8. Remove jackstand and torque axle nut and wheel nuts to specification.

= T
Wheel Nut Torque: See “Torque Table” on page 7.2.

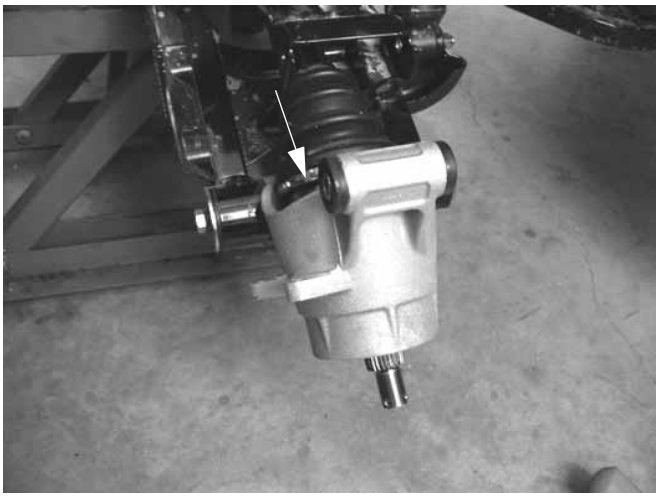
= T
Hub Nut Torque: **80 ft. lbs. (109 Nm)**

9. Install a new cotter pin. Tighten nut slightly to align holes if required.

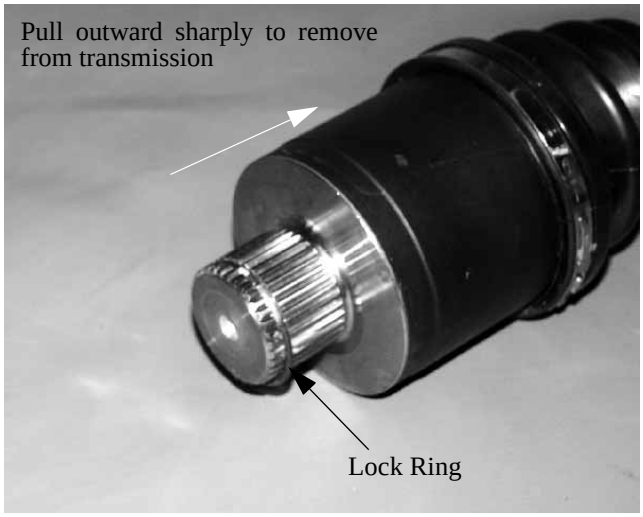
REAR DRIVE (CV) SHAFT

Removal

1. Remove rear hub, see “REAR HUB REMOVAL”.
2. Remove upper carrier bolt. Tip hub outward and remove shaft from carrier.

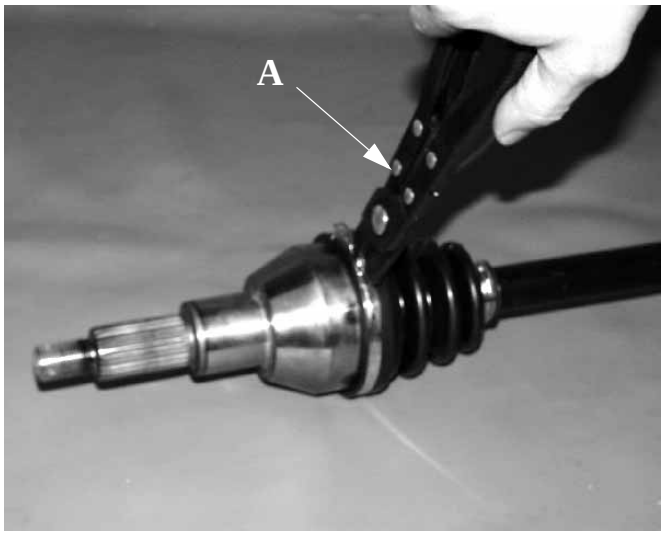


3. Pull sharply outward to remove shaft from transmission. Install a new lock ring upon assembly.



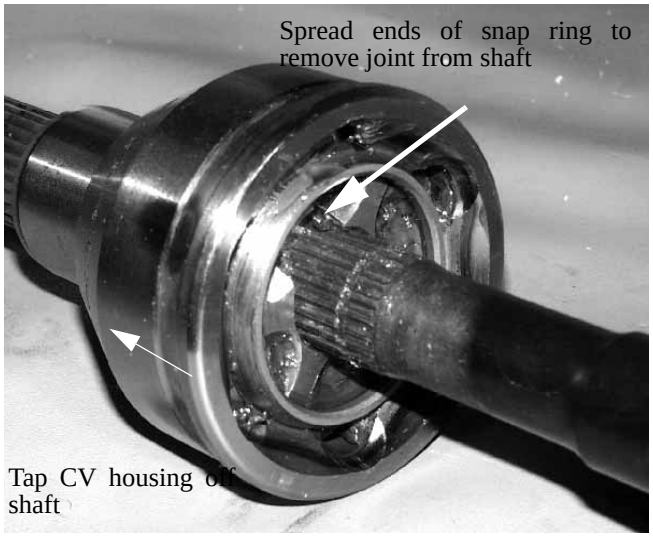
Service

1. Remove clamps from rubber boot(s) using the CV Boot Clamp Pliers **(PN 8700226**) (A).

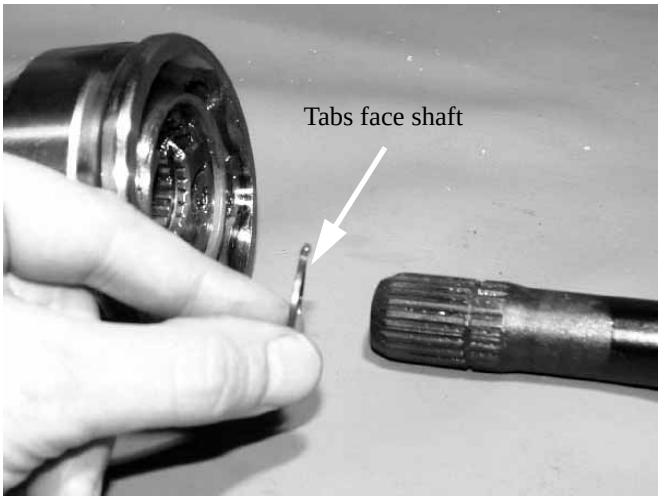


2. **Photo below is shown without shaft for clarity. Wipe grease away from recess in CV joint inner hub to locate snap ring**

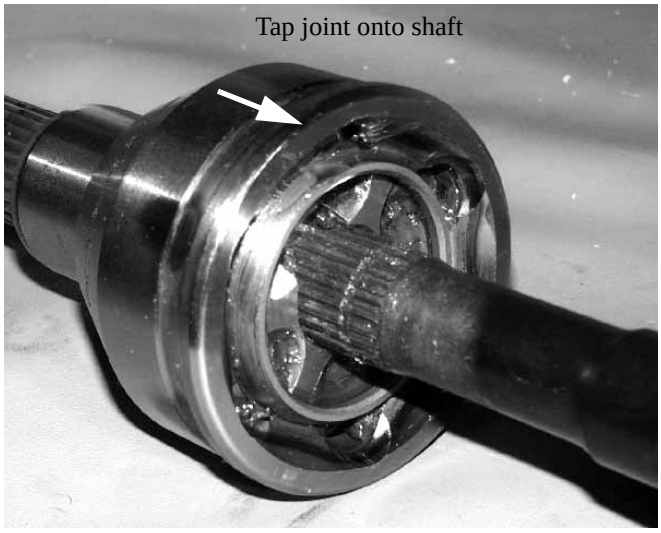
3. Open the snap ring using a snap ring pliers or small needle nose pliers. Tap CV housing off shaft with a soft faced hammer while holding snap ring open.



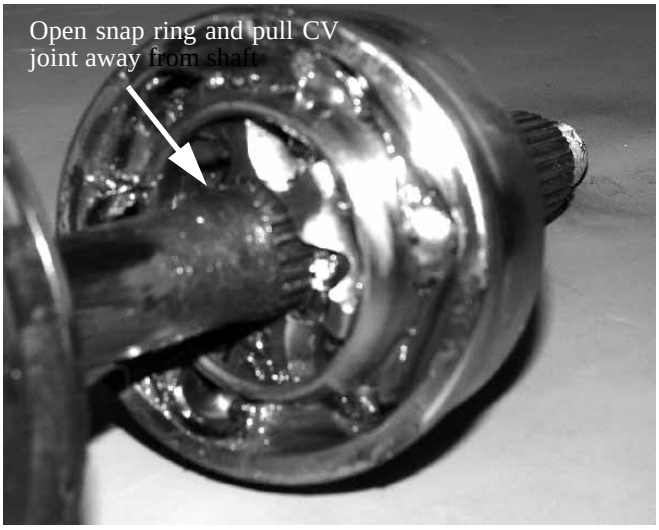
4. Place a new snap ring in the groove of the CV joint inner hub, with tabs facing the shaft as shown.



5. Refit CV joint on interconnecting shaft by tapping with a plastic hammer on the joint housing. Take care not to damage threads on the outboard CV joint. The joint is fully assembled when the snap ring is located in the groove on the interconnecting shaft.



6. Install and tighten large boot clamp with boot clamp pliers.
7. Remove excess grease from the CV joint's external surfaces and position joint boot over housing, making sure boot is seated in groove. Position clamp over boot end and make sure clamp tabs are located in slots. **NOTE**: Before tightening boot clamp on inboard joint, make sure any air pressure which may have built up in joint boot has been released. The air should be released after the plunging joint has been centered properly. Tighten boot clamp using boot clamp pliers.



CV Boot Replacement

1. Remove CV joint from end of shaft.
2. Remove boot from shaft.

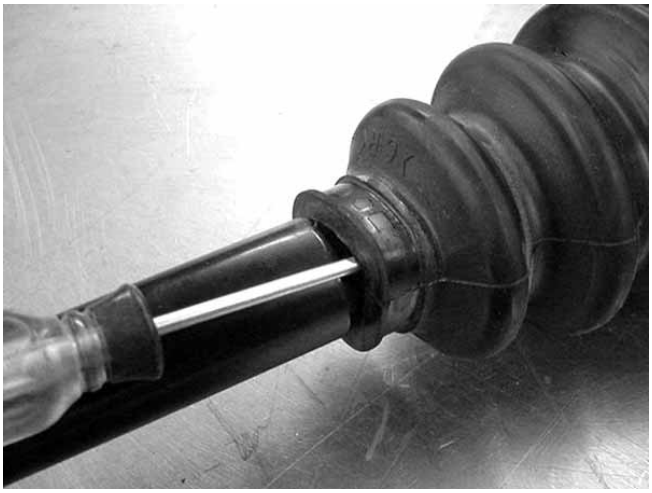
NOTE: When replacing a damaged boot, check the grease for contamination by rubbing it between two fingers. A gritty feeling indicates contamination. If the grease is not contaminated, the boot can be replaced without cleaning the CV joint. Use the recommended amount of grease for boot replacement only (see below). Proceed to Boot Installation.

3. Thoroughly clean and dry the CV joint and inspect ball tracks and cages for wear, cracks or other damage.

NOTE: Shiny areas in ball tracks and on the cage spheres are normal. Do not replace CV joints because parts have polished surfaces. Replace CV joint only if components are cracked, broken, worn or otherwise unserviceable.

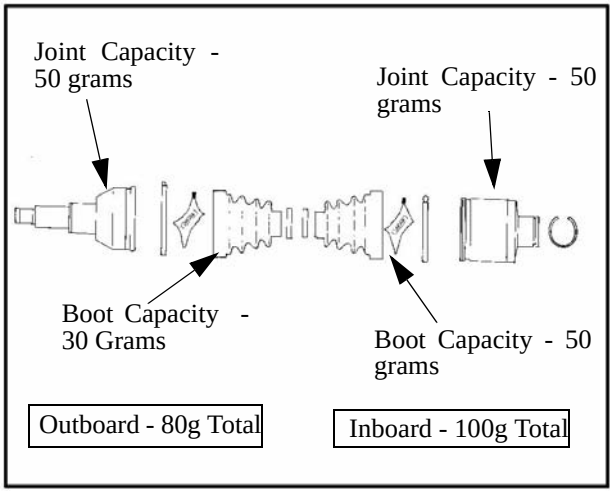
4. Add the recommended amount of grease for CV joint cleaning to the joint as shown below. Be sure grease penetrates all parts of the joint.
5. Refit CV joint on interconnecting shaft by tapping with a plastic hammer on the joint housing. Take care not to damage threads on the outboard CV joint. The joint is fully assembled when the snap ring is located in the groove on the interconnecting shaft.
6. Add grease through large end of boot.
7. Install a new boot onto the axle shaft and fill the CV joint and boot with the correct type and amount of grease.

8. While pulling out on the CV shaft, fully extend the CV joint and slide a straight O-ring pick or a small slotted screw driver between the small end of the boot and the shaft. This will allow the air pressure to equalize in the CV boot in the position that the joint will spend most of its life. Before you remove your instrument, be sure the small end of the boot is in its correct location on the axle.



9. Install the small clamp on the boot.
10. Be sure to use only the Constant Velocity Joint grease supplied with boot service kit. IF CV JOINT WAS CLEANED, add the recommended amount of grease to the joint in addition to the grease pack supplied with boot kit.

NOTE: CV Joint Grease Capacity:



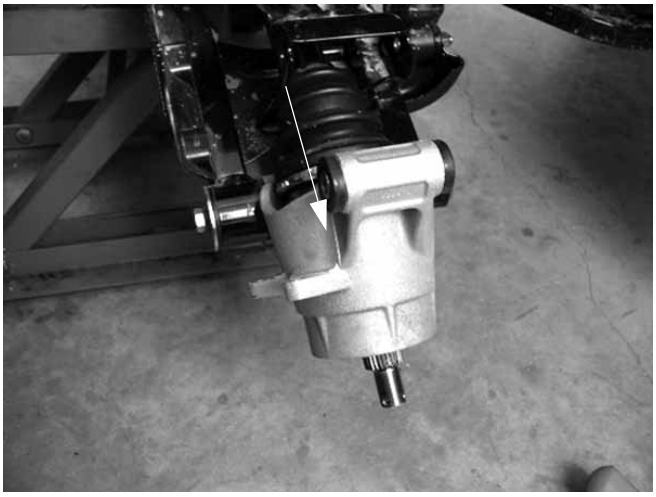
CV Joint Grease:
30g PN 1350046 50g PN 1350047

Outboard Joint - 30g if boot is replaced only. Another 50g (80 total) if joint is cleaned.

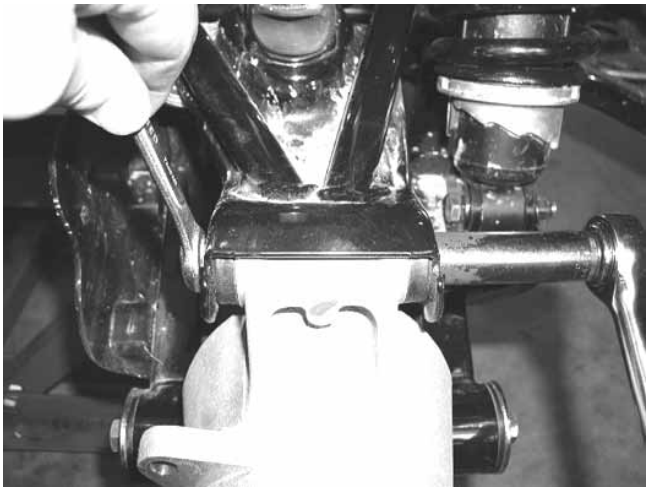
Inboard Joint - 50g if boot is replaced only. Another 50g (100 total) if joint is cleaned.

INSTALLATION

1. Slide shaft assembly into bearing carrier hub.



2. Apply anti-seize compound to splines of shaft.
3. Install a new lock ring and install the shaft.
4. Lift bearing carrier into place and install bolt to upper control arm. Torque bolt to specification.



= T

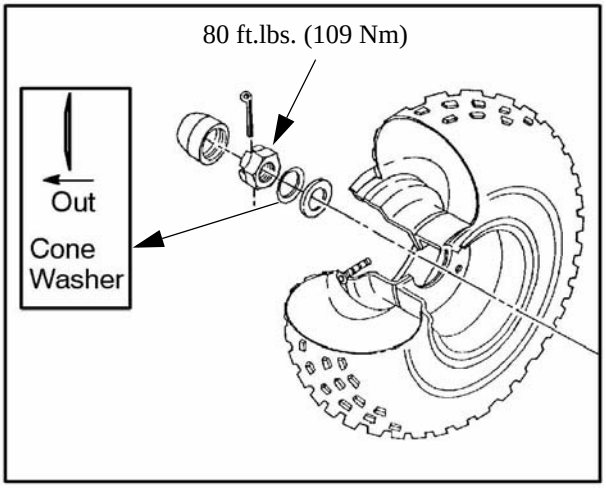
Upper Hub Carrier Bolt Torque:
35 ft. lbs. (48 Nm)

5. Install hub, flat washer, domed washer (domed side out) and nut. Torque center hub nut to specification. Install new cotter pin and hub cap.

= T

Hub Nut Torque:
80 ft. lbs. (109 Nm)

6. Install rear wheel and torque wheel nuts to specification.



Refer to Page 7.2 for Wheel Nut Torque.

7. Grease all fittings thoroughly with Premium U-Joint Lubricant (**PN 2871551**).

Drive Shaft and CV Joint Handling Tips

Care should be exercised during driveshaft removal or when servicing CV joints. Driveshaft components are precision parts.

Cleanliness and following these instructions is very important to ensure proper shaft function and a normal service life.

- The complete driveshaft and joint should be handled by getting hold of the interconnecting shaft to avoid disassembly or potential damage to the driveshaft joints.
- Over-angling of joints beyond their capacity could result in boot or joint damage.
- Make sure surface-ground areas and splines of shaft are protected during handling to avoid damage.
- Do not allow boots to come into contact with sharp edges or hot engine and exhaust components.
- The driveshaft is not to be used as a lever arm to position other suspension components.
- Never use a hammer or sharp tools to remove or to install boot clamps.
- Be sure joints are thoroughly clean and that the proper amount and type of grease is used to refill when joint boots are replaced and when joints are cleaned. Refer to text for grease capacity of CV joints and CV joint boots.

REAR GEARCASE

Removal

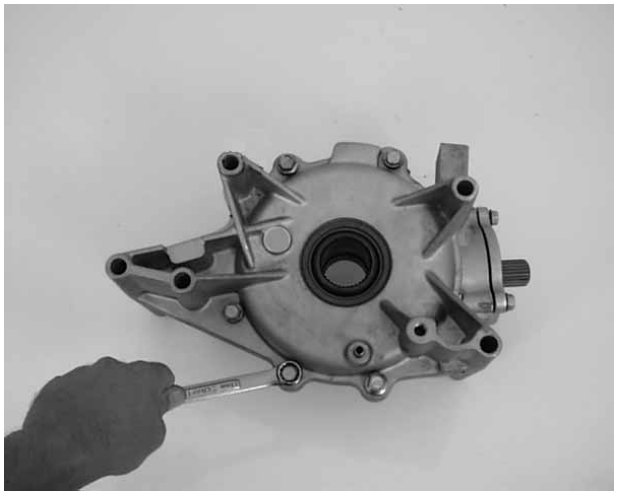
1. Place ATV on a level surface and place transmission in 'PARK'.
2. Loosen both rear wheel nuts.
3. Loosen both rear center hub nuts.
4. Lift and safely support rear of ATV so that the rear wheels are off the ground.
5. Remove the roll pin from the rear transmission yoke and pull vent line off the gearcase.
6. Remove both rear wheels and center hub nuts.

NOTE: Hub removal is not required to remove CV shafts.

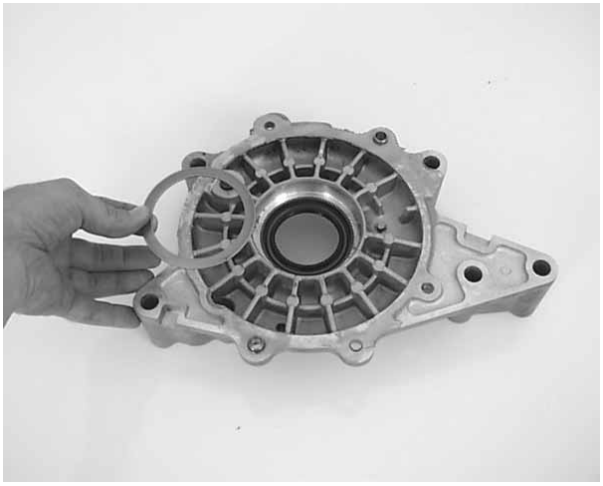
7. Remove both upper hub carrier bolts. Tilt hubs outward and remove both CV shafts.
8. Remove the upper and lower bolts from the gearcase mounts.
9. Pull gearcase out the rear of the vehicle. Some prying and tapping with a soft-face hammer may be required. Use care not to damage other components.

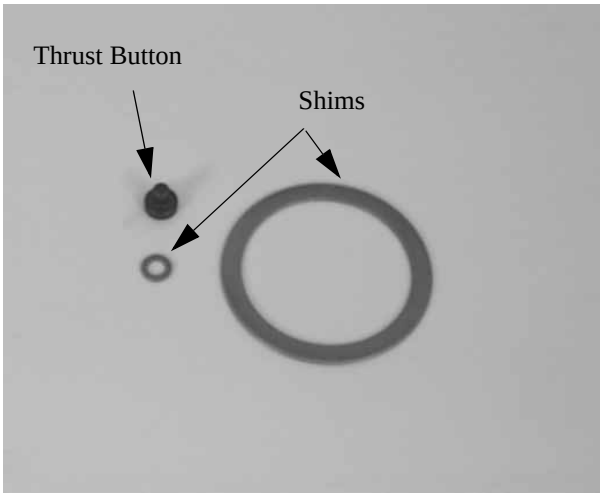
Disassembly and Inspection

1. Drain and properly dispose of used oil.
2. Remove the gearcase housing cover bolts and the gearcase housing cover.



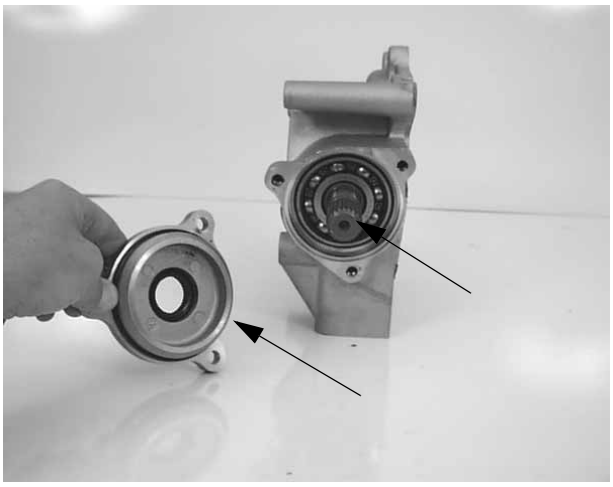
3. Remove the shim, thrust button, and thrust button shim from the gearcase.



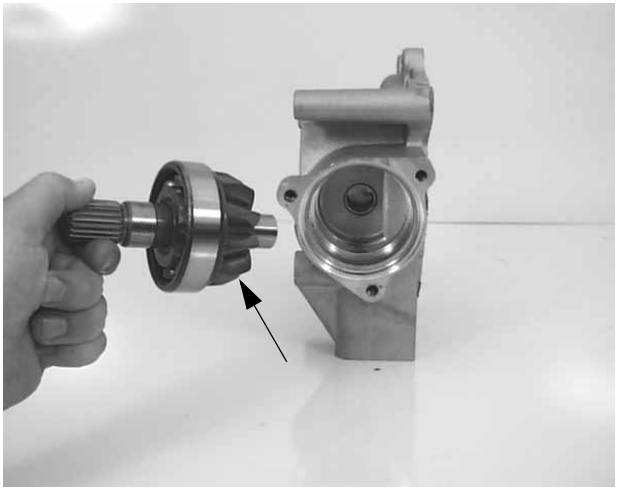


4. Remove rear bevel gear from the gearcase housing. cover.

5. Inspect the ring gear for abnormal wear, broken, or chipped teeth. Spin the bearing to check the ball bearings for smoothness. Replace the bearing if needed.
6. Remove the input shaft cover and the pinion shaft from the gearcase housing. See next page.

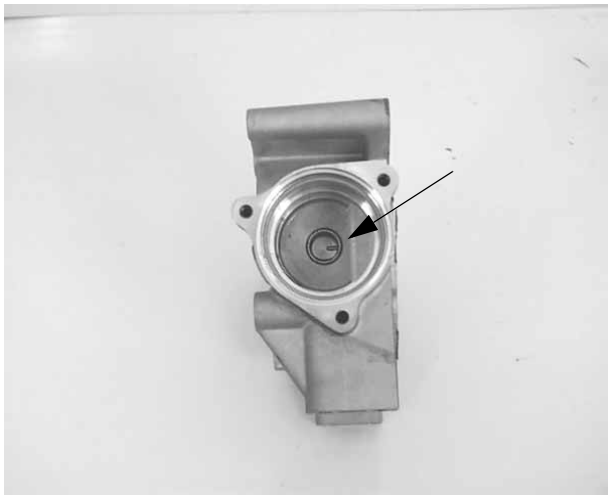


7. Inspect the ring gear for abnormal wear, broken, or chipped teeth. Spin the bearing to check the ball bearings for smoothness. Replace the bearing if needed.

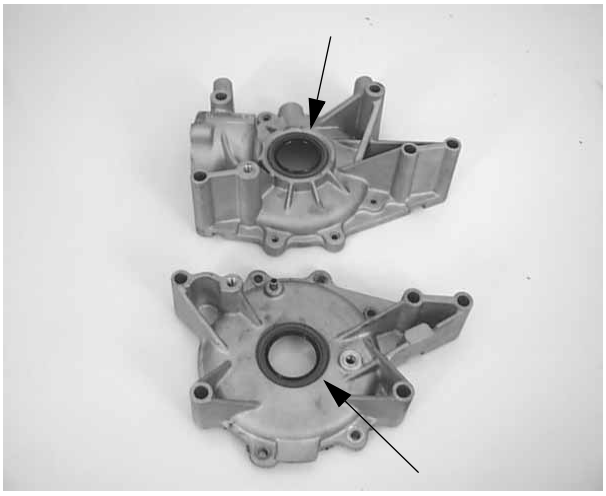


Reassembly

1. Inspect the pinion shaft bushing for wear.



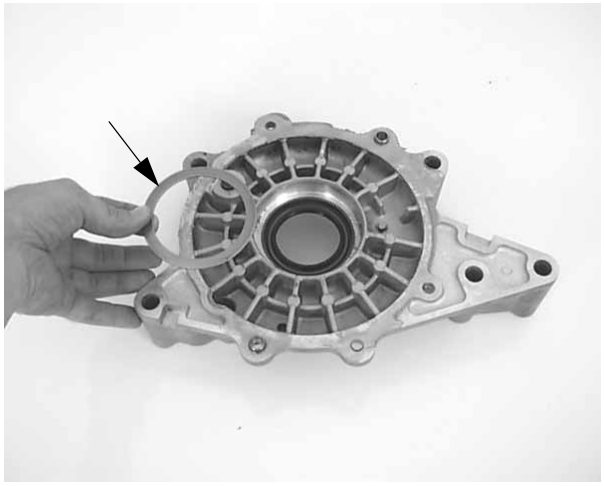
2. Replace all O-rings, seals, and worn components.



3. Install the pinion shaft into the gearcase housing. Install the pinion shaft cover and torque the cover bolts to specification.

= T
Input Cover Bolt Torque: **25 ft.lbs. (34 Nm)**

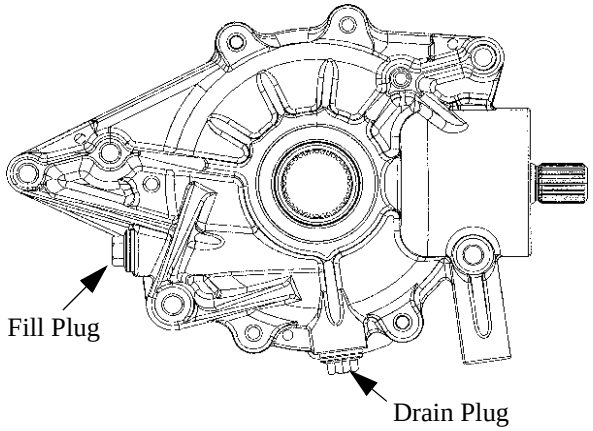
4. Install the original shim(s), thrust button, and thrust button shims into the gearcase cover.



5. Apply Crankcase Sealant (**PN 2871557**) to surface of case and install cover bolts. Install the gearcase cover onto the gearcase housing. Torque the cover bolts in a criss-cross pattern to specification.

= T
Cover Bolt Torque: **25 ft.lbs. (34 Nm)**

6. Install the drain plug and fill plug. Replace the drain plug washers to ensure proper sealing after filling.



= T
Drain / Fill Plug Torque: **14-18 ft.lbs. (19-24 Nm)**

Installation

1. To install the rear gearcase, reverse the removal procedures.
2. Pre-install the propshaft onto the transmission and insert the roll pin. While installing the gearcase, align the propshaft and gearcase input shaft for easier propshaft installation. Use of anti-seize compound on the shaft splines is recommended.
3. Torque the gearcase mounting bolts to specification.

= T
Gearcase Mounting Bolts **30 ft.lbs. (41 Nm)**

4. Re-install CV shafts, hubs, carrier bolts, etc. and torque to specifications.

= T
Lower Control Arm Bolt Torque: **50 ft. lbs. (68 Nm)**

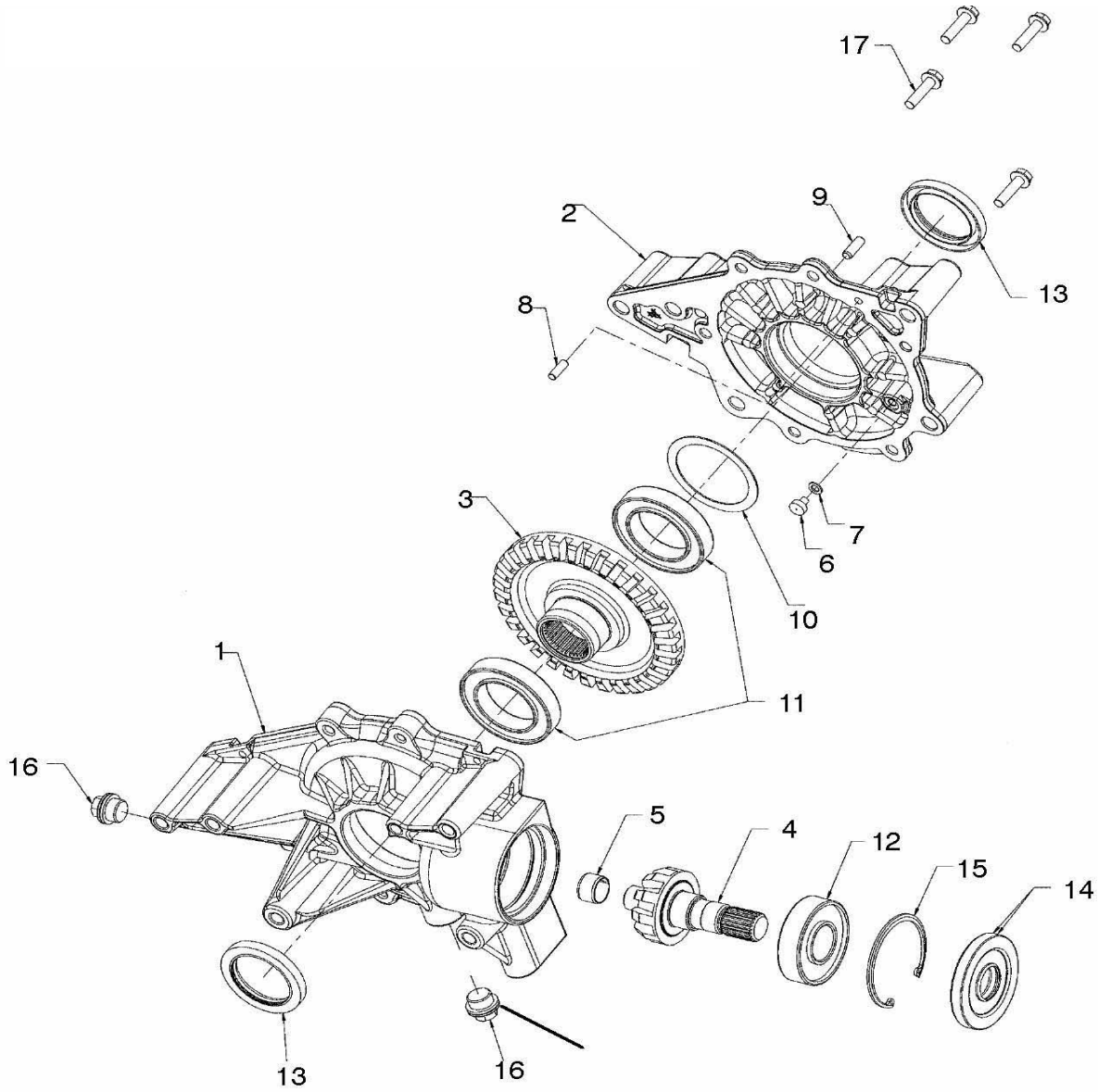
= T
Upper Control Arm Bolt Torque: **35 ft. lbs. (48 Nm)**

= T
Hub Nut Torque: **80 ft. lbs. (109 Nm)**

= T
Wheel Nut Torque: See “Torque Table” on page 7.2.

5. Re-install gearcase vent line.
6. Refill the rear gearcase with Polaris Premium Gearcase Lubricant (**PN 2871653**). Refer to the “REAR GEARCASE LUBRICATION” procedure in Chapter 2.

Rear Gearcase Exploded View



Ref.	Qty.	Description	Ref.	Qty.	Description
	1	Asm., Rear Gearcase	11.	2	Ball Bearing
1.	1	RH Gearcase	12.	1	Ball Bearing
2.	1	LH Cover	13.	2	Triple Lip Seal
3.	1	31T Straight Bevel Gear	14.	1	Triple Lip Seal
4.	1	10T Straight Bevel Pinion	15.	1	Retaining Ring
5.	1	Bushing	16.	2	Plug
6.	1	Thrust Button	17.	6	Bolts
7.	1	Shim			
8.	1	Dowel Pin			
9.	1	Vent			
10.	1	Shim			

NOTES

CHAPTER 8
TRANSMISSION

SPORTSMAN. 8.3-8.18
SPORTSMAN X2 . . . . . 8.19-8.38

NOTES

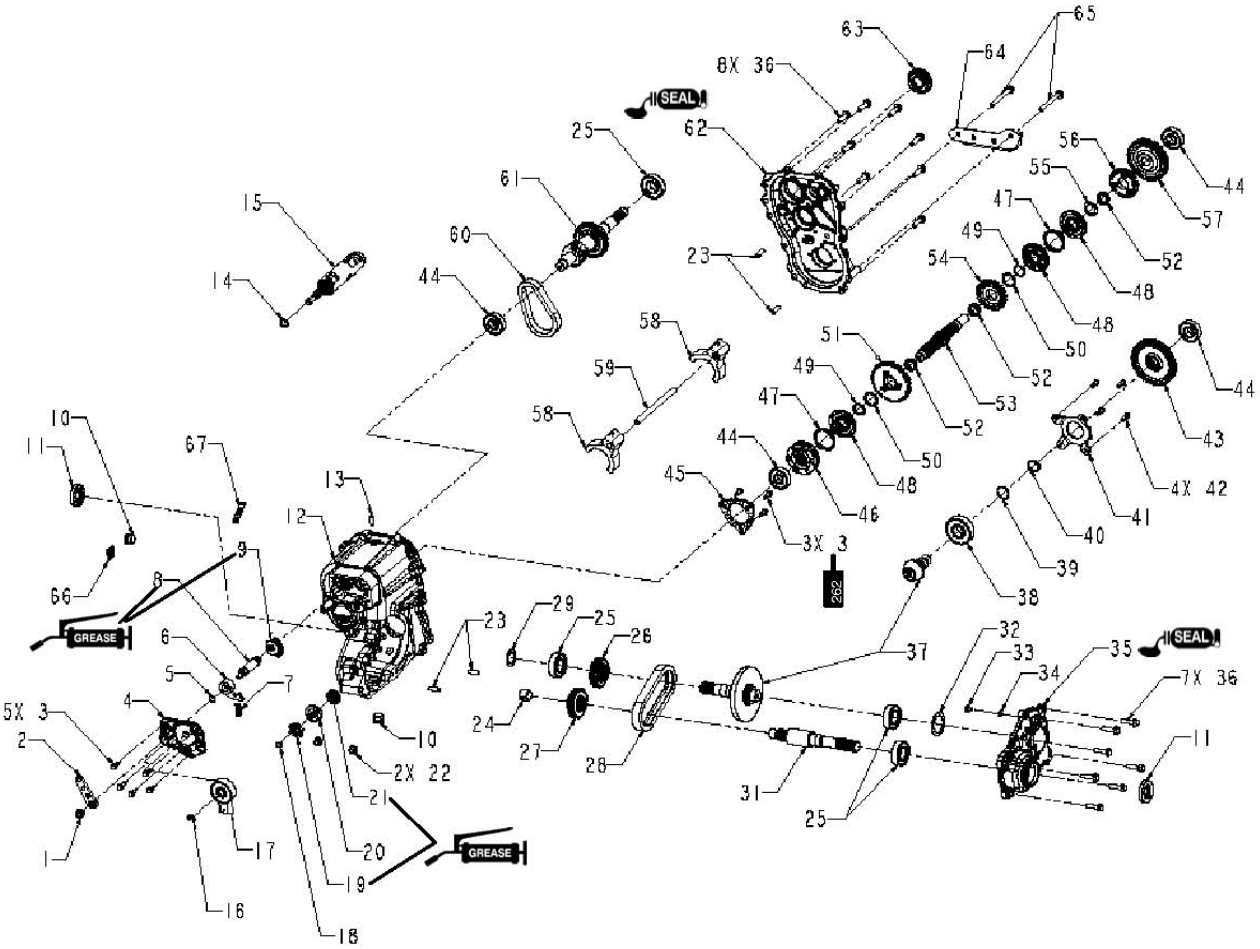
CHAPTER 8

SPORTSMAN TRANSMISSION

TRANSMISSION EXPLODED VIEW 8.4
SPORTSMAN 700/800 EFI TRANSMISSION 8.4
SPECIFICIATONS 8.6
TORQUE SPECIFICATIONS 8.6
LUBRICANT / CAPACITY 8.6
TRANSMISSION SERVICE 8.6
TRANSMISSION REMOVAL 8.6
DISASSEMBLY 8.7
ASSEMBLY 8.12
TRANSMISSION INSTALLATION 8.18
TROUBLESHOOTING 8.18

TRANSMISSION EXPLODED VIEW

Sportsman Transmission



TORQUE SPECIFICATIONS

Item	Torque
1	12-18 fl.lbs. (16-24 Nm)
3	7-9 ft.lbs. (9.5-12 Nm)
22	15-19 ft.lbs. (20-26 Nm)
36	25-30 ft.lbs. (34-40 Nm)
42	6-12 ft.lbs. (8-16 Nm)
10	14-18 ft.lbs. (19-24 Nm)

FOR REASSEMBLY

GREASE — Apply White Lithium Based Grease.

SEAL — Apply Polaris Crankcase Sealant

262 — Apply Loctite™ 262 to the bolt threads.

Transmission Exploded View Table

REF.	QTY	DESCRIPTION	REF.	QTY.	DESCRIPTION
1	1	Nylon Lock Nut	35	1	Output Front Cover
2	1	Shift Drum Bell Crank	36	15	Hex Screw
3	8	Hex Screw	37	1	Gear Set, Lapped Bevel, 10T/31T
4	1	Sector Cover	38	1	Ball Bearing, includes 56, 61, 67
5	1	O-ring	39	1	Spacer
6	1	Detent Pawl	40	1	Retaining Ring
7	1	Compression Spring	41	1	Center Drive Bearing Cover
8	1	Shift Shaft	42	4	Torx Screws
9	1	31T Sector Gear	43	1	56T Helical Gear
10	2	Hollow Hex Plug	44	4	Ball Bearing
11	2	Triple Lip Seal	45	1	12 Face Park Plate
12	1	Main Gearcase	46	1	6 Face Park Engagement Dog
13	1	Vent Tube	47	2	Wave Spring
14	1	O-ring	48	3	6 Face Engagement Dog
15	1	Shift Drum	49	2	Retaining Ring
16	1	Retaining Ring	50	2	Washer
17	1	6 Pin Rotary Switch	51	1	33T- 6 Face Gear
18	1	O-ring	52	3	Needle Split Cage Bearing
19	1	Detent Star	53	1	Reverse Shaft
20	1	Lockout Disc	54	1	24T, 6 Face
21	1	16T Sector Gear	55	1	Washer
22	2	Hex Nut	56	1	28T, 6 Face Gear, Includes 38, 61, 67
23	4	Dowel Pin	57	1	51T Mid Output Helical Gear
24	1	Plain Bearing	58	2	Shift Fork
25	4	Ball Bearings	59	1	Shift Shaft Rail
26	1	22T/18T Sprocket	60	1	Silent Chain
27	1	22T/22T Spline Sprocket	61	1	Input Shaft Sub- Assy, Includes 38, 56, 67
28	1	Silent Chain	62	1	LH Main Cover
29	1	Thrust Washer	63	1	Dual Lip Seal
30	1	Vent Plug	64	1	Transmission Mount Bracket
31	1	Front Main Output Shaft	65	2	Hex Screw
32	1	Shim, 2.0 x 1.5	66	1	Oil Fill Check Label
33	1	Thrust Button	67	1	Transmission Label
34	1	Shim, .450 x .265			

SPECIFICIATONS

Torque Specifications

Table 8-1: Torque Specifications

COMPONENT	FT.LBS. (IN.LBS.)	NM
Transmission Case Bolts	27-34	37-46
Oil Deflector Screws	(16-30)	2-3.3
Shift Cover Bolt	6-12	8-16
Bell Crank Nut	12-18	16-24
Trans. Drain/Fill Plug	14	19
Trans. Mounting Bolts	25	34.5
Snorkel Lock Screw	8-12	11-16

NOTE: TRANSMISSION ILLUSTRATIONS DEPICTED WITH PARK LOCK. PARK LOCK IS REMOVED FOR 2007.

Lubricant / Capacity

Use only Polaris recommended products if possible.

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Specified Lubricant: Polaris AGL Gearcase Lubricant (Gallon - PN 2873603) (12 oz. - PN 2873602) **Capacity:** 15 oz. (450 ml)

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Fill Plug Torque: 14 ft.lbs. (19 Nm) **Drain Plug Torque:** 14 ft.lbs. (19 Nm)

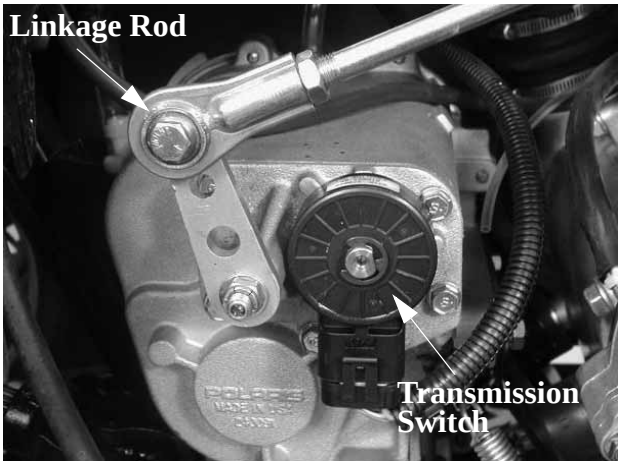
TRANSMISSION SERVICE

Transmission Removal

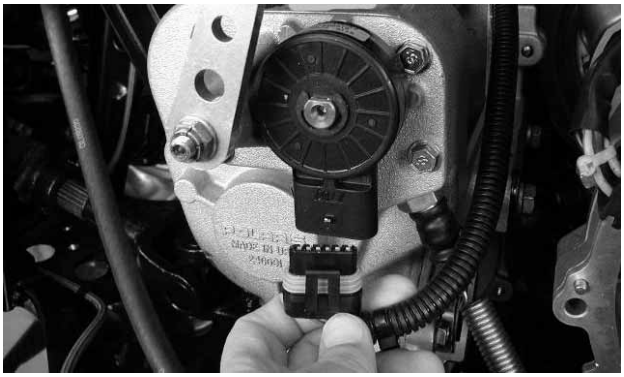
1. Disconnect linkage rod from gear selector handle.
2. Remove two bolts attaching gear selector mount to machine frame.
3. Lift gear selector out of mounting bracket and away from frame.

NOTE: TRANSMISSION ILLUSTRATIONS DEPICTED WITH PARK LOCK. PARK LOCK IS REMOVED FOR 2007.

4. Remove seat, rear rack, rear cab, air box, exhaust system, and right footwell (as required for access).
5. Disconnect transmission vent line.
6. Drain transmission lubricant.
7. Disconnect shift linkage rod end from transmission bellcrank.

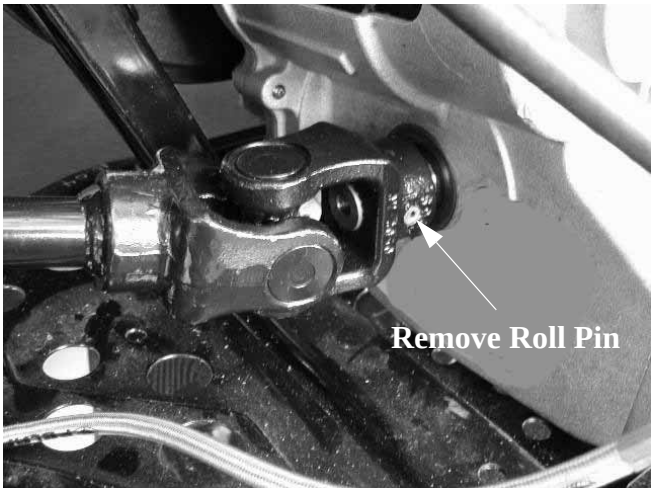


8. Disconnect gear position switch harness.

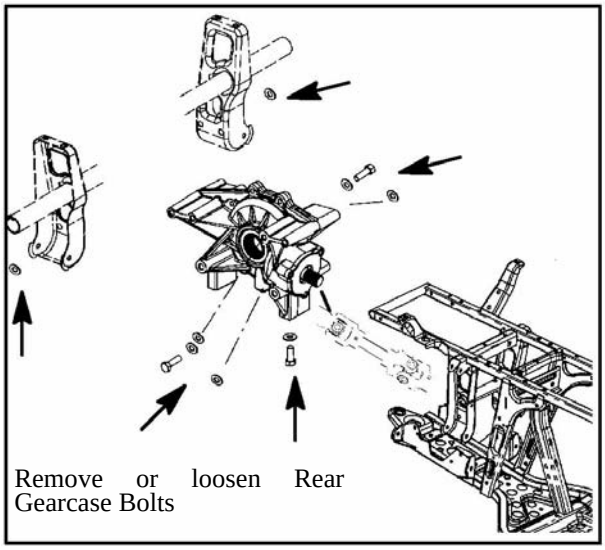


9. Remove auxiliary brake mounting bracket from frame and secure out of way for transmission removal.
10. Remove PVT outer cover, both drive and driven clutch, and inner PVT cover (refer to Clutch Chapter 6).

11. Use the Roll Pin Removal Tool (**PN 2872608**) to remove the roll pins from the front prop shaft and the rear prop shaft. Remove the front propshaft.



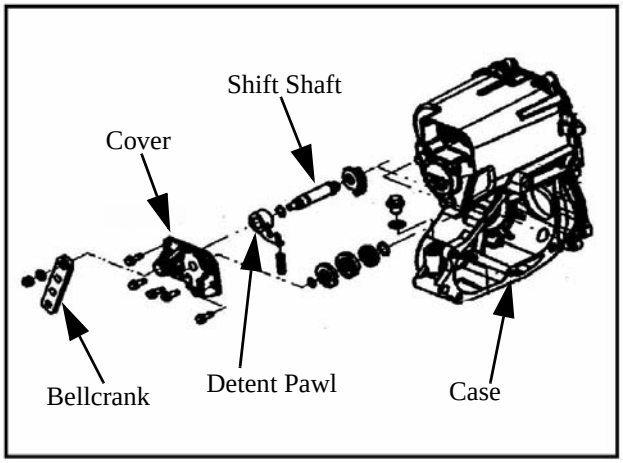
12. To remove the rear propshaft, loosen or remove the bolts that secure the rear gearcase. Move the rear gearcase back just enough to slide the rear propshaft from the transmission shaft.



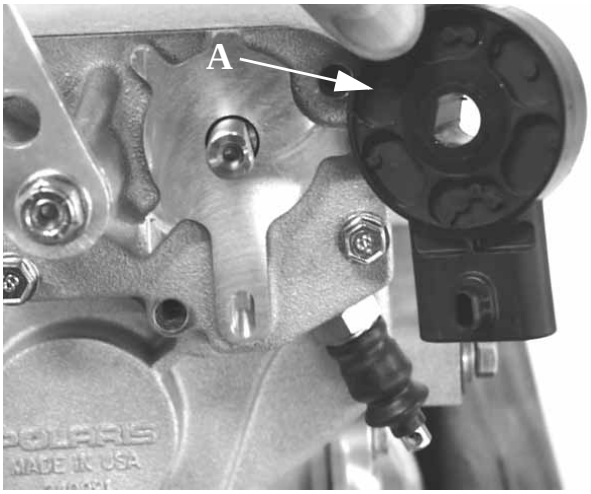
13. Remove left side transmission bracket, rear bracket, and lower right bracket bolt.
14. Remove front transmission-to-engine mount bolts. See illustration.
15. Remove transmission from right side of frame.

Disassembly

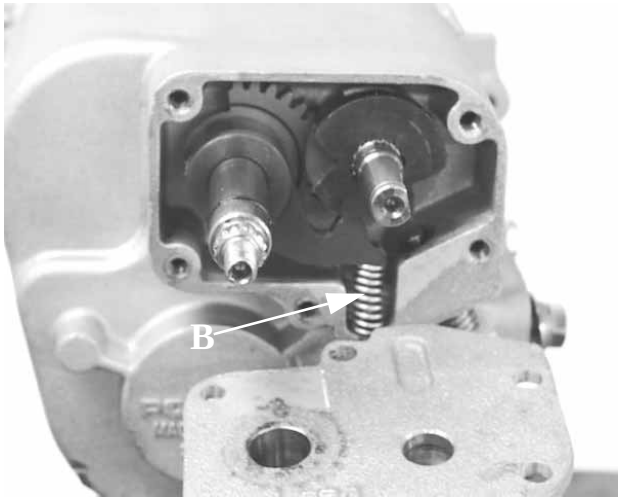
1. Place the bellcrank in neutral position.



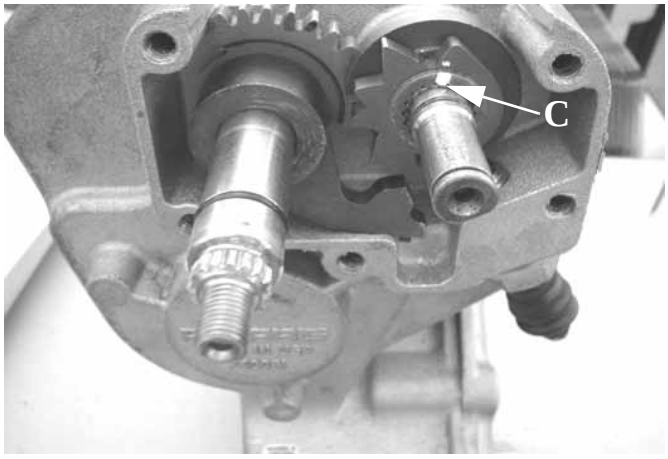
2. Remove the nut, and washer that secure the bell crank. Remove the bellcrank.
3. Remove the e-clip and then remove the transmission switch (A).



4. Remove the five bolts that secure the cover. Remove the detent spring (B).



5. Mark the detent gear (C) with a white pen. Remove the detent gear from the case.

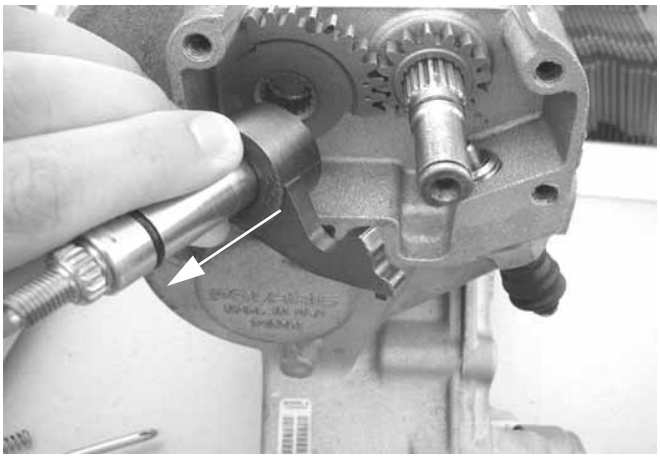


NOTE: It may be helpful to place a mark just above the keyed spline. Note the raised edge on the detent gear for reassembly.

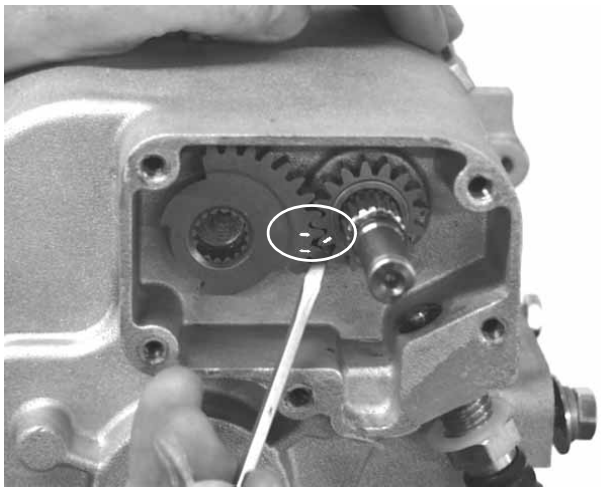
6. Mark the shift lockout disc, this will indicate which side of the disc faces outward during assembly. Remove the shift lockout disc.

NOTE: It may be helpful to place a mark just above the keyed spline. Note the raised edge on the detent gear for reassembly.

7. Remove the shift shaft and detent lever.

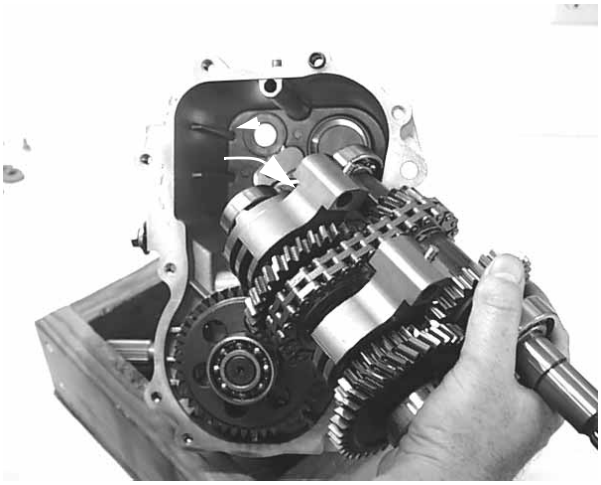


8. Note the timing marks on the shift gears. Remove the shift gears from the case.

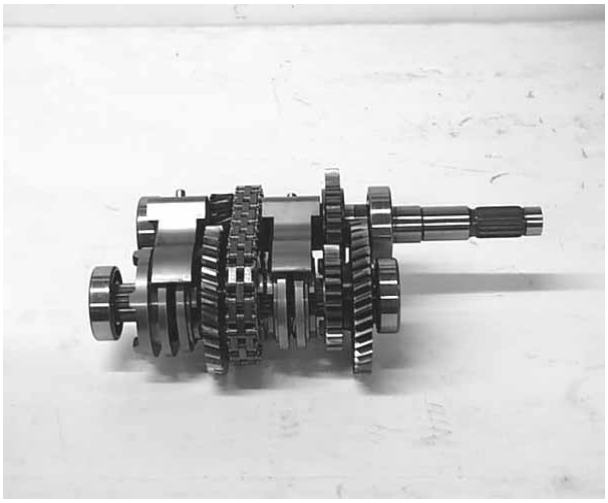


NOTE: You may have to tap the shift drum from the backside of the case to aid in removal.

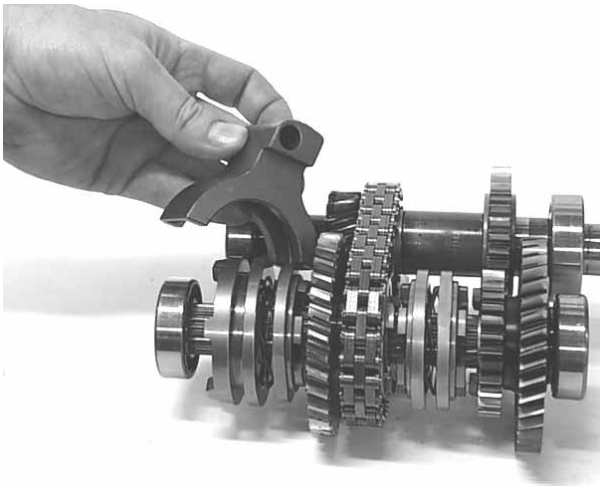
9. Remove the upper gear cluster and shift forks. You may need to move the assembly back and forth to aid in removal.



10. Set the upper gear cluster on a flat surface and inspect the components.

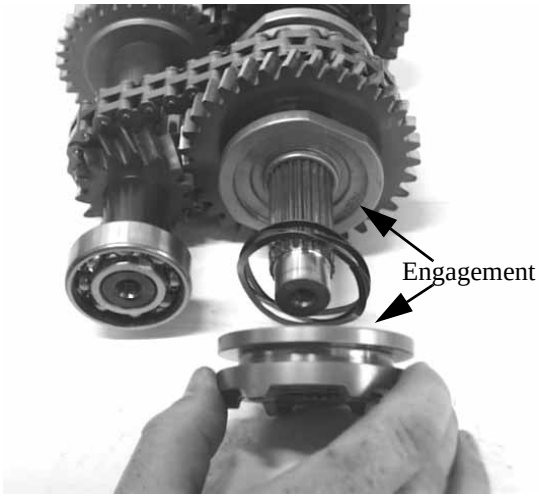


11. Remove the shift forks from the assembly. Note the correct position of each fork.

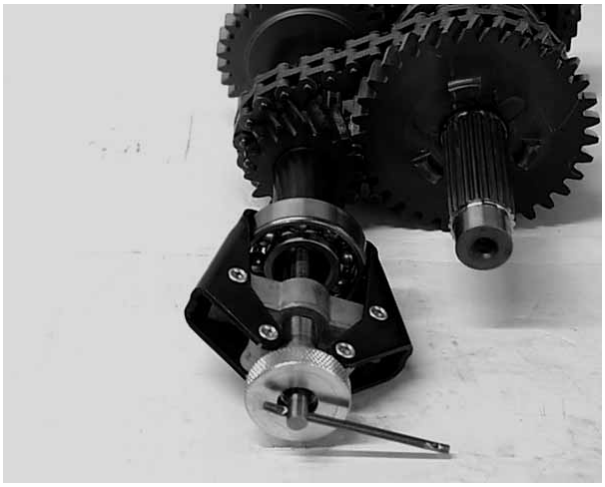


12. Remove the bearing from the reverse shaft using a puller.

13. Remove the park lock engagement dog. Remove the wave spring and reverse engagement dog.



14. Remove the bearing from the input shaft with a puller.



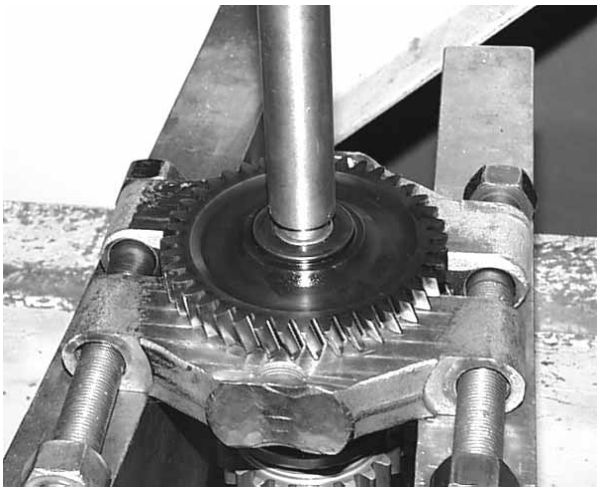
15. Remove the snap ring and washer from the reverse shaft.

16. Remove low gear (33T) and the needle bearing.

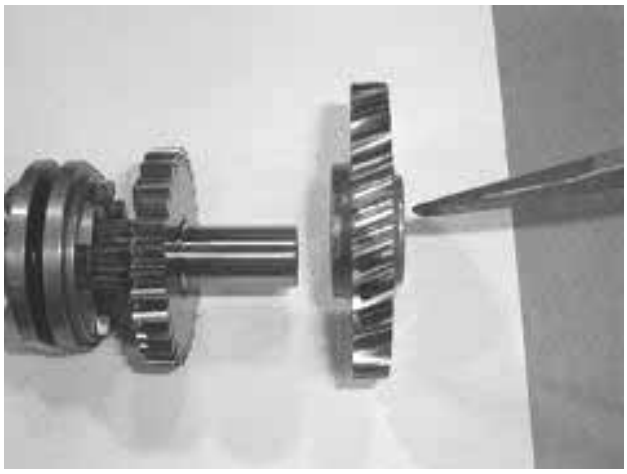
17. Remove the reverse gear shaft.

18. Remove the rest of the bearings from the shafts.

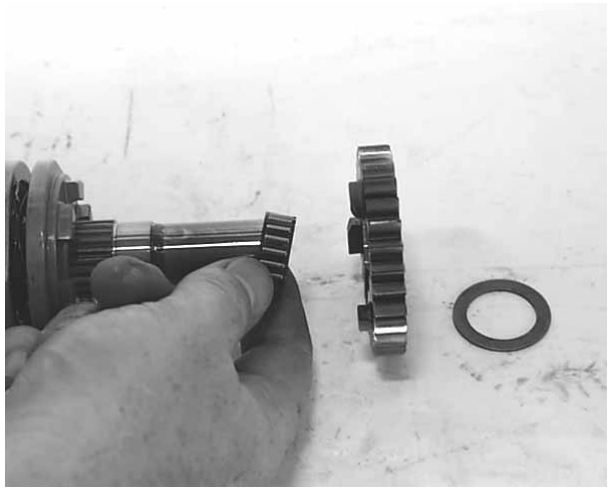
19. Use a press to remove the gear from the shaft.



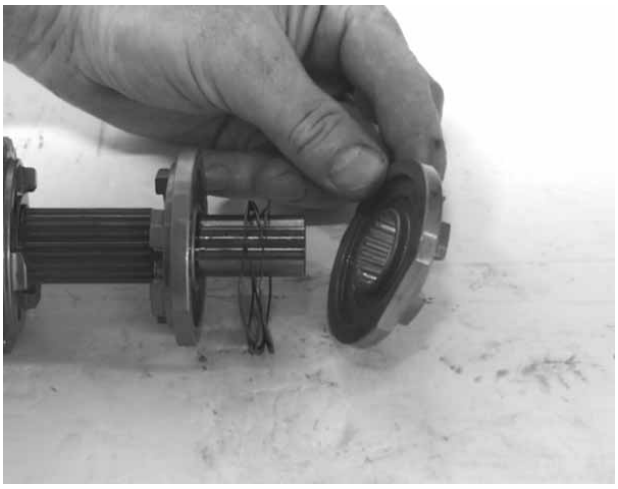
20. Make note of the direction of the gear and hub location.



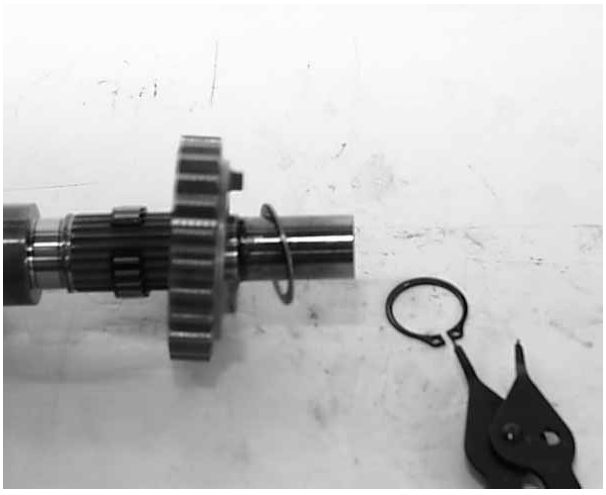
21. Remove the gear, split bearing, and washer from the reverse shaft.



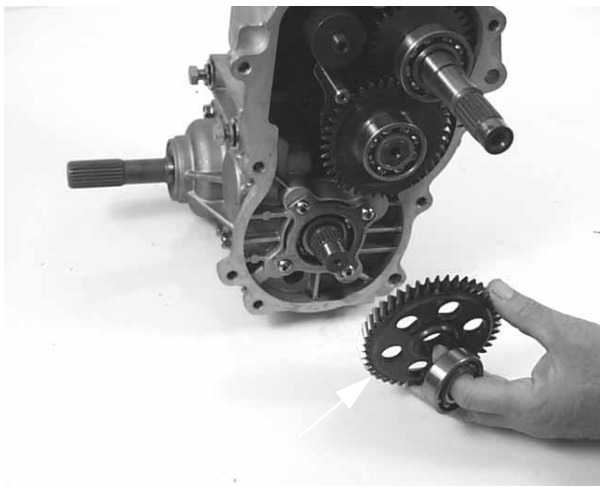
22. Slide off the shift dogs and wave springs.



23. Remove the snap ring, washer, gear, and split bearing.

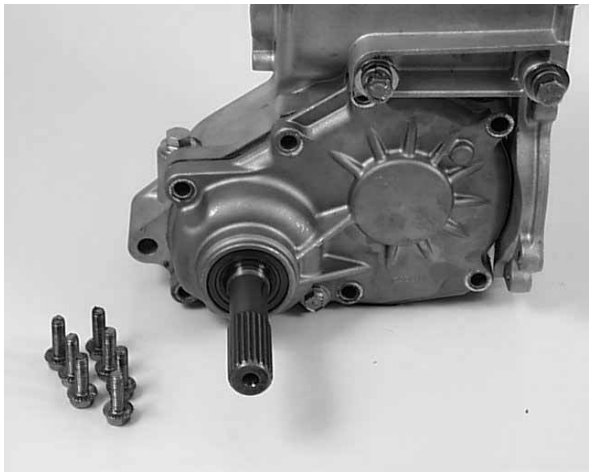


24. Remove bearing and the helical gear.

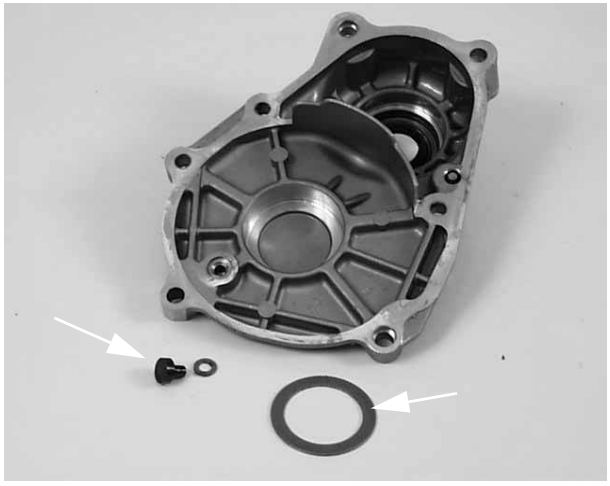


25. Remove the pinion shaft retainer plate and the pinion shaft.

26. Remove the front housing cover screws.



27. Remove the front housing cover, shim, thrust button, and thrust button shim.



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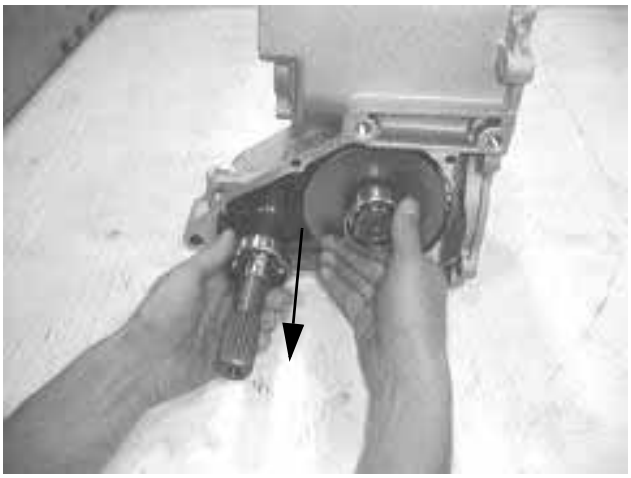
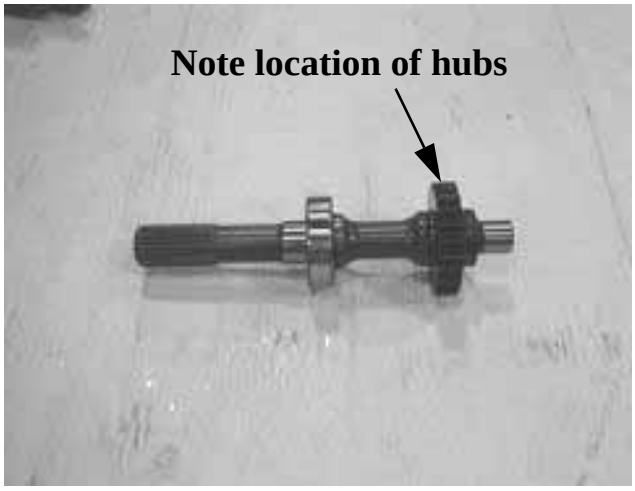
28. Remove the shafts as an assembly.



29. Remove the silent chain from the assembly for shaft inspection.



30. Clean all components in a parts washer and inspect for wear.
31. Inspect engagement dogs of gears and replace if edges are rounded.
32. Inspect gear teeth for wear, cracks, chips or broken teeth. Note the location of the hubs on the gear.
33. Remove seals from transmission case.

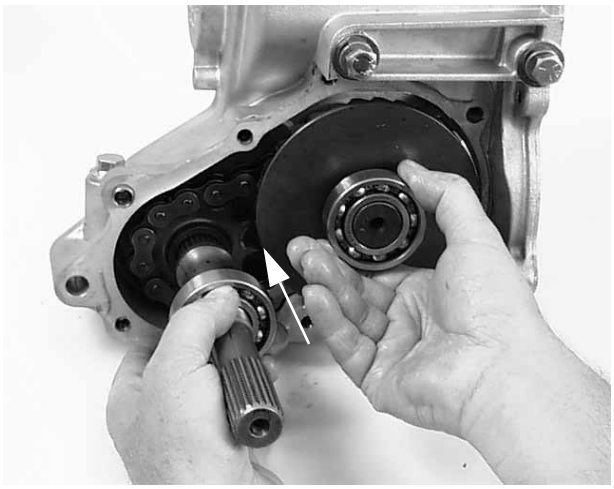
IMPORTANT: New seals should be installed after the transmission is completely assembled.

34. Inspect bearings for smooth operation. Check for excessive play between inner and outer race.

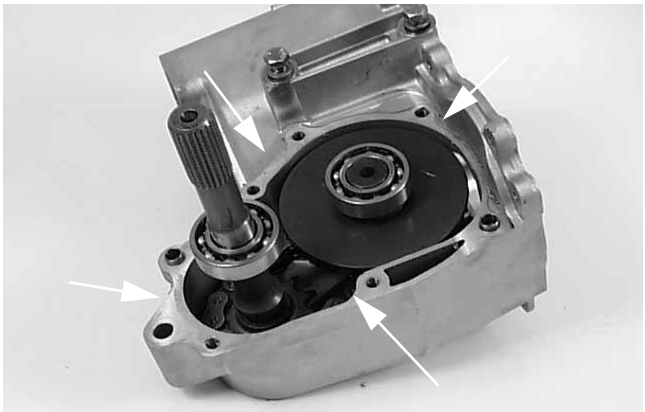
Assembly

1. Reinstall the chain onto the front output shaft and rear output shaft.

2. Install front and rear output shafts into the case.



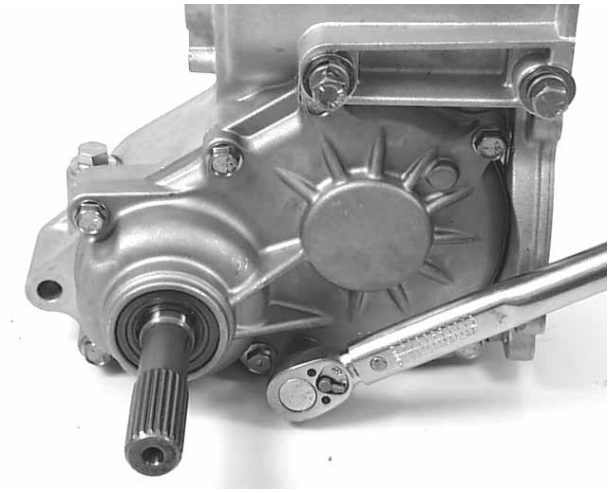
3. Before installing the cover make sure the sealing surfaces are clean and dry, and shafts are fully seated in the transmission case. Apply Crankcase Sealant **(PN 2871557)** to the mating surfaces.



Apply Crankcase Sealant to mating surfaces.

4. Reinstall the thrust button shim, thrust button, and other shims into the cover. Reinstall cover and torque bolts in a criss-cross pattern in 3 steps to specification.

NOTE: Verify case locating pins (knock pipes) are in place.



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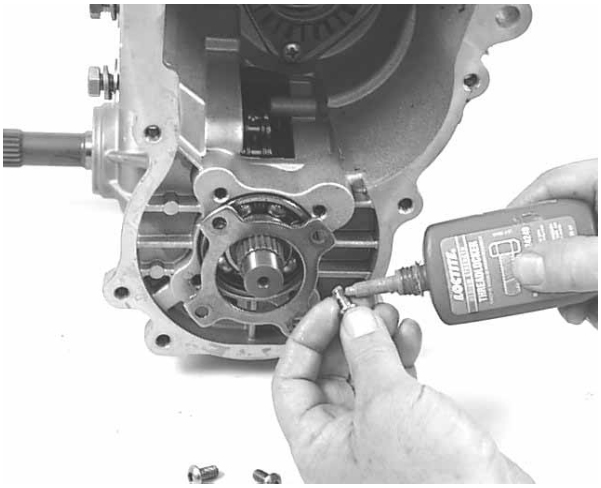
Cover Bolt Torque: **27-34 ft.lbs. (36.5-46 Nm)** Torque in Sequence

5. Install new front and rear output shaft seals. Apply grease to the seal lips. Cover the splines of the shaft to protect the seal lips during installation.
6. Install pinion shaft with bearing.
7. Install retainer plate with flat side toward bearing.
8. Apply Loctite™ 262 (Red) (**PN 2871951**) to screw threads and torque screws to specification.



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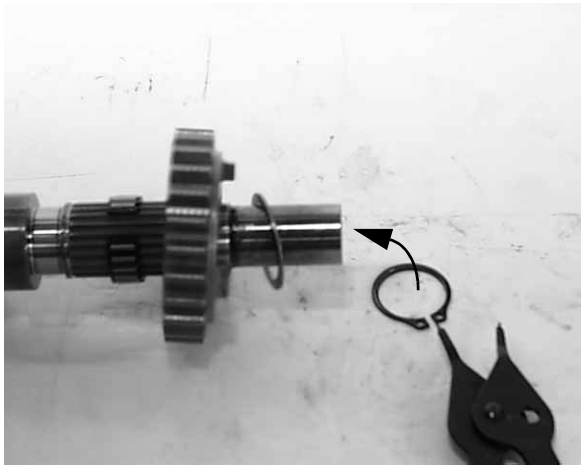
Pinion Retainer Plate Bolt Torque: **6-12 ft.lbs. (8-16 Nm)**

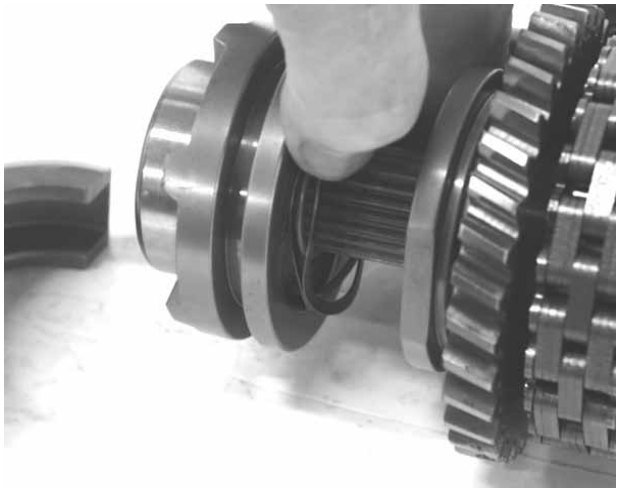
9. Install the a new needle bearing, the 24T reverse sprocket, washer, and a new snap ring. Install the shift dogs and wave spring. Install the washer, a new needle bearing and the high gear. Install the press fit gear and ball bearing.



NOTE: Install a new snap ring at this time. When installing the new snap ring, open the the snap ring just far enough to go over the shaft, to avoid stressing the snap ring. If the snap ring is over-stressed, it could come off the shaft and cause internal damage to the transmission.

10. Slide the reverse shaft assembly through the silent chain.

11. Install a new needle bearing, the low gear, the thrustwasher and the snap ring. A new snap ring is recommended.
12. Install the engagement dogs, wave springs, and bearing.



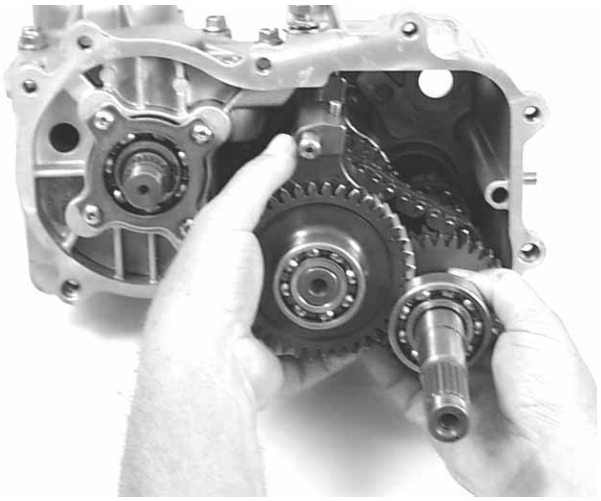
13. Install the ball bearing onto the end of the input shaft.

14. As the engagement dogs are installed onto the shaft, place the wave springs into the spring groove. Keep the spring in place while the fork is being installed on the shaft and while placing the shafts into the case.

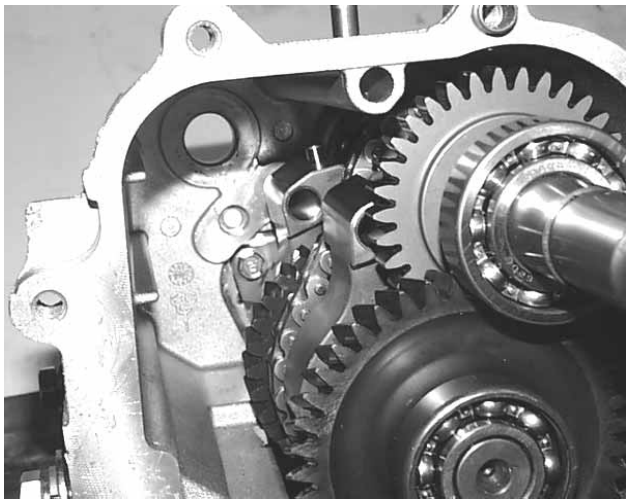
NOTE: Use caution when installing the fork, as the spring can easily fall out.

NOTE: Installing the shift rail will aid in keeping the shift forks, shift dogs, and the springs in place.

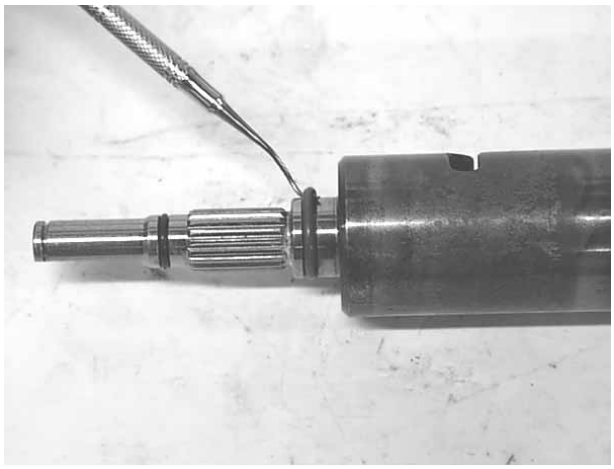
15. Carefully install the shaft assembly and gear cluster as a unit into their respective bearing case recesses. Tap with a soft face hammer to seat shaft assemblies.



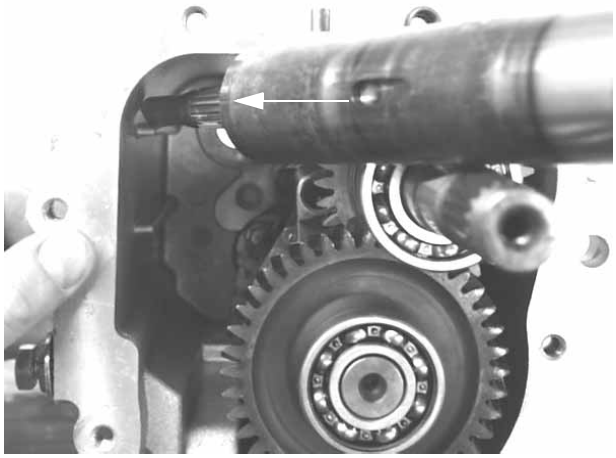
16. Position the shift forks up and so the the pins point toward the 9 o'clock position, before installing the shift drum assembly.



17. Replace and grease the O-rings on the shift drum before installation.

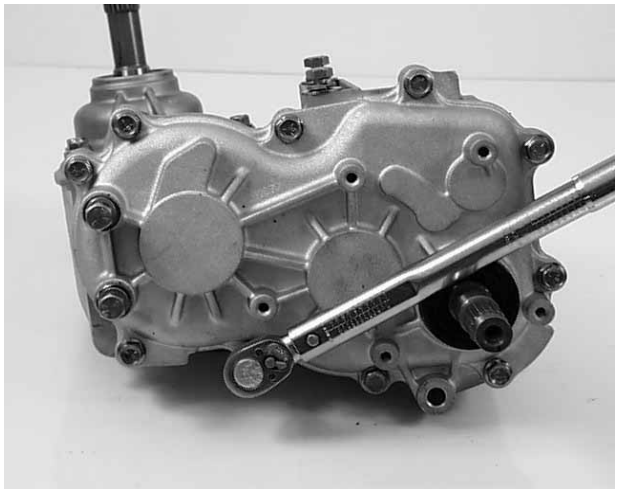


18. Install the shift drum into the case.



NOTE: Make sure shift shaft pins are properly positioned in the slot on selector arms.

19. Lift the shift rail slightly and rotate the rail/fork assembly so it meshes with the tracks on the shiftdrum. Be sure the wave springs are properly in place and that the shift rail is seated into the pocket on the backside of the case.
20. Install the helical gear and bearing onto the pinion shaft.
21. Clean the mating surfaces of the case and cover. Apply Crankcase Sealant (**PN 2871557**) to the mating surfaces. Be sure the locating pins (knock pipes) are in place. Reinstall cover, LH mounting bracket and torque bolts in a criss-cross pattern in 3 steps to specification.



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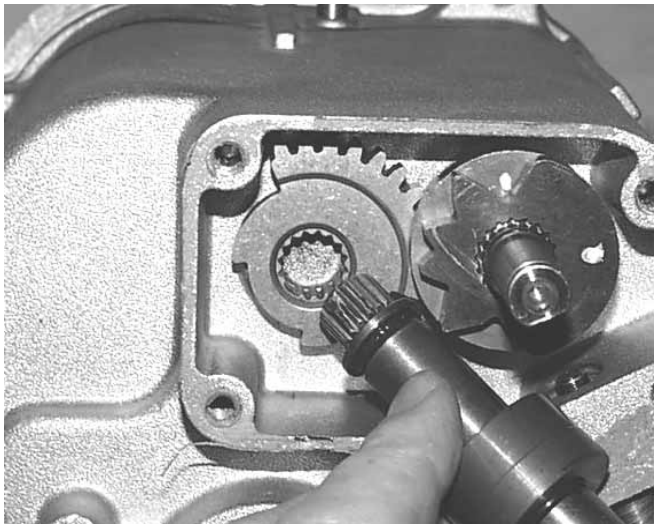
Cover Bolt Torque: **27-34 ft.lbs. (36.5-46 Nm)**

22. Grease the seal lips of the input shaft seal. Apply electricians tape or somehow cover the splines of the shaft to protect the seal lips during installation. Install new input shaft seal.
23. Install drain plug with a new sealing washer. Torque drain plug to specification.

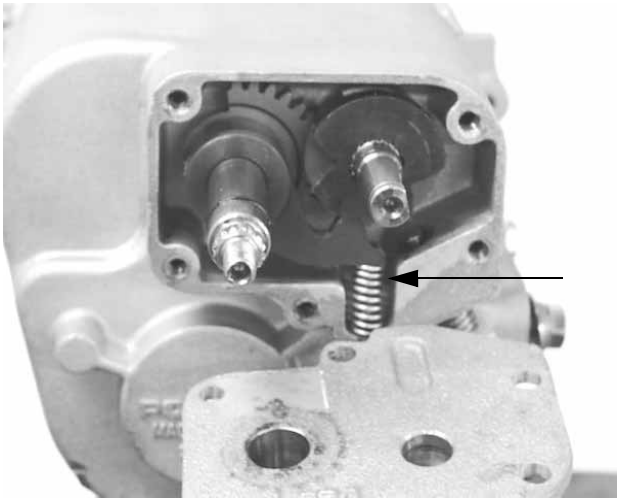
24. Place a small amount of grease (PN 2871551) into the pocket before installing the sector gear. Install the shift gear (16T) on the shift drum shaft. Install the sector gear in the bushing pocket on the left side. Aligning the timing marks on the gears.

NOTE: Note the location of the skip tooth on the splines. Apply a light coating of grease on the gear teeth.

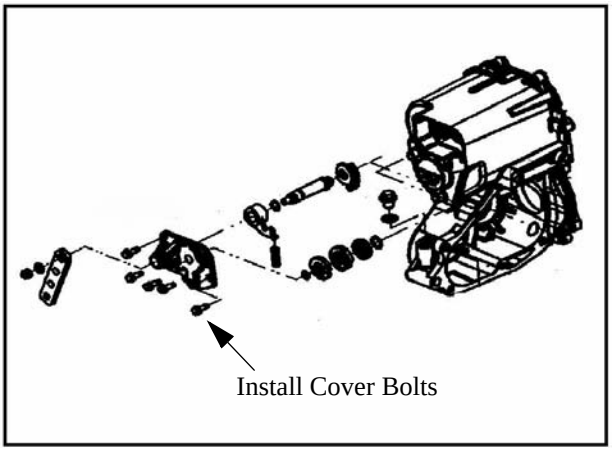
25. Install the shift shaft and the detent star. Note the keyed spline on the end of the shaft.



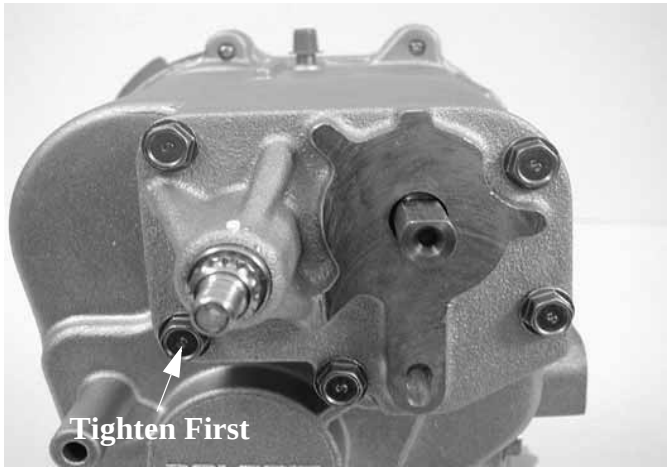
26. Install the detent pawl and spring. Install a new o-ring onto the shift shaft after the detent pawl is assembled to the shaft. Place a small amount of grease on the small o-ring on the shift shaft and on the detent star. Grease the o-ring on the end of the shift drum.



27. Apply Crankcase Sealant (**PN 2871557**) onto the cover and case mating surfaces. Install the cover and hand tighten all of the bolts.



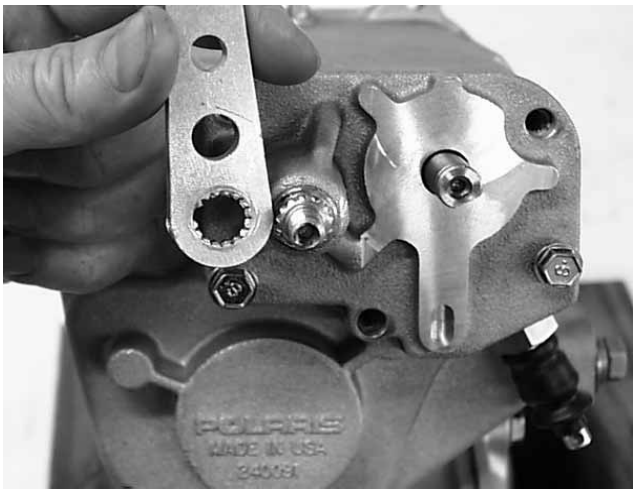
28. Tighten bottom left corner bolt first. This helps to align the cover and shafts to ensure smoother and precise shifting. Torque the bolt to specification.



29. Torque the remaining bolts to specification.

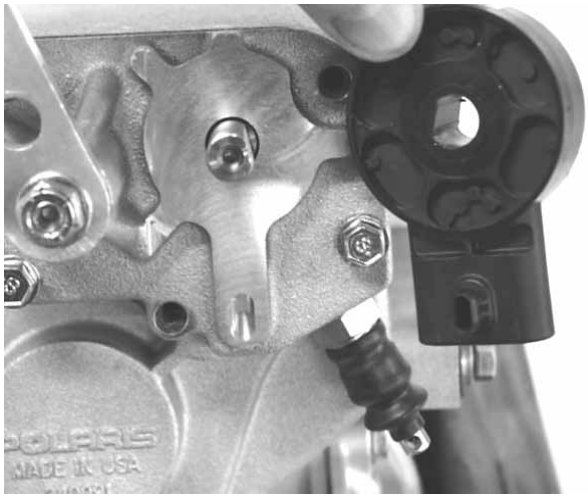
= T
Cover Bolt Torque: **6-12 ft.lbs. (12-16 Nm)**

30. Install a new bellcrank onto the shift shaft. Note the keyed spline on the bellcrank and shaft. Install the washer and nut. Torque the bellcrank nut to specification.



= T
Torque Bellcrank Nut: **12-18 ft.lbs. (16-24 Nm)**

31. Install the shift switch. Install the retaining clip. Hook up the switch harness and reconnect the lockout plunger spring.



NOTE: Rotate the bellcrank to line the flat side of the switch up to the flat side of the shaft.

32. Install transmission and add Polaris AGL Gearcase Lubricant (**PN 2873602**) in the recommended amount. Refer to Maintenance Chapter 2 for more information.

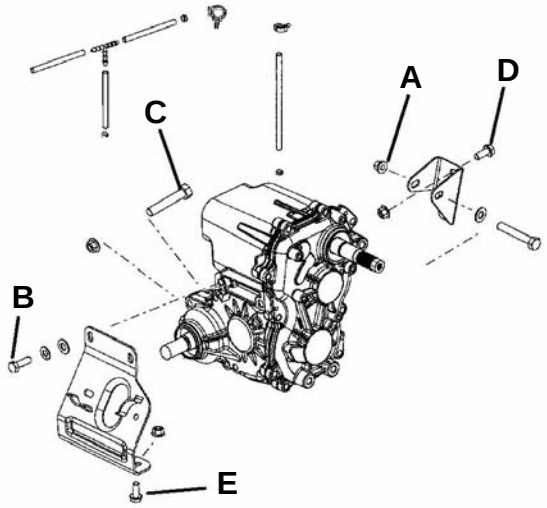
Transmission Installation

1. Install transmission from right side of vehicle.
2. Align output shafts to propshaft yokes and roll pin holes.
3. Slide output shafts into propshaft yokes and insert roll pins.
4. Position transmission in frame.
5. Loosely install left side and rear mounting brackets.
6. Loosely install lower right bracket bolt.
7. Loosely install front mounting bolts.
8. Install PVT back cover, bolts and driven clutch and torque to specfication.

IMPORTANT: Align clutches as outlined in Chapter 6

9. Tighten mounting fasteners in order A-F as shown.

Tighten Bolts in Sequence



= T
Transmission Mounting Bolt Torque: **25 ft.lbs. (34.5 Nm)**

10. Tighten rear gearcase fasteners to specification.
11. Install shift switch and shift rod.
12. Install remaining body panels and fasteners as required.

Troubleshooting

Check the following items when shifting difficulty is encountered.

- Idle speed adjustment
- PVT alignment
- Transmission oil type/quality
- Transmission torque stop adjustment (where applicable)
- Engine torque stop adjustment (where applicable)
- Drive belt deflection
- Loose fasteners on rod ends
- Loose fasteners on selector box
- Worn rod ends, clevis pins, or pivot arm bushings
- Linkage rod adjustment and rod end positioning
- Shift selector rail travel
- *Worn, broken or damaged internal transmission components

NOTE: To determine if shifting difficulty or problem is caused by an internal transmission problem, isolate the transmission by disconnecting linkage rod from transmission bellcrank. Manually select each gear range at the transmission bellcrank, and test ride vehicle. If it functions properly, the problem is outside the transmission. If transmission problem remains, disassemble transmission and inspect all gear dogs for wear (rounding), damage. Inspect all bearings, circlips, thrust washers and shafts for wear.

CHAPTER 8

Sportsman X2 Transmission

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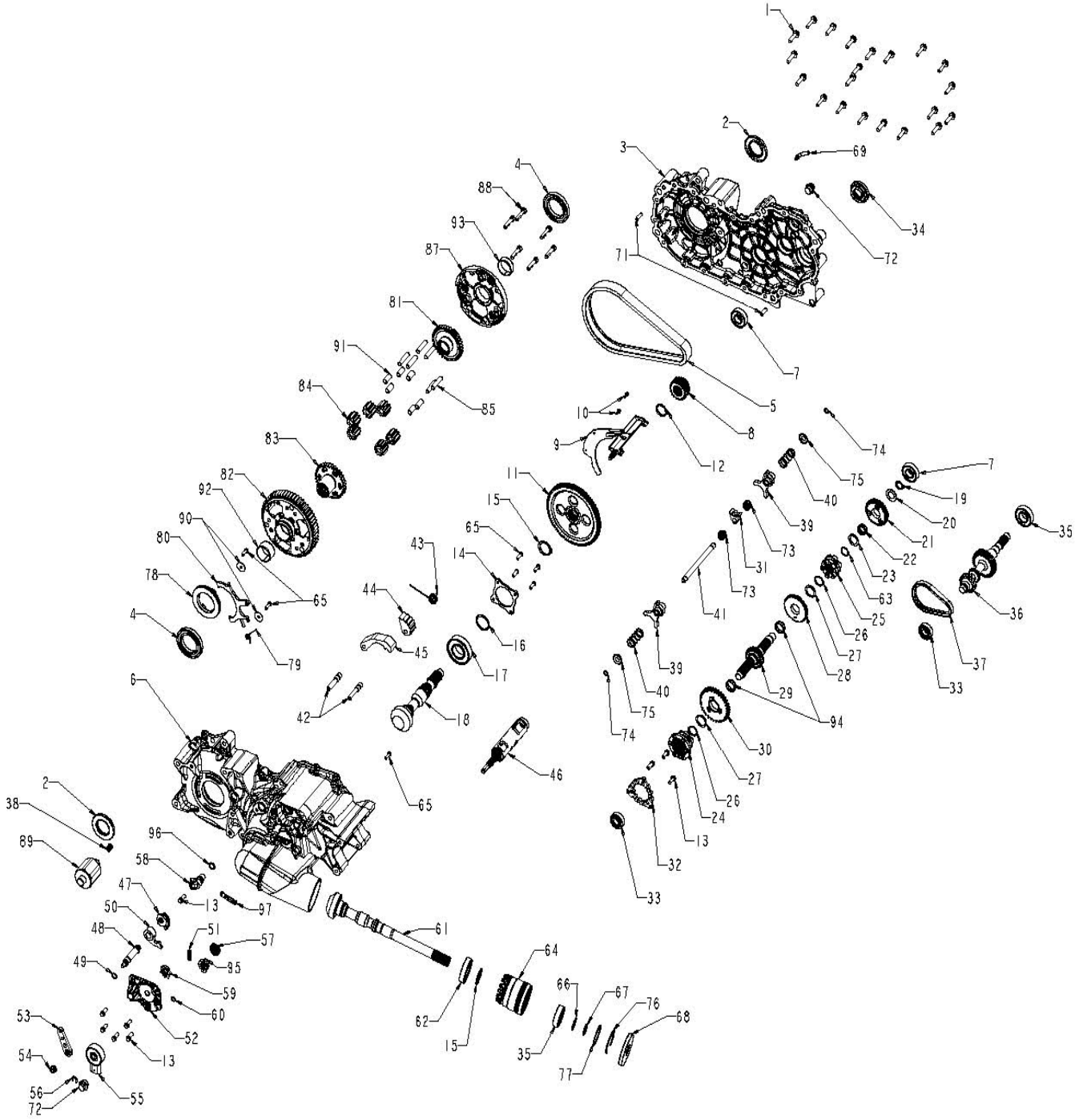
TRANSMISSION EXPLODED VIEWS

X2 Transmission Exploded View

262 = THREAD LOCKING AGENT FOR ALL 'FT. LBS.' FASTENERS

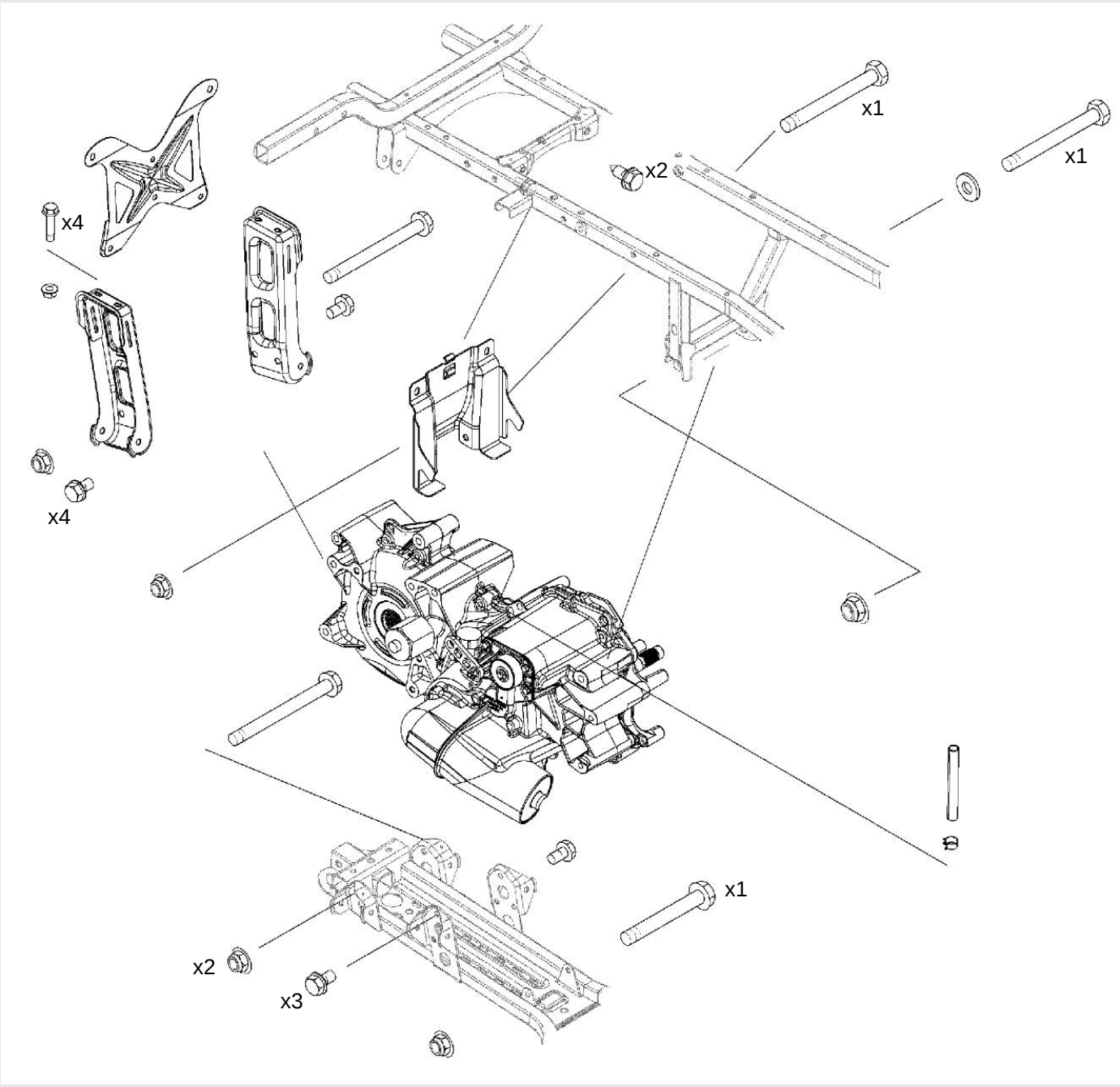
242 = THREAD LOCKING AGENT FOR 'INCH LBS. ' FASTENERS



NO	QTY	DESCRIPTION
1	21	SCREW, TAPPING, HEX WASHER HD
	262	TORQUE 22-27 FT-LBS
2	2	SEAL, TRIPLE LIP 40 X 70 X 7
3	1	COVER, LH MACH
4	2	BEARING, BALL 6010 C3 50 X 80 X 10
5	1	CHAIN, SILENT, 17 WIDE X 1.0 X 86p
6	1	CASE, RH MACH
7	2	BEARING, BALL 6204 C3 20 X 47 X 14
8	1	SPROCKET 19T
9	1	DEFLECTOR, OIL
10	2	SCREW, TAPPING TORX, 8-32 X .50
	242	TORQUE 20-30 IN LBS
11	1	GEAR OUTPUT 91T
12	1	RTNG RING, RR 7200-118
13	9	SCREW, TAPPING HEX 1/4-20 UNC X .75
	262	TORQUE 8-12 FT-LBS
14	1	COVER, BEARING, CENTER DRIVE
15	2	RING, RETAINING
16	1	SHIM 1.700 X 1.385
17	1	BEARING, BALL 6207
18	1	PINION, 13T CENTER DRIVE
19	1	RING, RETAINING SHR-75
20	1	WASHER THRUST, 1.270 X .793 X .065
21		
22	1	BEARING, NEEDLE SPLIT CAGE 22 X 26 X 10
23	1	WASHER, 1.250 X .876 X .050
24	1	DOG, L/P
25	1	ENGAGEMENT DOG, 6-FACE
26	2	RING, RETAINING BASIC EXT .938
27	2	WASHER, THRUST 1.300 X .995 X .065
28	1	SPROCKET, 38T 6-FACE
29	1	SHAFT, REVERSE 26T
30	1	GEAR, 33T 6-FACE
31	1	COLLAR, SHIFT
32	1	PLATE, PARK 12-FACE
33	2	BEARING, BALL 6203 17 X 40 X 12
34	1	SEAL, DUAL LIP 25 X 47
35	2	BEARING, BALL 6205 C3 25 X 52 X 15
36		
37	1	SILENT CHAIN, .25P X .40 W X 50L
38	1	SPRING, COMPRESSION
39	2	FORK, SHIFT
40	2	COMPRESSION, SPRING .92 O.D X 2.000
41	1	RAIL, SHIFT SHAFT
42	2	PIN
43	1	TORSION SPRING
44	1	CAM, CHAIN TENSIONER
45	1	SHOE, CHAIN TENSIONER
46	1	DRUM, SHIFT
47	1	GEAR, SECTOR 31T
48	1	SHAFT, SHIFT
49	1	O-RING, -014
50	1	PAWL, DETENT
51	1	SPRING, COMPRESSION
52	1	COVER, SECTOR GEAR MACH
53	1	BELLCRANK, SHIFT DRUM
54	1	NUT, LOCK, HEX FLANGE NYLON 5/16-24
	262	TORQUE 12-18 FT LBS

NO	QTY	DESCRIPTION
21	1	GEAR, SPUR 36T, DP16, PA14.5, HA27 RIGHT
36	1	SHAFT, INPUT 37T, DP16, PA14.5, HA27 LEFT
97	1	LABEL, TRANS, PDS 500 EFI
21	1	GEAR, SPUR 36T, DP16, PA14.5, HA28 RIGHT
36	1	SHAFT, INPUT 35T, DP16, PA14.5, HA28 LEFT
97	1	LABEL, TRANS, PDS 400 EFI
21	1	GEAR, SPUR 32T, DP16, PA14.5, HA21 RIGHT
36	1	SHAFT, INPUT 42T, DP16, PA14.5, HA21 LEFT
55	1	SWITCH, ROTARY 6-PIN ITW
56	1	RING, RETAINING, BASIC EXT.
57	1	GEAR, SECTOR 16T
58	1	SENSOR, SPEED
59	1	STAR, DETENT
60	1	O-RING, -012
61	1	GEAR, 13T SNORKEL
62	1	BEARING, BALL 6007 C3 35 X 62 X 14
63	1	RING, RETAINING BASIC EXT Ø22.0
64	1	TUBE, SNORKEL MACH
65	7	SCREW, TORX PAN HD 1/4-20 X .75
	262	TORQUE 8-12 FT-LBS
66	1	SHIM 1.180 X .995
67	1	RING, RETAINING
68	1	SEAL, TRIPLE LIP, 25 X 80 X 10
69	1	TUBE, VENT 90° 1/4" LINE
70	1	CAP, VENT PLUG, 5/16
71	2	PIN, DOWEL 5/16 X 1.0
72	2	PLUG, HEX FLANGE 3/4-16
		TORQUE 20-25 FT-LBS
73	2	COMPRESSION, SPRING
74	2	RETAINING, RING
75	2	WASHER, CUP
76	1	RING, RETAINING
77	1	SHIM, 2.040 X 1.63
78	1	DOG, ENGAGEMENT
79	1	TORSION SPRING
80	1	FORK, SHIFT
81	1	SIDE, GEAR 36T, SUBASSEMBLY
82	1	SPROCKET, CARRIER 59T
83	1	SIDE, GEAR 36T DISCONNECT, SUBASSEMBLY
84	6	SHAFT, PLANET
85	6	PIN, DOWEL 10 X 45
86		
87	1	COVER, CARRIER
88	6	SCREW, CAP HH 5/16-24 X 1.50
	262	TORQUE 23-27 FT-LBS
89	1	SOLENOID
		TORQUE 23-27 FT-LBS
90	2	WASHER, FENDER .256 X 1.00 X .047
91	6	BEARING , PLAIN
92	1	PLAIN, BEARING 40 X 44 X 25
93	1	BEARING, PLAIN, 40 X 44 X 15
94	2	BEARING, NEEDLE 25 X 29 X 10
95	1	DISC, LOCKOUT
96	1	O-RING, -113

X2 Mounting Exploded View



SPECIFICATIONS

Torque Specifications

COMPONENT	FT. LBS. (IN.LBS.)	NM
Transmission Case Bolts	25-30	36-43
Bell Crank Nut	12-18	17-26
Transmission Fill/Drain Plug	20-25	29-36
Trans. Mounting Bolts	40	57
Gear Sector Cover	8-12	11-17
Oil Deflector Screws	(20-30)	2-3.6
Snorkel Torx Screw	8-12	11-17
Bearing Cover	8-12	11-17
Carrier Cover	23-27	33-39
Shift Fort Retainer Screws	8-12	11-17
Park Plate	8-12	11-17
Differential Solenoid	23-27	33-39
Speed Sensor	8-12	11-17

Special Tools

PART NUMBER	TOOL DESCRIPTION
2871695 (Part of **2871702** Kit)	Backlash Setting Tool
2871698 (Part of **2871702** Kit)	Rear Output Seal Driver
2871699 (Part of **2871702** Kit)	Rear Driveshaft Seal Guide
2871282	Bearing Seal Driver (50 mm)

Lubrication

=
Specified Lubricant **Polaris AGL Fluid** Gearcase Capacity **Approx. 32 oz. (948ml)**

Refer to Chapter 2 for transmission lubricant service.

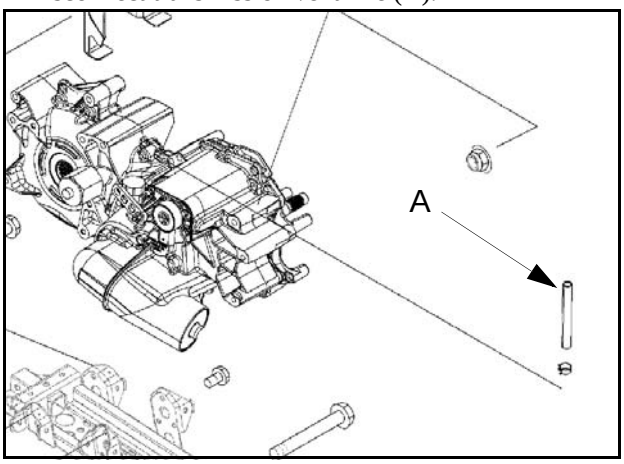
TRANSMISSION SERVICE

Gear Selector Removal

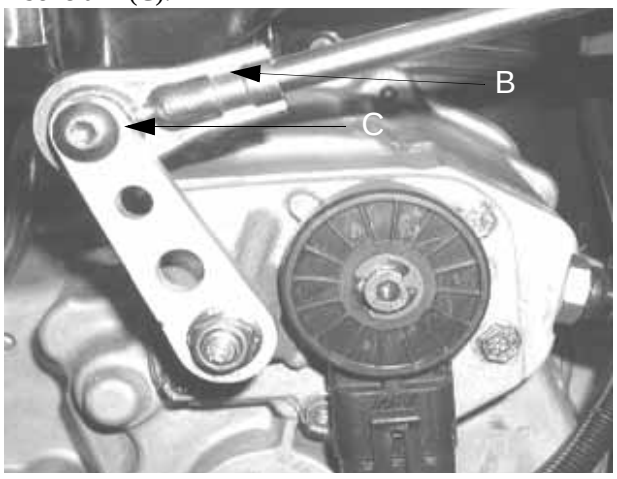
1. Disconnect linkage rod from gear selector handle.
2. Remove two bolts attaching gear selector mount to machine frame.
3. Lift gear selector out of mounting bracket and away from frame.

Transmission Removal

1. Place vehicle in “park”. Raise and securely support rear of ATV at the frame. Remove both rear wheels.
2. Drain transmission lubricant (if required).
3. Remove seat, both side panels, both rear cab quarter panels and both footwells. See Chapter 5.
4. Disconnect the differential, speed sensor and gear selection switch connectors from the transmission.
5. Disconnect transmission vent line (A).

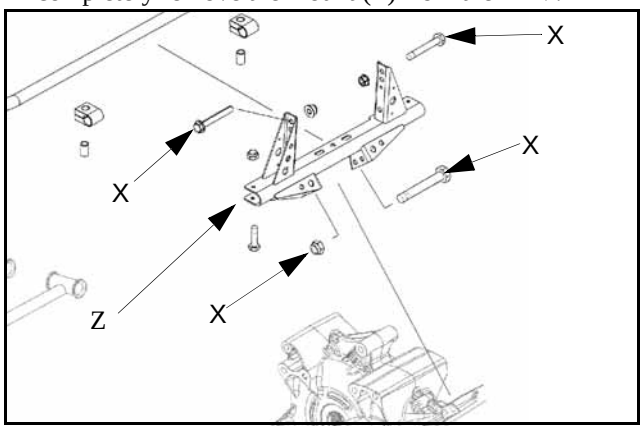


6. Disconnect shift linkage rod end (B) from transmission bellcrank (C).

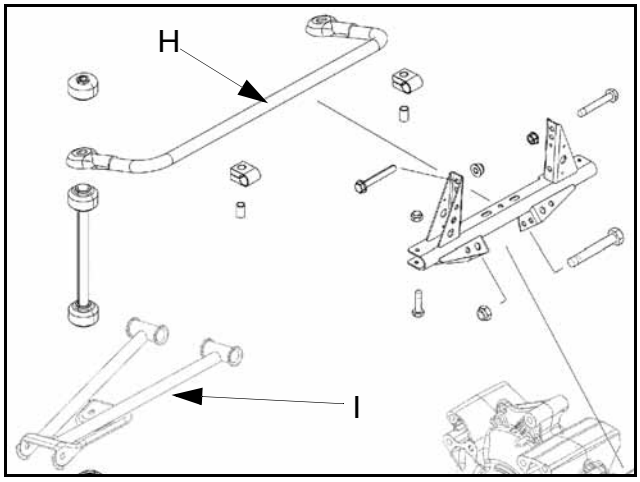


7. Remove PVT outer cover, drive and driven clutches, and the inner PVT cover. (refer to Chapter 6).

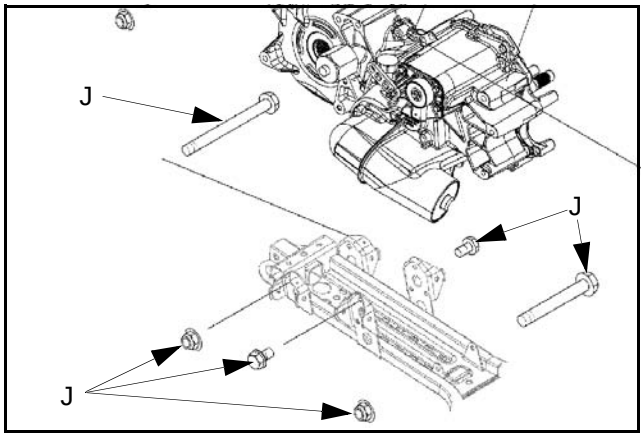
8. Remove both rear drive shafts. Brake caliper removal is required. Do not let calipers hang by the brake line. (See Chapters 7 and 9)
9. Remove both upper shock absorber mounting bolts and swing shocks away from the transmission.
10. Remove the torsion bar mountings from the control arms.
11. Remove all fasteners (X) attaching the torsion mount, and completely remove the mount (Z) from the ATV.



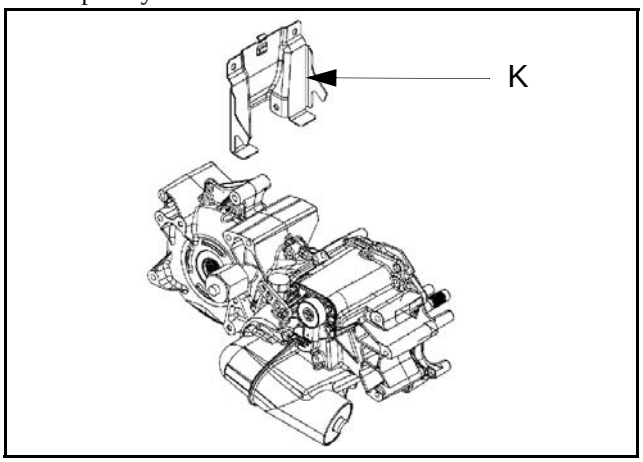
12. Remove both upper control arms (I). Refer to Chapter 7 for more details.



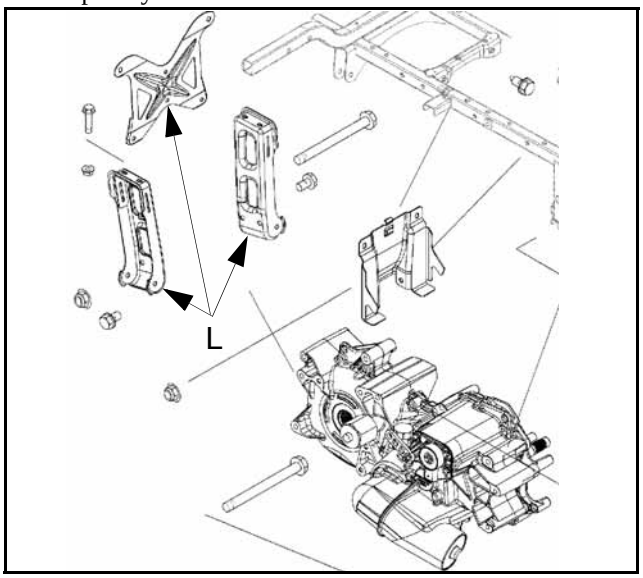
13. Remove all lower transmission mounting fasteners (J) from each side.



14. Remove the middle transmission support bracket (K) completely from the ATV.



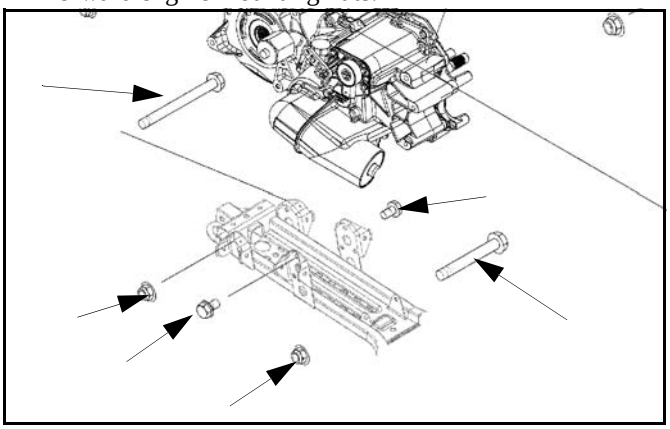
15. Remove the rear transmission support brackets (L) completely from the ATV.



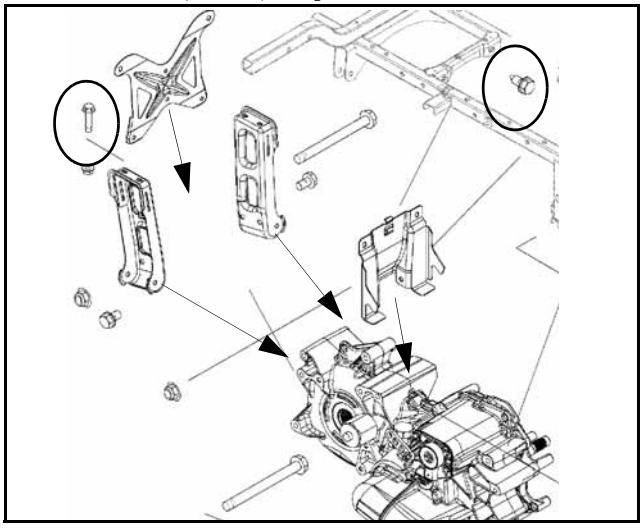
16. Lift and remove transmission out right side of frame while pulling the output shaft from the propshaft yoke.

Transmission Installation

1. Apply Polaris Premium All Season Grease (PN 2871423) to splines of front output shaft ,install new O–ring in prop shaft.
2. *With the help of an assistant*, rotate transmission into place from the right side of the frame, aligning the forward transmission bracket into the rear engine mounting holes while ensuring that the output shaft and propshaft align and slide together.
3. Loosely install lower transmission mounting fasteners and forward engine mounting nuts.



4. Install the rear support bracket, middle support bracket and torsion bar support bracket. Torque all lower bracket bolts to specification. Torque all upper rear and middle support bracket bolts (circled) to specification.



= T
Transmission Bracket Bolt Torque: Lower - **40 ft.lbs. (57Nm)** Upper Rear / Middle Bolts - **17 ft.lbs. (24 Nm)**

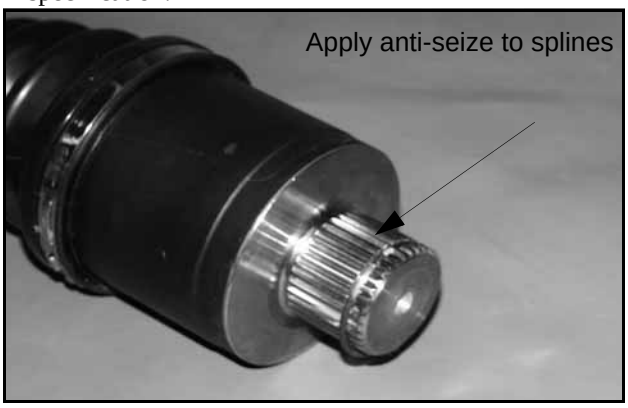
5. Install the upper control arms. Refer to Chapter 5 for procedures and torque specifications.
6. Reconnect the torsion bar to both lower control arms. Torque to specification.

= T
Lower Torsion Bar Bolt Torque: **17 ft.lbs. (24 Nm)**

7. Install both upper shock absorber mounts and torque to specification.

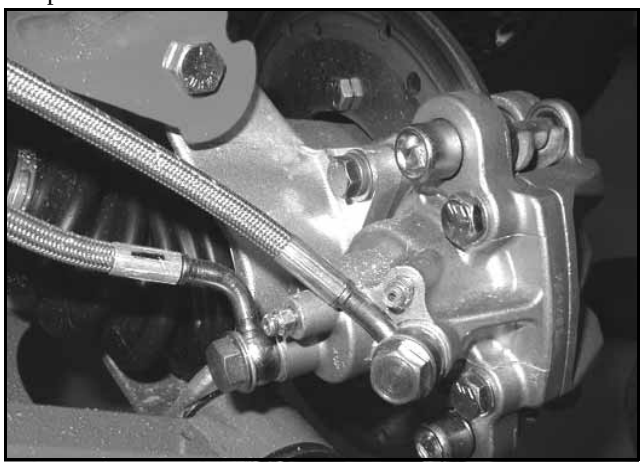
= T
Shock Bolt Torque: **30 ft.lbs. (43 Nm)**

8. Apply anti-seize to splines of rear drive shafts and insert drive shafts into carriers and transmission. Install rear carriers and hubs.
   Torque lower carrier bolts to specification. Torque all other control arm bolts and remaining carrier bolts to specification.



= T
Upper Carrier Bolt Torque: **50 ft.lbs. (71 Nm)** All Other Carrier Bolts: **35 ft.lbs. (50 Nm)**

9. Install the rear hubs, rear brake disc and brake caliper. Refer to Chapters 5 and 9 for procedures and torque specifications.



10. Install PVT system. Refer to Chapter 6 PVT section for procedures and torque specifications.
11. Once the PVT system is installed. Tighten all remaining transmission mounting bolts to specification. See page 8.2 for transmission bolt placement.

= T
Transmission Mount Bolt Torque: **40 ft.lbs. (57Nm)**

12. Install transmission vent line. Be sure vent line is not kinked or pinched.
13. Install seat, both side panels, both rear cab quarter panels and both footwells. See Chapter 5.
14. Reconnect the differential, speed sensor and gear selection switch connectors to the transmission.
15. Reconnect the shift rod. Torque to standard specification.
16. Install the rear wheel nuts and torque to specification.

Rear Wheel Nut Torque **Refer to Chapter 2**

17. With the ATV on level ground, add Polaris AGL Gearcase Lubricant to the proper level. See Chapter 2 for proper fill procedures and Torque Specifications.

Polaris AGL Gearcase Lubricant **(PN 2873602) (12 oz.)** **(PN 2873603) (Gallon)**

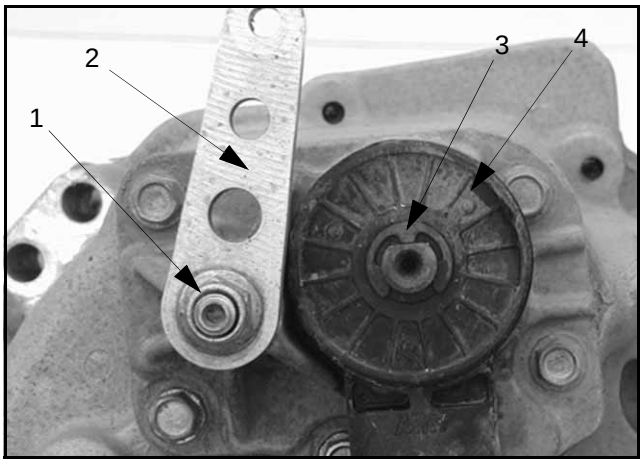
Troubleshooting Checklist

Check the following items when shifting difficulty is encountered.

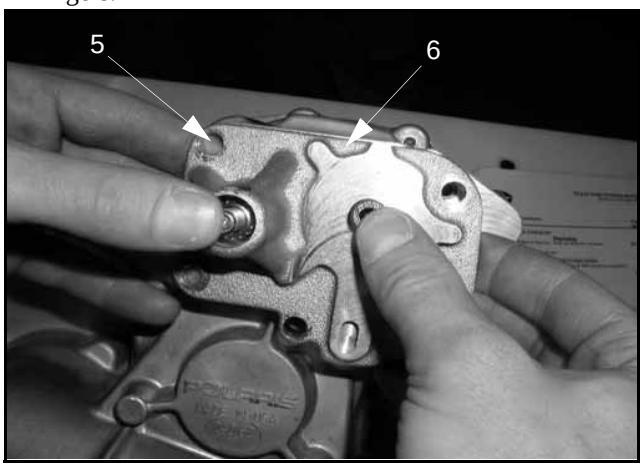
- Idle speed adjustment
- Transmission oil type/quality
- Drive belt deflection
- *Worn, broken or damaged internal transmission components

Transmission Disassembly

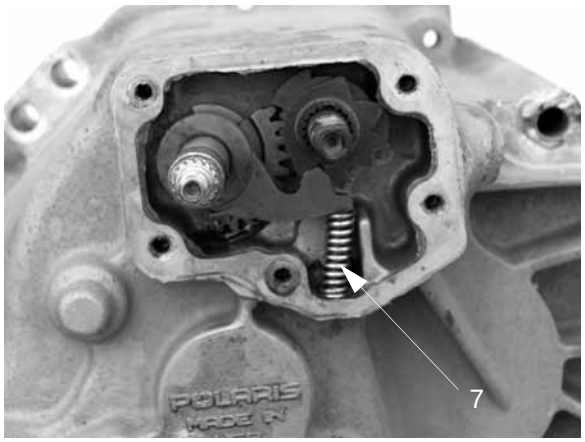
1. Place the transmission in the Neutral gear before disassembly.
2. Drain and properly dispose of transmission oil. See Chapter 2.
3. Remove the bellcrank nut (1) and remove the bellcrank (2).
4. Remove the c-clip (3) that holds the gear selector switch (4) onto the shaft and remove the selector switch.



5. Remove the sector cover bolts (5) and remove the sector cover (6). Removal can be aided by using your thumbs to press down on the shafts and pulling up the cover with your fingers.

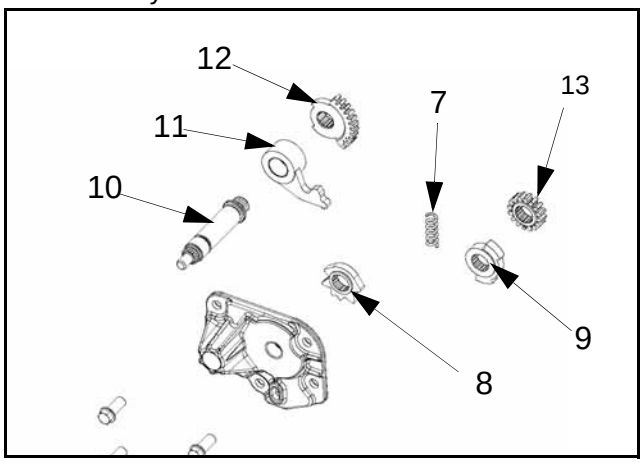


6. Remove the compression spring (7).

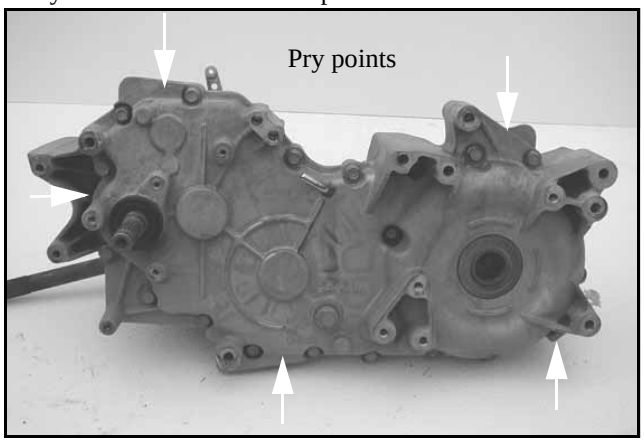


7. Remove the detent star (8). Note how the detent star fits onto the splined shaft and the raised edge facing outward for reassembly.
8. Remove the lockout disc (9). Note the raised edge facing outward for reassembly.
9. Remove the shift shaft (10) and the shift gears (11,12).

NOTE: Note the timing marks on the shift gears (12,13) for reassembly.

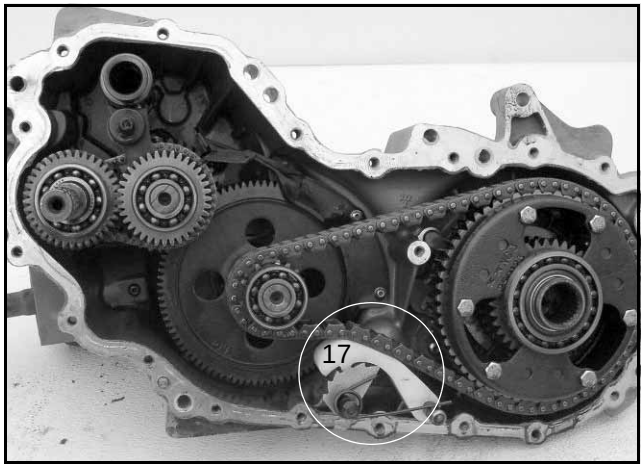


10. Remove all cover bolts. Using suitable pry tools, remove the cover using the designated pry points. Tap cover with soft face hammer to remove. The pry points are indicated by the white arrows in the photo below.



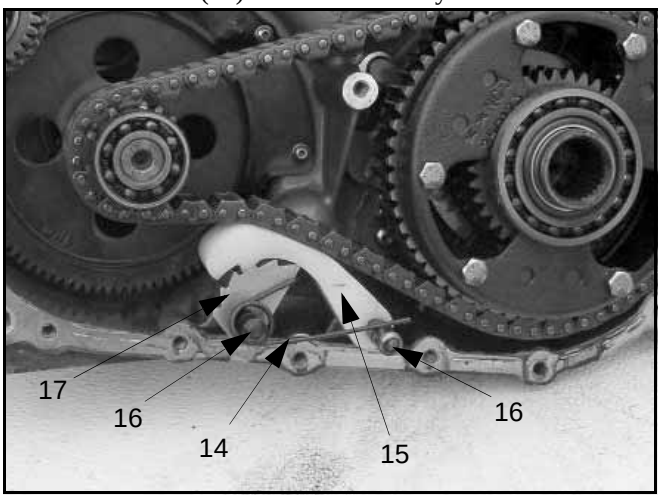
⚠ CAUTION

Do not pry on case-halve sealing surfaces. Use only the designated pry points on the transmission.

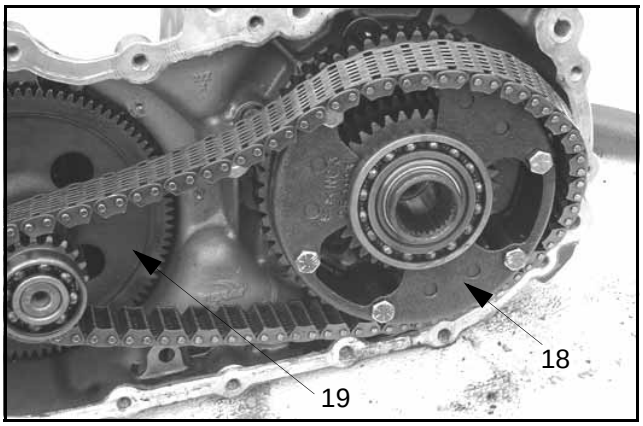


11. Note location of chain tensioner cam (17). If fully extended, chain is worn beyond service limit. Replace chain and chain tensioner shoe.

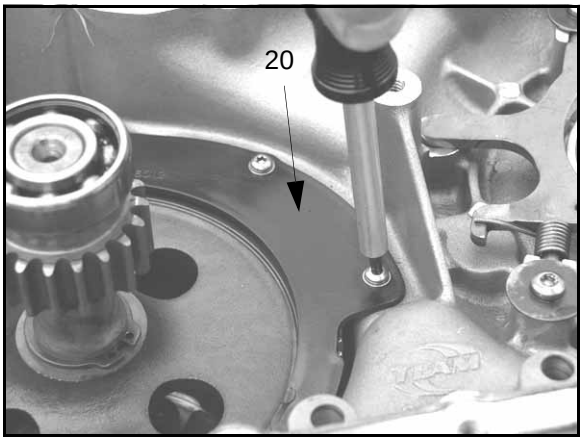
12. Remove the cam chain tensioner spring (14). Slide the cam chain tensioner shoe (15), pins (16), and cam chain tensioner cam (17) from the assembly.



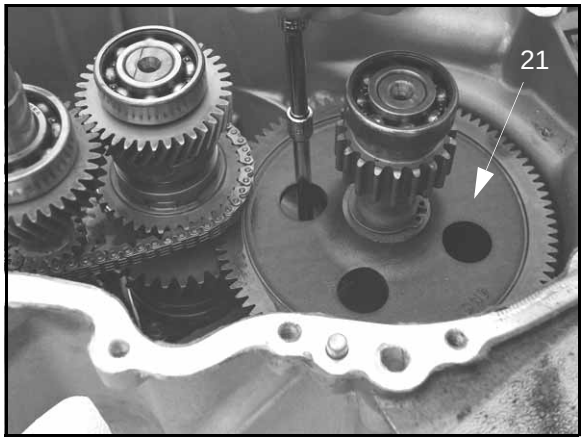
13. Remove the differential gear (18) and chain by gently prying underneath or tapping the differential gear from the opposite side until it tips toward the output gear (19). The differential gear is connected to the shift fork and must slide backwards to clear the fork arms once the chain is removed.



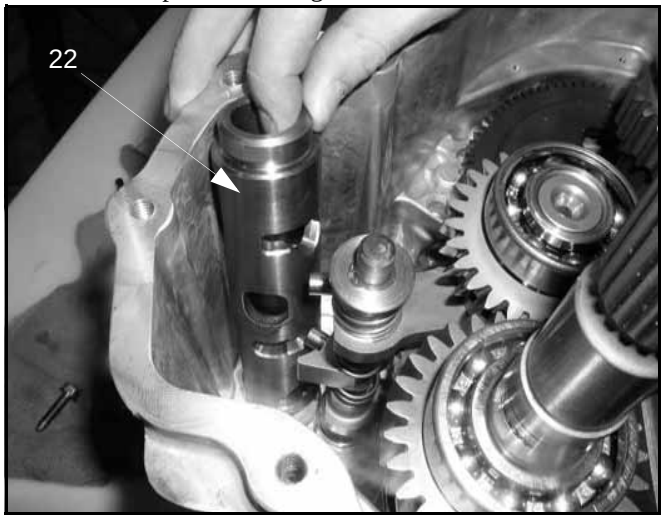
14. Remove the T20 screws that secure the oil deflector (20) with a T20 hex socket or driver.



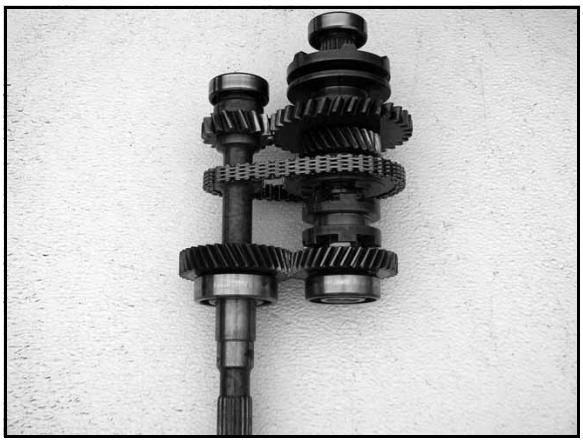
15. Remove the T27 screws that secure the output gear (21) with a T27 hex socket or driver.



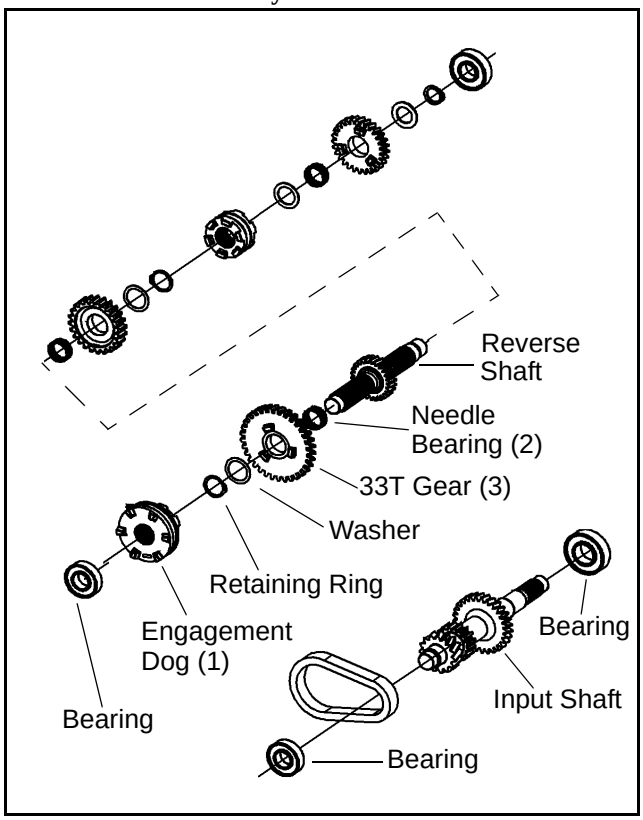
16. Remove the shift drum (22) from the gearcase by moving the drum up and to the right to clear the shift shaft.



17. Remove the output gear (21) and gear cluster assembly from the gearcase by pulling both assemblies straight up. Place the gear cluster assembly on a clean surface for inspection.

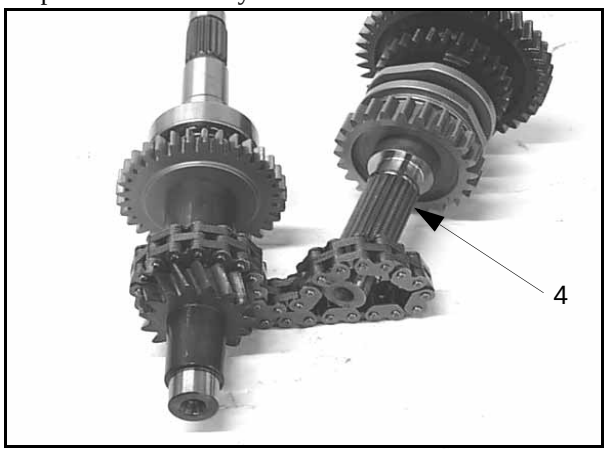


Gear Cluster Disassembly



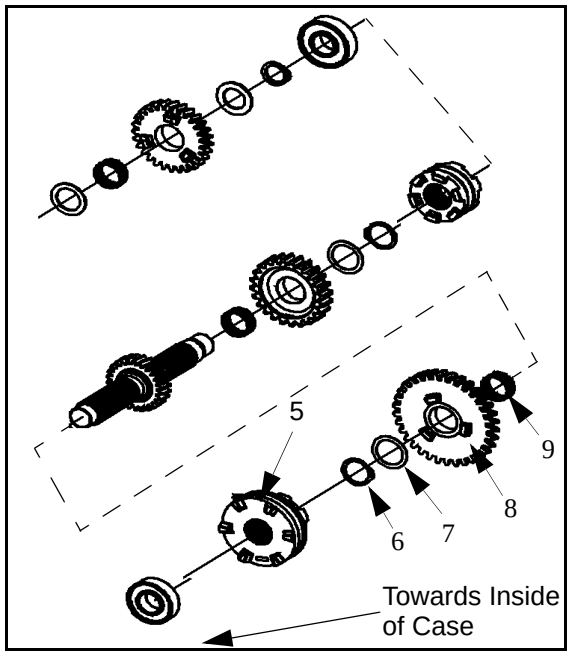
18. Remove the bearing from the reverse shaft using a bearing puller. Slide the engagement dog (1) off of the reverse shaft.
19. Remove the retaining ring and washer from the reverse shaft.
20. Remove the bearing from the input shaft using a bearing puller.
21. Remove the 33T gear (3) and needle bearing (2) from the reverse shaft.

22. The reverse shaft should slide out of the silent chain (4) to separate the assembly.



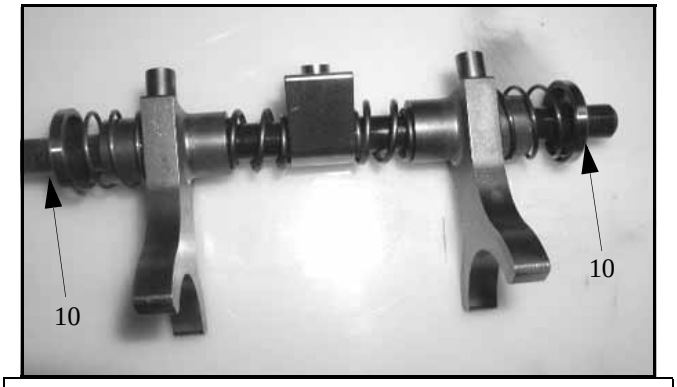
23. Remove the rest of the bearings from the shafts.
24. Remove the engagement dog (5) from the reverse shaft.

REVERSE SHAFT



25. Remove the retaining ring (6) and then washer (7), gear (8), and split bearing (9) from the reverse shaft.

26. To disassemble the shift fork rail remove the snap ring (10) from the end of the shift rail on either side.

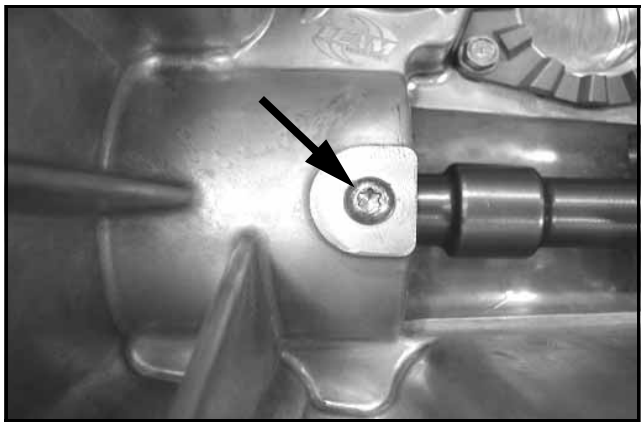


⚠ CAUTION

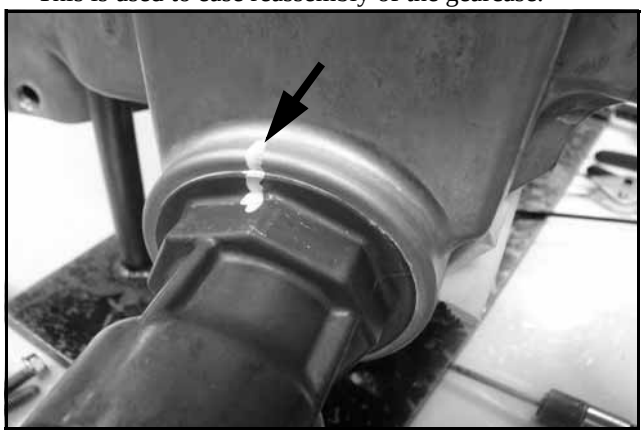
Use caution when disassembling the shift rail. The compressed springs on the shift rail may pop off causing eye or face injury.

Transmission Snorkel Shaft Removal

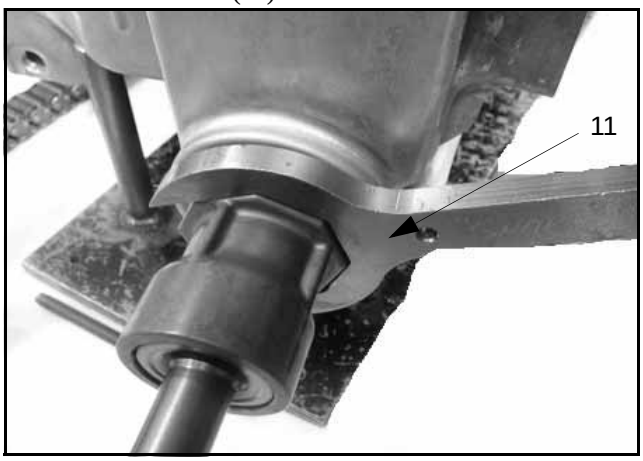
27. Remove the snorkel lock screw located inside the gearcase. Use a T27 hex socket or driver.



28. Mark the snorkel tube and case with a white pen or marker. This is used to ease reassembly of the gearcase.

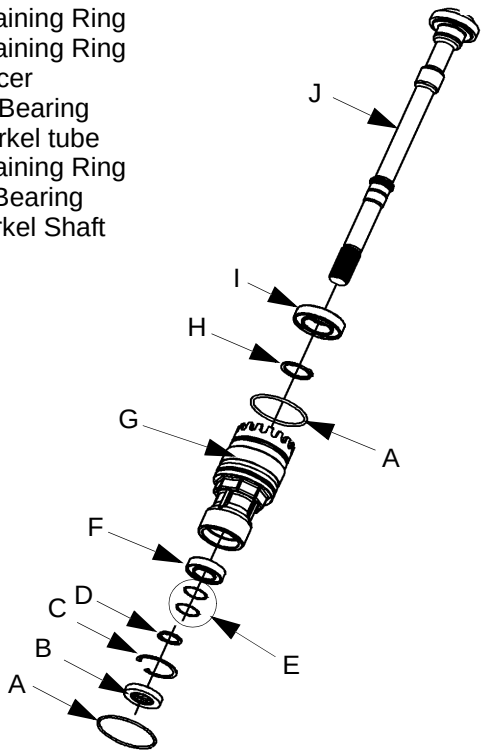


29. Use a 2 3/8” wrench to loosen and remove the front drive shaft snorkel tube (11).

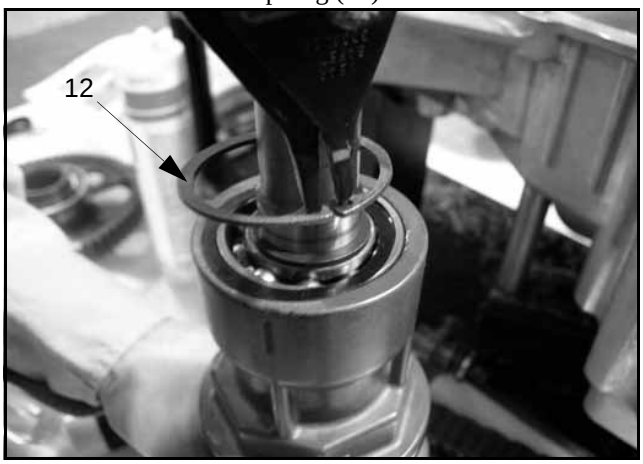


Front Drive Snorkel Assembly

A. O-ring
B. Seal
C. Retaining Ring
D. Retaining Ring
E. Spacer
F. Ball Bearing
G. Snorkel tube
H. Retaining Ring
I. Ball Bearing
J. Snorkel Shaft

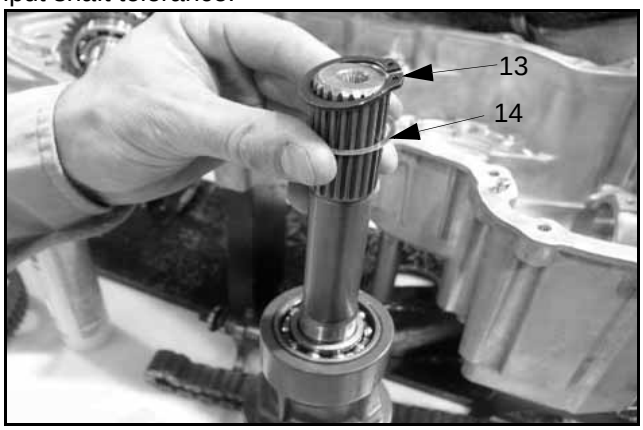


30. If needed, remove the seal from the front of the snorkel tube. Remove the snap ring (12).

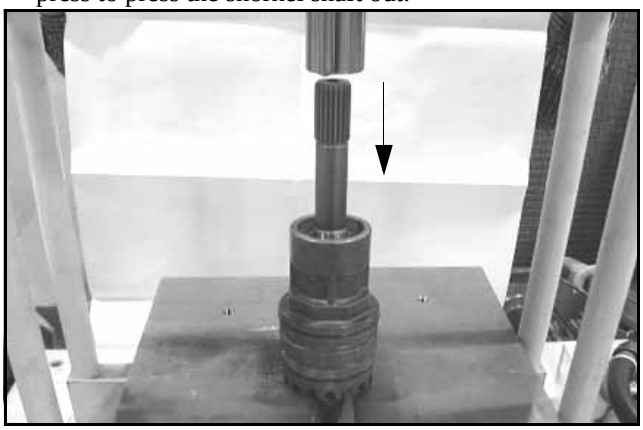


31. Remove the second snap ring (13) and spacer (14) from the snorkel shaft.

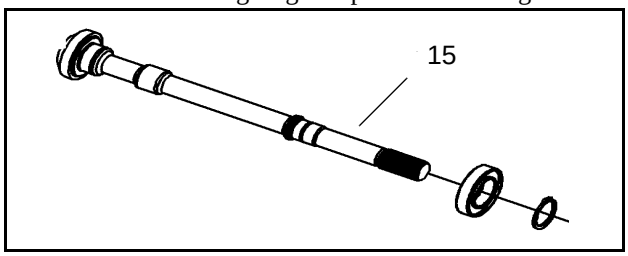
NOTE: Shim may or may not be present. Depending on input shaft tolerance.



32. To remove the snorkel shaft from the snorkel tube, use a press to press the snorkel shaft out.

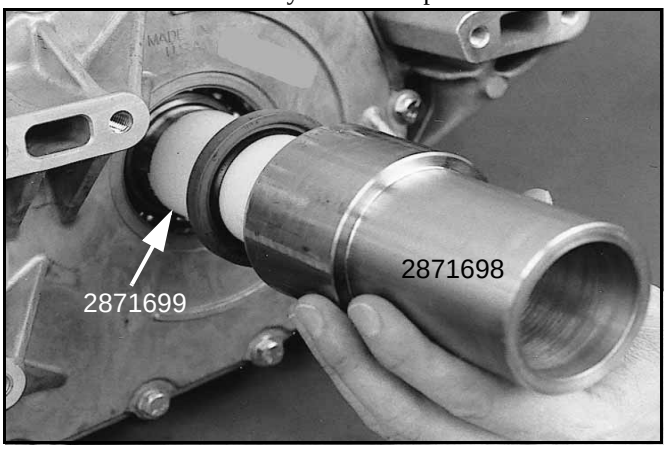


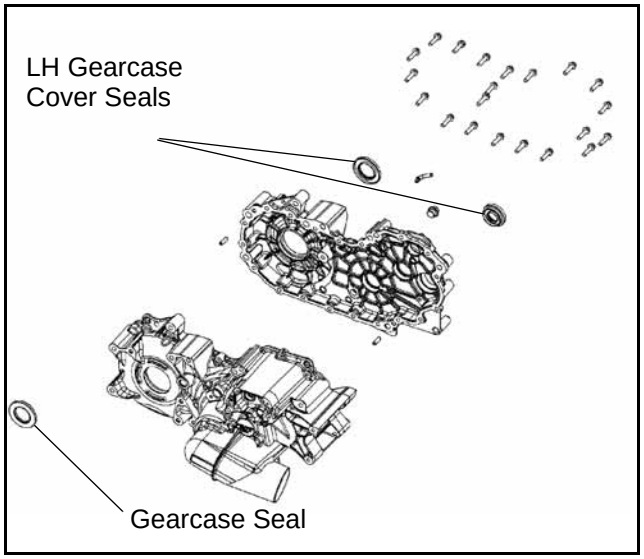
33. To remove the remaining bearing on the snorkel shaft (15), remove the retaining ring and press the bearing off.



Transmission assembly

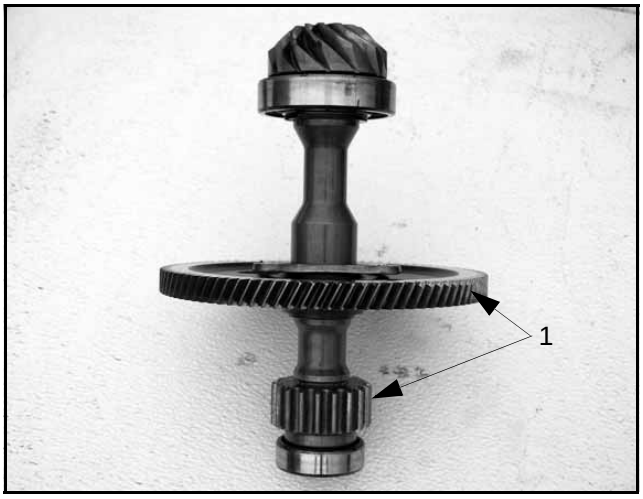
1. Install all new seals in the gearcases. Use the Rear Output Seal Driver (PN 2871698) and Rear Driveshaft Seal Guide (PN 2871699) to install the seals into the gearcases. See illustration 1 to identify seals for replacement.



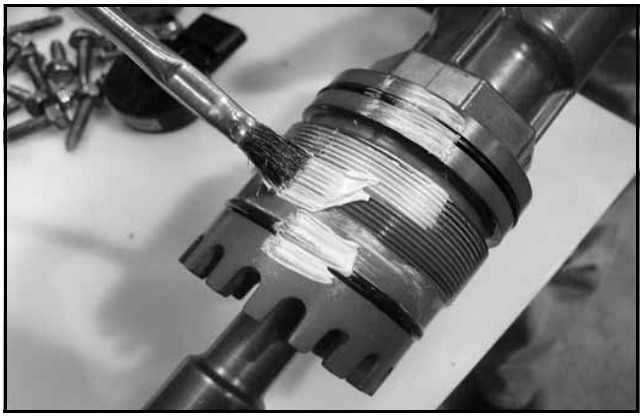


2. Reverse the disassembly procedure for the assembly of the snorkel shaft assembly.

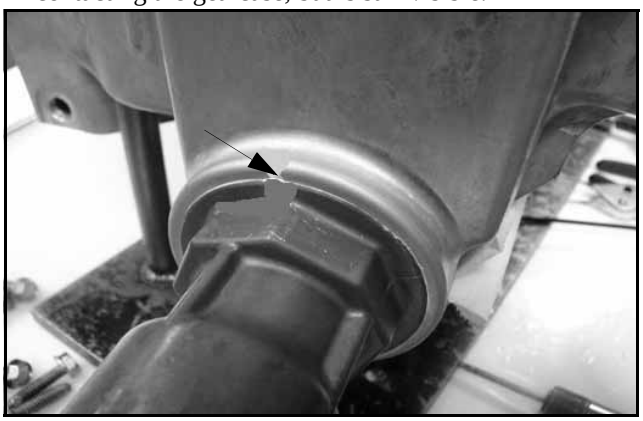
3. Inspect the output gear assembly (1), replace bearings if needed. Inspect the 91T gear for damage, chips, or abnormal worn teeth.



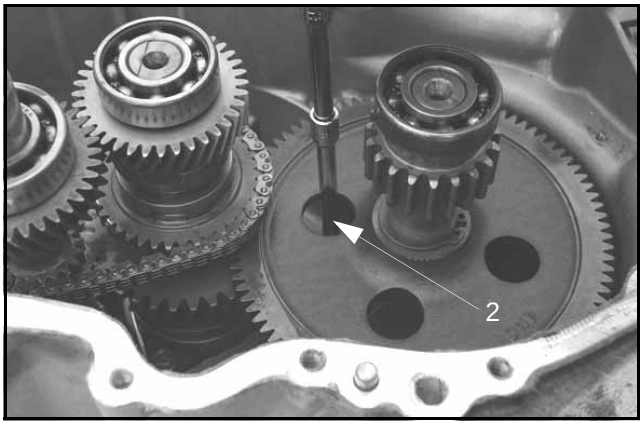
4. Install 2 new O-rings onto the snorkel tube. Apply a white lithium grease onto the O-rings and threads of the snorkel tube.



5. Install the snorkel shaft assembly into the gearcase. Install the snorkel shaft assembly in until the second O-ring is contacting the gearcase, but is still visible.



6. Install the output gear assembly. Be sure to properly mesh the snorkel shaft bevel gear with the output bevel gear. Install the 4 torx screws (2) to secure the output gear assembly into place. Torque screws to .
NOTICE! : It is important to set zero lash between the output gear and the snorkel shaft gear. If there is binding or excess lash, tighten or loosen the snorkel shaft until there is zero lash.



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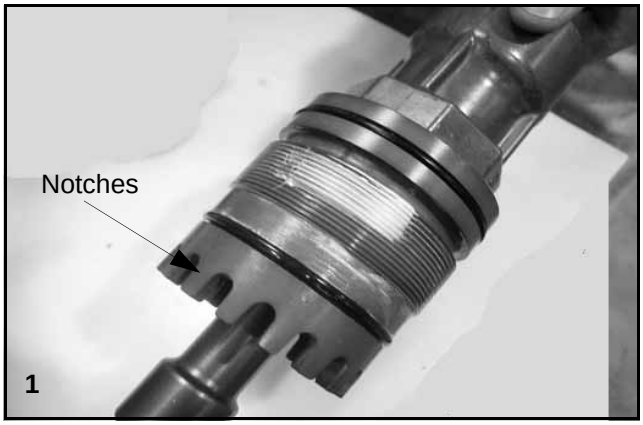
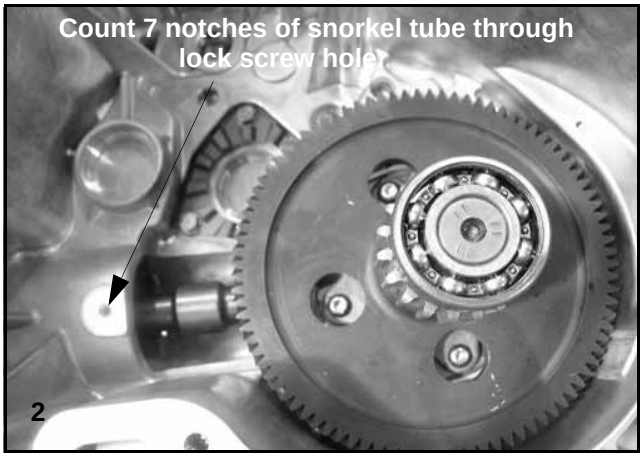
Output Gear Retaining Screw Torque:
8-12 ft.lbs. (11-17 Nm)

Transmission front output shaft backlash procedure

1. The following steps must be performed to obtain proper front output gear backlash adjustment:

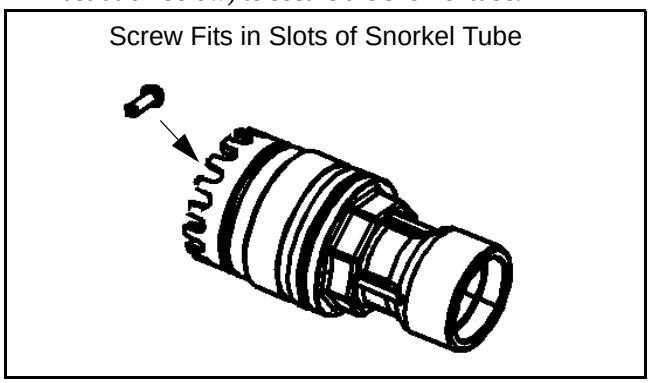
   - Upon completion of Step 6, make sure the snorkel gear and output bevel gear are lightly seated or meshing so there is 'zero' lash. **Do not overtighten. Gears should rotate freely without binding.**
   - Before turning the snorkel tube, look down into the gearcase at the snorkel lock screw hole opening (Photo 2) to reference your starting point. Next, slowly rotate the snorkel tube counterclockwise (Photo 3), counting the number of notches passing through the thread hole as you rotate the tube. **Rotate the snorkel tube to the 7th notch from 'seated' position** (Photo 1 & 2) using a 2 3/8" wrench.
   - Check the output shaft gear backlash again by feel. If the output shaft lash appears to be too tight, rotate the snorkel shaft counterclockwise to the next notch or 8th notch.

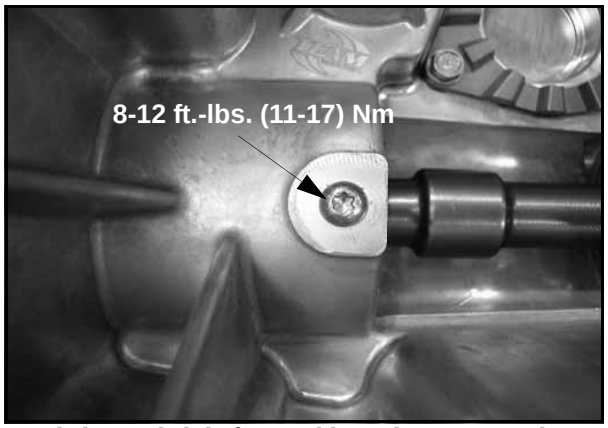




8

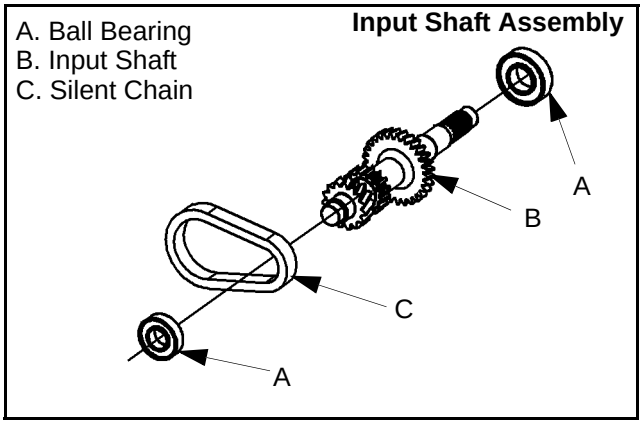
2. Once the gear backlash is found, to install the snorkel lock screw, you may have to rotate the snorkel tube clockwise or counterclockwise slightly. This will allow the lock screw to thread itself into one of the slots of the snorkel tube (See illustration below) to secure the snorkel tube.





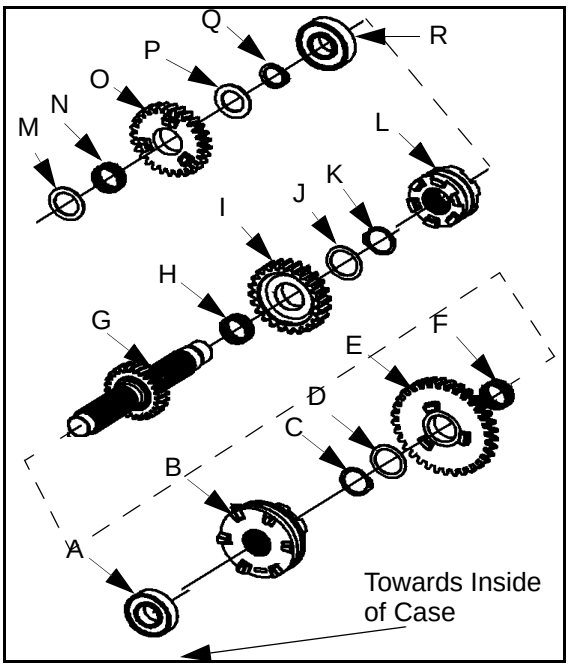
3. With the snorkel shaft assembly in place, remove the 4 Torx screws from the output shaft assembly. Remove the output shaft assembly.

4. Assemble the input shaft assembly if previously disassembled.



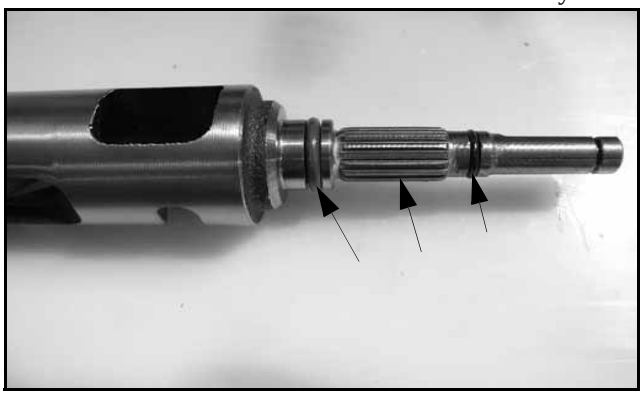
5. Assemble the reverse shaft assembly if previously disassembled.

REVERSE SHAFT



A. Ball Bearing
B. Engagement Dog
C. Retaining Ring
D. Washer
E. Gear
F. Needle Bearing
G. Reverse Shaft
H. Needle Bearing
I. Sprocket
J. Washer
K. retaining Ring
L. Engagement Dog
M. Washer
N. Needle Bearing
O. Gear
P. Washer
Q. Retaining Ring
R. Ball bearing

6. Inspect the shift drum for any damage or wear. Inspect the splines of the shift drum. Replace the O-rings on the end of the shift drum and lubricate them before assembly.

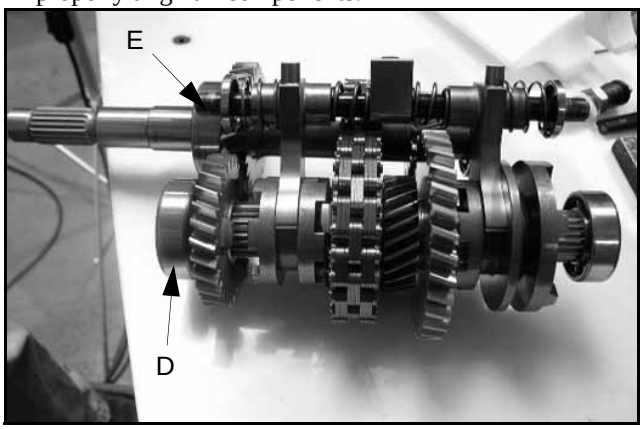


7. Stretch the silent chain on a flat surface and measure the length of 8 pitches in a minimum of three places on the chain. Replace the chain if the measurement is longer than the service limit.

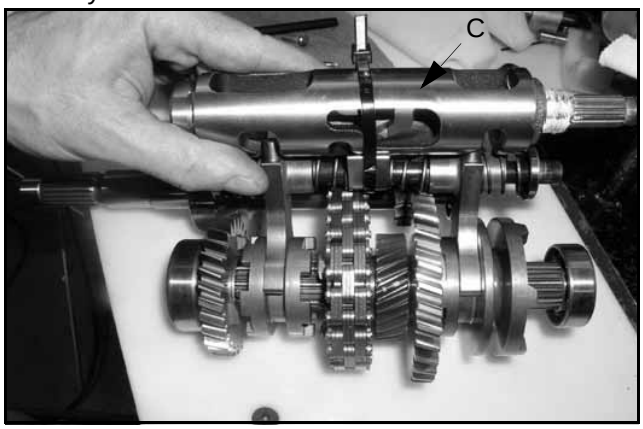
 **= In. / mm.**

Silent Chain Service Limit (8 pitch):
3.0904" (7.8496 cm)

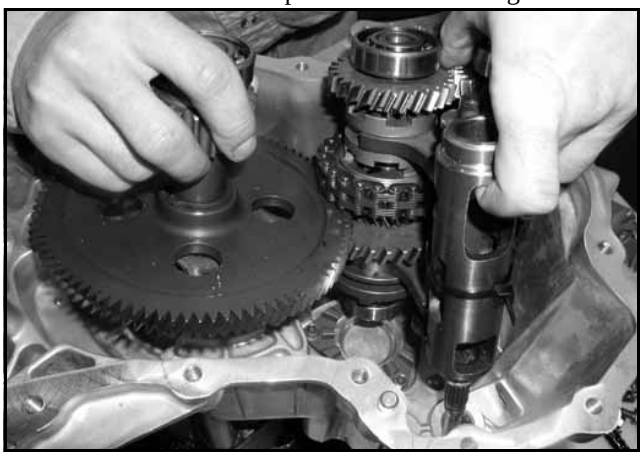
8. The shift drum (C), reverse shaft (D), input shaft (E), and output gear assembly must be installed at the same time to properly align all components.



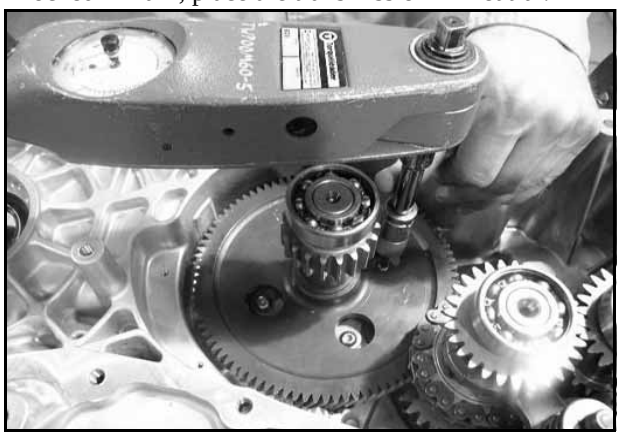
NOTE: To ease assembly use a plastic tie strap to hold the shift forks (D) and the shift drum (C) together during assembly.



9. With the gearcase on it's side, hold the gear cluster assembly and output assembly together. Carefully install each shaft into their respective recess in the gearcase.



10. With all of the components in the correct positions install the 4 output gear assembly screws. Apply Loctite™ 262 (**PN 2871952**) to the threads of the screws. Torque the screws to specification. **NOTE:** If the transmission is in locked in Park, place the transmission in Neutral.



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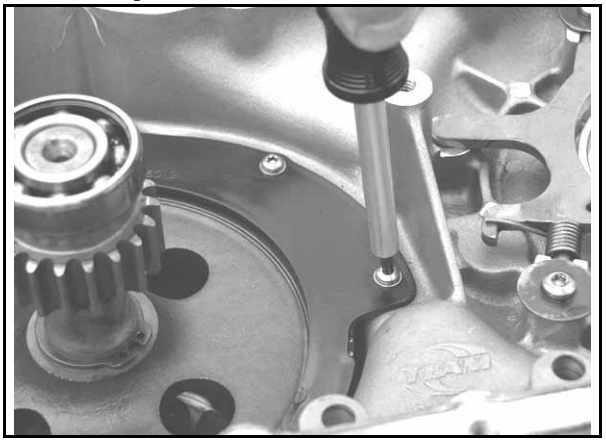
Output Gear Retaining Screws:
8-12 ft.lbs. (11-17 Nm)

11. Install the oil deflector shield into the gearcase. Apply Loctite™ 242 to the threads of the screws. Torque the screws to specification.



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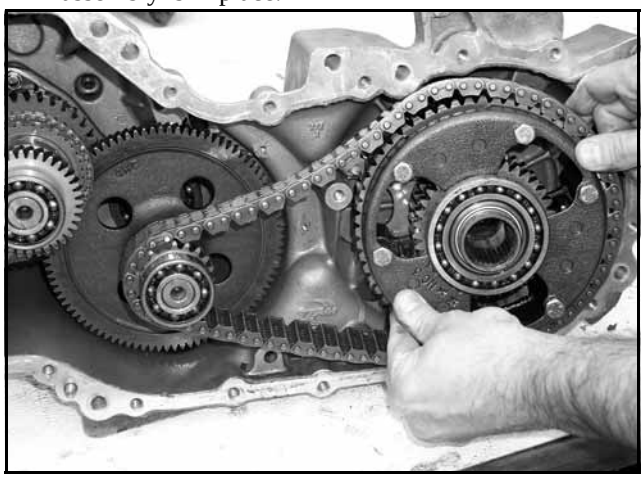
Oil Deflector Retaining Screws:
16-30 in.lbs. (2-3.6 Nm)

12. Install the rear drive differential and drive chain, following these precautions:

- The case half rear output seal should be removed prior to installation of the differential, as seal damage can occur with seal installed due to the angle of entry.
- Install the differential sliding geardog onto the shift fork arms at the same time the silent chain is installed.
- The differential gear bearing may be lightly tapped into place. The output seal can be installed once the assembly is in place.

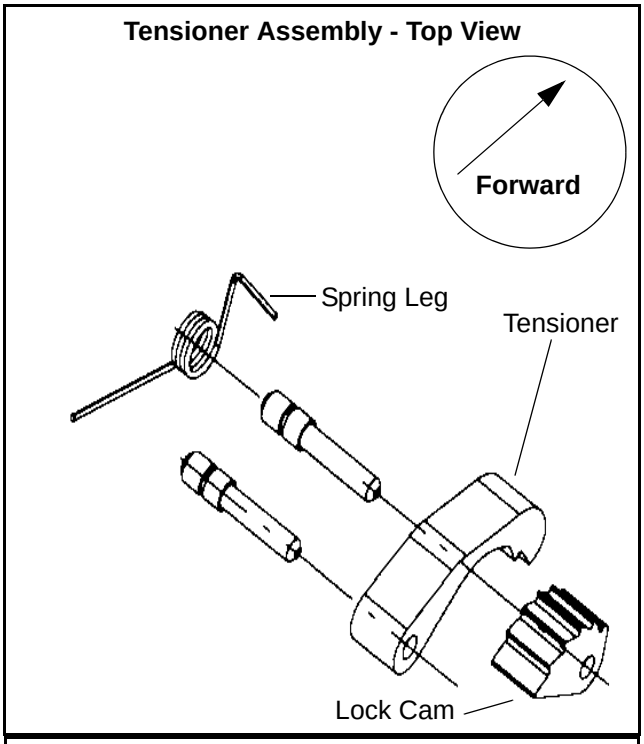


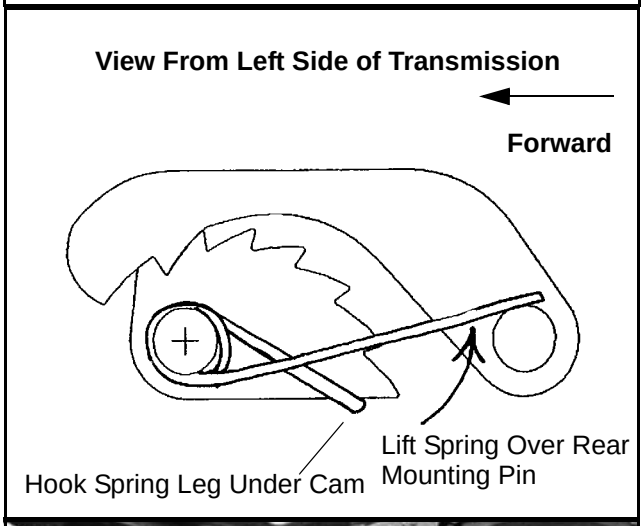
13. Tensioner Installation:

NOTE: Case-halve mating may be difficult due to tensioner pressure on the drive chain during installation. Release tension at the ratcheting cam to aid case half installation. Release the tensioner spring after the case halves are mated but not yet touching.

- Place the tensioner cam on the front spacer and tensioner shoe on the rear spacer.
- Insert the pins through the cam and through the shoe.
- Place the spring over the front pin and hook the spring leg under the cam.

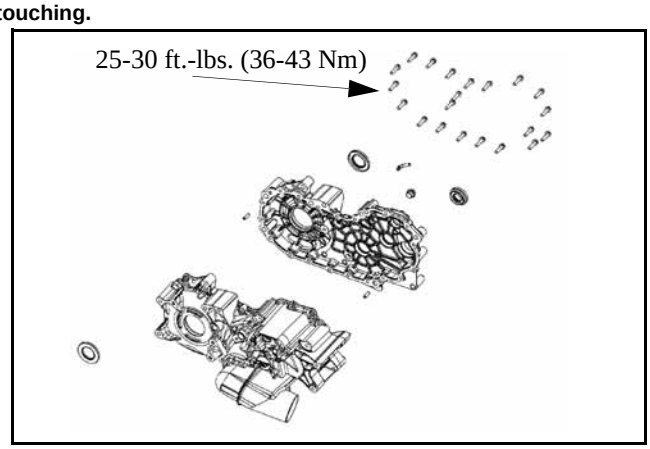
14. Lift the leg of the spring up and over the rear pin. The tensioner cam will lift the shoe and tension chain.





15. Apply a continuous bead of Crankcase Sealant (3-Bond) (**PN 2871557**) to the LH gearcase mating surface and install the cover. Install and tighten the 22 screws in a criss cross pattern to evenly secure the cover. Torque the screws to specification.

NOTE: Case-halve mating may be difficult due to tensioner pressure on the drive chain during installation. Release tension at the ratcheting cam to aid case half installation. Release the tensioner spring after the case halves are mated but not yet touching.



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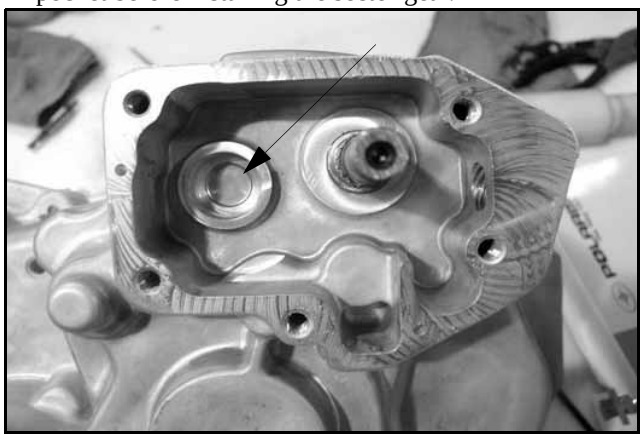
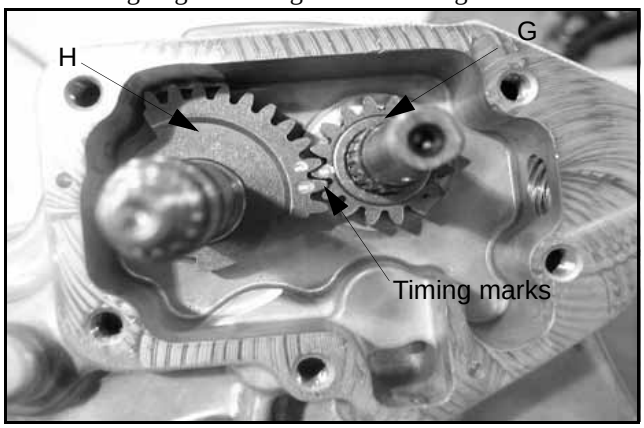
Gearcase Bolt Torque: **25-30 ft.lbs. (36-43 Nm)**

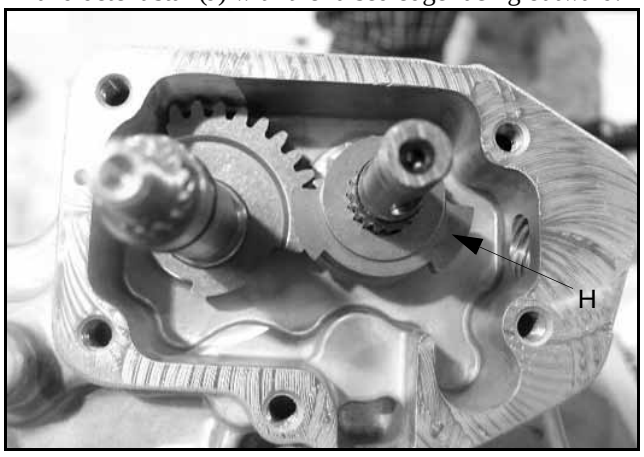
16. Place a small amount of grease (**PN 2871551**) into the pocket before installing the sector gear.



17. Install the shift gear (16T) (G) on the shift drum shaft. Install the sector gear (F) in the bushing pocket on the left side. Aligning the timing marks on the gears.

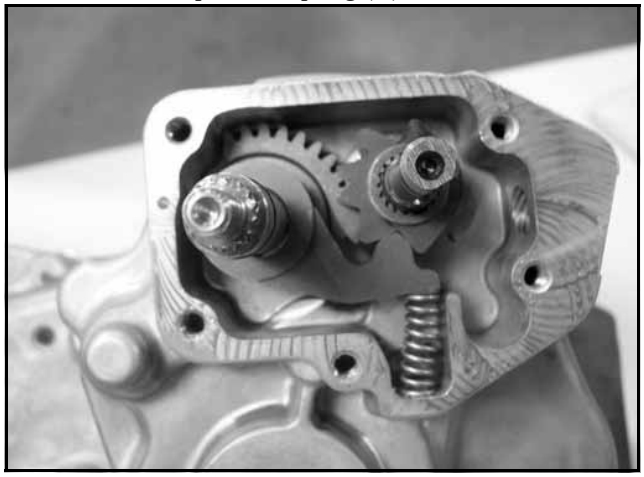


18. Install the O-ring (if not yet done) and lockout disc (H) onto the shift drum shaft. Be sure to install the lockout disc (H) and detent star (J) with the raised edge facing outward.



19. Install the detent pawl (I) onto the shift shaft. Install the detent star (J). Install a new O-ring onto the shift shaft. Apply a small amount of grease onto the O-rings and end of the shift drum.

20. Install the compression spring (K).



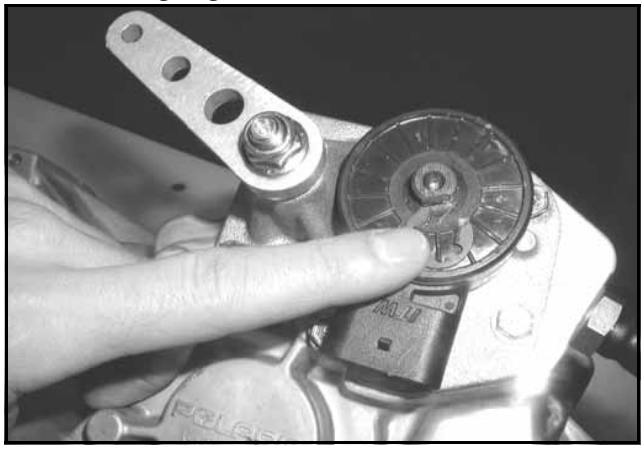
21. Apply Crankcase Sealant (3-Bond) (**PN 2871557**) onto the cover and case mating surfaces. Install the cover and torque the bolts to specification

= T
Shift Shaft Cover Bolt Torque: **12-18 ft.lbs. (16-26 Nm)**

22. Install the bellcrank onto the shift shaft. Note the key splined on the bellcrank and shaft. Install the nut. Torque the nut to specification.

= T
Bellcrank Nut Torque: **12-18 ft.lbs. (16-26 Nm)**

23. Install the transmission switch and secure the switch with the retaining ring.



CHAPTER 9
BRAKES

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SPECIFICATIONS

Torque Table

TORQUE SPECIFICATIONS (Sportsman and X2)

ITEM	TORQUE FT.LBS. (IN.LBS.)	TORQUE NM
Front / Rear Caliper Mounting Bolts	18	24
Handlebar Master Cylinder Clamp Bolts	(25 in.lbs.)	3.0
Hand Master Cylinder Reservoir Cover Screws	(7 in.lbs.)	0.79
Brake Line Banjo Bolt	15.0	21
Brake Line Flared Fittings	12-15	16-21
Brake Disc Bolts	18.0	24
Brake Switch	12-15	16-21
Caliper Mounting Bolts	18.0	24
Sportsman Caliper Slide Pins	30-35	41-48
Rear Master Cylinder-to-Frame Bolts	8	11

NOTE: Refer to tightening procedures in this chapter. Some special procedures are used when torquing certain bolts and fasteners.

Component Service Limits

FRONT BRAKE CALIPER (Sportsman and X2)

ITEM	STANDARD	SERVICE LIMIT
Brake Pad Thickness	.298” / 7.6 mm	.180” / 4.6 mm
Brake Disc Thickness	.150-.165” / 3.81-4.19 mm	.140” / 3.556 mm
Brake Disc Thickness Variance	--	.002” / .051 mm
Brake Disc Runout	--	.010 / .254 mm

REAR BRAKE CALIPER (X2 ONLY)

ITEM	STANDARD	SERVICE LIMIT
Brake Pad Thickness	.298” / 7.6 mm	.180” / 4.6 mm
Brake Disc Thickness	.180-.195” / 4.57-4.95 mm	.170” / 4.318 mm
Brake Disc Thickness Variance	--	.002” / .051 mm
Brake Disc Runout	--	.010” / .254 mm

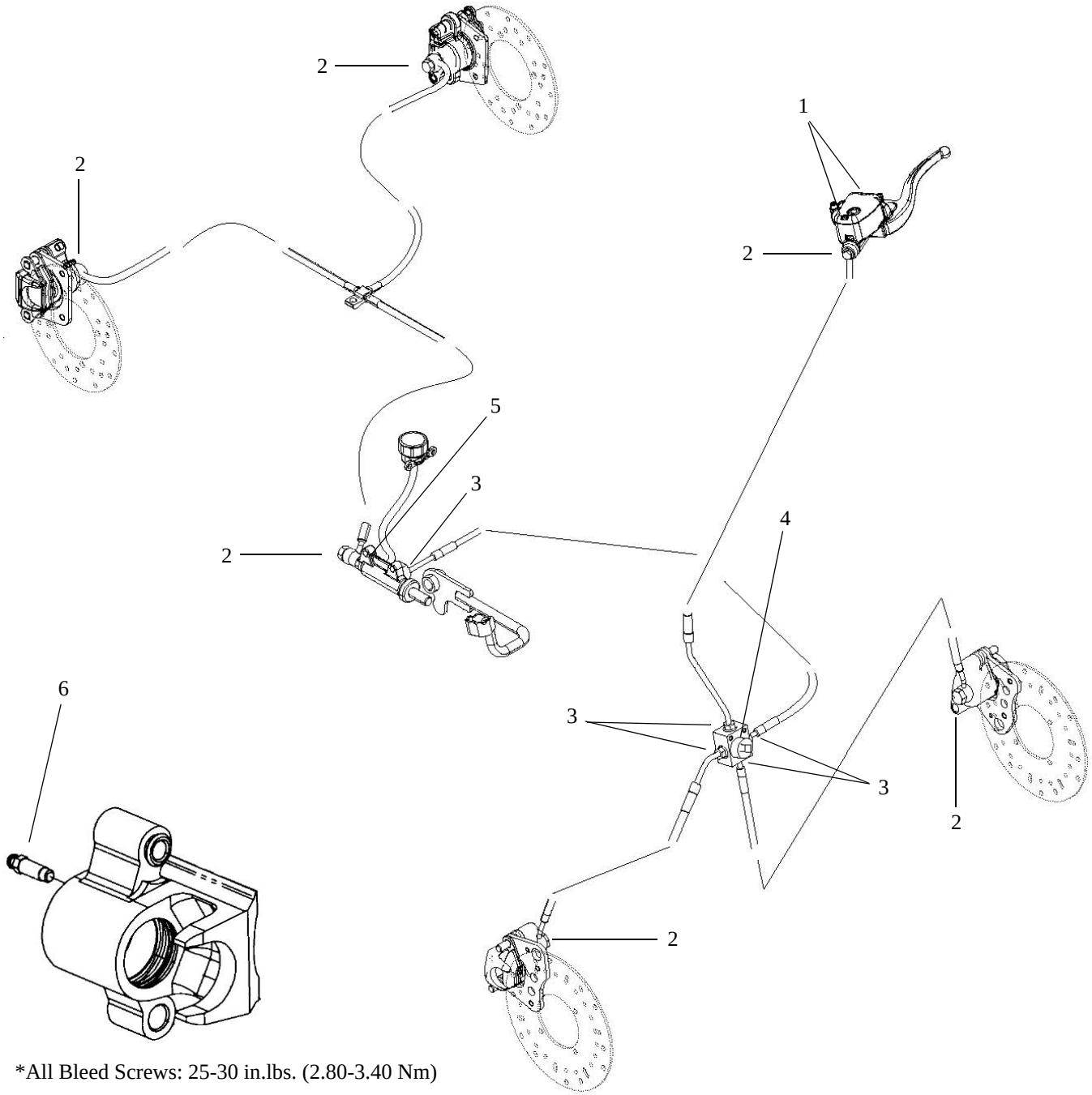
REAR BRAKE CALIPER (Sportsman ONLY)

ITEM	STANDARD	SERVICE LIMIT
Brake Pad Thickness	.318” / 7.6 mm	.180” / 4.6 mm
Brake Disc Thickness	.150-.165” / 3.81-4.19 mm	.140” / 3.56 mm
Brake Disc Thickness Variance	--	.002” / .051 mm
Brake Disc Runout	--	.010” / .254 mm

BRAKE SYSTEM EXPLODED VIEWS

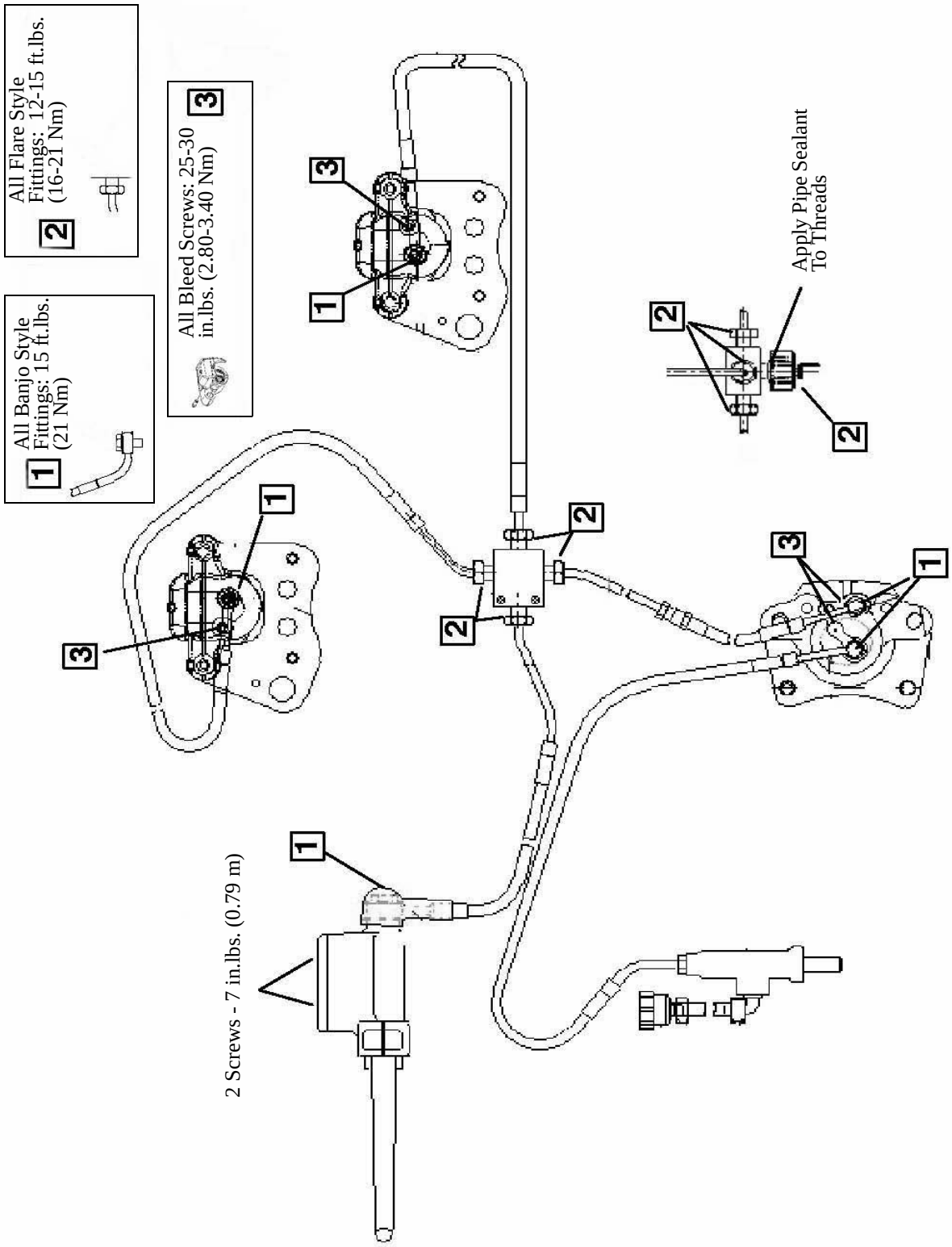
X2 System Component Exploded View

1) Master Cylinder Cover Screws: 7 in.lbs. (0.79 Nm)
2) Banjo Style Fitting: 15 ft.lbs. (21 Nm)
3) Flare Style Fittings: 12-15 ft.lbs. (16-21 Nm)
4) Brake Switch: 12-15 ft.lbs. (16-21 Nm) *Apply Pipe Sealant to Threads
5) Dual Input Master Cylinder and Bleed Screw: 25-30 in. lbs. (2.8-3.4 Nm)
6) Front and Rear Caliper Bleed Screws: 36-60 in. lbs. (4.07-6.78 Nm)



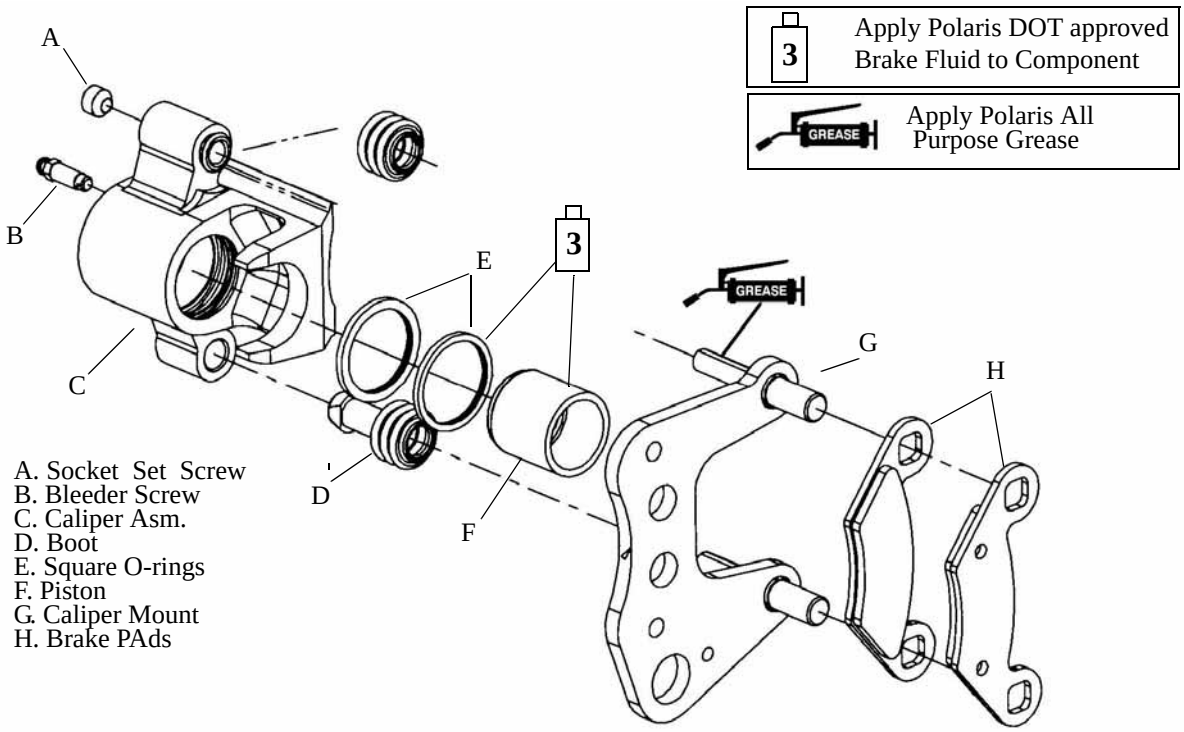
*All Bleed Screws: 25-30 in.lbs. (2.80-3.40 Nm)

Sportsman System Component Exploded View



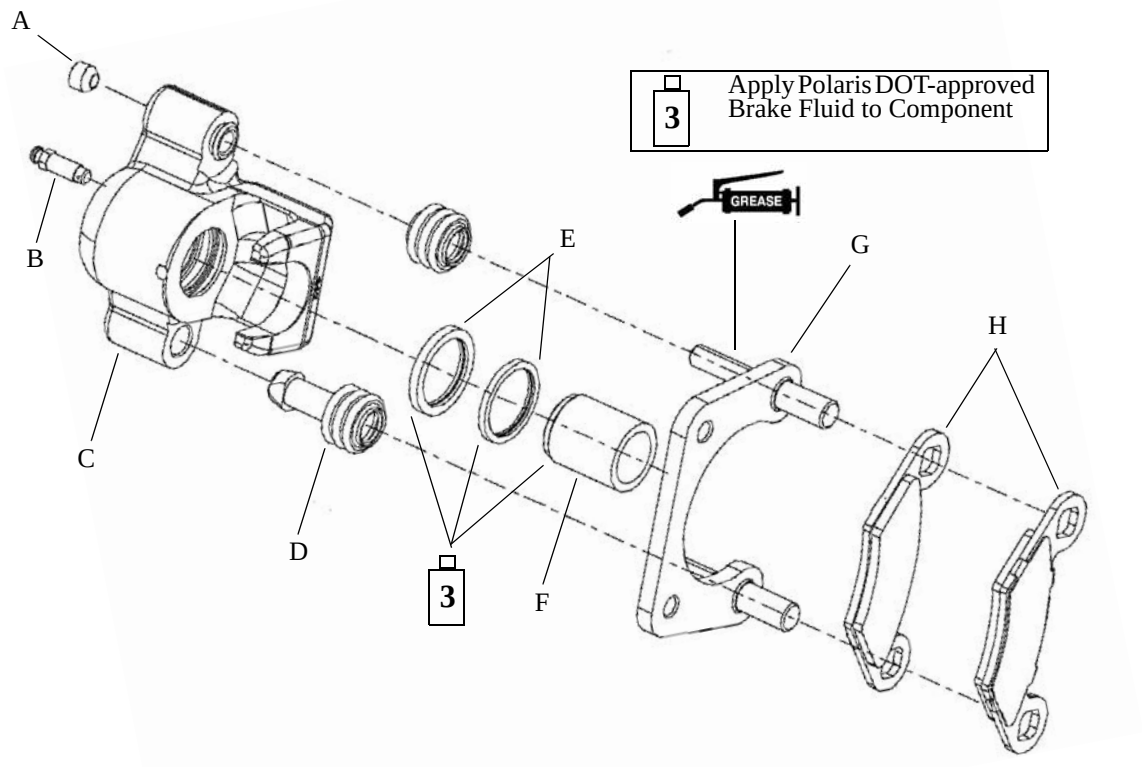
BRAKE CALIPER EXPLODED VIEWS

Sportsman and X2 Front Caliper Assembly



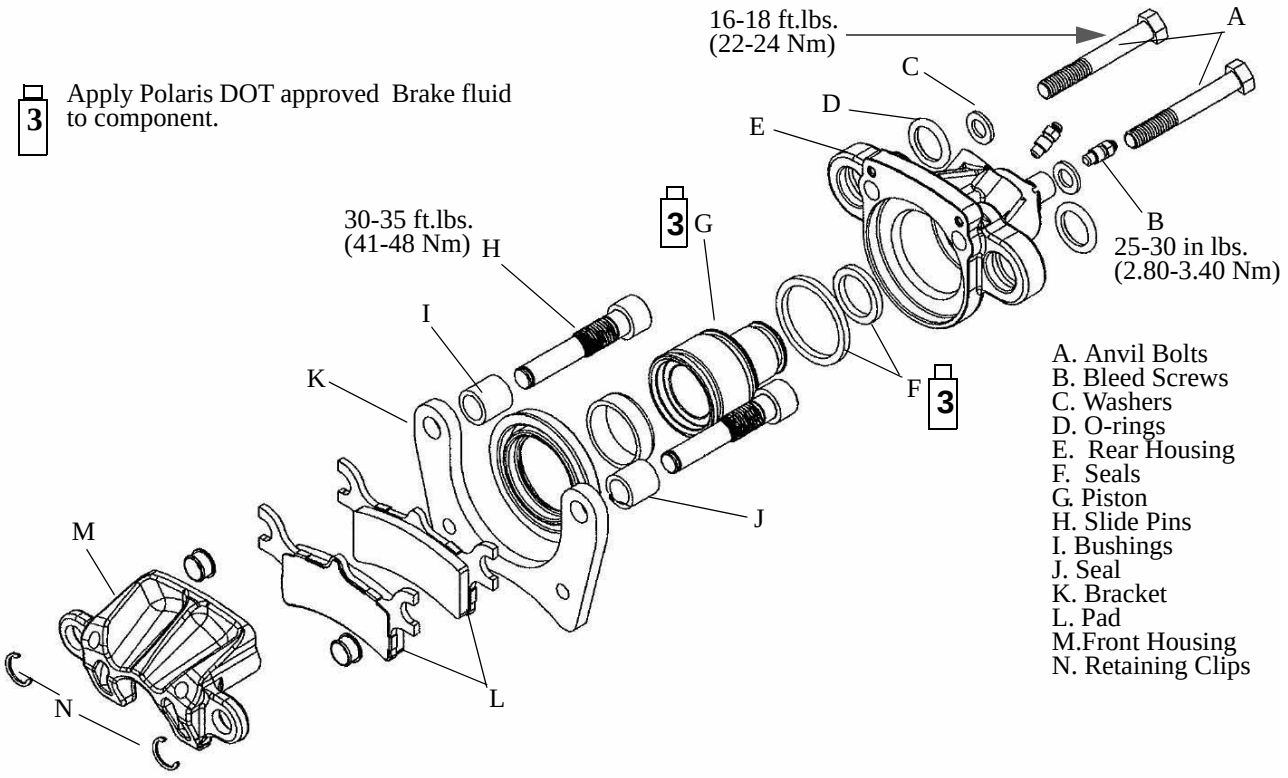
A. Socket Set Screw
B. Bleeder Screw
C. Caliper Asm.
D. Boot
E. Square O-rings
F. Piston
G. Caliper Mount
H. Brake PAds

X2 Rear Caliper Assembly



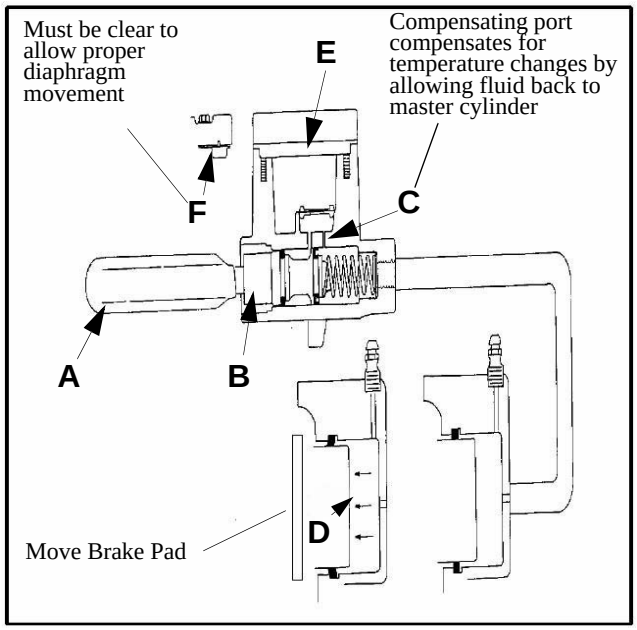
A. Socket Set Screw
B. Bleeder Screw
C.Caliper Asm
D. Boot
E. Caliper Seals
F. Piston
G. Caliper Mount
H. Brake Pads

Sportsman Rear Caliper Assembly



HYDRAULIC BRAKE SYSTEM

Operation Overview



The Polaris disc brake system consists of the following components or assemblies: brake lever; master cylinder; hydraulic hose; brake calipers (slave cylinder); brake pads; and brake discs, which are secured to the drive line.

When the hand activated brake lever (A) is applied it contacts piston (B) within the master cylinder. As the master cylinder piston moves inward it closes a small opening (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 brake pad. This pad contacts the brake disc and moves the caliper in its floating bracket, pulling the stationary side pad into the brake disc. The resulting friction reduces brake disc and vehicle speed. As the lever pressure is increased, the braking affect is also increased.

The friction applied to the brake pads will cause the pads to wear. As these pads wear, the piston within the caliper moves further outward and becomes self adjusting. Fluid from the reservoir fills the additional area created when the caliper piston moves outward.

Brake fluid level is critical to proper system operation. Too little fluid will allow air to enter the system and cause the brakes to feel spongy. Too much fluid could cause brakes to drag due to fluid expansion.

Located within the master cylinder is the compensating port (C) which is opened and closed by the master cylinder piston assembly. The port is open when the lever is released and the master cylinder piston is outward. As the temperature within the hydraulic system changes, this port compensates for fluid expansion (heated fluid) or contraction (cooled fluid). 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 has adequate space to allow for fluid expansion. **Never overfill the reservoir!** Fill to 1/4, - 5/16, (.64 - .80 cm) from top of the cylinder.

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. Make sure the vent is open and allowed to function. If the reservoir is over filled or the diaphragm vent is plugged the expanding fluid may build pressure in the brake system leading to brake fail

When servicing Polaris ATV brake systems, use only Polaris DOT-approved brake fluid.

⚠ WARNING

Once a bottle is opened, use what is necessary and discard the rest in accordance with local laws. Do not store or use a partial bottle of brake fluid. Brake fluid is hygroscopic, meaning it rapidly absorbs moisture. This causes the boiling temperature of the brake fluid to drop, which can lead to brake fade and the possible loss of control.

Brake Noise Troubleshooting

Dirt or dust buildup on the brake pads and disc is the most common cause of brake noise (squeal caused by vibration). If cleaning does not reduce the occurrence of brake noise, a product such as Permatex™ Disc Brake Quiet can be applied to the back of the pads. Follow directions on the package. This will keep pads in contact with caliper piston(s) to reduce the chance of squeaks caused by dirt or dust.

BRAKE NOISE TROUBLESHOOTING

POSSIBLE CAUSE	REMEDY
Dirt, dust, or imbedded material on pads or disc	Spray disc and pads with CRC Brake Kleen™ or equivalent non-flammable aerosol brake cleaner. Remove pads and/or disc hub to clean imbedded material from disc or pads.
Pad(s) dragging on disc (noise or premature pad wear)	Adjust pad stop
Insufficient lever or pedal clearance	Set to proper level
Master cylinder reservoir overfilled	Check brake fluid level, adjust as needed
Master cylinder compensating port restricted, Master cylinder piston not returning completely, Caliper piston(s) not returning	Clean piston(s) seal

BRAKE NOISE TROUBLESHOOTING

POSSIBLE CAUSE	REMEDY
Operator error (riding the brake / park brake applied)	Educate operator
Loose wheel hub or bearings	Tighten wheel, hub nuts or replace bearings if worn
Brake disc warped or excessively worn	Replace disc
Brake disc misaligned or loose	Inspect and repair as necessary
Noise is from other source (chain, axle, hub, disc or wheel)	If noise does not change when brake is applied check other sources. Inspect and repair as necessary
Wrong pad for conditions	Change to a softer or harder pad (if available)

Brake Bleeding / Fluid Change

NOTE: When bleeding the brakes or replacing the fluid, always start with the caliper farthest from the master cylinder.

⚠ CAUTION

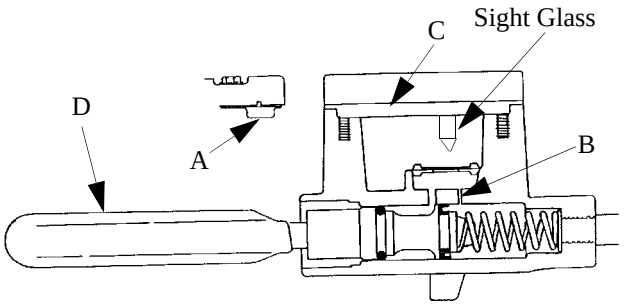
Always wear safety glasses during these procedures. Brake fluid will damage finished surfaces. Do not allow brake fluid to come in contact with finished surfaces.

NOTE: Do not remove brake lever when reservoir fluid level is low.

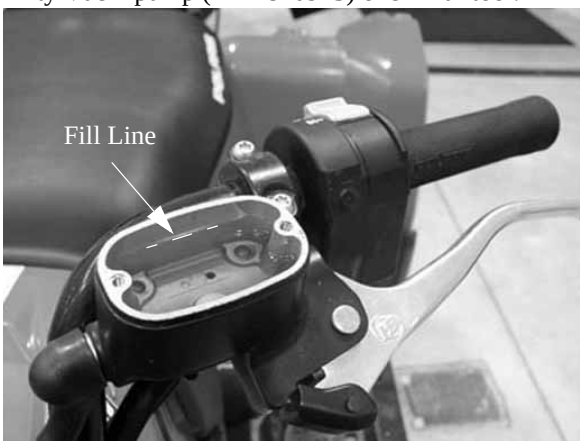
This procedure should be used to change fluid or bleed brakes during regular maintenance.

1. Clean reservoir cover thoroughly.
2. Remove screws, cover and diaphragm (C) from reservoir.

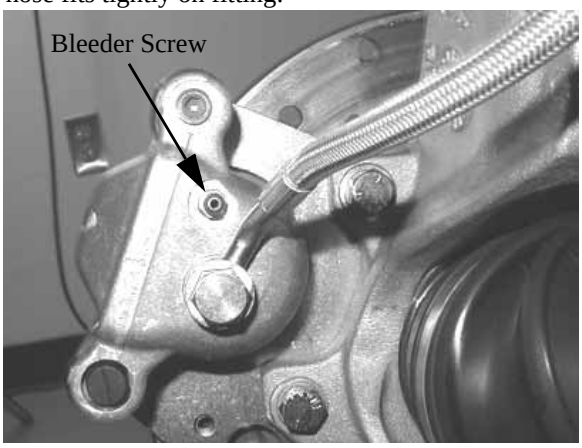
3. Inspect vent slots (A) in cover and remove any debris or blockage.



4. If changing fluid, remove old fluid from reservoir with a Mity Vac™ pump (**PN 2870975**) or similar tool.



5. Begin bleeding procedure with the caliper that is farthest from the master cylinder. Install a box end wrench on caliper bleeder screw. 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 supply port (B) when brake lever is pumped. Place diaphragm (C) in reservoir to prevent spills. Do not install cover. See Illustration above.

6. Slowly pump the brake lever until pressure builds and holds.

7. While maintaining lever pressure, open bleeder screw. Close bleeder screw and release brake lever.

NOTE: Do not release lever before bleeder screw is tight or air may be drawn into caliper.

8. 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.

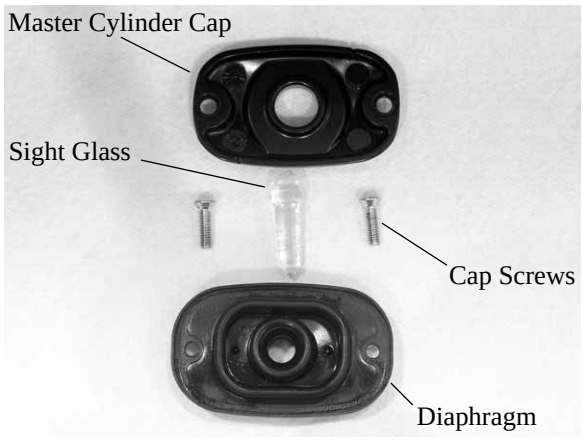
9. Tighten bleeder screw securely and remove bleeder hose. Torque the bleeder screw to specification.

= T
Bleeder Screw Torque: **25-30 in.lbs. (2.80-3.40 Nm)**

10. Repeat procedure Steps 5-9 for the remaining caliper(s).

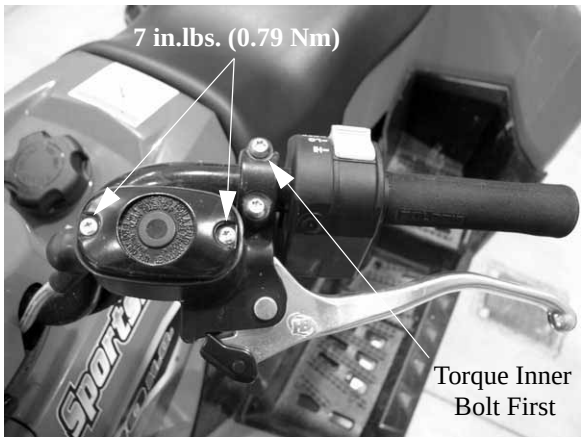
11. Add Polaris DOT-approved Brake Fluid to MAX level inside reservoir.

12. Install diaphragm, sight glass, cap and screws.



13. Wiggle and press down on the cap to be sure it fits evenly and snug.

14. Torque the screw to specification .



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Master Cylinder Cover Screw Torque: **7 in.lbs. (0.79 Nm**)

15. Field test machine at low speed 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.
16. Check brake system for fluid leaks and inspect all hoses and lines for wear or abrasion. Replace hose if wear or abrasion is found.

FRONT MASTER CYLINDER

Removal

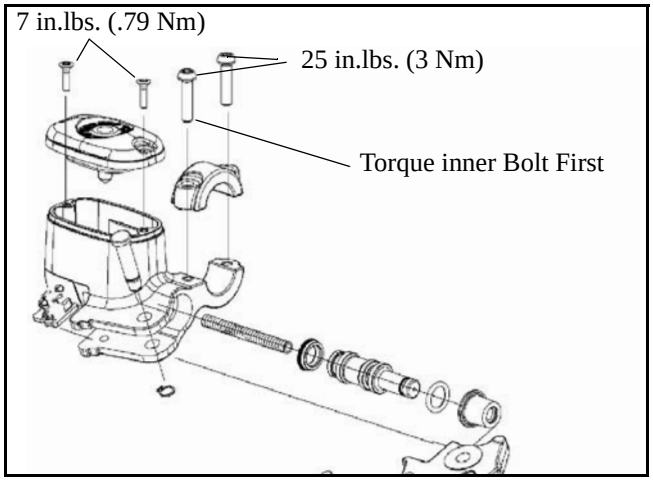
1. Clean master cylinder and reservoir assembly. Make sure you have a clean work area to disassemble brake components.
2. Remove master cylinder from handlebars.

⚠ CAUTION
Brake fluid will damage finished surfaces. Do not allow brake fluid to come in contact with finished surfaces.

3. While holding upright, continue to remove master cylinder. Cover the brake line to avoid spillage when removing the brake line banjo bolt.

Installation

1. Install master cylinder on handlebars. Torque mounting bolts to specification. Torque the inner bolt first as indicated in the illustration below.



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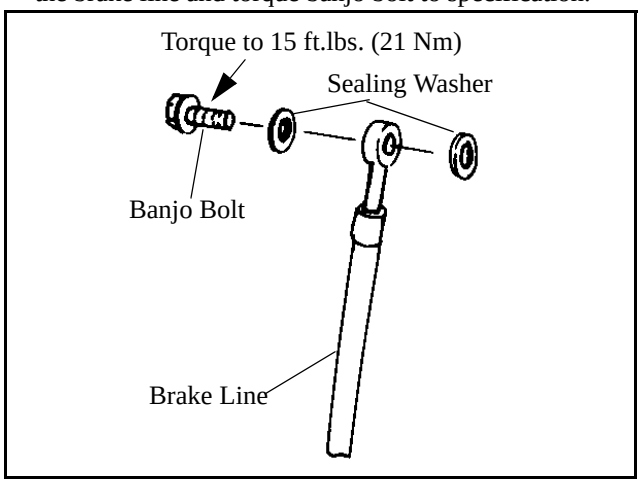
Master Cylinder Mount Bolt Torque: **25 in. lbs. (3 Nm)** Torque Inner Bolt First

9

2. Place new sealing washers on each side of banjo fitting on the brake line and torque banjo bolt to specification.



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Banjo Bolt Torque:
15 ft.lbs. (21 Nm)

3. Fill reservoir with DOT-approved brake fluid.

NOTE: To speed up the brake bleeding procedure, the master cylinder can be purged of air before brake line is attached. Fill with DOT-approved brake fluid and pump lever slowly two to three times with finger over the outlet end to purge master cylinder of air.

4. Follow proper bleeding procedures. Check all connections for leaks and repair if necessary.

FRONT BRAKES

Pad Removal

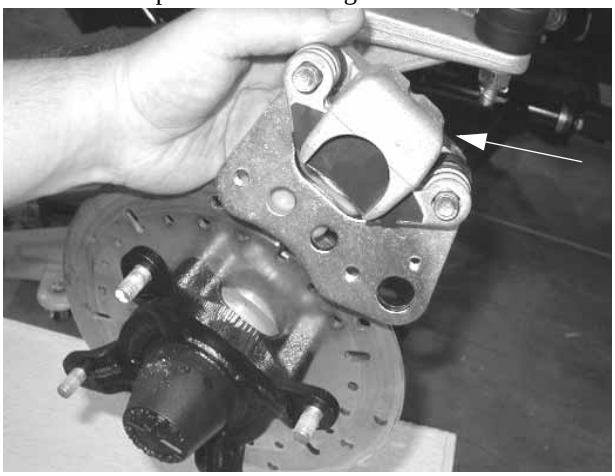
1. Elevate and support the of the ATV.

CAUTION

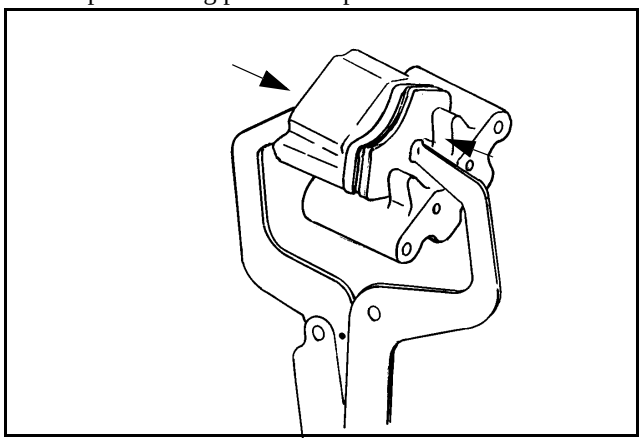
Use care when supporting vehicle so that it does not tip or fall. Severe injury may occur.

2. Remove the wheel.
3. Loosen pad adjuster screw 2-3 turns.

4. Remove caliper from mounting bracket.

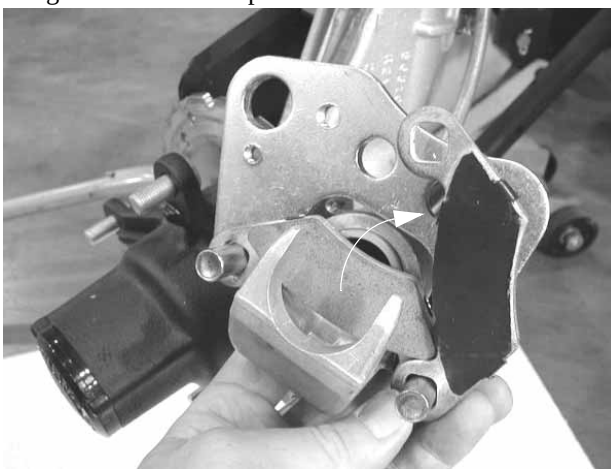


5. Push caliper piston into caliper bore slowly using a C-clamp or locking pliers with pads installed.

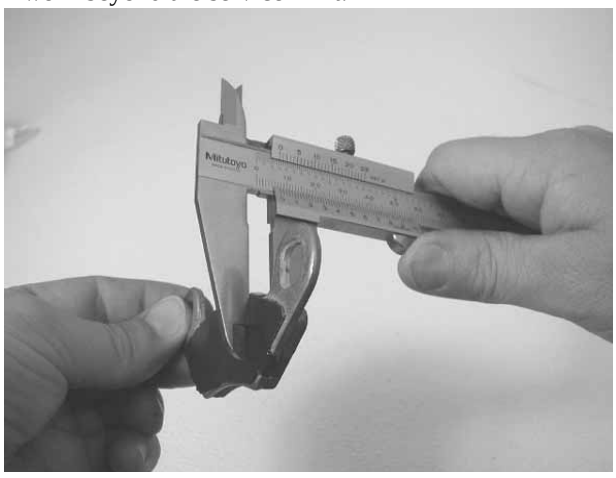


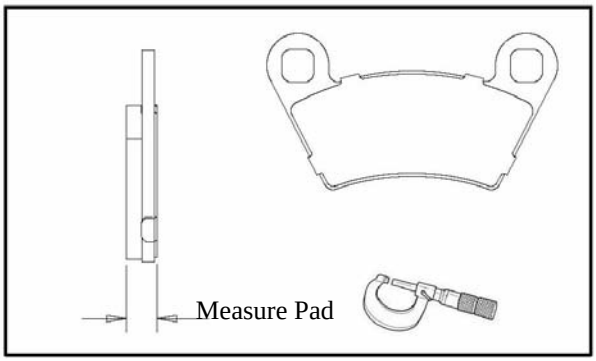
NOTE: Brake fluid will be forced through compensating port into master cylinder fluid reservoir when piston is pushed back into caliper. Remove excess fluid from reservoir as required.

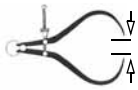
6. Push mounting bracket inward and slip outer brake pad past edge. Remove inner pad.



7. Measure the thickness of the pad material. Replace pads if worn beyond the service limit.





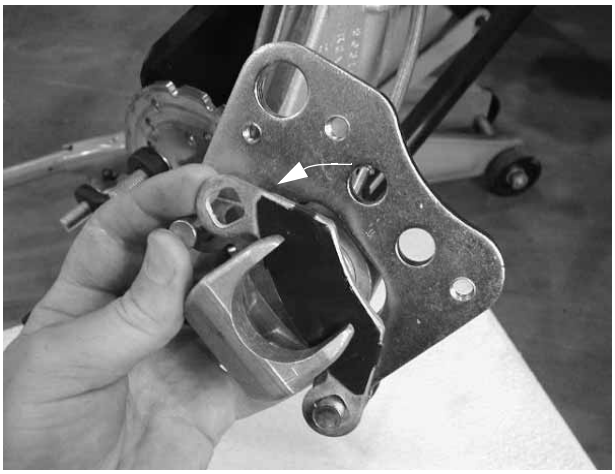
 = **In. / mm.**

Front Brake Pad Thickness Service Limit:
.180" / 4.6 mm

Assembly

1. Lubricate mounting bracket pins with a light film of Polaris Premium All Season Grease (**PN 2871423**), and install rubber dust boots.

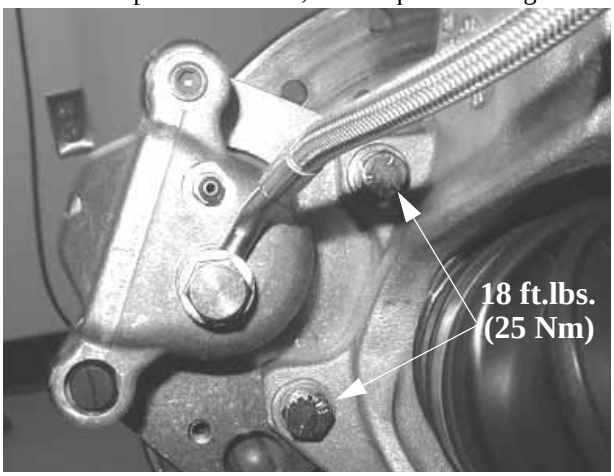
2. Compress mounting bracket and make sure dust boots are fully seated. Install pads with friction material facing each other.



⚠ WARNING

If pads are contaminated with grease, oil, or liquid soaked do not use the pads. Use only new clean pads.

3. Install caliper on hub strut, and torque mounting bolts.



4. Slowly pump the brake lever until pressure has been built up. Maintain at least 1/2, (12.7 mm) of brake fluid in the reservoir to prevent air from entering the brake system.

5. Install the adjuster screw and turn clockwise until stationary pad contacts disc, then back off 1/2 turn (counterclockwise).

6. Verify fluid level in reservoir is up to MAX line inside reservoir and install reservoir cap.

7. Install wheels and torque wheel nuts. It is required that a burnishing procedure be performed after installation of new brake pads to extend service life and reduce noise.

NOTE: Front Wheel Nut Torque: Refer to Chapter 2.

Brake Burnishing Procedure

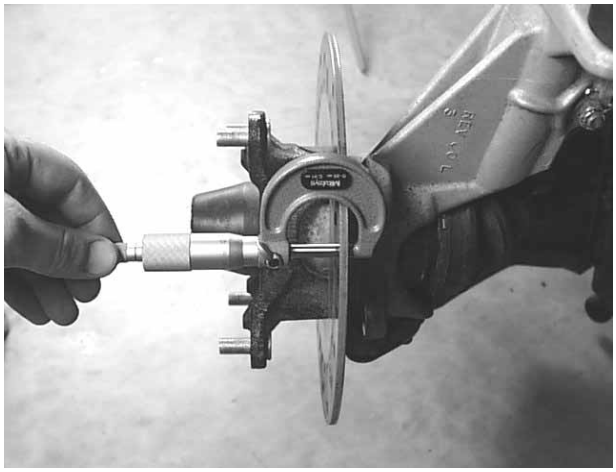
Start machine and slowly increase speed to 30 mph. Gradually apply brakes to stop machine. Allow pads and disc to cool sufficiently during the procedure. Do not allow pads or disc to become hot or warping may result. Repeat this procedure 10 times.

FRONT BRAKE DISC

Inspection

1. Visually inspect the brake disc for nicks, scratches, or damage.

2. Measure the disc thickness at eight different points around the pad contact surface. Replace disc if worn beyond service limit.



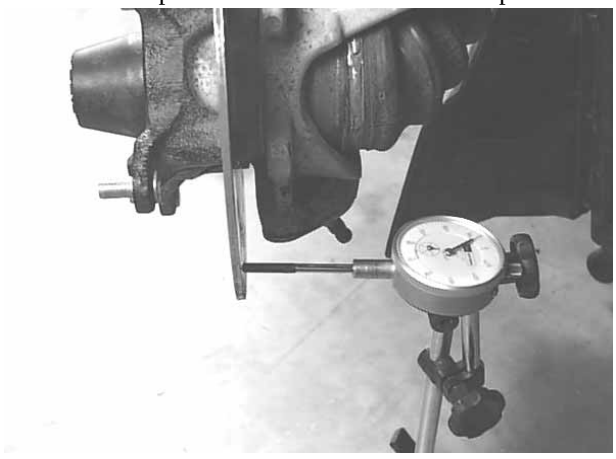
= In. / mm.

Brake Disc Thickness:
Service Limit: .140" / 3.556 mm

= In. / mm.

Brake Disc Thickness Variance Service Limit:
.002" (.051 mm) between measurements.

3. Mount dial indicator as shown to measure disc runout. Slowly rotate the disc and read total runout on the dial indicator. Replace the disc if runout exceeds specifications.



= In. / mm.

Brake Disc Runout Service Limit:
.010" / .254 mm

Removal / Replacement

NOTE: To reduce the possibility of warping, try removing the brake disc mounting bolts before applying heat to the bolts.

1. Apply heat to the hub in the area of the brake disc mounting bolts to soften the bolt locking agent.

2. Remove bolts and disc.
3. Clean mating surface of disc and hub.
4. Install disc on hub.
5. Install new bolts and tighten to specification.

= T

Brake Disc Bolt Torque:
18 ft.lbs. (24 Nm)

⚠ CAUTION

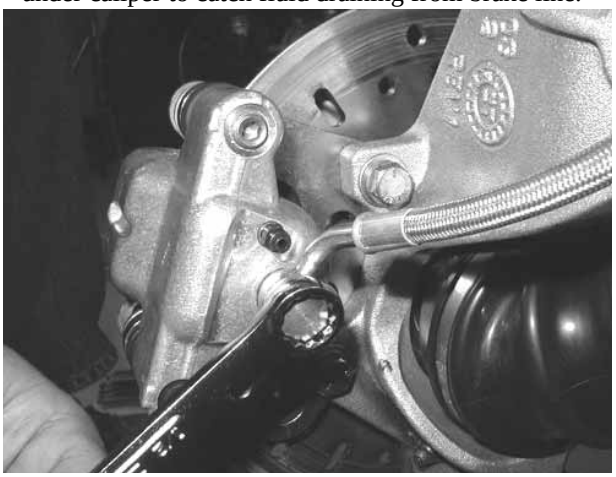
Always use new brake disc mounting bolts. The bolts have a pre-applied locking agent which is destroyed upon removal.

FRONT CALIPER

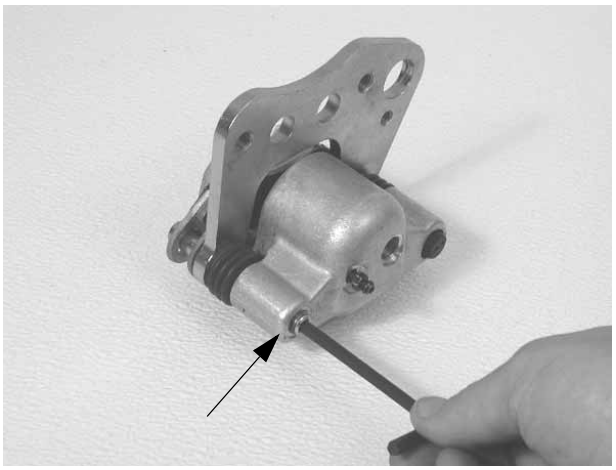
Removal

> **CAUTION**
>
> Use care when supporting vehicle so that it does not tip or fall. Severe injury may occur.

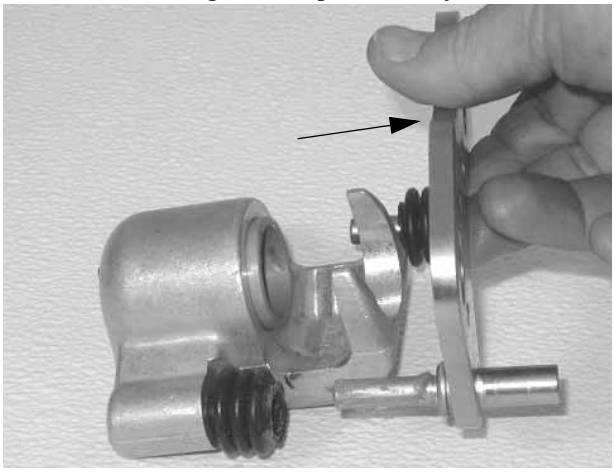
1. Loosen and remove brake line to caliper. Place a container under caliper to catch fluid draining from brake line.



2. Push upper pad retainer pin inward and slip brake pads past edge. Loosen pad adjuster.

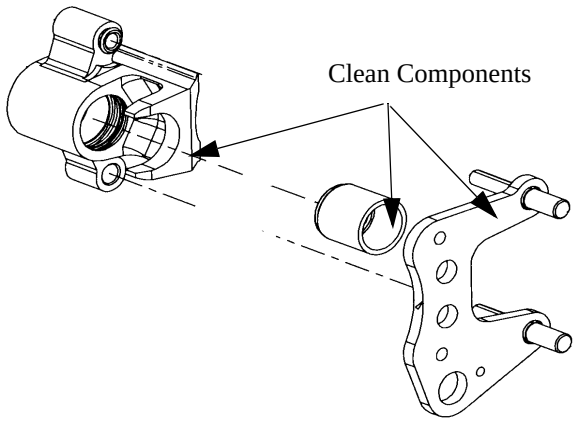


3. Remove mounting bracket, pin assembly and dust boot.



4. Remove piston, dust seals and piston seals.
5. Clean the caliper body, piston, and retaining bracket with brake cleaner or alcohol.

NOTE: Be sure to clean seal grooves in caliper body.



Inspection

1. Inspect caliper body for nicks, scratches or wear. Measure bore size and compare to specifications. Replace if damage is evident or if worn beyond service limit.

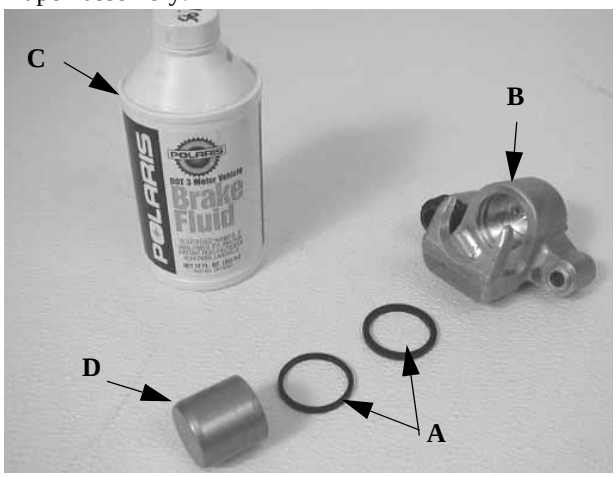
= In. / mm.
Front Caliper Piston Bore I.D.: Service Limit: 1.193" (30.30 mm)

2. Inspect piston for nicks, scratches, wear or damage. Measure diameter and replace if damaged or worn beyond service limit.

3. Inspect the brake disc and pads as outlined for brake pad replacement in this section. See "BRAKE PAD INSPECTION" earlier in this chapter.

Reassembly

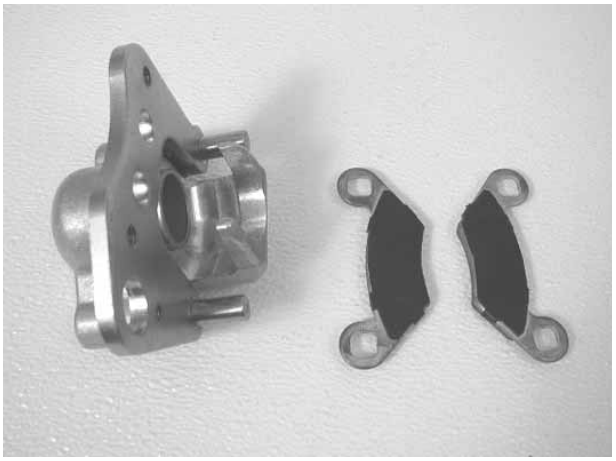
1. Install new caliper seals (A) in the caliper body (B). Be sure groove is clean and free of residue or brakes may drag upon assembly.



2. Coat piston with clean Polaris DOT-approved Brake Fluid (C). Install piston (D) with a twisting motion while pushing inward. Piston should slide in and out of bore smoothly, with light resistance.

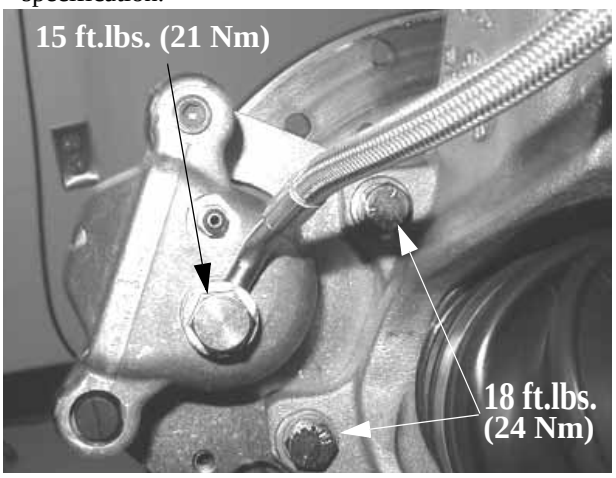
3. Lubricate the mounting bracket pins with Polaris Premium All Season Grease (**PN 2871423**), and install the rubber dust seal boots.

4. Compress the mounting bracket and make sure the dust seals are fully seated. Install the brake pads. Clean the disc and pads with brake parts cleaner or denatured alcohol to remove any dirt, oil or grease.



Installation

5. Install caliper on hub strut, and torque mounting bolts to specification.



= T
Brake Caliper Mounting Bolt Torque: **18 ft.lbs. (24 Nm)**

6. Install brake line and torque the banjo bolt to specification.

= T
Brake Line Banjo Bolt Torque: **15 ft.lbs. (21 Nm)**

7. Install the adjuster screw and turn until stationary pad contacts disc, then back off 1/2 turn.

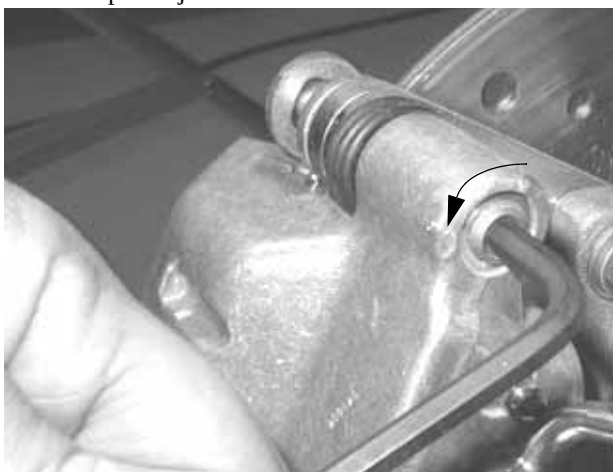
8. Perform brake bleeding procedure as outlined earlier in this chapter.

9. Install wheels and torque wheel nuts to specification. Refer to Chapter 2.

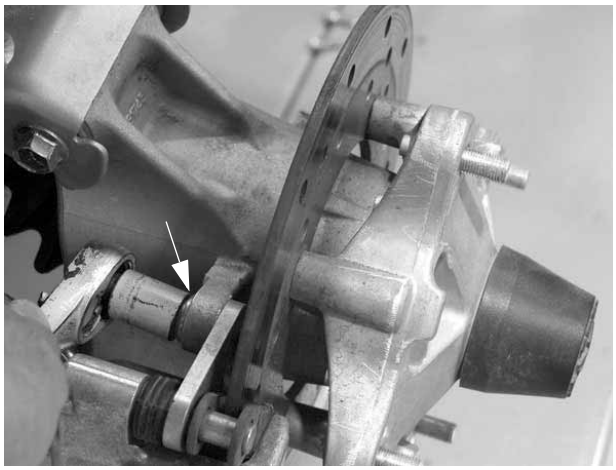
REAR BRAKE PAD

X2 Pad Removal

1. Elevate and support the rear of the ATV.
2. Remove the rear wheel
3. Loosen pad adjuster screw 2-3 turns.

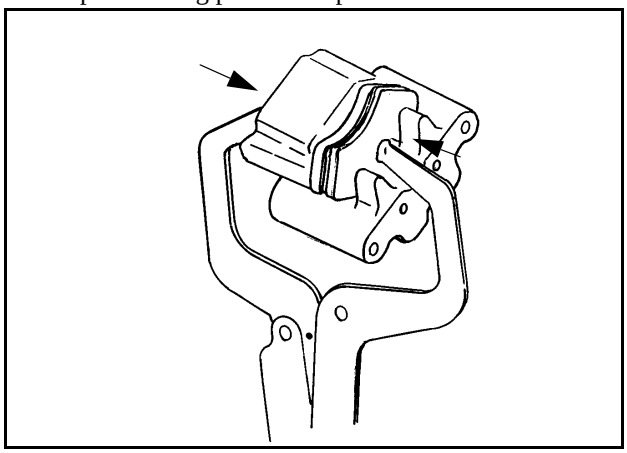


4. Remove the two caliper mounting bolts and lift caliper off the brake disc.



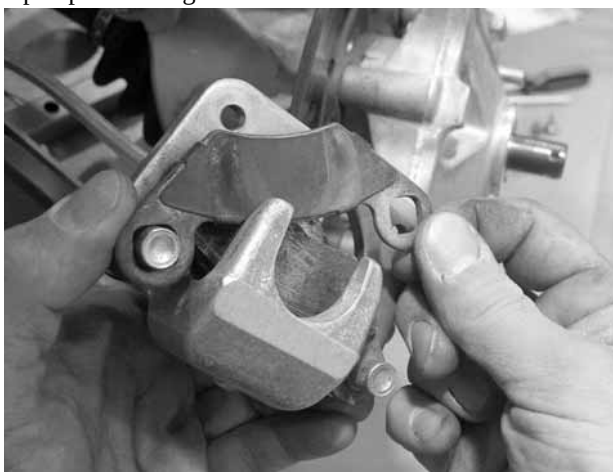
NOTE: When removing caliper, be careful not to damage brake line. Support caliper so as not to kink or bend brake line.

5. Push caliper piston into the caliper bore slowly using a C-clamp or locking pliers with pads installed.



NOTE: Brake fluid will be forced through compensating port into master cylinder fluid reservoir when piston is pushed back into caliper. Remove excess fluid from reservoir as required.

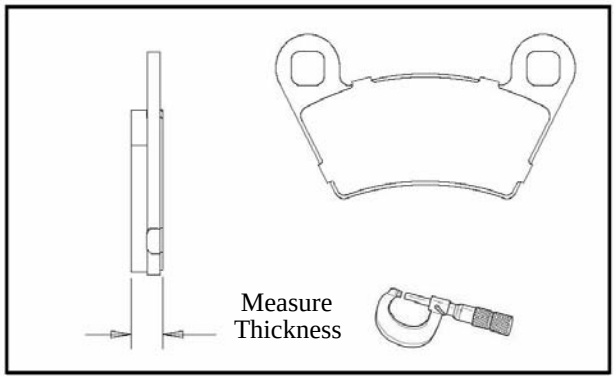
6. Push caliper mounting bracket inward and slip outer brake pad past the edge to remove.



7. Remove the inner brake pad.

8. Clean the caliper with brake cleaner or alcohol.

9. Measure the thickness of the pad material. Replace pads if worn beyond the service limit.

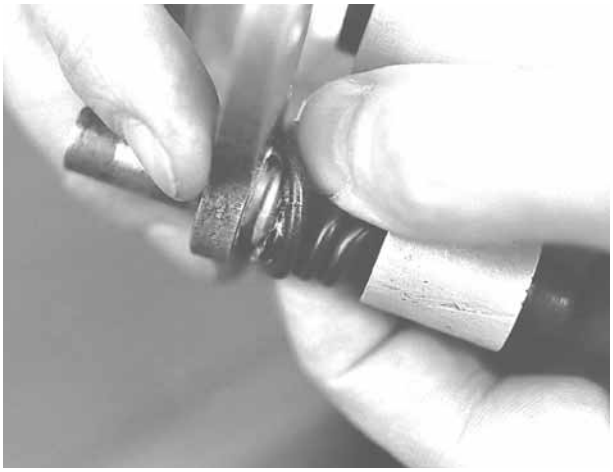


= In. / mm.

Rear Brake Pad Thickness
Service Limit: .180" (4.6 mm)

X2 Pad Installation

1. Lubricate mounting bracket pins with a light film of Polaris Premium All Season Grease (**PN 2871423**), and install rubber dust boots.

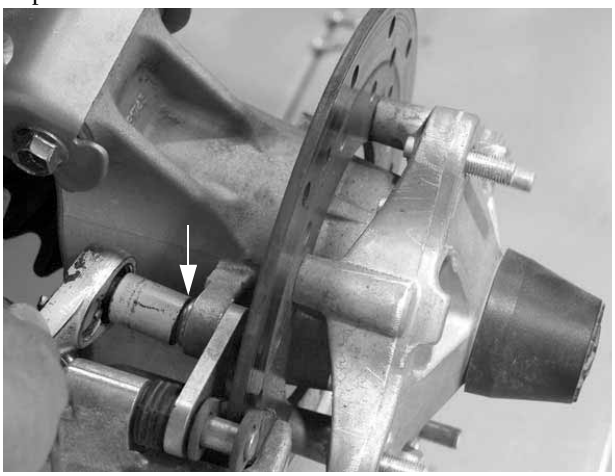


2. Compress mounting bracket and make sure dust boots are fully seated. Install pads with friction material facing each other.

WARNING

If brake pads are contaminated with grease, oil, or liquid soaked do not use the pads. Use only new clean pads.

3. Install caliper and torque the mounting bolts to specification.



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Caliper Mount Bolt Torque:
18 ft.lbs. (24 Nm)

4. Slowly pump the brake lever until pressure has been built up. Maintain at least 1/2, (12.7 mm) of brake fluid in the reservoir to prevent air from entering the brake system.

5. Install the adjuster screw and turn clockwise until the stationary pad contacts the disc, then back off 1/2 turn (counterclockwise).

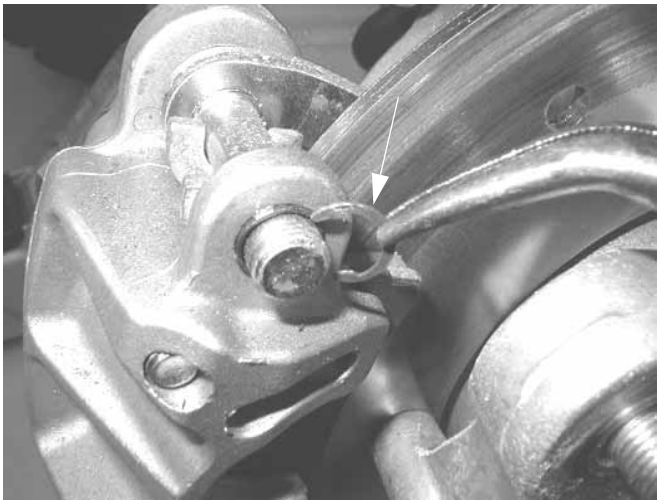
6. Verify fluid level in reservoir is up to the MAX line inside reservoir and install reservoir cap.

7. Install wheel(s) and torque wheel nut(s).

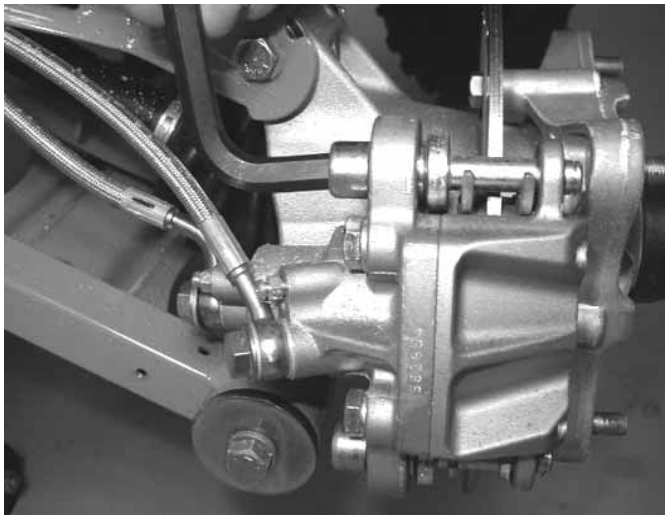
8. It is recommended that a burnishing procedure be performed after installation of new brake pads to extend service life and reduce noise.

Sportsman Rear Pad Removal

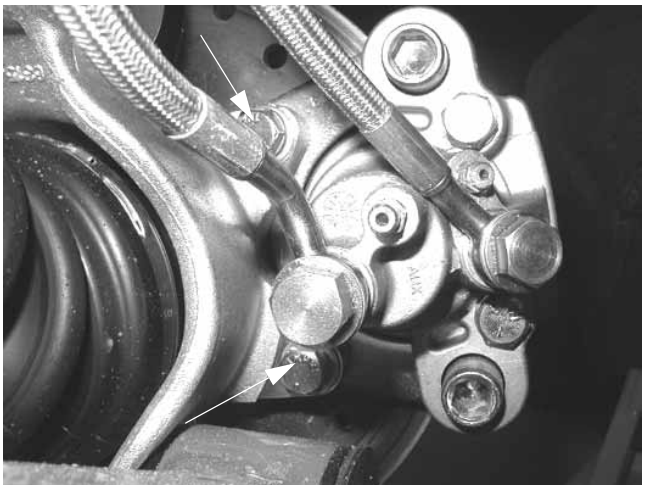
1. Support the machine. Remove the rear tire.
2. Remove the slide pin clips from the slide bolt.



3. Loosen the slide pins with a hex wrench.



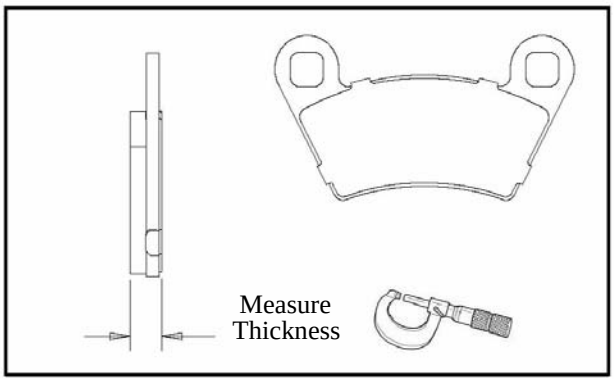
4. Remove caliper mounting bolts and lift caliper off of disc.



NOTE: When removing caliper, be careful not to damage brake line. Support caliper so as not to kink or bend brake line.

5. Push caliper pistons into caliper bore slowly with pads installed.
6. Remove the caliper slide pins and remove the brake pads from the caliper.

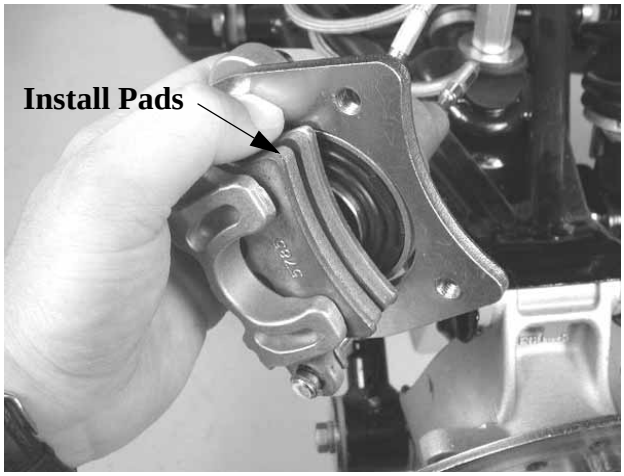
7. Clean the caliper with brake cleaner or alcohol.
8. Measure the thickness of the pad material. Replace pads if worn beyond the service limit.



= In. / mm.
Rear Brake Pad Thickness **Service Limit: .180" (4.6 mm)**

Sportsman Rear Pad Installation

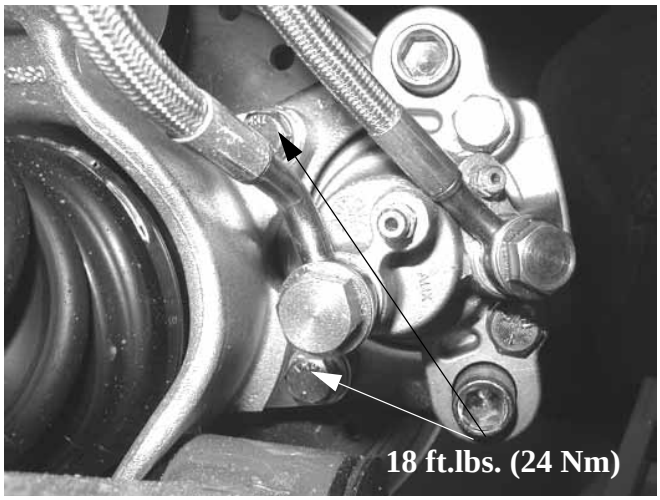
1. Install new brake pads in caliper body.



WARNING

If the brake pads are contaminated with grease, oil, or liquid soaked do not use the pads, use only new clean pads.

2. Install and tighten the slide pin with a hex wrench.
3. Install caliper and torque the mounting bolts to specification.



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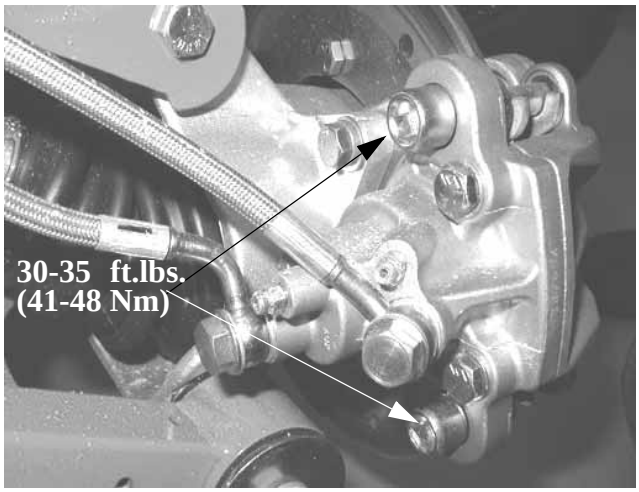
Caliper Mount Bolt Torque:
18 ft.lbs. (24 Nm)

4. Install the slide bolt snap ring. Torque the slide pin to specification.



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Caliper Slide Bolt Torque:
30-35 ft.lbs. (41-48Nm)

5. Slowly pump the brake lever until pressure has been built up. Maintain at least 1/2, (12.7 mm) of brake fluid in the reservoir to prevent air from entering the master cylinder.
6. It is recommended that a burnishing procedure be performed after installation of new brake pads to extend service life and reduce noise.

Brake Burnishing Procedure

Start machine and slowly increase speed to 30 mph. Gradually apply brakes to stop machine. Allow pads and disc to cool sufficiently during the procedure. Do not allow pads or disc to become hot or warping may result. Repeat this procedure 10 times.

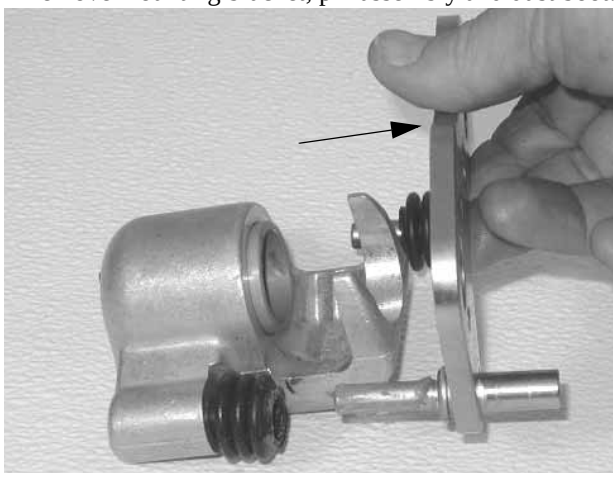
X2 REAR CALIPER

Removal

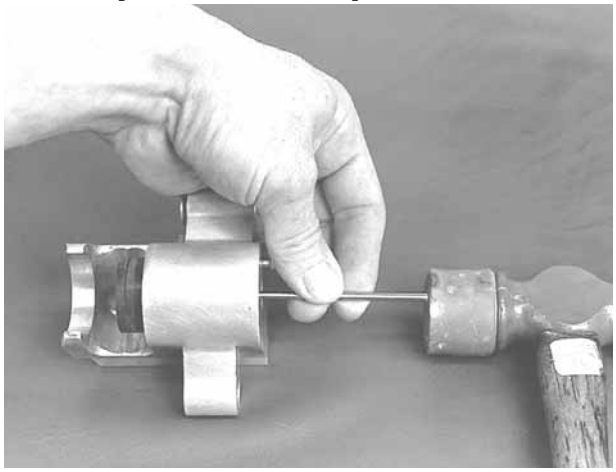
> **⚠ CAUTION**
>
> Use care when supporting vehicle so that it does not tip or fall. Severe injury may occur.

1. Clean caliper area before removal.
2. Place a container below the caliper to catch brake fluid that will drain from the brake line. Remove brake line from caliper

3. Remove the two caliper mounting bolts and the caliper.
4. Loosen the adjuster screw and remove the brake pads.
5. Remove mounting bracket, pin assembly and dust boot.

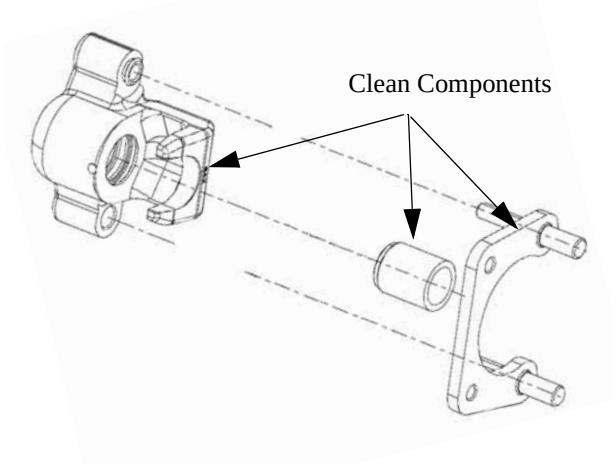


6. Remove piston, dust seals and piston seals.



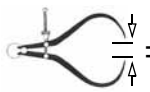
7. Clean the caliper body, piston, and retaining bracket with brake cleaner or alcohol.

NOTE: Be sure to clean seal grooves in caliper body.



Inspection

1. Inspect caliper body for nicks, scratches or wear. Measure bore size and compare to specifications. Replace if damage is evident or if worn beyond service limit.

 **= In. / mm.**

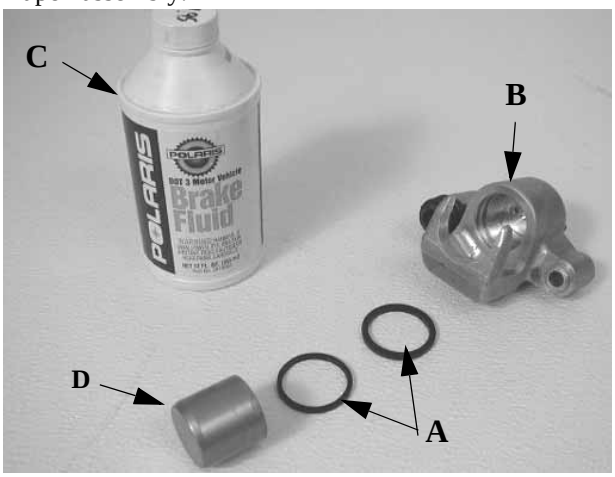
Rear Caliper Piston Bore I.D.
Service Limit: 1.193" (30.30 mm)

2. Inspect piston for nicks, scratches, wear or damage. Measure diameter and replace if damaged or worn beyond service limit.

3. Inspect the brake disc and pads as outlined for brake pad replacement in this section. See "BRAKE PAD INSPECTION" earlier in this chapter.

Reassembly

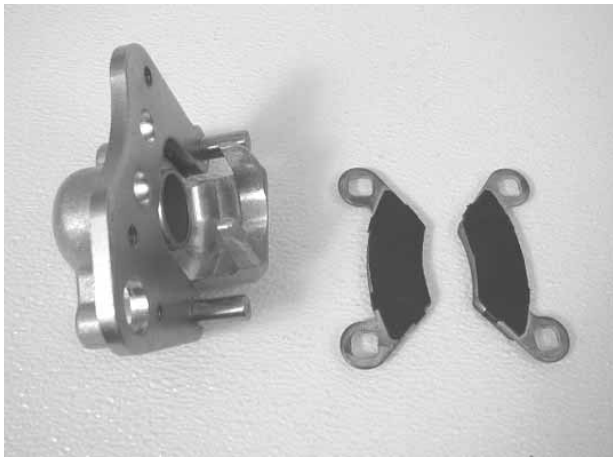
1. Install new caliper seals (A) in the caliper body (B). Be sure groove is clean and free of residue or brakes may drag upon assembly.



2. Coat piston with clean Polaris DOT-**approved** Brake Fluid (C). Install piston (D) with a twisting motion while pushing inward. Piston should slide in and out of bore smoothly, with light resistance.

3. Lubricate the mounting bracket pins with Polaris Premium All Season Grease (**PN 2871423**), and install the rubber dust seal boots.

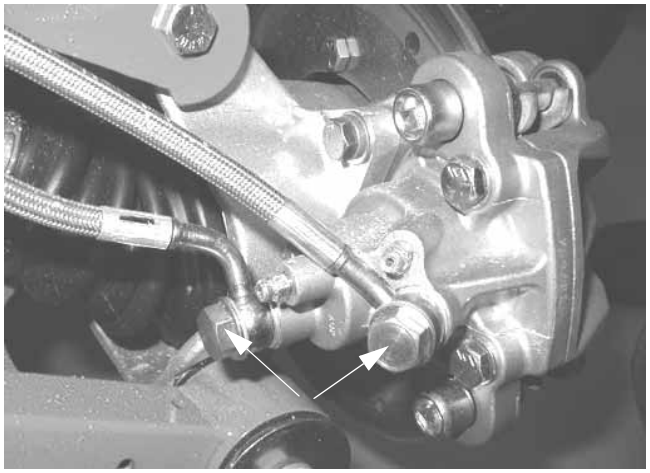
4. Compress the mounting bracket and make sure the dust seals are fully seated. Install the brake pads. Clean the disc and pads with brake parts cleaner or denatured alcohol to remove any dirt, oil or grease.



SPORTSMAN REAR CALIPER

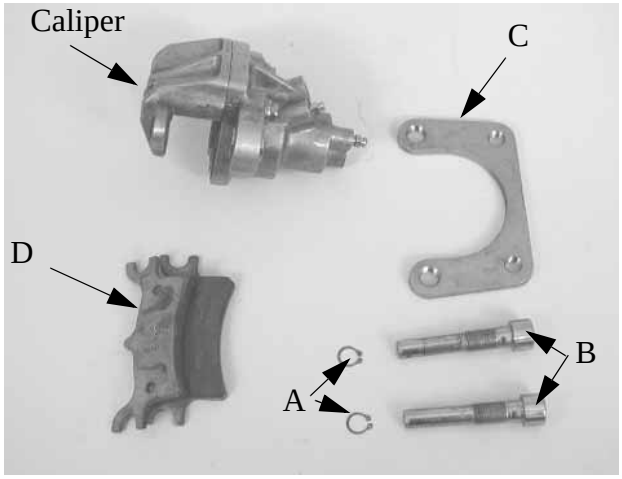
Removal and Inspection

1. Clean caliper area before removal.
2. Using a flare nut wrench, remove hand brake (inner) and auxiliary brake (outer) lines (arrows). Place a container to catch brake fluid draining from brake lines.

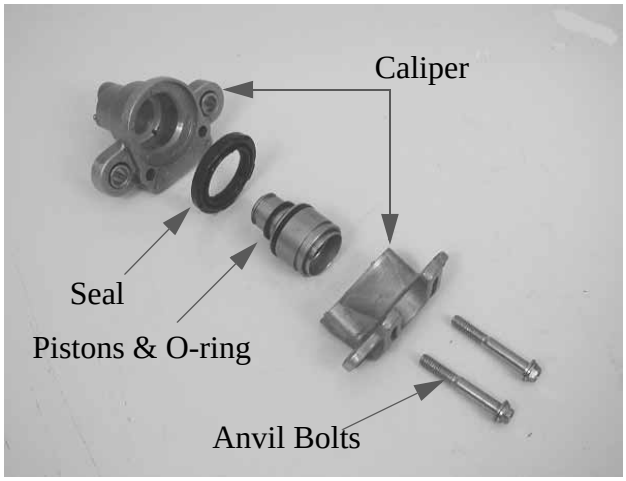


3. Remove the two caliper mounting bolts and the caliper.

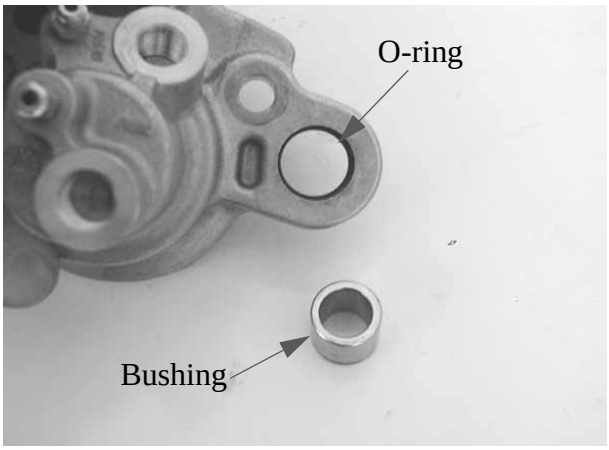
4. Remove the slide bolt snap rings (A), the slide pins (B), the bracket pad (C), and the brake pads (D).



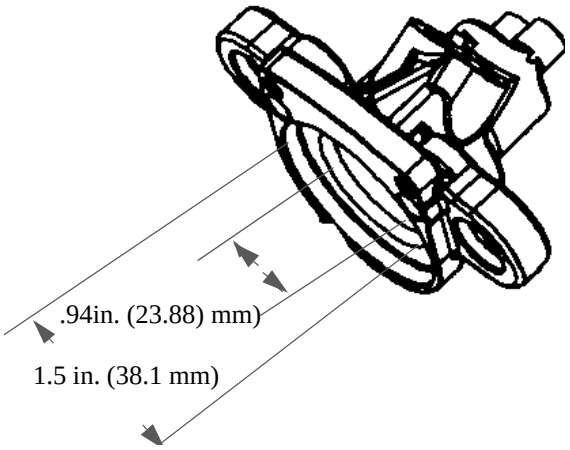
5. Remove the anvil bolts and separate caliper halves and remove pistons with piston pliers.



6. Remove seals and O-rings. Clean the O-ring grooves.
7. Clean disc, caliper body, and pistons with brake cleaner or alcohol.
8. Remove the slide bolt bushings. Inspect the bushings and O-rings and replace if necessary.

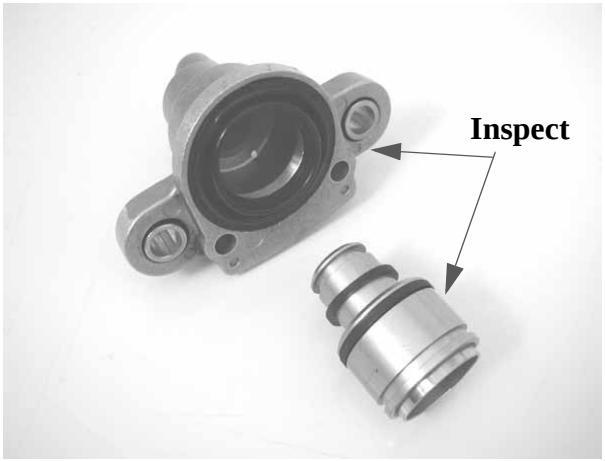


9. Measure the inside diameter of the rear caliper. The caliper body is a 2-step piston. The rear step is measured as well as the outside step.



= In. / mm.
Rear Caliper Piston Bore I.D. **Inner Bore Service Limit: .94" (23.88 mm)** **Outer Bore Service Limit: 1.5" (38.1 mm)**

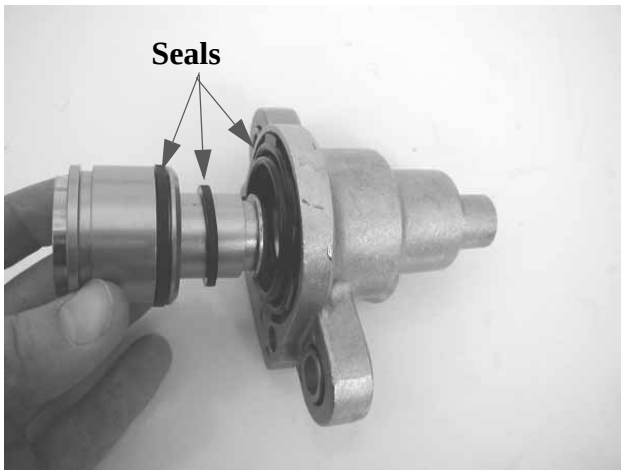
10. Inspect caliper piston bore for scratches, severe corrosion, or galling and replace if necessary.



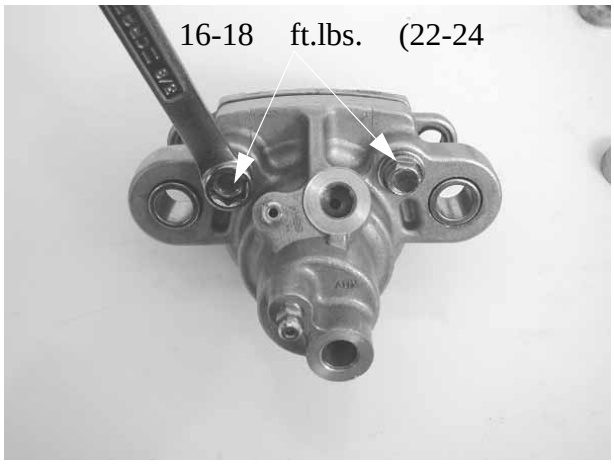
11. Inspect surface of caliper piston for nicks, scratches, or damage and replace if necessary.

Assembly

1. Install new O-rings in the slide bolt bushing holes. Be sure O-ring and seal grooves are thoroughly cleaned of all residue, or piston may bind in bore. Apply brake fluid to piston seals and install carefully with a twisting motion to ease assembly until fully seated.



2. Carefully assemble caliper body, making sure O-rings are properly positioned in groove. Tighten the caliper anvil bolts and then torque the anvil bolts evenly to specification.



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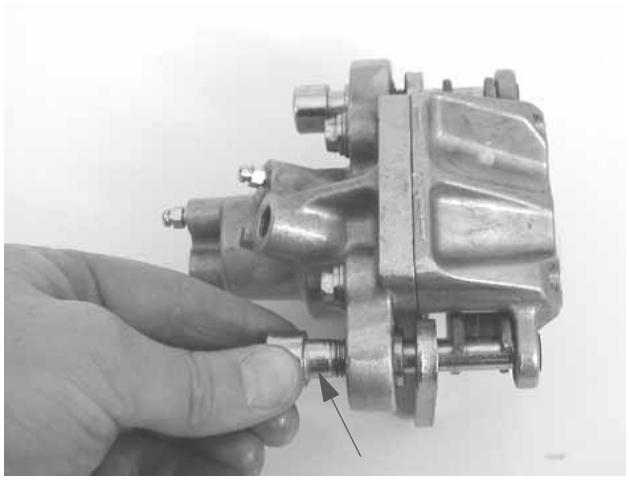
Caliper Anvil Bolt Torque: **16-18 ft.lbs. (22-24 Nm)**

3. Install brake pads in caliper body with friction material facing each other. Install the slide pins and the slide pin retaining rings. Torque the slide pins to specification.

NOTE: The slide pins should be torqued when installed on caliper mount.



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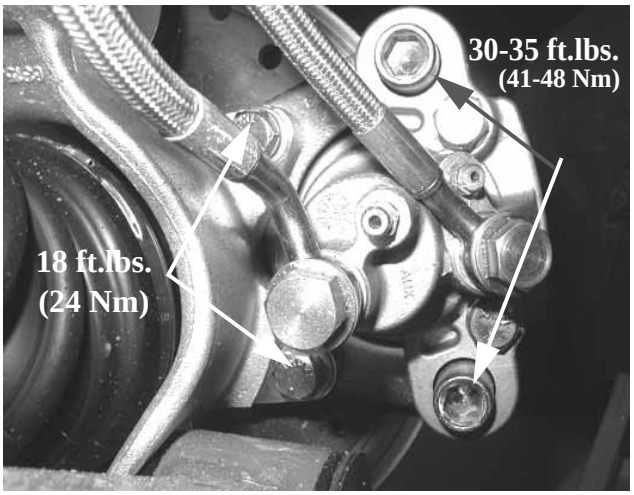
Slide Pin Torque: **30-35 ft.lbs. (41-48 Nm)**

4. Install caliper and torque mounting bolts to specification.



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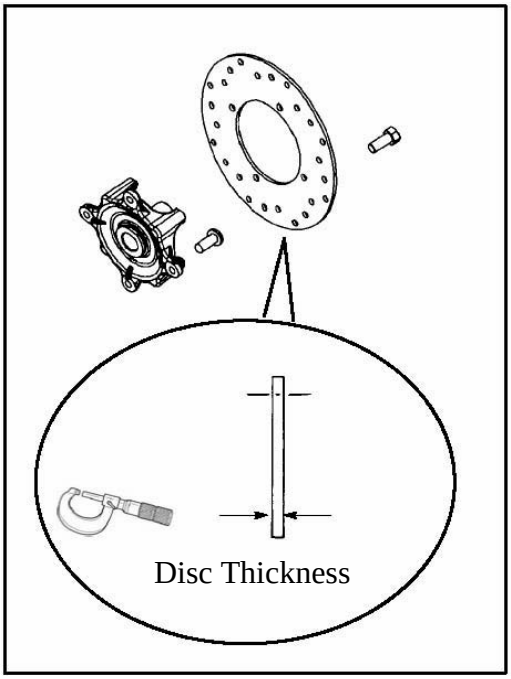
Caliper Mounting Bolt Torque: **16-18 ft.lbs. (22-24 Nm)**

5. Install brake line and tighten securely with a line wrench. Torque the brake lines to the proper torque specification.
6. Follow bleeding procedure outlined in the "BLEEDING PROCEDURE" in this chapter.
7. Field test unit for proper braking action before putting into service. Inspect for fluid leaks and firm brakes. Make sure the brake is not dragging when lever is released. If the brake drags, re-check assembly and installation.

REAR BRAKE DISC

Inspection

1. Visually inspect disc for scoring, scratches, or gouges. Replace the disc if any deep scratches are evident.
2. Use a micrometer and measure disc thickness at 8 different points around perimeter of disc. Replace disc if worn beyond service limit.



= In. / mm.
Brake Disc Thickness: **Service Limit: .170" (4.318 mm)**

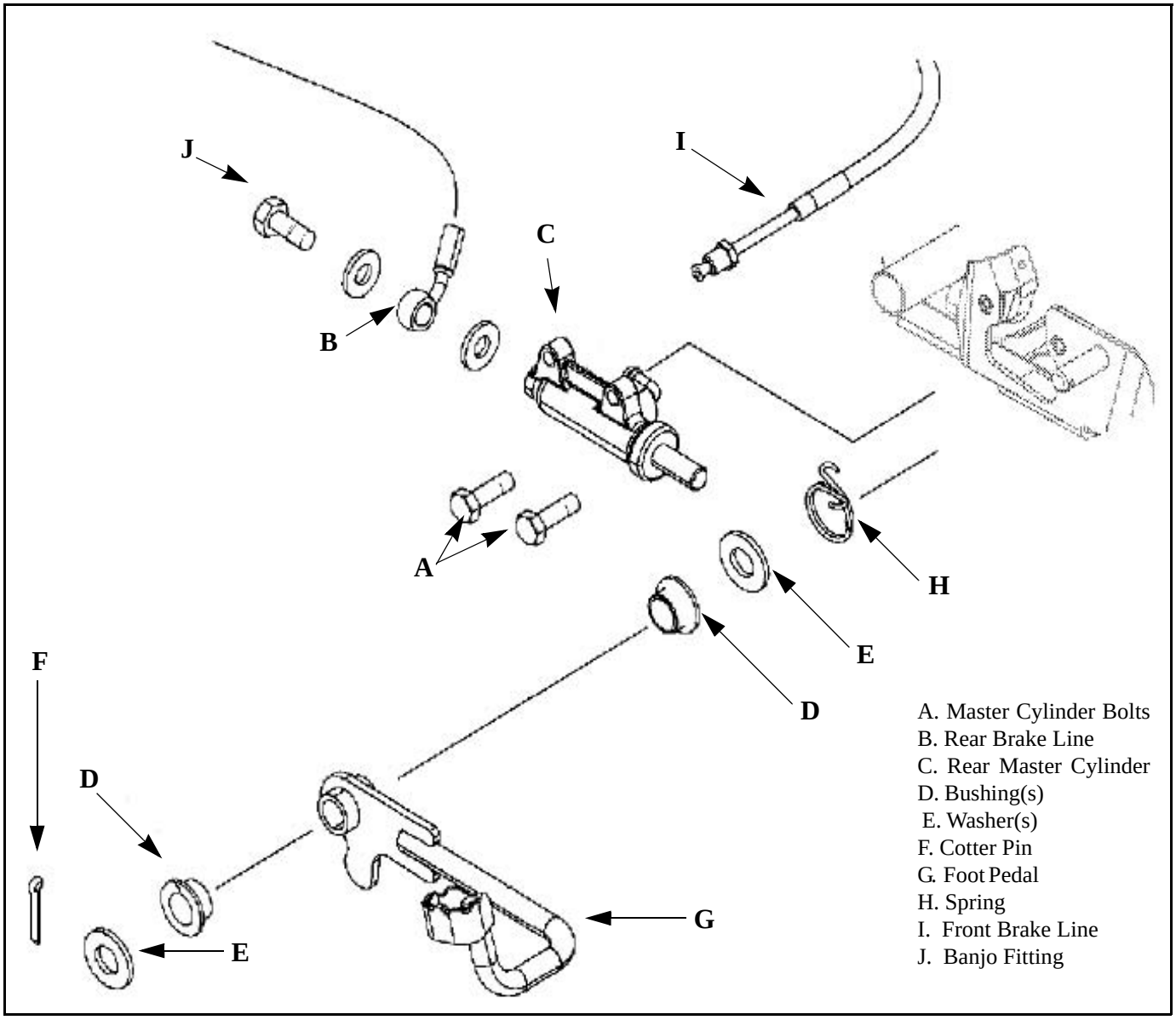
= In. / mm.
Brake Disc Thickness Variance: **Service Limit: .002" (.051 mm)** Between Measurements

3. Mount dial indicator and measure disc runout. Replace the disc if runout exceeds specifications.

= In. / mm.
Brake Disc Runout **Service Limit: .010" / .254 mm**

REAR MASTER CYLINDER

X2 Exploded View



Overview

Polaris disc brake systems are light weight, low maintenance and perform well in the conditions ATV's routinely encounter. However, there are a few things to remember when replacing disc brake pads or performing brake system service to ensure proper system function and maximum pad service life.

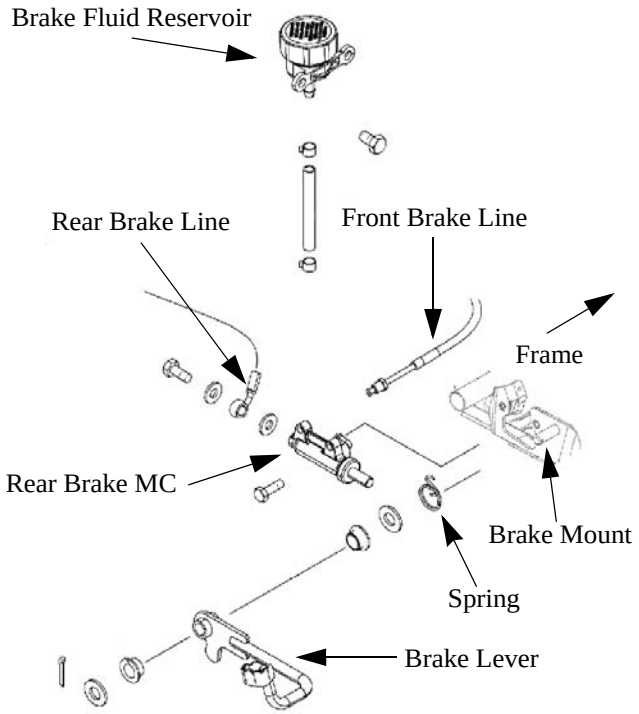
- Perform a brake burnishing procedure after installing new pads to maximize service life.
- Optional pads are available to suit conditions in your area. Select a pad to fit riding style and environment.
- Do not over-fill the master cylinder fluid reservoir.
- Make sure the brake lever and pedal returns freely and completely.
- Adjust stop pin on caliper (if applicable) after pad service.
- Check and adjust master cylinder reservoir fluid level after pad service.
- Make sure atmospheric vent on reservoir is unobstructed.
- Test for brake drag after any brake system service and investigate cause if brake drag is evident.
- Make sure caliper moves freely on guide pins (where applicable).
- Inspect caliper piston seals for foreign material that could prevent caliper pistons from returning freely.

⚠ CAUTION

Use only DOT-approved brake fluid as an assembly aid for all procedures described in this chapter to prevent brake system contamination.
DO NOT USE LUBRICANTS OF ANY KIND FOR ASSEMBLY, AS THEIR USE CAN CAUSE RUBBER COMPONENTS TO SWELL.

X2 Rear Master Cylinder Removal and Installation

1. Remove the RH footwell to gain access to the rear master cylinder.
2. If required, remove the rear brake line from the master cylinder. Use a suitable container to catch the brake fluid. Dispose of brake fluid properly.



3. Remove the two bolts that secure the rear master cylinder to the frame. Replace parts as needed.
4. To install the rear master cylinder, mount the master cylinder to the frame and torque bolts to specification.

= T
Master Cylinder to Frame Bolt Torque: **8 ft.lbs. (11 Nm)**

5. Reinstall the brake line and torque the banjo bolt to specification.

= T
Banjo Bolt Torque: **15 ft.lbs. (21 Nm)**

6. Perform brake bleeding procedures as outlined in this chapter.

Sportsman Rear Master Cylinder Removal / Installation

1. Remove the RH footwell to gain access to the rear master cylinder.
2. Remove the rear brake lines from the master cylinder. Use a suitable container to catch the brake fluid. Dispose of brake fluid properly.
3. Remove the two bolts that secure the rear master cylinder to the brake mount plate. Replace parts as needed.
4. To install the rear brake master cylinder, mount the master cylinder to the mount plate and torque bolts to specification.

= T
Master Cylinder to Frame Bolt Torque: **8 ft.lbs. (11 Nm)**

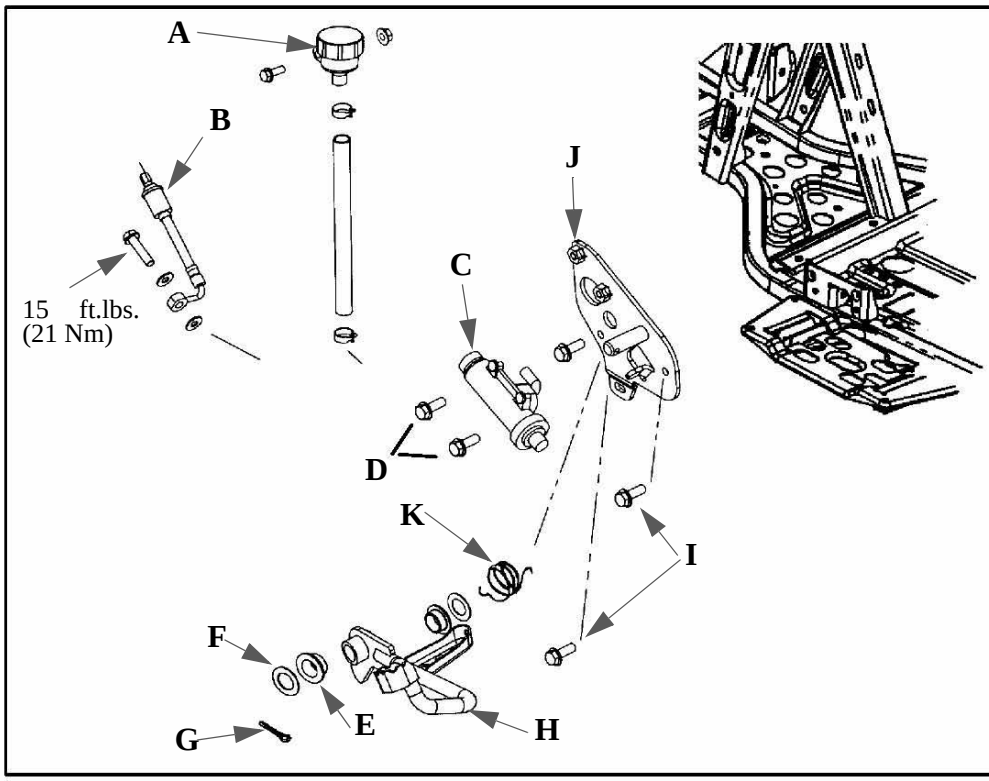
5. Reinstall the brake line and torque the banjo bolt to specification depending on the style of fitting.

= T
Banjo Bolt Torque: **15 ft.lbs. (21 Nm)**

= T
Flare Stye Brake Line Torque: **12-15 ft.lbs. (16-20 Nm)**

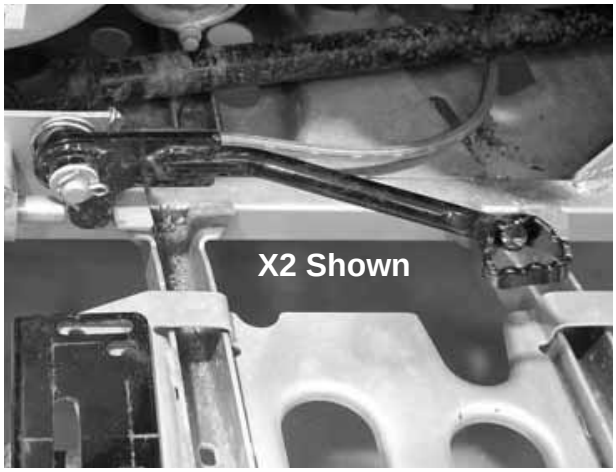
6. Perform brake bleeding procedures as outlined in this chapter.

SPORTSMAN



A. Brake Reservoir
B. Rear Foot Brake Line
C. Rear Master Cylinder
D. Master Cylinder Bolts
E. Bushing
F. Washer
G. Cotter Pin
H. Foot Pedal
I. Mount Plate Bolts
J. Mount Plate
K. Spring

Pedal Removal and Installation



1. Remove the RH footwell to gain access to the rear master cylinder.
2. Remove the cotter key.
3. Remove the washers, bushings, and tension spring.
4. Reverse the steps for installation, use a new cotter key during installation.

TROUBLESHOOTING

Brakes Squeal

- Dirty/contaminated friction pads
- Improper alignment
- Worn disc
- Worn disc splines

Poor Brake Performance

- Air in system
- Water in system (brake fluid contaminated)
- Caliper/disc misaligned
- Caliper dirty or damaged
- Brake line damaged or lining ruptured
- Worn disc and/or friction pads
- Incorrectly adjusted lever
- Incorrectly adjusted stationary pad
- Worn or damaged master cylinder or components
- Improper clearance between lever and switch

Lever Vibration

- Disc damaged
- Disc worn (runout or thickness variance exceeds service limit)

Caliper Overheats (Brakes Drag)

- Compensating port plugged
- Pad clearance set incorrectly
- Auxiliary brake pedal incorrectly adjusted
- Brake lever or pedal binding or unable to return fully
- Parking brake left on
- Residue build up under caliper seals
- Operator riding brakes

Brakes Lock

- Alignment of caliper to disc

NOTES

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ELECTRICAL

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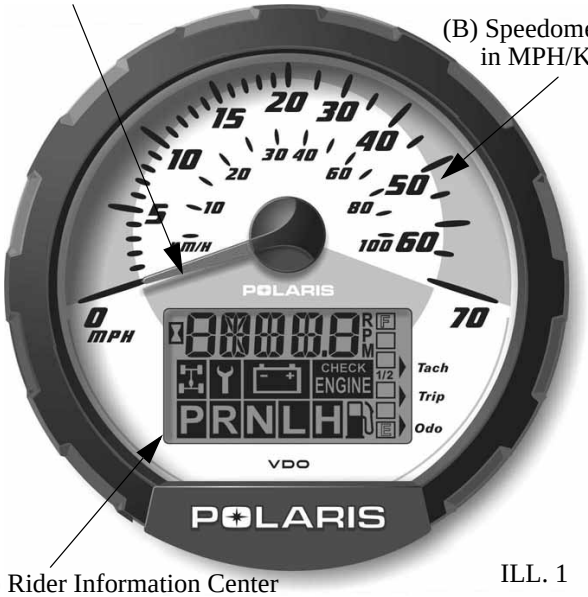
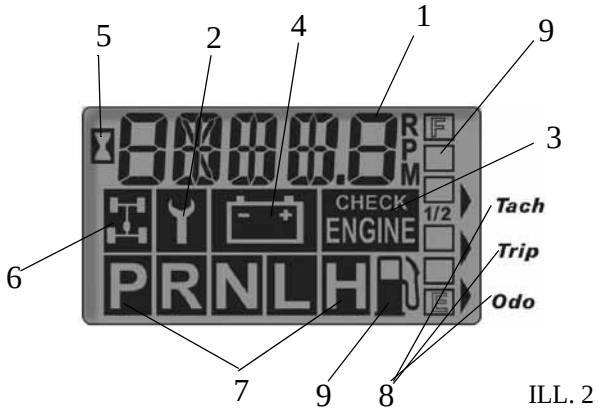
INSTRUMENT CLUSTER

Overview

(A) Speedometer Needle (flashes during warning condition)



ILL. 1



ILL. 2

Introduction

Refer To Illustration 1:

The Polaris ATV Instrument Cluster is powered by battery voltage (12 VDC) and requires inputs from the engine RPM, transmission gear, and speed sensor for proper operation. Two harnesses plug into the cluster head; one from the speed sensor, and one from the vehicle main harness. A non-serviceable internal memory battery maintains odometer and hour meter data when the machine is not running. The illumination lamp inside the gauge is non-serviceable and is designed to last for the life of the unit. (A) The speedometer needle indicates speed from an electronic speed sensor. The needle also flashes during a warning condition. The speedometer needle indicates speed in MPH and KPH. **NOTE: A flashing needle could indicate a hot engine, low battery warning, or the No. 10 Pin could be grounded.** (B) The speedometer face features numbers in Mile Per Hour (MPH) and Kilometers Per Hour (KPH). (C) The Rider Information Center performs a number of functions (See Illustration 2):

1. Odometer / Tachometer / Trip meter / Hour Meter / Clock

- **Odometer** records the miles traveled by the ATV.
- **Tachometer** displays engine RPM. This feature will also display with the vehicle in motion NOTE: Small RPM fluctuations from day to day are normal because of changes in humidity, temperature, and elevation
- **Trip meter** records the miles traveled by the ATV if reset before each trip or total miles to 999. To reset the trip meter, select the trip meter mode. Press and hold the mode button (override button) until the total changes to 0. NOTE: In the Rider Information Center, the trip meter display contains a decimal point, but the odometer displays without a decimal point.
- **Hour meter** logs the total hours the engine has been in operation.
- **Clock** - displays hours and minutes.

2. Programmable Service Interval / Diagnostic Mode

- **Service Interval** - The purpose of the programmable service interval is to provide the consumer and the dealer with a convenient way to schedule routine maintenance. When the ATV leaves the factory, this feature is set at “50 hours". When the first 50 hours of engine operation are finished the wrench icon will flash for 10 seconds each time the ATV is started as a reminder that ATV maintenance is due. NOTE: To reset the Service Interval, follow the directions for “SETTING NEW SERVICE INTERVAL” later in this chapter.

3. Check Engine Warning Indicator

- The word HOT will display alpha numerically when the engine is overheating. Do not continue to operate the ATV if this warning appears. Refer to Chapter 3 “COOLING SYSTEM TROUBLESHOOTING” for help with diagnosis of overheating.

4. High/Low Battery Voltage

- This warning usually indicates that the ATV is being operated at an RPM too low to keep the battery charged. A low battery warning may also occur under normal operation if the machine is at idle and high electrical load (lights, cooling fan, accessories) is applied. Driving at a higher RPM or connecting a battery charger will usually clear the warning. This indicator may also turn in the event of an overcharging situation, such as a faulty voltage regulator.

5. Engine Hour Display Indicator

- Displays number of hours of engine operation.

6. AWD Indicator

- Illuminates when the electrical portion of the AWD system is enabled.

7. Gear Indicator

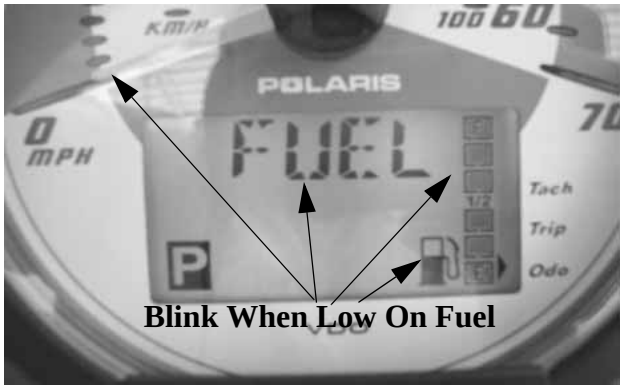
- Specifies what position the shift lever and transmission are in. This area is blank if a fault occurs.

8. Mode Indicator

- Indicates which modes are being utilized.

9. Fuel Gauge

- The segments of the fuel gauge indicate the level of fuel in the fuel tank. When the last segment clears, a low fuel warning is activated. All related icons will flash, "FUEL" will display in the LCD, and the speedometer needle will blink. If riding, be sure to refuel immediately.



Instrument Cluster Diagnostic Mode

NOTE: This gauge features auto shut-off protection if the voltage on the DC bus is excessive. This is usually the result of an open battery condition, and the gauge is designed to survive such an event.

NOTE: If the gauge will not indicate what gear it is in and will not allow AWD operation, AWD can still be enabled by holding in the mode/override button.

1. Turn the key switch off and wait 10 seconds.
2. Set the park brake and shift the transmission to neutral.
3. Hold the mode/reverse override button as you turn the key switch on.
4. Release the switch as soon as the display is activated.

Use the mode/reverse override button to toggle through the diagnostic screens.

NOTE: The initial screen display refers to the software version installed on your ATV. This information is only displayed briefly.

Screen 1 - Clock: This screen allows for setting the time of day. To reset the clock:

1. Enter the diagnostic mode.
2. Toggle to the clock screen.
3. Press and hold the mode button until the hour display flashes. Release the button.
4. Press and release the mode button once to advance the setting by one hour. Press and hold the mode button to advance the hours quickly.
5. When the desired hour is displayed, wait approximately four seconds, until the minute display flashes.
6. When the display stops flashing, the mode has been set.
7. Use the same procedure to reset the minutes.

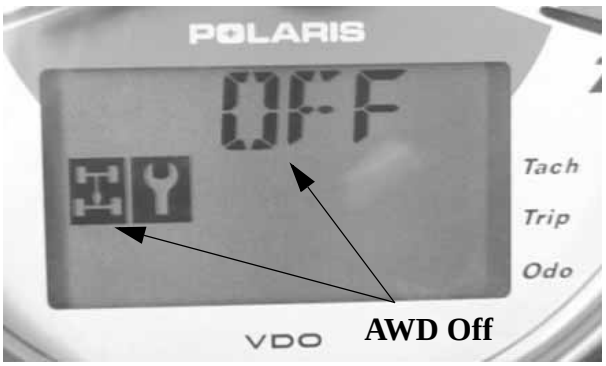
Screen 2 - Battery: This screen indicates battery voltage. Refer to Ill. 2.

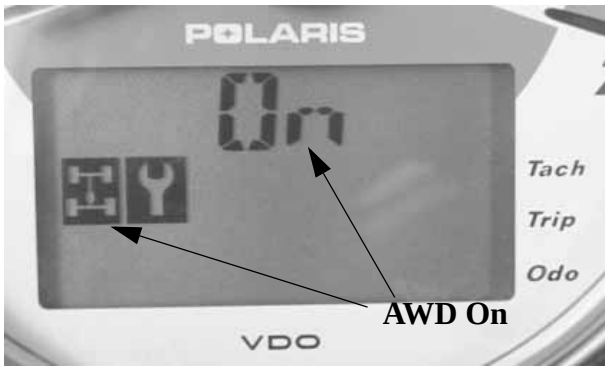
Ill. 2

Screen 2 - Tachometer: (Ill. 3) indicates engine rpm.

Ill.3

Screen 3 - AWD Diagnostic Screen: This screen indicates whether or not current is flowing through the AWD coil on models with AWD.

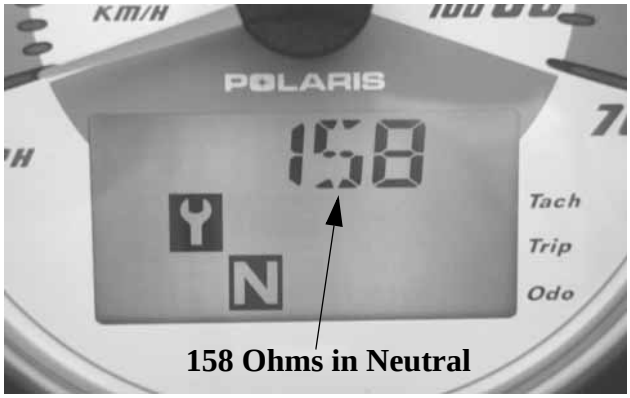


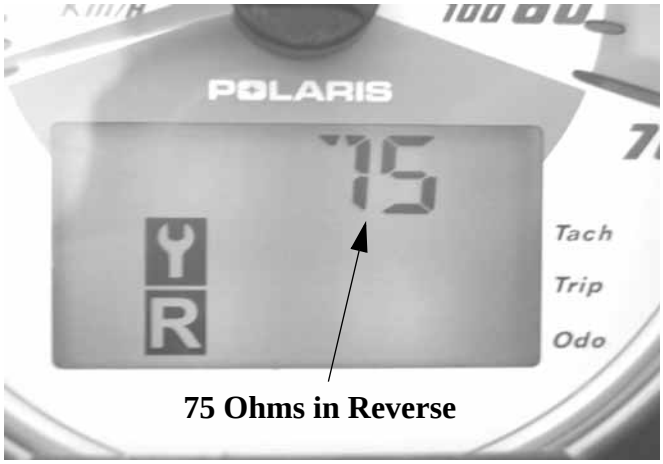


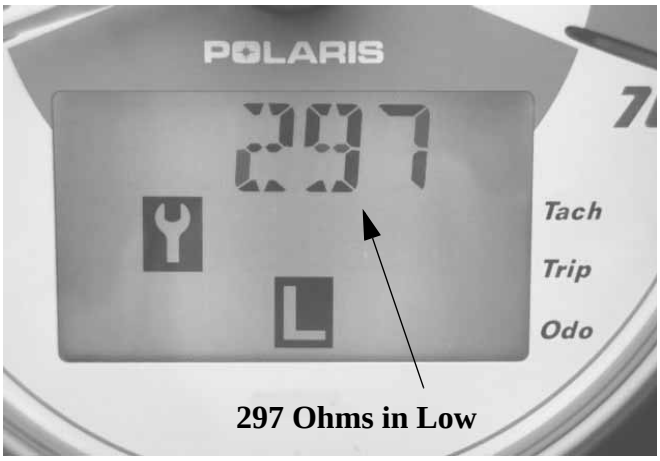
Screen 4 - Gear Circuit Diagnostic:

This screen displays the resistance value (in ohms) being read at the gear switch input of the gauge.

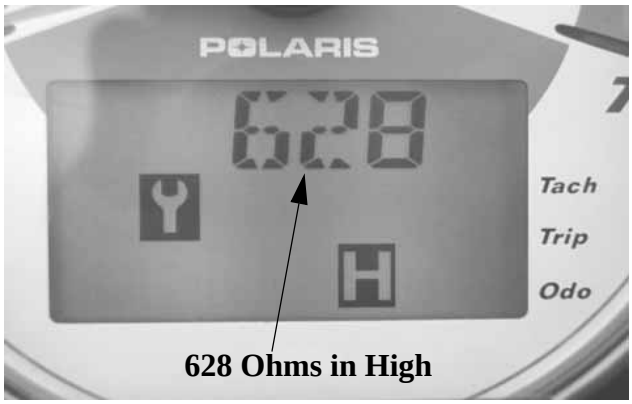
NOTE: 10--20% Variance from these reading is within normal parameters.







297 Ohms in Low

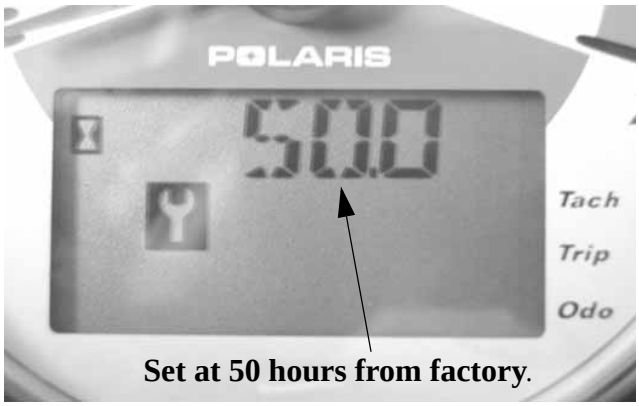


628 Ohms in High

Screen 5 - Programmable Service Interval:

The purpose of the programmable service interval is to provide the consumer and dealer with a convenient reminder for routine maintenance. When the ATV leaves the factory, this feature is set at 50 hours.

Once the service interval mode is set with the hours when service is due, the hours of actual engine operation are subtracted from the set hours until 0 is reached. When the counter reaches 0, the wrench icon will flash quickly for 10 seconds each time the vehicle is started as a reminder that the periodic maintenance is due.



Set at 50 hours from factory.

Setting A New Service Interval

1. While in the service interval mode, press and hold the mode/override button until the wrench icon flashes. When it begins to flash, release the button.
2. The setting will increase by one hour each time the button is pressed. Pressing and holding the button will allow the numbers to escalate much faster.
3. When the desired time increment is displayed, release the button and wait for the wrench to stop flashing. When the wrench stops blinking, your service hours are set.

NOTE: If you scroll past the intended number, hold the button down until the count turns over to 0. You can then reset the number.

Turn Service Interval OFF:

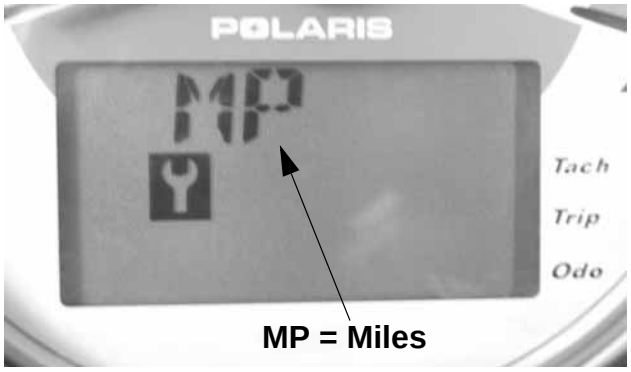
1. If the service interval is enabled (functioning) on your ATV and you wish to turn it off, toggle to the service interval mode.
2. Press and hold the mode button for approximately 7 seconds until the word OFF appears in the Rider Information Center. The service interval is now OFF. To enable (turn on) the service interval mode, repeat the steps above in “Setting Service Interval After Countdown”.

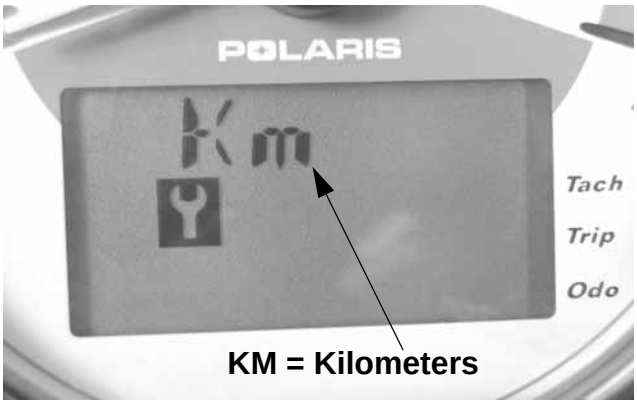
Change Service Interval Time

If you would like to change the service interval time, (example: change the interval from 50 hrs. to 55 hrs.). Follow the steps below:

1. While in the service interval mode, press and hold the mode button for approximately 7 seconds until the word OFF appears in the Rider Information Center.
2. Wait 5 seconds and then press the mode button in until the wrench icon flashes. Press the mode button again to set the desired service increment. Release the button and wait for the wrench icon to stop flashing. The new service interval is now set.

Screen 6 - Miles/Kilometers: toggle, The display in the trip meter and odometer can be changed to display either kilometers or miles. The current display mode will be shown as "KM" or "MP". To change, hold in the mode button until the letters flash, then press and release the button once. When the display stops flashing, the mode has been set.





NOTE: As long as you are in the diagnostic mode, the wrench icon will remain lit.

NOTE: To leave the diagnostic mode, turn the key switch off and on.

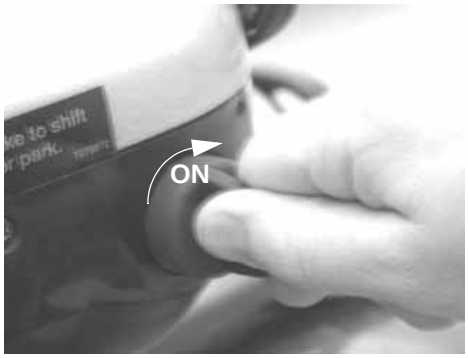
NOTE: Any movement of the tires will trigger the speedometer out of the diagnostic mode and into standard display mode.

EFI Diagnostic Mode

NOTE: The EFI diagnostic mode is intended to quickly view fault codes stored in the EFI module. Polaris dealers are equipped with the proper diagnostic tools to further diagnose the blink code.

To download blink codes (failure codes) from you EFI module:

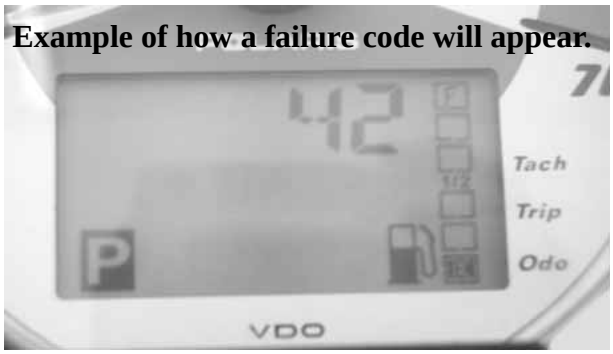
1. Be sure the ATV key switch is off and with the shifter is in Park.
2. Turn the key switch ON and OFF 3 times within 5 seconds, leaving the key switch in the 'ON' position on the third turn.



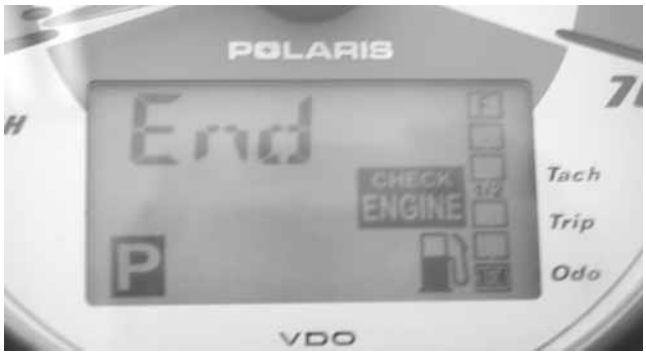
3. The word "Wait" will appear, the EFI module is now searching for blink codes. If any blink codes are stored they will display in numerical order on the instrument cluster.

NOTE: The check engine icon will flash during this mode.

Example of how a failure code will appear.



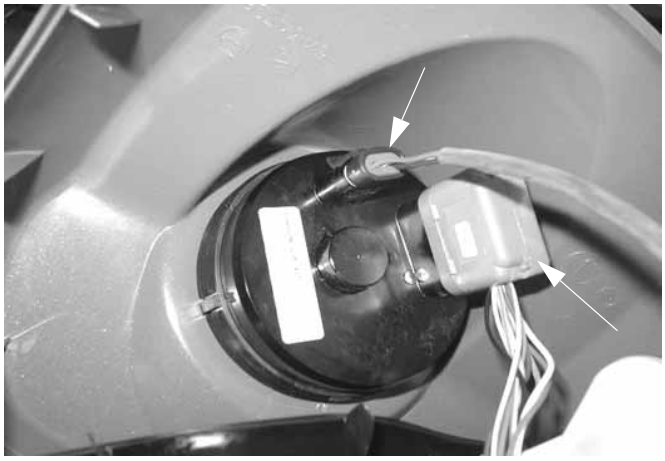
4. The word "End" will display after all of the codes have been displayed.



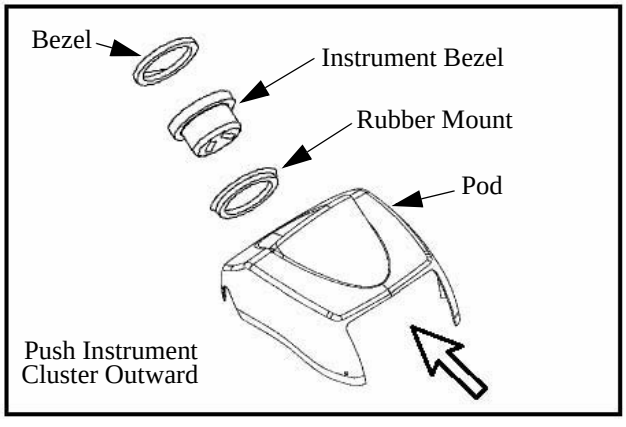
BLINK CODE	FAILURE DESCRIPTION
	No RPM Signal
21	Loss of Synchronization
45	Barometric Pressure Sensor: Circuit Low Input
46	Barometric Pressure Sensor: Circuit High Input
22	TPS: Open or Short Circuit to Ground
22	TPS: Short Circuit to Battery
23	RAM Error: Defective ECU
42	Engine Temp Sensor Circuit: Short to Ground
42	Engine Temp Sensor Circuit: Open or Short to Battery
51	Injector 1: Open Load
51	Injector 1: Short Circuit to Ground
51	Injector 1: Short Circuit to Battery
52	Injector 2: Open Load
52	Injector 2: Short Circuit to Ground
52	Injector 2: Short Circuit to Battery
54	Engine Temp Lamp: Open Load
54	Engine Temp Lamp: Short Circuit to Ground
54	Engine Temp Lamp: Short Circuit to Battery
55	Diag Lamp: Open Load
55	Diag Lamp: Short Circuit to Ground
55	Diag Lamp: Short Circuit to Battery
56	Pump Relay: Open Load
56	Pump Relay: Short Circuit to Ground
56	Pump Relay: Short Circuit to Battery
58	Cooling Fan: Open Load
58	Cooling Fan: Short Circuit to Ground
58	Cooling Fan: Short Circuit to Battery
41	Intake Air Temp Sensor: Open or Short Circuit to +Sensor Voltage
41	Intake Air Temp Sensor: Short Circuit to Ground
61	END of Check

Speedometer Removal

1. Remove the three screws that secure the headlight pod cover and disconnect the wire connectors from the instrument cluster.



2. Push the instrument cluster out from the backside of the pod, while securely holding the pod.



NOTE: Do not remove the rubber grommet in the pod. Only remove the rubber grommet if necessary. The bezel is a snap-on assembly and is a serviceable part.

Speedometer Installation

1. Spray a soap and water mixture onto the outer surface area of the instrument cluster. This will help the instrument cluster slide into the pod assembly more easily.

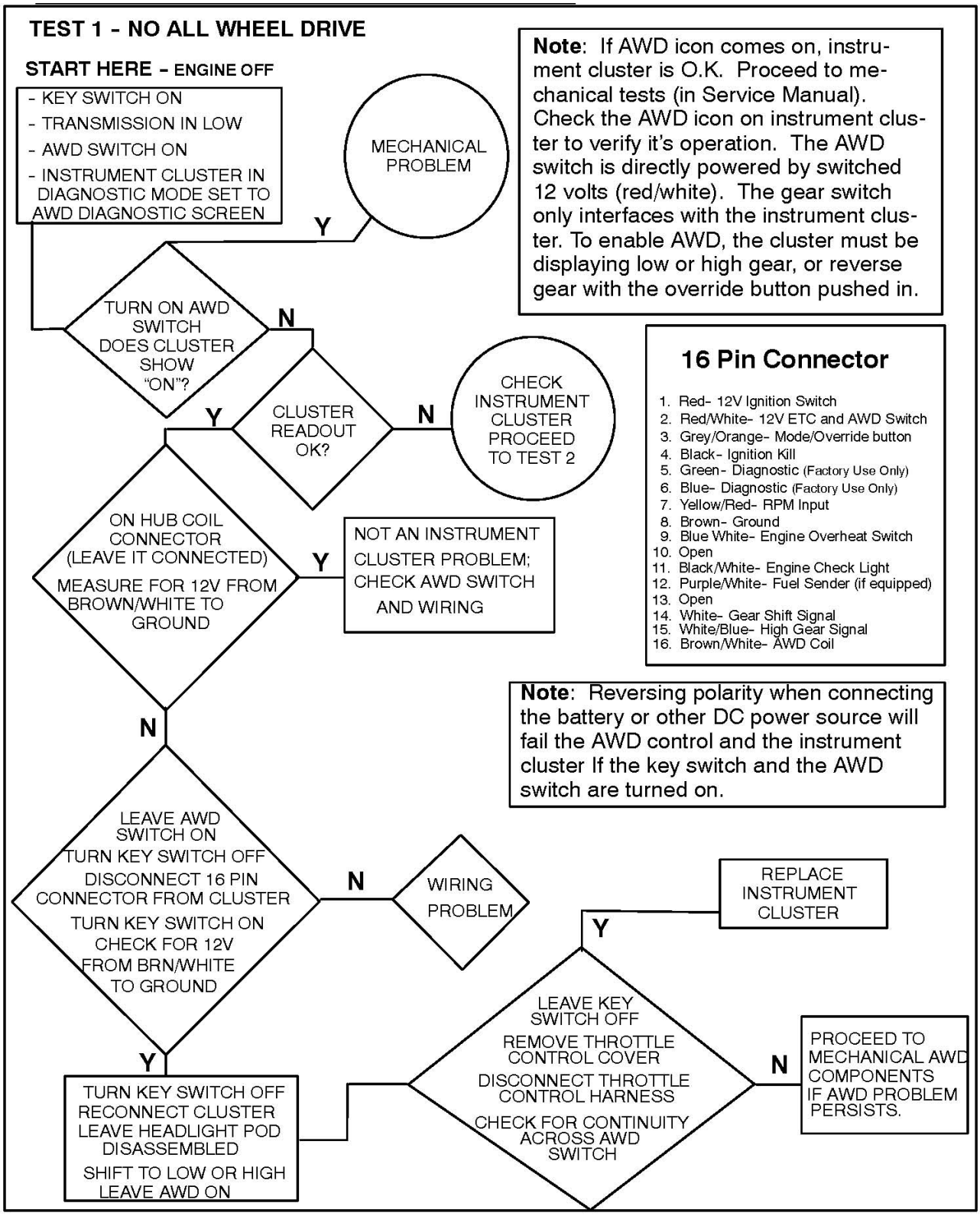
2. Be sure the rubber grommet inside the pod is fully installed and that the indexing key is in the headlight pod keyway.

3. Hold the pod assembly securely and insert the instrument cluster into the pod assembly. Twist the instrument cluster gently in a clockwise motion to properly seat the instrument cluster into the pod assembly. Apply pressure on the bezel while pressing down on the instrument cluster.

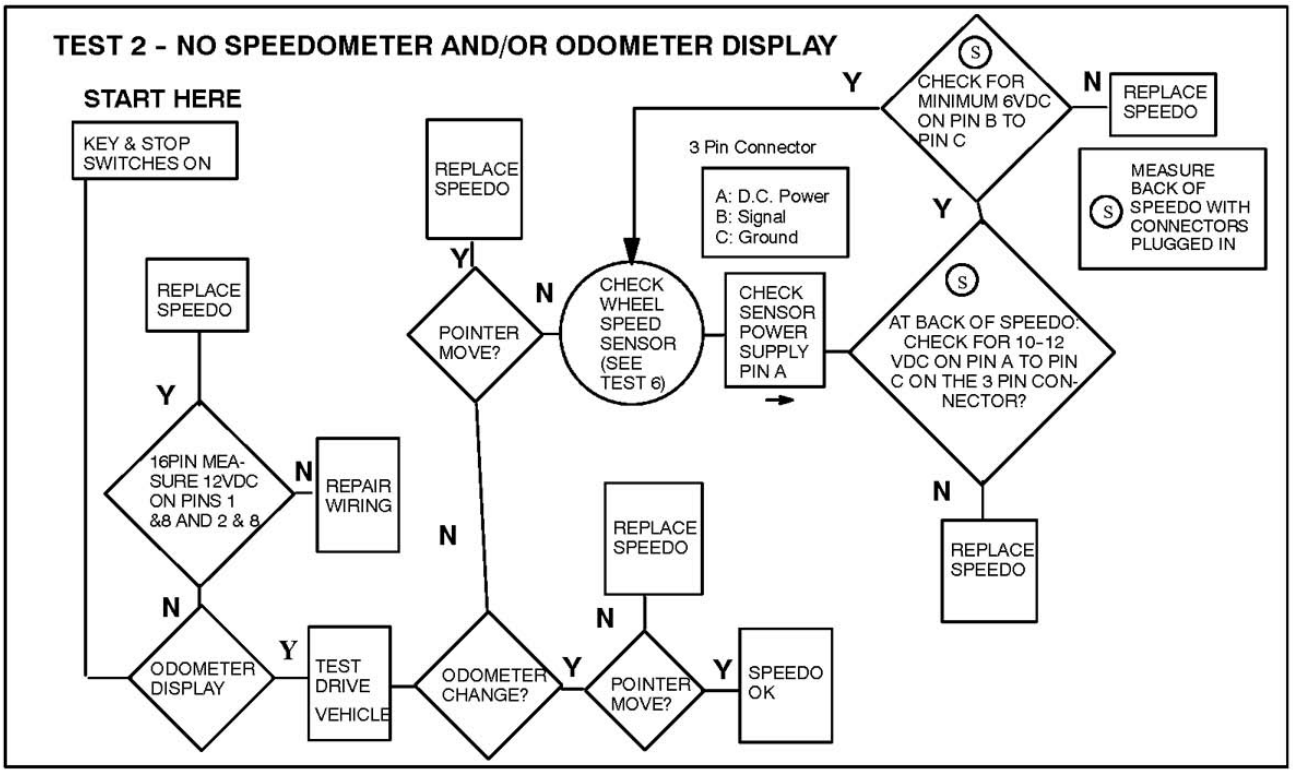
NOTE: Do not allow alcohol or petroleum products to come in contact with the instrument cluster lens.

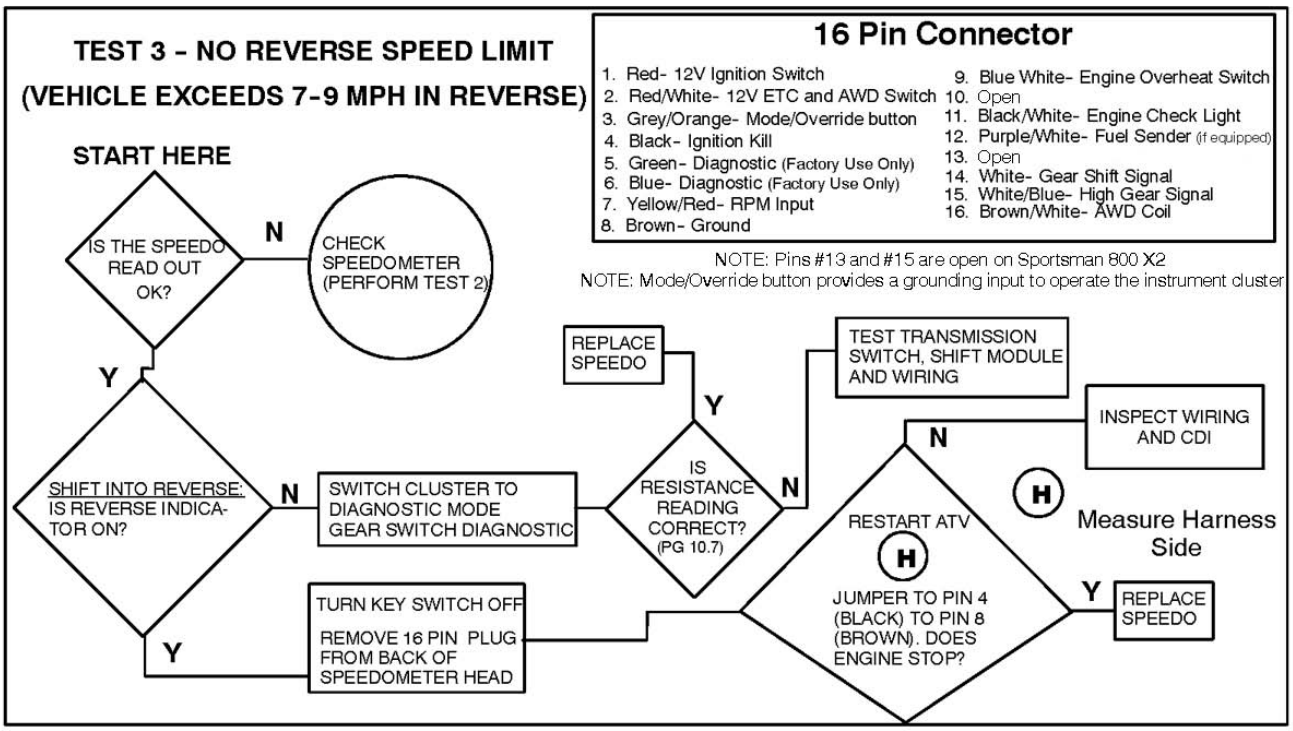
SPEEDOMETER TROUBLESHOOTING

Test 1 - No All Wheel Drive

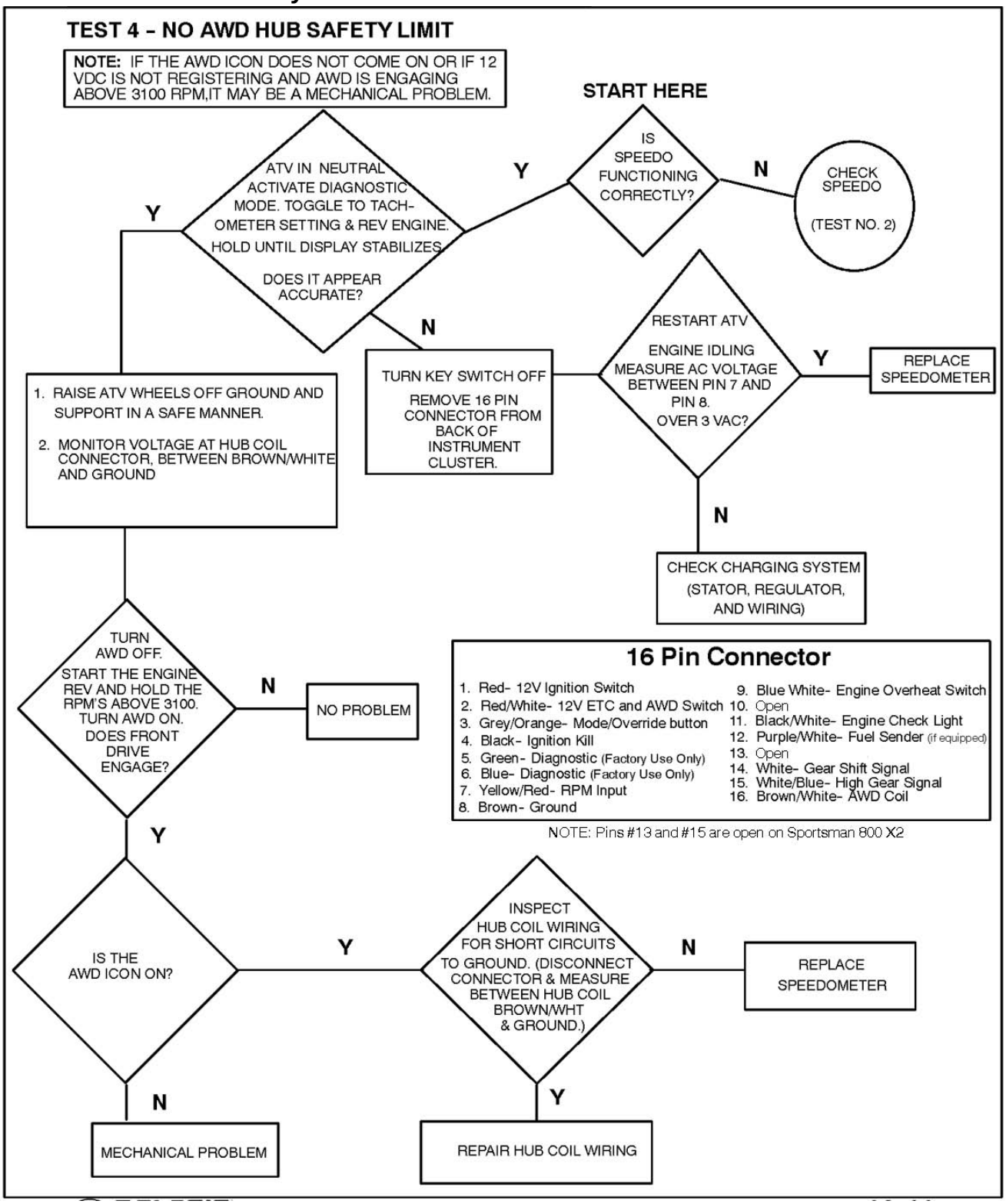


TEST 2 - No Display / TEST 3 - No Reverse Speed Limit





TEST 4 - No AWD Hub Safety Limiter



TEST 5 - Reverse Speed Limiter / TEST 6 - Speed Sensor

TEST 5 REVERSE SPEED LIMITER ACTIVATED IN FORWARD GEAR

(Engine loses spark when vehicle speed is above 7-9 mph.)

START HERE

INSTRUMENT CLUSTER FUNCTION OK?

CHECK SPEEDOMETER (PERFORM TEST 2)

Y

SHIFT TO LOW OR HIGH GEARS. IS REVERSE INDICATOR ICON ON OR GEAR ON?

DOES GEAR INDICATOR GO BLANK?

N

Y

CHECK TRANSMISSION SWITCH, RESISTOR MODULE AND RELATED WIRING

TURN KEY SWITCH OFF
REMOVE 16 PIN PLUG FROM BACK OF INSTRUMENT CLUSTER
RESTART ATV AND TEST DRIVE

CHECK FUEL & IGNITION SYSTEMS

Y

PROBLEM REMAINS?

N

REPLACE SPEEDOMETER

NOTE: OVERRIDE SWITCH PLAYS NO ROLE IN REVERSE GEAR OUTPUT

16 Pin Connector

1. Red- 12V Ignition Switch
2. Red/White- 12V ETC and AWD Switch
3. Grey/Orange- Mode/Override button
4. Black- Ignition Kill
5. Green- Diagnostic (Factory Use Only)
6. Blue- Diagnostic (Factory Use Only)
7. Yellow/Red- RPM Input
8. Brown- Ground
9. Blue White- Engine Overheat Switch
10. Open
11. Black/White- Engine Check Light
12. Purple/White- Fuel Sender (if equipped)
13. Open
14. White- Gear Shift Signal
15. White/Blue- High Gear Signal
16. Brown/White- AWD Coil

NOTE: Pins #13 and #15 are open on Sportsman 800 X2

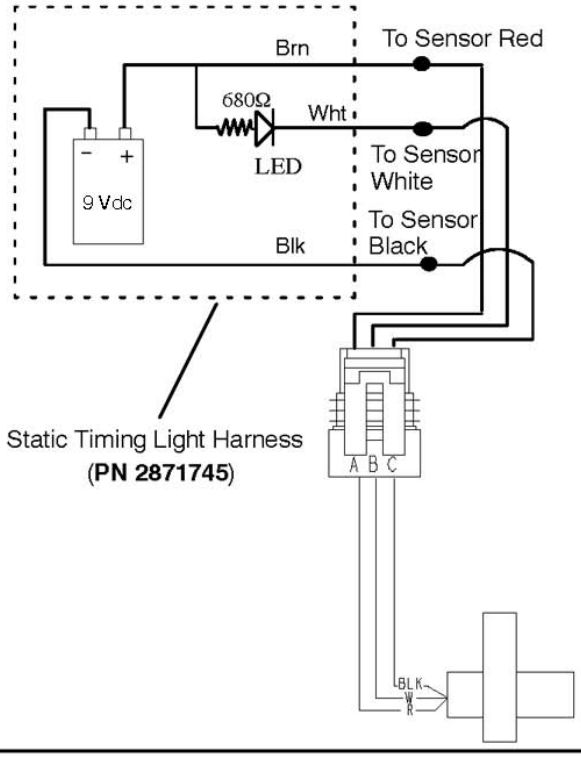
TEST 6 SPEED SENSOR

Tools Required:

- Static Timing Light Harness **(PN 2871745)**
- Hall Sensor Probe Harness **(PN 2460761)** or equivalent jumper wires.

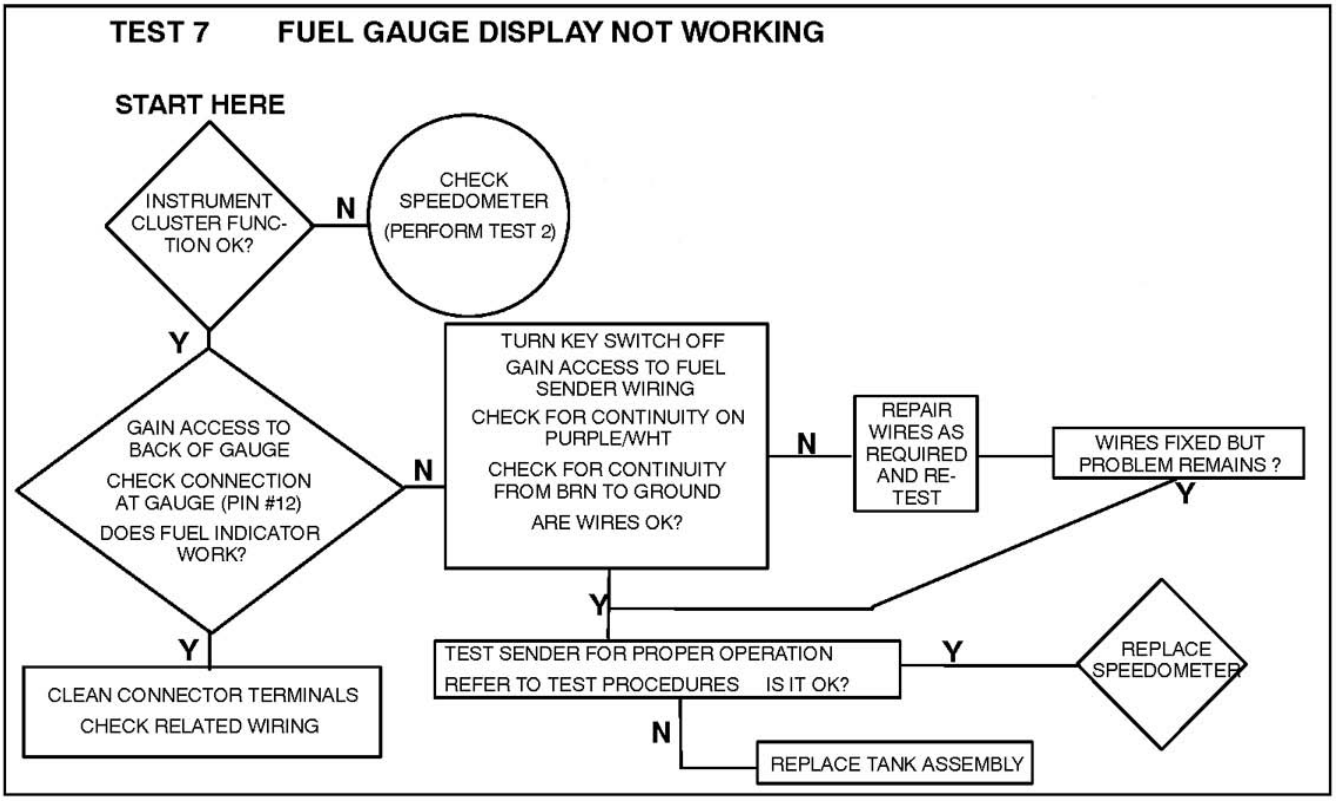
To test speed sensor:

1. Disconnect 3 Pin connector from speedometer.
2. Connect wires from test light to sensor 3 Pin connector as shown at right, using the Hall Sensor Probe Harness **(PN 2460761)** or jumper leads.
3. Elevate end of vehicle the sensor is located at until the tires are free to rotate.
4. Slowly turn the applicable wheel while observing the test light.
5. If light flashes, sensor is O.K. Be sure connections are good and 9 volt battery is in good condition.



Static Timing Light Harness
(PN 2871745)

TEST 7 - No Fuel Gauge / TEST 8 - Transmission Switch



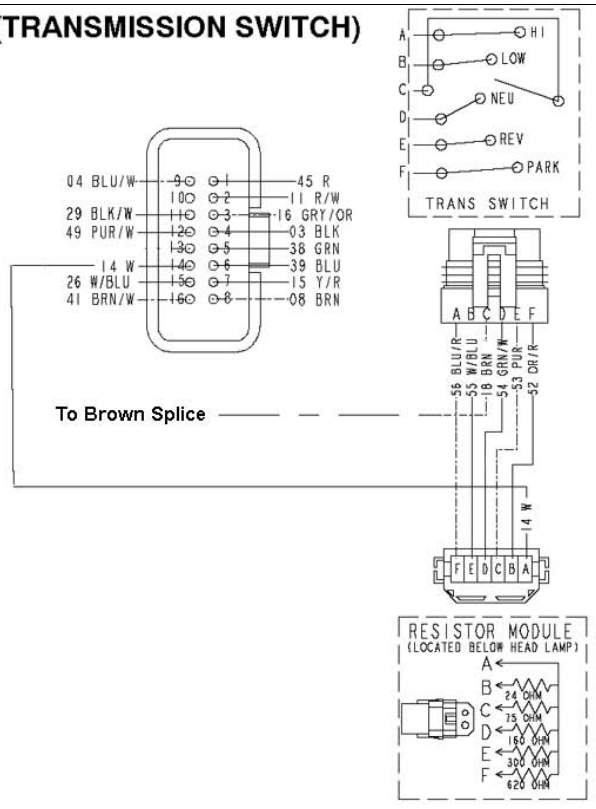
TEST 8 SHIFT INDICATOR NOT WORKING (TRANSMISSION SWITCH)

Operation:

The Instrument cluster sends a signal through the White wire to the resistor module. This signal completes it's path on the Brown wire through the transmission switch. Depending on the transmission switch position, the Instrument cluster interprets the resistance reading and displays the corresponding shift position in the LCD panel.

Testing:

Use the diagram provided to test the continuity loop at each of the shift points with a multi-meter. **NOTE:** *The Instrument cluster contains this diagnostic feature.*



16 Pin Connector

1. Red- 12V Ignition Switch
2. Red/White- 12V ETC and AWD Switch
3. Grey/Orange- Mode/Override button
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5. Green- Diagnostic (Factory Use Only)
6. Blue- Diagnostic (Factory Use Only)
7. Yellow/Red- RPM Input
8. Brown- Ground
9. Blue White- Engine Overheat Switch
10. Open
11. Black/White- Engine Check Light
12. Purple/White- Fuel Sender
13. Open
14. White- Gear Shift Signal
15. White/Blue- High Gear Signal (Open - 800 X2)
16. Brown/White- AWD Coil

ACTIVE DESCENT CONTROL (ADC) COIL

Operation Overview

- AWD switch must be 'ON'. 12Vdc power is present at the ADC hub coil.
- ECU pin #11 controls the grounding of the ADC hub coil for operation.
- ECU Pin #20 senses the gear signal indicating the transmission is engaged and is not in Park or Neutral.
- ECU pin #27 senses the speed sensor signal for determining if vehicle speed is below 15 Mph.
- ECU senses the TPS position and will cancel ADC operation if TPS moves off 'idle' position.
- System must be grounded to operate.

Diagnosing System Failures

- Verify the AWD switch is functional.
- Verify the ADC hub coil is functional. Test the ADC hub coil using an ohm meter.

ADC Hub Coil Resistance:
12 Ω ± 5%

- Verify the TPS is functioning correctly. Test using Digital Wrench Diagnostic Software. (Dealer Only)
- Verify the wiring harness, wiring, connectors, connector pins, grounds and ECU pin locations are undamaged, clean and connect properly.
- Verify continuity of wire connections with a known good volt/ohm meter.

IMPORTANT: Verify all wires and wiring connections have been tested properly with a known good volt/ohm meter before suspecting a component failure. 80% of all electrical issues are caused by bad/failed connections and grounds.

NOTE: Refer to the ADC subsystem diagram located in 'Wire Diagrams' at the end of this chapter.

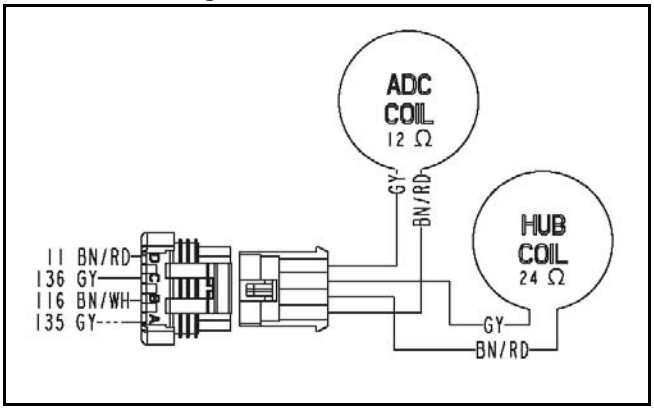
ALL WHEEL DRIVE (AWD) COIL

Operation Overview

- AWD switch must be 'ON'. 12Vdc power is present at the ADC hub coil.
- The instrument cluster senses grounding at pin #16. AWD icon should turn on at the instrument cluster.
- System must be grounded to operate.

Diagnosing System Failures

- Verify the AWD switch is functional.
- Verify the AWD hub coil is functional. Test the AWD hub coil using an ohm meter.



AWD Hub Coil Resistance:
24 Ω ± 5%

- Verify the wiring harness, wiring, connectors, connector pins and grounds are undamaged, clean and connect properly.
- Verify continuity of wire connections with a known good volt/ohm meter.

IMPORTANT: Verify all wires and wiring connections have been tested properly with a known good volt/ohm meter before suspecting a component failure. 80% of all electrical issues are caused by bad/failed connections and grounds.

COOLING SYSTEM COMPONENTS

Fan Control Circuit Operation / Testing

Power is supplied to the fan via the Orange/Black wire when the relay is ON. The ground path for the fan motor is through the Brown harness wire. Refer to "RELAYS" later in this chapter for more information on fan functions.

> **⚠ CAUTION**
>
> Keep hands away from fan blades during operation. Serious personal injury could result.

NOTE: The fan may not function or operation may be delayed if coolant level is low or if air is trapped in the cooling system. Be sure cooling system is full and purged of air. Refer to Maintenance Chapter 2 for cooling system information.

Fan Control Circuit Bypass Test

1. Disconnect harness from coolant temperature sensor on engine.
2. With the ATV in "Park" and with the parking brake on, turn the ignition key (and engine stop switch) "ON". The fan should start running.
3. If the fan does not run or runs slowly, check the fan motor wiring, ground, motor condition and mechanical relay for proper operation (refer to "FAN MOTOR CURRENT DRAW" in this section). Repair or replace as necessary. If the fan runs with the sensor harness disconnected, but will not turn on when the engine is hot, check the coolant temperature sensor and connector terminals.

Coolant Temperature Sensor

The coolant temperature sensor can be tested using an ohmmeter or voltmeter.

1. With the engine and temperature sensor at room temperature (68°F = 20°C), disconnect the harness connector.
2. With the meter in the ohms mode, place the meter leads onto the sensor contacts.
3. Use the table Temperature / Resistance table to determine if the sensor needs to be replaced.

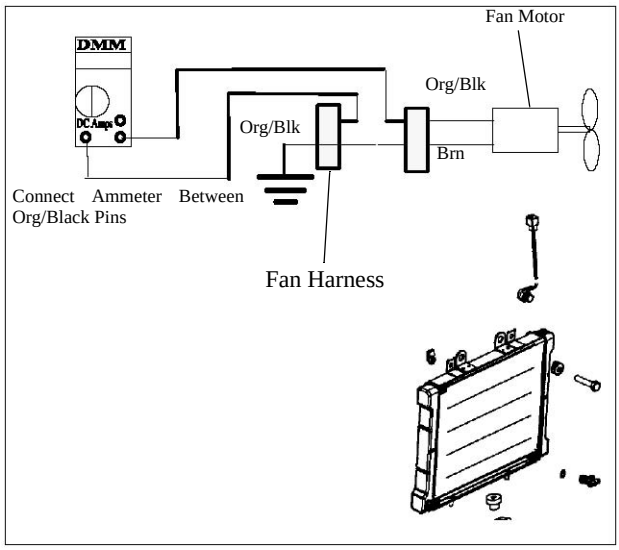
TEMPERATURE °F (°C)	RESISTANCE
68 °F (20 °C)	2.5 k Ω ± 6%
212 °F (100 °C)	0.186 Ω ± 2%

NOTE: If the coolant temperature sensor or circuit malfunctions the radiator fan will default to 'ON'.

NOTE: The fan may not function or operation may be delayed if coolant level is low or if air is trapped in the cooling system. Be sure cooling system is full and purged of air. Refer to Maintenance Chapter 2 for cooling system information.

Fan Motor Current Draw

A current draw test will provide a good indication of fan motor condition. A worn or damaged fan motor will draw more current, which causes a reduction in blade speed and reduced cooling.



1. Disconnect the harness from the coolant sensor.
2. Connect a DC ammeter in between the fan switch harness wires as shown.
3. Be sure fan blade is free to rotate.
4. Turn ignition key and engine stop switch to ON" position. Read the current draw on ammeter with fan running.
5. If the fan motor draws more than 15 Amps, replace the motor.

Fan Motor Current Draw:
Should Be Less Than 15 Amps

NOTE: This fan motor current draw specification only applies to Sportsman EFI models.

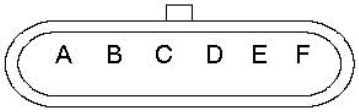
GEAR POSITION INDICATOR SWITCH

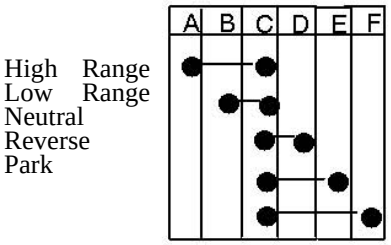
Test Diagram

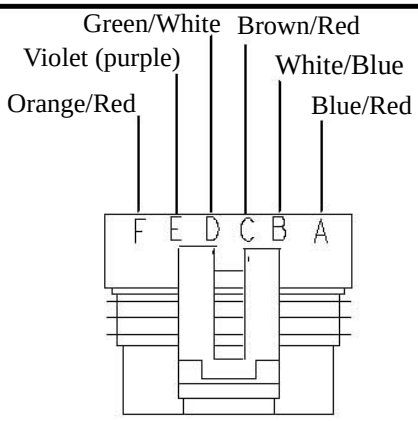
NOTE: Also see "INSTRUMENT CLUSTER TROUBLESHOOTING" for gear switch resistance.

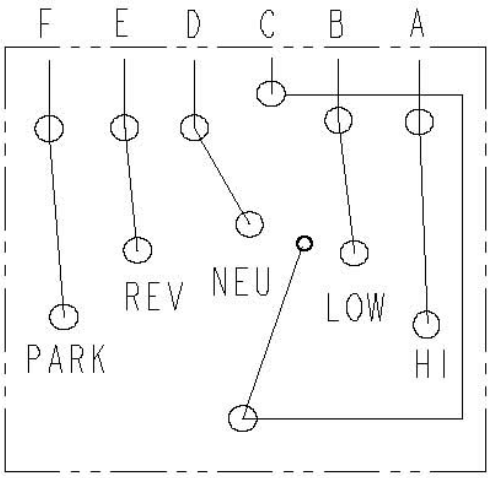
TRANSMISSION SWITCH

High/Low/Neutral/Reverse/Park Switch









10

ELECTRONIC THROTTLE CONTROL (ETC) SWITCH

ETC Switch Operation

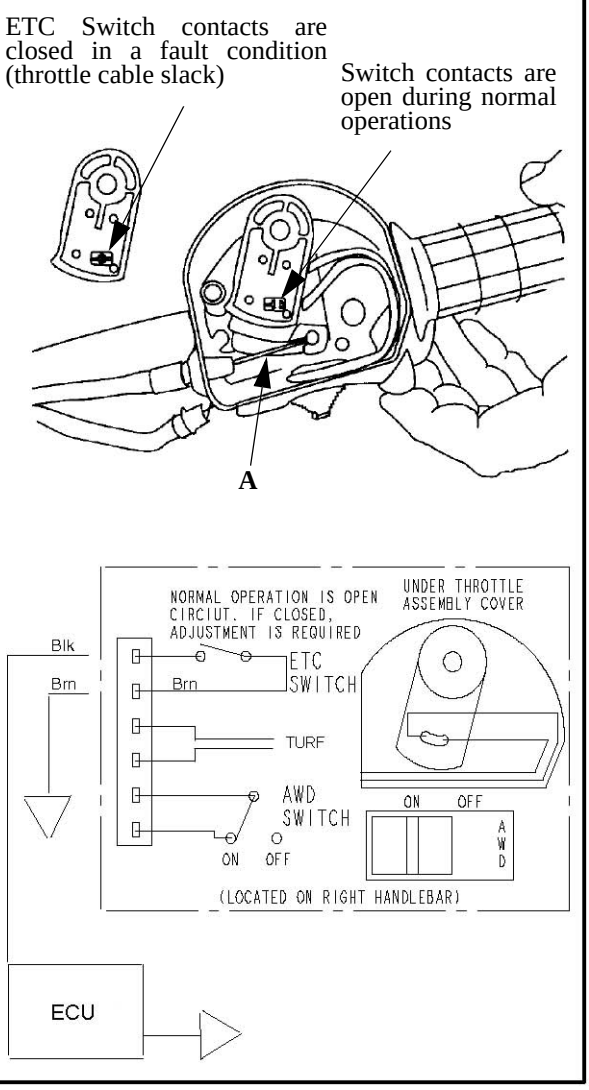
The Electronic Throttle Control (ETC) system is designed to stop the engine of an ATV in the event of a mechanical problem with the throttle mechanism. The ETC switch is mounted independently of the throttle actuator lever inside the throttle block assembly. This is a normally closed switch, and is held in the open position (contacts are separated (as shown below) by throttle cable tension. The contacts are open" during normal operation regardless of throttle lever position. In the event of a mechanical problem in the throttle mechanism (cable tension is lost), the switch contacts close, connecting the black wire to ground, which prevents ignition spark. This is the same as turning the key or engine stop switch "OFF".

NOTE: Test the ETC switch at the harness connector. ETC will not activate unless there is throttle plate movement off of "zero" detected by the ECU. Adjust throttle cable freeplay (ETC switch) and make sure throttle mechanism is functioning properly before testing the switch. Refer to Maintenance Chapter 2 for cable adjustment procedure.

ETC Operation Test

1. Remove throttle block cover by carefully releasing all tabs around edge of cover.
2. Place transmission in neutral and apply parking brake.
3. Start engine and open throttle lever slightly until engine RPM is just above idle speed.
4. Hold throttle cable with fingers at point "A" as shown below and release throttle lever. If the ETC system is functioning properly, the engine will lose spark and stop.

Electronic Throttle Control (ETC) Switch (Composite Throttle Housing)

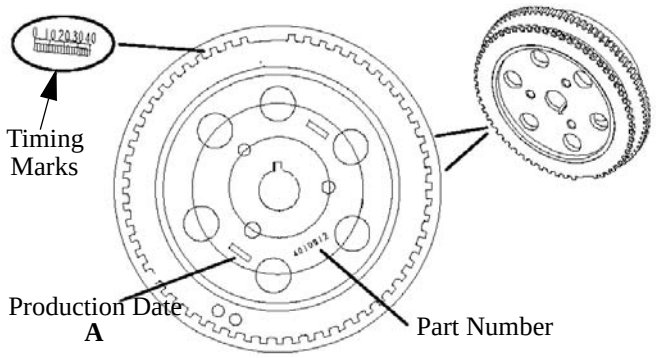


IGNITION SYSTEM

Flywheel Identification

The flywheel can be identified by the stamp mark in location A. Refer to I.D." location in chart below. Do not use the cast mark to determine flywheel application.

Kokusan Flywheel



Engine Application	Cast	Comment
Kokusan Flywheel	4010912	500 W

EFI - DC/CDI Ignition Overview

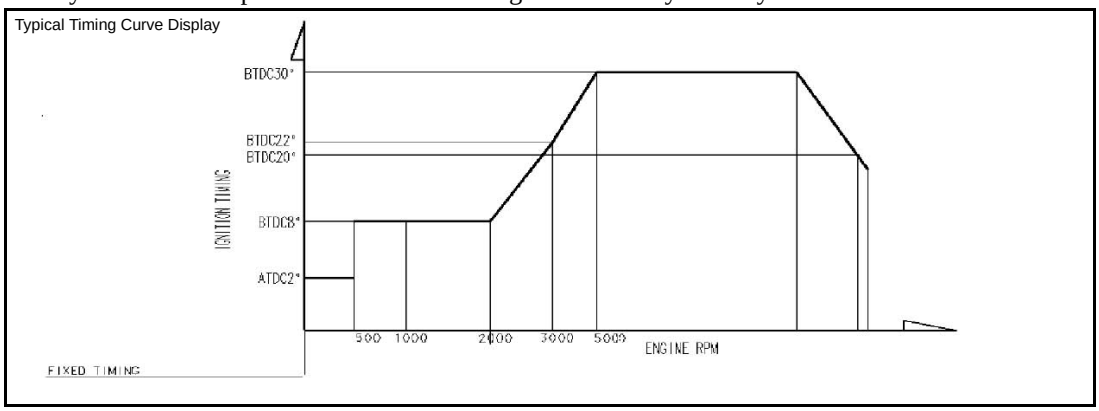
The Sportsman EFI system has incorporated into it's design a DC/ CDI ignition system.

The DC/CDI system relies on battery power for ignition. Instead of generating DC voltage via magnetic induction, a 12 Vdc current is supplied directly to the ECU from the battery. 12 volt DC current charges an internal capacitor to build up the initial ignition charge. An A/C signal from the Crank Shaft Position Sensor is processed by the ECU, which determines ignition timing by calculating from a point pre-determined in the crankshaft rotation. This signal releases the electrical charge which saturates the coil for ignition. DC/ CDI systems have the ability to ignite with as little as 6 volts of power.

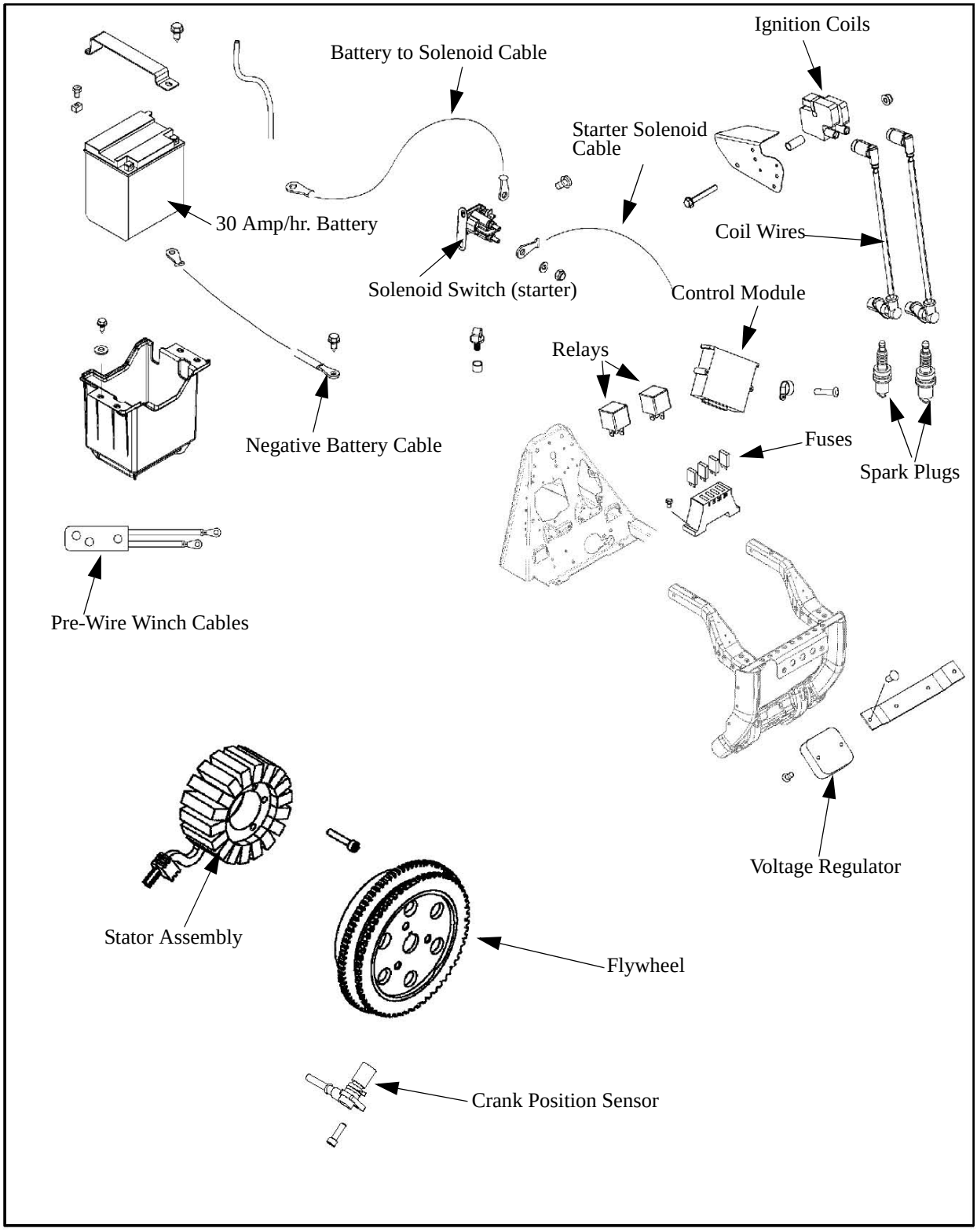
Some of the advantages of DC ignition are:

- Stronger, more consistent spark at low rpm for better performance
- Easier starts
- Simpler component design for ease trouble shooting and maintenance

NOTE: DC/CDI systems and components are not interchangeable with any other system.



Alternator/Ignition Components - 700/800 EFI



Crankshaft Position Sensor Gap

Measure trigger coil gap with a feeler gauge. The gap should be .059 inch (1.0 mm).

Crankshaft Position Sensor Gap:
.059" ± .010 inch
(1.0 ± .26 mm)

Ignition System Troubleshooting

No Spark, Weak, or Intermittent Spark

- Spark plug gap incorrect
- Fouled spark plug
- Faulty spark plug cap or poor connection to high tension lead
- Related wiring loose, disconnected, shorted, or corroded
- Engine Stop switch or ignition switch faulty
- ETC switch mis-adjusted or faulty
- Wire harness or connections wet, corroded
- Poor ignition coil ground (e.g. coil mount loose or corroded)
- Incorrect wiring (inspect color coding in connectors etc.)
- Faulty ignition coil winding (measure resistance of primary and secondary)
- Sheared flywheel key
- Flywheel loose or damaged
- Faulty ECU

CHARGING SYSTEM

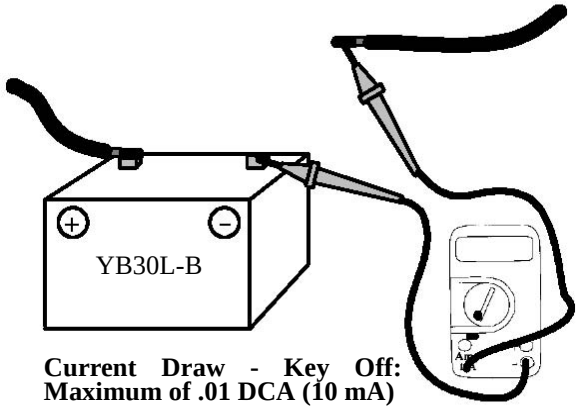
Current Draw - Key Off

⚠ CAUTION

Do not connect or disconnect the battery cable or ammeter with the engine running. Damage will occur to electrical components.

Connect an ammeter in series with the negative battery cable. Check for current draw with the key off. If the draw is excessive, loads should be disconnected from the system one by one until the draw is eliminated. Check component wiring as well as the component for partial shorts to ground to eliminate the draw.

Current Draw Inspection (key off)



Current Draw - Key Off:
Maximum of .01 DCA (10 mA)

Charging System "Break Even" Test

⚠ CAUTION

Do not connect or disconnect the battery cable or ammeter with the engine running. Damage will occur to electrical components.

The "break even" point of the charging system is the point at which the alternator overcomes all system loads (lights, etc.) and begins to charge the battery. Depending on battery condition and system load, the break even point may vary slightly. The battery should be fully charged before performing this test.

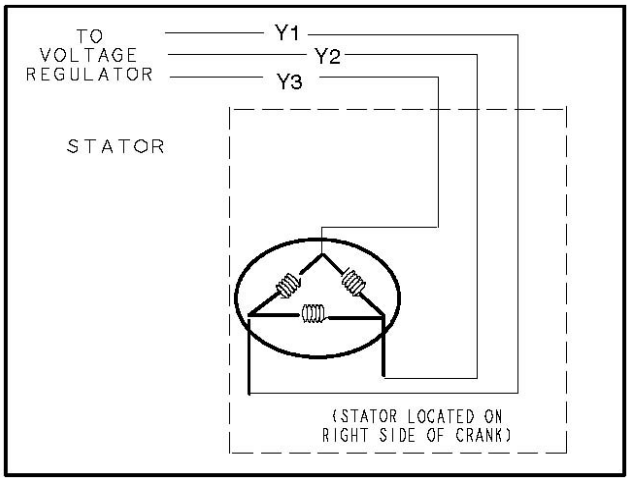
⚠ WARNING

Never start the engine with an ammeter connected in series. Damage to the meter or meter fuse will result. Do not run test for extended period of time. Do not run test with high amperage accessories.

1. Connect a tachometer to the engine.
2. Using an inductive amperage metering device, (set to DC amps) connect to the negative battery cable.
3. With engine off and the key, kill switch, and lights in the ON position, the ammeter should read negative amps (battery discharge). Reverse meter lead if a positive reading is indicated.
4. Shift transmission into Park and start the engine. With the engine running at idle, observe meter readings.
5. Increase engine RPM while observing ammeter and tachometer.
6. Note RPM at which the battery starts to charge (ammeter indication is positive).
7. With lights and other electrical loads off, the "break even" point should occur at approximately 1500 RPM or lower.
8. With the engine running, turn the lights on and engage parking brake lock to keep brake light on.
9. Repeat test, observing ammeter and tachometer. With lights on, charging should occur at or below 2000 RPM.

Alternator Output Test

Three tests can be performed using a multimeter to determine the condition of the stator (alternator).



TEST 1: Resistance Value of Each Stator Leg

1. Measure the resistance value of each of the three stator legs: Y1 to Y2, Y1 to Y3, and Y2 to Y3. Each should measure 0.19 Ω ± 15 %.

TEST	CONNECT METER WIRES TO:	READING IN OHMS
Charge Coil	Y1 to Y2	0.19 Ω ± 15%
Charge Coil	Y1 to Y3	0.19 Ω ± 15%
Charge Coil	Y2 to Y3	0.19 Ω ± 15%
Charge Coil	Y1, Y2, or Y3 to Ground	Open (Infinity)

NOTE: If there are any significant variations in ohm's readings between the three legs; it is an indication that one of the three stator legs maybe weak or failed.

TEST 2: Resistance Value of Stator Leg to Ground

1. Measure the resistance value of each of the stator legs to ground: Y1 to Ground, Y2 to Ground, Y3 to Ground.

NOTE: Any measurement other than Infinity (open) will indicate a failed or shorted stator leg.

TEST 3: Measure AC Voltage Output of Each Stator Leg at Charging RPM

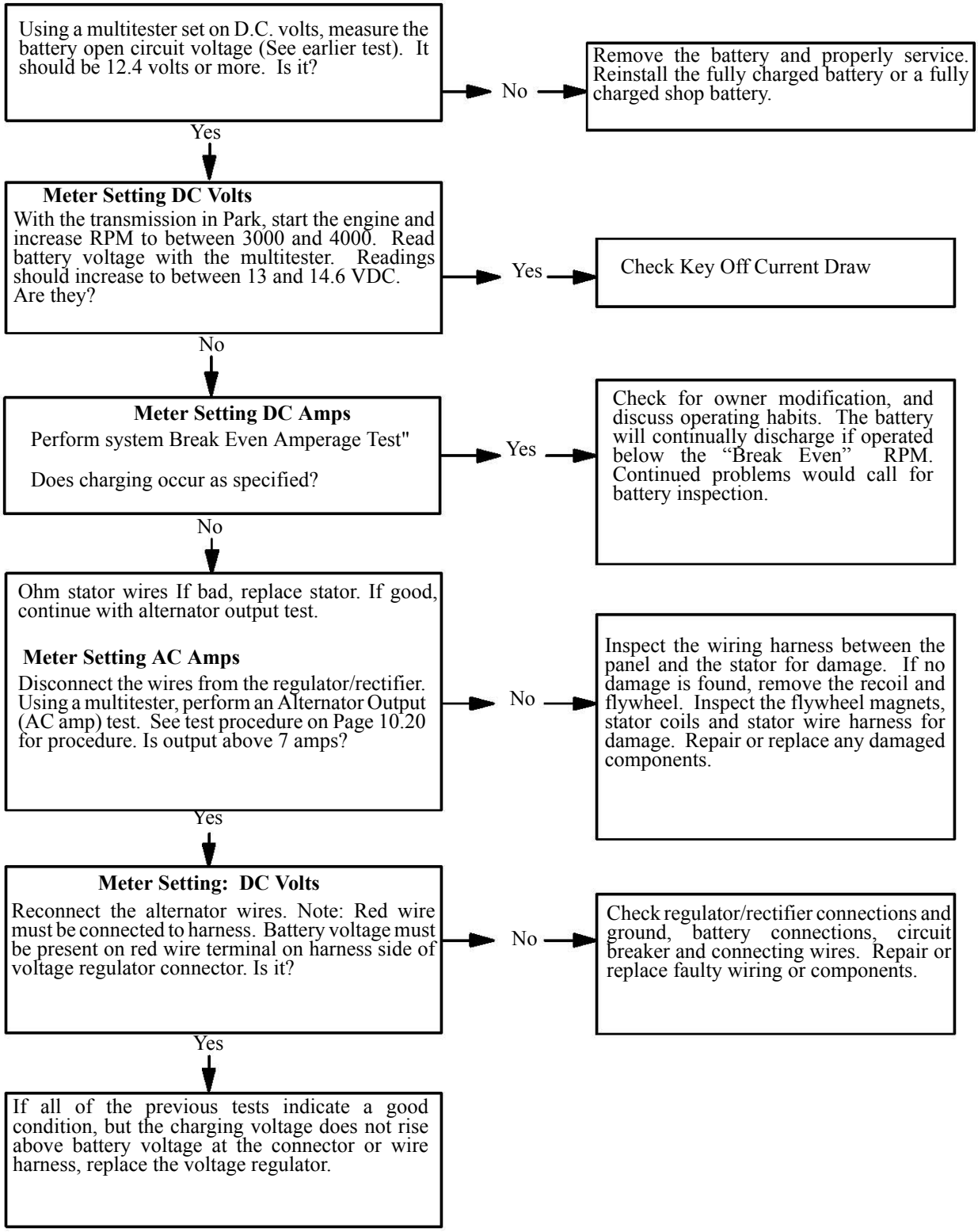
1. Set the selector dial to measure AC Voltage.
2. Start the engine and let it idle.
3. While holding the ATV at a specified RPM, separately measure the voltage across each "leg" of the stator by connecting the meter leads to the wires leading from the alternator (Y1 to Y2, Y1 to Y3, Y2 to Y3).
4. Refer to the table below for approximate Voltage AC readings according to RPM. Test each leg at the specified RPM in the table. Example: The alternator voltage output reading should be approximately **18 Vac at 1300 RPM between each 'leg'.**

NOTE: If one or more of the stator leg output AC voltage varies significantly from the specified value, the stator may need to be replaced.

ATV RPM READING	AC VOLTAGE (VAC) READING
1300	18 Vac ± 25%
3000	42 Vac ± 25%
5000	64 Vac ± 25%

Charging System Testing Flow Chart

Whenever charging system problems are suspected, proceed with the following system check after verifying that all wires are in good condition, connected and not kinked or pinched.



RELAYS

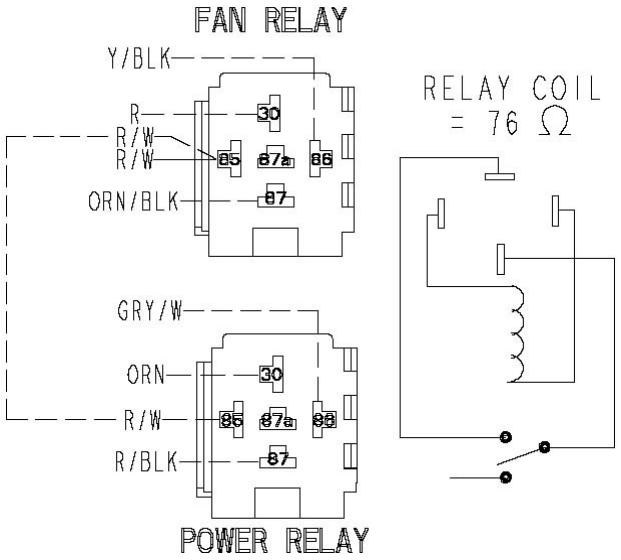
Operation

The relays, located next to the ECU, assist with component operation such as the fan, fuel pump, etc.

The fan relay, controlled by the ECU, operates the fan.

The power relay, controlled by the ECU, turns on power for components such as the fuel pump, injectors, etc.

The differential relay, controlled by the AWD switch and ECU, operates the differential solenoid.



FAN RELAY

COLOR	FUNCTION
Red	Fused 20-amp, unswitched FAN power supply.
Yellow /Black	Fan 'ON' Command. Ground is supplied by the ECU, closing the relay to turn on the fan.
Red / White	KEY-ON Battery power supply, switched on by the key and LH control switches, enables power to relay.
Orange / Black	KEY-ON Battery power supply, switched on by the key and LH control switches, enables power to relay.

POWER RELAY

COLOR	FUNCTION
Red/White	KEY-ON Battery power supply, switched on by the key and LH control switches, enables power to relay. Tied to Fan Relay terminal.
Gray/White	Relay “ON” command. The ECU supplies a ground which closes the relay, supplying power to run the fuel pump, injectors, etc.
Orange	Fused 15-amp, unswitched battery power IN supply for EFI component operation.
Red/Black	EFI power output. 'ON' when ECU sends a signal on the GRY/W wire, closing the relay. Supplies 15-amp power for ECU-controlled operation of EFI components.

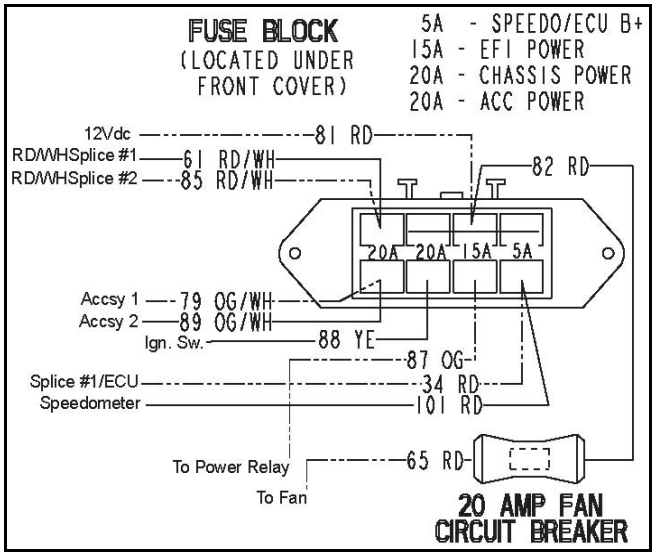
NOTE: See “Differential Relay Testing” on page 10.34.

FUSES/CIRCUIT BREAKER

Operation

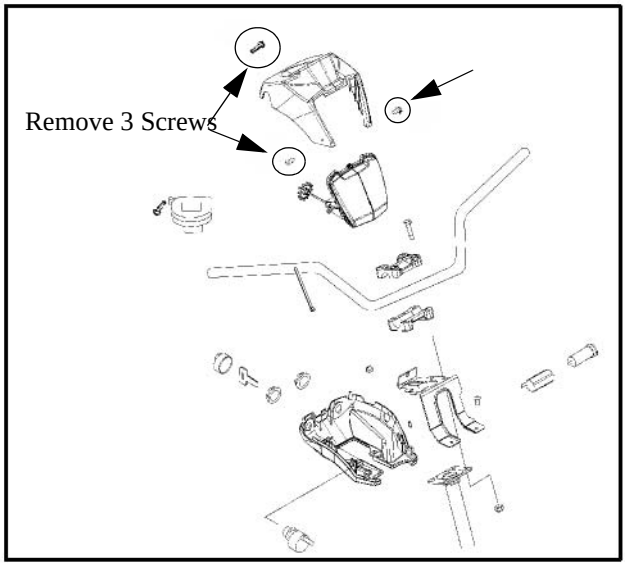
The fuse panel, located next to the ECU, assist with component protection such as the Instrument Cluster/ECU, EFI system, Chassis Power and Accessories.

A 20-amp circuit breaker protects the fan circuit.



LIGHTING

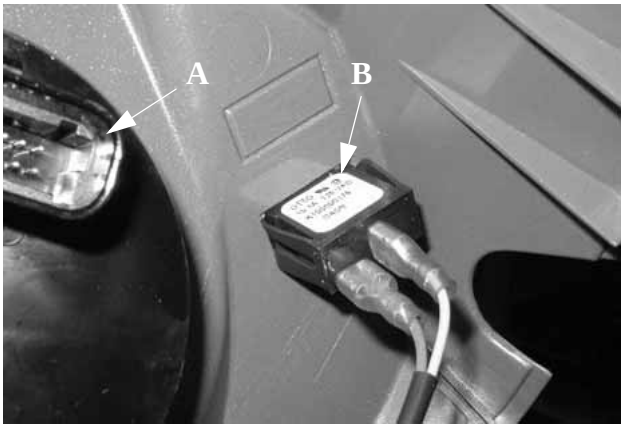
High Beam Headlight Bulb Replacement



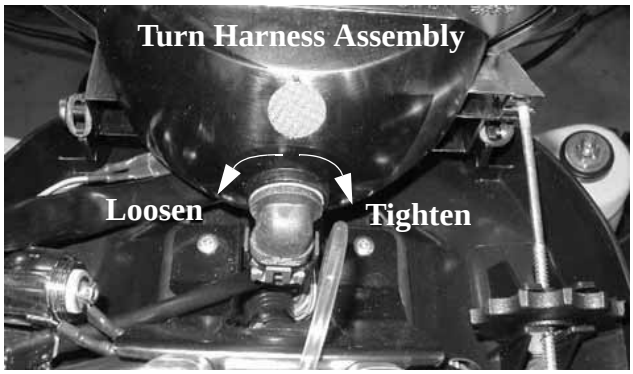
CAUTION

Do not service while headlight is hot. Serious burns may result. Protect lamp during install.

1. Remove three Phillips screws on the headlight pod.
2. Lift pod cover up.
3. Disconnect instrument cluster harness (A) and work light switch (B).

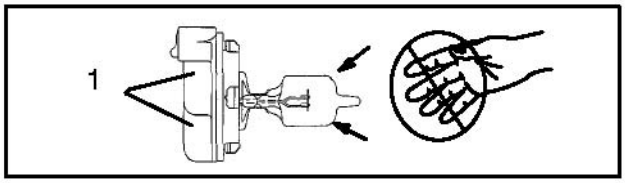


4. Turn the headlight lamp socket counter-clockwise and remove.



5. Carefully remove headlamp bulb from housing.
6. Remove the headlamp and replace with a new headlamp.

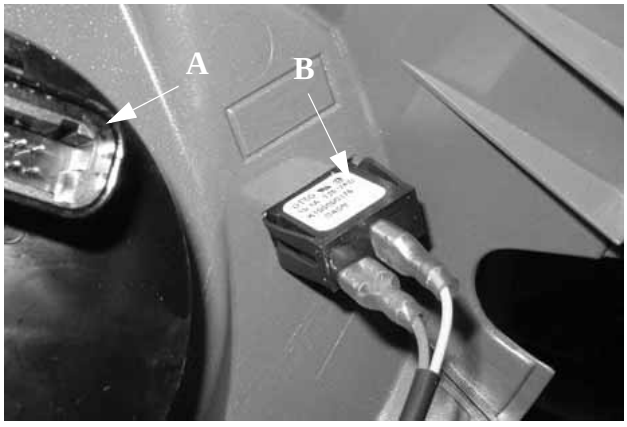
NOTE: Do not touch the lamp with bare fingers. Hold the plastic part (1) of the lamp. Oil from your skin leaves a residue, causing a hot spot that will shorten the life of the lamp.



7. Install the new headlamp and harness assembly into the headlight assembly. Turn the headlight harness clockwise to secure the headlamp into place.

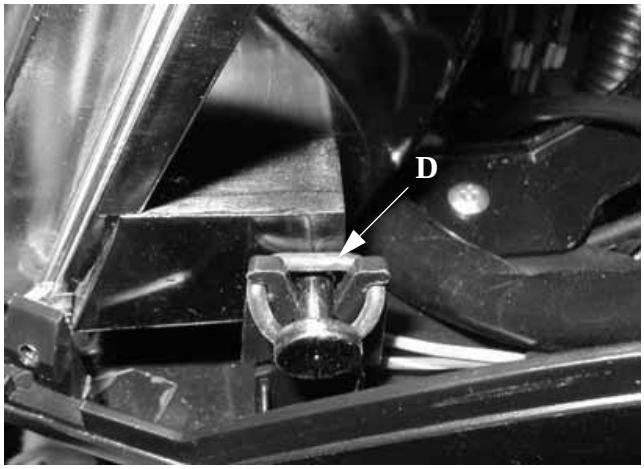
Headlight Housing Replacement

1. Remove three Phillips screws on the headlight pod.
2. Disconnect instrument cluster harness (A) and work light switch (B).

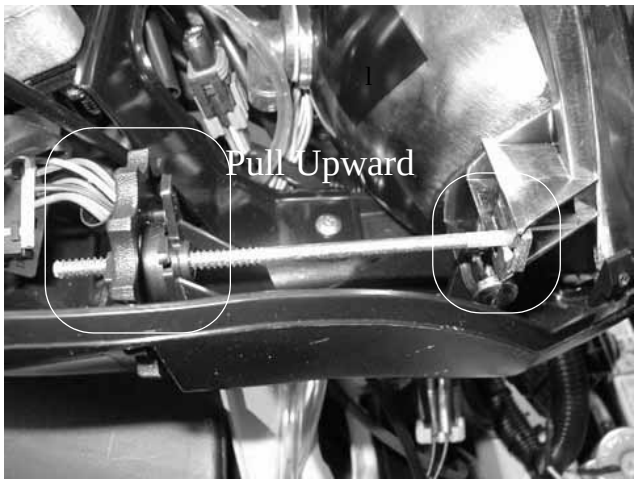


3. Unplug headlamp harness (C).

4. Remove O-Ring (D) from headlight pivot pins. (Both Sides)

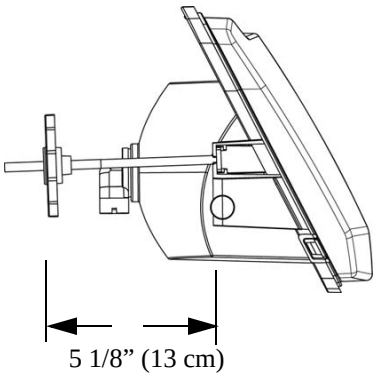


5. Pull the headlight housing up to release from the locking tabs.



6. Lift the adjusting knob up to remove from the locking tabs.
7. Carefully pull the assembly up and out of pod.

8. Reverse the steps to install the new housing and reassemble the pod.



NOTE: The distance from the headlamp parting line to the end of the adjustment knob stop is 5 1/8”, (13 cm). See illustration.

9. Adjust the headlight aim by turning the adjusting knob.

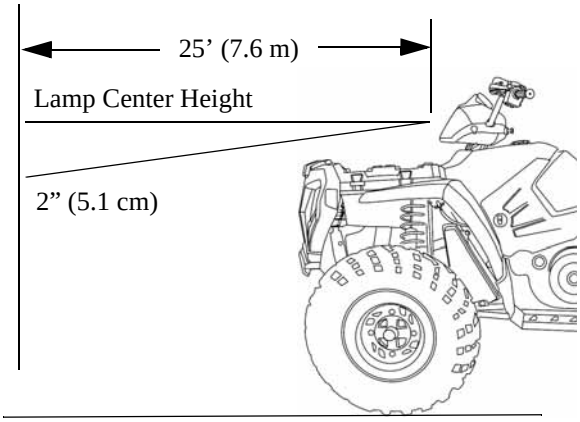
High Beam Headlight Adjustment

The headlight beam can be adjusted to any position desired by turning the adjusting knob located on the bottom right side of the headlight pod.

Raise Headlight - Turn knob counter- counterclockwise

Lower Headlight - Turn knob clockwise

1. Place the vehicle on a level surface with the headlight approximately 25' (7.6 m) from a wall.

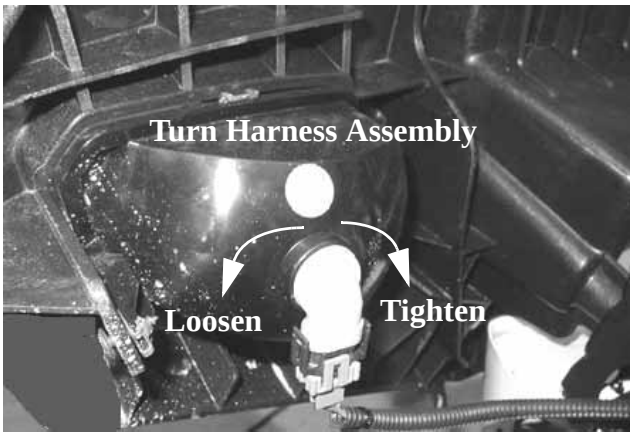


2. Measure the distance from the floor to the center of the headlight and make a mark on the wall at the same height.
3. Start the engine and turn the headlight switch to high beam.
4. Observe headlight aim. The most intense part of the headlight beam should be aimed 2” (5.1 cm) below the mark placed on the wall in Step 2.

NOTE: Rider weight must be included on the seat. On machines with separate low beam lights, the drop should be 8, (20.3 cm) in 25' from the center of the low beam lamp.

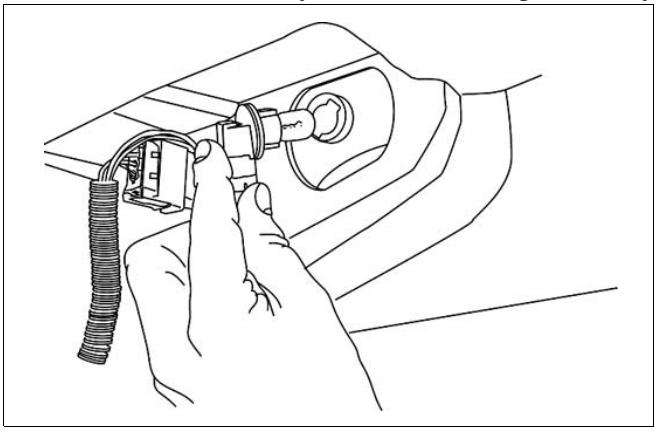
5. Adjust beam to desired position.

Lower Headlamp Removal / Installation



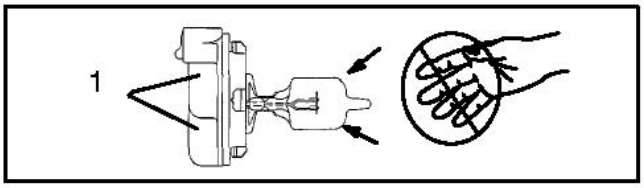
1. Turn the back of the headllamp harness in a counter-clockwise direction to loosen.

2. Pull the harness assembly out from the headlight assembly.



3. Remove the lamp and replace with a new headlamp.

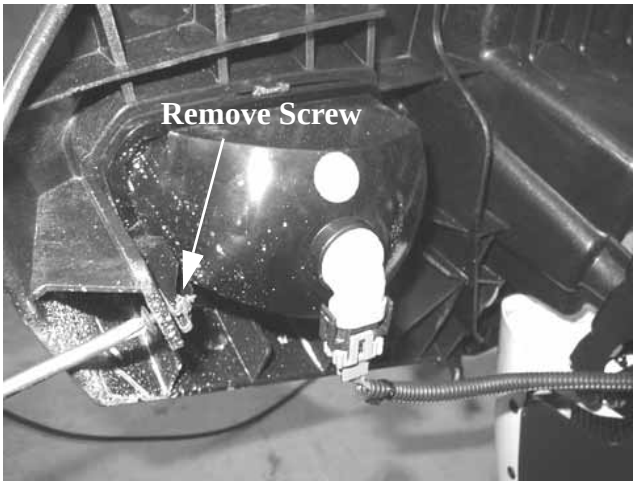
NOTE: Do not touch the new lamp with bare fingers. Hold the plastic part (1) of the lamp. Oil from your skin leaves a residue, causing a hot spot that will shorten the life of the lamp.



4. Install the harness assembly into the headlight assembly. Turn the headlight harness clockwise to secure the headlamp into place.

Lower Headlamp Housing Removal (if required)

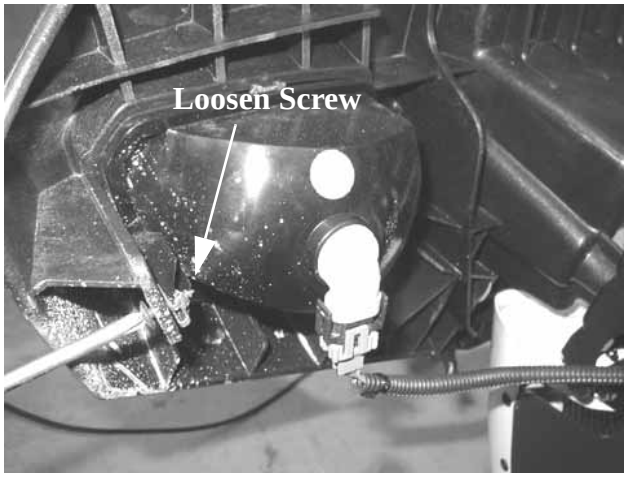
5. Remove the screw that secures the lower headlamp.



6. Pull the headlamp out of the locking tab.

Low Beam Headlight Adjustment

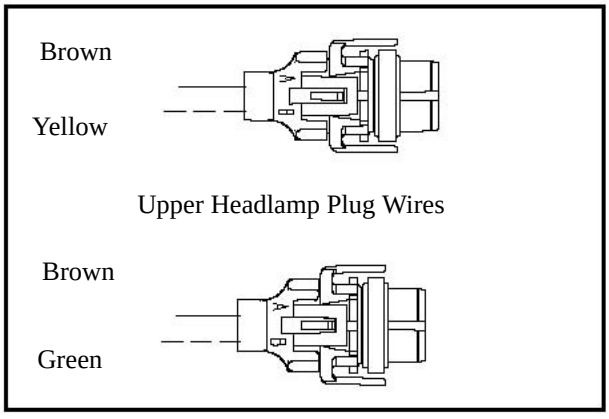
1. The low beam can be adjusted slightly upward or downward.



2. Loosen the phillips screw located at the rear of the headlamp.
3. Tilt the headlamp upward or downward.
4. Tighten the screw.

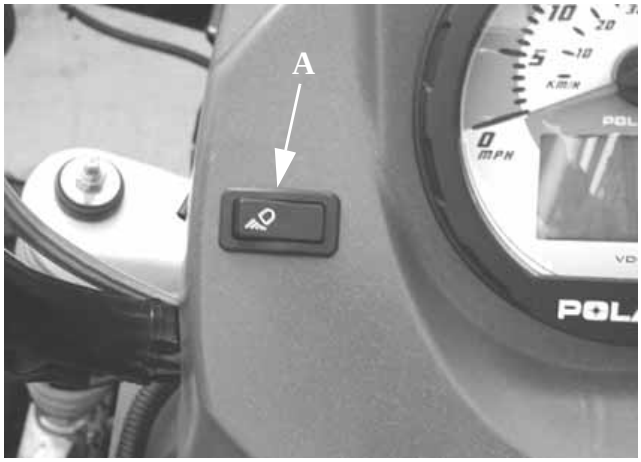
Headlamp Switch Test

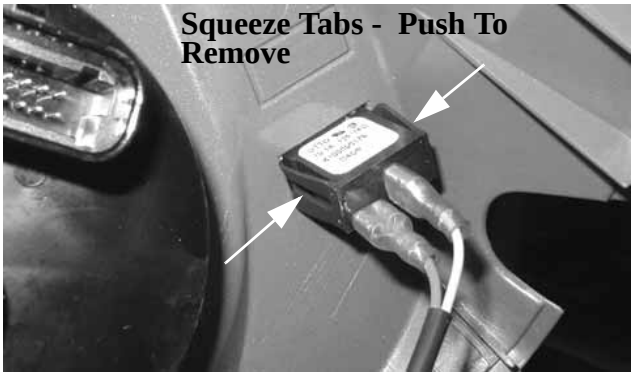
1. Remove the headlight pod cover.
2. Set meter to DC Volts and probe the headlamp plug wires (Brown and Yellow) at back of connector for 12 Volts.
3. Turn ignition and headlight on. If there is no power, continue with checks to the harness and fuses.



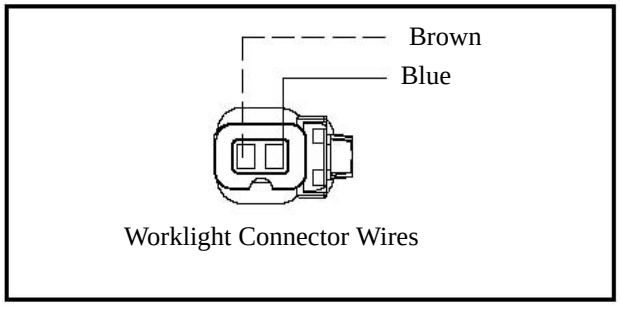
Sportsman Work Light Switch (Deluxe)

Remove the headlight pod cover to locate the switch wires. The switch snaps out by pushing in on the tabs on both sides of the switch.





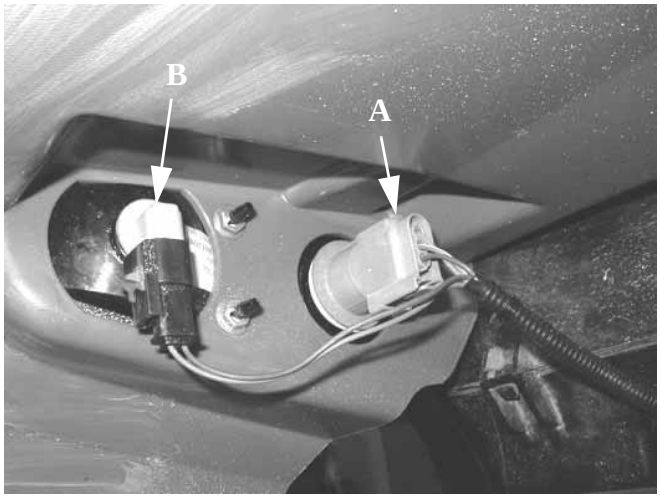
- Check for continuity between the switch contacts - Place meter leads between two contacts with switch in 'ON' position.
- Probe the worklight plug wires at back of vehicle, there should be at least 12Vdc at the plug.
- Check for 12 Vdc at the blue wire.



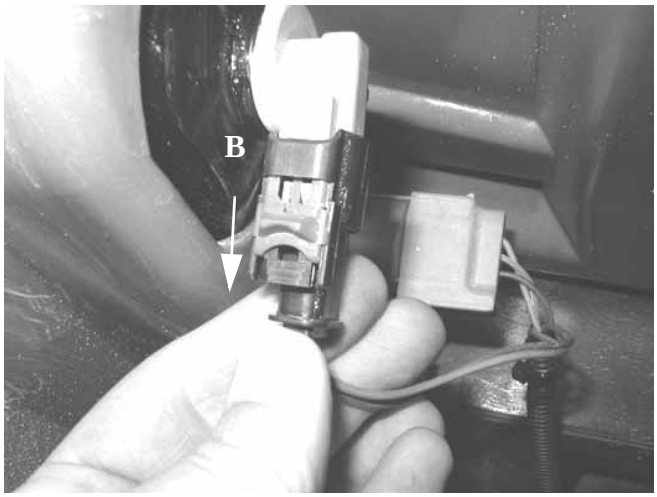
Worklight Connector Wires

Sportsman Brake Light / Work Light (Deluxe) Replacement

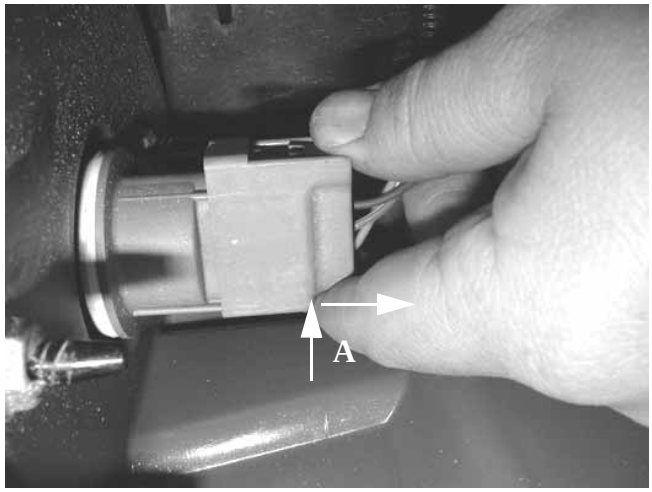
The brake light (A) and the work light (B) are both located in the rear tail lamp housing.



1. To remove the worklight electrical connector (B), pull down on the connector lock and pull the connector from the bulb assembly.



2. To remove the brake light electrical connector (B), press in on the tab on the connector to unlock the connector and pull the connector from the bulb assembly.

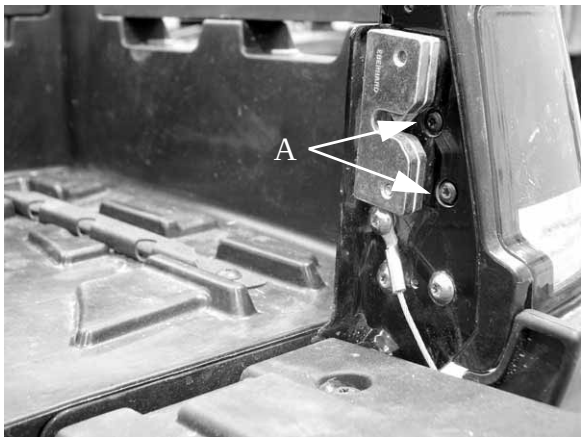


3. To remove either of the bulbs, turn the holder assembly counter-clockwise to remove and pull out. Turn the holder assembly clockwise to install. Refer to the parts manual for the correct bulb part number.

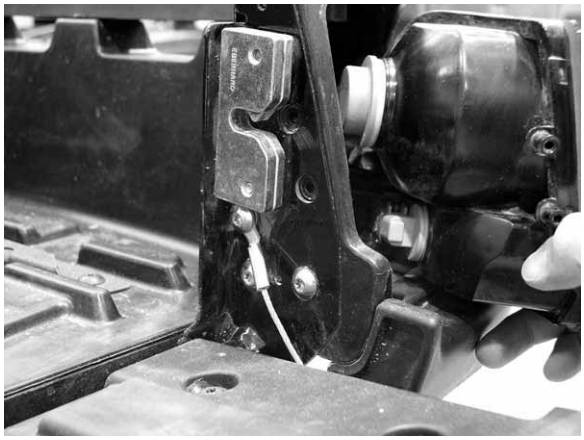
X2 BRAKE LIGHT / WORK LIGHT (Deluxe) REPLACEMENT

The brake light (A) and the work light (B) are both located in the rear tail lamp housing.

1. Open the tailgate and remove the 2 torx head screws (A) securing the rear taillights on each side of the cargo box as illustrated below.

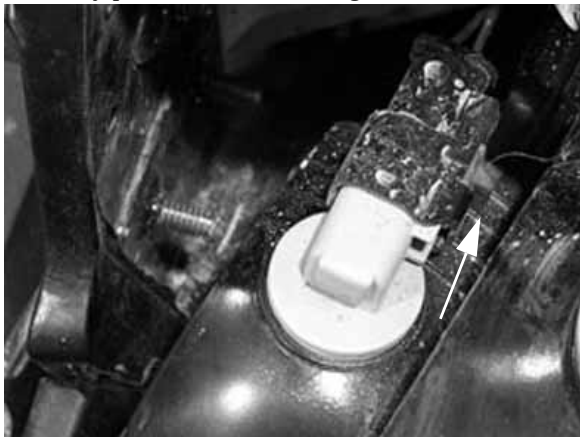


2. Remove the taillight assembly from the cargo box.

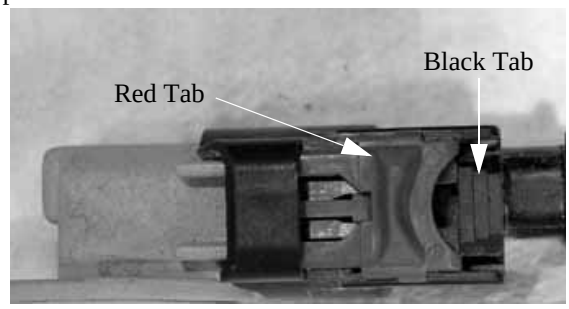


CAUTION
Use caution when disconnecting smaller light bulbs. Follow the procedures to avoid damaging the connector. Damaging connectors may require wire harness replacement.

3. Carefully pull out the red locking tab on the connector.



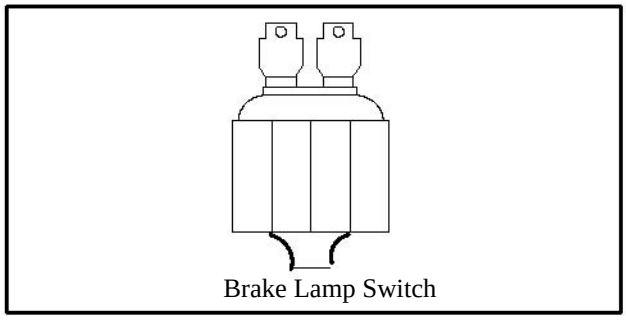
4. Once the red tab is pulled out, press in on the black tab and pull out to disconnect harness.

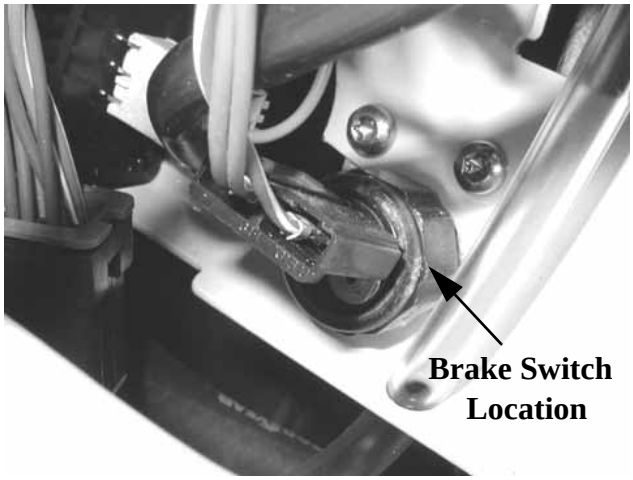


5. Disconnect the two wire harnesses connected to each of the taillights. Twist bulb housing to remove from lamp assembly.

Brake Light Switch

1. Remove the front cover.





2. Disconnect wire harness from switch.
3. Connect an ohmmeter across switch contacts. Reading should be infinite (∞).
4. Apply brake at handlebar lever and check for continuity between switch contacts. Replace switch if there is no continuity or greater than .5 ohms resistance when the brake is applied with slight pressure.

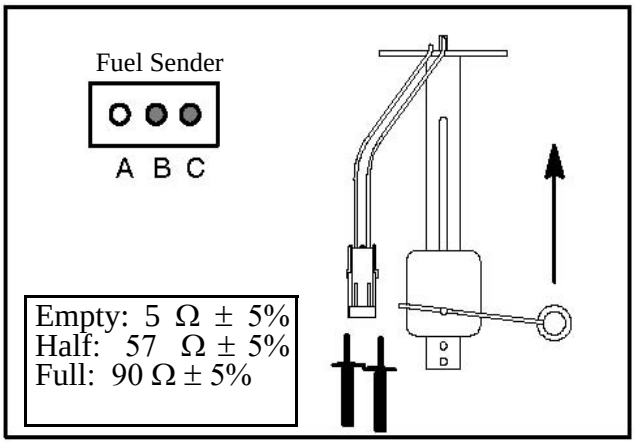
FUEL SENDER

Testing

1. Drain the fuel tank and remove it from the atv.
2. Set the fuel tank on a flat surface.
3. Hook up an ohm meter to the fuel sender harness Violet/ White wire (B) and Brown wire (C).
4. With the sender float in the **empty position** and compare to specification.

Fuel Sender - Empty: 5 Ω ± 5%

5. Slowly tilt invert the tank so that gravity moves the sender float to the **full position** and compare to specification.



Fuel Sender - Full: 90 Ω ± 5%

6. If the readings are not to specification, or if the reading is erratic or LCD display "sticks", check the following before replacing the fuel pump assembly.

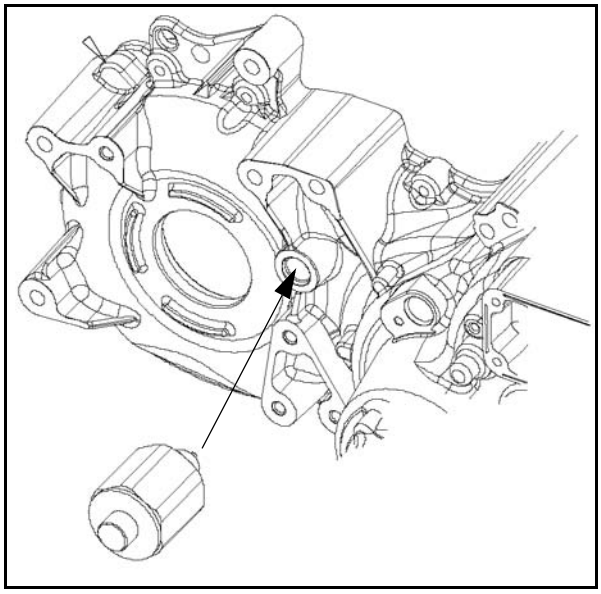
   - Loose float
   - Float contact with tank
   - Bent Float Rod

If none of the conditions exists, the sender assembly is faulty. Fuel pump assembly replacement is required.

X2 DIFFERENTIAL SYSTEM

Solenoid Testing

Disconnect from the wire harness. Using a digital ohmmeter, test the solenoid at the connector leads and compare to the specification. Replacement of solenoid is required as it is not serviceable.



Differential Solenoid Resistance: 1.45 Ω ± 5 %

Solenoid Replacement

1. Remove the solenoid using a suitable tool.
2. Coat threads of new solenoid with anti-seize compound or sealant.
3. Thread new solenoid into gearcase housing. Tighten to specification.

= T
Differential Solenoid Torque **23-27 ft. lbs. (31-37 Nm)**

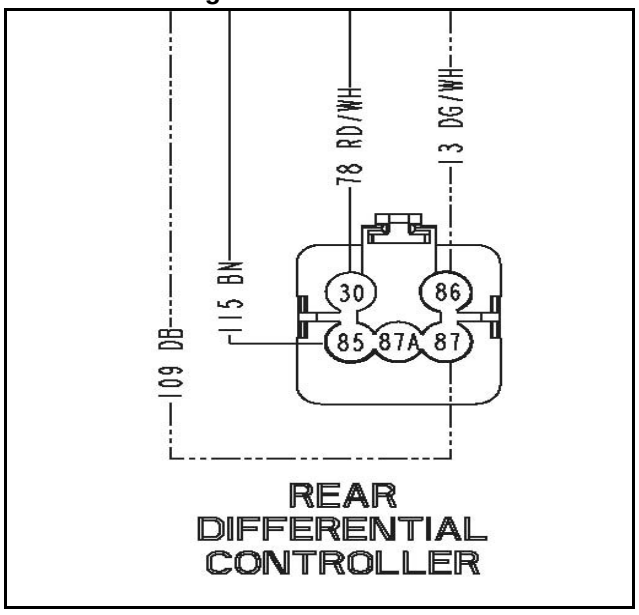
Differential Relay Operation

- The AWD switch must be turned to 'TURF' mode.
- Speed must be below 15mph and transmission must not be in 'Park'.
- 12Vdc is constant at the differential relay.
- ECU senses grounding on pin #26 from the AWD switch.
- ECU grounds pin #13, activating the relay.
- Relay powers the differential solenoid.
- System must be grounded to operate.

Differential Relay Testing

- Test for 12Vdc constant at the relay with the AWD switch turned to 'TURF' mode.
- Test for continuity to ground at pin #26 of the ECU connector from the AWD switch.
- Test for continuity to ground at ECU pin #13.
- Test for continuity at ECU connector pin #13 to the solenoid.
- Test the AWD/TURF switch for proper function.

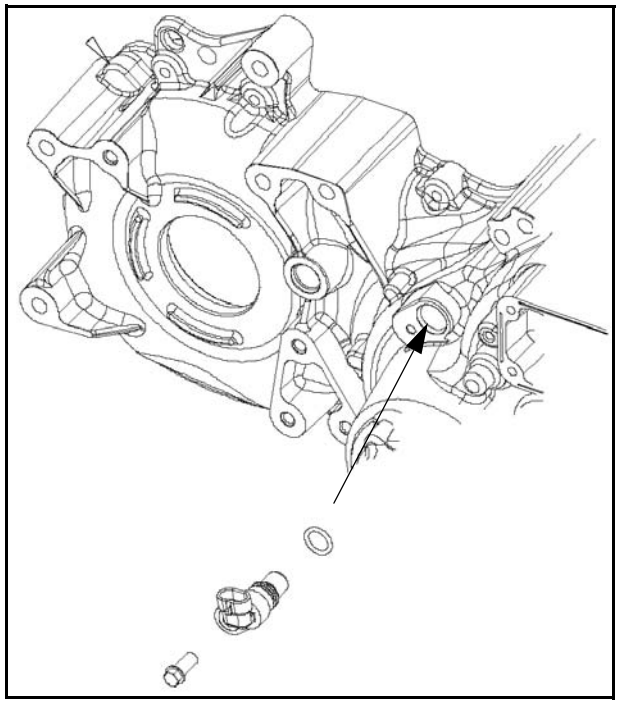
IMPORTANT: Verify all wires and wiring connections have been tested properly with a known good volt/ohm meter before suspecting an ECU failure. 80% of all electrical issues are caused by bad/failed connections and grounds.



X2 SPEED SENSOR

Testing

Using the special tools listed, test the speed sensor according to the tester instructions. Remove sensor and inspect the o-ring seal for damage or wear and replace as required. Replacement of sensor is required as it is not serviceable.



Speed Sensor Special Tools:

Static Timing Light Harness
PN 2871745
Hall Sensor Probe Harness
PN 2460761

Replacement

1. Remove the sensor retaining using a suitable tool.
2. Coat o-ring of new sensor with anti-seize compound or sealant.
3. Push new sensor into gearcase housing. Install bolt and tighten to specification.

= T
Speed Sensor Bolt Torque **8-12 ft. lbs. (11-17 Nm)**

ACCESSORY POWER

Wire Connections

Winch Installation

The Sportsman models have the main winch cables routed and installed from the factory. This enables quick installation.

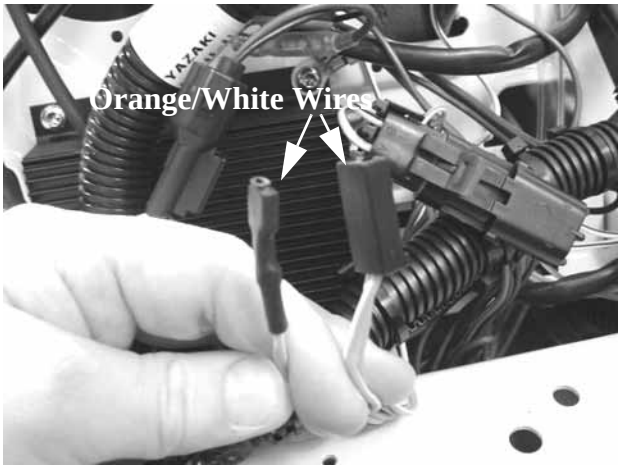
Refer to Chapter 2 for more information on winch installation and operation.

Accessory Power Wires

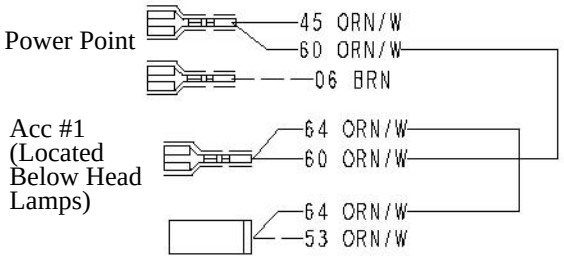
The accessory power leads for all accessories are located under the front cover. The wires are 12 Volt wires and are Orange / White in color. To locate the wires, remove the front cover. The wires will be located in the main wire loom on the right side.

If you have trouble locating the Orange / White wires remove the left side panel and search under the front fender area.

NOTE: Refer to the accessory instructions for accessory hook-up and installation.



Accessory Wires



STARTER SYSTEM

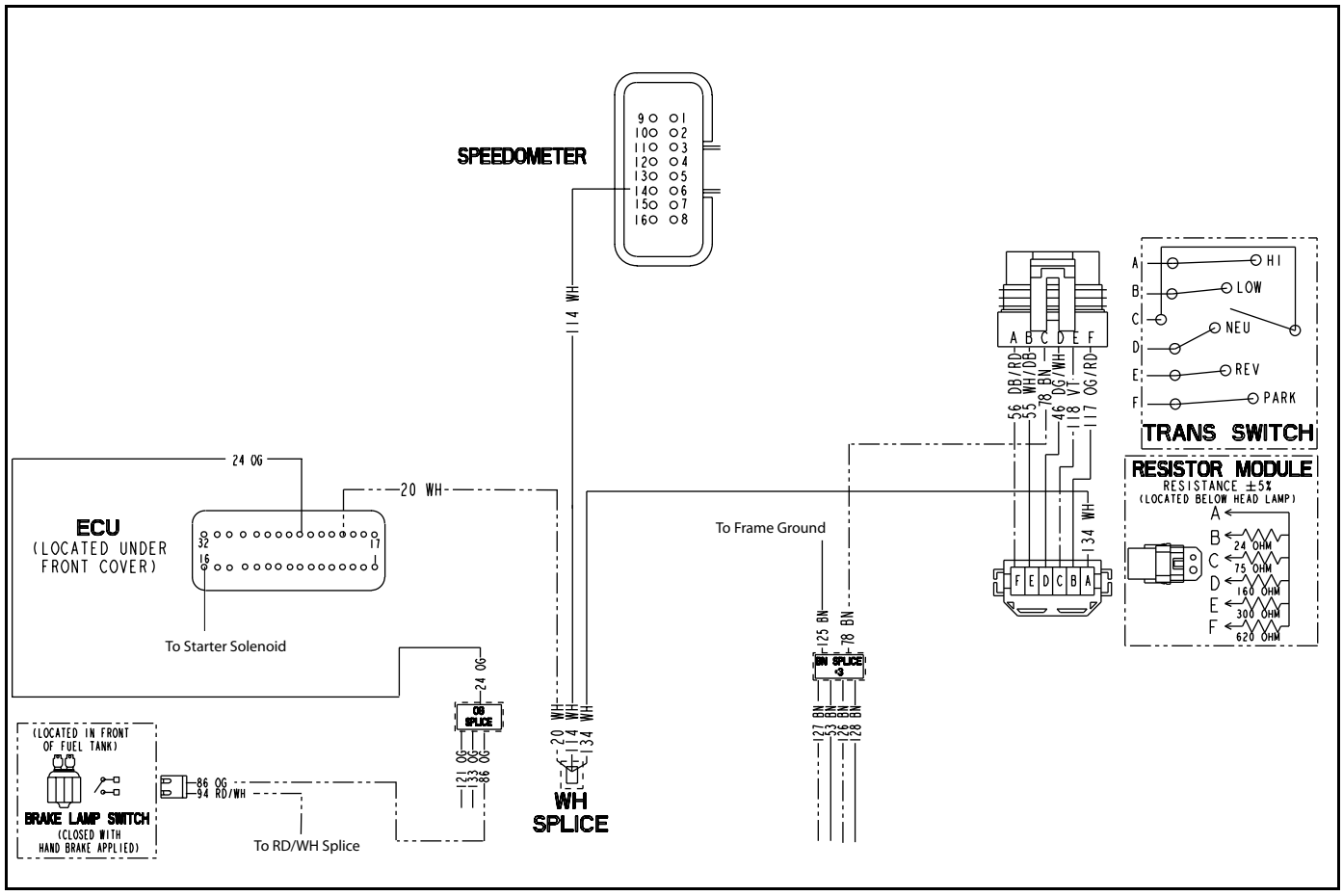
700/800 Starter Lockout Overview and Diagnostic

The Sportsman 700/800 and International EFI starter lockout is controlled by the ECU. Pin #20 senses the transmission signal and determines if the switch is in Neutral or Park. Pin #24 senses when the brake is applied. When the conditions are met, the ECU will activate Pin #16 to ground the starter solenoid. Note the ground for the transmission switch runs to the wire harness splice. The ECU will allow starting in Neutral or Park without the brake applied. Applying the brake overrides this system and allows starting regardless of transmission shift position.

Items to check when diagnosing a no-start condition are:

- Transmission switch for proper function
- Starter solenoid for proper function
- Brake switch for proper function
- Wire harness, loose connections/pins (including the ECU) leading to and from these components
- Proper ground to frame

Should all these items be found in working order, the ECU may be at fault.



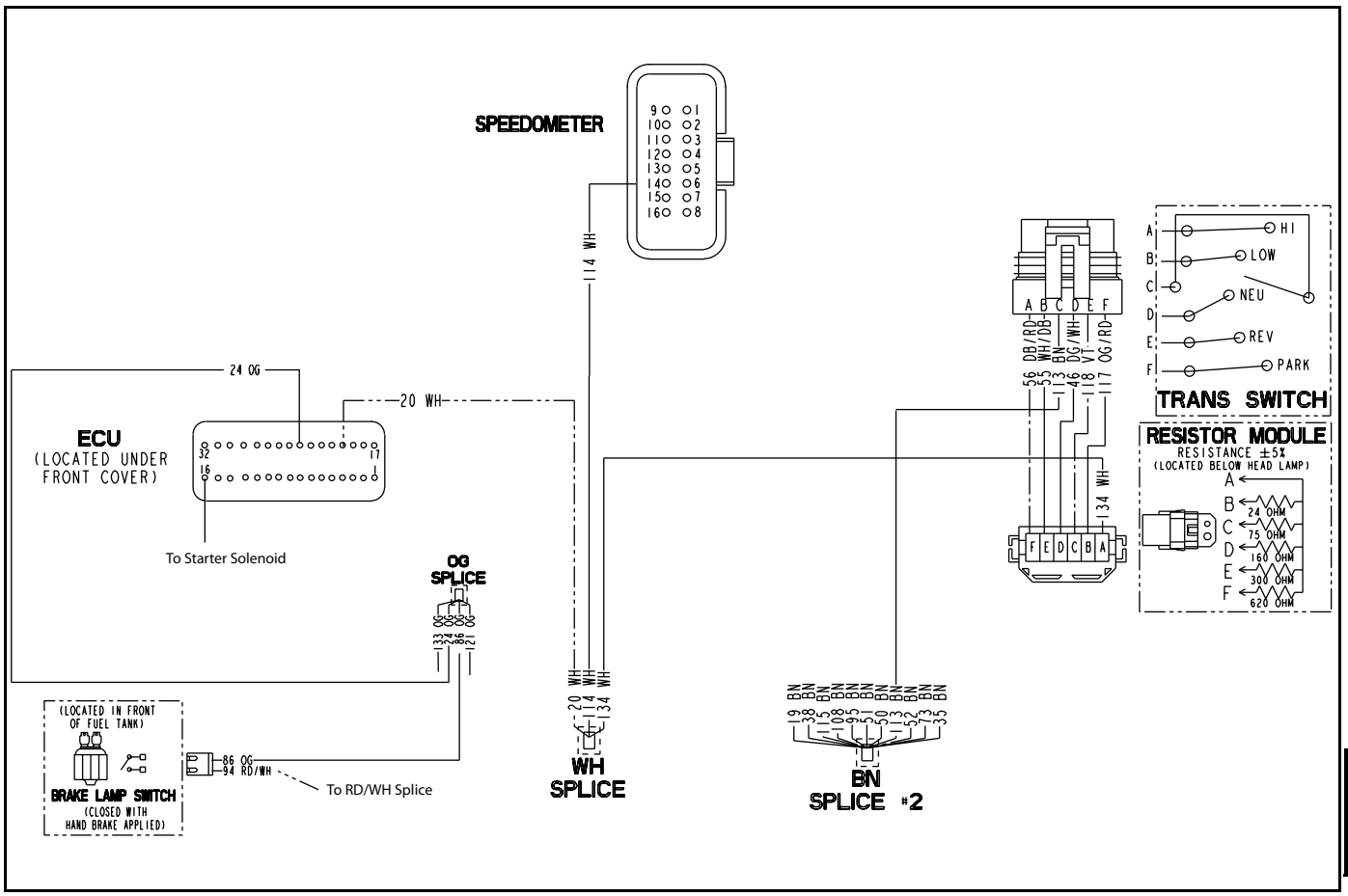
800 X2 Starter Lockout Overview and Diagnostic

The Sportsman 800 X2 EFI starter lockout is controlled by the ECU. Pin #20 senses the transmission signal and determines if the switch is in Neutral or Park. Pin #24 senses when the brake is applied. When the conditions are met, the ECU will activate Pin #16 to ground the starter solenoid. Note the ground for the transmission switch runs to the wire harness splice. The ECU will allow starting in Neutral or Park without the brake applied. Applying the brake overrides this system and allows starting regardless of transmission shift position.

Items to check when diagnosing a no-start condition are:

- Transmission switch for proper function
- Starter solenoid for proper function
- Brake switch for proper function
- Wire harness, loose connections/pins (including the ECU) leading to and from these components
- Proper ground to frame

Should all these items be found in working order, the ECU may be at fault.



Troubleshooting

Starter Motor Does Not Run

- Battery discharged - Low specific gravity
- Loose or faulty battery cables or corroded connections (see Voltage Drop Tests)
- Related wiring loose, disconnected, or corroded
- Poor ground connections at battery cable, starter motor or starter solenoid (see Voltage Drop Tests)
- Faulty key switch
- Faulty kill switch
- Faulty starter lockout function
- Faulty starter solenoid or starter motor
- Engine problem - seized or binding (Can engine be rotated easily?)

Starter Motor Turns Over Slowly

- Battery discharged - low specific gravity
- Excessive circuit resistance - poor connections (see Voltage Drop Test)
- Engine problem - seized or binding (Can engine be rotated easily?)
- Faulty or worn brushes in starter motor

Starter Motor Turns - Engine Does Not Rotate

- Faulty starter drive
- Faulty starter drive gears or starter motor gear
- Faulty flywheel gear or loose flywheel

Voltage Drop Test

The Voltage Drop Test is used to test for bad connections. When performing the test, you are testing the amount of voltage drop through the connection. A poor or corroded connection will appear as a high voltage reading. Voltage shown on the meter when testing connections should not exceed .1 VDC per connection or component.

To perform the test, place the meter on DC volts and place the meter leads across the connection to be tested. Refer to the voltage drop tests on the starter system in this chapter.

Voltage should not exceed .1 DC volts per connection

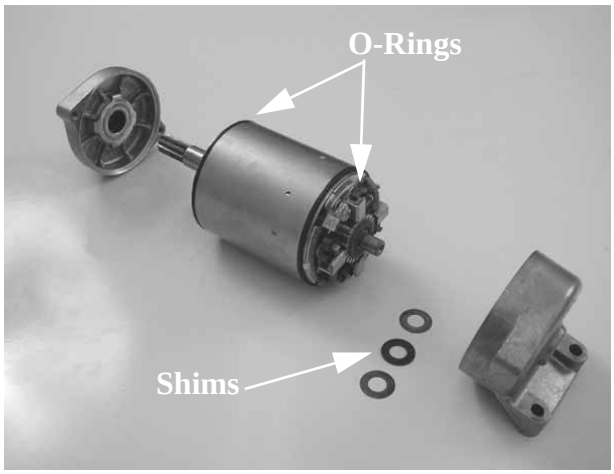
Starter Motor Removal / Disassembly

NOTE: Use electrical contact cleaner to clean starter motor parts. Some solvents may leave a residue or damage internal parts and insulation.

1. Remove the starter from the engine.
2. Remove the two bolts, washers, and sealing O-Rings. Inspect O-Rings and replace if damaged.

NOTE: Note the alignment marks on both ends of the starter motor casing. These marks must align during reassembly.

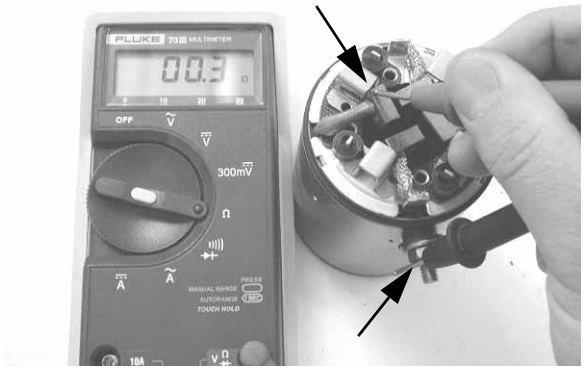
3. Remove the front bracket assembly and the rear bracket assembly. Remove the shims from the armature shaft and inspect the O-rings located on the armature housing.



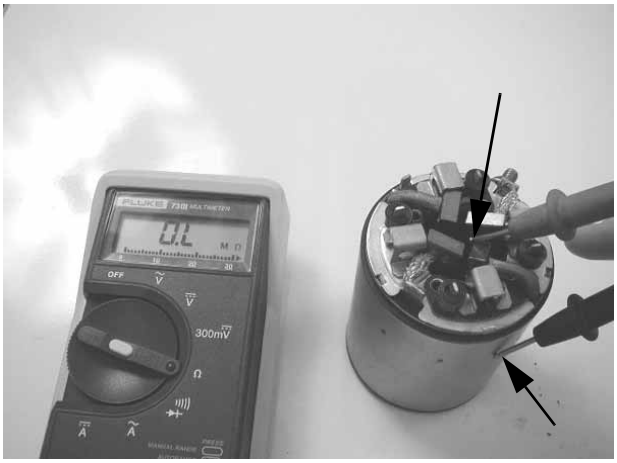
NOTE: The shims will be replaced during reassembly.

BRUSH INSPECTION / REPLACEMENT

1. Measure resistance between starter input terminal and insulated brushes. The reading should be .3 ohms or less. Remember to subtract meter lead resistance.



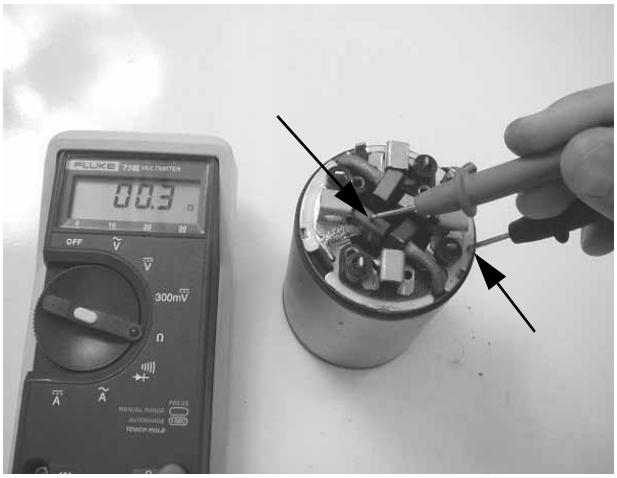
2. Measure resistance between insulated brush and starter housing. Reading should be infinite. (OL). Inspect insulation on brush wires for damage and repair or replace as necessary.



3. Slide positive brush springs to the side, pull brushes out of their guides and remove brush plate. Slide brush end frame off end of starter.

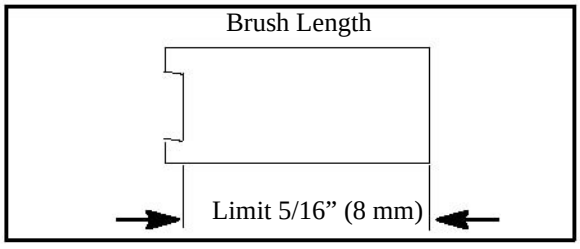
NOTE: The electrical input post must stay with the field coil housing.

4. Measure resistance between ground brush and brush plate. Resistance should be .3 ohms or less.



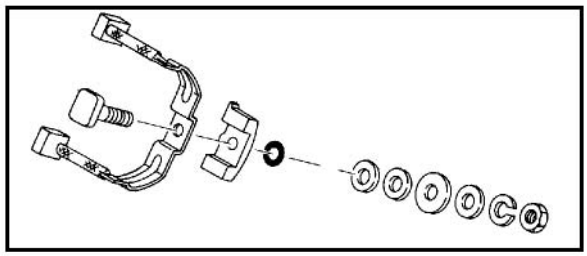
Brush Inspection

1. Measure length of each carbon brush. Replace brush assembly when worn to 5/16" (8 mm) or less. The brushes must slide freely in their holders.



Brush Replacement

1. Remove terminal nut with lock washer, flat washer, large phenolic washer, the small phenolic spacers, and sealing O-ring. Inspect O-ring and replace if damaged.

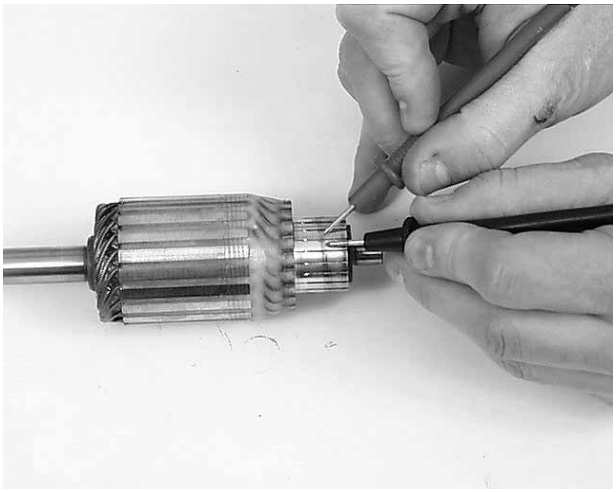


2. Slide positive brush springs to the side, pull brushes out of their guides and remove brush plate.

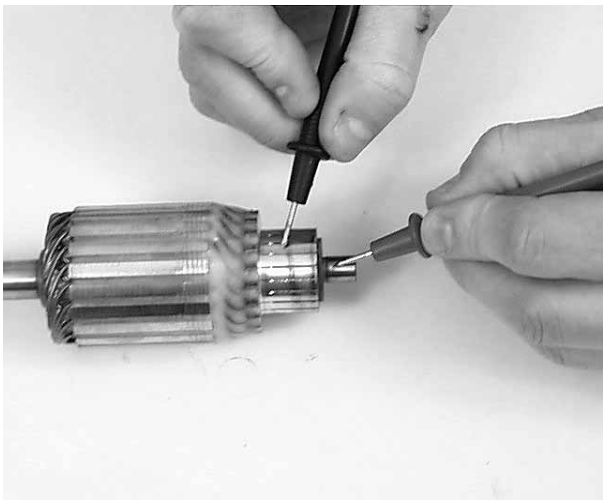
> **⚠ CAUTION**
>
> Some cleaning solvents may damage the insulation in the starter. Care should be exercised when selecting an appropriate solvent. If the commutator needs cleaning use only electrical contact cleaner.

Armature Testing

1. Remove armature from starter casing. Note order of shims on drive end for reassembly.



2. Inspect surface of commutator. Replace if excessively worn or damaged.
3. Using a digital multitester, measure the resistance between each of the commutator segments. The reading should be .3 ohms or less.
4. Measure the resistance between each commutator segment and the armature shaft. The reading should be infinite (no continuity).



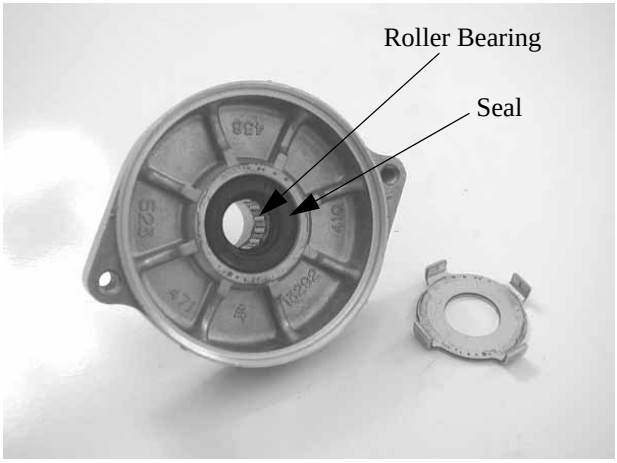
5. Check commutator bars for discoloration. Bars discolored in pairs indicate shorted coils, requiring replacement of the starter motor.
6. Place armature in a growler. Turn growler on and position a hacksaw blade or feeler gauge lengthwise 1/8" (.3 cm) above armature coil laminates. Rotate armature 360°. If hacksaw blade is drawn to armature on any pole, the armature is shorted and must be replaced.

> **⚠ CAUTION**
>
> Use care when handling starter housing. Do not drop or strike the housing as magnet damage is possible. If magnets are damaged, starter must be replaced.

Starter Reassembly / Installation

1. Install brush plate to field magnet housing aligning index tab.

2. Install O-ring, two small phenolic spacers, large phenolic washer, flat washer, lock washer, and terminal nut.
3. While holding brush springs away from brushes, push brushes back and hold in place.
4. Slide armature into field magnet housing. Release brushes.
5. Lightly grease the drive roller bearing and reinstall drive end frame on armature. Inspect seal for wear or damage. Replace drive end cap if necessary.



6. Be sure wire insulation is in place around positive brush wire and pushed completely into slot on phenolic plate.
7. Using Dielectric Grease (**PN 2871329**), lubricate brush end bushing and install shims.
8. Align brush plate and install cover and screws.
9. Lightly grease pinion shaft and install pinion, spring stopper, and snap ring.

10. Install the starter onto the engine case. Hand tighten each of the starter bolts. **Torque the bottom bolt first to 9 ft.lbs. (12 Nm**). Then torque the top bolt to the same specification.

NOTE: It is important to tighten the bottom starter bolt first (circle), as the bottom hole acts as a pilot hole to properly align the starter drive (bendix) with the flywheel. This helps to prevent binding and starter damage.

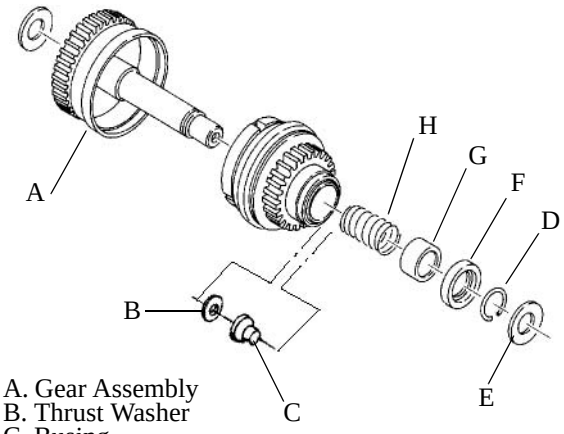
Starter Solenoid Bench Test

To measure the resistance of the pull-in coil, connect one meter lead to the solenoid lead wire and the other to ground. The resistance should be 2.8-3.6 ohms. Refer to "Electric Starter System Testing" in this section to further test the solenoid.

Starter Drive

Pinion Gear - Anti-kick Out Shoe, Garter Spring Replacement

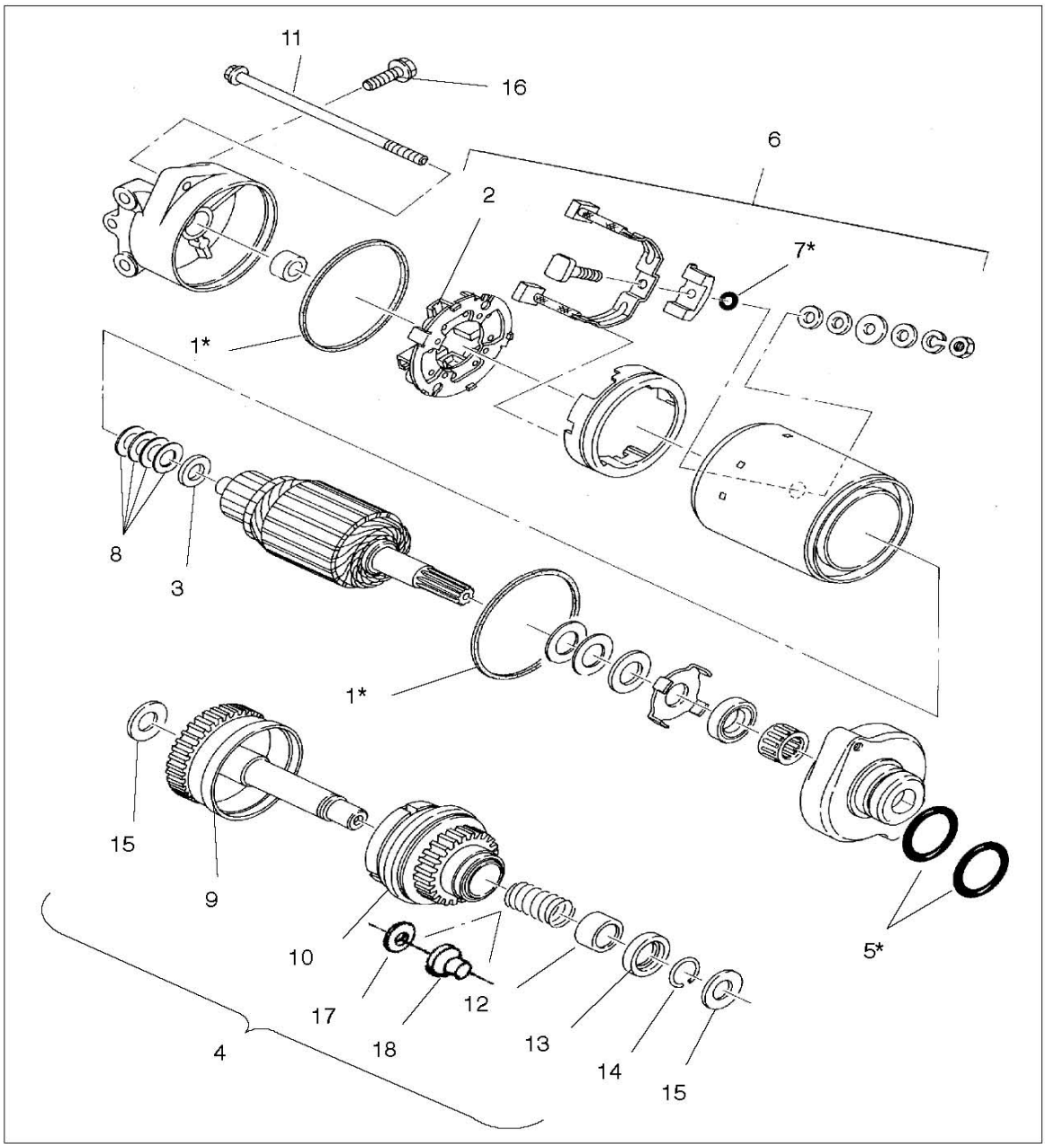
If the garter spring is damaged, the overrun clutch may fail to return properly. Use either of the following methods to remove and install a new garter spring:



A. Gear Assembly
B. Thrust Washer
C. Busing
D. Retaining Ring
E. Thrust Washer
F. Stopper
G. Cover
H. Spring

1. Screw the overrun clutch out to the engaged position on the pinion shaft assembly. Use a small piece of wire with the end bent in a hook and pick the old spring out of its channel. Slide it off the end of the shaft. Slide the new spring over the overrun clutch and into the spring groove. Make sure that the spring is positioned between the shoe alignment pins and the back flange of the anti kick-out shoes.
2. Remove the retaining ring, thrust washer, spring retainers and clutch return spring. Screw the overrun clutch off the end of the pinion shaft. Remove the old spring and install a new one. Lightly grease the pinion shaft and reinstall the clutch, spring, retainers, end washer and lock ring in the reverse order. Make sure the end washer is positioned properly so that it will hold the lock ring in its groove.

Starter Exploded View

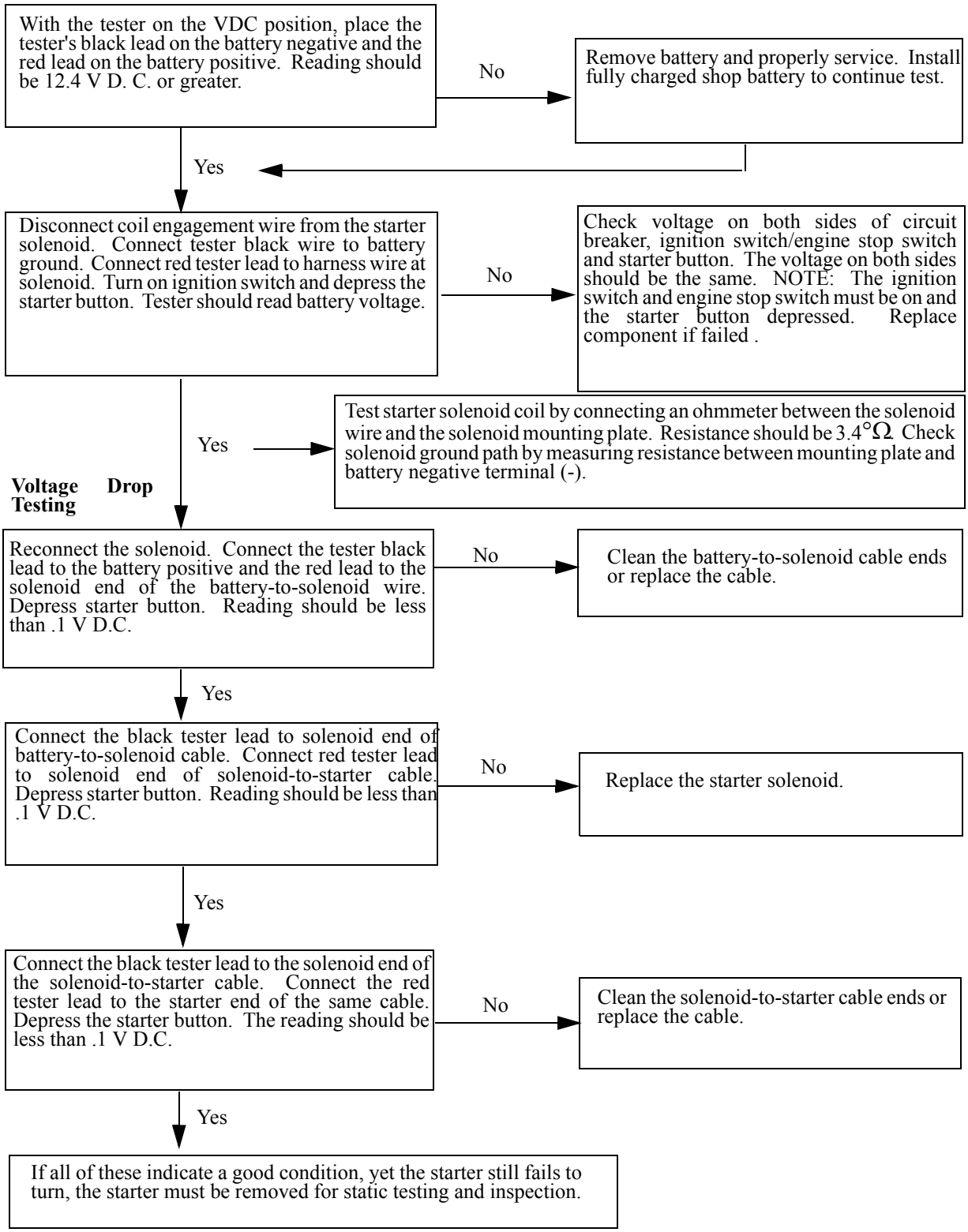


***** Indicates - Do not reuse. Replace with new parts.

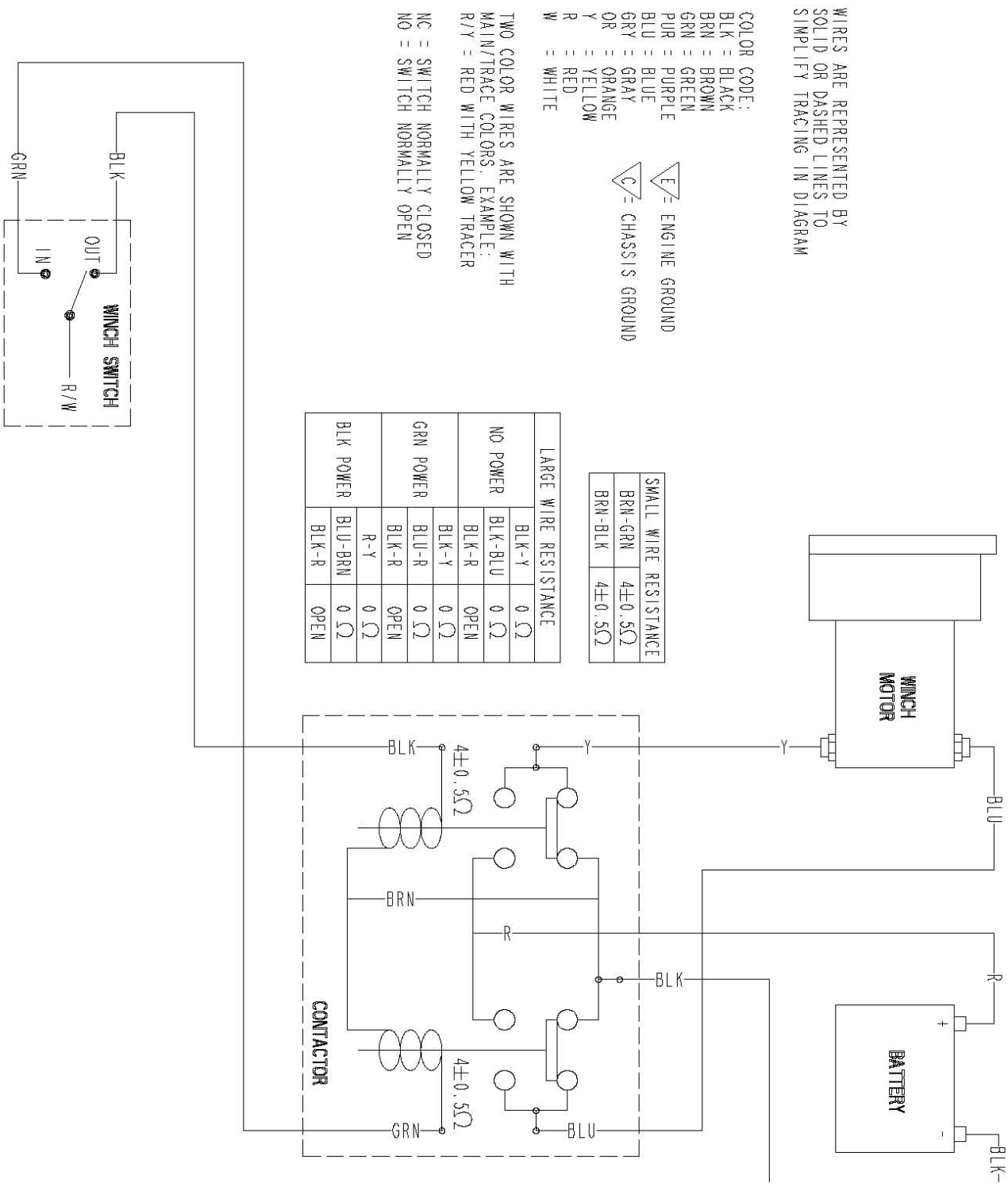
1. Rubber Ring*	10. Gear Assembly
2. Brush Spring	11. Through Bolt
3. Thrust Washer	12. Cover
4. Gear Assembly	13. Stopper
5. O-Ring*	14. Snap Ring
6. Brush Complete	15. Washer
7. O-Ring*	16. Flange Bolt
8. Thrust Washer	17. Thrust Washer
9. Shaft Complete	18. Flange Bushing

STARTER SYSTEM TESTING FLOW CHART

Condition: Starter fails to turn motor. NOTE: Make sure engine crankshaft is free to turn before proceeding with dynamic testing of starter system. A digital multitester must be used for this test



BASIC WINCH WIRING- PRE-WIRED MODELS

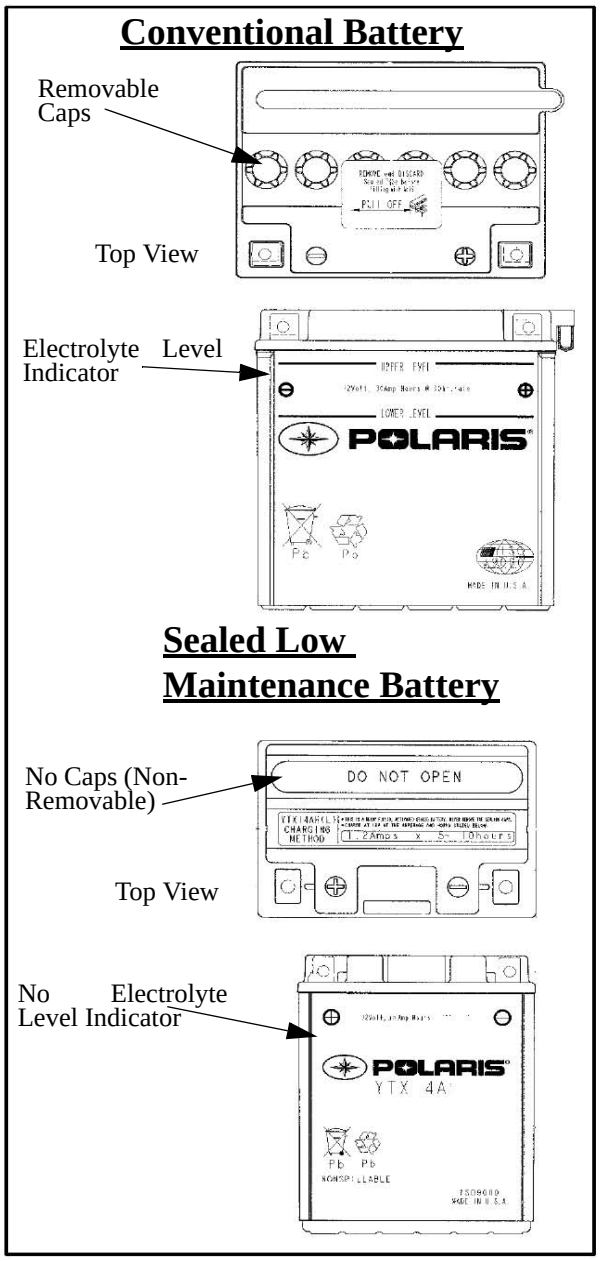


BATTERY

Battery Identification

NOTE: It is important to identify what type of battery you have installed in your ATV. Different types of batteries require different service procedures. Proper servicing and upkeep of your battery is very important for maintaining long battery life.

Your ATV may have a Conventional Battery or a Sealed Low Maintenance Battery. To identify which type of battery your ATV has, refer to the illustration below and follow the correct service and charging procedures that follow in the manual.



Battery Activation (Conventional)

⚠ WARNING

Battery electrolyte is poisonous. It contains sulfuric acid. Serious burns can result from contact with 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 an enclosed space. Always shield eyes when working near batteries. KEEP OUT OF REACH OF CHILDREN.

⚠ 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. Should there be contact with battery acid, wash the affected area with large quantities of cool water and seek immediate medical attention.

To ensure maximum service life and performance from a new battery, perform the following steps.

NOTE: Do not service the battery unless it will be put into regular service within 30 days. After initial service, add only distilled water to the battery. Never add electrolyte after a battery has been in service.

NOTE: New Battery: Battery must be fully charged before use or battery life will be significantly reduced 10-30% of the battery's full potential.

To activate a new battery:

1. Remove vent plug from vent fitting. Remove cell caps.
2. Fill battery with electrolyte to upper level marks on case.
3. Set battery aside to allow for acid absorption and stabilization for 30 minutes.

4. Add electrolyte to bring level back to upper level mark on 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. Examples: 1/10 of 9 amp battery = .9 amp; 1/10 of 14 amp battery = 1.4 amp; 1/10 of 18 amp battery = 1.8 amp (recommended charging rates).
6. Check specific gravity of each cell with a hydrometer to assure each has a reading of 1.270 or higher.

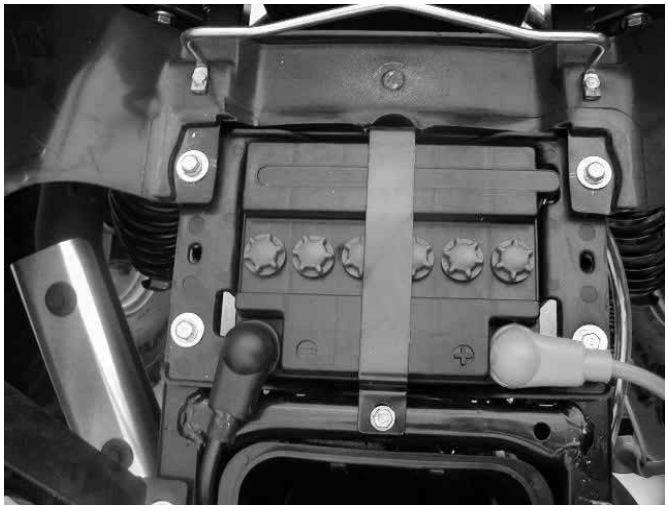
Battery Terminals/Bolts

Terminal Preparation

Use Polaris corrosion resistant Nyogel™ grease (PN 2871329) on battery bolts and terminals when installing a battery. This will help to prevent corrosion and maintain good electrical connection. See "BATTERY INSTALLATION".

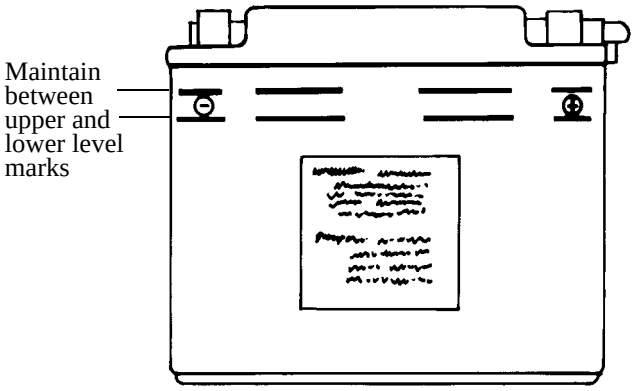
Conventional Battery Inspection / Removal

The battery is located under the seat on Sportsman models.



The X2 battery is located under fuel tank and can be accessed by removing the right hand side panel.

Inspect the battery fluid level. When the battery fluid nears the lower level, remove the battery and fill with distilled water only to the upper level line. To remove the battery:



1. Disconnect holder strap and remove covers.
2. Disconnect battery negative (-) (black) cable first, followed by the positive (+) (red) cable.

> **⚠ CAUTION**
>
> Whenever removing or reinstalling the battery, disconnect the negative (black) cable first and reinstall the negative cable last!

3. Remove the battery.
4. Remove the filler caps and add distilled water only as needed to bring each cell to the proper level. Do not overfill the battery.

NOTE: Refill using only distilled water. Tap water contains minerals which are harmful to a battery.

NOTE: Do not allow cleaning solution or tap water inside the battery. Battery life may be reduced.

5. Reinstall the battery caps.

Conventional Battery Installation

1. lean battery cables and terminals with a stiff wire brush. Corrosion can be removed using a solution of one cup water and one tablespoon baking soda. Rinse well with clean water and dry thoroughly.
2. Route the cables correctly.
3. Reinstall battery, attaching positive (+) (red) cable first and then the negative (-) (black) cable. Coat terminals and bolt threads with Nyogel™ Grease (PN 2871329).

4. Install clear battery vent tube from vehicle to battery vent.

> **⚠ WARNING**
>
> Vent tube must be free from obstructions and kinks and securely installed. If not, battery gases could accumulate and cause an explosion. The vent tube should be routed away from frame and body to prevent contact with Route the cables correctly.

5. Reinstall the holder strap.

Conventional Battery Testing

Whenever a service complaint is related to either the starting or charging systems, the battery should be checked first.

Following are three tests which can easily be made on a battery to determine its condition: OCV Test, Specific Gravity Test and Load Test.

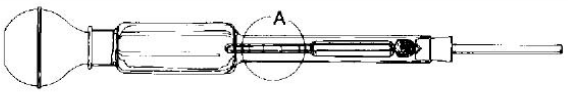
Conventional Battery OCV - Open Circuit Voltage Test

Battery voltage should be checked with a digital multitester. Readings of 12.6 volts or less require further battery testing and charging. See charts and Load Test below.

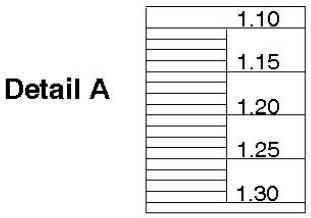
NOTE: Lead-acid batteries should be kept at or near a full charge as possible. Electrolyte level should be kept between the low and full marks. If the battery is stored or used in a partially charged condition, or with low electrolyte levels, hard crystal sulfation will form on the plates, reducing the efficiency and service life of the battery.

Conventional Battery Specific Gravity Test

A tool such as a 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.



Battery Hydrometer (**PN 2870836**)



OPEN CIRCUIT VOLTAGE

STATE OF CHARGE	CONVENTIONAL LEAD - ACID	LOW MAINTENANCE
100%	12.60V	12.70V
Charged	12.40V	12.50V
75% Charged	12.10V	12.20V
50% Charged	11.90V	12.0V
25% Charged	less than 11.80V	Less than 11.90V
0% Charged	--	--

SPECIFIC GRAVITY

STATE OF CHARGE*	CONVENTIONAL LEAD - ACID	LOW MAINTENANCE
100%	1.265	1.275
Charged	1.210	1.225
75% Charged	1.160	1.175
50% Charged	1.120	1.135
25% Charged	less than 1.100	Less than 1.115
0% Charged	--	--

* Measurement at 80° F

NOTE: Subtract .01 from the specific gravity reading at 40° F

Battery Load Test

CAUTION

To prevent shock or component damage, remove spark plug high tension leads and connect securely to engine ground before proceeding.

NOTE: This test can only be performed on machines with electric starters. This test cannot be performed with an engine or starting system that is not working properly.

A battery may indicate a full charge condition in the OCV test and the specific gravity test, but still may 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 this test, hook a multitester to the battery in the same manner as was done in the OCV test. The reading should be 12.6 volts or greater. Engage the starter and observe the battery voltage while cranking the engine. Continue the test for 15 seconds. During cranking the observed voltage should not drop below 9.5 volts. If the beginning voltage is 12.6 volts or higher and the cranking voltage drops below 9.5 volts during the test, replace the battery.

Off Season Storage

To prevent battery damage during extended periods of non-use, the following basic battery maintenance items must be performed:

- Remove the battery from the 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. **NOTE:** Do not get any of the baking soda into the battery or the acid will be neutralized.
- Using a wire brush or knife, remove any corrosion from the cables and terminals.
- Make sure that the electrolyte is at the proper level. Add distilled water if necessary.
- 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.
- Store the battery either in the machine with the cables disconnected, or store in a cool place.

NOTE: Recharge to full capacity every 30 to 60 days during a non-use period. If the battery is stored during the winter months, electrolyte will freeze at higher temperatures as the battery discharges. The chart below indicates freezing points by specific gravity.

ELECTROLYTE FREEZING POINTS

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

1. Remove the battery from the ATV to prevent damage from leaking or spilled acid during charging.
2. Charge the battery with a charging output no larger than 1/10 of the battery's amp/hr rating. Charge as needed to raise the specific gravity to 1.270 or greater.
3. Install battery in vehicle with positive terminal toward the front. Coat threads of battery bolt with a corrosion resistant dielectric grease (**PN 2871329**).
4. Connect battery cables.

WARNING

To avoid the possibility of explosion, connect positive (red) cable first and negative (black) cable last.

5. After connecting the battery cables, install the cover on the battery and attach the hold down strap.

6. Install clear battery vent tube from vehicle to battery vent.

> **⚠ WARNING**
>
> Vent tube must be free from obstructions and kinks and securely installed. If not, battery gases could accumulate and cause an explosion. Vent should be routed away from frame and body to prevent contact with electrolyte. Avoid skin contact with electrolyte, as severe burns could result. If electrolyte contacts the vehicle frame, corrosion will occur.

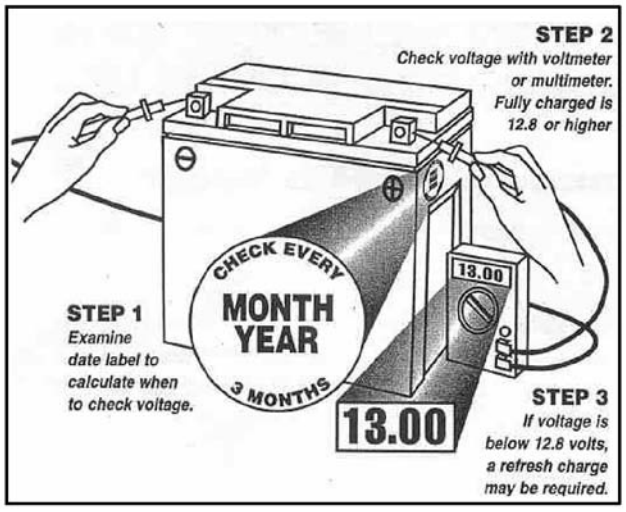
7. Route cables so they are tucked away in front and behind battery.

Low Maintenance Battery

Battery Check:

NOTE: All Low Maintenance batteries are fully charged and tested at the factory before installation. Expected shelf life varies on storage conditions. As a general rule before placing the battery into service, check the battery condition and charge accordingly.

1. Check the date label on the side of the battery to calculate when to check voltage. The battery should be checked every 3 months.
2. Check the voltage with a voltmeter or multimeter. **A fully charged battery should be 12.8 V or higher.**
3. If the voltage is below 12.8 V, the battery will need to be recharged.



NEW BATTERIES: Batteries must be fully charged before use or battery life can be reduced by 10-30% of full potential. Charge battery for 3-5 hours using a variable rate charger. Do not use the alternator to charge a new battery. A high rate battery charger can cause battery damage.

Low Maintenance batteries are permanently sealed at the time of manufacture. The use of lead-calcium and AGM technology instead of lead-antimony allows the battery acid to be fully absorbed. For this reason, a Low Maintenance battery case is dark and the cell caps are not removable, since there is no need to check electrolyte level.

NEVER attempt to add electrolyte or water to a Low Maintenance battery. Doing so will damage the case and shorten the life of the battery. Refer to the Battery Activation and Maintenance Video (**PN 9917987**) for proper instruction on servicing Low Maintenance batteries.

NOTE: New Batteries: Batteries must be fully charged before use or battery life will be reduced by 10-30% of full potential. Charge battery for 3-5 hours at a current equivalent of 1/10 of the battery's rated amp/hour capacity. Do not use the alternator to charge a new battery. (Refer to Battery Activation and Maintenance video PN 9917987)

NEVER attempt to add electrolyte or water to a Low Maintenance battery. Doing so will damage the case and shorten the life of the battery. Refer to the Battery Maintenance Video (**PN 9917987**) for proper instruction on servicing Low Maintenance batteries.

TO SERVICE A LOW MAINTENANCE BATTERY:

1. Remove battery from the vehicle.
2. Test battery with a voltage meter or load tester to determine battery condition. This will determine the length of time required to charge the battery to full capacity. Refer to capacity table.
3. Charge battery using a variable rate charger.

Low Maintenance Battery Charging

If battery voltage is 12.8 V or less, the battery may need recharging. When using an automatic charger, refer to the charger manufacturer's instructions for recharging. When using a constant current charger, use the following guidelines for recharging.

NOTE: Always verify battery condition before and 1-2 hours after the end of charging.

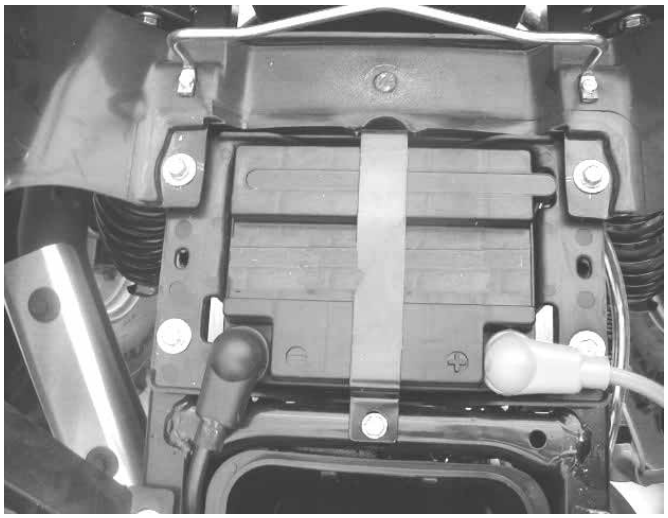
> **⚠ WARNING**
>
> An overheated battery could explode, causing severe injury or death. Always watch charging times carefully. Stop charging if the battery becomes very warm to the touch. Allow it to cool before resuming charging.

BATTERY CHARGING REFERENCE TABLE

STATE OF CHARGE	VOLTAGE	ACTION	CHARGE TIME
100%	12.8-13 V	None, check voltage at 3 mos. after manufacture date	None Required
75-100%	12.5-12.8 V	May need slight charge	3-6 Hours
50-75%	12.0-12.5 V	Needs Charge	5-11 Hours
25-50%	11.5-12.0 V	Needs Charge	At least 13 hours, verify state of charge
0-25%	11.5 V or less	Needs Charge	At least 20 hours

Low Maintenance Battery Inspection / Removal

The battery is located under the seat on Sportsman models.



The X2 battery is located under fuel tank and can be accessed by removing the right hand side panel.

1. Remove the seat and Disconnect holder strap.
2. Disconnect battery negative (-) (black) cable first, followed by the positive (+) (red) cable.

⚠ CAUTION

Whenever removing or reinstalling the battery, disconnect the negative (black) cable first and reinstall the negative cable last!

3. Remove the battery.

Low Maintenance Battery Installation

1. Clean battery cables and terminals with a stiff wire brush. Corrosion can be removed using a solution of one cup water and one tablespoon baking soda. Rinse well with clean water and dry thoroughly.
2. Route the cables correctly.
3. Reinstall battery, attaching positive (+) (red) cable first and then the negative (-) (black) cable. Coat terminals and bolt threads with Nyogel™ Grease (**PN 2871329**).
4. Reinstall the holder strap.

Low Maintenance Battery - OCV- Open Circuit Voltage Test

Battery voltage should be checked with a digital multitester. Readings of 12.8 volts or less require further battery testing and charging. See charts and Load Test.

NOTE: Lead-acid batteries should be kept at or near a full charge as possible. If the battery is stored or used in a partially charged condition, or with low electrolyte levels, hard crystal sulfation will form on the plates, reducing the efficiency and service life of the battery.

NOTE: Use a voltmeter or multimeter to test battery voltage.

OPEN CIRCUIT VOLTAGE

STATE OF CHARGE	LOW MAINTENANCE BATTERY	CONVENTIONAL BATTERY
100 %	13.0V	12.70V
75% Charged	12.80V	12.50V
50%	12.50V	12.20V
25%	12.20V	12.0V
0% Charged	less than 12.0V	less than 11.9V

* Measurement at 80° F

NOTE: Subtract .01 from the specific gravity reading at 40° F.

Low Maintenance Battery Load Test

CAUTION

To prevent shock or component damage, remove spark plug high tension leads and connect securely to engine ground before proceeding.

NOTE: This test can only be performed on machines with electric starters. This test cannot be performed with an engine or starting system that is not working properly.

A battery may indicate a full charge condition in the OCV test and the specific gravity test, but still may 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 this test:

1. Hook a multitester to the battery in the same manner as was done in the OCV test. The reading should be 12.8 volts or greater.
2. Engage the starter and observe the battery voltage while cranking the engine. Continue the test for 15 seconds.
3. During cranking the observed voltage should not drop below 9.5 volts.
4. If the beginning voltage is 12.8 volts or higher and the cranking voltage drops below 9.5 volts during the test, replace the battery.

Low Maintenance Battery Off-season Storage

Battery voltage should be checked with a digital multitester. Readings of 12.8 volts or less require further battery testing and charging. See charts and Load Test.

- Remove the battery from the 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.
- Using a wire brush or knife, remove any corrosion from the cables and terminals.
- Make sure that the electrolyte is at the proper level.
- 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.
- Store the battery either in the machine with the cables disconnected, or store in a cool place.

NOTE: Stored batteries lose their charge at the rate of 1% per day. Recharge to full capacity every 30 to 60 days during a non-use period. If the battery is stored during the winter months, electrolyte will freeze at higher temperatures as the battery discharges. The chart below indicates freezing points by specific gravity.

ELECTROLYTE FREEZING POINTS

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

Low Maintenance Battery Charging Procedure

1. Remove the battery from the ATV to prevent damage from leaking or spilled acid during charging.
2. Charge the battery with a variable rate charging output. Charge as needed to raise the specific gravity to 1.270 or greater.
3. Install battery in vehicle with positive terminal toward the front. Coat threads of battery bolt with a corrosion resistant Nyogel™ Grease (**PN 2871329**).
4. Route cables so they are tucked away in front and behind battery.
5. Connect battery cables.

> **WARNING**
>
> To avoid the possibility of sparks and explosion, connect positive (red) cable first and negative (black) cable last.

6. After connecting the battery cables, install the cover on the battery and attach the hold down strap.

NOTES

CHAPTER 11

800 EFI INTERNATIONAL

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NOTE: This chapter illustrates components that are unique to the Sportsman 800 EFI International. Except where noted, any servicing of these components or other components on the ATV can be done using this service manual's procedures and illustrations.

800 EFI INTERNATIONAL BRAKE SYSTEM

Overview

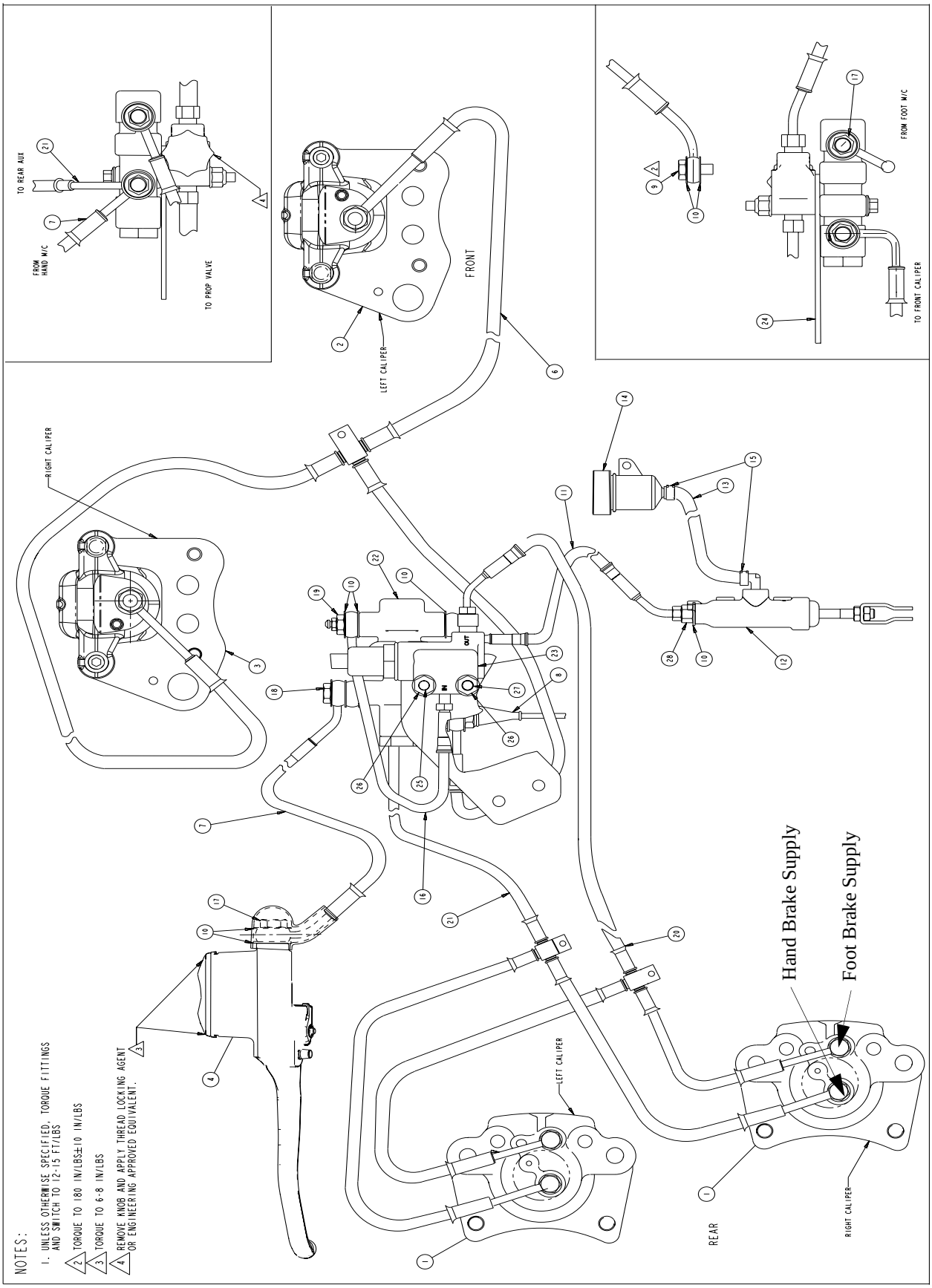
The Sportsman International brake system consists of a complete hydraulic brake system. All-wheel braking is integrated into the foot brake and hand brake systems and allows 4 wheel braking from either control separately, or at the same time.

When the foot brake is applied, all brake calipers are active, as braking pressure is routed from the foot brake master cylinder through the proportioning valve and distribution block, exiting one line to the front calipers, while the other line exits the proportioning valve and feeds the outer line to the rear calipers.

When the hand brake is applied, all brake calipers are active, as braking pressure is routed from the hand brake master cylinder through the distribution block, exiting one line to the front calipers, while the other line feeds the inner line to the rear calipers.

ITEM	PART NAME	QTY.
28	ADAPTOR - M10 X 1.0, 3/8-24IF,BRASS	1
27	SCREW-1/4-20 X 1 3/4 HXHDCP-Z	1
26	NUT-1/4-20-NYLOK-Y	2
25	BOLT-1/4-20 X 2.75 - HXHDCP-GR5-Y	1
24	PLATE-BRAKE, VALVE, BLK	1
23	VALVE-REDUCING, BRAKE	1
22	BLOCK-DIST, BRAKE, LONG PISTON	1
21	LINE-BRAKE, REAR, AUX,800 INTL	1
20	LINE-BRAKE, REAR, SERVICE,800 INTL	1
19	BOLT-BANJO, 10MM X 1.25 W/BLEEDER	1
18	BOLT-DOUBLE BANJO, 10MM X 1.25	1
17	BOLT-BANJO, 10MM X 1.25 -6G	2
16	LINE-BRAKE, J/B TO P/VALVE,NPT	1
15	HOSE CLAMP,RED	2
14	ASM-RESERVOIR,REAR BRAKE	1
13	HOSE-RESERVOIR,1/4 ID,19.5	1
12	ASM-M/CYL FOOT 3/4",3.70 LONG	1
11	LINE-BRAKE,FT TO J/B, 800 INTL	1
10	SEAL-STAT-O, 3/8	24
9	BOLT-BANJO, 10MM X 1.00	6
8	SWITCH-PRESSURE,BRAKE,M10 X 1.25	1
7	LINE-BRAKE,HAND TO J/B	1
6	LINE-BRAKE,FRONT	1
5	FLUID BRAKE, DOT4	A/R
4	ASM-MASTER CYLINDER,HB,11/16"	1
3	ASM-CALIPER, BRAKE,1-1/4,RH, 9"	1
2	ASM-CALIPER, BRAKE,1-1/4,LH, 9"	1
1	ASM-CALIPER, DH4P, 165YPAD	2

Exploded View



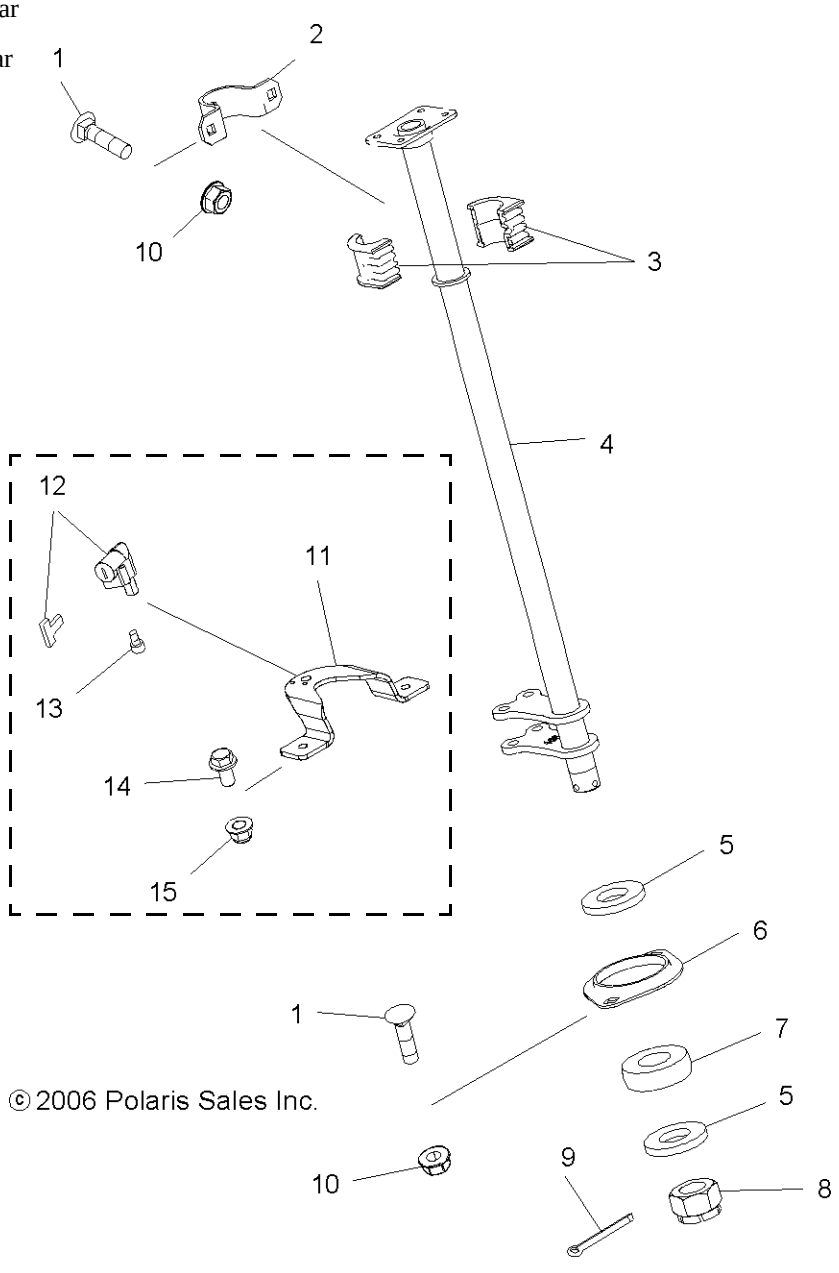
800 EFI INTERNATIONAL STEERING POST AND LOCK ASSEMBLY

Steering Assembly Exploded View

The 800 EFI International Sportsman is equipped with a locking mechanism to prevent theft or unauthorized use. Steering post removal may be required for lock service or repair.

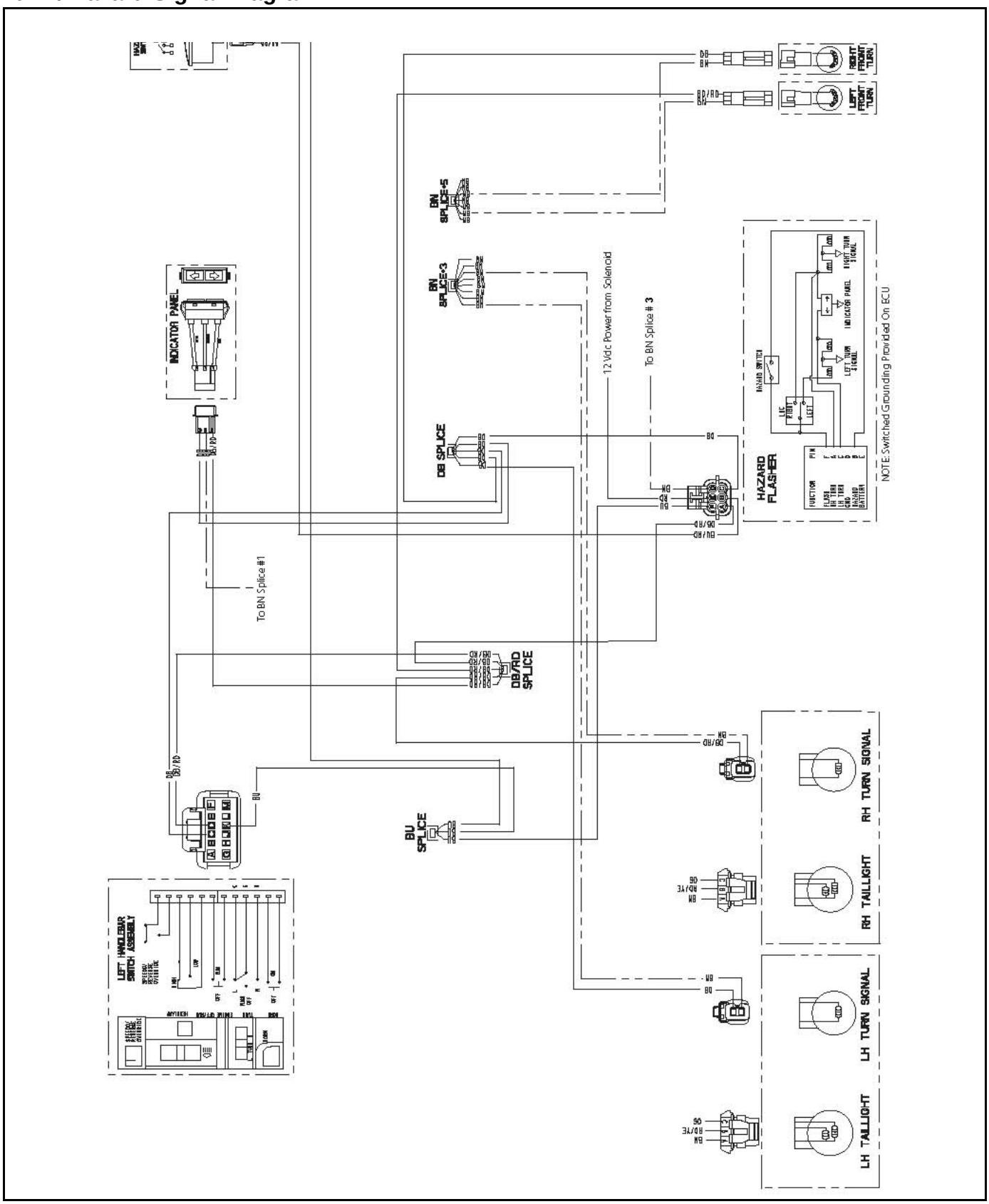
Lock System Item Number / Description:

11. Lock Collar
12. Lock Set
13. Bolt, Lock Set
14. Bolt(s), Lock Collar
15. Nut(s), Lock Collar



800 EFI INTERNATIONAL ELECTRICAL

Turn / Hazard Signal Diagram



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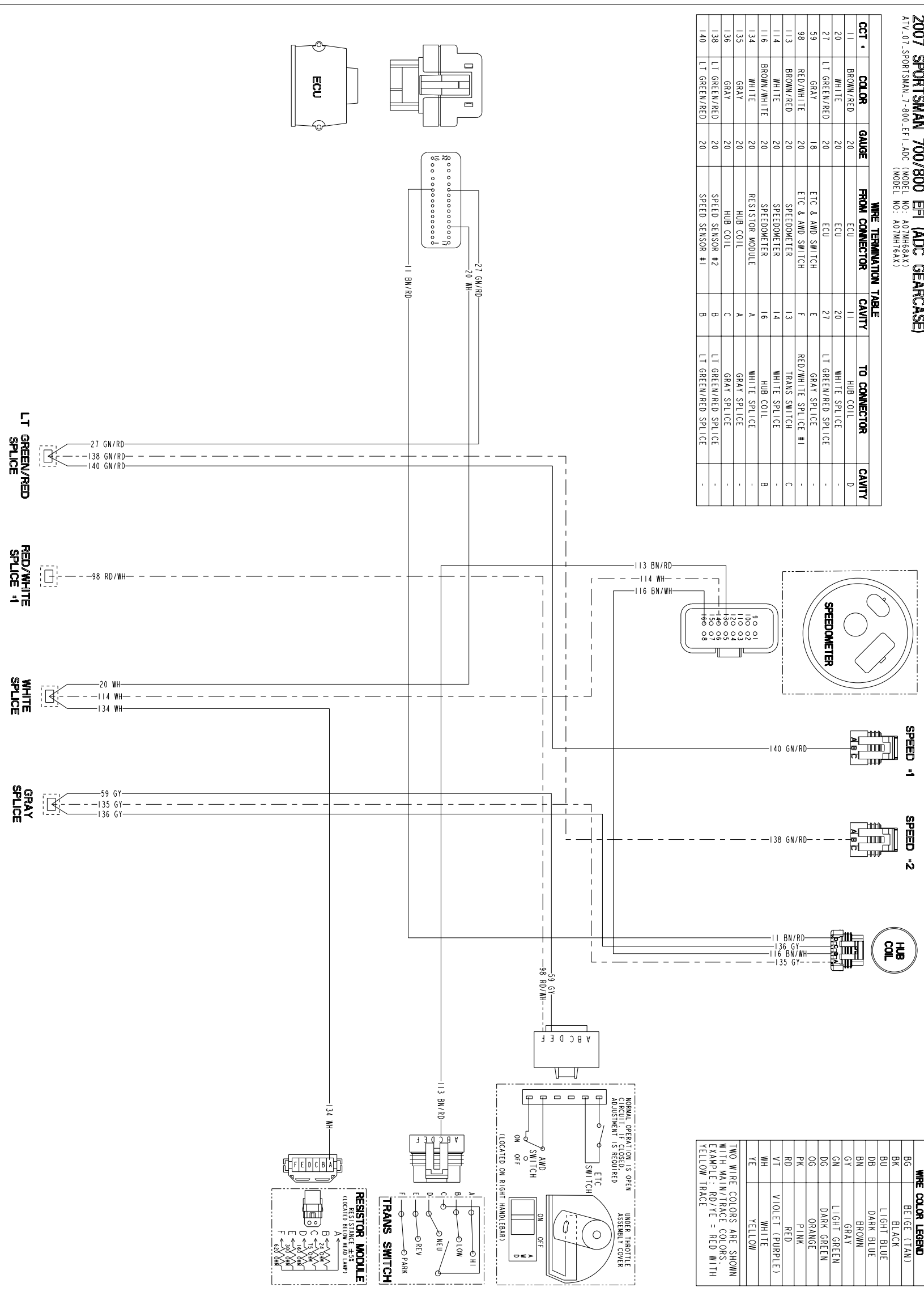
2007 SPORTSMAN ACTIVE DESCENT CONTROL (ADC) WIRE DIAGRAM

2007 SPORTSMAN 700/800 EFI (ADC GEARCASE)

ATV_07_SPORTSMAN_7-800_EFI_ADC (MODEL NO: A07MH68AX)
(MODEL NO: A07MH76AX)

WIRE TERMINATION TABLE

CCT #	COLOR	GAUGE	FROM CONNECTOR	CAVITY	TO CONNECTOR	CAVITY
11	BROWN/RED	20	ECU	11	HUB COIL	D
20	WHITE	20	ECU	20	WHITE SPLICE	-
27	LT GREEN/RED	20	ECU	27	LT GREEN/RED SPLICE	-
59	GRAY	18	ETC & AWD SWITCH	E	GRAY SPLICE	-
98	RED/WHITE	20	ETC & AWD SWITCH	F	RED/WHITE SPLICE #1	-
113	BROWN/RED	20	SPEEDOMETER	13	TRANS SWITCH	C
114	WHITE	20	SPEEDOMETER	14	WHITE SPLICE	-
116	BROWN/WHITE	20	SPEEDOMETER	16	HUB COIL	B
134	WHITE	20	RESISTOR MODULE	A	WHITE SPLICE	-
135	GRAY	20	HUB COIL	A	GRAY SPLICE	-
136	GRAY	20	HUB COIL	C	GRAY SPLICE	-
138	LT GREEN/RED	20	SPEED SENSOR #2	B	LT GREEN/RED SPLICE	-
140	LT GREEN/RED	20	SPEED SENSOR #1	B	LT GREEN/RED SPLICE	-

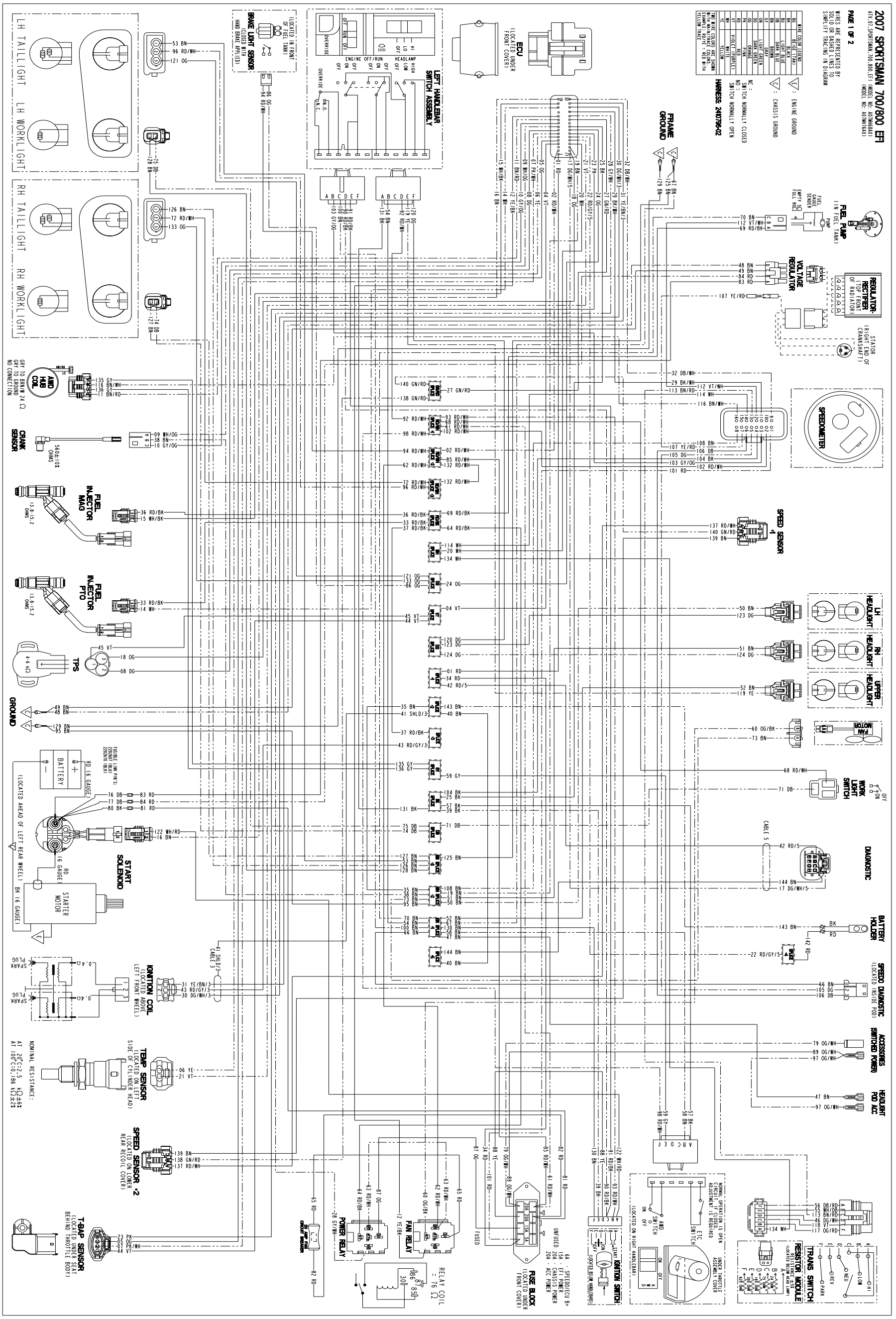


WIRE COLOR LEGEND

BG	BEIGE (TAN)
BK	BLACK
BU	LIGHT BLUE
DB	DARK BLUE
BN	BROWN
GY	GRAY
GN	LIGHT GREEN
DG	DARK GREEN
OG	ORANGE
PK	PINK
RD	RED
VT	VIOLET (PURPLE)
WH	WHITE
YE	YELLOW

TWO WIRE COLORS ARE SHOWN WITH MAIN/TRACE COLORS.
EXAMPLE: RD/YE = RED WITH YELLOW TRACE

2007 SPORTSMAN 700/800 EFI WIRE DIAGRAM



2007 SPORTSMAN 700/800 EFI

ATV_07_SPORTSMAN_700_800_EFI (MODEL NO: A07MH68AX)
(MODEL NO: A07MH76AX)

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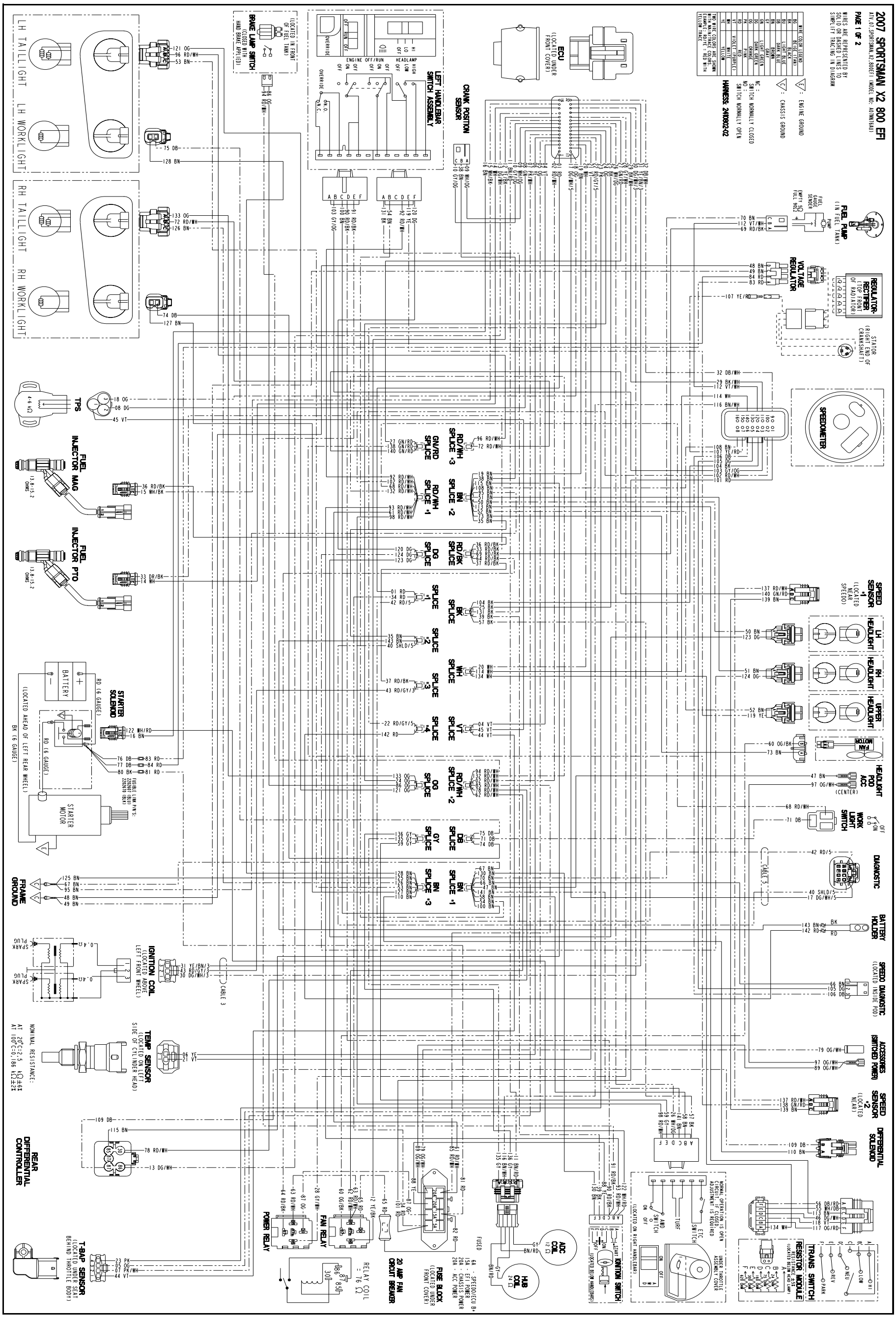
WIRE TERMINATION TABLE						
REF #	COLOR	GAUGE	FROM CONNECTOR	CAVITY	TO CONNECTOR	CAVITY
01	RED	20	ECU	1	SPLICE #1	-
02	RED/WHITE	20	ECU	2	RED/WHITE SPLICE #2	-
03	-	-	-	-	-	-
04	VIOLET	20	ECU	4	VIOLET SPLICE	-
05	ORANGE	20	ECU	5	T-BAP SENSOR	3
06	YELLOW	20	ECU	6	TEMP SENSOR	2
07	PINK/WHITE	20	ECU	7	T-BAP SENSOR	2
08	GREEN	20	ECU	8	TPS	2
09	WHITE/ORANGE	20	ECU	9	CRANK SENSOR	A
10	GRAY/ORANGE	20	ECU	10	CRANK SENSOR	C
11	BROWN/RED	20	ECU	11	HUB COIL	D
12	YELLOW/BLACK	20	ECU	12	FAN RELAY	86
13	-	-	-	-	-	-
14	WHITE	20	ECU	14	FUEL INJECTOR PTO	2
15	WHITE/BLACK	20	ECU	15	FUEL INJECTOR MAG	2
16	BROWN	20	ECU	16	START SOLENOID	2
17	GREEN/WHITE/5	20	ECU	17	DIAGNOSTIC	C
18	ORANGE	20	ECU	18	TPS	3
19	BROWN	20	ECU	19	BROWN SPLICE #2	-
20	WHITE	20	ECU	20	WHITE SPLICE	-
21	VIOLET	20	ECU	21	TEMP SENSOR	1
22	RED/GRAY/5	20	ECU	22	SPLICE #4	-
23	PINK	20	ECU	23	T-BAP SENSOR	4
24	ORANGE	20	ECU	24	ORANGE SPLICE	-
25	BLACK	20	ECU	25	BLACK SPLICE	-
26	-	-	-	-	-	-
27	LT GREEN/RED	20	ECU	27	LT GREEN/RED SPLICE	-
28	GRAY/WHITE	20	ECU	28	POWER RELAY	86
29	BLACK/WHITE	20	ECU	29	SPEEDOMETER	11
30	GREEN/WHITE/3	20	ECU	30	IGNITION COIL	1
31	YELLOW/BROWN/3	20	ECU	31	IGNITION COIL	3
32	BLUE/WHITE	20	ECU	32	SPEEDOMETER	9
33	RED/BLACK		FUEL INJECTOR PTO	1	RED/BLACK SPLICE	-
34	RED	20	FUSE BLOCK	5AMP	SPLICE #1	-
35	BROWN	20	BROWN SPLICE #2	-	SPLICE #2	-
36	RED/BLACK		FUEL INJECTOR MAG	1	RED/BLACK SPLICE	-
37	RED/BLACK		RED/BLACK SPLICE	-	SPLICE #3	-
38	BROWN	20	CRANK SENSOR	B	BROWN SPLICE #2	-
39	BLACK	20	IGNITION SWITCH	E	BLACK SPLICE	-
40	SHLD/5	20	SPLICE #5	-	SPLICE #2	-
41	SHLD/3	20	SPLICE #2	-	-	-
42	RED/5	20	DIAGNOSTIC	A	SPLICE #1	-
43	RED/GRAY/3	20	IGNITION COIL	2	SPLICE #3	-
44	VIOLET	20	T-BAP SENSOR	1	VIOLET SPLICE	-
45	VIOLET	20	TPS	1	VIOLET SPLICE	-
46	GREEN/WHITE		TRANS SWITCH	D	RESISTOR MODULE	D
47	BROWN	16	HEADLIGHT POD ACC	.250F	BROWN SPLICE #1	-
48	BROWN	14	VOLTAGE REGULATOR	D	GROUND	.197R
49	BROWN	14	VOLTAGE REGULATOR	C	GROUND	.197R
50	BROWN		LH HEADLIGHT	A	BROWN SPLICE #2	-
51	BROWN	16	RH HEADLIGHT	A	BROWN SPLICE #2	-
52	BROWN		UPPER HEADLIGHT	A	BROWN SPLICE #1	-
53	BROWN		LH TAILLIGHT	1	BROWN SPLICE #3	-
54	BROWN	20	LH HANDLEBAR	B	BROWN SPLICE #1	-
55	WHITE/BLUE		TRANS SWITCH	B	RESISTOR MODULE	E
56	BLUE/RED		TRANS SWITCH	A	RESISTOR MODULE	F
57	BLACK	20	ETC & AWD SWITCH	A	BLACK SPLICE	-
58	BROWN	20	ETC & AWD SWITCH	B	BROWN SPLICE #1	-
59	GRAY	18	ETC & AWD SWITCH	E	GRAY SPLICE	-
60	ORANGE/BLACK	16	FAN MOTOR	B	FAN RELAY	87
61	RED/WHITE	16	RED/WHITE SPLICE #1	-	FUSE BLOCK	20AMP
62	RED/WHITE	20	FAN RELAY	85	RED/WHITE SPLICE #2	-
63	RED/WHITE	20	FAN RELAY	85	POWER RELAY	85
64	RED/BLACK	16	POWER RELAY	87	RED/BLACK SPLICE	-
65	RED	16	FAN RELAY	30	20A CIRCUIT BREAKER	-
66	BROWN	20	SPEEDO DIAGNOSTIC	1	BROWN SPLICE #1	-
67	BROWN	16	FRAME GROUND	.250R	BROWN SPLICE #1	-
68	RED/WHITE		WORK LIGHT SWITCH	-	RED/WHITE SPLICE #1	-
69	RED/BLACK		FUEL PUMP	A	RED/BLACK SPLICE	-
70	BROWN		FUEL PUMP	C	BROWN SPLICE #1	-
71	BLUE		WORK LIGHT SWITCH	-	BLUE SPLICE	-
72	RED/WHITE		RH TAILLIGHT	2	RED/WHITE SPLICE #3	-
73	BROWN	16	FAN MOTOR	A	BROWN SPLICE #2	-
74	BLUE		RH WORKLIGHT	-	BLUE SPLICE	-
75	BLUE		LH WORKLIGHT	-	BLUE SPLICE	-
76	BLUE		SOLENOID BATTERY +	.250R	18/14 SPLICE	-
77	BLUE		SOLENOID BATTERY +	.250R	18/14 SPLICE	-
78	-	-	-	-	-	-
79	ORANGE/WHITE	16	FUSE BLOCK	20AMP	ACCESSORIES (SW POWER)	-
80	BLACK	16	SOLENOID BATTERY +	.250R	16/12 SPLICE	-
81	RED	12	FUSE BLOCK	20AMP	16/12 SPLICE	-
82	RED	16	FUSE BLOCK	20AMP	20A CIRCUIT BREAKER	-
83	RED	14	VOLTAGE REGULATOR	A	18/14 SPLICE	-
84	RED	14	VOLTAGE REGULATOR	B	18/14 SPLICE	-

WIRE TERMINATION TABLE						
REF #	COLOR	GAUGE	FROM CONNECTOR	CAVITY	TO CONNECTOR	CAVITY
85	RED/WHITE	16	FUSE BLOCK	20AMP	RED/WHITE SPLICE #2	-
86	ORANGE		BRAKE LIGHT SENSOR	-	ORANGE SPLICE	-
87	ORANGE	16	FUSE BLOCK	15AMP	POWER RELAY	30
88	YELLOW	16	FUSE BLOCK	20AMP	IGNITION SWITCH	D
89	ORANGE/WHITE	16	FUSE BLOCK	20AMP	ACCESSORIES (SW POWER)	.250F
90	RED/BLACK		IGNITION SWITCH	C	LH HANDLEBAR	D
91	RED/BLACK		IGNITION SWITCH	C	LH HANDLEBAR	E
92	RED/WHITE	16	LH HANDLEBAR	D	RED/WHITE SPLICE #1	-
93	RED/WHITE		IGNITION SWITCH	B	RED/WHITE SPLICE #1	-
94	RED/WHITE	16	BRAKE LIGHT SENSOR	-	RED/WHITE SPLICE #2	-
95	BROWN	16	GROUND	.197R	BROWN SPLICE #2	-
96	RED/WHITE		LH TAILLIGHT	2	RED/WHITE SPLICE #3	-
97	ORANGE/WHITE	16	HEADLIGHT POD ACC	.187F	ACCESSORIES (SW POWER)	.250F
98	RED/WHITE	20	ETC & AWD SWITCH	F	RED/WHITE SPLICE #1	-
99	-	-	-	-	-	-
100	BROWN	20	LH HANDLEBAR	C	BROWN SPLICE #1	-
101	RED	20	SPEEDOMETER	1	FUSE BLOCK	5AMP
102	RED/WHITE	20	SPEEDOMETER	2	RED/WHITE SPLICE #1	-
103	GRAY/ORANGE	20	SPEEDOMETER	3	LH HANDLEBAR	B
104	BLACK	20	SPEEDOMETER	4	BLACK SPLICE	-
105	GREEN	20	SPEEDOMETER	5	SPEEDO DIAGNOSTIC	2
106	BLUE	20	SPEEDOMETER	6	SPEEDO DIAGNOSTIC	3
107	YELLOW/RED	20	SPEEDOMETER	7	ALTERNATOR	.180M
108	BROWN	20	SPEEDOMETER	8	BROWN SPLICE #2	-
109	-	-	-	-	-	-
110	-	-	-	-	-	-
111	-	-	-	-	-	-
112	VIOLET/WHITE	20	SPEEDOMETER	12	FUEL PUMP	B
113	BROWN/RED	20	SPEEDOMETER	13	TRANS SWITCH	C
114	WHITE	20	SPEEDOMETER	14	WHITE SPLICE	-
115	-	-	-	-	-	-
116	BROWN/WHITE	20	SPEEDOMETER	16	HUB COIL	B
117	ORANGE/RED		TRANS SWITCH	F	RESISTOR MODULE	B
118	VIOLET		TRANS SWITCH	E	RESISTOR MODULE	C
119	YELLOW		LH HANDLEBAR	E	UPPER HEADLIGHT	B
120	GREEN		LH HANDLEBAR	F	GREEN SPLICE	-
121	ORANGE		ORANGE SPLICE	-	LH TAILLIGHT	3
122	WHITE/RED		IGNITION SWITCH	A	START SOLENOID	1
123	GREEN		LH HEADLIGHT	B	GREEN SPLICE	-
124	GREEN		RH HEADLIGHT	B	GREEN SPLICE	-
125	BROWN	16	FRAME GROUND	.250R	BROWN SPLICE #3	-
126	BROWN		RH TAILLIGHT	1	BROWN SPLICE #3	-
127	BROWN		RH WORKLIGHT	-	BROWN SPLICE #3	-
128	BROWN		LH WORKLIGHT	-	BROWN SPLICE #3	-
129	BROWN	14	GROUND	.197R	FRAME GROUND	.250R
130	BROWN	20	IGNITION SWITCH	F	BROWN SPLICE #1	-
131	BLACK	20	LH HANDLEBAR	A	BLACK SPLICE	-
132	RED/WHITE	16	RED/WHITE SPLICE #2	-	RED/WHITE SPLICE #3	-
133	ORANGE		RH TAILLIGHT	3	ORANGE SPLICE	-
134	WHITE	20	RESISTOR MODULE	A	WHITE SPLICE	-
135	GRAY	20	HUB COIL	A	GRAY SPLICE	-
136	GRAY	20	HUB COIL	C	GRAY SPLICE	-
137	RED/WHITE	20	SPEED SENSOR #1	A	SPEED SENSOR #2	A
138	LT GREEN/RED	20	SPEED SENSOR #2	B	LT GREEN/RED SPLICE	-
139	BROWN	20	SPEED SENSOR #1	C	SPEED SENSOR #2	C
140	LT GREEN/RED	20	SPEED SENSOR #1	B	LT GREEN/RED SPLICE	-
141	-	-	-	-	-	-
142	RED	20	BATTERY HOLDER	-	SPLICE #4	-
143	BROWN	20	BATTERY HOLDER	-	SPLICE #2	-
144	BROWN	20	DIAGNOSTIC	D	SPLICE #5	-

2007 SPORTSMAN 800 X2 EFI WIRE DIAGRAM



2007 SPORTSMAN X2 800 EFI

ATV_07_SPORTSMAN_X2_800EFI (MODEL NO: A07MN76AU)

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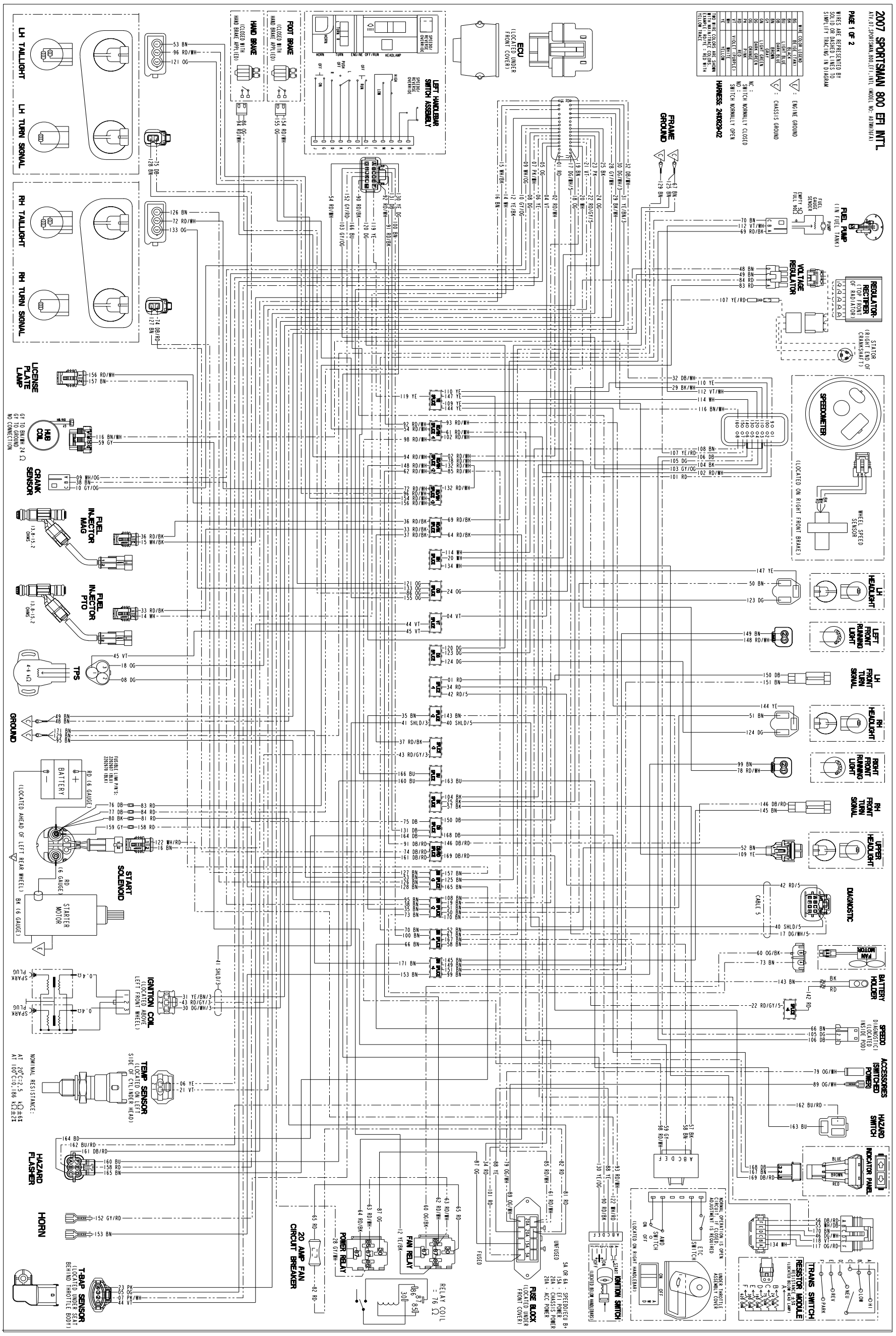
WIRE TERMINATION TABLE

REF #	COLOR	GAUGE	FROM CONNECTOR	PIN	TO CONNECTOR	PIN
01	RED	20	ECU	1	SPLICE #1	-
02	RED/WHITE	20	ECU	2	RED/WHITE SPLICE #2	-
03	-	-	-	-	-	-
04	VIOLET	20	ECU	4	VIOLET SPLICE	-
05	ORANGE	20	ECU	5	T-BAP SENSOR	3
06	YELLOW	20	ECU	6	TEMP SENSOR	2
07	PINK/WHITE	20	ECU	7	T-BAP SENSOR	2
08	GREEN	20	ECU	8	TPS	2
09	WHITE/ORANGE	20	ECU	9	CRANK SENSOR	A
10	GRAY/ORANGE	20	ECU	10	CRANK SENSOR	C
11	BROWN/RED	20	ECU	11	HUB COIL	D
12	YELLOW/BLACK	20	ECU	12	FAN RELAY	86
13	GREEN/WHITE	20	ECU	13	REAR DIFF CONTROLLER	86
14	WHITE	20	ECU	14	FUEL INJECTOR PTO	2
15	WHITE/BLACK	20	ECU	15	FUEL INJECTOR MAG	2
16	BROWN	20	ECU	16	START SOLENOID	2
17	GREEN/WHITE/5	20	ECU	17	DIAGNOSTIC	C
18	ORANGE	20	ECU	18	TPS	3
19	BROWN	20	ECU	19	BROWN SPLICE #2	-
20	WHITE	20	ECU	20	WHITE SPLICE	-
21	VIOLET	20	ECU	21	TEMP SENSOR	1
22	RED/GRAY/5	20	ECU	22	SPLICE #4	-
23	PINK	20	ECU	23	T-BAP SENSOR	4
24	ORANGE	20	ECU	24	ORANGE SPLICE	-
25	BLACK	20	ECU	25	BLACK SPLICE	-
26	WHITE/GREEN	20	ECU	26	ETC & AWD SWITCH	D
27	LT GREEN/RED	20	ECU	27	LT GREEN/RED SPLICE	-
28	GRAY/WHITE	20	ECU	28	POWER RELAY	86
29	BLACK/WHITE	20	ECU	29	SPEEDOMETER	11
30	GREEN/WHITE/3	20	ECU	30	IGNITION COIL	1
31	YELLOW/BROWN/3	20	ECU	31	IGNITION COIL	3
32	BLUE/WHITE	20	ECU	32	SPEEDOMETER	9
33	RED/BLACK	18	FUEL INJECTOR PTO	1	RED/BLACK SPLICE	-
34	RED	20	FUSE BLOCK	5A	SPLICE #1	-
35	BROWN	20	BROWN SPLICE #2	-	SPLICE #2	-
36	RED/BLACK	18	FUEL INJECTOR MAG	1	RED/BLACK SPLICE	-
37	RED/BLACK	18	RED/BLACK SPLICE	-	SPLICE #3	-
38	BROWN	20	CRANK SENSOR	B	BROWN SPLICE #2	-
39	BLACK	20	IGNITION SWITCH	E	BLACK SPLICE	-
40	SHLD/5	20	DIAGNOSTIC	D	SPLICE #2	-
41	SHLD/3	20	SPLICE #2	-	-	-
42	RED/5	20	DIAGNOSTIC	A	SPLICE #1	-
43	RED/GRAY/3	20	IGNITION COIL	2	SPLICE #3	-
44	VIOLET	20	T-BAP SENSOR	1	VIOLET SPLICE	-
45	VIOLET	20	TPS	1	VIOLET SPLICE	-
46	GREEN/WHITE	18	TRANS SWITCH	D	RESISTOR MODULE	D
47	BROWN	16	HEADLIGHT POD ACC	.250F	BROWN SPLICE #1	-
48	BROWN	14	VOLTAGE REGULATOR	D	GROUND	.197R
49	BROWN	14	VOLTAGE REGULATOR	C	GROUND	.197R
50	BROWN	18	LH HEADLIGHT	A	BROWN SPLICE #2	-
51	BROWN	16	RH HEADLIGHT	A	BROWN SPLICE #2	-
52	BROWN	18	UPPER HEADLIGHT	A	BROWN SPLICE #1	-
53	BROWN	18	LH TAILLIGHT	C	BROWN SPLICE #3	-
54	BROWN	20	LH HANDLEBAR	B	BROWN SPLICE #1	-
55	WHITE/BLUE	18	TRANS SWITCH	B	RESISTOR MODULE	E
56	BLUE/RED	18	TRANS SWITCH	A	RESISTOR MODULE	F
57	BLACK	20	ETC & AWD SWITCH	A	BLACK SPLICE	-
58	BROWN	20	ETC & AWD SWITCH	B	BROWN SPLICE #1	-
59	GRAY	18	ETC & AWD SWITCH	E	GRAY SPLICE	-
60	ORANGE/BLACK	16	FAN MOTOR	B	FAN RELAY	87
61	RED/WHITE	16	RED/WHITE SPLICE #1	-	FUSE BLOCK	20A
62	RED/WHITE	20	FAN RELAY	85	RED/WHITE SPLICE #2	-
63	RED/WHITE	20	FAN RELAY	85	POWER RELAY	85
64	RED/BLACK	16	POWER RELAY	87	RED/BLACK SPLICE	-
65	RED	16	FAN RELAY	30	20A CIRCUIT BREAKER	-
66	BROWN	20	SPEEDO DIAGNOSTIC	1	BROWN SPLICE #1	-
67	BROWN	16	FRAME GROUND	.250R	BROWN SPLICE #1	-
68	RED/WHITE	18	WORK LIGHT SWITCH	-	RED/WHITE SPLICE #1	-
69	RED/BLACK	18	FUEL PUMP	A	RED/BLACK SPLICE	-
70	BROWN	18	FUEL PUMP	C	BROWN SPLICE #1	-
71	BLUE	18	WORK LIGHT SWITCH	-	BLUE SPLICE	-
72	RED/WHITE	18	RH TAILLIGHT	B	RED/WHITE SPLICE #3	-
73	BROWN	16	FAN MOTOR	A	BROWN SPLICE #2	-
74	BLUE	18	RH WORKLIGHT	-	BLUE SPLICE	-
75	BLUE	18	LH WORKLIGHT	-	BLUE SPLICE	-
76	BLUE	18	SOLENOID BATTERY +	.250R	18/14 SPLICE	-
77	BLUE	18	SOLENOID BATTERY +	.250R	18/14 SPLICE	-
78	RED/WHITE	18	REAR DIFF CONTROLLER	30	RED/WHITE SPLICE #2	-
79	ORANGE/WHITE	16	FUSE BLOCK	20A	ACCESSORIES (SW POWER)	-
80	BLACK	16	SOLENOID BATTERY +	.250R	16/12 SPLICE	-
81	RED	12	FUSE BLOCK	20A	16/12 SPLICE	-
82	RED	16	FUSE BLOCK	20A	20A CIRCUIT BREAKER	-
83	RED	14	VOLTAGE REGULATOR	A	18/14 SPLICE	-
84	RED	14	VOLTAGE REGULATOR	B	18/14 SPLICE	-

WIRE TERMINATION TABLE

REF #	COLOR	GAUGE	FROM CONNECTOR	PIN	TO CONNECTOR	PIN
85	RED/WHITE	16	FUSE BLOCK	20A	RED/WHITE SPLICE #2	-
86	ORANGE	18	BRAKE LIGHT SENSOR	-	ORANGE SPLICE	-
87	ORANGE	16	FUSE BLOCK	15A	POWER RELAY	30
88	YELLOW	16	FUSE BLOCK	20A	IGNITION SWITCH	D
89	ORANGE/WHITE	16	FUSE BLOCK	20A	ACCESSORIES (SW POWER)	.250F
90	RED/BLACK	18	IGNITION SWITCH	C	LH HANDLEBAR	D
91	RED/BLACK	18	IGNITION SWITCH	C	LH HANDLEBAR	E
92	RED/WHITE	16	LH HANDLEBAR	D	RED/WHITE SPLICE #1	-
93	RED/WHITE	18	IGNITION SWITCH	B	RED/WHITE SPLICE #1	-
94	RED/WHITE	16	BRAKE LIGHT SENSOR	-	RED/WHITE SPLICE #2	-
95	BROWN	16	GROUND	.197R	BROWN SPLICE #2	-
96	RED/WHITE	18	LH TAILLIGHT	B	RED/WHITE SPLICE #3	-
97	ORANGE/WHITE	16	HEADLIGHT POD ACC	.197F	ACCESSORIES (SW POWER)	.250F
98	RED/WHITE	20	ETC & AWD SWITCH	F	RED/WHITE SPLICE #1	-
99	-	-	-	-	-	-
100	BROWN	20	LH HANDLEBAR	C	BROWN SPLICE #1	-
101	RED	20	SPEEDOMETER	1	FUSE BLOCK	5A
102	RED/WHITE	20	SPEEDOMETER	2	RED/WHITE SPLICE #1	-
103	GRAY/ORANGE	20	SPEEDOMETER	3	LH HANDLEBAR	B
104	BLACK	20	SPEEDOMETER	4	BLACK SPLICE	-
105	GREEN	20	SPEEDOMETER	5	SPEEDO DIAGNOSTIC	2
106	BLUE	20	SPEEDOMETER	6	SPEEDO DIAGNOSTIC	3
107	YELLOW/RED	20	SPEEDOMETER	7	ALTERNATOR	.180M
108	BROWN	20	SPEEDOMETER	8	BROWN SPLICE #2	-
109	BLUE	18	REAR DIFF CONTROLLER	87	DIFF SOLENOID	B
110	BROWN	18	BROWN SPLICE #3	-	DIFF SOLENOID	A
111	-	-	-	-	-	-
112	VIOLET/WHITE	20	SPEEDOMETER	12	FUEL PUMP	B
113	BROWN	20	BROWN SPLICE #2	-	TRANS SWITCH	C
114	WHITE	20	SPEEDOMETER	14	WHITE SPLICE	-
115	BROWN	18	REAR DIFF CONTROLLER	85	BROWN SPLICE #2	-
116	BROWN/WHITE	20	SPEEDOMETER	16	HUB COIL	B
117	ORANGE/RED	18	TRANS SWITCH	F	RESISTOR MODULE	B
118	VIOLET	18	TRANS SWITCH	E	RESISTOR MODULE	C
119	YELLOW	18	LH HANDLEBAR	E	UPPER HEADLIGHT	B
120	GREEN	18	LH HANDLEBAR	F	GREEN SPLICE	-
121	ORANGE	18	ORANGE SPLICE	-	LH TAILLIGHT	A
122	WHITE/RED	18	IGNITION SWITCH	A	START SOLENOID	1
123	GREEN	18	LH HEADLIGHT	B	GREEN SPLICE	-
124	GREEN	18	RH HEADLIGHT	B	GREEN SPLICE	-
125	BROWN	16	FRAME GROUND	.250R	BROWN SPLICE #3	-
126	BROWN	18	RH TAILLIGHT	C	BROWN SPLICE #3	-
127	BROWN	18	RH WORKLIGHT	-	BROWN SPLICE #3	-
128	BROWN	18	LH WORKLIGHT	-	BROWN SPLICE #3	-
129	-	-	-	-	-	-
130	BROWN	20	IGNITION SWITCH	F	BROWN SPLICE #1	-
131	BLACK	20	LH HANDLEBAR	A	BLACK SPLICE	-
132	RED/WHITE	16	RED/WHITE SPLICE #2	-	RED/WHITE SPLICE #3	-
133	ORANGE	18	RH TAILLIGHT	A	ORANGE SPLICE	-
134	WHITE	20	RESISTOR MODULE	A	WHITE SPLICE	-
135	GRAY	20	HUB COIL	A	GRAY SPLICE	-
136	GRAY	20	HUB COIL	C	GRAY SPLICE	-
137	RED/WHITE	20	SPEED SENSOR #1	A	SPEED SENSOR #2	A
138	LT GREEN/RED	20	SPEED SENSOR #2	B	LT GREEN/RED SPLICE	-
139	BROWN	20	SPEED SENSOR #1	C	SPEED SENSOR #2	C
140	LT GREEN/RED	20	SPEED SENSOR #1	B	LT GREEN/RED SPLICE	-
141	BROWN	20	ETC & AWD SWITCH	C	BROWN SPLICE #1	-
142	RED	20	BATTERY HOLDER	-	SPLICE #4	-
143	BROWN	20	BATTERY HOLDER	-	SPLICE #2	-

2007 SPORTSMAN 800 EFI INTERNATIONAL WIRE DIAGRAM



WIRE TERMINATION TABLE

REF #	COLOR	GAUGE	FROM CONNECTOR	PIN	TO CONNECTOR	PIN
01	RED	20	ECU	1	SPLICE #1	-
02	RED/WHITE	20	ECU	2	RED/WHITE SPLICE #2	-
03	-	-	-	-	-	-
04	VIOLET	20	ECU	4	VIOLET SPLICE	-
05	ORANGE	20	ECU	5	T-BAP SENSOR	3
06	YELLOW	20	ECU	6	TEMP SENSOR	2
07	PINK/WHITE	20	ECU	7	T-BAP SENSOR	2
08	GREEN	20	ECU	8	TPS	2
09	WHITE/ORANGE	20	ECU	9	CRANK SENSOR	A
10	GRAY/ORANGE	20	ECU	10	CRANK SENSOR	C
11	BROWN/RED	20	ECU	11	HUB COIL	D
12	YELLOW/BLACK	20	ECU	12	FAN RELAY	86
13	GREEN/WHITE	20	ECU	13	REAR DIFF CONTROLLER	86
14	WHITE	20	ECU	14	FUEL INJECTOR PTO	2
15	WHITE/BLACK	20	ECU	15	FUEL INJECTOR MAG	2
16	BROWN	20	ECU	16	START SOLENOID	2
17	GREEN/WHITE/5	20	ECU	17	DIAGNOSTIC	C
18	ORANGE	20	ECU	18	TPS	3
19	BROWN	20	ECU	19	BROWN SPLICE #2	-
20	WHITE	20	ECU	20	WHITE SPLICE	-
21	VIOLET	20	ECU	21	TEMP SENSOR	1
22	RED/GRAY/5	20	ECU	22	SPLICE #4	-
23	PINK	20	ECU	23	T-BAP SENSOR	4
24	ORANGE	20	ECU	24	ORANGE SPLICE	-
25	BLACK	20	ECU	25	BLACK SPLICE	-
26	WHITE/GREEN	20	ECU	26	ETC & AWD SWITCH	D
27	LT GREEN/RED	20	ECU	27	LT GREEN/RED SPLICE	-
28	GRAY/WHITE	20	ECU	28	POWER RELAY	86
29	BLACK/WHITE	20	ECU	29	SPEEDOMETER	11
30	GREEN/WHITE/3	20	ECU	30	IGNITION COIL	1
31	YELLOW/BROWN/3	20	ECU	31	IGNITION COIL	3
32	BLUE/WHITE	20	ECU	32	SPEEDOMETER	9
33	RED/BLACK	18	FUEL INJECTOR PTO	1	RED/BLACK SPLICE	-
34	RED	20	FUSE BLOCK	5A	SPLICE #1	-
35	BROWN	20	BROWN SPLICE #2	-	SPLICE #2	-
36	RED/BLACK	18	FUEL INJECTOR MAG	1	RED/BLACK SPLICE	-
37	RED/BLACK	18	RED/BLACK SPLICE	-	SPLICE #3	-
38	BROWN	20	CRANK SENSOR	B	BROWN SPLICE #2	-
39	BLACK	20	IGNITION SWITCH	E	BLACK SPLICE	-
40	SHLD/5	20	DIAGNOSTIC	D	SPLICE #2	-
41	SHLD/3	20	SPLICE #2	-	-	-
42	RED/5	20	DIAGNOSTIC	A	SPLICE #1	-
43	RED/GRAY/3	20	IGNITION COIL	2	SPLICE #3	-
44	VIOLET	20	T-BAP SENSOR	1	VIOLET SPLICE	-
45	VIOLET	20	TPS	1	VIOLET SPLICE	-
46	GREEN/WHITE	18	TRANS SWITCH	D	RESISTOR MODULE	D
47	BROWN	16	HEADLIGHT POD ACC	.250F	BROWN SPLICE #1	-
48	BROWN	14	VOLTAGE REGULATOR	D	GROUND	.197R
49	BROWN	14	VOLTAGE REGULATOR	C	GROUND	.197R
50	BROWN	18	LH HEADLIGHT	A	BROWN SPLICE #2	-
51	BROWN	16	RH HEADLIGHT	A	BROWN SPLICE #2	-
52	BROWN	18	UPPER HEADLIGHT	A	BROWN SPLICE #1	-
53	BROWN	18	LH TAILLIGHT	C	BROWN SPLICE #3	-
54	BROWN	20	LH HANDLEBAR	B	BROWN SPLICE #1	-
55	WHITE/BLUE	18	TRANS SWITCH	B	RESISTOR MODULE	E
56	BLUE/RED	18	TRANS SWITCH	A	RESISTOR MODULE	F
57	BLACK	20	ETC & AWD SWITCH	A	BLACK SPLICE	-
58	BROWN	20	ETC & AWD SWITCH	B	BROWN SPLICE #1	-
59	GRAY	18	ETC & AWD SWITCH	E	GRAY SPLICE	-
60	ORANGE/BLACK	16	FAN MOTOR	B	FAN RELAY	87
61	RED/WHITE	16	RED/WHITE SPLICE #1	-	FUSE BLOCK	20A
62	RED/WHITE	20	FAN RELAY	85	RED/WHITE SPLICE #2	-
63	RED/WHITE	20	FAN RELAY	85	POWER RELAY	85
64	RED/BLACK	16	POWER RELAY	87	RED/BLACK SPLICE	-
65	RED	16	FAN RELAY	30	20A CIRCUIT BREAKER	-
66	BROWN	20	SPEEDO DIAGNOSTIC	1	BROWN SPLICE #1	-
67	BROWN	16	FRAME GROUND	.250R	BROWN SPLICE #1	-
68	RED/WHITE	18	WORK LIGHT SWITCH	-	RED/WHITE SPLICE #1	-
69	RED/BLACK	18	FUEL PUMP	A	RED/BLACK SPLICE	-
70	BROWN	18	FUEL PUMP	C	BROWN SPLICE #1	-
71	BLUE	18	WORK LIGHT SWITCH	-	BLUE SPLICE	-
72	RED/WHITE	18	RH TAILLIGHT	B	RED/WHITE SPLICE #3	-
73	BROWN	16	FAN MOTOR	A	BROWN SPLICE #2	-
74	BLUE	18	RH WORKLIGHT	-	BLUE SPLICE	-
75	BLUE	18	LH WORKLIGHT	-	BLUE SPLICE	-
76	BLUE	18	SOLENOID BATTERY +	.250R	18/14 SPLICE	-
77	BLUE	18	SOLENOID BATTERY +	.250R	18/14 SPLICE	-
78	RED/WHITE	18	REAR DIFF CONTROLLER	30	RED/WHITE SPLICE #2	-
79	ORANGE/WHITE	16	FUSE BLOCK	20A	ACCESSORIES (SW POWER)	-
80	BLACK	16	SOLENOID BATTERY +	.250R	16/12 SPLICE	-
81	RED	12	FUSE BLOCK	20A	16/12 SPLICE	-
82	RED	16	FUSE BLOCK	20A	20A CIRCUIT BREAKER	-
83	RED	14	VOLTAGE REGULATOR	A	18/14 SPLICE	-
84	RED	14	VOLTAGE REGULATOR	B	18/14 SPLICE	-

WIRE TERMINATION TABLE

REF #	COLOR	GAUGE	TO CONNECTOR	PIN
85	RED/WHITE	16	FUSE BLOCK	-
86	ORANGE	18	BROWN SPLICE #2	-
87	ORANGE	16	-	-
88	YELLOW	16	-	-
89	ORANGE/WHITE	16	-	-
90	RED/BLACK	18	-	-
91	RED/WHITE	18	-	-
92	RED/WHITE	16	-	-
93	RED/WHITE	18	-	-
94	RED/WHITE	16	BROWN SPLICE #2	-
95	BROWN	16	-	-
96	RED/WHITE	18	-	-
97	ORANGE/WHITE	16	-	-
98	RED/WHITE	20	-	-
99	-	-	-	-
100	BROWN	20	-	-
101	RED	20	-	-
102	RED/WHITE	20	-	-
103	GRAY/ORANGE	20	-	-
104	BLACK	20	-	-
105	GREEN	20	-	-
106	BLUE	20	-	-
107	YELLOW/RED	20	-	-
108	BROWN	20	-	-
109	BLUE	18	RED/WHITE SPLICE #2	-
110	BROWN	18	-	-
111	-	-	-	-
112	VIOLET/WHITE	20	-	-
113	BROWN	20	-	-
114	WHITE	20	-	-
115	BROWN	18	RED/WHITE SPLICE #2	-
116	BROWN/WHITE	20	-	-
117	ORANGE/RED	18	-	-
118	VIOLET	18	-	-
119	YELLOW	18	-	-
120	GREEN	18	-	-
121	ORANGE	18	-	-
122	WHITE/RED	18	-	-
123	GREEN	18	-	-
124	GREEN	18	-	-
125	BROWN	16	-	-
126	BROWN	18	-	-
127	BROWN	18	-	-
128	BROWN	18	-	-
129	-	-	-	-
130	BROWN	20	-	-
131	BLACK	20	-	-
132	RED/WHITE	16	RED/WHITE SPLICE #3	-
133	ORANGE	18	-	-
134	WHITE	20	-	-
135	GRAY	20	-	-
136	GRAY	20	-	-
137	RED/WHITE	20	-	-
138	LT GREEN/RED	20	-	-
139	BROWN	20	-	-
140	LT GREEN/RED	20	-	-
141	BROWN	20	-	-
142	RED	20	-	-
143	BROWN	20	-	-

2007 SPORTSMAN X2 800 EFI
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