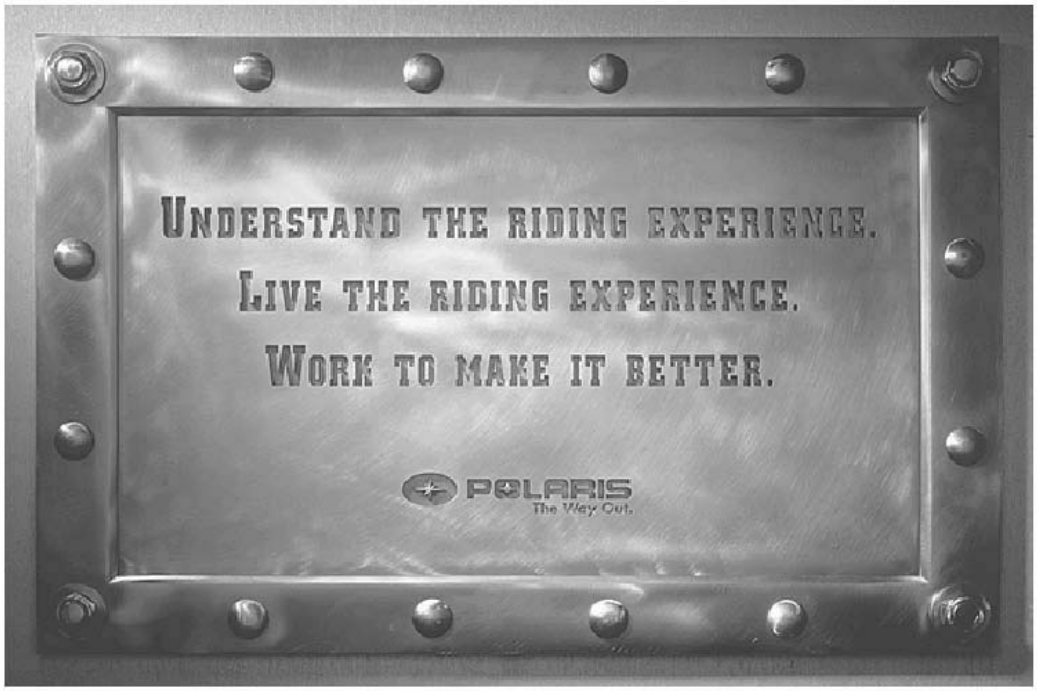
POLARIS
The Way Out.



2012 *RANGER* RZR 570 / INTL SERVICE MANUAL

FOREWORD

The information printed within this publication includes the latest product information at time of print. The most recent version of this Service Manual is available in electronic format at www.polarisdealers.com.

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 the service procedures before starting any repair. Certain procedures require the use of special tools. Use only the proper tools as specified. If you have any doubt as to your ability to perform any of the procedures outlined in this Service Manual, contact an authorized dealer for service.

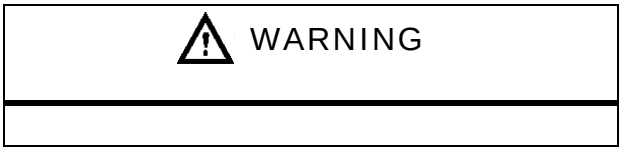
We value your input and appreciate any assistance you can provide in helping make these publications more useful. Please provide any feedback you may have regarding this manual. Authorized dealers can submit feedback using 'Ask Polaris'. Click on 'Ask Polaris', and then click on 'Publications Question'.

Consumers, please provide your feedback in writing to: Polaris Industries Inc. ATTN: Service Publications Department, 2100 Hwy 55, Medina, MN 55340.

Publication Printed November 2011 (PN 9923523) Rev. 3

UNDERSTANDING MANUAL SAFETY LABELS AND DIRECTIONS

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



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.

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

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

FOX, Registered Trademark of FOX RACING SHOX

RydeFX, Registered Trademark of ArvinMeritor

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

CHAPTER 1
GENERAL INFORMATION

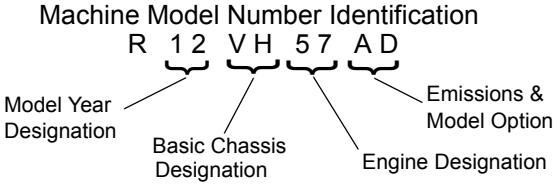
1

9923523 - 2012 *RANGER* RZR 570 Service Manual

MODEL INFORMATION

Model Identification

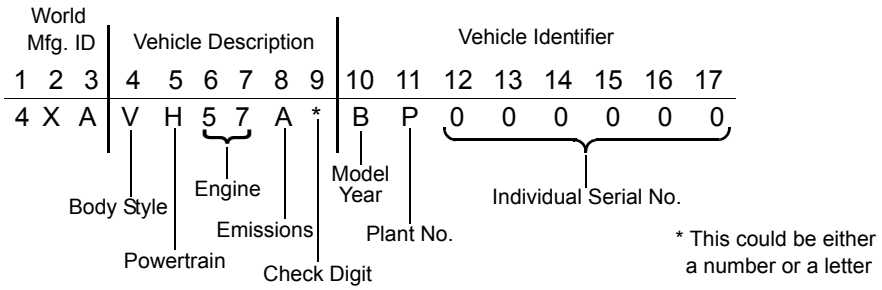
The machine model number must be used with any correspondence regarding warranty or service.



Engine Designation Number

1204286.....Single Cylinder, Liquid Cooled, OHV 4 Stroke, Electric Start

VIN Identification



Vehicle and Engine Serial Number Location

Whenever corresponding about a Polaris ORV, refer to the vehicle identification number (VIN) and the engine serial number.

The VIN can be found stamped on a portion of the left-hand rear upper frame rail, above the left rear wheel. (see Figure 1-1)

The engine model and serial number can be found on a decal applied to the crankcase on the front of the engine. (see Figure 1-2)

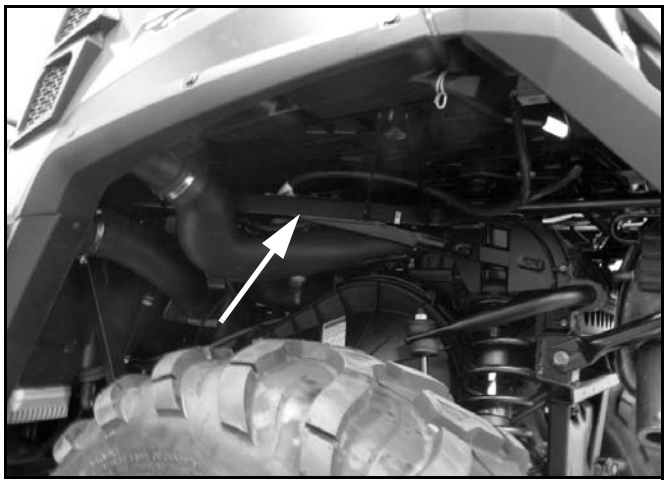


Figure 1-1

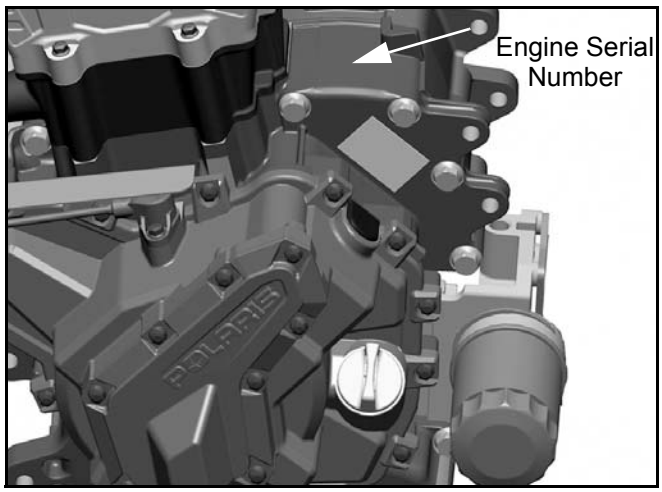


Figure 1-2

VEHICLE INFORMATION

Publication Numbers

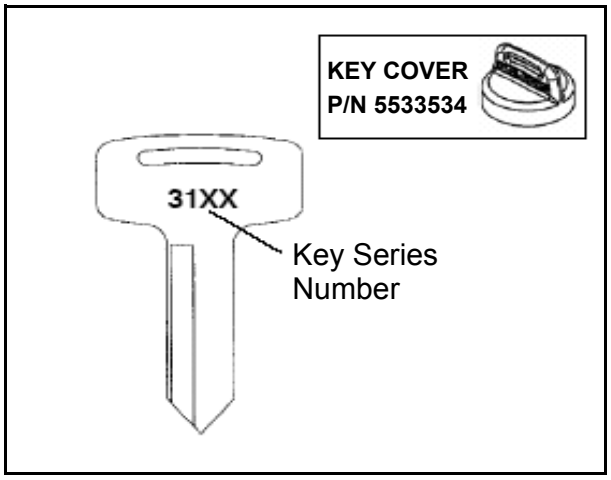
Model	Model No.	Owner's Manual	Parts Manual
2012 *RANGER* RZR 570	R12VH57AD	9923521	9923522
2012 RANGER RZR 570 INTL.	R12VH57FX	9923521	9924058

NOTE: When ordering service parts be sure to use the correct parts manual.

NOTE: Polaris factory publications can be found at www.polarisindustries.com or purchased from www.purepolaris.com.

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.



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

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, by phone at 1-800-328-6657 or on-line at http://polaris.spx.com/.

GENERAL SPECIFICATIONS

MODEL: 2012 *RANGER* RZR 570

MODEL NUMBER: R12VH57AD
ENGINE NUMBER: 1204286

Category	Dimension / Capacity
Length	107.5 in. / 273.05 cm
Width	50 in. / 127 cm
Height	69 in. / 175.26 cm
Wheel Base	77 in. / 196 cm
Ground Clearance	10 in. / 25.4 cm
Dry Weight	970 lbs. / 440 kg
Front Storage Capacity	25 lbs. / 11.3 kg
Cargo Box Dimension (LxWxH)	20 x 40 x 9" (51 x 102 x 23 cm)
Cargo Box Capacity	300 lbs. / 136 kg
Maximum Weight Capacity (Payload)	740 lbs. / 335.6 kg (Includes rider(s), cargo, accessories and trailer tongue weight)
Hitch Towing Capacity	1500 lbs. / 680 kg
Hitch Tongue Capacity	150 lbs. / 68 kg

MODEL: 2012 *RANGER* RZR 570

MODEL NUMBER: R12VH57AD
ENGINE NUMBER: 1204286

Engine	
Platform	Domestic Single Cylinder, Liquid Cooled, 4-Stroke, DOHC
Engine Number	1204286
Engine Displacement	567cc
Number of Cylinders	1
Bore & Stroke (mm)	99 x 73.6 mm
Compression Ratio	10:1
Compression Pressure	80 - 120 psi (decompression)
Engine Idle Speed	1200 ± 100 RPM
Engine Max Operating RPM	7750 RPM
Lubrication	Pressurized Wet Sump
Oil Requirements	PS-4 Plus Synthetic
Oil Capacity	2 qts. / 1.9 liters
Coolant Capacity	4.25 qts. (4 l)
Overheat Warning	Instrument Cluster Indicator
Exhaust System	Single Headpipe / Single Silencer
Fuel System	
Fuel System Type	Bosch M17 EFI
Fuel Delivery	Electronic Fuel Pump (in tank)
Fuel Pressure	43-48 psi (296.5 - 331 KPA)
Fuel Filters	In tank, See Chapter 4
Fuel Capacity / Requirement	7.25 gal. (27.4 liters) 87 Octane (minimum)
Electrical	
Alternator Max Output	650 Watts @ 7000 RPM
Headlights	2 - Halogen: Single Beam 55W
Tail / Brake	2 - 6 Watts / 2 - 27 Watts
Starting System	Electric Start
Ignition System	Bosch M17 (ECU Controlled)
Ignition Timing (Variable)	ECU Controlled
Spark plug / Gap	RG4YCX / .0276" - .0315" (.7 - .8 mm)
Battery (RZR)	Yuasa YB14-B2 / 14 Amp Hr. / 12 Volt
Instrument Type	Multifunction Instrument Cluster
DC Outlet	Standard 12 Volt
Relays	EFI / Chassis / Fan / Fuel Pump / Headlight
Circuit Breaker	Fan Motor: 20 Amp
Fuses (Fuse/Relay Box)	Drive / Fuel Pump: 10 Amp Lights / EFI / Accessory: 20 Amp
Fuses (Power Fuse Holder)	EFI: 30 Amp Chassis: 30 Amp

Drivetrain	
Transmission Type	Polaris Automatic PVT
Drive Ratio - Front	3.818:1
Drive Ratio - Final	3.70:1
Shift Type	In Line Shift - H / L / N / R / P
Front Gearcase Fluid Type / Capacity	Polaris Demand Drive Plus 6.75 oz. (200 ml)
Transmission: Main Gearcase Fluid Type / Capacity	Polaris AGL Plus 44 oz. (1300 ml)
Belt	3211143
Steering / Suspension	
Front Suspension	Independent Dual A-arm w/Anti-Sway Bar
Front Travel	9 in. / 23 cm
Rear Suspension	Independent Dual A-arm w/Anti-Sway Bar
Rear Travel	9.5 in. / 24 cm
Shock Preload Adjustment Front / Rear	Cam Adjustment
	Cam Adjustment
Toe Out	1/8 - 1/4 in. (3 - 6.4 mm)
Wheels / Brakes	
Front Wheel Size Front Tire Type / Size	12 x 6 / Steel Ancla / 25 x 8 R12
Rear Wheel Size Rear Tire Type / Size	12 x 8 / Steel Ancla / 25 x 10 R12
Tire Pressure	Front: 10 psi (69 kPa) Rear: 12 psi (83 kPa)
Brake - Front / Rear	Foot Actuated - 4 Wheel Hydraulic Disc
Brake Fluid	DOT 4

CLUTCH CHART

Altitude		Shift Weight	Drive Spring
Meters (Feet)	0-1500 (0-5000)	25-52 (5632409)	Black (7043594)
	1500-3700 (5000 - 12000)	25-48 (5632408)	Black (7043594)

MODEL: 2012 *RANGER* RZR 570 INTL

MODEL NUMBER: R12VH57FX
ENGINE NUMBER: 1204286

Category	Dimension / Capacity
Length	107.5 in. / 273.05 cm
Width	50 in. / 127 cm
Height	69 in. / 175.26 cm
Wheel Base	77 in. / 196 cm
Ground Clearance	10 in. / 25.4 cm
Dry Weight	1001 lbs. / 454 kg
Front Storage Capacity	25 lbs. / 11.3 kg
Cargo Box Dimension (LxWxH)	20 x 40 x 9" (51 x 102 x 23 cm)
Cargo Box Capacity	300 lbs. / 136 kg
Maximum Weight Capacity (Payload)	740 lbs. / 335.6 kg (Includes rider(s), cargo, accessories and trailer tongue weight)
Hitch Towing Capacity	1500 lbs. / 680 kg
Hitch Tongue Capacity	150 lbs. / 68 kg

MODEL: 2012 *RANGER* RZR 570 INTL

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ENGINE NUMBER: 1204286

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Compression Ratio	10:1
Compression Pressure	80 - 120 psi (decompression)
Engine Idle Speed	1200 ± 100 RPM
Engine Max Operating RPM	7750 RPM
Lubrication	Pressurized Wet Sump
Oil Requirements	PS-4 Plus Synthetic
Oil Capacity	2 qts. / 1.9 liters
Coolant Capacity	4.25 qts. (4 l)
Overheat Warning	Instrument Cluster Indicator
Exhaust System	Single Headpipe / Single Silencer
Fuel System	
Fuel System Type	Bosch M17 EFI
Fuel Delivery	Electronic Fuel Pump (in tank)
Fuel Pressure	43-48 psi (296.5 - 331 KPA)
Fuel Filters	In tank, See Chapter 4
Fuel Capacity / Requirement	7.25 gal. (27.4 liters) 87 Octane (minimum)
Electrical	
Alternator Max Output	650 Watts @ 7000 RPM
Headlights (INTL)	2 - Halogen: 55W Low / 60W High
Tail / Brake	2 - 6 Watts / 2 - 27 Watts
INTL Features	Turn Signals, Rear Diff. Control, Horn, Lic. Plate Light
Starting System	Electric Start
Ignition System	Bosch M17 (ECU Controlled)
Ignition Timing (Variable)	ECU Controlled
Spark plug / Gap	RG4YCX / .0276" - .0315" (.7 - .8 mm)
Battery (RZR)	Yuasa YB14-B2 / 14 Amp Hr. / 12 Volt
Instrument Type	Multifunction Instrument Cluster
DC Outlet	Standard 12 Volt
Relays	EFI / Chassis / Fan / Fuel Pump / Headlight
Circuit Breaker	Fan Motor: 20 Amp
Fuses (Fuse/Relay Box)	Drive / Fuel Pump: 10 Amp Lights / EFI / Accessory: 20 Amp
Fuses (Power Fuse Holder)	EFI: 30 Amp Chassis: 30 Amp

Drivetrain	
Transmission Type	Polaris Automatic PVT
Drive Ratio - Front	3.818:1
Drive Ratio - Final	3.70:1
Shift Type	In Line Shift - H / L / N / R / P
Front Gearcase Fluid Type / Capacity	Polaris Demand Drive Plus 6.75 oz. (200 ml)
Transmission: Main Gearcase Fluid Type / Capacity	Polaris AGL Plus 44 oz. (1300 ml) 570 INTL: 41 oz. (1200 ml)
Belt	3211143
Steering / Suspension	
Front Suspension	Independent Dual A-arm w/Anti-Sway Bar
Front Travel	9 in. / 23 cm
Rear Suspension	Independent Dual A-arm w/Anti-Sway Bar
Rear Travel	9.5 in. / 24 cm
Shock Preload Adjustment Front / Rear	Cam Adjustment
	Cam Adjustment
Toe Out	1/8 - 1/4 in. (3 - 6.4 mm)
Wheels / Brakes	
Front Wheel Size Front Tire Type / Size	12 x 6 Aluminum Ancla / 25 x 8 R12
Rear Wheel Size Rear Tire Type / Size	12 x 8 Aluminum Ancla / 25 x 10 R12
Tire Pressure	Front: 10 psi (69 kPa) Rear: 12 psi (83 kPa)
Brake - Front / Rear	Foot Actuated - 4 Wheel Hydraulic Disc
Brake Fluid	DOT 4
Parking Brake	Equipped

CLUTCH CHART

Altitude		Shift Weight	Drive Spring
Meters (Feet)	0-1500 (0-5000)	25-52 (5632409)	Black (7043594)
	1500-3700 (5000 - 12000)	25-48 (5632408)	Black (7043594)

MISC. SPECIFICATIONS AND CHARTS

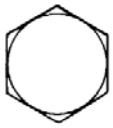
Conversion Table

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) x R^2 x H (height)		= Cylinder Volume

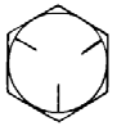
°C to °F: $^{9/5}$(°C + 32) = °F **°F to °C: $^{5/9}$(°F - 32) = °C**

9923523 - 2012 *RANGER* RZR 570 Service Manual

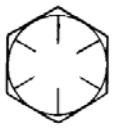
Standard Bolt Torque Specification



Grade 2



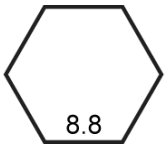
Grade 5



Grade 8

Bolt Size	Grade 2 Ft. Lbs. (Nm)	Grade 5 Ft. Lbs. (Nm)	Grade 8 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 Bolt Torque Specification



Bolt Size	Grade				
	4.6	4.8	8.8 / 8.9	10.9	12.9
	Ft. Lbs. (Nm) Dry Threads				
M3	.3 (.5)	.5 (.7)	1 (1.3)	1.5 (2)	1.5 (2)
M4	.8 (1.1)	1 (1.5)	2 (3)	3 (4.5)	4 (5)
M5	1.5 (2.5)	2 (3)	4.5 (6)	6.5 (9)	7.5 (10)
M6	3 (4)	4 (5.5)	7.5 (10)	11 (15)	13 (18)
M8	7 (9.5)	10 (13)	18 (25)	26 (35)	33 (45)
M10	14 (19)	18 (25)	37 (50)	55 (75)	63 (85)
M12	26 (35)	33 (45)	63 (85)	97 (130)	11 (150)
M14	37 (50)	55 (75)	103 (140)	151 (205)	177 (240)
M16	59 (80)	85 (115)	159 (215)	232 (315)	273 (370)
M18	81 (110)	118 (160)	225 (305)	321 (435)	376 (510)

SAE Tap / Drill Sizes

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

Metric Tap / Drill Sizes

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

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	5 mm = .1969″
13/64	.2031	
7/32	.2188	
15/64	.2344	6 mm = .2362″
1/4	.25	
17/64	.2656	7 mm = .2756″
9/32	.2813	
19/64	.2969	
5/16	.3125	8 mm = .3150″
21/64	.3281	
11/32	.3438	9 mm = .3543″
23/64	.3594	
3/8	.375	
25/64	.3906	10 mm = .3937″
13/32	.4063	
27/64	.4219	11 mm = .4331″
7/16	.4375	
29/64	.4531	
15/32	.4688	12 mm = .4724″
31/64	.4844	
1/2	.5	13 mm = .5118
33/64	.5156	
17/32	.5313	
35/64	.5469	14 mm = .5512″
9/16	.5625	
37/64	.5781	15 mm = .5906″
19/32	.5938	
39/64	.6094	
5/8	.625	16 mm = .6299″
41/64	.6406	
21/32	.6563	17 mm = .6693″
43/64	.6719	
11/16	.6875	
45/64	.7031	18 mm = .7087″
23/32	.7188	
47/64	.7344	19 mm = .7480″
3/4	.75	
49/64	.7656	
25/32	.7813	20 mm = .7874″
51/64	.7969	
13/16	.8125	21 mm = .8268″
53/64	.8281	
27/32	.8438	
55/64	.8594	22 mm = .8661″
7/8	.875	
57/64	.8906	23 mm = .9055″
29/32	.9063	
59/64	.9219	
15/16	.9375	24 mm = .9449″
61/64	.9531	
31/32	.9688	25 mm = .9843
63/64	.9844	
1	1.0	

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CHAPTER 2
MAINTENANCE

2

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SPECIAL TOOLS

SPX Corporation: 1-800-328-6657 or on-line at http://polaris.spx.com/.

PERIODIC MAINTENANCE CHART

Periodic Maintenance Overview

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 Pure 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.

Severe Use Definition

- 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 or see your dealer.

Break-In Period

The break-in period consists of the first 25 hours of operation, or the time it takes to use 14 gallons (53 liters) of fuel. Careful treatment of a new engine and drive components will result in more efficient performance and longer life for these components.

- Drive vehicle slowly at first while varying the throttle position. Do not operate at sustained idle.
- Pull only light loads.
- Perform regular checks on fluid levels and other areas outlined on the daily pre-ride inspection checklist.
- Change both the engine oil and filter after 25 hours or one month.
- See "Owner's Manual" for additional break-in information.

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: See information provided above.
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 ■ could result in component failure and lead to serious injury or death. Have an authorized Polaris dealer perform these services.

Pre-Ride - 25 Hour Maintenance Interval

Item		Maintenance Interval (whichever comes first)			Remarks
		Hours	Calendar	Miles (KM)	
■	Steering	-	Pre-Ride	-	Make adjustments as needed. See Pre-Ride Checklist on Page 2.10.
▸	Front Suspension	-	Pre-Ride	-	
▸	Rear Suspension	-	Pre-Ride	-	
	Tires	-	Pre-Ride	-	
▸	Brake Fluid Level	-	Pre-Ride	-	
▸	Brake Pedal 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-Ride	-	Inspect; replace as needed
	Coolant Level	-	Daily	-	Check level daily, change coolant every 2 years
	Head Lamp / Tail Lamp	-	Daily	-	Check operation; apply dielectric grease if replacing
▸ E	Air Filter	-	Weekly	-	Inspect; replace as needed
▸ ■	Brake Pad Wear	10 H	Monthly	100 (160)	Inspect periodically
▸ ■	Brake Pad Wear / Inspect Parking Brake Pads (INT'L)	10 H	Monthly	100 (160)	Inspect periodically
▸ ■	Parking Brake Cable Adjustment (INT'L)	25 H	-	-	Inspect; adjust tension after first 25 hours
	Battery	25 H	Monthly	250 (400)	Check terminals; clean; test
▸	Front Gearcase Oil (Demand Drive Plus)	25 H	Monthly	250 (400)	Inspect level; change yearly
▸	Transmission - Main (AGL Gearcase Lubricant)	25 H	Monthly	250 (400)	Inspect level; change yearly
▸ E	Engine Oil Change (Break-In Period)	25 H	1 M	250 (400)	Perform a break-in oil change at one month

▸ 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.

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50 - 500 Hour Maintenance Interval

	Item	Maintenance Interval (whichever comes first)			Remarks
		Hours	Calendar	Miles (KM)	
■ E	Throttle Cable / Throttle Pedal	50 H	6 M	300 (500)	Inspect; adjust; lubricate; replace if necessary
E	Throttle Body Air Intake Ducts / Flange	50 H	6 M	300 (500)	Inspect ducts for proper sealing / air leaks
▸	General Lubrication	50 H	3 M	500 (800)	Lubricate all fittings, pivots, cables, etc.
	Shift Linkage	50 H	6 M	500 (800)	Inspect, lubricate, adjust
■	Steering	50 H	6 M	500 (800)	Lubricate
▸	Front Suspension	50 H	6 M	500 (800)	Lubricate
▸	Rear Suspension	50 H	6 M	500 (800)	Lubricate
	Cooling System	50 H	6 M	500 (800)	Inspect coolant strength seasonally; pressure test system yearly
■ E	Fuel System	100 H	12 M	600 (1000)	Check for leaks at fill cap, fuel line / rail, and fuel pump. Replace lines every two years.
■ E	Spark Plug	100 H	12 M	600 (1000)	Inspect; replace as needed
▸ E	Engine Oil & Filter Change	100 H	6 M	1000 (1600)	Perform a break-in oil change at 25 hours or one month / always replace oil filter when changing engine oil
▸ ■	Parking Brake Cable Adjustment (INT'L)	100 H	6 M	1000 (1600)	Inspect; adjust tension as needed
	Drive Belt	100 H	12 M	1000 (1600)	Inspect; replace as needed
▸	Radiator / Cooling Hoses	100 H	12 M	1000 (1600)	Inspect; clean external surfaces
▸	Engine Assembly Mounts	100 H	12 M	1000 (1600)	Inspect, torque to specification
	Exhaust Muffler / Pipe	100 H	12 M	1000 (1600)	Inspect
▸	Wiring	100 H	12 M	1000 (1600)	Inspect for wear, routing, security; apply dielectric grease to connectors subjected to water, mud, etc.
■	Clutches (Drive and Driven)	100 H	12 M	1000 (1600)	Inspect; clean; replace worn parts
■	Front Wheel Bearings	100 H	12 M	1000 (1600)	Inspect; replace as needed
▸	Shocks	100 H	-	-	Visually inspect shock seals
■	Brake Fluid	200 H	24 M	2000 (3200)	Change every two years (DOT 4)
	Spark Arrestor	300 H	36 M	3000 (4800)	Clean out
▸ ■	Shocks	500 H	12 M	-	Change shock oil and seals
■ E	Valve Clearance Check	500 H	-	5000 (8050)	Inspect / Adjust as needed
■	Toe Adjustment	-			Inspect periodically; adjust when parts are replaced
	Headlight Aim	-			Adjust as needed

▸ Perform these procedures more often for vehicles subjected to severe use.

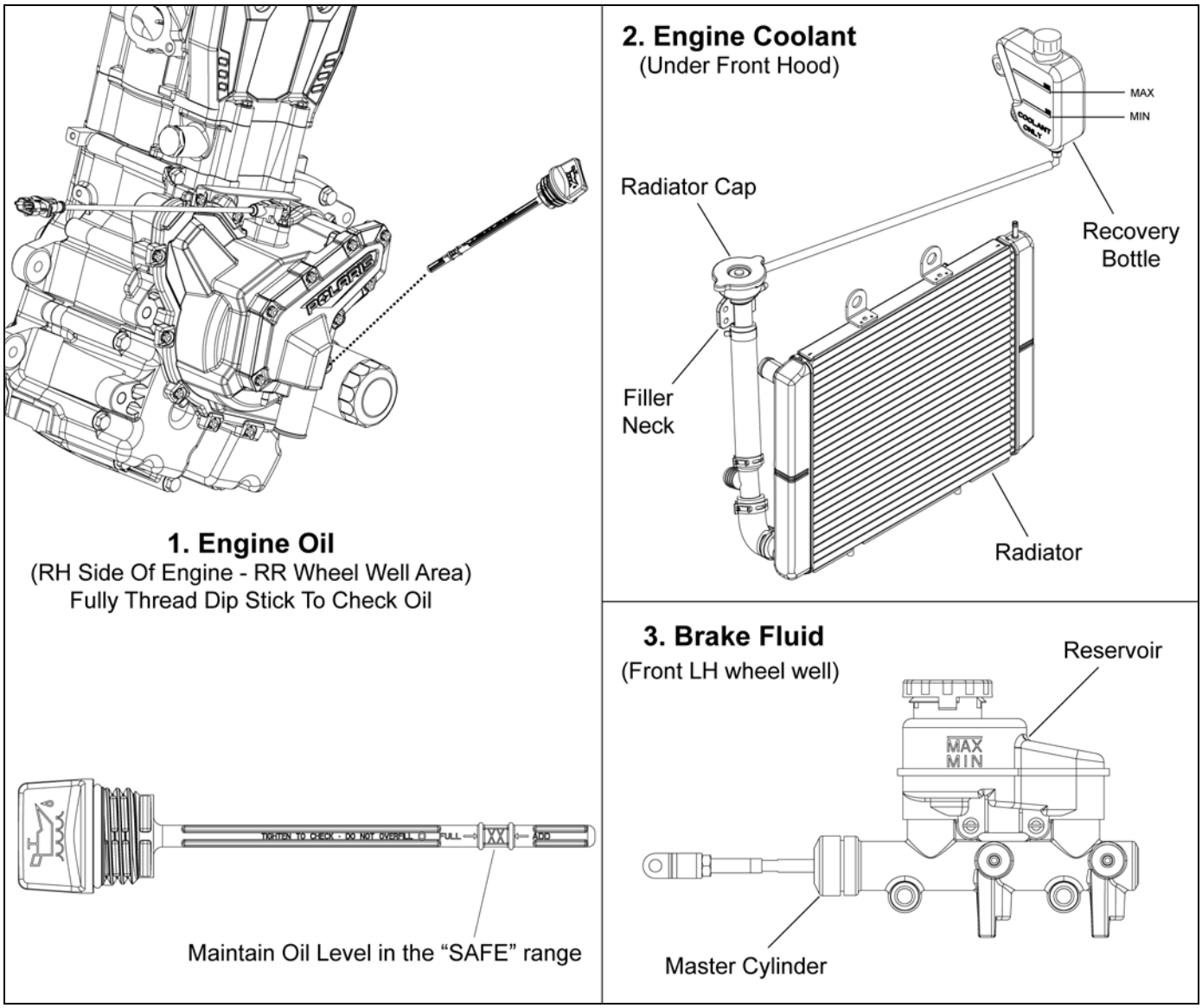
E Emission Control System Service (California)

■ Have an authorized Polaris dealer perform these services.

Maintenance Quick Reference

Ill. #	Item	Lube Rec.	Method	Frequency*
1	Engine Oil	Polaris PS-4 Plus Performance Synthetic 4-Cycle Engine Oil	Add oil to proper level on dipstick	Change after 1st month or first 25 hours of operation, 100 hours thereafter; Change more often (25 hours) in severe duty conditions or short trip cold weather operation
2	Engine Coolant	Polaris 60/40 Coolant	Maintain coolant level in coolant reservoir bottle	Check level daily, change coolant every 2 years
3	Brake Fluid	Polaris DOT 4 Brake Fluid	Maintain fluid level between “MAX and “MIN” lines on the master cylinder reservoir	Check level during pre-ride inspection; change fluid every two years

* More often under severe use, such as operated in water or under severe loads.

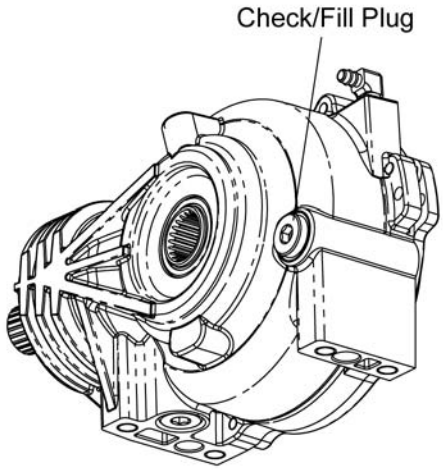


Maintenance Quick Reference

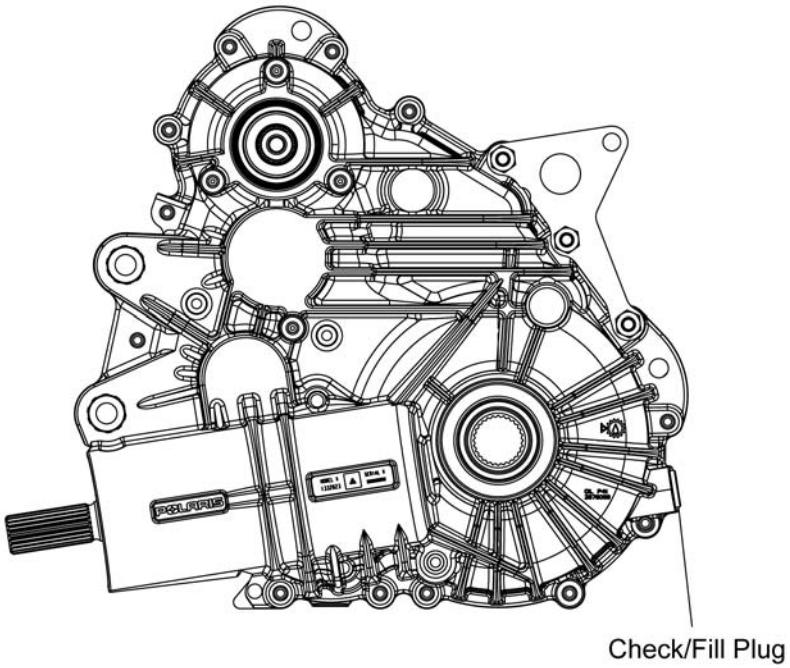
Ill. #	Item	Lube Rec.	Method	Frequency*
4	Front Gearcase	Polaris Demand Drive Plus	Add lubricant until it is visible at the fill hole threads	Check level every 25 hours; change fluid yearly
5	Transmission	Polaris AGL Plus Gearcase Lubricant	Add lubricant until it is visible at the fill hole threads	Check level every 25 hours; change lubricant yearly

* More often under severe use, such as operated in water or under severe loads.

4. Front Gearcase
(Front RH Wheel Well)



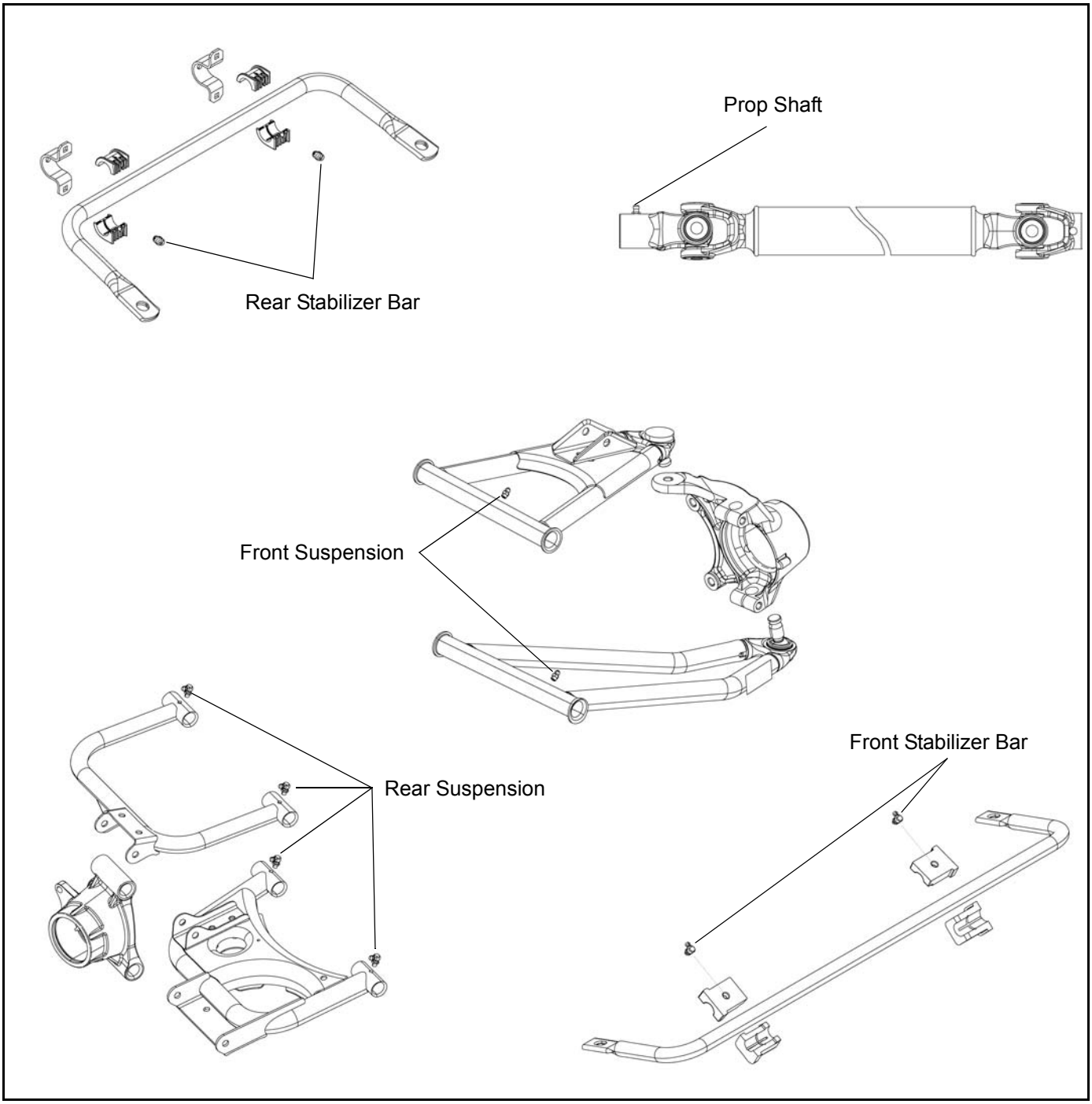
5. Transmission
(Rear of Vehicle)



Grease Lubrication Points

There are greasefittings at each A-arms pivot point, each front or rear stabilizer bushing, and on the front propshaft yoke. Apply grease until all traces of water have been purged out at each of these areas.

Item	Recommended Lube	Method	Frequency
Front Propshaft Yoke(s)	Polaris Premium U-Joint Grease	Grease fittings every 500 miles (800 km).	Grease before long periods of storage, and after thoroughly washing or submerging the vehicle.
A-arm Pivot Bushings			
Stabilizer Bar Bushings			



LUBRICANTS / SERVICE PRODUCTS

Polaris Lubricants, Maintenance and Service Products

Part No.	Description
Engine Lubricant	
2870791	Fogging Oil (12 oz. Aerosol)
2876244	PS-4 Plus Synthetic 4-Cycle Engine Oil (Quart)
2876245	PS-4 Plus Synthetic 4-Cycle Engine Oil (Gallon)
Gearcase / Transmission Lubricants	
2878068	AGL Plus Gearcase Lubricant (1 Qt.) (12 Count)
2878069	AGL Plus Gearcase Lubricant (1 Gal.) (4 Count)
2878070	AGL Plus Gearcase Lubricant (2.5 Gal.) (2 Count)
2877922	Demand Drive Plus (Quart)
2877923	Demand Drive Plus (2.5 Gallon)
2870465	Oil Pump for 1 Gallon Jug
Grease / Specialized Lubricants	
2871312	Grease Gun Kit
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)
2871329	Dielectric Grease (Nyogel™)
Coolant	
2871323	60/40 Coolant (Gallon) (6 Count)
2871534	60/40 Coolant (Quart) (12 Count)

NOTE: Each item can be purchased separately at your local Polaris dealer.

Part No.	Description
Additives / Sealants / Thread Locking Agents / Misc.	
2871950	Loctite™ Threadlock 242 (6 ml.) (12 count)
2871326	Premium Carbon Clean (12 oz.) (12 count)
2870652	Fuel Stabilizer (16 oz.) (12 count)
2872189	DOT 4 Brake Fluid (12 count)
2871557	Crankcase Sealant, 3-Bond 1215 (5 oz.)

NOTE: The number count indicated by each part number in the table above indicates the number of units that are shipped with each order.

GENERAL VEHICLE INSPECTION AND MAINTENANCE

Pre-Ride / Daily Inspection

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

- Tires - check condition and pressures
- Fuel tank - fill to proper level
- All brakes - check operation and adjustment
- Throttle - check for free operation and closing
- Headlights/Taillights/Brakelights - also check operation of all indicator lights and switches
- Ignition switch - check for proper function
- Wheels - check for tightness of wheel nuts and axle nuts; check to be sure axle nuts are secured by cotter pins
- Air cleaner element - check for dirt; replace if necessary.
- 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
- Check all front and rear suspension components for wear or damage.

Frame, Nuts, Bolts, and Fasteners

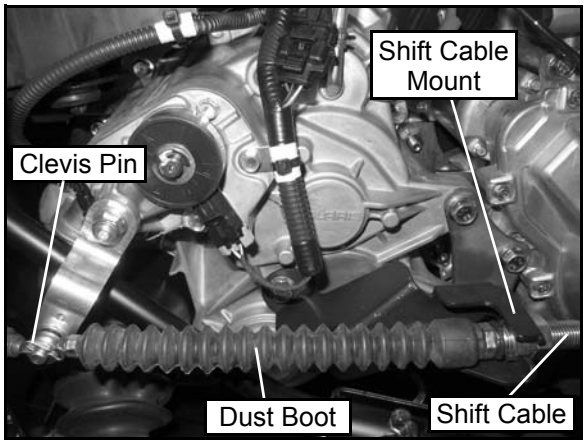
Periodically inspect the torque of all fasteners in accordance with the maintenance schedule. Check that all cotter pins are in place. Refer to specific fastener torques listed in each chapter.

Shift Cable Inspection / Adjustment

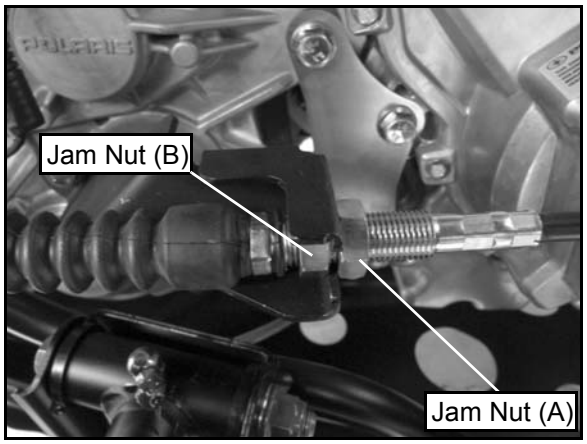
Shift cable adjustment may be necessary if symptoms include:

- No AWD or gear position display on instrument cluster
- Ratcheting noise on deceleration
- Inability to engage into a gear
- Excessive gear clash (noise)
- Gear selector moving out of desired range

1. Locate the shift cable in the rear right-hand wheel well area.



2. Inspect shift cable, clevis pin, pivot bushings, and dust boot. Replace if worn or damaged.
3. If adjustment is required: Loosen jam nut (A), pull the cable out of the mount and rotate jam nut (B).



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4. Adjust the shift cable so there is the same amount of cable travel when shifting slightly past the detents of HIGH (H) gear and PARK (P).

5. Thread jam nut (A) or (B) as required to obtain proper cable adjustment.

NOTE: This procedure may require a few attempts to obtain the proper adjustment.

6. Once the proper adjustment is obtained, place the shift cable and jam nut (B) into the mount. Tighten jam nut (A) against the mount.

7. Start engine and shift through all gears to ensure the shift cable is properly adjusted. If transmission still ratchets after cable adjustment, the transmission will require service.

FUEL SYSTEM AND AIR INTAKE

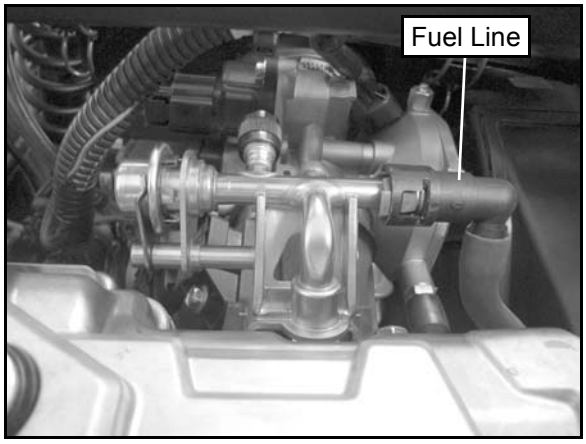
Fuel System

⚠ WARNING

Gasoline is extremely flammable and explosive under certain conditions.
Always stop the engine and refuel outdoors or in a well ventilated area.
Do not smoke or allow open flames or sparks in or near the area where refueling is performed or where gasoline is stored.
Do not overfill the tank. Do not fill the tank neck.
If you get gasoline in your eyes or if you swallow gasoline, seek medical attention immediately.
If you spill gasoline on your skin or clothing, immediately wash it off with soap and water and change clothing.
Never start the engine or let it run in an enclosed area. Engine exhaust fumes are poisonous and can result in loss of consciousness or death in a short time.
Never drain the fuel when the engine is hot. Severe burns may result.

Fuel Line

1. Check the quick-connect fuel line from the engine fuel rail connection to the fuel tank connection for signs of wear, deterioration, damage or leakage. Replace if necessary.



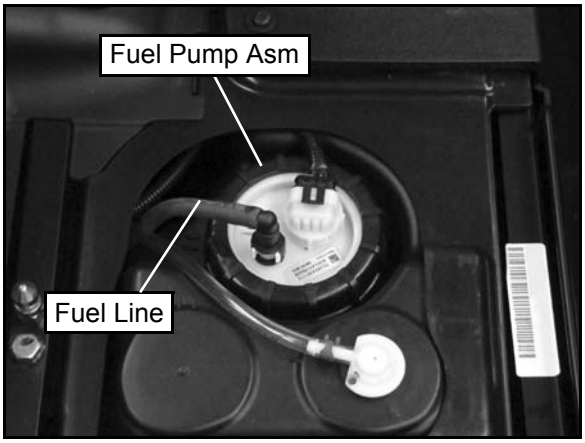
2. Be sure fuel line is routed and retained properly.

IMPORTANT: Make sure line is not kinked or pinched.

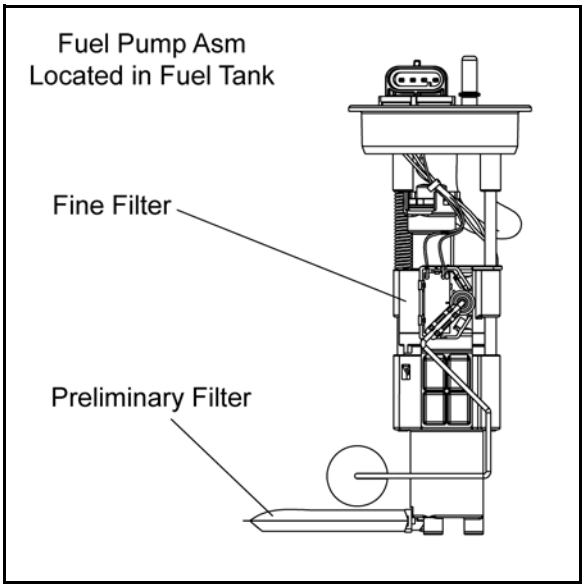
3. Replace fuel line every two years.

Fuel Pump / Fuel Filters

The RZR 570 engine uses a serviceable, high-volume, high-pressure, fuel pump that includes a preliminary filter and an internal fine filter located before the pump regulator.



NOTE: Neither filter is servicable individually. Must replace the fuel pump as an assembly.



NOTE: Refer to Chapter 4 for fuel pump replacement and all other information related to the EFI System.

Vent Lines

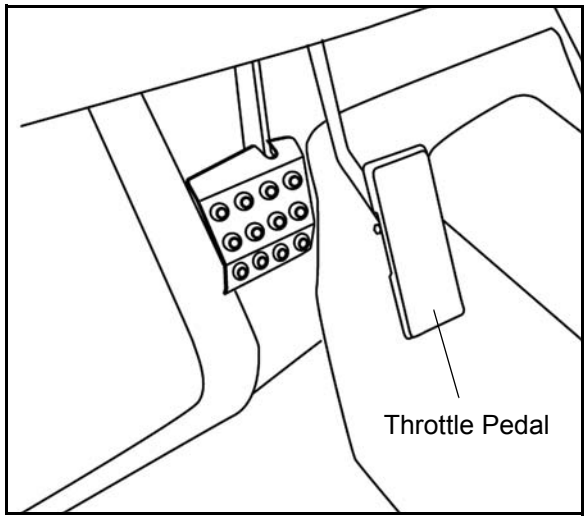
1. Check fuel tank, front gearcase and transmission vent lines for signs of wear, deterioration, damage or leakage. Replace every two years.

2. Be sure vent lines are routed and secured properly.

IMPORTANT: Ensure lines are not kinked or pinched.

Throttle Pedal Inspection

If the throttle pedal has excessive play due to cable stretch or cable misadjustment, it will cause a delay in throttle speed. Also, the throttle may not open fully. If the throttle pedal has no play, the throttle may be hard to control, and the idle speed may be erratic.



Check the throttle pedal play periodically in accordance with the Periodic Maintenance Chart and adjust the play if necessary.

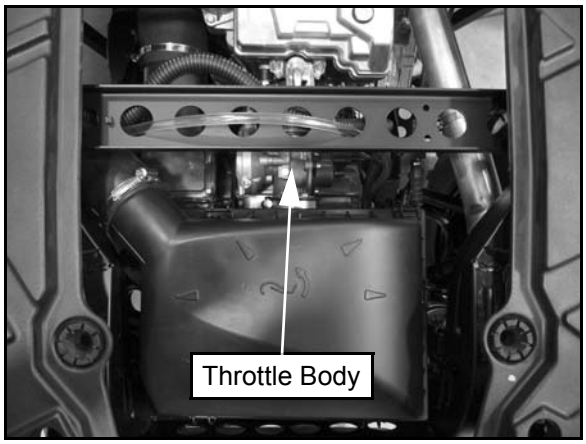
Throttle Freeplay Adjustment

Inspection

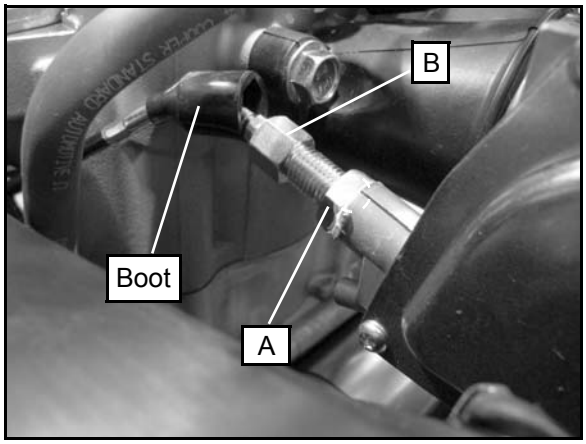
1. Place the transmission in the P (Park) position.
2. Start the engine, and warm it up thoroughly.
3. Measure the distance the throttle pedal moves before the engine begins to increase in RPM. Freeplay should be 1/16" - 1/8" (1.5 - 3 mm).

Adjustment

1. Remove the cargo box access panel to access the throttle body area.



2. Locate throttle cable on the left-hand side of the throttle body. Slide back the cable adjuster boot.



3. Using an open-end wrench, loosen the adjustment jam nut (A). Using another open-end wrench, move the cable adjuster (B) until 1/16" to 1/8" (1.5 - 3 mm) of freeplay is achieved at the throttle pedal.

NOTE: While adjusting, lightly move the throttle pedal in and out.

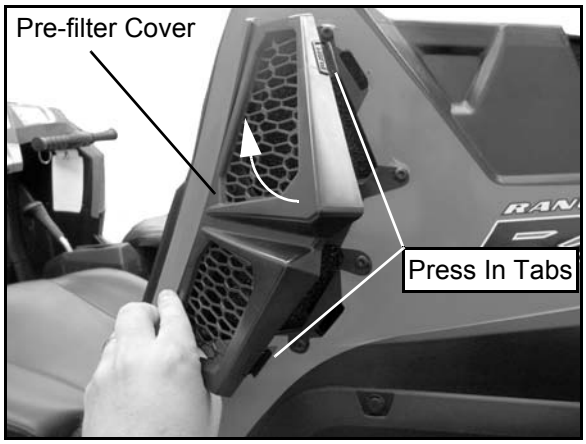
4. Re-tighten the jam nut after final adjustment is made.
5. Apply a small amount of grease to the inside of the boot and slide it over the cable adjuster to its original position.
6. Reinstall the cargo box access panel.

Engine and PVT Intake Pre-Filter Service

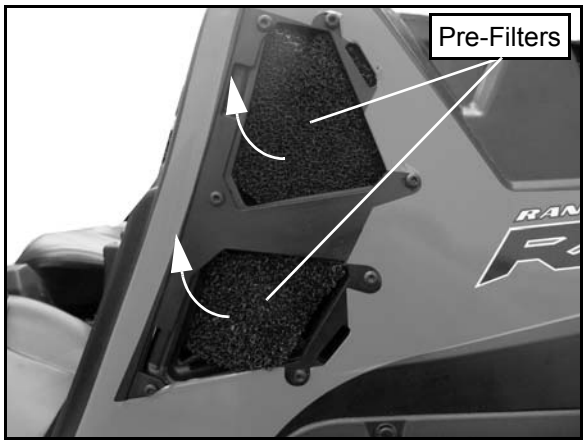
It is recommended that the engine and PVT intake pre-filter be inspected daily. The filter should be inspected using the following procedure:

NOTE: The engine and PVT intake pre-filter is located just above the left-rear wheel fender.

1. Press "IN" on the intake grill cover tabs and remove the pre-filter cover to access the pre-filters.



2. Remove and inspect the pre-filters. If necessary, clean with soapy water and dry with compressed air.



3. Reinstall the dry pre-filters and install the pre-filter cover.

Air Filter Service

It is recommended that the air filter be inspected as part of pre-ride inspection. In extremely dusty conditions, air filter replacement will be required more often.

The filter should be inspected using the following procedure:

AIR FILTER SERVICE

Remove and clean all dirt and debris from air box area BEFORE servicing the air filter. Loosen hose clamp and remove the air intake hose from the air box lid before unlatching the (6) air box lid clips.

Before re-installing the filter, ensure there is no dirt or debris in airbox. Failure to do so could result in severe engine damage.

The Air Filter must be properly seated into the air box before the lid is reinstalled. Follow the "Air Filter Service" procedure outlined in the owner's manual. Failure to comply with these items may result in premature engine wear.

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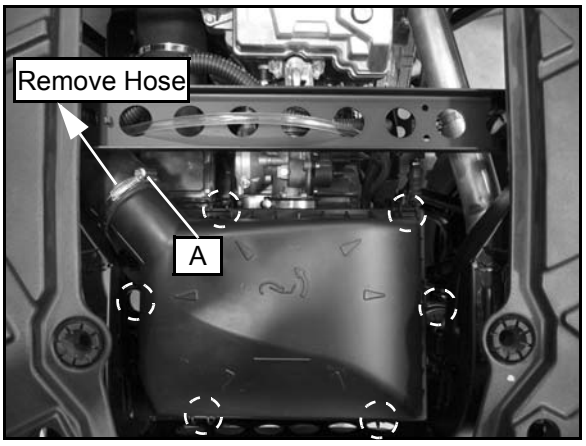
Removal

NOTE: The air box is located underneath the cargo box access panel.

1. Thoroughly clean the air box area to remove dirt and debris.
2. Loosen hose clamp (A) and remove the intake hose from the air box cover.
3. Unlatch the (6) clips and carefully remove the air box cover. Be sure not to let the air box cover contact the air filter element during removal.



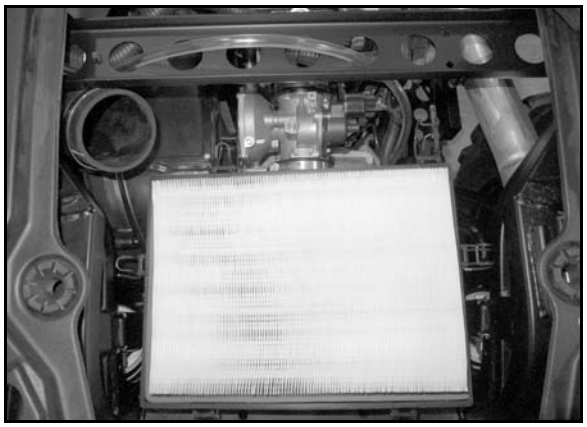
4. Inspect the air filter element and replace if necessary. Do not attempt to clean the air filter.

NOTE: If the filter has been soaked with fuel or oil it must be replaced.

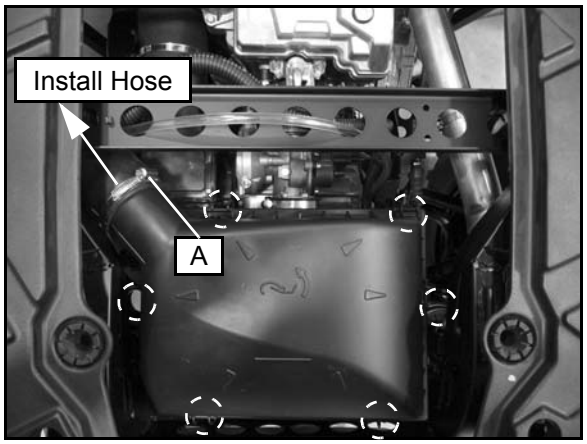
NOTE: Service more frequently if vehicle is operated in wet conditions or at high throttle operation for extended periods.

Installation

1. Clean the air box and air box cover thoroughly.
2. Place the filter into the air box with the air filter pleats facing UP, as shown.

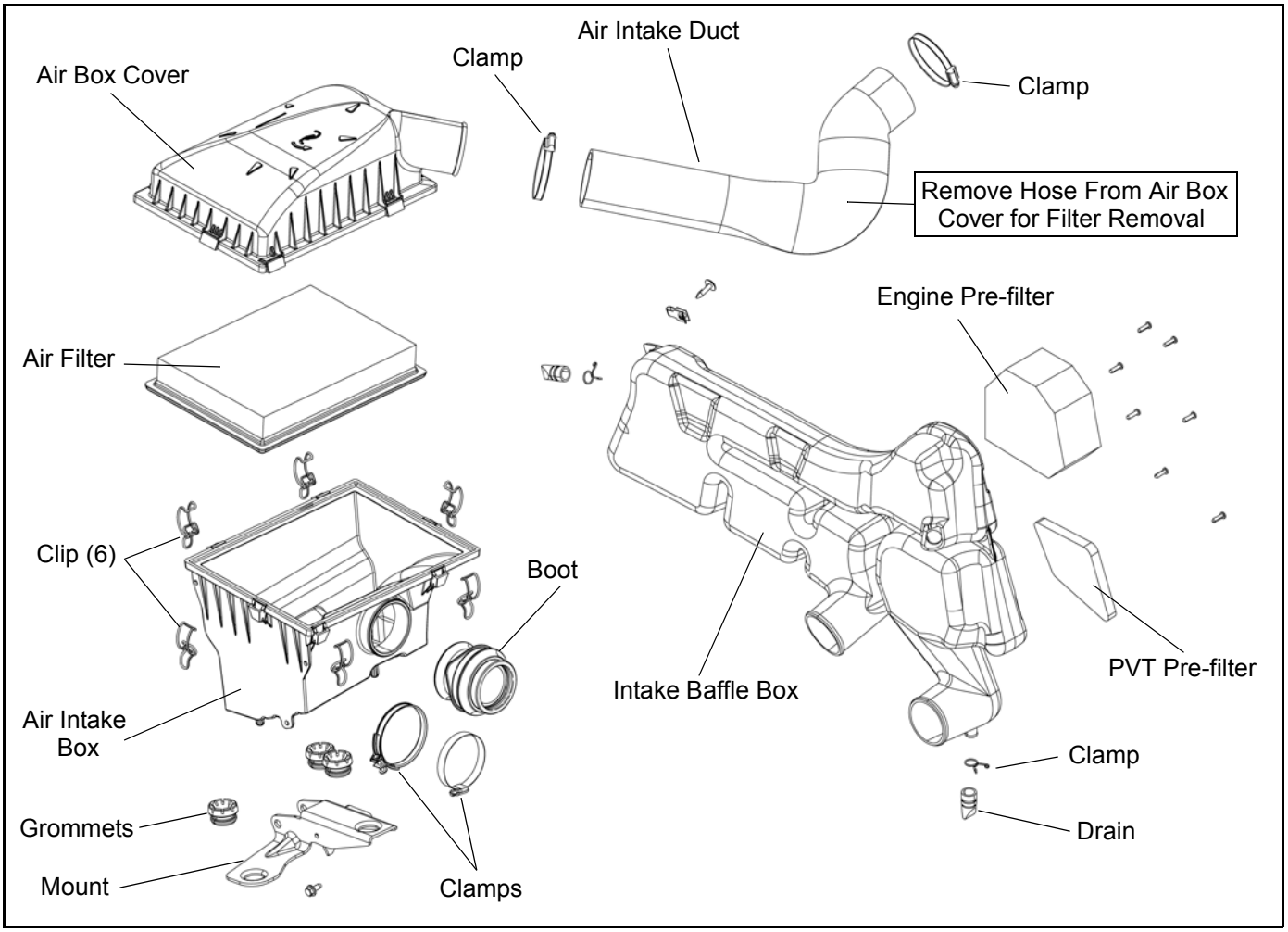


3. Carefully install air box cover and secure with the (6) clips.



4. Reinstall the clean intake hose and tighten hose clamp (A).
5. Reinstall the cargo box access cover.

Air Box / Air Filter Exploded View



AIR FILTER SERVICE

Remove and clean all dirt and debris from air box area BEFORE servicing the air filter. Loosen hose clamp and remove the air intake hose from the air box lid before unlatching the (6) air box lid clips.

Before re-installing the filter, ensure there is no dirt or debris in airbox. Failure to do so could result in severe engine damage.

The Air Filter must be properly seated into the air box before the lid is reinstalled. Follow the "Air Filter Service" procedure outlined in the owner's manual. Failure to comply with these items may result in premature engine wear.

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ENGINE

Engine Oil Level

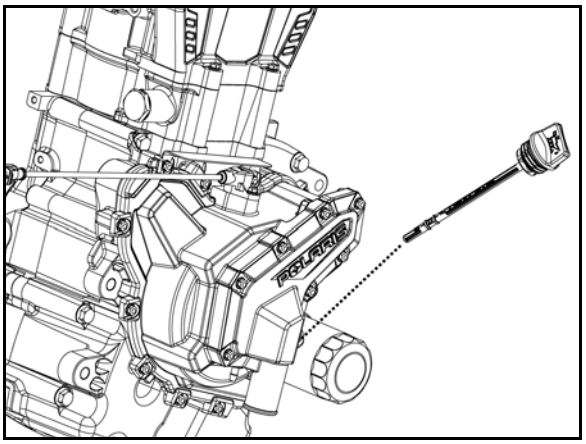
This single cylinder engine is a wetsump engine, meaning the oil is contained in the bottom of the crankcase. To check the oil level follow the procedure listed below:

IMPORTANT: Thoroughly clean engine around the oil drain plug, oil filter and oil dipstick to prevent contamination from entering the engine.

1. Position vehicle on a level surface.
2. Place the transmission in Park (P).
3. Be sure engine OFF has not been run for at lease 3 minutes.

IMPORTANT: Do not run the machine and then immediately check the oil level.

4. Locate the engine oil dipstick:
   - **RZR 570 - Located on the right-hand side of the engine case; accessible through the right-hand rear wheel well area.**



5. Thoroughly clean the engine around dipstick area.
6. Unscrew / remove dipstick and wipe dry with a clean cloth.
7. Reinstall the dipstick completely.

NOTE: Make certain the dipstick is threaded all the way into the engine case.

8. Unscrew and remove dipstick and verify the oil level is in the SAFE (XX) range. Add oil as indicated by the level on the dipstick. Do not overfill (see NOTE below!).

Maintain Oil Level In SAFE Range

DO NOT Overfill the Engine

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.

9. Reinstall the dipstick and hand tighten.

Engine Oil and Filter Service

Always change engine oil and filter at the intervals outlined in the Periodic Maintenance Chart. Always change the oil filter whenever changing the engine oil.

IMPORTANT: Thoroughly clean engine around the oil drain plug, oil filter and oil dipstick to prevent contamination from entering the engine.

⚠ WARNING

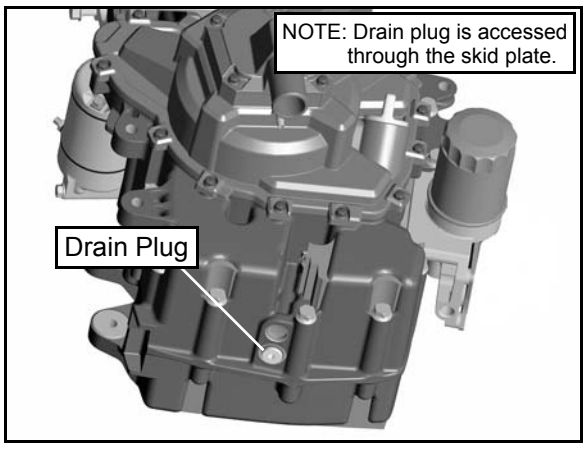
Personal injury can occur when handling used oil. Hot oil can cause burns or skin damage.

Recommended Engine Oil:

PS-4 Plus Synthetic 4-Cycle Engine Oil (PN 2876244) (Quart)

1. Position vehicle on a level surface.
2. Place the transmission in PARK (P).

3. If needed, start the engine and allow it to idle for three minutes until warm. Stop the engine.
4. Place a drain pan beneath engine crankcase and remove the drain plug.



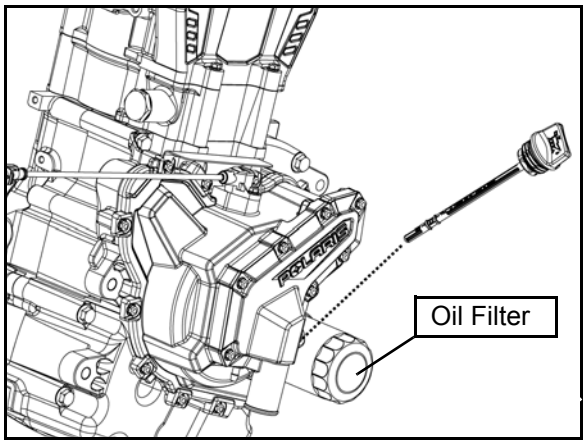
⚠ CAUTION

Oil may be hot. Do not allow hot oil to come into contact with skin, as serious burns may result.

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

NOTE: The sealing surface on the drain plug should be clean and free of burrs, nicks or scratches.

7. Reinstall drain plug and torque to **12 ft. lbs. (16 Nm)**.
8. Place a drain pan under vehicle below the oil filter.
9. Place shop towels beneath oil filter. Using Oil Filter Wrench (PU-50105) and a 3/8" extension, turn the oil filter counter-clockwise to remove it.



10. Using a clean dry cloth, clean filter sealing surface on the crankcase.
11. Lubricate O-ring on new filter with a film of fresh engine oil. Check to make sure the O-ring is in good condition.
12. Install new filter and turn by hand until filter gasket contacts the sealing surface, then turn an additional 1/2 turn.
13. Remove the engine oil dipstick (see "Engine Oil Level").
14. Using a long funnel, fill the sump with 2 qts. (1.9 l) of PS-4 Plus Synthetic Engine Oil (2876244).

= T

Crankcase Drain Plug Torque:
12 ft. lbs. (16 Nm)

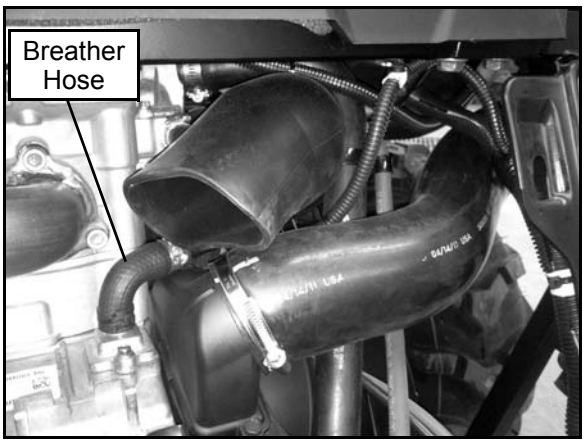
Oil Filter Torque:
Turn by hand until filter gasket contacts sealing surface, then turn an additional 1/2 turn

Oil Filter Wrench:
PU-50105: 2.5" (64 mm)

15. Verify the transmission is still positioned in PARK (P).
16. Start the engine and let it idle for two minutes.
17. Stop the engine and inspect for leaks.
18. Re-check the oil level on the dipstick and add oil as necessary to bring the level to the upper mark on the dipstick.
19. Dispose of used oil and oil filter properly.

Engine Breather Hose Inspection

The engine is equipped with a breather hose. Inspect the breather hose for possible kinks or wear. The hose is form fitted for a proper fit. Follow the breather hose from the engine crankcase to the air intake baffle box on the left-hand rear fender panel.



NOTE: Make sure line is not kinked or pinched.

Engine and Transmission Mounts

Periodically inspect engine and transmission mounts for cracks or damage.

Refer to Chapter 3 “Engine Assembly and Installation” for mounting fastener torque values.

Compression Test Specification

NOTE: This engine does have decompression components.

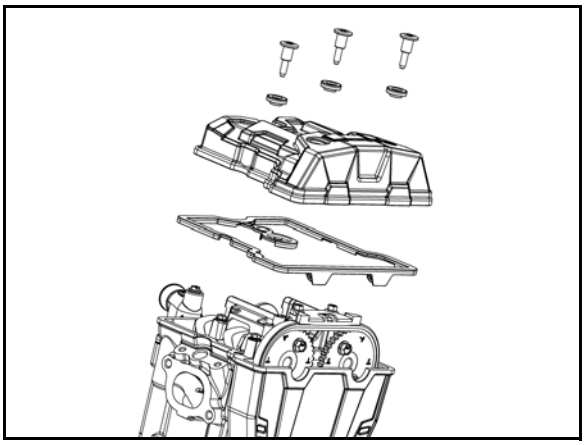
A smooth idle generally indicates good compression. Low engine compression is rarely a factor in running condition problems above idle speed.

Cylinder Compression:
80 - 120 psi (decompression)

Valve Clearance Inspection

IMPORTANT: Valve clearance inspection should be performed on a cold engine, at room temperature.

1. Remove the seats and disconnect the negative (-) battery cable.
2. Remove the cargo box access panel.
3. Remove the spark plug wire from the engine and remove the spark plug. Place a clean shop towel into the spark plug tube to prevent debris from entering the combustion chamber.
4. Remove the (3) T40 bolts retaining the valve cover.
5. Remove the valve cover from the engine out of the right-hand rear wheel well area.



6. Remove the outer PVT cover and drive belt as shown in chapter 6.

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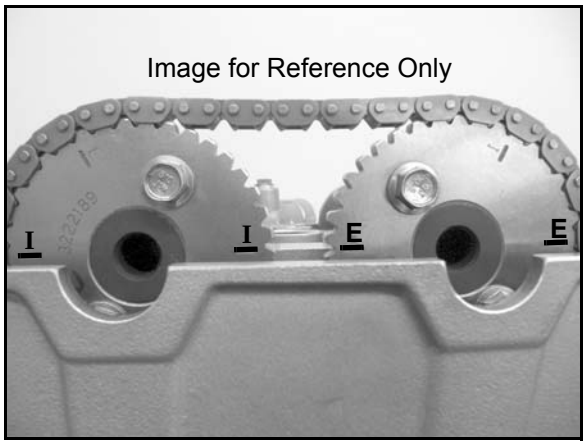
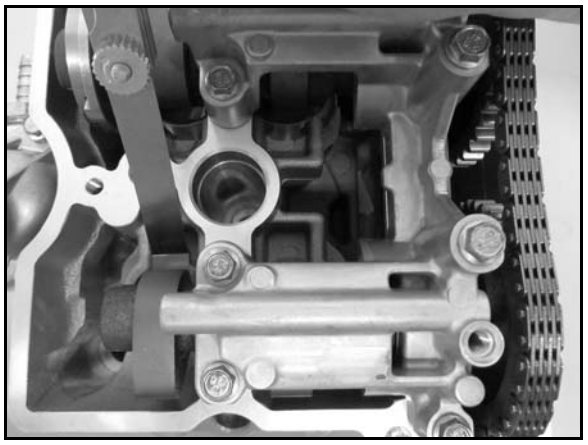
7. Rotate the drive clutch counter-clockwise until the cam chain sprocket timing marks are aligned with the gasket surface as shown (see Chapter 3 for more TDC setting procedures).

IMPORTANT: Intake cam sprocket should have "I" marks aligned with gasket surface and the exhaust cam sprocket should have "E" marks aligned with gasket surface.



8. Measure the valve clearance of each valve using a thickness (feeler) gauge. Record the measurement if clearance is out of specification.



9. If the valve clearance is out of specification, proceed to "Valve Clearance Adjustment" (see Chapter 3).

= In. / mm.
Intake Valve Clearance (cold): .005-.007 in. (0.125-0.175 mm)

= In. / mm.
Exhaust Valve Clearance (cold): .008-.010 in. (0.152-0.254 mm)

10. Repeat steps 8- 9 until all (4) valves have been inspected.

11. Inspect the valve cover seal and replace if necessary.

12. Install the valve cover and spark plug as outlined in Chapter 3.

13. Install drive belt and outer clutch cover and (8) retaining screws (see Chapter 6)

= T
Outer Clutch Cover Screws: **45-50 in. lbs. (5 Nm)**

14. Connect the negative (-) battery cable to the battery.

15. Start the engine to ensure proper operation.

16. Reinstall the cargo box access panel and seats (see Chapter 5).

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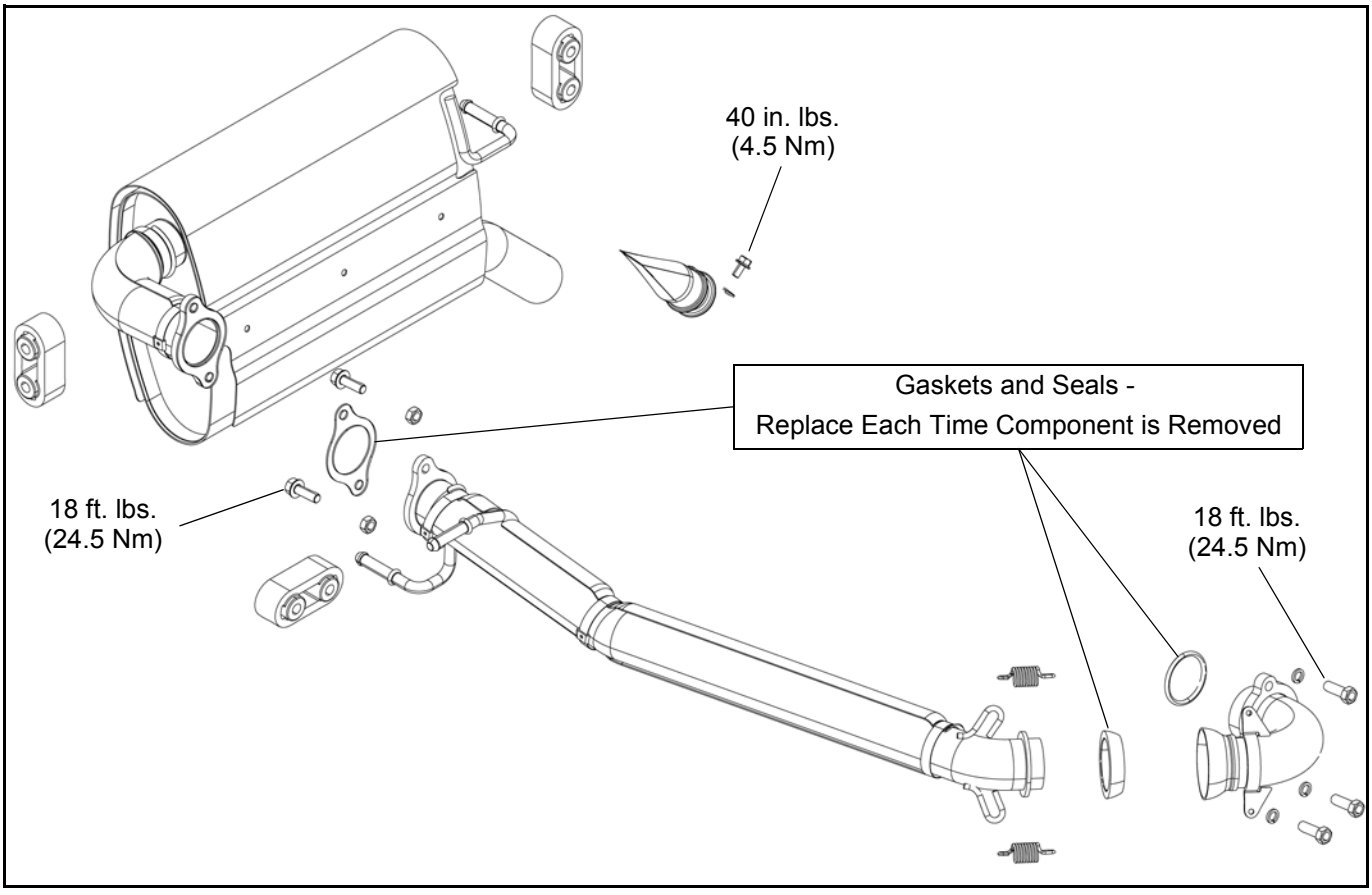
Exhaust - Spark Arrestor

WARNING

Do not clean spark arrestor immediately after the engine has been run, as the exhaust system becomes very hot. Serious burns could result from contact with the exhaust components. Allow components to cool sufficiently before proceeding. Wear eye protection and gloves.
Never run the engine in an enclosed area. Exhaust contains poisonous carbon monoxide gas that can cause loss of consciousness or death in a very short time.

Periodically clean spark arrestor to remove accumulated carbon.

1. Allow engine and exhaust system to completely cool.
2. Remove the retaining screw, washer and spark arrestor from the end of the silencer.
3. Use a non-synthetic brush to clean the arrestor screen.
4. Inspect the screen for wear and damage. Replace if needed.
5. Reinstall the arrestor and torque the screw to **40 in. lbs. (4.5 Nm)**.



TRANSMISSION AND FRONT GEARCASE

Specification Chart

Gearcase	Lubricant	Capacity	Fill / Drain Plug Torque
Transmission	AGL Plus Gearcase Lubricant	44 oz. (1300 ml)	10-14 ft. lbs. (14-19 Nm)
Transmission (INTL)	AGL Plus Gearcase Lubricant	41 oz. (1200 ml)	10-14 ft. lbs. (14-19 Nm)
Front Gearcase	Demand Drive Plus	6.75 oz. (200 ml)	8-10 ft. lbs. (11-14 Nm)

Transmission Lubrication

NOTE: It is important to follow the transmission maintenance intervals described in the Periodic Maintenance Chart. Regular lubricant level inspections should be performed as well.

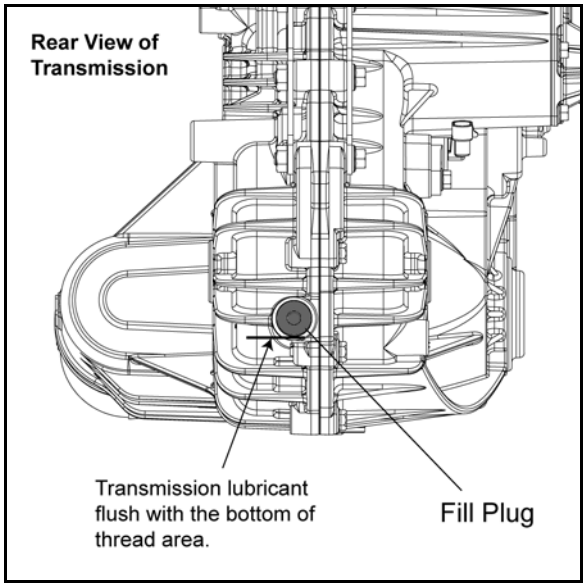
The transmission lubricant level should be checked and changed in accordance with the maintenance schedule.

- Be sure vehicle is positioned on a level surface when checking or changing the lubricant.
- Check vent hose to be sure it is routed properly and unobstructed.

Transmission Lubricant Level Check

The fill plug is located on the rear portion of the transmission gearcase. Access the fill plug at the rear of the vehicle. Maintain lubricant level even with the bottom of the fill plug hole.

1. Position vehicle on a level surface.
2. Remove the fill plug and check the lubricant level.



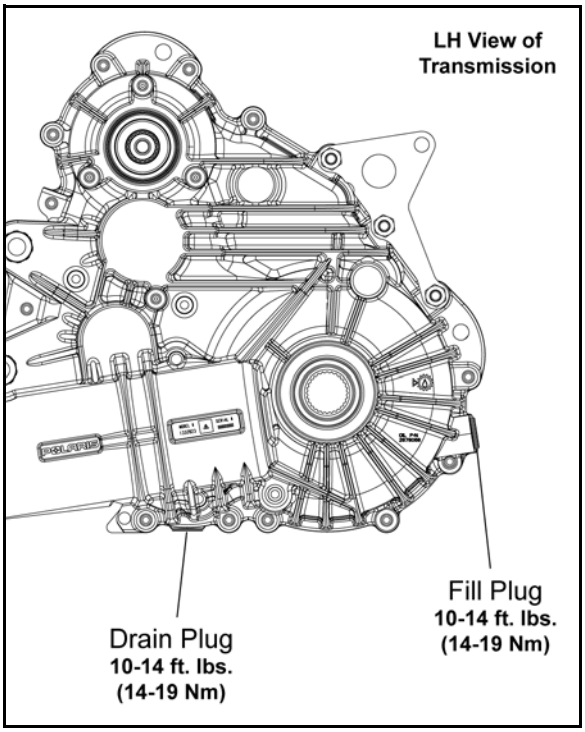
3. If lubricant level is not even with the bottom threads, add the recommended lubricant as needed. Do not overfill.
4. Reinstall the fill plug and torque to specification.

= T
Fill / Drain Plug Torque: **10-14 ft. lbs. (14-19 Nm)**

Transmission Lubricant Change

The drain plug is located on the bottom of the transmission gearcase. Access the drain plug through the drain hole in the skid plate.

1. Remove the fill plug (refer to "Transmission Lubricant Level Check").
2. Place a drain pan under the transmission drain plug.
3. Remove drain plug and allow lubricant to drain completely.



4. Clean the drain plug magnetic surface.
5. Reinstall drain plug with a ***new*** O-ring and torque to specification.
6. Add the recommended amount of lubricant through the fill plug hole. Maintain the lubricant level at the bottom of the fill plug hole when filling the transmission. Do not overfill.

=
Recommended Transmission Lubricant: AGL Plus Gearcase Lubricant (PN 2878068) (Quart) **Capacity:** 44 oz. (1300 ml) **Capacity (INTL):** 41 oz. (1200 ml)

7. Reinstall fill plug with a ***new*** O-ring and torque to specification.

= T
Fill / Drain Plug Torque: **10-14 ft. lbs. (14-19 Nm)**

8. Check for leaks. Dispose of used lubricant properly.

Front Gearcase Lubrication

NOTE: It is important to follow the front gearcase maintenance intervals described in the Periodic Maintenance Chart. Regular fluid level inspections should be performed as well.

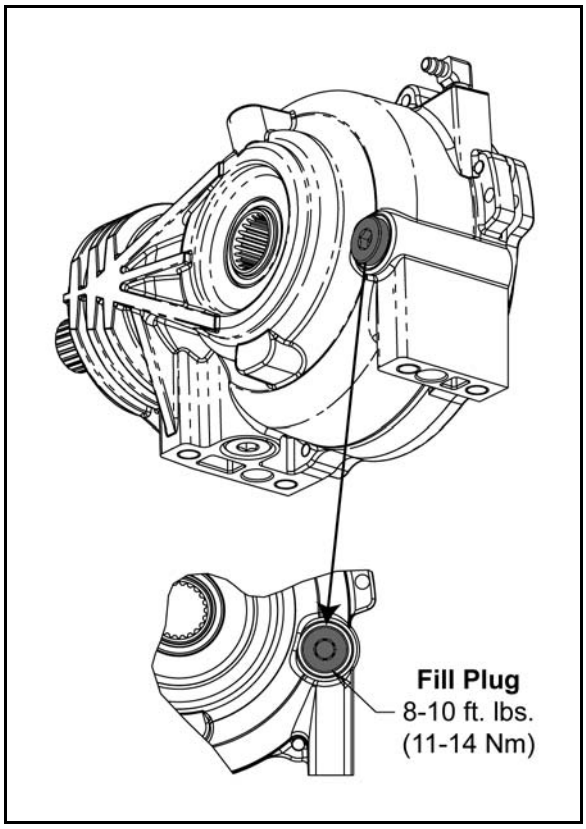
The front gearcase fluid level should be checked and changed in accordance with the maintenance schedule.

- Be sure vehicle is positioned on a level surface when checking or changing the fluid.
- Check vent hose to be sure it is routed properly and unobstructed.

Front Gearcase Fluid Level Check

The fill plug is located on the bottom right side of the front gearcase. Access the fill plug through the right front wheel well. Maintain fluid level even with the bottom of the fill plug hole.

1. Position vehicle on a level surface.
2. Remove the fill plug and check the fluid level.



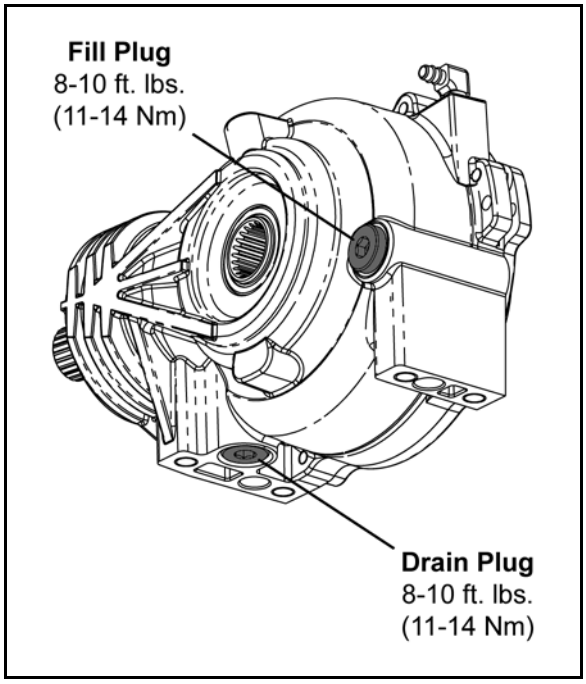
3. If fluid level is not even with the bottom threads, add the recommended fluid as needed. Do not overfill.
4. Reinstall the fill plug and torque to specification.

= T
Fill / Drain Plug Torque: **8-10 ft. lbs. (11-14 Nm)**

Front Gearcase Fluid Change:

The drain plug is located on the bottom of the front gearcase. Access the drain plug through the access hole in the frame underneath the front gearcase.

1. Remove the fill plug (refer to “Front Gearcase Fluid Level Check”).
2. Place a drain pan under the front gearcase drain plug.
3. Remove the drain plug and allow fluid to drain completely.



4. Clean the drain plug magnetic surface.
5. Reinstall drain plug with a ***new*** O-ring and torque to specification.

6. Add the recommended amount of fluid through the fill hole. Maintain the fluid level even with the bottom threads of the fill plug hole.


Recommended Front Gearcase Fluid: Polaris Demand Drive Plus (PN 2877922) (Quart) **Capacity:** 6.75 oz. (200 ml)

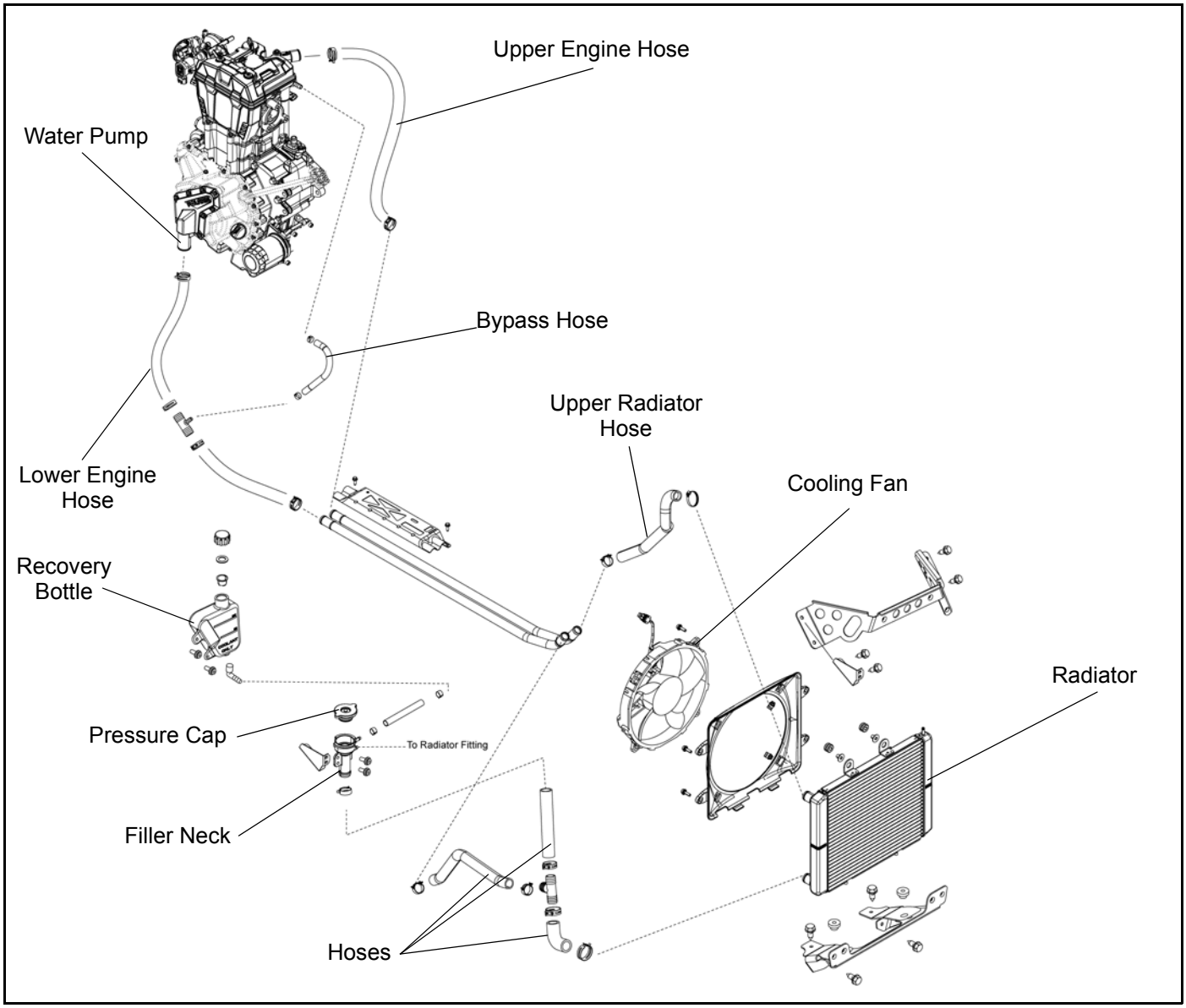
7. Reinstall fill plug with a ***new*** O-ring and torque to specification.


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

8. Check for leaks. Dispose of used fluid properly.

COOLING SYSTEM

Cooling System Exploded View



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Cooling System Overview

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.

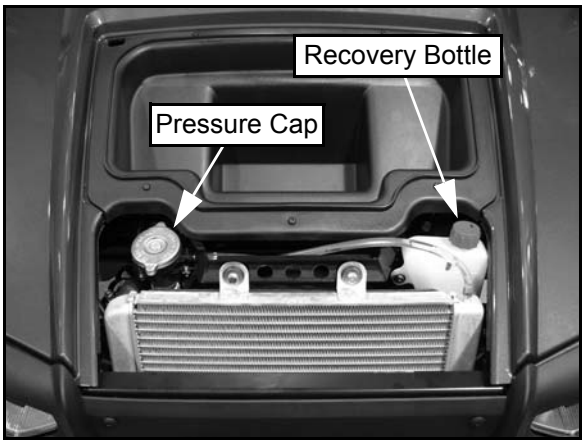
NOTE: Some coolant level drop on new machines is normal as the system is purging itself of trapped air. Observe coolant levels often during the break-in period.

NOTE: Overheating of engine could occur if air is not fully purged from system.

Polaris Premium 60/40 is already premixed and ready to use. Do not dilute with water.

Coolant Level Inspection

The pressure cap and recovery bottle are located under the front hood of the vehicle. The coolant level must be maintained between the minimum and maximum levels indicated on the recovery bottle.



With the engine at operating temperature, the coolant level should be between the upper and lower marks on the coolant recovery bottle. If not, perform the following procedure:

1. Position the vehicle on a level surface.
2. Remove the hood from the front cab.
3. View the coolant level in the recovery bottle.
4. If the coolant level is below the MIN line, inspect the coolant level in the radiator.

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

⚠ WARNING

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

5. Remove the pressure cap. Using a funnel, add coolant to the top of the filler neck.
6. Reinstall the pressure cap.

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

7. Remove recovery bottle cap and add coolant using a funnel.
8. Fill recovery bottle to MAX level with Polaris 60/40 premix Anti Freeze/Coolant or 50/50 or 60/40 mixture of antifreeze and distilled water as required for freeze protection in your area.
9. Reinstall the recovery bottle cap.
10. If coolant was required, start engine and check for leaks. Make sure radiator fins are clean to prevent overheating.

Cooling System Pressure Test

Refer to Chapter 3 for cooling system pressure test procedure.

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 Premium Antifreeze
2871534 - Quart
2871323 - Gallon

Cooling System

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

⚠ CAUTION

Do not over-tighten hose clamps at radiator, or radiator fitting may distort, causing a restriction to coolant flow.
Radiator hose clamp torque is **36 in. lbs. (4 Nm)**.

2. Check tightness of all hose clamps.

Coolant Drain / Fill

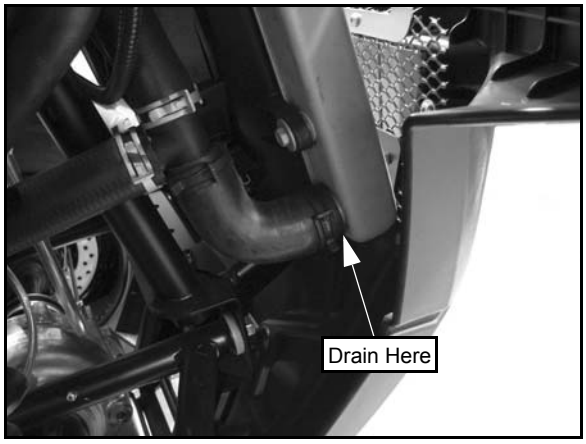
Coolant Drain

1. Remove the hood from the front cab.

⚠ WARNING

Never drain the coolant when the engine and radiator are warm or hot. Hot coolant can cause severe burns. Allow engine and radiator to cool.

2. Slowly remove the pressure cap to relieve any cooling system pressure.
3. Place a suitable drain pan underneath the radiator fitting on the front right-hand side of the vehicle.
4. Drain the coolant from the radiator by removing the lower coolant hose from the radiator as shown. Properly dispose of the coolant.



5. Allow coolant to completely drain.
6. Place a suitable drain pan underneath the lower engine hose on the right-hand rear side of the vehicle.

7. Remove the hose and completely drain the engine. Reinstall the lower coolant hose.
8. Properly dispose of the coolant.
9. Remove the pressure cap. Using a funnel, add the recommended coolant to the top of the filler neck and fill the recovery bottle to the MAX level.
10. Refer to Chapter 3 for the “Cooling System Bleeding Procedure”.

Polaris Premium Antifreeze
2871534 - Quart
2871323 - Gallon

FINAL DRIVE / WHEEL AND TIRE

Wheel and Hub Torque Table

= T
Wheel Nuts: **Steel Wheels: 27 ft. lbs. (37 Nm)** **Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)**

= T
Hub Retaining Nuts: **80 ft. lbs. (108 Nm)**

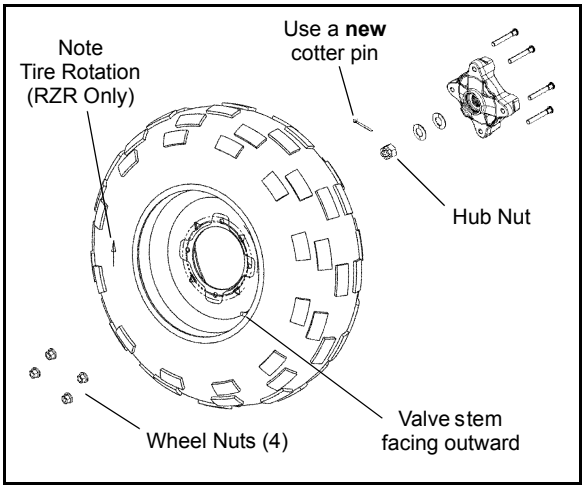
NOTE: Do not lubricate the stud or the lug nut.

Wheel Removal

1. Position the vehicle on a level surface.
2. Place the transmission in PARK (P) and stop the engine.
3. Loosen the wheel nuts slightly. If wheel hub removal is required, remove the cotter pin and loosen the hub nut slightly.
4. Elevate the appropriate side of the vehicle by placing a suitable stand under the frame.
5. Remove the wheel nuts and remove the wheel.
6. If hub removal is required, remove the hub nut and washers.

Wheel Installation

1. Verify the transmission is still in PARK (P).
2. Install the wheel hub, washers, and hub nut, if previously removed.
3. 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.
4. Attach the wheel nuts and finger tighten them.
5. Carefully lower the vehicle to the ground.
6. Torque the wheel nuts and/or hub nut to the proper torque specification listed in the torque table at the beginning of this section.
7. If hub nut was removed, install a ***new*** cotter pin after the hub nut has been tightened.



⚠ CAUTION

If wheels are improperly installed it 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.

Tire Inspection

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

⚠ WARNING

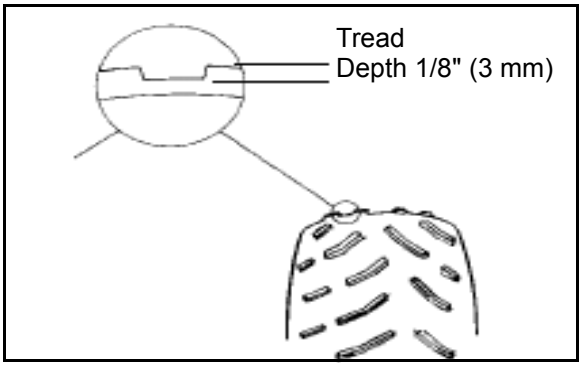
Operating with worn tires will increase the possibility of the vehicle skidding easily with possible loss of control.

Worn tires can cause an accident.

Always replace tires when the tread depth measures 1/8", (.3 cm) or less.

Tire Tread Depth

Replace tires when tread depth is worn to 1/8" (3 mm) or less.



Tire Pressure

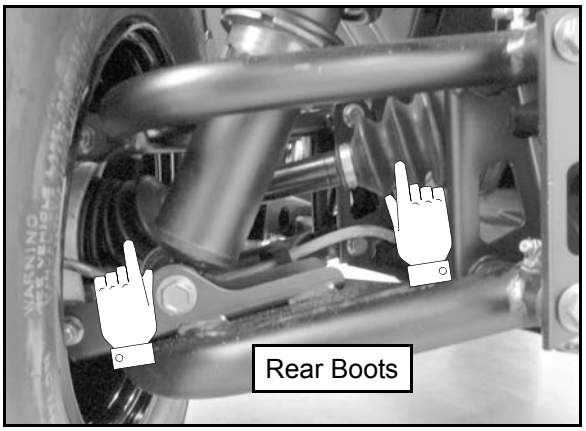
⚠ CAUTION

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

Tire Pressure Inspection (Cold)	
Front	**Rear**
10 psi (55 kPa)	12 psi (55 kPa)

Drive Shaft Boot Inspection

Inspect the drive shaft boots for damage, tears, wear or leaking grease. If the boots exhibit any of these symptoms, they should be replaced. Refer to Chapter 7 for drive shaft boot replacement.



ELECTRICAL AND IGNITION SYSTEM

Battery Maintenance

Keep battery terminals and connections free of corrosion. If cleaning is necessary, remove the corrosion with a stiff wire brush. Wash with a solution of one tablespoon baking soda and one cup water. Rinse well with tap water and dry off with clean shop towels. Coat the terminals with dielectric grease or petroleum jelly.

⚠ WARNING

CALIFORNIA PROPOSITION 65 WARNING:
Batteries, battery posts, terminals and related accessories contain lead and lead compounds, and other chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.
WASH HANDS AFTER HANDLING.

⚠ 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: Batteries must be fully charged before use or battery life will be reduced by 10-30% of full potential. Charge battery according to "Charging Procedure" provided in Chapter 10. Do not use the vehicle's stator/alternator to charge a new battery.

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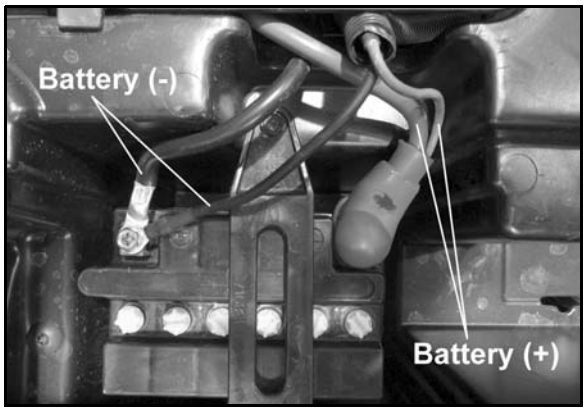
Battery Removal

1. Remove the driver's seat to access the battery.



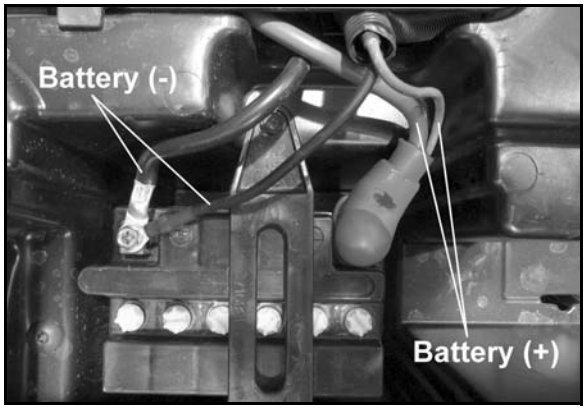
2. Disconnect the (2) black (negative) battery cables.
3. Disconnect the (2) red (positive) battery cables.
4. Remove the hold-down strap and lift the battery out of the vehicle.

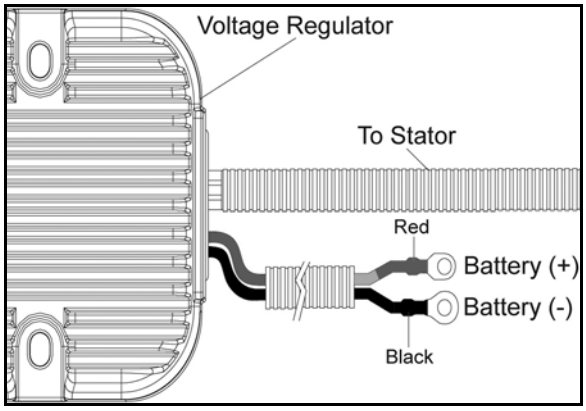
> **⚠ CAUTION**
>
> To reduce the chance of sparks: Whenever removing the battery, disconnect the black (negative) cable first. When reinstalling the battery, install the black (negative) cable last.

Battery Installation

IMPORTANT: Using a new battery that has not been fully charged can damage the battery and result in a shorter life. It can also hinder vehicle performance. Follow the battery charging procedure in Chapter 10 "Electrical" before installing the battery.

1. Ensure the battery is fully charged.
2. Place the battery in the battery holder and secure with hold-down strap.
3. Coat the terminals with dielectric grease or petroleum jelly.
4. Connect and tighten the (2) red (positive) cables first.
5. Connect and tighten the (2) black (negative) cable last.





6. Verify that cables are properly routed and reinstall the driver's seat.

Battery Off Season Storage

Refer to Chapter 10 "Electrical" for off season storage procedures.

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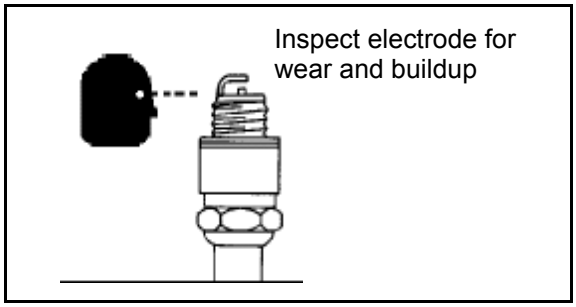
Spark Plug Service

1. Remove the driver's seat and disconnect the (-) negative battery cable from the battery.
2. Remove cargo box access panel.

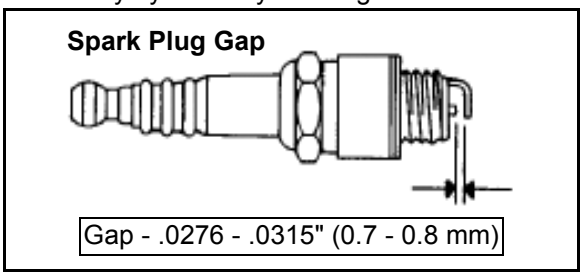
> **⚠ WARNING**
>
> A hot exhaust system and engine can cause serious burns. Allow engine to cool or wear protective gloves when removing the spark plugs.

3. Clean top of engine to remove all dirt and debris.
4. Remove the spark plug wire from the engine.

5. Remove spark plug.
6. Inspect electrodes for wear and carbon buildup. Look for a sharp outer edge with no rounding or erosion of the electrodes.



7. Clean with electrical contact cleaner only.
8. Measure gap with a wire gauge. Adjust gap if necessary by carefully bending the side electrode.



9. If necessary, replace spark plug with proper type. **CAUTION:** Severe engine damage may occur if the incorrect spark plug is used.
10. Apply Anti-seize compound to the spark plug threads.
11. Install spark plugs and torque to specification.

Recommended Spark Plug:
Champion RG4YCX

Spark Plug Torque:
7 ft. lbs. (10 Nm)
Apply Anti-seize

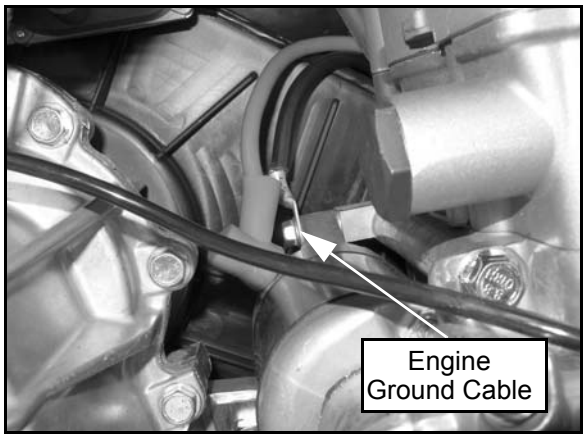
12. Install spark plug wire into spark plug / engine.
13. Reinstall cargo box access panel.
14. Reinstall the (-) negative battery cable and driver's seat.

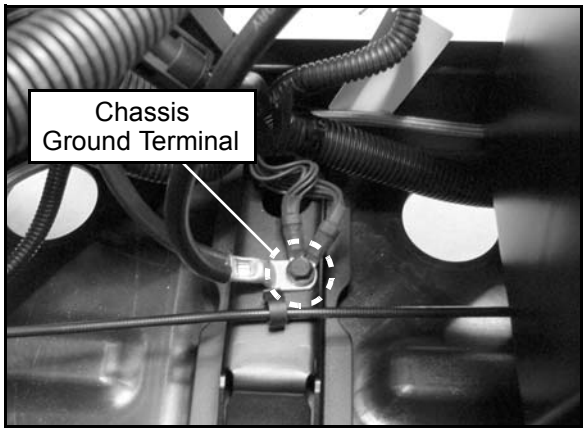
Engine To Frame Ground

Inspect ground cable connections. Be sure they are clean and tight.

The engine ground cable runs from the upper starter motor mounting bolt to the chassis ground terminal.

The Chassis ground is located under the drivers seat, near the starter solenoid.





STEERING

Steering Inspection

The steering components should be checked periodically for loose fasteners, worn tie rod ends, ball joints, 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 the 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.

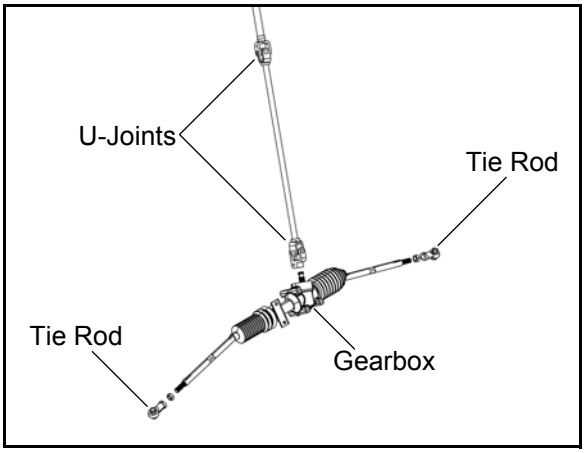
⚠ WARNING

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.
Use only genuine Polaris replacement parts.

Steering Wheel Freeplay

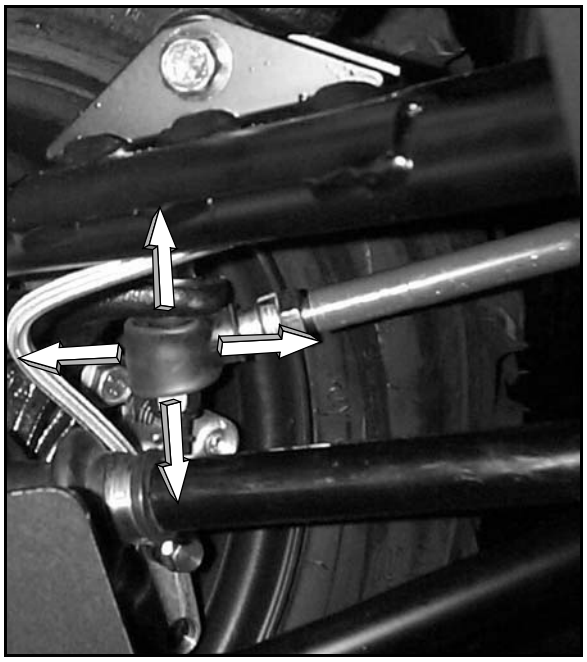
Check t he st eering wh eel f or specified freeplay and operation.

1. Position the vehicle on level ground.
2. Lightly turn the steering wheel left and right.
3. There should be 0.8”-1.0” (20-25 mm) of freeplay.
4. If there is exce ssive fr eeplay or the stee ring feels rough, inspect the following components.
   - Tie Rod Ends
   - Steering Shaft U-Joints
   - Steering Gearbox

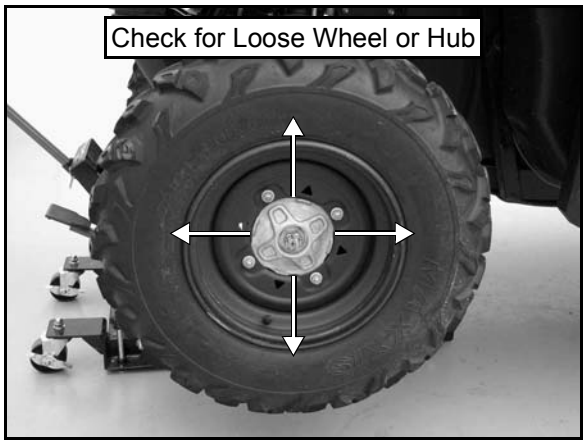


Tie Rod End / Wheel Hub Inspection

- To check for play in the tie rod end, grasp the steering tie rod, pull in all directions feeling for movement.



- 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 whe el assemb ly to deter mine the cau se (loose wheel nuts or loose front hub nut).
- Refer to Chap ter 7 “ Final Drive” for fro nt hu b service procedures.

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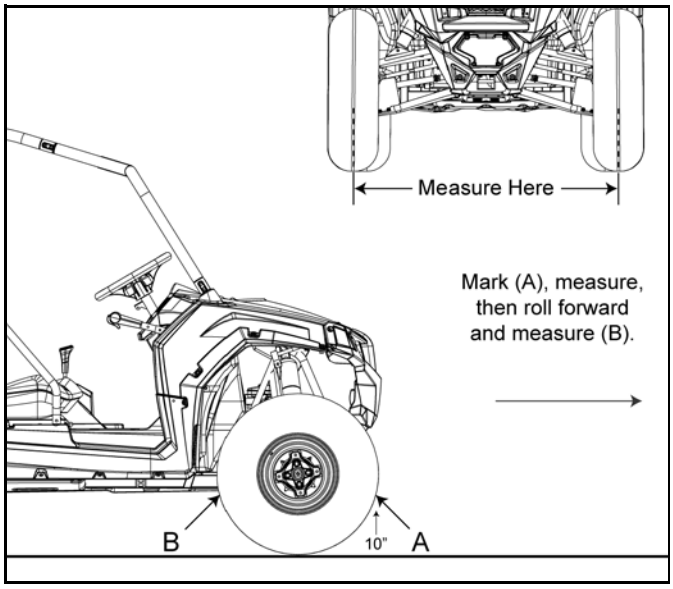
Wheel Toe Alignment Inspection

1. Place machine on a smooth level surface and set steering wheel in a straight ahead position. Secure the steering wheel in this position.

2. 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.

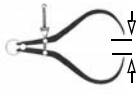


NOTE: It is important the height of both marks be equally positioned to get an accurate measurement.

3. Measure the distance between the marks and record the measurement. Call this measurement “A”.

4. Rotate the tires 180° by moving the vehicle forward. Position chalk marks facing rearward, even with the hub/axle center line.

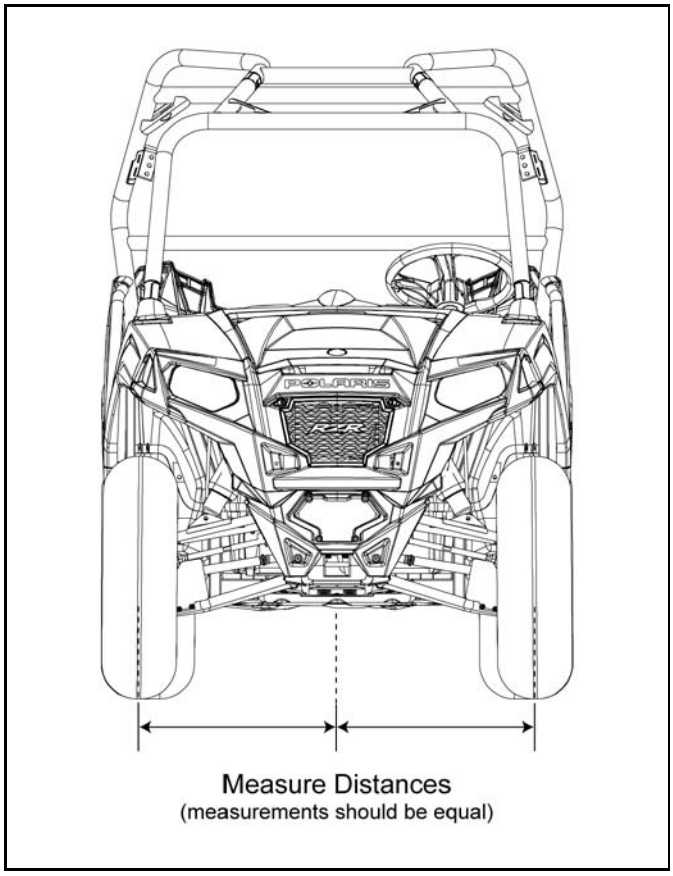
5. Again measure the distance between the marks and record. Call this measurement “B”. Subtract measurement “B” from measurement “A”. The difference between measurements “A” and “B” is the vehicle toe alignment. The recommended vehicle toe tolerance is 1/8”, to 1/4”, (.3 to .6 cm) toe out. This means 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)

Wheel Toe Adjustment

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 steering wheel is straight ahead before determining which tie rod needs adjustment.

⚠ CAUTION

During tierod 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 in “Wheel Toe Alignment”.
- **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.
- After alignment is complete, torque jam nuts to specification.

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

SUSPENSION

Spring Preload Adjustment

The front and rear shock absorber springs are adjustable by rotating the adjustment cam to change spring tension preload.

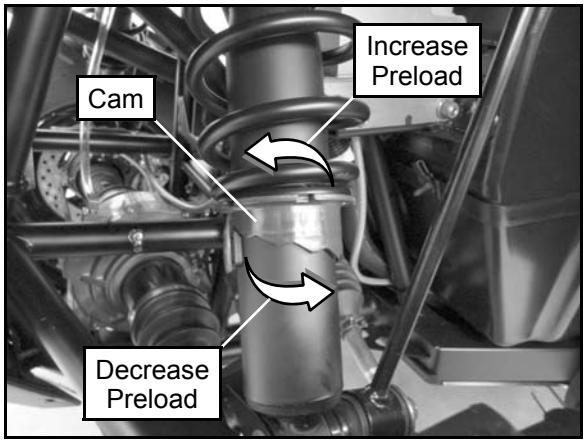
WARNING
Uneven adjustment may cause poor handling of the vehicle, which could result in an accident and serious injury or death. Always adjust both the left and right spring preloads equally.

Suspension Spring Adjustment

1. Position the vehicle on a level surface and stop the engine.
2. Raise and safely support the front or rear of the vehicle off the ground to allow the suspension to fully extend.

NOTE: The tires should not be touching the ground.

3. To adjust the suspension, rotate the adjustment cam clockwise to increase spring tension or counter-clockwise to decrease spring tension.



Shock Spanner Wrench

(PN 2871095)

4. Each notch of the adjustment will add 6% - 8% more preload to the spring over the primary position.

BRAKE SYSTEM

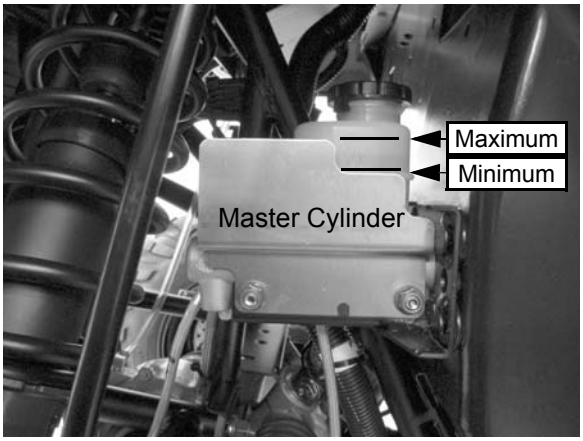
Brake Fluid Inspection

Always check the brake pedal travel and inspect the brake fluid reservoir level before each operation. If the fluid level is low, add DOT 4 brake fluid only.

Brake fluid should be changed every two years. The fluid should also be changed anytime the fluid becomes contaminated, the fluid level is below the minimum level, or if the type and brand of the fluid in the reservoir is unknown.

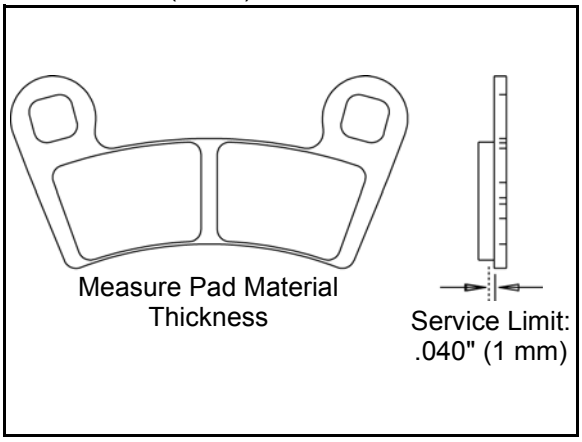
The brake fluid master cylinder reservoir can be accessed through the left front wheel well.

1. Position the vehicle on a level surface.
2. Place the transmission in PARK (P).
3. View the brake fluid level in the reservoir. The level should be between the MAX and MIN level lines.
4. If the fluid level is lower than the MIN level line, add brake fluid until it reaches the MAX level line.
5. Install the reservoir cap and apply the brake pedal forcefully for a few seconds and check for fluid leakage around the master cylinder fittings and the brake caliper fittings.

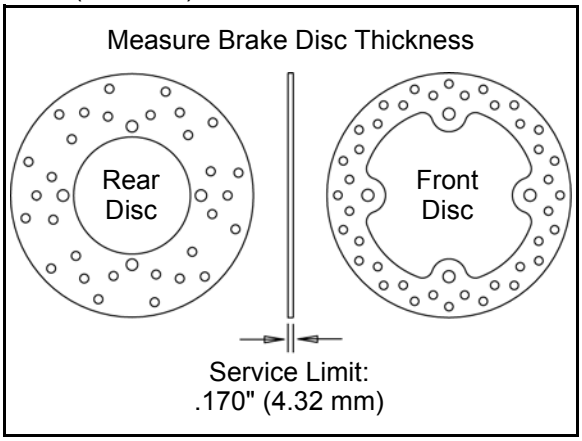


Brake Pad / Disc Inspection

1. Check the brake pads for wear, damage, or looseness.
2. Inspect the brake pad wear surface for excessive wear.
3. Pads should be changed when the friction material is worn to .040” (1 mm).



4. Check surface condition of the brake discs.
5. Measure the thickness of the front and rear brake discs.
6. The disc(s) should be replaced if thickness is less than .170” (4.32 mm).



Brake Hose and Fitting Inspection

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

Parking Brake Cable Adjustment (INTL)

When the parking brake is fully engaged and “BRAKE” is displayed on the instrument cluster, engine speed is limited to 1500 RPM while in gear. If throttle is applied, this limiting feature prevents operation, which protects the parking brake pads from excessive wear.

NOTE: Inspect the parking brake cable tension after the first 25 hours of operation and every 100 hours of operation afterwards to ensure proper cable tension.

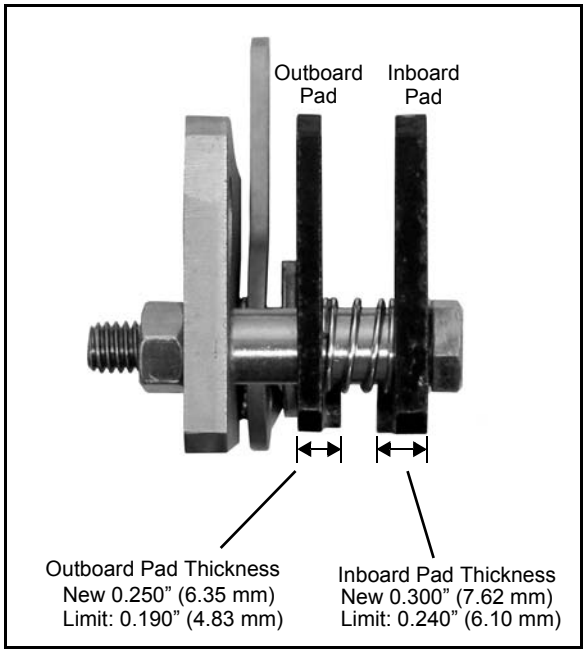
Loss of tension in the parking brake cable will cause illumination of the parking brake indicator and activation of the limiting feature. If this occurs, inspect and adjust parking brake cable tension. If performing this service is difficult due to conditions or location, temporarily disconnect the parking brake switch electrical connector. Reconnect the connector as soon as practicable and adjust the parking brake cable to proper tension.

1. Pull back on the parking brake lever (located in dash).
2. After 3 to 4 clicks “BRAKE” should display on the instrument cluster and the wheels of the vehicle should not rotate when turning by hand. After 8 full clicks of lever travel, the vehicle should not roll while parked.
3. If the vehicle moves, adjustment is necessary.
4. Adjust the parking brake cable where the cable attaches to the caliper mount / shift cable bracket. The mount bracket is located on the right-hand side of the transmission.

Adjustment Procedure: Refer to Chapter 9 “Brakes” for complete adjustment procedure.

Parking Brake Pad Inspection (INTL)

Inspect the parking brake caliper brake pad thickness. Replace brake pads if damaged or worn beyond service limit. Replace caliper assembly if damage or excessive wear is found. Refer to the following image for brake pad specifications.



CHAPTER 3

ENGINE / COOLING SYSTEM

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GENERAL INFORMATION

Special Tools

Tool Description	Part Number
Bench Mount Engine Stand Adapter	PW-47053
Clutch Center Distance Tool	PU-50658
Crankshaft Removal / Installation Tool Kit	PU-50784
Cylinder Holding & Camshaft Timing Plate	PU-50563
Engine Stand (2” Bore)	PU-50624
Engine Stand Adapter (Mounts To The Engine)	PU-50824
Engine Stand Sleeve Adapter (Use With 2” Bore Stand)	PU-50625
Engine Stand Sleeve Adapter (Use With 2.375” Bore Stand)	PW-47054
Flywheel Puller	PA-49316
Oil Filter Wrench	PU-50105
Oil Pressure Gauge	PV-43531
Oil Pressure Gauge Adapter	PU-50569
Stator Cover Removal Handles	PA-49317
Valve Spring Compressor	PV-1253 or PV-4019 (Quick Release)
Valve Spring Compressor Adapter	PV-43513-A
Water Pump Mechanical / Oil Seal Installation Kit	PU-50689

SPX Corporation - 1-800-328-6657
http://polaris.spx.com/.

Engine Lubrication Specifications

=	
Oil Capacity	Approx. 2 Quarts (1.9 L)
Oil Filter Wrench	PU-50105 or 2.5” (64 mm)
Oil Type	Polaris PS-4 Plus Synthetic Engine Oil
Oil Pressure Minimum Specification (using Polaris PS-4 Plus at operating temperature)	10 PSI @ 1200 RPM (Minimum)
	40 PSI @ 7000 RPM (Minimum)

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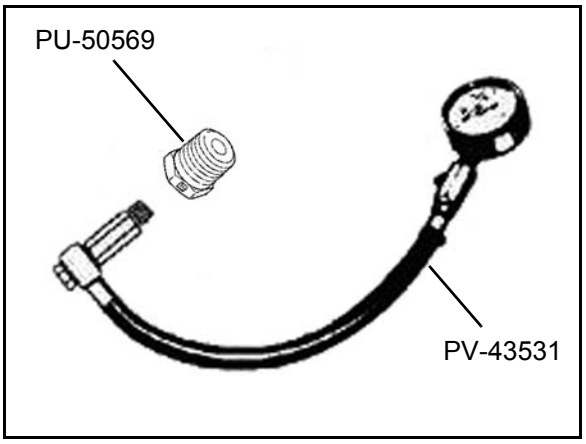
Oil Pressure Test

1. Attach the Oil Pressure Gauge Adapter (PU-50569) to the Oil Pressure Gauge (PV-43531).

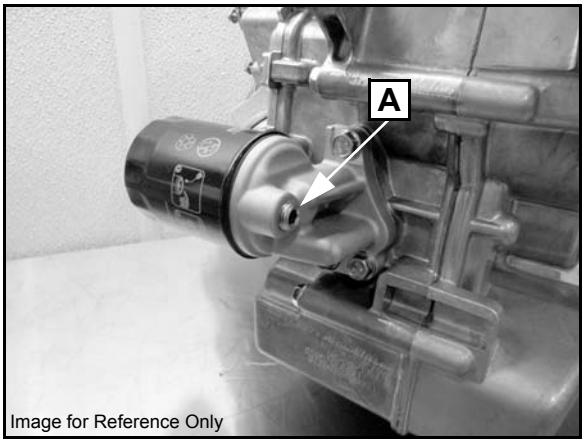


Oil Pressure Gauge Adapter: PU-50569
Oil Pressure Gauge: PV-43531

2. Remove the seats and engine service panel.

3. Clean the area around the main oil gallery plug (A), located on the oil filter adapter housing.

4. Remove the plug (A) and insert the oil pressure adapter.



5. Start engine and allow it to reach operating temperature, monitoring gauge indication.

NOTE: Test results are based on the use of the recommended engine oil (Polaris PS-4 Plus) at operating temperature, and may vary considerably if any other oil is used or if engine is not up to temperature.

=

Oil Capacity	Approx. 2 Quarts (1.9 L)
Oil Filter Wrench	PU-50105 or 2.5” (64 mm)
Oil Type	Polaris PS-4 Plus Synthetic Engine Oil
Oil Pressure Minimum Specification (using Polaris PS-4 Plus at operating temperature)	10 PSI @ 1200 RPM (Minimum)
	40 PSI @ 7000 RPM (Minimum)

6. Upon assembly, torque the crankcase gallery plug to specification.

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Oil Gallery Plug: **11 ft. lbs. (15 Nm)**

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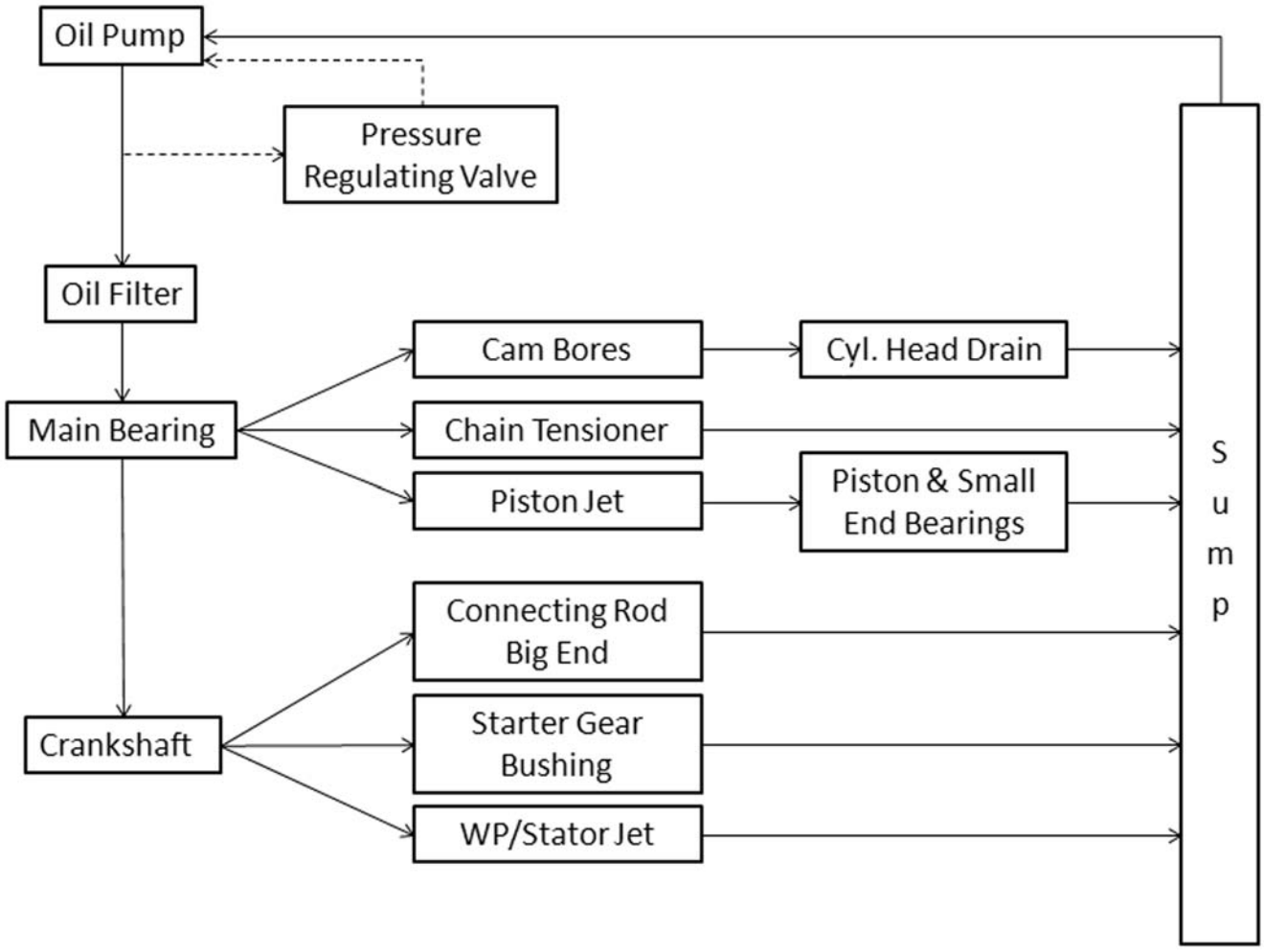
Engine Oil Flow Chart



ENGINE SERVICE SPECIFICATIONS

Engine Specifications - 1204286 RZR570HO-11

CAMSHAFT / CYLINDER HEAD / CYLINDER (IN. / MM)		
Camshaft	Cam Lobe Height - Intake	1.5704" ± 0.0038" (39.89 ± 0.097 mm)
	Cam Lobe Height - Exhaust	1.5405" ± 0.0038" (39.13 ± 0.097 mm)
	Camshaft Journal O.D. - All (Standard)	0.9029" - 0.9037 " (22.933 - 22.954 mm)
	Camshaft Journal O.D. - All (Service Limit)	0.9025" (22.923 mm)
	Camshaft Journal Bore I.D. - All (Standard)	0.9055" - 0.9063" (23.000 - 23.021 mm)
	Camshaft Journal Bore I.D. - All (Service Limit)	0.9072" (23.044 mm)
	Camshaft Oil Clearance (Standard)	0.0018" - 0.0034" (0.046 - 0.088 mm)
	Camshaft Oil Clearance (Service Limit)	0.0047" (0.121 mm)
	Camshaft End Play (Standard)	0.0069" - 0.0128" (0.175 - 0.325 mm)
	Camshaft End Play (Service Limit)	0.0157" (0.4 mm)
Cylinder Head	Cylinder Head - Surface Warp Limit	0.0024" (0.060 mm)
	Cylinder Head - Standard Height	4.745" ± 0.0020" (120.53 ± 0.05 mm)
Valve Seat	Valve Seat - Contacting Width - Intake (Standard)	0.0393" ± 0.0039" (1.0 ± 0.10 mm)
	Valve Seat - Contacting Width - Intake (Service Limit)	0.0551" (1.4 mm)
	Valve Seat - Contacting Width - Exhaust (Standard)	0.0590" ± 0.0039" (1.5 ± 0.10 mm)
	Valve Seat - Contacting Width - Exhaust (Service Limit)	0.0748" (1.9 mm)
	Valve Seat Angles	30.0° ± 1.5° / 45.0° ± 0.5° / 60.0° ± 1.5°
Valve Guide	Valve Guide Inner Diameter	0.2165" - 0.2171" (5.500 - 5.515 mm)
Valve	Valve Lash (Cold) - Intake	0.005" - 0.007" (0.125 - 0.175 mm)
	Valve Lash (Cold) - Exhaust	0.006" - 0.010" (0.152 - 0.254 mm)
	Valve Stem Diameter - Intake	0.2155" - 0.2161" (5.475 - 5.490 mm)
	Valve Stem Diameter - Exhaust	0.2147" - 0.2153" (5.455 - 5.470 mm)
	Valve Stem Oil Clearance - Intake	0.0003" - 0.0015" (0.010 - 0.040 mm)
	Valve Stem Oil Clearance - Exhaust	0.0011" - 0.0023" (0.030 - 0.060 mm)
	Valve Stem Overall Length - Intake	3.7704" (95.77 mm)
	Valve Stem Overall Length - Exhaust	3.7964" (96.43 mm)
Valve Spring	Valve Spring Free Length (Standard)	1.7263" (43.85 mm)
	Valve Spring Free Length (Service Limit)	1.683" (42.75 mm)
Cylinder	Cylinder - Surface Warp Limit (mating with cylinder head)	0.00098" (0.025 mm)
	Cylinder Bore - Standard	3.8976" ± 0.0003" (99.0 mm ± 0.008 mm)
	Cylinder Out of Round Limit	0.001" (0.025 mm)
	Cylinder Taper Limit	0.001" (0.025 mm)
	Cylinder to Piston Clearance	0.00019" - 0.00216" (.005 - .055 mm)

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PISTON / RINGS / CONNECTING ROD / CRANKSHAFT / BALANCE SHAFT (IN. / MM)			
Piston	Piston - Standard O.D. - Measured 90 degrees to pin, 0.47 in. (12 mm) up from piston skirt. See text.		3.8957” - 3.8968” (98.953 - 98.980 mm)
	Piston Pin Bore I.D. (Standard)		0.8662” - 0.8665” (22.004 - 22.010 mm)
	Piston Pin Bore I.D. (Service Limit)		0.8677" (22.042 mm)
Piston Pin	Piston Pin O.D. (Standard)		0.8659" - 0.8661" (21.995 - 22.000 mm)
	Piston Pin O.D. (Service Limit)		0.8651" (21.975 mm)
Piston Ring	Installed Gap	Top Ring (Standard)	0.0059" - 0.0122" (0.15 - 0.31 mm)
		Top Ring (Service Limit)	0.0137" (0.35 mm)
		Second Ring (Standard)	0.0094" - 0.0196" (0.24 - 0.50 mm)
		Second Ring (Service Limit)	0.0220" (0.56 mm)
		Oil Control Rails (Standard)	0.0098" - 0.0401" (0.25 - 1.02 mm)
		Oil Control Rails (Service Limit)	0.0480" (1.22 mm)
	Ring to Groove Clearance	Top Ring (Standard)	0.0011" - 0.0037" (0.030 - 0.095 mm)
		Top Ring (Service Limit)	0.0042" (0.108 mm)
		Second Ring (Standard)	0.0007" - 0.0029" (0.020 - 0.076 mm)
		Second Ring (Service Limit)	0.0035" (0.089 mm)
Connecting Rod	Connecting Rod Small End I.D. (Standard)		0.8665" - 0.8670" (22.010 - 22.023 mm)
	Connecting Rod Small End I.D. (Service Limit)		0.8682" (22.053 mm)
	Connecting Rod Big End I.D.		See Service Procedure Listed In This Chapter
Crankshaft	Main Journal O.D. (Service Limit)		1.6137" (40.990 mm)
	Crankshaft Runout Limit (PTO and MAG)		See Service Procedure Listed In This Chapter
Balance Shaft	Bearing Journal O.D. (Standard)		1.1798” - 1.1802" (29.969 - 29.979 mm)

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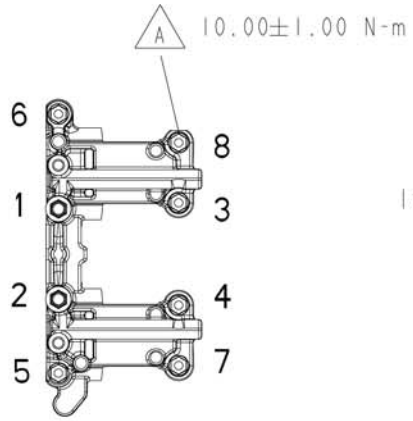
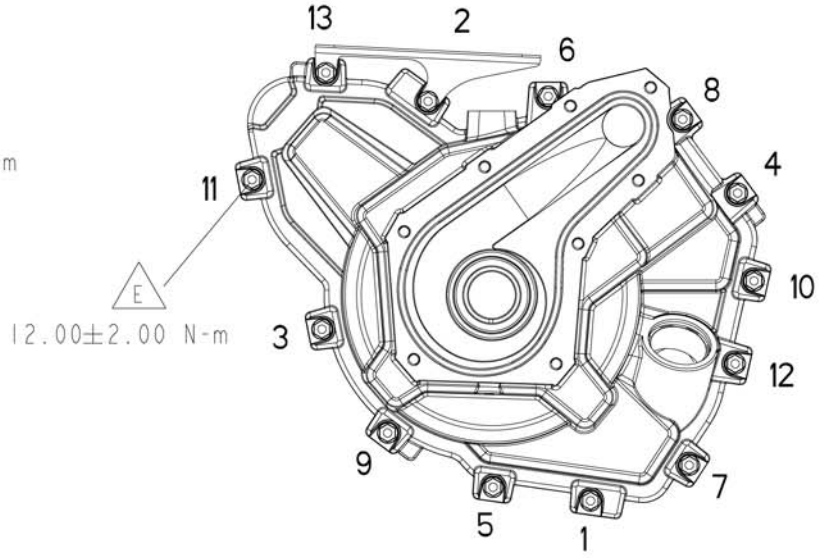
ENGINE DETAIL - TORQUE VALUES / SEQUENCES / ASSEMBLY NOTES

Main Engine Components - Torque Specification and Sequence

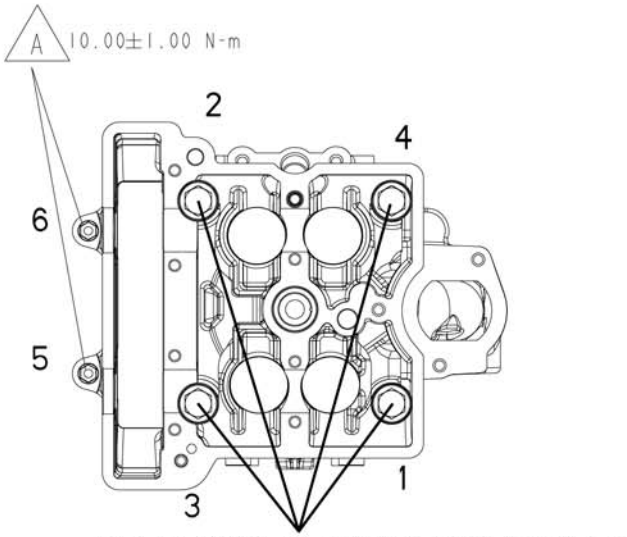
FASTENER TORQUE TABLE	
A	10.00±1.00 N-m
E	12.00±2.00 N-m



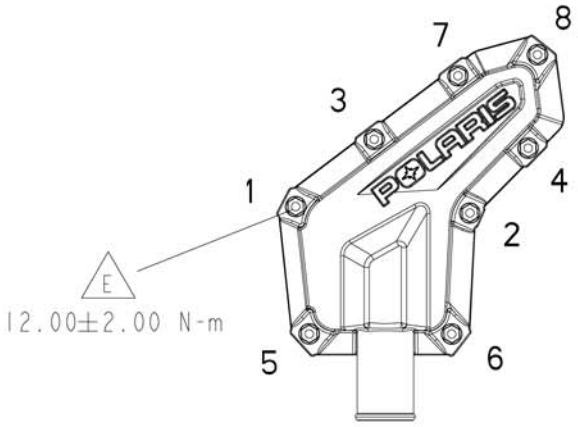
CAM CARRIER
TORQUE SEQUENCE



STATOR COVER
TORQUE SEQUENCE

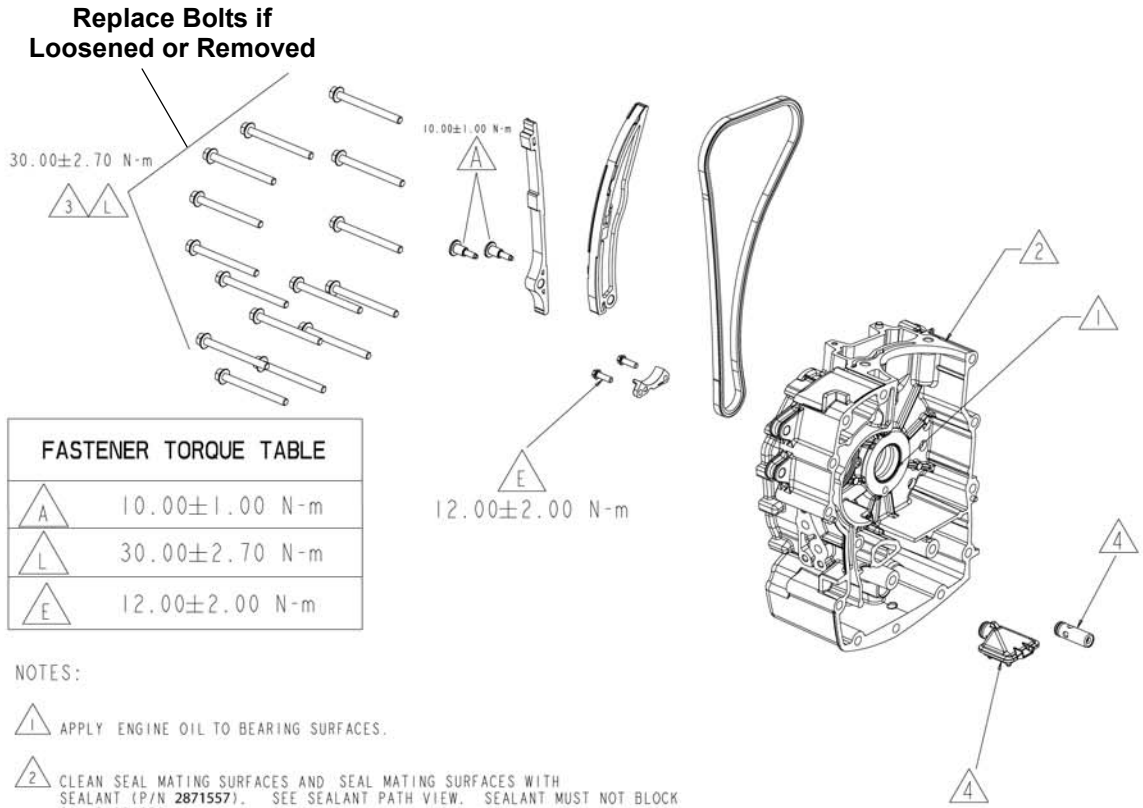


CYLINDER HEAD
TORQUE SEQUENCE



WATER COVER
TORQUE SEQUENCE

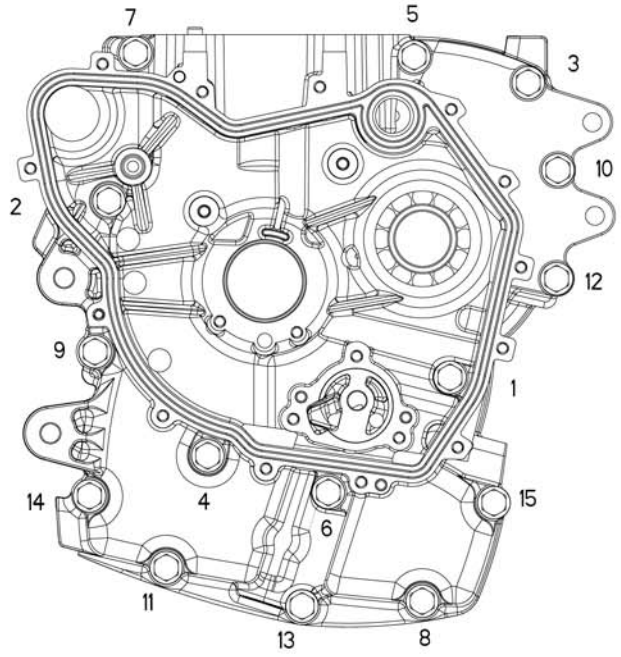
Crankcase / Timing Chain Guides / Oil Pickup / Regulator Valve



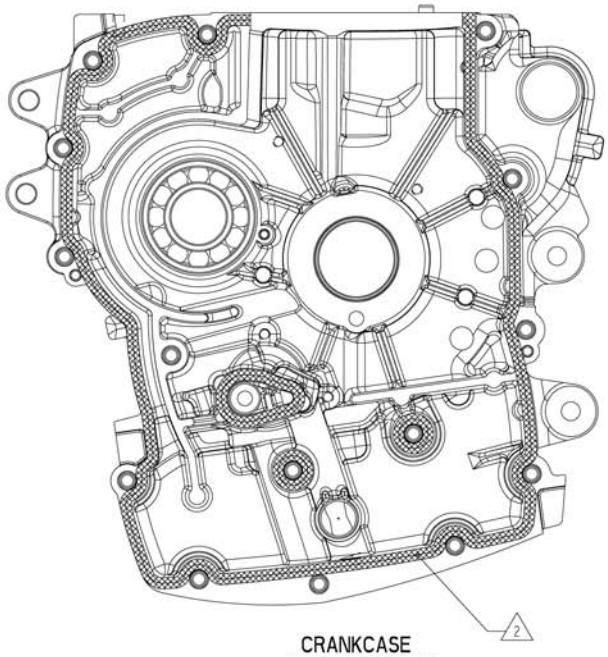
FASTENER TORQUE TABLE	
A	10.00±1.00 N-m
L	30.00±2.70 N-m
E	12.00±2.00 N-m

NOTES:

1. APPLY ENGINE OIL TO BEARING SURFACES.
2. CLEAN SEAL MATING SURFACES AND SEAL MATING SURFACES WITH SEALANT (P/N 2871557). SEE SEALANT PATH VIEW. SEALANT MUST NOT BLOCK OIL PASSAGES.
3. TORQUE IN SEQUENCE PER CRANKCASE TORQUE VIEW.
4. INSTALL UNTIL FULLY SEATED IN BORE/HOLE. ENGINE OIL MAY BE USED TO FACILITATE INSTALLATION.



CRANKCASE
TORQUE SEQUENCE

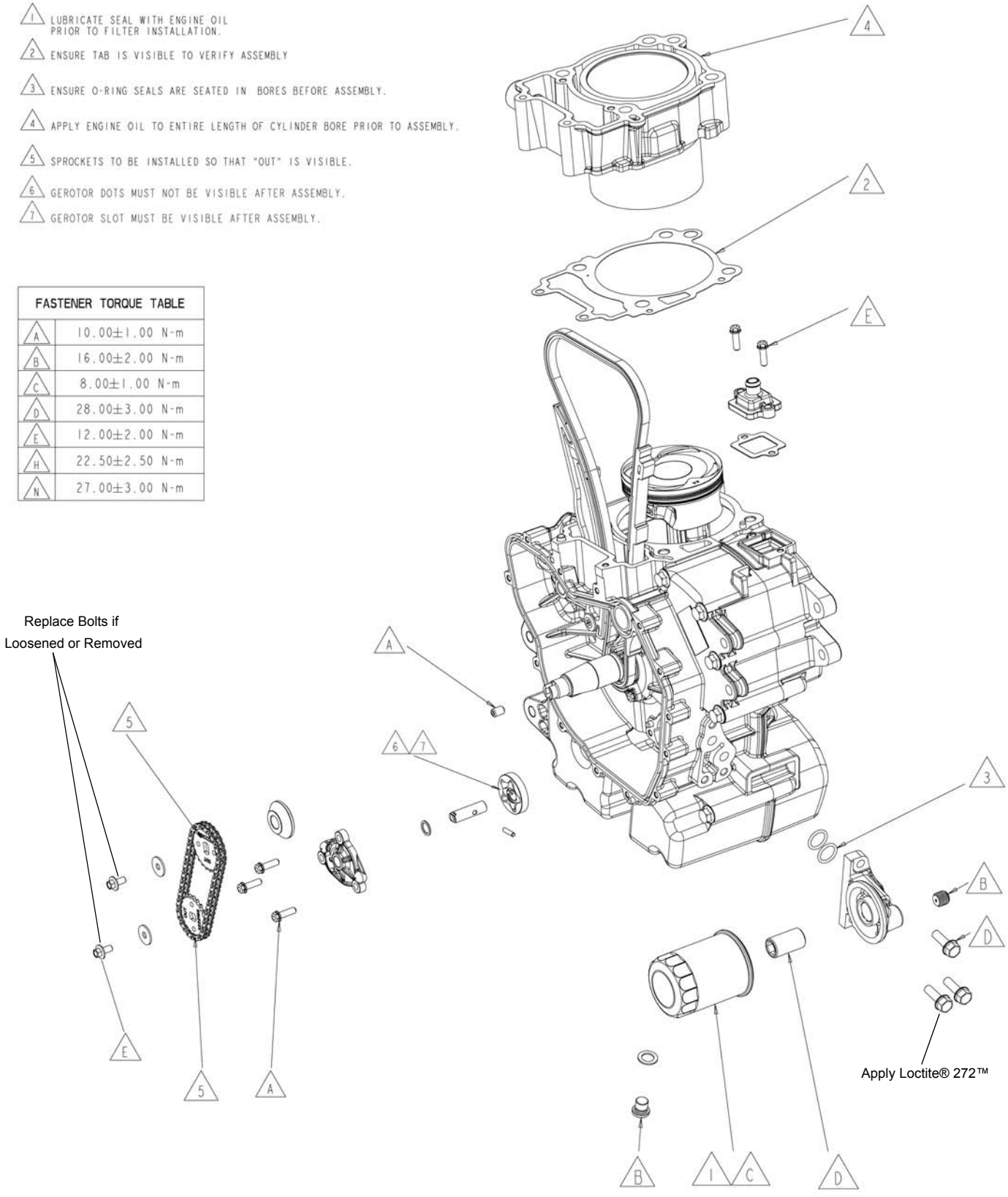


CRANKCASE
SEALANT PATH

Cylinder / Oil Filter / Oil Pump / Breather

1. LUBRICATE SEAL WITH ENGINE OIL PRIOR TO FILTER INSTALLATION.
2. ENSURE TAB IS VISIBLE TO VERIFY ASSEMBLY
3. ENSURE O-RING SEALS ARE SEATED IN BORES BEFORE ASSEMBLY.
4. APPLY ENGINE OIL TO ENTIRE LENGTH OF CYLINDER BORE PRIOR TO ASSEMBLY.
5. SPROCKETS TO BE INSTALLED SO THAT "OUT" IS VISIBLE.
6. GEROTOR DOTS MUST NOT BE VISIBLE AFTER ASSEMBLY.
7. GEROTOR SLOT MUST BE VISIBLE AFTER ASSEMBLY.

FASTENER TORQUE TABLE	
A	10.00±1.00 N-m
B	16.00±2.00 N-m
C	8.00±1.00 N-m
D	28.00±3.00 N-m
E	12.00±2.00 N-m
H	22.50±2.50 N-m
N	27.00±3.00 N-m



Camshafts / Cylinder Head / Flywheel / Idler Gears / Stator Cover

2 ENSURE TAB IS VISIBLE TO VERIFY ASSEMBLY.

3 TORQUE IN SEQUENCE SHOWN IN STATOR COVER VIEW.

4 THE MOUNTING SURFACE ON BOTH THE CRANKSHAFT AND FLYWHEEL SHOULD BE FREE FROM OIL OR GREASE.

5 TORQUE IN SEQUENCE SHOWN FOR CYLINDER HEAD.
STEP 1: TORQUE IN SEQUENCE TO 28.0±3.0 N-m
STEP 2: TORQUE IN SEQUENCETO 35.0±3.5 N-m
STEP 3: TORQUE IN SEQUENCE TO 180 DEGREES.

6 TORQUE IN SEQUENCE SHOWN FOR CAM CARRIERS.

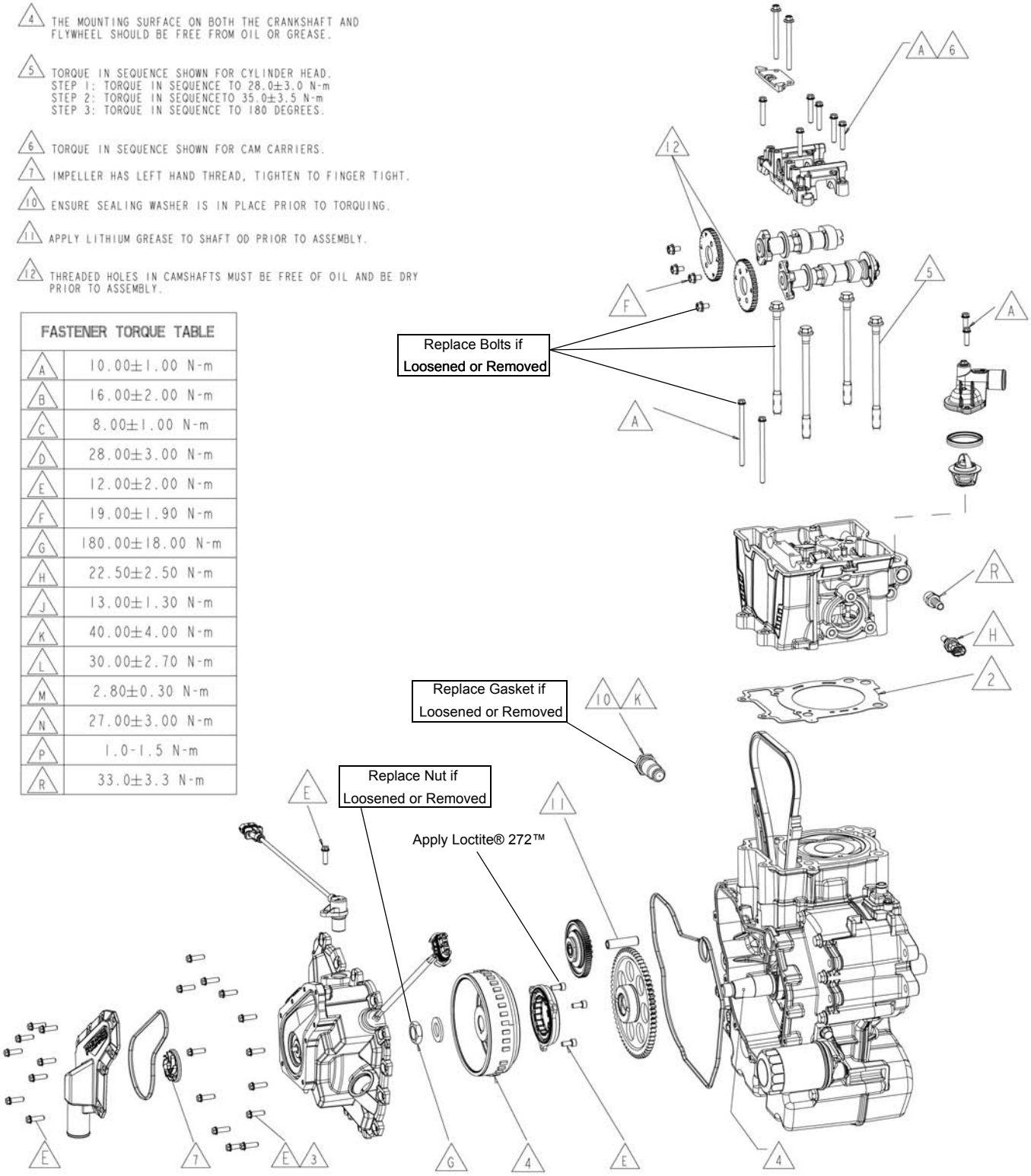
7 IMPELLER HAS LEFT HAND THREAD, TIGHTEN TO FINGER TIGHT.

10 ENSURE SEALING WASHER IS IN PLACE PRIOR TO TORQUING.

11 APPLY LITHIUM GREASE TO SHAFT OD PRIOR TO ASSEMBLY.

12 THREADED HOLES IN CAMSHAFTS MUST BE FREE OF OIL AND BE DRY PRIOR TO ASSEMBLY.

FASTENER TORQUE TABLE	
A	10.00±1.00 N-m
B	16.00±2.00 N-m
C	8.00±1.00 N-m
D	28.00±3.00 N-m
E	12.00±2.00 N-m
F	19.00±1.90 N-m
G	180.00±18.00 N-m
H	22.50±2.50 N-m
J	13.00±1.30 N-m
K	40.00±4.00 N-m
L	30.00±2.70 N-m
M	2.80±0.30 N-m
N	27.00±3.00 N-m
P	1.0-1.5 N-m
R	33.0±3.3 N-m



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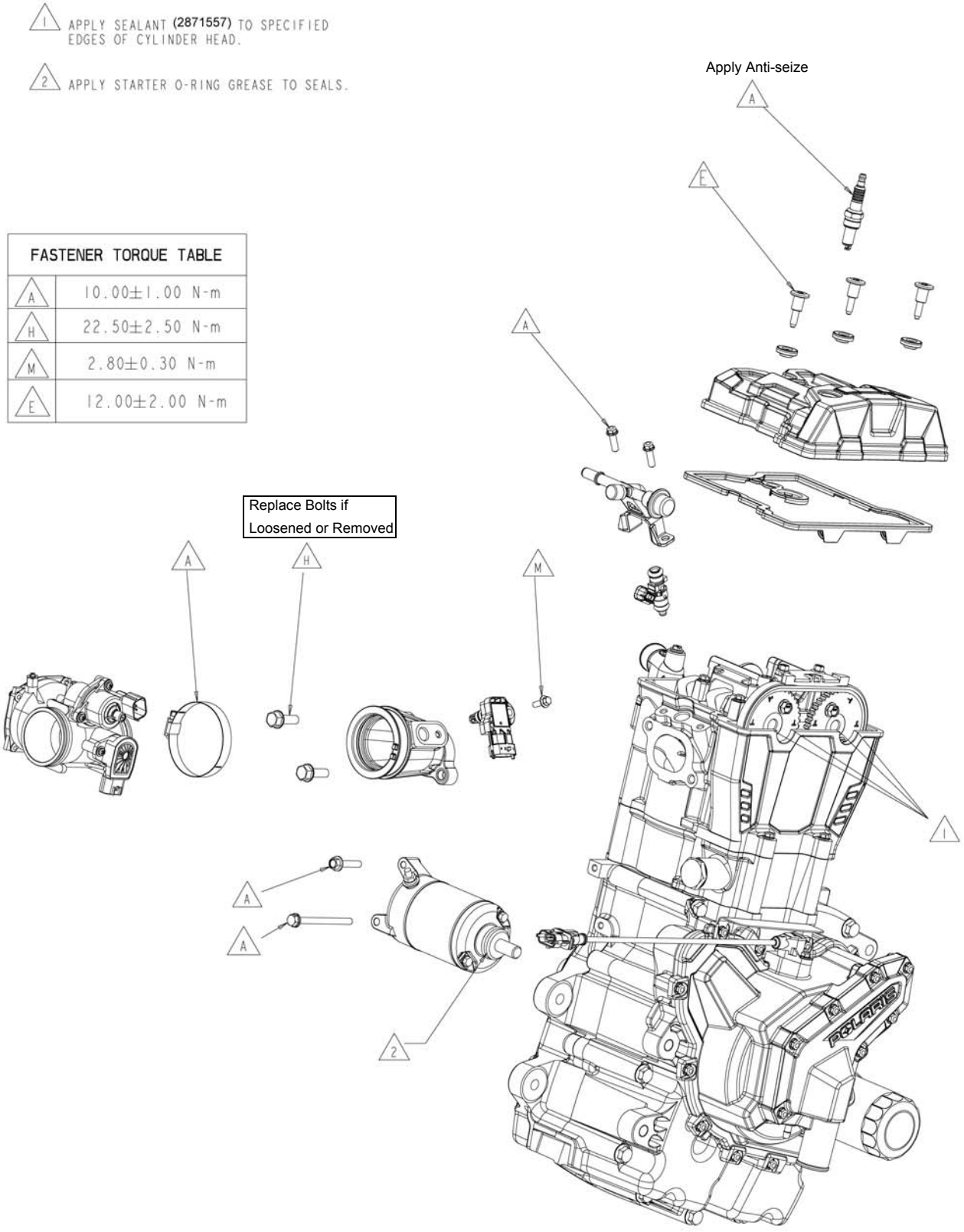
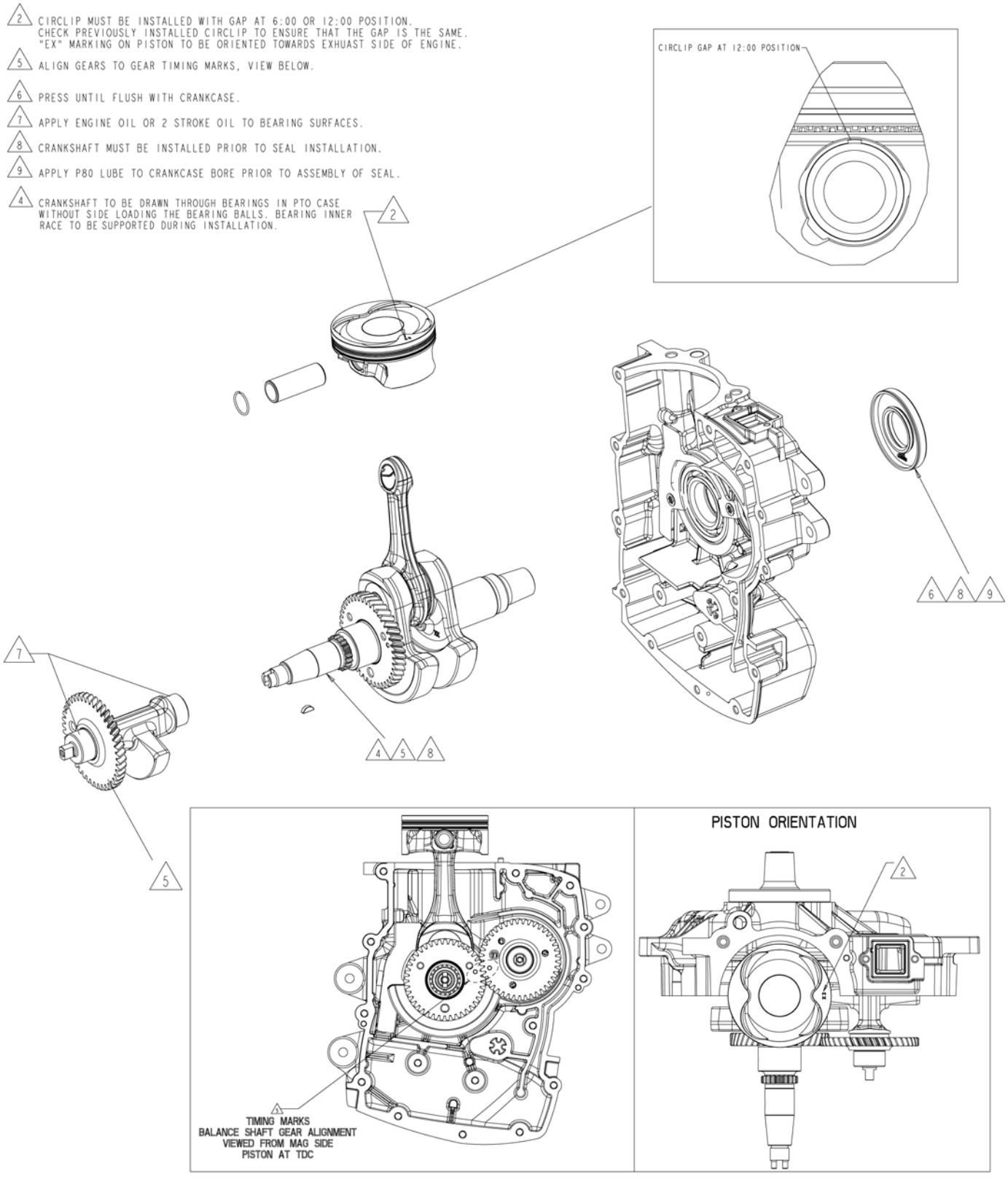
Spark Plugs / Starter / Throttle Body / Valve Cover

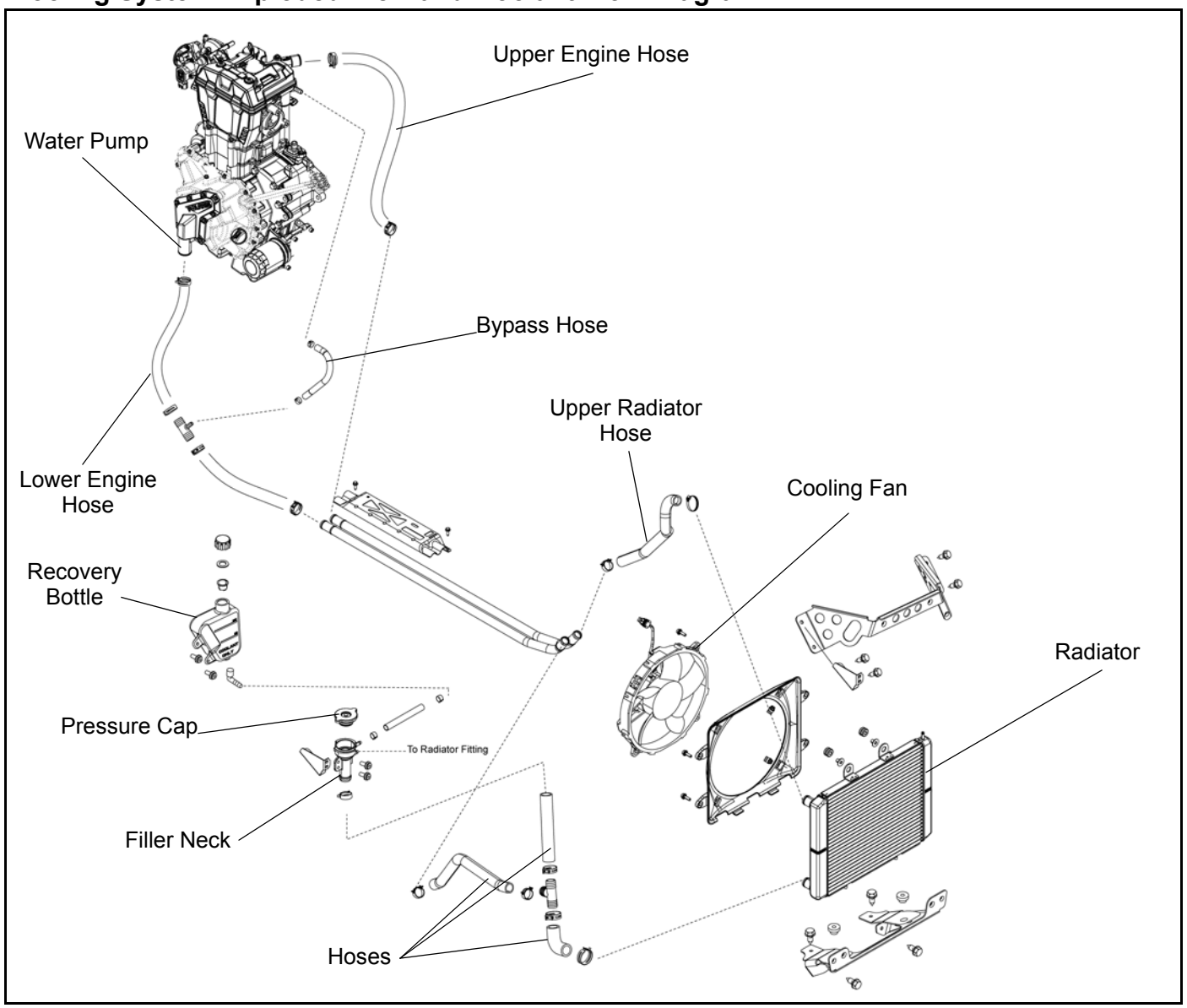


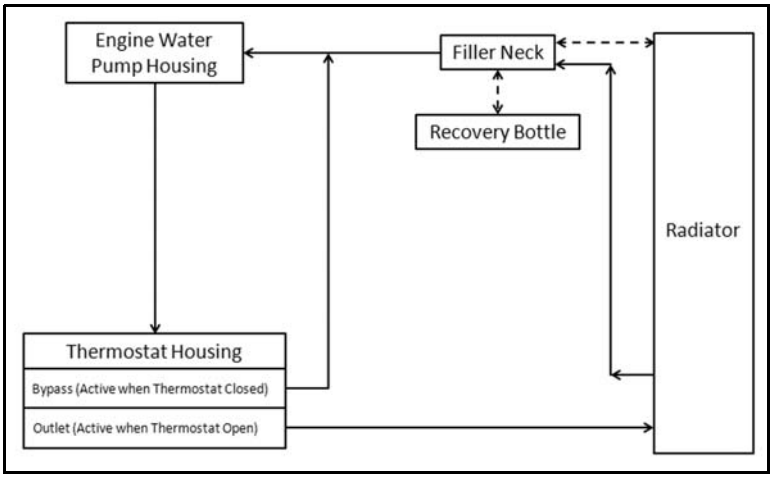
Piston / Crankshaft / Balance Shaft



ENGINE COOLING SYSTEM

Cooling System Exploded View and Coolant Flow Diagram





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Cooling System Specifications

Condition	Coolant Temperature °F (°C)
Room Temperature	68° F (20° C)
Thermostat Open	180° F (82° C)
Fan Off	192° F (89° C)
Fan On	198° F (92° C)
Thermostat Full Open Lift	203° F (95° C)
Engine Temperature Overheat Indicator	233° F (112° C)
Engine Protection Ignition Misfire	236° F (113° C)
Engine Protection Shutdown	257° F (125° C)

Item	Specification
Cooling System Capacity	4.25 qts. (4 l)
Pressure Cap Relief	13 PSI

Polaris Premium Antifreeze
2871534 - Quart
2871323 - Gallon

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.

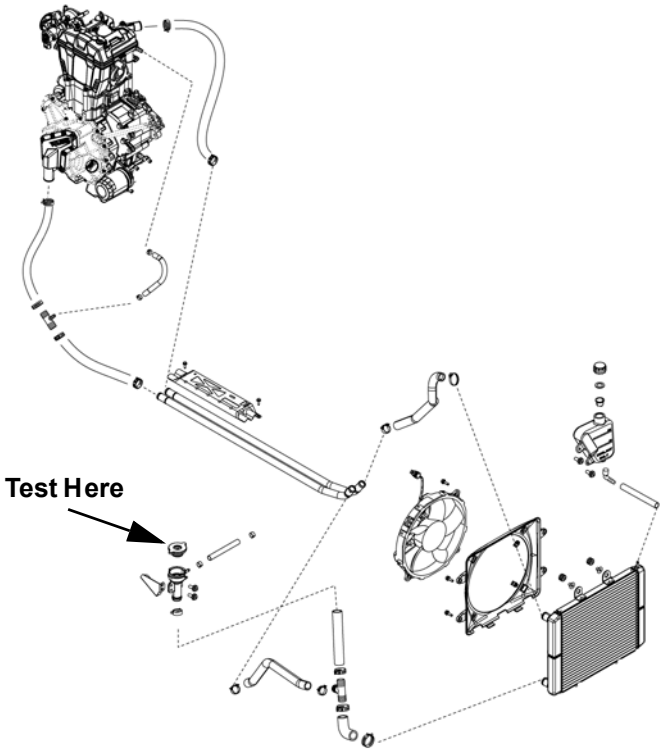
CAUTION: Using tap water in the cooling system will lead to a buildup of deposits which may restrict coolant flow and reduce heat dissipation, resulting in possible engine damage. Polaris Premium 60/40 Antifreeze/Coolant is recommended for use in all cooling systems and comes pre-mixed, ready to use.

Cooling System Pressure Test

1. Remove the hood from the front cab.

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

2. Remove pressure cap and pressure test the cooling system using a commercially available pressure tester.



3. The system must maintain 10 psi for five minutes or longer. If pressure loss is evident within five minutes, check the filler neck, radiator, hoses, clamps and water pump weep hole for leakage.

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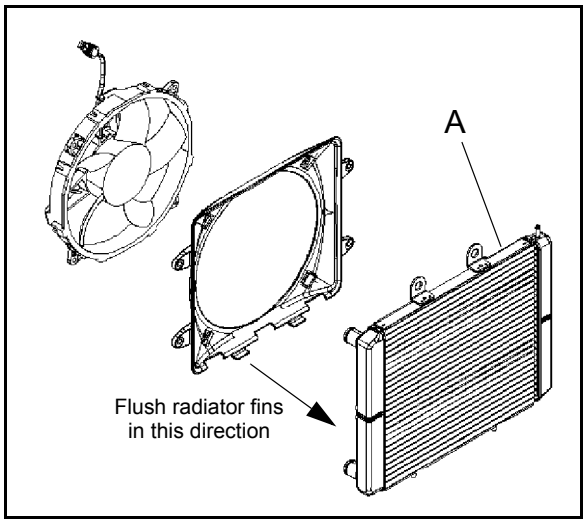
Pressure Cap Test

1. Remove the hood from the front cab (see "WARNING" under "Cooling System Pressure Test").
2. Remove pressure cap (A) and test using a pressure cap tester (commercially available).

3. The pressure cap relief pressure is 13 psi. Replace cap if it does not meet this specification.

Radiator

1. Check radiator (A) air passages for restrictions or damage.



2. Carefully straighten any bent radiator fins.
3. Remove any obstructions with compressed air or low pressure water.

⚠ CAUTION

Washing the vehicle with a high-pressure washer could damage the radiator fins and impair the radiators effectiveness. Use of a high-pressure washer is not recommended.

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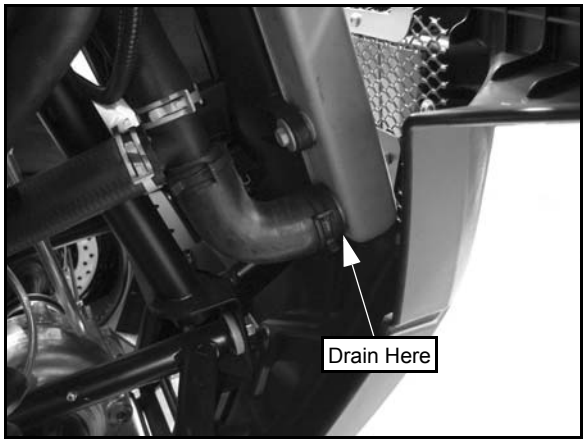
Coolant Drain / Radiator Removal

Coolant Drain

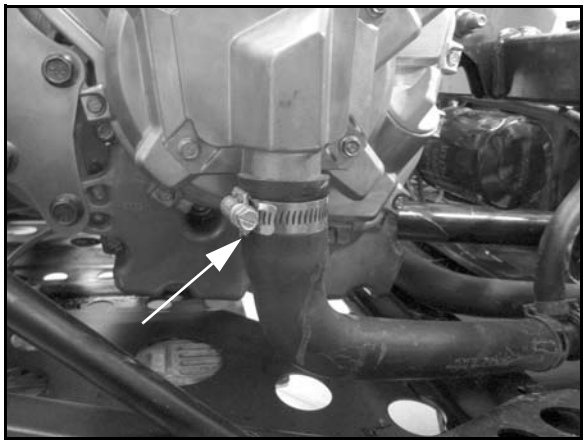
1. Remove the hood from the front cab.

> **WARNING**
>
> Never drain the coolant when the engine and radiator are warm or hot. Hot coolant can cause severe burns. Allow engine and radiator to cool.

2. Slowly remove the pressure cap to relieve any cooling system pressure.
3. Place a suitable drain pan underneath the radiator fitting on the front right-hand side of the vehicle.
4. Drain the coolant from the radiator by removing the lower coolant hose from the radiator as shown. Properly dispose of the coolant.



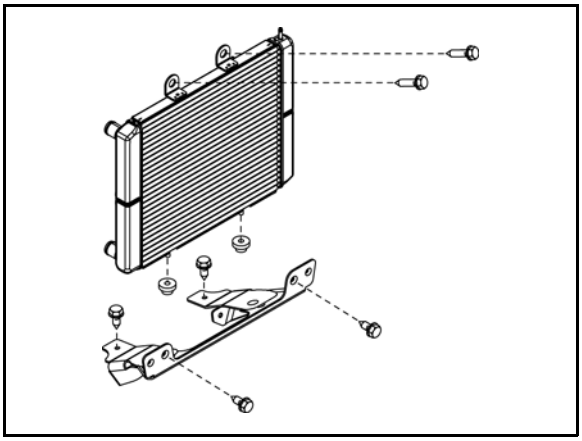
5. Allow coolant to completely drain.
6. Place a suitable drain pan underneath the lower engine hose on the right-hand rear side of the vehicle.



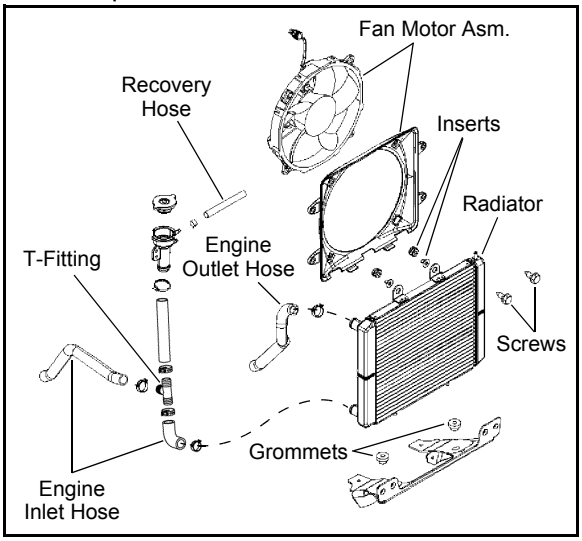
7. Remove the hose and completely drain the engine.

Radiator Removal

1. Remove the front bumper (see Chapter 5).
2. Remove the upper engine outlet hose and recovery hose from the top of the radiator.
3. Remove the (2) upper radiator retaining bolts and the (4) bolts retaining the lower radiator mount bracket. Remove the bracket from the frame.



4. Disconnect the fan motor and remove the radiator from the vehicle. Take care not to damage the cooling fins.
5. Reverse procedure for installation.



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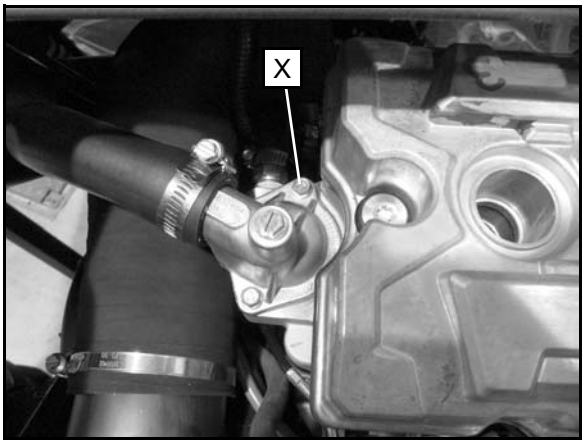
Thermostat Replacement

1. Remove the hood from the front cab.

> **WARNING**
>
> The cooling system is under pressure and serious burns may result.
> Allow the engine to cool before servicing.

2. Remove the pressure cap to relieve any system pressure (see “Pressure Cap Test”).
3. Drain coolant to a level below the thermostat housing.
4. Remove the cargo box access panel.
5. Remove the spark plug wire from the engine.
6. Remove the (2) bolts (X) retaining the thermostat cover.



7. Lift the cover from the engine and remove the thermostat.
8. Reverse this procedure for installation. Replace thermostat seal if worn or damaged. Torque thermostat cover bolts to specification.

> **= T**
>
> Thermostat Cover Bolts:
> **7.5 ft. lbs. (10 Nm)**

9. Be sure to properly fill and bleed cooling system as outlined in this chapter.

Cooling System Bleeding Procedure

> **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.

> **CAUTION**
>
> Use caution when performing these procedures. Coolant may be hot and may cause severe injury or burns.

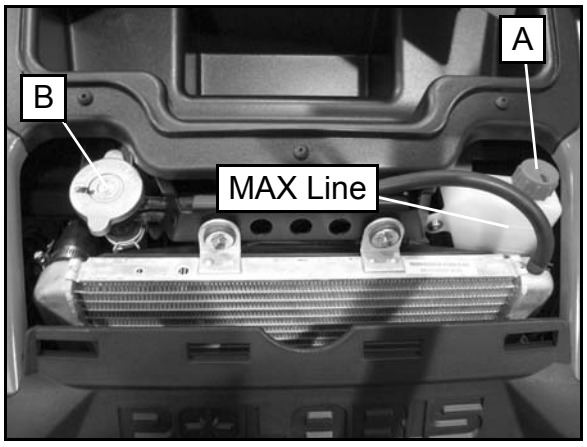
NOTE: If the coolant level is LOW in the radiator, or if there are leaks in the system, the coolant system will not draw coolant from the reservoir tank.

NOTE: It may be necessary to safely raise the front of the vehicle 12” (30 cm) to bleed the cooling system.

1. Allow engine and cooling system to completely cool.

> **CAUTION**
>
> Be sure the engine has cooled and no pressure is built up in the cooling system before removing the pressure cap. The coolant may be hot and could cause severe injury or burns.

2. Remove the hood.
3. Remove the recovery bottle cap (A) and fill the bottle to the MAX line.



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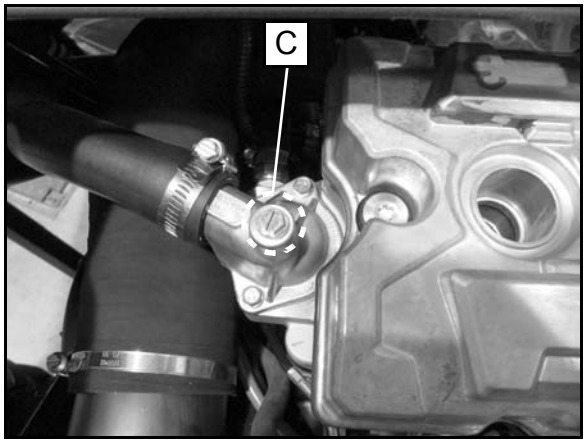
4. Remove the pressure cap (B) and add the necessary amount of Polaris Premium Antifreeze to the radiator filler neck.

5. Remove the cargo box access cover to gain access to the coolant bleed screw that is on top of the thermostat housing.

6. Open the bleed screw (C) to allow any trapped air to escape.

7. Fill the radiator until a steady stream of coolant begins to drain out of the bleed screw (C).



8. Tighten the bleed screw to specification, to prevent coolant and properly install the pressure cap.

= T
Coolant Bleed Screw: **6 ft. lbs. (8 Nm)**

9. Start the engine and allow it to idle until the coolant fan has cycled.

10. Allow engine and cooling system to completely cool down (see CAUTION).

11. Remove the pressure cap. Add the necessary amount of Polaris Premium Antifreeze to the radiator filler neck.

12. Open the bleed screw to allow any trapped air to escape. Close the bleed screw once a steady stream of coolant begins to drain out.

13. Tighten the bleed screw to specification, to prevent coolant and properly install the pressure cap.

= T
Coolant Bleed Screw: **6 ft. lbs. (8 Nm)**

14. Fill the recovery bottle to the MAX line.

15. Reinstall the hood.

16. Reinstall cargo box access cover.

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WATER PUMP SERVICE

Water Pump Cover and Impeller Service (Stator Cover Remains on Engine)

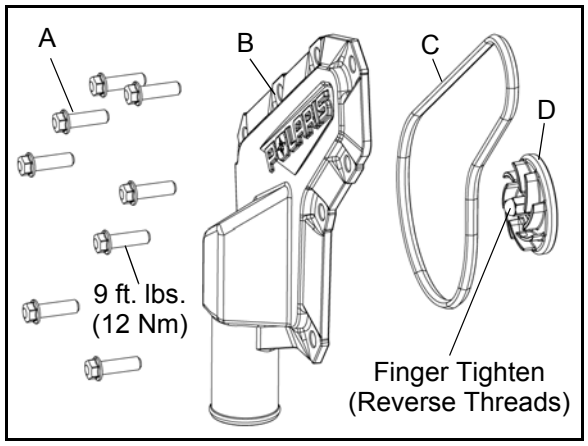
NOTE: The water pump cover, gasket and impeller can be serviced with the stator cover installed on the engine.

1. Allow engine and cooling system to completely cool.

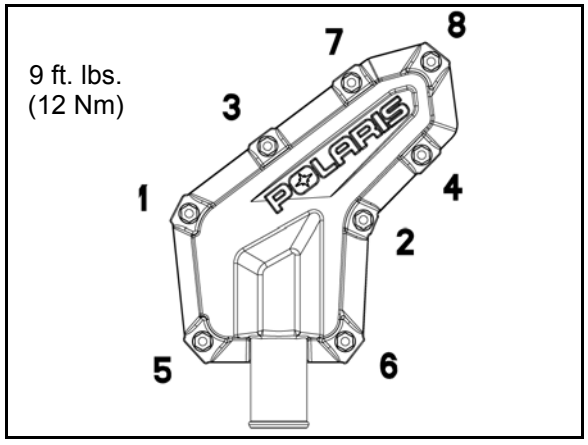
> **CAUTION**
>
> Be sure the engine has cooled and no pressure is built up in the cooling system before removing the pressure cap. The coolant may be hot and could cause severe injury or burns.

2. Remove both seats and the engine service panel.
3. Disconnect the (-) negative battery cable.
4. Remove all debris and thoroughly clean water pump area and right-hand side of engine block.
5. Remove the hood.
6. Remove the pressure cap from the filler neck.
7. Completely drain cooling system and engine as outlined in this chapter.
8. Raise and safely support the vehicle. Remove the right-hand rear wheel.
9. Remove the (8) bolts (A) attaching the water pump cover to the stator cover.
10. Remove the water pump cover (B) and water pump cover gasket (C). Discard the water pump gasket (C).
11. Using an 8 mm socket, remove the water pump impeller (D).

NOTE: The water pump impeller (D) uses reverse (LH) threads.



12. Inspect the water pump cover and impeller for damage. Replace as necessary.
13. Follow this procedure in reverse to assemble the water pump impeller and cover. Always use a ***new*** water pump cover gasket. Torque all fasteners in sequence to specification.



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Water Pump Cover Fastener Torque:
9 ft. lbs. (12 Nm)

14. Fill and bleed cooling system as outlined in this chapter.

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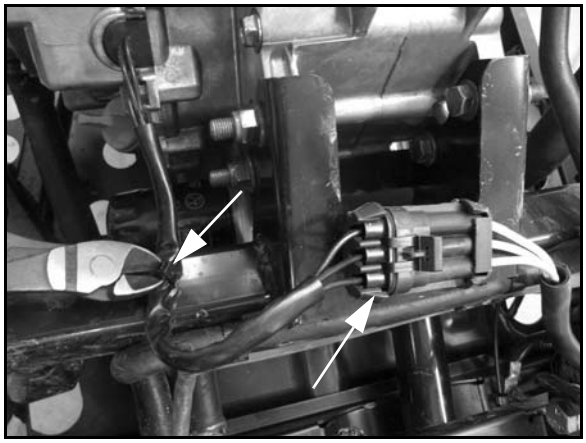
Water Pump Mechanical Seal / Oil Seal Replacement

NOTE: The stator cover must be removed from the engine to service the water pump drive shaft, oil seal, mechanical seal and bearing.

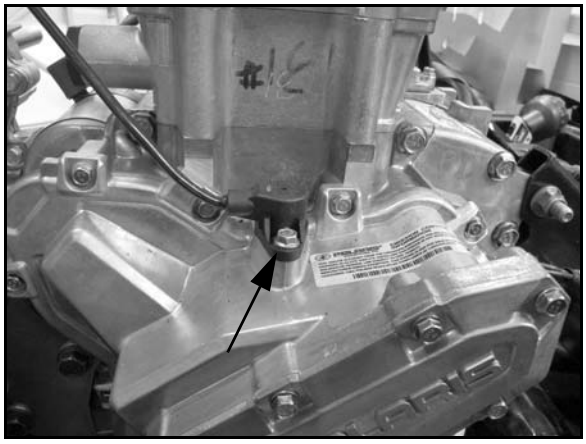
1. Allow engine and cooling system to completely cool.

> **⚠ CAUTION**
>
> Be sure the engine has cooled and no pressure is built up in the cooling system before removing the pressure cap. The coolant may be hot and could cause severe injury or burns.

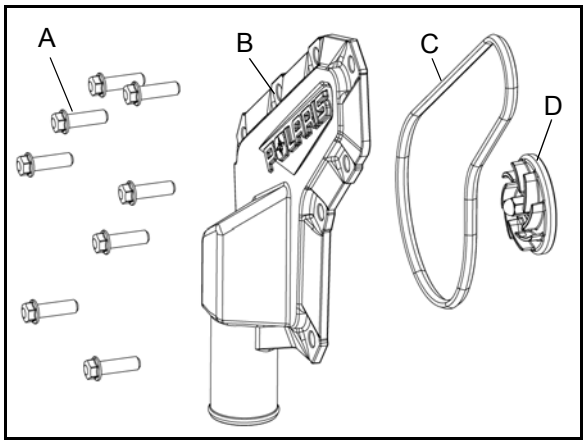
2. Remove both seats and the engine service panel.
3. Disconnect the (-) negative battery cable.
4. Remove all debris and thoroughly clean water pump area and right-hand side of engine block.
5. Remove the hood.
6. Remove the pressure cap from the filler neck.
7. Completely drain cooling system and engine as outlined in this chapter.
8. Raise and safely support the vehicle. Remove the right-hand rear wheel.
9. Disconnect the stator wire connector and cut the tie strap securing the wiring to the front engine mount bracket.



10. Remove the CPS sensor from the stator cover on the right-hand side of the engine. Inspect CPS O-ring and replace if needed.



11. Remove the oil dipstick.
12. Remove the (8) bolts (A) retaining the water pump cover to the stator cover.
13. Remove the water pump cover (B) and water pump cover gasket (C). Discard the water pump gasket (C).



14. Remove the water pump impeller (D).

NOTE: The water pump impeller (D) uses reverse (LH) threads.

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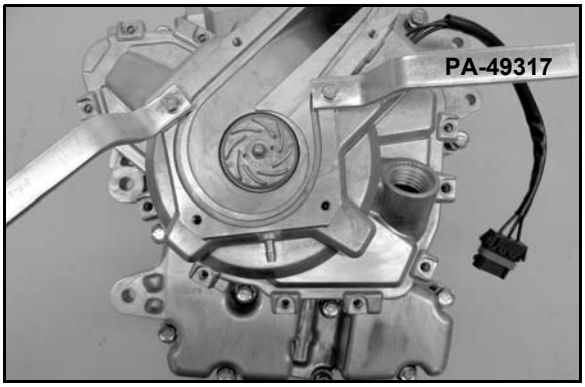
15. Remove the (13) bolts securing the stator cover to the engine.

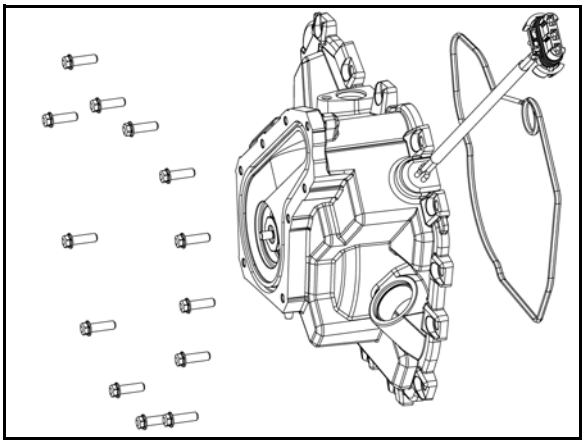
16. If needed, install the stator cover removal handle tool (PA-49317) to the water pump cover bolt holes to aid in stator cover removal.



⚠ CAUTION

The flywheel contains powerful magnets. Use caution when removing the stator cover. DO NOT place fingers between cover and crankcase at any time during the removal process or injury could result.

17. Remove and discard the stator cover gasket.

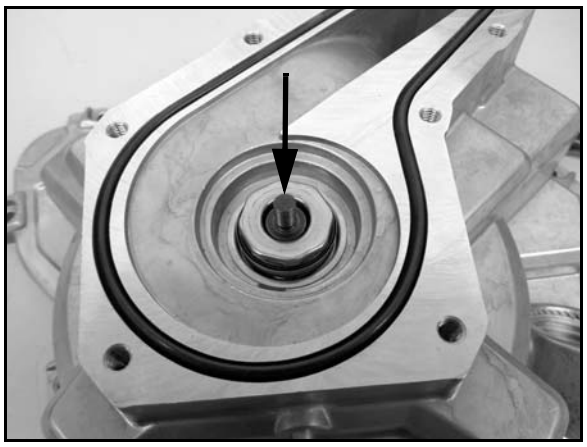


⚠ CAUTION

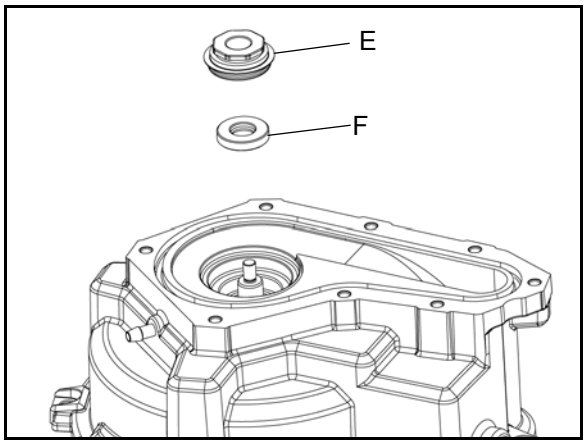
Be sure engine coolant does not contaminate the engine oil during stator cover service.

18. Bring the stator cover assembly to a clean work bench.

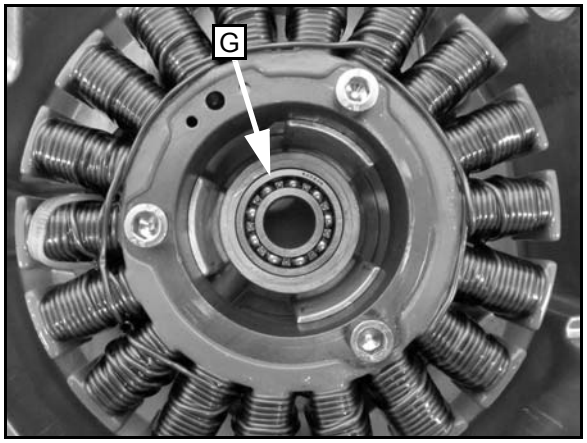
19. Using a brass drift, remove the water pump drive shaft. Be sure not to damage the threads. Inspect shaft for wear or damage, replace if necessary.



20. Extract the mechanical seal (E) and the oil seal (F) from the stator cover.



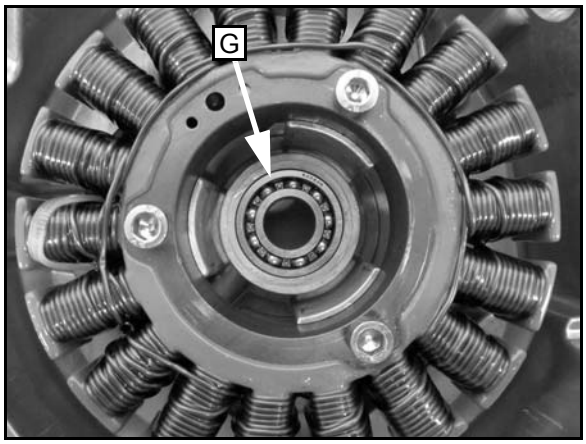
21. Press out the water pump drive shaft bearing (G) from the stator cover. Discard bearing and replace with new.



Water Pump Assembly

1. Thoroughly clean the stator cover.

2. Press in a ***new*** water pump drive shaft bearing (G) until it is fully seated in the cover.

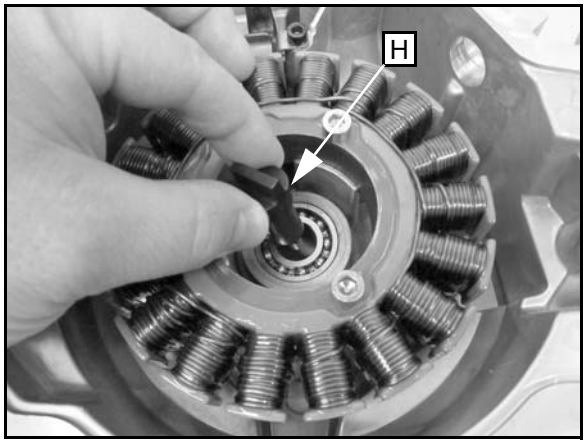


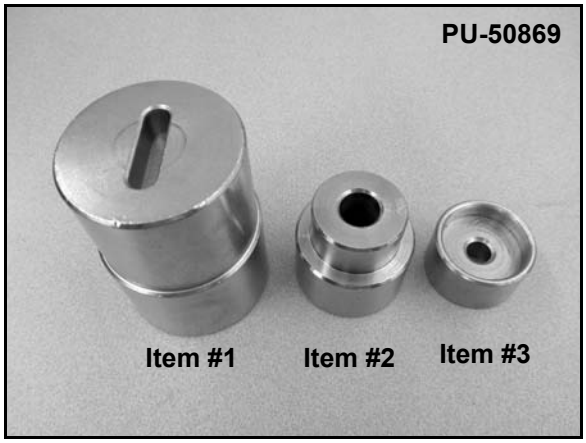
⚠ CAUTION

Be sure bearing is fully seated in cover orsevere engine damage may result.

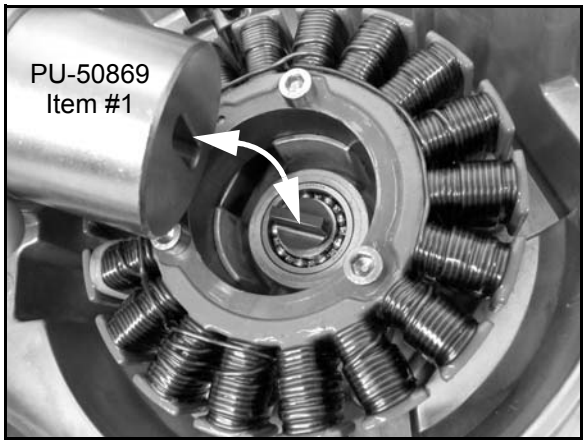
3. Clean and de-grease the water pump drive shaft (H).

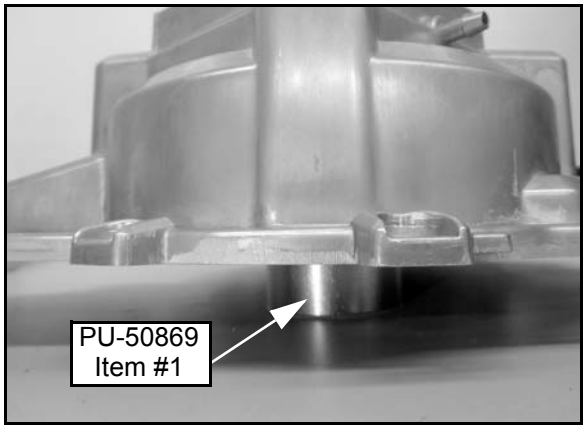
4. Press in th e wa ter pu mp dr ive shaft (H) into the bearing using PU-50869 Item #1.





5. Install the water pump drive shaft ho lding tool (Item #1) in kit PU-50869. Hold the tool in position and flip the as sembly u p-side-down so the spe cial tool PU-50869 is supporting the assembly.





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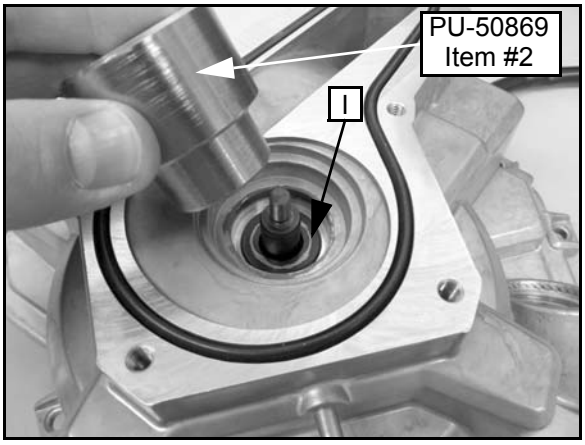
6. Lubricate the ***new*** water pump oil seal with clean engine oil.

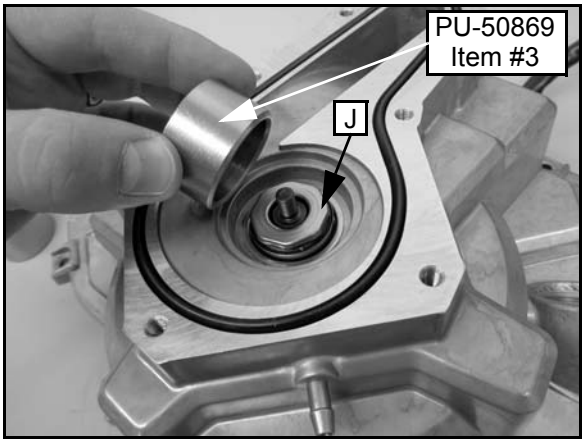
7. Use the water pump oil seal installation tool in kit PU-50869 to fully install the ***new*** water pump oil seal (I).



⚠ CAUTION

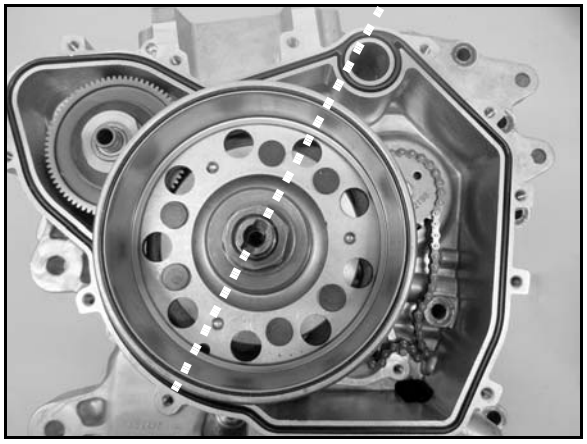
Be sure the oil seal is fully seated in cover or severe engine damage may result

8. Use the water pump mechanical seal installation tool in kit PU-50869 to fully install the ***new*** water pump mechanical seal (J) until it is fully seated in the cover.



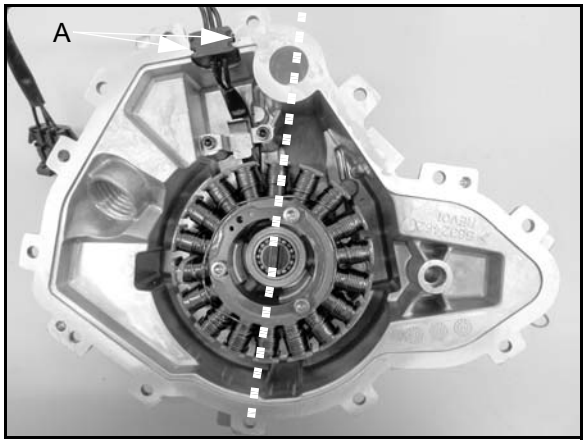
9. Install a ***new*** stator cover gasket onto the engine.

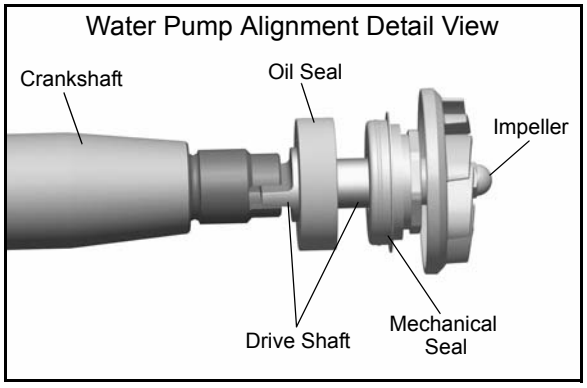
10. Align the water pump drive slot as shown below.



11. Align the water pump drive shaft blade as shown below.

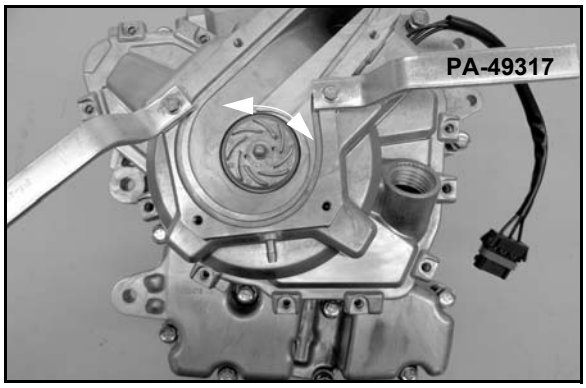
12. Apply a small amount of crankcase sealant to the area indicated below (A).





13. If needed, install the stator cover removal handles tool PA-49317 to the water cover bolt holes to aid in stator cover installation.

14. While installing the stator cover to the engine, slightly rotate the water pump impeller to verify the crankshaft slot and the water pump drive shaft blade are properly engaged. Verify the stator cover is laying flat on the engine case.



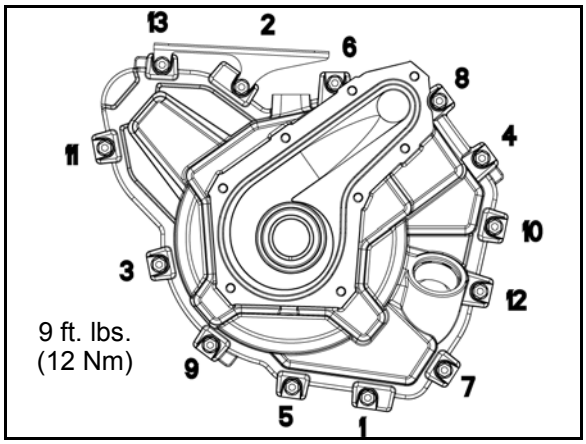
⚠ CAUTION

The flywheel contains powerful magnets. Use caution when installing the stator cover. DO NOT place fingers between cover and crankcase at any time during the removal and installation process or injury could result.

⚠ CAUTION

If the water pump drive shaft blade and slot in the crank shaft are not in alignment during the installation process, severe engine damage may result.

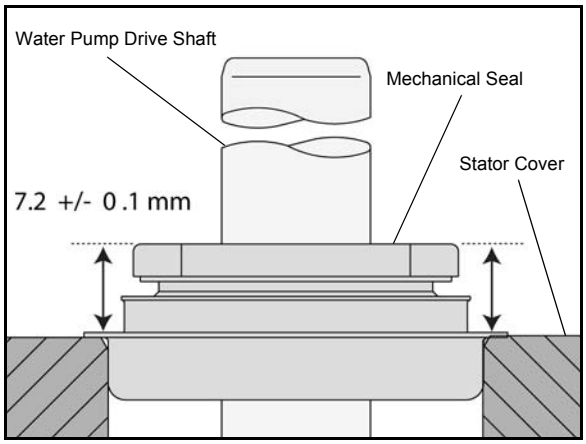
15. Install and torque the stator cover fasteners in sequence to specification.



= T

Stator Cover and Water Pump Cover
9 ft. lbs. (12 Nm)

16. Measure the installed height of the ***new*** mechanical seal as shown below. If not within specification, remove and discard the mechanical seal and properly install new mechanical seal as outlined in this chapter.

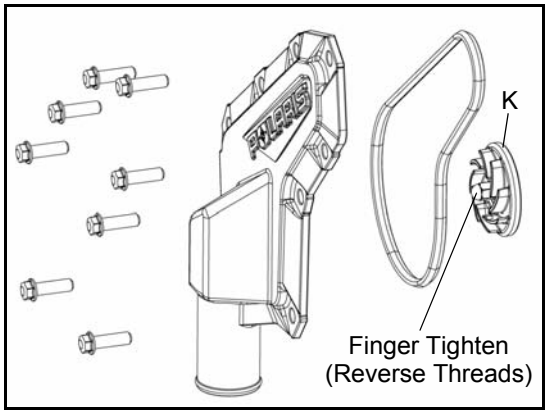


= In. / mm.

Mechanical Water Pump Seal Installed Height:
0.280" - 0.287" (7.2 +/- 0.1 mm)

17. Install the water pump impeller (K). **Finger tighten only.**

NOTE: The water pump impeller (K) uses reverse (LH) threads.



18. Install a **new** water pump cover gasket.

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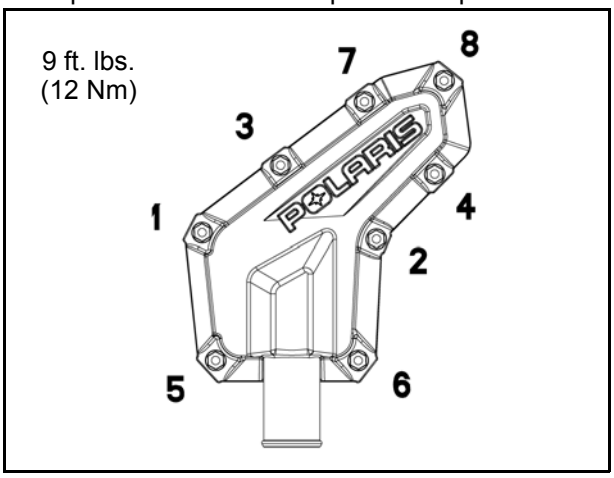
19. Install the water pump cover to the stator cover. Torque all fasteners in sequence to specification.



20. Install the oil dipstick.
21. Install the coolant hose to the water pump cover and tighten hose clamp.
22. Connect the stator wire connector and install a new tie strap securing the wiring to the front engine mount bracket.
23. Install the CPS sensor into the stator cover. Inspect CPS O-ring and replace if needed.
24. Install the right-hand rear wheel and torque the wheel nuts to specification. Safely lower vehicle.

= T
Wheel Nuts: **Steel Wheels: 27 ft. lbs. (37 Nm)** **Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)**

25. Install both seats and the engine service panel.
26. Connect the (-) negative battery cable.
27. If the engine oil was contaminated during this service procedure, perform an engine oil change as outlined in Chapter 2. DO NOT run the engine until coolant has been added to the cooling system.
28. Fill cooling system with recommend coolant and bleed the system of air as outlined in this chapter.
29. Check for leaks.

ENGINE SERVICE

Accessible Engine Components

The following components can be serviced or removed with the engine installed:

- Camshaft
- Camshaft Sprockets
- Cylinder Head and Gaskets
- Cylinder and Gaskets
- Piston and Rings
- Flywheel
- Starter Motor / Idler Gear Asm
- Stator (Alternator)
- Thermostat
- Valve Cover
- Water Pump
- Camshaft Timing Chain and Guides
- Crankshaft Seal (PTO)
- Oil Pump / Oil Pump Sprocket or Chain

The following components require engine removal for service:

- Counterbalance Shaft and Bearings
- Crankshaft and Bearings
- Crankcase
- Oil Pressure Regulator
- Oil Pump Pickup Assembly

Top-End Service (Engine in Chassis)

ALL of the top-end engine components can be serviced while the engine is mounted in the chassis.

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Engine Removal

IMPORTANT: Some engine repair procedures can be performed without removing the engine assembly from the vehicle. Refer to "Accessible Engine Components" for further information.

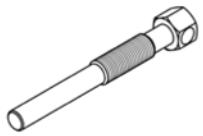
NOTE: The use of an overhead or portable engine hoist is the only recommended method for removing and installing the engine.

NOTE: Have an assistant help guide the engine in and out of the vehicle while using an engine hoist to prevent personal injury or damage to vehicle components.

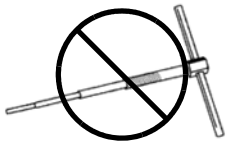
CAUTION

Correct Drive Clutch Puller P/N PA-48595

PA-48595 - Correct Drive Clutch Puller For RZR 570



2872085 - Incorrect Drive Clutch Puller

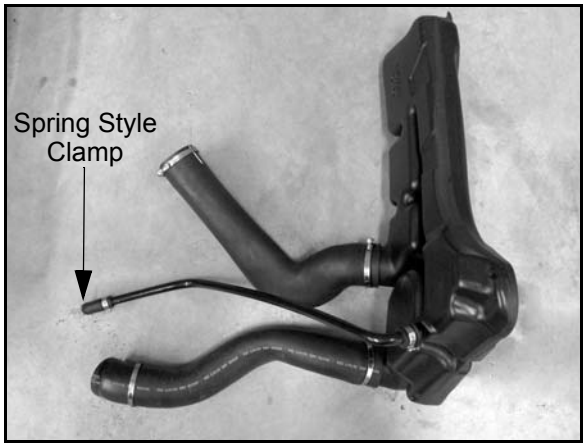


WARNING

Always wear safety glasses and proper shop clothing when performing the procedures in this Service Manual.
Failing to do so may lead to possible injury.

1. If vehicle was recently operated, allow it to cool down before attempting to perform any work.
2. Thoroughly clean the engine and chassis.
3. Drain the engine oil and engine coolant prior to engine removal (see Chapter 2).

4. Remove the seats and engine service panel (see Chapter 5).
5. Disconnect the (-) negative battery cable from the battery.
6. Remove the rear bumper and cargo box assembly (see Chapter 5).
7. Loosen the (3) clamps securing the intake baffle assembly to the air box lid, inner clutch cover and engine crankcase vent. Remove the air intake baffle / intake hoses / engine crankcase vent tube assembly as shown below.



8. Elevate the rear of the vehicle off the ground using a suitable lift and remove the left rear wheel.

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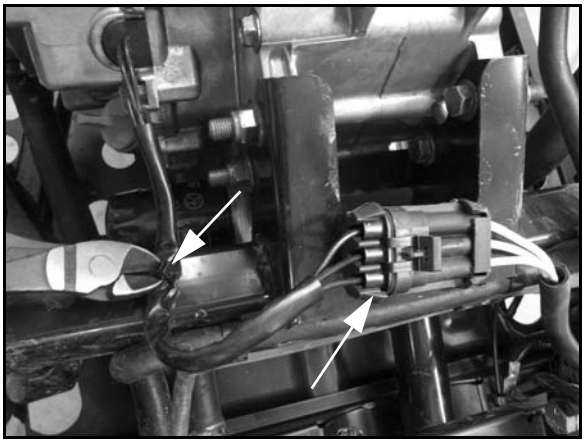
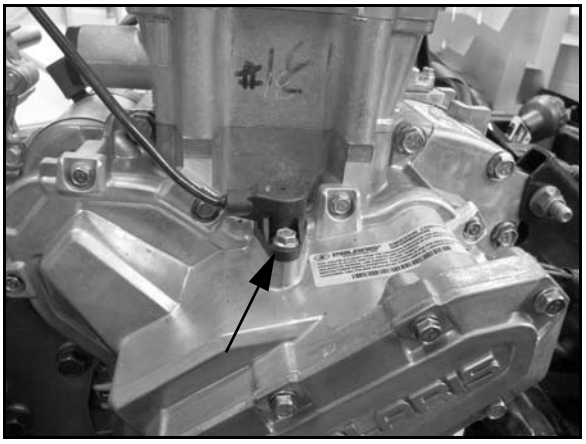
9. Remove the outer clutch cover, drive belt, drive clutch, driven clutch and inner clutch cover (see Chapter 6). Make note of hose and wire routings for reassembly.

IMPORTANT: Be sure to use the correct Drive Clutch Puller (PA-48595) to prevent damage to crankshaft.

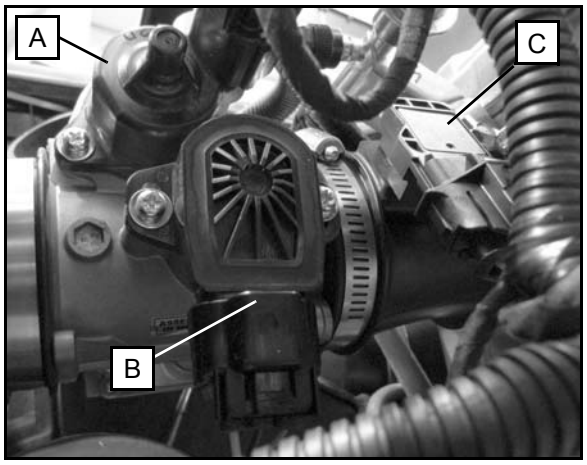
10. Disconnect the stator wire connector and cut the tie strap securing the wiring to the front engine mount bracket. Replace tie strap for engine installation.



11. Remove the CPS sensor from the stator cover on the right-hand side of the engine. Plug CPS hole with clean shop towel. Inspect CPS O-ring and replace if needed.



12. Disconnect the IAC valve (A), TPS (B), T-MAP sensor (C), harness leads from the throttle body.

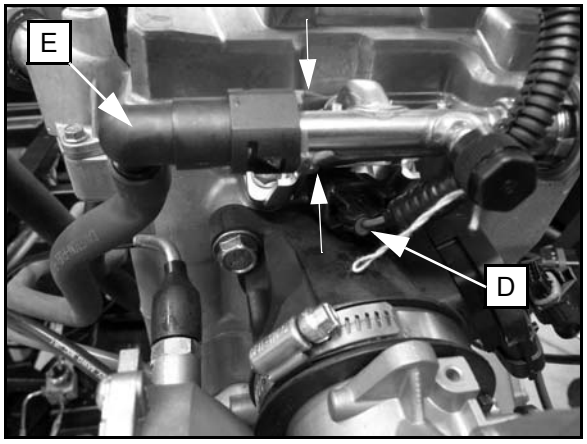


13. Disconnect the fuel injector harness lead (D) from the fuel injector.

14. Properly relieve fuel pressure from the fuel rail.

15. Place a shop to beneath the fuel line quick connector to catch any excess fuel. Disconnect the fuel line (E) from the fuel rail by pressing in on the quick connector tabs.

16. Move fuel line to the left-hand side of the engine compartment. Make note of line routing for installation.



17. Disconnect the ignition coil harness connector and remove the spark plug wire from the engine.

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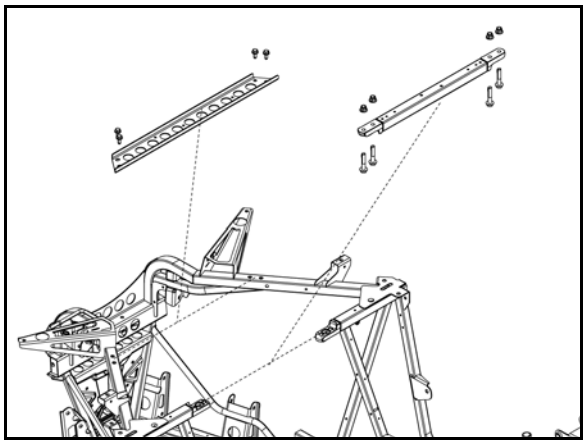
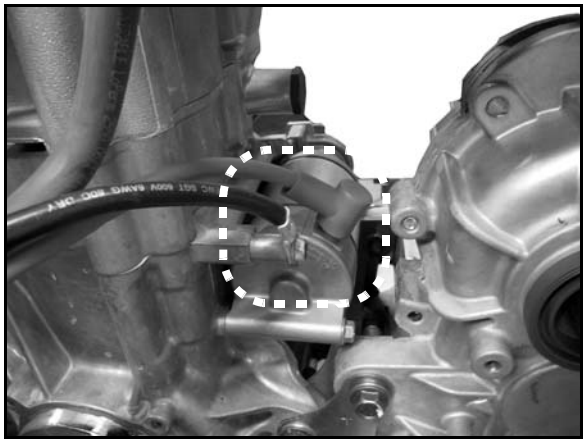
18. Remove the (8) fasteners securing the (2) bolt in braces to the vehicle main frame. Maneuver the braces for engine removal clearance. Note the routing of the transmission breather hose and wire harness.



19. Remove (+) positive cable from the starter motor.

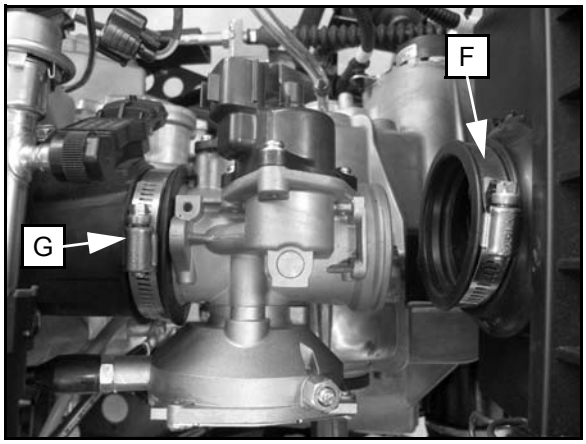
20. If desired, remove the remaining starter motor bolt and remove the starter motor from the engine.

21. Remove (-) negative cable from the starter mounting bolt.



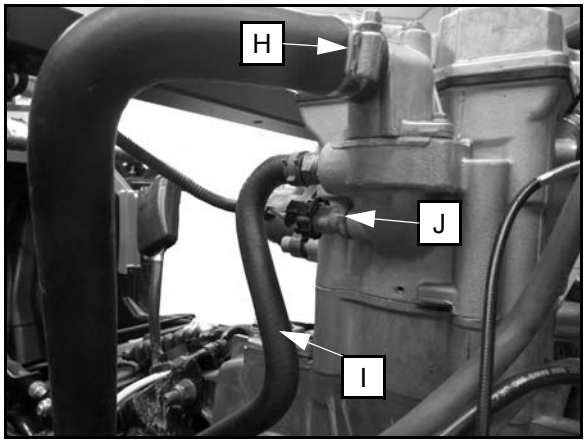
22. Loosen the hose clamp (F) securing the throttle body to the air box. Lift air box up and rearward as an assembly to disengage it from the throttle body.

23. Loosen the hose clamp (G) securing the throttle body to the engine intake boot. Remove throttle body from the engine and wrap it with a clean shop towel. Place throttle body on the left-hand side frame rail area.



IMPORTANT: Be sure dirt and debris do not enter the engine, air box or throttle body. Use clean shop towels to plug engine and air box intake holes.

24. Disconnect the upper engine coolant hose (H), bypass hose (I) and ECT (J) harness connector.



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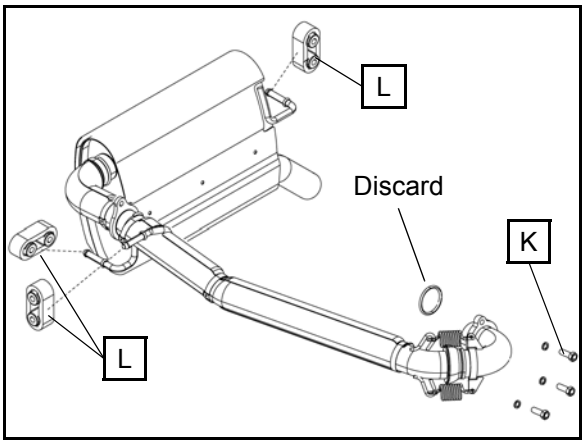
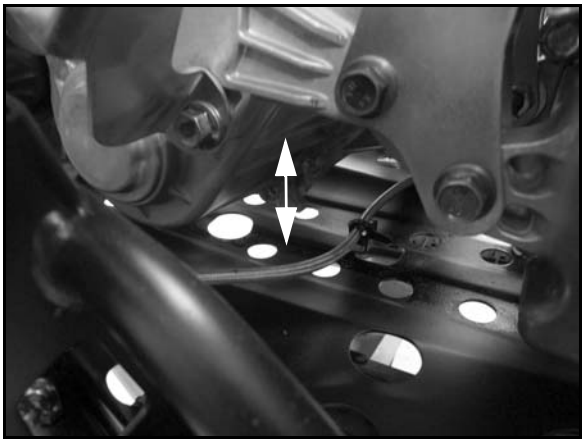
25. Remove the (3) hex bolts (K) securing the exhaust head pipe to the engine. Remove the (3) rubber exhaust hangers (L) securing the exhaust system to the main frame. Discard the exhaust seal and replace with new for reassembly.



26. Maneuver the exhaust system towards the right-hand side of the vehicle to gain engine removal clearance. Removal of the exhaust system from the chassis is not needed.

27. Place a support in-between the main frame and transmission case. Do not pinch brake line.

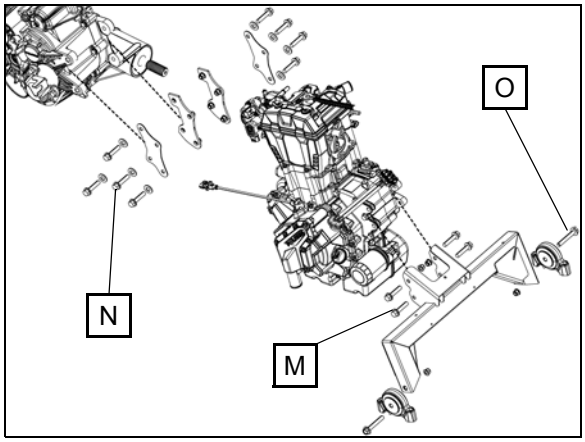


28. Use an overhead or portable engine hoist and suitable engine straps to secure the engine in its current position.

29. Remove the (4) bolts and nuts (M) securing the engine to the front motor mount bracket.

30. Remove the (8) bolts (N) securing the coupler brackets to the engine and transmission.

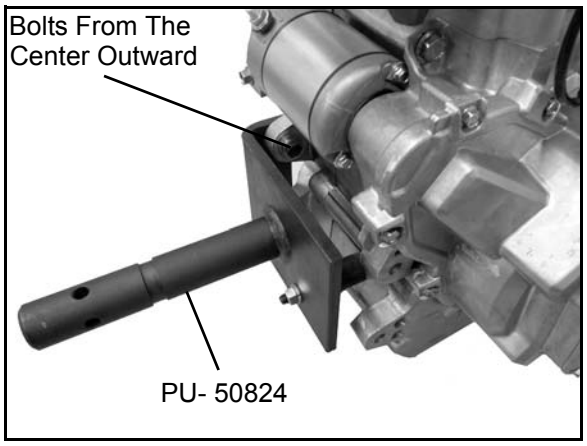
31. Loosen the (2) bolts and nuts (O) so the engine mount bracket can be slightly tilted away from engine.



32. With the help of an assistant and the engine hoist, raise the engine vertically out of the vehicle frame.

NOTE: Have an assistant help guide the engine in and out of the vehicle while using an engine hoist to prevent personal injury or damage to the vehicle components.

33. Install the engine stand adapter (PU-50824) onto the engine PTO side mounting ears as shown below.



34. Select the proper engine stand sleeve adapter and install it onto the engine stand adapter.

    - Sleeve adapter for a 2” bore engine stand: (PU-50625)
    - Sleeve adapter for a 2.375” bore engine stand: (PW-47054)

35. Place engine onto the engine stand (PU- 50624) for service.

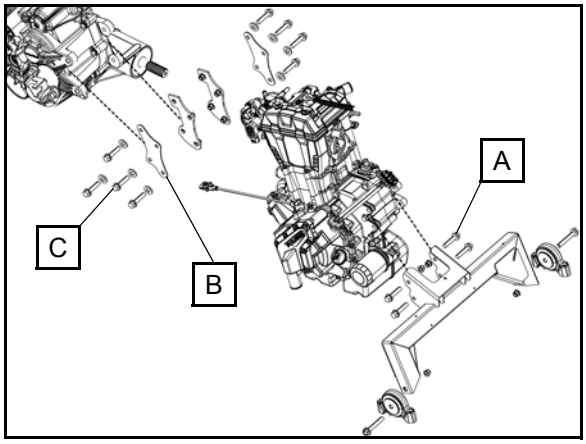
Engine Installation

Use the following procedure to re install the engine assembly.

1. Attach engine with suitable lifting straps to an overhead or portable engine hoist.
2. Remove the engine stand adapter plate.
3. Use the overhead or portable engine hoist and suitable engine straps to lower the engine into the vehicle frame.

NOTE: Have an assistant help guide the engine in and out of the vehicle while using an engine hoist to prevent personal injury or damage to vehicle components.

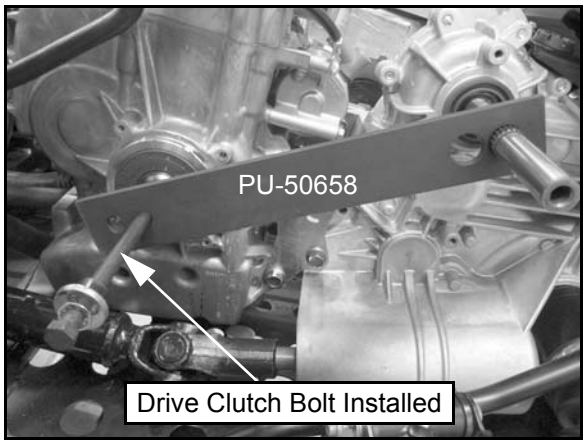
4. By hand, install the (4) front engine mount bolts and nuts (A). Do not tighten at this time.
5. Instal the (4) engine to transmission coupler plates (B) and instal the (8) bolts and washers (C). Do not tighten fasteners at this time.

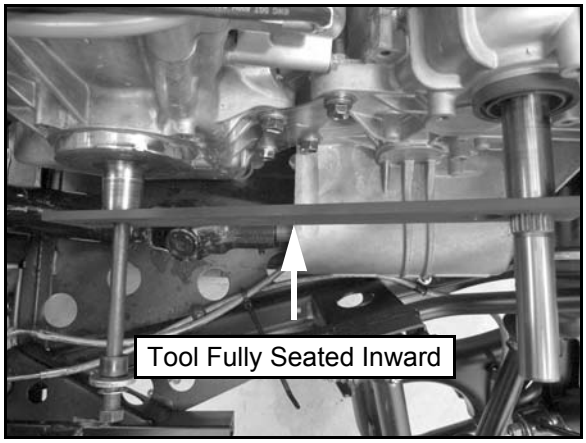


IMPORTANT: DO NOT torque fasteners at this time.

6. Install the Clutch Center Distance Tool (PU-50658) onto the crankshaft and transmission input shaft to properly position the clutch center distance.

The pictures below show the tool (PU-50658) properly installed.





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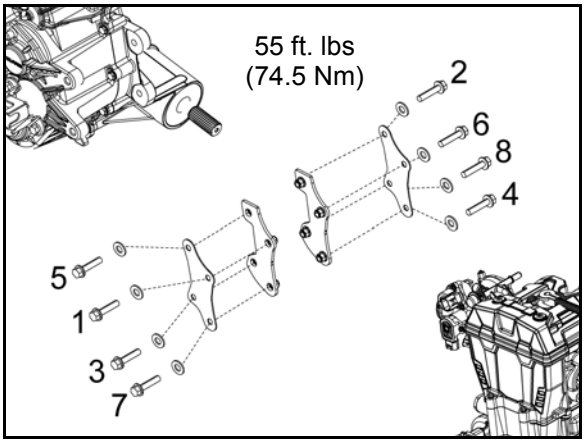
7. In sequence, torque the (8) engine coupler bracket fasteners to specification.

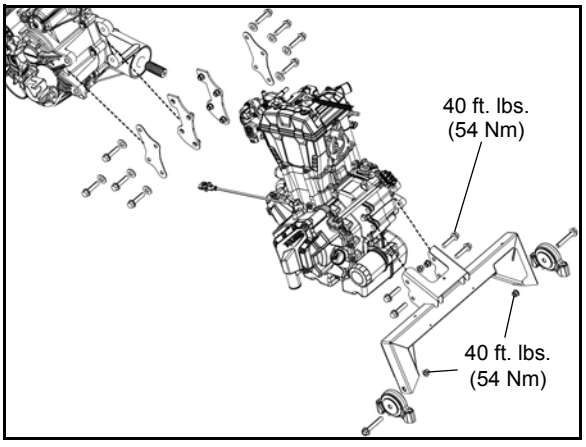


= T
Rear Engine Coupler Fastener (In Sequence): **55 ft. lbs. (74.5 Nm)**

8. In a criss-cross pattern, torque the (4) front engine mount fasteners to specification.

= T
Front Engine Mount Fasteners: **40 ft. lbs. (54 Nm)**

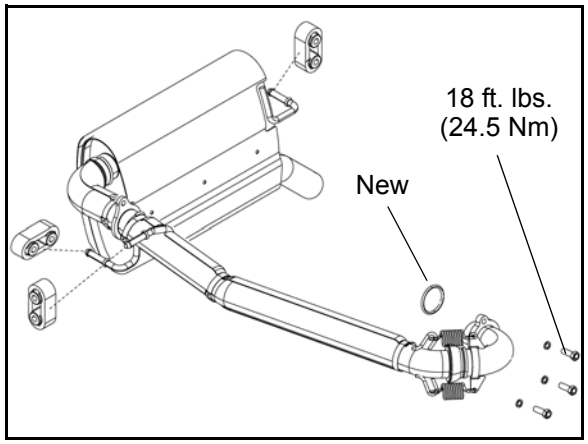
9. Torque the (2) front center isolator bolts to specification.



= T
Isolator Center Bolt: **40 ft. lbs. (54 Nm)**

10. Remove the lifting straps and overhead or portable engine hoist and remove the support previously installed under the transmission case during the engine removal process.

11. Reposition the exhaust system and install the (3) rubber exhaust hangers, new exhaust seal and the (3) head pipe bolts. Torque head pipe bolts to specification.



= T
Exhaust Head Pipe Bolts: **18 ft. lbs. (24.5 Nm)**

12. Install the (3) coolant hoses onto the engine.

13. Install the throttle body and air box. Tighten the hose clamps that secure the throttle body to the intake boot and air box.

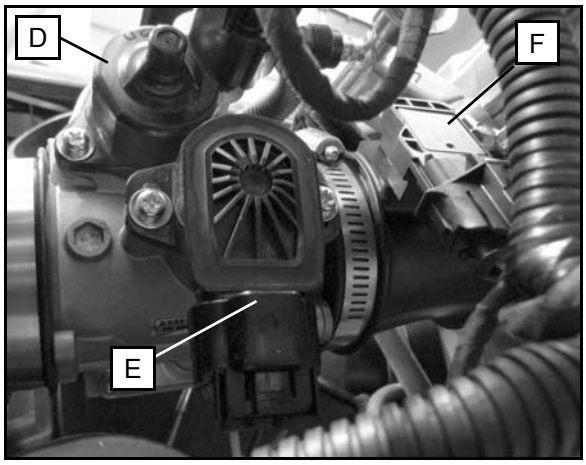
14. Install the lower stater motor bolt through the lower starter motor mounting boss.

15. Instal the starter motor onto the engine.

16. Install the starter motor and battery cables as outlined in Chapter 10.

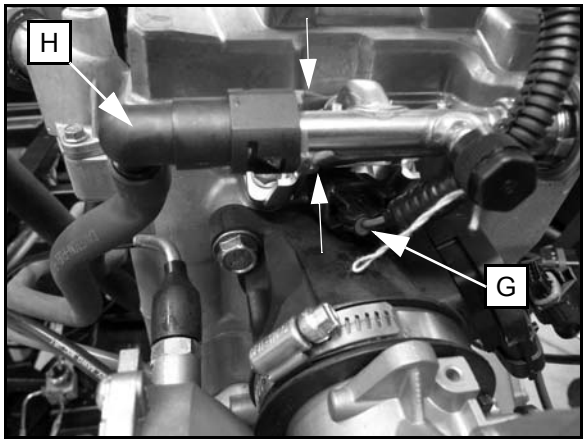
= T
Starter Motor Fastener: **7 ft. lbs. (10 Nm)**

17. Connect the harness leads to the IAC valve (D), TPS (E), T-MAP sensor (F). Verify routing is correct.

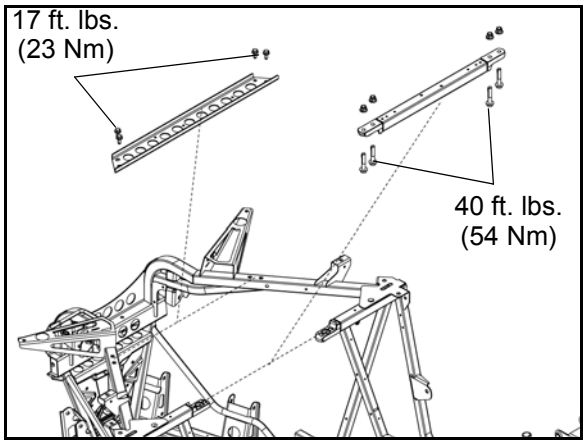


18. Connect the fuel injector harness lead (G) to the fuel injector.

19. Connect the fuel line (H) to the fuel rail.



20. Install the (8) fasteners securing the (2) bolt in braces to the vehicle main frame. Torque fasteners to specification. Be sure the routing of the transmission breather hose and wire harness is correct.



= T
Rear Bolt in Brace Fastener Torque: **17 ft. lbs. (23 Nm)** Front Bolt in Brace Fastener Torque: **40 ft. lbs. (54 Nm)**

21. Connect the ignition coil harness connector and install the spark plug wire.

22. Install the CPS and mounting bolt into the stator cover and torque to specification.

= T
CPS Fastener Torque: **9 ft. lbs. (12 Nm)**

23. Connect the stator wire connector and install a new tie strap to secure the wiring to the front engine mount bracket.

24. Install the inner clutch cover as outlined in chapter 6.

25. Install the drive clutch, driven clutch, belt and outer clutch cover as outlined in Chapter 6. Be sure all hose and wire routings are correct. Torque all fasteners to specification as outlined in Chapter 6.

26. Install the intake baffle assembly. Secure the 3 clamps that attach the assembly to the crankcase vent, air box lid and inner clutch cover.

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27. Install the rear bumper and cargo box assembly as outlined in Chapter 5.

28. Install the left-hand rear wheel and torque wheel nuts to specification.

= T
Wheel Nuts: **Steel Wheels: 27 ft. lbs. (37 Nm)** **Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)**

29. Remove the pressure cap and fill the cooling system through the filler neck with properly mixed anti-freeze / coolant.

30. If the engine oil was completely drained, add approximately 2 quarts (1.9 L) of Polaris PS-4 Plus Synthetic Engine Oil into the crankcase.

31. Install a new oil filter. Lubricate the seal with engine oil prior to installation (see Chapter 2 "Maintenance").

32. Connect the (-) negative battery cable to the battery.

33. Install the engine service panel and seats.

34. Follow the "Cooling System Bleeding Procedure" as outlined in this chapter.

35. Start engine and check for any oil or coolant leaks.

36. Check the engine oil level (see Chapter 2).

37. Refer customer to "Engine Break-In Period" up on returning vehicle to customer.

Engine Break-In Period

The break-in period consists of the first 25 hours of operation, or the time it takes to use 15 gallons (57 liters) of fuel. Careful treatment of a new engine and drive components will result in more efficient performance and longer life for these components.

CAUTION
Use only Polaris PS-4 PLUS Synthetic Engine Oil. 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 fuel which has a minimum pump octane number of 87 = (R+ M)/2.

2. Refer to Chapter 2, "Engine Oil Level". Check oil level indicated on oil tank dipstick. Add oil if necessary.

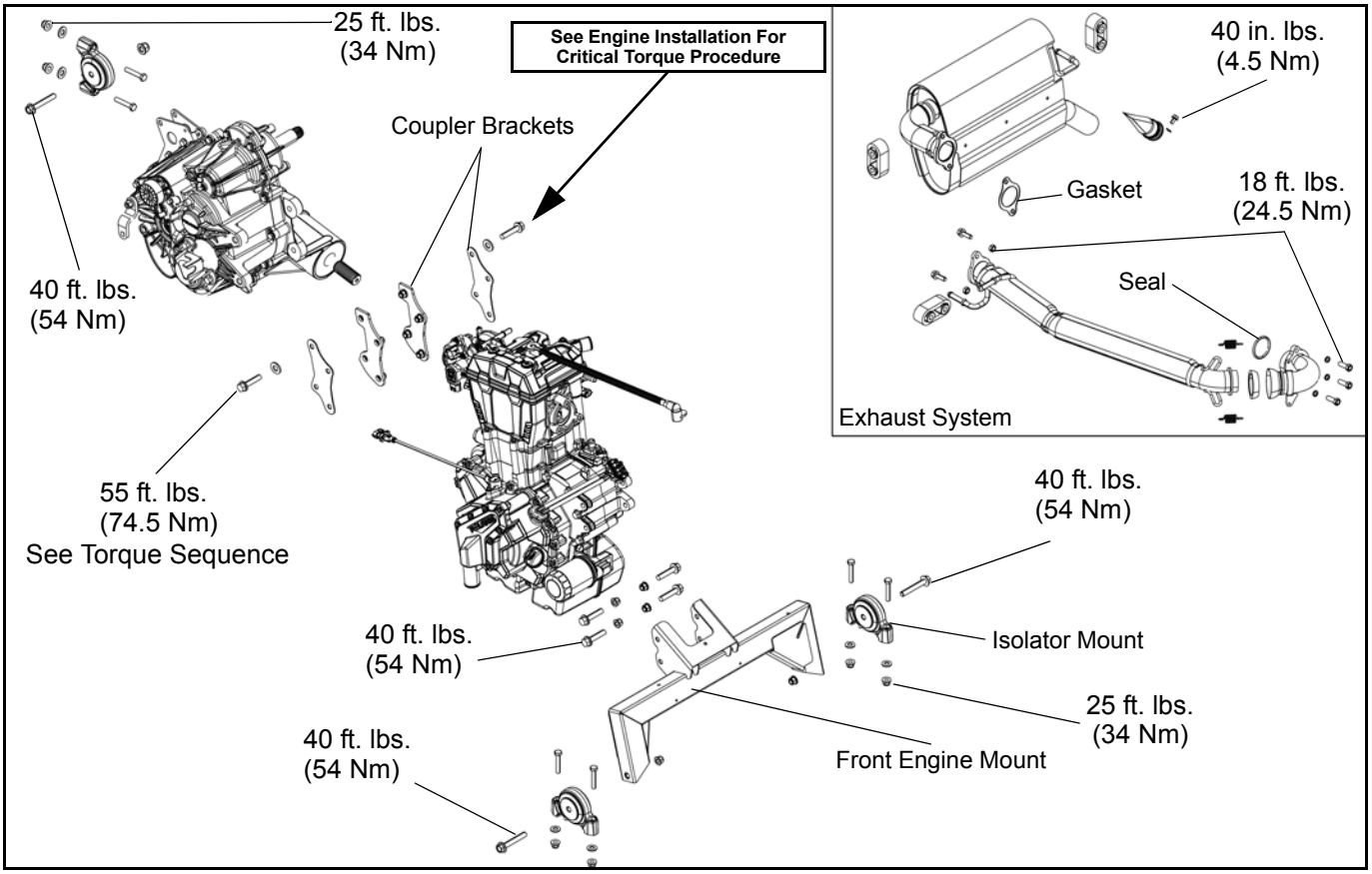
3. Drive slowly at first to gradually bring engine up to operating temperature.

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.

6. Change oil and oil filter after break-in period at 25 hours.

Engine Mounting and Torque Values



Engine Lubrication Specifications

=	
Oil Capacity	Approx. 2 Quarts (1.9 L)
Oil Filter Wrench	PU-50105 or 2.5” (64 mm)
Oil Type	Polaris PS-4 Plus Synthetic Engine Oil
Oil Pressure Minimum Specification (using Polaris PS-4 Plus at operating temperature)	10 PSI @ 1200 RPM (Minimum)
	40 PSI @ 7000 RPM (Minimum)

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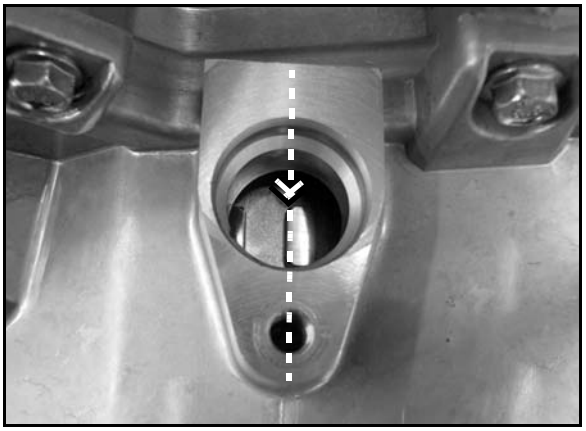
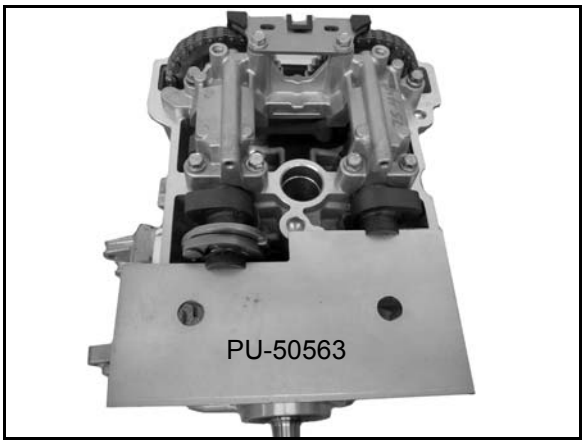
SETTING TDC (TOP-DEAD-CENTER)

There are three ways to ensure the piston is at TDC. Remove the outer clutch cover to access the drive clutch to aid in engine rotation (manually turn the drive clutch counter clockwise).

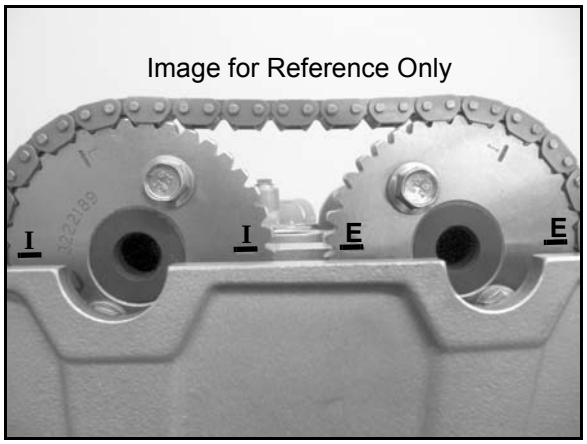
1. With the CPS sensor removed, rotate the engine until the "V" marked on the flywheel is aligned with the CPS mounting hole. **This will set TDC, but not necessarily TDC of the compression stroke.** View the timing marks on the camshaft sprockets to ensure the engine is at TDC of the compression stroke.



2. With the valve cover and thermostat housing removed, rotate the engine so the cam lobes are facing outward and the Cylinder Holding and Camshaft Timing Plate (PU-50563) can be installed into the slots of the camshafts as shown below. This will set TDC of the compression stroke.

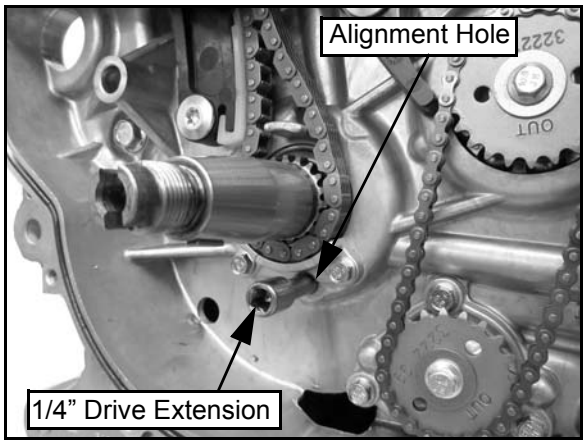


IMPORTANT: Intake cam sprocket should have "I" marks aligned with gasket surface and the exhaust cam sprocket should have "E" marks aligned with gasket surface.



3. With the stator cover and flywheel removed, rotate the engine and position the piston at TDC by aligning the timing hole in crank case with a timing hole in the crankshaft.

   Insert a 1/4" drive socket extension through the crankcase and into the crankshaft locating hole. **This will set TDC, but not necessarily TDC of the compression stroke.** View the timing marks on the cam shaft sprockets to ensure the engine is at TDC of the compression stroke.



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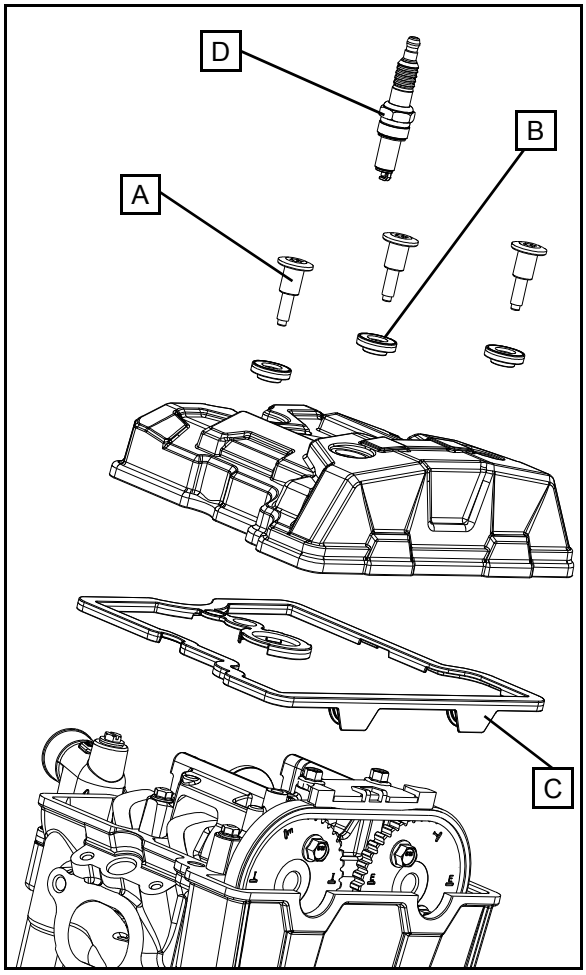
ENGINE DISASSEMBLY / INSPECTION - TOP END

Valve Cover Removal

NOTE: The valve cover, camshafts, cylinder head, cylinder and piston can be serviced with the engine installed in the chassis.

1. If needed, remove the spark plug wire from the engine.
2. Remove dirt and debris from valve cover area.
3. Remove the (3) valve cover shoulder bolts (A) and isolators (B) using a T40 driver.
4. Carefully lift valve cover from the engine and remove it out of the right-hand rear wheel well area.

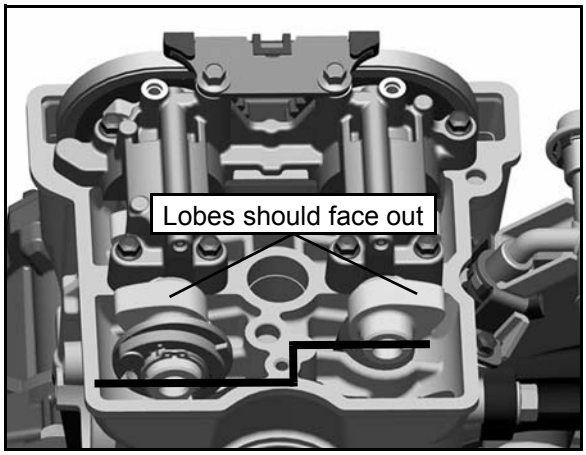


5. Replace isolators (B) and valve cover seal (C) if oil leaks are evident.
6. Remove the spark plug (D). Stuff spark plug hole with a shop towel to prevent anything from falling into the combustion chamber (if further engine disassembly is required).

Camshaft Removal

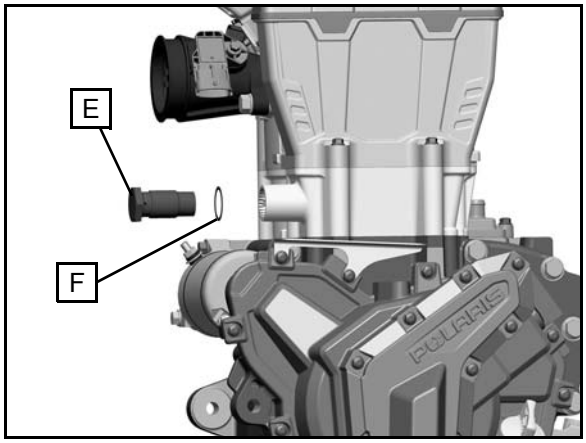
NOTE: The camshafts can be removed with the engine installed in the chassis.

1. Rotate the engine so the piston is at Top Dead Center (TDC) on the compression stroke.



NOTE: To verify TDC, see the "SETTING TDC" section in this chapter.

2. Remove the hydraulic cam chain tensioner (E) from the cylinder. Replace the sealing washer (F) upon reassembly.



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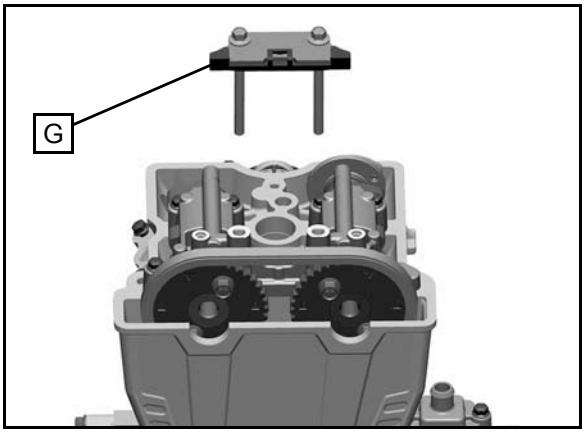
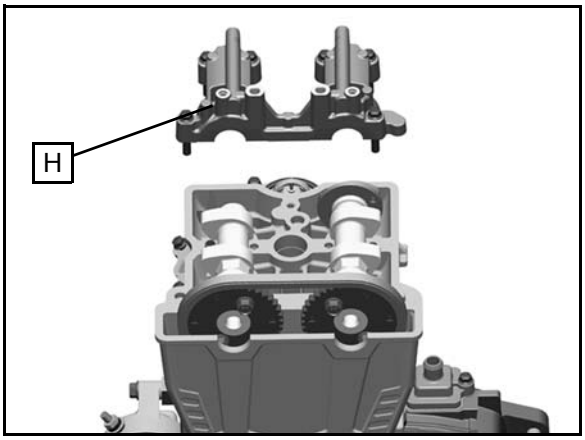
3. Remove the (2) bolts retaining the fixed cam chain guide (G) and remove the assembly from the engine. Inspect the guide for wear and replace if necessary.



4. Remove the remaining (6) bolts that retain the camshaft carrier (H) and carefully lift the carrier off the camshafts.

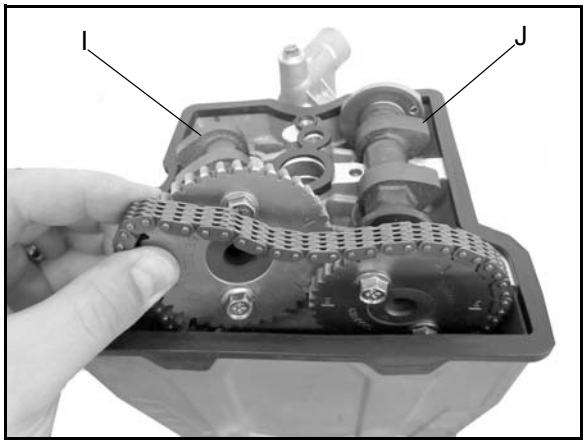


NOTE: The crankcase has a lower guide to prevent the chain from falling off the crankshaft.

5. Attach a hook or other tool to the camshaft chain to prevent it from dropping down into the engine.

6. Mark the intake (I) and exhaust (J) camshafts to ensure proper assembly.

7. Lift upward on the intake camshaft while rotating it counter-clockwise. Walk the timing chain off of the sprocket. Carefully remove the intake camshaft from the engine.

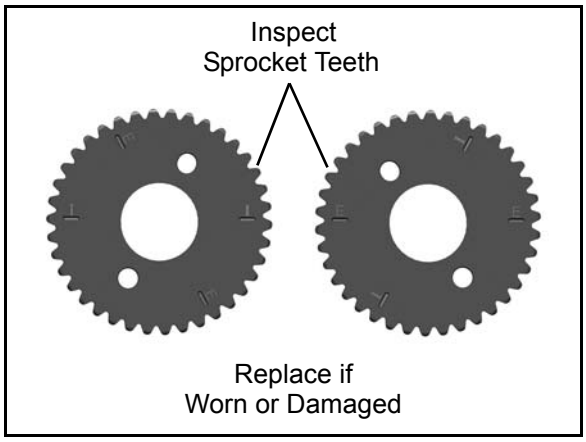


8. Remove the cam chain from the exhaust camshaft sprocket (J) and remove the exhaust camshaft from the engine.

Camshaft Sprocket Inspection

NOTE: Camshaft sprocket removal is not necessary unless the replacement of the sprockets is required.

Inspect cam sprocket teeth for wear or damage. Replace timing chain and sprockets as a set if worn or damaged.



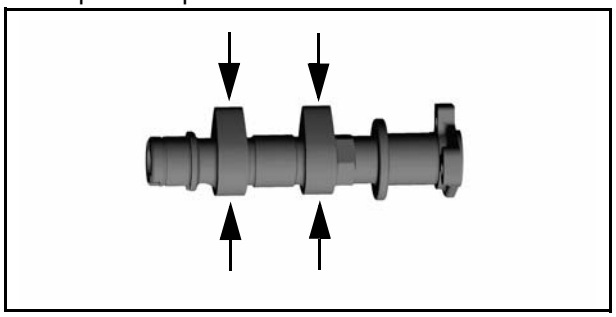
IMPORTANT: Replace camshaft sprocket bolts if they are loosened or removed.

= T
Camshaft Sprocket Bolts: **15 ft. lbs. (20 Nm)**

Camshaft / Camshaft Bore Inspection

Inspect all main journals and cam lobes as described below and compare to specifications. Replace camshafts or cylinder head if worn beyond service limit or if any surface is pitted or damaged.

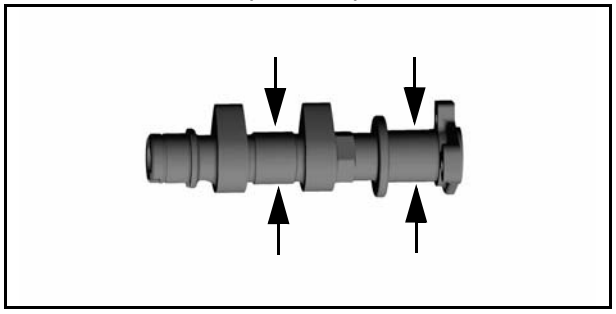
1. Visually inspect each cam lobe for wear or damage.
2. Measure the height of each cam lobe from the base circle to highest point on the lobe using a micrometer. Compare to specification.



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

= In. / mm.
Camshaft Lobe Height: **Intake:** 1.5704" ± 0.0038" (39.89 ± 0.097 mm) **Exhaust:** 1.5405" ± 0.0038" (39.13 ± 0.097 mm)

3. Visually inspect each camshaft journal for scoring, wear or damage.
4. Measure the diameter of the camshaft journals using a micrometer. Compare to specification.



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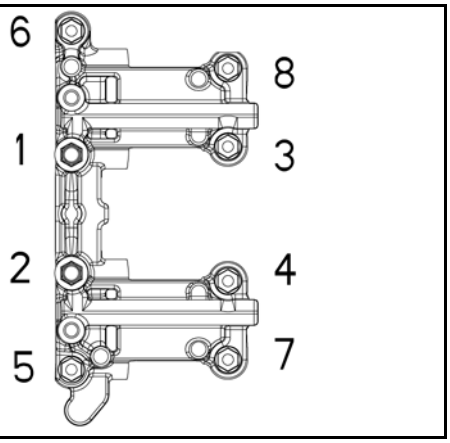
NOTE: Replace camshafts if damaged or if any part is worn past the service limit.

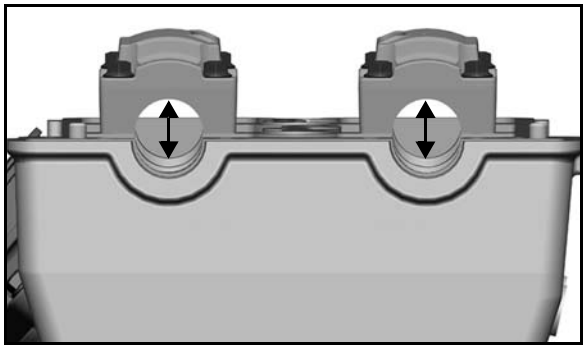
= In. / mm.
Camshaft Journal O.D. Standard: 0.9029” - 0.9037” (22.933 - 22.954 mm) **Service Limit:** 0.9025” (22.923 mm)

5. Temporarily install the camshaft carriers to measure the camsha ft b ore. To rque b olts in sequence to specification.



= T
Camshaft Carrier Bolts: **7.5 ft. lbs. (10 Nm)**

6. If the camshaft journal bo re is found to be ou t of specification, re placement o f th e cylin der head assembly is required.



NOTE: Replace cy linder he ad if camshaft jour nal bores are damaged or if worn past the service limit.

= In. / mm.
Camshaft Journal Bore I.D. Standard: 0.9055" - 0.9063" (23.000 - 23.021 mm) **Service Limit:** 0.9072" (23.044 mm)

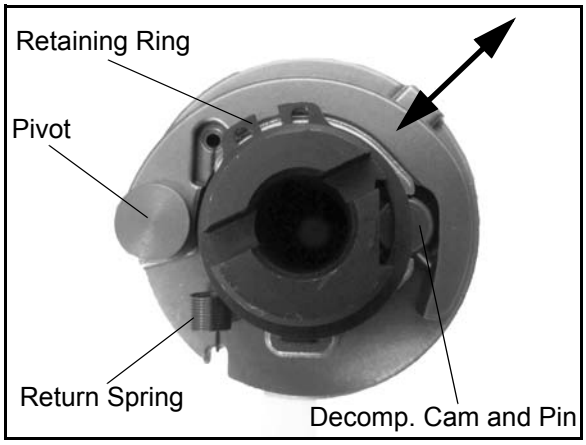
7. Calculate o il cle arance by su btracting ca mshaft journal O.D.s fro m camshaft car rier bor e I.D.s. Compare to specification.

= In. / mm.
Calculated Camshaft Oil Clearance: 0.0018" - 0.0034" (.046 - .088 mm) **Service Limit:** .0047" (.121 mm)

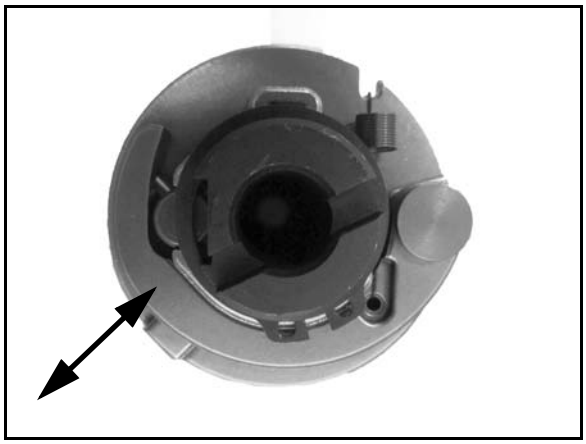
Exhaust Camshaft Decompression Mechanism

NOTE: Removal of the decompression mechanism is not necessary unless replacement is required.

1. Thoroughly clean and inspect the decompression mechanism located on the exhaust camshaft.
2. Replace the decompression assembly if any excessive wear or binding is evident.



3. Be sure the decompression mechanism functions smoothly and easily returns under spring pressure to the resting position against gravity.

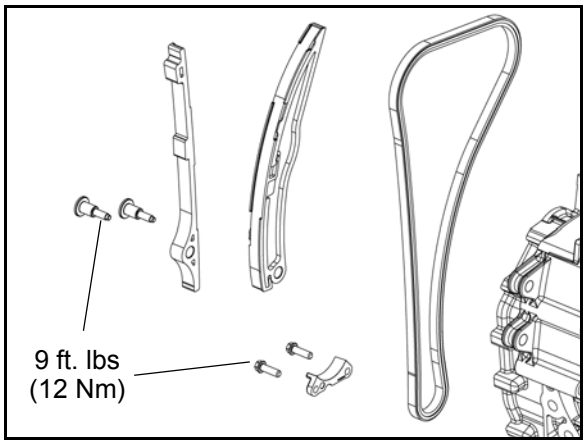


Cam Chain and Guide Service

NOTE: The crankcase has a removable lower cam chain guide that prevents the chain from disengaging the crankshaft during engine service.

NOTE: The cam chain, cam chain guides and cam chain tensioner can be replaced with the engine installed in the vehicle.

1. If not already performed, remove the valve cover, stator cover, flywheel, cam chain tensioner, cam carrier and camshafts as outlined in this chapter.
2. Remove the (2) fasteners that secure the cam chain guides to the crankcase.
3. Remove the (2) fasteners that secure the lower cam chain guide to the crankcase.
4. Inspect all cam chain guides and replace if excessive wear is evident.
5. Upon installation, torque all fasteners to specification and reassemble engine and vehicle as outlined in this chapter.



= T
Tension Blade and Guides: **9 ft. lbs. (12 Nm)**

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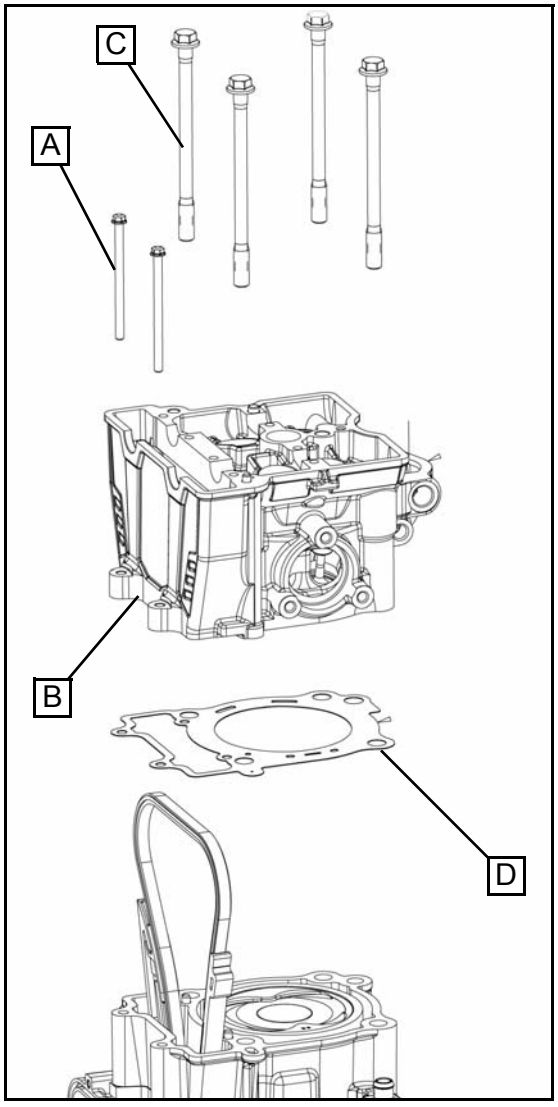
Cylinder Head Removal

NOTE: The cylinder head can be serviced with the engine installed in the chassis.

IMPORTANT: Do not rotate head assembly up side-down until the valve buckets and shims have been removed.

1. Remove and discard the (2) outer M6 bolts (A) that retain the cylinder head (B) and the cylinder.
2. Loosen the (4) cylinder head bolts (C) evenly 1/8 turn (60 degrees) at a time until all are loose.
3. Remove and discard the cylinder head bolts (C). Replace with ***new*** upon assembly.
4. Tap cylinder head lightly with a soft faced hammer until loose. Tap only in reinforced areas or on thick parts of the cylinder head casting.
5. Remove the cylinder head (B) and head gasket (D).



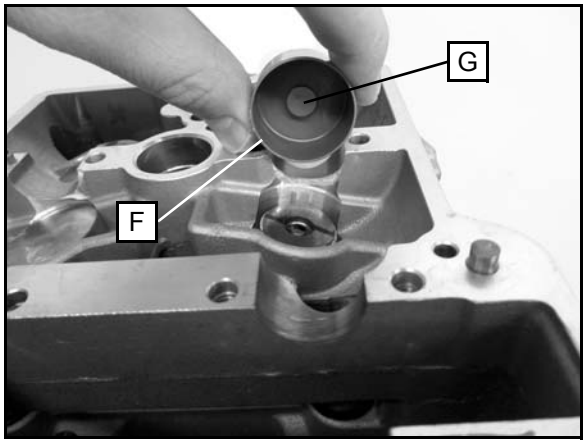
Cylinder Head Disassembly

WARNING

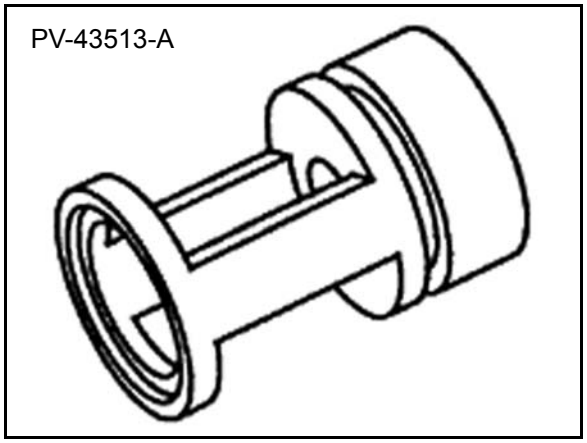
Wear eye protection during cylinder head disassembly and reassembly or when working with the valve springs.

IMPORTANT: Keep mated parts together and in order with respect to their location in the cylinder head for assembly purposes. It is important to install cylinder head components back in the same location. Mark each component or place them in an organized rack as you remove them.

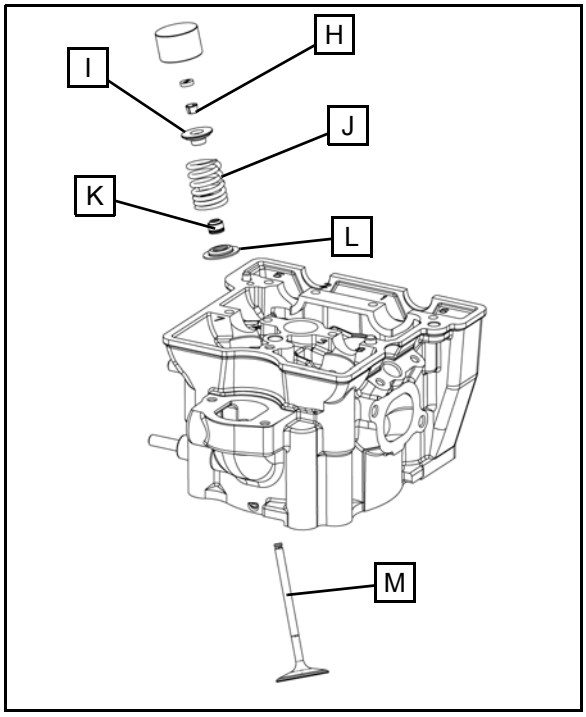
1. Remove the valve bucket (F) and adjustment shim (G) from the cylinder head.



2. Compress the valve spring by hand using valve spring compressor adapter (PV-43513-A).



3. Push down on the spring and remove the split keepers (H).



4. Slowly release valve spring pressure and remove the compressor adapter.

5. Remove the valve retainer (I), valve spring (J), valve stem seal (K) and valve spring seat (L). Discard the valve seal.

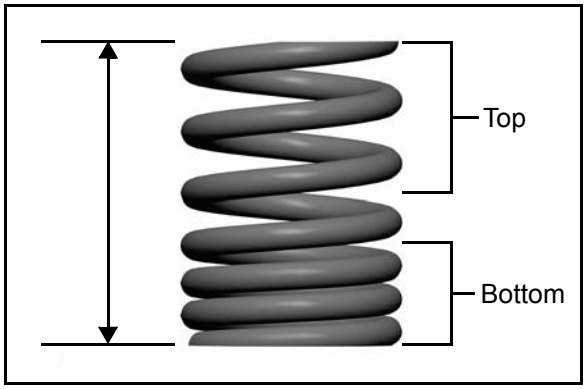
NOTE: Replace valve seals whenever cylinder head is disassembled. Hardened, cracked or worn seals will cause excessive oil consumption.

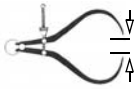
6. Lift up the cylinder head and push the valve (M) out, keeping it in order for reassembly in the same valve guide.

7. Repeat the previous steps to remove the remaining valves.

8. Clean the combustion chamber and head gasket surface.

9. Measure the free length of each valve spring with a Vernier caliper and compare to specification.



 **= In. / mm.**

Valve Spring Free Length:
Standard: 1.7263" (43.85 mm)
Service Limit: 1.6830" (42.75 mm)

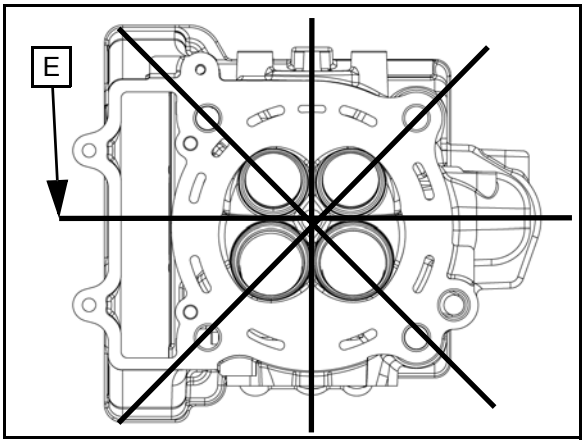
Cylinder Head Inspection

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

CAUTION
Use care not to damage gasket sealing surface. All gasket surfaces must be clean, dry and free of any oil or grease upon assembly. Clean sealing surfaces with rubbing alcohol or electrical contact cleaner. Do not touch sealing surfaces of the new head gasket.

Cylinder Head Warp Inspection

1. Lay a straight edge (E) across the surface of the cylinder head 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.

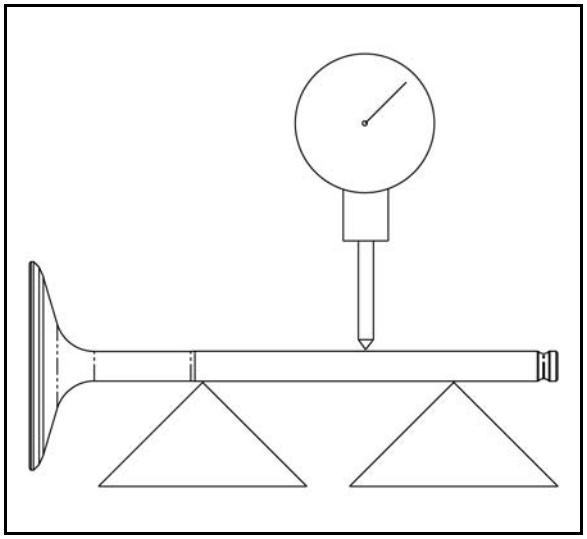


 = In. / mm.

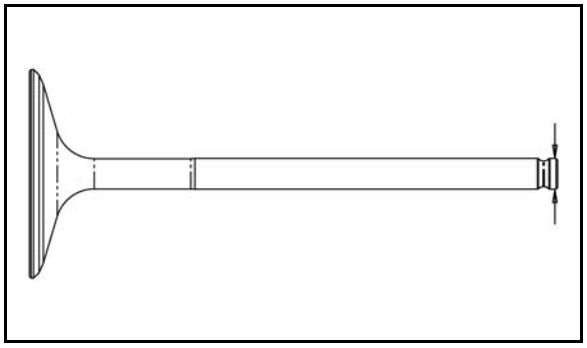
Cylinder Head Warp Limit:
.0024" (0.06 mm)

Valve Inspection

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



4. Check the end of the valve stem for flaring, pitting, wear or damage.



5. Inspect split keeper groove for wear or flaring in the keeper seat area.

NOTE: The valves can be re-faced or end ground, if necessary. They must be replaced if extensively worn, burnt, bent or damaged.

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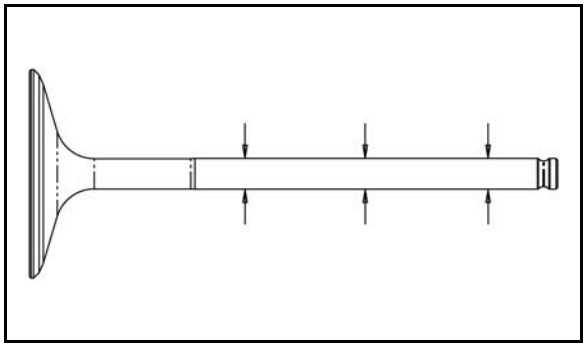
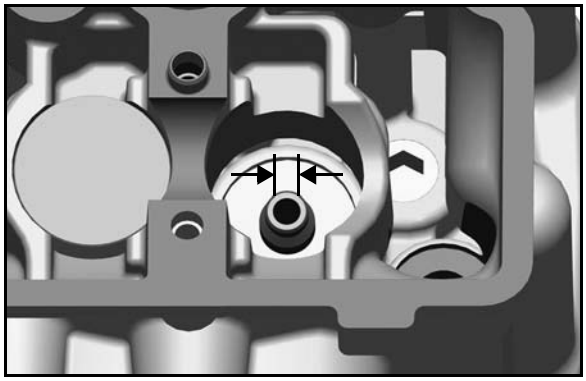
6. Measure diameter of valve stem with a micrometer in three places, then rotate 90° and measure again (take six measurements total). Compare to specifications.



= In. / mm.

Valve Stem Diameter:
Intake: 0.2155" - 0.2161" (5.475 - 5.490 mm)
Exhaust: 0.2147" - 0.2153" (5.455 - 5.470 mm)

7. Measure valve guide 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.:
0.2165" - 0.2171" (5.500 - 5.515 mm)

8. Be sure to measure each guide and valve combination individually.

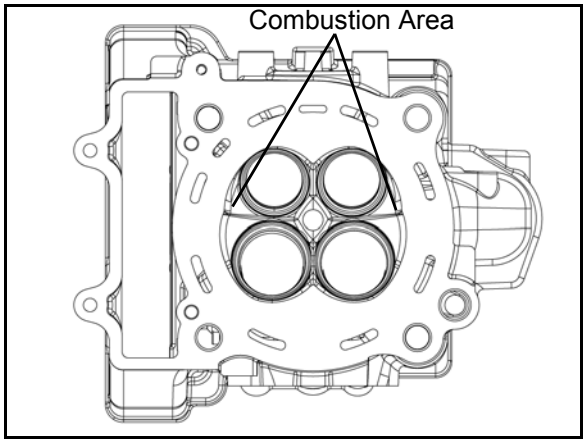
NOTE: The valve guides cannot be replaced.

Combustion Chamber Cleaning

WARNING

Wear eye protection during combustion chamber cleaning.

1. Clean all accumulated carbon deposits from combustion chambers and valve seat area.



NOTE: Carbon Clean Fuel Treatment (2871326) can be used to help remove carbon deposits.

IMPORTANT: Do not use a metal scraper, a coarse wire brush or abrasive cleaners to clean the cylinder head. Damage may result.

2. Visually inspect cylinder head gasket surface and combustion chamber for cracks or damage. Pay close attention to the areas around spark plug and valve seats.

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Valve Seat Reconditioning

Valve seat reconditioning should be performed by a technician proficient in cylinder head reconditioning techniques. Reconditioning techniques vary, so follow the instructions provided by the valve reconditioning equipment manufacturer. Do not grind seats more than necessary to provide proper seat surface, width, and contact point on valve face.

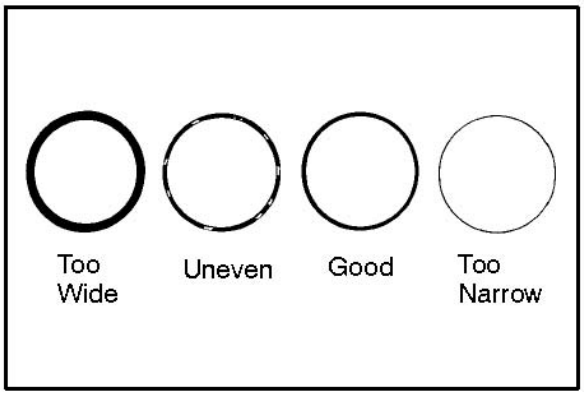
⚠ WARNING

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.*

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.



Renewing Valve Seats

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.

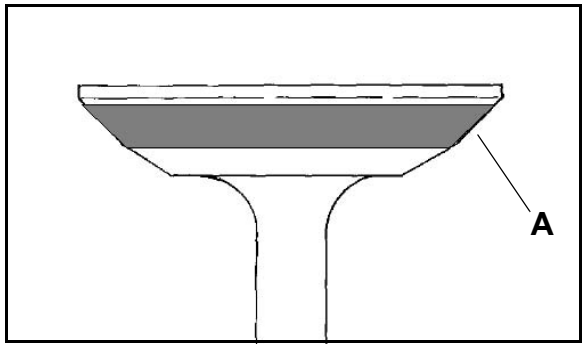
* If the cutter now contacts the uncut portion of the seat, check the pilot. Look for burrs, nicks, or runout. If the pilot is bent it must be replaced.

* 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.

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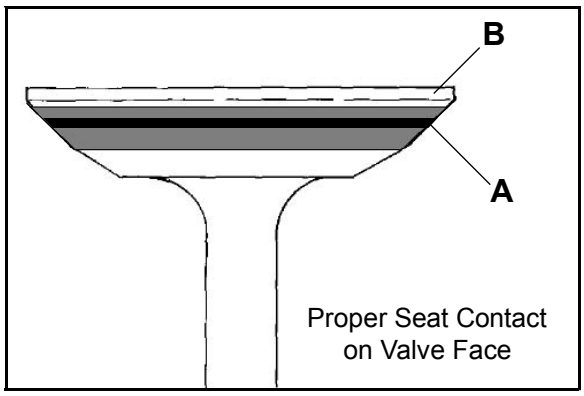
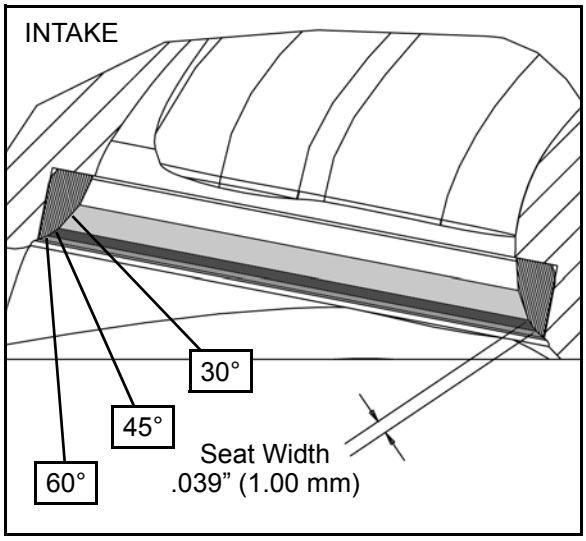
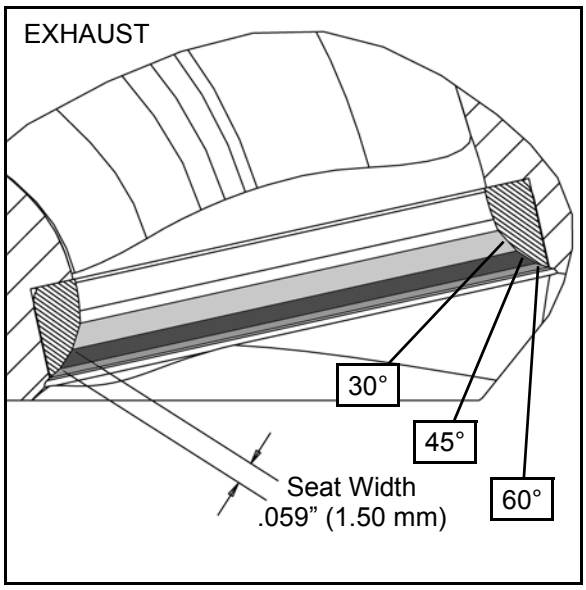
NOTE: When using an interference angle, the seat contact point on the valve will be very narrow, and is a normal condition. Look for an even and continuous contact point all the way around the valve face (A).



Intake Seat Cutter Diameter: 1.567 in. (39.80 mm)



Exhaust Seat Cutter Diameter: 1.364 in. (34.65 mm)



= In. / mm.

Valve Seat Width:
Intake: .0393" (1.00 mm)
Service Limit: .0551" (1.4 mm)

Exhaust: .0590” (1.50 mm)
Service Limit: .0758" (1.9 mm)

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

9. Lubricate 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 if an interference angle reconditioning method is used.

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 valves.

12. Thoroughly clean cylinder head and valves.

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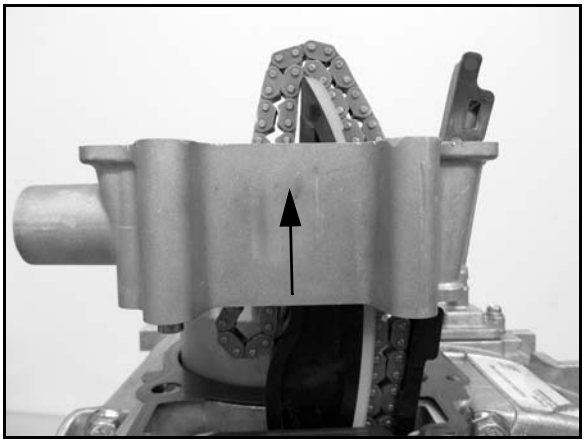
Cylinder Removal

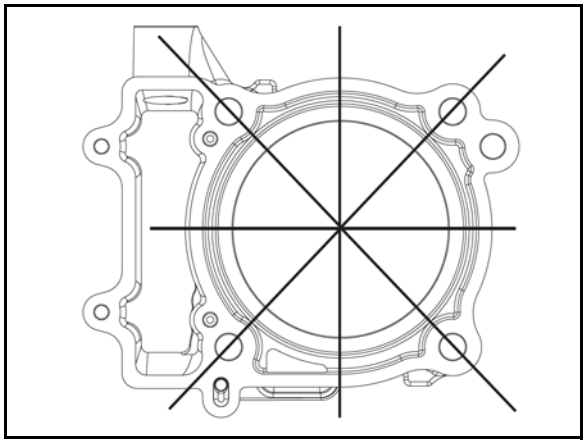
1. Remove and discard the head gasket.
2. Position the cam chain and guides vertically.
3. Tap cylinder lightly with a plastic hammer in the reinforced areas only until loose.
4. Rock cylinder forward and backward and lift it from the crankcase, supporting piston and connecting rod.
5. Remove the cylinder from the engine.



6. Remove and discard cylinder base gasket.

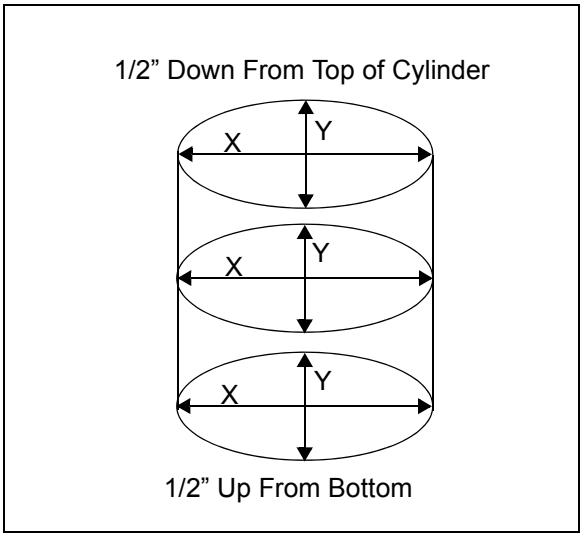
Cylinder Inspection

1. Remove all gasket material from the cylinder sealing surfaces.
2. Inspect the top of the cylinder for warpage using a straight edge and feeler gauge.



Cylinder Warpage:
.00098” (.025 mm)

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).

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5. Record measurements taken in Step 4. If cylinder is tapered, or out of round beyond .001, cylinder must be re-bored oversize, or replaced.

Cylinder Taper
Limit: .001 Max. (0.025 mm)

Cylinder Out of Round
Limit: .001 Max. (.025 mm)

Standard Bore Size:

3.8976 +/- 0.0003" (99.0 +/- 0.008 mm)

Piston Removal

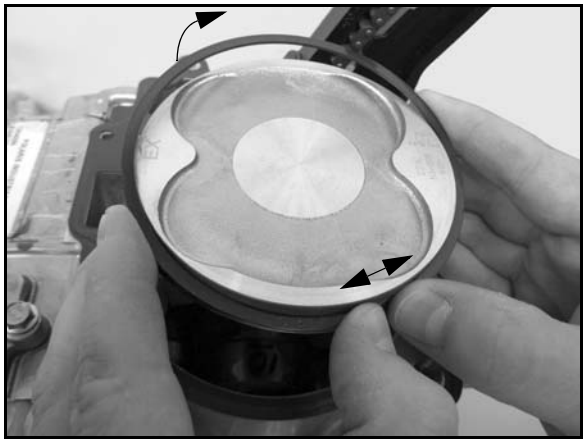
1. Note piston directional indicator "EX" positioned toward the exhaust side of engine.
2. Remove piston circlip and push piston pin out of piston. If necessary, heat the crown of the piston *slightly* with a heat gun.

   CAUTION: Do not apply heat to the piston rings, they may lose radial tension.
3. Remove top 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.

***By hand:** Placing both thumbs as shown, spread the ring open and push up on the opposite side.



4. Repeat procedure for second ring.
5. Remove oil control ring top rail first, then bottom rail.
6. Remove oil control ring expander.

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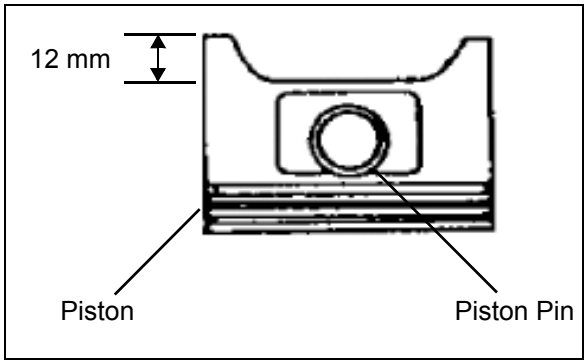
Piston-to-Cylinder Clearance

1. Measure the outside diameter of the piston 12 mm from the skirt and at a right angle to the direction of the piston pin.



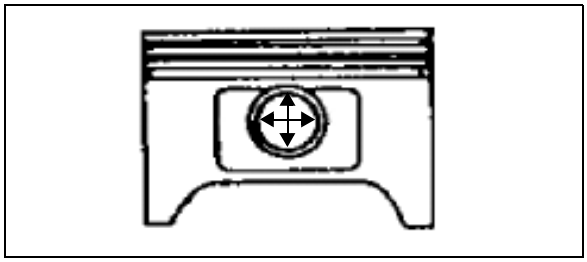
2. Subtract this measurement from the maximum cylinder size measurement from cylinder inspection.

Piston to Cylinder Clearance:
.00019" - .00216" (.005 - .055 mm)

Piston O.D.:
3.8957 - 3.8968" (98.953 - 98.980 mm)

Piston / Rod Inspection

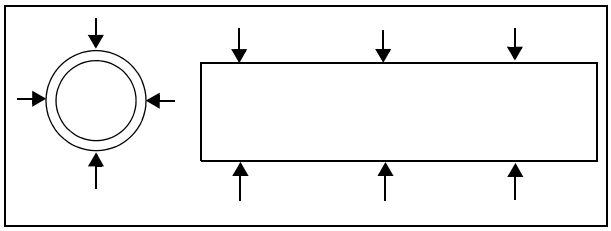
1. Measure piston pin bore.



Piston Pin Bore:
Standard.:
0.8662" - 0.8665" (22.004 - 22.010 mm)

Service Limit:
0.8651" (21.975 mm)

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



Piston Pin O.D.:
Standard.:
0.8659" - 0.8661" (21.995 - 22.0 mm)

Service Limit:
0.8651" (21.975 mm)

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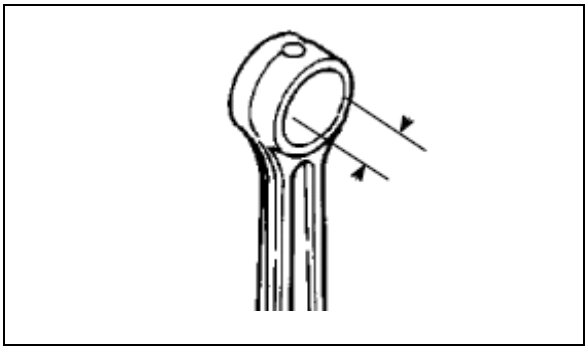
3. Measure connecting rod small end ID. Inspect bearing surface for damage.

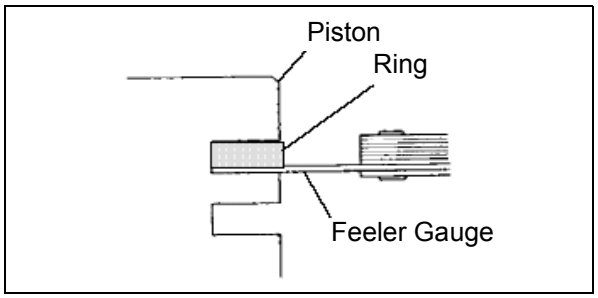


Piston Pin Degree of Fit

Pin should be a push-fit by hand with piston at room temperature or warmed slightly

Connecting Rod Small End ID:
Standard:
0.8665” - 0.8670” (22.010 - 22.023 mm)

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.



Piston Ring-to-Groove Clearance

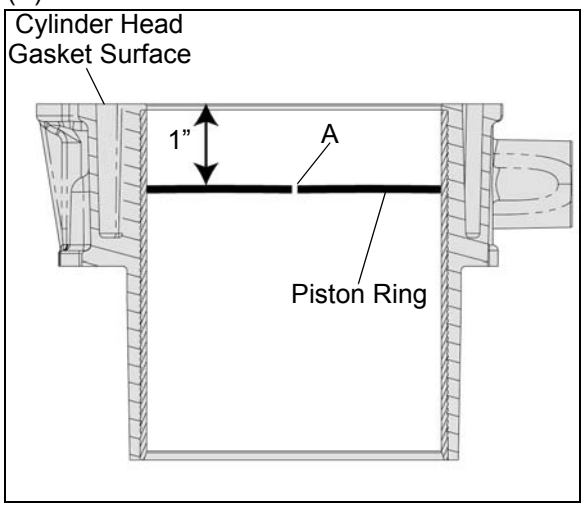
Top Ring Standard:
0.0011” - 0.0037" (0.030 - 0.095 mm)
Service Limit: 0.0042" (0.108 mm)

Second Ring Standard:
0.0007” - 0.0029" (.020 - 0.076 mm)
Service Limit: 0.0035" (0.89 mm)

Piston Ring Installed Gap

1. Place each piston ring inside cylinder. Use a piston to push the ring squarely into place 1” (25.4 mm) down from the cylinder head gasket surface.

2. Measure installed gap with a feeler gauge at location (A).



Piston Ring Installed Gap

Top Ring
Std: 0.0059” - 0.0122" (0.15 - 0.31 mm)
Limit: 0.0137" (0.35 mm)

Second Ring
Std: 0.0094” - 0.0196" (0.24 - 0.50 mm)
Limit: 0.022" (0.56 mm)

Oil Ring Rails
Std: 0.0098” - 0.0401" (0.25 - 1.02 mm)
Limit: 0.0480" (1.22 mm)

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

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Honing to Oversize

CAUTION

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

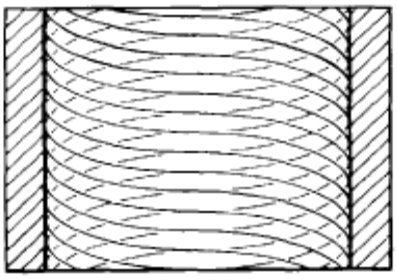
CAUTION

For oversize honing always wet hone using honing oil and a coarse roughing stone. Measure piston (see piston measurement) and calculate finished bore size. Always leave .002 - .003" (.05 - .07 mm) for finish bore sizing with a fine stone.

A finished cylinder should have a 45 degree cross-hatch pattern to ensure piston ring seating, aid in oil retention and reduce ring vibration during initial break-in. Hone cylinder according to hone manufacturer's instructions, or these guidelines:

- 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 stone approximately 1/2" (1.3 cm) beyond the bore at the end of each stroke.
- Release the hone at regular intervals and inspect the bore to determine if it has been cleared, and to check piston fit. **NOTE:** Do not allow cylinder to heat up during honing.

Example: Cross Hatch pattern



Cylinder Hone Selection / Honing Procedure

CAUTION

Selecting a hone which will straighten as well as remove material from the cylinder is very important. Using a common spring loaded finger type glaze breaker for honing is never advised. Polaris recommends using a rigid hone or arbor honing machine which also has the capability of oversizing.

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.

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. Use electrical contact cleaner if necessary to clean these areas. Rinse thoroughly, dry with compressed air, and oil the bore immediately with engine oil.

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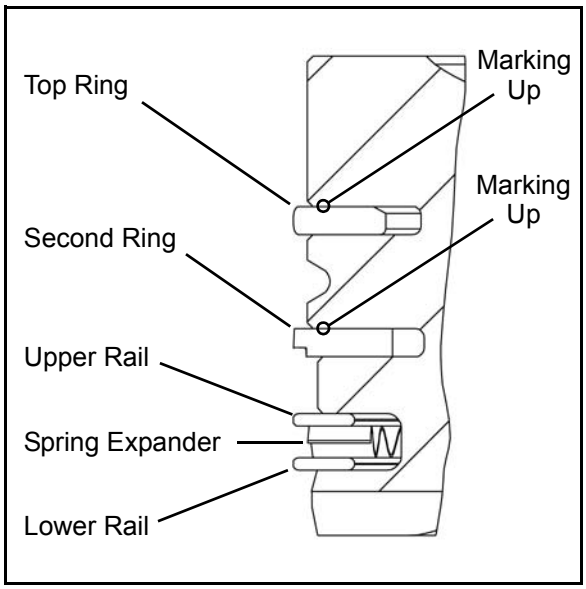
ENGINE ASSEMBLY - TOP END

Piston Ring Installation

NOTE: Apply clean engine oil to all ring surfaces and ring lands upon installation. Always check piston ring installed gap before rings are installed on piston (see "Piston Ring Installed Gap"). Clean accumulated carbon from piston ring grooves and oil ring lube holes if piston has been in service.

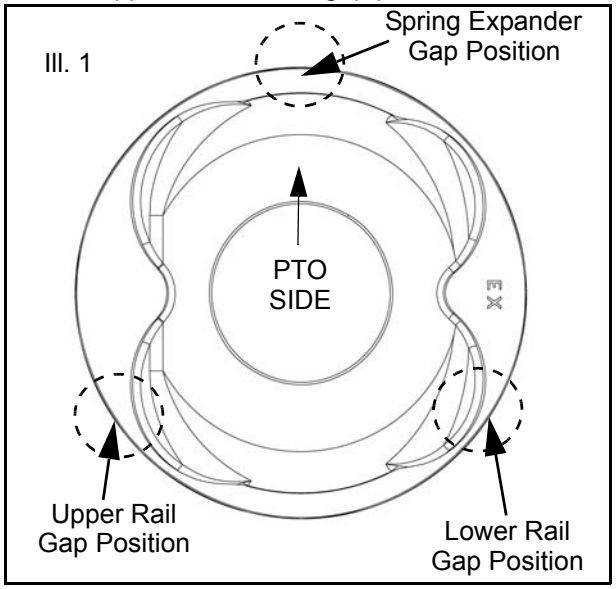


1. Place oil control ring expander in oil ring groove. Rotate expander in groove until butt ends are on PTO side of piston (see illustration 1).

IMPORTANT: Ends must butt squarely together and must not overlap.

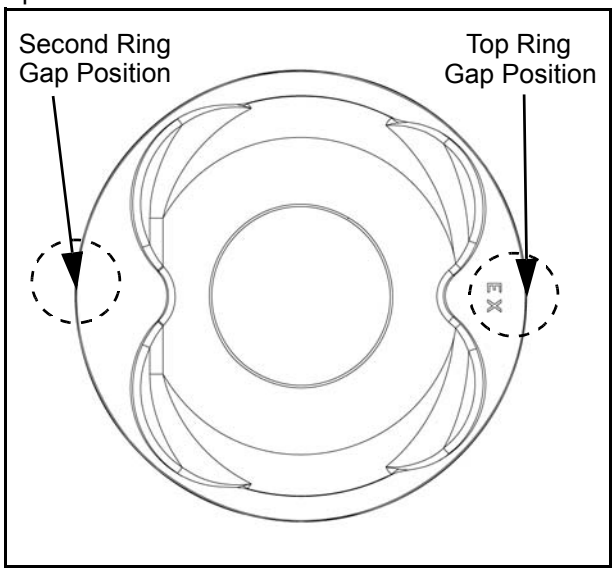
2. Install lower rail with end gap positioned as shown in illustration 1.

3. Install upper rail with end gap positioned as shown.



4. Install second ring with marking facing top of piston. Rotate ring to position the end gap toward intake side of piston as shown below.

5. Install top ring with mark facing top of piston. Rotate ring to position the end gap toward exhaust side of piston as shown below.



6. Be sure top and second rings rotate freely in their grooves and do not bind when compressed by hand.

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Piston / Connecting Rod Assembly

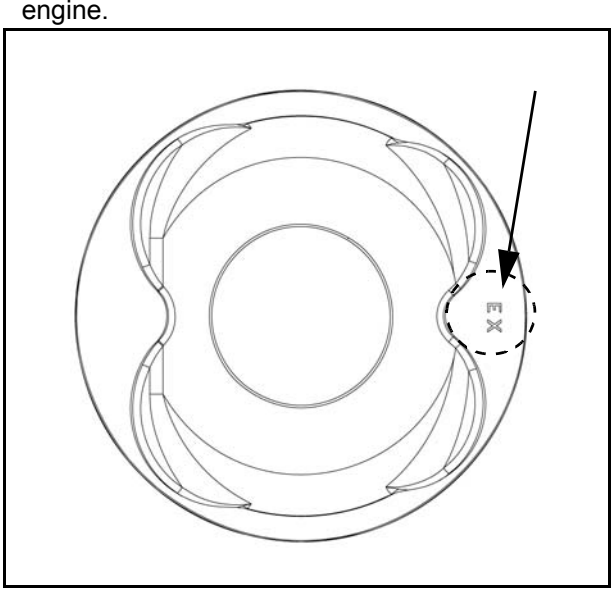
1. Lubricate connecting rod small end, piston pin bore and piston pin with engine oil.

⚠ CAUTION
Do not re-use circlips. Circlips become deformed during the removal process. Do not compress the new clip more than necessary to prevent loss of radial tension. Severe engine damage may result if circlips are re-used or deformed during installation.

2. Install a new circlip on one side of piston with gap at the top (12:00 position) or bottom (6:00 position).

IMPORTANT: Never re-use a piston pin circlip.

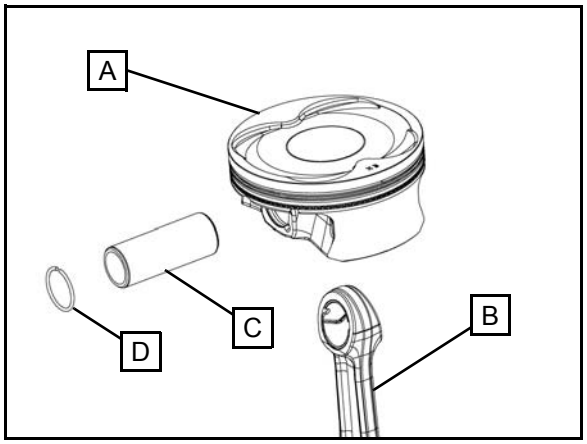
3. When Installing the piston, be sure the piston marking "EX" is positioned towards the exhaust side of the engine.



4. Place piston (A) on connecting rod (B). Push piston pin (C) through rod and piston until it seats against the installed circlip.

IMPORTANT: Do not tap on pin or cause any sideways force to connecting rod. Warm piston crown with a heat gun if pin cannot be installed by hand, or use a piston pin installation tool.

CAUTION
DO NOT apply heat to piston rings or a loss of radial tension could result.



5. Install the remaining circlip (D) with gap at the top (12:00 position) or bottom (6:00 position). Push the piston pin in both directions to make sure the clips are properly seated in the groove.

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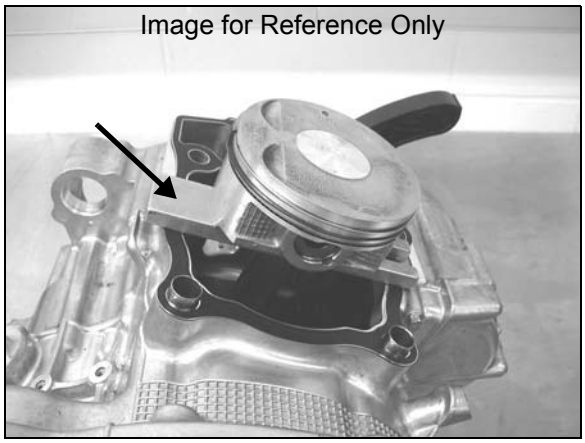
Cylinder Installation

1. Clean base gasket sealing surface on cylinder and crankcase to remove all oil, grease, or old sealant.

2. Install a new base gasket.

NOTE: Base gasket and surfaces must be DRY and oil free. Use care upon assembly to keep oil away.

3. Slide a commercially available Piston Support Block under piston skirt as shown to support piston during cylinder installation.



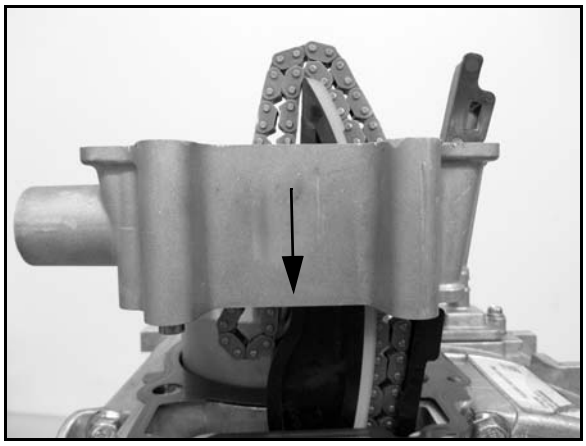
4. Apply clean engine oil to cylinder bore and bottom tapered portion of cylinder sleeve.

5. Verify all ring end gaps are correctly located on piston. Place cam chain and guides in alignment with chain room.

6. Carefully compress rings with fingers or commercially available spring compression tool and install cylinder with a slight front to back rocking motion until all rings are captive in cylinder and past the taper of the sleeve.

7. Remove support block and ring compressor.

8. Push cylinder downward until fully seated on base gasket.



9. Hold the cylinder in place and rotate the engine and position the piston at TDC.

NOTE: If cam chain and flywheel are installed (top end work only is being performed) hold cam chain tight while rotating the engine to avoid damage to the chain, drive sprocket teeth, or tensioner blade.

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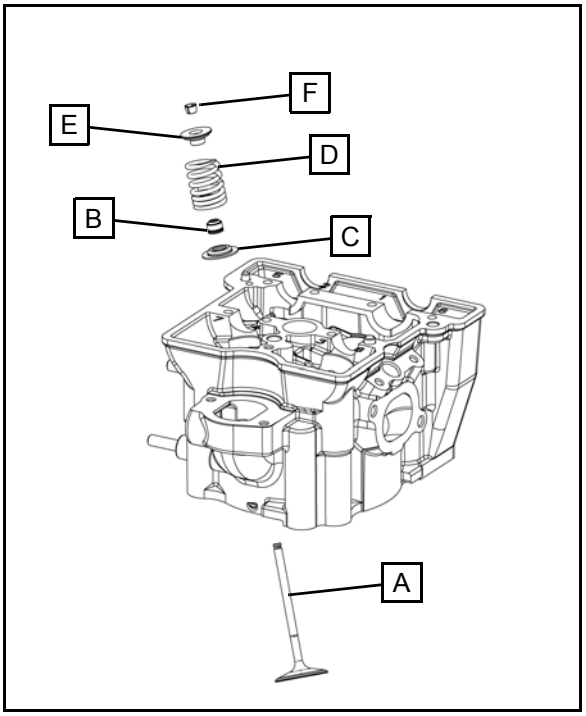
Cylinder Head Assembly

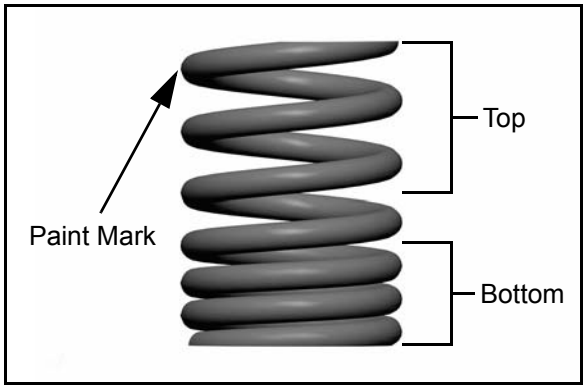
NOTE: Assemble the valves one at a time to maintain proper order.

> **WARNING**
>
> Wear eye protection during cylinder head disassembly and reassembly or when working with the valve springs.

1. Apply engine oil to valve guides and seats.
2. Lubricate the valve stems with clean engine oil.
3. Install the valve (A) in the cylinder head, through the guide.

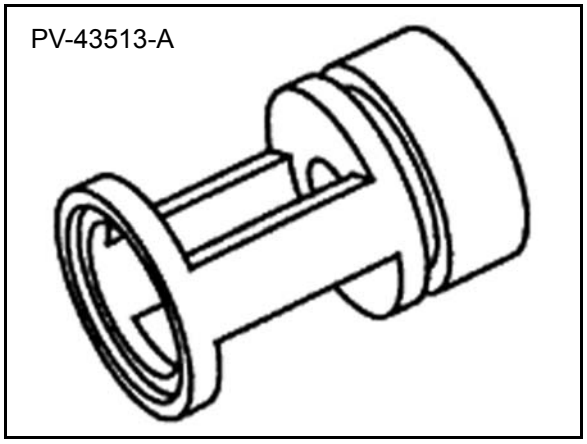


4. Carefully install a new valve seal (B) on the valve guide with a rotating motion. Push firmly until seated in retaining groove and square with the guide
5. Dip the seat (C), valve spring (D) and retainer (E) in clean engine oil.
6. Install the valve spring seat (C).
7. Install the valve spring (D) with tightly spaced coils facing down toward the cylinder head.



NOTE: Valve springs to be installed with the paint mark facing up.

8. Place the valve retainer (E) on the spring.
9. Compress the valve spring by hand using valve spring compressor adapter (PV-43513-A). Compress spring only enough to allow split keeper installation.



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

10. Install split keepers (F) with gap even on both sides.
11. Repeat this procedure for remaining valves.
12. Exercise each valve through its travel to ensure the valve keepers are seated correctly.

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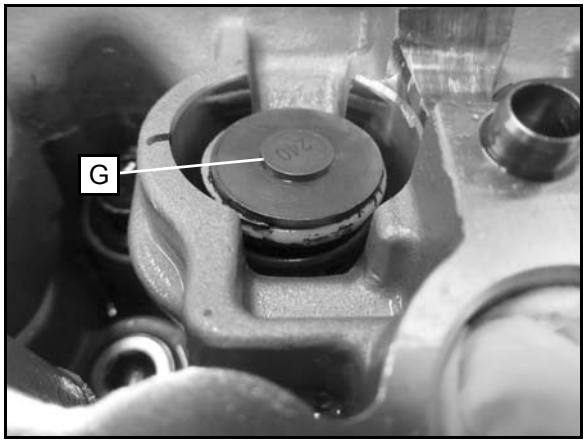
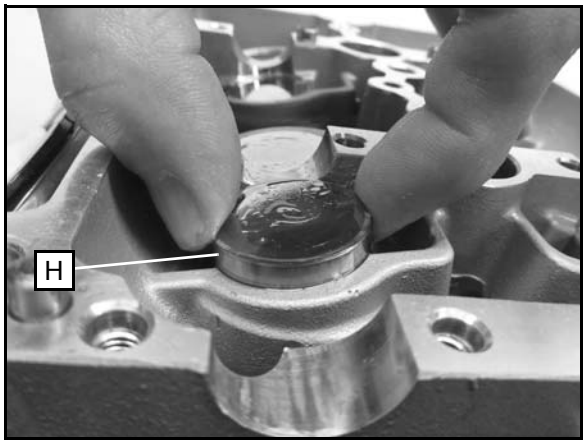
13. Install the valve adjustment shim (G) and valve bucket (H) for each valve in the order they were removed.



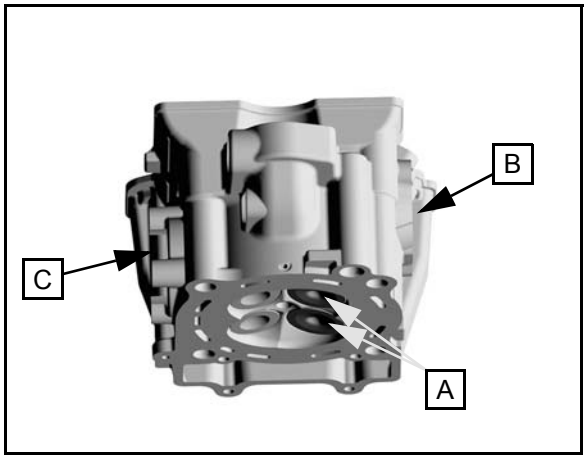
NOTE: Shim 240 is shown for reference only. Refer to "Valve Clearance Adjustment" procedure for proper shim selection.



IMPORTANT: If any valve train components were replaced, refer to "Valve Clearance Adjustment" procedure prior to "Camshaft Installation / Timing" procedure.

Valve Sealing Test

1. Clean and dry the combustion chamber area (A).
2. Pour a small amount of clean solvent into each intake port (B) and check for leakage around the valves. The valve seats should hold fluid with no seepage.
3. Repeat for exhaust valves by pouring fluid into each exhaust port (C).



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Cylinder Head Installation

NOTE: Head gasket and surfaces must be DRY and oil free. Use care during assembly to keep oil and finger prints off of gasket.

1. Prepare cylinder head gasket sealing surfaces by cleaning thoroughly to remove all residue. The new head gasket must be installed clean and dry, free from oil or grease.

NOTE: Do not touch sealing surfaces of the new head gasket.

2. Guide cam chain (D) through a new head gasket (E) and install the gasket on the cylinder, locating it on the alignment pins.

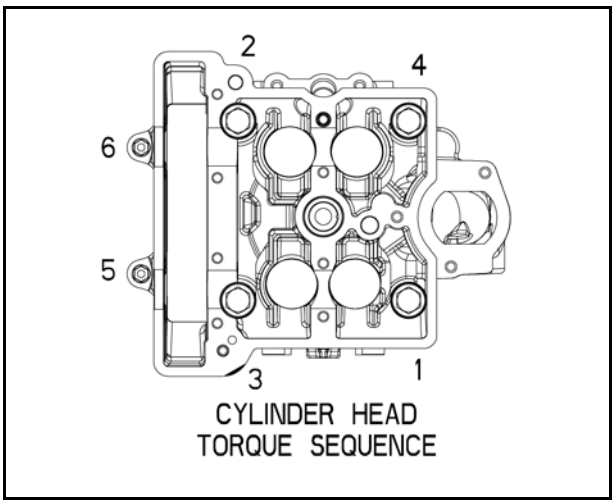
3. Carefully set the cylinder head (F) in place on alignment pins.

IMPORTANT: Install *new* cylinder head bolts.

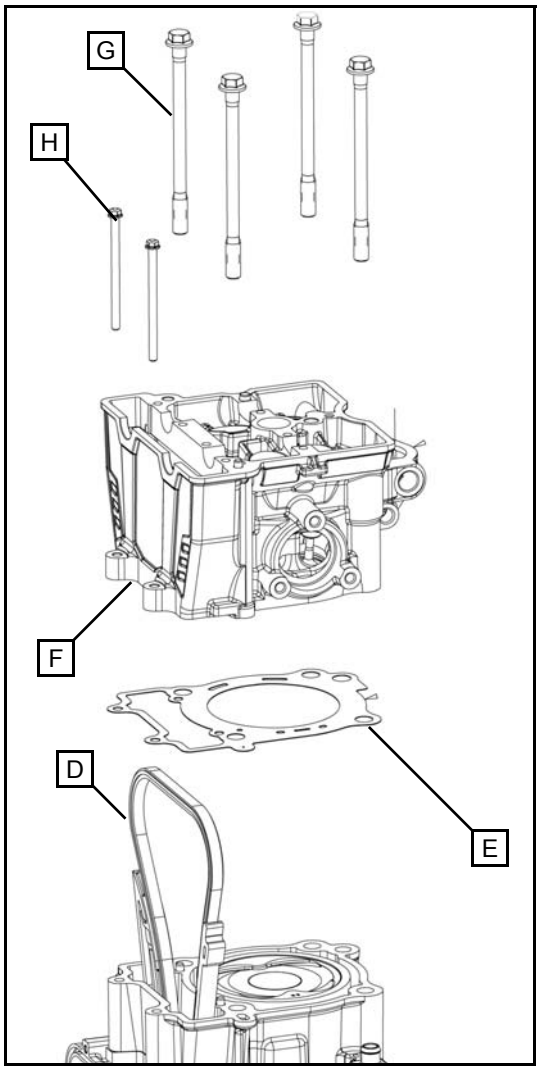
4. Install and finger tighten the (4) ***new*** cylinder head bolts (G) evenly.

5. Install and finger tighten the (2) ***new*** outer M6 bolts (H) evenly.

6. Torque the ***new*** cylinder head bolts in sequence to specification.



CYLINDER HEAD
TORQUE SEQUENCE



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Cylinder Head Torque Procedure:

<u>Step 1</u>: Torque the (4) M11 Bolts in Sequence 21 ft. lbs. (28 Nm)

<u>Step 2</u>: Torque the (4) M11 Bolts in Sequence 26 ft. lbs. (35 Nm)

<u>Step 3</u>: Torque the (4) M11 Bolts in Sequence Additional 180° (1/2 turn)

<u>Step 4</u>: Torque the Outer M6 Head Bolts 89 ± 9 in. lbs. (10 ± 1 Nm)

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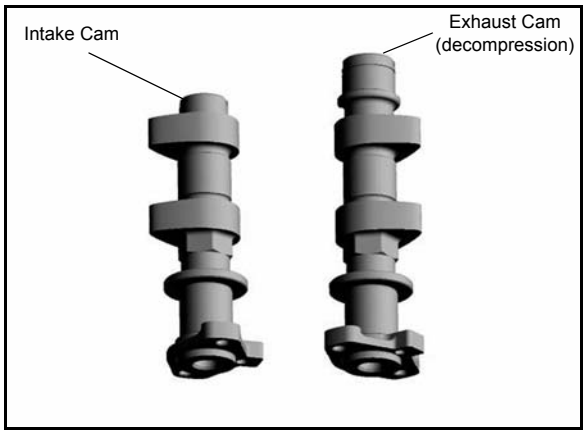
Valve Clearance Check / Adjustment

IMPORTANT: Always inspect valve clearance prior to camshaft installation or final engine assembly.

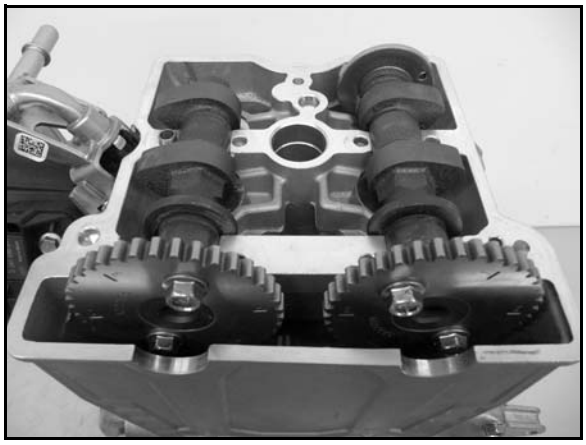
1. Install the cam chain guides and cam chain before camshaft installation (if removed) as outlined in this chapter.

2. Reference the camshaft intake and exhaust markings made during disassembly. If installing new camshafts or if camshafts were not marked, you can reference the part number stamped on the end of the shafts.



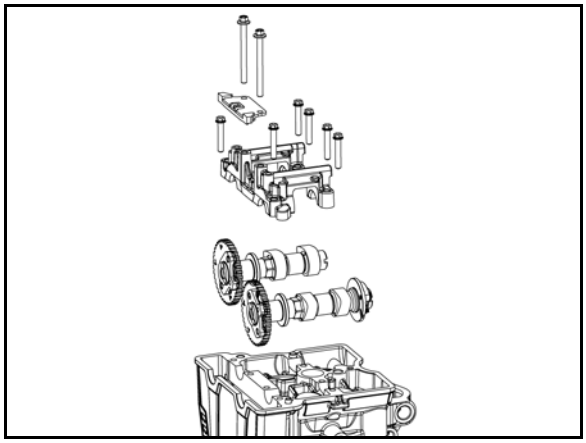
3. Lubricate the camshaft bearing journal surfaces with Polaris PS-4 Plus engine oil prior to installation.

4. Carefully install the camshafts into the cylinder head. The camshaft lobes should face out.

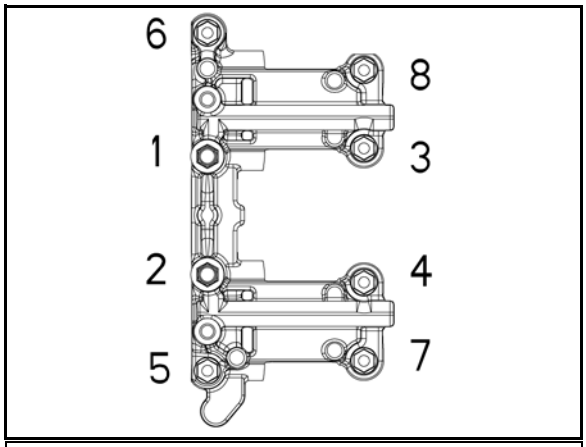


5. Carefully install the camshaft carrier onto the camshafts.

6. Install the upper cam chain guide and the (8) bolts that retain the camshaft carrier.



7. Torque the camshaft carrier bolts in sequence to specification.



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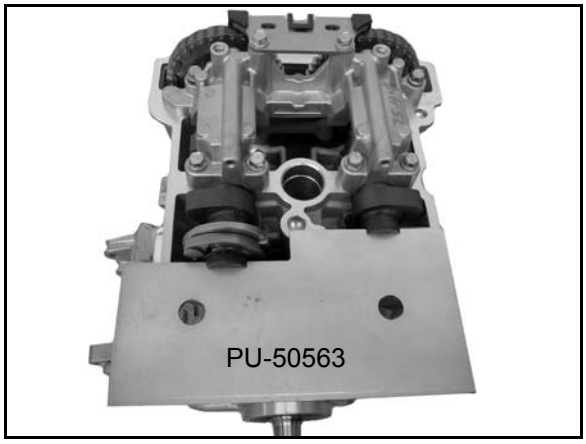
Camshaft Carrier Bolts:
7.5 ft. lbs. (10 Nm)

8. Install the Cylinder Holding and Camshaft Timing Plate (PU-50563) into the end of camshafts as shown below. The thermostat housing must be removed to install the timing plate PU-50563.



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9. Measure the valve clearance of each valve using a thickness (feeler) gauge. Record the measurement if clearance is out of specification.

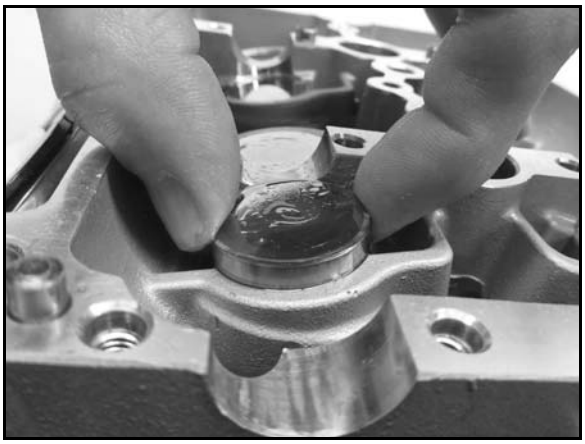
= In. / mm.
Intake Valve Clearance (cold): **.005-.007 in. (0.125-0.175 mm)**

= In. / mm.
Exhaust Valve Clearance (cold): **.006-.010 in. (0.152-0.254 mm)**

10. If any of the valve clearance measurements are out of specification, remove the camshaft carrier and camshafts and proceed with this procedure.

NOTE: If all valve clearance measurements are within specification, remove the camshaft carriers and proceed to "Camshaft Installation / Timing".

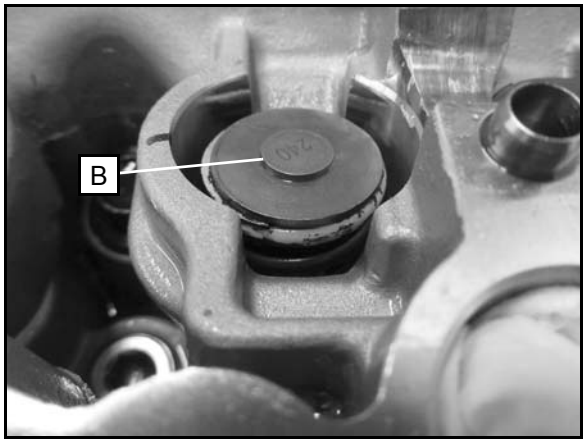
11. Remove the valve bucket from a valve that was out of specification.



IMPORTANT: Keep mated parts together and in order with respect to their location in the cylinder head for assembly purposes. Mark each component or place them in an organized rack as you remove them.

CAUTION
If performing this procedure with the cylinder head installed on the engine, cover the spark plug holes and the cam chain opening to prevent a valve adjustment shim from falling into the cylinder or crankcase.

12. Record the 3 digit adjustment shim number (B).



NOTE: Shim 240 is shown for reference only.

13. Reference the valve clearance measurement recorded for that valve, along with the 3- digit shim number.

14. Refer to the appropriate shim selection matrix (Intake or Exhaust) on the following pages and select the proper shim.

15. Install the new adjustment shim and valve bucket.

NOTE: Lubricate the outer portion of the valve bucket upon installation.

16. Repeat steps until all necessary valves have been adjusted.

17. Reinstall the camshafts and camshaft carriers and tighten the bolts evenly to specification.

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Camshaft Carrier Bolts: **7.5 in. lbs. (10 Nm)**

18. Measure and confirm that valve clearance is now within specification for each valve.

19. If valve clearance is not within specification, repeat this procedure.

20. If all valve clearance measurements are now within specification, remove the camshaft carriers and proceed to "Camshaft Installation / Timing".

Intake Valve Lash - Shim Selection Matrix

Example:

- Installed shim is 240
- Measured clearance is 0.002 in. (0.06 mm)
- Replace 240 shim with 232 shim

Shim Thickness: Example 240 equals thickness of 2.40 mm. Part Number: 3022173-XXX (Xs represent 3 digits on shim)

Intake Valve Clearance (cold):
0.005 - 0.007 in. (0.125 - 0.175 mm)

Intake Valve Clearance Before Adjusting (mm)	Existing Valve Lash Shim Marking (3 digits on shim)																																						
	190	192	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280
	Correct Valve Lash Shim Marking (3 digits on shim)																																				
0.000-0.024	178	180	182	185	188	190	192	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268
0.025-0.049	180	182	185	188	190	192	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270
0.050-0.074	182	185	188	190	192	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272
0.075-0.099	185	188	190	192	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275
0.100-0.124	188	190	192	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278
0.125-0.175 (Standard)																																					
0.176-0.200	192	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282
0.201-0.225	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285
0.226-0.250	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288
0.251-0.275	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290
0.276-0.300	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292
0.301-0.325	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295
0.326-0.350	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298
0.351-0.375	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300
0.376-0.400	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300	
0.401-0.425	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300		
0.426-0.450	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300			
0.451-0.475	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300				
0.476-0.500	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300					
0.501-0.525	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300						
0.526-0.550	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300							
0.551-0.575	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300								
0.576-0.600	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300									
0.601-0.625	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300										
0.626-0.650	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300											
0.651-0.675	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300												
0.676-0.700	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300													
0.701-0.725	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300														
0.726-0.750	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300															
0.751-0.775	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300																
0.776-0.800	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300																	
0.801-0.825	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300																		
0.826-0.850	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300																			
0.851-0.875	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300																				
0.876-0.900	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300																					
0.901-0.925	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300																						
0.926-0.950	268	270	272	275	278	280	282	285	288	290	292	295	298	300																							
0.951-0.975	270	272	275	278	280	282	285	288	290	292	295	298	300																								
0.976-1.000	272	275	278	280	282	285	288	290	292	295	298	300																									
1.001-1.025	275	278	280	282	285	288	290	292	295	298	300																										
1.026-1.050	278	280	282	285	288	290	292	295	298	300																											
1.051-1.075	280	282	285	288	290	292	295	298	300																												
1.076-1.100	282	285	288	290	292	295	298	300																													
1.101-1.125	285	288	290	292	295	298	300																														
1.126-1.150	288	290	292	295	298	300																															
1.151-1.175	290	292	295	298	300																																
1.176-1.200	292	295	298	300																																	
1.201-1.225	295	298	300																																		
1.226-1.250	298	300																																			
1.251-1.275	300																																				

Exhaust Valve Lash - Shim Selection Matrix

Exhaust Valve Clearance (cold):
.006-.010 in. (0.152-0.254 mm)

Example:

- Installed shim is 240
- Measured clearance is 0.006 in. (0.16 mm)
- Replace 240 shim with 232 shim

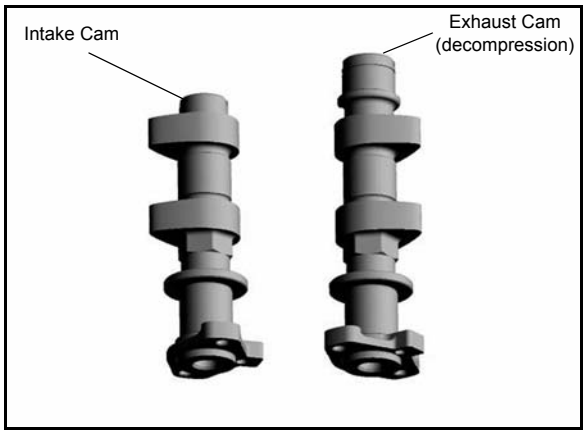
Shim Thickness: Example 240 equals thickness of 2.40 mm. Part Number: 3022173-XXX (Xs represent 3 digits on shim)

Exhaust Valve Clearance Before Adjusting (mm)	Existing Valve Lash Shim Marking (3 digits on shim)	190	192	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280
	Correct Valve Lash Shim Marking (3 digits on shim)																																					
0.000-0.025		170	172	175	178	180	182	185	188	190	192	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	
0.026-0.050	170	172	175	178	180	182	185	188	190	192	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	
0.051-0.075	172	175	178	180	182	185	188	190	192	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	
0.076-0.100	175	178	180	182	185	188	190	192	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	
0.101-0.125	178	180	182	185	188	190	192	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	
0.126-0.150	180	182	185	188	190	192	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	
0.151-0.175	182	185	188	190	192	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	
0.176-0.200	185	188	190	192	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	
0.201-0.225	188	190	192	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	
0.226-0.275 (Standard)																																						
0.276-0.300	192	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	
0.301-0.325	195	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	
0.326-0.350	198	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	
0.351-0.375	200	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	
0.376-0.400	202	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	
0.401-0.425	205	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	
0.426-0.450	208	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	
0.451-0.475	210	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300	
0.476-0.500	212	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300		
0.501-0.525	215	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300			
0.526-0.550	218	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300				
0.551-0.575	220	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300					
0.576-0.600	222	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300						
0.601-0.625	225	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300							
0.626-0.650	228	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300								
0.651-0.675	230	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300									
0.676-0.700	232	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300										
0.701-0.725	235	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300											
0.726-0.750	238	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300												
0.751-0.775	240	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300													
0.776-0.800	242	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300														
0.801-0.825	245	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300															
0.826-0.850	248	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300																
0.851-0.875	250	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300																	
0.876-0.900	252	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300																		
0.901-0.925	255	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300																			
0.926-0.950	258	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300																				
0.951-0.975	260	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300																					
0.976-1.000	262	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300																						
1.001-1.025	265	268	270	272	275	278	280	282	285	288	290	292	295	298	300																							
1.026-1.050	268	270	272	275	278	280	282	285	288	290	292	295	298	300																								
1.051-1.075	270	272	275	278	280	282	285	288	290	292	295	298	300																									
1.076-1.100	272	275	278	280	282	285	288	290	292	295	298	300																										
1.101-1.125	275	278	280	282	285	288	290	292	295	298	300																											
1.126-1.150	278	280	282	285	288	290	292	295	298	300																												
1.151-1.175	280	282	285	288	290	292	295	298	300																													
1.176-1.200	282	285	288	290	292	295	298	300																														
1.201-1.225	285	288	290	292	295	298	300																															
1.226-1.250	288	290	292	295	298	300																																
1.251-1.275	290	292	295	298	300																																	
1.276-1.300	292	295	298	300																																		
1.301-1.325	295	298	300																																			
1.326-1.350	298	300																																				
1.351-1.375	300																																					

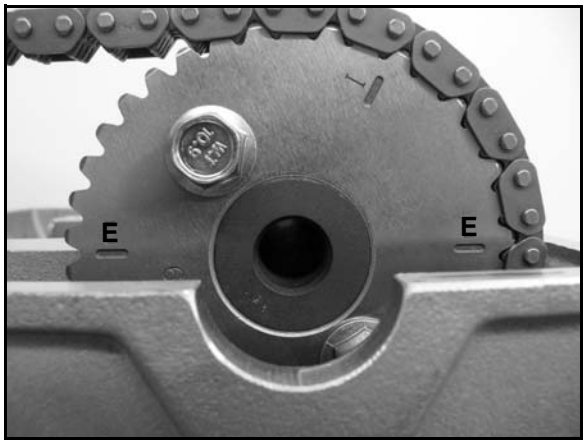
Camshaft Installation / Timing

IMPORTANT: If any valve train components were replaced, refer to "Valve Clearance Adjustment" procedure prior to "Camshaft Installation / Timing".

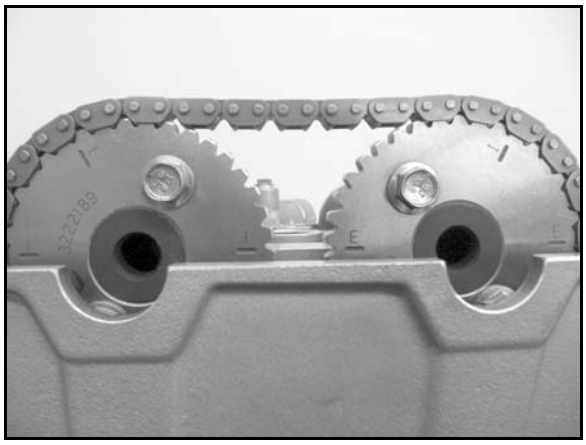
1. Rotate the engine and position the piston at TDC.
2. Reference the intake and exhaust markings made during disassembly.



3. Lubricate all camshaft lobes and bearing journal surfaces with Polaris PS-4 Plus engine oil prior to installation.
4. Place the exhaust cam into the cylinder head and align the timing marks as shown below.



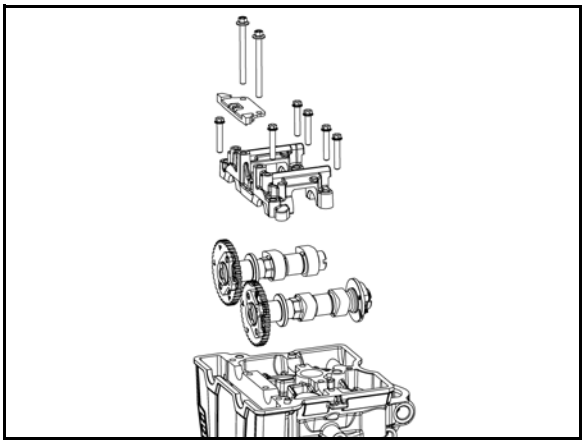
5. Wrap the camchain around the exhaust cam sprocket and hold the exhaust cam in its current position.
6. Carefully install the intake cam at an angle to allow for cam chain installation. Roll the cam shaft into its bearing pockets and verify that the timing marks are in alignment as shown below.



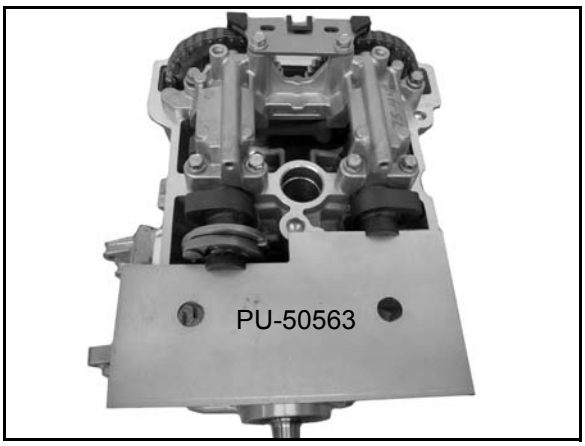
IMPORTANT: Intake cam sprockets should have "I" marks aligned with gasket surface and the exhaust cam sprocket should have "E" marks aligned with gasket surface.

7. Carefully install the camshaft carrier onto the camshafts.

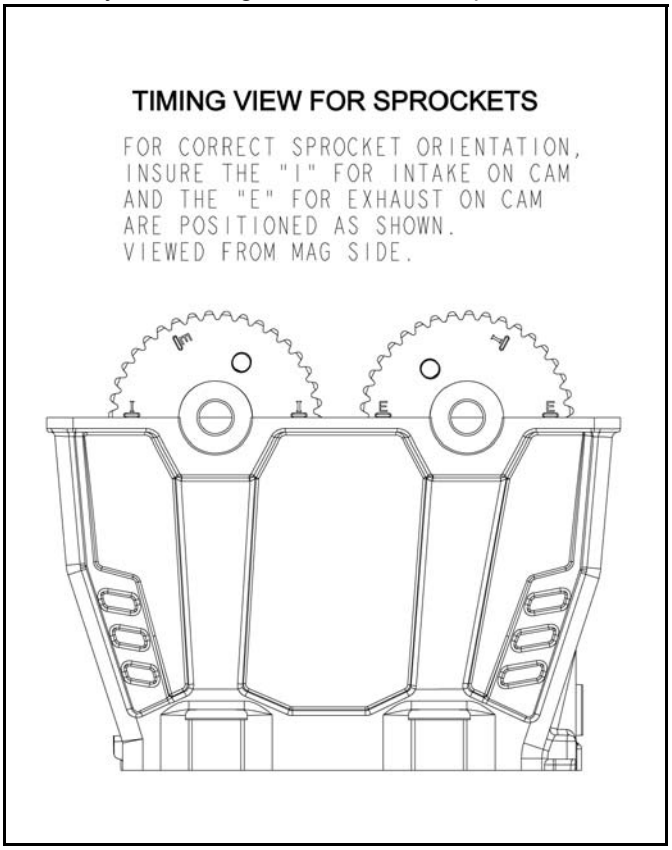
8. Install the upper cam chain guide and the (8) bolts that retain the camshaft carrier. Tighten the bolts evenly until snug. Do not torque at this time.



9. Install the Cylinder Holding and Camshaft Timing Plate (PU-50563) into the end of camshafts as shown.



10. Verify cam timing is correct and the piston is a TDC.



11. If timing marks are not aligned:

    - Remove the Camshaft Timing Plate (PU-50563) from the end of the camshafts.
    - Remove the cam carrier bolt and cam carrier.
    - Correct the camshaft timing as needed.
    - Reinstall the cam carrier.
    - Re-check cam timing.

12. Remove the Cylinder Holding & Camshaft Timing Plate (PU-50563) from the end of the camshafts.

13. If needed, install the camshaft carrier and bolts.

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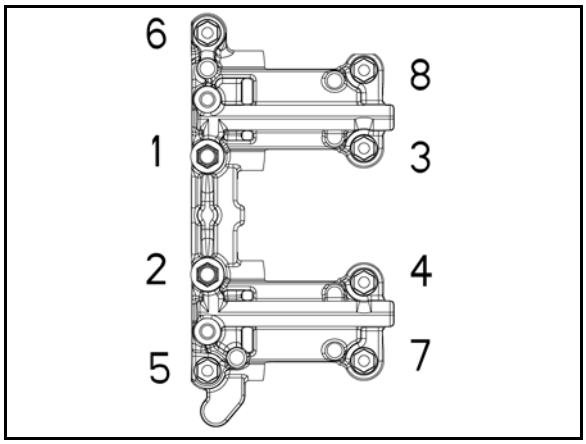
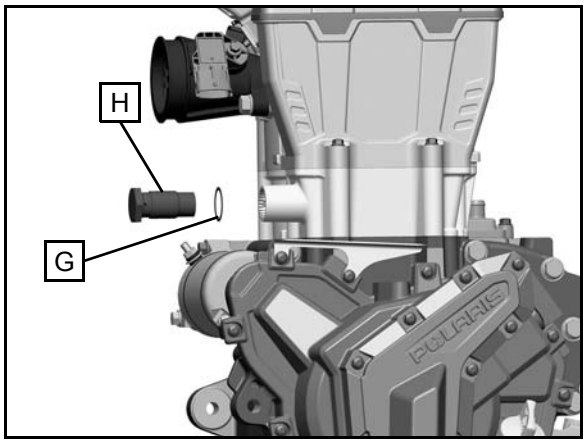
14. Torque the camshaft car rier bolts in seq uence to specification.



= T
Camshaft Carrier Bolts: **7.5 ft. lbs. (10 ± 1 Nm)**

15. Insure the ***new*** sealing washer (G) is in place.

16. Install the hydraulic cam chain tensioner (H) into the cylinder and torque to specification.



= T
Cam Chain Tensioner: **30 ft. lbs. (40 Nm)**

17. Rotate crankshaft through two revolutions and verify camshaft timing is correct.

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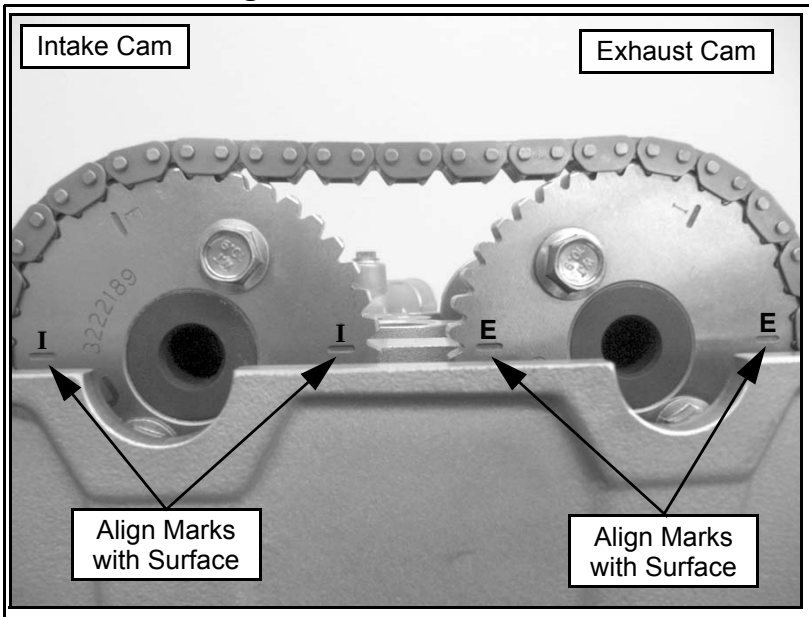
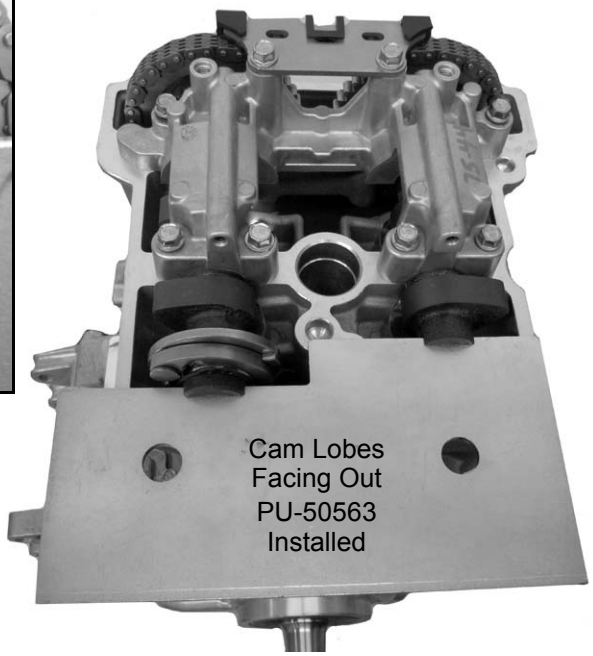
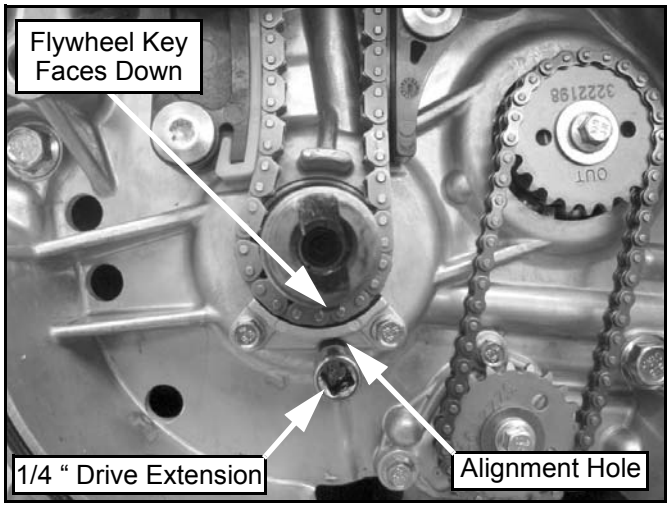
Camshaft Timing - Quick Reference



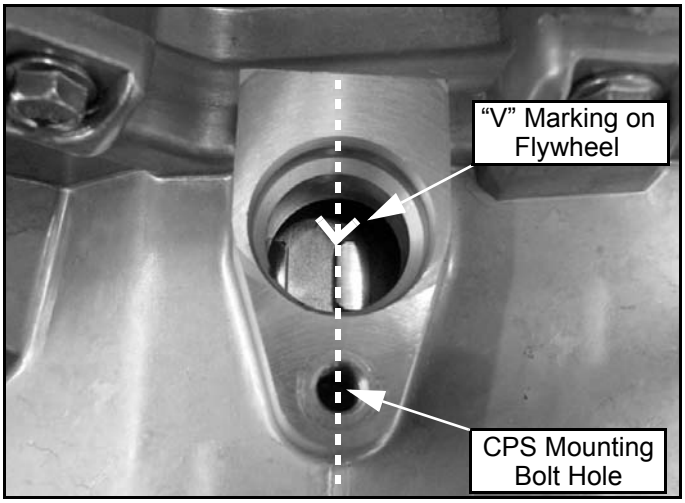
TOP END





Stator Cover / Flywheel Removed

Stator Cover / Flywheel Installed



BOTTOM END

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Valve Cover Installation

1. Apply Anti-seize and install the spark plug (A) and torque to specification.

= T
Spark Plug: **7 ft. lbs. (10 Nm) Apply Anti-seize**

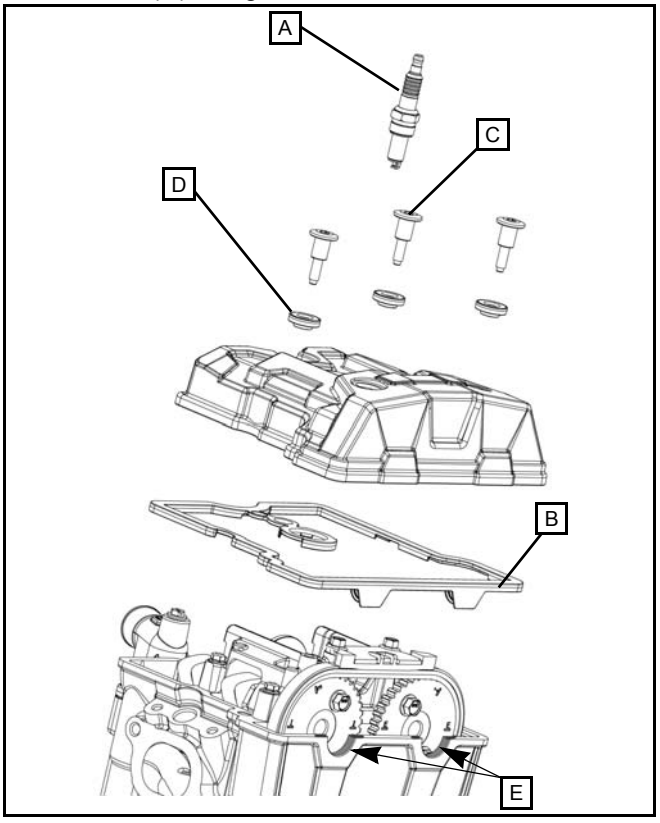
2. Prepare valve cover sealing surfaces by cleaning thoroughly to remove all residue.

3. Apply a small amount of crankcase sealant to the cylinder head half-moon cutouts (E) as shown.

Crankcase Sealant: 2871557

4. Install a ***new*** valve cover seal (B).

5. Install the (3) valve cover shoulder bolts (C) and isolators (D) using a T40 driver.



6. Torque valve cover bolts to specification.

= T
Valve Cover Bolts: **9 ft. lbs. (12 Nm)**

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ENGINE DISASSEMBLY / INSPECTION - LOWER END

Crankcase Disassembly

NOTE: The engine top end, starter motor, stator cover, starter drive, flywheel, stator, cam chain, oil pump and sprockets can be serviced with the engine installed in the vehicle.

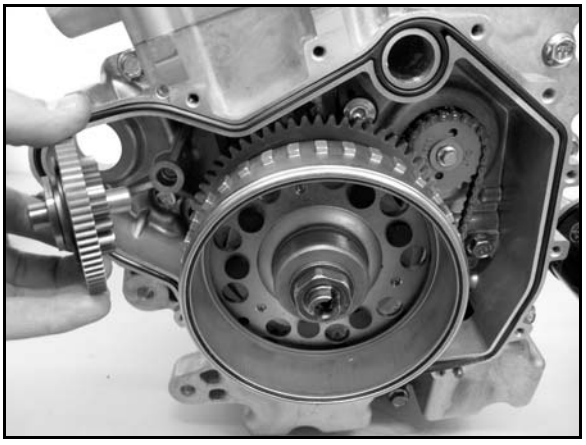
Flywheel / Stator Housing Removal

1. Remove the stator cover as outlined in the "Water Pump Mechanical Seal / Oil Seal Replacement" procedure" in this chapter.

> **⚠ CAUTION**
>
> **The flywheel contains powerful magnets. Use caution when removing the stator cover. DO NOT place fingers between cover and crankcase at any time during the removal process or injury could result.**

> **⚠ CAUTION**
>
> **Be sure engine coolant does not contaminate the engine oil during stator cover service.**

2. Remove starter drive gear and shaft. Inspect gear teeth for damage. Inspect fit of shaft inside gear and replace gear assembly if clearance is excessive. Inspect shaft and shaft bearing surfaces in case and stator housing for wear.



3. Hold flywheel with a commercially available strap wrench and remove flywheel nut and washer. Discard the flywheel nut and replace for assembly.

NOTE: The flywheel nut has standard rotation (right hand) threads.

4. Back the center screw of flywheel puller PA-49316 completely out and screw puller onto flywheel completely.

5. Tighten center bolt of tool PA-49316 and remove flywheel.

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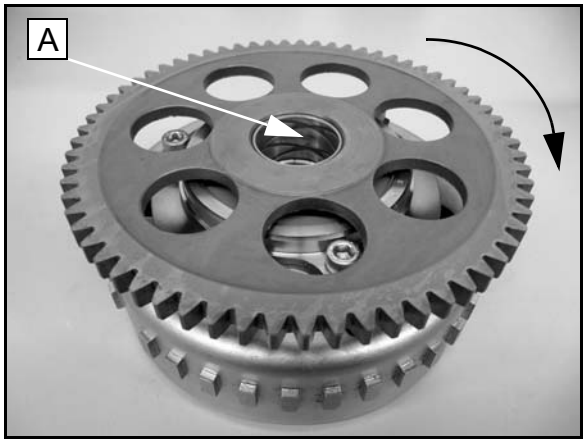
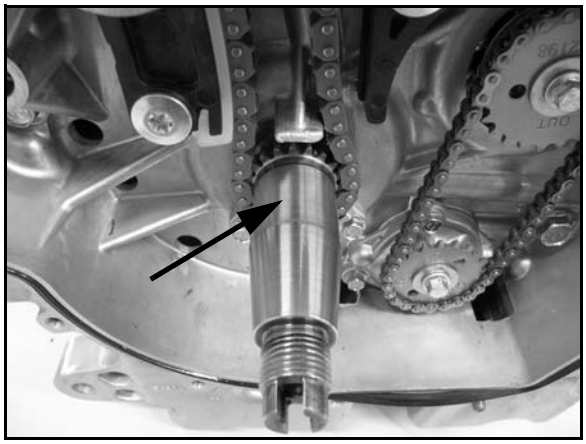
Starter One-Way Clutch Inspection

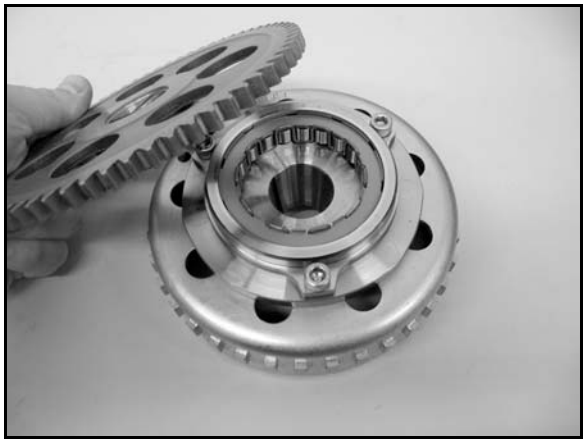
1. Remove flywheel as outlined in this chapter.
2. Place flywheel on work bench. Grasp gear and rotate clockwise. It should turn smoothly without binding.
3. Rotate gear counterclockwise. The gear should immediately lock in position and not slip.
4. Inspect inside of hub (A) for wear, galling, or uneven surface.



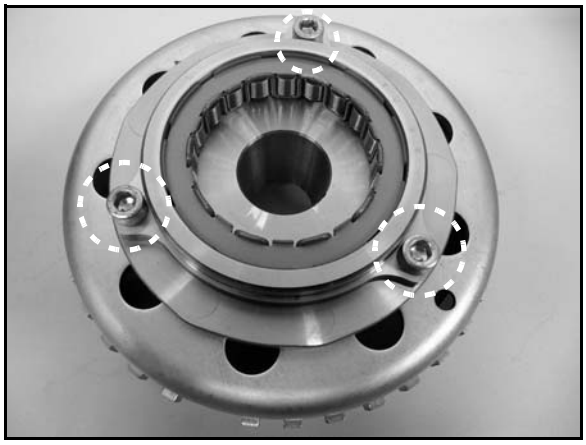
5. Inspect crankshaft bearing surface for abnormal wear.



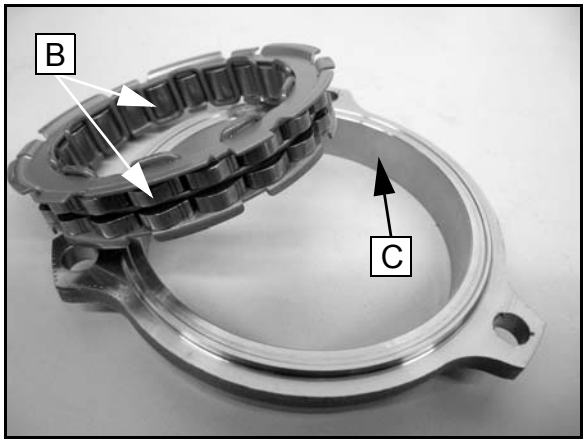
6. Remove starter gear from the flywheel assembly.



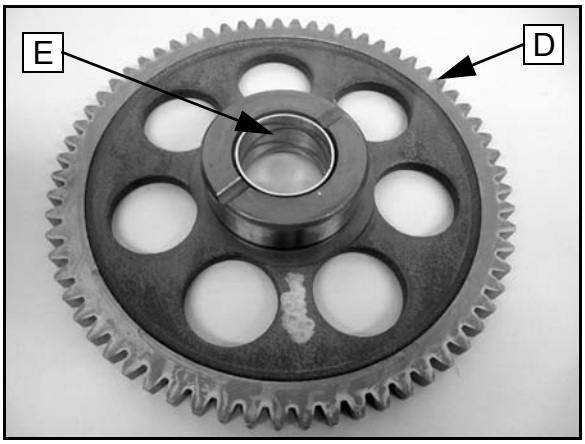
7. Remove the (3) one-way clutch retaining bolts.



8. Remove clutch and inspect both sides of drive rollers (B) and roller contact surface (C) inside hub for wear, damage, or uneven surface.

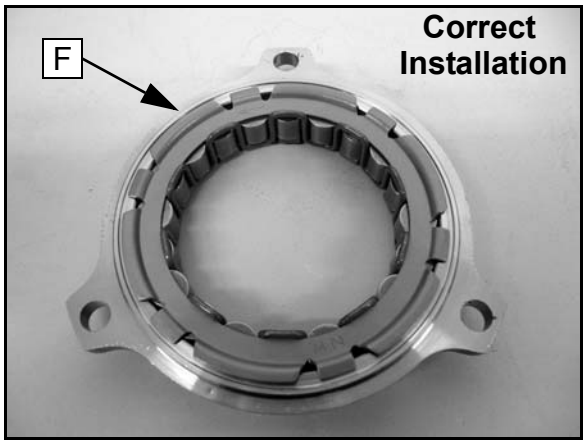


9. Inspect drive surface of starter gear (D) and bearing surface (E) for wear, damage, or uneven surface. If any starter clutch component is worn or damaged, replace clutch, clutch hub, and starter gear.



Starter One-Way Clutch Installation

1. Install one-way clutch in clutch hub with flange of clutch (F) engaged in recess.

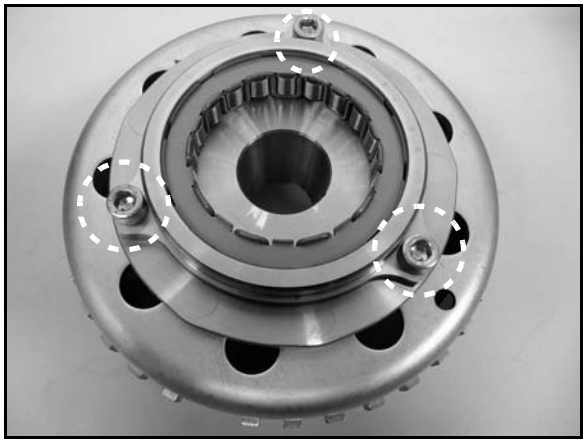


IMPORTANT: The one-way clutch can be installed into the hub incorrectly. This will cause engine cranking issues.

2. Clean screw threads in flywheel to remove all oil or grease.

3. Apply Loctite® 272™ on the (3) bolts. Place hub on flywheel and install (3) bolts.

4. Torque screws to specification.



= T
One Way Clutch Retaining Bolts: **9 ft. lbs. (12 Nm)** **Apply Loctite® 272™**

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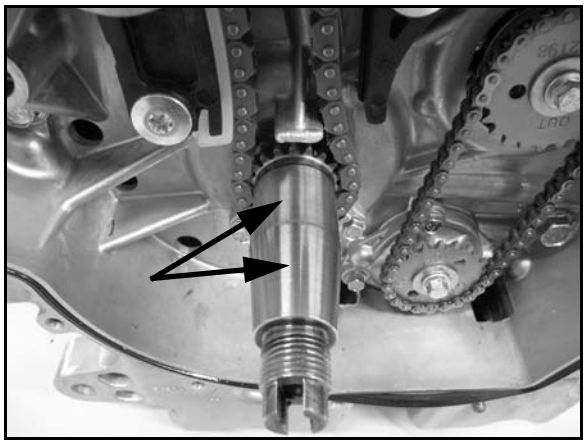
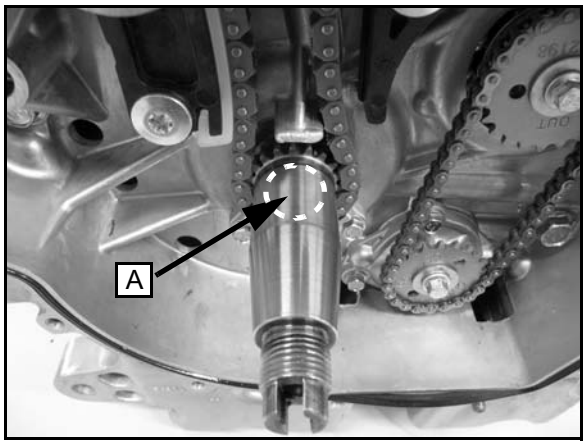
Flywheel Installation

1. Clean the threads, taper and flat of crankshaft to remove all oil or grease.



2. Clean flywheel taper to remove all oil or grease.

3. Apply a small amount of PS4 Plus engine oil to the flat area (A) on the MAG side crankshaft. DO NOT apply engine oil to the crankshaft taper.

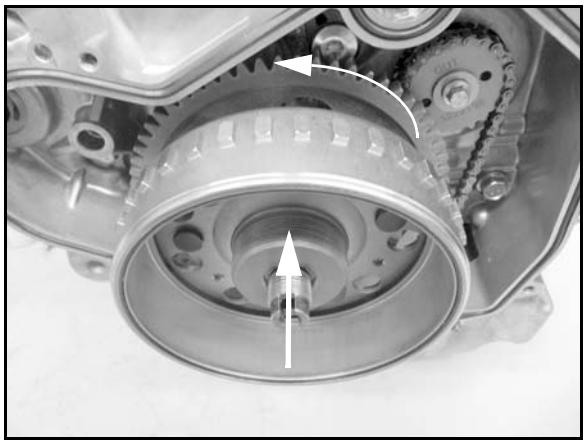


4. Rotate crankshaft so the flywheel key (A) is facing upward.

5. Fully install starter gear onto the crankshaft as shown.

6. Align the flywheel keyway with flywheel key on the crankshaft.

7. By hand, lightly press the flywheel inward while rotating the starter gear counter clock-wise. Fully install the flywheel until seated on the crankshaft taper.



8. Install the flywheel washer.

9. Hold flywheel with commercially available strap wrench.

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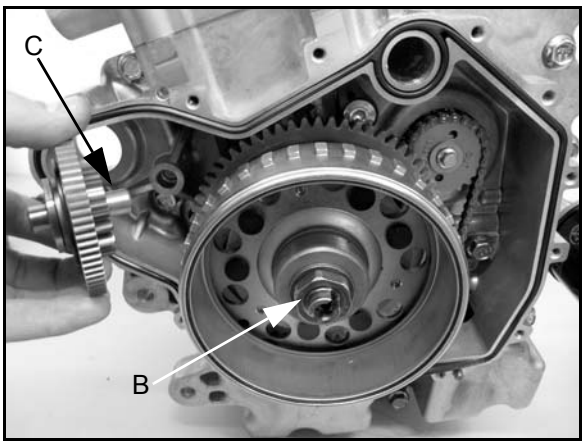
10. Torque ***new*** flywheel nut (B) to specification.



= T
Flywheel Retaining Nut: **133 ft. lbs. (180 Nm)**

11. Install starter idler gear and shaft (C).

Stator Removal

NOTE: Test stator wire continuity before removing it from the housing.

1. Remove the stator cover as outlined in the "Water Pump Mechanical Seal / Oil Seal Replacement" procedure" in this chapter.

CAUTION

The flywheel contains powerful magnets. Use caution when removing the stator cover. DO NOT place fingers between cover and crankcase at any time during the removal process or injury could result.

2. Remove and discard the stator cover gasket.

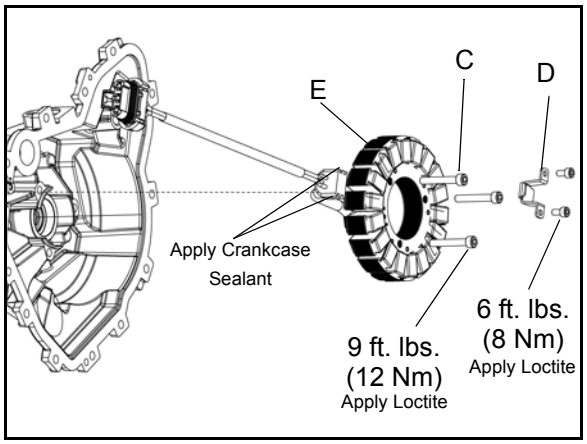
CAUTION

Be sure engine coolant does not contaminate the engine oil during stator cover service.

3. Remove the 3 bolts (C) that secure the stator to the stator cover.

4. Remove the 2 bolts that secure the stator wire routing bracket (D) to the stator cover.

5. Remove the stator (E) from the stator cover.



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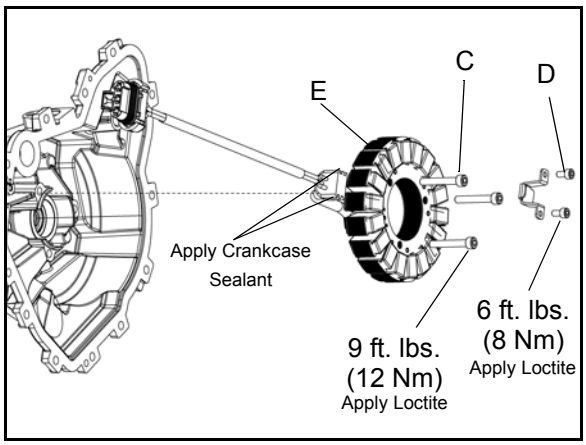
Stator / Stator Cover Installation

1. Clean and degrease screws and threads in stator housing.
2. Clean mounting surfaces of stator and housing.
3. Apply crankcase sealant to edges of rubber stator grommet as shown below.
4. Set the stator in housing and press wire grommet into slot on housing.
5. Apply Loctite® 242™ to end (8-10 threads) of (3) stator screws (C) and the (2) wire routing bracket screws (D).
6. Install all (5) screws and torque to specification.



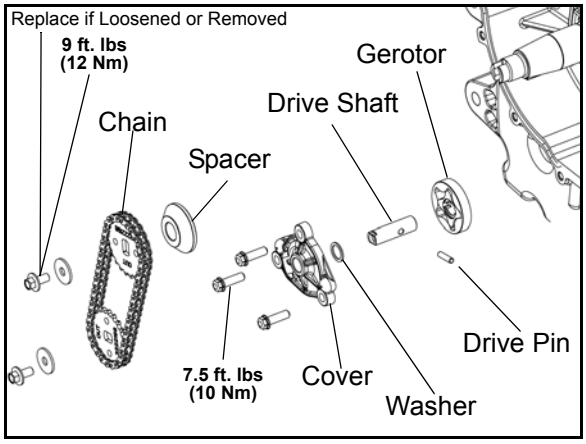
= T
Stator to Cover Retaining Bolts (C): **9 ft. lbs. (12 Nm) Apply Loctite® 242™**

= T
Stator Wire routing Bolts (D): **6 ft. lbs. (9 Nm) Apply Loctite® 242™**

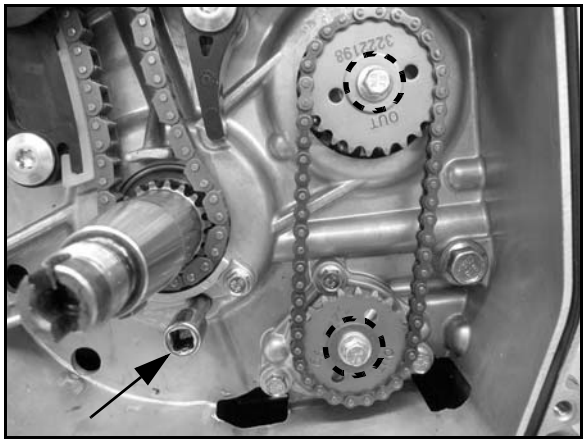
7. Install a ***new*** stator cover gasket into the engine.
8. Install the stator cover as outlined in this chapter.

CAUTION
The flywheel contains powerful magnets. Use caution when installing the stator cover. DO NOT place fingers between cover and crankcase at any time during the removal process or injury could result.

Oil Pump Removal



1. Rotate the crankshaft to TDC position by aligning the timing hole in crankcase with a timing hole in the crankshaft. Insert a 1/4" drive socket extension through the crankcase and in to the crankshaft locating hole.
2. Remove the (2) oil pump sprocket bolts and washers. Discard the bolts and replace with new for assembly. Remove the sprockets and chain from the engine.



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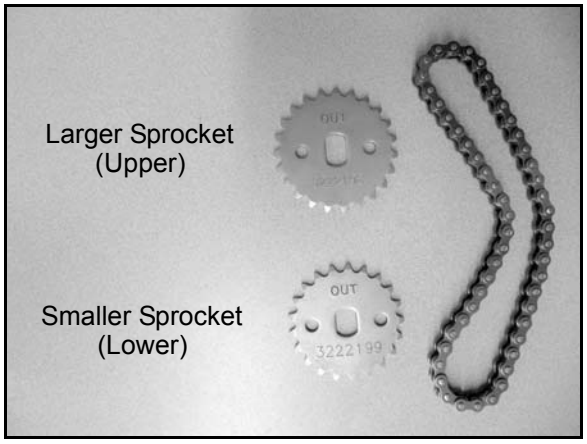
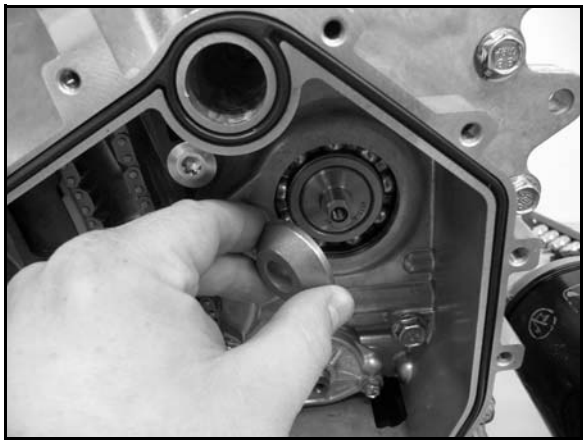
3. Inspect the oil pump chain for worn or missing rollers or damage. Chain should be replaced as a set with sprockets if sprocket teeth are worn.



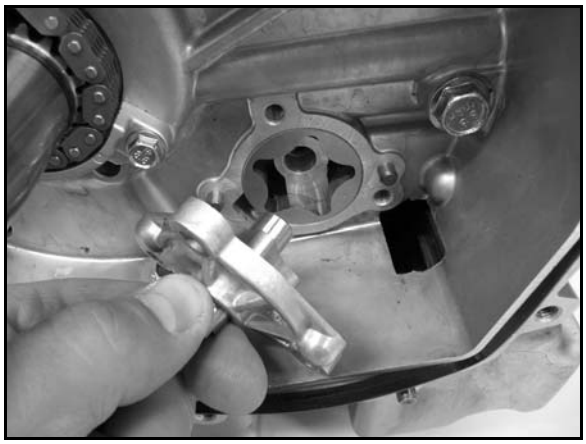
NOTE: The larger oil pump sprocket mounts to the balance shaft extension, the smaller oil pump sprocket mounts to the oil pump shaft.

4. Remove the upper oil pump sprocket spacer.



5. Remove the (3) bolts securing the oil pump cover to the crankcase.

6. Grasp the oil pump shaft and pull it outward to remove the shaft, oil pump cover and inner oil pump geroter. This will prevent the oil pumpdrive pin from falling out and into the crankcase.



IMPORTANT: The gerotor set has (2) orientation dots that must be installed inward upon assembly (Figure 1 on the next page).

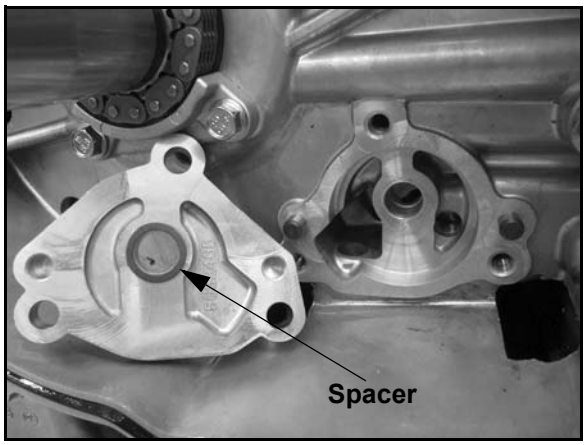
7. Remove the center geroter, pin and shaft from the oil pump cover.

NOTE: There is a spacer in between the inner oil pump geroter and the oil pump cover.

8. Remove the oil pump geroter that is in the engine case (if needed).

9. Clean the geroters to remove oil.

10. Inspect surfaces of pump cavity in crankcase and surface of pump cover for scoring or wear.



11. Inspect gerotor for scoring or other damage. Replace parts as a set if damaged.

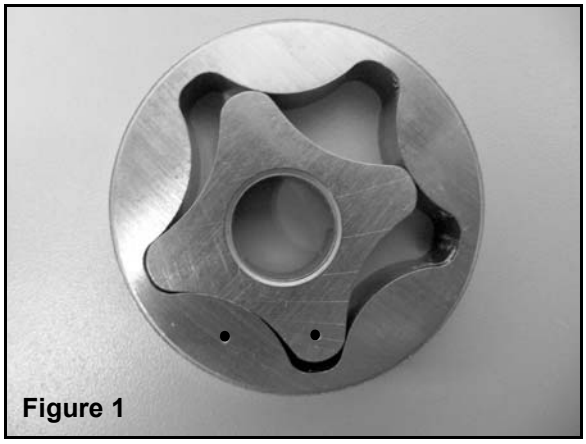
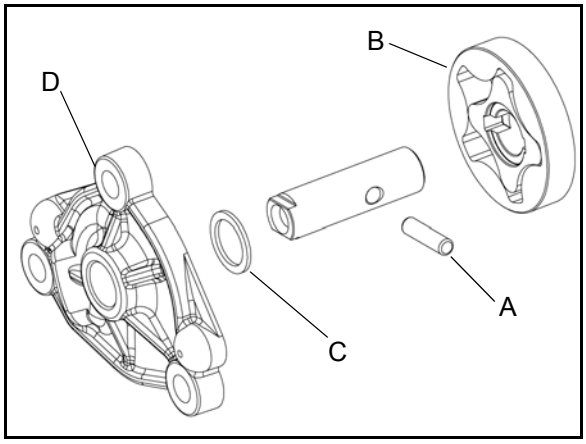


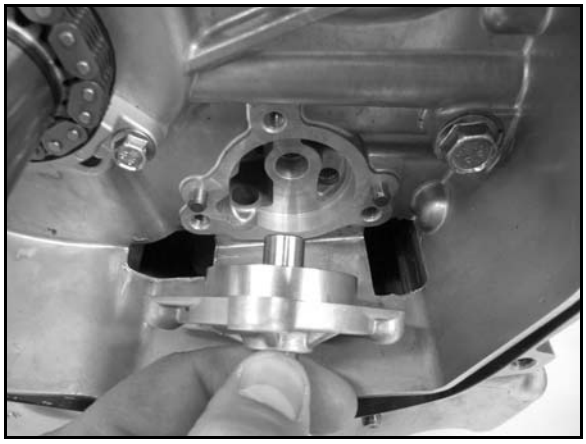
Figure 1

Oil Pump Assembly

1. Clean and dry all parts thoroughly. Apply clean engine oil to all parts. Do not use gasket sealer on the pump cover mating surfaces.
2. Align the gerotor according to the orientation dots.
3. Place the drive pin (A) through the oil pump drive shaft.
4. Slide the gerotor (B) onto the drive shaft and lock them into position on the drive pin.
5. Install the washer (C) onto the drive shaft.
6. Install the oil pump cover (D) onto the shaft assembly.



7. Grasp the complete oil pump assembly by the drive shaft and install the assembly into the crankcase.



8. Install the (3) oil pump cover bolts and torque to specification.

= T
Oil Pump Cover Bolt: **7.5 ft. lbs. (10 Nm)**

9. Install the upper oil pump sprocket spacer.
10. Install the oil pump sprockets, chain, washer and ***new*** bolts. Oil pump sprockets must be installed in the correct position, with the word "**OUT**" facing out.
11. Torque sprocket bolts to specification.

= T
Oil Pump Sprocket Bolt: **9 ft. lbs. (12 Nm)**

=	
Oil Capacity	Approx. 2 Quarts (1.9 L)
Oil Filter Wrench	PU-50105 or 2.5" (64 mm)
Oil Type	Polaris PS-4 Plus Synthetic Engine Oil
Oil Pressure Minimum Specification (using Polaris PS-4 Plus at operating temperature)	10 PSI @ 1200 RPM (Minimum)
	40 PSI @ 7000 RPM (Minimum)

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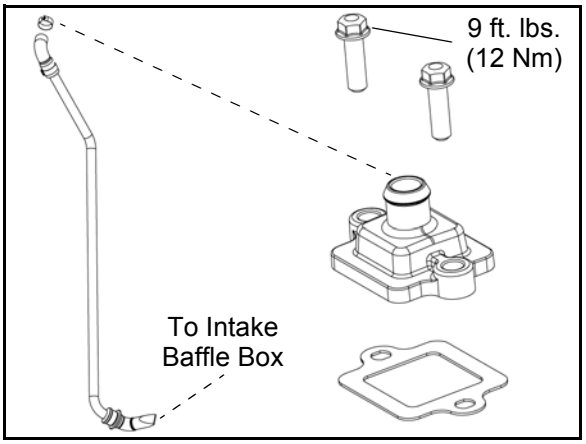
Crankcase Breather Service

NOTE: The crankcase breather is serviceable with the engine assembled and installed in the vehicle chassis.

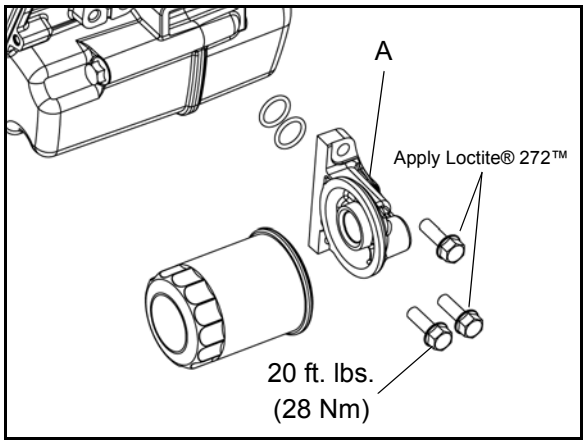
1. Remove the crankcase vent tube (if not already performed).
2. Remove the (2) fasteners securing the engine breather cover to the engine.
3. Remove the breather cover gasket and replace if damaged.
4. For reassembly, thoroughly clean the crankcase and breather cover mating surfaces. Install a new gasket and torque the (2) fasteners to specification.



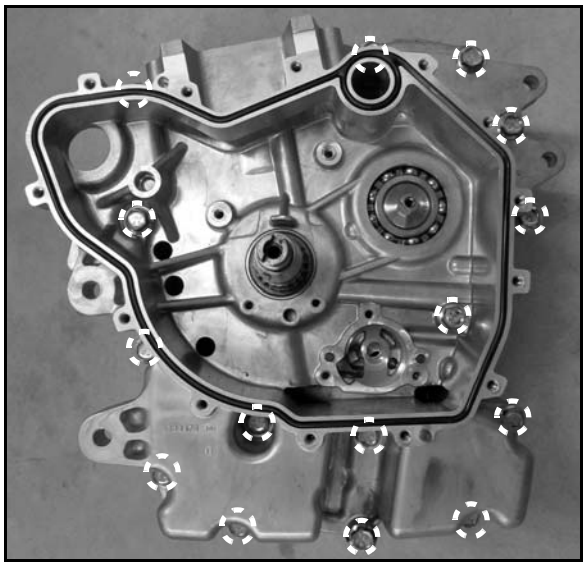
Crankcase Separation

NOTE: Before the crankcase can be separated, be sure the entire top end and oil pump assembly are removed from the engine as outlined in this chapter.

1. Rotate the engine on the engine stand so the magneto side is facing upward.
2. Remove the oil filter and the (3) fasteners that secure oil filter adapter (A) to the crankcase. Discard O-rings and through clean the adaptor for reassembly.



3. Remove and discard the (15) flange bolts from magneto side crankcase evenly in a criss-cross pattern.



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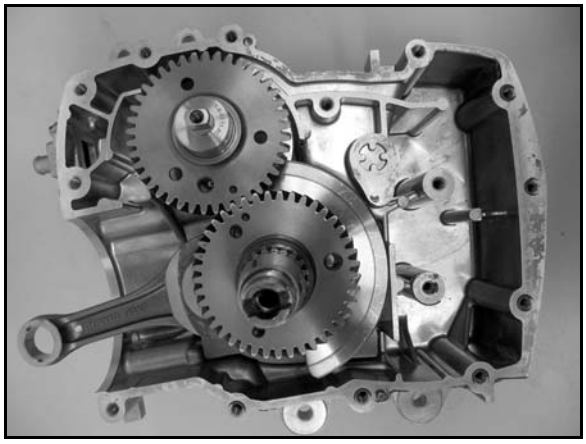
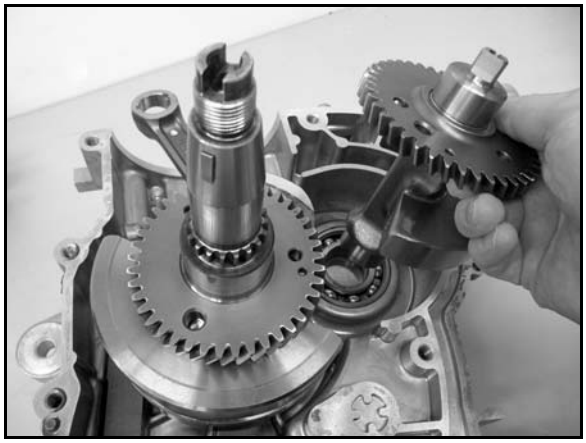
4. Separate crankcase by tapping with a soft faced hammer in reinforced areas and lift MAG crankcase off PTO case.



Balance Shaft Removal / Inspection

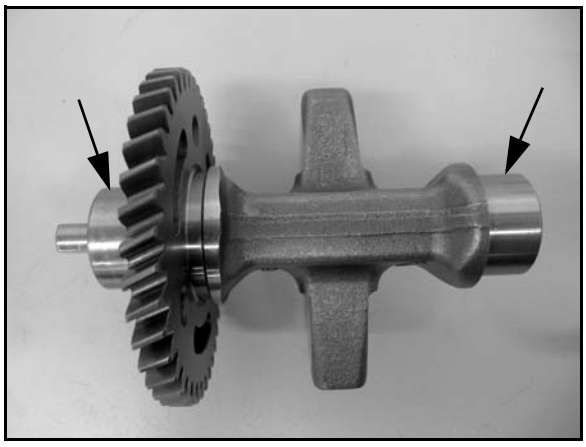
1. Rotate crankshaft to align the timing marks as shown below.

2. Pull upward on the balance shaft and remove it from the crankcase.



3. Inspect drive gear for broken or damaged teeth.

4. Inspect bearing surfaces for scoring or signs of wear.



5. Inspect / replace the balance shaft bearings in both crankcase halves. See "Crankcase Bearing Inspection / Removal" procedure in this chapter.

NOTE: Due to extremely close tolerances and minimal wear, counterbalance shaft bearings must be inspected visually and by feel. Look for signs of discoloration, scoring or galling. Turn the inner race of each bearing. The bearings should turn smoothly and quietly. The outer race of each bearing should fit tightly in the crankcase bore. The inner race should be firm with minimal side to side movement and no detectable up and down (radial) movement.

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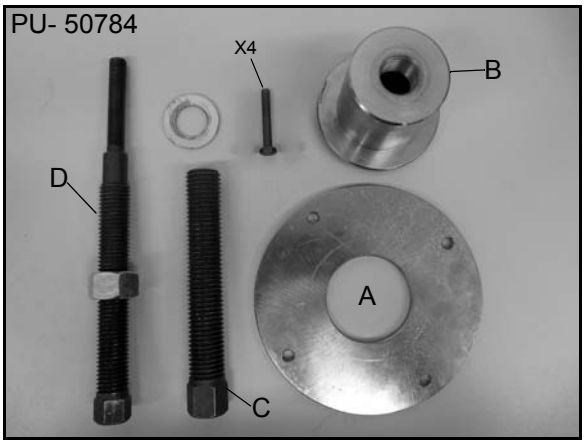
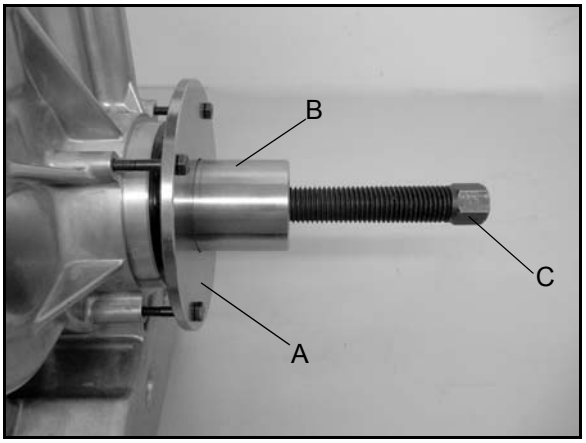
Crankshaft Removal

1. Remove the engine from the engine stand and place the assembly on a sturdy work bench.
2. Remove the (2) bolts securing the bearing retainer plate to the crankcase. Remove the bearing plate.
3. Install the crankshaft removal / installation tool PU-50784 on to the PTO side crank case.
   - Install plate “A” over adapter “B”.
   - Evenly attach the assembly onto the PTO side crankcase using the (4) bolts as shown below.
   - Thread the crankshaft removal screw “C” into adapter “B”.



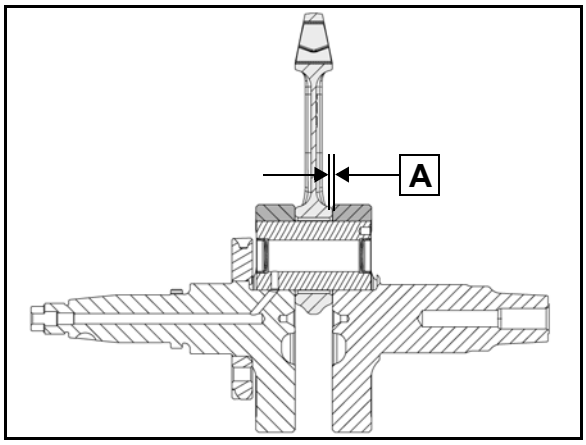


4. With the help of an assistant holding the crankshaft, slowly tighten the screw “C” until the crankcase is completely separated from the crankshaft.
5. Remove all special tools from the crankcase.

Crankshaft Inspection

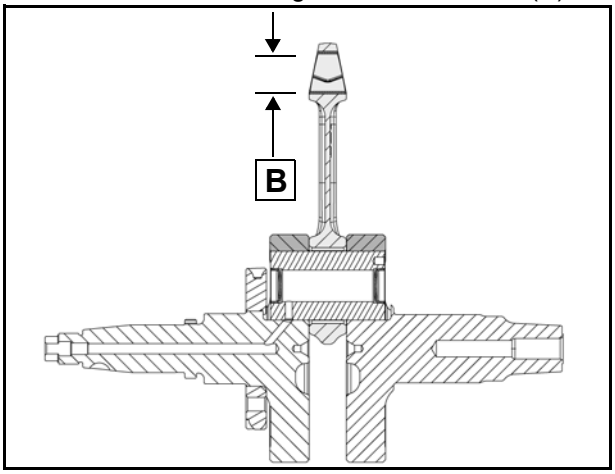
IMPORTANT: The connecting rod uses plain bearings. The connecting rod bearings are not serviceable. If ANY excessive wear or movement is present or if the rod does not rotate on the crankshaft freely, the crankshaft assembly must be replaced.

1. Use a feeler gauge to measure the connecting rod big end side clearance (A).



Connecting Rod Big End Side Clearance:
0.00590-.01771” (.15 - .45mm)

2. Measure the connecting rod small end I.D. (B).



Small End I.D. Standard:
0.8665” - 0.8670” (22.010 - 22.023 mm)
Service Limit: 0.08682” (22.053 mm)

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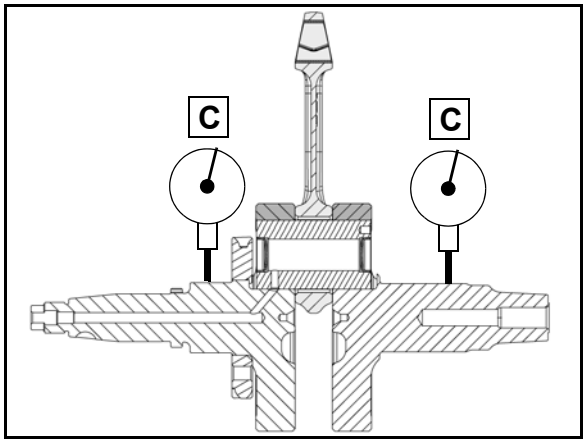
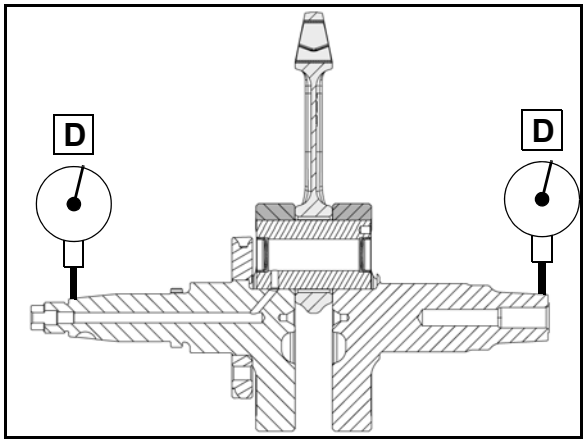
3. Place the crankshaft in a truing stand or V-blocks and measure the runout where indicated below with a dial indicator.





Maximum Runout:

Inner (C) - 0.00118" (0.03 mm)

Outer (D) - 0.00590" (0.15 mm)

IMPORTANT: The MAG side crankshaft plain bearing is not serviceable. Crankcase replacement is required if the bearing is damaged or has excessive wear. The crankshaft is reusable if it meets specifications and MAG side bearing surface is not groved, pitted, damaged or excessively worn.

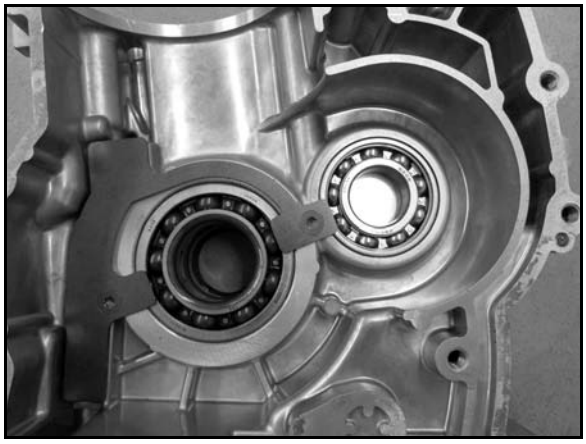
PTO Side Crankcase Bearing Service

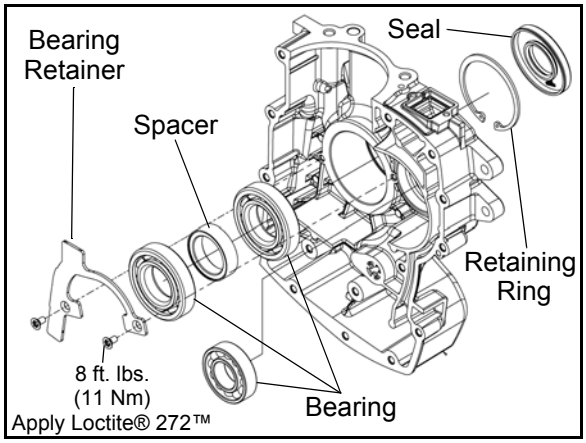
Bearing Removal

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

NOTE: Bearings are stressed during the removal process and must not be re-used!

1. Remove and discard the PTO side crankshaft seal. Replace with new for assembly.
2. If not already performed, remove the (2) screws that secure the bearing retainer to the case.
3. Remove the retaining ring.
4. Support the crankcase and drive, press, or extract the (3) bearings with a blind bearing remover.





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Installation

NOTE: To ease bearing installation, warm the crankcase evenly with a heat gun or place in an oven and heat to 220 -250° F. Place bearings in clean plastic wrap and set in a freezer for 10-20 minutes.

1. Clean all bearing bores and inspect for excessive wear.
2. Lubricate all bearing bores with clean engine oil.
3. Fully seat the ***new*** balance shaft bearing until bottomed in the bearing bore.
4. Install the retaining ring for the crankshaft bearings.
5. Fully seat the ***new*** outer PTO crankshaft bearing until bottomed against the retaining ring.
6. Install the bearing spacer.
7. Press in the ***new*** inner PTO bearing until it is bottomed against the bearing spacer.
8. Apply Loctite® 272™ to the (2) bearing retainer bolts.
9. Install the bearing retainer and torque the fastener to specification.

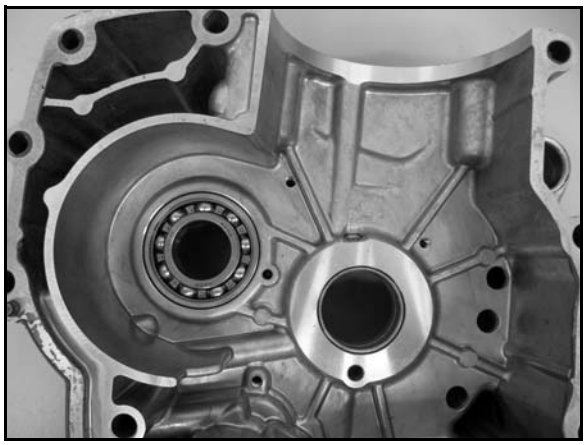
= T
Bearing Retainer Fastener: **8 ft. lbs. (11 Nm)** **Apply Loctite® 272™**

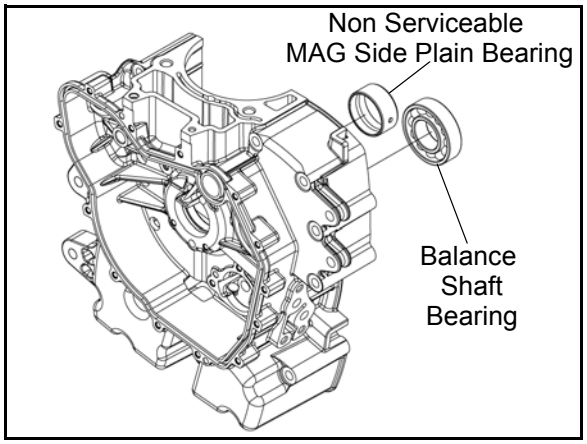
MAG Side Crankcase Bearing Service

Bearing Removal

1. Support the crankcase and drive, press, or extract the balance shaft bearing with a blind bearing remover.

IMPORTANT: The MAG side crankshaft plain bearing is not serviceable. Crankcase replacement is required if the bearing is damaged or has excessive wear. The crankshaft is reusable if it meets specifications and MAG side bearing surface is not groved, pitted, damaged or excessively worn.





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

NOTE: Bearings are stressed during the removal process and must not be re-used!

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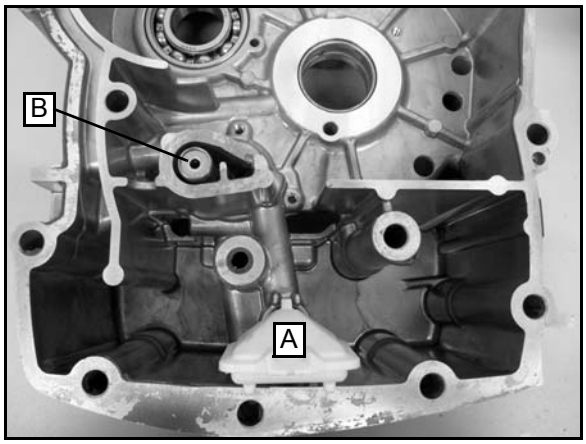
Installation

1. Clean all bearing bores and inspect for excessive wear.
2. Lubricate all bearing bores with clean engine oil.
3. Fully seat the ***new*** balance shaft bearing until bottomed in the bearing bore.

Oil Pickup Assembly Inspection

The oil pickup assembly is located in the MAG side crankcase (A).

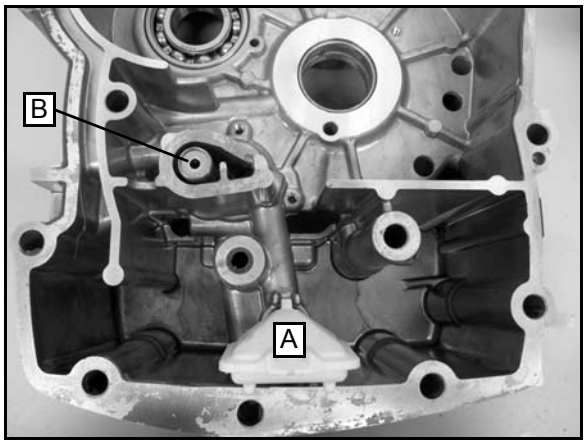


1. Pull and twist to remove the oil pickup assembly from the crankcase.
2. Inspect the assembly for cracks and excessive wear. Replace if necessary.
3. Remove and discard the O-ring.
4. Thoroughly clean the pickup assembly.
5. Replace the o-ring and lubricate with clean engine oil.
6. Press the pickup assembly into the crankcase until fully seated.

Oil Pressure Regulator (Bypass) Valve Inspection

The oil pressure regulator (bypass) valve is located in the MAG side crankcase (B).

1. Use a brass drift to press out the oil pressure valve from the crankcase.
2. Replace the oil pressure valve if the inner plunger binds, sticks or does not operate smoothly.
3. Remove and discard the O-ring.
4. Thoroughly clean the valve.
5. Replace the O-ring and lubricate with clean engine oil.
6. Press the oil pressure valve into the crankcase until fully seated.



Crankcase Inspection

1. Remove all traces of gasket sealer from the crankcase mating surfaces. Inspect the surfaces closely for nicks, burrs or damage.
2. Be sure alignment pins are in place where used.
3. Be sure oil passages are clean and free of any cleaning solvent.

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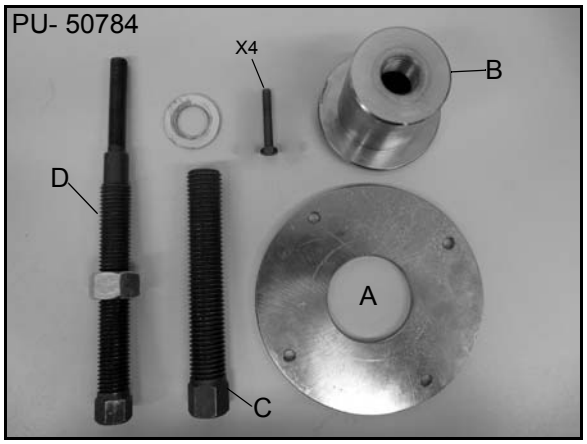
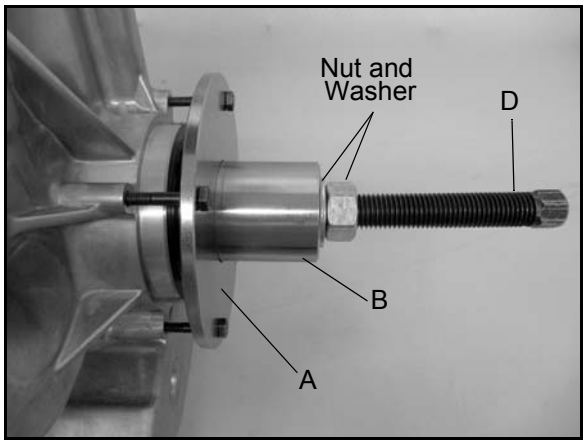
ENGINE ASSEMBLY - LOWER END

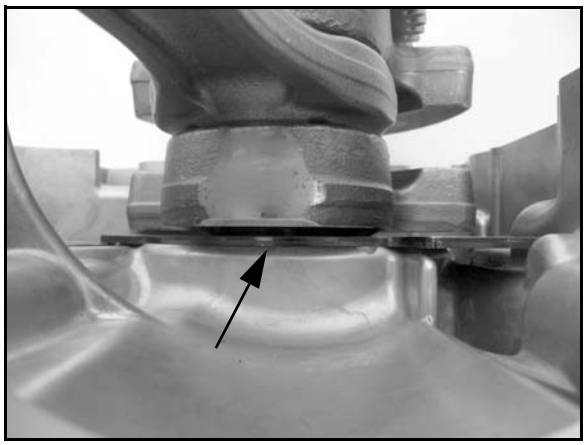
Crankcase Assembly - PTO Side

1. Lubricate all crankcase bearings with engine oil. Clean sealing surface to remove all old sealant.
2. Place crankcase on a sturdy work bench.
3. Carefully set the PTO crankcase onto the PTO side of the crankshaft.
4. Align the connecting rod with the cylinder area if the crankcase.
5. Install the crankshaft removal / installation tool PU-50784 on to the PTO side crankcase.
   - Install plate “A” over adapter “B”.
   - Evenly attach the assembly onto the PTO side crankcase using the 4 bolts as shown below.
   - Place the nut and large washer onto the crankshaft installation screw “D”.
   - Insert the crankshaft installation screw “D” through the threaded portion of the adaptor “B”.
   - Fully thread the crankshaft installation screw “D” into the clutch bolt threads of the crankshaft.
   - With the help of an assistant holding the crankshaft, firmly hold the crankshaft installation screw “D” with a wrench while tightening the large nut against the adaptor “B”.





6. With the help of an assistant, slowly tighten the nut until the crankshaft is completely seated into the crankcase bearings.
7. Remove the crankshaft removal / installation tool PU- 50784 from the crankcase.
8. Be sure crankshaft is fully seated and rotates smoothly.



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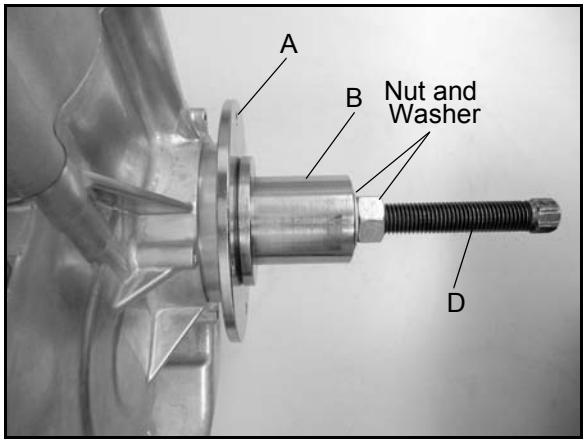
IMPORTANT: The crankshaft seal can be replaced with the engine installed in the chassis. The engine does not have to be removed and the crankcase does not have to be separated to replace the crankshaft seal.

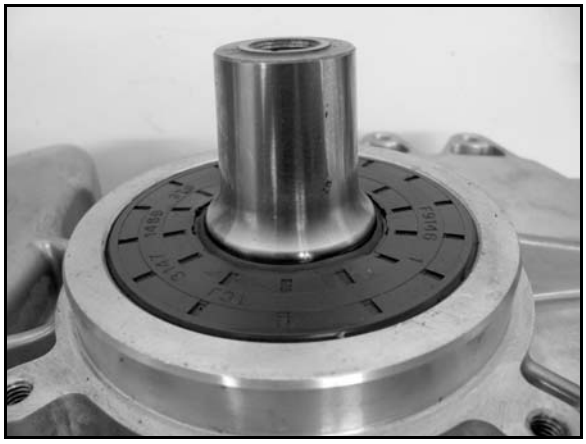
9. Lubricate a ***new*** crankshaft seal and slide it over the PTO end of the crankshaft. with numbers facing OUT. Be sure seal lip does not fold back when moving over the crankshaft flange.

10. Use the crankshaft removal / installation tool PU-50784 to properly drive the crankshaft seal into the crankcase.

    - Center plate “A” over the crankshaft so it is resting on the crankshaft seal.
    - Center adaptor “B” over the crankshaft end.
    - Place the nut and large washer onto the crankshaft installation screw “D”.
    - Insert the crankshaft installation screw “D” through the threaded portion of the adaptor “B”.
    - Fully thread the crankshaft installation screw “D” into the clutch bolt threads of the crankshaft.
    - Firmly hold the crankshaft installation screw “D” with a wrench while tightening the large nut against the adaptor “B”.



11. Drive seal until flush with seal bore.



12. Turn PTO crankcase over and support with crankshaft upright.

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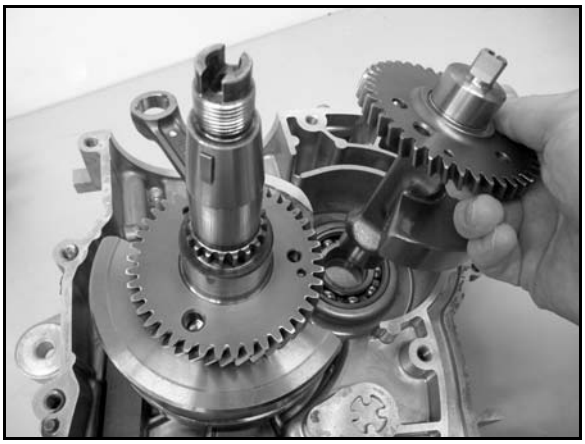
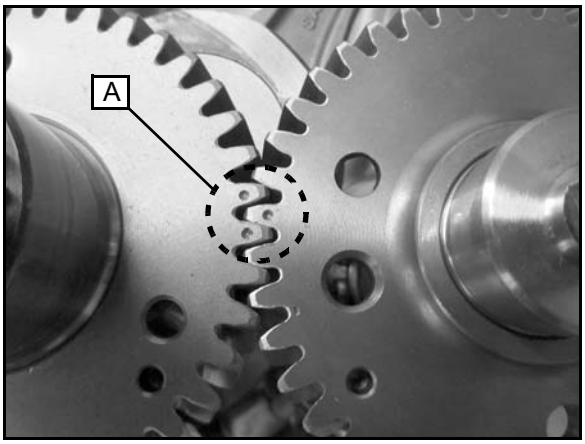
Balance Shaft Installation / Timing

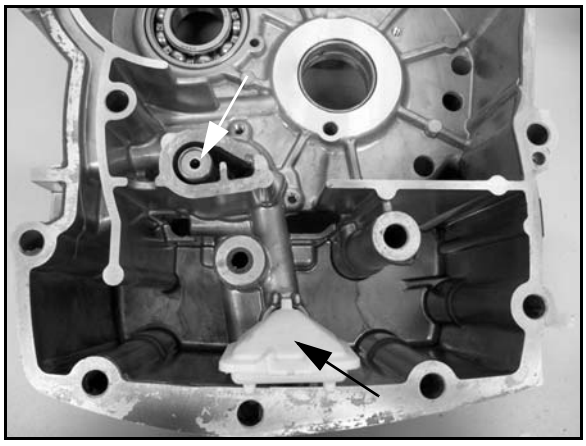
1. Position balance shaft in the crankcase.
2. Rotate crankshaft to align the timing marks (A) as shown below.
3. Fully seat the balance shaft into the crankcase and verify timing marks are correct.



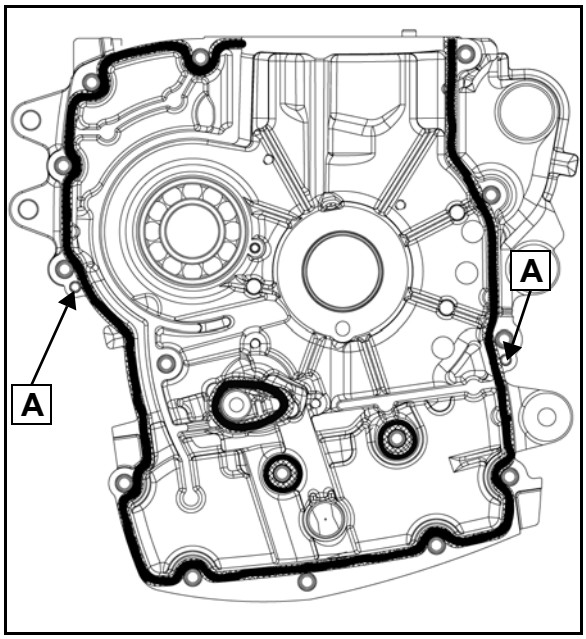


Final Crankcase Assembly

1. Prepare MAG side crankcase by cleaning sealing surface. Be sure the oil pickup and oil pressure valve are fully installed.



2. Apply a thin film of Crankcase Sealant (PN 2871557) evenly to a clean and oil-free MAG crankcase mating surface as indicated below. Be sure alignment pins (A) are in place.



Crankcase Sealant: 2871557

3. Assemble MAG crankcase to PTO crankcase immediately. Do not allow sealant to dry.

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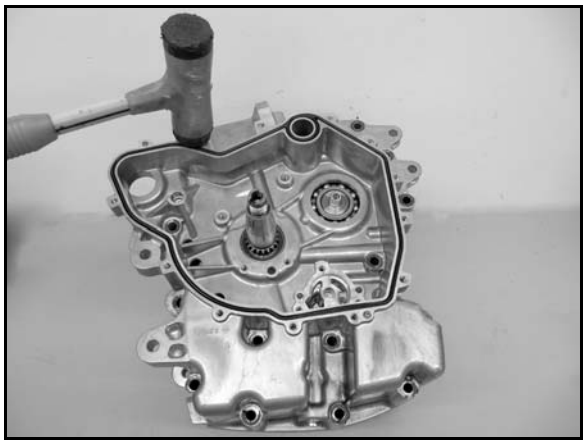
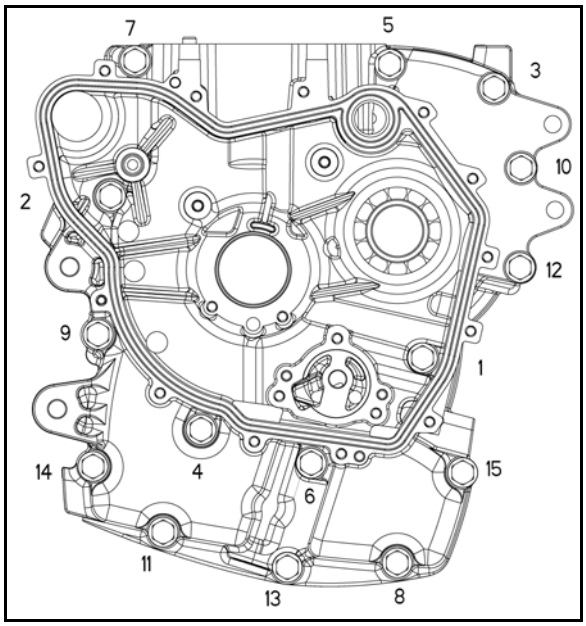
4. Tap crankcase evenly until fully seated with a soft sided hammer.



5. Install the (15) ***new*** crankcase bolts finger tight in MAG side crankcase.

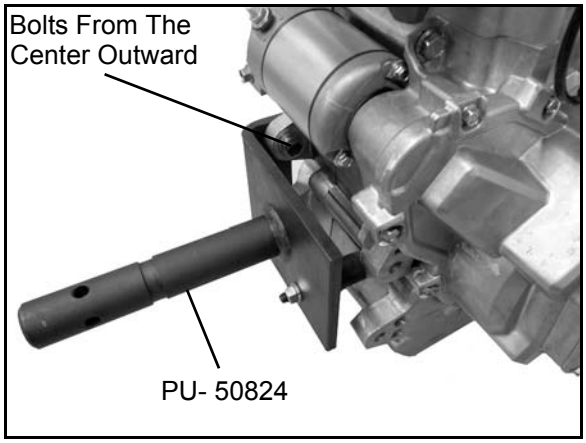
6. Tighten all bolts evenly until snug.

7. Torque the ***new*** crankcase bolts to in sequence to specification.



= T
Crankcase Bolts (In Sequence): **22 ft. lbs. (30 Nm)**

8. Install the engine stand adapter (PU-50824) onto the engine PTO side mounting ears as shown below.



9. Select the proper engine stand sleeve adapter and install it onto the engine stand adapter.
   - Sleeve adapter for a 2” bore engine stand: (PU-50625)
   - Sleeve adapter for a 2.375” bore engine stand: (PW-47054)

10. Place engine onto the engine stand (PU- 50624) for top end engine assembly as outlined in this chapter.

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, or stator)
- 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 fuel supply
- 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 flywheel installation or sheared flywheel key.
- 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
- 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

Slow Engine Cranking

- Weak battery
- Loose Electrical connections
- Decompression Mechanism not functioning properly.

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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

- Fouled spark plug or incorrect plug or plug gap
- Exhaust system air leaks
- Valve sticking
- Ignition system faulty:

  Spark plug cap cracked / broken

  Ignition coil faulty

  Ignition or kill switch circuit faulty

  Poor connections in ignition system

  Ignition timing incorrect

  Sheared flywheel key

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 (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)
- Low oil level
- Spark plug incorrect heat range
- Faulty hot light circuit
- Thermostat stuck closed or not opening completely
- Radiator is missing its internal diverter plate not allowing coolant to flow through entire radiator

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)

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NOTES

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CHAPTER 4
ELECTRONIC FUEL INJECTION

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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 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.

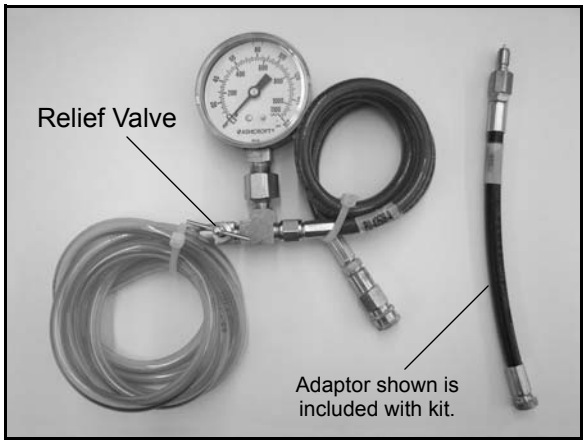
Special Tools

PART NUMBER	TOOL DESCRIPTION	
PU-43506-A	Fuel Pressure Gauge Kit	
PV-48656	Fuel Pressure Gauge Adaptor	
PU-47063-B	Digital Wrench™ Diagnostic Software (Includes most recent version of software w/serial number, standard interface cable and SmartLink Module Kit)	
PU-47471	Digital Wrench™ SmartLink Module Kit (PU-47470, PU-47469, PU-47468)	
	PU-47470	Digital Wrench™ PC Interface Cable
	PU-47469	Digital Wrench™ Vehicle Interface Cable
	PU-47468	Digital Wrench™ SmartLink Module

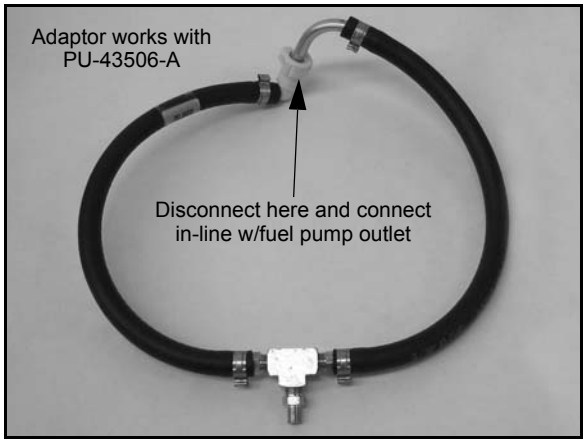
SPX Corporation: 1-800-328-6657or http://polaris.spx.com/.

Fuel Pressure Gauge Kit - PU-43506-A

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, pressure must be relieved (if applicable). The Fuel Pressure Gauge Kit has an integrated pressure relief valve that can be used to bleed off pressure once you have completed the fuel pressure test.



Fuel Pressure Gauge Adaptor - PV-48656



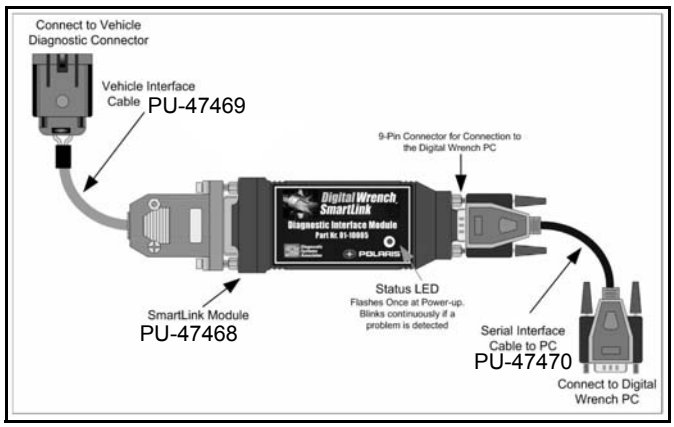
Digital Wrench™ Diagnostic Software - PU-47063-A

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.

IMPORTANT: If the PC you are using is not equipped with a 9-pin serial port, a USB to serial port adaptor will be necessary. A USB to serial port adaptor can be purchased through DSA at: www.diagsys.com

Digital Wrench™ SmartLink Module Kit - PU-47471

This module kit contains the necessary cables and hardware to communicate between the vehicle ECU and the Digital Wrench™ diagnostic software. Polaris dealers can also order the following kit components separately: **SmartLink Module PU-47468**, **Vehicle Interface Cable PU-47469** and **PC Interface Cable PU-47470**. This module kit is used on all 8-pin connector-based Polaris EFI systems. This kit is available to Polaris dealers through our tool supplier SPX at (1-800-328-6657) or http://polaris.spx.com

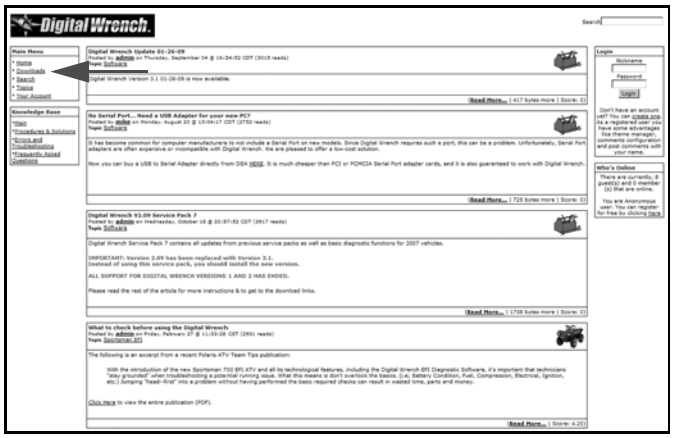


Digital Wrench™ - Diagnostic Connector

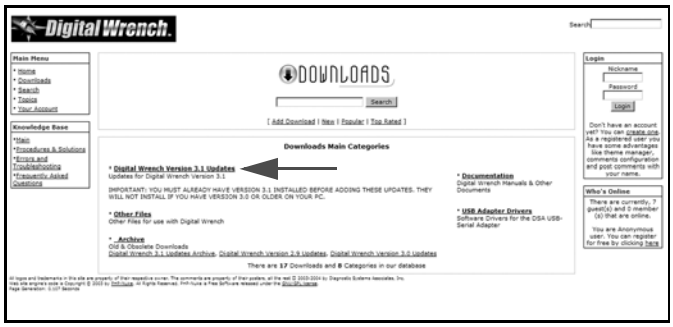
Located under the dash connected to a sealed plug.

Digital Wrench™ - Download Website

Located at: www.polaris.diagsys.com



Download Digital Wrench™ Updates:



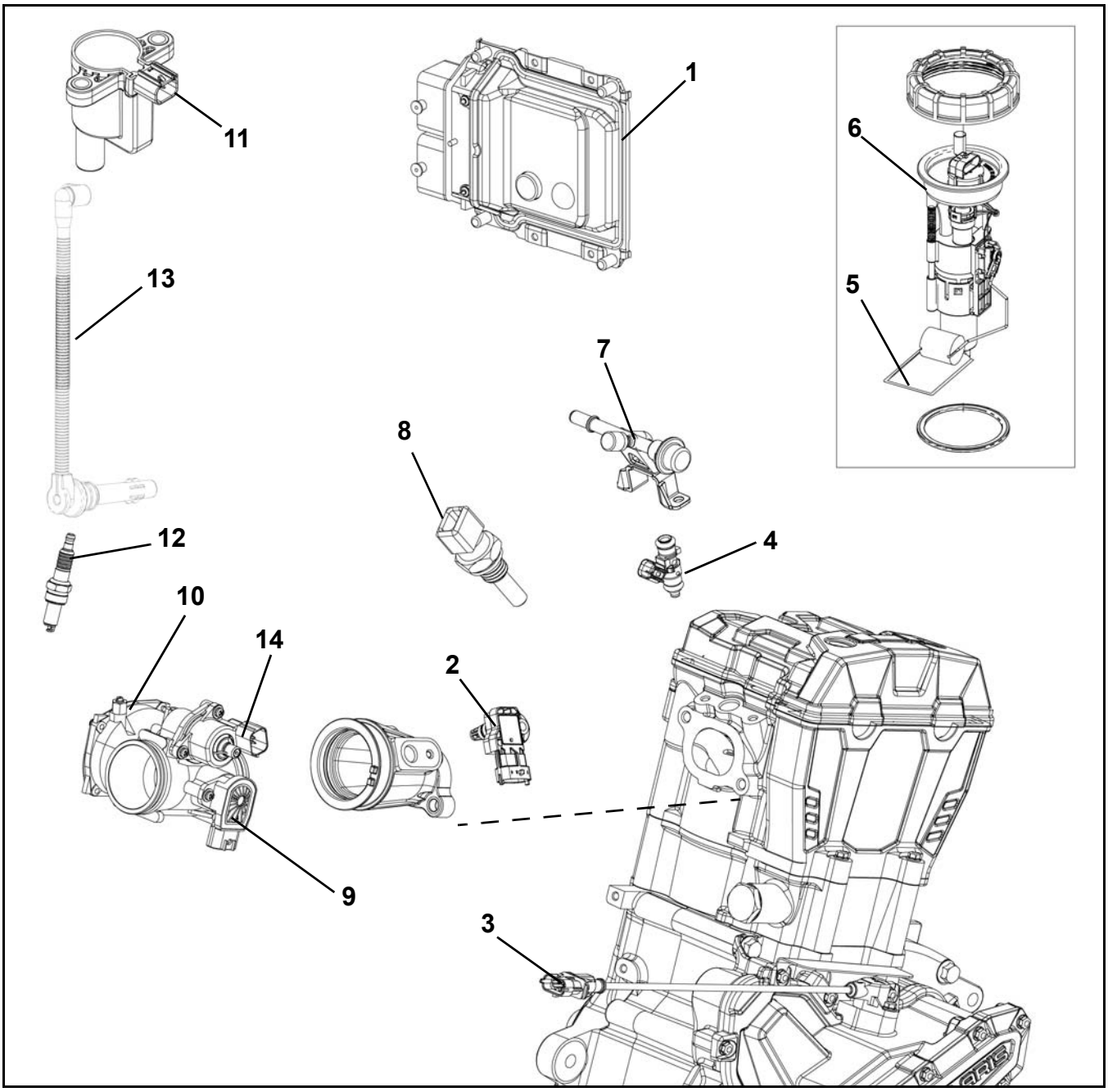
IMPORTANT: For the most recent information on Digital Wrench™ software and update downloads please visit the website: www.polaris.diagsys.com

Service Notes

- For more convenient and accurate testing of EFI components, it is recommended dealers utilize the Digital Wrench™ 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 an other *RANGER* RZR 570 of the same model and year 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 (red) cable to positive (+) battery terminal first, followed by negative (black) 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 unit.

EFI System Exploded View

1. Electronic Control Unit (ECU) 2. Temperature / Manifold Absolute Pressure Sensor (T-MAP) 3. Crankshaft Position Sensor (CPS) 4. Fuel Injector 5. Fuel Filter 6. Fuel Pump / Regulator / Fuel Level Sender (located in fuel tank) 7. Fuel Rail / Regulator 8. Engine Coolant Sensor (ECT) 9. Throttle Position Sensor (TPS) 10. Throttle Body 11. Ignition Coil 12. Spark Plug	13. Spark Plug Wire 14. Idle Air Control (IAC)



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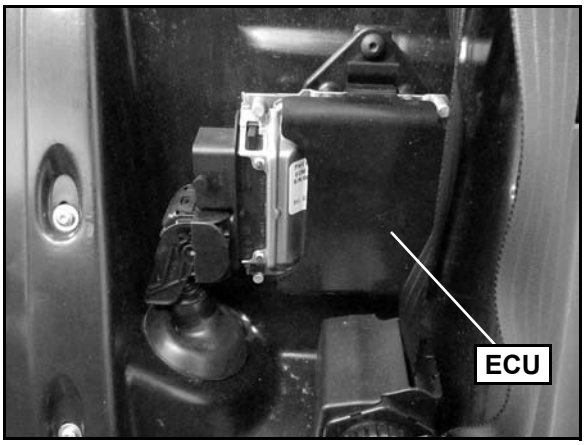
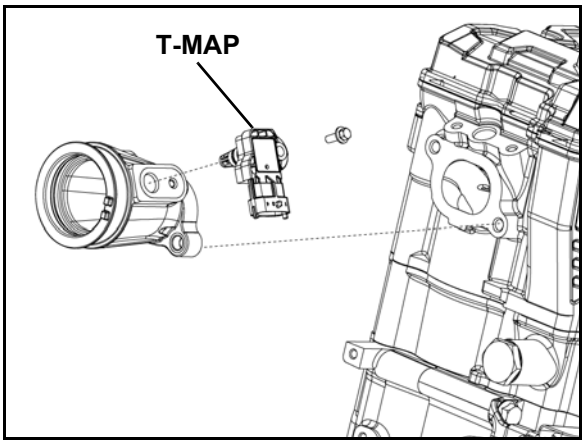
EFI System Component Locations

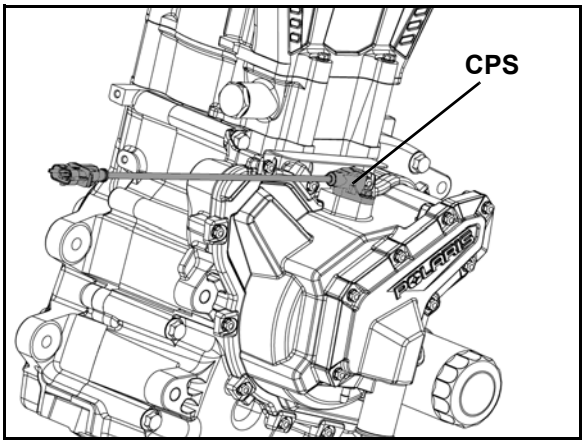
1. **Electronic Control Unit (ECU)**
   - Located behind the driver's seat.



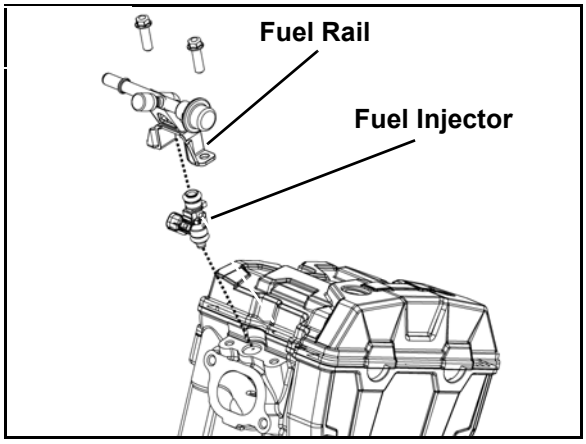
2. **Temperature and Manifold Absolute Pressure Sensor (T-MAP)**
   - Located in the rubber intake boot between the throttle body and the cylinder head.



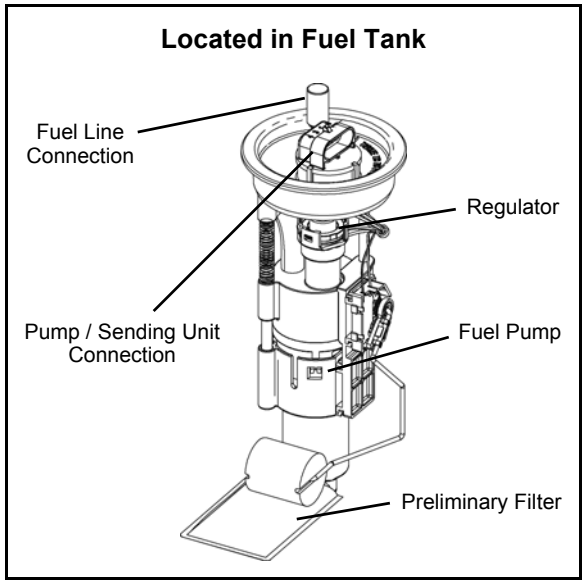
3. **Crankshaft Position Sensor (CPS)**
   - Located in the magneto cover on the right-hand side of the Engine.



4. **Fuel Injectors / Fuel Rail / Regulator**
   - Attached to the fuel rail located in the intake track of the cylinder head.



5. **Fuel Pump / Regulator / Fuel Gauge Sender Assembly**
   - Located under the passenger seat.



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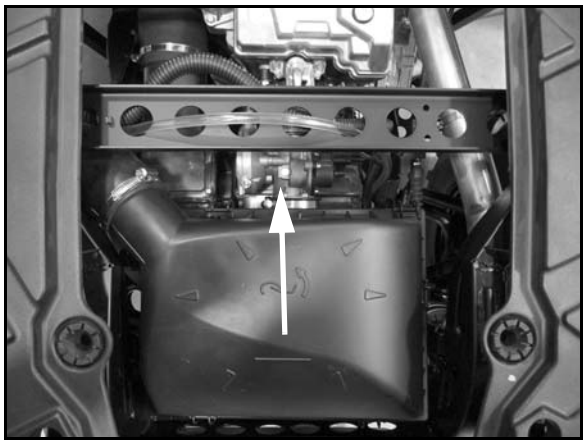
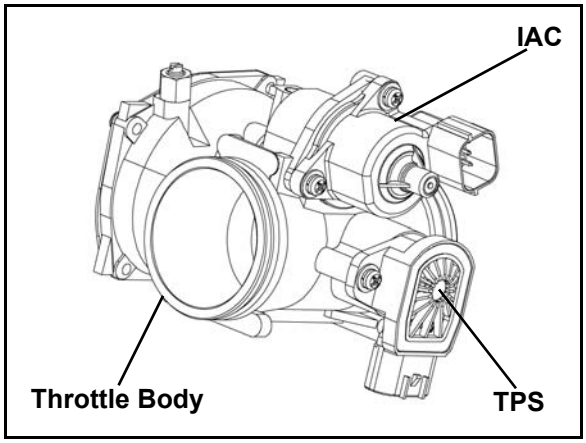
6. **Throttle Body**
   - Located between the rubber air box boot and rubber cylinder head adaptor under the cargo box access panel.

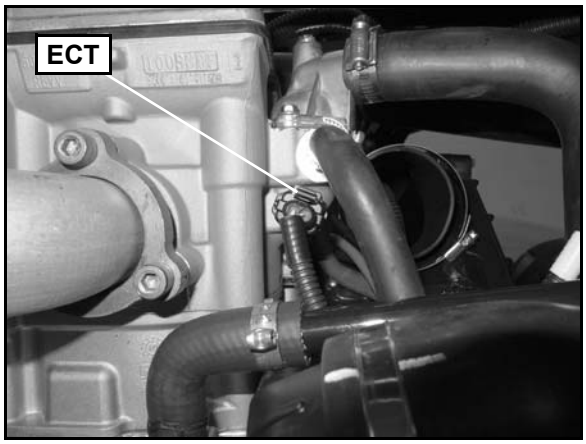
7. **Throttle Position Sensor (TPS)**
   - Located on the right-hand side of the throttle body below the IAC motor.

8. **Idle Air Control Motor (IAC)**
   - Located on the upper right-hand side of the throttle body above the TPS.

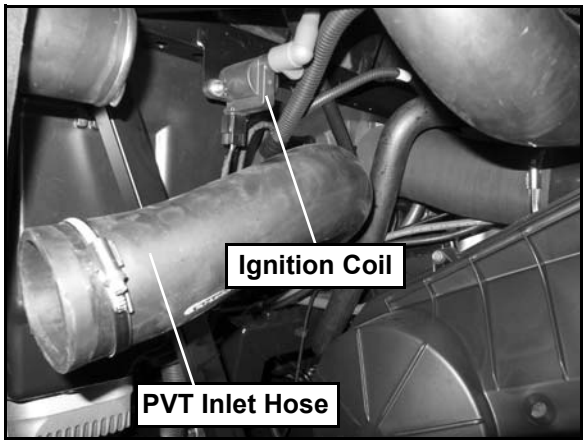




9. **Engine Coolant Temperature Sensor (ECT)**
   - Located in the cylinder head underneath the thermostat housing. The sensor can be accessed with the rear service panel, cargo box access panel and the clutch outlet hose removed.



10. **Ignition Coil**
    - Located in the LH rear wheel well area, behind the PVT inlet hose.



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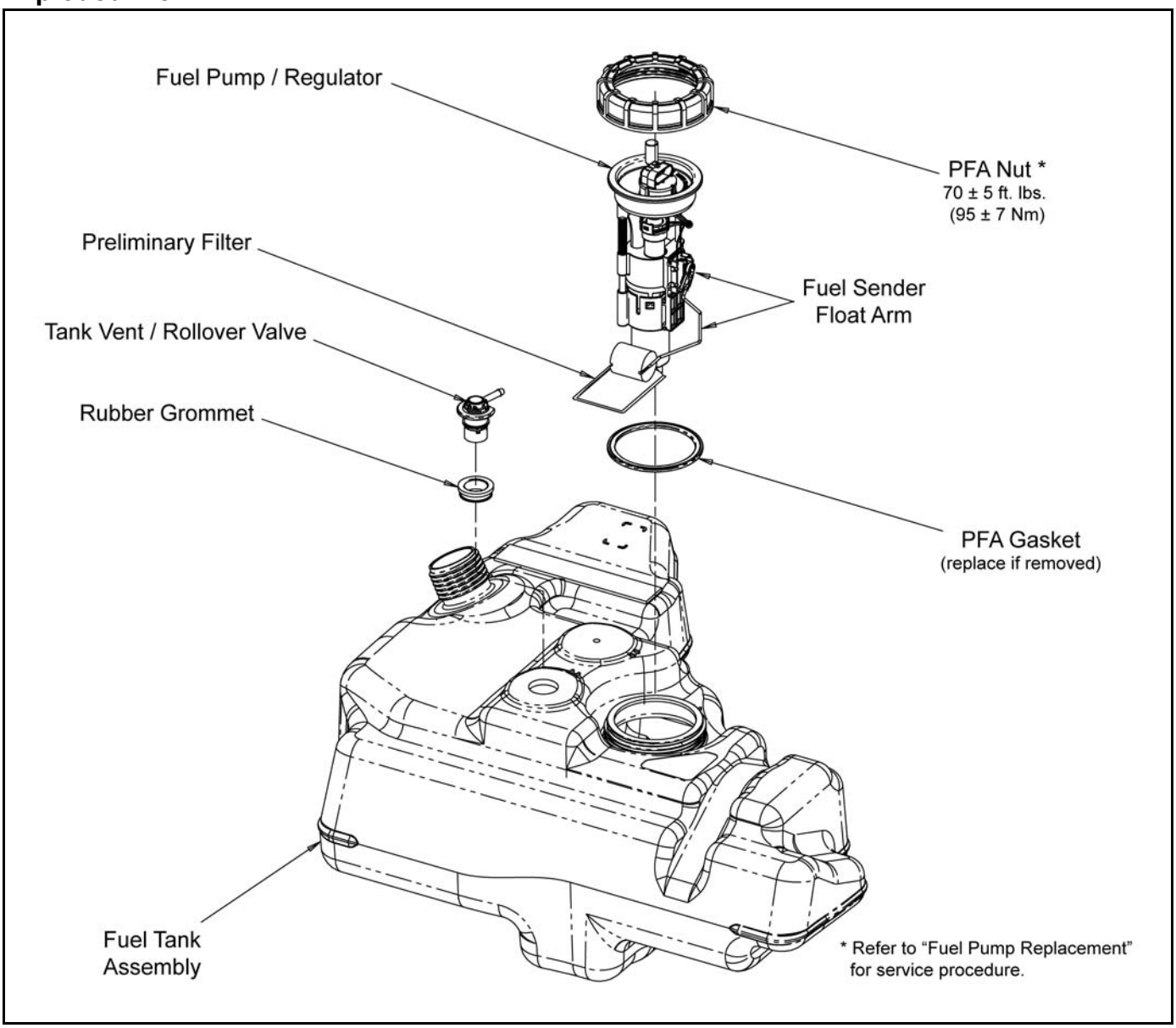
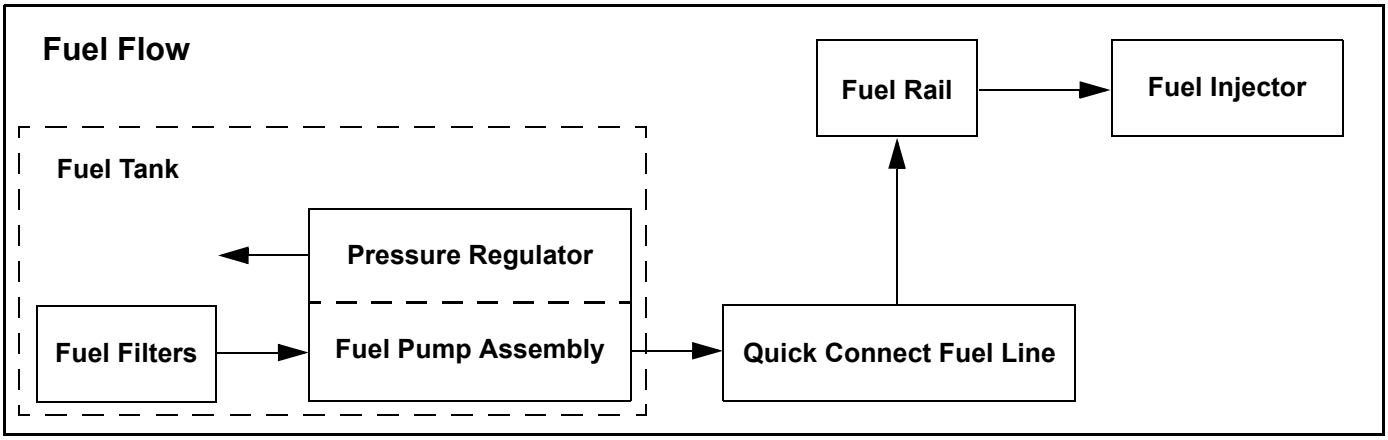
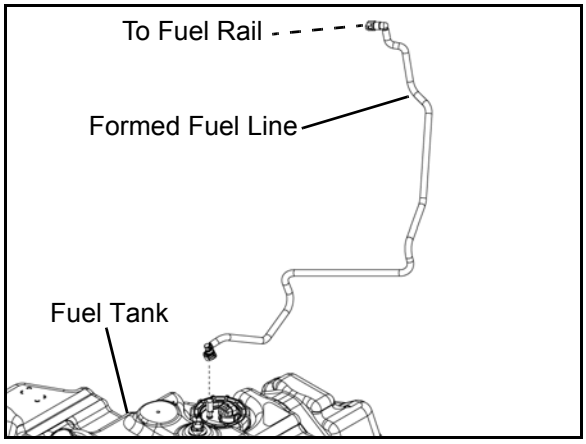
FUEL TANK

Exploded View

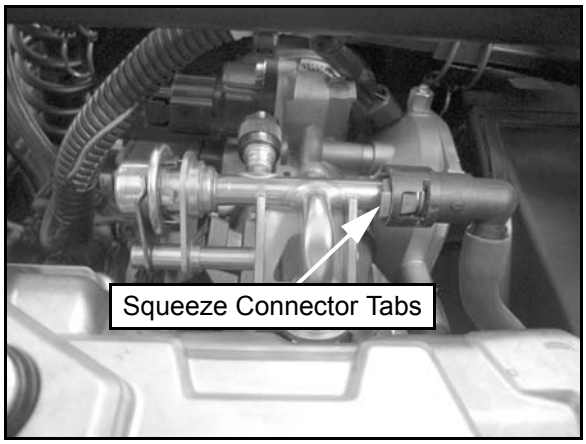




Fuel Lines - Quick Connect



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(s), verify the connections 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.

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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
- Fuel Filter(s)
- Fuel Injector
- Pressure Regulators
- Throttle Body / Intake Manifold
- Engine Control Unit (ECU)
- Ignition Coils
- Engine Coolant Temperature Sensor (ECT)
- Throttle Position Sensor (TPS)
- Crankshaft Position Sensor (CPS)
- Temperature and Manifold Absolute Pressure Sensor (T-MAP)
- Idle Air Control Motor (IAC)
- Wire Harness Assembly
- Check Engine Light

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 Electronic 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, to the fuel rail. The in-tank fuel pressure regulator maintains a system operating pressure and returns any excess fuel back into 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 range can vary depending on fuel requirements. The controlled injection of the fuel occurs every other crankshaft revolution, or once for each 4-stroke cycle. The total amount of fuel needed for one firing of a cylinder is injected during each cycle. 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 intake air temperature, manifold absolute pressure (load), engine temperature, speed (RPM), and throttle position. 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.

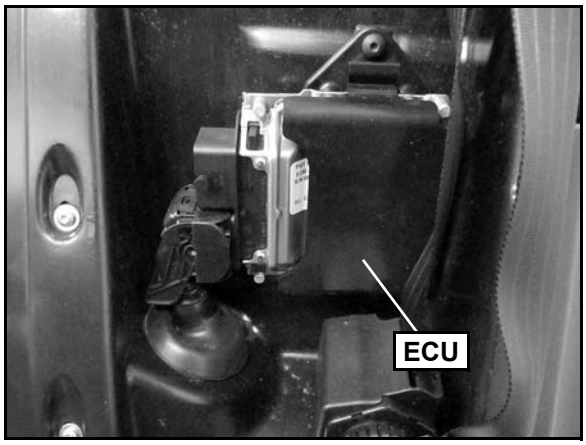
If the engine fails to start, a problem may still exist, and should be diagnosed.

NOTE: Accurate testing of EFI components is recommended utilizing the Digital Wrench™ 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, intake air temperature, intake manifold absolute 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 "Check Engine" light in 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 determine the cause of the "Check Engine" light by referencing the "Instrument Cluster Trouble Code Display" and "Diagnostic Trouble Code Table" or by using Digital Wrench™. 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, an RPM limiting feature is programmed into the ECU. If the maximum RPM limit is exceeded, the ECU suppresses the injection signals, cutting off the fuel flow and retards the ignition timing. This process repeats itself in rapid succession, limiting operation to the preset maximum.

***RANGER* RZR 570 EFI RPM Limit:**

Max RPM Limit - Injector and ignition suppression.

- **RZR 570:** 7750 RPM (All Gears)

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 re adjustment 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 adjusted.

For the purpose of troubleshooting, a known-good ECU from another Polaris *RANGER* RZR 570 of the same model may be used without system or engine component damage.

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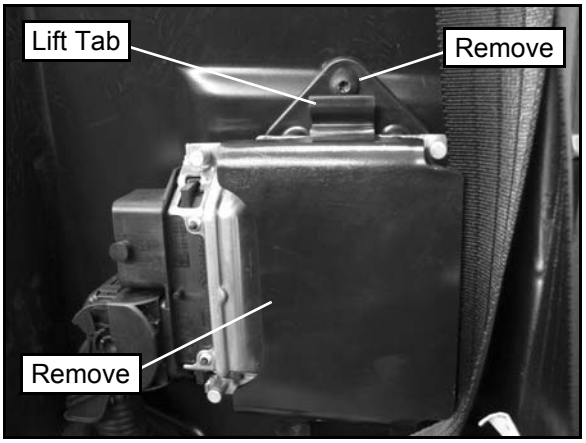
ECU Replacement

Although the need for ECU replacement is unlikely, a specific replacement procedure is required to ensure that all essential data contained within the original ECU is transferred to the replacement ECU.

IMPORTANT: Refer to this procedure and carefully follow all instructions provided in Digital Wrench™.

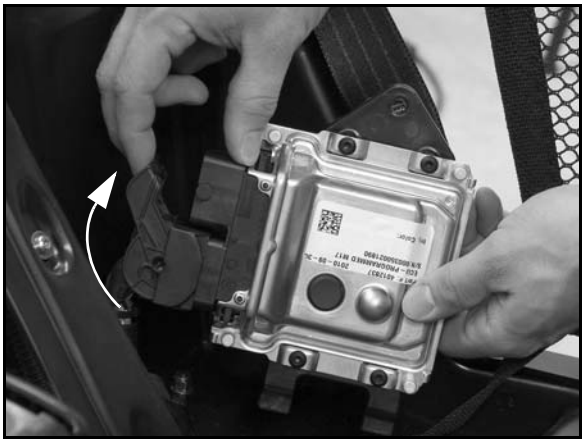
1. Carefully follow the ECU replacement instructions provided in Digital Wrench™ to ensure that all essential data contained within the original ECU is transferred to the replacement ECU.

2. Remove the black plastic cover by lifting up on the tab. Remove the retaining screw that attaches the ECU to the left rear fender well.



3. With the ignition turned off, disconnect the wire harness from the ECU. Lift the connector locking lever and rotate it up until the connector is free from the ECU.

NOTE: Upon removing the ECU connector, you should hear a "click" when the connector is fully open.



4. To install, reverse the procedure and tighten the mounting screws to specification.

NOTE: Upon installing the ECU connector, you should hear a "click" when the connector is fully closed.

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

ECU Replacement

1. Remove the (2) retaining screws holding the ECU.

2. With the ignition turned off, disconnect the wire harness from the ECU.

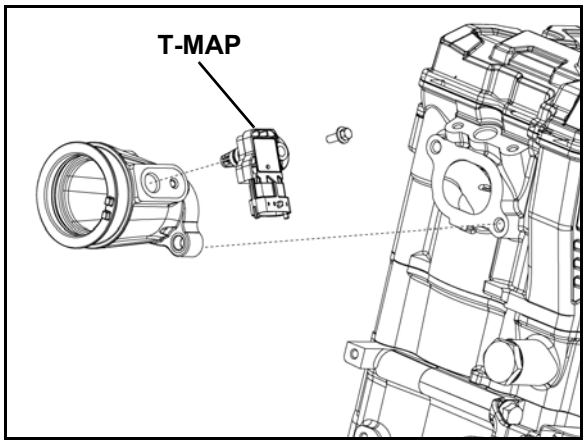
3. To install, reverse the procedure and tighten screws to specification.

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

TEMP / MANIFOLD ABSOLUTE PRESSURE SENSOR (T-MAP)

Operation Overview

Mounted on the throttle body intake manifold, the T-MAP sensor performs two functions in one unit.



Air passing through the intake is measured by the T-MAP and relayed to the ECU. These signals, comprised of separate air temperature and manifold absolute pressure readings, are processed by the ECU and compared to its programming for determining the fuel and ignition requirements during operation. The T-MAP sensor provides the ECU with engine load data.

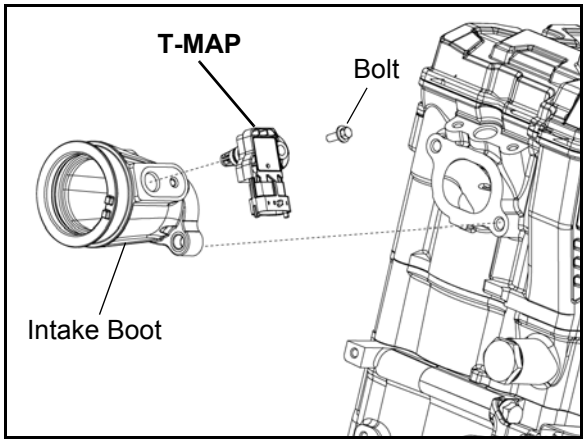
T-MAP Sensor Test

The T-MAP sensor is a non-serviceable item. If it is faulty, it must be replaced.

IMPORTANT: This sensor should only be tested using the Digital Wrench™ Diagnostic Software (dealer only).

T-MAP Sensor Replacement

1. Remove the drivers seat and disconnect the negative (-) battery cable.
2. Remove the cargo box access panel.
3. Disconnect vehicle harness from T-MAP sensor.
4. Remove the retaining bolt and remove the sensor from the intake boot.
5. Use a light coating of soapy water on the grommet to aid installation of the new sensor.
6. Install the sensor by inserting it with a twisting motion to properly seat the grommet.



7. Install the retaining bolt and torque to specification.

= T
T-MAP Retaining Bolt Torque: **24 in. lbs. (2.8 Nm)**

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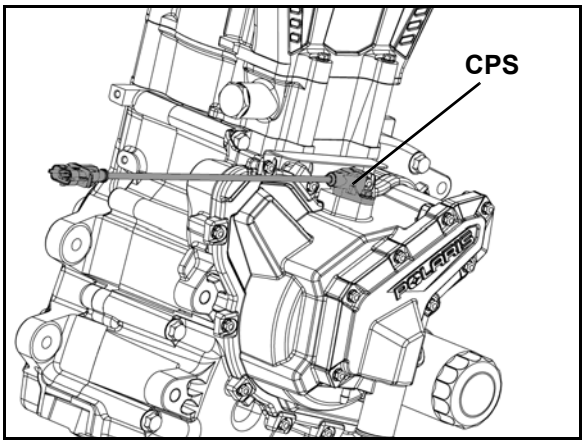
CRANKSHAFT POSITION SENSOR (CPS)

Operation Overview

Mounted on top of the stator cover, the crankshaft position sensor is essential to engine operation, constantly monitoring the rotational speed (RPM) and position of the crankshaft.



A ferromagnetic 35-tooth encoder ring with a missing tooth is built onto the flywheel. The inductive speed sensor is mounted 1.0 ± 0.26 mm (0.059 ± 0.010 in.) away from the encoder ring. During rotation, an AC pulse is created within the sensor for each passing to oth. The ECU calculates engine speed from the time interval between the consecutive pulses.

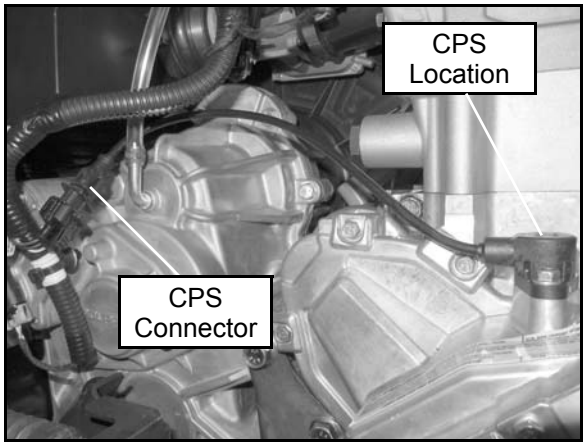
The encoder ring missing tooth creates an "interrupt" input signal, corresponding to specific crankshaft position. This signal serves as a reference for the control of ignition timing by the ECU. Synchronization of the CPS and crankshaft position takes placed during the first two revolutions each time 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 stop running.

CPS Test

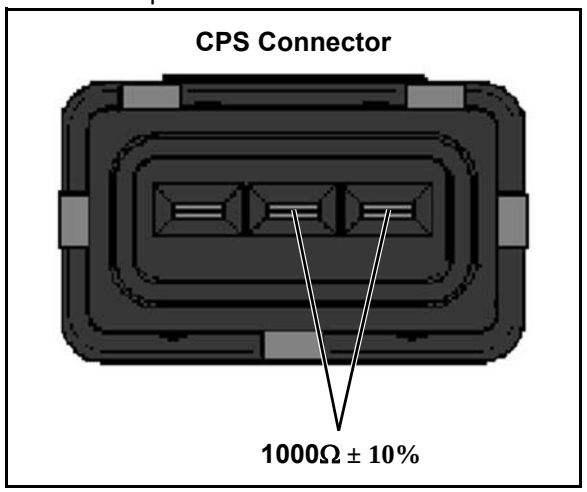
The CPS is a sealed, non-serviceable assembly. If fault code diagnosis indicates a problem with this sensor, test as follows:

1. The CPS is accessible through the right-hand rear wheel well area.

2. Disconnect CPS harness connector.



3. Connect an ohmmeter between the CPS pin terminals shown below. A resistance value of **1000 Ohm ± 10%** at room temperature should be obtained.



CPS Resistance Specification:
1000 Ohms ± 10%

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4. If the resistance is correct:

   - Test the main harness circuit between the sensor connector terminals and the corresponding pin terminals at the ECU (see wiring diagram).
   - Check the sensor mounting, air gap, flywheel encoder ring for damage or runout, and flywheel key. Follow the "CPS Replacement" procedure to inspect CPS and flywheel encoder ring for damage.

5. If the resistance is incorrect, follow the "CPS Replacement" procedure.

CPS Replacement

1. If not done already; disconnect the CPS harness connector (see "CPS Test").
2. Using an 8mm socket, remove the CPS retaining bolt and remove the sensor from the stator cover.
3. Install new sensor using a light coating of oil on the O-ring to aid installation.
4. Torque the CPS and heat shield retaining bolts (if equipped) to specification.

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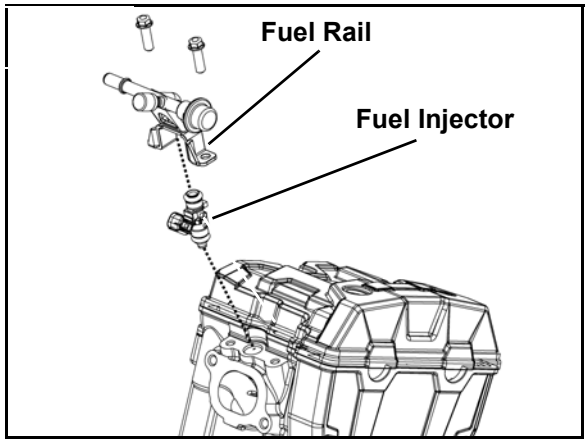
CPS Retaining Bolt Torque: **9 ft. lbs. (12 Nm)**

FUEL INJECTORS

Operation Overview

The fuel injector is mounted into the cylinder head, with the fuel rail retaining it from the top end. O-rings on both ends of the injector prevent external fuel leaks and also insulate the injectors from heat and vibration.



When the key switch is on, the fuel rail is pressurized, and the EFI relay provides voltage to the injectors. During engine operation, the ECU completes the ground circuit, energizing the injectors. The valve needle in each 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 contains a series of calibrated openings which directs the fuel into the intake port in a cone-shaped spray pattern.

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 depending on the speed and load requirements of the engine.

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Fuel Injector Troubleshooting

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. Excessive voltage will burn out the injector. Do not ground the injector with the ignition on. Injector(s) will open/turn on if relay is energized.

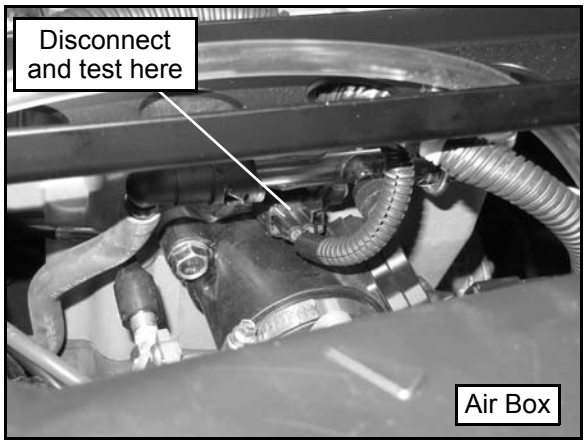
If an injector is not operating, it can indicate either a bad injector, or a wiring/electrical connection problem. Check as follows:

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 Test

The fuel injector is non-serviceable. If diagnosis indicates a problem with the injector, test the resistance of the fuel injector by measuring between the two pin terminals:



Fuel Injector Resistance Specification: 11.4 - 12.6 Ohms

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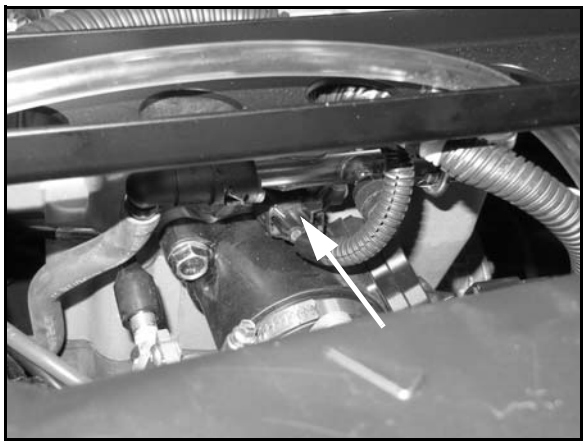
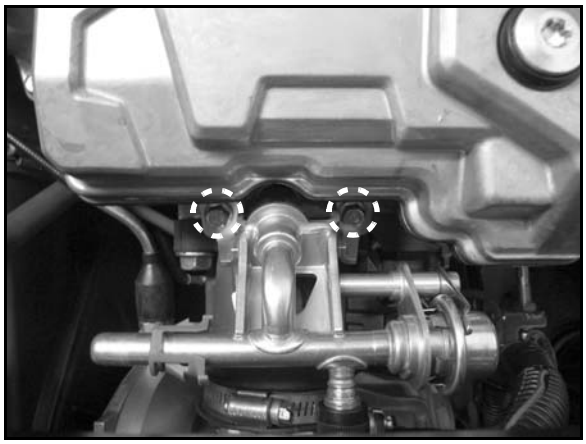
Fuel Injector Replacement

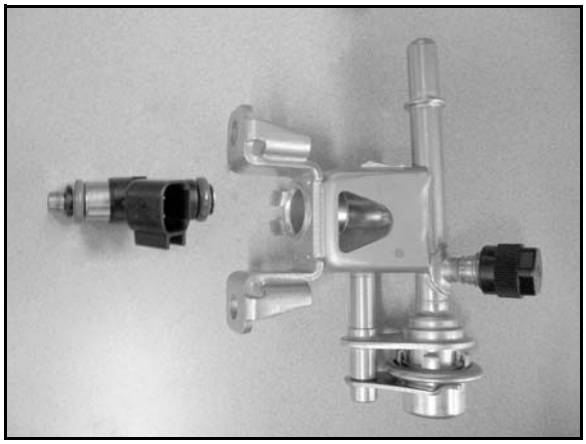
1. Remove the cargo box access panel.
2. Be sure the engine has cooled enough to work on.
3. Remove the driver's seat and disconnect the negative battery cable.
4. Thoroughly clean the fuel injector area if all dirt and debris.
5. Disconnect the fuel injector harness lead.



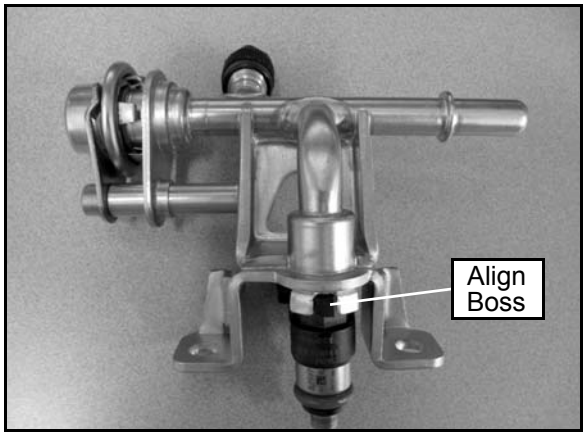
6. Hold a shop towel over the fuel line fittings and remove the fuel supply line from the fuel rail.
7. Remove the (2) screws that mount the fuel rail to the cylinder head.



8. Carefully pull upon the fuel rail and injector to remove them from the engine as an assembly. If the injector stays in the cylinder head, grab the injector with your fingers and gently pull and twist the injector unit it can be removed from the cylinder head. Take care not to damage the fuel injector ends during removal.
9. Gently pull and twist to free the injector from the fuel rail.



10. Upon installation of the new fuel injector, lightly lubricate the injector O-rings to aid installation.
11. Install the new injector into the fuel rail. Be sure to align boss in the injector with the slot in the fuel rail.



12. Thoroughly clean the area around the fuel injector port on the cylinder head.
13. Lightly lubricate the injector O-rings and reinstall the fuel rail / injector assembly into the cylinder head.

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14. Install the fuel rail mounting screws and torque to specification.

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Fuel Rail Mounting Screws: **7 ft. lbs. (10 Nm)**

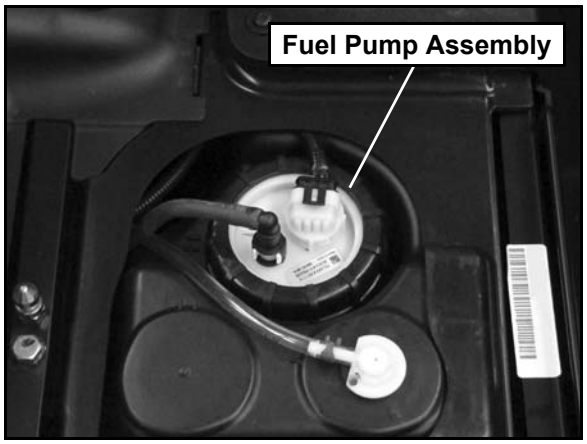
15. Reinstall the fuel line to the fuel rail.
16. Connect the harness lead to the fuel injector.
17. Reconnect the negative battery cable and reinstall the driver's seat.
18. Start the engine briefly and inspect the fuel rail and injector for fuel leaks.
19. Reinstall the cargo box access panel.

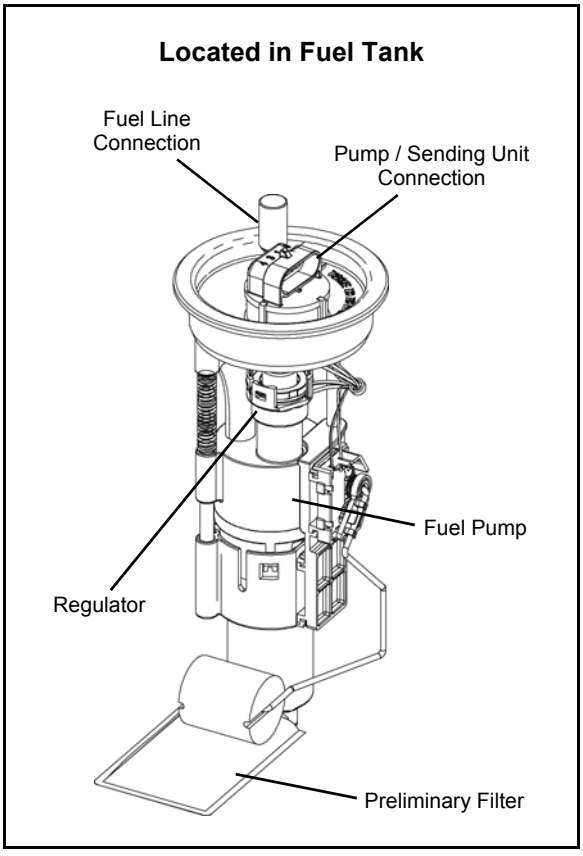
FUEL PUMP

Operation Overview

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, fuel filters, regulator and fuel gauge sender. The pump is rated for a minimum output of 25 liters per hour at 43 - 48 psi and has two non-serviceable fuel filters.

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





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

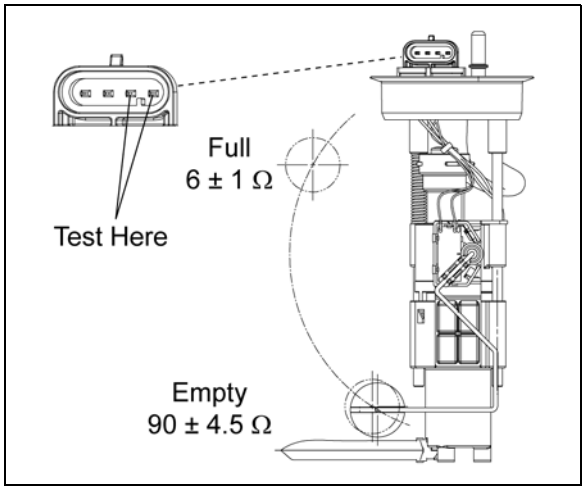
- If the key switch is not promptly turned to the "start" position.
- If the engine fails to start.
- If the engine is stopped with the key switch "on" (as in the case of an accident).

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 Sender Test

If the fuel gauge reading on the instrument cluster is not working, or if the display reading differs in large comparison to the fuel in the tank, perform a resistance test on the fuel sender.

Disconnect the fuel pump / sending unit connection and measure the resistance. If out of specification, replace the fuel pump assembly.



Fuel Sender Resistance Specifications:
Full: 6 ± 1 Ohms
Empty: 90 ± 4.5 Ohms

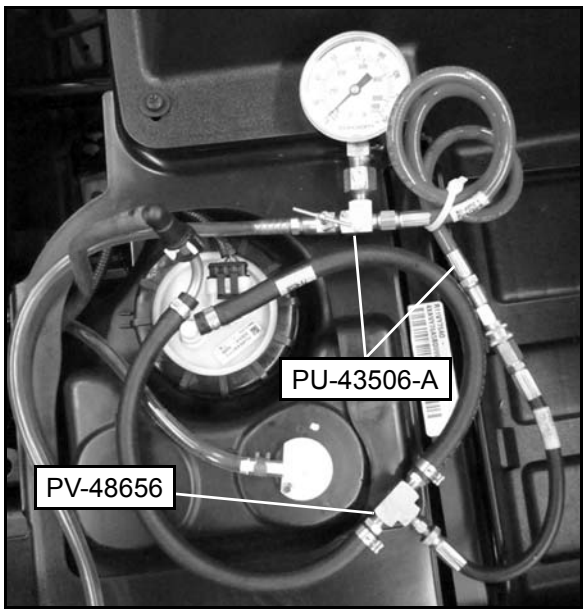
Fuel Pump Test

If a fuel delivery problem is suspected, make certain the fuel pump 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

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 passenger seat from the vehicle.
2. Cover the fuel line connection at the fuel tank with a shop towel and disconnect the line from the fuel pump outlet.
3. Install the Fuel Pressure Gauge Adaptor (PV-48656) in-line between the fuel pump outlet and fuel line.
4. Connect the hose from the Fuel Pressure Gauge Kit (PU-43506-A) to the test valve on the Fuel Pressure Gauge Adaptor (PV-48656). Route the clear hose into a portable gasoline container or the vehicle’s fuel tank.

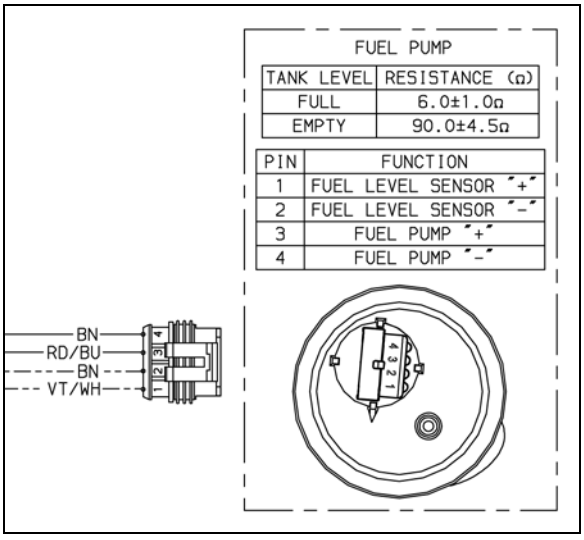


5. Turn on the key switch toactivate the pump and check the system pressure on the gauge. If system pressure of 43 - 48 psi is observed, the ignition switch, ECU, fuel pump, and pressure regulator are working properly. Turn the key switch off and depress the valve button on the tester to relieve the system pressure.

Normal Fuel Pressure:
43-48 psi (296.5 - 331 KPA)

NOTE: If the fuel pressure is out of specification, replace the fuel pump assembly.

6. If the pump did not activate (Step 5), disconnect the harness connector from the fuel pump. Connect a DC voltmeter across terminals "3" and "4" in the plug on the vehicle fuel pump harness. Turn on the key switch and observe voltage to ensure a minimum of 7 volts is present.



NOTE: If the voltage was below 7 VDC, test the battery, ignition switch, relay(s), wiring harness and ECU.

7. If the reading is between 7 and 14 volts, turn key switch off and connect an ohmmeter between terminals "3" and "4"' at the white fuel pump connector to check for continuity within the fuel pump.

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

8. If voltage at the plug was within the specified range, and there was continuity across the pump terminals, reconnect the plug to the fuel pump, making sure you have a clean connection. Turn on the key switch and listen for the pump to activate.

NOTE: If the pump starts, repeat steps 3, 4 and 5 to verify correct pressure.

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

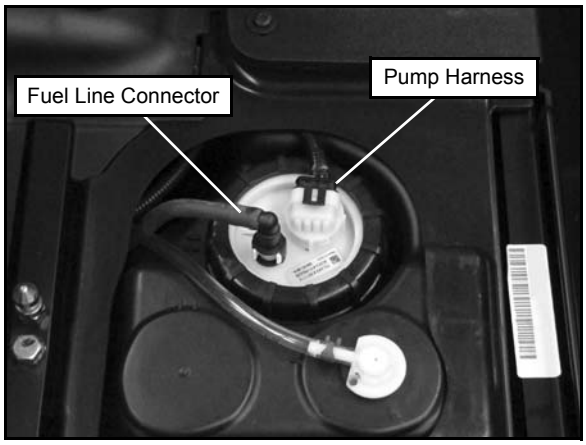
NOTE: If the pump still does not operate, replace the fuel pump assembly.

Fuel Pump Replacement

⚠ WARNING

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

1. Remove the driver and passenger seat to access the fuel pump.
2. Disconnect the battery (-) negative cable.
3. Ensure that static has been discharged from you by touching a ground source such as the engine or frame.
4. Disconnect the fuel pump electrical harness.



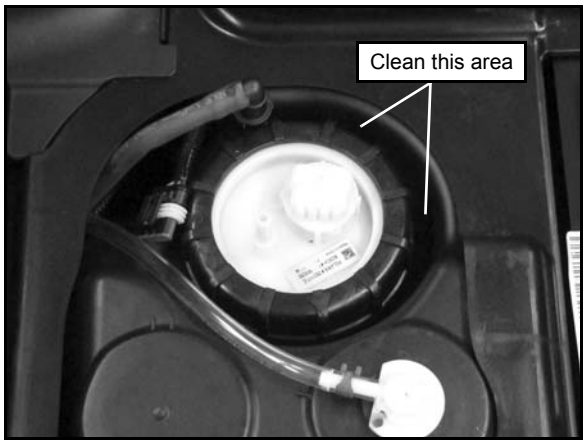
5. While holding a shop towel over the fuel line connector, disconnect the quick connect fuel line from the fuel pump.

⚠ CAUTION

It is possible for pressurized fuel to be present when disconnecting the fuel line.
It is recommended to allow the vehicle to sit for a period of one hour after shutting off the engine before servicing the fuel pump. This allows the exhaust to cool and fuel pressure to drop.

NOTE: A small amount of fuel may come out of the fuel line or tank. Properly drain fuel into a suitable container.

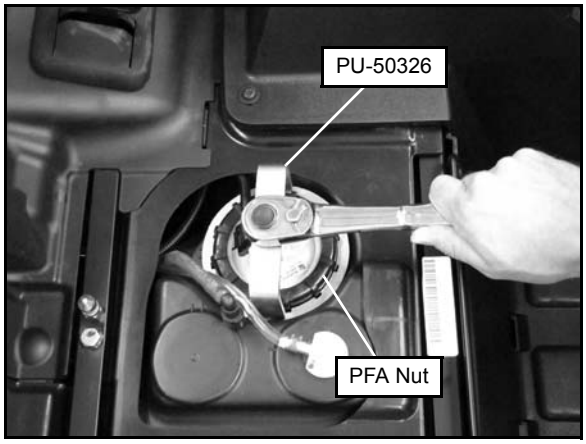
6. Be sure the top of the fuel tank is clean. If it requires cleaning, hand wash the top of the tank to ensure no debris will enter the fuel system when the fuel pump is removed.



CAUTION

Failure to clean area around fuel pump may lead to debris entering the fuel tank during service. Excessive debris in fuel tank may cause premature wear of fuel pump and/or clogging of internal fuel filters.

7. Place the Fuel Pump Service Tool (PU-50326) over the fuel pump PFA nut. Using a 1/2" drive ratchet or breaker bar, loosen and remove the PFA nut. Discard the PFA nut.



NOTE: Apply downward force on the fuel pump flange while removing the fuel pump PFA nut.

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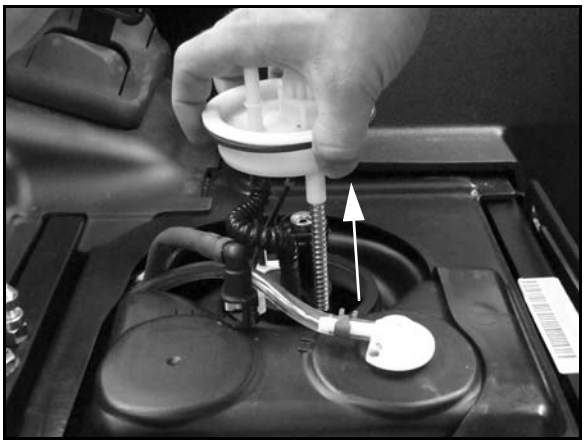
8. Carefully lift the fuel pump out of the fuel tank. As the fuel pump assembly is being removed, be aware of float arm and pump pre-filter. Hold the float arm to the pump body as you lift and tilt the pump to ensure that the float arm is not bent when removed from the tank.



9. Transfer old fuel pump to a suitable container capable of safely holding fuel. The fuel pump will retain some fuel.

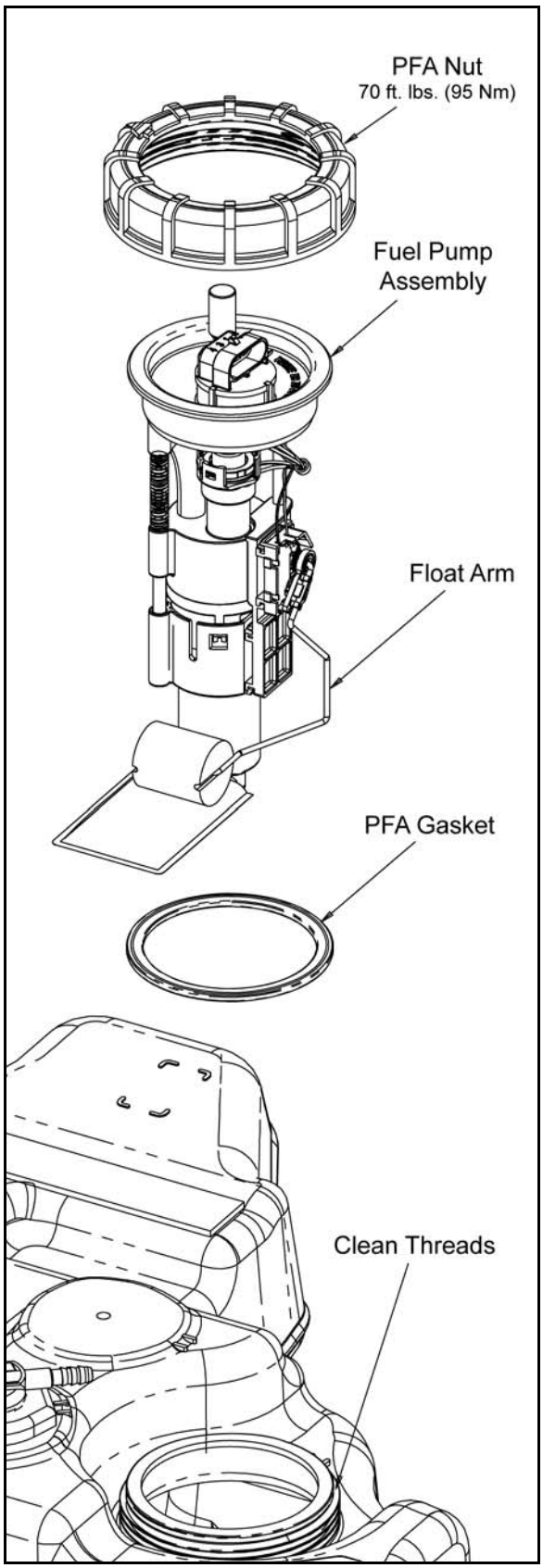
10. Inspect the inside of the fuel tank for debris (may require flashlight and mirror). If debris like mud or sand is present, fuel tank should be flushed and cleaned out prior to installation of new fuel pump assembly.

IMPORTANT: It is recommended to remove the fuel tank from the vehicle and rinse it with a small amount of clean fuel. Do not use water or any other chemicals to remove debris.

11. Remove new fuel pump assembly, gasket and PFA nut from packaging. Use care not to bend float arm during un-packaging. Do not lift or carry fuel pump assembly by the float arm.

12. Use cleaning wipes provided to clean fuel tank surface and threads. Remove all debris, grease and oil. Allow surfaces to dry completely.

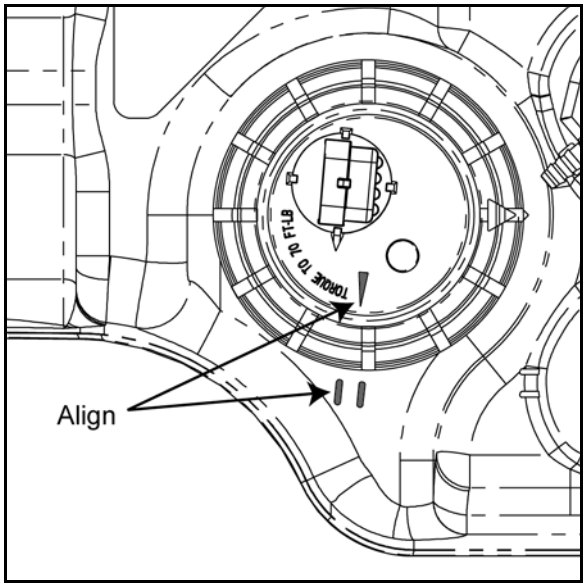
13. Install new PFA gasket onto fuel pump assembly using care not to damage gasket or bend float arm.



14. Install fuel pump into fuel tank, hold float arm to the pump body and tilt assembly to ensure float arm does not get caught or bent during installation.

15. Gently push down on fuel pump flange ensuring flange is centered.

16. Roughly align orientation mark on fuel pump between the orientation marks on fuel tank to ensure float arm does not get bent or snagged.



CAUTION

Failure to align the orientation marks may lead to interferences with the fuel level float arm and cause incorrect function.

17. While maintaining downward pressure, thread new PFA nut onto fuel tank and hand tighten. Use care when starting PFA nut, ensuring threads are properly aligned. Verify orientation marks are still aligned between fuel pump and fuel tank.

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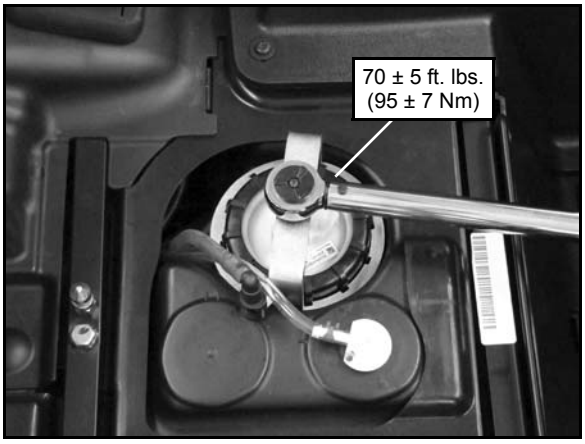
18. Torque PFA nut to specification using the Fuel Pump Service Tool (PU-5 0326) and a calibrated torque wrench.



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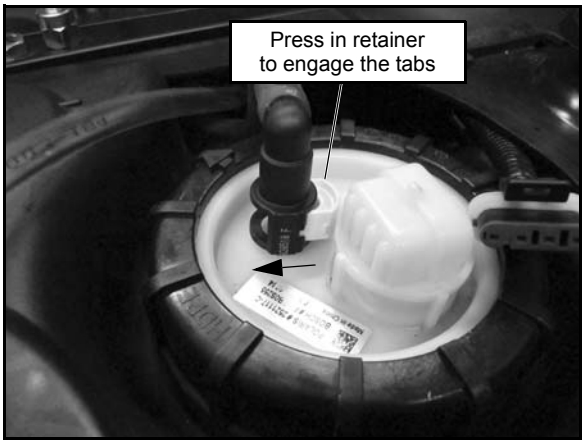
Fuel Pump PFA Nut: 70 ± 5 ft. lbs. (95 ± 7 Nm)

19. Verify alignment of fuel pump and tank orientation marks.

20. Connect the fuel line to the fuel pump outlet.



IMPORTANT: Be sure to engage the retainer on fuel line until it snaps into place. Pull on fuel line lightly to confirm connection.

21. Connect the fuel pump electrical harness.

22. Connect battery.

23. Install the driver and passenger seat.

24. Test the fuel pump by turning on the key and listening for the pump to activate. Cycle the key several times to prime the system.

Fuel Tank Removal

IMPORTANT: Syphon as much fuel from the tank as possible before at tempting to remove it from the vehicle.

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

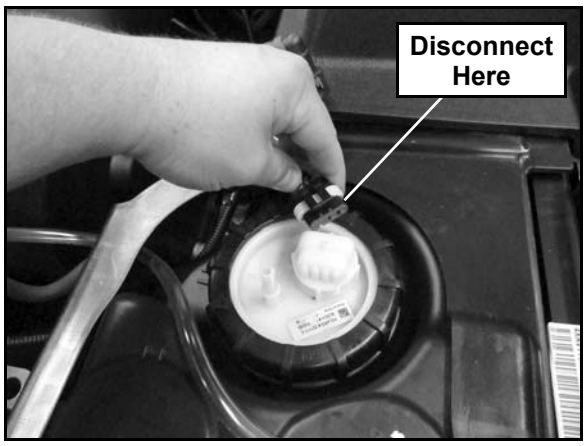
1. Remove the driver and passenger seats along with the rear service panel.

2. Disconnect the negative battery cable from the battery located under the driver's seat.

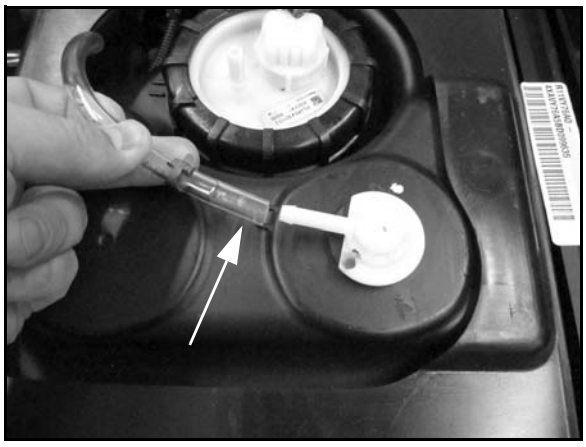
3. While holding a shop towel over the fuel line connector, disconnect the quick connect fuel line from the fuel pump. Move the fuel line out of the way for tank removal.

NOTE: A small amount of fuel may come out of the fuel line or tank. Properly drain fuel into a suitable container.

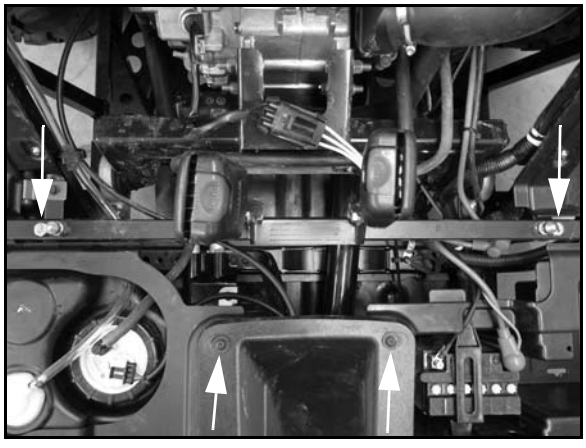
4. Disconnect the fuel pump electrical harness.



5. Remove the fuel tank vent hose clamp with a suitable pliers and remove the vent line from the tank vent fitting.

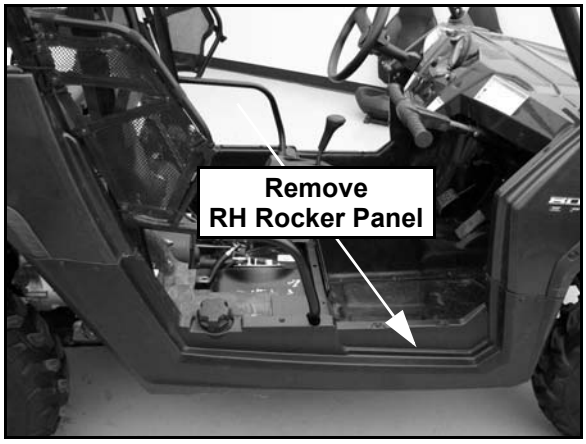


6. Remove the rear seat base assembly from the vehicle by removing the (2) fasteners retaining the rear seat base.

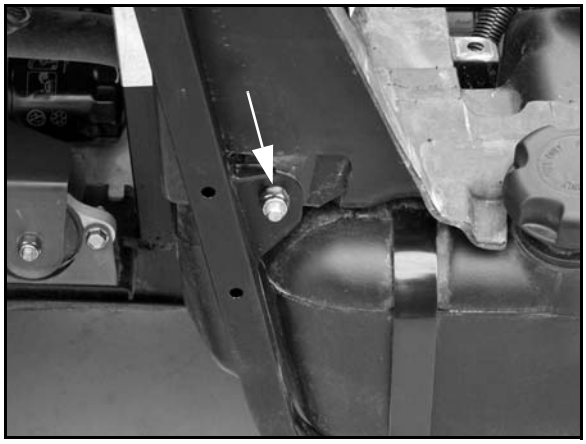


7. Remove the shift knob and center console from the vehicle.

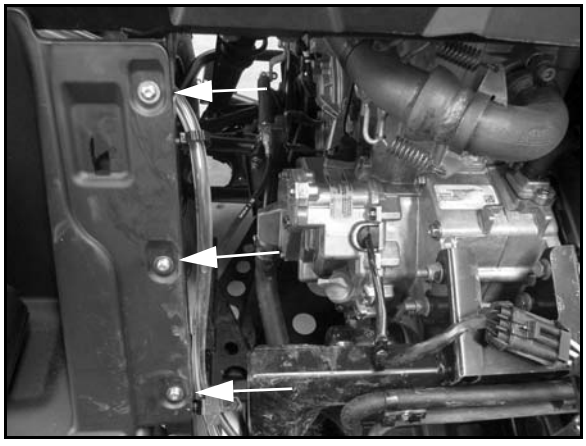
8. Remove the push rivets and screws retaining the RH rocker panel and remove panel from the vehicle (see Chapter 5).



9. Remove the lower bolt retaining the seat belt mechanism near the rear RH portion of the fuel tank. Once removed, place the mechanism in the rear cargo box to keep it out of the way.



10. Remove the (3) Torx fasteners from the rear RH fender well and remove the fender well from the vehicle (see chapter 5).



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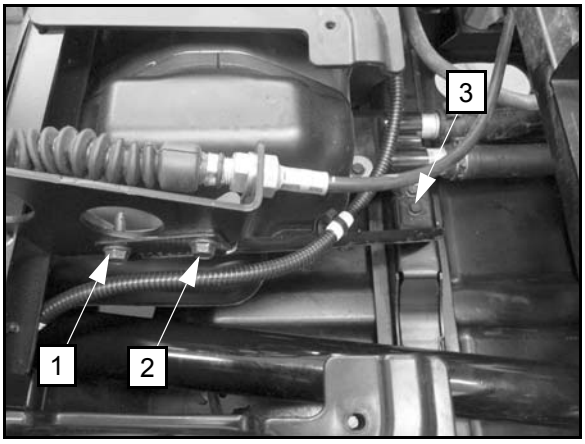
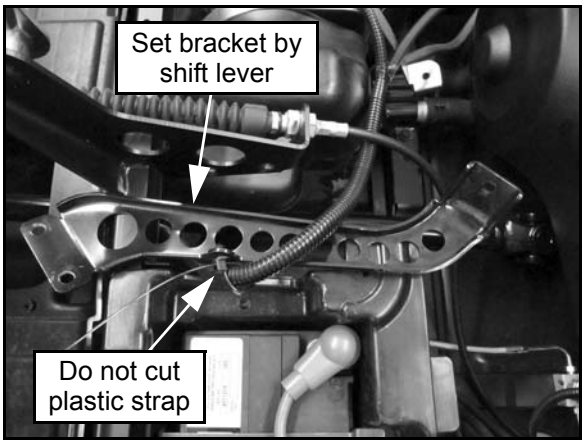
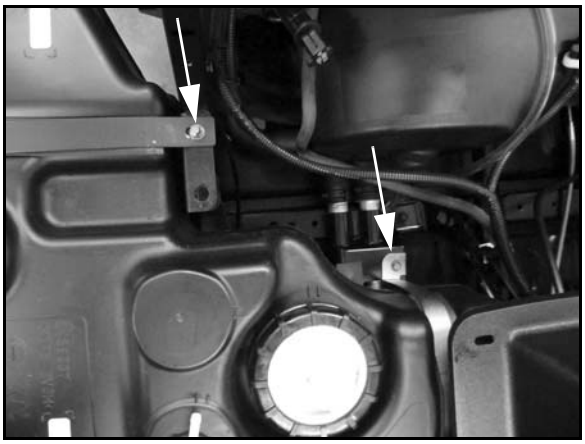
11. Remove the (3) shift lever support bracket bolts and place the bracket out of the way of the fuel tank, but do not remove or cut the plastic wire harness retainer.





12. Remove the (2) tank bracket fasteners that retain the fuel tank in the chassis. Swing the tank brackets clear of the fuel tank for removal.



13. Lift the rear of the fuel tank up first and carefully pull it up and out from the vehicle.

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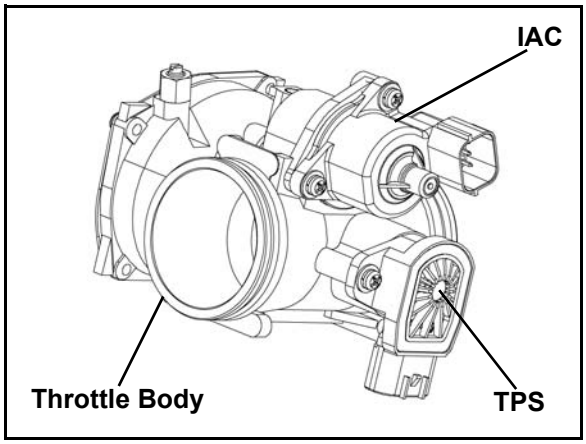
Fuel Tank Installation

1. Carefully reinstall the fuel tank assembly.
2. Reinstall the (2) fuel tank brackets and fasteners.
3. Reinstall the (3) shift lever support bracket fasteners.
4. Reinstall the rear R H fender well and secure with fasteners .
5. Reinstall the seat belt mechanism and secure the lower bolt.
6. Reinstall the RH rocker panel and all previously removed fasteners.
7. Reinstall the rear seat base / support assembly and secure with the fasteners.
8. Reinstall the center console and shift knob.
9. Install the fuel line, vent hose and clamp. Verify they are secure.
10. Reconnect the fuel pump electrical harness.
11. Reconnect the negative battery cable. Test the fuel pump by turning the ignition key on and listening for the pump to activate. Check for leaks.
12. Finally, install the rear service panel along with the seats.

IDLE AIR CONTROL (IAC)

Operation Overview

The Idle Air Control (IAC) is used to stabilize the idle quality of the engine at cold start-up and after warm-up operations.

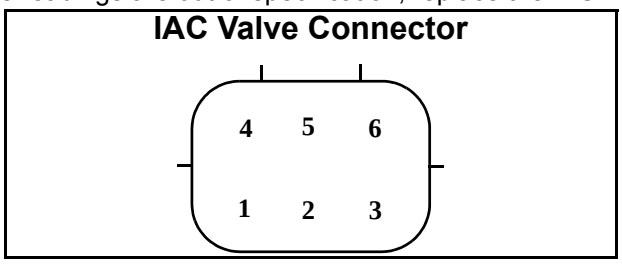


Mounted on the throttle body, the IAC contains 1 stepper motor which receives varying voltage signal pulses from the ECU. These pulses determine the IAC plunger setting, thereby controlling the amount of air bypassing the closed throttle body for idle control. If the IAC is disconnected or inoperative, it will remain at it's last operated position.

IAC Test

The IAC is a non-serviceable item. If it is faulty, it must be replaced. It can be 'bench tested' using the following method:

Set your meter to read Ohms. Check the resistance values at each of the following pin locations of the IAC. If any of the readings are out of specification, replace the IAC.



IAC Resistance Readings

Pins	Resistance	Pins	Resistance
1 - 2	**30 Ω ± 1.2 Ω**	4 - 5	**30 Ω ± 1.2 Ω**
2 - 3	**30 Ω ± 1.2 Ω**	5 - 6	**30 Ω ± 1.2 Ω**
1 - 3	**60 Ω ± 2.4 Ω**	4 - 6	**60 Ω ± 2.4 Ω**

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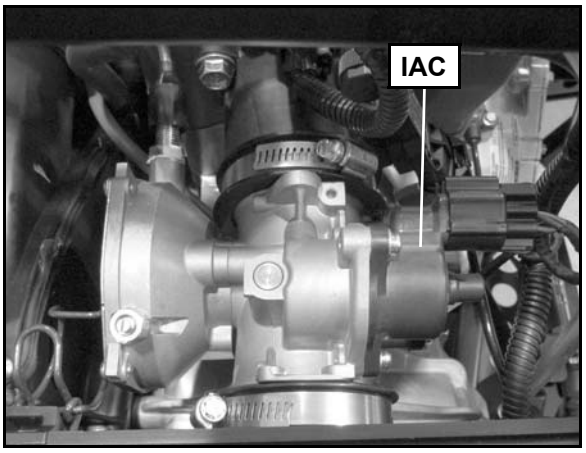
IAC Replacement

1. Remove the drivers seat and disconnect the negative (-) battery cable.
2. Remove the cargo box access panel.
3. Disconnect the vehicle harness from the IAC motor.
4. Remove the (3) Phillips-he ad mounting screws and remove the IAC from the throttle body. The screws can also be accessed from the RH rear wheel well area.



5. Install the new IAC and torque the mounting screws to specification.

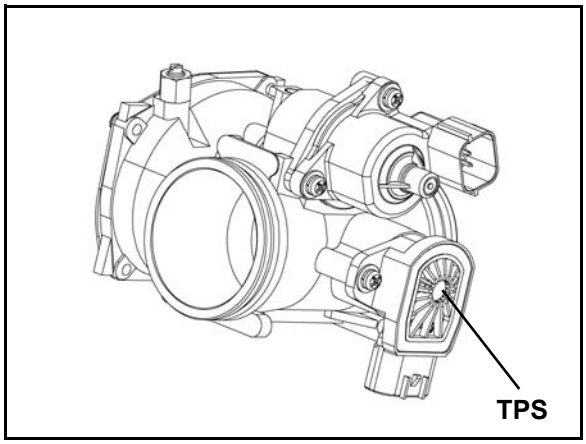
= T
IAC Mounting Screw Torque: **17.7 in. lbs. (2 ± 0.5 Nm)**

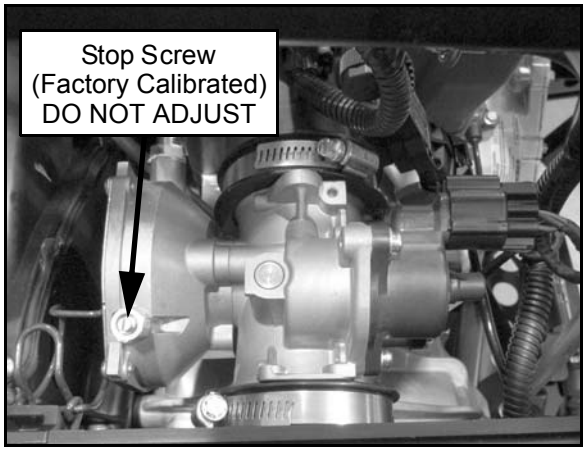
6. Reconnect the vehicle harness to the IAC motor.
7. Reinstall the cargo box acce ss pa nel, conn ect the negative (-) battery cable and install the drivers seat.

THROTTLE POSITION SENSOR (TPS)

Operation Overview

The th rottle po sition senso r (TPS) is used to ind icate throttle plate angle to the ECU. Mo unted 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.





The correct position of the throttle body stop screw is established and set at the factory. DO NOT loosen the throttle body stop screw or alter its position in any manner. The stop screw controls the air flow calibration of the throttle body. If the stop screw is repositioned or adjusted, the throttle body assembly must be replaced.

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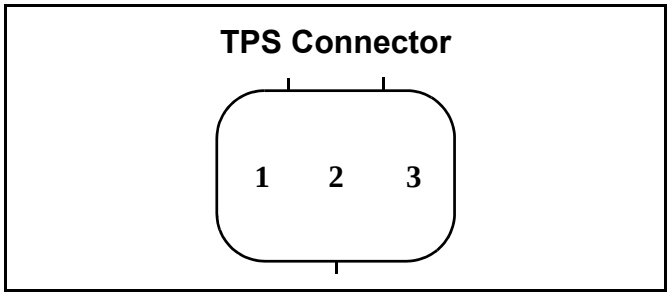
TPS Resistance Tests

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

With the test leads connected and the meter set to the ohms scale, observe the reading at the following pin locations of the TPS:



TPS Resistance Readings

Pins	Throttle Position	Resistance
2 - GND	-----	∞
1 - 2	**Closed**	**4kΩ - 5kΩ (reference)**
1 - 2	**Open**	**1150Ω - 1250Ω (reference)**
1 - 3	-----	**4kΩ – 6kΩ**

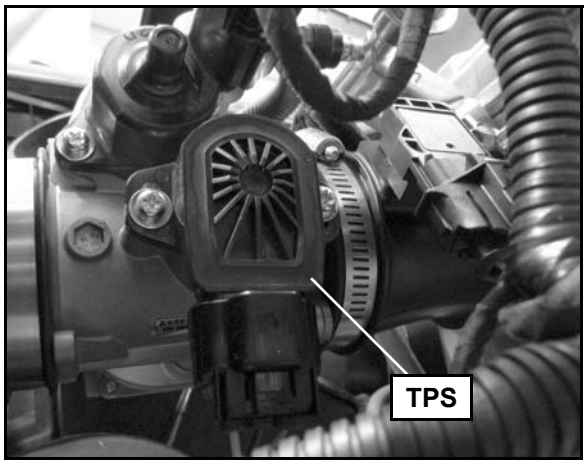
TPS Tester / Regulator

The TPS reading must be checked by using Digital Wrench™ Diagnostic Software.

TPS Replacement

NOTE: The correct position of the TPS angle on the throttle body is established and set at the factory. If the TPS is replaced or has been loosened it must be repositioned to obtain the proper voltage reading.

1. Remove the drivers seat and disconnect the negative (-) battery cable.
2. Remove the cargo box access panel. The TPS sensor screws can also be accessed through the right-hand rear wheel well area.
3. Disconnect the vehicle harness from the TPS.



4. Remove the (2) Phillips -head mounting screws and replace the TPS. Reconnect the vehicle harness to the TPS.

NOTE: If replacing the TPS or throttle body, you must set the TPS voltage to specification.

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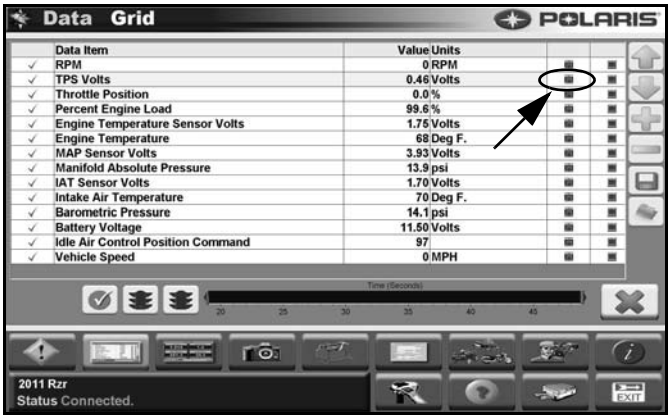
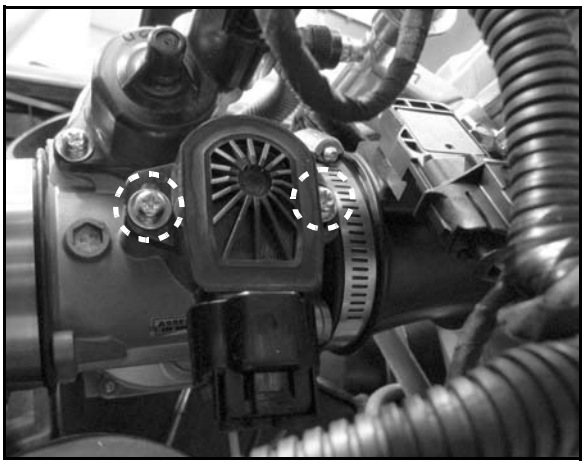
TPS Adjustment Using Digital Wrench™:

1. Assemble SmartLink Module and connect the diagnostic interface cable to the vehicle to allow Digital Wrench™ use (see "Digital Wrench™ - Diagnostic Connector").

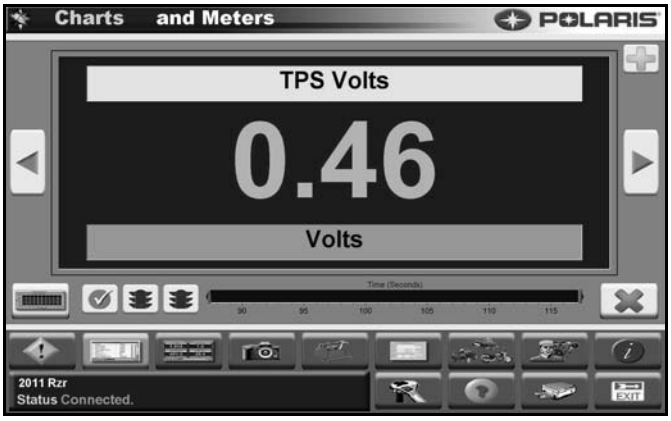
2. Select the appropriate vehicle and open the data display grid. Click on the meter icon next to "TPS Volts".



3. Loosen the TPS mounting screws.



4. Rotate the TPS until your display reading is within specification.



TPS Output Reading (Digital Wrench™):
0.46 ± 0.03 Vdc

5. Retighten the TPS mounting screws and torque to specification.

= T
TPS Mounting Screws: **17.7 in. lbs. (2 Nm)**

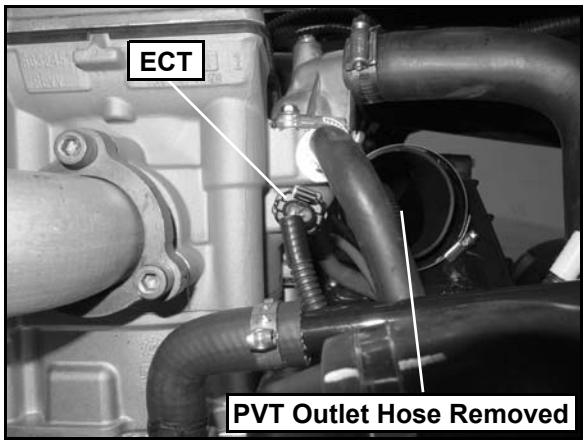
6. Verify voltage reading did not change. If voltage reading is now out of specification, repeat steps 3 - 5.

7. Reinstall items that were removed to access TPS sensor.

ENGINE COOLANT TEMPERATURE SENSOR (ECT)

Operation Overview

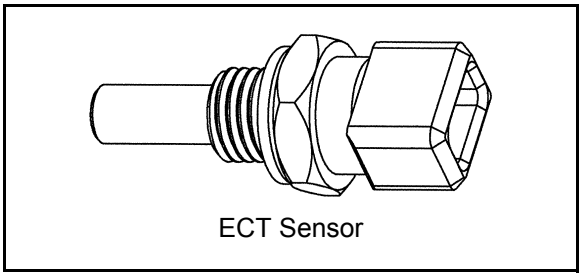
Mounted on the cylinder head, the engine temperature sensor measures coolant temperature. The engine temperature sensor is a Negative Temperature Coefficient (NTC) type sensor, as the temperature increases the resistance decreases.



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 its 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.

ECT Sensor Test

To quickly rule out other components and wiring related to the ECT, disconnect the harness from the ECT sensor and start the engine. After a few seconds, the fan should turn on and the “Check Engine” indicator should display on the instrument cluster. This indicates all other components are working properly.


ECT Sensor

Refer to Chapter 10 for additional ECT sensor information. Polaris dealers can test the sensor by using the Digital Wrench™ Diagnostic Software (dealer only).

ECT Sensor Resistance Readings

Temperature °F (°C)	Resistance
68 °F (20 °C)	2.5 kΩ ± 6%
86 °F (30 °C)	1.7 kΩ ± 6%
104 °F (40 °C)	1.2 kΩ ± 6%
122 °F (50 °C)	834 Ω ± 6%
140 °F (60 °C)	596 Ω ± 6%
158 °F (70 °C)	435 Ω ± 6%
176 °F (80 °C)	323 Ω ± 6%
194 °F (90 °C)	243 Ω ± 6%
212 °F (100 °C)	186 Ω ± 6%

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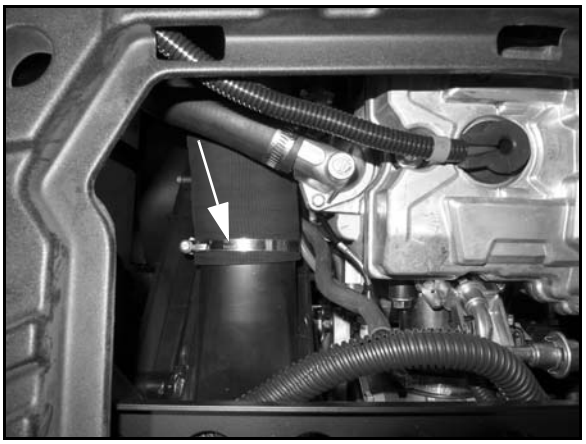
ECT Sensor Replacement

1. Remove the cargo box access panel.
2. Loosen the hose clamp that attaches the PVT outlet duct.



3. Remove the driver and passenger seats.
4. Remove the rear service panel to access the ECT sensor.
5. Remove the PVT outlet hose.
6. Drain coolant to level below sensor.
7. Disconnect sensor from engine harness.
8. Using a wrench, remove and replace the sensor, applying a light coating of thread sealant to aid installation.
9. Torque the sensor to **17 ft. lbs. (23 Nm)**.

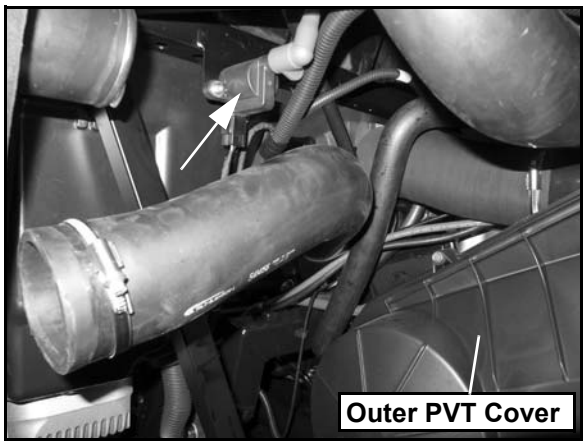
= T
ECT Torque: **17 ft. lbs. (23 Nm)**

10. Add the required amount of coolant and properly bleed the cooling system (see Chapter 3).

IGNITION COIL

Operation Overview

The ignition coil is used to provide high voltage to fire the spark plug. When the ignition key is on, DC voltage is present in primary side of the ignition coil windings. During engine rotation, an AC pulse is created within the crankshaft position sensor for each passing tooth on the flywheel. The two-tooth gap creates an "interrupt" input signal, corresponding to specific crankshaft position. This signal serves as a reference for the control of ignition timing. The ECU then calculates the time interval between the consecutive pulses, and determines when to trigger the voltage spike that induces the voltage from the primary to the secondary coil windings to fire the spark plug.



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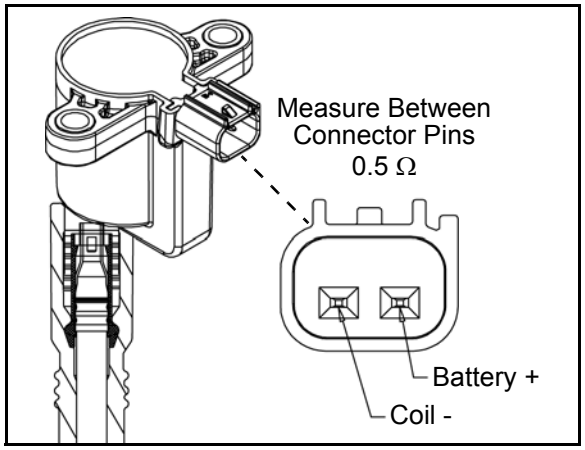
Ignition Coil Tests

The ignition coil can be tested by using an Ohmmeter. Use the following specification table and illustrations to test the ignition coil.

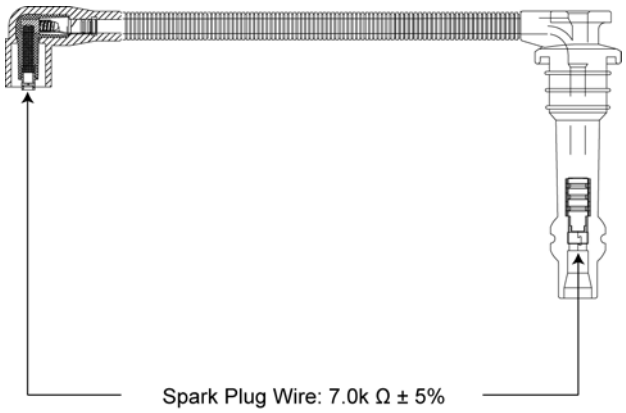
Ignition Coil Resistance Readings

Test	Pin Connection	Resistance
Primary	Between (Battery +) & (Coil -)	0.5 Ohms ± 10%
Primary Test	Between Coil - and + at the Coil Connection	0.5 Ohms
Secondary Test	Between High Tension Lead Caps	7.0 k Ohms ±5%

Primary Test

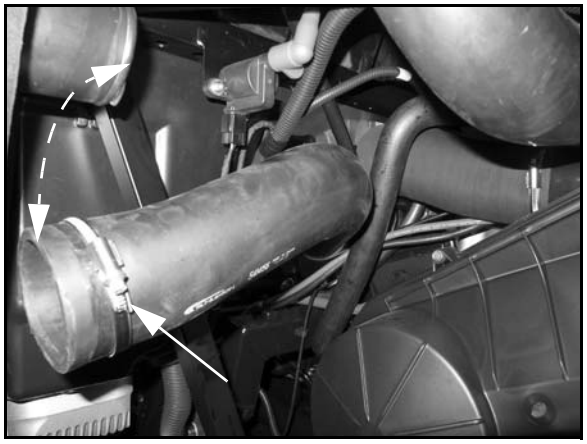


Secondary Tests



Ignition Coil and HT Lead Replacement

1. Remove the drivers seat and disconnect the (-) negative battery cable.
2. Loosen hose clamp and disengage the PVT intake hose from the duct.



3. Disconnect the harness connection to the ignition coil.
4. Remove the high tension lead cap from the spark plug.
5. Remove the fasteners retaining the ignition coil and remove the coil assembly from the vehicle.
6. Install the new ignition coil assembly and tighten fasteners to specification.

NOTE: Be sure to reinstall the coil mounting spacers upon assembly (if equipped).

= T
Ignition Coil Retaining Bolt Torque: **75 in. lbs. (8.5 Nm)**

7. Connect the harness connection to the ignition coil.
8. Reinstall the PVT intake hose and tighten hose clamp.
9. Reconnect the battery cable and install the drivers seat.

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EFI DIAGNOSTICS

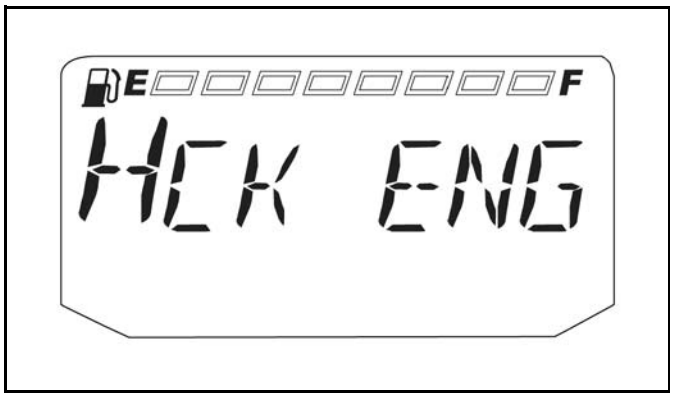
Instrument Cluster Trouble Code Display

NOTE: The diagnostic mode is accessible only when the check engine MIL has been activated.

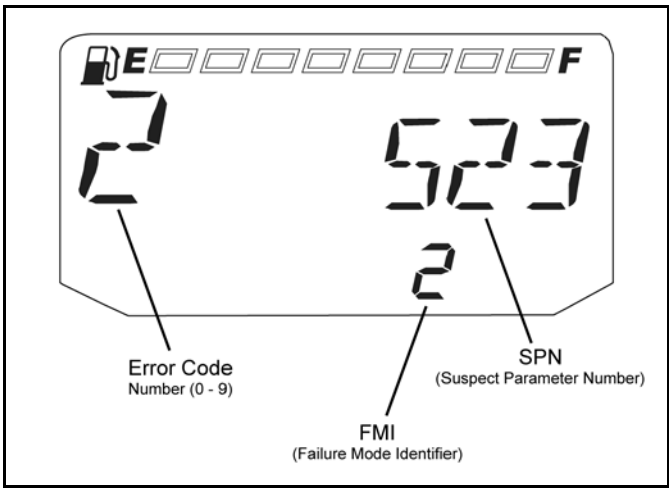
Use the following procedure to display diagnostic trouble codes that were activated during current ignition cycle causing the MIL to illuminate. Diagnostic trouble codes will remain stored in the gauge (even if MIL turns off) until the key is turned off.

NOTE: If there is a diagnostic problem with the power steering system, the power steering MIL will illuminate and blink in place of the check engine MIL.

1. If the trouble code(s) are not displayed, use the MODE button to toggle until "CK ENG" displays on the information display area.



2. Press and hold the MODE button to enter the diagnostics code menu.
3. A set of three numbers will appear in the information area.
   - The first number (located far left) can range from 0 to 9. This number represents the total number of trouble code present (example: 2 means there are 3 codes present).
   - The second number (located top right) can be 2 to 6 digits in length. This number equates to the suspected area of fault (SPN).
   - The third number (located bottom right) can be 1 to 2 digits in length. This number equates to the fault mode (FMI).



4. If more than one code exists, press the MODE button to advance to the next trouble code.
5. To exit the diagnostic mode, press and hold the MODE button or turn the ignition key OFF once the codes are recorded.

DIAGNOSTIC TROUBLE CODE TABLE

Component	Condition	SPN	FMI	Digital Wrench™ P-Code
Throttle Position Sensor (TPS)	Voltage Too High	51	3	P0123
	Voltage Too Low		4	P0122
Vehicle Speed Signal	Data Erratic or Intermittent (or missing)	84	2	P0503
	Received Vehicle Speed Has Error		2	C1069
Manifold Absolute Pressure Sensor (T-MAP)	Voltage Too High	102	3	P0108
	Voltage Too Low		4	P0107
Intake Air Temperature (T-MAP)	Voltage Too High	105	3	P0113
	Voltage Too Low		4	P0112
Engine Temperature Sensor (ECT)	Voltage Too High	110	3	P0118
	Voltage Too Low		4	P0117
	Temperature Too High		16	P0217
	Engine Overheat Shutdown		0	P1217
System Power (Battery Potential / Power Input)	Voltage Too High	168	3	P0563
				C1063
	Voltage Too Low		4	P0562
				C1064
Engine Speed	Received Engine Speed Has Error	190	0	C1059
	Engine Speed Too High		0	C1066
Gear Sensor Signal	Voltage Too Low	523	4	P0916
ECU Memory	EEPROM: Read/Write Failure	628	12	C1073
Calibration	Checksum / CRC Error	630	12	C1073
Crankshaft Position Sensor (CPS)	Plausibility Fault	636	2	P0335
Injector 1 (MAG)	Driver Circuit Open / Grounded	651	5	P0261
	Driver Circuit Short to B+		3	P0262
	Driver Circuit Grounded		4	P1262
Rear Differential Output (INTL)	Driver Circuit Open / Grounded	746	5	P1691
	Driver Circuit Short to B+		3	P1692
	Driver Circuit Grounded		4	P1693
Fan Relay Driver Circuit	Driver Circuit Open / Grounded	1071	5	P1481
	Driver Circuit Short to B+		3	P1482
	Driver Circuit Grounded		4	P1483
Ignition Coil Primary Driver 1 (MAG)	Driver Circuit Short to B+	1268	3	P1353
Fuel Pump Driver Circuit	Driver Circuit Open / Grounded	1347	5	P0230
	Driver Circuit Short to B+		3	P0232
	Driver Circuit Grounded		4	P0231

DIAGNOSTIC TROUBLE CODE TABLE

Component	Condition	SPN	FMI	Digital Wrench™ P-Code
ECU Output Supply Voltage 1	Voltage Too High	3597	3	P16A2
	Voltage Too Low		4	P16A1
ECU Output Supply Voltage 2	Voltage Too High	3598	3	P16A9
	Voltage Too Low		4	P16A8
All Wheel Drive Control Circuit (AWD)	Driver Circuit Open / Grounded	520207	5	P1836
	Driver Circuit Short to B+		3	P1835
	Driver Circuit Grounded		4	P1834
Idle Air Control Valve (IAC) M17; IAC Stepper Pin 1	Driver Circuit Open / Grounded	520271	5	P1505
	Driver Circuit Short to B+		3	P1509
	Driver Circuit Grounded		4	P1508
Idle Air Control Valve (IAC) M17; IAC Stepper Pin 3	Driver Circuit Open / Grounded	520268	5	P1515
	Driver Circuit Short to B+		3	P1519
	Driver Circuit Grounded		4	P1518
Idle Air Control Valve (IAC) M17; IAC Stepper Pin 4	Driver Circuit Open / Grounded	520269	5	P1525
	Driver Circuit Short to B+		3	P1529
	Driver Circuit Grounded		4	P1528
Idle Air Control Valve (IAC) M17; IAC Stepper Pin 6	Driver Circuit Open / Grounded	520270	5	P1535
	Driver Circuit Short to B+		3	P1539
	Driver Circuit Grounded		4	P1538

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)

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DIGITAL WRENCH™ OPERATION

Digital Wrench™ Diagnostic Software Overview

IMPORTANT: Refer to Section 2, 3 and 4 in the Instruction Manual provided in the Digital Wrench™ Diagnostic Kit to install the Polaris Digital Wrench™ diagnostic software on your computer.

The Digital Wrench™ diagnostic software allows the technician to perform the following tests and observations:

- View or clear trouble codes
- Analyze real-time engine data
- Reflash ECU calibration files
- Perform guided diagnostic procedures
- Create customer service account records
- Perform output state control tests (on some models)

Special Tools (also refer to page 4.2)

DIGITAL WRENCH™ DIAGNOSTIC SOFTWARE	PART NUMBER
Digital Wrench™ Diagnostic Kit	PU-47063-A
PU-47063-B (listed above) INCLUDES:	Digital Wrench™ Software: PU-48731
	Standard Interface Cable: PU-47151
	SmartLink Module Kit: PU-47471
Fuel Pressure Gauge Kit	PU-43506-A
Fuel Pressure Gauge Adapter	PV-48656
Fluke 73 Digital Multi-Meter or Fluke 77 DMM	PV-48656 (Fluke 77: PV-43568)
Laptop or Desktop Computer USB/Serial Adaptor: Saelig RS-232	Commercially Available (refer to diagnostic software user manual or HELP section for minimum requirements)

Diagnostic Software Version

Always use the most current version of the Digital Wrench™ software to ensure you have the latest updates or enhancements. New reprogramming files and guided diagnostic procedures are added to these updates as they become available. For information on how to determine if you have the latest update available, refer to "Digital Wrench™ Version and Update ID".

ECU Replacement

Although the need for ECU replacement is unlikely, a specific replacement procedure is required to ensure that all essential data contained within the original ECU is transferred to the replacement ECU.

Refer to procedure and carefully follow all instructions provided in Digital Wrench™.

Guided Diagnostic Available

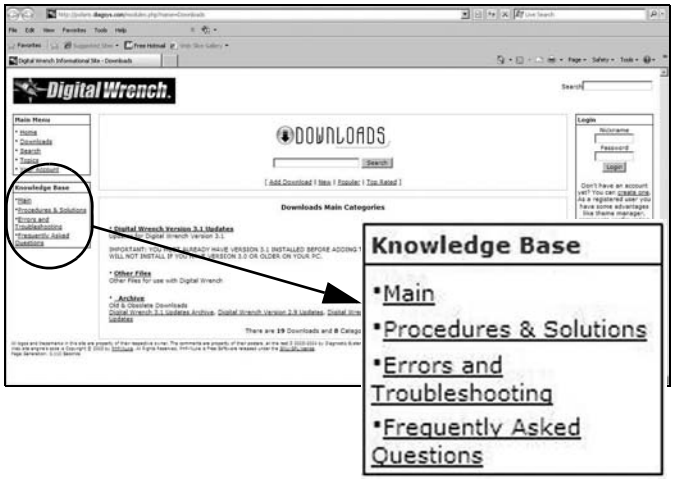
Guided diagnostics are available within Digital Wrench™ for all supported Trouble Codes (that is, any fault that will turn on the 'Check Engine' indicator).

In addition, guided diagnostics are also available for many other electrical sub systems.

Diagnostic procedures are added to subsequent versions of Digital Wrench™ as they become available. Check your release version often and upgrade when available to be sure you are using the most current software available.

Digital Wrench™ Communication Errors

If you experience problems connecting to a vehicle or any Digital Wrench™ related problem, visit the Digital Wrench™ Knowledge Base for the most current troubleshooting information, FAQs, downloads and software updates at: ***http://polaris.diagsys.com/.***



Digital Wrench™ - Diagnostic Connector

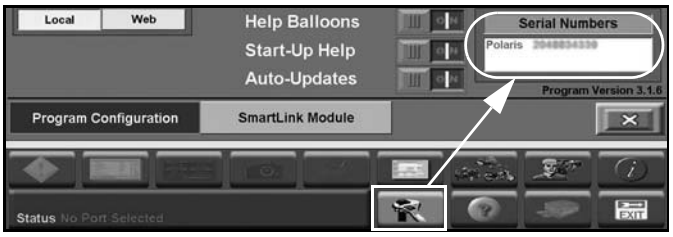
Located under the dash connected to a sealed plug.

Follow these steps to connect the diagnostic interface cable to the vehicle to allow Digital Wrench™ use:

1. Assemble the SmartLink Module and attach the PC Interface Cable to your laptop (see page 4.3).
2. Remove the protective cap from the Digital Wrench™ connector.
3. Connect the Vehicle Interface Cable to the Digital Wrench™ diagnostic connector.
4. Turn the ignition key to the 'ON' position, select the appropriate vehicle and wait for the status to display 'Connected' in the lower left corner of the screen.
5. Once connected, proceed with using Digital Wrench™.

Digital Wrench™ Serial Number Location

Open the configuration screen by clicking on the wrench icon. The serial number is located on the right side of the screen.

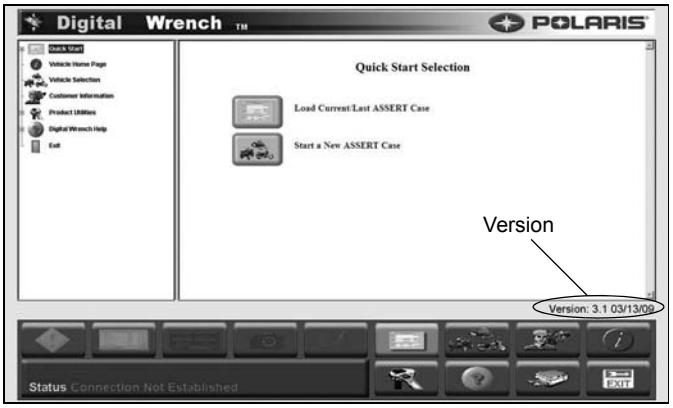


Digital Wrench™ Version and Update ID

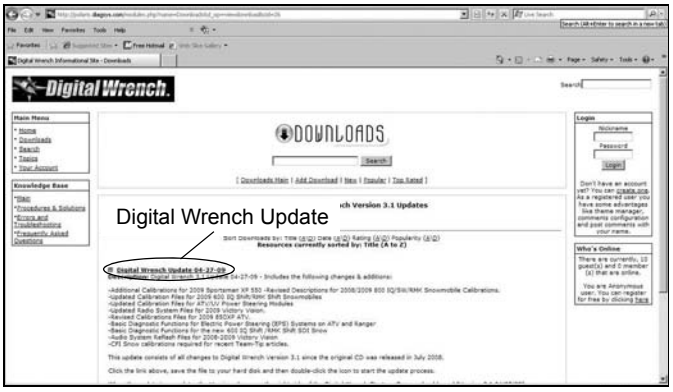
Knowing what Digital Wrench™ version and update is installed will help determine which updates are required.

NOTE: Versions and updates are subject to change.

1. Open the Digital Wrench™ software. Locate the version ID shown on the lower right side of the Digital Wrench™ start-up screen.



2. Proceed to ***http://polaris.diagsys.com*** to see if a newer update is available.



3. If a newer update is available, it should be downloaded before using Digital Wrench™ (see "Digital Wrench™ Updates").

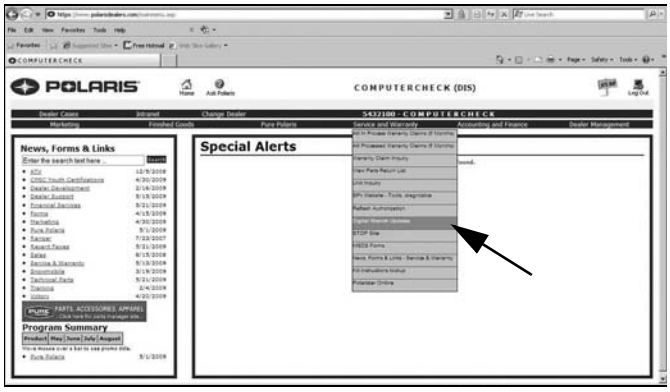
IMPORTANT: Always operate with the latest update.

Digital Wrench™ Updates

Updates are released for Digital Wrench™ via the Internet at: ***http://polaris.diagsys.com***. The Digital Wrench™ website can also be accessed through the dealer website at: ***www.polarisdealers.com***.

NOTE: Only authorized Polaris dealers and distributors can access the dealer website.

1. Log on to ***www.polarisdealers.com***.
2. Locate the "**Service and Warranty**" drop-down menu.
3. Click on "**Digital Wrench Updates**".



4. The Digital Wrench™ portal website should appear in a new web browser.
5. Click on "**Digital Wrench Version Updates**".

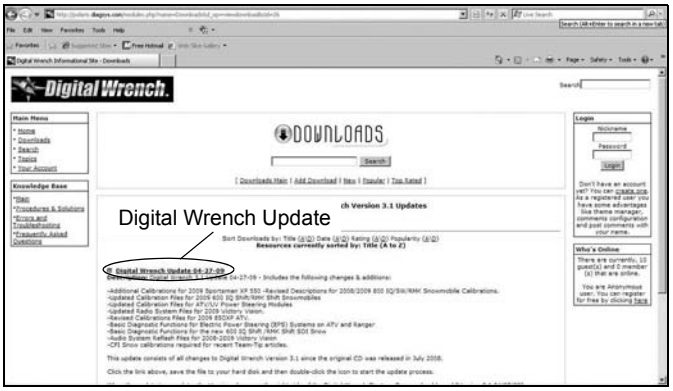
IMPORTANT: You must already have the current version installed before adding an update. Updates will not install if you are using an older version loaded on your PC.

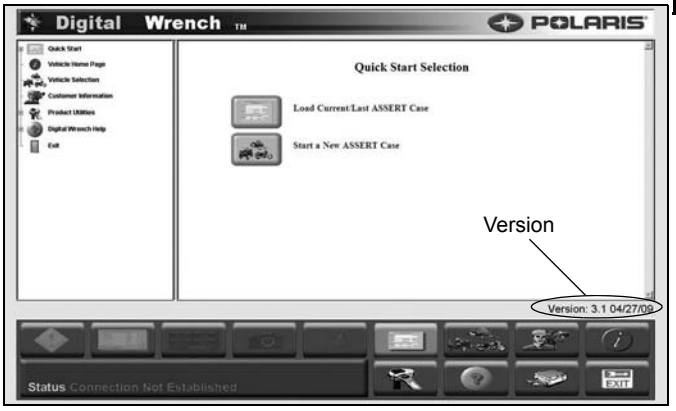
6. If the update file date listed is newer than your current version and update (see “Digital Wrench™ Version and Update ID”), download the file.

7. Click on the link shown above, save the file to your hard disk and then double-click the icon to start the update process.

NOTE: Do not "run" or "open" the file from where they are. Select "save" and download them to your PC before running the install.

8. When the update is complete, the version shown on the right side of the Digital Wrench™ start-up screen should match the update you just downloaded.

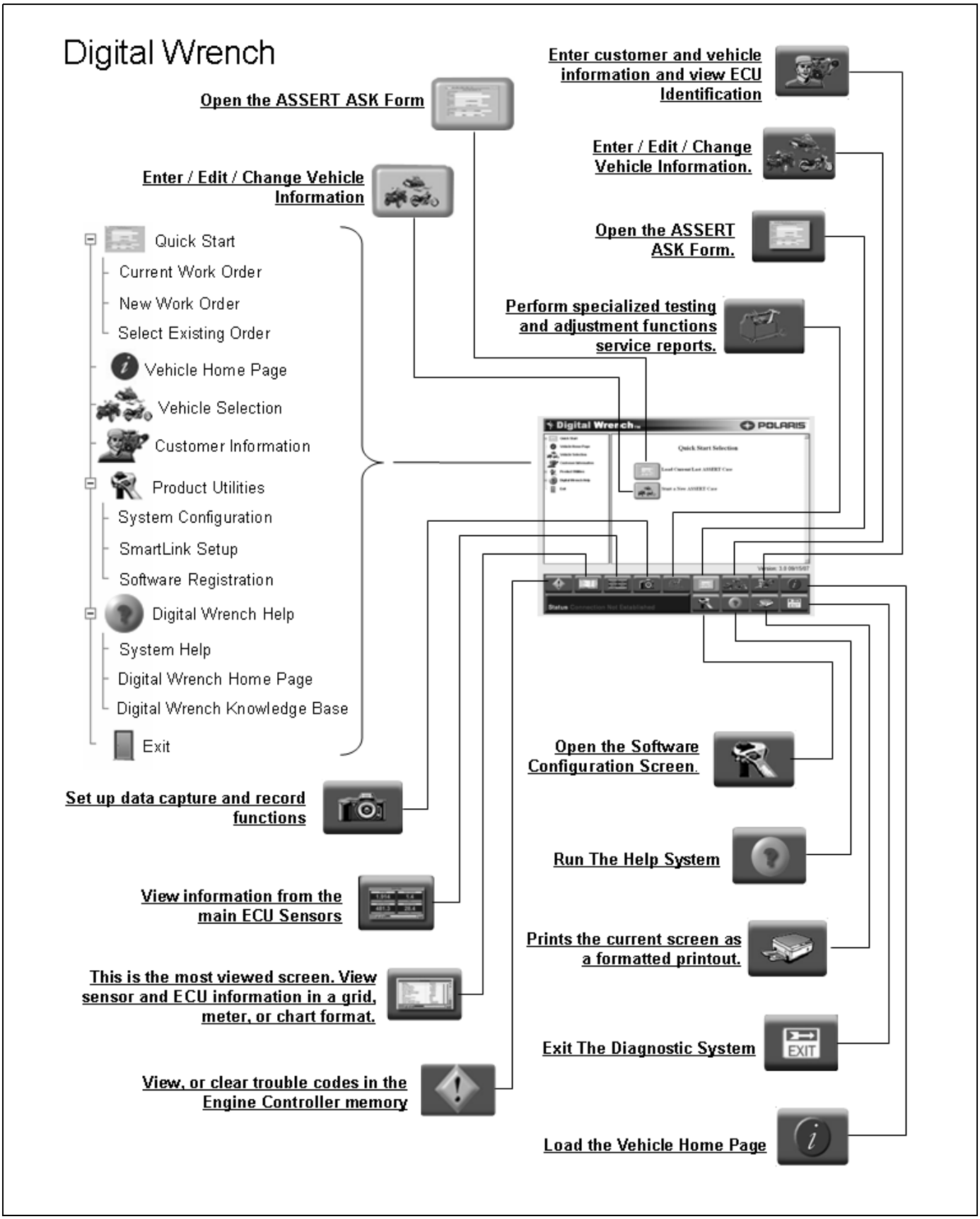




NOTE: Versions and updates are subject to change.

4

Digital Wrench™ Feature Map



Engine Controller Reprogramming (Reflash)

Process Overview

The reprogramming feature is in the Special Tests menu on the Digital Wrench™ screen. Start Digital Wrench™ and click on the Special Tests menu icon (red tool box). A technician should be familiar with the process and with computer operation in general before attempting to reprogram an ECU.

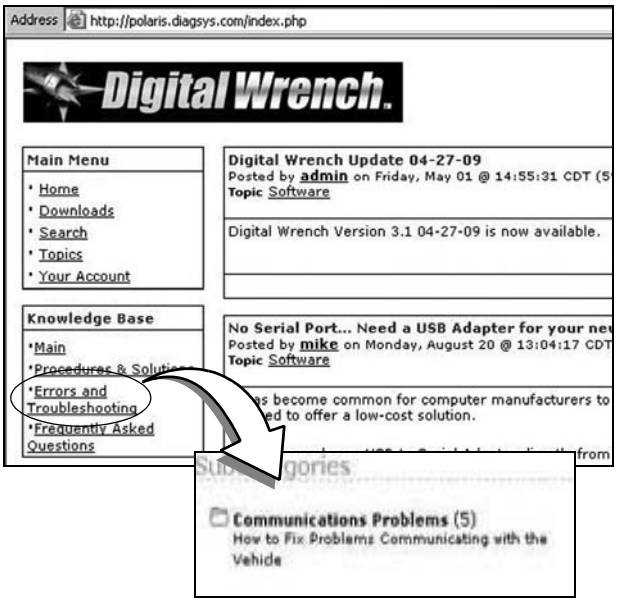
The Digital Wrench™ Engine Controller Reprogramming (or "Reflash") feature allows reprogramming of the ECU fuel and ignition map. To successfully reprogram the ECU, an Authorization Key must be obtained by entering a Request Code in the box provided on the Reflash Authorization site. The Request Code is automatically generated by Digital Wrench™ during the reprogramming process. The Reflash Authorization site is located under the "**Service and Warranty**" drop down menu on the dealer website at: ***www.polarisdealers.com***.

IMPORTANT: Failure to follow the reprogramming instructions completely and correctly can result in an engine that does not run! Replacement ECUs are programmed as "no-start" and require a reflash for them to work.

Reprogramming (Reflash) Tips:

- BATTERY VOLTAGE: The majority of problems with reprogramming can be attributed to a low battery. Be sure the battery voltage (no load) is at least 13 volts and at least 12.5 volts with the key 'ON'. Connect a battery charger if necessary to bring voltage level above minimum. Fully charge the battery before you attempt to reprogram.
- DEDICATED LAPTOP: Best results are obtained using a laptop computer that is "dedicated to Digital Wrench™". A laptop that is used by a variety of people and in several applications around the dealership is more likely to cause a reprogramming problem than one dedicated to Digital Wrench™ diagnostics only.
- OBTAINING THE LATEST UPDATE: Reprogramming updates are provided periodically and contain the most recent calibrations (see "Digital Wrench™ Updates").
- CLOSE NON-ESSENTIAL PROGRAMS : Polaris recommends that you DO NOT install non-essential programs on a Service Department laptop. Camera detection software, Virus Scanners, Tool Bars, etc. may clog up memory if running in the background and make it harder for the diagnostic software to operate.
- KNOW THE PROCESS: If you are not familiar with the entire reprogramming process, review the HELP section of the diagnostic software before you attempt reprogramming. Click on the **?** on the tool bar or press F11. The information in the on-line help is the most current and complete information available. This should be your first step until you are familiar with the process.
- COMMUNICATION PROBLEMS: If you have had problems communicating with a vehicle while performing diagnostic functions, do not attempt reprogramming until the cause has been identified and fixed. Check all connections, and be sure battery voltage is as specified.

  Proceed to ***http://polaris.diagsys.com*** for specific information and FAQs on how to troubleshoot communication problems.



- DON'T DISTURB THE PC : While reprogramming is in progress, don't move the mouse and don't touch the keyboard. The process only takes a few minutes, and is best left alone until complete.

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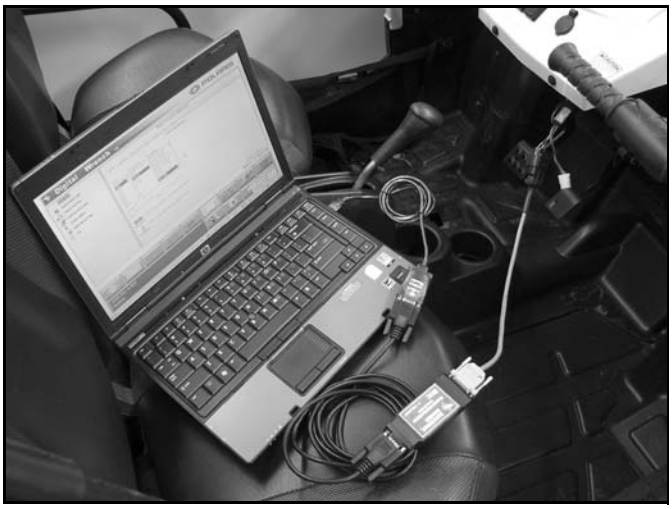
Reprogramming (Reflash) Procedure:

If you are not familiar with the reprogramming process, review the "Reprogramming (Reflash) Tips" before you begin. Follow the on-screen instructions as you progress through the steps. If you encounter a problem, always check the On-Line help for current tips and information.

1. Verify the most current update has been downloaded and loaded in to Digital Wrench™. See "Digital Wrench™ Version and Update ID" on page 4.40.

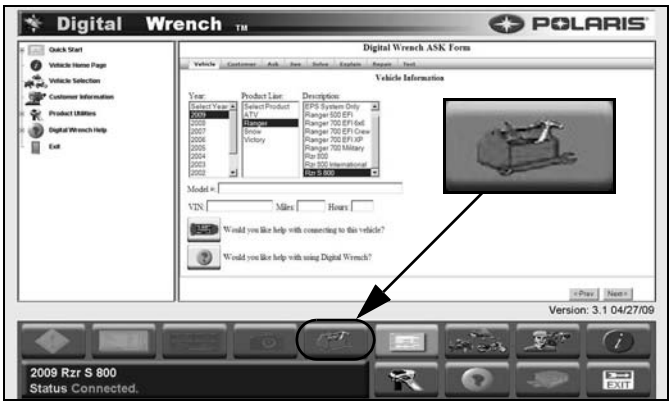
2. Connect the SmartLink Module cables to the PC and vehicle. See "Digital Wrench™ - Diagnostic Connector" on page 4.39.



3. Open the Digital Wrench™ program.

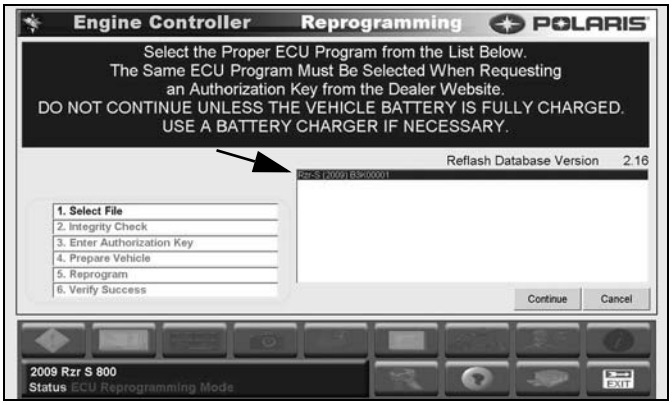
4. Select the model year, product line and vehicle description by selecting the "Change Vehicle Type" icon.

5. Select the "Special Tests" icon.



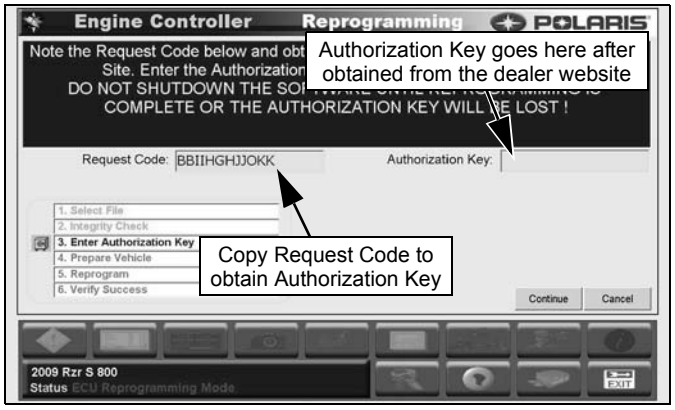
6. Select "Engine Controller Reprogramming".

7. Select the file you want to load into the ECU then click the "Continue" icon to proceed to the Integrity Check.



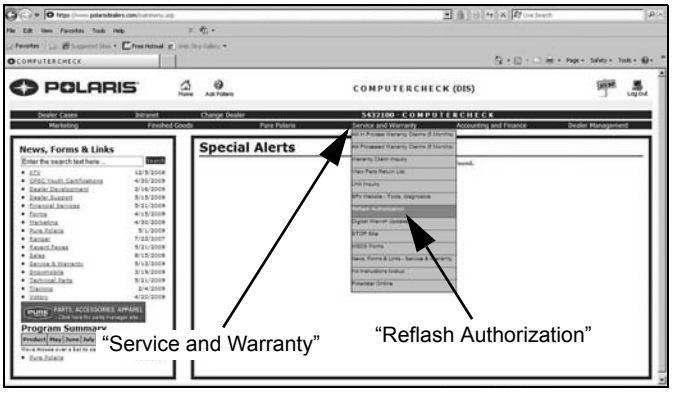
8. Follow the on screen instructions and connect a 9V battery to the reflash battery connector located off the main diagnostic connector. Click the “Continue” icon to obtain a Request Code.

9. Copy (CTRL+C) the Request Code that will be required on the dealer website in the next step. DO NOT CLOSE Digital Wrench™ or the Request Code will be invalid. **NOTE: All characters are letters; there are no numbers in a request code.**

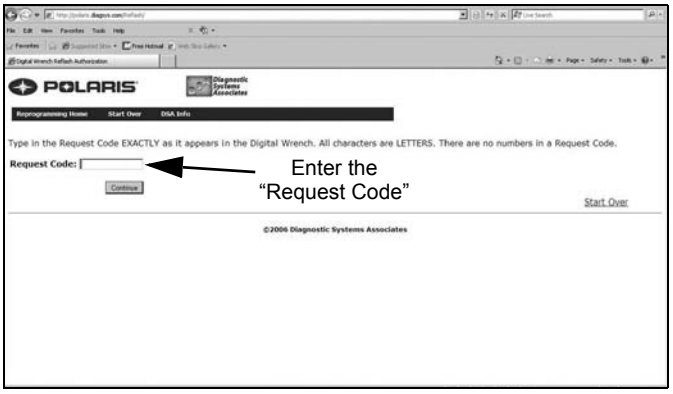


NOTE: Request Codes and Authorization Keys must be entered EXACTLY as they appear on the screen.

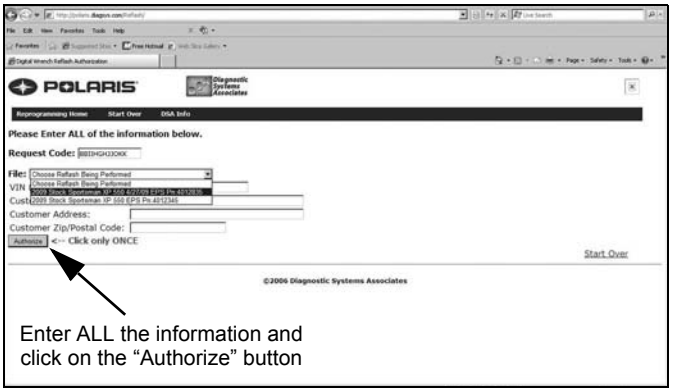
10. Go to ***www.polarisdealers.com*** and click on “ReFlash Authorization” from the “Service and Warranty” drop-down menu.



11. Enter or paste (CTRL+V) the Request Code into the box.



12. Select the same file type from the list that you selected previously while in Digital Wrench™. Enter the VIN along with the customer’s name and address. When completed, click the Authorize button **once** to proceed.



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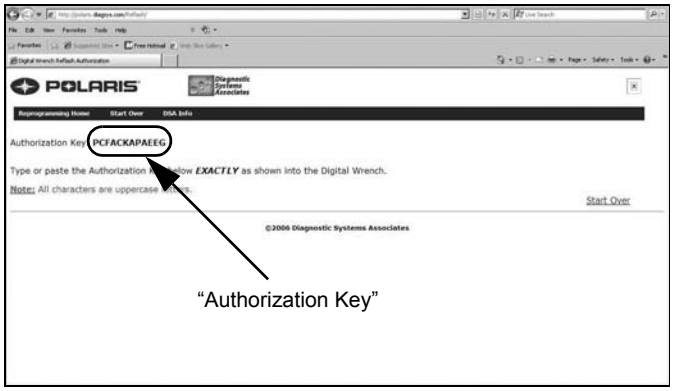
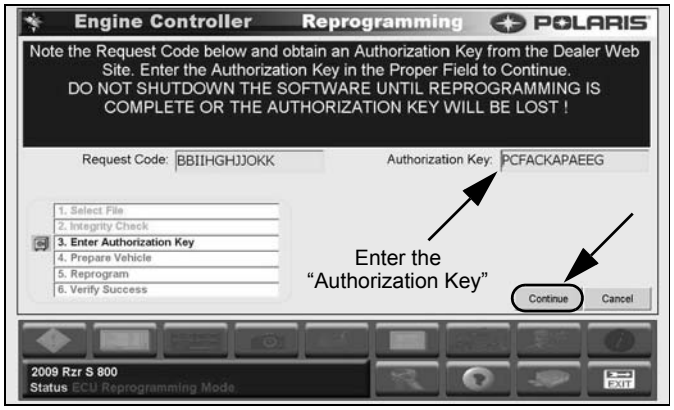
13. An “Authorization Key” will appear in the upper left corner of the screen. Copy (CTRL+C) this key exactly as it appears.



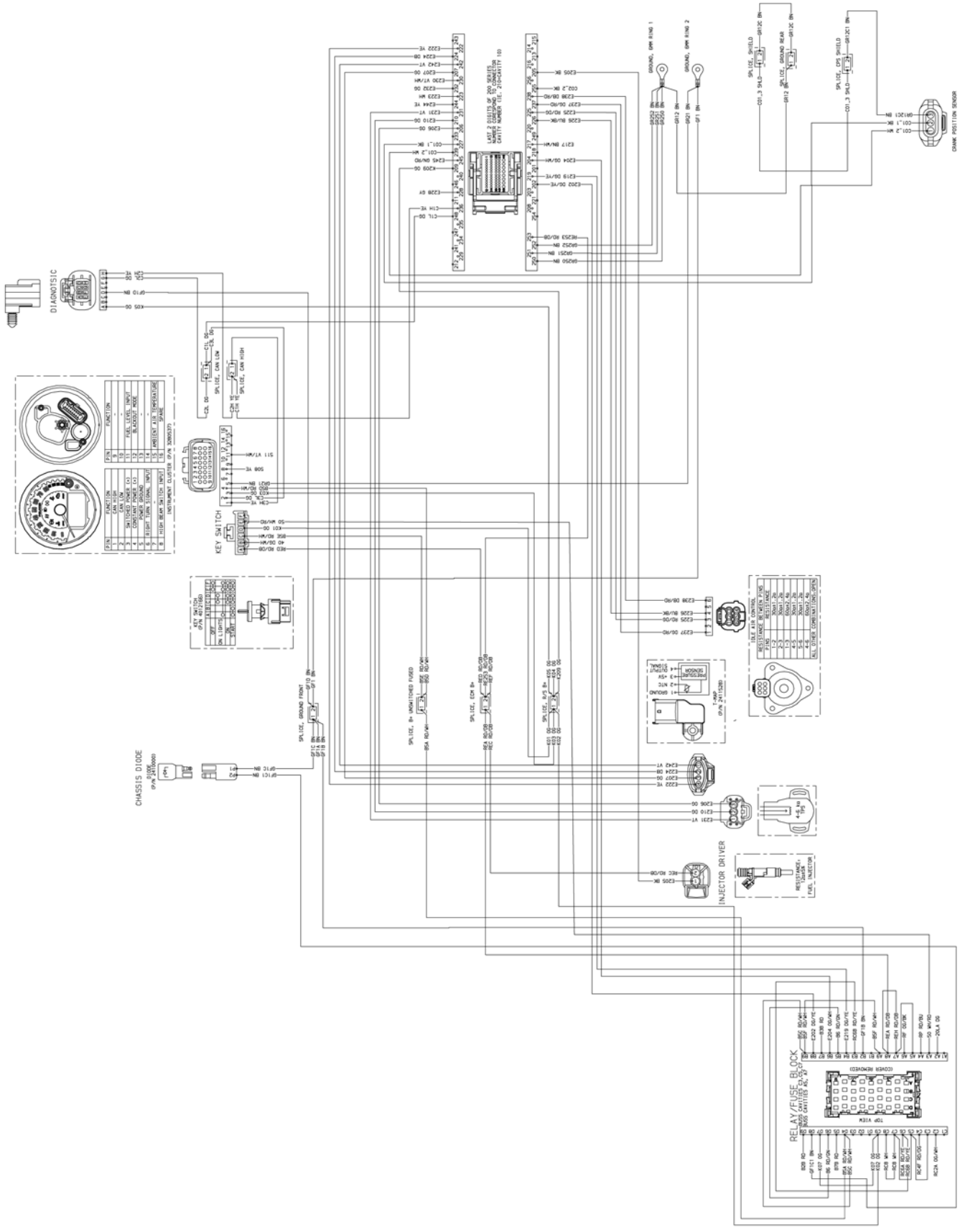
14. Enter or paste (CTRL+C) the Authorization Key in the box located on the Digital Wrench™ screen. Click the ‘Continue’ button and follow instructions provided on the screen to complete the re programming procedure.



15. At this point the reflash proc ess will begin. Do not touch the vehicle or PC during the process.

16. Once the ECU re programming pr ocedure is complete, clic k the ‘Finish’ button on the scre en. Verify th e r eflash was a success by sta rting th e vehicle.

EFI SYSTEM ELECTRICAL DIAGRAM



NOTES

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CHAPTER 5

BODY / STEERING / SUSPENSION

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TORQUE SPECIFICATIONS

ITEM	TORQUE VALUE
Front LH/RH Upper / Lower A-Arm Bolt	39 ft. lbs. (53 Nm)
Rear LH/RH Upper / Lower A-Arm Bolt	39 ft. lbs. (53 Nm)
Lower LH/RH Rear Bearing Carrier	40 ft. lbs. (54 Nm)
Upper LH/RH Rear Bearing Carrier	40 ft. lbs. (54 Nm)
Outer Tie Rod to Bearing Carrier Housing	42.5 ft. lbs. (58 Nm)
Front Ball Joint Pinch Bolts	23 ft. lbs. (31 Nm)
Shock Mounting Bolts	37 ft. lbs. (50 Nm)
Wheel Hub Castle Nuts	80 ft. lbs. (108 Nm)
Wheel Nuts (Cast Rims)	90 ft. lbs. (122 Nm)
Wheel Nuts (Steel Rims)	27 ft. lbs. (37 Nm)
Tie Rod End Jam Nut	13 ft. lbs. (18 Nm)
Seat Belt to Seat Base	40 ft. lbs. (54 Nm)
Tilt Shock Upper Fastener	7 ft. lbs. (10 Nm)
Tilt Shock Lower Fastener	12 ft. lbs. (16 Nm)
Steering Pivot Tube Fasteners	23 ft. lbs. (31 Nm)
Steering Wheel to Shaft	42 ft. lbs. (57 Nm)
Lower Steering Shaft to Box	30 ft. lbs. (41 Nm)
Steering Gear Box	17 ft. lbs. (23 Nm)

SPECIAL TOOLS

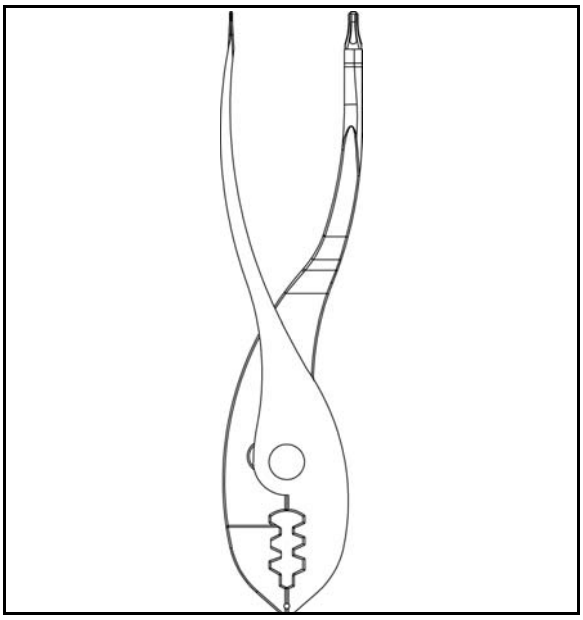
SPX: 1-800-328-6657 or on-line at http://polaris.spx.com/

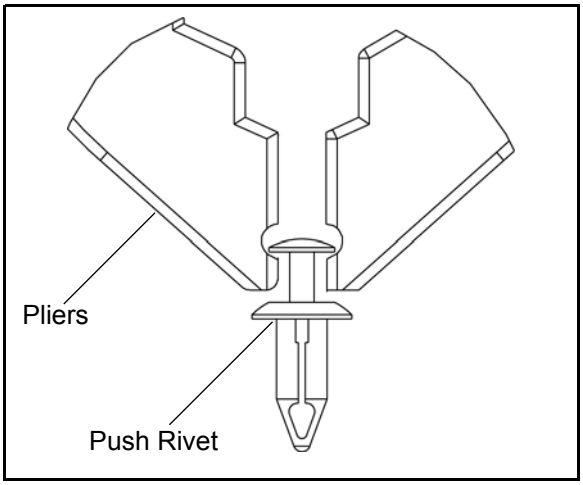
SPECIAL TOOLS

TOOL DESCRIPTION	PART NUMBER
Shock Spanner Wrench	2871095
Shock Spring Compressor Tool	2870623
Multi-Function Pliers	2876389

Multi-Function Pliers

Included in the tool kit, the multi-function pliers is designed to remove the plastic push rivets used to fasten body components.



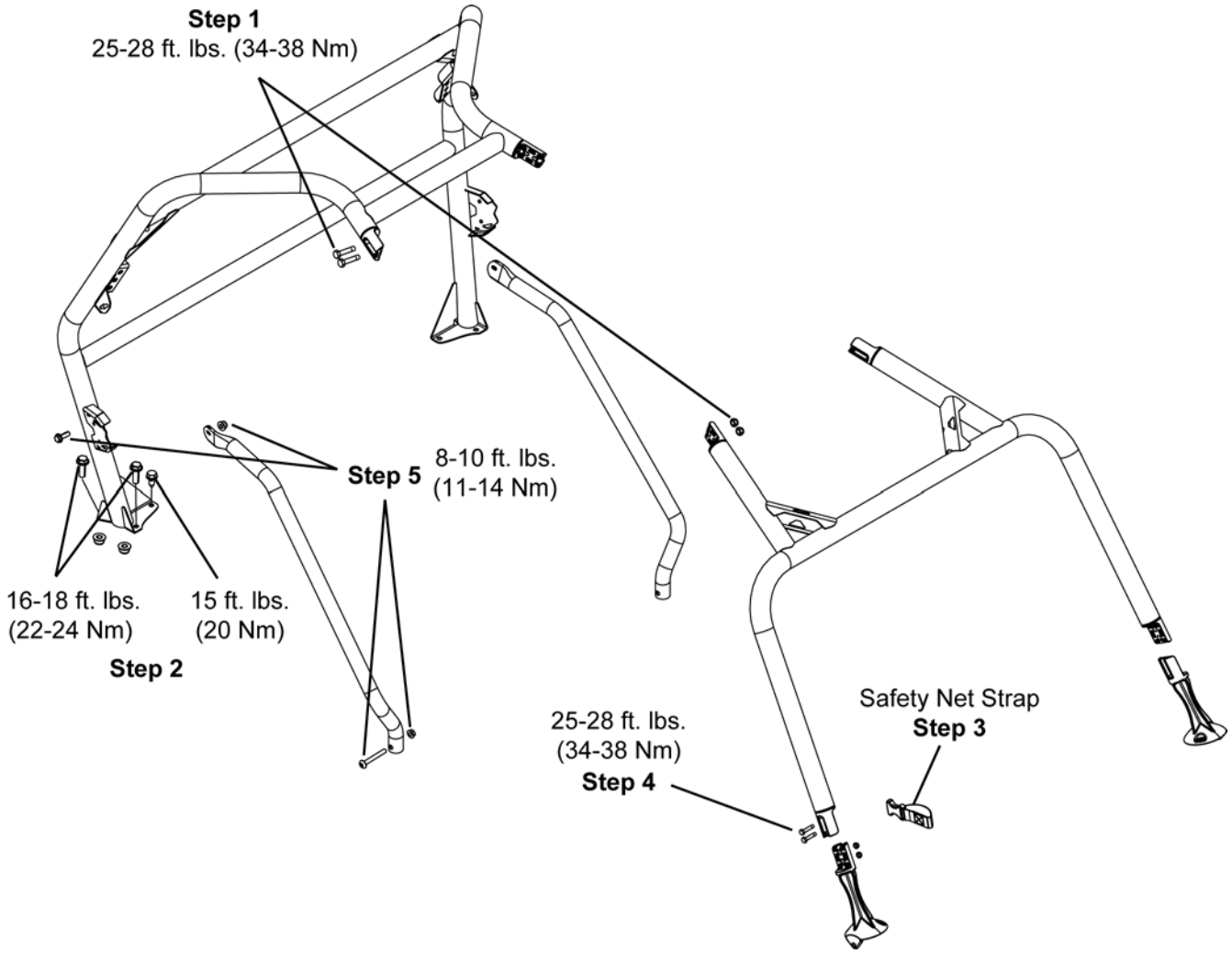


CAB FRAME

Assembly / Removal

NOTE: Finger tight en all co mponents until cab frame is c ompletely ass embled on veh icle, t hen tighten to specifications listed.

1. Assemble the rear cab frame and the front cab frame at the coupler joints and secure with four (3/8-16 x 1 1/4) screws and (3/8-16 Nyloc) nuts. Tighten screws to 25-28 ft. lbs. (34-38 Nm).
2. Place the assembled cab frame onto the vehicle and align the rear mount holes. Fasten the rear cab frame brackets to vehicle with four (5/16-18) bolts and (5/16-18) nuts. Tighten bolts to 16-18 ft. lbs. (22-24 Nm). Fasten the two self-tapping screws to the rear inner portion of the bracket on each side. Tighten screws to 15 ft. lbs. (20 Nm).
3. Place the straps from the safety net over the front coupler posts.
4. Fasten the front of the cab frame to the base brackets and secure with four (3/8-16 x 1 1/4) screws and (3/8-16 Nyloc) nuts. Tighten screws to 25-28 ft. lbs. (34-38 Nm).
5. Attach side bars to cab frame using M6 screws and nuts on top and M8 screws and nuts on the bottom. Tighten to 8-10 ft. lbs. (10.8-13.5 Nm).
6. To remove the cab frame, reverse the assembly procedure (steps 1-5).



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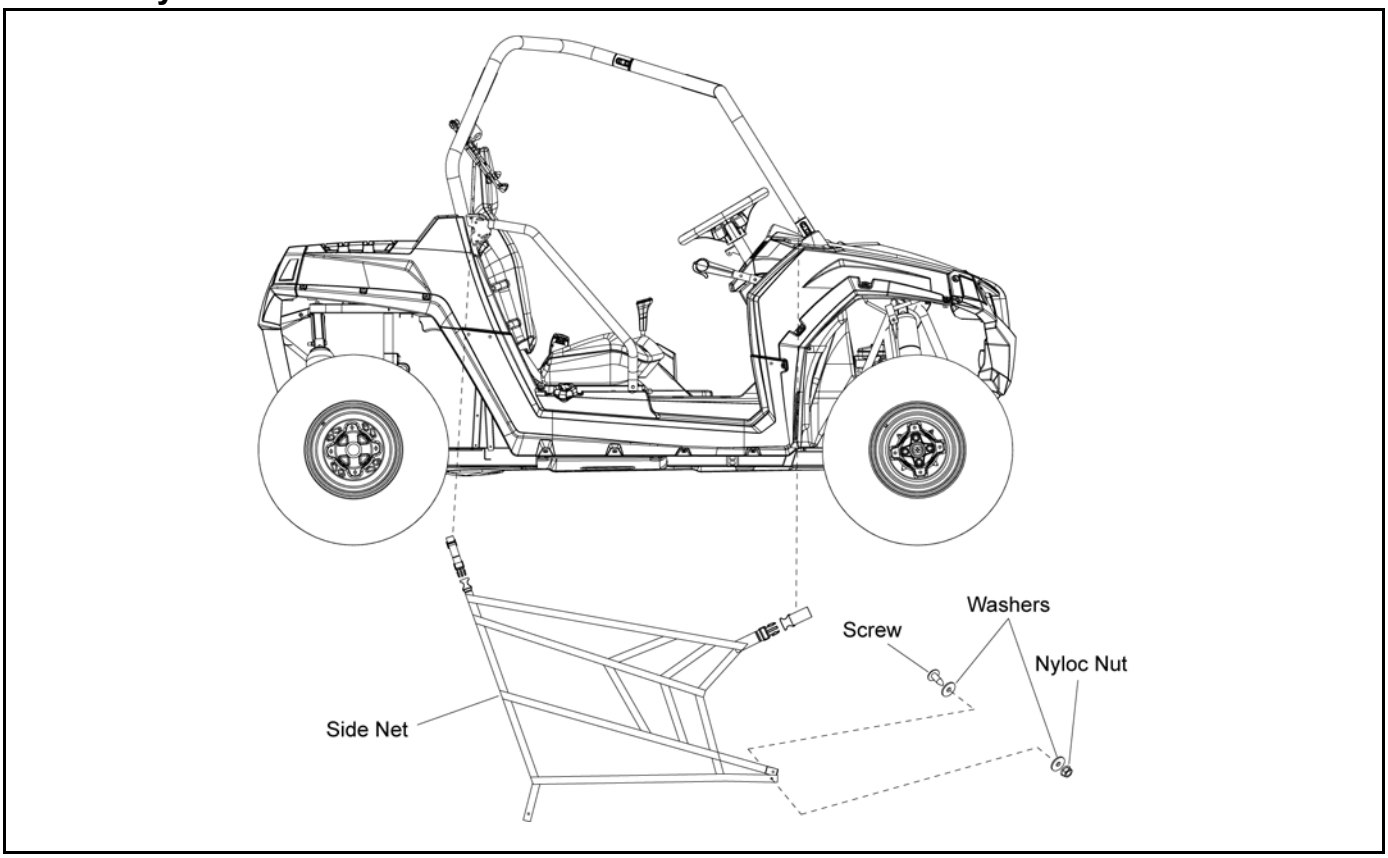
BODY EXPLODED VIEWS

Side Safety Nets



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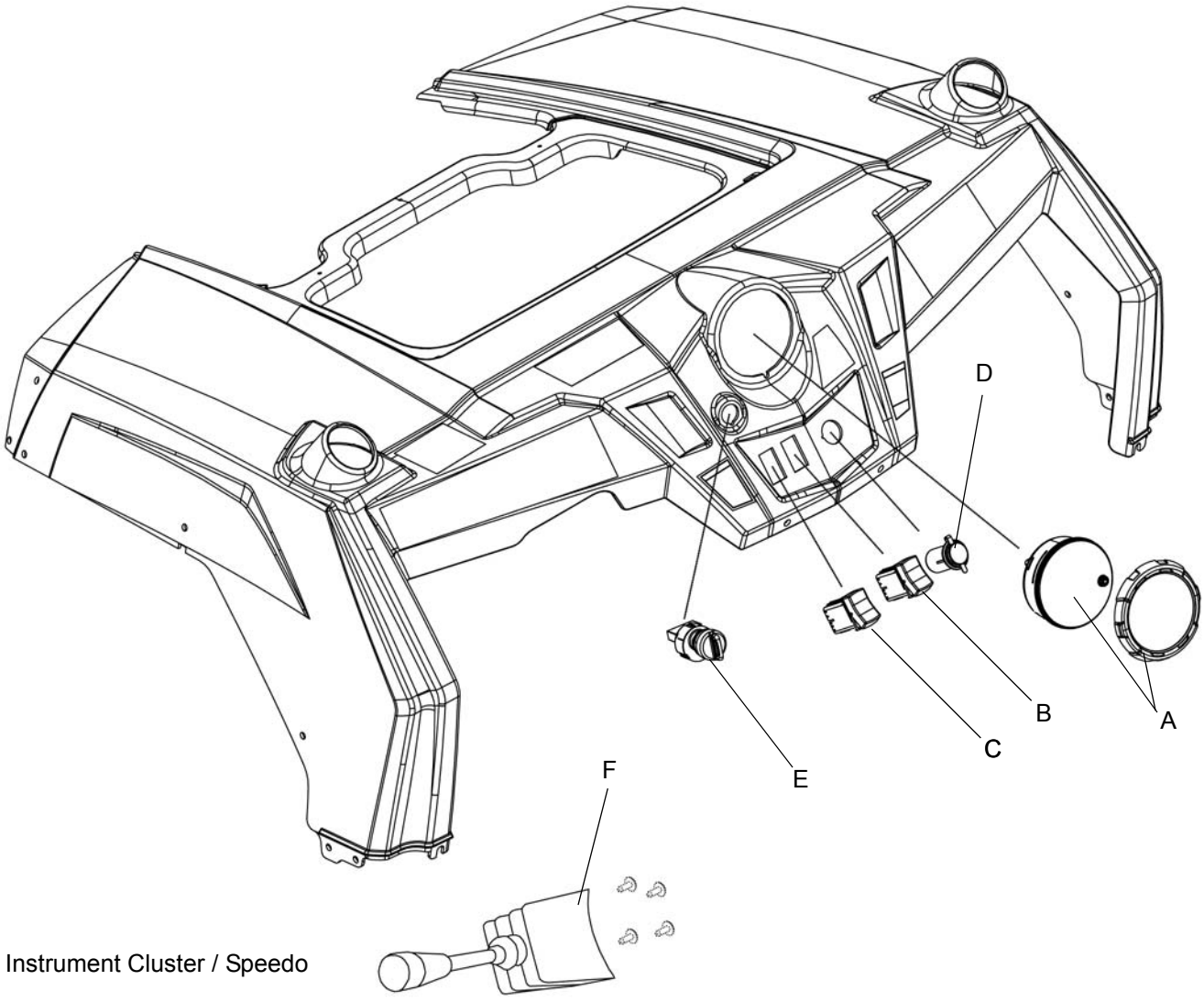
Dash Instruments / Controls / Glovebox



A. Instrument Cluster / Speedo

B. AWD / 2WD / TURF Switch

C. Headlight Switch or Hazard Switch (INT'L)

D. 12 Volt Accessory Receptacle

E. Key Switch / Headlight Switch

F. Switch; Turn, Lights, Horn (INT'L)

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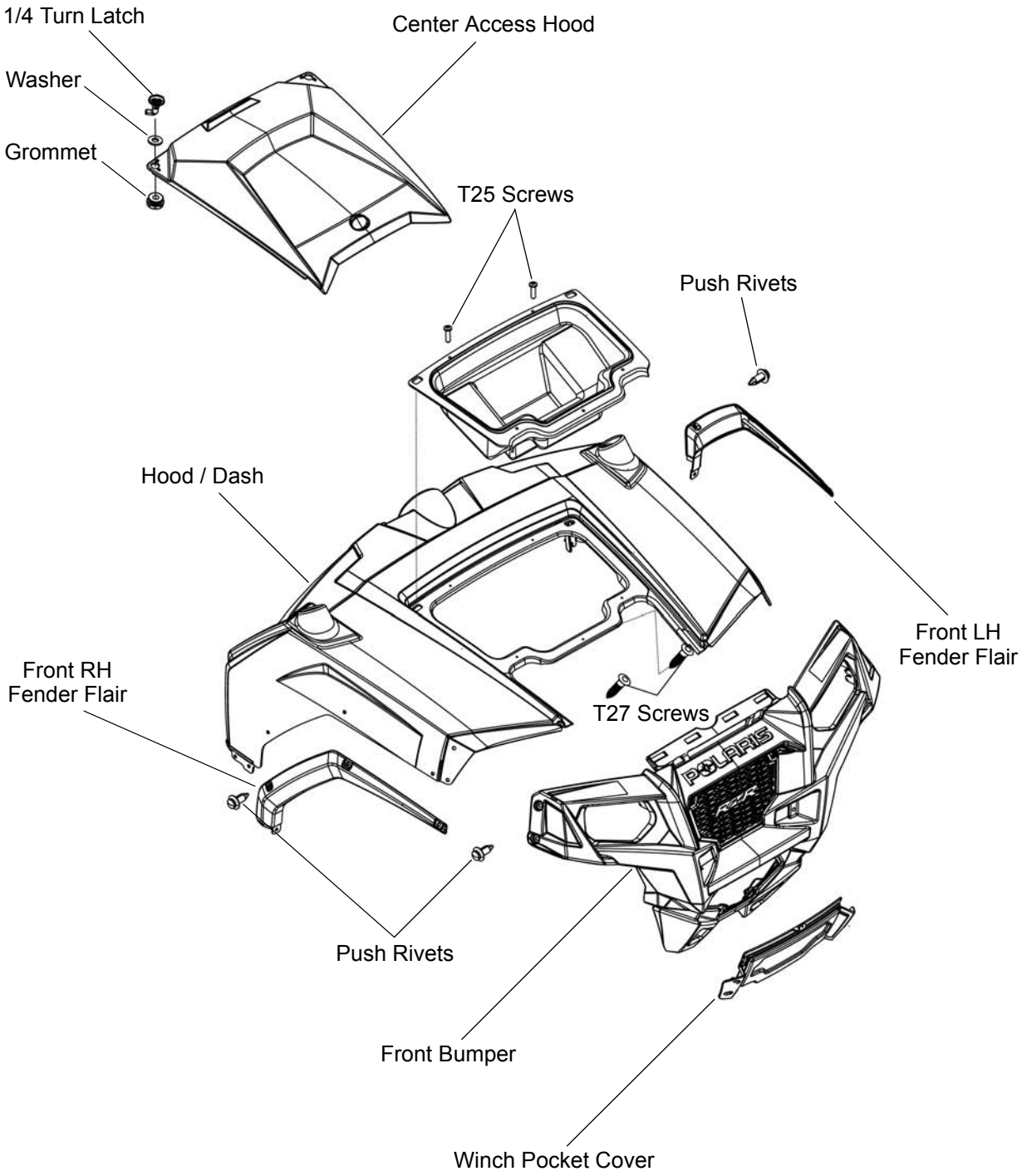
Hood / Front Body Work



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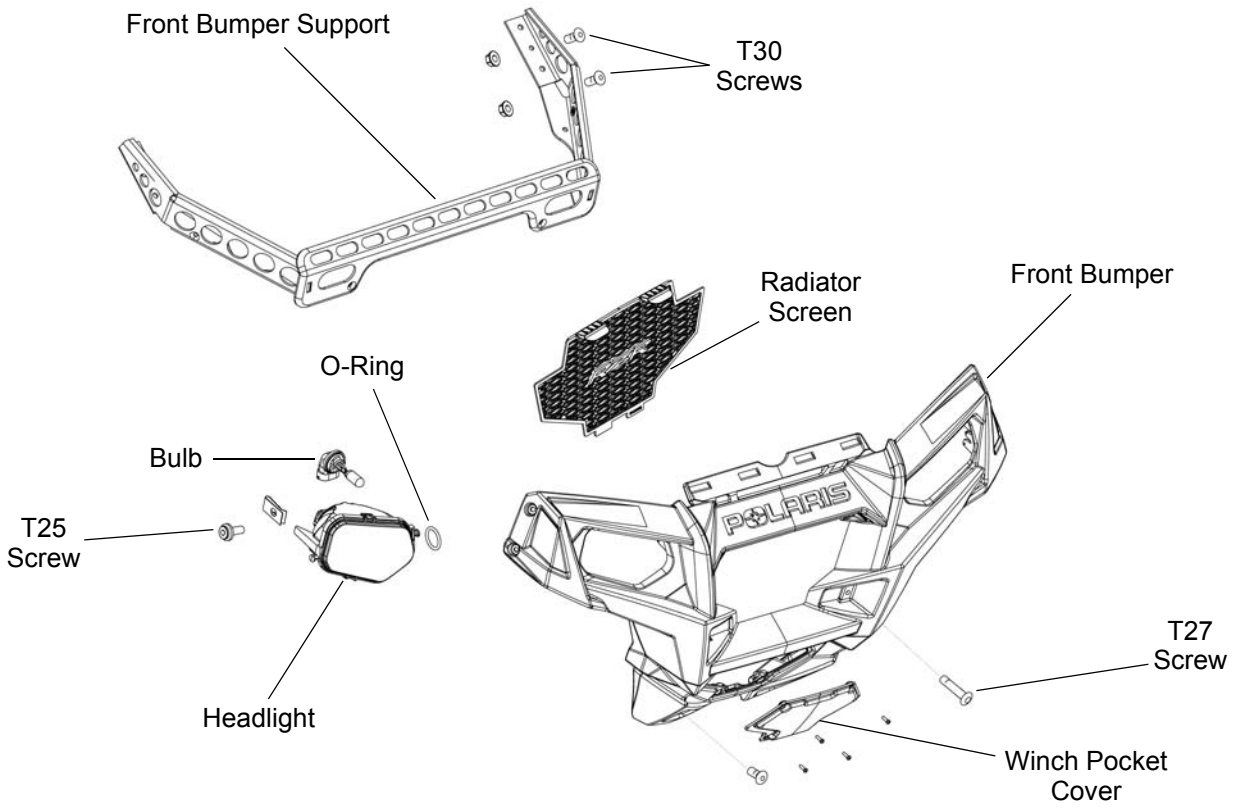
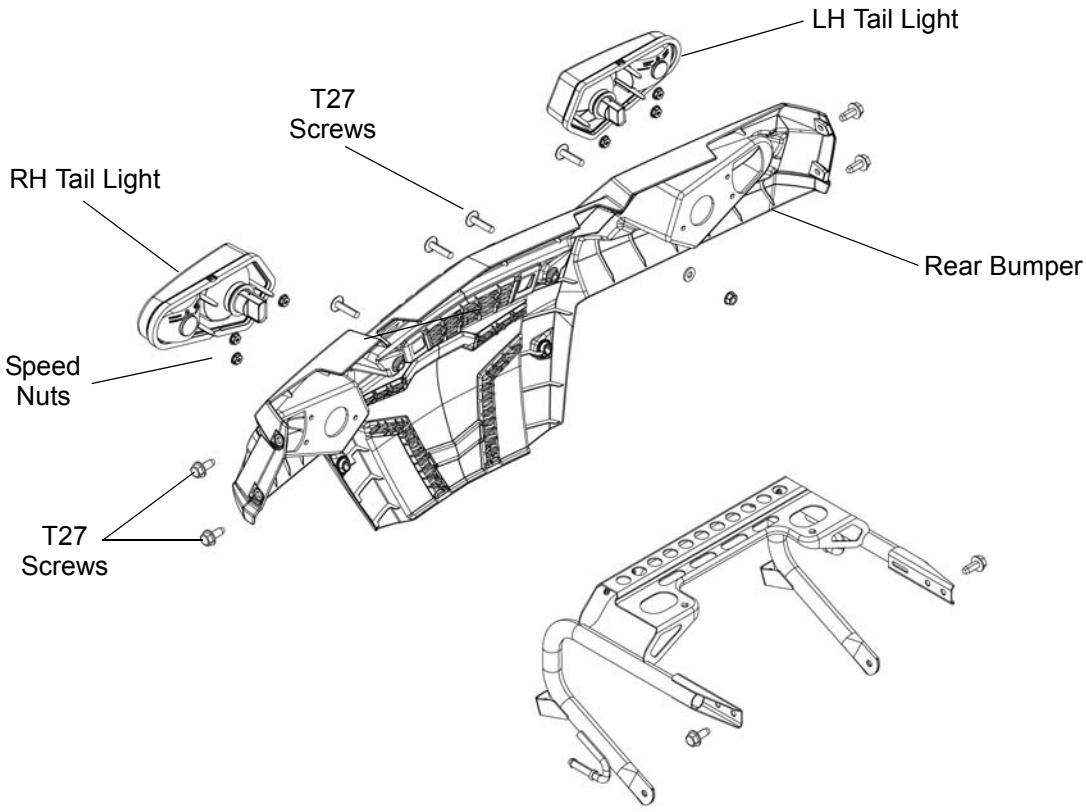
Front Bumper



Rear Bumper



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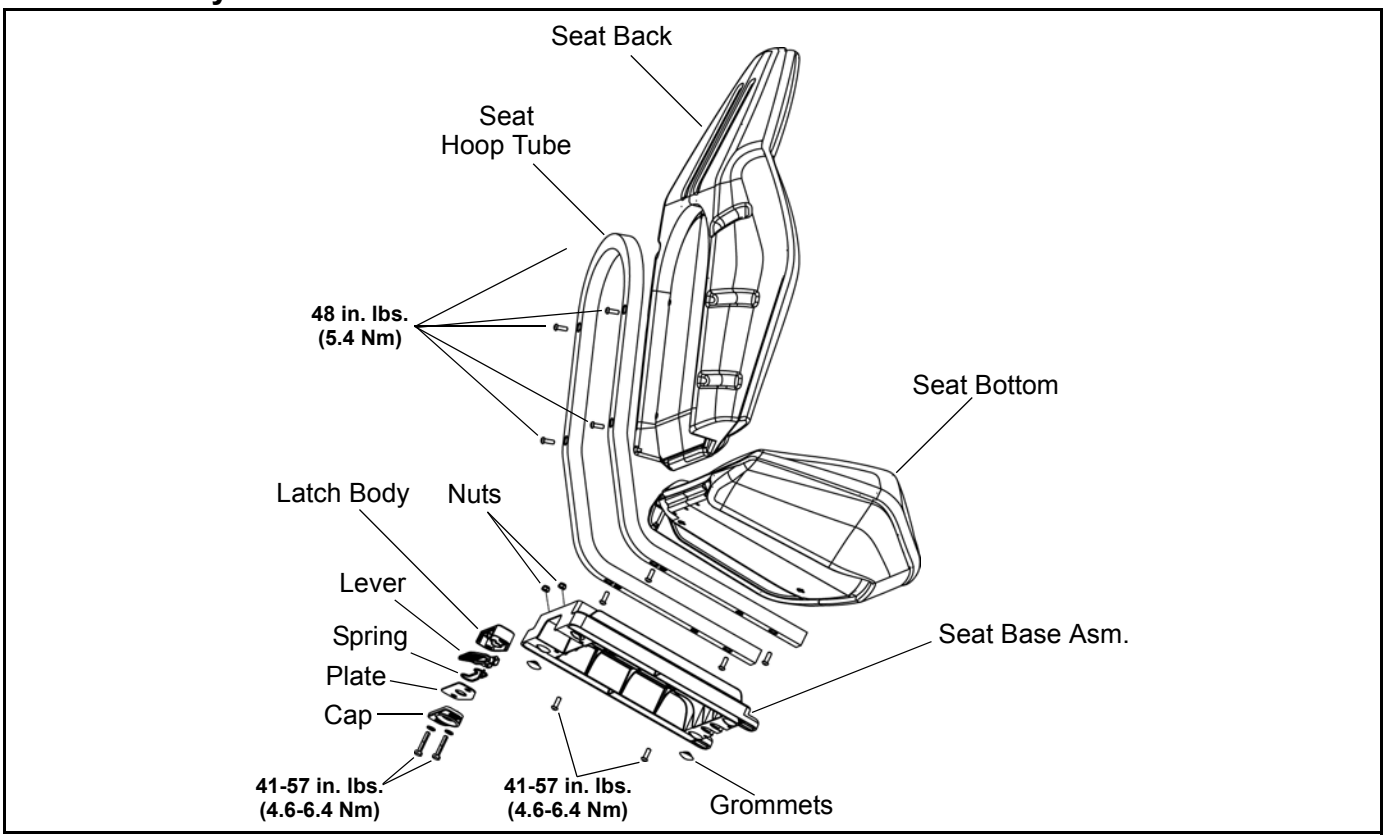
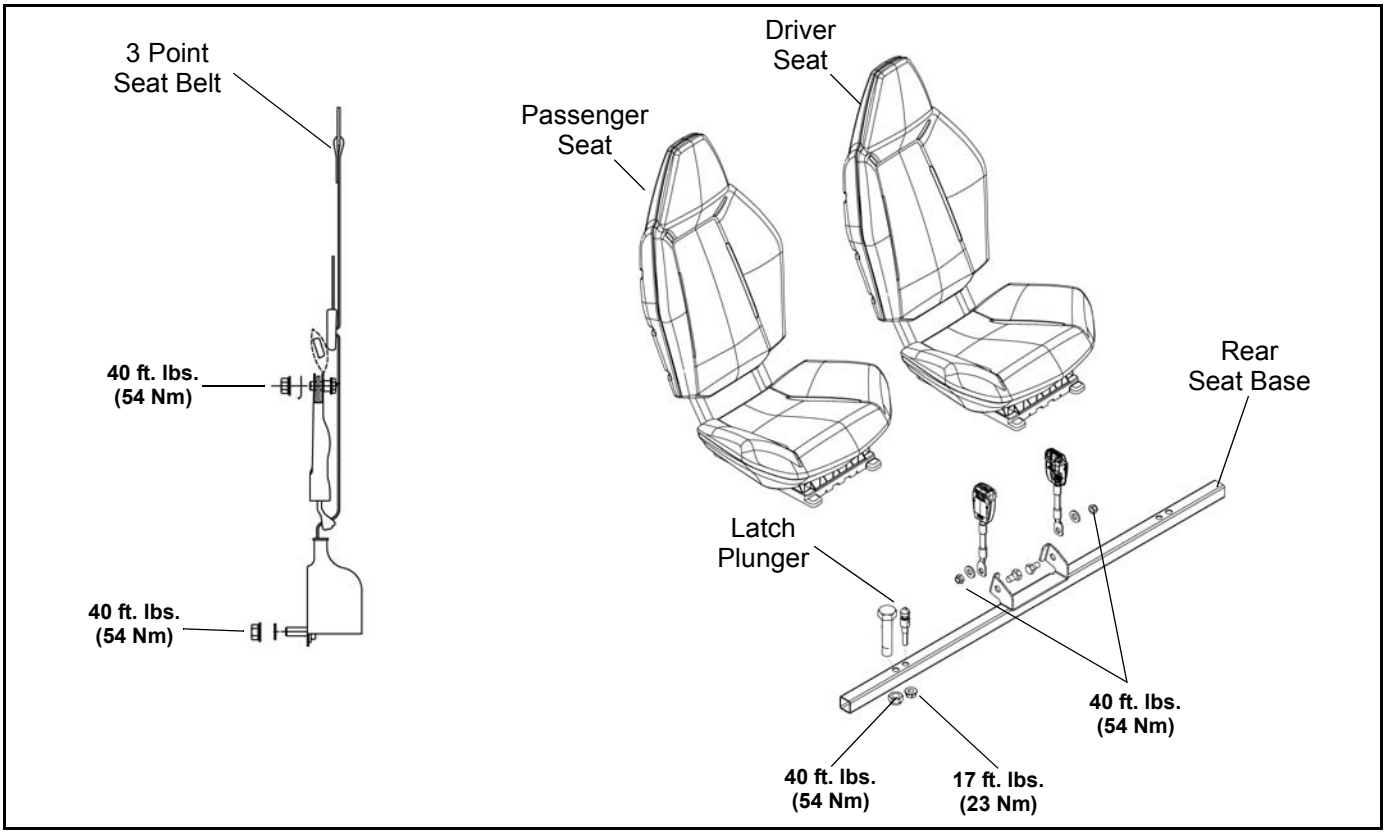
Seat Assembly



Seat Belts / Mounting



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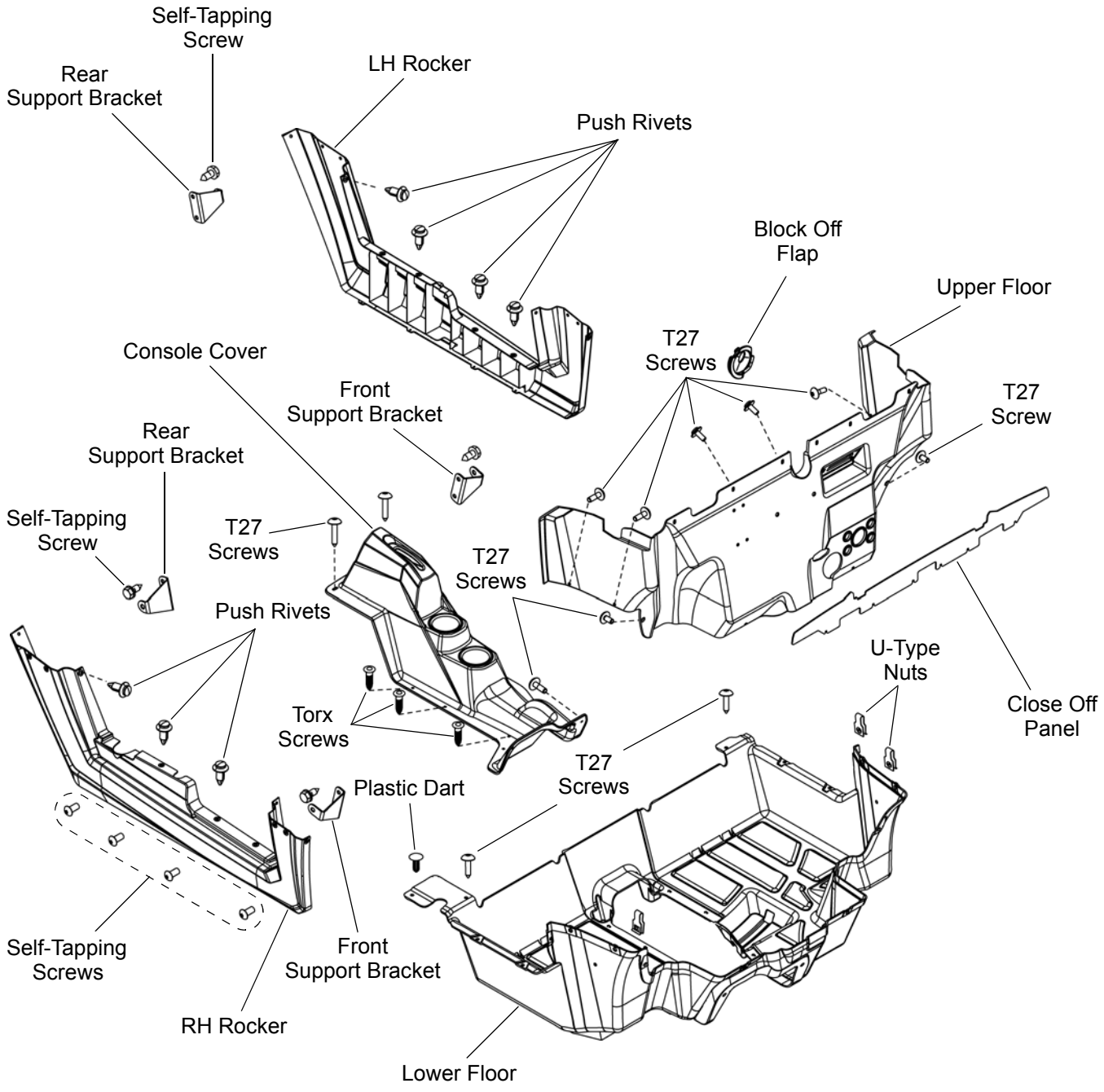
Floor / Rocker Panels



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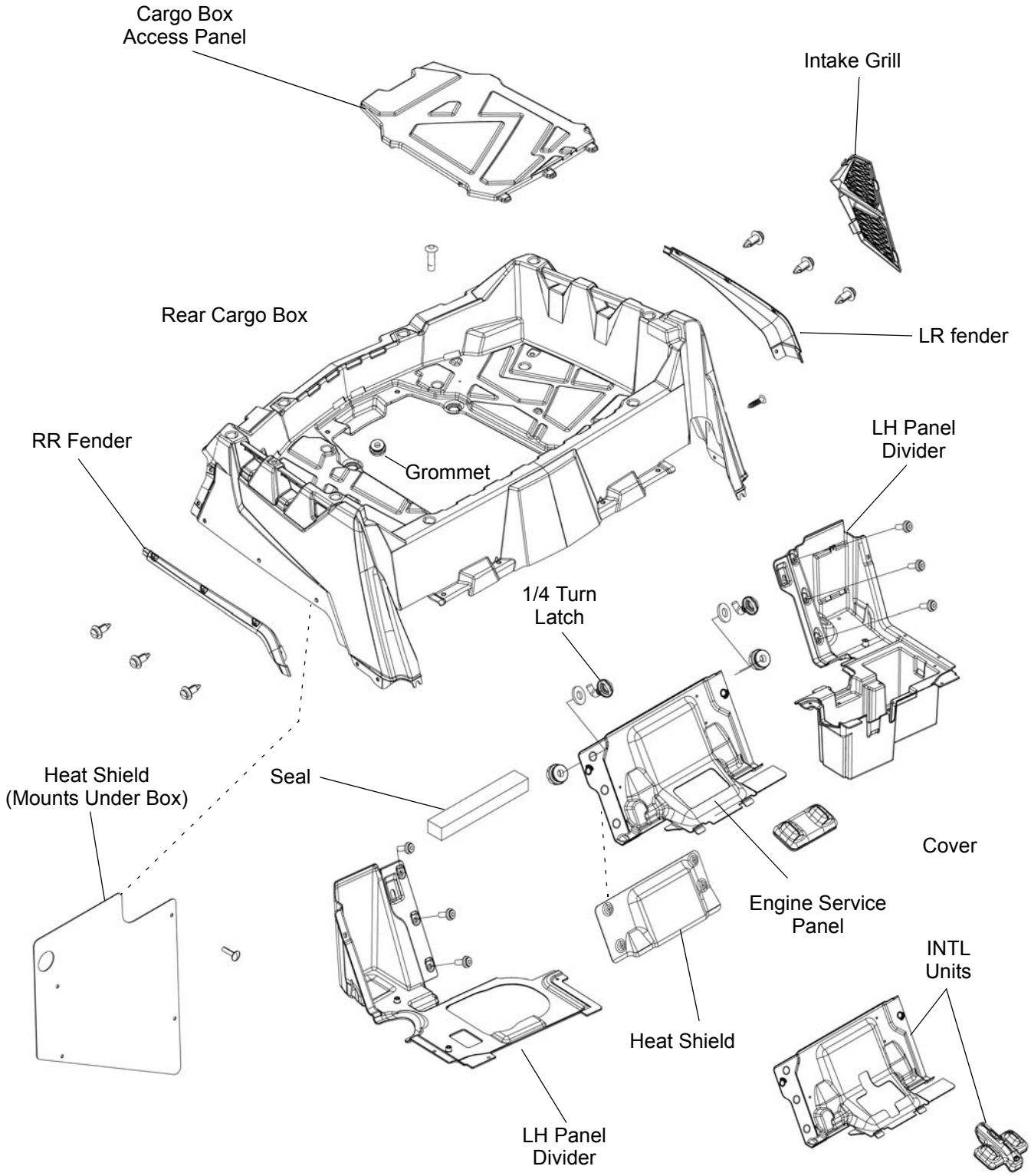
Rear Cargo Box / Fenders



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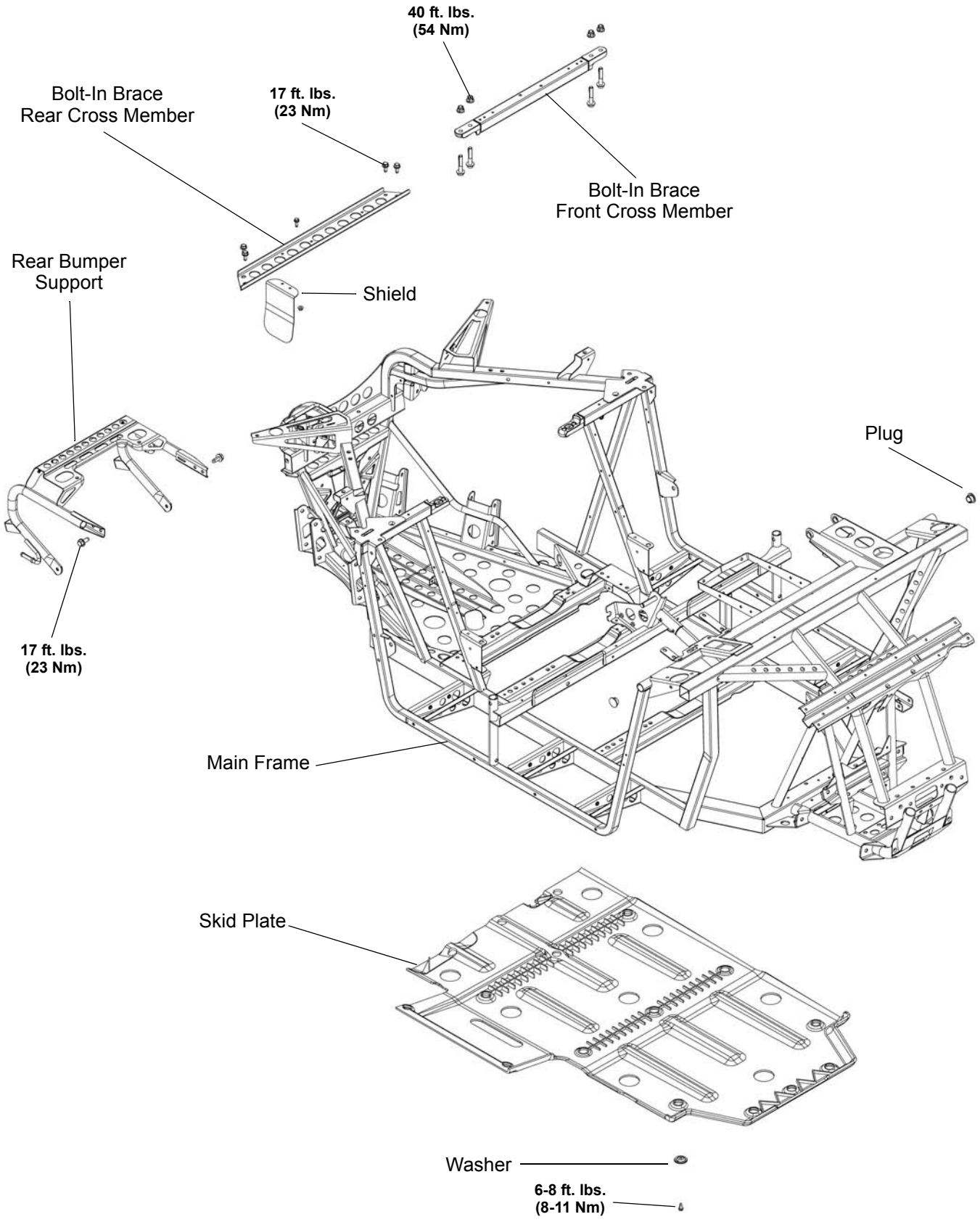
Chassis / Main Frame



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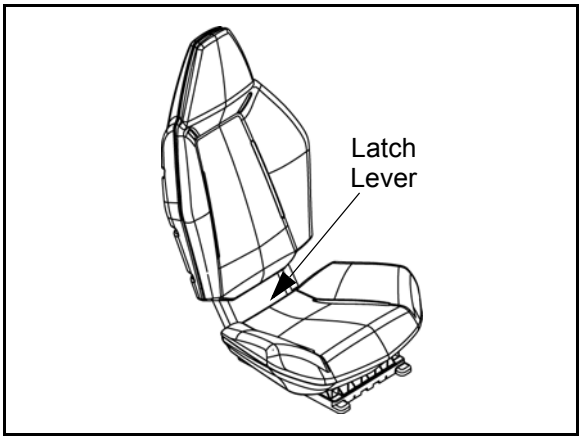
BODY COMPONENT REMOVAL

Seats

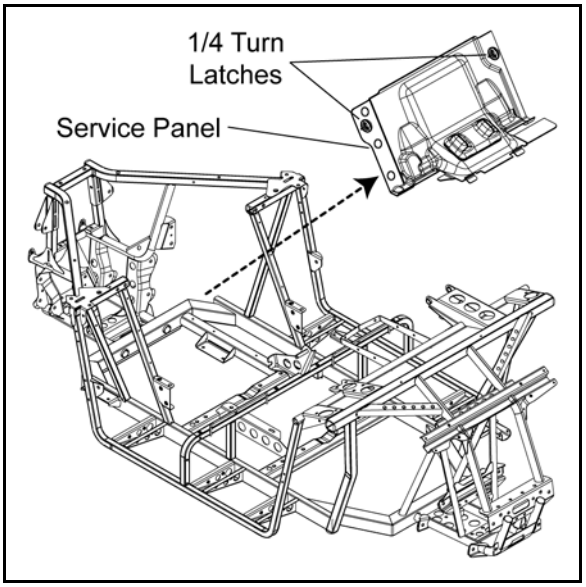
1. To remove any of the seats, lift upward on the latch lever located behind the seat bottom.



2. Lift upward and forward on the seat while lifting up on the latch lever and remove the seat from the vehicle.

Rear Service Panel

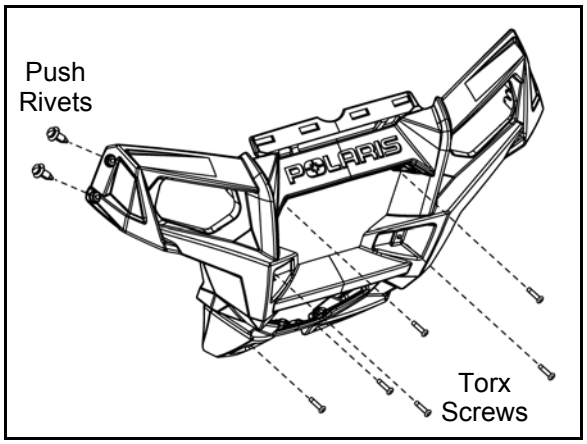
1. Remove driver and passenger seats.
2. Turn both latches 1/4 turn to disengage the panel.



3. Lift the panel upward and towards the front of the vehicle to remove it.

Front Bumper

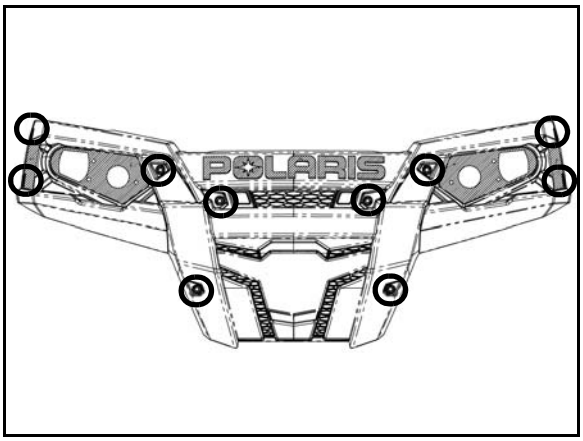
1. Remove the (4) push rivets from the sides of the front bumper.



2. Remove the (6) Torx screws retaining the upper, middle and lower portion of the bumper.
3. Disconnect the front headlamp connectors and remove the front bumper from the vehicle.

Rear Bumper

1. Disconnect the harness connectors at the tail lights.
2. Remove the (10) T-27 Torx screws retaining the rear bumper to the rear bumper support and rear cargo box.
3. Remove the rear bumper from the vehicle.



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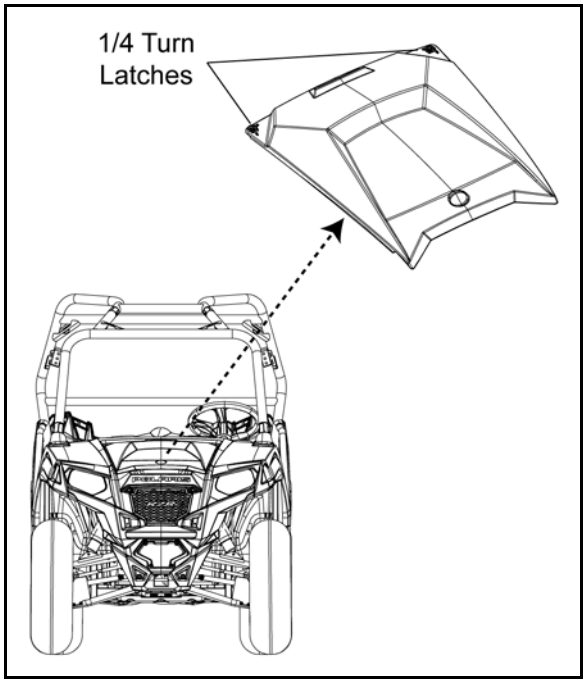
Hood and Front Body Work

Hood Removal

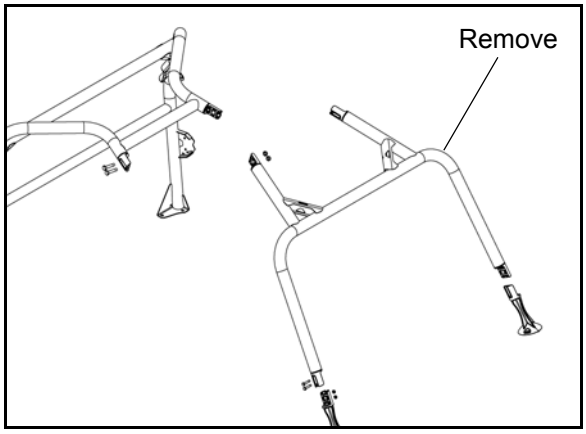
1. To remove the hood, turn both latches to disengage the rear portion of the hood.



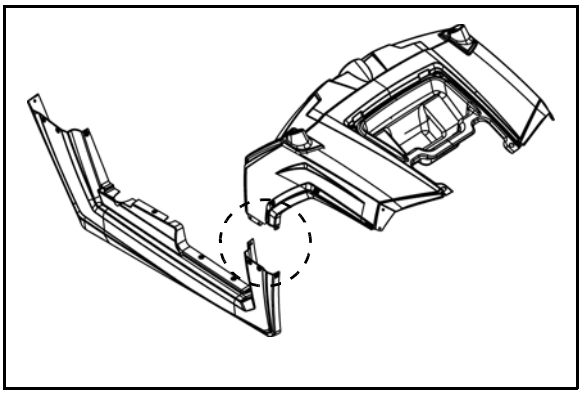
2. Tilt the hood back to disengage the front tabs and remove the hood from the vehicle.

Front Body / Dash Removal

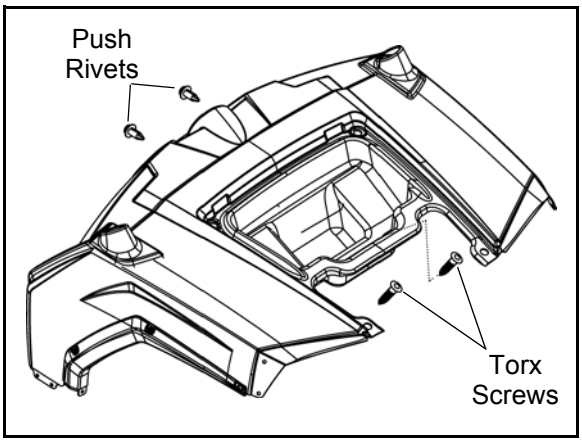
1. Remove the hood as previously described.
2. Remove the front bumper (see "BODY COMPONENT REMOVAL - Front Bumper").
3. Remove the front portion of the cab frame assembly to allow dash removal. Refer to appropriate "CAB FRAME - Assembly / Removal" procedure for assembly torque specifications.



4. Remove the push rivets that attach the dash assembly to the rocker panels on each side.



5. Remove the (2) Torx screws and (2) push rivets that retain the front and rear portions of the dash assembly.



6. Disconnect all electrical dash components noting their location and wire routing.
7. Remove the dash assembly from the vehicle.

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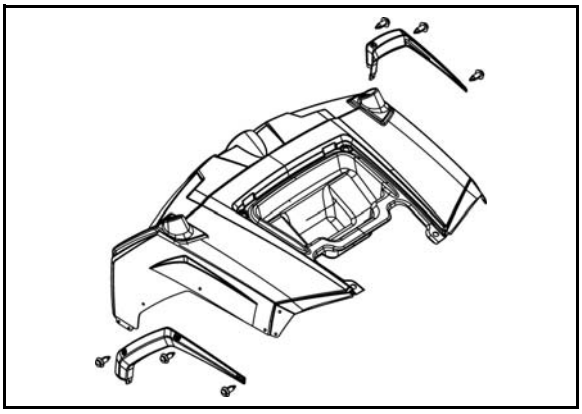
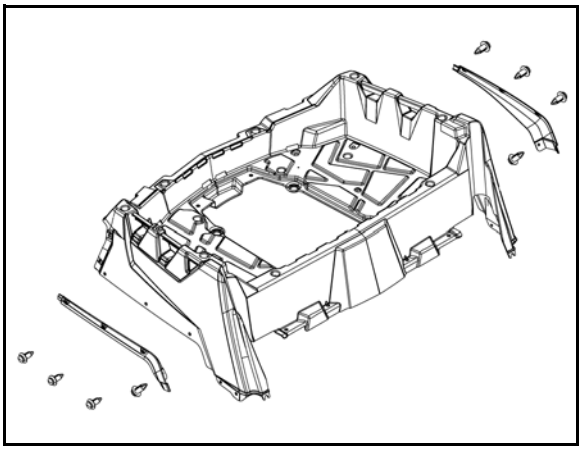
Front Fender Flair Removal

1. If dash is installed, remove the (2) push rivets that attach the lower portion of the fender flair to the rocker panels.
2. Remove the (6) push rivets and remove fender flairs from the dash assembly.



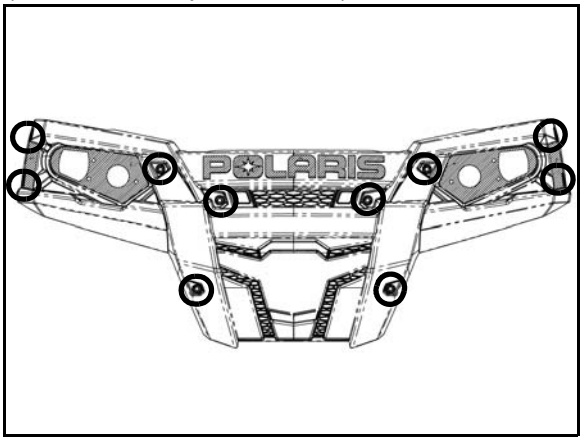
Rear Fender Flair Removal

1. Remove the rear bumper (see “BODY COMPONENT REMOVAL - Rear Bumper”).
2. Remove the (4) push rivets that secure the rear fender flair and remove the fender flair from the vehicle.

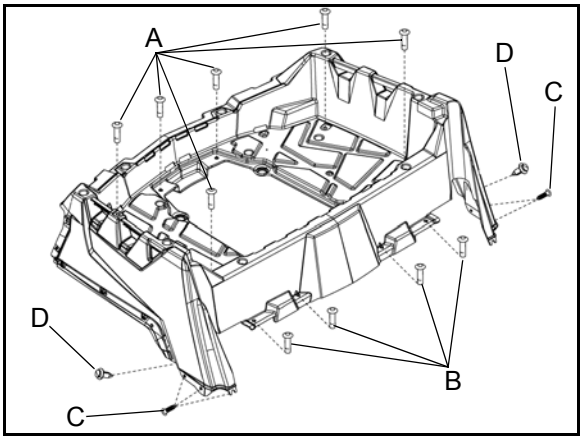


Cargo Box Assembly Removal

1. Remove the seats and the engine service panel.
2. Disconnect the harness connectors at the tail lights.
3. Disengage the tail light harness from the routing features molded into the rear box on both sides.
4. Remove the cargo box access panel.
5. Remove the (10) T-27 Torx screws retaining rear bumper to the rear bumper support and storage box (See Rear Bumper Removal).



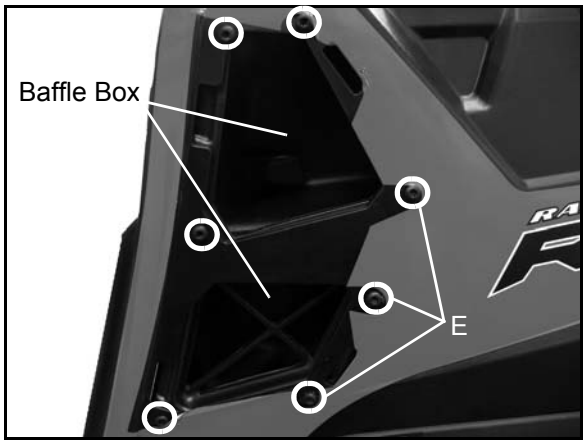
6. Remove the (6) T-27 Torx screws (A) from the middle of the cargo box.
7. Remove the (4) T-27 Torx Screws (B) from the front of the cargo box.
8. Remove the (6) T-27 Torx Screws (C) from both sides of the cargo box / rocker panels.
9. Remove the (2) push pins (D) from both sides of the cargo box / rocker panels.



10. Remove intake grill and foam filters from the LH side of the rear storage box.

11. Remove the (7) T-25 Torx screws (E) securing intake baffle to the rear storage box.

NOTE: Do not remove the baffle box along with the rear storage box. The baffle box will remain with the vehicle when the storage box is removed to prevent damage to the crankcase vent tube.

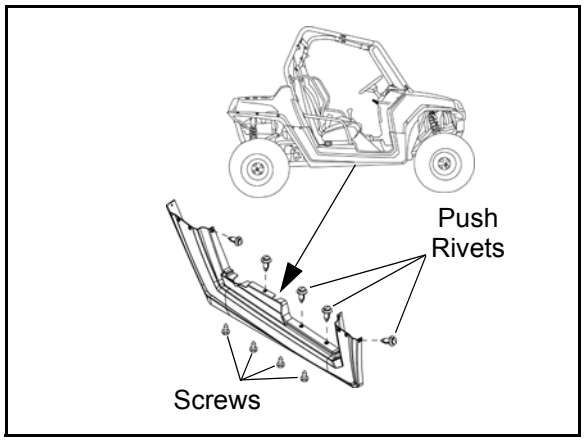


12. With the aid of an assistant, carefully lift and guide the cargo box assembly up and off of the vehicle frame. Make note of wire and hose routings for reassembly.

Rocker Panels, Console and Floor

Rocker Panel Removal

1. Remove the push rivets and Torx screws retaining the rocker panel and remove panel from the vehicle.

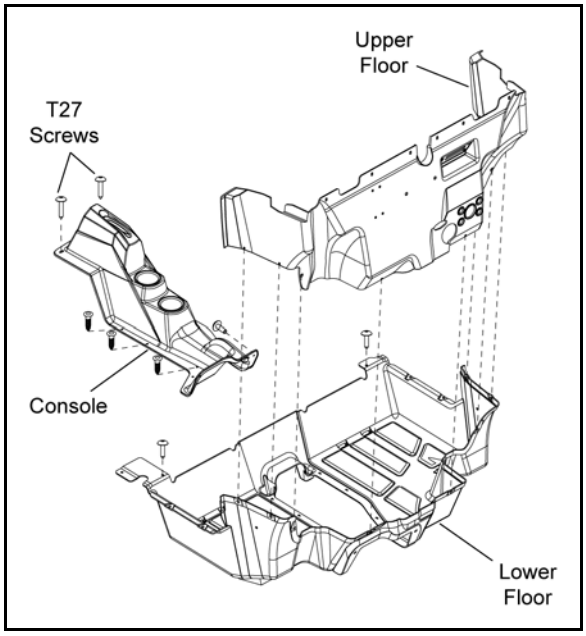


Console and Lower Floor Removal

1. Remove both seats and rocker panels (see “Rocker Panel Removal”).

2. Remove the T27 screws retaining the console to the floor.

3. Remove the shift handle knob and remove the console.



4. Remove the Torx screws retaining the upper floor to the lower floor.

5. Remove the Torx screws retaining the rear portion of the floor and remove the lower floor from the vehicle.

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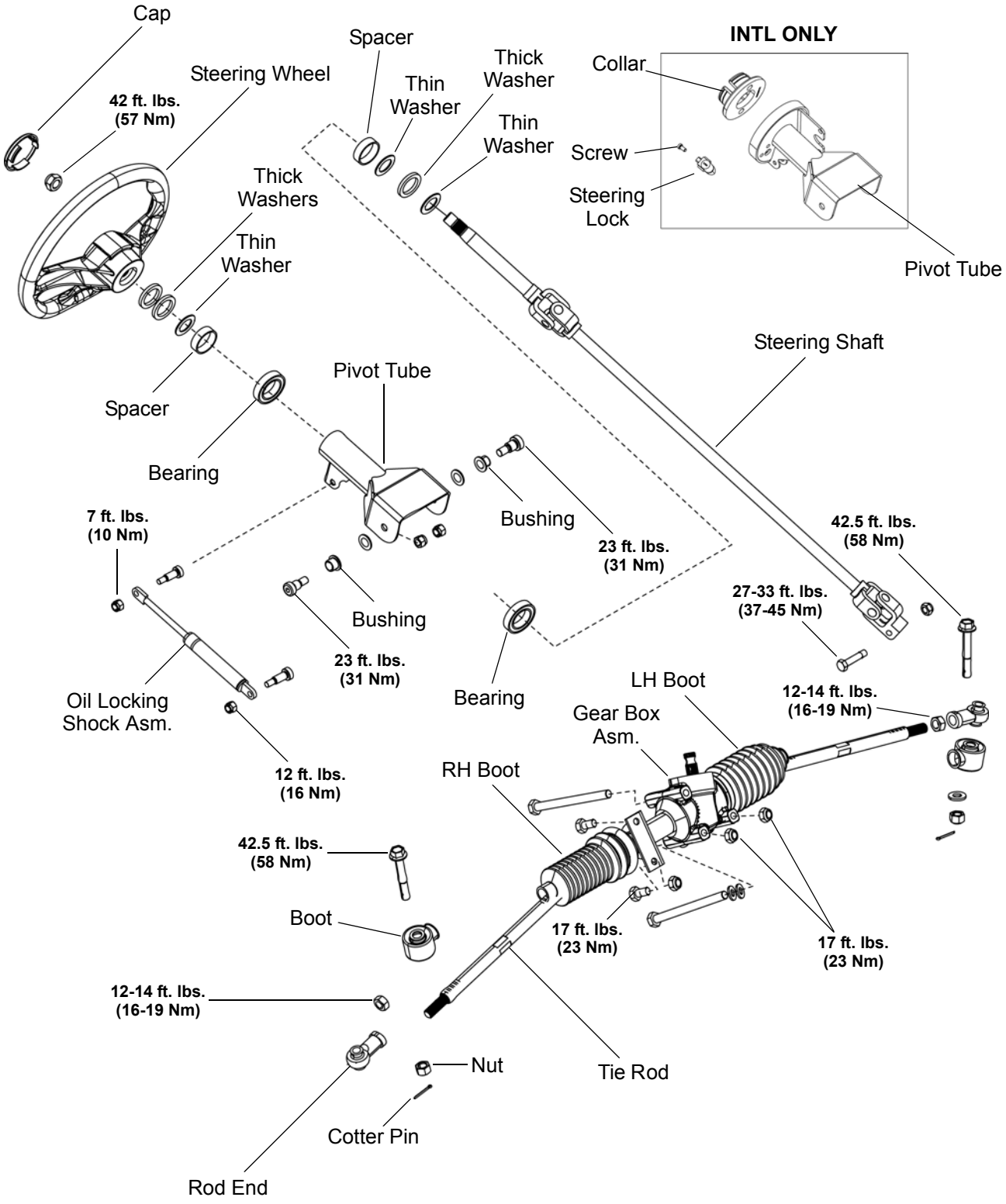
STEERING ASSEMBLY

Exploded View



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Steering Wheel Removal

CAUTION
This procedure should NOT be used on EPS models. Using this procedure on an EPS model can permanently damage the EPS unit and cause a Power Steering Fault.

1. Remove the steering wheel cap.
2. Loosen the nut and back it half way off the steering shaft.
3. With a glove on your hand, place it under the steering wheel. Lift upward on the inner portion of the steering wheel while using a hammer to strike the steering shaft nut.

IMPORTANT: If the steering wheel will not pop loose, proceed to "Steering Shaft Removal".

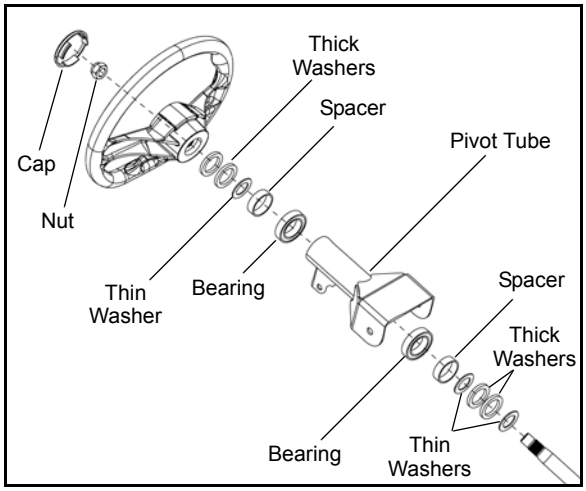
4. Once the steering wheel pops loose, completely remove the nut andlift the steering wheel off the shaft.

Steering Shaft Bearing Replacement

IMPORTANT: Replacement pivot tube assembly comes with new upper and lower bearings installed. Use this procedure if replacing just the bearings only.

1. Perform the "Steering Shaft Removal" procedure.
2. Remove the steering wheel cap and retaining nut.
3. Press steering shaft out of the steering wheel and pivot tube.
4. Note the order and location of the washers and spacers between the steering wheel and pivot tube.
5. Drive the bearings out of the pivot tube using a drift punch.
6. Inspect the pivot tube bearing surfaces for signs of excessive wear or damage.
7. Apply Loctite® 271™ (Red) to the outer circumference of the new lower bearing race. Slide the new lower bearing onto the steering shaft and install the steering shaft through the pivot tube.

NOTE: Use care not to allow any of the Loctite® to get in the bearing.



NOTE: Be sure the lower washers and spacers are still on the steering shaft.

8. Apply Loctite® 271™ (Red) to the outer circumference of the new upper bearing race. Slide the new upper bearing onto the steering shaft and press it into the pivot tube by hand.

NOTE: Use care not to allow any of the Loctite® to get in the bearing.

NOTE: Bearings will be seated in the pivot housing upon tightening the steering wheel nut in step 14.

9. Reinstall the upper washers and spacers in the order in which they were removed.
10. Install the steering wheel and hand tighten the nut.
11. Reinstall the steering shaft assembly in the vehicle. Install the lower portion of the steering shaft onto the steering gear box assembly (see Figure 5-16). Torque the lower pinch bolt to **30 ft. lbs. (41 Nm)**.
12. Install the (2) fasteners that retain the pivot tube (see Figure 5-17). Torque fasteners to **23 ft. lbs. (31 Nm)**.
13. Install the fastener retaining the upper portion of the steering wheel tilt shock to the pivot tube (see Figure 5-17). Torque fastener to **7 ft. lbs. (10 Nm)**.
14. Be sure the front wheels are facing straight forward. Remove the steering wheel and align as needed. Torque the steering wheel nut to **42 ft. lbs. (57 Nm)**.
15. Wipe the pivot tube clean of any excess Loctite.®
16. Install steering wheel cap and field test steering operation.

FRONT A-ARMS

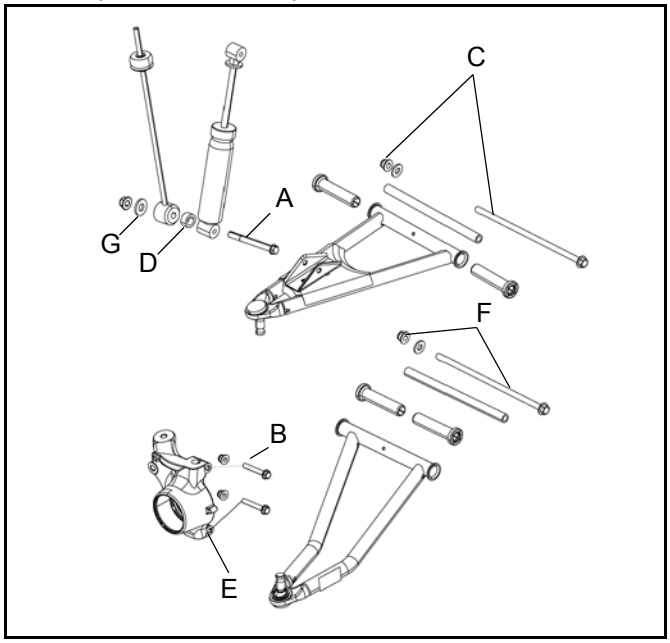
Removal / Replacement

The following procedure details upper and lower A-arm removal and replacement on one side of the vehicle.

1. Elevate and safely support the front of the vehicle and remove the front wheel.
2. Remove lower shock fastener (A) from the upper A-arm.
3. Remove upper ball joint pinch bolt (B) from bearing carrier.
4. Using a soft face hammer, tap on bearing carrier to loosen the upper A-arm ball joint end while lifting upward on the upper A-arm. Completely remove the ball joint end from the bearing carrier.
5. Remove the front bumper to allow A-arm bolt removal.
6. Loosen and remove the upper A-arm through-bolt fastener (C) and remove the upper A-arm from the vehicle.
7. Examine A-arm bushings and pivot tube (see "Exploded View"). Replace if worn. Discard hardware.

> **WARNING**
>
> The locking agent on the existing bolts was destroyed during removal. DO NOT reuse old hardware. Serious injury or death could result if fasteners come loose during operation.

8. If not replacing the A-arm, thoroughly clean the A-arm and pivot tube.
9. Install new ball joint into A-arm. Refer to "Ball Joint Replacement" section.
10. Insert new A-arm bushings and pivot tube into new A-arm.
11. Install new upper A-arm assembly onto vehicle frame. Torque new bolt to specification.
12. Insert upper A-arm ball joint end into the bearing carrier. Install upper ball joint pinch bolt (B) into the bearing carrier and torque bolt to specification.
13. Attach shock to A-arm with spacer (D) or washer (G) and fastener (A). Torque lower shock bolt to specification.
14. Remove lower ball joint pinch bolt (E) from bearing carrier.
15. Using a soft face hammer, tap on bearing carrier to loosen the lower A-arm ball joint end while pushing downward on the lower A-arm. Completely remove the ball joint end from the bearing carrier.
16. Loosen and remove the lower A-arm through-bolt fastener (F) and remove the lower A-arm from the vehicle.
17. Examine A-arm bushings and pivot tube (see "Exploded View"). Replace if worn. Discard hardware.
18. If not replacing the A-arm, thoroughly clean the A-arm and pivot tube.
19. Install new ball joint into A-arm. Refer to "Ball Joint Replacement" section.
20. Insert new A-arm bushings and pivot tube into new A-arm.
21. Install new lower A-arm assembly onto vehicle frame. Torque new bolt to specification.



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22. Insert lower A-arm ball joint end into the bearing carrier. Install lower ball joint pinch bolt (E) into the bearing carrier and torque bolt to specification.

WARNING
Upon A-arm installation completion, test vehicle at low speeds before putting into service.

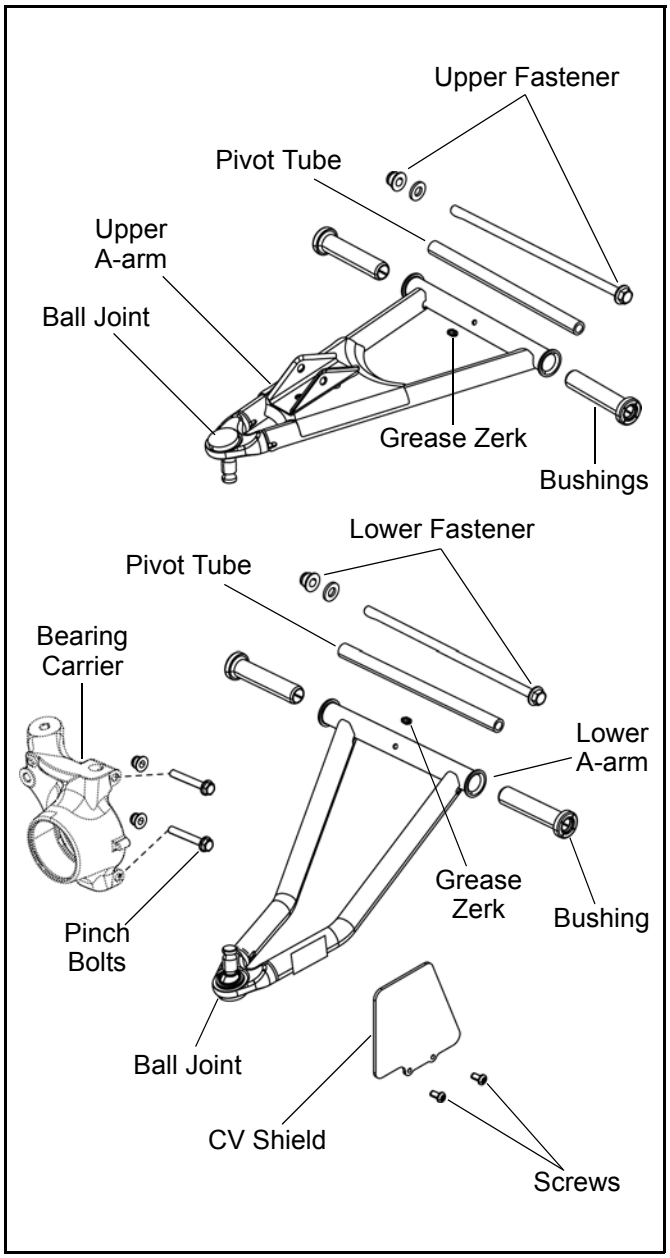
= T
Front Upper / Lower A-arm Bolts: **39 ft. lbs. (53 Nm)**

= T
Front Ball Joint Pinch Bolts: **23 ft. lbs. (31 Nm)**

= T
Shock Mounting Bolts: **37 ft. lbs. (41 Nm)**

= T
Wheel Nuts: **Steel Wheels: 27 ft. lbs. (37 Nm)** **Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)**

Exploded View



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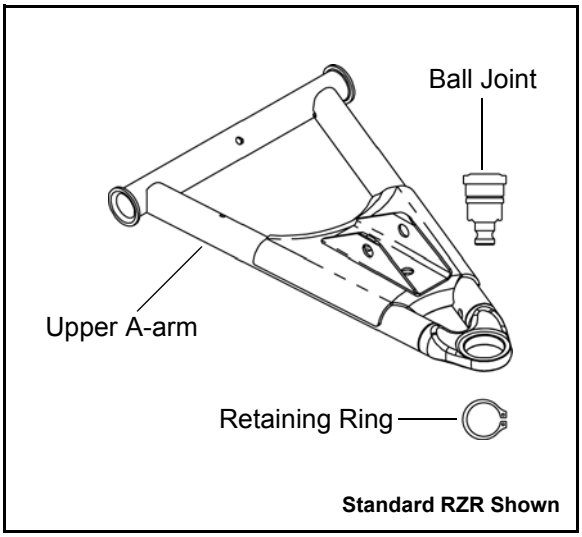
BALL JOINT SERVICE

Removal

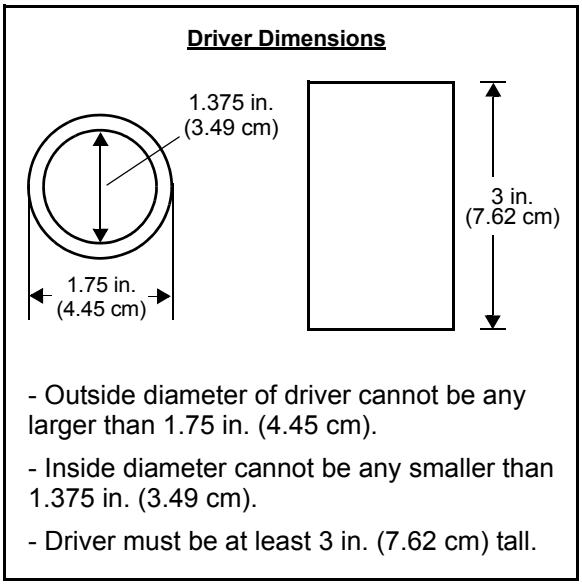
IMPORTANT: Do not reuse a ball joint if it has been removed for any reason. If removed, it must be replaced. Use this removal procedure only when replacing the ball joint.

1. The A-arm must be removed to perform this procedure (see "FRONT A-ARMS - Removal / Replacement").

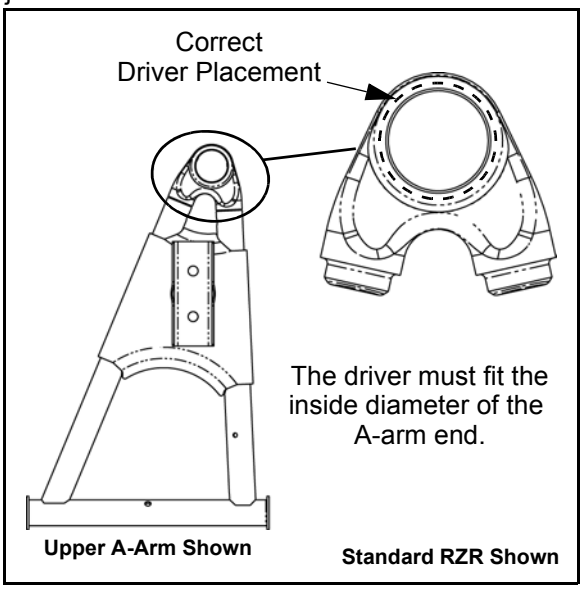


2. Remove the retaining ring from the ball joint.

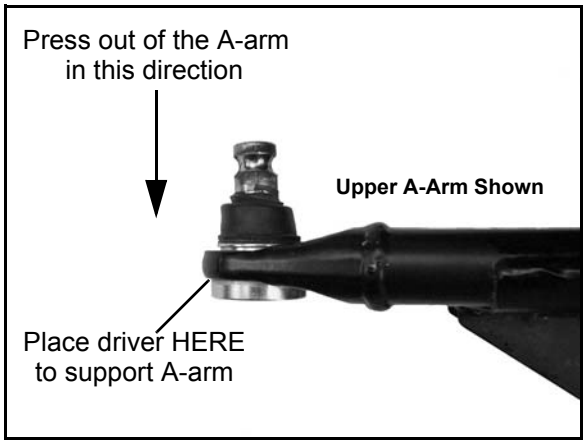
3. A driver must be used for the removal of the ball joint. Use the dimensions below to fabricate or locate the correct size driver to use in the following process.



4. Use a press and correct size driver to remove the ball joint from the A-arm.



NOTE: The driver must fit the ball joint housing in the A-arm. This will allow the ball joint to be properly pressed out of the A-arm without damaging the A-arm.



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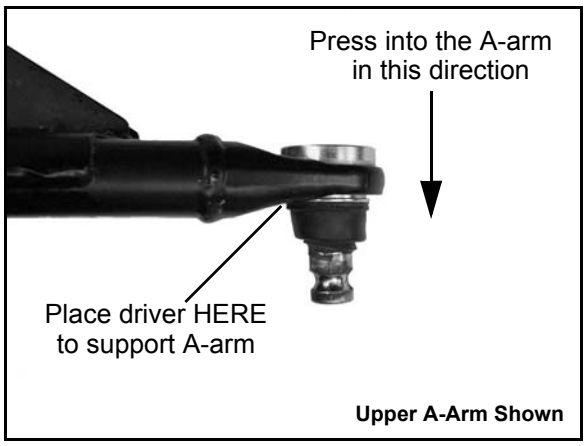
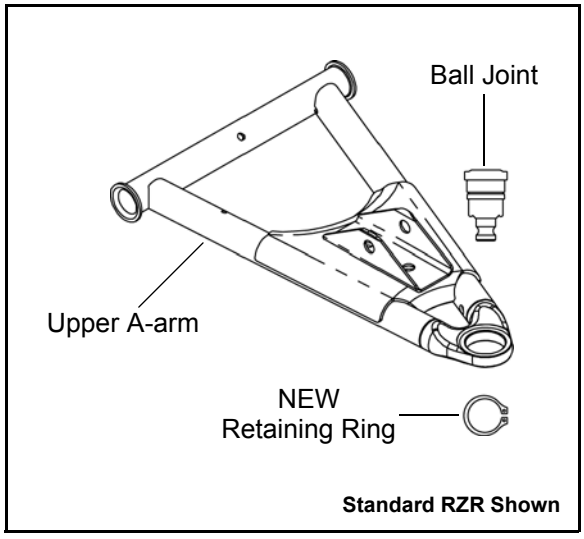
Installation

1. Place the A-arm in the correct position for ball joint installation. Face the A-arm end flat on top of the driver. Carefully drive the ball joint into place until the ball joint is properly seated.



Upper A-Arm Shown

2. After the new ball joint is installed into the A-arm, install a NEW retaining ring.



Standard RZR Shown

3. Reinstall the A-arm (see "FRONT A-ARMS - Removal / Replacement").

4. Repeat the ball joint service procedure for any additional A-arm ball joint replacements.

FRONT STABILIZER BAR

Stabilizer Bar Linkage Removal

1. Elevate and safely support the front of the vehicle.

2. Remove the lower shock mounting fastener from the upper A-arm on each side of the vehicle (see "Exploded View").

3. Remove the upper portion of the linkage from the stabilizer bar on each side of the vehicle (see "Exploded View"):

4. Inspect the linkage assemblies for signs of excessive wear or damage. Replace linkage assembly if damaged.

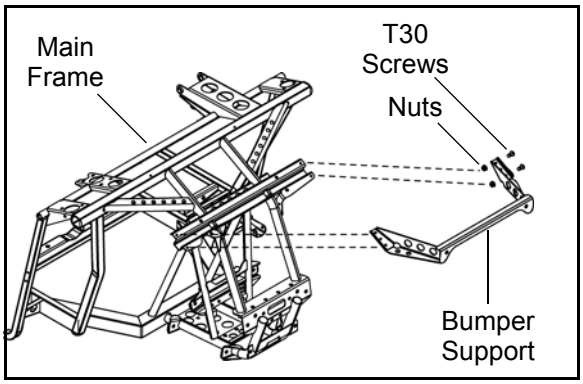
5. Reverse the procedure for installation. Torque the linkage fasteners to specification (see "Exploded View").

Stabilizer Bar Removal

1. If stabilizer bar linkages are installed, remove the nut and linkage bushings (see "Exploded View").

2. Remove the hood and front bumper (see " BODY COMPONENT REMOVAL").

3. Remove the (4) T30 Torx fasteners retaining the front bumper support to the frame.



NOTE: Properly support the bumper support and wires that are attached.

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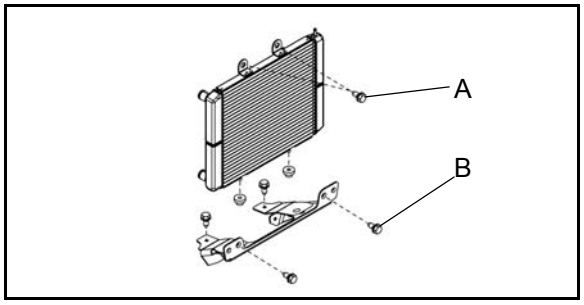
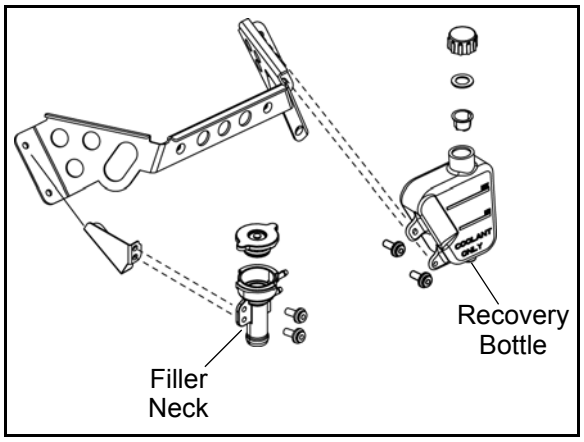
4. Remove the (2) upper radiator retaining bolts (A) and remove the (4) bolts (B) retaining the lower radiator mount bracket and remove the bracket from the frame

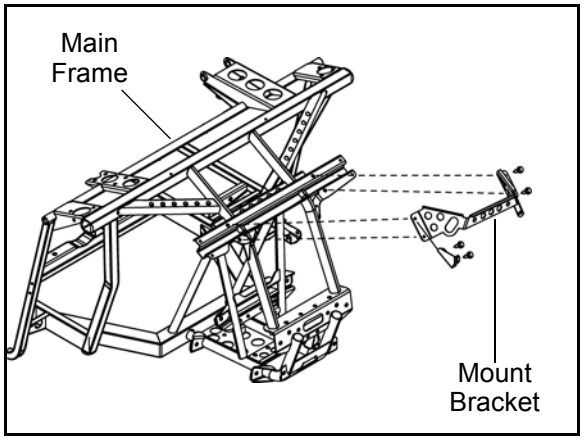


5. Allow radiator to sag down to allow access to recovery bottle retaining screws and filler neck retaining screws.

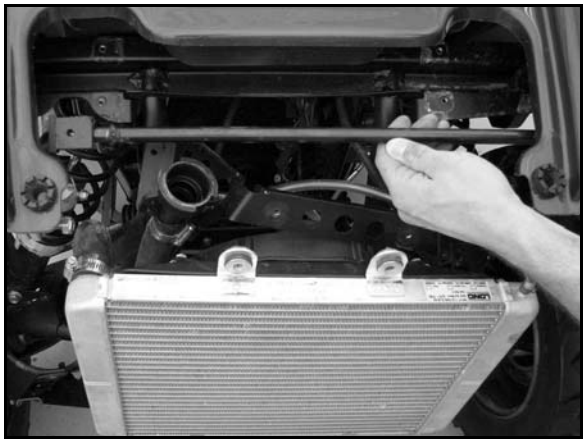
6. Remove retaining screws from recovery bottle and filler neck. Allow the recovery bottle and filler neck to hang down to access the (4) bolts retaining the upper radiator mount bracket.



7. Remove the (4) bolts retaining the upper radiator mount bracket and remove the bracket from the frame.



8. Lift up on the stabilizer bar and remove it from the vehicle.



9. Inspect the stabilizer bar for straightness. Inspect the bushings and replace if needed.

10. Reverse the procedure for installation. Torque the linkage fasteners to specification (see "Exploded View").

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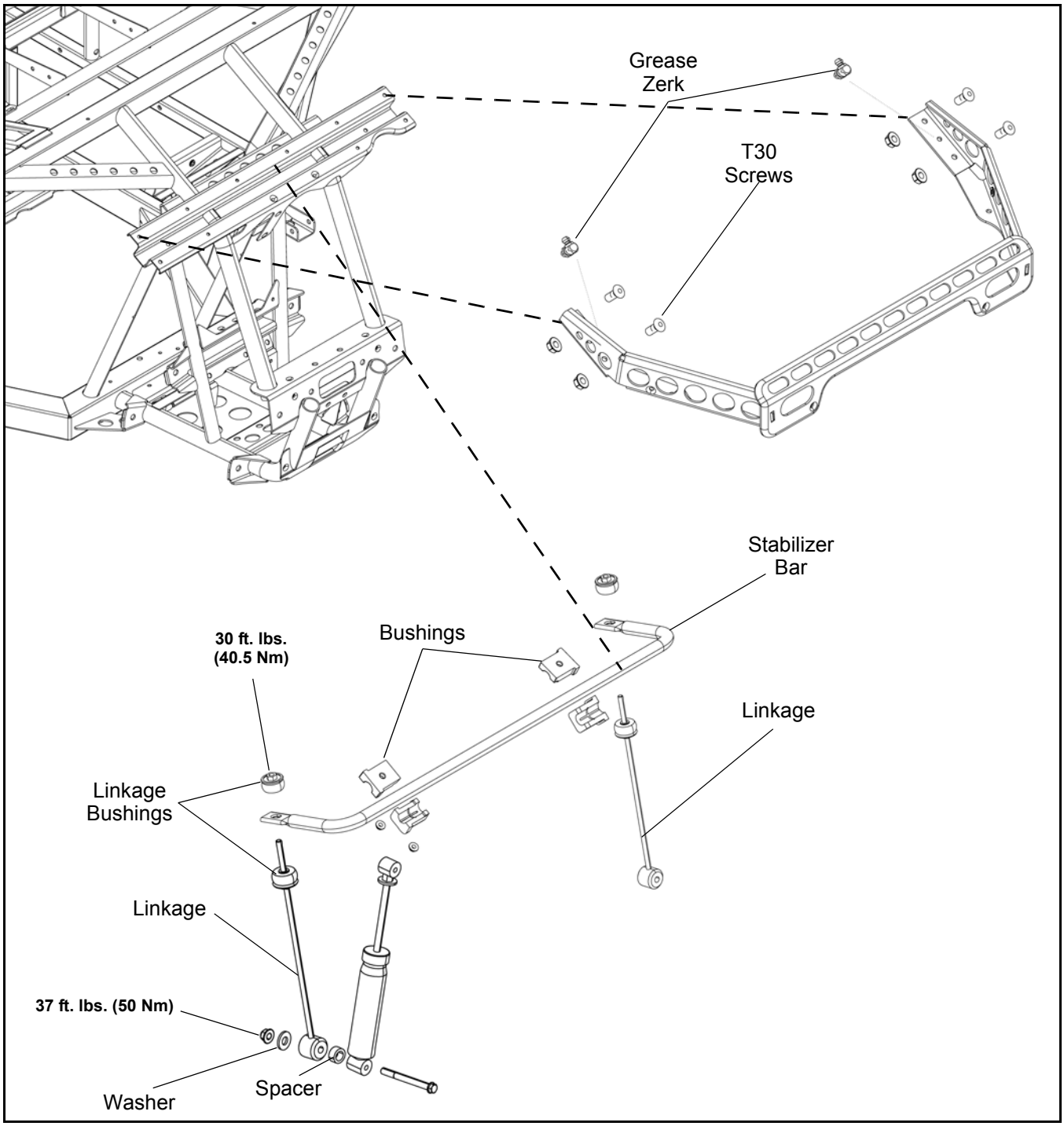
Exploded View



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REAR A-ARMS

Removal

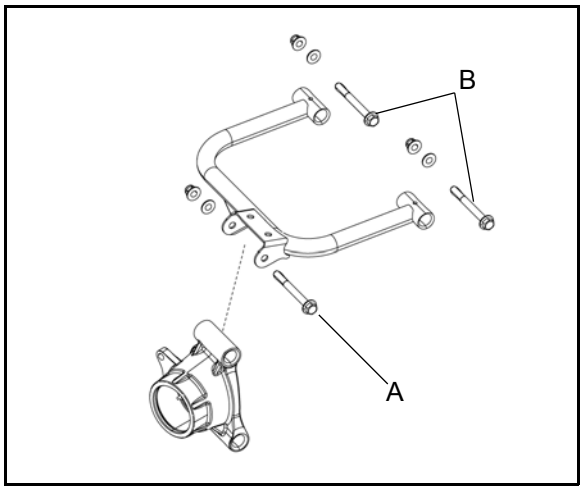
The following procedure details upper and lower A-arm removal and replacement on one side of the vehicle. Repeat the following steps to remove the A-arm(s) from the opposite side.

NOTE: Use the exploded view in this section as a reference during the procedure.

1. Elevate and safely support the rear of the vehicle off the ground.
2. Remove the wheel nuts, and rear wheel.

Upper A-arm Removal

1. Remove the fastener (A) attaching the upper A-arm to the bearing carrier.
2. Remove the (2) fastener (B) attaching the upper A-arm to the frame and remove the upper A-arm from the vehicle.



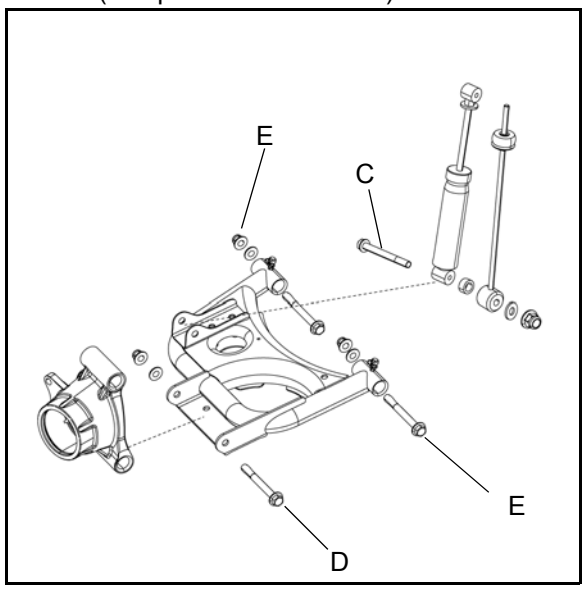
3. Examine bushings and pivot tubes. Replace if worn. Discard hardware.
4. If not replacing the A-arm, thoroughly clean the a-arm and pivot tubes.

> **WARNING**
>
> The locking agent on the existing bolts was destroyed during removal. DO NOT reuse old hardware. Serious injury or death could result if fasteners come loose during operation.

5. Insert new A-arm bushings and pivot tubes into new A-arm.

Lower A-arm Removal

1. Disengage the rear brake line from the routing clip on the lower A-arm.
2. Remove the fastener (C) retaining the lower portion of the shock and stabilizer linkage to the lower A-arm.
3. Remove the fastener (D) attaching the lower A-arm to the bearing carrier.
4. Remove the (2) fasteners (E) attaching the lower A-arm to the frame and remove the lowerA-arm from the vehicle (see previous illustration).



5. Examine bushings and pivot tubes (see “Exploded View”). Replace if worn. Discard hardware.
6. If not replacing the A-arm, thoroughly clean the A-arm and pivot tubes.

> **WARNING**
>
> The locking agent on the existing bolts was destroyed during removal. DO NOT reuse old hardware. Serious injury or death could result if fasteners come loose during operation.

7. Insert new A-arm bushings and pivot tubes into new A-arm.

Installation

1. Install lo wer A- arm as sembly o nto ve hicle f rame. Torque new fasteners to specification.
2. Attach lower A-a rm to be aring carr ier. Torque ne w fastener to specification.
3. Route brake line on top of th e lower A-arm and into the routing clip.
4. Reinstall the lower portion of the shock and stabilizer bar to the lower A-arm. Tor que sh ock fastener to specification.
5. Install upper A-a rm a ssembly o nto vehicle frame. Torque new fastener to specification.
6. Attach upper A-a rm to be aring carr ier. Torque ne w fastener to specification.
7. Install wheel and torque wheel nuts to specification.

WARNING
Upon A-arm installation completion, test vehicle at low speeds before putting into service.

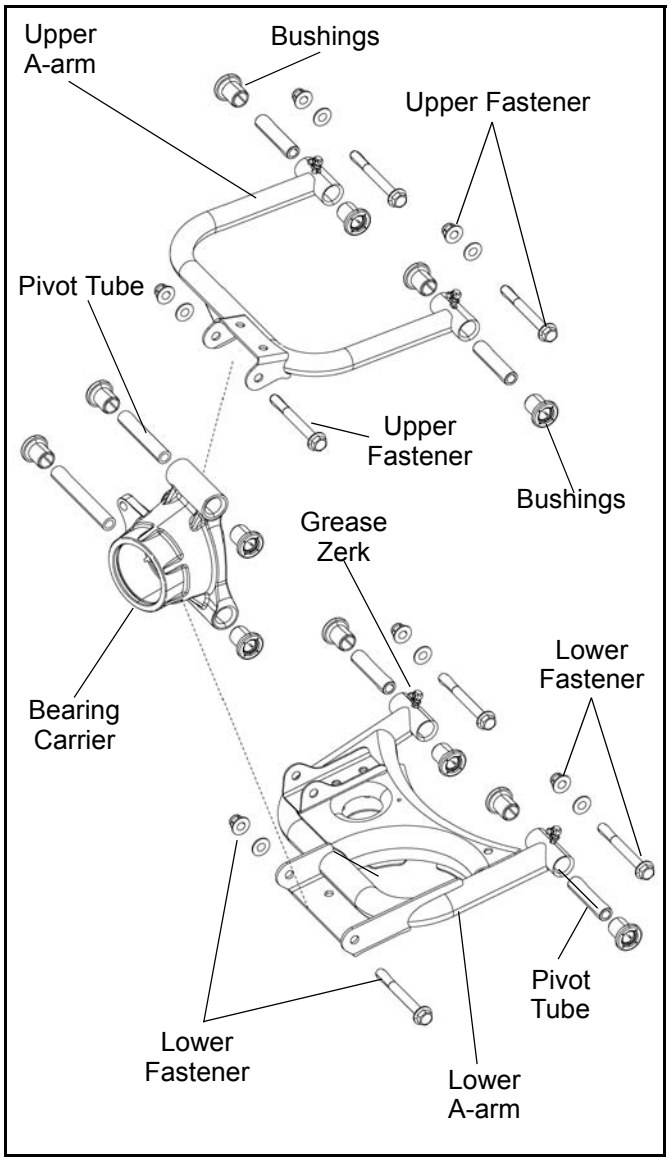
= T
Rear Upper / Lower A-arm Bolts: **39 ft. lbs. (53 Nm)**

= T
Shock Mounting Bolts: **37 ft. lbs. (50 Nm)**

= T
Upper and Lower Bearing Carrier Bolts: **40 ft. lbs. (54 Nm)**

= T
Wheel Nuts: **Steel Wheels: 27 ft. lbs. (37 Nm)** **Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)**

Exploded View



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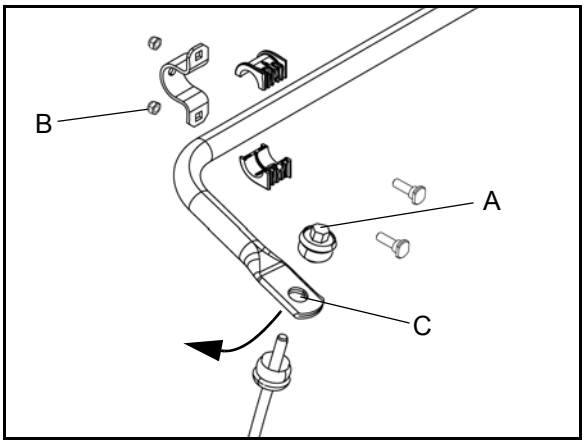
REAR STABILIZER BAR

Removal / Installation

1. Remove the cargo box access panel.
2. Remove the bushing retaining nut (A) from the upper portion of the stabilizer bar linkage on each side of the vehicle.
3. Remove the (4) fasteners (B) retaining the stabilizer bar bracket to the frame. Remove the bushing and bushing brackets from the vehicle.



4. Remove the stabilizer bar from the vehicle.

NOTE: Rotate the stabilizer bar 180 degrees so the linkage hole (C) is facing rearward to aid in stabilizer bar removal.

5. Inspect the stabilizer bar for straightness. Inspect the bushings and replace if needed.

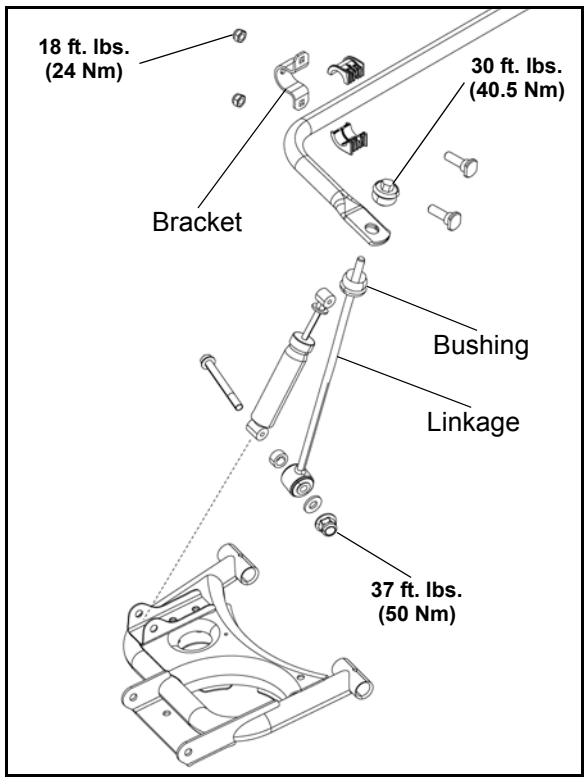
6. Inspect the rubber bushings on the linkage rod and replace if needed.

7. Reverse the procedure for installation.
8. Torque the stabilizer mounting nuts (B) to specification.

= T
Stabilizer Mounting Bolt Torque: **18 ft. lbs. (24 Nm)**

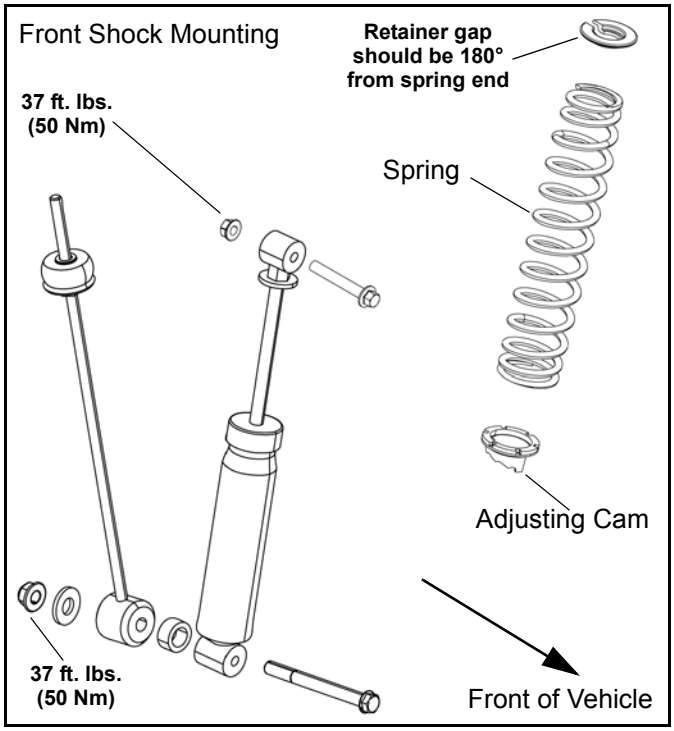
9. Torque the bushing retaining nut (A) on the upper portion of the stabilizer bar linkage to specification.

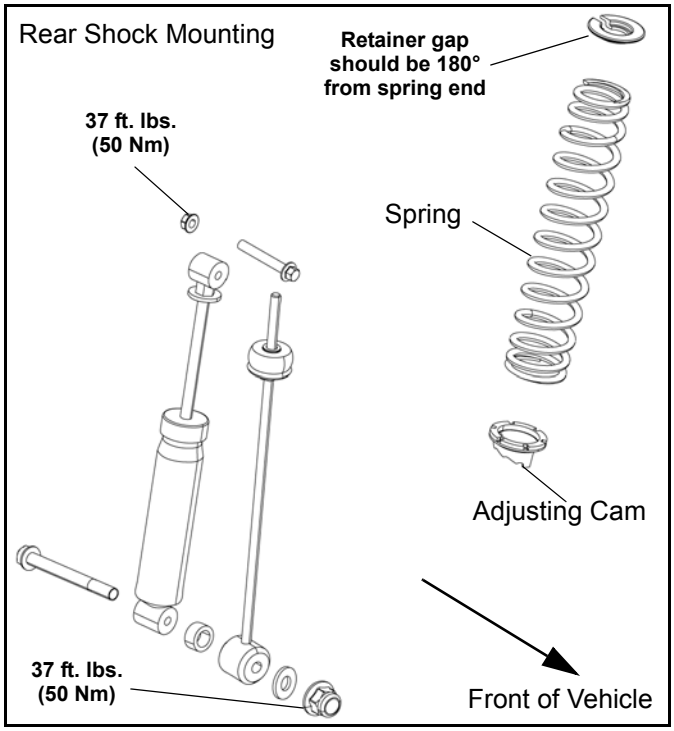
= T
Stabilizer Bushing Retaining Nut Torque: **30 ft. lbs. (40.5 Nm)**



SHOCKS / SPRINGS / FASTENERS

Exploded View





Shock Removal / Installation

1. Elevate the vehicle off the ground to relieve the suspension load.
2. Remove the stabilizer bar upper linkage bushings / nut from both sides. Rotate the stabilizer bar upward.
3. Remove the upper and lower fasteners retaining the shock and remove the shock from the vehicle.

NOTE: It may be necessary to use a commercially available swivel socket to remove and install the LR upper shock bolt.

4. Reverse the procedure to reinstall the shock. Torque **new** fasteners to specification (refer to exploded views).

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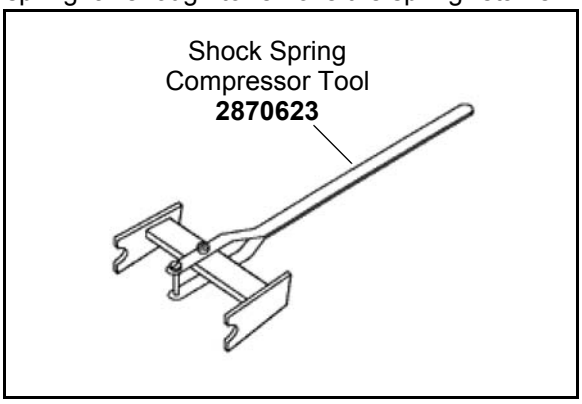
Shock Replacement

1. Using a spring compressor, compress the shock spring far enough to remove the spring retainer.



2. Remove the spring and adjusting cam from the existing shock and install components onto the new shock.

3. Compress the shock spring and install the spring retainer.

IMPORTANT: The spring retainer gap should be 180° from the end of the spring upon installation.

4. Reinstall the shock onto the vehicle and torque new fasteners to specification (refer to exploded views).

DECAL REPLACEMENT

⚠ WARNING

The following procedure involves the use of an open flame. Perform this procedure in a well ventilated area, away from gasoline or other flammable materials. Be sure the area to be flame treated is clean and free of gasoline or flammable residue.

⚠ WARNING

Do not flame treat components that are installed on the vehicle. Remove the component from the vehicle before flame treating.

The side panels, front and rear fender cabs are plastic polyethylene material. Therefore, they must be "flame treated" prior to installing a decal to ensure good adhesion. A bonus of the flame treating procedure is it can be used to reduce or eliminate the whitish stress marks that are sometimes left after a fender or cab is bent, flexed, or damaged.

CAUTION

Do not flame treat painted plastic components. Painted plastic surfaces should only be wiped clean prior to decal adhesion.

To flame treat the decal area:

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 (2-3 inches from the flame tip is recommended). Keep the torch moving to prevent damage.

2. Apply the decal on one edge first. Slowly lay down remainder of the decal while rubbing lightly over the decal surface to eliminate any air bubbles during the application.

CHAPTER 6
CLUTCHING

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SPECIAL TOOLS AND SUPPLIES

TOOL DESCRIPTION	PART NUMBER
Drive Clutch Puller (Short)	**PA-48595**
Clutch Holding Wrench	**9314177**
Clutch Holding Fixture	**2871358-A**
Drive Clutch Spider Removal and Installation Tool	**2870341**
Roller Pin Tool	**2870910**
Clutch Bushing Replacement Tool Kit	**2871226**
Piston Pin Puller	**2870386**
Universal Clutch Compressor Tool	**PU-50518**
Clutch Bushing Replacement Tool Kit	**2871025**

SPECIAL SUPPLIES	PART NUMBER
Loctite™ 609	**N/A**
RTV Silicone Sealer	**8560054**

SPX Corporation:
1-800-328-6657 or http://polaris.spx.com/.

TORQUE SPECIFICATIONS

PVT System Fastener Torques

ITEM	TORQUE VALUE
Drive Clutch Retaining Bolt	47 ft. lbs. (63.5 Nm)
Driven Clutch Retaining Bolt	36 ft. lbs. (48.5 Nm)
PVT Inner Cover Bolts	12 ft. lbs. (16 Nm)
PVT Outer Cover Bolts	45-50 in. lbs (5 Nm)
Drive Clutch Spider	200 ft. lbs. (271 Nm)
Drive Clutch Cover Plate	100 in. lbs. (12 Nm)

PVT SYSTEM OVERVIEW

CLUTCH CHART

Altitude		Shift Weight	Drive Spring
Meters (Feet)	**0-1500 (0-5000)**	25-52 (5632409)	Black (7043594)
	1500-3700 (5000 - 12000)	25-48 (5632408)	Black (7043594)

General Operation

WARNING

All PVT maintenance or repairs should be performed 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

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 the Polaris vehicle, 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.

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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.

PVT Break-In (Drive Belt / Clutches)

A proper break-in of the clutches and drive belt will ensure a longer life and better performance. Break in the clutches and drive belt by operating at slower speeds during the 10 hours as recommended (see Chapter 3 “Engine Break-In Period” for break-in example). Pull only light loads. Avoid aggressive acceleration and high speed operation during the break-in period.

Maintenance / Inspection

Under normal use 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. **Belt Inspection.**
2. **Drive and Driven Clutch Buttons and Bushings, Drive Clutch Shift Weights and Pins, Drive Clutch Spider Rollers and Roller Pins, Drive and Driven Clutch Springs.**
3. **Sheave Faces.** Clean and inspect for wear.
4. **PVT System Sealing.** Refer to the appropriate illustration(s) on the following pages. 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 and also to prevent water and other contaminants from entering the PVT area. This is especially critical on units subjected to frequent water forging.

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Overheating / Diagnosis

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 vehicle should be operated in Low when plowing or pulling heavy loads, or if extended low speed operation is anticipated.

CLUTCH DRIVE BELT & COVER RELATED ISSUES: DIAGNOSIS	
Possible Causes	**Solutions / What to do**
Loading the vehicle into a truck or tall trailer when in high range.	Shift transmission to Low during loading of the vehicle to prevent belt burning.
Starting out going up a steep incline from a stopped position.	When starting out on an incline, use Low gear. Shift transmission to Low during loading of the vehicle to prevent belt burning.
Driving at low RPM or low ground speed (at approximately 3-7 MPH).	Drive at higher speed or use Low. The use of Low is highly recommended for cooler PVT operating temperatures and longer component life.
Insufficient engine warm-up when 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.
Towing/Pushing at low RPM or low ground speed.	Use Low only.
Plowing snow, dirt, etc./utility use.	Use Low only.
Stuck in mud or snow.	Shift the transmission to Low, 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, carefully use fast, aggressive, brief 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 full throttle. Repeat several times as required. During this procedure, the throttle should not be held at the full position for more than 10 seconds. Clutch seals should be inspected for damage if repeated leaking occurs.
Clutch malfunction.	Clutch component inspection should be performed by a Polaris MSD certified technician.
Poor engine performance.	Fouled spark plugs, foreign material in fuel tank, restricted fuel lines, or faulty fuel pump may cause symptoms similar to clutching malfunction.
GENERAL RANGE OPERATION GUIDELINES:	Low: Heavy pulling, basic operational speeds less than 7 MPH, riding through rough terrain (swamps, mountains, ect.), or low ground speeds.
	High: High ground speeds, or speeds above 7 MPH.

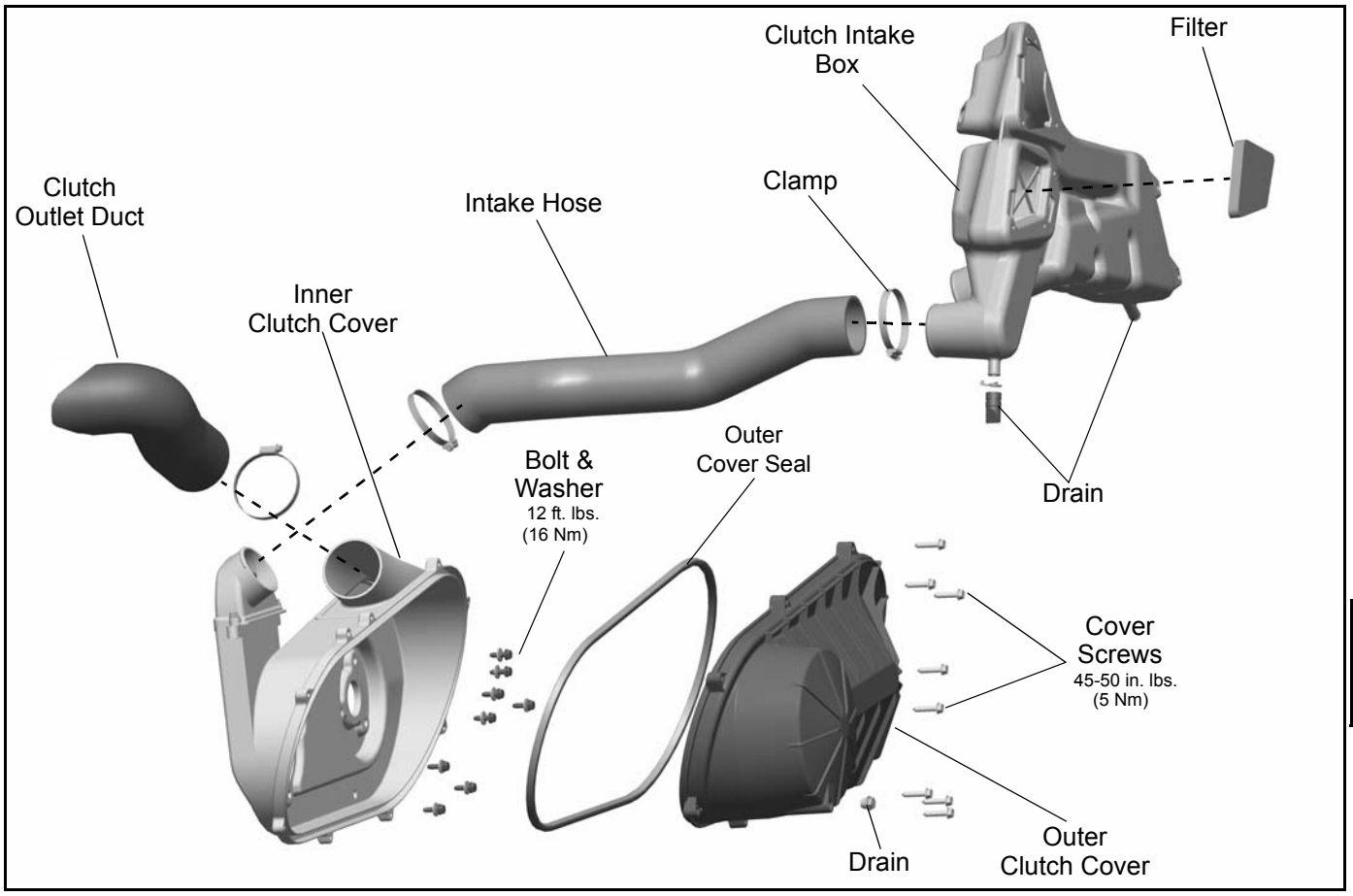
Operating in Low Gear

Low gear should be used when pulling heavy loads, riding through rough terrain, or when basic operational ground speeds are less than 7 MPH. Use High gear when basic operational ground speeds are more than 7 MPH.

IMPORTANT: Using High gear for heavy loads, hilly terrain, or in wet, muddy conditions will increase the chance of drive belt burning.

PVT SYSTEM SERVICE

PVT Covers and Ducting Components

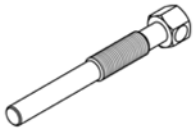


PVT Disassembly

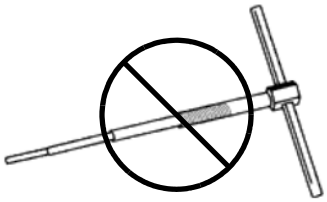
CAUTION

Correct Drive Clutch Puller P/N PA-48595

PA-48595 - Correct Drive Clutch Puller For RZR 570



2872085 - Incorrect Drive Clutch Puller



1. Remove the seats and engine service panel (see chapter 5).
2. Disconnect the (-) negative battery terminal.
3. Place transmission in neutral.
4. Raise and support the vehicle.

CAUTION

Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure.

5. Remove the left rear wheel.

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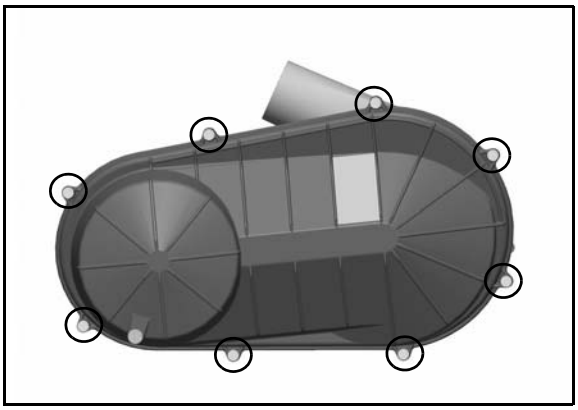
6. Remove the (8) clutch cover screws and remove the outer clutch cover from the vehicle.

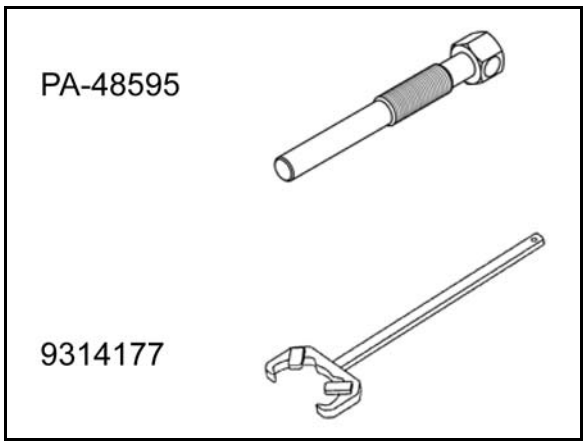


7. Mark the drive belt direction of rotation and remove drive belt (see “DRIVE BELT - Belt Removal”).

8. Remove the driven clutch retaining bolt and driven clutch.

9. Install the Drive Clutch Holder PN 9314177.

10. Remove the drive clutch retaining bolt and remove drive clutch using the Drive Clutch Puller PA-48595.

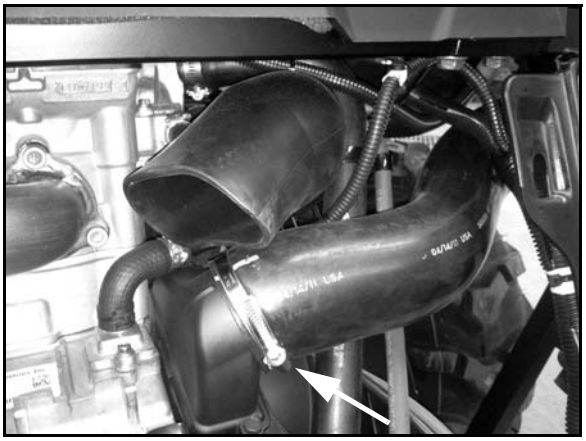


Drive Clutch Puller PA-48595

Drive Clutch Holder 9314177

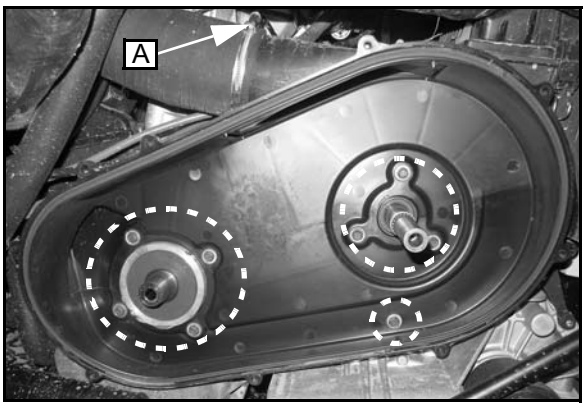
IMPORTANT: Be sure to use the correct Drive Clutch Puller (PA- 48595) to prevent damage to crankshaft.

11. Loosen hose clamp attaching the PVT inlet duct to the inner clutch cover. Disengage hose from the inner clutch cover.



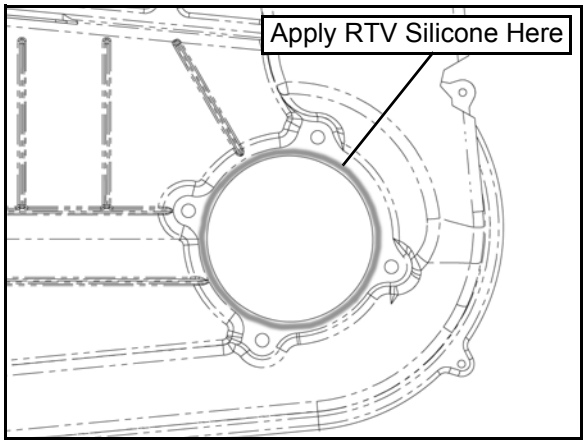
12. Loosen the hose clamp (A) that attach the clutch outlet duct to the inner clutch cover. Disengage the hose from the cover.

13. Remove the (8) bolts that retain the inner clutch cover to the engine and transmission. Remove inner clutch cover. Make note of cable and hose routings for assembly.



PVT Assembly

1. Inspect inner clutch cover. Replace if cracked or damaged.
2. Inspect the seal on the transmission input shaft. Replace if damaged.
3. Remove silicone sealant from the engine case and inner PVT cover.
4. Apply RTV silicone sealant to the back side of the inner clutch cover to ensure a water tight fit between the engine and inner clutch cover. Both surfaces must be clean to ensure adhesion of the silicone sealant.



5. Install and properly align the inner clutch cover. Be sure the cables and hose routings are correct.
6. Install the (4) inner clutch cover bolts and washers that retain the cover to the transmission. Torque bolts to specification.
7. Install the (4) inner clutch cover bolts and washers that retain the cover to the engine. Torque bolts to specification.

= T
Inner Clutch Cover Bolts: **12 ft. lbs. (16 Nm)**

8. Clean the splines inside the 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 and retaining bolt. Torque to specification.

= T
Driven Clutch Retaining Bolt: **36 ft. lbs. (48.5 Nm)**

11. Clean the end of the taper on the crankshaft and the tapered bore inside the drive clutch.
12. Install drive clutch onto the engine and torque retaining bolt to specification.

= T
Drive Clutch Retaining Bolt: **47 ft. lbs. (63.5 Nm)**

13. Install the drive belt noting direction of belt rotation (see “DRIVE BELT - Belt Installation”). If a new belt is installed, install so numbers can be easily read.
14. Install a new outer clutch cover seal with the colored stripe facing the inner clutch cover.
15. Reinstall outer clutch cover and secure with screws. Torque screws to specification.

= T
Outer Clutch Cover Retaining Screws: **45-50 in. lbs. (5 Nm)**

16. Install the clutch inlet and outlet ducts and tighten the hose clamps.

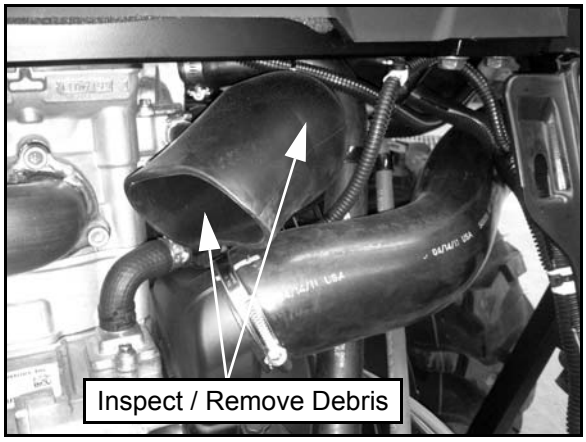
= T
Wheel Nuts: **Steel Wheels: 27 ft. lbs. (37 Nm)** **Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)**

17. Reconnect the battery cable.
18. Install engine service panel and both seats.

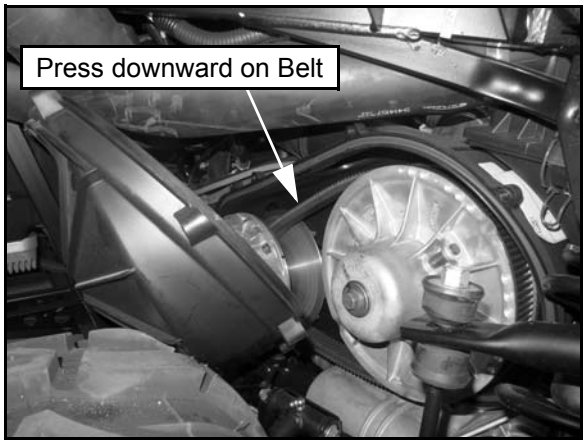
DRIVE BELT

Belt Removal

IMPORTANT: Inspect the entire clutch outlet duct when replacing a drive belt. Remove any debris found in the outlet duct.

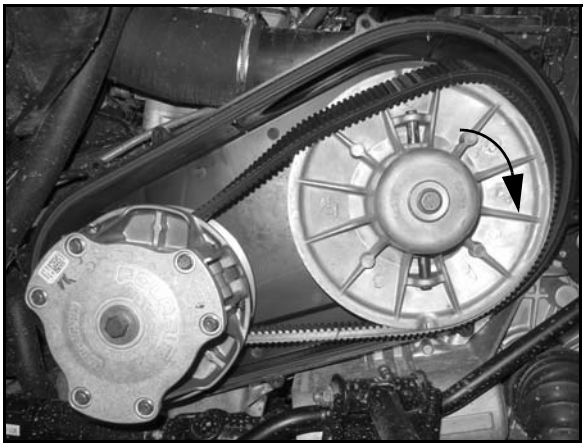


1. Remove the (8) screws that retain the outer clutch cover.
2. Maneuver the outer clutch cover outward as shown below to access the drive belt.
3. Mark the drive belt direction of rotation so that it can be installed in the same direction.
4. Push downward on belt to open the driven clutch sheaves.



NOTE: Removal of left rear wheel is NOT necessary for belt replacement.

5. Lift upward and outward on belt and rotate driven clutch clockwise to walk the belt off of the driven clutch.



6. Walk the belt out of the driven clutch and drive clutch. Remove the belt from the vehicle.

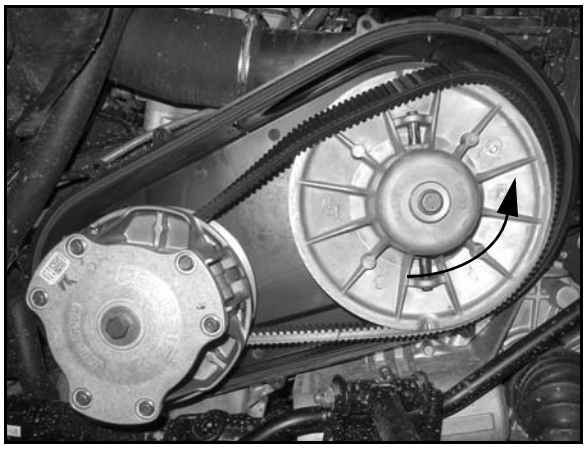
Belt Inspection

1. 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.
2. Inspect belt for loose cords, missing cogs, cracks, abrasions, thin spots, or excessive wear. Compare belt measurements with a new drive belt. Replace if necessary.
3. Belts with thin spots, burn marks, etc., should be replaced to eliminate noise, vibration, or erratic PVT operation. See the Troubleshooting Chart at the end of this chapter for possible causes.

Belt Installation

NOTE: Be sure to install belt in the same direction as it was removed.

1. Loop belt over the drive clutch and over the driven sheave.



2. Rotate the driven clutch and walk the belt into the clutch.
3. Rotate / spin the driven clutch and belt approximately 5-7 times to properly seat the belt in the driven clutch.
4. Install the outer clutch cover and (8) screws. Torque screws to specification.

= T
Outer Clutch Cover Retaining Screws: **45-50 in. lbs. (5 Nm)**

PVT Break-In (Drive Belt / Clutches)

A proper break-in of the clutches and drive belt will ensure a longer life and better performance. Break in the clutches and drive belt by operating at slower speeds during the 10 hour break-in period as recommended (see Chapter 3 “Engine Break-In Period” for break-in example). Pull only light loads. Avoid aggressive acceleration and high speed operation during the break-in period.

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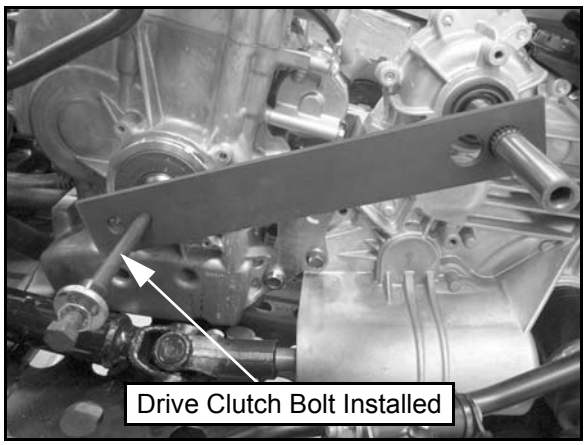
CLUTCH CENTER DISTANCE

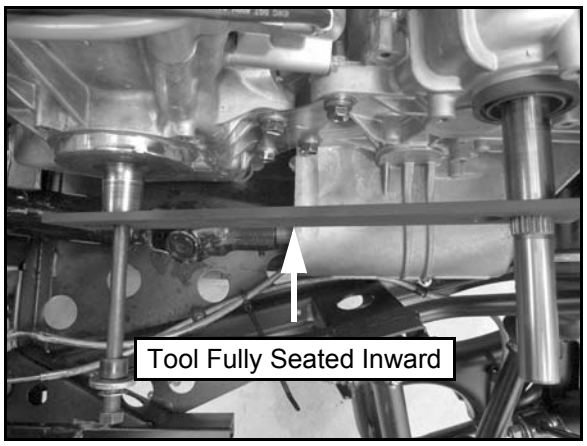
Inspection

1. Remove the outer PVT cover, drive belt, drive clutch and driven clutch as outlined in this chapter.

NOTE: The inner PVT cover does not need to be removed to check the clutch center to center distance.

2. Install the Clutch Center Distance Tool (PU-50658) onto the crankshaft and transmission input shaft. The pictures below show the tool (PU-50658) properly installed.



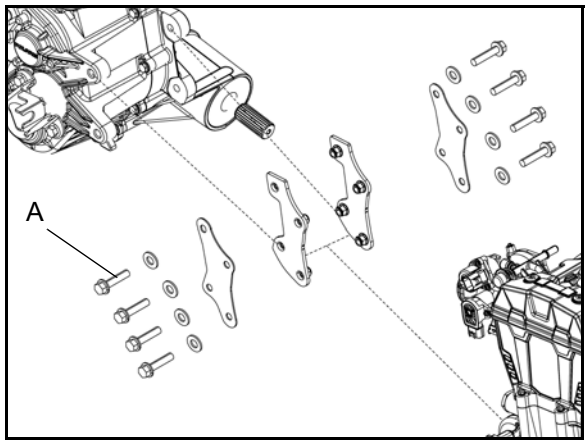


3. If the tool fits as shown above, the clutch center to center distance is correct.

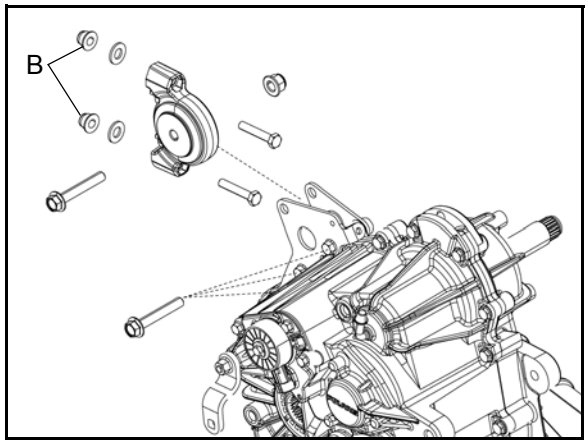
4. If the tool does not fit as shown above, adjustment is needed.

Adjustment

1. Remove the Clutch Center Distance tool from the engine and transmission.
2. Remove the inner PVT Cover.
3. Loosen the (8) engine to transmission coupler bolts (A).



4. Loosen the (2) fasteners (B) securing the rear transmission isolator to the vehicle frame.



5. With the engine and transmission mounting fasteners loose, install the Clutch Center Distance Tool (PU-50658) as shown in the inspection process.

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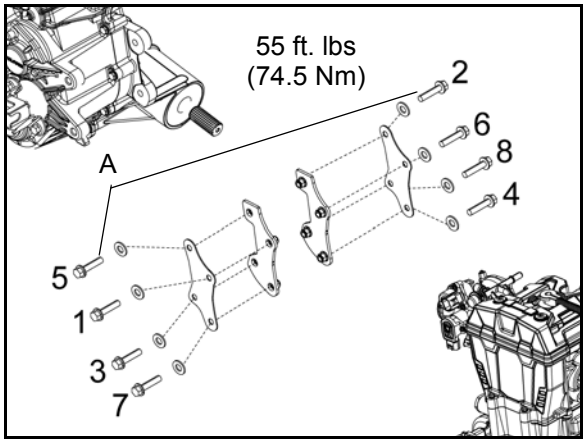
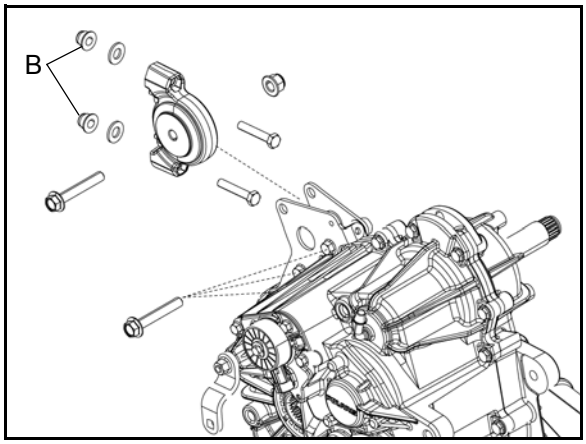
6. With the tool now properly installed, in sequence torque the (8) engine to transmission coupler bolts to specification.



= T
Engine To Trans Coupler Bolts: **55 ft. lbs. (75 Nm**)

7. Torque the (2) rear transmission isolator fasteners (B) to specification



8. Remove the Clutch Center Distance tool and reassemble the PVT system as outlined in this chapter.

= T
Rear Trans. Isolator Bolts: **25 ft. lbs. (34 Nm)**

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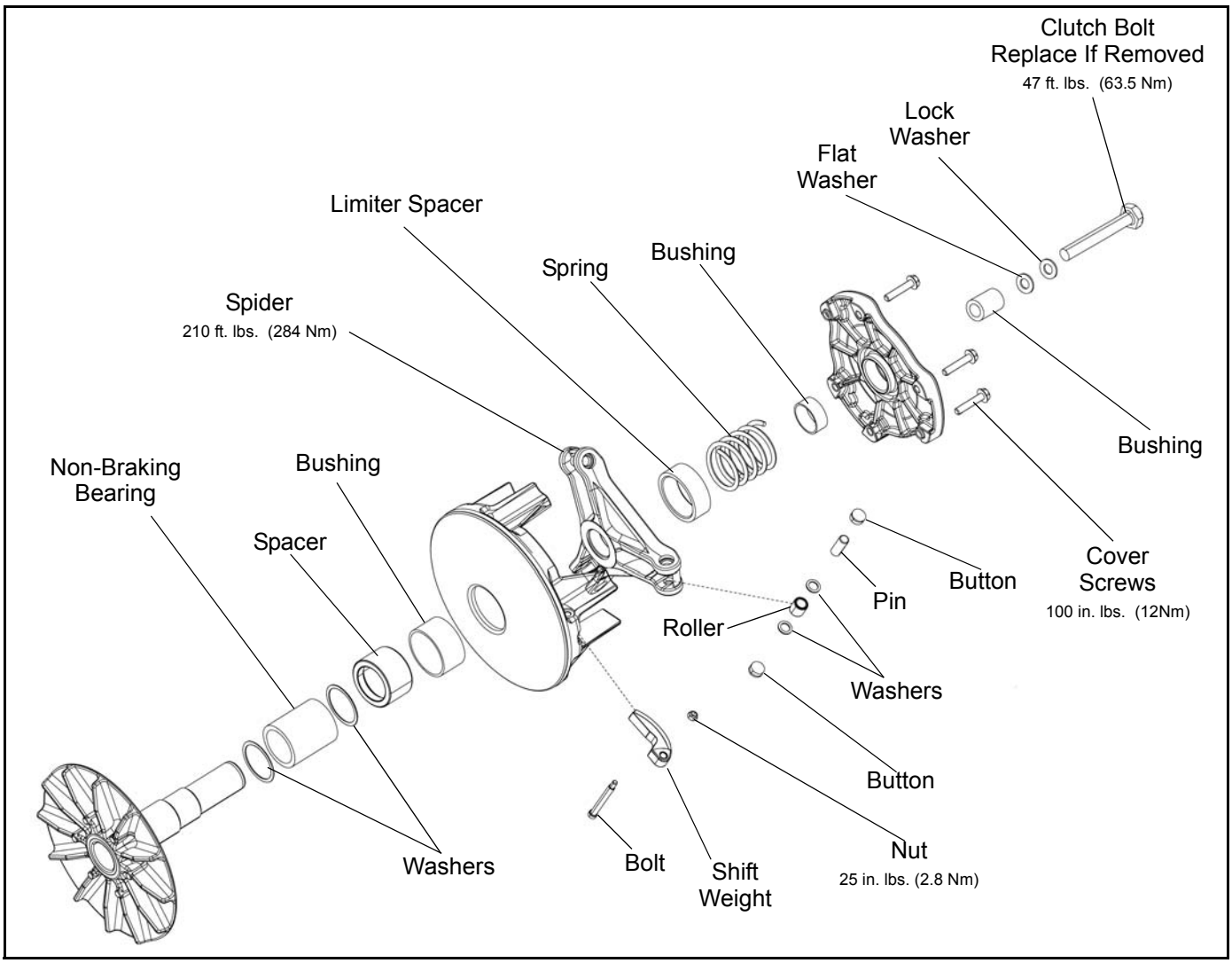
DRIVE CLUTCH SERVICE

Drive Clutch Exploded View



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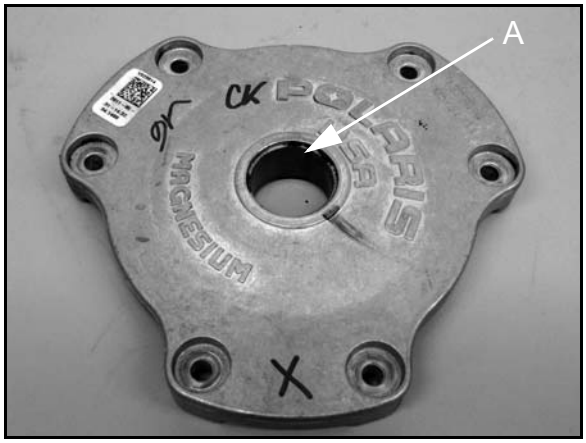
Clutch Disassembly

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. Mark the stationary sheave and clutch shaft to verify the shaft has not turned in the sheave after tightening the spider during clutch assembly.

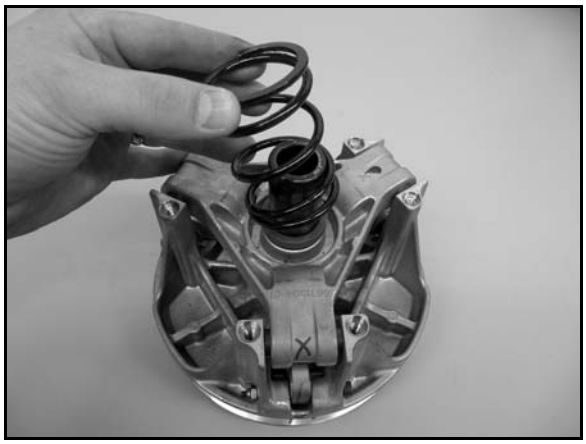
3. Remove the (6) cover bolts evenly in a cross pattern and remove cover plate.

4. 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.

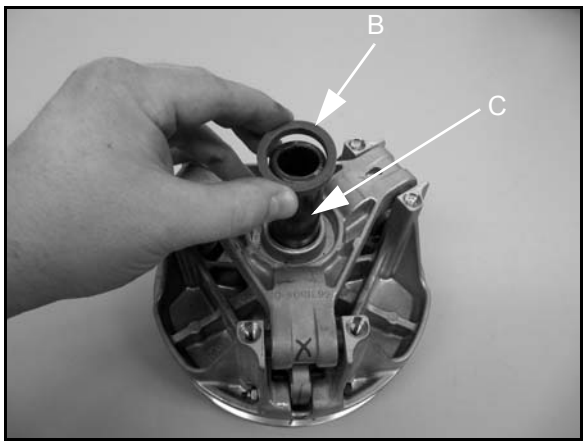


Cover Bushing Inspection:
Replace the cover bushing if more brass than Teflon is visible on the bushing. Refer to bushing replacement in this chapter.

5. Remove and inspect the clutch spring. See "Drive Clutch Spring Specifications" for spring inspection.



6. Remove the limiter spacer (B) and inspect for wear. Replace if excessive wear is evident.
7. Inspect area on shaft (C) where bushing rides for wear, galling, nicks, or scratches. Replace clutch assembly if worn or damaged.



CAUTION

DO NOT reassemble the drive clutch without the limiter spacer (B). Belt life will be greatly reduced.

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Drive Clutch Spring Inspection

CAUTION

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

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 relaxation the spring is subject to during operation, it should always be inspected for tolerance limits during any clutch operation diagnosis or repair.

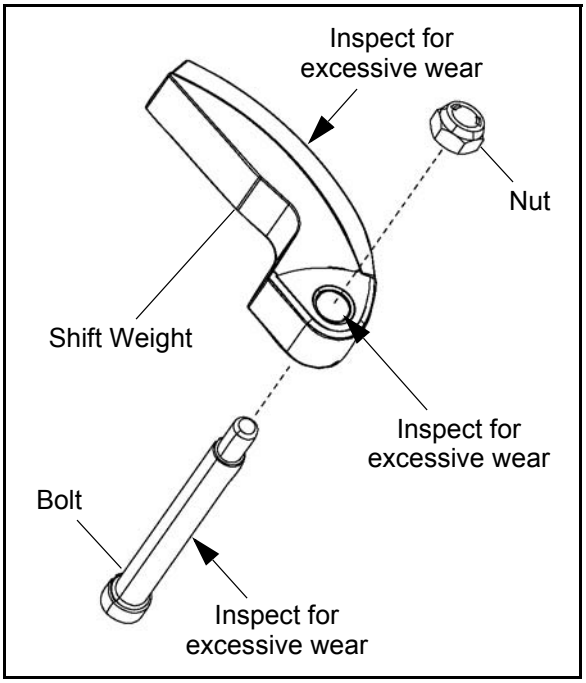
With the spring resting on a flat surface, measure its free length from the outer coil surfaces. Also check to see that spring coils are parallel to one another. Distortion of the spring indicates stress fatigue, requiring replacement.

Drive Clutch Spring Specifications

Color	Black
Free Length	2.8” (71.12mm)

Shift Weight Inspection

1. Remove shift weight bolts and weights. Inspect the contact surface of the weight. The surface should be smooth and free of dents or gall marks. Inspect the weight pivot bore and bolts for wear or galling. If weights or bolts are worn or broken, replace in sets of three with new bolts and nuts.



WARNING

The clutch assembly is a precisely balanced unit. Never replace parts with used parts from another clutch assembly!

NOTE: A damaged shift weight is usually caused by a damaged or stuck roller in the spider assembly. See “Roller, Pin and Thrust Washer Inspection”.

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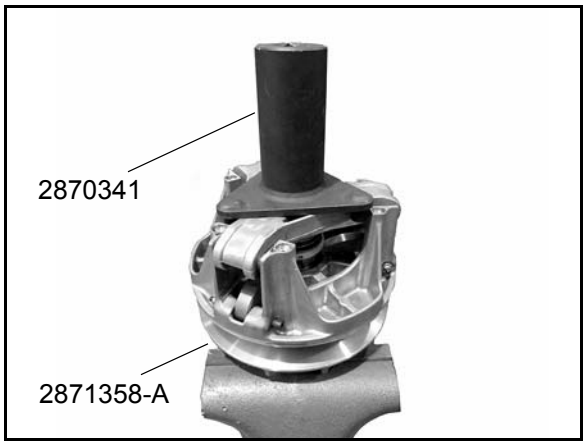
Spider Removal

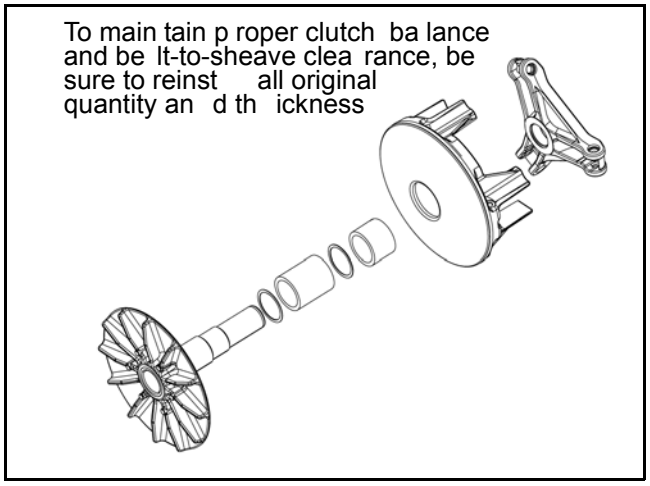
1. Install clutch in holding fixture (PN 2871358-A) and loosen the spider (counterclockwise) using Clutch Spider Removal Tool (PN 2870341).



Clutch Holding Fixture:
(PN 2871358-A)

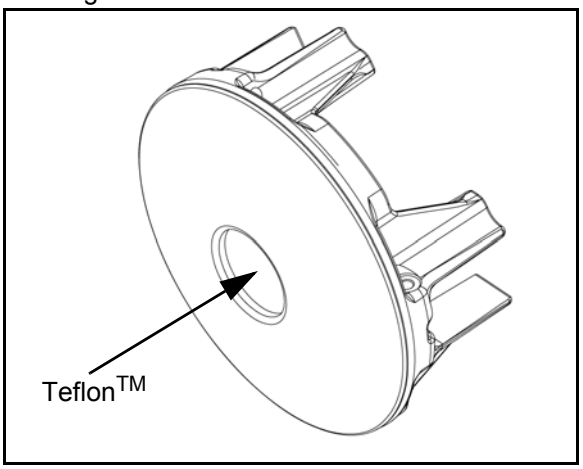
Spider Removal Tool:
(PN 2870341)

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.



Moveable Sheave Bushing Inspection

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.

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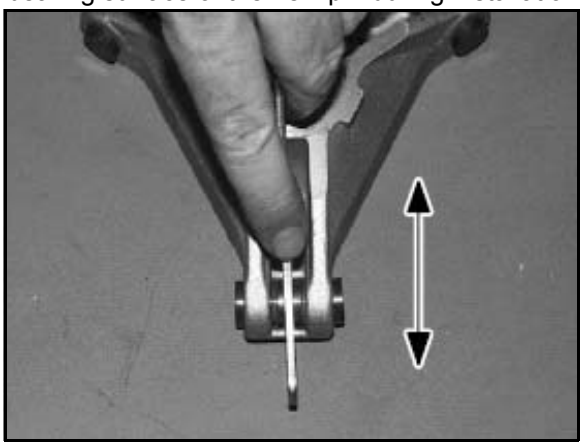
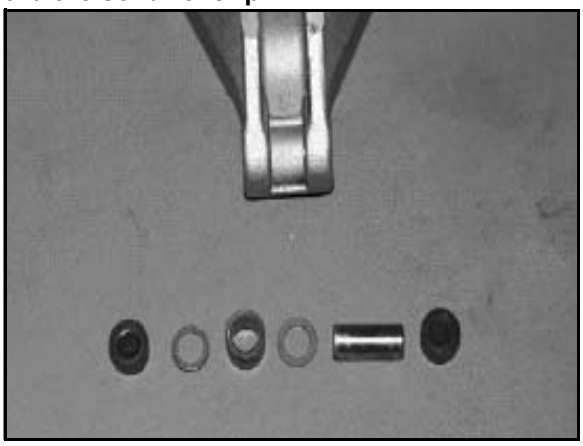
Roller, Pin, and Thrust Washer Inspection

1. 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.



2. Rubber backed buttons can be used in all *RANGER* clutches if the hollow roller pin is changed to the solid roller pin.

NOTE: The rubber side of the button is positioned toward the solid roller pin.



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.

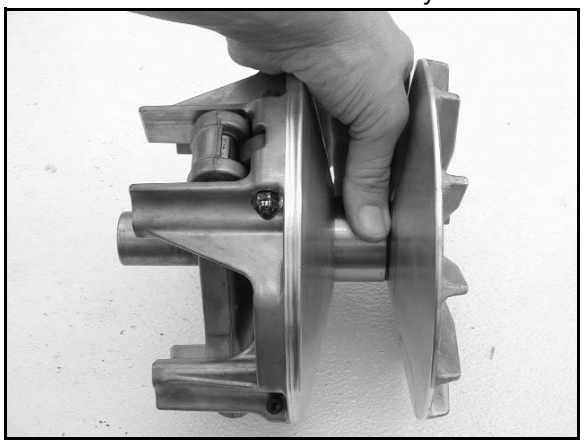
Button to Tower Clearance:
.000-.010”

2. Inspect sheave surfaces. Replace the entire clutch if worn, damaged or cracked.

Bearing Inspection

1. Rotate the clutch bearing in both clockwise and counter-clockwise directions. The non-braking bearing should rotate in both directions on the shaft with only a slight amount of drag.

2. Verify there is no binding or rough spots. If problems are noted continue with disassembly.



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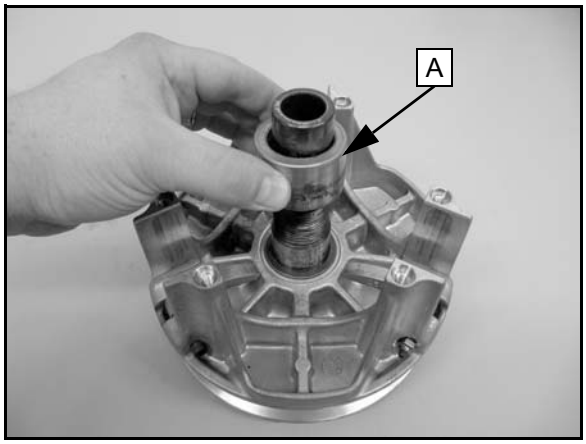
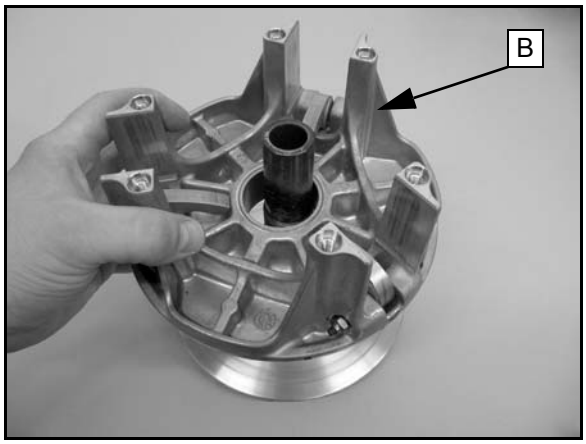
Clutch Inspection

NOTE: Remove cover, spring, and spider following instructions for drive clutch removal, then proceed as follows:

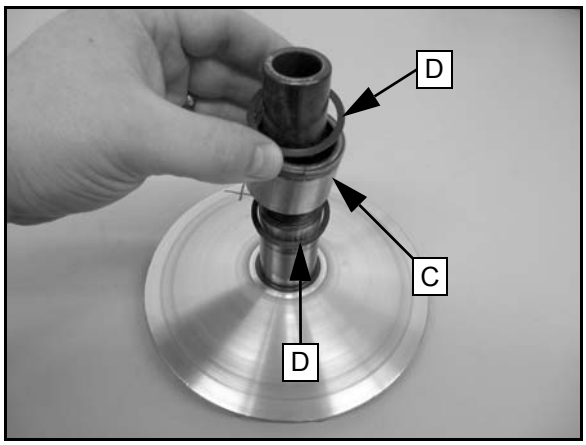
1. Remove the moveable sheave spacer sleeve (A). Inspect for damage and wear.



2. Remove the moveable clutch sheave (B). Inspect for damage and wear.



3. Lift bearing (C) and thrust washers (D) off shaft. Replace as an assembly if worn, damaged, or if problems were noted.



4. 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” (34.91 - 34.93 mm)** **Service Limit: 1.3730” (34.87 mm)**

5. Visually inspect PTFE thrust washers for damage. Measure the thickness and compare to specification. Replace if worn or damaged.

= In. / mm.
PTFE Washer Thickness **Standard: .030” (.76 mm)** **Service Limit: .025” (.64 mm)**

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Bushing Service

IMPORTANT: Special Tools Required

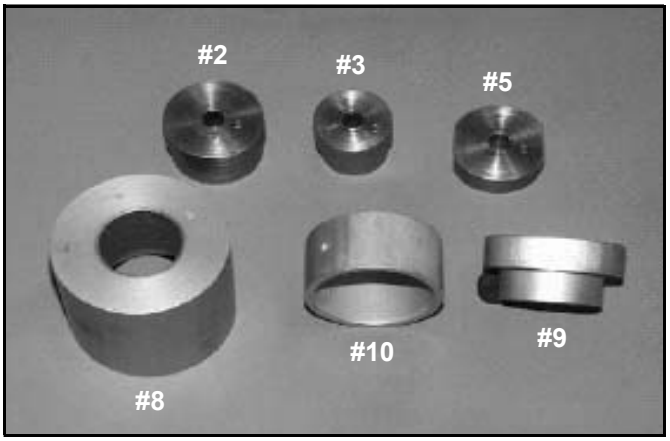
EBS Clutch Bushing Tool Kit - 2201379

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	Instructions	9915111

Additional Special Tools

Qty.	Part Description	Part #
1	Clutch Bushing Replacement Tool	2871226
1	Piston Pin Puller	2870386

***Clutch Bushing Replacement Tool Kit (PN 2871226)**



Item	Qty.	Part Description	Part #
#2	1	P-90 Drive/Driven Clutch Bushing Install Tool	5020628
#3	1	Drive Clutch Cover Bushing Removal/ Installation Tool (all clutches)	5020629
#5	1	P-90 Driven Clutch Cover Bushing Removal Tool	5020631
#8	1	Main Puller Adapter	5020632
#9	1	Adapter Reducer	5010279
#10	1	Number Two Puller Adapter	5020633

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

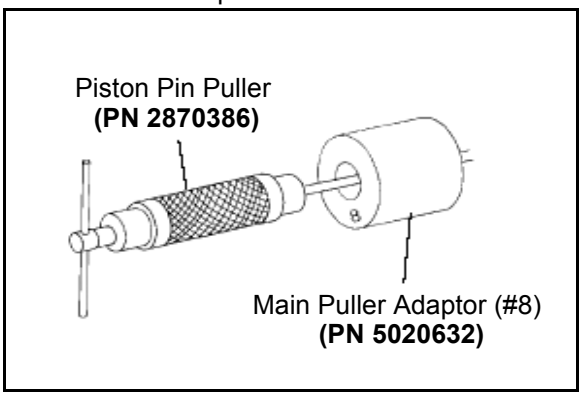
Clutch components will be hot! In order to avoid serious burns, wear insulated gloves during the removal process.

Moveable Sheave - Bushing Removal

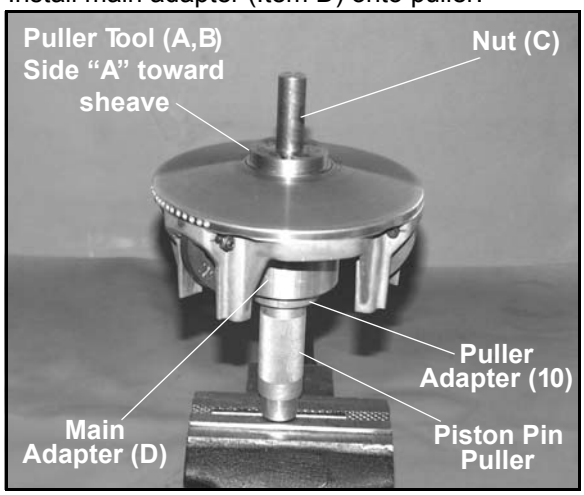
1. Remove clutch as outlined previously in this chapter.
2. Install handle end of the Piston Pin Puller **(PN 2870386)** securely into bench vise and lightly grease puller threads.

Piston Pin Puller (PN 2870386)

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.

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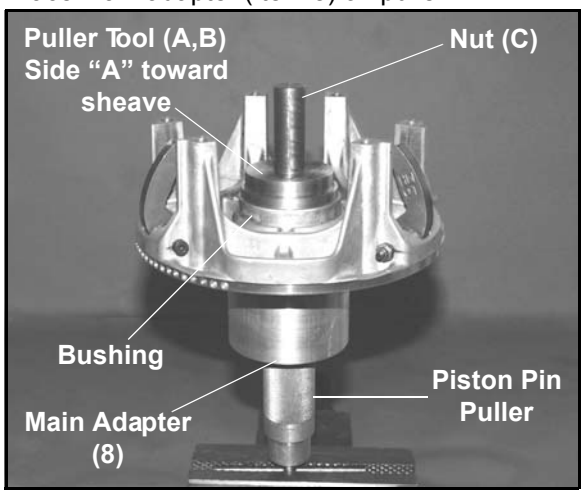
NOTE: Use Bushing Tool PA-47336.

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

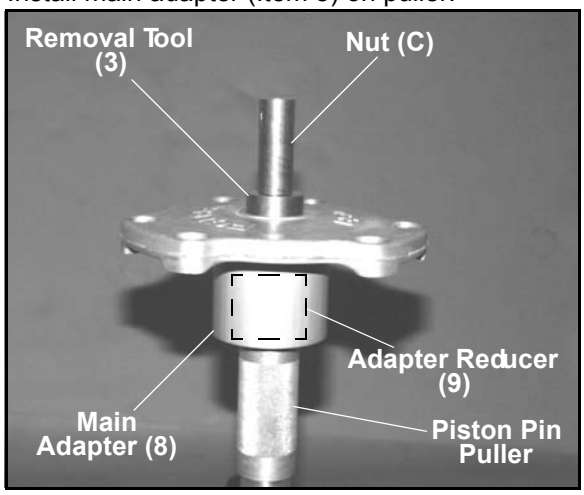
1. Place main adapter (Item 8) on puller.



2. Apply Loctiteä 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 Loctiteä 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.

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Clutch Assembly

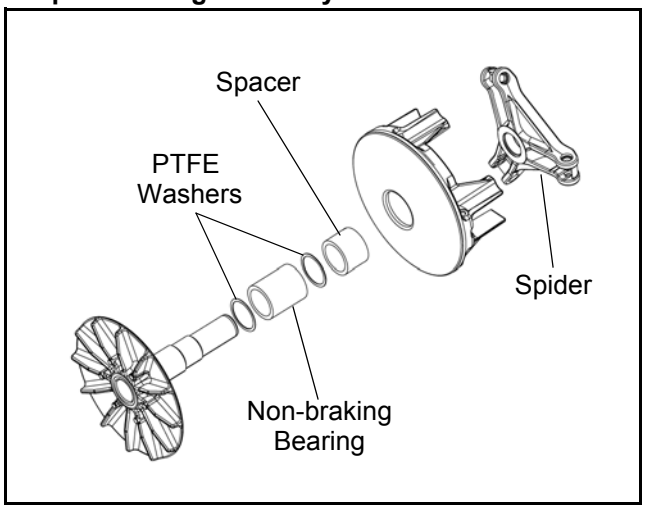
NOTE: The Teflon bushings are self-lubricating.

> **CAUTION**
>
> **Do not apply oil or grease to the bushings.**

Reassemble the drive clutch in the following sequence. Be sure the "X", or the marks that were made earlier are aligned during each phase of assembly.

1. Install the PTFE washers and non braking bearing over the clutch shaft. There should be one fiber washer on each side of the bearing.
2. Install the moveable sheave and spacer on to the clutch shaft.

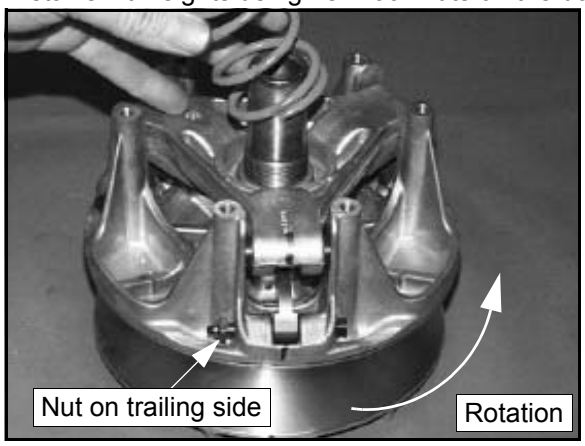
NOTE: To maintain proper clutch balance and belt-to-sheave clearance. be sure to reinstall the original quantity and thickness of washers / spacers beneath the spider during assembly.



3. 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, in 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.

> **= T**
>
> Spider Torque:
> **210 ft. lbs. (284 Nm)**

5. Install shift weights using new lock nuts on the bolts.

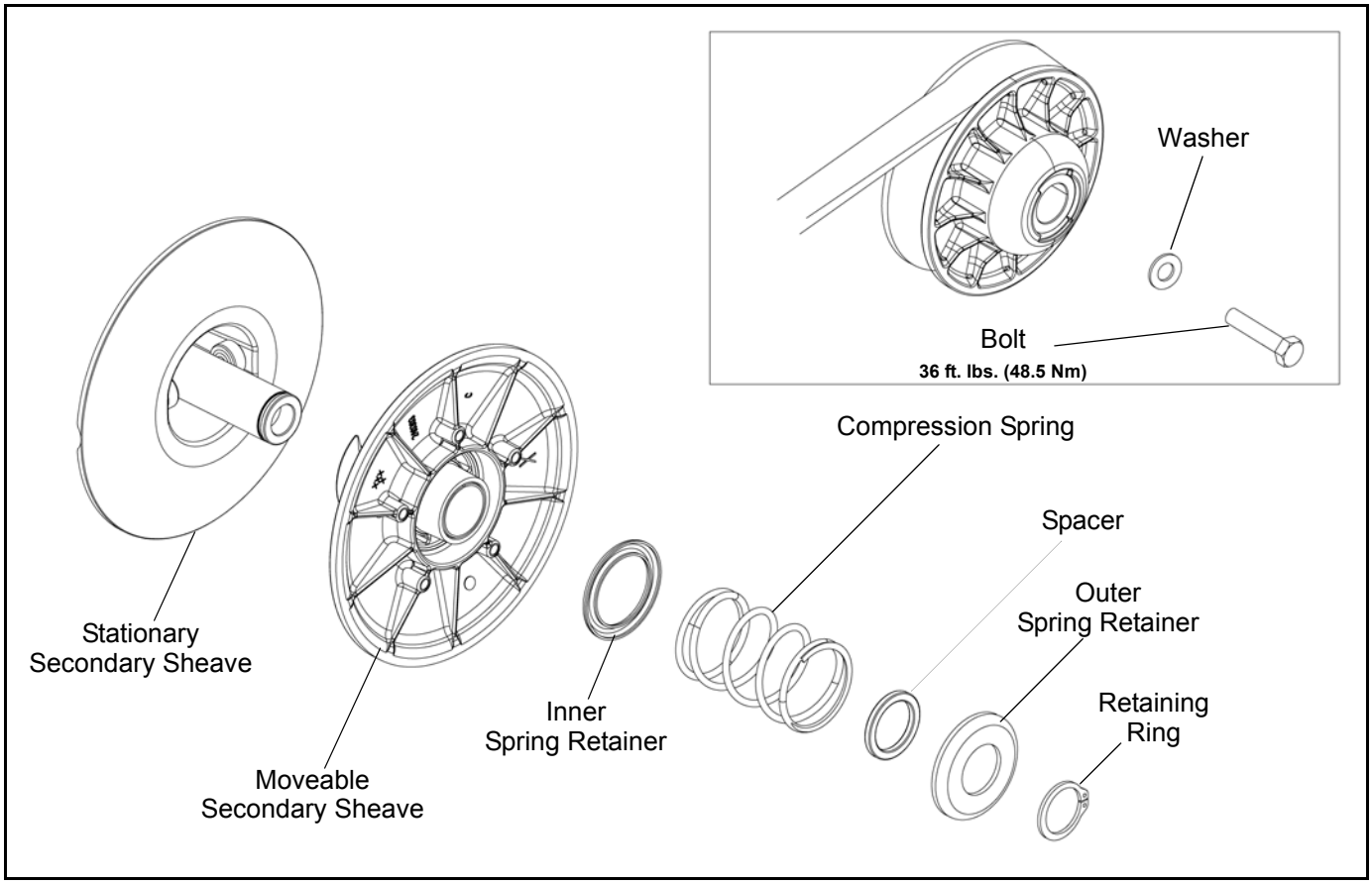


6. Reinstall clutch spring.
7. Reinstall cover, aligning "X" mark with other marks.
8. Torque cover bolts evenly to specification.

> **= T**
>
> Cover Screw Torque:
> **100 in. lbs. (12 Nm)**

DRIVEN CLUTCH SERVICE

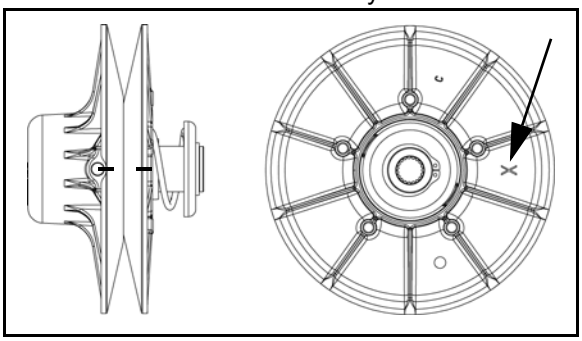
Exploded View



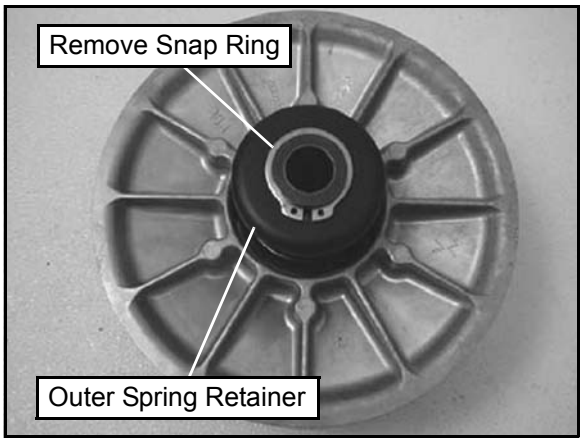
Clutch Disassembly / Inspection

> **CAUTION**
>
> Wear eye protection when removing snap ring to prevent serious personal injury.
> Use caution when removing, the snap ring pressure is loaded by the compression spring.

1. Remove driven clutch from the transmission input shaft.
2. Mark the position of the clutch sheaves before disassembly or use the X's on the sheaves for reference. This aids in reassembly and maintains clutch balance after reassembly.

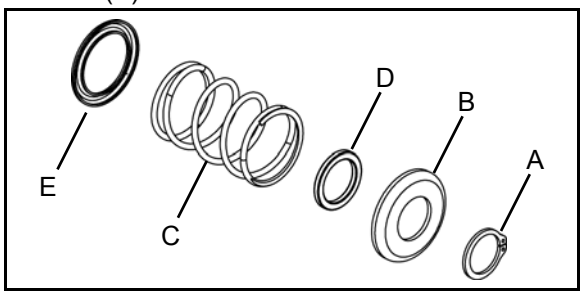


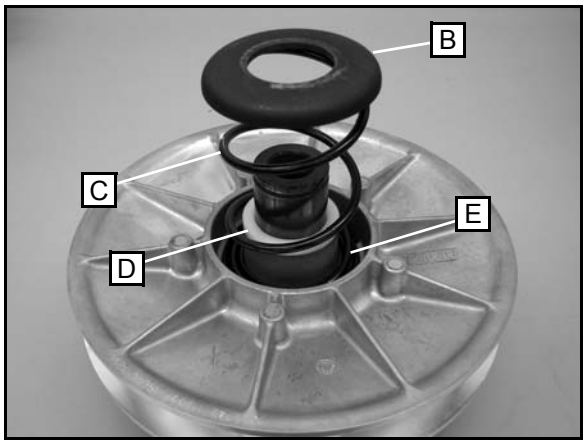
3. Place the clutch into the Universal Clutch Compressor Tool **PN PU- 50518**. App ly an d ho ld do wnward pressure on th e ou ter spr ing r etainer. Car efully remove the snap rin g. Reme mber the ou ter spring retainer contains strong spring pressure.



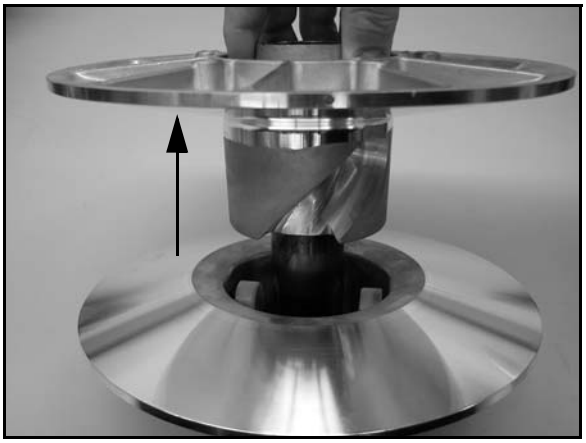
NOTE: Spring is c ompression only a nd h as no torsional wind.

4. With the snap ring (A) removed and spring pressure relieved, re move the outer sprin g r etainer (B), compression spring (C), spacer (D), and inner spring retainer (E).

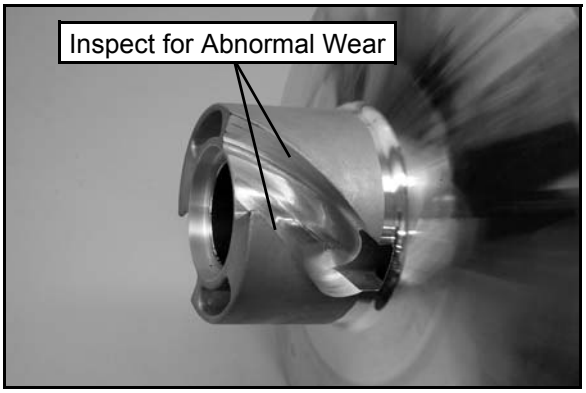




5. Separate the two clutch sheaves.



6. Inspect the helix on the moveable sheave.



7. Remove the inne r spr ing retainer from the inn er sheave. Inspect for wear and replace as needed.

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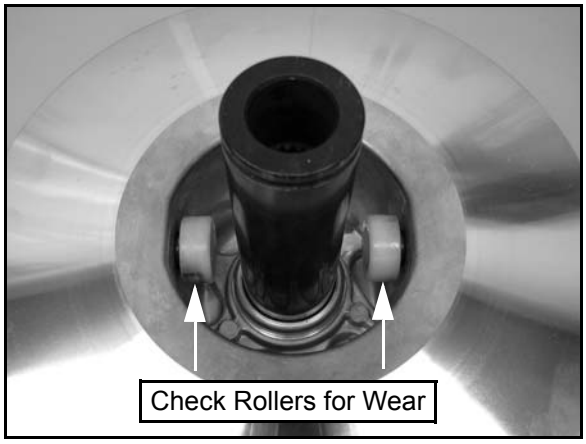
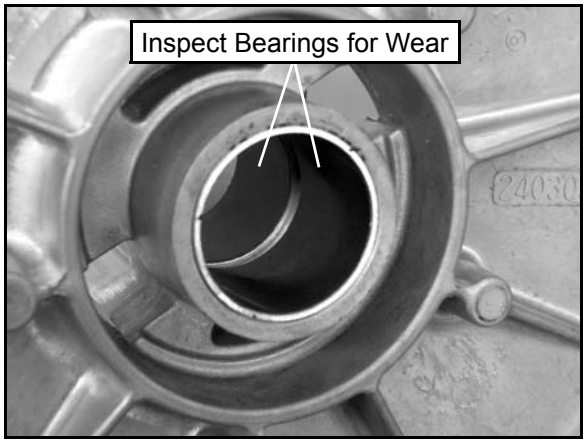
8. Check the rollers in the stationary sheave for wear. If rollers are worn, a new driven clutch assembly may be needed.



9. Inspect the bearings inside the moveable sheave.



Moveable Sheave Bearing Inspection:
Replace the clutch assembly if more brass than Teflon™ is visible on the bearing.

10. Inspect the Teflon™ coating on the moveable sheave bearings.

11. Inspect driven clutch sheave faces for wear or damage.

12. Clean and inspect splines on helix and transmission input shaft.

13. Lube splines with a light film of grease. **Do not lubricate the bearings!**

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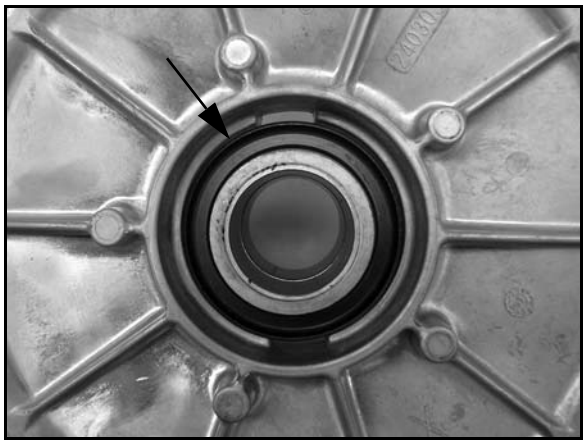
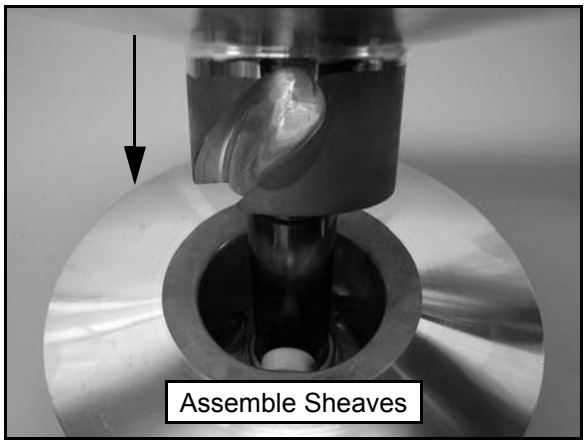
Clutch Assembly

1. Install the inner spring retainer if removed. **Do not apply oil or grease to the bearings.**



2. Align the "X" marks on each of the sheaves during reassembly.



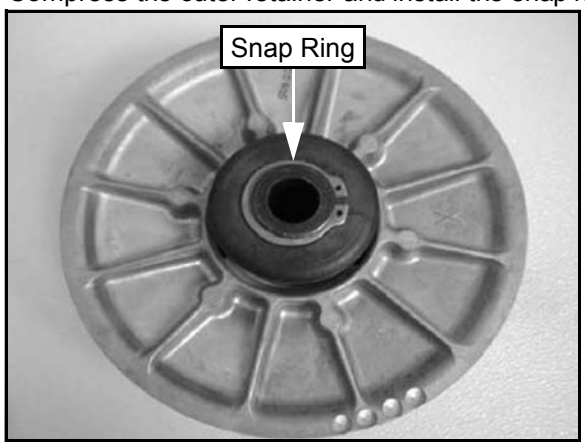
3. Install the spring into the inner retainer.

4. Install the spacer over the shaft.

5. Install the outer retainer on top of the spring.

6. Place the clutch into the Universal Clutch Compressor Tool **PN PU-50518** . Apply and hold downward pressure on the outer spring retainer. Carefully install the snap ring.

7. Compress the outer retainer and install the snap ring.



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TROUBLESHOOTING

Situation	Probable Cause	Remedy
Engine RPM below specified operating range, although engine is properly tuned.	-Wrong or broken drive clutch spring. -Drive clutch shift weight too heavy. -Driven clutch spring broken or installed in wrong helix location.	-Replace with recommended spring. -Install correct shift weight kit to match engine application. -Replace spring; refer to proper installation location.
Erratic engine operating RPM during acceleration or load variations.	-Drive clutch binding. -Belt worn unevenly - thin / burnt spots. -Driven clutch malfunction. -Sheave face grooved.	A. Disassemble drive clutch; inspect shift weights for wear and free operation. B. Clean and polish stationary shaft hub; reassemble clutch without spring to determine problem area. Replace belt. A. Replace ramp buttons. B. Inspect movable sheave for excessive bushing clearance. -Replace the clutch.
Engine RPM above specified operating range.	-Incorrect drive clutch spring (too high spring rate). -Drive clutch shift weights incorrect for application (too light). -Drive clutch binding. -Driven clutch binding. -Converter sheaves greasy; belt slipage.	-Install correct recommended spring. -Install correct recommended shift weights. -Disassemble and clean clutch, inspecting shift weights and rollers Reassemble without the spring and move sheaves through entire range to further determine probable cause. -Disassemble, clean, and inspect driven clutch, noting worn sheave bushing and ramp buttons and helix spring location. -Clean sheaves with denatured alcohol or brake cleaner, install new belt.
Harsh drive clutch engagement.	-Drive belt worn too narrow. -Excessive belt / sheave clearance with new belt.	-Replace belt. -Perform belt / sheave clearance adjustment with shim washers beneath spider.
Drive belt turns over	-Wrong belt for application.	-Replace with correct belt.
Belt burnt, thin spots	-Abuse (continued throttle application when vehicle is stationary, excess load) -Dragging brake -Slow, easy clutch engagement	-Caution operator to operate machine within guidelines. -Inspect brake system. -Fast, effective use of throttle for efficient engagement.

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Troubleshooting, Continued.....

Situation	Probable Cause	Remedy
PVT cover overheating (melting)	-Plugged air intake or outlet. -Belt slippage due to water, oil, grease, etc., rubbing on cover. -Clutches or weight being applied to cover while in operation. -High vs. low range.	-Clear obstruction -Inspect system. Clean , repair or replace as necessary. Seal PVT system ducts. -Remove weight. Inform operator. -Instruct operator on guidelines for operation in proper driving range for different terrain as outlined in Owner's Safety and Maintenance Manual.
Water ingestion	-Cover seals or ducts leaking -Operator error	-Find leak and repair as necessary. -Instruct operator on guidelines for operation in wet terrain as outlined in Owner's Safety and Maintenance Manual.
Belt slippage	-Belt worn out -Water ingestion -Belt contaminated with oil or grease	-Replace belt. -Inspect and seal PVT system. -Inspect and clean.
PVT noise	-Belt worn or separated, thin spots, loose belt -Broken or worn clutch components, cover hitting clutches	-Replace belt. -Inspect and repair as necessary.
Engagement erratic or stabby	-Thin spots on belt, worn belt -Drive clutch bushings stick	-Replace belt. Refer to belt burnt troubleshooting and instruct operator. -Inspect and repair clutches.

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CHAPTER 7
FINAL DRIVE

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SPECIAL TOOLS

PART NUMBER	TOOL DESCRIPTION
2872608	Roll Pin Removal Tool
8700226	CV Boot Clamp Pliers (earless type)
PU-48951	Axle Boot Clamp Tool

SPX Tools: 1-800-328-6657 or http://polaris.spx.com/.

TORQUE SPECIFICATIONS

Wheel and Hub Torque Table

ITEM	SPECIFICATION
Steel Wheel Nuts	27 ft. lbs. (37 Nm)
Aluminum Wheel Nuts (INTL)	30 ft. lbs. (41 Nm) + 90° (1/4 turn)
Front Hub Castle Nut	80 ft. lbs. (108 Nm)
Rear Hub Castle Nut	80 ft. lbs. (108 Nm)

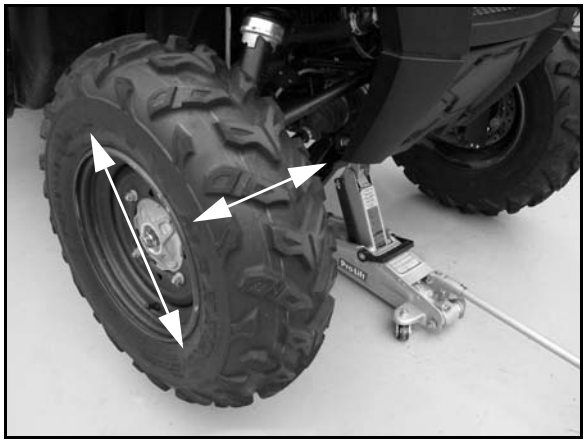
FRONT BEARING CARRIER

Bearing Carrier Inspection / Removal

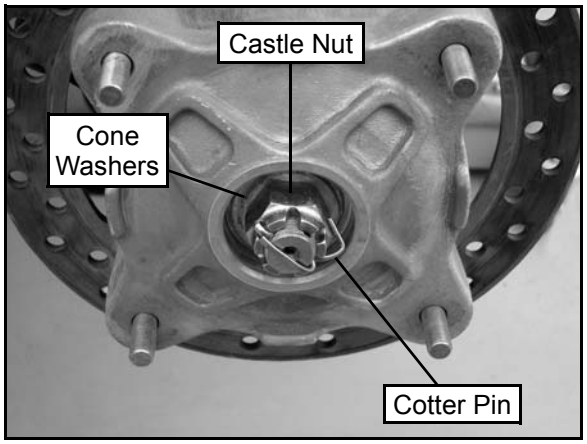
1. Elevate front of vehicle and safely support machine under the frame area.

> **⚠ 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 bearings and seals.

2. Check bearings for side play by grasping the top and bottom of the tire firmly and checking for movement. The tire should rotate smoothly without binding or rough spots.



3. Remove the (4) wheel nuts and remove the front wheel.
4. Remove the cotter pin and loosen the front wheel hub castle nut. Remove the nut, and (2) cone washers from the front wheel hub assembly.



5. Remove the fastener retaining the steering tie rod end to the front bearing carrier.

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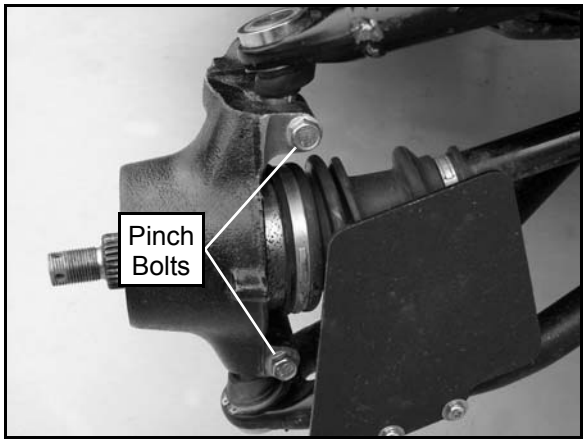
6. Remove the two front brake caliper mounting bolts and remove the caliper from the brake disc (see Chapter 9).
   CAUTION: Do not hang the caliper by the brake line. Use wire to hang caliper to prevent damage to the brake line.

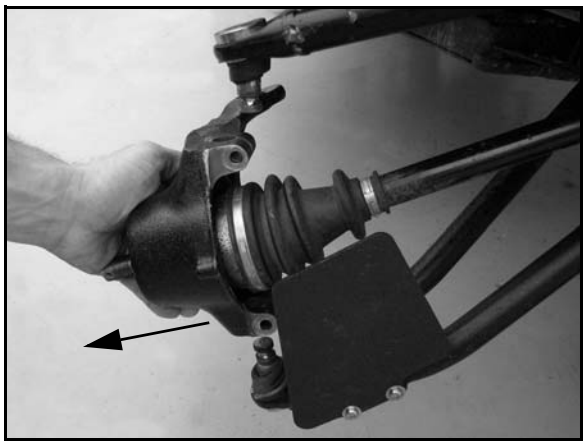
7. Remove the front wheel hub assembly.

8. Remove the upper and lower ball joint pinch bolts.



9. Using a soft faced hammer, lightly tap on the bearing carrier while removing the upper and lower ball joint ends.

10. Remove the bearing carrier from the front drive shaft.



11. Rotate bearing by hand and check for smooth rotation. Visually inspect bearing for moisture, dirt, or corrosion.

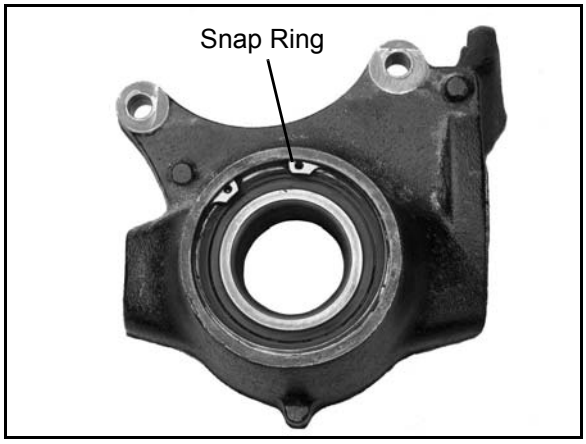
12. Replace bearing if moisture, dirt, corrosion, or roughness is evident.

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.

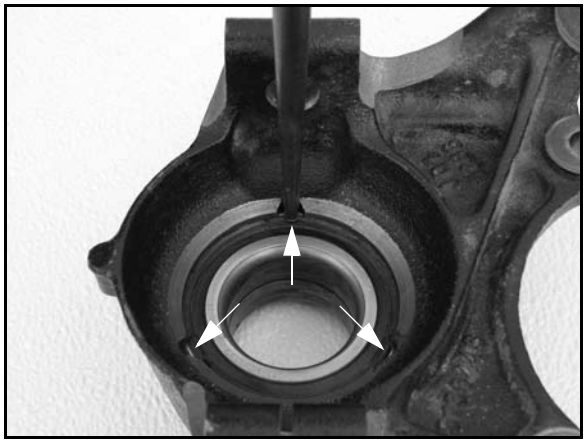
Bearing Replacement

Bearing Removal

1. Remove the outer snap ring.



2. From the back side of the bearing carrier, tap on the outer bearing race with a drift punch in the reliefs as shown.



3. 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.

4. Inspect the bearing carrier housing for scratches, wear or damage. Replace front bearing carrier if damaged.

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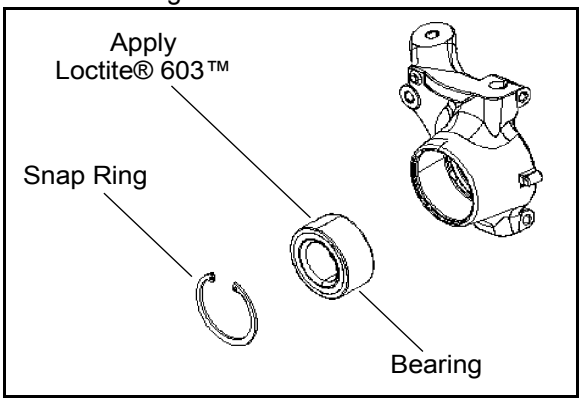
Bearing Installation

5. Thoroughly clean the front bearing carrier housing and the outer race on the new bearing. Be sure that all oil residue has been removed from each surface.
6. Support the bottom of the bearing carrier housing.

> **⚠ CAUTION**
>
> Use an arbor and press only on the outer race, otherwise bearing damage may occur.

7. Apply **Loctite® 603™** retaining compound to the outer circumference of the new bearing race and carefully press the new bearing into the bearing carrier housing.

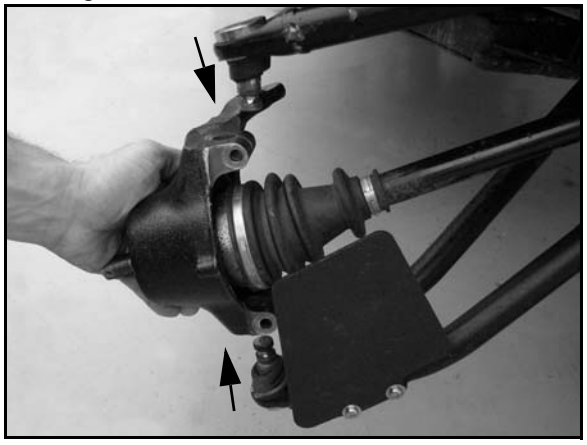


NOTE: Use care to not allow any of the Loctite® compound to get in the bearing.

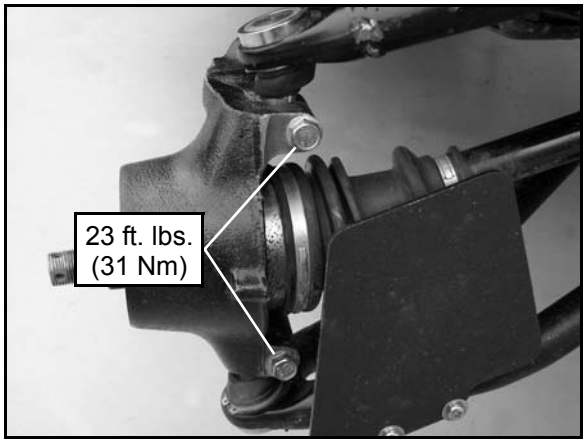
8. Wipe the housing clean of any excess compound and install the snap ring.

Bearing Carrier Installation

1. Install drive shaft axle through the backside of the bearing carrier.
2. Install the upper and lower ball joint ends into the front bearing carrier.



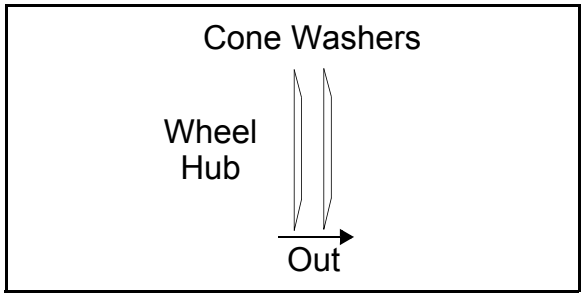
3. Install pinch bolts and torque to specification.



= T
Ball Joint Pinch Bolts: **23 ft. lbs. (31 Nm)**

4. Apply grease to drive shaft axle splines.

5. Install front wheel hub assembly, cone washers, and hand tighten the castle nut. Install washers with domed side out.



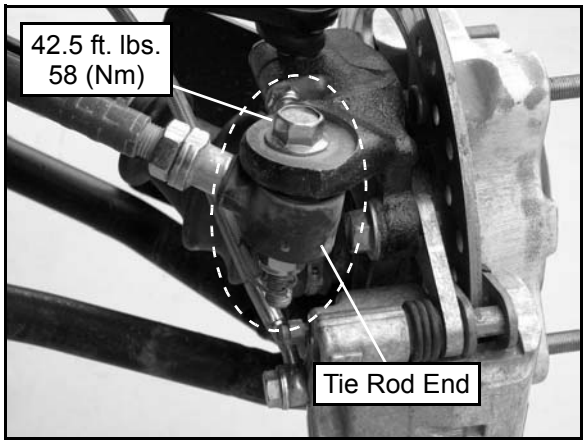
6. Install brake caliper mounting bolts and torque to specification.

= T
Front Caliper Mounting Bolts: **31-34 ft. lbs. (42-46 Nm)**

CAUTION
New bolts have a pre-applied locking agent which is destroyed upon removal. Always use new brake caliper mounting bolts upon assembly.

7. Install the steering tie rod end onto the front bearing carrier.

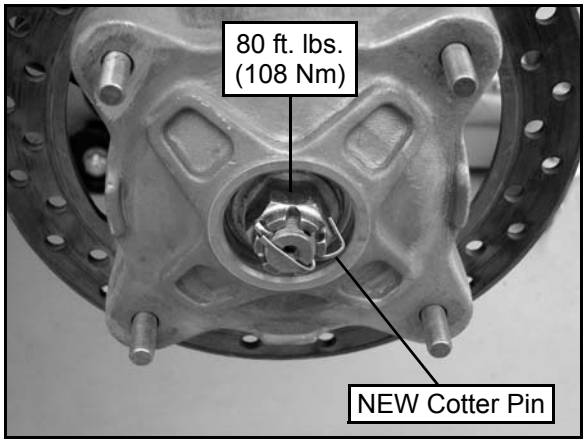
NOTE: Refer to the photos below to ensure proper placement of the tie rod end.



8. Torque the tie rod end fastener to specification and install a **new** cotter pin.

= T
Tie Rod End Fastener: **42.5 ft. lbs. (58 Nm)**

9. Torque wheel hub nut to specification and install a **new** cotter pin. Tighten nut slightly if necessary to align cotter pin holes.



= T
Wheel Hub Castle Nut: 80 ft. lbs. (108 Nm)

10. Install wheel and (4) wheel nuts. Torque wheel nuts to specification.

= T
Wheel Nuts: **Steel Wheels: 27 ft. lbs. (37 Nm)** **Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)**

11. Rotate wheel and check for smooth operation. Bend both ends of cotter pin around end of spindle in different directions.

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FRONT DRIVE SHAFT

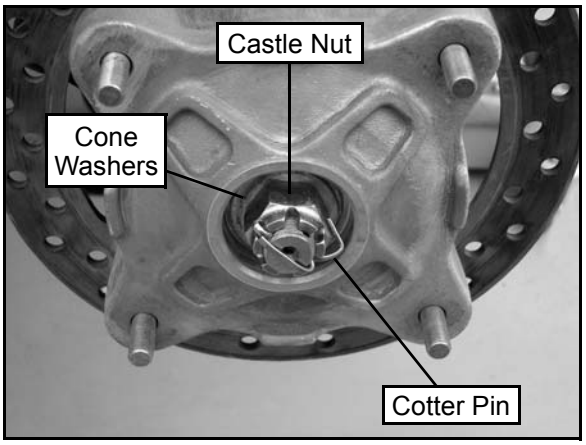
Drive Shaft Removal

1. Elevate front of vehicle and safely support machine under the 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 bearings and seals.

2. Remove the (4) wheel nuts and remove the front wheel.

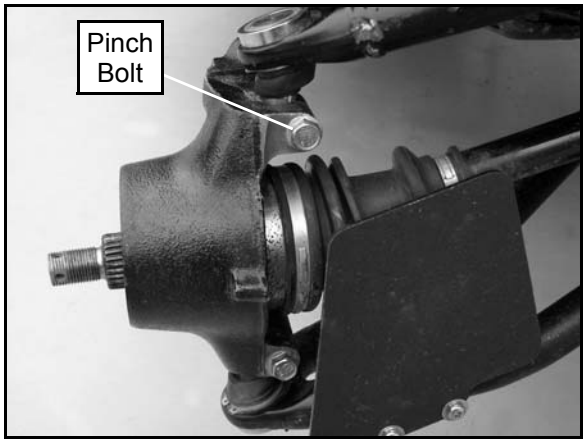
3. Remove the cotter pin and loosen the front wheel hub castle nut. Remove the nut, and (2) cone washers from the front wheel hub assembly.



4. Remove the two front brake caliper mounting bolts and remove the caliper from the brake disc (see Chapter 9).
   CAUTION: Do not hang the caliper by the brake line. Use wire to hang caliper to prevent damage to the brake line.

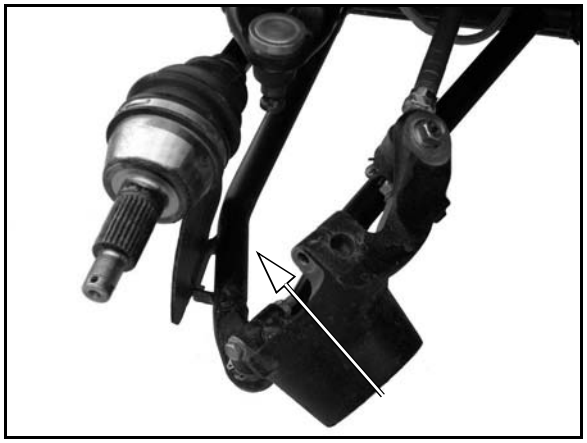
5. Remove the front wheel hub assembly.

6. Remove the upper ball joint pinch bolt.



7. Using a soft faced hammer, lightly tap on the bearing carrier while removing the upper ball joint end.

8. Remove the drive shaft from the front bearing carrier.



9. With a short, sharp jerk, remove drive shaft from the front gearcase.

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Drive Shaft / CV Joint Handling Tips

Care should be exercised during drive shaft removal or when servicing CV joints. Drive shaft components are precision parts.

Cleanliness and following these instructions is very important to ensure proper shaft function and a normal service life.

- The complete drive shaft and joint should be handled by getting hold of the interconnecting shaft to avoid disassembly or potential damage to the drive shaft 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 drive shaft 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.

Outer CV Joint / Boot Replacement

NOTE: Refer the "Electronic Parts Catalog" for the required parts to service the drive shaft. Some drive shafts have "Boot Replacement Kits" that include a new boot, clamps, and the required amount of grease.

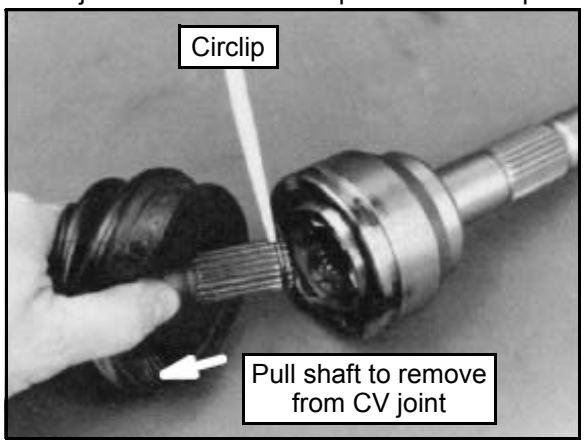
1. Remove clamps from rubber boot using the proper boot clamp pliers.

CV Boot Clamp Pliers:
Earless Type - 8700226

2. Remove the large end of the boot from the CV joint and slide the boot back.
3. Use a soft-faced hammer or brass drift to separate the outer CV joint from the drive shaft.

NOTE: If using a brass drift, be sure to tap on the inner race of the joint only.

4. Make sure the circlip remains on the shaft and not left in the joint. Discard the circlip as it will be replaced.



5. Remove the small clamp and boot from the drive shaft.

IMPORTANT: If the grease in the joint is obviously contaminated with water and/or dirt, the joint should be replaced.

6. Thoroughly clean the joint with an appropriate solvent and dry the joint to prevent any residual solvent from being left in the joint upon reassembly.
7. Visually inspect the joint bytilting the inner race to one side to expose each ball. Severe pitting, galling, play between the ball and its cage window, any cracking or damage to the cage, pitting or galling or chips in raceways call for joint replacement.

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8. Apply a light coat of grease to the end of the drive shaft and slide the new clamp and boot (small end first) over the shaft and position the boot in its groove machined in the shaft.

9. Install a NEW circlip on the end of the shaft.

10. Grease the joint with the special CV joint grease provided in the boot replacement kit. Fill the cavity behind the balls and the splined hole in the joint's inner race. Pack the ball tracks and outer face flush with grease. Place any remaining grease into the boot. Install small boot clamp.

NOTE: It is very important to use the correct type and quantity of grease by using the grease contained in the boot kit. DO NOT use a substitute grease and DO NOT overfill or under fill the CV joint.

Boot Replacement Grease Requirement:

Grease Service Kit
1350047 (50g)

Outer CV Joint Capacity: 80g

11. Slide the joint onto the drive shaft splines and align the circlip with the lead-in chamfer on the inner race.

12. Use a soft-faced hammer to tap the CV joint into the splines of the axle. Pull on the joint to ensure it's securely installed.

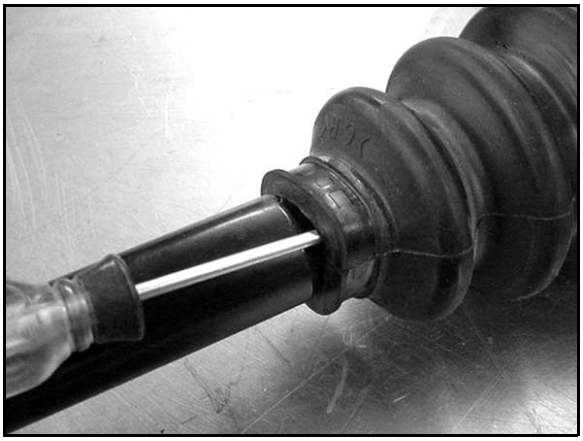
13. Add the remaining grease through large end of boot.

14. Pull the boot over the joint and position the boot lips into the grooves on the joint housing and shaft. Make sure the boot is not dimpled or collapsed.

15. Install and secure the CV boot with the large clamp using the "earless" clamp pliers.

CV Boot Clamp Pliers
Earless Type: 8700226

16. While pulling out on the CV shaft, 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 shaft.



17. Install and secure the small clamp on the boot using the "earless" clamp pliers.

CV Boot Clamp Pliers
Earless Type: 8700226

Inner Plunging Joint / Boot Replacement

1. Remove the front drive shaft from the vehicle (see "FRONT DRIVE SHAFT - Removal").
2. Remove and discard the boot clamps.

CV Boot Clamp Pliers
Earless Type: 8700226

3. Remove the large end of the boot from the plunging joint and slide the boot back.
4. Use a soft-faced hammer or brass drift to separate the plunging joint from the drive shaft.

NOTE: If using a brass drift, be sure to tap on the inner race of the joint only.

5. Make sure the circlip remains on the shaft and not left in the joint. Discard the circlip.
6. Remove the boot from the drive shaft.

⚠ CAUTION

Complete disassembly of the plunging joint is NOT recommended. The internal components are a precision fit and develop their own characteristic wear patterns. Intermixing the internal components could result in looseness, binding, and/or premature failure of the joint.

IMPORTANT: If the grease in the joint is obviously contaminated with water and/or dirt, the joint should be replaced.

7. Thoroughly clean the joint with an appropriate solvent and dry the joint to prevent any residual solvent from being left in the joint upon reassembly.
8. Visually inspect the joint bytilting the inner race toone side to expose each ball. Severe pitting, galling, play between the ball and its cage window, any cracking or damage to the cage, pitting or galling or chips in raceways call for joint replacement.
9. Clean the splines on the end of the shaft and apply a light coat of grease prior to reassembly.
10. Slide the small boot clamp and boot (small end first) onto the drive shaft and position the boot in it's groove machined in the shaft.
11. Install a NEW circlip on the end of the shaft.
12. Grease the joint with the special joint grease provided in the boot replacement kit. Fill the cavity behind the balls and the splined hole in the joint's inner race. Pack the ball tracks and outer face flush with grease. Place any remaining grease into the boot.

⚠ CAUTION

The grease provided in the replacement kit is specially formulated for wear resistance and durability. DO NOT use substitutes or mix with other lubricants.

NOTE: The amount of grease that's provided is pre-measured, so use all the grease.

Boot Replacement Grease Requirement:

Grease Service Kit
1350047 (50g)

Inner Plunging Joint Capacity: 80g

13. Fully compress the joint and push the drive shaft firmly into the inner race.
14. Align the circlip with the lead-in chamfer.
15. Use a soft-faced hammer to tap the joint onto the drive shaft until it locks into place.
16. Pull on the joint to make sure it is securely locked into place.
17. Remove excess grease from the plunging joint's external surfaces and place the excess grease in the boot.
18. Pull the boot over the joint and position the boot lips into the grooves on the joint housing and shaft. Make sure the boot is not dimpled or collapsed.
19. Install and secure the small clamp on the boot using the "earless" clamp pliers.

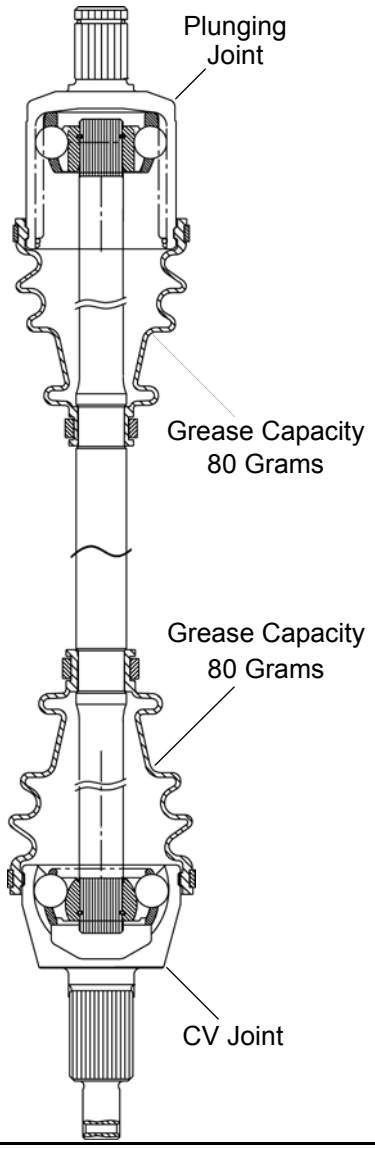
CV Boot Clamp Pliers
Earless Type: 8700226

20. Pull out on the drive shaft to center the joint in the housing. Slide a straight O-ring pick or a small slotted screw driver between the large end of the boot and the joint housing and lift up to equalize the air pressure in the boot.

21. Position the boot lip in its groove. Install and secure the boot with the large clamp using the "earless" clamp pliers.

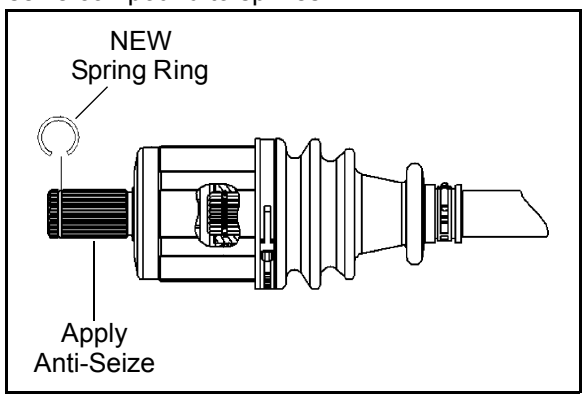
CV Boot Clamp Pliers
Earless Type: 8700226

FRONT DRIVE SHAFT



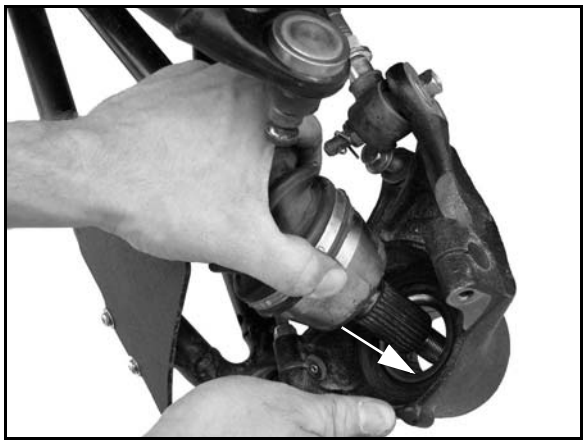
Drive Shaft Installation

1. Install new spring ring on drive shaft. Apply an anti-seize compound to splines.



2. Align splines of drive shaft with front gearcase and reinstall the drive shaft. Use a rubber mallet to tap on the outboard end of the drive shaft if necessary

3. Install drive shaft into the front bearing carrier.



4. Install the upper ball joint end into the front bearing carrier.

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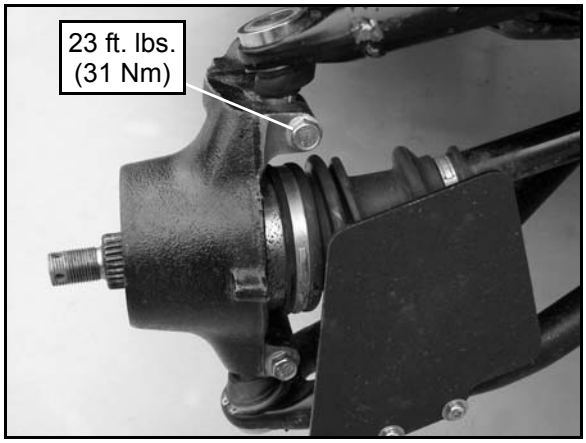
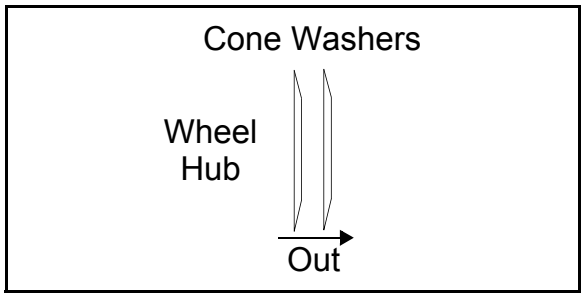
5. Install the upper pinch bolt and torque to specification.



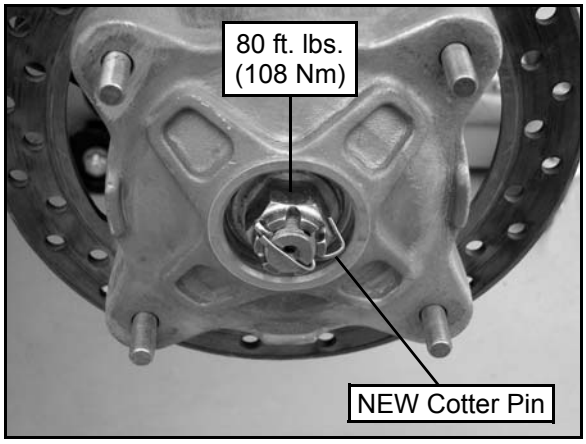
= T
Ball Joint Pinch Bolts: **23 ft. lbs. (31 Nm)**

6. Apply grease to drive shaft axle splines.

7. Install front wheel hub assembly, cone washers, and hand tighten the castle nut. Install washers with domed side out.



8. Torque wheel hub nut to specification and install a ***new*** cotter pin. Tighten nut slightly if necessary to align cotter pin holes.



= T
Wheel Hub Castle Nut: **80 ft. lbs. (108 Nm)**

9. Install brake caliper mounting bolts and torque to specification.

= T
Front Caliper Mounting Bolts: **31-34 ft. lbs. (42-46 Nm)**

CAUTION
New bolts have a pre-applied locking agent which is destroyed upon removal. Always use new brake caliper mounting bolts upon assembly.

10. Install wheel and (4) wheel nuts. Torque wheel nuts to specification.

= T
Wheel Nuts: **Steel Wheels: 27 ft. lbs. (37 Nm)** **Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)**

11. Rotate wheel and check for smooth operation. Bend both ends of cotter pin around end of spindle in different directions.

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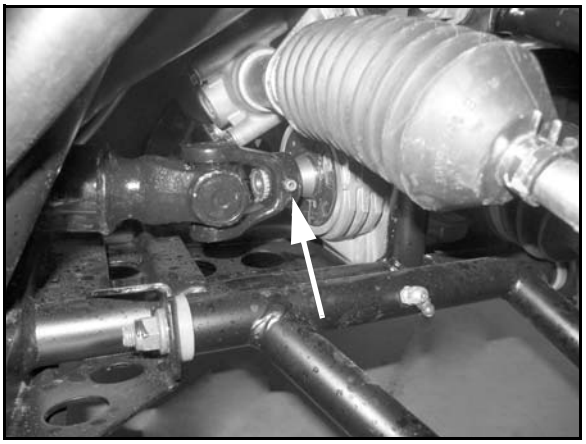
PROPSHAFT SERVICE

Removal / Installation

1. Remove both seats and the engine service panel as outlined in Chapter 5.
2. Disconnect the negative (-) battery cable.
3. Raise and support vehicle and remove the left-hand rear wheel.

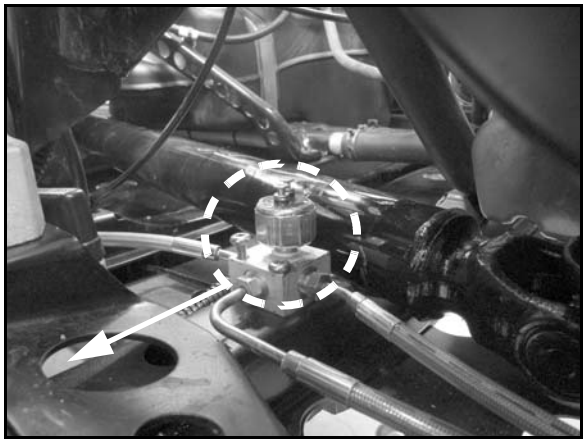
> **⚠ CAUTION**
>
> Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure. Wear eye protection when removing bearings and seals.

4. From the right-hand front wheel well, locate the propshaft roll pin. Use the Roll Pin Removal Tool (PN 2872608) to remove the roll pin from the front gearcase.

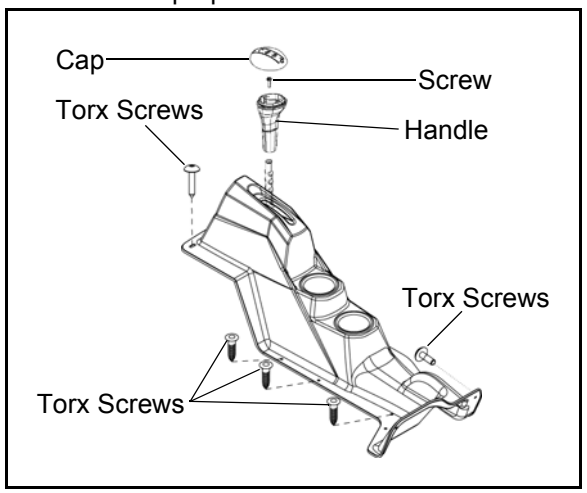


Roll Pin Removal Tool (PN 2872608)

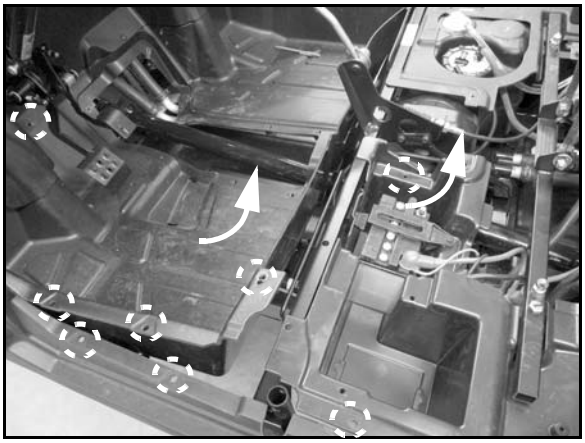
5. Remove the outer clutch cover, drive belt and drive clutch as outlined in Chapter 6.
6. Disconnect the harness connector at the brake switch. Remove the (2) screws securing the brake line junction block and move the junction block towards the left-hand frame rail.



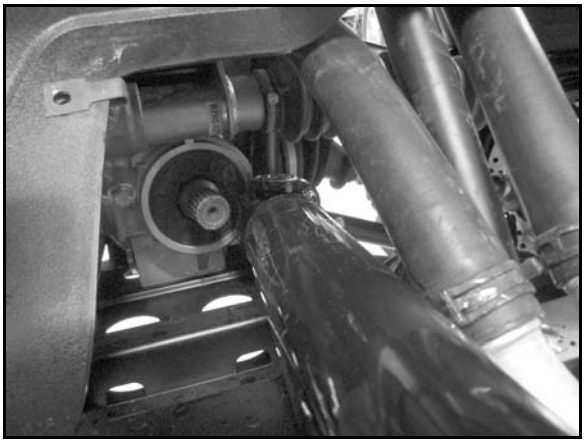
7. Remove the gear selector cap and remove the retaining screw and handle.
8. Remove the Torx screws retaining the center console to access the propshaft.



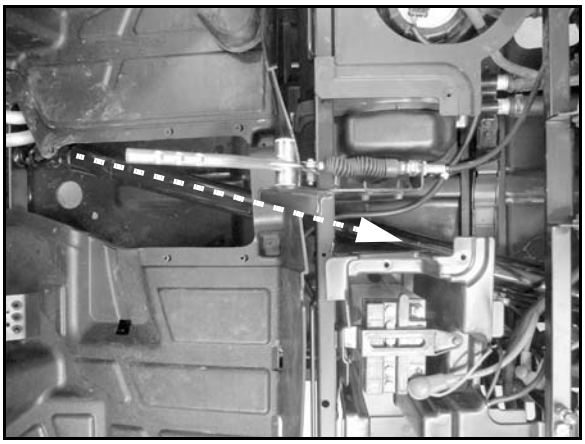
9. Remove the T-27 Torx screws and the push pins securing the driver's side floor, left-hand rocker panel and the rear left-hand panel divider as outlined in Chapter 5.
10. Gently lift and support floor and panel divider upward in order to allow the prop shaft to pass beneath them.



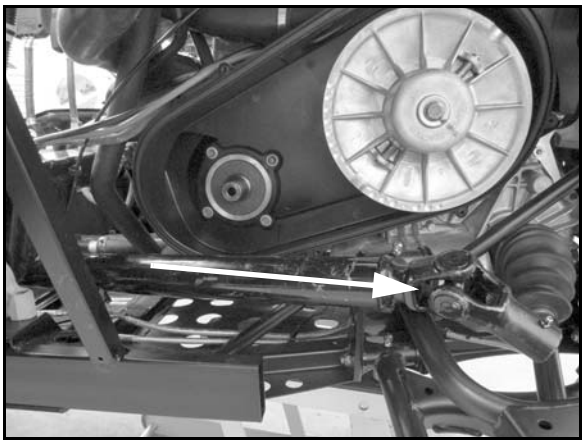
11. Slide prop shaft back far enough to remove it from the front gearcase input shaft splines.
12. Pull sharply forward to remove the propshaft from transmission shaft.
13. Position prop shaft to the right-hand side of the front gearcase as shown.



14. Maneuver the rear of the propshaft towards the left-hand side of the vehicle under the drivers side floor and rear left-hand panel divider in the battery area. Note angle of propshaft below.



15. Remove the propshaft from the left-hand rear wheel well area.



16. Reverse removal steps to reinstall propshaft. Use a NEW Roll Pin (Spring Pin) upon reassembly. Torque all fasteners to specification.

= T
Wheel Nuts: **Steel Wheels: 27 ft. lbs. (37 Nm)** **Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)** Drive Clutch Retaining Bolt: **47 ft. lbs (63.5 Nm)** Outer Clutch Cover Screws: **50 in. lbs. (5 Nm)** Brake Line Junction Block Mounting Screws: **36 in. lbs. (4 Nm)**

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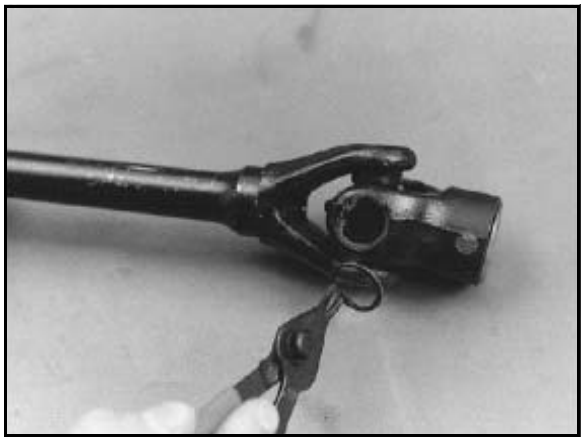
PROPSHAFT U-JOINT SERVICE

Disassembly

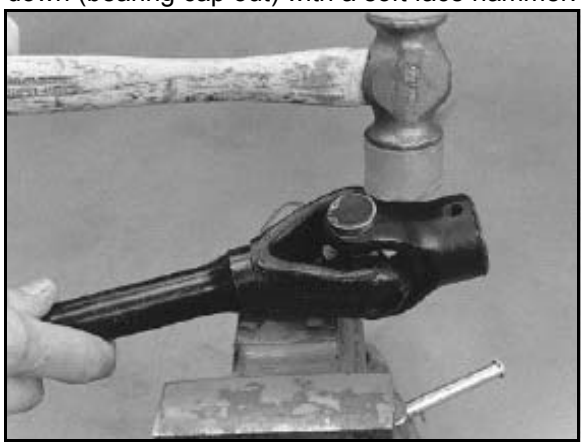
1. Remove internal or external snap ring from bearing caps.

⚠ CAUTION
Always wear eye protection.



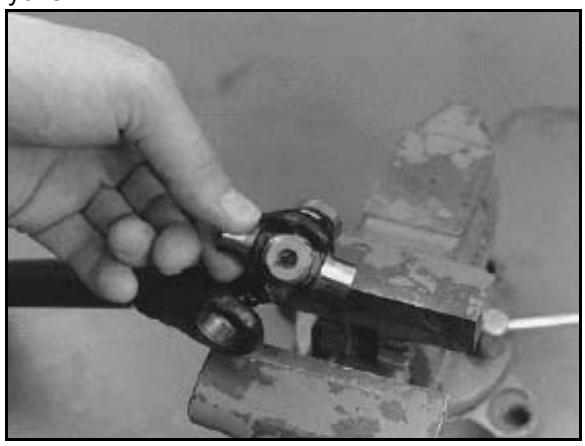
NOTE: If yoke or bearing is removed, cross bearing must be replaced. Note orientation of grease fitting and mark inner and outer yoke for correct re-positioning during installation.

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 caps.

4. Force U-joint cross to one side and lift out of inner yoke.



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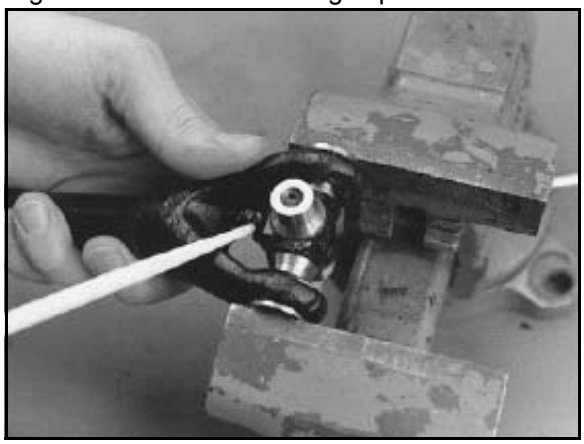
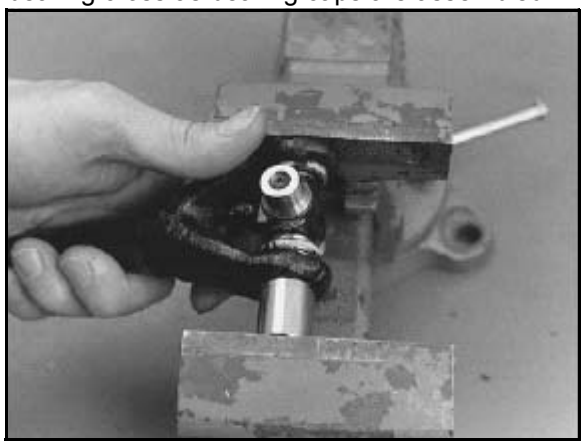
Assembly

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.

2. Tighten vise to force bearing caps in.



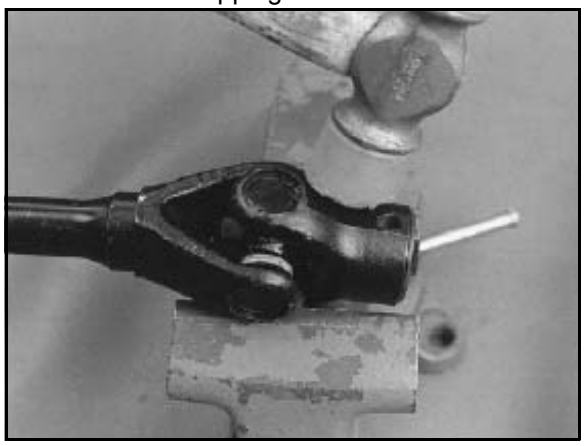
3. Using a suitable arbor, fully seat the bearing cap in one side. Continually check for free movement of bearing cross as bearing caps are assembled.



4. Install snap ring to contain bearing cap just installed. Repeat procedure for other side.

5. Install outer yoke, aligning marks made at disassembly and repeat Steps 1-3 to install bearing caps on outer yoke.

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.

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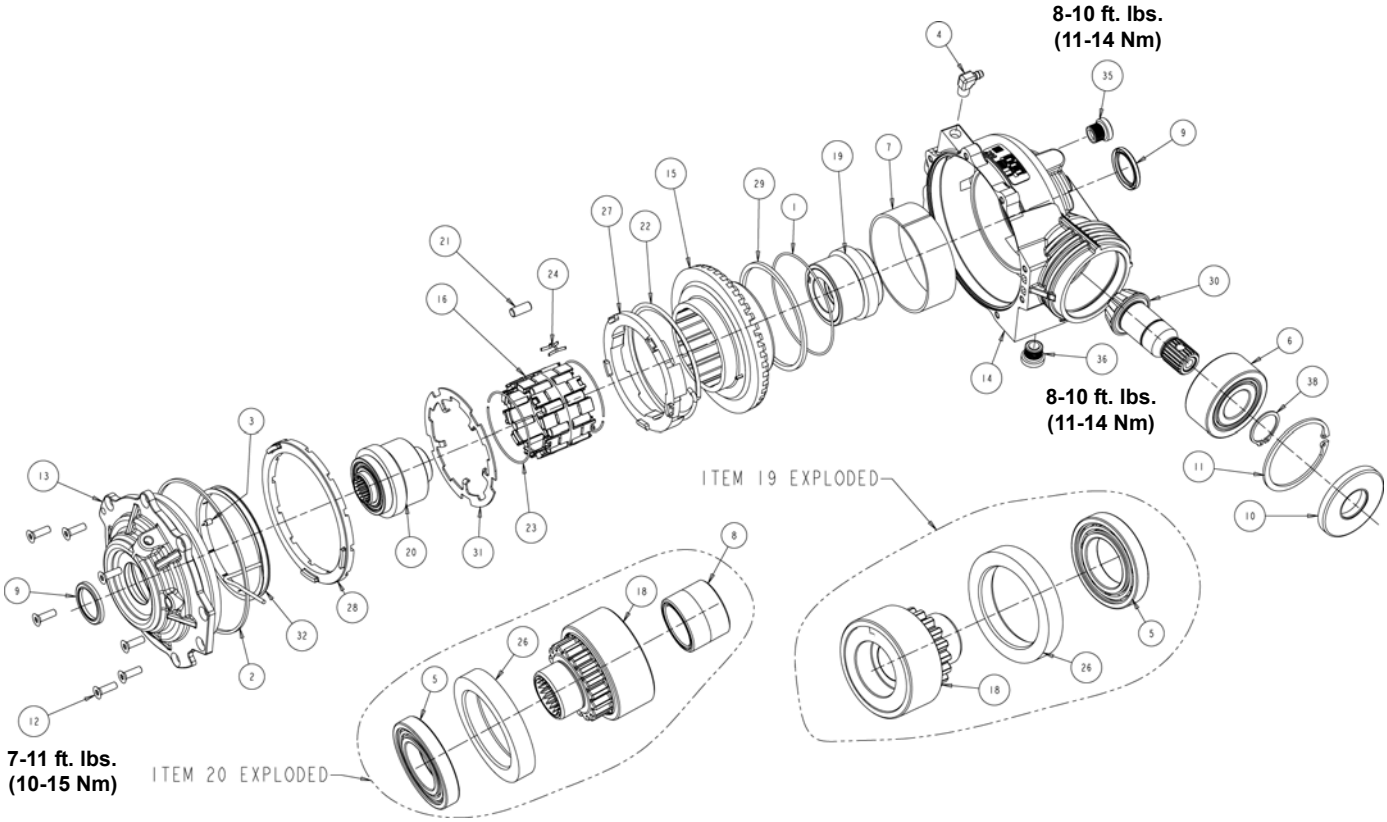
FRONT GEARCASE / CENTRALIZED HILLIARD

Centralized Hilliard Exploded View



REF#	DESCRIPTION	QTY	REF#	DESCRIPTION	QTY
1	O-Ring	1	19	Hub Sub-Assembly (Female)	1
2	O-Ring	1	20	Hub Sub-Assembly (Male)	1
3	Dowel Pin	1	21	Rollers	20
4	Vent Hose Fitting	1	22	Torsion Spring	1
5	Ball Bearing	2	23	Spring, Wireform	2
6	Ball Bearing (Double Row)	1	24	H-Clip Spring	20
7	Bushing	1	26	Nylon Spacer	2
8	Bushing	1	27	Torsion Spring Retainer	1
9	Oil Seal	2	28	Backlash Spacer	1
10	Oil Seal	1	29	Ring Gear Spacer	1
11	Retaining Ring, Internal	1	30	Pinion Gear	1
12	Cover Screws, M6 (T30 Torx)	7	31	Armature Plate	1
13	Cover Plate Assembly	1	32	AWD Coil	1
14	Gearcase Housing	1	35	Fill Plug	1
15	Clutch Housing (Ring Gear)	1	36	Drain Plug, Magnetic	1
16	Roll Cage	1	38	Retaining Ring, External	1
18	Hub / Race Assembly	2			

All Wheel Drive Operation

The AWD switch may be turned on or off while the vehicle is moving, however, AWD will not enable until the engine RPM drops below 3100. Once the AWD is enabled, it remains enabled until the switch is turned off.

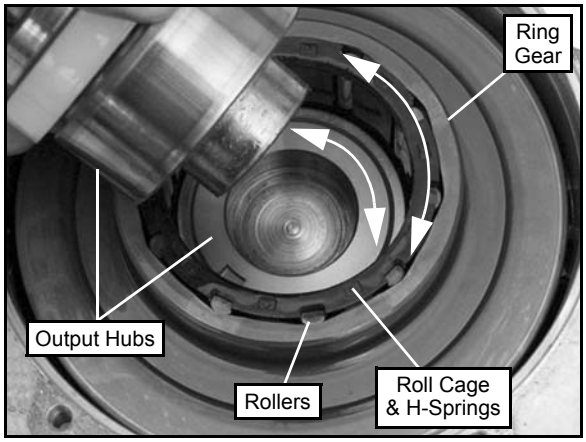
Engage the AWD switch before getting into conditions where the front wheel drive may be needed. If the rear wheels are spinning, release the throttle before switching to AWD.

> **⚠ 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 through the rear wheels only (2 wheel drive). When the AWD is enabled, the front drive acts as an on-demand AWD system. This means, the front drive will engage once the rear wheels have lost traction, and will remain engaged until the torque requirement goes away (i.e. rear wheels regain traction).

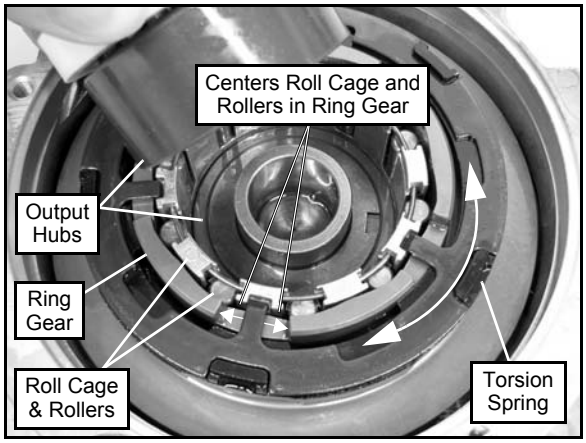
> **⚠ CAUTION**
>
> If the rear wheels are spinning, release the throttle before turning the AWD switch on. If AWD is engaged while the wheels are spinning, severe drive shaft and front gearcase damage could result.

AWD Engagement: When the AWD switch is activated, the AWD coil is powered by a 12 Vdc input which creates a magnetic field. This magnetic field attracts an armature plate that is keyed to the roll cage. When the ring gear and roll cage are spinning (vehicle is moving), the energized coil and armature plate will apply drag to the roll cage that indexes the rollers inside the ring gear to an engagement position. While in the engagement position, the front drive will be in an "over-running" condition (not engaged), until the rear wheels lose traction. Once the rear wheels begin to lose traction, the front drive will engage by coupling the output hubs to the ring gear via the rollers. The front drive will remain engaged until the torque requirement goes away (i.e. rear wheels regain traction).



AWD Disengagement: Once the rear wheels regain traction, the front wheels will return to the "over-running" condition. The vehicle is now back to rear wheel drive until the next loss of rear wheel traction occurs.

Torsion Spring Operation: The torsion spring acts as a return mechanism to help disengage the coupling of the output hubs and ring gear by creating an "over-running" condition for the rollers upon disengagement.



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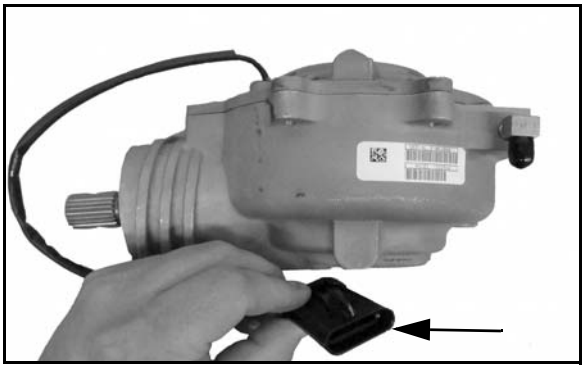
AWD Diagnosis

Symptom: AWD Will Not Engage

1. Check the gearcase coil resistance. To test the coil resistance, measure between the Grey and Brown/White wires. The measurement should be within specification.



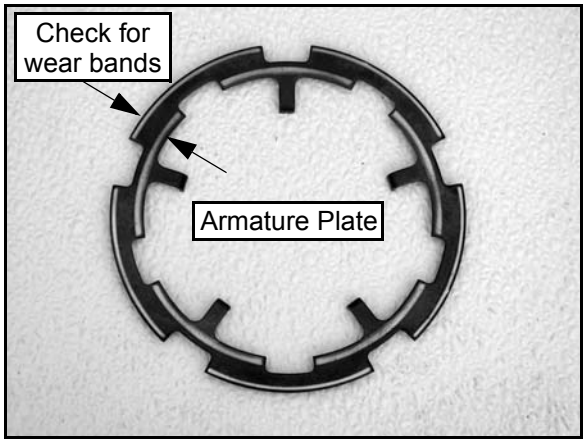
Front Gearcase Coil Resistance:

21.6 - 26.4 Ohms

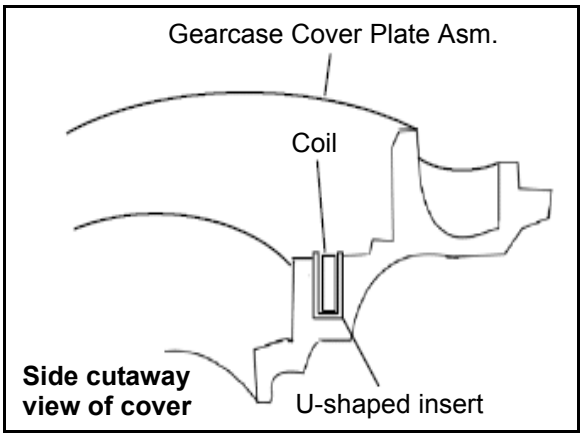
2. Turn the ignition and AWD switches on and place gear selector in High or Low gear. Check for minimum battery voltage at the Gray and Brown/White chassis wires that power the coil. A minimum of 11 Vdc should be present.

3. If electrical tests are within specification, remove gearcase (see "Gearcase Removal") and inspect components.

4. 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 5. A wear band with an interrupted wear mark may indicate a warped plate, which may cause intermittent operation. See the following illustrations:

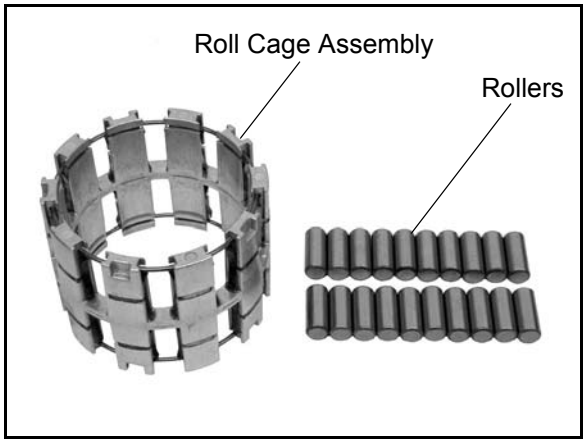


5. Check to make sure the coil is seated in the U-shaped insert that is pressed into the gearcase cover. The top of the coil should be seated below the U-shaped insert. The U-shaped insert controls the pole gap. If the top of the coil is above the surface of the U-shaped insert it raises the armature 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 found, replace the cover plate assembly.



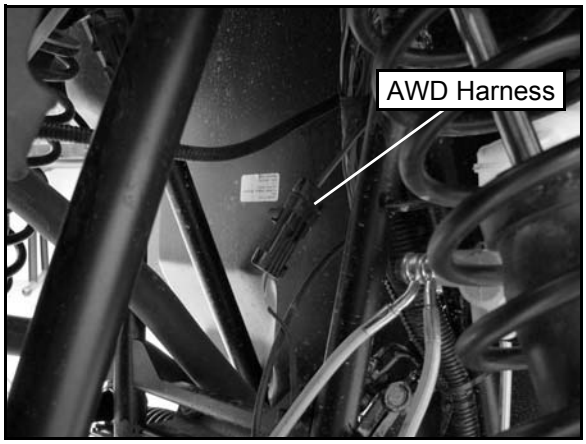
6. Inspect the rollers for nicks and scratches. The rollers must slide up, down, in and out freely within the roll cage sliding surfaces and H-springs.

7. Inspect the roll cage assembly for cracks or excessive wear. If damaged, replace the roll cage assembly.

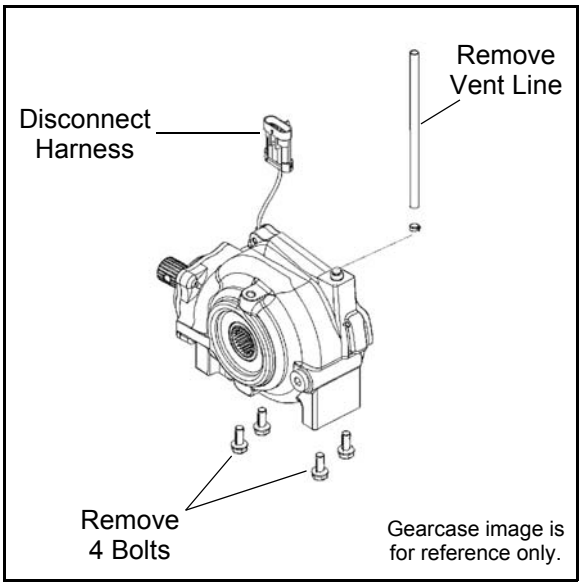


Gearcase Removal

1. Stop engine and place gear selector in Park.
2. Refer to “FRONT DRIVE SHAFT - Driv e Shaft Removal” and remove both front drive shafts from the front gearcase.
3. Remove the propshaft from the front gearcase. (see “PROPSHAFT SERVICE”).
4. Disconnect the wire harness above the front gearcase and remove the harness from the retaining dart.



5. Remove the vent line from the front gearcase.
6. Remove the (4) bolts securing the front gearcase to frame.



7. Remove the ge arcase from the front LH wheel well area and slide it between the upper and lower A-arm.

7

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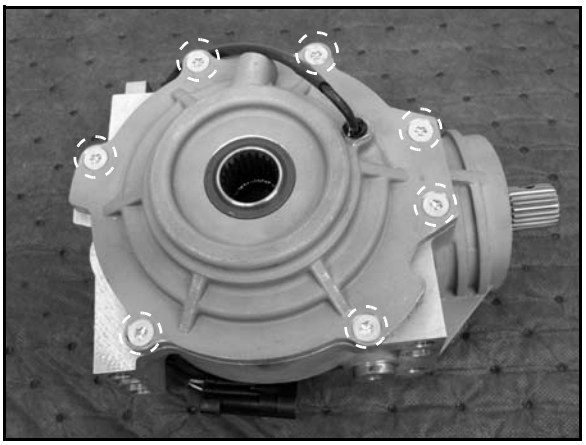
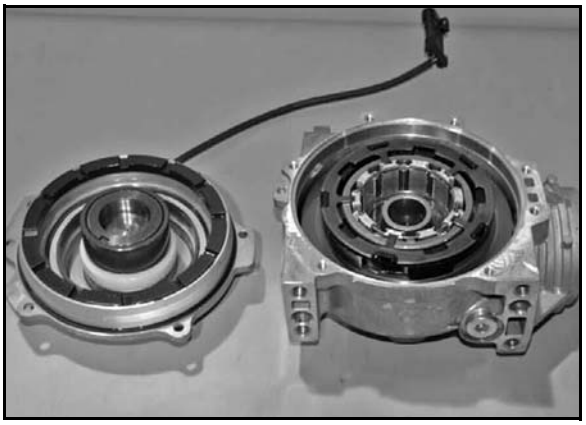
Gearcase Disassembly / Inspection

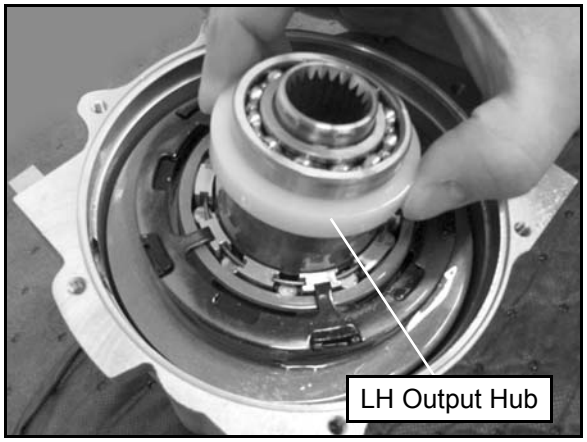
1. Drain and properly dispose of gearcase fluid. Remove any metal particles from the drain plug magnet.

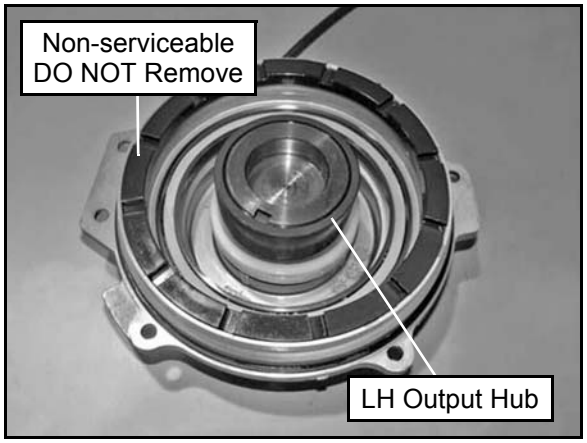
2. Remove the (7) cover screws and remove the cover plate assembly.





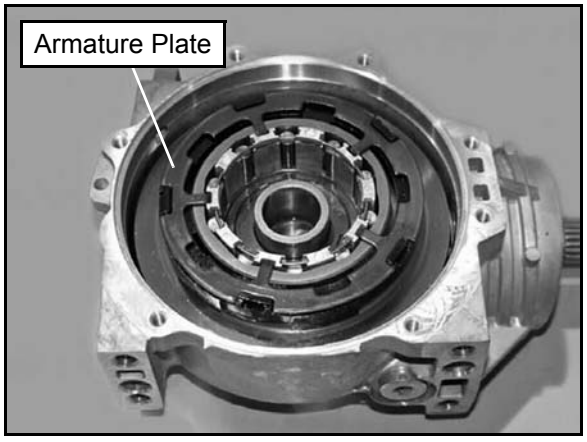
3. Remove the LH output hub assembly from the clutch housing or outer cover plate assembly.





NOTE: Nylon spacer is non-serviceable and should not be removed.

4. Remove and inspect the armature plate. Refer to “AWD Diagnosis” for detailed inspection process.



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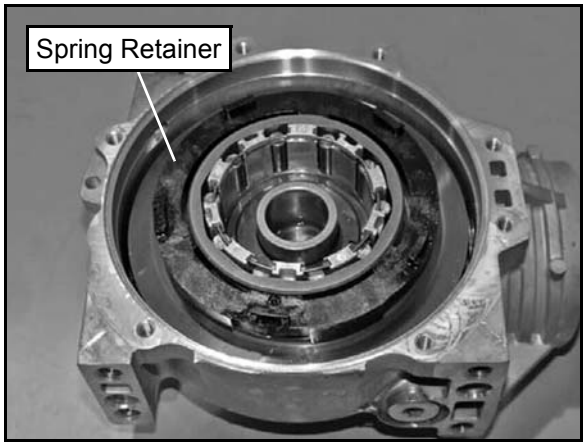
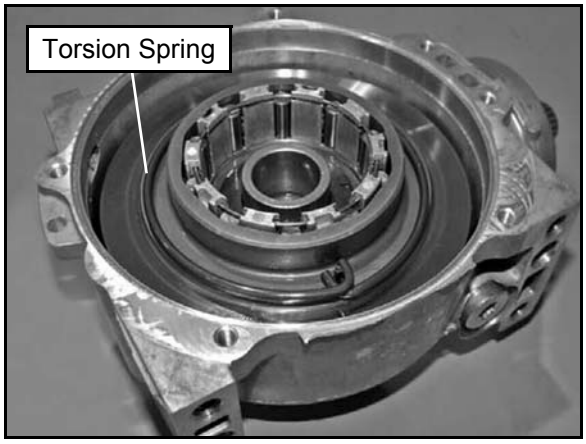
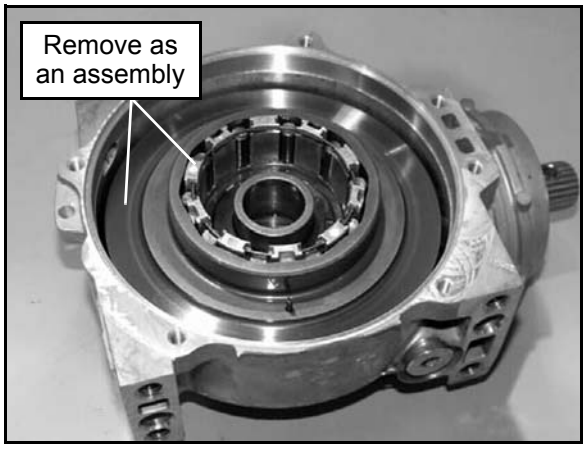
5. Remove the torsion spring retainer and torsion spring from the top of the ring gear.



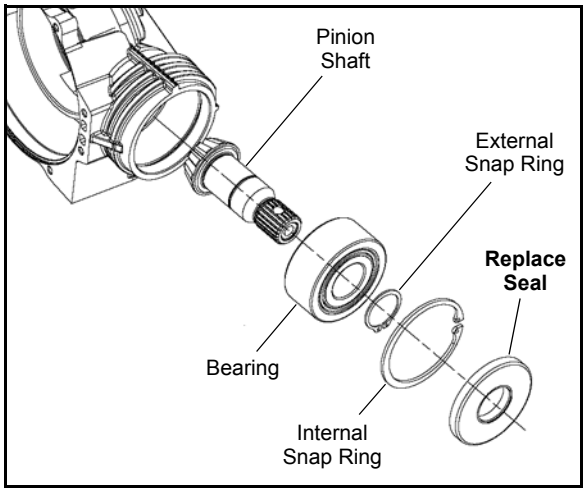


6. Remove the clutch housing / ring gear and roll cage assembly from the gearcase housing.

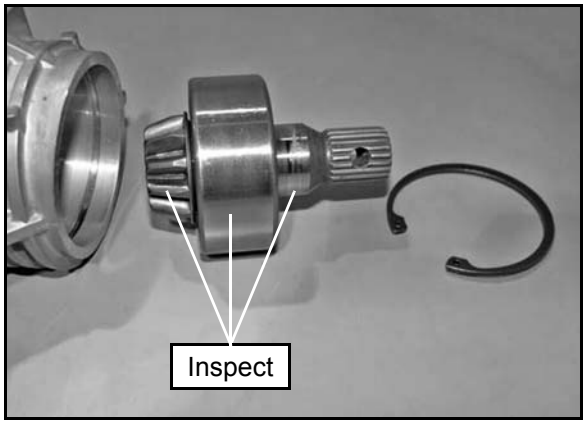


7. Remove the RH output hub assembly from the gearcase housing.

8. Remove pinion seal, internal retaining ring and pinion gear assembly from the gearcase housing. Inspect and clean the gearcase housing and replace all oil seals and O-rings.



9. Inspect the pinion gear for chipped, broken or missing teeth. Inspect the pinion bearing for signs of wear and the pinion shaft seal surface for pitting.



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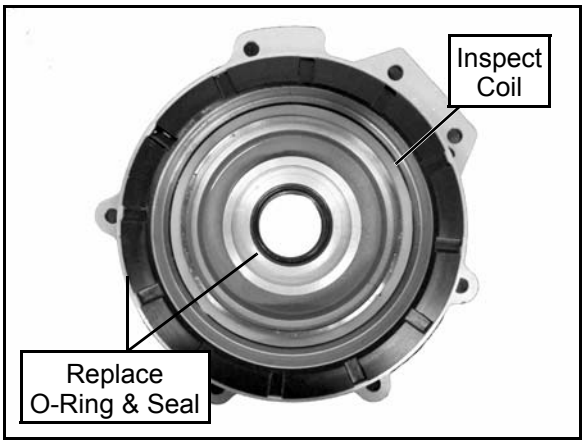
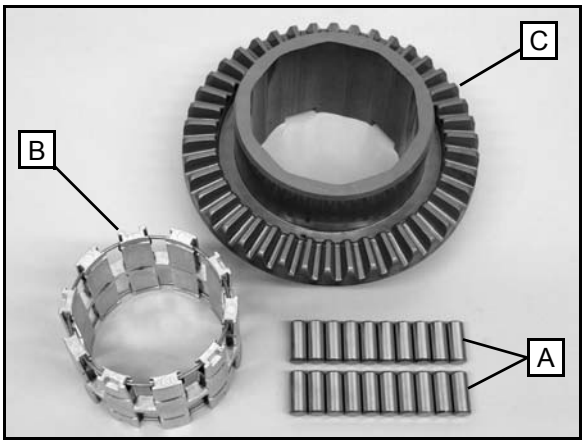
10. Inspect the AWD coil located in the outer cover plate assembly. Refer to “AWD Diagnosis” for detailed inspection process. Replace the cover plate seal and O-ring.



11. Remove the roll cage assembly and rollers from the clutch housing. Use a shop towel to cover the housing in order to retain all the rollers.

NOTE: Rollers are spring loaded. Take care not to allow them to fall out or lose them upon removal of the roll cage.

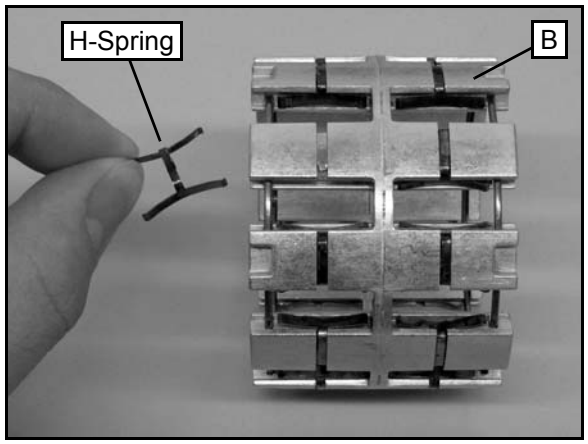
12. Thoroughly clean all parts and inspect the rollers (A) for nicks and scratches. The rollers must slide up and down and in and out freely within the roll cage (B) sliding surfaces and H-springs.



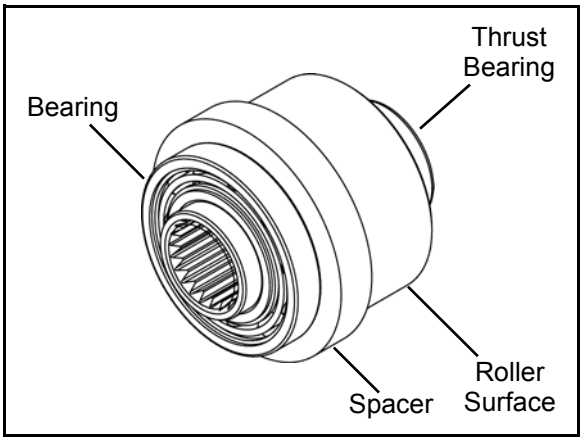
IMPORTANT: Refer to the “Electronic Parts Catalog” for individual part availability. Most parts are to be replaced as an assembly or as a complete kit.

13. Inspect clutch housing ring gear (C) for a consistent wear pattern. Inspect the ring gear for chipped, broken, or missing teeth.

14. Inspect the roll cage assembly (B) sliding surfaces and H-springs. The sliding surfaces must be clean and free of nicks, burrs or scratches. If damaged, replace the roll cage assembly.



15. Inspect both output hub assemblies. Inspect the bearings and replace if needed.



16. Clean and inspect all remaining front gearcase components. Check each for excessive wear or damage.

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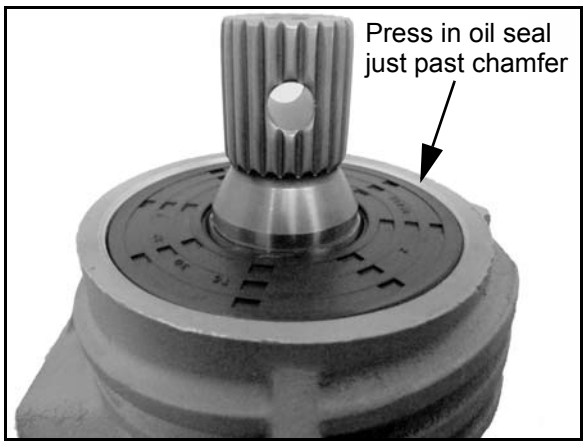
Gearcase Assembly

1. As mentioned during gearcase disassembly section, replace all O-rings, seals and worn components.

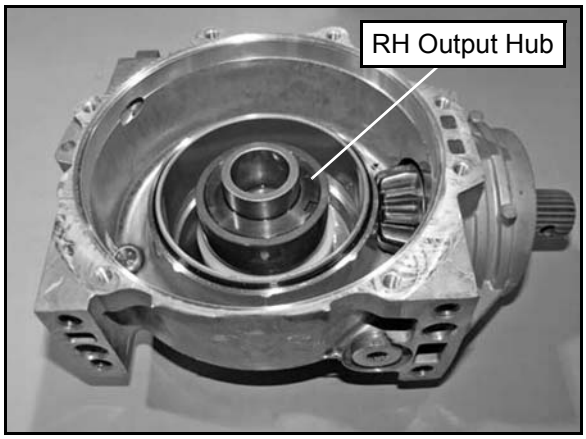
2. Install pinion shaft assembly and install internal snap ring.

NOTE: If bearing replacement was required, press new bearing onto the pinion shaft and install a new external snap ring.

3. Install a new pinion shaft seal into the pinion gear housing. Using a universal seal installer, press the new seal into the housing until the seal is just below the housing chamfer.

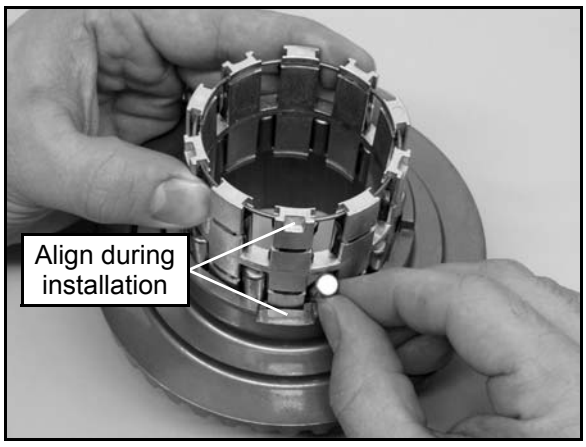


4. Install the RH output hub into the gearcase housing.

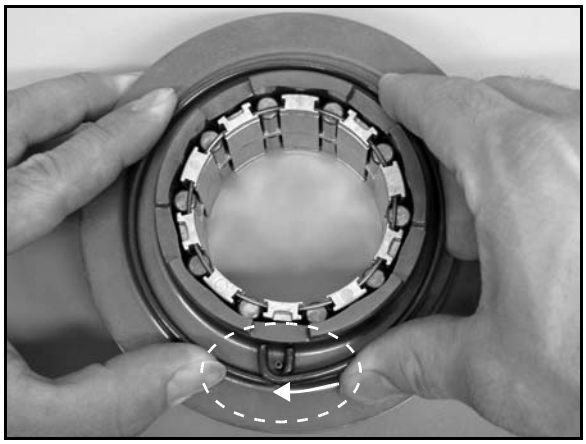


5. Carefully install the rollers into the roll cage assembly while installing the assembly into the clutch housing.

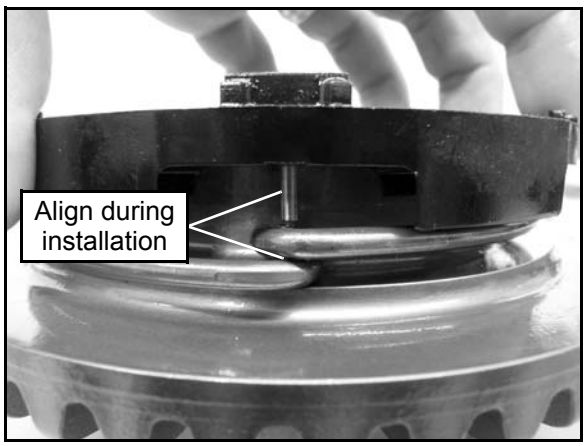
NOTE: Install the roll cage so that the ring gear grooves line up with the roll cage slots (see below).



6. Install the torsion spring by wrapping each leg of the spring around the dowel pin on the ring gear.



7. Align the spring retainer dowel pin with the ring gear dowel pin and install the retainer on top of the torsion spring.



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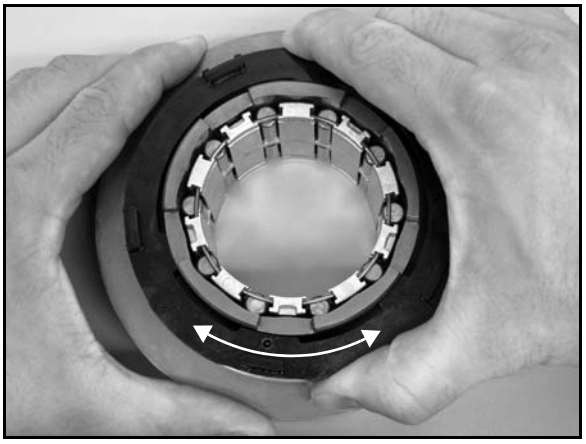
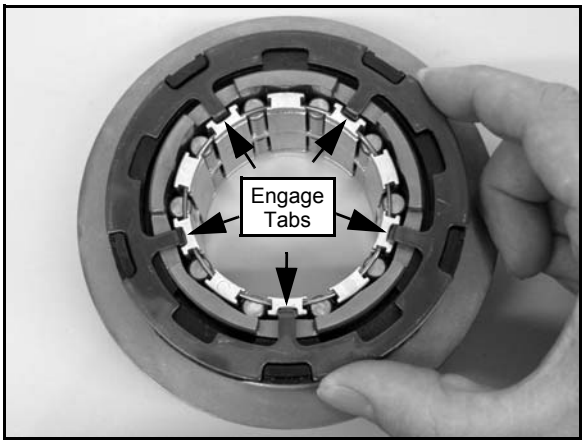
8. Check the action of the torsion spring by rotating in both directions to ensure the spring and retainer are installed properly.

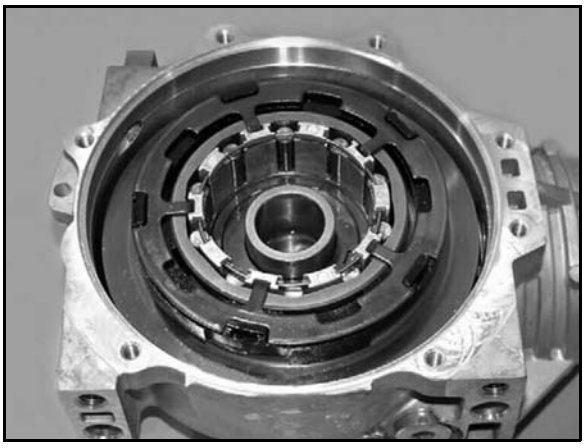


9. Be sure the armature plate tabs are fully engaged into the roll cage assembly and are resting on the cut-grooves of the ring gear.



NOTE: Verify armature plate tabs are in the slots on the roll cage and are resting in the ring gear grooves.

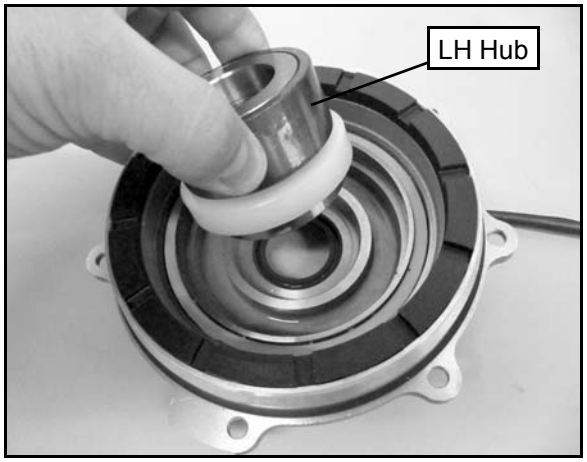
10. Carefully install the ring gear and roll cage assembly into the gearcase housing.



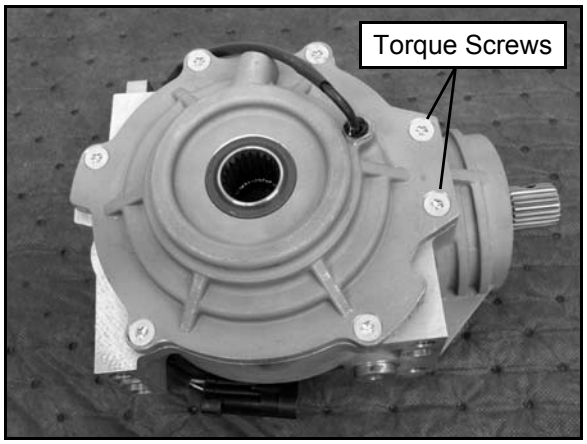
11. Install a new O-ring on the cover plate assembly.

NOTE: Be sure the square O-ring is placed flat on the cover surface. If the O-ring is twisted fluid leakage may occur.

12. Carefully install the LH output hub assembly into the cover plate. Take care not to damage the new cover plate seal while installing the output hub.



13. Install the output cover assembly onto the gearcase housing. Install the (7) cover plate screws and torque to specification.



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Cover Plate Screws: **7-11 ft. lbs. (10-15 Nm)**

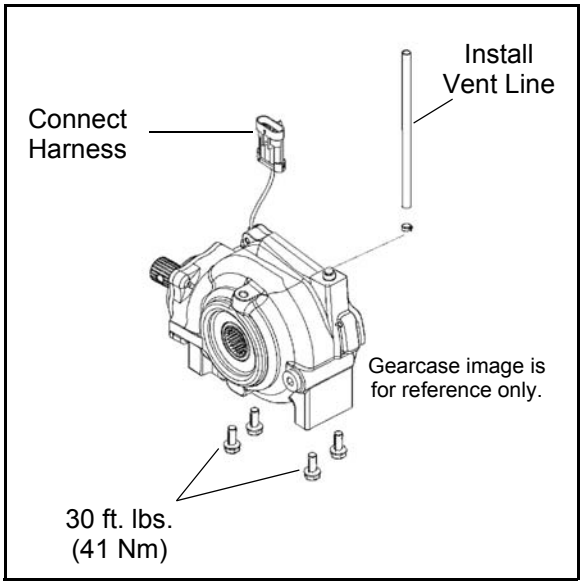
Gearcase Installation

1. Install the gearcase back into the vehicle through the left-hand wheel well area, between the upper and lower A-arms.

2. Install the propshaft onto the front gearcase input shaft. Use a NEW spring pin in the front propshaft.

3. Install the (4) bolts that secure the front gearcase to the frame and torque to **30 ft. lbs. (41 Nm)**.

4. Install the vent line.



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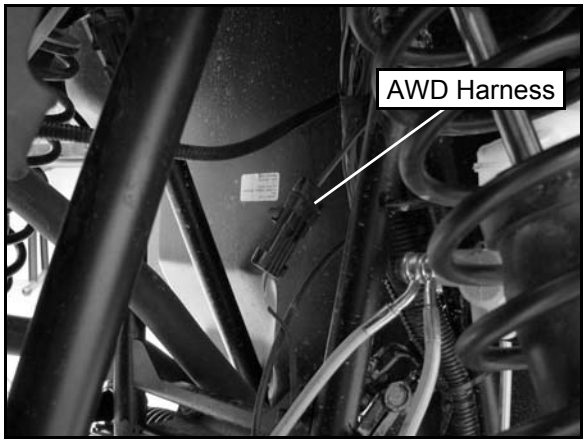
Front Gearcase Mounting Bolts: **30 ft. lbs. (41 Nm)**

5. Connect the AWD wire harness.



6. Refer to "FRONT DRIVE SHAFT - Drive Shaft Installation" and install both front drive shafts into the gearcase.

7. Add the proper lubricant to the front gearcase. Refer to Chapter 2 for fluid fill and change information.

Polaris Demand Drive Plus (PN 2877922)
Front Housing Capacity 6.75 fl. oz. (200 ml)

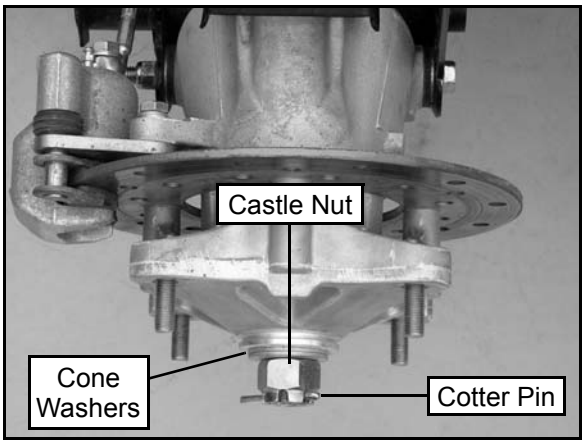
REAR BEARING CARRIER

Bearing Carrier Inspection / Removal

1. Elevate rear of vehicle and safely support machine under the frame area.

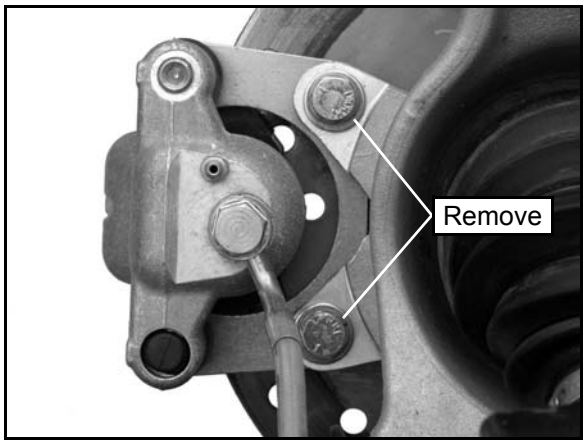
> **⚠ CAUTION**
>
> Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure. Wear eye protection when removing bearings and seals.

2. Check bearings for side play by grasping the top and bottom of the tire firmly and checking for movement. The tire should rotate smoothly without binding or rough spots.
3. Remove the (4) wheel nuts and remove the rear wheel.
4. Remove the cotter pin and loosen the rear wheel hub castle nut. Remove the nut, and (2) cone washers from the rear wheel hub assembly.

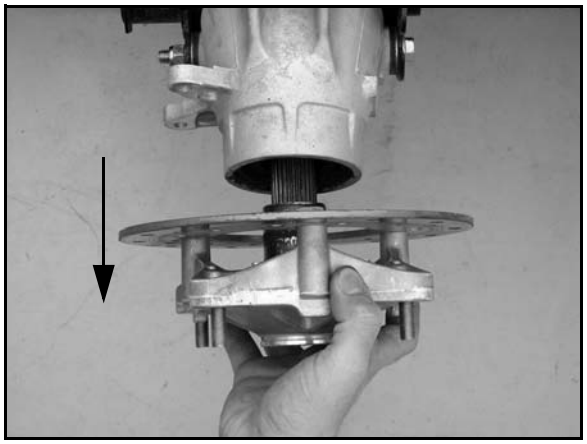


5. Remove and discard the two brake caliper mounting bolts.

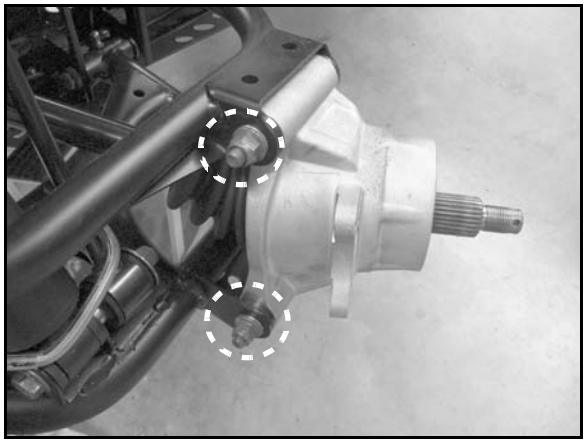
CAUTION: Do not hang the caliper by the brake line. Use wire to hang caliper to prevent damage to the brake line.



6. Remove the rear wheel hub assembly.



7. Remove the bolts, nuts and washers that attach the rear bearing carrier to the upper and lower A-arms. Discard nuts and replace with new.



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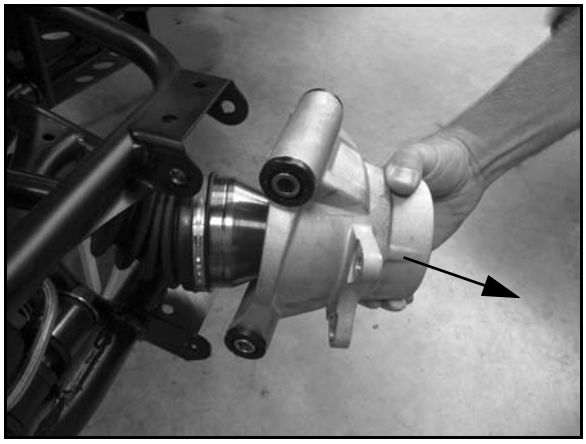
8. Remove the bearing carrier from the rear drive shaft.



9. Rotate bearing by hand and check for smooth rotation. Visually inspect bearing for moisture, dirt, or corrosion.

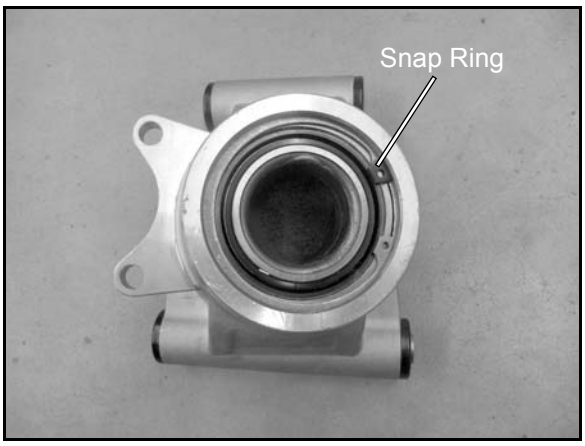
NOTE: Due to extremely close tolerances and minimal wear, the bearings must be inspected visually, and by feel. While rotating bearings by hand, inspect for rough spots, discoloration, or corrosion. The bearings should turn smoothly and quietly, with no detectable up and down movement and minimal movement sideways between inner and outer race.

10. Replace bearing if moisture, dirt, corrosion, or roughness is evident.

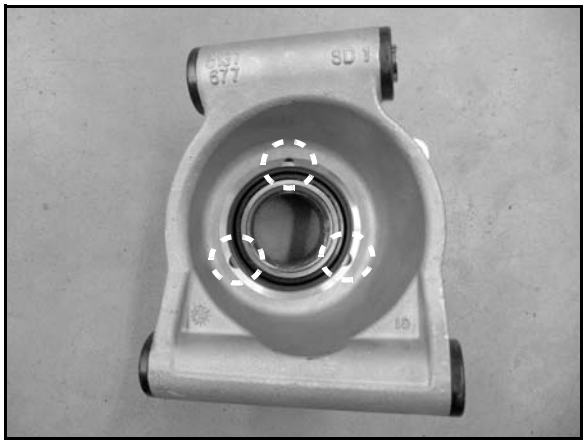
Bearing Replacement

Bearing Removal

1. Remove outer snap ring.



2. From the back side of the bearing carrier, tap on the outer bearing race with a drift punch in the reliefs as shown.



3. 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.

4. Inspect the bearing carrier housing for scratches, wear or damage. Replace rear bearing carrier if damaged.

7

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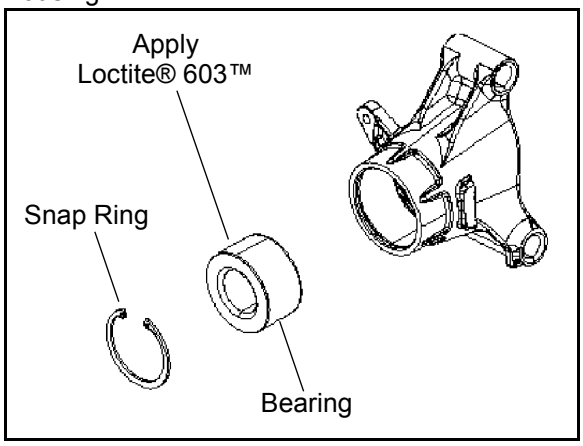
Bearing Installation

1. Thoroughly clean the rear bearing carrier housing and the outer race on the new bearing. Be sure that all oil residue has been removed from each surface.

2. Support the bottom of the bearing carrier housing.

> **⚠ CAUTION**
>
> Use an arbor and press only on the outer race, otherwise bearing damage may occur.

3. Apply **Loctite® 603™** retaining compound to the outer circumference of the new bearing race and carefully press the new bearing into the bearing carrier housing.

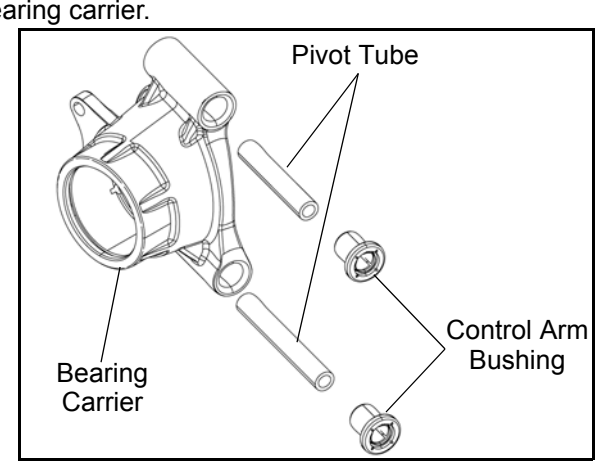


NOTE: Use care to not allow any of the Loctite® compound to get in the bearing.

4. Wipe the housing clean of any excess compound and install the snap ring.

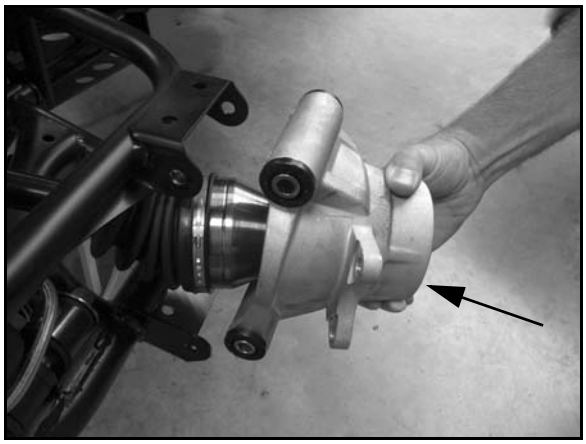
Bearing Carrier Bushing Replacement

Check bearing carrier bushings and pivot tubes for excessive wear or damage. If replacement is required, slide pivot tubes out and remove bushings with a drift punch. Install new bushings by pressing them into the bearing carrier.

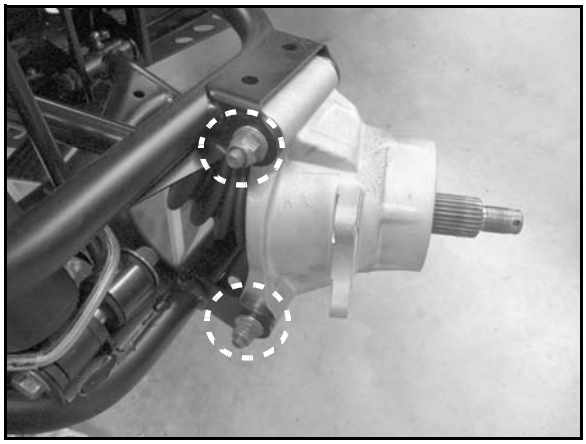


Bearing Carrier Installation

1. Install drive shaft axle through the backside of the bearing carrier. Be sure bushings and pivot tubes are installed.



2. Install the fasteners that attach the rear bearing carrier to the upper and lower A-arms. Torque NEW nuts to specification.



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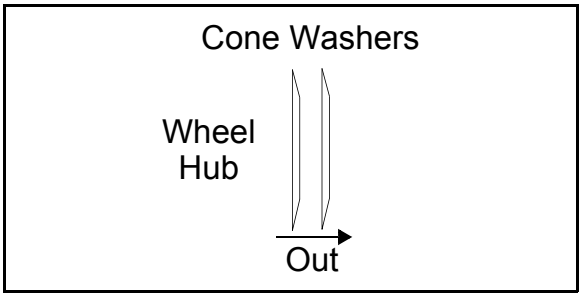
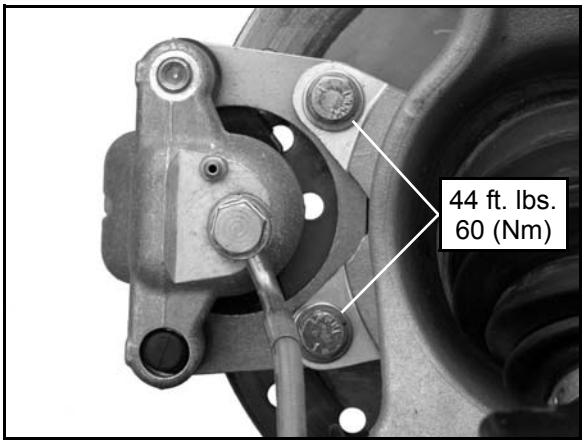
Upper and Lower Rear Bearing Carrier Nuts: **40 ft. lbs. (54 Nm)**

3. Apply grease to drive shaft axle splines.

4. Install rear wheel hub assembly, cone washers, and hand tighten the castle nut. Install washers with domed side out.



5. Install ***new*** brake caliper mounting bolts and torque to **44 ft. lbs. (60 Nm)**.



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Rear Caliper Mounting Bolts: **44 ft. lbs. (60 Nm)**

⚠ CAUTION
New bolts have a pre-applied locking agent which is destroyed upon removal. Always use new brake caliper mounting bolts upon assembly.

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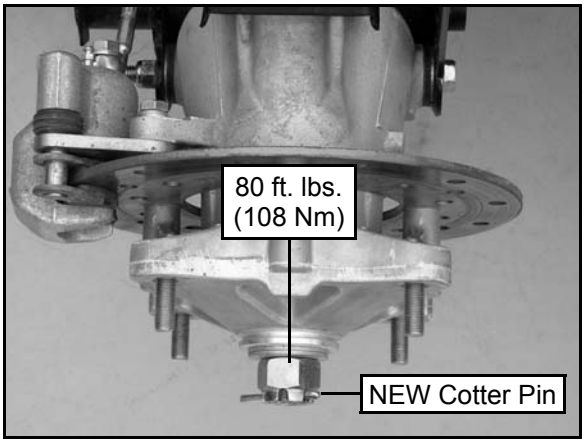
6. Torque wheel hub nut to **80 ft. lbs. (108 Nm)** and install a NEW cotter pin. Tighten nut slightly if necessary to align cotter pin holes.



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Wheel Hub Castle Nut: **80 ft. lbs. (108 Nm)**

7. Install wheel and (4) wheel nuts. Torque wheel nuts to specification.

= T
Wheel Nuts: **Steel Wheels: 27 ft. lbs. (37 Nm)** **Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)**

8. Rotate wheel and check for smooth operation. Bend both ends of cotter pin around end of spindle in different directions.

REAR DRIVE SHAFT

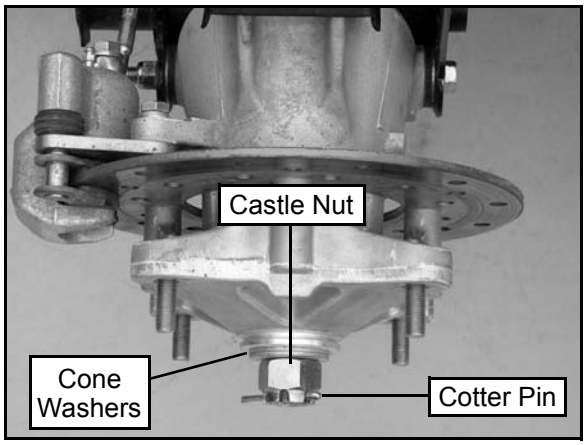
Drive Shaft Removal

1. Elevate rear of vehicle and safely support machine under the frame area.

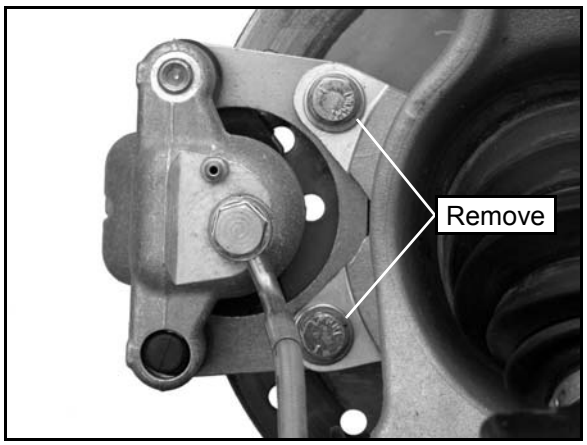
⚠ CAUTION
Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure. Wear eye protection when removing bearings and seals.

2. Remove the (4) wheel nuts and remove the rear wheel.

3. Remove the cotter pin and loosen the rear wheel hub castle nut. Remove the nut, and (2) cone washers from the rear wheel hub assembly.



4. Remove and discard the two brake caliper attaching bolts.
CAUTION: Do not hang the caliper by the brake line. Use wire to hang caliper to prevent damage to the brake line.



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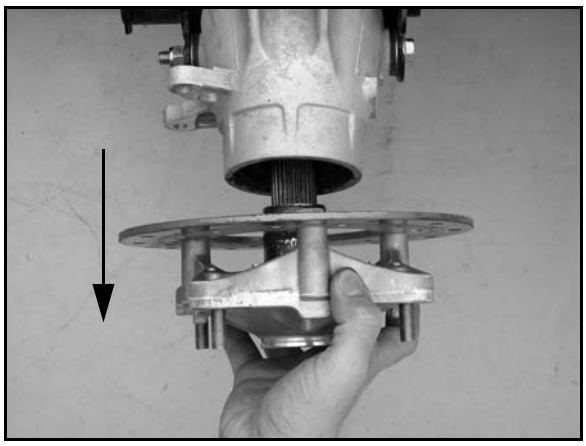
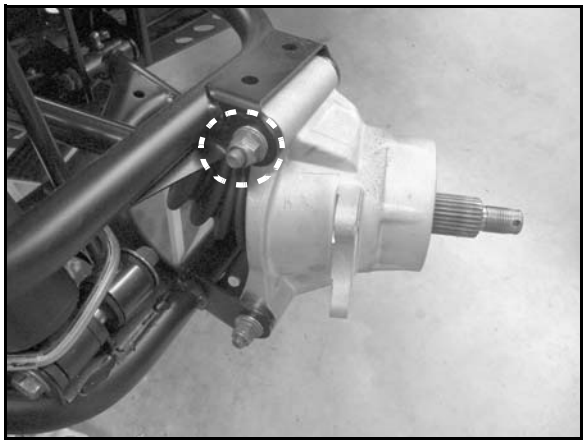
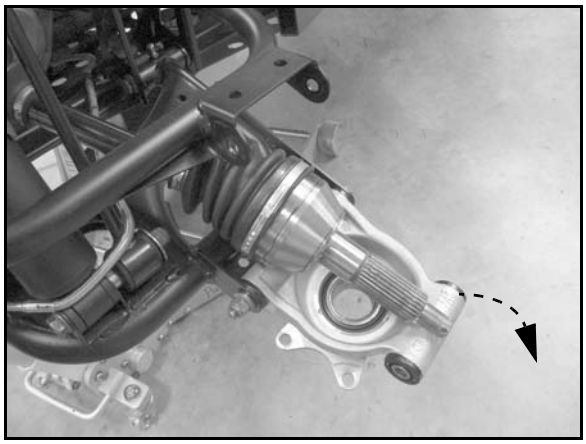
5. Remove the rear wheel hub assembly.



6. Remove the bolt that attaches the rear bearing carrier to the upper A-arm.

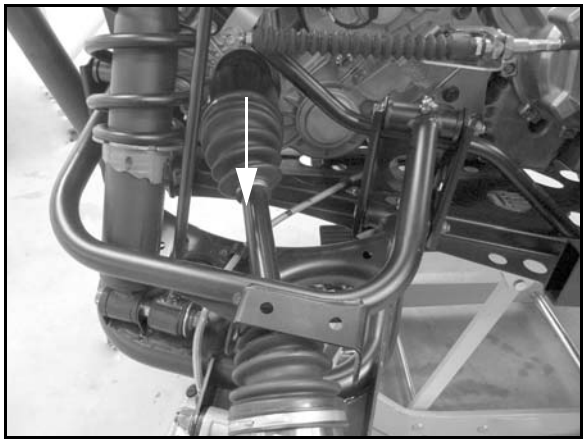


7. Slide the rear drive shaft out of the bearing carrier by pulling the bearin g carrier ass embly outward and tipping it down to remove the shaft.



8. Grasp the rear drive shaft and pull sharply outward on the shaft to disengage it from the rear gearcase.

NOTE: Take c are wh en removing t o prevent damaging the seal.



9. Inspect the axle spline s a nd CV boo ts for any damage.

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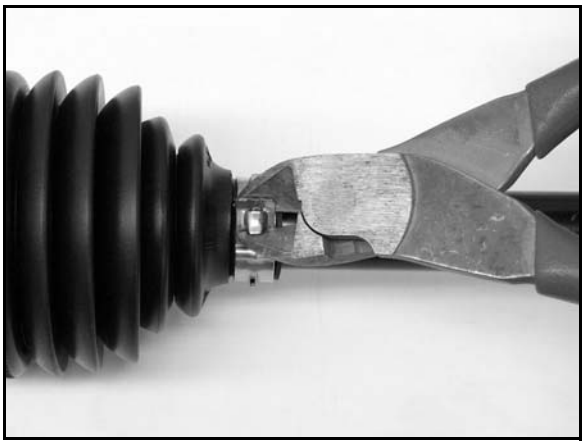
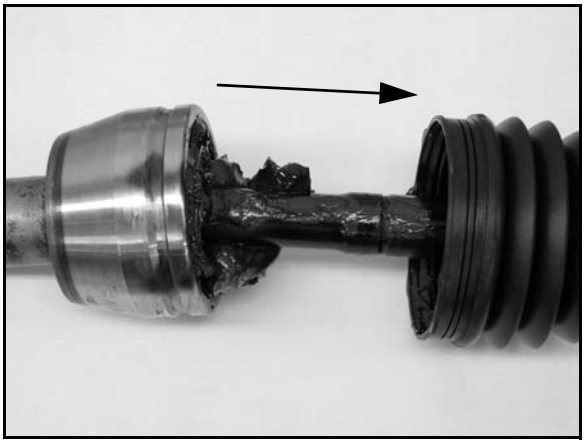
Outer CV Joint / Boot Replacement

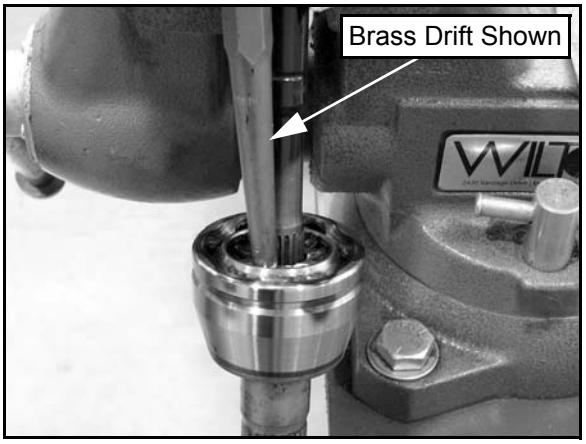
1. Using a side cutters, cut away and discard the boot clamps.



2. Remove the large end of the boot from the CV joint and slide the boot down the shaft.

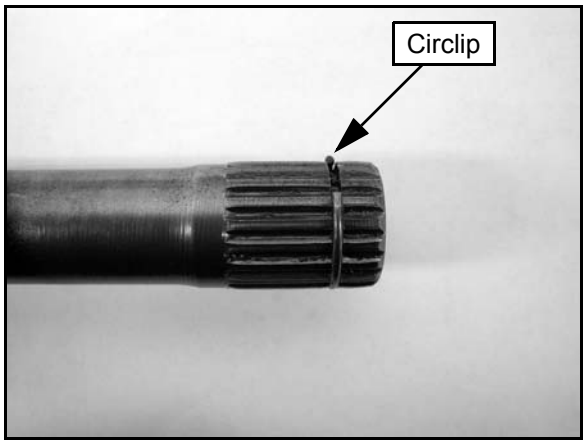


3. Clean the grease from the face of the joint.
4. Place the drive shaft in a soft-jawed vise. Using a soft-faced hammer, or brass drift, strike the inner race of the joint to drive the joint off the drive shaft. Be sure to tap evenly around the joint to avoid binding.



IMPORTANT: Tap on inner race only!

5. Make sure the circlip is on the shaft and not left in the joint.



6. Remove the CV boot from the shaft.

⚠ CAUTION

Complete disassembly of the CV joint is NOT recommended. The internal components are a precision fit and develop their own characteristic wear patterns. Intermixing the internal components could result in looseness, binding, and/or premature failure of the joint.

IMPORTANT: If the grease in the joint is obviously contaminated with water and/or dirt, the joint should be replaced.

7. Thoroughly clean the joint with an appropriate solvent and dry the joint to prevent any residual solvent from being left in the joint upon reassembly.

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8. Visually inspect the joint bytilting the inner race toone side to expose each ball. Severe pitting, galling, play between the ball and its cage window, any cracking or damage to the cag e, pitting or galling or chips in raceways call for joint replacement.

NOTE: Shiny areas in ball tracks and on t he c age spheres a re nor mal. Do not rep lace CV jo ints because parts ha ve polished s urfaces. Rep lace CV joint on ly if co mponents are cr acked, brok en, worn or otherwise unserviceable.

9. Clean the splines on the end of the shaft and apply a light coat of grease prior to reassembly.
10. Slide the small boot clamp and boot (small end first) onto the drive shaft and position the boot in it's groove machined in the shaft.
11. Install a NEW circlip on the end of the shaft.
12. Grease th e jo int with the special CV joint grease provided in the boot replac ement kit. Fill the cavity behind the balls and the splined holein the joint'sinner race. Pack the ball tracks an d outer face flush with grease. Place any remaining grease into the boot.

> **⚠ CAUTION**
>
> The grease provided in the replacement kit is specially formulated for wear resistance and durability. DO NOT use substitutes or mix with other lubricants.

NOTE: The amount of grease that's provided is pre-measured, so use all the grease.

Boot Replacement Grease Requirement:

Grease Only Service Kits
1350047 (50g)

Outer CV Joint Capacity:
RZR - 80g

13. Slide the joint ontothe drive shaft splines and align the circlip with thelead-in chamfer on the inner race of the joint.

14. Use a soft-faced hammer totap the joint onto the drive shaft until it locks into place.
15. Pull on the joint to make sure it is securely locked in place.
16. Remove excess grease from the CV join t's external surfaces and place the excess grease in the boot.
17. Pull the boot over the joint and position the boot lips into the grooves on the joint housing and shaft. Make sure the boot is not dimpled or collapsed.

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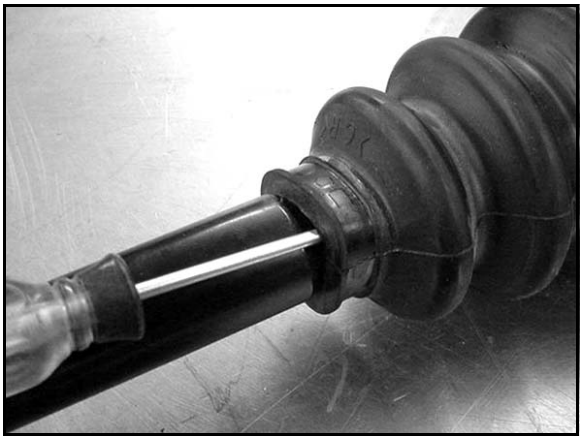
18. Install and tighten the large clamp using the appropriate clamp tool.

Axle Boot Clamp Tool: PU-48951
or
CV Boot Clamp Pliers: 8700226

19. While pulling out on the CV shaft, 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 shaft.



20. Install and tighten the small clamp on the boot using the appropriate clamp tool.

Axle Boot Clamp Tool: PU-48951
or
CV Boot Clamp Pliers: 8700226

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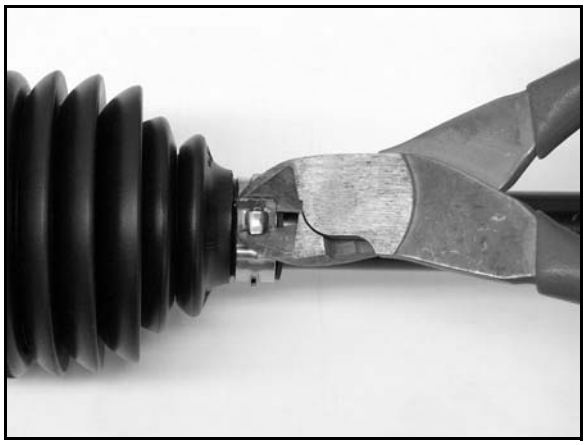
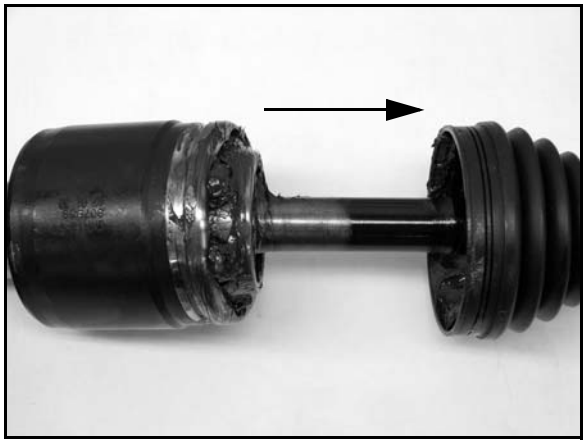
Inner Plunging Joint / Boot Replacement

1. Using a side cutters, cut away and discard the boot clamps.

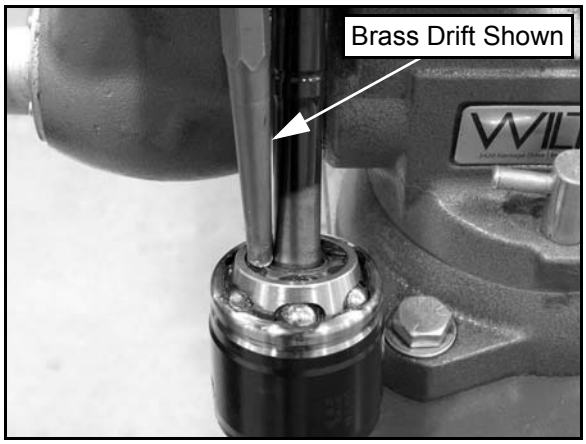


2. Remove the large end of the boot from the plunging joint and slide the boot down the shaft.



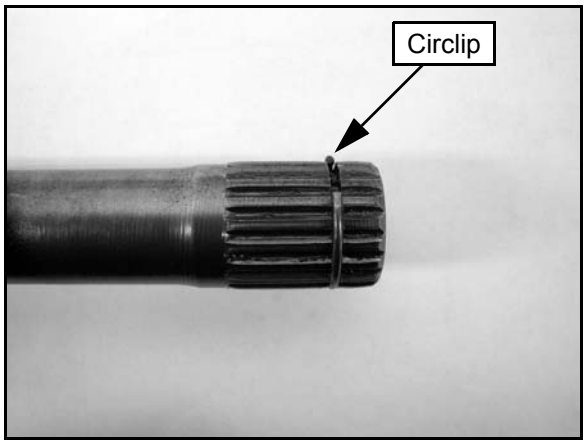
3. Clean the grease from the face of the joint and place the drive shaft in a soft-jawed vise.

4. Using a soft-faced hammer, or brass drift, strike the inner race of the joint to drive the joint off the drive shaft. Be sure to tap evenly around the joint to avoid binding.



IMPORTANT: Tap on inner race only!

5. Make sure the circlip is on the shaft and not left in the joint.



6. Remove the boot from the shaft.

⚠ CAUTION

Complete disassembly of the plunging joint is NOT recommended. The internal components are a precision fit and develop their own characteristic wear patterns. Intermixing the internal components could result in looseness, binding, and/or premature failure of the joint.

IMPORTANT: If the grease in the joint is obviously contaminated with water and/or dirt, the joint should be replaced.

7. Thoroughly clean the joint with an appropriate solvent and dry the joint to prevent any residual solvent from being left in the joint upon reassembly.
8. Visually inspect the joint for damage. Replace if needed.
9. Clean the splines on the end of the shaft and apply a light coat of grease prior to reassembly.
10. Slide the small boot clamp and boot (small end first) onto the drive shaft and position the boot in its groove machined in the shaft.
11. Install a NEW circlip on the end of the shaft.
12. Grease the joint with the special joint grease provided in the boot replacement kit. Fill the cavity behind the balls and the splined hole in the joint's inner race. Pack the ball tracks and outer face flush with grease. Place any remaining grease into the boot.

⚠ CAUTION

The grease provided in the replacement kit is specially formulated for wear resistance and durability. DO NOT use substitutes or mix with other lubricants.

NOTE: The amount of grease that's provided is pre-measured, so use all the grease.

Boot Replacement Grease Requirement:

Grease Only Service Kits
1350047 (50g)

Inner Plunging Joint Capacity:
RZR - 80g

13. Fully compress the joint and push the drive shaft firmly into the inner race.
14. Align the circlip with the lead-in chamfer.

15. Use a soft-faced hammer to tap the joint onto the drive shaft until you reach the end of the splines and the joint locks in place.
16. Pull on the joint to test that the circlip is seated and that the joint is securely fastened to the shaft.
17. Remove excess grease from the plunging joint's external surfaces and place the excess grease in the boot.
18. Pull the boot over the joint and position the boot lips into the grooves on the joint housing and shaft. Make sure the boot is not dimpled or collapsed.

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19. Install and tighten the small clamp using the appropriate clamp tool.

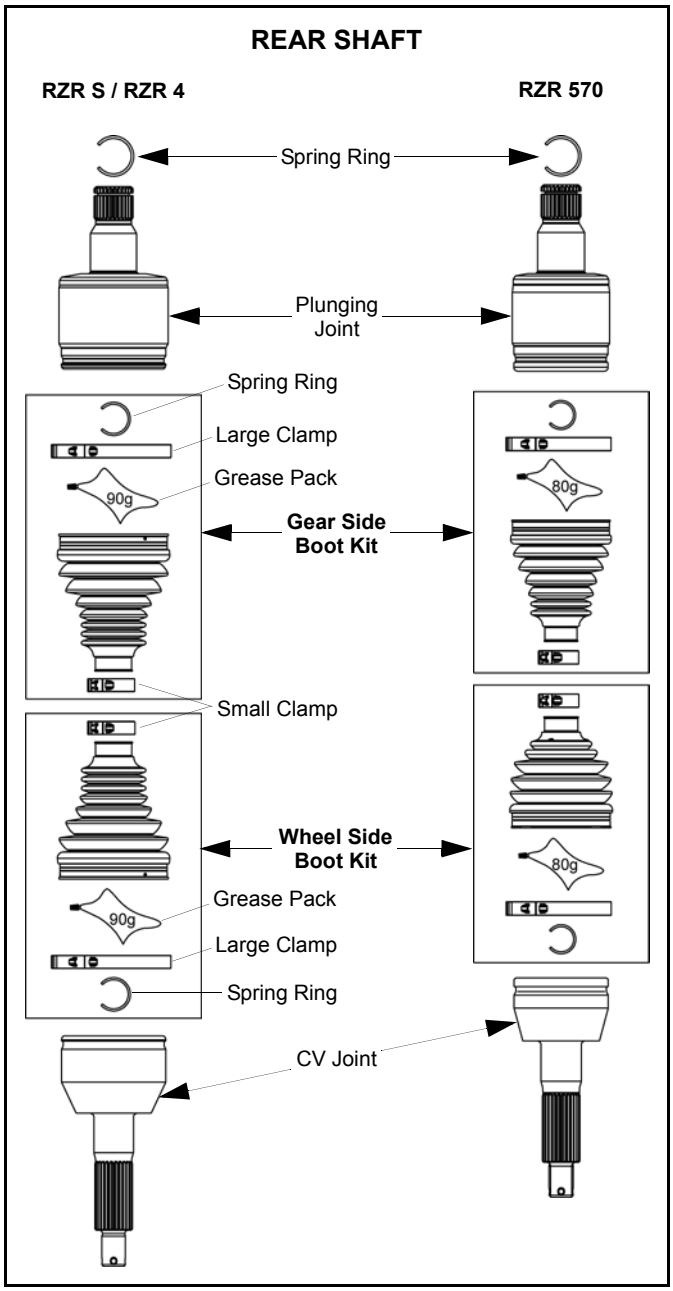
Axle Boot Clamp Tool: PU-48951
or
CV Boot Clamp Pliers: 8700226

20. Pull out on the drive shaft to center the joint in the housing. Slide a straight O-ring pick or a small slotted screw driver between the large end of the boot and the joint housing and lift up to equalize the air pressure in the boot.

21. Position the boot lip in its groove. Install and tighten the large clamp using the appropriate clamp tool.

Axle Boot Clamp Tool: PU-48951
or
CV Boot Clamp Pliers: 8700226

Drive Shaft Exploded View



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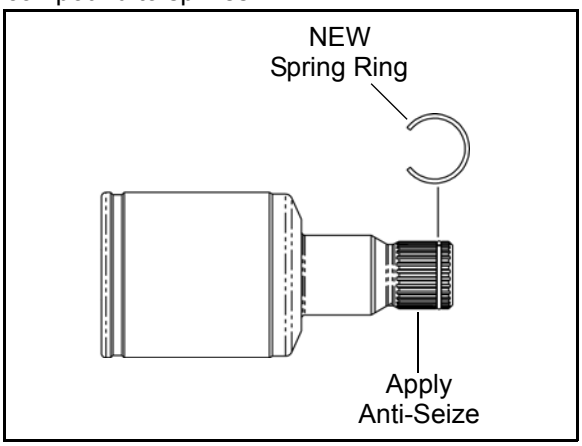
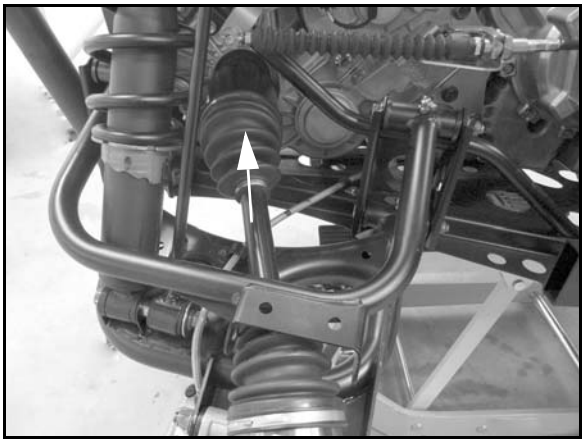
Drive Shaft Installation

1. Install new spring ring on drive shaft. Apply anti-seize compound to splines.

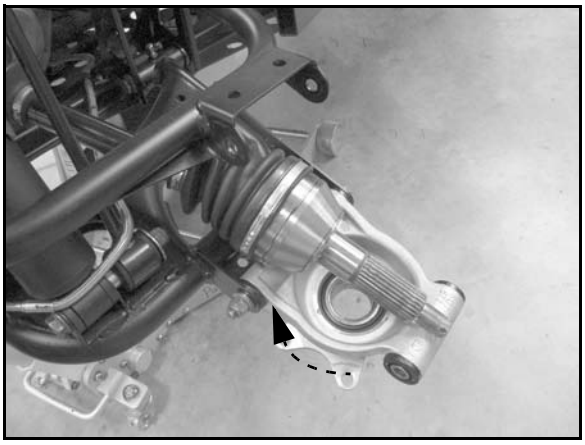


2. Align splines of drive shaft with rear gearcase and reinstall the drive shaft. Use a rubber mallet to tap on the outboard end of the drive shaft if necessary.

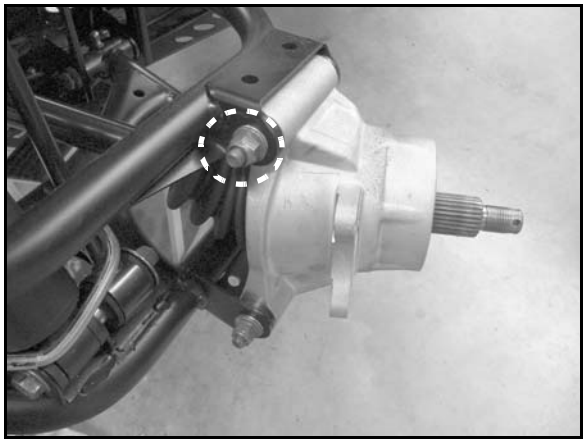
NOTE: Take care when installing the drive shaft to prevent damaging the seal.



3. Slide the rear drive shaft into the rear bearing carrier.



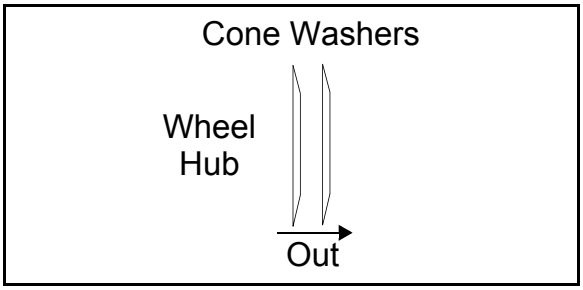
4. Lift bearing carrier into place and install the bolt attaching the bearing carrier to the upper A-arm. Torque fastener to specification.



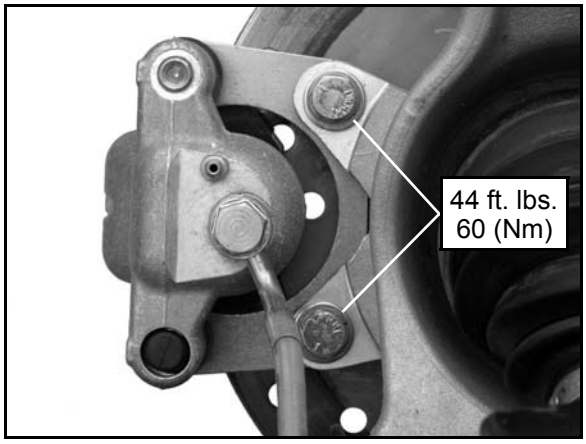
= T
Upper Rear Bearing Carrier Bolt: **40 ft. lbs. (54 Nm)**

5. Apply grease to drive shaft axle splines.

6. Install rear wheel hub assembly, cone washers, and hand tighten the castle nut. Install washers with domed side out.



7. Install NEW brake caliper mounting bolts and torque to **44 ft. lbs. (60 Nm)**.



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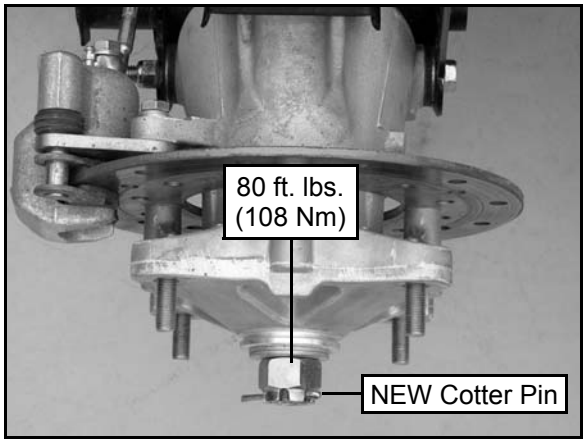
Rear Caliper Mounting Bolts: **44 ft. lbs. (60 Nm)**

CAUTION
New bolts have a pre-applied locking agent which is destroyed upon removal. Always use new brake caliper mounting bolts upon assembly.

8. Torque wheel hub nut to **80 ft. lbs. (108 Nm)** and install a NEW cotter pin. Tighten nut slightly if necessary to align cotter pin holes.



= T
Wheel Hub Castle Nut: **80 ft. lbs. (108 Nm)**

9. Install wheel and (4) wheel nuts. Torque wheel nuts to specification.

= T
Wheel Nuts: **Steel Wheels: 27 ft. lbs. (37 Nm)** **Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)**

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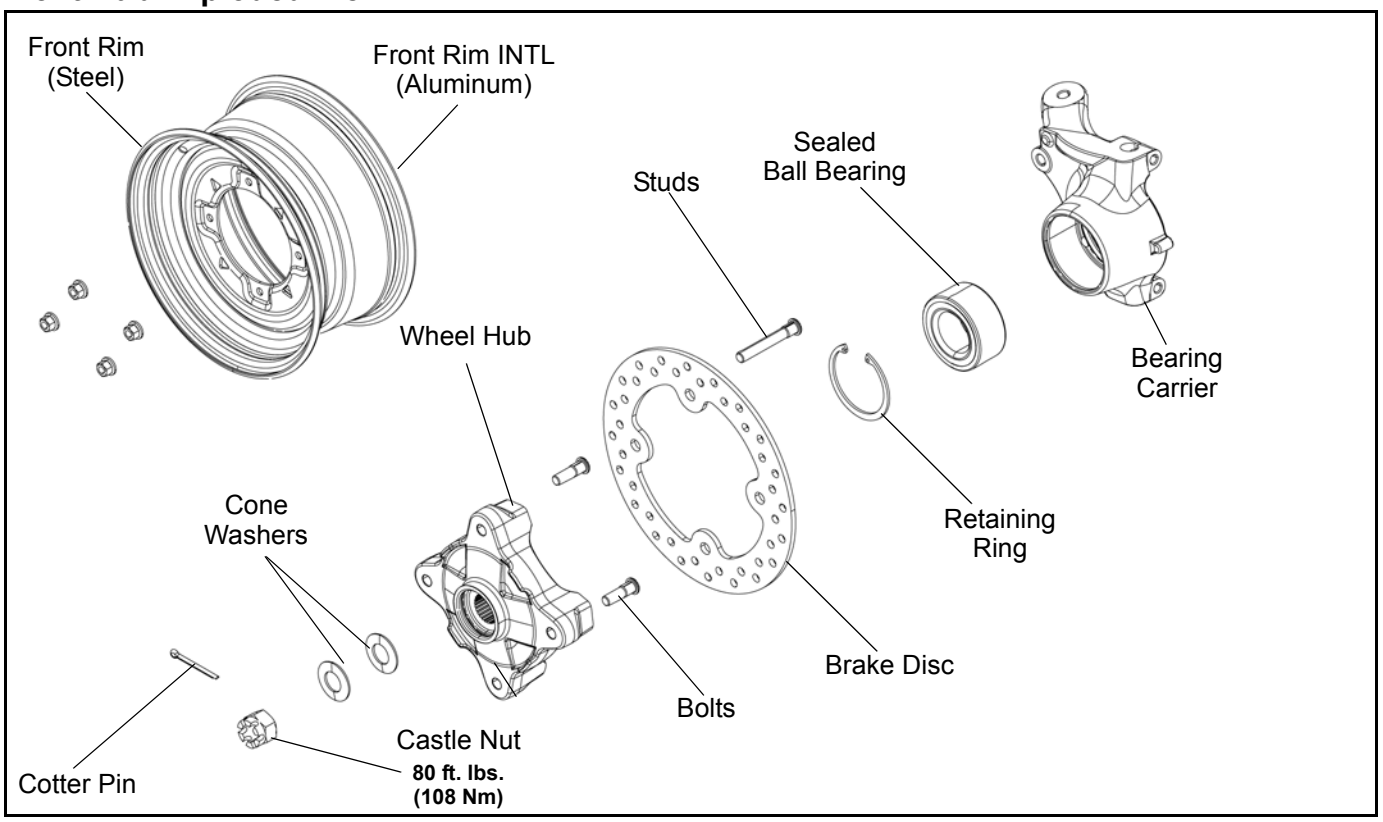
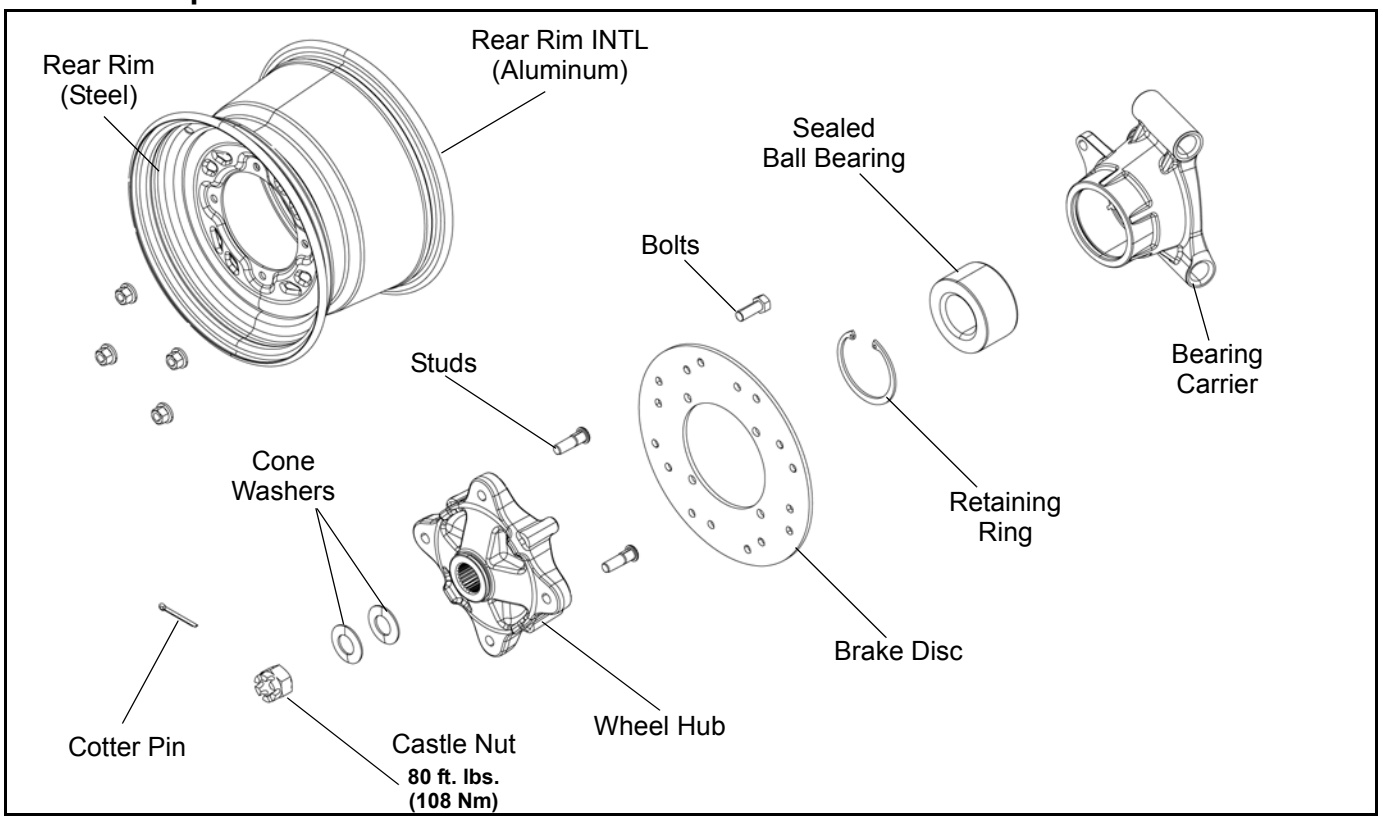
WHEEL HUBS

Front Hub Exploded View



Rear Hub Exploded View



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CHAPTER 8
TRANSMISSION

8

SPECIAL TOOLS

SPX Corporation - 1-800-328-6657 or http://polaris.spx.com/.

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SPECIFICATIONS

Torque Specifications

ITEM	TORQUE VALUE
Bearing Retaining Plate Screws	8-10 ft. lbs. (11-14 Nm)
Bell Crank Nut	12-18 ft. lbs. (16-24 Nm)
Fill / Drain Plugs	10-14 ft. lbs. (14-19 Nm)
Gear Sector Cover	9-12 ft. lbs. (12-16 Nm)
Park Brake Disc Mounting Bolt (INT'L)	8-10 ft. lbs. (11-14 Nm)
Park Flange Screws	8-10 ft. lbs. (11-14 Nm)
Rear Transmission Isolator Mount Bolt	40 ft. lbs. (54 Nm)
Snorkel Tube	Refer to "Snorkel Gear Backlash Procedure"
Snorkel Tube Locking Screw	8-10 ft. lbs. (11-14 Nm)
Support and Shift Cable Bracket Bolts	17 ft. lbs. (23 Nm)
Transmission Case Screws	15-20 ft. lbs. (20-27 Nm)
Speed Sensor Screw	7 - 9 ft. lbs. (9-12 Nm)

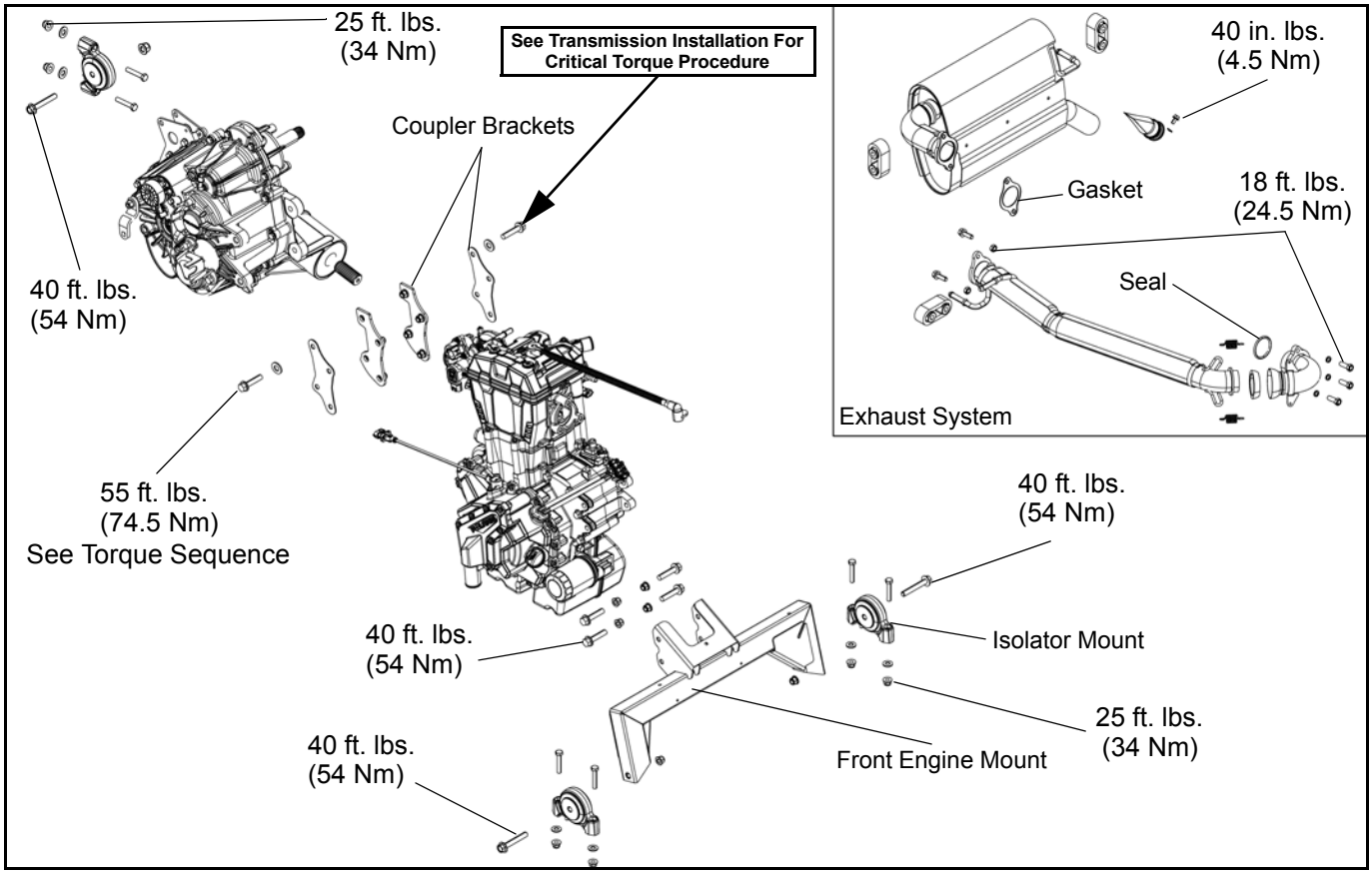
Special Tools

PART NUMBER	TOOL DESCRIPTION
PA-50231	Snorkel 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)
PU-50566	Transmission Nut Socket
PU-50658	Clutch Center Distance Tool

Lubrication

Recommended Transmission Lubricant:
AGL Plus (PN 2878068) (Quart)
Capacity (Standard): 44 oz. (1300 ml)
Capacity (INTL): 41 oz. (1200 ml)

Transmission Mounting and Torque Values



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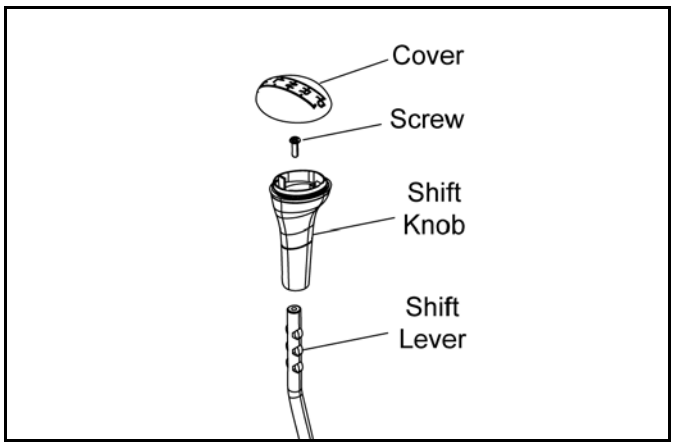
SHIFT LEVER

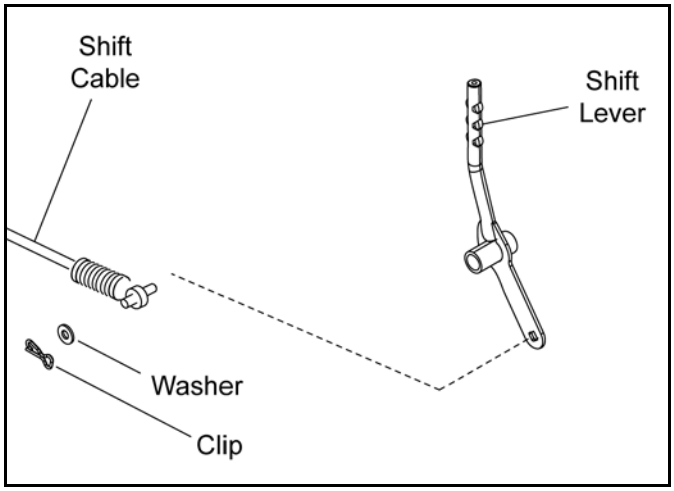
Removal

1. Remove the shift knob cover, retaining screw and shift knob from the shift lever.

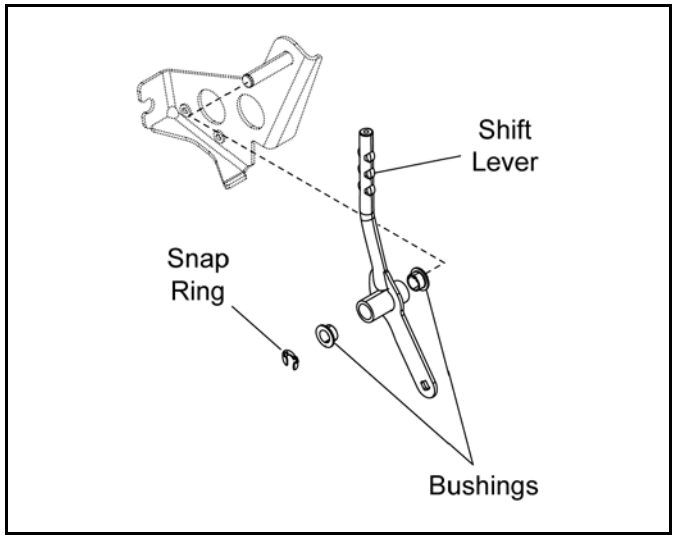


2. Remove the screws retaining the center console using a T27 and T30 Torx driver. Remove the console from the vehicle.

3. Remove the clip and washer retaining the shift cable to the shift lever and disconnect the cable end from the lever.



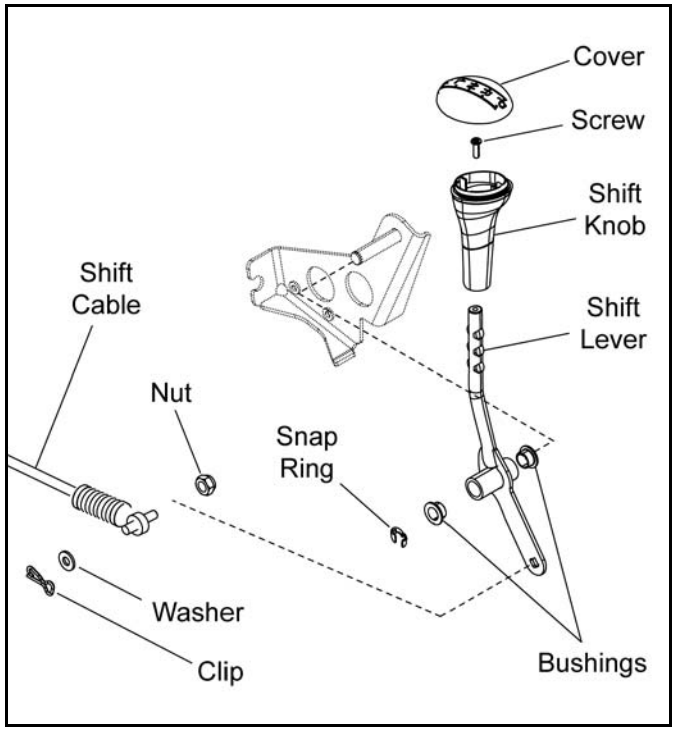
4. Remove the retaining ring and slide the shift lever off the mounting bracket and out from the frame.



5. Remove both bushings from the shift lever and service as needed.

Installation

1. Perform the removal steps in reverse order to install the gear shift lever (lever, cable, console, shift knob).



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SHIFT CABLE

Inspection

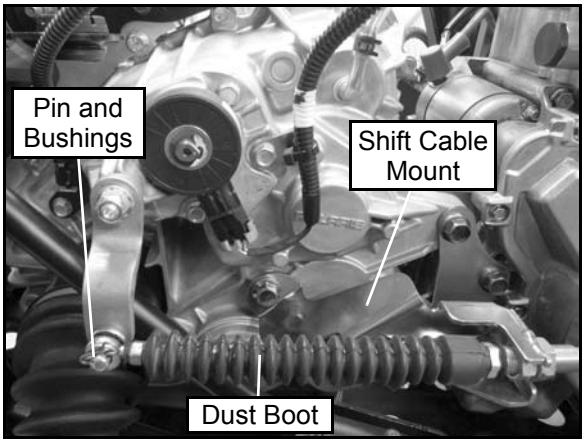
Shift cable adjustment may be necessary if symptoms include:

- No gear position or AWD display on instrument cluster
- Ratcheting noise on deceleration
- Inability to engage into a gear
- Excessive gear clash (noise)
- Gear selector moving out of desired range

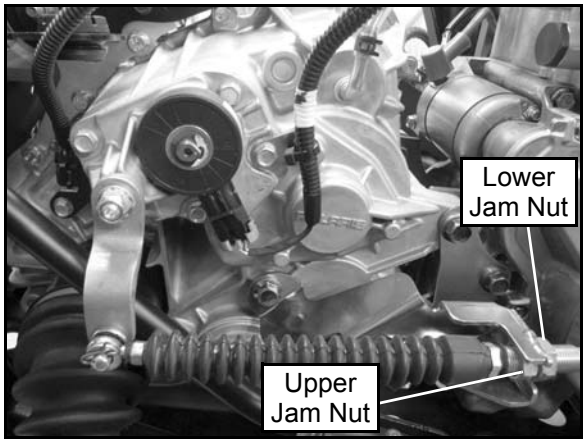
Inspect shift cable, clevis pins, and pivot bushings and replace if worn or damaged.

Adjustment

1. Locate the shift cable attached to the transmission case in the right rear wheel well area.
2. Inspect shift cable, clevis pin, pivot bushings, and dust boot. Replace if worn or damaged.



3. If adjustment is required, loosen the lower jam nut and pull the cable out of the mount to move the upper jam nut.



4. Adjust the shift cable so there is the same amount of cable travel when shifting slightly past HIGH gear and PARK.
5. Thread the upper or lower jam nut as required to obtain proper cable adjustment.

NOTE: This procedure may require a few attempts to obtain the proper adjustment.

6. Once the proper adjustment is obtained, place the shift cable and upper jam nut into the mount. Tighten the lower jam nut against the mount.
7. Start engine and shift through all gears to ensure the shift cable is properly adjusted. If transmission still ratchets after cable adjustment, the transmission will require service.

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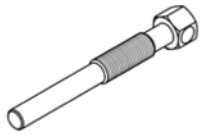
TRANSMISSION SERVICE

Transmission Removal

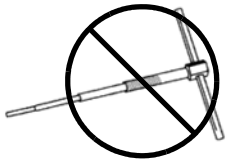
CAUTION

Correct Drive Clutch Puller P/N PA-48595

PA-48595 - Correct Drive Clutch Puller For RZR 570



2872085 - Incorrect Drive Clutch Puller

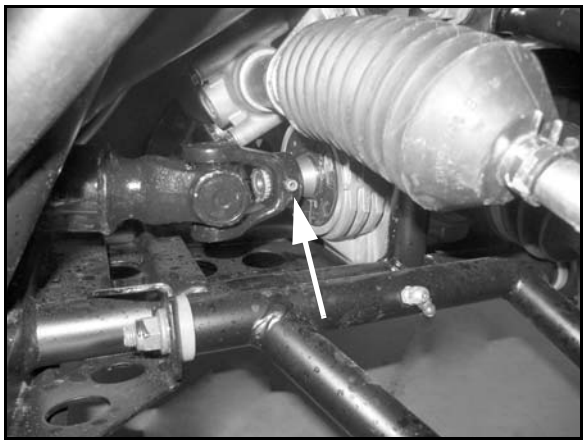


1. If internal transmission repair is required, drain the transmission lubricant (see Chapter 2).
2. Remove the seats and engine service panel (see Chapter 5).
3. Disconnect the (-) negative battery cable from the battery.
4. Raise and support the vehicle.

CAUTION

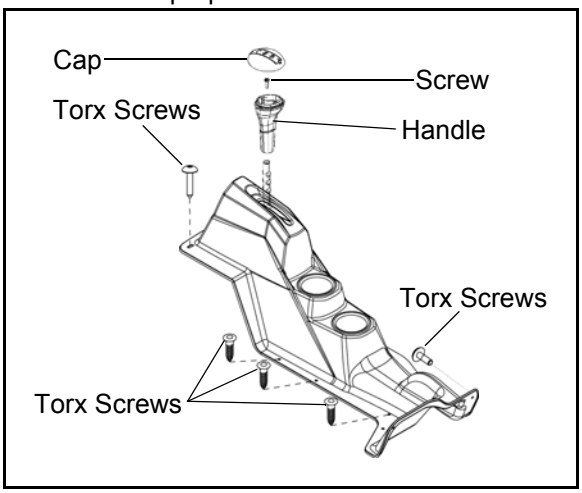
Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this procedure. Always wear eye protection.

5. Remove rear wheels from the vehicle.
6. From the right-hand front wheel well, locate the propshaft roll pin. Use the Roll Pin Removal Tool (PN 2872608) to remove the roll pin from the front gearcase.



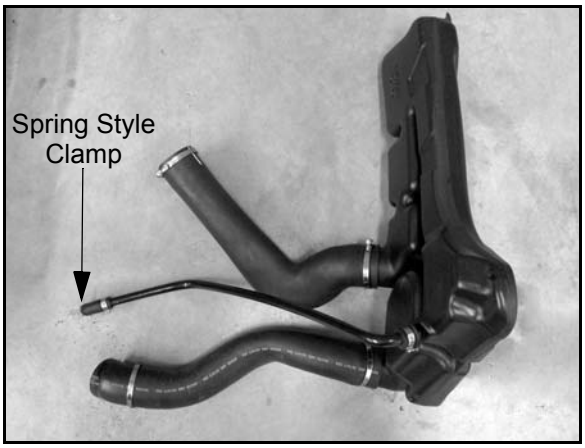
Roll Pin Removal Tool (PN 2872608)

7. Remove the gear selector cap and remove the retaining screw and handle.
8. Remove the Torx screws retaining the center console to access the propshaft.



9. Slide prop shaft back far enough to remove it from the front gearcase input shaft splines.
10. Pull sharply forward to remove the propshaft from transmission shaft.
11. Remove the rear bumper and cargo box as an assembly (see Chapter 5).

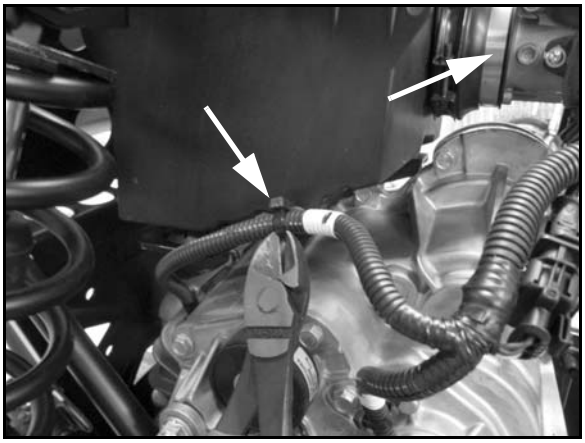
12. Loosen the (3) clamps securing the intake baffle assembly to the air box lid, inner clutch cover and engine crankcase vent. Remove the air intake baffle / intake hoses / engine crankcase vent tube and assembly as shown below.



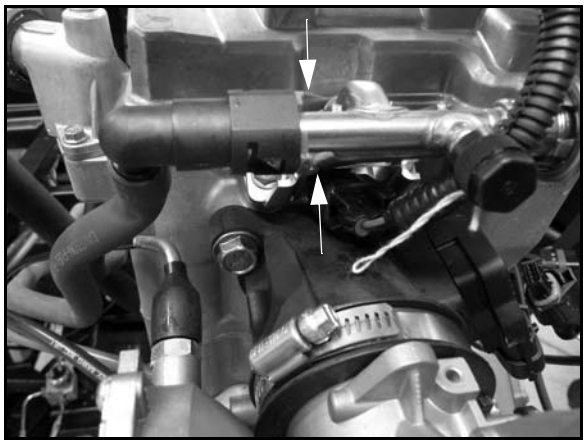
13. Remove the outer clutch cover, drive belt, drive clutch, driven clutch and inner clutch cover (see Chapter 6). Make note of hose and wire routings for reassembly.

IMPORTANT: Be sure to use the correct Drive Clutch Puller (PN PA-48595) to prevent damage to crankshaft.

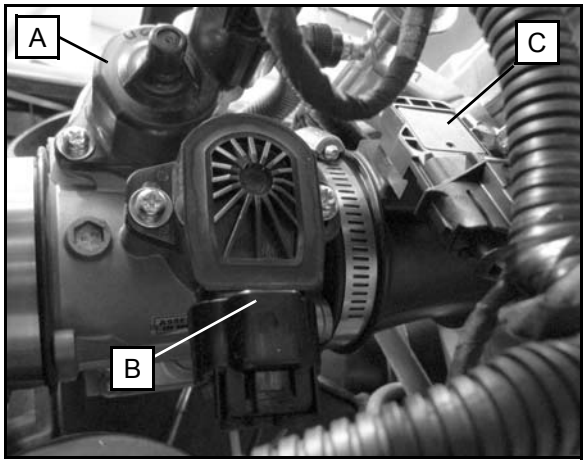
14. Loosen the hose clamp that secures the air box to the throttle body. Cut the tie strap that secures the wire harness to the right-hand side of the air box. Remove the air box assembly.



15. Place a shop to beneath the fuel line quick connector to catch any excess fuel. Disconnect the fuel line from the fuel rail by pressing in on the quick connector tabs. Move fuel line to the left-hand side of the engine compartment. Make note of line routing for installation.



16. Disconnect the IAC valve (A), TPS (B), T-MAP sensor (C), harness leads from the throttle body.



17. Remove throttle body from the engine and wrap it with a clean shop towel. Place throttle body on the LH side frame rail area.

IMPORTANT: Be sure dirt and debris do not enter the engine, air box or throttle body. Use clean shop towels to plug engine and air box intake holes.

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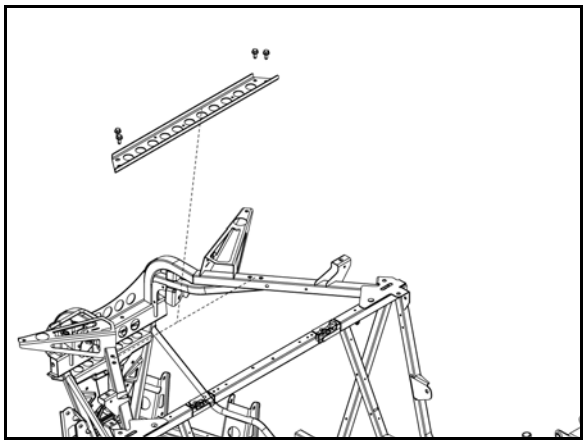
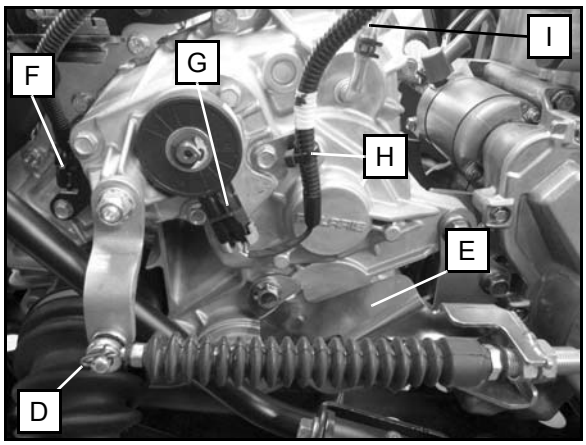
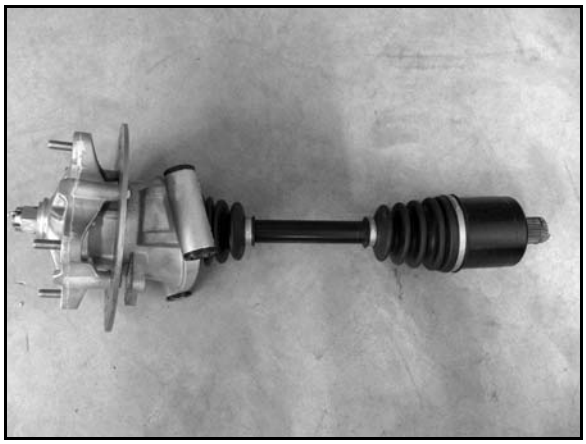
18. Remove the (4) fasteners securing the rear bolt in brace to the vehicle main frame. Maneuver the brace forward for transmission removal clearance. Note the routing of the transmission breather hose and wire harness.



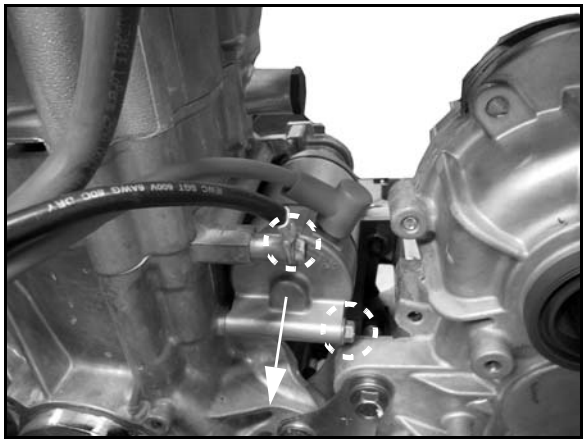
19. Remove the clip and washer (D) securing the shift cable to the bell crank.
20. Remove the (2) fasteners securing the transmission shift bracket (E) to the transmission case. Swing assembly clear of the main frame for transmission removal.
21. Disconnect the vehicle speed sensor (F) and gear position switch (G) harness connectors. Cut tie strap (H). Note harness routings for reassembly.
22. Remove the transmission vent tube (I).
    INTL - Remove the parking break cable and asm.



23. Remove and discard the (4) rear brake caliper mounting bolts on the RH and LH side as outlined in Chapter 7 and 9.
    CAUTION: Do not hang the caliper by the brake line. Use wire to hang caliper to prevent damage to the brake line.
24. Remove the (4) rear upper and lower A-arm to bearing carrier bolts, nuts and washers from the RH and LH side as outlined in chapter 7.
25. With a short, sharp jerk, remove the rear drive shaft / bearing carrier assemblies from the vehicle as shown.



26. Remove the (2) bolts securing the starter motor to the engine. Remove starter from the engine. Make note of wiring for reassembly.



27. Place a support in-between the main frame and the engine crankcase to support the engine in its current position. Do not pinch brake line.

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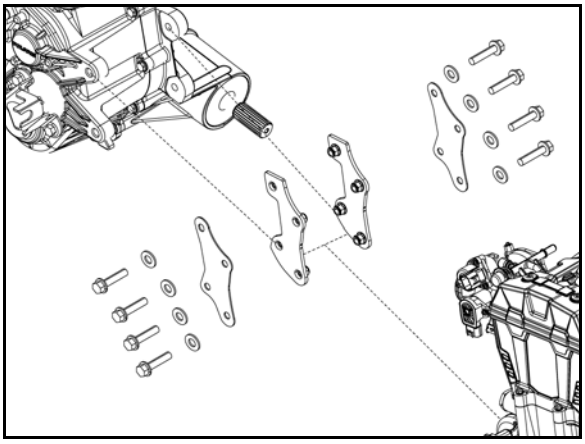
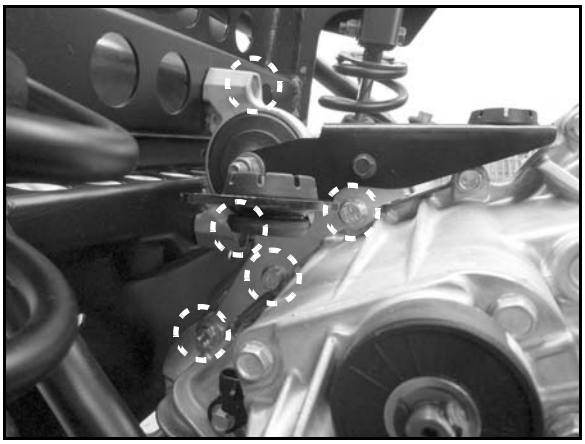
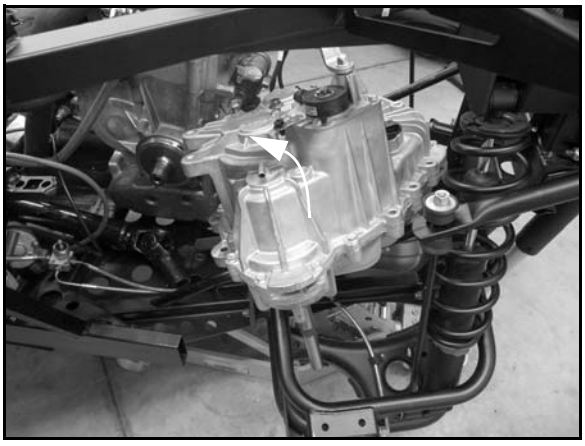
28. Remove the (8) engine to transmission coupler bracket bolts and washers. Remove the coupler brackets from the vehicle.



29. Remove the (5) fasteners securing the rear transmission mount to the vehicle frame. Remove the rear mount as an assembly.

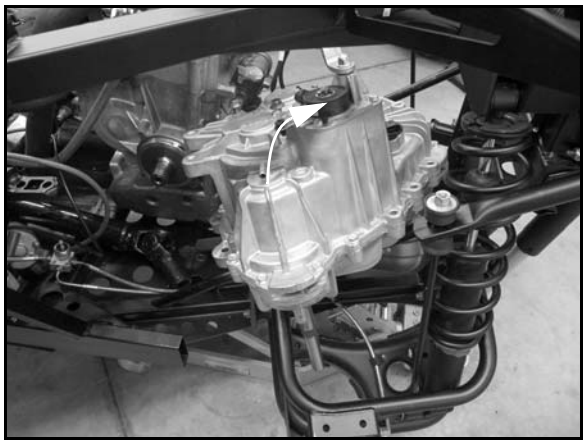


30. Rotate the top of the transmission to the left-hand side of the vehicle. With the help of an assistant, lift the assembly up and out of the vehicle frame.



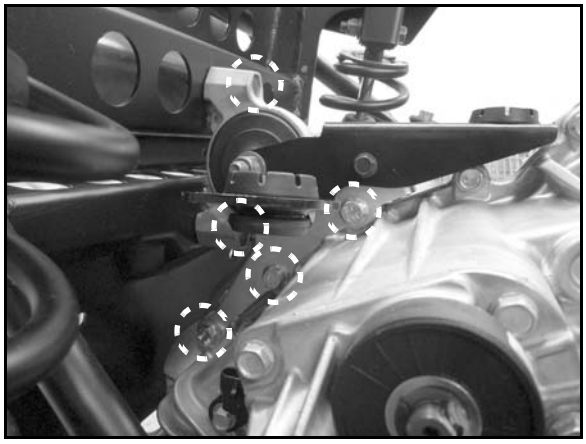
Transmission Installation

1. With the help of an assistant lift transmission into the vehicle frame through the left rear wheel well area as shown below.



2. Carefully rotate the top of the transmission upward into its proper location.

3. By hand, install the (5) rear transmission mount assembly fasteners. Do not torque fasteners at this time.



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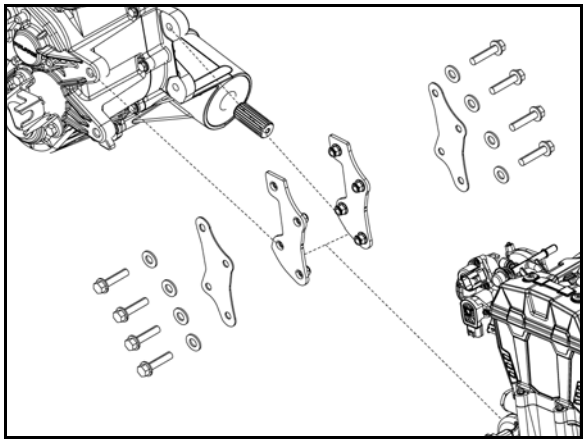
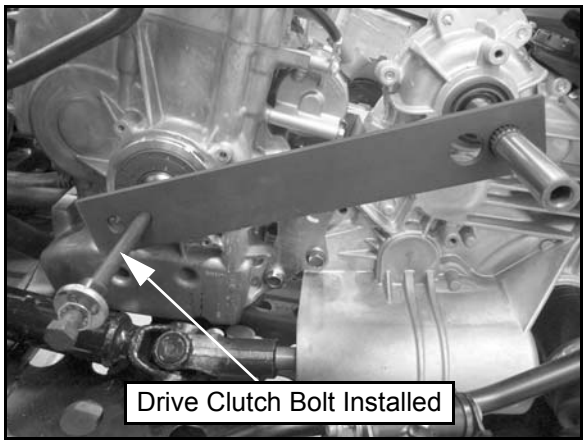
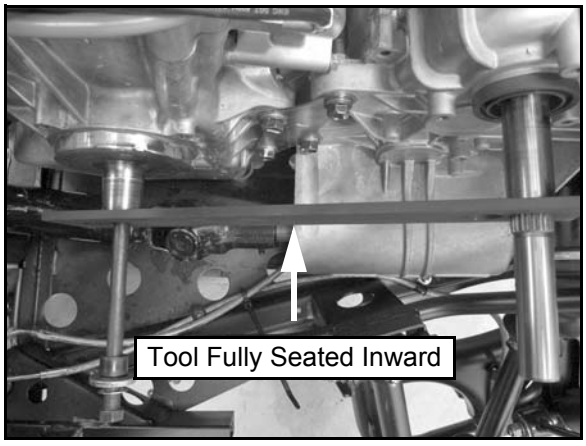
4. By hand, install the (8) engine to transmission coupler brackets, bolts and washers. Do not torque fasteners at this time.

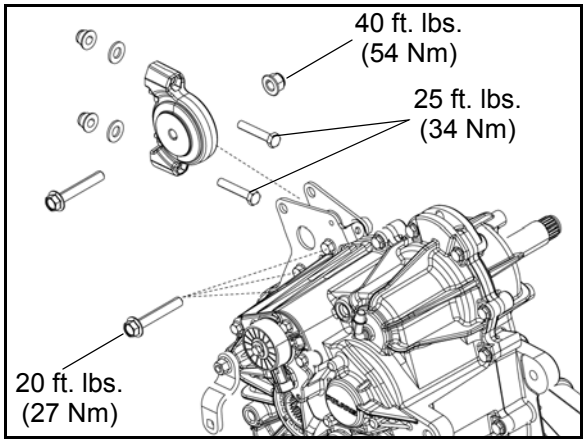


5. Install the Clutch Center Distance Tool (PU-50658) onto the crankshaft and transmission input shaft to properly position the clutch center distance. The pictures below show the tool (PU-50658) properly installed.

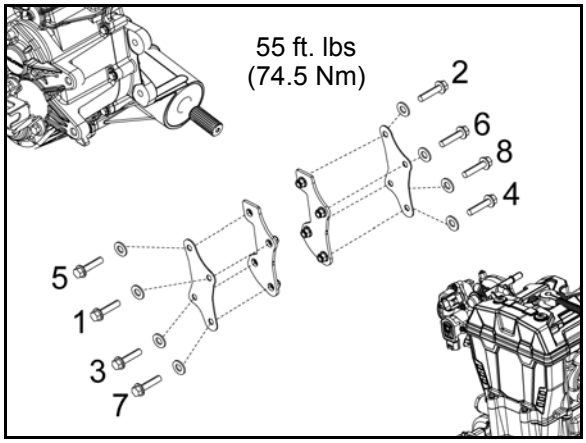




6. Torque the rear transmission mount fasteners to specification.



7. In sequence, torque the (8) engine coupler bracket fasteners to specification.



= T
Rear Engine Coupler Fastener Torque: (In Sequence) **55 ft. lbs. (74.5 Nm)**

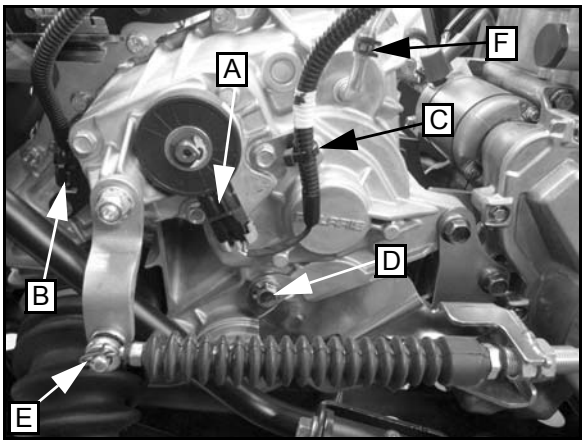
8. Remove the clutch center distance tool.

9. Remove the spacer or support between the vehicle frame and engine.

10. Replace starter O-ring if needed and lubricate O-ring with grease. Install the starter and the (2) bolts securing the starter motor to the engine. Torque fasteners to specification as outlined in Chapter 10. Be sure wires are routed correctly.

= T
Starter Bolt Torque: **7 ft. lbs. (10 Nm)**

11. Install and properly route the gear position switch connector (A), speed sensor connector (B), harness into tie strap (C), shift bracket, shift bracket bolts (D), shift cable clevis pin and washer (E) onto the transmission and install the vent hose (F).
INTL - Install the parking break cable and asm.

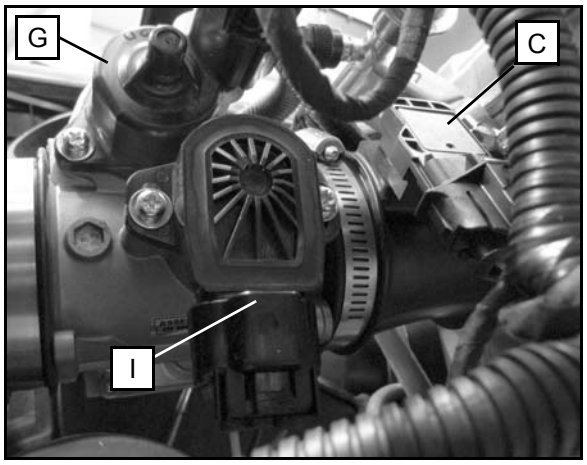


12. Torque the (2) shift cable bracket bolts to specification.

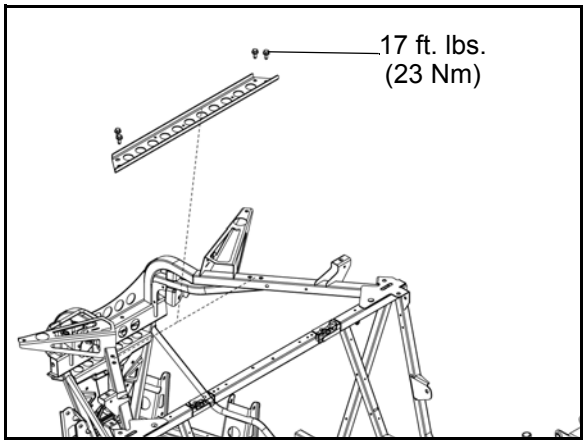
= T
Shift Cable Bracket Bolts: **17 ft. lbs. (23 Nm)**

13. Install the throttle body into the engine intake boot. Tighten hose clamp. Be sure throttle cable is routed correctly.

14. Connect the IAC valve (G), TPS (H), T-MAP sensor (I), harness leads from the throttle body.



15. Connect the fuel line to the fuel rail. Be sure routing is correct.
16. Install the air box assembly and tighten hose clamp. Replace the tie strap and rout wires properly on the right-hand side of the air box.
17. Install the (4) fasteners securing the rear bolt in brace to the vehicle main frame. Note the routing of the transmission breather hose and wire harness. Torque fasteners to specification.



18. Lubricate the transmission splines with Polaris All Purpose Grease. Install the propshaft on to the transmission splines.
19. Lubricate the front gearcase splines with anti-seize and install the propshaft onto the front gearcase (see Chapter 7). Use a new roll pin at the front gearcase splines.
20. Install the center console and shift handle.

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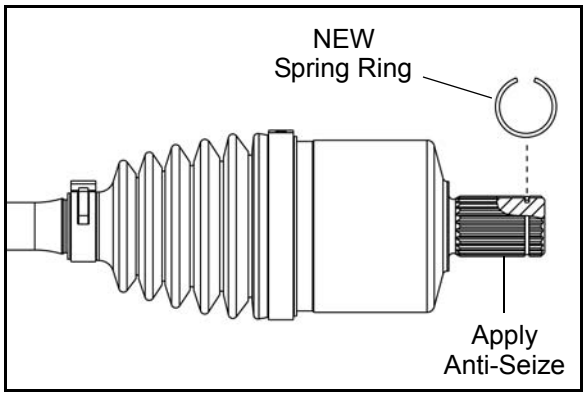
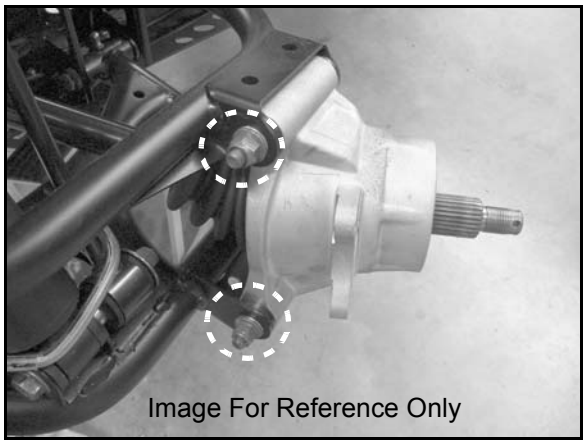
21. Install the inner clutch cover, drive clutch, driven clutch, belt and outer clutch cover (see chapter 6). Be sure wires and hoses are routed correctly. Torque fasteners to specification.

= T
Inner Clutch Cover Bolts: **12 ft. lbs. (16.6 Nm)** Driven Clutch Retaining Bolt: **36 ft. lbs. (48.5 Nm)** Drive Clutch Retaining Bolt: **47 ft. lbs. (63.5 Nm)** Outer Clutch Cover Retaining Screws: **45-50 in. lbs. (5 Nm)**

22. Install the (3) clamps securing the intake baffle assembly to the air box lid, inner clutch cover and engine crankcase vent. Be sure routings are correct.
23. Install the rear bumper and cargo box assembly (see chapter 5).
24. Install new spring ring on rear drive shafts. Apply an anti-seize compound to the splines.

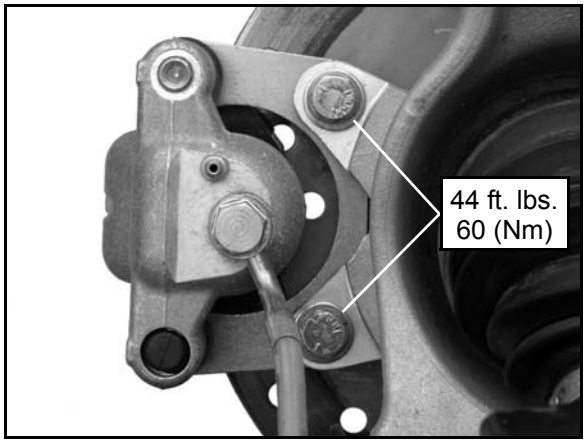


25. Install the rear drive shaft splines into transmission splines. Install the fasteners that attach the rear bearing carrier to the upper and lower A-arms. Torque new nuts to specification.



= T
Upper and Lower Rear Bearing Carrier Nuts: **40 ft. lbs. (54 Nm)**

26. Install ***new*** brake caliper mounting bolts and torque to specification.



= T
Rear Caliper Mounting Bolts: **44 ft. lbs. (60 Nm)**

⚠ CAUTION
New bolts have a pre-applied locking agent which is destroyed upon removal. Always use new brake caliper mounting bolts upon assembly.

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27. Install rear wheels and wheel nuts. Torque to specification.

= T
Wheel Nuts: **Steel Wheels: 27 ft. lbs. (37 Nm)** **Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)**

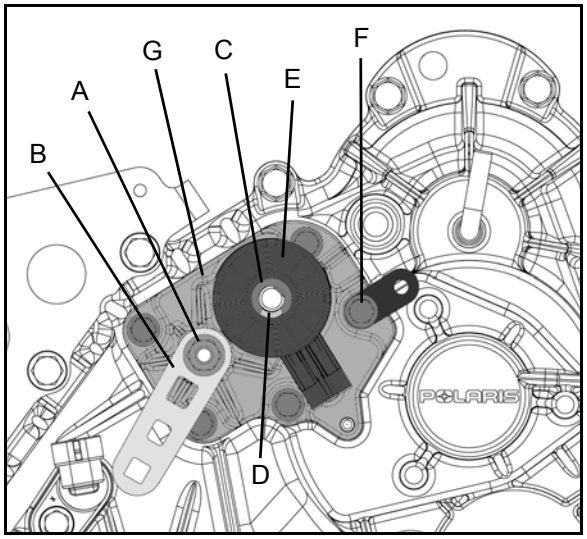
28. Properly lower the vehicle.
29. Verify all wire and hose routings are correct. Connect the (-) negative battery cable.
30. Install the engine service panel and seats.
31. If transmission lubricant was drained, fill the transmission with the specified amount of **Polaris AGL Plus** (see Chapter 2 "Transmission Lubrication").

=
Recommended Transmission Lubricant: AGL Plus (PN 2878068) (Quart) **Capacity:** 44 oz. (1300 ml)

Transmission Disassembly

NOTE: Refer to the exploded view at the end of this chapter as a reference.

1. Place the transmission in High gear before disassembly.
2. Drain and properly dispose of the transmission lubricant (see Chapter 2).
3. Remove the bellcrank nut (A) and bellcrank (B).



4. Remove the E-clip (C) that retains the spring washer (D), flat washer (D) and gear switch (E). Remove the switch.
5. Remove the sector cover bolts (F) and remove the sector cover (G).

NOTE: Removal can be aided by using your thumbs to press in on the shafts while pulling out the cover with your fingers.

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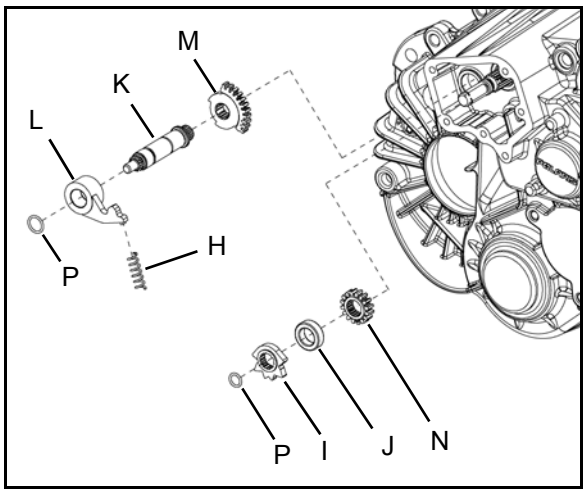
6. Remove the compression spring (H).



7. Remove the detent star (I). Note how the detent star fits onto the splined shaft with the raised edge facing outward for reassembly.

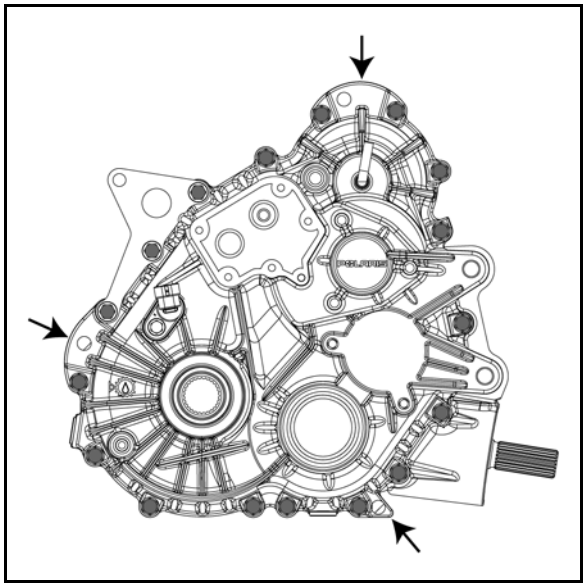
8. Remove the spacer (J).

9. Remove the shift shaft (K), detent pawl (L) and the shift sector gears (M and N).

IMPORTANT: Note the timing marks on the shift gears (M and N) for reassembly purposes.

10. Remove the O-rings (P) from each shaft and discard. Use new O-rings upon assembly.

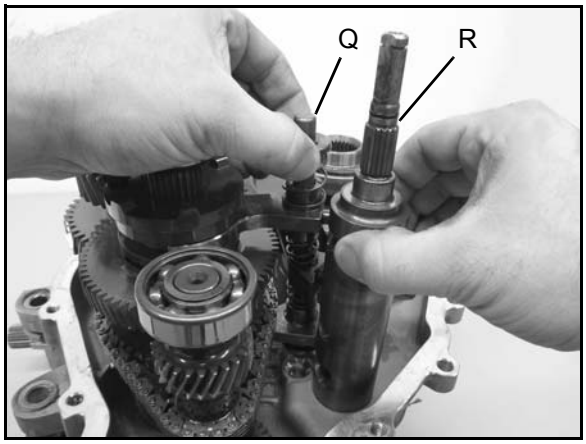
11. Remove all the transmission case bolts. Using suitable pry bars, remove the cover using the designated pry points (indicated by the black arrows in the illustration below).



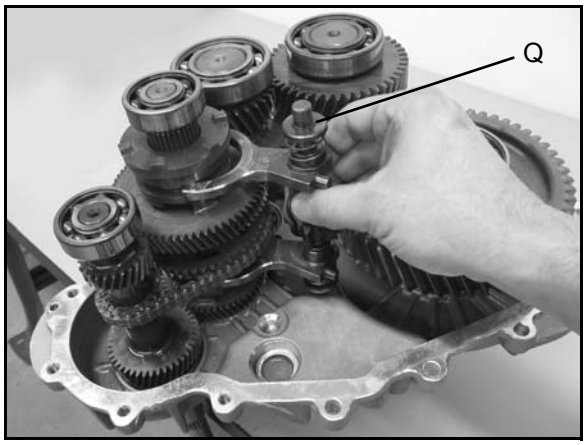
CAUTION

Do not pry on case sealing surfaces. Use only the designated pry points on the transmission.

12. Lift up on the shift shaft rail (Q) and move the rail assembly rearward to allow the shift fork pins to be removed from the shift drum (R). Remove the shift drum (R) from the transmission housing.



13. Remove the shift shaft rail (Q) and shift forks from the transmission housing as an assembly.



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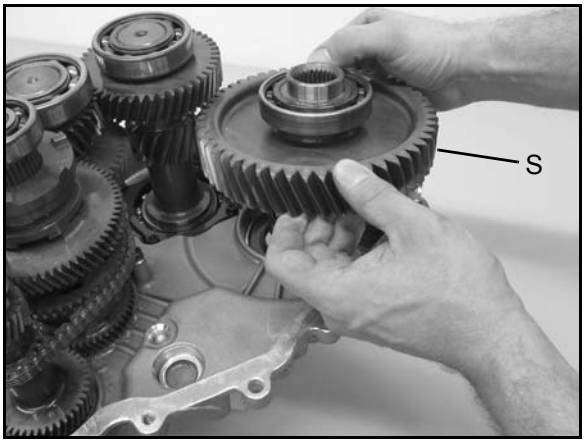
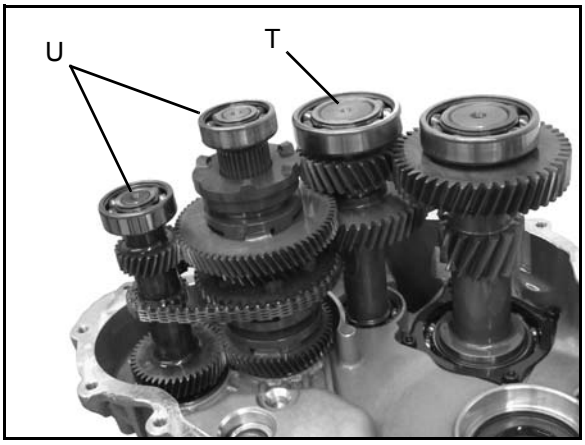
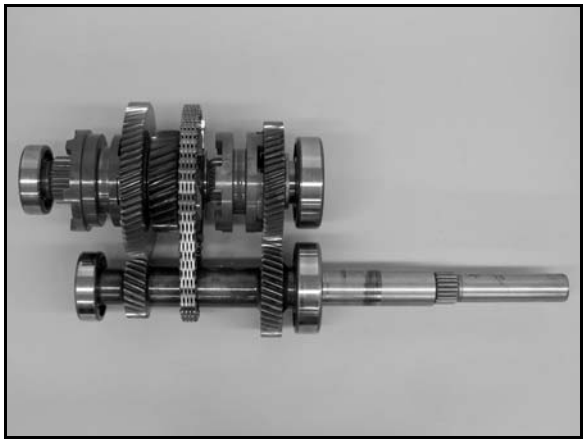
14. Remove the rear output shaft assembly (S) by lifting underneath the gear or by tapping the shaft from the opposite side.



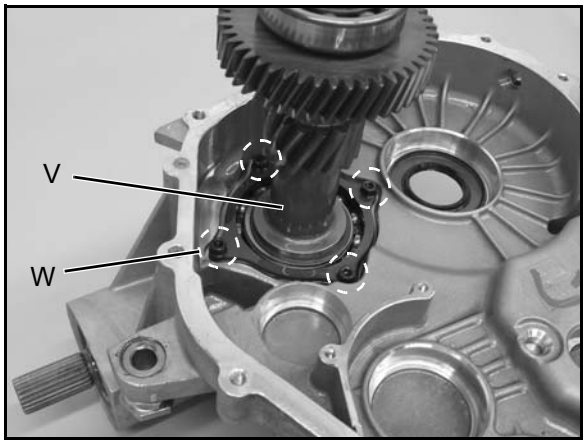
15. Remove the idler gear shaft assembly (T) and gear cluster assembly (U) from the transmission housing by pulling both assemblies straight up.



16. Place the gear cluster assembly on a clean surface for inspection. If disassembly is required, refer to “Gear Cluster Disassembly”.



17. Using a 5 mm Allen wrench, remove the screws that secure the pinion shaft assembly (V). Lift the pinion shaft assembly straight up to remove it from the housing. Note the longer screw (W) that locks the snorkel tube.



18. Remove all seals from the gearcase halves and clean the cases in preparation for assembly.

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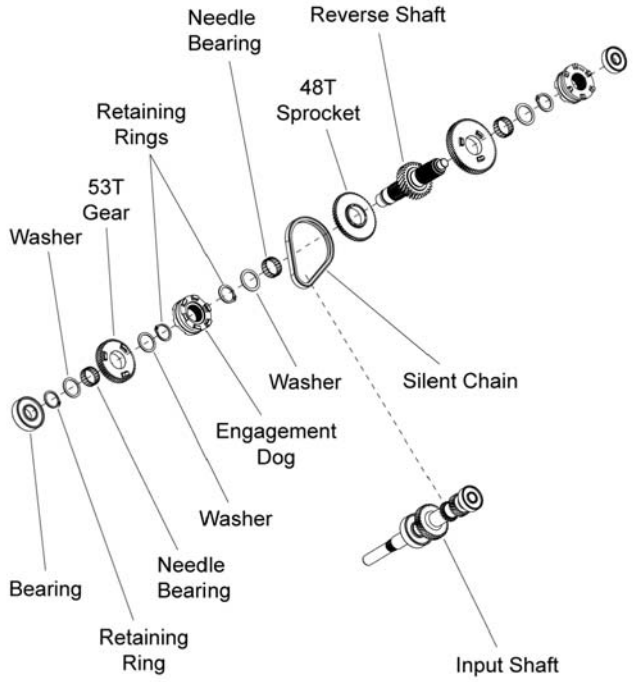
Gear Cluster Disassembly

19. Remove the bearing from the reverse shaft using a bearing puller. Remove the retaining ring and slide the washers, 53T gear and needle bearing off the reverse shaft (see Figure 8-1).

Figure 8-1



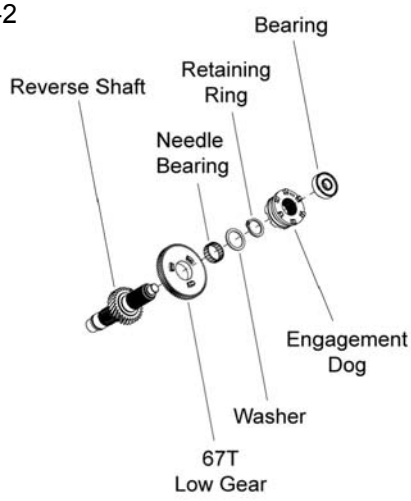
20. Remove the retaining ring and engagement dog from the reverse shaft (see Figure 8-1).

21. Remove the retaining ring, washer, needle bearing, and sprocket from the reverse shaft (see Figure 8-1).

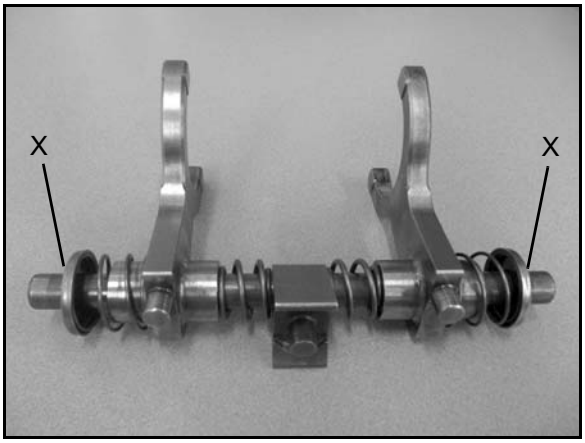
22. Tilt the two shafts towards each other and remove the silent chain from the two shafts.

23. If necessary, disassemble the other end of the reverse shaft. Remove the bearing, engagement dog, retaining ring, washer, gear and needle bearing from the reverse shaft (see Figure 8-2).

Figure 8-2



24. To disassemble the shift shaft rail remove the snap ring (X) 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.

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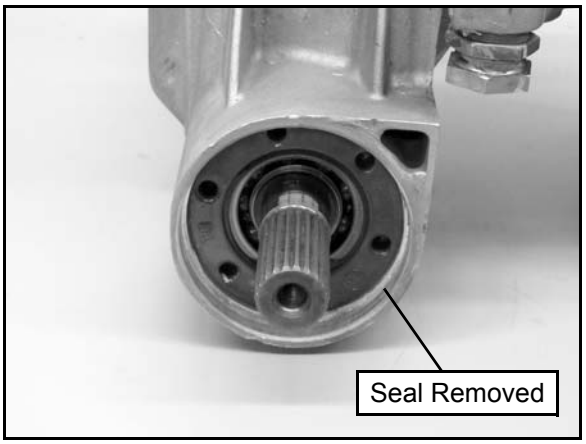
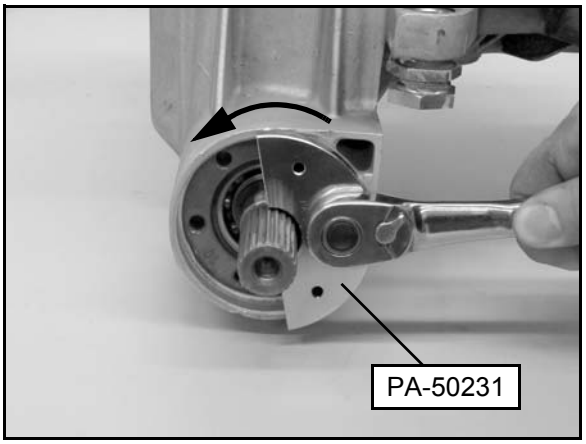
Snorkel Shaft Removal / Disassembly

CAUTION
The pinion shaft must be removed prior to removing the snorkel shaft assembly. Failure to remove pinion shaft, will result in damage to the snorkel shaft.

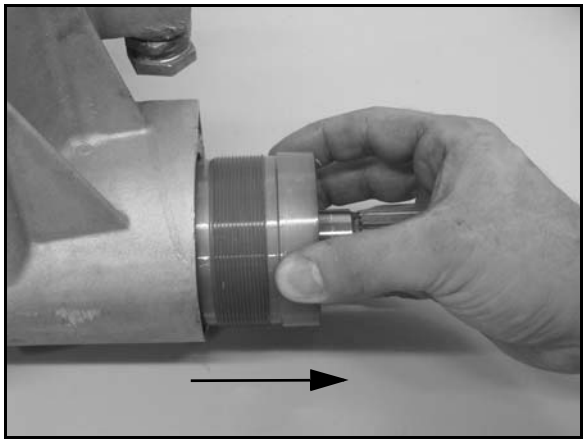
25. Extract the seal from the snorkel shaft to access the snorkel tube for removal.



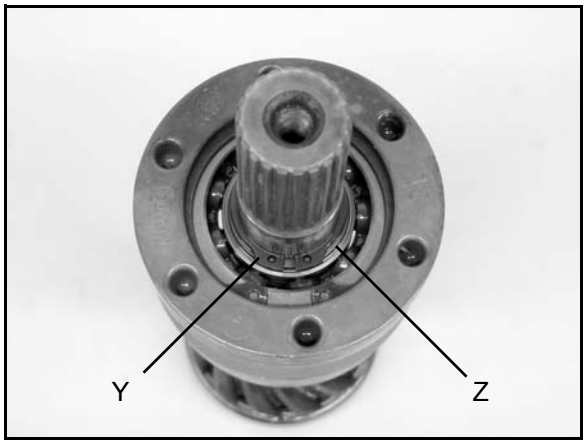
26. Using the Snorkel Tool (PA-50231), fully loosen the snorkel tube.



27. Remove the snorkel tube and shaft assembly from the transmission case.

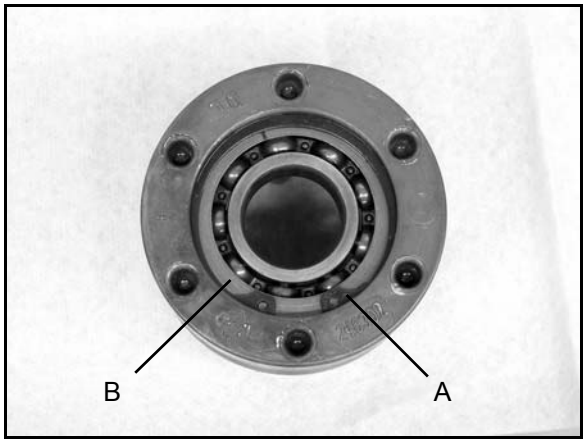


28. Remove the snap ring (Y) and shim (Z) from the snorkel shaft.



29. Use an arbor press to remove the snorkel tube from the snorkel shaft.

30. Remove the snap ring (A) and shim (B) retaining the bearing in the snorkel tube.



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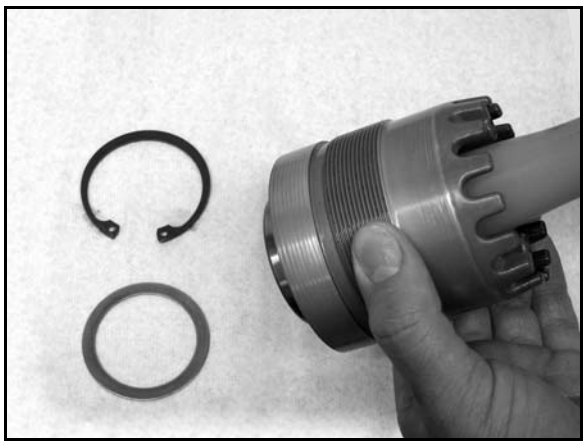
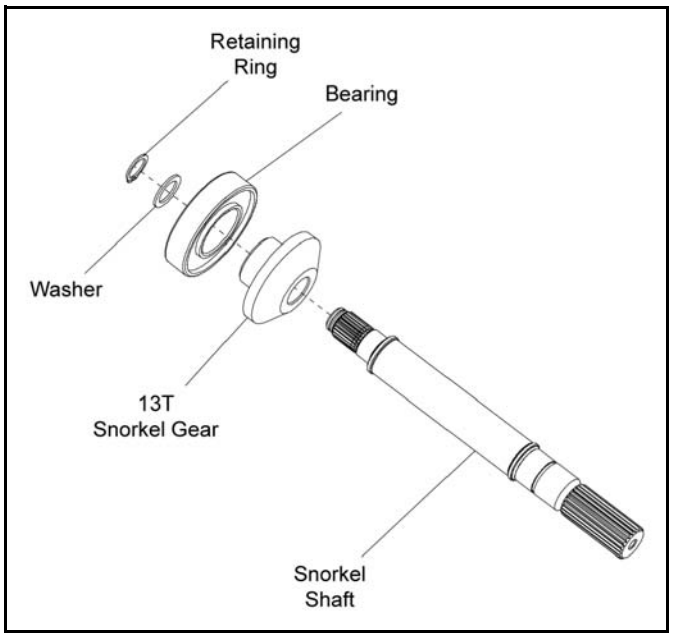
31. Lightly tap on the bearing from the opposite side to remove it from the snorkel tube.



32. Remove the retaining ring to remove the remaining washer, bearing and gear from the snorkel shaft.



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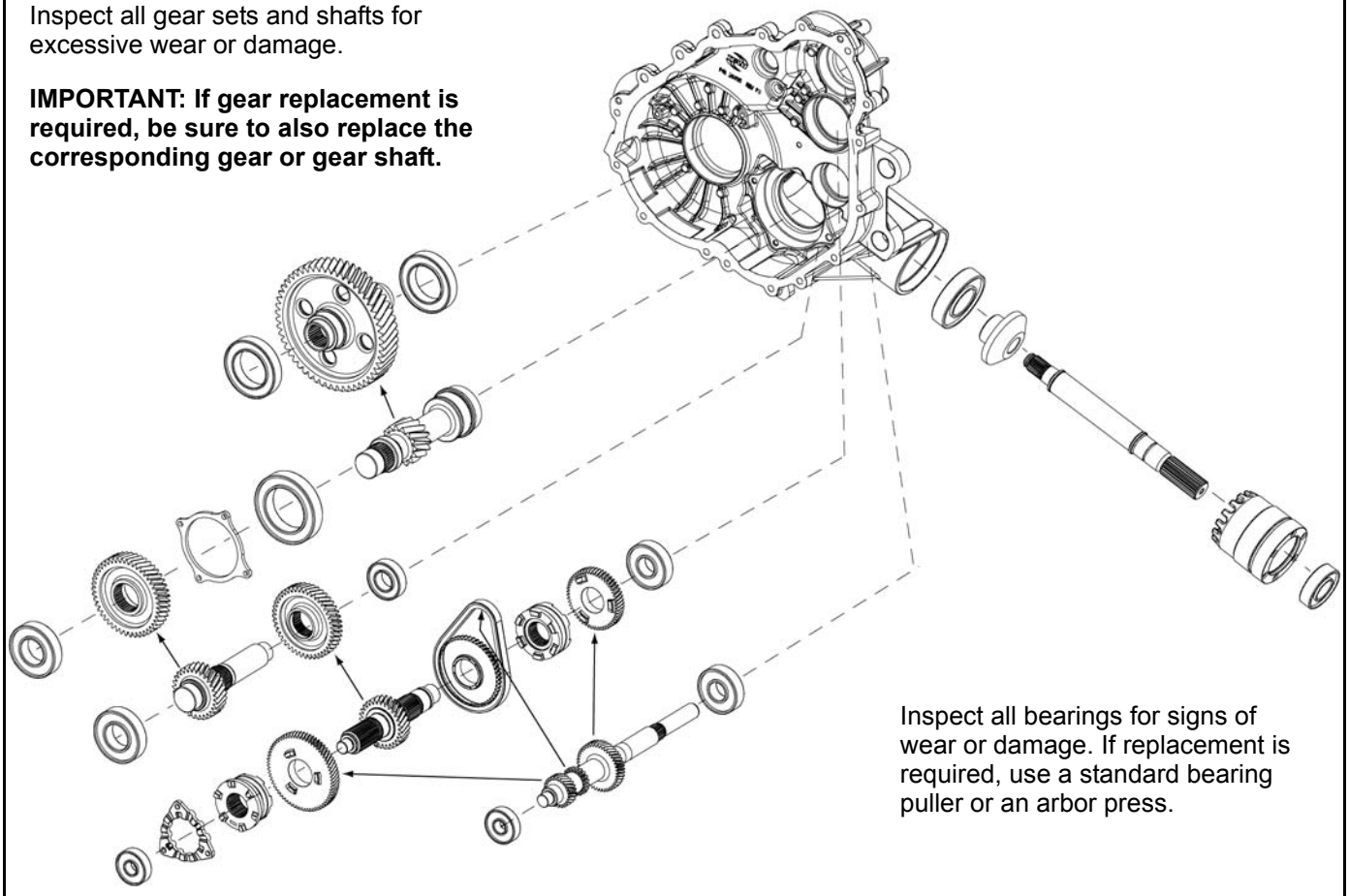
Gear / Shaft / Bearing Inspection

Inspect all gear sets and shafts for excessive wear or damage.

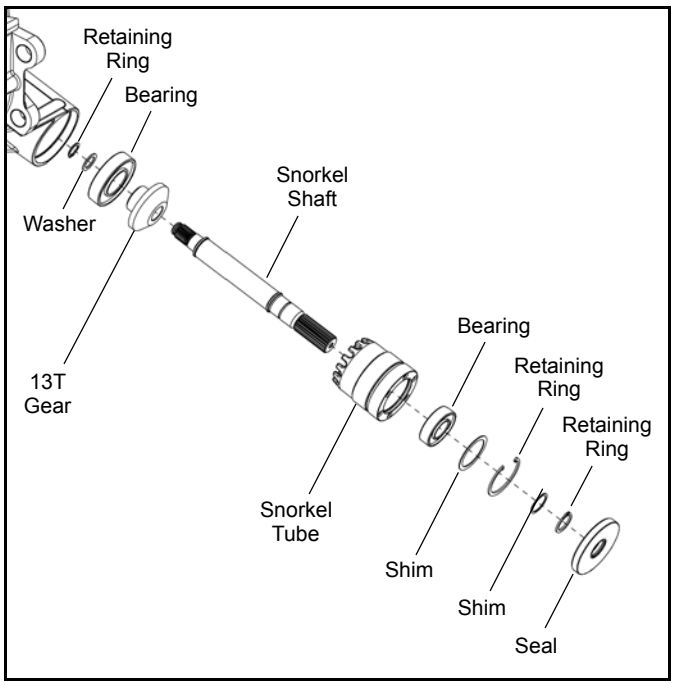
IMPORTANT: If gear replacement is required, be sure to also replace the corresponding gear or gear shaft.



Inspect all bearings for signs of wear or damage. If replacement is required, use a standard bearing puller or an arbor press.

Snorkel Gear Backlash Procedure

1. Reassemble the snorkel tube and snorkel shaft assembly by reversing the disassembly procedure (see “Snorkel Shaft Removal / Disassembly” in previous section).

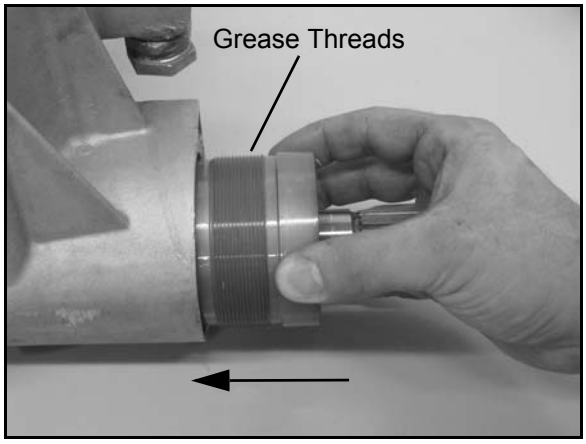


2. After the 13T gear and bearing are pressed onto the snorkel shaft (flush to the shoulder), install the washer and new retaining ring.

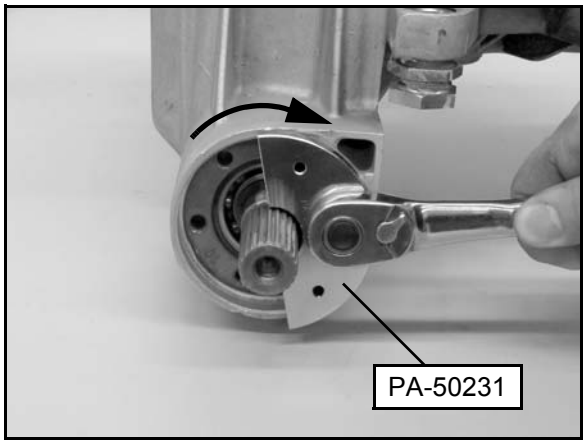
3. Press the gear back towards the retaining ring. Avoid excessive force so the retaining ring is not damaged or pre-stressed significantly.

IMPORTANT: Failure to press the gear back against the washer and retaining ring will lead to a gear backlash change after vehicle is placed into service.

4. Apply a small amount of white lithium grease or Anti-Seize on the threads of the snorkel tube.



5. Install the snorkel shaft into the gearcase. Using the Snorkel Tool (PA-50231), tighten the snorkel tube until it is lightly seated in the transmission housing.



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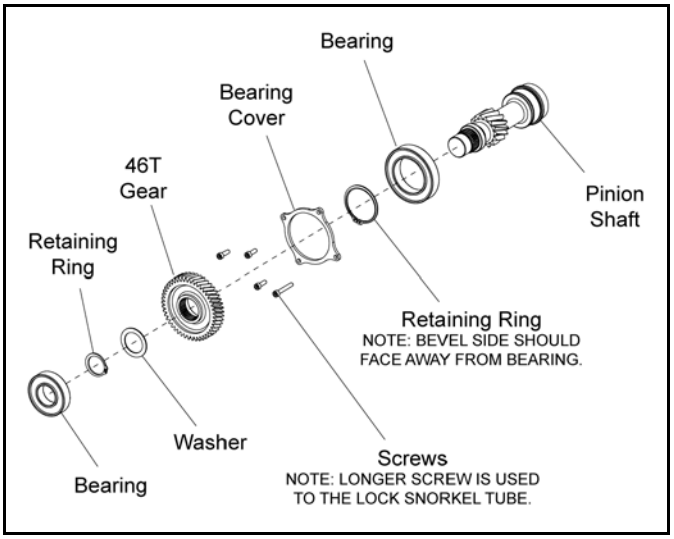
6. Inspect the pinion shaft assembly. Replace bearings if needed. Inspect each gear for damage, chips or abnormally worn teeth.

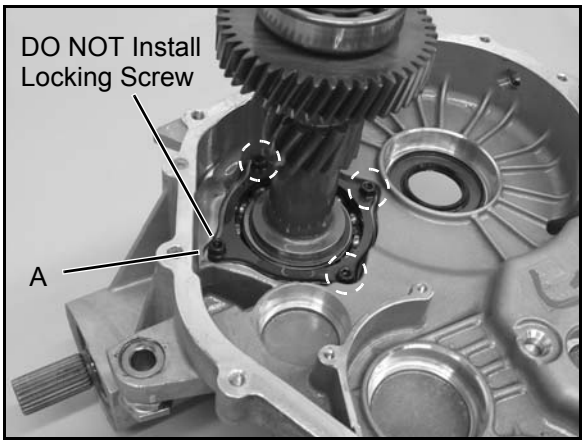


NOTE: If pinion shaft was disassembled, the bearing cover must be installed on the shaft before installing the 46T gear.

7. Install the pinion shaft assembly. Be sure to properly mesh the snorkel shaft bevel gear with the pinion shaft bevel gear.

8. Apply Loctite 242® to the threads of the bearing cover retaining screws.

9. Using a 5 mm Allenwrench, install only the (3) screws that secure the pinion shaft assembly as shown below. Leave the longer locking screw (A) out at this point.



IMPORTANT: DO NOT install the longer screw (A). Installing the longer screw will lock the snorkel tube and not allow for backlash setting adjustment.

10. Torque the bearing cover retaining screws to specification.

= T
Bearing Cover Retaining Screws: **8-10 ft. lbs. (11-14 Nm)**

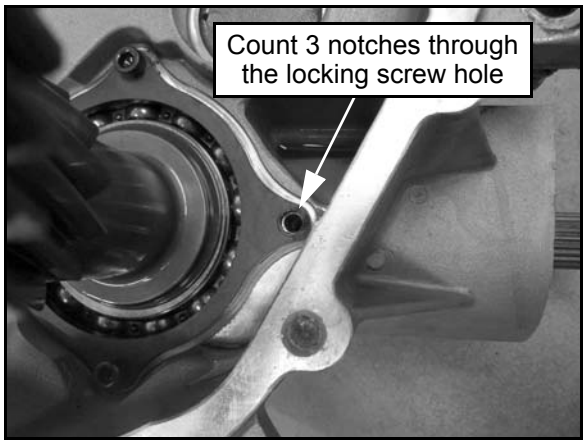
11. Rotate the snorkel tube ***counterclockwise*** using the snorkel tool (PA-50231) until the snorkel gear and pinion gear have 'zero' backlash.

IMPORTANT: DO NOT overtighten the snorkel tube when backing it out. At the 'zero' backlash position, you should still be able to turn the snorkel shaft using your fingers, but it will feel rough and may have some tight spots.

12. Look down into the transmission housing to see the snorkel locking screw hole opening to reference your starting point.

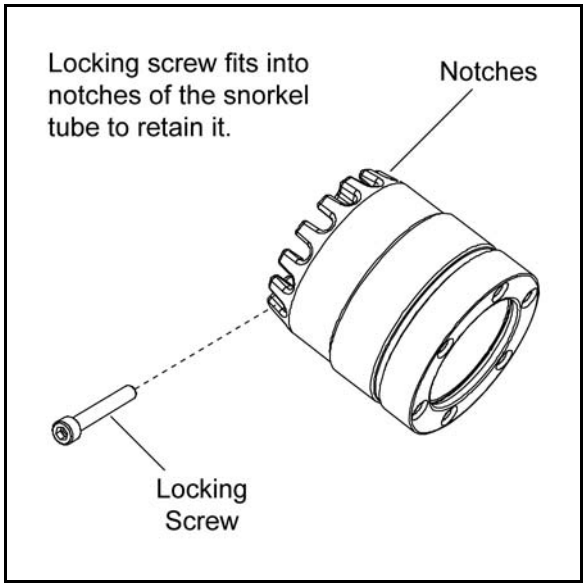
NOTE: If you have a hard time seeing into the hole, insert a small Allen wrench, punch or screwdriver into the hole to feel when the notch is aligned with the hole.

13. Slowly rotate the snorkel tube ***clockwise*** while counting the number of notches passing through the hole opening as you rotate the tube. Rotate the snorkel tube to the **3rd** notch from the 'zero' backlash position obtained in step 11.

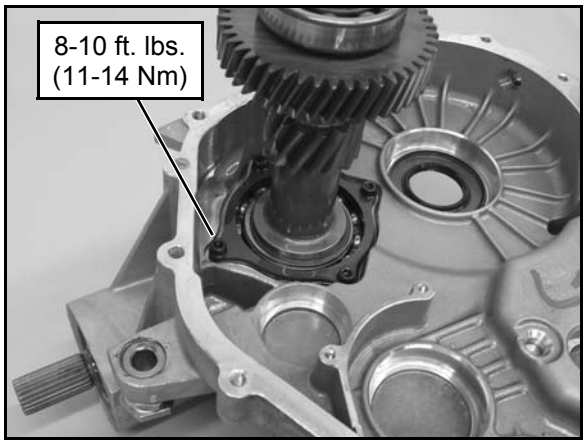


14. Check the pinion shaft gear backlash again by feel. If the pinion shaft gear lash appears to be too tight, rotate the snorkel shaft ***clockwise*** to the next notch (4th notch).

15. Once the backlash is set, apply Loctite 242® to the threads and install the locking screw to secure the snorkel tube.



16. Torque the locking screw to specification.



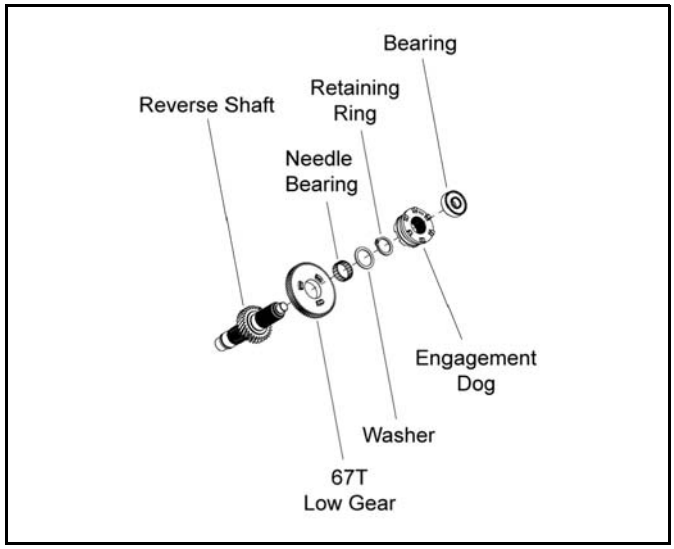
= T
Snorkel Locking Screw: **8-10 ft. lbs. (11-14 Nm)**

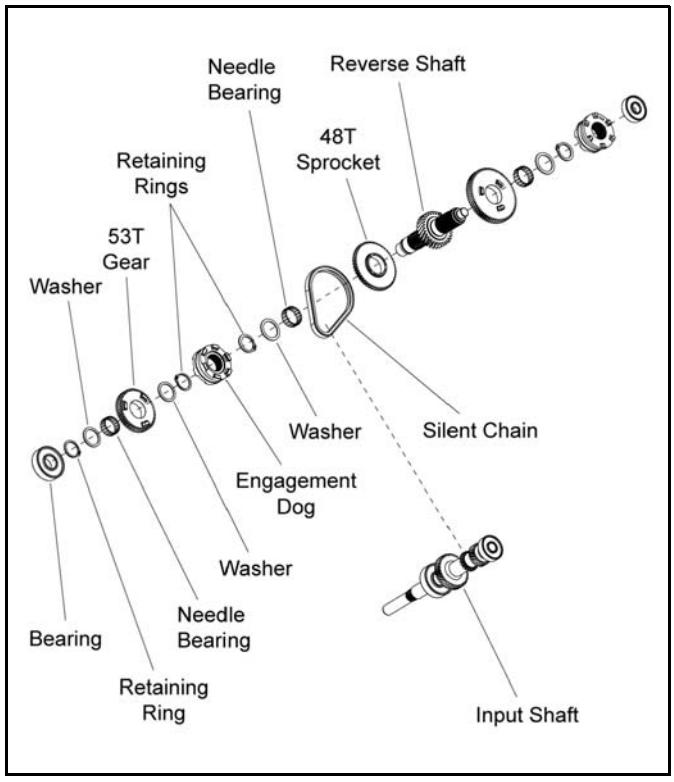
Transmission Assembly

IMPORTANT: The snorkel shaft and pinion shaft must be installed prior to transmission assembly. The snorkel shaft cannot be installed after assembling the transmission.

1. Clean both transmission case halves thoroughly. Inspect case half mating surfaces for damage.

2. Assemble the reverse shaft assembly and input shaft assembly if previously disassembled (see illustrations).





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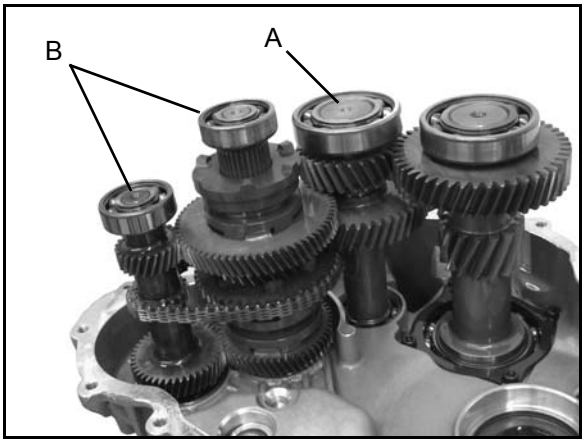
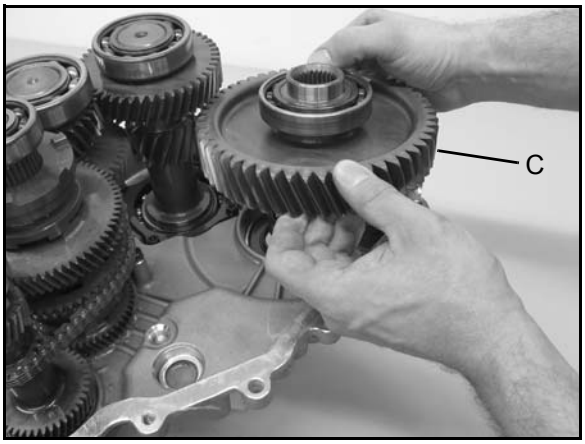
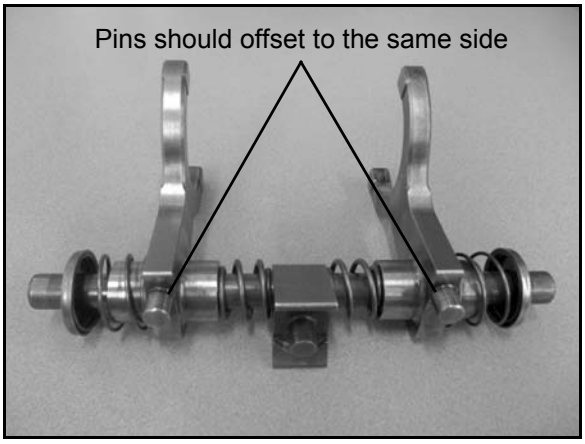
3. Install the idler gear shaft assembly (A) and gear cluster assembly (B) into the transmission housing, all at the same time.



4. Install the rear output shaft assembly (C).

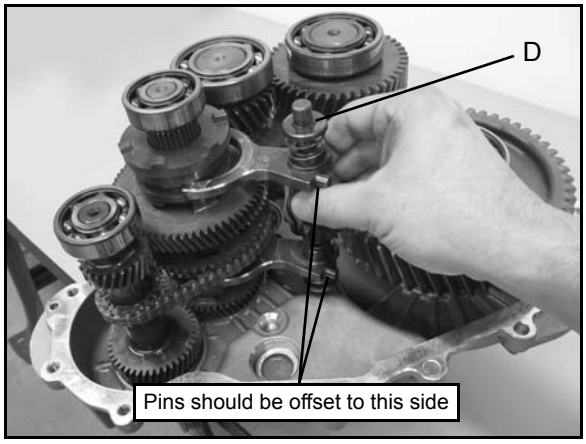


5. Assemble the shift shaft rail if previously disassembled.



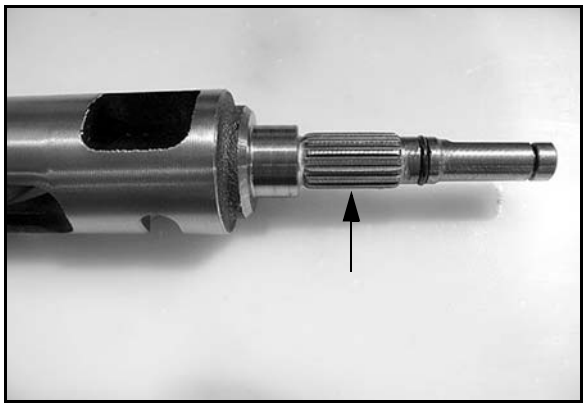
NOTE: Both shift forks need to be orientated the same way, so that the shift fork pins are both offset to the same side of the rail.

6. Install the shift shaft rail (D) and shift forks into the transmission housing as an assembly. Be sure the shift forks are engaged into the engagement dogs.

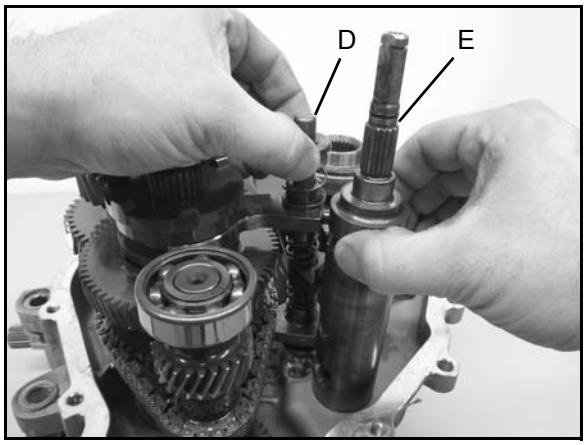


NOTE: Shift fork pins should be offset towards the input shaft as shown above.

7. Inspect the shift drum for any damage or wear. Inspect the splines of the shift drum.

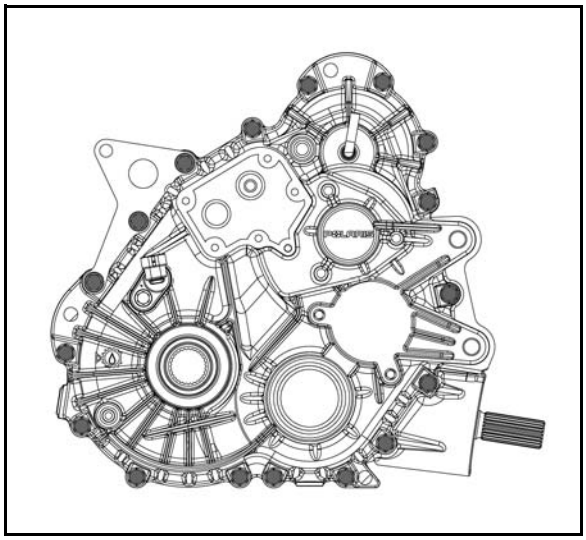


8. Install the shift drum (E) into the transmission housing. Lift up on the shift shaft rail (D) and move the rail assembly towards the shift drum to allow the shift fork ends to be installed into the shift drum (E).



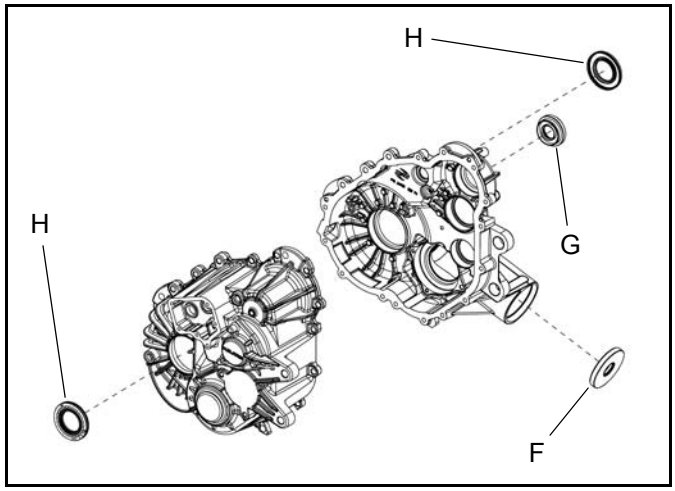
9. Apply a continuous bead of Crankcase 3 Bond Sealant (PN 2871557) to the left hand transmission mating surface.

10. Install the transmission case cover and retaining bolts. Torque bolts to specification.

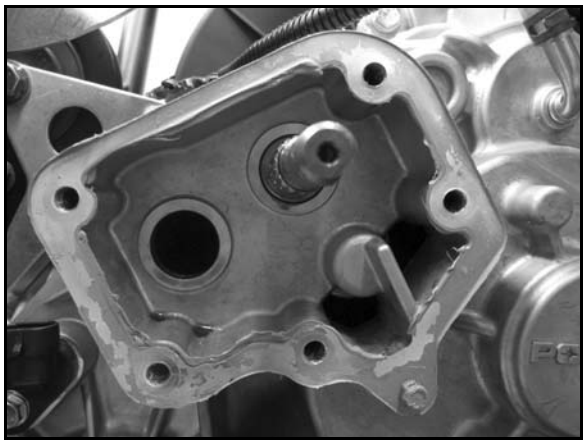


= T
Transmission Case Bolts: **15-20 ft. lbs. (20-27 Nm)**

11. Install new seals into the transmission case halves.
    - The snorkel shaft seal (F), should be pressed in until it seats against the housing counter-bore.
    - The input shaft seal (G), should be pressed in until it seats flush with the housing.
    - The rear output shaft seals (H), can be installed using a standard bushing installation tool. Seals should be installed just past the case lead-in chamfer (.070 in. or 1.8 mm from the outer face of the bore).



12. Thoroughly clean the shift shaft housing. **Be sure the transmission is in High gear prior to reassembly.**



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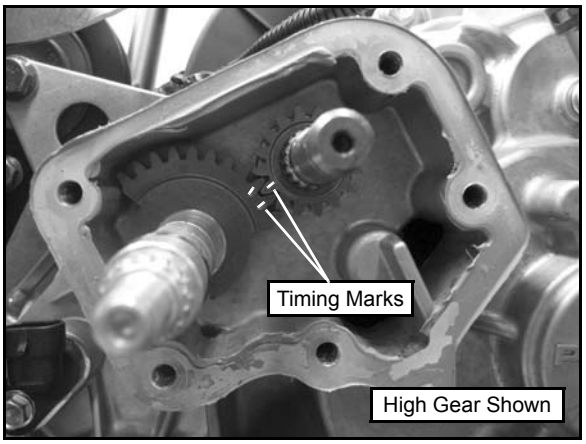
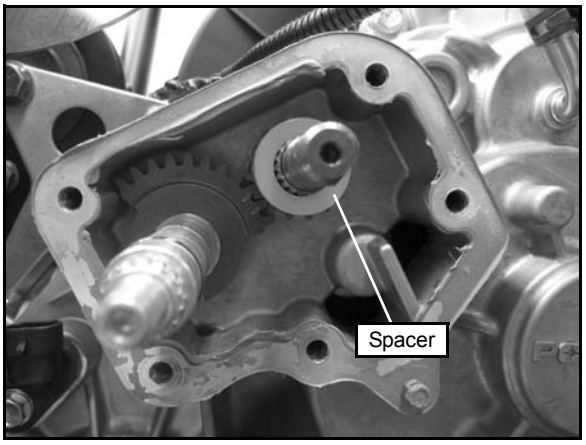
13. Install the sector gear (16T) onto the shift drum shaft. Install the shift shaft assembly and sector gear (11T) into the bushing pocket on the left side. Align the timing marks on the gears as shown.

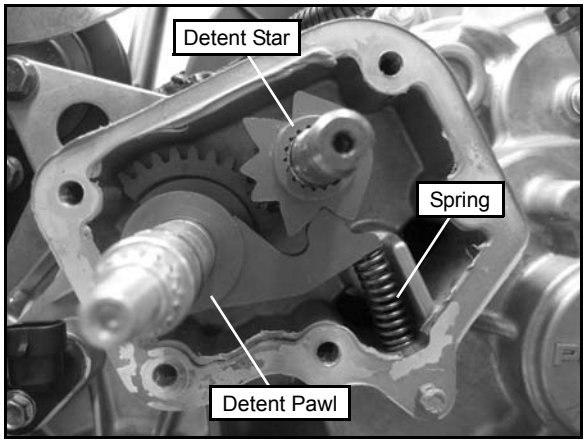


14. Install the spacer onto the shift drum shaft.

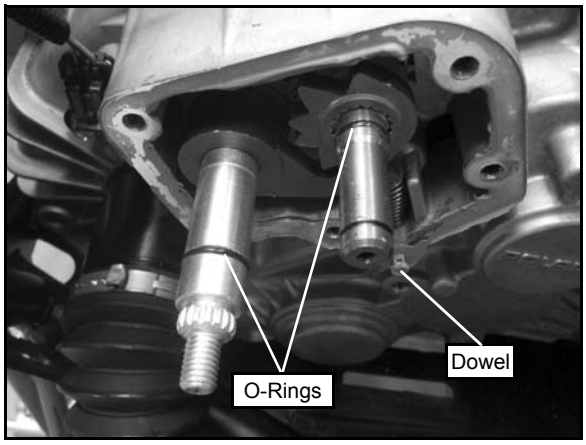


15. Install the detent star onto the shift drum shaft. Be sure to install the detent star with the raised edge facing outward and skip-tooth aligned.

16. Install the detent pawl onto the shift shaft and carefully install the compression spring.



17. Install a new O-ring on each shift shaft. Apply a small amount of white lithium grease on the O-rings, shift shafts and component contact surfaces prior to installing the sector cover.



18. Clean the transmission and gear sector cover mating surfaces thoroughly.

19. Apply Crankcase Sealant (3-Bond) (PN 2871557) onto the cover and transmission case mating surface.

20. Install the sector cover and align the transmission case dowel with the alignment hole. Install and torque the bolts to specification.

= T
Sector Cover Bolts: **7-9 ft. lbs. (9-12 Nm)**

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21. Install the transmission drain plug and torque to specification.

= T
Fill / Drain Plug: **10-14 ft. lbs. (14-19 Nm)**

22. Install the bellcrank onto the shift shaft. Note the key splined on the bellcrank and shift shaft. Install the nut and torque to specification.

= T
Bellcrank Nut: **12-18 ft. lbs. (16-24 Nm)**

23. Refer to "Transmission Installation" to complete the repair.

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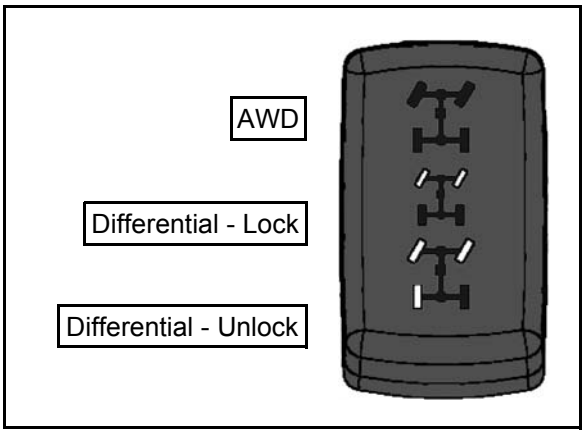
TRANSMISSION SERVICE (INTL)

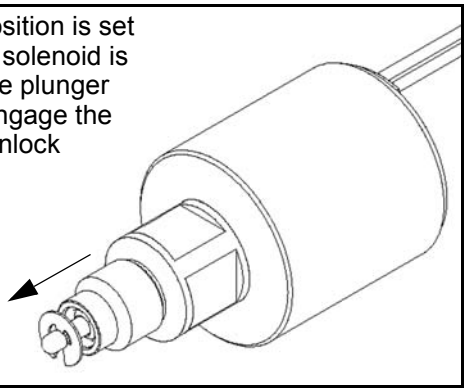
Differential Operation

The INT'L transmission has two traction operational modes: Differential Lock and Differential Unlock. Locking the rear differential is beneficial in low traction and rough terrain conditions. Unlocking the rear differential makes maneuvering easier and minimizes damage to terrain.



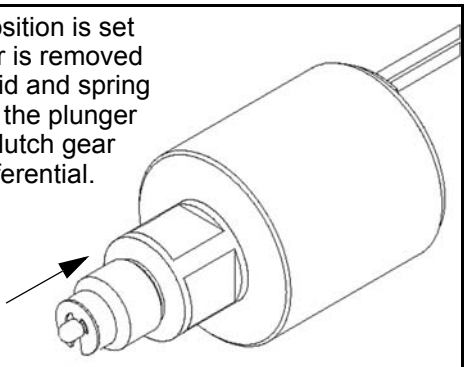
When "Differential-Unlock" is selected, the rear differential becomes unlocked for tighter turns. An electrical solenoid mounted in the rear portion of the gearcase actuates the shift fork. The solenoid plunger extends out to move the fork and slides the engagement dog away from the side gear that is part of the planetary differential assembly. This unlocks the rear differential. The rear drive shafts are now dependent on the differential allowing for tighter turns.

When switch position is set to "Unlock", the solenoid is powered and the plunger extends to disengage the side gear and unlock the differential.

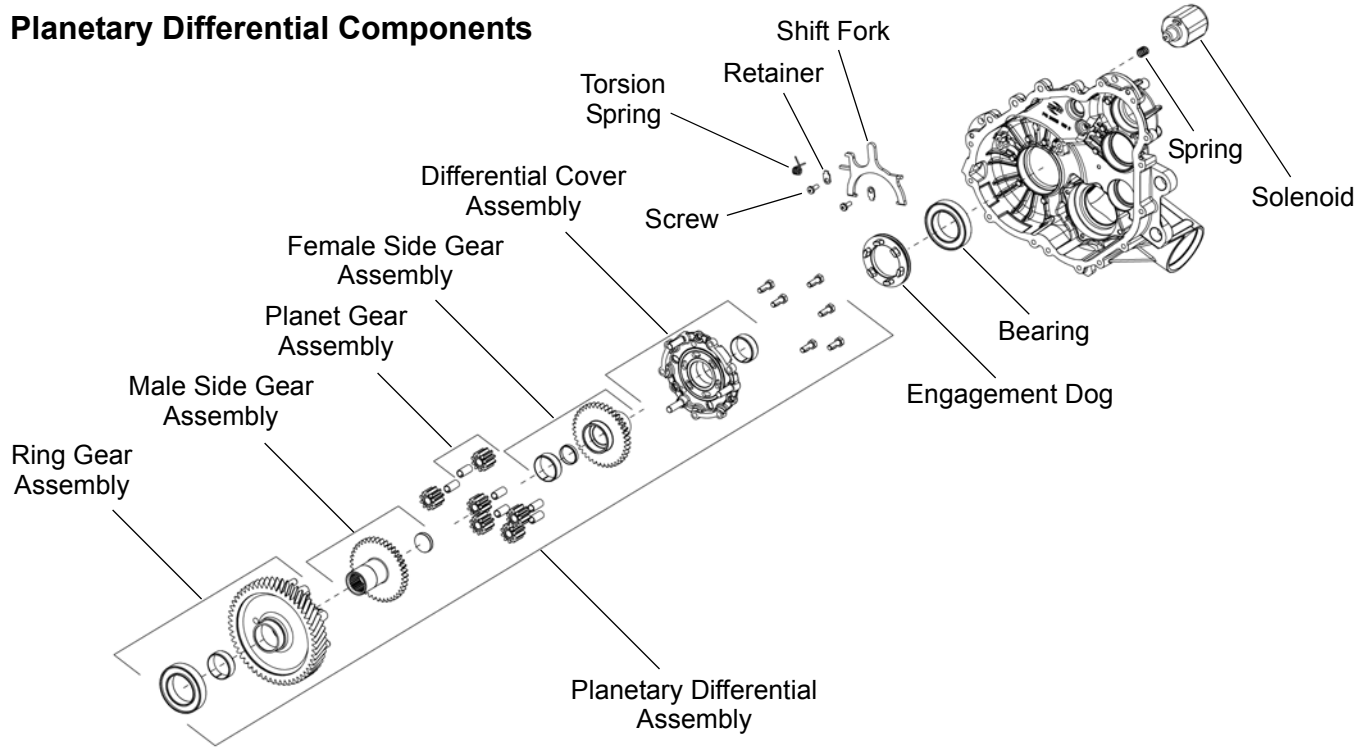


When "Differential-Lock" is selected, power is removed from the electrical solenoid allowing the solenoid plunger to retract. Spring tension moves the shift fork back into place and mates the engagement dog to the side gear that is part of the planetary differential assembly. This locks the rear differential as a solid rear axle, increasing traction.

When switch position is set to "Lock", power is removed from the solenoid and spring tension retracts the plunger to engage the clutch gear and lock the differential.



Planetary Differential Components



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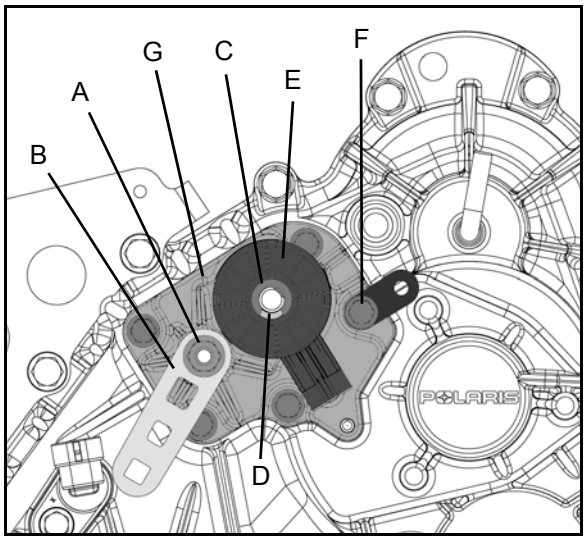
Transmission Disassembly

NOTE: Refer to the exploded view at the end of this chapter as a reference.

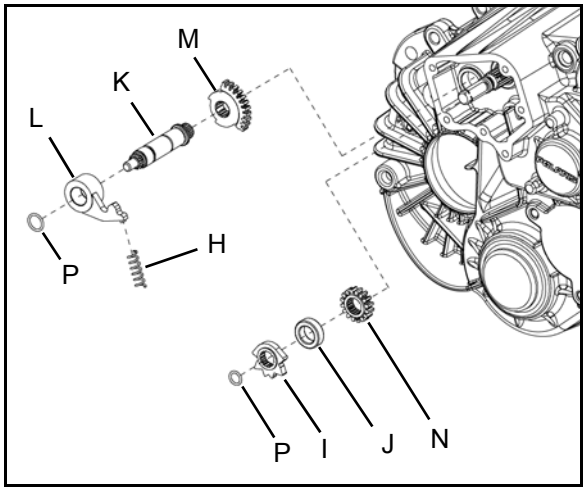
1. Place transmission in High gear before disassembly.
2. Drain and properly dispose of the transmission lubricant (see Chapter 2).
3. Remove the bellcrank nut (A) and bellcrank (B).



4. Remove E-clip (C) that retains spring washer (D), flat washer (D) and gear switch (E). Remove the switch.
5. Remove the sector cover bolts (F) and remove the sector cover (G).

NOTE: Removal can be aided by using your thumbs to press in on the shafts while pulling out the cover with your fingers.

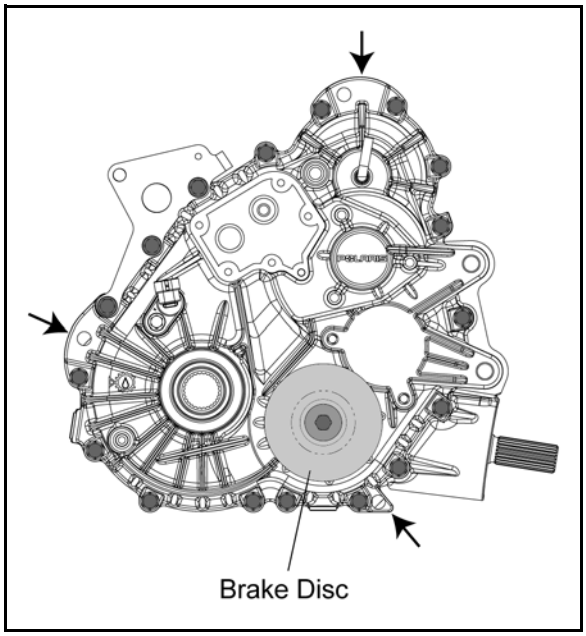
6. Remove the compression spring (H).



7. Remove the detent star (I). Note how the detent star fits onto the splined shaft with the raised edge facing outward for reassembly.
8. Remove the spacer (J).
9. Remove the shift shaft (K), detent pawl (L) and the shift sector gears (M and N).

IMPORTANT: Note the timing marks on the shift gears (M and N) for reassembly purposes.

10. Remove the O-rings (P) from each shaft and discard. Use new O-rings upon assembly.
11. Remove the bolt and washer retaining the brake disc to transmission pinion shaft. Remove disc from shaft.
12. Remove all transmission case bolts. Using suitable pry bars, remove the cover using the designated pry points (indicated by black arrows in illustration below).



⚠ CAUTION

Do not pry on case sealing surfaces. Use only the designated pry points on the transmission.

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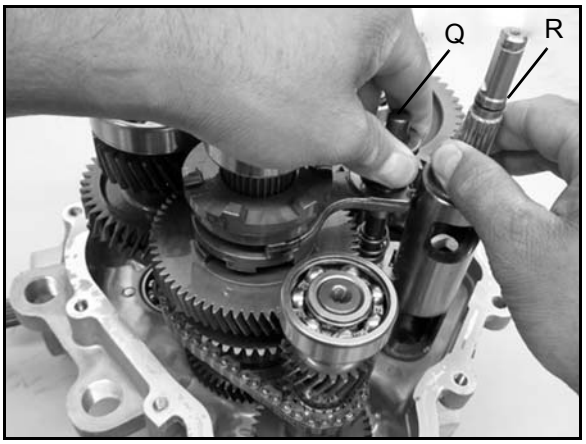
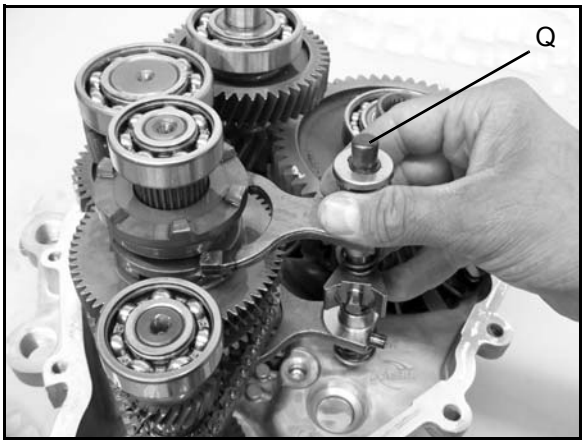
13. Lift up on the shift shaft rail (Q) and move the rail assembly rearward to allow the shift fork pins to be removed from the shift drum (R). Remove the shift drum (R) from the transmission housing.

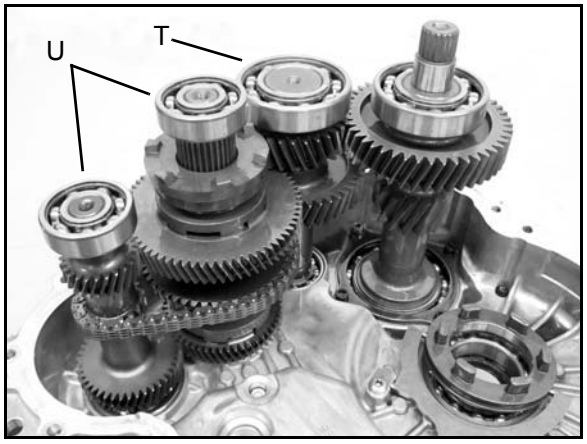


14. Remove the shift shaft rail (Q) and shift forks from the transmission housing as an assembly.

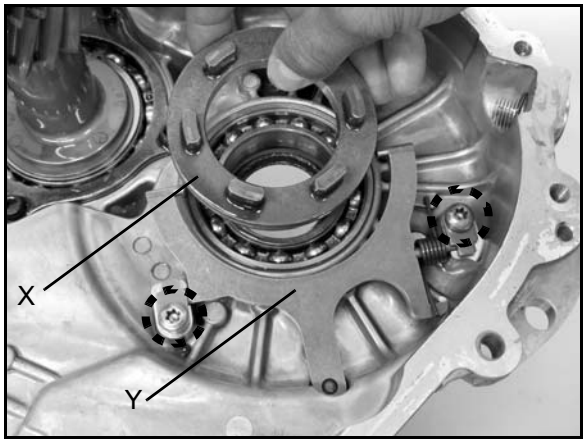


15. Remove the rear output shaft assembly (S) by lifting underneath the gear or by tapping the shaft from the opposite side. If use of a pry bar is necessary, take care not to pry on sealing surfaces of case.

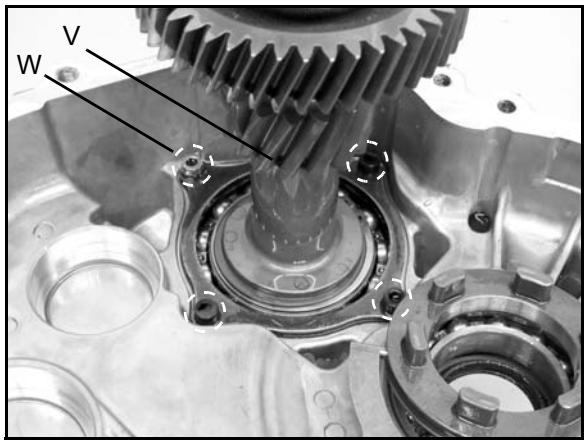
16. Remove the idler gear shaft assembly (T) and gear cluster assembly (U) from the transmission housing by pulling both assemblies straight up.



17. Place the idler gear shaft assembly (T) and gear cluster assembly (U) on a clean surface for inspection. If disassembly is required, refer to "Gear Cluster Disassembly".
18. Slide engagement dog (X) off of shift fork guides.
19. Remove (2) screws and retaining plates, then lift shift fork (Y) and torsion spring out of transmission housing.



20. Using a 5 mm Allen wrench, remove the screws that secure the pinion shaft assembly (V). Lift the pinion shaft assembly straight up to remove it from the housing. Note the longer screw (W) that locks the snorkel tube.

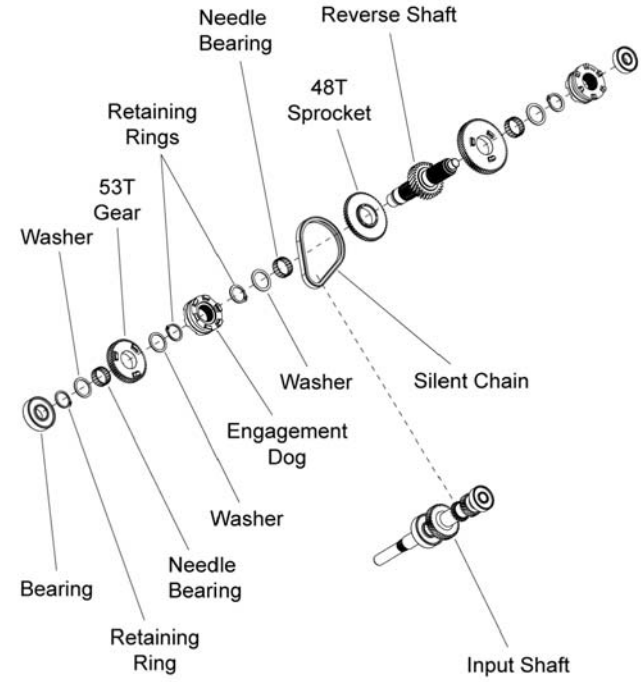


21. Remove all seals from the gearcase halves and clean the cases in preparation for assembly.

Gear Cluster Disassembly

22. Remove the bearing from the reverse shaft using a bearing puller. Remove the retaining ring and slide the washers, 53T gear and needle bearing off the reverse shaft (see Figure 8-1).

Figure 8-1



23. Remove the retaining ring and engagement dog from the reverse shaft (see Figure 8-1).
24. Remove the retaining ring, washer, needle bearing, and sprocket from the reverse shaft (see Figure 8-1).
25. Tilt the two shafts towards each other and remove the silent chain from the two shafts.

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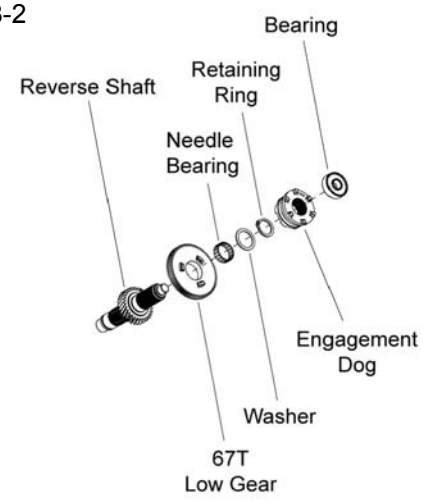
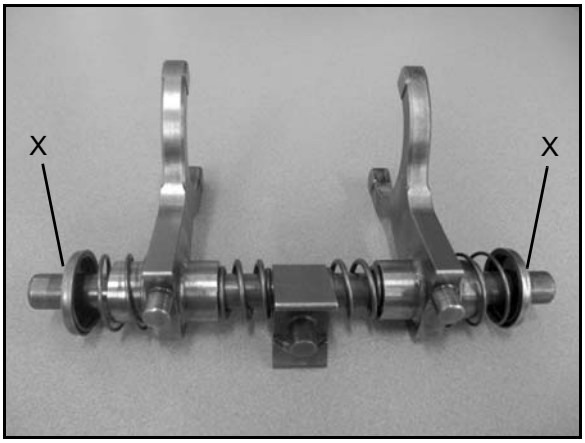
26. If necessary, disassemble the other end of the reverse shaft. Remove the bearing, engagement dog, retaining ring, washer, gear and needle bearing from the reverse shaft (see Figure 8-2).

Figure 8-2



27. To disassemble the shift shaft rail remove the snap ring (X) from the end of the shift rail on either side.



⚠ CAUTION

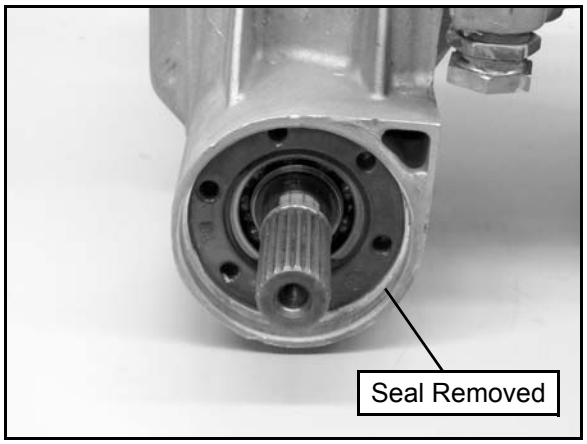
Use caution when disassembling the shift rail. The compressed springs on the shift rail may pop off causing eye or face injury.

Snorkel Shaft Removal / Disassembly

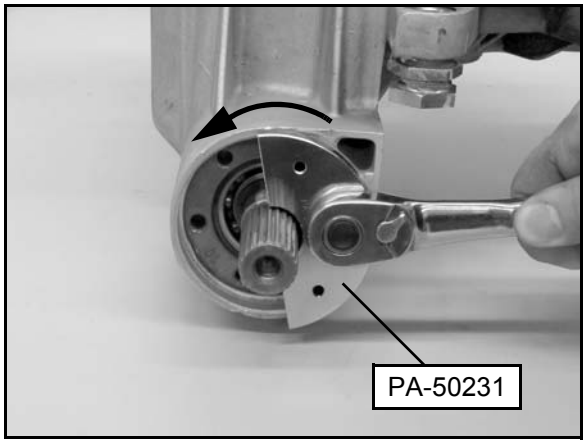
CAUTION

The pinion shaft must be removed prior to removing the snorkel shaft assembly. Failure to remove pinion shaft, will result in damage to the snorkel shaft.

28. Extract the seal from the snorkel shaft to access the snorkel tube for removal.



29. Using the Snorkel Tool (PA-50231), fully loosen the snorkel tube.



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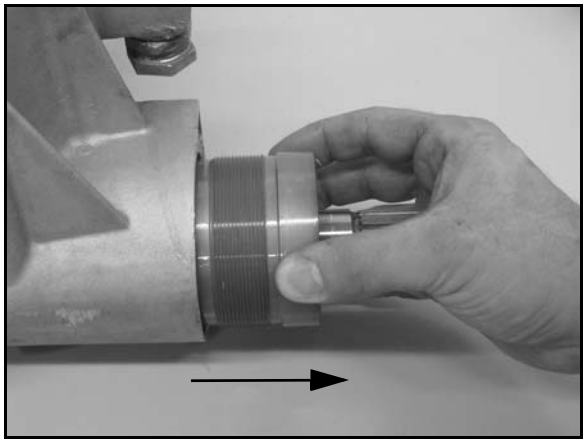
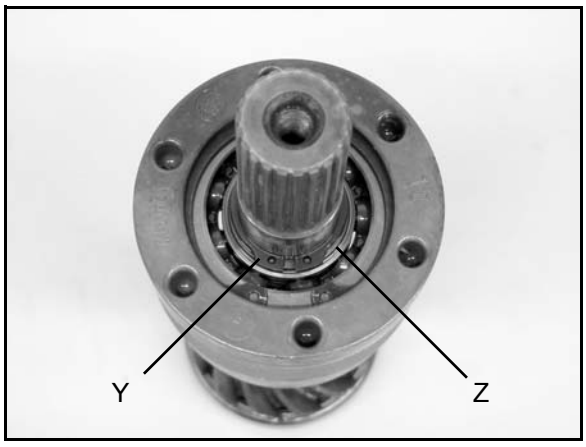
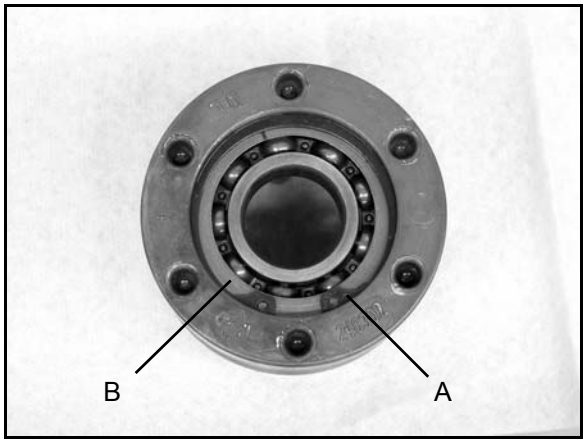
30. Remove the snorkel tube and shaft assembly from the transmission case.



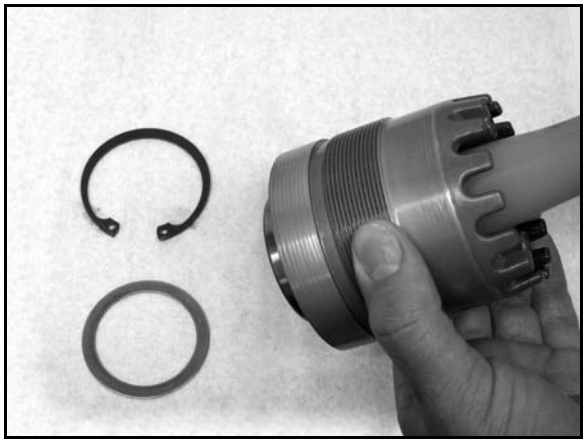
31. Remove the snap ring (Y) and shim (Z) from the snorkel shaft.



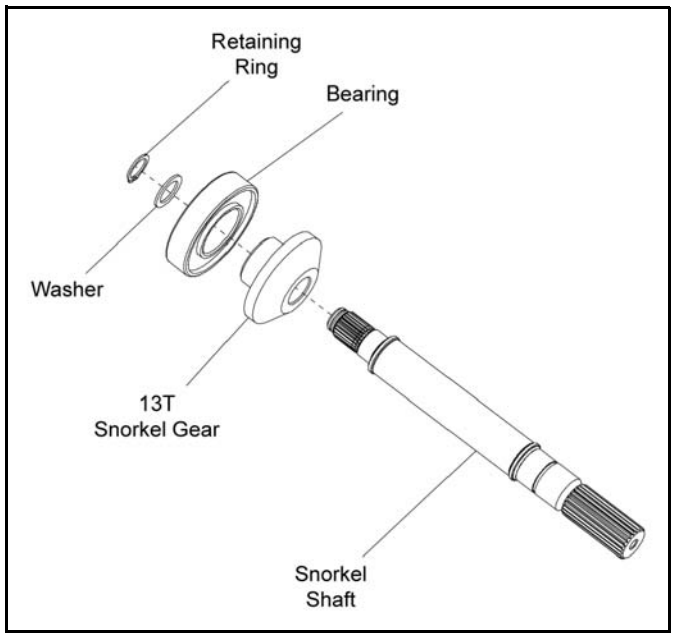
32. Use an arbor press to remove the snorkel tube from the snorkel shaft.
33. Remove the snap ring (A) and shim (B) retaining the bearing in the snorkel tube.



34. Lightly tap on the bearing from the opposite side to remove it from the snorkel tube.



35. Remove the retaining ring to remove the remaining washer, bearing and gear from the snorkel shaft.



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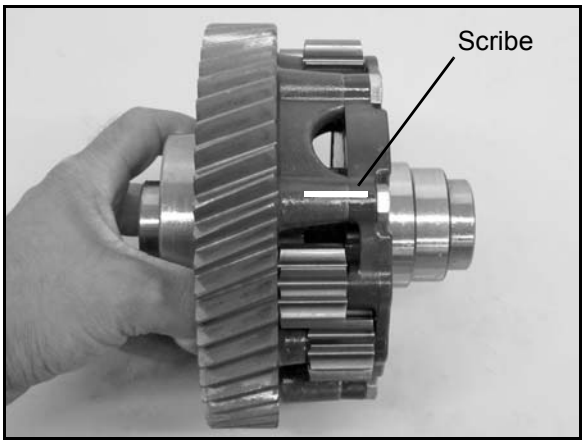
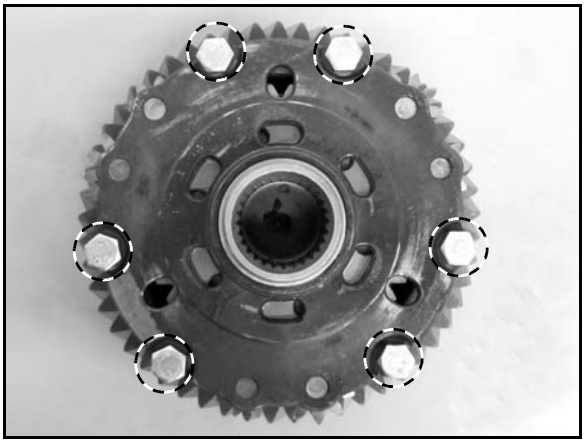
Planetary Differential Disassembly

NOTE: If the gearcase is completely assembled, perform the "Gearcase Disassembly and Inspection" procedure.

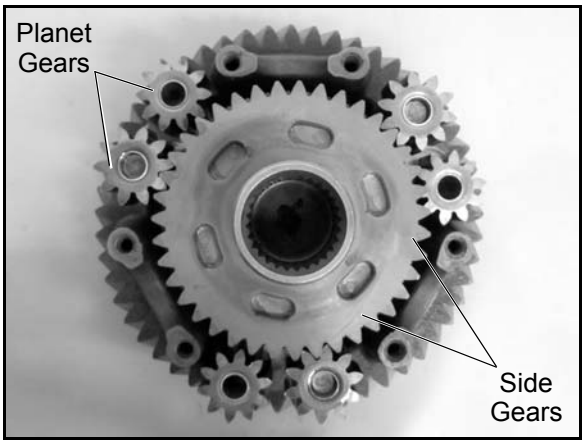
1. Use a scribe to mark the differential cover and ring gear prior to disassembly.



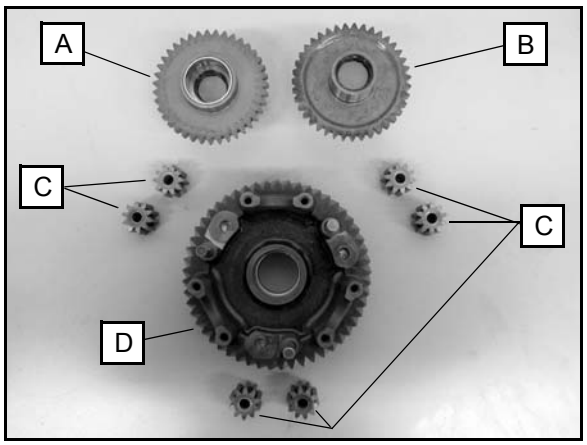
2. Remove the (6) screws retaining the differential cover and remove the cover.



3. Remove the (6) planet gears and each side gear assembly from the ring gear.



4. Inspect the female side gear (A), male side gear (B), planet gears (C) and ring gear (D). Replace components or bushings as needed. Bushing replacement can be performed on all necessary differential components. If bushing replacement is required, proceed to Planetary Differential Bushing Replacement".

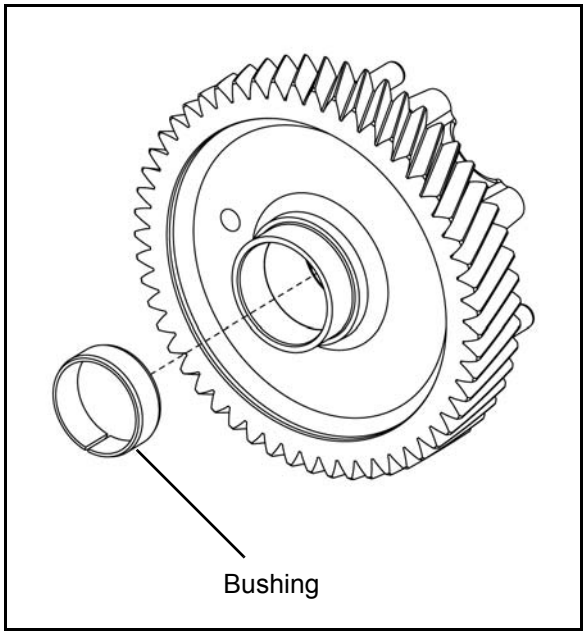


Planetary Differential Bushing Replacement

NOTE: If the differential is completely assembled, perform the "Planetary Differential Disassembly" procedure.

Ring Gear Bushing Replacement

1. Press the old bushing out of the ring gear.
2. Thoroughly clean the bore of the ring gear and check for any unwanted burs.
3. Press the new bushing into the ring gear housing.



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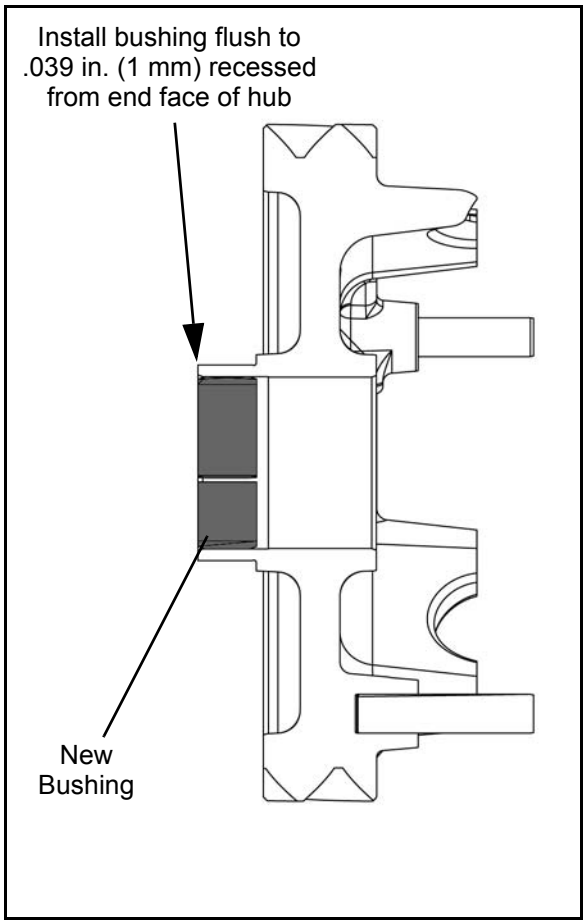
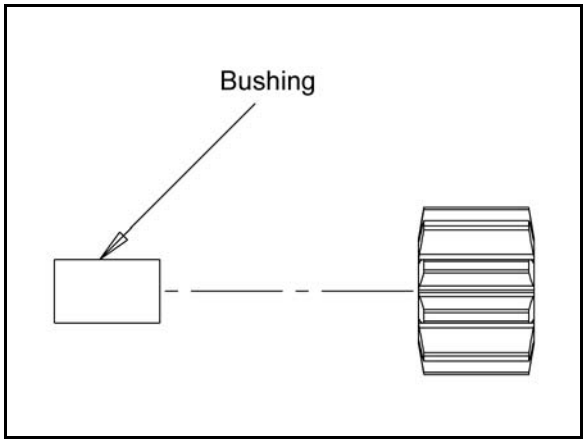
4. Install the bushing to the specified depth as shown.



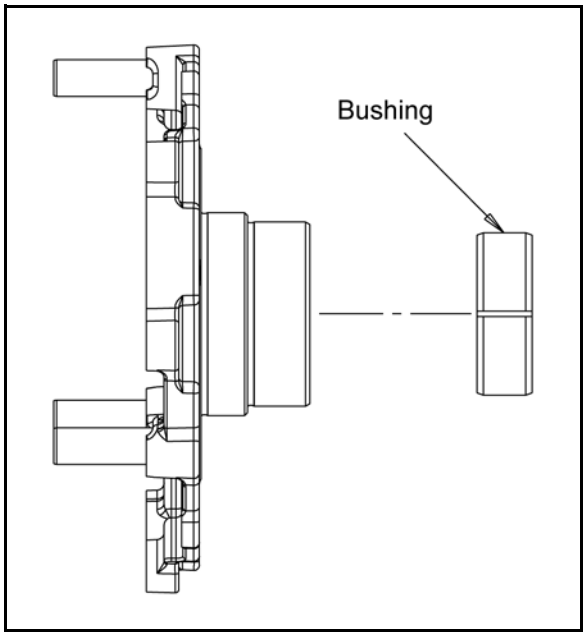
Planet Gear Bushing Replacement

1. Press the old bushing out of the planet gear.
2. Thoroughly clean the bore of the planet gear and check for any unwanted burs.
3. Press the new bushing into the planet gear until it is flush on each end. Repeat this procedure for the remaining planet gears.

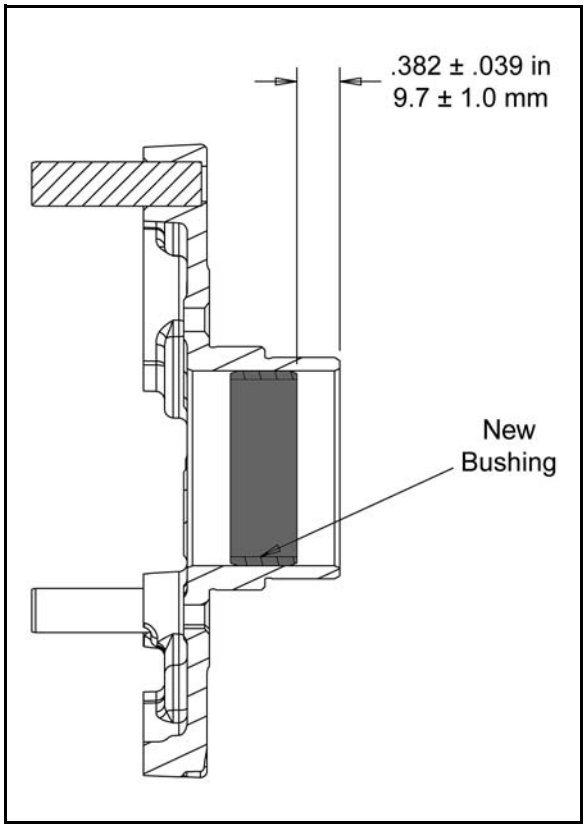


Differential Cover Bushing Replacement

1. Press the old bushing out of the differential cover.
2. Thoroughly clean the bore of the differential cover and check for any unwanted burs.
3. Press the new bushing into the differential cover.



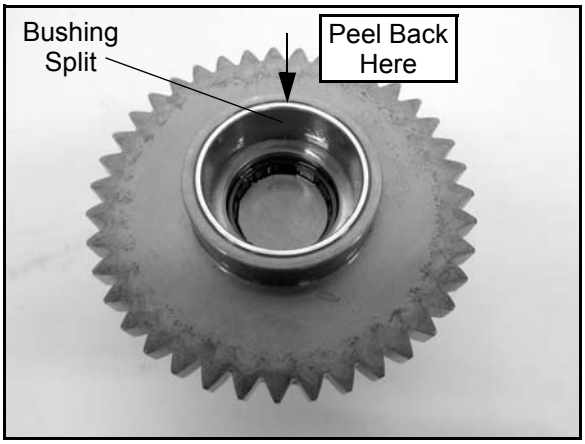
4. Install the bushing to the specified depth as shown.



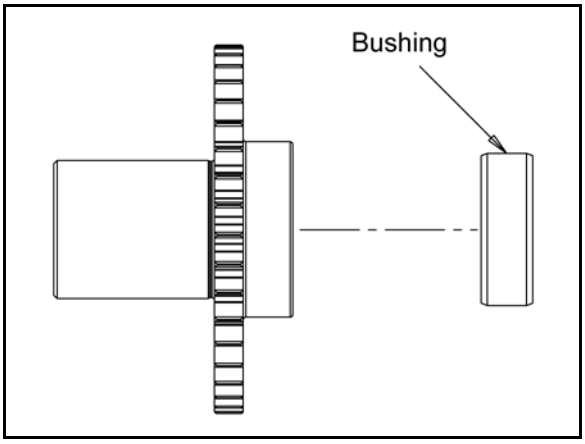
8

Female Side Gear Bushing Replacement

1. Locate the bushing split. Using a small chisel or flat blade screwdriver, peel back and remove the old bushing from the side gear, being careful not to damage the side gear.

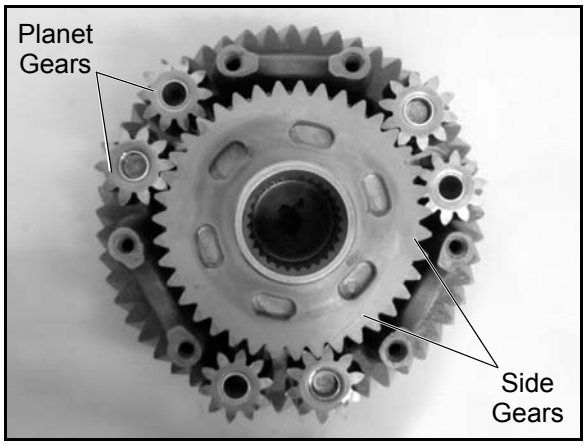


2. Thoroughly clean the bore of the side gear and check for any unwanted burs.
3. Press the new bushing into the side gear until it bottoms out.

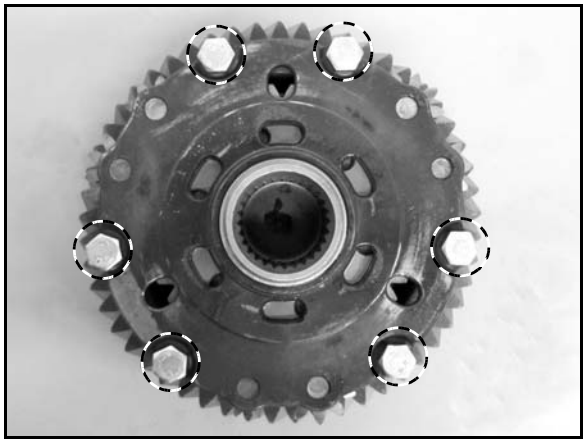


Planetary Differential Assembly

1. Thoroughly clean the differential components.
2. Assemble the side gears and place them onto the ring gear along with the (6) planet gears.



3. Align and install the differ ential cover using the previously made scribe marks.
4. Apply Loctite® 2760™ to cover screws.
5. Install screws hand tight. Place assembly in soft jaw vise and torque to specification.

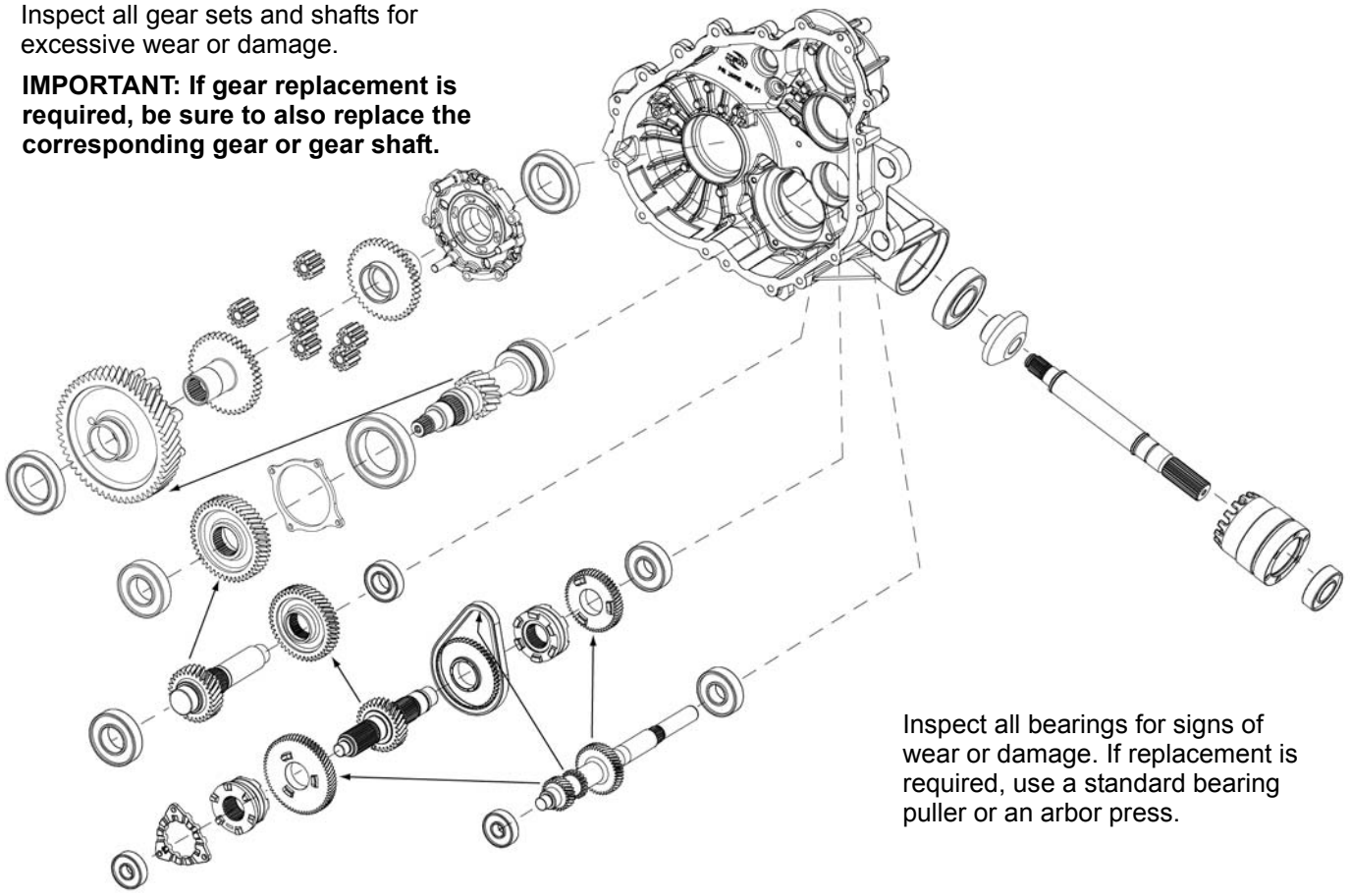


= T
Differential Cover Screws: **18-22 ft. lbs. (24-30 Nm)**

Gear / Shaft / Bearing Inspection

Inspect all gear sets and shafts for excessive wear or damage.

IMPORTANT: If gear replacement is required, be sure to also replace the corresponding gear or gear shaft.



Inspect all bearings for signs of wear or damage. If replacement is required, use a standard bearing puller or an arbor press.

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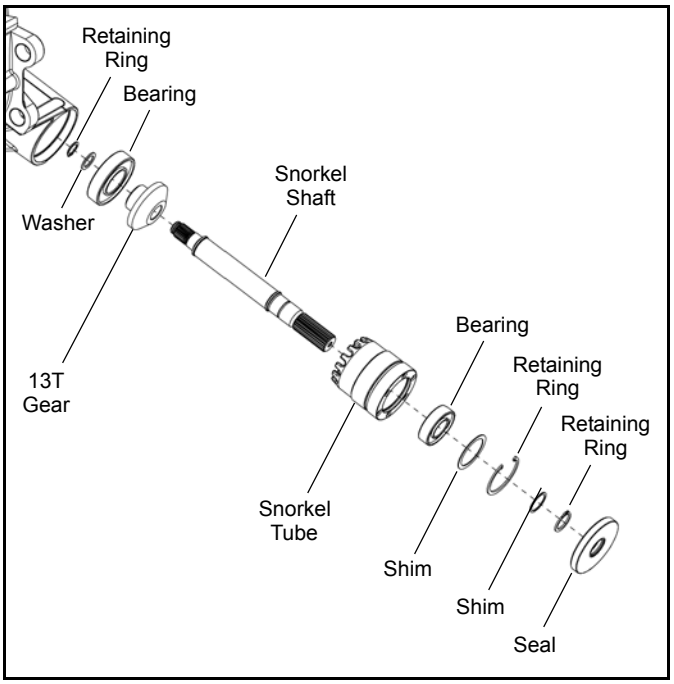
Snorkel Gear Backlash Procedure

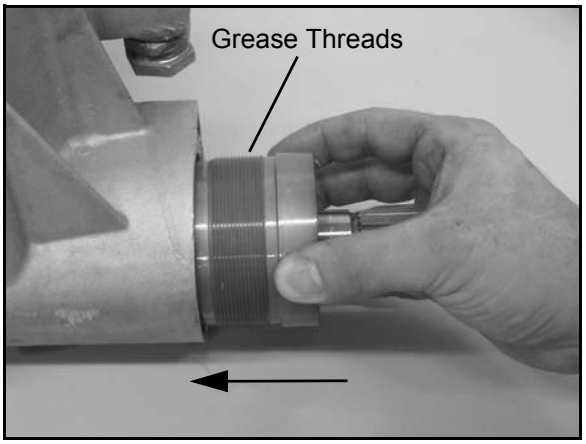
1. Reassemble the snorkel tube and snorkel shaft assembly by reversing the disassembly procedure (see “Snorkel Shaft Removal / Disassembly”).



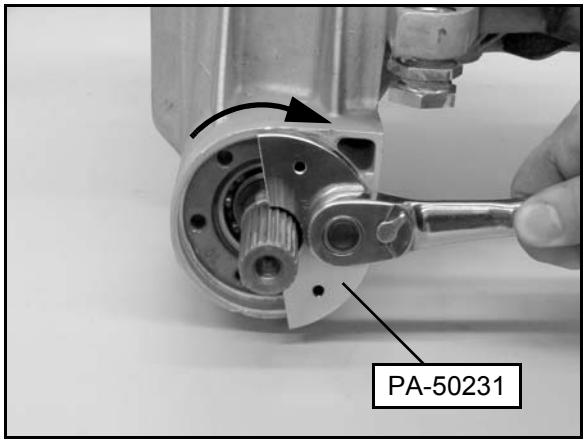
2. After the 13T gear and bearing are pressed onto the snorkel shaft (flush to the shoulder), install the washer and new retaining ring.
3. Press the gear back towards the retaining ring. Avoid excessive force so the retaining ring is not damaged or pre-stressed significantly.

IMPORTANT: Failure to press the gear back against the washer and retaining ring will lead to a gear backlash change after vehicle is placed into service.

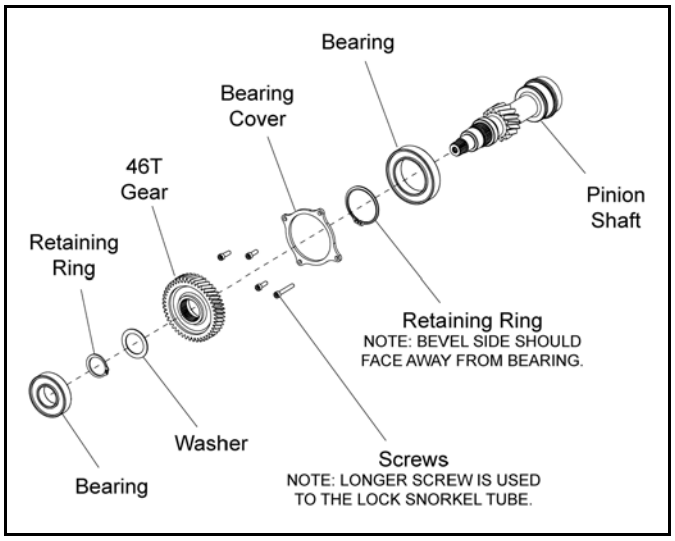
4. Apply a small amount of white lithium grease or Anti-Seize on the threads of the snorkel tube.



5. Install the snorkel shaft into the gearcase. Using the Snorkel Tool (PA-50231), tighten the snorkel tube until it is lightly seated in the transmission housing.



6. Inspect the pinion shaft assembly. Replace bearings if needed. Inspect each gear for damage, chips or abnormally worn teeth.



NOTE: If pinion shaft was disassembled, the bearing cover must be installed on the shaft before installing the 46T gear.

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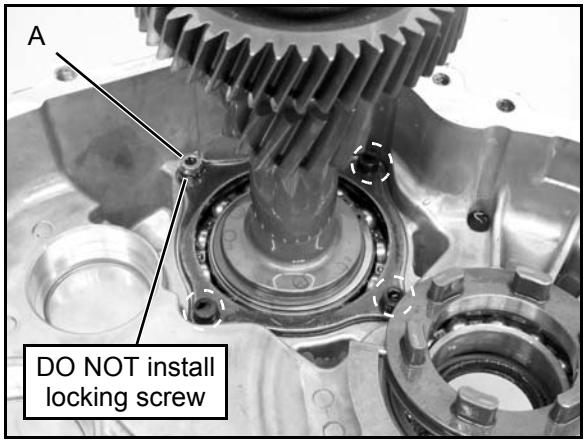
7. Install the pinion shaft assembly. Be sure to properly mesh the snorkel shaft bevel gear with the pinion shaft bevel gear.

8. Apply Loctite® 242™ to the threads of the bearing cover retaining screws.
9. Using a 5mm Allen wrench, install only the (3) screws that secure the pinion shaft assembly as shown below. Leave the longer locking screw (A) out at this point.



IMPORTANT: DO NOT install the longer screw (A). Installing the longer screw will lock the snorkel tube and not allow for backlash setting adjustment.

10. Torque the bearing cover retaining screws to specification.

= T
Bearing Cover Retaining Screws: **8-10 ft. lbs. (11-14 Nm)**

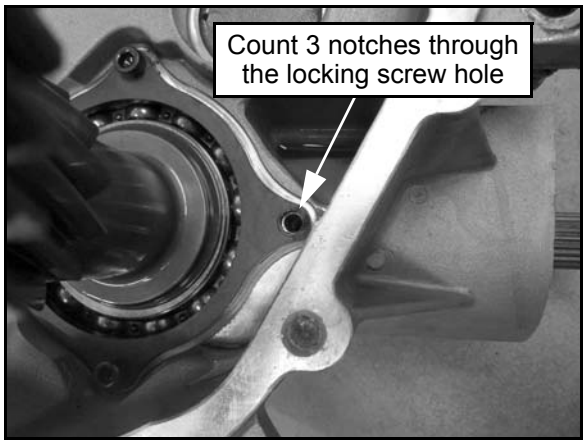
11. Rotate the snorkel tube ***counterclockwise*** using the snorkel tool (PA-50231) until the snorkel gear and pinion gear have 'zero' backlash.

IMPORTANT: DO NOT overtighten the snorkel tube when backing it out. At the 'zero' backlash position, you should still be able to tun the snorkel shaft using your fingers, but it will feel rough and may have some tight spots.

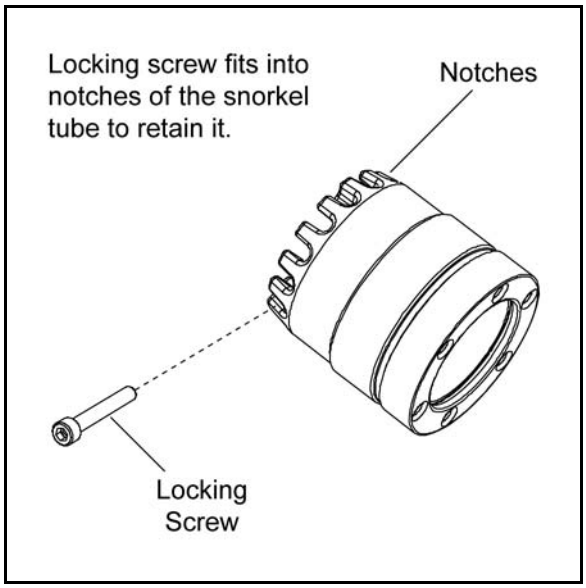
12. Look down into the transmission housing to see the snorkel locking screw hole opening to reference your starting point.

NOTE: If you have a hard time seeing into the hole, insert a small Allen wrench, punch or screwdriver into the hole to feel when the notch is aligned with the hole.

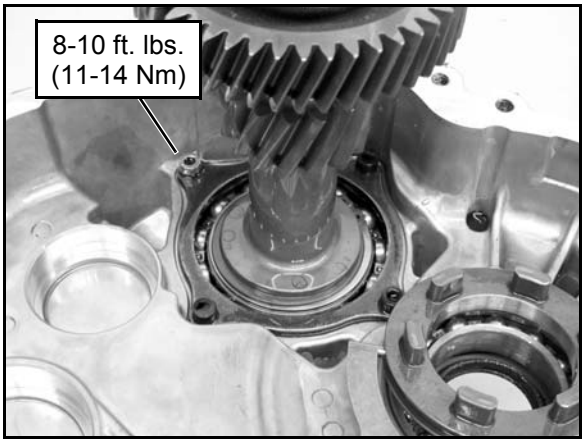
13. Slowly rotate the snorkel tube ***clockwise*** while counting the number of notches passing through the hole opening as you rotate the tube. Rotate the snorkel tube to the **3rd** notch from the 'zero' backlash position obtained in step 11.



14. Check the pinion shaft gear backlash again by feel. If the pinion shaft gear lash appears to be too tight, rotate the snorkel shaft ***clockwise*** to the next notch (4th notch).
15. Once the backlash is set, apply Loctite® 242™ to the threads and install the locking screw to secure the snorkel tube.



16. Torque the locking screw to specification.

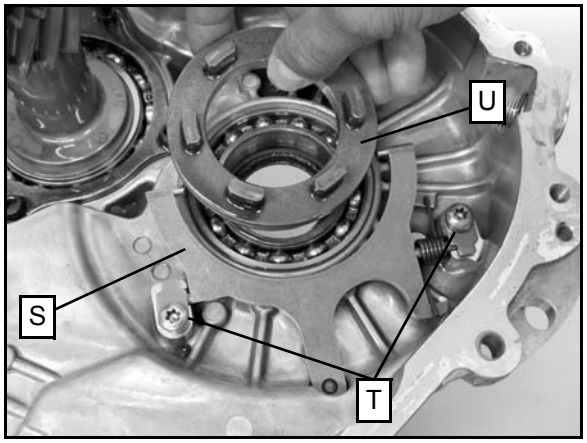


= T
Snorkel Locking Screw: **8-10 ft. lbs. (11-14 Nm)**

Transmission Assembly

IMPORTANT: The snorkel shaft and pinion shaft must be installed prior to transmission assembly. The snorkel shaft cannot be installed after assembling the transmission.

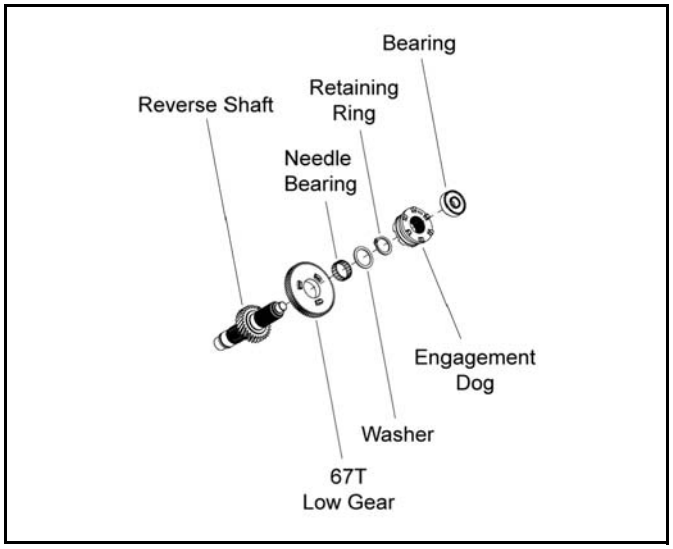
1. Clean both transmission case halves thoroughly. Inspect case half mating surfaces for damage.
2. Install shift fork (S) and torsion spring into transmission housing as an assembly. Load spring as shown in image below
3. Apply Loctite® 242™ to (2) screws (T) and install with retaining plates over shift fork. Torque to specification.

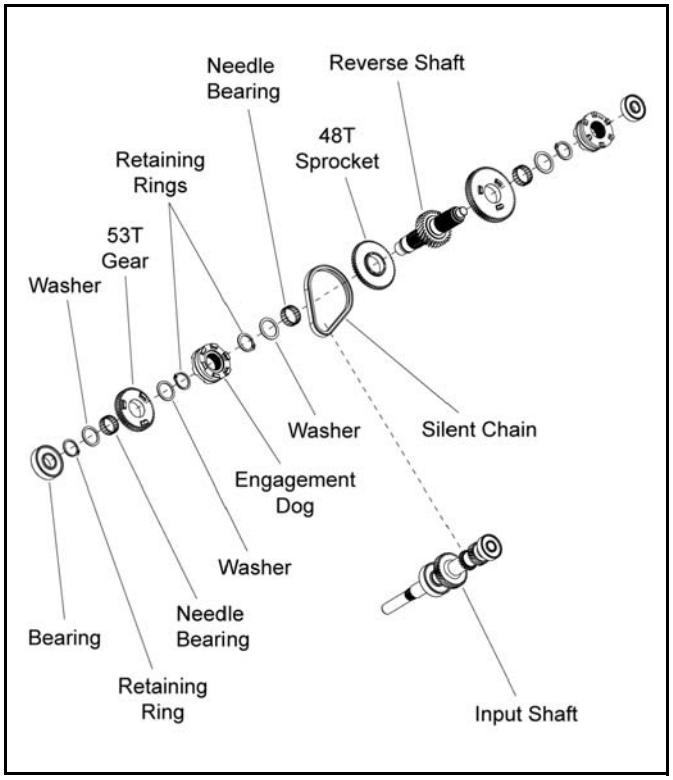


= T
Shift Fork Screws: **7-10 ft. lbs. (10-14 Nm)**

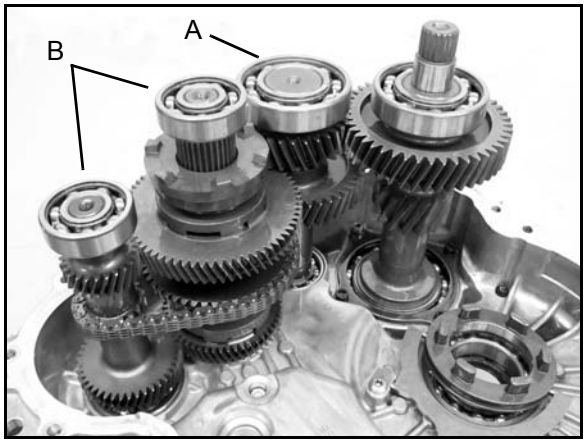
4. Slide engagement dog (U) onto retaining pins of shift fork.

5. Assemble the reverse shaft assembly and input shaft assembly if pr eviously disassembled (see illustrations).

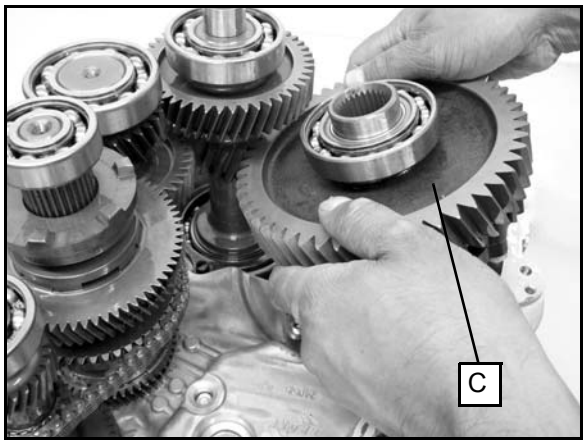




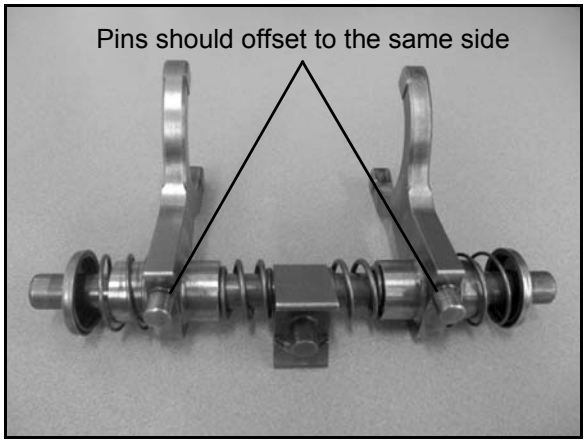
6. Install the idle r gear shaft assemb ly (A) an d gear cluster assembly (B) into the transmission housing, all at the same time.



7. Install th e rear o utput s haft as sembly (C). R otate output shaft assembly to align slots with engagement dog. Ensure bearing is fully seated upon assembly.

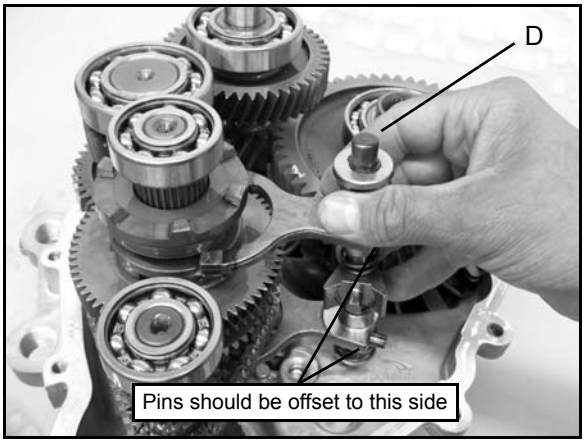


8. Assemble shift shaft rail if previously disassembled.



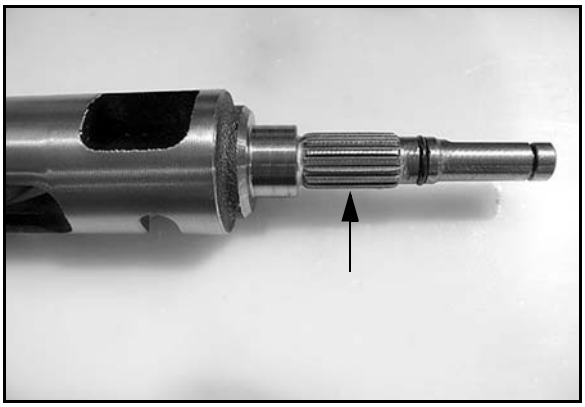
NOTE: Both s hift fo rks nee d t o be orien tated the same way, so that the shift fork pins are both offset to the same side of the rail.

9. Install the shift shaft rail (D) and shift forks into the transmission housing as an assembly. Be sure the shift forks are engaged into the engagement dogs.

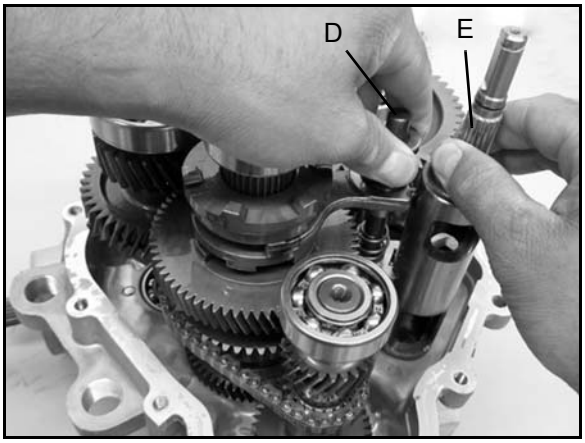


NOTE: Shift fork pins should be offset towards the input shaft as shown above.

10. Inspect the shift drum for any damage or wear. Inspect the splines of the shift drum.

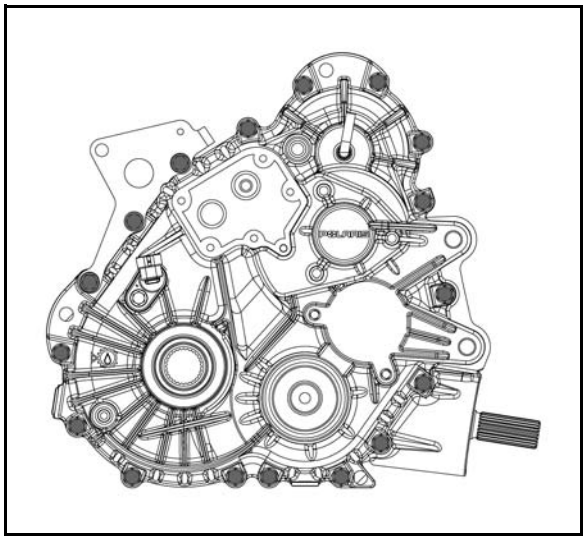


11. Install the shift drum (E) into the transmission housing. Lift up on the shift shaft rail (D) and move the rail assembly towards the shift drum to allow the shift fork ends to be installed into the shift drum (E).



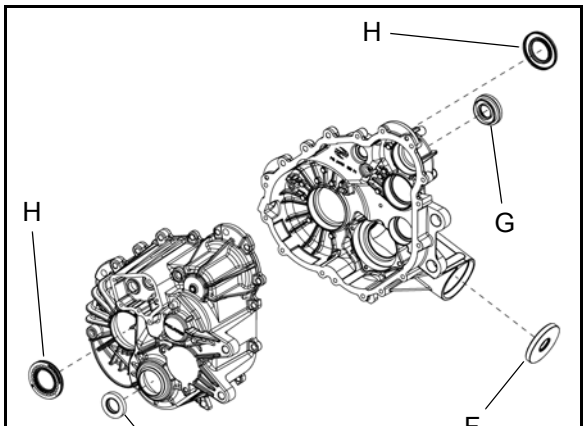
12. Apply a continuous bead of Crankcase 3 Bond Sealant (PN 2871557) to the left hand transmission mating surface.

13. Install the transmission case cover and retaining bolts. Torque bolts to specification.

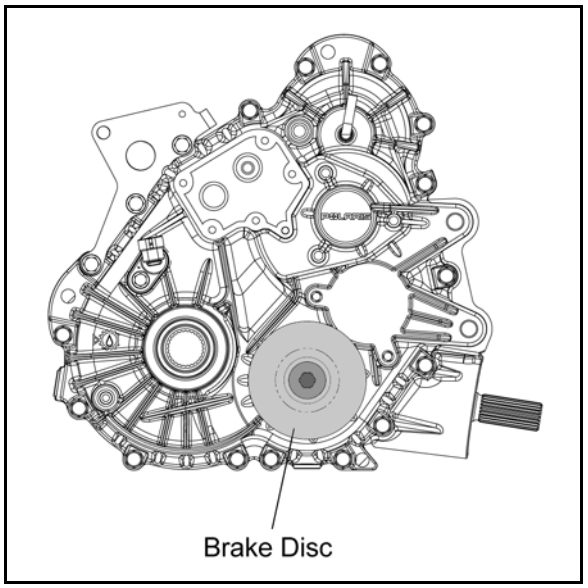


= T
Transmission Case Bolts: **15-20 ft. lbs. (20-27 Nm)**

14. Install new seals into the transmission case halves.
    - The snorkel shaft seal (F), should be pressed in until it seats against the housing counter-bore.
    - The input shaft seal (G), should be pressed in until it seats flush with the housing.
    - The rear output shaft seals (H) and pinion shaft seal (J) can be installed using a standard bushing installation tool. Seals should be installed just past the case lead-in chamfer (.070" or 1.8 mm from outer face of bore).



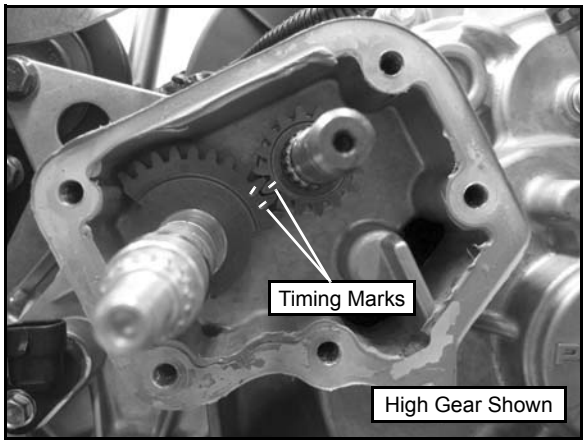
15. Install the brake disc onto the pinion shaft. Install the washer and apply Loctite® 262™ or 2760™ to the mounting bolt threads. Torque the bolt to specification.



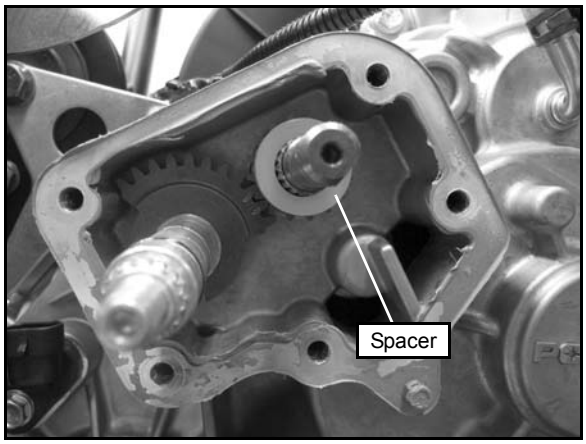
= T
Park Brake Disc Mounting Bolt: **18-22 ft. lbs. (24-30 Nm)**

16. Thoroughly clean the shift shaft housing. **Be sure the transmission is in High gear prior to reassembly.**

17. Install the sector gear (16T) onto the shift drum shaft. Install the shift shaft assembly and sector gear (11T) into the bushing pocket on the left side. Align the timing marks on the gears as shown.



18. Install the spacer onto the shift drum shaft.



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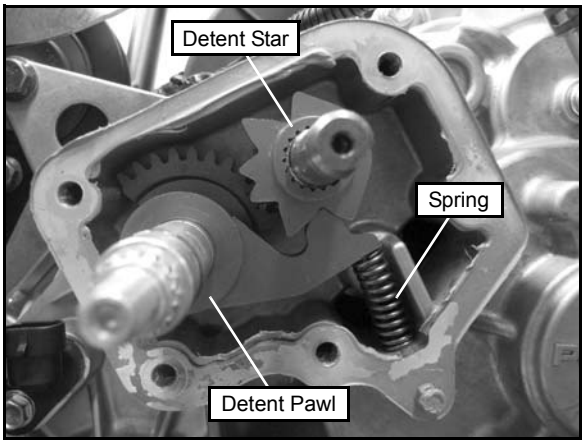
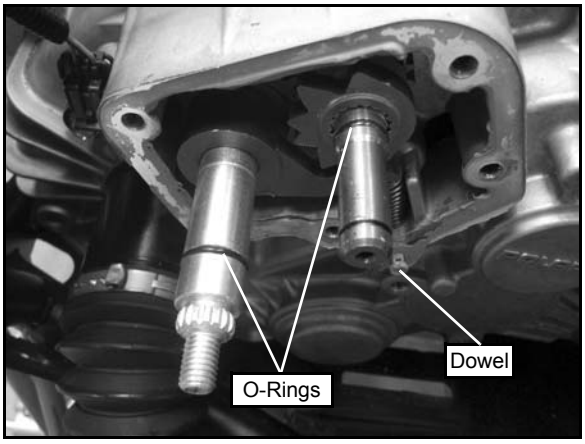
19. Install the detent star onto the shift drum shaft. Be sure to install the detent star with the raised edge facing outward and skip-tooth aligned.

20. Install the detent pawl onto the shift shaft and carefully install the compression spring.



21. Install a new O-ring on each shift shaft. Apply a small amount of white lithium grease on the O-rings, shift shafts and component contact surfaces prior to installing the sector cover.



22. Clean the transmission and gear sector cover mating surfaces thoroughly.
23. Apply Crankcase Sealant (3-Bond) (PN 2871557) onto the cover and transmission case mating surface.
24. Install the sector cover and align the transmission case dowel with the alignment hole. Install and torque the bolts to specification.

= T
Sector Cover Bolts: **9-12 ft. lbs. (12-16 Nm)**

25. Install the transmission drain plug and torque to specification.

= T
Fill / Drain Plug: **10-14 ft. lbs. (14-19 Nm)**

26. Install the bellcrank onto the shift shaft. Note the key splined on the bellcrank and shift shaft. Install the nut and torque to specification.

= T
Bellcrank Nut: **12-18 ft. lbs. (16-24 Nm)**

27. Refer to "Transmission Installation" to complete the repair.

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TROUBLESHOOTING

Troubleshooting Checklist

Check the following items when shifting difficulty is encountered.

- Shift cable adjustment/condition
- PVT alignment (clutch center distance)
- Idle speed (throttle cable routing)
- Transmission lubricant type/quality
- Loose fasteners on sector gear cover
- Worn rod ends, clevis pins, or pivot arm bushings
- 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 the shift cable end from the 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) or damage. Inspect all bearings, circlips, thrust washers and shafts for wear.

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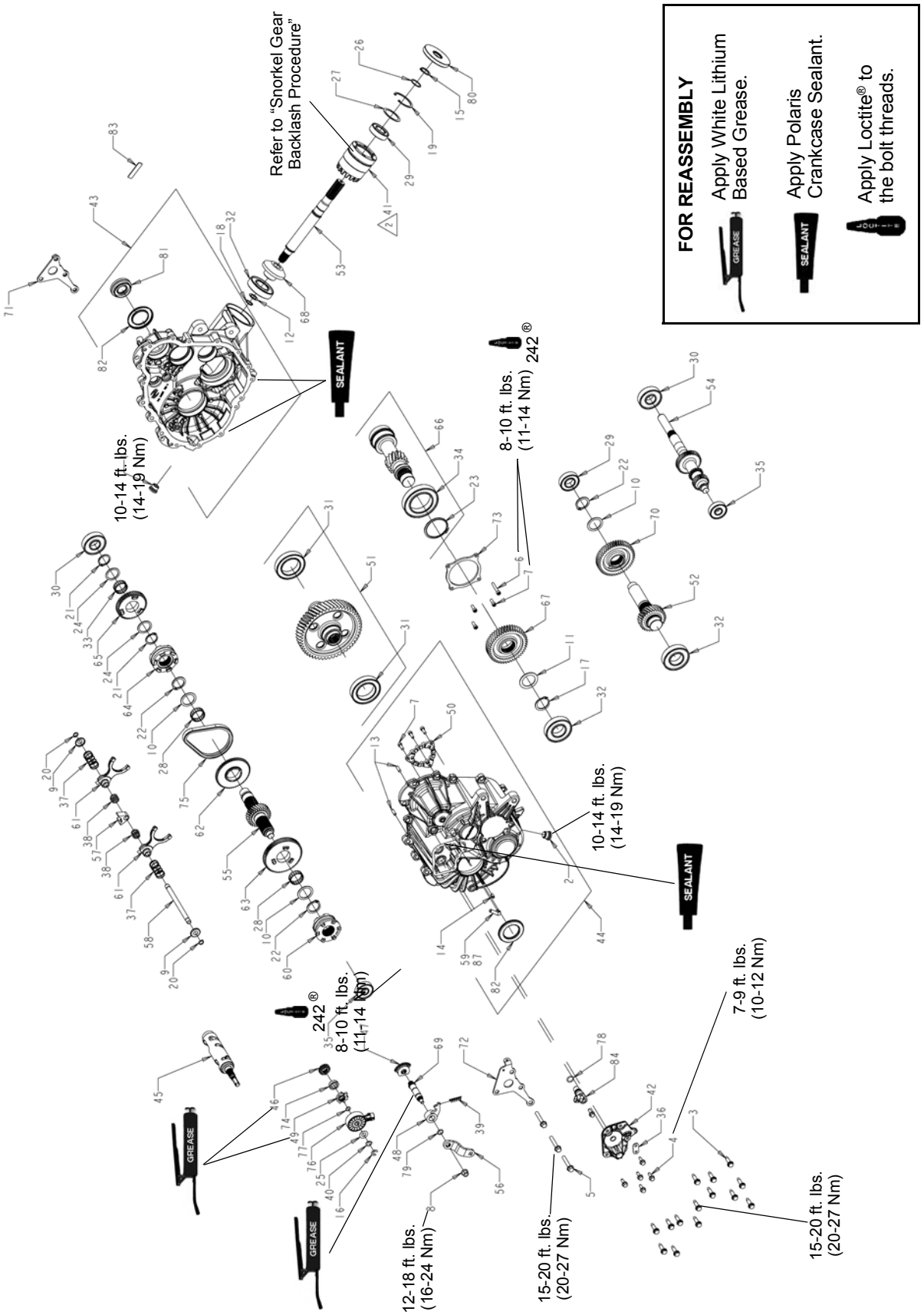
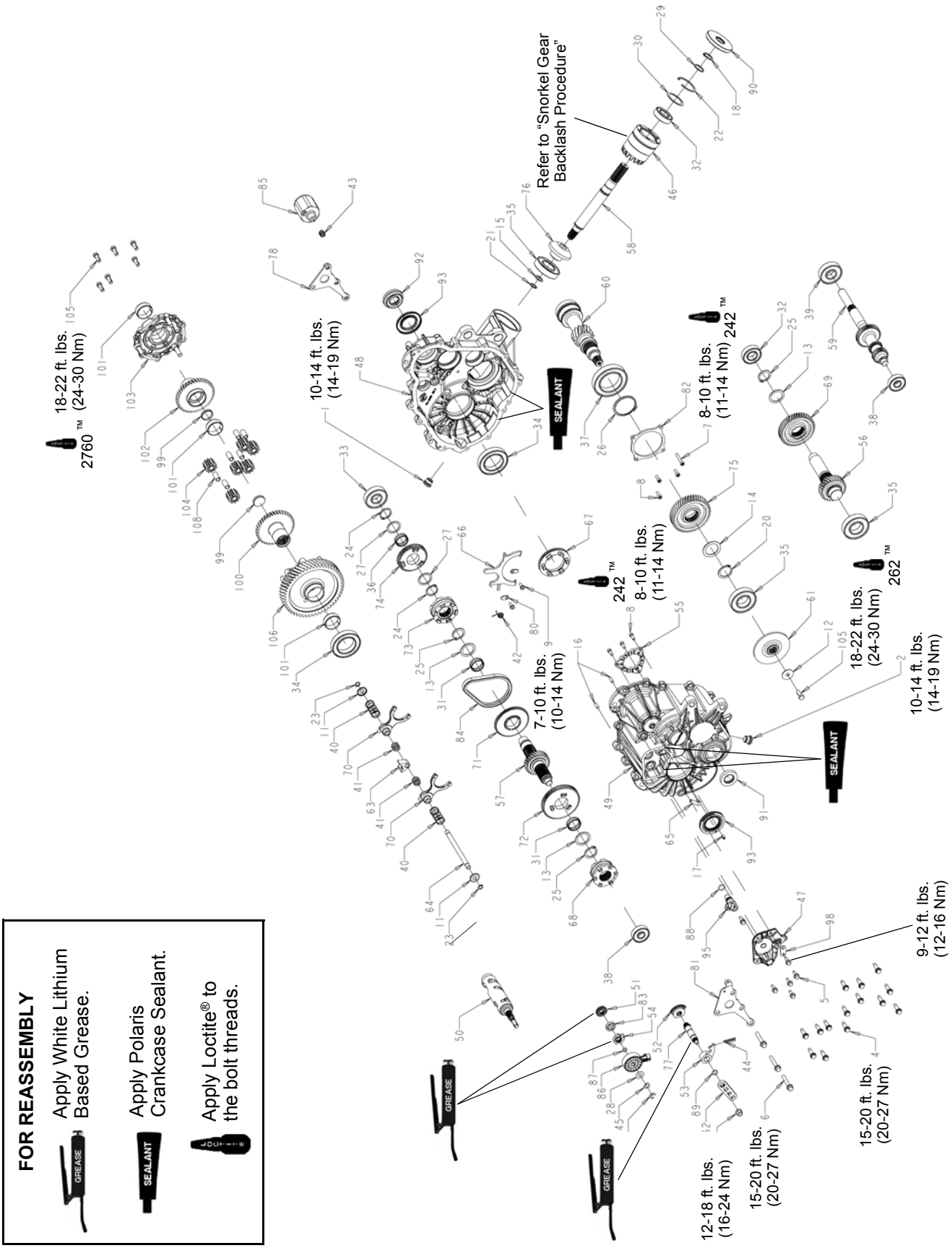
TRANSMISSION EXPLODED VIEW



Exploded View, Continued

Ref.	Qty.	Description	Ref.	Qty.	Description
1.	1	Fill Plug	46.	1	Gear, Sector 16T
2.	1	Drain Plug, Magnetic	47.	1	Gear, Sector 31T
3.	14	Screw, M8 x 1.25 x 30	48.	1	Pawl, Detent
4.	6	Screw, M6 x 1 x 20	49.	1	Star, Detent
5.	3	Screw, M8 x 50	50.	1	Plate, Park, 12-Face
6.	1	Screw, M6 x 1 x 40	51.	1	Shaft, Output 53T
7.	6	Screw, M6 x 1 x 18	52.	1	Shaft, Idler 29T
8.	1	Nut, NyLoc, M8 x 1.25	53.	1	Shaft, Front Output
9.	2	Washer, Cup	54.	1	Shaft, Input, Helical
10.	3	Washer	55.	1	Shaft, Reverse, 27T
11.	1	Washer	56.	1	Bellcrank
12.	1	Washer	57.	1	Collar, Shift
13.	2	Pin, Dowel	58.	1	Rail, Shift Shaft
14.	1	Pin, Spring	59.	1	Tube, Vent, 1/4 in.
15.	1	Retaining Ring, External	60.	1	Shift Dog, Park
16.	1	Snap Ring	61.	1	Gear, 44T
17.	1	Retaining Ring, External	62.	2	Fork, Shift
18.	1	Retaining Ring, External	63.	1	Sprocket, 48T, 6-Face
19.	1	Retaining Ring, Internal	64.	1	Gear, Low 67T
20.	2	Retaining Ring, External	65.	1	Engagement Dog, 6-Face
21.	2	Retaining Ring, External	66.	1	Gear, 53T
22.	3	Retaining Ring, External	67.	1	Shaft, Pinion 11T
23.	1	Retaining Ring, External	68.	1	Gear, 46T
24.	2	Washer, Thrust	69.	1	Gear, Snorkel 13T
25.	1	Washer, Thrust	70.	1	Shaft, Shift
26.	1	Shim	71.	1	Weldment, Rear Mount Bracket
27.	1	Shim	72.	1	Bracket, Rear Mount
28.	2	Bearing, Needle Cage	73.	1	Cover, Bearing, Center Drive
29.	2	Bearing, Ball	74.	1	Spacer
30.	2	Bearing, Ball	75.	1	Chain, Silent
31.	2	Bearing, Ball	76.	1	Switch, Rotary, 2-Pin
32.	3	Bearing, Ball	77.	1	O-Ring
33.	1	Bearing, Needle Cage	78.	1	O-Ring
34.	1	Bearing, Ball	79.	1	O-Ring
35.	2	Bearing, Ball	80.	1	Seal, Triple Lip
36.	1	Wire Harness Bracket	81.	1	Seal, Dual Lip
37.	2	Spring, Compression	82.	1	Seal, Triple Lip
38.	2	Spring, Compression	84.	1	Sensor, Speed
39.	1	Spring, Compression, Detent			
40.	1	Washer, Spring			
41.	1	Tube, Snorkel			
42.	1	Cover, Sector Gears			
43.	1	Case, LH			
44.	1	Case, LH			
45.	1	Drum, Shift			

TRANSMISSION EXPLODED VIEW (INTL)



Exploded View, Continued

Ref.	Qty.	Description	Ref.	Qty.	Description
1.	1	Fill Plug	53.	1	Pawl, Detent
2.	1	Drain Plug, Magnetic	54.	1	Star, Detent
4.	14	Screw, M8 x 1.25 x 30	55.	1	Plate, Park, 12-Face
5.	6	Screw, M6 x 1 x 20	56.	1	Shaft, Idler 29T
6.	3	Screw, M8 x 50	57.	1	Shaft, Reverse 29T
7.	1	Screw, M6 x 1 x 40	58.	1	Shaft, Front Output
8.	6	Screw, M6 x 1 x 18	59.	1	Shaft, Input Helical
9.	2	Screw, M6 x 1 x 16	60.	1	Shaft, Pinion, 11T
10.	1	Nut, NyLoc, M8 x 1.25	61.	1	Disc, Brake
11.	2	Washer, Cup	62.	1	Bellcrank
12.	1	Washer	63.	1	Collar, Shift
13.	3	Washer	64.	1	Rail, Shift Shaft
14.	1	Washer	65.	1	Tube, Vent, 1/4 in.
15.	1	Washer	66.	1	Fork, Pivot Shaft
16.	2	Pin, Dowel	67.	1	Dog, Engagement
17.	1	Pin, Spring	68.	1	Shift Dog, Park
18.	1	Retaining Ring, External	69.	1	Gear, 44T
19.	1	Snap Ring	70.	2	Fork, Shift
20.	1	Retaining Ring, External	71.	1	Sprocket, 48T, 6-Face
21.	1	Retaining Ring, External	72.	1	Gear, Low 67T
22.	1	Retaining Ring, Internal	73.	1	Engagement Dog, 6-Face
23.	2	Retaining Ring, External	74.	1	Gear, 53T
24.	2	Retaining Ring, External	75.	1	Gear, 46T
25.	3	Retaining Ring, External	76.	1	Gear, Snorkel 13T
26.	1	Retaining Ring, External	77.	1	Shaft, Shift
27.	2	Washer, Thrust	78.	1	Weldment, Rear Mount Bracket
28.	1	Washer, Thrust	80.	2	Retainer, Fork
29.	1	Shim	81.	1	Bracket, Rear Mount
30.	1	Shim	82.	1	Cover, Bearing, Center Drive
31.	2	Bearing, Needle Cage	83.	1	Spacer
32.	2	Bearing, Ball	84.	1	Chain, Silent
33.	1	Bearing, Ball	85.	1	Solenoid
34.	2	Bearing, Ball	86.	1	Switch, Rotary, 2-Pin
35.	3	Bearing, Ball	87.	1	O-Ring
36.	1	Bearing, Needle Cage	88.	1	O-Ring
37.	1	Bearing, Ball	89.	1	O-Ring
38.	2	Bearing, Ball	90.	1	Seal, Triple Lip
39.	1	Bearing, Ball	91.	1	Seal, Triple Lip
40.	2	Spring, Compression	92.	1	Seal, Dual Lip
41.	2	Spring, Compression	93.	2	Seal, Triple Lip
42.	1	Spring, Torsion	95.	1	Sensor, Speed
43.	1	Spring, Compression	98.	1	Bracket, Wire Harness
44.	1	Spring, Compression, Detent	99.	2	Plug, Expansion
45.	1	Spring, Washer	100.	1	Side Gear, Male, 39T
46.	1	Tube, Snorkel	101.	3	Bearing, Plain
47.	1	Cover, Sector Gears	102.	1	Side Gear, Female, 39T
48.	1	Case, LH	103.	1	Diff Cover
49.	1	Case, RH	104.	6	Planet Gear
50.	1	Drum, Shift	105.	7	Screw, M8 x 1.25 x 25
51.	1	Gear, Sector 16T	106.	1	Ring Gear, 53T
52.	1	Gear, Sector 31T	108.	6	Bearing, Plain

NOTES

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CHAPTER 9
BRAKES

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GENERAL SPECIFICATIONS

FRONT BRAKE SYSTEM		
Item	**Standard**	**Service Limit**
Front Brake Pad Thickness	.300 ± .007" (7.62 ± .178 mm)	.180" (4.6 mm)
Front Brake Disc Thickness	.188" (4.78 mm)	.170" (4.32 mm)
Front Brake Disc Runout	-	.010" (.254 mm)

REAR BRAKE SYSTEM		
Item	**Standard**	**Service Limit**
Rear Brake Pad Thickness	.298 ± .007" (7.57 ± .178 mm)	.180" (4.6 mm)
Rear Brake Disc Thickness	.188" (4.78 mm)	.170" (4.32 mm)
Rear Brake Disc Runout	-	.010" (.254 mm)

TORQUE SPECIFICATIONS

Item	Torque ft. lbs.	Torque Nm
Front Caliper Mounting Bolts	31-34	42-46
Rear Caliper Mounting Bolts	18	24
Brake Line Flare	12-15	16-20
Brake Line Banjo Bolts (Caliper Attachment)	15	20
Brake Line Banjo Bolt (Master Cylinder Attachment)	15	20
Front Brake Disc to Hub Bolts	18	24
Rear Brake Disc to Hub Bolts	28	38
Brake Switch	12-15	16-20
Master Cylinder to Frame	17	23
Brake Pedal Mounting Bracket to Frame	17	23
Park Brake Assembly Bolts	37	50
Park Brake Disc Mounting Bolt	18-22	24-30
Park Brake Lever Mount Bolts	16	22
Park Brake Mount Bracket to Transmission Bolts	37	50

SPECIAL TOOLS

Part Number	Tool Description
2870975	Mity Vac™ Pressure Test Tool

SPX Tools:
1-800-328-6657 or on-line at http://polaris.spx.com/.

BRAKE SYSTEM SERVICE NOTES

Disc brake systems are light weight, low maintenance, and perform well in the conditions this vehicle will routinely encounter. 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.

- 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 pedal returns freely and completely.
- Adjust stop pin on front caliper 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.
- Perform a brake burnishing procedure after installing new pads to maximize service life.
- DO NOT lubricate or clean the brake components with aerosol or petroleum products. Use only approved brake cleaning products.

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, 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 Brakeleen™ or an 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) because of improper adjustment Master cylinder reservoir overfilled Master cylinder compensating port restricted Master cylinder piston not returning completely Caliper piston(s) not returning Operator error (riding the brake)	Adjust pad stop (front calipers) Set to proper level Clean compensating port Inspect. Repair as necessary Clean piston(s) seal Educate operator
Loose wheel hub or bearings	Check wheel and hub for abnormal movement.
Brake disc warped or excessively worn	Replace disc
Brake disc misaligned or loose	Inspect and repair as necessary
Noise is from other source (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

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HYDRAULIC BRAKE SYSTEM OPERATION

The Polaris brake system consists of the following components or assemblies: brake pedal, master cylinder, hydraulic brake lines, brake calipers, brake pads, and brake discs, which are secured to the drive line.

When the foot activated brake lever is applied it applies pressure on the piston within the master cylinder. As the master cylinder piston moves inward it closes a small opening (compensating port) within the cylinder and starts to build pressure within the brake system. As the pressure within the system is increased, the pistons located in the brake calipers move outward and apply pressure to the moveable brake pads. These pads contact the brake discs and move the calipers in their floating bracket, pulling the stationary side pads into the brake discs. The resulting friction reduces brake disc and vehicle speed.

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.

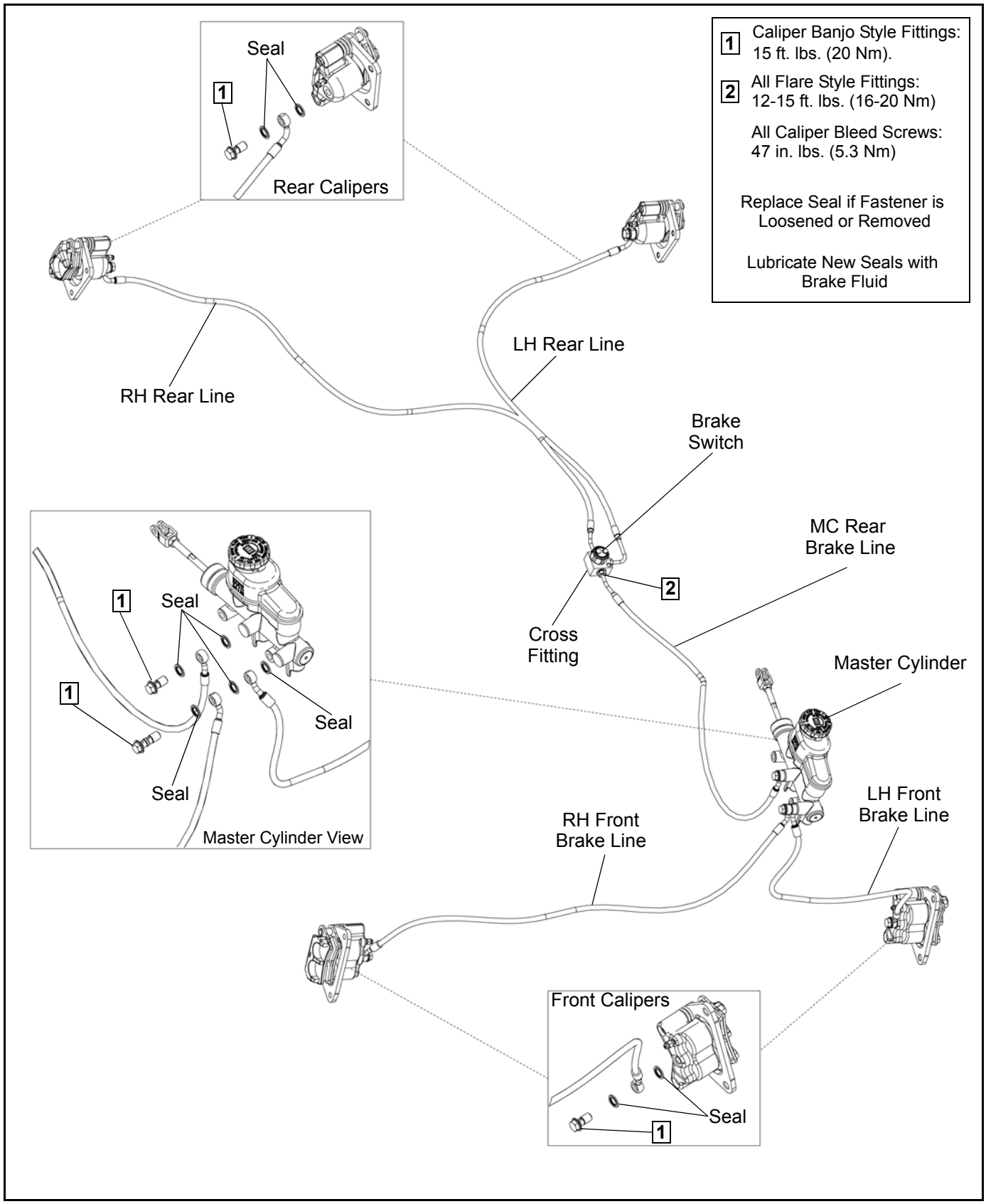
Brake fluid level is critical to proper system operation. Too little fluid will allow air to enter the system and cause the brakes to feel spongy. Too much fluid could cause brakes to drag due to fluid expansion.

Located within the master cylinder is the compensating port which is opened and closed by the master cylinder piston assembly. As the temperature within the hydraulic system changes, this port compensates for fluid expansion or contraction. Due to the high temperatures created within the system during heavy braking, it is very important that the master cylinder reservoir have adequate space to allow for fluid expansion. **Never overfill the reservoir! Do not fill the reservoir beyond the MAX LEVEL line!**

When servicing Polaris brake systems use only **Polaris DOT 4 Brake Fluid (PN 2872189)**. **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 early brake fade and the possibility of serious injury.

BRAKE SYSTEM EXPLODED VIEW

RZR 570



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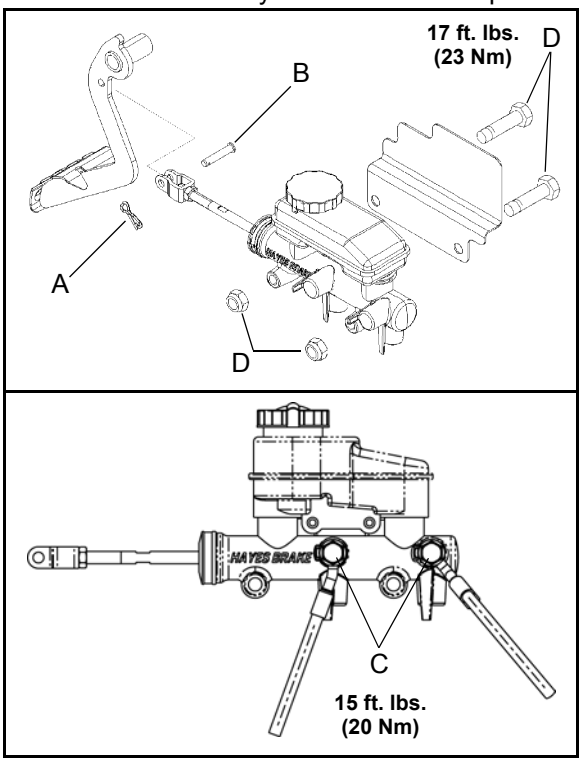
MASTER CYLINDER

Removal

1. Locate the master cylinder above the left front tire in the wheel well area.

2. Remove the clip (A) from the clevis pin (B) that attaches the master cylinder to the brake pedal lever.



3. Place a container to catch brake fluid under the master cylinder brake line banjo bolts (C).

> **CAUTION**
>
> Brake fluid will damage finished surfaces. Do not allow brake fluid to come in contact with finished surfaces.

NOTE: Make note of front and rear brake line locations to master cylinder.

4. Loosen the brake line banjo bolts (C) and allow fluid to drain.

NOTE: Dispose of fluid properly. Do not re-use.

5. Remove the two mounting fasteners (D) that secure the master cylinder to the frame.

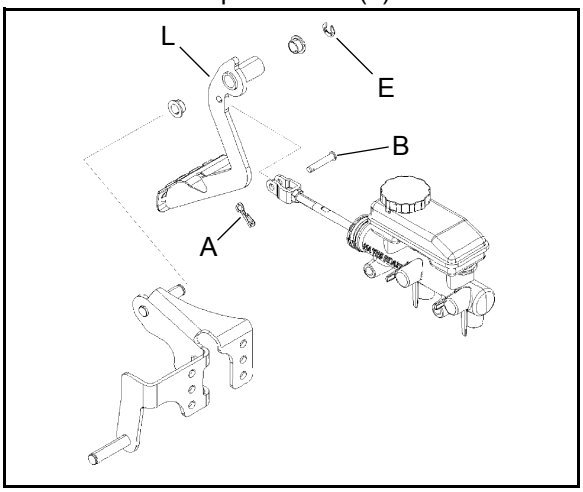
Installation

1. Reverse Steps 1-5 for master cylinder installation. **Refer to the torque specifications in the illustration.**
2. After installing the foot brake check pedal freeplay. Pedal freeplay should not exceed .090" (2.286 mm).

BRAKE PEDAL LEVER

Pedal Removal

1. Locate the brake pedal lever (L) and remove the master cylinder clevis pin (B) and clip (A).
2. Remove the E-ring (E) from the pedal mount and remove the brake pedal lever (L) from the vehicle.



Pedal Installation

1. Reverse "Removal" steps to install brake pedal lever. Brake pedal freeplay should not exceed .090" (2.28 mm).

Brake Pedal Freeplay:
.090" (2.28 mm)

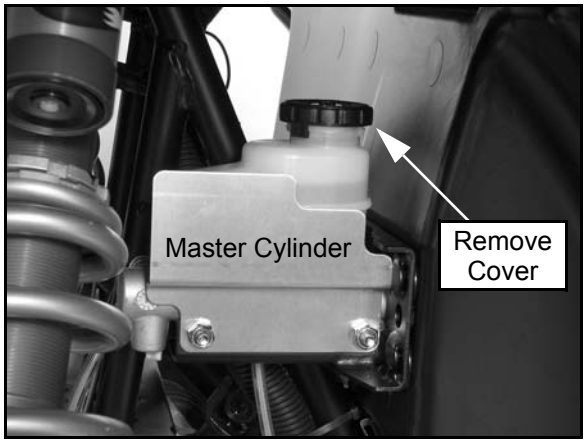
BRAKE BLEEDING / FLUID CHANGE

NOTE: When bleeding the brakes or replacing the fluid always start with the furthest caliper from the master cylinder.

> **⚠ CAUTION**
>
> Always wear safety glasses.

> **⚠ CAUTION**
>
> Brake fluid will damage finished surfaces. Do not allow brake fluid to come in contact with finished surfaces. This procedure should be used to change fluid or bleed brakes during regular maintenance.

1. Clean master cylinder reservoir cover thoroughly and remove the cover.



2. If changing fluid, remove old fluid from reservoir with a Mity Vac™ pump or similar tool.

Mity Vac™ (PN 2870975)

3. Add brake fluid to the indicated MAX level of reservoir.

Polaris DOT 4 Brake Fluid (PN 2872189)

4. 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.
5. Have an assistant slowly pump foot pedal until pressure builds and holds.
6. Hold brake pedal on to maintain pedal pressure, and open bleeder screw. Close bleeder screw and release foot pedal.

NOTE: Do not release foot pedal before bleeder screw is tight or air may be drawn in to master cylinder.

7. 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.

8. Tighten bleeder screw securely and remove bleeder hose. Torque bleeder screw to **47 in. lbs. (5.3 Nm)**.
9. Repeat procedure Steps 5 - 8 for the remaining calipers.
10. Add brake fluid to MAX level inside reservoir.

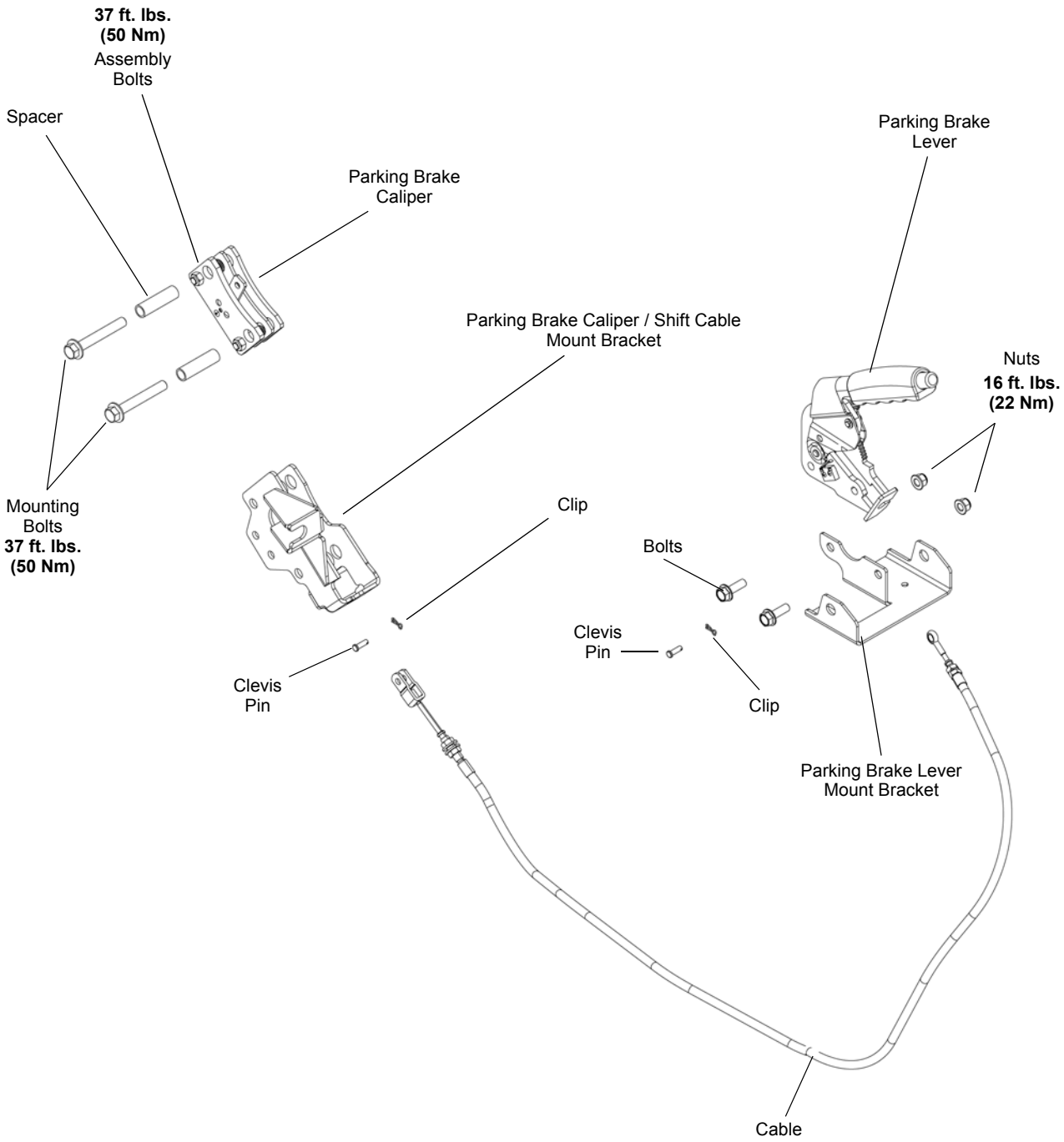
Master Cylinder Fluid Level

Between the MIN and MAX line shown on the reservoir.

11. Install master cylinder reservoir cover.
12. Field test machine at low speed before putting into service. Check for proper braking action and pedal reserve. With pedal firmly applied, pedal reserve should be no less than 1/2"(1.3 cm).
13. Check brake system for fluid leaks.

PARKING BRAKE (INTL MODEL)

Exploded View



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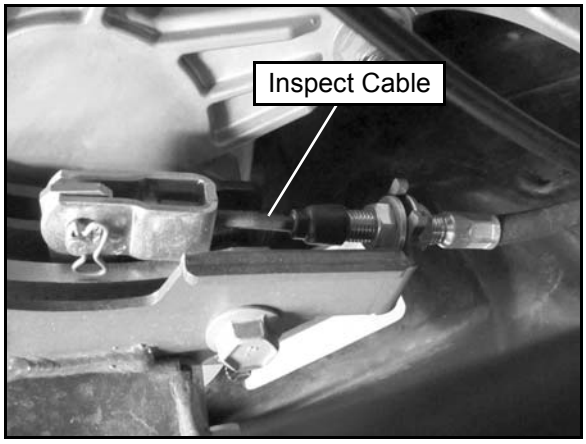
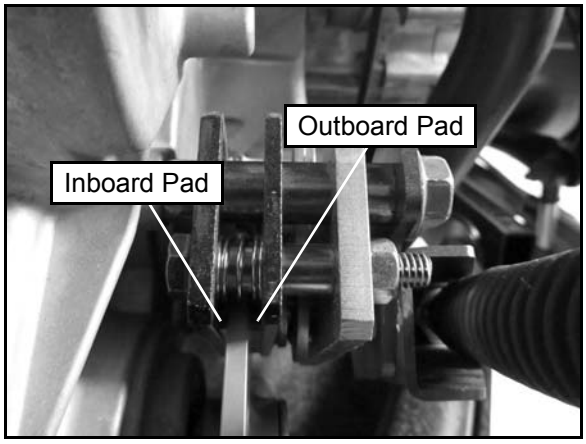
Parking Brake Inspection

1. Inspect parking brake cable and brake pads for wear.
2. Refer to "Parking Brake Cable Adjustment" if adjustment is necessary. Refer to "Parking Brake Caliper Service" for brake pad replacement.





Parking Brake Cable Adjustment

When the parking brake is fully engaged and "BRAKE" is displayed on the instrument cluster, engine speed is limited to 1500 RPM while in gear. If throttle is applied, this limiting feature prevents operation, which protects the parking brake pads from excessive wear.

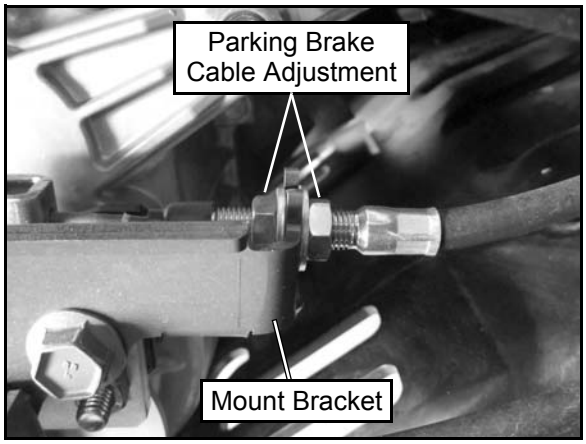
NOTE: Inspect parking brake cable tension after the first 25 hours of operation and every 100 hours of operation afterwards to ensure proper cable tension.

Loss of tension in the parking brake cable will cause illumination of the parking brake indicator and activation of the limiting feature. If this occurs, inspect and adjust parking brake cable tension. If performing this service is difficult due to conditions or location, temporarily disconnect the parking brake switch electrical connector. Reconnect the connector as soon as practicable and adjust the parking brake cable to proper tension.

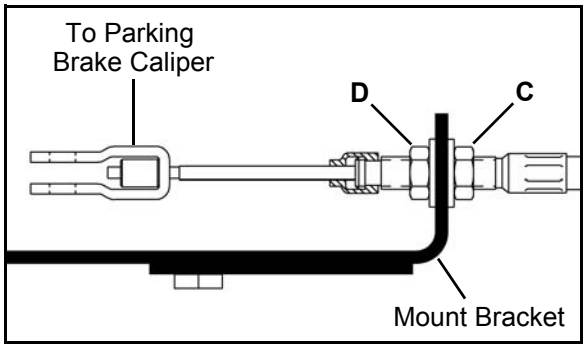
1. Pull back on parking brake lever (located in the dash).
2. After 3 to 4 clicks "BRAKE" should display on the instrument cluster and the wheels should not rotate when turning by hand. After 8 full clicks of lever travel, the vehicle should not roll while parked.
3. If the vehicle moves, adjustment is necessary.
4. Adjust the parking brake cable where it attaches to the caliper mount / shift cable bracket. The mount bracket is located on the right-hand side of the transmission.

Adjustment Procedure

1. Place the vehicle in neutral on a flat level surface.
2. Locate the parking brake cable adjustment area where the cable attaches to the caliper mount bracket.



3. Use two open-end wrenches and loosen the outer jam nut (D). Back out the outer jam nut (D) 1 1/2 turns.



4. Now hold the outer jam nut (D) and turn in the inner jam nut (C) clockwise, until the jam nut is tight against the bracket.
5. Repeat Step 3 and Step 4 until the proper adjustment is obtained for the parking brake.

NOTE: See Chapter 10 for more information on the parking brake switch.

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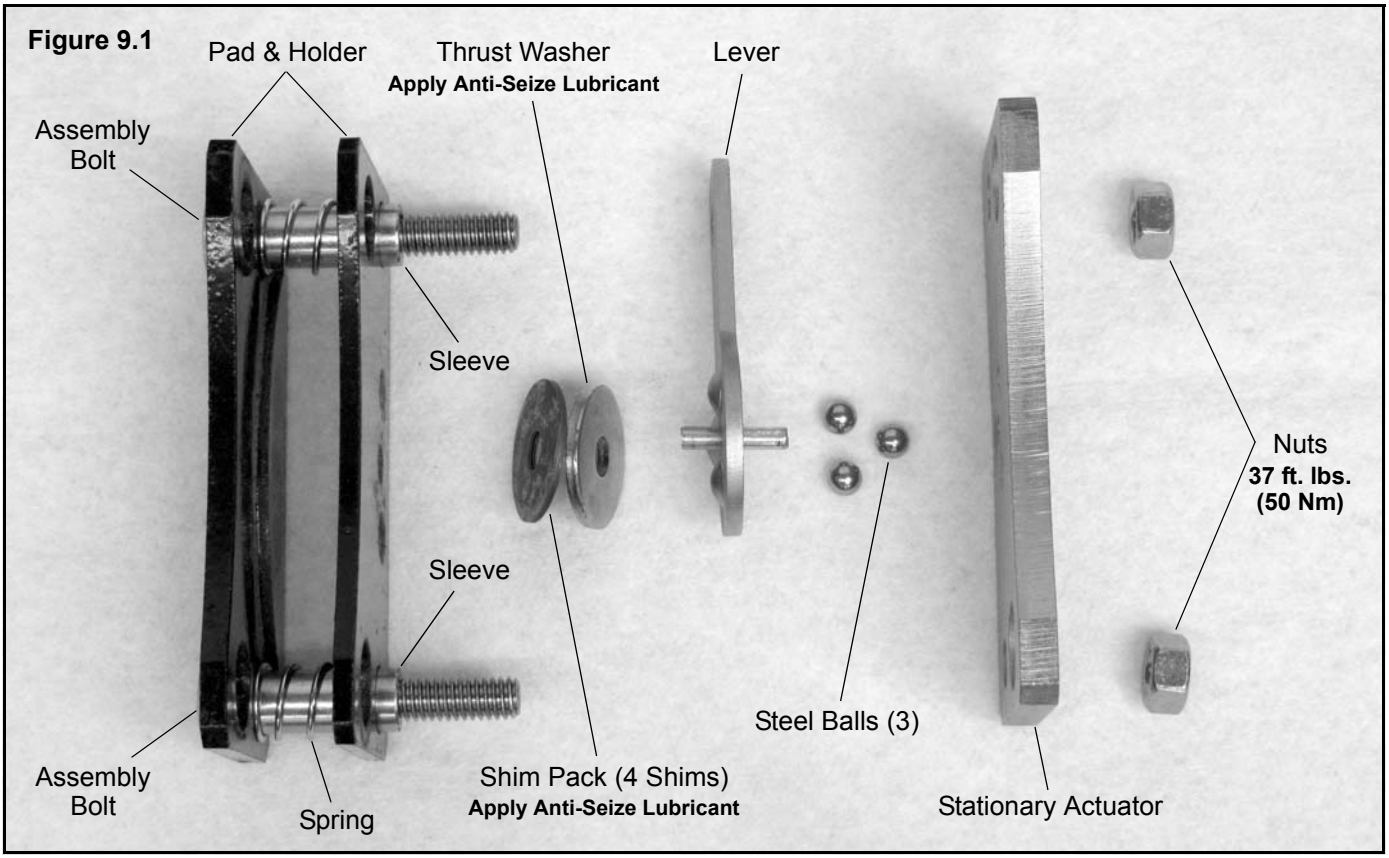
PARKING BRAKE CALIPER SERVICE (INTL MODEL)

Caliper Exploded View

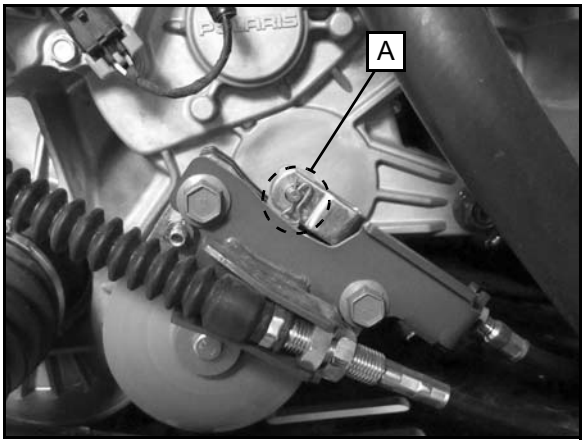


Caliper Removal

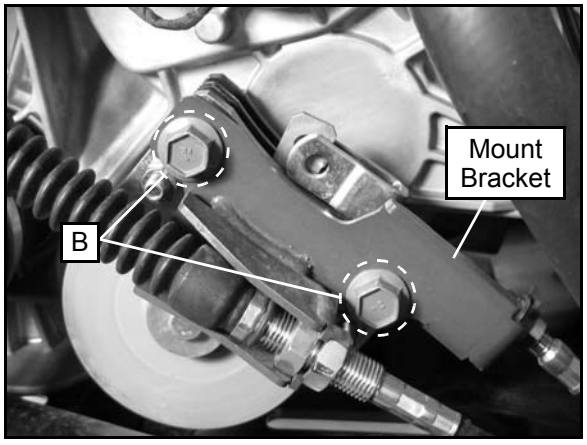
NOTE: Do not get oil, grease, or fluid on the parking brake pads. Damage to or contamination of the pads may cause the pads to function improperly.

1. Remove the clip pin and pin (A) from the parking brake cable.

NOTE: Be sure the parking brake is not engaged.



2. Remove the two fasteners (B) retaining the parking brake caliper mount / shift cable bracket.

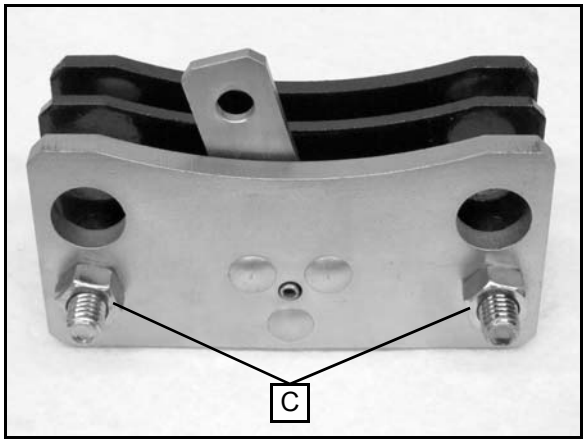


3. Lift the parking brake caliper off the brake disc and remove it from the vehicle.

Caliper Disassembly / Inspection

NOTE: Refer to the "Electronic Parts Catalog" for parking brake caliper replacement parts information.

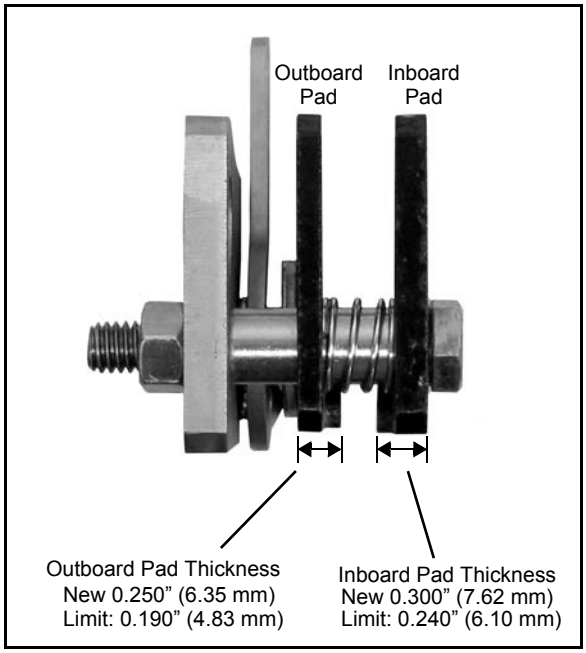
1. Remove the two caliper assembly bolts (C).



2. Slide the brake pads and springs from the assembly.

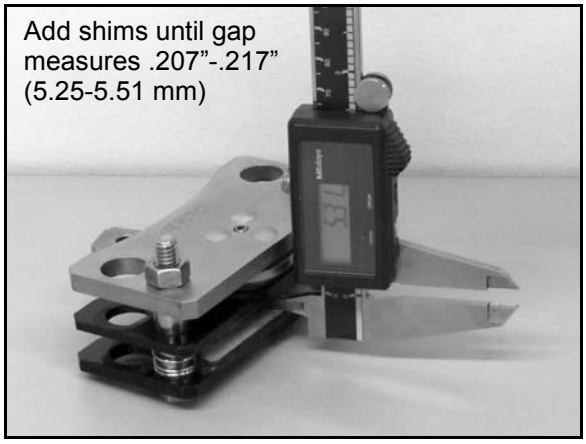
NOTE: Retain the lever and ball bearings for reassembly.

3. Inspect brake pads for excessive wear. Replace as needed.
4. Check the three steel balls for any signs of cracking. Replace as needed.
5. Check ball seats in lever and stationary actuator. If excessively worn, replace parts as needed.
6. Measure thickness of the rear caliper parking brake pads. Replace assembly or pads as needed. Refer to the following image for brake pad specifications.



New Brake Pad Installation

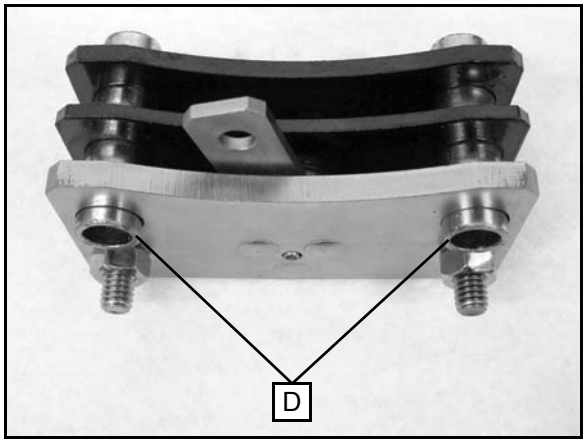
1. Install new pads and assemble the caliper with one shim. For shim location, see **Figure 9.1** on page 9.11.
2. Measure gap for the brake disc and compare to gap specification. Disassemble and add shim(s) between thrust washer and the inside brake pad as needed to close the gap to .207-.217 in. (5.25-5.51 mm).



3. Once you have determined the correct amount of shims to use, reassemble the caliper and apply an Anti-Seize Lubricant to the thrust washer and shims.
4. Torque the caliper assembly bolts to specification.

= T
Parking Brake Caliper - Assembly Bolts: **37 ft. lbs. (50 Nm)**

5. Ensure the parking brake assembly functions properly by actuating the lever. Install the mounting sleeves (D) before installation.



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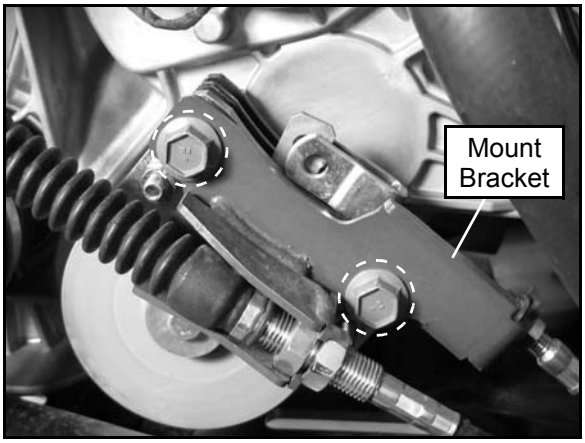
Caliper Installation

1. Install the parking brake caliper over the brake disc. Align the caliper mounting sleeves with the holes in the mount bracket.
2. Install and tighten the two caliper mount / shift cable bracket fasteners to specification.



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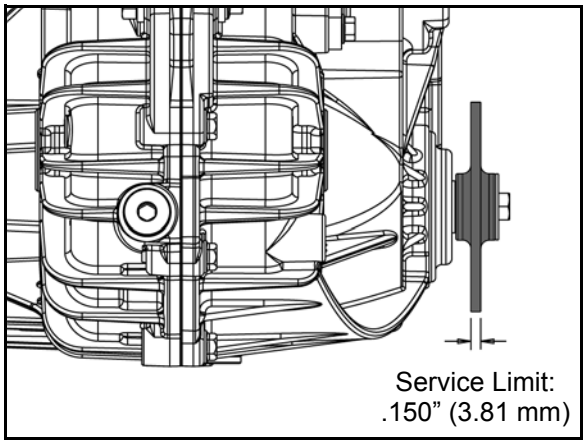
Parking Brake Caliper - Mount Bracket Bolts: **37 ft. lbs. (50 Nm)**

3. Install the cable, pin and clip pin. Test the park brake for proper function.

PARKING BRAKE DISC (INTL MODEL)

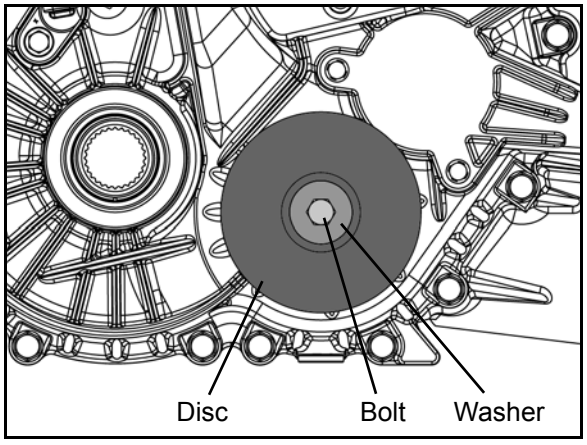
Disc Inspection

1. Measure the brake disc with a micrometer. If the thickness of the disc is less than specified, replace the brake disc (see “Disc Replacement”).



Disc Replacement

1. Remove the parking brake caliper from the disc (see “Caliper Removal”).
2. Using a 1/2” socket and ratchet, remove the brake disc retaining bolt and flat washer.
3. Remove the disc from the transmission shaft.
4. Install the new brake disc. Install the mounting bolt and flat washer. Torque the mounting bolt to specification.



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Parking Brake Disc Mounting Bolt: **18-22 ft. lbs. (24-30 Nm)**

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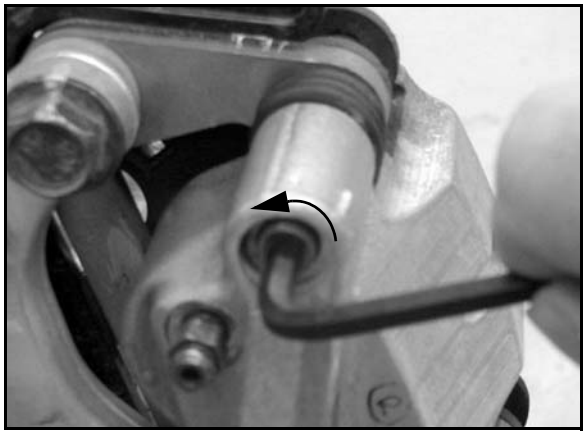
FRONT BRAKE PADS

Pad Removal

1. Elevate and support front of vehicle.

> **⚠ CAUTION**
>
> Use care when supporting vehicle so that it does not tip or fall.
> Severe injury may occur if machine tips or falls.

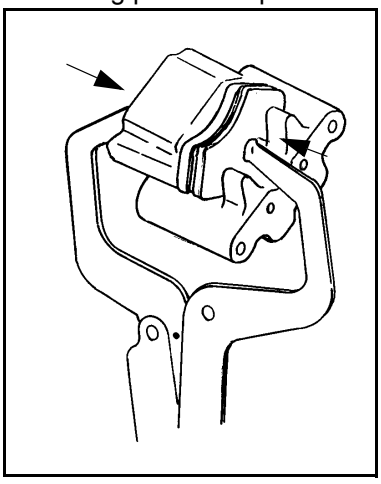
2. Remove the front wheel.
3. Loosen the pad adjuster screw 2-3 turns.



4. Remove and discard the upper and lower caliper mounting bolts and remove the caliper from the front hub.

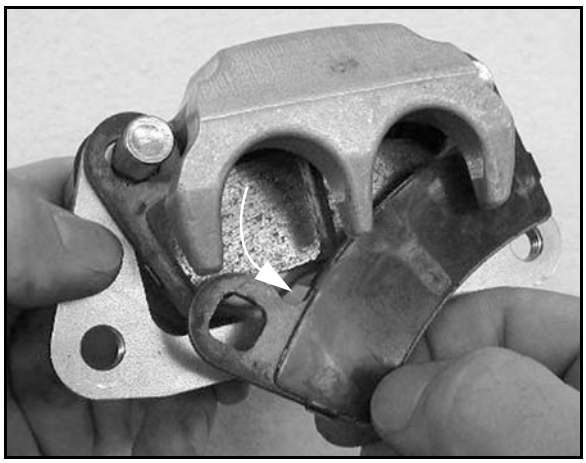
NOTE: When removing caliper, use care not to damage brake line. Support caliper so to avoid kinking or bending brake line.

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 the mounting bracket inward and the slip outer brake pad out between the bracket and caliper body.



7. Remove the inner pad from the bracket and caliper.

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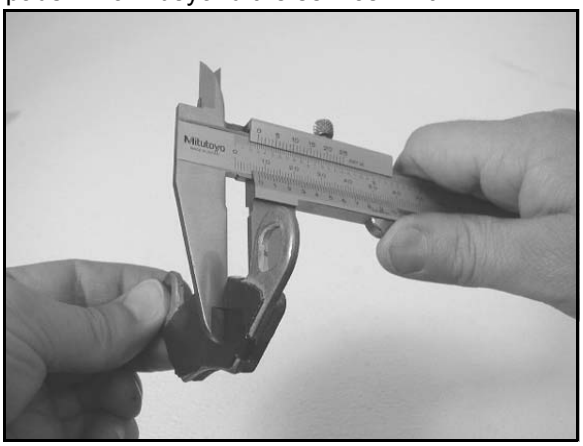
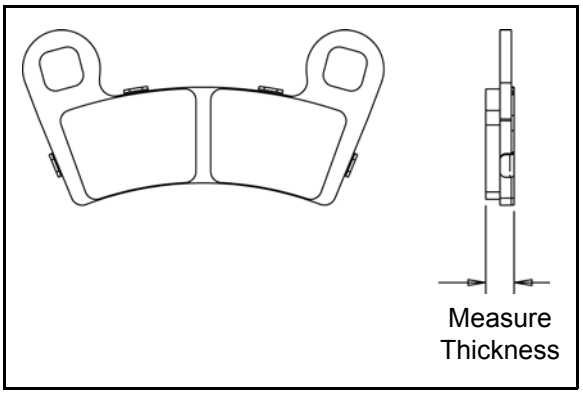
Pad Inspection

1. Measure the thickness of the pad material. Replace pads if worn beyond the service limit.

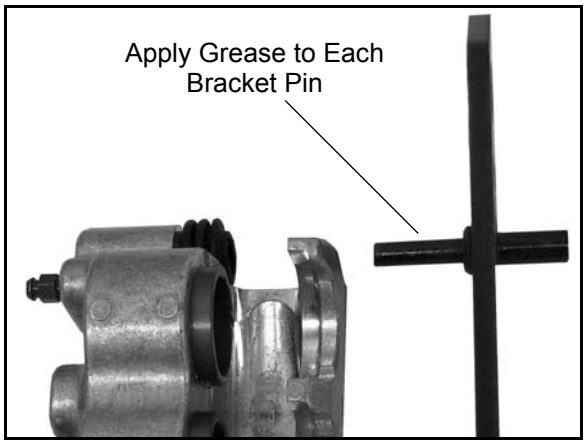




Front Brake Pad Thickness:
.300” ± .007” (7.6 mm ± .178 mm)
Service Limit: .180” (4.6 mm)

Pad Assembly / Installation

1. Lubricate mounting bracket pins with a light film of silicone grease 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.

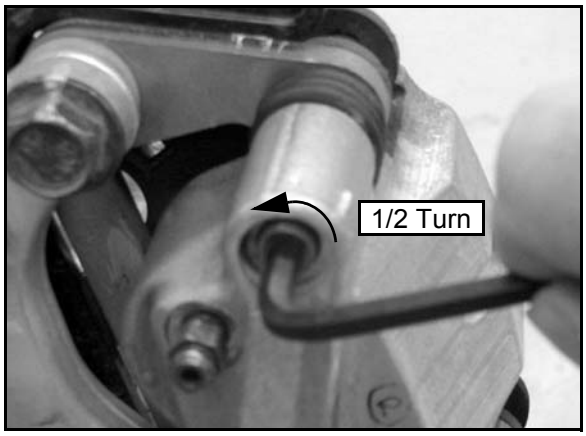
3. Install caliper onto front hub and torque ***new*** mounting bolts to specification.

= T

Front Caliper Mount Bolt Torque:
31-34 ft. lbs. (42-46 Nm)

4. Slowly pump the brake pedal 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 adjustment set 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.

Master Cylinder Fluid
Up to MAX line inside reservoir

7. Install wheel and torque wheel nuts to specification.

= T
Wheel Nuts: **Steel Wheels: 27 ft. lbs. (37 Nm)** **Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)**

Brake Burnishing Procedure

It is required that a burnishing procedure be performed after installation of new brake pads to extend service life and reduce noise.

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. **Do not make more than 3 stops per 1 mile (1.6 km)**.

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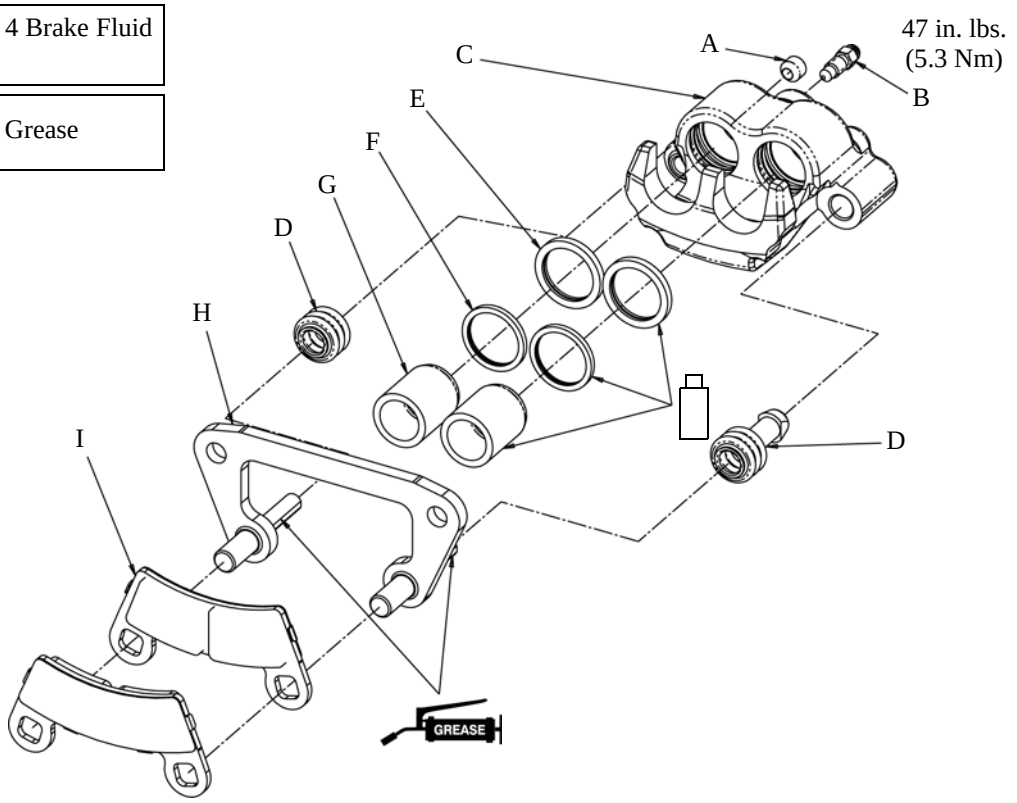
FRONT CALIPER SERVICE

Caliper Exploded View

Apply Polaris DOT 4 Brake Fluid to Component

Apply Silicone Grease



A. Socket Set Screw
B. Bleeder Screw
C. Caliper Assy.
D. Boot
E. Square O-ring (thick)
F. Square O-ring (thin)
G. Piston
H. Caliper Mount
I. Brake Pads

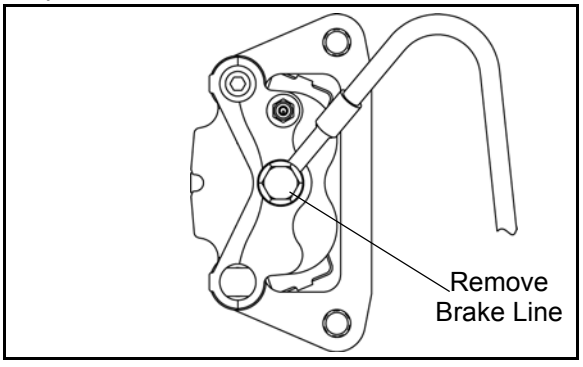
Caliper Removal

1. Elevate and safely support the front of the vehicle.
2. Remove the (4) wheel nuts and the front wheel.

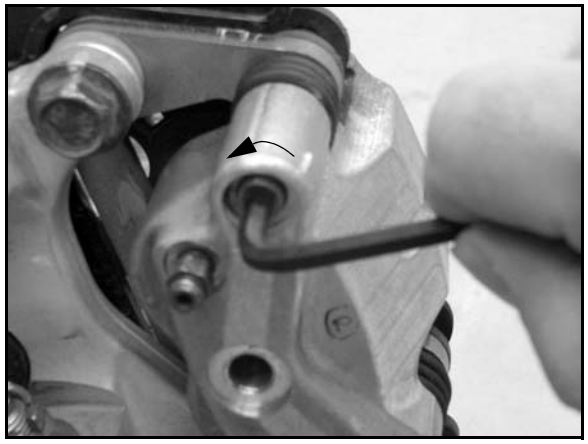
CAUTION

Use care when supporting vehicle so that it does not tip or fall. Severe injury may occur.

3. Clean caliper area before removal.
4. Place a container below the caliper to catch brake fluid when removing the line. Remove brake line from caliper.



5. Loosen brake pad adjustment set screw 2-3 turns to allow brake pad removal after the caliper is removed.



6. Remove and discard the two caliper mounting bolts and remove the caliper assembly from the front hub.

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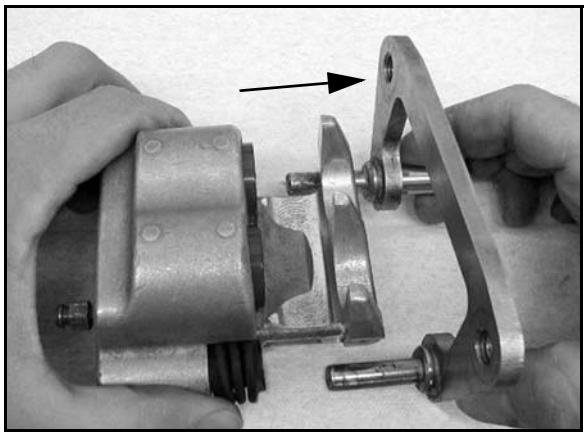
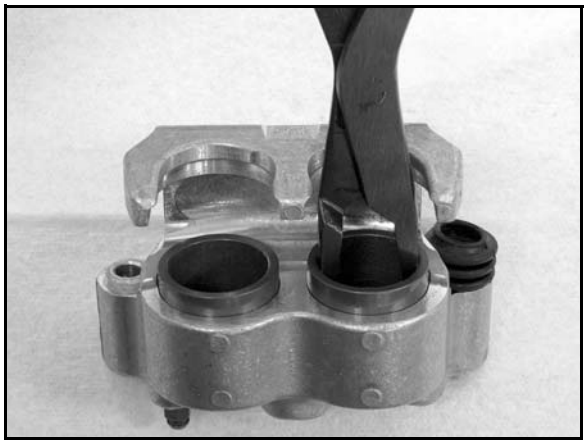
Caliper Disassembly

1. Remove both brake pads from the caliper (see "FRONT BRAKE PADS - Pad Removal").
2. Remove mount bracket assembly and dust boots.

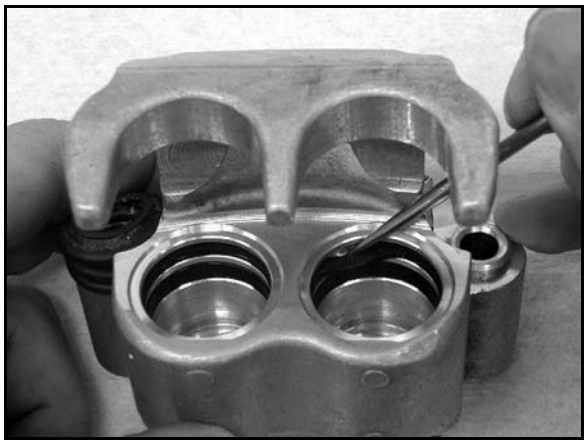


3. Thoroughly clean the caliper before disassembly and prepare a clean work area for disassembly.
4. Use a commercially available caliper piston pliers to extract the pistons from the caliper.

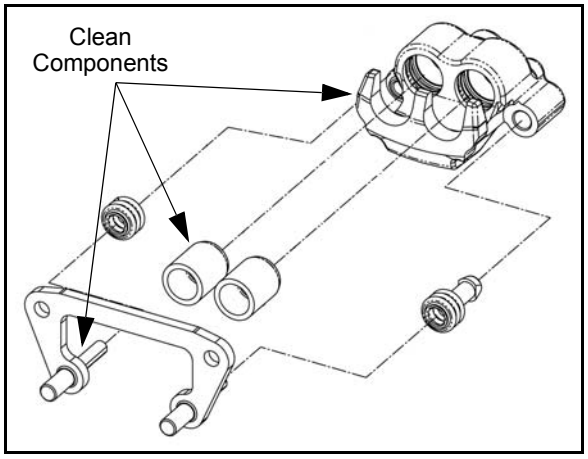


IMPORTANT: Do not remove the caliper pistons with a standard pliers. The piston sealing surfaces will become damaged if a standard pliers is used.

5. Once the pistons are removed, use a pick to carefully remove the square O-rings from the caliper. O-rings should be replaced during caliper service.



6. Clean the caliper body, piston, and retaining bracket with brake cleaner or alcohol.



NOTE: Be sure to clean seal grooves in caliper body.

9

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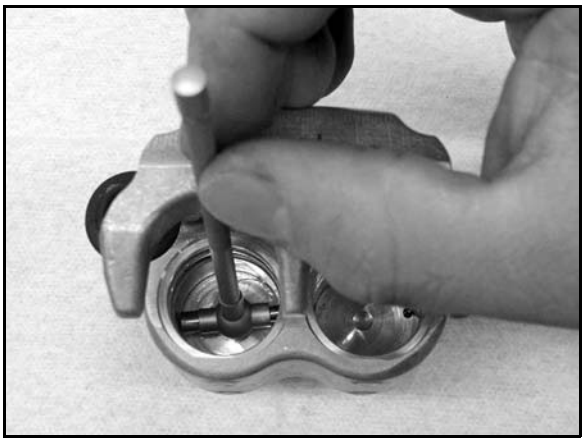
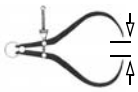
Caliper Inspection

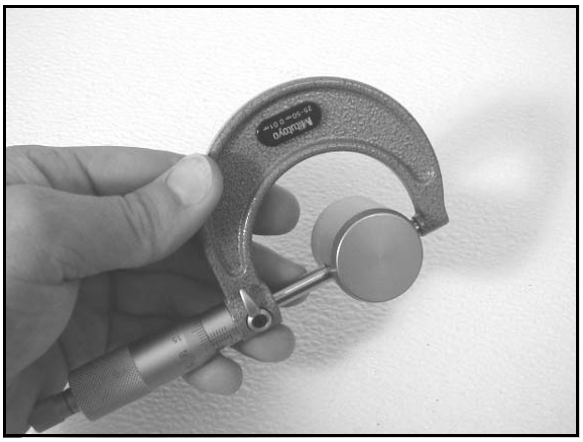
1. Inspect caliper body for nicks, scratches, pitting or wear. Measure bore size and compare to specifications. Replace if damaged or worn beyond service limit.

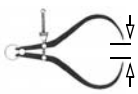


 **= In. / mm.**

Front Caliper Piston Bore I.D.:
Std: 1.004” (25.5 mm)
Service Limit: 1.006” (25.55 mm)

2. Inspect piston for nicks, scratches, pitting or wear. Measure piston diameter and replace if damaged or worn beyond service limit.



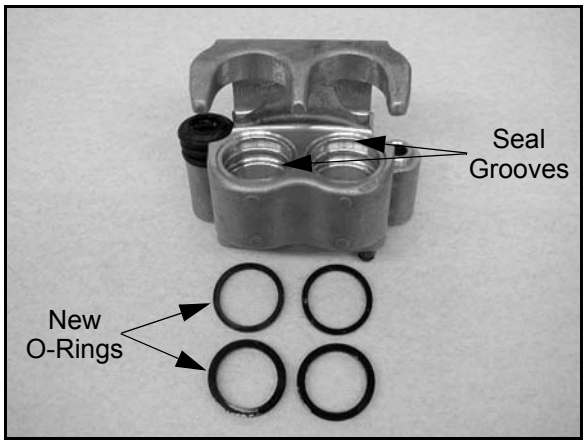
 **= In. / mm.**

Front Caliper Piston O.D.:
Std: 1.002” (25.45 mm)
Service Limit: 1.000” (25.4 mm)

3. Inspect the brake disc and pads as outlined in this chapter.

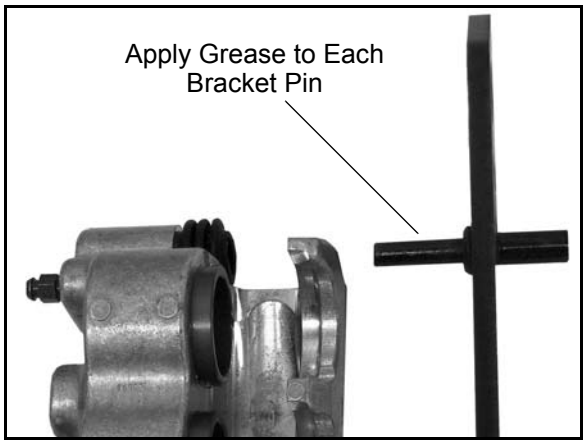
Caliper Assembly

1. Install new O-rings in the caliper body. Be sure the grooves are clean and free of residue or brakes may drag upon assembly.



2. Coat pistons with clean Polaris DOT 4 Brake Fluid. Install pistons 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 silicone grease and install the rubber dust seal boots.



4. Compress the mounting bracket and make sure the dust seal boots 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.

Caliper Installation

1. Install the brake line onto the caliper taking care not to allow any debris to enter the caliper.

2. Install the caliper and torque the ***new*** mounting bolts to specification.

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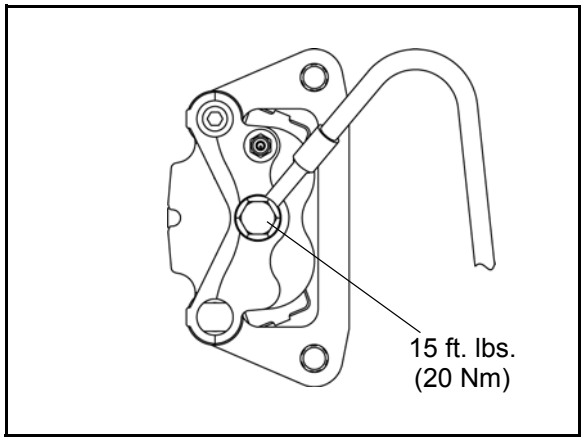
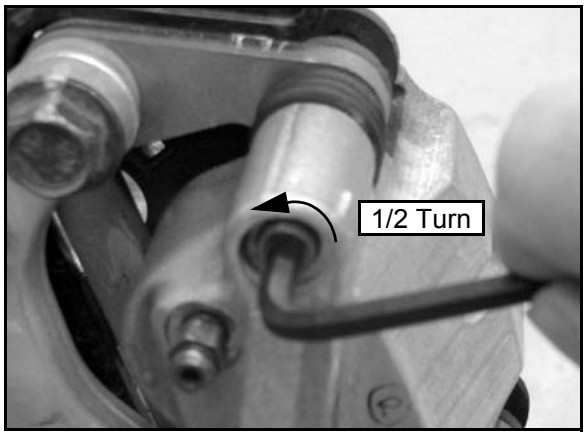
Front Caliper Mount Bolt Torque: **31-34 ft. lbs. (42-46 Nm)**

3. Torque the banjo bolt to the proper torque specification.



4. Install the adjustment set screw and turn clockwise until stationary pad contacts disc, then back off 1/2 turn (counterclockwise).



5. Perform brake bleeding procedure as outlined earlier in this chapter.

6. Install wheel and torque wheel nuts to specification.

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Wheel Nuts: **Steel Wheels: 27 ft. lbs. (37 Nm)** **Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)**

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 pedal is released. If the brake drags, re-check assembly and installation.

NOTE: If new pads are installed, refer to "FRONT BRAKE PADS - Brake Burnishing Procedure".

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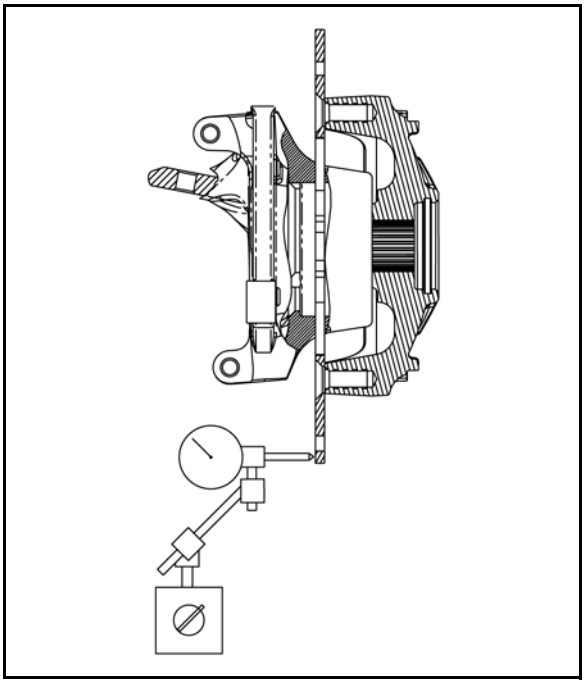
FRONT BRAKE DISC

Disc Runout

1. 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 specification.



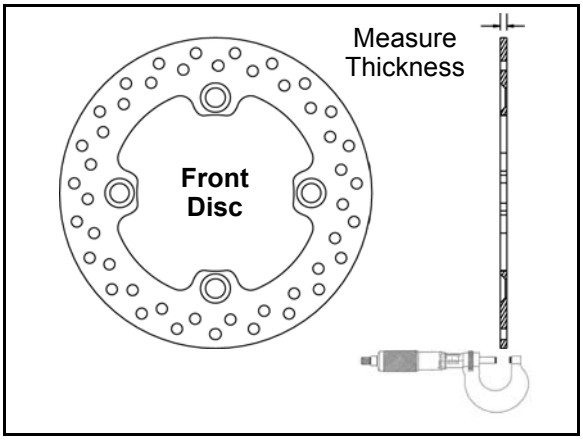
Brake Disc Runout

Service Limit .010” (.254 mm)

Disc Inspection

1. Visually inspect disc for scoring, scratches, or gouges. Replace the disc if any deep scratches are evident.

2. Use a 0-1” micrometer and measure the disc thickness at eight different points around the pad contact surface. Replace disc if worn beyond service limit.



Brake Disc Thickness
New .188” (4.78 mm)
Service Limit .170” (4.32 mm)

Brake Disc Thickness Variance
Service Limit: .002” (.051 mm)
difference between measurements

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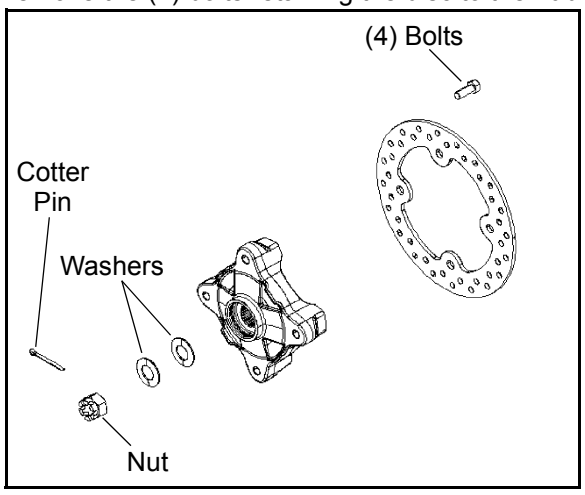
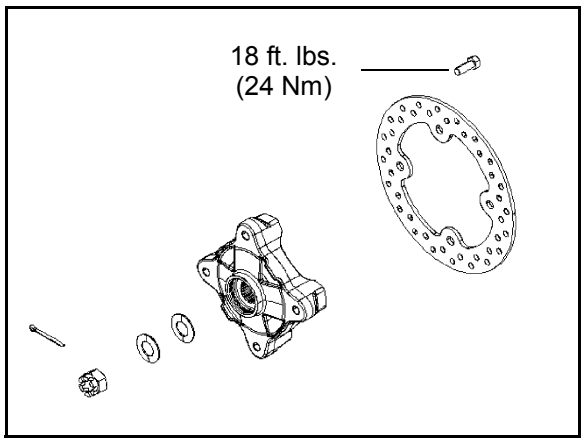
Disc Replacement

1. Remove th e fr ont br ake calip er (see “FRONT CALIPER SERVICE”).
2. Remove wheel hub cotter pin, castle nut and washers.
3. Remove the wheel hub assembly from the vehicle and remove the (4) bolts retaining the disc to the hub.



4. Clean the wheel hub mating surface and install new disc on wheel hub.
5. Install ***new*** bolts and torque to **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.

6. Install wheel hub assembly, washers, and castle nut. Torque castle nut to **80 ft. lbs. (108 Nm)** and install a ***new*** cotter pin.
7. Install the front brake caliper (see “FRONT CALIPER SERVICE”).
8. Follow blee ding procedure outlin ed ear lier in this chapter.
9. Field test unit for proper braking action before putting into service. Inspect for fluid leaks and firm brakes. Make sure the brake is n ot dragging when pedal is released. If the brake drags, re-check assembly and installation.

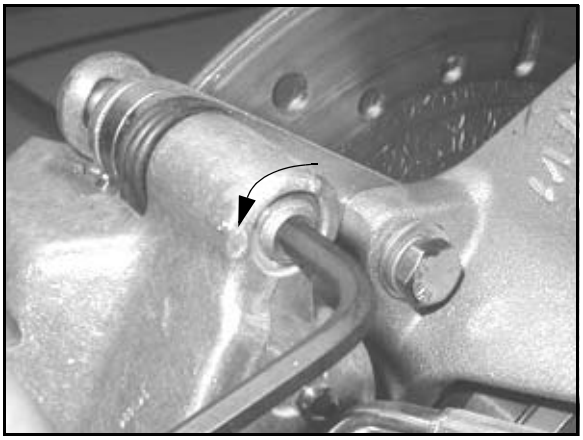
REAR BRAKE PADS

Pad Removal

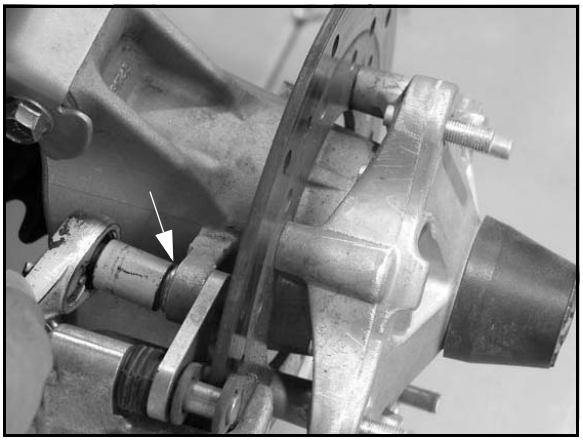
1. Elevate and support rear of vehicle.

> **⚠ CAUTION**
>
> Use care when supporting vehicle so that it does not tip or fall.
> Severe injury may occur if machine tips or falls.

2. Remove the rear wheel.
3. Loosen pad adjuster screw 2-3 turns.

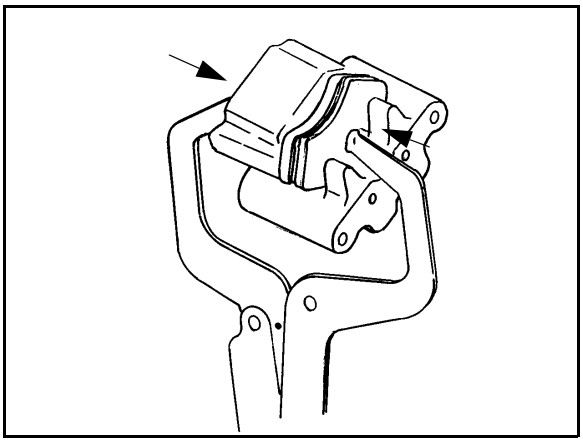


4. Remove and discard the two caliper mounting bolts and lift caliper off the brake disc.



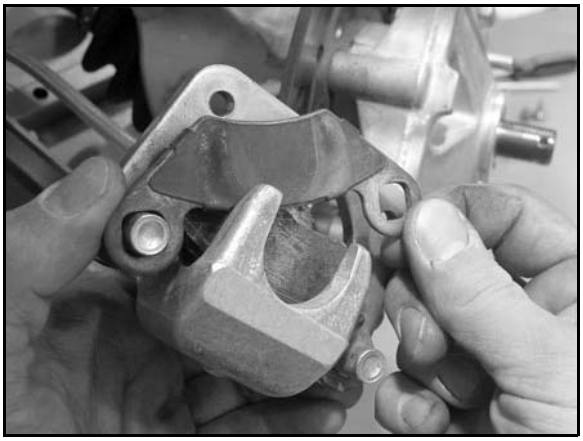
NOTE: When removing caliper, be careful not to damage brake line. Support caliper so as not to kink or bend brake line.

5. Push caliper piston into the caliper bore slowly using a C-clamp or locking pliers with pads installed.

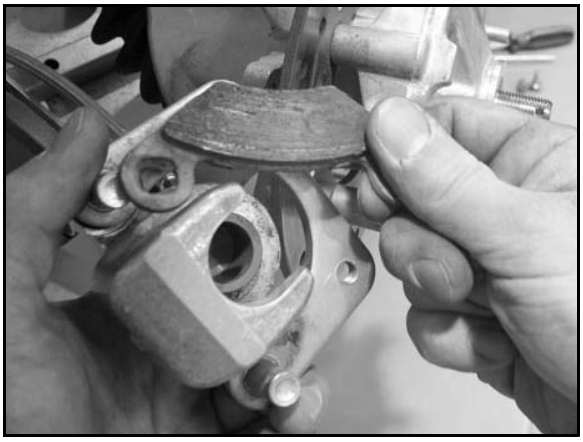


NOTE: Brake fluid will be forced through compensating port into master cylinder fluid reservoir when piston is pushed back into caliper. Remove excess fluid from reservoir as required.

6. Push caliper mounting bracket inward and slip outer brake pad past the edge to remove.



7. Remove the inner brake pad.



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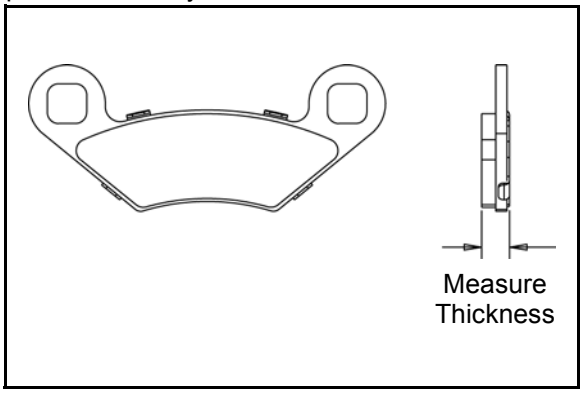
Pad Inspection

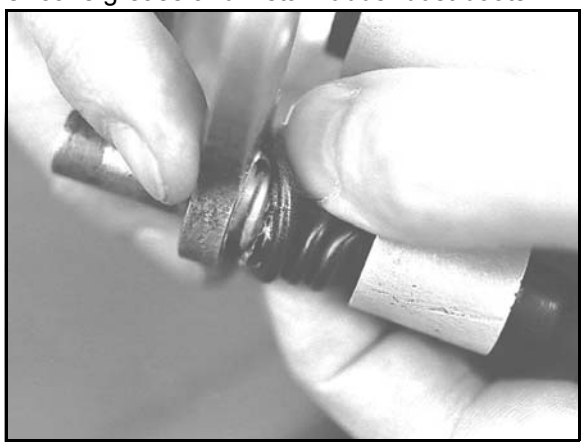
1. Clean the caliper with brake cleaner or alcohol.
2. Measure the thickness of the pad material. Replace pads if worn beyond the service limit.



Rear Brake Pad Thickness
New .298" ± .007" (7.57 mm ± .178 mm)
Service Limit .180" (4.6 mm)

Pad Assembly / Installation

1. Lubricate mounting bracket pins with a light film of silicone grease and install rubber dust boots.

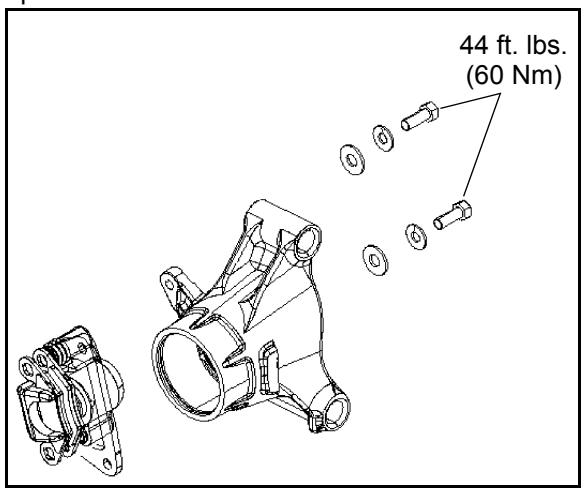


2. Compress mounting bracket and make sure dust boots are fully seated. Install pads with friction material facing each other.

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 ***new*** mounting bolts to specification.



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Rear Caliper Mount Bolt Torque:
44 ft. lbs. (60 Nm)

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4. Slowly pump the brake pedal 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 adjustment set screw and turn clockwise until the stationary pad contacts the disc, then back off 1/2 turn.
6. Verify fluid level in reservoir is up to the MAX line inside reservoir and install reservoir cap.

Master Cylinder Fluid
Up to MAX line inside reservoir

7. Install wheel and torque wheel nuts to specification.

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Wheel Nuts: **Steel Wheels: 27 ft. lbs. (37 Nm)** **Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)**

Brake Burnishing Procedure

It is required that a burnishing procedure be performed after installation of new brake pads to extend service life and reduce noise.

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. **Do not make more than 3 stops per 1 mile (1.6 km)**.

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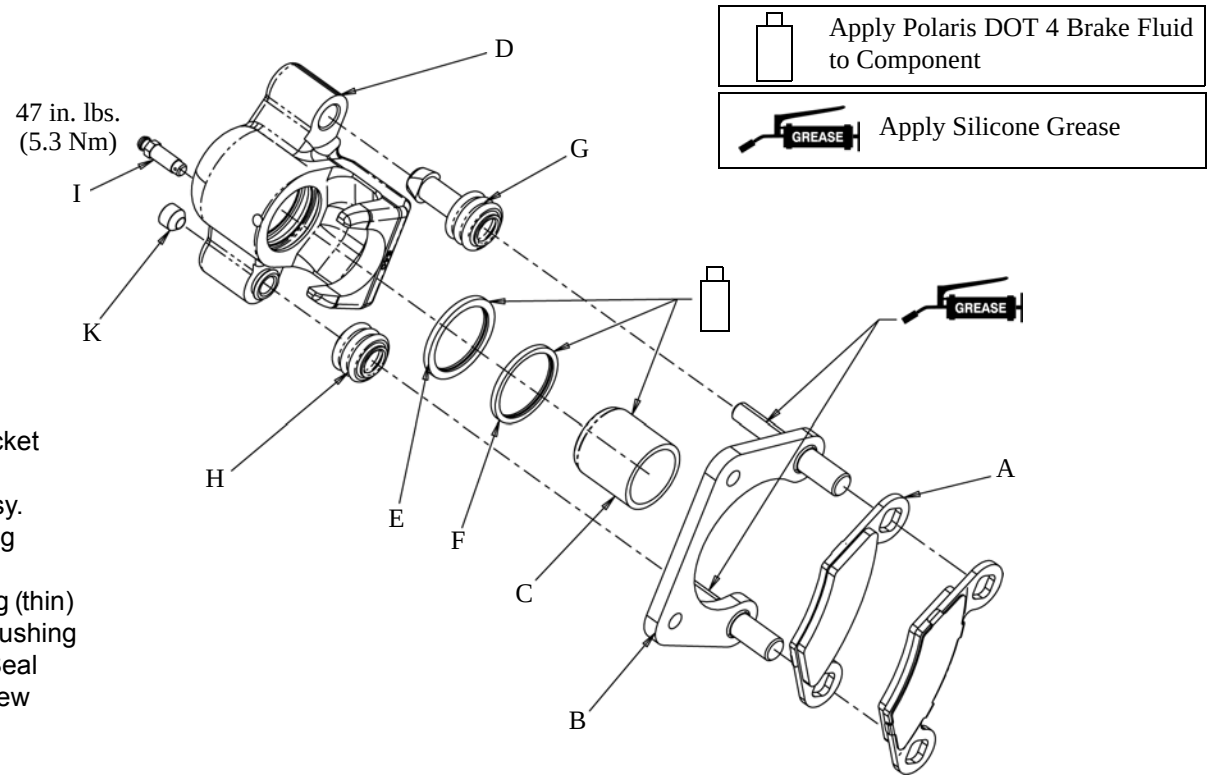
REAR CALIPER SERVICE

Caliper Exploded View



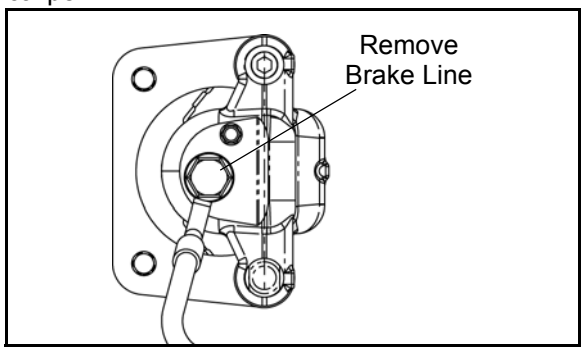
A. Brake Pad
B. Mount Bracket
C. Piston
D. Caliper Assy.
E. Square Ring (thick)
F. Square Ring (thin)
G. Boot, Pin Bushing
H. Boot, Pin Seal
I. Bleeder Screw
K. Set Screw

Caliper Removal

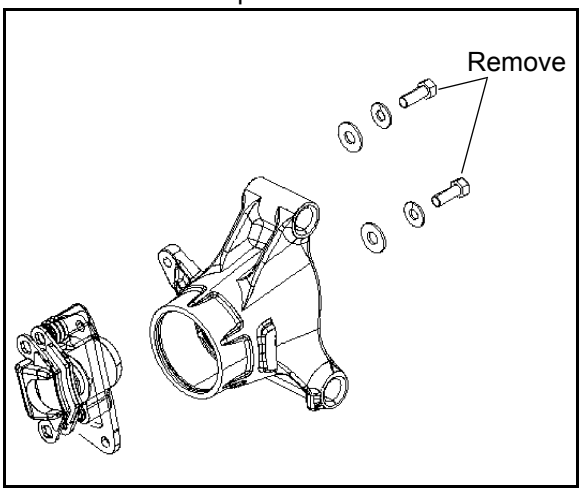
1. Elevate and safely support the rear of the vehicle.

> **CAUTION**
>
> Use care when supporting vehicle so that it does not tip or fall. Severe injury may occur.

2. Remove the (4) wheel nuts and rear wheel.
3. Clean caliper area before removal.
4. Place a container below the caliper to catch the brake fluid when removing the line. Remove brake line from caliper.



5. Loosen the brake pad adjustment set screw to allow brake pad removal after the caliper is removed.
6. Remove and discard the two caliper mounting bolts and remove the caliper.



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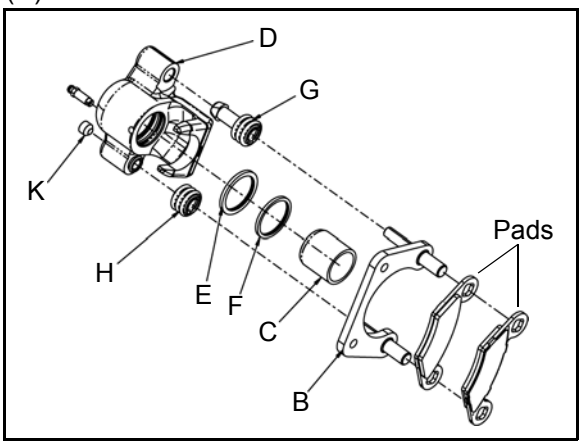
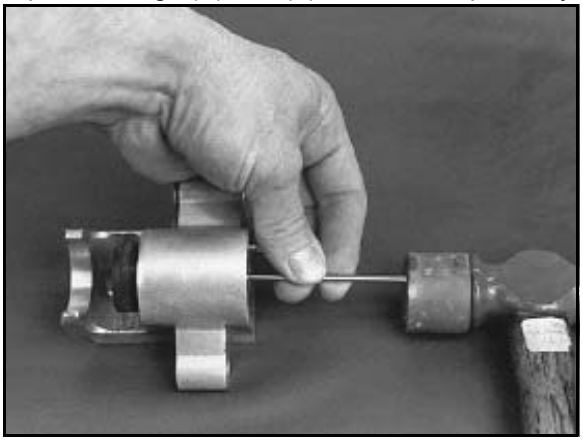
Caliper Disassembly

1. Remove brake pad adjustment set screw (K).
2. Push upper pad retainer pin inward and slip brake pads past the edge and remove from the caliper.
3. Remove mounting bracket (B) and dust boots (G) and (H).

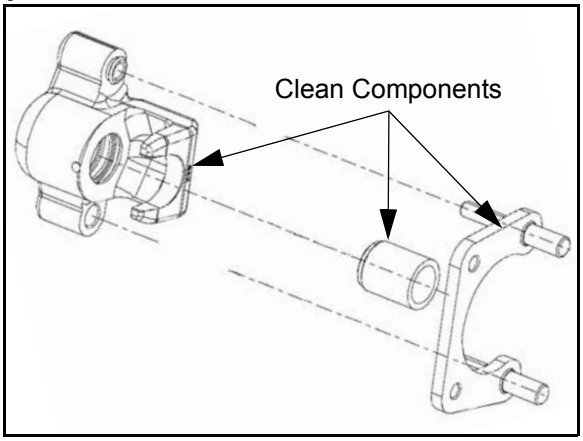


4. Using a hammer and a small punch, remove the piston (C) from the caliper body (D). Remove the square O-rings (E) and (F) from the caliper body (D).



5. Clean the caliper body, piston, and retaining bracket with brake cleaner or alcohol.

NOTE: Be sure to clean seal grooves in caliper body.



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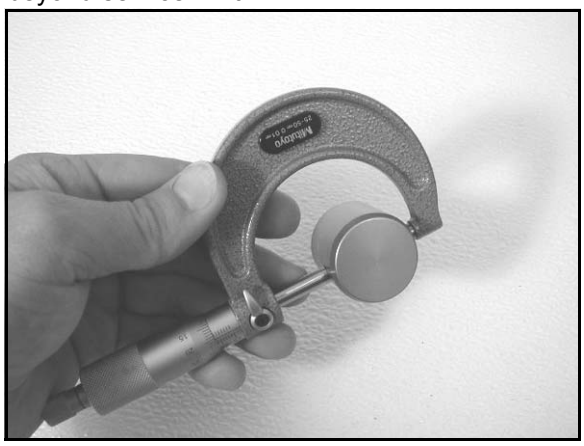
Caliper Inspection

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. Standard: 1.191” (30.25 mm) Service Limit: 1.192” (30.28 mm)

2. Inspect piston for nicks, scratches, wear or damage. Measure diameter and replace if damaged or worn beyond service limit.

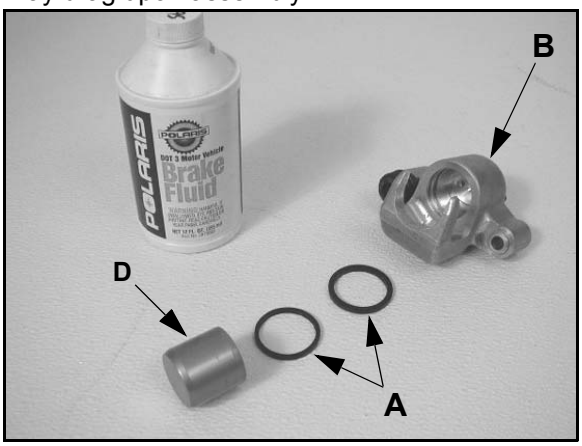


= In. / mm.
Rear Caliper Piston O.D. Standard: 1.1875” (30.16 mm) Service Limit: 1.186” (30.12 mm)

3. Inspect the brake disc and pads as outlined in this chapter.

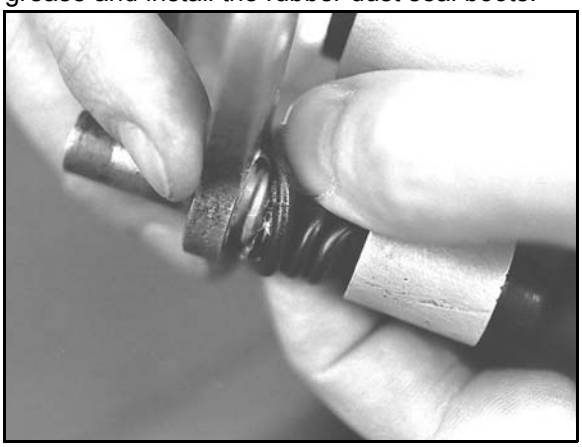
Caliper Assembly

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 4 Brake Fluid **(PN 2872189)**. 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 silicone grease 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.

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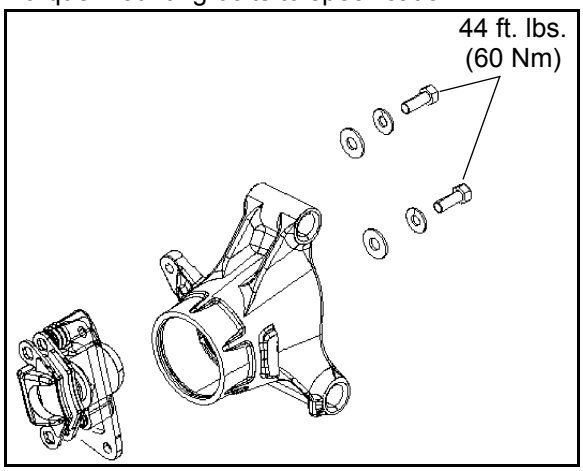
Caliper Installation

1. Install the ***new*** rear caliper with the mounting bolts. Torque mounting bolts to specification.



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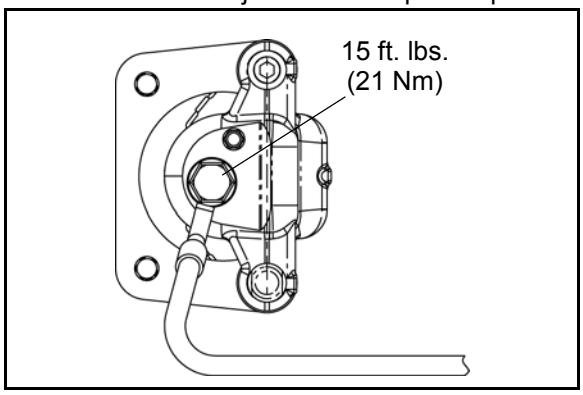
Rear Caliper Mount Bolt Torque: **44 ft. lbs. (60 Nm)**

2. Install brake line banjo bolt and torque to specification.



3. Install the pad adjustment screw and turn until stationary pad contacts disc, then back off 1/2 turn.
4. Follow bleeding procedure outlined earlier in this chapter.
5. Install wheel and torque wheel nuts to specification.

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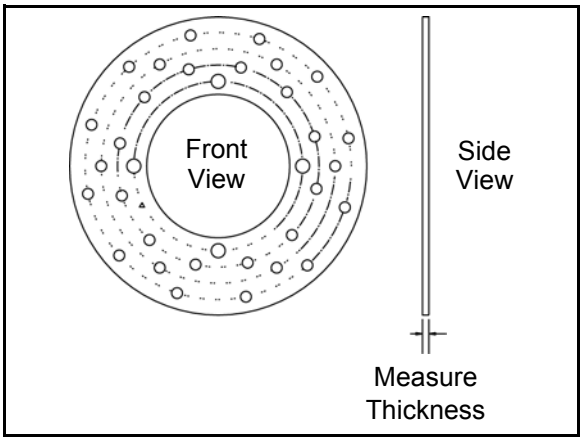
Wheel Nuts: **Steel Wheels: 27 ft. lbs. (37 Nm)** **Aluminum Wheels: 30 ft. lbs. + 90° (1/4 turn)**

NOTE: If new pads are installed, refer to "REAR BRAKE PADS - Brake Burnishing Procedure".

REAR BRAKE DISC

Disc Inspection

1. Visually inspect disc for scoring, scratches, or gouges. Replace the disc if any deep scratches are evident.
2. Use a 0-1" micrometer and measure the disc thickness at eight different points around the pad contact surface. Replace disc if worn beyond service limit.



Brake Disc Thickness **New: .188" (4.78 mm)** **Service Limit: .170" (4.32 mm)**

Brake Disc Thickness Variance **Service Limit .002" (.051 mm)** **difference between measurements**

3. Mount a dial indicator and measure disc runout. Slowly rotate the disc and read total runout on the dial indicator. Replace the disc if runout exceeds specifications.

Brake Disc Runout **Service Limit .010" (.254 mm)**

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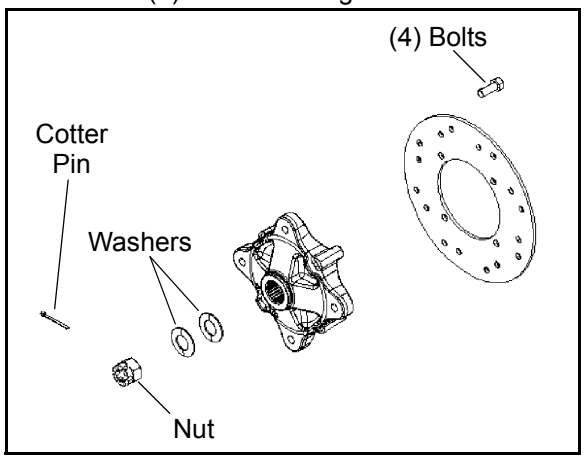
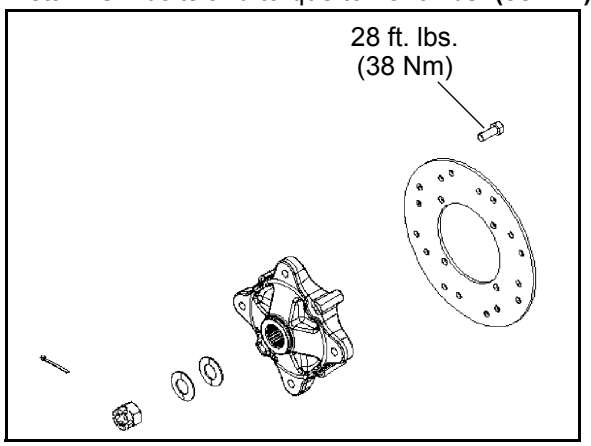
Disc Replacement

1. Remove rear brake caliper (see "REAR CALIPER SERVICE").
2. Remove wheel hub cotter pin, castle nut and washers.
3. Remove the hub assembly from the vehicle and remove the (4) bolts retaining the disc to the hub.



4. Clean the wheel hub mating surface and install new disc on wheel hub.
5. Install ***new*** bolts and torque to **28 ft. lbs. (38 Nm)**.



⚠ CAUTION

Always use new brake disc mounting bolts. The bolts have a pre-applied locking agent which is destroyed upon removal.

6. Install wheel hub assembly, washers, and castle nut. Torque castle nut to **80 ft. lbs. (108 Nm)** and install a ***new*** cotter pin.
7. Install rear caliper (see "REAR CALIPER SERVICE"). Follow bleeding procedure outlined earlier in this chapter.
8. 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 pedal is released. If the brake drags, re-check assembly and installation.

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TROUBLESHOOTING

Brakes Squeal / Poor Brake Performance

- Air in system
- Water in system (brake fluid contaminated)
- Caliper or disc misaligned
- Caliper dirty or damaged
- Brake line damaged or lining ruptured
- Worn disc and/or friction pads
- Incorrectly adjusted stationary pad
- Worn or damaged master cylinder or components
- Damaged break pad noise insulator
- Brake pads dragging
- Brake caliper dragging

Pedal Vibration

- Disc damaged
- Disc worn (runout or thickness variance exceeds service limit)

Caliper Overheats (Brakes Drag)

- Compensating port plugged
- Pad clearance set incorrectly
- Brake pedal binding or unable to return fully
- Residue build up under caliper seals
- Operator riding brakes

Brakes Lock

- Alignment of caliper to disc
- Caliper pistons sticking
- Improper assembly of brake system components

CHAPTER 10
ELECTRICAL

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GENERAL INFORMATION

Special Tools

Part Number	Tool Description
PV-43568	Fluke™ 77 Digital Multimeter
PV-43526	Connector Test Kit
2870630	Timing Light
PU-50338	Battery Hydrometer
2460761	Hall Effect Sensor Probe Harness
2871745	Static Timing Light Harness
-	Digital Wrench™ (see Chapter 4)

SPX Corporation:
1-800-328-6657 or http://polaris.spx.com/.

Electrical Service Notes

Keep the following notes in mind when diagnosing an electrical problem:

- Refer to wiring diagram for stator and electrical component resistance specifications.
- When measuring resistance of a component that has a resistance value under 10 Ohms, remember to subtract meter lead resistance from the reading. Connect the leads together and record the resistance. The resistance of the component is equal to tested value minus the lead resistance.
- Become familiar with the operation of your meter. Be sure leads are in the proper jack for the test being performed (i.e. 10A jack for current readings). Refer to the Owner's Manual included with your meter for more information.
- Voltage, amperage, and resistance values included in this manual are obtained with a Fluke™ 77 Digital Multimeter (PV-43568). This meter is used when diagnosing electrical problems. Readings obtained with other meters may differ.
- Pay attention to the prefix on the multimeter reading (K, M, etc.) and the position of the decimal point.
- For resistance readings, isolate the component to be tested. Disconnect it from the wiring harness or power supply.

Under-Dash Components

The following switches and components can be accessed underneath the instrument / dash panel:

- Speedometer
- Digital Wrench Diagnostic Connector
- AWD Switch
- 12 Vdc Accessory Power Point
- Ignition Switch / Headlamp Switch
- Fuse / Relay Box

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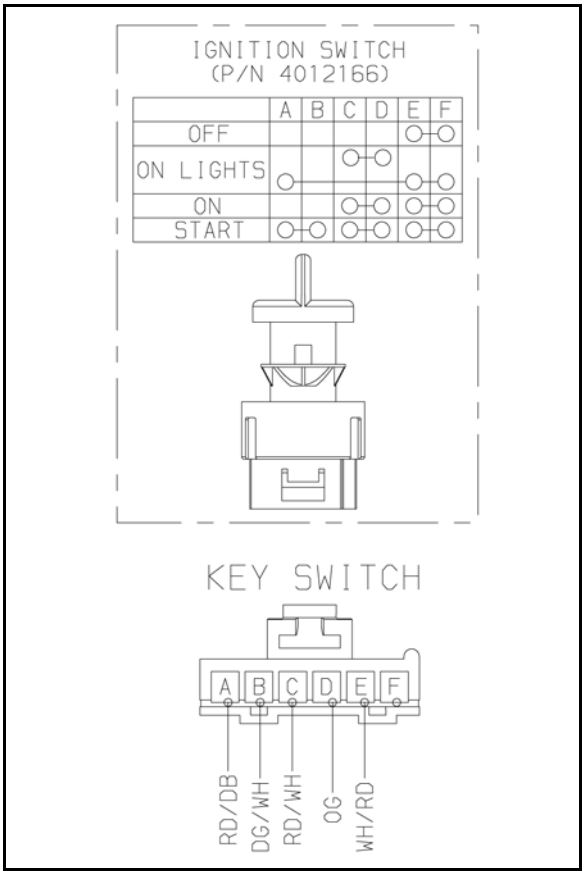
SWITCHES / CONTROLS

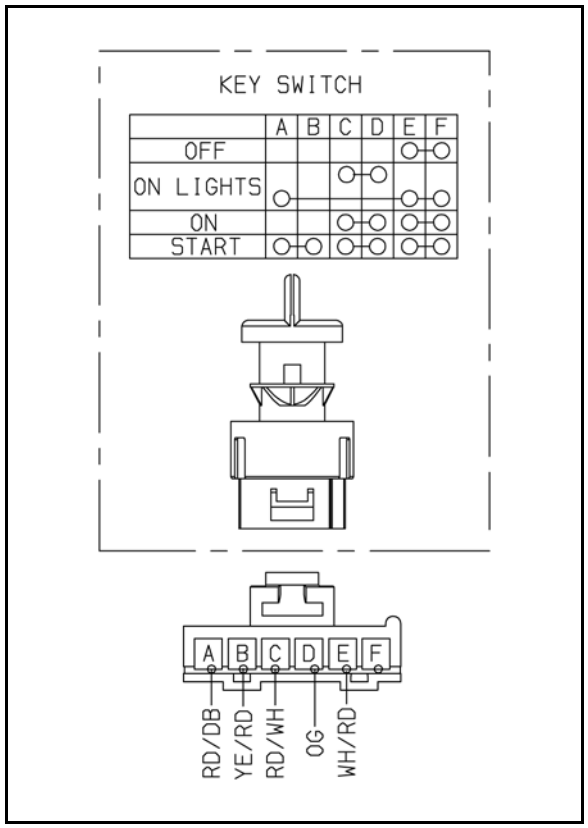
Ignition Key Switch / Headlamp Switch

1. Disconnect the key switch harness by lifting the connector lock and pulling on the connector. Do not pull on the wiring.
2. Test between the 4 sets of outputs (OFF / ON LIGHTS / ON / START). If any of the tests fail, replace ignition switch assembly.
   - Move the switch “ON LIGHTS”. There should be continuity between pins A and E; C and D.
   - Turn the ignition key to ON. There should be continuity between switch pins C and D; E and F.
   - Turn the ignition key to START. There should be continuity between switch pins A and B; C and D; E and F.



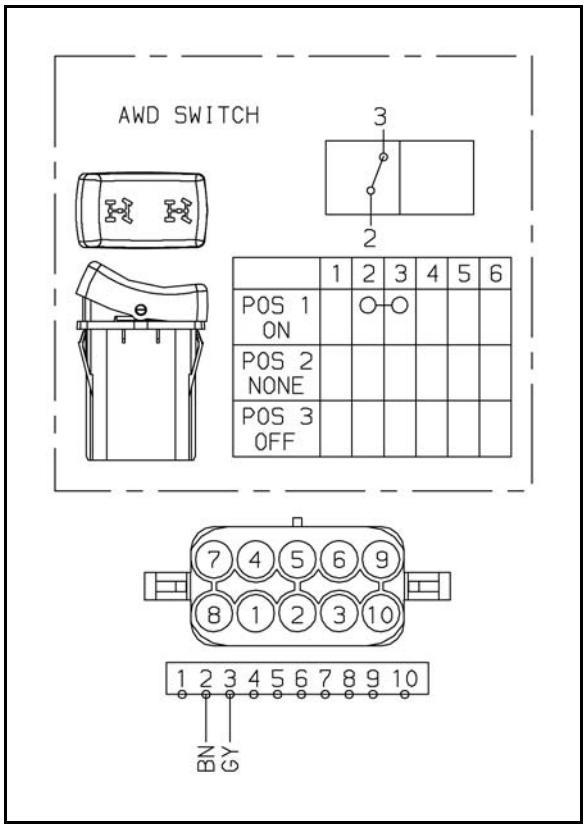
Ignition Key Switch (INTL)

1. Disconnect the key switch harness by lifting the connector lock and pulling on the connector. Do not pull on the wiring.
2. Test between the 4 sets of outputs (OFF / ONLIGHTS / ON / START). If any of the tests fail, replace ignition switch assembly.
   - Turn the ignition key to ON LIGHTS. There should be continuity between switch pins A, E and F; C and D.
   - Turn the ignition key to ON. There should be continuity between pins C and D; E and F.
   - Turn the ignition key to START. There should be continuity between pins A and B; C and D; E and F.



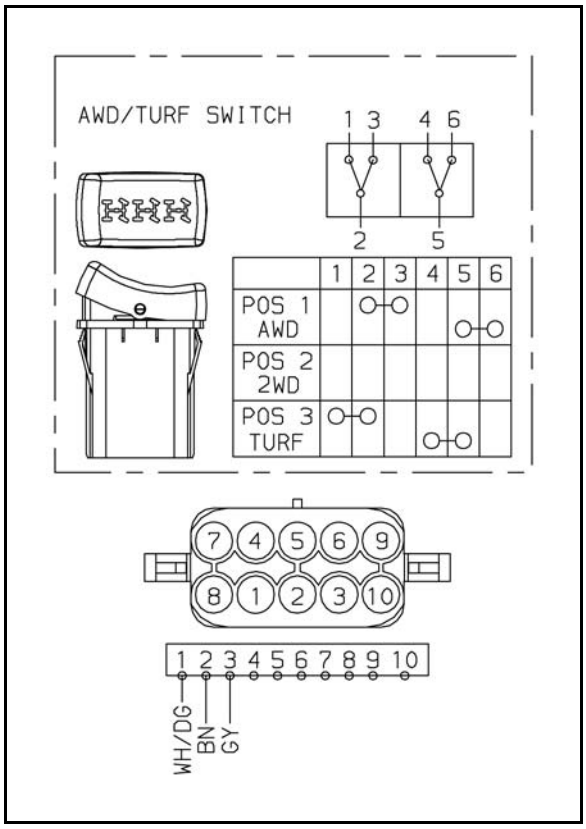
AWD / 2WD Switch

1. Disconnect the AWD / 2WD switch harness by depressing the connector locks and pulling on the connector. Do not pull on the wiring.
2. Test between the 2 sets of outputs (AWD / 2WD). If any of the tests fail, replace the switch assembly.
   - Move the switch to AWD (ON). There should be continuity between switch pins 2 and 3.
   - Move the switch to 2WD (NONE / OFF). There should be no continuity between any pins.



AWD / 2WD / TURF Switch (INTL)

1. Disconnect the AWD / 2WD / TURF switch harness by depressing the connector locks and pulling on the connector. Do not pull on the wiring.
2. Test between the 3 sets of outputs (AWD / 2WD / TURF). If any of the tests fail, replace the switch assembly.
   - Move the switch to AWD. There should be continuity between switch pins 2 and 3; 5 and 6.
   - Move the switch to 2WD. There should be no continuity between any pins.
   - Move the switch to TURF. There should be continuity between switch pins 1 and 2; 4 and 5.



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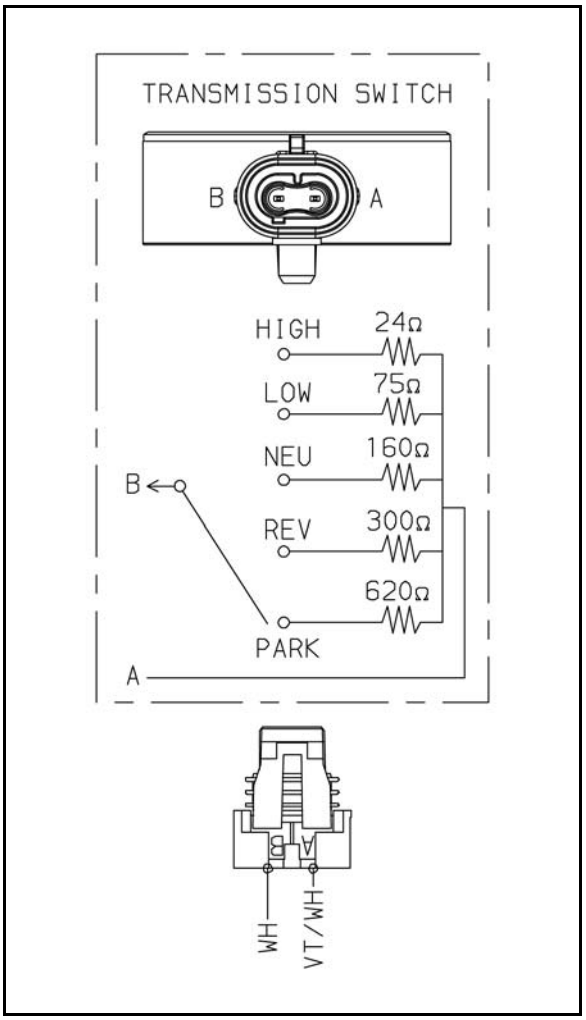
Transmission (Gear Position) Switch

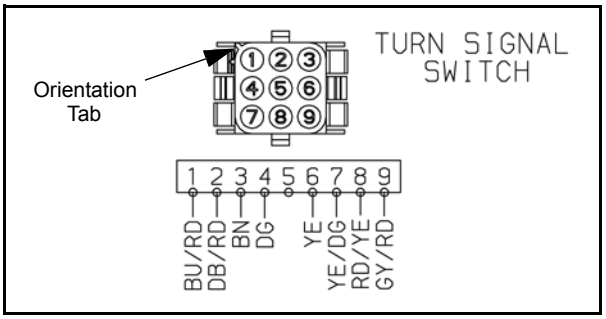
1. The transmission (gear position) switch is located on the RH side of the transmission and can be accessed through the RH wheel well area.
2. Disconnect the transmission switch harness by lifting the connector lock and pulling on the connector. Do not pull on the wiring.
3. Test the transmission switch continuity readings for each gear position and compare to the specification table below.



Gear Position	**Resistance Value** when measured at switch terminals A and B
HIGH	24 Ohms
LOW	75 Ohms
NEU	160 Ohms
REV	300 Ohms
PARK	620 Ohms

Turn Signal Switch (INTL)

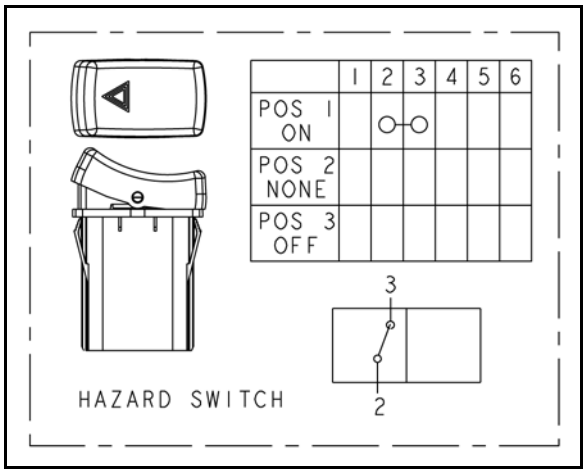
1. Disconnect the Turn Signal switch harness by depressing the connector locks and pulling on the connector. Do not pull on the wiring.
2. Test between the 5 sets of outputs (HI BEAM / LO BEAM /L-TURN / R-TURN/ HORN). If any of the tests fail, replace the switch assembly.



	1	2	3	4	6	7	8	9
HI BEAM					O	O		
LO BEAM				O		O		
L - TURN	O		O					
R - TURN		O	O					
HORN							O	O

Hazard Switch (INTL)

1. Disconnect wires or harness from the Hazard switch.
2. Test between the outputs (ON / NONE / OFF). If any of the tests fail, replace the switch assembly.
   - Move switch to ON. There should be continuity between switch pins 2 and 3.
   - Move switch to NONE / OFF. There should be no continuity between switch pins.



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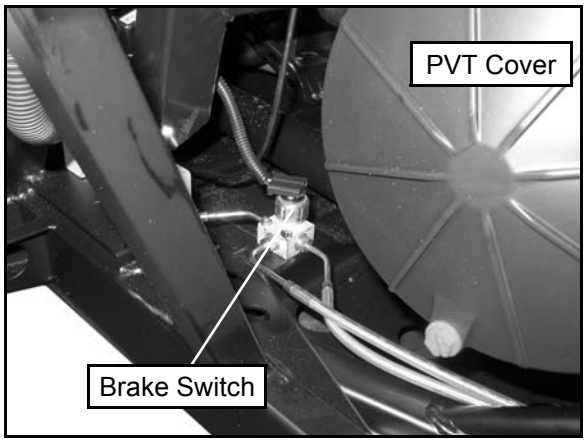
Brake Light Switch

1. The brake switch can be accessed through the LH rear wheel well area. The switch is located near the outer PVT cover along the lower frame. The brake pressure switch is installed into the cross fitting block.

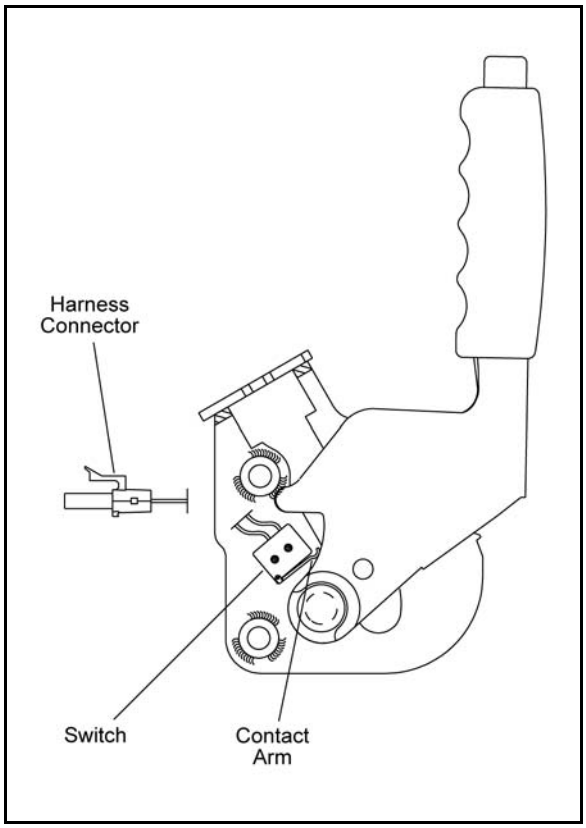


2. Disconnect wire harness from switch and connect an ohmmeter across switch contacts. The reading should be infinite (OL).

3. Apply the brake and check for continuity. If there is no continuity or if resistance is greater than 0.5 ohms, clean the switch terminals. Re-test and replace switch if necessary.

Parking Brake Switch (INTL Model)

The parking brake switch is located within the parking brake lever. Remove the rubber boot covering the parking brake lever to locate the internally mounted switch.



The switch remains in the “open” position when the park brake lever is not applied.

When the parking brake lever is applied, the switch makes contact and sends voltage to the ECU to illuminate “BRAKE” in the instrument cluster rider information display area (see “Park Brake Indicator”).

NOTE: If the parking brake is applied the ECU will rev limit the engine at 1500 RPM until the parking brake is released. This feature has been added to prevent drive-away with the parking brake applied.

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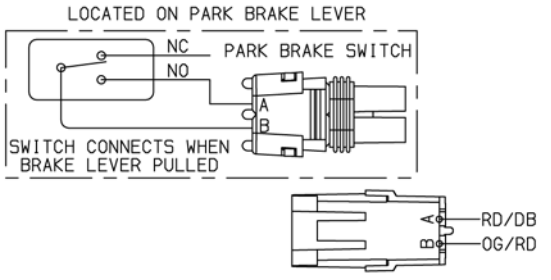
Testing The Parking Brake Switch

1. Disconnect the harness connector at the parking brake switch (Orange/Red and Red/Blue wires).

2. Place the ohmmeter leads onto the switch terminals. The reading should be infinite (OL).



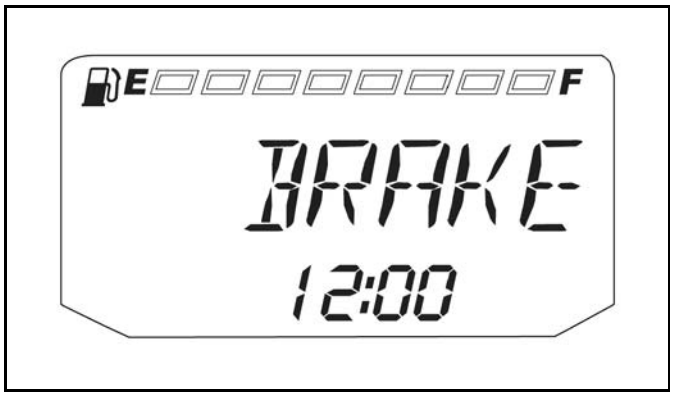
CAVITY	CAVITY	LEVER POSITION	CONTINUITY
A	B	BRAKE SET	YES
A	B	BRAKE RELEASED	NO

3. Apply the parking brake. Continuity should now exist between the switch terminals. If no continuity exists when the parking brake is applied, try to clean the switch terminals and re-test. Replace switch if necessary.

Park Brake Indicator

This warning is used to notify the operator that the park brake lever is engaged.

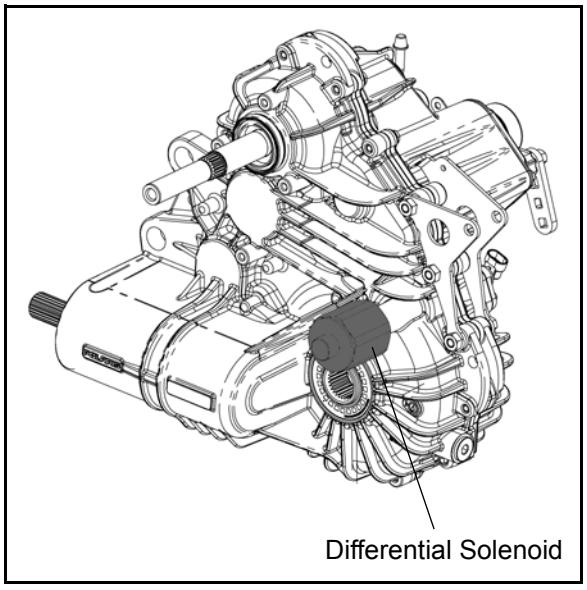
When the parking brake is fully engaged, “BRAKE” appears in the rider information display. Engine speed is limited to 1500 RPM in all gears, except neutral. If throttle is applied, this limiting feature prevents operation, which protects the park brake pads from excessive wear.



REAR DIFF SOLENOID (INTL)

Differential Solenoid Overview

The differential solenoid is located on the rear portion of the transmission case. The solenoid actuates a shift fork with an engagement dog, which locks and unlocks the rear differential. Refer to Chapter 8 for more information.



Differential Solenoid Circuit Operation

The Rear Diff Solenoid Relay is attached to the lower airbox bracket and can be accessed through the right rear wheel well.

When the switch is pushed to activate “TURF”, a ground signal is provided to the ECU from the AWD / 2WD / TURF Switch.

Depending on engine speed and gear position criteria, the ECU energizes the Rear Diff Solenoid Relay allowing it to enable the differential solenoid.

If the rear diff fails to switch from operational modes:

- Check the solenoid and relay connectors. Look for loose wires or bad connections.
- Check for power from the relay connector, to ensure the solenoid has power to be activated.
- Check the AWD / 2WD / TURF Switch wires for loose connections.
- Remove solenoid from rear differential and ensure the solenoid plunger is actuating.

⚠ CAUTION

Do not power the solenoid with 12 Volts for more than 1 second, or damage may occur to solenoid.

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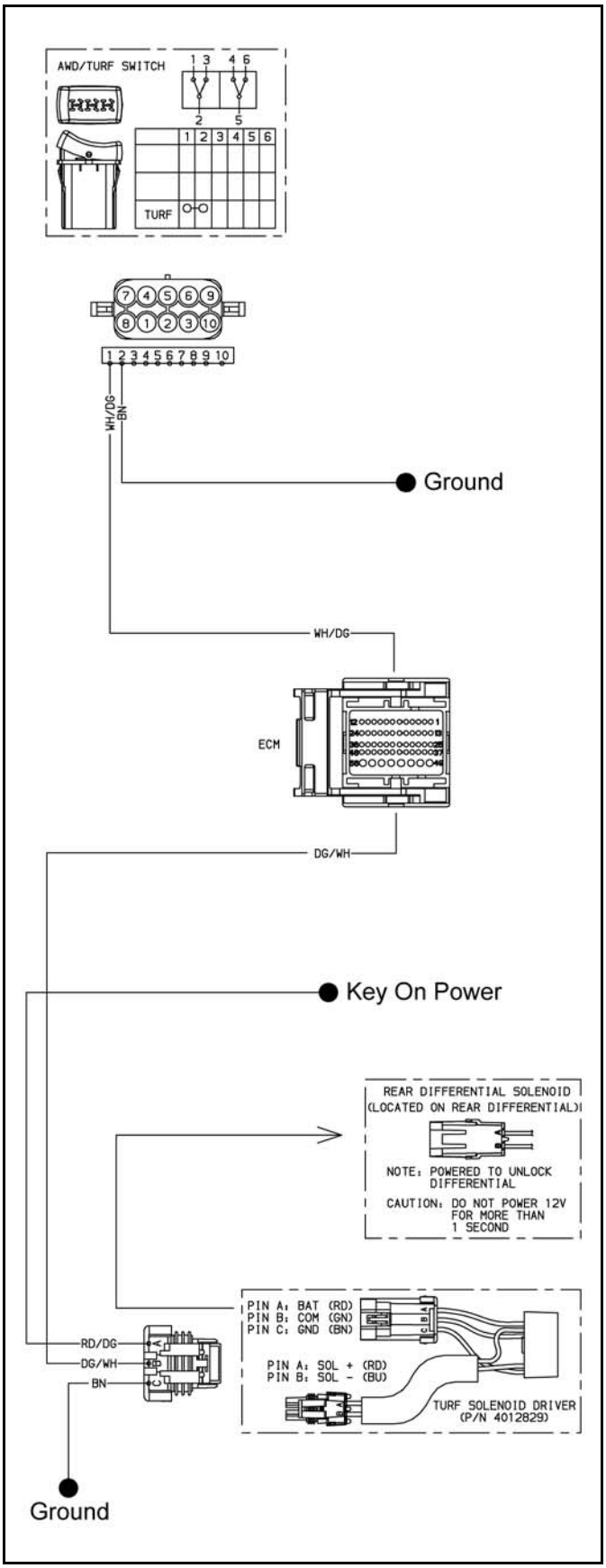
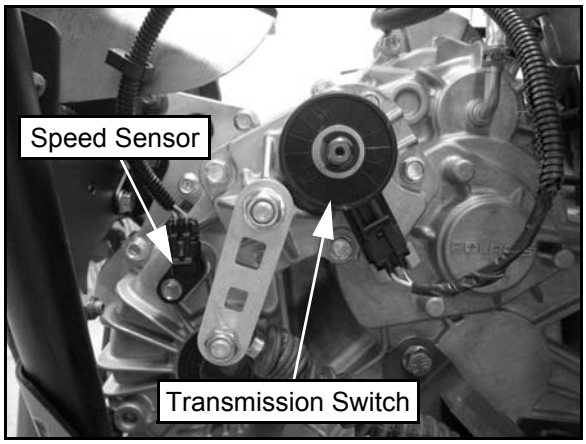


VEHICLE SPEED SENSOR

Speed Sensor Location

The speed sensor is located on the RH side of the transmission and can be accessed through the rear RH wheel well area.



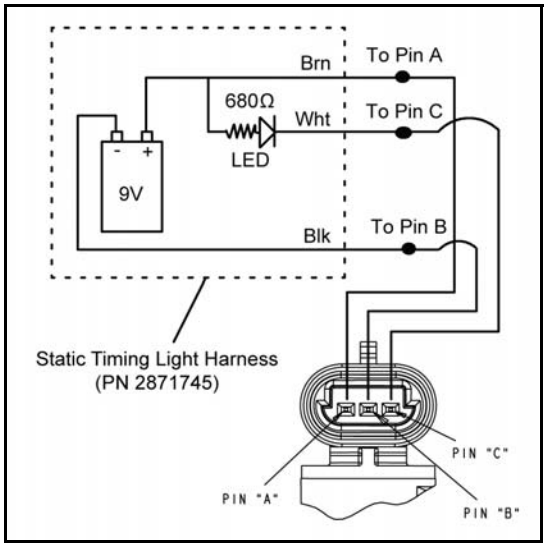
Speed Sensor Testing

Special Tools Required:

Static Timing Light Harness (PN 2871745)

Hall Sensor Probe Harness (PN 2460761)

1. Disconnect the 3 wire harness from the speed sensor and remove the sensor from the transmission.
2. Connect the wires from the Static Timing Light Harness to the sensor 3 pin connector using the Hall Sensor Probe Harness (PN 2460761).
3. Pass a screwdriver back and forth in front of the sensor tip.
4. Be sure connections are good and 9V battery is in good condition. If the light flashes, the sensor is good.



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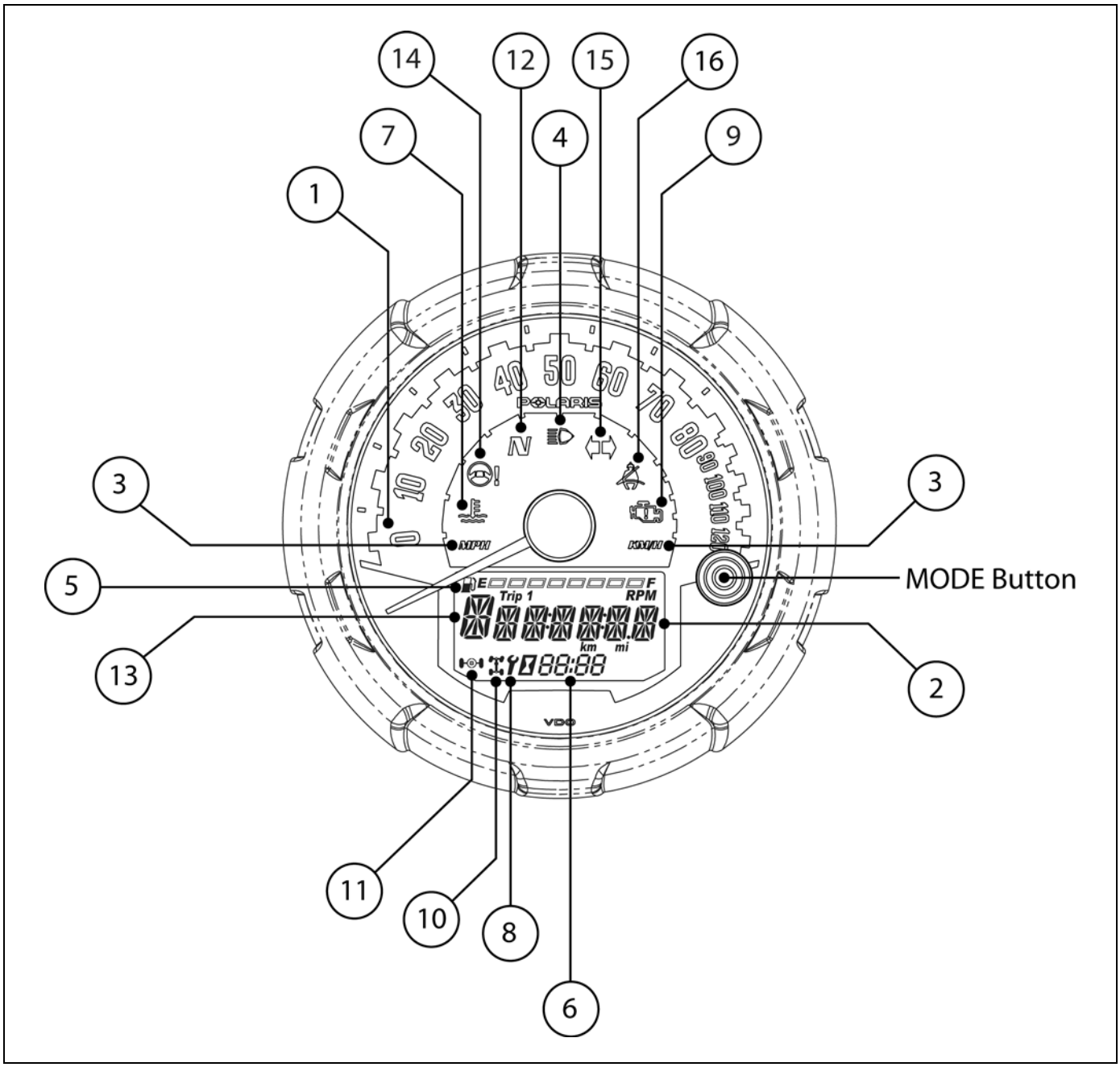
INSTRUMENT CLUSTER

Overview

The instrument cluster displays critical vehicle information to the user. Reference the following page for display functions and descriptions.



NOTE: Some features are not applicable to all models.

IMPORTANT: The use of a high pressure washer may damage the instrument cluster. Wash the vehicle by hand or with a garden hose using mild soap. Certain products, including insect repellents and chemicals, will damage the instrument cluster lens. Do not use alcohol to clean the instrument cluster. Do not allow insect sprays to contact the lens.

Rider Information Display

The rider information display is located in the instrument cluster. All segments will light up for 1 second at start-up.

NOTE: If the instrument cluster fails to illuminate, a battery over-voltage may have occurred and the instrument cluster may have shut off to protect the electronic speedometer.

1. **Vehicle Speed Display** - Analog display of vehicle speed in MPH or km/h.
2. **Information Display Area - Odometer / Trip Meter / Tachometer / Engine Temperature / Engine Hours / Service Info / Clock** - LCD display of the service hour interval, total vehicle miles or km., total engine hours, a trip meter, engine RPM and engine temperature.
3. **MPH / KM/H Display** - MPH is displayed when the instrument cluster is in the *Standard* mode. KM/H is displayed when the instrument cluster is in the *Metric* mode.
4. **High Beam Indicator** LED icon illuminates whenever the Headlamp switch is in the high beam position.
5. **Fuel Level Indicator** - LCD bar graph indicating current fuel level. All segments will flash when the last segment is cleared indicating a low fuel warning.
6. **Clock** - Displays current time in either 12-hour or 24-hour formats.
7. **Engine Temperature Indicator** - LED icon illuminates when the ECM determines the engine is overheating. The indicators will initially flash to indicate the engine is overheating. The indicators will stay lit and not flash if a severe overheating condition exists.
8. **Service Interval Indicator** - Preset at the factory and adjustable by the user, a flashing wrench symbol alerts the operator that the preset service interval has been reached and maintenance should be performed. The wrench icon will flash for 10 seconds upon start-up once it reaches 0.
9. **Check Engine MIL** - Illuminated when the ECM has detected a Diagnostic Trouble Code in the engine management system.
10. **AWD Indicator** - Illuminated when the AWD / TURF switch is in the *AWD* position.
11. **TURF Indicator** - Illuminated when the AWD / TURF switch is in the *TURF* position (INTL Models Only).
12. **Neutral Gear Indicator** - LED icon illuminates when gear selector is in the neutral (N) position.
13. **Gear Position Indicator -** Displays gear selector position.

H = High

L = Low

N = Neutral

R = Reverse

P = Park

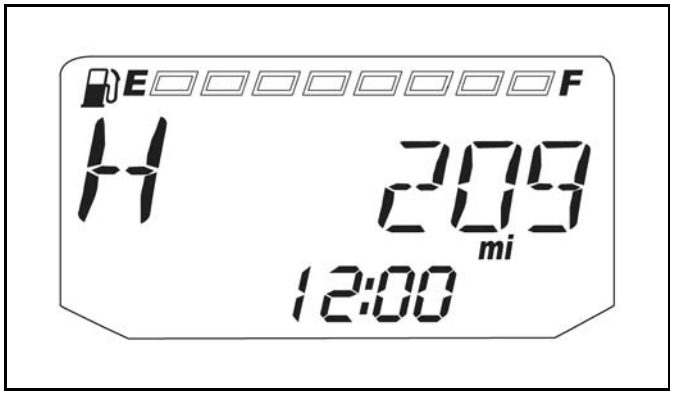
-- = Gear Signal Error (shifter stuck between gears)

14. **Power Steering System MIL -** LED icon illuminates when a fault has occurred with the power steering system. This indicator illuminates when the key is turned to the ON position and goes off when the engine is started.
15. **Turn Signal / Hazard Lamp Indicator** - LED icon illuminates whenever the LH, RH or hazard lamps are activated (INTL Models Only).
16. **Helmet / Seat Belt Indicator** - LED icon illuminates for several seconds when the key is turned to the ON position. The lamp is a reminder to the operator to ensure all riders are wearing helmets and seat belts before operating the vehicle.

Information Display Area

The LCD portion of the instrument cluster is the information display area. Information displayed in this area includes: odometer, trip meter, engine RPM, engine hours, service interval, clock, engine Diagnostic Trouble Codes (DTCs) and power steering DTCs.

Odometer



The odometer records and displays the total distance traveled by the vehicle. The odometer can not be reset.

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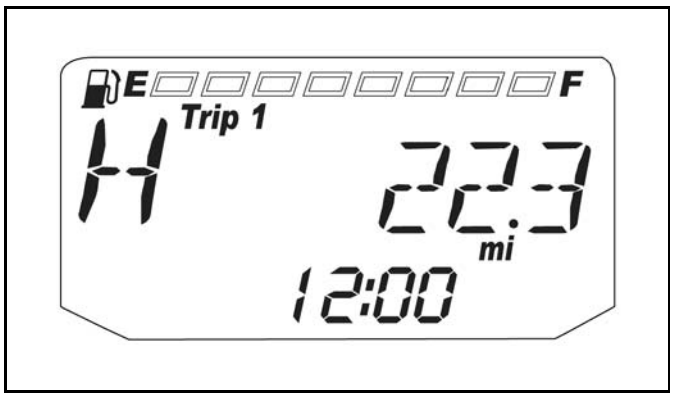
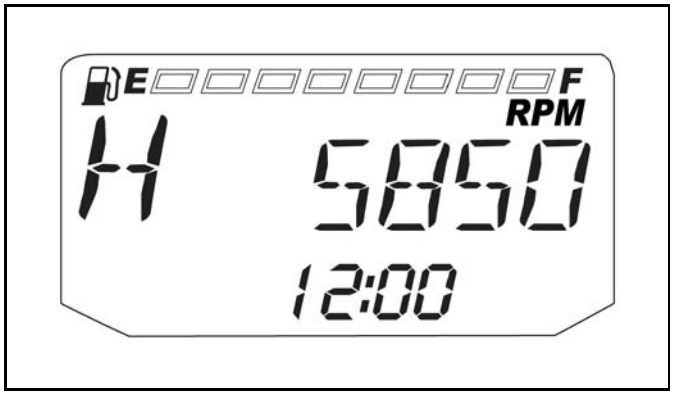
Trip Meter



The trip meter records the miles traveled by the vehicle on each trip. To reset the trip meter:

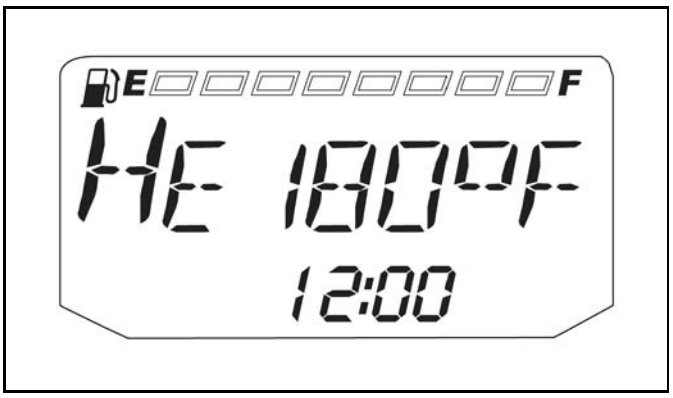
1. Toggle the MODE button to TRIP 1.
2. To reset to 0, push and hold the MODE button until the distance display changes to 0.

Tachometer (RPM)



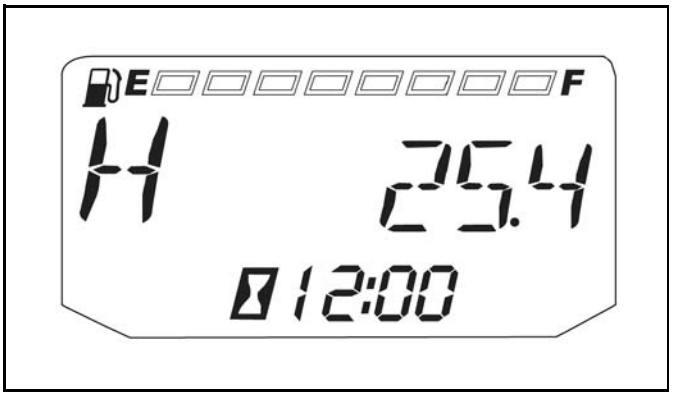
Engine RPM can be displayed digitally.

Engine Temperature



Engine temperature can be displayed in Fahrenheit or Celsius. Refer to "Units of Measurement" to change the format.

Engine Hours



Engine hours are logged anytime the engine is running. Total hours can not be reset.

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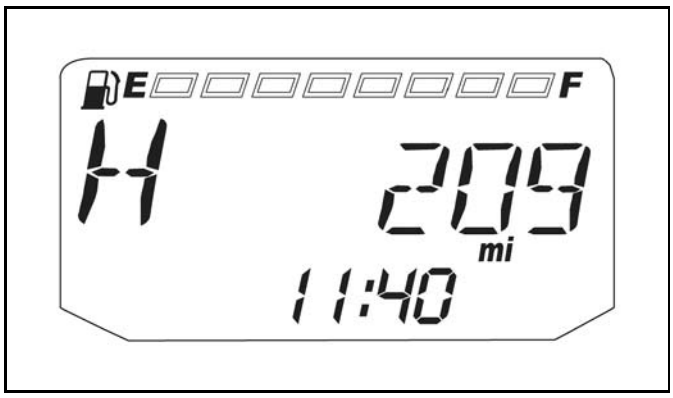
Programmed Service Interval

The initial factory service interval setting is 50 hours. Each time the engine is started, the engine hours are subtracted from the service interval hours. When the service interval reaches 0, the LCD wrench icon will flash for approximately 10 seconds each time the engine is started.

To change the hour setting or reset the function, follow these steps:

1. Toggle the MODE button until the wrench icon is displayed in the information area.
2. Press and hold the MODE button until the information display area begins to flash.
3. Toggle the MODE button to increase the service interval hours in 5 hour increments to a maximum of 100 hours.
4. To turn off the service interval function, toggle the MODE button until “OFF” is displayed.

Clock



The clock displays the time in a 12-hour or 24-hour format. Refer to “Units of Measurement” to change the format (Standard 12-hour / Metric-24 hour). To set the clock, follow these steps:

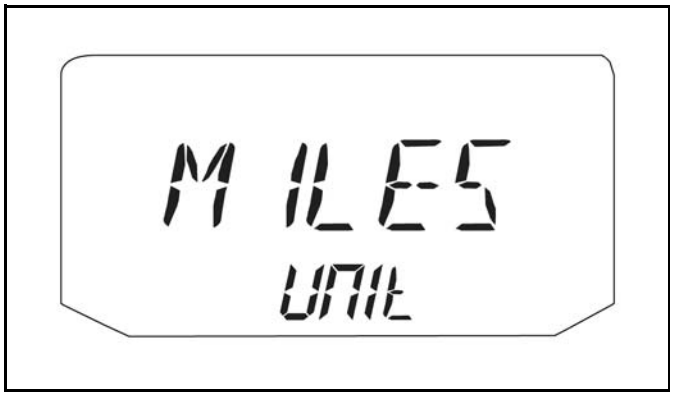
1. Toggle the MODE button until the odometer is displayed.
2. Press and hold the MODE button until the hour segment flashes. Release the button.
3. With the segment flashing, tap the MODE button to advance to the desired setting.
4. Press and hold the MODE button until the next segment flashes. Release the button.
5. Repeat steps 3-4 twice to set the 10 minute and 1 minute segments. After completing the 1-minute segment, step 4 will save the new settings and exit the clock mode.

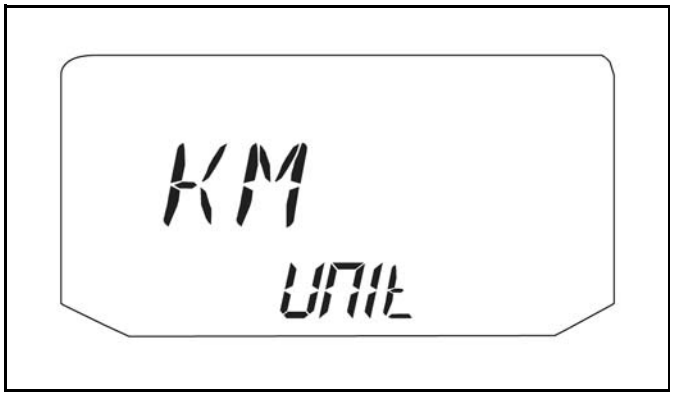
Units of Measurement

	Standard Display	Metric Display
Distance	Miles (MPH)	Kilometers (KM/H)
Time	12-Hour Clock	24-Hour Clock
Temperature	Fahrenheit	Celsius

To change between Standard and Metric units of measurement, follow these steps:

1. Turn the key to the OFF position.
2. Press and hold the MODE button while turning the key to the ON position.
3. When the display flashes the distance setting, tap the MODE button to advance to the desired setting.



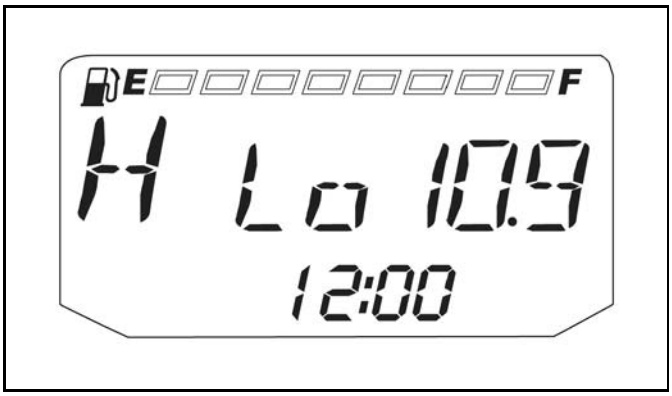


4. Press and hold the MODE button to save the setting and advance to the next display option.
5. Repeat the procedure to change remaining display settings.

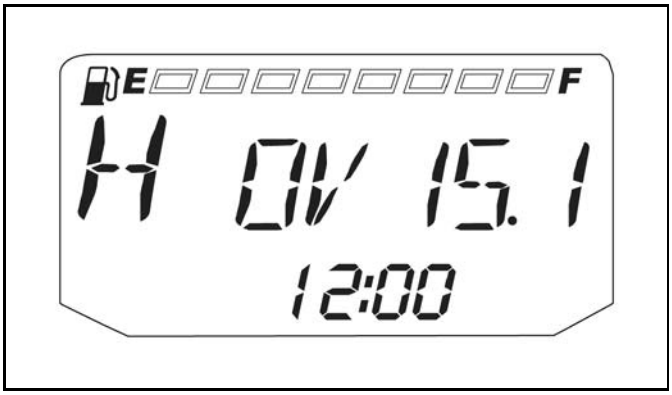
Under / Over Voltage

This warning usually indicates that the vehicle is operating at an RPM too low to keep the battery charged. It may also occur when the engine is at idle and a high electrical load is applied (lights, cooling fan or other accessories).

If battery voltage drops below 11 volts, a warning screen will display “Lo” and provide the present battery voltage. If voltage drops below 8.5 volts, LCD backlighting and icons will turn off.



If battery voltage rises above 16 volts, a warning screen will display “OV” and provide the present battery voltage. If voltage rises above 16.5 volts, LCD backlighting and icons will turn off.



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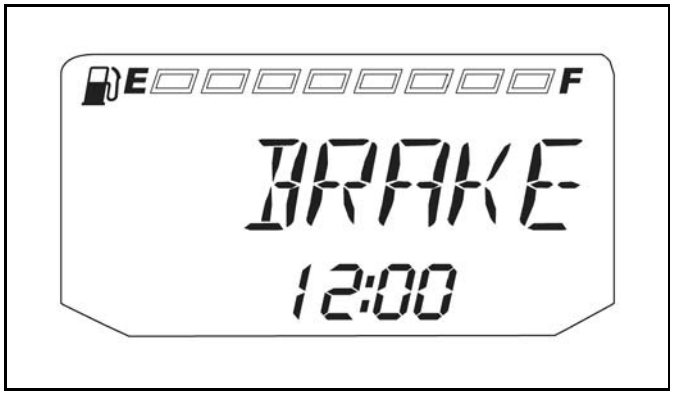
Park Brake Indicator (INTL Model Only)

This warning is used to notify the operator that the park brake lever is engaged.

When the park brake is fully engaged, “BRAKE” appears in the rider information display. Engine speed is limited to 1500 RPM in all gears, except neutral. If throttle is applied, this limiting feature prevents operation, which protects the park brake pads from excessive wear.

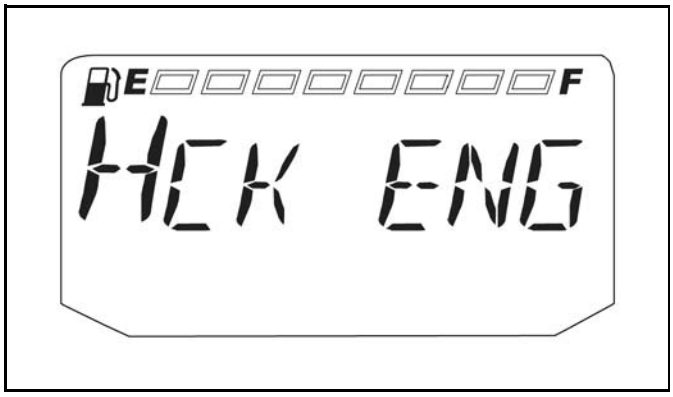


Diagnostic Mode

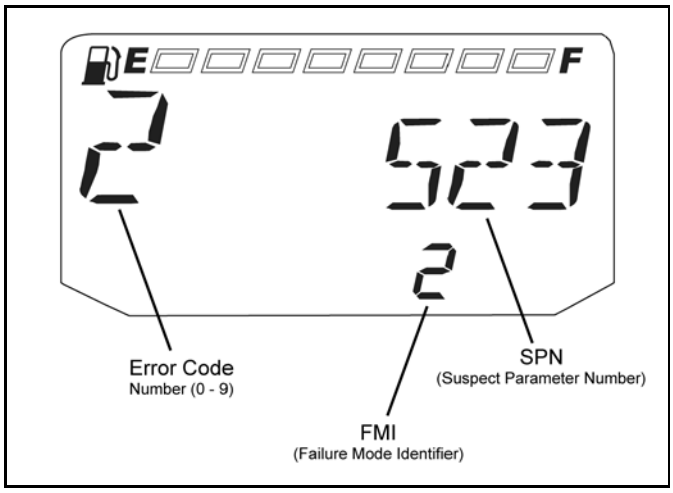
The diagnostic mode is accessible only when the check engine MIL has been activated.

Use the following procedure to display diagnostic trouble codes that were activated during current ignition cycle causing the MIL to illuminate. Diagnostic trouble codes will remain stored in the gauge (even if MIL turns off) until the key is turned off.

1. If the trouble code(s) are not displayed, use the MODE button to toggle until “CK ENG” displays on the information display area.



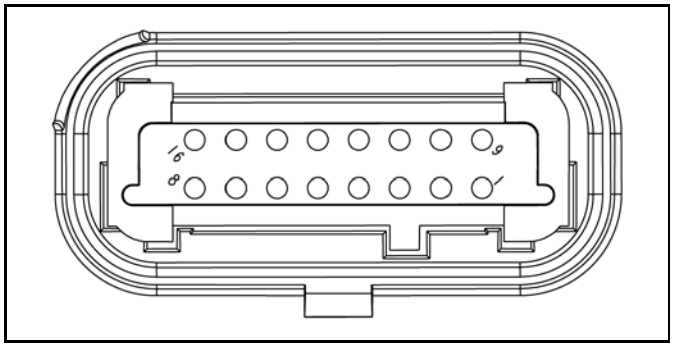
2. Press and hold the MODE button to enter the diagnostics code menu.
3. A set of three numbers will appear in the information area.
   - The first number (located far left) can range from 0 to 9. This number represents the total number of trouble code present (example: 2 means there are 3 codes present).
   - The second number (located top right) can be 2 to 6 digits in length. This number equates to the suspected area of fault (SPN).
   - The third number (located bottom right) can be 1 to 2 digits in length. This number equates to the fault mode (FMI).



4. Use the trouble code reference table in the EFI Chapter for a description of each code.
5. If more than one code exists, press the MODE button to advance to the next trouble code.
6. To exit the diagnostic mode, press and hold the MODE button or turn the ignition key OFF once the codes are recorded.

NOTE: If there is a diagnostic problem with the power steering system, the power steering MIL will illuminate and blink in place of the check engine MIL.

Instrument Cluster Pinouts

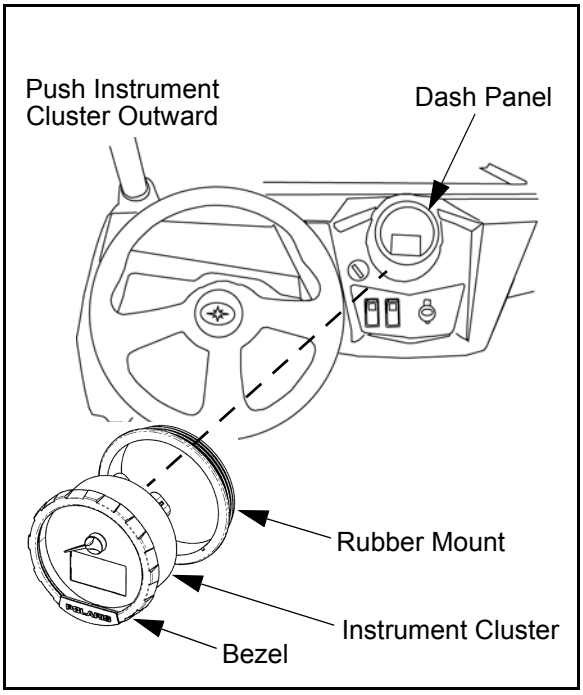


FUNCTION	PIN
CAN High	1
CAN Low	2
Switched Power (Vdc)	3
Constant Power (Vdc)	4
Ground	5
High Beam Input	8
Fuel Level Sensor	11

Instrument Cluster Removal

NOTE: Do not allow alcohol or petroleum products to come in contact with the instrument cluster lens.

1. Disconnect the wire harness connector from the back side of the instrument cluster.
2. Push the instrument cluster out from the back side of the dash while securely holding the dash and rubber mount.



NOTE: Do not remove the rubber mount from the dash panel. Only remove the rubber mount if necessary. The bezel is a snap-on assembly and is a serviceable part.

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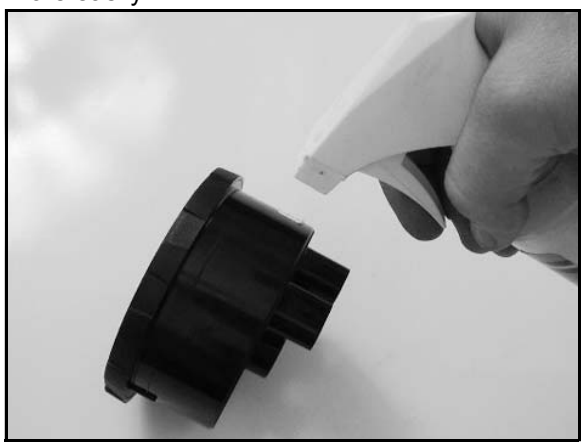
Instrument Cluster Installation

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 rubber mount more easily.



2. Be sure the rubber mount inside the dash is fully installed and that the indexing key on the rubber mount is lined up with the keyway in the dash.

3. Hold the dash securely and insert the instrument cluster into the dash. Twist the instrument cluster gently in a clockwise motion to properly seat the instrument cluster into the rubber mount. Apply pressure on the bezel while pressing down on the instrument cluster.

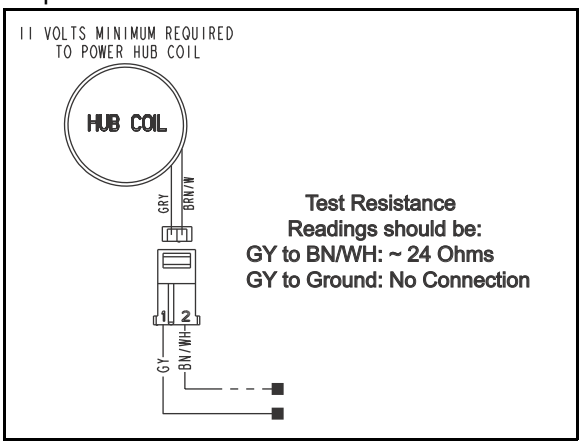
ALL WHEEL DRIVE COIL

Operation Overview

- When the AWD switch is “ON”, 12 VDC power is present at the hub coil.
- If the criteria is met, the Engine Controller provides a ground path (brown/white wire). When this occurs the AWD icon should display in the instrument cluster.
- The AWD system must be grounded to operate.

Diagnosing System Failures

- Verify the AWD switch is functional and that a minimum of 11 volts is present at the hub coil.
- Verify the AWD hub coil is functional. Test the AWD hub coil using an ohm meter. See specifications below:



AWD Hub Coil Resistance:
24 Ohms ± 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.

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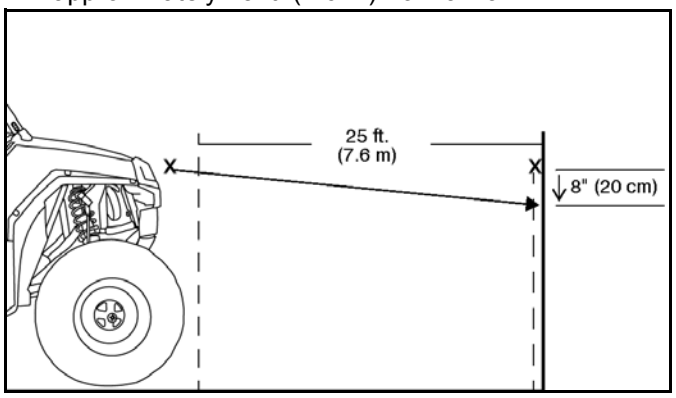
HEAD LIGHTS

Headlight Adjustment

The headlight beam is adjustable.

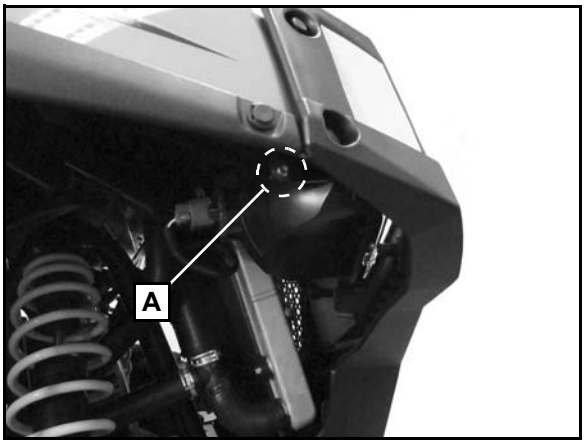
1. Place the vehicle on a level surface with the headlight approximately 25 ft. (7.6 m) from a wall.



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. With the machine in Park, start the engine and turn the headlight switch to on.
4. The most intense part of the headlight beam should be aimed 8 in. (20 cm) below the mark placed on the wall in Step 2.

NOTE: Rider weight must be included in the seat while performing this procedure.

5. Adjust the beam to the desired position by loosening the adjustment screw (A) and moving the lamp to the appropriate height.



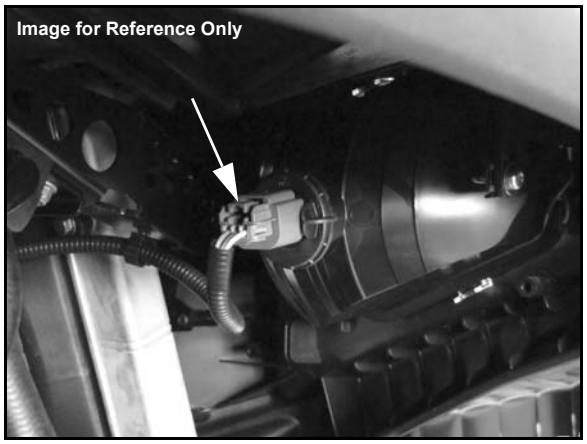
6. Adjust the beam to desired position. Repeat the procedure to adjust the other headlight.

⚠ WARNING

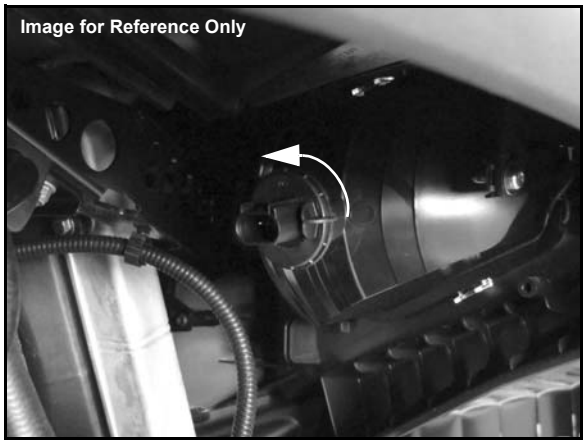
Due to the nature of light utility vehicles and where they are operated, headlight lenses become dirty. Frequent washing is necessary to maintain lighting quality. Riding with poor lighting can result in severe injury or death.

Headlamp Bulb Replacement

1. Disconnect the wire harness from the headlamp bulb. Be sure to pull on the connector, not on the wiring.



2. Turn the bulb counterclockwise to remove it.



3. Insert new bulb. Reinstall the wire harness onto the headlamp assembly.

NOTE: Make sure the tabs on the bulb locate properly in the housing.

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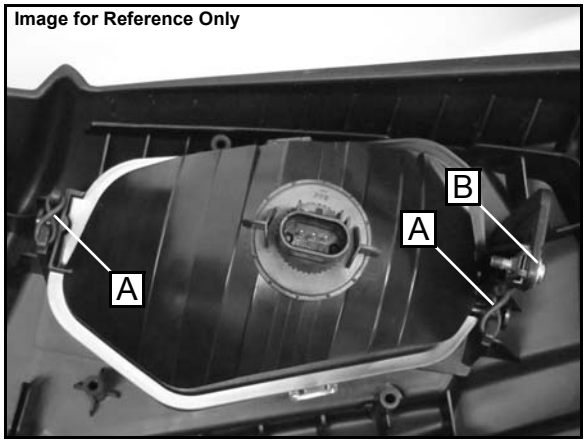
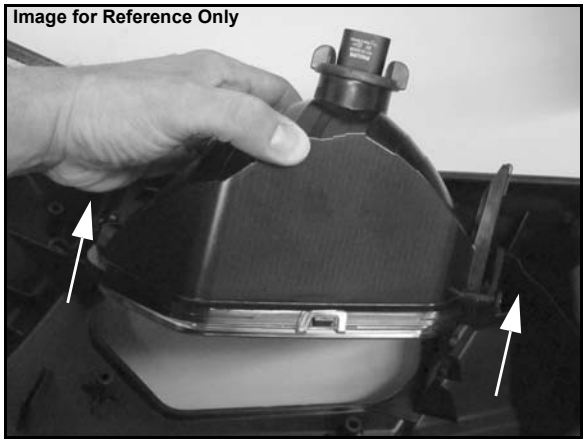
Headlamp Housing Removal

1. Disconnect the wire harness from the headlamp bulb. Be sure to pull on the connector, not on the wiring.
2. Remove the O-rings (A) from the headlamp brackets on both sides of the headlamp.
3. Remove the adjustment screw (B) from the bracket.



4. Carefully remove the headlamp from the front bumper.



Headlamp Housing Installation

1. Install the headlamp housing back into the front bumper.
2. Secure the headlamp housing with the rubber O-rings (A) on both sides of the headlamp and install the adjustment screw (B).
3. Reconnect wire harness or re-insert bulb if previously removed.
4. Adjust headlights using the "Headlight Adjustment" procedure in this section.

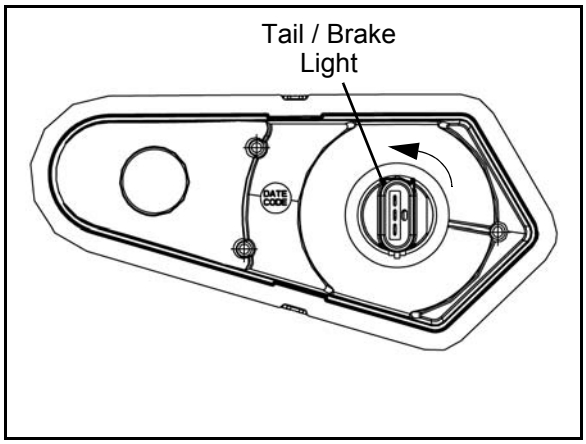
TAIL / BRAKE LIGHTS

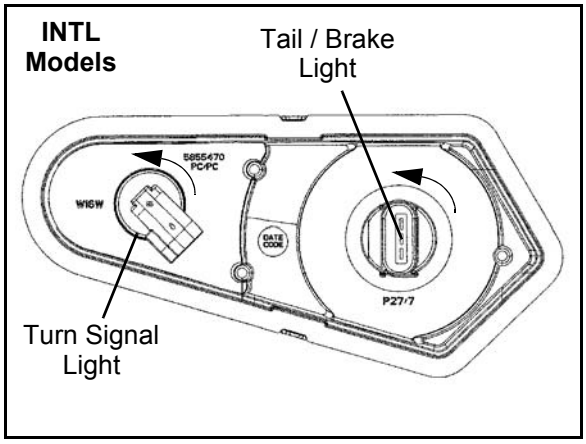
Bulb Replacement

Before replacing the bulb(s), use a digital multi-meter to test the harness to ensure the lamp is receiving 12 volts and that a ground path is present.

If a tail light, brake light or turn signal (INTL Only) does not work the bulb may need to be replaced.

1. Disconnect the wire harness.
2. Remove bulb by turning the rubber base 1/4 turn and pulling the bulb out. Replace it with recommended bulb. Apply Dielectric Grease (PN 2871329).





3. Test the tail light, brake light and turn signal (INTL Only) to verify it is working properly.

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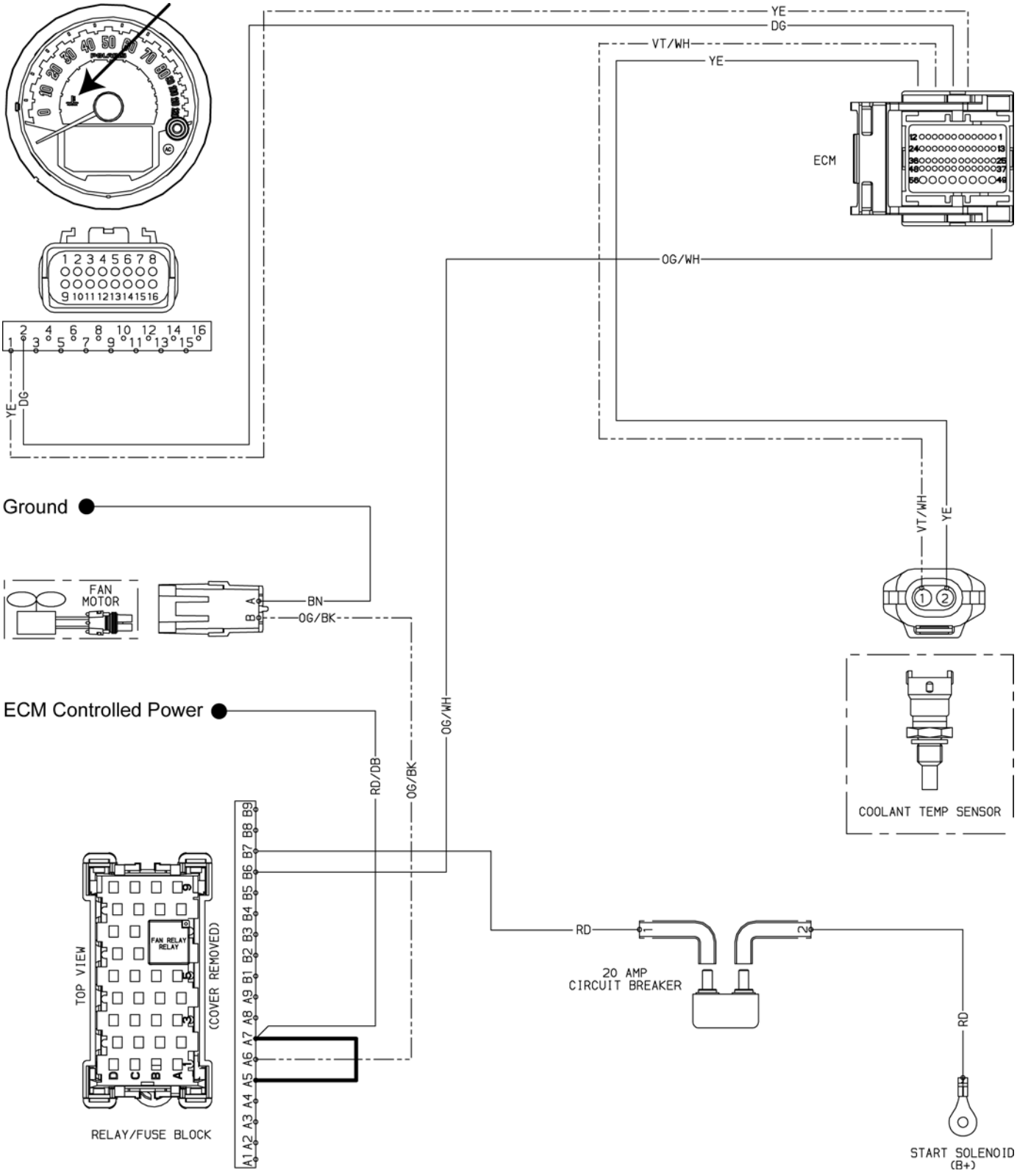
COOLING SYSTEM

Cooling System Break-Out Diagram



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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 Chapter 2 "Maintenance" for cooling system information.

Fan Control Circuit Bypass Test

1. Disconnect harness from coolant temperature sensor on the engine cylinder head (see Chapter 4 for location).
2. With the transmission in Park, start the engine. After a few seconds, the fan should start running and the "Check Engine" indicator should display on the instrument cluster. This indicates all other components are working properly.
3. If the fan does not run or runs slowly, check the fan motor wiring, ground, motor condition and mechanical relay for proper operation. 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.
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 kΩ ± 6%
212 °F (100 °C)	186 Ω ± 2%

NOTE: If the coolant temperature sensor or circuit malfunctions the radiator fan will default to 'ON'.

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EFI DIAGNOSTICS

EFI Component Testing

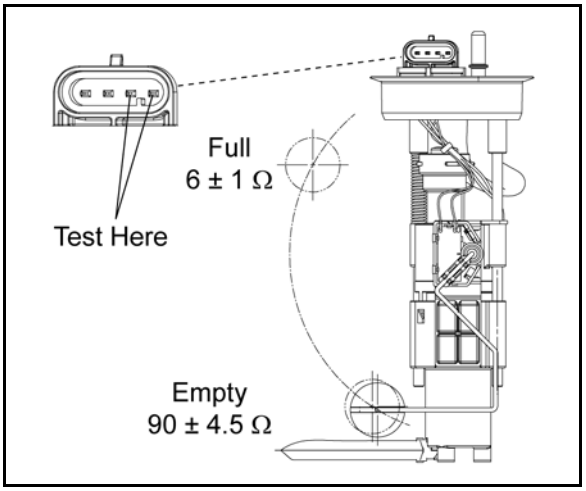
All EFI component information and diagnostic testing procedures are located in **Chapter 4**.

Refer to Chapter 4 “Electronic Fuel Injection System (EFI)” when diagnosing an EFI system or component.

FUEL SENDER

Testing

1. Drain the fuel tank and remove it from the vehicle (see Chapter 4).
2. Set the fuel tank on a flat surface. Using an Ohm meter, measure the resistance of the fuel sender as shown below.



3. Allow the sender float to sit in the **empty position** and compare to specification.

Fuel Sender - Empty: 90 ± 4.5 Ω

4. Slowly tilt the tank so that gravity moves the sender float to the **full position** and compare to specification.

Fuel Sender - Full: 6 ± 1 Ω

5. If the readings are out of 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 exist, the fuel sender assembly is faulty. Replace the fuel pump assembly (see Chapter 4).

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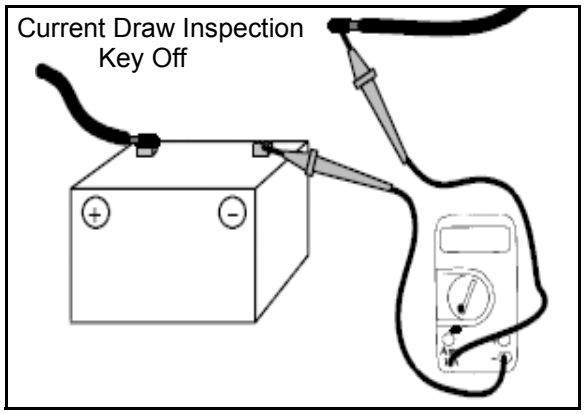
CHARGING SYSTEM

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 - Key Off:
Maximum of .01 DCA (10 mA)

Charging System "Break Even" Test

⚠ CAUTION

Do not allow the battery cables to become disconnected with the engine running. Follow the steps below as outlined to reduce the chance of damage 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. Using an inductive amperage metering device, (set to DC amps) connect to the negative battery cable.
2. With engine off, key switch and lights in the on position, the ammeter should read negative amps (battery discharge).
3. Shift transmission into park and start the engine. With the engine running at idle, observe meter readings.
4. Increase engine RPM while observing ammeter and tachometer. Note the RPM at which the battery starts to charge (ammeter indication is positive).
5. With lights and other electrical loads off, the "break even" point should occur at approximately 1500 RPM or lower.
6. With the engine running, turn the lights on and depress the brake pedal to keep brake lights on.
7. Repeat test, observing ammeter and tachometer. With lights on, charging should occur at or below 2000 RPM.

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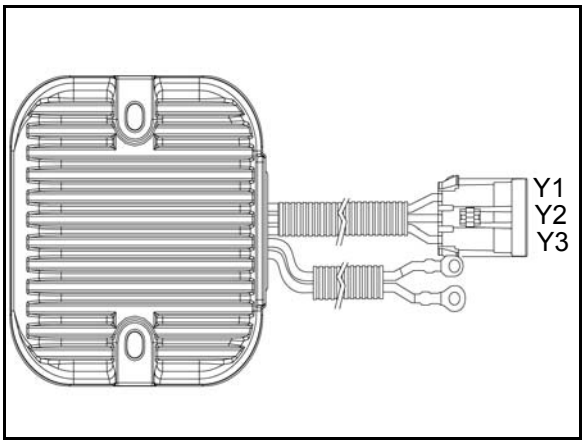
Charging System Stator (Alternator) Tests

Three tests can be performed using a multi-meter 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 test should measure: **0.2 Ohms ± 15%**

Test	Connect Meter Leads To:	Ohms Reading
Battery Charge Coil	Y1 to Y2	0.2Ω ± 15%
Battery Charge Coil	Y1 to Y3	0.2Ω ± 15%
Battery Charge Coil	Y2 to Y3	0.2Ω ± 15%

NOTE: If there are any significant variations in ohm readings between the three legs it is an indication that one of the stator legs may be weak or failed.

TEST 2: Resistance Value of Each 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.
   Each test should measure: **Open Line (OL)**

Test	Connect Meter Leads To:	Ohms Reading
Battery Charge Coil	Y1, Y2, or Y3 to Ground	Open Line (Infinity)

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 engine 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 following table for approximate AC Voltage readings according to RPM. Test each leg at the specified RPM in the table.

   Example: The alternator current output reading should be approximately **21 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.

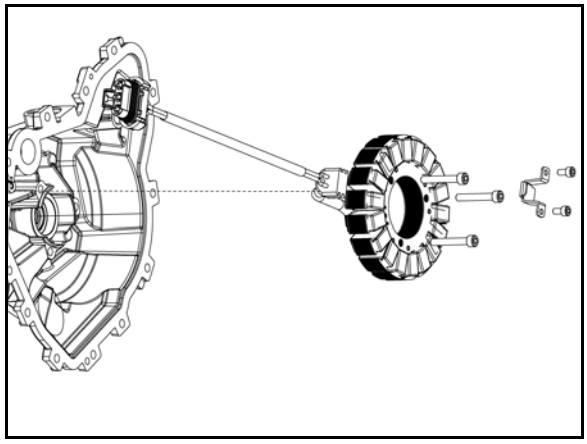
RPM Reading	AC Voltage (VAC) Reading
1300	22 VAC ± 25%
3000	51 VAC ± 25%
5000	85 VAC ± 25%

Stator (Alternator) Replacement

Refer to Chapter 3 (Engine / Cooling System) to service the stator.

NOTE: The stator cover can be removed with the engine installed in the chassis.

IMPORTANT: Be sure to thoroughly drain the engine coolant and clean the area around the stator cover prior to removal. See chapter 3.



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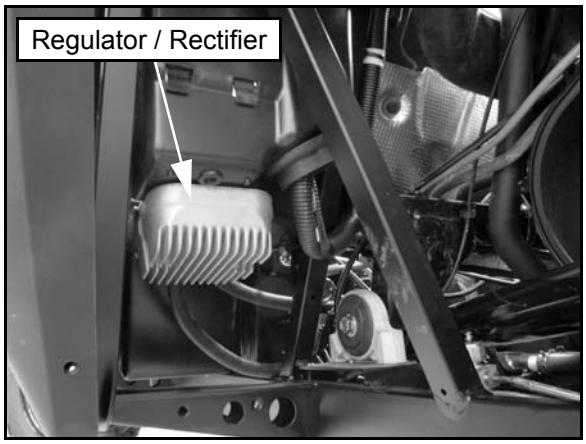
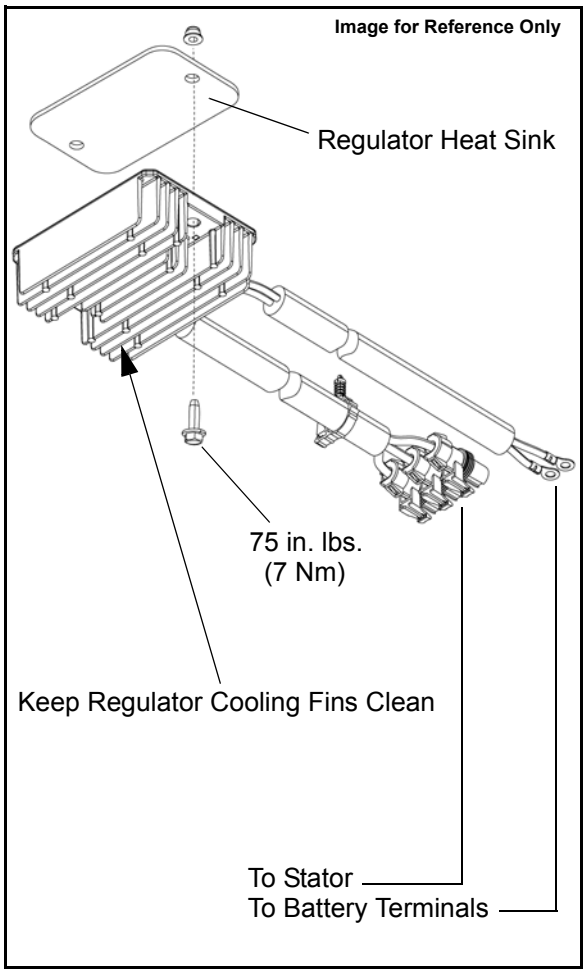
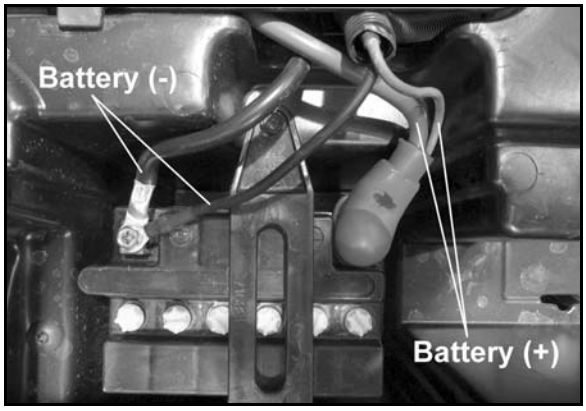
Regulator / Rectifier

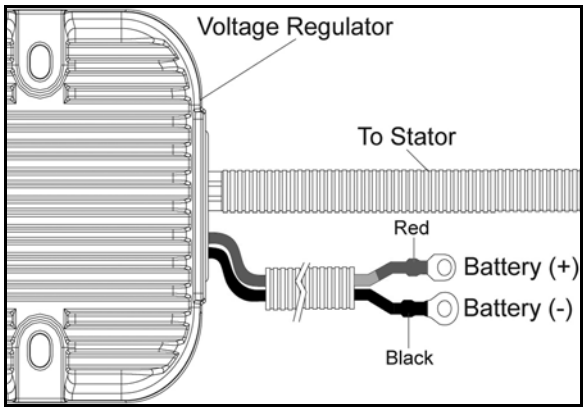
The Regulator / Rectifier is located in the left rear wheel well area in front of theleft rear wheel. It is mounted under the LH panel divider, below the ECU.



NOTE: If the regulator / rectifier overheats, the unit will turn itself off to cool down. The unit will turn on again after it has cooled down. If it turns off, verify the cooling fins are clean, free from debris and that adequate airflow is present.







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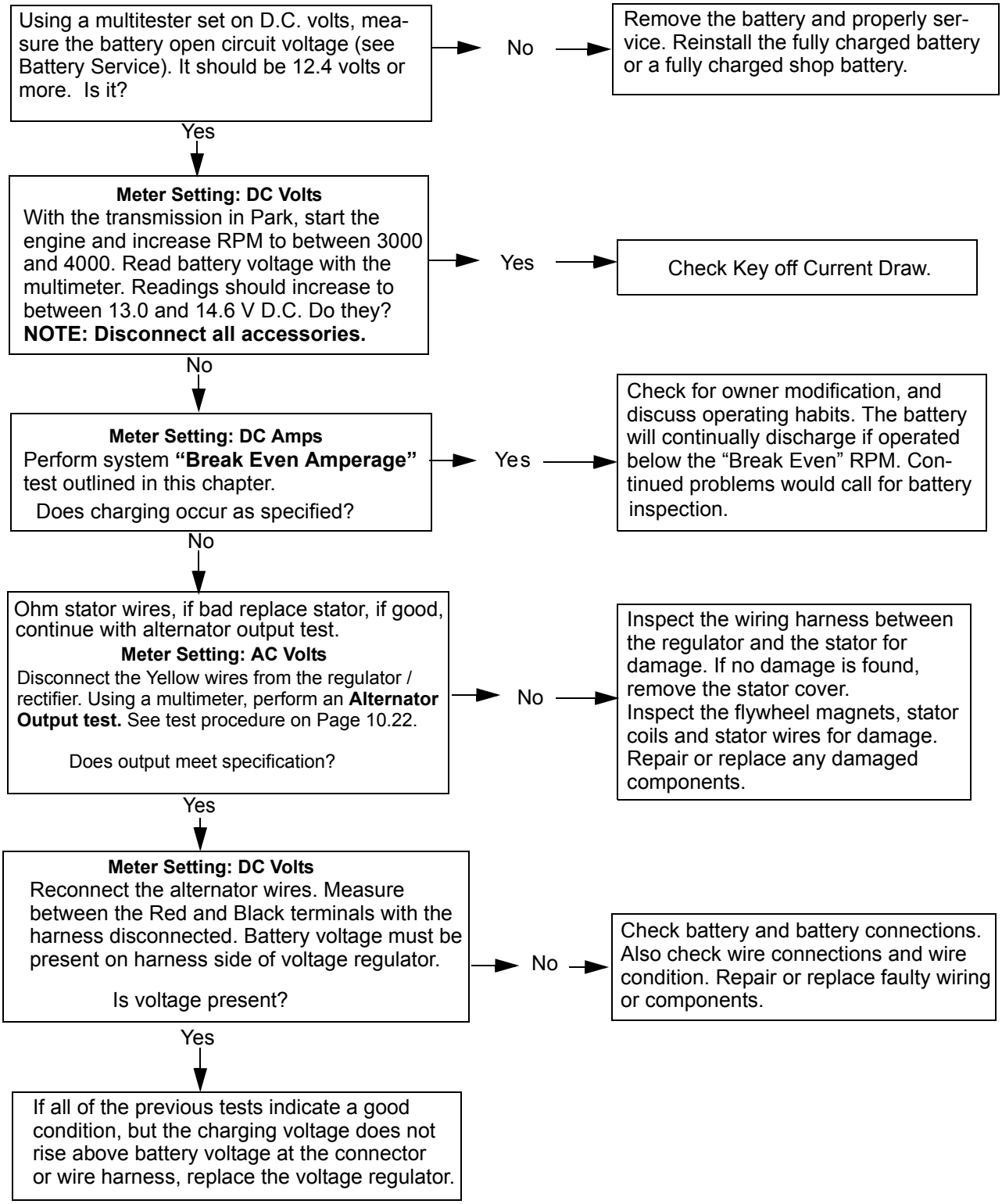
Charging System Testing Flow Chart

Whenever charging system problems are suspected, proceed with the following system check after verifying that all wires are in good condition, connected and not exposed or pinched.



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BATTERY SERVICE

Battery Specifications

RZR 570
Battery PN 4012622

Type	Polaris / YB14-B2
Voltage	12 Vdc
Nominal Capacity @ 10 HR Rate	14 AH
Nominal Open Circuit Voltage	12.8 Vdc or more.
Recommended Charging Rate	10 - 17 hours at 1 to 1.5 AMPS

General Battery Information

⚠ WARNING

CALIFORNIA PROPOSITION 65 WARNING:
Batteries, battery posts, terminals and related accessories contain lead and lead compounds, and other chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. WASH HANDS AFTER HANDLING.

⚠ WARNING

Battery electrolyte is poisonous. It contains acid! Serious burns can result from contact with the skin, eyes, or clothing.

ANTIDOTE:
External: Flush with water.

Internal: Drink large quantities of water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil. Call a physician immediately.

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

Batteries produce explosive gases. Keep sparks, flame, cigarettes, etc. away. Ventilate when charging or using in closed space. Always shield eyes when working near batteries.

Keep out of reach of children.

1. Check battery voltage with a volt/ohm meter. A fully charged battery should be 12.8 V or higher.
2. If the voltage is below 12.6 V, the battery will need to be recharged (see “Charging Procedure”).

Battery Activation

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 all the filling plugs.
2. Remove the sealing tube (red cap) from vent fitting.
3. Place battery on a level surface. Fill battery with electrolyte to upper level marks on the battery case.

NOTE: Never activate a battery on the vehicle. Electrolyte spills can cause damage.

4. Set battery aside to allow for acid absorption and stabilization for 30 minutes.
5. Add electrolyte to bring the level back to the upper level mark on the battery case.
6. Charge battery for 10 - 17 hours at 1 to 1.5 AMPS.
7. Check during initial charging to see if electrolyte level has fallen, and if so, fill with acid to the upper level. After adding, charge for another hour at the same rate.

NOTE: This is the last time that electrolyte should be added. If the level becomes low after this point, add only distilled water.

8. When charging is complete, install the filling plugs firmly.

IMPORTANT: Do not apply excessive pressure. Finger tighten only. Do not over-tighten.

9. Wash off spilled acid with water and baking soda solution, paying particular attention that any acid is washed off the terminals. Dry the battery case.

Battery Removal / Installation

See Chapter 2 "Maintenance" for battery removal and installation procedures.

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Battery Off Season Storage

Whenever the vehicle is not used for a period of three months or more, remove the battery from the vehicle, ensure that it's fully charged, and store it out of the sun in a cool, dry place. Check battery voltage each month during storage and recharge as needed to maintain a full charge.

NOTE: Battery charge can be maintained by using a Polaris battery tender charger or by charging once a month to make up for normal self-discharge. Battery tenders can be left connected during the storage period, and will automatically charge the battery if the voltage drops below a pre-determined point.

Battery Testing

Whenever a service complaint is related to either the starting or charging systems, the battery should be checked first.

Battery Conductance Analyzer

Conductance describes the ability of a battery to conduct current. A conductance tester functions by sending a low frequency AC signal through the battery and a portion of the current response is captured, from this output a conductance measurement is calculated. Conductance testing is more accurate than voltage, specific gravity, or load testing.

Authorized Polaris dealers/distributors are required to use the conductance analyzer when testing 12V Polaris batteries.

Polaris MDX-610P
SPX PN: PU-50296

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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 the following chart and "Load Test".

NOTE: Use a volt/ohm meter to test battery voltage.

Battery PN 4012622

OPEN CIRCUIT VOLTAGE	
State of Charge	**Maintenance Free**
100%	12.7 V and up
75% Charged	12.5 V
50% Charged	12.2 V
25% Charged	12.0 V
0% Charged	11.9 V or less

Load Test

⚠ CAUTION

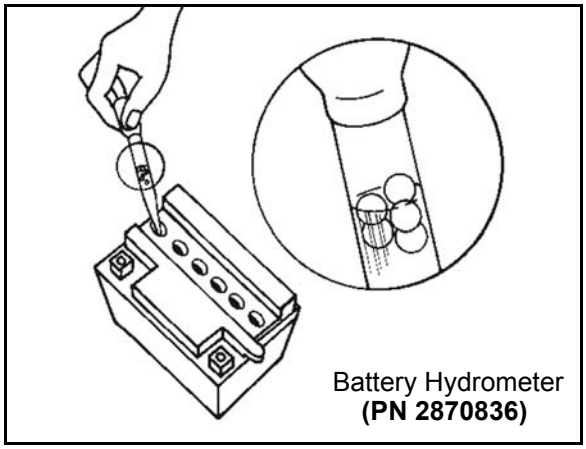
To prevent shock or component damage, remove spark plug high tension leads and connect securely to engine ground before proceeding.

A battery may indicate a full charge condition in the OCV 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, use a load testing device that has an adjustable load. Apply a load of three times the ampere-hour rating. At 14 seconds into the test, check battery voltage. A good 12V battery will have at least 10.5 volts. If the reading is low, charge the battery and retest.

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)

SPECIFIC GRAVITY	
State of Charge*	**YuMicron™ Type**
100% Charged	1.275
75% Charged	1.225
50% Charged	1.175
25% Charged	1.135
0% Charged	1.115 or less
* At 80° F. **NOTE:** Subtract .01 from the specific gravity reading at 40° F.	

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.

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Charging Procedure

1. Remove the battery 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. Coat threads of battery bolt with a corrosion resistant dielectric grease.

Dielectric Grease (PN 2871329)

4. Connect battery cables.

⚠ WARNING
To avoid the possibility of explosion, connect positive (+) cable first and negative (-) 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.

STARTING SYSTEM

Troubleshooting

Starter Motor Does Not Run

- Battery discharged
- 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 starter solenoid or starter motor
- Engine problem - seized or binding (can engine be rotated easily)

Starter Motor Turns Over Slowly

- Battery discharged
- 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 0.1 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

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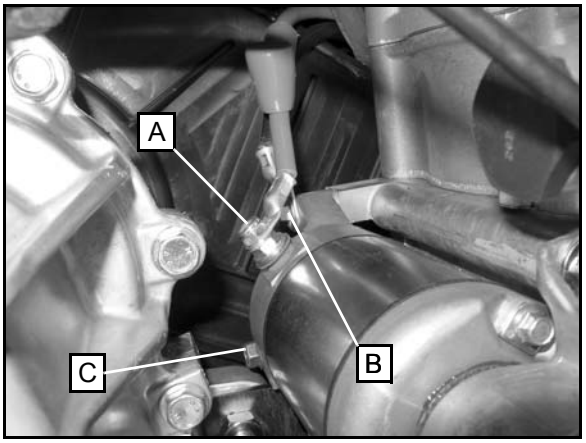
Starter Motor Removal

1. Remove the driver's side seat and disconnect the battery.
2. Raise and support rear of vehicle. Remove the right-hand rear wheel if necessary.
3. Remove the (+) positive wire (A) from the starter motor terminal.
4. From the right-hand side wheel well, remove the upper starter motor fastener (B) securing the starter motor and (-) negative battery cable to the engine. Completely loosen the lower starter motor fastener (C).



NOTE: The (-) negative battery cable is mounted to the engine using the upper starter mounting bolt.

5. Remove the starter from the engine.

Starter Motor Installation

1. Inspect and replace starter motor O-ring if needed.
2. Lubricate the starter motor O-ring with fresh engine oil.
3. Place the lower starter motor fastener (C) through the lower mounting boss in the starter motor.
4. Install the starter motor onto the engine case.
5. Install the (-) negative battery cable in the upper starter bolt and hand tighten the upper starter mounting bolt (B).
6. Install and torque the lower mounting bolt (C) to specification.

IMPORTANT: Tighten the lower starter bolt first, as the bottom hole acts as a pilot hole to properly align the starter drive (bendix) with the flywheel. This helps prevent binding and starter damage.

7. Torque the upper starter mounting bolt (B) to specification.

= T
Starter Mounting Bolts and Nut: **7 ft. lbs. (10 Nm)**

8. If removed, install the right-hand rear wheel and torque wheel nuts to specification (see chapter 2).
9. Lower vehicle.
10. Connect the (-) negative battery cable and install the driver's side seat.

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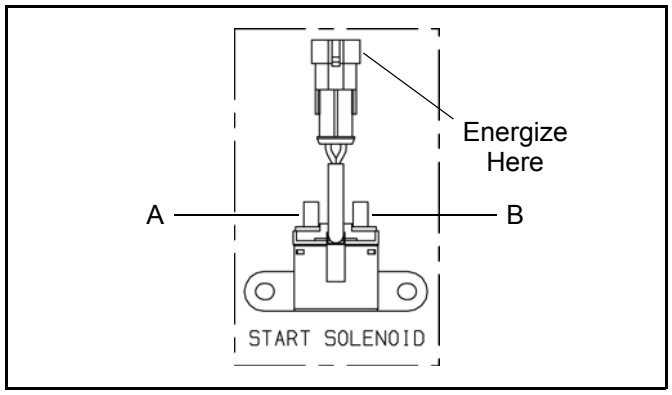
Starter Solenoid Bench Test

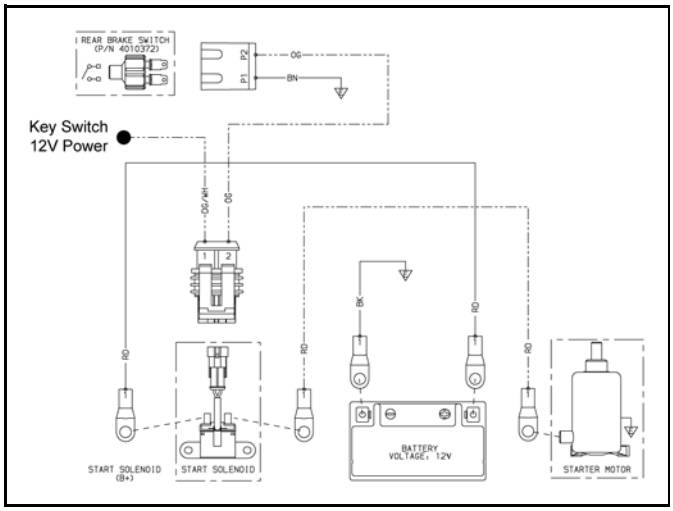
Test the start solenoid by powering the solenoid using battery voltage for a maximum of 5 seconds. With the solenoid energized, resistance should read about 0 - 0.5 Ohms between terminals (A) and (B). If resistance measurement is out of specification, replace the starter solenoid.



Starter Solenoid Operation

To energize the Starter Solenoid the following must occur:

- The brake must be applied to provide a ground path via the Orange wire.
- The key switch must be turned to the “start” position to provide 12V power via the Green / White wire.
- Once the pull-in coil is energized, the solenoid provides a current path for 12V power to reach the starter motor.



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STARTING SYSTEM TESTING FLOW CHART

Condition: Starter fails to turn over the engine.

With the tester on the VDC position, place the tester's black lead on the battery negative and the red lead on the battery positive. Reading should be 12.4 V D. C. or greater.

No → Remove battery and properly service. Install fully charged shop battery to continue test.

Yes

Disconnect 2-wire connector at the solenoid. Using a multi-meter, connect the black meter lead to the Orange/Green harness wire and the red meter lead to the White/Red harness wire. Apply the brake and turn ignition switch to the “start” position. Meter should read battery voltage.

No → Check for voltage at the chassis 20 Amp fuse and then check for voltage entering the ignition switch. Battery voltage should be present. If battery voltage is present at the ignition switch, but not the solenoid, replace the switch. **NOTE:** The brake MUST be applied when performing these tests.

Yes → Test the start solenoid by powering the solenoid via the 2-wire connection. With the solenoid energized, resistance should read about 0.5Ω ± 10% between the two terminals. If resistance measurement is out of specification, replace the starter solenoid (see “Starter Solenoid Bench Test”)

Voltage Drop Testing

Reconnect the solenoid. Connect the tester black lead to the battery positive and the red lead to the solenoid end of the battery-to-solenoid wire. Turn the ignition key to the “start” position. Reading should be less than .1 V D.C.

No → Clean the battery-to-solenoid cable ends or replace the cable.

Yes

Connect the black tester lead to solenoid end of battery-to-solenoid cable. Connect red tester lead to solenoid end of solenoid-to-starter cable. Turn the ignition key to the “start” position. Reading should be less than .1 V D.C.

No → Replace the starter solenoid.

Yes

Connect the black tester lead to the solenoid end of the solenoid-to-starter cable. Connect the red tester lead to the starter end of the same cable. Turn the ignition key to the “start” position. The reading should be less than .1 V D.C.

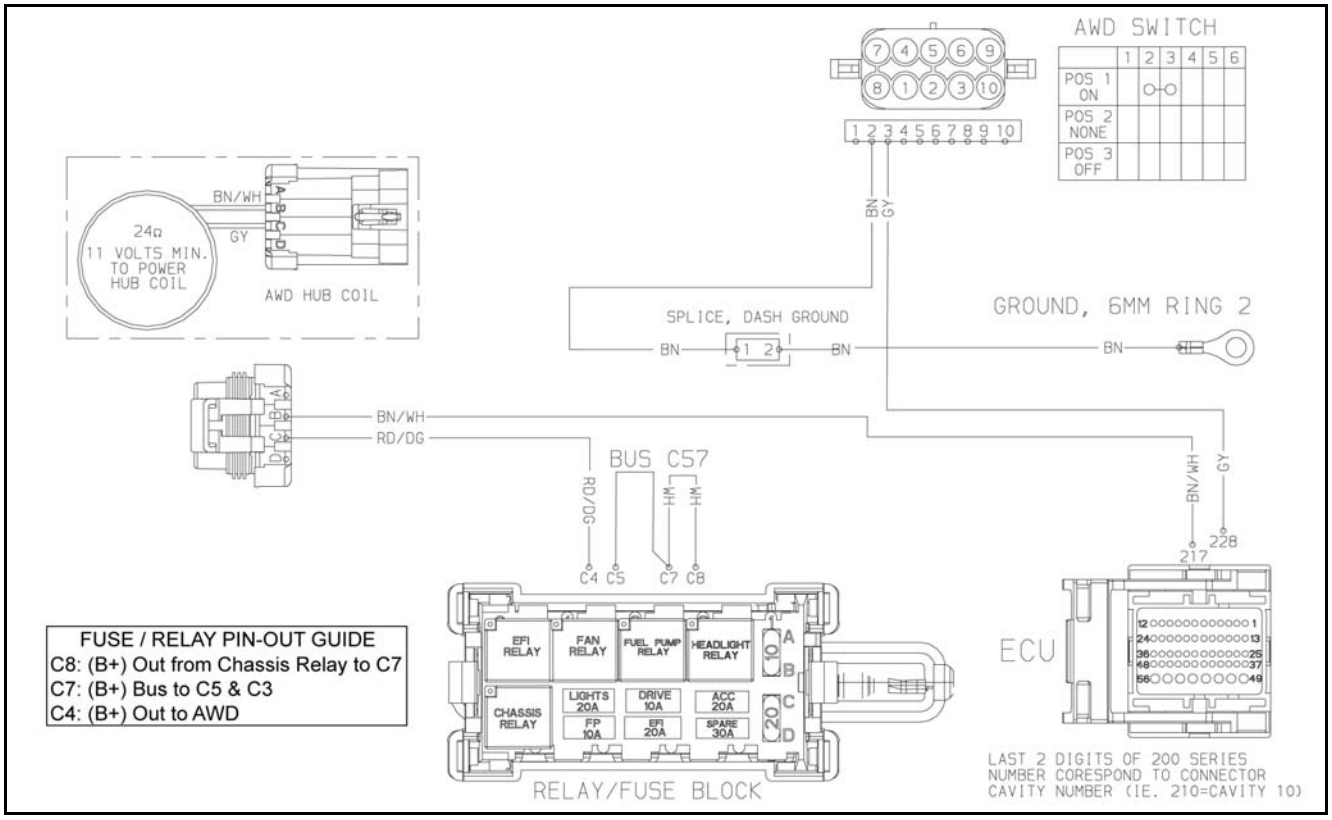
No → Clean the solenoid-to-starter cable ends or replace the cable.

Yes

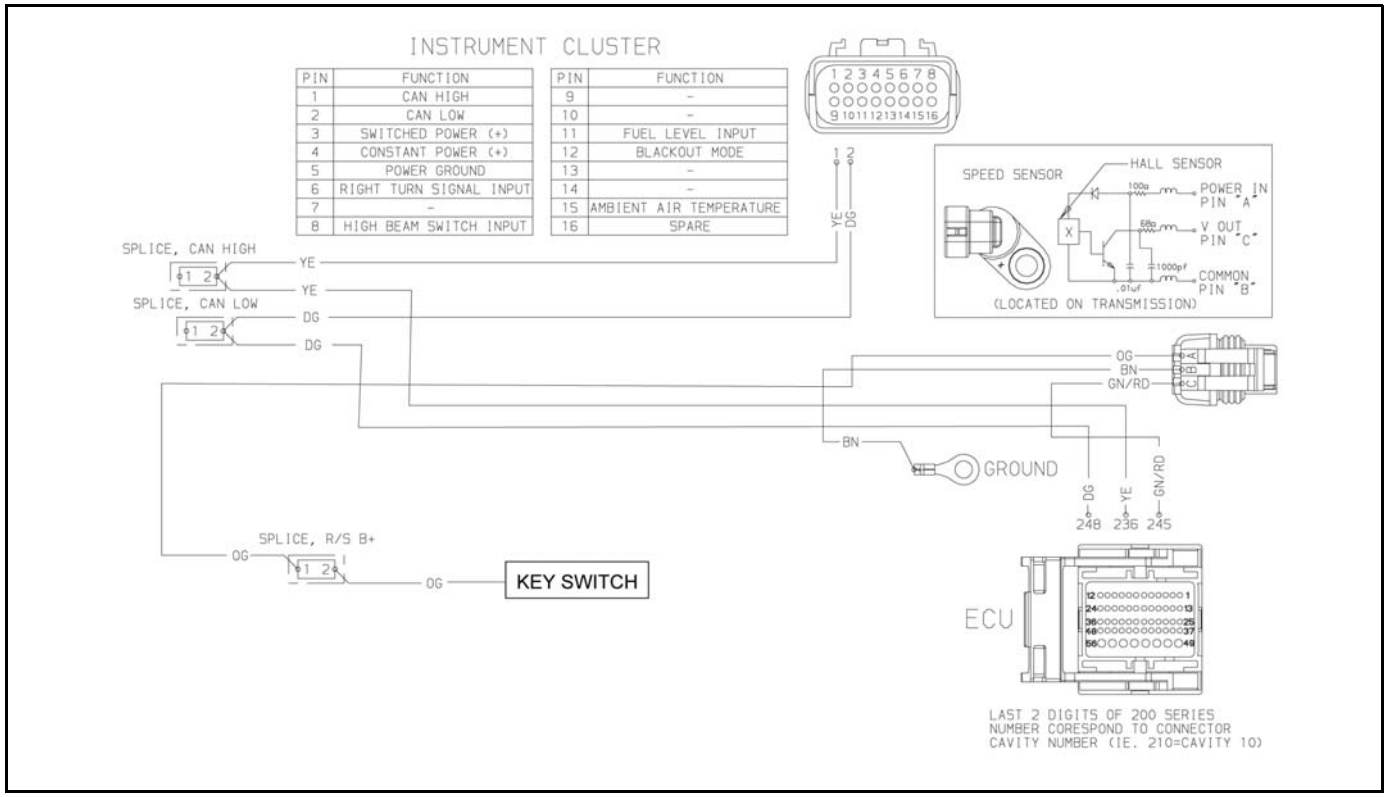
If all of these indicate a good condition, yet the starter still fails to turn, the starter must be removed for static testing and inspection.

ELECTRICAL SYSTEM BREAKOUTS

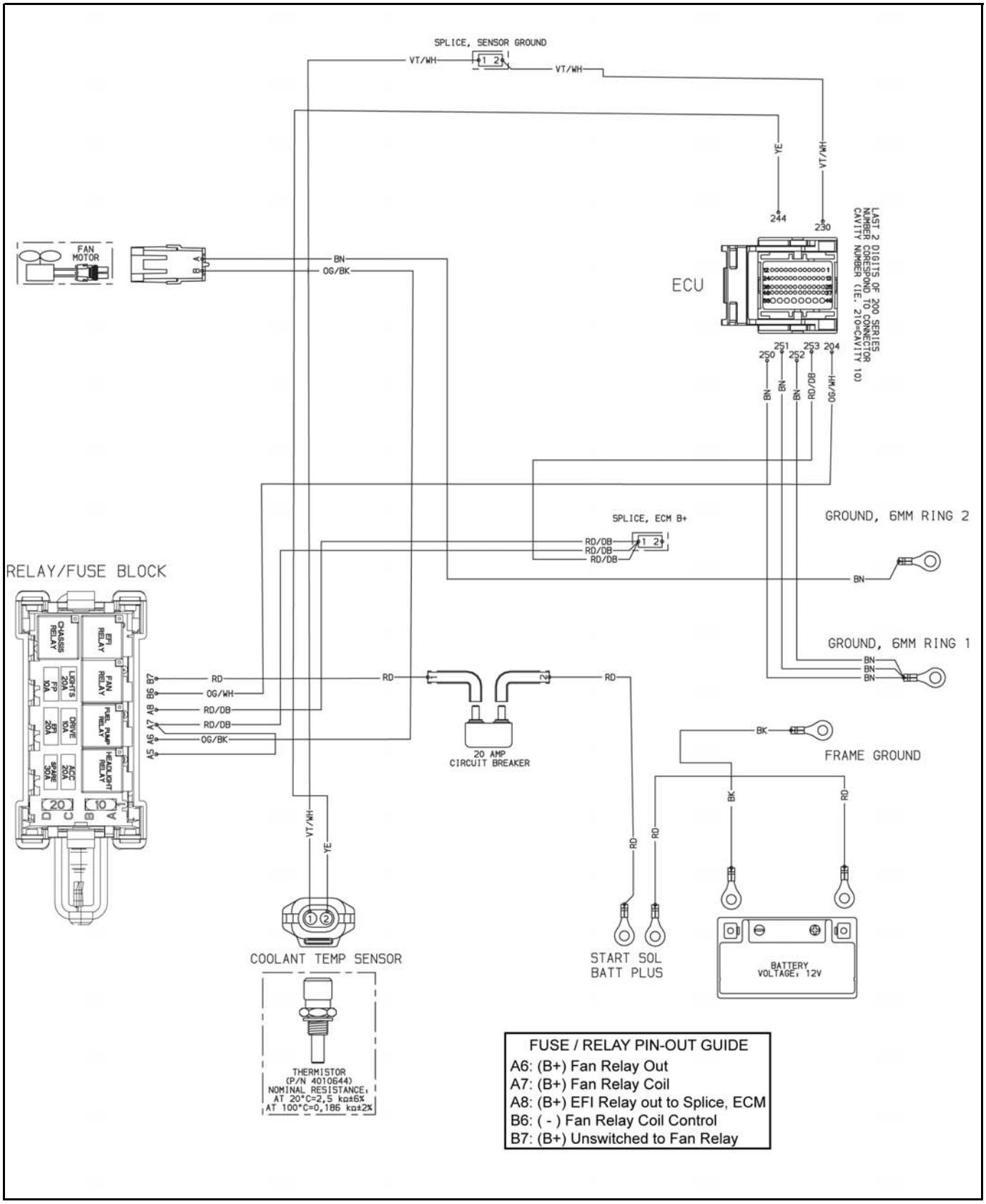
AWD



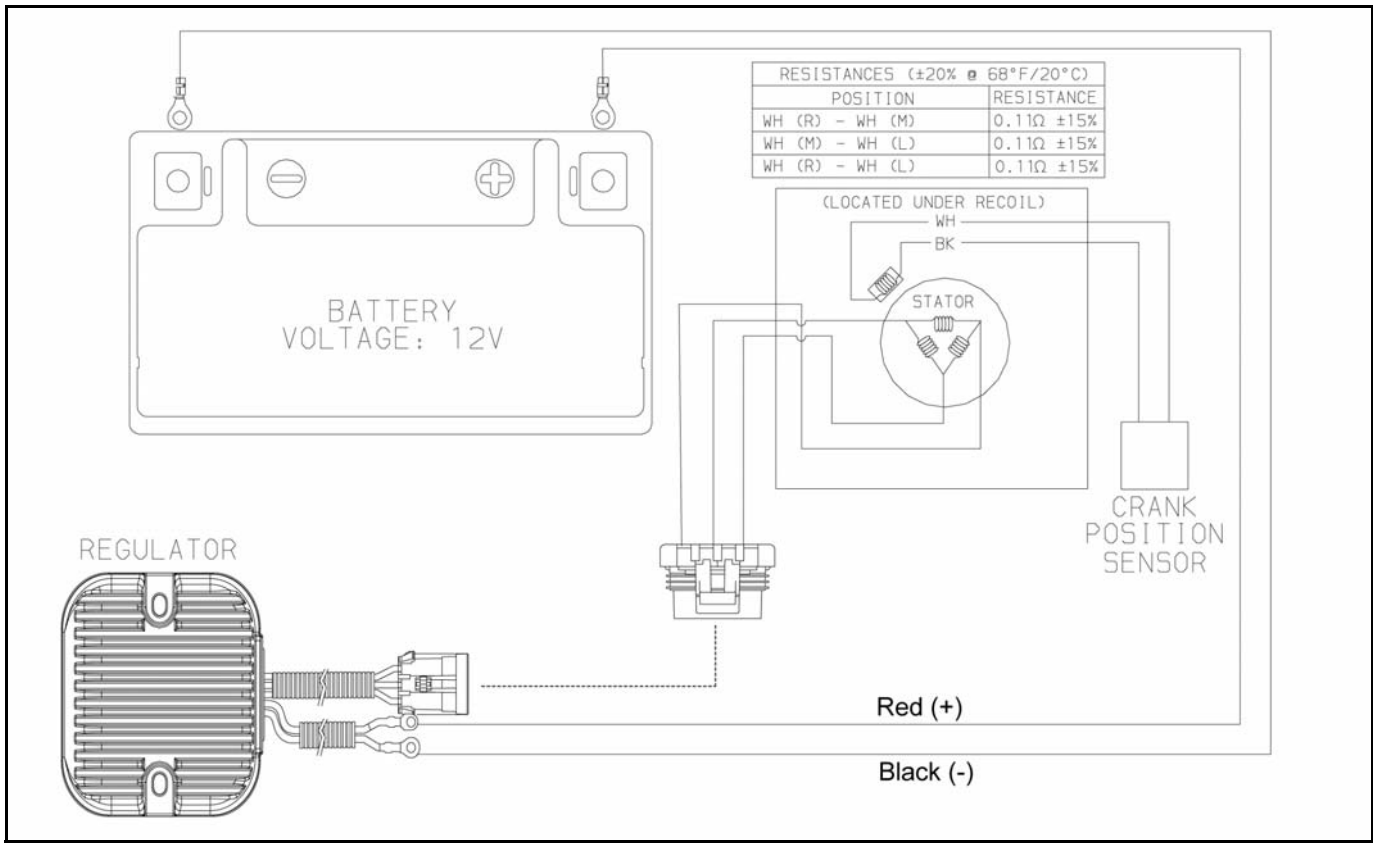
Vehicle Speed Sensor



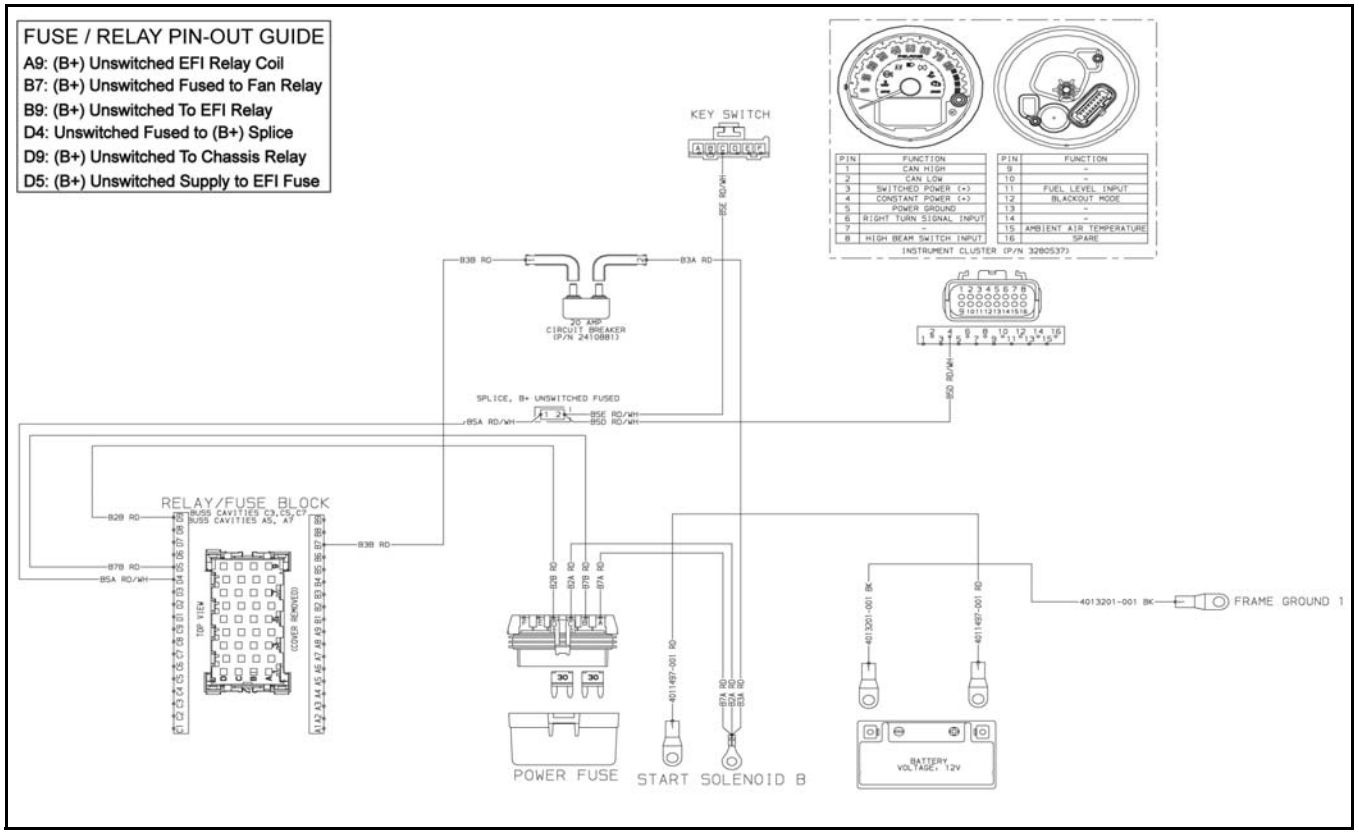
Cooling Fan



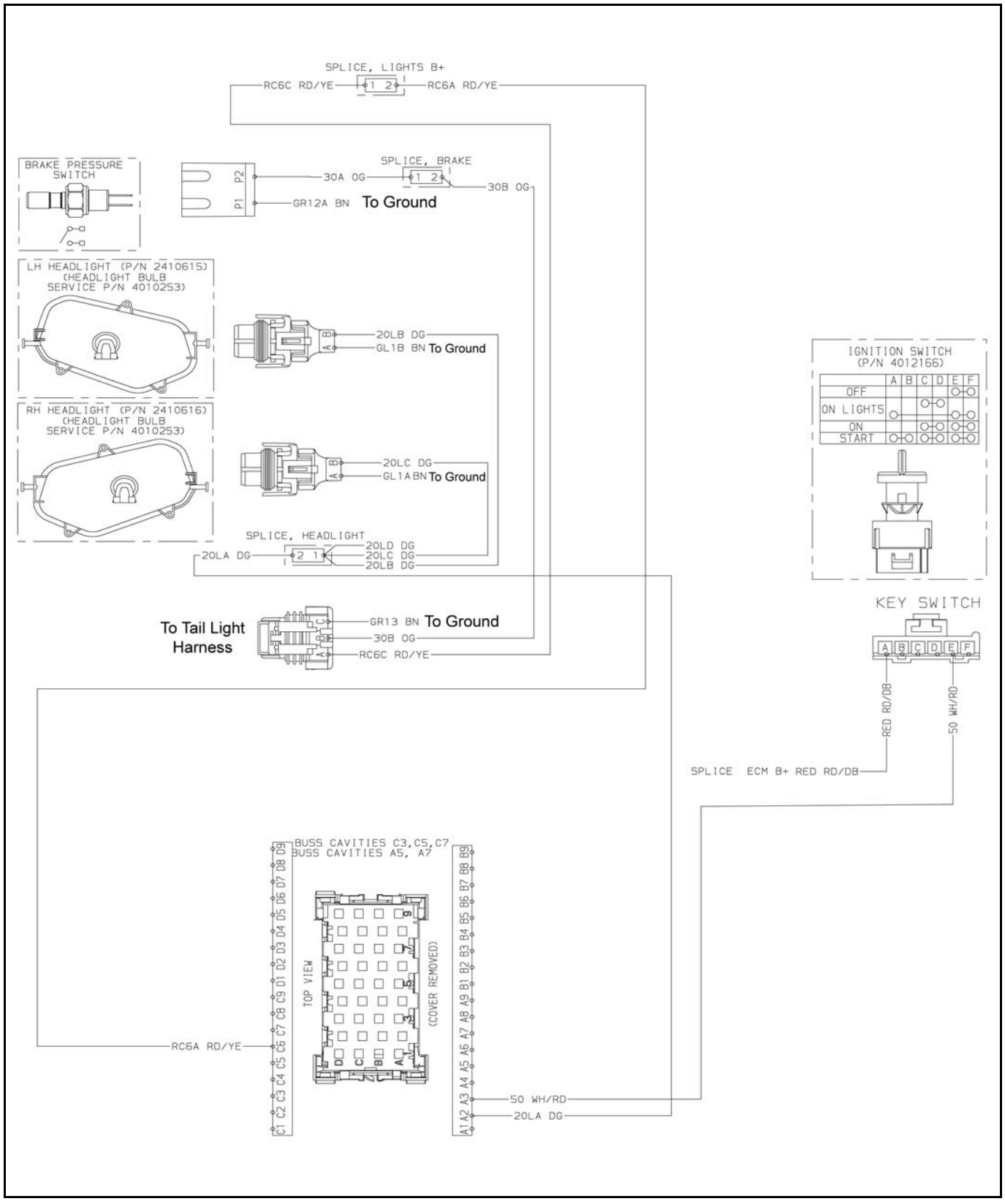
Charging System



Chassis Power



Lights



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