POLARIS
INDUSTRIES INC.

ATV AND LIGHT UTILITY VEHICLE SERVICE MANUAL

Foreword

This manual is designed primarily for use by ATV service technicians in a properly equipped shop. Since a certain knowledge of mechanical theory, tool use, and shop procedures is necessary to perform the service work safely, all operations should be performed by qualified service personnel only. In order to perform the work efficiently and prevent costly errors, the technician should read the text and be familiar with procedures before starting the work. Cleanliness of parts and tools as well as the work area is of primary importance.

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

This manual includes procedures for maintenance operations, component identification and unit repair, along with service specifications for 1996-1998 model Polaris ATVs and Light Utility Vehicles. The section index tabs enable the user to quickly locate the section desired. In addition, a table of contents is placed at the beginning of each section for location of specific page numbers and service information. Keep this manual available for reference in the shop area.

To keep this manual current it is important that it is updated yearly with new model information and specifications.

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

Comments or suggestions about this manual may be directed to: Polaris Industries Inc., Service Publications Supervisor, 1225 Highway 169 North, Minneapolis, Minnesota 55441-5078.

1996-1998 Service Manual Volume II Part No. 9913680
1998 Service Manual Update Part No. 9914752

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UNDERSTANDING SAFETY LABELS AND INSTRUCTIONS

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

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

⚠ DANGER

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

⚠ WARNING

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

CAUTION:

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

NOTE:

A NOTE provides key information to clarify instructions.

Trademarks

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Ammco, Registered Trademark of Ammco Tools, Inc.
Torx, Registered Trademark of Textron
Hilliard, Trademark of the Hilliard Corporation

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CHAPTER 1
GENERAL INFORMATION

1

Engine Serial Number Location

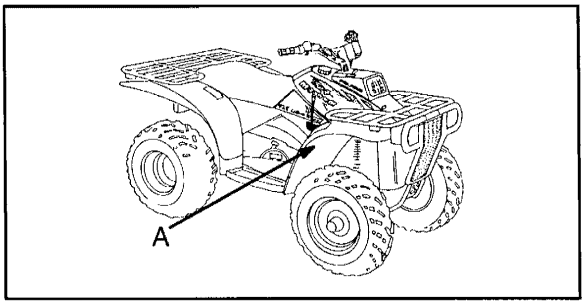
Whenever corresponding about an engine, be sure to refer to the engine model number and serial number. This information can be found on the sticker applied to the manual starter recoil housing. An additional number is stamped in one of the following locations:

- 4 stroke models - center top of crankcase beneath the cylinder coolant elbow
- 2 stroke liquid cooled models - center top of crankcase beneath the carburetor mounting flange
- 2 stroke air cooled models - top of crankcase near right side of cylinder

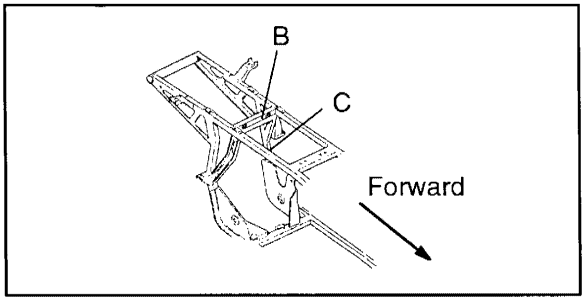
Machine Model Number and Serial Number Location

The machine model number and serial number are important for vehicle identification. The machine model number is located on the frame on the left side of the vehicle near the oil tank. Depending on model, the Serial number will be stamped into the frame in one of the following locations:

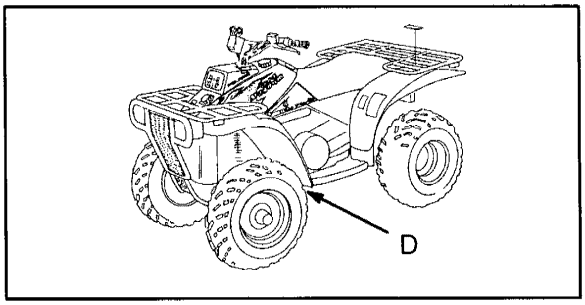
- On the right side of the vehicle in front of the shift selector box (A). (1996)
- Under the seat on the upper shock mount cross member (B) (1996)
- On the right hand frame rail (C) near the air box. (1997)
- On the left hand lower frame rail (D) near the rear A-arm mount. (1998-Current)



VIN Location - 1996



VIN Location - 1996/1997



VIN Location - 1998-Current

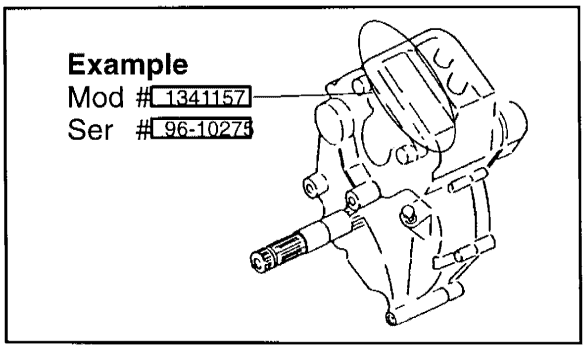
Transmission I.D. Number Location

Transmission model and serial numbers are located on top of the transmission case below the shifting bellcranks.

Carburetor I.D. Number Location

The carburetor I.D. number is in one of the following locations:

- 4 stroke models - right side center of the carburetor body
- 2 stroke models - right side of carburetor body near choke plunger boss

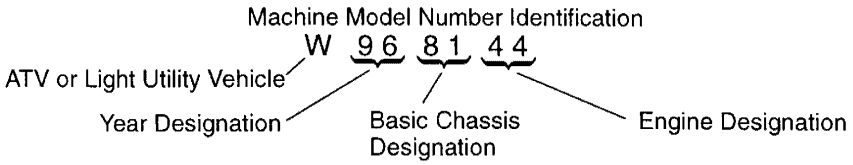


Transmission I.D. Numbers

1996 Model Identification

The machine model and serial number must be used with any correspondence regarding service or repair.

1996 MODEL NUMBERS



1996 Engine Designation Numbers

27 250
30 300
40 400
44 425
50 500

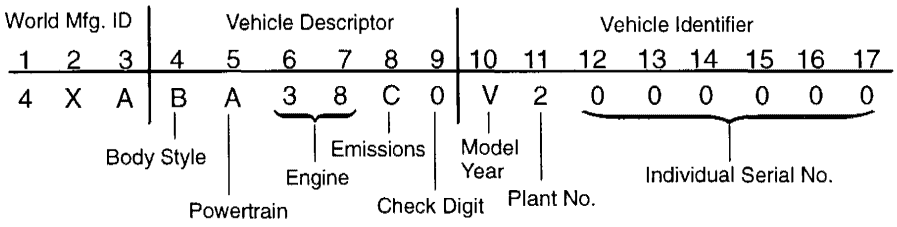
1996 Chassis Designation Numbers

75 ..... Magnum 2x4
78 ..... Trail Blazer / Scrambler
80 ..... Sportsman 4x4
81 ..... Magnum 4x4
85 ..... Trail Boss / Sport
87 ..... 400 6x6 / Magnum 6x6
91 ..... Xplorer 300 / Xplorer 400
92 ..... Sportsman 500
95 ..... Xpress 300 / Xpress 400

Vehicle Identification Number (1997 and Later Model Years)

1997 to Current ATVs and Light Utility Vehicles have a 17 digit Vehicle Identification Number (VIN). The VIN is organized as follows: Digits 1-3: World Manufacturer Identifier. For Polaris ATVs, this is 4XA. Digits 4-9: Vehicle Descriptor Section. Digits 10-17: Vehicle Indicator Section. Digits 4-8 of the VIN identify the body style, drive type, engine type, and emissions equipment. The VIN number and the model number must be used with any correspondence regarding service or repair.

1997-Current VIN Number



Vehicle Identification Number / Model Number Key

Body Style	Powertrain	Engine	Emissions	Options
A=Gen II	A=2x4 chain	25=EC25PF(250cc)	A=Approved by CARB*	A=Std
B=Gen III	C=4x4 chain	28=EC28PF(300 cc)	C=Non CARB* Approved	B=1st Color Option
C=Gen IV	D=4x4 shaft	38=EC38PL(400 cc)	D=Norway	
	E=6x6 chain	42=EH42PL (425 cc)	E=Sweden	
		50=EH50PL (500 cc)		

*CARB = California Air Resources Board

Year / Letter Identification

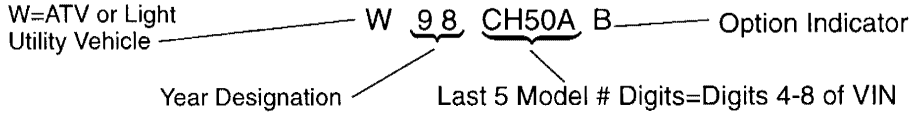
The tenth digit of a 17 digit VIN is the model year of the vehicle. Example: W = 1998; X = 1999 etc. Refer to the listing below.

V 1997
W 1998
X 1999
Y 2000

1997 to Current Model Numbers

The model year is also listed in the model number. The last 4 digits in the model number correspond to digits 4 through 8 of the Vehicle Identification Number (VIN).

Machine Model Number Identification



1996 Publication Numbers

Model	Model No.	Owner's Manual PN	Parts Manual PN	1996 Parts Micro Fiche Set PN
Trail Blazer	W967827	9913584	9913586	9913433
Trail Boss	W968527	9913506	9913588	
Xplorer 300	W969130	9913332	9913590	
Xpress 300	W969530	9913327	9913592	
Sport	W968540	9913584	9913586	
Scrambler 4x4	W967840	9913519	9913582	
Xpress 400	W969540	9913327	9913592	
Xplorer 400	W969140	9913511	9913598	
Sportsman 4x4	W968040	9913414	9913594	
400 6x6	W968740	9913516	9913596	
Magnum 2x4	W967544	9913512	9913603	
Magnum 4x4	W968144	9913512	9913605	
Magnum 6x6	W968744	9913522	9913607	
Sportsman 500	W969244	9913269	9913609	

1997 Publication Numbers

Model	Model No.	Owner's Manual	Parts Manual	1997Parts Micro Fiche Set PN
Trail Blazer	W97BA25C	9914011	9914012	9914645
Trail Boss	W97AA25C	9914056	9914057	
Xplorer 300	W97CC28C	9913980	9913981	
Xpress 300	W97CA28C	9913959	9913960	
Sport 400	W97BA38C	9914011	9914012	
Scrambler 4x4	W97BC38C	9913988	9913989	
Xpress 400	W97CA38C	9913959	9913960	
Xplorer 400	W97CC38C	9913974	9913975	
Sportsman 4x4	W97AC38C	9913966	9913967	
400 6x6	W97AE38A	9913917	9914081	
Magnum 2x4	W97AA42A	9914069	9914070	
Magnum 4x4	W97AC42A	9914069	9914083	
Magnum 6x6	W97AE42A	9914074	9914075	
Sportsman 500	W97CH50A	9913998	9913999	
Xplorer 500	W97CD50A	9914134	9914135	
Scrambler 500	W97BC50A	9913988	9914307	

1998 Publication Numbers

Model	Model No.	Owner's Manual	Owner's Manual Supplement	Parts Manual	Parts Microfiche
Trail Boss	W98AA25C	9914659	9914530	9914531	9914532
Trail Blazer	W98BA25C	9914659	9914530	9914546	9914547
Xpress 300	W98CA28C	9914659	9914525	9914536	9914537
Xplorer 300	W98CC28C	9914659	9914525	9914526	9914527
Sport 400	W98BA38C	9914659	9914545	9914723	9914724
Scrambler 400	W98BC38C	9914659	9914722	9914725	9914726
Xplorer 400	W98CC38C	9914659	9914540	9914541	9914542
Magnum 2x4	W98AA42A	9914659	9914520	9914552	9914553
Magnum 4x4	W98AC42A	9914659	9914721	9914521	9914522
Scrambler 500	W98BC50A	9914659	9914498	9914499	9914501
Sportsman 500	W98CH50A(&AB)	9914659	9914570	9914571	9914572
Big Boss 500 6x6	W98AE50A	9914720	N/A	9914639	9914640

DESCRIPTION	PART NUMBER
1995-1996 Magnum and Sportsman 500 Service Manual	9913681
1996 ATV Service Manual Volume II	9913680
1998 ATV Service Manual Vol. II Update	9914752

SERVICE TRAINING VIDEOS		
VIDEO TITLE	**PART NUMBER**	**DESCRIPTION**
Magnum 4-Stroke Introduction	9912996	Includes 4 Stroke theory of operation, engine removal, disassembly, and assembly techniques, along with and general tech-tips.
Ignition System Diagnostics	9913533	Describes all current Polaris ignition systems. Provides working knowledge of ignition system theory and diagnostics.
Charging System Diagnostics	9913278	Describes all current Polaris charging systems. Provides working knowledge of charging system theory and diagnostics.
Polaris Variable Transmissions (PVT)	9913987	Theory, disassembly, assembly and troubleshooting of the Polaris PVT system.
Fuels and Fuel Delivery	9914393	Describes fuel properties including octane and vapor pressure; fuel mixture and burn characteristics; VM and CV carburetor theory and adjustments.

Service/Information Bulletins - By Bulletin Number

ATV-94-08	1995 Scrambler - Oil line may contact exhaust head pipe
ATV-94-09	1994 400 ATVs and 1995 Xplorer, Sportsman, and 400 6X6 - Poor fuel economy and hesitation
ATV-94-10	1995 Scrambler - Some brake calipers may rub on inside of tire rim
ATV-95-01	1995 Scrambler - Loose clamp on carburetor boot
ATV-95-02	1995 Xplorer 4x4, Sportsman - Front hub oil leak
ATV-95-03	1995 Xplorer 4x4 - Incorrect speedometer angle drive
ATV-95-04	1995 Scrambler - Headlight wiring reversed
ATV-95-05	1995 Magnum 2x4, Magnum 4x4 - Engine oil in air box
ATV-95-06	1995 Scrambler 4x4 - Revised carburetor jetting
ATV-95-07	1995 Models Equipped with Auxiliary Brake - Brake inspection and adjustment procedure
ATV-95-08	1995 Scrambler 4x4 - Missing lower front bumper bolts
ATV-95-09	1995 Scrambler 4x4 - Incorrect sprocket guard spacer
ATV-95-10	1995 Scrambler 4x4 - Front brake lines may rub against CV joint boot
ATV-95-11	1995 Magnum 2x4, Magnum 4x4 - Oil tank vent fitting restricted
ATV-95-12	All 1995 Models - Transmission lubricant expelled through vent line
ATV-95-13	All 1995 Models (exc. Scrambler, Xplorer, 6x6 - Aux. brake arm may contact right footrest
ATV-95-14	All 1995 All Wheel Drive Models - Faulty Gear Selector Switches
ATV-95-15	1995 Scrambler - Headlight Bulb May Fall Out Of Socket
ATV-95-16	1995 Magnum 2x4 and 4x4 - Rich Condition/Plug Fouling Checklist
ATV-95-17	All 1996 - Synthetic Chaincase Lubricant Recommended for all 1996 Models
ATV-95-18	1996 Sport - Loose Headlight Mounting Screws
ATV-95-19	1995 Xplorer, 400 2x4, Sport, Scrambler, 6x6 - Idle Speed Adjustment on 1995 400 cc ATVs
ATV-95-20	1996 Scrambler, Sport 400L - Incorrect Carburetor Jetting Chart in Owner's Manual
ATV-95-21	1996 Scrambler - Water May Freeze in Oil Pump Housing
ATV-95-22	1996 Xplorer 400L, Xpress 300, Sportsman 500 - Plow Blade Mounting Kit Applications
ATV-96-01	1996 Trail Boss; Magnum 4x4 - Water Leaks at Inner PVT Cover
ATV-96-02	1996 Sportsman 500 - Oil Tank Vent Hose Routing
ATV-96-03	1996 Sportsman 500 - Loose Rear Drive Shaft Retaining Bolts
ATV-96-04	1996 Sportsman 500; Magnum 2x4; 4x4; 6x6 - Improved Seat Fit For 1996 ATVs
ATV-96-05	1996 Gen IV models with rear rack extender kit. Flag mount not functional w/ rack extender.
ATV-96-06	1996 Sport, Scrambler - Brake Line Retention Strap May Be Missing
ATV-96-07	1996 Sport, Scrambler - Exhaust Muffler Restricted
ATV-96-08	1996 All Except Tr. Blazer, Tr. Boss - Cooling Fan Motors May Be Damaged By Water.
ATV-96-09	1996 Sportsman 500 Hose Clamp On Coolant Line May Contact Fuel Filter
ATV-96-10	1996 Sportsman 500 - Engine Overheating due to fan placement and debris in the shroud
ATV-96-11	1995 / 1996 4 Stroke Models - Moisture May Freeze In Oil Tank Vent Line
ATV-96-12	1996 / 1997 Xlorer and Xpress 300s - Revised Oil Pump Bleeding Procedure
ATV-96-13	1996 Sportsman 500; 1997 Sportsman and Xplorer 500 - Rear Brake Noise / Floating Disc Kit
ATV-96-14	1997 Magnum 6x6 - Fuel Tank Vent Line Routed Incorrectly
ATV-96-15	1997 Sportsman 500 - Pressure Relief Slit Missing Form Oil Tank Vent Line
ATV-96-16	1997 Scrambler 400 / 1997 Scrambler 500 - Brake Lines May Contact CV Boot or Clamp
ATV-97-01	1995 and 1996 4 Stroke Models - Oil Tank Breather Modification For Cold Temperatures
ATV-97-02	1997 Sportsman and Xplorer 500 - Rear Brake Disc Hub Bolt Torque Procedure
ATV-97-03	1997 Sportsman and Xplorer 500 - Revised Serial Number Range For ATV-97-02

Bulletin Index - 1996 By Model

1996 Model	Bulletin #	Type	Notes
ALL 1996 MODELS	ATV-96-11	Information	Moisture May Freeze In Oil Tank Vent Line
1996 Sportsman 500	ATV-96-13	Information	Rear Brake Noise / Floating Disc Kit
	ATV-96-10	Service	Engine Overheating
	ATV-96-09	Information	Hose Clamp May Contact Fuel Filter
	ATV-96-08	Service	Cooling Fan Motor May Be Damaged By Water
	ATV-96-05	Service	Flag Mount Not Functional
	ATV-96-04	Information	Poor Seat Fit
	ATV-96-03	Information	Loose Rear Drive Shaft Retaining Bolts
	ATV-96-02	Service	Oil Tank Vent Hose Routing
	ATV-95-22	Information	Plow Blade Mounting Kit Applications
1996 Magnum 6x6	ATV-96-08	Service	Cooling Fan Motor May Be Damaged By Water
	ATV-96-04	Information	Poor Seat Fit
1996 Magnum 4x4	ATV-96-08	Service	Cooling Fan Motor May Be Damaged By Water
	ATV-96-04	Information	Poor Seat Fit
	ATV-96-01	Service	Water Leaks at Inner PVT Cover
	ATV-95-17	Information	Synthetic Chaincase Lubricant Recommended
1996 Magnum 2x4	ATV-96-08	Service	Cooling Fan Motor May Be Damaged By Water
	ATV-96-04	Information	Poor Seat Fit
1996 400 6x6	ATV-96-08	Service	Cooling Fan Motor May Be Damaged By Water
	ATV-95-17	Information	Synthetic Chaincase Lubricant Recommended
1996 Sportsman 4x4	ATV-96-08	Service	Cooling Fan Motor May Be Damaged By Water
	ATV-95-17	Information	Synthetic Chaincase Lubricant Recommended
1996 Scrambler	ATV-96-08	Service	Cooling Fan Motor May Be Damaged By Water
	ATV-96-07	Information	Exhaust Muffler Restriction
	ATV-96-06	Service	Brake Line Retention Strap May Be Missing
	ATV-95-21	Information	Water May Freeze In Oil Pump Housing
	ATV-95-20	Information	Incorrect Jetting Chart In Owners Manual
1996 400 Xplorer	ATV-96-08	Service	Cooling Fan Motor May Be Damaged By Water
	ATV-95-22	Information	Plow Blade Mounting Kit Applications
	ATV-95-17	Information	Synthetic Chaincase Lubricant Recommended
1996 400 Xpress	ATV-96-08	Service	Cooling Fan Motor May Be Damaged By Water
1996 Sport	ATV-96-08	Service	Cooling Fan Motor May Be Damaged By Water
	ATV-96-07	Information	Exhaust Muffler Restriction
	ATV-96-06	Service	Brake Line Retention Strap May Be Missing
	ATV-95-20	Information	Incorrect Jetting Chart In Owners Manual
	ATV-95-18	Service	Loose Headlight Mounting Screws
1996 300 Xplorer	ATV-96-12	Service	Revised Oil Pump Adjustment Procedure
	ATV-96-08	Service	Cooling Fan Motor May Be Damaged By Water
	ATV-95-17	Information	Synthetic Chaincase Lubricant Recommended
1996 300 Xpress	ATV-96-12	Service	Revised Oil Pump Adjustment Procedure
	ATV-96-08	Service	Cooling Fan Motor May Be Damaged By Water
	ATV-95-22	Information	Plow Blade Mounting Kit Applications
1996 Trail Boss	ATV-96-01	Service	Water Leaks at Inner PVT Cover
1996 Trail Blazer	ATV-95-18	Service	Loose Headlight Mounting Screws

1997 Model	Bulletin #	Type	Notes
All 1997 Models			
Sportsman 500	ATV-97-03	Service	Loose Pins And Locking Hub For Rear Disc Brake Revised Serial Number Range For ATV-97-02
	ATV-97-02	Service	Rear Brake Disc Hub Bolt Torque Procedure/Hub Kit
	ATV-96-15	Service	Pressure Relief Slit Missing From Oil Tank Vent Line
	ATV-96-13	Service	Rear Brake Noise
Xplorer 500	ATV-97-03	Service	Loose Pins And Locking Hub For Rear Disc Brake Revised Serial Number Range For ATV-97-02
	ATV-97-02	Service	Rear Brake Disc Hub Bolt Torque Procedure/Hub Kit
	ATV-96-13	Service	Rear Brake Noise
Scrambler 500	ATV-96-16	Service	Brake Line May Contact CV Boot Or Clamp
Magnum 6x6	ATV-96-14	Service	Fuel Tank Vent Line Routing
Magnum 4x4			
Magnum 2x4			
Big Boss 6x6 400L			
Sportsman 400L			
Xplorer 400L			
Xpress 400L			
Scrambler 400L	ATV-96-16	Service	Brake Line May Contact CV Boot Or Clamp
Sport 400L			
Xplorer 300	ATV-96-12	Service	Revised Oil Pump Adjustment Procedure
Xpress 300	ATV-96-12	Service	Revised Oil Pump Adjustment Procedure
Trail Blazer ES			
Trail Boss 250			

1998 Model	Bulletin #	Type	Notes
No bulletins issued as of 4/24/1998			
All 1998 Models			
Big Boss 500 6x6			
Sportsman 500			
Scrambler 500			
Magnum 4x4			
Magnum 2x4			
Xplorer 400			
Scrambler 400			
Sport 400			
Xplorer 300			
Xpress 300			
Trail Blazer			
Trail Boss			

Model	Item	Color	Raw Material No.	PPG Ditzler No.
400L	Springs	Purple Velvet	8520160	51467
	Rims	Brushed Aluminum	N/A	N/A
Trail Blazer	Springs	Fire Red	8520149	72060
	Rims	Bright White	8520153	2185
Trail Boss	Springs	Aqua Marine	8520159	46975
	Rims	Bright White	8520153	2185
	Rack	Aqua Marine	8520159	46975
Scrambler	Springs	Lavender	8520157	N/A
	Rims	Bright White	8520153	2185
Xpress 300	Springs	Bonnie Blue	8520148	12908
	Rims	Brushed Aluminum	N/A	N/A
Xpress 400	Springs	Blue Green	8520202	N/A
	Rims	Brushed Aluminum	N/A	N/A
Xplorer 300	Springs	Eddie B. Green	8520150	44931
	Rims	Brushed Aluminum	N/A	N/A
Xplorer	Springs	Fire Red	8520149	72060
	Rims	Brushed Aluminum	N/A	N/A
Magnum 2x4	Springs	Eddie B. Green	8520150	44931
	Rims	Brushed Aluminum	N/A	N/A
	Racks	Steel Gray	8520151	N/A
Magnum 4x4	Springs	Bonnie Blue	8520148	12908
	Rims	Brushed Aluminum	N/A	N/A
	Racks	Bonnie Blue	8520148	12908
Sportsman 500	Springs	Black	8520147	9440
	Rims	Black	8520147	9440
	Racks	Black	8520147	9440
Magnum 6x6	Springs	Eddie B. Green	8520150	44931
	Rims	Brushed Aluminum	N/A	N/A
	Rack	Eddie B. Green	8520150	44931
	Box	Eddie B. Green	8520150	44931
400 6x6	Springs	Eddie B. Green	8520150	44931
	Rims	Brushed Aluminum	N/A	N/A
	Rack	Eddie B. Green	8520150	44931
	Box	Eddie B. Green	8520150	44931

Order direct from Midwest Industrial Coatings (612-934-8252). Mix as directed.

1997 Paint Codes

MODEL	PAINTED PART	COLOR DESCRIPTION	DITZLER NUMBER	POLARIS NUMBER
Trail Blazer	Springs	Fire Red	72060	8520149
	Rims	Bright White	2185	8520153
Trail Boss	Springs	Aqua Marine	46975	8520159
	Rims	Bright White	2185	8520153
	Rack	Aqua Marine	46975	8520159
Sport	Springs	Purple Velvet	51467	8520160
	Rims	Brushed Aluminum	N/A	N/A
Xpress 300	Springs	Bonnie Blue	12908	8520148
	Rims	Brushed Aluminum	N/A	N/A
Xpress 400	Springs	Blue-green	N/A	8520202
	Rims	Brushed Aluminum	N/A	N/A
Xplorer 300	Springs	Eddie Bauer Green	44931	8520150
	Rims	Brushed Aluminum	N/A	N/A
Xplorer 400	Springs	Eddie Bauer Green	44931	8520150
	Rims	Brushed Aluminum	N/A	N/A
Xplorer 500	Springs	Screamin' Yellow	N/A	8520241
	Rims	Brushed Aluminum	N/A	N/A
Scrambler 4x4	Springs	Lavender	N/A	8520157
	Rims	Bright White	2185	8520153
Scrambler 500	Springs	Screamin' Yellow	N/A	8520241
	Rims	Brushed Aluminum	N/A	N/A
Sportsman 4x4	Springs	Black	9440	8520147
	Rims	Black	9440	8520147
	Rack	Black	9440	8520147
Sportsman 500	Springs	Black	9440	8520147
	Rims	Black	9440	8520147
400 6x6	Springs	Eddie Bauer Green	44931	8520150
	Rims	Brushed Aluminum	N/A	N/A
	Rack	Eddie Bauer Green	44931	8520150
	Box	Eddie Bauer Green	44931	8520150
Magnum 2x4	Springs	Fire Red	72060	8520149
	Rims	Brushed Aluminum	N/A	N/A
	Rack	Black	9440	8520147
Magnum 4x4	Springs	Eddie Bauer Green	44931	8520150
	Rims	Brushed Aluminum	N/A	N/A
	Rack	Eddie Bauer Green	44931	8520150
Magnum 6x6	Springs	Eddie Bauer Green	44931	8520150
	Rims	Brushed Aluminum	N/A	N/A
	Rack	Eddie Bauer Green	44931	8520150
	Box	Eddie Bauer Green	44931	8520150
Big Boss 6x6	Springs	Eddie Bauer Green	44931	8520150
	Rims	Brushed Aluminum	N/A	N/A
	Rack	Eddie Bauer Green	44931	8520150
	Box	Eddie Bauer Green	44931	8520150

1998 Paint Codes

Model	Item	Color	Raw Material No.	PPG Ditzler No.
Big Boss 500 6X6	Springs	Eddie B Green	8520150 (P195)	44931
	Rims	Aluminum	(P117)	
Sportsman 500 (Opt. 1)	Springs	Black	8520147 (P067)	9440
	Rims	Black	8520147 (P067)	9440
Sportsman 500 (Opt. 2)	Springs	Bonnie Blue	8520148 (P157)	12908
	Rims	Aluminum	(P117)	
Scrambler 500	Springs	Black	8520147 (P067)	9440
	Rims	Aluminum	(P117)	
Magnum 4X4	Springs	Fire Red	8520149 (P093)	72060
	Rims	Aluminum	(P117)	
	Racks	Eddie B. Green	8520150 (P195)	44931
Magnum 2X4	Springs	Black	8520147 (P067)	9440
	Rims	Aluminum	(P117)	
	Racks	Black	8520147 (P067)	9440
Xplorer 400L	Springs	Burnished Brown	P218	
	Rims	Aluminum	(P117)	
Scrambler 400	Springs	Fire Red	8520149 (P093)	72060
	Rims	Bright White	8520153 (P133)	2185
Sport 400L	Springs	Purple Velvet	8520160 (P194)	51467
	Rims	Bright White	8520153 (P133)	2185
Xplorer 300	Springs	Fire Red	8520149 (P093)	72060
	Rims	Aluminum	(P117)	
Xpress 300	Springs	Bonnie Blue	8520148 (P157)	12908
	Rims	Aluminum	(P117)	
Trail Blazer	Springs	Fire Red	8520149	72060
	Rims	Bright White	8520153 (P133)	2185
Trail Boss	Springs	Fire Red	8520149 (P093)	72060
	Rims	Bright White	8520153 (P133)	2185
	Rack(s)	Fire Red	8520149 (P093)	72060

Order direct from Midwest Industrial Coatings (612-934-8252). Mix as directed.

Frames (Medium Black) P067 / 8520147 / Ditzler 9440

1997 Model (Gen II, III, or IV)	Trail Boss (II)	Trail Blazer ES (III)	Xpress 300 (IV)	Xplorer 300 (IV)
Model Number	W97AA25C	W97BA25C	W97CA28C	W97CC28C
Height	44″	46″	45.5″	45.5″
Width	44″	46.5″	46″	46″
Length	73.2″	74.5″	78.5″	81″
Wheel Base	49.75″	49.75″	49.75″	49.75″
Seat Height	33″	34″	33″	34″
Ground Clearance	5.5″	6″	6.75″	6″
Weight	425 lbs.	420 lbs.	512 lbs.	567 lbs.
Turning Radius (Unloaded)	60″	60″	60″	57″
Front Suspension Travel (McPherson Strut)	6.25″	6.25″	6.25″	6.25″
Rear Suspension	8.5″	8.5″	8.5″	8.5″
Front Tires	23x7x10	23x7x10	23x7x10	23x7x10
Rear Tires	22x11x10	22x11x10	24x11x10	24x11x10
Center Tires	N/A	N/A	N/A	N/A
Front/Rear/Center Tire PSI	4/3	4/3	4/3	4/3
Front Brake	Hydr. Disc	Hydr. Disc	Hydr. Disc	Hydr. Disc
Rear Brake	Hydr. Disc	Hydr. Disc	Hydr. Disc	Hydr. Disc
Auxiliary Brake	Mechanical	Mechanical	Mechanical	Mechanical
Fuel Capacity (U.S. Gallons)	4	4	4	4
Oil Capacity (U.S. Quarts)	2	2	2	2
Gearcase Oil Capacity (oz)	16	16	20	20
Main Head Light	12V 60/60W	12V 55W	N/A	N/A
Grill Mounted Lights	N/A	N/A	2, 12V 30/30W	2, 12V 30/30W
Tail Light	12V/8.26W	12V/8.26W	12V/8.26W	12V/8.26W
Gear Box	F/R/N	F/R/N	HI/LO/R/N	HI/LO/R/N
Gear Reduction Low	N/A	N/A	6.64/1	6.64/1
Drive Type	520 O-ring	520 O-ring	520 O-ring	520 O-ring
FInal Drive	12/42 88P	12/42 88P	13/38 86P	13/40 88P
Center Drive	N/A	N/A	N/A	11/22 70P
Front Drive	N/A	N/A	N/A	12/22 64P
Axle to Axle	N/A	N/A	N/A	N/A
Displacement	244cc	244cc	283cc	283cc
Engine Model Number	EC25PFE08	EC25PFE09	EC28PFE01	EC28PFE01
Compression Ratio (Effective)	6.1/1	6.1/1	6.1/1	6.1/1
Bore and Stroke	72x60	72x60	74.5x65	74.5x65
Spark Plug	BR8ES (NGK)	BR8ES (NGK)	BR8ES (NGK)	BR8ES (NGK)
Alternator Output	150W	150W	150W	150W
Timing Degrees	25@3000	25@3000	25@3000	25@3000
Carburetion	(1) VM30SS	(1) VM30SS	(1) VM30SS	(1) VM30SS
Main Jet	145	130	155	155
Pilot Jet	40	40	40	40
Jet Needle	5DP7-3	5DP7-3	5DP7-3	5DP7-3
Needle Jet	0-4 (169)	0-4 (169)	0-4 (169)	0-4 (169)
Cutaway	2.0	2.0	2.0	2.0
Air Screw/Pilot Screw	1 Turn	1 Turn	1.5 Turn	1.5 Turn
* See Owner's Manual for rack load recommendations and restrictions.				

Specifications 1997

1997 Model (Gen II, III, or IV)	Xpress 400 (IV)	Xplorer 400 (IV)	Sport 400 (III)	Sportsman 4x4 (II)
Model Number	W97CA38C	W972238C	W97BA38C	W97AC38C
Height	47.5″	47.5″	47″	46″
Width	46″	46″	46.5″	46″
Length	78.5″	81″	74.5″	77″
Wheel Base	49.75″	49.75″	49.75″	49.75″
Seat Height	33″	34″	33″	34″
Ground Clearance	6.75″	7.375″	5.5″	6″
Weight	543 lbs.	570 lbs.	479 lbs.	585 lbs.
Turning Radius (Unloaded)	60″	65″	60″	65″
Front Suspension Travel (McPherson Strut)	6.25″	6.25″	6.25″	6.25″
Rear Suspension	8.5″	8.5″	8.5″	8.5″
Front Tires	23x7x10	25x8x12	23x7x10	25x8x12
Rear Tires	24x11x10	25x12x10	22x11x10	25x12x10
Center Tires	N/A	N/A	N/A	N/A
Front/Rear/Center Tire PSI	4/3	4/3	4/3	4/3
Front Brake	Hydr. Disc	Hydr. Disc	Hydr. Disc	Hydr. Disc
Rear Brake	Hydr. Disc	Hydr. Disc	Hydr. Disc	Hydr. Disc
Auxiliary Brake	Mechanical	Mechanical	Mechanical	Mechanical
Fuel Capacity (U.S. Gallons)	4	4	4	4
Oil Capacity (U.S. Quarts)	2	2	2	2
Coolant Capacity (Quarts / Liters)	2.25 / 2.16	2.25 / 2.16	2.25 / 2.16	2.25 / 2.16
Gearcase Oil Capacity (oz)	20	20	16	20
Engine Counter Balancer Oil Capacity (10W/30)	100cc	100cc	100cc	100cc
Main Head Light	12V 60/55W	12V 60W	12V 55W	12V 60W
Grill Mounted Lights	Accessory	2, 12V 35W	N/A	2, 12V 35W
Tail Light	12V/8.26W	12V/8.26W	12V/8.26W	12V/8.26W
Gear Box	HI/LO/R/N	HI/LO/R/N	F/R/N	HI/LO/R/N
Gear Reduction Low	6.64/1	6.64/1	N/A	6.64/1
Drive Type	520 O-ring	520 O-ring	520 O-ring	520 O-ring
Final Drive	13/34 84P	13/34 84P	13/34 84P	13/34 84P
Center Drive	N/A	11/22 70P	N/A	11/22 70P
Front Drive	N/A	13/22 64P	N/A	13/22 64P
Axle to Axle	N/A	N/A	N/A	N/A
Displacement	378.7cc	378.7cc	378.7cc	378.7cc
Engine Model Number	EC38PLE06	EC38PLE06	EC38PLE07	EC38PLE06
Compression Ratio (Effective)	6.9/1	6.9/1	6.9/1	6.9/1
Bore and Stroke	83x70	83X70	83x70	83x70
Spark Plug	BR8ES (NGK)	BR8ES (NGK)	BR8ES (NGK)	BR8ES (NGK)
Alternator Output	200W	200W	150W	200W
Timing Degrees	23.5@3000	23.5@3000	23.5@3000	23.5@3000
Carburetion	(1) VM34SS	(1) VM34SS	(1) VM34SS	(1) VM34SS
Main Jet	200	200	230	200
Pilot Jet	30	30	35	30
Jet Needle	6CEY6-3	6CEY6-3	6CEY6-3	6CEY6-3
Needle Jet	0-6 (480)	0-6 (480)	0-6 (480)	0-6 (480)
Cutaway	1.5	1.5	1.5	1.5
Air Screw/Pilot Screw	1.5 Turn	1.5 Turn	1.5 Turn	1.5 Turn
* See Owner's Manual for rack load recommendations and restrictions.				

1997 Model (Gen II, III, or IV)	Scrambler 4x4 (III)	Magnum 2x4 (II)	Magnum 4x4 (II)	Sportsman 500(IV)
Model Number	W97BC38C	W97AA42A	W97AC42A	W97CH50A
Height	47″	47″	46″	47″
Width	45.5″	46.5″	46″	46″
Length	74.5″	77″	77″	7″
Wheel Base	48.5″	49.75″	49.75″	50.5″
Seat Height	33″	33″	34″	34″
Ground Clearance	6″	5.5″	6″	10″
Weight	490 lbs.	534 lbs.	595 lbs.	649 lbs.
Turning Radius (Unloaded)	60″	60″	65″	65″
Front Suspension Travel (McPherson Strut)	8.5″	6.25″	6.25″	6.25″
Rear Suspension	8.5″	8.5″	8.5″	9.5″
Front Tires	23x7x10	23x7x10	25x8x12	25x8x12
Rear Tires	22x11x10	24x11x10	25x12x10	25x12x10
Front/Rear/Center Tire PSI	4/3	4/3	4/3	5/5
Front Brake	Hydr. Disc	Hydr. Disc	Hydr. Disc	Hydr. Disc
Rear Brake	Hydr. Disc	Hydr. Disc	Hydr. Disc	Hydr. Disc
Auxiliary Brake	Mechanical	Mechanical	Mechanical	Mech.
Fuel Capacity (U.S. Gallons)	4	3.5	3.5	5.25
Oil Capacity (U.S. Quarts)	2	2- 0W40 Engine Oil	2- 0W40 Engine Oil	3
Coolant Capacity (Quarts / Liters)	2.25 / 2.16	2.25 / 2.16	2.25 / 2.16	2.25 / 2.16
Gearcase Oil Capacity (oz)	16	20	20	32
Engine Counter Balancer Oil Capacity (10W/30)	100cc	N/A	N/A	N/A
Main Head Light	12V 35/35W	12V 60/60W	12V 60W	12V 60W
Grill Mounted Lights	N/A	Acc.	2,12V 35W	2,12V 35W
Tail Light	12V/8.26W	12V/8.26W	12V/8.26W	12V 8.26W
Gear Box	F/R/N	HI/LO/R/N	HI/LO/R/N	HI/LO/R/N
Gear Reduction Low	N/A	6.64/1	6.64/1	6.64/1
Drive Type	520 O-ring	520 O-ring	520 O-ring	Shaft
FInal Drive	13/38 84P	12/38 86P	12/38 86P	3.16:1
Center Drive	11/22 70P	N/A	11/22 70P	N/A
Front Drive	12/22 64P	N/A	11/22 68P	2:1
Axle to Axle	N/A	N/A	N/A	N/A
Displacement	378.7cc	425cc	425cc	498
Engine Model Number	EC38PLE07	EH42PLE01	EH42PLE01	EH50PLE01
Compression Ratio (Effective)	6.9/1	9.2/1	9.2/1	N/A
Bore and Stroke	83x70	87.9x70	87.9x70	92x75
Spark Plug	BR8ES (NGK)	BKR5ES (NGK)	BKR5ES (NGK)	BKR5ES (NGK)
Alternator Output	150W	200W	200W	200W
Timing Degrees	23.5@3000	30@3500	30@3500	30@3500
Carburetion	(1) VM34SS	(1) BST34-CV type	(1) BST34-CV type	(1) BST34 CV type
Main Jet	230	140	140	142.5
Pilot Jet	35	40	40	42.5
Pilot Air Jet	N/A	#160	#160	#160
Jet Needle	6CEY6-3	5F81-3	5F81-3	5D78-3
Needle Jet	0-6 (480)	P-8	P-8	P-1
Cutaway	1.5	N/A	N/A	N/A
Air Screw or Fuel Screw (Turns Out)	1.5	2.5	2.5	2
* See Owner's Manual for rack load recommendations and restrictions.				

Specifications 1997

1997 Model (Gen II, III, or IV)	Scrambler 500 (III)	Xplorer 500(IV)	Magnum 6x6 (II)	400 6x6 (II)
Model Number	W97BC50A	W97CD50A	W97AE42A	W97AE38A
Height	47″	47″	47″	47″
Width	45.5″	46″	46″	46″
Length	74.5″	7″	103″	103″
Wheel Base	48.5″	50.5″	75″	75″
Seat Height	33″	34″	34″	34″
Ground Clearance	6″	10″	5.5″	5.5″
Weight	547 lbs.	649 lbs.	852 lbs.	830 lbs.
Turning Radius (Unloaded)	60″	65″	98″	98″
Front Suspension Travel (McPherson Strut)	8.5″	6.25″	6.25″	6.25″
Rear Suspension	9.5″	9.5″	8.5″	8.5″
Front Tires	23x7X10	25x8x12	25x8x12	25x8x12
Rear Tires	24x11x10	25x12x10	25x12x10	25x12x10
Center Tires	N/A	N/A	25x12x10	25x12x10
Front/Rear/Center Tire PSI	4/3	5/5	5/5/5	5/5/5
Front Brake	Hydr. Disc	Hydr. Disc	Hydr. Disc	Hydr. Disc
Rear Brake	Hydr. Disc	Hydr. Disc	Hydr. Disc	Hydr. Disc
Auxiliary Brake	Mech.	Mech.	Hydr. Disc	Hydr. Disc
Fuel Capacity (U.S. Gallons)	3.5	5.25	3.5	4
Oil Capacity (U.S. Quarts)	2	3	2- 0W40 Engine Oil	2
Coolant Capacity (Quarts / Liters)	2.25 / 2.16	2.25 / 2.16	2.25 / 2.16	2.25 / 2.16
Gearcase Oil Capacity (oz)	16	32	20	20
Counter Balancer Oil Capacity	N/A	N/A	N/A	100cc (10W30)
Main Head Light	12V 35/35W	N/A	12V 60W	12V 60W
Grill Mounted Lights	N/A	2,12V 35W	2,12V 35W	2, 12V 35W
Tail Light	12V 8.26W	12V 8.26W	12V/8.26W	12V/8.26W
Gear Box	HI/R/N	HI/LO/R/N	HI/LO/R/N	HI/LO/R/N
Gear Reduction Low	N/A	6.64/1	6.64/1	6.64/1
Drive Type	520 O-ring	Shaft	520 O-ring	520 O-ring
Final Drive	12/38/86P	3.16:1	12/42 88P	13/42 88P
Center Drive	11/22/70P	N/A	11/24 72P	11/22 70P
Front Drive	11/22/68P	2:1	11/22 68P	12/22 64P
Axle to Axle	N/A	N/A	30/30 116P	30/30 116P
Displacement	498	498	425cc	378.7cc
Engine Model Number	EH50PLE02	EH50PLE01	EH42PLE01	EC38PLE06
Compression Ratio (Effective)	N/A	N/A	9.2/1	6.9/1
Bore and Stroke	92x75	92x75	87.9x70	83x70
Spark Plug	BKR5ES (NGK)	BKR5ES (NGK)	BKR5ES (NGK)	BR8ES (NGK)
Alternator Output	200W	200W	200W	200W
Timing Degrees	30@3500	30@3500	30@3500	23.5@3000
Carburetion	(1) BST34 CV type	(1) BST34 CV type	(1) BST34-CV type	(1) VM34SS
Main Jet	125	142.5	140	210
Pilot Jet	42.5	42.5	40	30
Pilot Air Jet	160	#160	#160	
Jet Needle	5D78-3	5D78-3	5F81-3	6DH29-3
Needle Jet	P-3	P-1	P-8	0-6 (480)
Cutaway	N/A	N/A	N/A	1.5
Air Screw	2.0	2 Turns	2.5 Turn	1 Turn
* See Owner's Manual for rack load recommendations and restrictions.				

1998 Model (Gen II, III, or IV)	Trail Boss (II)	Trail Blazer (III)	Xpress 300 (IV)	Xplorer 300 (IV)
Model Number	W98AA25C	W98BA25C	W98CA28C	W98CC28C
Height, inches (cm)	44″ (111.8)	46″ (116.8)	45.5″ (115.6)	45.5″ (115.6)
Width, inches (cm)	44″ (111.8)	46.5″ (118.1)	46″ (116.8)	46″ (116.8)
Length, inches (cm)	73.2″ (185.9)	74.5″ (189.2)	79.5″ (201.9)	81″ (205.7)
Wheel Base, inches (cm)	49.75″ (126.4)	49.75″ (126.4)	49.75″ (126.4)	49.75″ (126.4)
Seat Height, inches (cm)	33″ (83.8)	34″ (86.4)	34″ (86.4)	34″ (86.4)
Ground Clearance, inches (cm)	5.5″ (14.0)	6″ (15.2)	6.75″ (16.5)	6″ (15.2)
Weight, Dry - Lbs. (Kg)	425 (203.4)	420 lbs. (199.8)	512 lbs. (224.7)	567 lbs. (252.4)
Turning Radius-Unloaded, in. (cm)	60″ (152.4)	60″ (152.4)	60″ (152.4)	57″ (144.8)
Front Suspension Travel, in. (cm) (McPherson Strut)	6.25″ (15.9)	6.25″ (15.9)	6.25″ (15.9)	6.25″ (15.9)
Rear Suspension, inches (cm)	8.5″ (21.6)	8.5″ (21.6)	8.5″ (21.6)	8.5″ (21.6)
Front Tires	23x7x10	23x7x10	23x7x10	23x7x10
Rear Tires	22x11x10	22x11x10	24x11x10	24x11x10
Center Tires	N/A	N/A	N/A	N/A
Front/Rear/Center Tire PSI	4/3	4/3	4/3	4/3
Front Brake	Hydr. Disc	Hydr. Disc	Hydr. Disc	Hydr. Disc
Rear Brake	Hydr. Disc	Hydr. Disc	Hydr. Disc	Hydr. Disc
Auxiliary Brake	Mechanical	Mechanical	Mechanical	Mechanical
Fuel Capacity (U.S. Gallons)	4	4	4	4
Oil Capacity (U.S. Quarts)	2	2	2	2
Cooling System Capacity (Qt./Liter)	N/A	N/A	N/A	2.25 / 2.16
Gearcase Oil Capacity (oz)	16	16	20	20
Engine Counter Balancer Oil Capacity (10W/30)	N/A	N/A	N/A	N/A
Main Head Light	12V 60/60W	12V 55W	N/A	N/A
Grill Mounted Lights	N/A	N/A	2, 12V 30/30W	2, 12V 30/30W
Tail Light / Brake Light (Watts)	12V - 8.26 / 26.9	12V - 8.26 / 26.9	12V - 8.26 / 26.9	12V - 8.26 / 26.9
Gear Box	F/R/N	F/R/N	HI/LO/R/N	HI/LO/R/N
Gear Reduction Low	N/A	N/A	6.64/1	6.64/1
Drive Type	520 O-ring	520 O-ring	520 O-ring	520 O-ring
Final Drive	12/42 88P	12/42 88P	13/38 86P	13/40 88P
Center Drive	N/A	N/A	N/A	11/22 70P
Front Drive	N/A	N/A	N/A	12/22 64P
Displacement	244cc	244cc	283cc	283cc
Engine Model Number	EC25PFE10	EC25PFE11	EC28PFE02	EC28PFE02
Compression Ratio (Effective)	6.1/1	6.1/1	6.1/1	6.1/1
Bore and Stroke (mm)	72x60	72x60	74.5x65	74.5x65
Spark Plug / Gap, in.	BR8ES (NGK) .028	BR8ES (NGK) .028	BR8ES (NGK) .028	BR8ES (NGK) .028
Alternator Output	150W	150W	150W	150W
Timing Degrees	25@3000	25@3000	25@3000	25@3000
Carburetion	(1) VM30SS	(1) VM30SS	(1) VM30SS	(1) VM30SS
Main Jet	145	130	155	155
Pilot Jet	40	40	40	40
Jet Needle	5DP7-3	5DP7-3	5DP7-3	5DP7-3
Needle Jet	0-4 (169)	0-4 (169)	0-4 (169)	0-4 (169)
Cutaway	2.0	2.0	2.0	2.0
Air Screw/Pilot Screw	1 Turn	1 Turn	1.5 Turn	1.5 Turn
* See Owner's Manual for rack load recommendations and restrictions.				

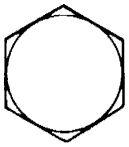
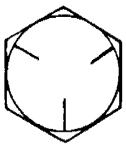
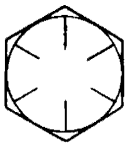
GENERAL INFORMATION
Specifications 1998

1998 Model (Gen II, III, or IV)	Sport 400 (III)	Scrambler 400 (III)	Xplorer 400 (IV)	Magnum 2x4 (II)
Model Number	W98BA38C	W98BC38C	W98CC38C	W98AA42A
Height, inches (cm)	47″ (119.4)	47″ (119.4)	47.5″ (120.7)	47″ (119.4)
Width, inches (cm)	46.5″ (118.1)	45.5″ (115.6)	46″ (116.8)	46.5″ (118.1)
Length, inches (cm)	74.5″ (189.2)	74.5″ (189.2)	81″ (205.7)	77″ (195.6)
Wheel Base, inches (cm)	49.75″ (126.4)	48.5″ (123.2)	49.75″ (126.4)	49.75″ (126.4)
Seat Height, inches (cm)	33″ (83.8)	33″ (83.8)	34″ (86.4)	33″ (83.8)
Ground Clearance, inches (cm)	5.5″ (15.2)	6.5″ (15.2)	7.375″ (19.0)	5.5″ (14.0)
Weight - Lbs. (Kg)	479 lbs. (215)	519 lbs. (236)	570 lbs. (267)	534 lbs. (244)
Turning Radius (Unloaded), in.(cm)	60″ (152.4)	60″ (152.4)	65″ (165)	60″ (152.4)
Front Suspension Travel (McPherson Strut)	6.25″ (15.9)	8.2″ (21.6)	6.25″ (15.9)	6.25″ (15.9)
Rear Suspension	8.5″ (21.6)	8.5″ (21.6)	8.5″ (21.6)	8.5″ (21.6)
Front Tires	23x7x10	23x7x10	25x8x12	23x7x10
Rear Tires	22x11x10	22x11x10	25x11x10	24x11x10
Front/Rear/Center Tire PSI	4/3	4/3	4/3	4/3
Front Brake	Hydr. Disc	Hydr. Disc	Hydr. Disc	Hydr. Disc
Rear Brake	Hydr. Disc	Hydr. Disc	Hydr. Disc	Hydr. Disc
Auxiliary Brake	Mechanical	Mechanical	Mechanical	Mechanical
Fuel Capacity (U.S. Gallons)	4	4	4	3.5
Oil Capacity (U.S. Quarts)	2	2	2	2- 0W40 Engine oil
Cooling System Capacity-qt (liter)	2.25 (2.13)	2.25 (2.13)	2.25 (2.13)	2.25 (2.13)
Gearcase Oil Capacity (oz)	16	32	20	20
Engine Counter Balancer Oil Capacity (10W/30)	100cc	100cc	100cc	N/A
Main Head Light	12V 55W	(2) 12V 30/30W	12V 60W	12V 60/60W
Grill Mounted Lights	N/A	N/A	2, 12V 27W	Acc.
Tail Light / Brake Light (Watts)	12V - 8.26 / 26.9	12V - 8.26 / 26.9	12V - 8.26 / 26.9	12V - 8.26 / 26.9
Gear Box	F/R/N	F/R/N	HI/LO/R/N	HI/LO/R/N
Gear Reduction Low	N/A	N/A	6.64/1	6.64/1
Drive Type	520 O-ring	520 O-ring	520 O-ring	520 O-ring
Final Drive	13/34 84P	13/36 76P	13/34 84P	12/38 86P
Center Drive	N/A	11/22 70P	11/22 70P	N/A
Front Drive	N/A	12/22 64P	13/22 64P	N/A
Axle to Axle	N/A	N/A	N/A	N/A
Displacement	378cc	378cc	378cc	425cc
Engine Model Number	EC38PLE07	EC38PLE09	EC38PLE06	EH42PLE02
Compression Ratio (Effective)	6.9/1	6.9/1	6.9/1	9.2/1
Bore and Stroke	83x70	83x70	83X70	87.9x70
Spark Plug	BR8ES (NGK)	BR8ES (NGK)	BR8ES (NGK)	BKR5ES (NGK)
Alternator Output	150W	150W	200W	200W
Timing Degrees	23.5@3000	23.5@3000	23.5@3000	30@3500
Carburetion	(1) VM34SS	(1) VM34SS	(1) VM34SS	(1) BST34-CV type
Main Jet	230	230	200	140
Pilot Jet	35	35	30	40
Jet Needle	6CEY6-3	6CEY6-3	6CEY6-3	5F14-3
Needle Jet	0-6 (480)	0-6 (480)	0-6 (480)	P-9
Cutaway	1.5	1.5	1.5	Pilot Air Jet #160
Air Screw/Pilot Screw	1.5 Turn	1.5	1.5 Turn	2.5
* See Owner's Manual for rack load recommendations and restrictions.				

1998 Model (Gen II, III, or IV)	Magnum 4x4 (II)	Scrambler 500 (III)	Sportsman 500 (IV)	Big Boss 500 6x6 (II)
Model Number	W98AC42A	W98BC50A	W98CH50A	W98AE42A
Height, inches (cm)	46″ (119.4)	47″ (119.4)	47″ (119.4)	47″ (119.4)
Width, inches (cm)	46″ (116.8)	45.5″ (115.6)	46″ (116.8)	46″ (116.8)
Length, inches (cm)	77″ (195.6)	74.5″ (189.2)	81″ (205.7)	103″ (261.6)
Wheel Base, inches (cm)	49.75″ (126.4)	48.5″ (123.2)	50.5″ (128.3)	75″ (190.5)
Seat Height, inches (cm)	34″ (86.4)	33″ (83.8)	34″ (86.4)	34″ (91.4)
Ground Clearance, inches (cm)	6″ (15.2)	6.5″ (15.2)	11″ (27.9)	5.5″ (14.0)
Weight - Lbs. (Kg)	595 lbs. (274)	542 lbs. (246)	660 lbs. (316)	870 lbs. (395)
Turning Radius (Unloaded), in. (cm)	65″ (165)	60″ (152.4)	65″ (165)	98″ (249)
Front Suspension Travel, in. (cm) (McPherson Strut)	6.25″ (15.9)	8.2″ (21.6)	6.25″ (15.9)	6.25″ (15.9)
Rear Suspension, inches (cm)	8.5″ (21.6)	8.5″ (24.1)	9.5″ (24.1)	7.5″ (21.6)
Front Tires	25x8x12	23x7X10	25x8x12	25x8x12
Rear Tires	25x11x10	24x11x10	25x11x10	25x11x10
Center Tires	N/A	N/A	N/A	25x11x10
Front/Rear/Center Tire PSI	4/3	4/3	5/5	5/5/5
Front Brake	Hydr. Disc	Hydr. Disc	Hydr. Disc	Hydr. Disc
Rear Brake	Hydr. Disc	Hydr. Disc	Hydr. Disc	Hydr. Disc
Auxiliary Brake	Mechanical	Mech.	Hydr. Disc	Hydr. Disc
Fuel Capacity (U.S. Gallons)	3.5	3.5	5.25	3.5
Oil Capacity (U.S. Quarts)	(2) 0W40 Engine Oil	(2) 0W40 Engine Oil	(2) 0W40 Engine Oil	(2) 0W40 Engine Oil
Cooling System Capacity (Qt./Liter)	2.25 / 2.16	2.25 / 2.16	2.25 / 2.16	2.25 / 2.16
Gearcase Oil Capacity (oz)	20	32	32	20
Main Head Light	12V 60W	(2)12V 30/30W	12V 60W	12V 60W
Grill Mounted Lights	2,12V 27W	N/A	2,12V 27W	2,12V 27W
Tail Light / Brake Light (Watts)	12V - 8.26 / 26.9	12V - 8.26 / 26.9	12V - 8.26 / 26.9	12V - 8.26 / 26.9
Gear Box	HI/LO/R/N	HI/R/N	HI/LO/R/N	HI/LO/R/N
Gear Reduction Low	6.64/1	N/A	6.69/1	6.64/1
Drive Type	520 O-ring	520 O-ring	Shaft	520 O-ring
FInal Drive	12/38 86P	13/36-76P	3.16:1	12/42 88P
Center Drive	11/22 70P	N/A	N/A	11/24 72P
Front Drive	11/22 68P	N/A	2:1	11/22 68P
Axle to Axle	N/A	N/A	N/A	30/30 116P
Displacement	425cc	499	498	498cc
Engine Model Number	EH42PLE02	EH50PLE04	EH50PLE07	EH50PLE06
Compression Ratio (Full Stroke)	9.2/1	10.2/1	10.2/1	10.2/1
Bore and Stroke	87.9x70	92x75	92x75	92x75
Spark Plug	BKR5ES (NGK)	BKR5E (NGK)	BKR5E (NGK)	BKR5E (NGK)
Alternator Output	200W	250W	250W	250W
Timing Degrees	30@3500	30@3500	30@3500	30@3500
Carburetion	(1) BST34-CV type	(1) BST40 CV type	(1) BST34 CV type	(1) BST34-CV type
Main Jet	140	155	142.5	140
Pilot Jet	40	40	42.5	40
Pilot Air Jet				
Jet Needle	5F14-3	6H25-94-3	5D78-3	5D78-3
Needle Jet	P-9	Y-0	P-1	Q-6
Cutaway	N/A	N/A	N/A	N/A
Air Screw or Fuel Screw (Turns Out)	2.5	2.0	2.0	2.0
* See Owner's Manual for rack load recommendations and restrictions.				

Standard Torque Specifications

The following torque specifications are to be used as a general guideline. Some fasteners require a special torque procedure during installation. In addition, some fastener torque values may be different than the standard torque value listed below. Critical fastener torques are listed (where applicable) at the beginning of each section. Always refer to the appropriate chapter for specific torque specifications and procedures before using standard torque.

Bolt Size	Threads/In	Grade 2	Grade 5	Grade 8
		Torque in. lbs. (kg-m)		
#10 -	24	27 (.31)	43 (.50)	60 (.69)
#10 -	32	31 (.36)	49 (.56)	68 (.78)
		Torque ft. lbs. (kg-m)*		
1/4 -	20	5 (.7)	8 (1.1)	12 (1.6)
1/4 -	28	6 (.8)	10 (1.4)	14 (1.9)
5/16 -	18	11 (1.5)	17 (2.3)	25 (3.5)
5/16 -	24	12 (1.6)	19 (2.6)	29 (4.0)
3/8 -	16	20 (2.7)	30 (4.0)	45 (6.2)
3/8 -	24	23 (3.2)	35 (4.8)	50 (6.9)
7/16 -	14	30 (4.0)	50 (6.9)	70 (9.7)
7/16 -	20	35 (4.8)	55 (7.6)	80 (11.0)
1/2 -	13	50 (6.9)	75 (10.4)	110 (15.2)
1/2 -	20	55 (7.6)	90 (12.4)	120 (16.6)

Metric

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

*To convert ft. lbs. to kg-m multiply foot pounds by .1383.
*To convert kg-m to N-m move the decimal to the right one position.

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	

Unit of Measure	Multiplied by	Converts to
ft. lbs.	x 12	= in. lbs.
in. lbs.	x .0833	= ft. lbs.
ft. lbs.	x .1383	= kg-m
in. lbs.	x .0115	= kg-m
kg-m	x 7.233	= ft. lbs.
kg-m	x 86.796	= in. lbs.
kg-m	x 10	= Nm
in.	x 25.4	= mm
mm	x .03937	= in.
in.	x 2.54	= cm
mile (mi.)	x 1.6	= km
km	x .6214	= mile (mi.)
Ounces (oz)	x 28.35	= Grams (g)
Grams (g)	x 0.035	= Ounces (oz)
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)
Cubic centimeters (cc)	x .03381	= Fluid Ounces (fl.oz.)
Fluid Ounces (fl.oz.)	x 29.57	= Cubic centimeters (cc)
Imperial pints (Imp pt)	x 0.568	= Liters (l)
Liters (l)	x 1.76	= Imperial pints (Imp pt)
Imperial quarts (Imp qt)	x 1.137	= Liters (l)
Liters (l)	x 0.88	= Imperial quarts (Imp qt)
Imperial quarts (Imp qt)	x 1.201	= US quarts (US qt)
US quarts (US qt)	x 0.833	= Imperial quarts (Imp qt)
US quarts (US qt)	x 0.946	= Liters (l)
Liters (l)	x 1.057	= US quarts (US qt)
US gallons (US gal)	x 3.785	=Liters (l)
Liters (l)	x 0.264	= US gallons (US gal)
Pounds - force per square inch (psi)	x 6.895	= Kilopascals (kPa)
Kilopascals (kPa)	x 0.145	= Pounds - force per square inch (psi)
Kilopascals (kPa)	x 0.01	= Kilograms - force per square cm
Kilograms - force per square cm	x 98.1	= Kilopascals (kPa)

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

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

LIMITED WARRANTY

Polaris Industries Inc., 1225 Highway 169 North, Minneapolis, Minnesota 55441-5078, gives a SIX MONTH LIMITED WARRANTY on all components of the Polaris All Terrain Vehicle (ATV) against defects in material or workmanship. This warranty covers the parts and labor charges for repair or replacement of defective parts which are covered by this warranty. This warranty begins on the date of purchase. This warranty is transferrable to another consumer during the warranty period through a Polaris dealer. There is a charge of $35.00 payable to Polaris Industries Inc.

REGISTRATION

At the time of sale, the Warranty Registration Form must be completed by your dealer and submitted to Polaris within ten days. Upon receipt of this registration, Polaris will record the registration for warranty. THE PURCHASER MUST COMPLETE AN ATV SAFETY TRAINING COURSE PROVIDED BY THE DEALER IN ORDER TO HAVE VALID WARRANTY ON THE ATV. No verification of registration will be sent to the purchaser as the copy of the Warranty Registration Form will be the warranty entitlement. If you have not signed the original registration and received the "customer copy", please contact your dealer immediately. NO WARRANTY COVERAGE WILL BE ALLOWED UNLESS YOUR ATV IS REGISTERED WITH POLARIS.

Initial dealer preparation and set-up of your ATV is very important in ensuring trouble-free operation. Purchasing a machine in the crate or without proper dealer set-up will void your warranty coverage.

WARRANTY COVERAGE AND EXCLUSIONS:

LIMITATIONS OF WARRANTIES AND REMEDIES

The Polaris limited warranty excludes any failures that are not caused by a defect in material or workmanship. This warranty does not cover accidental damage, normal wear and tear, abuse or improper handling. This warranty also does not cover any ATV that has been altered structurally, modified, neglected, improperly maintained, used for racing, or used for purposes other than for which it was manufactured, or for any damages which occur during trailer transit or as a result of unauthorized service or the use of unauthorized parts. In addition, this warranty does not cover physical damage to paint or finish, stress cracks, tearing or puncturing of upholstery material, corrosion, or defects in parts, components or the ATV due to fire, explosions or any other cause beyond Polaris' control.

This warranty does not cover the use of unauthorized lubricants, chemicals, or fuels that are not compatible with the ATV. The exclusive remedy for breach of this warranty shall be, at Polaris' exclusive option, repair or replacement of any defective materials, or components or products. THE REMEDIES SET FORTH IN THIS WARRANTY ARE THE ONLY REMEDIES AVAILABLE TO ANY PERSON FOR BREACH OF THIS WARRANTY. POLARIS SHALL HAVE NO LIABILITY TO ANY PERSON FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY DESCRIPTION, WHETHER ARISING OUT OF EXPRESS OR IMPLIED

WARRANTY OR ANY OTHER CONTRACT, NEGLIGENCE, OR OTHER TORT OR OTHERWISE. Some states do not permit the exclusion or limitation of incidental or consequential damages or implied warranties, so the above limitations or exclusions may not apply to you if inconsistent with controlling state law.

ALL IMPLIED WARRANTIES (INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) ARE LIMITED IN DURATION TO THE ABOVE SIX MONTH WARRANTY PERIOD. POLARIS FURTHER DISCLAIMS ALL EXPRESS WARRANTIES NOT STATED IN THIS WARRANTY. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you if inconsistent with controlling state law.

HOW TO OBTAIN WARRANTY SERVICE

If your ATV requires warranty service, you must take it to a Polaris Servicing Dealer. When requesting warranty service you must present your copy of the Warranty Registration form to the dealer. (THE COST OF TRANSPORTATION TO AND FROM THE DEALER IS YOUR RESPONSIBILITY). Polaris suggests that you use your original selling dealer; however, you may use any Polaris Servicing Dealer to perform warranty service.

Please work with your dealer to resolve any warranty issues. Should your dealer require any additional assistance they will contact the appropriate person at Polaris.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

If any of the above terms are void because of state or federal law, all other warranty terms will remain in effect.

Engine Oil

1. Always use Polaris engine oil.
2. Never substitute or mix oil brands as serious engine damage and voiding of warranty can result.

Service Tips

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

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

⚠ Watch for sharp edges which can cause personal injury. Protect hands with gloves when working with sharp components.

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

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

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

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

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

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

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

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

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

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

ABDC: After bottom dead center.

ACV: Alternating current voltage.

Alternator: Electrical generator producing voltage alternating current.

ATDC: After top dead center.

BBDC: Before bottom dead center.

BDC: Bottom dead center.

BTDC: Before top dead center.

CC: Cubic centimeters.

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

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

Chain Pitch: Distance between chain link pins (520 = 5/8″ or 1.6 cm). Chain length is measured in number of pitches (pins). A 520 x 86 has 86 total pins, including the master link pins.

CI: Cubic inches.

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

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

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

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

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

DCV: Direct current voltage.

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

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

Driven Clutch: (Also-Secondary Clutch). The torque sensitive clutch in a CVT system which is located on the transmission input shaft.

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

Electrical Short: Short circuit. An electrical circuit which is completed before the current reaches the intended component. (i.e. a bare wire touching the grounded chassis).

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

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

EBS: Engine Braking System

ft.: Foot/feet.

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

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

gal.: Gallon.

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

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

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

HP: Horsepower.

ID: Inside diameter.

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

Ignition Generating Coil: Exciter coil, primary charge coil. Stator plate coil which generates primary ignition voltage.

in.: Inch/inches.

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

kg/cm ^{2} : Kilograms per square centimeter.

kg-m: Kilogram meters.

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

l or ltr: Liter.

lbs/in ^{2} : Pounds per square inch.

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

m: Meter/meters.

Mag: Magneto.

Magnetic Induction: As a conductor (coil) is moved through a magnetic field, a voltage will be generated in the windings. The common method used to convert mechanical enery to electrical energy in the lighting coil, ignition generating coils and trigger coil.

mi.: Mile/miles.

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

N-m: Newton meters.

OD: Outside diameter.

Ohm: The unit of electrical resistance opposing current flow.

oz.: Ounce/ounces.

Piston Clearance: Total difference between piston outside diameter and cylinder inside diameter.

Piston Erosion: Piston dome melts. Usually occurs at the exhaust port area. Possible causes: 1) Detonation due to lean fuel/air mixture, improper spark plug heat range, excess heat buildup, poor fuel quality / octane rating.

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

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

Primary Clutch: Drive clutch on engine. Mainly RPM sensitive.

psi.: Pounds per square inch.

PTO: Power take off.

PVT: Polaris Variable Transmission (Drive Clutch System)

qt.: Quart/quarts.

RPM: Revolutions per minute.

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

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

RPM: Revolutions per minute.

Running Time: Ignition timing when fully advanced or at specified RPM.

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

Secondary Clutch: (Also-Driven Clutch) The torque sensitive clutch in a CVT system which is located on the transmission input shaft.

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

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

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

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

TDC: Top dead center. Piston's most outward travel from crankshaft.

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

Voltage Regulator: Maintains Prevents over-charging of battery or damage to electrical components as engine RPM increases.

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

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

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

WOT: Wide open throttle.

Special tool part numbers and usage are listed in each section of this manual as required for a specific service procedure. For complete tool information refer to the Service Tool Catalog (PN 9914681). U.S. dealers can obtain a current price list or get tool information by contacting Victor Specialty Tool Company at the address, phone or FAX number listed below. Canadian dealers can obtain this information by contacting the Winnipeg parts department at (204)-925-7125. Dealers serviced by a distributor should follow tool ordering procedures established by their respective distributor parts department.

POLARIS

SPECIAL TOOLS

VICTOR SPECIALTY TOOL CO.

66 School Street

Victor, New York 14564

TO PLACE AN ORDER

Toll Free Tool Order **FAX** Numbers

(U.S.)1–800–716–3938

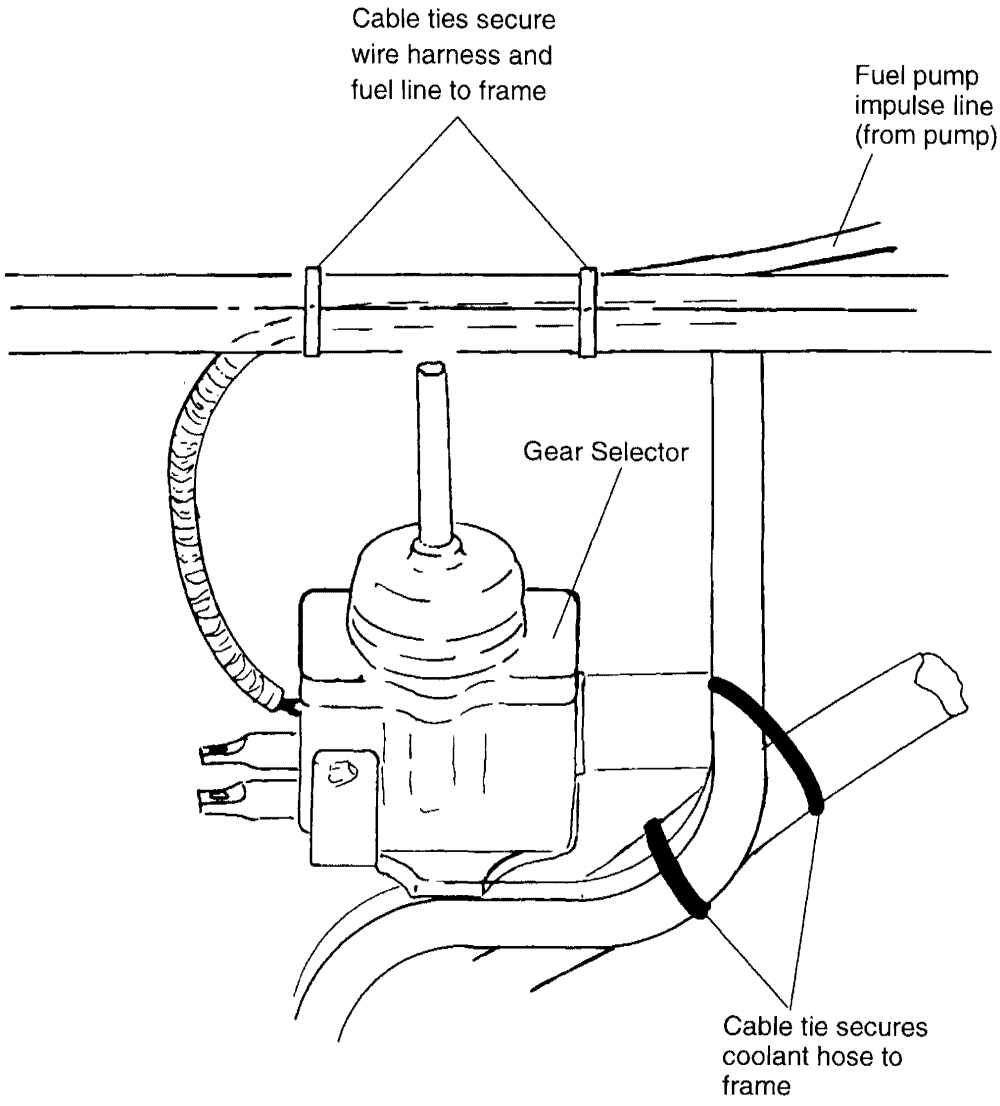
(Canadian Dealers) 1-800-413-4441

Phone Orders or Information

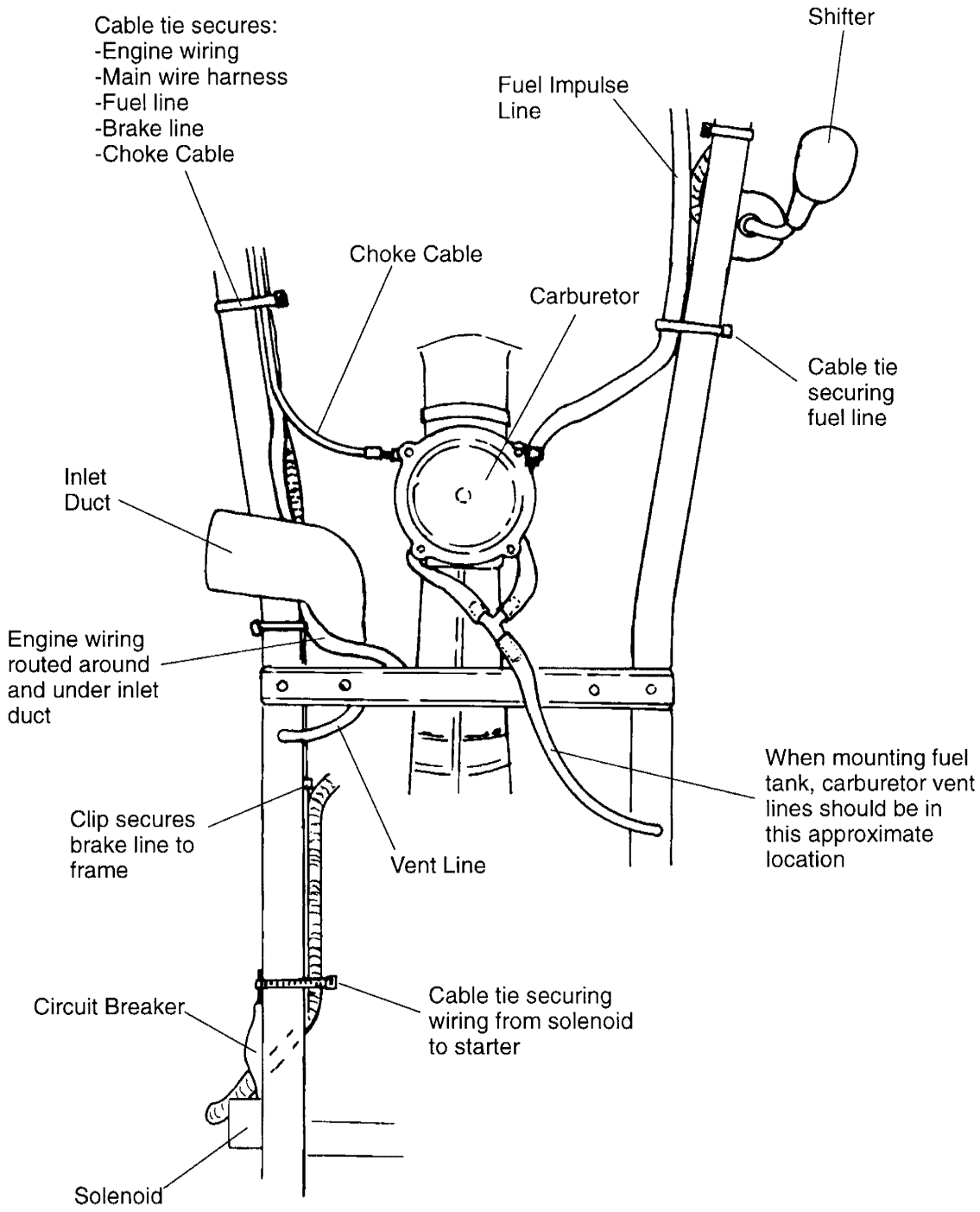
(U.S.) 1–716–742–1790

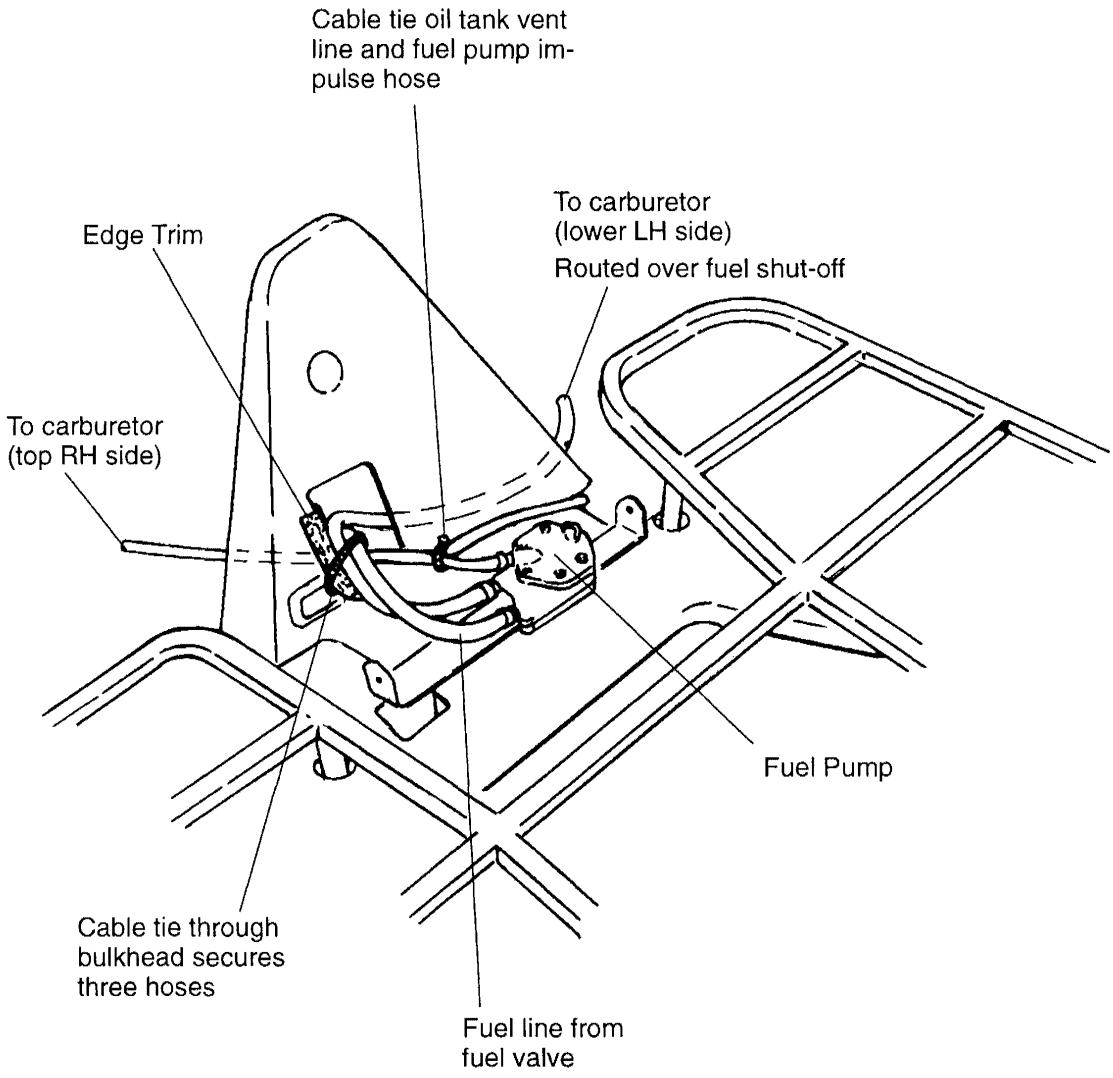
(Canadian Dealers) 1-204-925-7125

Magnum

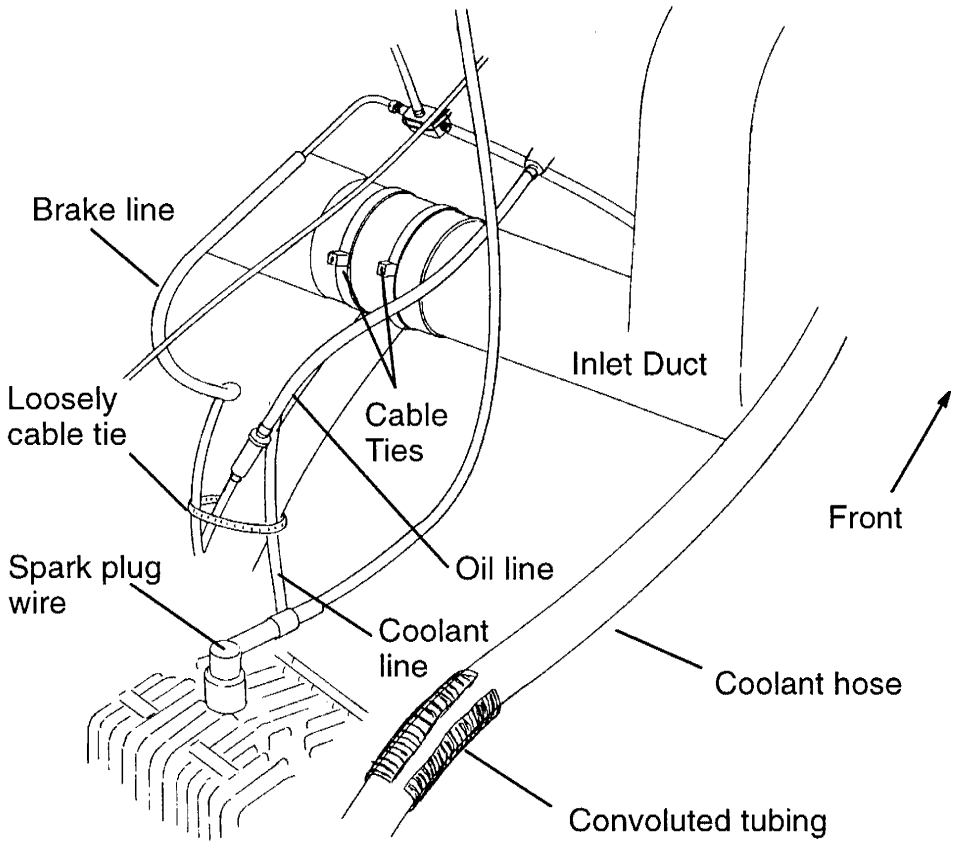

Cable ties secure wire harness and fuel line to frame
Fuel pump impulse line (from pump)
Gear Selector
Cable tie secures coolant hose to frame

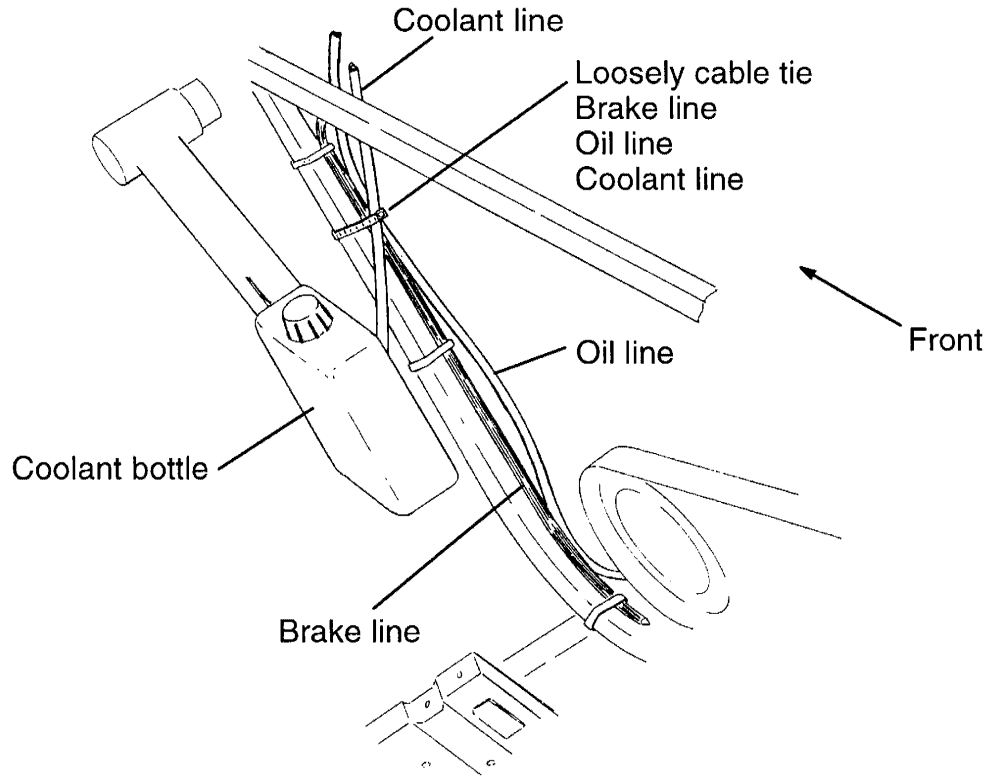
Magnum Routing Diagram

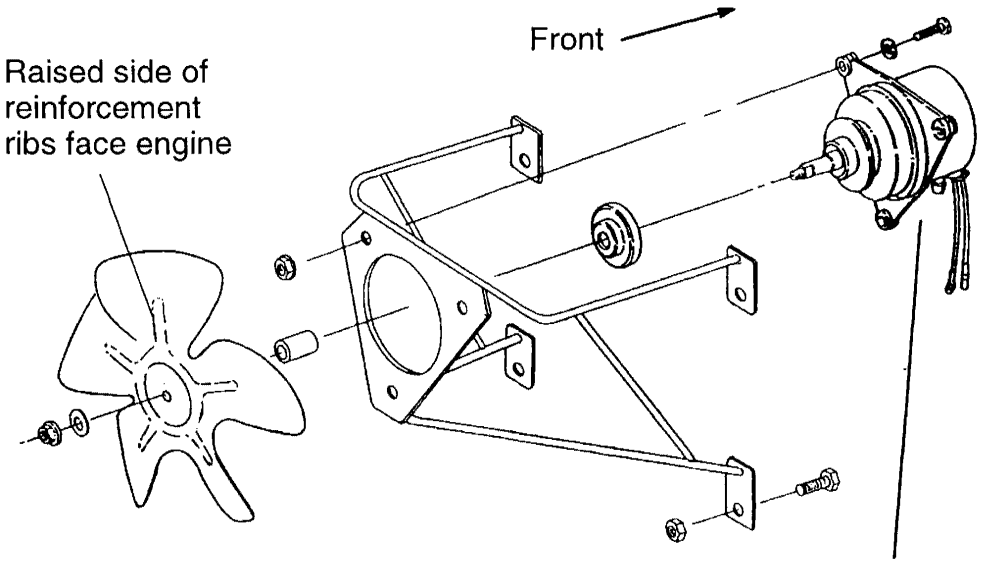



Cable tie oil tank vent line and fuel pump impulse hose
Edge Trim
To carburetor (lower LH side)
Routed over fuel shut-off
To carburetor (top RH side)
Fuel Pump
Cable tie through bulkhead secures three hoses
Fuel line from fuel valve

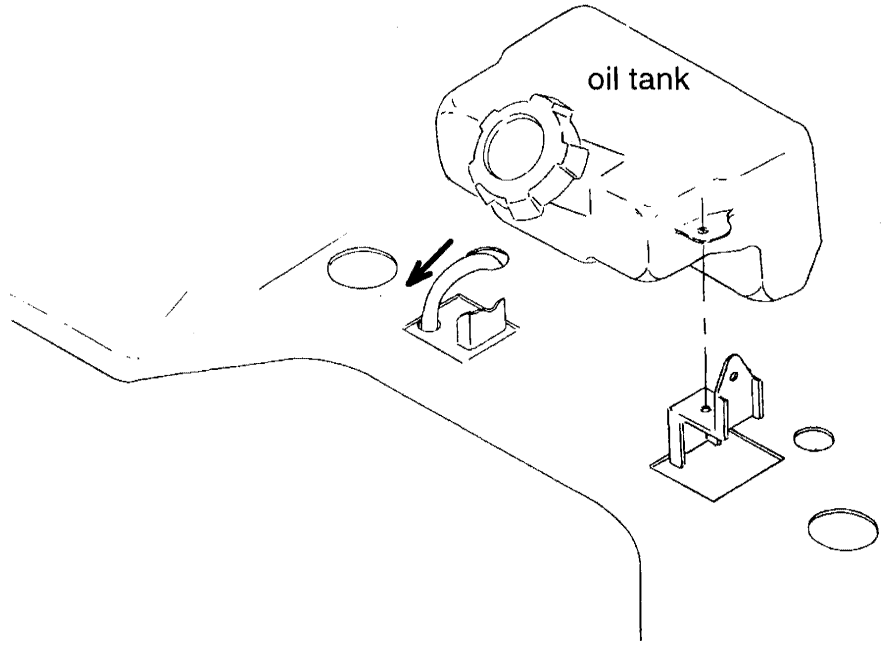
400s


Brake line
Loosely cable tie
Cable Ties
Inlet Duct
Front
Spark plug wire
Oil line
Coolant line
Coolant hose
Convoluted tubing

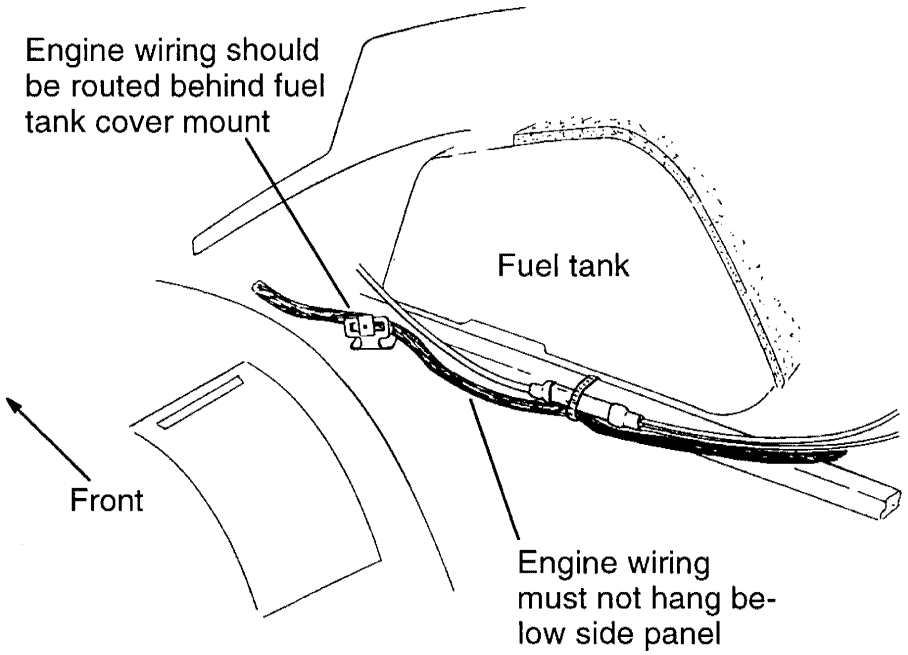

Coolant line
Loosely cable tie
Brake line
Oil line
Coolant line
Front
Oil line
Coolant bottle
Brake line

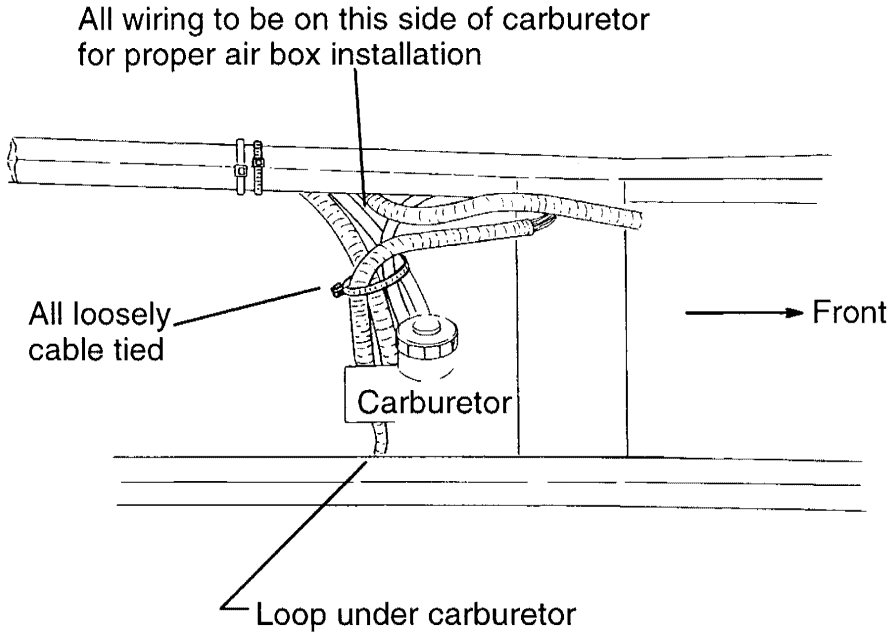


Fan motor vent line should come straight up from motor between the two large coolant lines, through cab assembly and back down into frame as shown.



ALL MODELS


Engine wiring should be routed behind fuel tank cover mount
Fuel tank
Front
Engine wiring must not hang below side panel


All wiring to be on this side of carburetor for proper air box installation
All loosely cable tied
Front
Carburetor
Loop under carburetor

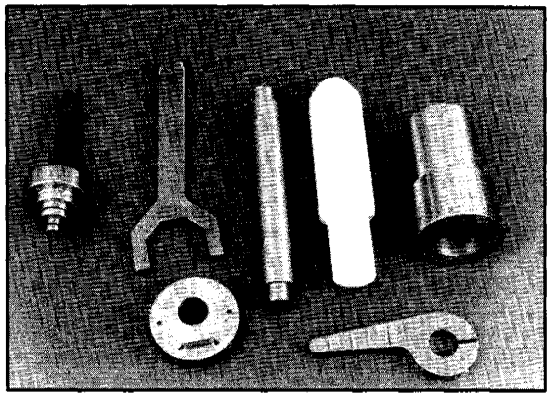
CHASSIS/SUSPENSION

TRANSMISSION

Transmission Tool Kit - Shaft Drive

Used to disassembly and assembly transmission and front gearcase on 500 models.

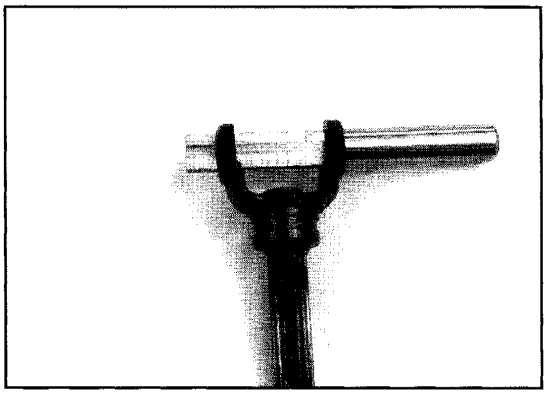
PN 2871702



Yoke Gauge Tool- Shaft Drive

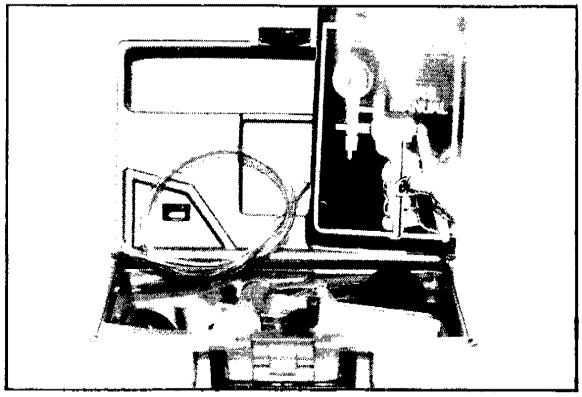
Used to check yoke alignment

PN 2871813 - Large Yoke
PN 2871814 - Small Yoke



GENERAL

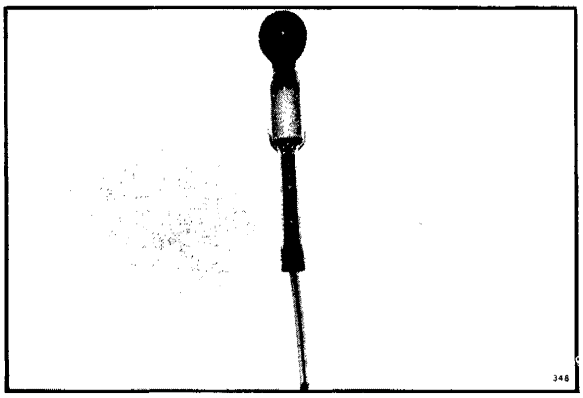
Mity Vac™ Pump Kit



This tool is used for many service functions on Polaris ATVs including testing of cooling systems, carburetor needle and seat, oil system check valves, etc.

PN 2870975

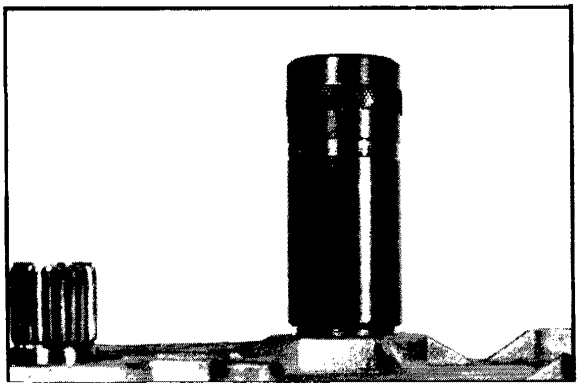
Small Battery Hydrometer



Measures the strength of battery electrolyte in terms of specific gravity. Specially designed for small batteries.

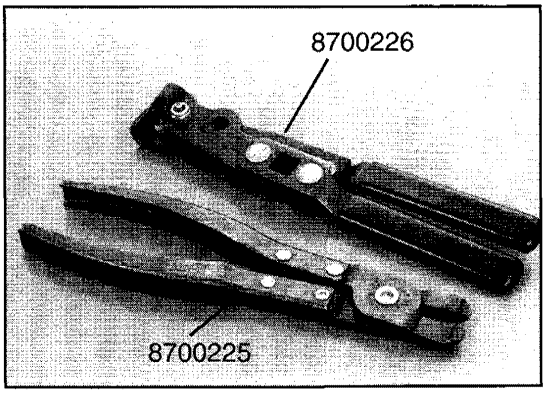
PN 2870836

Transmission Seal/Bearing Driver - 50mm



For installing bearings and case seals during transmission gearcase overhaul.
PN 2871282

CV Boot Clamp Pliers



The ear and earless driveshaft CV boots require a special pliers to secure the clamps properly without distortion.

PN 8700225 For Earless (Flush) Style Clamps
PN 8700226 For Ear Style Clamps

LIMITED WARRANTY

Polaris Industries Inc., 1225 Highway 169 North, Minneapolis, Minnesota 55441-5078, gives a SIX MONTH LIMITED WARRANTY on all components of the Polaris All Terrain Vehicle (ATV) against defects in material or workmanship. This warranty covers the parts and labor charges for repair or replacement of defective parts which are covered by this warranty. This warranty begins on the date of purchase. This warranty is transferrable to another consumer during the warranty period through a Polaris dealer. There is a charge of $25.00 payable to Polaris Industries Inc.

REGISTRATION

At the time of sale, the Warranty Registration Form must be completed by your dealer and submitted to Polaris within ten days. Upon receipt of this registration, Polaris will record the registration for warranty. THE PURCHASER MUST COMPLETE AN ATV SAFETY TRAINING COURSE PROVIDED BY THE DEALER IN ORDER TO HAVE VALID WARRANTY ON THE ATV. No verification of registration will be sent to the purchaser as the copy of the Warranty Registration Form will be the warranty entitlement. If you have not signed the original registration and received the "customer copy", please contact your dealer immediately. NO WARRANTY COVERAGE WILL BE ALLOWED UNLESS YOUR ATV IS REGISTERED WITH POLARIS.

Initial dealer preparation and set-up of your ATV is very important in ensuring trouble-free operation. Purchasing a machine in the crate or without proper dealer set-up will void your warranty coverage.

WARRANTY COVERAGE AND EXCLUSIONS:

LIMITATIONS OF WARRANTIES AND REMEDIES

The Polaris limited warranty excludes any failures that are not caused by a defect in material or workmanship. This warranty does not cover accidental damage, normal wear and tear, abuse or improper handling. This warranty also does not cover any ATV that has been altered structurally, modified, neglected, improperly maintained, used for racing, or used for purposes other than for which it was manufactured, or for any damages which occur during trailer transit or as a result of unauthorized service or the use of unauthorized parts. In addition, this warranty does not cover physical damage to paint or finish, stress cracks, tearing or puncturing of upholstery material, corrosion, or defects in parts, components or the ATV due to fire, explosions or any other cause beyond Polaris' control.

This warranty does not cover the use of unauthorized lubricants, chemicals, or fuels that are not compatible with the ATV. The exclusive remedy for breach of this warranty shall be, at Polaris' exclusive option, repair or replacement of any defective materials, or components or products. THE REMEDIES SET FORTH IN THIS WARRANTY ARE THE ONLY REMEDIES AVAILABLE TO ANY PERSON FOR BREACH OF THIS WARRANTY. POLARIS SHALL HAVE NO LIABILITY TO ANY PERSON FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY DESCRIPTION, WHETHER ARISING OUT OF EXPRESS OR IMPLIED

WARRANTY OR ANY OTHER CONTRACT, NEGLIGENCE, OR OTHER TORT OR OTHERWISE. Some states do not permit the exclusion or limitation of incidental or consequential damages or implied warranties, so the above limitations or exclusions may not apply to you if inconsistent with controlling state law.

ALL IMPLIED WARRANTIES (INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) ARE LIMITED IN DURATION TO THE ABOVE SIX MONTH WARRANTY PERIOD. POLARIS FURTHER DISCLAIMS ALL EXPRESS WARRANTIES NOT STATED IN THIS WARRANTY. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you if inconsistent with controlling state law.

HOW TO OBTAIN WARRANTY SERVICE

If your ATV requires warranty service, you must take it to a Polaris Servicing Dealer. When requesting warranty service you must present your copy of the Warranty Registration form to the dealer. (THE COST OF TRANSPORTATION TO AND FROM THE DEALER IS YOUR RESPONSIBILITY). Polaris suggests that you use your original selling dealer; however, you may use any Polaris Servicing Dealer to perform warranty service.

Please work with your dealer to resolve any warranty issues. Should your dealer require any additional assistance they will contact the appropriate person at Polaris.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

If any of the above terms are void because of state or federal law, all other warranty terms will remain in effect.

Engine Oil

1. Always use Polaris engine oil.
2. Never substitute or mix oil brands as serious engine damage and voiding of warranty can result.

Glossary Of Terms

ABDC: After bottom dead center.

ACV: Alternating current voltage.

Alternator: Electrical generator producing voltage alternating current.

ATDC: After top dead center.

BBDC: Before bottom dead center.

BDC: Bottom dead center.

BTDC: Before top dead center.

CC: Cubic centimeters.

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

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

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

CI: Cubic inches.

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

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

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

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

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

DCV: Direct current voltage.

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

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

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

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

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

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

ft.: Foot/feet.

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

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

gal.: Gallon.

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

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

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

HP: Horsepower.

ID: Inside diameter.

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

Ignition Generating Coil: Exciter coil, primary charge coil. Stator plate coil which generates primary ignition voltage.

in.: Inch/inches.

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

kg/cm ^{2} : Kilograms per square centimeter.

kg-m: Kilogram meters.

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

l or ltr: Liter.

lbs/in ^{2} : Pounds per square inch.

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

m: Meter/meters.

Mag: Magneto.

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

mi.: Mile/miles.

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

N-m: Newton meters.

OD: Outside diameter.

Ohm: The unit of electrical resistance opposing current flow.

oz.: Ounce/ounces.

Piston Clearance: Total distance between piston and cylinder wall.

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

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

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

Primary Clutch: Drive clutch on engine.

psi.: Pounds per square inch.

PTO: Power take off.

PVT: Polaris Variable Transmission (Drive Clutch System)

qt.: Quart/quarts.

RPM: Revolutions per minute.

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

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

RPM: Revolutions per minute.

Running Time: Ignition timing when fully advanced or at specified RPM.

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

Secondary Clutch: Driven clutch on chaincase or jackshaft.

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

Select Monitor: Diagnostic tool which provides static and dynamic displays of the function of critical components in an EFI system. It also has the capability to display the contents of the ECU memory.

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

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

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

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

Glossary Of Terms

TDC: Top dead center. Piston's most outward travel from crankshaft.

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

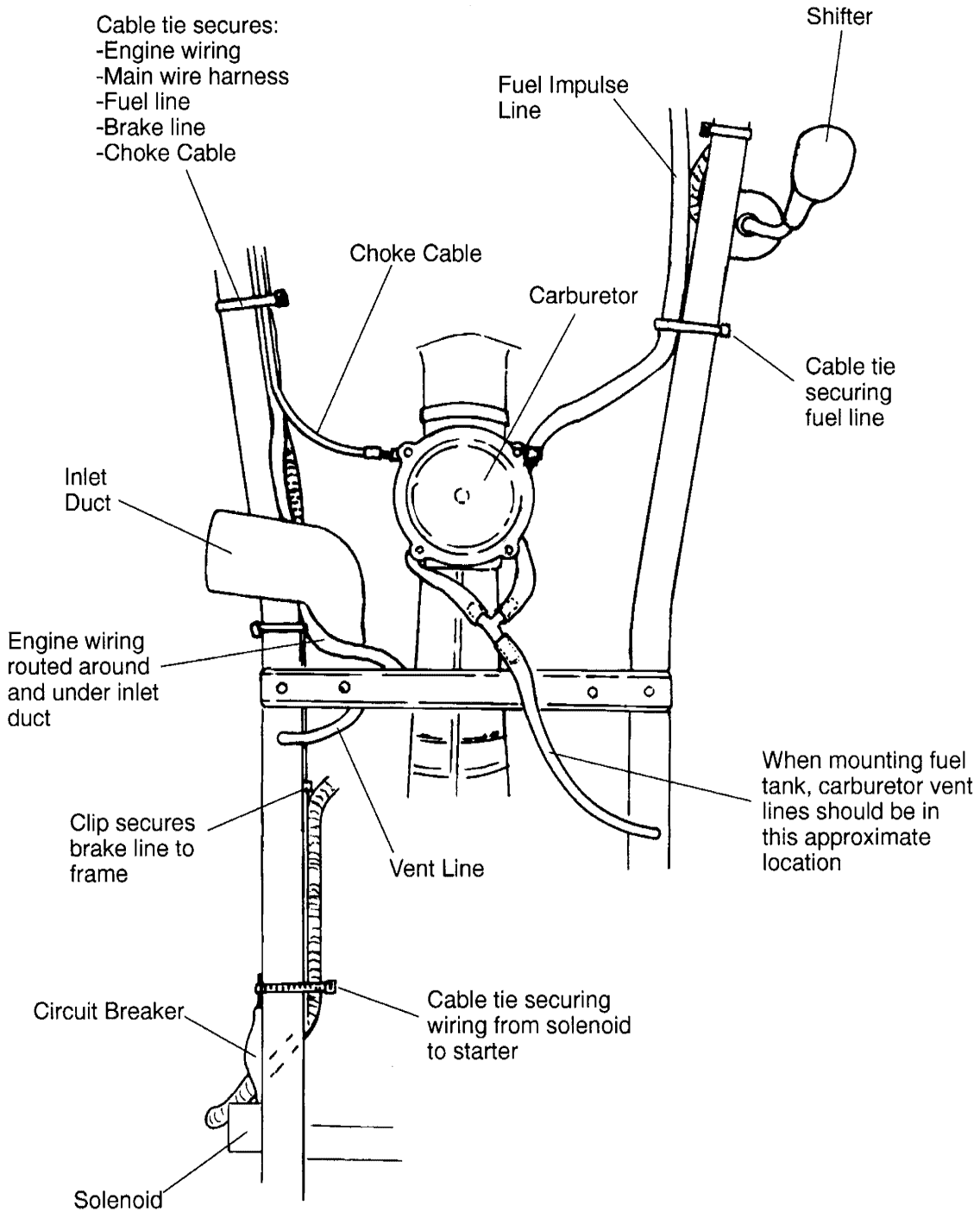
V Regulator: Voltage regulator. Maintains maximum lighting coil output at approx. 14.5 ACV as engine RPM increases.

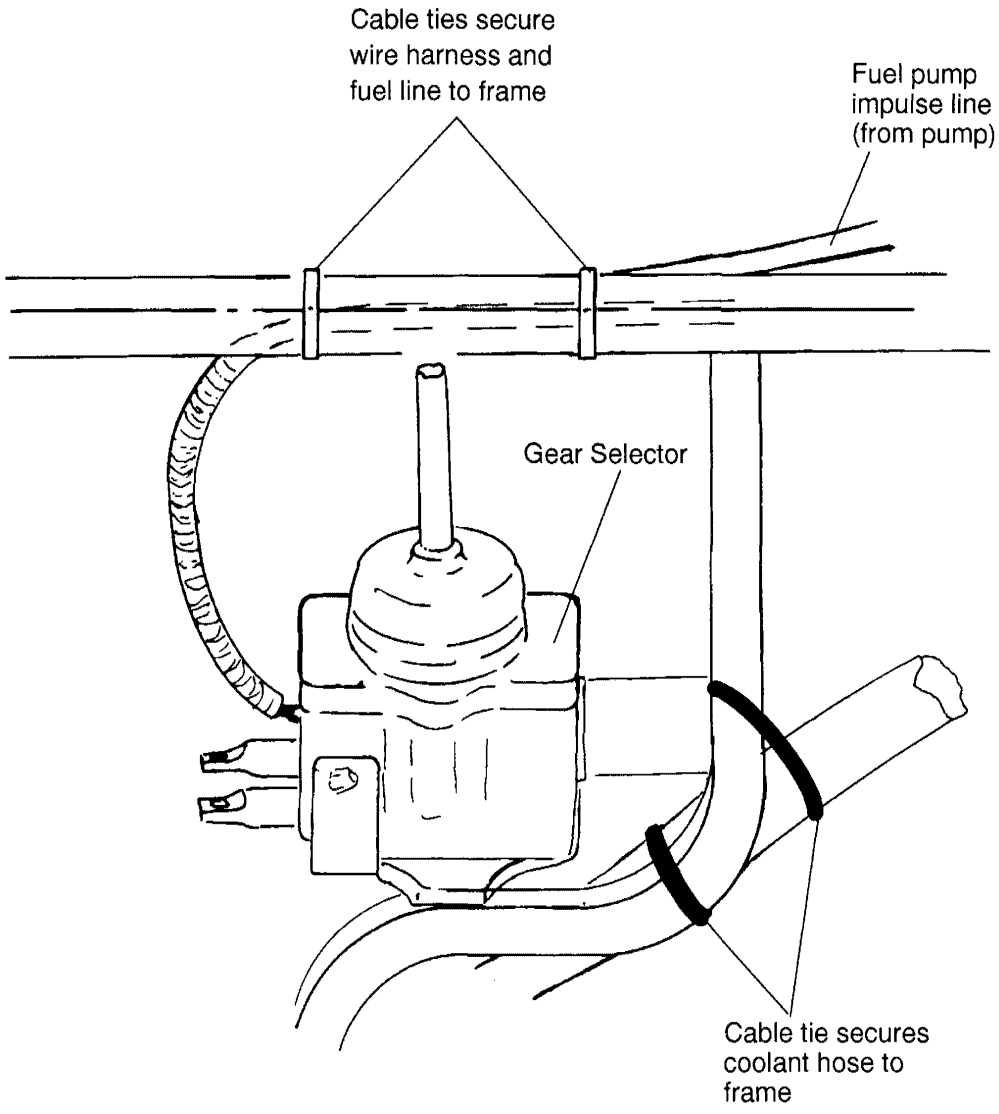
Venturi: An area of air constriction. A venturi is used in carburetors to speed up air flow which lowers pressure in venturi to below atmospheric pressure, causing fuel to be pushed through jets, etc., and into the venturi to be mixed with air and form a combustible air/fuel mixture.

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

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

WOT: Wide open throttle.


Cable tie secures:
-Engine wiring
-Main wire harness
-Fuel line
-Brake line
-Choke Cable
Shifter
Fuel Impulse Line
Choke Cable
Carburetor
Cable tie securing fuel line
Inlet Duct
Engine wiring routed around and under inlet duct
When mounting fuel tank, carburetor vent lines should be in this approximate location
Clip secures brake line to frame
Vent Line
Circuit Breaker
Cable tie securing wiring from solenoid to starter
Solenoid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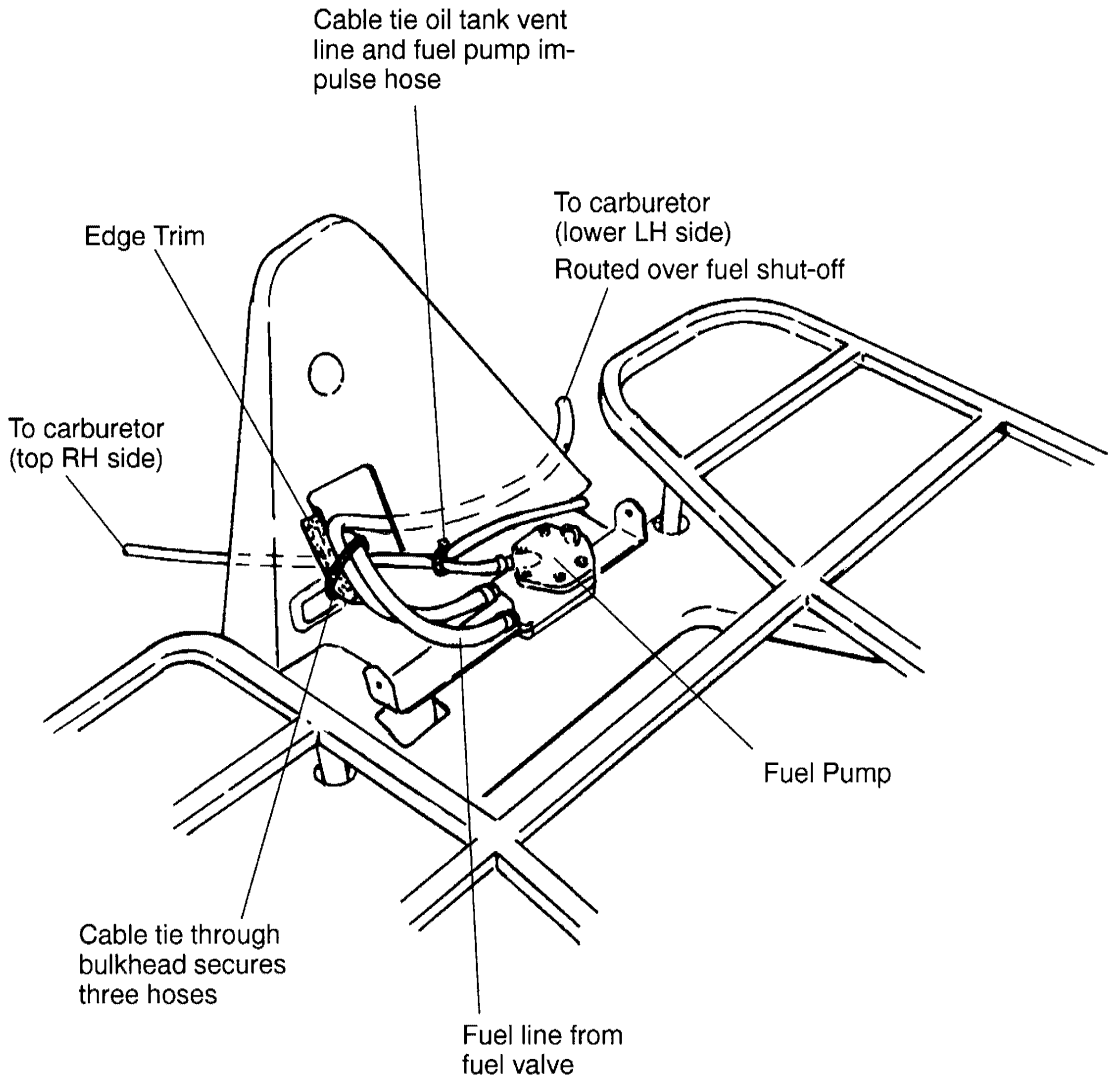
Fuel pump impulse line (from pump)
Gear Selector
Cable tie secures coolant hose to frame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To carburetor (top RH side)
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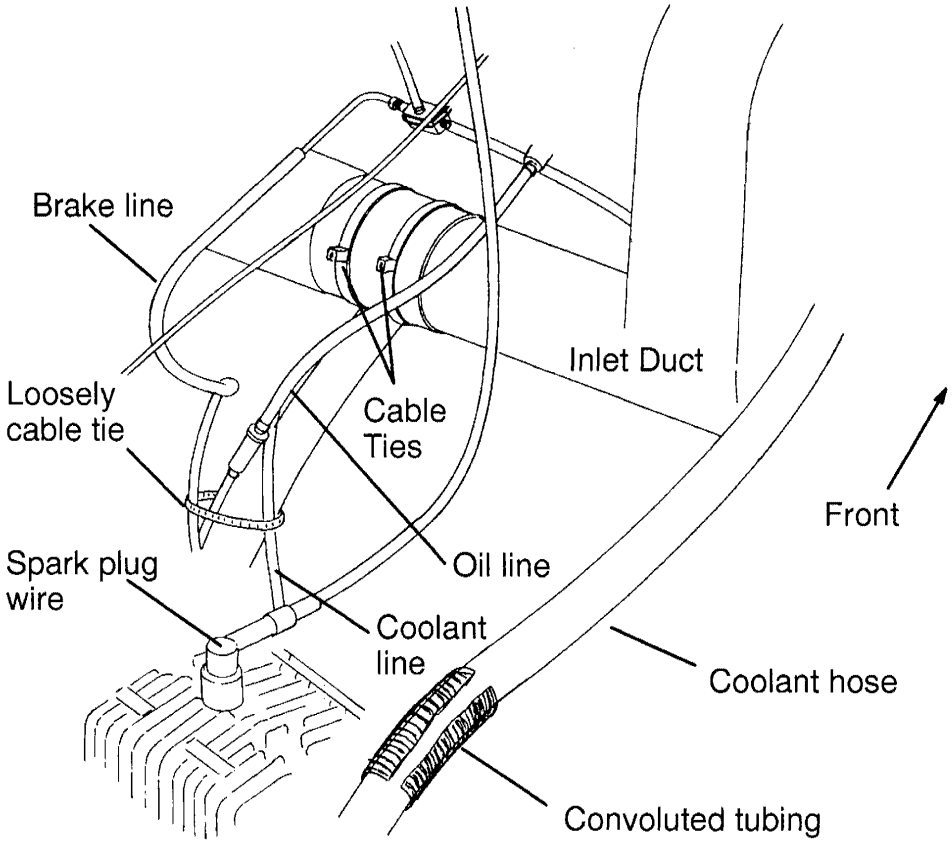
400s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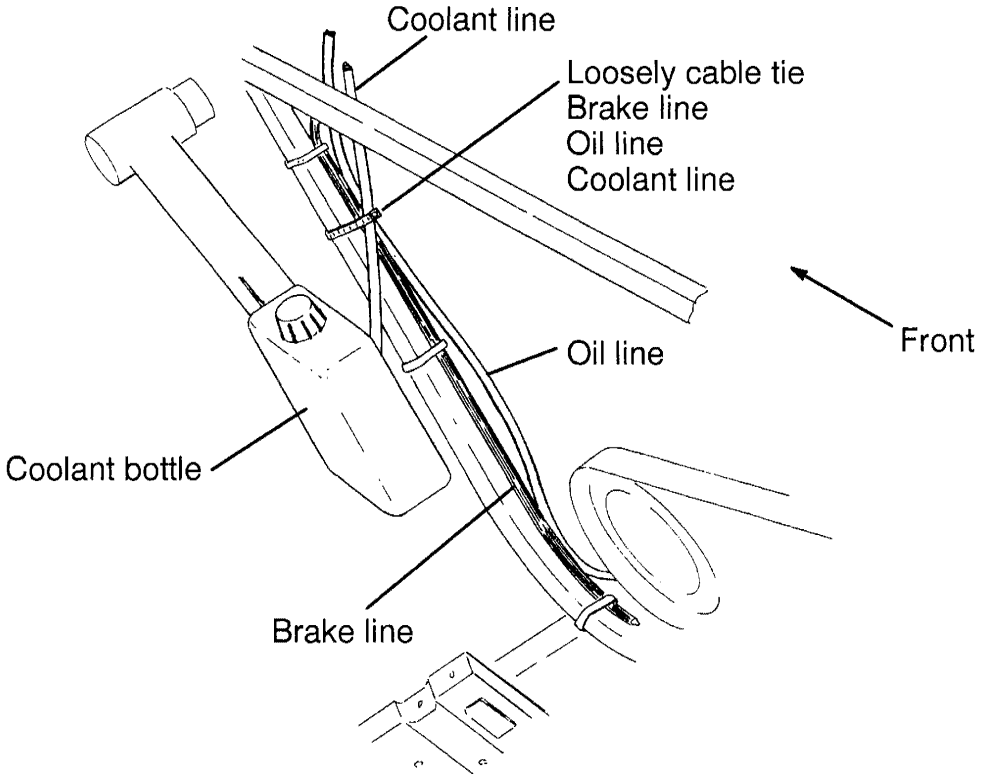
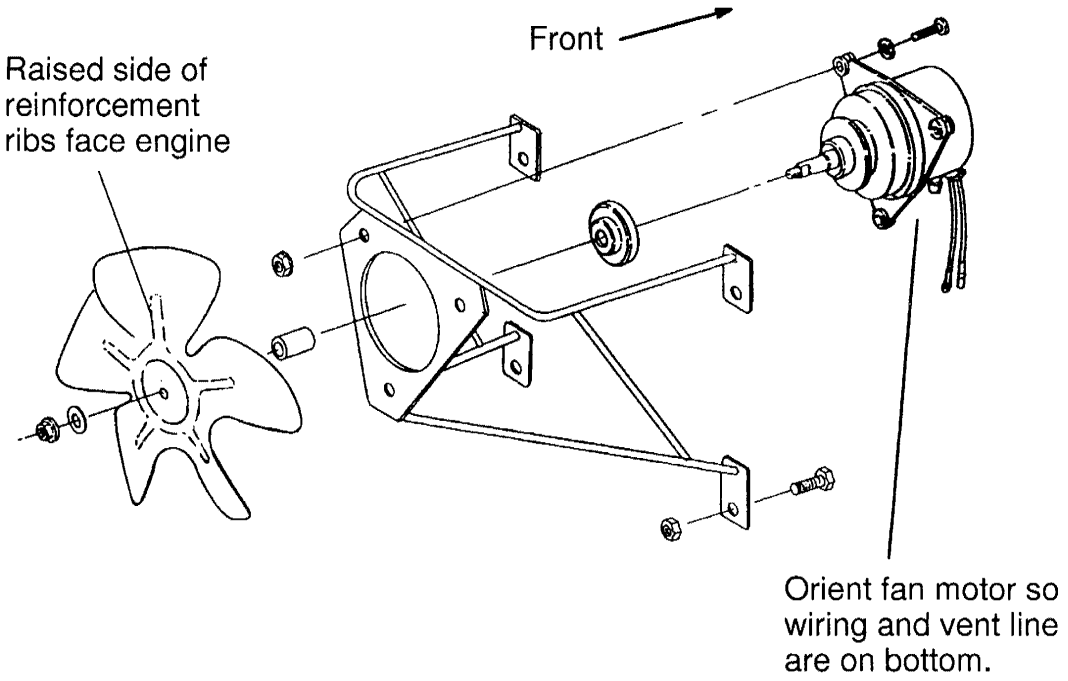
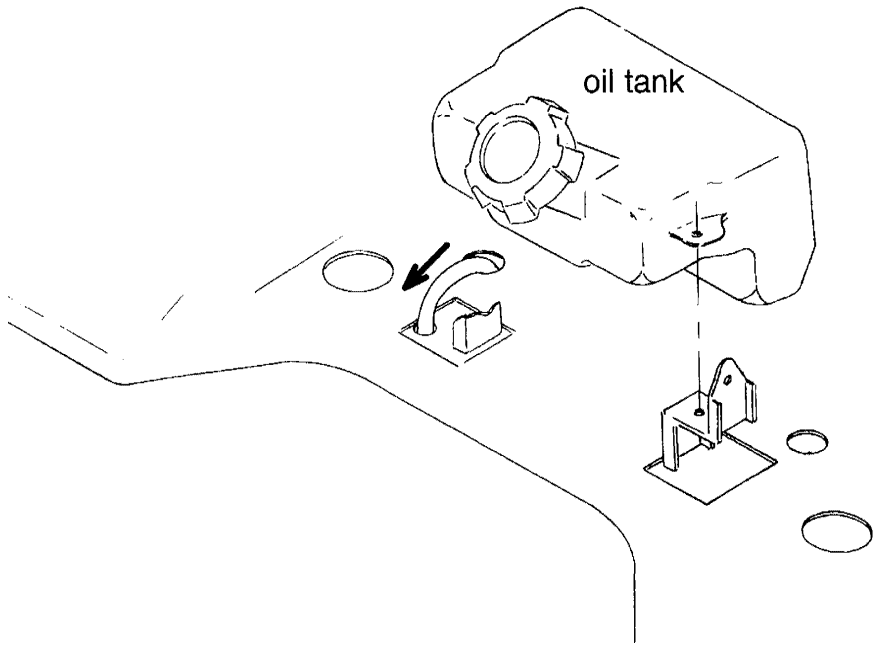
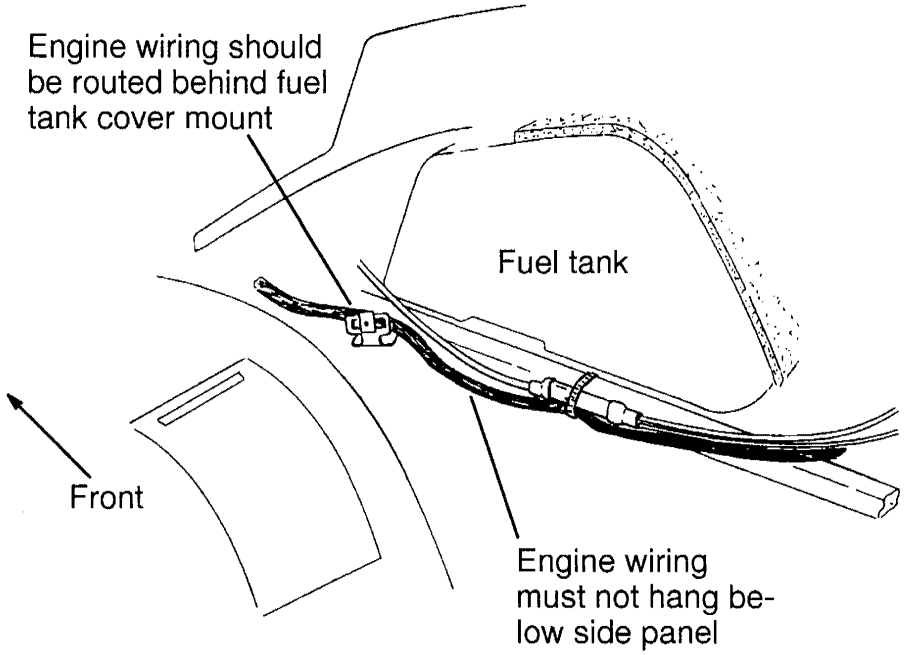

Coolant line
Loosely cable tie
Brake line
Oil line
Coolant line
Front
Oil line
Coolant bottle
Brake line

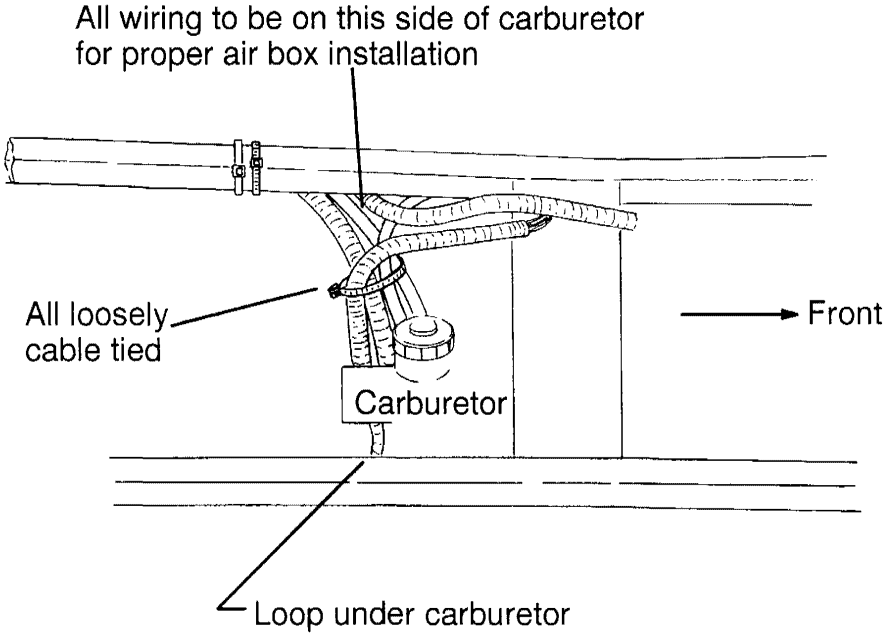


Fan motor vent line should come straight up from motor between the two large coolant lines, through cab assembly and back down into frame as shown.

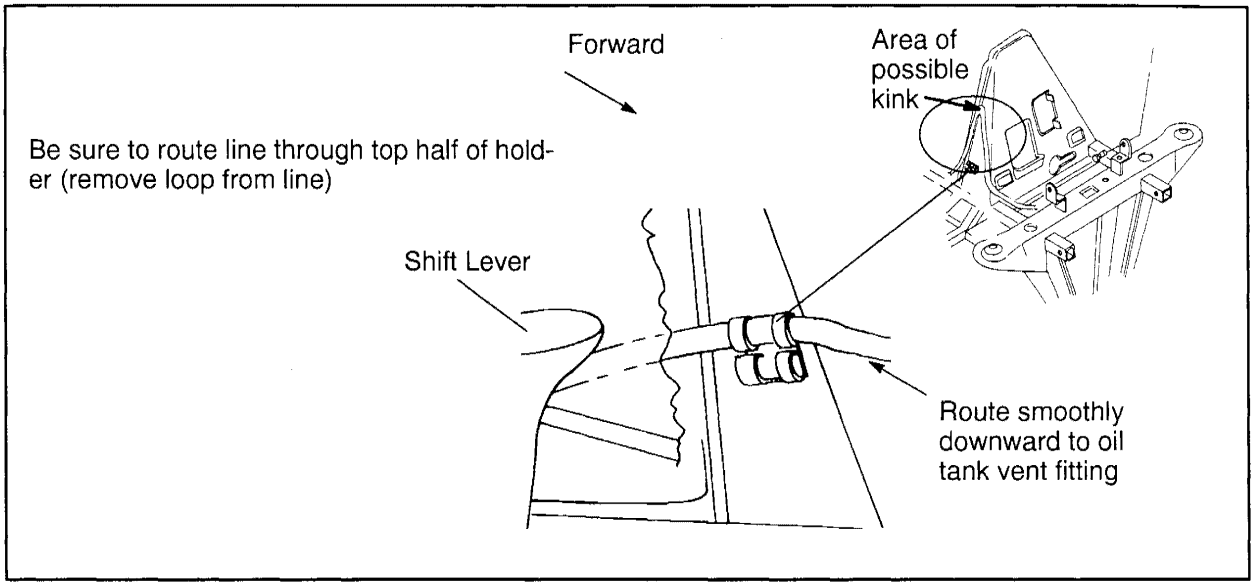


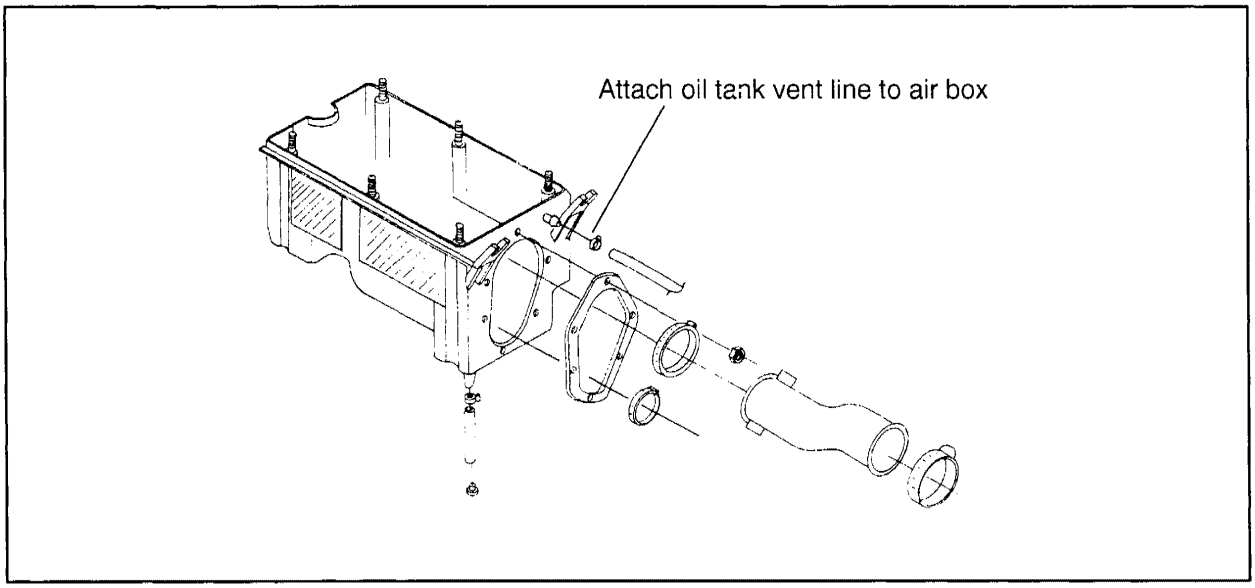
ALL MODELS

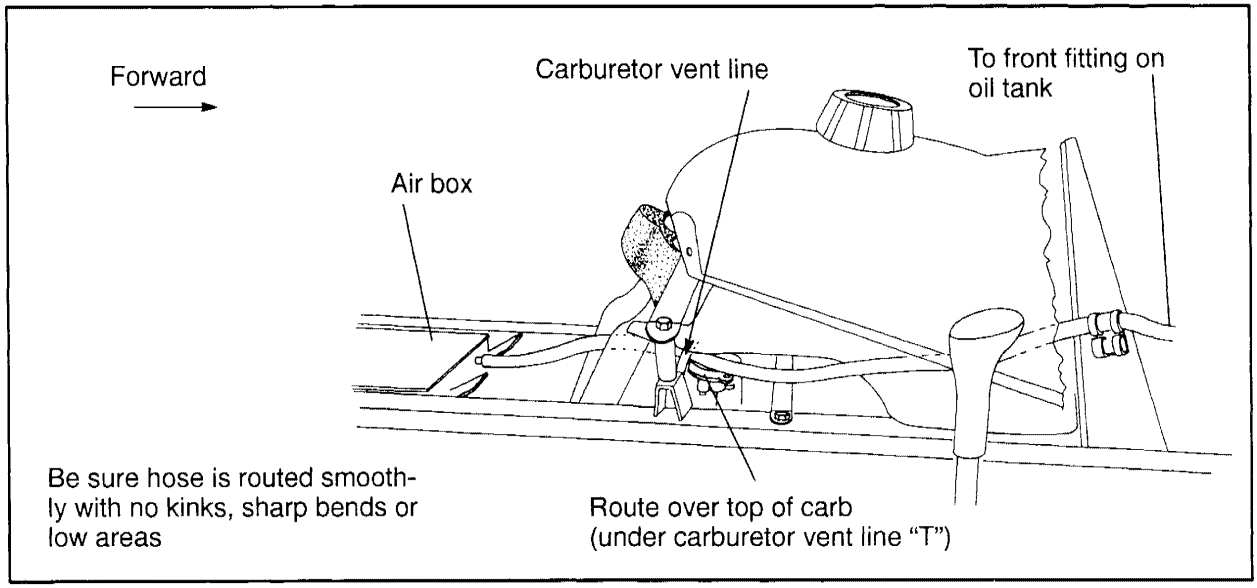

Engine wiring should be routed behind fuel tank cover mount
Fuel tank
Front
Engine wiring must not hang below side panel


All wiring to be on this side of carburetor for proper air box installation
All loosely cable tied
Front
Carburetor
Loop under carburetor

Oil Tank Vent Line Routing (1996 Sportsman 500)







CHAPTER 2
MAINTENANCE

Inspection, adjustment and lubrication intervals of important components is listed in the following chart. Maintenance intervals are based upon average riding conditions and a vehicle speed of approximately 10 miles per hour.

Inspect, clean, lubricate, adjust or replace parts as necessary. **NOTE:** Inspection may reveal the need for replacement parts. Always use genuine Polaris parts.

■**CAUTION:** Due to the nature of these adjustments, it is recommended that service be performed by an authorized Polaris dealer. For engine oil, short trip cold weather riding also constitutes severe use. Pay special attention to oil level. A rise in oil level in cold weather can indicate moisture collecting in the oil tank.

▶Vehicles subjected to severe use, such as operation in wet or dusty areas, should be inspected and serviced more frequently.

E Emission Control System Service (California). For 4-cycle models built after January 1, 1997.

ENGINE					
	Item	**Hours**	**Frequency**	**See Page**	**Remarks**
E▶	Engine Oil - Level/Change	100 hrs	6 months	2.23	Check Level Daily; Break In service at 1 month
E	Oil Filter (4-strokes)	100 hrs	6 months	2.23	Replace with oil change
	Oil Filter (2-strokes)	100 hrs	12 months	2.22	Replace
	Oil Pump Cable (2-strokes)	50 hrs	6 months	2.19	Inspect, Adjust, Lubricate, Replace if Required
E▶	Air Filter - Foam Pre-Cleaner	Daily	Daily	2.22 / 2.25	Inspect - Clean & oil more often in dirty cond.
E▶	Air Filter - Main Element	Weekly	Weekly	2.22 / 2.25	Inspect - Replace if necessary
▶	Air Box Sediment Tube	-	Daily	2.26	Drain deposits whenever visible
▶	Engine Breather Filter	20 hrs	Monthly		Inspect and replace if necessary
▶	Oil Tank Vent Hose	100 hrs	12 months		Inspect hose routing /hose condition
E■	Valve Clearance (4-strokes)	100 hrs	12 months	2.27	Inspect/Adjust
▶	Counter Balancer Fluid (400s)	100 hrs	12 months	2.21	Check Monthly / Change Annually
E	Idle Speed	As required	As required	2.11	Adjust
■	Throttle Cable / ETC Switch	50 hrs	6 months	2.11	Inspect -Adjust, Lubricate, Replace if necessary
	Choke (Enricher) Cable	50 hrs	6 months	2.12	Inspect -Adjust, Lubricate, Replace if necessary
	Carburetor Float Bowl	50 hrs	6 months	2.13	Drain bowl periodically and prior to storage
	Carburetor Air Intake Ducts/Flange	50 hrs	6 months	-	Inspect all ducts for proper sealing/air leaks
E■	Fuel System	100 hrs	12 months	2.13	Check for leaks at tank cap, lines, fuel valve, filter, pump & carburetor. Replace lines every 2 years.
E■	Fuel Filter	100 hrs	12 months	2.13	Replace filter annually
	Coolant/Level Inspection	Daily	Daily	2.18	Replace engine coolant every 2 years
	Coolant Strength / Pressure Test System	100 hrs	6 months	2.18	Inspect strength seasonally; Pressure test system annually
	Radiator	100 hrs	12 months	2.18	Inspect / Clean external surface
	Cooling System Hoses	100 hrs	12 months	2.18	Inspect
	Engine Mounts	100 hrs	12 months	2.17	Inspect
	Drain Recoil Housing	Weekly	Weekly	2.21	More often if operating in wet environment
	Exhaust Muffler / Pipe	100 hrs	12 months		
ELECTRICAL					
E	Spark Plug	100 hrs	12 months	2.17	Inspect - Replace if necessary
	Ignition Timing	100 hrs	12 months	10.10	Inspect
	Battery	20 hrs	Monthly	2.16	Check terminals; Clean; Check fluid level
	Headlight Aim	As required	As required	10.4	Adjust if Necessary
	Headlamp Inspection	Daily	Daily	10.4	Check operation daily; Apply Polaris Dielectric Grease to connector when lamp is replaced
	Tail Lamp Inspection	Daily	Daily	10.9	Check Operation Daily; Apply Polaris Dielectric Grease to socket when lamp is replaced

Periodic Maintenance Chart, Cont.

CHASSIS					
■ ▶	Item	Hours or Odometer	Frequency	See Page	Remarks
▶	General Lubrication	50 hrs	3 months	2.5 - 2.9	Lubricate All Fittings, Pivots, Cables, Etc.
▶	Front Hubs/Fluid Check	50 hrs	6 months	2.32	Check monthly
▶	Front Hubs/Fluid Change	100 hrs	12 months	2.32	Check monthly
■	Front Wheel Bearings (2x4)	Annually	Annually	7.21	Inspect and replace if necessary
■	Front Hub Spindle Nut Torque (AWD Models)	Annually	Annually	7.21	Inspect Torque and Locking Fastenerand replace if necessary
	Drive Belt	50 hrs	6 months	6.12	Inspect - Adjust, Replace if Necessary
	Clutches (Drive And Driven)	100 hrs	12 months	6.7	Inspect, Clean
▶	Transmission Oil Level	25 hrs	Monthly	2.41	Inspect Monthly; Change Annually
	Shift Linkage	50 hrs	6 months	2.41	Inspect,Lubricate, Adjust
	Shift Selector Box	200 hrs	24 months	8.9	Change Lubricant Every Two Years
■	Steering	50 hrs	6 months	2.31	Inspect Daily, Lubricate
■	Toe Adjustment	As required	As required	2.31	Periodic Inspection, Adjust When Parts are Replaced
▶	Rear Axle	50 hrs	6 months	7.24	Inspect Bearings, Grease Fitting
▶	Front Suspension	50 hrs	6 months	2.40	Inspect - Lubricate
▶	Rear Suspension	50 hrs	6 months	2.40	Inspect - Lubricate
	Drive Chain	50 hrs	6 months	2.37	Inspect Daily, Adjust and Lubricate if Needed
	Tires	Pre-ride	Pre-ride	2.43	Inspect Daily, Pre-Ride Inspection Item
■	Brake Fluid	200 hrs	24 months	2.34	Change Every Two Years
▶	Brake Fluid Level	Pre-ride	Pre-ride	2.34	Inspect Daily, Pre-Ride Inspection Item
▶	Brake Lever Travel	Pre-ride	Pre-ride	2.34	Inspect Daily, Pre-Ride Inspection Item
■	Brake Pad Wear	10 hrs/100 miles	Monthly	2.34	Inspect Periodically
	Auxiliary Brake Adjustment	As required	As required	2.35	Inspect Deflection Daily; Adjust
	Output Shaft Bearing	Monthly	Monthly	2.7	Grease Monthly
	Brake System	Pre-ride	Pre-ride	2.34	Pre-Ride Inspection Item
	Wheels	Pre-ride	Pre-ride	2.42	Pre-Ride Inspection Item
	Frame Nuts, Bolts, Fasteners	Pre-ride	Pre-ride	2.43	Pre-Ride Inspection Item

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 and oil tanks - fill both tanks to their proper level; Do not overfill 4-stroke oil tank
- All brakes - check operation and adjustment (includes auxiliary brake)
- Throttle - check for free operation and closing
- Headlight/Taillight/Brakelight - check operation of all indicator lights and switches
- Engine stop 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
- Drive chain - condition and slack; refer to drive chain adjustment
- Air cleaner element - check for dirt; clean or replace
- Steering - check for free operation noting any unusual looseness in any area
- Loose parts - visually inspect vehicle for any damaged or loose nuts, bolts or fasteners
- Engine coolant - check for proper level at the recovery bottle

Recommended Lubricants - Quick Reference

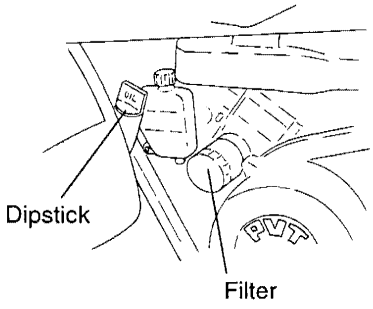
Lubricants and maintenance product part numbers are listed on page 2.4.

Item	Type	Capacity	Notes	See Page
Engine Oil 4-Strokes	Polaris Premium 4 Synthetic, 0W/40	2 Quarts	Add to proper level on dipstick. See oil change.	2.23
Engine Injector Oil (2-Strokes)	Polaris Premium TC-W3 2-Stroke oil	2 Quarts	Add to top of oil reservoir as required.	2.22
Counter Balancer Oil (400L Engines)	SAE 10W30 Motor Oil (SG/SH Rated)	3.2 oz.	Add to proper level on dipstick.	2.21
Transmission (Gearcase) Type III HLR Type III HR Type IV	Polaris Synthetic Gear Case Oil	 20 oz. 16 oz. 32 oz.	Add to proper level on dipstick. See transmission oil change. Capacity after draining is approx. 20 ounces	2.41
Front Gear Case (Shaft Drive)	Premium Front Gearcase Fluid or GL5 80-90 Gear Lube	3.25 oz. (100 cc)	Add to bottom of fill plug threads.	2.10
Shift Selector Box	Polaris 0W/40 Synthetic Engine Lubricant or 10W Motor Oil	1 oz. 30cc	Oil in selector box should be at the center line of the shift selector plungers. Do not overfill or the selector may hydro-lock.	8.9
Coolant Level	Polaris Premium 60/40 pre-mixed Antifreeze/Coolant or 50/50 mixture antifreeze/coolant and distilled water	Approx. 2 Quarts	Fill reservoir tank to full line. Check after short period of operation when system is cold. Add if necessary. Refer to 2.18 for more information.	2.18
Front Hubs (AWD Models)	Premium Demand Drive Hub Fluid	2.5 oz. (75cc)	Fill hub at 4:00 or 8:00 position until fluid trickles out. Do not force fluid into hub.	2.32
Brake Fluid	Polaris DOT 3 Brake Fluid	-	-Fill reservoir to 1/4″ (6.4 mm) below cover gasket surface for aluminum reservoir. -Fill between "Min" & "Max" indicators on plastic reservoir.	2.34

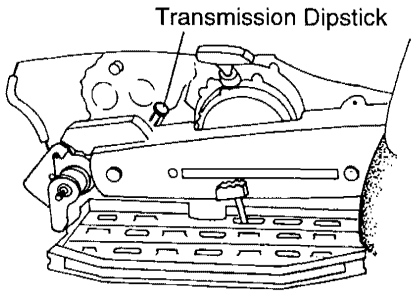
Polaris Premium Lubricant and Maintenance Product Part Numbers

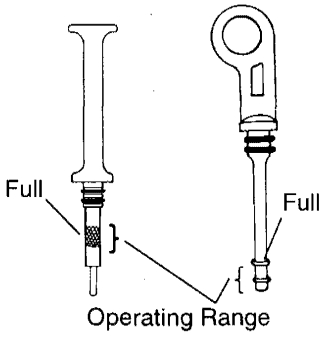
Part No.	Description
2871281	Premium 4 Synthetic 0-W40 (4-Cycle) Engine Oil (Quart)
2871567	Premium 4 Synthetic 0-W40 (4-Cycle) Engine Oil (16 Gallon)
2871098	Premium 2 Cycle Engine Oil (Quart)
2871097	Premium 2 Cycle Engine Oil (Gallon)
2871240	Premium 2 Cycle Engine Oil (2.5 Gallon)
2871566	Premium 2 Cycle Engine Oil (16 Gallon)
2871385	Premium 2 Cycle Engine Oil (30 Gallon)
2871240	Premium 2 Cycle Engine Oil (55 Gallon)
2871721	Premium Gold 2 Cycle Synthetic Lubricant
2871477	Premium Synthetic Gearcase Lubricant (1 Gal.)
2871478	Premium Synthetic Gearcase Lubricant (12 oz. bottle)
2870465	Oil Pump for Gearcase Oil
2871654	Premium Demand Drive Hub Fluid (12 oz.)
2871653	Premium Front Gearcase Fluid (12 oz.)
2870510	Cable Lube
2870584	Loctite RC 680-10cc Retaining Compound
2870587	518 Gasket Eliminator
2870601	Loctite Chisel Gasket Remover
2870661	RTV Silicone Sealer
8560054	Marine Grade Silicone Sealer (14 oz. cartridge)
2870791	Fogging Oil
2870990	DOT3 Brake Fluid
2871027	Anti-Corrosive Dielectric Grease
2871322	Premium All Season Grease (3 oz. cartridge)
2871423	Premium All Season Grease (14 oz. cartridge)
2871460	Starter Drive Grease
2871515	Premium U-Joint Lube (3 oz.)
2871551	Premium U-Joint Lube (14 oz.)
2871323	60/40 Coolant Gallon
2871534	60/40 Coolant Quart
2871312	Grease Gun Kit
2871326	Premium Carbon Clean 12 oz.
2870652	Fuel Stabilizer 16 oz.

Ill. #	Item	Lube Rec.	Method	Frequency*
1	Engine Oil (4 Strokes)	Polaris 0W/40 Synthetic	Add oil to proper level. See page 2.23.	Change after 1st month, 6 months or 100 hours thereafter; Change more often (25-50 hours) in extremely dirty conditions, or short trip cold weather operation.
2	Transmission	Polaris Synthetic Gear Case Lubricant	Add lube to FULL level on dipstick. See pages 2.41.	Change annually [2]
3	Brake Fluid	Polaris DOT 3 Brake Fluid	Fill master cylinder reservoir to 1/4" (6.4mm) from top, or between indicated lines. See page 2.34.	As required. Change fluid every 2 years.
4	Throttle Cable	Polaris Cable Lube	See page 2.11.	Semi-annually [1]
5	Speedometer Cable	Polaris Cable Lube	Disconnect cable on back of speedometer and lubricate inner cable.	Semi-annually [1]
6	Drive Chain	Polaris Chain Lube or O-Ring chain lube	Apply to chain link plates and rollers.	As required*

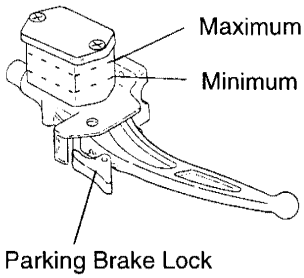


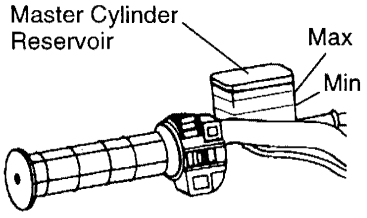
1. Engine Oil and Filter (4 Cycle)



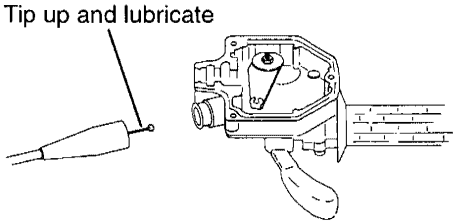


2. Transmission Dipstick

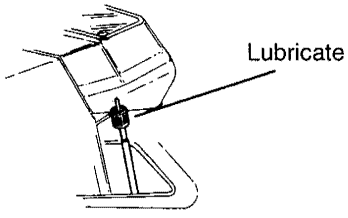




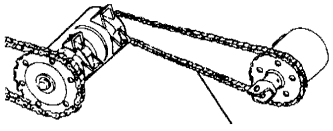
3. Brake Fluid (Left hand Master Cylinder)



4. Throttle Cable

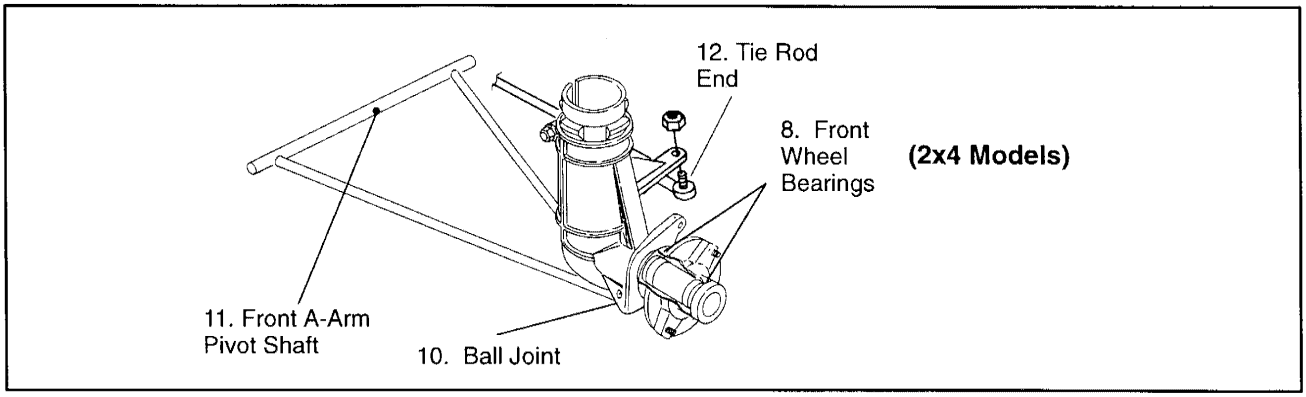


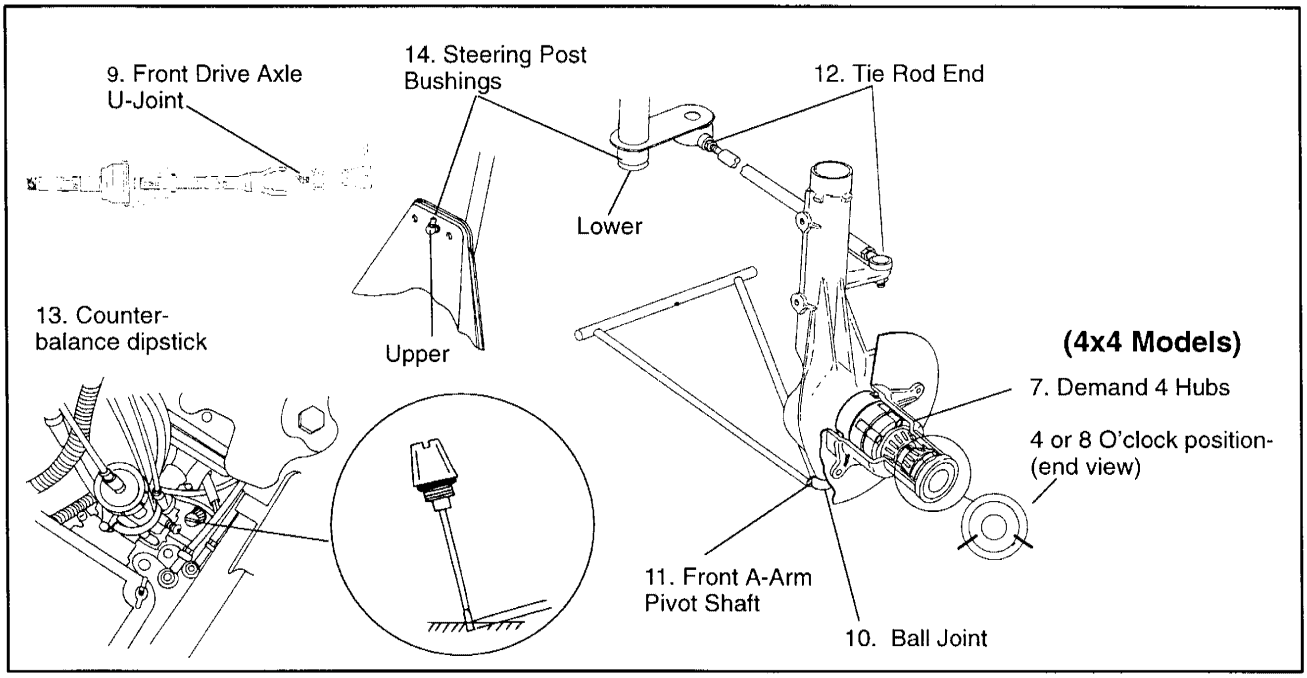
5. Speedometer Cable



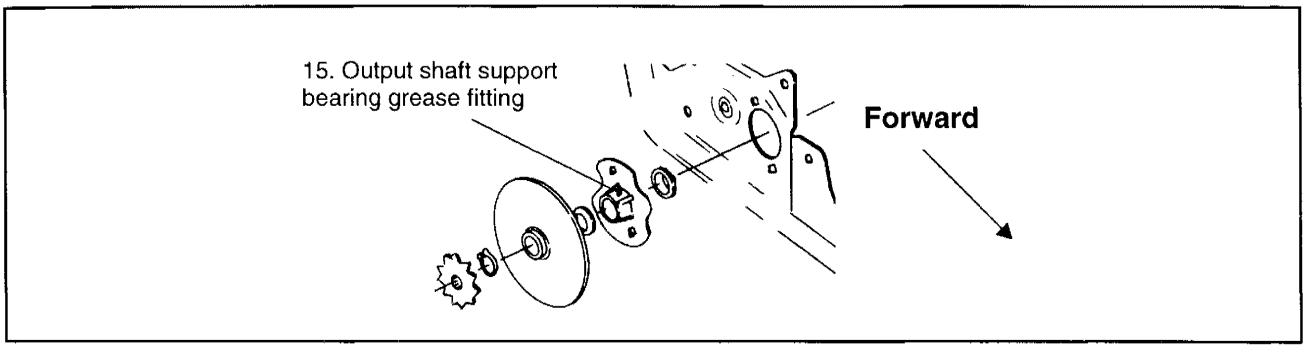
6. Drive Chain(s)

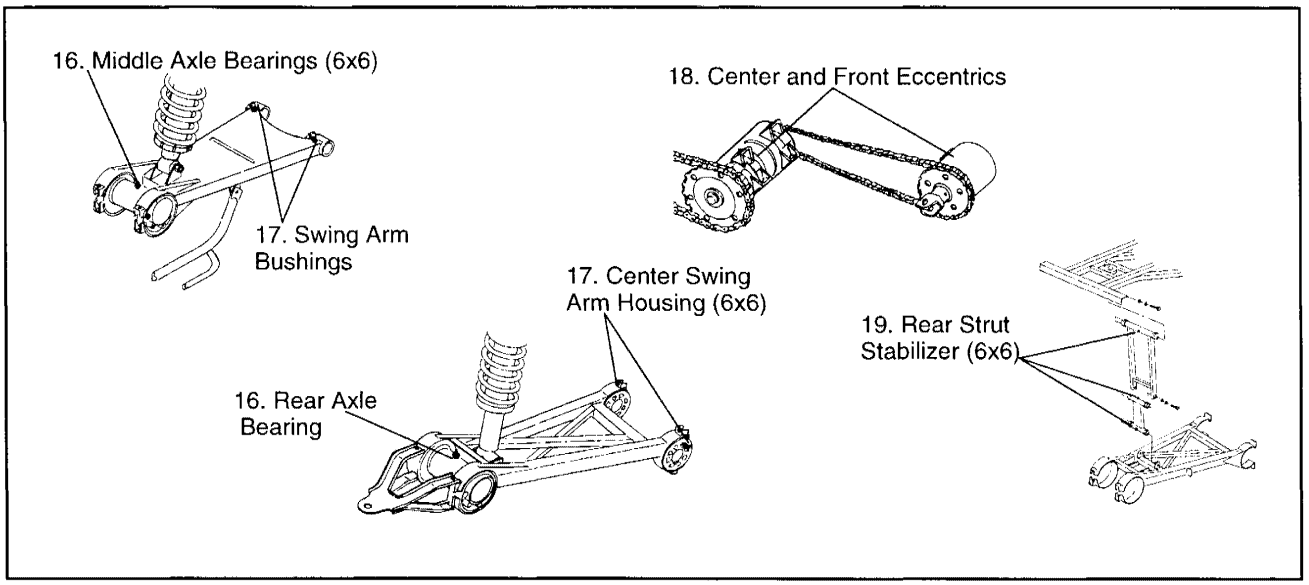
Lubrication Chart





Ill. #	Item	Lube Rec.	Method	Frequency*
7	Demand 4 Hubs - All Wheel Drive ATVs	Polaris Demand Drive Hub Fluid or ATF Type F	Remove filler hole screw in hubs. Rotate wheels to 4 or 8 O'clock position. If lubricant is not visible add until it flows from filler hole screw. Reinstall screw.	Semi-annually [1]
8	Front Wheel Bearings - Non - driving front wheels	Sealed; Replace	Inspect and replace bearings if necessary	Annually [2]
9	Front Drive Axle "U" Joints	Polaris U-Joint Grease**	Locate grease fitting and grease with grease gun.	Semi-annually [1]
10	Ball Joint	Polaris All Season Grease**	Locate grease fitting on back side of struts and grease with grease gun.	Semi-annually [1]
11	Front A-Arm Pivot Shaft	Polaris All Season Grease**	Locate grease fitting on pivot shaft and grease with grease gun.	Semi-annually [1]
12	Tie Rod Ends	Polaris All Season Grease**	Locate grease fitting and grease with grease gun (where applicable. On others: Lift boot. Clean away dirt and grease. Apply fresh grease by hand and reassemble.	Semi-annually [1]
13	Counter Balance Housing (400L)	10W30 Motor Oil	Check level on dipstick and add oil as necessary. Change annually. To change oil see page 2.21.	Change Annually [2]
14	Steering Post Bushings	All Season Grease**	Locate fittings on upper and lower steering post and grease with grease gun.	Semi-annually [1]





III. #	Item	Lube Rec.	Method	Frequency*
15	Transmission Output Shaft	Polaris All Season Grease**	Locate grease fitting on transmission output shaft and grease with grease gun.	Semi-annually [1]
15 a	Rear Strut Assy	Polaris All Season Grease**		
16	Rear and Middle Axle Bearings (6x6)	Polaris All Season Grease**	Locate grease fitting on eccentric and grease with grease gun.	Semi-annually [1]
17	Swing Arm Bushings and Center Swing Arm Housing (6x6)	Polaris All Season Grease**	Locate grease fitting on swing arm and grease with grease gun.	Semi-annually [1]
18	Chain Adjusters (Center and Front Eccentrics)	Polaris All Season Grease**	Locate grease fitting on center eccentric and grease. Locate grease fitting on front eccentric (side opposite chain) and grease.	Semi-annually [1]
19	Rear Strut (6x6)	Polaris All Season Grease**	Locate fitting on rear strut and grease with grease gun.	Semi-annually [1]

* More often under severe use, such as wet or dusty conditions

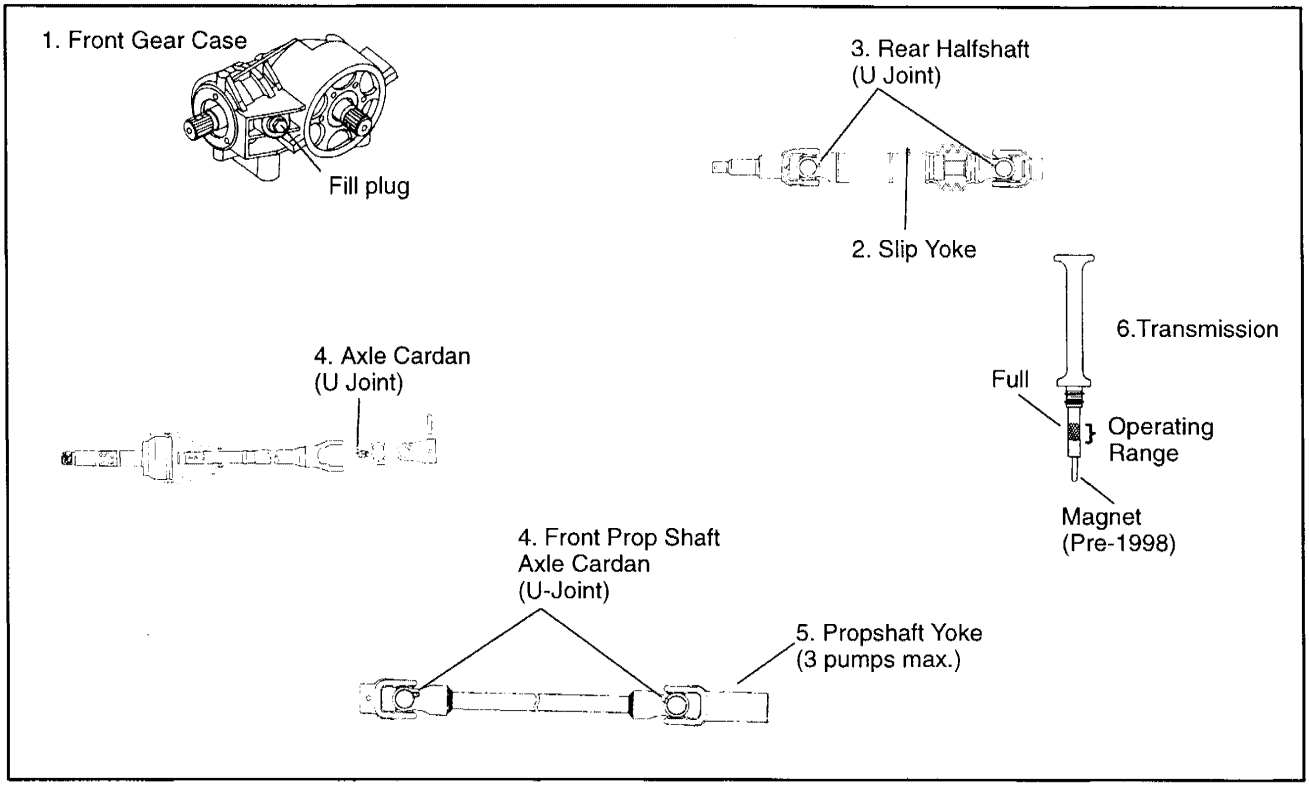
**Grease conforming to NLGI No. 2, such as Polaris Premium All Season Grease, Conoco Superlube M or Mobilegrease Special

[1] Semi-annually or 50 hours of operation

[2] Annually or 100 hours of operation

NOTE: Hours are based on 10 mph average.

MAINTENANCE
Lubrication Chart - Type IV Transmission (Shaft Drive)



NOTE: On Shaft Drive models, lubricate these areas in addition to applicable general lubrication items.

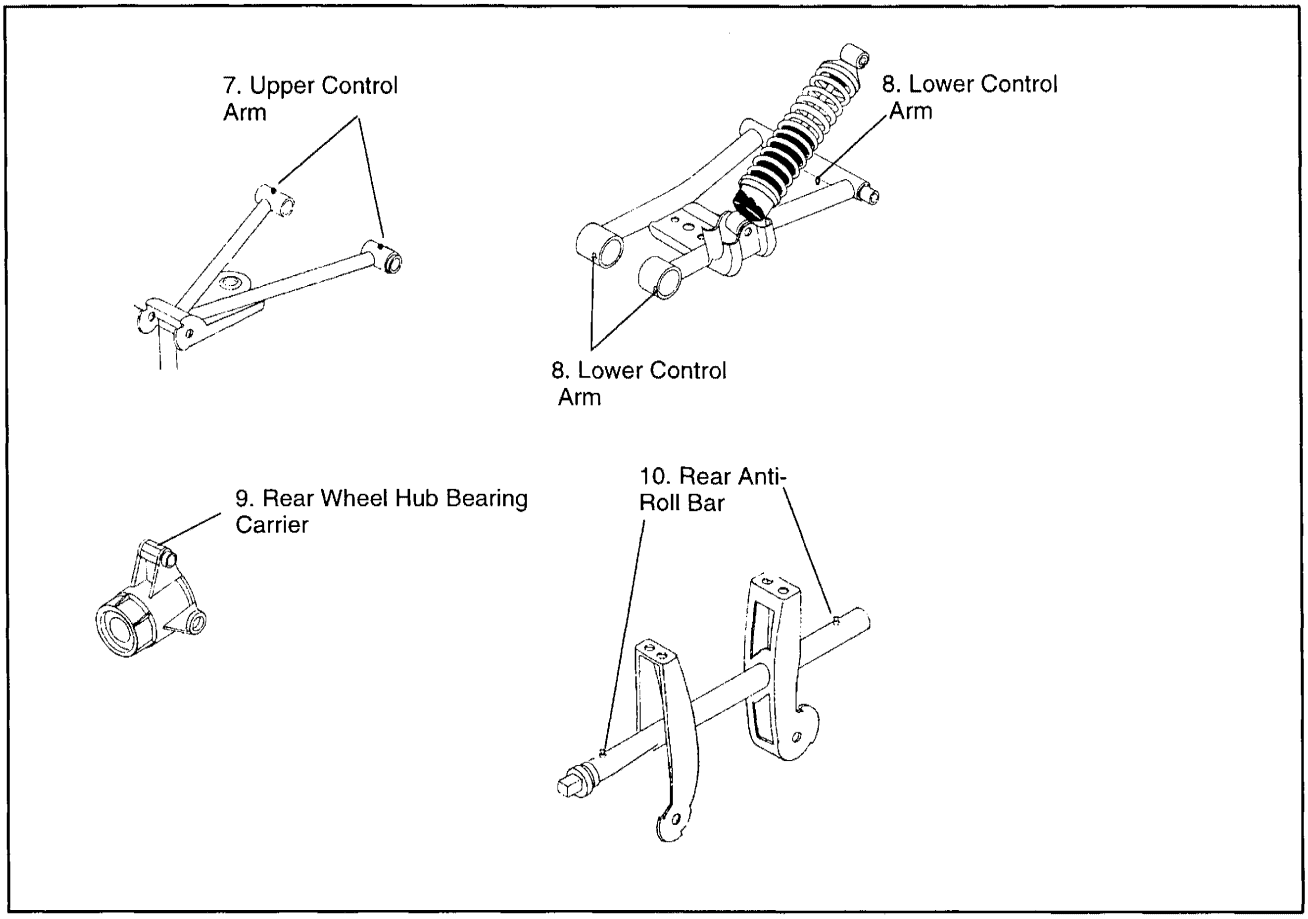
Ill. #	Item	Lube Rec.	Method	Frequency*
1	Front Gearcase Oil	GL5 80-90 Weight Gear Lube	Add to bottom of fill plug threads. See page 2.10	Change annually [2]
2	Slip Yoke (No grease fitting on late models)	Premium U-Joint Grease	Locate fittings and grease - 3 pumps maximum	Semi-annually [1]
3	Rear Halfshafts	Premium U-Joint Grease	Locate Fittings and Grease	Semi-annually [1]
4	Axle Cardan (U-Joint) Front Drive Shaft / Prop Shaft	Premium U-Joint Grease	Locate Fittings and Grease	Semi-annually [1]
5	Propshaft Yoke	Premium U-Joint Grease	Locate fittings and grease - 3 pumps maximum	Annually [2]
6	Transmission	Synthetic Transmission Lubricant	Add to proper level on dipstick. Approx. 20 oz. at change; Approx 32 oz. initial fill after disassembly.	Inspect Monthly; Change annually [2]

* More often under severe use, such as wet or dusty conditions

[1] Semi-annually or 50 hours of operation

[2] Annually or 100 hours of operation

NOTE: Hours are based on 10 mph average.



Ill. #	Item	Lube Rec.	Method	Frequency*
7	Upper Control Arms	Grease**	Locate fittings and grease	Semi-annually [1]
8	Lower Control Arms	Grease**	Locate fittings and grease	Semi-annually [1]
9	Rear Wheel Hub Bearing Carrier	Grease**	Locate fittings and grease	Semi-annually [1]
10	Rear Anti-Roll Bar	Grease**	Locate fittings and grease	Semi-annually [1]

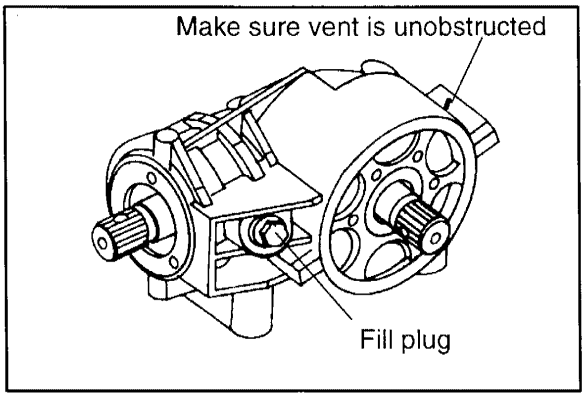
* More often under severe use, such as wet or dusty conditions
**Grease conforming to NLGI No. 2, such as Polaris Premium All Season Grease, Conoco Superlube M or Mobilegrease Special
[1] Semi-annually or 50 hours of operation
[2] Annually or 100 hours of operation
NOTE: Hours are based on 10 mph average.

MAINTENANCE
Front Gearcase Lubrication - Type IV Transmission (Shaft Drive)

Front Gearcase Lubrication

The front gearcase fill plug is located on the right side of the machine.

The gearcase lubricant level should be checked every six months or 1000 miles (1600 km), whichever comes first. Change front gearcase lubricant annually or at 100 hour intervals, whichever comes first. With the ATV on a level surface, remove fill plug and check the lubricant level. Lubricant should be kept at the bottom of the fill hole threads. The correct gearcase lubricant to use is GL5 80-90 Gear Lube.



Front Gearcase Lubricant
PN 2871653
Or GL5 80-90 Gearlube

Gearcase Lubricant Change

1. Remove fill plug.
2. Remove gearcase drain plug located on the bottom right hand side and drain the oil. Catch and discard used oil properly.
3. Clean and reinstall the drain plug using a new sealing washer.
4. Add GL5 80-90W Gear Lube to bottom of fill hole threads.
5. Install fill plug.
6. Check for leaks.
7. Make sure vent hose is clear and free of kinks.

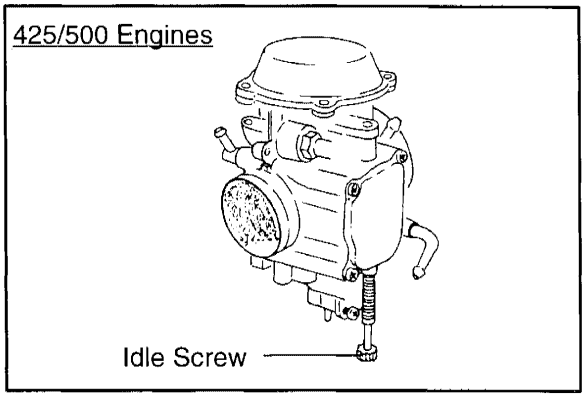
Carburetor Adjustments

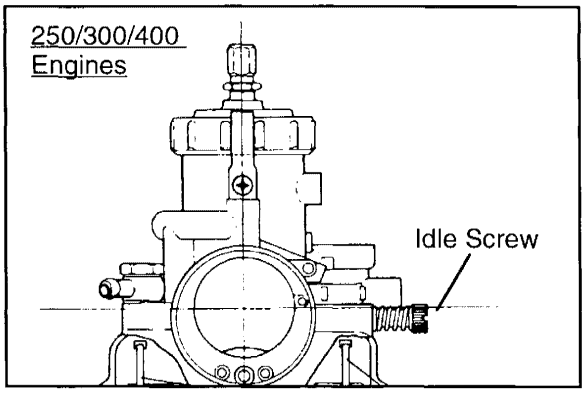
Idle Speed Adjustment

1. Start engine and warm it up thoroughly.
2. Adjust idle speed by turning the idle adjustment screw. See illustrations at right.

NOTE: Adjusting the idle speed affects throttle cable freeplay and electronic throttle control (ETC) adjustment. Always check throttle cable freeplay after adjusting idle speed and adjust if necessary.

Idle Speed: (+- 100 RPM)	
425/500 Engine	1200
250/300/400 Engines	700





Throttle Cable / Electronic Throttle Control (ETC Switch) Adjustment

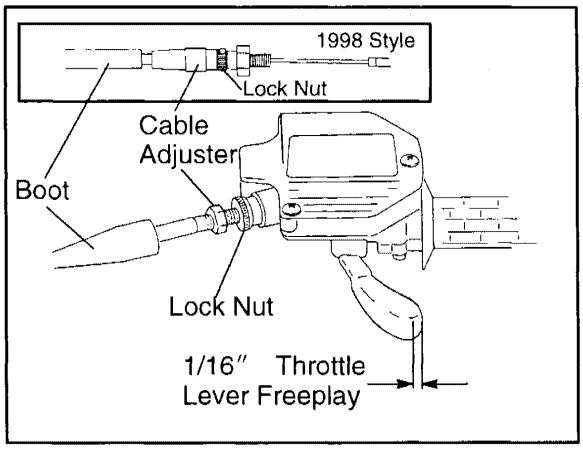
1. Slide boot off throttle cable adjuster and jam nut at throttle block.
2. Place shift selector in neutral and set parking brake.
3. Start engine and set idle to.

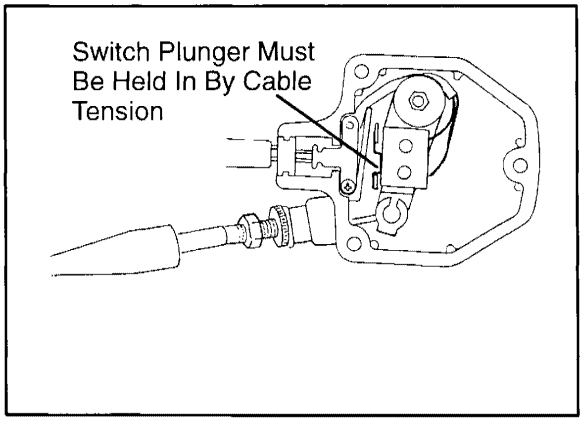
NOTE: Be sure the engine is at operating temperature. See Idle Speed Adjustment.

4. Loosen lock nut.
5. Turn cable adjuster out until engine RPM starts to increase.
6. Turn cable adjuster back in until throttle lever has 1/16″ (.16 cm) of travel before engine RPM increases. Be sure ETC switch plunger is held inward by throttle cable tension.
7. Tighten lock nut securely and slide boot completely in place to ensure a water-tight seal.

NOTE: On 2 stroke models, whenever throttle cable adjustments are made, always check oil pump adjustment. Refer to pages 2.19 - 2.20 for adjustment procedure.

8. Turn handlebars from left to right through the entire turning range. If idle speed increases, the throttle cable freeplay must be increased, or check for proper cable routing.





Throttle Operation

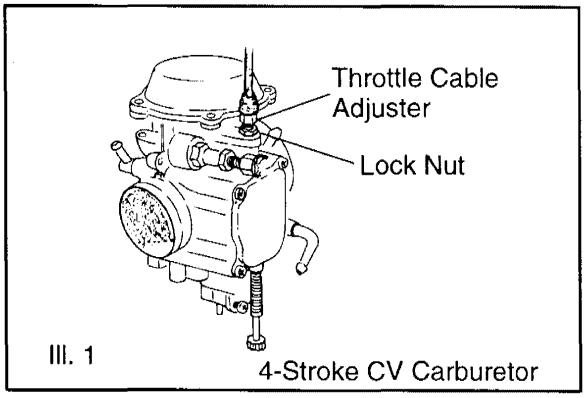
Check for smooth throttle opening and closing in all handlebar positions. Throttle lever operation should be smooth and lever must return freely without binding. Replace the throttle cable if worn, kinked, or damaged.

Carburetor Adjustments

Throttle Cable Adjustment

NOTE: If the proper freeplay cannot be obtained with the throttle block adjuster, adjust the cable at the carburetor using the following procedure. See Ill. 1 and 3.

1. Remove fuel tank.
2. Slide boot off throttle cable adjuster and jam nut.
3. Loosen lock nut and turn adjuster until proper throttle lever freeplay is obtained.
4. Tighten locknut and slide boot back over adjuster.
5. Reinstall fuel tank.
6. Check for proper throttle operation and correct freeplay in all handlebar positions.



Ill. 1 4-Stroke CV Carburetor

Choke Adjustments

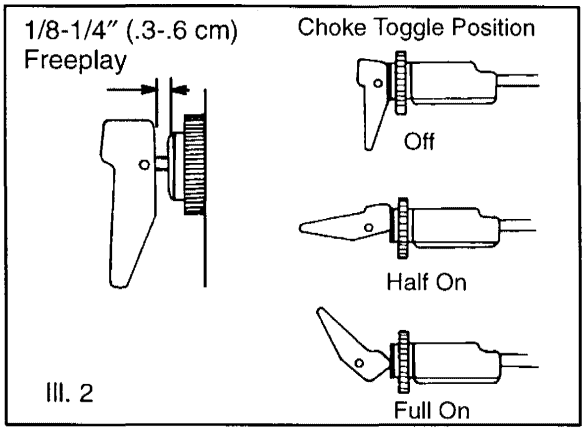
With the choke control toggle flipped to the full off position, the choke plunger must be seated on the fuel passage way in the carburetor. If the plunger is not seated on the passage way, the engine will flood or run too rich, causing plug fouling and very poor engine performance.

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

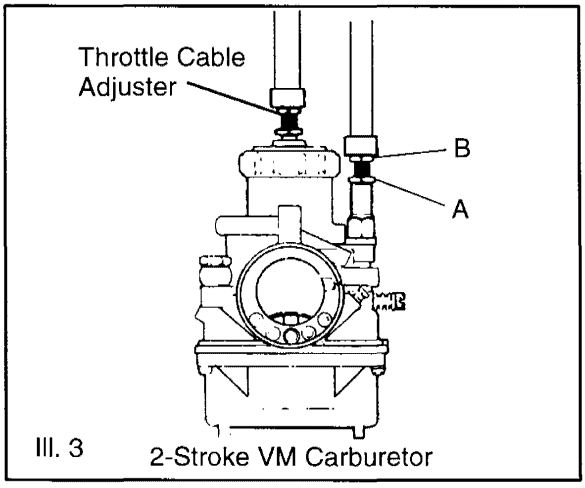
1. Flip choke toggle to full off position.
2. Loosen adjustment locknut (A) on carburetor.
3. Turn cable sleeve adjusting nut (B) clockwise on carburetor until 1/4″ (6 mm) or more choke toggle free play is evident.
4. Turn cable sleeve adjusting nut counterclockwise on carburetor until toggle has zero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

Choke Lever Freeplay -

1/8 - 1/4″ (.3 - .6 cm)



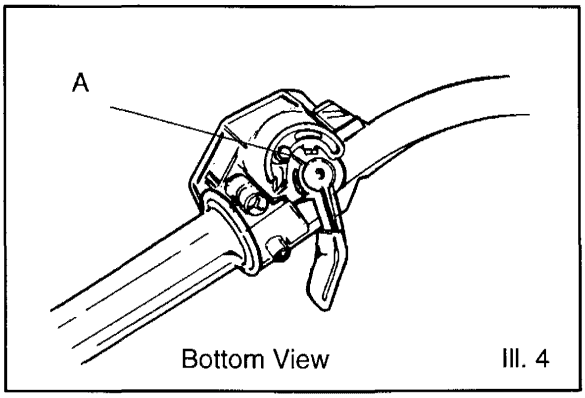
Ill. 2



Ill. 3 2-Stroke VM Carburetor

Throttle Control Lever Stop Adjustment

The throttle control lever incorporates an adjustable stop. This can be adjusted to limit the amount of throttle opening by loosening the screw (A) and sliding the stop to a desired setting. Then tighten screw. See Ill. 4.



Bottom View Ill. 4

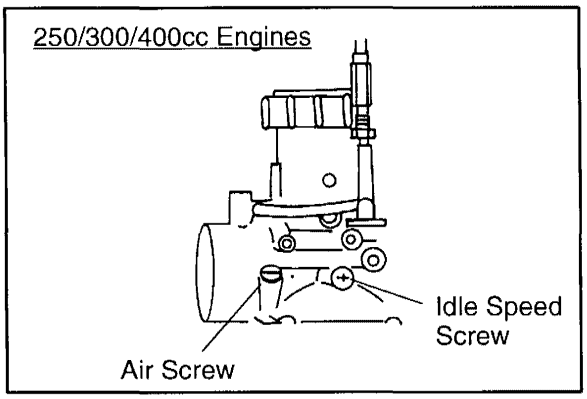
Air Screw Adjustment

2–Stroke Models

1. Turn carburetor air screw in until lightly seated. Back screw out the specified number of turns.

Air Screw Adjustment (2-Stroke engines)

Refer to Specifications (Chapter 4)



2. Warm up the engine to operating temperature.
3. Set idle speed to 600-800 RPM.

NOTE: Adjusting the air screw may affect idle speed. Always check throttle cable freeplay after adjusting idle speed and adjust if necessary.

4. Turn the screw in (to richen) or out (to lean) the mixture. Adjust air screw for best throttle response and smooth idle.
5. Re-adjust idle if necessary.

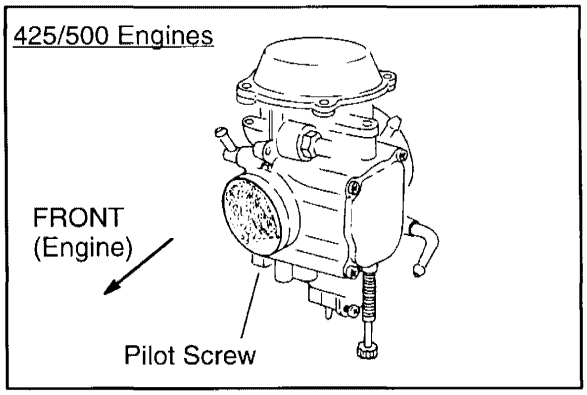
Pilot Screw (Idle Mixture) Adjustment

4–Stroke Models

NOTE: The pilot screw is pre-set at the factory. The following adjustment procedure should be used after disassembly and cleaning or if the pilot screw is replaced. Be sure all engine maintenance items have been performed and are within specifications before adjusting pilot screw.

1. Turn pilot screw in (clockwise) until *lightly* seated. Turn screw out the specified number of turns.

Pilot Screw Adjustment
(4-Stroke Engines)
Refer to Specifications (Chapter 4)



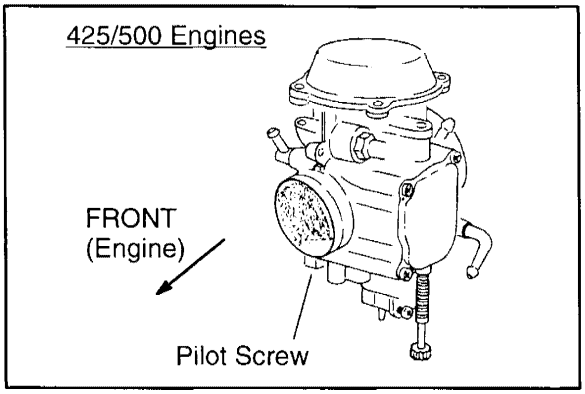
2. Start engine and warm it up to operating temperature (about 10 minutes).
3. Connect an accurate tachometer that will read in increments of + or – 50 RPM.
4. Set idle speed to 1200 RPM. Always check throttle cable freeplay after adjusting idle speed and adjust if necessary.
5. Slowly turn mixture screw clockwise until RPM begins to decrease by 50 RPM or greater.

Pilot Screw (Idle Mixture) Adjustment, Cont.

4–Stroke Models

NOTE: If tamper proof plug is installed refer to removal procedure below.

6. Slowly turn mixture screw counterclockwise until idle speed increases to maximum RPM. Continue turning counterclockwise until idle RPM begins to drop.
7. Center the pilot screw between the points in step 5 and 6.
8. Re adjust idle speed if not within specification.



Fuel Lines

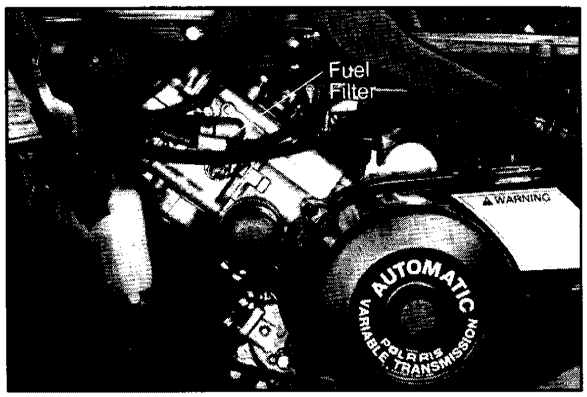
1. Check fuel lines for signs of wear, deterioration, damage or leakage. Replace if necessary.
2. Be sure fuel lines are routed properly and secured with cable ties. **CAUTION:** Make sure lines are not kinked or pinched.
3. Replace all fuel lines every two years.

Vent Lines

1. Check fuel tank, oil tank, carburetor, battery and transmission vent lines for signs of wear, deterioration, damage or leakage. Replace every two years.
2. Be sure vent lines are routed properly and secured with cable ties. **CAUTION:** Make sure lines are not kinked or pinched.

Fuel Filter

The fuel filter should be replaced periodically or whenever sediment is visible in the filter.



1. Shut off fuel supply at fuel valve.
2. Remove line clamps at both ends of the filter.
3. Remove fuel lines from filter.
4. Install new filter and clamps onto fuel lines with arrow pointed in direction of fuel flow.
5. Install clamps on fuel line.
6. Start engine and inspect for leaks.
7. Reinstall fuel tank.

Carburetor Float Bowl Draining

⚠ 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, see your doctor immediately.

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

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

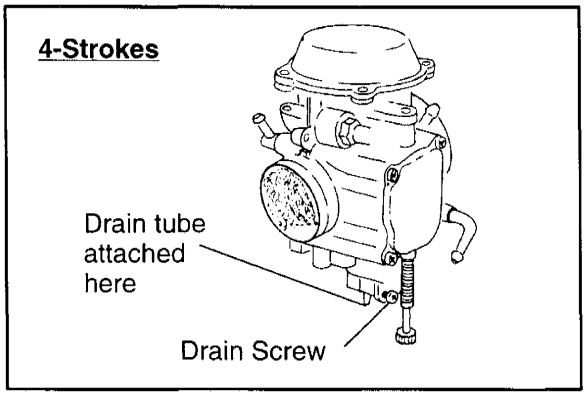
⚠ Never drain the float bowl when the engine is hot. Severe burns may result.

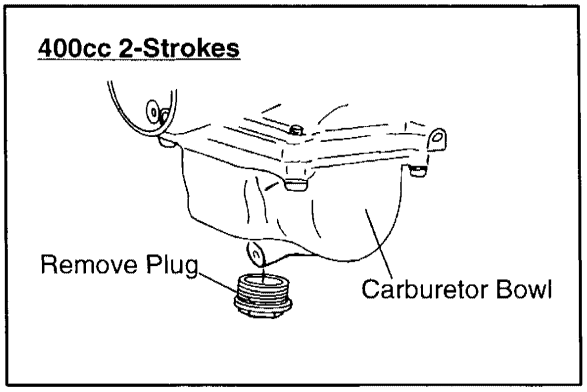
Carburetor Draining

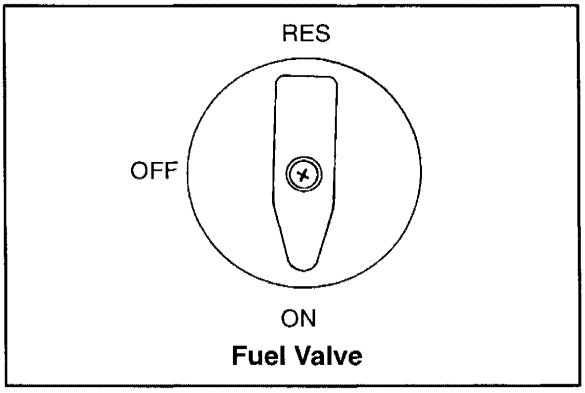
The carburetor float bowl should be drained periodically to remove moisture or sediment from the bowl, or before extended periods of storage.

NOTE: The bowl drain screw is located on the bottom left side of the float bowl on 4-stroke models. A drain plug (which also acts as a water/sediment trap) is located on the bottom of the float bowl on 400cc 2-stroke models.

1. Turn fuel valve to the off position.
2. Remove left side body panel. See Body Panel Removal, Chapter 5.
3. Place a clean container beneath the bowl drain spigot or bowl drain hose.
4. Turn drain screw out two turns (remove drain plug for 2-Strokes) and allow fuel in the float bowl and fuel line to drain completely.
5. Inspect the drained fuel for water or sediment.
6. Tighten drain screw.
7. Turn fuel valve to "on".
8. Start machine and check for leaks.







Fuel Valve

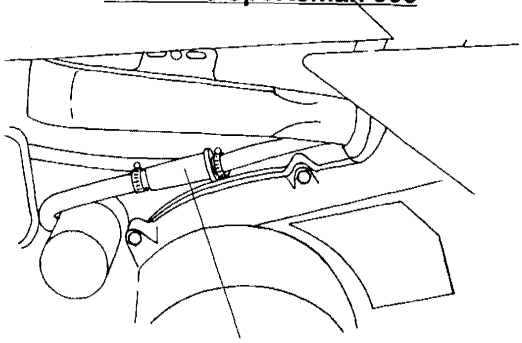
Breather Filter Inspection

1. Inspect the breather filter(s) for obstruction. Replace if necessary. Breather filter service life is extended when the air box pre-filter is in place and maintained properly. Never operate the engine without the pre-filter.

Breather Hose

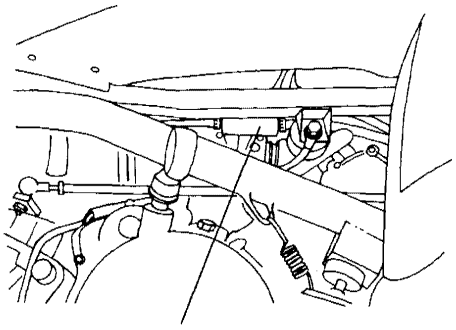
1. Be sure breather line is routed properly and secured in place. **CAUTION:** Make sure lines are not kinked or pinched.

1997 Magnums, 500 6x6, and 1998 Sportsman 500

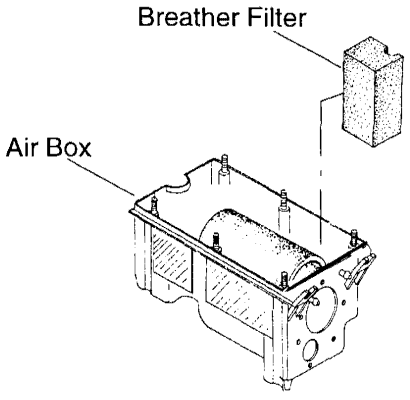


Breather Filter (In-Line)

Scrambler 500



Breather Filter (In-Line)



Compression Test - 2 Stroke

1. Remove spark plug and install compression tester.
2. Connect high tension lead to a good ground on engine.
3. Open throttle and crank engine until maximum reading is obtained (approximately 3-5 revolutions).

Cylinder Compression (2-Stroke)	
Service Limit	**115 PSI**

Compression Test - 4 Stroke

NOTE: 4-Stroke engines are equipped with an automatic decompressor. Compression readings will vary in proportion to cranking speed during the test. Average compression (measured) is about 50-90 psi during a compression test.

Smooth idle generally indicates good compression. Low engine compression is rarely a factor in running condition problems above idle speed. Abnormally high compression can be caused by a decompressor malfunction, or worn or damaged exhaust cam lobes. Inspect camshaft and automatic decompression mechanism if compression is abnormally high.

A cylinder leakage test is the best indication of engine condition on models with automatic decompression. Follow manufacturer's instructions to perform a cylinder leakage test. (Never use high pressure leakage tester as crank seals may dislodge and leak).

Cylinder Leakage	
Service Limit (4-Stroke)	**10 %**
(Inspect for cause if leakage exceeds 10%)	

⚠ 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.

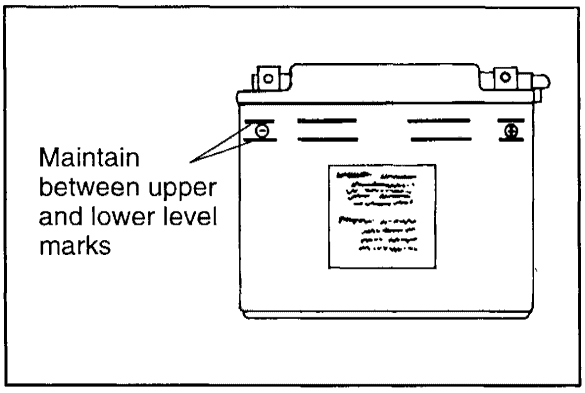
Internal: Drink large quantities of water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil. Call physician immediately.

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.

The battery is located under the left rear fender.

Inspect the battery fluid level. When the battery fluid nears the lower level, the battery should be removed and distilled water should be added to the upper level line. To remove the battery:



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

⚠ CAUTION

Whenever removing or reinstalling the battery, disconnect the negative (black) cable first and reinstall the negative cable last!

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

⚠ To refill use only distilled water. Tap water contains minerals which are harmful to a battery.

⚠ Do not allow cleaning solution or tap water to enter the battery. It will shorten the life of the battery.

6. Reinstall the battery caps.
7. Clean battery cables and terminals with a stiff wire brush. Corrosion can be removed using a solution of one cup water and one tablespoon baking soda. Rinse will with clean water and dry thoroughly.
8. Reinstall battery, attaching positive (+) (red) cable first and then the negative (-) (black) cable.
9. Reattach vent hose making sure it is not kinked or pinched.
10. Coat terminals and bolt threads with Polaris dielectric grease PN 2871027.
11. Reinstall battery cover and holder strap.

⚠ Do not start the engine with the battery disconnected. Vehicle lamps will burn out if battery is disconnected or has a specific gravity lower than 1.14 during vehicle operation. Also, the reverse speed limiter can be damaged.

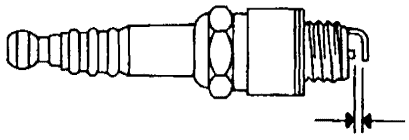
Spark Plug

1. Remove right body panel. See Body Panel Removal, Chapter 2 (4 strokes). On two stroke models, access spark plug through the right front footwell.
2. Remove spark plug high tension lead. Clean plug area so no dirt and debris can fall into engine when plug is removed.
3. Insert spark plug wrench provided in tool kit. Remove spark plug.
4. Inspect electrodes for wear and carbon buildup. Look for a sharp outer edge with no rounding or erosion of the electrodes.
5. Clean with electrical contact cleaner or a glass bead spark plug cleaner only. **CAUTION:** A wire brush or coated abrasive should not be used.
6. Measure gap with a wire gauge. Recommended spark plug gap is shown in chart at right. Adjust if necessary by bending the side electrode carefully.
7. If necessary, replace spark plug with proper type. **CAUTION:** Severe engine damage may occur if the incorrect spark plug is used.
8. Coat spark plug threads with a small amount of anti-seize compound.
9. Install spark plug and torque to 14 ft. lbs.

Recommended Spark Plug:

4-Stroke	**NGK BKR5ES**
	Spark Plug Gap:
	.025″ (.6 mm)
2-Stroke	**NGK BR8ES**
	Spark Plug Gap:
	.028″ (.7mm)

Spark Plug Torque:
14 Ft. Lbs.



Spark Plug Gap
.024 - .028″ (.6 - .7 mm)

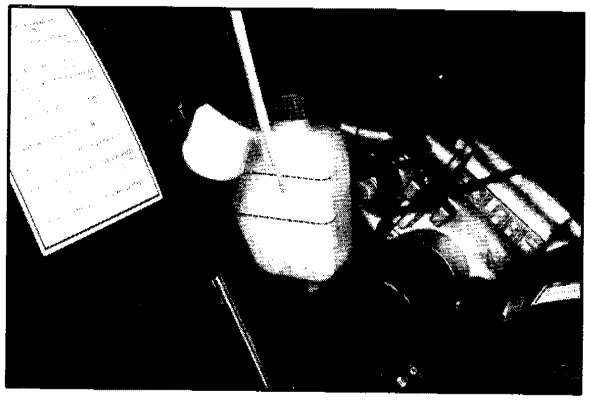
Ignition Timing

Refer to the electrical section for ignition timing procedure.

Engine Mounts

Inspect rubber engine mounts for cracks or damage. Check fasteners and ensure they are tight.

Coolant Level Inspection



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

1. Remove recovery bottle cap. Inner splash cap vent hole must be clear and open.
2. Fill recovery bottle to upper mark with Polaris Premium 60/40 Anti Freeze / Coolant or 50/50 or 60/40 mixture of antifreeze and distilled water.
3. Reinstall cap.

NOTE: If coolant is excessively low in the radiator, coolant will not circulate or be drawn in from the recovery bottle.

Coolant Strength

Test the strength of the coolant using an 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 will cause the system to freeze.

Antifreeze Hydrometer

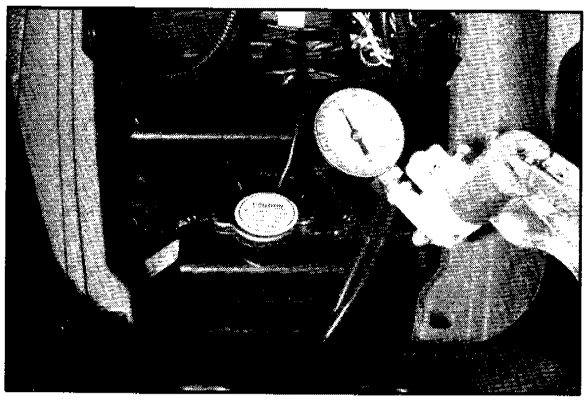
Polaris 60/40 Anti-Freeze / Coolant

PN 2871323

Cooling System Hoses

1. Inspect all hoses for cracks, deterioration, abrasion or leaks. Replace if necessary.
2. Check tightness of all hose clamps.

Radiator



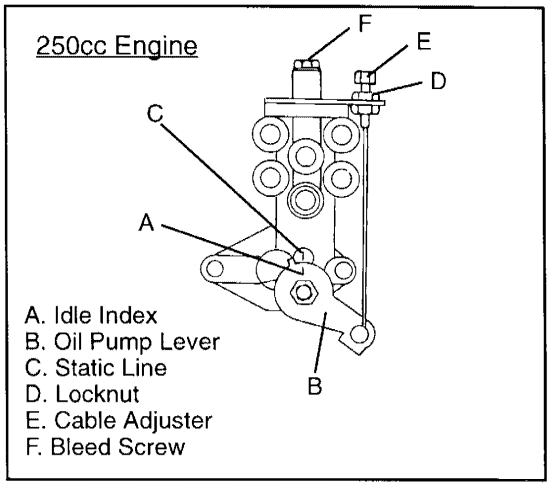
1. Check radiator air passages for restrictions or damage.
2. Carefully straighten any bent radiator fins.
3. Remove any obstructions with compressed air or low pressure water.

Cooling System Pressure Test

Refer to page 3.6 for pressure test procedure.

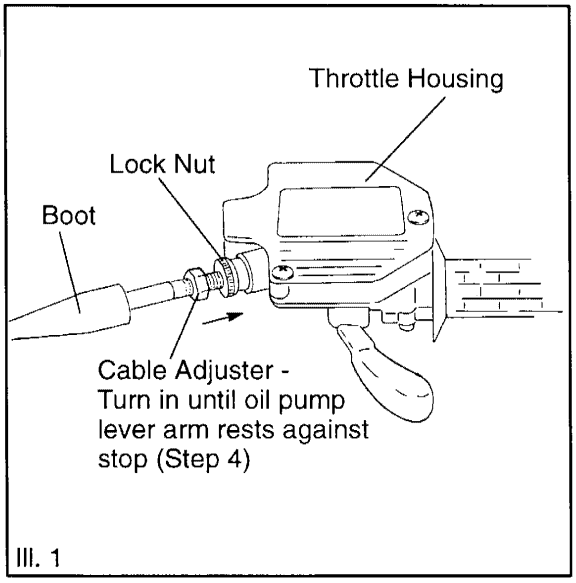
Oil Pump Adjustment Procedure (1996 250cc Engines)

1. Before adjusting the oil pump, check engine idle RPM. Recommended RPM is 700. Adjust if necessary. Check and adjust throttle lever free play (ETC switch). See page 2.12.
2. Start the engine and let it idle. Place very slight pressure on the throttle lever until all freeplay is removed from throttle cable to carburetor.
3. Loosen locknut (D) and align marks (A) and (C) by turning adjuster (E) up or down as needed.
4. When the marks are aligned, tighten locknut (D).
5. Check throttle lever freeplay/ETC switch adjustment and readjust at throttle block if necessary.



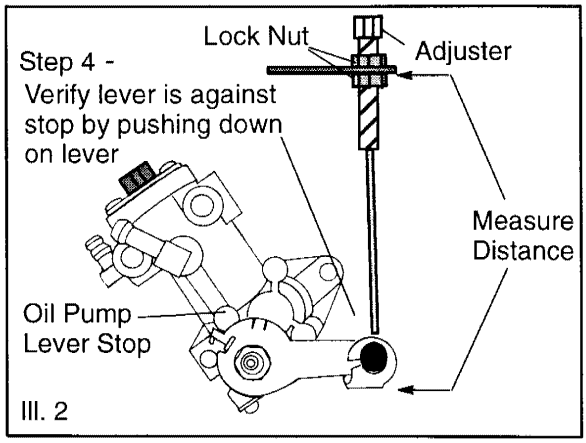
Oil Pump Adjustment Procedure (300cc Engines and 1997 to current 250 cc Engines)

1. Adjust engine idle speed to 600-800 RPM.
2. Remove seat, air box cover, and air filter to gain access to carburetor slide.
3. Pull boot back from throttle cable adjuster located on throttle housing. Loosen lock nut. See. Ill. 1.



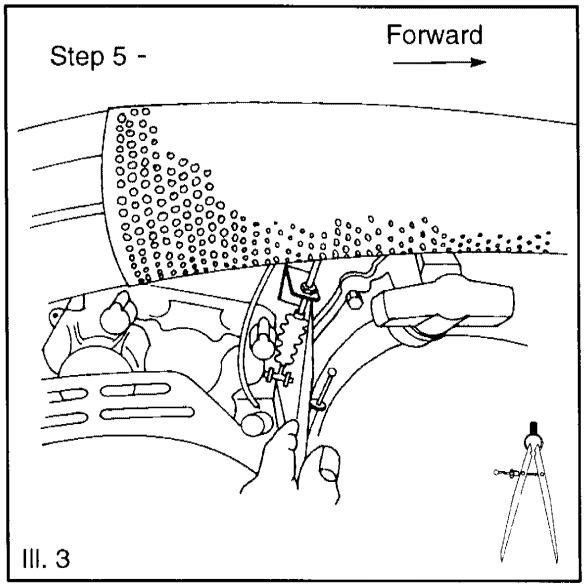
4. Turn adjuster into throttle housing until the oil pump lever arm rests firmly against its stop on the oil pump body. Verify this by pushing downward on lever arm and checking for movement. See Ill. 2.

NOTE: If lever arm cannot rest against stop even with throttle cable adjuster screwed all the way in, loosen oil pump cable adjuster nuts and adjust cable down until lever arm is firmly against stop.



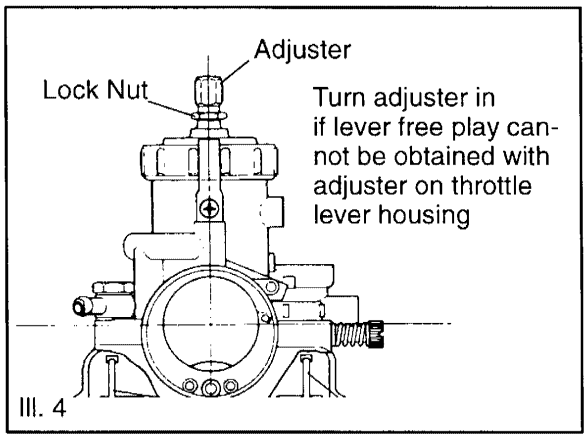
Oil Pump Adjustment Procedure (300cc Engines and 1997 to current 250 cc Engines), cont.

5. Using machinist's dividers or a drafting compass, gauge the distance from the bottom of the cable bracket to the bottom of the lever arm tip as shown in Ill. 3. Note the exact position of the divider on the bracket and lever arm. The divider must be in the same position on these parts when you perform the oil pump cable measurements in Step 8. It may be helpful to scribe or mark a line on the end of the lever arm to use as a reference. See Ill. 2 and 3.
6. Measure the width of the divider on a metric ruler to the nearest 1/2 millimeter. Record this measurement.



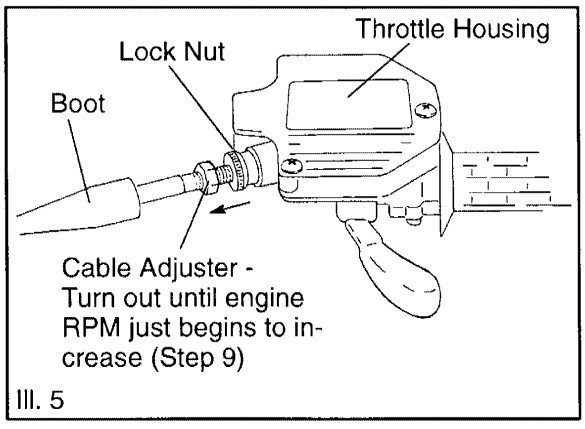
Ill. 3

Note: The carburetor slide must be resting against the idle stop screw and the throttle lever must have free play before proceeding with Step 7. If you cannot obtain free play at the carburetor even with the throttle housing adjuster screwed completely into the throttle housing, loosen the lock nut on top of carburetor, turn the throttle cable adjuster in until free play is obtained, tighten the lock nut, and then proceed with Step 7.



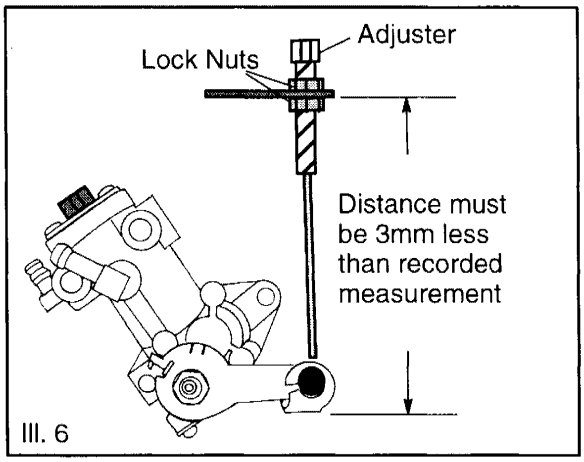
Ill. 4

7. Place gear selector in neutral and set parking brake.
8. Start engine.
9. Turn the adjuster on the throttle lever housing out until the engine RPM just begins to rise. Repeat this step to make sure you have the throttle cable set to the exact point where the slide (engine RPM) just begins to rise.
10. Stop engine.



Ill. 5

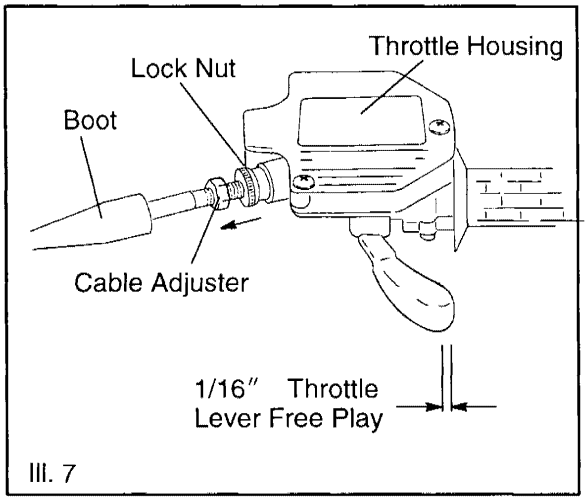
11. Adjust the dividers to a distance 3mm less than the measurement recorded in Step 6. Set the distance from the bracket to the lever arm tip (or mark made in Step 5) by placing the divider points in exactly the same location as in step 5. Loosen lock nuts and adjust oil pump cable to new divider dimension. Tighten lock nuts. Note: Adjustment may change when oil pump cable adjuster lock nuts are tightened. Verify the distance is 3mm less than the recorded measurement.



Ill. 6

12. Reinstall air filter, air box cover, and seat.

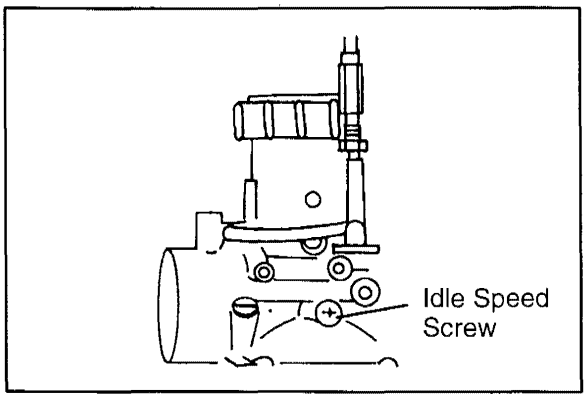
13. Turn throttle cable adjuster in (at throttle housing) approximately 1 turn. Place transmission in neutral, set parking brake, start engine and let it idle.
14. Turn throttle cable adjuster out until engine RPM starts to increase.
15. Turn adjuster in until there is 1/16″ of throttle lever movement before engine RPM begins to increase. Tighten lock nut and slide boot over adjuster.
16. Turn handlebars from left to right through the entire turning range. If engine RPM increases, readjust throttle cable free play and check for proper cable routing.



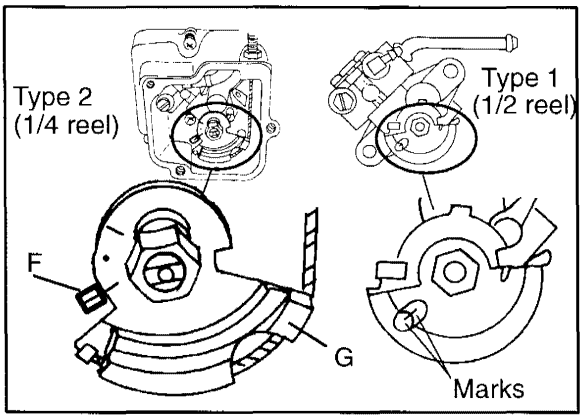
Ill. 7

Oil Pump Adjustment Procedure (400L Engines)

1. Before adjusting the oil pump, check engine idle RPM. Recommended RPM is 700. Adjust if necessary. Check and adjust throttle lever free play (ETC switch). See page 2.11.

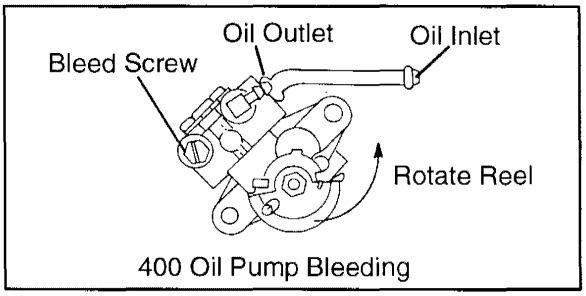


2. Adjust oil pump cable until marks (F) align when throttle slide just begins to raise and engine speed just begins to increase.
3. Tighten jam nuts.
4. Reinstall the ETC cover removed in step 1. , making sure cover gasket is properly seated. If not, moisture can enter the ETC and damage the switch.



Oil Pump Bleeding Procedure

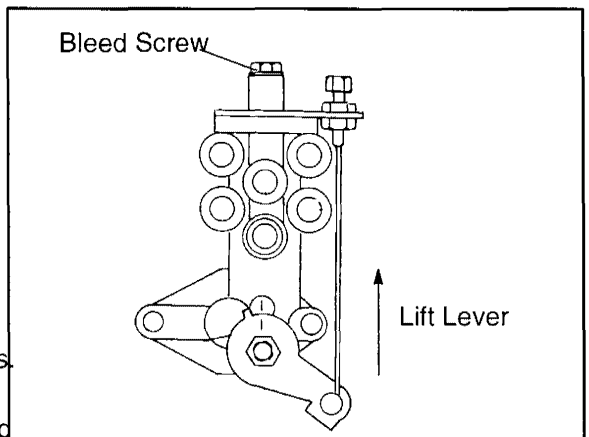
1. Fill the oil reservoir with Polaris injector oil.
2. Loosen the pump bleed screw one full turn. Allow oil to flow from the bleed screw for five to ten seconds. Tighten bleed screw. **CAUTION:** Never run the engine with the bleed screw loose. Loss of oil will cause serious engine damage.
3. Start the engine and lift the oil pump lever or reel to its full up (open) position. Allow engine to idle with the lever or wheel in this position for ten to twenty seconds to make sure all air is out of the system.



400 Oil Pump Bleeding

If oil starvation is suspected, proceed as follows:

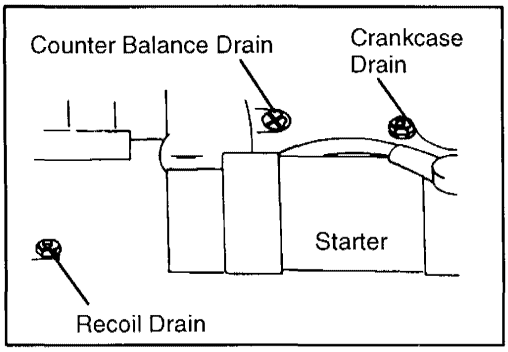
1. Premix fuel in tank at a 40:1 fuel/oil ratio.
2. With the oil reservoir full and the pump bled, remove the oil delivery line from the intake manifold.
3. Test the oil delivery check valve with a low pressure pump and gauge. (See Page 3.21).
4. Start engine and lift oil pump lever to full open position.
5. Oil should pulse from the delivery line every few seconds. If it does not, suspect one of the following:
   A. Oil line or filter plugged/Oil tank vent line restricted
   B. Oil lines leaking or blocked
   C. Faulty oil pump or drive mechanism



250/300 Oil Pump Bleeding

Recoil Housing

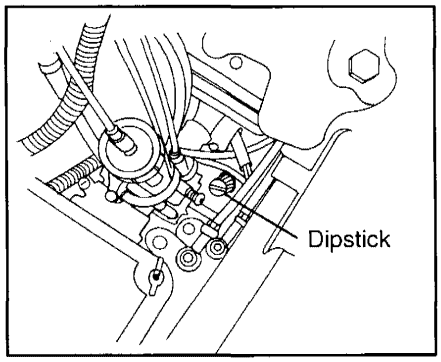
Drain the housing periodically to remove moisture.



Counter Balancer Lubrication (400)

The counter balance oil should be checked semi-annually, especially before off season storage. If the machine is used in wet conditions the oil should be checked more frequently. If the oil has a milky white or gray appearance it should be changed as soon as possible. Failure to properly maintain this important area can result in premature wear or possible failure of the counter balancer components. Always use SAE 10W30 oil.

Procedure for Adding Oil (400)

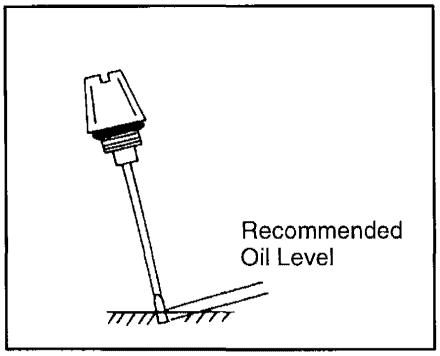


1. Remove seat and locate dipstick. Remove by loosening with a long handled screwdriver.
2. Remove dipstick. Oil level is shown on dipstick.
3. Add SAE 10W30 oil with a transmission fluid funnel. The recommended oil level is indicated by the knurled area on the dipstick.

NOTE: Screw dipstick in fully and remove to check. Check with engine at room temperature. Do not overfill. If overfilled, excess oil will be expelled through the vent hose.

4. Reinstall dipstick. Do not over tighten.
5. Inspect vent line for kinks or obstructions.

Counter Balance Oil Changing Procedure



1. Remove seat. Locate and remove dipstick.
2. Remove drain plug and drain oil. Catch and discard used oil properly.
3. Clean and reinstall drain plug.
4. Add SAE 10W30 oil using a transmission fluid funnel. The recommended oil level is indicated by the knurled area on the dipstick. The dipstick should be screwed in fully to check. Do not overfill. If overfilled, excess oil will be expelled through the vent hose.
5. Reinstall dipstick.
6. Check for leaks.

Air Cleaner
Trail Boss, Xpress 300, Xplorer 300, Xplorer 400

Dual Stage Air Cleaner

The Polaris ATV is equipped with a dual stage engine air filtration system. The primary pre-cleaner foam boot is designed to remove the majority of dust particles before they reach the secondary dry filter element.

Primary Pre-cleaner Foam Boot

Inspect the primary air cleaner boot daily or on a regular basis depending on running conditions and dust.

1. Remove the ATV seat.

2. Remove the primary air filter box.

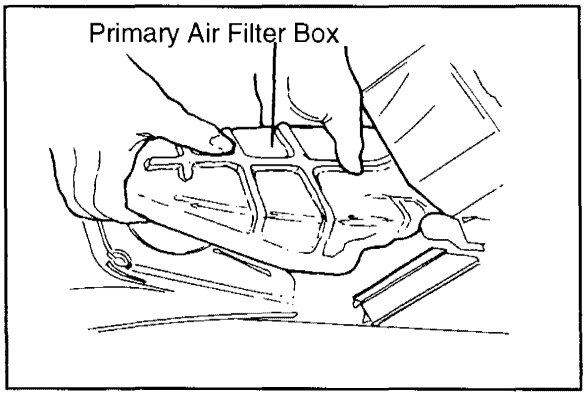
3. Remove the yellow pre-cleaner foam boot, held in place by a gray collar, from the air box. Do not remove the collar.

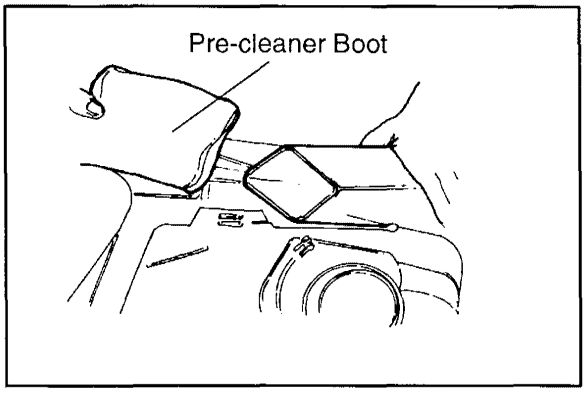
4. Carefully wash the yellow foam boot in soapy water and dry it.

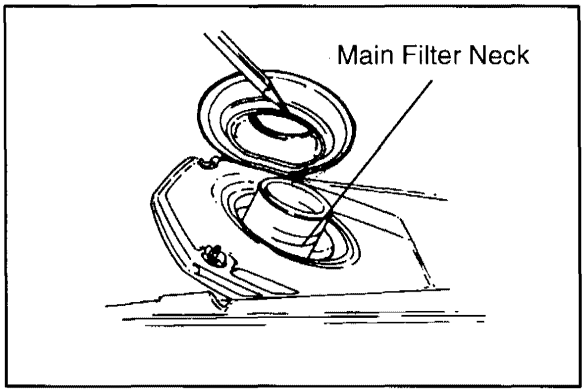
5. Oil the foam boot with engine injection oil (1 to 2 teaspoons). Squeeze out the excess into an absorbant cloth.

6. Reinstall the yellow foam boot onto the air filter box.

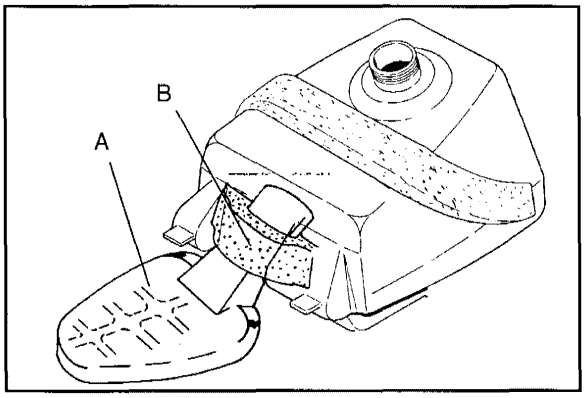
7. Reinstall the primary air filter box removed in step 2. **NOTE:** There will be some resistance. Be sure the black rubber sealing ring is securely positioned over the main filter neck.







CAUTION: When installing the primary air filter box be sure the gray foam collar (B) is below the intake opening of the air box intake (A). Improper installation will restrict airflow to the engine possibly resulting in engine damage.



Air Cleaner
Trail Blazer, Trail Boss, Xpress 300, Xplorer 300, Xplorer 400

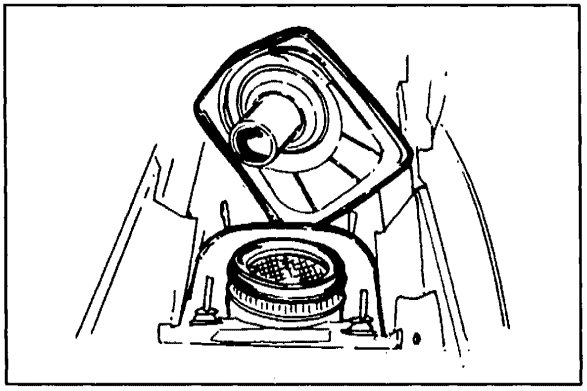
Secondary (Main) Filter

Inspect the secondary filter weekly or after every 50 hours of operation.

CAUTION: Never operate the ATV with the filter element removed. Dirt will enter the engine causing serious rapid wear and damage to the engine.

Secondary filter removal and installation procedure:

1. Remove ATV seat.
2. Remove primary air filter box.
3. Remove four wing nuts holding cover assembly to secondary air filter housing.
4. Remove filter element.
5. Inspect gaskets on both sides of filter. Replace if required.
6. Coat top and bottom gaskets of filter with a generous amount of grease.
7. Check condition of air box and replace if necessary. Install filter into airbox. Be sure filter element seats securely.
8. Check cover gasket and replace if required. Be sure cover is seated properly and wing nuts are finger tightened securely.
9. Reinstall primary air filter box as per instructions found on page 2.22.
10. Reinstall ATV seat.



Cleaning the Main Filter

Important:

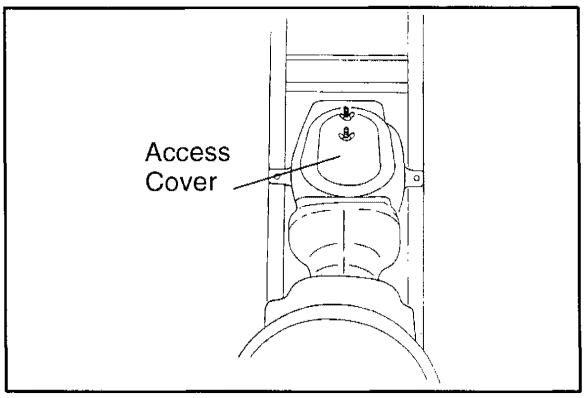
It is advisable to replace the filter when it is dirty. However, in an emergency it is permissible to clean the main filter if you observe the following practices.

1. **Never** immerse the filter in water since dirt can be transferred to the clean air side of the filter.
2. If compressed air is used **never** exceed a pressure of 40 PSI. Always use a dispersion type nozzle to prevent filter damage and clean from the outside to the inside.

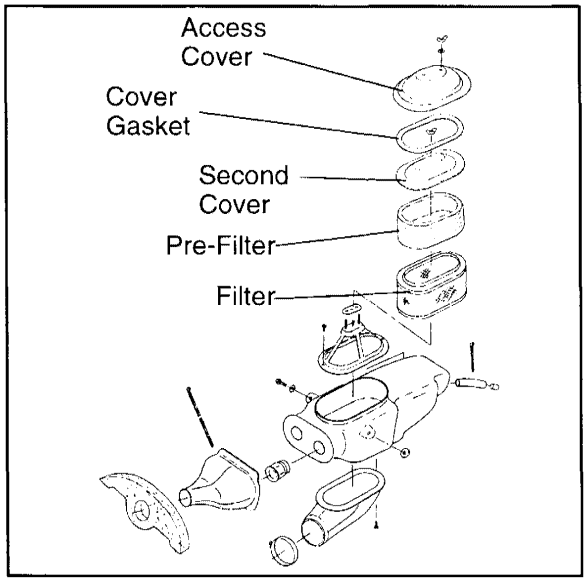
NOTE: Replace the air filter every 50 hours, and possibly more often in very dirty conditions.

Air Filter Service
Sport, Scrambler 400

1. Release seat latch and lift up on the rear of the seat.
2. Pull the seat back and free the tab from front cab.
3. Remove the two wing nuts and washers securing the air filter access cover.
4. Remove the cover. Inspect the gasket. It should adhere tightly to the cover and seal all the way around.

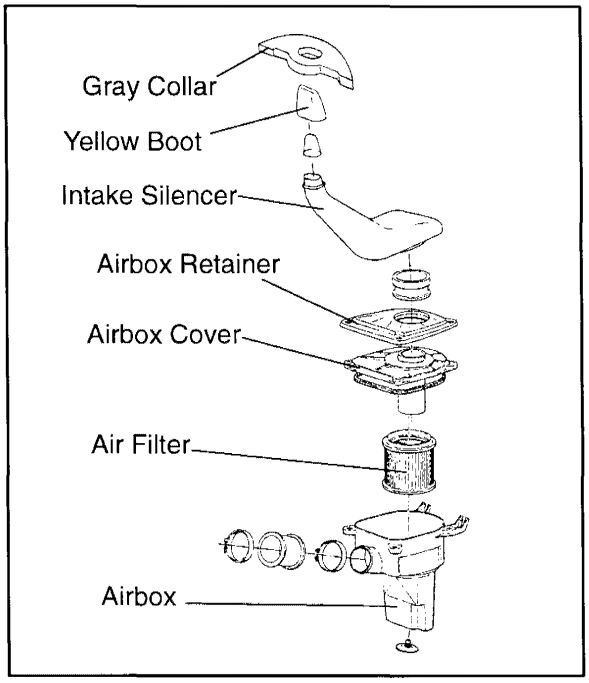


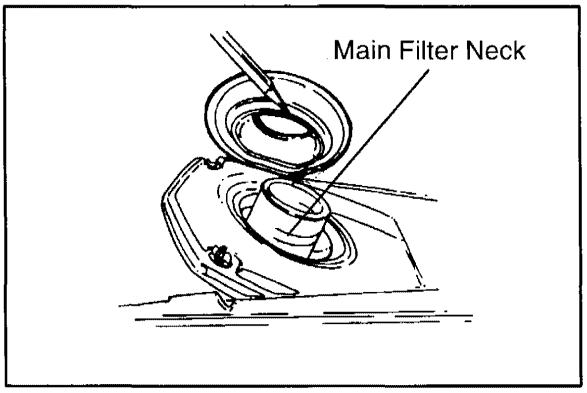
5. Remove the wing nut and washer securing the second cover. The cover should be straight and not distorted.
6. Remove pre filter from main filter and discard the main air filter.
7. Carefully wash the pre-filter in soapy water and dry it.
8. Install dry pre-filter over new main filter and install. **NOTE:** Apply a small amount of general purpose grease to the sealing edges of the filter before installing.



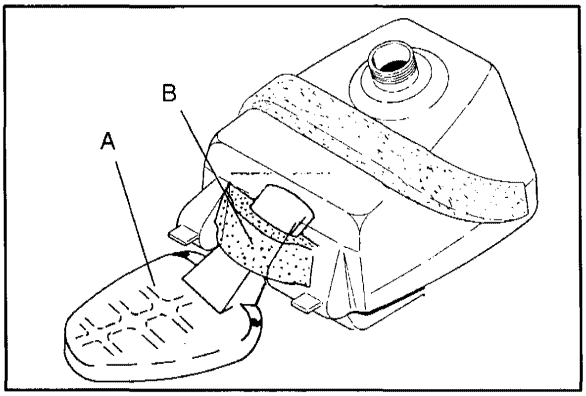
Air Filter Service
Trail Blazer

1. Release seat latch and lift up on the rear of the seat.
2. Pull the seat back and free of the tabs.
3. Remove the primary air filter box.
4. Remove the yellow pre-cleaner foam boot, held in place by a gray collar, from the air box. Do not remove the collar.
5. Carefully wash the yellow foam boot in soapy water and dry it.
6. Oil the foam boot with engine injection oil (1 to 2 teaspoons). Squeeze out the excess into an absorbant cloth.
7. Reinstall the yellow foam boot onto the air filter box.
8. Reinstall the primary air filter box removed in step 2. **NOTE:** There will be some resistance. Be sure the black rubber sealing ring is securely positioned over the main filter neck.





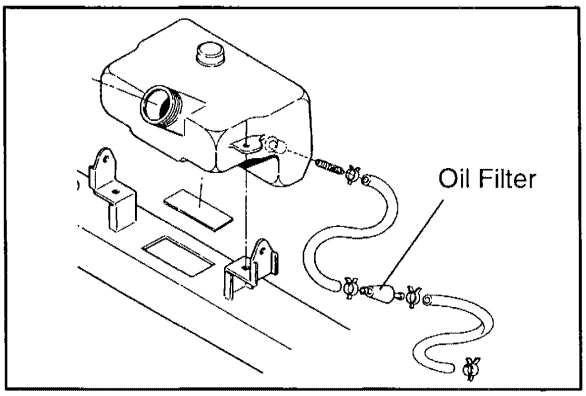
CAUTION: When installing the primary air filter box be sure the gray foam collar (B) is below the intake opening of the air box intake (A). Improper installation will restrict airflow to the engine possibly resulting in engine damage.



Oil Filter (2 Strokes)

The oil filter is located in-line between the oil tank and the oil pump on all 2-stroke models. The in-line oil filter is a special type and must not be substituted. Replace the oil filter annually or whenever water or debris has entered the oil tank. Do not attempt to clean this filter.

1. Remove clamps, securing lines to filter.
2. Remove lines and replace filter with arrow pointing in direction of oil flow (towards pump).
3. Reinstall clamps on each line and check for leaks.



Oil Filter Change (2-Strokes)

Replace oil filter every 100 hours of operation.

4 Stroke Engine Maintenance

NOTES

Air Filter - 4 Stroke Engines

It is recommended the air filter be replaced yearly. When riding in extremely dusty conditions replacement will be required more often.

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

Pre-Filter Service

1. Lift up on the rear of the seat.
2. Pull the seat back and free of the tabs. **NOTE:** When reinstalling seat, make sure the slots in the seat engage the tabs in the fuel tank.

Magnum

3. Remove splash guard foam securing pre-filter. Remove pre-filter element. Note position of duct support wire. It must be properly positioned before reinstalling pre-filter.

Gen IV 500s

Remove wing nuts (6) from air box cover and remove cover. Slip the pre-filter element off of main element.

Cleaning

4. Clean the element with high flash point solvent, followed by hot soapy water.
5. Rinse and dry thoroughly.
6. Inspect element for tears or damage.
7. Apply a 1-2 oz of 2-stroke oil (or foam filter oil) to the pre-filter. Thoroughly work oil completely into foam. Squeeze out excess oil.

Installation

Magnum

8. Reinstall pre-filter element making sure duct support wire is in proper position. Secure splash guard foam removed in step 3. Do not allow splash guard foam to restrict air intake. Do not tuck the element under the noise baffle foam.

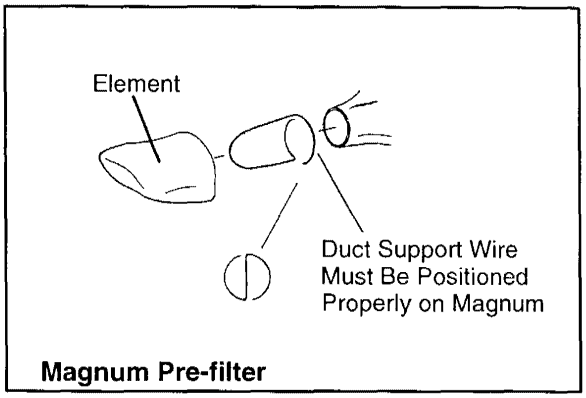
Gen IV 500s

Reinstall element over main filter. Be sure the element covers entire surface of main filter without folds or creases.

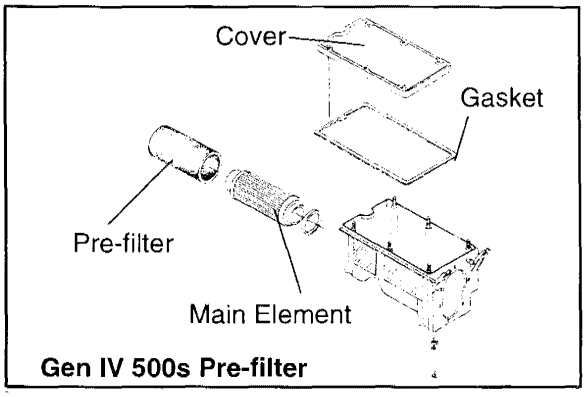
Air Filter Main Element

1. Remove the two wing nuts and washers securing the air filter access cover (6 on Gen IV 500s).

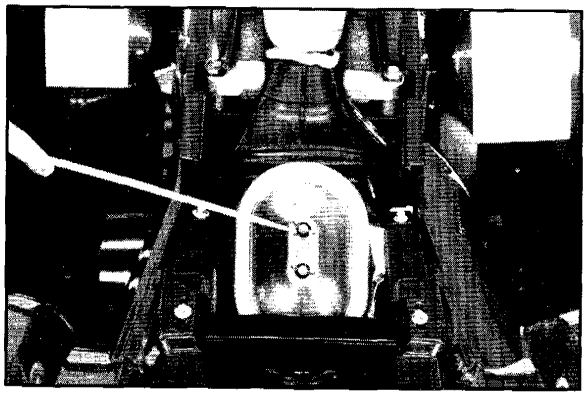
2. Remove the cover. Inspect the gasket. It should adhere tightly to the cover and seal all the way around.

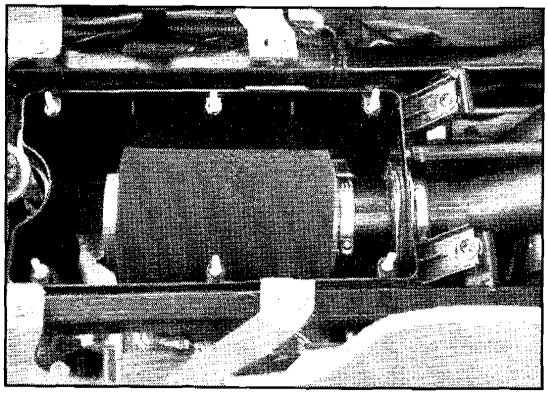


Magnum Pre-filter



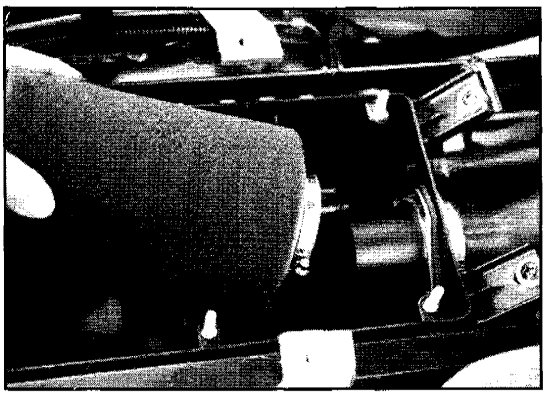
Gen IV 500s Pre-filter





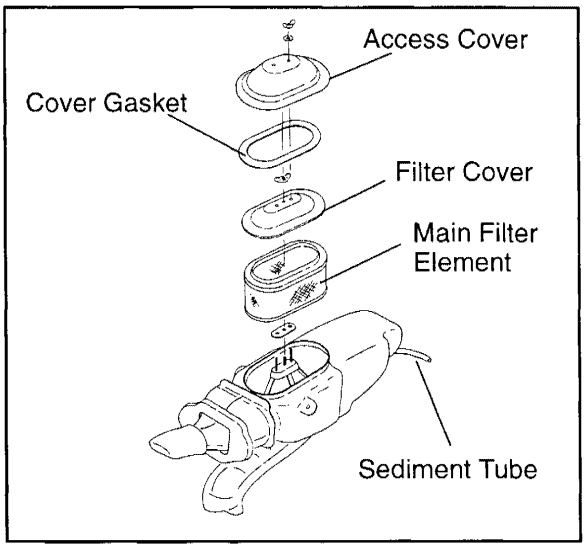
Air Filter Main Element, Cont.

3. Remove the wing nut and washer securing the filter cover. The cover should be straight and not distorted (Loosen clamp on Gen IV 500s).



4. Remove the air filter. Inspect and replace if necessary. If the filter has been soaked with water, fuel or oil it must be replaced.

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



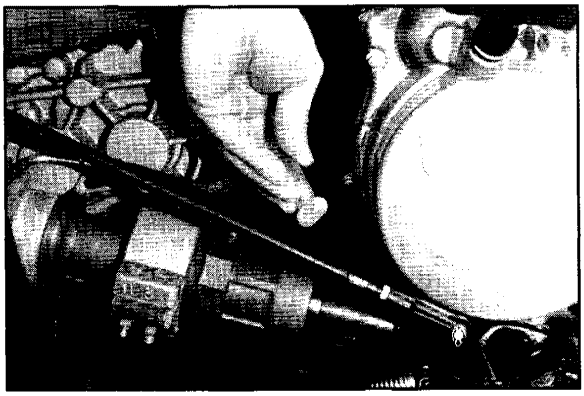
Air Box Sediment Tube

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

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

1. Remove drain plug from end of sediment tube.
2. Drain tube.
3. Reinstall drain plug.

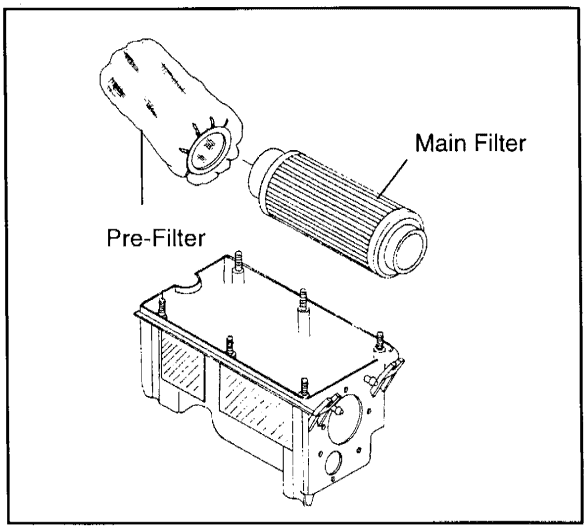
Magnum Style



Sportsman Style

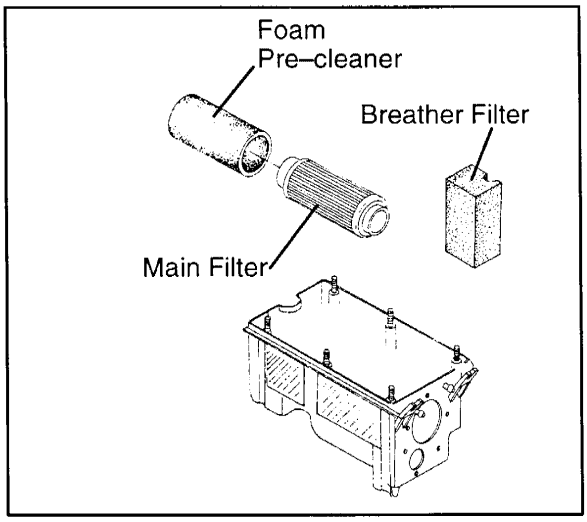
Air Filter Service
Scrambler 500

1. Remove seat.
2. Release clips and remove cover.
3. Loosen clamp and remove filter
4. Remove fabric type pre-filter from main filter. Wash pre-filter in soapy water and dry it.
5. Reinstall pre-filter in main filter. Replace main filter as required.



Air Filter Service
Sportsman 500, Xplorer 500

1. Remove seat.
2. Remove wingnuts securing the airbox lid and remove lid.
3. Pull foam breather filter out.
4. Loosen clamp and remove filter.
5. Remove foam pre-cleaner from main filter.
6. Wash the pre-filter in soapy water and dry it.
7. Install dry pre-filter over new main filter and reinstall.
8. Push foam breather filter straight down into airbox until flush with upper edge of box. Make certain foam is flush with front edge of airbox so air cannot enter engine breather fitting hole without first passing through the foam.



NOTES

Check Engine Oil (4 Stroke)

The oil tank is located on the left side of the vehicle. To check the oil:

1. Set machine on a level surface.
2. Start and run engine for 20-30 seconds. This will return oil to its true level in the oil tank. About a cup of oil will remain in the crankcase.
3. Stop engine, remove dipstick and wipe dry with a clean cloth.
4. Reinstall dipstick, screwing into place.

NOTE: The dipstick must be screwed completely in to keep the angle and depth of stick consistent.

5. Remove dipstick and check to see that the oil level is between the safe and add marks. Add oil as indicated by the level on the dipstick. Do not overfill.

NOTE: Rising oil level between checks in cold weather driving, can indicate moisture collecting in the oil reservoir.

Maintain Oil Level In Normal Range

Screw in completely to check

Oil and Filter Change (4 Stroke)

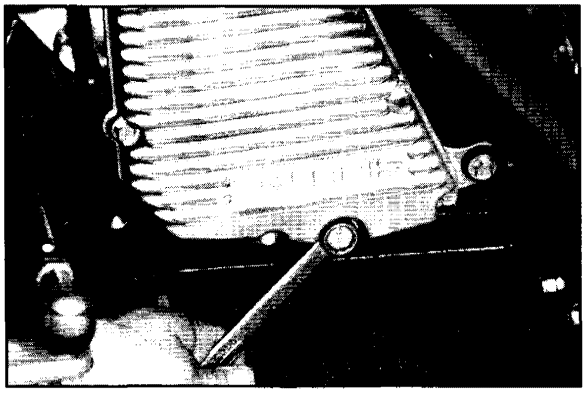
The recommended oil change interval is 100 hours, 1000 miles, or every six months, whichever comes first. Suggested break in oil change is at 20 hours, 500 miles, or one month, whichever comes first. Severe use, such as continuous duty in dirt, dust, water, short trip winter driving, or any driving below -10° F. (-23°C) requires more frequent service. Be sure to change the oil filter whenever changing oil.

Recommended Engine Oil:

Polaris Premium 4 All Season Synthetic, 0W/40, PN 2871281

Ambient Temperature Range: -40° F to 120° F

1. Place vehicle on a level surface.
2. Run engine for two to three minutes until warm. Shut engine off.
3. Clean area around drain plug at the bottom of the oil tank.
4. Place a drain pan beneath the oil tank 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 oil drain plug. **NOTE:** The sealing surfaces on the drain plug and the oil tank should be clean and free of burrs, nicks or scratches.
7. Reinstall drain plug and torque to 14 ft. lbs. (1.9 kgm).



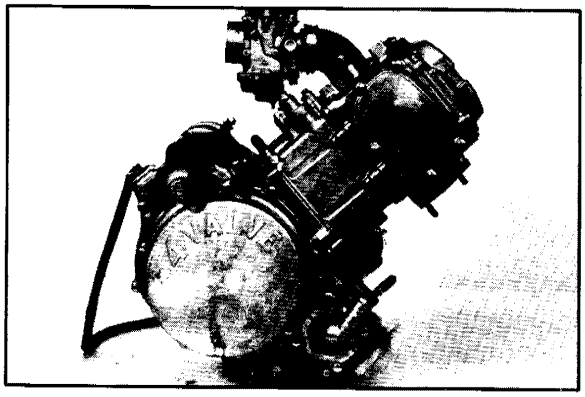
Oil and Filter Change, Cont. (4 Stroke)

8. Place shop towels beneath oil filter. Using an oil filter wrench, turn filter counterclockwise to remove.
9. Using a clean dry cloth, clean filter sealing surface on crankcase.
10. Lubricate O-ring on new filter with a film of engine oil. Check to make sure the O-ring is in good condition.
11. Install new filter and turn by hand until filter gasket contacts the sealing surface, then turn and additional 1/2 turn.

12. Approximately 1 cup of engine oil will remain in the crankcase. To drain, remove drain plug found on lower right side of crankcase.

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

13. Reinstall drain plug.
14. Remove dipstick and fill tank with 2 quarts (1.9 l) of Polaris Premium 4 synthetic oil.
15. Place gear selector in neutral and set parking brake.
16. Start the engine and let it idle for one to two minutes. Stop the engine and inspect for leaks.
17. Re-check the oil level on the dipstick and add oil as necessary to bring the level to the upper mark on the dipstick.
18. Dispose of used filter and oil properly.



Engine Sump Drain Plug

Oil Tank Drain Plug Torque:
14 ft. lbs. (1.93 kgm)

Crankcase Drain Plug Torque:
14 ft. lbs. (1.93 kgm)

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

Oil Filter Wrench:
Snap On PN YA997 or 2 1/2 inch

NOTES

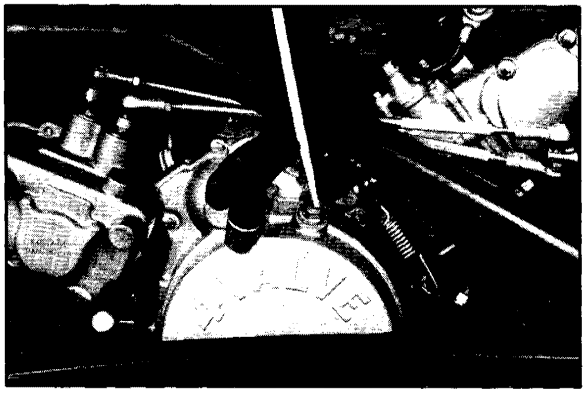
NOTES

Valve Clearance

Inspect and adjust valve clearance while the engine is cold and the piston positioned at Top Dead Center (TDC) on compression stroke.

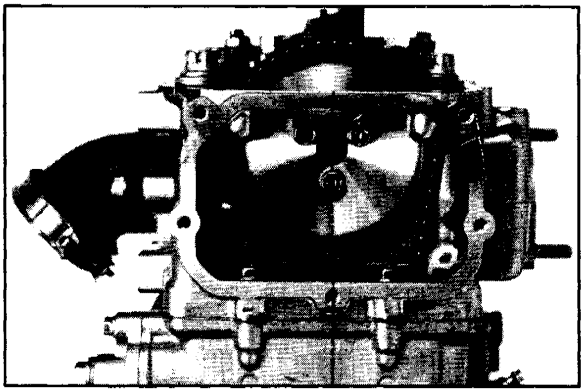
1. Lift up on the rear of the seat.
2. Pull the seat back and free of the tabs. **NOTE:** When reinstalling seat, make sure the slots in the seat engage the tabs in the fuel tank.
3. Remove the left and right side body panels and fuel tank cover. See Body Panel Removal, Chapter 2.
4. Remove the fuel tank.
5. Remove the spark plug high tension lead and remove the spark plug. **CAUTION:** Place a clean shop towel into the spark plug cavity to prevent dirt from entering.
6. Remove the eight 6 x 20 mm bolts securing the rocker cover. Remove the cover and gasket. **NOTE:** It may be necessary to tap the cover lightly with a plastic hammer to loosen it from the cylinder head.
7. Remove the timing inspection plug from the recoil housing.

CAUTION: Failure to position the crankshaft exactly as shown (TDC on compression stroke) will result in improper valve adjustment.

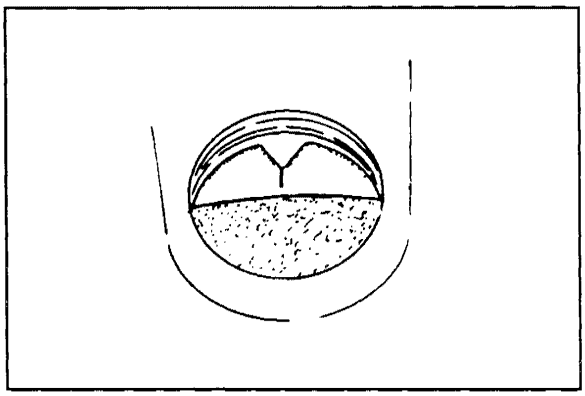


8. Rotate the engine slowly with the recoil rope, watching the intake valves open and close.

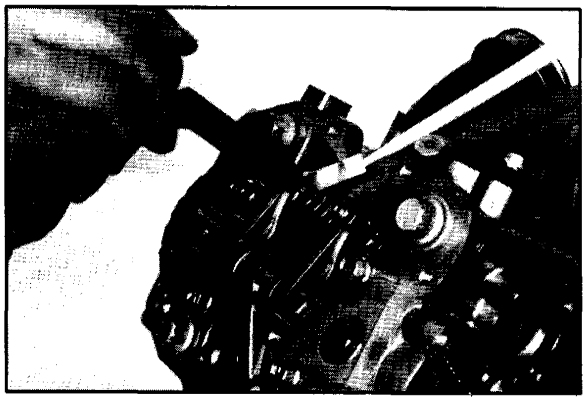
NOTE: At this point watch the camshaft sprocket marks and slowly rotate engine until marks are parallel to rocker cover gasket surface. The cam sprocket locating pin will be facing upward directly in line with the crankshaft to camshaft center line as shown. See photo at right.



9. Verify accurate TDC positioning by observing the mark aligned with the line in the timing inspection hole. In this position there should be clearance on all valves.



Intake Valve Clearance Adjustment

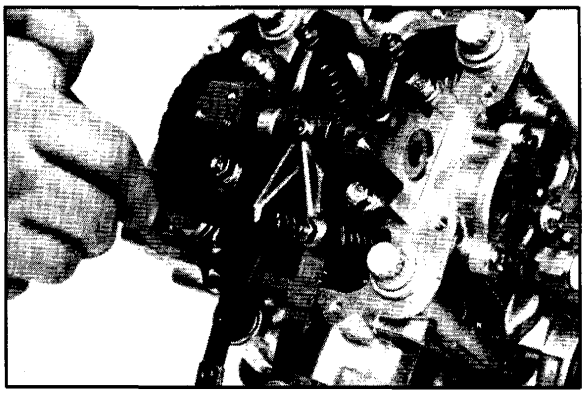


1. Insert a .006″ (.15 mm) feeler gauge between the end of the intake valve stem and the clearance adjuster screw as shown.
2. Using a 10 mm wrench and a screwdriver, loosen the adjuster lock nut and turn the adjusting screw until there is a slight drag on the feeler gauge.
3. Hold the adjuster screw and tighten the adjuster lock nut to a torque of 5.8 to 7.2 ft. lbs., using the 10mm flank drive torque adapter at a 90° angle to the torque wrench as shown. **NOTE:** The flank drive must be positioned at a 90° angle to the torque wrench to prevent over torquing.
4. Re-check the valve clearance.
5. Repeat adjustment procedure if necessary until clearance is correct.
6. Repeat this step for the other intake valve.

INTAKE VALVES
Valve Clearance - Engine Cold and Positioned at TDC on Compression Stroke:
.006″ (.15 mm)

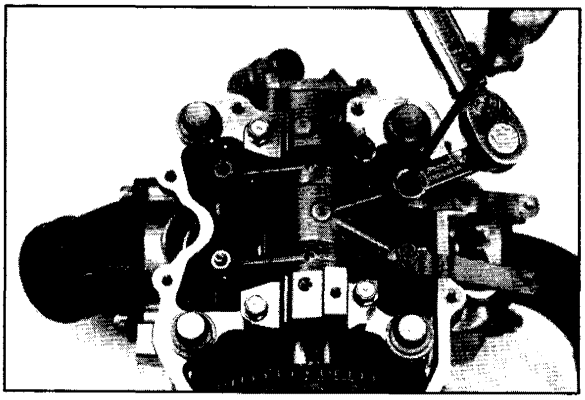
Exhaust Valve Clearance Adjustment

NOTE: The exhaust valves share a common rocker arm, and must be adjusted using two feeler gauges.



1. Insert a .006″ (.15 mm) feeler gauge between each of the exhaust valves and adjuster screws.
2. If adjustment is needed, loosen the locknuts and turn the adjuster screws until there is a slight drag on both feeler gauges. **NOTE:** Both feeler gauges should remain inserted during adjustment.

EXHAUST VALVES
Valve Clearance - Engine Cold and Positioned at TDC on Compression Stroke:
.006″ (.15 mm)



Use torque adaptor for all valve adjuster locknuts.

3. When the clearance is correct, hold the adjuster screw and tighten the locknut to 5.8 to 7.2 ft. lbs., using the 10mm flank drive torque adapter at a 90° angle to the torque wrench as shown. **NOTE:** The flank drive must be positioned at a 90° angle to the torque wrench to prevent over torquing.
4. Re-check the valve clearance.
5. Repeat adjustment procedure if necessary until clearance is correct.
6. Scrape gasket surfaces to remove all traces of the old gasket. **CAUTION:** Use care not to damage the sealing surface of the cover or cylinder head.

Exhaust Valve Clearance Adjustment Cont.

7. Reinstall the cover using a new gasket.
8. Torque cover bolts to 72 in. lbs.
9. Remove the shop towel from the spark plug cavity.
10. Reinstall the spark plug. Torque to 11 ft. lbs. (new), 18 ft. lbs. (used).
11. Reinstall the spark plug high tension lead.
12. Reinstall the fuel tank.
13. Reinstall the fuel tank shroud.
14. Reinstall the left and right body panels.

Cover Bolt Torque:	**72 in. lbs.**
Spark Plug Torque:	**11 ft. lbs. new** **18 ft. lbs. used**

Throttle Cable Lubrication

Lubricate throttle cable from the throttle block end.

1. Turn engine off.
2. Remove three throttle block cover screws.
3. Slide boot off throttle cable adjuster and jam nut.
4. Loosen cable adjuster jam nut.
5. Turn adjuster in to obtain maximum cable freeplay.
6. Open throttle and hold cable.
7. Carefully disconnect throttle cable from throttle lever. Do not kink or bend throttle cable.
8. Unscrew adjuster and remove cable.
9. Hold throttle cable up and lubricate with Polaris Cable Lube.

Polaris Cable Lube **PN 2870510**

10. Turn adjuster in to obtain maximum cable freeplay.
11. Reinstall cable onto throttle lever.
12. Perform throttle cable adjustment.

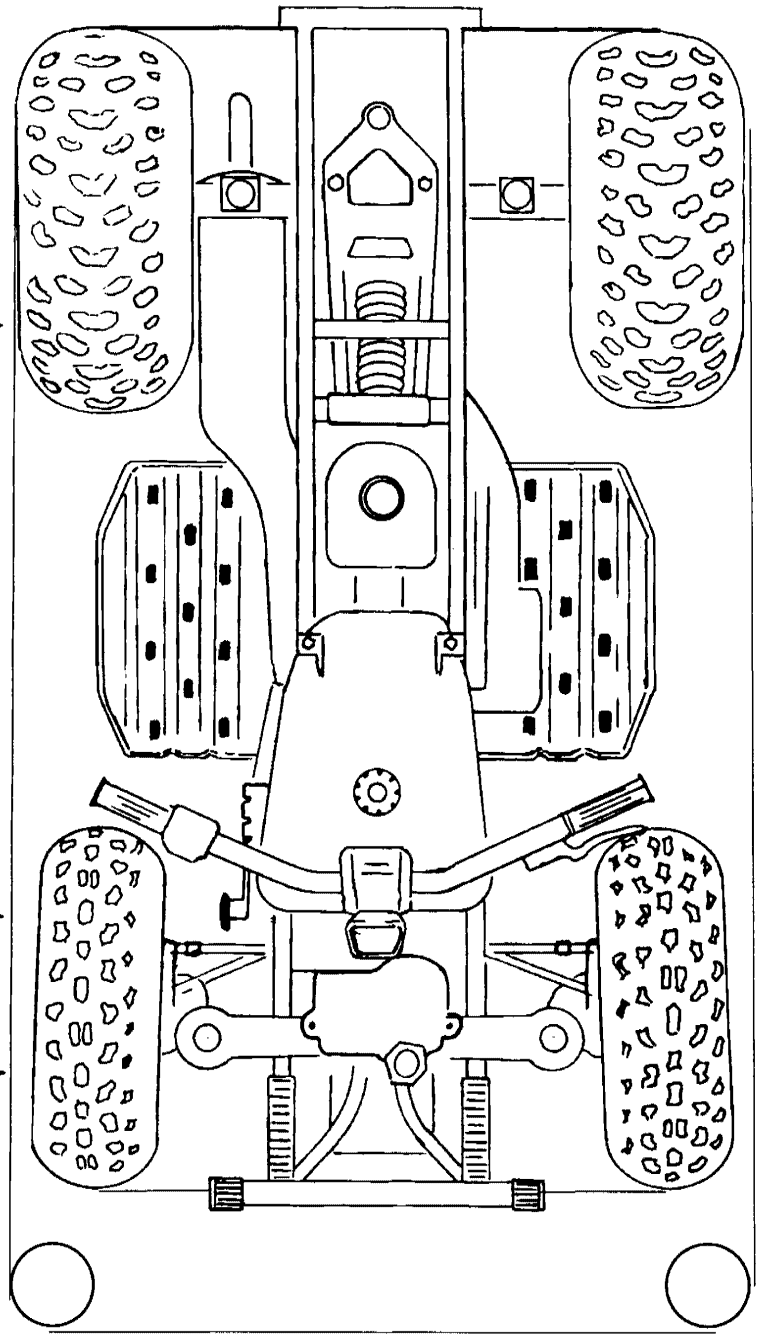
MAINTENANCE

Toe Alignment Inspection

CAUTION: 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 Dealer. One of two methods can be used to measure toe alignment. The string method is shown below and the chalk method on page 2.31. If adjustment is required, refer to page 2.31 for procedure.

Method 1

Be sure to keep handlebars centered. See note below.



NOTE: The steering post arm can be used as an indicator of whether the handlebars are straight. The arm should always point straight back from the steering post.

Steering

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

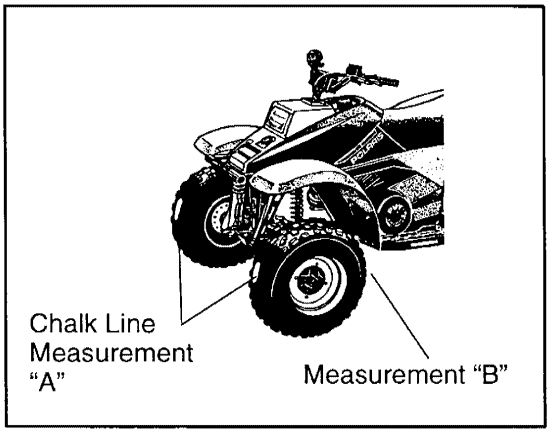
Replace any worn or damaged steering components. Steering should move freely through entire range of travel without binding. Check routing of all cables, hoses, and wiring to be sure the steering mechanism is not restricted or limited. **NOTE:** Whenever steering components are replaced, check front end alignment. See page 5.9 for an optional alignment procedure. Polaris recommends steering component repair and adjustment be performed by an authorized Polaris dealer.

Camber and Caster

The camber and caster are non-adjustable.

Toe Alignment Inspection

1. Place machine on a smooth level surface.
2. Set handlebars in a straight ahead position and secure handlebars in this position. **NOTE:** The steering frog can be used as an indicator of whether the handlebars are straight. The frog should always point straight back from the steering post.
3. Place a chalk mark on the face of the front tires approximately 10″ (25.4 cm) from the floor as close to the horizontal center line of the hub as possible. **NOTE:** It is important that both marks be equally positioned from the ground in order to get an accurate measurement.
4. Measure the distance between the marks and record. Call this measurement "A".

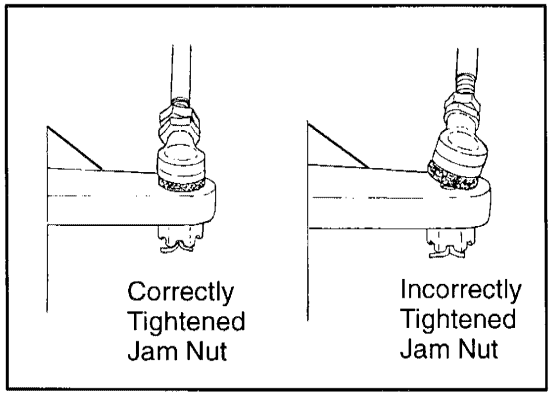


5. Rotate the tires 180° by moving vehicle forward or backward. Position chalk marks approximately 10″ (25.4 cm) from the floor. Measure the distance between the marks and record. Call this measurement "B".
6. Subtract measurement "B" from measurement "A". The difference between measurements "A" and "B" is called vehicle toe alignment. The recommended vehicle toe tolerance is 1/8″ to 1/4″ (.3 to .6 cm) total 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).
7. If this measurement needs to be adjusted, measure the distance between vehicle center and each wheel. This will tell you which tie rod needs adjusting. **NOTE:** Be sure handlebars are straight ahead before determining which tie rod(s) need adjustment.The steering post arm can be used as an indicator of whether the handlebars are straight.

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

- To adjust toe alignment, the jam nuts must be loosened and the tie rod either shortened or lengthened for proper toe setting.
- When the tie rod end jam nuts are tightened, be sure to hold tie rod ends so they are parallel with the steering arm or the steering frog, respectively.

8. After alignment is complete, torque jam nuts to 12-14 ft. lbs. (1.66-1.93 kg-m).

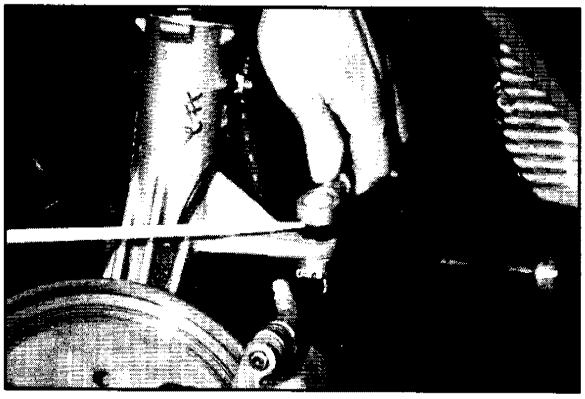


Tie Rod End Inspection

⚠ WARNING

Only a qualified technician should replace worn or damaged steering parts.

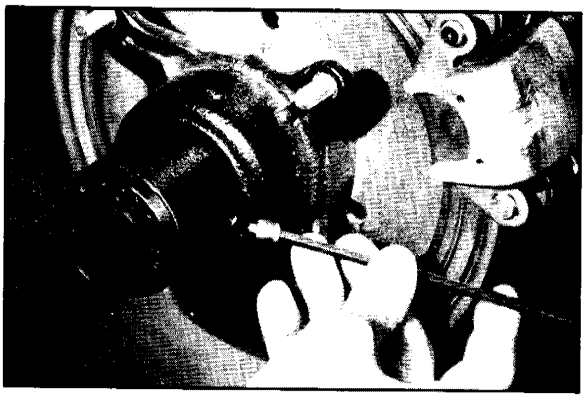
To check for play in the tie rod end, grasp the steering tie rod, pull in all directions feeling for movement. Replace any worn steering components. Steering should move freely through entire range of travel without binding.



Front Hubs (4x4 AWD Model)

To check front hub fluid:

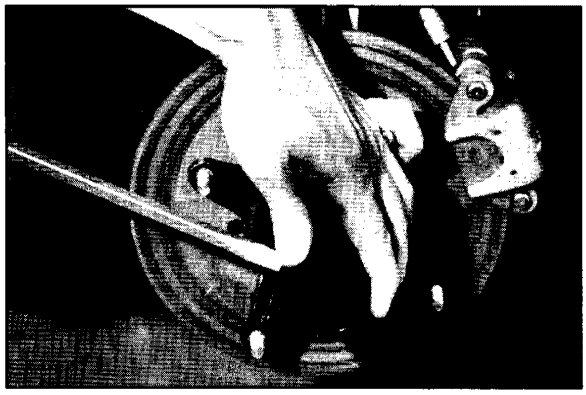
1. Place vehicle on a level surface.
2. Turn wheel until front hub fill/check plug is in either the 4:00 or 8:00 position.



3. Remove fill/check plug.
4. Add Polaris Premium Demand Drive Hub Fluid or Type F Automatic Transmission Fluid if necessary until fluid trickles out. **NOTE:** Do not force the fluid into the hub under pressure or seal damage may occur.
5. Reinstall plug.
6. Repeat procedure for other hub.

Changing Front Hub Fluid

1. Place a drain pan beneath the hub.
2. Remove the hub cap by carefully prying with a screwdriver in the notches provided. Pry equally until cap is removed. **NOTE:** Mid 1996 to current AWD model ATVs are equipped with three Torx™ head screws to secure the hub cap.
3. Allow fluid to drain completely.
4. Inspect hub cap O-rings for nicks, cuts or abrasions. Replace if necessary.
5. Remove check/fill plug.
6. Reinstall the hub cap. **NOTE:** The check/fill plug must be removed before reinstalling the hub cap.
7. Turn wheel until front hub fill/check plug is in either the 4:00 or 8:00 position.
8. Add fluid until it trickles out. **NOTE:** Do not force the fluid into the hub under pressure or seal damage may occur.



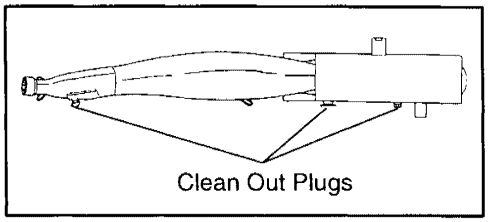
Recommended Front Hub Fluid:

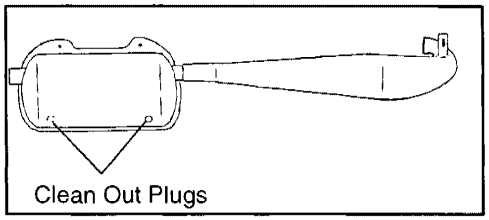
Polaris Demand Drive Hub Fluid
PN 2871654 12 oz.

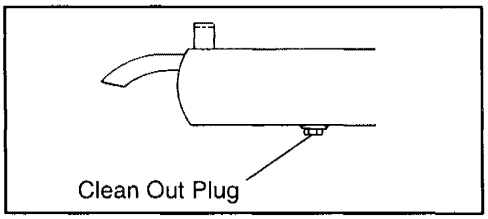
Exhaust Pipe

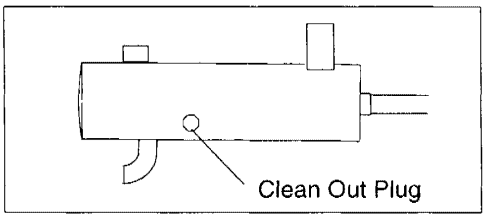
The exhaust pipe must be periodically purged of accumulated carbon as follows:

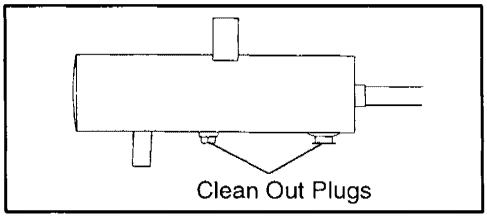
1. Remove the clean out plugs located on the bottom of the muffler as shown above.
2. Place the transmission in neutral and start the engine. Purge accumulated carbon from the system by momentarily revving the engine several times.
3. If some carbon is expelled, cover the exhaust outlet and rap on the pipe around the clean out plugs while revving the engine several more times.
4. If particles are still suspected to be in the muffler, back the machine onto an incline so the rear of the machine is one foot higher than the front. Set the parking brake and block the wheels. Make sure the machine is in neutral and repeat steps 2 and 3. **WARNING:** SEE BELOW.
5. If particles are still suspected to be in the muffler, drive the machine onto the incline so the front of the machine is one foot higher than the rear. Set the parking brake and block the wheels. Make sure the machine is in neutral and repeat steps 2 and 3. **WARNING:** SEE BELOW.
6. Repeat steps 2 through 5 until no more particles are expelled when the engine is revved.
7. Stop the engine and allow the arrestor to cool.
8. Reinstall the clean out plugs.











⚠ WARNING

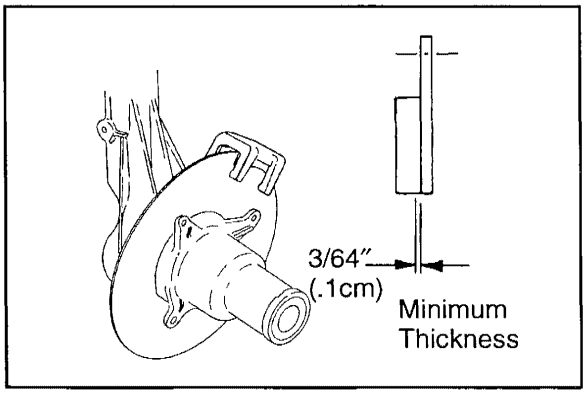
- Do not perform this operation immediately after the engine has been run because the exhaust system becomes very hot.
- Because of the increased fire hazard, make sure that there are no combustible materials in the area when purging the spark arrestor.
- Wear eye protection.
- Do not stand behind or in front of the vehicle while purging the carbon from the spark arrestor.
- Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas.
- Do not go under the machine while it is inclined.

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

Brake System Inspection

The following checks are recommended to keep the brake system in good operating condition. How often they need checking depends upon the type of driving that has been done.

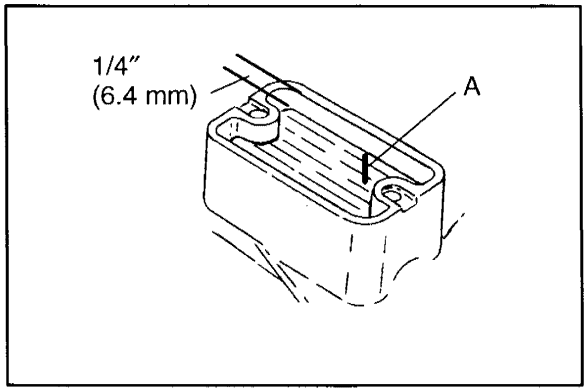
- Keep fluid level in the master cylinder reservoir 1/4″ (6.4 mm) from the top (between "Min" & "Max" lines on plastic reservoirs) at all times. Normal functioning of the diaphragm is to extend into the reservoir as fluid level drops. If the fluid level is low and the diaphragm is not extended, a leak is indicated and the diaphragm should be replaced. Always fill the reservoir to within 1/4″ (6.4 mm) of the top (between "Min" & "Max" lines on plastic reservoirs) whenever the cover is loosened or removed to insure proper diaphragm operation. Use Polaris DOT 3 brake fluid (PN 2870990).
- Check brake system for fluid leaks.
- Check brake for excessive travel or spongy feel.
- Check friction pads for wear, damage and looseness.
- Check surface condition of the disc.
- Pads should be changed when worn to 3/64″ (.1 cm), or about the thickness of a dime.



Brake Fluid Level Inspection

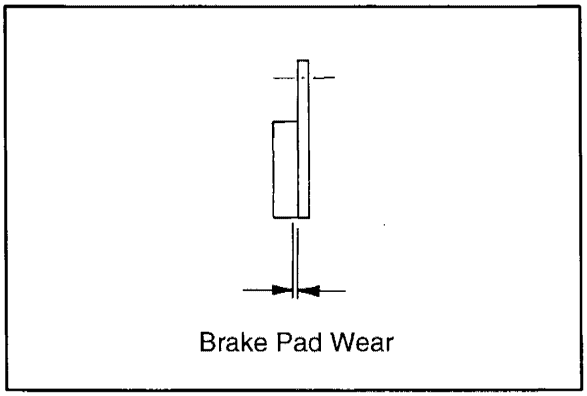
The master cylinder is located on the left handlebar. Remove the cover and check the brake fluid level often. The correct fluid level is 1/4″ (6.4 mm) from the top "A" (between "Min" & "Max" lines on plastic reservoirs). If the fluid level is low add DOT 3 brake fluid PN 2870990 only. Fill to 1/4″ (6.4 mm) from the top (between "Min" & "Max" lines on plastic reservoirs).

When reservoir cover is removed *do not* squeeze brake lever. Fluid may squirt out the compensating port if lever is pulled.



Wear Line

- Pads should be changed when worn to the indicator lines (A), as shown. See page 9.1 for pad wear specifications.
- Inspect the brake disc spline and pad wear surface for excessive wear.



Auxiliary Mechanical Brake System

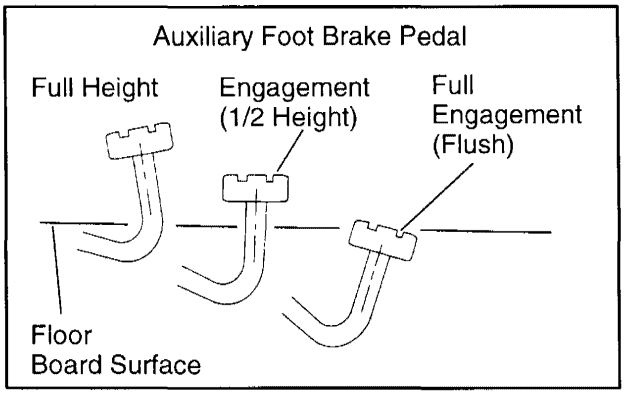
The auxiliary brake system is intended to be used as a backup for the hydraulic system. Should the hydraulic system fail, the rear brake can be activated by depressing the foot pedal on the inside of the right floorboard.

NOTE: Since this is a rear brake only, it will not be as effective as the all wheel system.

Auxiliary Brake Testing

The auxiliary brake should be checked for proper adjustment.

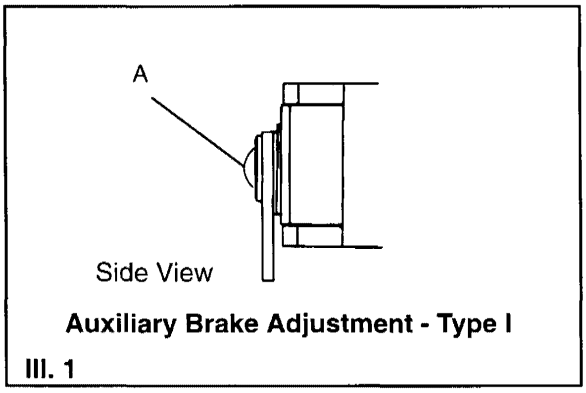
1. Support the rear wheels off the ground.
2. While turning the rear wheels by hand, apply the auxiliary foot brake. This brake should not stop the wheels from turning until the lever is half way between its rest position and bottoming on the footrest.



Auxiliary Brake Adjustment

The auxiliary brake should be adjusted if the brake pedal deflection is under 1/2″ (1.3 cm) or exceeds 3/4″ (1.9 cm) prior to brake activation.

1. Put the machine in neutral. Stop engine.
2. **Type I:** If adjustment is necessary turn adjuster bolt (A) clockwise until disc rotation becomes difficult. Turn adjuster bolt counterclockwise until brake engagement starts at approximately 1/2 of the total pedal travel (See Illustration 1).

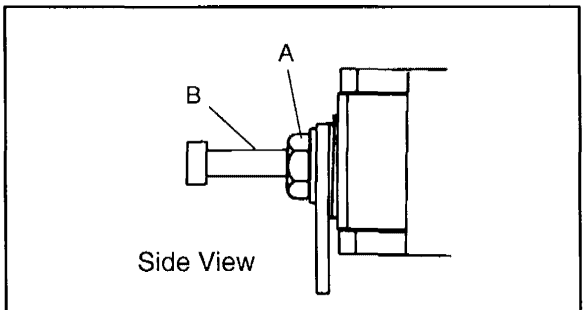


Auxiliary Brake Adjustment - Type I

Ill. 1

Type II:If adjustment is necessary, loosen jam nut (A) and turn adjuster bolt (B) clockwise until disc rotation becomes difficult. Turn adjuster bolt counterclockwise until brake engagement starts at approximately 1/2 of the total pedal travel (See Illustration). Tighten the lock nut securely. (See Illustration 2).

3. Check brakes to be sure they are not dragging. Readjust pedal deflection if necessary.
4. **Type III (Hydraulic):** Refer to Inspection Procedure/ Linkake adjustment on page 9.30b.



Auxiliary Brake Adjustment - Type II

Ill. 2

Hose/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.

Drive Chain and Sprocket Inspection

Inspect the drive chain for missing or damaged O-Rings, link plates, or rollers. Do not wash the chain with a high pressure washer, gasoline or solvents; do not use a wire brush to clean the chain as damage to the O-Rings may occur. Clean chain with hot soapy water and a soft bristled nylon brush.

Never allow battery acid to contact the drive chain. Periodically lubricate the chain with Polaris O-Ring Chain Lubricant (PN 2871079).

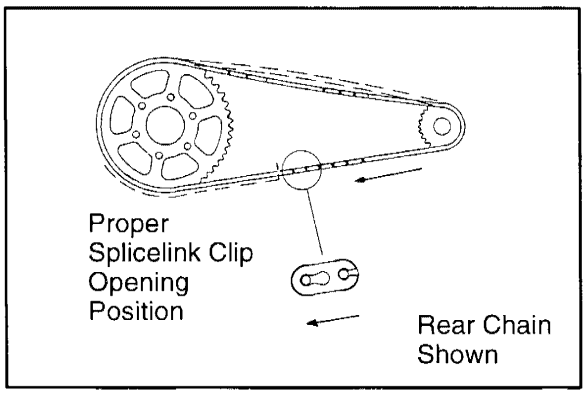
Drive Chain Lubricant:

Polaris O-Ring Chain Lubricant
PN 2871079

Drive Chain Inspection

The chain must be replaced when it reaches 3% elongation.

1. Stretch the chain tightly in a straight line.
2. Measure a length of twenty pitches (pins) from pin center to pin center, and compare to the specification. Replace the chain if the length exceeds the wear limit.
3. When replacing or reinstalling drive chain, install the closed end of the splice link clip as shown, with the closed end leading in forward operation.



Drive Chain Wear Limit, 20 Pitch Length:

Std: 12.5″ (32 cm)
Wear Limit: 12.875″ (32.7 cm)

Rear Drive Chain Note (All Except Models With Concentric Swingarm):

The rear chain will change tension as the swingarm moves through the range of travel. Adjusting the chain at the tightest point (swingarm pivot, output shaft sprocket, and rear axle are aligned in a straight line) will ensure proper adjustment and prevent damage to the chain, sprockets, axle bearings and transmission bearings.

Drive Chain Inspection

Polaris ATV drive chains are equipped with O-ring sealed permanently greased pins and rollers. The sprockets and outer rollers require periodic lubrication.

Always inspect the drive chain prior to operating the vehicle, checking for damaged or missing O-rings, rollers and correct slack adjustment. Maintain the stone guard to rear sprocket clearance at 1/8″ (.3 cm).

Regularly lubricate the drive chain with Polaris O-Ring Chain Lube or an approved O-ring chain spray lube.

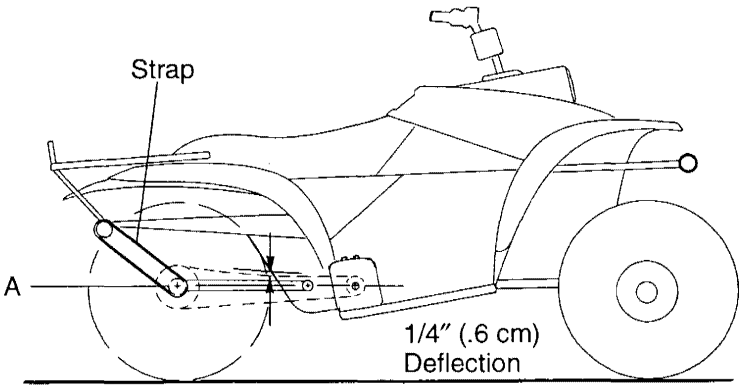
Rear Drive Chain Tension Adjustment

NOTE: On models with concentric swingarm (such as 1998 Scramblers), chain tension can be measured at any point in the swingarm arc. It is not necessary to compress the suspension on concentric models (as shown below). Refer to page 2.37a for drive chain adjustment procedure on concentric swingarm models.

CAUTION:

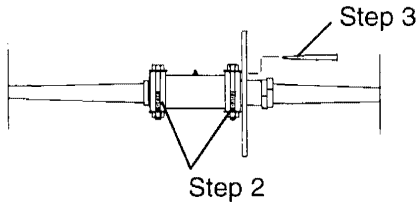
Never adjust or operate the vehicle with the rear drive chain too loose or too tight as severe damage to the transmission and drive components can result.

Check the amount of chain slack by moving the vehicle slightly forward to gain slack at the top side of the rear chain. Collapse the suspension by using an adjustable (buckle type) trailer tie down. Fasten the strap around the axle and rear bumper tube. Tighten until a straight line (A) can be drawn from the axle to the transmission output shaft intersecting the swing arm pivot. If the chain needs adjustment, use the following procedure.



IMPORTANT: Suspension must be compressed as shown to check drive chain tension (except concentric swingarm models).

1. Loosen chain guard.
2. Loosen two eccentric locking bolts.
3. Insert a pin punch through the sprocket hub and into the eccentric axle housing.
4. Roll the vehicle ahead or back to adjust chain slack to 1/4 inch (6mm) in the center of the chain as shown above.
5. Tighten the eccentric locking bolts to 60 ft. lbs. (8.3 kg-m). Re-check chain deflection measurement.
6. Reinstall chain guard.
7. Adjust stone guard to allow 1/8" clearance between sprocket and guide.

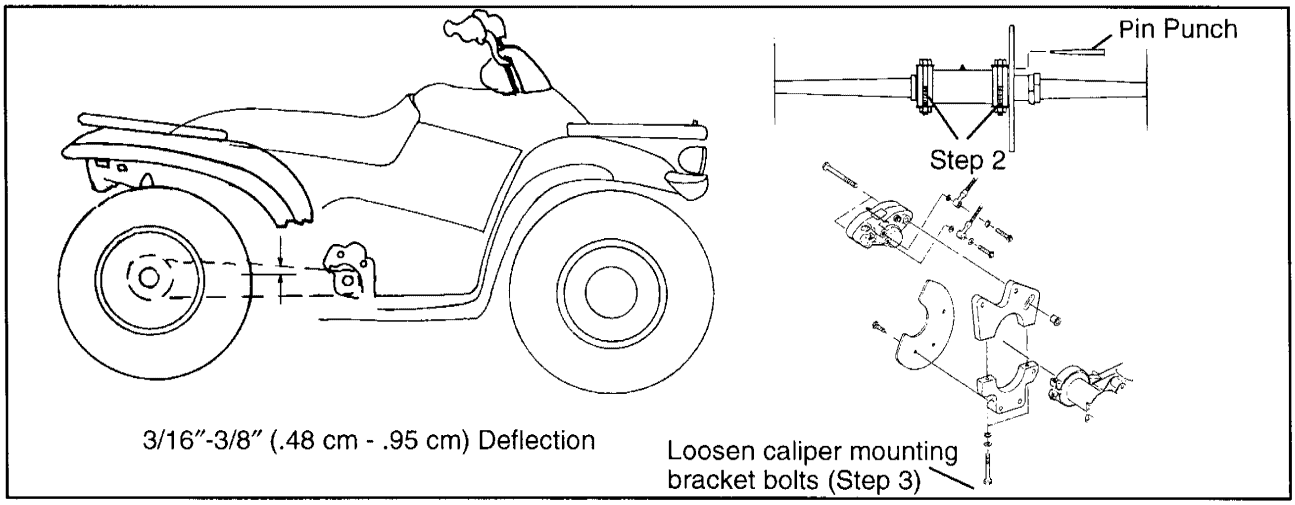


Rear Drive Chain Adjustment

Drive Chain Adjustment, Concentric Swingarm

⚠ **CAUTION:** Never adjust or operate the vehicle with the rear drive chain too loose or too tight as severe damage to the transmission and drive components can result.

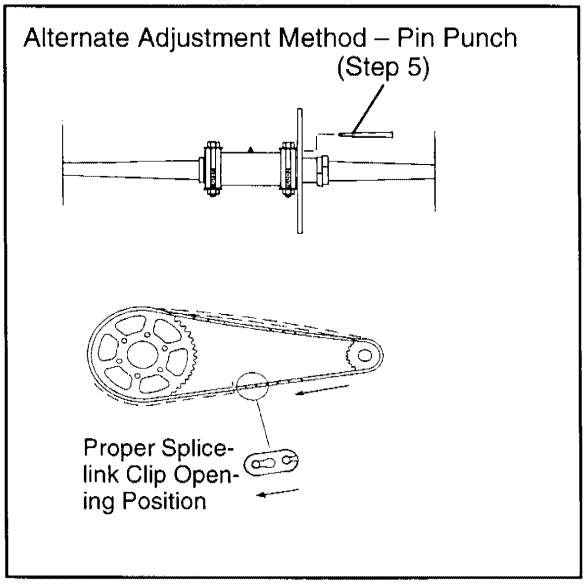
Check the amount of chain slack by moving the vehicle slightly forward to gain slack at the top side of the rear chain. At this point the chain should have 3/16″-3/8″ (.48 cm - .95 cm) deflection. If the chain needs adjustment, use the following procedure.



Adjustment Procedure

1. Loosen chain guard.
2. Loosen two eccentric locking bolts.
3. Loosen caliper mount bolts.
4. Using a 2 1/2″ wrench, rotate the housing to adjust chain slack to the proper dimension, and then proceed to Step 7;
   or... follow Steps 5 and 6.
5. Insert a pin punch through the sprocket hub and into the eccentric axle housing.
6. Roll the vehicle ahead or back to adjust chain slack to the proper dimension.
7. Tighten caliper mount bolts 10-12 ft. lbs. (1.4 - 1.7 kg/m)
8. Tighten the eccentric locking bolts to 60 ft. lbs. (8.3 kg/m).
9. Reinstall chain guard.

NOTE: Reposition chain guide to allow 1/8″ (.3 cm) clearance between sprocket and guide.



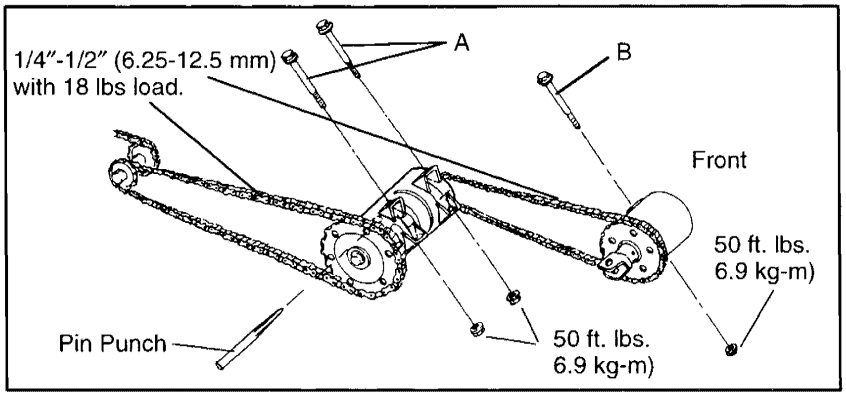
NOTES

Center/Front Drive Chain Slack Adjustment

Periodically remove the chain guards to check chain quality and adjustment.

The center chain should be adjusted before the front chain. This adjustment affects the front chain slack. After the recommended center chain adjustment is made, proceed to the front chain. **NOTE:** This procedure should be performed while the vehicle is empty (i.e. no one sitting on the machine).

Center/Front Drive Chain Inspection/Adjustment

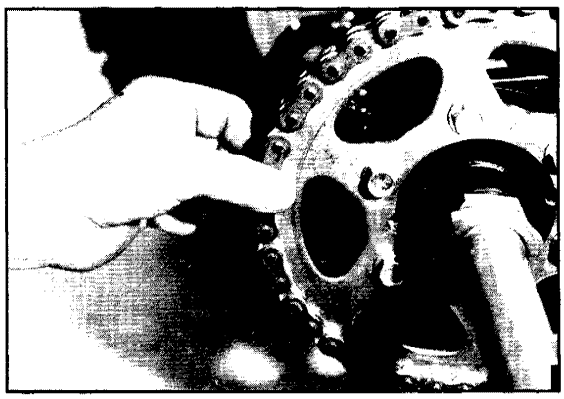


1. Remove cotter pin and washer connecting brake pedal linkage to caliper actuating arm. Remove linkage from arm.
2. Remove right front fender mud flap foot rest attaching hardware.
3. Remove center chain guard attaching hardware. Press brake pedal downward and remove guard.
4. Remove forward chain guard attaching bolts and guard.
5. Loosen center chain eccentric clamp bolts (A).
6. Rotate vehicle forward or rearward until one of sprocket holes aligns with hole provided in eccentric.
7. Insert a large punch or screwdriver through sprocket and into eccentric hole. Rotate vehicle rearward to tighten chain. Chain deflection should be 1/4-1/2" (.6 -1.2 cm) with 18 lbs. (8.18 kg) of force at center of chain.
8. Tighten eccentric clamp bolts to 45 ft. lbs. (6.21 kg-m). **NOTE:** This does not include nut rolling torque. Check chain tension.
9. Loosen forward chain eccentric clamp bolt (B). Install punch as was done previously and adjust chain to 1/4-1/2" (.6 -1.2 cm) with 18 lbs. (8.18 kg) force at center of chain.
10. Tighten forward eccentric clamp bolt to 45 ft. lbs. (6.21 kg-m). **NOTE:** This does not include nut rolling torque. When this bolt is tightened the chain deflection may change. Check deflection and adjust again if needed.

Sprocket Inspection

Inspect the sprocket for worn, broken or bent teeth.

To check for wear, pull outward on the chain as shown. Replace sprocket if chain movement exceeds 1/4" (.6 cm).

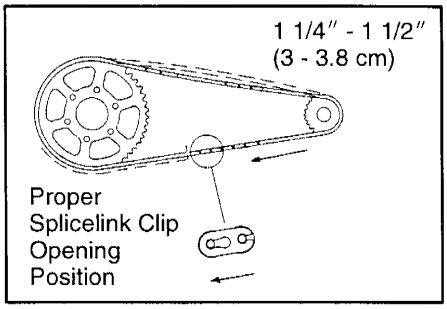


Drive Chain Inspection/Adjustment

CAUTION:

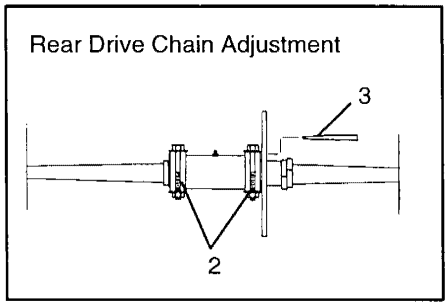
Never adjust or operate the vehicle with the rear drive chain slack out of the 1 1/4″ to 1 1/2″ (3 to 3.8 cm) specification as severe damage to the transmission and drive components can result.

Check the amount of chain slack by moving the vehicle slightly forward to gain slack at the top side of the rear chain. Then pull up and down on the chain. Total slack should be 1 1/4″ to 1 1/2″ (3 to 3.8 cm). If slack is not within specification, it must be adjusted.



Rear Axle (6x6 Middle Axle) Adjustment Procedure

1. Loosen chain guard.
2. Loosen two eccentric locking bolts.
3. Insert a pin punch through the sprocket hub and into the eccentric axle housing.
4. Roll the vehicle ahead or back to adjust chain slack to the proper dimension. Correct chain slack adjustment is 1 1/4″ to 1 1/2″ (3 to 3.8 cm) total at the midpoint.
5. Tighten the eccentric locking bolts to 60 ft. lbs.
6. Reinstall chain guard.



NOTE: Reposition chain guide to allow 1/8″ (.3 cm) clearance between sprocket and guide.

Final Drive Chain

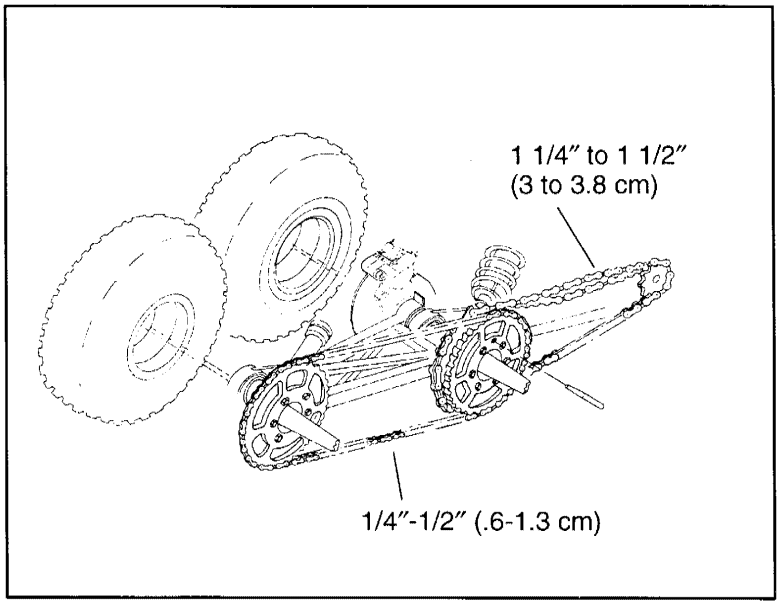
CAUTION: Never adjust or operate the vehicle with the drive chain slack out of the 1 1/4″ to 1 1/2″ (3 to 3.8 cm) specification. Severe damage to the transmission and drive components can result.

6x6 Rear Axle Drive Chain Adjustment

To adjust the rear axle drive chain on 6x6 models, loosen the rear most eccentric and rotate using the same method as outlined for the middle axle chain. Total slack, however, should be adjusted to 1/4″-1/2″ (.6-1.3 cm). Check to be sure all cotter pins, cable ties, hose clamps, etc., are in place and in good condition.

Chain Deflection

1/4-1/2″(3 - 3.8 cm)



Front Suspension

Compress and release front suspension. Damping should be smooth throughout the range of travel.

Check all front suspension components for wear or damage.

Inspect front strut cartridges for leakage.

Rear Suspension

Compress and release rear suspension. Damping should be smooth throughout the range of travel.

Check all rear suspension components for wear or damage.

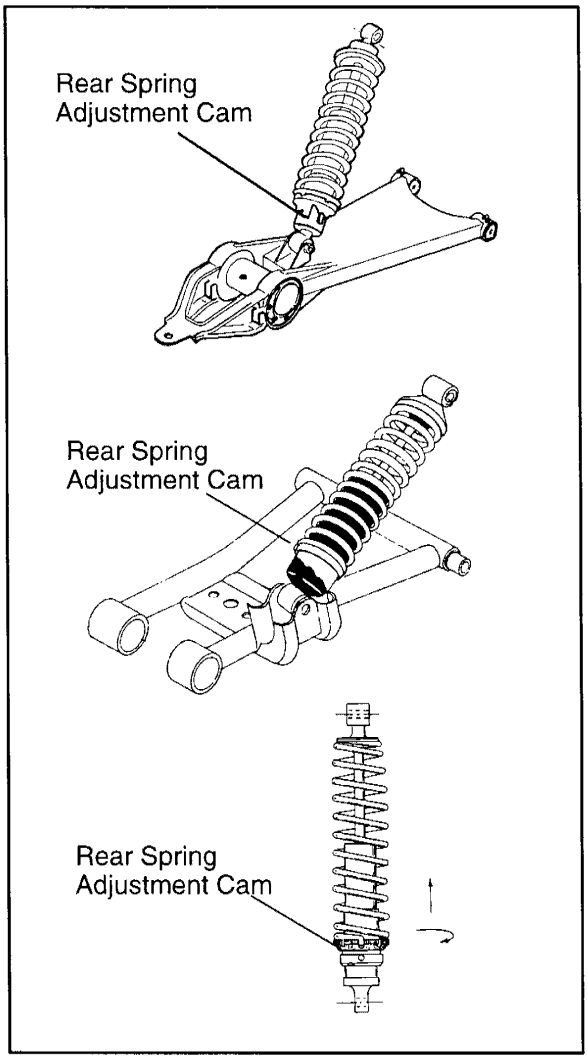
Inspect shock for leakage.

Shock spring preload can be adjusted using the shock spanner wrench.

Shock Spanner Wrench

PN 2870872

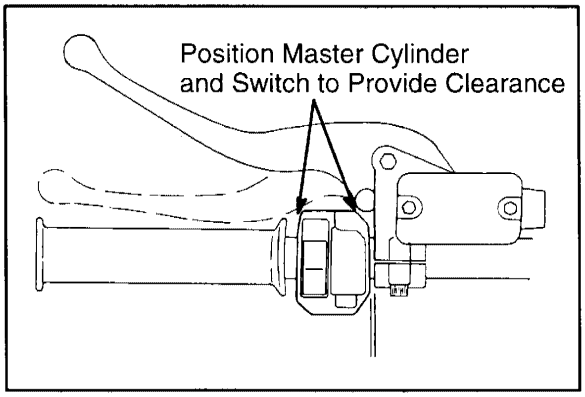
Operator weight and loading affect spring preload requirements. Adjust as necessary.



Controls

Check controls for proper operation, positioning and adjustment. Brake lever and switches must be positioned to allow adequate clearance for the movement of the lever.

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



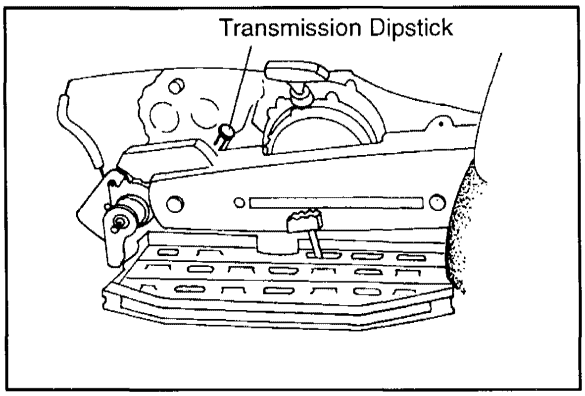
Transmission Lubrication

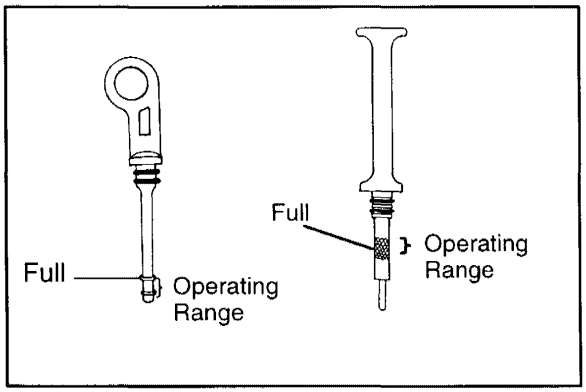
The transmission dipstick is located on the right side of the machine.

The transmission lubricant level should be checked monthly or 1000 miles (1600 km), whichever comes first. Transmission oil should be changed annually. With the ATV on a level surface, remove fill plug dipstick and check the lubricant level. Lubricant should be kept at the full mark on the dipstick. The correct transmission lubricant to use is Polaris Premium Synthetic Gearcase Lubricant (PN 2871478).

Transmission Oil Changing Procedure

1. Remove skid plate.
2. Remove fill plug/dipstick.
3. Remove transmission drain plug located on the bottom right hand side and drain the oil. Catch and discard used oil properly.
4. Clean and reinstall the drain plug.
5. Add Polaris Premium Synthetic Gearcase Lubricant (PN 2871478 - 12 oz. bottle) to full mark on the fill plug/dipstick.
6. Check for leaks.
7. Reinstall skid plate removed in step 1.





Transmission Oil Change - Dipstick Models

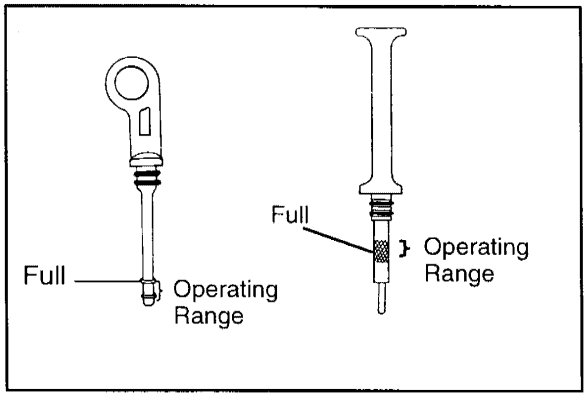
1. Place a drain pan beneath the transmission oil drain plug area.
2. Remove the drain plug and wipe the magnetic end clean to remove accumulated metallic filings.
3. After the oil has drained completely, install a new sealing washer and install the drain plug. Torque to 14 ft. lbs. (1.93 kg-m).
4. Remove dipstick and clean accumulated metallic filings from the magnetic end.

NOTE: On some models the magnet is located on the drain plug.

5. Add Polaris Chaincase Oil through the dipstick hole. Insert the dipstick all the way, remove, and check the level on the stick. Add oil if necessary until the oil level is between the upper and lower limits of the knurled portion. Do not overfill.

Recommended Transmission Oil
Polaris Synthetic gear case oil,
PN 2871478 12 oz. / PN 2871477 Gallon
High / Low/Rev Transmission - 20 oz.
High / Reverse Transmission - 16 oz.

Shaft Drive Transmission -
Approx 20-22 oz. (at change)
32 oz. (when completely disassembled)



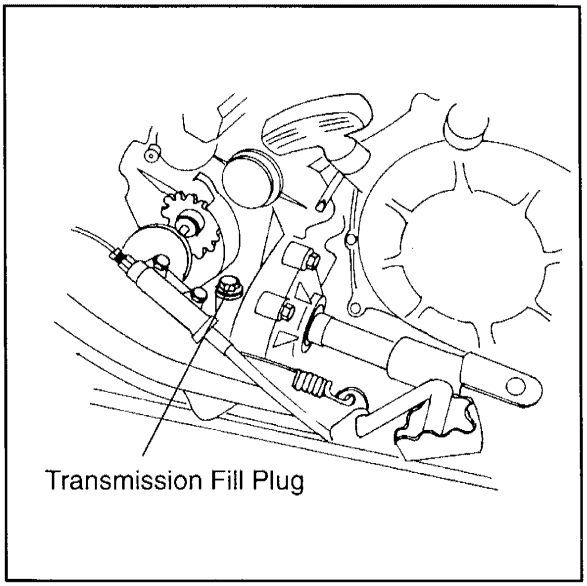
Transmission Lubrication - Type V Shaft/Chain

The transmission fill plug is located on the right side of the machine behind the propshaft shield.

The transmission lubricant level should be checked every six months or 1000 miles (1600 km), whichever comes first. Transmission oil should be changed annually. With the ATV on a level surface, remove fill plug and check the lubricant level. Lubricant level is correct when it reaches the bottom thread of filler hole. Use Polaris Premium Synthetic Gearcase Lubricant (PN 2871478).

Transmission Oil Change Procedure

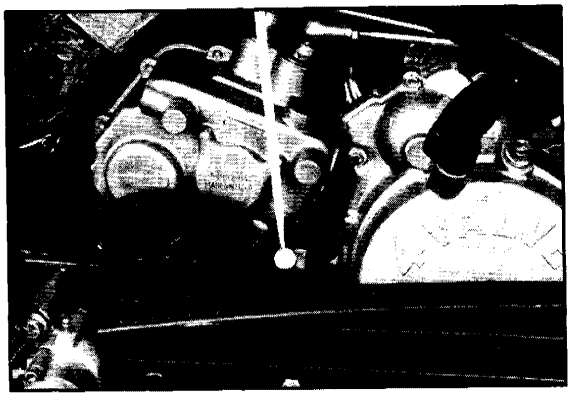
1. Remove propshaft shield from the right side of the vehicle.
2. Remove fill plug.
3. Remove transmission drain plug located on the bottom left hand side and drain the oil. Catch and discard used oil properly.
4. Clean and reinstall the drain plug.
5. Add Polaris Premium Synthetic Gearcase Lubricant (PN 2871478 - 12 oz. bottle) until oil reaches the bottom thread of the filler hole.
6. Check for leaks.
7. Reinstall propshaft shield removed in step 1.



Transmission Vent Line Routing

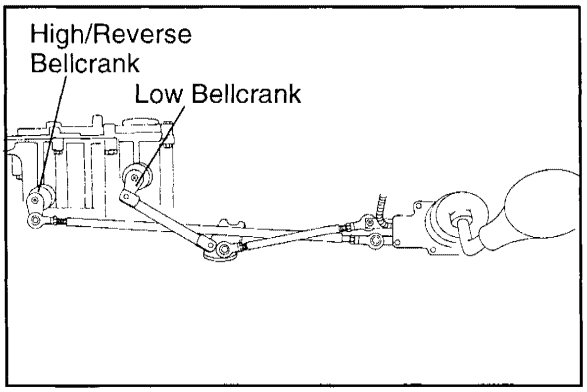
1. Check the transmission vent line for proper routing, cracks or damage. Be sure the vent line is not kinked or pinched.

NOTE: Vent line location varies by model.



Transmission Linkage Adjustment

The transmission shift linkage should be periodically inspected for wear and proper adjustment. Refer to Transmission, Chapter 8 for more information.



Sportsman 500

Wheels

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

Wheel, Hub, and Spindle Torque Table

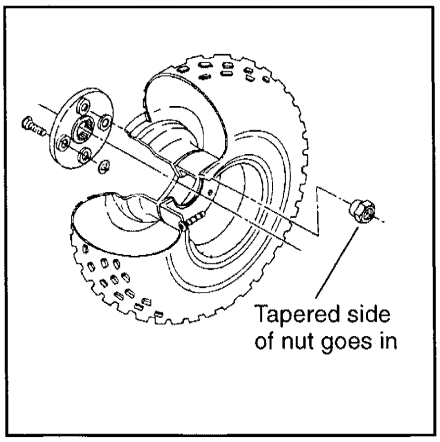
Model	Item	Specification
2x4	Front Wheel Nuts	15 Ft. Lbs.
	Rear Wheel Nuts	50 Ft. Lbs.
	Front Spindle Nut	40 Ft. Lbs.
	Rear Hub Retaining Nut	80 Ft. Lbs.
4x4 Chain Drive and Chain/Shaft Models	Front Wheel Nuts	15 Ft. Lbs.
	Rear Wheel Nuts	50 Ft. Lbs.
	Front Spindle Nut	Refer to procedures listed on following pages
	Rear Hub Retaining Nut	80 Ft. Lbs.
4 x 4 Shaft Drive	Front Wheel Nuts	15 Ft. Lbs.
	Rear Wheel Nuts	15 Ft. Lbs.
	Front Spindle Nut	Refer to procedures listed on following pages
	Rear Hub Retaining Nut	100 Ft. Lbs.

Wheel Removal Front or Rear

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

Wheel Installation

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



CAUTION:

If wheels are improperly installed it could affect vehicle handling and tire wear. On vehicles with tapered rear wheel nuts, make sure the tapered end of the nut goes into the taper on the wheel.

Tire Pressure

Tire Pressure Inspection (PSI - Cold)			
Model	**Front**	**Center**	**Rear**
(1996-Current) All Except Models Listed Below	4	–	3
(1996-Current) 6x6	5	5	5
Sportsman/Xplorer 500 (1996-Current)	5	–	5

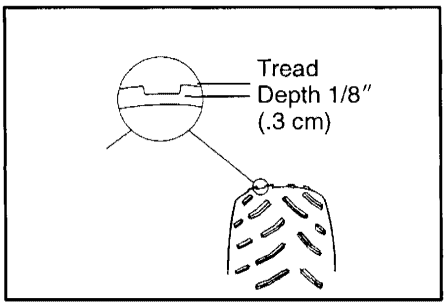
Tire Inspection

CAUTION:

Maintain proper tire pressure. Improper tire inflation may affect ATV maneuverability. When replacing a tire always use original equipment size and type.

CAUTION:

The use of non-standard size or type tires may affect ATV handling.



Tire Tread Depth

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

⚠ WARNING

Operating an ATV 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.

Frame, Nuts, Bolts, Fasteners

Periodically inspect the tightness 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.

CHAPTER 3
ENGINE

2 Stroke Engine Torque Specifications

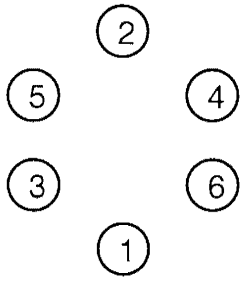
Fastener	Size	250 EC25PFE Ft. Lbs. (kg-m)	300 EC28PFE Ft. Lbs.(kg-m)	400 EC38PLE Ft. Lbs. (kg-m)
Cylinder Head Bolts	8mm	17-19(2.3-2.6)	17-19(2.3-2.6)	17-19(2.3-2.6)
Cylinder Base Bolts	10mm	24-28 (3.3-3.9)	24-28 (3.3-3.9)	24-28 (3.3-3.9)
Crankcase	8mm	17-18 (2.3-2.4)	17-18 (2.3-2.4)	17-18 (2.3-2.4)
Crankcase	6mm	6-8 (.8-1.1)	6-8 (.8-1.1)	6-8 (.8-1.1)
Crankshaft Slotted Nut	16mm	-	-	36–44(5.0-6.0)
Drive Clutch Bolt	7/16 - 20	40 (5.5)	40 (5.5)	40 (5.5)
Flywheel	16mm	44-54(6.0-7.5)	44-54 (6.0-7.5)	36-44 (5.0-6.0)
Recoil Housing	6mm	5-6.5 (.69-.90)	5-6.5 (.69-.90)	5-6.5 (.69-.90)
Spark Plug	14mm	14 (1.94)	14 (1.94)	14 (1.94)
Starter Motor	6mm	5-6.5 (.69-.90)	5-6.5 (.69-.90)	5-6.5 (.69-.90)
Stator Plate	6mm	5-6.5 (.69-.90)	5-6.5 (.69-.90)	5-6.5 (.69-.90)
Water Pump Impeller Nut	6mm	-	-	6–7 (.8-1.0)

4 Stroke Engine Torque Specifications

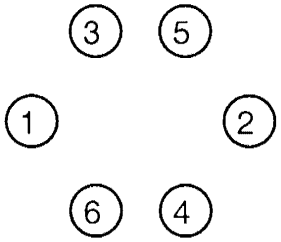
Cylinder Head Bolts	11mm	See Engine Assembly for torque procedure, page 3.82.		
	6mm	See Engine Assembly for torque procedure, page 3.82.		
Cylinder Base Bolts	10mm	45-49 ft. lbs.	6.21-6.76 kg-m	62.1-67.6 N-m
	6mm	5-6 ft. lbs.	.69-.828 kg-m	6.9-8.28 N-m
Crankcase	8mm	14-15 ft. lbs.	1.93-2.07 kg-m	19.3-20.7 N-m
Cam Chain Drive Sprocket	28mm	35-51 ft. lbs.	4.83-7.04 kg-m	48.3-70.4 N-m
Cam Chain Driven Sprocket	6mm	5-6 ft. lbs.	.69-.828 kg-m	6.9-8.28 N-m
Cam Chain Tensioner	6mm	5-6 ft. lbs.	.69-.828 kg-m	6.9-8.28 N-m
Cam Chain Tensioner Plug	11mm	14-19 ft. lbs.	1.93-2.62 kg-m	19.3-26.2 N-m
Rocker Arm Shaft Support	8mm	8-9 ft. lbs.	1.10-1.24 kg-m	11.0-12.4 N-m
Rocker Arm Adjuster Nut	6mm	6-7 ft. lbs.	.828-.966 kg-m	8.28-9.66 N-m
Water Pump Impeller Nut	6mm	5-6.5 ft. lbs.	.69-.897 kg-m	6.9-8.97 N-m
Water Pump Cover	6mm	5-6.5 ft. lbs.	.69-.897 kg-m	6.9-8.97 N-m
Carburetor Flange	8mm	12-14 ft. lbs.	1.66-1.93 kg-m	16.6-19.3 N-m
Oil Pump Mount Bolts	6mm	5-6.5 ft. lbs.	.69-.897 kg-m	6.9-8.97 N-m
Oil Pump Case Screws	5mm	2 ft. lbs.	.276 kg-m	27.6 N-m
Union (Breather)	1/8 PT	6.5-11 ft. lbs.	.897-1.52 kg-m	8.97-15.2 N-m
Union (Oil Hose)	1/8 PT	6.5-11 ft. lbs.	.897-1.52 kg-m	8.97-15.2 N-m
Union (Oil Filter)	20mm	36-43 ft. lbs.	4.97-5.93 kg-m	49.7-59.3 N-m
Oil Pressure Blind Plug	1/8 PT	6.5-11 ft. lbs.	.897-1.52 kg-m	8.97-15.2 N-m
Oil Delivery Pipe	12mm	18-25 ft. lbs.	2.48-3.45 kg-m	24.8-34.5 N-m
Oil Drain Bolt (Crankcase)	14mm	14-17 ft. lbs.	1.93-2.35 kg-m	19.3-23.5 N-m
Plug (One Way Valve)	11mm	14-19 ft. lbs.	1.93-2.62 kg-m	19.3-26.2 N-m
Stator Plate	6mm	5-6.5 ft. lbs.	.69-.897 kg-m	6.9-8.97 N-m
Flywheel	16mm	58-72 ft. lbs.	8.00-9.94 kg-m	80.0-99.4 N-m
Starter Motor	6mm	5-6.5 ft. lbs.	.69-.897 kg-m	6.9-8.97 N-m
Recoil Housing	6mm	5-6.5 ft. lbs.	.69-.897 kg-m	6.9-8.97 N-m
Spark Plug		14 ft. lbs.	1.94 kg-m	19.4 N-m

ENGINE
Engine Fastener Torque Patterns

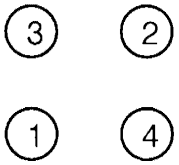
When torquing nuts, bolts and screws, a specific pattern should be followed to ensure that all parts are tightened evenly. The correct amount of turning force or tightness is determined by a torque wrench which is broken down into either inch or foot pounds.



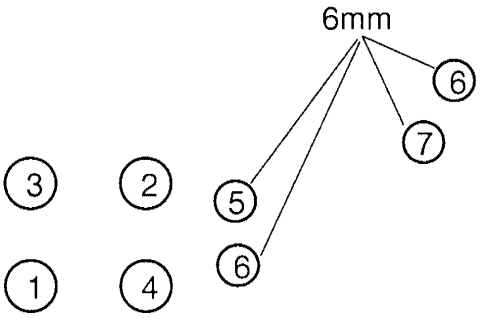
Cylinder Head
250 / 300



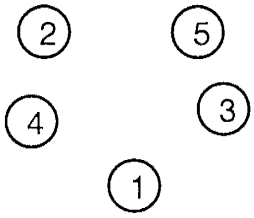
Cylinder Head
400



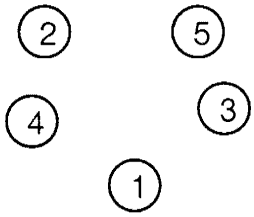
Cylinder Base
250 / 300 / 400



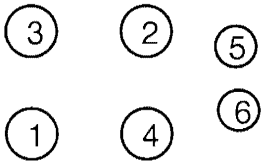
Cylinder Base
425 / 500



Crankcase
400L



Crankcase
250/300



Refer to page 3.82
for torque procedure.

Cylinder Head
425 / 500

1996 to Current Engine Specifications

Machine Model	Engine Model	Cyl. Disp. cc's	Bore mm / in.	Stroke mm/ in.	Ring End Gap in. (mm)	Piston Clearance in. (mm)	Clearance Svc. Limit in. (mm)	Engine Operating RPM
Trail Blazer Trail Boss	EC25PFE-09/11 EC25PFE-08/10	244	72/2.8346	60/2.362	.009-.018 (.23-.46)	.0011-.0021 (.03-.05)	.006 (.15)	5800 6000
Xpress 300 Xplorer 300 300	EC28PFE-01, 02	283	74.5/2.935	65/2.561	.012-.022 (.31-.56)	.0012-.0026 (.03-.07)	.006 (.15)	5600
Xpress 400 Xplorer 4x4 Sportsman 400 400 6x6	EC38PLE-04, 06	379	83/3.270	70/2.758	.007-.015 (.18-.38)	.0023-.0037 (.06-.09)	.006 (.15)	5700
Sport Scrambler 400	EC38PLE-05, 07, 09	379	83/3.270	70/2.758	.007-.015 (.18-.38)	.0023-.0037 (.06-.09)	.006 (.15)	5700 6000
Magnum 2x4 Magnum 4x4 Magnum 6x6	EH42PLE-01, 02	425	87.9/3.461	70/2.758	.008-.015 (.20-.38)	.0006-.0018 (.015-.046)	.0024 (.061)	6000
Sportsman 500 Xplorer 500 Big Boss 500 6x6	EH50PLE-01, 05, 06, 07	498	92/3.622	75/2.953	.008-.015 (.20-.38)	.0006-.0018 (.015-.046)	.0024 (.061)	6000
Scrambler 500	EH50PLE-02, 04	498	92/3.622	75/2.953	.008-.015 (.20-.38)	.0006-.0018 (.015-.046)	.0024 (.061)	6000

Piston Identification

Note the directional and identification marks when viewing the pistons from the top. The letter "F", " → ", " ▶" or **:** must always be toward the flywheel side of the engine. The other numbers are used for identification as to diameter, length and design. Two stroke rings are keystone design. Four stroke engine rings are rectangular profile. The numbers or letters on all rings (except 4-stroke oil control rings) must be positioned upward. See text for 4 stroke oil control ring upper rail installation. Use the information below to identify pistons and rings.

Engine Model No.	Oversize Available* (mm)	Piston Length	Standard Piston Identification
EC25PFE-08, 09, 10, 11	.25 .50 1.00	68 mm	3W, 4W
EC28PFE-01, 02	.25 .50	70 mm	28
EC38PLE-04, 05	.25 .50	78mm	38A
EC38PLE-06, 07	.25 .50	78mm	38B
EH42PL-01	.25 .50	66mm	B
EH50PL-01, 02, 03	.25 .50	72mm	C

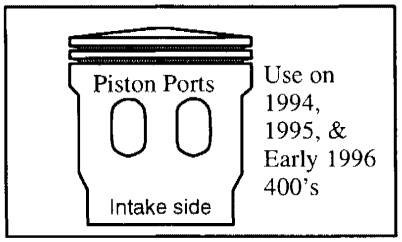
*

Pistons and rings marked 25 equal .25mm (.010") oversized
Pistons and rings marked 50 equal .50mm (.020") oversized
Pistons and rings marked 10 equal 1.0mm (.040") oversized (250 engines only)

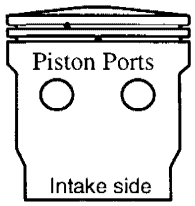
EC38PL Engines

Jetting Guidelines For Round-Port Pistons

Pistons for EC38PL engines shipped as service parts have round ports on the intake skirt. If you are replacing an oblong port piston with the new round port style, follow the instructions included with the piston or refer to this chart for quick reference. Without the jetting change the machine will run slightly rich on the main jet.



Use on 1994, 1995, & Early 1996 400's



Use on Late 1996 to current

This piston was shipped with:

1 200 Main Jet
1 230 Main Jet
1 6CEY6-3 Jet Needle.

A **#35 Pilot Jet** is **not supplied** with this piston kit, although a #35 is required if you install a round port piston in a 1995 Scrambler (EC38PLE-03 engine).

A round port piston along with the jetting changes shown effectively changes earlier model EC38PL engines to 1997 specifications for carburetion and engine operating characteristics. Jetting compensation for altitude and temperature will be the same as 1997 EC38PLE-06 engines or EC38PLE-07 (Sport, Scrambler) engines.

****In all cases the 6CEY6-3 Jet Needle (included with piston) should be installed if you replace an "oblong port" style piston with a "round port" style piston. Standard "E" clip position is #3.**

Year	Engine Type	Model	Original Piston Type	Original Main Jet	Need to Change Main Jet?	Need to Change Pilot Jet?
1994	EC38PL-01	ALL (EC38s)	**Oblong Ports	200	NO-Use Original	NO
1995	EC38PLE-01	400 2x4, Xplorer 4x4, Sportsman, 400 6x6	**Oblong Ports	200	NO-Use Original	NO
1995	EC38PLE-02	Sport	**Oblong Ports	200	NO-Use Original	NO
1995	EC38PLE-03	Scrambler	**Oblong Ports	240	**YES-Use 230 Main Jet**	**YES-Use *35 Pilot Jet**
Early 1996	EC38PLE-04	Xpress 400, Xplorer 400, Sportsman 4x4, 400 6x6	**Oblong Ports	210	**YES-Use 200 Main Jet**	NO
Late 1996	EC38PLE-04	Xpress 400, Xplorer 400, Sportsman 4x4, 400 6x6	Round Ports	200	NO-Use Original	NO
Early 1996	EC38PLE-05	Sport 4x4, Scrambler	**Oblong Ports	250	**YES-Use 230 Main Jet**	NO
Late 1996	EC38PLE-05	Sport 4x4, Scrambler	Round Ports	230	NO-Use Original	NO
1997	EC38PLE-06	Xpress 400, Xplorer 400, Sportsman 4x4, 400 6x6	Round Ports	200	NO-Use Original	NO
1997	EC38PLE-07	Sport 400, Scrambler 4x4	Round Ports	230	NO-Use Original	NO

NOTES

EH42PL / EH50PL Engine Service Data

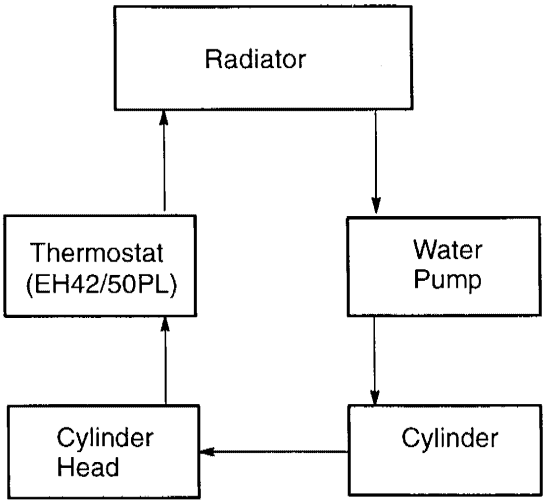
Cylinder Head / Valve				EH42PL	EH50PL
Rocker Arm	Rocker arm ID			.8669-.8678" (22.020-22.041 mm)	.8669-.8678" (22.020-22.041 mm)
	Rocker shaft OD			.8656-.8661" (21.987-22.0 mm)	.8656-.8661" (21.987-22.0 mm)
	Rocker shaft Oil Clearance		Std	.0008-.0021" (.020-.054 mm)	.0008-.0021" (.020-.054 mm)
			Limit	.0039" (.10 mm)	.0039" (.10 mm)
Camshaft	Cam lobe height	In	Std	1.2884-1.2924" (32.726-32.826 mm)	1.2884-1.2924" (32.726-32.826 mm)
			Limit	1.2766" (32.426 mm)	1.2766" (32.426 mm)
		Ex	Std	1.2884-1.2924" (32.726-32.826 mm)	1.2884-1.2924" (32.726-32.826 mm)
			Limit	1.2766" (32.426 mm)	1.2766" (32.426 mm)
	Camshaft journal OD		Mag	1.4935-1.4941" (37.935-37.950 mm)	1.4935-1.4941" (37.935-37.950 mm)
			PTO	1.4935-1.4941" (37.935-37.950 mm)	1.4935-1.4941" (37.935-37.950 mm)
	Camshaft journal bore ID		Mag	1.4963-1.4970" (38.005-38.025 mm)	1.4963-1.4970" (38.005-38.025 mm)
			PTO	1.4963-1.4970" (38.005-38.025 mm)	1.4963-1.4970" (38.005-38.025 mm)
	Camshaft Oil clearance		Std	.0022-.0035" (.055-.090 mm)	.0022-.0035" (.055-.090 mm)
			Limit	.0039" (.10 mm)	.0039" (.10 mm)
Cylinder Head	Surface warpage limit			.0020" (.05 mm)	.0020" (.05 mm)
	Standard height			3.870" (98.3 mm)	3.870" (98.3 mm)
Valve Seat	Contacting width	In	Std	.028" (.7 mm)	.028" (.7 mm)
			Limit	.055" (1.4 mm)	.055" (1.4 mm)
		Ex	Std	.039" (1.0 mm)	.039" (1.0 mm)
			Limit	.071" (1.8 mm)	.071" (1.8 mm)
Valve Guide	Inner diameter			.2362-.2367" (6.0-6.012 mm)	.2362-.2367" (6.0-6.012 mm)
	Protrusion above head			.689-.709" (17.5-18.0 mm)	.689-.709" (17.5-18.0 mm)
Valve	Margin thickness	In	Std	.039" (1.0 mm)	.039" (1.0 mm)
			Limit	.031" (.8 mm)	.031" (.8 mm)
		Ex	Std	.047" (1.2 mm)	.047" (1.2 mm)
			Limit	.031" (.8 mm)	.031" (.8 mm)
Valve	Stem diameter		In	.2343-.2348" (5.950-5.965 mm)	.2343-.2348" (5.950-5.965 mm)
			Ex	.2341-.2346" (5.945-5.960 mm)	.2341-.2346" (5.945-5.960 mm)
	Stem oil clearance	Std	In	.0014-.0024" (.035-.062 mm)	.0014-.0024" (.035-.062 mm)
			Ex	.0016-.0026" (.040-.067 mm)	.0016-.0026" (.040-.067 mm)
		Limit		.0059" (.15 mm)	.0059" (.15 mm)
	Overall length		In	3.976" (101.0 mm)	3.976" (101.0 mm)
			Ex	3.984" (101.2 mm)	3.984" (101.2 mm)

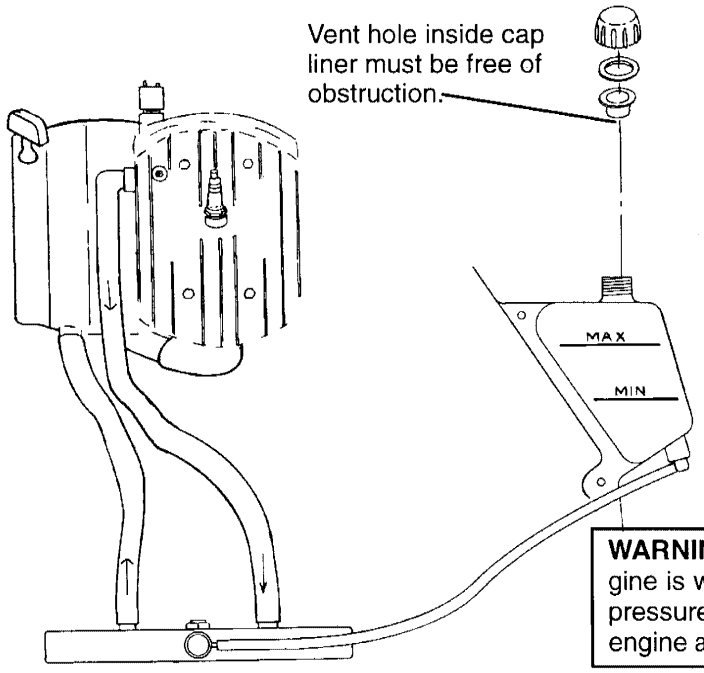
Valve Spring	Free length	Orange Paint	Std	1.7342" (44.05 mm)
			Limit	1.656" (42.05 mm)
		Yellow Paint	Std	1.654" (42.0 mm)
			Limit	1.575" (40.0 mm)
	Squareness			.075" (1.9 mm) 2.5°

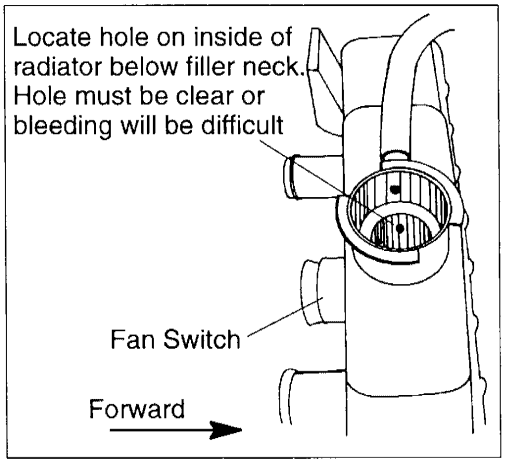
EH42PL / EH50PL Engine Service Data

Cylinder / Piston / Connecting Rod				EH42PL	EH50PL
Cylinder	Surface warpage limit (mating with cylinder head)			.0020" (.05 mm)	.0020" (.05 mm)
	Cylinder bore		Std	3.4606-3.4614" (87.900-87.920 mm)	3.6216-3.6224" (91.99-92.01 mm)
	Taper limit			.0020" (.050 mm)	.0020" (.050 mm)
	Out of round limit			.0020" (.050 mm)	.0020" (.050 mm)
	Piston clearance		Std	.0006-.0018" (.015-.045 mm)	.0006-.0018" (.015-.045 mm)
			Limit	.0024" (.060 mm)	.0024" (.060 mm)
	Boring limit			.020" (.5 mm)	.020" (.5 mm)
Piston	Outer diameter	Std		3.4596-3.4600" (87.875-87.885 mm)	3.6206-3.6210" (91.96-91.97 mm)
		.0098" (.25 mm) OS		3.4695-3.4699" (88.125-88.135 mm)	3.6304-3.6310 (92.21-92.23 mm)
		.0197" (.50 mm) OS		3.4793-3.4797" (88.375-88.385 mm)	3.6403-3.6407 (92.46-92.47 mm)
	Standard inner diameter of piston pin bore			.9055-.9057" (23.0-23.006 mm)	.9055-.9057" (23.0-23.006 mm)
Piston Pin	Outer diameter			.9053-.9055" (22.994-23.0 mm)	.9053-.9055" (22.994-23.0 mm)
	Standard clearance-piston pin to pin bore			.0002-.0003" (.004-.008 mm)	.0002-.0003" (.004-.008 mm)
	Degree of fit			Piston pin must be a push (by hand) fit at 68° F (20° C)	
Piston Ring	Piston ring installed gap	Top ring	Std	.0079-.0138" (.20-.36 mm)	.0079-.0138" (.20-.36 mm)
			Limit	.039" (1.0 mm)	.039" (1.0 mm)
		Second ring	Std	.0079-.0138" (.20-.36 mm)	.0079-.0138" (.20-.36 mm)
			Limit	.039" (1.0 mm)	.039" (1.0 mm)
		Oil ring	Std	.0079-.0276" (.20-.70 mm)	.0079-.0276" (.20-.70 mm)
			Limit	.059" (1.5 mm)	.059" (1.5 mm)
Piston Ring	Standard clearance - piston ring to ring groove	Top ring	Std	.0016-.0031" (.040-.080 mm)	.0016-.0031" (.040-.080 mm)
			Limit	.0059" (.15 mm)	.0059" (.15 mm)
		Second ring	Std	.0012-.0028" (.030-.070 mm)	.0012-.0028" (.030-.070 mm)
			Limit	.0059" (.15 mm)	.0059" (.15 mm)
Connecting Rod	Connecting rod small end ID			.9058-.9063" (23.007-23.020 mm)	.9058-.9063" (23.007-23.020 mm)
	Connecting rod small end radial clearance		Std	.0003-.0010" (.007-.026 mm)	.0003-.0010" (.007-.026 mm)
			Limit	.0020" (.05 mm)	.0020" (.05 mm)
	Connecting rod big end side clearance		Std	.0039-.0256" (.1-.65 mm)	.0039-.0256" (.1-.65 mm)
			Limit	.0315" (.80 mm)	.0315" (.80 mm)
	Connecting rod big end radial clearance		Std	.0004-.0015" (.011-.038 mm)	.0004-.0015" (.011-.038 mm)
			Limit	.0020" (.05 mm)	.0020" (.05 mm)
Crankshaft	Crankshaft runout limit			.0024" (.06 mm)	.0024" (.06 mm)

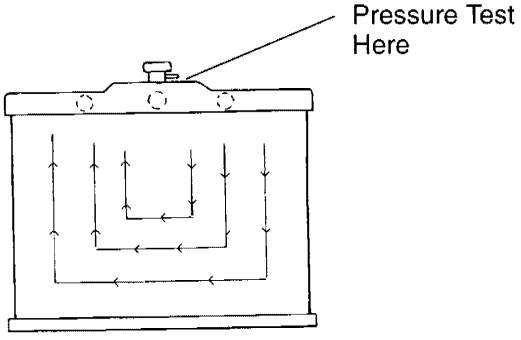
KEY - Std: Standard; OS: Oversize; ID: Inner Diameter; OD: Outer Diameter; Mag: Magneto Side; PTO: Power Take Off Side







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

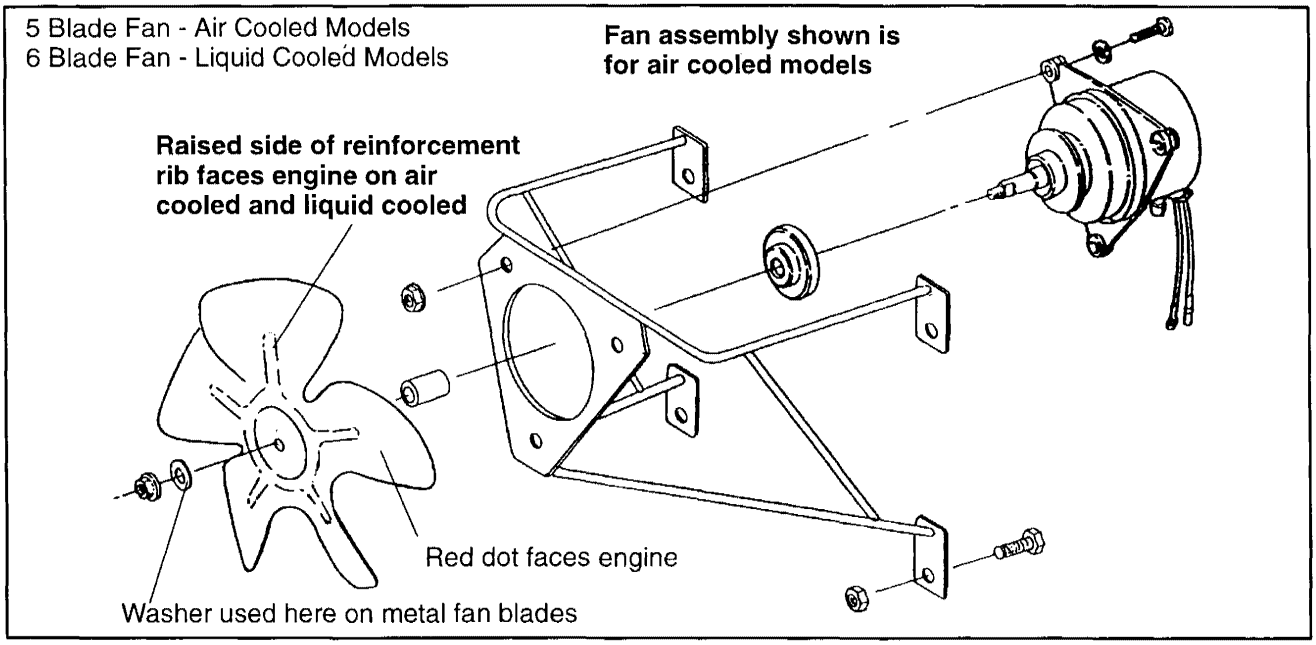


System Pressure Test

1. Remove radiator cap access panel from front of headlamp housing.
2. Remove recovery bottle hose from radiator.
3. Connect a Mity Vac™ (PN 2870975) to radiator and pressurize system to 10 PSI. The system must retain 10 lbs of pressure for five minutes or longer. If pressure loss is evident within five minutes, check radiator, all cooling system hoses and clamps, or water pump seal.

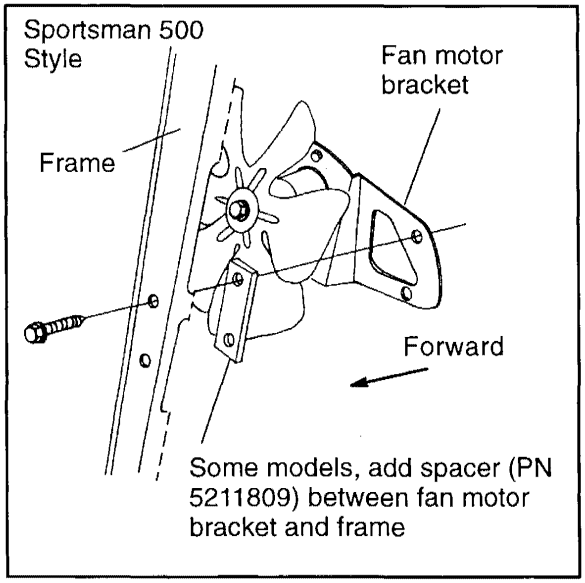
Radiator Cap Pressure Test

1. Remove radiator cap and test using a cap tester (commercially available).
2. The radiator cap relief pressure is 13 lbs. for all models.



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 and ready to use.



Cooling System Specifications

	250/300	Scrambler and Sport	Liquid Cooled Except Scrambler and Sport
Fan Switch (Off) Fan Switch (On)	210° F (99° C) ± 10° 235° F (113° C)	154° F (68° C) ± 5° 174° F (79° C)	175° F (79° C) ± 5° 190° F (88° C)
Hot Light On - 4 Strokes	-	-	221° F (105° C)
Hot Light On - 2 Strokes	-	205° F (96° C)	205° F (96° C)
System Capacity	-	2.25 Quarts	2.25 Quarts
Radiator Cap Relief Pressure	-	13 PSI	13 PSI

ENGINE
2 Stroke Engine Removal

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

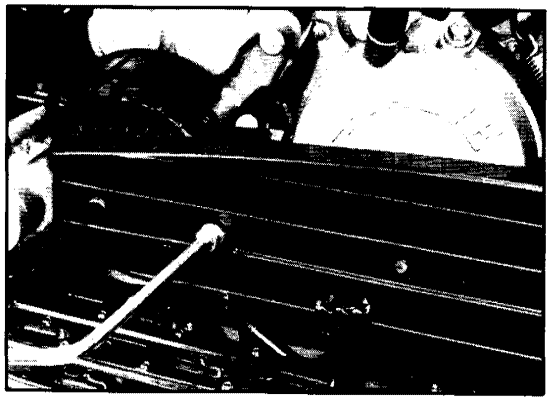
- Flywheel
- Alternator/Stator
- Starter Motor/Starter Drive
- Cylinder Head
- Cylinder
- Piston/Rings
- Oil pump (250/400L)
- Counterbalancer Assembly (400L engines)
- Water pump

The following components require engine removal for service:

- Connecting Rod
- Crankshaft
- Crankshaft Main Bearings
- Crankcase
- Oil pump (300)

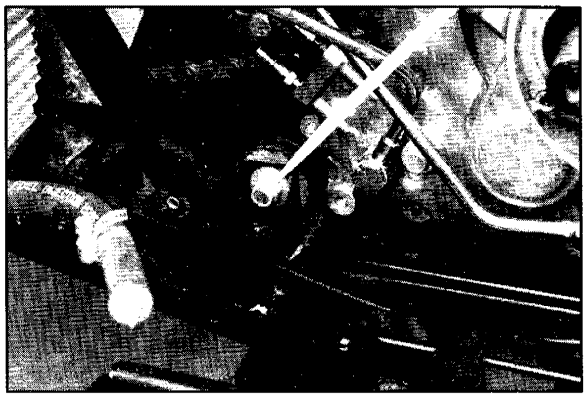
Engine Removal Preparation, Typical (2 Stroke)

1. Clean work area.
2. Thoroughly clean the ATV engine and chassis.
3. Disconnect battery negative (-) cable.
4. Remove the following parts. Refer to the Body Chapter for removal procedures.
   - Seat
   - Left and Right Side Covers
   - Fuel Tank Cover
   - Fuel Tank (see Fuel System Chapter)
5. Disconnect oil pump cable (2-Strokes).
6. Disconnect spark plug high tension lead.
7. Remove springs from exhaust pipe and remove pipe.
8. Remove air pre-cleaner and duct.
9. Remove airbox.
10. Remove carburetor.
11. Insert a shop towel into the carburetor flange to prevent dirt from entering the intake port.
12. Loosen auxiliary brake adjuster locknut, remove adjusting bolt and brake actuator arm.
13. Remove center chain guard bolt, two screws, and chain guard on AWD models.
14. Remove center drive and driven sprocket bolts and remove chain and sprockets as an assembly.
15. Refer to PVT section page 6.9 for procedure to remove inner PVT cover.

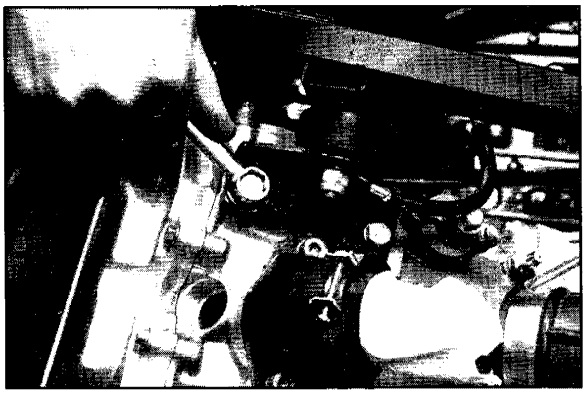


Engine Removal Preparation, Cont.

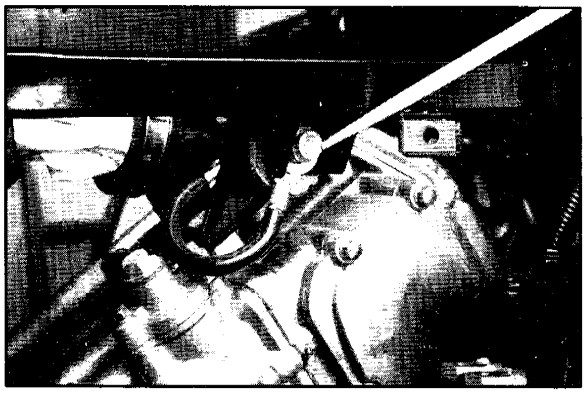
16. Starter motor. Note ground cable location. Mark positive (+) cable mounting angle and remove cable.
17. Remove transmission linkage rods from shift selector and secure out of the way.
18. Disconnect coolant temp sender wire (where applicable).
19. Remove nut, ground cable and washer from the upper right engine mount.



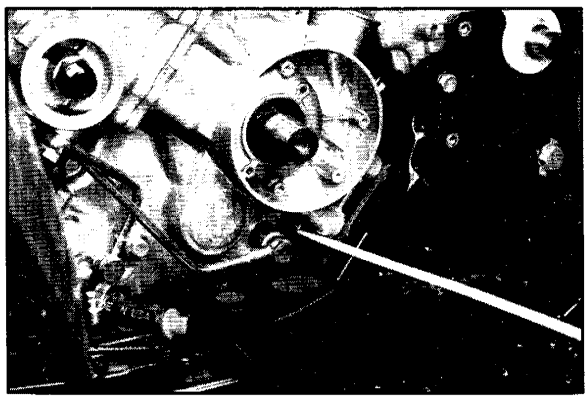
20. Remove the two upper engine mount plate bolts and remove the plate and ground cable (where applicable).



21. Remove nut and washer from lower front engine mount.

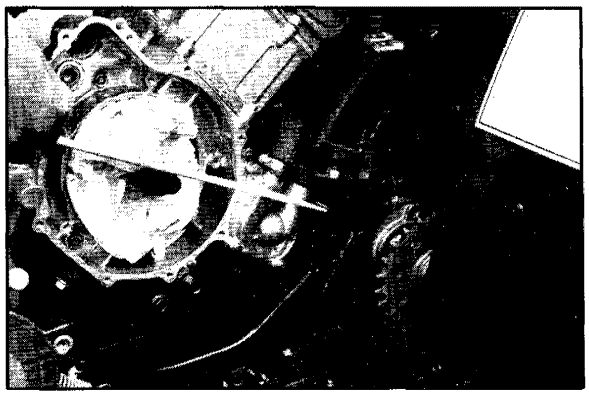


22. Loosen nut on slotted rear engine mount plate and back it out to the end of the stud.

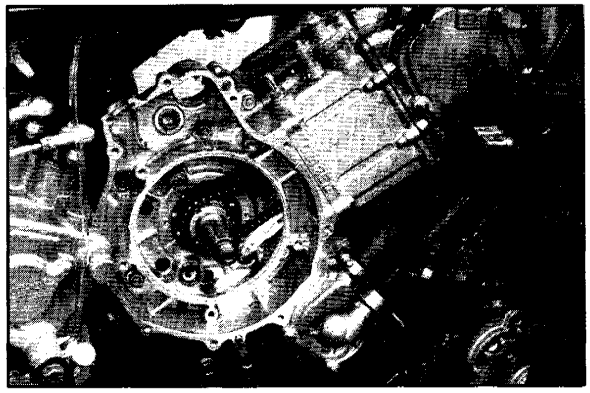


Engine Removal Preparation, Cont.

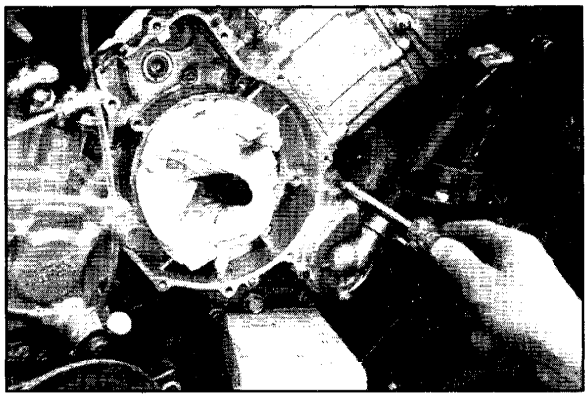
23. Move top of engine to left until coolant supply hose clamp clears frame at water pump fitting.



24. Lift and twist engine clockwise until lower left engine mount stud is clear of frame mount and the lower right coolant hose clamp clears frame tube.



25. Support engine in this position with a suitable support, such as a board or a 2x4.
26. Place a drain pan beneath area to catch coolant.
27. Clamp coolant inlet hose leading from radiator to pump to reduce coolant spillage.
28. Remove hose from water pump inlet and place in container. Release clamp from hose and allow hose to drain completely.
29. Lift back of engine while rotating front of engine clockwise and remove engine from left side of frame.



Engine Installation Notes (2 Stroke)

Bleed Cooling System

1. Fill coolant reservoir tank to full mark.
2. Loosen bleed screw at top of cylinder head until all air is purged from coolant system. Tighten bleed screw.
3. Install radiator cap and squeeze coolant lines to force air out of system.

NOTE: Radiator must be full or coolant will not circulate, and reservoir will not refill radiator.

4. Remove cap and add coolant if necessary.
5. After reassembly is complete, start engine and observe coolant level in the radiator. Allow air to purge and top off as necessary. Reinstall radiator cap and bring engine to operating temp. Check level in reservoir tank after engine is cool and add coolant if necessary.

Transmission

1. Readjust transmission shift linkage as outlined in Transmission Chapter page 8.3.

Exhaust

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

Engine Break In Period (2 Strokes)

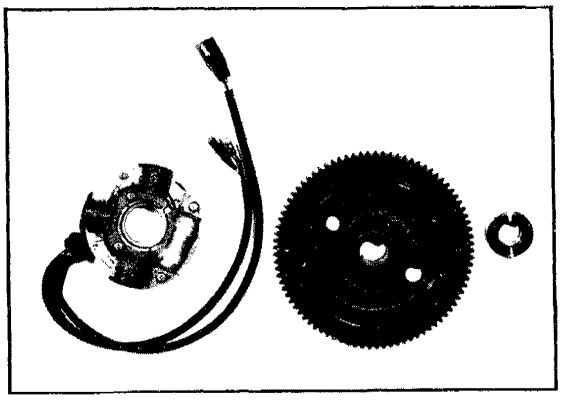
1. Pre-mix first tank of fuel at a 40:1 ratio with Polaris Premium Synthetic 2 Cycle Lubricant. Verify proper oil usage from oil tank during the first tank of fuel.
2. Avoid prolonged idle or periods of sustained full throttle. Vary throttle settings.

Disassembly

1. Remove the flywheel nut and flywheel with Flywheel Puller (PN 2871043). Remove stator assembly.

Flywheel Puller

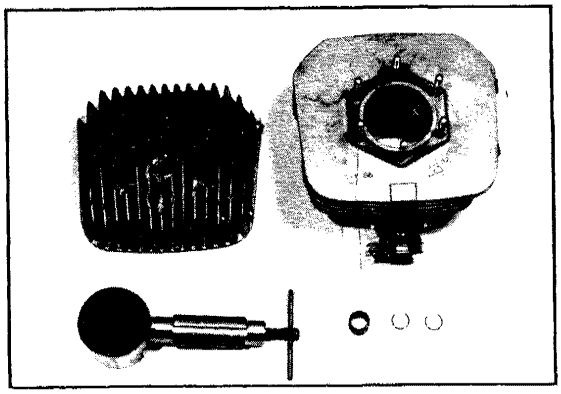
PN 2871043



2. Remove cylinder head and cylinder. Remove piston pin clips. Use Piston Pin Puller (PN 2870386) to remove piston pin from piston.

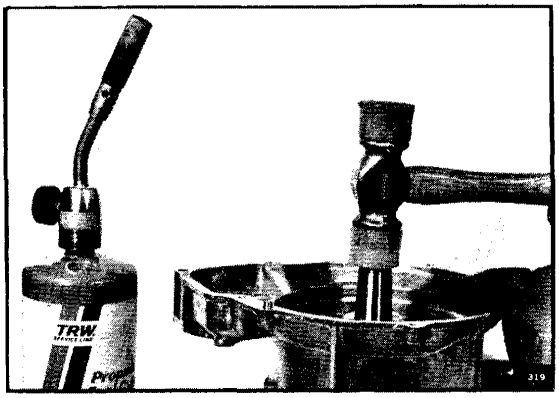
Piston Pin Puller

PN 2870386

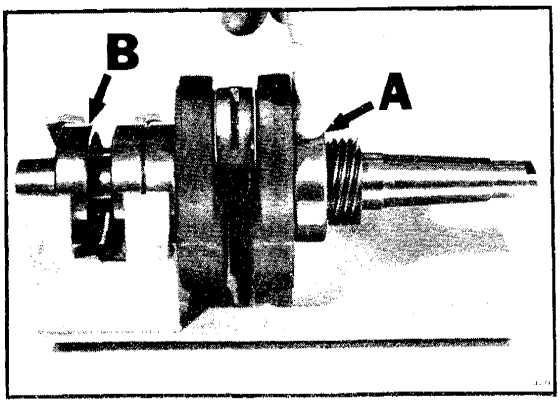


3. Inspect connecting rod small end and bearing; piston, piston pin, cylinder bore as shown on page 3.33 - 3.34b.

4. Remove the crankcase half attaching bolts. Heat crankcase in the bearing support areas. After applying heat, tap on PTO end and magneto end to separate case half from crankshaft.



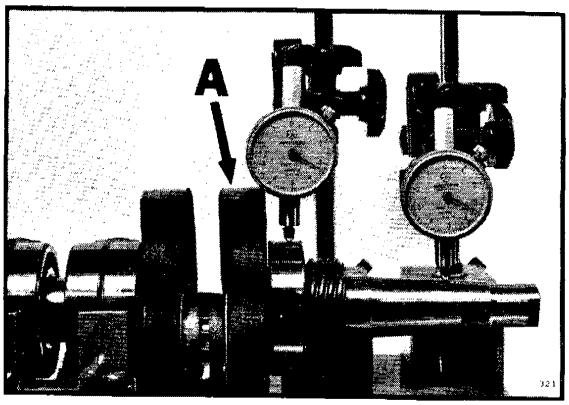
5. After removing the crankshaft, thoroughly clean the bearings and lubricate. Check bearing condition by pressing on and rotating the outer race (A). If the bearing(s) feel rough they must be replaced. Check the crankshaft runout by sliding a bearing onto the PTO end (B) and clamping the shaft into the special holding fixture (PN 2870710). The shaft should be straightened to .002" (.05 mm) or less.



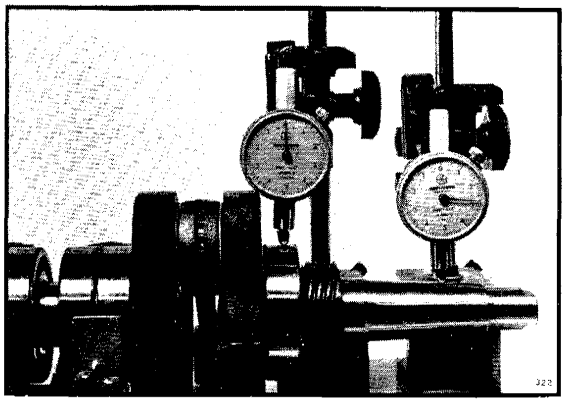
Crankshaft Alignment

When the crankshaft runout exceeds .005" (.15 mm) it must be straightened or replaced. To straighten a crankshaft the crank wheel(s) must be relocated on the lower rod pin. The four basic movements which may be required to realign the crankshaft are listed below.

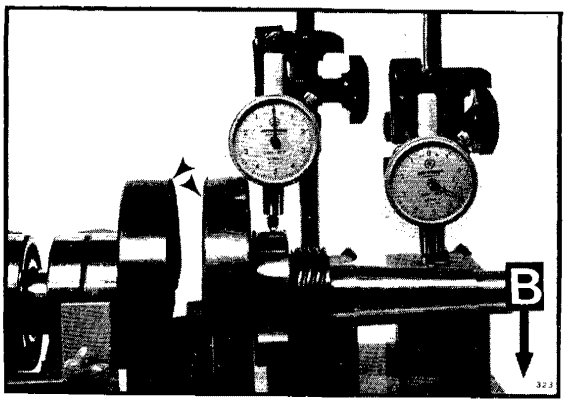
1. If the dial indicators are moving in the same direction and approximately the same amount while the shaft is rotated, the crankshaft has twisted on the lower rod pin. To correct this, remove the shaft from the fixture and strike the crank wheel on the high spot (A). This will rotate the wheel on the lower rod pin.



2. If the right side indicator is moving more than the left indicator while turning the shaft, and the high spot is found with the rod in this position (see photo at right), the crankshaft wheels will have to be squeezed together. Remove the shaft from the fixture. Locate the high spot and squeeze directly opposite from it using a large channel lock pliers or a vise. Arrows show direction of force to be applied.



3. If the right side indicator is moving more than the left indicator while turning the shaft, and the high spot is found with the rod in this position (see photo at right), the crankshaft wheels will have to be spread apart. Place a large chisel between the wheels and force the chisel downward. This will open the wheels and bring the end of the shaft down (B). Arrows show the direction of force to be applied.



4. If the indicators are moving in opposite directions while turning the shaft, the shaft is twisted. To correct this, remove the shaft from the fixture and strike the high spot found on the left side indicator.

NOTE: Squeezing the crank wheels is always done opposite the high spot. Spreading the crank wheels is always done at the high spot. Twisting the crank wheel by striking it is always done at a right angle to the lower rod pin, and at the high spot.

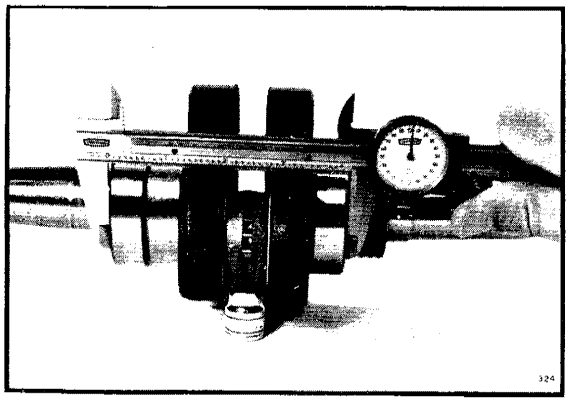
Assembly

Before reassembling the crankcase, the following steps should be performed to determine the amount of crankshaft end play. Excessive end play will cause the engine to be noisy at idle and slow speeds. Too little end play will side load the main bearings, which may cause premature bearing failure.

Measure Crankshaft Width – Bearings Installed

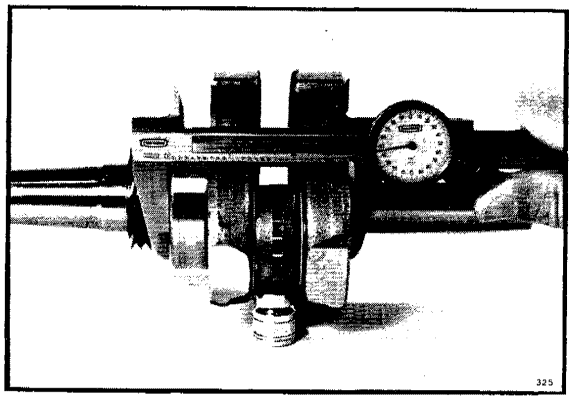
1. Measure distance from outer edge of PTO end bearing race to outer edge of mag side bearing race. Record measurement.

If bearings and spacers are already installed, measure distance as shown in photo at right, then proceed to Step 5.

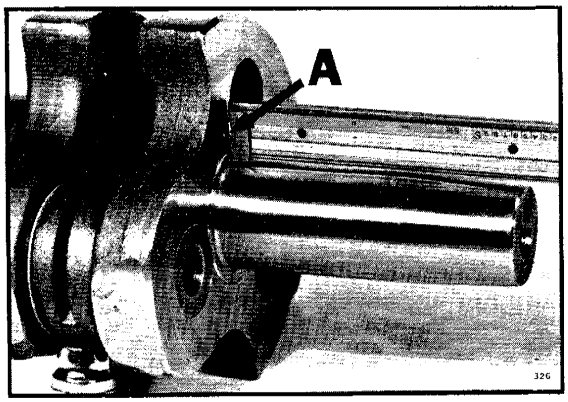


or...

If PTO end bearings have not yet been installed, measure distance as shown in photo at right, then proceed to Step 2.



2. Measure distance from crank wheel to bearing seating surface (A). Record measurement.

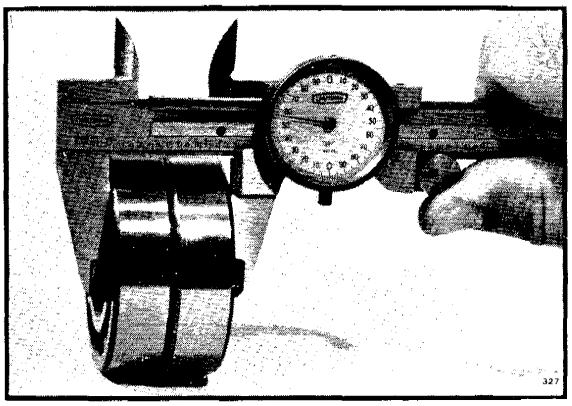


Assembly, Cont.

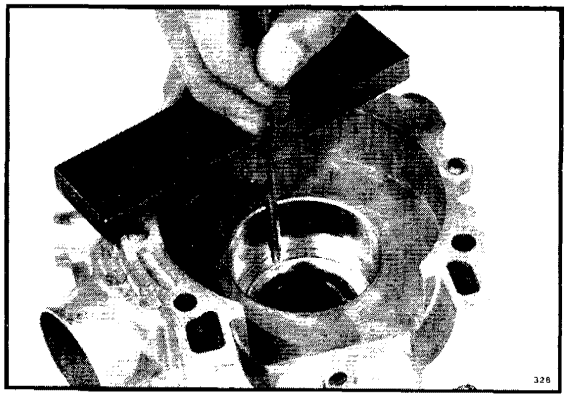
Correct crankshaft end play is .008" - .016" (.2 - .4 mm). End play is adjusted by adding or subtracting spacer washers from between the inner PTO end bearing and the crank wheel. Two different thickness spacers are available for EC 25 and EC28 engines:
For all EC25PF (except late 1998) - PN 3083629 - .008" (.2 mm); and PN 3083630 - .004" (.1 mm).
For late 1998 EC25PF and All EC28PF - PN 3084778 - .008" (.2 mm); and PN 3084779 - .012" (.3 mm).

3. Measure width of main bearing outer races with bearings positioned as shown. Add the thickness of the spacer between the bearings (if applicable). Record measurement.

4. Add all recorded measurements from Steps 1, 2, and 3 and record the total on line A below. If PTO bearings were assembled on crankshaft, record the measurement from Step 1.



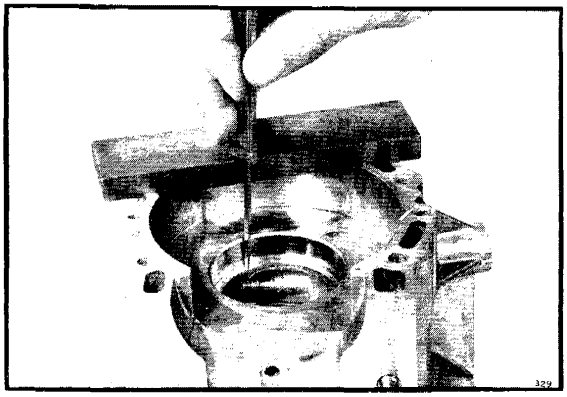
5. Measure PTO crankcase half as shown to determine depth of case. Place a piece of flat stock on the case mating surface and measure from this surface to the bearing seating surface. Subtract thickness of flat stock and record the measurement on line B below.



6. Measure magneto side case half using the same procedure. Record measurement on line C below. (Remember to subtract thickness of flat stock.)

7. Add the readings from steps 5 and 6 and record on line D. Subtract line A from line D. The result is the amount of crankshaft end play.

8. If adjustment is required, determine the amount of spacers needed to achieve proper end play. Install spacers on crankshaft followed by PTO bearings.



Connecting Rod Side Clearance

1. Measure clearance between lower rod and counterweight with a feeler gauge (connecting rod big end side clearance). New measurement should be between .016"-.020" (.4-.5 mm). Clearance should not exceed .036" (.9mm).

Total from Step 1, 2, and 3. (or from Step 1 only if PTO bearings were installed). **(A)**_____

Step 5 Result **(B)**_____

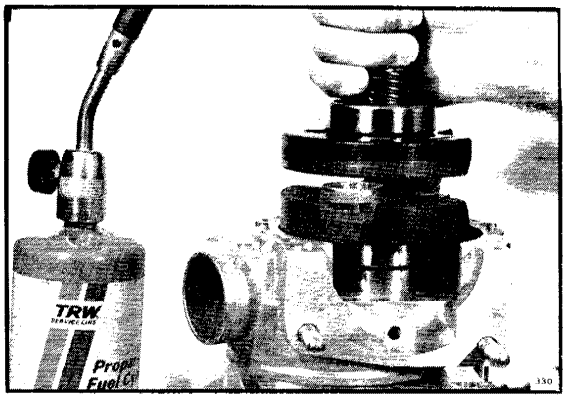
Step 6 Result **(C)**_____

Line B and Line C = **(D)** _____

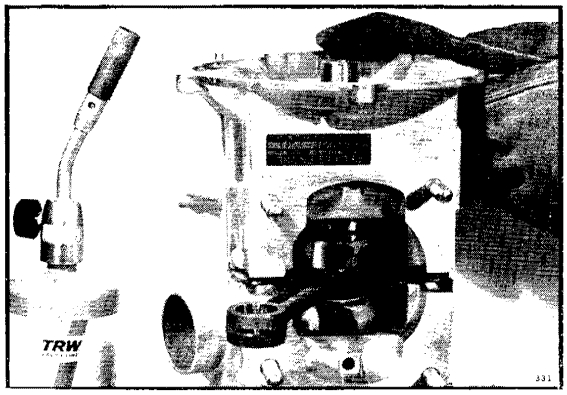
Line D – Line A = End Play _____

Assembly, Cont.

10. Remove crankcase end seals and thoroughly clean the case half mating surfaces.
11. Heat PTO side case half until it is hot to the touch.
12. Reinstall crankshaft into heated case.



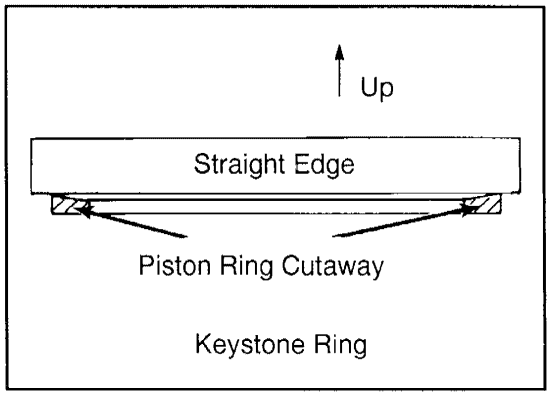
13. Heat mag side case half until it is hot to the touch.
14. Place Loctite 518 gasket eliminator on one of the case halves.
15. Reinstall the mag side half.



16. Torque case half attaching bolts in three steps to 17 ft. lbs. (2.3 kg-m) following pattern shown on page 3.2.

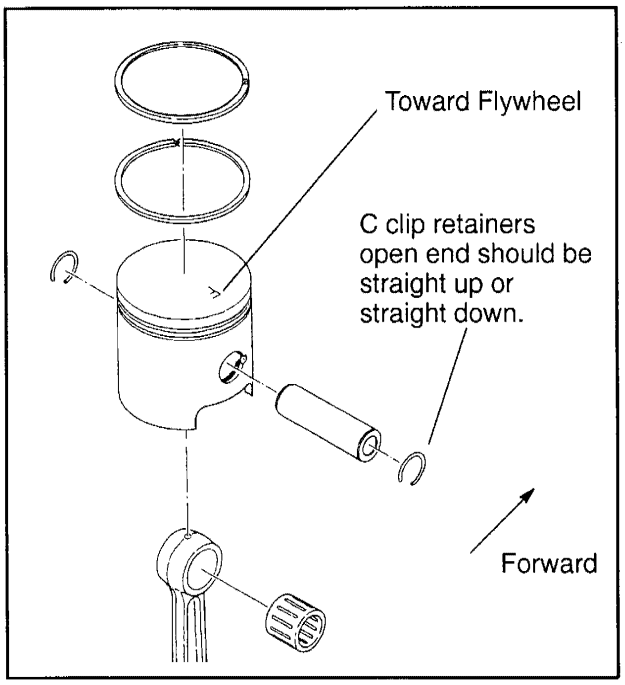
NOTE: Before proceeding, check piston to cylinder clearance and ring end gap (page 3.34) and cylinder honing procedures (page 3.33).

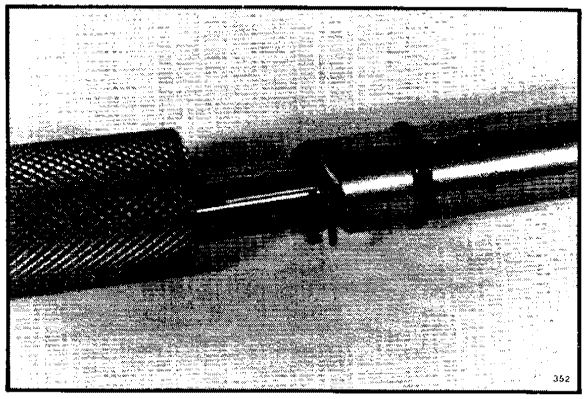
17. Install piston rings, beveled side up, onto piston. Keystone rings are beveled to the inside. This bevel must be toward the top of the piston (letter and/or number marks near end gap of ring face upward.



Assembly, Cont.

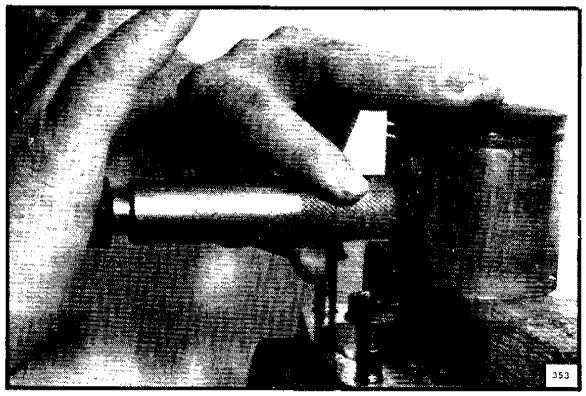
18. Position C clip onto driver (PN 2870773) with open end down as shown, Slide barrel over driver.





19. Install guide pin at the driver into the piston pin and position the barrel up against the piston. While holding the barrel against the piston, push the driver in until you hear the clip engage into the piston groove. Visually inspect the C-clip to be sure it is fully seated.

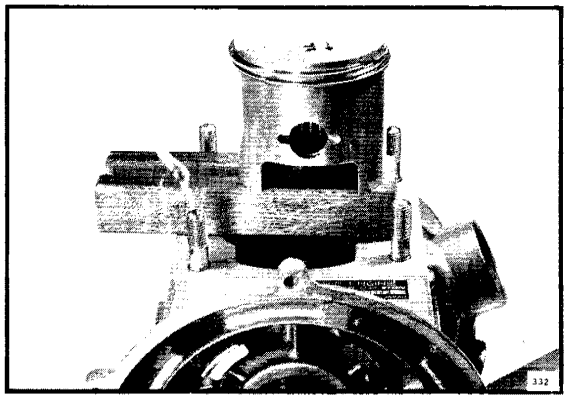
20. Rotate driver to complete engagement of clip.



21. Reinstall piston onto rod with "F" mark or →toward the magneto side of the engine. Support with support block.

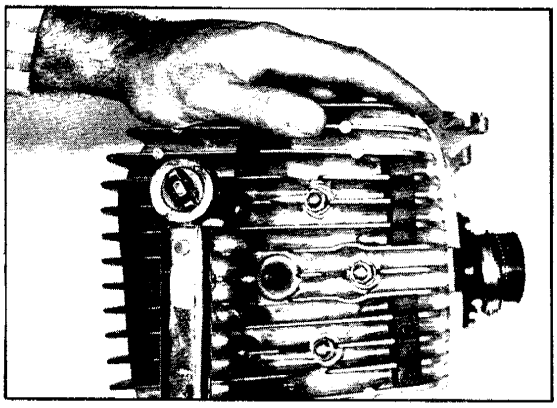
22. Lubricate piston pin and pin bearing.

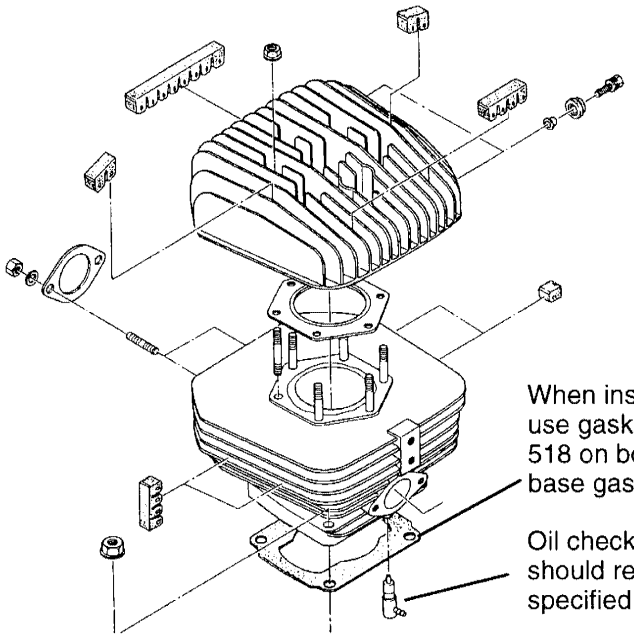
23. Reinstall piston pin.



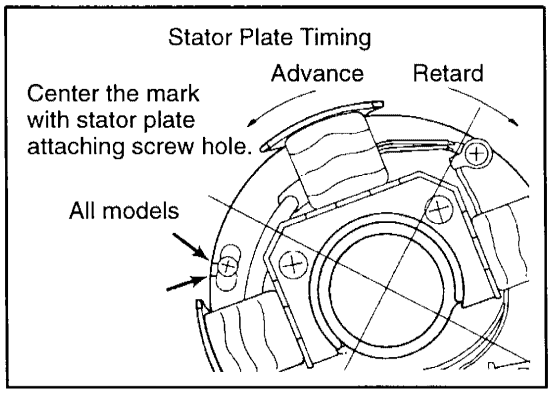
Assembly, Cont.

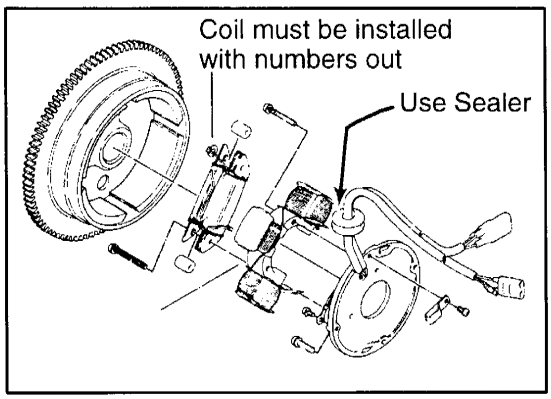
2. Apply Loctite No. 518 Gasket Eliminator to both sides of the cylinder base gasket. Install the base gasket and cylinder. Torque the cylinder base nuts in 3 steps to 28 ft. lbs. (3.9 kg-m). Install the head gasket and head. Torque nuts to 20 ft. lbs. (2.8 kg-m) following pattern on page 3.2.





1. Reinstall stator plate and align timing marks.
2. Reinstall flywheel.
3. Reinstall magneto housing.
4. Torque flywheel bolt to 44-62 ft. lbs. (6.08-8.57 kg-m).
5. Reinstall recoil starter assembly.

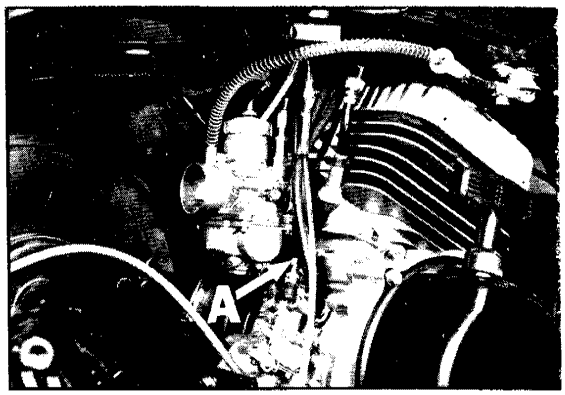




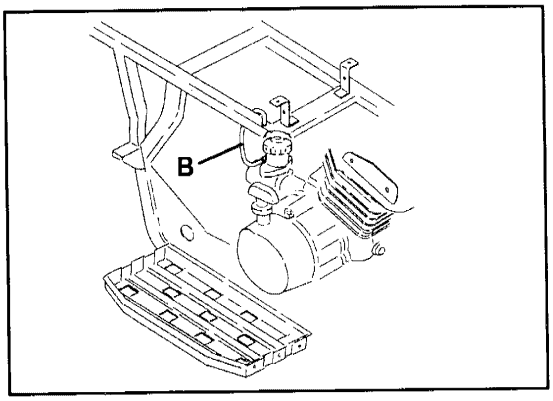
6. Seal wire harness grommet to crankcase using RTV silicone sealant.
7. Refer to electrical section of this manual for starter motor inspection. Reinstall starter motor.

Installation

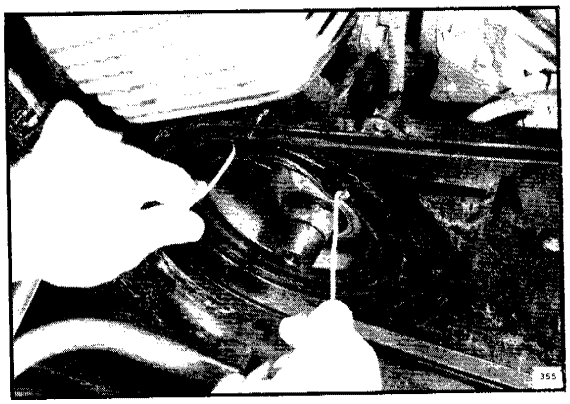
1. The engine can be reinstalled into the frame and secured. The oil pump and carburetor can also be assembled onto the engine. Bleed the oil pump of trapped air by loosening the bleed screw (A) for a few seconds, then tighten. Install the air box and filter element. **NOTE:** If the crankcase or oil pump have been replaced, check the oil pump end play as outlined on page 3.20.



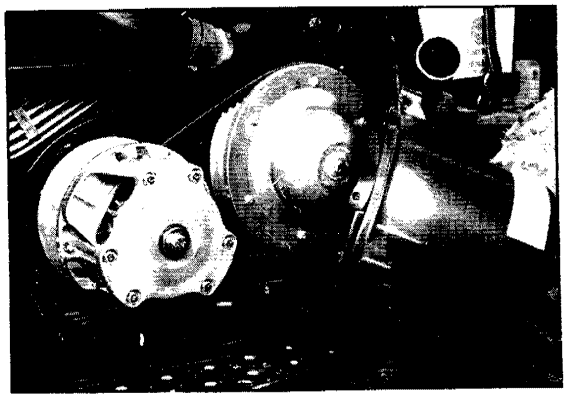
2. Make sure the vent line from the carburetor is routed to the upper part of the frame (B). Check the vent line and be sure it is not pinched or kinked.



3. Install PVT system as outlined in PVT section. Be sure to inspect clutch offset, alignment, and belt deflection and adjust if necessary.



4. Torque drive clutch retaining bolt to 40 ft. lbs. (5.5 kg-m). Torque driven clutch retaining bolt to 17 ft. lbs. (2.35 kg-m).



Assembly

Oil Pump End Play Adjustment

The oil pump is a positive displacement type pump. Whenever the oil pump, oil pump bushing, or crankcase are replaced, the end play clearance must be checked. Target clearance is .008-.024″ (.2-.6mm) between the oil pump boss and the bushing in the crankcase. Symptoms of excessive gear end play include: noticeable engine noise at idle; pump lever arm binds in the 1/2 open position (will release when engine is rotated).

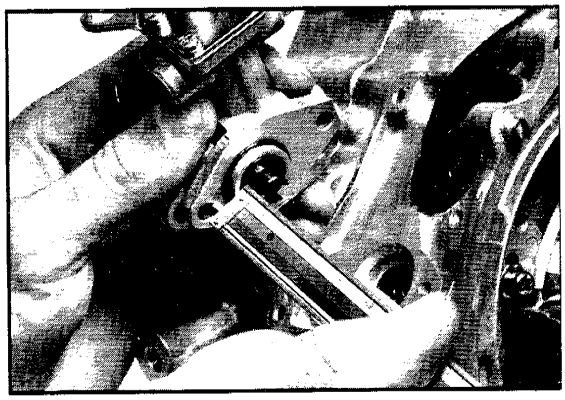
NOTE: Some 250/300 cc ATV engine oil pumps were produced with a plastic oil pump drive gear (PN 3084825). The plastic drive gear is no longer available and subs to a metal drive gear (PN 3083429). If you are replacing a plastic drive gear with a metal one, you must also order and install thrust washer (PN 3083428). If you install the metal drive gear without the thrust washer you will not be able to achieve the proper drive gear end play as outlined below. Refer to the Illustration on page 3.21

250/300 Models

Refer to Illustration on following page.

1. Measure distance from pump shoulder to pump mounting flange. Record this measurement.

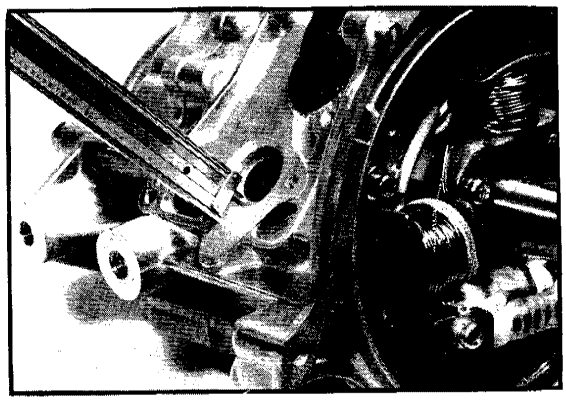
   Example: 3.9mm



2. Lubricate and install pump drive gear thrust washer, pump drive gear, and bushing into crankcase. Make sure parts are completely seated.

3. Measure the distance from the pump bushing to the crankcase pump seating surface. Record this measurement. Example: 4.8mm

4. Subtract the measurement recorded in step 1 from the measurement recorded in step 3. See example below right. The difference between these two measurements is the end play the pump bushings will have without shims. Add shims to adjust end play to .008″ - .024″ (.2 - .6 mm).



EXAMPLE:

	4.8	
–	3.9	
=	.9	
–	.2-.6 mm	Target clearance
=	.3–.7mm	Total thickness of shims required

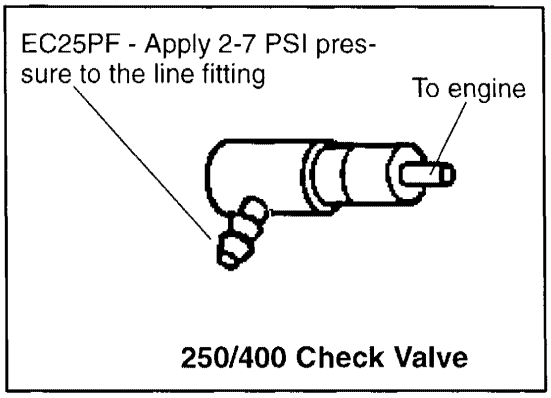
Spacer shim part numbers:

PN 3083671	.15 mm/.006″
PN 3083672	.3 mm/.012″
PN 3083673	.6 mm/.024″

Assembly

Oil Check Valve Testing (250/400)

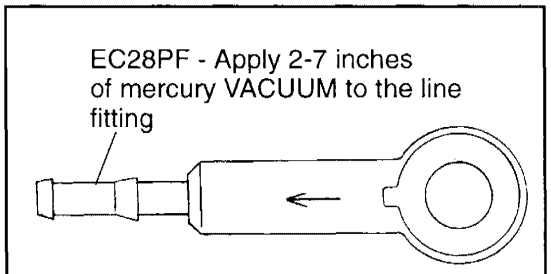
The oil pump check valve on the EC25PF engine must be tested by applying 2-7 PSI of pressure to the line spigot of the check valve. Use a Mity Vac (PN2870975) or similar tester. The valve should release between 2 and 7 PSI. The check valve is located on the cylinder.



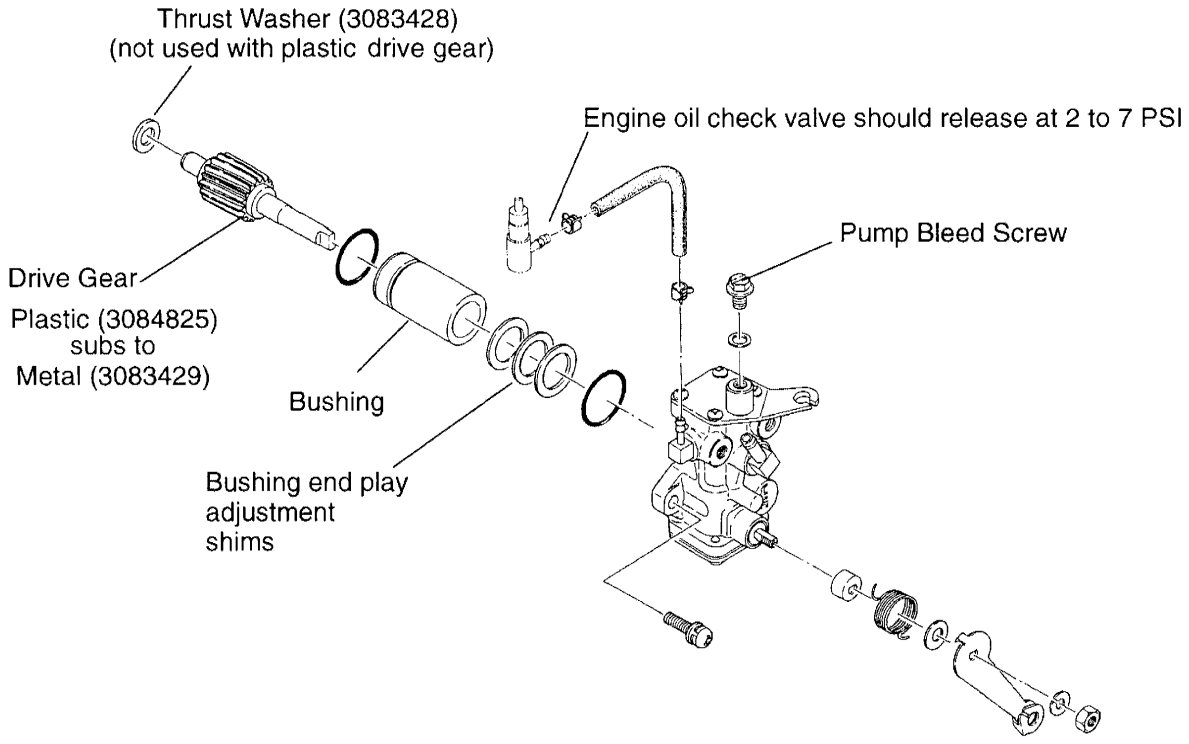
250/400 Check Valve

Oil Check Valve Testing (300)

The oil pump check valve on the EC28PF engine must be tested by applying 3-7 inches of mercury VACUUM to the line spigot of the check valve. The valve should release between 3 and 7 inches of mercury. Use a Mity Vac (PN2870975) or similar vacuum tester. The check valve is located on the oil pump.

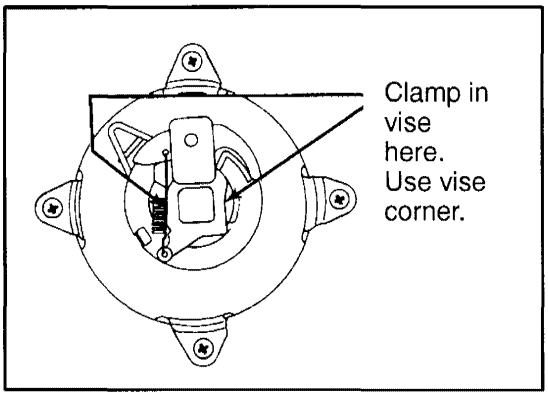


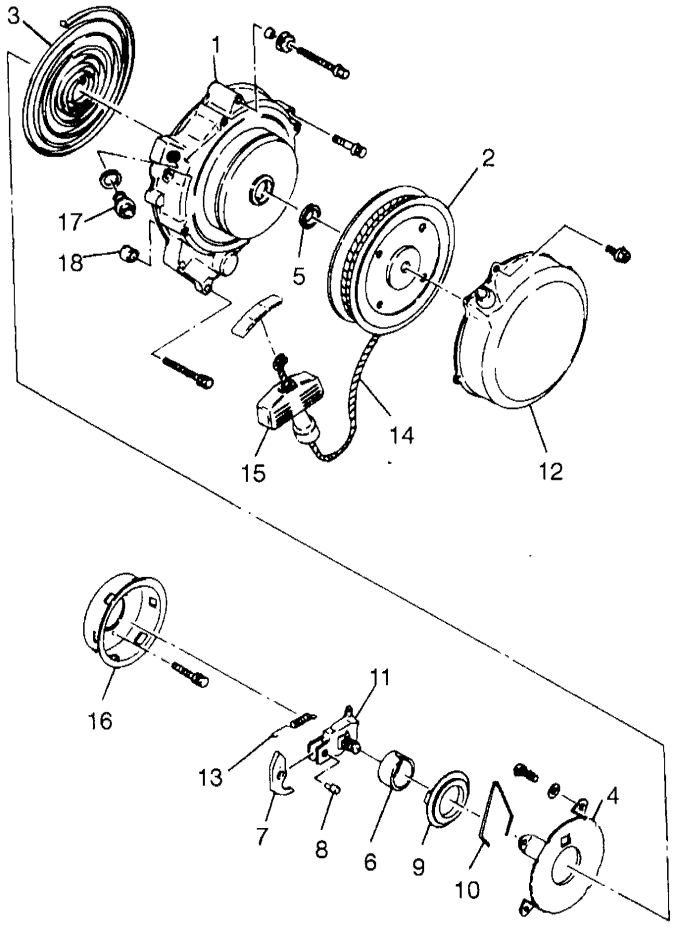
300 Check Valve



Recoil Disassembly

1. Remove four 6mm bolts securing reel housing to flywheel housing. **NOTE:** When the last bolt is removed, the reel housing will rotate, unwinding the recoil spring.
2. Remove reel housing. **NOTE:** If rope replacement is the only service necessary, it may be replaced without any further disassembly.
3. Remove pawl return spring.
4. Clamp sides of ratchet pawl bracket in the corner of the jaws of a vise.
5. Using a cloth belt type strap wrench wrapped around the outside edge of the reel, unscrew the reel counterclockwise to remove it from the ratchet pawl bracket shaft.
6. Remove the ratchet pawl bracket, spring hook, ratchet friction ring and friction spring. **NOTE:** It is not necessary to remove the spring retainer plate and spring unless it is damaged.
7. Clean and inspect all parts. Repair or replace as required.

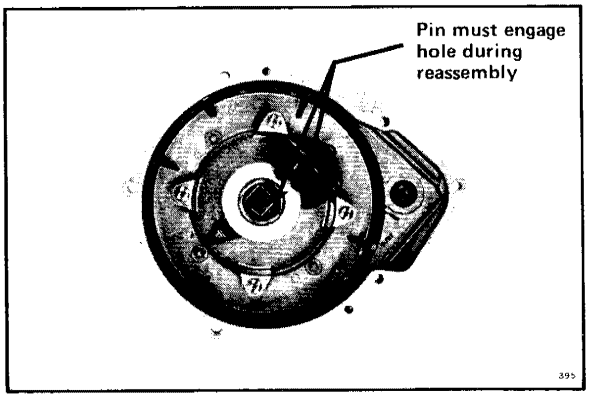




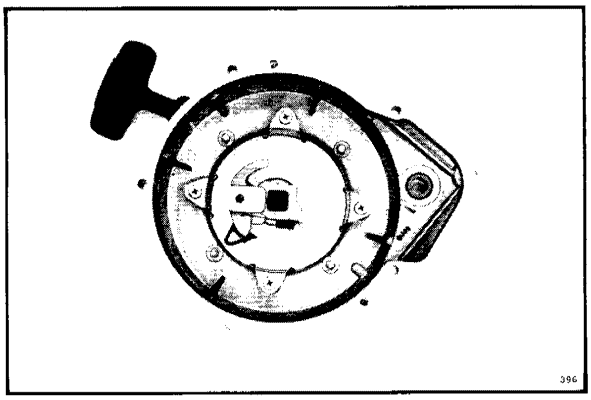
1. Flywheel Housing
2. Reel
3. Recoil Spring
4. Spring Retaining Plate
5. Seal
6. Spring Hook
7. Ratchet Pawl
8. Pawl Pin
9. Ratchet Friction Ring and Pawl Guide
10. Friction Spring
11. Ratchet Pawl Bracket
12. Reel Housing
13. Pawl Return Spring
14. Recoil Rope
15. Rope Handle
16. Recoil Cup
17. Timing Plug
18. Bushing

Recoil Assembly

1. If the recoil spring was removed, reinstall it in its recess in the flywheel housing. The spring should spiral counterclockwise toward the center.
2. Grease spring with Polaris low temperature grease.
3. Install recoil spring retaining plate.
4. Grease and install spring hook, making sure it properly engages the spring end.
5. Install ratchet friction ring and friction spring assembly. The friction spring should engage the bent tab on the recoil spring retaining plate. The "L" on the friction ring should be positioned as shown in the photo at right.
6. Grease the center hole and seal in the flywheel housing.
7. Install ratchet pawl bracket. The alignment pin and the square drive on the bracket shaft should properly align in the spring hook.
8. While holding the bracket tight against the spring hook, flip the flywheel housing over and thread the reel onto the pawl bracket shaft.



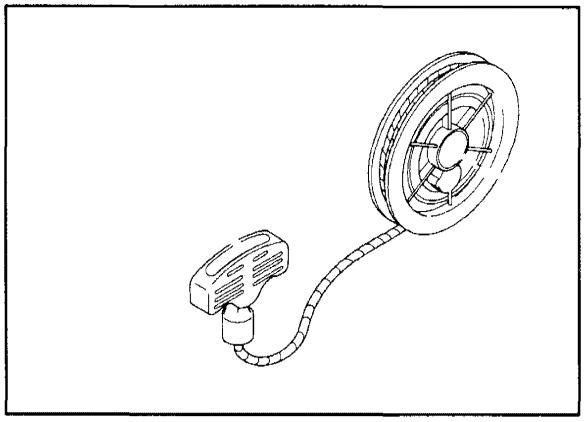
9. Clamp the ratchet pawl bracket in the corner of the jaws of a vise. Firmly hand tighten the reel.
10. If the rope was removed, or if a new rope is being installed, attach one end of the rope to the reel, pass the other end of the rope through the guide in the reel housing and attach it to the rope handle.
11. Install the rope housing over the reel.
12. Holding the flywheel housing with one hand, rotate the rope housing clockwise until the rope is completely re-wound.
13. Rotate the housing three more turns and reinstall bolts.
14. Reinstall pawl return spring.
15. Check recoil and ratchet operation.
16. When reinstalling assembly onto engine, use Loctite 515 Gasket Eliminator between the flywheel housing and crankcase.



Recoil Assembly

The recoil cup is incorporated onto the flywheel.

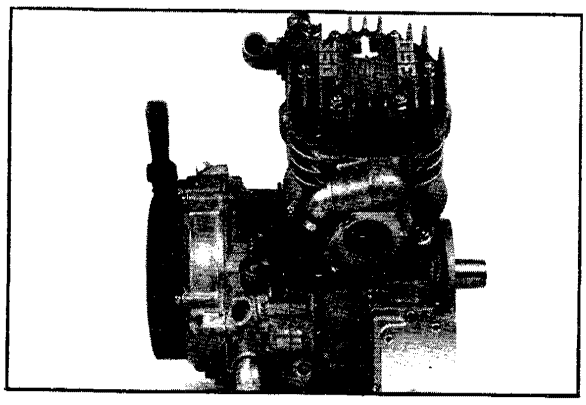
1. If the recoil rope was removed or if a new rope is being installed, attach one end of the rope to the reel, pass the other end of the rope through the guide in the reel housing and attach it to the rope handle.
2. Install the rope housing over the reel.
3. Holding the flywheel housing with one hand, rotate the rope housing clockwise until the rope is completely re-wound.
4. Rotate the housing three more turns and install the pawl return spring with the large end of the spring going into rope housing; reinstall retainer plate, lock washer and bolt.
5. Check recoil and ratchet operation.
6. When reinstalling assembly onto engine, use Loctite 515 Gasket Eliminator between the flywheel housing and crankcase.



Disassembly

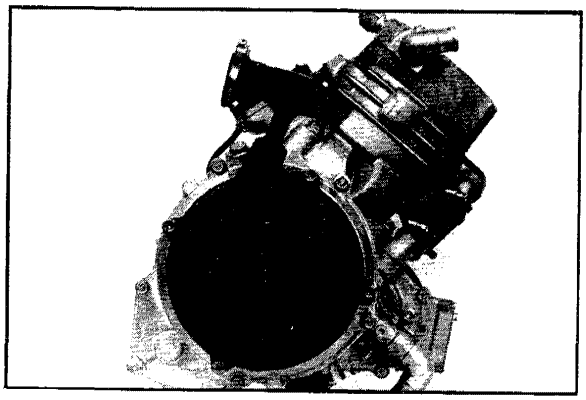
NOTE: To reassemble engine, reverse the following procedure, paying attention to reassembly notes as indicated.

1. Refer to page 3.8 and follow engine removal instructions. This engine will also require removal of coolant lines and the sending unit wire mounted at the rear of the cylinder head.



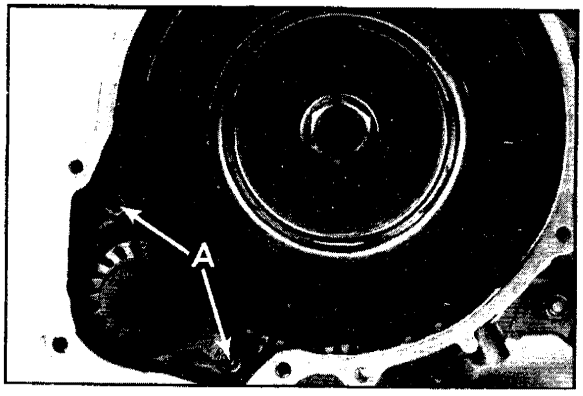
2. Remove the six bolts retaining the starter assembly and flywheel cover.

Reassembly Note: During reassembly apply Loctite 518 to mating surfaces of starter cover assembly and crankcase assembly.

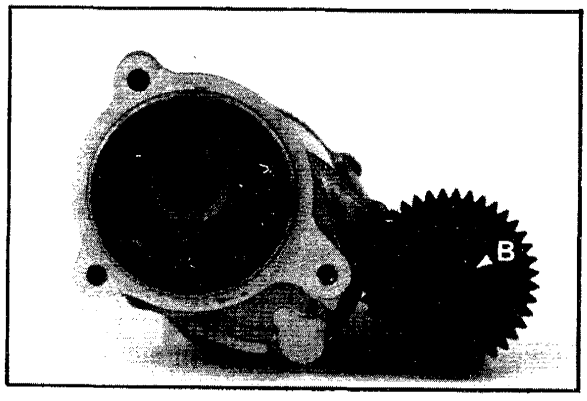


3. Remove starter pulley and flywheel nut.

4. For starter removal, remove bolts retaining starter bracket on PTO side and two bolts (A) on mag side.

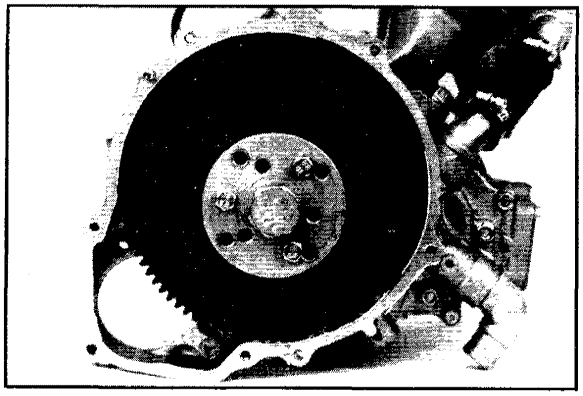


NOTE: If starter inspection is necessary, make sure during reassembly that the gear shaft washer (B) is in place between the gear shaft assembly and starter motor for reassembly. Starter damage will occur if this washer is not correctly positioned. For detailed service and repair of electric starters and starter drives, refer to Chapter 8 of this Service Manual.



7. Remove flywheel using Polaris flywheel puller .

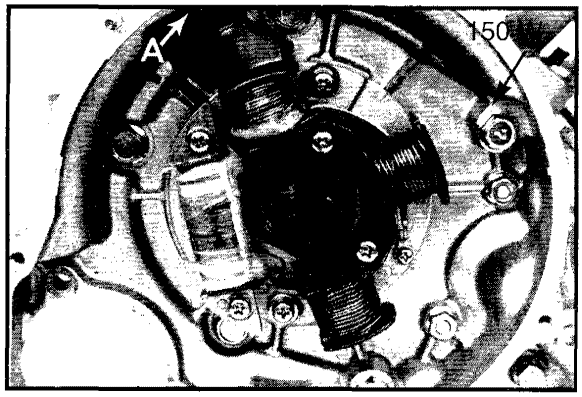
Flywheel Puller PN 2871043



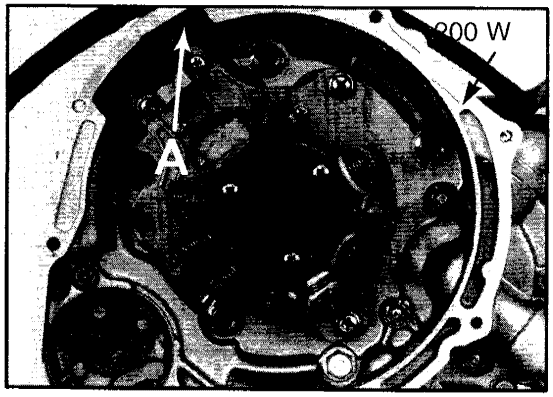
8. Remove stator assembly.

Reassembly Note: During reassembly be sure to seal rubber grommet (A) completely with silicone sealer to avoid water or dirt ingestion into stator assembly.

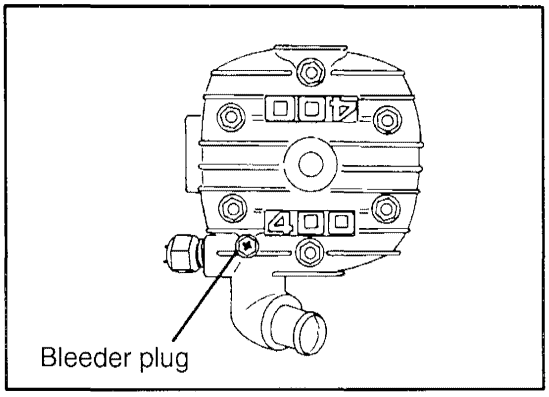
150 Watt alternator shown at right (photo 2).



200 Watt alternator shown at right (photo 3).

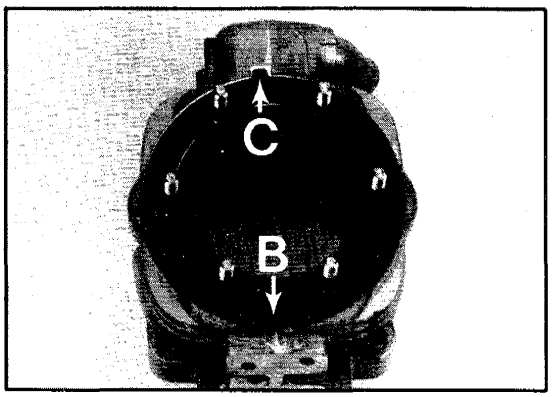


9. Remove six cylinder head bolts using a 12 mm socket. Note the position of the bleeder plug for the coolant system.



Disassembly, Cont.

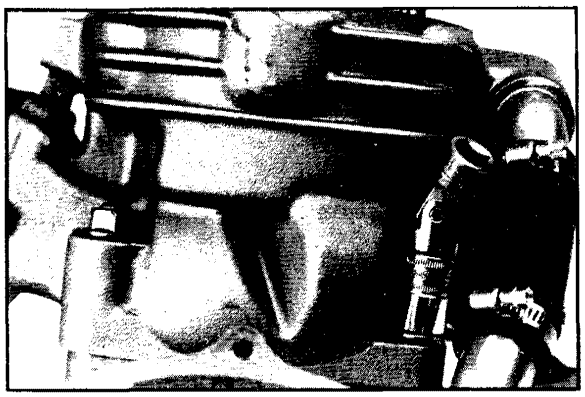
400L Head Gasket pictured at right.



Reassembly Note: The 400L head gasket should have the word *UP* (B) toward the cylinder head and the tab (C) toward the exhaust, matching the tab area on the cylinder.

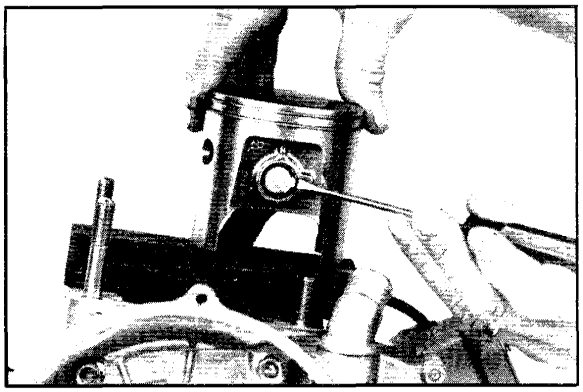
NOTE: Small hole in cylinder above exhaust port is a decompression aid for starting.

10. Loosen clamps retaining coolant transfer hose and remove the four cylinder nuts. **NOTE:** Use a 14 mm socket on the exhaust side. A 14 mm wrench will be necessary on the intake side.



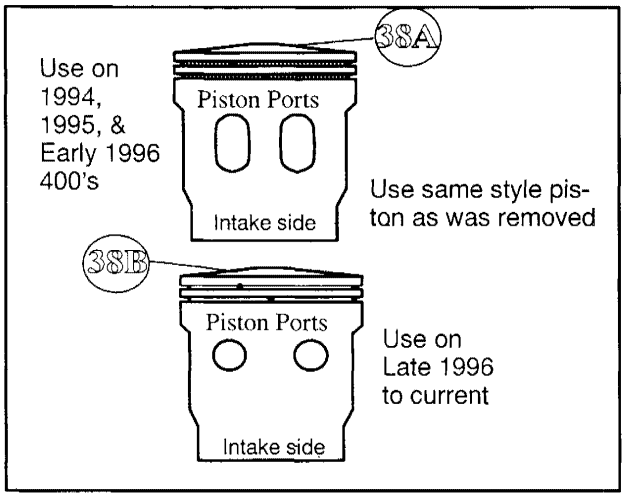
Reassembly Note: Due to limited space you will need to use a crows foot adaptor for final torquing during reassembly.

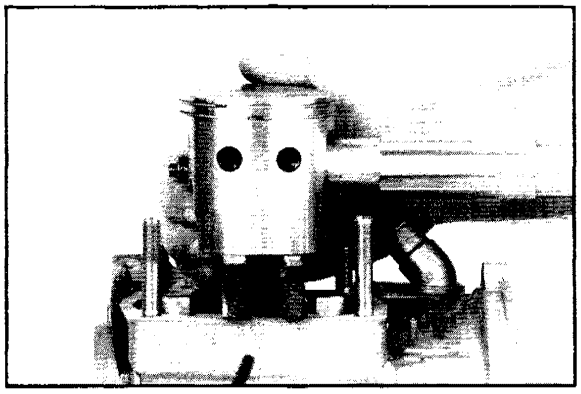
11. Install piston support block and remove C clips.



Reassembly Note: When reinstalling C clips, make sure that the open end of the retainer clip points either up or down, not to the side.

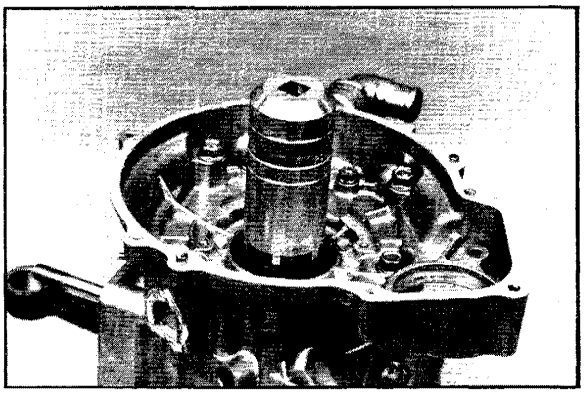
12. Remove piston pin using Polaris piston pin puller (PN 2870386).



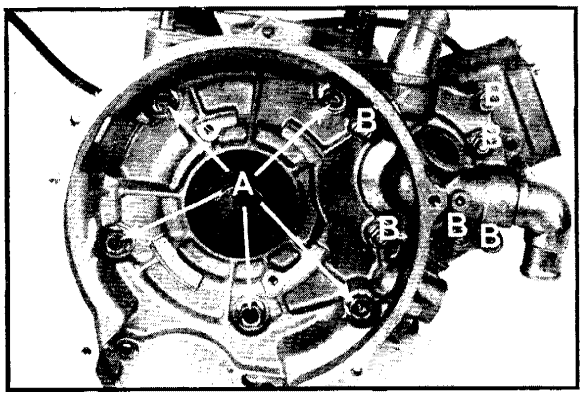


13. Remove slotted *left hand thread* crankshaft nut using Polaris tool (PN 2870967).

Reassembly Note: Reinstallation of this crankshaft nut will also require use of tool PN 2870967.

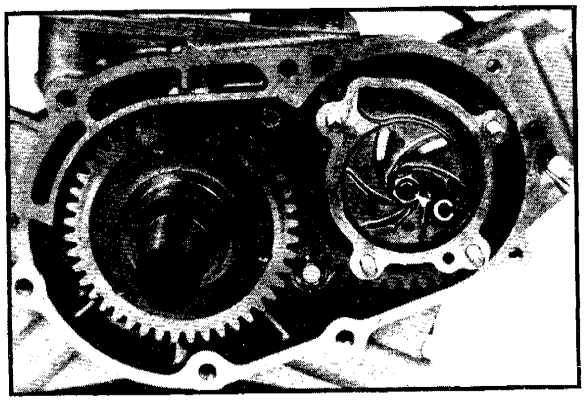


14. Remove five crankcase bolts (A) with a 12 mm socket.
15. Remove four nuts and two bolts (B) indicated in the photo at right with a 10 mm socket.
16. Remove cover, tapping lightly with a soft face hammer if necessary.



17. Using a 10 mm socket, remove the impeller nut (C).
18. Slide water pump assembly from counterbalance assembly.

Reassembly Note: Watch for adjuster shims which may be between the impeller and pump housing. Make sure to reinstall any shims removed. Apply Loctite 242™ to impeller nut.

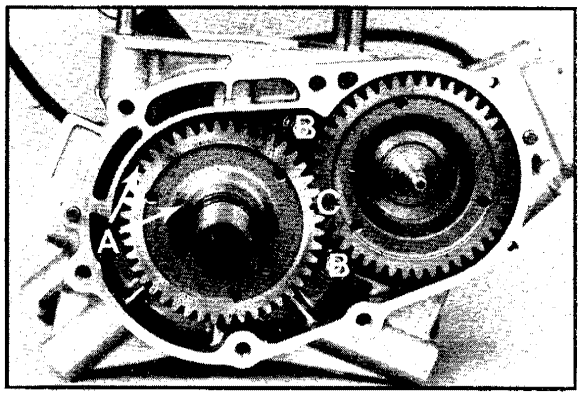


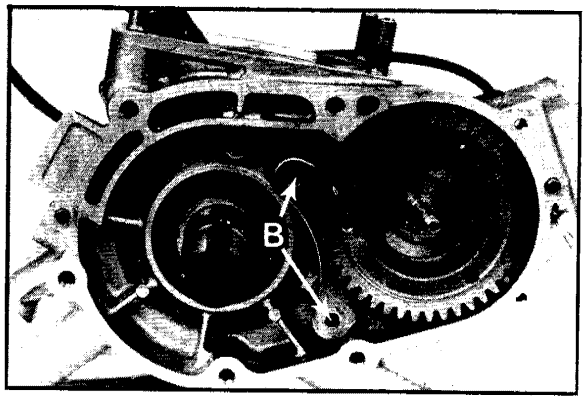
Disassembly, Cont.

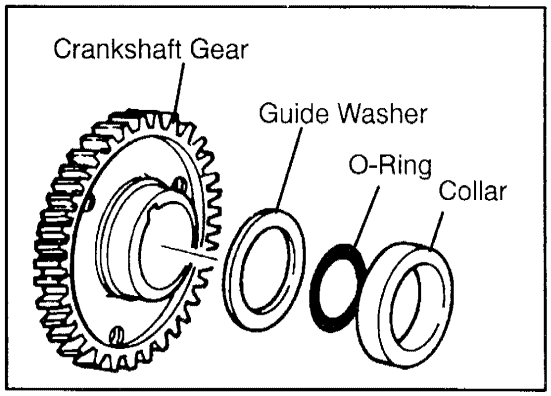
17. Remove collar, O-ring, guide washer and crankshaft gear (A). **NOTE:** A large screwdriver may be used to aid removal.

18. Remove two bolts retaining the counter balance bracket (B) using a 10 mm socket. **CAUTION:** Make no attempt to remove the counterbalance until steps 17 and 18 are complete, or damage may result to the counterbalance assembly.

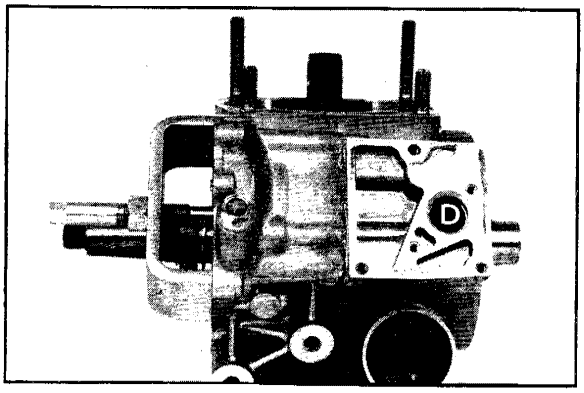
Reassembly Note: Punch marks (C) on both gears must be across from each other during reassembly. See photo three at right.







19. Remove oil pump assembly (D).

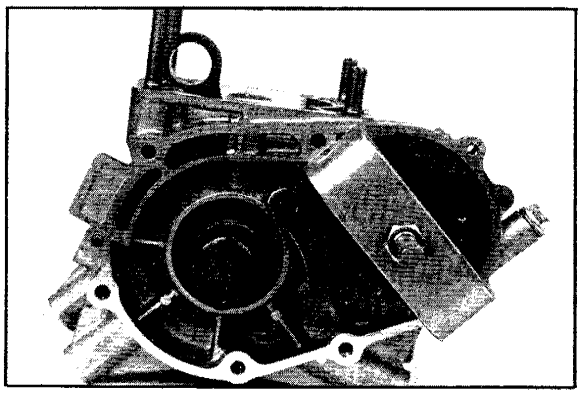


20. Attach counterbalance puller onto counter balance and position as shown in the picture at right.

Reassembly Note: The retainer bracket must be in position on the counterbalance assembly before the assembly is installed in the crankcase.

Counter Balance Puller

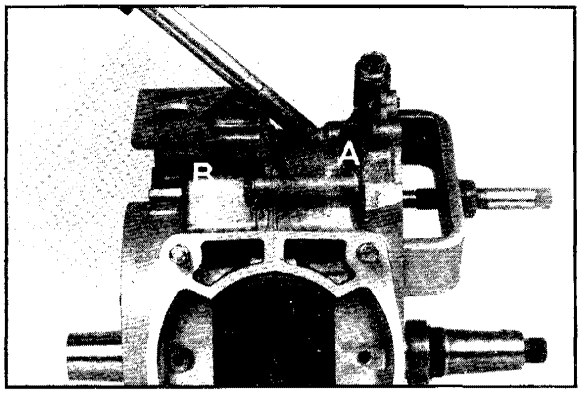
PN 2870968



Disassembly, Cont.

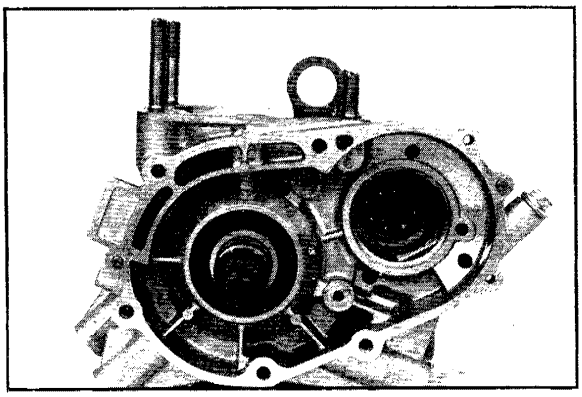
21. Heat areas (A) and (B) with a small propane torch for approximately one to two minutes, no closer than 1″ (2.5 cm) from case areas.

WARNING: Oil and gasoline are highly flammable and explosive under certain conditions. Use extreme caution when using a propane torch in this environment.



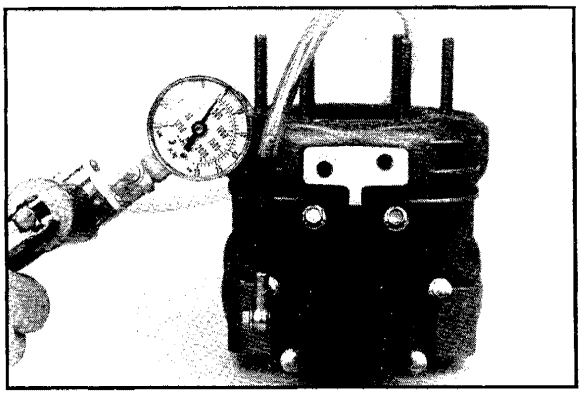
22. Once these areas are thoroughly heated, add tension to the puller by turning the large nut. Continue tensioning the puller until the counterbalance assembly is completely removed.

Reassembly Note: For reassembly of counterbalancer, heat areas (A) and (B) and press the balancer and bracket back into place.

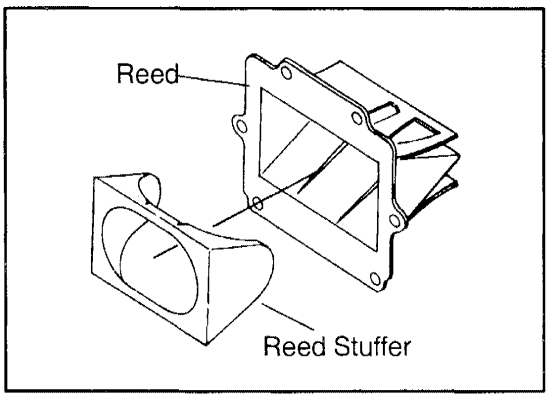


23. With counterbalance assembly removed, follow instructions for crankshaft service on pages 3.13 - 3.15.

24. The injection oil check valve is tested using the Mity Vac™ (PN 2870975). With the Mity Vac in the pressure mode the check valve should release between 2 and 5 PSI.



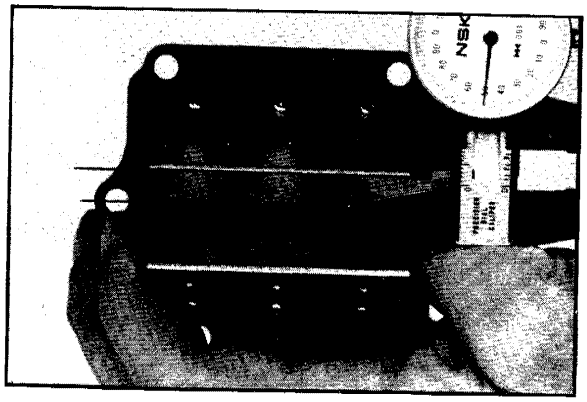
25. Remove the six bolts retaining the carb adapter and reed valve assembly using an 8 mm socket. **NOTE:** The reed stuffer is standard on the 400L models.



Disassembly, Cont.

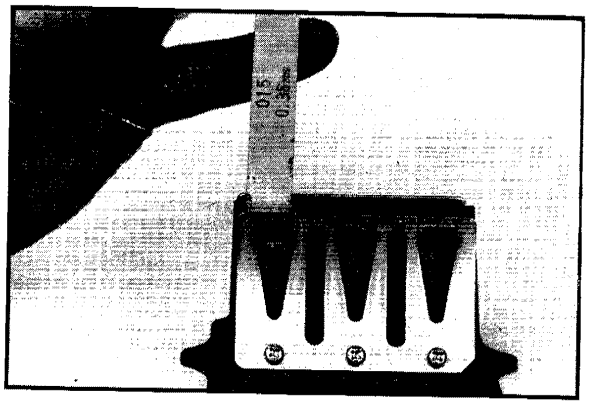
Reed Valve Assembly

26. Measure reed stop height in the area (A) indicated. Recommended stop height is .350″ (9 mm).



27. Measure the air gap of each reed valve petal as shown in the photo at right. The air gap should not exceed .015″ (.4 mm). **NOTE:** An early sign of reed valve failure may be hard starting.

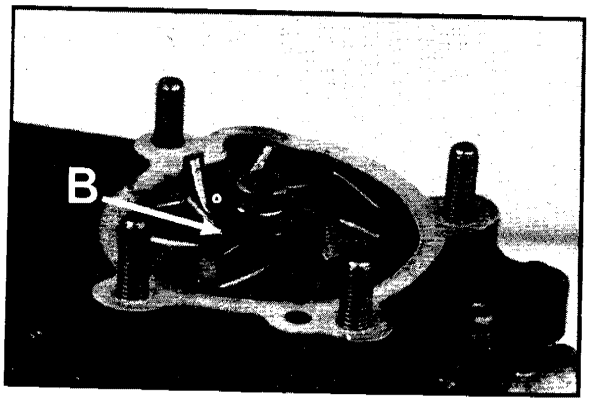
28. Check each reed valve petal for white stress marks or missing material. Replace if necessary.



Water Pump Impeller Clearance

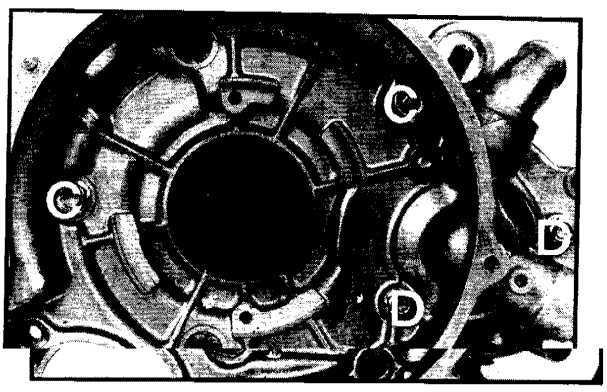
Whenever the counterbalance assembly is removed it will be necessary to verify impeller clearance. Following is a recommended procedure for measuring water pump impeller clearance.

29. Apply a small amount of putty or clay to the top of one impeller blade (B).



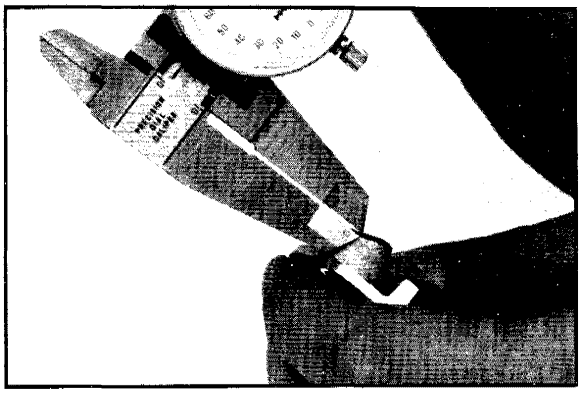
30. Reinstall case gasket and bolt case together at areas (C) and (D) as indicated on the photo at right.

31. Carefully remove case cover.

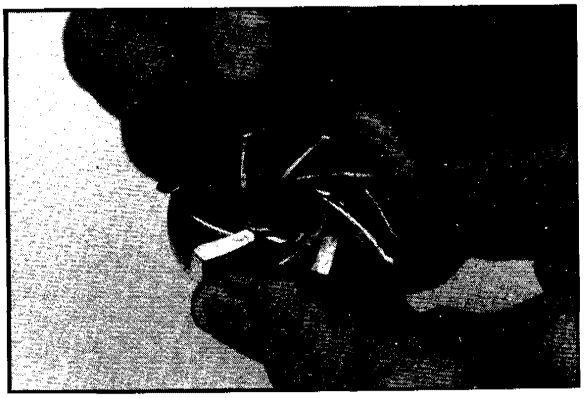


Disassembly, Cont.

5. Remove water pump impeller and check clearance measurement. Acceptable clearance measured with a dial caliper is between .020″ - .040″ (.05 -.1 cm). **CAUTION:** If the clearance is less than .020″ (.05 cm) the impeller may grind against the case. If the clearance is more than .040″ (.1 cm) the water pump may cavitate.



6. The photo at right illustrates checking clearance measurement with a feeler gauge. This method may also be used to check thickness by removing half of the putty from the impeller blade.



Spacer shim part numbers:

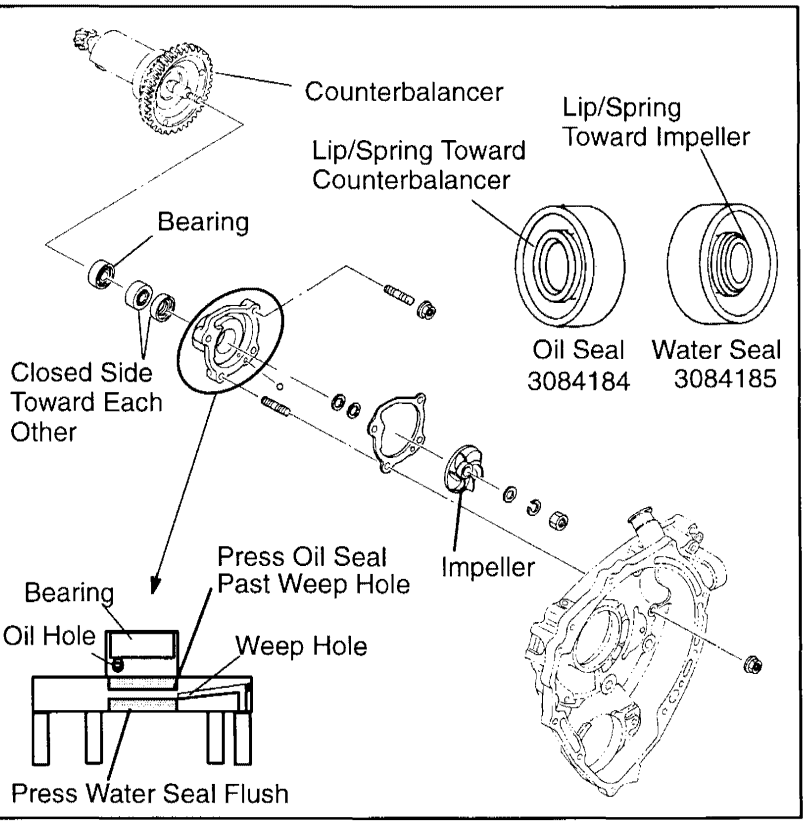
PN 3084188 0.1 mm/.004″

PN 3084189 0.2 mm/.008″

The illustration depicts correct positioning of the seals. The water seal is identified by counting the number of sealing "lips". It is a triple lip seal and has a protruding edge that faces away from the spring.

The oil seal is a double lip variety. The lip (on the spring end) angles back toward the spring. The spring end of the seals (open side) must face the oil or coolant as shown in the illustration.

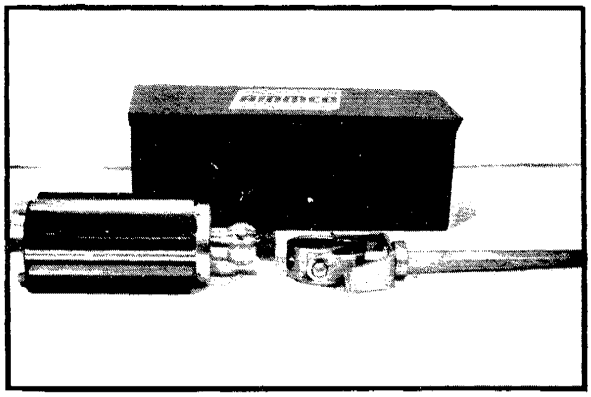
To assemble the pump casing, press the bearing into the casing until *flush* with the casting. Note: *Do not* press the bearing in until it seats against the shoulder, or the oil hole will be covered by the bearing outer race. Next, press the oil seal into the seal bore until the weep hole is visible. Now press the water seal in until flush with the outer edge of the seal bore.



Cylinder Hone Selection/Honing Procedure

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 type hone which also has the capability of oversizing. Two manufacturers of this type of hone are Sunnen Products Company of St. Louis, Missouri and Ammco Tools, Inc., of North Chicago, Illinois.

The photo at right shows the Ammco No. 3950 hone.

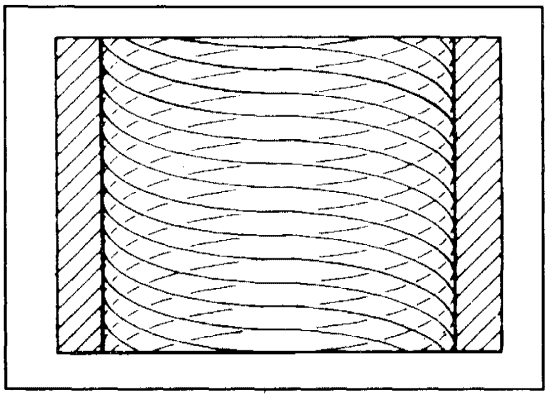


Cylinders may be wet or dry honed depending upon the hone manufacturer's recommendations. Wet honing removes more material faster and leaves a more distinct pattern in the bore.

CAUTION:

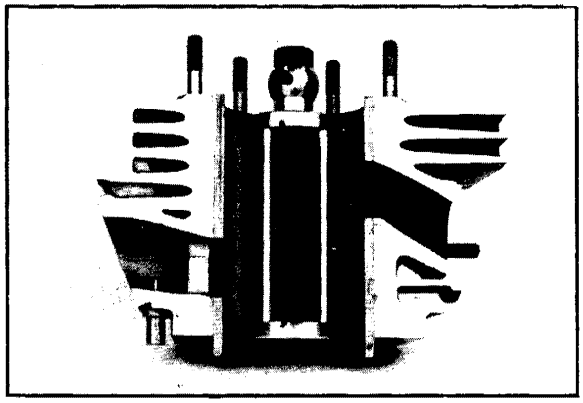
It is important that the cylinder be thoroughly cleaned after honing to remove all grindings which could cause piston or cylinder damage. Wash the cylinder in a solvent; then in hot soapy water; rinse; blow dry; and oil lightly.

NOTE: Honing material may become trapped in rough casting areas such as the area between the cylinder sleeve and port openings. Use electrical contact cleaner to ensure these areas are clean.

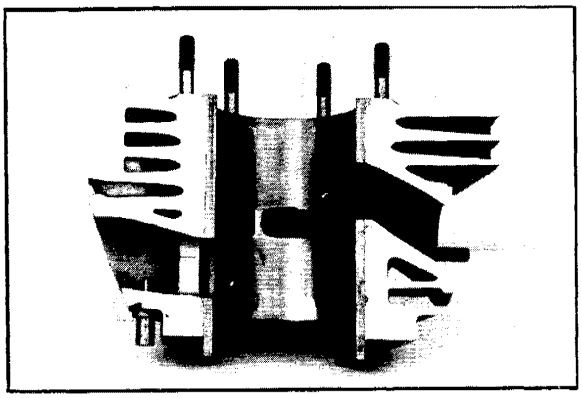


A finished cylinder should have a cross-hatch pattern to aid in the retention of the fuel/oil mixture in the initial break in.

1. Wash cylinder with solvent.
2. Using a vise, clamp cylinder around the exhaust port studs. **NOTE:** Protect from vise jaw serrations with brass stock, wood or cardboard.
3. Place hone in cylinder. Tighten stone adjusting knob until the stone contacts the cylinder walls. **CAUTION:** Do not overtighten. Cylinder damage may result.
4. With a 1/2″ drill motor at a speed of 300-500 RPM, run the hone in and out of the cylinder rapidly until cutting tension decreases. Remember to keep the hone drive shaft centered and to bring the stone approximately 1/2″ (1.3 cm) beyond the bore at the end of each stroke.



5. Release the hone at regular intervals and inspect the bore to determine if it has been cleared, and to check piston fit. **NOTE:** Don't allow cylinder to heat up during honing. The thinner areas of the liner around the ports will expand causing uneven bore.
6. After honing has been completed inspect all port opening areas for rough or sharp edges. Apply a slight chamfer to all ports to remove sharp edges or burrs, paying particular attention to the corners of the intake and exhaust ports.



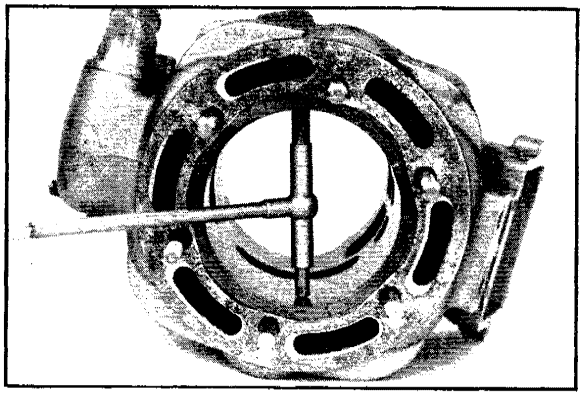
Piston/Cylinder Clearance (2 Strokes)

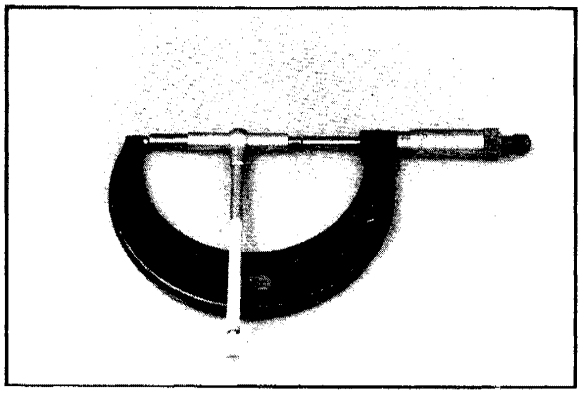
CAUTION:

Follow new engine break-in procedures after replacing piston/rings. Pre-mix the first tank of fuel. Bleed oil pump and warm engine thoroughly. Avoid sustained full throttle for the first two tanks of fuel. Confirm oil system is working properly. Oil level in reservoir should drop after first tank of fuel.

Cylinder Inspection/Measurement

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



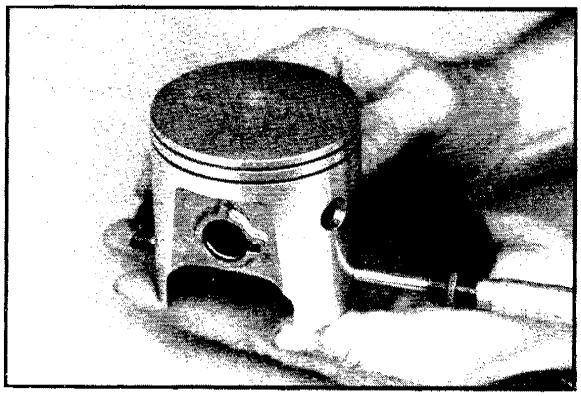


Piston Inspection/Measurement (Generic)

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

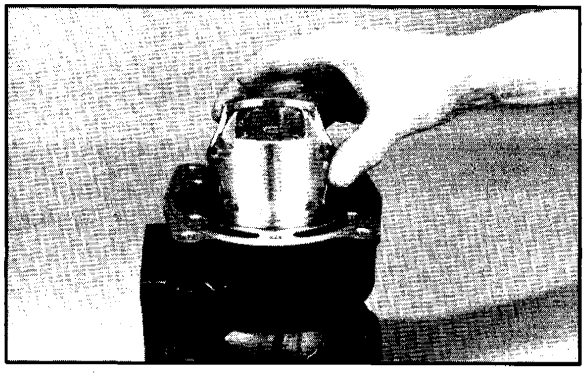
NOTE: The piston must be measured at this point to provide accurate piston-to-cylinder clearance measurement.

3. Subtract this measurement from the maximum cylinder measurement recorded previously. If clearance exceeds the service limit, determine if piston or cylinder is worn and recondition or replace as necessary. Refer to page 3.3 for piston to cylinder clearance specifications.



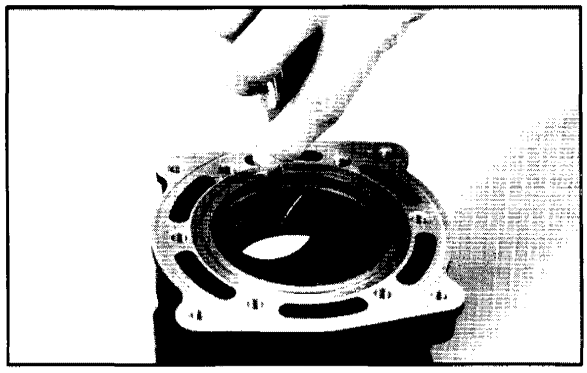
Piston Ring Installed Gap

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



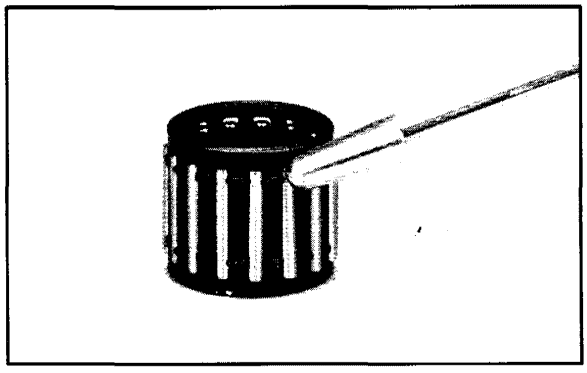
NOTE: A difference in end gap between the bottom and top of the cylinder indicates cylinder taper. The cylinder should be measured for excessive taper and out of round. Replace rings if the installed end gap exceeds the service limit. Refer to page 3.3 for specifications.

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

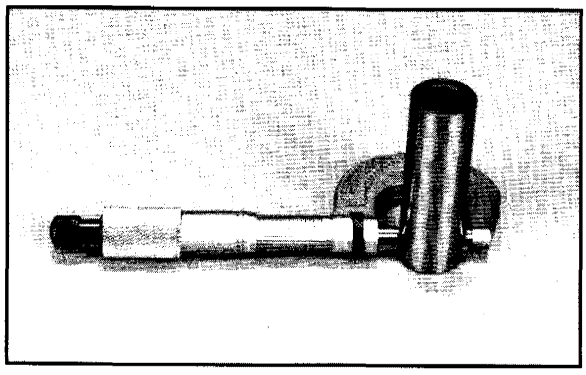


Piston Pin / Needle Bearing Inspection

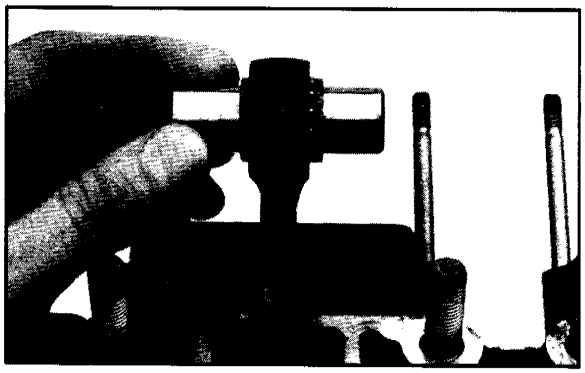
1. Clean needle bearing in solvent and dry with compressed air.
2. Inspect needle cage carefully for cracks or shiny spots which indicate wear. Replace needle bearing if worn or cracked, and always replace if piston damage has occurred.



3. Visually inspect piston pin for damage, discoloration, or wear. Run your fingernail along the length of the pin and replace it if any rough spots, galling or wear is detected. Measure piston pin.

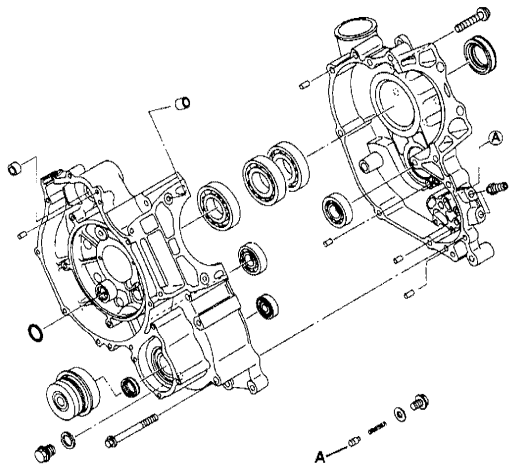


Connecting Rod Small End Inspection

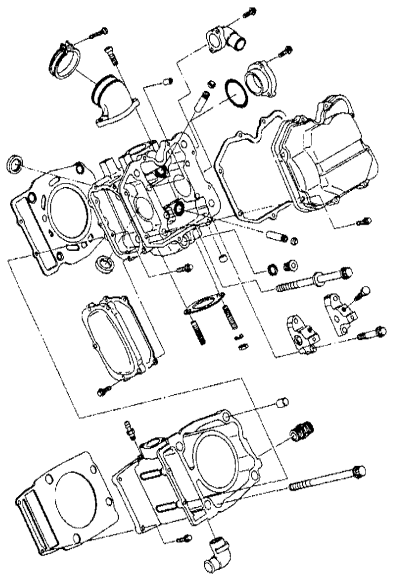


1. Clean small end of connecting rod and inspect inner bore with a magnifying glass. Look for any surface irregularities including pitting, wear, or dents.
2. Run your fingernail around the inside of the rod and check for rough spots, galling, or wear.
3. Oil and install needle bearing and pin in connecting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

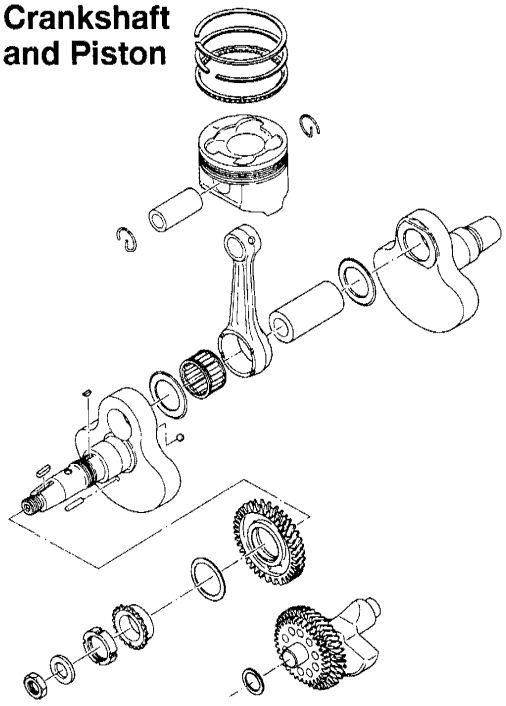
Crankcase



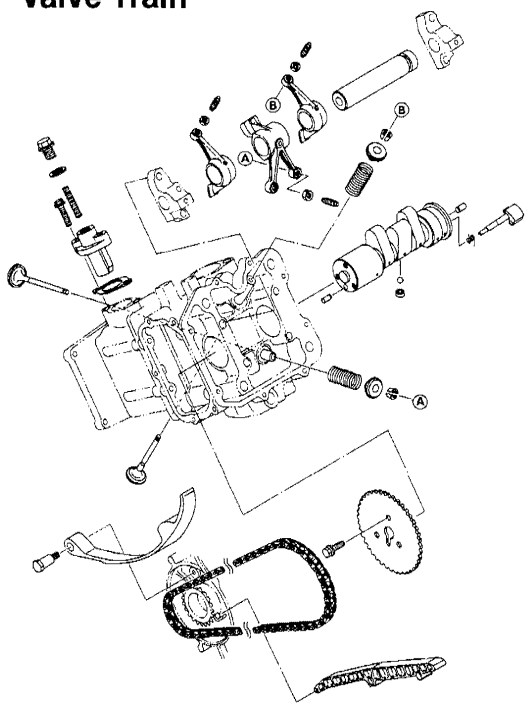
Cylinder/ Cylinder Head



Crankshaft and Piston



Valve Train



Engine Lubrication

Oil Type	Polaris Premium 4 Synthetic (PN 2871281); or API certified "SH" 5W30 oil
Capacity	2 U.S. Quarts (1.9 l)
Filter	PN 3084963
Filter Wrench	Snap On PN YA997 or equivalent
Drain Plug Torques	14 ft. lbs. (1.9 kg-m) tank and sump
Oil Pressure Specification	20 PSI @ 5500 RPM, Polaris 0W/40 Synthetic (Engine Hot)

Oil Flow

The chart on page 3.37 describes the flow of oil through the engine. Beginning at the oil tank, the oil flows through a screen fitting in the bottom of the tank and into the oil supply hose. The feed side of the oil pump draws oil through the hose and into the crankcase oil gallery, and then pumps the oil through another passage to the one way valve. (When the engine is off, the one way valve closes to prevent oil in the tank from draining into the crankcase.) The oil is pumped through a delivery pipe to the oil filter. If the oil filter is obstructed, a bypass valve contained in the filter allows oil to bypass the filter element.

At this point, the oil is diverted in two directions. Oil is supplied to the camshaft through the left front cylinder stud, and an oil passage in the head. Oil enters the camshaft through the PTO (L) journal. The camshaft journals, cam lobes, and rocker arms are lubricated through holes in the camshaft. The oil lubricates the cam chain and sprocket and drains to the sump.

The other oil path from the filter leads through a delivery pipe to the crankcase main oil gallery, which leads to the stator plate oil passage. Here it passes through the slotted friction bearing into the crankshaft. An oil seal on the stator plate prevents oil from entering the stator/flywheel area. Oil travels through the crankshaft to the crank pin, lubricating the connecting rod large end bearing directly. Oil also passes through an oil jet (drilled orifice) in the end of the crank pin to the PTO end main bearings and counterbalancer gears.

Residual oil from the lubrication of the crankshaft and connecting rod indirectly lubricates the cylinder wall, piston, rings, connecting rod small end bearing, piston pin, oil/water pump drive gears, cam chain and drive sprocket, and Magneto end crankshaft main bearing.

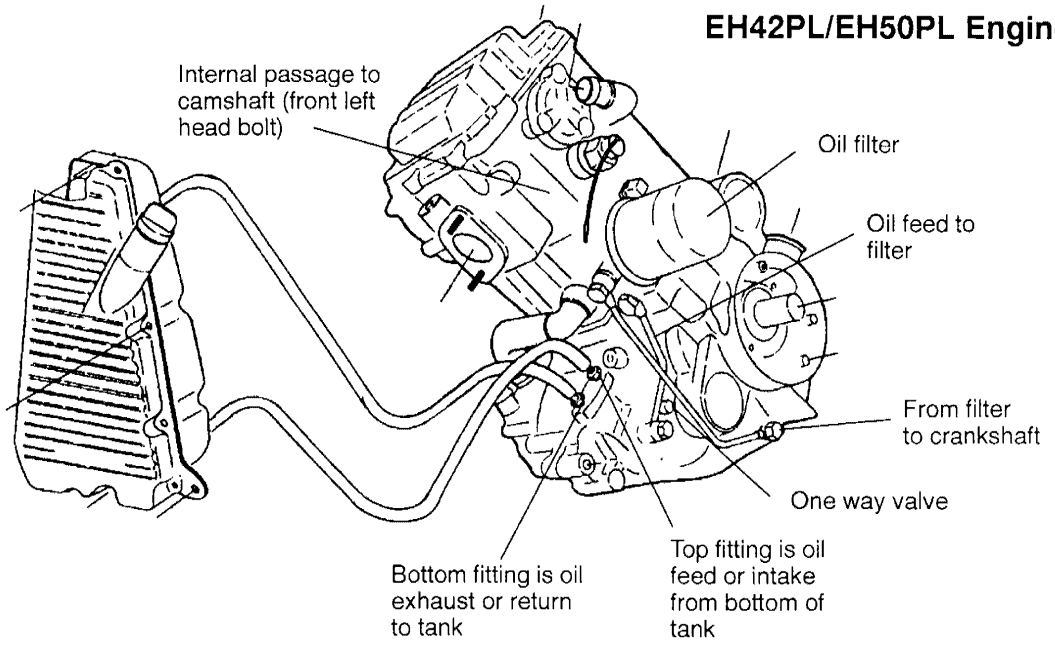
The one-way valve is located on the front left (PTO) side of the crankcase. The valve prevents oil in the tank from draining into the engine sump when the engine is off. The valve mechanism consists of a plunger, return spring, guide plug, and sealing washer. When the engine is running, oil pressure lifts the plunger off the seat, allowing oil flow. When the engine is off, spring pressure forces the plunger against the oil passage seat, preventing oil flow from the tank to the sump. The one-way valve requires very little maintenance. If engine oil drains into the sump when the engine is off, inspect the valve sealing surface for debris or damage. Inspect the return spring for distortion or damage.

Oil Pressure Test

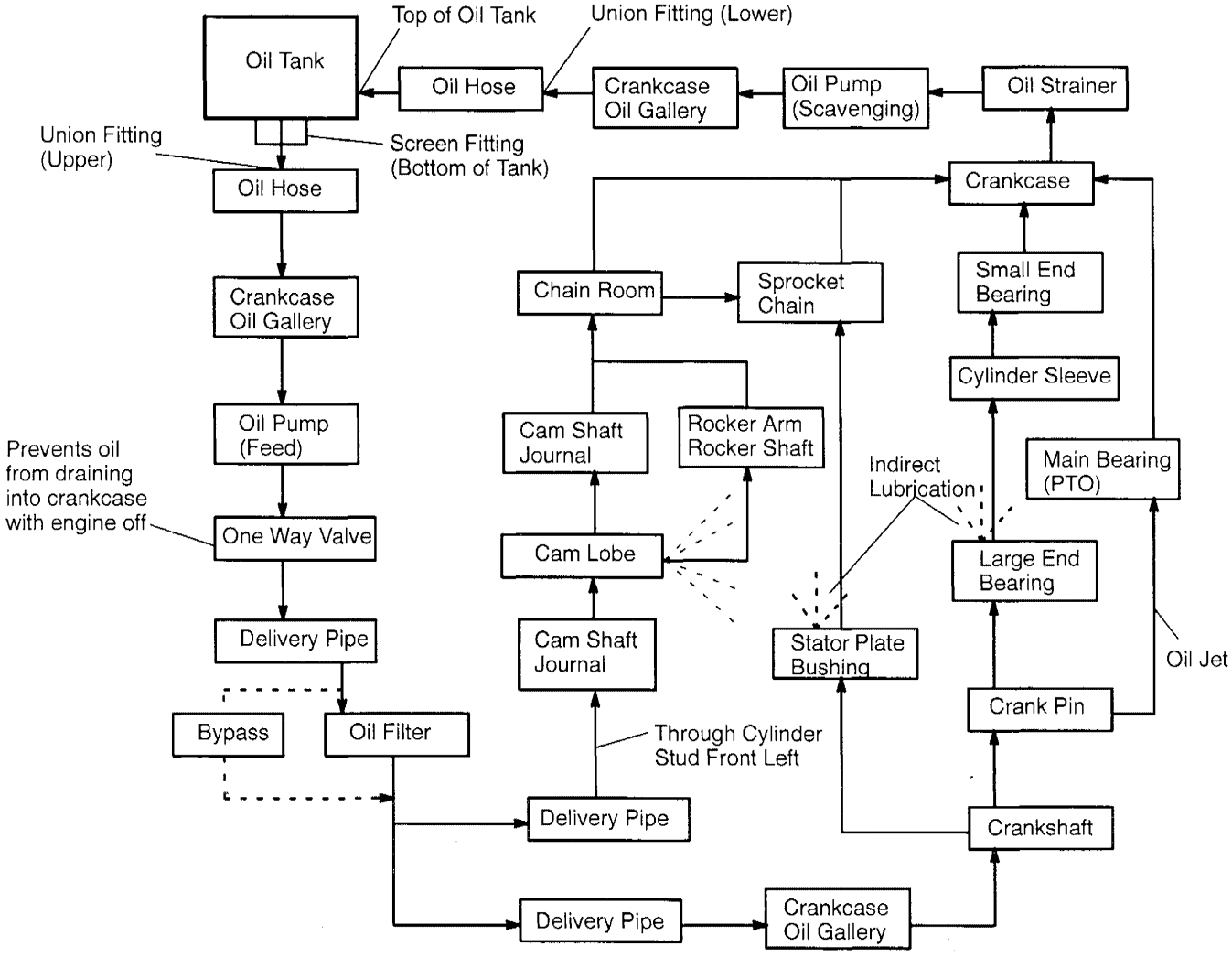
1. Remove blind plug on front left cylinder head.
2. Insert a 1/8 NPT oil pressure gauge adaptor into the cylinder head and attach the gauge.
3. Start engine and allow it to reach operating temperature, monitoring gauge indicator.

Oil Pressure at 5500 RPM (Engine Hot):
Standard: 20 PSI
Minimum: 12 PSI

EH42PL/EH50PL Engine



EH42PL/EH50PL Oil Flow Chart



Removal

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

- PVT System
- Flywheel
- Alternator/Stator
- Starter Motor/Starter Drive
- Camshaft
- Rocker Arms
- Cam Chain and Sprockets
- Cam Chain Tensioner and Guides
- Cylinder Head
- Cylinder
- Piston/RIngs

The following components require engine removal for service:

- Oil Pump
- Water Pump*
- Water Pump Mechanical Seal
- Counterbalancer Assembly
- Connecting Rod
- Crankshaft
- Crankshaft Main Bearings
- Crankcase

* Complete engine removal is not necessary to inspect or replace the water pump impeller.

Engine Removal Preparation

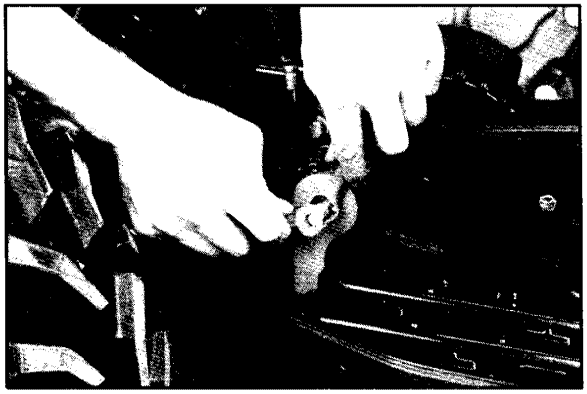
1. Clean work area.
2. Thoroughly clean the ATV engine and chassis.
3. Disconnect battery negative (-) cable.
4. Drain oil tank and engine sump.
5. Remove the following parts. Refer to the Body Chapter for removal procedures.
   - Seat
   - Left and Right Side Covers
   - Fuel Tank Cover
   - Fuel Tank (see Fuel System Chapter)
   - Rear Rack
   - Rear Cab
6. Disconnect spark plug high tension lead.
7. Remove air pre-cleaner and duct.
8. Disconnect engine breather line from engine.
9. Hold plastic fitting on airbox LH side with a wrench, remove oil tank breather line clamp and remove line.
10. Loosen carburetor boot clamp and two bolts securing airbox. Remove airbox.

Removal, Cont.

11. Remove carburetor.
12. Insert a shop towel into the carburetor flange to prevent dirt from entering the intake port.
13. Remove springs from exhaust pipe and remove pipe.

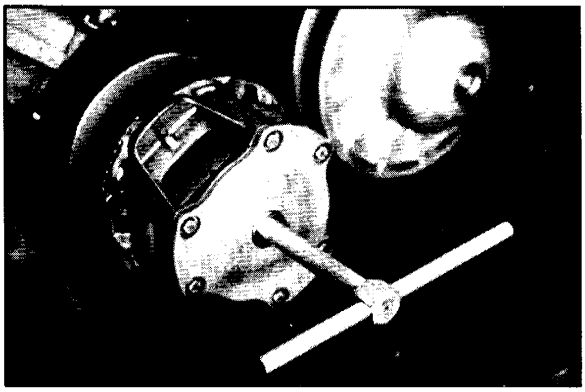
AWD Models:

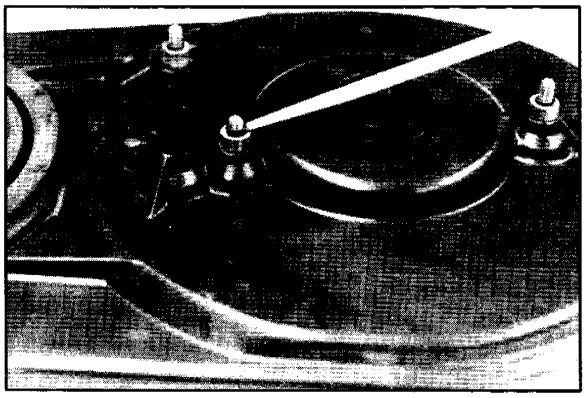
14. Loosen auxiliary brake adjuster locknut, remove adjusting bolt and brake actuator arm.
15. Remove center chain guard bolt, two screws, and chain guard.
16. Remove center drive and driven sprocket bolts and remove chain and sprockets as an assembly.



PVT Disassembly, All Models:

1. Remove the screws and retainer clips from PVT outer cover and remove cover.
2. Mark the drive belt direction of rotation and remove drive belt. The belt is normally installed so the numbers can be easily read.
3. Remove drive clutch retaining bolt and remove drive clutch using puller PN 2870506.
4. Remove driven clutch retaining bolt and driven clutch using puller PN 2870913.
5. Remove driven clutch offset spacers from the transmission input shaft.
6. Remove cable tie from PVT air outlet duct.
7. Bend back retainer tabs on three screws at the front of the inner cover and remove screws and retainer plate.
8. Loosen three inner cover retaining bolts at the rear of the cover only enough to allow cover removal.
9. Remove cover. **NOTE:** Do not lose spacers or spacer retaining O-rings located on the inside of the inner cover.





Removal, Cont.

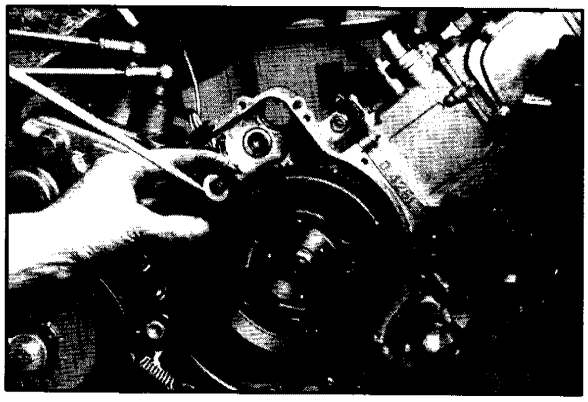
Recoil/Stator Removal

NOTE: Removal of the recoil flywheel and stator assembly will allow additional clearance for engine removal.

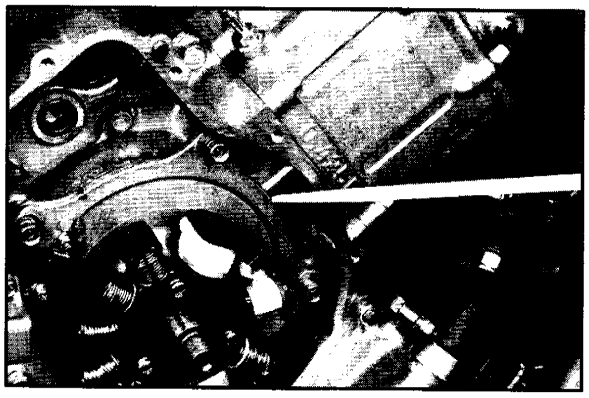
Remove:

- Recoil housing bolts and housing.
- Starter drive assembly. Note the thrust washer located at the rear of the drive mechanism.
- Flywheel nut and washer.

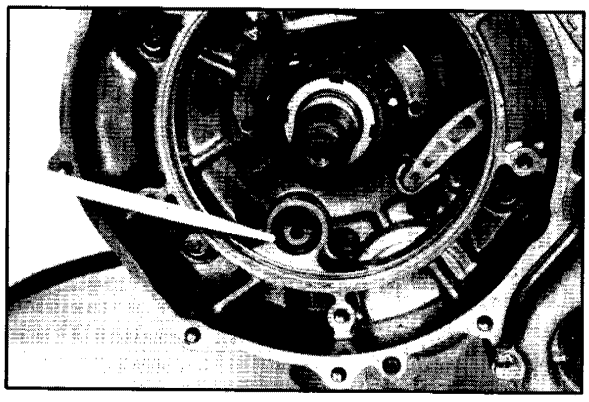
1. Install flywheel puller and remove flywheel. **CAUTION:** Do not thread the puller bolts into the flywheel more than 1/4" (.63 cm) or stator coils may be damaged.



2. Mark or note position of stator plate on crankcase.
3. Remove bolts and carefully remove stator assembly, being careful not to damage the crankshaft bushing or oil seal on the stator plate.
4. Wrap stator in a shop towel and secure stator out of the way on top of frame.



5. Remove oil passage O-Ring.
6. Place a shop towel in the cam chain area and over crankshaft oil passage.
7. Remove transmission linkage rods from shift selector and secure out of the way.
8. Remove PVT air intake duct.
9. Disconnect coolant temp sender wire.

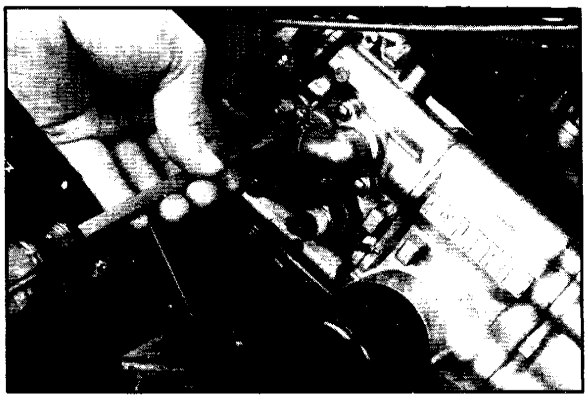


Removal, Cont.

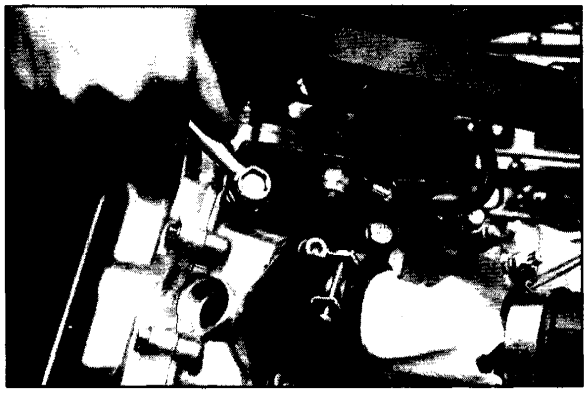
5. Remove the following.
   - Starter motor. Note ground cable location. Mark positive (+) cable mounting angle and remove cable.
   - Oil tank bolts and oil tank, securing it out of the way.
   - Oil filter. Cover oil filter area with a shop towel.
6. Loosen oil line hose clamps and remove oil lines. **NOTE:** The uppermost line is the oil feed from the bottom of the tank. Cover both oil lines to prevent dirt from entering the line.
7. Remove coolant tank Torx™ screws and remove tank. Secure out of the way.
8. Loosen clamp and remove coolant line from thermostat housing. Drain the line into a suitable container. Plug end of thermostat housing to minimize spillage.

NOTE: Mark the center of the engine mount studs in the frame for reference upon installation.

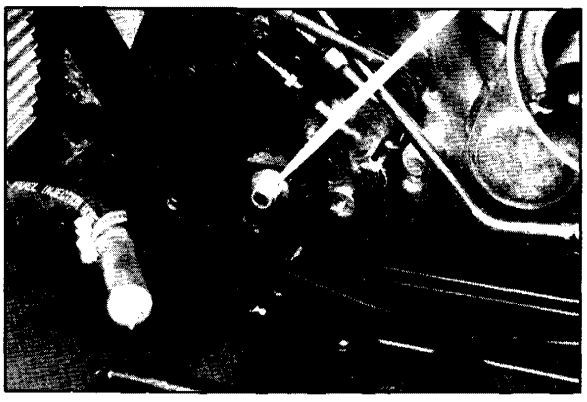
9. Remove nut, ground cable and washer from the upper right engine mount and mark the location of the center of the mount stud.



10. Remove the two upper engine mount plate bolts and remove the plate and ground cable.

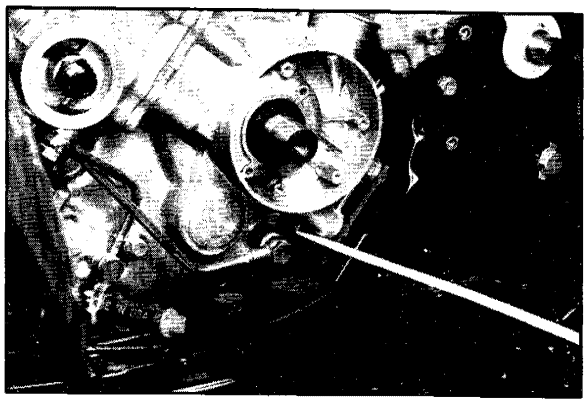


11. Remove nut and washer from lower left engine mount and mark location of stud. Some engines have the front motor mount located in front of the engine.



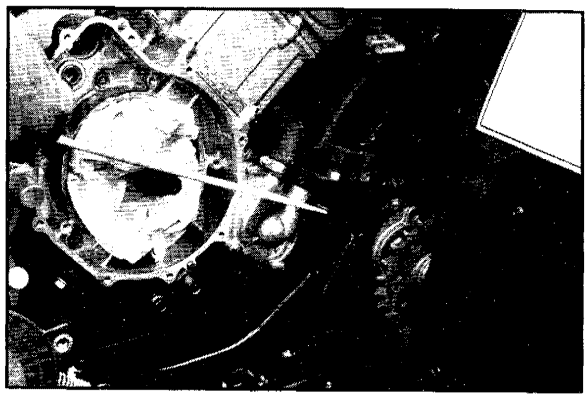
Removal, Cont.

17. Loosen nut on slotted rear engine mount plate and back it out to the end of the stud.

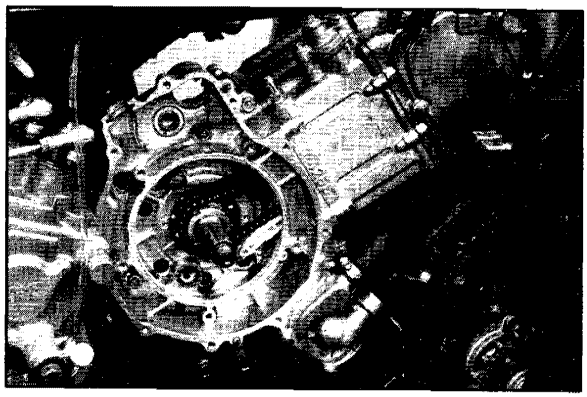


Final Coolant Draining/Engine Removal

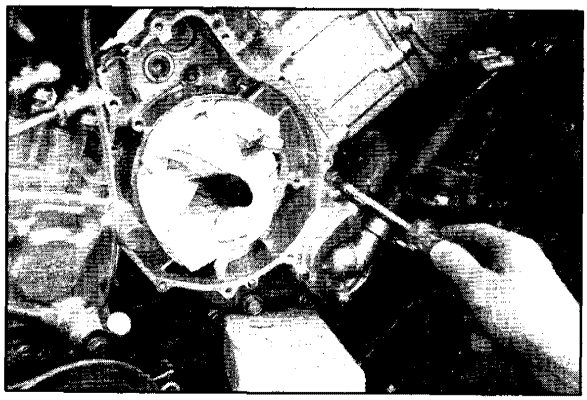
1. Move top of engine to left until the coolant supply hose clamp clears the frame at the water pump fitting.



2. Lift and twist engine clockwise until the lower left engine mount stud is clear of the frame mount and the lower right coolant hose clamp clears the frame tube.



3. Support engine in this position with a suitable support, such as a board or a 2x4.
4. Place a drain pan beneath area to catch coolant.
5. Clamp coolant inlet hose leading from radiator to pump to reduce coolant spillage.
6. Loosen hose clamp on upper water pump outlet coolant hose and remove hose, draining engine coolant into container. **NOTE:** Remove plug in thermostat housing to increase flow.
7. Reinstall hose and clamp.
8. Remove hose from water pump inlet and place in container. Release clamp from hose and allow hose to drain completely.
9. Lift back of engine while rotating front of engine clockwise and remove engine from left side of frame.

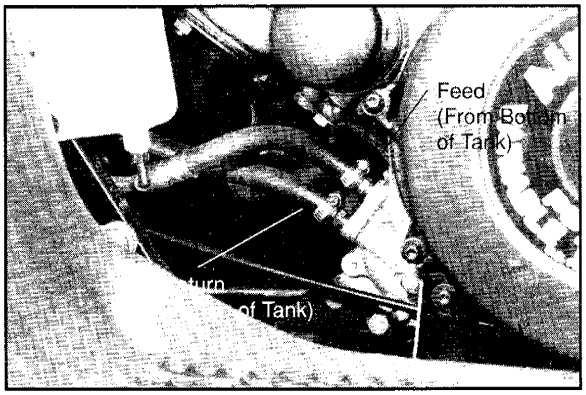


Engine Installation

1. Install engine from left side of frame, placing slotted rear engine plate in position with washer and nut on top of plate.
2. Attach water pump inlet hose and tighten clamp.
3. With engine in place on rear mount and inlet hose connected, tip top of engine to the left and rotate counterclockwise to engage lower left engine mount in frame.
4. Continue rotating engine making sure the hose clamp for the water pump inlet hose clears the frame at lower right side of engine near water pump.
5. Install upper engine mount bracket to engine and line up all reference marks.
6. Align engine by temporarily installing clutches and following alignment/offset procedure outlined in the PVT Chapter.
7. When engine is aligned properly, tighten all engine mounts and install all parts, reversing the order of disassembly. See engine installation notes.

Oil Supply

1. Before installing oil supply line, add Polaris Premium 4 0W/40 oil to the oil tank until oil flows from feed line.
2. Connect the lines to the pump inlet and outlet fitting and tighten securely. Be sure oil feed line is properly connected to the uppermost oil line fitting on the crankcase. Add oil until it is at the upper mark on dipstick.



Bleed Cooling System

1. Fill coolant reservoir tank to full mark.
2. With hose removed from thermostat housing, add coolant to radiator *slowly* until coolant begins to flow from thermostat housing.
3. Install hose on thermostat housing and tighten clamp. Continue to add coolant *slowly* until radiator is full.
4. Install radiator cap and squeeze coolant lines to force air out of system.
5. Remove cap and add coolant if necessary.
6. After reassembly is complete, start engine and observe coolant level in the radiator. Allow air to purge and top off as necessary. Reinstall radiator cap and bring engine to operating temp. Check level in reservoir tank after engine is cool and add coolant if necessary.

Transmission

1. Readjust transmission shift linkage as outlined in Transmission Chapter.

Exhaust

1. Seal all connections with high temp silicone seal.
2. Check to be sure all springs are in good condition.

Engine Disassembly

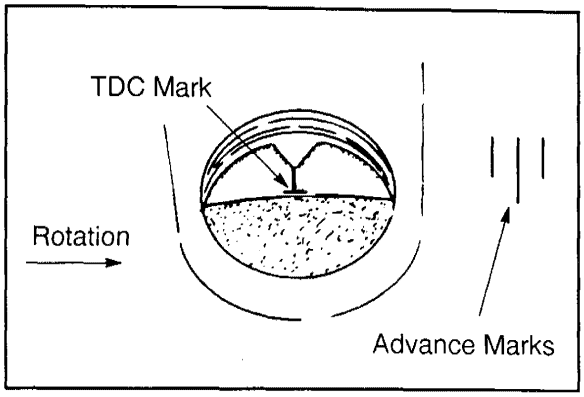
Cam Chain Tensioner/Rocker Arm/Camshaft Removal

1. Remove fuel tank and spark plug high tension lead. If camshaft is to be removed, drain engine coolant. See cooling system draining/refilling.
2. Remove bolt securing rocker cover and remove cover and gasket.
3. Remove ignition timing inspection plug from recoil housing.

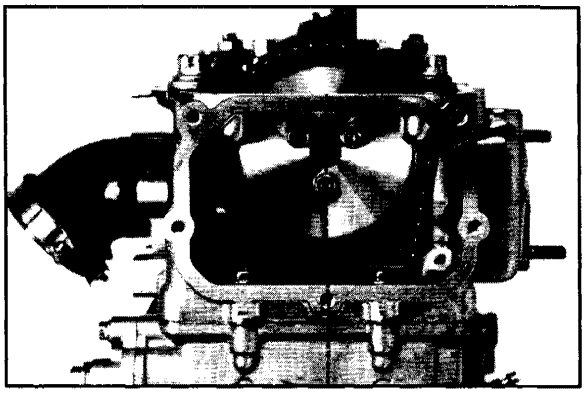
Engine Disassembly, Cont.

To position crankshaft at Top Dead Center (TDC) on compression stroke:

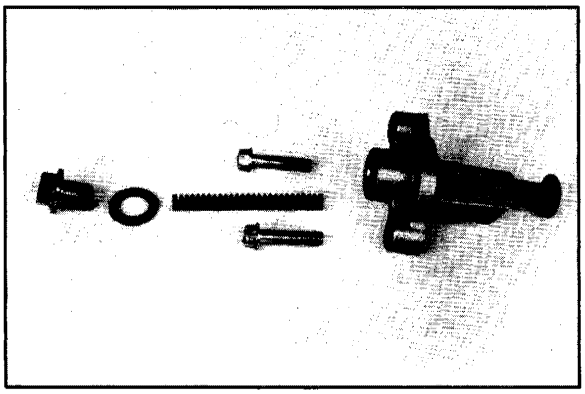
12. Rotate engine slowly in the direction of rotation watching intake valves open and start to close.
13. Continue to rotate engine slowly, watching camshaft sprocket marks and the mark in the timing inspection hole.



14. Align single (TDC) mark on flywheel with projection in inspection hole, and the cam sprocket pin (facing upward) aligned with the camshaft to crankshaft center line. **NOTE:** The cam lobes should be pointing down and all valves should have clearance at this point.

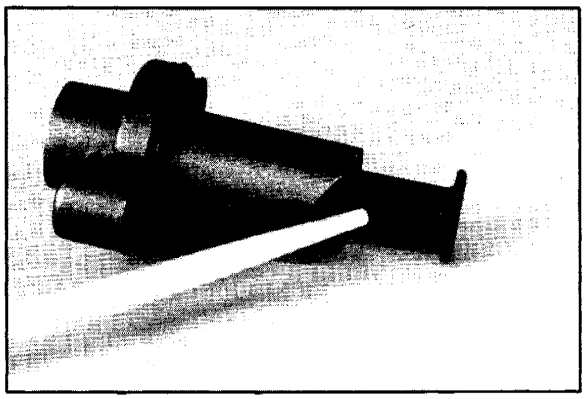


15. Remove cam chain tensioner plug, sealing washer, and spring. **CAUTION:** The plug is under spring tension. Maintain inward pressure while removing.
16. Remove the two 6x25 mm cam chain tensioner flange bolts.
17. Tap lightly on tensioner body with a soft face hammer and remove tensioner.



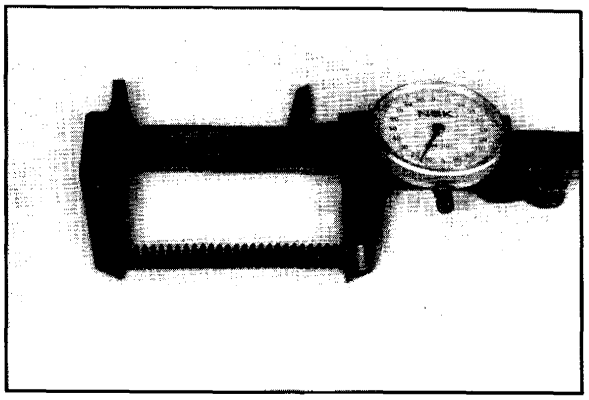
Cam Chain Tensioner Inspection

1. Pull cam chain tensioner plunger outward to the end of its travel. Inspect teeth on ratchet pawl and plunger for wear or damage.
2. Push ratchet pawl and hold it. The plunger should move smoothly in and out of the tensioner body.



Engine Disassembly, Cont.

3. Release ratchet pawl and push inward on plunger. It should remain locked in position and not move inward.
4. Measure free length of tensioner spring. Replace spring if excessively worn.



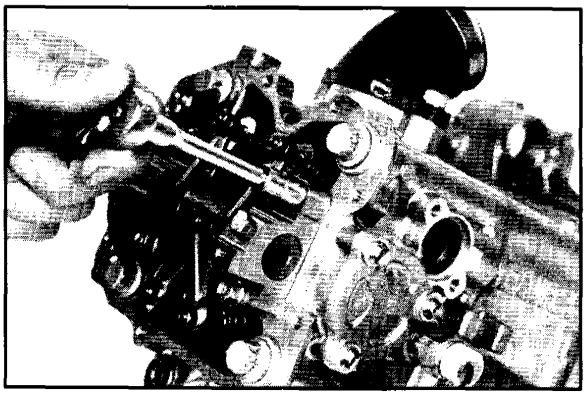
Tensioner Spring Free Length:

Std. 2.320" (5.9 cm)

5. Replace entire tensioner assembly if any part is worn or damaged.

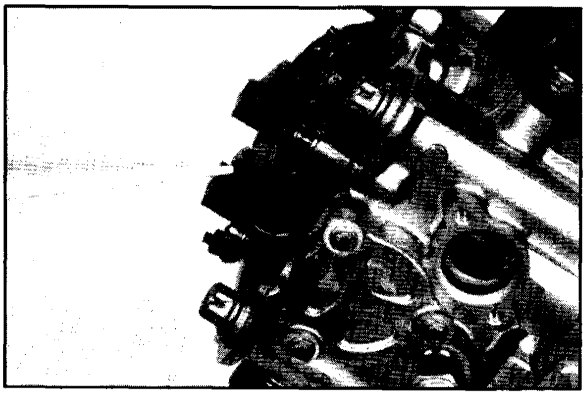
Rocker Arm/Shaft Removal

1. Loosen rocker shaft retaining bolt.
2. Remove the four bolts securing rocker shaft supports, and remove the supports, rocker shaft and rocker arms as an assembly, being careful not to drop the dowel pins into the engine.



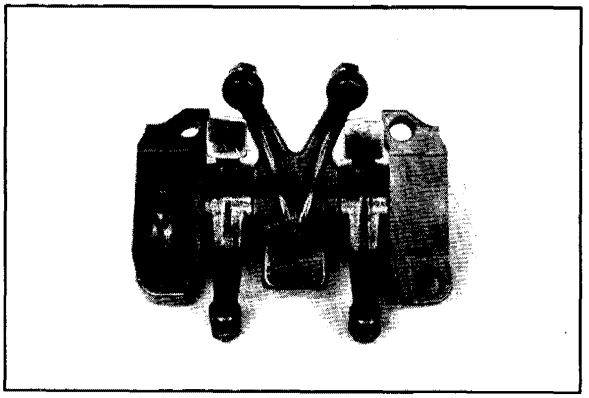
Rocker Arm/Shaft Inspection

1. Remove retaining bolt from the PTO (left) end rocker shaft support.
2. Mark or tag intake rocker arms so they can be installed in the same position.



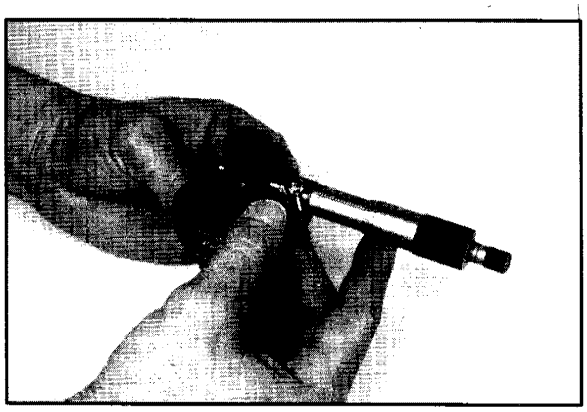
Rocker Shaft Retaining Bolt

3. Inspect each rocker arm cam follower surface. If there is any damage or uneven wear, replace the rocker arm. **NOTE:** Always inspect camshaft lobe if rocker arms are worn or damaged.

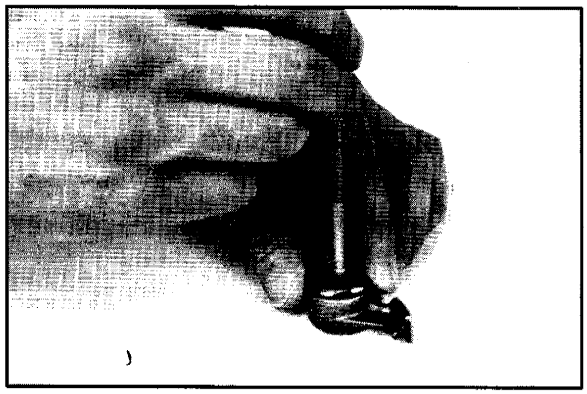


Engine Disassembly, Cont.

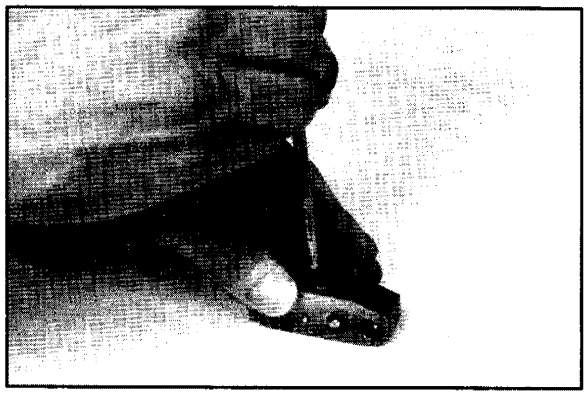
4. Measure O.D. of rocker shaft. Inspect it for wear or damage.



5. Measure I.D. of each rocker arm.



6. Measure I.D. of both rocker arm shaft supports and visually inspect surface.



Rocker Shaft OD:
.8656-.8661 (21.987-22.00 mm)

Rocker Arm ID and Shaft Support:
.8669-.8678 (22.020-22.041 mm)

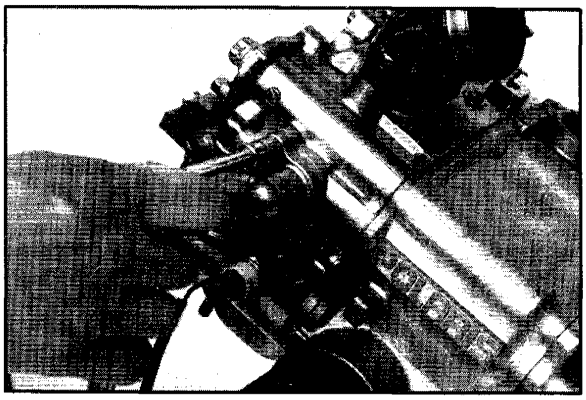
Clearance-Rocker Arm to Rocker Shaft:
Std: .0008-.0021 (.020-.054 mm)
Service Limit: .0039 (.10 mm)

7. Inspect rocker adjuster screws for wear, pitting, or damage to threads of the adjuster or locknut. Replace all worn or damaged parts. **NOTE:** The end of the adjuster screw is hardened and cannot be ground or re-faced.

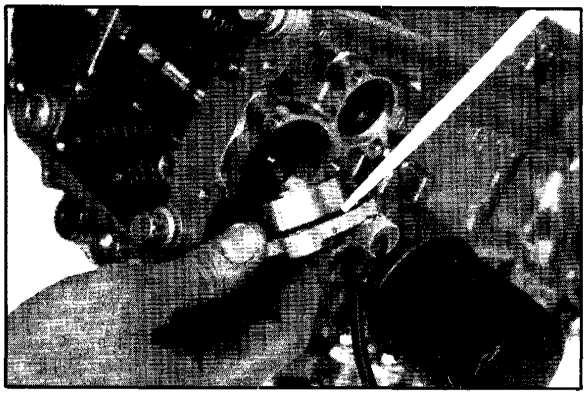
Engine Disassembly, Cont.

Camshaft Removal

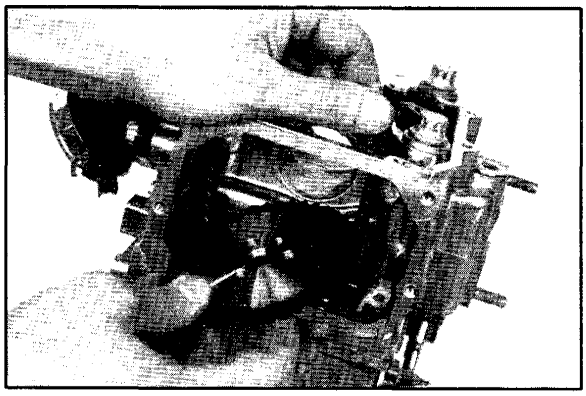
1. Remove camshaft sprocket inspection cover.
2. Loosen three camshaft sprocket bolts.
3. Remove thermostat housing and thermostat. Note the location of the air bleed holes in the thermostat. Upon reassembly, the thermostat bleed holes should be positioned next to the holes for the thermostat cover bolts.



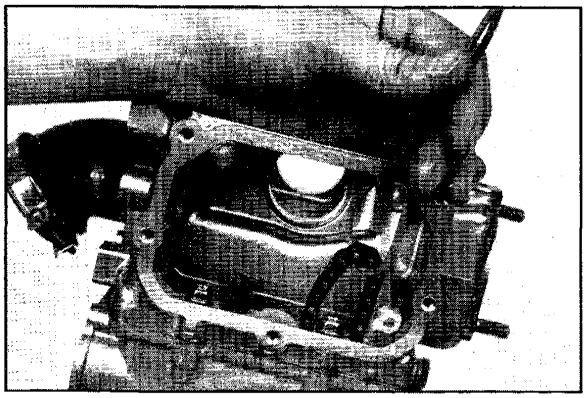
4. Remove camshaft end cap and O-Ring.
5. Place a clean shop towel in the area below cam chain sprocket and remove sprocket retaining bolts.



6. Slide camshaft inward to allow removal of cam sprocket and remove sprocket from camshaft and chain.



7. Secure cam chain with a wire to prevent it from falling into the crankcase.
8. Inspect cam sprocket teeth for wear or damage. Replace if necessary.
9. Slide camshaft out the PTO side of the cylinder head.

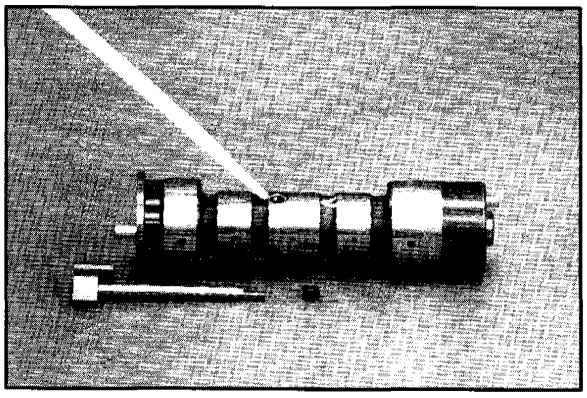


Engine Disassembly, Cont.

Automatic Compression Release Removal/Inspection

NOTE: The automatic compression release mechanism can be inspected and serviced without removing the camshaft from the cylinder head. The actuator ball in the camshaft is not replaceable. Replace the camshaft as an assembly if the actuator ball is worn or damaged.

1. Check release lever shaft for smooth operation throughout the entire range of rotation. The spring should hold the shaft weight against the stop pin. In this position, the actuator ball will be held outward in the compression release mode.
2. Remove release lever shaft and return spring.
3. Inspect shaft for wear or galling.
4. Inspect lobe on end of release lever shaft and actuator ball for wear and replace if necessary.



Automatic Compression Release Installation

1. Slide spring onto shaft.
2. Apply engine oil to release lever shaft.

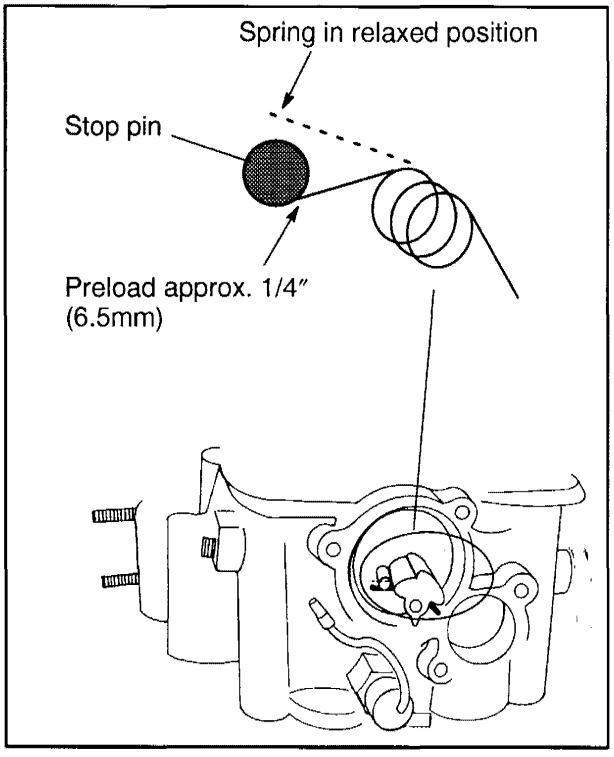
The actuator ball must be held outward to allow installation of the release lever shaft.

If Camshaft Is Removed From Engine:

3. Turn the camshaft until the actuator ball is in the lowest position and install the release lever shaft, pre-winding the spring approximately 1/4″ (6.5mm).

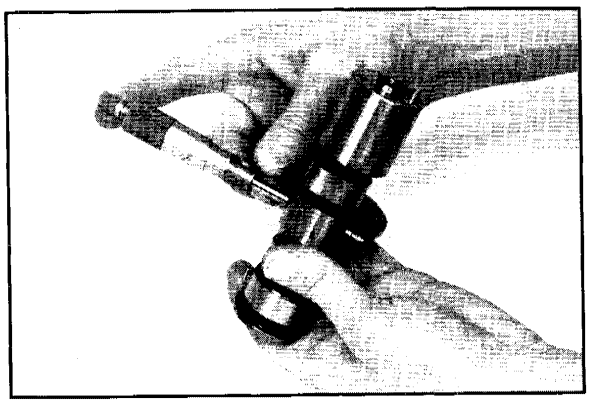
If Camshaft Is Installed In The Engine:

4. Use a small magnet to draw the actuator ball outward, or rotate the engine until the cam lobes face upward and install release lever shaft.
5. Position camshaft as shown at bottom of illustration at right.
6. Place arm of spring under stop pin as shown and push release lever inward until fully seated. *Do not* pre-wind the spring one full turn or the compression release will not disengage when the engine starts. Check operation of mechanism as outlined in step 1 of Removal (above).
   NOTE: When shaft is properly installed, actuator ball will be held in the "out" position. It is important to note that spring pressure is very light.



Engine Disassembly, Cont.

Camshaft Inspection

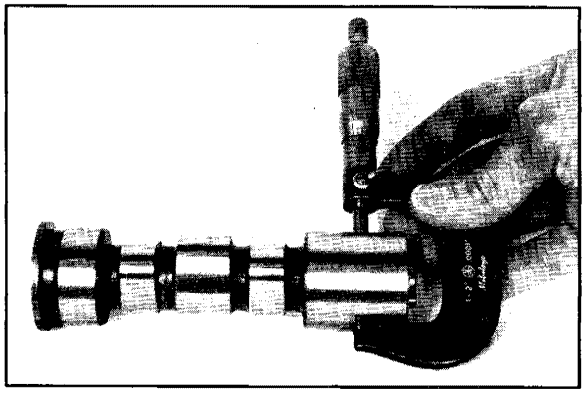


1. Visually inspect each cam lobe for wear, chafing or damage.
2. Thoroughly clean the cam shaft, making sure the oil feed holes are not obstructed.
3. Measure height of each cam lobe using a micrometer.

Intake Cam Lobe Height:

Std: 1.2884-1.2924 (32.726-32.826 mm)
Limit: 1.2766 (32.426 mm)

Exhaust Cam Lobe Height:
Std: 1.2884-1.2924 (32.726-32.826 mm)
Limit: 1.2766 (32.426 mm)



4. Measure camshaft journal OD.
5. Measure ID of camshaft journal bore.
6. Calculate oil clearance by subtracting journal OD from journal bore ID.

Camshaft Journal OD
Mag: 1.4935-1.4941 (37.935-37.950 mm)
PTO: 1.4935-1.4941 (37.935-37.950 mm)

Camshaft Journal Bore ID
Mag: 1.4963-1.4970 (38.005-38.025 mm)
PTO: 1.4963-1.4970 (38.005-38.025 mm)

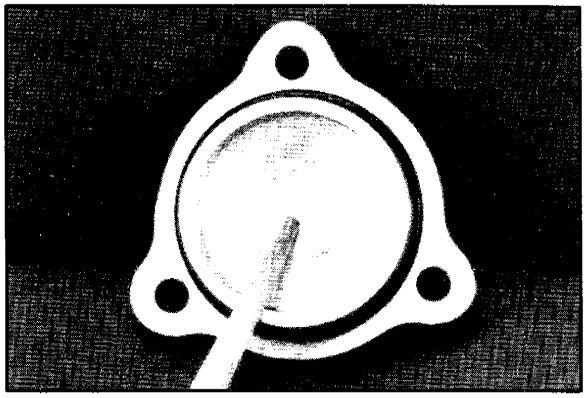
Oil Clearance
Std: .0022-.0035 (.055-.090 mm)
Limit: .0039 (.10 mm)

Engine Disassembly, Cont.

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

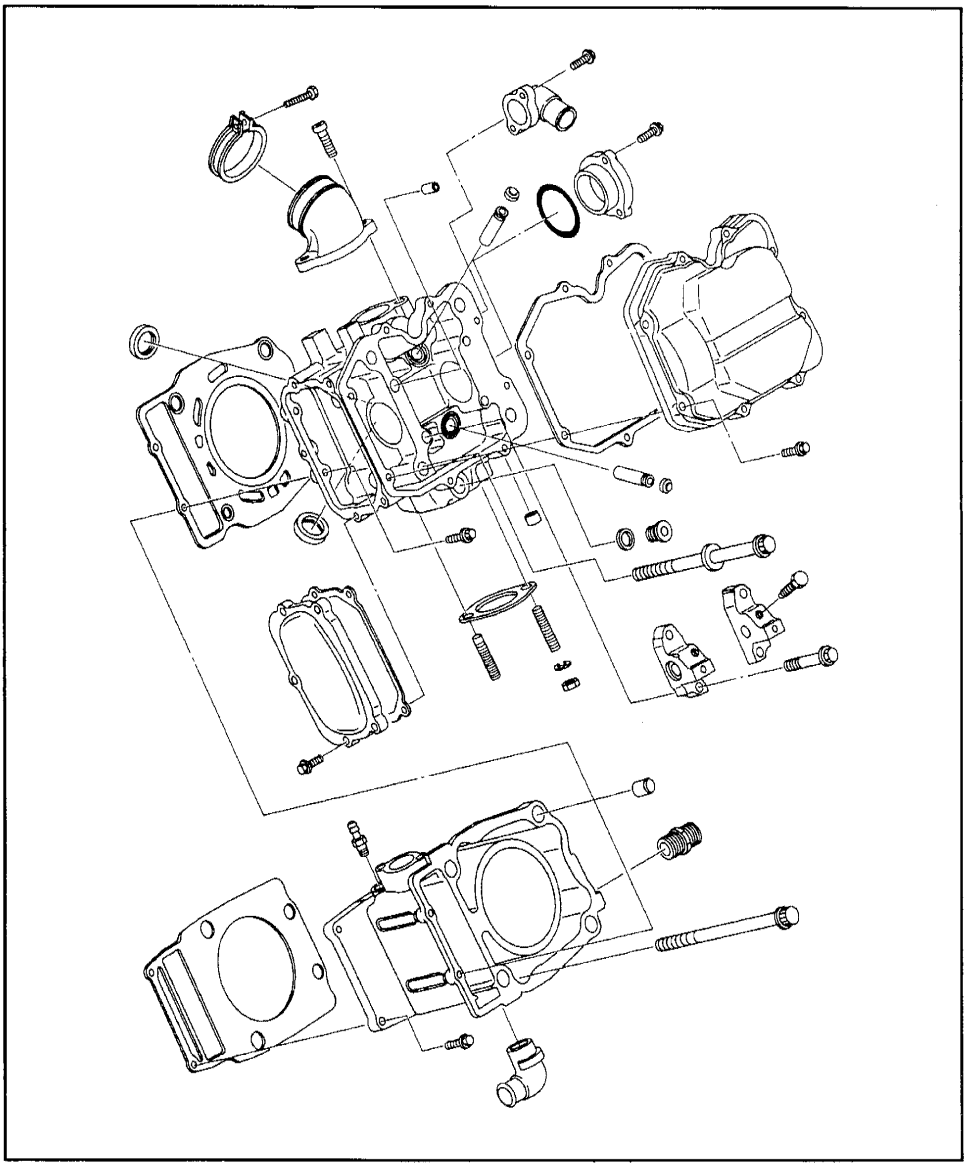
Replace cylinder head if camshaft journal bore is damaged or worn excessively.

7. Inspect camshaft end cap (thrust face) for wear. Replace if worn or damaged.



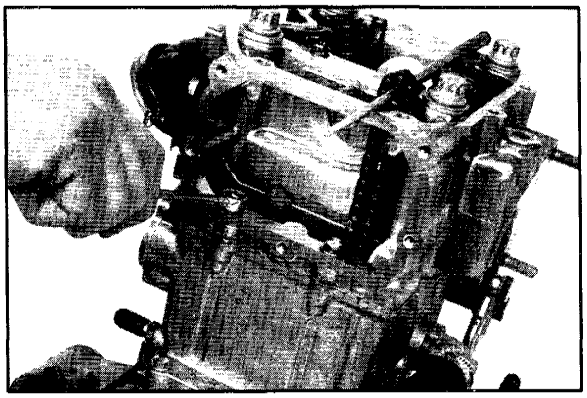
Cylinder Head Removal

See appropriate chapter to remove the following: fuel tank, spark plug high tension lead, exhaust pipe, carburetor, and top engine mount plate. Drain coolant. Remove cam chain tensioner, camshaft, and rocker assembly.

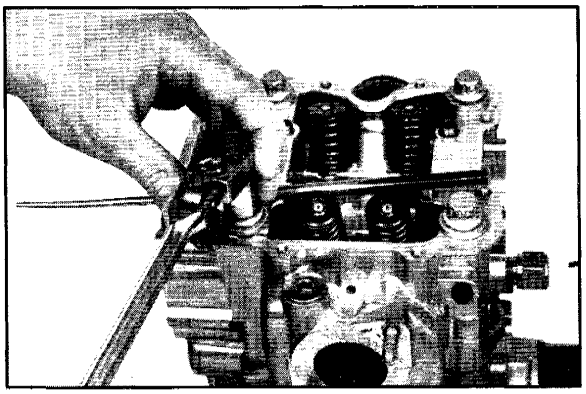


Engine Disassembly, Cont.

1. Remove the two 6x28 mm flange bolts from cylinder head.

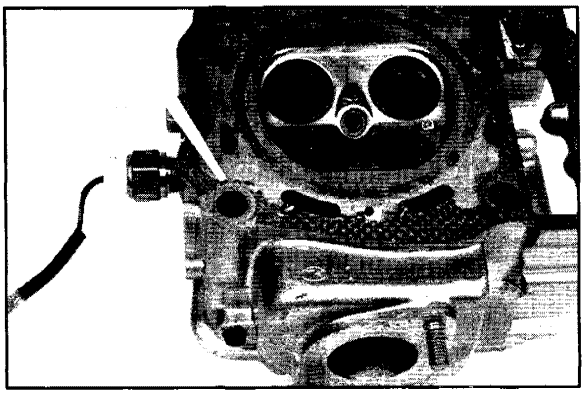


2. Loosen each of the four 11x191 mm cylinder head bolts evenly 1/8 turn each time in a criss-cross pattern until loose.
3. Remove bolts and tap cylinder head lightly with a plastic hammer until loose. **CAUTION:** Tap only in reinforced areas or on thick parts of cylinder head casting to avoid damaging casting.



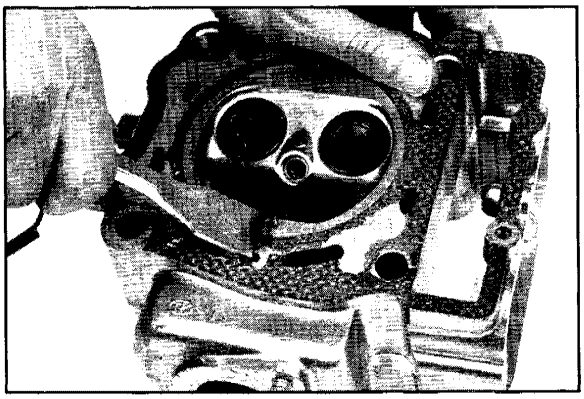
4. Remove cylinder head and head gasket. Note the O-Ring in the corner of the gasket which seals the front left cylinder stud. The O-Ring is part of the fiber type gasket.

NOTE: This gasket has been superceded by an all metal gasket which does not require an O-ring.



Cylinder Head Disassembly/Inspection

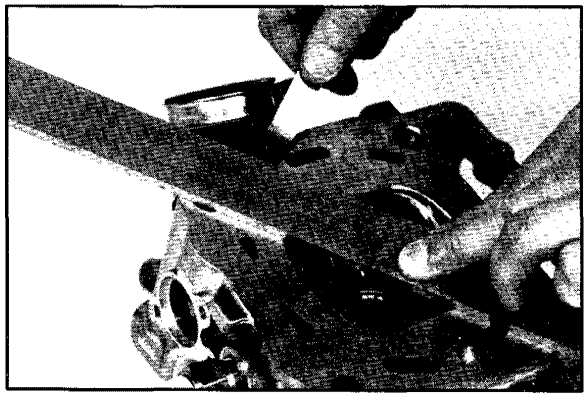
1. Thoroughly clean cylinder head surface to remove all traces of gasket material and carbon. **CAUTION:** Use care not to damage sealing surface.



Engine Disassembly, Cont.

Cylinder Head Warpage

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



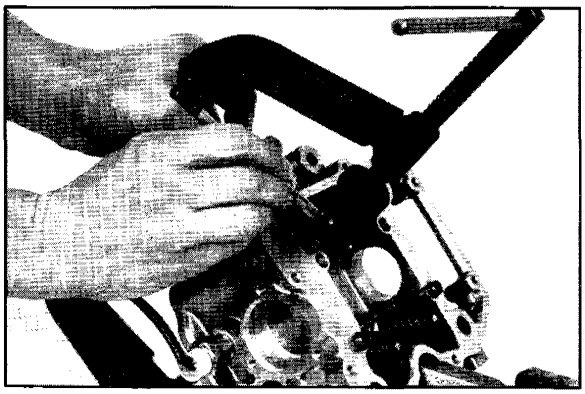
Cylinder Head Warpage Limit:
.002" (.05 mm)

Cylinder Head Disassembly

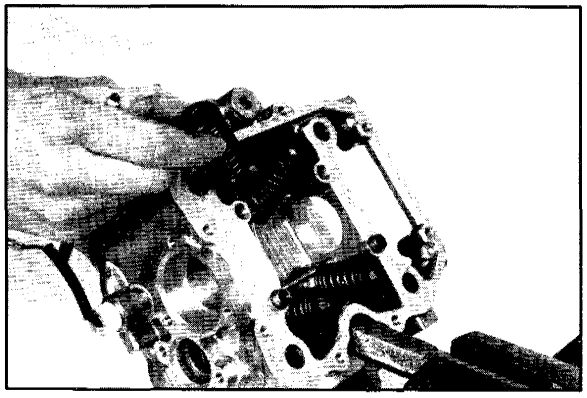
WARNING: Wear eye protection or a face shield during cylinder head disassembly and reassembly.

NOTE: Keep all parts in order with respect to their location in the cylinder head.

1. Using a valve spring compressor, compress the valve spring and remove the split keeper. **NOTE:** To prevent loss of tension, do not compress the valve spring more than necessary.

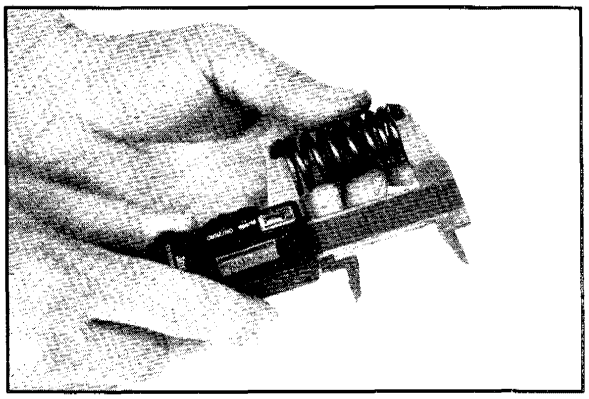


2. Remove spring retainer and spring. **NOTE:** The valve springs should be positioned with the tightly wound coils against the cylinder head.
3. Push valve out, keeping it in order for reassembly in the same guide.



Engine Disassembly, Cont.

4. Measure free length of spring with a Vernier caliper. Check spring for squareness. Replace spring if either measurement is out of specification.

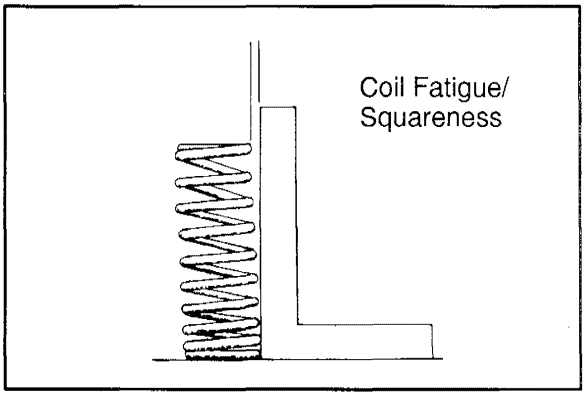


Valve Spring Free Length

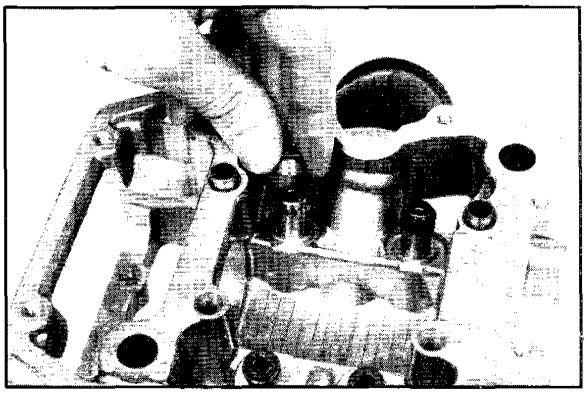
Orange Std: 1.7342 (44.05 mm)
Orange Limit: 1.656 (42.05 mm)

Yellow Std: 1.654 (42.0 mm)
Yellow Limit: 1.575 (40.0 mm)

Squareness: 2.5° (.075") (1.9 mm)



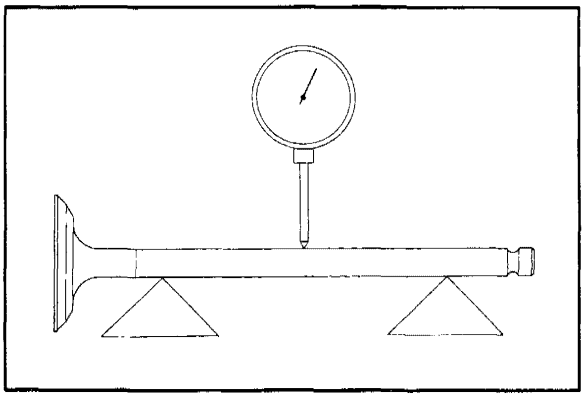
5. Remove valve seals. **CAUTION:** Replace seals whenever the cylinder head is disassembled. Hardened, cracked or worn valve seals will cause excessive oil consumption and carbon buildup.



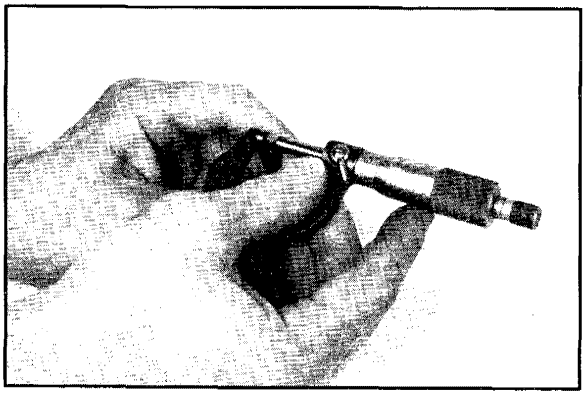
Engine Disassembly, Cont.

Valve Inspection

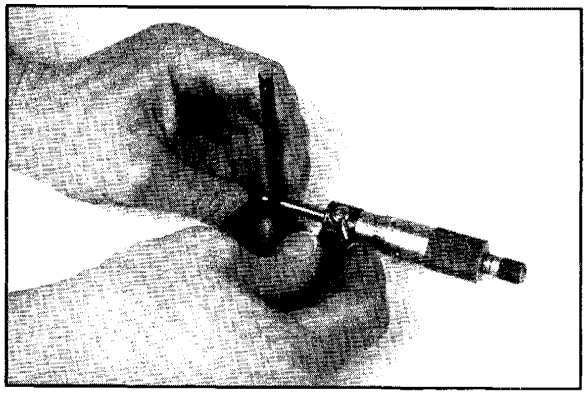
1. Remove all carbon from valve with a soft wire wheel.
2. Check valve face for runout, pitting, and burnt spots. To check for bent valve stems, mount valve in a drill or use "V" blocks and a dial indicator.



3. Check end of valve stem for flaring, pitting, wear or damage.
4. Inspect split keeper groove for wear or flaring of the keeper seat area. **NOTE:** The Stellite™ valves cannot be re-faced or end ground. They must be replaced if worn, bent, or damaged.



5. Measure diameter of valve stem with a micrometer in three places and in two different directions (six measurements total).

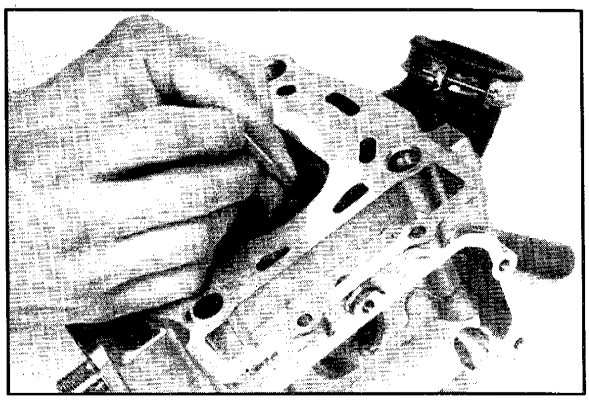


Valve Stem Diameter
Intake: .2343-.2348 (5.950-5.965 mm)
Exhaust: .2341-.2346 (5.945-5.960 mm)

Engine Disassembly, Cont.

6. 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, front to back and side to side.
7. Subtract valve stem measurement to obtain stem to guide clearance. **NOTE:** Be sure to measure each guide and valve combination individually.
8. Replace valve and/or guide if clearance is excessive.

NOTE: If valve guides are replaced, valve seats must be reconditioned.

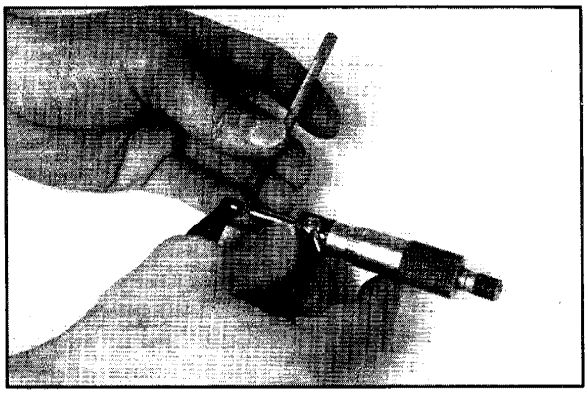


Valve Guide Inside Diameter:
.2362-.2367 (6.000-6.012 mm)

Stem to Guide Clearance:
Std. Intake: .0014-.0024 (.035-.062 mm)

Std. Exhaust: .0016-.0026 (.040-.067 mm

Limit: .0059 (.15 mm)



Combustion Chamber

Clean all accumulated carbon deposits from combustion chamber and valve seat area with a soft wire brush.

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. See Valve Seat Reconditioning, page 3.56. *If the valve seat is cracked the cylinder head must be replaced.*

Cylinder Head Reconditioning

NOTE: Servicing the valve guides and valve seats requires special tools and a thorough knowledge of reconditioning techniques. Follow the instructions provided in the cylinder head service tool kit.

CAUTION: Wear eye protection when performing cylinder head service. Valve guide replacement will require heating of the cylinder head. Wear gloves to prevent burns.

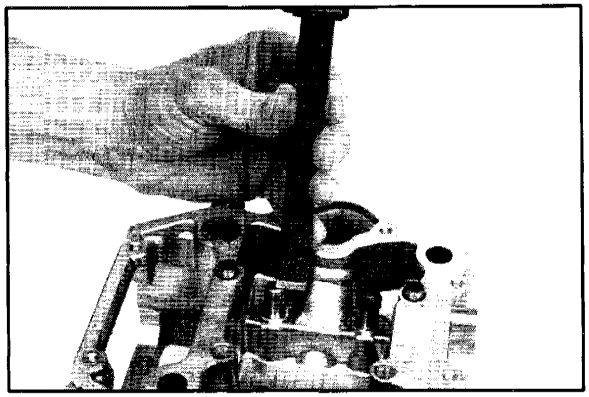
Valve Guide Removal/Installation

1. Remove all carbon deposits from the combustion chamber, valve seat and valve guide area before attempting to remove valve guides. **CAUTION:** Carbon deposits are extremely abrasive and may damage the valve guide bore when guides are removed.
2. Place new valve guides in a freezer for at least 15 minutes while heating cylinder head.
3. Heat cylinder head in an oven or use a hot plate to bring cylinder head temperature to 212° F (100° C). **CAUTION:** Do not use a torch to heat cylinder head or warpage may result from uneven heating. Head temperature can be checked with a pyrometer or a welding temperature stick.
4. When thoroughly heated, place cylinder head on blocks of wood which will allow the old guides to be removed.
5. Using valve guide driver, drive guides out of the cylinder head from the combustion chamber side. Be careful not to damage guide bore or valve seat when removing guides.

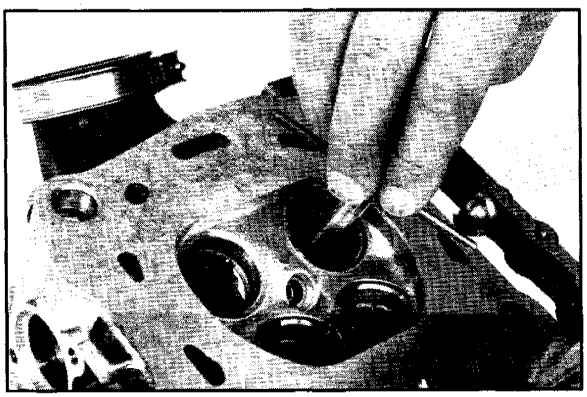
Engine Disassembly, Cont.

6. Place cylinder head on cylinder head table. **NOTE:** Be sure cylinder head is still at 212° F (100° C) before installing new guides.
7. Place a new guide in the valve guide installation tool and press guide in to proper depth. Check height of each guide above the cylinder head. **NOTE:** The guide can be driven in to the proper depth. Inspect the guide closely for cracks or damage if a driver is used.

Protrusion Above Head:
.689-.709 (17.5-18.0 mm)



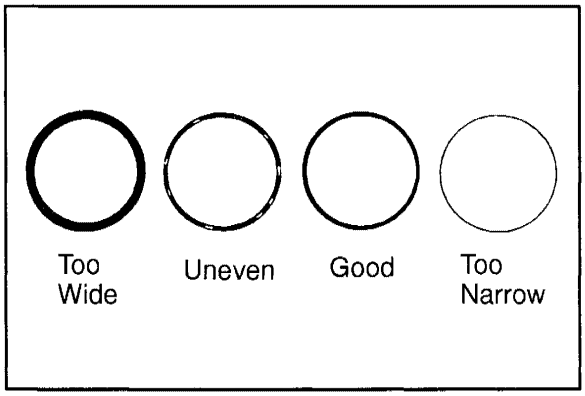
8. Allow cylinder head to cool to room temperature. Apply cutting oil to the reamer supplied with the cylinder head service kit. Guides should be reamed from the valve spring side of the cylinder head. Ream each guide to size by turning the reamer clockwise continually. Continue to rotate reamer clockwise during removal of the tool.
9. Clean guides thoroughly with hot soapy water and a nylon brush. Rinse and dry with compressed air. Apply clean engine oil to guides.



Valve Seat Reconditioning

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

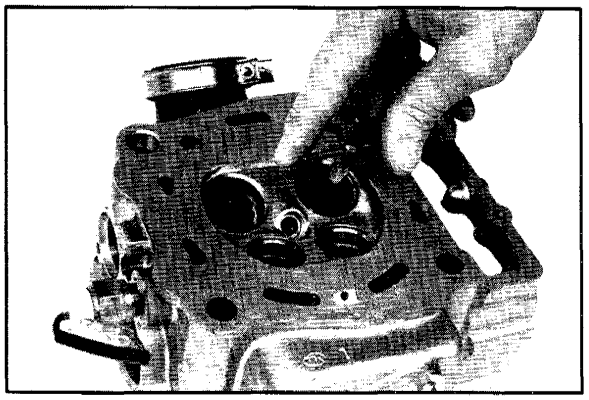
NOTE: Valve seat width and point of contact on the valve face is very important for proper sealing. The valve must contact the valve seat over the entire circumference of the seat, and the seat must be the proper width all the way around. If the seat is uneven, compression leakage will result. If the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



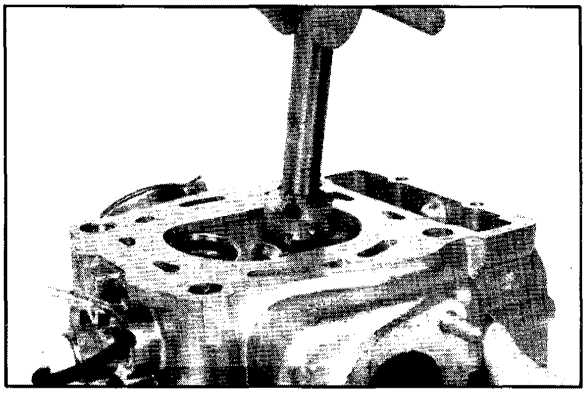
Engine Disassembly, Cont.

Valve Seat Reconditioning

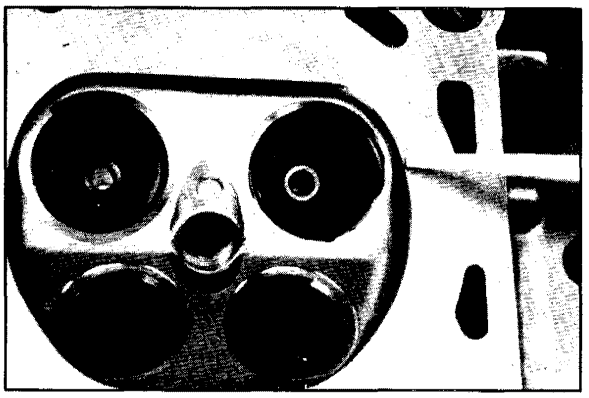
1. Install pilot into valve guide.
2. Apply cutting oil to valve seat and cutter.



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 and must be replaced. Be sure the cylinder head is at the proper temperature and replace the guide.
   - 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.

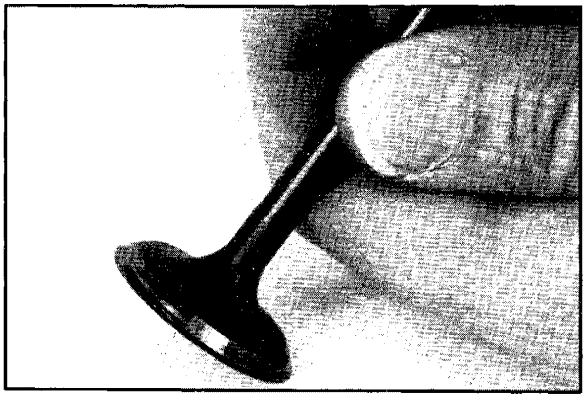


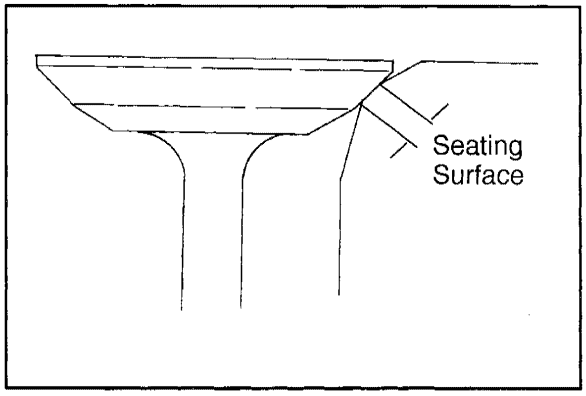
5. To check the contact area of the seat on the valve face, apply a thin coating of Prussian Blue™ paste to the valve seat.
6. Insert valve into guide and tap valve lightly into place a few times.

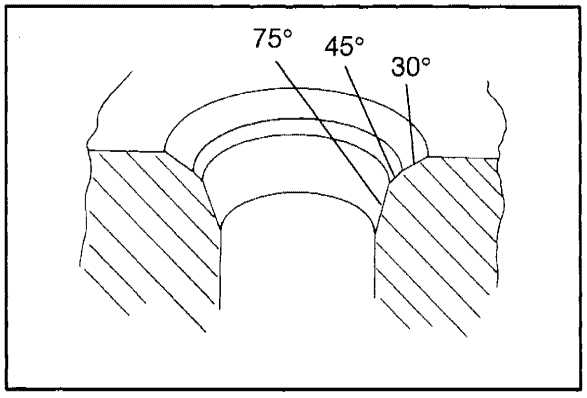


Engine Disassembly, Cont.

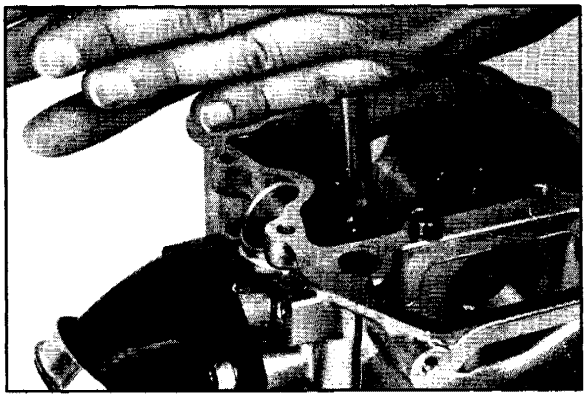
7. Remove valve and check where the Prussian Blue™ indicates seat contact on the valve face. The valve seat should contact the middle of the valve face and must be the proper width.
   - If the indicated seat contact is too high on the valve face, use the 30° or 31° cutter to lower the valve seat.
   - If too low use the 60° or 75° 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 46° cutter and re-check contact point on the valve face and seat width after each cut.
8. Clean all filings from the area with hot soapy water, rinse, and dry with compressed air.
9. Lubricate the valve guides with clean engine oil, and apply oil or water based lapping compound to the face of the valve.





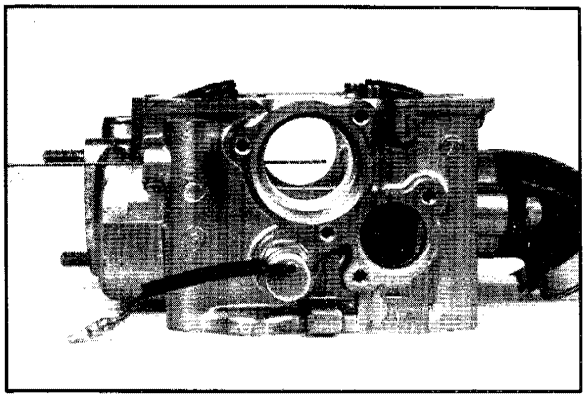


10. Insert the valve into its respective guide and lap using a lapping tool or a section of fuel line connected to the valve stem.
11. Rotate the valve rapidly back and forth until the cut sounds smooth. Lift the valve slightly off of the seat, rotate 1/4 turn, and repeat the lapping process. Do this four to five times until the valve is fully seated, and repeat process for the other three valves.
12. Remove oil passage blind plug and thoroughly clean cylinder head and valves.



Engine Disassembly, Cont.

13. After cylinder head and oil passage are clean, apply 3 Bond 1215 or equivalent sealer to the threads of the blind plug and install, torquing to 8 ft. lbs. (1.1 kg-m). **CAUTION:** Do not allow sealer to enter oil passage.
14. Spray electrical contact cleaner into oil passage and dry using compressed air.

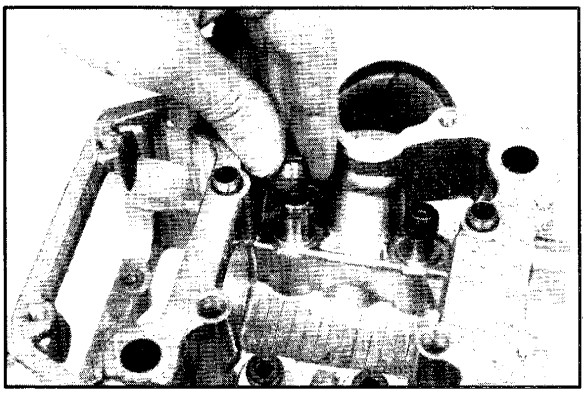


Cylinder Head Assembly

CAUTION: Wear eye protection during assembly.

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

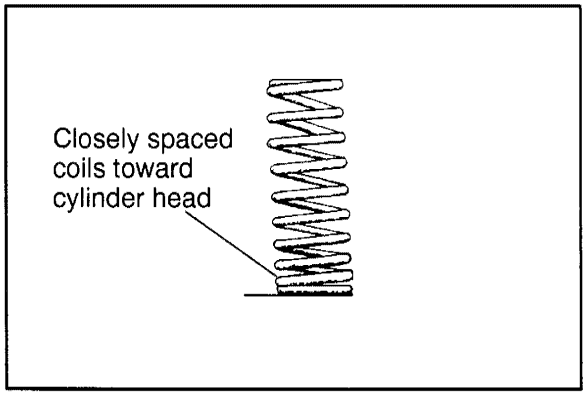
1. Install new valve seals on valve guides. **NOTE:** The intake and exhaust valve seals are different, and must be installed on the proper guide.



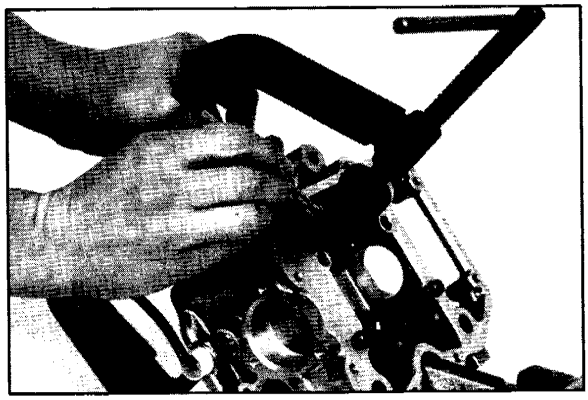
Intake Seal PN 3084857, Black

Exhaust Seal PN 3084859, Brown

2. Apply engine oil to valve guides and seats.
3. Coat valve stem with molybdenum disulfide grease.
4. Install valve carefully with a rotating motion to avoid damaging valve seal.
5. Dip valve spring and retainer in clean engine oil and install spring with closely spaced coils toward the cylinder head.



6. Place retainer on spring and install valve spring compressor. Compress spring only enough to allow split keeper installation to prevent loss of spring tension. Install split keepers with the gap even on both sides.
7. Repeat procedure for remaining valves.
8. When all valves are installed, tap lightly with soft faced hammer on the end of the valves to seat the split keepers.



Engine Disassembly, Cont.

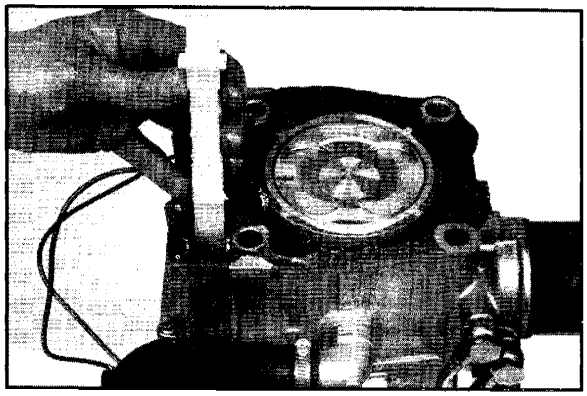
Valve Sealing Test

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

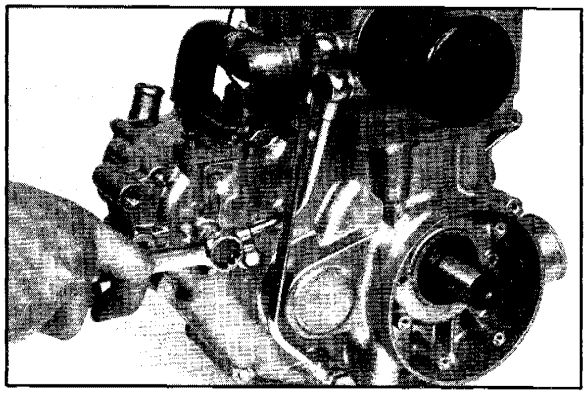
Cylinder/Piston Removal and Inspection

Follow engine disassembly procedures to remove valve cover, camshaft and rocker arms, and cylinder head.

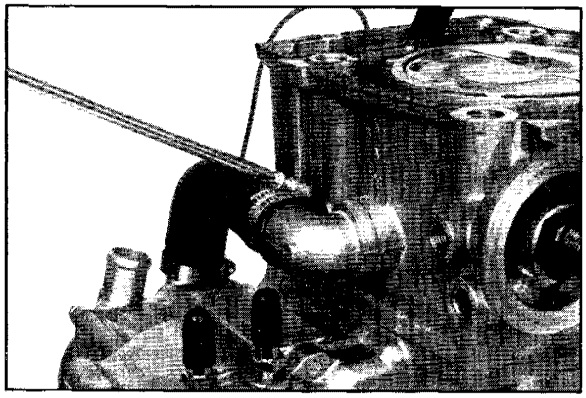
1. Remove cam chain guide at front of cylinder.



2. Loosen all four oil pipe banjo bolts and then remove the bolts and eight sealing washers. Remove the pipes.

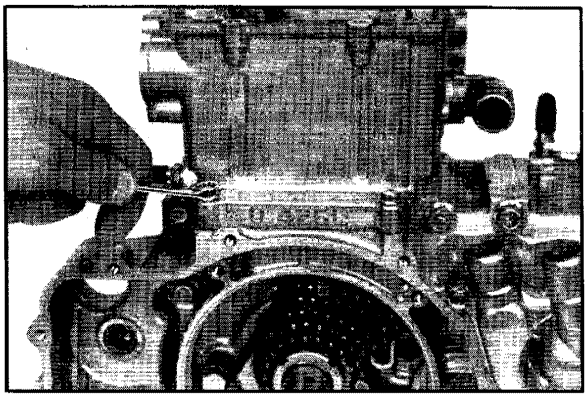


3. Loosen hose clamps on coolant inlet hose and remove hose.

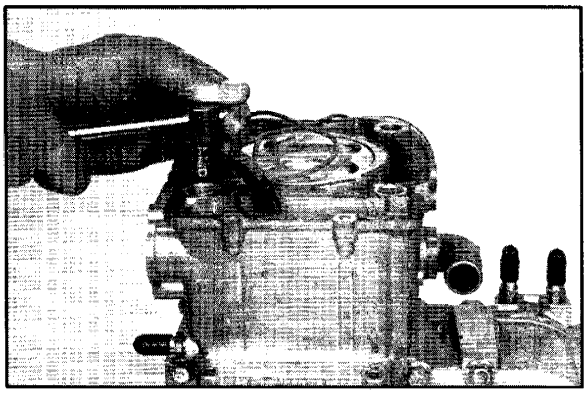


Engine Disassembly, Cont.

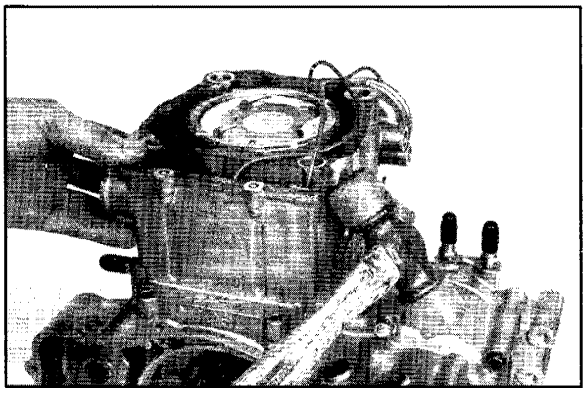
4. Remove the two 6 mm cylinder base bolts.



5. Loosen each of the four cylinder base bolts inside the water jacket 1/4 turn at a time in a criss-cross pattern until loose.
6. Remove the bolts.

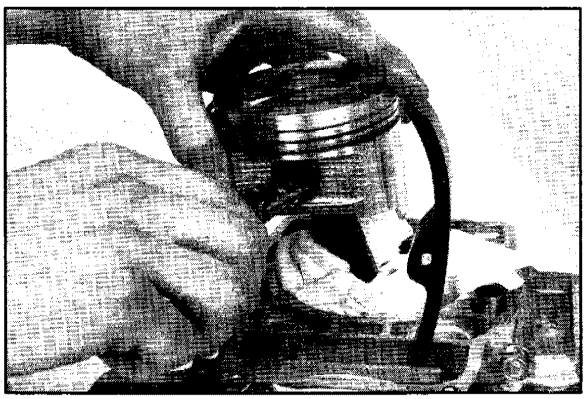


7. Tap cylinder lightly with a plastic hammer in the reinforced areas only until loose.
8. Rock cylinder forward and backward and lift it from the crankcase, supporting piston and connecting rod. Support piston with piston support block PN 2870390.
9. Remove dowel pins from crankcase.



Piston Removal

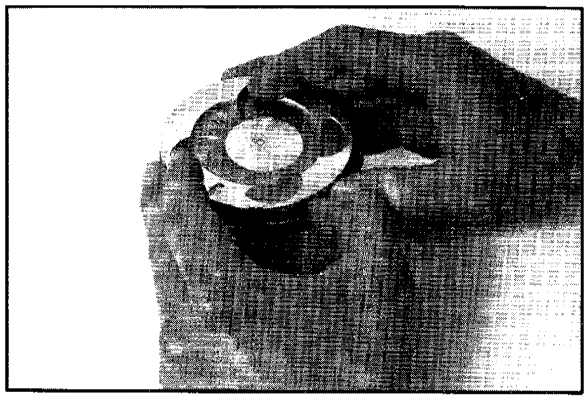
1. Note piston directional arrow pointing toward the Magneto (right) side of the engine.
2. Remove piston circlip and push piston pin out of piston. If necessary, heat the crown of the piston *slightly* with a propane torch. **CAUTION:** Do not apply heat to the piston rings. The ring may lose radial tension.
3. Remove top compression ring.



Engine Disassembly, Cont.

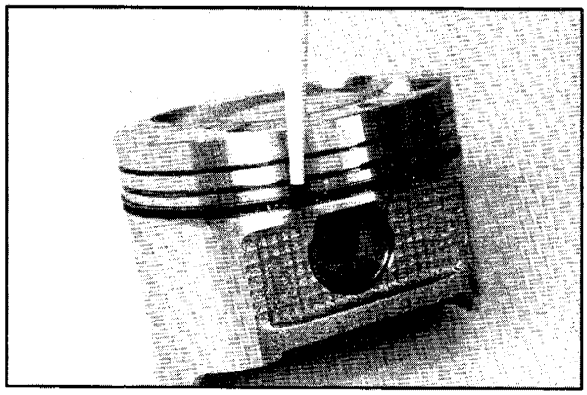
***Using a piston ring pliers**: Carefully expand ring and lift it off the piston. **CAUTION:** Do not expand the ring more than the amount necessary to remove it from the piston, or the ring may break.
***By hand:** Placing both thumbs as shown, spread the ring open and push up on the opposite side. Do not scratch the ring lands.

4. Repeat procedure for second ring.



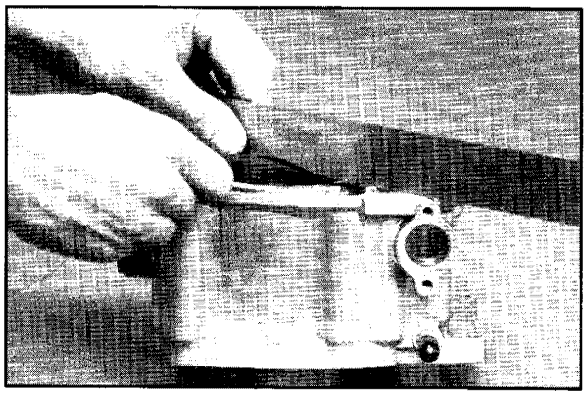
The oil control ring is a three piece design consisting of a top and bottom steel rail and a center expander section. The top rail has a locating tab on the end which fits into a notch in the upper oil ring land of the piston.

5. Remove the top rail first followed by the bottom rail.
6. Remove the expander.



Cylinder Inspection

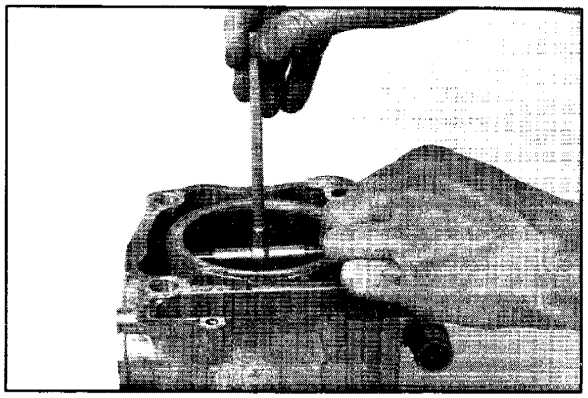
1. Remove all gasket material from the cylinder sealing surfaces.
2. Inspect the top of the cylinder for warpage using a straight edge and feeler gauge.



Cylinder Warpage:
.002″ (.05 mm)

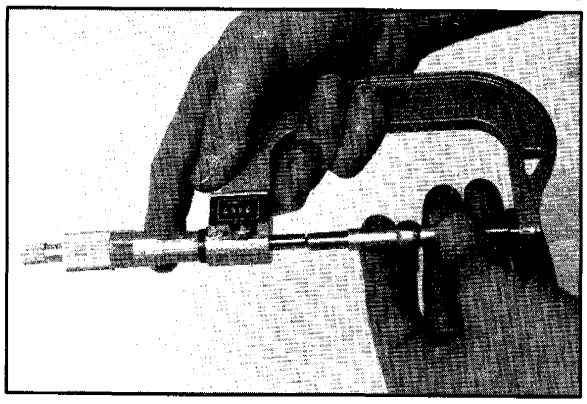
3. Inspect cylinder for wear, scratches, or damage.

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).



Engine Disassembly, Cont.

2. Record measurements. If cylinder is tapered or out of round beyond .002, the cylinder must be re-bored oversize, or replaced.



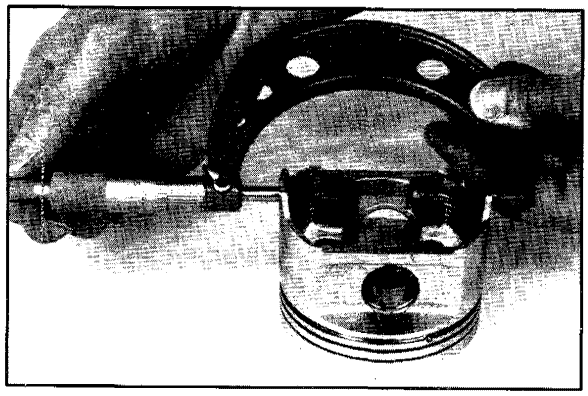
Cylinder Taper
Limit: .002 Max.

Cylinder Out of Round
Limit: .002 Max.

Standard Bore Size:
EH42PL
3.4606-3.4614 (87.90-87.92 mm)
EH50PL
3.6216-3.6224 (91.99-92.01 mm)

Piston to Cylinder Clearance

1. Measure piston outside diameter at a point 5 mm up from the bottom of the piston at a right angle to the direction of the piston pin.
2. Subtract this measurement from the maximum cylinder measurement obtained in step 5 above.



Piston to Cylinder Clearance

Std: .0006-.0018 (.015-.045 mm)

Limit: .0024 (.060 mm)

Boring Limit: .020 (.5 mm)

Piston O.D.:

EH42PL
Std: 3.4596-3.4600 (87.87-87.89 mm)

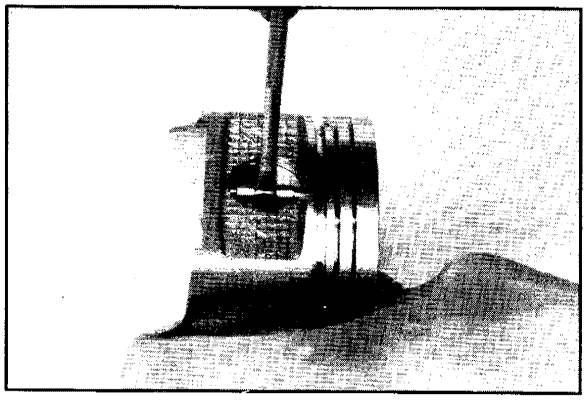
EH50PL
Std: 3.6205-3.6213 (91.96-91.98 mm)

Engine Disassembly, Cont.

3. Measure piston pin bore.

Piston Pin Bore:

Std: .9055-.9057 (23.00-23.006 mm)

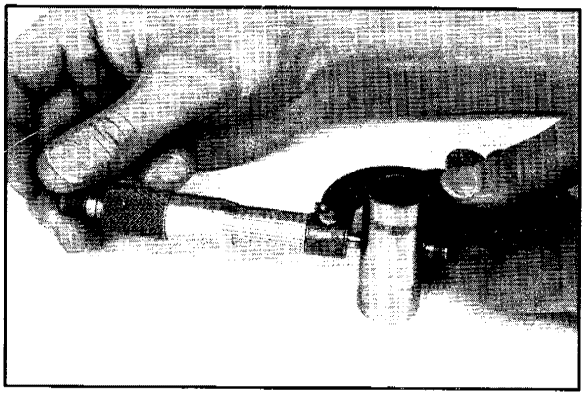


4. Measure piston pin O.D. Replace piston and/or piston pin if out of tolerance.

Piston Pin O.D.: .9063-.9055 (22.994-23.00 mm)

Std. Clearance Piston Pin to Pin Bore: .0002-.0003 (.004-.008 mm)

Degree of Fit: Piston Pin Must Be Fitted Into Position With Thumb at 20° C (68° F)



5. Measure connecting rod small end ID.

Connect Rod Small End ID:

.9058-.9063 (23.007-23.020 mm)

6. 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.

Clearance Between Piston Ring and Piston Ring Groove

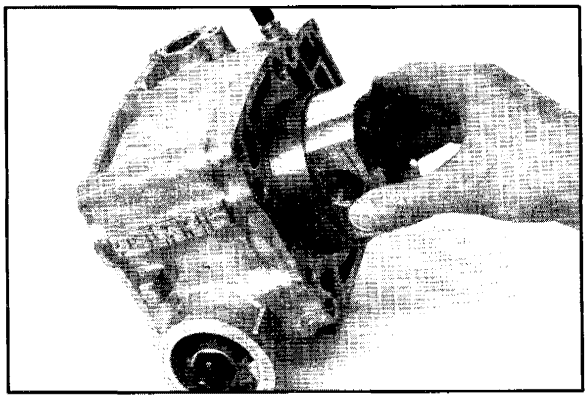
Top Ring
Std: .0016-.0031 (.040-.080 mm)
Limit: .0059 (.15 mm)

Second Ring
Std: .0012-.0028 (.030-.070 mm)
Limit: .0059 (.15 mm)

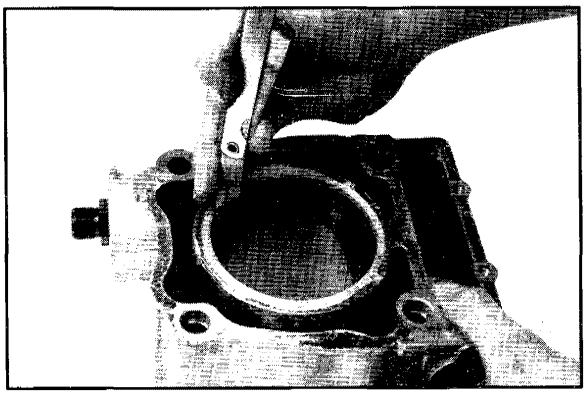
Engine Disassembly, Cont.

Piston Ring Installed Gap

1. Place each piston ring inside cylinder using piston to push ring squarely into place.



2. Measure installed gap with a feeler gauge at both the top and bottom of the cylinder. **NOTE:** A difference in end gap indicates cylinder taper. The cylinder should be measured for excessive taper and out of round.
3. If the *bottom* installed gap measurement exceeds the service limit, replace the rings.



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

Piston Ring Installed Gap

Top Ring
Std: .0079-.0138 (.20-.36 mm)
Limit: .039 (1.0 mm)

Second Ring
Std: .0079-.0138 (.20-.36 mm)
Limit: .039 (1.0 mm)

Oil Ring
Std: .0079-.0276 (.20-.70 mm)
Limit: .059 (1.5 mm)

Crankcase Disassembly

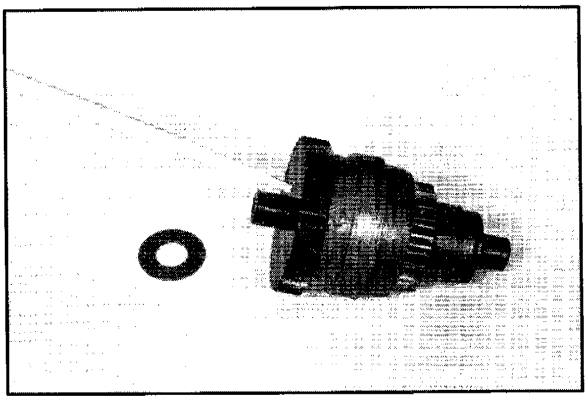
NOTE: Engine must be removed from frame to disassemble crankcase. Refer to engine removal, pages 3.38 - 3.42. Remove the following components: cylinder head, cylinder, water pump impeller.

NOTE: The recoil starter, starter motor, starter drive, flywheel, stator, cam chain and sprockets can be serviced with the engine in the frame.

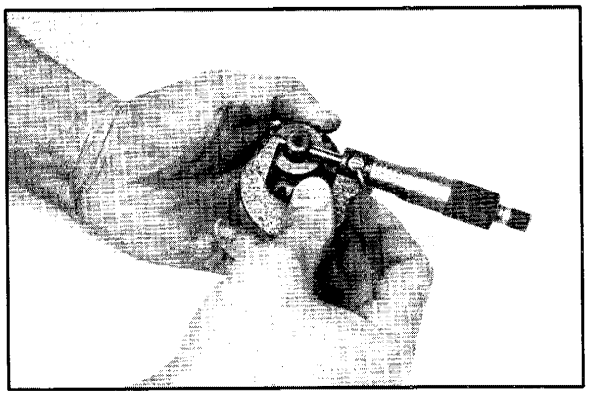
Engine Disassembly, Cont.

Starter Drive Removal/Inspection

1. Remove recoil housing bolts and remove housing.
2. Remove starter drive assembly. Note the thrust washer located at the rear of the drive mechanism.
3. Inspect the thrust washer for wear or damage and replace if necessary.



4. Measure the OD of the starter drive shaft on both ends and record.
5. Measure the ID of the bushing in the recoil housing and in the crankcase and record. Measure in two directions 90° apart to determine if bushing is out of round. Calculate bushing clearance. Replace bushing if clearance exceeds the service limit.



Std. Bushing ID:
.4735"-.4740" (11.11-12.04 mm)

Std. Shaft OD:
.470"-.472" (11.93-11.99 mm)

Starter Drive Bushing Clearance:
Std: .0015"-.004" (.038-.102 mm)

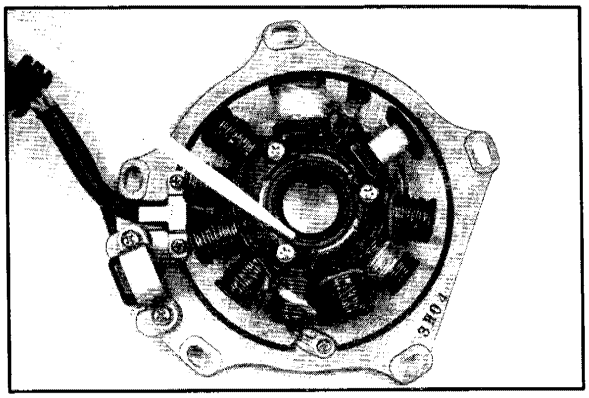
Service Limit:
.008" (.203 mm)

6. Inspect gear teeth on starter drive. Replace starter drive if gear teeth are cracked, worn, or broken.

Engine Disassembly, Cont.

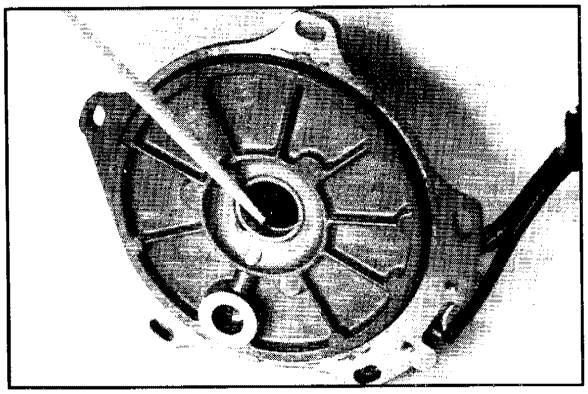
Flywheel/Stator Removal/Inspection

1. Remove flywheel nut and washer.
2. Install flywheel puller (PN 2870159) and remove flywheel. **CAUTION:** Do not thread the puller bolts into the flywheel more than 1/4″ or stator coils may be damaged.
3. Mark or note position of stator plate on crankcase.
4. Remove bolts and carefully remove stator assembly, being careful not to damage crankshaft bushing or oil seal on stator plate.
5. Remove oil passage O-Ring.
6. Remove large sealing O-Ring from outer edge of stator plate.



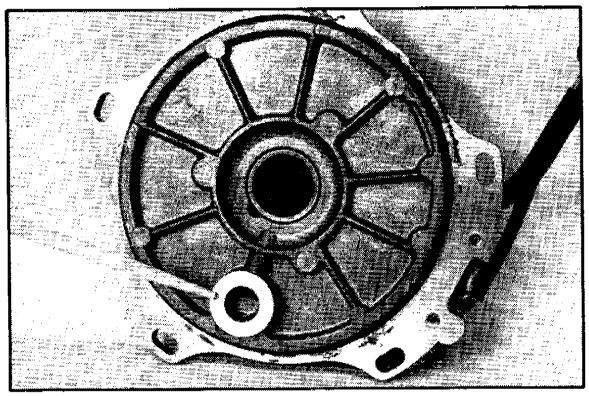
Cam Chain/Tensioner Blade

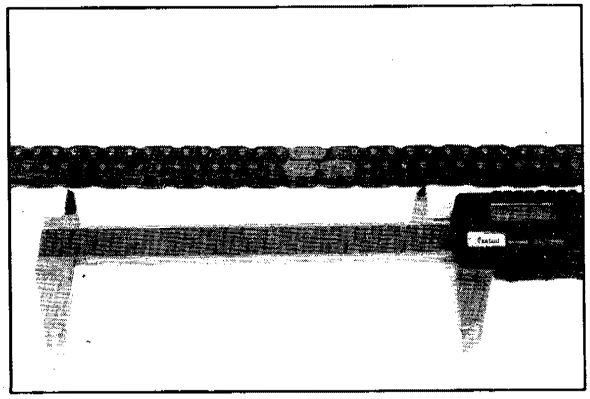
1. Remove bolt securing tensioner blade to crankcase.
2. Remove blade and inspect for cracks, wear, or damage.



3. Remove cam chain. Inspect chain for worn or missing rollers or damage. Stretch chain tight on a flat surface and apply a 10 lb. (4.53 kg) load. Measure length of a 20 pitch section of chain. Replace if worn past service limit.

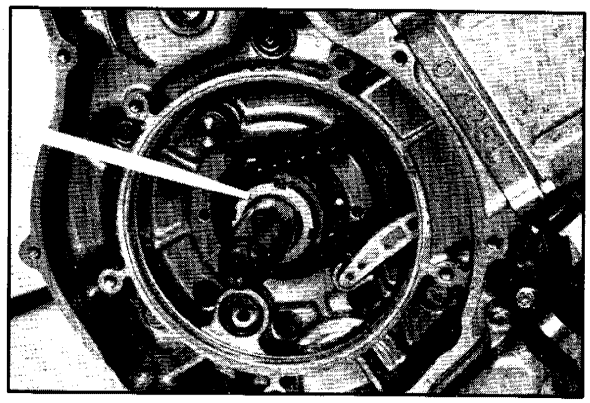
Chain Service Limit:
5.407″ (13.7 cm)





Engine Disassembly, Cont.

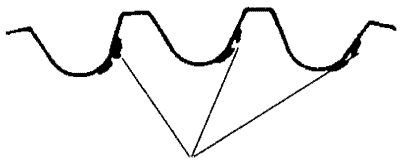
4. Using the special socket, remove the crankshaft slotted nut. **NOTE:** The slotted nut is a left hand thread.
5. Remove cam chain drive sprocket and Woodruff key from crankshaft.
6. Inspect sprocket teeth for wear or damage.
7. Inspect Woodruff key for wear.
8. Replace any worn or damaged parts.



One Way Valve

The one way valve prevents oil from draining out of the oil tank and into the crankcase when the engine is off. It must be clean and have adequate spring pressure in order to seal properly.

1. Remove cap bolt, sealing washer, spring, and one way valve from PTO side crankcase.

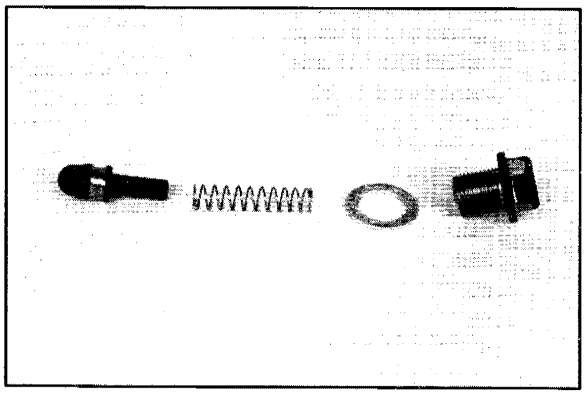


Inspect for Areas of Tooth Wear or Damage

2. Inspect free length of spring and check coils for distortion.

One Way Valve Spring Free Length:

Std: 1.450" (3.68 cm)



3. Inspect valve for wear.
4. Check seat area for nicks or foreign material that may prevent proper sealing of valve.

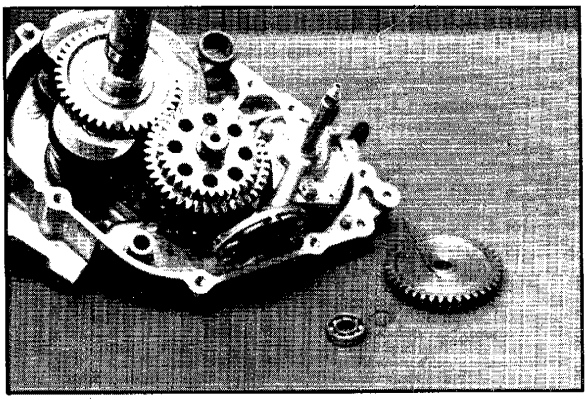
Crankcase Separation

1. Remove flange bolts (10) from magneto side crankcase evenly in a criss-cross pattern.
2. Install crankcase puller tool on magneto side crankcase with hole positioned over balancer gear. **NOTE:** The flywheel key must be removed before puller is installed.
3. Separate crankcase by tightening puller bolt in small steps and tapping on the pump shaft lightly with a plastic hammer.
4. Tap lightly on balancer gear with a brass drift through the hole in the puller if necessary to ensure the balancer shaft stays in the PTO side crankcase.
5. Continue to tighten puller center bolt while tapping on pump shaft and balancer shaft until cases are separated.

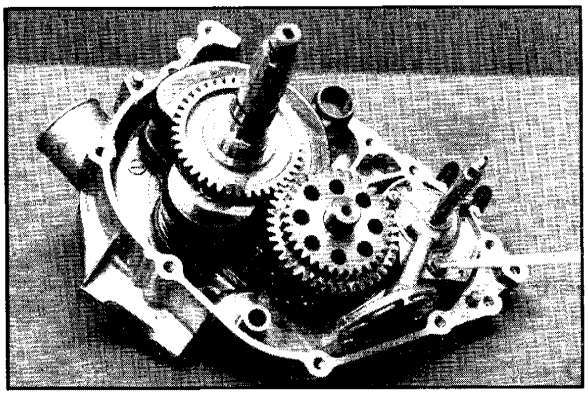
Engine Disassembly, Cont.

Oil Pump Removal/Inspection

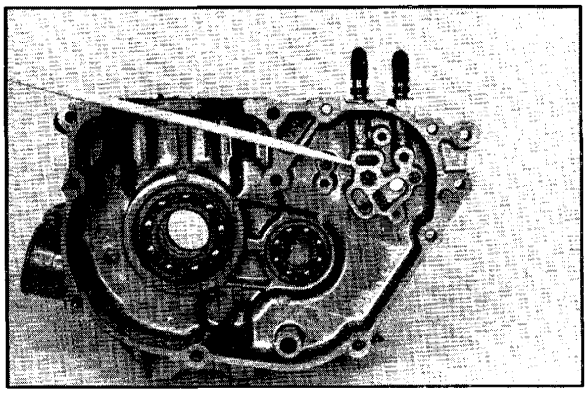
1. Remove thrust washer from pump shaft.
2. Remove pump drive gear.
3. Inspect drive gear teeth for cracks, damage or excessive wear.



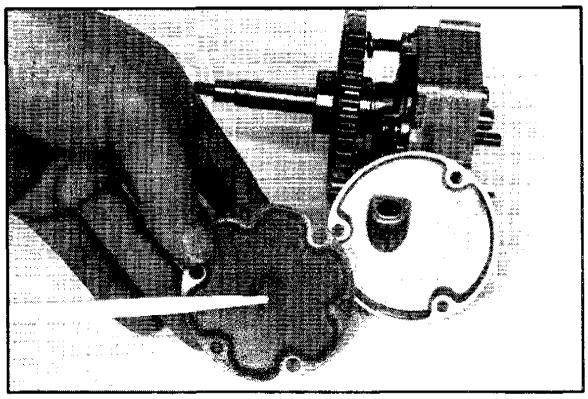
4. Remove three oil pump retaining bolts and pump.



5. Inspect mating surface of crankcase and oil pump. Check for nicks, burrs, or surface irregularities.

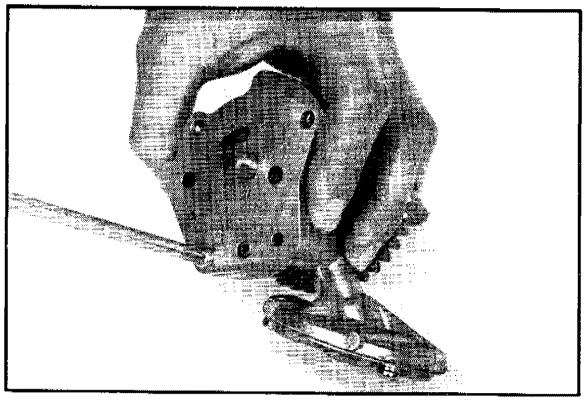


6. Remove the three screws and strainer screen from pump.
7. Clean screen thoroughly.

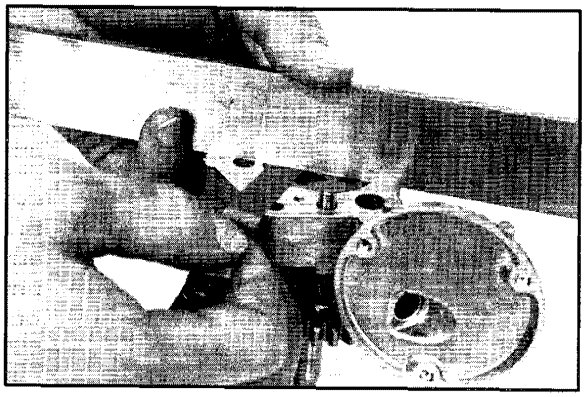


Engine Disassembly, Cont.

8. Remove pump body screw and feed chamber cover.



9. Measure pump end clearance using a thickness gauge and straight edge.

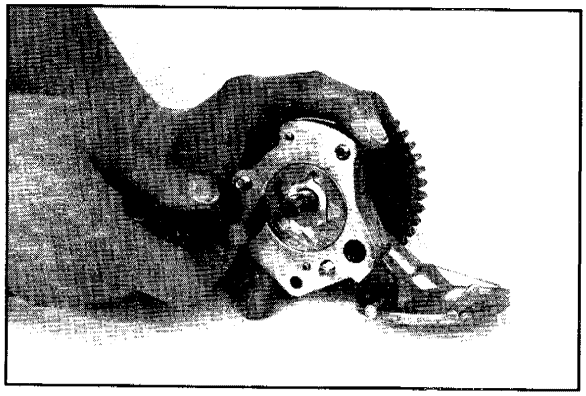


Pump End Clearance:

Std: .001-.003 (.0254-.0762 mm)

Wear Limit: .004 (.1016 mm)

10. Measure clearance between outer feed rotor and pump body with a thickness gauge.

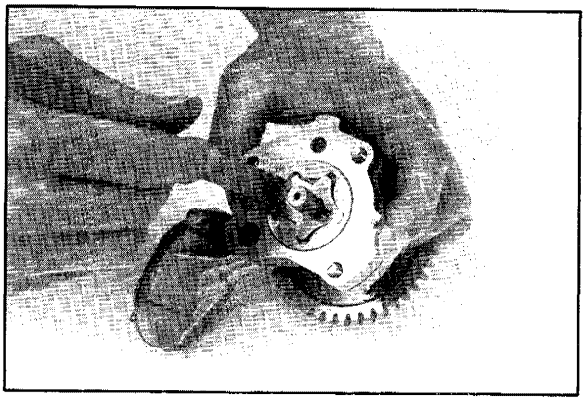


Outer Feed Rotor to Pump Body Clearance:

Std: .001-.003 (.0254-.0762 mm)

Wear Limit: .004 (.1016 mm)

11. Measure rotor tip clearance with a thickness gauge.



Rotor Tip Clearance:

Std: .005 (.127 mm)

Wear Limit: .008 (.2032 mm)

12. Remove inner and outer feed rotor and pump chamber body.
13. Repeat measurements for scavenge rotor.
14. Remove inner and outer scavenge rotor and inspect pump shaft for wear.

Engine Disassembly, Cont.

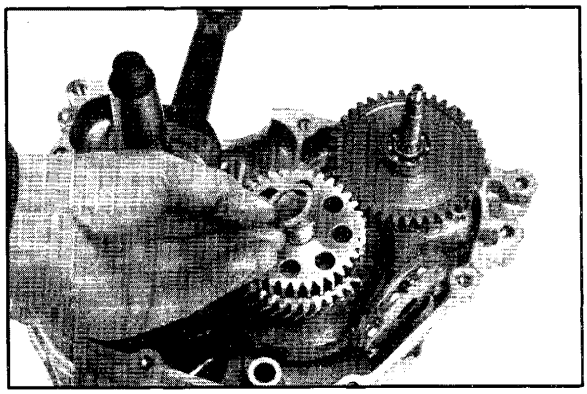
Oil Pump Assembly

1. Clean and dry all parts thoroughly. Apply clean engine oil to all parts. *Do not* use gasket sealer on the pump body mating surfaces or oil passages will become plugged.
2. Install pump shaft and scavenge rotor drive pin.
3. Install outer scavenge rotor, inner scavenge rotor, and scavenge casing.
4. Install outer feed rotor and inner feed rotor drive pin.
5. Install inner feed rotor and feed chamber cover with screw.
6. Tighten screw securely.
7. Install screen on pump body.
8. Install oil pump on crankcase and torque bolts to 6 ft. lbs. (.828 kg-m).

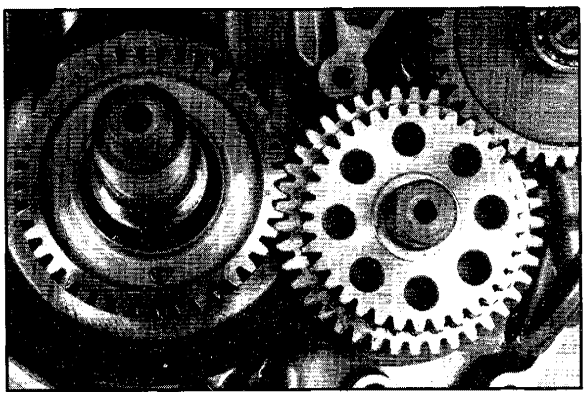
Oil Pump Attaching Bolt Torque:
6 ft. lbs. (.828 kg-m)

Counter Balancer Shaft Removal/Inspection

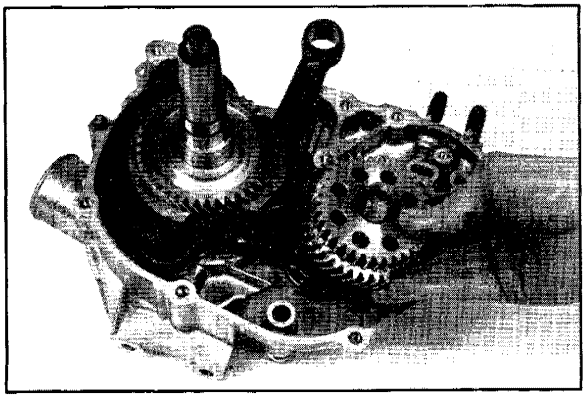
1. Remove the shim washer from the counter balancer shaft.



2. Note the alignment dots on the balancer and crankshaft gears, the marks must be aligned during reassembly.



3. Remove the balancer shaft from the crankcase.



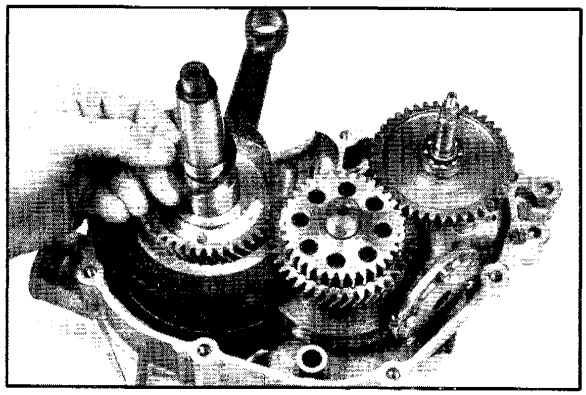
Engine Disassembly, Cont.

4. Inspect the balancer drive gear and pump shaft drive gear.
5. Replace the shaft if gear teeth are abnormally worn or damaged.
6. Inspect the balancer shaft bearings.

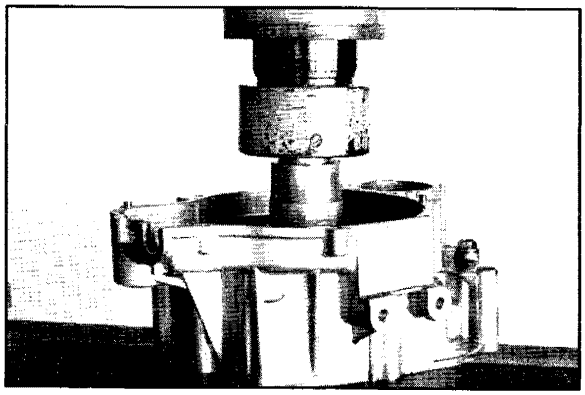
NOTE: Due to extremely close tolerances and minimal wear, the balancer shaft ball bearings must be inspected visually and by feel. Look for signs of discoloration, scoring or galling. Turn the inner race of each bearing. The bearings should turn smoothly and quietly. The outer race of each bearing should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

Crankshaft Removal/Inspection

1. Remove the shim washer from the crankshaft.



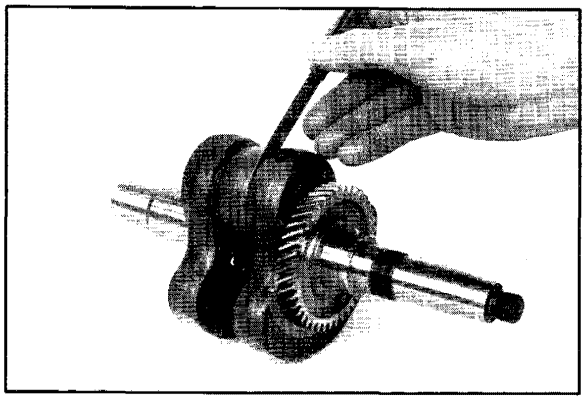
2. Support the PTO side crankcase and crankshaft; press the crankshaft out. Be careful not to damage the crankcase mating surface or connecting rod.



3. Use a thickness gauge to measure the connecting rod big end side clearance.

Connecting Rod Big End Side Clearance:

Std: .0039-.0256 (.1-.65 mm)
Limit: .0315 (.80 mm)



Engine Disassembly, Cont.

4. Place the crankshaft in a truing stand or V-blocks and measure the runout on both ends with a dial indicator.

Runout: .0024" (.06 mm)

5. Measure the connecting rod big end radial clearance.

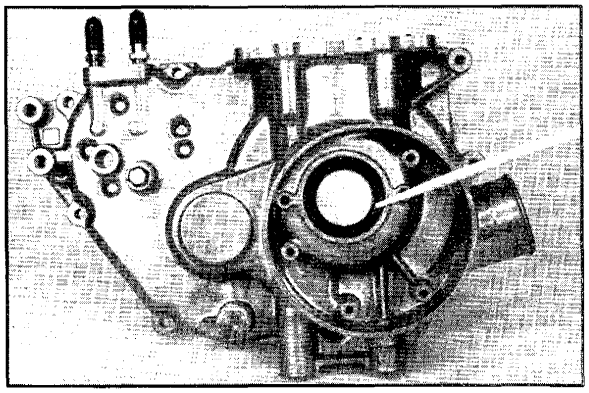
Big End Radial Clearance:

Std. .0004-.0015" (.011-.038 mm)
Limit .002" (.05 mm)

6. Inspect the crankshaft main bearing journals for scoring and abnormal wear.

Crankcase Bearing Inspection

1. Remove the seal from the PTO side crankcase.
2. Inspect the crankshaft main bearings, balancer shaft bearings, and pump shaft bearing.



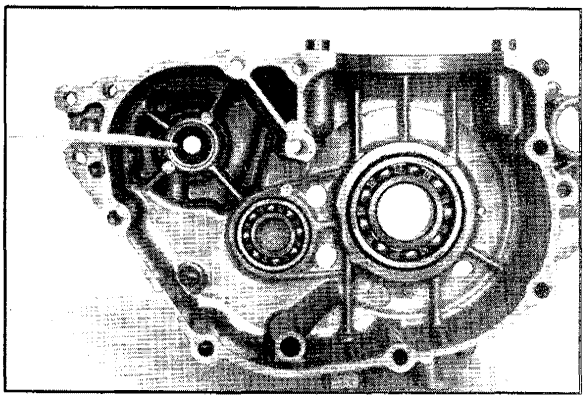
NOTE: Due to extremely close tolerances and minimal wear, the bearings must be inspected visually, and by feel. Look for signs of discoloration, scoring or galling. Turn the inner race of each bearing. The bearings should turn smoothly and quietly. The outer race of each bearing should fit tightly in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

3. Support the crankcase and drive or press the main bearings out of each crankcase.
4. To remove balancer shaft bearings and pump shaft bearing use a blind hole bearing puller.

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

Pump Shaft Oil Seal/ Water Pump Mechanical Seal Removal

Replace the pump shaft seal and water pump mechanical seal whenever the crankcase is disassembled.



1. Remove the pump shaft bearing from the Magneto (right hand) side crankcase.
2. Pry out the oil seal, noting the direction of installation. See page 3.76 for seal installation.
3. Drive the water pump mechanical seal out of the crankcase from inside to outside. Note: The new mechanical seal must be installed after the crankcases are assembled. See Mechanical Seal Installation, page 3.77.

Assembly

Crankcase Assembly

1. Remove all traces of gasket sealer from the crankcase mating surfaces. Inspect the surfaces closely for nicks, burrs or damage.
2. Check the oil pump and oil gallery mating surfaces to be sure they are clean and not damaged.

Bearing Installation

NOTE: To ease bearing installation, warm the crankcase until hot to the touch. Place the bearings in a freezer.

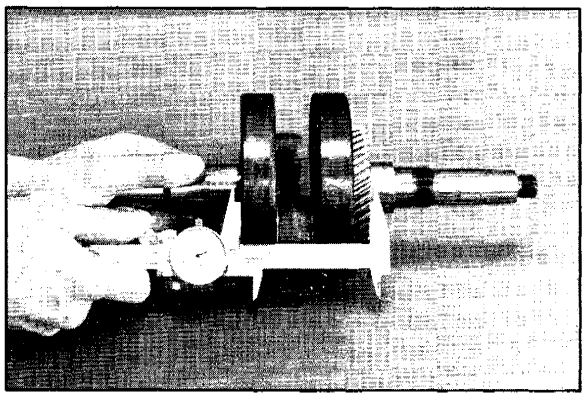
1. Install the bearings so the numbers are visible.
2. Drive or press new bearings into the crankcases, using the proper driver. **CAUTION:** Press only on outer race of bearing to prevent bearing damage.
   - 70mm (2.755″) driver- For crankshaft main bearings.
   - 46mm (1.810″) For counter balancer bearings.
   - 28mm (1.100″) For pump shaft bearing.

End Play Inspection/Adjustment

Before reassembling the crankcase,the following steps should be performed to determine the amount of crankshaft, counter balancer shaft, and pump shaft end play. Excessive end play may cause engine noise at idle and slow speeds. Too little play will side load the bearings which may lead to premature bearing failure.

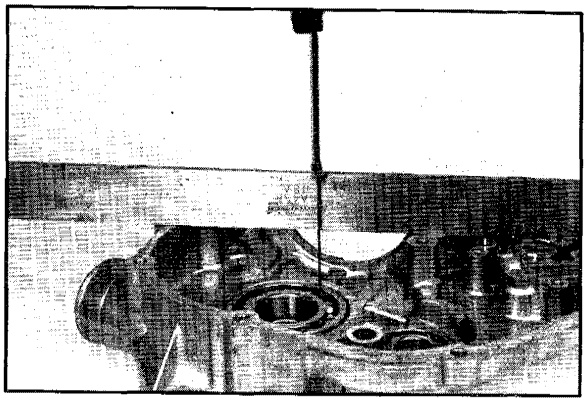
Crankshaft

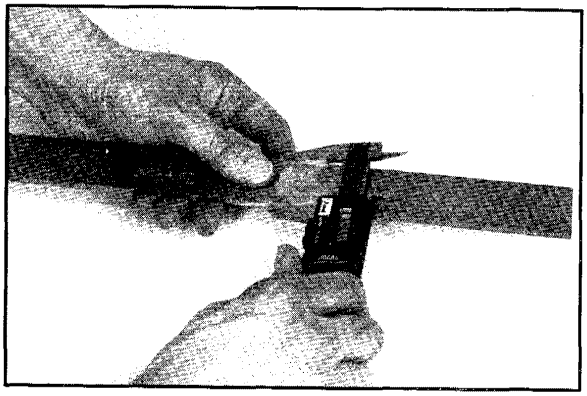
1. Make sure all bearings are firmly seated in the crankcase.
2. Measure the width of the crankshaft at the bearing seats with a dial caliper or micrometer, and record reading.



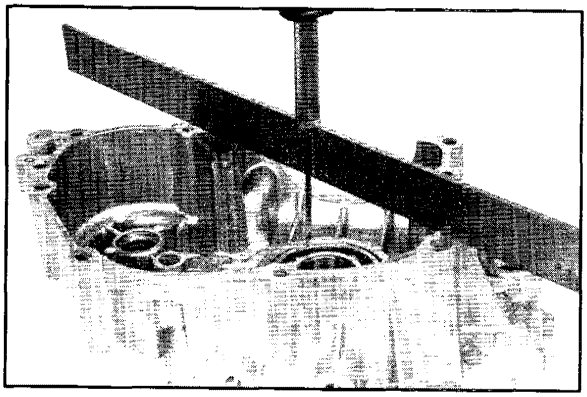
Assembly, Cont.

3. Measure the distance from the PTO crankcase mating surface to the main bearing using a dial caliper and a straight edge. Subtract the thickness of the straightedge and record.





4. Measure the distance from the magneto crankcase mating surface to the main bearing using the same method. Remember to subtract the straightedge from the measurement, and record.
5. Add the readings obtained in step 3 and 4.
6. Subtract the crankshaft width measured in step 2 from the figure obtained in step 5.
7. Subtract the thickness of the existing shim from the result of step 6 to determine if a different shim is needed.



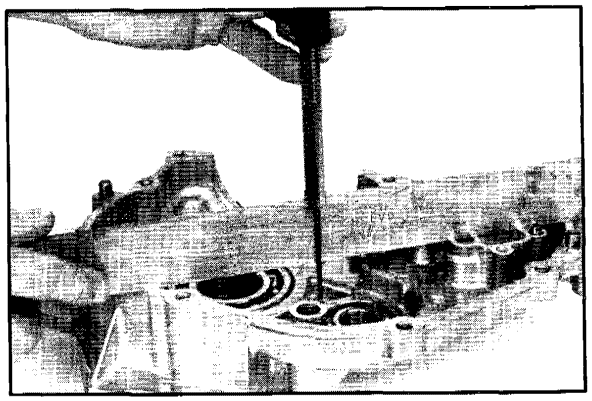
Crankshaft End Play:

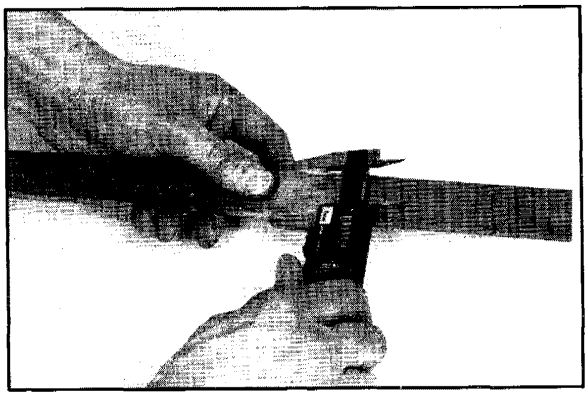
.008″-.016″ (.02-.04 cm)

Assembly, Cont.

Counter Balancer

1. Make sure all bearings are firmly seated in the crankcase.
2. Measure the width of the counter balancer shaft at the bearing seats with a dial caliper or micrometer, and record reading.
3. Measure the distance from the PTO crankcase mating surface to the bearing using a dial caliper and a straight edge. Subtract the thickness of the straightedge and record.
4. Measure the distance from the magneto crankcase mating surface to the bearing using the same method.
5. Add the readings obtained in step 3 and 4.
6. Subtract the counter balancer shaft width measured in step 2 from the figure obtained in step 5.
7. Subtract the thickness of the existing shim from the result of step 6 to determine if a different shim is needed.





Counter Balancer Shaft End Play:

.008"-.016" (.02-.04 cm)

Pump Shaft

1. Make sure the pump shaft bearing is firmly seated in the Magneto side crankcase.
2. Measure the distance from the magneto crankcase mating surface to the bearing using a dial caliper and a straight edge. Subtract the thickness of the straightedge and record.
3. Install the gear on the oil pump and measure the width of the pump and gear. Subtract this measurement from the measurement recorded in step 2.
4. Subtract the thickness of the existing shim from the result of step 3 to determine if a different shim is needed.

Pump Shaft End Play:

.008"-.016" (.02-.04 cm)

Pump Shaft Oil Seal Installation

1. Install the seal from the outside of the crankcase (water pump side) with the spring facing inward, toward the pump shaft bearing.
2. Drive or press the seal into place using the 25mm (.985") seal driver, until flush with the bottom of the mechanical seal bore.
3. Lubricate the seal lip with grease.

Assembly, Cont.

Crankshaft, Counter Balancer, and Oil Pump Installation

Lubricate all bearings with clean engine oil before assembly. See engine disassembly photos (page 3.43-3.73) for reference.

Use the crankshaft installation tool kit PN 2871283 to prevent damage to the crankshaft and main bearings during installation.

1. Install the crankshaft into the PTO side crankcase. Screw the threaded rod into the crankshaft until the threads are engaged a minimum of one inch (25.4mm).
2. Install the collar, washer, and nut onto the threaded rod. Hold the crankshaft and tighten the nut to draw the crankshaft into the main bearings until fully seated. Loosen the nut and remove the threaded rod from the crankshaft. If removal is difficult, install two nuts on the end of the threaded rod and tighten against each other.
3. Install the proper shim on the magneto end of the crankshaft.
4. Place the balancer shaft in the PTO crankcase aligning the timing marks on the crankshaft and balancer gears. Install the proper shim washer on the shaft.
5. Inspect the oil pump sealing surface on the crankcase. Apply a light film of engine oil to the surface and install the oil pump.

NOTE: Do not use gasket sealer on the pump mating surfaces.

Oil Pump Bolt Torque:
6. ft. lbs. (.828 kg-m)

6. Align the drive gear with the drive pin on the pump shaft and install the gear. Be sure the gear is fully seated and properly engaged.
7. Install the proper shim washer on the pump shaft.

Crankcase Assembly

1. Apply 3 Bond 1215 (P/N 2871557) to the crankcase mating surfaces. Be sure the alignment pins are in place.
2. Set the crankcase in position carefully to avoid damaging the pump shaft seal, and install the magneto end crankshaft installation tool (follow instructions provided with tool kit PN 2871283). Draw the crankcase halves together by tightening the nut on the tool and tapping lightly in the pump shaft area with a soft faced hammer to maintain alignment. Continually check alignment of the cases during installation, closing the gap equally until the surfaces are tightly seated.
3. Remove the tool.
4. Install the crankcase flange bolts and tighten in 3 steps in a criss-cross pattern to specified torque.

Crankcase Bolt Torque:
14 ft. lbs. (1.932 kg-m)

Crankcase Sealant:
PN 2871557

Water Pump Mechanical Seal Installation

1. Clean the seal cavity to remove all traces of old sealer.
2. Place a new mechanical seal in the seal drive collar, and install on the pump shaft.
3. Screw the guide onto the end of the pump shaft.
4. Install the washer and nut and tighten to draw seal into place until fully seated.
5. Remove the guide adaptor using the additional nut as a jam nut if necessary.

Water Pump Mechanical Seal Removal - Engine Installed

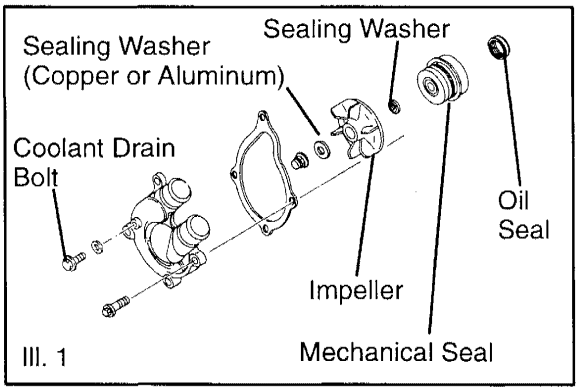
Water pump mechanical seal removal tool: 2872105

Replacement T-handle for 2872105: 2872106

This tool allows a technician to replace the mechanical water pump seal on EH42PL & EH50PL engines without removing the engine and splitting the cases.

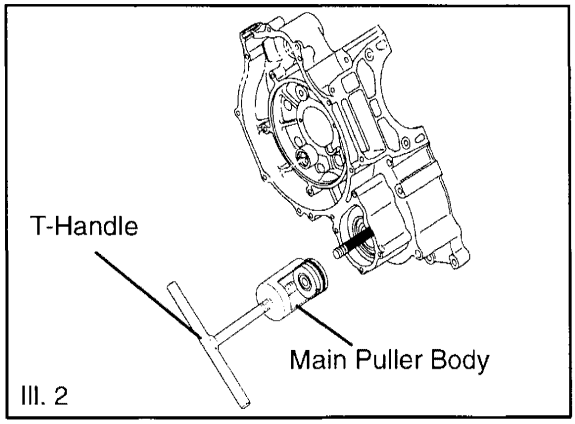
CAUTION: Improper or careless use of this tool or procedure can result in a bent water pump shaft. Pump shaft replacement requires engine removal and crankcase separation. Use caution while performing this procedure. Make sure that the puller is parallel to the shaft at all times. Do not place side loads on the water pump shaft or strike the puller or shaft in any way.

1. After the coolant has been drained, remove the water pump cover, impeller and the sealing washer. (Ill. 1)



Ill. 1

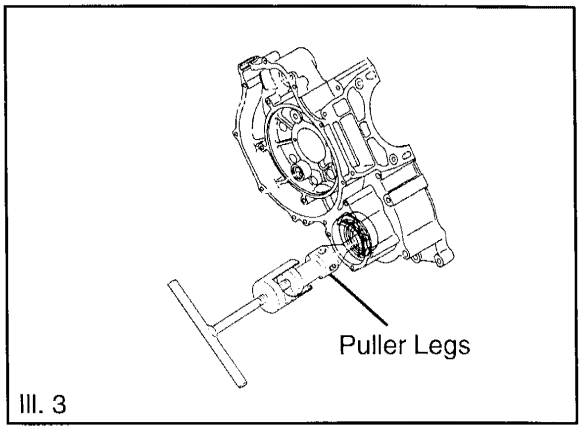
2. Slide the main puller body over the outer portion of the mechanical seal as shown in Ill. 2 and turn T-Handle clockwise until it contacts water pump shaft. Continue rotating until outer portion of mechanical seal is separated from the metal seal body.



Ill. 2

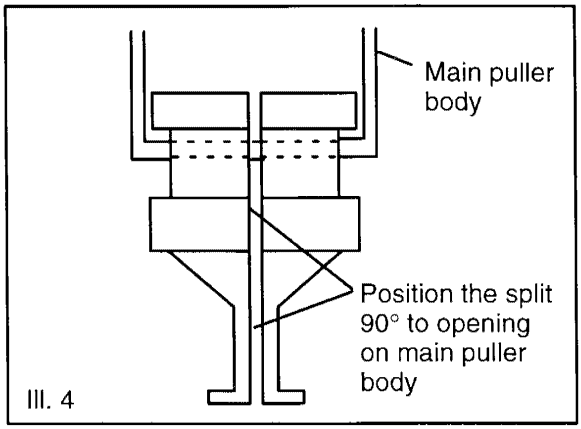
Water Pump Mechanical Seal Removal - Engine Installed, Cont.

3. Insert the puller legs between the water pump drive shaft and the remaining portion of the mechanical seal. Attach the puller legs to the main puller body. Ill. 3



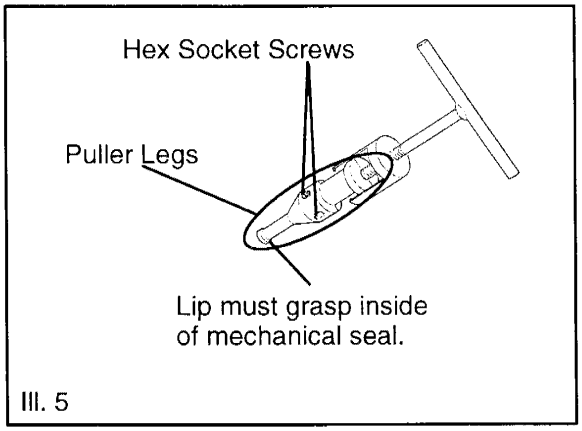
Ill. 3

4. Ensure that the split between the puller legs is fully supported by the main body of the tool (Ill 4).



Ill. 4

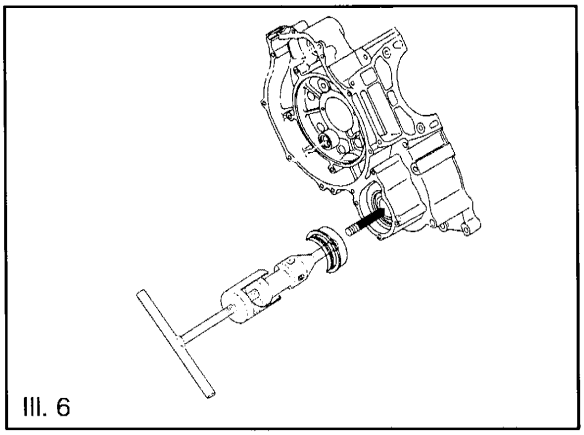
5. Tighten the hex socket screws on the puller legs sufficiently so the lip of the puller legs will grasp the mechanical seal. Ill. 5



Ill. 5

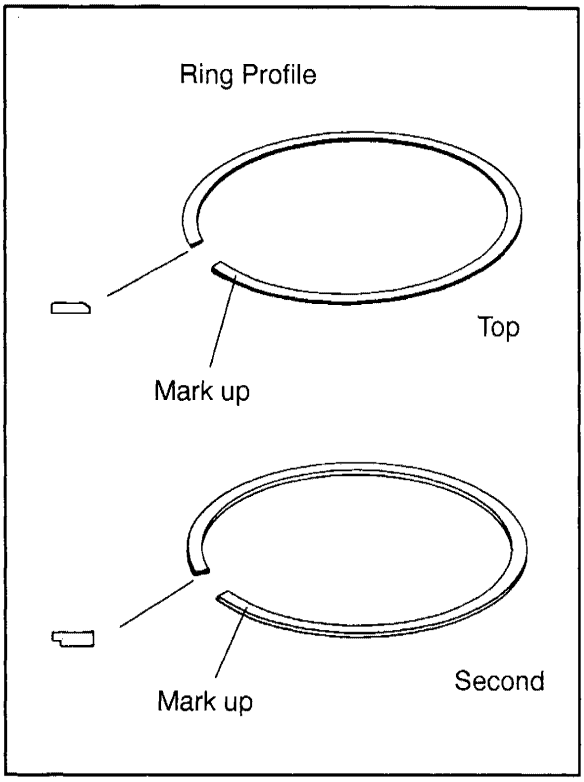
6. Turn the puller T-Handle clockwise until it contacts the water pump shaft. Continue rotating until the remaining portion of mechanical seal has been removed from the cases. Ill. 6 Pump shaft oil seal can also be replaced at this time if necessary.

7. Special tool (PN 5131135) is required to install the new mechanical seal. This tool is available separately and it is also included in the Crankshaft/Water Pump Seal Installation Kit (PN 2871283).


Ill. 6

Assembly, Cont.

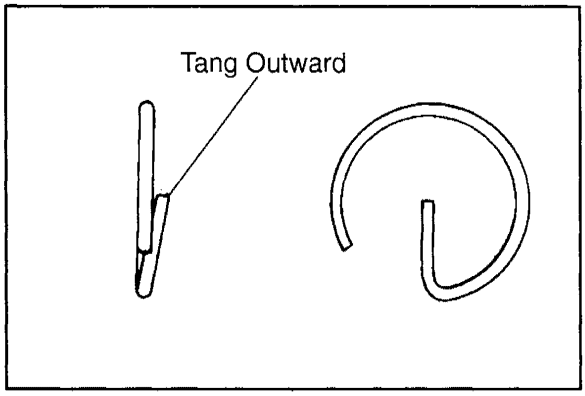
3. Install the bottom rail with the gap at least 30° from the end of the expander on the side opposite the top rail gap.(See Ill.).
4. Install the second ring with the "R" mark facing up. Position the end gap toward the rear (intake) side of the piston.
5. Install the top ring (chrome faced) with the "R" mark facing up and the end gap facing forward (toward the exhaust). (See Ill.).
6. Check to make sure the rings rotate freely in the groove when compressed.



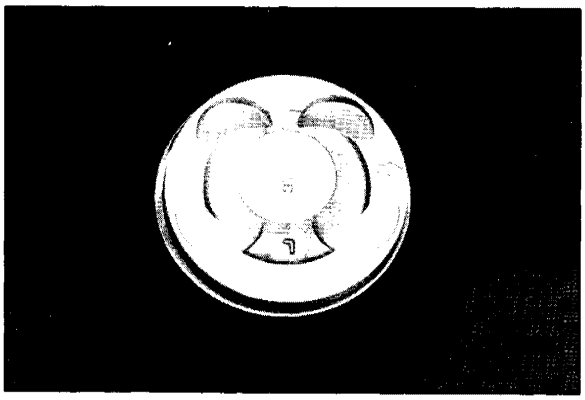
Piston Installation

1. Clean the gasket surfaces on the cylinder and crankcase. Remove all traces of old gasket material.
2. Make sure the cylinder mounting bolt holes are clean and free of debris.
3. Install a new circlip on one side of the piston with the end gap facing *up* or *down,* and tang outward.

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

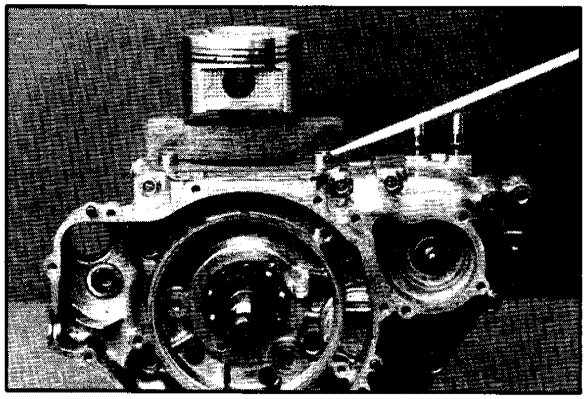


4. Apply clean engine oil to the piston rings, ring lands, piston pin bore, piston pin, and piston skirt. Lubricate the connecting rod (both ends), balancer drive gear, and crankshaft main bearing area.
5. Install the piston on the connecting rod with the arrow facing the magneto (RH) end of the crankshaft. The piston pin should be a push fit in the piston.
6. Install the other circlip with the gap facing up or down and tang outward. (See Caution with step 3 above). Push the piston pin in both directions to make sure the clips are properly seated in the groove.



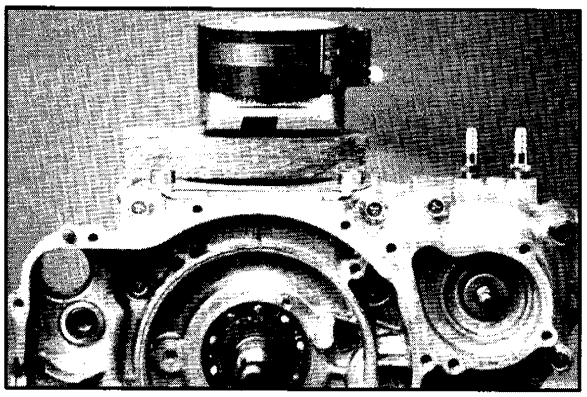
Assembly, Cont.

7. Place the dowel pins in the crankcase and install a new cylinder base gasket.

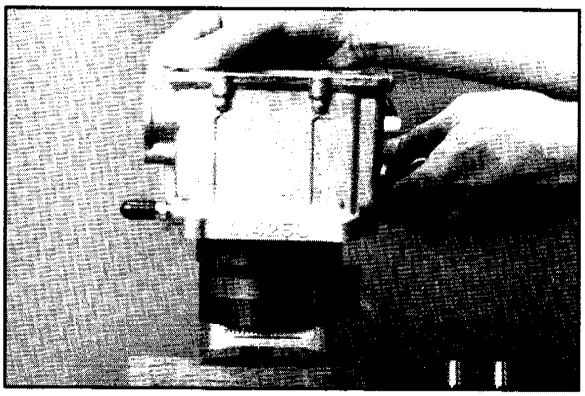


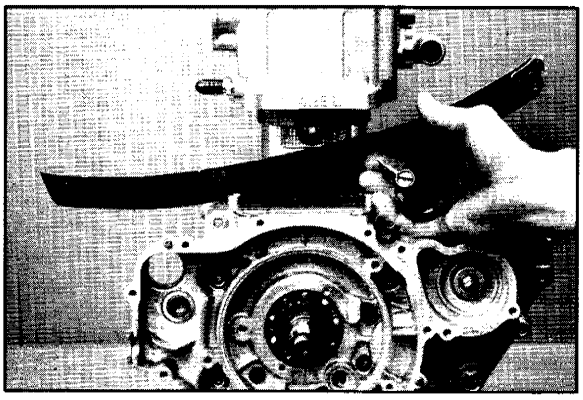
Cylinder Installation

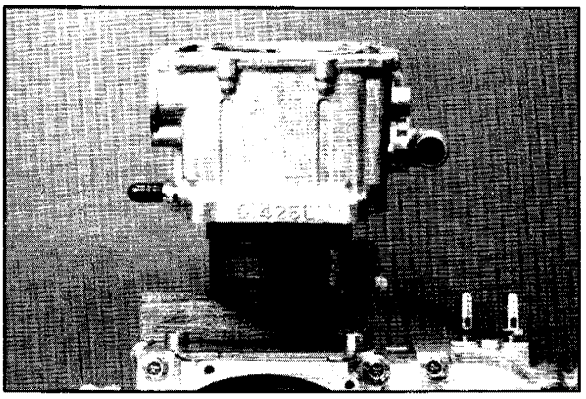
1. Position the piston support block PN 2870390 beneath the piston skirt to support the piston during cylinder installation.
2. Apply clean engine oil to the ring compressor (Snap On™ PN RCL30) and install the compressor following manufacturers instructions. **CAUTION:** Make sure the oil control ring upper rail tab is positioned properly in the notch of the piston. Verify all ring end gaps are correctly located.



3. Apply clean engine oil liberally to the cylinder bore and tapered area of the sleeve. Install the cylinder with a slight rocking motion until the rings are captive in the sleeve, and remove the ring compressor.







Assembly, Cont.

6. Push the cylinder downward until fully seated on the base gasket.

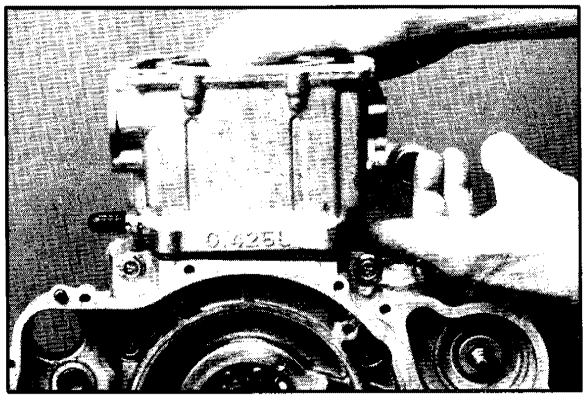
7. Apply a light film of oil to the threads and flange surface of the cylinder mounting bolts.

8. Install all four bolts finger tight. Rotate the engine and position the piston at BDC.

NOTE: If cam chain is installed, hold it up while rotating the engine to avoid damage to the chain, drive sprocket teeth, or tensioner blade.

9. Tighten the cylinder bolts in three steps in a criss cross pattern and torque to specifications.

10. Install the two 6mm bolts.



Cylinder Bolt Torque:

10mm - 46 ft. lbs. (6.348 kg-m)
6mm - 6 ft. lbs. (.828 kg-m)

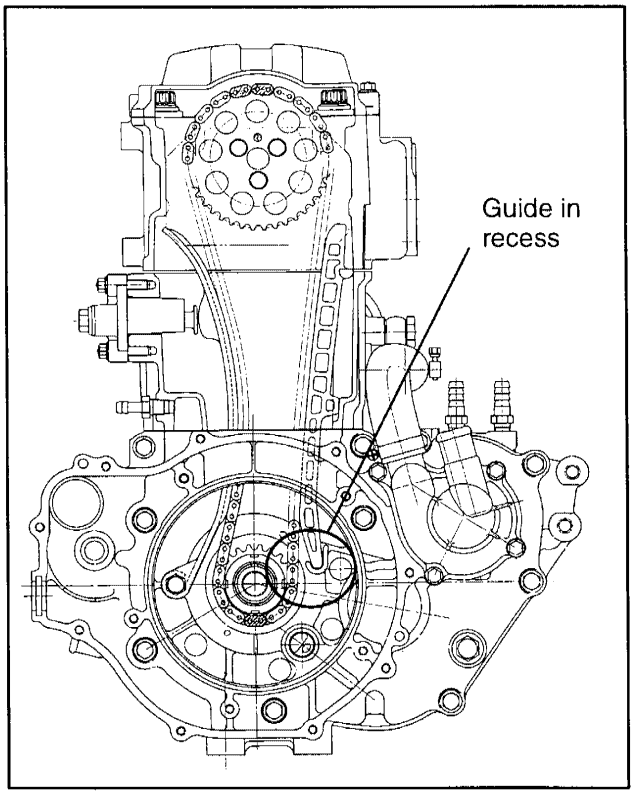
Cylinder Head Installation

Clean the gasket surfaces on the cylinder head and cylinder. Remove all traces of old gasket material.
Refer to disassembly photos.

1. Install the cam chain tensioner guide. Be sure bottom end of guide is located properly in crankcase.

2. Install the two dowel pins and a new cylinder head gasket.

3. Place the cylinder head on the cylinder. Apply a film of engine oil to the cylinder head bolt threads and washers, and hand tighten the bolts.



Assembly, Cont.

The following procedure must be used to torque the cylinder head properly:

Torque all bolts evenly in a criss cross pattern

***Torque bolts to 22 ft. lbs. (3.04 kg-m)**

***Torque bolts to 51 ft. lbs. (7.04 kg-m)**

***Loosen bolts evenly 180° (1/2 turn)**

***Loosen bolts again another 180° (1/2 turn)**

***Torque bolts to 11 ft. lbs. (1.52 kg-m)**

***From this point, tighten bolts evenly 90° (1/4 turn)**

***Finally, tighten another 90° (1/4 turn)**

***Install two 6mm bolts and torque to 6 ft. lbs. (.828 kg-m)**

Cam Chain/Camshaft Installation

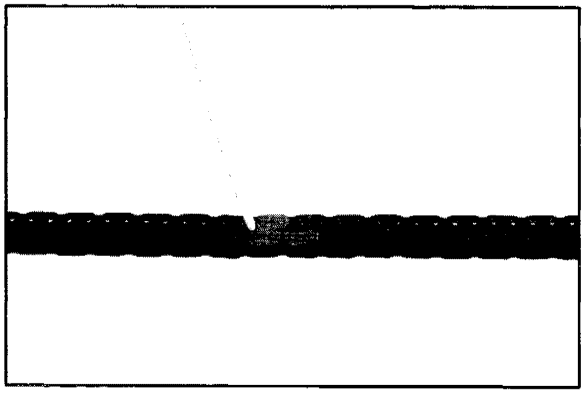
Install the cam chain over the crankshaft with the plated links facing outward.

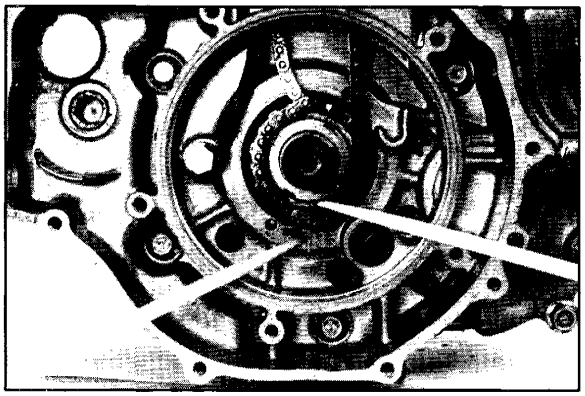
CAUTION: Serious engine damage may result if the camshaft is not properly timed to the crankshaft.

IMPORTANT CAMSHAFT TIMING NOTE: In order to time the camshaft to the crankshaft, the piston must be precisely located at Top Dead Center (TDC). This can be accomplished using one of two methods.

When the stator assembly is removed, follow the procedure outlined in Method 1. This method uses the cam chain plated links to time the camshaft and the dot on the cam chain drive sprocket to establish TDC (see Method 1, page 3.83). It is important to note that this method can only be used when the stator is removed and the cam chain drive sprocket is in view. The plated links *are not* used to time the camshaft when the flywheel is installed.

When the stator assembly is installed use Method 2. This method establishes accurate Top Dead Center (TDC) by aligning the single mark on the flywheel with the notch in the timing inspection hole (see Method 2, page 3.85). The camshaft sprocket alignment pin faces upward and directly in line with the crankshaft to camshaft centerline.





Assembly, Cont.

Camshaft Installation - Timing Method 1. Refer to Illustration, Page 3.84

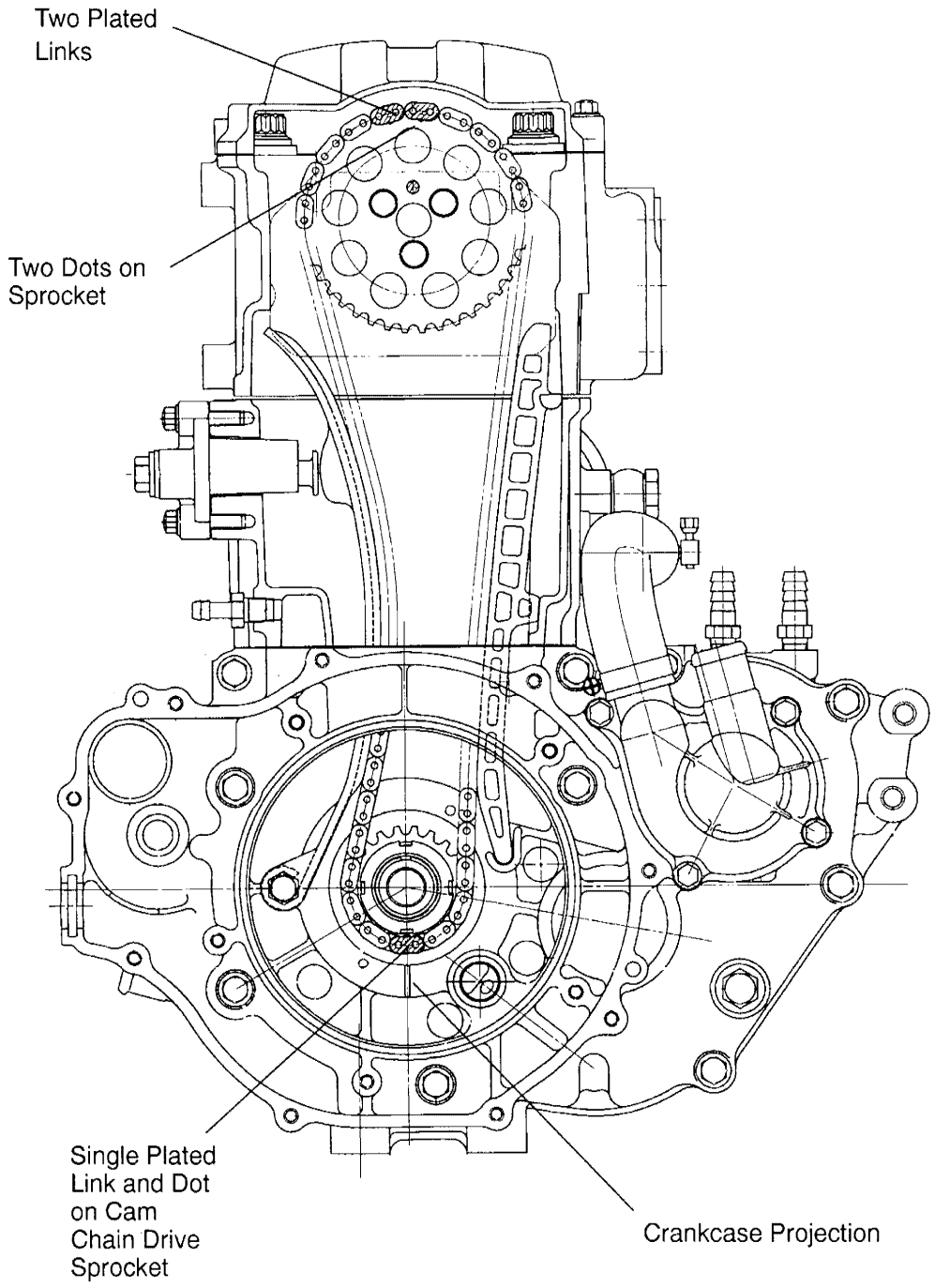
If the stator assembly is removed: **NOTE:** Use this method only when the stator is removed and cam chain drive sprocket is in view.

1. Rotate the crankshaft until the dot on the cam chain drive sprocket is aligned with the crankcase projection (dot facing downward).
2. Align the single plated link on the cam chain with the dotted tooth of the cam chain drive sprocket. Use a wire to pull the chain up through the cylinder and cylinder head, and secure it to hold the chain in place.
3. Apply Polaris Low Temp Grease PN 2870577, or moly grease to the camshaft main journals and cam lobes. Lubricate automatic compression release mechanism with clean engine oil. (To install the compression release mechanism, refer to page 3.48).
4. Install the camshaft with the lobes facing downward and the sprocket alignment pin facing upward.
5. Disconnect the wire from the cam chain and install the cam sprocket with the two dots facing outward.
6. Loop the cam chain over the cam sprocket, aligning the two plated links on the chain with the two dots on the sprocket.
7. Install the sprocket on the camshaft. Apply Loctite 242 to the cam sprocket bolts and torque to specifications.

Cam Sprocket Bolt Torque:
6 ft. lbs. (.828 kg-m)

8. Apply Loctite 515 or 518 Gasket Eliminator to the camshaft end cap and install using a new O-ring.
9. Check all cam timing marks to verify proper cam timing, and install the cam chain tensioner. See Cam Chain Tensioner Installation page 3.87. **NOTE:** The plated links will not align after engine is rotated.

Method 1 - Camshaft Timing with Stator Removed

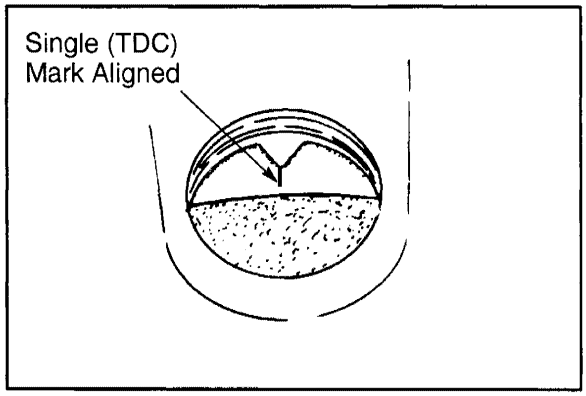


NOTE: Plated links will not align after engine is rotated.

Assembly, Cont.

Camshaft Installation - Timing Method 2. Refer to Illustration, Page 3.86

1. Apply Polaris Low Temp Grease PN 2870577, or molybdenum disulfide grease to the camshaft main journals and cam lobes. Lubricate automatic compression release mechanism with clean engine oil. (To install the compression release mechanism, refer to page 3.48).
2. Install the camshaft with the lobes facing downward and the sprocket alignment pin facing upward.
3. Disconnect the wire from the cam chain and rotate the engine to align the single (TDC) timing mark (Top Dead Center) on the flywheel with the notch in the timing inspection window. Be sure to use the *single* TDC mark when installing the cam. Do not use the advance marks. See Ill. on next page.
4. Loop the cam chain on the cam sprocket with the dots on the sprocket facing outward and the alignment pin notch facing directly upward.
5. Before positioning the sprocket on the camshaft, check the position of the cam sprocket alignment pin. When the cam is positioned properly, the cam sprocket alignment pin is directly in line with the crankshaft/camshaft centerline.
6. Install the sprocket on the camshaft. Apply Loctite 242 to the cam sprocket bolts and torque to specifications.

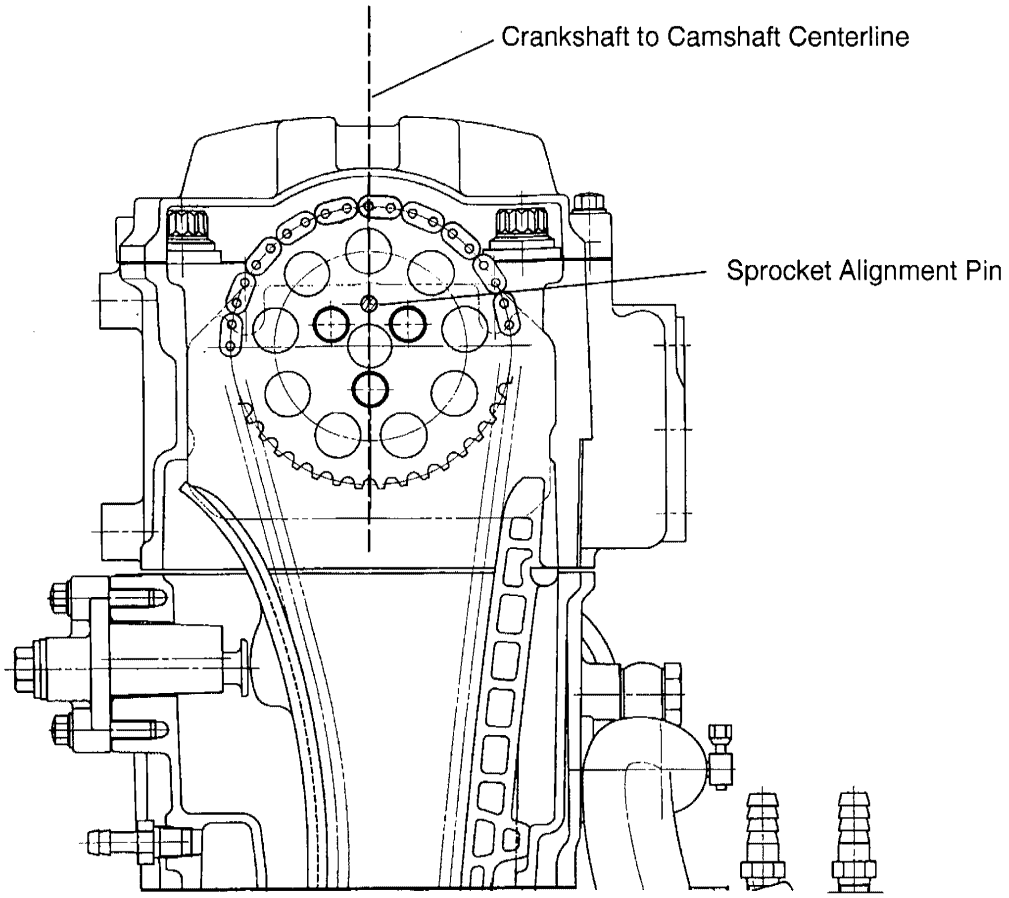


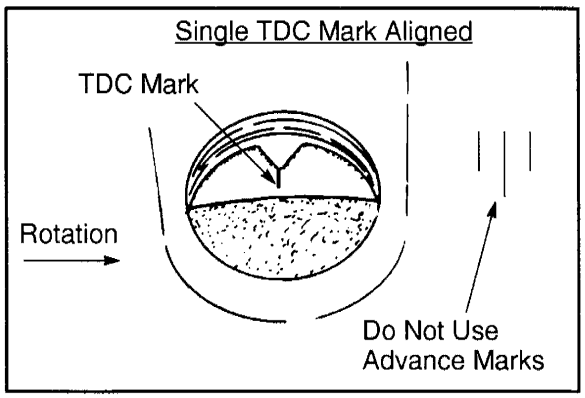
Cam Sprocket Bolt Torque:

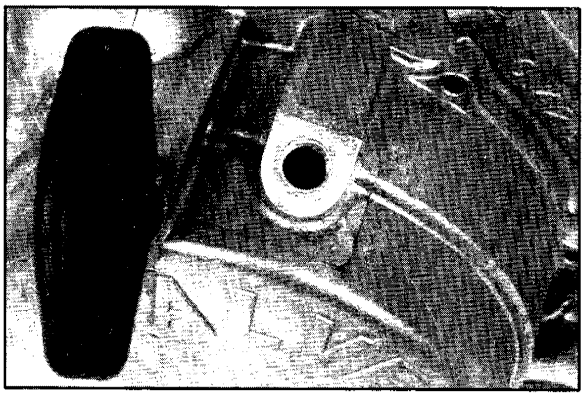
6 ft. lbs. (.828 kg-m)

7. Apply Loctite 515 or 518 Gasket Eliminator, or 3 Bond 1215 to the camshaft end cap and install using a new O-Ring.
8. Check all cam timing marks to verify proper cam timing, and install the cam chain tensioner body with a new gasket.
9. After tensioner installation, rotate engine at least two revolutions and re-check marks/timing.

Method 2 Camshaft Timing Using Flywheel TDC Mark





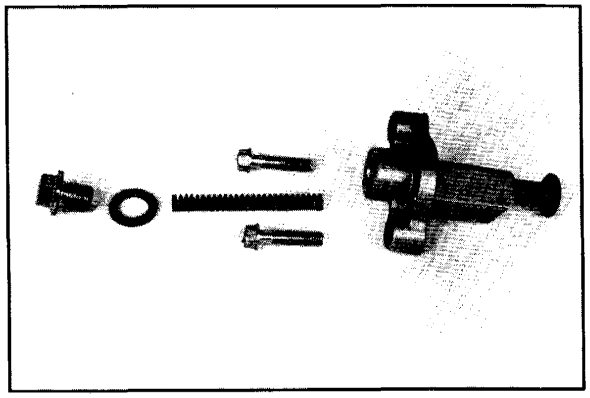


Recoil Housing Timing Inspection Hole

Assembly, Cont.

Cam Chain Tensioner Installation

1. Release the ratchet pawl and push the tensioner plunger all the way into the tensioner body.
2. Install the tensioner body with a new gasket and tighten the bolts.



Tensioner Bolt Torque:
6 ft. lbs. (.828 kg-m)

3. Install the spring, new sealing washer, and tensioner plug.

Tensioner Plug Torque:
17 ft. lbs. (2.346 kg-m)

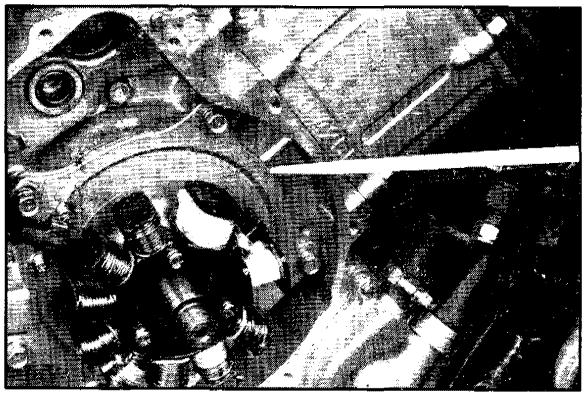
4. Slowly rotate engine two to three revolutions and re-check cam timing. **NOTE:** Plated links will not align after engine is rotated. Check crankshaft position by aligning dot on sprocket with crankcase projection (or TDC mark if flywheel is installed). Use cam sprocket locating pin (see Timing Method 2) to check camshaft position.

Stator, Flywheel and Starter Drive Installation

NOTE: The stator, flywheel, starter drive, and recoil can be assembled with the engine in the frame.

Stator

1. Apply a light film of grease to the crankshaft seal. Apply molybdenum disulfide grease or assembly lubricant to the crankshaft bushing.
2. Install a new O-Ring in the oil passage recess in the crankcase.
3. Apply 3 Bond 1215, Loctite 515 or 518, or an equivalent sealer to the stator plate outer surface and install a new O-Ring.
4. Install the stator plate being careful not to damage the seal. Align timing reference marks on the plate and crankcase. Be sure the plate is fully seated.



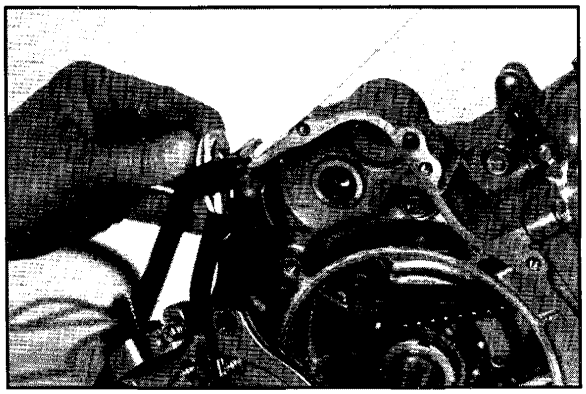
Assembly, Cont.

4. Torque bolts evenly to specification.

Stator Plate Bolt Torque:

5.1-6.5 ft. lbs. (.68-.88 kg-m)

5. Seal stator wire grommet with 3 Bond 1215 or equivalent sealer.



Flywheel

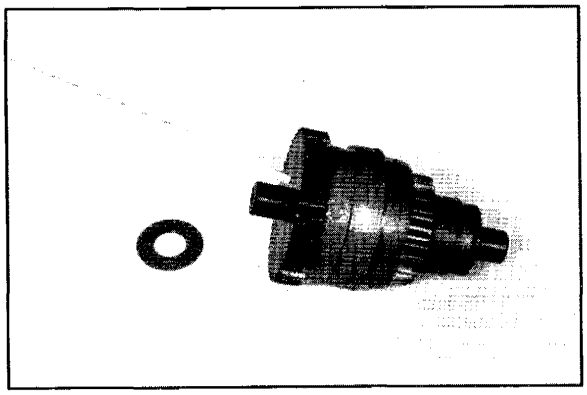
1. Install flywheel, washer, and nut. Torque flywheel to specification.

Flywheel Nut Torque:

58-72 ft. lbs. (7.85-9.81 kg-m)

Starter Drive

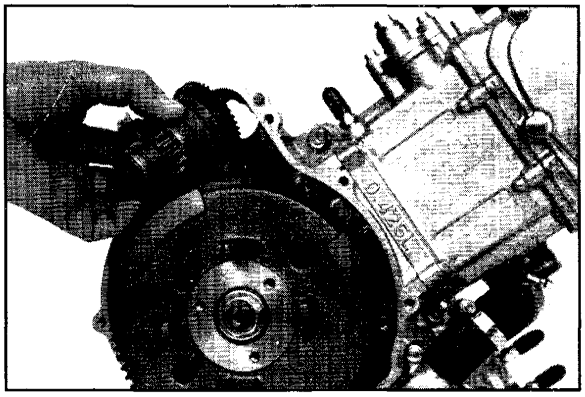
1. Be sure the washer is positioned on the back of the drive gear.



2. Apply grease to the drive bushing in the crankcase and all moving surfaces of the starter drive mechanism. Install the starter drive.
3. Install recoil housing gasket and recoil housing.

Starter Drive Grease:

PN 2871460



Assembly, Cont.

Rocker Shaft/Rocker Arm Assembly Installation

1. Assemble rocker arms, rocker shaft, and shaft supports.
2. Install and tighten rocker arm shaft locating bolt.
3. Apply molybdenum disulfide grease to the cam lobes and cam follower surfaces.
4. Rotate the engine until the cam lobes are pointing downward.
5. Be sure the dowel pins are in place and install the rocker shaft assembly.
6. Apply a light film of engine oil to the threads of the bolts and tighten evenly.

Rocker Shaft Support Tower Bolt Torque:
9 ft. lbs. (1.242 kg-m)

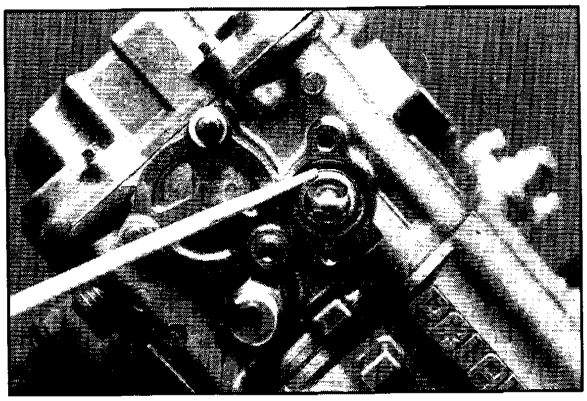
Rocker Shaft Locating Bolt Torque:
6 ft. lbs. (.828 kg-m)

7. Adjust valves according to the valve adjustment procedure found in Chapter 2, Maintenance.
8. Apply clean engine oil liberally to the valve springs, cam chain, rocker arms, and camshaft.
9. Place a new rocker cover gasket on the cylinder head and install the cover and bolts.

Rocker Cover Bolt Torque:
6 ft. lbs. (.828 kg-m)

Thermostat Installation

Install the thermostat with one of the air bleed holes positioned next to the upper thermostat cover bolt hole as shown.



Oil Pipes

Install the oil pipes with new sealing washers. Tighten all bolts evenly to specified torque.

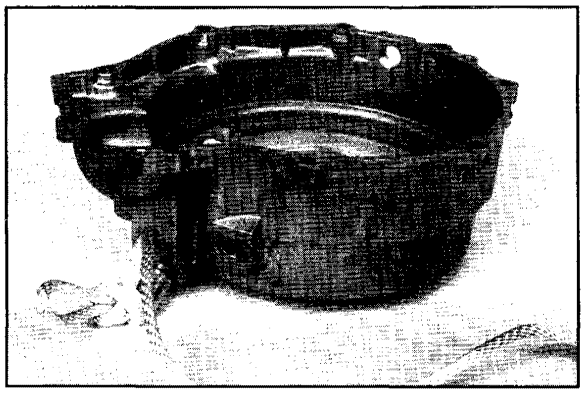
Oil Pipe Bolt Torque:
20 ft. lbs. (2.76 kg-m)

Recoil Disassembly/Inspection

CAUTION: The recoil is under spring tension. A face shield and eye protection is required during this procedure.

Replace any parts found to be worn or damaged.

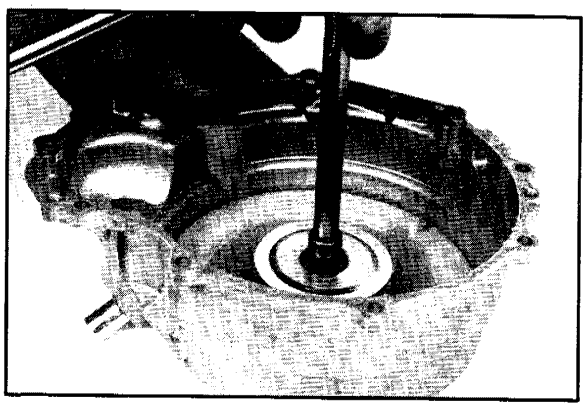
1. Remove bolts and recoil housing.
2. Pull recoil rope so it is fully extended and tie a loose knot at the rope guide bushing.

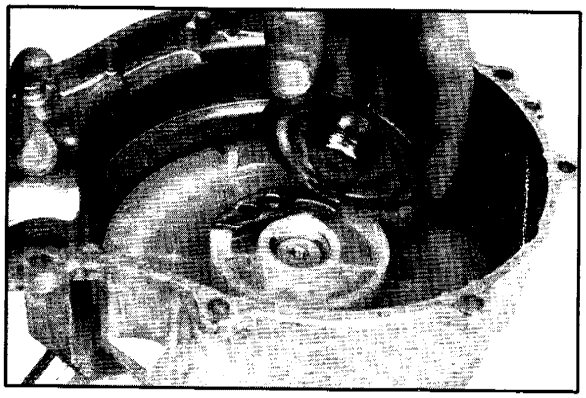


3. Check handle for cracks or damage which may allow water or dirt to enter the recoil housing through the rope. **NOTE:** The handle must also seal tightly on the recoil housing to prevent water from entering.
4. Pull knot out of of recoil reel. Untie knot. remove rope from reel.

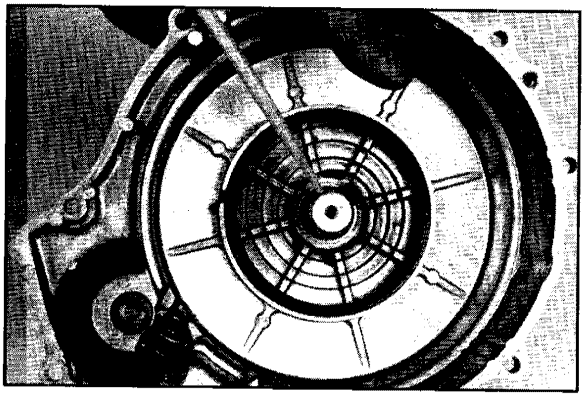
Recoil Disassembly/Inspection, Cont.

5. Slowly remove spring tension by rotating reel clockwise until all tension is removed.
6. Remove 6 mm bolt and spring washer securing friction plate. Remove friction plate. Inspect plate for wear or damage. Inspect plate friction spring for wear, damage, and proper tension. The spring should fit tightly on friction plate.
7. Remove ratchet pawl with spring and inspect. Replace spring or ratchet pawl if worn, broken, or damaged.





8. Slowly and carefully remove reel from recoil housing making sure the spring remains in the housing. Inspect the reel hub and bushing for wear.
9. Unwind rope and inspect for cuts or abrasions.
10. Inspect drive tab on hub return spring for damage. To remove hub return spring, hold outer coils in place with one hand and slowly remove spring one coil at a time from the inside out.



Recoil Assembly

CAUTION: Be sure to wear a face shield and eye protection when performing this procedure.

To install a new spring:

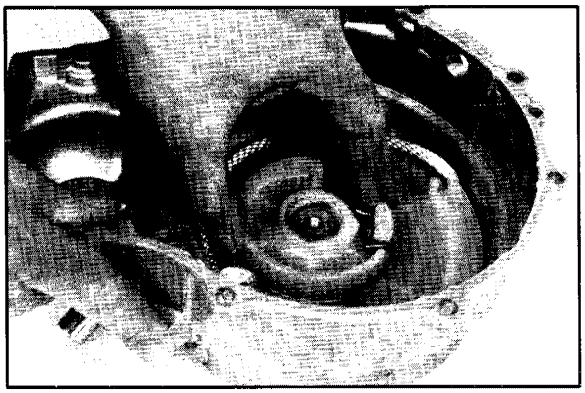
1. Place spring in housing with the end positioned so the spring spirals inward in a counterclockwise direction. See photo above.
2. Hold spring in place and cut retaining wire.

To reinstall an old spring:

3. Hook outer tab in place in recoil housing and wind spring in a counterclockwise direction one coil at a time while holding the installed coils in place.
4. Lubricate the spring with light lubricant such as Polaris Cable Lube (PN 2870510) or low temperature grease.

Recoil Assembly, Cont.

1. Route rope through guide bushing and into reel. Tie a secure knot in end of the rope.
2. Wind rope counterclockwise onto the reel, as viewed from ratchet side of reel as shown.
3. Lock rope into notch on outer edge of reel.
4. Apply a small amount of Polaris low temp grease or equivalent to the center post of the housing and the bushing.
5. Install reel into housing making sure the spring drive tab on the reel engages the spring and the reel is fully seated in the housing.
6. Apply downward pressure on the reel and rotate counterclockwise approximately 6 turns to pre-wind the spring. Continue rotating counterclockwise until rope on outer edge aligns with rope guide bushing.
7. Release rope from notch and allow reel to rewind completely. If more pre-wind is required, place rope in notch and add additional turns of pre-wind.
8. Install ratchet pawl and return spring.
9. Reinstall friction plate. **NOTE:** The friction plate must be positioned with both end tabs of the friction spring on the drive side of the ratchet.
10. Torque friction plate retaining bolt to 5-6 ft. lbs. (.69-.828 kg-m).
11. Reinstall recoil housing using a new gasket. Seal stator wire harness grommet with RTV silicone.



Spark Plug Fouling - 2 Stroke Engines

- Oil pump adjusted incorrectly
- Adjustment (pilot screw)
- Restricted air filter (main or pre-cleaner)
- Improperly assembled air intake system
- Oil pump shaft seal leaking (fills crankcase)
- Oil pump arm or reel not returning properly (cable, arm or reel sticking)
- Spark plug cap loose or faulty
- Choke cable adjustment or plunger/cable sticking
- Foreign material on choke plunger seat or plunger
- Incorrect spark plug heat range or gap
- Carburetor inlet needle and seat worn
- Jet needle and/or needle jet worn or improperly adjusted
- Excessive carburetor vibration (loose or missing needle jet locating pins)
- Loose jets in carburetor or calibration incorrect for altitude/temperature
- Incorrect float level setting
- PVT system calibrated incorrectly or components worn or mis-adjusted
- Fuel quality poor (old) or octane too high
- Low compression
- Restricted exhaust
- Weak ignition (loose coil ground, faulty coil, stator, or ETC switch)
- ETC switch mis-adjusted
- Oil line check valve leaking

Spark Plug Fouling - 4 Stroke Engines

- Spark plug cap loose or faulty
- Choke cable adjustment or plunger/cable sticking
- Foreign material on choke plunger seat or plunger
- Incorrect spark plug heat range or gap
- Carburetor inlet needle and seat worn
- Jet needle and/or needle jet worn or improperly adjusted
- Excessive carburetor vibration (loose or missing needle jet locating pins)
- Loose jets in carburetor or calibration incorrect for altitude/temperature
- Incorrect float level setting
- PVT system calibrated incorrectly or components worn or mis-adjusted
- Fuel quality poor (old) or octane too high
- Low compression
- Restricted exhaust
- Weak ignition (loose coil ground, faulty coil, stator, or ETC switch)
- ETC switch mis-adjusted
- Restricted air filter (main or pre-cleaner)
- Improperly assembled air intake system
- Restricted engine breather system
- Oil contaminated with fuel
- Restricted oil tank vent

ENGINE
2 Stroke Engine Troubleshooting

Condition	Possible Cause	Action/Possible Cause
Engine turns over but does not start	-No fuel	-Add fuel as required
	-Dirt in fuel line or filter	-Clean line, replace filter
	-Fuel will not pass through on-off valve (petcock)	-Clean or replace valve as necessary
	-Tank vent plugged	-Repair vent system
	-Carb starter circuit	-Clean or replace as needed
	-Engine flooded	-Turn off fuel and drain crankcase a. Inspect carb venting system for obstructions b. Inspect carb needle and seat
	-Low compression (below 100 PSI at sea level)	a. Inspect head gasket b. Inspect piston and cylinder (repair as required)
	-No spark	-Repair ignition system (refer to ignition trouble-shooting
Engine does not turn over	-Dead battery	-Charge or replace battery (refer to battery testing)
	-Starter motor does not turn	-Repair starter (refer to starter testing)
	-Engine stuck	-Repair engine as required
Engine runs but will not idle	-Plugged carb pilot system	-Clean or replace pilot jet
	-Carb misadjusted	-Adjust as per specification
	-Choke not adjusted properly	-Adjust choke as per specification
	-Low compression	-Repair engine as required
	-Crankcase leak	-Repair crankcase as required
Engine idles but will not rev up	-Broken throttle cable	-Replace cable
	-Obstruction in air intake	-Clean or repair air intake
	-Incorrect carb jetting	-Jet as per jetting chart
	-ETC limiting speed (1989 and newer)	-Repair ETC (refer to ETC troubleshooting)
	-Reverse speed limiter limiting speed	-Repair reverse speed limiter (refer to reverse speed limiter troubleshooting chart)
	-Incorrect ignition timing	-Check and adjust ignition timing
	-Restricted exhaust system	-Repair or replace exhaust system
Engine has low power	-Cylinder, piston and ring wear or damage (check compression)	-Repair cylinder and piston as needed
	-PVT not operating properly	-Clean, repair or replace as required
	-Plugged exhaust	-Repair or replace exhaust system
Piston failure Scoring	-Lack of lubrication	-Fill oil tank and bleed pump
		-Check pump for proper operation, pinched vent line
		-Restricted oil delivery (lines, filter, check valve)
		-Oil pump drive gear failure
Melted piston top	-Engine overheating	-Install fan or check fan operation, test cooling sys tem, loose or broken impeller
	-Lean air fuel ratio	-Clean carb and jet as per chart
	-Air leak in crankcase	-Repair as needed
	-Low octane fuel	-Use 87 octane minimum
	-Incorrect ignition timing	-Adjust timing as per specifications
	-Incorrect spark plug	-Install recommended spark plug
Skirt breakage	-Piston fatigue from scoring	
Excessive smoke and carbon buildup	-Excessive piston-to-cylinder clear-ance	-Repair cylinder (Check air filter and air box)
	-Oil pump misadjusted	-Synchronize pump to carb (refer to oil pump bleed-ing and adjustment)
	-Oil pump cable not allowing pump to return to idle position	-Lubricate or replace cable
Engine coolant found in counter balance assem-bly (Liquid cooled mod-els)	-Water pump gasket	-Inspect/replace gasket
	-Water pump seal	-Replace

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
- Carb starter circuit
- Engine flooded
- Low compression (high cylinder leakage)
- No spark (Spark plug fouled)

Engine Does Not Turn Over

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

Engine Runs But Will Not Idle

- Restricted carburetor pilot system
- Carburetor misadjusted
- Choke not adjusted properly
- Low compression
- Crankcase breather restricted

Engine Idles But Will Not Rev Up

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

Engine Has Low Power

- Spark plug fouled
- Cylinder, piston, ring, or valve wear or damage (check compression)
- PVT not operating properly
- Restricted exhaust muffler
- Carburetor vacuum slide sticking/diaphragm damaged
- Dirty carburetor

Piston Failure - Scoring

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

Excessive Smoke and Carbon Buildup

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

Low Compression

- Decompressor stuck
- Cylinder head gasket leak
- No valve clearance or incorrectly adjusted
- 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

Overheating

- Low coolant level - air in system
- Faulty pressure cap or system leaks
- Lean mixture (restricted jets, vents, fuel pump or fuel valve)
- Fuel pump output weak
- Restricted radiator (internally or cooling fins)
- Water pump failure
- Cooling system restriction
- Cooling fan inoperative
- Ignition timing misadjusted
- Low oil level
- Spark plug incorrect heat range
- Faulty hot light circuit
- Thermostat stuck closed

Backfiring

- ETC or speed limiter system malfunction
- Fouled spark plug or incorrect plug or plug gap
- Carburetion faulty - lean condition
- Exhaust system air leaks
- Ignition system faulty:
  - Spark plug cap cracked/broken
  - Ignition coil faulty
  - Ignition or kill switch circuit faulty
  - Ignition timing incorrect
  - Sheared flywheel key
- Poor connections in ignition system
- System wiring wet
- Valve sticking
- Air leaks in intake
- Lean condition

EH42PL/EH50PL Cooling System Troubleshooting

Overheating

- Insufficient/wrong type coolant
- Air in system
- Thermostat stuck closed or not opening completely
- Radiator cap faulty (fails to pressurize)
- Restricted system (mud or debris in radiator fins or restriction to air flow, passages blocked in radiator, lines, pump, or water jacket)
- Water pump inoperative
- Fan motor inoperative

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)

ENGINE
Piston Damage Checklist
Piston Damage Checklist - 2 Stroke Engines
(Some items may not apply to all engines)

- Oil tank empty; oil wrong type or contaminated
- Oil filter restricted
- Oil pump inoperative (drive gear, cable, pump); oil check valve restricted or faulty
- Lean carburetion or oil delivery due to: Vent lines pinched, kinked, or restricted (carburetor, oil tank, fuel tank etc.); Restricted oil or fuel passages, incorrect jetting for altitude/temperature
- Inoperative fan or low fan RPM (check fan motor amp draw-should be less than 6.5 amps; low battery, fan switch or connections, wiring)
- Cooling system, cooling fins, radiator fins restricted, air flow obstructed
- Incorrect piston to cylinder clearance
- Air leaks in intake tract / air intake ducts / mounting flange (damaged or loose)
- Foreign material ingestion
- Air in oil pump / lines
- Air in cooling system / low coolant level
- Poor fuel quality
- Restricted exhaust
- Incorrect ignition timing
- Spark plug heat range incorrect
- Fan blade incorrectly installed or damaged
- Air box, carburetor, or exhaust modified

CHAPTER 4
FUEL SYSTEM/CARBURETION

Jetting Guidelines

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

Carburetors on Polaris ATVs are calibrated for an altitude of 0-3000 ft. (0-900 meters) and ambient temperatures between +40 and +80° F (+5° to +26° C). All carburetors must be re-calibrated if operated outside the production temperature and/or altitude range. The main jet installed in production is not correct for all operating conditions.

CAUTION:

A main jet that is too small will cause a lean operating condition and may cause serious engine damage. Jet the carburetors carefully for elevation and temperature according to the jetting charts in this chapter, or in the Owner's Safety and Maintenance Manual for each model.

NOTE: Maximum engine efficiency and horsepower are directly related to proper carburetor settings. The following charts have been established as a guideline for selecting optimum jetting for varying temperature and altitude conditions. Air screw or fuel screw adjustment will affect mixture from approximately 0 to 1/4 throttle setting and should be adjusted as follows:

Air Screw (2 stroke models)

Turn the air screw in (clockwise) 1/4 turn for each 30° below 60° F. Turn the air screw out (counterclockwise) 1/4 turn for each 30° above 60° F.

Fuel Screw (4 stroke models)

Turn the fuel screw in (clockwise) 1/4 turn for each 30° above 60° F. Turn the fuel screw out (counterclockwise) 1/4 turn for each 30° below 60° F.

IMPORTANT: The following guidelines must be followed when establishing a main jet setting:

1. Select the lowest anticipated temperature at which the machine will be operated.
2. Determine the lowest approximate altitude at which the machine will be operated.
3. Tracing down and across on the chart, use the intersecting main jet recommendation.
4. Clutching changes may also be required for changes in elevation. Refer to clutching charts in Chapter 6 for recommendations.

Jetting Compensation for Altitude and Temperature – 1996 Models

Trail Blazer		AMBIENT TEMPERATURE			
		Below 0°F Below -18°C	0° to +40°F -18°to +5°C	+40°to +80°F +5° to +26°C	+80° & Above °F 26° & Above °C
Altitude Meters (Feet)	0-900 (0-3000)	150	140	130	120
	900-1800 (3000-6000)	140	130	120	110
	1800-2700 (6000-9000)	125	120	110	100
	2700-3700 (9000-12000)	115	110	100	95

Production Jetting Specifications

Carburetor Type ..... Mikuni VM30SS

Main Jet	130
Pilot Jet	40
Jet Needle	5DP7-3
Needle Jet	O-4 (169)
Cut Away	2.0
Air Screw	1 Turn

Jetting Compensation for Altitude and Temperature

Trail Boss		AMBIENT TEMPERATURE			
		Below 0°F Below -18°C	0° to +40°F -18°to +5°C	+40°to +80°F +5° to +26°C	+80° & Above °F 26° & Above °C
Altitude Meters (Feet)	0-900 (0-3000)	170	155	145	135
	900-1800 (3000-6000)	155	145	135	125
	1800-2700 (6000-9000)	140	130	120	115
	2700-3700 (9000-12000)	130	120	110	100

Production Jetting Specifications

Carburetor Type ..... Mikuni VM30SS

Main Jet	145
Pilot Jet	40
Jet Needle	5DP7-3
Needle Jet	O-4 (169)
Cut Away	2.0
Air Screw	1.0 Turns Out

Xpress 300		AMBIENT TEMPERATURE			
		Below 0°F Below -18°C	0° to +40°F -18°to +5°C	+40°to +80°F +5° to +26°C	+80° & Above °F 26° & Above °C
Altitude Meters (Feet)	0-900 (0-3000)	180	170	155	145
	900-1800 (3000-6000)	165	150	140	130
	1800-2700 (6000-9000)	150	140	130	120
	2700-3700 (9000-12000)	135	125	115	110

Production Jetting Specifications

Carburetor Type ..... Mikuni VM30SS

Main Jet	155
Pilot Jet	40
Jet Needle	5DP7-3
Needle Jet	O-4 (169)
Cut Away	2.0
Air Screw	1.5 Turns Out

- Turn in air screw 1/2 to 3/4 turn.

- Shaded zone should drop Jet Needle one position (raise E-Clip)

Xplorer 300		AMBIENT TEMPERATURE			
		Below 0°F Below -18°C	0° to +40°F -18°to +5°C	+40°to +80°F +5° to +26°C	+80° & Above °F 26° & Above °C
Altitude Meters (Feet)	0-900 (0-3000)	180	170	155	145
	900-1800 (3000-6000)	165	150	140	130
	1800-2700 (6000-9000)	150	140	130	120
	2700-3700 (9000-12000)	135	125	115	110

Production Jetting Specifications

Carburetor Type ..... Mikuni VM30SS

Main Jet	155
Pilot Jet	40
Jet Needle	5DP7-3
Needle Jet	O-4 (169)
Cut Away	2.0
Air Screw	1.5 Turns Out

- Turn in air screw 1/2 to 3/4 turn.

- Shaded zone should drop Jet Needle one position (raise E-Clip)

Jetting Compensation for Altitude and Temperature

Scrambler Sport		AMBIENT TEMPERATURE			
		Below 0°F Below -18°C	0° to +40°F -18°to +5°C	+40°to +80°F +5° to +26°C	+80° & Above °F 26° & Above °C
Altitude Meters (Feet)	0-900 (0-3000)	290	270	250	230
	900-1800 (3000-6000)	270	250	230	210
	1800-2700 (6000-9000)	240	230	210	195
	2700-3700 (9000-12000)	220	210	190	175

Production Jetting Specifications

Carburetor Type . . . . . Mikuni VM34SS

Main Jet	250
Pilot Jet	35
Jet Needle	6F9-3
Needle Jet	O-6 (480)
Cut Away	1.5
Air Screw	1.0 Turns Out

(EARLY) Xpress 400 Sportsman 4 x 4 Xplorer 400 400 6x6		AMBIENT TEMPERATURE			
		Below 0°F Below -18°C	0° to +40°F -18°to +5°C	+40°to +80°F +5° to +26°C	+80° & Above °F 26° & Above °C
Altitude Meters (Feet)	0-900 (0-3000)	240	230	210	195
	900-1800 (3000-6000)	220	210	195	180
	1800-2700 (6000-9000)	200	190	175	165
	2700-3700 (9000-12000)	185	175	160	150

Production Jetting Specifications

Carburetor Type . . . . . Mikuni VM34SS

Main Jet	210
Pilot Jet	30
Jet Needle	6DH29-3
Needle Jet	O-6 (480)
Cut Away	1.5
Air Screw	1.0 Turns Out

▭ - Shaded zone should drop Jet Needle one position (raise E-Clip)

▭ - Turn in air screw 1/2 to 3/4 turn.

(LATE) Sportsman 4 x 4 Xplorer/Xpress 400 400 6x6		AMBIENT TEMPERATURE			
		Below 0°F Below -18°C	0° to +40°F -18°to +5°C	+40°to +80°F +5° to +26°C	+80° & Above °F 26° & Above °C
Altitude Meters (Feet)	0-900 (0-3000)	240	230	210	195
	900-1800 (3000-6000)	220	210	195	180
	1800-2700 (6000-9000)	200	190	175	165
	2700-3700 (9000-12000)	185	175	160	150

Production Jetting Specifications

Carburetor Type . . . . . Mikuni VM34SS

Main Jet	200
Pilot Jet	30
Jet Needle	6CEY6-3
Needle Jet	O-6 (480)
Cut Away	1.5
Air Screw	1.0 Turns Out

▭ - Shaded zone should drop Jet Needle one position (raise E-Clip)

▭ - Turn Air Screw in 1/2 to 3/4 turn

Jetting Compensation for Altitude and Temperature

Magnum 2 x 4 Magnum 4 x 4 Magnum 6 x 6		AMBIENT TEMPERATURE			
		Below 0°F Below -18°C	0° to +40°F -18°to +5°C	+40°to +80°F +5° to +26°C	+80° & Above °F 26° & Above °C
Altitude Meters (Feet)	0-900 (0-3000)	150	145	140	135
	900-1800 (3000-6000)	145	140	132.5	122.5
	1800-2700 (6000-9000)	140	135	127.5	122.5
	2700-3700 (9000-12000)	132.5	125	120	115

Production Jetting Specifications

Carburetor Type ..... Mikuni BST 34
Carburetor I.D. 42PL01B

Main Jet	140
Pilot Jet	40
Pilot Air Jet	160
Jet Needle	5F81-3
Needle Jet	P-8
Throttle Valve	#100
Pilot Screw	2.5 Turns Out

▒ - Shaded zone pilot screw in 1/2 turn

Sportsman 500		AMBIENT TEMPERATURE			
		Below 0°F Below -18°C	0° to +40°F -18°to +5°C	+40°to +80°F +5° to +26°C	+80° & Above °F 26° & Above °C
Altitude Meters (Feet)	0-900 (0-3000)	152.5	147.5	142.5	137.5
	900-1800 (3000-6000)	147.5	142.5	135	127.5
	1800-2700 (6000-9000)	142.5	137.5	130	122.5
	2700-3700 (9000-12000)	135	127.5	122.5	117.5

Production Jetting Specifications

Carburetor Type ..... Mikuni BST 34
Carburetor I.D. 42PL01B

Main Jet	142.5
Pilot Jet	42.5
Pilot Air Jet	160
Jet Needle	5D78-3
Needle Jet	P-1
Throttle Valve	#100
Pilot Screw	1.5 Turns Out

▒ - Shaded zone should drip jet needle one position (raise E-Clip)

Jetting Compensation for Altitude and Temperature

Sportsman 500 Xplorer 500		AMBIENT TEMPERATURE			
		Below 0°F Below -18°C	0° to +40°F -18°to +5°C	+40°to +80°F +5° to +26°C	+80° & Above °F 26° & Above °C
Altitude Meters (Feet)	0-900 (0-3000)	152.5	147.5	142.5	137.5
	900-1800 (3000-6000)	147.5	142.5	137.5	130
	1800-2700 (6000-9000)	140	135	130	125
	2700-3700 (9000-12000)	135	130	125	120

Production Jetting Specifications

Carburetor Type ..... Mikuni BST 34
Carburetor I.D. 42PL01B

Main Jet	142.5
Pilot Jet	42.5
Pilot Air Jet	160
Jet Needle	5D78-3
Needle Jet	P-1
Throttle Valve	#100
Pilot Screw	2.0

- Shaded zone pilot screw in 1/2 turn.

Scrambler 500		AMBIENT TEMPERATURE			
		Below 0°F Below -18°C	0° to +40°F -18°to +5°C	+40°to +80°F +5° to +26°C	+80° & Above °F 26° & Above °C
Altitude Meters (Feet)	0-900 (0-3000)	135	130	125	120
	900-1800 (3000-6000)	130	125	120	115
	1800-2700 (6000-9000)	122.5	120	115	110
	2700-3700 (9000-12000)	117.5	115	110	105

Production Jetting Specifications

Carburetor Type ..... Mikuni BST 34
Carburetor I.D. 42PL01B

Main Jet	125
Pilot Jet	42.5
Pilot Air Jet	160
Jet Needle	5D78-3
Needle Jet	P-3
Throttle Valve	#100
Pilot Screw	2.0

- Shaded zone pilot screw in 1/2 turn.

1998 TRAIL BOSS
W98AA25C
(Engine - EC-25PFE-10)

SPECIFICATIONS AND CLUTCHING AND JETTING GUIDELINES FOR ALTITUDE AND TEMPERATURE

Carburetor, Mikuni VM30SS

Main Jet - 145 Pilot Jet - 40 Float Level – Float arm parallel with bowl gasket surface (Page 4.22)

Jet Needle - 5DP7-3 Needle Jet - 0-4 (169)

Air Screw - 1 Turn Cutaway - 2.0 Needle Seat - 2.5

Flywheel Marking: FF45 CDI Marking: CU2167 Alternator Output: 150 Watts

Ignition Timing: 25° BTDC @ 3000 RPM (± 3°) Spark Plug: BR8ES Gap: .028 (.7mm)

Operating RPM: 6000 (± 200) Idle RPM: 700 (± 100)

Turn out (counterclockwise) one quarter turn for each 30 degrees above 60 degrees F.

Observe the following altitude recommendations and set up the vehicle accordingly.

Altitude	AMBIENT TEMPERATURE	Below 0°F (Below –18°C)	0° to 40°F (–18°C to +5°C)	+40° to +80°F (+5°C to +26°C)	+80°F & Above (+26°C & Above)
Meters (Feet)	0-900 (0-3000)	**170**	**155**	**145**	**135**
	900-1800 (3000-6000)	**155**	**145**	**135**	**125**
	1800-2700 (6000-9000)	**140**	**130**	**120**	**115**
	2700-3700 (9000-12000)	**130**	**120**	**110**	**100**

- Pilot air screw out 1/2- 3/4 turn from lightly seated

Clutching

Altitude		Shift Weight	Clutch Spring	Driven Helix
Meters (Feet)	0-900 (0-3000)	16	Blue/Green	2-2
	900-1800 (3000-6000)	16	Blue/Green	2-1
	1800-2700 (6000-9000)	16 Mod	Blue/Green	2-2
	2700-3700 (9000-12000)	16 Mod	Blue/Green	2-2

1998 TRAIL BLAZER
W98BA25C
(Engine - EC-25PFE-11)

SPECIFICATIONS AND CLUTCHING AND JETTING GUIDELINES FOR ALTITUDE AND TEMPERATURE

Carburetor VM30SS

Main Jet - 130 Pilot Jet - 40 Float Level – Float arm parallel with bowl gasket surface (Page 4.22)

Cut Away - 2.0 Air Screw - 1 Turn CCW from Seat*

Jet Needle - 5DP7-3 Needle Jet - 0-4 (169)

Needle Seat - 2.5

Flywheel Marking: FF45 CDI Marking: CU2167 Alternator Output: 150 Watts

Ignition Timing: 25° BTDC @ 3000 RPM (± 3°) Spark Plug: BR8ES Gap: .028 (.7mm)

Operating RPM: 5800 (± 200) Idle RPM: 700 (± 100)

*Turn in (clockwise) one quarter turn for each 30 degrees below 60 degrees F.

Turn out (counterclockwise) one quarter turn for each 30 degrees above 60 degrees F.

Observe the following altitude recommendations and set up the vehicle accordingly.

Altitude		Below 0°F (Below –18°C)	0° to 40°F (–18°C to +5°C)	+40° to +80°F (+5°C to +26°C)	+80°F & Above (+26°C & Above)
Meters (Feet)	0-900 (0-3000)	**150**	**140**	**130**	**120**
	900-1800 (3000-6000)	**140**	**130**	**120**	**110**
	1800-2700 (6000-9000)	**125**	**120**	**110**	**100**
	2700-3700 (9000-12000)	**115**	**110**	**100**	**95**

- Turn air screw out 1/2 turn (counterclockwise)Shaded Zone should drop Jet Needle one position to lower jet needle

Clutching

Altitude		Shift Weight	Clutch Spring	Driven Helix
Meters (Feet)	0-900 (0-3000)	G	Blue/Green	2-2
	900-1800 (3000-6000)	G	Blue/Green	2-1
	1800-2700 (6000-9000)	16	Blue/Green	2-2
	2700-3700 (9000-12000)	16	Blue/Green	2-1

XPRESS 300
W98CA28C
(Engine - EC-28PFE-02)

SPECIFICATIONS AND CLUTCHING AND JETTING GUIDELINES FOR ALTITUDE AND TEMPERATURE

Carburetor VM30SS

Main Jet - 155 Pilot Jet - 40 Float Level – Float arm parallel with bowl gasket surface (Page 4.22)

Cut Away - 2 Nickel/Aluminum Air Screw - 1.5 Turn CCW from Seat*

Jet Needle - 5DP7-3 Needle Jet - 0-4 (169)

Needle Seat - 2.5

Flywheel Marking: FF4574 CDI Marking: CU2513 Alternator Output: 150 Watts

Ignition Timing: 25° BTDC @ 3000 RPM (± 2°) Spark Plug: BR8ES Gap: .028 (.7mm)

Operating RPM: 5600 (± 200) Idle RPM: 600 (± 100)

*Turn in (clockwise) one quarter turn for each 30 degrees below 60 degrees F.

Turn out (counterclockwise) one quarter turn for each 30 degrees above 60 degrees F.

Observe the following altitude recommendations and set up the vehicle accordingly.

Altitude	AMBIENT TEMPERATURE	Below 0°F (Below –18°C)	0° to 40°F (–18°C to +5°C)	+40° to +80°F (+5°C to +26°C)	+80°F & Above (+26°C & Above)
Meters (Feet)	0-900 (0-3000)	**180**	**170**	**155**	**145**
	900-1800 (3000-6000)	**165**	**150**	**140**	**130**
	1800-2700 (6000-9000)	**150**	**140**	**130**	**120**
	2700-3700 (9000-12000)	**135**	**125**	**115**	**110**

- Shaded Zone should drop Jet Needle one position (raise E-Clip)
- Turn Air Screw in 1/2 to 3/4 Turn

Clutching

Altitude		Shift Weight	Clutch Spring	Driven Helix
Meters (Feet)	0-900 (0-3000)	G 48GR	Blue/Green	2-2
	900-1800 (3000-6000)	G 48GR	Blue/Green	2-2 or 2-1
	1800-2700 (6000-9000)	F 45GR	Blue/Green	2-2
	2700-3700 (9000-12000)	F 45GR	Blue/Green	2-1

XLPORER 300
W98CC28C
(Engine - EC-28PFE-02)

SPECIFICATIONS AND CLUTCHING AND JETTING GUIDELINES FOR ALTITUDE AND TEMPERATURE

Carburetor VM30SS

Main Jet - 155 Pilot Jet - 40 Float Level – Float arm parallel with bowl gasket surface (Page 4.22)

Cut Away - 2 Nickel/Aluminum Air Screw - 1.5 Turn CCW from Seat*

Jet Needle - 5DP7-3 Needle Jet - 0-4 (169)

Needle Seat - 2.5

Flywheel Marking: FF4574 CDI Marking: CU2513 Alternator Output: 150 Watts

Ignition Timing: 25° BTDC @ 3000 RPM (± 2°) Spark Plug: BR8ES Gap: .028 (.7mm)

Operating RPM: 5600 (± 200) Idle RPM: 600 (± 100)

*Turn in (clockwise) one quarter turn for each 30 degrees below 60 degrees F.

Turn out (counterclockwise) one quarter turn for each 30 degrees above 60 degrees F.

Observe the following altitude recommendations and set up the vehicle accordingly.

Altitude	AMBIENT TEMPERATURE	Below 0°F (Below –18°C)	0° to 40°F (–18°C to +5°C)	+40° to +80°F (+5°C to +26°C)	+80°F & Above (+26°C & Above)
Meters (Feet)	0-900 (0-3000)	**180**	**170**	**155**	**145**
	900-1800 (3000-6000)	**165**	**150**	**140**	**130**
	1800-2700 (6000-9000)	**150**	**140**	**130**	**120**
	2700-3700 (9000-12000)	**135**	**125**	**115**	**110**

- Shaded Zone should drop Jet Needle one position (raise E-Clip)
- Turn Air Screw in 1/2 to 3/4 Turn

Clutching

Altitude		Shift Weight	Clutch Spring	Driven Helix
Meters (Feet)	0-900 (0-3000)	G 48GR	Blue/Green	2-2
	900-1800 (3000-6000)	G 48GR	Blue/Green	2-2 or 2-1
	1800-2700 (6000-9000)	F 45GR	Blue/Green	2-2
	2700-3700 (9000-12000)	F 45GR	Blue/Green	2-1

1998 XPLORER 400
W98CC38C
(Engine - EC-38PLE-06)

SPECIFICATIONS AND CLUTCHING AND JETTING GUIDELINES FOR ALTITUDE AND TEMPERATURE

Carburetor, Mikuni VM34SS

Main Jet - 200 Pilot Jet - 30 Float Level – Float arm parallel with bowl gasket surface (Page 4.22)

Jet Needle - 6CEY6-3 Needle Jet - 0-6 (480) Air Screw - 1.5 Turns

Needle Seat - 2.5

Flywheel Marking: FF95 CDI Marking: CU2510 Alternator Output: 200 Watts

Ignition Timing: 23.5° BTDC @ 3000 RPM (± 1.5°) Spark Plug: BR8ES Gap: .028 (.7mm)

Operating RPM: 5700 (± 200) Idle RPM: 600 (± 100)

Turn out (counterclockwise) one quarter turn for each 30 degrees above 60 degrees F.

Observe the following altitude recommendations and set up the vehicle accordingly.

Altitude	AMBIENT TEMPERATURE	Below 0°F (Below –18°C)	0° to 40°F (–18°C to +5°C)	+40° to +80°F (+5°C to +26°C)	+80°F & Above (+26°C & Above)
Meters (Feet)	0-900 (0-3000)	**230**	**220**	**200**	**185**
	900-1800 (3000-6000)	**210**	**200**	**185**	**170**
	1800-2700 (6000-9000)	**185**	**170**	**165**	**145**
	2700-3700 (9000-12000)	**165**	**155**	**145**	**130**

- Shaded Zone should drop Jet Needle one position (raise E-Clip)
- Turn Air Screw in 1/2 to 3/4 Turn From Standard Setting

Clutching

Altitude		Shift Weight	Clutch Spring	Driven Helix
Meters (Feet)	0-900 (0-3000)	S-55	Blue/Green	2/2
	900-1800 (3000-6000)	S-55	Blue/Green	2/2 or 2/1
	1800-2700 (6000-9000)	S	Blue/Green	2/1
	2700-3700 (9000-12000)	S	Blue/Green	2/1

1998 SPORT 400
W98BA38C
(Engine - EC-38PLE-07)

SPECIFICATIONS AND CLUTCHING AND JETTING GUIDELINES FOR ALTITUDE AND TEMPERATURE

Carburetor, Mikuni VM34SS

Main Jet - 230 Pilot Jet - 35 Float Level – Float arm parallel with bowl gasket surface (Page 4.22)

Jet Needle - 6CEY6-3 Needle Jet - 0-6 (480) Air Screw - 1.5 Turns*

Needle Seat - 2.5 (Large Diameter)

Flywheel Marking: FF95 CDI Marking: CU2515 Alternator Output: 150 Watts

Ignition Timing: 23.5° BTDC @ 3000 RPM (± 3°) Spark Plug: BR8ES Gap: .028 (.7mm)

Operating RPM: 5700 (± 200) Idle RPM: 600 (± 100)

Observe the following altitude recommendations and set up the vehicle accordingly.

Altitude	AMBIENT TEMPERATURE	Below 0°F (Below –18°C)	0° to 40°F (–18°C to +5°C)	+40° to +80°F (+5°C to +26°C)	+80°F & Above (+26°C & Above)
Meters (Feet)	0-900 (0-3000)	**270** Air Screw .5 Turn	**250** Air Screw 1.0 Turn	**230** Air Screw 1.5 Turn	**210** Air Screw 1.5 Turn
	900-1800 (3000-6000)	**250** Air Screw .5 Turn	**230** Air Screw 1.0 Turn	**210** Air Screw 1.5 Turn	**195** Air Screw 1.75 Turn
	1800-2700 (6000-9000)	**220** Air Screw 1.5 Turn	**210** Air Screw 1.5 Turn	**195** Air Screw 1.75 Turn	**175** Air Screw 1.75 Turn
	2700-3700 (9000-12000)	**200** Air Screw 1.5 Turn	**190** Air Screw 1.75 Turn	**175** Air Screw 1.75 Turn	**160** Air Screw 1.75 Turn

- Turn Air Screw out 1/4 turn

Clutching

Altitude		Shift Weight	Clutch Spring	Driven Helix
Meters (Feet)	0-900 (0-3000)	S-55	White	2/2
	900-1800 (3000-6000)	S-55	White	2/2 or 2/1
	1800-2700 (6000-9000)	S	White	2/1
	2700-3700 (9000-12000)	S or C	White	2/1

1998 Scrambler 400
W98BC38C
(Engine - EC38PLE-09)

SPECIFICATIONS AND CLUTCHING AND JETTING GUIDELINES FOR ALTITUDE AND TEMPERATURE

Carburetor VM34SS

Main Jet - 230 Pilot Jet - 35 Float Level – Float arm parallel with bowl gasket surface (Page 4.22)

Cut Away - 1.5 Nickel/Aluminum Air Screw - 1.5 Turn CCW from Seat*

Jet Needle - 6CEY6-3 Needle Jet - 0-6 (480)

Needle Seat - 2.5 (Large Diameter)

Flywheel Marking: FF95 CDI Marking: CU2515 Alternator Output: 150 Watts

Ignition Timing: 23.5° BTDC @ 3000 RPM (± 3°) Spark Plug: BR8ES Gap: .028 (.7mm)

Operating RPM: 5700 (± 200) Idle RPM: 600 (± 100)

*Turn in (clockwise) one quarter turn for each 30° below 60° F.
Turn out (counterclockwise) one quarter turn for each 30° above 60° F.

Altitude	AMBIENT TEMPERATURE	Below 0°F (Below –18°C)	0° to 40°F (–18°C to +5°C)	+40° to +80°F (+5°C to +26°C)	+80°F & Above (+26°C & Above)
Meters (Feet)	0-900 (0-3000)	**270** MJ **0.5** AS	**250** MJ **1.0** AS	**230** MJ **1.5** AS	**210** MJ **1.5** AS
	900-1800 (3000-6000)	**250** MJ **0.5** AS	**230** MJ **1.0** AS	**210** MJ **1.5** AS	**195** MJ **1.75** AS
	1800-2700 (6000-9000)	**220** MJ **1.5** AS	**210** MJ **1.5** AS	**195** MJ **1.75**	**175** MJ **1.75** AS
	2700-3700 (9000-12000)	**200** MJ **1.5** AS	**190** MJ **1.75** AS	**175** MJ **1.75** AS	**160** MJ **1.75** AS

MJ - Indicates Main Jet Size

AS - Indicates Air Screw Turns out from Lightly Seated Position

Clutching

Altitude		Shift Weight	Clutch Spring	Driven Helix
Meters (Feet)	0-900 (0-3000)	S-55	White	2/2
	900-1800 (3000-6000)	S-55	White	2/2 or 2/1
	1800-2700 (6000-9000)	S	White	2/1
	2700-3700 (9000-12000)	S or C	White	2/1

Magnum 2 x 4
W98AA42A
(Engine - EH-42PLE-02)

SPECIFICATIONS AND CLUTCHING AND JETTING GUIDELINES FOR ALTITUDE AND TEMPERATURE

Carburetor, Mikuni BST 34 (Marking 42PL01B)

Main Jet - 140 Pilot Jet - 40 Pilot Screw - 2.5 turns out from lightly seated*

Jet Needle - 5F14-3 Needle Jet - P-9 Float Level 13.0mm (Page 4.37)

Needle Seat - 1.5 Pilot Air Jet - 160 Throttle Valve - #100

Flywheel Marking: FF9502 CDI Marking: CU2509 Alternator Output: 200 Watts

Ignition Timing: 30° BTDC @ 3500 RPM (± 3°) Spark Plug: BKR5ES Gap: .028 (.7mm)

Operating RPM: 6000 (± 200) Idle RPM: 1200 (± 100)

*Turn in (clockwise) one quarter turn for each 30 degrees above 60 degrees F.

Observe the following altitude recommendations and set up the vehicle accordingly.

Altitude	AMBIENT TEMPERATURE	Below 0°F (Below –18°C)	0° to 40°F (–18°C to +5°C)	+40° to +80°F (+5°C to +26°C)	+80°F & Above (+26°C & Above)
Meters (Feet)	0-900 (0-3000)	**150**	**145**	**140**	**135**
	900-1800 (3000-6000)	**145**	**140**	**135**	**130**
	1800-2700 (6000-9000)	**137.5**	**132.5**	**127.5**	**122.5**
	2700-3700 (9000-12000)	**132.5**	**127.5**	**122.5**	**117.5**

- Pilot screw in 1/2 turn from standard setting

Clutching

Altitude		Shift Weight	Clutch Spring	Driven Helix
Meters (Feet)	0-900 (0-3000)	10MH	Blue/Green	2-2
	900-1800 (3000-6000)	10WH	Blue/Green	2-2 or 2-1
	1800-2700 (6000-9000)	10RH	Blue/Green	2-1
	2700-3700 (9000-12000)	10RH	Blue/Green	2-1

Magnum 4 x 4
W98AC42A
(Engine - EH-42PLE-02)

SPECIFICATIONS AND CLUTCHING AND JETTING GUIDELINES FOR ALTITUDE AND TEMPERATURE

Carburetor, Mikuni BST 34 (Marking 42PL01B)

Main Jet - 140 Pilot Jet - 40 Pilot Screw - 2.5 turns out from lightly seated*

Jet Needle - 5F14-3 Needle Jet - P-9 Float Level 13.0mm (Page 4.37)

Needle Seat - 1.5 Pilot Air Jet - 160 Throttle Valve - #100

Flywheel Marking: FF9502 CDI Marking: CU2509 Alternator Output: 200 Watts

Ignition Timing: 30° BTDC @ 3500 RPM (± 3°) Spark Plug: BKR5ES Gap: .028 (.7mm)

Operating RPM: 6000 (± 200) Idle RPM: 1200 (± 100)

*Turn in (clockwise) one quarter turn for each 30 degrees above 60 degrees F.

Observe the following altitude recommendations and set up the vehicle accordingly.

Altitude	AMBIENT TEMPERATURE	Below 0°F (Below –18°C)	0° to 40°F (–18°C to +5°C)	+40° to +80°F (+5°C to +26°C)	+80°F & Above (+26°C & Above)
Meters (Feet)	0-900 (0-3000)	**150**	**145**	**140**	**135**
	900-1800 (3000-6000)	**145**	**140**	**135**	**130**
	1800-2700 (6000-9000)	**137.5**	**132.5**	**127.5**	**122.5**
	2700-3700 (9000-12000)	**132.5**	**127.5**	**122.5**	**117.5**

- Pilot screw in 1/2 turn

Clutching

Altitude		Shift Weight	Clutch Spring	Driven Helix
Meters (Feet)	0-900 (0-3000)	10MH	Blue/Green	2-2
	900-1800 (3000-6000)	10WH	Blue/Green	2-2 or 2-1
	1800-2700 (6000-9000)	10RH	Blue/Green	2-1
	2700-3700 (9000-12000)	10RH	Blue/Green	2-1

1998 Scrambler 500
W98BC50A
(Engine - EH50PLE-04)

SPECIFICATIONS AND CLUTCHING AND JETTING GUIDELINES FOR ALTITUDE AND TEMPERATURE

Carburetor BST 40

Main Jet - 155 Pilot Jet - 40 Pilot Screw Setting* - 2.0 turns out from lightly seated

Jet Needle - 6H25-94-3 Needle Jet - Y-0 Float Level 14.7mm (Page 4.37)

Needle Seat - 1.5 Pilot Air Jet - 1.3 Throttle Valve - #100

Flywheel Marking: FF97 CDI Marking: CU2544 Alternator Output: 250 Watts

Ignition Timing: 30° BTDC @ 3500 RPM (± 1.5°) Spark Plug: BKR5ES Gap: .028 (.7mm)

Operating RPM: 6500 (± 200) Idle RPM: 1200 (± 100)

Altitude	AMBIENT TEMPERATURE	Below 0°F (Below –18°C)	0° to 40°F (–18°C to +5°C)	+40° to +80°F (+5°C to +26°C)	+80°F & Above (+26°C & Above)
Meters (Feet)	0-900 (0-3000)	**167.5**	**160**	**155**	**147.5**
	900-1800 (3000-6000)	**160**	**155**	**147.5**	**142.5**
	1800-2700 (6000-9000)	**152.5**	**147.5**	**142.5**	**135**
	2700-3700 (9000-12000)	**145**	**140**	**135**	**130**

- Turn Air Screw in 1/2 turn
- Turn Air Screw out 1/2 turn

Clutching

Altitude		Shift Weight	Clutch Spring	Driven Helix
Meters (Feet)	0-900 (0-3000)	10WH	Blue/Green	1/1
	900-1800 (3000-6000)	10WH	Blue/Green	2/1
	1800-2700 (6000-9000)	10RH	Blue/Green	1/1
	2700-3700 (9000-12000)	10RH	Blue/Green	2/1

SPORTSMAN 500
W98CH50A (W90CH50AB)
(Engine - EH-50PLE-07)

SPECIFICATIONS AND CLUTCHING AND JETTING GUIDELINES FOR ALTITUDE AND TEMPERATURE

Carburetor BST34 (CV)

Main Jet - 142.5 Pilot Jet - 42.5 Pilot Screw* - 2.0 Turns out from lightly seated

Jet Needle - 5D78-3 Needle Jet - P-1 Float Level 13.0mm (Page 4.37)

Needle Seat - 1.5 Pilot Air Jet - 160 Throttle Valve - #100

Flywheel Marking: FF97 CDI Marking: CU2557 Alternator Output: 250 Watts

Ignition Timing: 30° BTDC @ 3500 RPM (± 1.5°) Spark Plug: BKR5ES Gap: .028 (.7mm)

Operating RPM: 6000 (± 200) Idle RPM: 1200 (± 100)

*Turn out (counterclockwise) one quarter turn for each 30 degrees below 60 degrees F.

Observe the following altitude recommendations and set up the vehicle accordingly.

Altitude	AMBIENT TEMPERATURE	Below 0°F (Below –18°C)	0° to 40°F (–18°C to +5°C)	+40° to +80°F (+5°C to +26°C)	+80°F & Above (+26°C & Above)
Meters (Feet)	0-900 (0-3000)	**152.5**	**147.5**	**142.5**	**137.5**
	900-1800 (3000-6000)	**147.5**	**142.5**	**137.5**	**130**
	1800-2700 (6000-9000)	**140**	**135**	**130**	**125**
	2700-3700 (9000-12000)	**135**	**130**	**125**	**120**

- Pilot screw in 1/2 turn

Clutching

Altitude		Shift Weight	Clutch Spring	Driven Helix
Meters (Feet)	0-900 (0-3000)	10 MH	Blue/Green	2-2
	900-1800 (3000-6000)	10 BH	Blue/Green	2-2
	1800-2700 (6000-9000)	10 WH	Blue/Green	2-1
	2700-3700 (9000-12000)	10 RH	Blue/Green	2-1

Models Equipped With EBS Require No Helix Adjustment

1998 BIG BOSS 500 6X6
W98AE50A
(Engine - EH50PLE-06)

SPECIFICATIONS AND CLUTCHING AND JETTING GUIDELINES FOR ALTITUDE AND TEMPERATURE

Carburetor BST34 (CV) Mikuni (42PL01B)

Main Jet - 140 Pilot Jet - 40 Pilot Screw* - 2.0 Turns out from lightly seated

Jet Needle - 4D33-3 Needle Jet - Q-6 Float Level 13.0mm (Page 4.37)

Needle Seat - 1.5 Pilot Air Jet - 160 Throttle Valve - #100

Flywheel Marking: FF97 CDI Marking: CU2557 Alternator Output: 250 Watts

Ignition Timing: 30° BTDC @ 3500 RPM (± 1.5°) Spark Plug: BKR5ES Gap: .028 (.7mm)

Operating RPM: 6000 (± 200) Idle RPM: 1200 (± 100)

*Turn out (counterclockwise) one quarter turn for each 30 degrees below 60 degrees F.

Altitude	AMBIENT TEMPERATURE	Below 0°F (Below –18°C)	0° to 40°F (–18°C to +5°C)	+40° to +80°F (+5°C to +26°C)	+80°F & Above (+26°C & Above)
Meters (Feet)	0-900 (0-3000)	**150**	**145**	**140**	**135**
	900-1800 (3000-6000)	**145**	**140**	**135**	**130**
	1800-2700 (6000-9000)	**137.5**	**135**	**130**	**122.5**
	2700-3700 (9000-12000)	**132.5**	**127.5**	**122.5**	**117.5**

- Pilot screw in 1/2 turn

Clutching

Altitude	AMBIENT TEMPERATURE	Shift Weight	Clutch Spring	Driven Helix
Meters (Feet)	0-900 (0-3000)	10MH	Blue/Green	2-2
	900-1800 (3000-6000)	10BH	Blue/Green	2-2
	1800-2700 (6000-9000)	10WH	Blue/Green	2-1
	2700-3700 (9000-12000)	10RH	Blue/Green	2-1

Jet Part Numbers

Pilot Jets Part Numbers - Mikuni VM

Jet No.	Part No.
30	3130331
35	3130066
40	3130067
45	3130068
50	3130069

Hex Main Jet Part Numbers - Mikuni VM

Jet No.	Part No.
110	3130105
115	3130106
120	3130107
125	3130108
130	3130109
135	3130110
140	3130111
145	3130112
150	3130113
155	3130114
160	3130115
165	3130116
170	3130117
175	3130118
180	3130119
185	3130120
190	3130121
195	3130122
200	3130123
210	3130124
220	3130125
230	3130126
240	3130127
250	3130128
260	3130129
270	3130130
280	3130131
290	3130132
300	3130133
310	3130134
320	3130135

Main Jet Part Numbers - Mikuni BST Carburetor

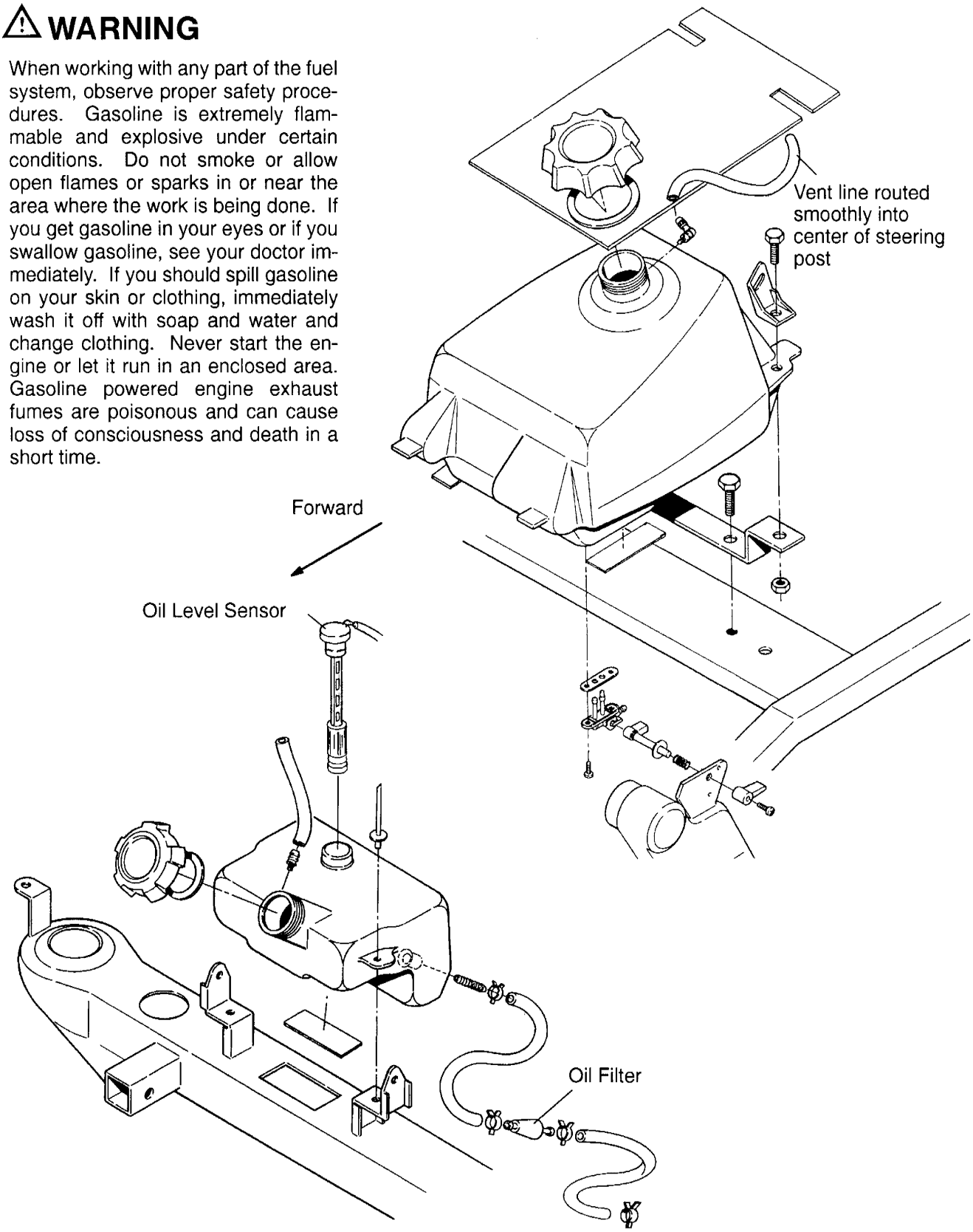
112.5	3130554
115	3130555
117.5	3130556
120	3130557
122.5	3130558
125	3130559
127.5	3130560
130	3130561
132.5	3130562
135	3130563
137.5	3130564
140	3130527
142.5	3130566
145	3130567
147.5	3130568
150	3130569
152.5	3130570
155	3130571
157.5	3130572

Pilot Jet Part Number - Mikuni BST Carburetor

40.0	3130624
42.5	3130526

⚠ WARNING

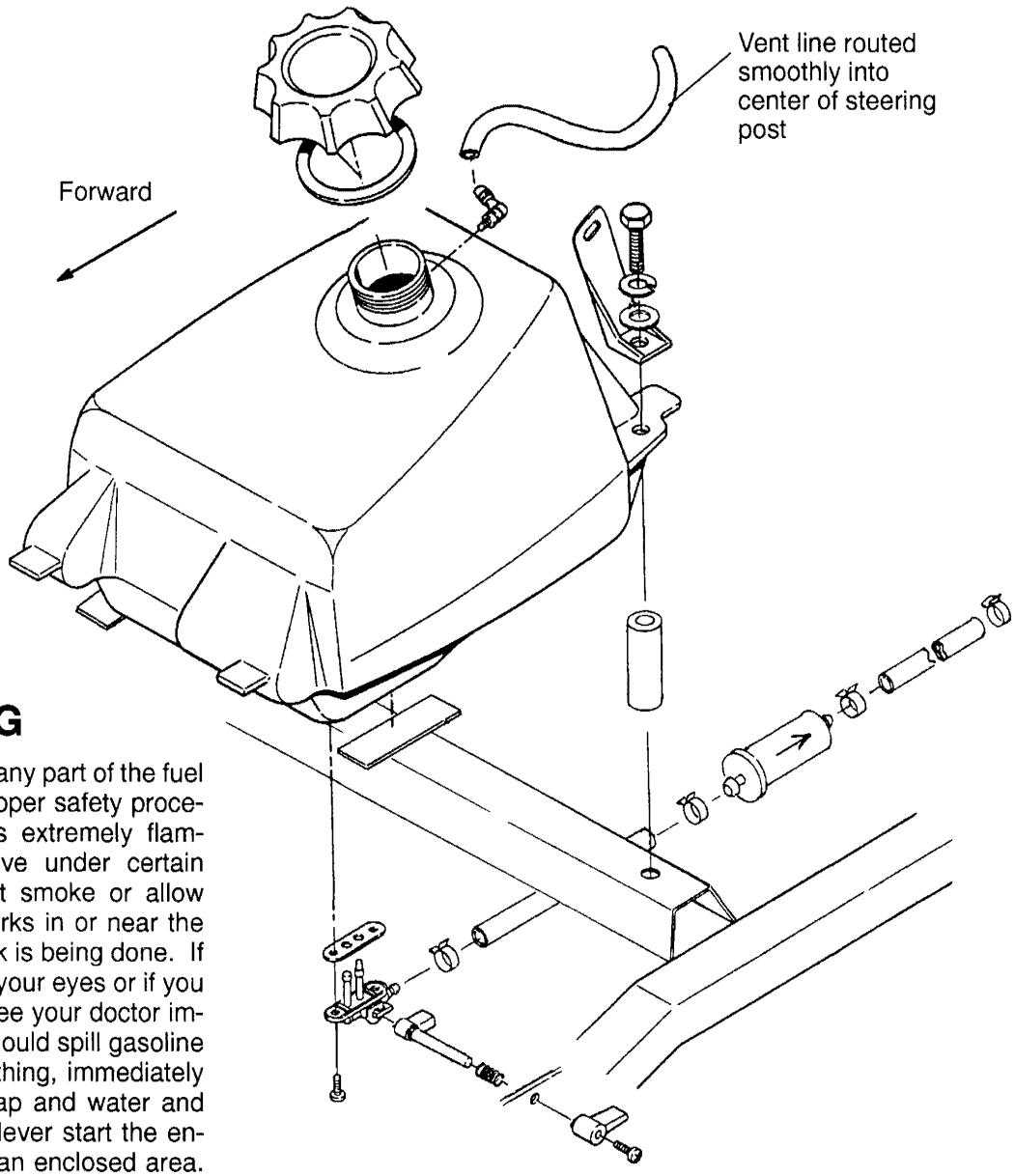
When working with any part of the fuel system, observe proper safety procedures. Gasoline is extremely flammable and explosive under certain conditions. Do not smoke or allow open flames or sparks in or near the area where the work is being done. If you get gasoline in your eyes or if you swallow gasoline, see your doctor immediately. If you should spill gasoline on your skin or clothing, immediately wash it off with soap and water and change clothing. Never start the engine or let it run in an enclosed area. Gasoline powered engine exhaust fumes are poisonous and can cause loss of consciousness and death in a short time.



NOTE: When servicing the fuel or oil system, use care to prevent kinking or obstructing vent lines.

Fuel Tank Assembly (Magnum)

NOTE: When servicing the fuel or oil system, use care to prevent kinking or obstructing vent lines.



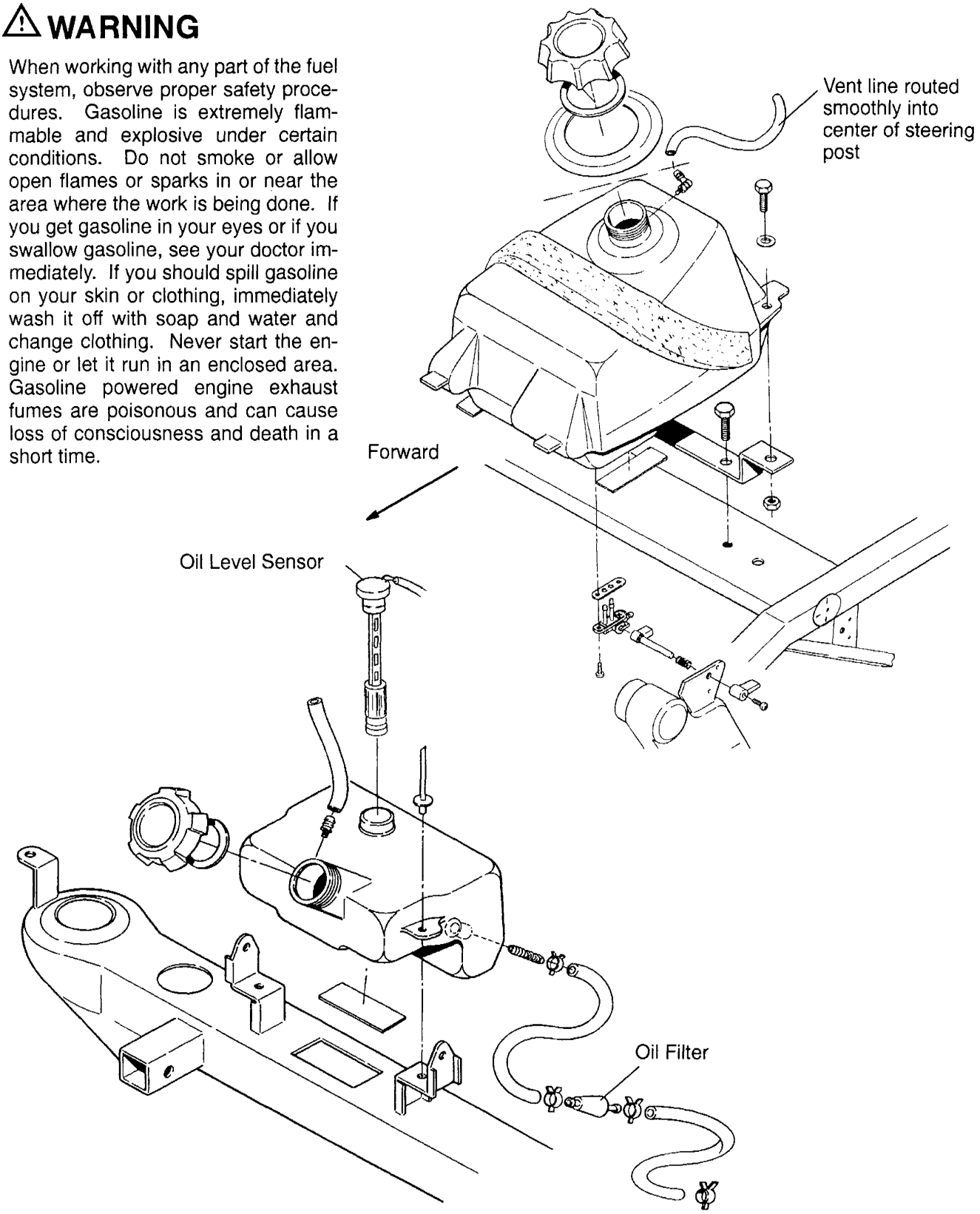
⚠ WARNING

When working with any part of the fuel system, observe proper safety procedures. Gasoline is extremely flammable and explosive under certain conditions. Do not smoke or allow open flames or sparks in or near the area where the work is being done. If you get gasoline in your eyes or if you swallow gasoline, see your doctor immediately. If you should spill gasoline on your skin or clothing, immediately wash it off with soap and water and change clothing. Never start the engine or let it run in an enclosed area. Gasoline powered engine exhaust fumes are poisonous and can cause loss of consciousness and death in a short time.

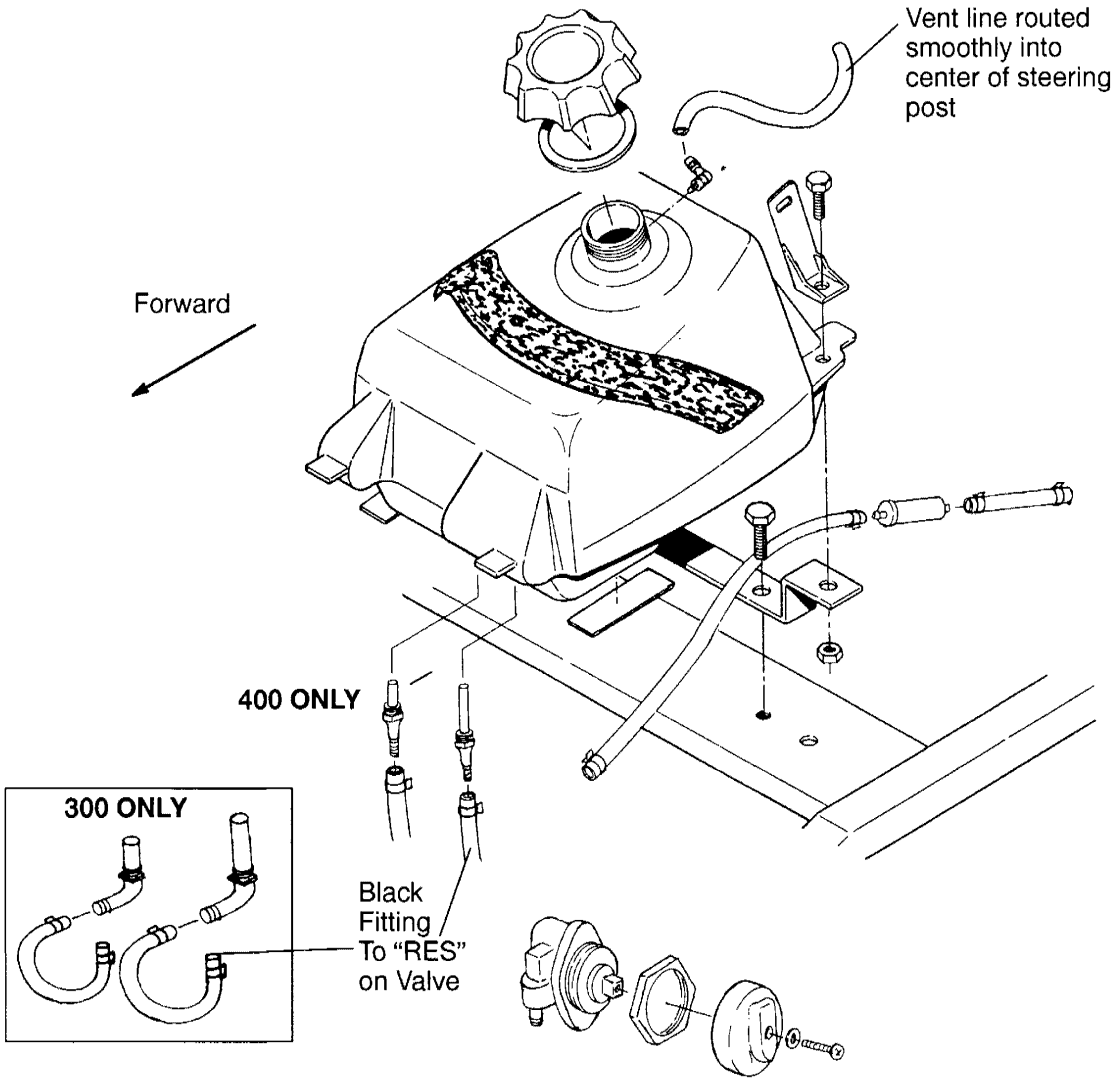
Oil Tank and Fuel Tank Assembly (Gen III Typical)

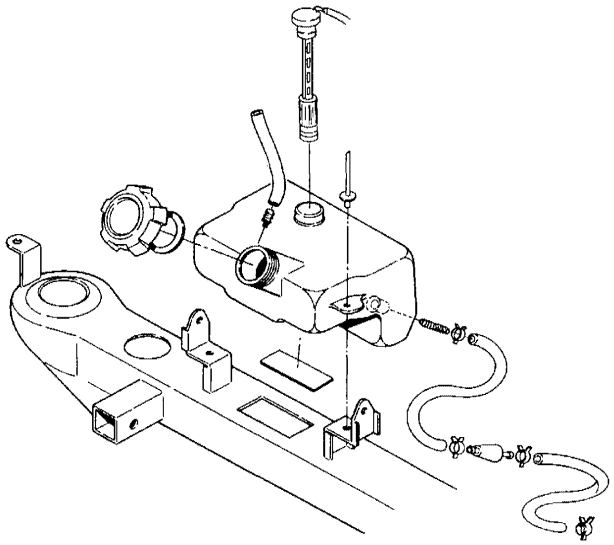
⚠ WARNING

When working with any part of the fuel system, observe proper safety procedures. Gasoline is extremely flammable and explosive under certain conditions. Do not smoke or allow open flames or sparks in or near the area where the work is being done. If you get gasoline in your eyes or if you swallow gasoline, see your doctor immediately. If you should spill gasoline on your skin or clothing, immediately wash it off with soap and water and change clothing. Never start the engine or let it run in an enclosed area. Gasoline powered engine exhaust fumes are poisonous and can cause loss of consciousness and death in a short time.

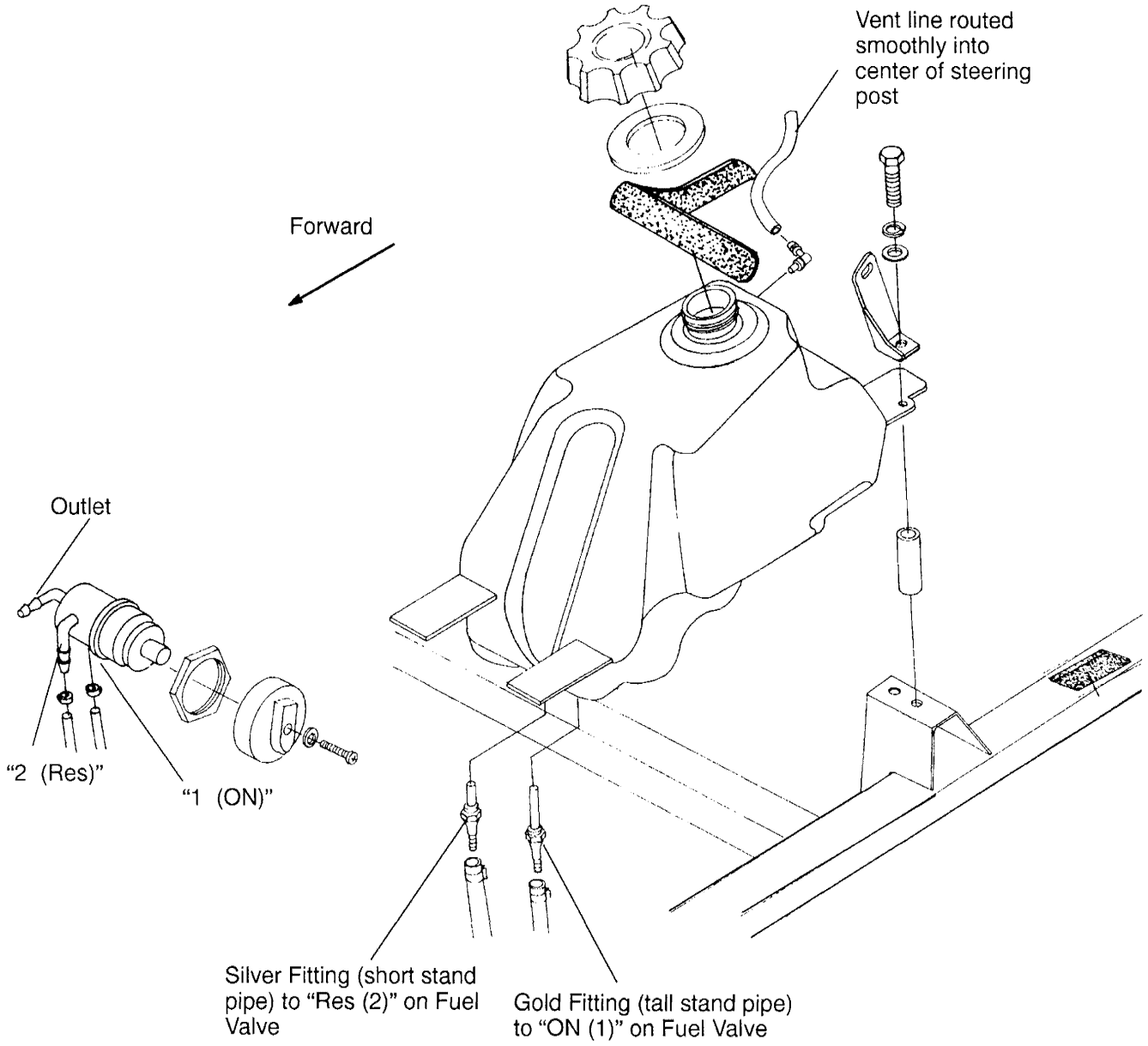


NOTE: When servicing the fuel or oil system, use care to prevent kinking or obstructing vent lines.

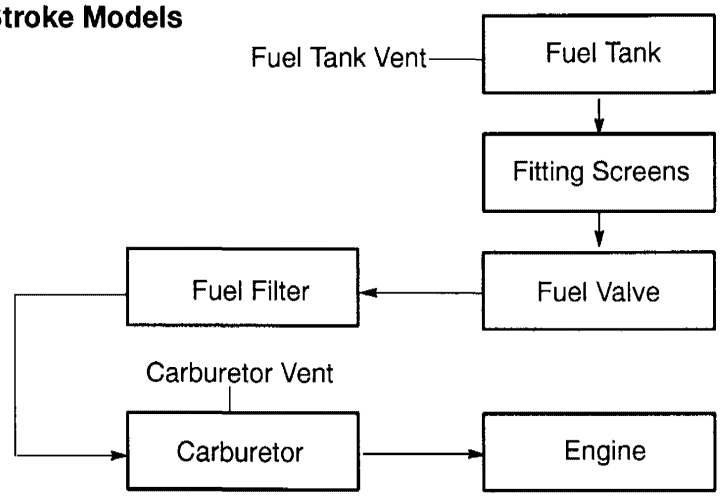

Vent line routed smoothly into center of steering post
Forward
400 ONLY
300 ONLY
Black Fitting To "RES" on Valve



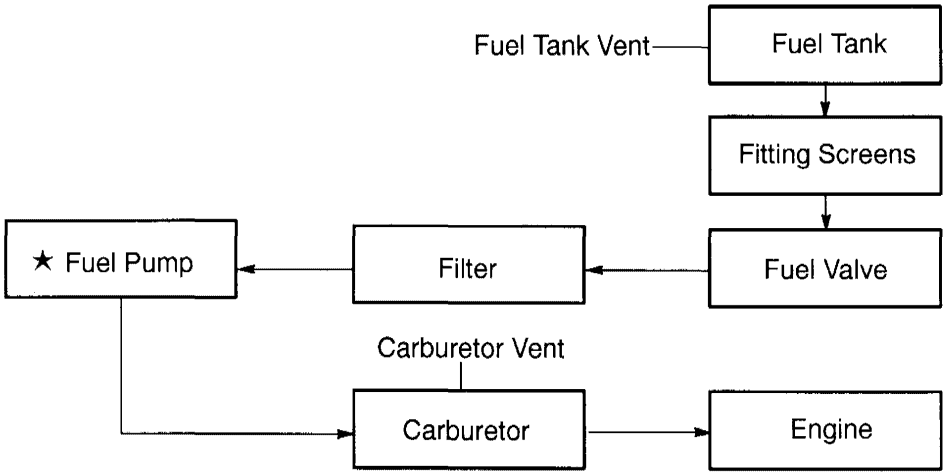
1997 Xplorer 500, Sportsman 500



Fuel System Diagram - 2 Stroke Models



Fuel System Diagram - 4 Stroke Models



★ 425 Under Headlamp Cover
500 Above Oil Tank

Pilot Jets Part Numbers - Mikuni VM

Jet No.	Part No.
30	3130331
35	3130066
40	3130067
45	3130068
50	3130069

Hex Main Jet Part Numbers - Mikuni VM

Jet No.	Part No.
110	3130105
115	3130106
120	3130107
125	3130108
130	3130109
135	3130110
140	3130111
145	3130112
150	3130113
155	3130114
160	3130115
165	3130116
170	3130117
175	3130118
180	3130119
185	3130120
190	3130121
195	3130122
200	3130123
210	3130124
220	3130125
230	3130126
240	3130127
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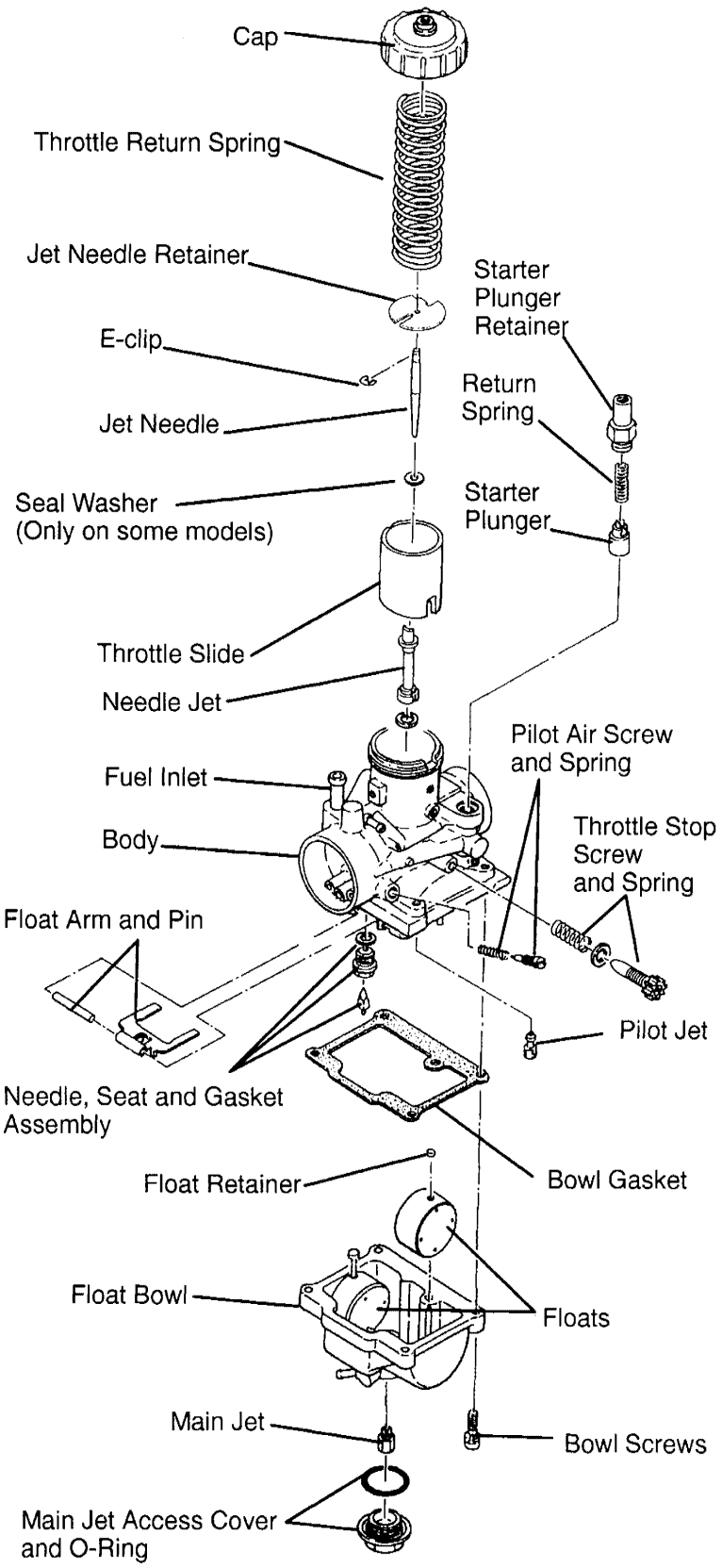
320	3130135

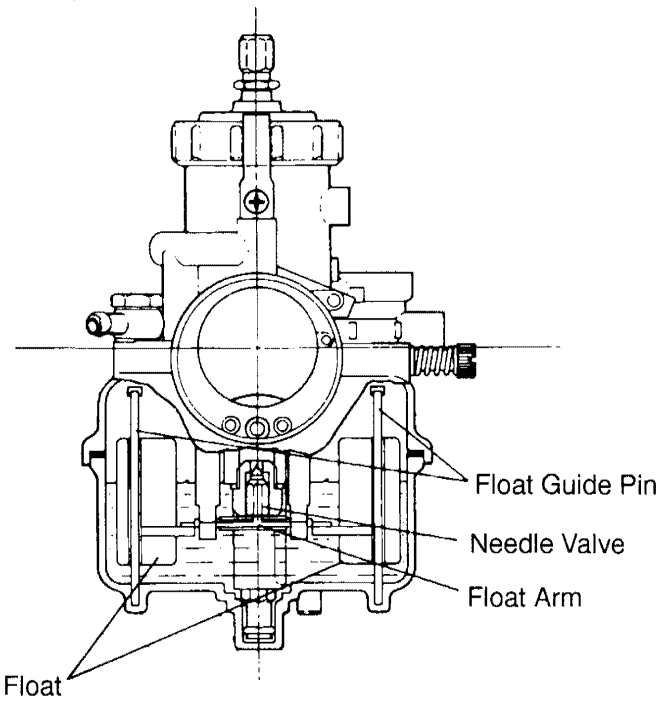


FUEL SYSTEM/CARBURETION
Function

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

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

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



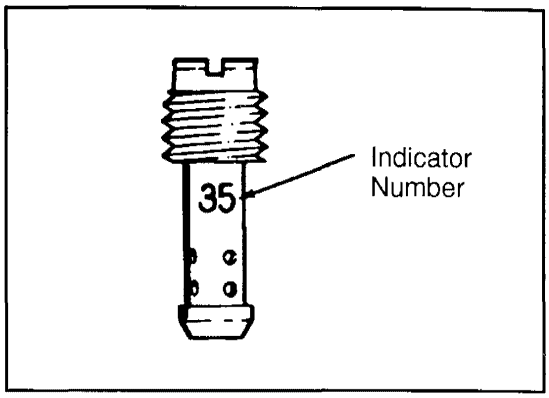
Float System

The float system is designed to maintain a constant height of gasoline during operation. When the fuel flowing from the fuel pump into the float chamber through the needle valve reaches the constant fuel level, the floats rise. When the buoyancy of the float and the fuel pressure of the fuel pump balance, the needle valve seals the orifice in the needle seat, preventing further fuel delivery, and the level of fuel in the bowl remains relatively constant.

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

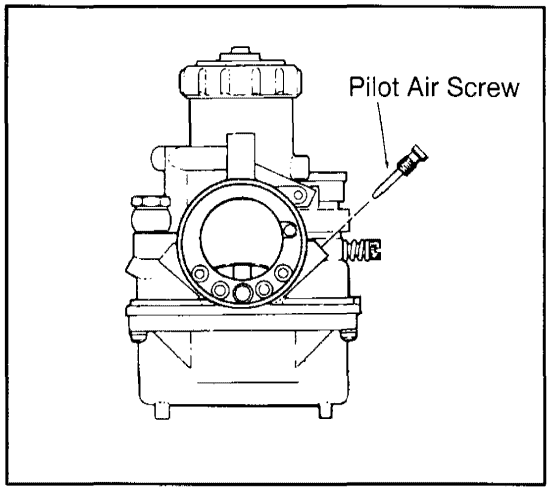
Pilot Jet

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



Pilot Air Screw

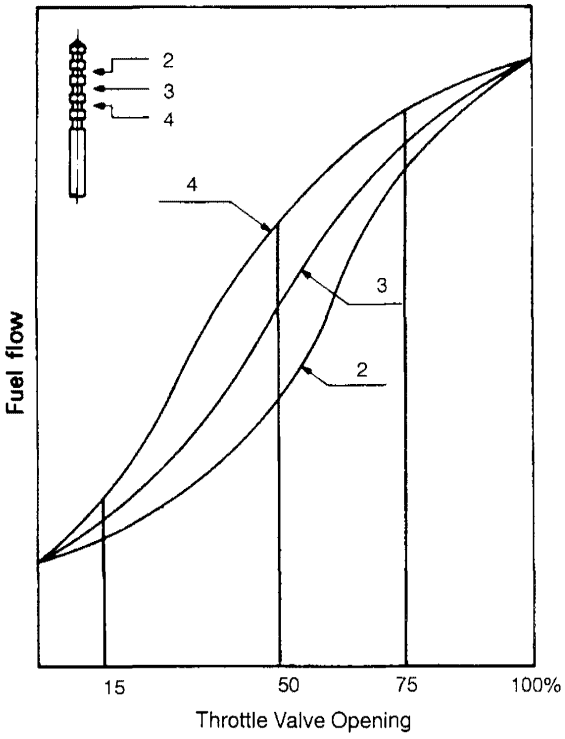
The pilot air screw controls the fuel mixture from idle to low speeds. The tapered tip of the air screw projects into the air passage leading to the pilot jet air bleeds. By turning the screw in or out, the cross sectional area of the air passage is varied, in turn varying the pilot jet air supply and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



Air/Fuel Mixture Ratio

A carburetor with a piston type throttle valve is also called a variable venturi type carburetor. In this type of carburetor, the needle jet and jet needle serve to control a proper air/fuel mixture ratio at the medium throttle valve opening (between 1/4 and 3/4 opening). Having the proper needle jet and jet needle has a major impact on engine performance at partial load.

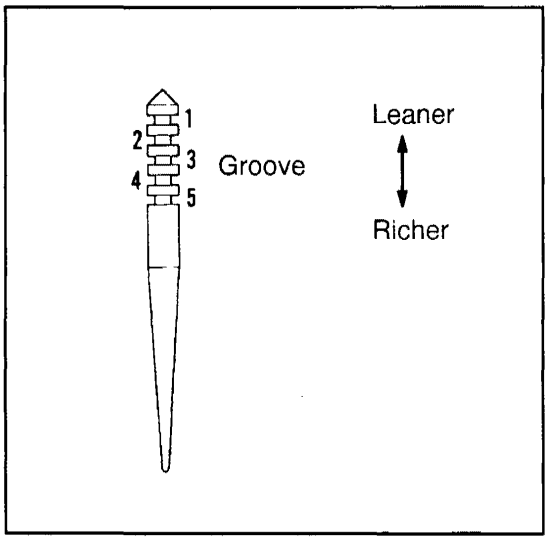
The jet needle tapers off at one end and the clearance between the jet needle and the needle jet increases as the throttle valve opening gets wider. The air/fuel mixture ratio is controlled by the height of the "E" ring inserted into one of the five slots provided in the head of the jet needle. The chart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



Component Functions

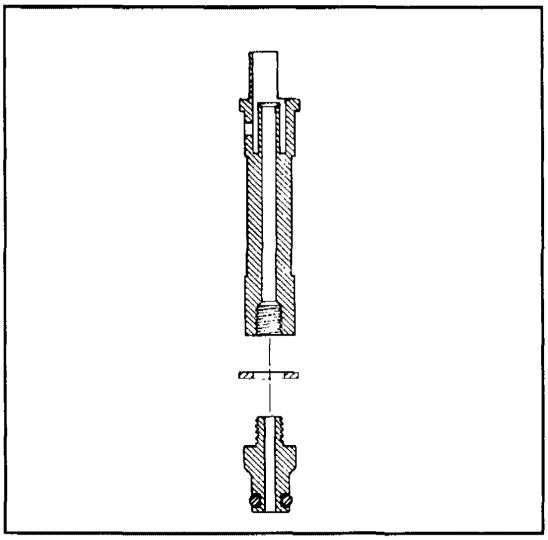
Jet Needle

The jet needle has five adjustment grooves cut into the upper portion, and is tapered from approximately the middle of the needle to the lower end. The top is fixed to the center of the throttle valve by the needle clip, and the tapered end extends into the needle jet. Fuel flows through the space between the needle jet and jet needle. This space does not vary until the throttle reaches the 1/4 open point. At that time the tapered portion of the needle begins to move out of the jet, affecting fuel flow as the opening enlarges. If the needle clip is changed from the standard position to a lower groove, the needle taper starts coming out of the jet sooner, resulting in a richer mixture. Moving the clip higher produces a leaner mixture. If the taper is worn due to vibration, fuel flow may be significantly affected.



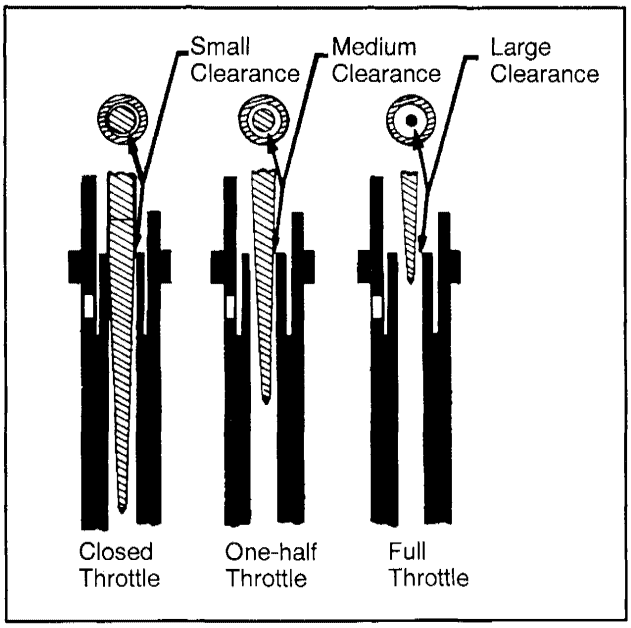
Needle Jet

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



Throttle Opening vs. Fuel Flow

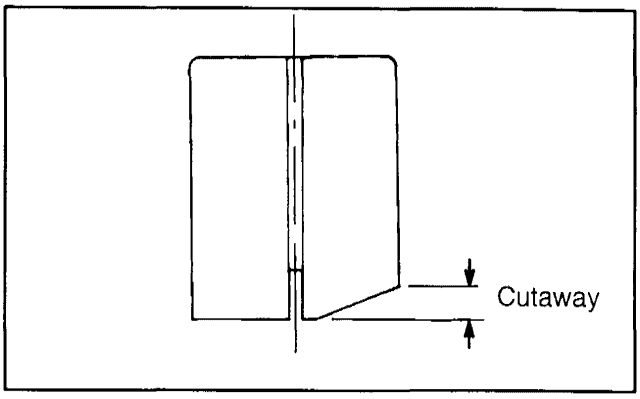
In a full throttle condition the cross sectioned area between the jet needle and the needle jet is larger than the cross sectioned area of the main jet. The main jet therefore has greater control over fuel flow.



Throttle Valve

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

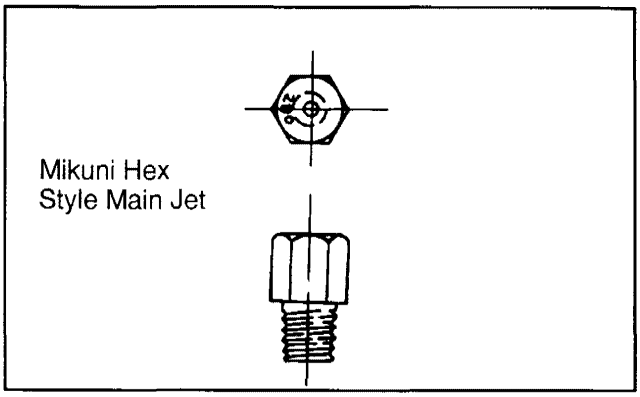
The throttle valves are numbered 1.0, 1.5, 2.0, etc., according to the size of the cutaway. The higher the number, the leaner the gasoline/air mixture.



Main Jet

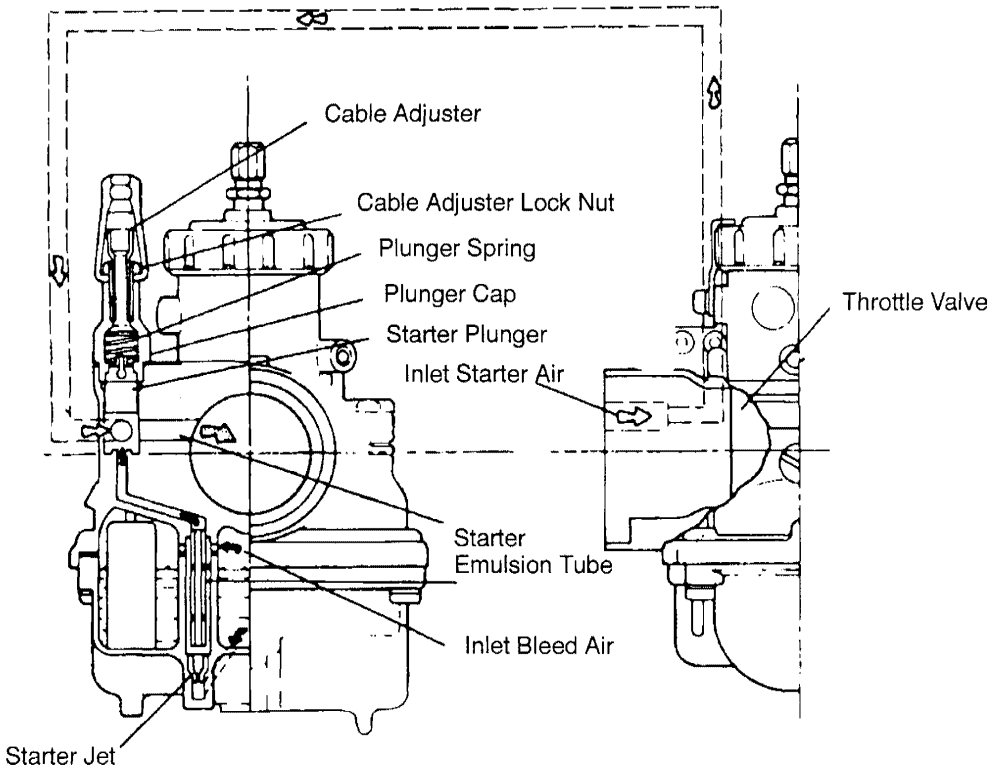
When the throttle opening becomes greater and the area between the needle jet and jet needle increases, fuel flow is metered by the main jet. The number on the jet indicates the amount of fuel CCs which will pass through it in one minute under controlled conditions. Larger numbers give a greater flow,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

Main jets are screwed directly into the needle jet base.



FUEL SYSTEM/CARBURETION
Starter System - Closed Throttle

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

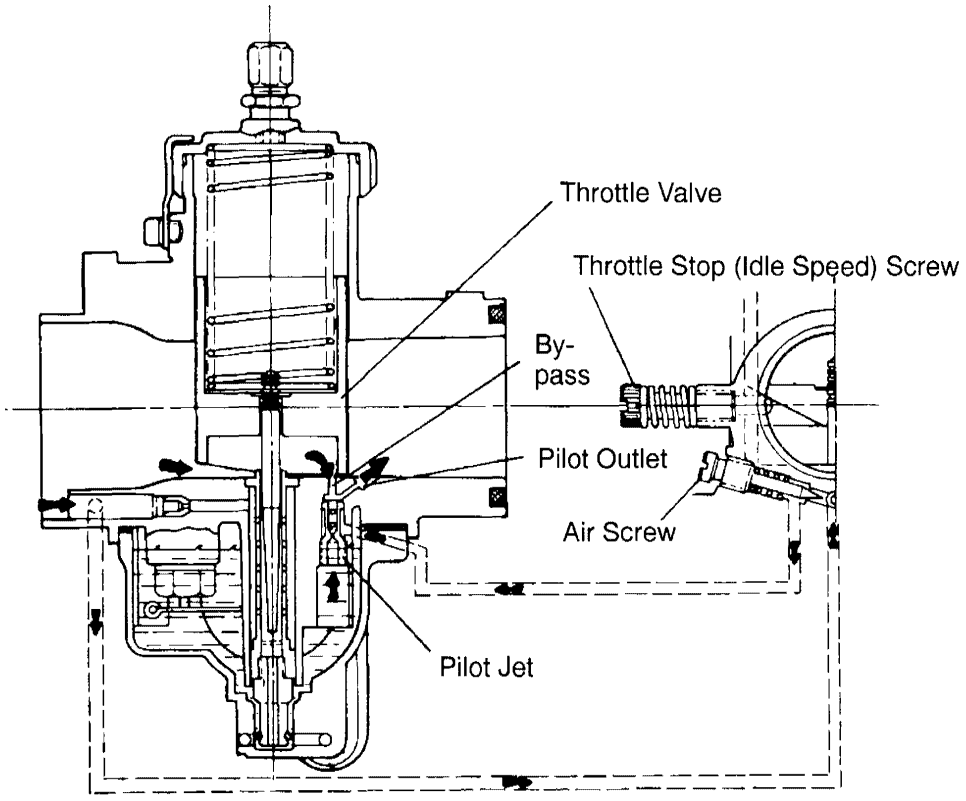


Pilot System (0-3/8 Throttle)

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

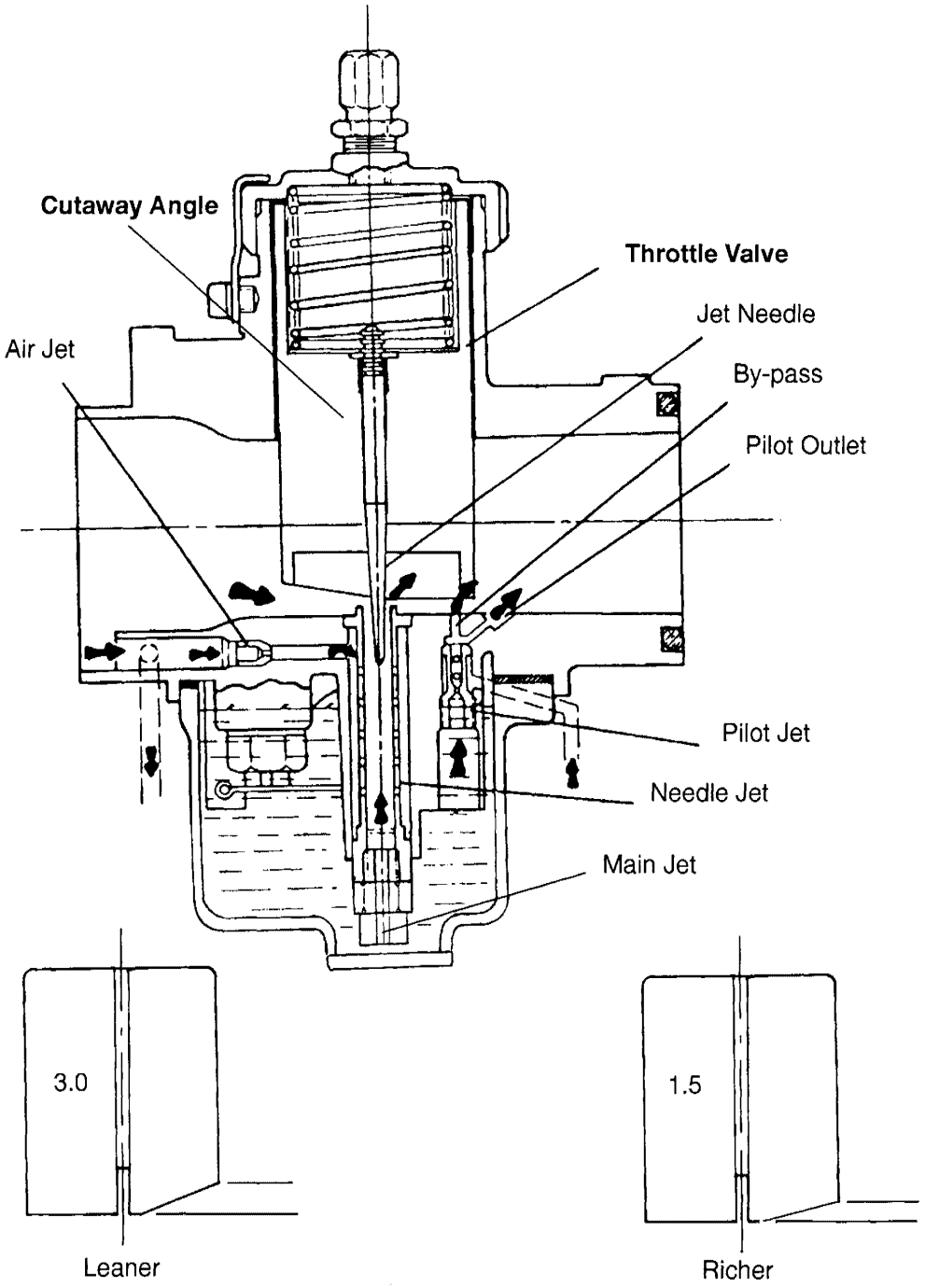
Fuel for the pilot jet is drawn from the float bowl, mixed with air regulated by the air screw, and delivered to the engine through the pilot outlet.

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



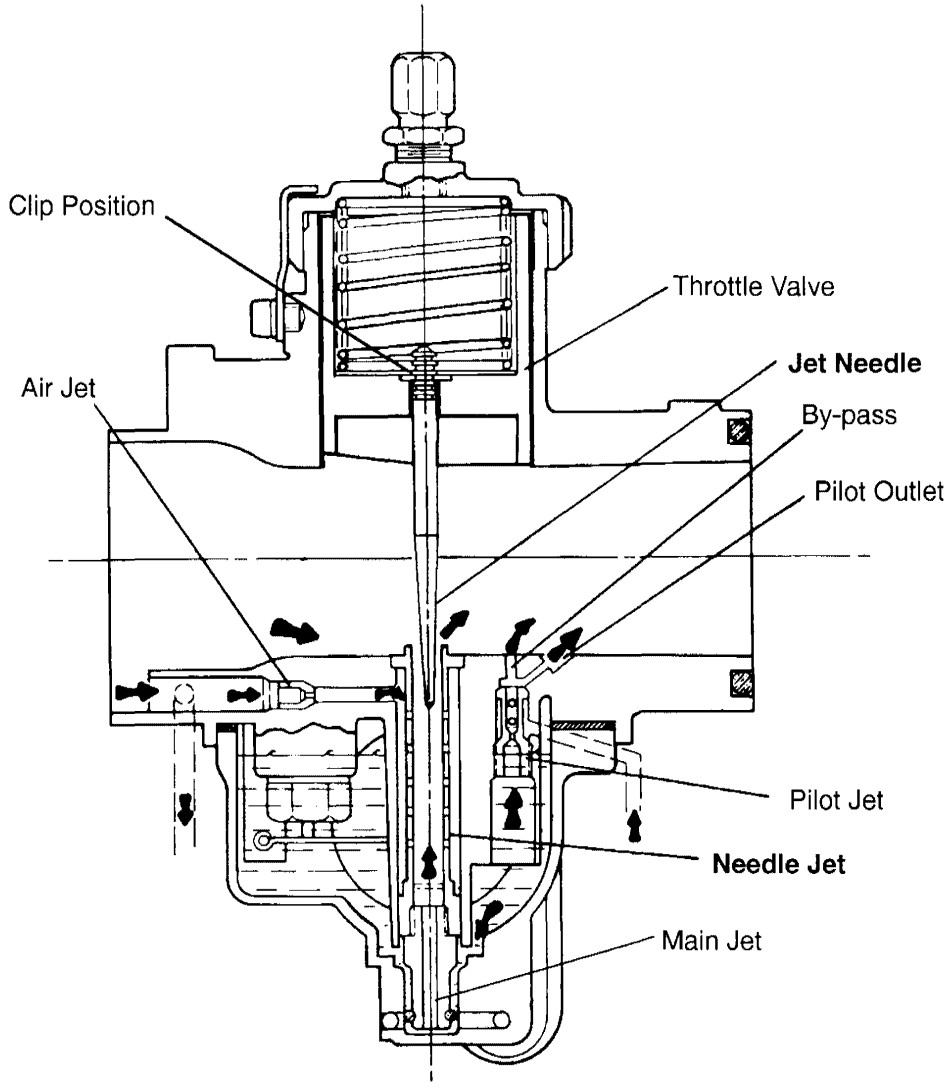
FUEL SYSTEM/CARBURETION
Slide Cutaway (1/8-3/8 Throttle)

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



Jet Needle/Needle Jet (3/8-3/4 Throttle)

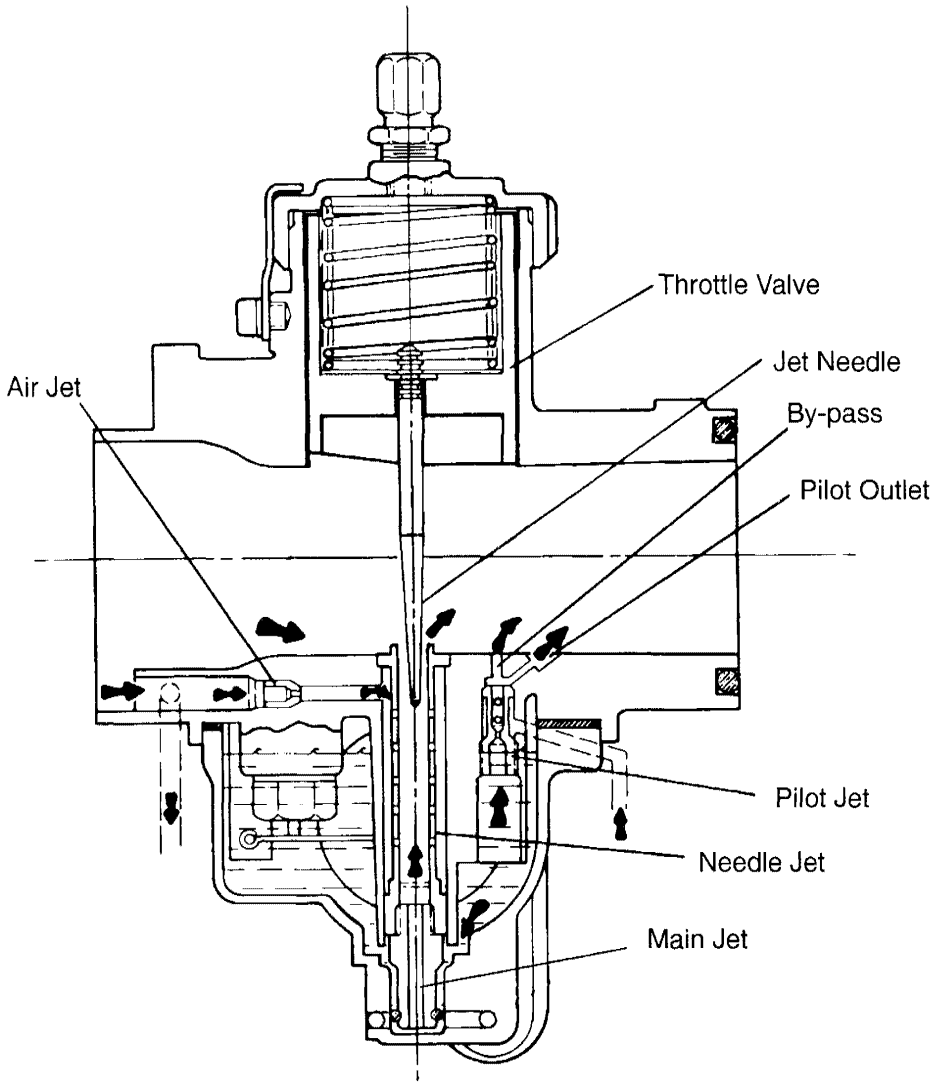
The jet needle and needle jet have the most effect between 3/8 and 3/4 throttle opening. Some mixture adjustment can be accomplished by changing the location of the "E" clip on the needle. Moving the clip down raises the needle in the jet passage and richens the mixture. Moving the clip up lowers the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



FUEL SYSTEM/CARBURETION
Main System (3/4 to Full Throttle)

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

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



Component Effect vs. Throttle Opening

The throttle opening chart below demonstrates component relationship to fuel flow versus throttle valve opening.

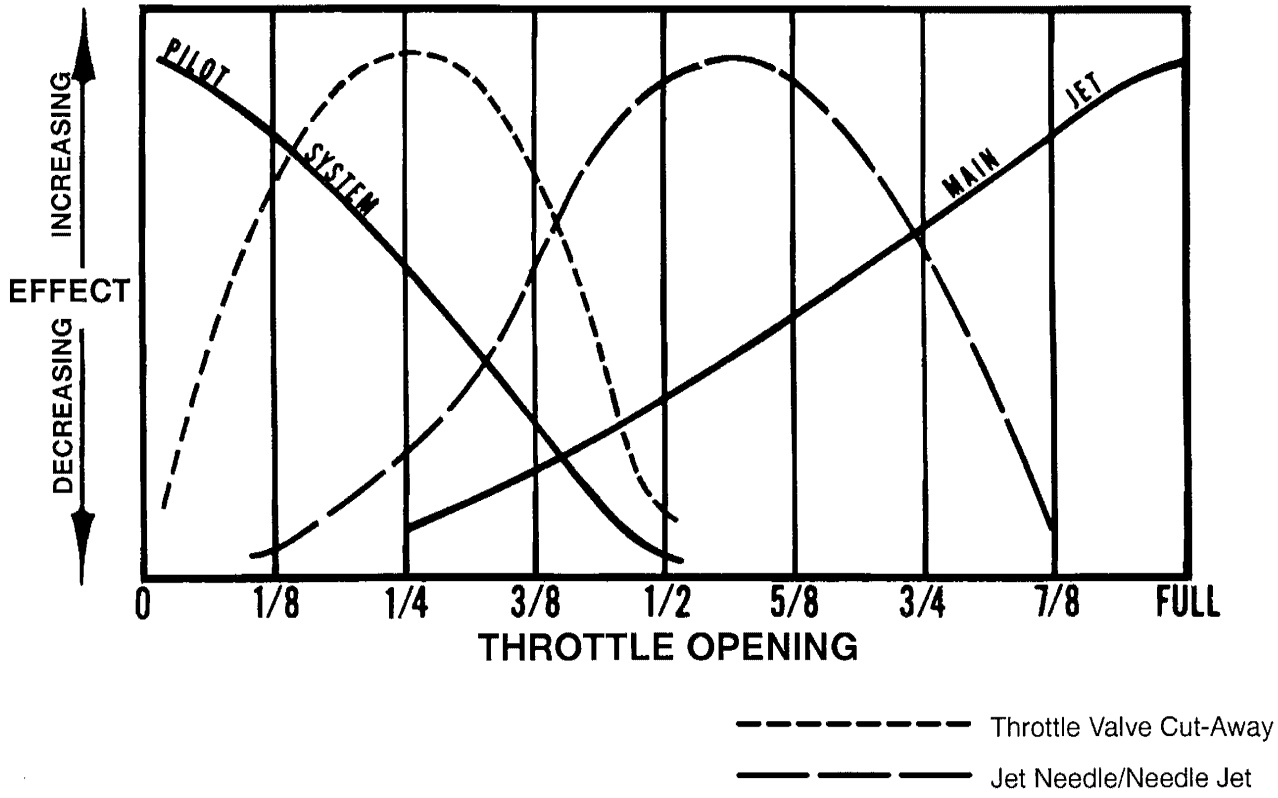
The pilot system's main function is that of a low speed jet. Its most effective range of fuel delivery is from idle to approximately 3/8 throttle valve opening.

The throttle valve controls the rate of engine air by its movement up and down in the carburetor venturi. At small throttle openings the air flow is regulated chiefly by the valve cutaway, with greatest effectiveness at 1/4 throttle opening. Throttle valves are numbered 1.0, 1.5, 2.0, etc., according to the size of the cutaway. Decreasing the cutaway number will increase the amount of fuel delivered in its effective range.

The jet needle and needle jet have an effective operating range from approximately 1/8 to 7/8 throttle opening. The amount of fuel delivered during this range relies upon the jet needle clip position, as well as the needle jet size and other specifications.

The main jet affects fuel delivery at 1/4 throttle and consistently increases to full throttle opening.

Mikuni VM Fuel Delivery

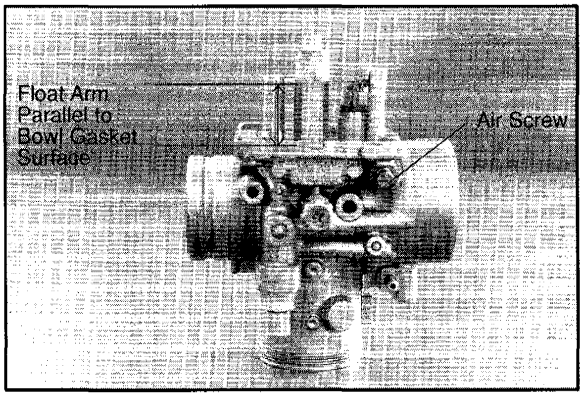


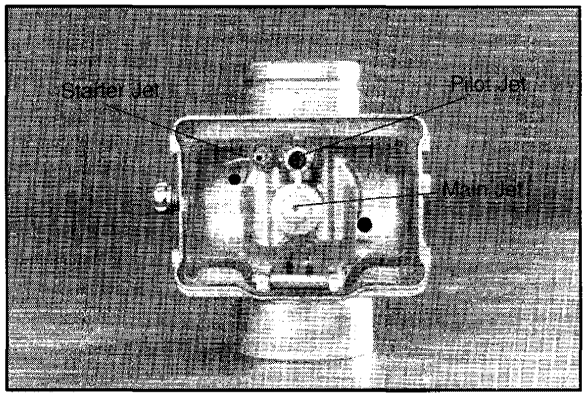
Venting Systems

The fuel tank vent line supplies atmospheric pressure to the fuel in the tank. It must be free of kinks and restrictions and be properly routed to allow fuel to flow from the tank and prevent contaminants from entering the tank. The line should be routed into the center of the steering post.

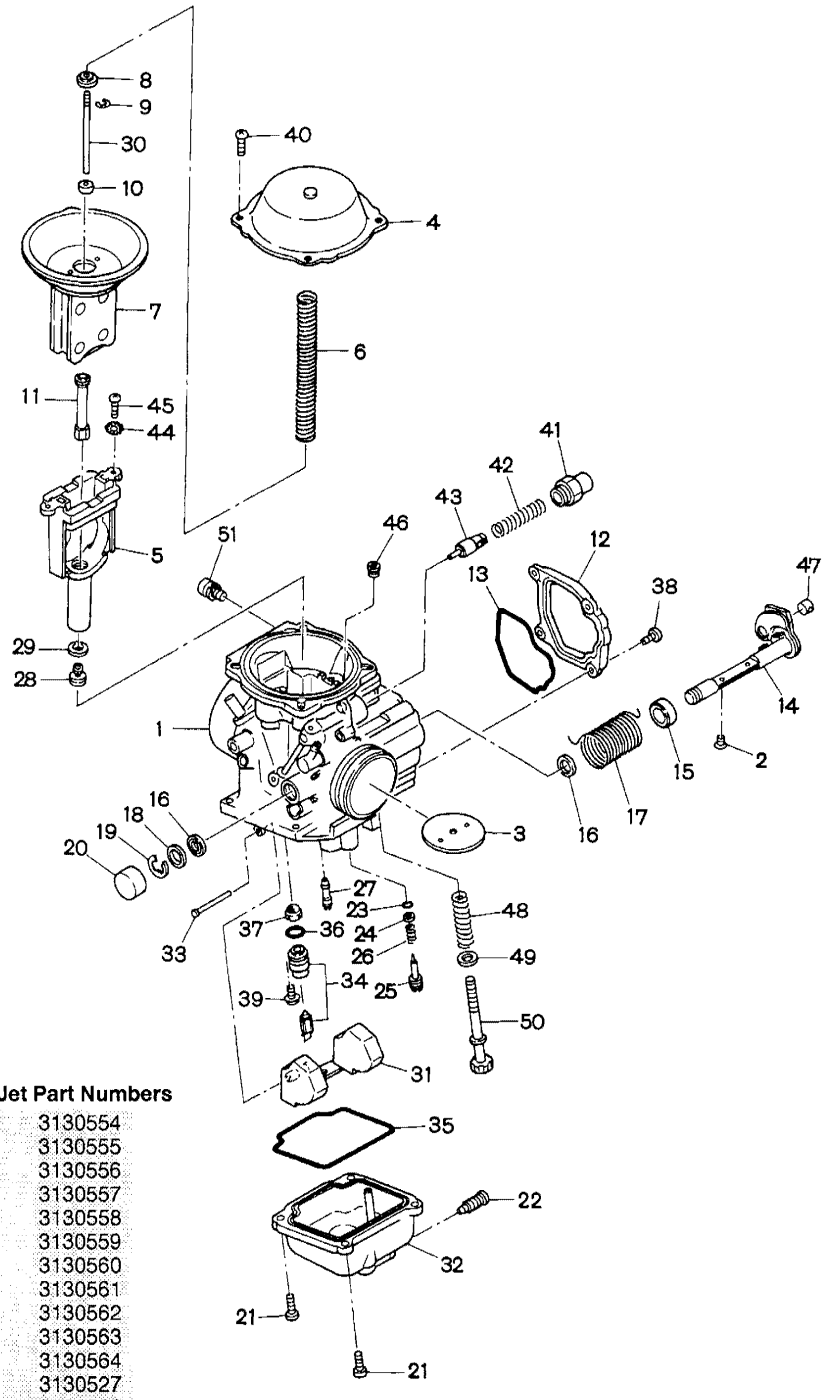
The carburetor float bowl vent lines supplies atmospheric pressure to the fuel in the float bowl. It must be free of kinks and restrictions and be properly routed to allow fuel to flow in the proper amount and to prevent contaminants from entering the carburetor.

System	Main Components	Main Function	Main Affect
Float System (Fuel Level Control)	Inlet Pipe, Needle and Seat, Floats, Float Pins	Maintains specified fuel level in float chamber (carburetor float bowl)	All systems All throttle ranges
Venting	Vent Passages in Carburetor, Vent line	Supplies atmospheric pressure to fuel in float chamber	All systems All throttle ranges
Starter (Choke/Enrichment)	Choke Lever, Cable, Choke Plunger, Return Spring, Carb Passages (Starter Jet, passage in float bowl)	Supplies additional fuel air mixture necessary for cold starting	All throttle ranges Greatest effect at low throttle settings and idle speeds
Pilot (Idle System)	Pilot Jet/Passageways, Pilot Air Screw with Spring, Bypass Port (Beneath Throttle Slide), Air Jet, Pilot Outlet, Throttle Valve Cutaway	Primarily supplies fuel at idle and low throttle settings	Mainly idle to 1/4 throttle Minimal effect after 1/2 throttle
Main System	Main Jet, Main Air Passage, Needle Jet, Jet Needle, Throttle Valve	Supplies fuel at mid-range and high throttle settings.	1/4 to full throttle





Mikuni BST 34 Carburetor Exploded View



Main Jet Part Numbers

112.5	3130554
115	3130555
117.5	3130556
120	3130557
122.5	3130558
125	3130559
127.5	3130560
130	3130561
132.5	3130562
135	3130563
137.5	3130564
140	3130527
142.5	3130566
145	3130567
147.5	3130568
150	3130569
152.5	3130570
155	3130571
157.5	3130572

Pilot Jet Part Number

40.0	3130624
42.5	3130526

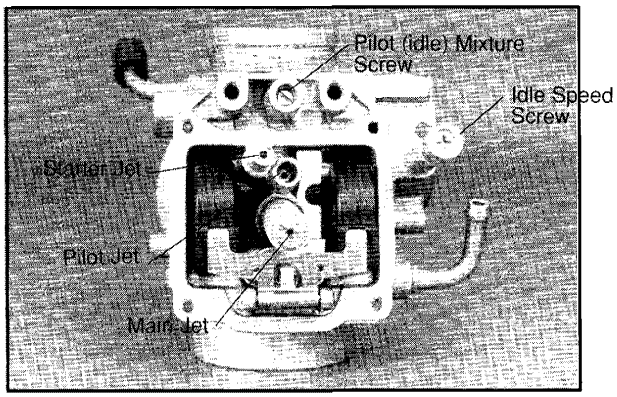
1. Carburetor Assembly
2. Screw
3. Throttle Valve
4. Cover Assembly
5. Jet Block Assembly
6. Spring
7. Diaphragm Assembly
8. Ring
9. "E" Ring
10. Ring
11. Needle Jet
12. Cover
13. O-Ring
14. Throttle Shaft Assembly
15. Ring
16. Seal
17. Spring
18. Packing
19. "E" Ring
20. Cap
21. Screw
22. Screw
23. O-Ring
24. Washer
25. Adjuster
26. Spring
27. Pilot Jet
28 Main Jet
29. Washer
30. Jet Needle
31. Float Assembly
32. Float Body Assembly
33. Float Pin
34. Needle Valve
35. O-Ring
36. O-Ring
37. Filter
38. Screw
39. Screw
40. Screw
41. Guide Holder
42. Spring
43. Plunger Assembly
44. Spring Washer
45. Screw
46. Air Jet
47. Cable Guide
48. Spring
49. Ring
50. Adjust Screw
51. Screw and Washer Assy.

Venting Systems

The fuel tank vent line supplies atmospheric pressure to the fuel in the tank. It must be free of kinks and restrictions and be properly routed to allow fuel to flow from the tank and prevent contaminants from entering the tank. The line should be routed into the center of the steering post.

The carburetor float bowl vent lines supplies atmospheric pressure to the fuel in the float bowl. It must be free of kinks and restrictions and be properly routed to allow fuel to flow in the proper amount and to prevent contaminants from entering the carburetor.

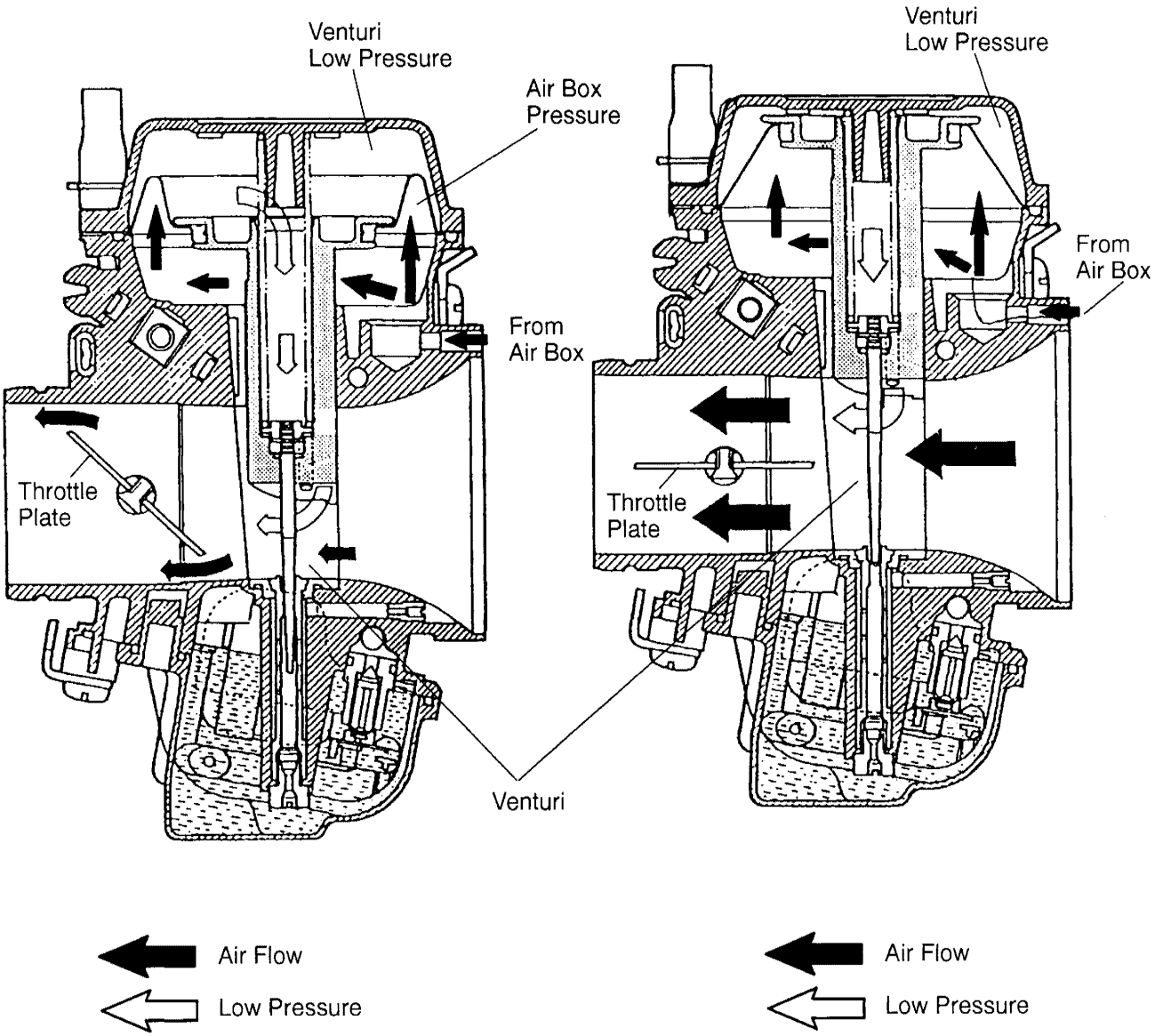
System	Main Components	Main Function	Main Affect
Float System (Fuel Level Control)	Inlet Pipe, Needle and Seat, Float, Float Pin	Maintains specified fuel level in float chamber (carburetor float bowl)	All systems All throttle ranges
Venting	Vent Passages in Carburetor, Vent lines (2) into (1) to frame	Supplies atmospheric pressure to fuel in float chamber	All systems All throttle ranges
Starter (Choke/Enrichment)	Choke Lever, Cable, Choke Plunger, Return Spring, Carb Passages (Starter Jet, Starter Bleed Pipe)	Supplies additional fuel air mixture necessary for cold starting	All throttle ranges Greatest effect at low throttle settings and idle
Pilot (Idle System)	Pilot Jet/Passageways, Pilot-Mixture Screw with Spring Washer and Sealing O-Ring, Bypass Ports (Behind Throttle Plate), Pilot Air Jet, Pilot Outlet, Throttle Plate	Primarily supplies fuel at idle and low throttle settings	Mainly idle to 1/4 throttle Minimal effect after 1/2 throttle
Main System	Main Jet, Main Air Jet, Main Air Passage, Needle Jet, Jet Needle, Vacuum Slide, Throttle Plate	Supplies fuel at mid-range and high throttle settings.	1/4 to full throttle



The constant velocity carburetor used on Polaris Magnum and Sportsman 500 model ATVs incorporates a mechanically operated throttle plate and a vacuum controlled slide valve (vacuum slide). The venturi cross-sectional area in the carburetor bore is increased or decreased automatically by the vacuum slide, which moves according to the amount of negative pressure (less than atmospheric) present in the venturi.

A diaphragm attached to the top of the vacuum slide is sealed to the slide and to the carburetor body forming two chambers. The chamber above the diaphragm is connected to the venturi area by a drilled orifice in the center of the vacuum slide. The chamber below the diaphragm is vented to atmospheric pressure by a passage on the air box side of the carburetor. A spring, installed in the center of the vacuum slide, dampens the slide movement and assists the return of the slide.

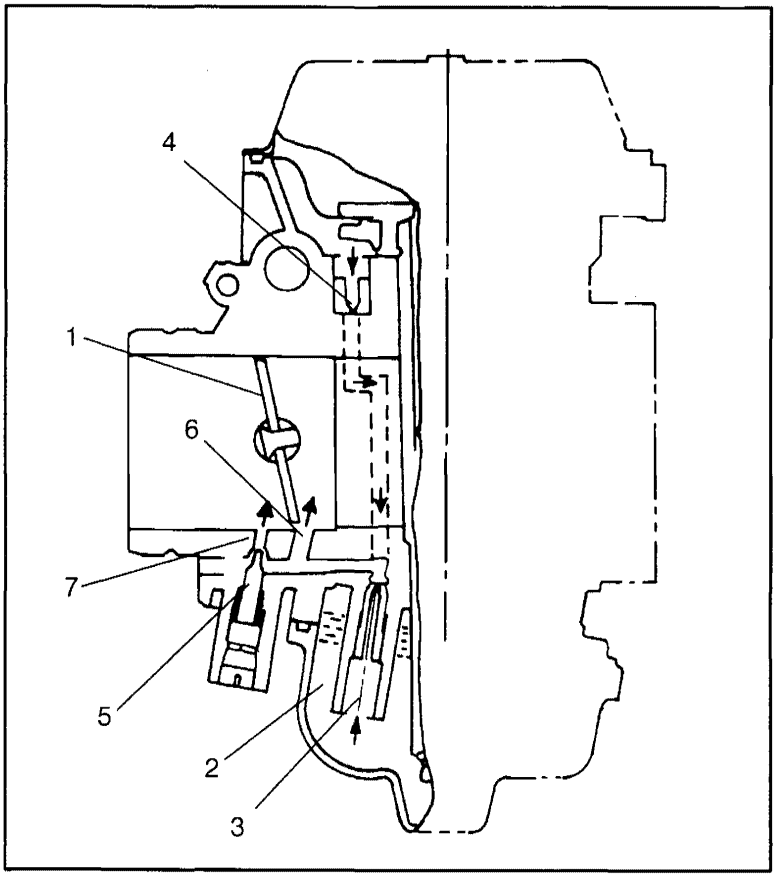
When the throttle plate is opened and engine speed begins to increase, the pressure in the venturi (and therefore in the chamber above the diaphragm) becomes significantly lower than atmospheric. Atmospheric pressure in the chamber below the diaphragm forces the diaphragm upward, raising the slide against spring pressure. When the pressure above and below the diaphragm are nearly equal, the slide moves downward under spring pressure. Raising or lowering the slide increases or decreases the cross sectional area in the venturi, and therefore the air velocity in the venturi is kept relatively constant. This provides improved fuel atomization and optimum fuel/air ratio.



Note: Diagrams are for explanation of theory only, and are not true representations of Mikuni BST 34 carburetor.

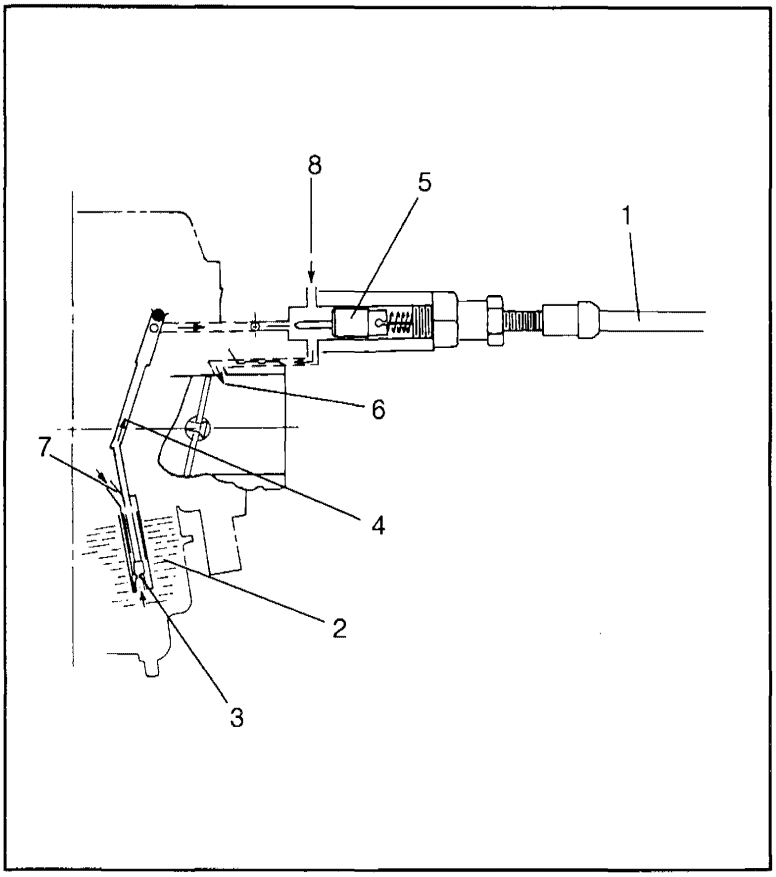
Pilot (Idle and Slow) System

This system supplies fuel during engine operation with throttle valve closed (1) or slightly opened. The fuel from float chamber (2) is metered by pilot jet (3) where it mixes with air coming in through pilot air jet (4). The mixture then goes up through pilot passage to pilot screw (5). A part of the mixture is discharged into the main bore out of bypass ports (6). The remainder is then metered by pilot screw and discharged into the main bore through pilot outlet (7).



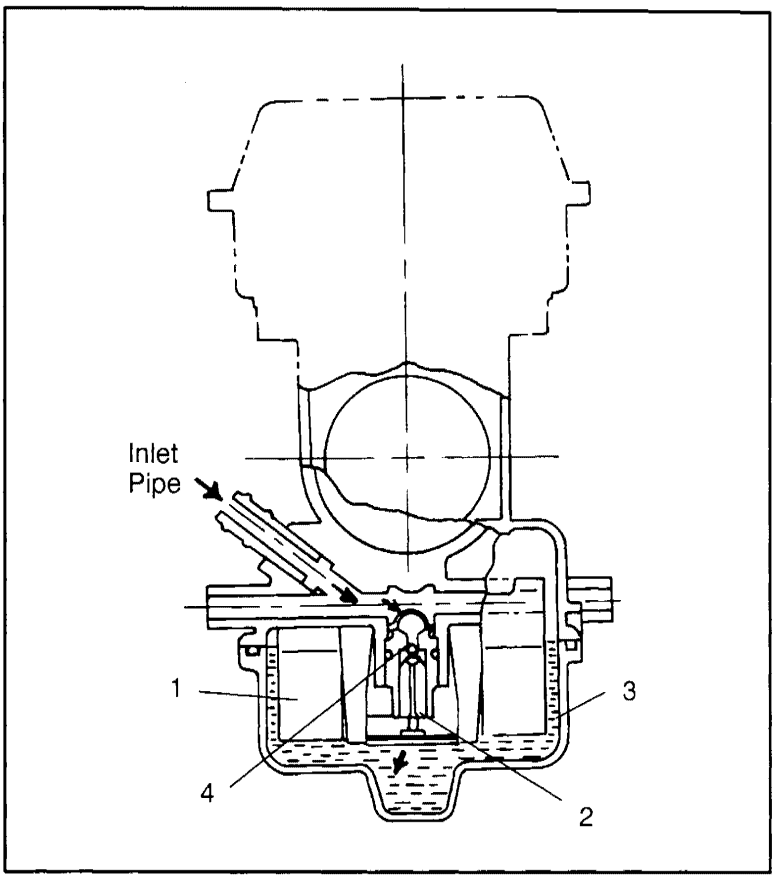
Starter System (Choke or Enrichment)

When the choke cable (1) is activated, the starter plunger (5) is lifted off the seat. Fuel is drawn into the starter circuit from the float chamber (2) through the starter jet (3). Starter jet meters this fuel, which then flows into starter pipe (4) and mixes with the air (7) coming from the float chamber. The mixture, rich in fuel content, reaches starter plunger and mixes again with the air coming through a passage (8) extending from underneath the diaphragm. The rich fuel/air mixture for starting is discharged through starter outlet (6) in the the main bore.



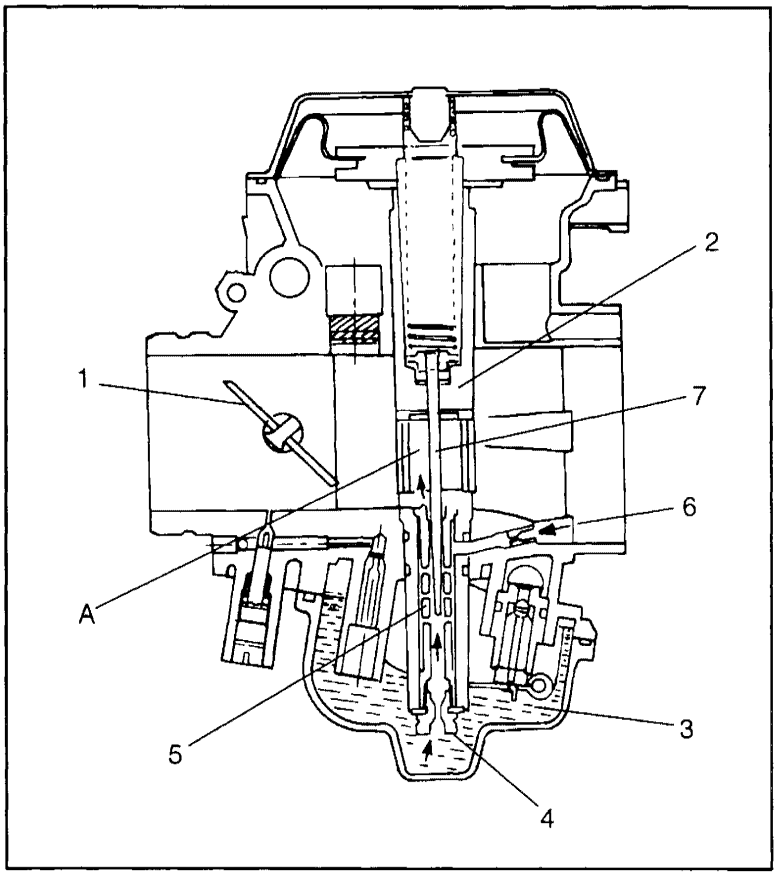
Float System

Fuel enters the float chamber (3) by means of the inlet pipe and passage, through a screen on the back of the inlet needle seat (4), and around the inlet needle (2). As the fuel fills the float chamber, the float (1) rises and forces the inlet needle against the seat, shutting off the orifice in the seat. When fuel level is up in float chamber, floats are up and needle valve remains pushed up against valve seat. Under this condition, no fuel enters the float chamber. As the fuel level falls, floats go down and needle valve unseats itself to admit fuel into the chamber. In this manner, the needle valve admits and shuts off fuel alternately to maintain a practically constant fuel level inside the float chamber.



Main System

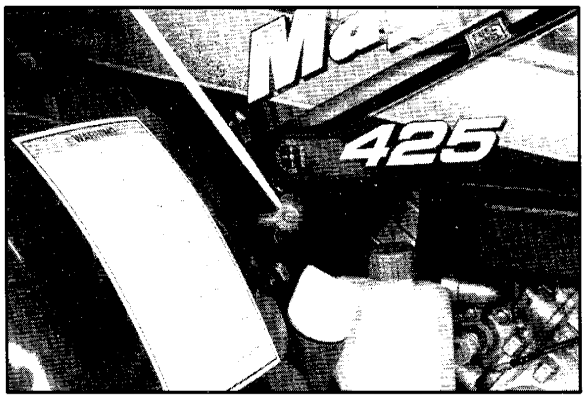
As throttle valve (1) is opened, engine speed rises, and this increases negative pressure in the venturi. Consequently the vacuum slide (2) moves upward. The fuel in float chamber (3) is metered by main jet (4), and the metered fuel enters needle jet (5), in which it mixes with the air admitted through main air jet (6) to form an emulsion. The emulsified fuel then passes through the clearance between needle jet (5) and jet needle (7), and is discharged into the venturi (A). Mixture proportioning is accomplished in needle jet (5); the clearance through which the emulsified fuel must flow is determined ultimately by throttle position and vacuum slide height.



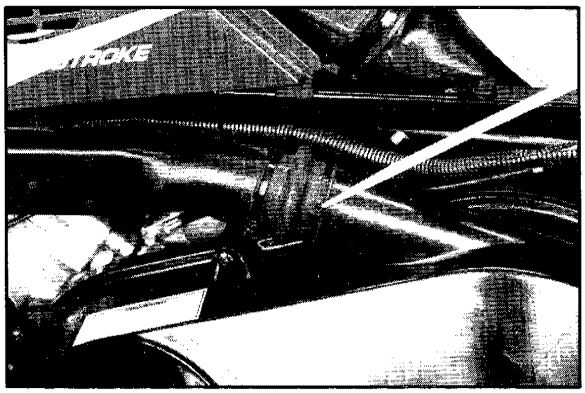
Magnum Fuel Tank Removal

Fuel Tank Removal

1. Turn fuel valve to "Off" position.
2. Remove the following items:
   - Seat
   - Ignition Key
   - Side Panels
   - Fuel Tank Cover

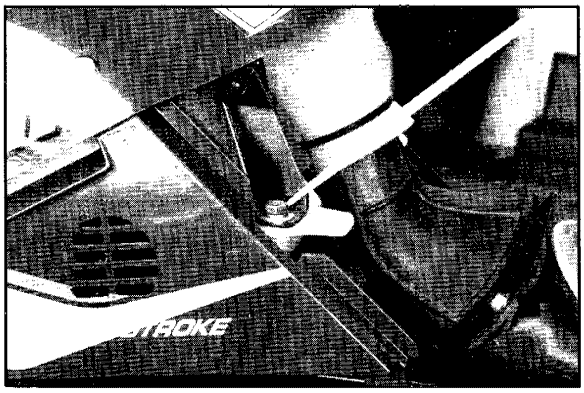


3. Remove cable tie on PVT exhaust duct.
4. Remove the two bolts securing the duct and remove the duct.
5. Disconnect fuel line from fuel valve and vent line from top of tank.
6. Remove the two Torx™ screws at the rear of the headlight pod until they no longer project into the tank area.
7. Remove the two bolts and spacers from the rear of the fuel tank.
8. Shift tank and position throttle cable below the PVT air inlet duct.
9. Pull and hold fuel valve selector lever out to clear fuel valve.
10. Lift and pull tank back.
11. Rotate rear of tank to left and remove tank.



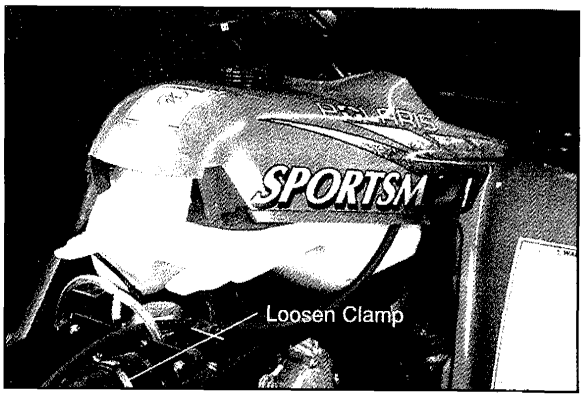
CAUTION:

Be careful not to damage fuel valve.

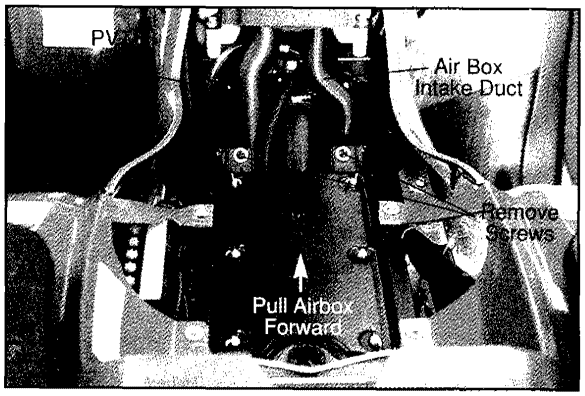


Carburetor Removal (Mikuni CV)

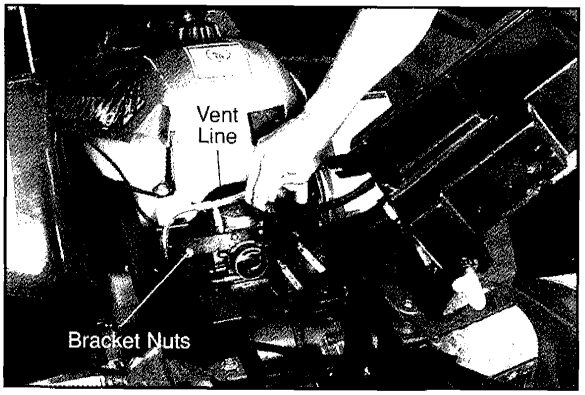
1. Remove fuel tank on Gen II models. Refer to procedure on page 4.28.
2. Remove seat and side covers. Loosen clamp at rear of carburetor.



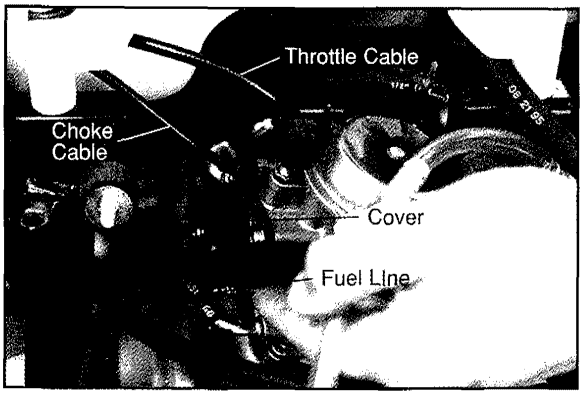
3. Loosen clamps securing air box intake duct and PVT intake duct and remove both.
4. Remove air box retaining screws. Pull air box forward to disengage rear mounting tabs and lift upward.



5. Disconnect vent line from right side of carburetor and slip oil tank vent hose under vent line. Set airbox aside.
6. Remove two nuts securing rear of carb bracket to dampers.
7. Remove impulse line clamp and carefully remove line.
8. Loosen carburetor flange clamp at front of carburetor.
9. Remove carburetor. Place a shop towel in carb flange to prevent dirt from entering.
10. Remove fuel line clamp and fuel line.

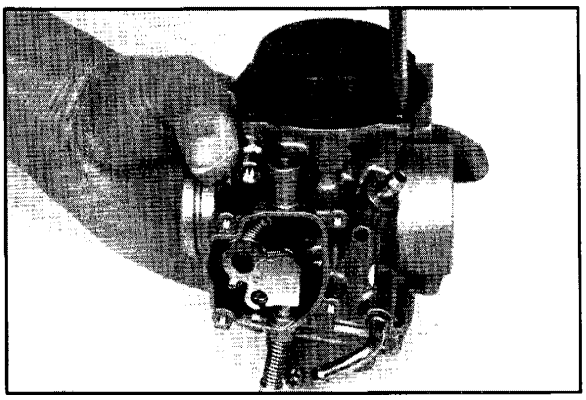


11. Remove choke assembly with cable attached.
12. Remove four screws from throttle shaft cover.
13. Hold cable adjuster and loosen lock nut. Turn adjuster in if necessary to provide enough cable play to prevent damaging the throttle cable during removal.
14. Lift throttle shaft.
15. Remove throttle cable from throttle shaft.

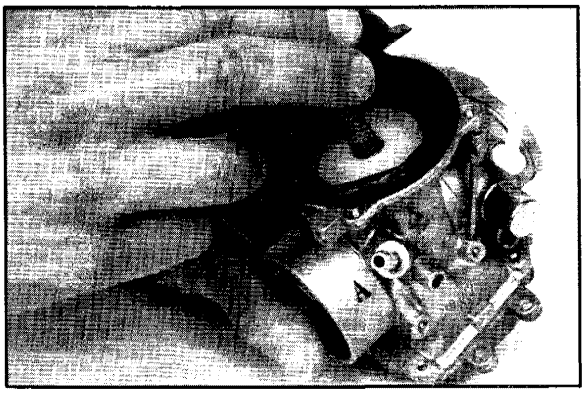


Carburetor Disassembly - Mikuni CV

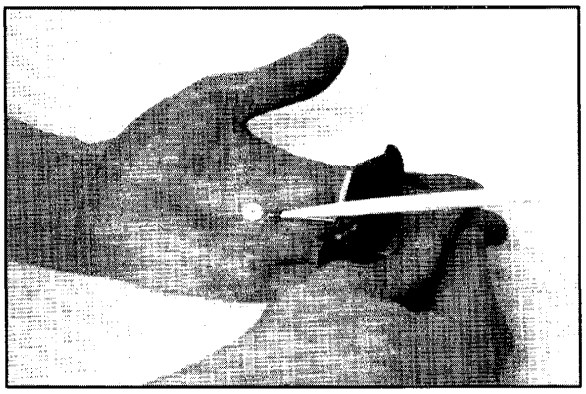
1. Remove carburetor diaphragm chamber cover.



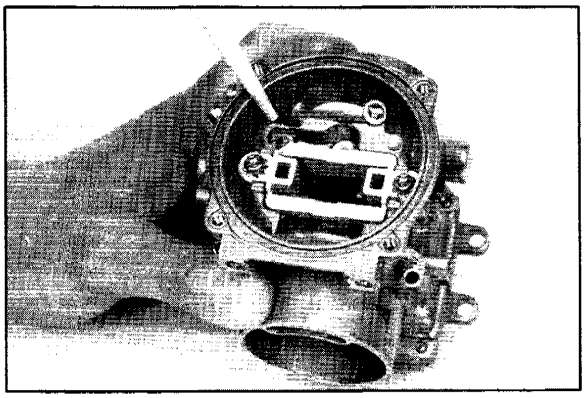
2. Remove return spring and vacuum slide.



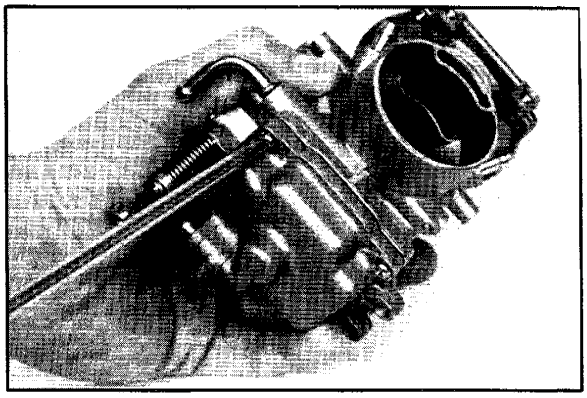
3. Invert vacuum slide and remove spring seat and jet needle from slide. Note position of "E" clip and washer.



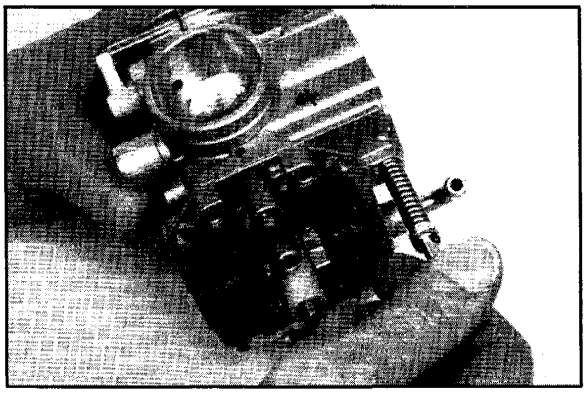
4. Remove pilot air jet.



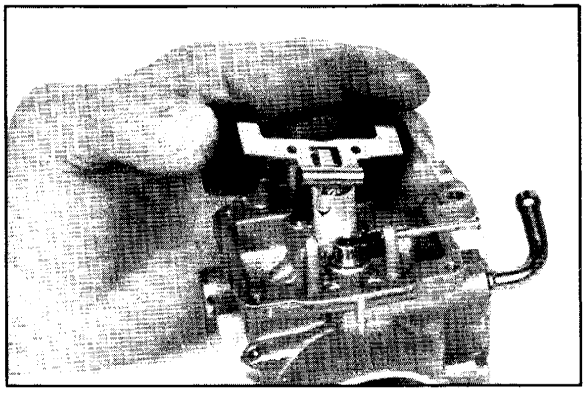
5. Remove carburetor float bowl.



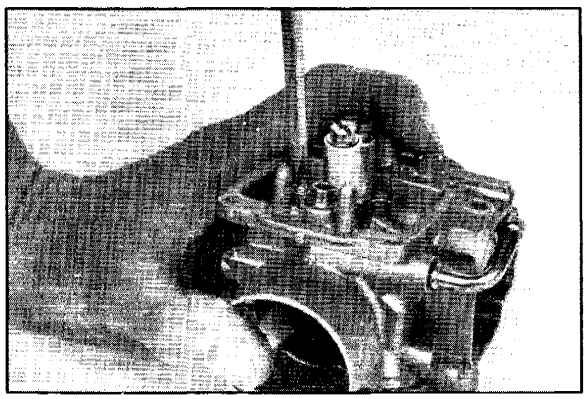
6. Remove idle stop screw, washer and spring.



7. Using a small pin punch or a spring loaded automatic center punch, remove float pin, float, and inlet needle.

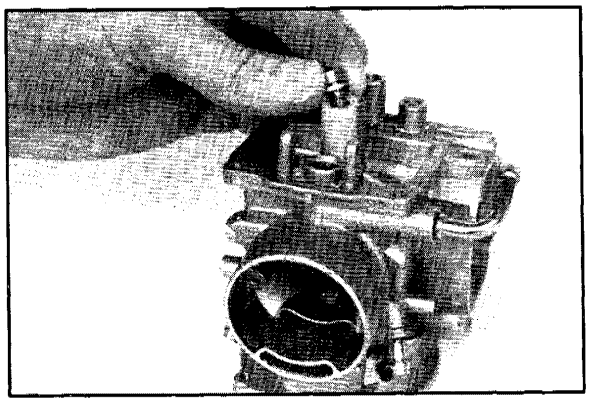


8. Remove inlet needle seat retaining screw along with plate, and carefully remove needle seat. **NOTE:** Do not use a pliers to remove the seat or damage may occur.

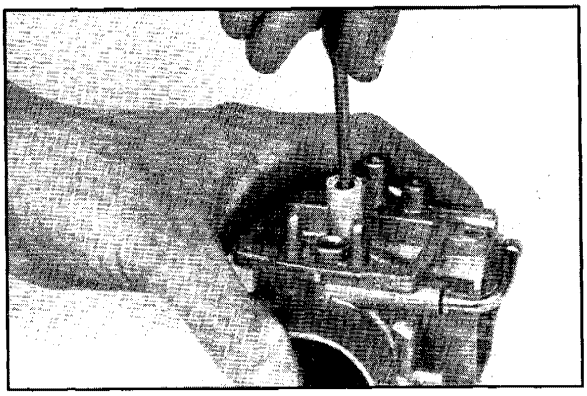


Carburetor Disassembly - Mikuni CV

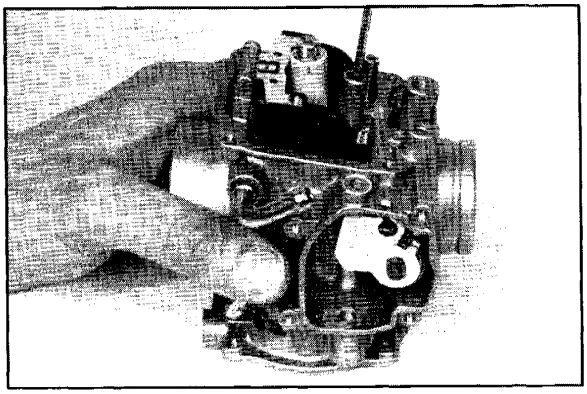
9. Remove main jet and washer.



10. Remove needle jet by carefully pushing it out through the top of the carburetor from the float chamber side. Do not push on the inside of the needle jet or damage may occur to the main jet threads.

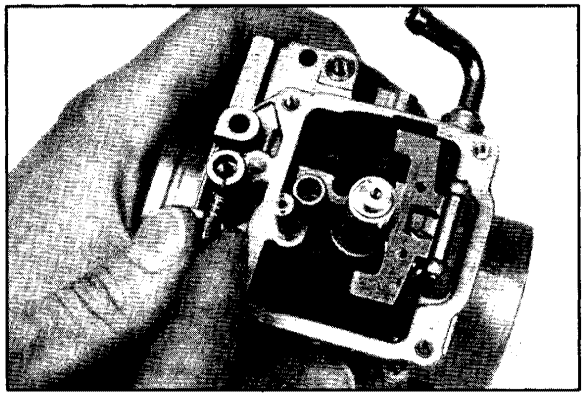


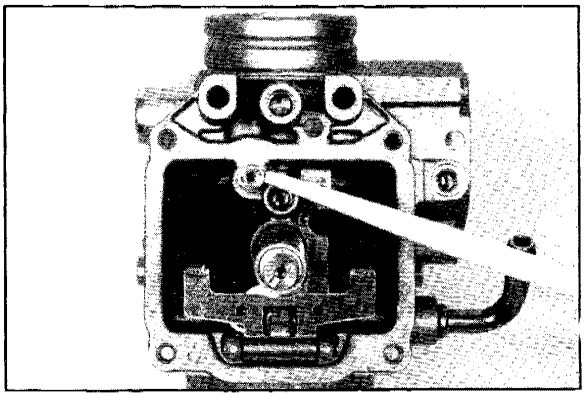
11. Remove pilot jet.



12. Remove the pilot mixture screw with spring, flat washer, and O-Ring.

NOTE: The starter jet is not removeable.





1. Thoroughly clean the carburetor body, jets, and all passages with carburetor cleaner or electrical contact cleaner.

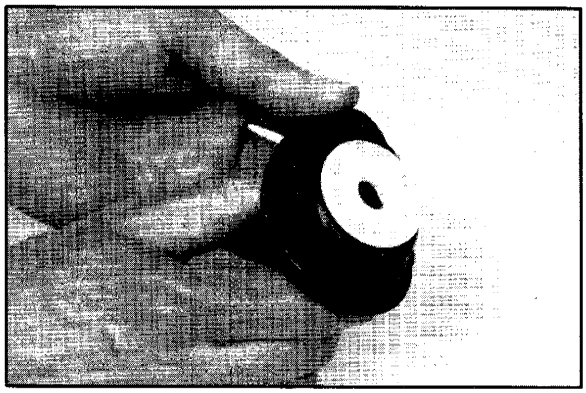
⚠ WARNING

Protect eyes from contact with cleaner. If you get cleaner in your eyes or if you swallow cleaner, see your doctor immediately. Some carburetor cleaners are extremely caustic and extended periods of soaking can loosen the adhesive sealer on the passage drill-way plugs. *Do not* soak rubber or plastic components (such as the vacuum slide diaphragm, needle seat screen, or O-Rings in caustic cleaning solutions. Irreparable damage may occur. Do not use agitator type carburetor cleaning equipment. Rubber parts must be cleaned with mild detergent and hot water only.

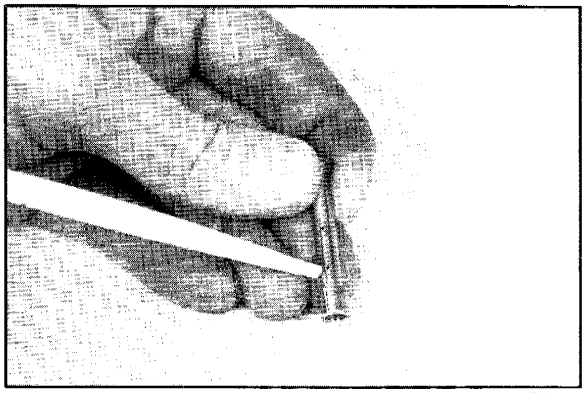
2. If the carburetor is extremely dirty or contaminated with fuel residue and varnish, soak for short periods only in carburetor cleaner, and rinse in hot water.
3. Replace the jets if they are extremely dirty or have a buildup of fuel residue or bacterial growth. Even a small amount of residue will reduce the flow characteristics of the jet.
4. Verify all passages and jets are unobstructed by spraying electrical contact cleaner through the passages. **CAUTION:** Do not use wire or welding tip cleaners on the jets as the orifice size may be altered.
5. Use low pressure air to dry carburetor body and all components.

Carburetor Inspection

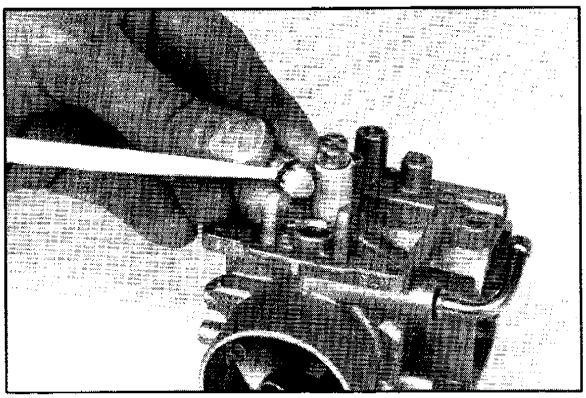
1. Inspect the diaphragm for holes, deterioration, or damage. Make sure the diaphragm is pliable but not swollen. The diaphragm should fit properly in the carburetor body. Replace diaphragm assembly if diaphragm is damaged.
2. Inspect the diaphragm return spring for damage or distortion of the coils.
3. Inspect the slide for wear, scratches, or damage. It should move freely in the jet block. Replace if necessary.



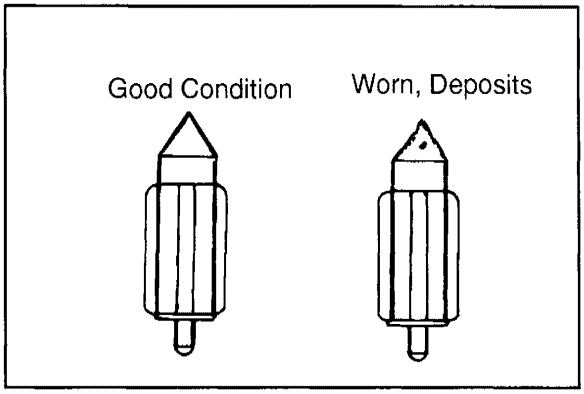
4. Inspect jet needle for wear, bending, or other damage.
5. Inspect needle jet. Air bleed holes must be clear. Check for wear at the top inside surface where the jet needle enters the needle jet.
6. Inspect the inlet needle seat for wear, damage and foreign material. Check the inside for abrasion or wear from the needle.



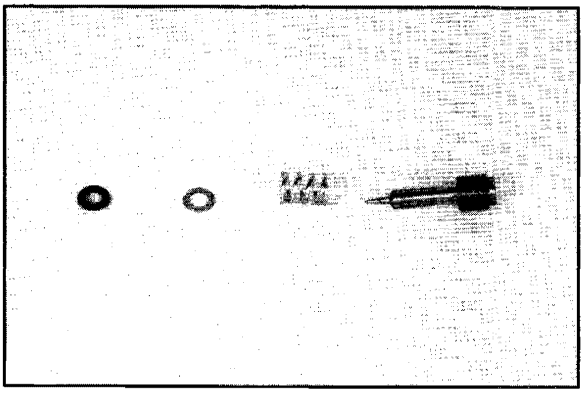
7. Inspect O-ring for cuts, nicks and abrasions. The O-ring must fit snugly on the needle seat and in the carburetor body to ensure a leak-free seal. The screen must be clean and fit snugly on the needle seat. Replace needle and seat assembly if necessary.

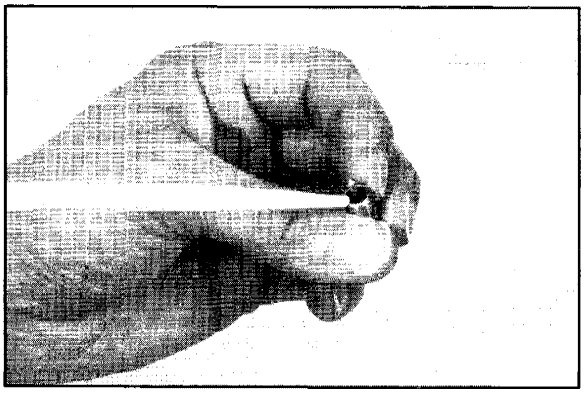


8. Inspect the inlet needle tapered surface for any sign of wear or damage. Be sure the spring loaded pin is free moving and returns freely when pushed. The inlet needle and seat should be pressure tested after assembly. See Carburetor Assembly/Adjustment, pages 4.36 - 4.38.

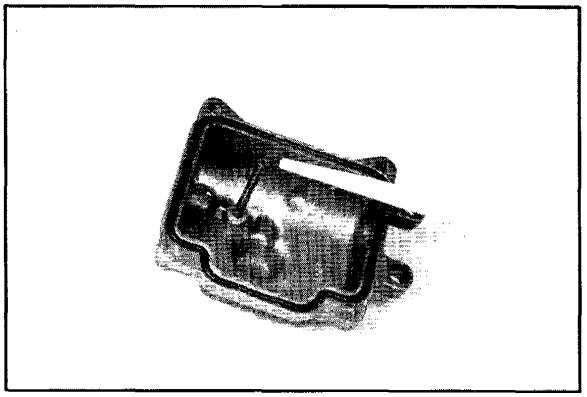


9. Inspect the pilot mixture screw for damage. Make sure the small tip is not bent or missing. The washer must be in place between the O-Ring and spring on reassembly. Check the O-Ring for cracks, damage or wear. Replace if necessary.
10. Inspect the float, float pin, and pin mounting boss for wear or damage. The float should pivot freely on the pin without binding. Replace the float assembly, pin, or carburetor body if worn.
11. Inspect the starter plunger for wear, cracks, foreign material or bending. Check the seating surface in the carburetor for damage, burrs, or foreign material. Inspect return spring, making sure it is not damaged or weak.

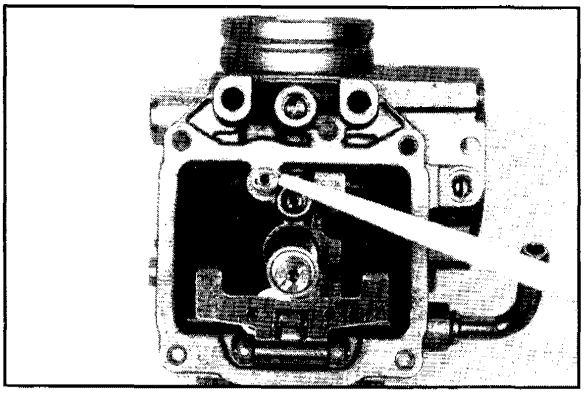




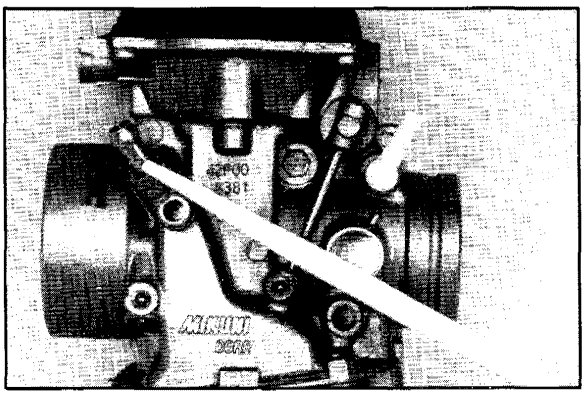
12. Check the overflow stand pipe in float bowl for cracks or bending. Be sure the pipe is clear. Fill the bowl with liquid and check for leakage out the drain orifice. If the bowl drain leaks, inspect tapered surface of the screw and seating surface. Check the bowl sealing O-Ring for damage or wear.



13. Check the starter jet to be sure it is clear.



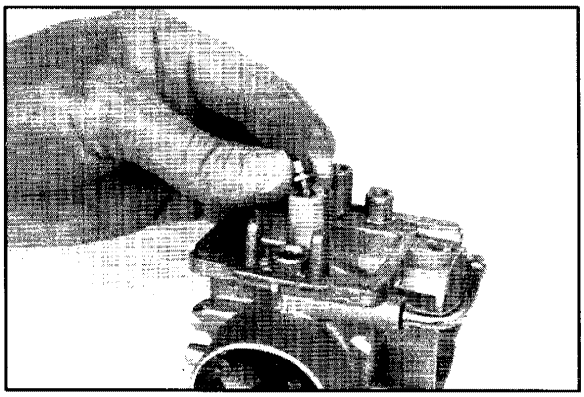
14. Check the vent passages and impulse source for cracks or obstructions.
15. Inspect the throttle shaft. It should return freely and completely when opened and released. Check the shaft for excess play or movement.
16. Inspect the throttle plate and retaining screws. Make sure the plate is closed all the way and is centered in the bore. Check to be sure the screws are tight.



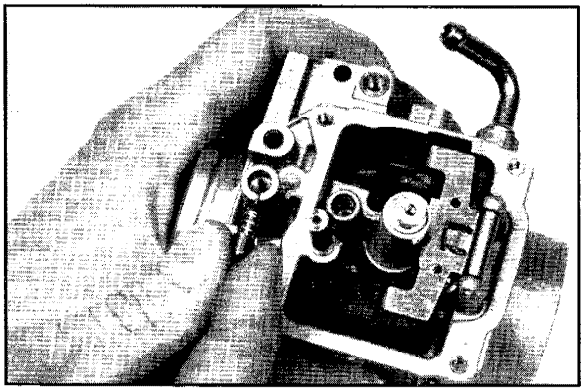
Carburetor Assembly - Mikuni CV

1. Install the needle jet making sure the slot is aligned with the tab in the jet block.

2. Install the main jet and washer.



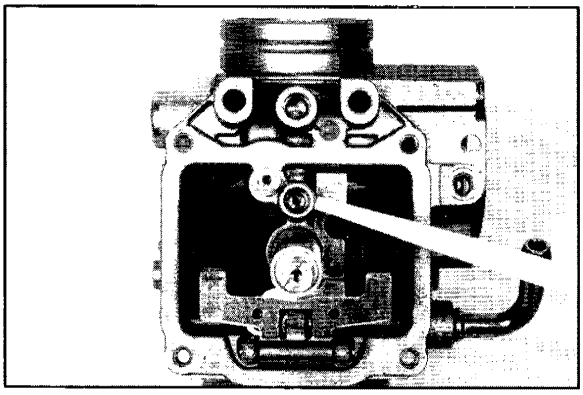
3. Install the pilot mixture screw, spring, washer, and O-ring as an assembly. Lubricate the O-Ring with oil or light grease before installation. **CAUTION:** Do not damage the O-ring during installation. Turn the screw in until it *lightly* contacts the seat. Back out the specified number of turns[1].



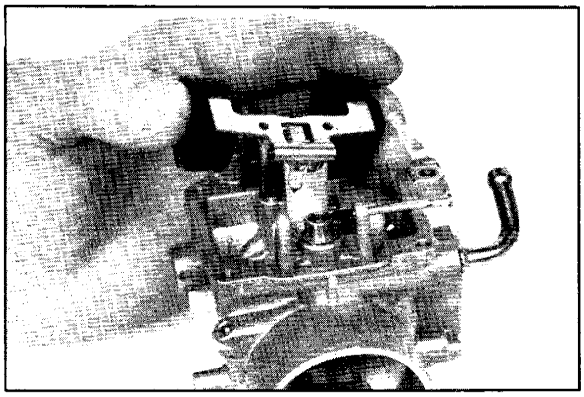
Pilot Mixture Screw (Turns Out)

Refer to specifications page 4.1-4.4p

4. Install the pilot jet and pilot air jet.
5. Install the inlet needle seat with screen and O-ring. Lubricate the O-ring with oil or a light film of grease.
6. Install the plate and retaining screw.
7. Install the float with inlet needle and install the pin. **CAUTION:** Do not bend the float during installation.

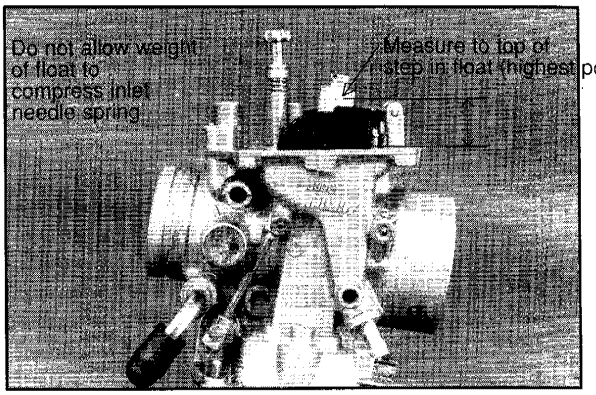


[1] NOTE: The final pilot (idle) mixture must be adjusted with the engine running. Refer to Page 2.12a.



Float Height Adjustment

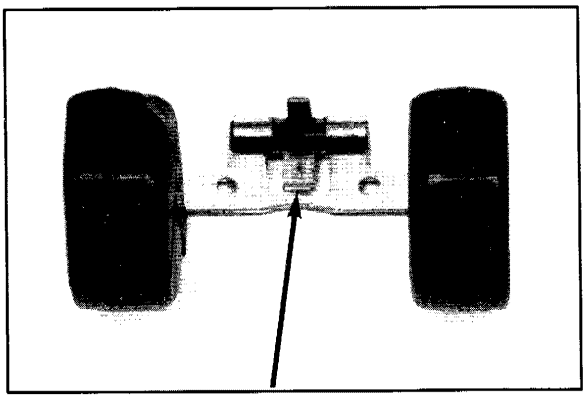
1. Place the carburetor on a level surface in the position shown. In this position, the float tongue will lightly contact the inlet needle valve pin without compressing the pin spring.



2. Measure the height from the float bowl mating surface to the top of step in float (highest point) as shown. Both sides of float should be parallel to each other. The measurement should be made at the mid-point on the top of the float using a vernier caliper. When measuring the height be sure the inlet needle valve spring is not compressed.

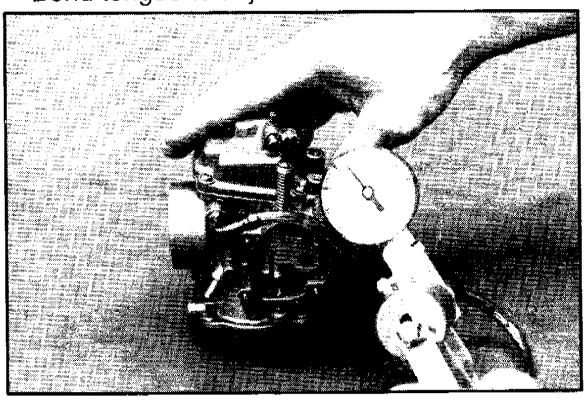
Float Height:	
Std: BST 34	**13.0mm (.51″) ± 1 mm**
BST 40	**14.7mm (.58″) ± 1 mm**

3. If adjustment is necessary, bend the tongue slightly.



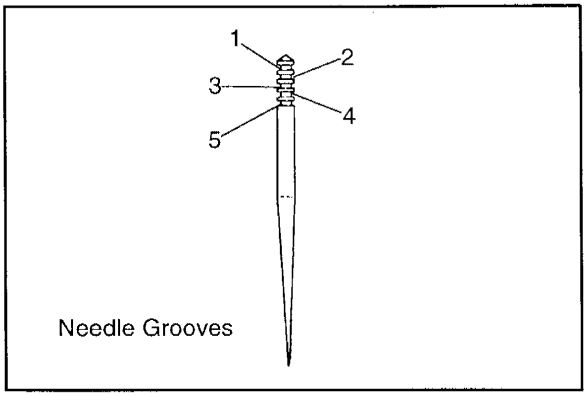
Bend tongue to adjust.

4. Install the float bowl. Invert the carburetor and install a Mity-Vac™ (PN 2870975) to the fuel inlet fitting. Apply 5 PSI pressure to inlet fitting. The needle and seat should hold pressure indefinitely. If not, inspect needle and seat and seat O-ring.



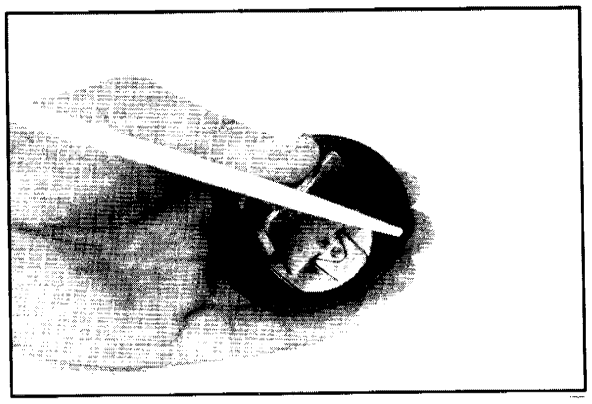
Mity Vac™ PN 2870975

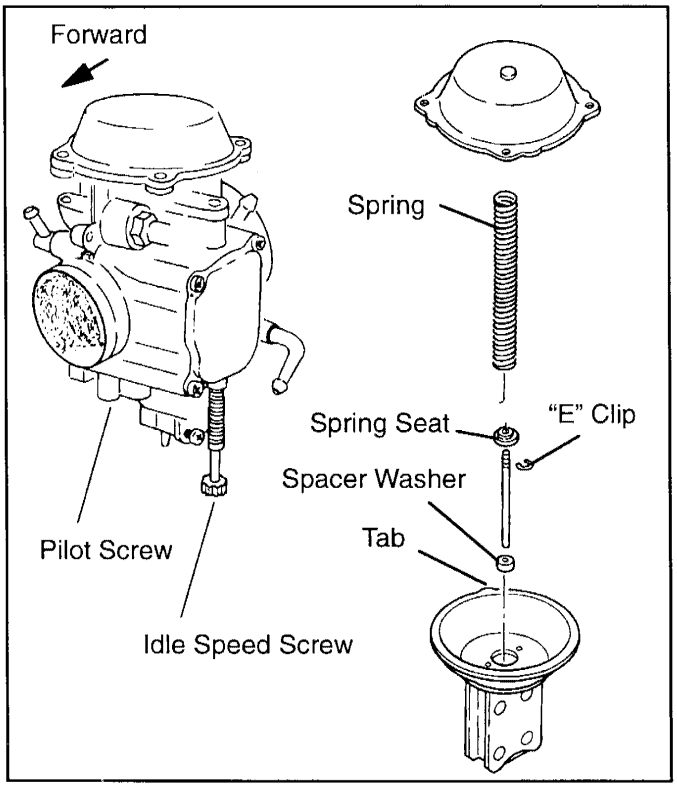
5. Install the "E" clip on the jet needle in the proper position. Inspect the needle closely for wear and replace both needle and needle jet if needle is worn.



Float Height Adjustment, Cont.

6. Install the plastic spacer washer on the bottom of the needle and slide it up to the "E" clip.





7. Install the jet needle assembly into the vacuum slide and install the slide into the carburetor body. Be sure the tab on the outer edge of the diaphragm is positioned properly in the carburetor body.
8. Fit the diaphragm sealing lip into the groove in the carburetor body.
9. Install the spring seat washer and install the spring.
10. Install the diaphragm chamber cover and tighten the screws.
11. Check for free movement of the slide and make sure it returns smoothly and completely.
12. Install the idle stop screw with spring until it lightly contacts the throttle shaft stop arm. Turn the screw in 1 1/2 turns from this point to provide a base setting. Final idle speed must be adjusted with the engine running and warmed to operating temperature. Move the throttle actuator arm to full open and make sure operation is smooth and arm returns quickly and completely to closed position (against the idle speed screw).

CV Carburetor Installation

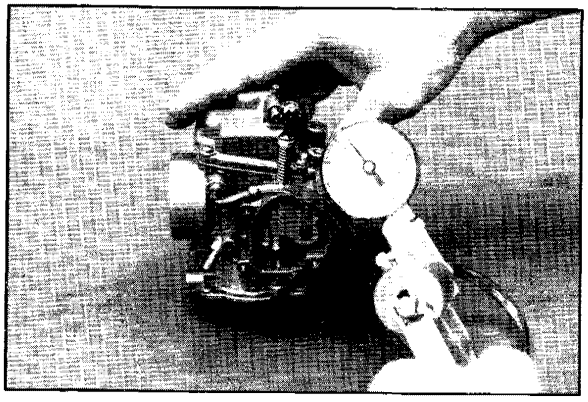
1. Install the throttle cable by screwing the adjuster into carburetor body completely. Lightly grease the end of the throttle cable and install the cable into the end of the throttle actuator arm.
2. Install the throttle shaft cover.
3. Apply a light film of oil to the choke plunger and install the plunger and cable assembly.
4. Install fuel line and fuel line clamp.
5. Remove the shop towel from the carburetor flange.
6. Install carb into flange and install rear air duct onto the back of the carburetor. Be sure carburetor is pushed completely into flange and tighten the clamp.
7. Loosely install two bolts into carburetor bracket. Do not tighten.
8. Install clamp on rear air duct and tighten.
9. Tighten bracket bolts.
10. Install impulse line and clamp.
11. Perform throttle cable adjustment and choke adjustment. See Maintenance Chapter 2. Make sure throttle operates smoothly and returns completely.
12. Install fuel tank, cover, and panels, and re-check throttle operation.
13. Turn handlebars completely left to right and check for free movement and full return to idle stop screw.
14. Set parking brake with gear selector in neutral.
15. Start engine and adjust idle speed when engine is warm. Check for fuel leaks.
16. Adjust idle mixture. Refer to page 2.12a.

Needle and Seat Pressure Test Mikuni CV

Needle and Seat Pressure Test

1. Invert the carburetor and install a Mity-Vac™ to the fuel inlet fitting. Apply 5 PSI pressure to inlet fitting. The needle and seat should hold pressure indefinitely. If not, inspect needle and seat.

Mity-Vac™ PN 2870975



Inlet Needle and Seat

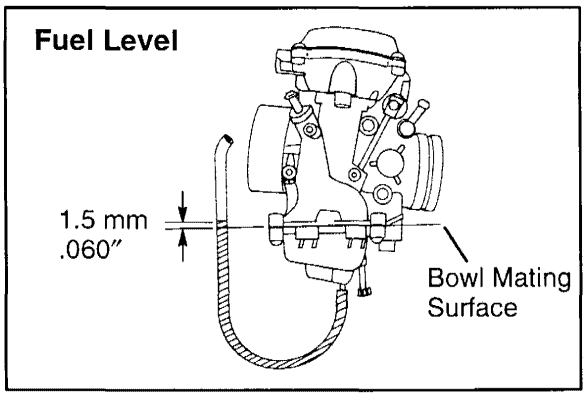
If foreign matter is caught between the sealing surfaces of the needle valve seat and needle valve, or if they are worn, the fuel will continue flowing and cause overflow.

Conversely, if the inlet needle sticks closed, the fuel will not flow into the float chamber. If overflow occurs, clean the float chamber, float parts and fuel passages, and inspect the needle and seat for wear or damage.

Inspect float height and pressure test needle and seat assembly prior to carb installation. See page 4.37.

Fuel Level

A fuel level test can be performed on some models if the drain hose fitting is accessible. Be sure to re-attach the bowl drain hose after performing the test. A fuel level test allows you to observe the height of the fuel in the float bowl without removing the carburetor. The fuel level can be observed with the engine either running or shut off, however, engine must run briefly to allow fuel level to stabilize. Be sure to review all fuel warnings on page 4.41 and 4.44.



1. Attach a clear line to drain fitting. Be sure line fits tightly on fitting. Position hose along side of carburetor as shown.
2. Open bowl drain screw by turning counterclockwise approximately two turns. Start and run engine for 3 to 5 seconds to allow fuel level to stabilize in the line. If level is out of specification, remove carburetor and inspect inlet needle and seat, float height, passages, etc.

Carburetor Float Bowl Draining

⚠ 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, see your doctor immediately.

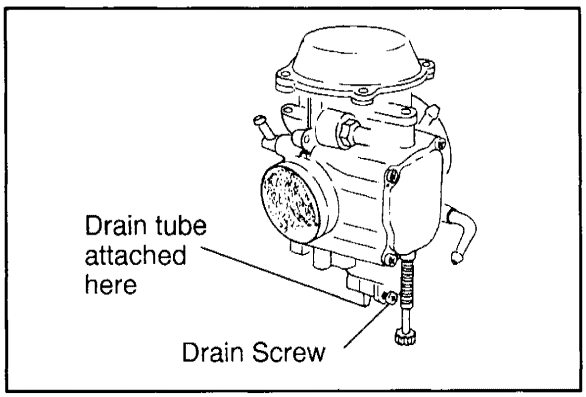
⚠ If you spill gasoline on your skin or clothing, immediately wash it off with soap and water and change clothing.

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

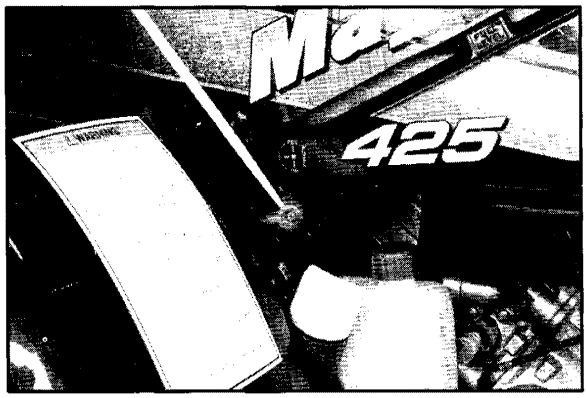
⚠ Never drain the float bowl when the engine is hot. Severe burns may result.

The carburetor float bowl should be drained periodically to remove moisture or sediment from the bowl, or before extended periods of storage.

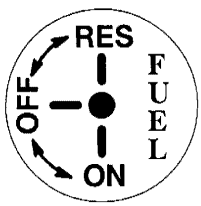
NOTE: The bowl drain screw is located on the bottom left side of the float bowl.



1. Turn fuel valve to the off position.



2. Remove left side body panel. See Body Panel Removal, page 5.3.
3. Place a clean container beneath the bowl drain spigot or bowl drain hose.
4. Turn drain screw out two turns and allow fuel in the float bowl and fuel line to drain completely.
5. Inspect the drained fuel for water or sediment.
6. Tighten drain screw.
7. Turn fuel valve to "on".
8. Start machine and check for leaks.



Fuel valve decal, located on left side of machine

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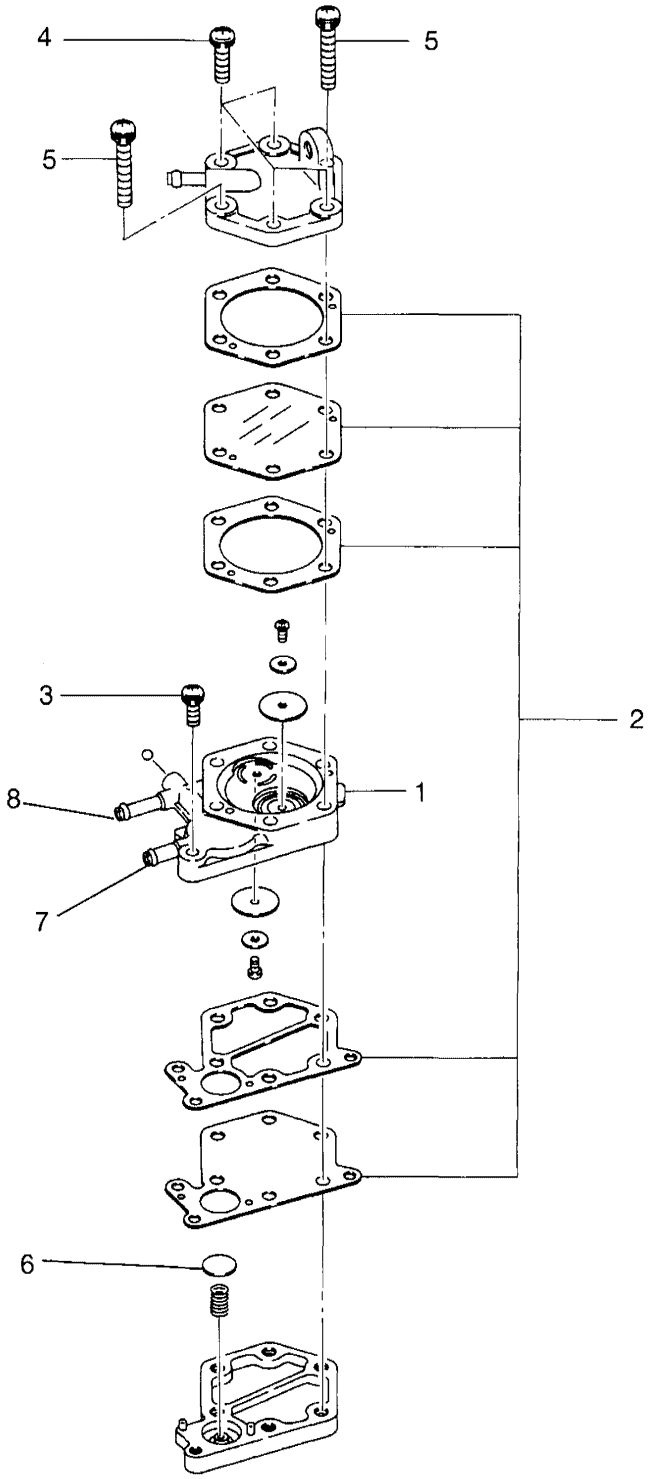


Fuel Pump Exploded View

1. Fuel Pump Assembly
2. Diaphragm, Gasket Set
3. Screw and Washer Assembly
4. Screw and Washer Assembly
5. Screw and Washer Assembly
6. Pressure Regulator
7. Fuel Inlet
8. Fuel Outlet

FUEL SYSTEM/CARBURETION
Fuel Pump

The fuel pump is located under the headlight cover at the front of the machine on 425 Magnums; at lower left side of fuel tank (near oil tank) on 500 Sportsman. To test the fuel pump:

1. Remove headlight cover. (425s only)
2. Turn fuel off.
3. Disconnect impulse line from pump.
4. Connect Mity-Vac™ (PN 2870975) to the impulse line fitting on the pump.
5. Apply 5 inches of mercury vacuum to the pump fitting. The diaphragm should hold vacuum indefinitely.

If fuel is present in the impulse line or vacuum chamber of the pump, the diaphragm is ruptured and the pump diaphragms must be replaced.

⚠ WARNING

Gasoline is extremely flammable and explosive under certain conditions.

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

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

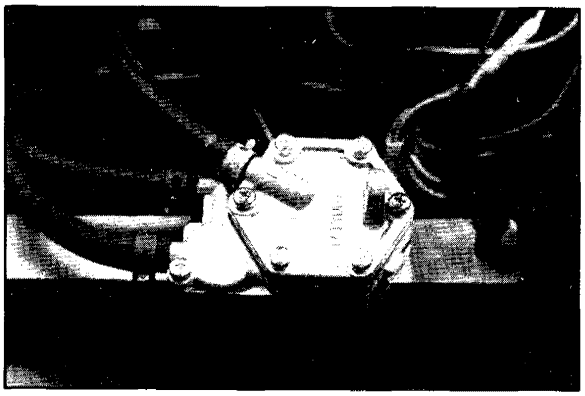
⚠ If you spill gasoline on your skin or clothing, immediately wash it off with soap and water and change clothing.

Fuel Pump Disassembly

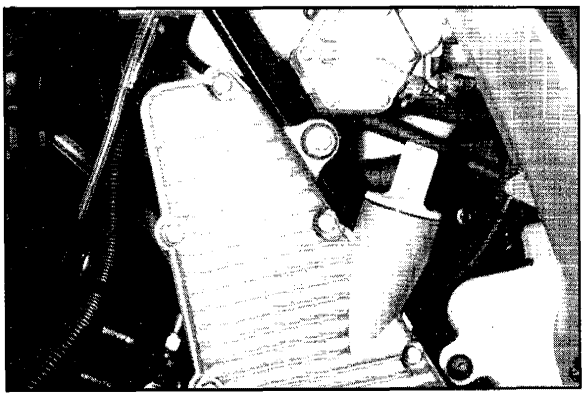
1. Refer to illustration on page 4.43.
2. Remove the screws from the pump diaphragm cover. Note the location of the two longer screws.
3. Remove the diaphragm cover gasket, diaphragm, and valve body gasket.
4. Remove the outlet check valve cover, diaphragm, and gasket.

Fuel Pump Inspection/Assembly

1. Inspect inlet and outlet check valves for cracks, warpage or damage. Inspect the diaphragms for cracks, holes or swelling.
2. To clean the valves or pump body, remove the set screw and washer. Remove the valve and wash with soap and water. Carburetor cleaner may be used to clean the pump body when the check valves are removed. **CAUTION:** Some carburetor cleaners are very caustic and should not be used to clean the non-metal parts of the fuel pump.
3. Check the sealing surfaces of the pump body and covers. Carefully remove all traces of old gasket and check the surfaces for damage. Replace diaphragms and gaskets as a set.
4. Reassemble the pump in the reverse order of disassembly. Tighten all screws evenly.



425 Fuel Pump Location



500 Fuel Pump Location

Fuel Starvation/Lean Mixture

Symptoms: Hard start or no start; Bogs, Backfires, Pops; Hesitation; Detonation; Low power; Spark plug erosion; Engine runs hot; Surging; Idles high, Idle varies.

- No fuel in tank
- Restricted tank vent, or routed improperly
- Fuel lines or fuel valve restricted
- Fuel filter plugged
- Carburetor vent line(s) restricted
- Plugged or restricted inlet needle and seat screen or inlet passage
- Clogged jets or passages
- Float stuck, holding inlet needle closed or inlet needle stuck
- Float level too low
- Fuel pump inoperative (4 Strokes)
- Air leak at impulse line (4 Strokes)
- Restricted impulse line (kinked, pinched) (4 Strokes)
- Intake air leak (throttle shaft, intake ducts, airbox or air cleaner cover)
- Ruptured vacuum slide diaphragm; Vacuum slide stuck closed or sticky (4 Strokes)
- Improper spring (4 Strokes)
- Jet needle position incorrect
- Incorrect pilot screw adjustment

Rich Mixture

Symptoms: Fouls spark plugs; Black, sooty exhaust smoke; Rough idle; Poor fuel economy; Engine runs rough/misses; Poor performance; Bogs; Engine loads up; Backfires, Pops.

- Air intake restricted
- Air filter dirty/plugged
- Choke plunger sticking, incorrectly adjusted choke
- Choke cable binding or improperly routed
- Incorrect pilot air/fuel screw adjustment
- Faulty inlet needle and seat
- Faulty inlet needle seat O-Ring
- Float level too high
- Poor fuel quality (old fuel)
- Loose jets
- Worn jet needle/needle jet or other carburetor parts
- Dirty carburetor (air bleed passages or jets)
- Weak or damaged vacuum piston return spring (4 Strokes)
- Fouled spark plug

Poor Idle

Symptoms: Idles too high.

- Idle adjusted improperly/idle mixture screw damaged
- Sticky vacuum slide (4 Strokes) or throttle valve (2 strokes)
- Throttle cable sticking, improperly adjusted, routed incorrectly
- Choke cable sticking, improperly adjusted, routed incorrectly

Troubleshooting

Idle Too Low

- Choke cable bending or incorrectly adjusted
- Idle speed set incorrectly
- Idle mixture screw misadjusted or damaged
- Belt dragging
- Ignition timing incorrect
- Worn jet needle/needle jet

Erratic Idle

- Choke cable bending or incorrectly adjusted
- Throttle cable incorrectly adjusted
- Air leaks, dirty carburetor passages (pilot circuit)
- Pilot mixture screw damaged or adjusted incorrectly
- Tight valves
- Ignition timing incorrect
- Belt dragging
- Dirty air cleaner
- Engine worn
- Spark plug fouled
- Idle speed set incorrectly (speed limiter)
- Worn jet needle/needle jet

CHAPTER 5
BODY AND STEERING

Torque Specifications

*Suspension / Steering

Front A-Arm Attaching Bolt ..... 30 ft. lbs. (4.14 kg-m)
Front A-Arm Ball Joint Stud Nut ..... 25 ft. lbs. (3.45 kg-m)
Handlebar Adjuster Block ..... 10-12 ft. lbs. (1.38-1.66 kg-m)
Master Cylinder ..... 45-55 in. lbs. (.52-.63 kg-m)
Rear Axle Nut and Lock Nut ..... 150 ft. lbs. (20.70 kg-m)
Rear Axle Nut - Concentric Swingarm (Tapered Roller Bearings)
(Left side) ..... 120 ft. Lbs.
(Right side) ..... 8-10 ft. lbs.
Rear Shock Bolt (upper) ..... 25 ft. lbs. (3.45 kg-m)
Rear Shock Bolt (lower) ..... 25 ft. lbs. (3.45 kg-m)
Rear Wheel Hub Nut (Shaft Drive Models) ..... 100 ft. lbs. (13.83 kg-m)
Rear Wheel Hub Nut ..... 80 ft. lbs. (11.06 kg-m)
Rear Wheel Nuts (Chain Drive Models) ..... 50 ft. lbs. (6.91 kg-m)
Rear Wheel Nuts (Shaft Drive Models) ..... 15 ft. lbs. (2.07 kg-m)
Strut Rod Retaining Nut (Top) ..... 15 ft. lbs. (2.07 kg-m)
Strut Casting Pinch Bolt ..... 15 ft. lbs. (2.07 kg-m)
Swing Arm Pivot Bolt (standard swingarm) .... 55 ft. lbs. (7.59 kg-m)
Swing Arm Pivot Bolt (concentric swingarm) ... 150 ft. lbs. (20.70 kg-m)
Tie Rod End Jam Nut ..... 12-14 ft. lbs. (1.66-1.93 kg-m)
Tie Rod End Castle Nut ..... 23-24 ft. lbs. (3.18-3.31 kg-m)
Tie Rod End Attaching Bolt ..... 25-30 ft. lbs. (3.45-4.14 kg-m)

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

Special Tools

Description	Part No.
Strut and Ball Joint Tool Set	2870871
Shock Spanner Wrench	2870872
Shock Spring Compressor Tool	2870623
Strut Rod Holding Wrench	2871572
Strut Spring Compressor Tool (LH)	2871573
Strut Spring Compressor Tool (RH)	2871574
Body Holding Tool	2871017
Safety Needle	7052069
Shock Spring Compressor Tool	2870623
Gas Shock Recharging Kit	2200421
Damper Rod Holding Tool	2871352
Fox™ Shock IFP Tool	2871351

Body Styles

1996 Body Styles

Body Style	Model
Gen II	Trail Boss, Magnum 2x4, Magnum 4x4, Magnum 6x6, 400 6x6, Sportsman 4x4
Gen III	Trail Blazer, Sport, Scrambler
Gen IV	Xpress 300, Xplorer 300, Xpress 400, Xplorer 400, Sportsman 500

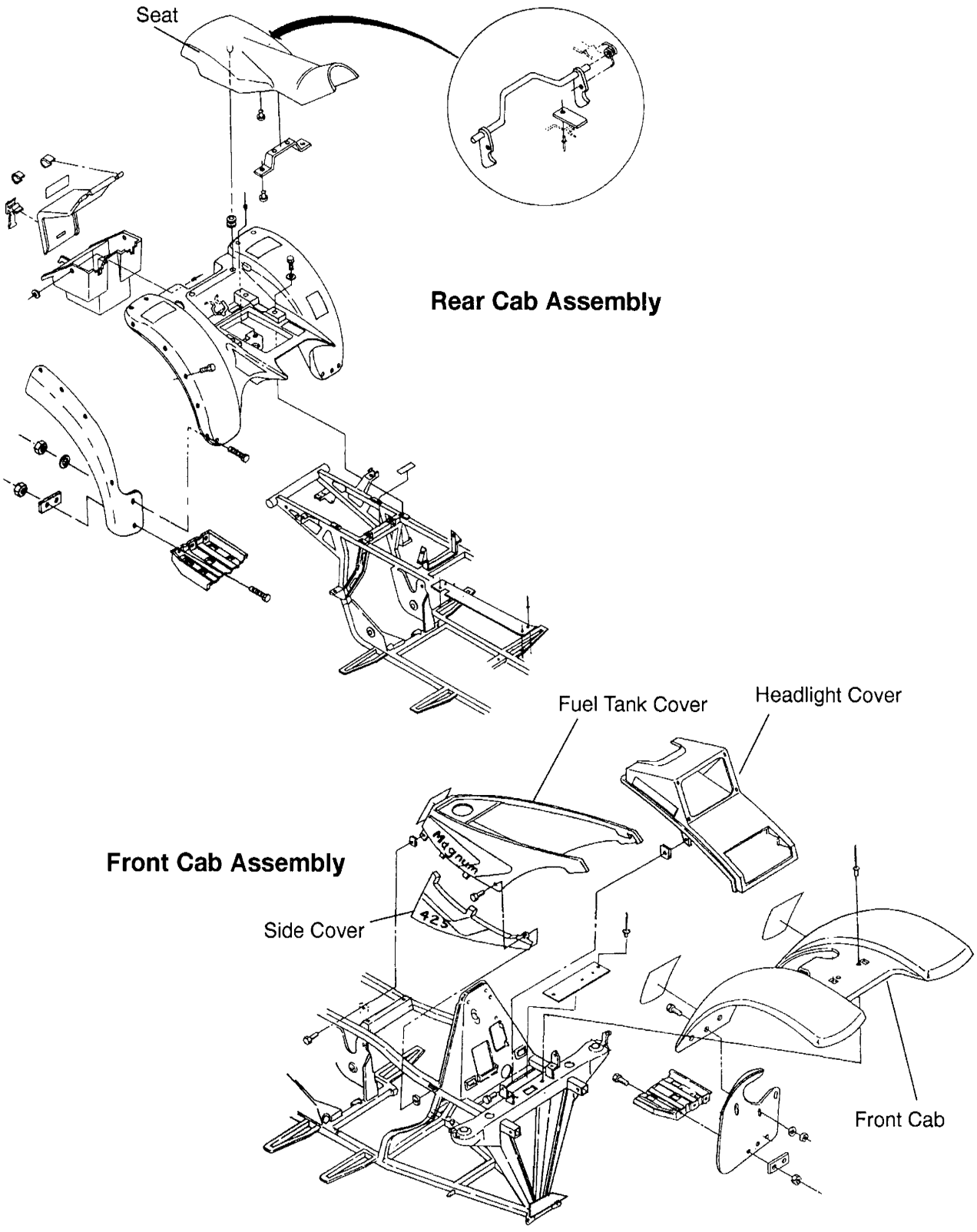
1997 Body Styles

Body Style	Model
Gen II	Trail Boss, Sportsman 4x4, Magnum 2x4, Magnum 4x4, Magnum 6x6, 400 6x6,
Gen III	Trail Blazer, Sport, Scrambler 4x4, Scrambler 500
Gen IV	Xpress 300, Xplorer 300, Xpress 400, Xplorer 400, Xplorer 500, Sportsman 500

1998 Body Styles

Body Style	Model
Gen II	Trail Boss, Magnum 2x4, Magnum 4x4, Big Boss 500 6x6,
Gen III	Trail Blazer, Sport 400, Scrambler 400, Scrambler 500
Gen IV	Xpress 300, Xplorer 300, Xplorer 400, Sportsman 500

Body Assembly Exploded View (Gen II - Typical)



All warning information labels must be in place when body parts are assembled.

Cover/Panel Removal (Gen II - Typical)

To Remove:	Perform These Steps:
Seat	Pull release lever at the rear of the seat Lift and pull seat rearward, disengaging seat from tabs at the rear of the fuel tank
Fuel tank cover	Remove: Seat Ignition key Side panels Fuel cap 2 retaining screws at rear of fuel tank cover 2 retaining screws at side of fuel tank cover Disengage tabs at front of cover on left and right side
Side panels	Remove: Seat 1 screw on left side front 1 screw on right side front
Headlight cover	Remove: Seat Fuel tank cover 2 Torx™ screws at rear of cover 1 screw on left front 1 screw on right front Disconnect headlamp wiring harness
Radiator cap access panel	Turn fastener at front 1/4 turn
Rear rack	Remove: Seat 2 bolts, nuts and washers at rear of rack 2 bolts, nuts and washers at front of rack
Rear cab assembly	Remove: Seat Rear rack 3 screws, nuts and washer plate at rear of left footrest 2 screws, nuts and washer plate at rear of right footrest 6 bolts and flat washers from top of cab assembly, under seat 2 screws at front of muffler guard
Front rack	Remove: 4 bolts, nuts and washers
Front cab assembly	Remove: Seat Side panels Fuel tank cover Headlight cover Front rack Fuel pump bracket 3 screws, nuts and washers from left footrest 2 screws, nuts and washers from right footrest 2 rivets at top of cab beneath fuel pump bracket

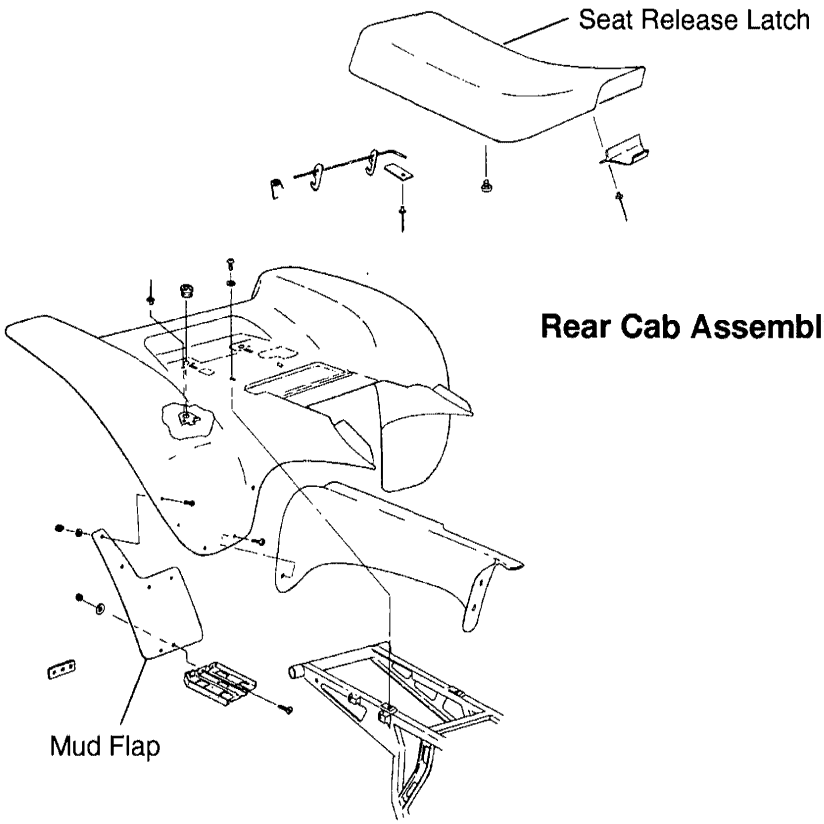
BODY AND STEERING
Cover/Panel Removal (Gen III - Typical)

To Remove:	Perform These Steps:
Seat	Pull release lever at left rear of seat Lift and pull seat rearward, disengaging seat from tabs at the rear of the fuel tank
Headlight cover	Remove: Oil tank cap Disengage tabs on both sides and rear Disconnect headlamp wiring harness
Rear cab assembly	Remove: Seat 3 screws, nuts and washer plate at rear of left footrest 2 screws, nuts and washer plate at rear of right footrest 4 bolts and flat washers from top of cab assembly 2 screws at rear of muffler guard 2 screws at rear of front cab on each side Disconnect taillight harness
Front cab assembly	Remove: Seat Fuel tank cap Headlight cover 3 screws, nuts and washers from left footrest 2 screws, nuts and washers from right footrest 2 rivets at top of cab beneath fuel pump bracket 2 screws at rear of front cab on each side 2 screws in front top of cab 2 Torx™ screws on key switch face plate Key Key switch face plate

Cover/Panel Removal (Gen IV - Typical)

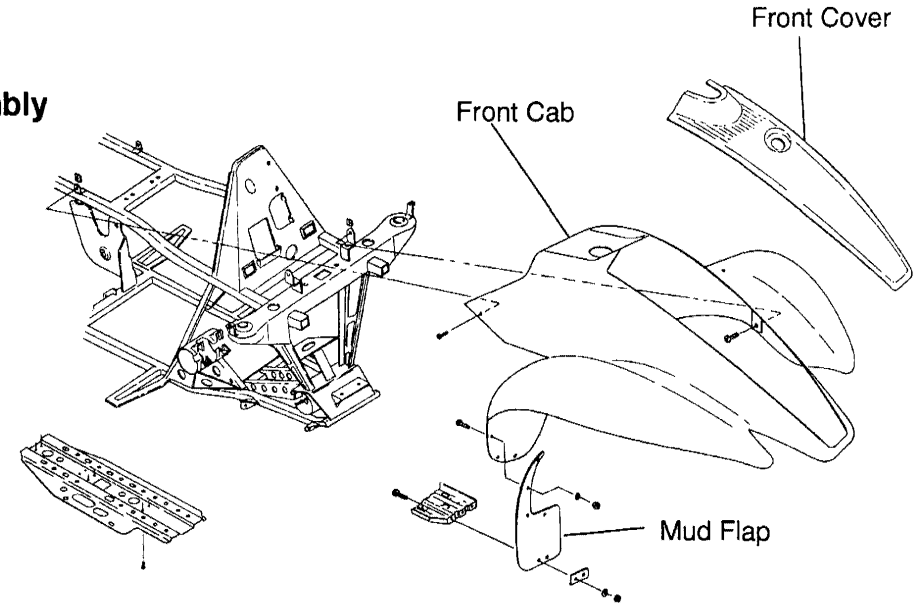
To Remove:	Perform These Steps:
Seat	Pull release lever at the rear of the seat Lift and pull seat rearward, disengaging seat from tabs at the rear of the fuel tank
Side panels	Remove: Seat Disengage tabs at front and rear
Headlight pod	Remove: 2 Phillips screws at front 3 Phillips screws at rear Lift upper half of pod and disconnect speedometer cable Disconnect indicator lamp wiring harness connector Disengage side tabs Remove upper half of pod Remove 2 screws from mounting bracket Disconnect connector at rear of headlamp Remove lower half of pod
Radiator cap access panel	Remove: Front rack Disengage tabs at front and rear Lift panel out
Rear rack	Remove: Seat 2 bolts at rear of rack 2 bolts at front of rack
Rear cab assembly	Remove: Seat Rear rack 1 screw, nut and washer at rear of inner left footrest 4 screws at bottom of left rear mudflap 1 screw, nut and washer at rear of inner right footrest 4 screws at bottom of right rear mudflap 4 bolts and flat washers from top of cab assembly, under seat 2 screws at rear bottom of cab assembly near tail light Disconnect taillight harness
Front rack	Remove: 4 screws, lock washers, and flat washers
Front cab assembly	Remove: Seat Side panels 2 screws at rear of cab at fuel tank mount bracket Front rack Front bumper Front panel 3 screws from bottom left mudflap 3 screws from bottom right mudflap 1 inner screw from front cab to foot rest on each side 2 screws under front panel

Body Assembly Exploded View (Gen III - Typical)

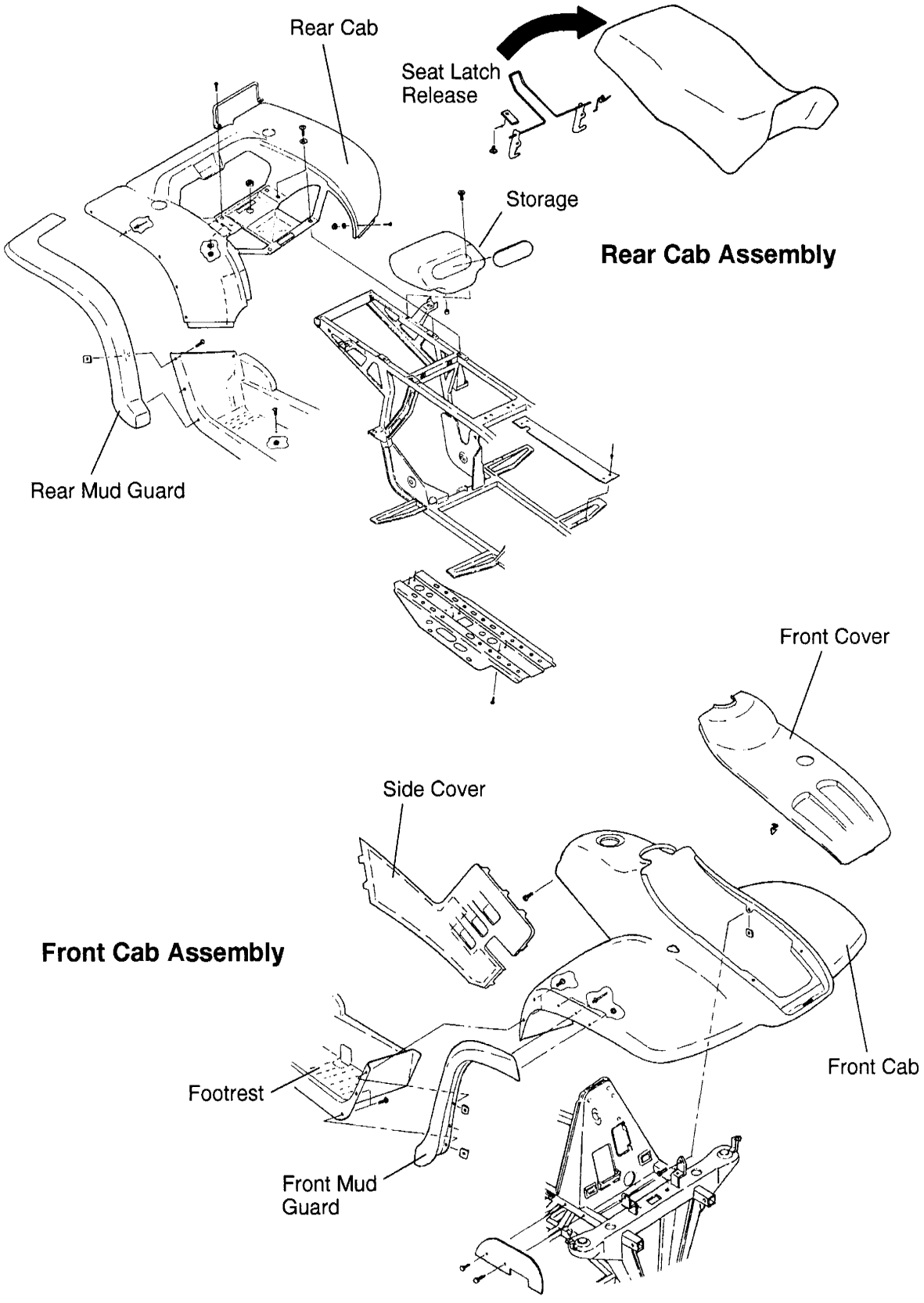


Rear Cab Assembly

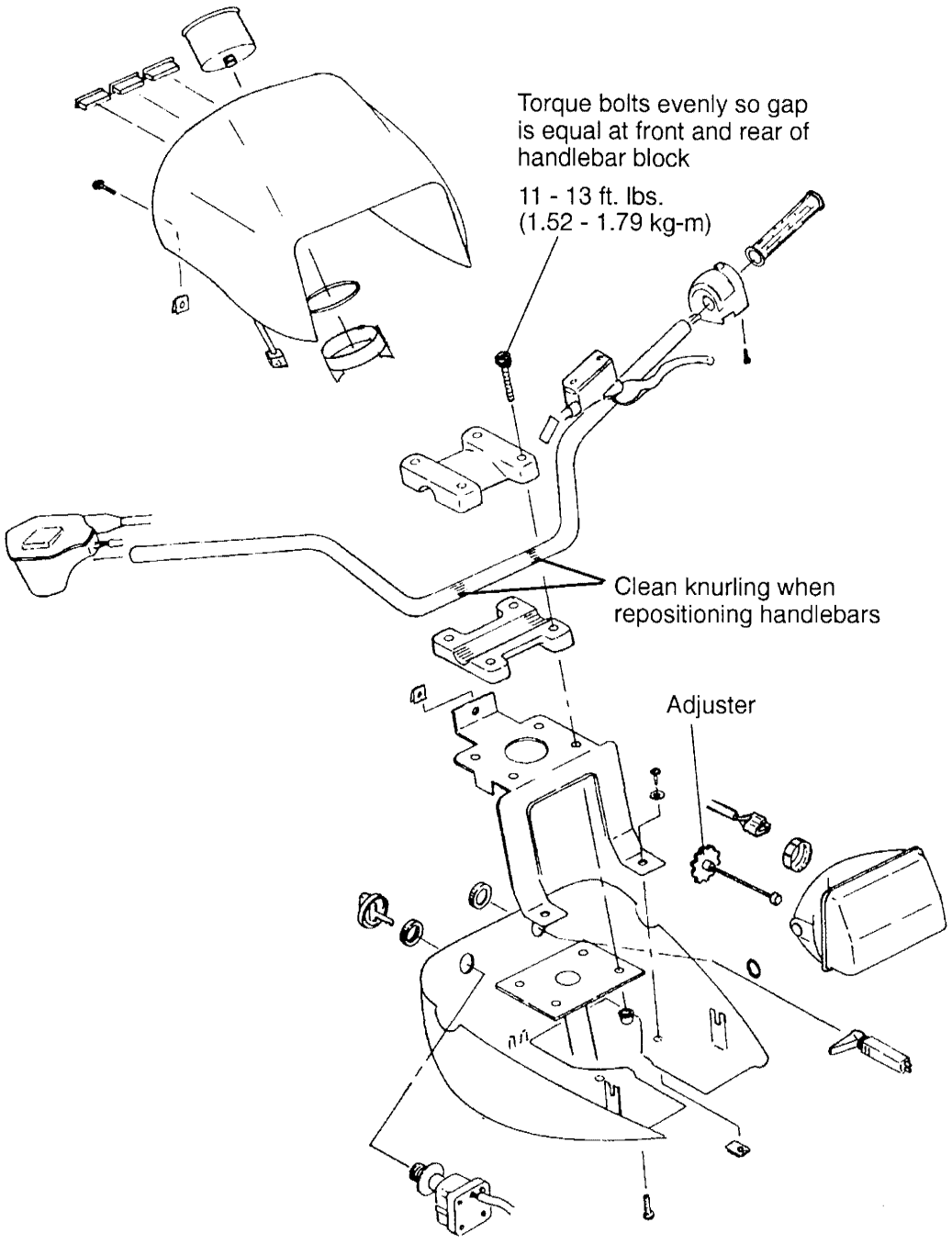
Front Cab Assembly



Body Assembly Exploded View (Gen IV - Typical)

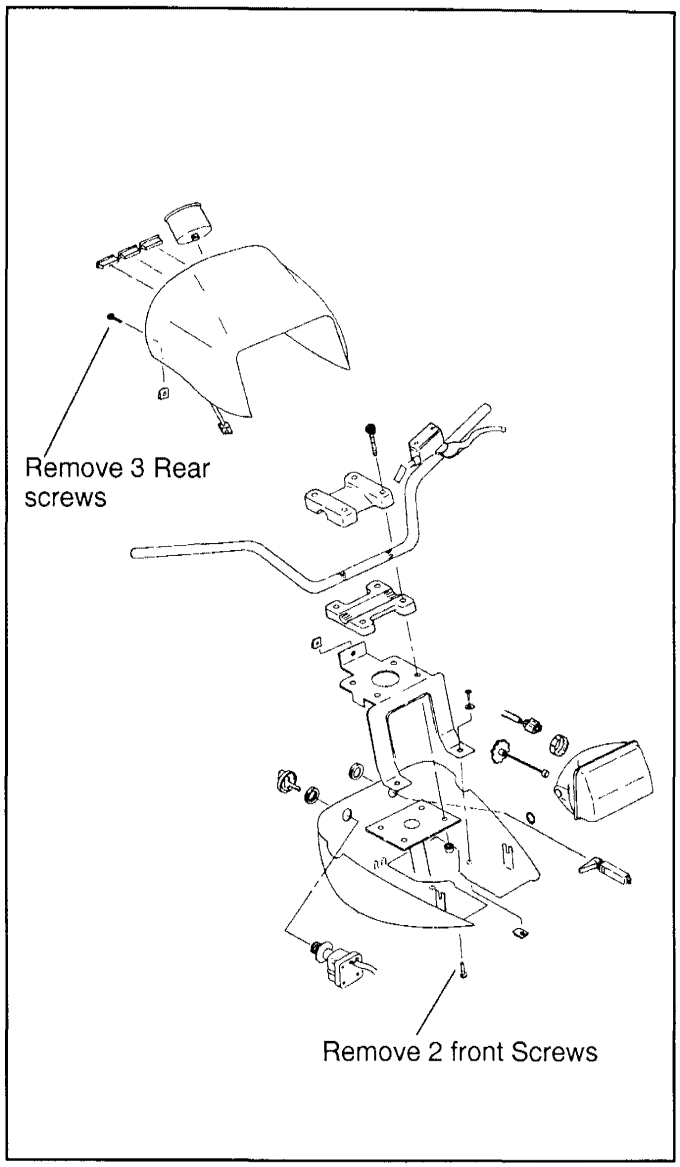


Body Assembly Exploded View (Gen IV - Headlight Pod)



Disassembly

1. Remove two front Phillips screws.
2. Remove three rear Phillips screws.
3. Lift top half of pod.
4. Disconnect speedometer cable.
5. Disconnect indicator light wire coupler.
6. Remove ignition switch and choke cable.
7. Remove three screws securing bottom half of pod.



Installation

1. Install bottom of pod onto handlebar and secure to brackets.

CAUTION:

Do not over tighten screws or holes may strip.

2. Install key switch, choke cable, and headlight.

3. Connect indicator light wire coupler to indicator lights in top half of pod.

4. Connect speedometer cable to speedometer.

5. Install top of pod onto bottom half, making sure interlocking tabs mate properly.

6. Install two front Phillips screws.

NOTE: When assembling a new pod, use the screw to pre-thread the two front holes in the top pod before mating halves.

7. Install three rear Phillips screws, aligning with Tinnerman™ clips.

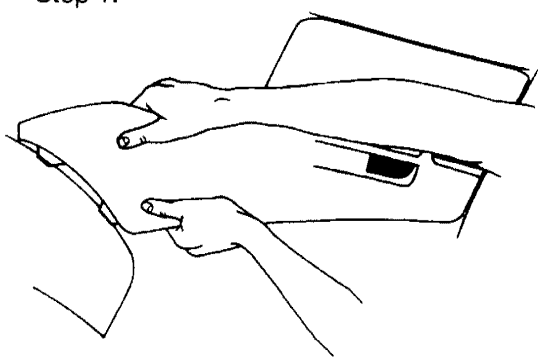
8. To adjust headlight, refer to procedure outlined in Maintenance chapter.

Side Panel Removal (Gen IV - Typical)

Side panel removal may be difficult until the locking tabs and receivers have been snapped and un-snapped a few times.

1. Remove seat. Grasp rear of side panel near rear cab. With a quick and firm motion, pull the panel forward and outward to disengage the two rear tabs.

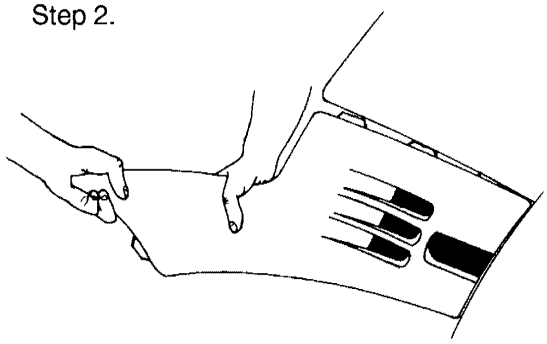
Step 1.



Pull forward and out to disengage two rear tabs.

2. Place hand on top of side panel behind the fuel tank. With a quick and firm motion, push down on the side panel to disengage the top rear two tabs. Then pull up on side panel to disengage front upper and lower tab.

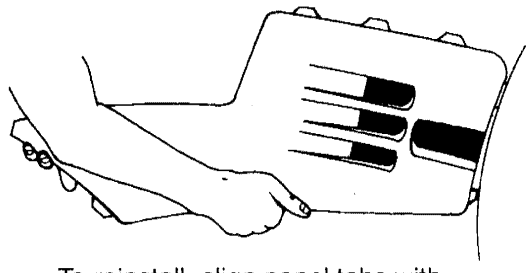
Step 2.



Push down to disengage top rear two tabs.

3. To reinstall side panel, align panel tabs with slots on front cab. Push panel upward and forward until tabs lock. Bend rear of side panel and insert the two tabs into the rear cab.

Step 3.



To reinstall, align panel tabs with slots. Push upward and forward until tabs lock.

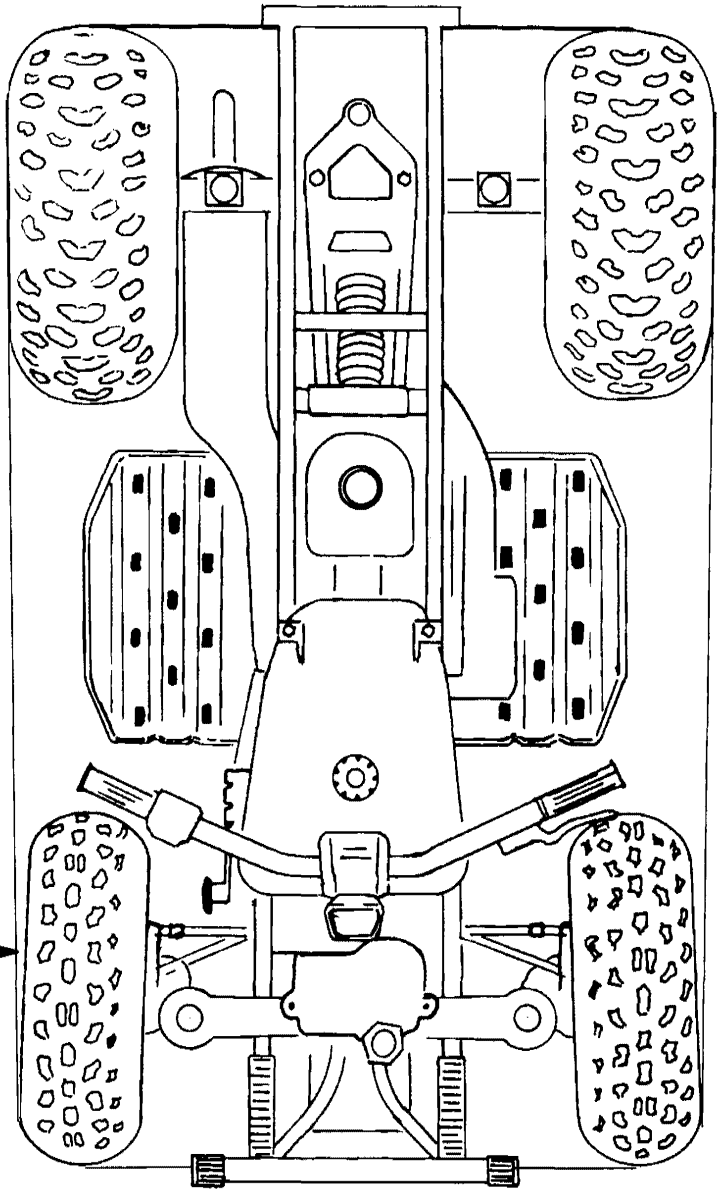
Toe Alignment

CAUTION: 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 Dealer.

Method 1

Be sure to keep handlebars centered.

If adjustment is required refer to page 5.9 for procedure and cautions.

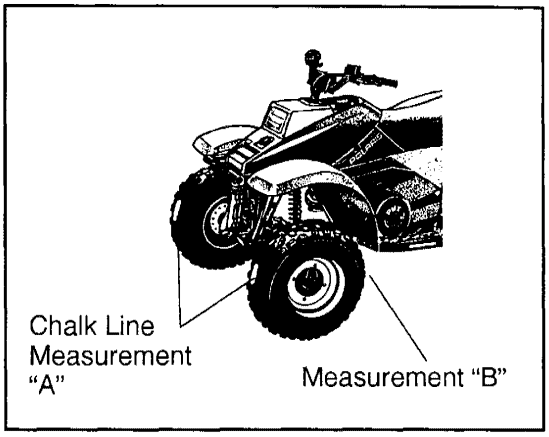


NOTE: The steering frog can be used as an indicator of whether the handlebars are straight. The frog should always point straight back from the steering post.

CAUTION: 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 Dealer.

Method 2

1. Place machine on a smooth level surface.
2. Set handlebars in a straight ahead position and secure handlebars in this position. **NOTE:** The steering frog can be used as an indicator of whether the handlebars are straight. The frog should always point straight back from the steering post.
3. Place a chalk mark on the face of the front tires approximately 10″ (25.4 cm) from the floor as close to the horizontal center line as possible. Call this measurement "A". **NOTE:** It is important that both marks be equally positioned from the ground in order to get an accurate measurement.



4. Measure the distance between the marks.
5. Rotate the tires 180° by moving vehicle forward or backward. Position chalk marks approximately 10″ (25.4 cm) from the floor. Call this measurement "B".
6. Again measure the distance between the marks. Subtract measurement "B" from measurement "A". The difference between measurements "A" and "B" is called 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).

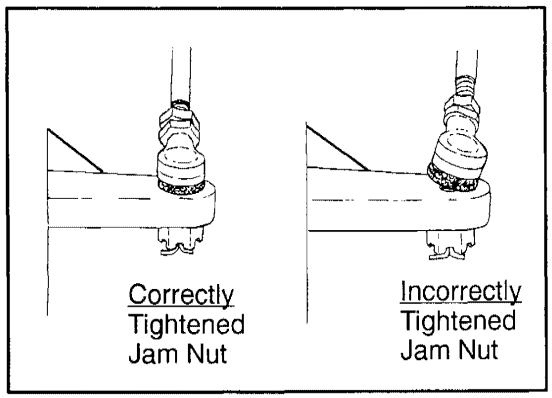
Toe Alignment

7. If toe alignment is incorrect, measure the distance between vehicle center and each wheel. This will tell you which tie rod needs adjusting. **NOTE:** Be sure handlebars are straight ahead before determining which tie rod(s) need adjustment.

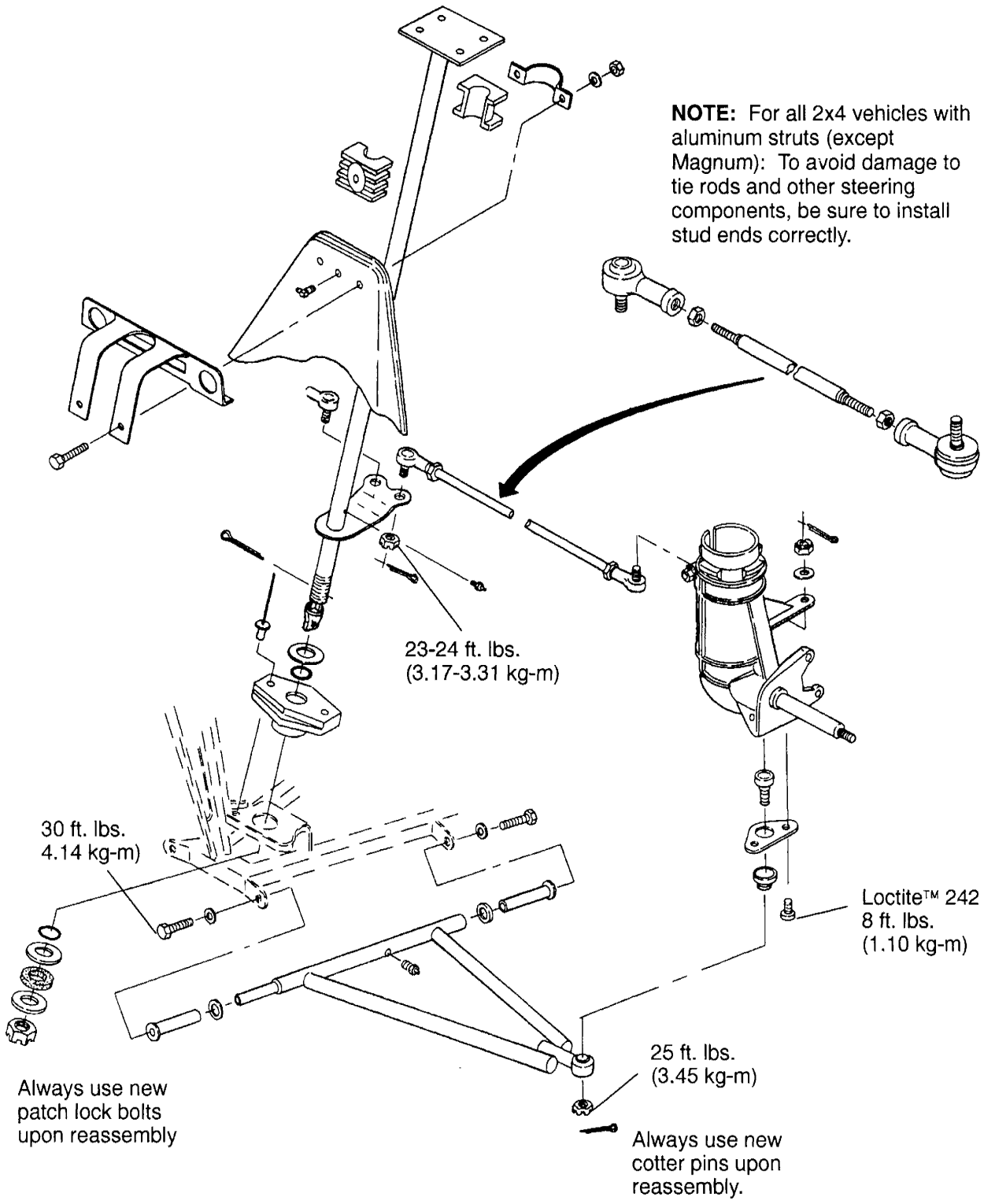
CAUTION: During tie rod adjustment it is very important that the following precautions be taken when tightening tie rod end jam nuts. If the rod end is positioned incorrectly it will not pivot, and may break.

- To adjust toe alignment, the jam nuts must be loosened and the tie rod either shortened or lengthened for proper toe setting.
- When the tie rod end jam nuts are tightened, be sure to hold tie rod ends so they are parallel with the steering arm or the steering frog, respectively.

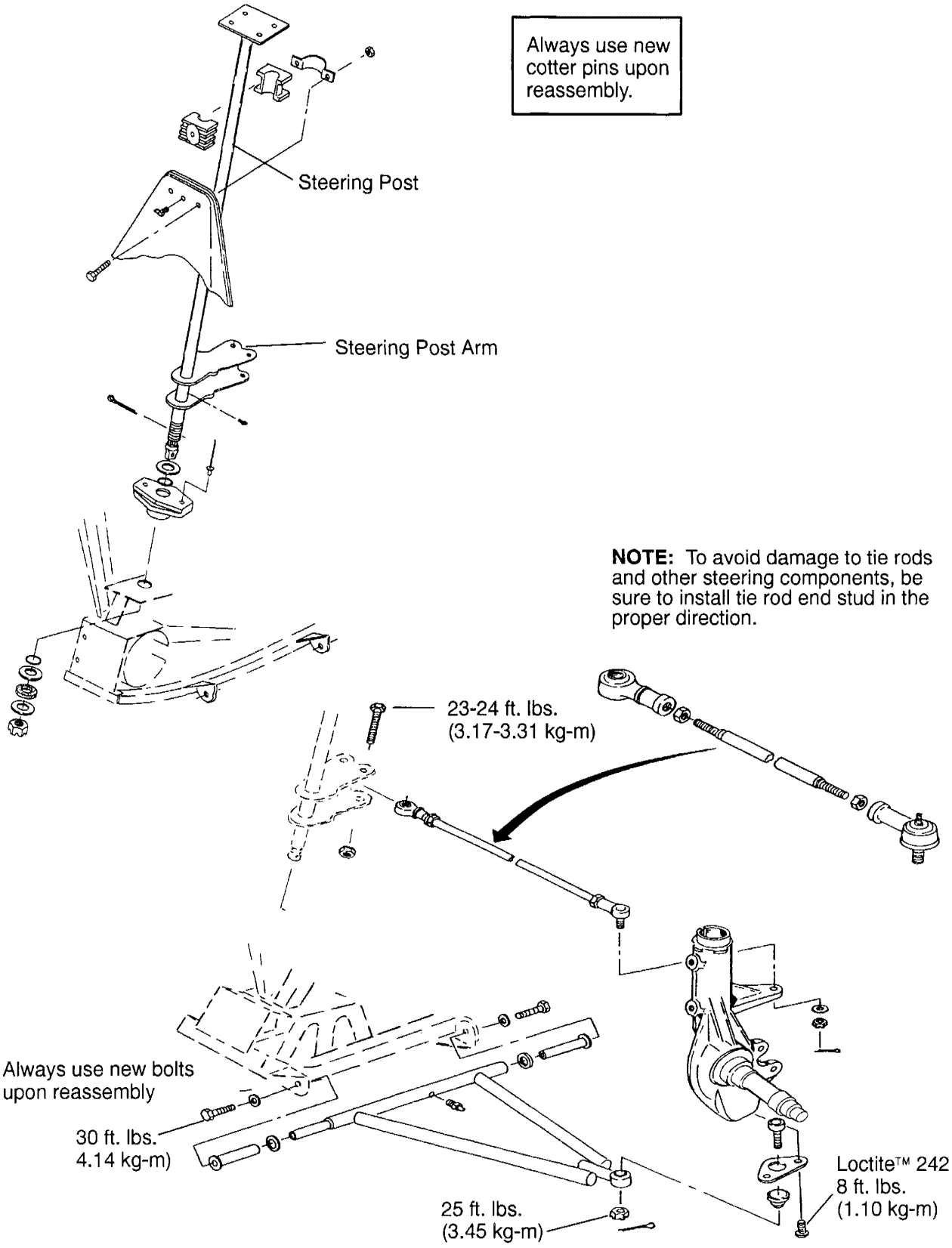
8. After alignment is complete, torque jam nuts to 12-14 ft. lbs. (1.66-1.93 kg-m).



Typical Steering Assembly, Exploded View, Trail Boss 250

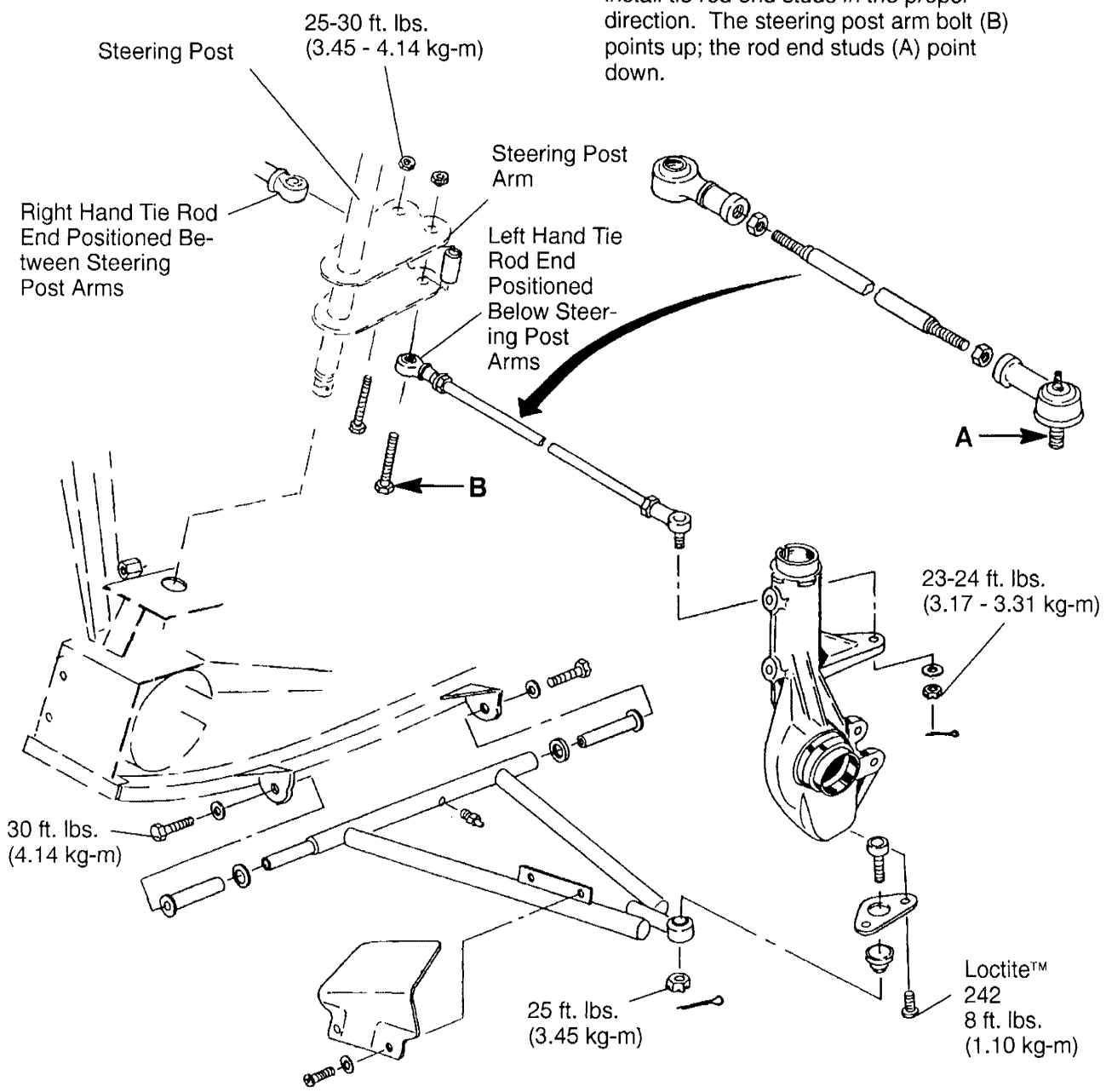


Steering Assembly, Exploded View, 2x4 Models (Except Trail Boss 250)



Steering Assembly, Exploded View, All 4x4 and 6x6 Models

NOTE: To avoid damage to tie rods and other steering components, be sure to install tie rod end studs in the proper direction. The steering post arm bolt (B) points up; the rod end studs (A) point down.



Always use new bolts upon reassembly

Always use new cotter pins upon reassembly.

Rear Axle Bend

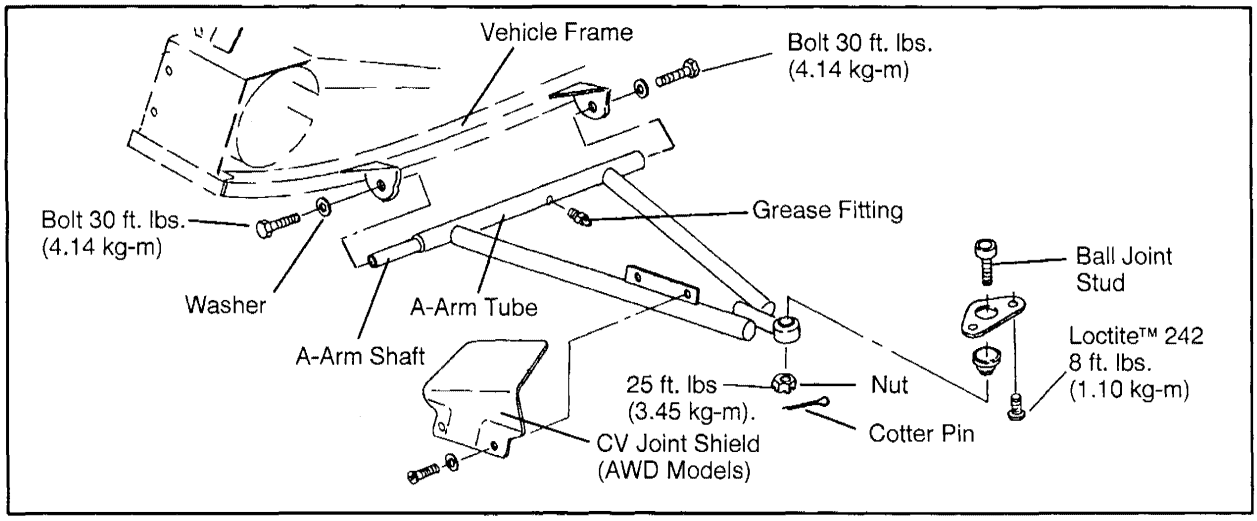
The rear axle shaft is hardened to approximately 3" to 4" (7.6 to 10 cm) from the outer ends. This allows the shaft to bend in case of impact or accident. Small amounts of axle runout can be straightened using V blocks, a hydraulic press, and a dial indicator. **CAUTION:** Do not use heat on any part of the axle. Heat will destroy the temper and cause the shaft to become brittle.

A-Arm Replacement

1. Lay a pad or tarp on floor and carefully tip vehicle onto its side with the A-arm to be replaced in the upright position. **NOTE:** To be sure fuel spillage does not occur, only perform this operation when the fuel tank is half full or less.
2. Remove cotter pin from ball joint stud at wheel end of A-arm and loosen nut until it is flush with end of stud.
3. Using a soft face hammer, tap nut to loosen A-arm from bolt. Remove nut and A-arm from hub strut assembly.

CAUTION: On 4x4 models, when removing the A-arm from the ball joint stud, *do not* over extend the CV axle assembly. Over extension may disengage the CV joint. If the CV joint is disengaged, it must be disassembled and repaired. To prevent over extension, tie a wire between the lower strut casting pinch bolt and the inner axle universal joint.

4. Loosen two bolts on A-arm tube by alternating each about 1/3 of the way until A-arm can be removed.
5. Examine A-arm shaft. Replace if worn. Discard hardware.
6. Insert A-arm shaft into new A-arm. **NOTE:** On 4x4 models the CV joint shields will need to be attached to the A-arm. See Ill.



7. Install new A-arm assembly onto vehicle frame. Torque bolts to 30 ft. lbs. (4.14 kg-m).

⚠ WARNING

The locking features on the existing bolts were destroyed during removal. **DO NOT** reuse old bolts. Serious injury or death could result if fasteners come loose during operation.

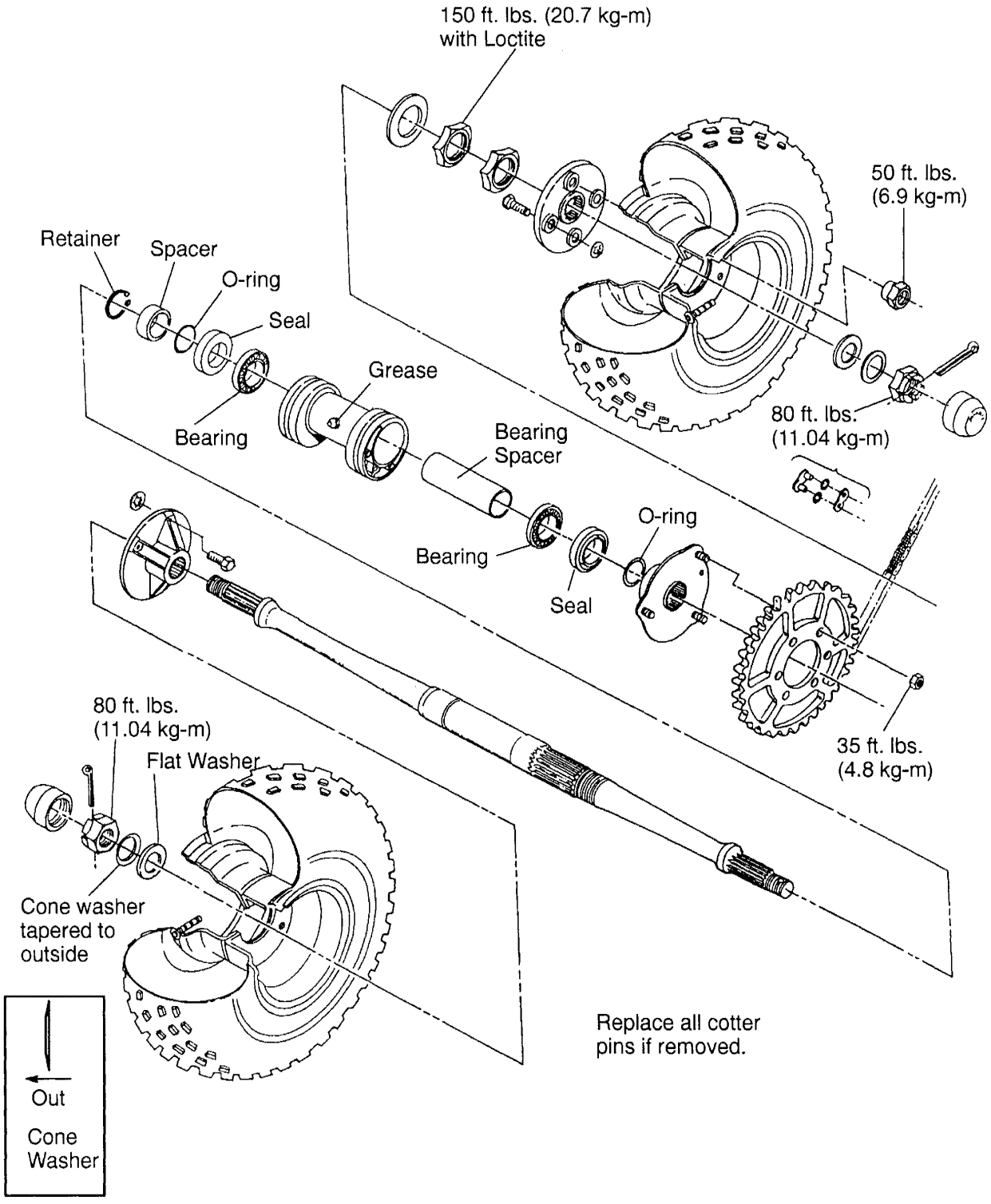
8. Attach A-arm to hub strut assembly. Tighten ball joint nut to 25 ft. lbs. (3.45 kg-m). If cotter pin holes are not aligned, tighten nut slightly to align. Install a new cotter pin with open ends toward rear of machine. Bend both ends in opposite directions around nut.
9. Locate grease fitting in center of A-arm tube and pump A-arm full of grease.
10. Carefully return vehicle to upright position.

A-arm Attaching Bolt Torque:
30 ft. lbs. (4.14 kg-m)
Ball Joint Stud Nut Torque:
25 ft. lbs. (3.45 kg-m)

⚠ WARNING

Upon A-arm installation completion, test vehicle at low speeds before putting into regular service.

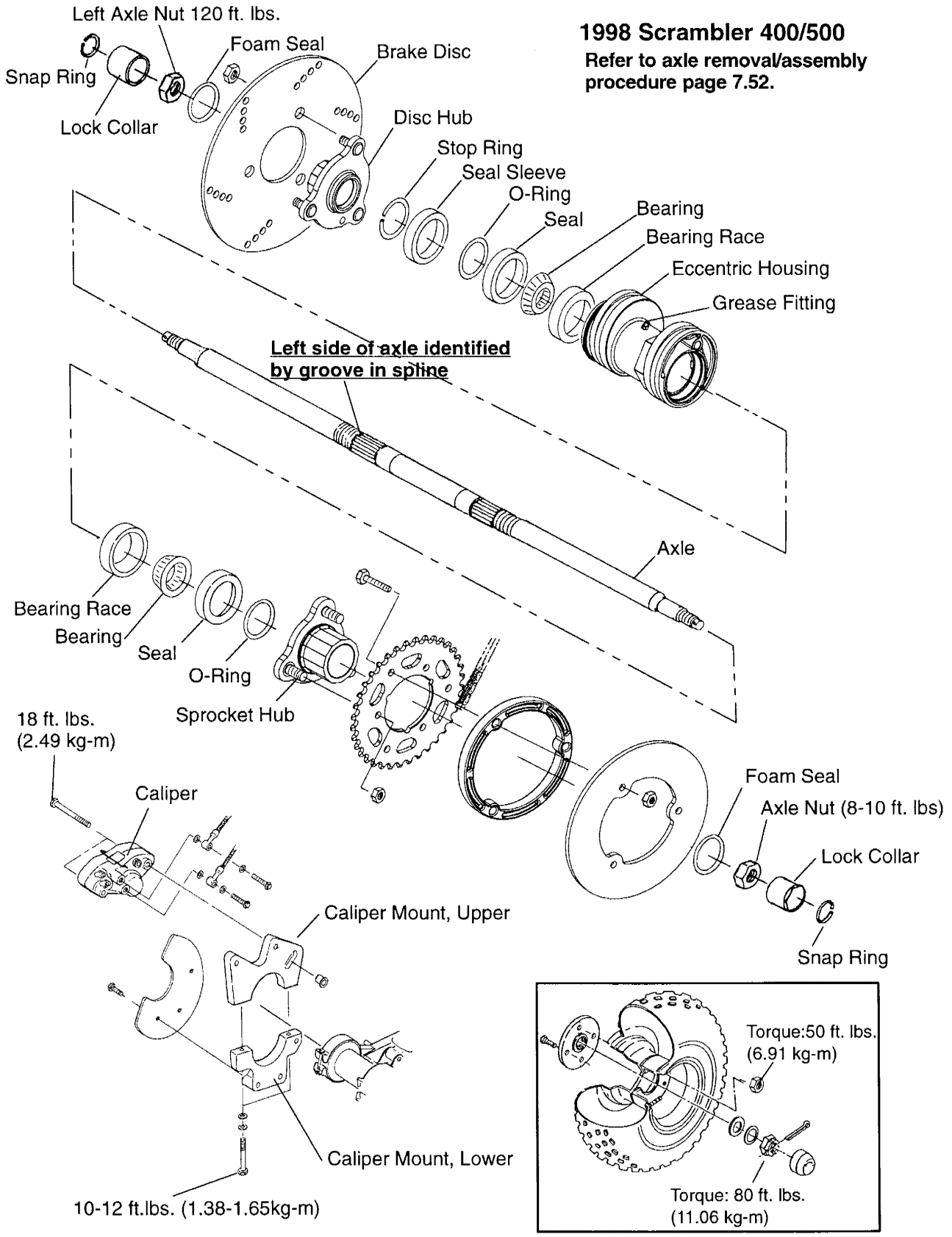
Rear Drive Axle, Hub and Wheel Assembly, - 2x4 and 4x4 (Except Sportsman 500)



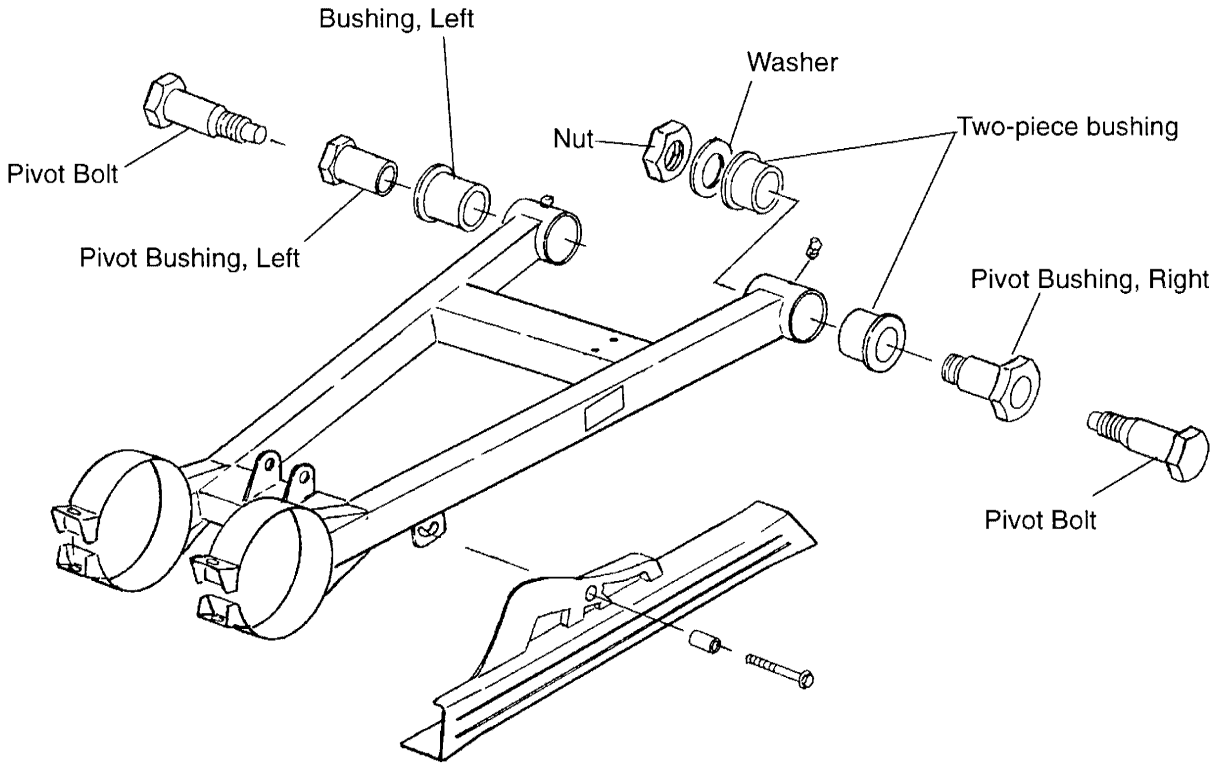
Concentric Swingarm Rear Axle Assembly, Exploded View

1998 Scrambler 400/500

Refer to axle removal/assembly procedure page 7.52.

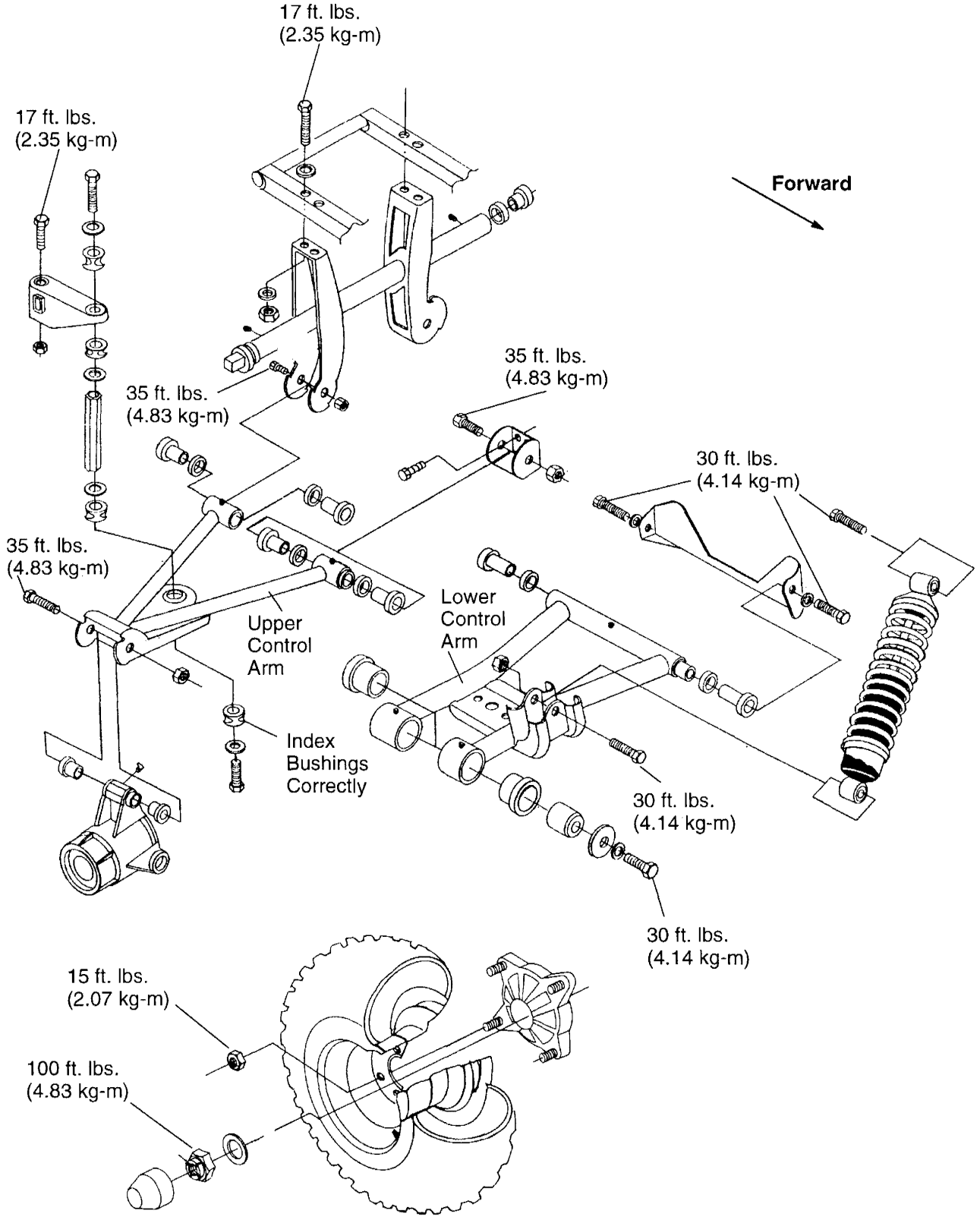


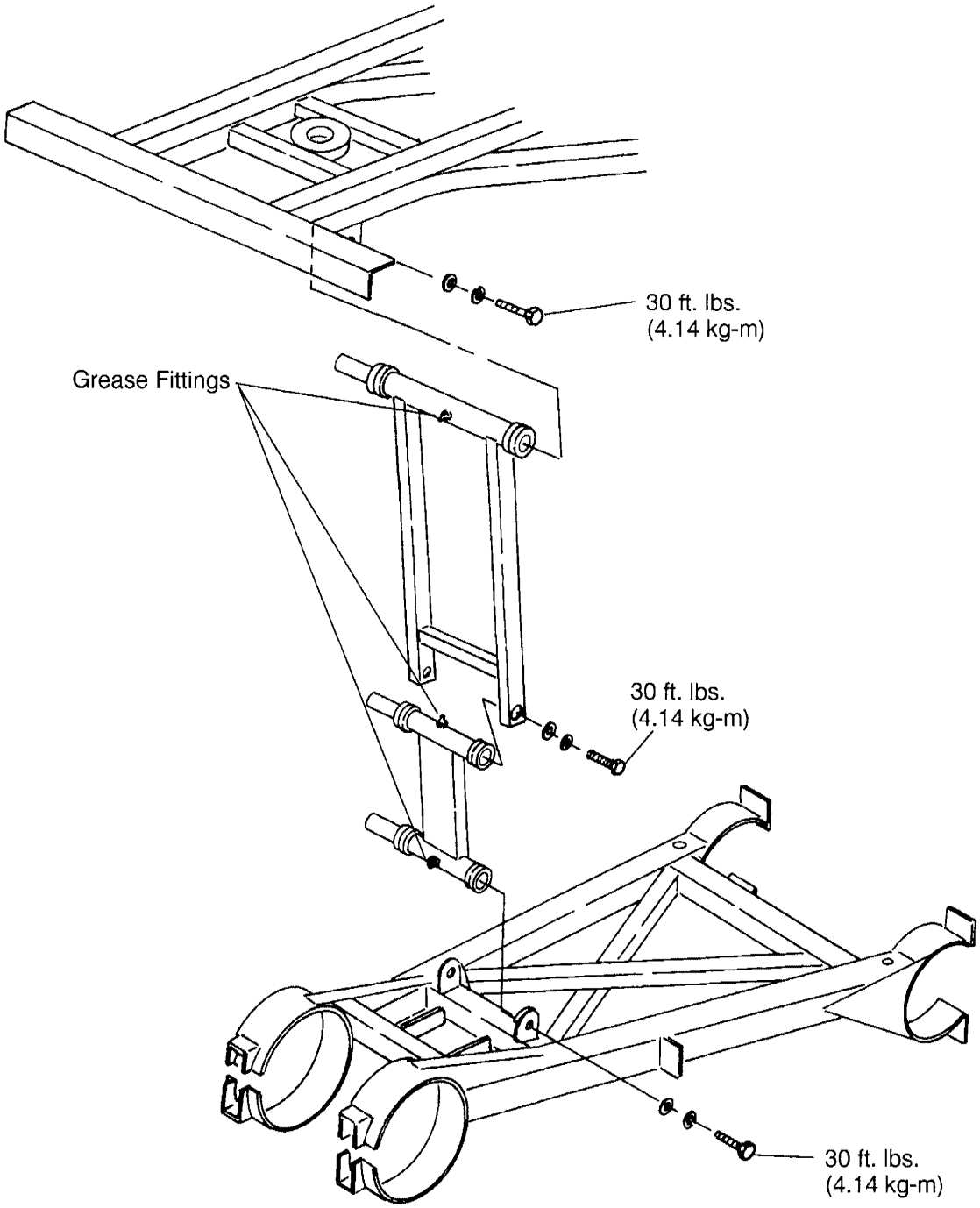
1998 Scrambler 400/500

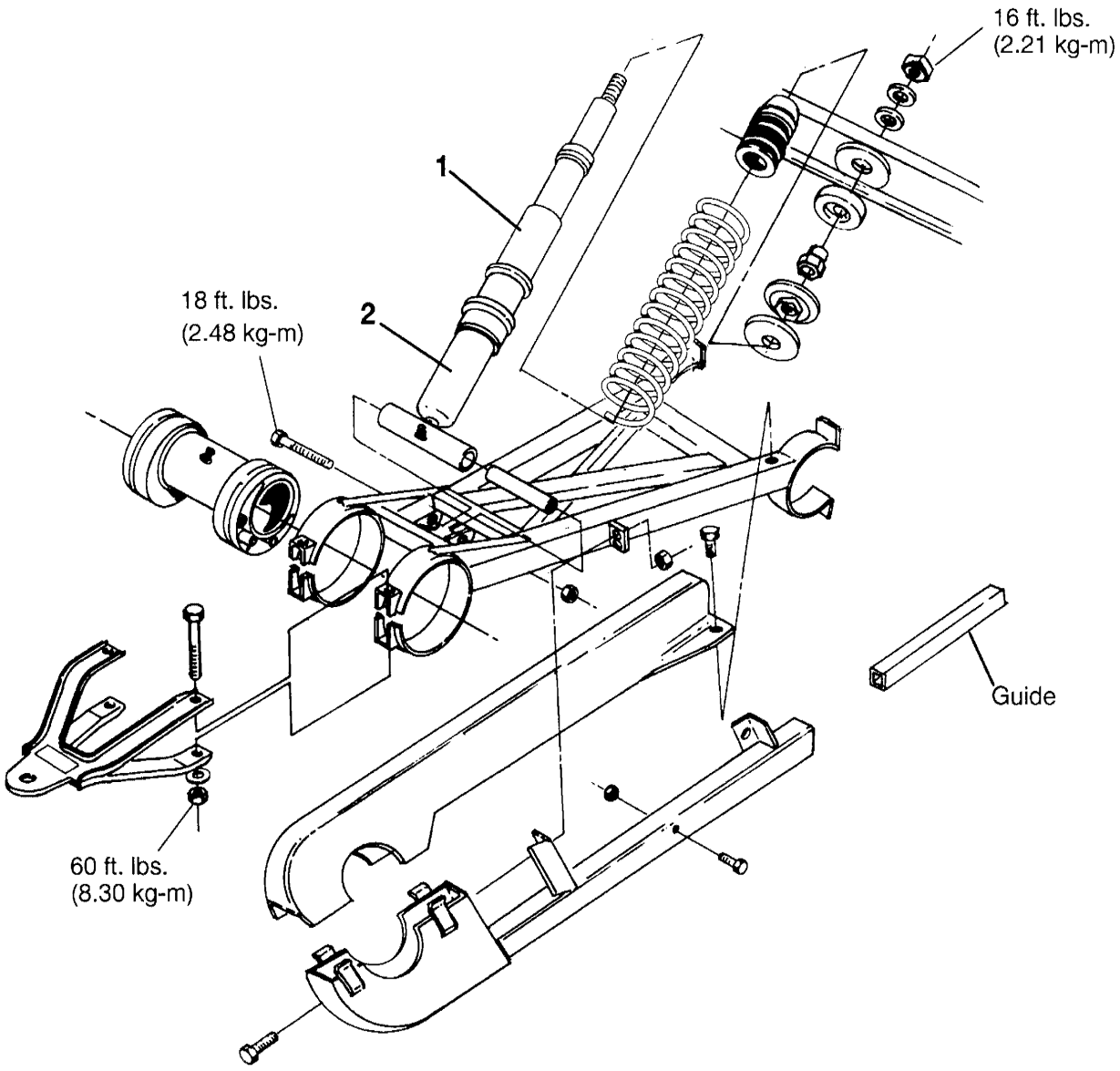


Rear Drive Axle, Hub and Wheel Assembly, - Shaft Drive Models

NOTE: When servicing, check model number for correct replacement parts. Be sure fasteners are properly torqued.

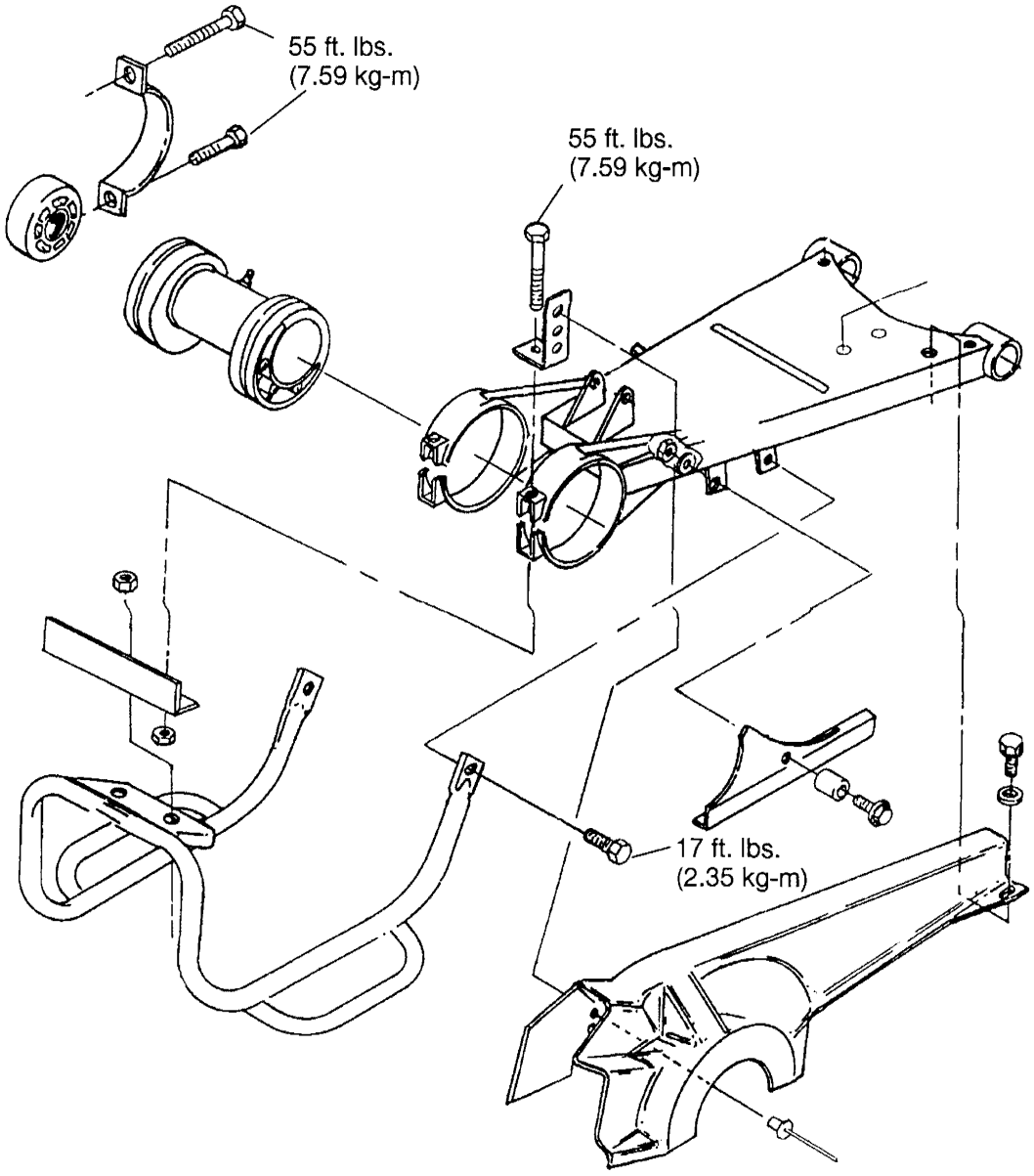



30 ft. lbs.
(4.14 kg-m)
Grease Fittings
30 ft. lbs.
(4.14 kg-m)
30 ft. lbs.
(4.14 kg-m)

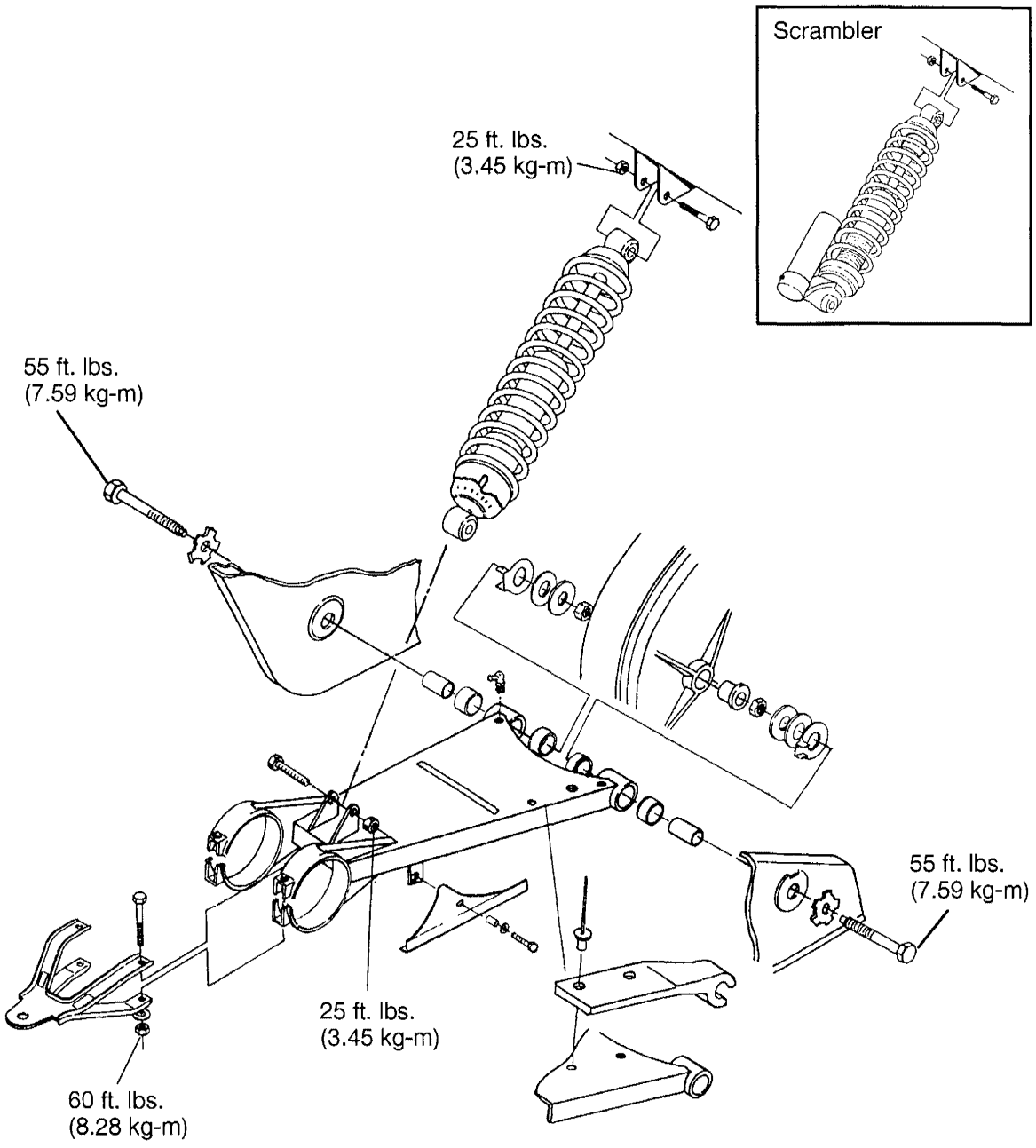


- Rear strut (1) and weldment (2) can only be replaced as an assembly. They are pressed and welded together at the factory and cannot be disassembled.
- Grease fittings (3 and 4). Check lubrication guide for service intervals.

Front Swing Arm Weldment, 6x6 Models

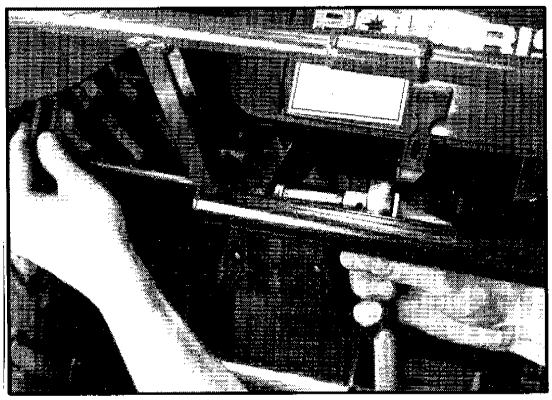


Swing Arm and Rear Suspension Exploded View

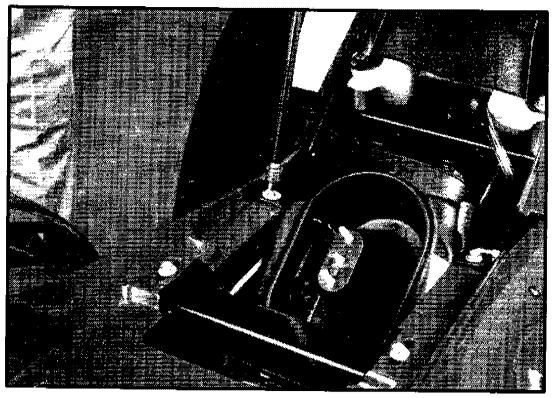


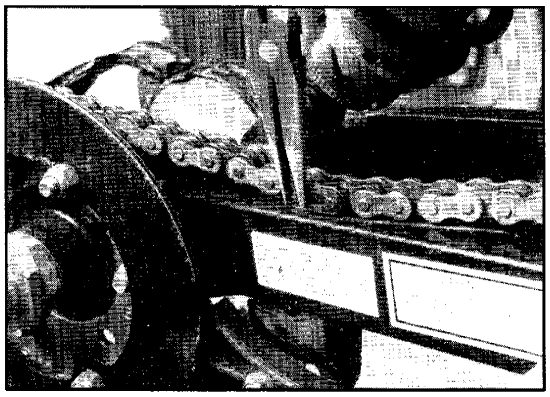
Swing Arm Removal

1. Remove seat.
2. Remove two nuts, bolts and washers at rear and front of rack and remove rack.
3. Remove three screws and nuts, and washer plate at rear of left footrest.
4. Remove two screws and nuts, and washer plate at rear of right footrest.

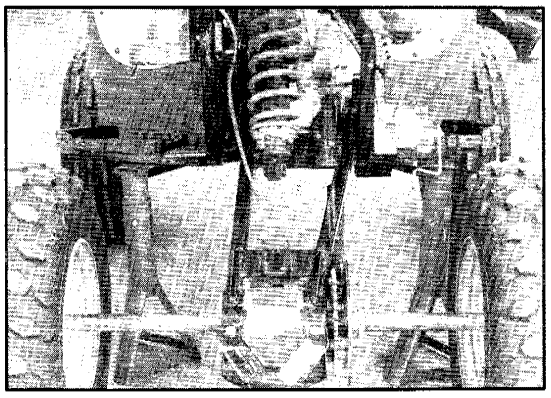


5. Remove six bolts and flat washers from top of rear cab assembly.
6. Remove two screws at front of muffler guard.
7. Remove rear cab.
8. Refer to PVT Disassembly, page 6.9, and disassemble PVT system and inner cover.
9. Carefully support the rear of the vehicle off the ground. **CAUTION:** Severe personal injury may result if vehicle tips or falls.
10. Remove pinch bolts (B).
11. Remove chain clip, master link and drive chain (C).
12. Remove wheels.



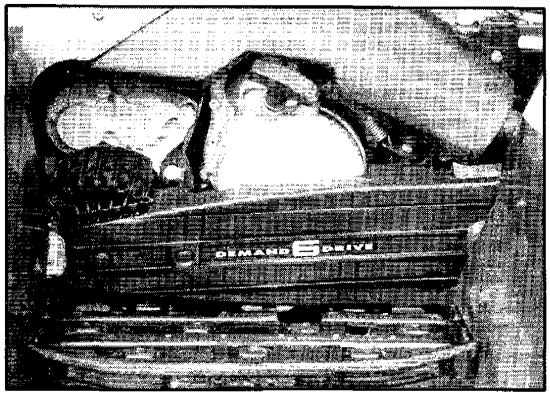


13. Support swing arm and remove rear shock assembly lower mounting bolt.

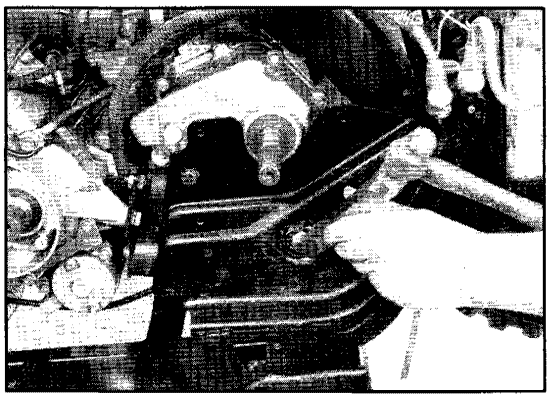


Swing Arm Removal/Inspection

14. On AWD models, remove auxiliary brake arm, middle chain guard, middle chain, and sprockets.

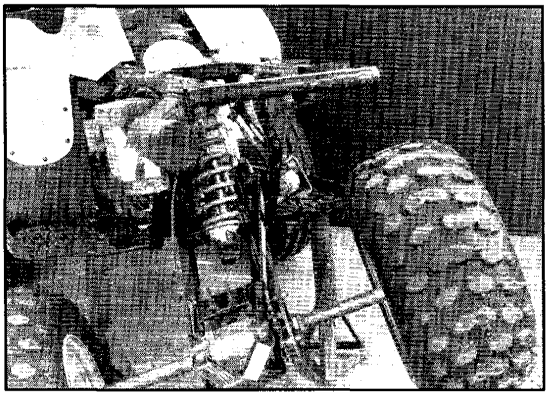


15. Remove output shaft brake caliper and guard, circlip and brake rotor.



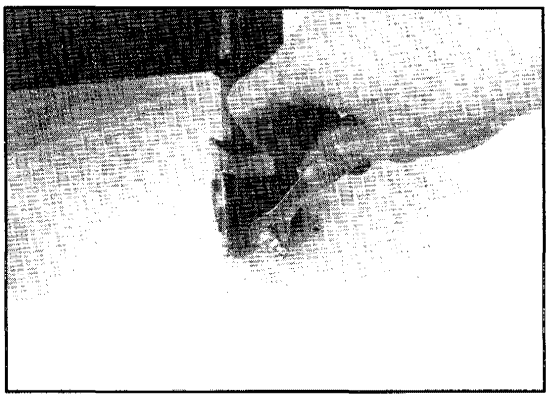
16. Bend tab washers open and remove swing arm pivot bolts.

NOTE: The left side swingarm bolt is shorter than the right.



17. Remove the swing arm. Remove grease fittings before pressing bushings and spacers out. Inspect bushings, spacer, and pivot bolts for wear.

18. Note orientation of grease fittings for reassembly.



Swing Arm Assembly and Installation

Swing Arm Assembly/Installation

1. Lubricate and installnew bushings with spacer into swingarm.
2. Install thrust bushings with tab washer as shown. Reinstall grease fittings.
3. Install swingarm. Make sure thrust bushing remains in place.
4. Use new swing arm pivot bolt tab washers. Bend to secure to frame and head of bolt after torquing.
5. Torque swing arm pivot bolts to 55 ft. lbs. (7.59 kg-m).
6. Torque rear shock mount bolt to 25 ft. lbs. (3.45 kg-m).
7. Torque center chain drive sprocket to 17 ft. lbs. (2.35 kg-m).
8. Torque center chain driven sprocket to 30 ft. lbs. (4.14 kg-m).
9. Apply a small amount of RTV silicone sealant to the spline area of the output shaft where the brake rotor is positioned, install the brake rotor.
10. Install the brake caliper and guard. Torque bolts to 10-12 ft. lbs. (1.38-1.66 kg-m)
11. Torque wheel nuts to 50 ft. lbs. (6.9 kg-m).
12. Refer to PVT section, pages 6.10-6.11, for proper assembly procedure and torque values.

Pivot Bolt and Nut Torque:
55 ft. lbs. (7.59 kg-m)

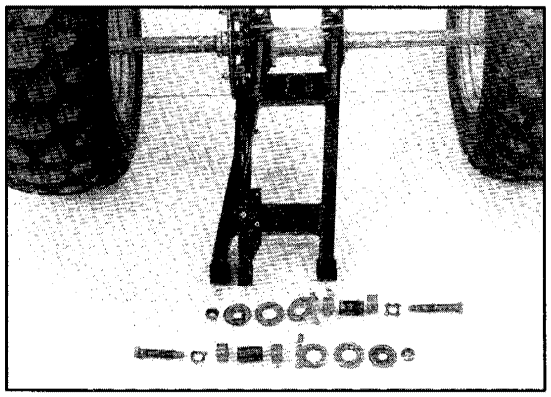
Rear Shock Mount Bolt Torque:
25 ft. lbs. (3.45 kg-m)

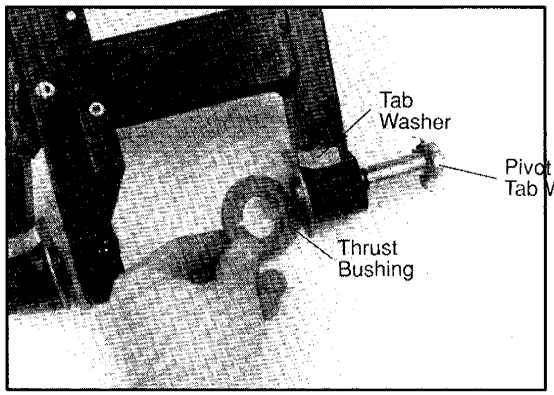
Center Chain Drive Sprocket Torque:
(on transmission output shaft)
17 ft. lbs. (2.35 kg-m)

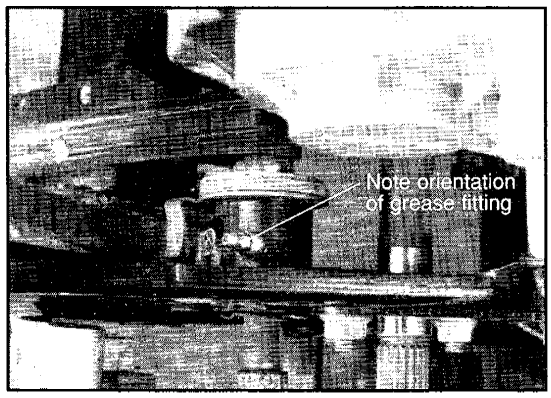
Center Chain Driven Sprocket Torque:
30 ft. lbs. (4.14 kg-m)

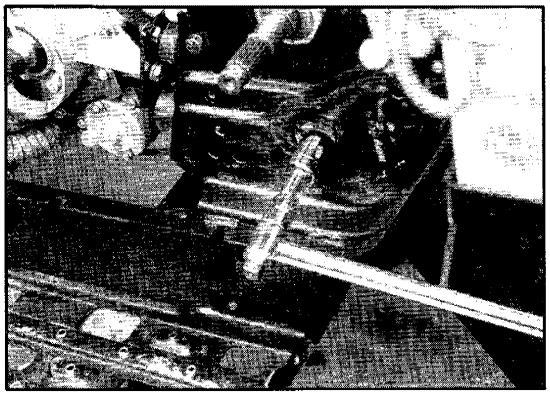
Brake Caliper and Guard Bolt Torque:
10-12 ft. lbs. (1.38-1.66 kg-m)

Wheel Nut Torque:
50 ft. lbs. (6.9 kg-m)



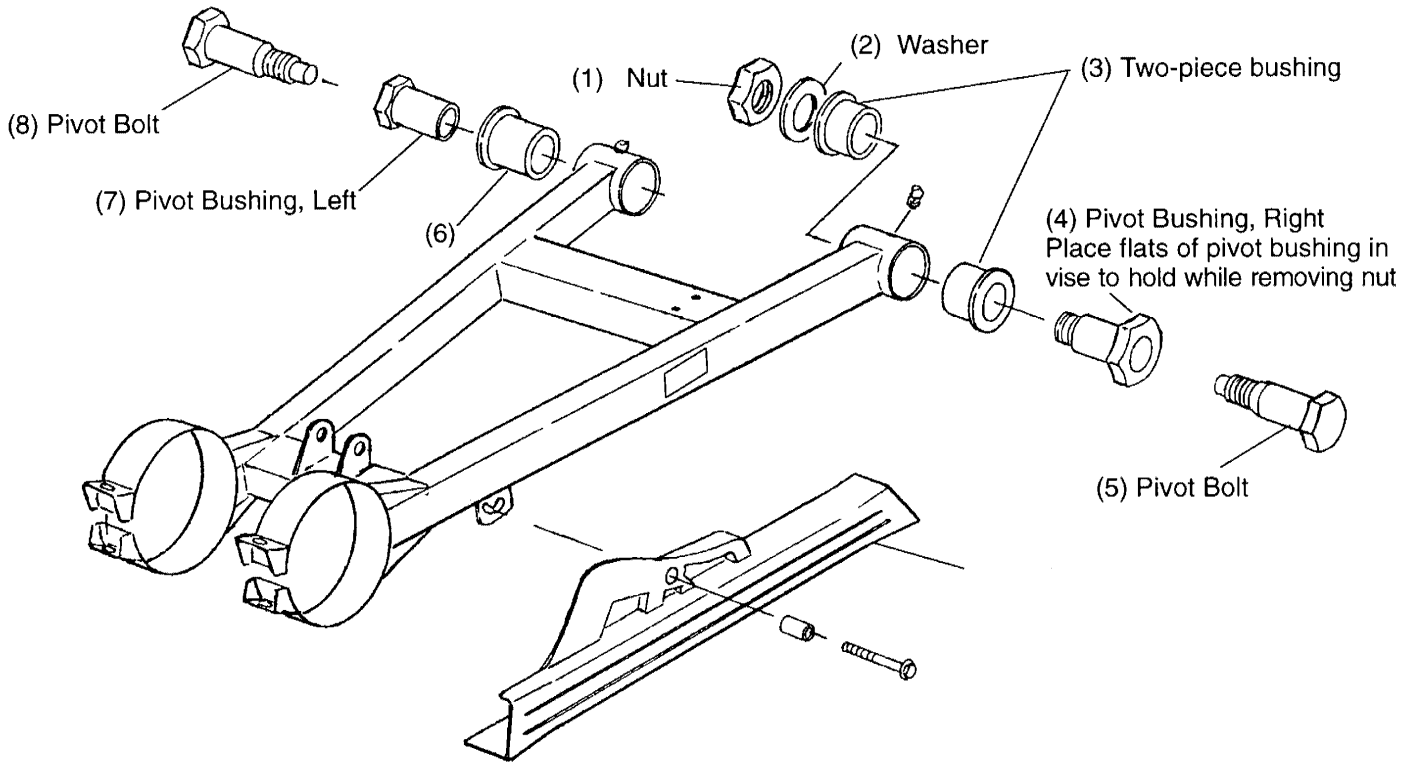






Removal / Disassembly

1. Lift rear of machine and support securely with wheels off the floor.
2. Remove drive chain.
3. Remove rear caliper.
   CAUTION: Do not allow the caliper to hang by the brake line. Brake line damage may result.
4. Remove rear wheels and/or hubs.
5. Remove lower shock bolt.
6. Loosen both swingarm pivot bolts (5 and 8) and then remove both bolts while supporting swingarm.
7. Remove swingarm.
8. Remove LH pivot bushing (7) and swingarm bushing (6) from swingarm.
9. Place flats of right side pivot bushing (4) in a vise to hold while removing nut (1)
10. Remove two-piece bushing (3) and RH pivot bushing (4) from swingarm.
11. Clean and inspect parts for wear. Replace worn parts.

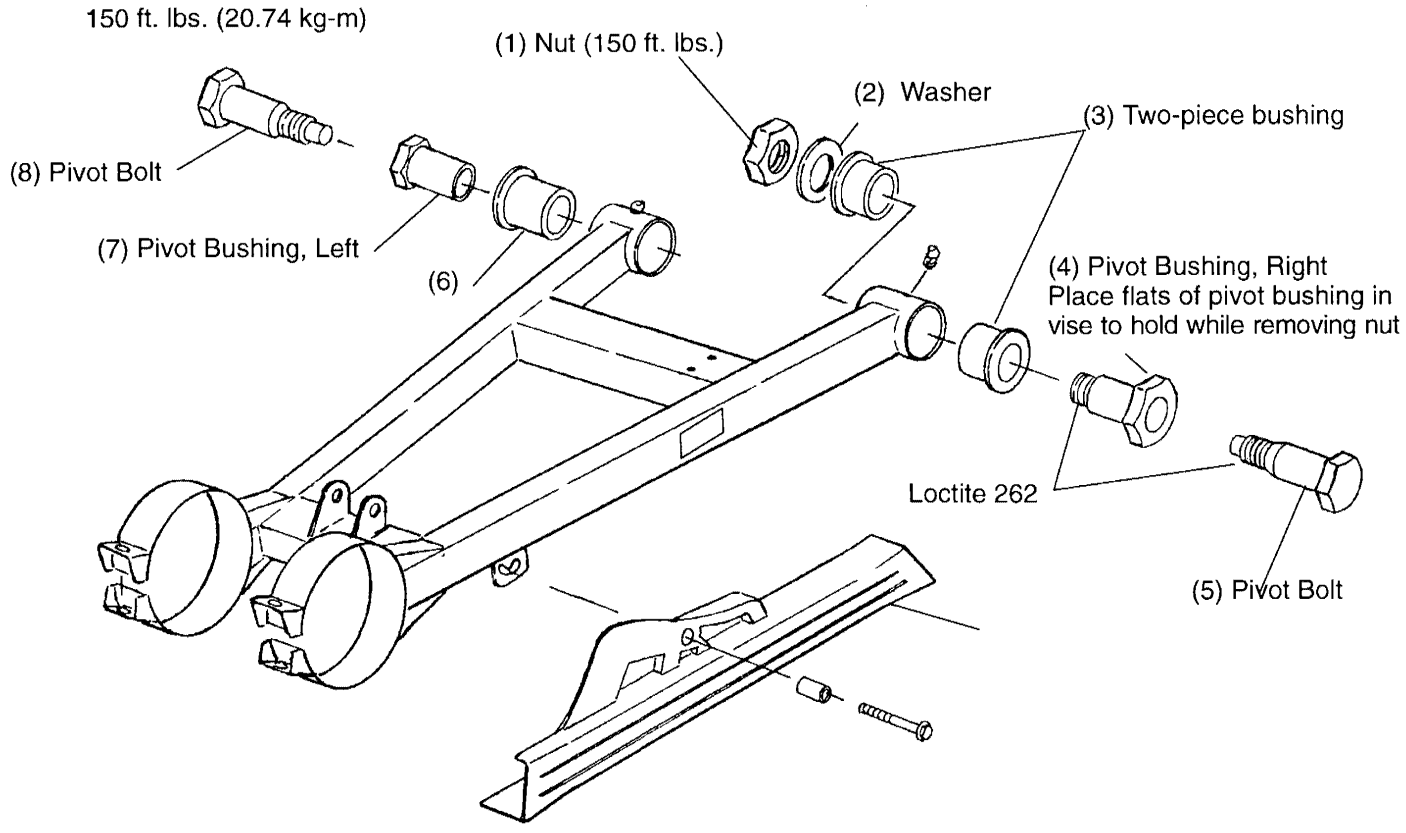


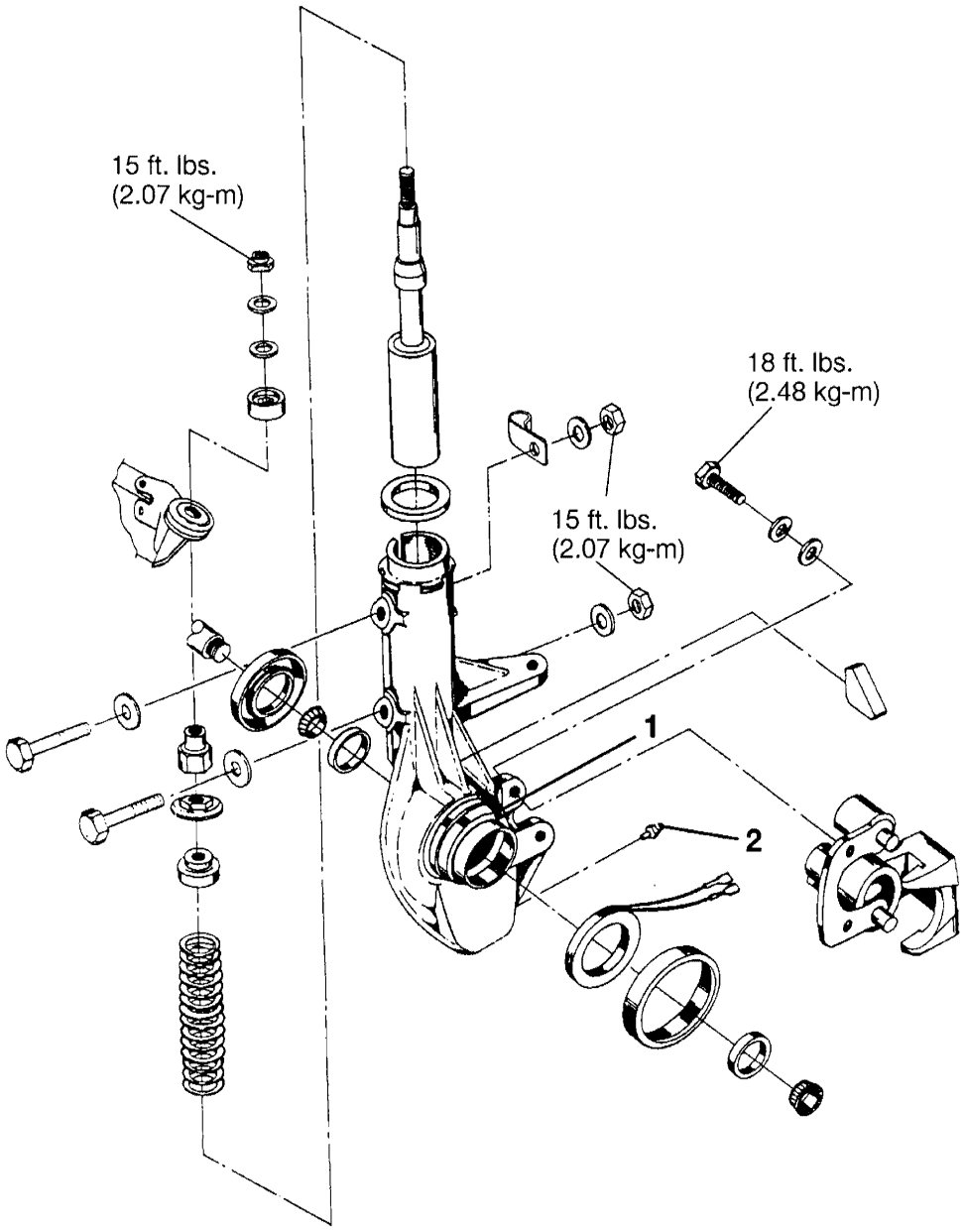
Assembly / Installation

1. Lubricate and install bushing (6) in left side of swingarm and two-piece bushings (3) in right side.
2. Clean threads of nut (1), pivot bolts (5) and (8), and pivot bushings (4) and (7) with Loctite Primer T or Primer N. Apply Loctite 262 to end threads of pivot bushing (4).
3. Install right pivot bushing (4) through the two-piece bushing (3).
4. Install washer and nut. Hold pivot bolt (5) in vise and torque nut (1) to 150 ft. lbs. (20.74 kg-m).
5. Install left pivot bushing (7).

Note: There are stop plates attached to the inside of the frame to prevent the pivot bushings from turning when the pivot bolts are tightened. The flats of the pivot bushings must be oriented correctly to align with the frame plate, or the pivot bolt holes will not be aligned. The top flat on the nut should be approximately parallel with top surface of the swingarm.

6. Install swingarm assembly in frame.
7. Apply Loctite 262 to threads of pivot bolts (5 and 8). Install and tighten pivot bolts slowly until the flats of the pivot bushings (4) and (7) engage the stop plate on the frame.
8. Torque pivot bolts (5) and (8) to 150 ft. lbs. (20.74 kg-m).
9. Install lower rear shock bolt. Torque to 25 ft. lbs. Assemble rear axle, brake caliper and mount, hubs, wheels and chain. (Refer to Chapter 7)





NOTE: Be sure steel insert notch (1) and strut casting notch are lined up and provide a channel for the magnetic coil wires to lie in. If insert and strut do not match, strut replacement will be necessary.

Grease fitting (2) location. Check lubrication guide for recommended service intervals.

Specified pole gap for 1996 to current models is 0-.001″ (0-.0254mm)

Front Strut Weldment Replacement

Front Strut Cartridge Replacement

1. Hold strut rod with holder wrench and remove top nut.
2. Compress spring using strut spring compressor tools.

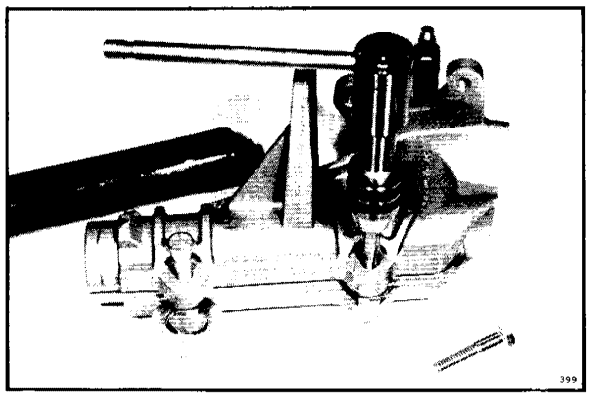
Strut Rod Holder Wrench PN 2871572

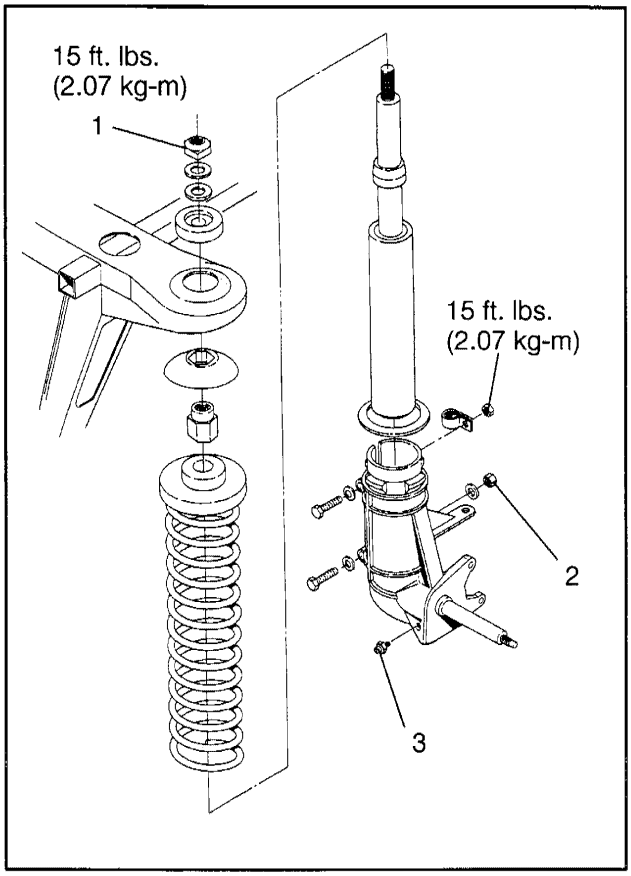
Strut Spring Compressor Tools PN 2871573 and PN 2871574

3. Remove upper strut pivot assembly.
4. Remove coil spring and collapse strut cartridge.
5. Scribe a line on the strut cartridge level with the top of the aluminum strut casting. This line can be used as a reference for installed height of the new cartridge upon reassembly.
6. Remove two pinch bolts and tap upper and lower pinch bolt boss with a 3/8″-16 tap.
7. Install a large, thick flat washer as shown in photo at right.
8. Use a 3/8″-16 bolt to spread the strut casting just enough to allow the old cartridge to be removed and the new one to be installed. Install cartridge until bottomed in strut casting or to the same level as the one removed.
9. Torque pinch bolts to 15 ft. lbs. (2 kg-m).
10. Reassemble spring and top pivot assembly. Be sure all parts are installed properly and seated fully.
11. Torque strut rod nut to specification. Do not over torque nut.

Strut Rod Nut Torque

15 ft. lbs. (2.07 kg-m)





Strut Assembly - 2x4 Models

Self locking nuts (1 and 2) should not be reused as the locking properties will be destroyed. If these nuts are removed, make sure to replace with new nuts.

Grease fitting location (3). Check lubrication guide for recommended service intervals.

Front Strut Removal

1. Elevate and safely support machine under footrest/frame area.

CAUTION:

Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure.

2. Remove wheel.

CAUTION:

Spring may be under compression. Use compression tools to remove tension before disassembling strut. Both left and right tools are required to compress each strut spring.

RH Strut Spring Compressor - PN 2871574

LH Strut Spring Compressor - PN 2871573

3. Hold strut rod with tool. Remove top nut securing strut rod to strut tower.

Strut Rod Holder Tool

PN 2871572

4. Remove strut by lowering out of frame.

Installation

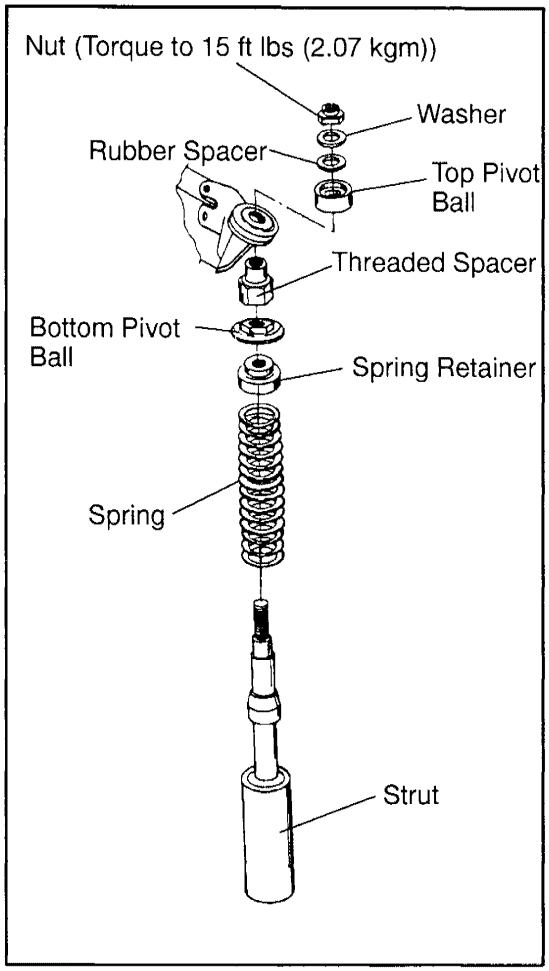
1. Assemble strut in proper order. See illustration at right.
2. Compress spring using compression tool.
3. Install spring retainer, bottom pivot ball, and bottom threaded spacer.
4. Install strut assembly into strut tower on frame.
5. Install top pivot ball, rubber spacer, and washer.
6. Tighten strut retention nut. Hold strut rod with holder.

Strut Holder PN 2871572

7. Torque strut rod retention nut to specification.

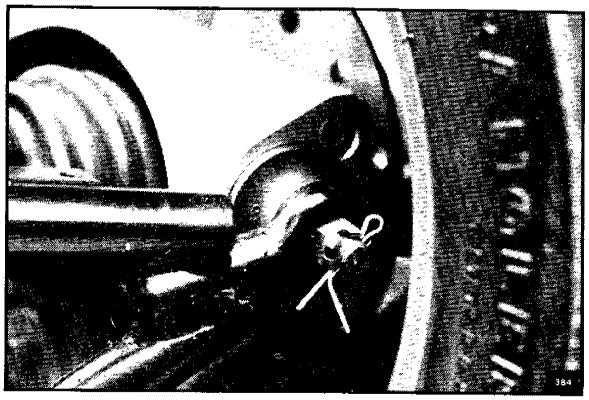
Strut Rod Retention Nut Torque-

15 ft. lbs. (2.07 kgm)

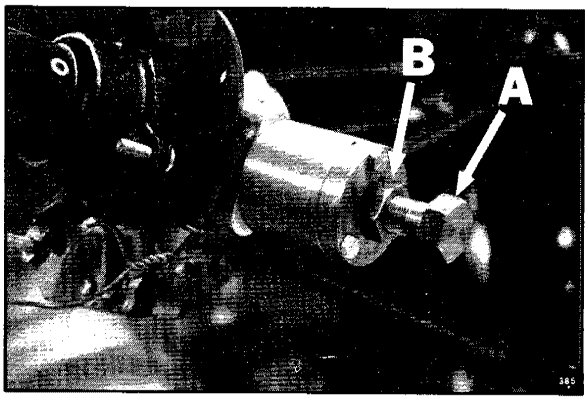


Front Strut Ball Joint Replacement

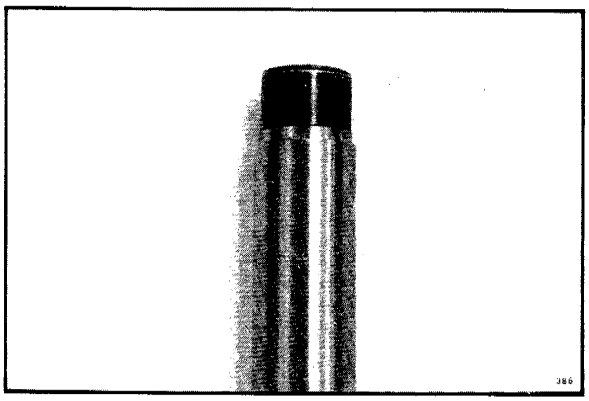
1. Remove front wheel, cotter pin, castle nut and A-arm. **NOTE:** On 4x4 models be sure to wire A-arm to disc as shown in photo 2. This will prevent CV joint disengagement.



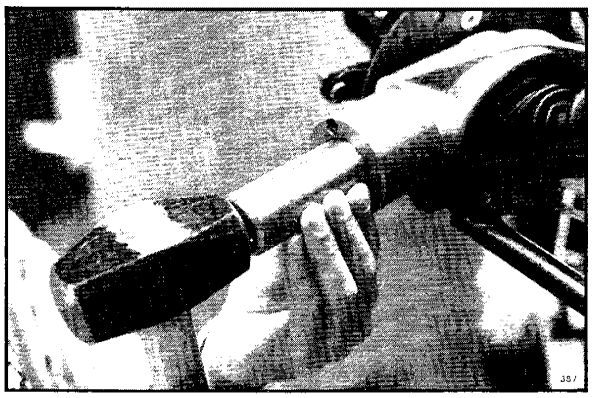
2. Remove ball joint retaining plate.
3. Install ball joint puller as shown.
4. To pull ball joint out, hold bolt head (A) while tightening jam nut (B).



5. To reinstall ball joint, position new joint onto driver as shown.



6. Install sleeve with top plate removed, as shown.
7. Using a large hammer, drive ball joint in until it bottoms in casting bore.
8. Reinstall retaining plate cap and A-arm.
9. Torque A-arm ball joint castle nut to 25 ft. lbs. (3.5 kg-m).
10. Reinstall cotter pin with open ends toward rear of machine.



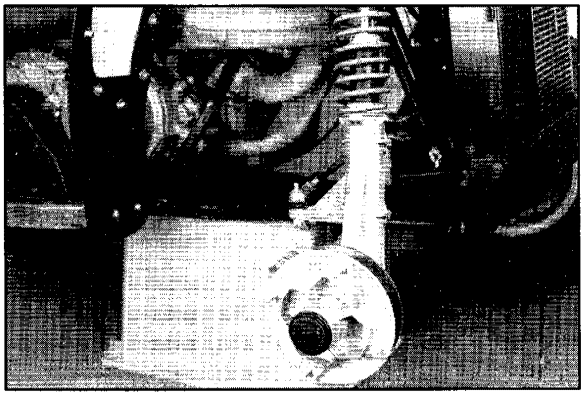
2x4 Hub Bearing Service

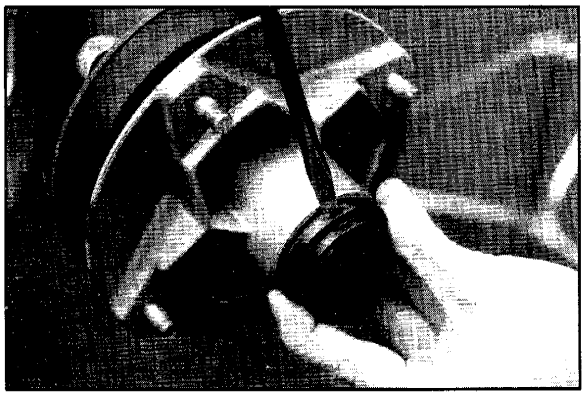
2x4 Front Hub Disassembly/Inspection

1. Stop engine, place machine in gear and set parking brake.
2. Loosen front wheel nuts slightly.
3. Elevate and safely support machine under footrest/frame area.

CAUTION: Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure. Wear eye protection when removing and installing bearings and seals.

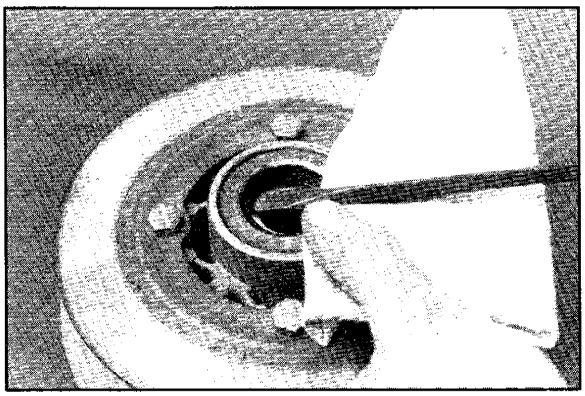
4. Remove wheel nuts and wheels.
5. Check bearings for play by grasping hub firmly and checking for movement. Rotate the hub. It should rotate smoothly without binding or rough spots.
6. Remove hub cap, cotter pin, front spindle nut, and washer. Remove the hub.
7. Rotate each bearing by hand and check for smooth rotation. Visually inspect bearing for moisture, dirt, or corrosion. Replace bearing if moisture, dirt, corrosion, or roughness is evident.



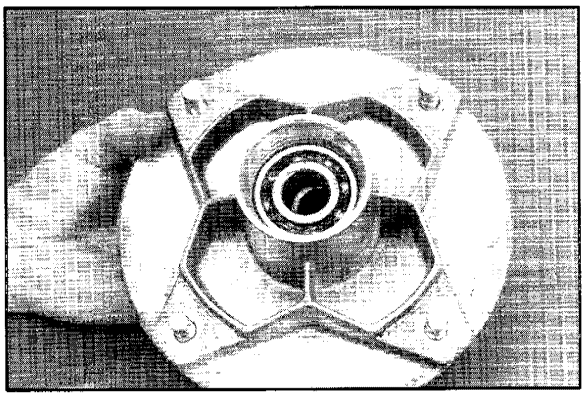


NOTE: If bearings are removed, they must be replaced.

8. Pry seal out back of hub.

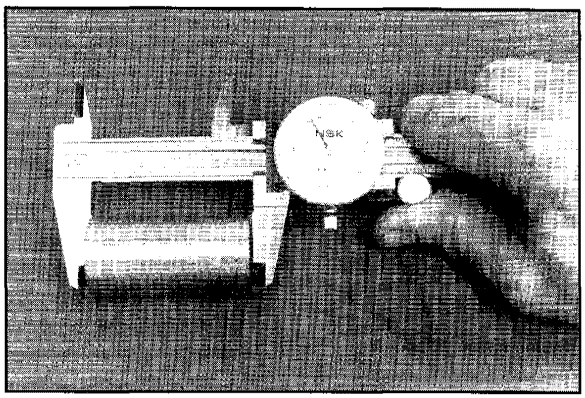


9. Using a brass drift, tap bearing spacer to one side to expose inner bearing race. Drive bearing out using a drift through opposite side of hub.
10. Remove spacer and drive other bearing out.
11. Clean hub and spacer thoroughly.



2x4 Front Hub Disassembly, Cont.

12. Inspect spacer for wear or damage. Measure length of spacer and replace if worn beyond service limit or if ends are rounded.



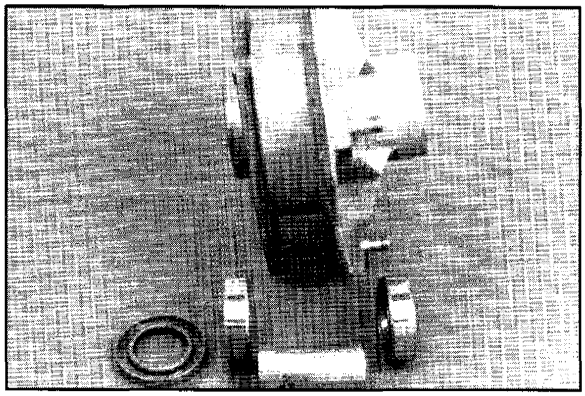
Premium All-Season Grease

PN 2871322 (3 oz. Tube)
PN 2871423 (14 oz. Tube)

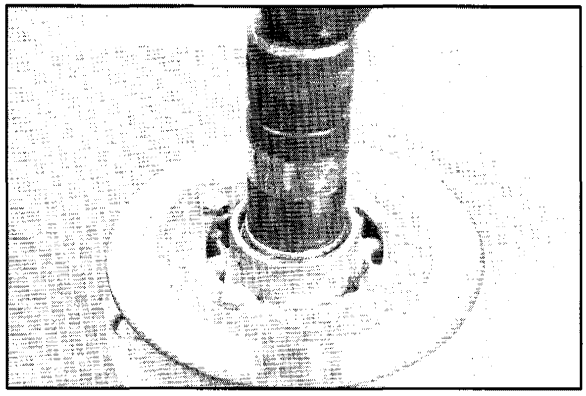
Bearing Spacer Length:
Service Limit: 2.1850″ (5.55 cm)

2x4 Front Hub Assembly

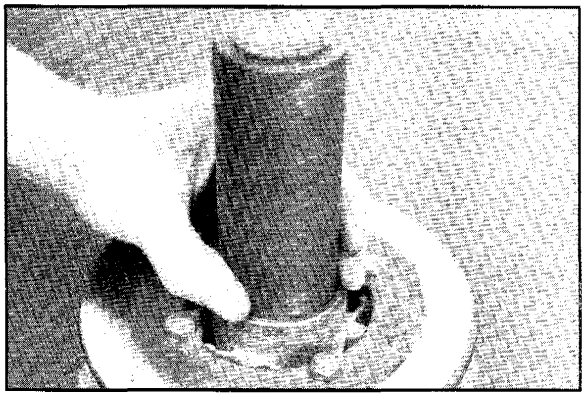
1. Pack bearings with Polaris Premium All Season Grease. Drive one of the bearings into rear of hub using a 1.180 (46 mm) bearing driver. **CAUTION:** *Do not* drive on the inner race of the bearing.



2. Coat bearing spacer with grease and install into hub. Drive other bearing into hub until seated.

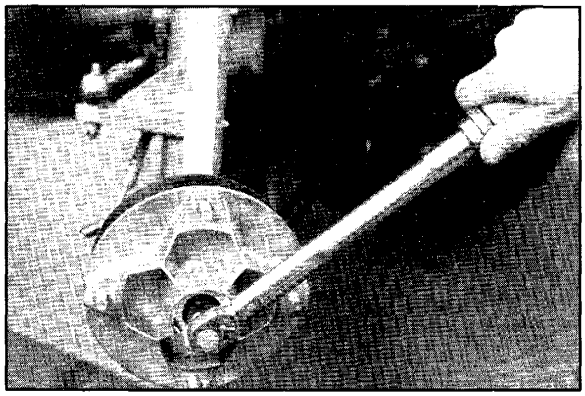


3. Install seal into hub (with numbers facing out) until flush with end of seal bore.



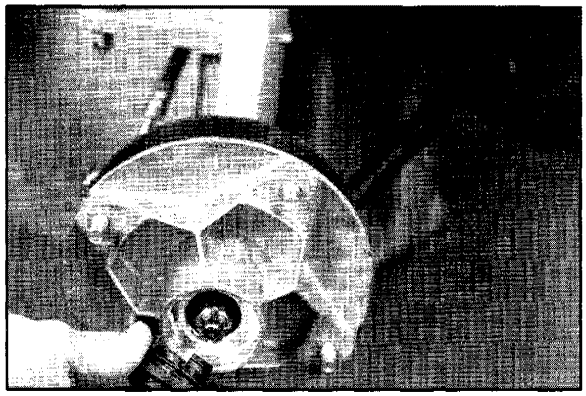
2x4 Front Hub Installation

1. Apply grease to washer and install with spindle nut. Torque nut to 40 ft. lbs. (5.52 kg-m) and install cotter pin. Tighten nut slightly if necessary to align cotter pin holes. Rotate wheel and check for smooth operation. Bend both ends of cotter pin around nut in opposite directions.



2 x 4 Spindle Nut Torque:
40 ft. lbs. (5.52 kg-m)

2. Inspect O-Rings on hub cap for wear, cracks or damage and replace if necessary.
3. Apply a light film of grease to hub cap and install until fully seated.
4. Rotate hub. It should rotate smoothly without binding or rough spots.
5. Install wheel and wheel nuts and torque evenly in a cross pattern to 15 ft. lbs. (2.07 kg-m).



Front Wheel Nut Torque
15 ft. lbs. (2.07 kg-m)

Fox™ Shock Service

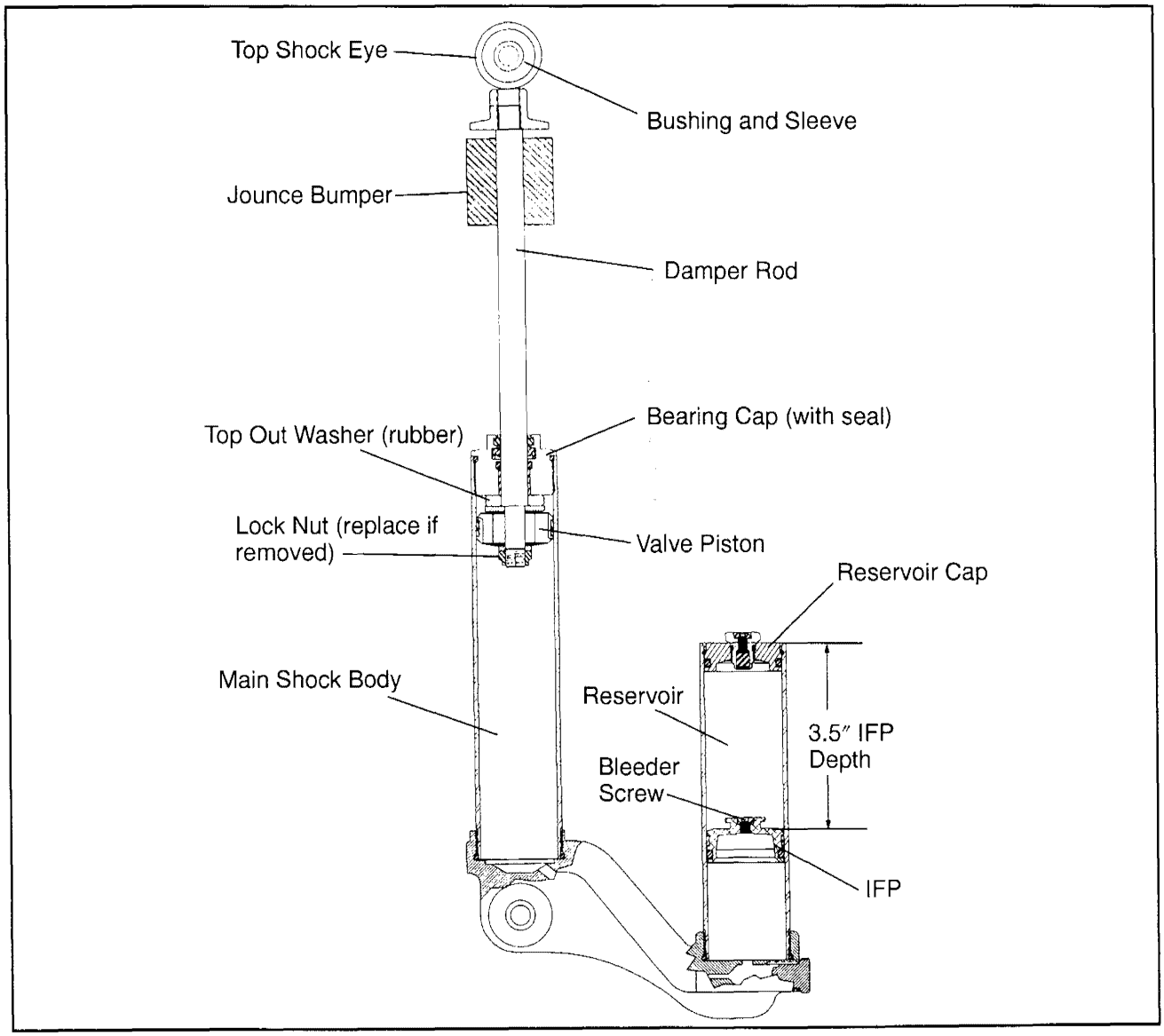
Oil in the Fox™ shock should be changed annually to maintain a high level of performance, minimize wear, and prevent corrosion of internal components. When performing maintenance on Fox™ shocks, use the Gas Shock Recharging Kit (PN 2200421). It consists of the necessary valves, pressure gauge, and fittings to deflate and pressurize the shocks.

WARNING: Fox™ shocks contain high pressure nitrogen gas. Extreme caution must be used while handling and working with Fox™ shocks and the related high pressure service equipment. The pressure must be released from the shock before disassembly. We strongly recommend you wear safety glasses and ear protection during service of these shocks.

CAUTION: Extreme cleanliness is of utmost importance during all disassembly and reassembly operations to prevent dirt or foreign particles from entering the shock.

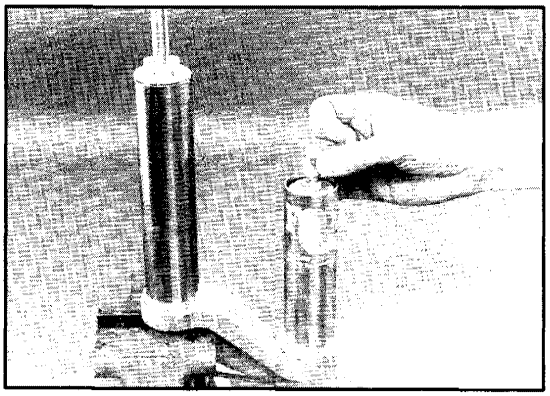
Tools Required:

Body Holding Tool (PN 2871017)
Shock Spring Compressor Tool (PN 2870623)
Damper Rod Holding Tool (PN 2871352)
Safety Needle (PN 7052069)
Gas Shock Recharging Kit (PN 2200421)
Fox™ Shock IFP Tool (PN 2871351)

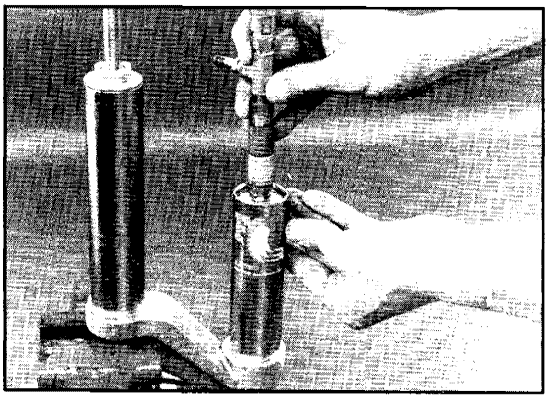


Fox™ Shock Service

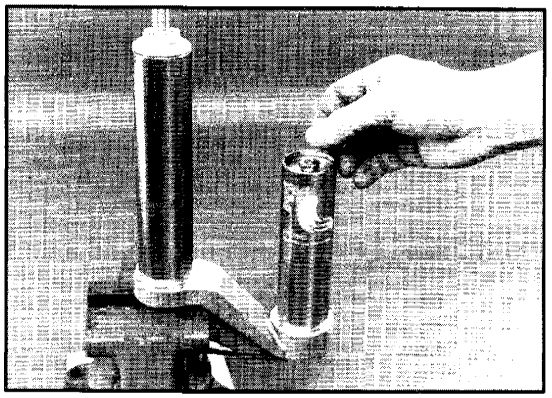
1. Clean shock thoroughly to remove all dirt, oil, and grease. Dry completely with compressed air.
2. Inspect the upper and lower shock bushings and inner sleeves for wear or damage and replace if necessary. Remove the lower shock bushings and sleeve.
3. Position and clamp lower shock mount in a soft jawed vise with reservoir and shock body upright.
4. Install shock spring compressor tool (PN 2870623). Compress spring and remove spring retainer, spring, and protector sleeve from shock body.
5. Remove cap screw from pressure valve located in the reservoir cap.



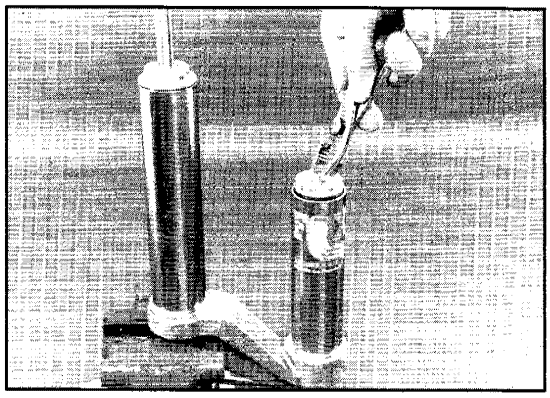
6. Install safety needle into pressure gauge assembly. Install red fitting (on the end of the safety needle assembly) squarely into the pressure valve recess.
7. With valve outlet pointed in a safe direction, depress and hold the safety release detent pin on safety needle and push gauge assembly forward to compress the unit. This will fully insert the needle through the rubber core of the pressure valve. **NOTE:** Be sure to hold the gauge assembly at a 90° angle to the pressure valve to avoid damage to the safety needle. When pressure gauge registers zero, the shock has been de-pressurized.



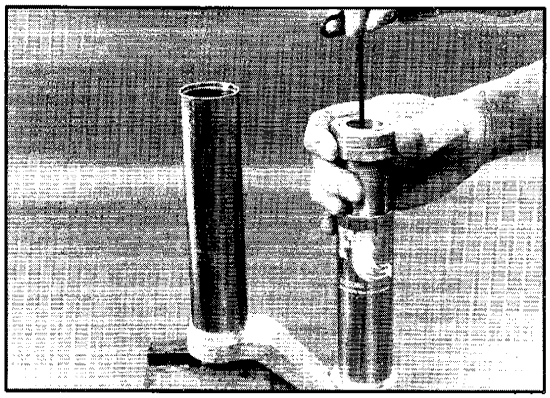
8. Push the reservoir cap down just enough to expose the retaining circlip. Remove the circlip being careful not to damage the reservoir chamber bore or circlip groove.

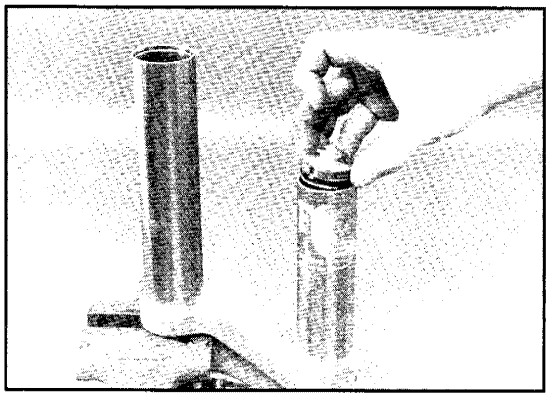


9. Remove the reservoir cap carefully with a pliers.

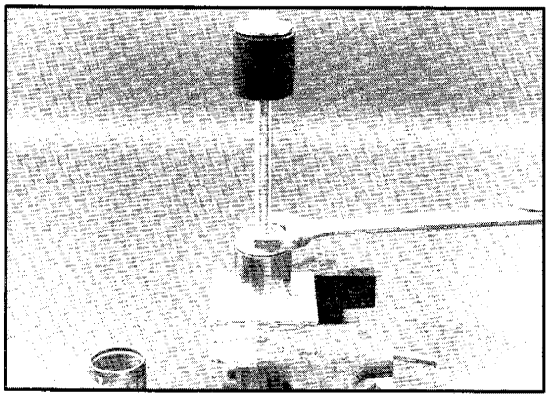


10. Remove bleeder screw from internal floating piston (IFP) using IFP Holding Tool (PN 2871351) and a 1/8″ hex wrench. To remove IFP from reservoir, install holding tool, rotate tool 1/4 turn, and pull the piston slowly upward. Be prepared to catch IFP piston ring when piston is remove from reservoir.

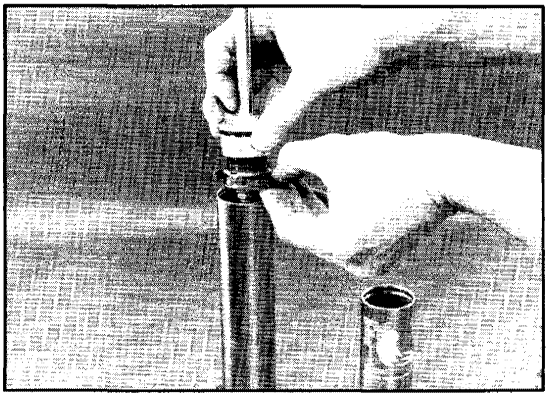


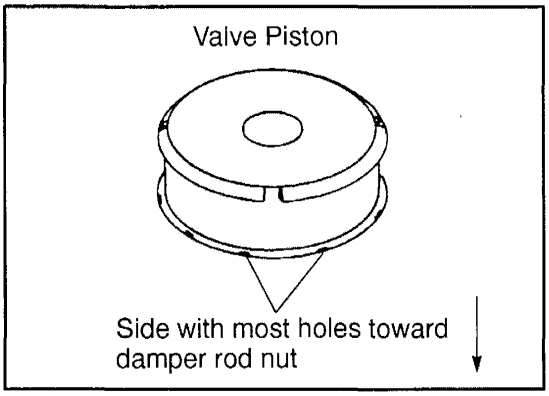


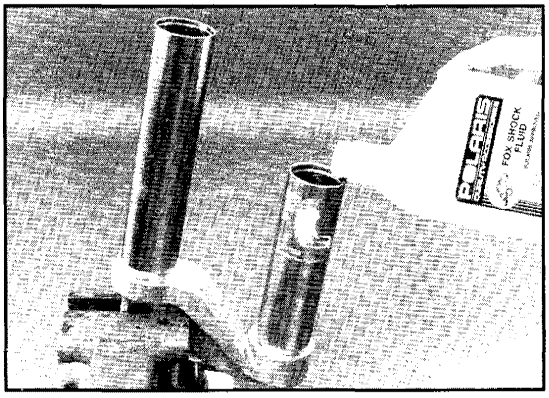
11. Using a 1″ wrench, loosen shaft bearing cap. **NOTE:** If the shock body starts to unscrew from the reservoir casting, install body holding tool (PN 2871071). Position the tool approximately 1 1/2″ below the bearing cap as shown, tighten securely in the vise and loosen the bearing cap.



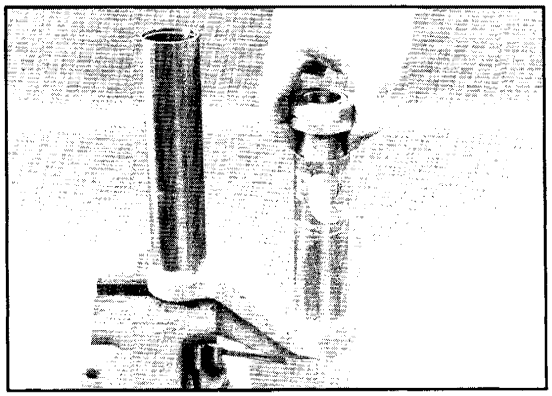
12. Unscrew the bearing cap completely and pull shock rod and piston straight out to avoid seal or valve damage. **NOTE:** Be prepared to catch the valve assembly piston ring. It may fall out when the valve assembly is removed from the shock body.
13. Remove shock from vise, drain oil from shock body and dispose of properly.
14. Clean shock body with clean high flash point solvent and dry thoroughly with compressed air. Inspect walls of shock and reservoir body for wear or damage.
15. To clean the damper valve assembly, slide the jounce bumper away from the top shock eye toward the valve assembly. Position the holder with the valve assembly facing upward. **CAUTION:** Be sure the shaft and tool are clean and free of debris before installing the tool, or shaft damage may result.
16. Remove the valve assembly locknut to allow thorough cleaning of individual valving washers. Clean with solvent and dry thoroughly with compressed air. **CAUTION:** Pay close attention to the order of valving washers and the direction of the holes in the valve piston. All parts must be replaced in the same order as removed to maintain proper dampening characteristics.
17. Remove and clean all valve washers and valve piston with solvent and dry thoroughly with compressed air. Assemble in the same order as removed.
18. Replace lock nut with a new one (PN 1500016) and tighten to 18 ft. lbs. **CAUTION:** Locking properties of nut will be reduced when nut is loosened or removed. Replace lock nut before reassembly. Do not re-use old nut.
19. Mount shock in vise a t a10° to 15° angle. Pour oil (PN 2870995 only) down the side of reservoir *slowly* until level is equal in main shock body. Continue to fill reservoir within 1/4″ from top, and set the shock upright in vise.



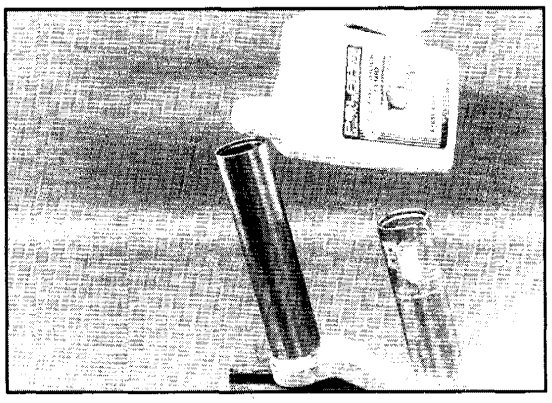




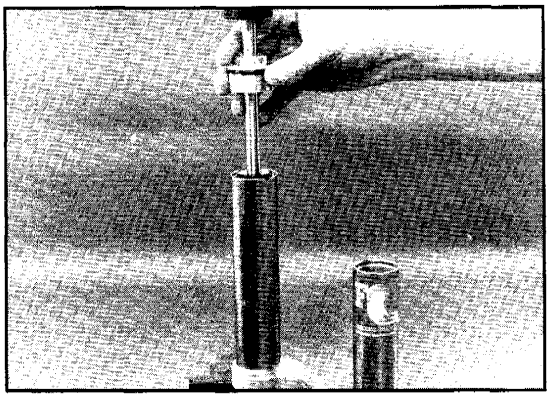
20. Lubricate O-Ring and piston ring on IFP with clean shock oil. Compress the piston ring and install carefully in reservoir
21. Push piston into reservoir slowly, allowing air to escape from beneath piston through bleed hole as piston is installed. Continue to push piston into reservoir approximately 2″. Piston will be submerged in oil.
22. Inspect bleeder screw O-Ring for damage and replace if necessary. Install bleeder screw and O-Ring lightly in piston. Do not tighten at this point.



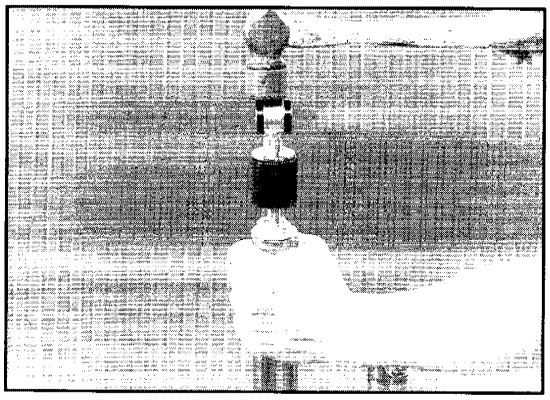
23. Tip shock to a 15° angle and fill main shock body to 1 1/2″ from top. Always add oil slowly to minimize air bubbles in oil.
24. Slide jounce bumper to top of damper rod and position bearing cap in middle of rod.
25. Compress piston ring and insert rod into shock body until half submerged in oil. Rotate rod and wiggle piston and rod to help disperse air from valve piston.



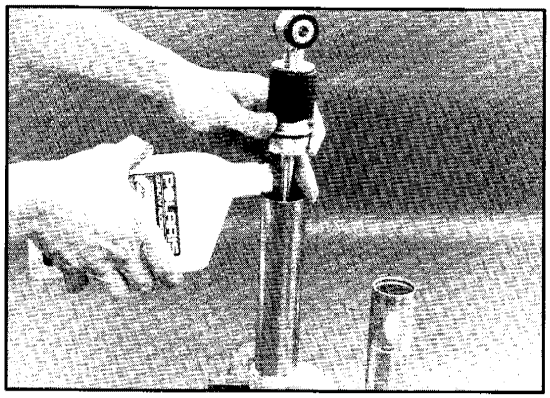
26. Continue to slide piston in until completely submerged. Tip shock upright.
27. Slowly push rod and valve piston assembly into shock body and screw bearing cap in until O-Ring touches shock body.



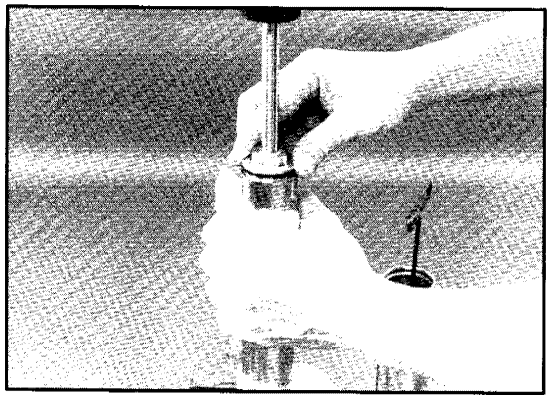
8. Support shock with one hand and strike top shock eye with a soft face hammer two to three times. This will force oil through the valve piston and push remaining air out.
9. Unscrew bearing cap and lift rod slowly upward, adding oil as necessary to keep the valve piston assembly submerged in oil. **IMPORTANT:** Do not allow valve piston assembly to come out of the oil.



10. Add oil as rod is lifted upward until valve piston is just below threads in shock body. fill shock completely and wrap a shop cloth around the shock body. If air bubbles are present, wipe them away or push them over the edge of shock body.

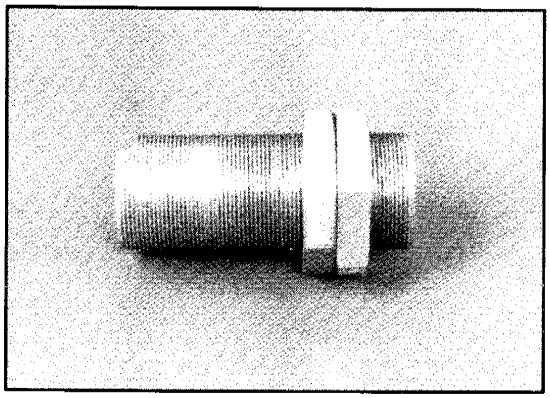


11. Fully extend damper rod and screw bearing cap into shock body. Tighten cap to 8 ft. lbs. using a 1″ crowfoot wrench.
12. Extend shock damper rod completely.
13. Remove bleeder screw from IFP.

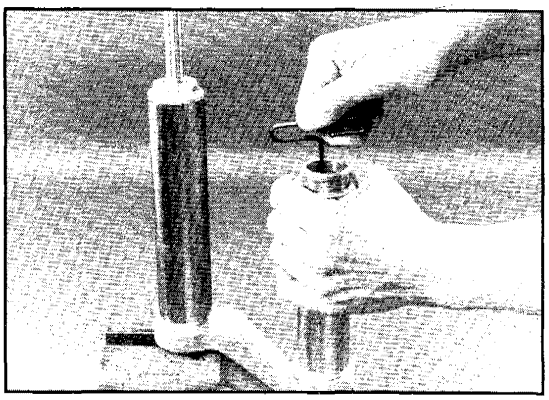


14. Set depth gauge on IFP holder tool to specified depth.

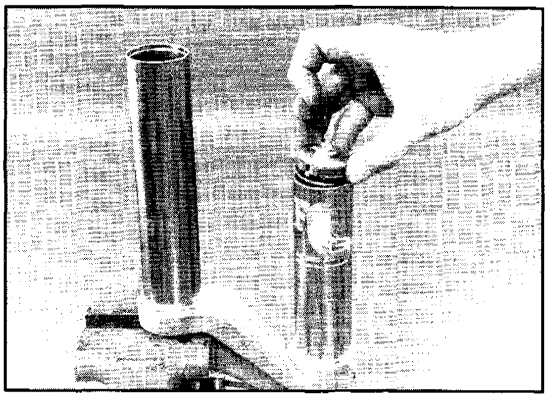
IFP Depth- 3.50″ (89 mm)



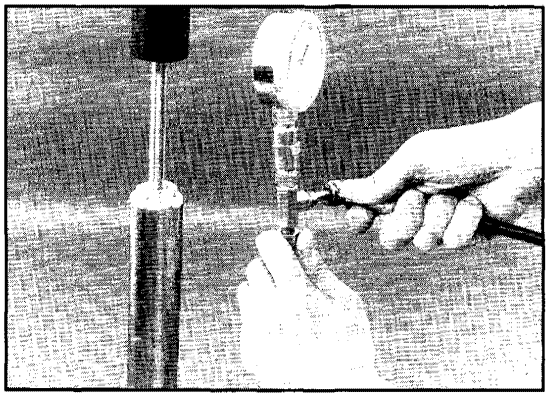
35. Install holder tool in reservoir and push IFP in slowly until depth gauge contacts reservoir body. Hold IFP with tool and tighten bleeder screw securely.
36. Drain and clean residual oil from reservoir.



37. Install reservoir cap and retaining circlip. **CAUTION:** Be sure circlip is in good condition and firmly seated in groove.

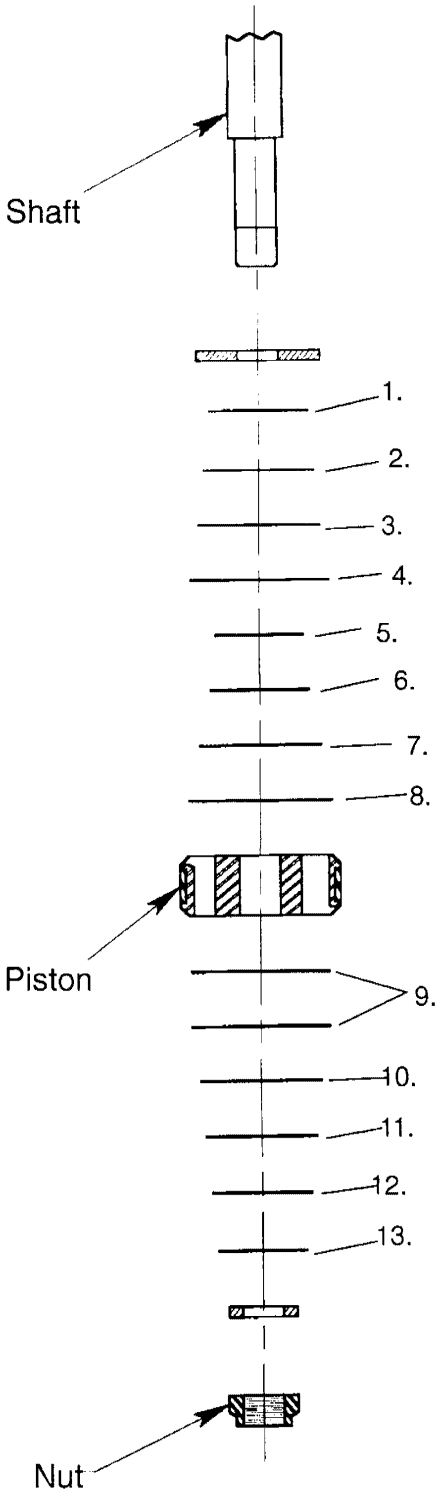


38. Insert the Fox™ Safety Needle and charge with nitrogen to 200 PSI. Pull the needle straight outward and remove from the pressurizing valve while holding the pressure hose on the fitting. Do not insert the needle again to check pressure as the volume inside the gauge will reduce pressure in the shock.
39. Install cap screw in pressure valve.



Fox™ Shock Standard Valving Chart

Ref.	Part No.	Qty.	Description
1.	1500033	1	Valve, Shock .90 x .375 x .008
2.	1500032	1	Valve, Shock 1.0 x .375 x .008
3.	1500031	1	Valve, Shock 1.1 x .375 x .008
4.	1500026	1	Valve, Shock 1.25 x .375 x .010
5.	1500047	1	Valve, Shock .80 x .375 x .010
6.	1500046	1	Valve, Shock .90 x .375 x .010
7.	1500049	1	Valve, Shock 1.1 x .375 x .006
8.	1500052	1	Valve, Shock1.3 x .375 x .006
9.	1500095	2	Valve, Shock 1.25 x .375 x .012
10.	1500060	1	Valve, Shock 1.1 x .375 x .012
11.	1500096	1	Valve, Shock 1.0 x .375 x .015
12.	1500094	1	Valve, Shock .90 x .375 x .015
13.	1500057	1	Valve, Shock .80 x .375 x .012



1996 Optional Suspension Springs

The following accessory springs are available to better suit individual riding preferences. **NOTE:** Optional springs may be a different color than standard springs. Springs may be painted to desired color. See chart above.

	SOFT ←		→ FIRM
Trail Blazer- Rear Compression Spring	N/A	7041470-067 STANDARD 150 lb/in	7041389-067 OPTION 175 lb/in
Trail Blazer - Front Strut Spring	N/A	7041471-067 STANDARD 41 lb/in	7041238-067 OPTION 61 lb/in
Trail Boss Rear Compression Spring	7041518-067 OPTION 175 lb/in	7041204-067 STANDARD 190 lb/in	7041303-067 OPTION 250 lb/in
Trail Boss - Front Strut Spring	7041471-067 OPTION 41 lb/in	7041238-067 STANDARD 61 lb/in	7041375-067 OPTION 64/113 lb/in
Xpress 300- Rear Compression Spring	7041518-067 OPTION 175 lb/in	7041204-067 STANDARD 190 lb/in	7041303-067 OPTION 250 lb/in
Xpress 300 - Front Strut Spring	7041238-067 OPTION 61 lb/in	7041375-067 STANDARD 64/113 lb/in	7041450-067 OPTION 101 lb/in
Xplorer 300- Rear Compression Spring	7041518-067 OPTION 175 lb/in	7041204-067 STANDARD 190 lb/in	7041303-067 OPTION 250 lb/in
Xplorer 300 - Front Strut Spring	7041238-067 OPTION 61 lb/in	7041375-067 STANDARD 64/113 lb/in	7041450-067 OPTION 101 lb/in
Sport 400L- Rear Compression Spring	7041470-067 OPTION 150 lb/in	7041518-067 STANDARD 175 lb/in	7041204-067 OPTION 190 lb/in
Sport 400L - Front Strut Spring	7041471-067 OPTION 41 lb/in	7041238-067 STANDARD 61 lb/in	7041375-067 OPTION 64/113 lb/in
Scrambler 4x4- Rear Compression Spring	7041470-067 OPTION 150 lb/in	7041389-067 STANDARD 175 lb/in	7041204-067 OPTION 190 lb/in
Scrambler 4x4 - Front Strut Spring	7041238-067 OPTION 61 lb/in	7041375-067 STANDARD 64/113 lb/in	7041450-067 OPTION 101 lb/in
Xpress 400- Rear Compression Spring	7041518-067 OPTION 175 lb/in	7041204-067 STANDARD 190 lb/in	7041303-067 OPTION 250 lb/in
Xpress 400 - Front Strut Spring	7041238-067 OPTION 61 lb/in	7041375-067 STANDARD 64/113 lb/in	7041450-067 OPTION 101 lb/in
Xplorer 400L - Rear Compression Spring	7041518-067 OPTION 175 lb/in	7041204-067 STANDARD 190 lb/in	7041303-067 OPTION 250 lb/in
Xplorer 400L - Front Strut Spring	7041238-067 OPTION 61 lb/in	7041375-067 STANDARD 64/113 lb/in	7041450-067 OPTION 101 lb/in
Sportsman 400L 4x4 - Rear Compression Spring	7041204-067 STANDARD 190 lb/in	7041303-067 OPTION 250 lb/in	N/A
Sportsman 400L 4x4 - Front Strut Spring	7041238-067 OPTION 61 lb/in	7041375-067 STANDARD 64/113 lb/in	7041450-067 OPTION 101 lb/in
Magnum 2x4 - Rear Compression spring	7041518-067 OPTION 175 lb/in	7041204-067 STANDARD 190 lb/in	7041303-067 OPTION 250 lb/in
Magnum 2x4 - Front Strut Spring	7041238-067 OPTION 61 lb/in	7041375-067 STANDARD 64/113 lb/in	7041450-067 OPTION 101 lb/in
Magnum 4x4 - Rear Compression Spring	7041518-067 OPTION 175 lb/in	7041204-067 STANDARD 190 lb/in	7041303-067 OPTION 250 lb/in
Magnum 4x4 -- Front Strut Spring	7041238-067 OPTION 61 lb/in	7041375-067 STANDARD 64/113 lb/in	7041450-067 OPTION 101 lb/in
Magnum 6x6 - Rear Compression Spring	7041204-067 OPTION 190 lb/in	7041303-067 STANDARD 250 lb/in	N/A
Magnum 6x6 - Front Strut Spring	7041375-067 OPTION 64/113 lb/in	7041450-067 STANDARD 101 lb/in	N/A
400L 6x6 - Rear Compression Spring	7041204-067 OPTION 190 lb/in	7041303-067 STANDARD 250 lb/in	N/A
400L 6x6 - Front Strut Spring	7041375-067 OPTION 64/113 lb/in	7041450-067 STANDARD 101 lb/in	N/A
Sportsman 500 4x4 - Rear Compression Spring	7041517-067 OPTION 80 lb/in	7041453-067 STANDARD 100 lb/in	7041519-067 OPTION 140 lb/in
Sportsman 500 4x4 - Front Strut Spring	7041238-067 OPTION 61 lb/in	7041375-067 STANDARD 64/113 lb/in	7041450-067 OPTION 101 lb/in

1997 Optional Suspension Springs

	SOFT ←		→ FIRM
Trail Blazer- Rear Compression Spring	N/A	7041470-067 STANDARD 150 lb/in	7041389-067 OPTION 175 lb/in
Trail Blazer - Front Strut Spring	N/A	7041471-067 STANDARD 41 lb/in	7041238-067 OPTION 61 lb/in
Trail Boss Rear Compression Spring	7041518-067 OPTION 175 lb/in	7041204-067 STANDARD 190 lb/in	7041303-067 OPTION 250 lb/in
Trail Boss - Front Strut Spring	7041471-067 OPTION 41 lb/in	7041238-067 STANDARD 61 lb/in	7041375-067 OPTION 64/113 lb/in
Xpress 300- Rear Compression Spring	7041518-067 OPTION 175 lb/in	7041204-067 STANDARD 190 lb/in	7041303-067 OPTION 250 lb/in
Xpress 300 - Front Strut Spring	7041238-067 OPTION 61 lb/in	7041375-067 STANDARD 64/113 lb/in	7041450-067 OPTION 101 lb/in
Xplorer 300- Rear Compression Spring	7041518-067 OPTION 175 lb/in	7041204-067 STANDARD 190 lb/in	7041303-067 OPTION 250 lb/in
Xplorer 300 - Front Strut Spring	7041238-067 OPTION 61 lb/in	7041375-067 STANDARD 64/113 lb/in	7041450-067 OPTION 101 lb/in
Sport 400L- Rear Compression Spring	7041470-067 OPTION 150 lb/in	7041389-067 STANDARD 175 lb/in	7041204-067 OPTION 190 lb/in
Sport 400L - Front Strut Spring	7041471-067 OPTION 41 lb/in	7041238-067 STANDARD 61 lb/in	7041375-067 OPTION 64/113 lb/in
Scrambler 4x4- Rear Compression Spring	7041470-067 OPTION 150 lb/in	7041389-067 STANDARD 175 lb/in	7041204-067 OPTION 190 lb/in
Scrambler 4x4 - Front Strut Spring	7041648-067 OPTION 75/100 lb/in	7041603-067 STANDARD 75/110 lb/in	7041647-067 OPTION 80/120 lb/in
Xpress 400- Rear Compression Spring	7041518-067 OPTION 175 lb/in	7041204-067 STANDARD 190 lb/in	7041303-067 OPTION 250 lb/in
Xpress 400 - Front Strut Spring	7041238-067 OPTION 61 lb/in	7041375-067 STANDARD 64/113 lb/in	7041450-067 OPTION 101 lb/in
Xplorer 400L - Rear Compression Spring	7041518-067 OPTION 175 lb/in	7041204-067 STANDARD 190 lb/in	7041303-067 OPTION 250 lb/in
Xplorer 400L - Front Strut Spring	7041238-067 OPTION 61 lb/in	7041375-067 STANDARD 64/113 lb/in	7041450-067 OPTION 101 lb/in
Sportsman 400L 4x4 - Rear Compression Spring	7041204-067 STANDARD 190 lb/in	7041303-067 OPTION 250 lb/in	N/A
Sportsman 400L 4x4 - Front Strut Spring	7041238-067 OPTION 61 lb/in	7041375-067 STANDARD 64/113 lb/in	7041450-067 OPTION 101 lb/in
400L 6x6 - Rear Compression Spring	7041204-067 OPTION 190 lb/in	7041305-067 STANDARD 250 lb/in	N/A
400L 6x6 - Front Strut Spring	7041375-067 OPTION 64/113 lb/in	7041450-067 STANDARD 101 lb/in	N/A
Magnum 2x4 - Rear Compression spring	7041518-067 OPTION 175 lb/in	7041204-067 STANDARD 190 lb/in	7041303-067 OPTION 250 lb/in
Magnum 2x4 - Front Strut Spring	7041238-067 OPTION 61 lb/in	7041375-067 STANDARD 64/113 lb/in	7041450-067 OPTION 101 lb/in
Magnum 4x4 - Rear Compression Spring	7041518-067 OPTION 175 lb/in	7041204-067 STANDARD 190 lb/in	7041303-067 OPTION 250 lb/in
Magnum 4x4 -- Front Strut Spring	7041238-067 OPTION 61 lb/in	7041375-067 STANDARD 64/113 lb/in	7041450-067 OPTION 101 lb/in
Magnum 6x6 - Rear Compression Spring	7041204-067 OPTION 190 lb/in	7041305-067 STANDARD 250 lb/in	N/A
Magnum 6x6 - Front Strut Spring	7041375-067 OPTION 64/113 lb/in	7041450-067 STANDARD 101 lb/in	N/A
Scrambler 500- Rear Compression Spring	7041470-067 OPTION 150 lb/in	7041389-067 STANDARD 175 lb/in	7041204-067 OPTION 190 lb/in
Scrambler 500 - Front Strut Spring	7041648-067 OPTION 75/100 lb/in	7041603-067 STANDARD 75/110 lb/in	7041647-067 OPTION 80/120 lb/in
Xplorer 500 Rear Compression Spring	7041517-067 OPTION 80 lb/in	7041546-067 STANDARD 100 lb/in	7041519-067 OPTION 140 lb/in
Xplorer 500 - Front Strut Spring	7041238-067 OPTION 61 lb/in	7041375-067 STANDARD 64/113 lb/in	7041450-067 OPTION 101 lb/in
Sportsman 500 - Front Strut Spring	7041238-067 OPTION 61 lb/in	7041375-067 STANDARD 64/113 lb/in	7041450-067 OPTION 101 lb/in
Sportsman 500 Rear Compression Spring	7041517-067 OPTION 80 lb/in	7041546-067 STANDARD 100 lb/in	7041519-067 OPTION 140 lb/in

MODEL	PAINTED PART	COLOR DESCRIPTION	DITZLER NUMBER	POLARIS NUMBER
Trail Blazer	Springs	Fire Red	72060	8520149
	Rims	Bright White	2185	8520153
Trail Boss	Springs	Aqua Marine	46975	8520159
	Rims	Bright White	2185	8520153
	Rack	Aqua Marine	46975	8520159
Sport	Springs	Purple Velvet	51467	8520160
	Rims	Brushed Aluminum	N/A	N/A
Xpress 300	Springs	Bonnie Blue	12908	8520148
	Rims	Brushed Aluminum	N/A	N/A
Xpress 400	Springs	Blue-green	N/A	8520202
	Rims	Brushed Aluminum	N/A	N/A
Xplorer 300	Springs	Eddie Bauer Green	44931	8520150
	Rims	Brushed Aluminum	N/A	N/A
Xplorer 400	Springs	Fire Red	72060	8520149
	Rims	Brushed Aluminum	N/A	N/A
Scrambler	Springs	Lavender	N/A	8520157
	Rims	Bright White	2185	8520153
Sportsman 4x4	Springs	Black	9440	8520147
	Rims	Black	9440	8520147
	Rack	Black	9440	8520147
Sportsman 500	Springs	Black	9440	8520147
	Rims	Black	9440	8520147
Big Boss 6x6	Springs	Eddie Bauer Green	44931	8520150
	Rims	Brushed Aluminum	N/A	N/A
	Rack	Eddie Bauer Green	44931	8520150
	Box	Eddie Bauer Green	44931	8520150
Magnum 2x4	Springs	Eddie Bauer Green	44931	8520150
	Rims	Brushed Aluminum	N/A	N/A
	Rack	Steel Gray	N/A	8520151
Magnum 4x4	Springs	Bonnie Blue	12908	8520148
	Rims	Brushed Aluminum	N/A	N/A
	Rack	Bonnie Blue	12908	8520148
Big Boss 6x6	Springs	Eddie Bauer Green	44931	8520150
	Rims	Brushed Aluminum	N/A	N/A
	Rack	Eddie Bauer Green	44931	8520150
	Box	Eddie Bauer Green	44931	8520150

1997 Paint Codes

MODEL	PAINTED PART	COLOR DESCRIPTION	DITZLER NUMBER	POLARIS NUMBER
Trail Blazer	Springs	Fire Red	72060	8520149
	Rims	Bright White	2185	8520153
Trail Boss	Springs	Aqua Marine	46975	8520159
	Rims	Bright White	2185	8520153
	Rack	Aqua Marine	46975	8520159
Xpress 300	Springs	Bonnie Blue	12908	8520148
	Rims	Brushed Aluminum	N/A	N/A
Xplorer 300	Springs	Eddie Bauer Green	44931	8520150
	Rims	Brushed Aluminum	N/A	N/A
Sport	Springs	Purple Velvet	51467	8520160
	Rims	Brushed Aluminum	N/A	N/A
Xpress 400	Springs	Blue-green	N/A	8520202
	Rims	Brushed Aluminum	N/A	N/A
Xplorer 400	Springs	Eddie Bauer Green	44931	8520150
	Rims	Brushed Aluminum	N/A	N/A
Scrambler 4x4	Springs	Lavender	N/A	8520157
	Rims	Bright White	2185	8520153
Sportsman 4x4	Springs	Black	9440	8520147
	Rims	Black	9440	8520147
	Rack	Black	9440	8520147
400 6x6	Springs	Eddie Bauer Green	44931	8520150
	Rims	Brushed Aluminum	N/A	N/A
	Rack	Eddie Bauer Green	44931	8520150
	Box	Eddie Bauer Green	44931	8520150
Magnum 2x4	Springs	Fire Red	72060	8520149
	Rims	Brushed Aluminum	N/A	N/A
	Rack	Black	9440	8520147
Magnum 4x4	Springs	Eddie Bauer Green	44931	8520150
	Rims	Brushed Aluminum	N/A	N/A
	Rack	Eddie Bauer Green	44931	8520150
Magnum 6x6	Springs	Eddie Bauer Green	44931	8520150
	Rims	Brushed Aluminum	N/A	N/A
	Rack	Eddie Bauer Green	44931	8520150
	Box	Eddie Bauer Green	44931	8520150
Scrambler 500	Springs	Screamin' Yellow	N/A	8520241
	Rims	Brushed Aluminum	N/A	N/A
Xplorer 500	Springs	Screamin' Yellow	N/A	8520241
	Rims	Brushed Aluminum	N/A	N/A
Sportsman 500	Springs	Black	9440	8520147
	Rims	Black	9440	8520147

CHAPTER 6
CLUTCHES

6

Special Service Tools and Supplies

Description	Part Number
Drive Clutch Puller	2870506
Clutch Holding Fixture	2871358
Spider Removal Tool	2870341
Offset Alignment Tool	2870654
Driven Clutch Puller	2870913
Spider Pin Tool	2870910
Clutch Bushing Removal & Installation	2871226
Piston Pin Puller (Also used with 2871226)	2870386
401 Loctite	2870769
RTV Silicone Sealer	2870661
Loctite/Chisel Gasket Remover	2870601

PVT System Fastener Torques

Drive Clutch Retaining Bolt	40 ft. lbs.
Driven Clutch Retaining Bolt	17 ft. lbs.
PVT Inner Cover Bolts	12 ft. lbs.
Drive Clutch Spider	200 ft. lbs.
Drive Clutch Spider (Eng.brake)	185 ft. lbs.
Drive Clutch Cover Plate	90 in. lbs.

1996 Production Specifications [1]

Machine Model	Engine Model	Operating RPM +/- 200	Drive Clutch Spring Color	Shift Wt. I.D. and Gram Wt.	Driven Clutch Helix Angle Spring Position
Trail Boss	EC25PFE-08	6000	Blue/Green	16 43 gr	40° 2-2
Trail Blazer	EC25PFE-09	5800	Blue/Green	G 48 gr	40° 2-2
300s	EC28PFE-01	5600	Blue/Green	G 48 gr	44°-36° 2-2
400s Except Scrambler/Sport	EC38PLE-04	5700	Blue/Green	S-55 55 gr	44°-36° 2-2
Scrambler/ Sport	EC38PLE-05	5700	White	S-55 55 gr	40° 2-2
425s (Magnums)	EH42PLE-01	6000	Blue/Green	10MH 50.5 gr	40° 2-2
500 Sportsman	EH50PLE-01	6000	Blue/Green	10MH 50.5 gr	40° 2-2

1996 Clutch Recommendations for Altitude* [1]

Meters/Feet		Trail Blazer ES	Trail Boss	300	400 Except Scramb/Sport	Scrambler/ Sport 400L	425/500
0-900 0-3000'	Weight	G (48 gr)	16	G 48 gr	S55 55 gr	S55 - 55 gr	10MH 50 gr
	Drive Spring	Blue/Green	Blue/Green	Blue/Green	Blue/Green	White	Blue/Green
	Driven Spring/ Position	(Red) 2-2	(Red) 2-2	(Red) 2-2	(Red) 2-2	(Red) 2-2	(Red) 2-2
900-1800 3000-6000'	Weight	G (48 gr)	16	G 48 gr	S55 55 gr	S55 - 55 gr	10MB
	Spring	Blue/Green	Blue/Green	Blue/Green	Blue/Green	White	Blue/Green
	Driven Spring/ Position	(Red) 2-1	(Red) 2-1	(Red) 2-2 or 2-1	(Red) 2-2 or 2-1	(Red) 2-2 or 2-1	(Red) 2-2
1800-2700 6000-9000'	Weight	16	16 Mod	F 45 gr	S 53 gr	S 53 gr	10MW
	Spring	Blue/Green	Blue/Green	Blue/Green	Blue/Green	White	Blue/Green
	Driven Spring/ Position	(Red) 2-2	(Red) 2-2	(Red) 2-1	(Red) 2-1	(Red) 2-1	(Red) 2-1
2700-3700 9000-12000'	Weight	16	16 Mod	F 45 gr	S 53 gr	S or C	10MR
	Spring	Blue/Green	Blue/Green	Blue/Green	Blue/Green	White	Blue/Green
	Driven Spring/ Position	(Red) 2-1	(Red) 2-1	(Red) 2-1	(Red) 2-1	(Red) 2-1	(Red) 2-1

*** NOTE: Shift weights BH, RH, and WH (recommended for some 1998 models at high elevation) supercede the 10MB, 10MR, and 10MW listed in the charts for some 1996 and 1997 models. Refer to page 6.3 for more information.**

[1] Refer to Page 6.31 for Engine Braking Clutch instructions, maintenance, and specifications.

CLUTCHES
Specifications

1997 Production Specifications [1]

Machine Model	Engine Model	Operating RPM +/- 200	Drive Clutch Spring Color	Shift Wt. I.D. and Gram Wt.	Driven Clutch Helix Angle Spring Position
Trail Boss	EC25PFE-08	6000	Blue/Green	16 43 gr	40° 2-2
Trail Blazer	EC25PFE-09	5800	Blue/Green	G 48 gr	40° 2-2
300s	EC28PFE-01	5600	Blue/Green	G 48 gr	44°-36° 2-2
400s Except Scrambler/Sport	EC38PLE-04	5700	Blue/Green	S-55 55 gr	44°-36° 2-2
Scrambler/ Sport	EC38PLE-05	5700	White	S-55 55 gr	40° 2-2
425s (Magnums)	EH42PLE-01	6000	Blue/Green	10MH 50.5 gr	40° 2-2
Sportsman 500 Xplorer 500	EH50PLE-05	6000	Blue/Green	10MH 50.5 gr	Compound 2-2
500 Scrambler	EH50PLE-02	6000	White	10MH 50.5 gr	Compound 2-2

1997 Clutch Recommendations for Altitude * [1]

Meters/Feet		Trail Blazer ES	Trail Boss	300 Xpress Xplorer	400 Except Scrambler/ Sport	Scrambler/ Sport 400L	425	Xplorer/ Sportsman 500	500 Scrambler
0-900 0-3000'	Weight	G (48 gr)	16	G 48 gr	S55 55 gr	S55 - 55 gr	10MH 50 gr	10MH 50 gr	10MH 50 gr
	Spring	Blue/Green	Blue/Green	Blue/Green	Blue/Green	White	Blue/Green	Blue/Green	White
	Driven Position	(Red) 2-2	(Red) 2-2	(Red) 2-2	(Red) 2-2	(Red) 2-2	(Red) 2-2	(Red) 2-2	(Red) 2-2
900-1800 3000-6000'	Weight	G (48 gr)	16	G 48 gr	S55 55 gr	S55 - 55 gr	10MW	10MB	10MB
	Spring	Blue/Green	Blue/Green	Blue/Green	Blue/Green	White	Blue/Green	Blue/Green	White
	Driven Position	(Red) 2-1	(Red) 2-1	(Red) 2-2 or 2-1	(Red) 2-2 or 2-1	(Red) 2-2 or 2-1	(Red) 2-2 or 2-1	(Red) 2-2	(Red) 2-2
1800-2700 6000-9000'	Weight	16	16 Mod	F 45 gr	S 53 gr	S 53 gr	10MR	10MW	10MW
	Spring	Blue/Green	Blue/Green	Blue/Green	Blue/Green	White	Blue/Green	Blue/Green	White
	Driven Position	(Red) 2-2	(Red) 2-2	(Red) 2-2	(Red) 2-1	(Red) 2-1	(Red) 2-1	(Red) 2-1	(Red) 2-1
2700-3700 9000-12000	Weight	16	16 Mod	F 45 gr	S 53 gr	S or C	10MR	10MR	10MR
	Spring	Blue/Green	Blue/Green	Blue/Green	Blue/Green	White	Blue/Green	Blue/Green	White
	Driven Position	(Red) 2-1	(Red) 2-2	(Red) 2-1	(Red) 2-1	(Red) 2-1	(Red) 2-1	(Red) 2-1	(Red) 2-1

*** NOTE: Shift weights BH, RH, and WH (recommended for some 1998 models at high elevation) supercede the 10MB, 10MR, and 10MW listed in the charts for some 1996 and 1997 models. Refer to page 6.3 for more information.**

[1] Refer to Page 6.31 for Engine Braking Clutch instructions, maintenance, and specifications.

1998 Production Specifications *

Machine Model	Operating RPM +/- 200	Drive Clutch Spring Color	Shift Wt. I.D. and Gram Wt.	Driven Clutch Helix Angle Spring Position
Trail Boss	6000	Blue/Green	16 43 gr	40° 2-2
Trail Blazer	5800	Blue/Green	G 48 gr	40° 2-2
300s	5600	Blue/Green	G 48 gr	44°-36° 2-2
Sport 400	5700	White	S-55 55 gr	40° 2-2
Scrambler 400	5700	White	S-55 55 gr	40° 2-2
Xplorer	5700	Blue/Green	S-55 55 gr	44°-36° 2-2
425s (Magnums)	6000	Blue/Green	10MH 50.5 gr	40° 2-2
Sportsman 500	6000	Blue/Green	10MH 50.5 gr	Compound 2-2
Scrambler 500	6000	Blue/Green	10MH 50.5 gr	Compound 2-2

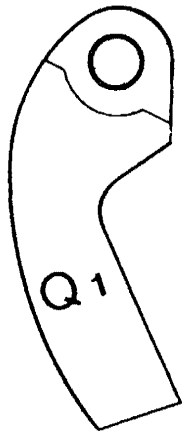
1998 Clutch Recommendations for Altitude *

Meters (Feet)		Trail Boss	Trail Blazer	300 Xpress Xplorer	Scrambler/ Sport 400L	Xplorer 400	Magnum 2x4/4x4	Sports-man 500	Scrambler 500	Big Boss 500 6x6
0-900 (0-3000)	Weight	16	G (48 gr)	G (48 gr)	S55 (55 gr)	S55 (55 gr)	10MH (50 gr)	10MH (50 gr)	10WH (50 gr)	10MH (50 gr)
	Spring	Blu/Grn	Blu/Grn	Blu/Grn	White	Blu/Grn	Blu/Grn	Blu/Grn	Blu/Grn	Blu/Grn
	Driven Spring (Color) Position	(Red) 2-2	(Red) 2-2	(Red) 2-2	(Red) 2-2	(Red) 2-2	(Red) 2-2	(Red) 2-2	(Red) 1-1	(Red) 2-2
900-1800 (3000-6000)	Weight	16	G (48 gr)	G (48 gr)	S55 (55 gr)	S55 (55 gr)	10WH	10BH	10WH	10BH
	Spring	Blu/Grn	Blu/Grn	Blu/Grn	White	Blu/Grn	Blu/Grn	Blu/Grn	Blu/Grn	Blu/Grn
	Driven Spring (Color) Position	(Red) 2-1	(Red) 2-1	(Red) 2-2 or 2-1	(Red) 2-2 or 2-1	(Red) 2-2 or 2-1	(Red) 2-2 or 2-1	(Red) 2-2	(Red) 2-1	(Red) 2-2
1800-2700 (6000-9000)	Weight	16 Mod	16	F (45 gr)	S	S	10RH	10WH	10RH	10WH
	Spring	Blu/Grn	Blu/Grn	Blu/Grn	White	Blu/Grn	Blu/Grn	Blu/Grn	Blu/Grn	Blu/Grn
	Driven Spring (Color) Position	(Red) 2-2	(Red) 2-2	(Red) 2-2	(Red) 2-1	(Red) 2-1	(Red) 2-1	(Red) 2-1	(Red) 1-1	(Red) 2-1
2700-3700 9000-12000	Weight	16 Mod	16	F (45 gr)	S or C	S	10RH	10RH	10RH	10RH
	Spring	Blu/Grn	Blu/Grn	Blu/Grn	White	Blu/Grn	Blu/Grn	Blu/Grn	Blu/Grn	Blu/Grn
	Driven Spring (Color) Position	(Red) 2-2	(Red) 2-1	(Red) 2-1	(Red) 2-1	(Red) 2-1	(Red) 2-1	(Red) 2-1	(Red) 2-1	(Red) 2-1

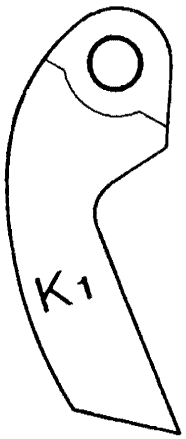
*** Refer to Page 6.31 for engine braking clutch maintenance, and specifications.**

CLUTCHES
Shift Weights

Shown below are the shift weights which have been designed for, or which may be used in the PVT system. These shift weights have many factors designed into them for controlling engagement RPM and shifting patterns. Some of these weights require modifications to spider spacing when installed, which will affect clutch balance. Shift weights should not be changed or altered without first having a thorough understanding of their positioning and the effects they may have on belt to sheave clearance, clutch balance and shifting pattern.



PN 5630295
35.5 gr
Mod.



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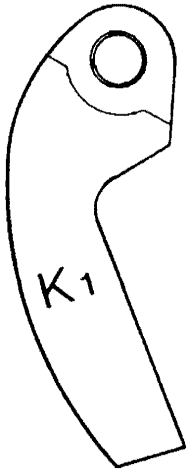
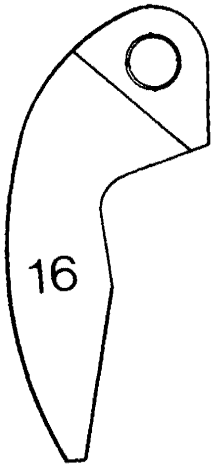
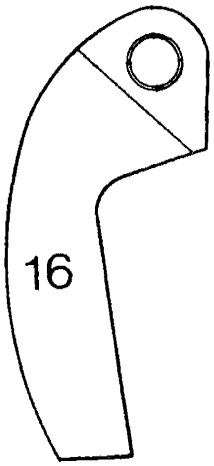
38.5 gr
Mod.



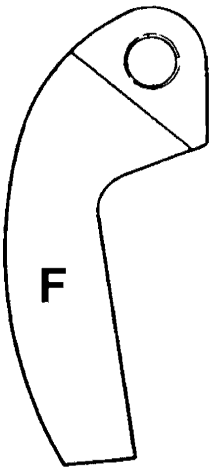
PN 5630144
39 gr



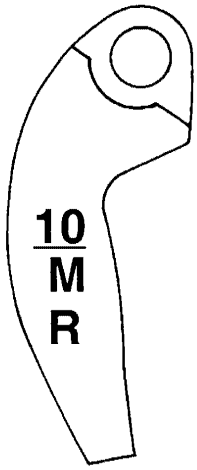
PN 5630280
40 gr
Mod.-(High Alt.)



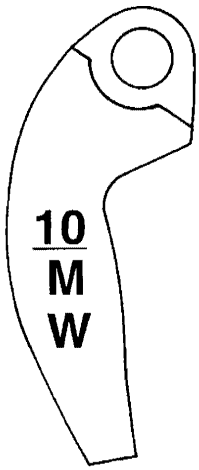
PN 5630279
43 gr



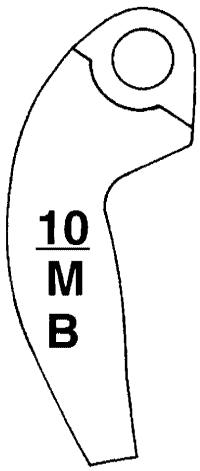
PN 5630515
45 gr
(High Altitude)



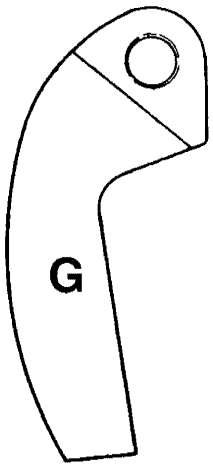
PN 1321530
44 gr
(High Altitude)



PN 1321527
46 gr
(High Altitude)



PN 1321529
47.5 gr
(High Altitude)

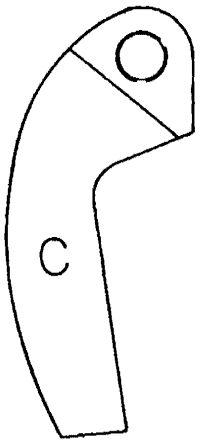


PN 5630514
48 gr

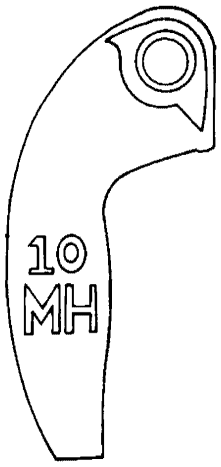
Although these (snowmobile) weights are specified for some 1996 and 1997 models at high elevation, the RH, WH, and BH weights (specified for some 1998 models) should be substituted when MR, MW, and MB are specified.

The "H" weights have a thicker heel which reduces clearance between the shift weight surface and spider roller when the drive clutch is in the neutral or "de-clutched" position.

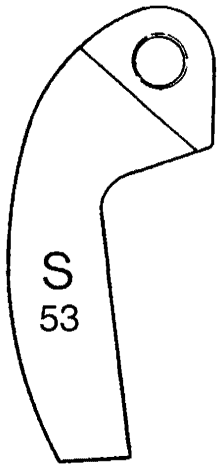
If 10 MR (1321530) is specified, use 10 RH (5630709)
If 10 MW (1321527) is specified, use 10 WH (5630710)
If 10 MB (1321529) is specified, use 10 BH (5630711)



PN 5630418
50 gr
(High Alt. 350L)



PN 5630513
50.5 gr



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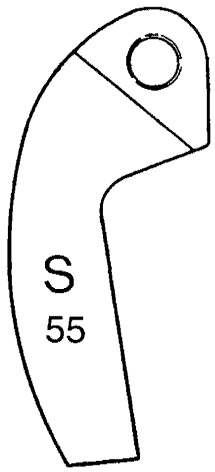
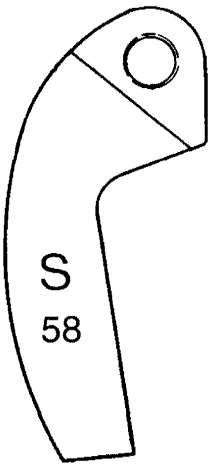
53 gr



PN 5630509
55 gr



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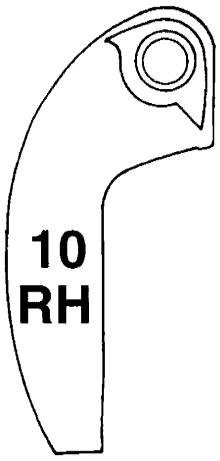
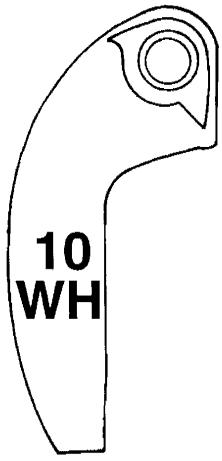
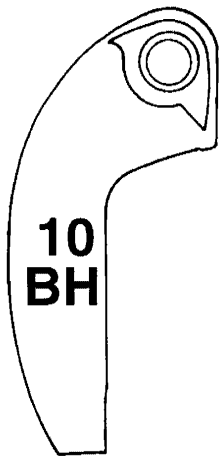
58 gr



PN 5630709
44 gr



PN 5630710
46 gr



PN 5630711
47gr

Use these weights when 10 MR, 10 MW, and 10 MB are specified.
Refer to page 6.2.

CLUTCHES
Drive Clutch Spring Specifications

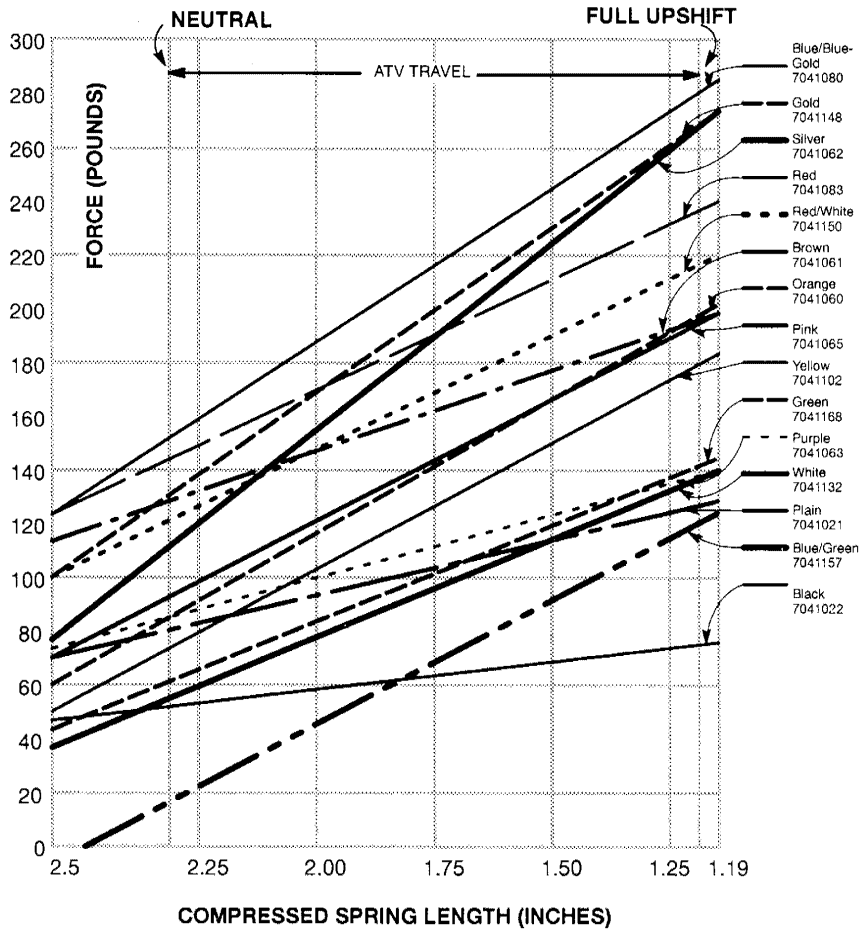
The drive clutch spring has two primary functions:

1. **To control clutch engagement RPM.** The springs which have a higher rate when the clutch is in neutral will increase clutch engagement RPM.
2. **To control the rate at which the drive belt moves upward in the drive clutch sheaves.** This is referred to as drive clutch upshift.

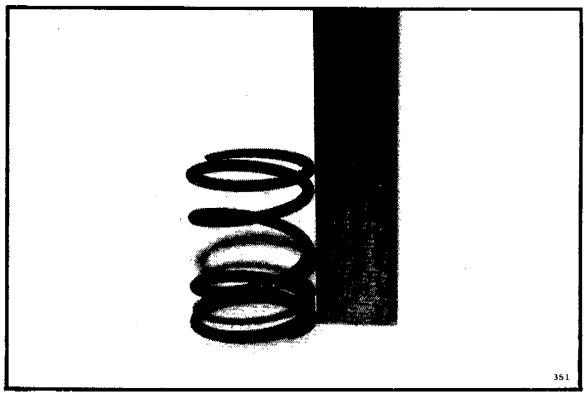
There are other components which control upshift, but the spring is one of the primary components in insuring optimum performance. It is very important that the spring is of the correct design and is in good condition.

CAUTION: Never shim a drive clutch spring to increase its compression rate. This may result in complete stacking of the coils and subsequent clutch 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 stress 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 as shown. Refer to the spring specification chart for specific free length measurements and tolerances. Also check to see that spring coils are parallel to one another. Distortion of the spring indicates stress fatigue, requiring replacement.



PART NUMBER	COLOR CODE	WIRE DIAMETER	FREE LENGTH ±.125″
7041021	Plain	.157″	4.38″
7041022	Black	.140″	4.25″
7041063	Purple	.168″	4.37″
7041062	Silver	.208″	3.12″
7041065	Pink	.177″	4.69″
7041060	Orange	.196″	3.37″
7041080	Blue/Gold	.207″	3.50″
7041083	Red	.192″	3.77″
7041102	Yellow	.192″	2.92″
7041061	Brown	.200″	3.06″
7041132	White	.177″	2.92″
7041168	Green	.177″	3.05″
7041148	Gold	.207″	3.25″
7041150	Red/White	.192″	3.59″
7041157	Blue/Green	.177″	2.53″

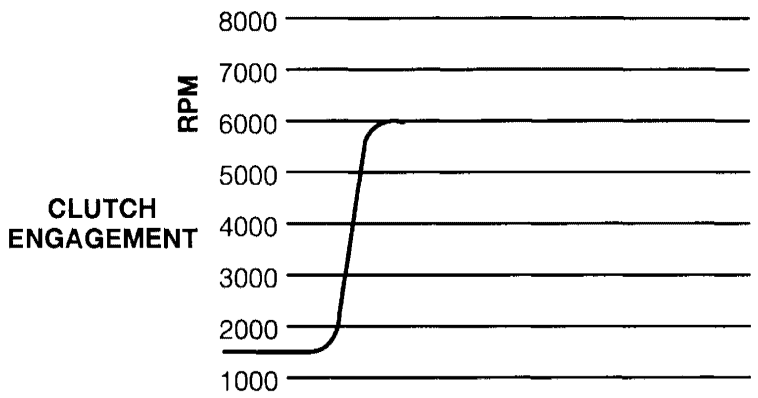
Relationship of Drive Clutch Weights and Spring in Maintaining Operating RPM

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

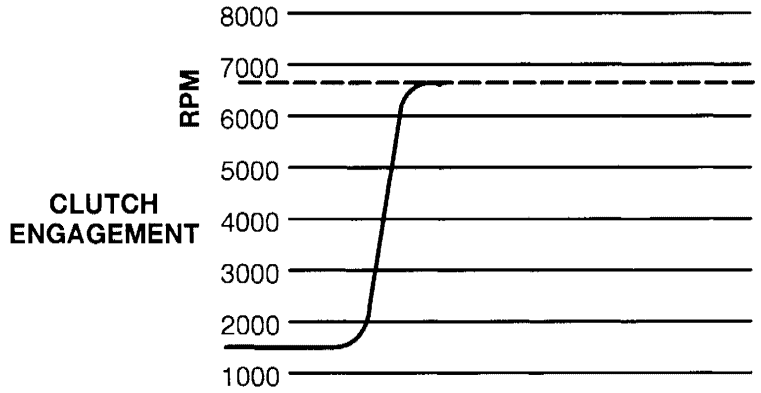
The spring and weights work in combination. In a properly set up clutch, the maximum desired operating RPM will be reached immediately after clutch engagement, under full throttle conditions. To gain optimum power this RPM should be maintained. As centrifugal force pushes the weights against the rollers,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

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

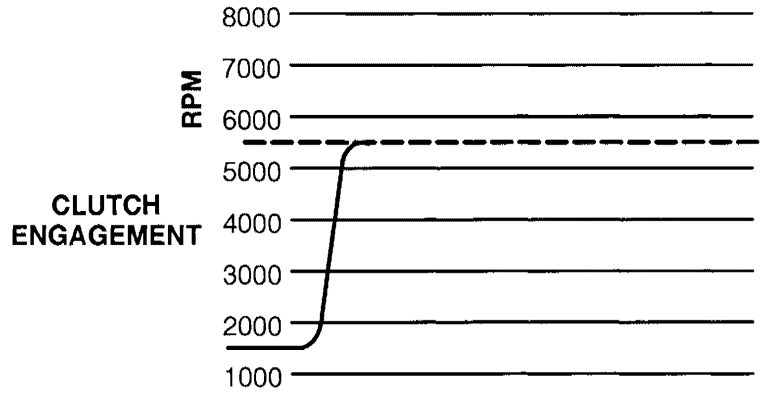
Example : Engine Operating RPM 6000 ±200



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



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



CLUTCHES
PVT System Introduction

The Polaris variable transmission (PVT) consists of three major assemblies: 1) drive clutch; 2) drive belt; and 3) driven clutch. The internal components of the drive clutch and driven clutch control clutch engagement (for initial vehicle movement), clutch upshifting and backshifting. During the development of an ATV, the PVT system is matched first of all to the engine power curve; then to average riding conditions and to vehicle design usage. Modifications to the PVT or variations of components at random are never recommended. Proper PVT system setup and careful inspection of existing components must be the primary objective when troubleshooting and tuning.

⚠ WARNING

⚠ All PVT system maintenance repairs must be performed only by an authorized Polaris service technician who has attended a Polaris sponsored service training seminar and understands the proper procedures as outlined in this manual. **Because of the critical nature and precision balance incorporated into the PVT system, it is absolutely essential that no attempt at disassembly or repair be made without factory authorized special tools and service procedures.**

Drive Clutch Operation

The drive clutch primarily senses engine RPM. The two major components which control its shifting function are the shift weights and the coil spring. When the engine RPM is increased, the centrifugal force of the shift weights working against the coil spring increases. When this force reaches a force higher than the preload in the spring, the moveable sheave of the drive clutch will move inward, contacting the drive belt. The force will pinch the belt between the spinning sheaves and cause the drive belt to move. This movement in turn rotates the driven clutch.

At light throttle settings the drive belt will stay low in the drive clutch and high in the driven clutch. As engine RPM increases, so does the centrifugal force on the shift weights, causing the drive belt to be forced upward in the drive clutch and downward into the driven clutch. The forces in the driven clutch will now affect the upshift.

Driven Clutch Operation

The driven clutch primarily senses torque. It opens and closes according to the forces applied to it from the drive belt and the transmission input shaft. If the torque resistance on the input shaft is greater than the load from the drive belt, it will keep the drive belt outward at the top of the driven clutch sheaves. As the throttle setting and engine horsepower increase, there will be a greater load on the drive belt, pulling the belt down into the driven clutch and up on the drive clutch. This action, which increases the driven clutch speed, is called upshifting.

If the throttle setting remains the same and the vehicle is subjected to a heavier load, the driven clutch senses this load, moving the belt back up on the sheaves of the driven clutch and down into the sheaves of the drive clutch. This action, which decreases the driven clutch speed, is called downshifting.

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 will hold the engine RPMs 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 change throttle position, as a governor does, the PVT system changes engine load requirements by either upshifting or downshifting.

PVT Maintenance/Inspection

Under normal operation the PVT system will provide years of trouble free operation. Periodic inspection and maintenance is required to keep the system operating at peak performance. The following list of items should be inspected and maintained to ensure maximum performance and service life of PVT components. Refer to the troubleshooting checklist at the end of this chapter for more information.

1. **Belt Tension, Drive to Driven Clutch Offset, Belt Width.** See pages 6.12-6.13.
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.** See pages 6.14-6.22.
3. **Sheave Faces.** Clean and inspect for wear.
4. **PVT System Sealing.** Refer to appropriate illustration below and 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.

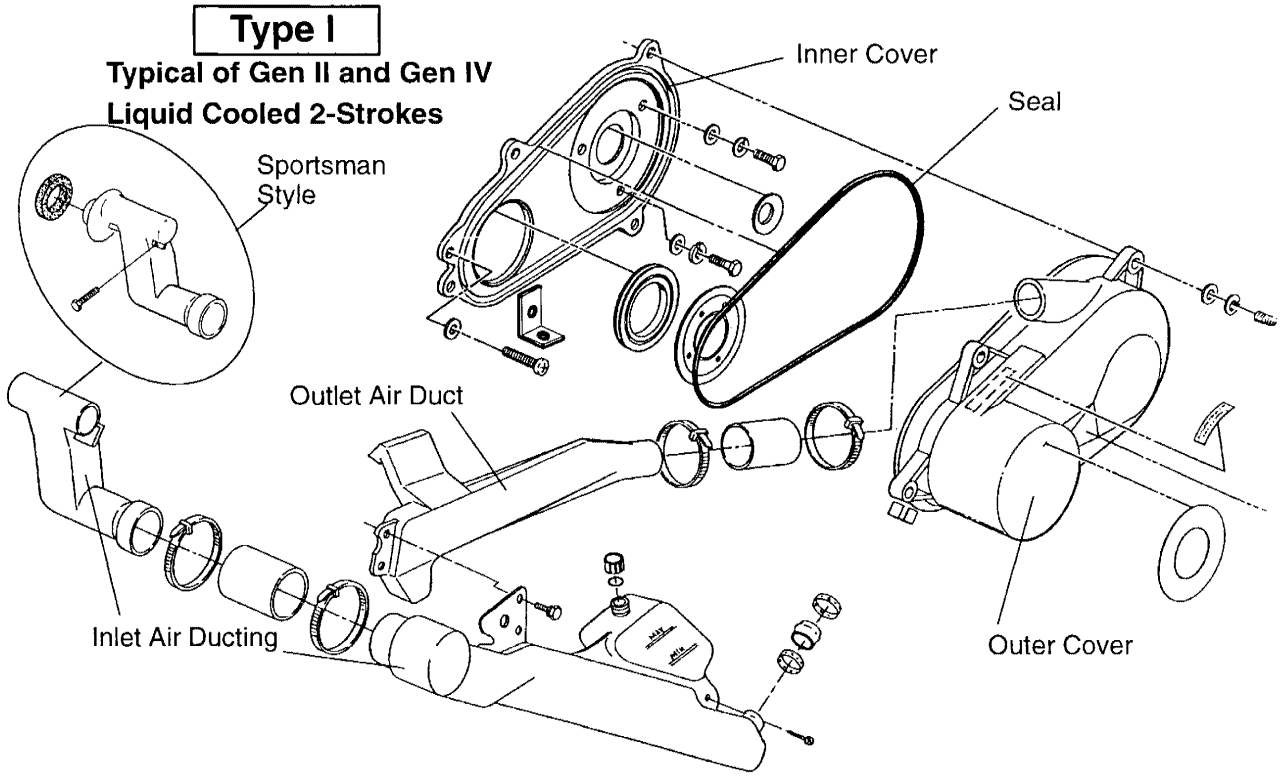
PVT Drying

If water is ingested, shift transmission to neutral and rev engine slightly to expel the moisture and air-dry the belt and clutches. Allow engine RPM to settle to idle speed, shift transmission to low range and test for belt slippage. Operate ATV in low range for a short period of time until PVT system is dry.

PVT Overheating

During routine maintenance or whenever PVT system overheating is evident, it's important to check the inlet *and* outlet ducting for obstructions. Obstructions to air flow through the ducts will significantly increase PVT system operating temperatures. The ATV should be operated in LOW RANGE when pulling or plowing heavy loads, or if extended low speed operation is anticipated.

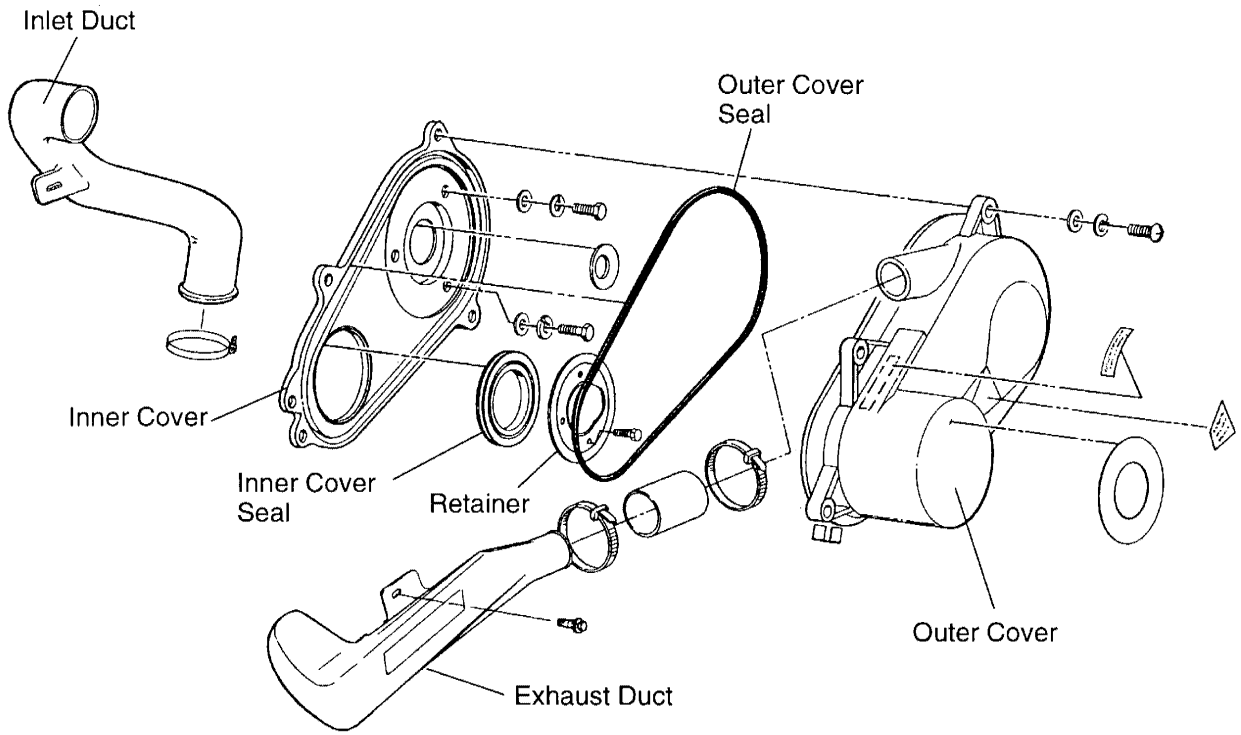
PVT Sealing and Ducting Components



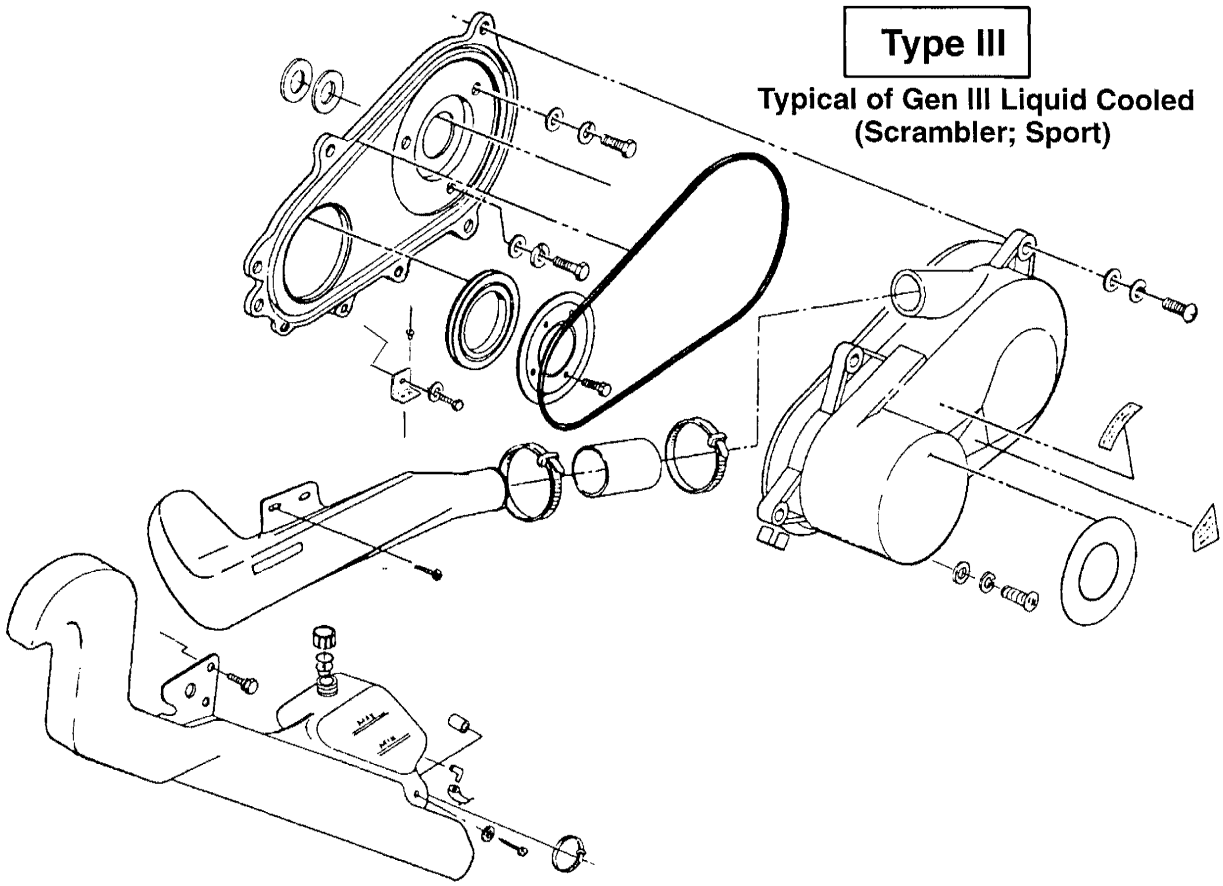
PVT Sealing and Ducting Components

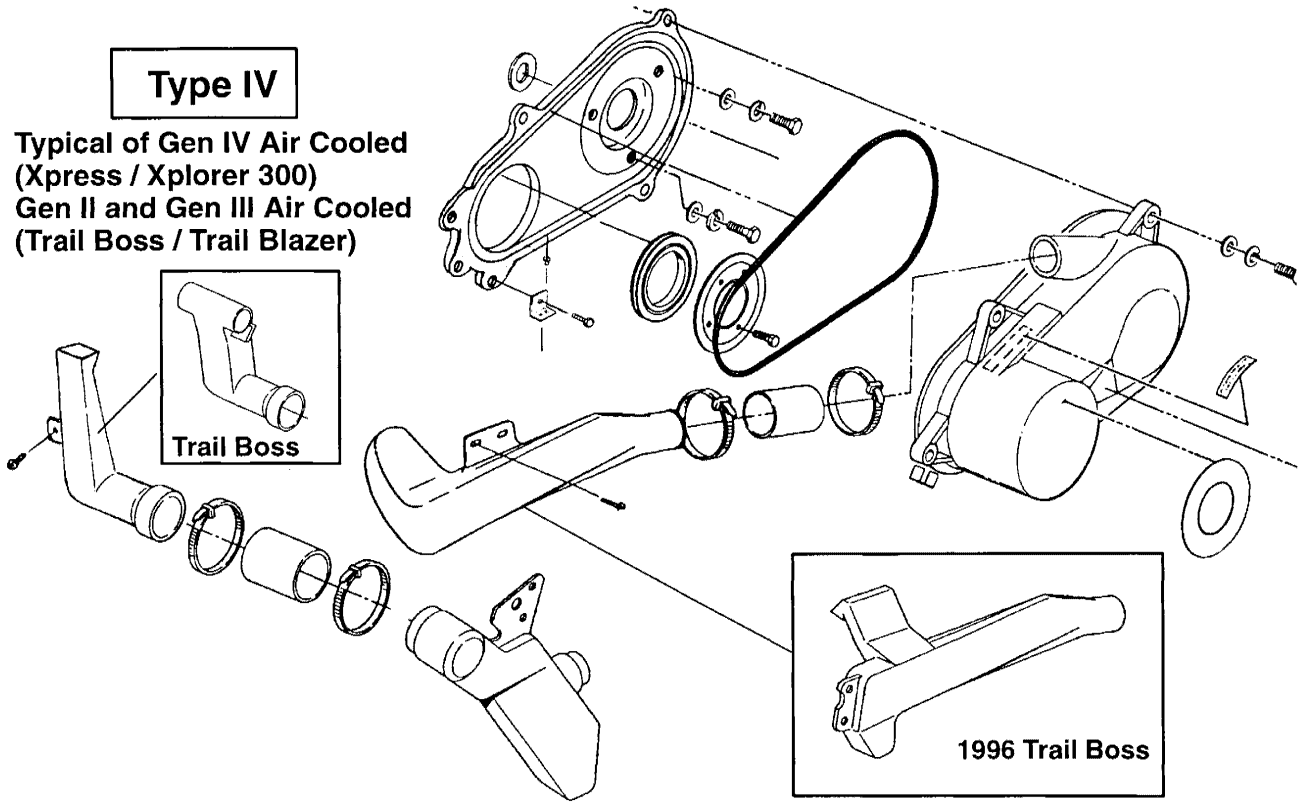
Type II

Typical of Gen II 4-strokes



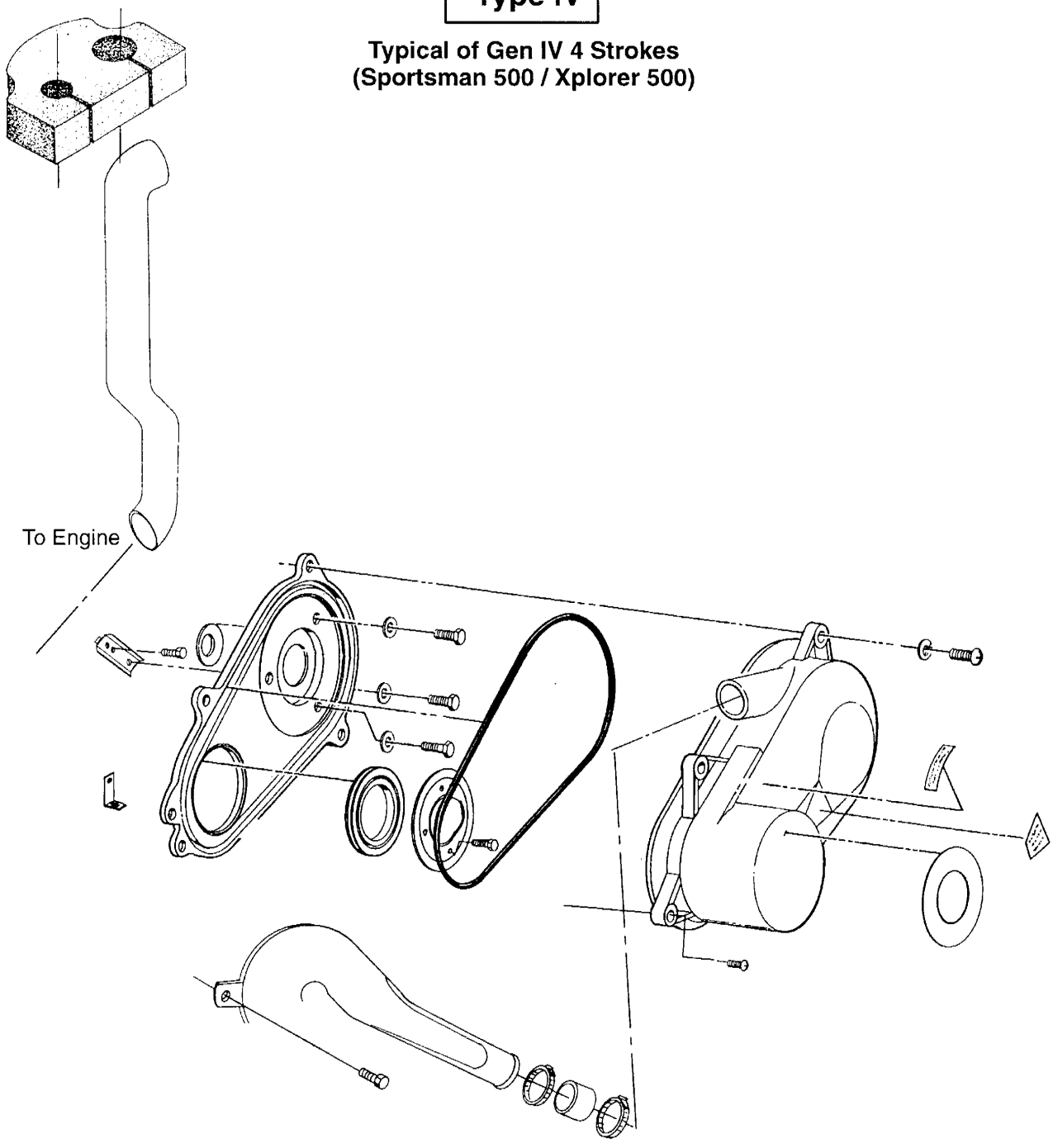
PVT Sealing and Ducting Components





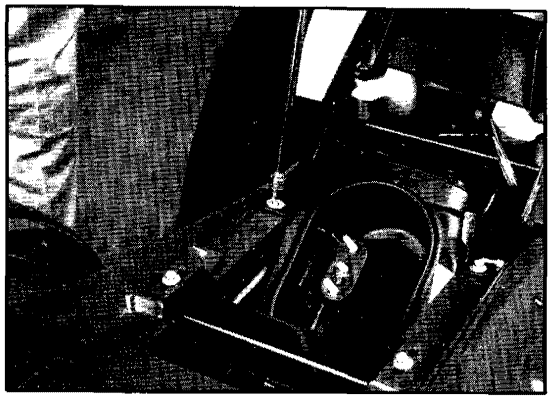
Type IV

Typical of Gen IV 4 Strokes
(Sportsman 500 / Xplorer 500)



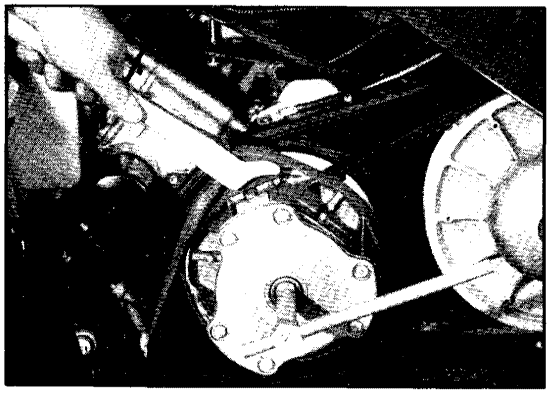
Typical PVT Disassembly

NOTE: Some fasteners and procedures will vary. Refer to the appropriate parts manual for proper fasteners and fastener placement.



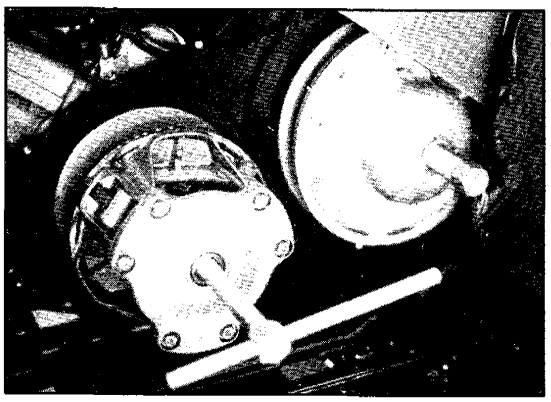
1. Remove seat.
2. Remove six bolts and washers from the top of the rear cab assembly.
3. Remove three screws, nuts and backing plate from the left footrest.
4. Remove screws, retainer clips, and cable tie from PVT air outlet duct, Remove outer cover.

5. Mark the drive belt direction of rotation and remove drive belt. The belt is normally installed so the numbers can be easily read. To remove drive belt, apply brake, pull upward and rearward on belt to open driven clutch sheaves, push down on belt to hold sheaves open, and slip belt over driven clutch outer sheave.



6. Remove drive clutch retaining bolt and remove drive clutch using puller.

Drive Clutch Puller PN 2870506



7. Remove driven clutch retaining bolt and driven clutch using puller.

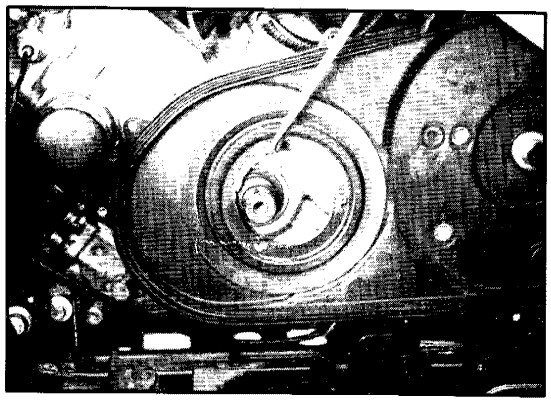
Driven Clutch Puller PN 2870913

8. Remove driven clutch offset spacers from the transmission input shaft.

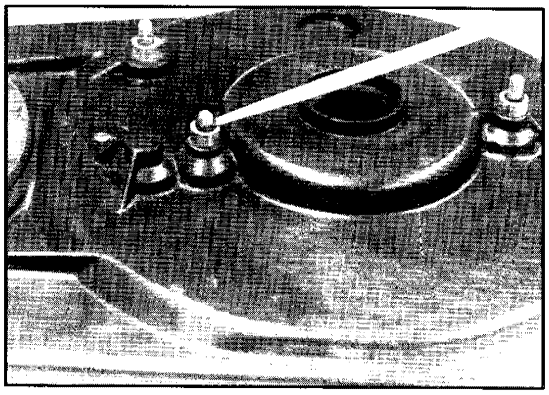
PVT Assembly

5. Bend back retainer tabs on three screws at the front of the inner cover and remove screws and retainer plate.

6. Loosen three inner cover retaining bolts at the rear of the cover only enough to allow cover removal.



7. Remove cover. **NOTE:** Some covers (pre 1996) have removable inner cover spacers. Do not lose spacers or spacer retaining O-rings located on the outside of the inner cover.



PVT Assembly

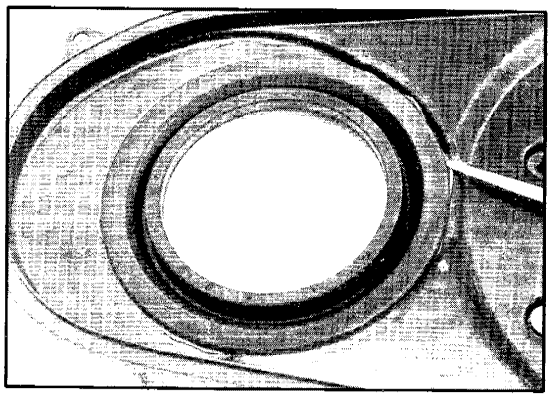
1. Inspect PVT inner cover seal. Replace if cracked or damaged.

2. Use RTV silicone to ensure a water tight fit between the seal and the cover. Surfaces must be clean to allow proper adhesion of the silicone sealant. Allow at least 12 hours for sealant to cure before operating vehicle.

3. Make sure the spacers and O-rings are in place on the inner cover rear bolts (where applicable).

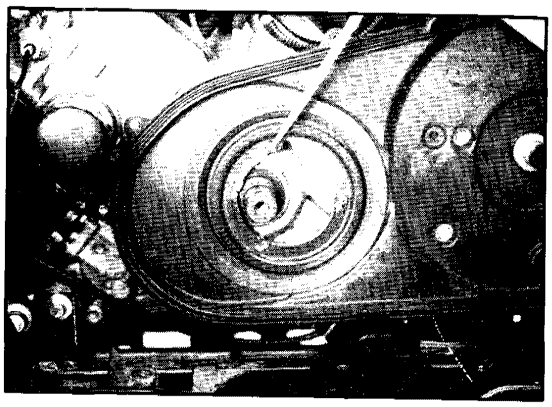
4. Reinstall cover and tighten rear cover bolts just enough to hold it in place.

5. Fit lip of inner cover seal to engine. Install seal retainer plate and tighten screws.

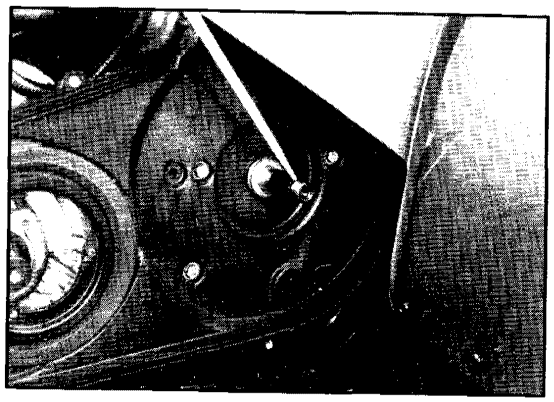


6. Bend screw retainer tabs over screws.
7. Torque inner cover bolts to specification.

Inner Cover Bolt Torque:
12 ft. lbs. (1.66 kg-m)



8. Install clutch offset spacers on transmission input shaft.
9. Clean splines inside driven clutch and on the transmission input shaft.
10. Apply a light film of grease to the splines on the shaft.
11. Install the driven clutch, aligning the boss spline on the input shaft.
12. Install driven clutch retaining bolt, washer, and lock washer. Torque to specification.
13. Clean the end of the taper on the crankshaft and taper bore inside the drive clutch.
14. Install the drive clutch and torque the retaining bolt to specification.
15. Reinstall drive belt noting direction of rotation. If a new belt is installed, install so numbers can be easily read.
16. Inspect PVT outer cover rubber gasket for cracks or damage. Replace if necessary. When installing a new gasket, position the ends at the top rear of the inner cover (highest point) and apply a small amount of RTV silicone to the ends. **NOTE:** The square side of the gasket faces the outer cover.
17. Reinstall PVT outer cover and secure with screws.
18. Reinstall rear cab assembly and seat.

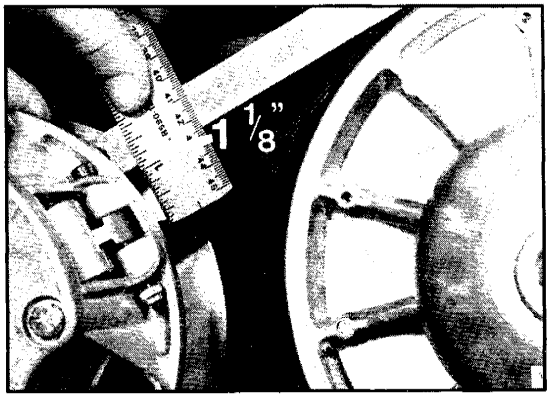


Driven Clutch Retaining Bolt Torque:
17 ft. lbs. (2.35 kg-m)

Drive Clutch Retaining Bolt Torque:
40 ft. lbs. (5.5 kg-m)

Drive Belt Tension

1. Remove PVT outer cover. See PVT Disassembly, page 6.9.
2. Place a straight edge on top of the belt between drive and driven clutch.
3. Push down on drive belt until it is lightly tensioned.
4. Measure belt deflection as shown in photo.

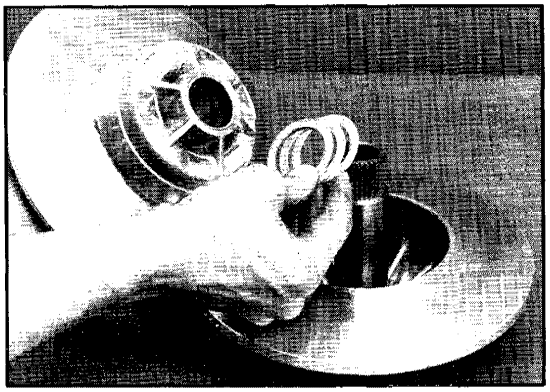


Belt Deflection (Tension):

1 1/8" (2.9 cm) - 1 1/4" (3.2 cm)

If belt deflection is out of specification, adjust by removing or adding shims between the driven clutch sheaves.

- Remove shims to decrease belt deflection
- Add shims to increase belt deflection



See Driven Clutch Disassembly/Inspection, pages 6.14 - 6.15.

NOTE: At least one shim must remain between the inner and outer sheave of the driven clutch. If proper belt deflection cannot be obtained, measure drive belt width, length, and center distance of drive and driven clutch, outlined in this section; all have an effect on belt deflection.

Drive Belt Removal/Inspection

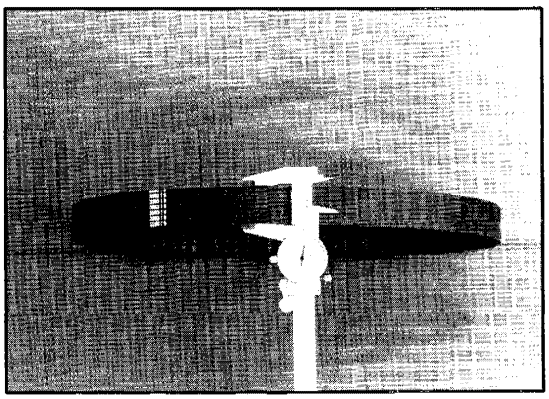
1. Remove outer PVT cover as described in PVT Disassembly, page 6.9.
2. Mark drive belt direction of rotation so that it can be installed in the same direction. **NOTE:** Normally positioned so part numbers are easily read.
3. To remove drive belt, apply brake, pull upward and rearward on belt to open driven clutch sheaves, push down on belt to hold sheaves open, and slip belt over driven clutch outer sheave.

4. Inspect belt width, measuring across the top of the belt with a dial caliper.

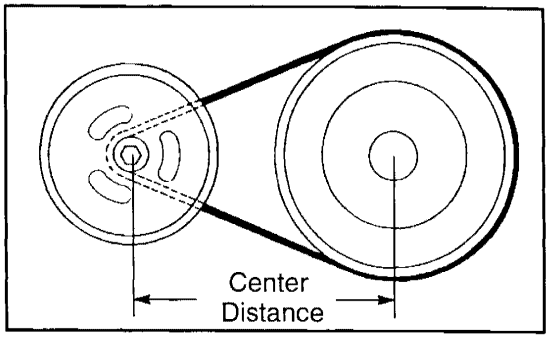
Belt Width:

New 1.188" (3.02 cm)

Wear Limit 1.125" (2.86 cm)



5. Measure belt length with a tape measure around the outer circumference of the belt. Belts which measure longer than nominal length may require driven shimming or engine adjustment for a longer center distance to obtain proper belt deflection. Belts which measure shorter than nominal length may require driven shimming or a shorter center distance. *Remember, proper belt deflection is the desired goal – not a specific center distance.*
6. Replace belt if worn past the service limit. Belts with thin spots, burn marks, etc., should be replaced to eliminate noise, vibration, or erratic PVT operation. See Troubleshooting Chart at the end of this chapter for possible causes. **NOTE:** If a new belt is installed, check belt deflection.



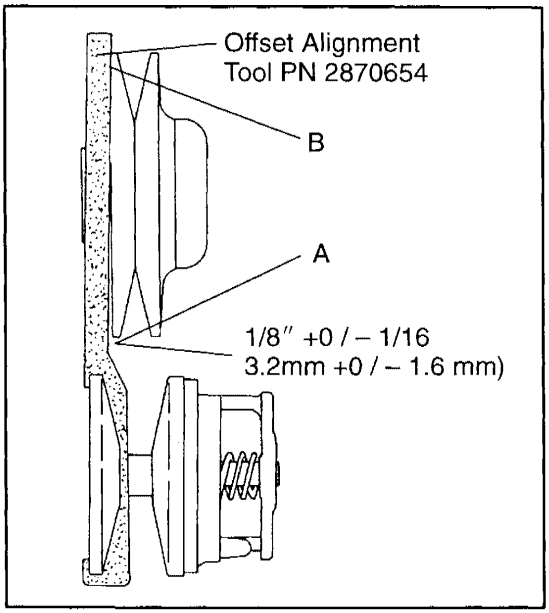
Clutch Center Distance -
10″ +.1 / -.05 (254 +2.5 / -1.3mm)
Belt Nominal Length - 40.875″± 3/16
(103.8 cm ± .48 cm)

Clutch Alignment

1. Remove belt and install offset/alignment tool as shown.
2. With tool touching rear of driven clutch inner sheave, the distance at point "A" should be 1/8″.

If the distance is greater than 1/8″ or less than 1/16″, clutch alignment must be adjusted as follows:

3. Remove drive and driven clutch. See PVT Disassembly, page 6.9.
4. Remove PVT inner cover.
5. Loosen all engine mounts. Move front of engine to the right or left slightly until alignment is correct.
6. Tighten engine mounts and verify alignment is correct.
7. Measure belt deflection and offset and adjust if necessary.



NOTE: On some models, minor adjustments can be made by adding shims between the frame and front lower left engine mount to increase the distance at point "A". If a shim is present, it can be removed to decrease the distance at point "A".

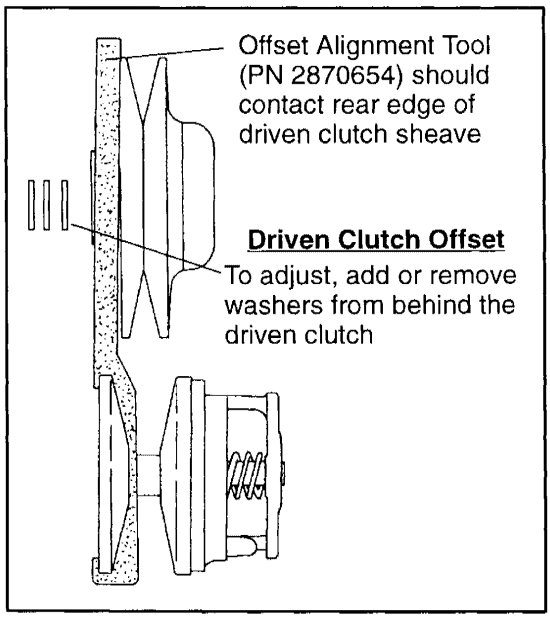
Shim Kit PN 2200126

Clutch Offset

Important: Inspect clutch alignment and center distance before adjusting offset.

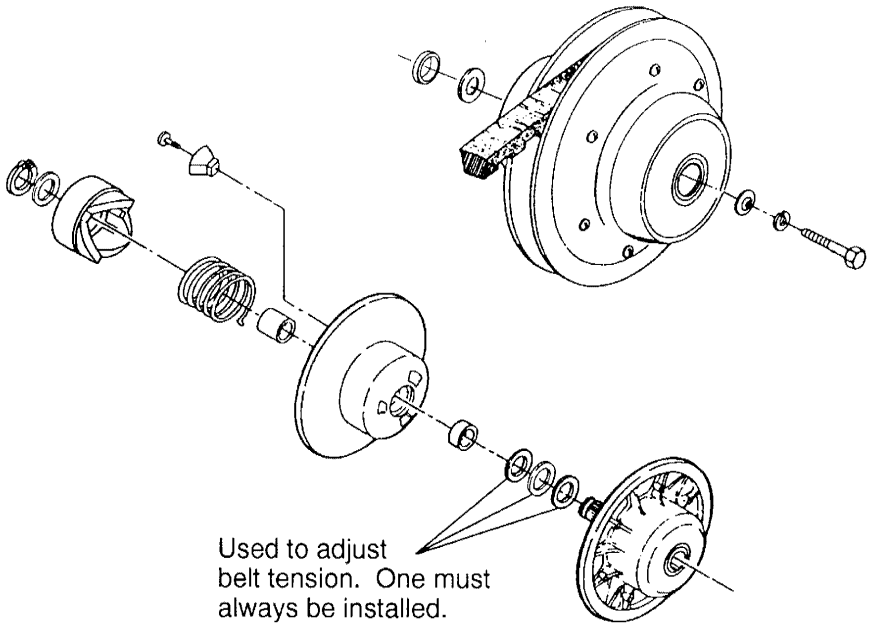
1. Install offset alignment tool as shown.

Offset is correct when rear of tool contacts rear of inner sheave with driven clutch pushed completely inward on shaft and bolt torqued. Adjust offset by adding or removing spacer washers between back of driven clutch and spacer as shown.



Spacer Washer PN 7556401

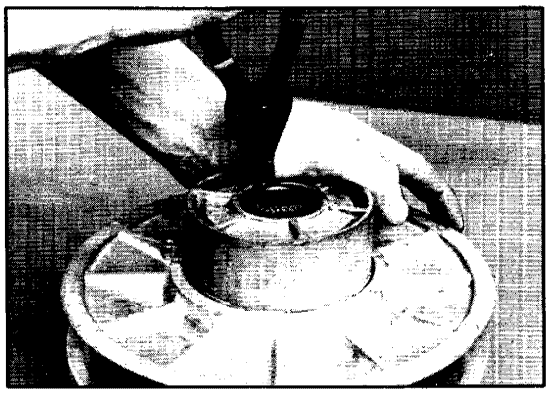
Driven Clutch Disassembly



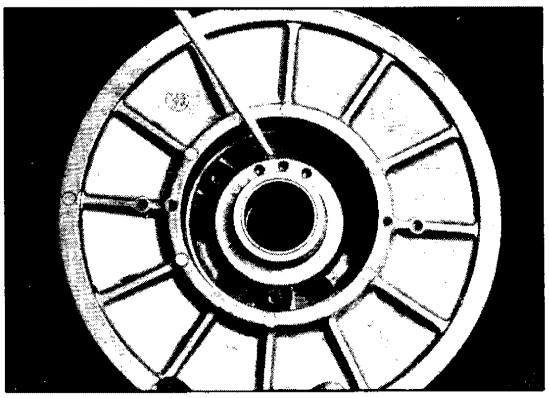
CAUTION:

Wear eye protection when removing snap ring to prevent serious personal injury.

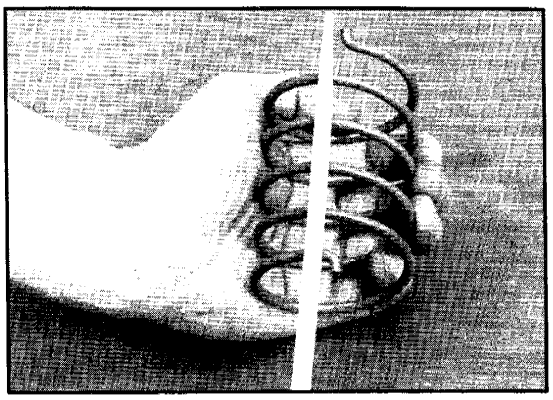
1. Apply and hold downward pressure on the helix.
2. Remove snap ring retainer.



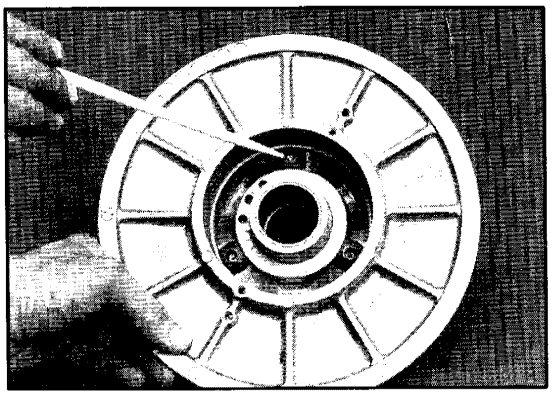
3. Note location of spring and remove helix.
4. Note location of spring in the moveable sheave, and remove the spring.



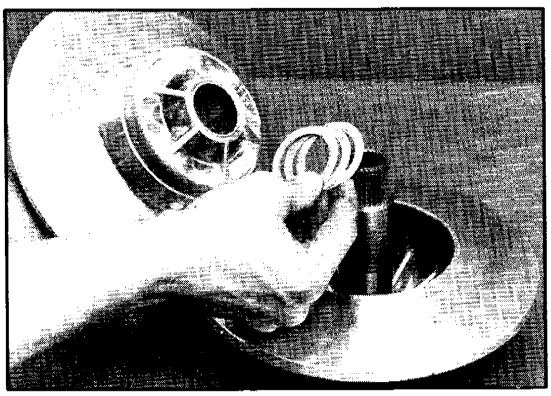
5. Check alignment of tabs on spring. Replace the spring if tabs are misaligned or the spring coils are distorted.



6. Inspect ramp buttons in the moveable sheave and replace if worn. **NOTE:** The ramp buttons are secured by Torx™ screws. The buttons can be turned 180° to provide a new wear surface. When both are worn, they must be replaced.



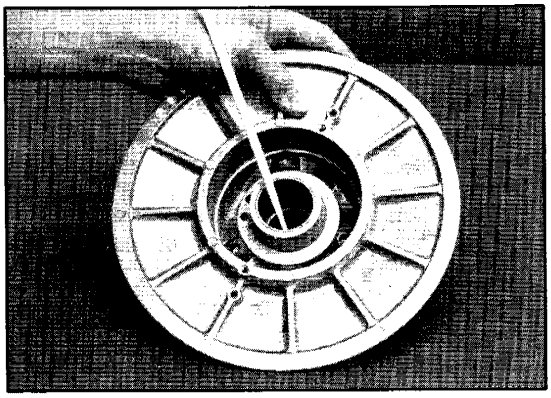
7. Remove moveable sheave and note the number of spacer washers. One spacer must remain between the sheaves when adjusting belt deflection.



8. Inspect the Teflon™ coating on the moveable sheave bushing.

Moveable Sheave Bushing Inspection:

Replace the bushing if more brass than Teflon™ is visible on the bushing. Refer to bushing replacement in this chapter.



9. Inspect driven clutch faces for wear or damage.

10. Clean and inspect splines on helix and transmission input shaft.

11. Lube splines with a light film of grease.

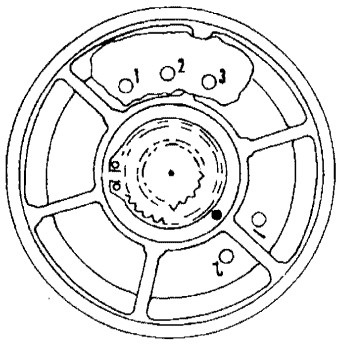
Driven Clutch Assembly

1. Install moveable sheave with spacer washers. **Important:** At least one spacer washer must be installed. Teflon bushings are self-lubricating. Do not apply oil or grease to the bushings.

2. Install spring, inserting spring tab into proper hole in moveable sheave.

3. Insert spring tab into proper hole in helix. See specifications at the beginning of this section.

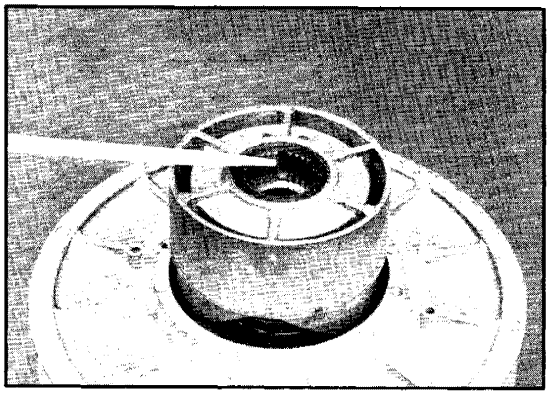
The driven clutch, helix/moveable assembly has several different spring locations which affect clutch shifting and RPMs. The greatest amount of spring tension will raise engine RPMs during clutch upshift and allow quicker backshift or downshift when pulling or negotiating a hill, for example. The least amount of tension will create a slower downshift and a harder upshift.



Example:	Helix	Moveable Sheave	Spring Tension
	2	1	Heavy
Spring/	2	2	↑
Position	1	1	
	2	3	
	1	2	
	1	3	Soft

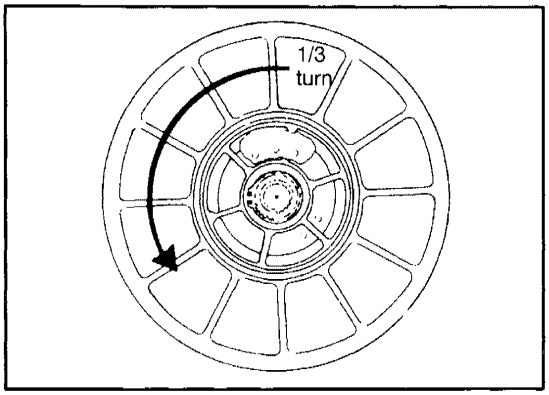
Production settings are 2-2

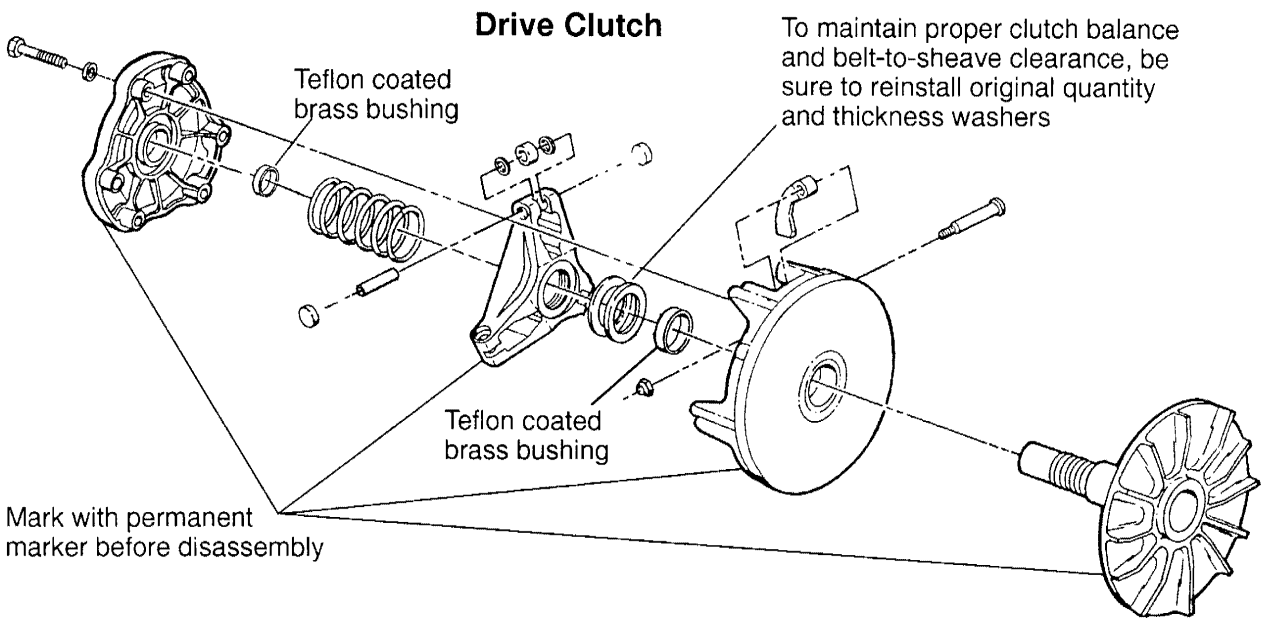
4. Line up boss spline and push helix down until it engages the splines 1/2″ to 3/4″.



5. While holding downward pressure on helix, wind moveable sheave counterclockwise approximately 1/3 turn (120°).

6. Push helix into place and install snap ring.

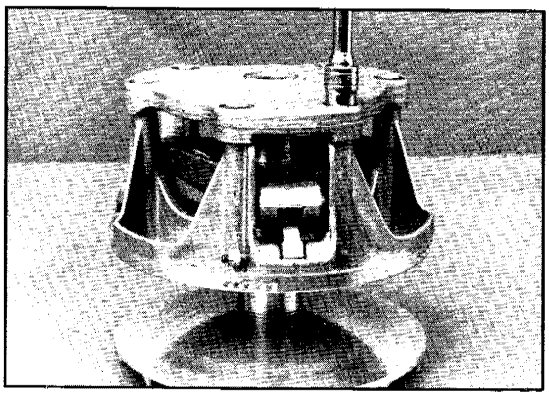




Drive Clutch Disassembly

1. Using a permanent marker, mark the cover, spider, and moveable and stationary sheaves to verify balance after assembly. See illustration above.

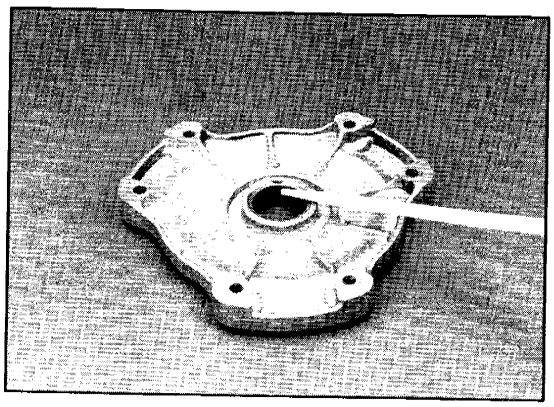
2. Install clutch in holding fixture. Remove cover plate bolts evenly in a criss-cross pattern.



Clutch Holding Fixture

PN 2871358

3. Inspect cover bushing. The outer cover bushing is manufactured with a Teflon™ coating. Bushing wear is determined by the amount of Teflon™ remaining on the bushing.



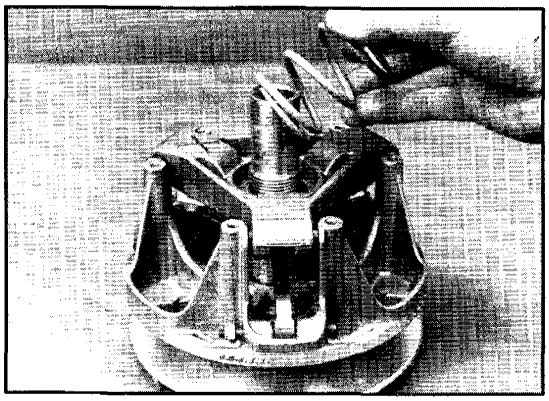
Cover Bushing Inspection:

Replace the cover bushing if more brass than Teflon™ is visible on the bushing. Refer to bushing replacement in this chapter.

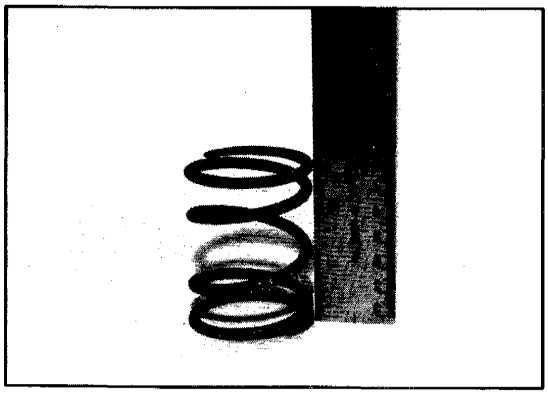
Drive Clutch Disassembly

4. Inspect area on shaft where bushing rides for wear, galling, nicks, or scratches. Replace clutch assembly if worn or damaged.

5. Remove and inspect spring.



With the spring resting on a flat surface, measure its free length from the outer coil surfaces as shown. Refer to the spring specification chart for specific free length measurements and tolerances. Also check to see that spring coils are parallel to one another. Distortion of the spring indicates stress fatigue, requiring replacement.

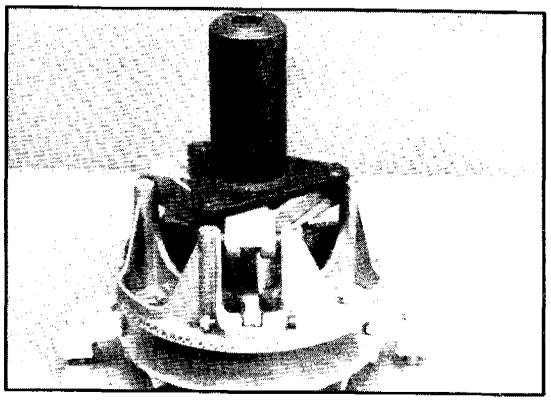


Spring Specifications

PART NUMBER	COLOR CODE	WIRE DIAMETER	FREE LENGTH ±.125″
7041021	Plain	.157″	4.38″
7041022	Black	.140″	4.25″
7041063	Purple	.168″	4.37″
7041062	Silver	.208″	3.12″
7041065	Pink	.177″	4.69″
7041060	Orange	.196″	3.37″
7041080	Blue/Gold	.207″	3.50″
7041083	Red	.192″	3.77″
7041102	Yellow	.192″	2.92″
7041061	Brown	.200″	3.06″
7041132	White	.177″	2.92″
7041168	Green	.177″	3.05″
7041148	Gold	.207″	3.25″
7041150	Red/White	.192″	3.59″
7041157	Blue/Green	.177″	2.53″

Spider Removal

1. Install clutch in holding fixture and loosen the spider using spider removal tool.

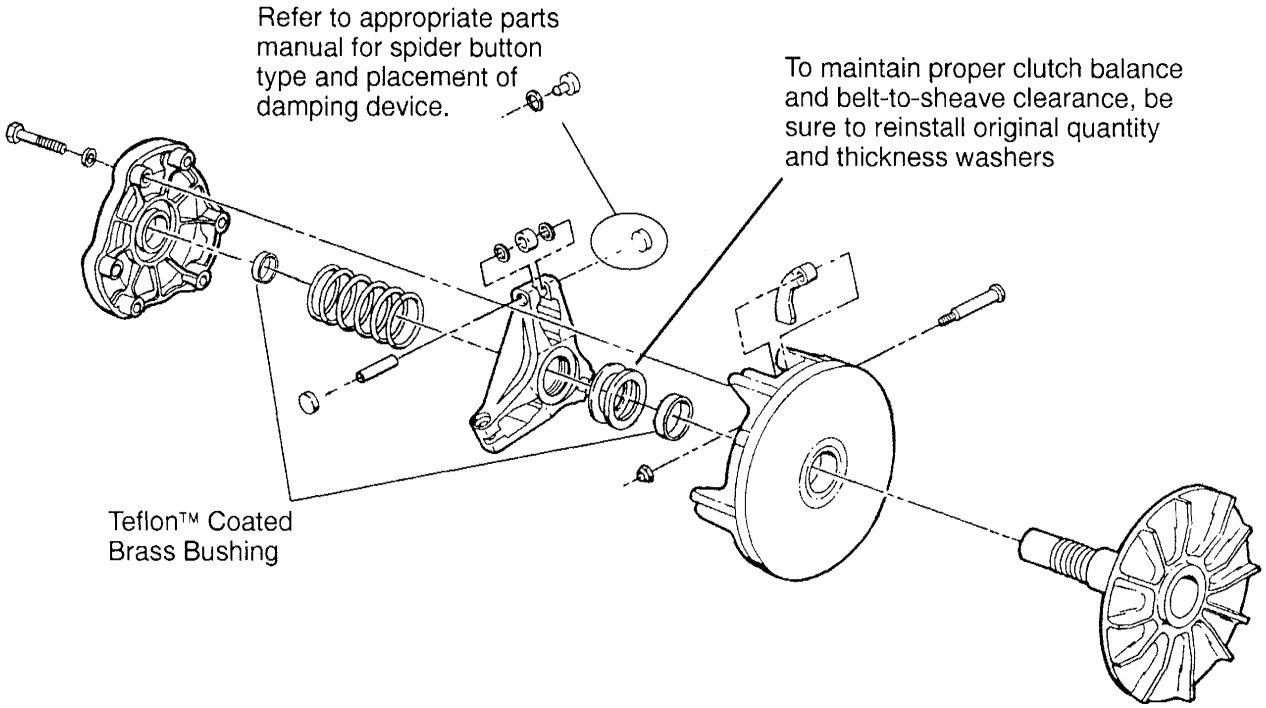


Clutch Holding Fixture:
PN 2870547 or 2871358

Spider Removal Tool:
PN 2870341

2. To remove, turn spider counterclockwise.

NOTE: It is important that the same number and thickness of washers are reinstalled beneath the spider during assembly to maintain clutch balance. Be sure to note the number and thickness of these washers.



Moveable Sheave Bushing Inspection

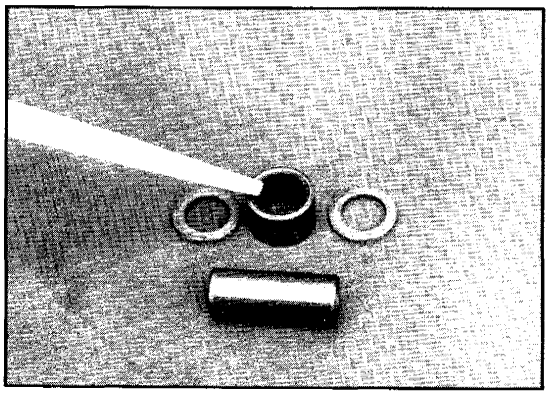
3. Inspect the Teflon™ coating on the moveable sheave bushing.

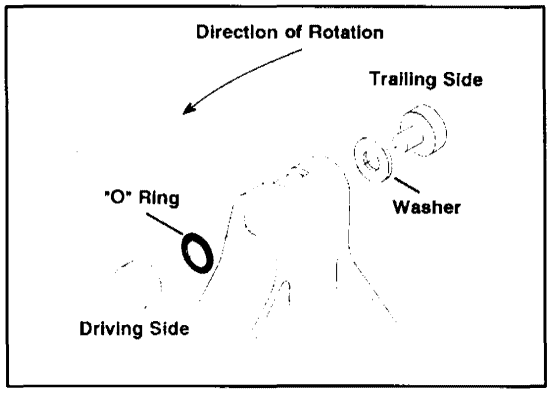
Moveable Sheave Bushing Inspection:

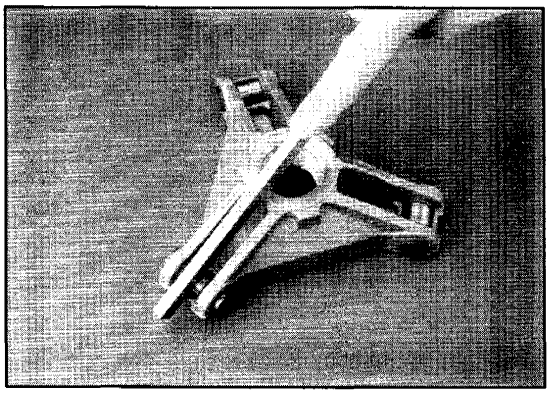
Replace the cover bushing if more brass than Teflon™ is visible on the bushing. Refer to bushing replacement in this chapter.

Roller, Pin and Thrust Washer Inspection

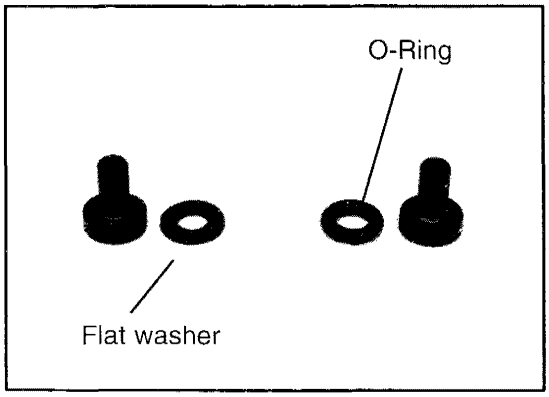
4. Inspect all rollers, bushings and roller pins by pulling a flat metal rod across the roller. Turn roller with your finger. If you notice resistance, galling, or flat spots, replace rollers, pins and thrust washers in sets of three. Also inspect to see if roller and bushing are separating. Bushing must fit tightly in roller. Use pin removal tool PN 2870910 to replace rollers and pins. Take care not to damage roller bushing or bearing surface of the new pin during installation.



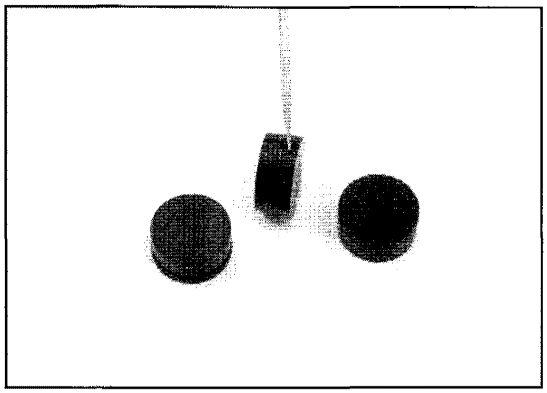




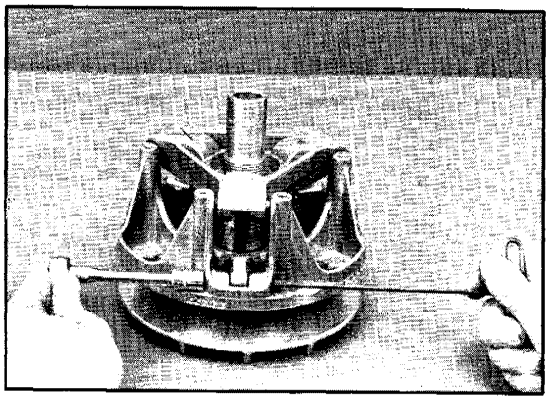
5. Shown at right is a typical spider button used on Trail Boss and Trail Blazer models. Some models will have a different style button or damping device (O-Ring). **NOTE:**Some models use an O-ring (on the driving side of the spider) and a flat rubber washer (on the trailing side of the spider). Refer to the illustration above. Pre-mature wear will result if the heat resistant O-rings are substituted with another type. Use only genuine Polaris parts. Do not install a flat washer on the driving side of the spider. Refer to the appropriate parts manual for placement and part numbers.

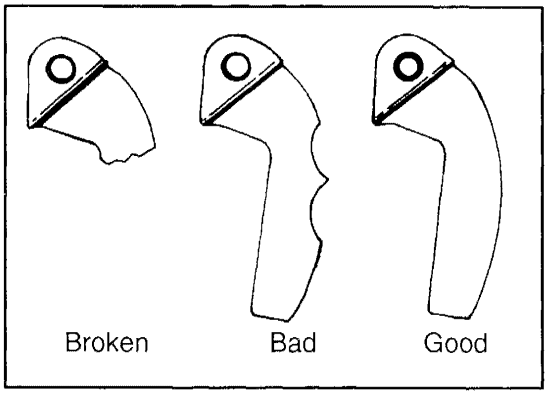


6. Rubber backed buttons (introduced in mid-1995 production) can be used in all ATV clutches *if the hollow roller pin is changed to the solid roller pin.* **NOTE:** The rubber side of the button is positioned toward the solid roller pin.

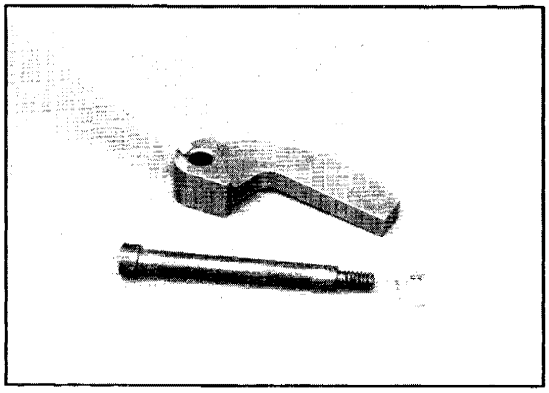


7. Remove shift weight bolts and weights. Inspect as shown. The contact surface of the weight should be smooth and free of dents or gall marks. Inspect the weight pivot bore and pivot bolts for wear or galling. If weights or bolts are worn or broken, replace in sets of three with new bolts. **NOTE:** A damaged shift weight is usually caused by a damaged or stuck roller in the spider assembly. See roller inspection, page 6.20.





8. Inspect spider button to tower clearance. If clearance exists, replace all buttons and/or O-rings and inspect surface of towers. The leading edge button has an O-Ring behind it. The trailing edge button has a flat rubber washer behind it. See spider removal page 6.19.

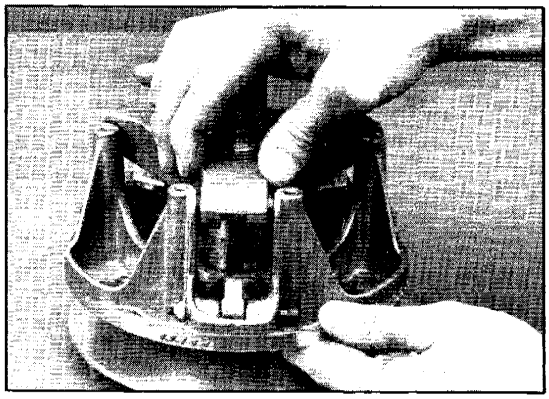


9. Inspect sheave surfaces. Replace the *entire service clutch* if worn, damaged or cracked.

⚠ WARNING

The clutch assembly is a precisely balanced unit. Never replace parts with used parts from another clutch assembly!

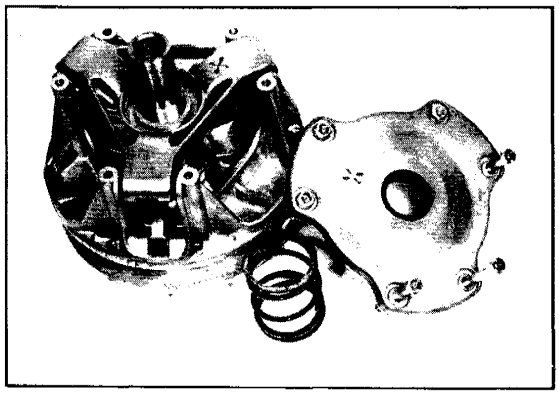
All PVT system maintenance repairs must be performed only by an authorized Polaris service technician who has attended a Polaris sponsored service training seminar and understands the proper procedures as outlined in this manual. **Because of the critical nature and precision balance incorporated into the PVT system, it is absolutely essential that no attempt at disassembly or repair be made without factory authorized special tools and service procedures.**



CLUTCHES
Drive Clutch Assembly

NOTE: It is important that the same number and thickness of washers are reinstalled beneath the spider during assembly. The Teflon bushings are self-lubricating. Do not apply oil or grease to the bushings.

1. Reassemble drive clutch in the following sequence, making sure the "X" marks are aligned:
   1) "X" mark cover
   2) "X" mark spider
   3) "X" mark under weight (moveable sheave)
2. Install moveable sheave.
3. Install spider, making sure spacers installed are the same quantity and thickness, and that "X" mark on spider aligns with "X" mark in moveable sheave.



CAUTION:

Do not lubricate. Lubrication can get on the drive belt and clutch sheaves causing excessive slippage and wear. Lubrication also collects dirt and abrasive material, accelerating component wear.

4. Torque spider to specification using the holding fixture and spider tool.

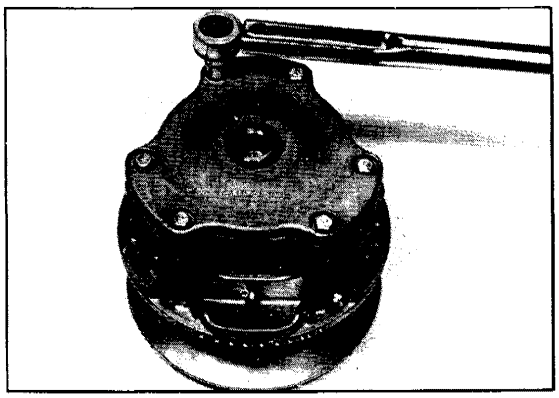
CAUTION:

Be sure the spider spacer washers are fully seated in the recessed area in the spider. Any misalignment will alter clutch balance. Inverting the clutch while tightening the spider will help position the washers.

5. Install shift weights using new lock nuts on the bolts.
6. Reinstall clutch spring.
7. Reinstall cover, aligning "X" mark with other marks. Torque cover bolts evenly to specification.

Spider Torque:
200 ft. lbs. (27.6 kg-m)

Cover Screw Torque:
90 in. lbs. (1.04 kg-m)



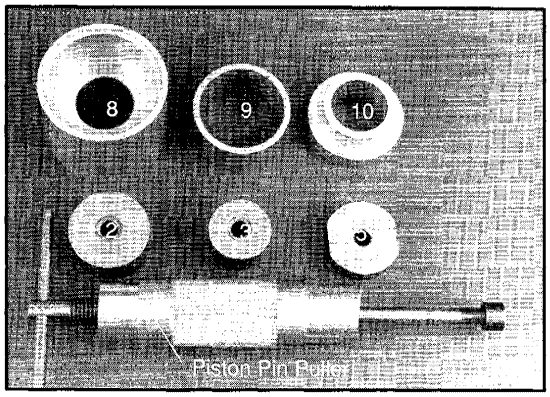
Polaris Kit PN 2871226

Item	Qty.	Part Description	Part No.
2	1	P-90 Drive Clutch and Driven Clutch Bushing Installation Tool	5020628
3	1	Drive Clutch Cover Bushing Removal and Installation Tool (for all drive clutches)	5020629
5	1	P-90 Driven Clutch Bushing Removal Tool	5020631
8	1	Main Puller Adapter	5020632
9	1	Adapter Reducer	5010279
10	1	Number Two Puller Adapter	5020633

Drive Clutch Moveable Sheave - Bushing Removal

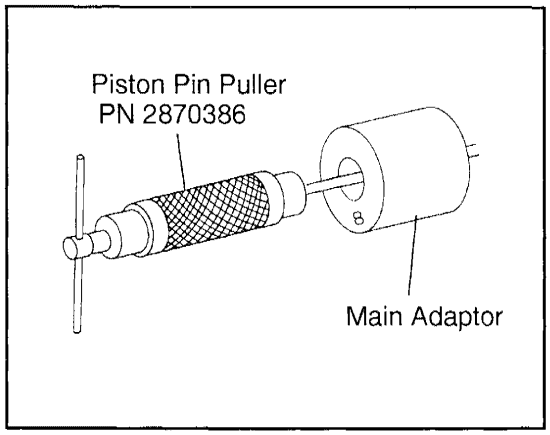
1. Install handle end of piston pin puller securely into bench vise and lightly grease puller threads.

Piston Pin Puller PN 2870386



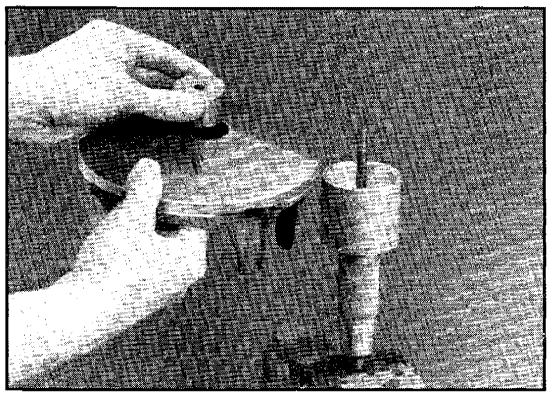
2. Remove nut from puller rod and set aside.

3. Install main adapter (Item 8) onto puller.



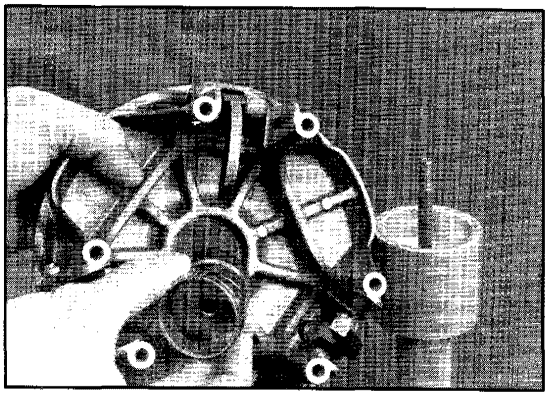
4. Insert adaptor #2 into bushing from belt side as shown. With towers pointing toward vise, slide sheave and bushing onto puller rod.

5. Install nut removed in step 2 onto end of puller rod and hand tighten. Turn puller barrel to increase tension on sheave if needed. Nut is left hand thread.



Clutch Bushing Removal and Installation

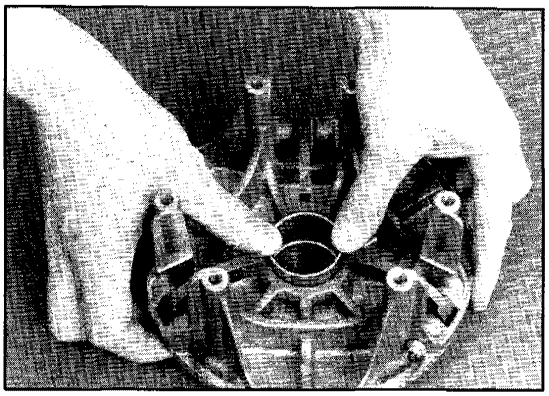
6. Turn sheave and puller barrel together counterclockwise on puller rod until bushing is removed.



7. Remove nut from puller rod and set aside.
8. Pull bushing removal tool and adapter from puller rod. Remove bushing from tool and discard.

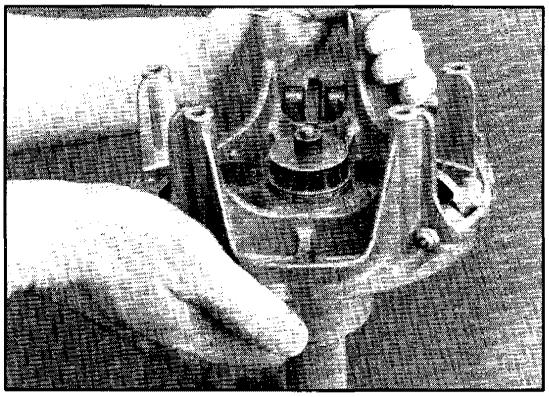
Drive Clutch Moveable Sheave - Bushing Installation

9. Place main adapter (Item 8) on puller.
10. Push bushing into center of sheave on tower side by hand.



Bushing PN 3576504

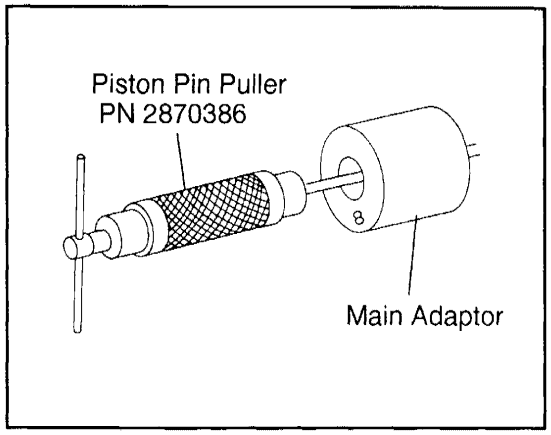
11. Insert installation tool (Item 2) into center of sheave and with towers pointing away from vise, slide sheave onto puller rod.



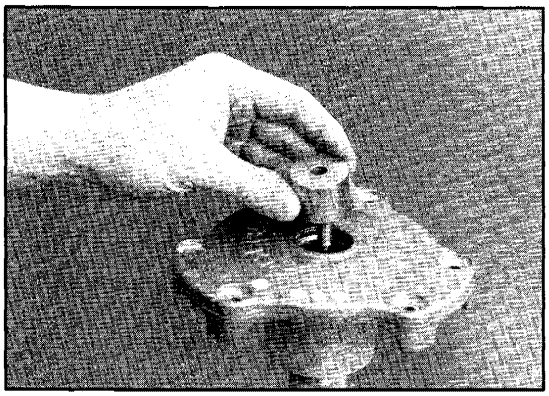
12. Install nut on puller rod and hand tighten. Turn barrel to apply additional tension if needed.
13. Turn sheave and barrel together counterclockwise until bushing is seated.
14. Remove nut from puller rod and set aside.
15. Remove sheave from puller.
16. Remove installation tool.

Drive Clutch Cover - Bushing Removal

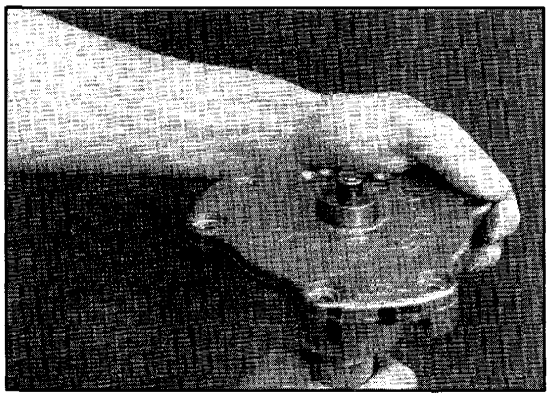
1. Install main adapter (Item 8) on puller.



2. From outside of clutch cover, insert removal tool (Item 3) into cover bushing.
3. With inside of cover toward vise, slide cover onto puller.
4. Install nut onto puller rod and hand tighten. Turn puller barrel to increase tension as needed.



5. Turn clutch cover counterclockwise on puller rod until bushing is removed.
6. Remove nut from puller rod and set aside.
7. Remove bushing and bushing removal tool from puller. Discard bushing.

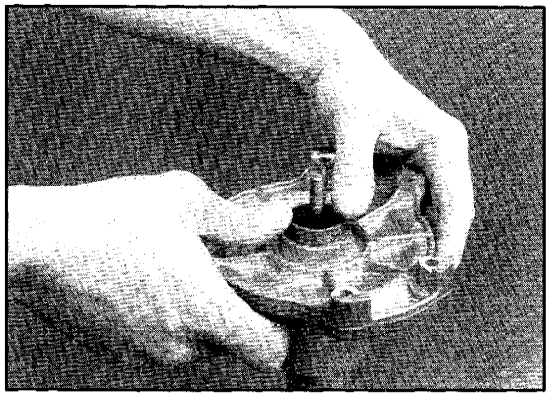


Clutch Bushing Removal/Installation

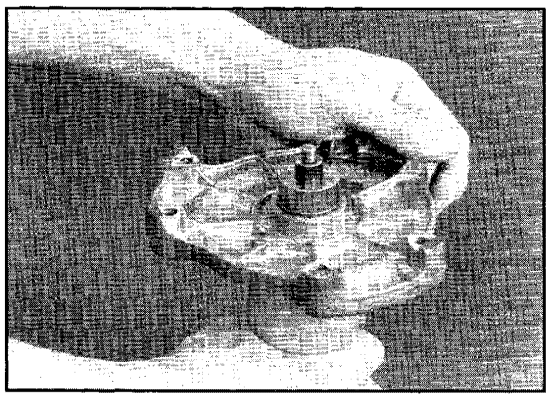
Drive Clutch Cover - Bushing Installation

8. Working from inside of cover, insert bushing and bushing installation tool into center of clutch cover.

Bushing PN 3576510



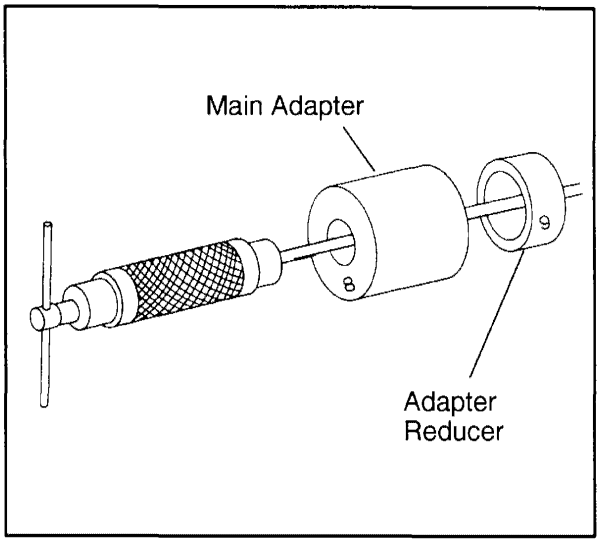
9. With main adapter on puller, insert cover onto puller rod, placing outside of cover toward vise.
10. Install nut on rod and hand tighten. Turn puller barrel to apply more tension if needed.
11. Turn clutch cover and barrel together counterclockwise on puller rod until bushing is seated.
12. Remove nut from puller rod and take installation tool and clutch cover off rod.



Driven Clutch Moveable Sheave - Bushing Removal

NOTE: Bushings are installed at the factory using Loctite. In order to remove the bushing it will be necessary to apply heat.

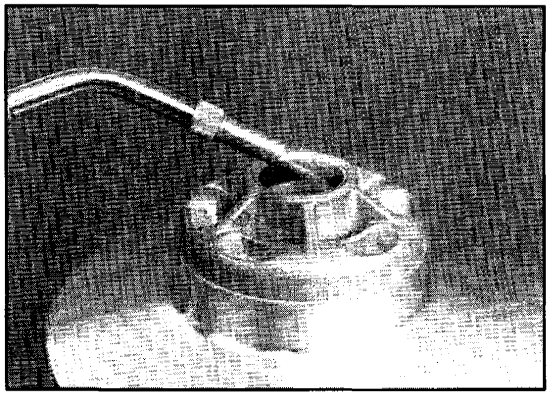
13. Install main adapter (Item 8) onto puller.
14. Insert adapter reducer (Item 9) onto puller, sliding it inside the main adapter..
15. Remove ramp buttons from moveable sheave.



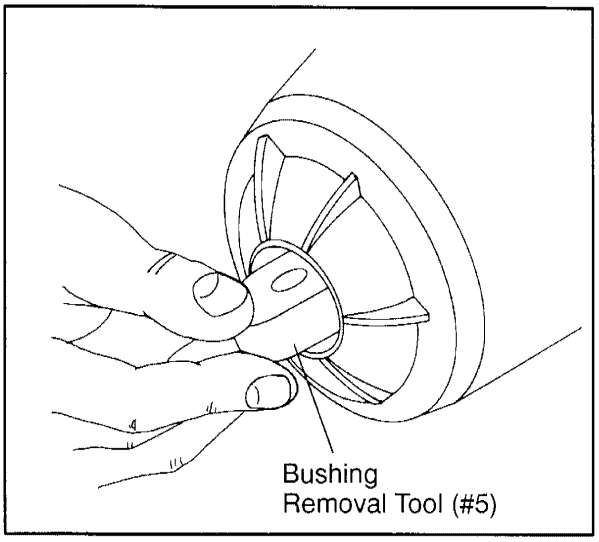
16. Using a hand held propane torch, apply heat directly on bushing until tiny smoke tailings appear.

CAUTION:

Clutch components will be hot! In order to avoid serious burns, wear some type of insulated gloves for the rest of the removal process.

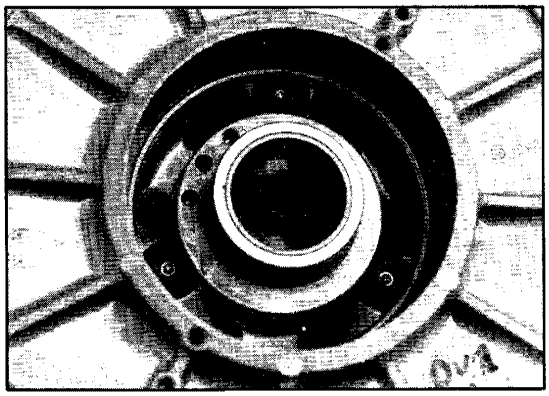


8. Working from the top, install bushing removal tool (Item 5) into center of clutch sheave with smaller diameter toward bushing to be removed. See illustration at right.



9. Install sheave onto puller.

10. Install nut onto puller rod and tighten by hand. Turn puller barrel for further tension if needed.

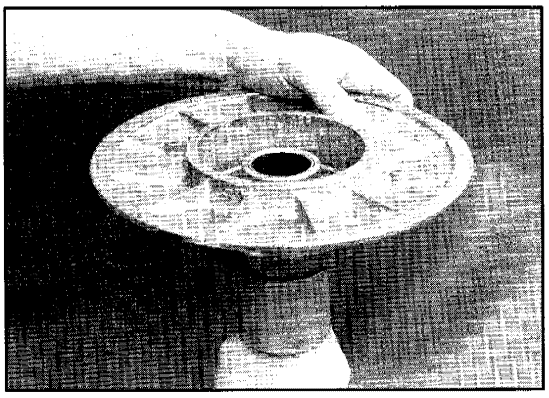


11. Turn clutch sheave counterclockwise until bushing is removed. Flip sheave over to remove wide bushing, repeating steps 17. -20. **NOTE:** Apply heat to soften Loctite™.

12. Remove nut from puller rod and set aside.

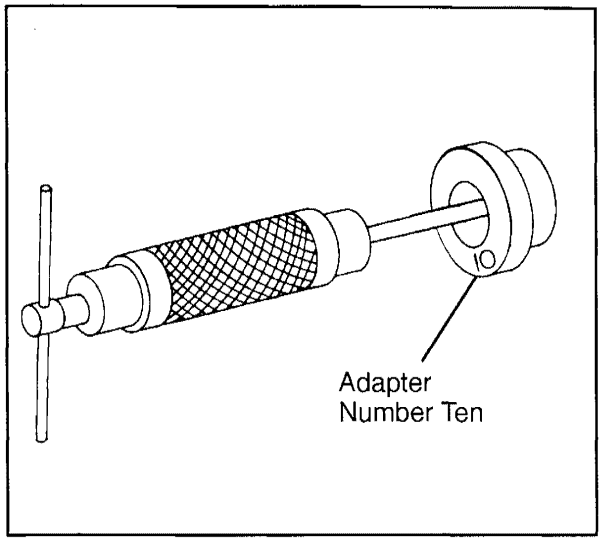
13. Remove adapters from puller.

14. Remove bushing and removal tool from adapters. Discard bushing.

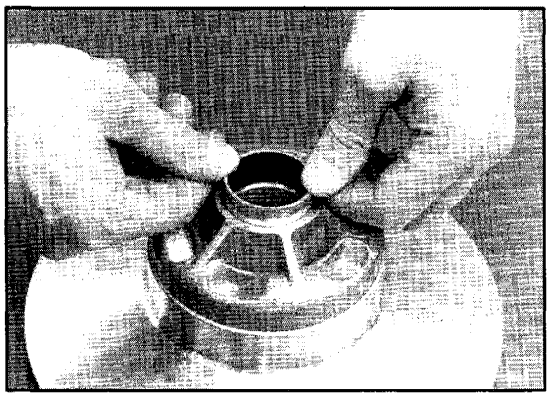


Driven Clutch Moveable Sheave - Bushing Installation

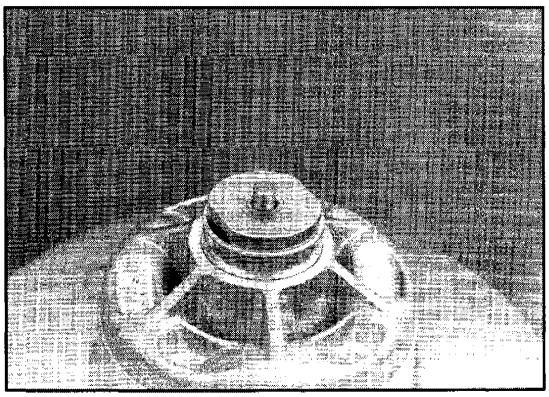
24. Working from the top, insert adapter number ten onto puller. See illustration at right.



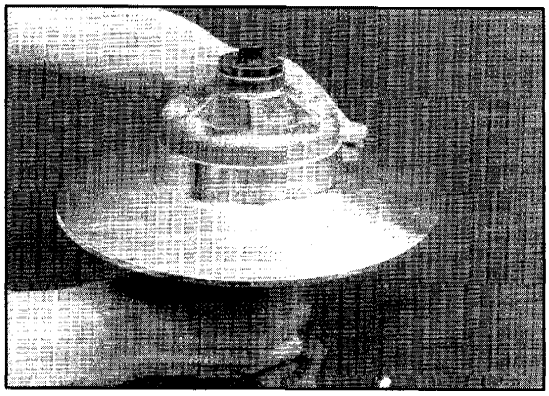
25. Start new bushing evenly in moveable sheave. Apply Loctite™ 262 or 271 to the outer surface of the bushing.



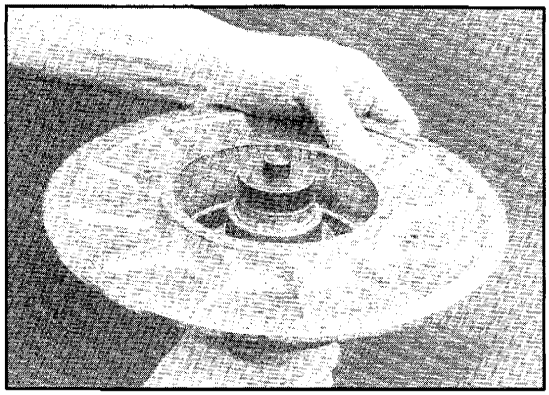
26. Install sheave onto puller with new bushing upward as shown. Install adaptor number two.



27. Install nut onto puller rod and hand tighten against installation tool.



28. Turn clutch sheave counterclockwise until bushing is seated.
29. Remove nut from puller rod and set aside.
30. Remove installation tool and clutch sheave from puller.
31. Repeat installation procedure for other moveable bushing.



Theory Of Operation

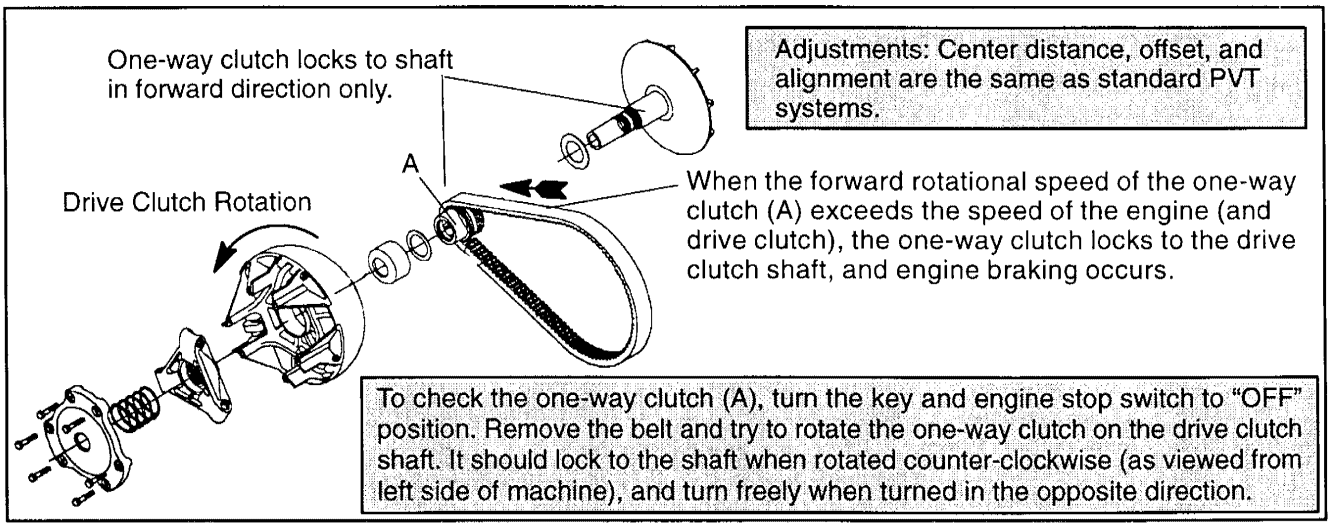
The Engine Braking System (EBS) combines the standard "no-shift" feature of the Polaris Variable Transmission (PVT) system with the added benefit of engine braking. Outwardly, both drive and driven clutch resemble those used in a standard PVT system, however, there are some important differences in the EBS clutches:

- Belt Deflection - It's important to note that the belt is always "tight" in an EBS system. Belt deflection is not adjustable. Consequently, there are no shims in the driven clutch for changing drive belt deflection.
- Special Drive Belt - The bottom side of the belt is grooved for better contact with the one-way clutch (A).
- One-Way Clutch - One-way clutch (A) located on the drive clutch shaft is the key to system operation.

  In a standard PVT system, engine braking occurs briefly on deceleration until engine RPM falls below belt engagement speed and the drive clutch returns to the neutral position (sheaves open). At this point the drive belt is no longer engaged with the drive clutch, and no further engine braking occurs.

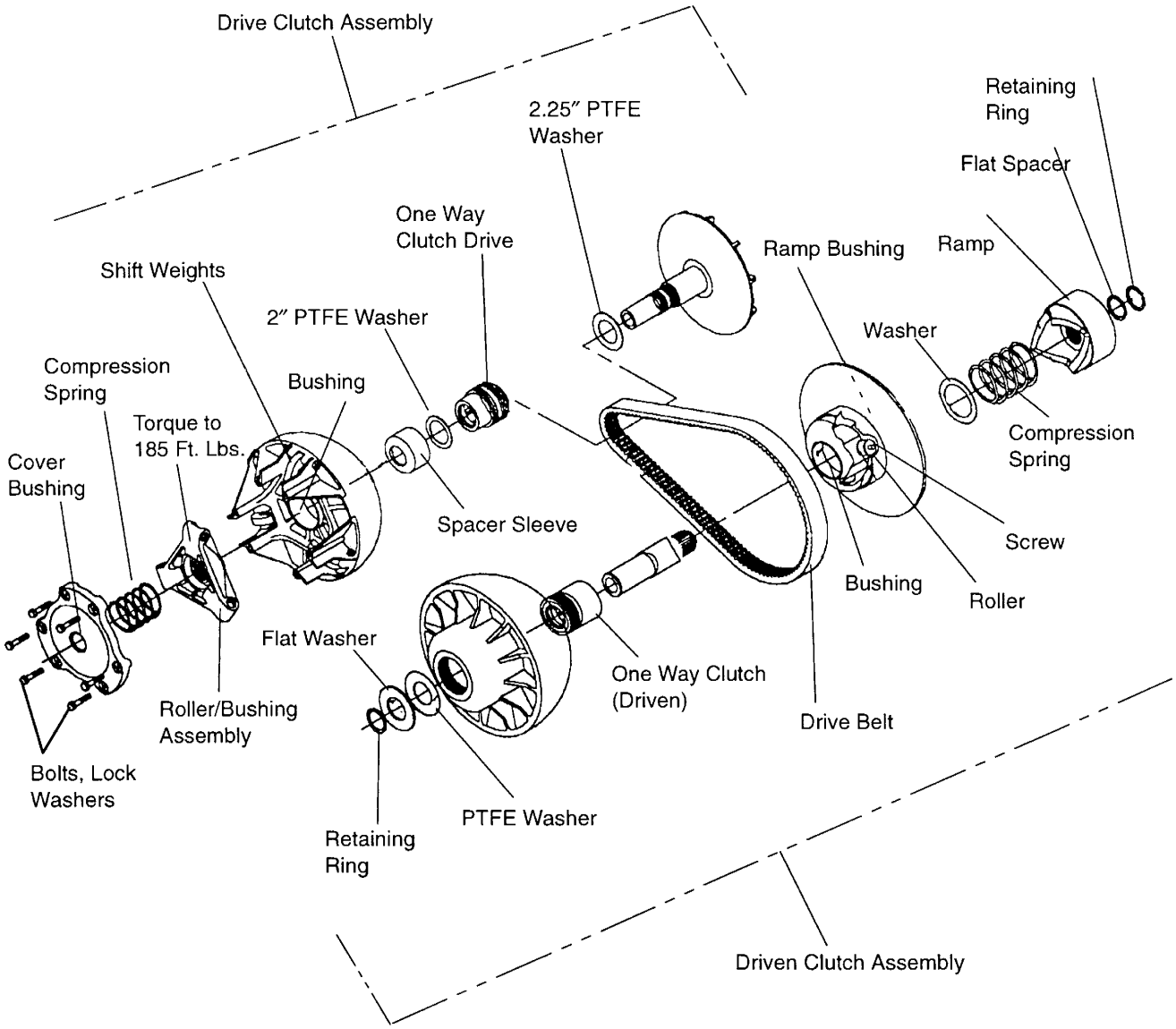
  Drive clutch operation is the same on a machine equipped with EBS at engine speeds above belt engagement. However, the difference with EBS is evident when engine RPM is below engagement speed and the drive clutch sheaves are open in the neutral position. In a standard PVT system, the belt is loose on the drive clutch shaft when the clutch is disengaged due to the nominal belt deflection of 1 1/4" (loose belt). If the vehicle is moving downhill or coasting, the belt simply freewheels on the drive clutch shaft and engine braking does not occur. With EBS, the belt is tight and engaged with the one-way clutch. If the vehicle is moving downhill or coasting, the drive train turns the driven clutch, belt, and one way clutch in the direction of engine rotation. When the one-way clutch rotational speed exceeds drive clutch rotational speed, the one-way clutch locks to the drive clutch shaft, and engine braking occurs. Essentially, the driven clutch has become the "driving" clutch. Engine braking will continue until drive clutch speed exceeds one-way clutch speed, or until the throttle is applied and engine RPM reaches clutch engagement speed, lifting the belt off the one-way clutch.

  When the engine is idling and the vehicle is at rest, the one-way clutch simply "freewheels" on the drive clutch shaft.



- Driven Clutch Spring - Unlike a standard PVT driven clutch spring, the EBS driven clutch spring has no torsional wind. It is a compression spring only. The only difference between a 2-stroke and a 4-stroke EBS kit is the color (and tension) of the driven spring. Like the EBS drive clutch, the driven clutch also utilizes a one-way clutch, which locks to the shaft during engine braking. To check it, remove the belt and try to rotate the stationary sheave counterclockwise (as viewed from the left side of the machine). The sheave should lock to the shaft when rotated counterclockwise, and turn freely when rotated clockwise.
- High Elevation Setup - As with a standard PVT system, calibration changes are required for optimum performance at elevations above 3000 feet (900 meters). EBS clutch setup is the same as a standard PVT system for a given model. For example, if you install an EBS kit on a Magnum 4x4, use the drive clutch setup information provided for a Magnum 4x4 with standard PVT. Disregard the driven clutch setup information (the EBS driven spring has no torsional wind).

EBS Exploded View



Drive Clutch Disassembly - EBS

NOTE: Most of the disassembly and inspection procedures for the EBS drive clutch are the same as with a standard PVT drive clutch. This section will cover only the disassembly and inspection procedures unique to the EBS drive clutch. Assembly notes are included when different from standard PVT assembly procedures. Refer to page 6.17-6.22 for information common to both the standard and EBS type.

Drive Belt Removal - EBS

1. Mark the drive belt direction of rotation and remove drive belt. The belt is normally installed so the numbers can be easily read. To remove drive belt, push moveable sheave inward to open driven clutch sheaves, push down on belt to hold sheaves open, and slip belt over driven clutch outer sheave.

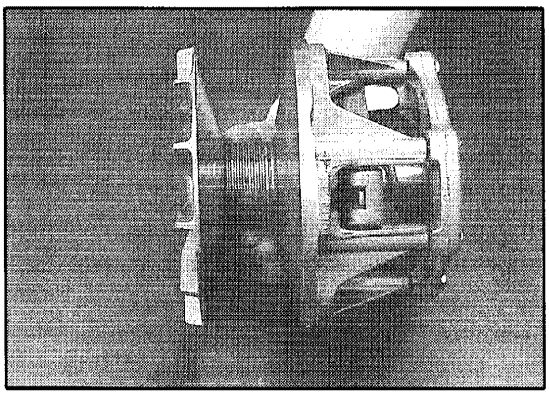
One-Way Clutch Inspection (Drive Clutch)

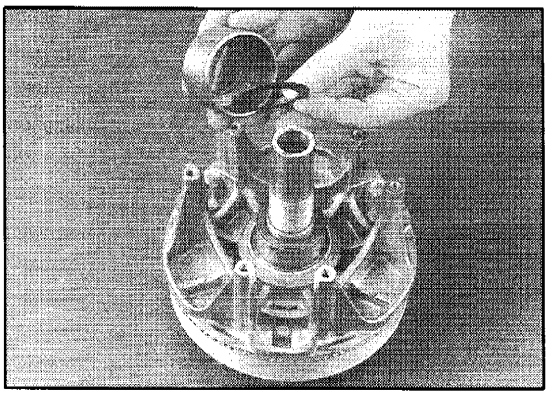
1. Rotate one-way clutch clockwise (as viewed from the cover plate side). The clutch should rotate on the shaft with only slight amount of drag. There should not be any binding or rough spots. When rotated counterclockwise, the clutch should lock to the shaft without slipping. If problems are noted in either direction, continue with disassembly.
2. Remove drive clutch. Refer to page 6.9.
3. Remove spider assembly. Refer to page 6.19.

NOTE: SPIDER TORQUE: Torque EBS drive clutch spider to 180-190 ft. lbs. (24.9-26.3 Kg-m) upon assembly.

4. Remove spacer sleeve and the 2″ PTFE washer. Visually inspect the washer for damage. Measure the thickness and compare to specification. Replace if worn or damaged.

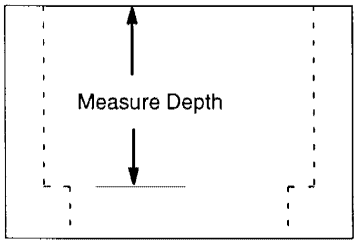
PTFE Washer Thickness
Standard: .030″ (.76mm)
Service Limit: .025″ (.64mm)





NOTE: Some early EBS drive clutches use two washers beneath the spacer sleeve. Late production use only one. Reinstall the same number as were removed. If you are not sure how many were removed measure the depth of the spacer sleeve and refer to the chart below.

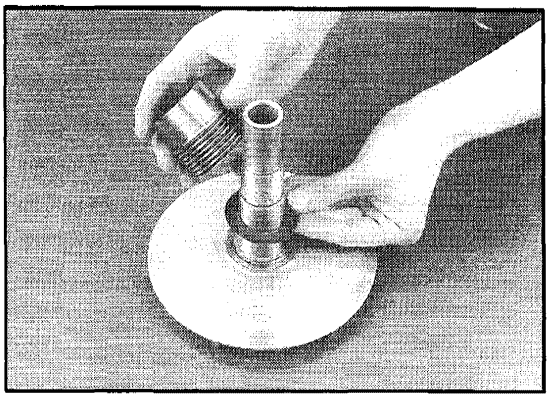
Spacer Sleeve Depth	Washers Required
1.000″ (25.40 mm)	1 (Late to current)
1.030″ (26.16 mm)	2 (Limited # of Early)



Spacer Sleeve - Drive Clutch

One-Way Clutch Inspection, cont.

5. Lift one-way clutch off shaft. Replace as an assembly if worn, damaged, or if problems were noted in Step 1 above.



6. 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.

Shaft Diameter
Standard:
Service Limit:

7. Remove 2 1/2″ PTFE washer from shaft. Visually inspect the washer for damage. Measure the thickness and compare to specification. Replace if worn or damaged.

PTFE Washer Thickness
Standard: .030″ (.76mm)
Service Limit: .025″ (.64mm)

Moveable Sheave Bushing Inspection

1. Inspect moveable sheave bushing and surface of sleeve. Compare to specifications and replace if worn or damaged.

Moveable Sheave Bushing Inspection:

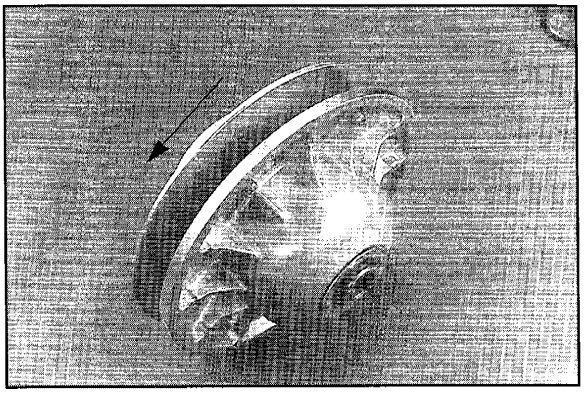
Replace the bushing if more brass than Teflon™ is visible on the surface of the bushing.

Driven Clutch Disassembly - EBS

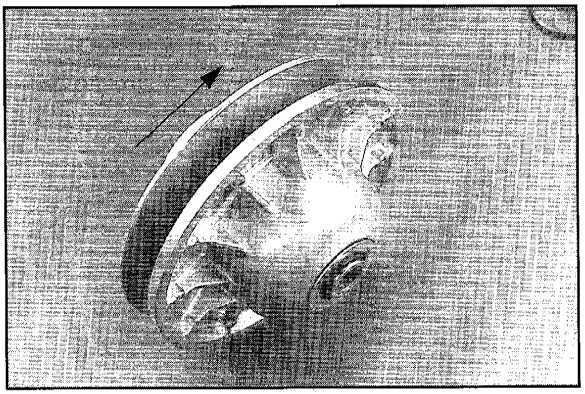
CAUTION: The driven clutch should be disassembled from the helix end to lessen the chance of damage to seals in the one-way clutch. Review all information below before proceeding.

One-Way Clutch Preliminary Inspection (Driven)

1. With drive belt removed and transmission in neutral, hold the outer sheave and rotate the inner sheave of the driven clutch (moveable) in a counterclockwise direction as shown at right. The sheave should rotate on the shaft with only a slight amount of drag. There should not be any binding or rough spots.

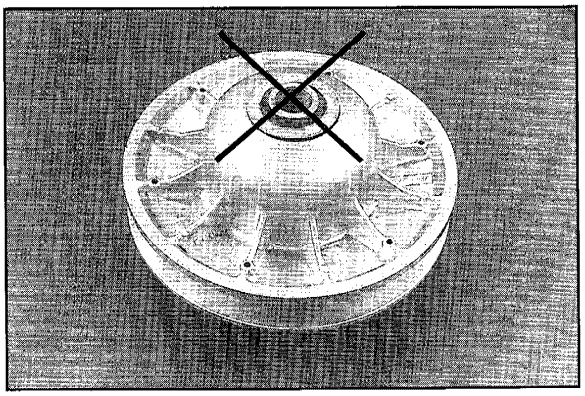


2. When rotated clockwise, the inner (moveable) sheave should lock to the shaft and outer sheave without slipping.



Driven Clutch Disassembly

3. Remove driven clutch from the transmission input shaft. Do not disassemble the driven clutch from the outside snap ring at this time. The driven clutch must be disassembled from the helix side or the one-way clutch seals may be damaged.

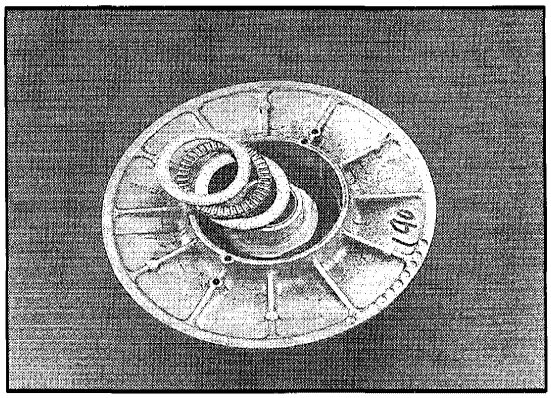


4. Push helix inward. Remove snap ring, washer, helix, and spring. The spring is a compression spring only and has no torsional wind.

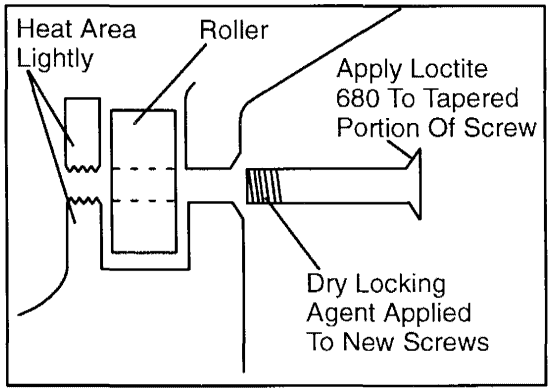
One-Way Clutch Inspection (Driven), cont.

5. Remove washer, needle bearing, and spring seat washer. Inspect bearing and surfaces of washer and spring seat for wear or damage. Replace all parts if any are worn. Apply a light film of grease to the needle bearing upon assembly.

6. Inspect surface of rollers for flat spots and wear. Rollers must rotate freely on pins without excessive clearance. Check the roller pin and roller bore for wear and replace if necessary.



NOTE: ROLLER PIN DISASSEMBLY New roller retaining bolts have a dry locking agent applied to the threads. Before attempting to remove the roller pins, heat the threaded area lightly with a propane torch. Use a high quality hexagonal wrench (Allen™) in good condition to avoid screw damage. A small amount of valve grinding compound can be applied to the tip of the hex wrench to ensure a tight fit. Always use new bolts if they are removed for inspection. Apply Loctite 680 retaining compound sparingly to the tapered head portion of the roller retaining screws. Do not allow locking agent to contact the inside of the rollers. Do not lubricate the roller or roller pin.



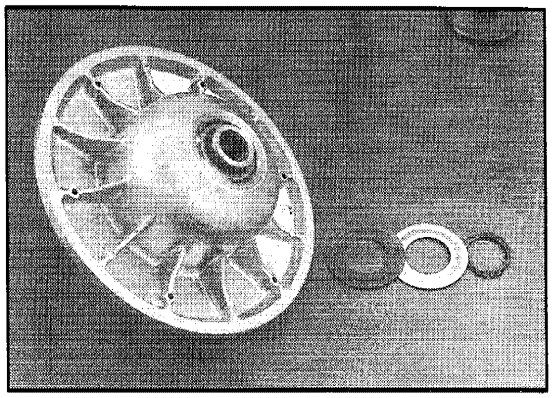
7. Inspect moveable sheave bushing for wear.

Moveable Sheave Bushing Inspection:

Replace the bushing if more brass than Teflon™ is visible on the surface of the bushing.

8. Check for movement of the driven clutch shaft in the one-way clutch. If the shaft can be moved laterally, or if the one-way clutch does not function properly as described in Step 1 and 2 above, disassemble the one-way clutch for further inspection.

9. Remove snap ring, flat washer, and PTFE washer.



PTFE Washer Inspection:

10. Carefully rotate shaft clockwise and pull outward to remove.

11. Inspect surface of shaft for pitting, grooves, or damage. Measure the outside diameter and compare to specifications. Replace the driven clutch assembly if shaft is worn or damaged.

Shaft O.D.

12. Inspect the bushings on each end of the one-way clutch for wear.

2 1/2" PTFE Washer

13. Inspect all other drive clutch components as outlined in this section.

OPERATION GUIDELINES FOR EBS CLUTCHES

- EBS clutches have a slightly higher starting gear ratio between the drive and driven clutch due to the location of the one-way clutch on the clutch shaft. For best performance and belt life, *always* use low-range in hilly terrain and when towing or hauling a load. In fact, High Range should only be used when traveling on level ground with light or no load.
- EBS kits are recommended for models equipped with High / Low / Reverse transmissions. Engine braking is enhanced when operating in low range-especially with 2 stroke model ATVs.
- When an operator makes the transition to and from engine braking engagement, the driven clutch helix changes from the acceleration side to the deceleration side. An audible engagement noise may be heard during this transition and is a normal condition.
- Changes to drive clutch calibration are recommended if the vehicle will be operated at elevations above 3000 ft (900 meters). Refer to the model specific clutching chart for type of drive clutch weight and/or drive clutch spring to install for high elevation.[1]

⚠ WARNING

⚠ All PVT system maintenance repairs must be performed only by an authorized Polaris service technician who has attended a Polaris sponsored service training seminar and understands PVT system maintenance and repair procedures. **Because of the critical nature and precise balance of components within the PVT system, it is absolutely essential that no attempt at disassembly or repair be made without factory authorized special tools and service procedures.**

- Refer to your Owner's Safety and Maintenance Manual for system maintenance intervals.

[1] Disregard references to the driven clutch helix position. Helix adjustments do not apply to the EBS driven clutch.

Situation	Probable Cause	Remedy
Engine RPM below specified operating range, although engine is properly tuned.	-Wrong or broken drive clutch spring.	-Replace with recommended spring.
	-Drive clutch shift weight too heavy.	-Install correct shift weight kit to match engine application.
	-Driven clutch spring broken or installed in wrong helix location.	-Replace spring; refer to proper installation location.
	-Converter sheaves greasy; belt slippage.	-Install new belt and/or adjust belt tension.
Erratic engine operating RPM during acceleration or load variations.	-Drive clutch binding.	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.
	-Belt worn unevenly - thin/burnt spots	Replace belt
	-Driven clutch malfunction.	a. Replace ramp buttons. b. Inspect movable sheave for excessive bushing clearance/ replace.
	-Sheave face grooved.	-Replace the clutch.
Engine RPM above specified operating range.	-Incorrect drive clutch spring (too high spring rate).	-Install correct recommended spring.
	-Drive clutch shift weights incorrect for application (too light).	-Install correct recommended shift weights.
	-Drive clutch binding.	-Disassemble and clean clutch, inspecting shift weights and buttons. Reassemble without the spring and move sheaves through entire range to further determine probable cause.
	-Driven clutch binding.	-Disassemble, clean, and inspect driven clutch, noting worn sheave bushing and ramp buttons and helix spring location.
Harsh drive clutch engagement.	-Drive belt worn too narrow.	-Replace belt.
	-Excessive belt/sheave clearance with new belt.	-Perform belt/sheave clearance adjustment with shim washers beneath spider.
Drive belt turns over	-Wrong belt for application.	-Replace with correct belt.
	-Clutch alignment out of spec.	-Adjust alignment offset.
	-Engine mount broken or loose.	-Inspect/adjust or replace.
PVT cover overheating (melting)	-Plugged air intake or outlet	-Clear obstruction.
	-Belt slippage due to water, oil, grease, etc., rubbing on cover	-Inspect system. Clean , repair or replace as necessary. Seal PVT system.
	-Clutches or weight being applied to cover while in operation	-Remove weight. Inform operator.
Water ingestion	-Cover seals or ducts leaking	-Find leak and repair as necessary.
Belt slippage	-Belt worn out	-Replace belt.
	-Belt deflection excessive	-Adjust belt deflection.
	-Water ingestion	-Inspect and seal PVT system.
	-Belt contaminated with oil or grease	-Inspect and clean.
Belt burnt, thin spots	-Abuse (continued throttle application when vehicle is stationary, excess load	-Caution operator to use low gear when pulling heavy loads, and operate machine within guidelines.
	-Dragging brake	-Vehicle operated with park brake on. Inspect brake system.
PVT noise	-Belt worn or separated, thin spots, loose belt (too much deflection)	-Replace or adjust belt.
	-Broken or worn clutch components, cover hitting clutches	-Inspect and repair as necessary.
Engagement erratic or stabby	-Thin spots on belt, worn belt	-Replace belt. Adjust belt deflection.
	-Drive clutch bushings stick	-Inspect and repair clutches.

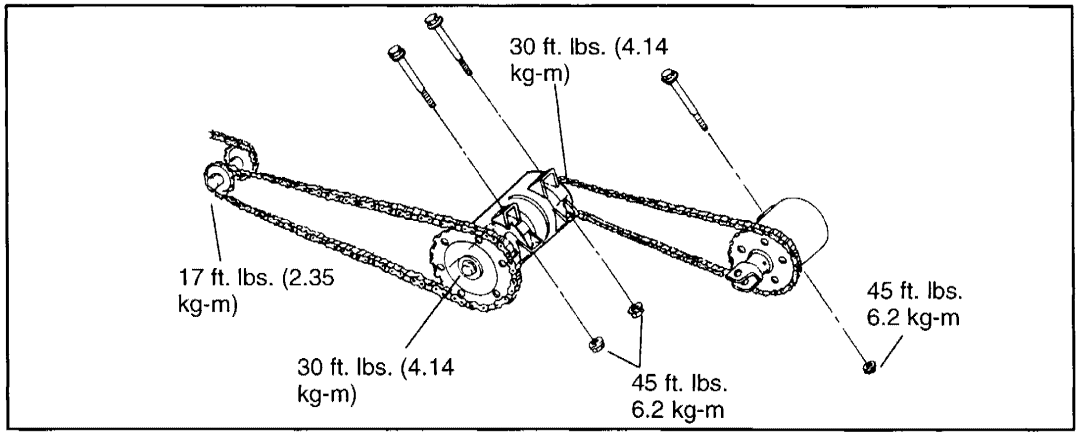
CHAPTER 7
FINAL DRIVE

Final Drive Torque Specifications

*Front Hub Nut 4x4	Refer to page 7.13-7.13b for torque procedure.
Rear Axle Retaining Nut (Except 1998 Scrambler 400/500	150 ft. lbs. (20.7 kg-m)
Sprocket, Transmission Output Shaft	17 ft. lbs. (2.35 kg-m)
Sprocket, Center Eccentric Inner and Outer	30 ft. lbs. (4.14 kg-m)
*Sprocket, Rear	35 ft. lbs. (4.8 kg-m)
*Sprocket, 6x6 Rear	35 ft. lbs. (4.8 kg-m)

Wheel, Hub, and Spindle Torque Table

Model	Item	Specification
2x4	Front Wheel Nuts	15 Ft. Lbs.
	Rear Wheel Nuts	50 Ft. Lbs.
	Front Spindle Nut	40 Ft. Lbs.
	Rear Hub Retaining Nut	80 Ft. Lbs.
4x4 Chain Drive and Chain/Shaft Models	Front Wheel Nuts	15 Ft. Lbs.
	Rear Wheel Nuts	50 Ft. Lbs.
	Front Spindle Nut	Refer to procedures listed on following pages
	Rear Hub Retaining Nut	80 Ft. Lbs.
4 x 4 Shaft Drive	Front Wheel Nuts	15 Ft. Lbs.
	Rear Wheel Nuts	15 Ft. Lbs.
	Front Spindle Nut	Refer to procedures listed on following pages
	Rear Hub Retaining Nut	100 Ft. Lbs.



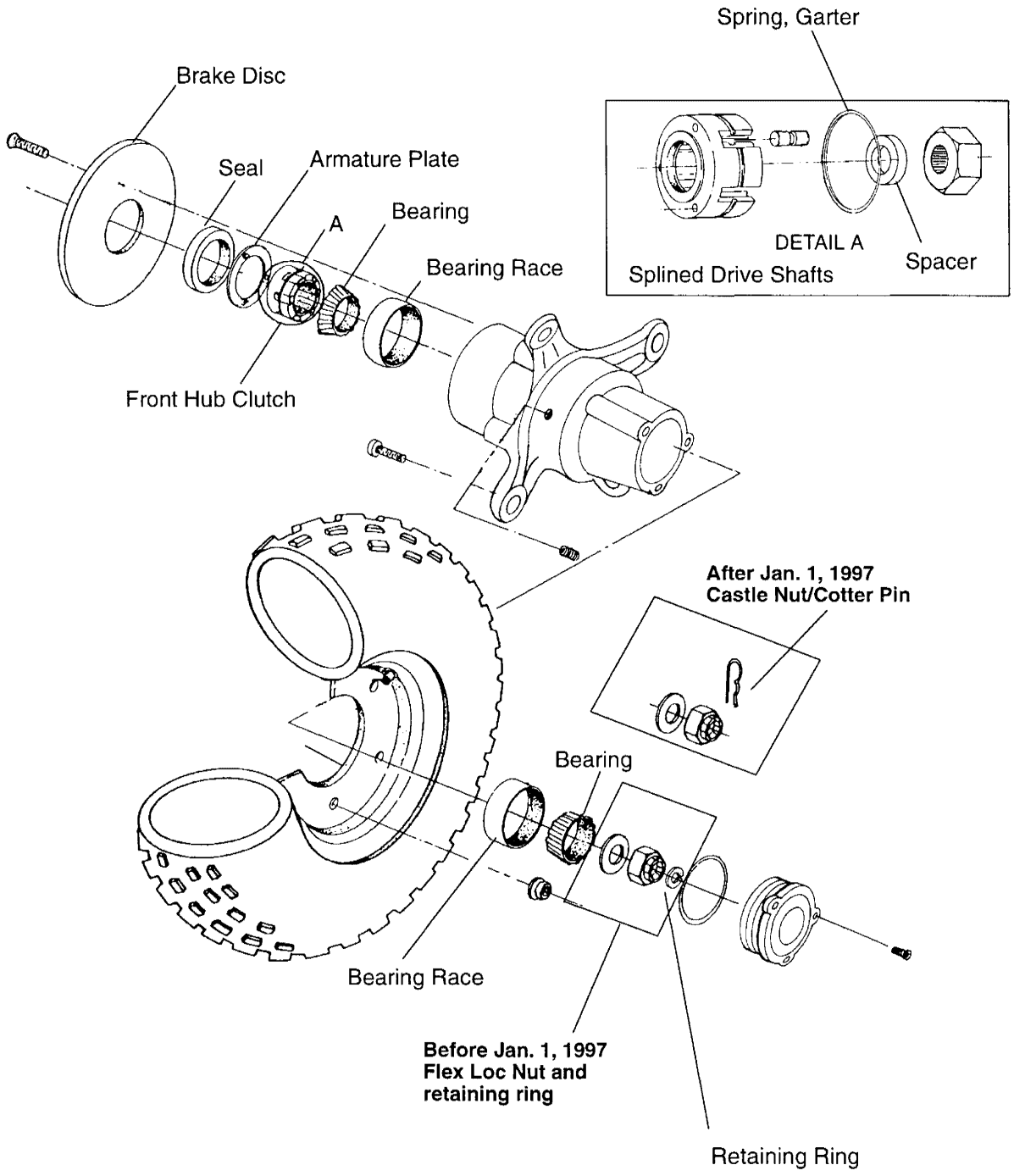
***Rolling Torque** The torque values indicated with a * do not include rolling torque values of self-locking nuts. The locking features of these nuts create resistance when installing the nut, called rolling torque. It is necessary to determine the rolling torque of these fasteners and add it to the torque specification listed above. For example, if a self-locking nut has 5 ft. lbs. of resistance, and a torque specification of 35 ft. lbs., the formula would be:

Torque specification	= 35 ft. lbs.
Plus rolling torque	= 5 ft. lbs.
Final nut torque	= 40 ft. lbs.

NOTE: Rolling torque values are only accurate if threads are clean and not damaged. Checking rolling torque on a damaged fastener may cause final torque to exceed recommended value. Always replace worn or damaged fasteners.

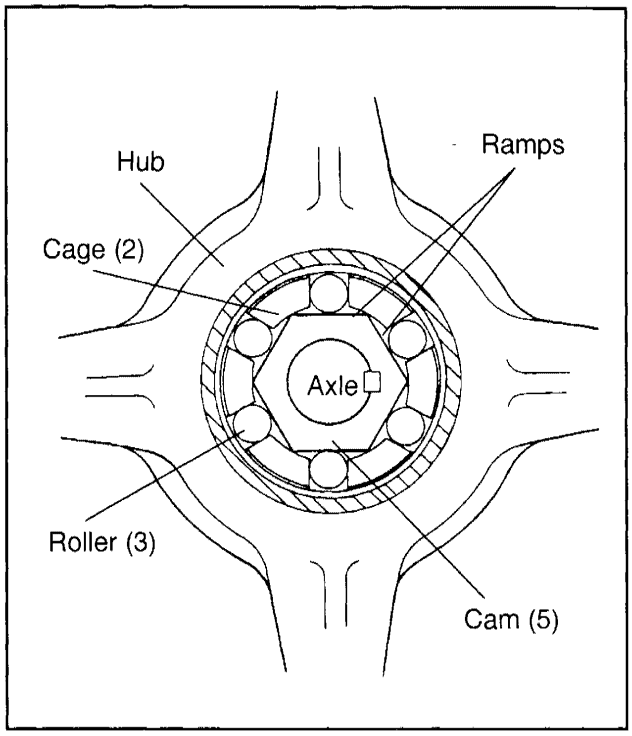
CAUTION: Locking nuts should be replaced if removed. The self-locking properties of the nut are reduced or destroyed during removal. Some front hub nuts on AWD models use FlexLoc nuts which require a minimum of 75 in. lbs. of rolling torque. Refer to page 7.13 for procedure.

AWD Front Hub



With the Polaris Demand 4 Drive System, the machine operates as a 2 wheel drive vehicle as long as the front wheel rotational speed remains greater than the front drive axle speed. If the rear wheels lose traction and AWD is selected (button depressed), the front wheel rotational speed will decrease, causing the front drive axle speed to exceed front wheel speed. Restricting the rotation of the drive clutch roller cage (2) (see Electric Hub Operation) will cause the rollers (3) to climb the ramps of the cam (5), and become squeezed between the ramps and the ring in the hub. See Ill. 1.

When the demand 4 clutch assembly, wheel hub, and drive axle are engaged, the front wheels will drive and stay engaged until rear wheel traction is regained. When traction is regained, the front wheels will overdrive the front drive axle, pushing the clutch rollers (3) toward the lower part of the cam (5), disengaging the Demand 4 clutch. The rollers are held in place by the spring (4). See Ill. 2.



Ill. 1

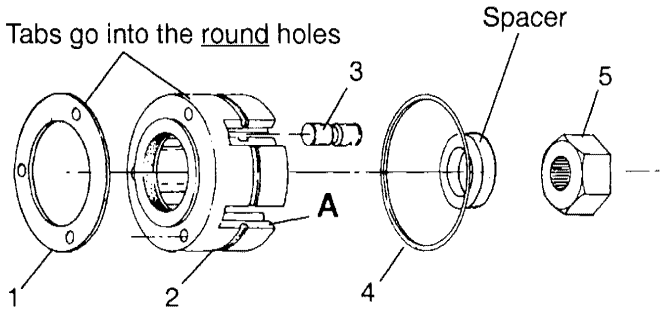
⚠ WARNING

It is important that the front and rear axle drive ratio and tire size are not changed. Changing this ratio will cause erratic engagement, which could result in serious injury or death.

Electric Hub Engagement (4x4)

When AWD is selected in a forward gear, current flows through a coil of wire located in the strut housing, creating a magnetic field. An armature plate (1) coupled to the roller cage (2) is attracted to the magnetic field, and resists rotation, creating drag on the drive roller cage assembly. This causes the roller to climb the ramps of the cam, engaging the hub. **NOTE:** In reverse gear the override button must be pushed to deliver power to the wheel coil. Electric hub engagement offers an advantage over mechanical systems. When the AWD button is switched off, the machine will have the steering ease of a 2 wheel drive unit; and with the switch turned on, 4 wheel drive will be engaged whenever the rear wheels lose traction.

1. Armature Plate **NOTE:** Armature plate is positioned with tabs in round holes of cage.
2. Roller Cage
3. Roller
4. Garter Spring
5. Cam

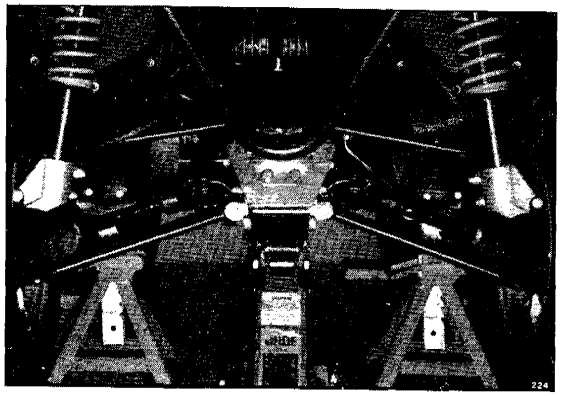


Ill. 2

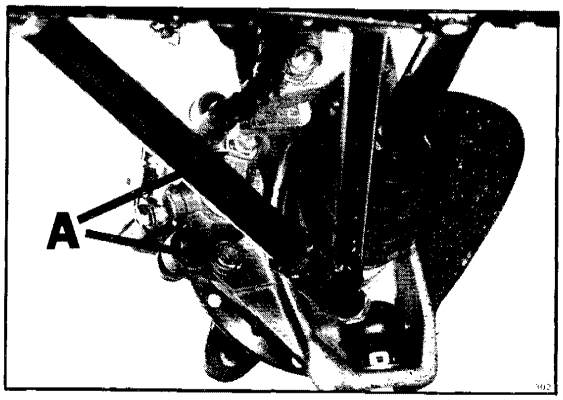
Front Hub Disassembly (4x4)

If an AWD problem is encountered, thoroughly inspect the electrical portion of the system as well as the front hubs.

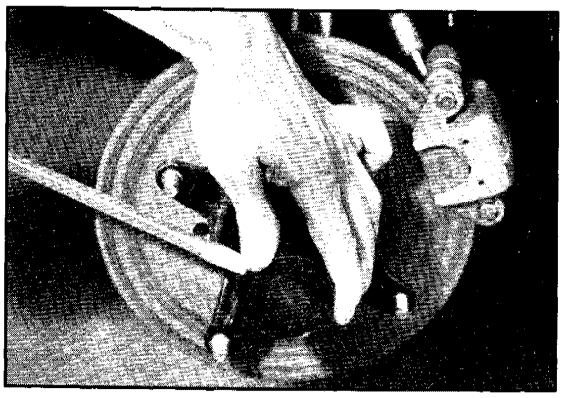
1. Carefully lift and support the front end of the machine as shown with the jack stands under the front end of the foot rests. **CAUTION:** Make sure the machine is solidly supported before proceeding. Serious injury could occur if the machine tips or falls.
2. Remove the front wheels and thoroughly clean the area around the hub, strut casting, brake caliper and brake disc.



3. Remove the two brake caliper attaching bolts (A). **CAUTION:** Do not hang the caliper by the brake hose. Use wire to hang the caliper to prevent possible damage to the brake line.



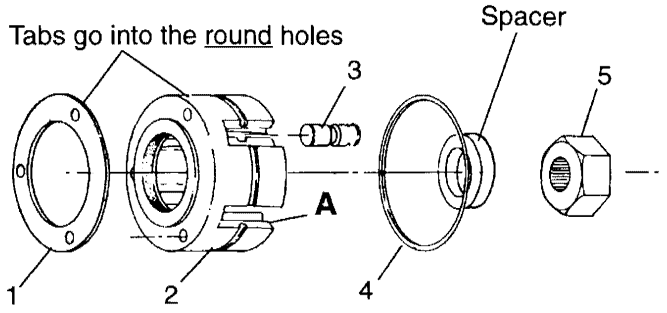
4. Place a catch pan beneath the front hub and remove the hub cap.
5. Remove retaining ring from drive axle.
6. Remove FlexLoc nut. **CAUTION:** The FlexLoc nut must be replaced if removed. The self-locking properties of the nut are destroyed upon removal. Refer to page 7.12 for AWD front hub installation procedure.
7. Remove front hub, bearings, and Hilliard clutch assembly. Be sure to note the proper positioning of the armature plate for reassembly.



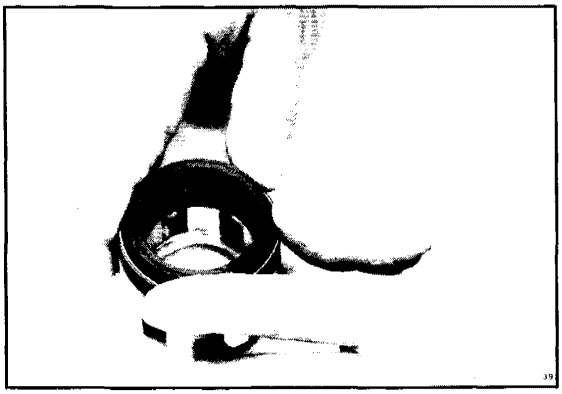
Hilliard Clutch Disassembly/Inspection

1. Disassemble the roller clutch and thoroughly clean all parts. **CAUTION:** Do not remove the garter spring. If the spring is removed it will become over stressed and will require replacement.
2. Inspect roll cage sliding surface (A). This surface must be clean and free of nicks, burrs or scratches. Use a small file or emery cloth to remove any imperfections.
3. Inspect rollers (3). The rollers must slide up and down freely within the roller cage sliding surfaces.
4. Without removing the garter spring, inspect the coils for consistency. If coils are distorted or uneven, cut the old spring with a side cutter to remove it, and replace it.

1. Armature Plate **NOTE:** Armature plate is positioned with tabs in round holes of cage.
2. Roller Cage
3. Roller
4. Garter Spring
5. Cam

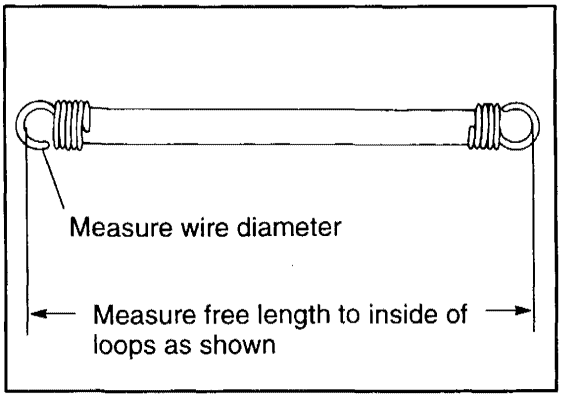


5. If garter spring replacement is necessary, *it is very important that the correct installation procedure and special tool be used.* Hold rollers in place on roller cage with a light film of grease. Gently and evenly roll the spring down the tapered tool (PN 2870888) and into the groove of the rollers and cage. **WARNING:** If this procedure is not followed the spring will be over stressed and lose it's tension. Springs with incorrect tension may allow rollers to move outward at high vehicle speeds. If the rollers move outward, the front hub(s) will engage and cause vehicle instability, which could result in serious injury or death.



WARNING: Current all wheel drive models have a heavier garter spring than previous 4x4s. These springs are very similar in appearance to those used on earlier models. If the old, lighter springs were installed on a machine requiring the heavier spring the front wheels may engage at high speed, possibly resulting in serious injury or death. **Check springs before installation. Always verify the correct replacement spring part number by referring to the appropriate parts manual.**

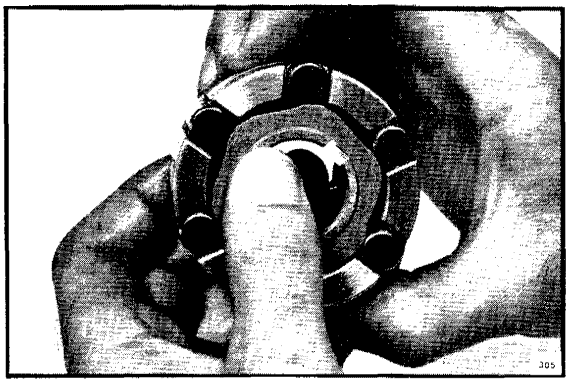
Current electro-mechanical spring, PN 3250032; wire diameter .018″ (.46 mm); spring free length end to end inside hooks 6.968″ (177 mm).



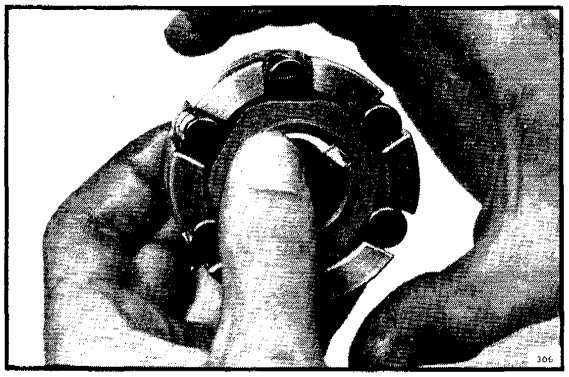
Hilliard Clutch Assembly Testing

1. Reassemble Hilliard clutch assembly and lubricate with Polaris Premium Demand Drive Lubricant or Type F Automatic Transmission Fluid. **WARNING:** Make sure the rollers move up and down freely in the roll cage. If they do not move freely the front hubs may not engage or disengage properly, causing vehicle instability.

2. Hold clutch as shown and rotate roller cage to simulate clutch engagement. **NOTE:** The roller is now in the engaged position on the cam ramp and the garter spring tension against the roller has increased.

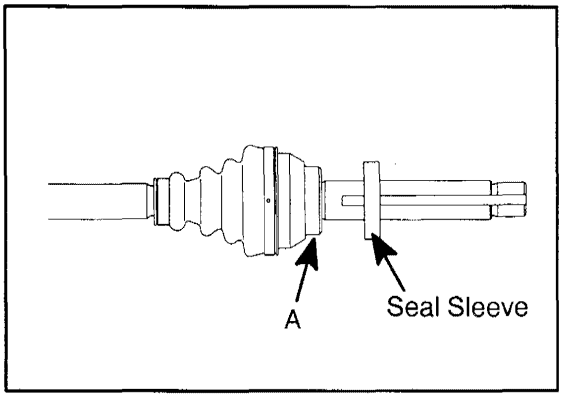


3. Release the roller cage to simulate clutch disengagement. When the cage is released the roller should move down the ramp and into its neutral position. If not, check the following:
   - Roll cage to roller sliding surfaces.
   - Roll cage to cam mating surfaces, including the cam shoulder and cage to cam mating surfaces.
   - Garter spring condition. Spring must have more than enough tension to pull rollers to neutral. (See inspection and replacement on page 7.5.)



Seal Sleeve Replacement

1. If front axle sleeves become damaged they are replaceable. Using a hammer and drift punch, remove the seal sleeve by driving it off evenly being careful not to nick or damage the sleeve mounting area (A).
2. Coat the sleeve mounting area (A) with silicone and using extreme care, press the new seal sleeve onto area (A) until it bottoms. Allow 12 hours for silicone to cure.

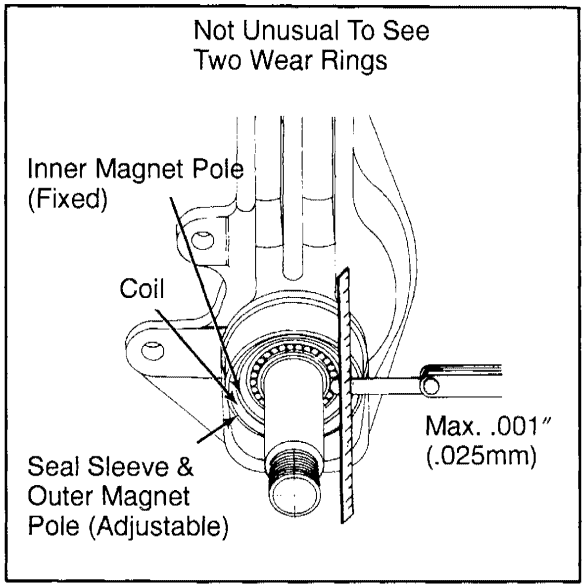


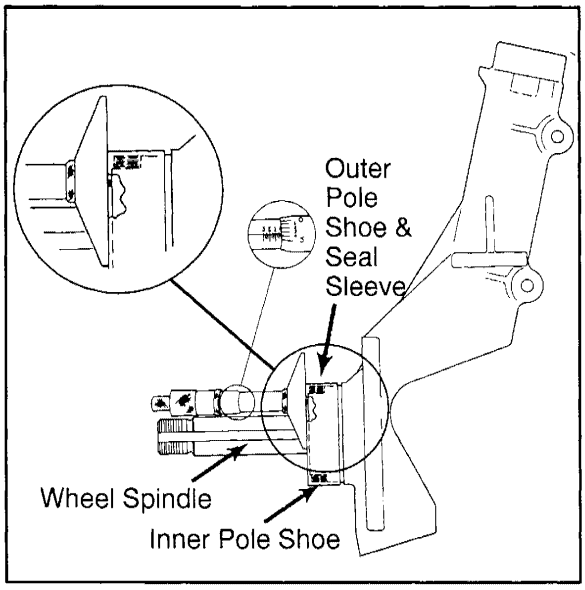
Seal Sleeve Replacement, Cont.

3. When servicing the all-wheel drive strut assembly (replacing seal sleeve or installing new coils) it is important that the inner and outer poles of the electrically engaged front drive system be properly adjusted.
4. As the armature plate is engaged, it should contact the outer magnet pole (seal sleeve) and may contact the inner magnet pole. Also, the armature plate must be flat when placed on a flat surface. Bent armature plates should be replaced. It is not unusual to see a double wear ring on the armature plate.
5. To check the gap between the inner and outer poles place a straight edge on the outer pole so that it just intersects with the inner pole. The gap between the straight edge and inner pole should be 0 to .001″ (0-.025mm). This measurement should be checked in three different positions around the pole assemblies. The three measurements must be within .0005″ (.013 mm) of each other. If the gap is excessive, the hub may not engage.
6. The outer magnet pole (seal sleeve) is adjustable by either tapping inward or placing a small punch to the inside edges and tapping the outer pole (sleeve) outward.

Pole Gap:
.000″-.001″ (.00-.025mm)

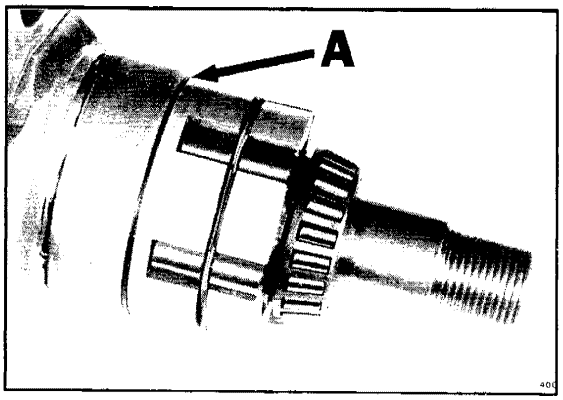
Seal Sleeve Installation Tool Set
PN 2871199





7. Install the roller clutch assembly and be sure the armature plate (A) is positioned properly. Also, when installing the hub assembly, be sure the armature plate tabs remain engaged with the roller clutch cage.

CAUTION: After the hub is installed, the slightest movement outward with the hub may cause the armature plate tabs to disengage from the roller clutch cage. If the unit is driven with the armature plate out of position it will cause roller clutch damage.



Magnetic Coil Replacement

Remove the seal sleeve from the strut casting using a drift punch and hammer, tapping evenly on each side until the sleeve slides off. Remove the existing coil and clean the coil wire channel, coil mount area and the seal sleeve mounting area of all silicone and foreign matter.

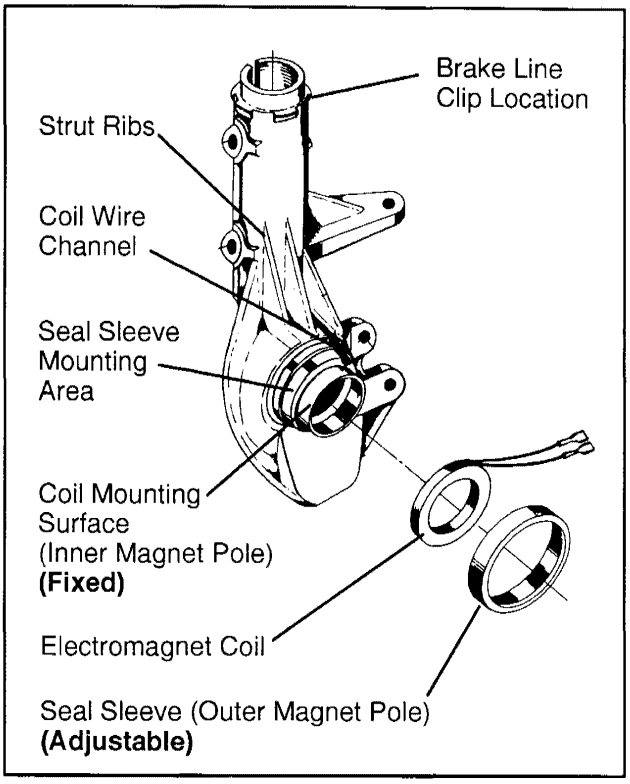
1. Apply 1/4″ (.6 cm) bead of silicone in the coil wire channel.
2. Install the coil to the coil mount surface and press the coil wires into the silicone in the coil wire channel.
3. Apply 1/4″ (.6 cm) bead of Loctite Ultra Blue silicone around the seal sleeve mounting area. **NOTE:** This includes applying silicone over the coil lead wires again. Always allow 12 hours cure time for silicone.
4. Press on the seal sleeve until the desired pole gap is achieved. See page 7.7 for additional information. Once the seal sleeve is properly positioned, a 1/16″ (.16 cm) bead of silicone should remain around the inner edge. Clean off all excess silicone. The seal sleeve area must be free of silicone.

   NOTE:

   - Always install a new seal sleeve when replacing the coil.
   - It may be necessary to apply more silicone to the wire channel area to properly secure and protect the coil wires.

5. Apply 401 Loctite (super glue) to the inside of the strut ribs and press the foam block to contain the coil wires. Make sure the foam block is bonded well to protect the coil wires.

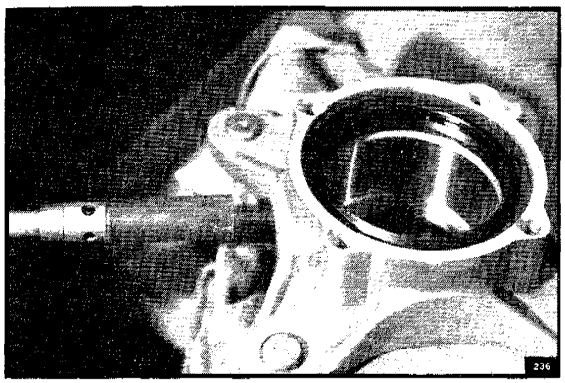
NOTE: Coil wires must be contained in the brake line clip on the back side of the upper strut casting and the wires must be snug against the casting.



Hub Seal Replacement

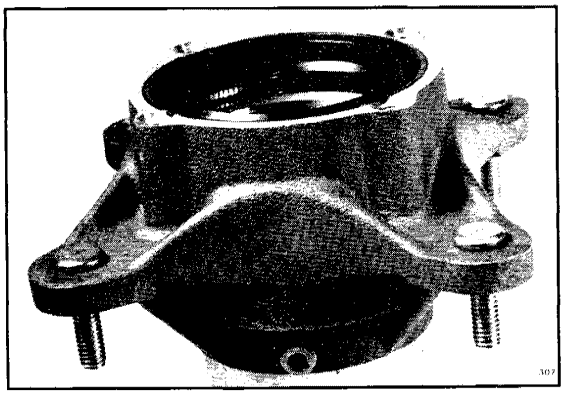
1. Disassemble front hub. Refer to page 7.4.

2. Remove brake disc attaching bolts and brake disc. Clean brake disc. **NOTE:** If the attaching bolts are difficult to remove, it may be helpful to heat the outer surfaces of the hub in the area shown. Using valve grinding compound on the end of the Allen wrench will also aid in bolt removal.



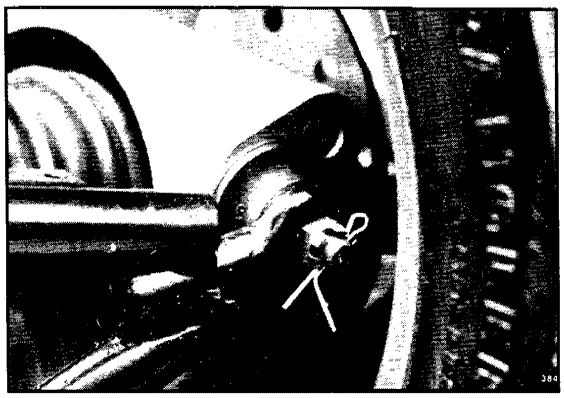
3. When the hub becomes too hot to touch, pry out the old seal as shown. Do not damage the surface of the seal cavity. Clean the hub in the seal mating area.

4. With spring side of new seal facing toward hub casting, press it in until flush with brake disc mating surface. **CAUTION:** Do not use a hammer as damage to the seal will result.
5. Thoroughly clean the brake disc with brake cleaner. It is very important that the brake disc be free of any oil or solvents.
6. Reinstall the brake disc.
7. Apply a medium strength thread locking compound to the bolts.
8. Reinstall attaching bolts and torque to 18 ft. lbs. (2.5 kg-m).

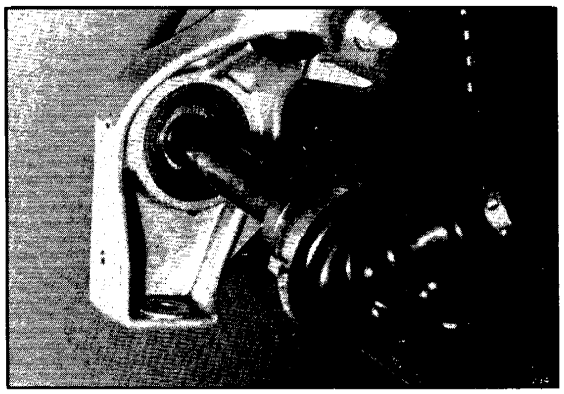


Strut Casting Seal Replacement

1. Disassemble front hub. Refer to page 7.4.
2. Remove the cotter pin and castle nut from the A arm ball joint. Separate A-arm from ball joint.



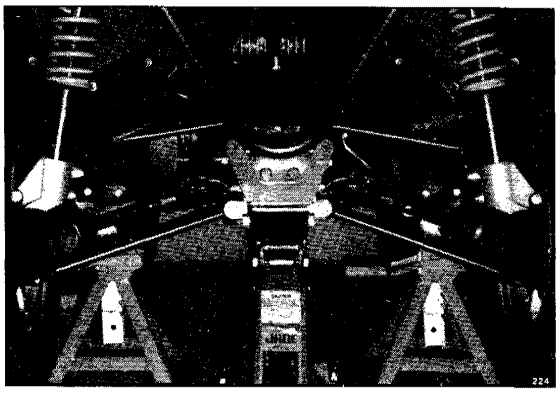
3. Remove the spindle and axle assembly from the strut casting bearing by pulling the strut outward as shown. Drive out the old seal, taking care not to damage the tapered roller bearing. Install the new seal until it bottoms against the shoulder in the strut casting.
4. Apply grease to the seal inner lip, reinstall the spindle and axle assembly.
5. Reinstall the A arm to the ball joint. Torque to 25 ft. lbs. (3.5 kg-m).



NOTE: If the cotter pin hole does not align at the above torque, tighten slightly until the cotter pin hole aligns and install the pin with open ends *toward rear* of machine.

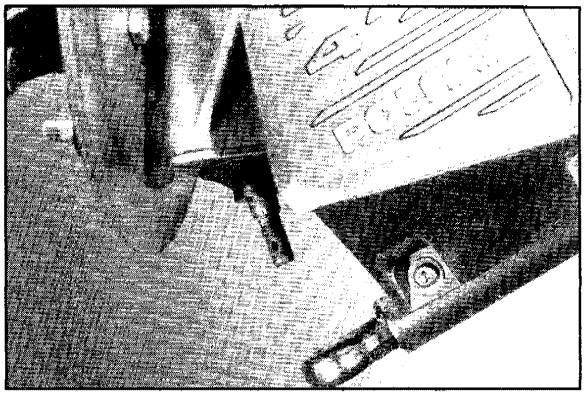
Front Drive Shaft CV Joint Boot Replacement (4x4 Models)

1. Remove wheel, brake caliper and wheel hub. Refer to front hub disassembly page 7.4 for procedure.
2. Remove cotter pin and castle nut from A arm ball joint.

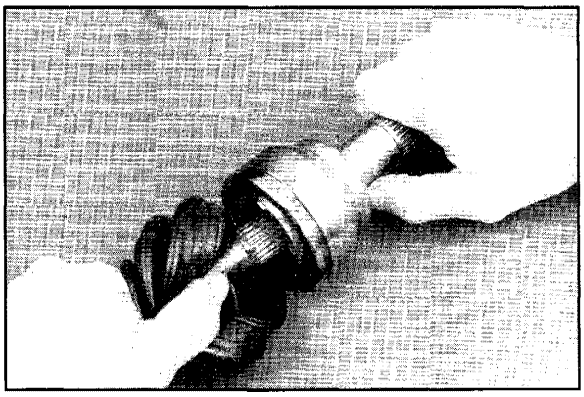


3. Disconnect A-arm from ball joint.
4. Slide strut off end of drive shaft and tie it up out of the way of the shaft.

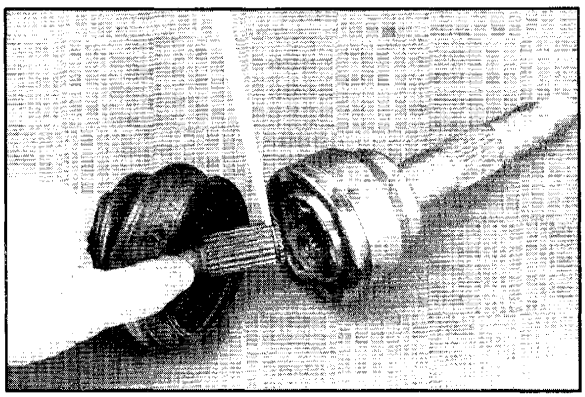
NOTE: Be careful not to damage the wheel coil wires when positioning the strut.



5. Remove clamps from rubber boot using the proper boot clamp pliers.



6. Remove the large end of the boot from the CV joint, slide the boot back and remove the wheel spindle and CV joint assembly by pulling it sharply outward, away from the axle. It may be necessary to tap the CV joint assembly outward with a soft faced hammer.
7. Remove small clamp and boot from driveshaft.



Hub/Wheel Bearing Installation

Front Drive Shaft CV Joint Boot Replacement Cont. (4x4 Models)

8. Before installing the new boot, remove the grease from the shaft and CV joint banding areas.

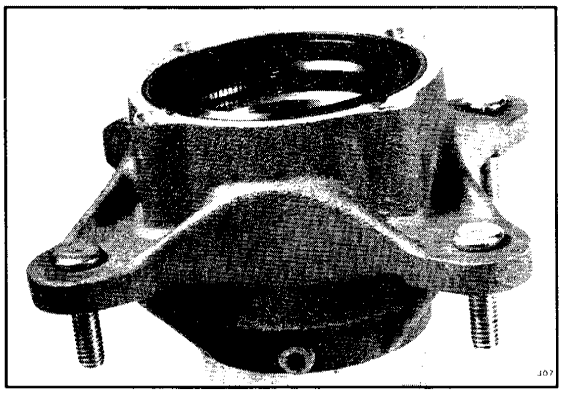
NOTE: Before assembly, make sure the CV joint has a sufficient quantity of grease. The grease will aid in assembly by holding the internal parts of the CV joint in place. If the ATV has been operated with the damaged boot, the CV joint grease may be contaminated. The CV joint must be thoroughly cleaned and the grease replaced.

CV Joint Grease - PN 3260110
CV Joint Cleaner - PN 2870770

CV Boot Clamp Pliers:
Ear Type 8700225
Earless Type 8700226

9. Slide the new clamp and boot (small end first) over the splined shaft, then slide (tap) the CV joint into the splines of the axle.
10. Position large end of boot on CV joint and secure both clamps.

Hub/Wheel Bearing Installation (4x4 Models)



1. Thoroughly inspect the hub internally. If the hub bearing sleeve is damaged or shows signs of movement, the hub assembly must be replaced. When the sleeve is pressed into the hub it should be flush with the outside surface of the hub.
2. Grease hub seal to allow it to slide over roller clutch components.
3. Install wheel hub inner bearing. **NOTE:** All bearings must slide freely onto the spindle. If bearings do not slide freely, wheel bearing torque will be affected.
4. Install wheel hub, outer bearing, washer, and attaching nut. **NOTE:** It is very important that the hub is not moved outward once installed, or the seal on the hub will disengage the armature plate.

⚠ WARNING

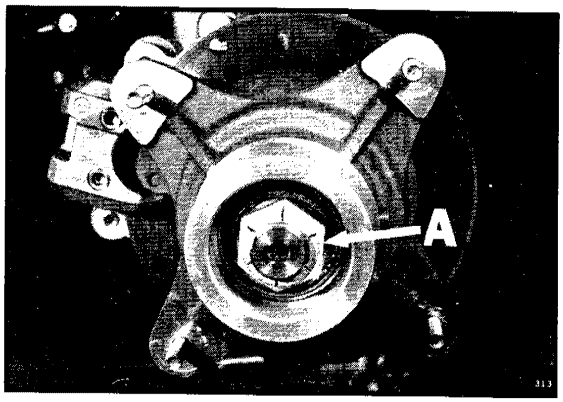
The following bearing adjustments are very important. Incorrect adjustment will increase bearing wear, reduce braking action, and may affect front drive hub engagement, which could result in serious personal injury or death.

Front Hub Bearing Adjustment (AWD Models)

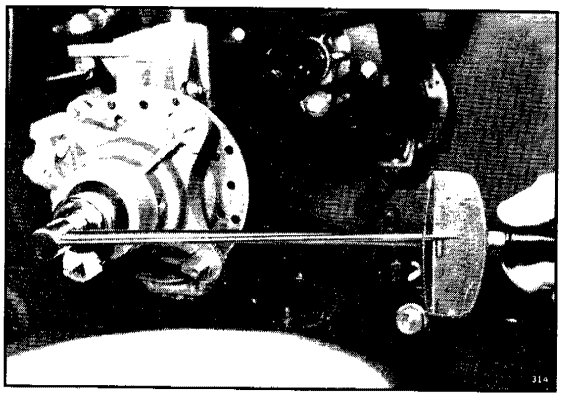
NOTE: Some 1996 to present AWD models use a cotter pin and castle nut to secure the hub. Refer to page 7.13a.

FlexLoc™ Nut Axles

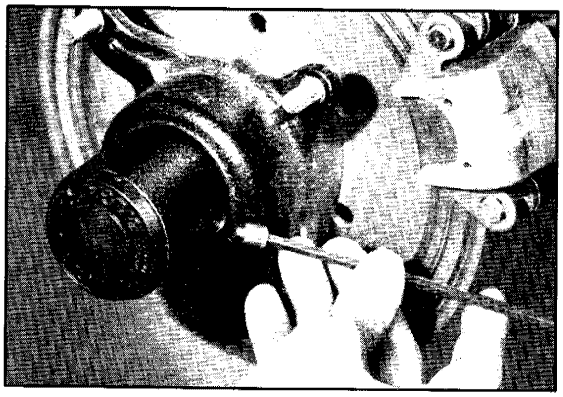
1. Torque spindle nut (A) to 400 inch lbs. and back nut off 1/2-3/4 turn.
2. Tighten nut again and read the force it takes to rotate the lock nut (nut rolling torque)using a dial or beam style torque wrench. **NOTE:** Rolling torque on FlexLoc nuts should be 75 to 150 inch lbs. If the rolling torque is less than 75 inch lbs. the nut should be replaced. To achieve the final torque, add the nut rolling torque plus 100 inch lbs. and record this reading.
3. Rotate hub several revolutions. Rotate front drive axles by elevating rear of machine and turning rear axle. Re-torque to the reading recorded in step 2.
4. Reinstall hub cap.
5. Remove fill check plug and rotate hole to either 4:00 or 8:00 position.
6. Fill with Polaris Premium Demand Drive Hub Fluid or Type F Automatic Transmission Fluid until fluid trickles out. **NOTE:** Do not force the oil into the hub under pressure. This can cause seal damage and leaking.



Premium Demand Drive Hub Fluid
PN 2871654 (12 oz.)
or Type F ATF



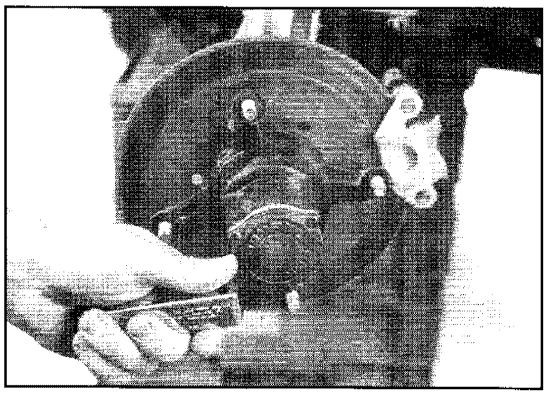
7. Reinstall plug.



8. Reinstall brake caliper assembly. Torque retaining bolts to 18 ft. lbs. (2.5 kg-m).
9. Reinstall front wheels. Torque retaining nuts to 15 ft. lbs. (2.1 kg-m).
10. Carefully lower vehicle.
11. Field test vehicle for proper operation of brake system and AWD operation.

Front Spindle Nut Final Torque:
100 in. lbs. (See Procedure)

Brake Caliper Retaining Bolt Torque:
18 ft. lbs. (2.5 kg-m)



12. Some 1996 to present models use three screws to secure the hub cap in place. Install screws and torque to specification.

Hub Cap Screw Torque

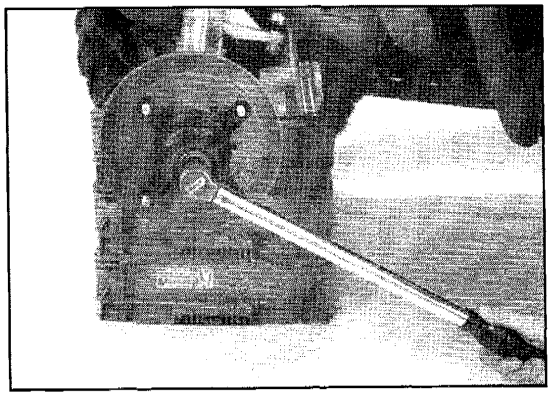
12 in. lbs.

Front Hub Bearing Adjustment (AWD Models Equipped with Cotter Pins)

1. Torque nut to 100 in. lbs. and proceed to step 2.

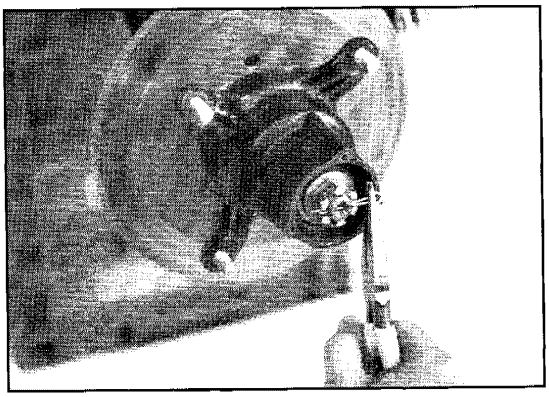
Front Hub Nut Torque
100 in. lbs. (1.15 kg-m)

2. Rotate hub several revolutions. Rotate axle several revolutions by raising rear of machine and rotating rear wheels.



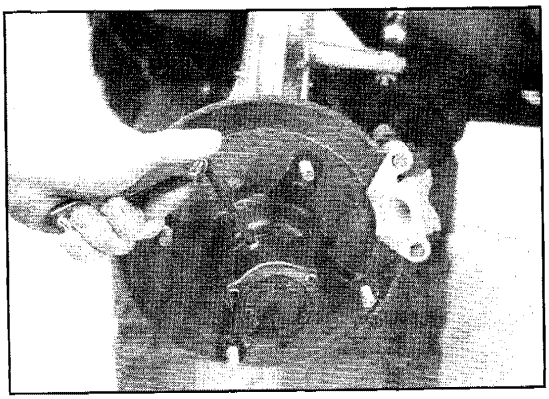
3. Re-torque hub nut to 100 in. lbs.

Front Hub Nut Torque
100 in. lbs. (1.15 kg-m)



4. Install cotter pin. Bend each leg of cotter pin around castle nut in different directions.

NOTE: If cotter pin hole does not align, tighten slightly to align and install pin.



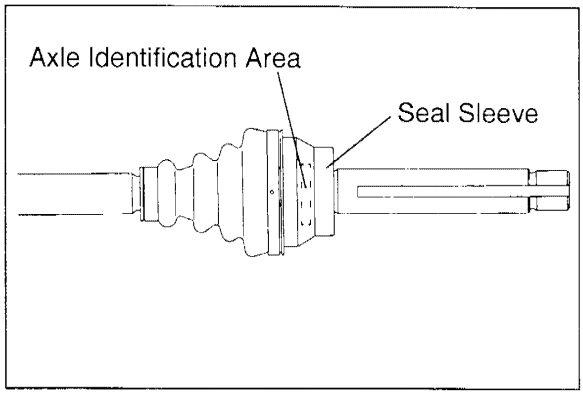
Front Axle Identification

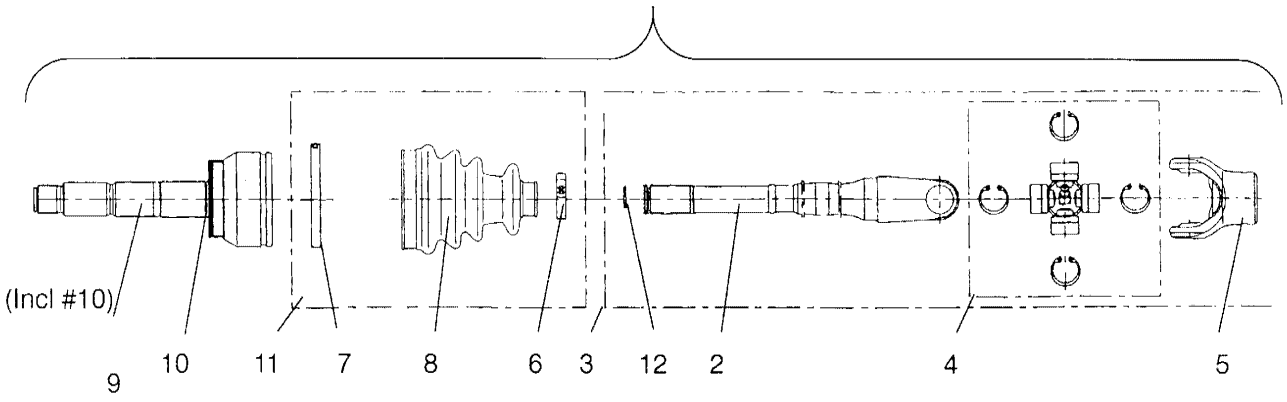
Front Axle Identification

CAUTION: The left and right front drive axles are not interchangeable. The LH side axle has the letters "LH" stamped in the end. The axle has a left hand thread and must be installed on the *left side of the vehicle only.*

When replacing a front drive axle, check the identification letters stamped on the beveled area of the CV joint housing next to the large boot clamp.

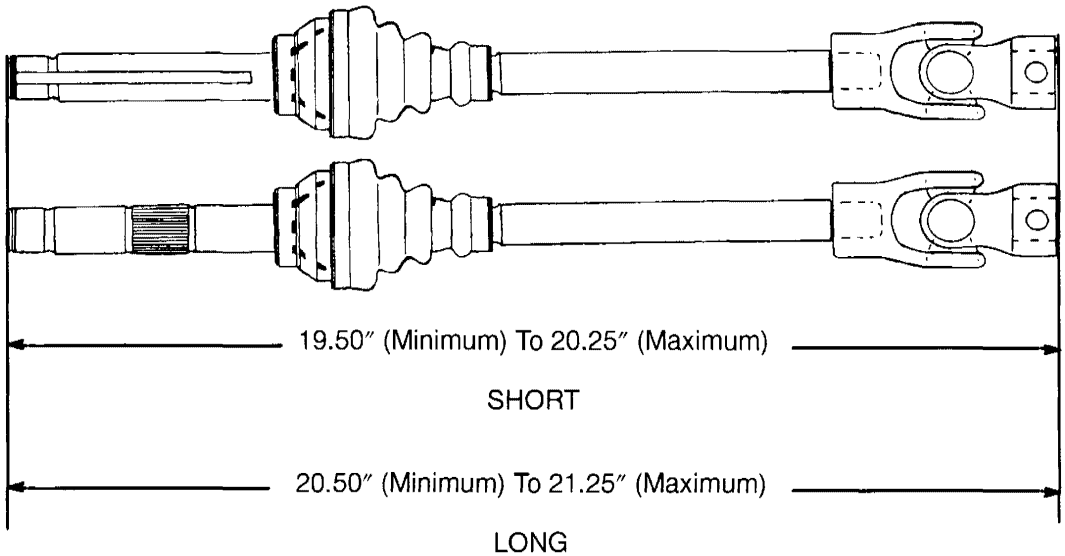
There are different types of axles used and they are not interchangeable. You will find either "USA" or "BTB" stamped on the housing. Refer to the following chart and the appropriate parts manual for the correct part number and drive axle application.





NOTE: Reference Only Revised Parts/Microfiche Manuals (Rev. 01 or later)		**NEAPCO**		**BTB**	
		Marked USA or NEAPCO on CV Bell		Marked BTB on CV Bell	
Ref No.	**Description**	**Long Splined**	**Long Keyway**	**Long Splined**	**Short Splined**
1	L.H. Drive Shaft Assembly with Sleeve	1380066	1380075	1380085	1380083
1	R.H. Drive Shaft Assembly with Sleeve	1380063	1380058	1380086	1380084
2	Weld Shaft Replacement	1380060	1380060	1380094	1380095
3	Weld Cardan Replacement	1380061	1380061	1380092	1380093
4	Cross and Bearing Kit	3260104	3260104	2200771	2200771
5	Yoke	3260101	3260101	3260130	326013
6	Small Band Clamp	3260123	3260123	7080627	7080627
7	Large Band Clamp	3260121	3260121	3260115	3260115
8	CV Boot	3260120	3260120	5411106	5411106
9	LH CV Housing with Sleeve	1380068	1380076	1380098	1380098
9	RH CV Housing with Sleeve	1380069	1380048	1380099	1380099
10	Drive Shaft Seal Sleeve	5222299	5222299	5222299	5222299
11	Kit- Repl Boot, CV Joint	3260108	3260108	2200773	2200773
12	Circlip	7670092	7670092	7670091	7670091

Front Axle Identification, Cont.

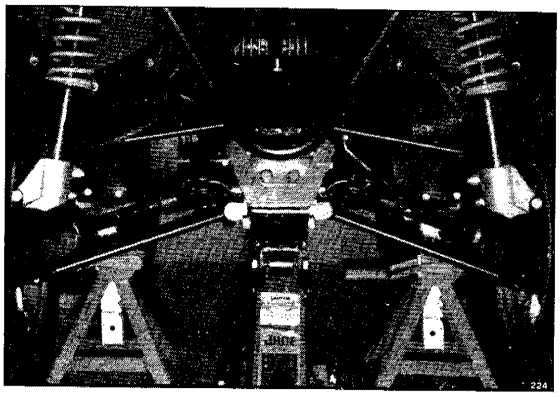


Front Drive Axle Removal

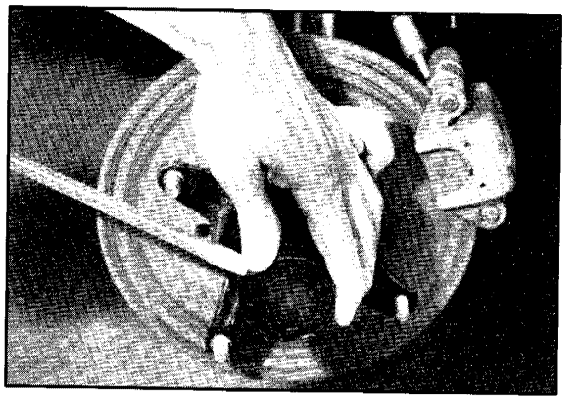
1. Loosen front wheel nuts slightly.
2. Elevate and support machine under footrest/frame area with front wheels elevated.

CAUTION: Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure. Wear eye protection when removing and installing drive axles or component parts.

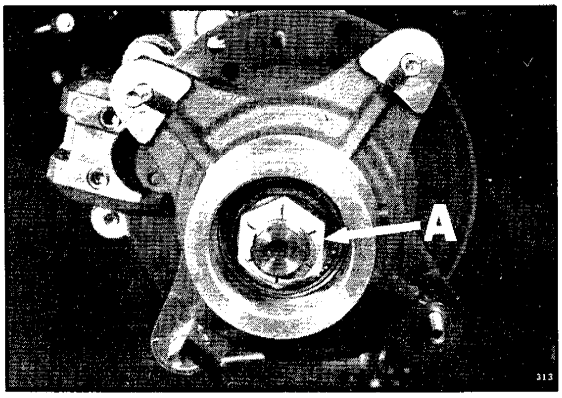
3. Remove wheel nuts and wheels.



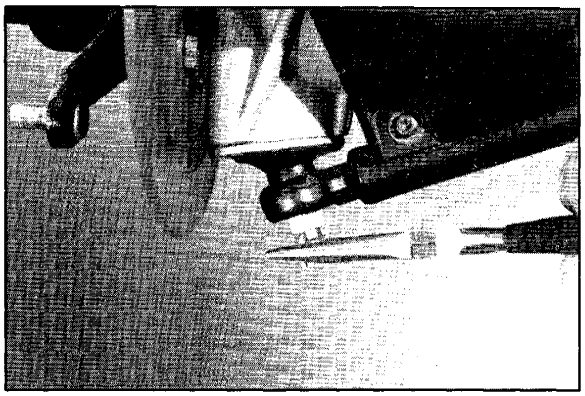
4. Remove hub cap.



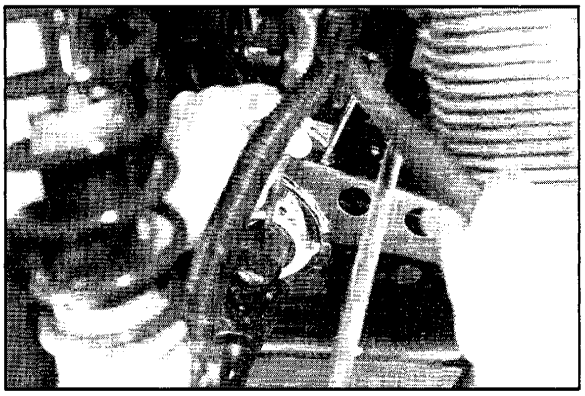
5. Remove outer hub nut.
6. Remove hub, bearings, Hilliard assembly, and armature plate.



7. Remove cotter pin and castle nut from lower A arm ball joint. Remove lower A-arm from ball joint.

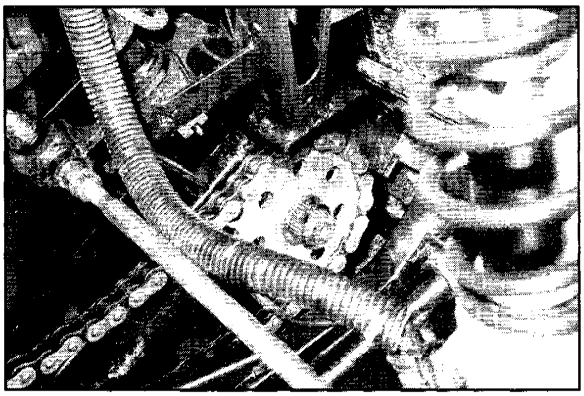


8. Using a drift punch remove roll pin at eccentric housing.



Front Drive Axle Installation

1. Install spring washer and drive shaft. Align hole in U-joint yoke with hole in eccentric shaft, and install new roll pin.
2. Install new seal in strut casting.
3. Install drive shaft in strut.



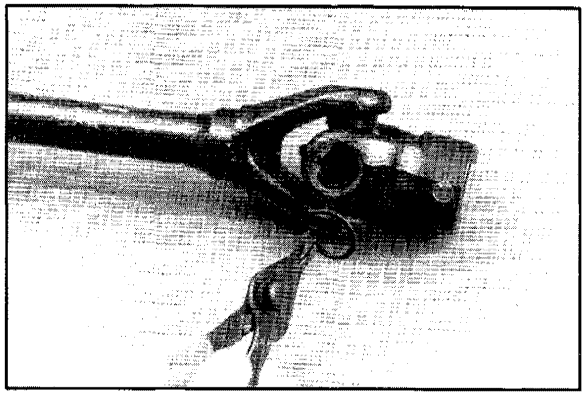
4. Install lower ball joint, torque nut to 25 ft. lbs. (3.45 kg-m) and install new cotter pin.
5. Follow procedure to install Hilliard clutch components and hub as outlined on page 7.6.

U-Joint Disassembly (Typical)

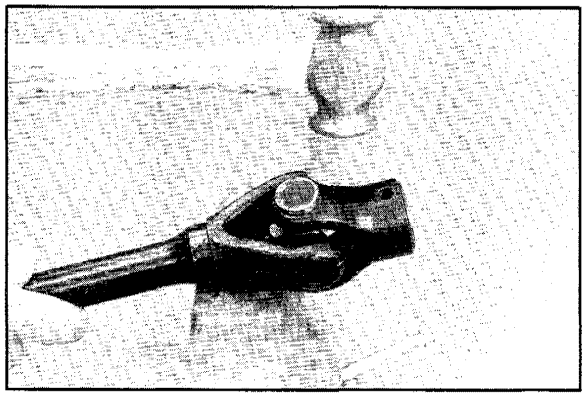
CAUTION: Always wear eye protection.

1. Remove internal or external snap ring from all bearing caps.

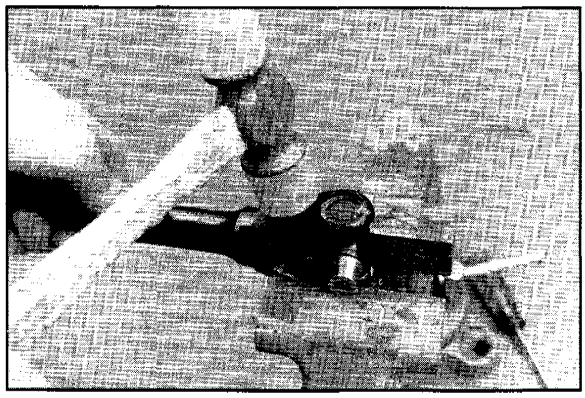
NOTE: If yoke or bearing is removed, cross bearing must be replaced. Note orientation of grease fitting and mark inner and outer yoke for correct re-positioning during installation.



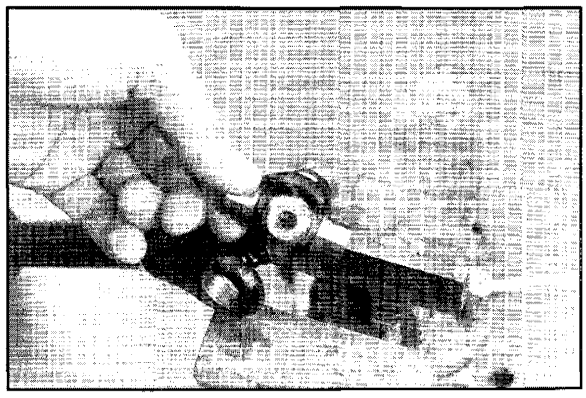
2. Support inner yoke as shown and drive outer yoke down (bearing cap out) with a soft face hammer.



3. Support U-joint in vise as shown and drive inner yoke down to remove remaining bearing caps.



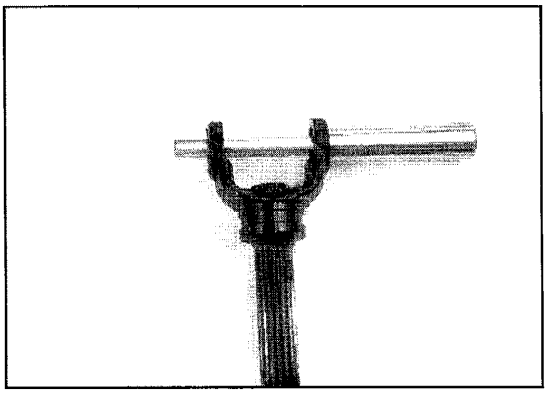
4. Force U-joint cross to one side and lift out of inner yoke.



U-Joint Inspection

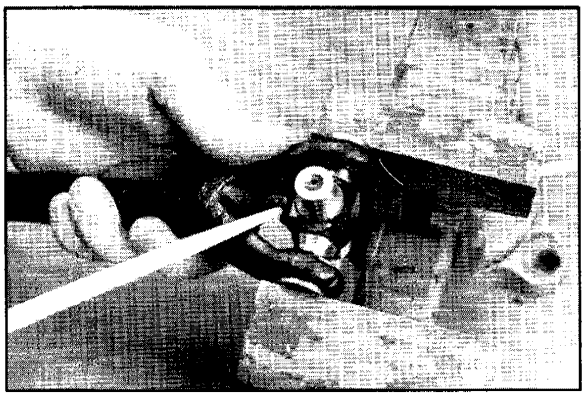
NOTE: When rebuilding Type IV shaft drive rear U-Joints it is necessary to inspect the yoke cap bores for alignment or warpage. If a yoke cap bore is warped or twisted, the yoke must be replaced.

1. Make sure yoke bores are free of nicks or burrs from disassembly.
2. Slide the appropriate tool through both bores as shown. Hold the tool so the flat portion is in line with the yoke centerline. If yoke tool does not slide freely in both bores, replace yoke.
3. Pull tool out and turn 90°. Slide tool through both bores. Tool must slide freely into both bores.

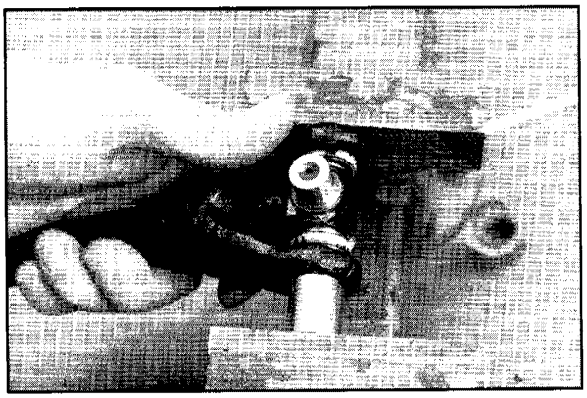


U-Joint Assembly (Typical)

1. Install new bearing caps in yoke by hand. Carefully install U-joint cross with grease fitting properly positioned. Take care not to dislodge needle bearings upon installation of cross joint. Tighten vise to force bearing caps in.



2. Using a suitable arbor, fully seat bearing cap in one side. Continually check for free movement of bearing cross as bearing caps are assembled.
3. Install snap ring to contain bearing cap just installed. Repeat procedure for other side.

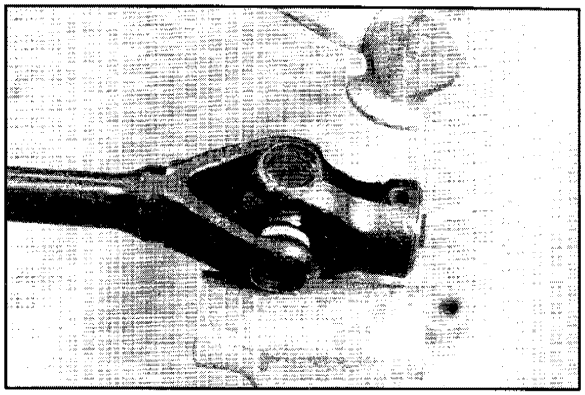


4. Install outer yoke, aligning marks made before disassembly.

U-Joint Assembly (Typical)

5. 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.

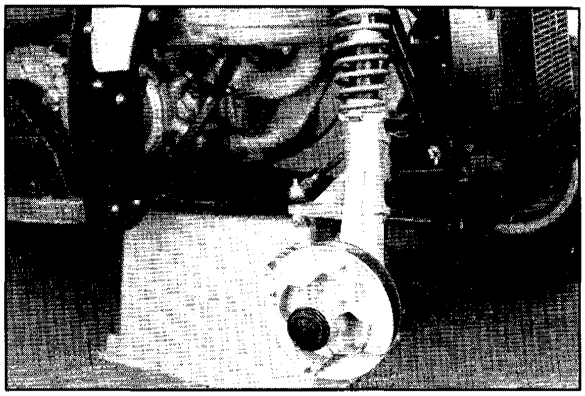


7. When installation is complete, Yokes must pivot freely in all directions without binding.

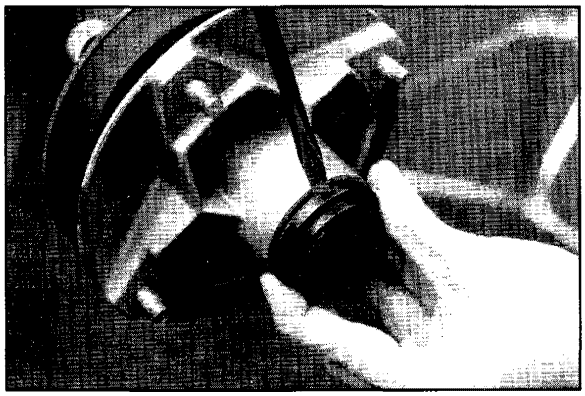
2x4 Front Hub Disassembly/Inspection

1. Stop engine, place machine in gear and set parking brake.
2. Loosen front wheel nuts slightly.
3. Elevate and safely support machine under footrest/frame area.

CAUTION: Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure. Wear eye protection when removing and installing bearings and seals.

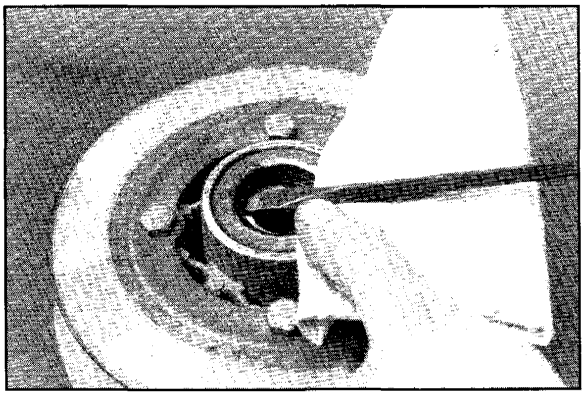


4. Remove wheel nuts and wheels.
5. Check bearings for play by grasping hub firmly and checking for movement. Rotate the hub. It should rotate smoothly without binding or rough spots.
6. Remove hub cap, cotter pin, front spindle nut, and washer. Remove the hub.
7. Rotate each bearing by hand and check for smooth rotation. Visually inspect bearing for moisture, dirt, or corrosion. Replace bearing if moisture, dirt, corrosion, or roughness is evident.

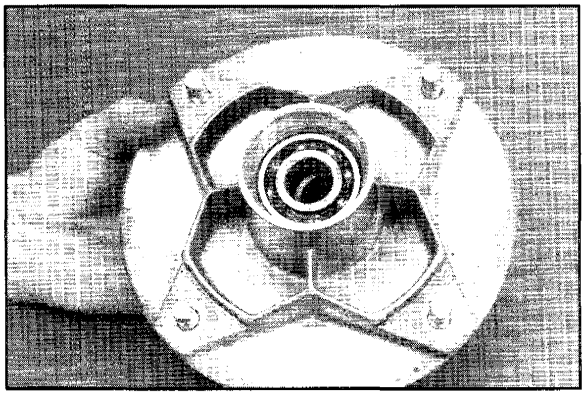


NOTE: If bearings are removed, they must be replaced.

8. Pry seal out back of hub.

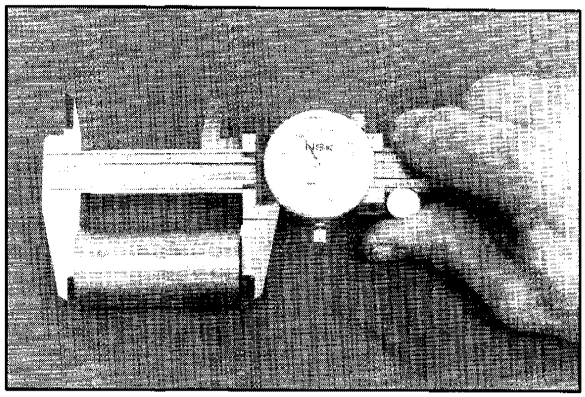


9. Using a brass drift, tap bearing spacer to one side to expose inner bearing race. Drive bearing out using a drift through opposite side of hub.
10. Remove spacer and drive other bearing out.
11. Clean hub and spacer thoroughly.



2x4 Front Hub Disassembly, Cont.

12. Inspect spacer for wear or damage. Measure length of spacer and replace if worn beyond service limit or if ends are rounded.



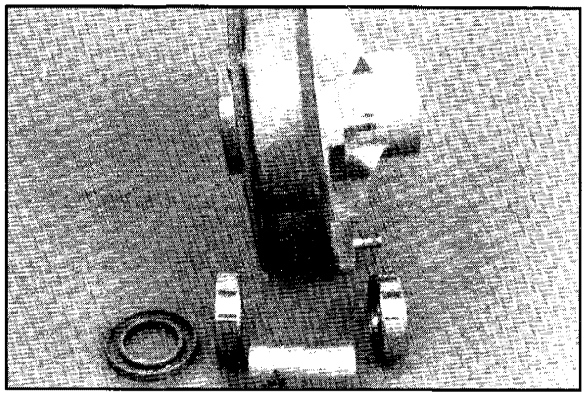
Premium All-Season Grease

PN 2871322 (3 oz. Tube)
PN 2871423 (14 oz. Tube)

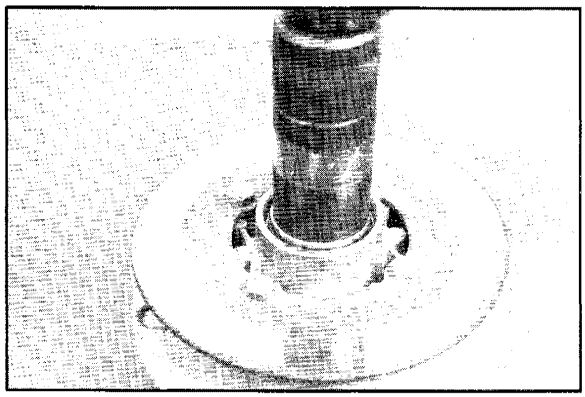
Bearing Spacer Length:
Service Limit: 2.1850″ (5.55 cm)

2x4 Front Hub Assembly

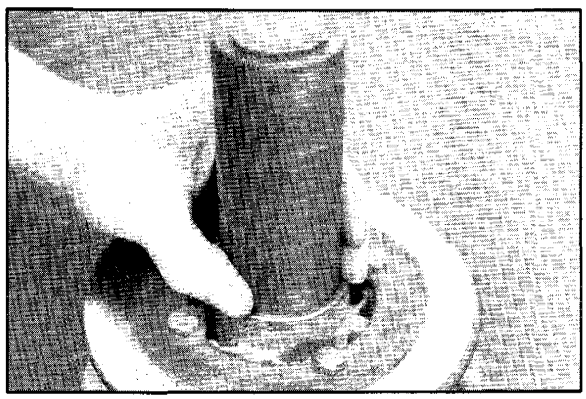
1. Pack bearings with Polaris Premium All Season Grease. Drive one of the bearings into rear of hub using a 1.180 (46 mm) bearing driver. **CAUTION:** *Do not* drive on the inner race of the bearing.



2. Coat bearing spacer with grease and install into hub. Drive other bearing into hub until seated.

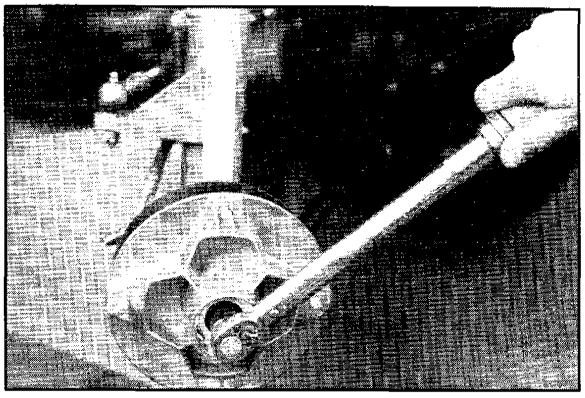


3. Install seal into hub (with numbers facing out) until flush with end of seal bore.



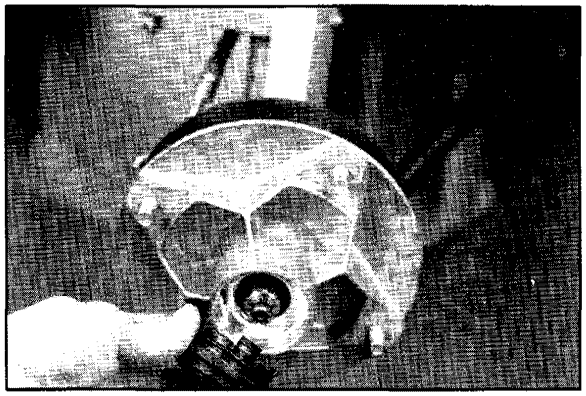
2x4 Front Hub Installation

1. Apply grease to washer and install with spindle nut. Torque nut to 40 ft. lbs. (5.52 kg-m) and install cotter pin. Tighten nut slightly if necessary to align cotter pin holes. Rotate wheel and check for smooth operation. Bend both ends of cotter pin around nut in opposite directions.



2 x 4 Spindle Nut Torque:
40 ft. lbs. (5.52 kg-m)

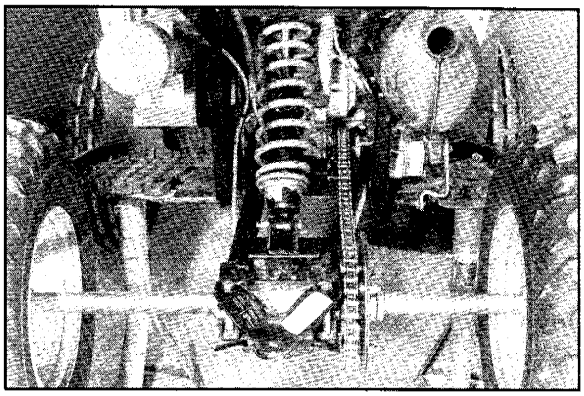
2. Inspect O-Rings on hub cap for wear, cracks or damage and replace if necessary.
3. Apply a light film of grease to hub cap and install until fully seated.



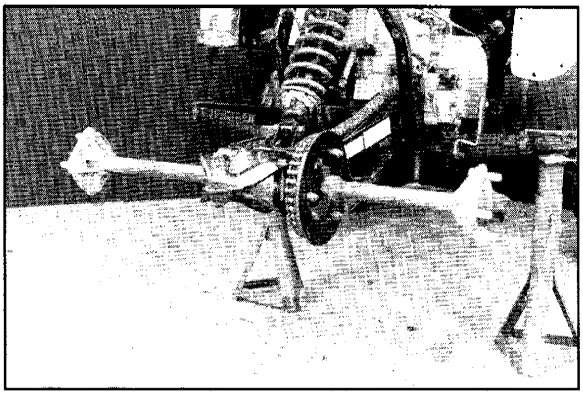
FINAL DRIVE
Rear Axle
Rear Axle Removal

1. Stop engine. Place machine in gear and set parking brake.
2. Loosen rear wheel nuts slightly.
3. Remove both hub caps and cotter pins, and loosen hub nuts 1-2 turns.
4. Elevate and safely support machine under footrest/frame area.

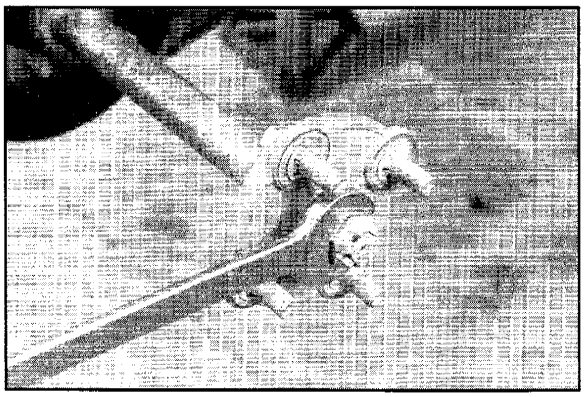
CAUTION: Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure. Wear eye protection when removing and installing bearings and seals.



5. Remove wheel nuts and rear wheels.



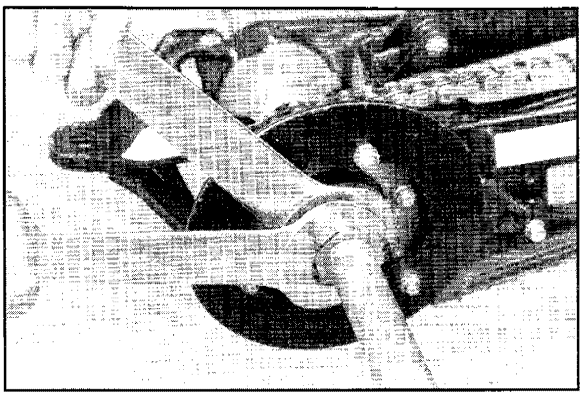
6. Remove both hub nuts, cone washers, and flat washers. Remove hubs.



7. Remove rear axle lock nut using 1 3/4″ axle nut wrench.

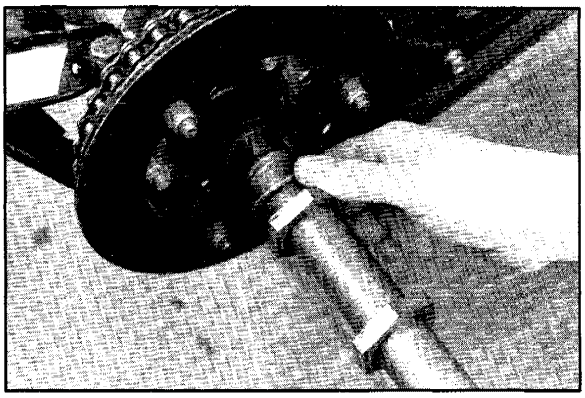
1 3/4″ Axle Nut Wrench

PN 2870772

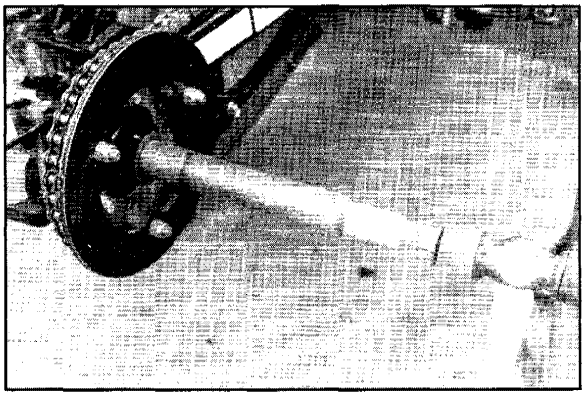


Rear Axle Removal

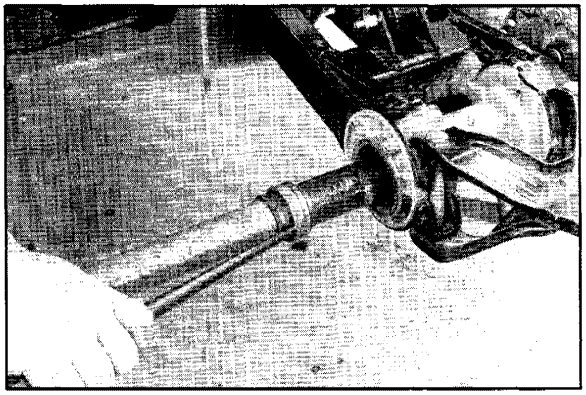
8. Remove axle nut and washer.



9. Place a block of wood on end of axle or use a soft face hammer, and drive axle out from right to left.

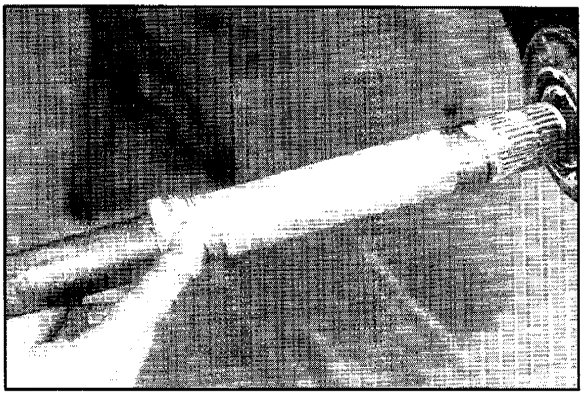


10. Tap locating collar on left side of axle toward the right enough to expose the circlip retainer. Remove retainer and locating collar.
11. Inspect locating collar on left side of axle and replace if worn or damaged. A worn collar will allow dirt to enter axle bearing area.

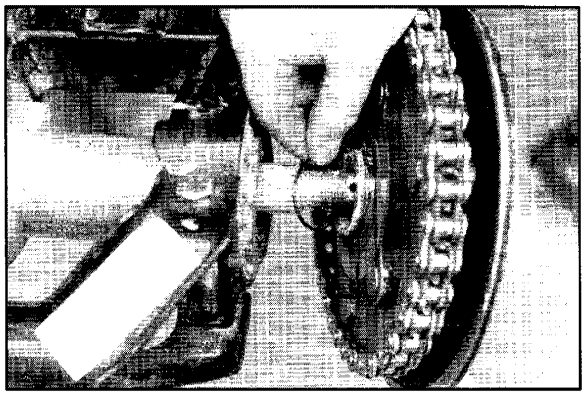


Rear Axle Installation

1. Slide locating collar on left end of axle with recess facing outward.
2. Install a new circlip.
3. Tap locating collar back towards left end of axle until it captivates circlip.
4. Apply a light coat of grease to axle and install a new O-Ring.
5. Insert axle from left to right.



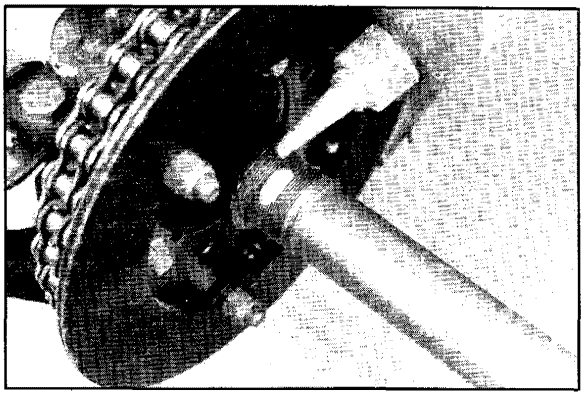
6. Install O-Ring, sprocket hub, and washer.



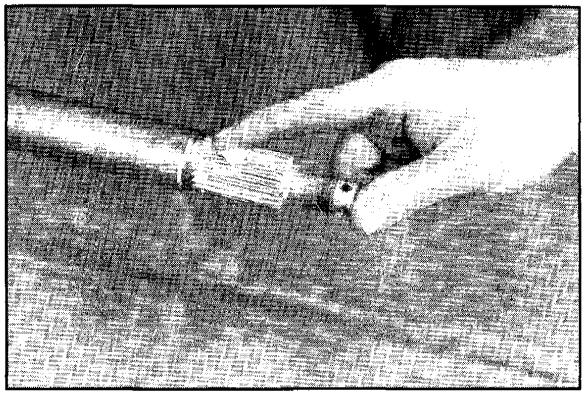
Rear Axle Installation

7. Clean axle nut threads with a wire brush. Apply Loctite 242 to threads and install axle nut. Torque to 150 ft. lbs. (20.7 kg-m). Rotate axle and check for smooth operation.
8. Install lock nut and torque to 150 ft. lbs.

**Rear Axle Retaining Nut and Lock Nut:
150 ft. lbs. (20.7 kg-m)**

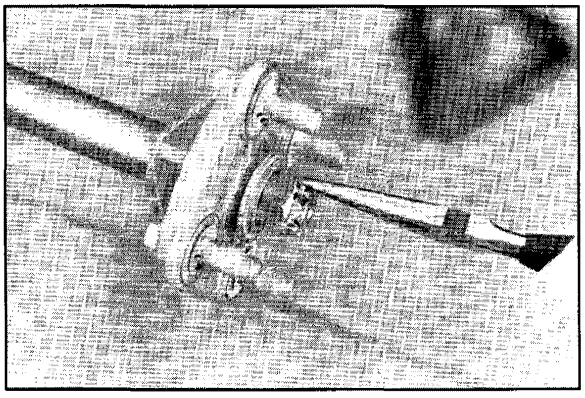


9. Lightly grease splines of axle and install wheel hubs, flat washers, and cone washers with concave side facing flat washer.



10. Torque hub nuts to 80 ft. lbs. (11.04 kg-m) and install new cotter pin, bending one leg of cotter pin inward and one outward against end of axle.

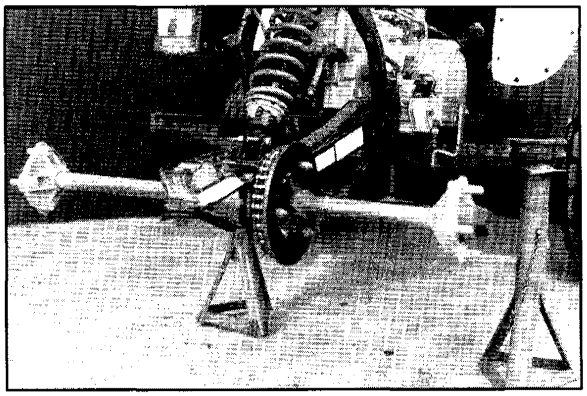
**Rear Hub Retaining Nut:
80 ft. lbs. (11.04 kg-m)**



Rear Axle Installation

5. Install hub cap.

6. Place wheels on hubs and install wheel nuts with tapered side facing in. Torque evenly to specifications.



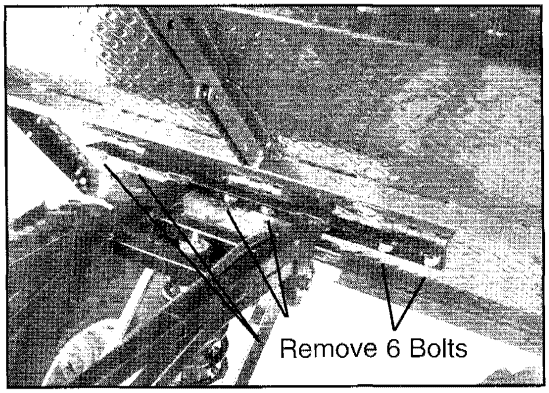
Rear Axle Retaining Nut:
150 ft. lbs. (20.7 kg-m)

Rear Hub Retaining Nut:
80 ft. lbs. (11.04 kg-m)

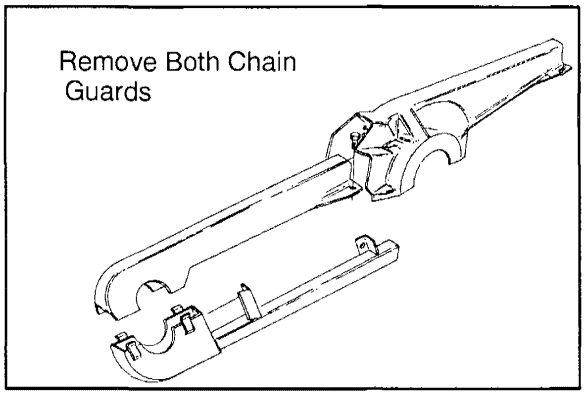
Rear Wheel Nuts:
50 ft. lbs. (6.9 kg-m)

6x6 Middle Axle/Sprocket Removal

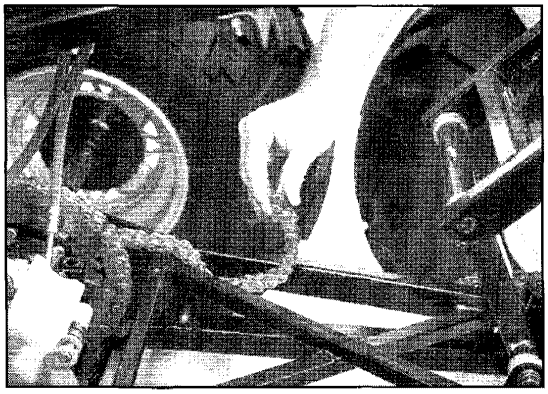
1. Disconnect taillight harness.
2. Remove cargo box. Note location of hinge shims between hinge and frame (where applicable).



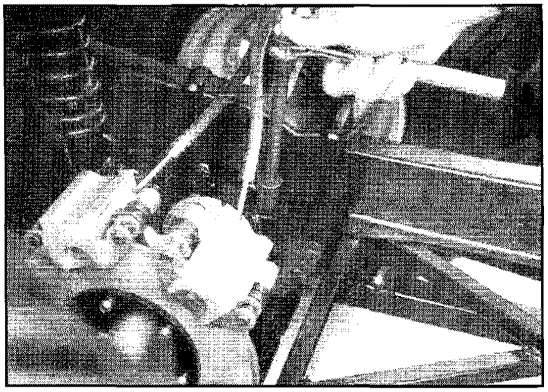
3. Remove both chain guards.



4. Remove rear chain.

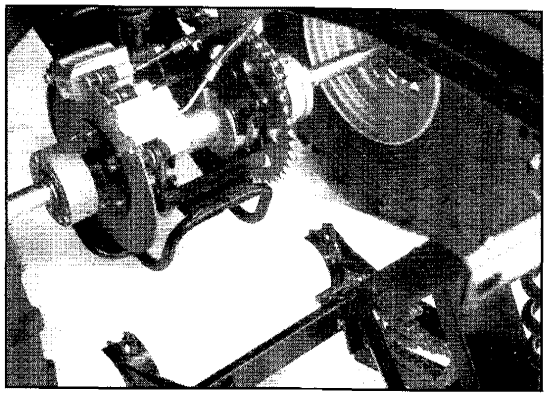


5. Remove middle axle eccentric bolt and front chain guard.
6. Remove chain, making sure to note location of O-Rings on master link.

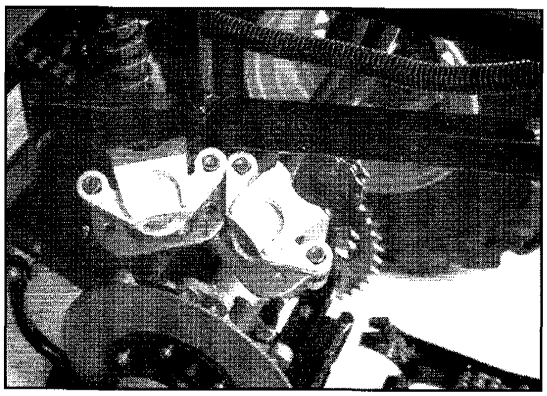


6x6 Middle Axle/Sprocket Removal

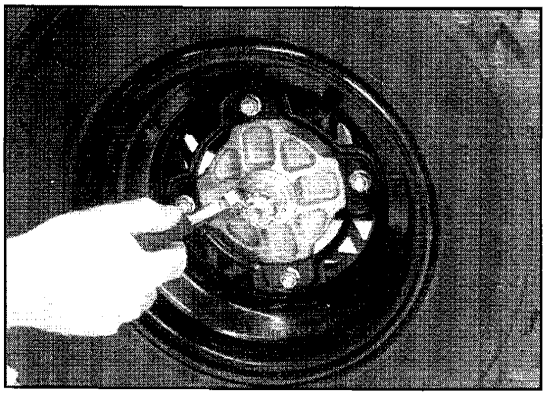
7. Remove rear swing arm end caps on both sides.
8. Lower rear swing arm down out of the way.



9. Remove rear brake caliper(s) and safely secure caliper(s) to frame as shown.
10. Remove wheels.

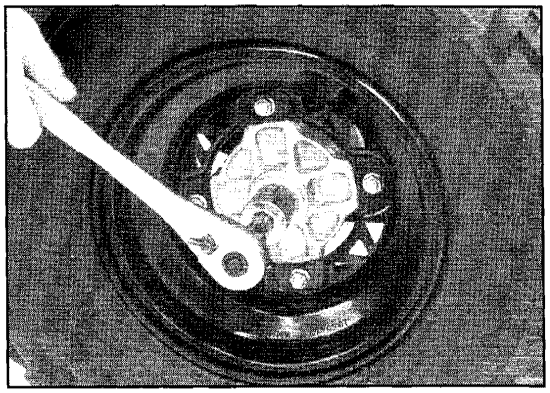


11. Remove cotter pin from RH hub nut.

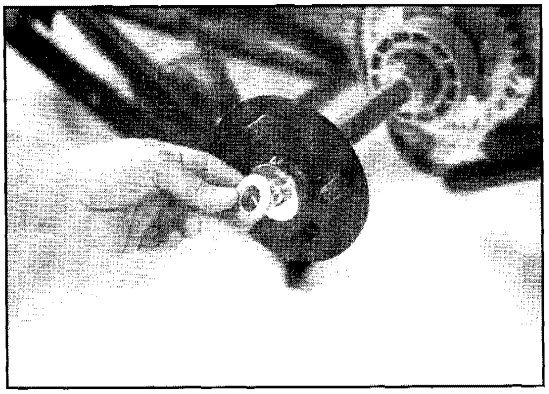


6x6 Middle Axle/Sprocket Removal

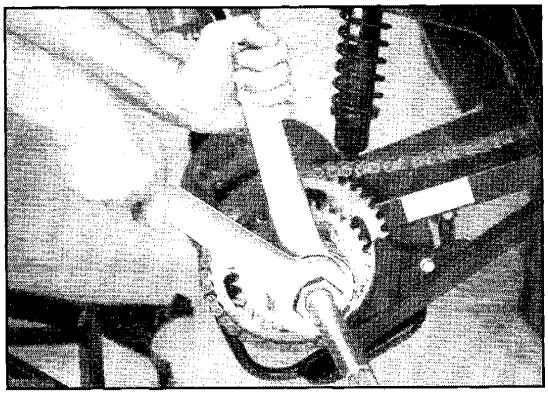
12. Loop chain around sprocket and apply LH brake.
13. Remove RH hub nut.



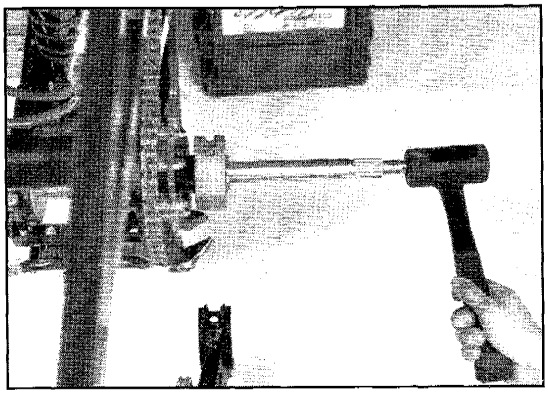
14. Note position of washers. Cone washer is positioned with domed side facing outward.



15. Hold inner lock nut and remove outer nut. Remove inner nut and middle chain.

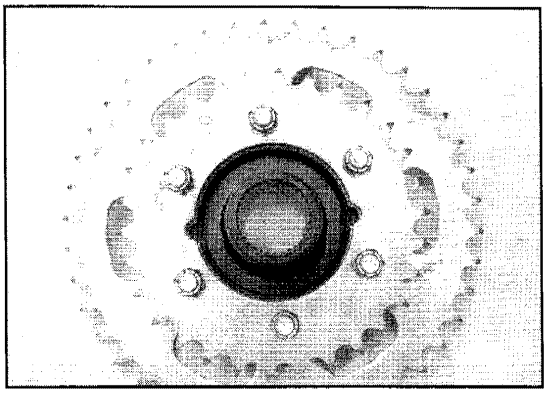


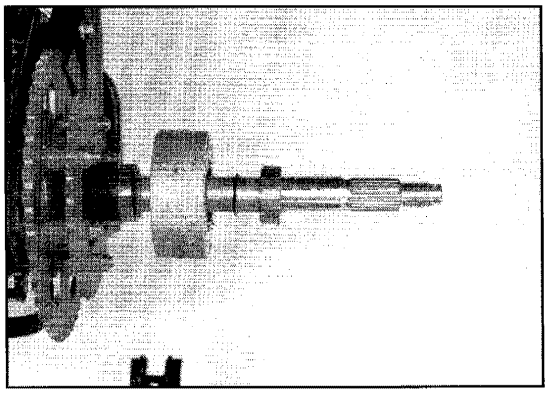
16. Remove axle from right to left. Note position of spacer O-Ring on assembly.



17. Inspect sealing surfaces of sprocket hub.

NOTE: When installing a new sprocket, be sure to align eccentric adjustment access holes in sprockets.

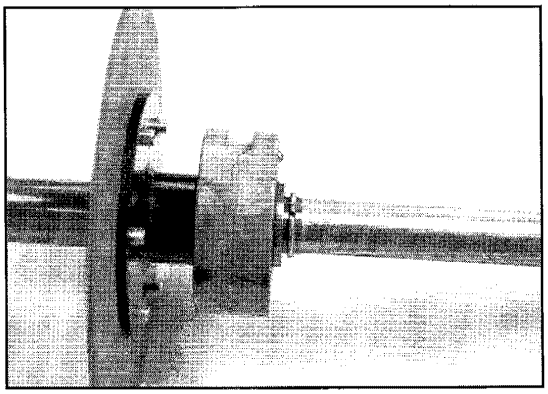




Brake Disc Hub Removal

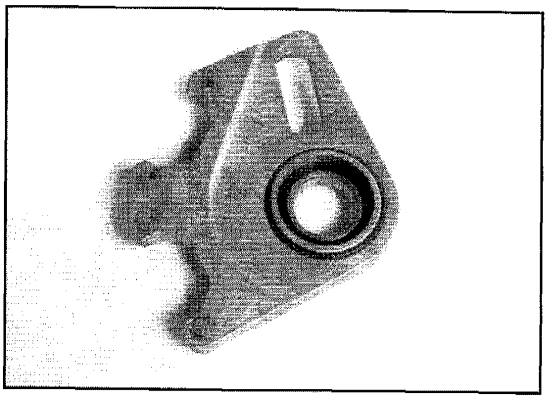
1. With axle removed, tap spacer, LH bearing housing and disc hub inward to expose wire retainer clip.
2. Remove wire clip from groove.
3. Slide clip, spacer, O-Ring, bearing housing and disc hub off LH side of axle.
4. Inspect sealing surface on brake disc hub.

Reverse disassembly procedure to assemble. Be sure to install rear swing arm bearing housing with grease fitting outward.

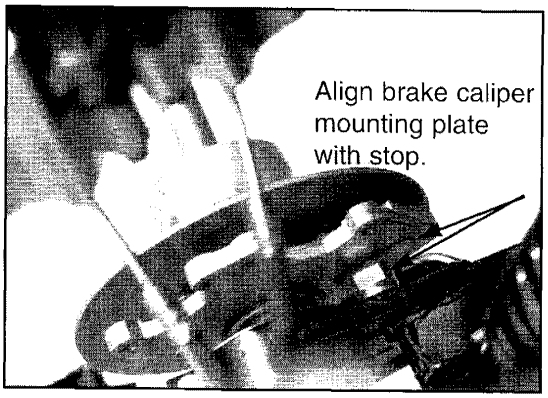


Middle Axle Assembly

1. Install new O-Ring on brake caliper mount plate.
2. Install caliper on axle. Install spacer.
3. Install axle from left to right.



4. Lubricate splines of axle and sealing surfaces on sprocket hub with a light film of grease. Install hub (large sprocket inward).
5. Lube and install O-Ring on axle with spacer (tapered side in). Apply Loctite™ 242 to axle threads and loosely install inner axle nut.
6. Install drive chain with closed end of link clip leading (in forward gear).
7. Install brake caliper(s) and torque retaining bolts to specification.



Brake Caliper Retaining Bolt Torque:

15 ft. lbs. (2.07 kg-m)

8. Apply brake to prevent axle from turning. Torque inner axle nut to specification.

Inner Axle Nut Torque-

150 ft. lbs. (20.75 kg-m)

9. Apply Loctite™ 242 to threads of axle and install jam nut. Hold inner axle nut and torque jam nut to specification.

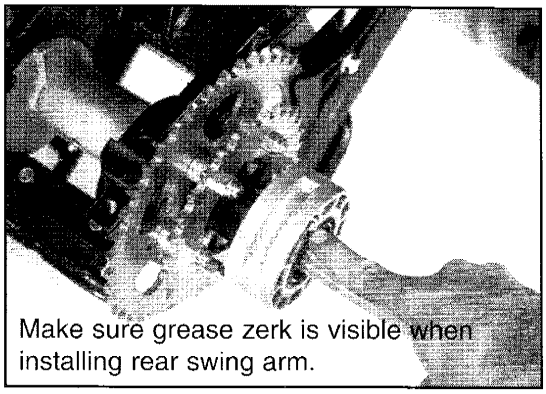
Jam Nut Torque-
150 ft. lbs. (20.75 kg-m)

Middle Axle Assembly

10. Set rear swingarm in place on pivot bearing housings.
11. Install retainer caps and torque bolts to specification.

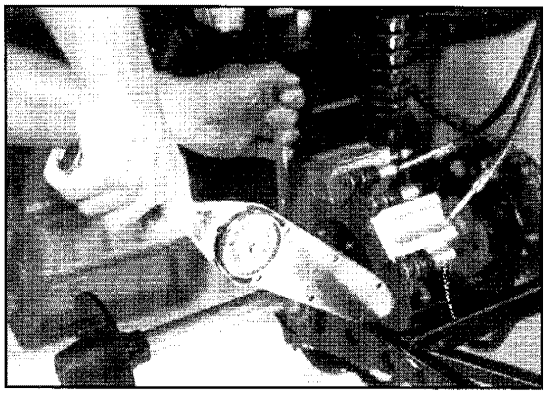
Retainer Cap Bolt Torque:

50 ft. lbs. (6.91 kg-m)



Make sure grease zerk is visible when installing rear swing arm.

12. Grease wheel hub splines and install hubs on axle followed by flat washer and dome washer with dome side out. Torque nut to specification. Install a new cotter pin. Tighten nut slightly to align cotter pin if necessary.



Hub Nut Torque:

80 ft. lbs. (11.04 kg-m)

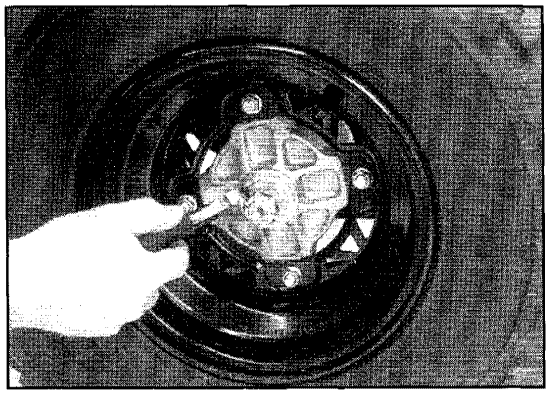
13. Install wheel nuts (tapered side in) and torque to specifications.

Wheel Nut Torque:

50 ft. lbs. (6.91 kg-m)

Rear Hub/Bearing Carrier Removal (Type IV Shaft Drive)

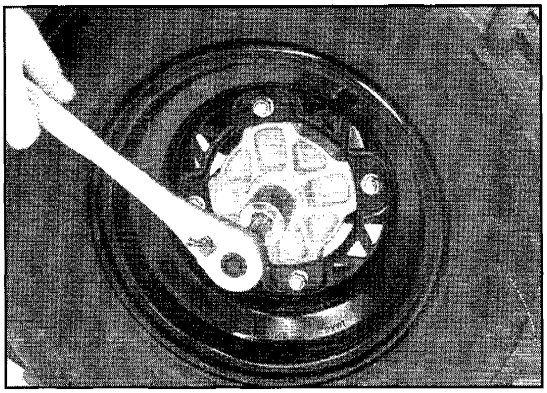
1. Lock the parking brake. Remove rear hub cap.
2. Remove cotter pin.



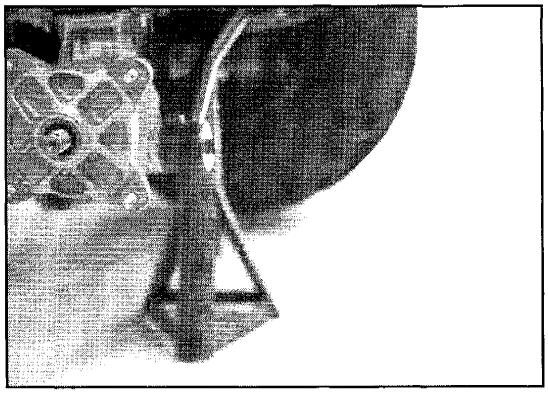
3. Loosen the hub retaining nut.
4. Loosen - but do not remove - the wheel nuts.
5. Safely support the rear of the ATV.

CAUTION:

Serious injury could occur if machine tips or falls.

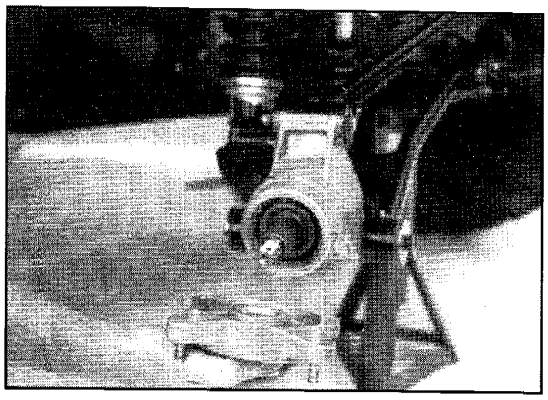


6. Remove wheel.

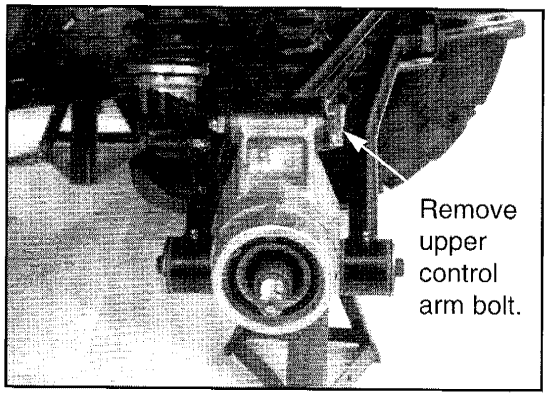


Rear Hub/Bearing Carrier Removal (Type IV Shaft Drive)

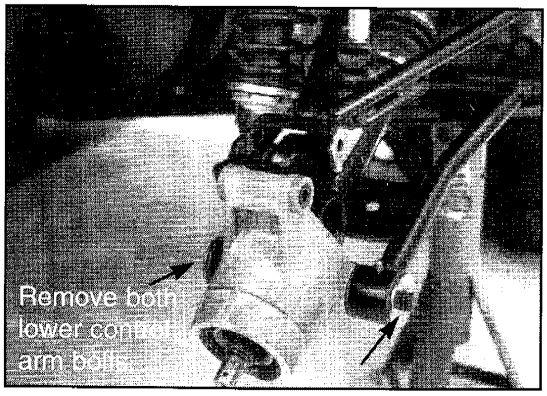
7. Remove hub.



8. Remove upper control arm bolt as shown.

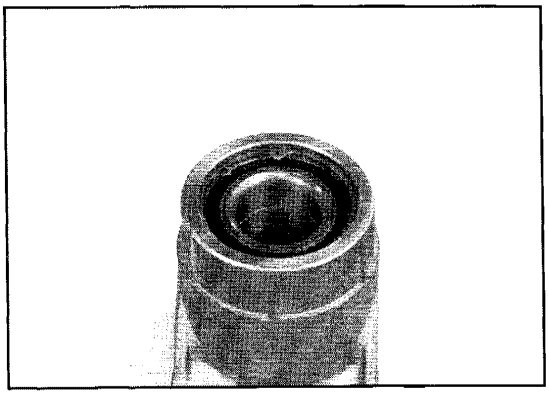


9. Remove both lower control arm bolts.
10. Remove bearing carrier.



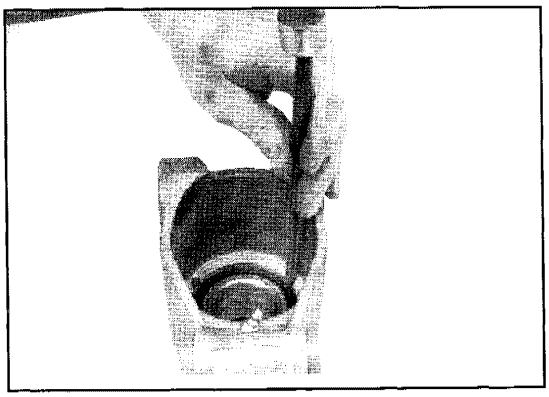
Rear Hub Disassembly (Shaft Drive)

1. Remove outer snap ring.



2. From the back side, tap on the outer bearing race with a drift punch in the reliefs as shown.

NOTE: Drive bearing out evenly by tapping on outer race only. Once bearing is at bottom of casting, support casting on outer edges so bearing can be removed.



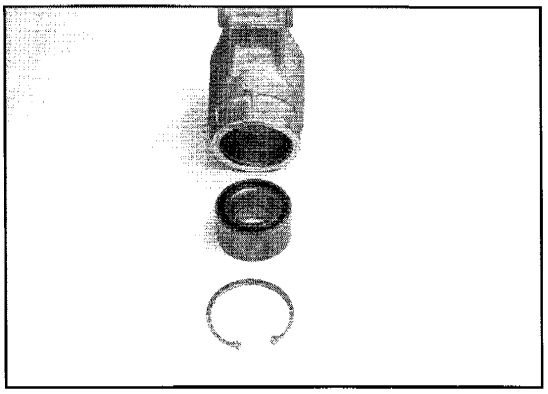
3. Inspect bearing.

NOTE: Due to extremely close tolerances and minimal wear, the bearings must be inspected visually, and by feel. While rotating bearings by hand, inspect for rough spots, discoloration, or corrosion. The bearings should turn smoothly and quietly, with no detectable up and down movement and minimal movement sideways between inner and outer race.

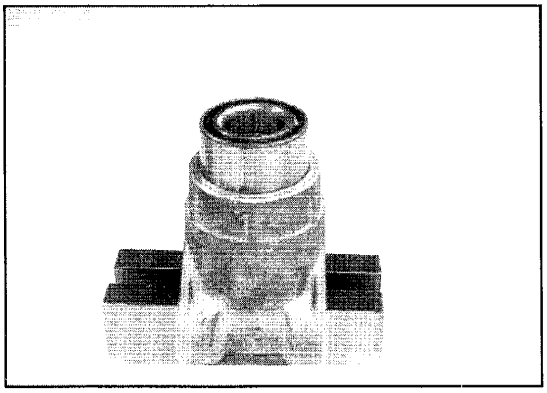
4. Inspect bearing housing for scratches, wear or damage.

Assembly

1. Support bottom of bearing carrier housing.



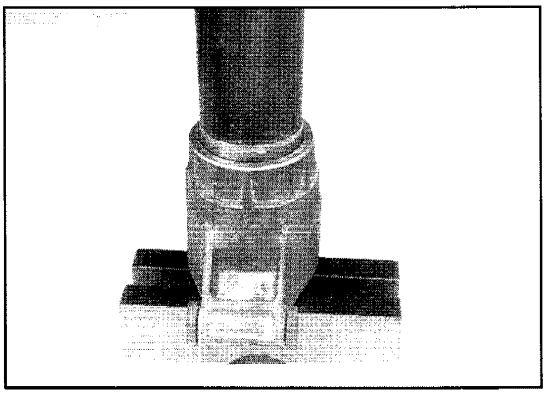
2. Start bearing in housing.



3. Press bearing into place until outer race bottoms on housing.

CAUTION:

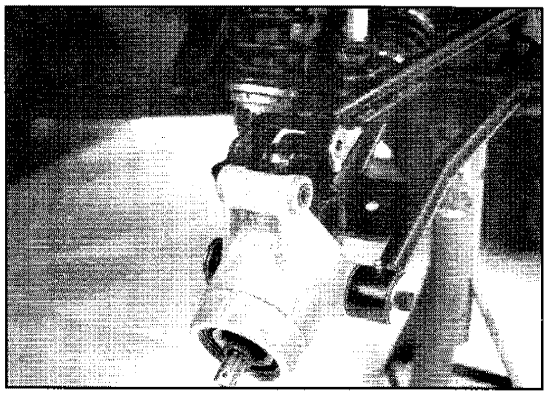
Use an arbor and press only on the outer race, as bearing damage may occur.



4. Install snap ring into groove.

Installation

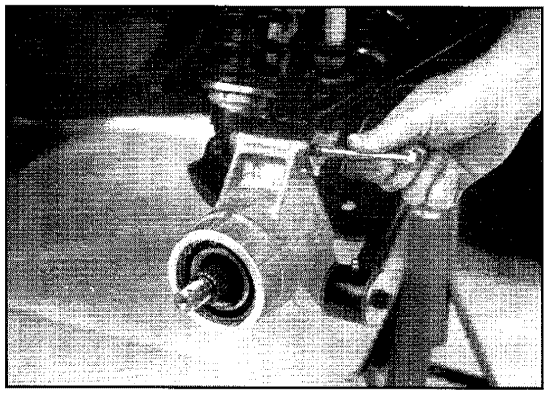
1. Start bearing carrier on drive shaft.
2. Align bottom of carrier housing and lower control arm. Grease and slide lower control arm bushings into place, securing corner housing.
3. Install and torque both lower control arm bolts.



Lower Control Arm Bolt Torque:
30 ft. lbs. (4.14 kg-m)

Upper Control Arm Bolt Torque:
35 ft. lbs. (4.83 kg-m)

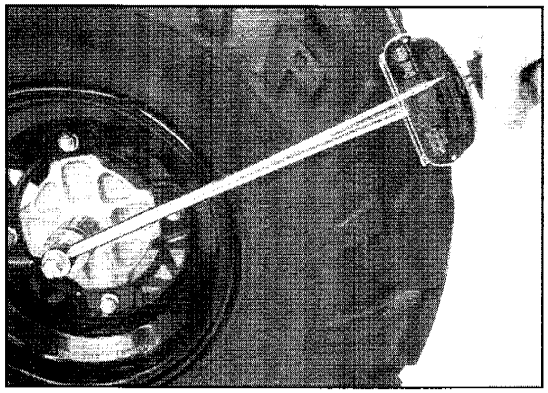
4. Lift bearing carrier until top aligns with upper control arm. Install and torque upper control arm bolt and torque to specification.
5. Pull drive shaft outward and install hub onto driveshaft splines.
6. Install cone washer with domed side facing outward.
7. Install retainer nut, wheel and wheel nuts.
8. Remove jackstand and torque axle nut and wheel nut.



Rear Hub Nut Torque:
100 ft. lbs. (13.83 kg-m)

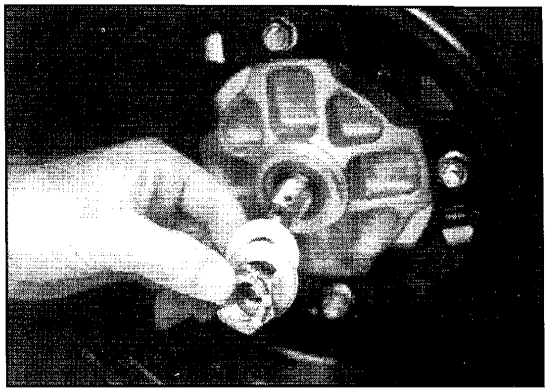
Rear Wheel Nut Torque
15 ft. lbs. (2.07 kg-m)

9. Install a new cotter pin. Tighten nut slightly to align holes if required.
10. Install hub cap.



Rear Drive Shaft Removal

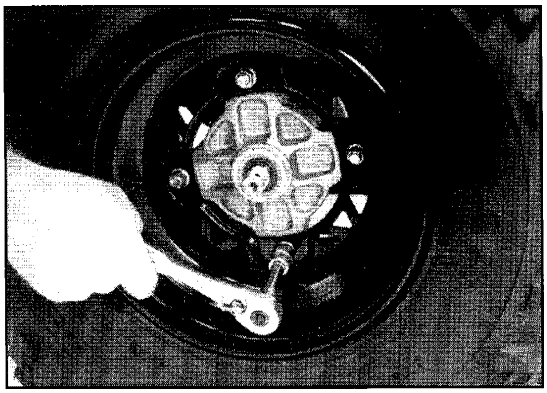
1. Lock the parking brake. Remove rear hub cap.
2. Remove cotter pin.



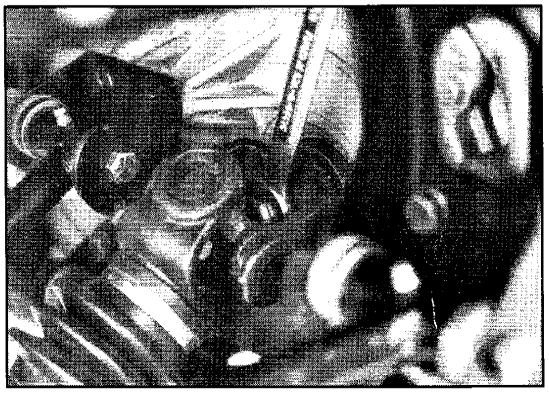
3. Loosen the hub retaining nut.
4. Loosen - but do not remove - the wheel nuts.
5. Safely support the rear of the ATV.

CAUTION:

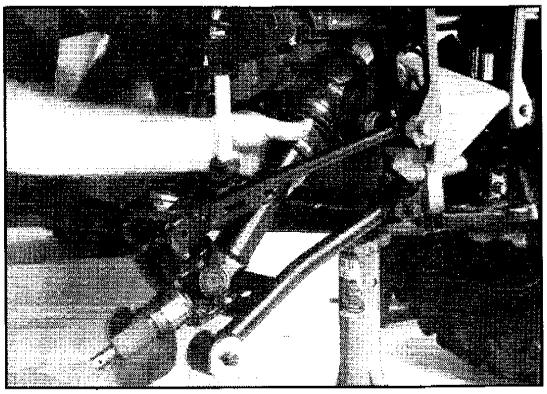
Serious injury could occur if machine tips or falls.



6. Remove wheel.



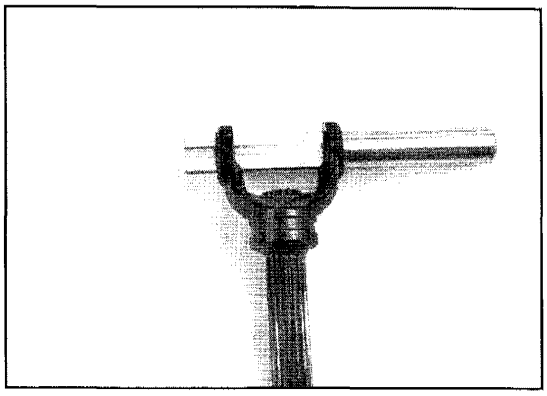
7. Remove inner drive shaft bolt.
8. Slide drive shaft out of transmission splines. Lift drive shaft up and toward center of ATV. Turn bearing carrier down to disengage outer end of drive shaft. Once drive shaft is free from bearing carrier, pull out side of machine.



Rear Drive Shaft Disassembly

NOTE: Drive shaft must be aligned properly to avoid vibration. Before disassembling driveshaft, be sure to mark the shaft and all U-joints, taking note of the position of grease fittings to ease assembly.

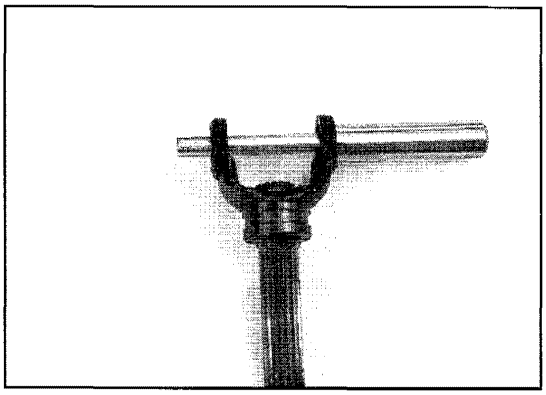
1. Remove shaft boot clamp.
2. Separate drive shaft halves.
3. Inspect the inner and outer splines.
4. Refer to page 7.18 for axle cardan U-Joint disassembly procedure. When disassembling U-Joint, the yoke bore alignment must be inspected. Refer to page 7.19 for procedure.



Assembly

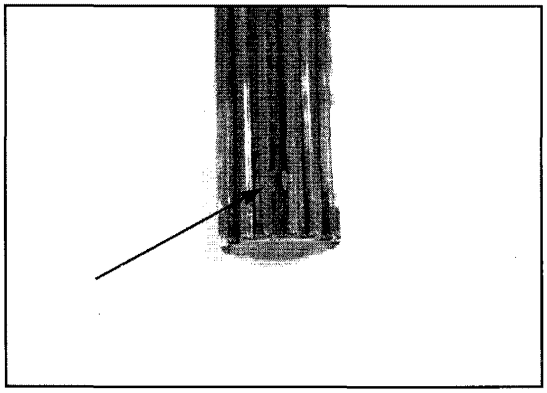
NOTE: When assembling U-Joints, be sure to position grease fittings correctly.

1. Assemble axle cardan U-Joints as described on page 7.19. Be sure to inspect yoke bore alignment on all yokes. If a yoke is twisted, warped, or misaligned, it *must* be replaced or pre-mature joint failure will result.
2. Install drive shaft boot on one of the drive shaft halves.
3. Grease splines of shaft with Polaris Premium U-Joint Lubricant.



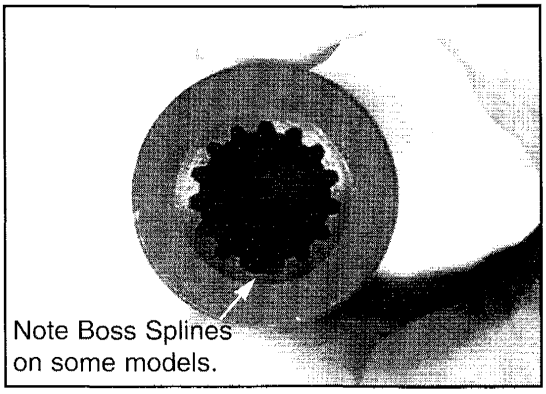
NOTE: The only recommended lubricant for the U-joints is Polaris Premium U-Joint Lubricant. Do not use inferior lubricants in U-Joints or pre-mature failure may result.

Premium U-Joint Lubricant	
2871515	3 oz.
2871551	14 oz.



4. In order to prevent driveline vibration, the inner and outer yokes must be aligned properly (refer to illustration on page 8.42). Assemble rear drive shaft, aligning inner and outer yokes and grease fittings.
5. Install boot clamps using boot clamp pliers.

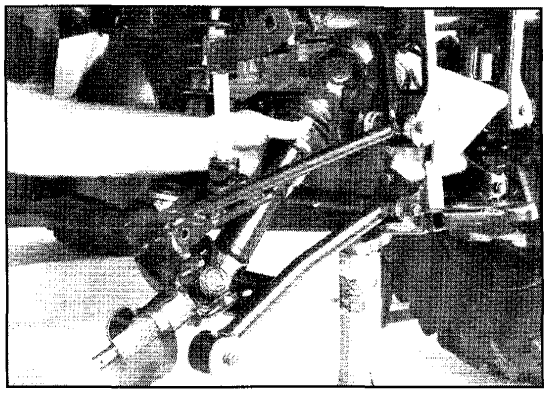
CV Boot Clamp Pliers	
Earless (Flush) Type	8700225
Ear Type	8700226



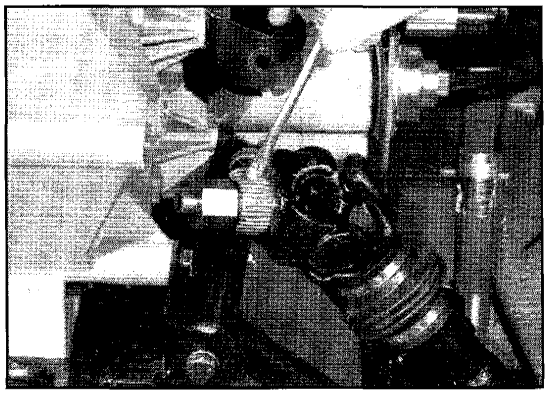
6. Collapse driveshaft assembly and grease until grease starts to run out of hole on end of shaft.

Rear Drive Shaft Installation

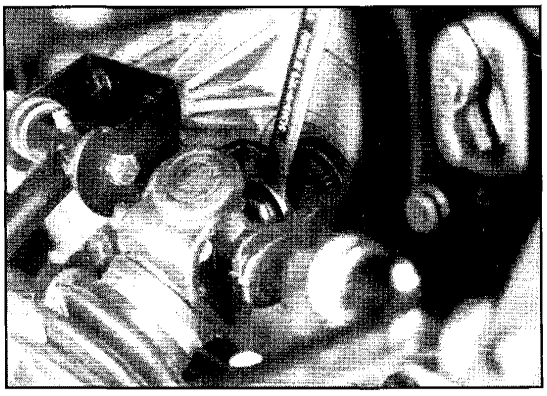
1. Slide shaft assembly into bearing carrier hub.



2. Apply anti-seize compound to splines of shaft.

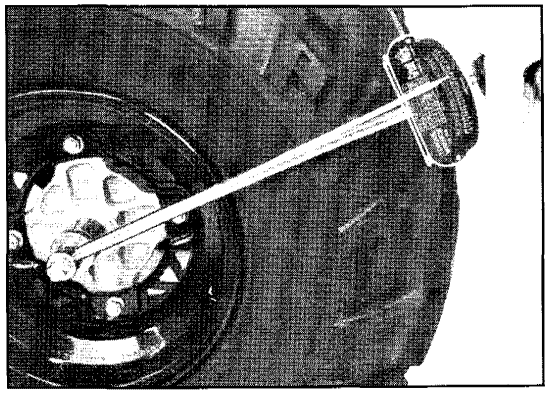


3. Apply Loctite 272 to threads of driveshaft mounting bolt. Install and tighten bolt to 35 ft. lbs. (4.83 kg-m).
4. Lift bearing carrier into place and install bolt to upper control arm. Torque bolt to 35 ft. lbs. (4.83 kg-m).



5. Install rear wheel and torque wheel nuts to specification.

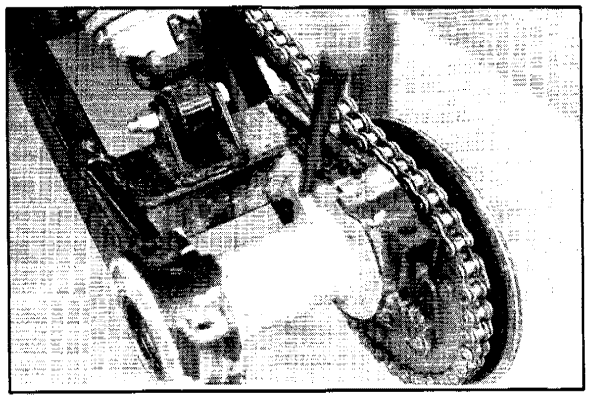
Rear Wheel Nut Torque:	
15 ft. lbs.	(2.07 kg-m)



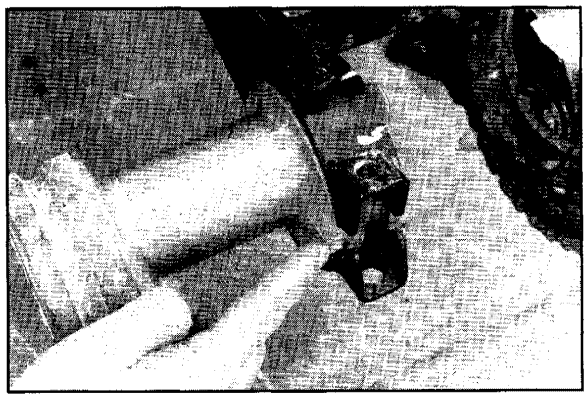
6. Grease all fittings thoroughly with Premium U-Joint Lubricant.

Rear Eccentric Removal

1. Remove rear axle. See page 7.24.
2. Completely remove rear eccentric pinch bolts.
3. Mark direction hub is installed for ease of installation.
4. Rotate eccentric hub until projections line up with slots in eccentric clamp.



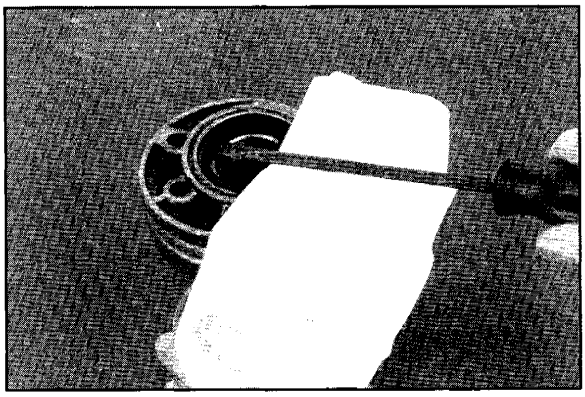
5. Slide eccentric assembly out of clamp.

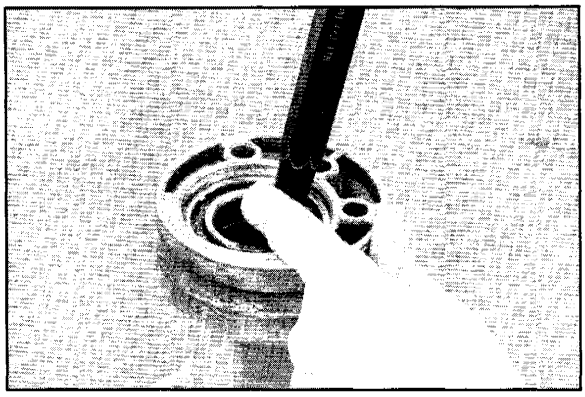


Rear Eccentric Disassembly

NOTE: Bearings and seals must be replaced if removed.

1. Pry out drive axle seals. Be careful not to damage seal bore or eccentric housing.
2. Using a brass flat punch and a hammer, tap bearing spacer sideways until loose.
3. Drive bearing outward from opposite end of housing.

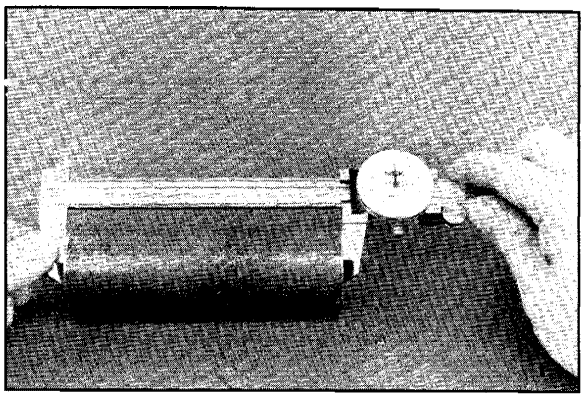




Rear Eccentric Disassembly

4. Remove spacer. Check spacer length. Replace spacer damaged or worn beyond the service limit.

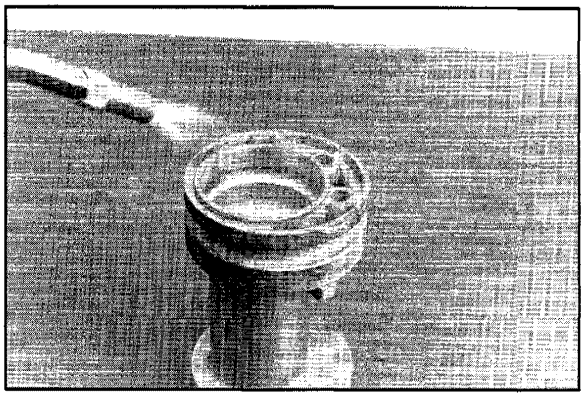
Rear Eccentric Inner Spacer Length
Service Limit 5.200″ (132.08mm)



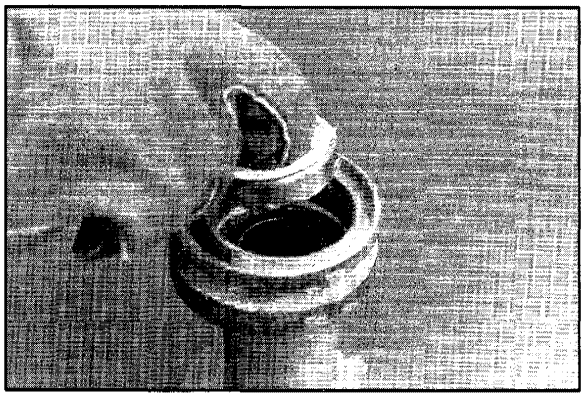
Rear Eccentric Assembly

1. Place new bearings in a freezer for 10 minutes before installation. Warm eccentric housing evenly to ease bearing installation.

CAUTION: Wear protective gloves and eye protection.

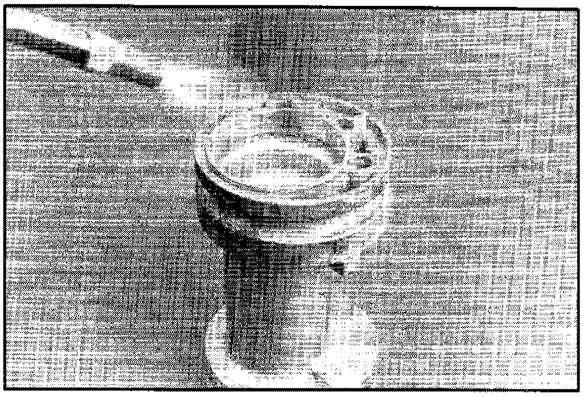


2. Install bearing until seated.

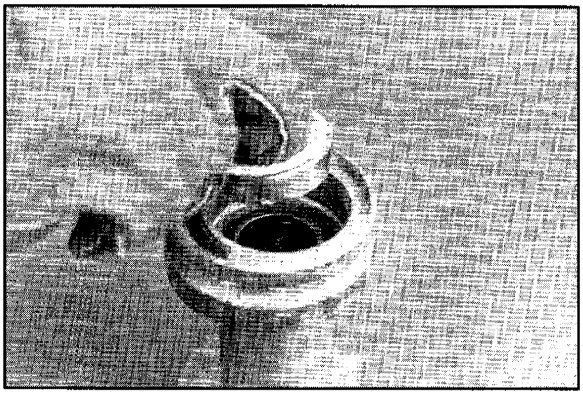


Rear Eccentric Assembly

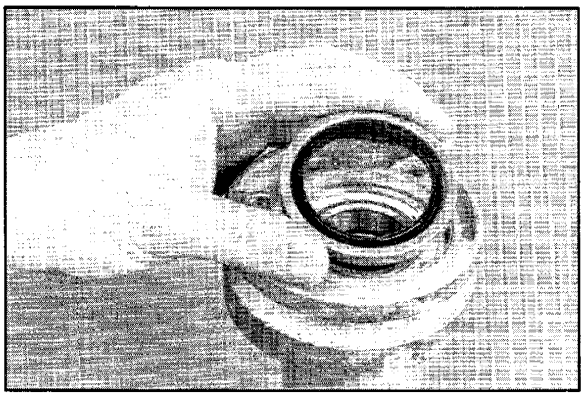
3. Turn housing over and support outer race of bearing.
4. Apply a light film of grease to spacer and install.
5. Heat end of housing without bearing.



6. Install other bearing until fully seated.

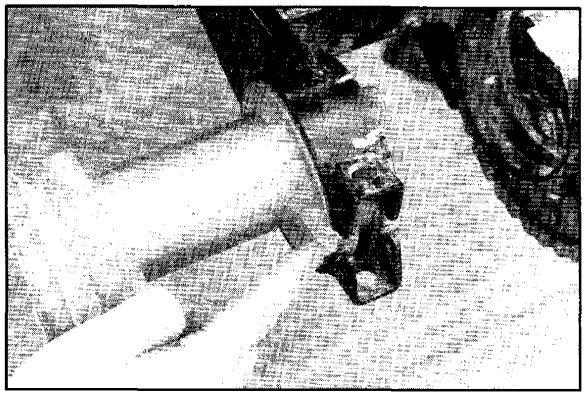


7. Install seals in both ends until flush with housing.

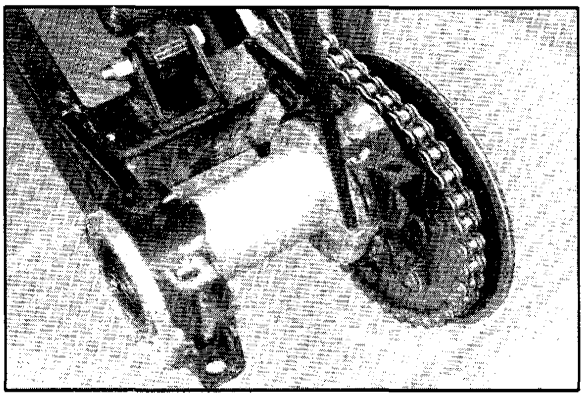


Rear Eccentric Installation

1. Slide eccentric housing into swingarm with short side toward the sprocket. The alignment tabs on eccentric must align with slots in eccentric clamp.

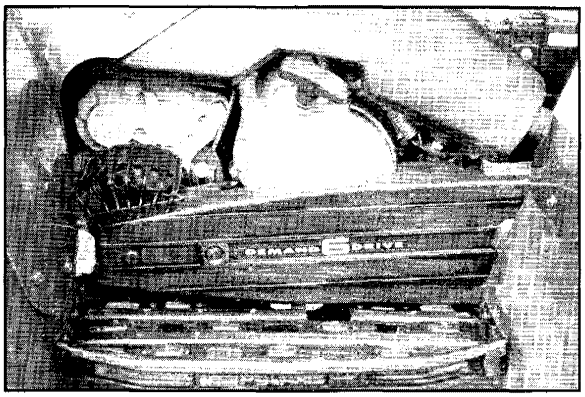


2. Turn the eccentric 1/2 turn clockwise, as viewed from left side of machine.
3. Install clamp bolts and tighten nuts until snug (do not tighten at this time).
4. Refer to axle installation on page 7.26 to install axle.
5. Refer to chain adjustment in Maintenance section to adjust rear drive chain.

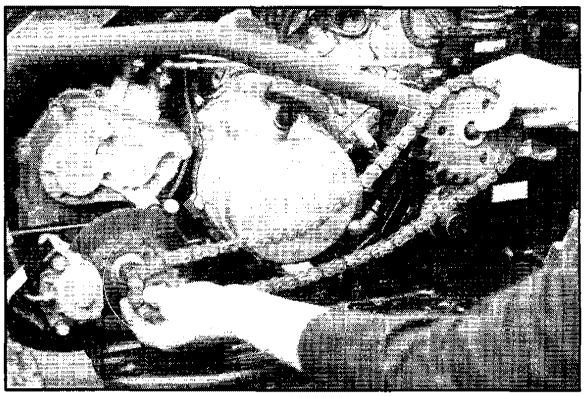


Center Eccentric Removal

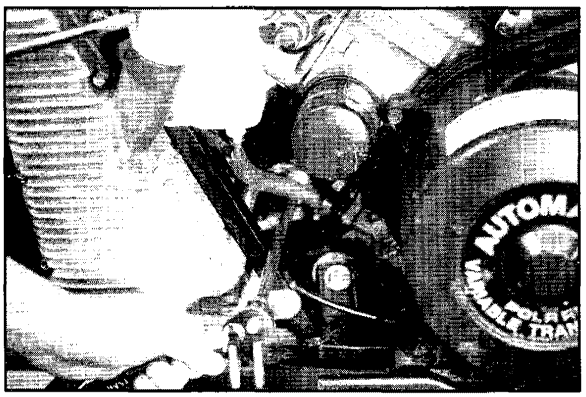
1. Remove cab screws at front and rear of right side foot rest.
2. Remove chain guard.



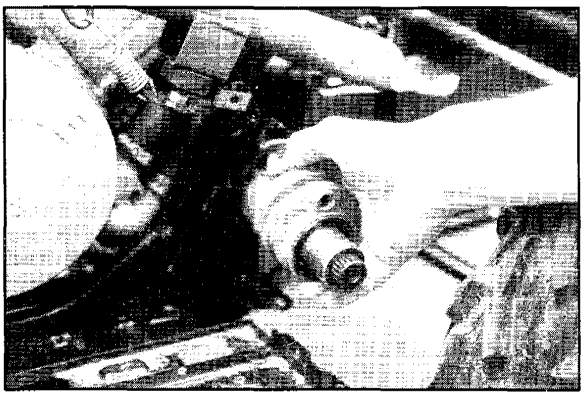
3. Remove chain and sprockets from center drive as an assembly. **NOTE:** Loosen center eccentric inner sprocket bolt before removing center drive chain.



4. Remove center eccentric inner sprocket from center eccentric.



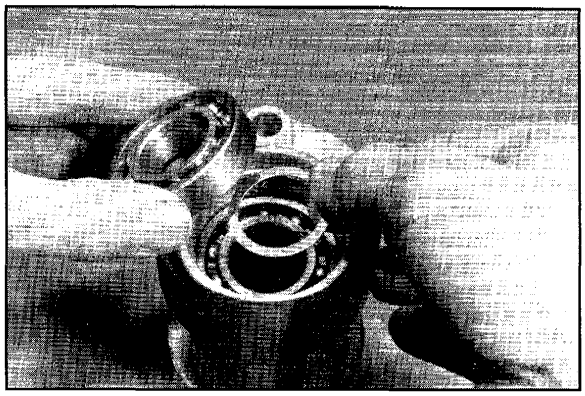
5. Remove center eccentric bolts and eccentric assembly out right side of frame.



Center Eccentric Disassembly

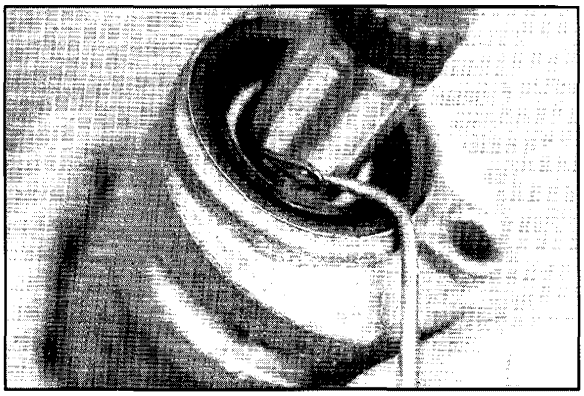
NOTE: AWD units in 1996 were built with both two bearing and four bearing center eccentrics. Disassembly procedure is basically the same for both types. Note the placement of a spacer washer between bearings on the four bearing models.

1. Remove spacers from each end.
2. Remove O-ring on both ends of shaft.



NOTE: Bearings should be replaced if removed.

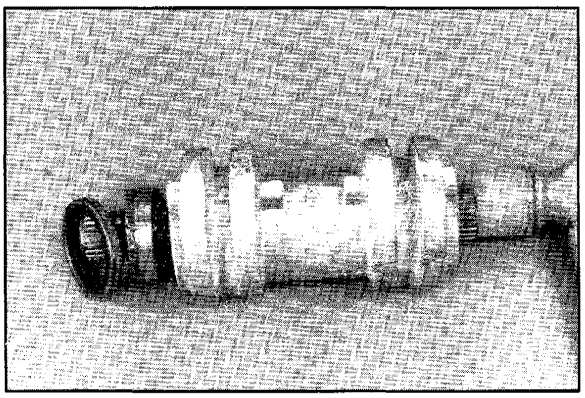
3. Drive shaft, bearings, and seals out with a soft face hammer. Note direction of seal with lip facing outward.
4. Remove bearing from shaft and use shaft to drive bearing and seal out other end.
5. Clean shaft and housing thoroughly.



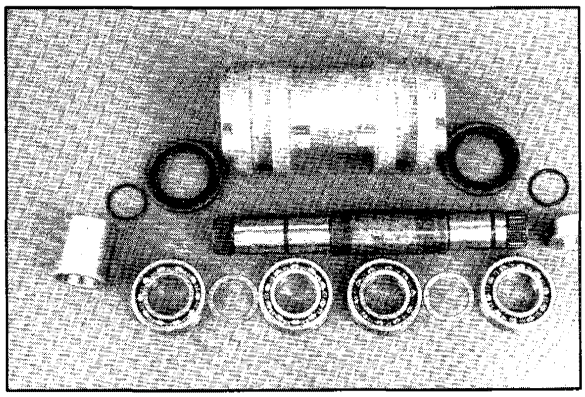
Center Eccentric Assembly

NOTE: AWD units in 1996 were built with both two bearing and four bearing center eccentrics. Although two bearing assembly is shown, assembly procedure is the basically the same for four bearing types with the exception of placing the spacer washer between bearings on the four bearing models.

1. Place new bearings in a freezer for ten minutes before installation. Warm eccentric housing evenly to ease bearing installation. Install bearing until outer race bottoms in housing.

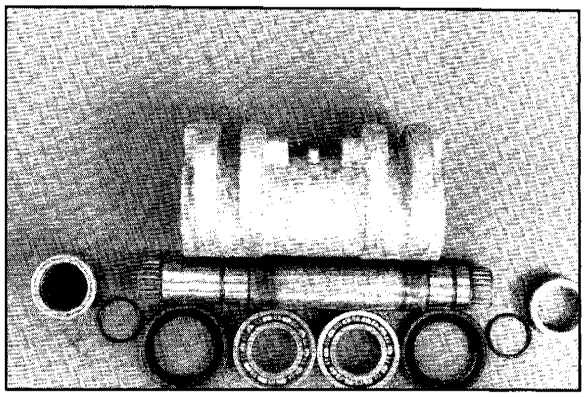


2. On four bearing housings install only the inner bearing at this time.

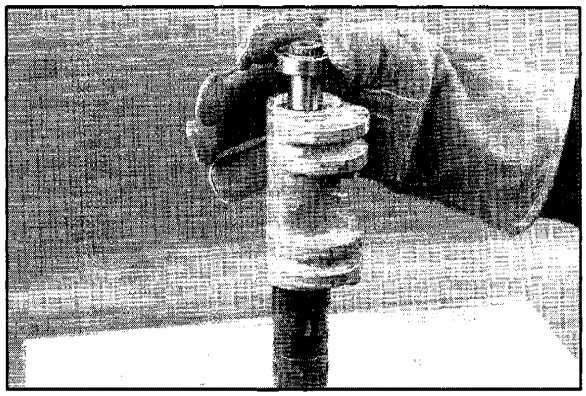


Center Eccentric Assembly

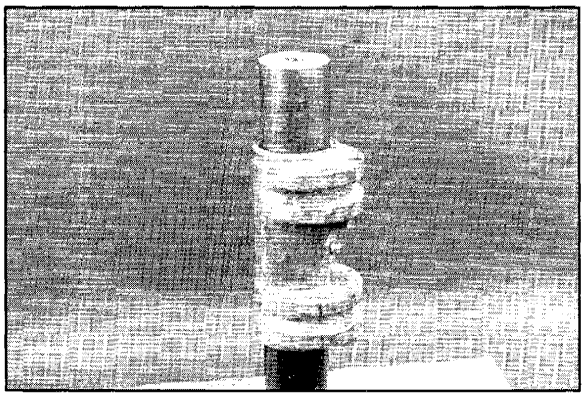
3. Install short end of shaft into bearing housing until shaft bottoms on inner race of bearing.



4. Support bearing in housing with bearing installation tool PN 2870676 or similar tool that supports outer race of bearing.



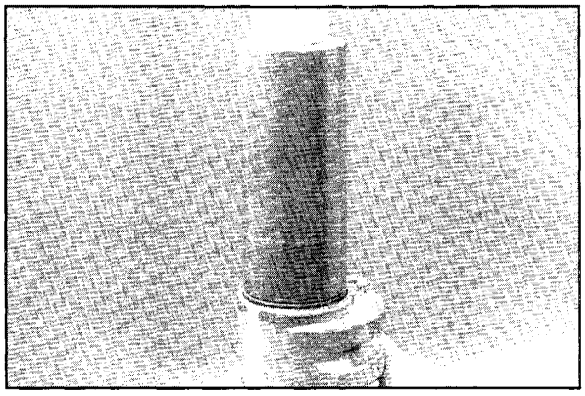
5. Install other bearing using Magnum PTO end crankshaft installation tool. Seat bearings completely.



6. Install both end seals using seal and bearing installation tool. **NOTE:** Do not support assembly by housing. Support outer race of bearing, otherwise seals and bearings may not be fully seated.

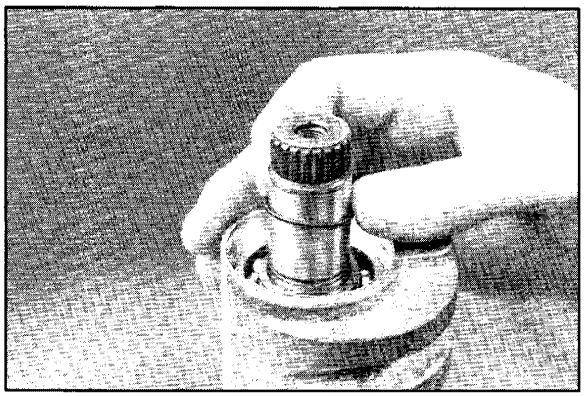
Seal and Bearing Installation Tool

PN 2871282



Center Eccentric Assembly, Cont.

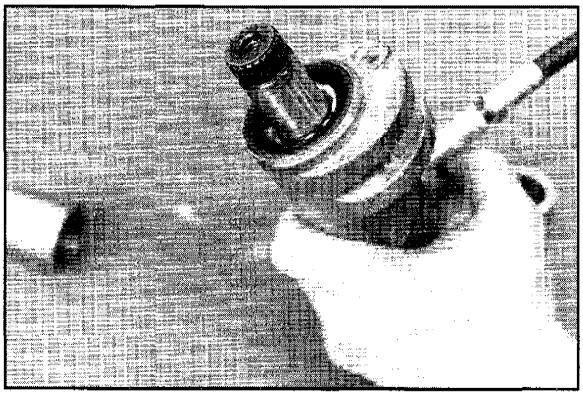
7. Lubricate and install new O-rings in grooves on both ends of shaft.



8. Grease housing until grease begins to flow through bearings and into seal area.

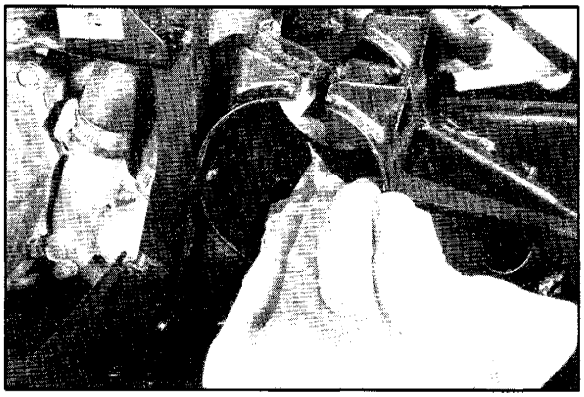
9. Install spacers in each end large chamfer inward.

NOTE: Install long spacer on long splined end of shaft.



Center Eccentric Installation

1. Thoroughly clean eccentric housing surface and clamp housing with alcohol or lacquer thinner to remove any grease or dirt.



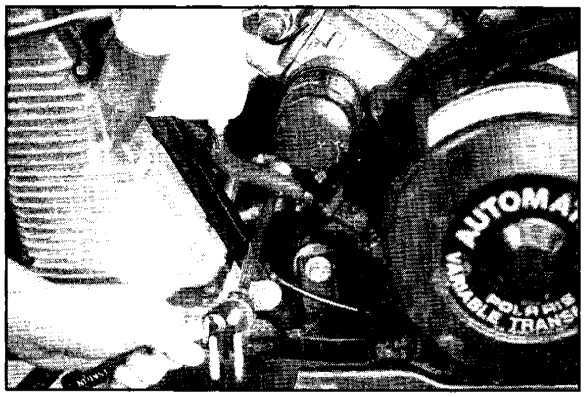
2. Install eccentric housing with long end of shaft facing right side of machine as shown.

NOTE:*Do not* tap or press on eccentric shaft to install assembly in frame. This may force seal out of housing and cause premature bearing failure.

3. Loosen front eccentric pinch bolt and rotate front eccentric to loosen front drive chain.

Center Eccentric Installation Cont.

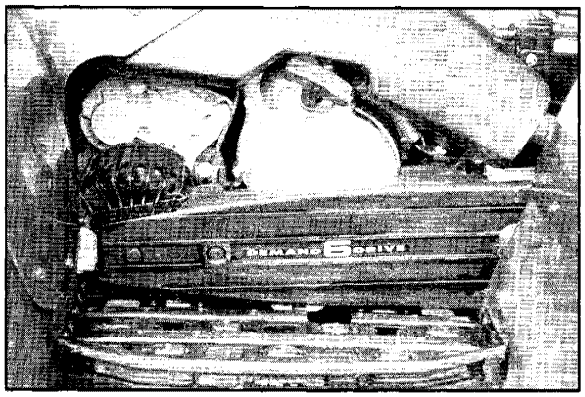
4. Install front drive chain sprocket on center eccentric shaft. Using blue Loctite™ 242 install and hand tighten bolt.
5. With center eccentric turned to loose setting, install center drive chain and sprockets. Using blue Loctite™ 242 install center sprocket bolt and torque both sprocket bolts to specification.



Center Eccentric Sprocket bolt torque
30 ft. lbs. (4.14 kg-m)

Center Eccentric Pinch Bolt Torque
45 ft. lbs. (6.22 kg-m)

6. Adjust center eccentric to achieve 1/4-1/2″ (6.35-12.70mm) deflection at center of drive chain when an 18 lb. force is applied to the chain (see Maintenance section for adjustment procedure).
7. Tighten and torque center eccentric pinch bolts evenly and re-check adjustment.
8. Adjust the front eccentric to achieve 1/4-1/2″ (6.35-12.70mm) deflection at center of drive chain when an 18 lb. force is applied to the chain (see Maintenance section for adjustment procedure).
9. Torque the front eccentric pinch bolt and re-check adjustment.

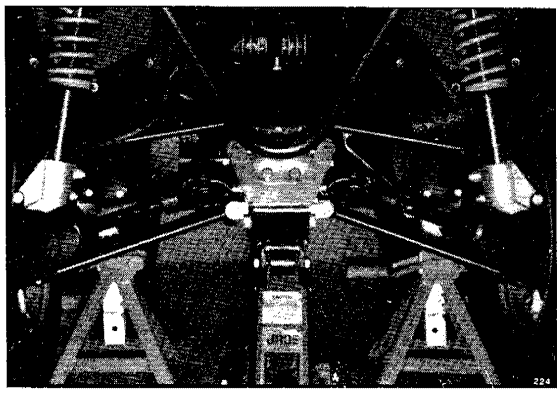


Front Eccentric Pinch Bolt Torque
45 ft. lbs. (6.22 kg-m)

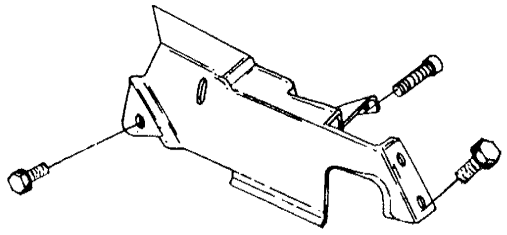
10. Install chain guard and reattach mudflaps.

Front Eccentric Removal

1. Carefully lift and support front end of machine as shown.

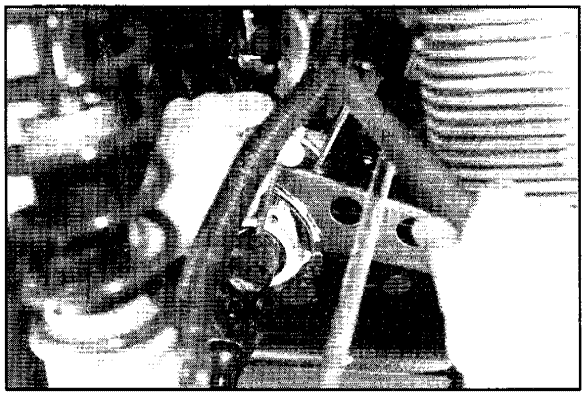


2. Remove front chain guard.

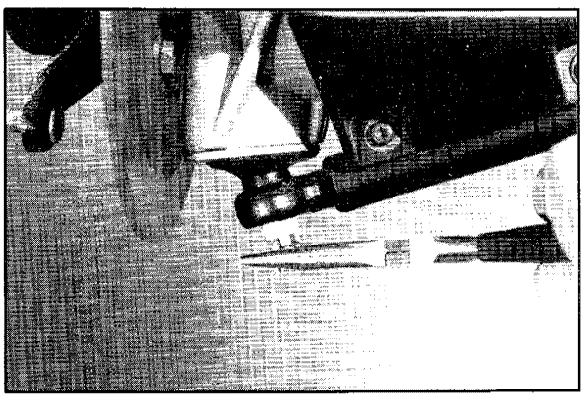


Remove 3 bolts holding cover in place

3. Remove cotter pin, lower ball joint nut and A-arm from ball joint.



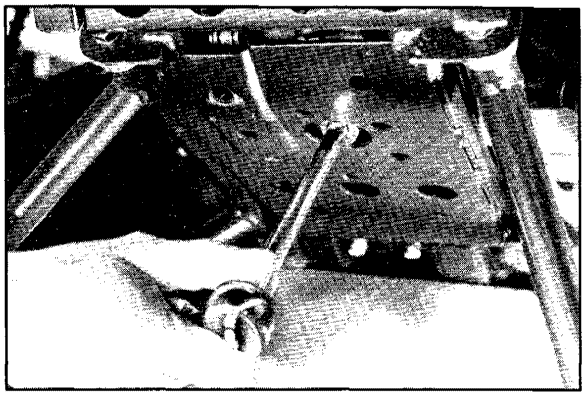
4. Drive roll pin from both front drive shafts.
NOTE: There are wave washers located between drive axle and spacer on left side, and between drive axle and sprocket on right side.



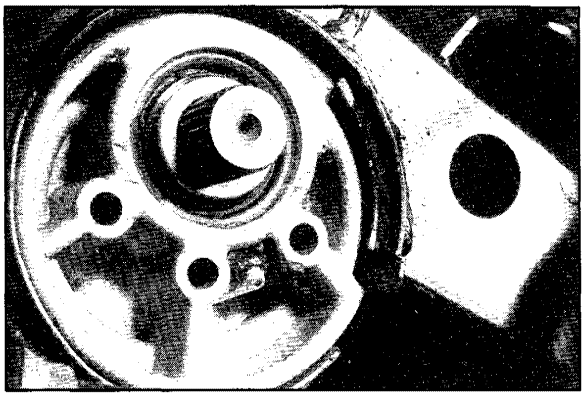
Front Eccentric Removal

5. Remove front eccentric pinch bolt.

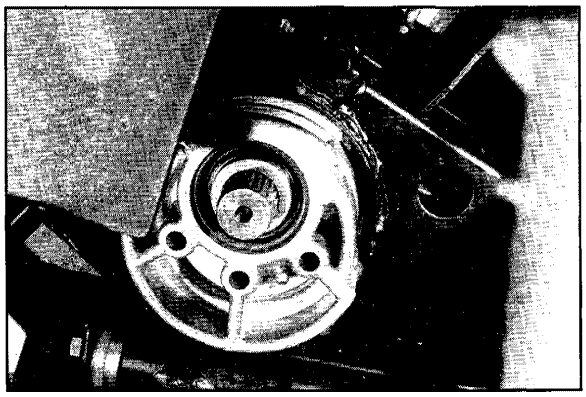
6. Pull black plastic spacer out left hand side of eccentric housing.



7. Rotate front eccentric assembly until opening in eccentric casting aligns with stop bracket.

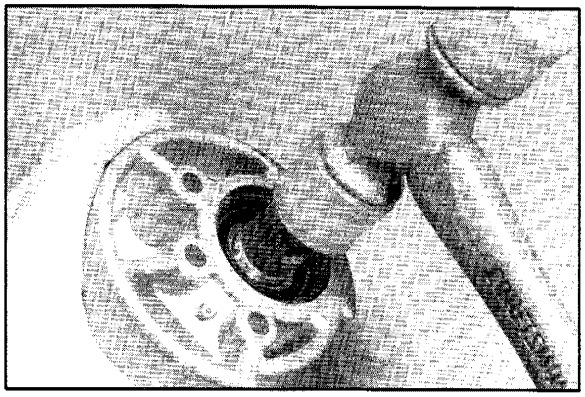


8. Remove eccentric out of left side of frame.

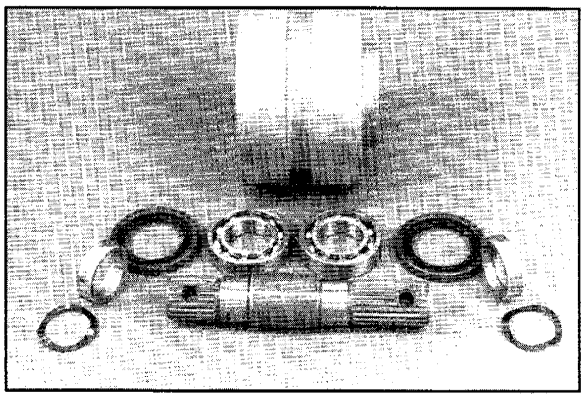


Front Eccentric Disassembly

1. Remove spacers and O-rings from both sides.
2. Using a soft face hammer tap seal and bearing out other side.
3. Remove bearing from shaft and use eccentric shaft to remove bearing and seal out opposite side.
4. Clean all parts and rotate each bearing by hand to check for smooth rotation. Visually inspect bearing for moisture, dirt, or corrosion, and replace if required.



5. Inspect shaft for wear in bearing area.

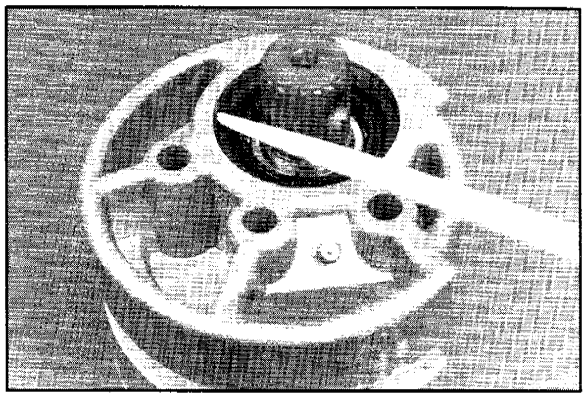


Front Eccentric Assembly

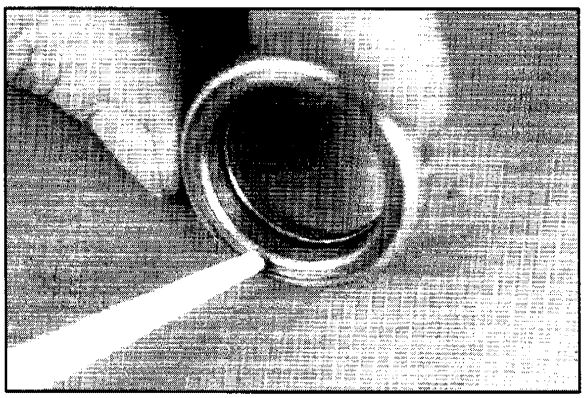
1. Heat eccentric housing around left side bearing area (grease fitting side).
2. Install bearing until outer race is fully seated in left side of eccentric housing (grease fitting side).

Front Eccentric Assembly

3. Support bearing on inner race, and turn over.
4. Install short splined end of shaft in eccentric housing until shaft is firmly seated on inner race of left hand bearing.
5. Install right hand bearing until inner race is fully seated on shaft.
6. Install seals in both sides of eccentric with seal lip facing outward.
   NOTE: Seals should be installed to a depth of 1/8″ (3.17mm) past end of eccentric housing.
7. Grease eccentric housing until grease appears at both end seals.
8. Lubricate and install new O-rings on both sides.

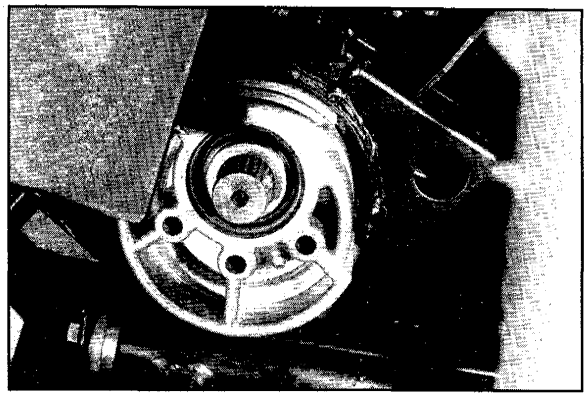


9. Install spacers with large chamfer toward O-rings as shown.



Front Eccentric Installation

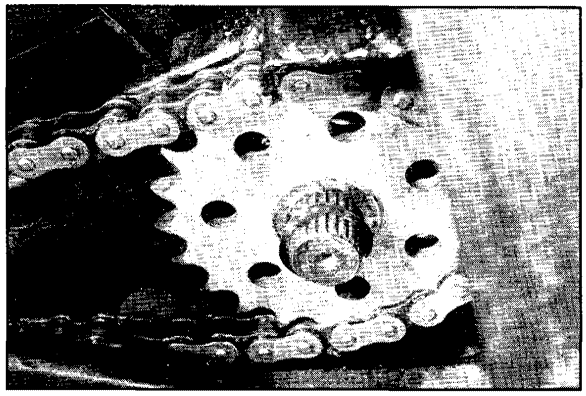
1. Align slot in eccentric assembly with tab on frame and slide eccentric assembly into frame with long splines to right of machine (grease fitting facing left side of machine).



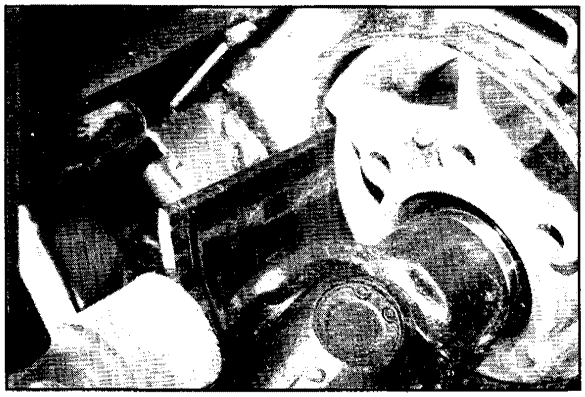
NOTE: Install the sprocket and chain as an assembly at same time.

NOTE: *Do not* tap or press on eccentric shaft to install assembly in frame. This may force seal out of housing and cause premature bearing failure.

2. Rotate eccentric assembly until chain begins to tighten.

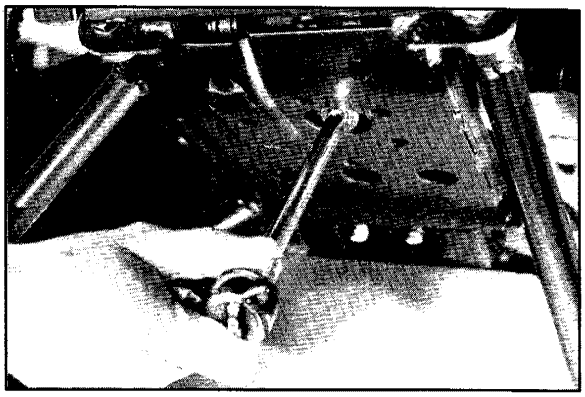


3. Install plastic spacer.



Front Eccentric Installation

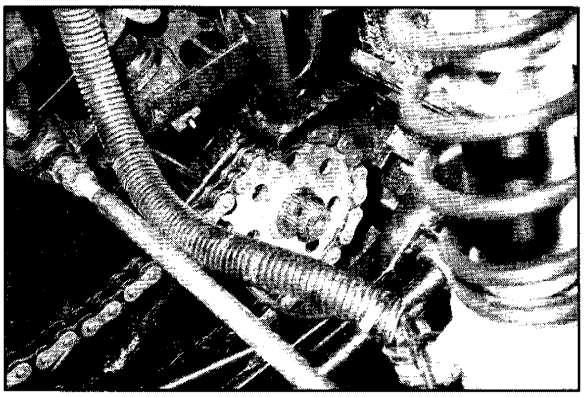
4. Install pinch bolt and lightly tighten to hold eccentric in place.



5. Set chain tension and torque pinch bolt to 50 ft. lbs.

Front Eccentric Pinch Bolt Torque
50 ft. lbs (6.9kg-m)

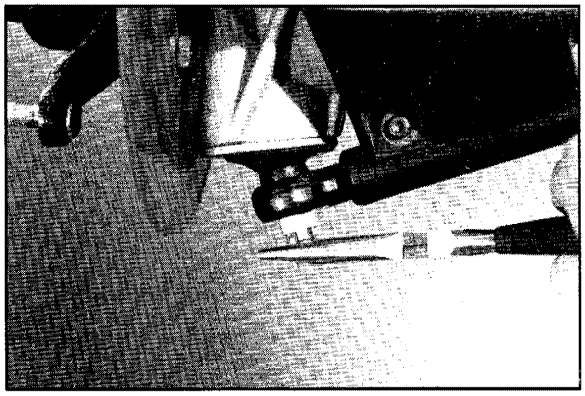
6. Install spring washers and both drive shafts. Align hole in U-joint yoke with hole in eccentric shaft, and install new roll pin.



7. Install lower ball joint, torque nut to specification and install new cotter pin. Install wheels and torque wheel nuts to specification.

Lower Ball Joint Nut Torque
25 ft. lbs. (3.45 kg-m)

Wheel Nut Torque
15 ft. lbs. (2.07 kg-m)



FINAL DRIVE
Front Gearcase
Front Gearcase Removal

NOTE: The front gearcase input (pinion) shaft seal can be replaced without removing gearcase from frame.

1. Remove prop shaft (see below)
2. Loosen pinion shaft nut set screws, top and bottom. See page 7.50.
3. Remove gearcase front cover.
4. Note depth to which seal is installed and pry out old seal.
5. Install new seal to depth of old.
6. Install front cover and torque to specification. It is not necessary to re-set backlash unless RH side cover of front gear case is removed.

Front Cover Bolt Torque-

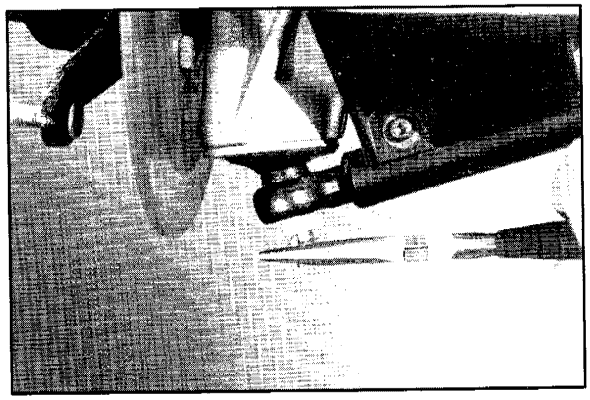
20 ft. lbs. (2.76 kg-m)

Front Gearcase Removal

1. Stop engine, place machine in gear and set parking brake.
2. Loosen front wheel nuts slightly.
3. Elevate and support machine under footrest/frame area.

CAUTION: Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure. Wear eye protection when removing and installing bearings and seals.

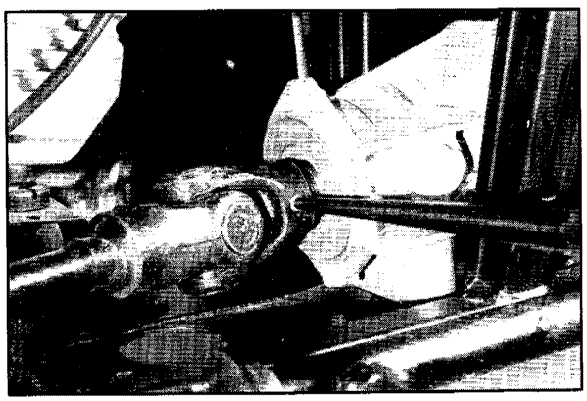
4. Remove wheel nuts and wheels.
5. Remove cotter pin, lower ball joint nut and A-arm from ball joint.



Prop Shaft Removal

6. Using a drift punch, remove the roll pin from prop shaft at rear of gearcase. Slide prop shaft back and away from front gearcase. Pull sharply forward to remove from transmission shaft.

NOTE: If removing front gearcase, use a drift punch to remove the roll pins from both front drive axles.

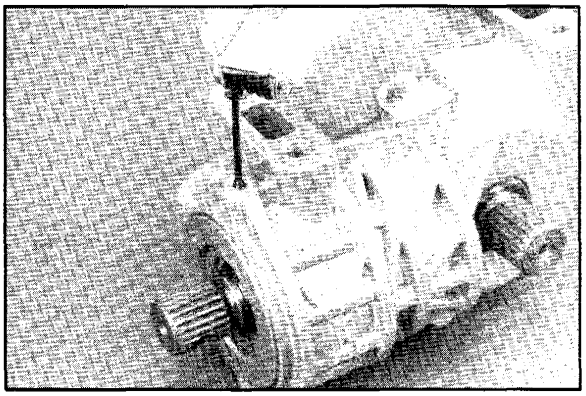


Front Gearcase Removal

7. Remove all bottom bolts securing gearcase to frame. Remove vent line, and remove gearcase out right side of frame.

Front Gearcase Disassembly

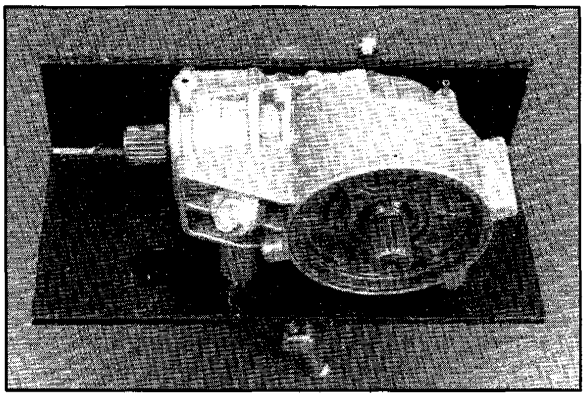
1. Drain and properly dispose of used gearcase oil. Loosen both Allen set screws on input side of gearcase.



2. Mount gearcase to front gearcase holding fixture as shown.

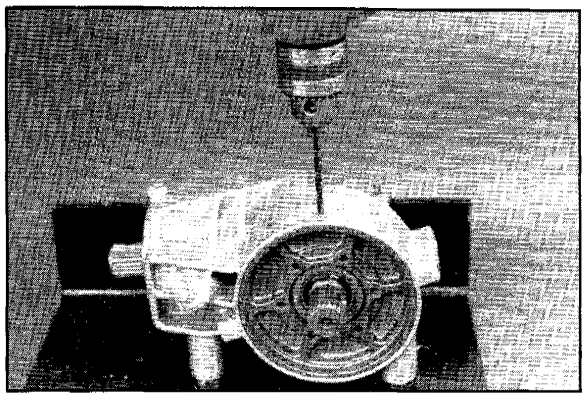
Front Gearcase Holding Fixture

PN 2871696



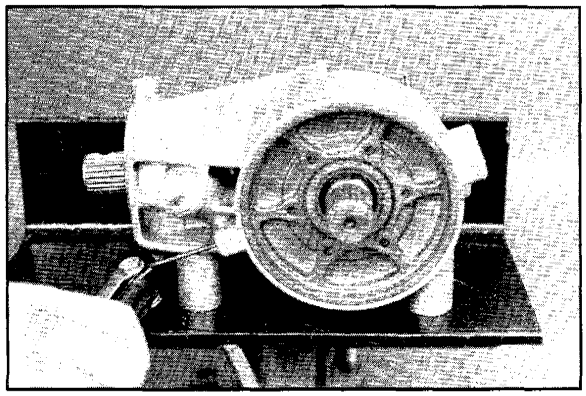
Front Gearcase Disassembly

7. Using an 1/8" drill bit, remove rivet securing side cover to front gearcase.



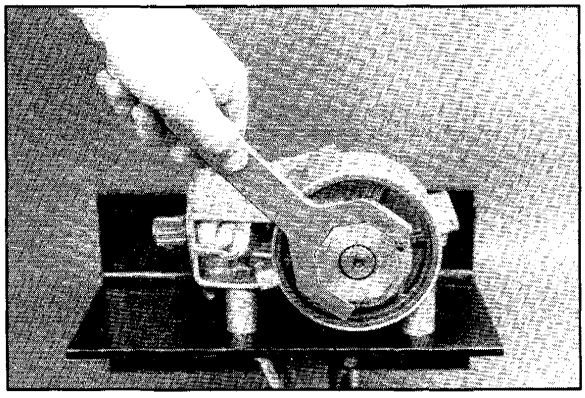
8. Loosen both Allen screws securing side cover to front gearcase (1996 models only).

NOTE: There are no Allen screws on output cover on 1997 front gearcase.



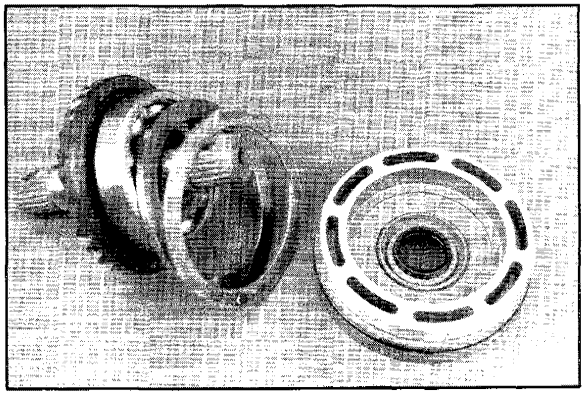
9. Install spanner tool on side cover. Use 2 1/8" wrench on spanner tool to remove side cover. Turn cover counterclockwise as viewed from the right side (standard threads).

Front Gear Case Service Tools	
Spanner Socket	PN 2871693
Spanner Wrench	PN 2871701



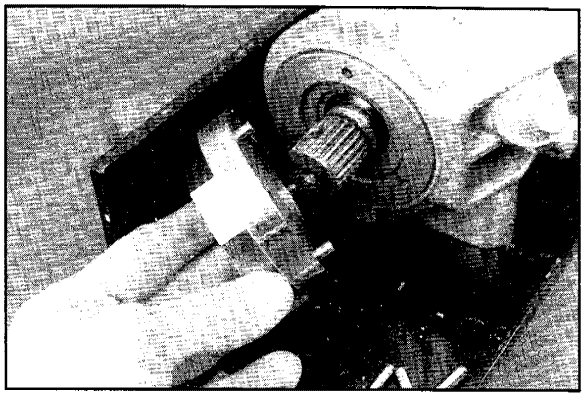
10. Remove cover, thrust washer, steel spacer, ring gear assembly and shaft. Clean all parts and inspect spacers for wear. Inspect ring gear for chipped, broken, or missing teeth.

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.



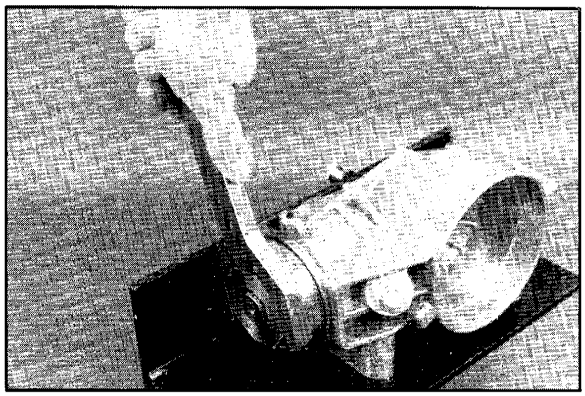
Front Gearcase Disassembly

7. Some gearcases may have a pinion shaft retainer with three holes. It will be necessary to remove three drive pins on spanner tool to match these covers.



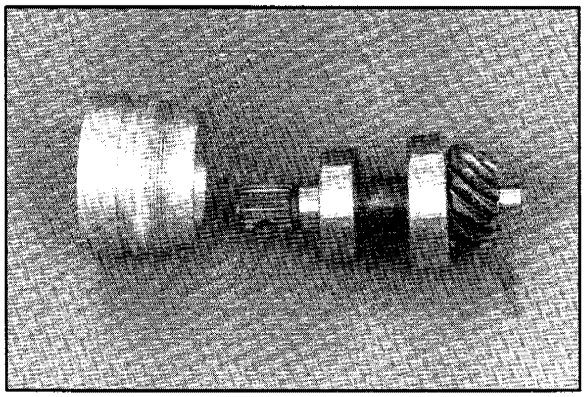
8. Install spanner tool on pinion shaft retainer. Use 2-1/8″ wrench and turn spanner socket counter clockwise (as viewed from end of pinion shaft) to remove retainer.

Spanner Socket	**PN 2871693**
Spanner Wrench	**PN 2871701**



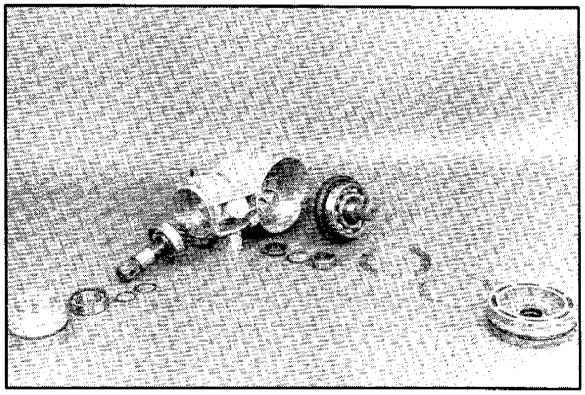
9. Remove pinion shaft assembly. Inspect pinion gear for chipped broken or missing teeth. Remove cover, brass spacer, steel spacer, ring gear assembly and shaft. Clean all parts and inspect spacers for wear. Inspect ring gear for chipped, broken, or missing teeth.

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.

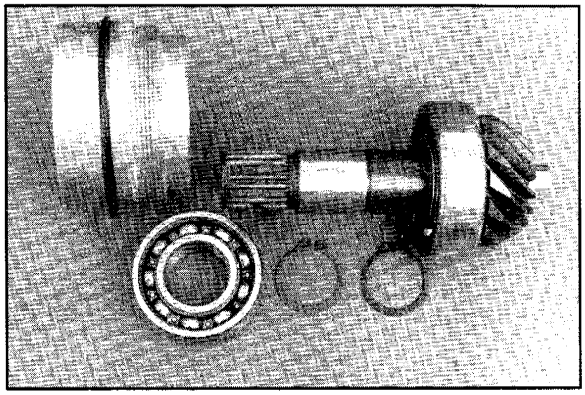


Front Gearcase Assembly

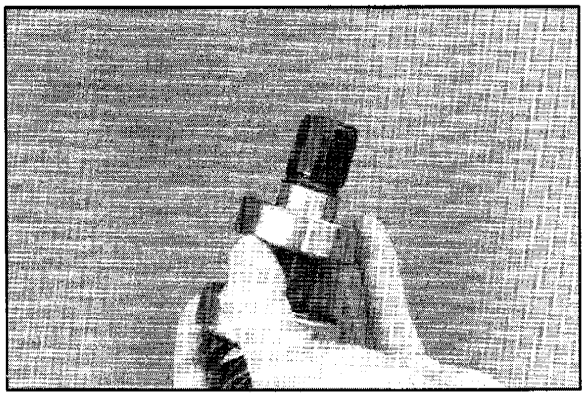
1. Replace all O-rings, seals, and worn components.



2. Install needle bearing, snap ring, and left side seal.

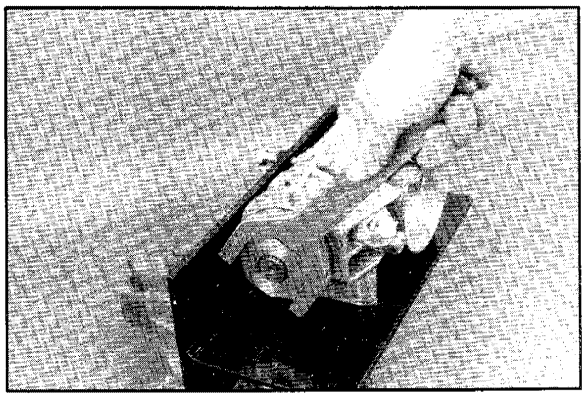


3. Press bearing on pinion shaft, install both snap rings, and slide outer bearing into place.
NOTE: Thoroughly lubricate cover O-ring and cover threads before installation.



Shaft Retainer Nut Torque
20 ft. lbs. (2.76 kg-m)

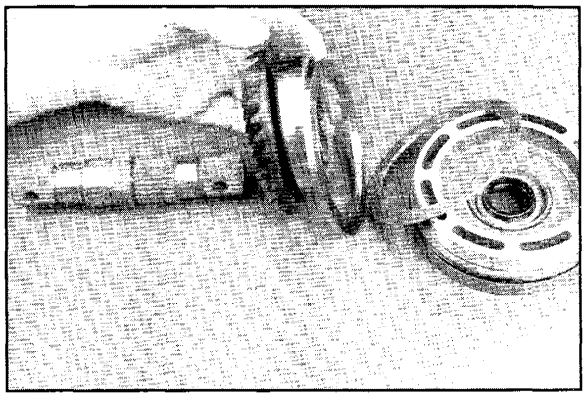
4. Install pinion shaft assembly in case and tap lightly to seat. Grease O-ring on pinion shaft retainer nut and install. Tighten nut securely (see specification above) until all end play is removed from pinion shaft. Tighten top set screw.



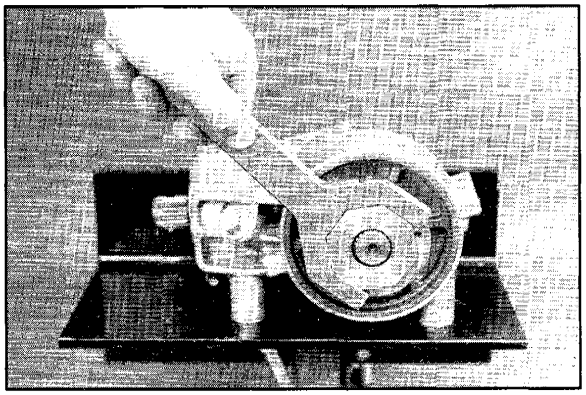
NOTE: For proper back lash measurement, both ring gear and pinion gear should be free of oil and grease when installed. Do not install seal in pinion shaft retainer nut until backlash is properly set.

Front Gearcase Assembly

5. Install ring gear assembly, steel spacer, brass spacer and side cover. Make sure lock bolt on holding fixture is backed out of the way. Rotate pinion shaft while slowly turning side cover inward until gears mesh. As gear backlash is reduced to zero, the shaft will begin to bind. At this point back off 1/4 turn.

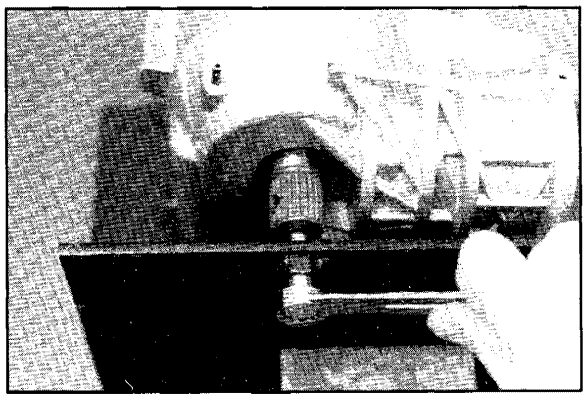


6. Tighten locking bolt on holding fixture against drive shaft until shaft is held securely and will not rotate. This will also force ring gear against cover to maximize backlash.



7. Install backlash tool on pinion shaft as shown. Position dial indicator 1.875″ (47.63mm) from center line of shaft which is indicated by first mark on tool. Be sure dial indicator shaft is perpendicular to surface of tool. If dial indicator is placed any other distance or angle, backlash measurement will be inaccurate.

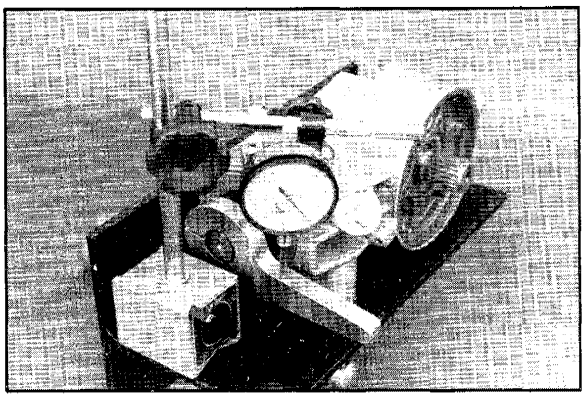
Backlash Tool PN 2871695



8. Rotate pinion shaft back and forth to read total dial indicator movement. Backlash must be between .004″-.007″ total movement.

NOTE: When changing backlash:

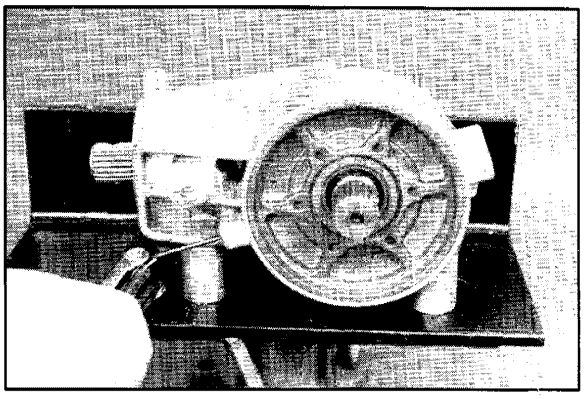
- To reduce backlash loosen lock bolt securing output shaft and rotate side cover clockwise as viewed from cover side.
- To increase backlash loosen lock bolt securing output shaft and rotate side cover counterclockwise as viewed from cover side.
- Be sure to tighten the lock bolt against shaft when rechecking backlash.
- When backlash is properly set, rotate output shaft 180° and verify proper backlash at this point on the ring gear.



Front Gearcase Assembly

11. Install pinion shaft seal, and both output shaft seals. Electrical tape can be applied to all shafts to protect seals during installation.

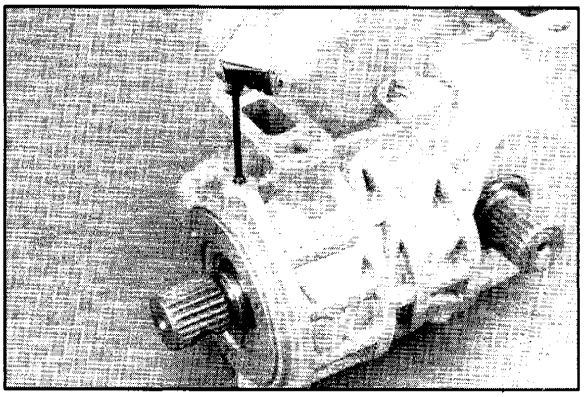
12. On 1996 models, tighten both set screws and install 1/8″ steel rivet. On 1997 models, secure cover with rivet.



CAUTION:

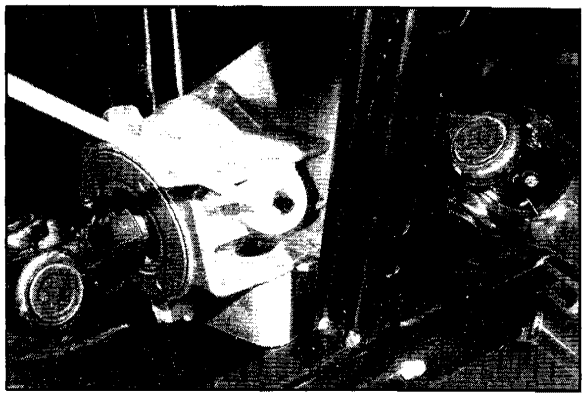
Do not overtighten set screw (if so equipped) or cover damage will result.

13. On 1996 models, remove front gearcase from holding fixture and tighten bottom pinion shaft retaining nut set screw.



Front Gearcase Installation

1. To install gearcase reverse removal procedure. Use new roll pins in drive shafts.
2. Add Polaris Premium Front Gearcase Lubricant or GL5 80-90 (non-hypoid) to front gearcase. Fill to bottom of fill hole threads. Check drain plug for proper torque.



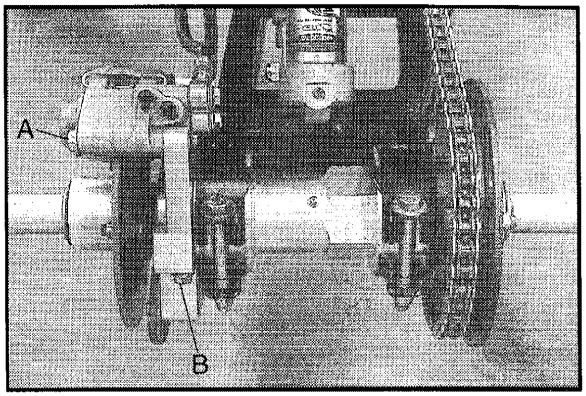
Premium Front Gearcase Fluid
PN 2871653 (12 oz.)
or
GL5 80-90 Gear Lubricant (non-hypoid)

Front Gearcase Capacity
120cc (4.0 fl. oz.)

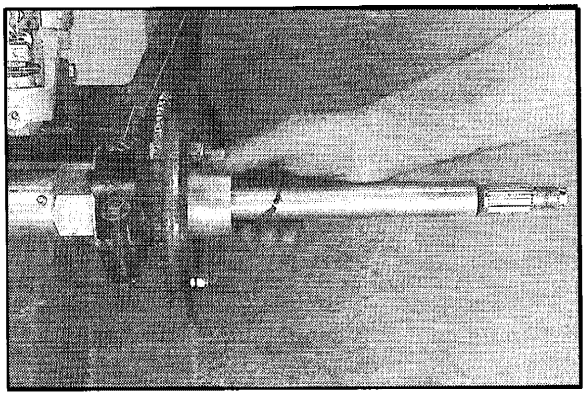
Concentric Swingarm Rear Axle Removal

1. Refer to exploded view on page 7.55. Securely support rear of machine with rear wheels off the floor. Remove rear wheels and hubs.

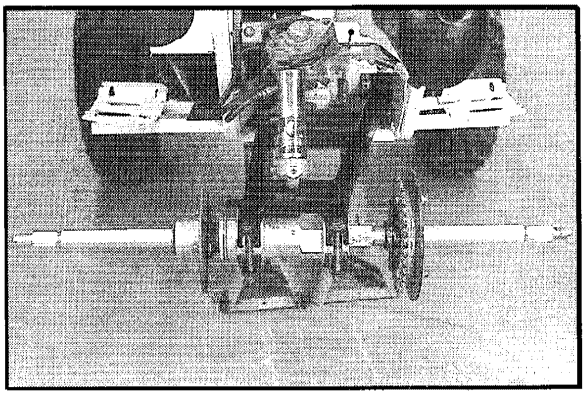
2. Remove drive chain, rear brake caliper (A), and caliper bracket (B). Secure caliper to rear shock with wire or tie strap. Do not hang caliper by brake line.



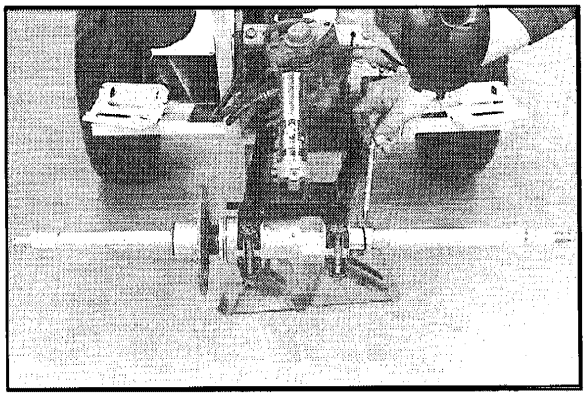
3. Remove snap ring (C) and pull back the lock sleeve (D) from right side of axle.



4. Remove sprocket hub assembly from right side of axle.

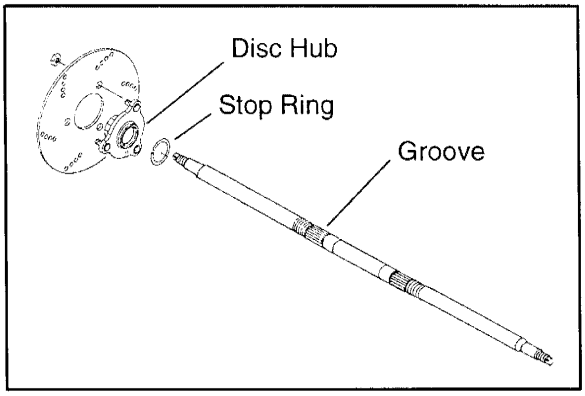


5. Note sealing O-ring on axle. Remove axle assembly from left side of eccentric housing.

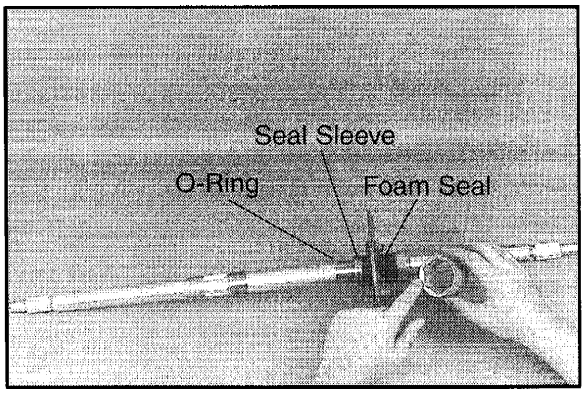


Concentric Swingarm Rear Axle Assembly

1. (Refer to exploded view on page 7.55). Install stop ring in groove on left side of axle.

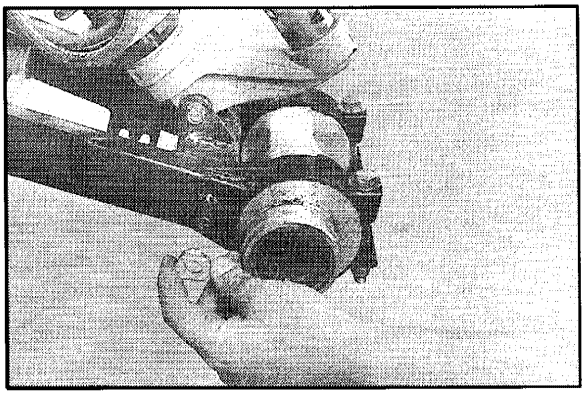


2. Install disc hub assembly on axle. Place axle in a soft jawed vise. Apply Loctite 262 to threads, install left axle nut and tighten to 120 ft. lbs. Install foam seal and axle nut lock sleeve with taper toward nut as shown. Install snap ring to retain the lock sleeve. Slide disc hub seal sleeve and then a new O-ring onto the axle.

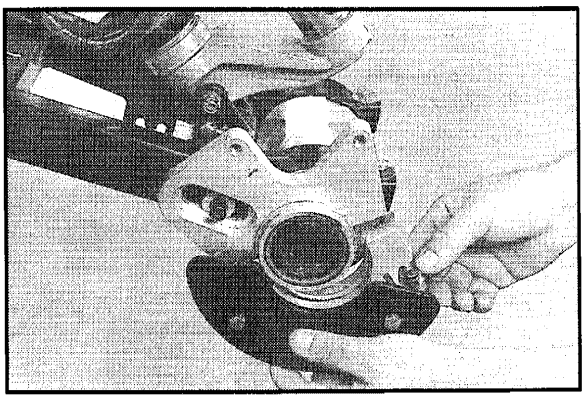


Concentric Swingarm Rear Axle Installation

1. Place brake caliper pivot bushing on stud with flange inward as shown.

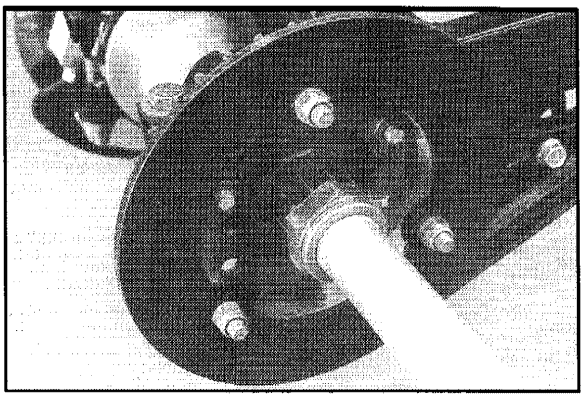


2. Loosely assemble upper and lower brake caliper mount. Do not tighten at this time.

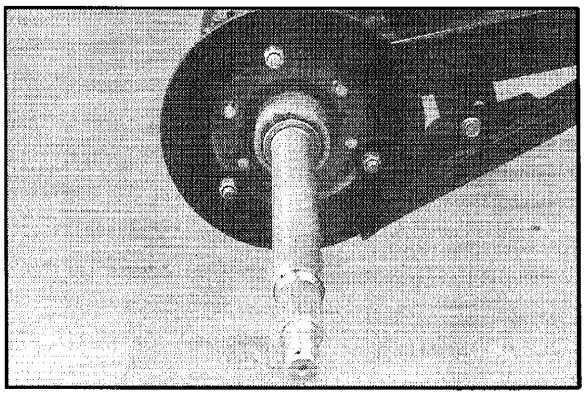


Concentric Swingarm Rear Axle Installation, Cont.

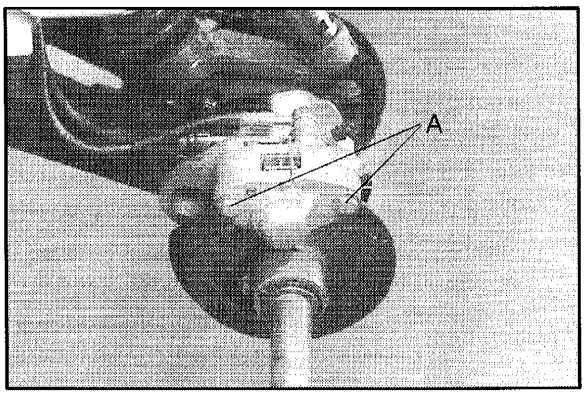
3. Lubricate seal sleeve and O-ring and install axle from left to right.
4. Lubricate and install a new O-ring on right side of axle. Slide O-ring against RH axle bearing. Apply grease to sealing area on inside of sprocket hub and slide sprocket hub assembly onto right side of axle. Seat the hub against O-ring and bearing.
5. Apply Loctite™ 262 to threads of right side axle nut and install nut. Tighten nut with wrench to approximately 8-10 ft. lbs. (1.10-1.38 kg-m). Axle must rotate smoothly without binding. If axle binds the nut is too tight. If axle movement (up and down or side to side) is detected, axle is too loose.



6. Install foam seal and slide lock sleeve onto hub and install lock sleeve with taper inward. Install snap ring.

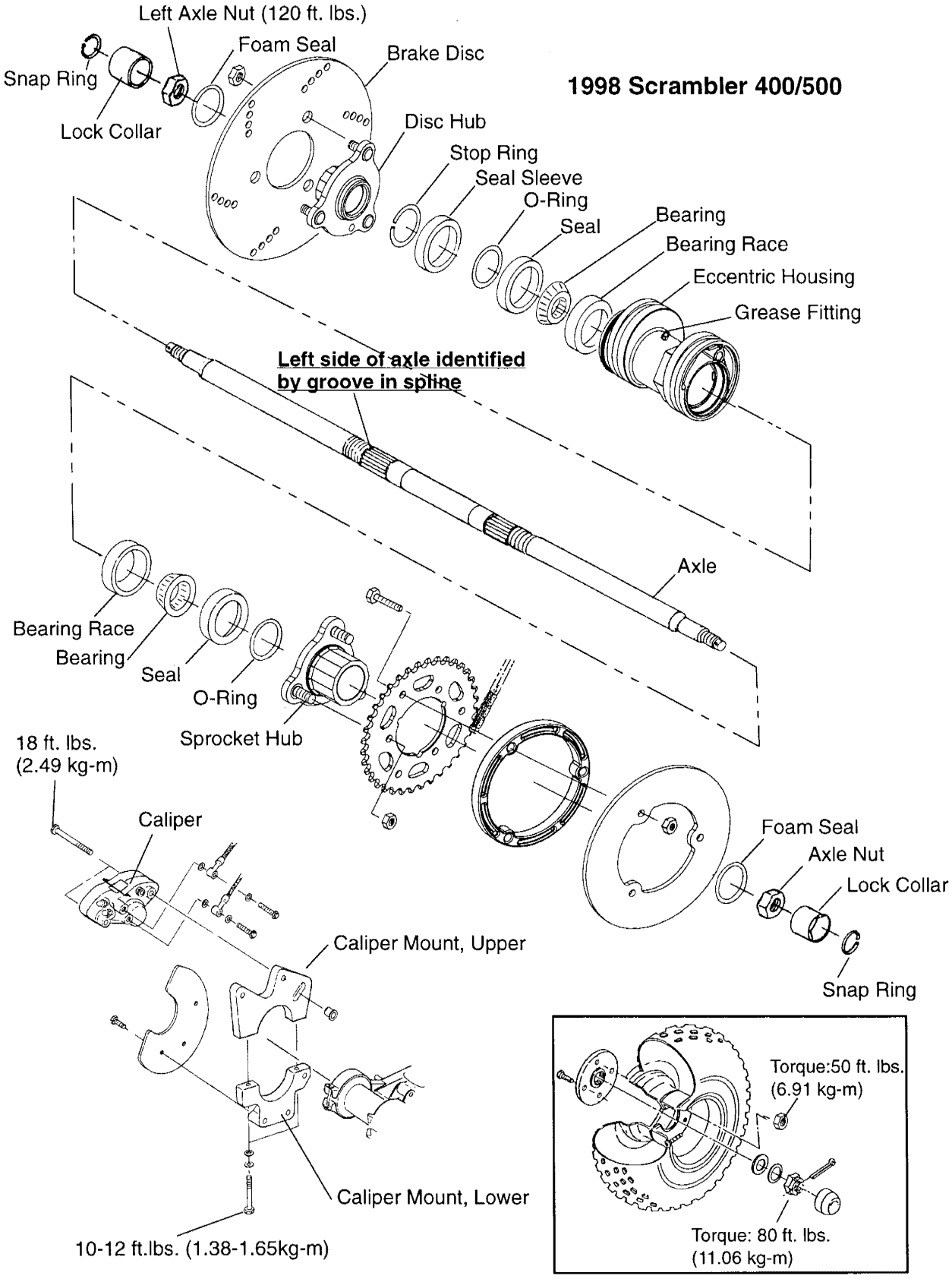


7. Install brake caliper and drive chain. Torque brake caliper mounting bolts (A) to 18 ft. lbs.
8. Install rear wheel hubs. Torque center hub nut to 80 ft. lbs. and install a new cotter pin. Torque wheel nuts to 50 ft. lbs.



9. Adjust drive chain (refer to Maintenance Chapter 2 for procedure). Torque eccentric pinch bolts (B) to 60 ft. lbs.
10. Torque lower caliper bracket bolts to 10-12 ft. lbs.
11. Lubricate eccentric housing grease fitting with Polaris Premium All Season Grease.

Concentric Swingarm Rear Axle Assembly, Exploded View



CHAPTER 8
TRANSMISSION SERVICE

Torque Specifications

Transmission Case Bolts	12 ft. lbs. (1.66 kg-m)
Bell Crank Nut	12 ft. lbs. (1.66 kg-m)
Transmission Drain Plug	14 ft. lbs. (1.93 kg-m)
Speedometer Angle Drive	11 ft. lbs. (1.52 kg-m)
Transmission Mounting Bolts	25 ft. lbs. (3.45 kg-m)
Drive Sprocket Bolt	17 ft. lbs. (2.35 kg-m)
Output Shaft Bearing Mounting Nuts	12 ft. lbs. (1.66 kg-m)
Swing Arm Pivot Bolts (Std)	55 ft. lbs. (7.59 kg-m)
Swing Arm Pivot Bolts (Concentric Swingarm 1998 Scrambler 400/500)	150 ft. lbs. (20.75 kg-m)

Lubrication

Item	Type	Capacity	Notes
HLR	Premium Synthetic Chaincase Lube	20 fl. oz	Dipstick
HR	Premium Synthetic Chaincase Lube	16 fl. oz.	Dipstick
Shaft Drive	Premium Synthetic Chaincase Lube	32 fl. oz.[1]	Dipstick
Chain/Shaft Drive	Premium Synthetic Chaincase Lube	32 fl. oz.	Fill to bottom of fill hole threads.
Front Gearcase	GL5 80-90 gear lube.	4.0 fl. oz.	Fill to bottom of fill hole threads.
Shift Selector	0W40 Synthetic or 10W Non-Detergent		Fill selector box to the middle of shift selector slide. Do not overfill. Shift slides may hydro-lock.

1 Capacity after draining is approximately 20-24 ounces. 32 ounces when disassembled and completely dry.

TRANSMISSION SERVICE
Gear Ratios

Polaris ATVs have utilized different transmissions in various models. To assist with identification and repair procedures, use the following guide.

NOTE: When ordering replacement parts, always reference the applicable parts manual by model number.

1996 Models	Model #	Part No.	Type	Gear Ranges*
Trail Blazer	W967827	1341161	Type III	HR
Trail Boss	W968527	1341151	Type III	HR
Xpress 300	W969530	1341147	Type III	HLR
Xplorer 300	W969130	1341146	Type III	HLR
Sport	W968540	1341174	Type III	HR
Scrambler 4x4	W967840	1341167	Type III	HR
Xpress 400	W969540	1341158	Type III	HLR
Xplorer 400L	W969140	1341157	Type III	HLR
Sportsman 4x4	W968040	1341157	Type III	HLR
400 6X6	W968740	1341157	Type III	HLR
Magnum 2x4	W967544	1341185	Type III	HLR
Magnum 4x4	W968144	1341184	Type III	HLR
Magnum 6x6	W968744	1341184	Type III	HLR
Sportsman 500	W969244	1341189	Type IV	HLR Shaft Drive

*HR = High/Reverse

*HLR = High/Low/ Reverse

Type 3 - Gear/Chain USA (EZ Shift)

1997 Models	Model #	Part No.	Type	Gear Ranges*
Trail Blazer	W97BA25C	1341161	Type III	HR
Trail Boss	W97AA25C	1341151	Type III	HR
Xpress 300	W97CA28C	1341147	Type III	HLR
Xplorer 300	W97CC28C	1341146	Type III	HLR
Sport	W97BA38C	1341174	Type III	HR
Scrambler 400	W97BC38C	1341167	Type III	HR
Xpress 400	W97CA38C	1341158	Type III	HLR
Xplorer 400L	W97CC38C	1341157	Type III	HLR
Sportsman 400	W97AC38C	1341157	Type III	HLR
400 6X6	W97AE38A	1341157	Type III	HLR
Magnum 2x4	W97AA42A	1341185	Type III	HLR
Magnum 4x4	W97AC42A	1341184	Type III	HLR
Magnum 6x6	W97AE42A	1341184	Type III	HLR
Scrambler 500	W97BC50A	1341189	Type III	HR
Xplorer 500	W97CD50A		Type IV	HLR Shaft Drive
Sportsman 500	W97CD50A	1341217	Type IV	HLR Shaft Drive

*HR = High/Reverse

*HLR = High/Low/ Reverse

Type III - Gear/Chain USA (EZ Shift)

Gear Ratios		Forward	Reverse	Low
Polaris Gear/Chain USA	H/L/R	3.29/1	5.13/1	6.64/1
	H/R	2.68/1	3.42/1	–
Sportsman 500	H/L/R	3.29/1	5.13/1	6.64/1
Scrambler 500	H/R	2.68/1	3.42/1	–
Xplorer 500	H/L/R	3.29/1	5.13/1	6.64/1

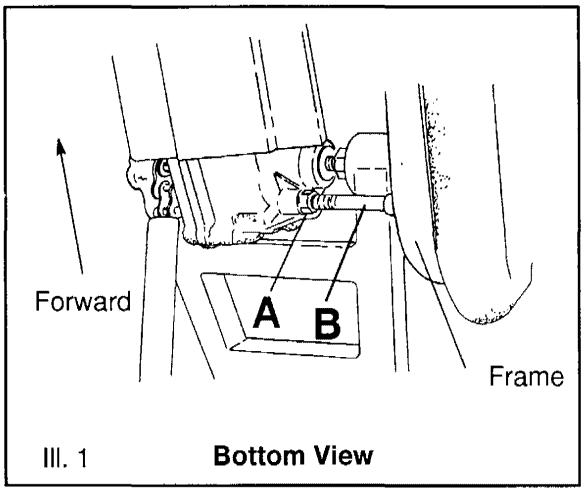
Torque Stop Adjustment (Except Sportsman 500)

Adjust the torque stop:

- Prior to shift linkage adjustment;
- When shifting difficulties are encountered;
- If transmission has been removed from the frame.

NOTE: The torque stop is located on the bottom left hand side of the transmission.

1. Loosen jam nut (A).
2. Turn adjuster bolt (B) until it touches the frame, and then an additional 1/2 turn.
3. Tighten the jam nut securely while holding the adjuster bolt.



Ill. 1 **Bottom View**

Shift Linkage Adjustment (All High/Low/Reverse Transmissions)

Linkage rod adjustment is necessary when symptoms include:

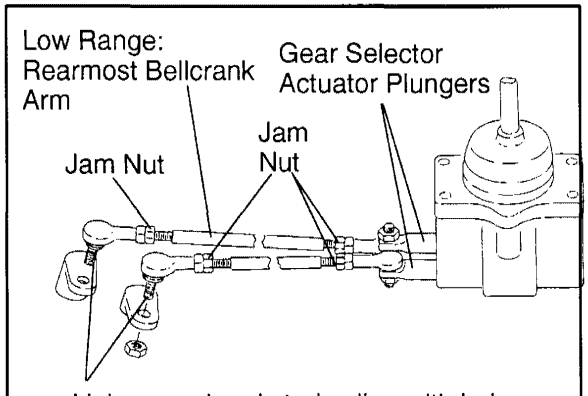
- No All Wheel Drive light;
- Noise on deceleration;
- Inability to engage a gear;
- Excessive gear clash (noise);
- Shift selectors moving out of desired range.

NOTE: When adjusting linkage, always adjust both linkage rods. The adjustment of one rod can affect the other. Remove necessary components to gain access to shift linkage rod ends (i.e. exhaust heat shield, exhaust pipe, etc.).

1. Perform torque stop adjustment above.
2. Inspect shift linkage tie rod ends, clevis pins, and pivot bushings and replace if worn or damaged. Lubricate the tie rod ends with Polaris Cable Lube PN 2870510.
3. Loosen all rod end adjuster jam nuts see Ill. 2.
4. Note orientation of tie rod end studs with stud up or down. Remove both rod end studs from transmission bell cranks.

NOTE: It is important to disconnect *both* rod ends from the transmission bell cranks. If one linkage rod is incorrectly adjusted, it can affect the adjustment of the other rod. (Disconnect Low range linkage rod end from pivot arm on Sportsman 500).

5. Position shift selector in neutral. (In neutral, the shift box actuator slide ends should be even.) Make sure the transmission bell cranks are positioned in the neutral position detents. (The bell cranks will be perpendicular to the transmission case parting line (except Low range on Sportsman 500. See Ill. 5. on page 8.4).



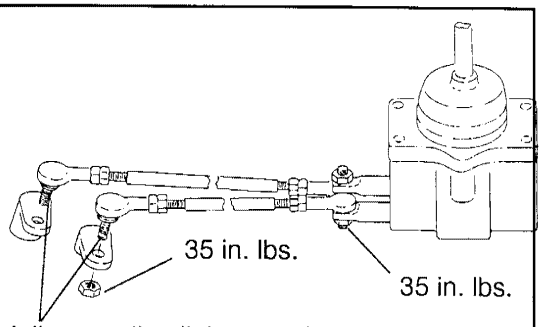
Linkage rod end studs align with holes

NOTE: Rod end orientation (up or down) depends on model. See chart on page 8.5 for proper positioning.

Ill. 2

Shift Linkage Adjustment, Cont.

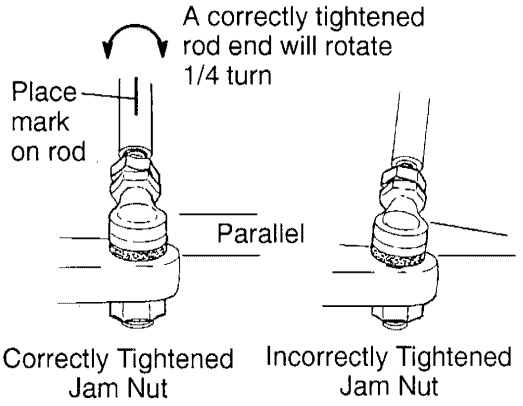
3. Type III Transmissions: Be sure the shift linkage rod ends are firmly attached to the shift selector slides. Adjust the High/Rev range (outside) rod so the rod end is precisely centered on the forwardmost transmission bell crank. Install the lock nut to the rod end and torque to 35 in. lbs. Perform steps 7-10 on High/Rev range shift linkage rod for final adjustment.
   Type IV Transmissions: Be sure the shift linkage rod ends are firmly attached to the shift transmission bell cranks and low range pivot. Adjust the high range (outer) rod so rod end stud is precisely centered on hole in shift actuator slide. Install lock nut and torque to 35 in. lbs. Perform steps 7-10 on High/Rev range shift linkage rod for final adjustment.
4. Rotate the linkage rod clockwise until resistance is felt. Mark the rod so revolutions can be easily counted. See Ill. 4 at right.
5. Rotate the linkage rod counterclockwise until the same resistance is felt, counting the revolutions as the rod is turned.
6. Turn the rod clockwise again one half of the revolutions counted in Step 8.
7. Tighten the rod end jam nuts securely while holding the rod end. The jam nuts must be tightened with both front and rear rod ends parallel to each other. See Ill. 4 at right. If jam nuts are properly tightened, the rod should rotate freely 1/4 turn without binding.
8. Repeat steps 6-10 for Low range linkage rod.
   Type IV Low Range Adjustment Note: After completing steps 6-9 on Low range rod, turn rod counter clockwise (as viewed from rear) until slight resistance can be felt. This will bias freeplay toward the shift selector box and ease shifting in and out of Low gear.



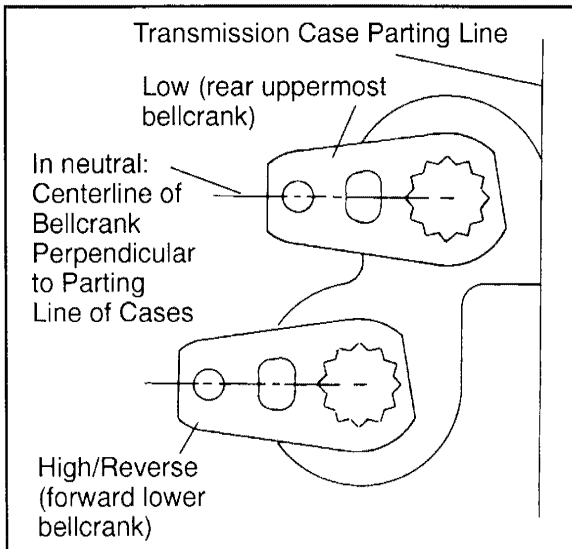
Adjust to align linkage rod end studs with holes in bellcrank(s).

NOTE: Rod end orientation (up or down) depends on model. See chart on page 8.5 for proper positioning.

Ill. 3

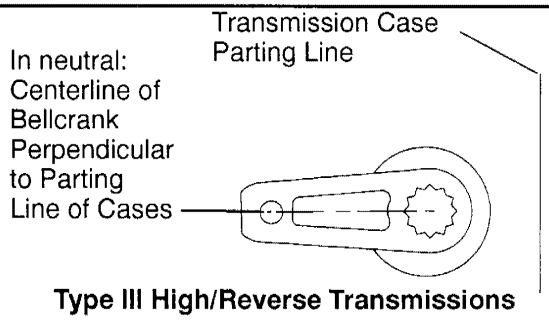


Ill. 4

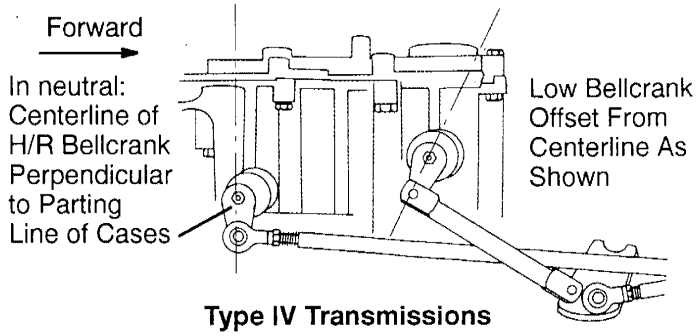


Type III High/Low/Reverse Transmissions

Ill. 5

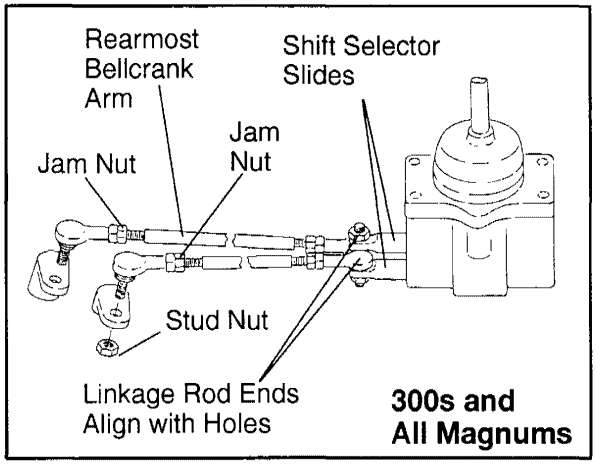


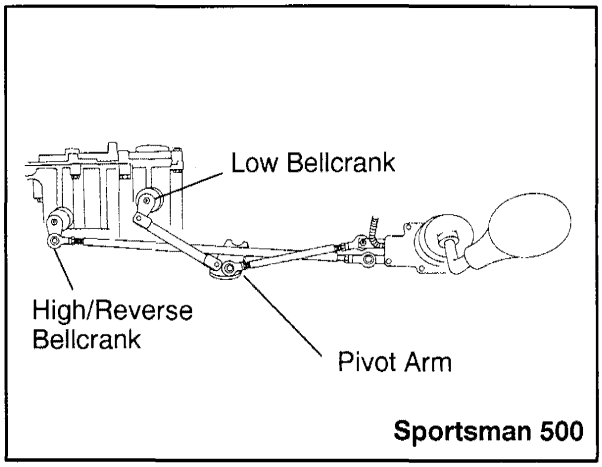
Type III High/Reverse Transmissions

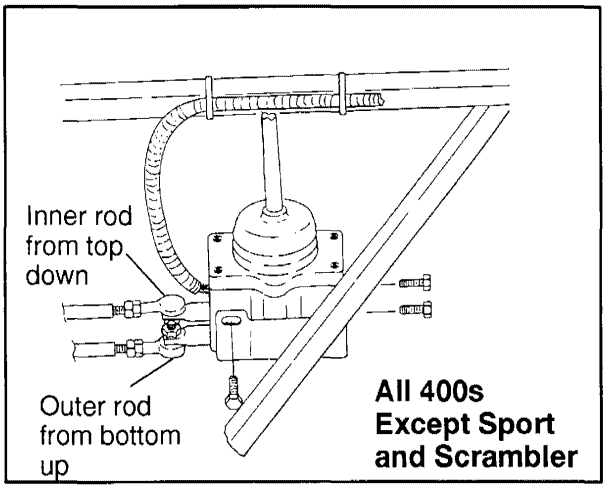


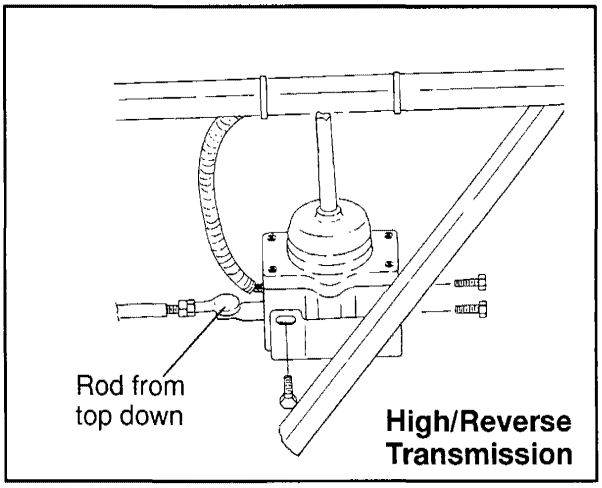
Type IV Transmissions

Shift Linkage Rod End Positioning









Shift Linkage Rod End Positioning

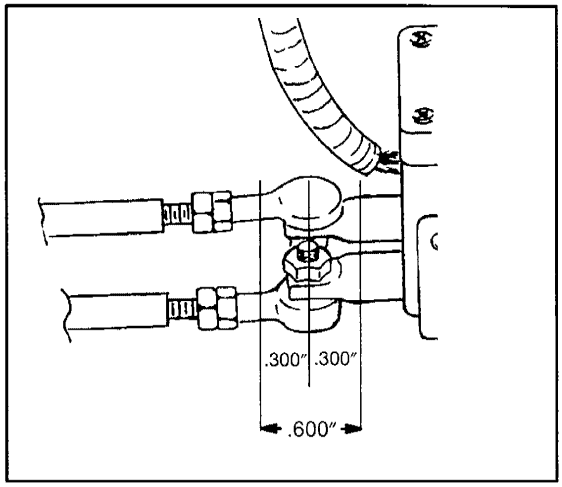
Model	Transmission Bellcrank	Shift Selector Slide
All 400s (Except Sport and Scrambler)	From top down (nut on bottom)	(inner rod) from top down (nut on bottom) (outer rod) from bottom up (nut on top)
All 300s All Magnums	From top down (nut on bottom)	(inner rod) from bottom up (nut on top) (outer rod) from top down (nut on bottom)
Trail Blazer Trail Boss Sport 400L Scrambler	Clevis pin or rod end from top down (nut on bottom)	From top down (nut on bottom) Horizontal nut towards motor
Sportsman 500	Clevis pin (on pivot arm) and rod end on bell cranks from top down (nut on bottom)	(inner rod) from bottom up (nut on top) (outer rod) from top down (nut on bottom)

If shifting difficulty is still encountered after adjustment, perform the following steps:

1. Disconnect shift rods from transmission bellcrank. Check torque required to move bellcrank (should be 10 ft. lbs.). Select gear and *hold 10 ft. lbs. torque on bellcrank*. Roll machine in the opposite direction of the gear selected (roll machine backward if a forward gear is selected - roll machine forward if reverse is selected). **NOTE:** Be sure to hold torque on bellcrank while rolling until the transmission gears are fully engaged.

2. Start machine and test ride. If transmission operation is satisfactory during the test ride, the shifting problem is *outside* the transmission. Check travel of the shift selector slides, re-check transmission adjustment, fasteners, torque stop, etc.

   - Travel of shift selector slides should be .600″ (15.2 mm) full movement, or .300″ (7.6 mm) one way.



Troubleshooting

Check the following items when shifting difficulty is encountered.

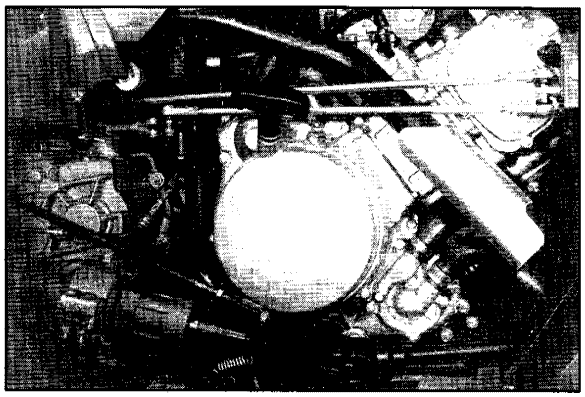
- Transmission oil type/quality
- Torque stop adjustment
- Loose fasteners on rod ends
- Loose fasteners on selector box
- Worn rod ends, clevis pins, or pivot arm bushings
- Linkage rod adjustment and rod end positioning
- Shift selector rail travel
- *Worn, broken or damaged internal transmission components

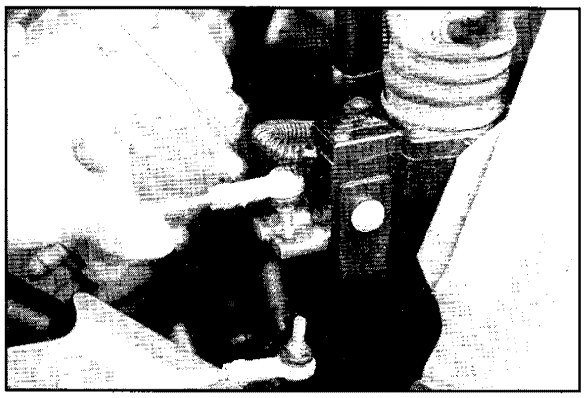
***NOTE:** To determine if shifting difficulty or problem is caused by an internal transmission problem, isolate the transmission by disconnecting linkage rods from transmission bellcranks. Manually select each gear range using the procedure in Step 1 above, and test ride vehicle. If it functions properly, the problem is outside the transmission. Refer to troubleshooting checklist above.

Gear Shift Selector Removal (Typical)

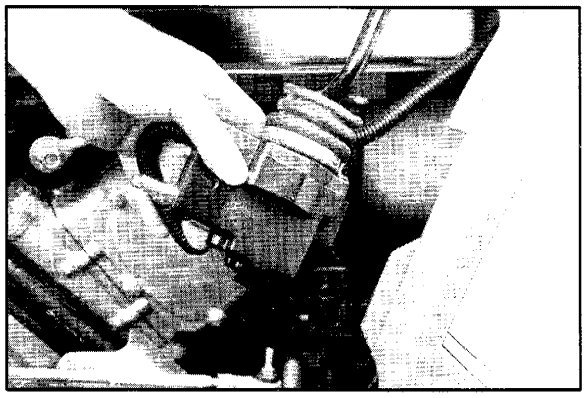
NOTE: The *shift selector switch* can be replaced with the shift selector box remaining in the frame. Perform steps 1-5 of removal, 1-4 of Disassembly, and 5-7 of Assembly. To change fluid, remove selector box assembly and follow Steps 1,2,3,5, and 6 of Disassembly, and Steps 2-7 of Assembly.

1. Remove seat, right side panel, and exhaust heat shield.
2. Remove exhaust pipe if it interferes with access to shift selector.
3. Cut cable ties securing gear shift selector switch wiring harness to frame. Note proper routing.
4. Disconnect wiring harness from terminal board, noting the color and location of the wires on the terminal board.
5. Pull the wiring harness through to gear shift selector side of machine.
6. Disconnect the two linkage rods from the gear shift selector slides.
7. Remove three bolts attaching gear shift selector to the mounting bracket.





8. Lift gear selector out of mounting bracket and away from frame.



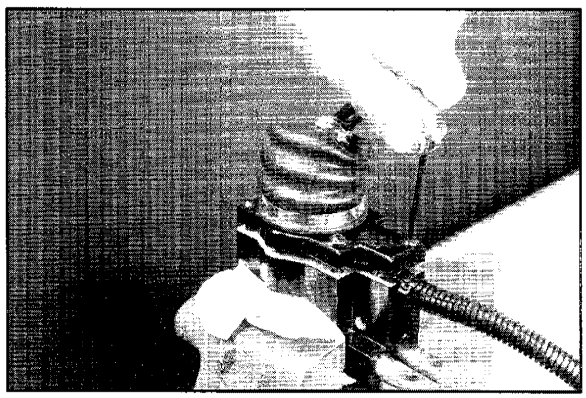
Gear Shift Selector Disassembly

CAUTION:

Wear eye protection during this procedure. Read each step completely before proceeding. Essential parts may be lost or damaged if you do not heed this caution!

1. Clamp gear selector body lightly in a soft jawed vice. Using a criss-cross pattern, loosen each of the five screws holding the gear shift selector cover to the gear shift selector body. Loosen each screw only a few turns, then proceed to another screw.

NOTE: These parts are under pressure from the internal spring.



Gear Shift Selector Disassembly, Cont.

2. Carefully pull the gear shift selector cover and rod from the gear shift selector body.

CAUTION: *Be very careful* to pull the cover away vertically and slowly to avoid damage to the internal gear selector switch. The selector switch is easily damaged.

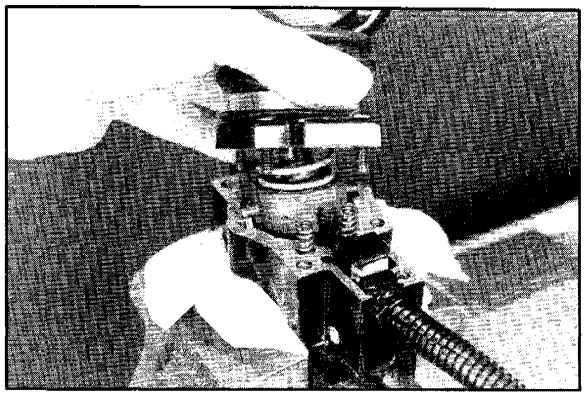
3. Set the cover/rod assembly aside.
4. *Very carefully* remove the gear shift selector switch from gear shift selector body.
5. Remove the white plastic bearing cup and three springs from gear shift selector.
6. Slowly tilt gear shift selector body sideways to drain oil.

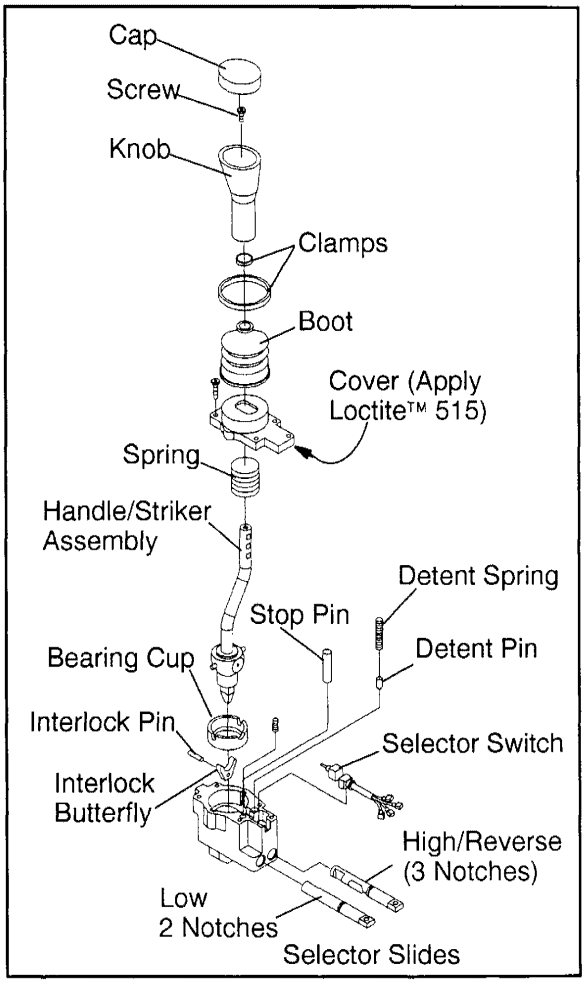
NOTE: *Do not* tip gear shift selector body upside down or detent bullets and stop pin may fall out. Check for signs of moisture in the selector body. Inspect shift boot closely if moisture is present in selector box.

7. Tap gear shift selector body, top down, against a hard, smooth, flat surface to jar the stop pin and two detent bullets loose. Pull the detent bullets and the stop pin out of the gear shift selector body.
8. Hold the interlock butterfly out of the way and remove the two slides, one at a time.
9. Remove interlock butterfly and inspect for wear or damage.

NOTE: The LH slide has two notches and the RH slide has three. The slides must be replaced in the proper channels.

10. Inspect O-rings for damage. Replace if any damage is found.
11. Flush housing with parts washer fluid or penetrating oil to remove all moisture.
12. Dry all gear shift selector parts and remove any corrosion with a wire brush.



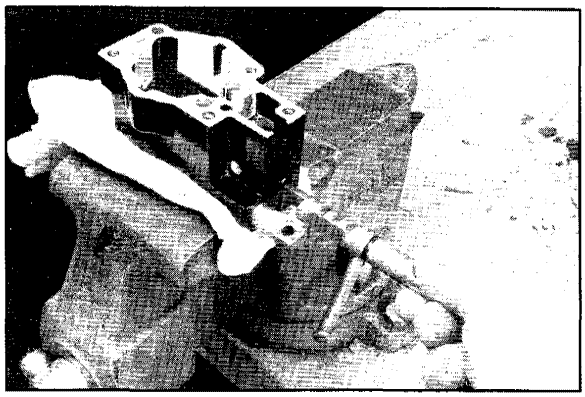


Gear Shift Selector Assembly

1. Install interlock butterfly.
2. Insert slides into gear shift selector body, taking care not to cut or tear O-rings in the process.

NOTE: The LH slide has two notches and the RH side has three. The slides must be replaced in the proper channels for the shifter to function properly.

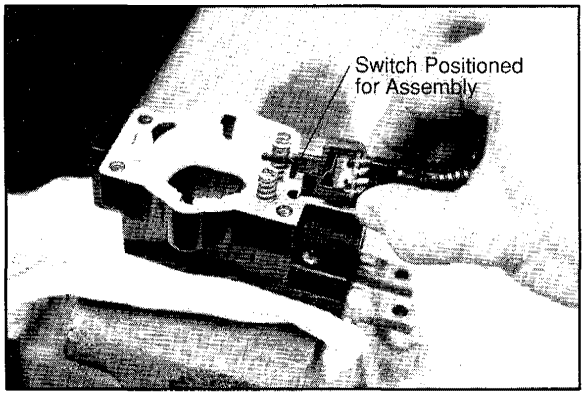
3. Replace detent bullets, stop pin, springs and white plastic bearing cup by reversing steps 5 - 7 of Gear Shift Selector Disassembly.
4. Clamp gear shift selector body lightly in a soft jawed vise.
5. Fill selector body with 10W40 motor oil. The oil level should be at one half the height of the slides.



10W40 Motor Oil or
Polaris 0W40 All Season Synthetic
PN 2871271

CAUTION: Too much oil could cause the selector to hydrolock. Be sure the selector box is level when adding oil.

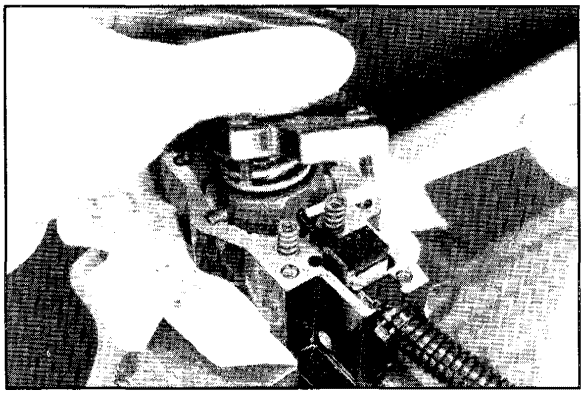
6. Carefully reinstall the gear shift selector switch. The hook on the switch faces downward toward shift slides. This hook catches on the selector body to prevent the switch from moving out of place.



NOTE: Switch must be positioned properly or AWD may not function.

7. Wipe gear selector dry, clean surfaces of cover and selector box with Loctite™ Primer T and place a bead of Loctite™ 515 Gasket Eliminator completely around the edge of the gear shift selector body.
8. *Carefully* reattach cover/rod assembly to gear shift selector body. Make sure slides are in neutral, or butterfly may be damaged.

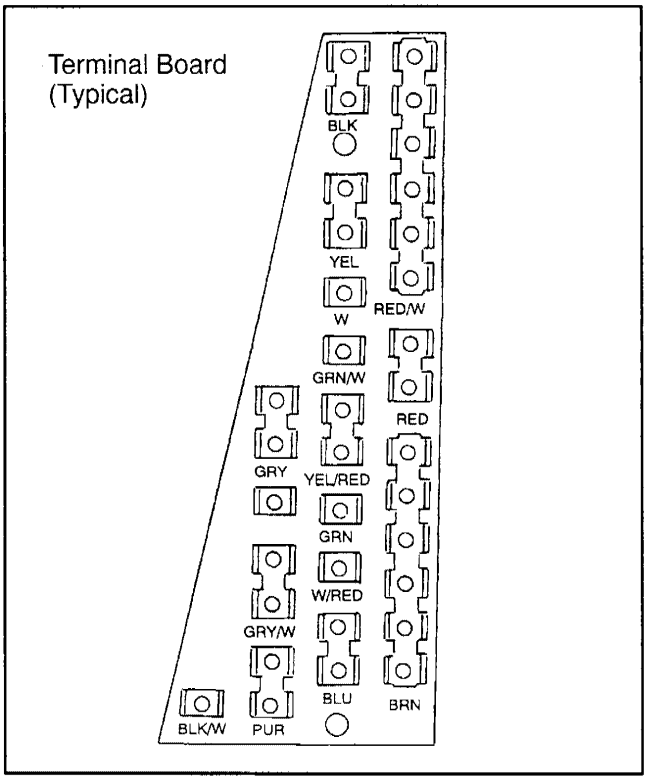
CAUTION: Be very careful not to damage the selector switch while assembling these parts. Tab end of selector switch must be positioned in hole of striker as shown at right. If not, assembling cover will damage switch. Torque cover screws to 12 ft. lbs. (1.7 kg-m).



Gear Shift Selector

Gear Shift Selector Installation

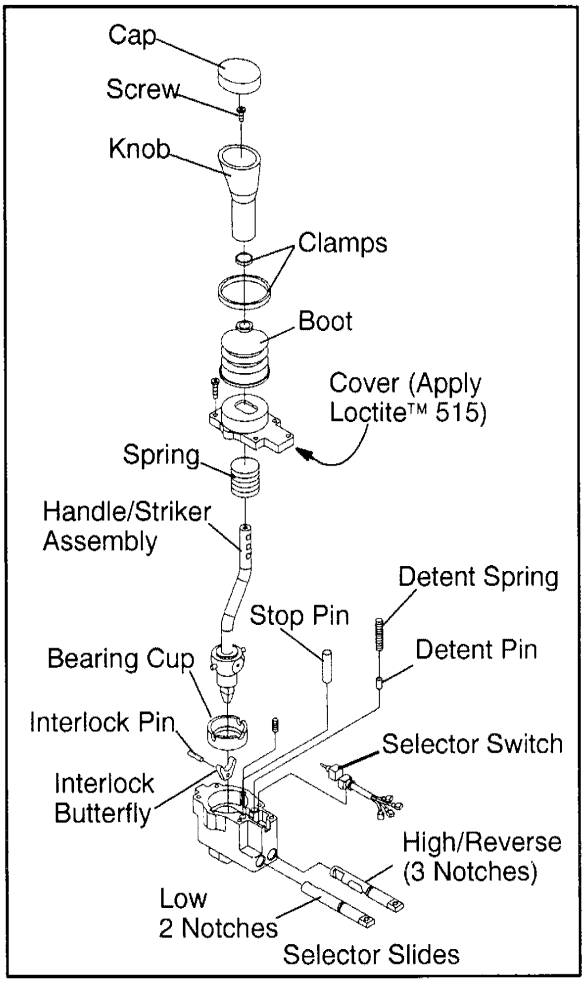
1. Place gear shift selector back into the mounting bracket and replace three bolts.
2. Reconnect linkage rods to gear shift selector slides. Adjust as required. See linkage adjustment procedures.
3. Route gear shift selector switch wiring harness properly and secure in place with cable ties.
4. Reconnect the wiring harness leads to the terminal board. Follow the color codes when installing wire leads to terminal board.
5. Using cable ties (PN 7080138), secure the gear shift selector switch wiring harness to the frame.
6. Remount the exhaust pipe using a new gasket, or high temp silicone to seal joints that do not have a gasket.
7. Secure heat shield to frame with two screws.
8. Replace covers and side panels.



Boot Replacement

NOTE: If moisture is found in the gear shift selector the boot should be replaced.

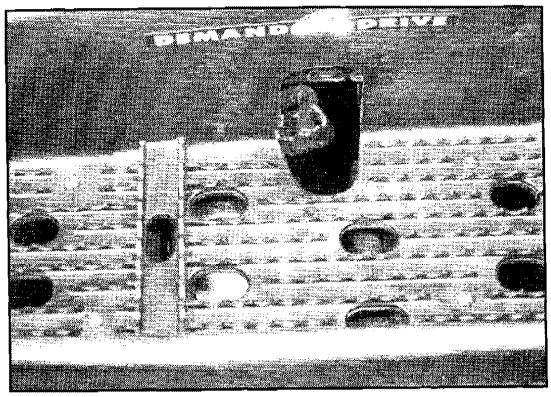
1. Using a slotted screwdriver, remove cap from gear shift knob.
2. Remove torx screw securing knob to selector rod.
3. Pull selector knob off selector rod.
4. Remove band clamps on rubber boot.
5. Slide boot off selector rod and replace with a new one.
6. Apply RTV silicone to selector rod to seal top of boot.
7. Place band clamps in position and tighten using CV boot clamp pliers.
8. Replace shift knob, securing it to selector rod with screw removed in step 2.
9. Push shift knob cover back into place. Allow approximately 12 hours for RTV silicone to cure.



Transmission Removal (Typical)

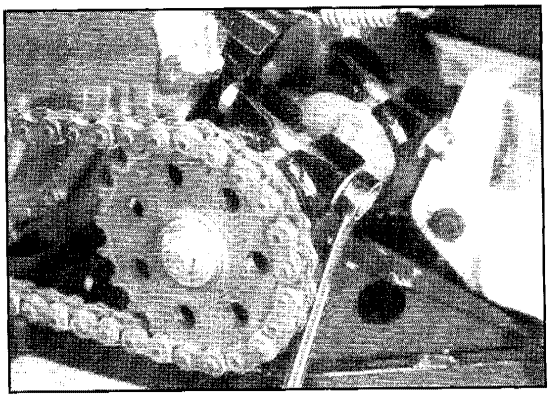
Remove the following items. Refer to Body & Steering Section for details.

- Rear rack
- Rear cab assembly
- Air filter pre-cleaner
- Air box assembly
- Exhaust pipe
- Linkage rod ends from transmission bell cranks
- PVT inner cover (refer to PVT Section for details)
- Auxiliary brake adjuster bolt, jam nut, washer, and auxiliary brake arm (arm may remain attached to brake rod)

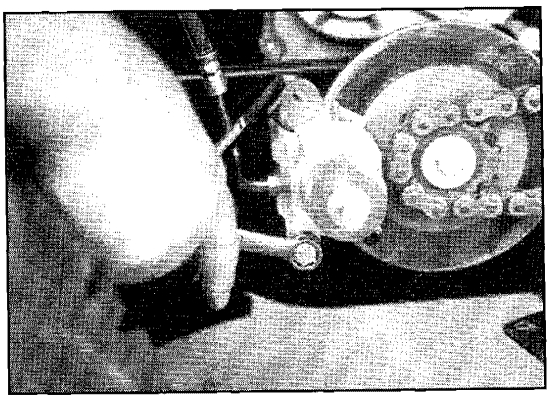


NOTE: Gen IV style shown.

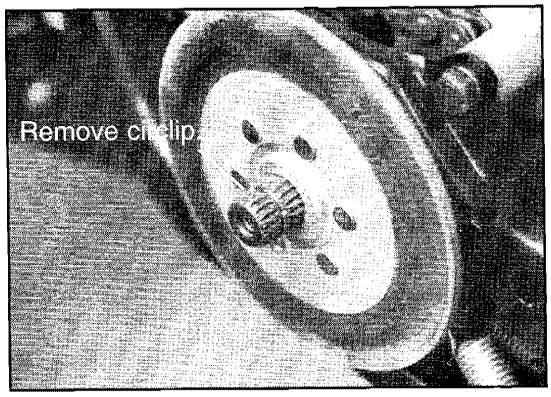
1. Remove center drive chain guard (4x4).
2. Loosen center eccentric to obtain slack to remove center chain and sprockets if necessary.



3. Remove caliper mounting bolts and rear caliper shield. Remove caliper assembly by rotating from 9 o'clock position to 11 o'clock and lifting off brake disk.

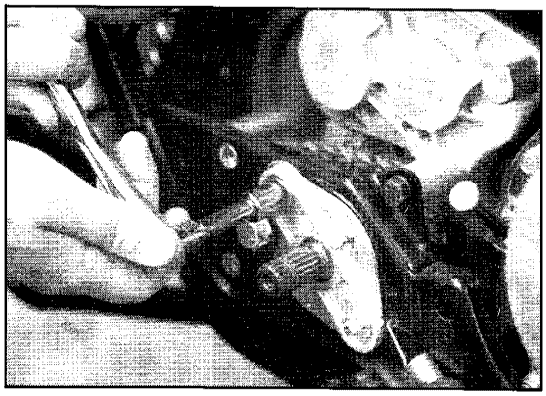


4. Remove brake disk snap ring. Peel off excess silicone from shaft and remove brake disk. Note direction of disc installation or mark outside disc before removal.

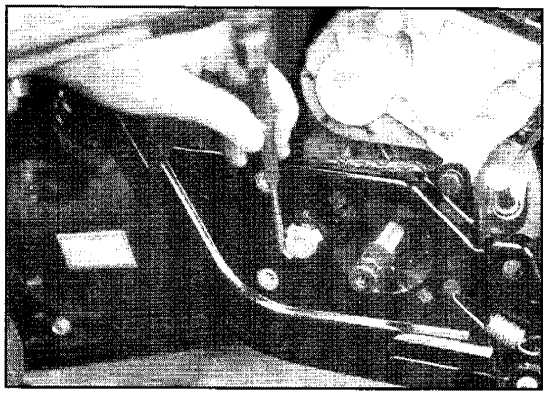


Removal (Typical), Cont.

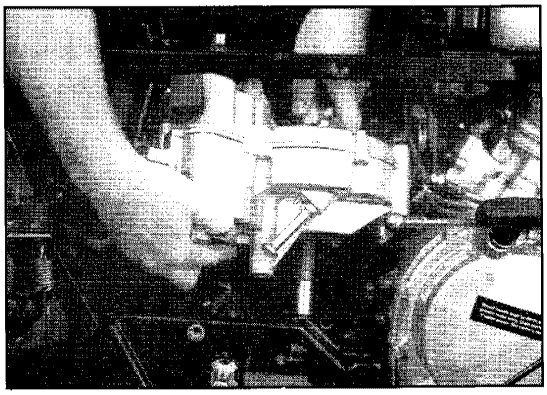
5. Remove output shaft bearing assembly (where applicable) along with any alignment shims. Note location of shims (where applicable) for reassembly. Inspect bearing for wear and replace if necessary.



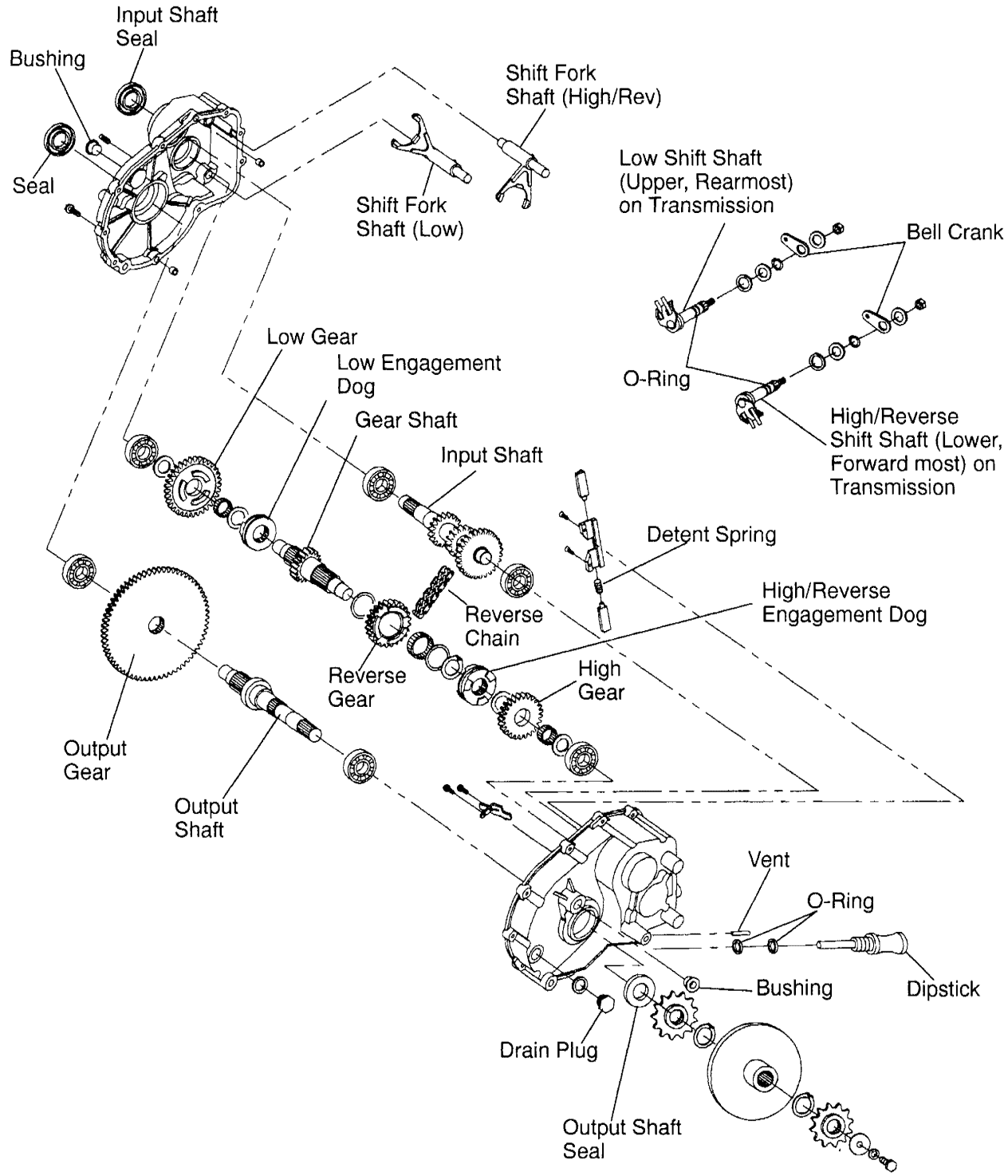
6. Open bolt lock plate on right side and back out swing arm bolt until it is flush with swing arm. *Do not* remove completely.
7. Remove rear drive chain from sprocket.
8. Remove six bolts attaching skid plate and remove skid plate.
9. Remove 3/8-16 x 3/4″ bolt from top left transmission mount.
10. Remove jam nut, roller chain guide and washer. Remove 3/8″ bolt from front top right transmission mount.



11. Remove drain plug and drain transmission lubricant into suitable container.
12. Remove lower transmission mounting bolt.
13. Loosen and remove speedometer cable from angle drive.
14. Remove dust seal and driven clutch spacer from transmission input shaft.
15. Open bolt lock plate on left side and back out swing arm bolt until it is flush with swing arm. *Do not* remove completely.
16. Remove nut and washer from swing arm pivot bolt.
17. Loosen transmission torque stop jam nut and turn torque stop in as far as possible to allow transmission removal.
18. Turn fuel valve to OFF position. Remove carburetor and secure out of the way.
19. Remove vent line from transmission and secure.
20. Transmission may now be removed by rotating the case, and moving the output shaft side down and the input shaft side up toward the top right rear opening of the frame. Remove the transmission from the right side of the vehicle.

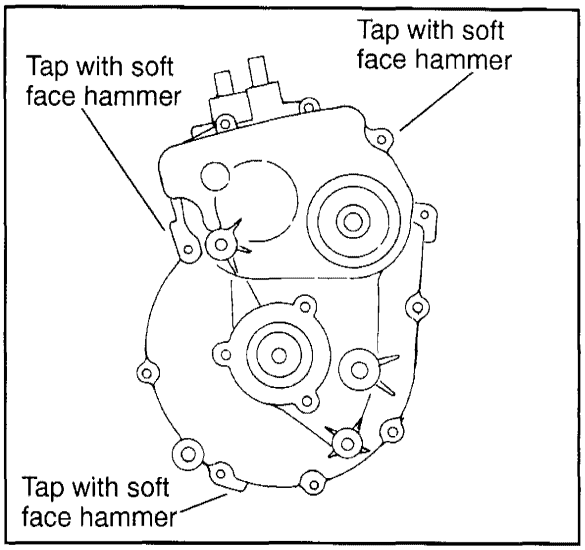


Type III Transmission Exploded View



Disassembly (Typical)

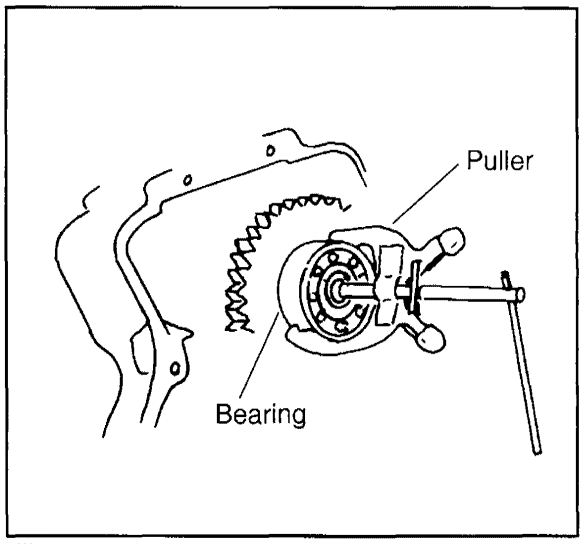
1. Remove speedometer angle drive, sprocket retaining circlip and sprocket.,
2. Remove the transmission cover bolts.
3. With a soft face hammer tap on the cover bosses and carefully walk the cover off. See Ill. 1.



Ill. 1

4. Using the battery cable clamp puller, remove the bearing from the sliding gear shaft. See Ill. 2.
5. Remove outer thrust washer.
6. To remove the needle bearing from the low gear, tip transmission to point end of shaft downward. Work gear back and forth as shown until bearing is exposed and slide bearing out. See Ill. 3.
7. Remove the low gear and inner thrust washer.
8. Place a 1/2″ wrench on each of the transmission bell crank retaining nuts to aid in removing the shift fork shaft.

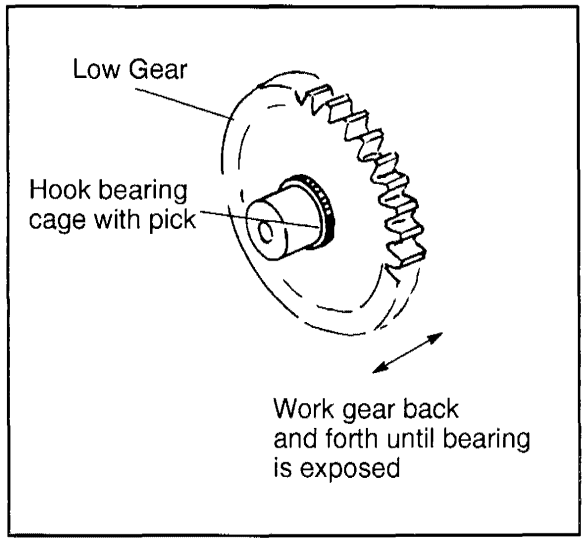
NOTE: Transmission must be in neutral to remove shift forks.



Ill. 2

9. Remove the low range shift fork shaft with engagement dog by rotating the low gear shift arm clockwise and pulling outward on shift fork shaft.
10. Remove output shaft and gear assembly by tapping on shaft with a soft faced hammer, from the back side of the gear case assembly.
11. Remove sliding gear shaft with high/reverse shift shaft and input shaft assembly as a unit by gradually walking assemblies from their bearing mounts while rotating the high/reverse shift arm counterclockwise.

NOTE: Make sure input shaft gear clears oil deflector, but do not remove the oil deflector. See assembly photo at top of next page.



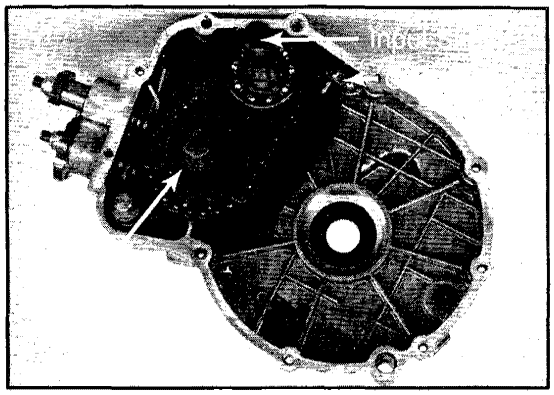
Ill. 3

Disassembly (Typical), Cont.

12. Clean all components in a parts washer and inspect for wear.
13. Inspect engagement dogs of gears and replace if edges are rounded.
14. Inspect gear teeth for wear, cracks, chips or broken teeth.
15. Remove seals from transmission case.

NOTE: New seals should be installed after the transmission is completely assembled.

16. Inspect bearings for smooth operation. Check for excessive play between inner and outer race.



Assembly (Typical)

1. Carefully install high/reverse shaft assembly and gear cluster (removed in step 11) as a unit into their respective bearing case areas. Make sure input shaft clears oil deflector. Tap with a soft face hammer to seat shaft assemblies.

NOTE: Make sure high/reverse shift shaft pin is properly positioned within spring retainers.

2. Seat the shafts and shift the assembly into neutral position.

NOTE: The assembly must be in neutral at this time to complete reassembly.

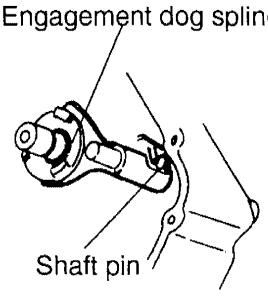
3. Install the output shaft and gear assembly into the gear case.
4. Install engagement dog on low range shift shaft.

NOTE: Dogs should face toward the mating gear.

5. Install low shift shaft assembly aligning shaft pin with spring; engagement dog splines with the sliding gear shaft splines; and shift shaft to the gearcase. See Ill. 1.
6. Install *large* I.D. washer on sliding gear shaft.
7. Install low gear on shaft with engagement dogs inward. See photo at right.
8. Lubricate and install needle bearing into gear.
9. Install smaller I.D. washer and bearing.

NOTE: The bearing should be flush with the shaft when seated correctly.

10. Prior to reinstalling the cover make sure the mating cover surfaces are clean and dry. Apply Loctite 515 or 518 to mating surfaces.
11. Reinstall cover and torque bolts to 12 ft. lbs. (1.66 kg-m).
12. Install transmission and fill with Polaris Premium Synthetic Gear Case Lubricant.



Ill. 1

Premium Synthetic Gear Case Lubricant

PN 2871178 (12 oz.)
PN 2870464 (Gallon)

Installation (Typical)

1. Install transmission from right side of ATV with output shaft side down and input shaft side up toward right rear corner of frame.

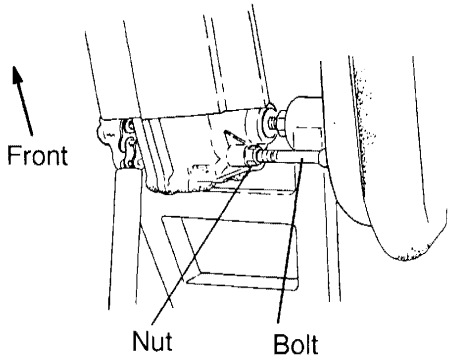
NOTE: As you are guiding the output shaft into its mounting, the rear drive chain can be installed onto shaft and sprocket. Make sure chain is properly positioned on axle sprocket.

2. Loosely install lower mounting bolt and nut.

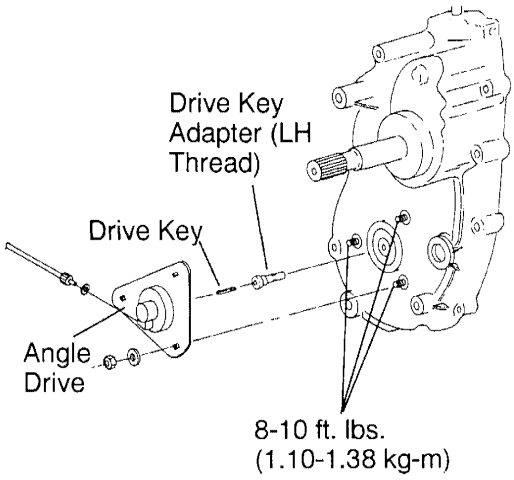
CAUTION:

Be sure bolts are proper length or transmission damage may occur.

3. Loosely install right side **3/8-16 x 3/4″** mounting bolt in top right hole.
4. Attach washer, nut and roller chain guide to the right side swing arm bolt.
5. Align transmission case bushing with bolt and torque nut to 55 ft. lbs. (7.6 kg-m). Bend the tab washer to lock the bolt in place.
6. Loosely install left side **3/8-16 x 3/4″** top mounting bolt.
7. Install washer and nut on the left side swing arm bolt.
8. Align transmission case bushing with bolt and torque nut to 55 ft. lbs. (7.6 kg-m). Bend the tab washer to lock the bolt in place.
9. Align transmission with engine (See Clutch Section for center distance and alignment procedure. Torque lower mounting bolt to 25 ft. lbs. (3.45 kg-m). Torque right and left 3/8-16 x 3/4″ bolts to 25 ft. lbs. (3.45 kg-m).
10. Adjust torque stop by adjusting bolt until it contacts the frame. Then tighten an additional one half turn using a wrench. Hold the adjuster bolt and tighten the jam nut.
11. Attach speedometer cable to angle drive and tighten.
12. Install skid plate and torque bolts to 5 ft. lbs. (.7 kg-m).
13. Install driven clutch spacer and dust seal(s).
14. Install inner cover and all PVT system components. Refer to PVT Section for procedure.

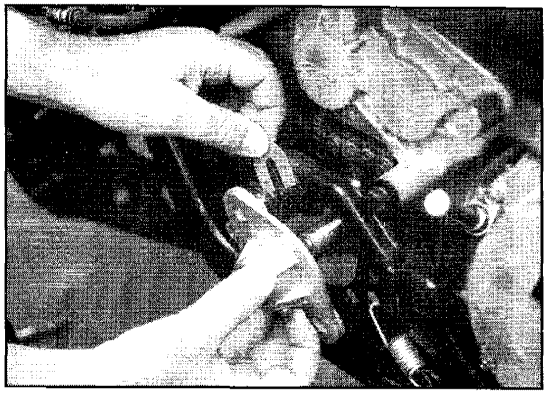


Transmission Torque Stop Adjustment



Installation (Typical)

15. Grease support bearing and install on output shaft.



Swing Arm Bolt Torque:
55 ft. lbs. (7.6 kg-m)

Transmission Mounting Bolt Torque:
25 ft. lbs. (3.45 kg-m)

Skid Plate Bolt Torque:
5 ft. lbs. (.7 kg-m)

Inner Cover Bolt Torque:
12 ft. lbs. (1.7 kg-m)

Drive Clutch Torque:
40 ft. lbs. (5.5 kg-m)

Driven Clutch Torque:
12 ft. lbs. (1.7 kg-m)

16. Slide output shaft support bearing inward against frame. Be sure to hold bearing square with shaft.
17. Visually inspect gap between frame and upper or lower mounting boss on support bearing. If a gap exists on upper or lower boss, measure with a feeler gauge and add shim(s) as required to maintain proper alignment when mounting nuts are tightened. Torque to specification.

Mounting Nut Torque:
18 ft. lbs. (2.48 kg-m)

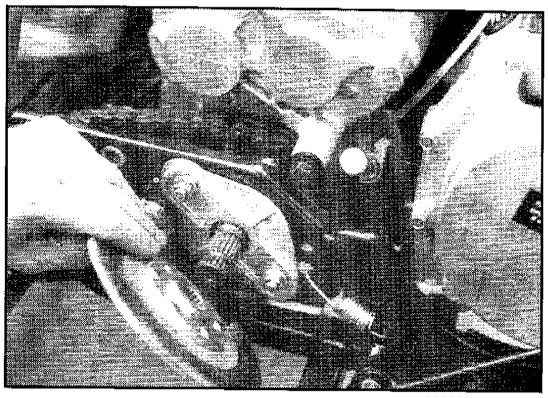
Shim Kit PN 2200126 Includes:
(2) 5210764 .020″
(2) 5210759 .063″
(2) 5210760 .080″

18. Apply silicone to splines of brake disk and reinstall disk.
19. Install brake caliper on disk and bolt to frame with the rear caliper shield. Torque to specification.

Caliper Attaching Bolt Torque:
12 ft. lbs. (1.7 kg-m)

Installation (Typical), Cont.

20. Install snap ring onto output shaft securing brake disk.
21. On 4x4 Models, install sprockets and middle chain. Install sprocket with bolt, lock washer and retaining washer and torque output shaft sprocket bolt to 17 ft. lbs. (2.35 kg-m). Torque center eccentric sprocket bolt to 30 ft. lbs. (4.14 kg-m). Install chain guard with spacer. Adjust rear and center chains. Refer to Maintenance Section for details.
22. Install brake disk cover.
23. Install top mounting bolts of brake disk cover, rear caliper shield and caliper to frame. Torque caliper mounting bolts to 12 ft. lbs. (1.7 kg-m).
24. Attach brake caliper arm to moveable cam and adjust foot pedal to 1/2″ deflection. (See Maintenance Section) Lock the jam nut.
25. Install air cleaner assembly, making sure carb boot seals on air box correctly. Tighten hose clamp.
26. Reinstall pre-cleaner duct work and pre-cleaner.
27. Proceed with linkage rod adjustment found on page 8.3.



Output Shaft Bearing Retaining Bolt Torque:
17 ft. lbs. (2. 35kg-m)
Brake Caliper Attaching Bolt Torque:
12 ft. lbs. (1.7 kg-m)
Output Shaft Sprocket Bolt Torque:
17 ft. lbs. (2.35 kg-m)
Center Eccentric Sprocket Bolt Torque:
30 ft. lbs. (4.14 kg-m)

Speedometer Service

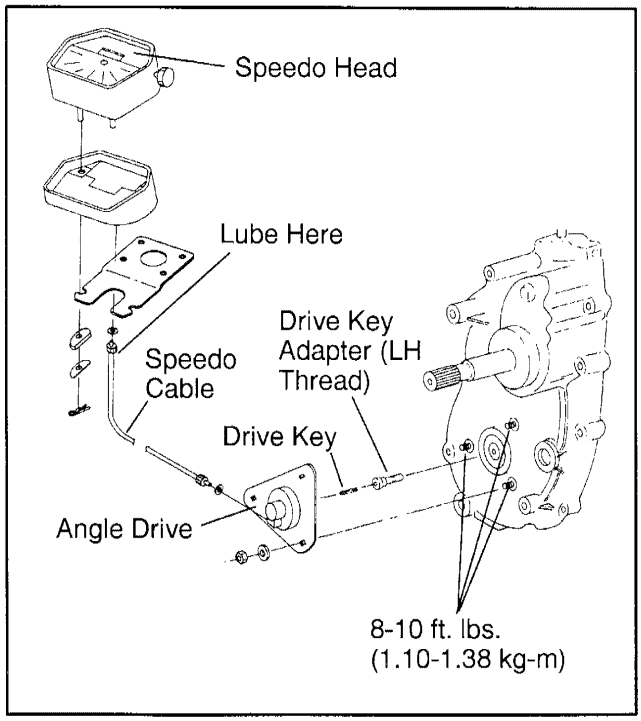
1. Remove speedometer cable from the speedometer head and lubricate it periodically with Polaris cable lube (PN 2870510).

Polaris Cable Lube

PN 2870510

2. Use a generous bend (radius) when installing cable. Do not kink cable.
3. If cable is binding or routing is incorrect, the small drive key may twist off at the drive adaptor. It will be necessary to remove the drive key adaptor out of the transmission shaft

NOTE: The drive adapter has left hand threads.



Transmission Removal (Type V; 1998 Scrambler 400/500)

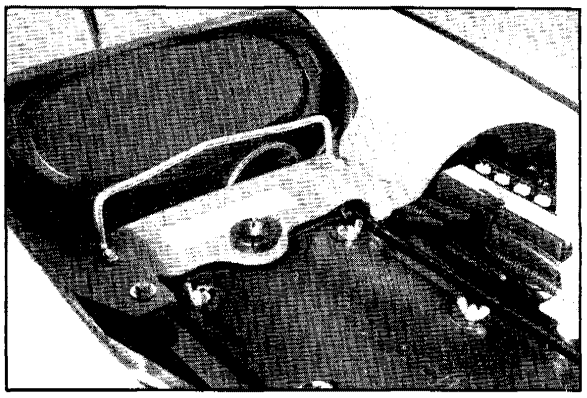
1. Remove seat, cab and air box.
2. Remove right side shield and auxiliary brake master cylinder and reservoir.
3. Remove PVT outer cover, both drive and driven clutch, and inner PVT cover.
4. Loosen left side swingarm mounting bolt and slide out away from transmission (do not remove the bolt completely.
   INSTALLATION NOTE: Apply Red Loctite 262 and torque to 150 ft. lbs.
5. Remove drive chain.
6. Remove (2) transmission mounting bolts from each bulkhead.
7. Remove through–bolt from bottom of transmission.
8. Remove both extruded transmission mounting brackets.
9. Remove wire connector from transmission position sensor.
10. Remove shift linkage rod from bell crank.
11. Remove front prop shaft from front gearcase (refer to prop shaft removal this section).
12. Remove transmission through right side of vehicle.

Shaft Drive Transmission Removal

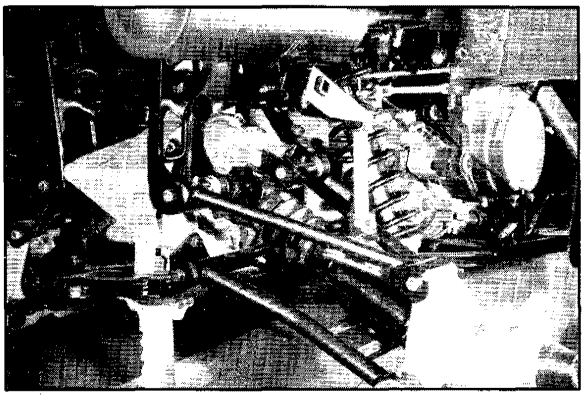
All operations regarding transmission front output housing assembly can be performed with transmission installed in frame.

1. Remove the inner PVT cover. Refer to Clutch Chapter. Remove speedometer cable.
2. Remove complete airbox assembly and transmission vent line.
3. Loosen rear wheel nuts slightly.
4. Elevate and support machine under footrest/frame area.

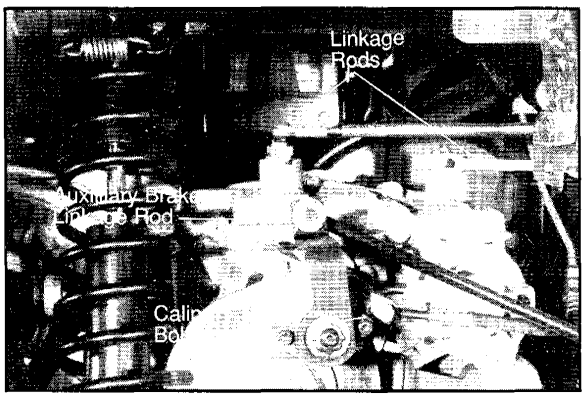
CAUTION: Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure. Wear eye protection when removing and installing bearings and seals.



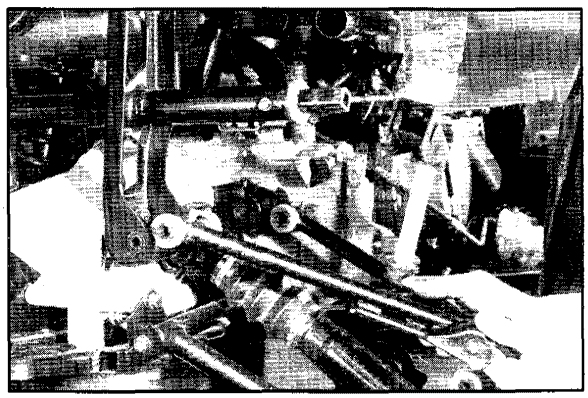
5. Remove wheel nuts and wheels.



6. Remove auxiliary brake linkage rod from caliper, caliper, and brake disk. Support caliper on right hand foot rest. Disconnect transmission shift linkage rods. Remove right hand shock absorber.

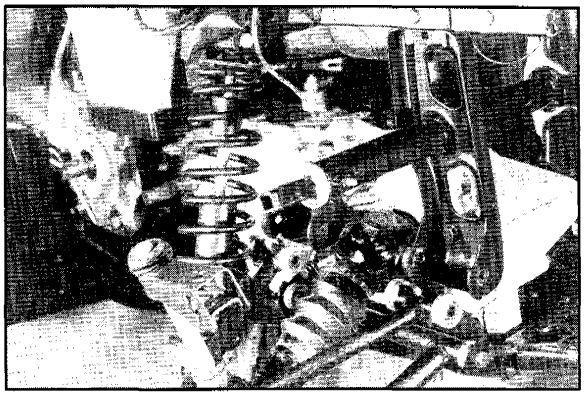


7. Disconnect the sway bar from both sides. Remove right side upper control arm.

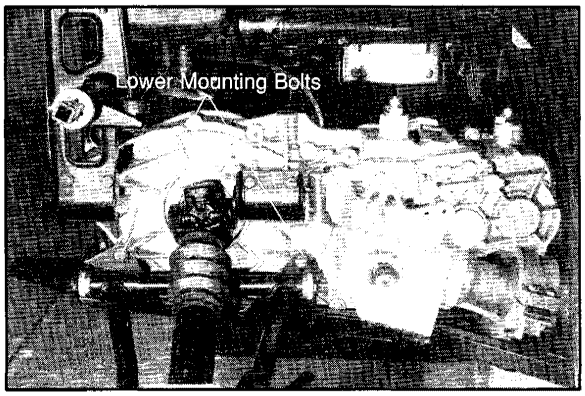


Shaft Drive Transmission Removal, Cont.

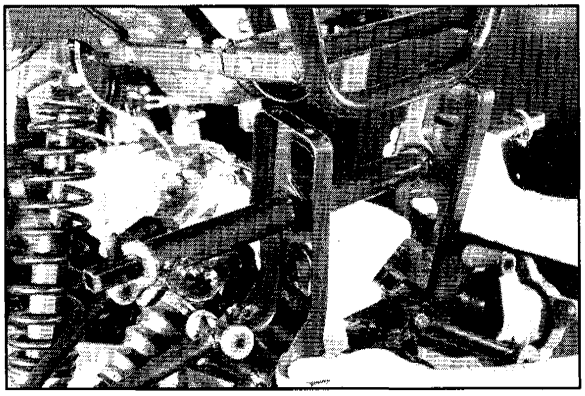
8. Remove left side upper control arm attaching bolts at transmission. Pivot upper control arm away from transmission as shown.



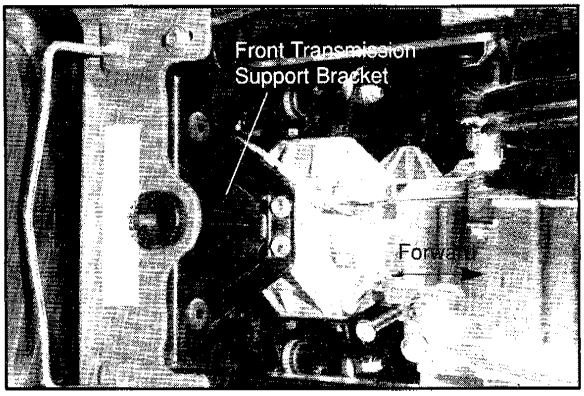
9. Remove both lower transmission mounting bolts from each side.



10. Remove all 8 bolts attaching the stabilizer support bracket, and remove support.

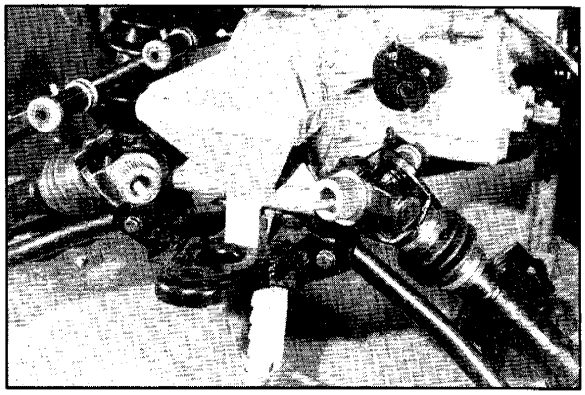


11. Remove front transmission support bracket.

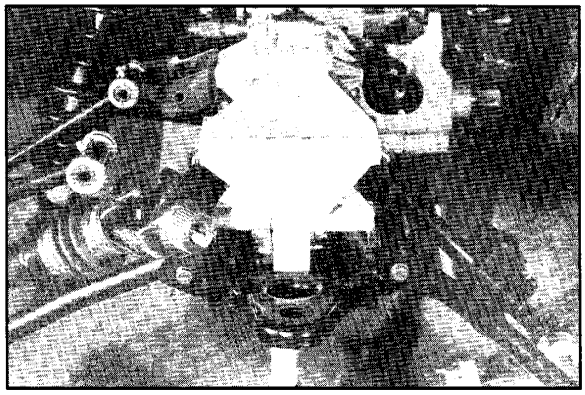


Shaft Drive Transmission Removal, Cont.

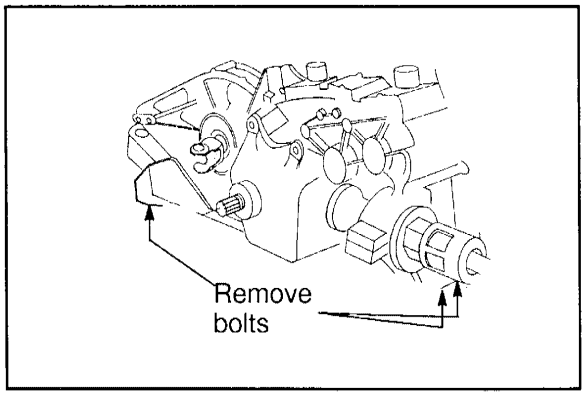
12. Using open end of a 9/16" wrench, loosen both side bolts securing drive shafts to transmission, and remove drive shafts.



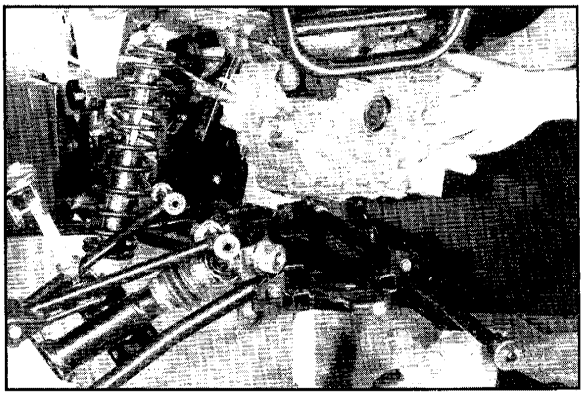
13. Lift right side drive shaft and hub up and out of the way. This will provide access to remove transmission out right side of frame.



14. Remove bottom transmission bolts as shown in illustration.

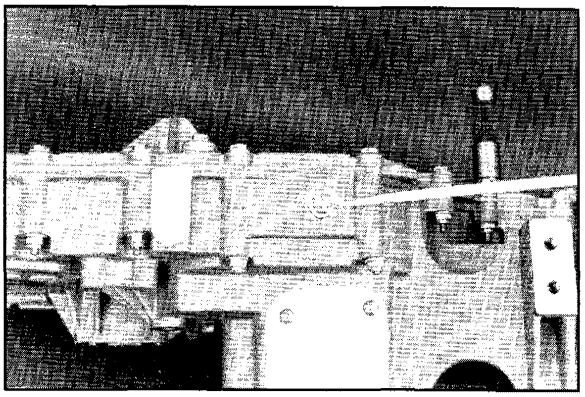


15. Lift and remove transmission out right side of frame.



Shaft Drive Transmission Disassembly

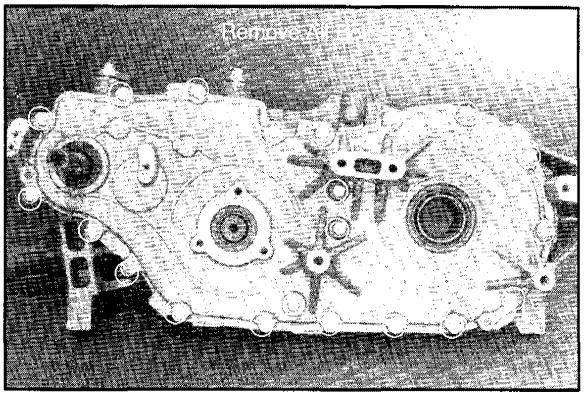
1. Drain and properly dispose of transmission oil.



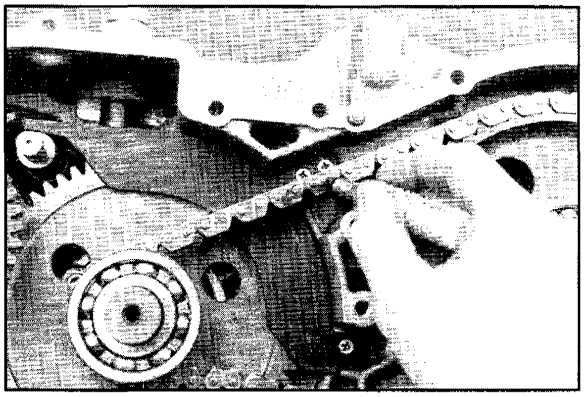
2. Remove all cover bolts. Tap cover with soft face hammer to remove. Note 2 bolts in center of cover.

CAUTION:

Do not pry on gasket face.

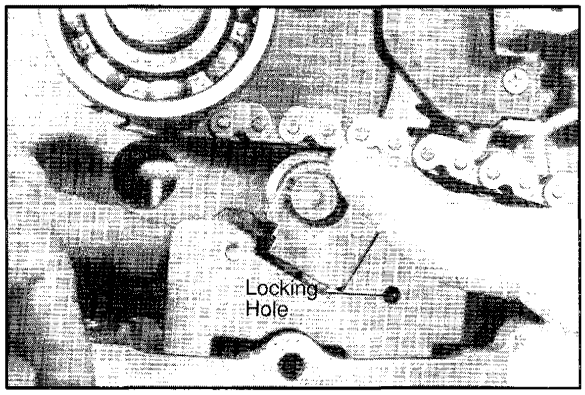


3. Mark chain rotation direction for reassembly. Note location of chain tensioner. If fully extended, replace chain.



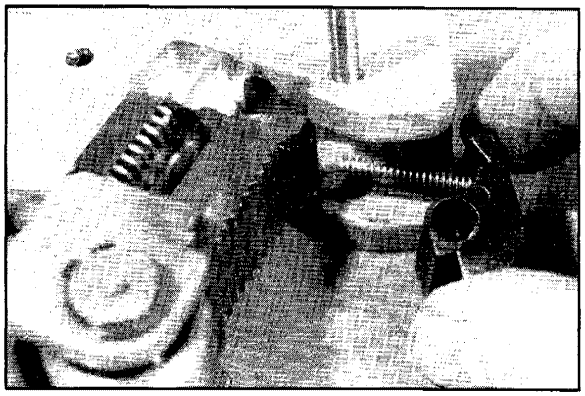
4. Compress chain tensioner by releasing locking tab and forcing roller assembly in.

5. Insert 1/8″ drill bit or similar tool in locking hole to secure tensioner and remove tensioner.

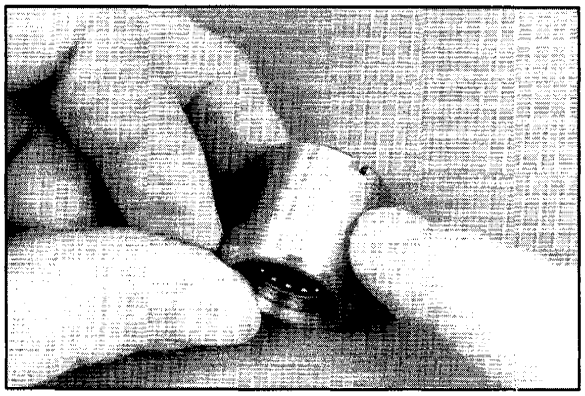


Shaft Drive Transmission Disassembly, Cont.

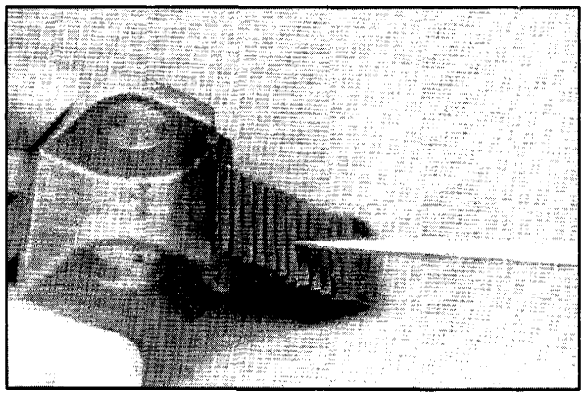
4. Holding pawl open , check for free movement of tensioner arm. With pawl closed, check locking action of ratchet. Replace tensioner assembly if not functioning correctly.



5. Inspect surface of roller for wear, discoloration, or grooving. Inspect roller and needle bearing. Be sure it rotates smoothly and fits tightly on roller pin. Replace tensioner assembly if worn.

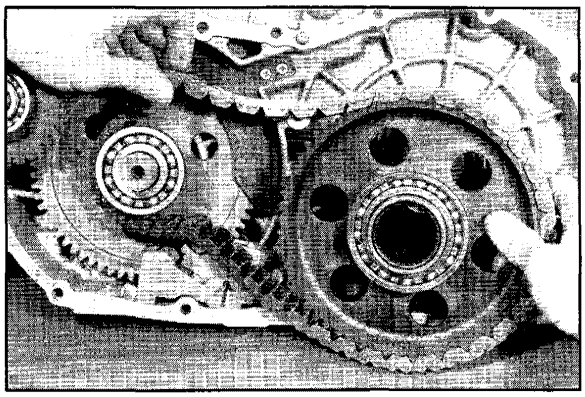


6. Inspect ratchet pawl and ratchet teeth for wear. Replace tensioner assembly if worn.

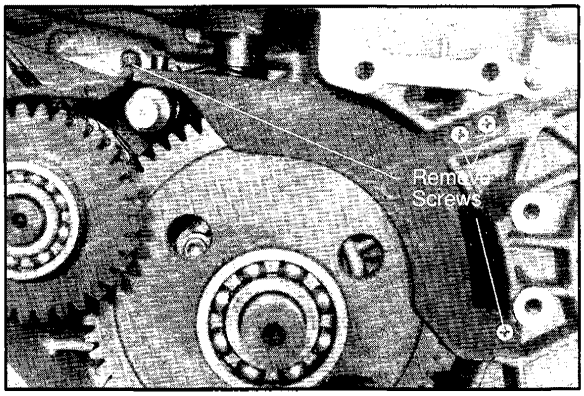


Shaft Drive Transmission Disassembly, Cont.

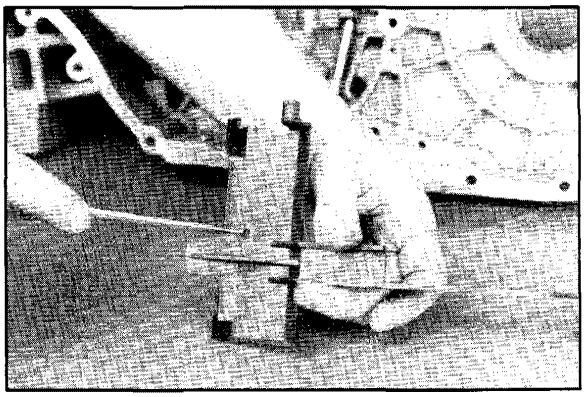
9. Remove rear output gear and chain as an assembly by lifting straight outward.



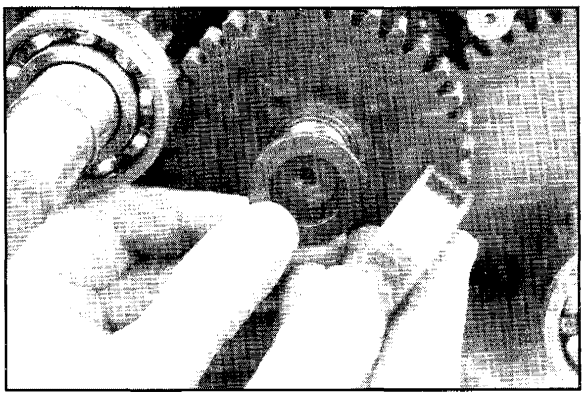
10. Remove oil deflector.



11. Make sure hole in oil deflector is clear and unobstructed.

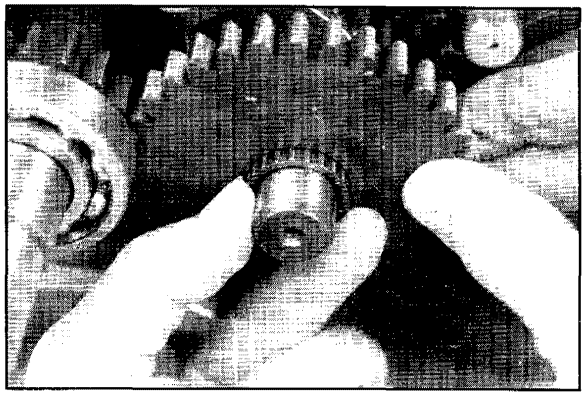


12. Using a puller remove Hi/Lo/Reverse (HLR) shaft bearing, and bearing thrust washer.

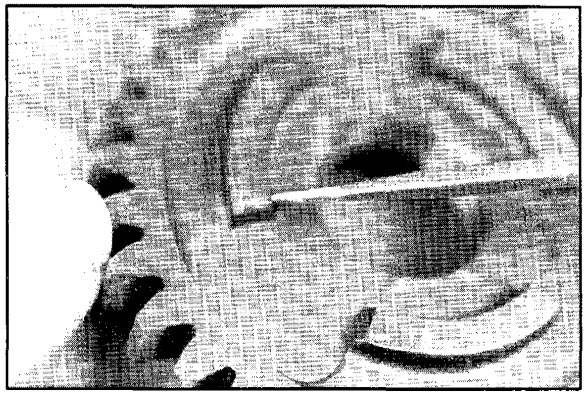


Shaft Drive Transmission Disassembly, Cont.

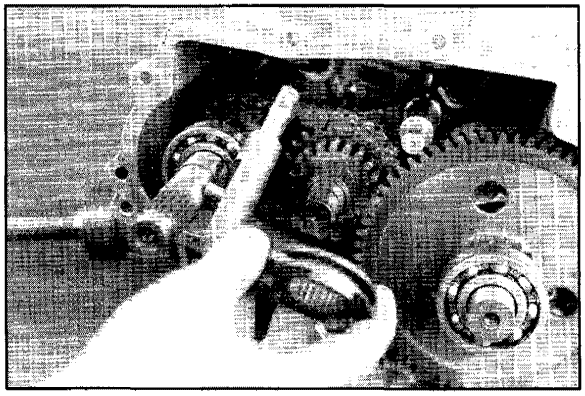
13. Turn transmission so shafts are pointing down. Slide the Low gear in and out until needle bearing is visible. Remove needle bearing, low gear, and inner thrust washer.



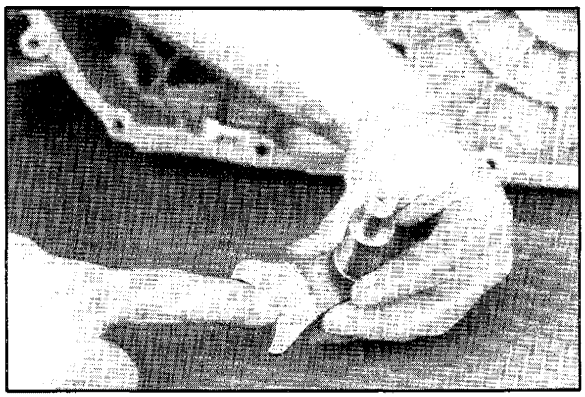
14. Inspect shift dogs for excessive rounding on the leading edges.



15. Remove low range shift fork and dog.



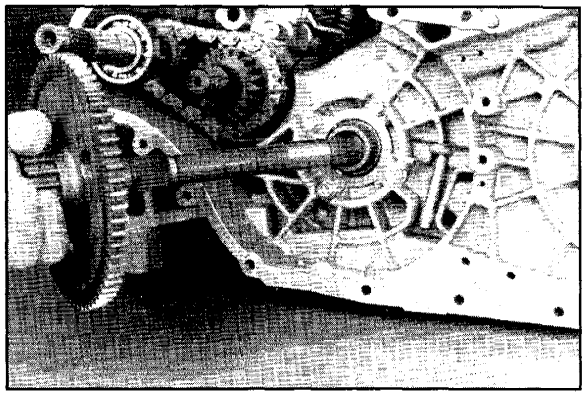
16. Inspect face of shift fork for excessive wear, discoloration, or bending.



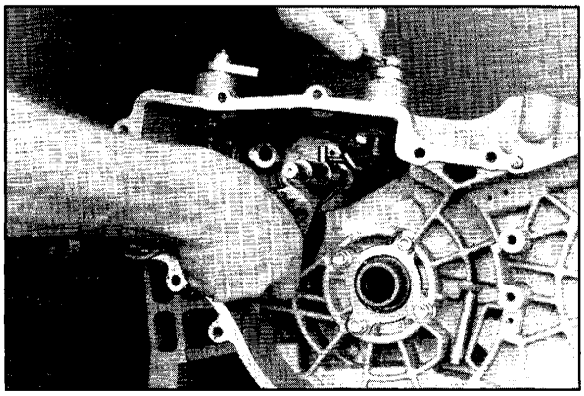
Shaft Drive Transmission Disassembly, Cont.

7. Remove center shaft assembly by tapping on opposite side with a soft face hammer.

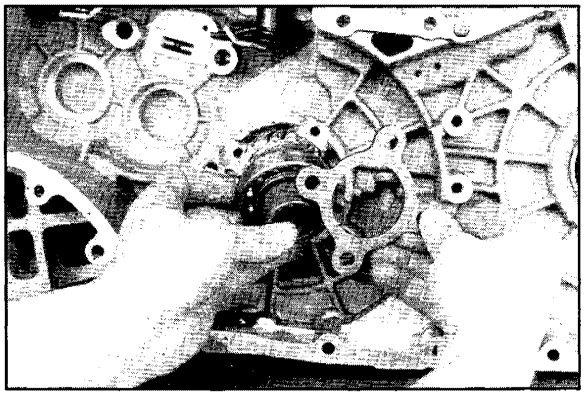
NOTE: Drain plug must be removed, or magnet will interfere with gear.



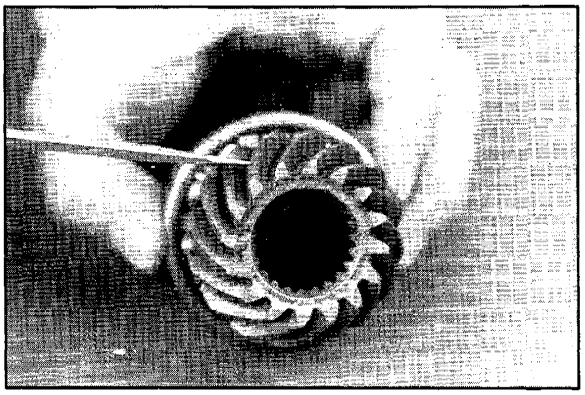
8. Remove the remaining shift components as an assembly. Use a 1/2" wrench on shift bellcrank to aid in removal.



9. Remove pinion gear retaining plate and pinion gear assembly.



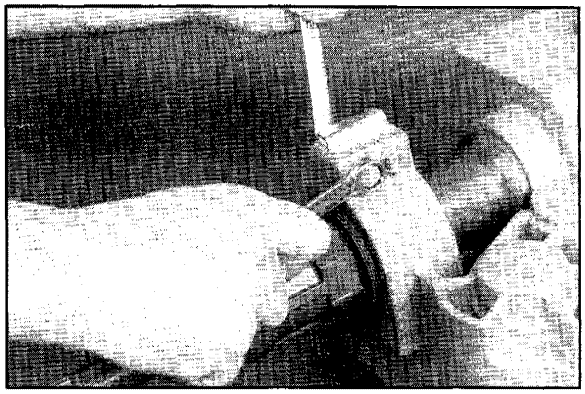
10. Inspect pinion gear for broken, chipped, or worn teeth. Check bearing condition, and snap ring location.



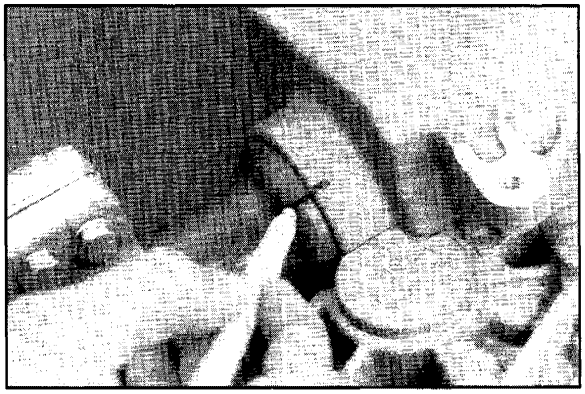
Shaft Drive Transmission Disassembly, Cont.

11. Loosen front output housing pinch bolts.

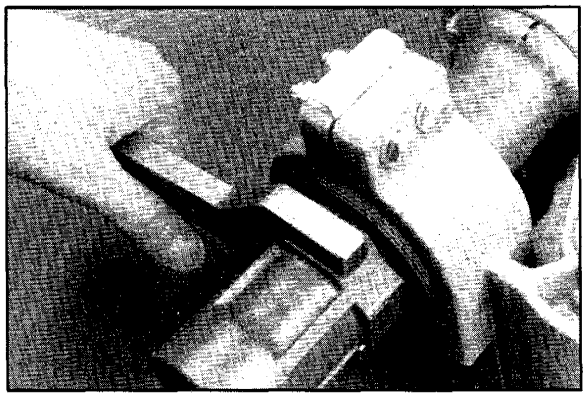
NOTE: 1996 Model shown with pinch plate.



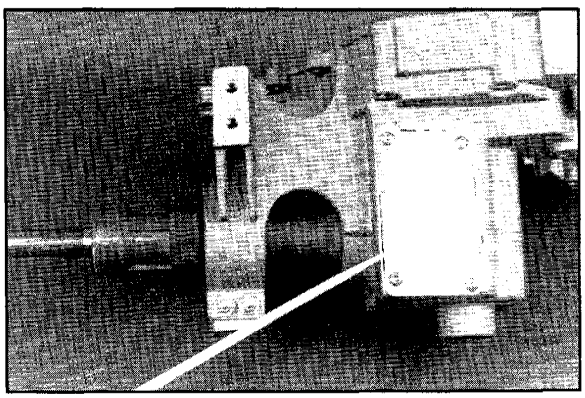
12. Mark housing and casting for reference when reassembling.



13. Using 2 1/8″ wrench (PN 2871701) unscrew the front drive housing from the transmission casting until O-ring is exposed 1/2″ (13mm).

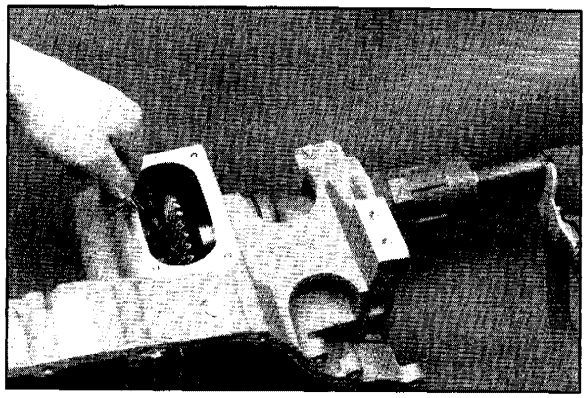


14. Remove bottom access plate.

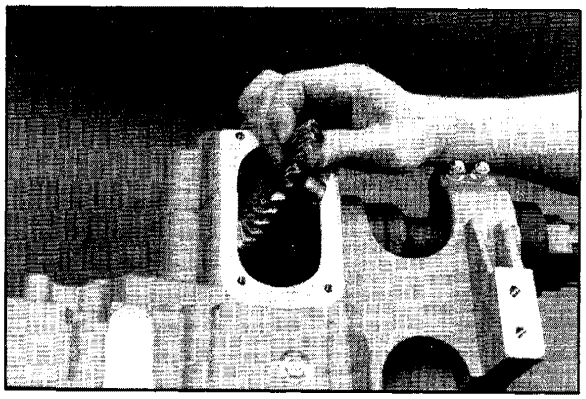


Shaft Drive Transmission Disassembly, Cont.

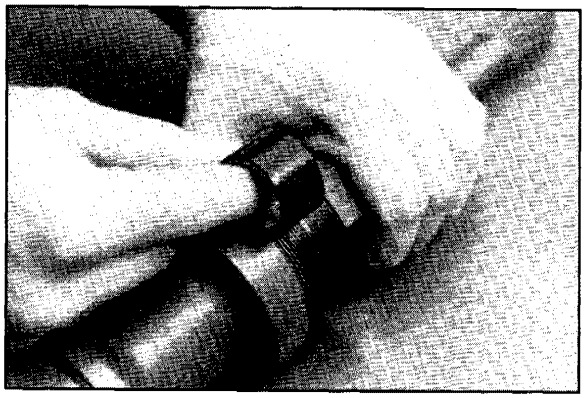
15. Use a strap wrench on splines to hold shaft. Bend lock tab away from front output ring gear retaining bolt and remove bolt.



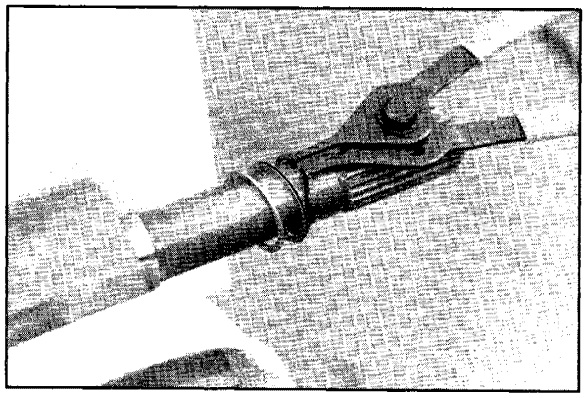
16. Remove front output ring gear. Inspect for broken, chipped, or worn teeth.



17. Unscrew front drive output and protect threads with electrical tape.



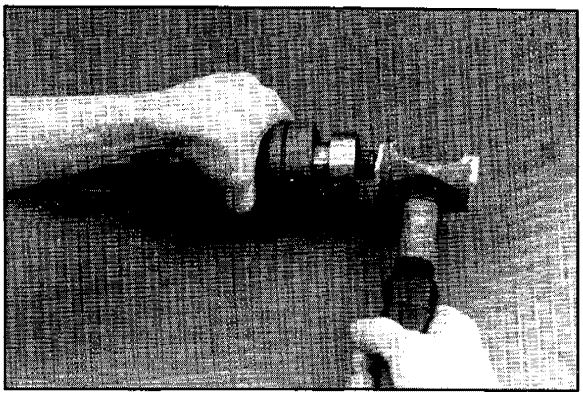
18. Slide seal off shaft and remove snap ring noting shims and thickness.

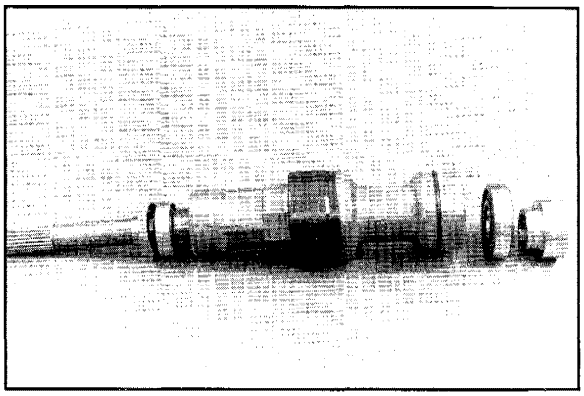


Shaft Drive Transmission Disassembly, Cont.

19. Using a brass hammer or a press, drive the shaft out front of output housing.

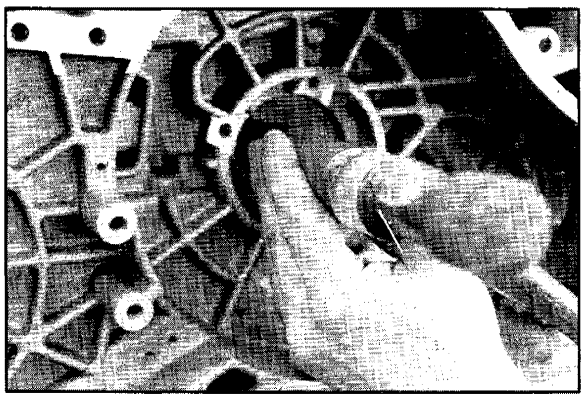
NOTE: Spacer shown is used on 1996 and early 1997 models only. Later models with extended hub gear do not use a spacer.





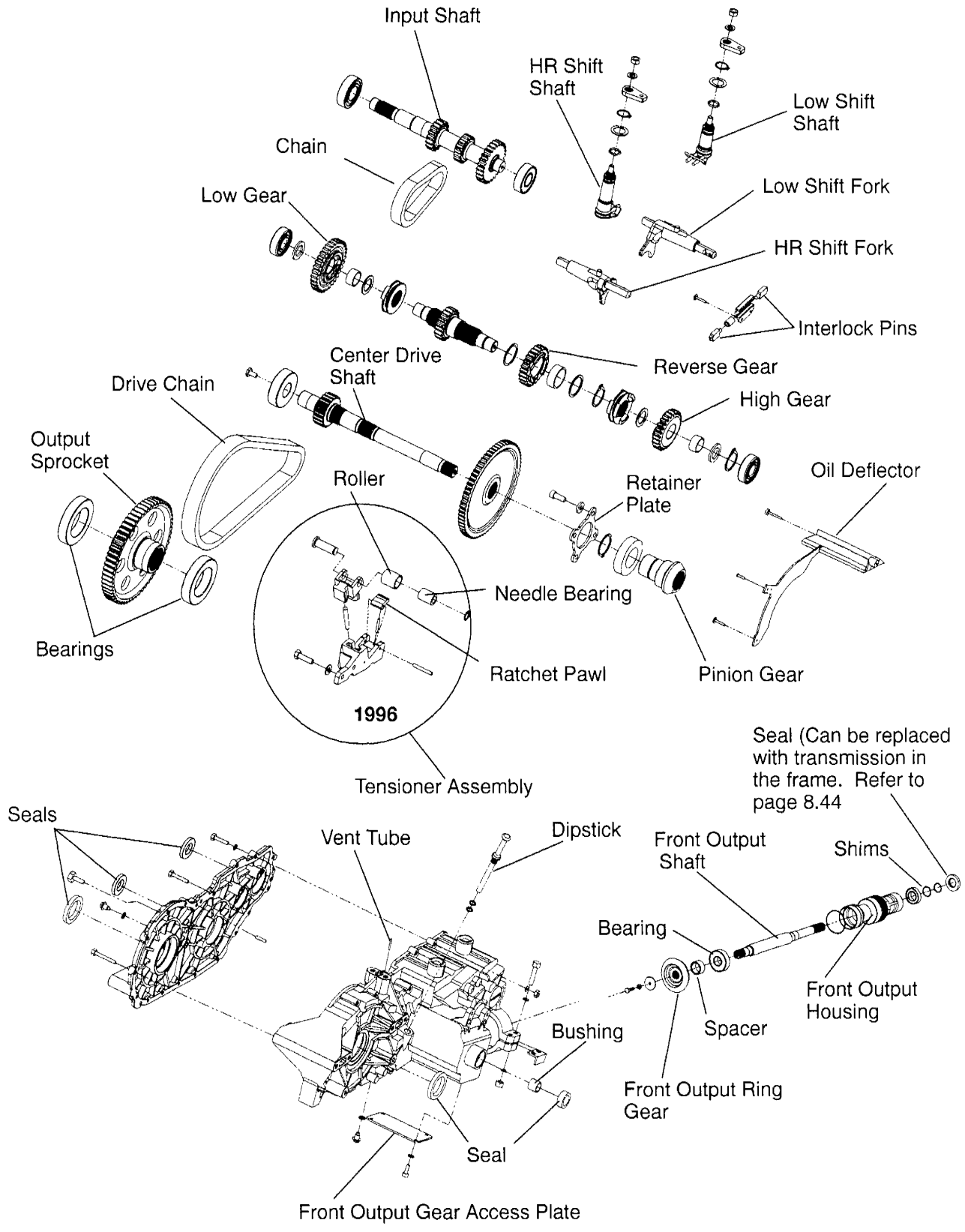
20. Inspect center shaft bushing for wear. If necessary, remove with the large end of bushing drive tool.

Bushing Drive Tool
PN 2871697

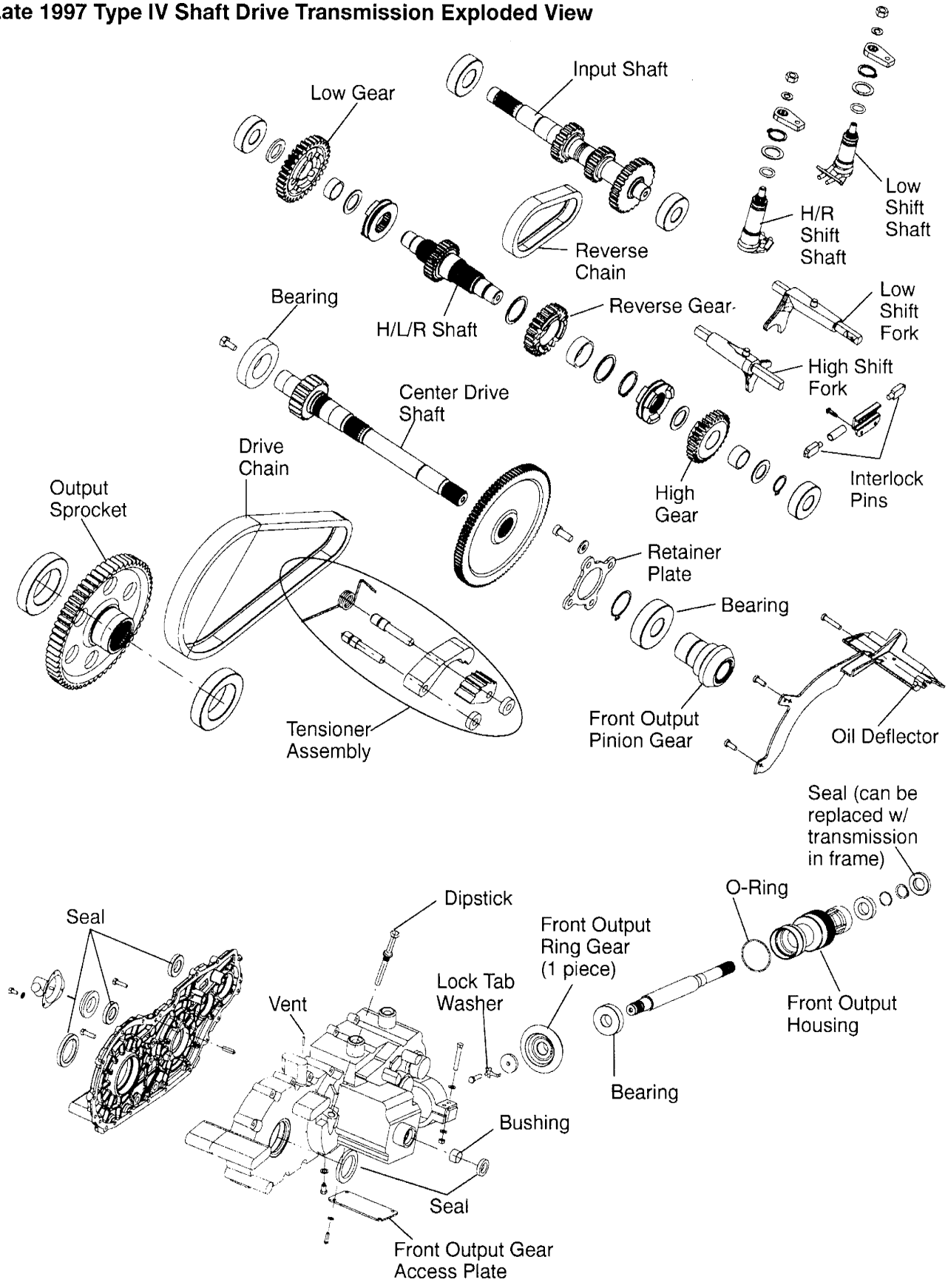


21. Remove all remaining seals and clean all parts thoroughly.

1996-Early 1997 Type IV Shaft Drive Transmission Exploded View

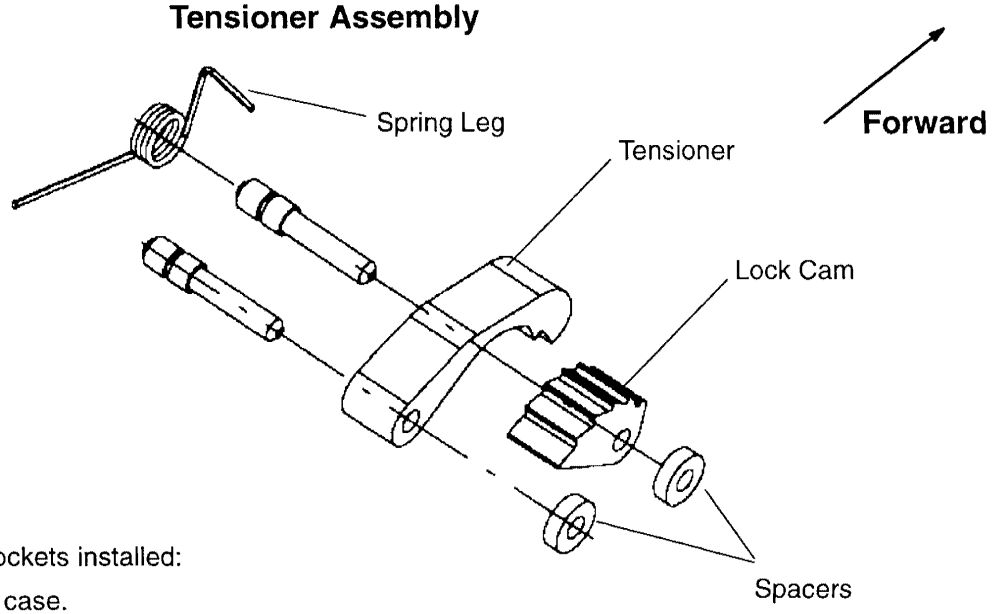


Late 1997 Type IV Shaft Drive Transmission Exploded View



1997 (Late) - Current Tensioner Installation

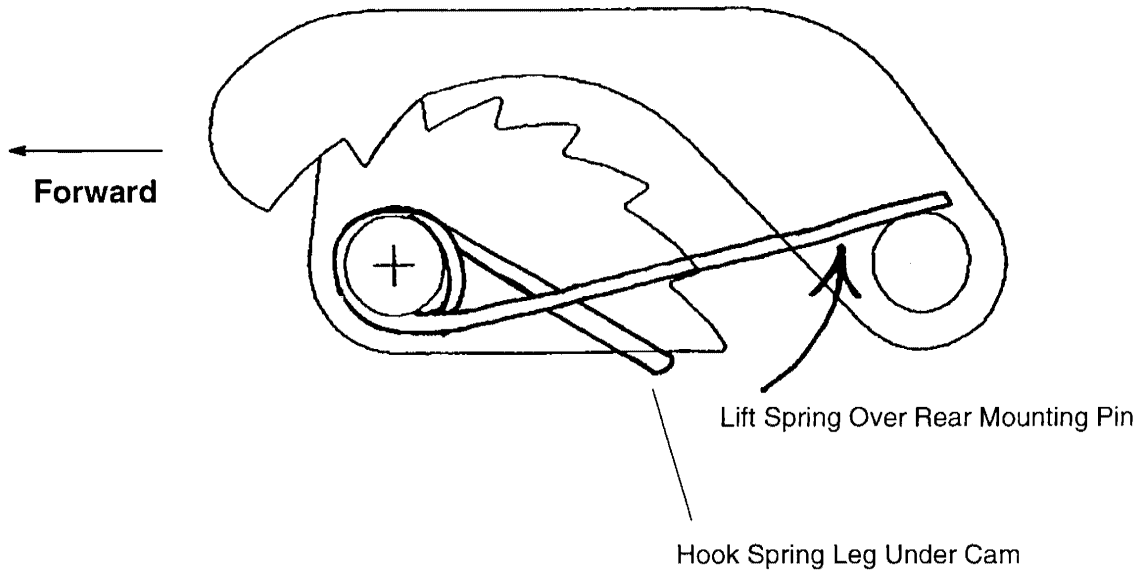
Tensioner Assembly



With chain and sprockets installed:

1. Place spacers in case.
2. Place tensioner cam on front spacer and tensioner shoe on rear spacer.
3. Insert pins through cam and washer, and through shoe and washer.
4. Place spring over front pin and hook spring leg under cam.
5. Lift leg of spring up and over the rear pin. Tensioner cam will lift shoe and tension chain.

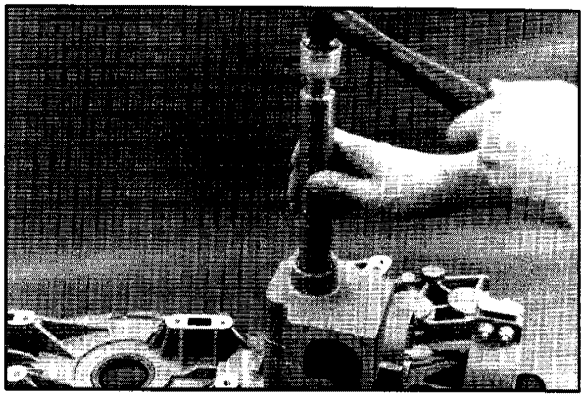
View From Left Side of Transmission



Shaft Drive Transmission Assembly

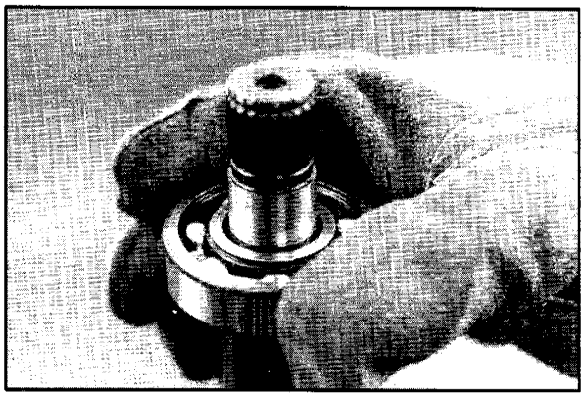
1. Install center shaft bushing using small end of bushing installation tool.

Bushing Drive Tool
PN 2871697



2. Bearing is a light press fit. Heat inner bearing on a hot plate or with a heat gun to ease installation, Install bearing on shaft until inner race bottoms on shaft flange.

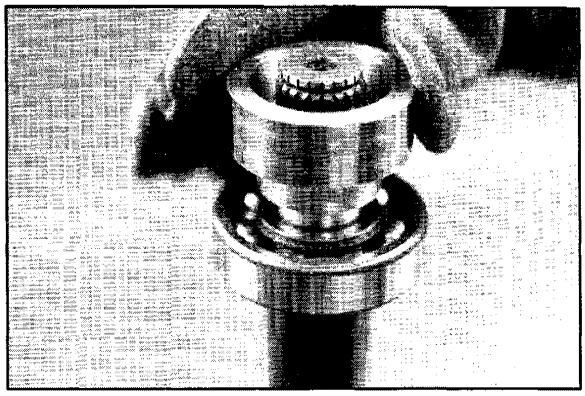
CAUTION: Do not use a torch - bearing damage may result.



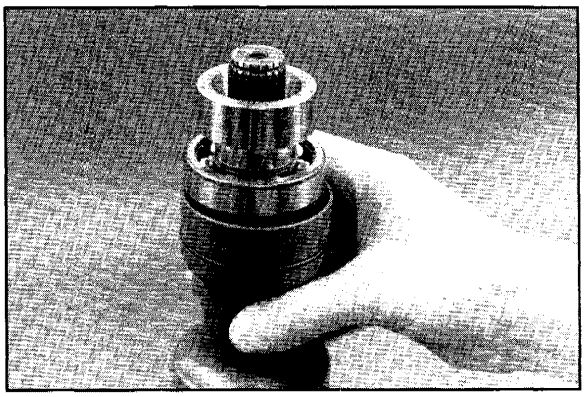
Shaft Drive Transmission Assembly, Cont.

22. Install front spacer until it bottoms on bearing race (1996-early 1997). Press into place if necessary with bearing installation tool.

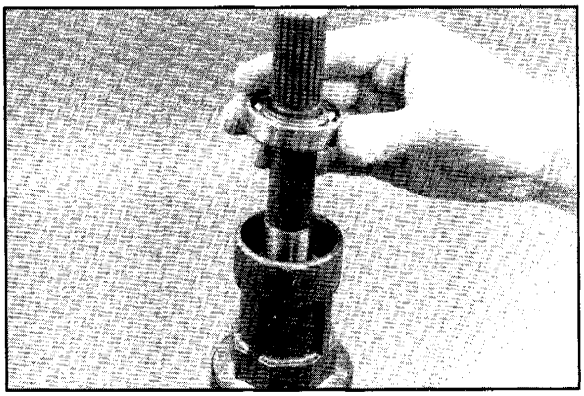
Seal Installation Tool
PN 2871282



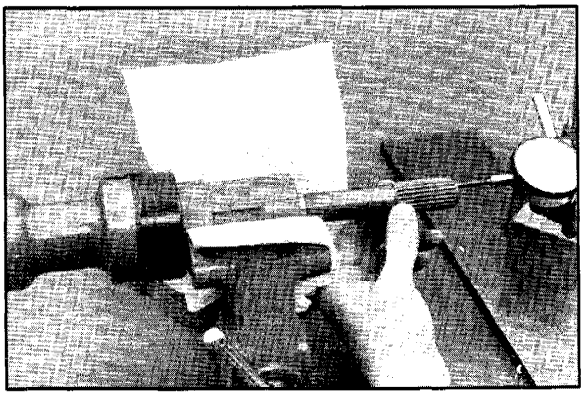
23. Install shaft with bearing and spacer in front output housing.



24. Turn front output housing over and install bearing until fully seated.



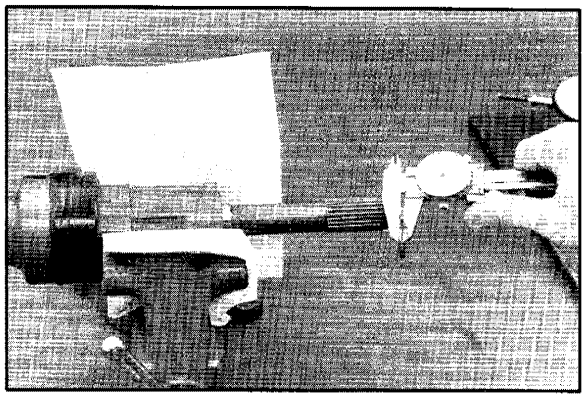
25. Install snap ring without shims in place. Clamp housing lightly in soft jawed vise.



Shaft Drive Transmission Assembly, Cont.

7. Set up a dial indicator to measure shaft end play.

8. Measured end play will be between .030″ -.070″. Shims must be added between bearing and circlip to reduce end play. To calculate proper end play, subtract total shim thickness from end play measured in step 8. Add or subtract shims as required to obtain specified end play (.000-.003″). Remove snap ring, install shims, reinstall snap ring. It may be necessary to tap snap ring into place.

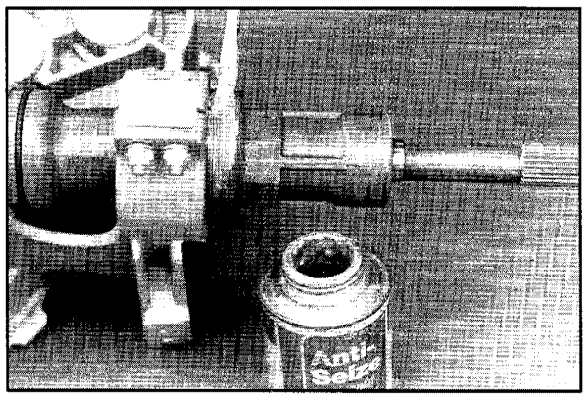


NOTE: Shaft should rotate freely when finished. Confirm end play measurement with dial indicator. *Do not* install seal in housing until backlash is adjusted.

Final Installed Shaft End Play

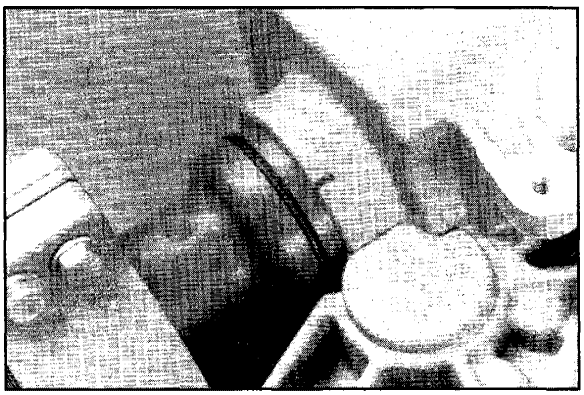
.000″ - .003″ (0mm - .075mm)

9. Liberally apply anti-seize compound to the threads of the output housing.



Shaft Drive Transmission Assembly, Cont.

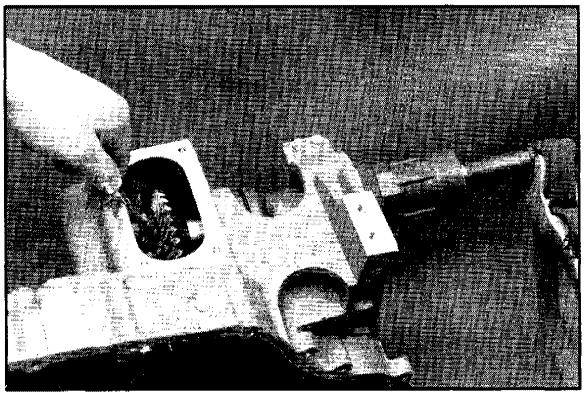
26. Screw in housing until O-ring is approximately 1/4″ (8mm) from transmission housing.



27. Install front output ring gear and retaining bolt. Hold shaft with strap wrench and tighten retaining bolt. Replace lock washer or lock tab washer, and use Loctite™ Primer T on threads and shaft. Use Loctite™ 242 on retaining bolt. Bend tab washer against flat portion of bolt head.

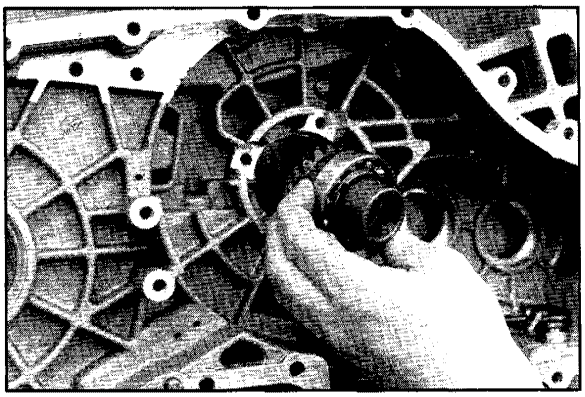
Ring Gear Retaining Bolt Torque:
17 - 20 ft. lbs. (2.35 - 2.7 kg-m)

Apply Loctite™ 242

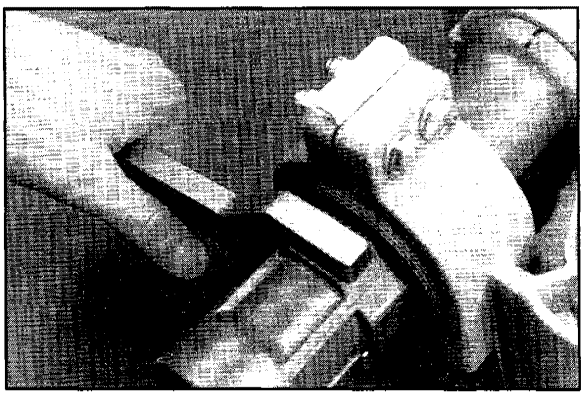


28. Install pinion gear assembly and retaining plate. Use Loctite™ Primer T on bolt and housing threads. Apply Loctite™ 242 to bolts and torque to specification.

Torque Pinion Gear Retainer Bolts to
(17 - 20 ft. lbs. (2.35 - 2.7 kg-m)
Apply Loctite™ 242



29. Lubricate front housing O-ring thoroughly with Polaris All Season grease. Continue to screw front housing in, making sure O-ring enters housing, and ring gear teeth mesh with pinion shaft teeth properly.



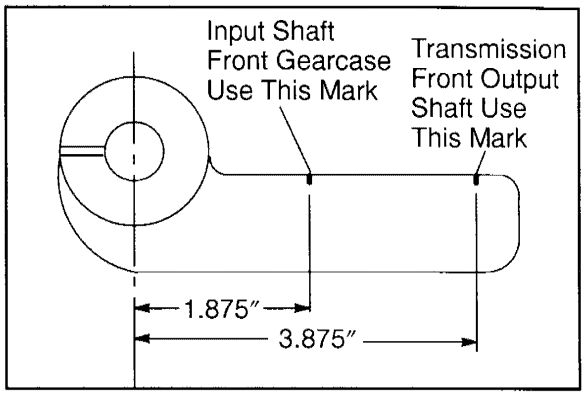
Shaft Drive Transmission Assembly, Cont.

30. Rotate front shaft while slowly turning housing inward. As gear backlash is reduced to zero, the shaft will begin to bind. At this point back off 1/4 turn.

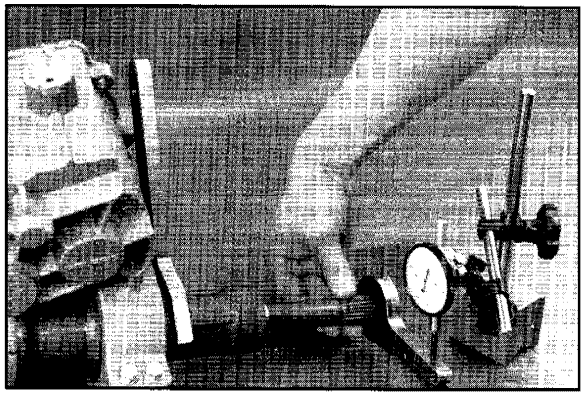
Transmission Output Gear Backlash Adjustment

NOTE: This procedure can be performed with transmission installed in frame.

31. The following steps must be performed to obtain proper front output gear backlash adjustment:
    - The pinion gear must be held securely.
    - Do not lubricate the gear teeth until backlash adjustment is complete. Both gears must be free of grease and oil.
    - Perform adjustment with front output housing seal removed.
    - Measure backlash using tool (PN 2871695). The measurement point is 3.875″ (98.43mm) from shaft centerline.
    - Adjust backlash to .008″ - .014″ (.20 -.36mm).
    - Check backlash in several locations of ring gear.

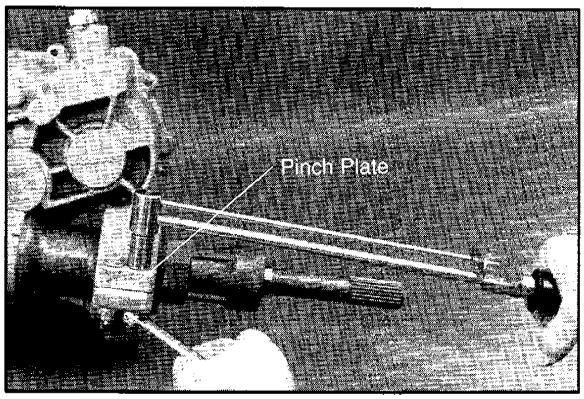


32. Install special tool (PN 2871695) on shaft as shown. With pinion gear held stationary rotate output shaft back and forth reading the total movement of dial indicator. The dial indicator must be positioned as shown at the proper distance (aligned with outermost mark on tool, and 90° to the tool surface), or backlash will be incorrect.
    - To reduce backlash rotate housing clockwise as viewed from front of housing.
    - To increase backlash rotate housing counterclockwise.



33. Torque pinch bolts. Recheck backlash.

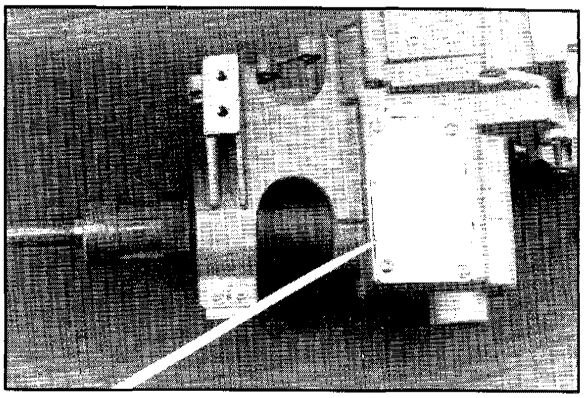
1996 Models: Make sure pinch plate is in place before tightening.



Front Drive Housing Pinch Bolt Torque
(17 - 20 ft. lbs. (2.35 - 2.7 kg-m)

Shaft Drive Transmission Assembly, Cont.

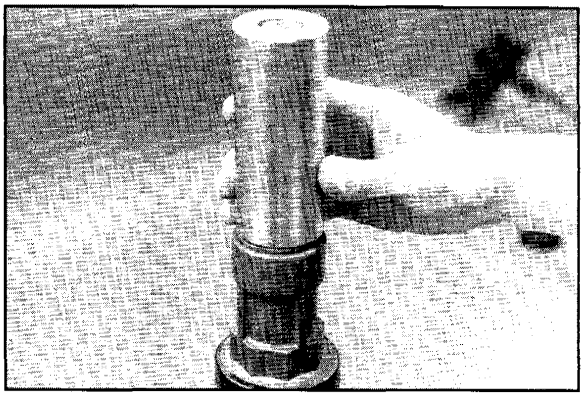
34. Make sure surface of access plate and transmission are clean, and install bottom access plate with notch to front as shown. Apply loctite™ 515/518 gasket eliminator.



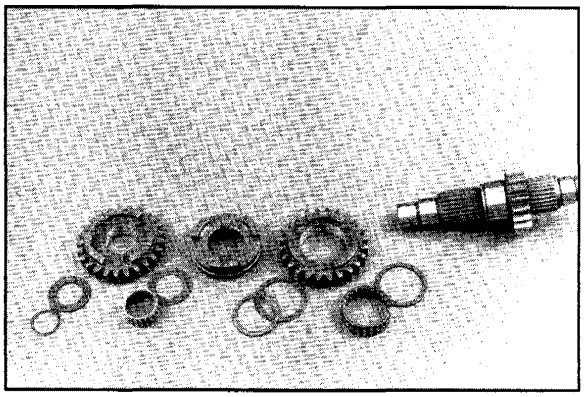
35. Using the Magnum crankshaft installation tool, lubricate and install the front seal until flush with housing.

Magnum Crankshaft Installation Tool Kit:

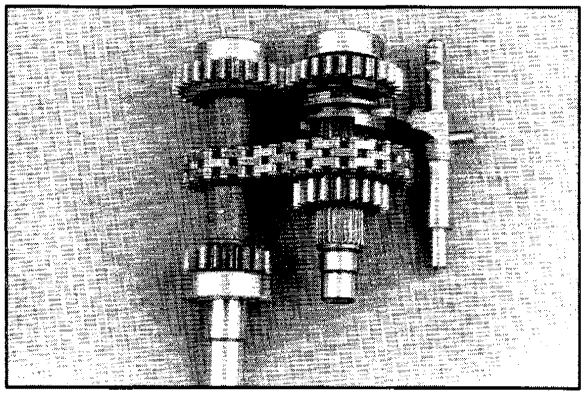
PN 2871283



36. Assemble Hi/Reverse assembly. Machined side of circlip should face direction of thrust. Sliding shift dog is symmetrical and can be installed either way. The outer gear dogs must face each other.

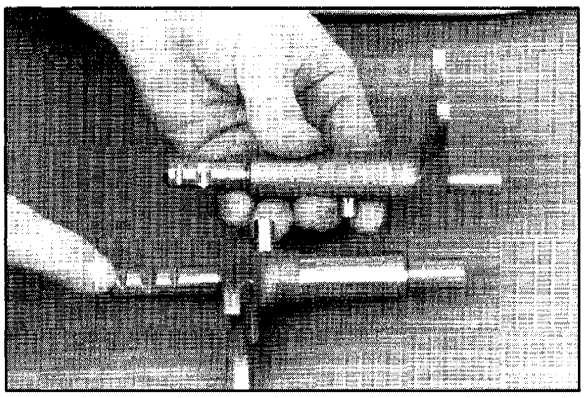


37. Assemble the Hi/Reverse gear cluster as shown.

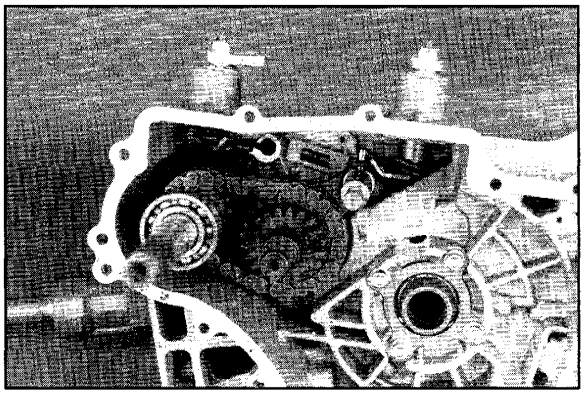


Shaft Drive Transmission Assembly, Cont.

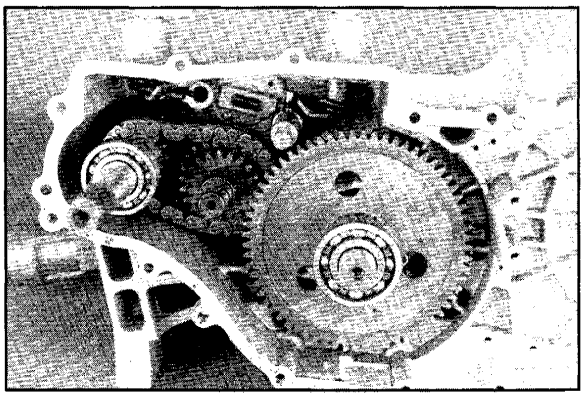
22. The two shift forks can be easily identified by the indentations. Low/Neutral shaft has 2 detents, and Hi/Neutral/Reverse has 3 detents.



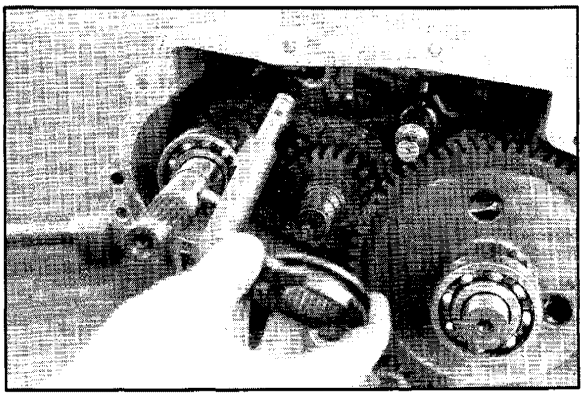
23. Install Hi/Reverse cluster in transmission as an assembly. If necessary use a soft face hammer to install shafts until fully seated. Make sure the hi/reverse shift pin is located between the spring tail ends. Make sure Hi/Reverse shift assembly is in neutral position. If not you will not be able to install low range shift fork.



24. Install center shaft assembly.

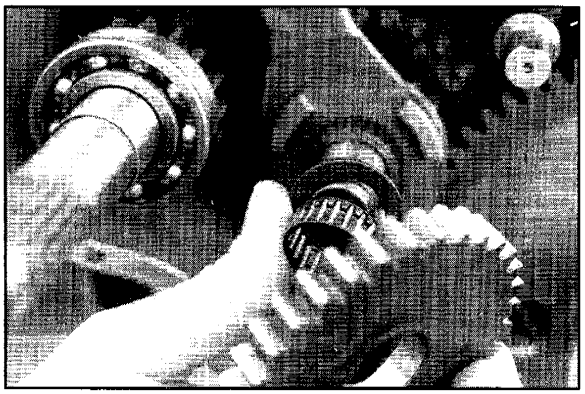


25. Install Low shift fork with sliding dog in place. Dogs must be positioned outward toward you. Slide the shift dog over the spline, and the low range shift shaft into the detent lock. Make sure the shift shaft pin is located between the spring tail ends.

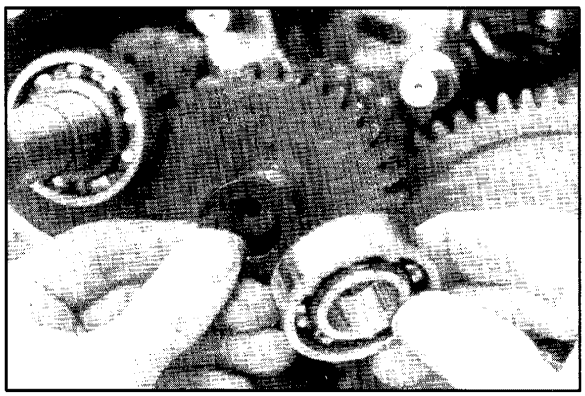


Shaft Drive Transmission Assembly, Cont.

26. Install inner thrust washer, low gear, and needle bearing.



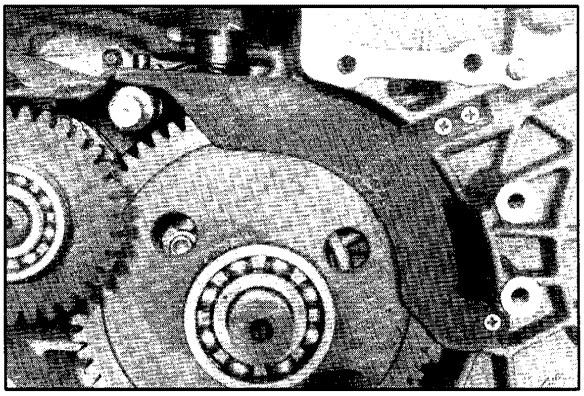
27. Install outer thrust washer and bearing.



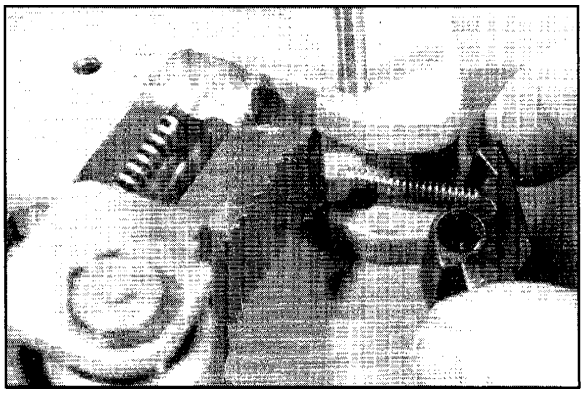
28. Install plastic oil deflector. Apply Loctite™ 242 to all four screws.

NOTE: Do not over tighten deflector screws, or deflector may crack.

Oil Deflector Screws
Loctite™ 242

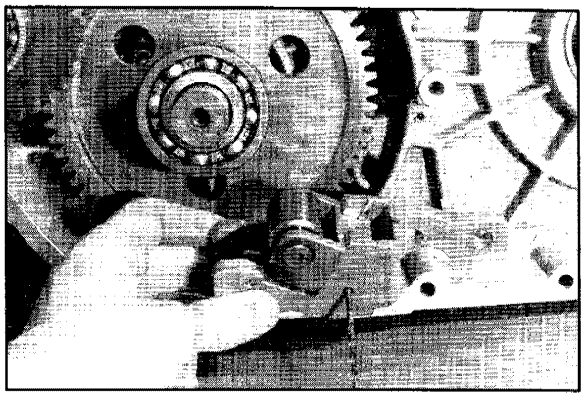


29. Assemble chain tensioner.



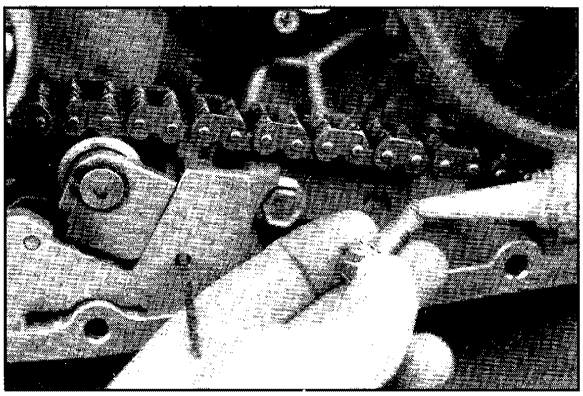
Shaft Drive Transmission Assembly, Cont.

38. 1996 Models – Compress and lock tensioner in retracted position with a 1/8" drill bit. Install chain tensioner in transmission.
    1997 to Current Models – Install tensioner assembly with spacers. Be sure spring is fully seated against ratchet or cover may bind.

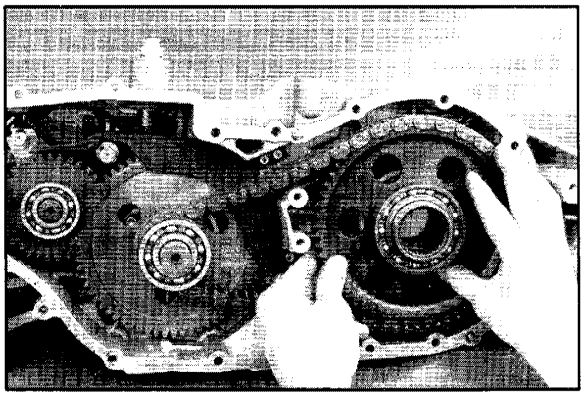


39. Clean tensioner bolts and housing threads with Loctite™ Primer T, and apply Loctite™ 242 to chain tensioner bolts.

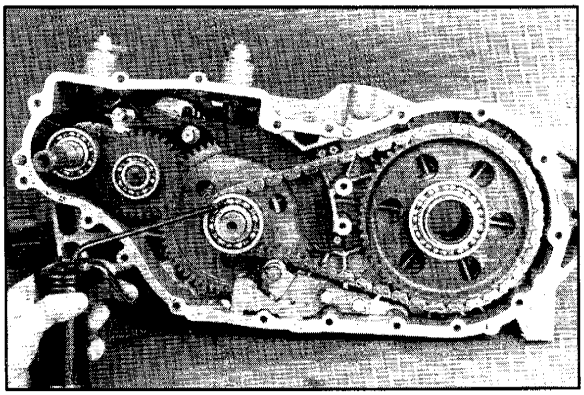
Chain Tensioner Bolt Torque:
17 - 20 ft. lbs. (2.35 - 2.7 kg-m)
Apply Loctite™ 242



40. Install drive gear and chain.



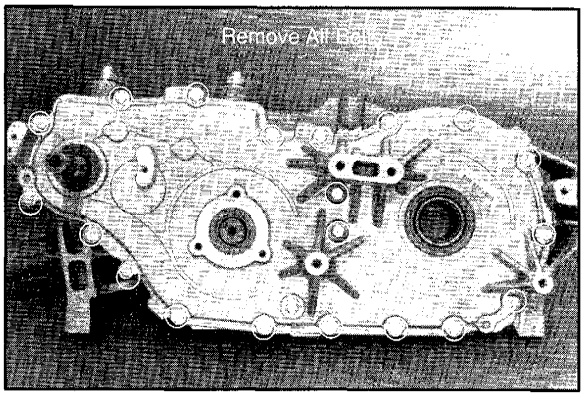
41. Pre-lubricate all bearings with Polaris Premium Synthetic Gear Case Lubricant before installing cover.



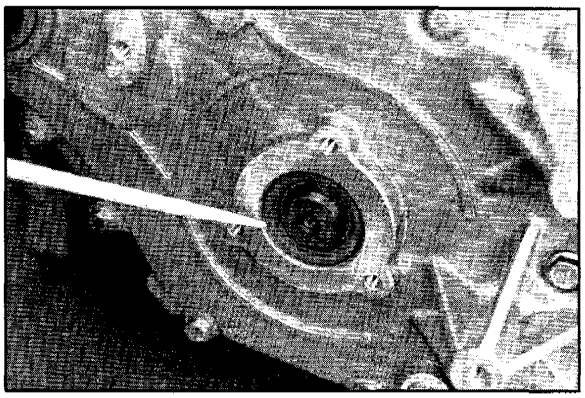
Shaft Drive Transmission Assembly, Cont.

42. Install cover with Loctite™ 515/518 and all cover bolts, torque to specification. Remove drill bit from chain tensioner and install plug (1996 models). Lubricate input shaft seal with Polaris All Season Grease, and install until flush using Magnum crankshaft installation tool.

Torque 5/16 bolts (2)
17 - 20 ft. lbs. (2.35 - 2.77 kg-m)
Torque 1/4 bolts
8 - 10 ft. lbs. (1.11 - 1.14 kg-m)



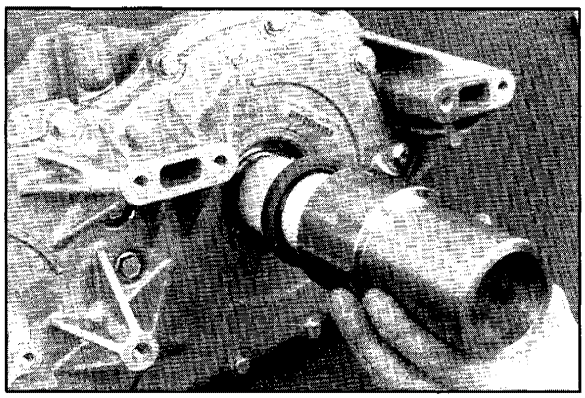
43. Install new greased seal on center drive shaft. Set seal to a depth of 1/8″ for speedometer angle drive clearance. Refer to photo.



44. Install seal installation tool in drive gear as shown. Lubricate new seal with grease and slide onto tool. Drive seal carefully into place using large end of seal driver. Repeat procedure for other side.

Output Gear Seal Driver

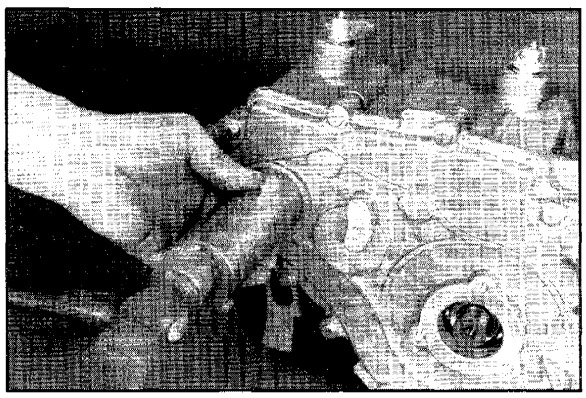
PN 2871699



45. Grease and install center shaft seal flush with transmission housing using seal installation tool.

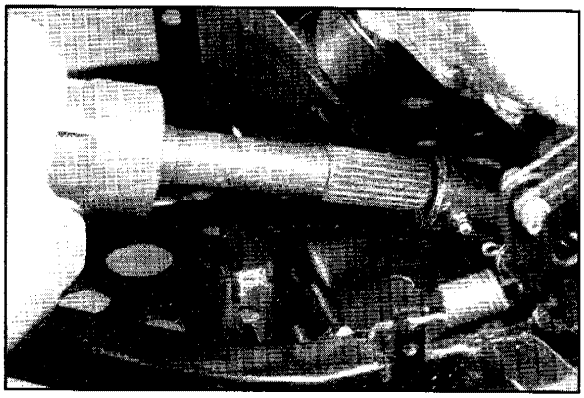
Seal Installation Tool

PN 2871282

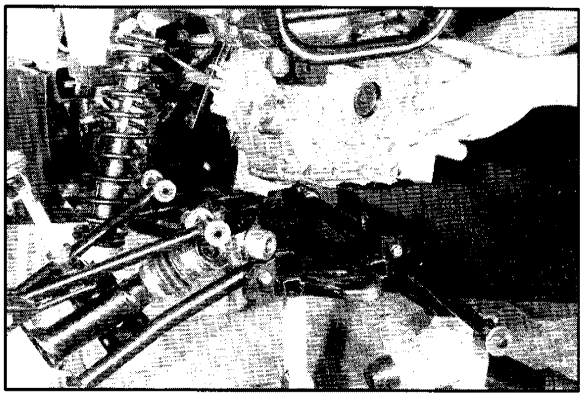


Shaft Drive Transmission Installation

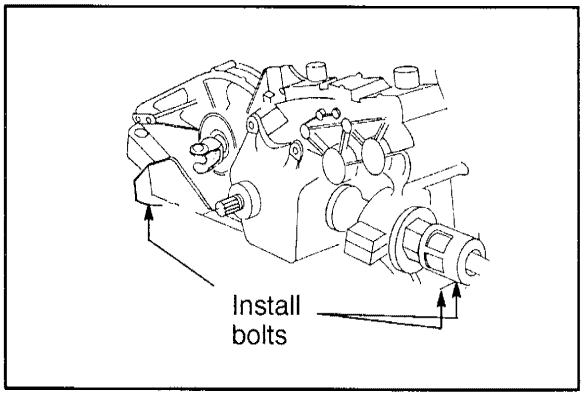
1. Apply anti-seize compound to splines of front output shaft and insert into prop shaft.



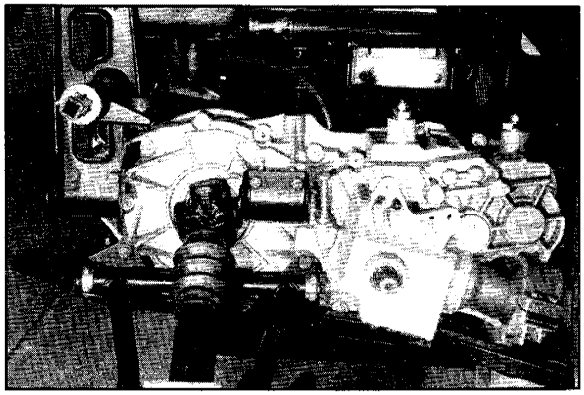
2. .Rotate transmission into place from right side of frame.



3. *Loosely* install bottom transmission bolts.

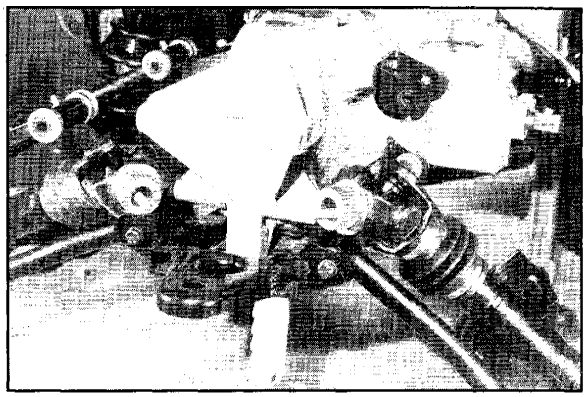


4. Install lower right and left transmission mounting bolts, front transmission bracket, and rear stabilizer support bracket. Tighten transmission bolts securely in the following sequence.
   - Front support bracket upper and lower.
   - Stabilizer bracket upper and lower.
   - Bottom transmission bolts.
   - Lower left and right transmission mounting bolts.



Shaft Drive Transmission Installation, Cont.

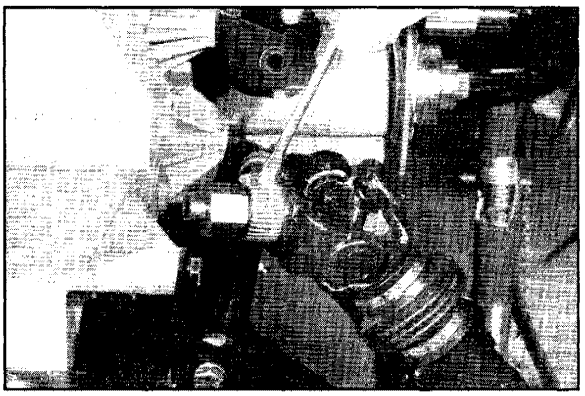
5. Apply Loctite™ 272 to right hand drive shaft bolt and install internally threaded spacer onto bolt. Torque to specification.



Rear Drive Shaft Retaining Bolt Torque
35 ft. lbs. (4.85 kg-m)
Apply Loctite™ 272

6. .Apply anti-seize to splines of drive shaft and install right side drive shaft in transmission with opening in U-joint upward. Support right hand hub and install right hand upper control arm attaching bolts. Install stabilizer bar arm on stabilizer bar.

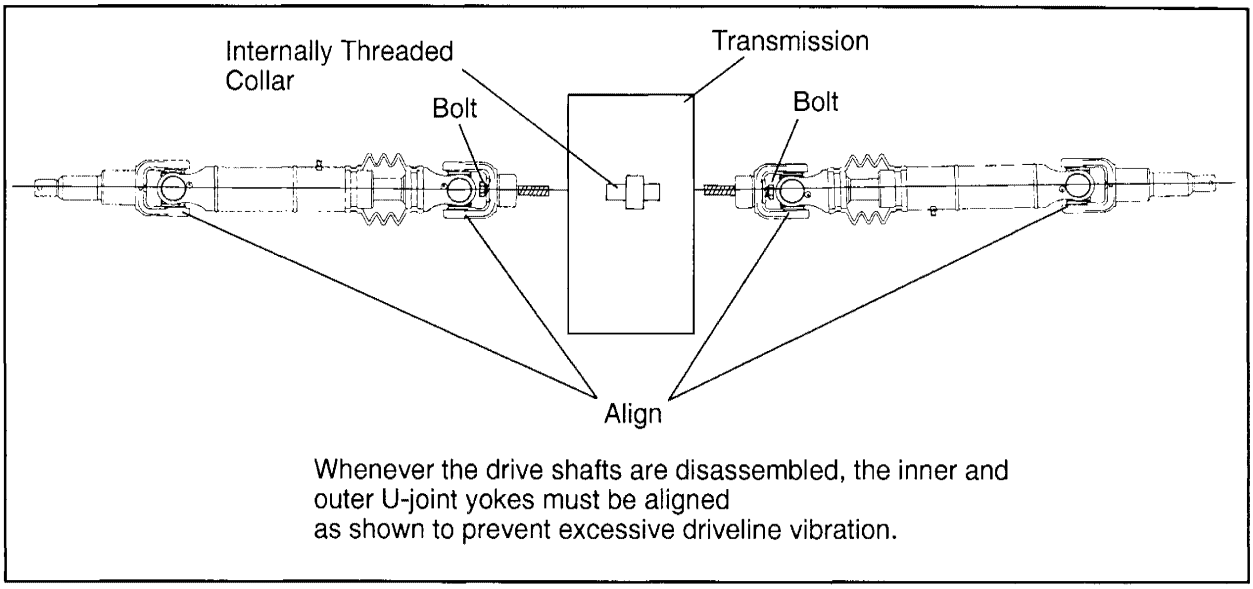
7. Apply Loctite™ 272 to left hand drive shaft bolt and install in transmission, aligning all U-joint yokes and grease fittings with the right side. Install left hand upper control arm attaching bolts.



NOTE: Start left hand driveshaft bolt before installing driveshaft completely into splined hub. Torque left drive shaft bolt to specification.

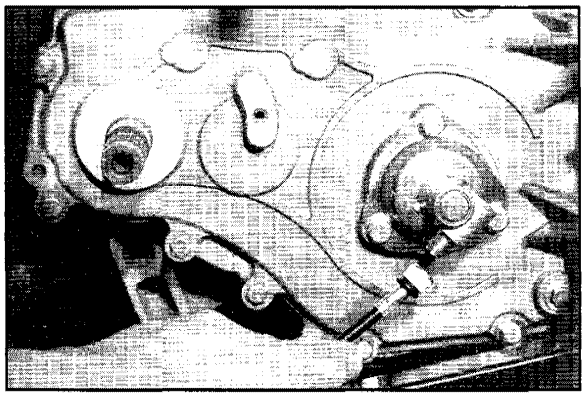
Rear Drive Shaft Retaining Bolt Torque
35 ft. lbs. (4.85 kg-m)
Apply Loctite™ 272

Shaft Drive Transmission Installation, Cont.



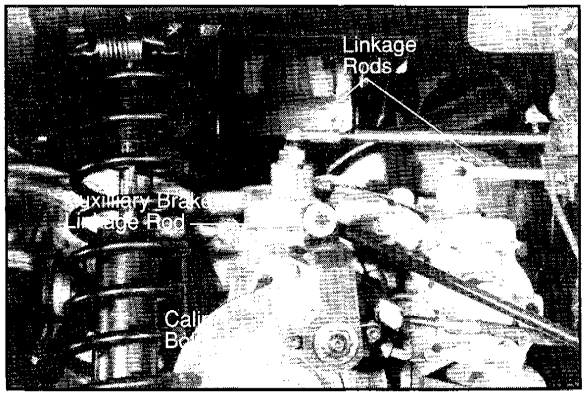
Whenever the drive shafts are disassembled, the inner and outer U-joint yokes must be aligned as shown to prevent excessive driveline vibration.

8. Attach speedometer cable.



9. Install brake disc, caliper, auxiliary brake linkage rod, and transmission shift linkage rods. Install right hand shock absorber.

10. Install PVT system. Refer to PVT section for procedure.



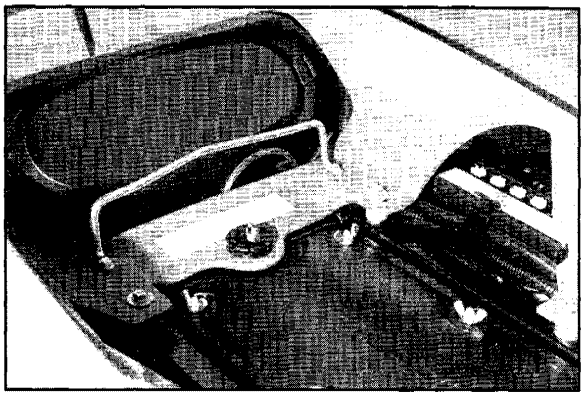
Shaft Drive Transmission Installation, Cont.

11. Install airbox assembly and transmission vent line. Be sure vent line is not kinked or pinched.

12. Add Polaris Premium Synthetic Gearcase Lubricant to the proper level on dipstick. (Approximately 1 quart). Do not overfill.

Premium Synthetic Gear Case Lubricant

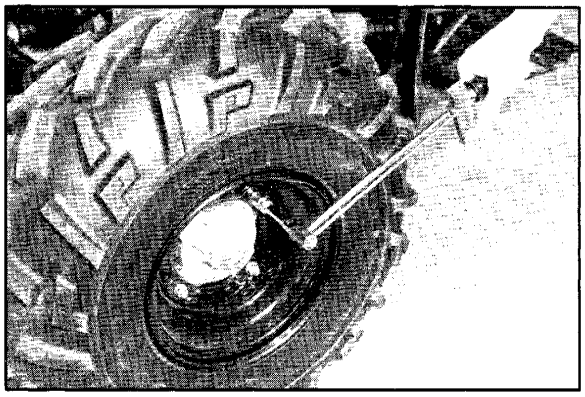
PN 2871178 (12 oz.)
PN 2870464 (Gallon)



13. Install rear wheel nuts and torque to specification.

Rear Wheel Retaining Bolt Torque

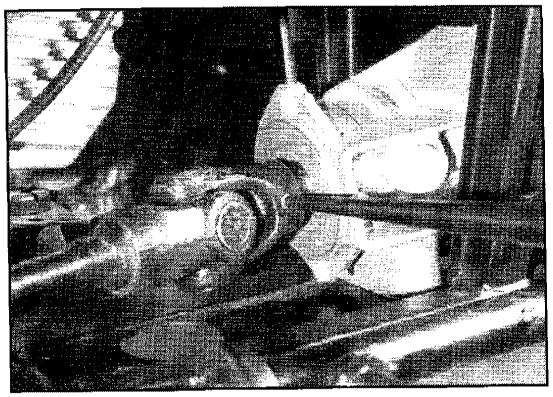
15 ft. lbs. (2.08 kg-m)



14. Refer to Maintenance Section to adjust transmission linkage.

Front Drive Housing Seal Service

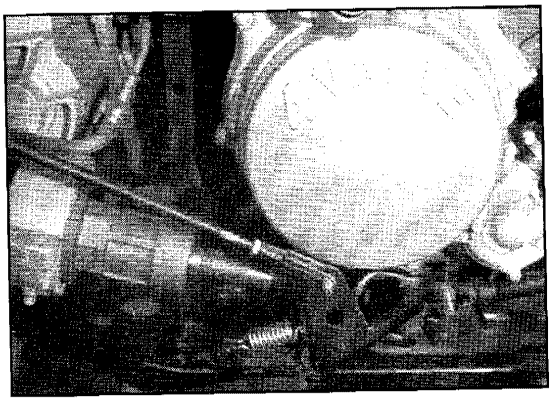
Front Drive Housing Seal Removal (In Frame)



1. Using a drift punch, remove roll pin from prop shaft at front gearcase. Slide prop shaft back and away from front gearcase. Pull sharply forward to remove from transmission front output shaft.
2. Tightly wrap electrical tape over splines of output shaft to protect sealing surface.
3. Pry front output housing seal out and discard.
4. Inspect the shaft and housing sealing areas for nicks, burrs, or damage.

Front Drive Housing Seal Installation (In Frame)

1. Make sure the sealing areas on the front output shaft and housing are clean and free of nicks, burrs, or damage. Wrap splines of shaft tightly with electrical tape to prevent seal damage during installation.
2. Apply a light film of grease to shaft surface and seal lip. Carefully slide new seal on output shaft with spring side in - toward transmission. Take care not to dislodge spring from seal lip.
3. Slide seal into position against output housing. Using the Magnum crankshaft installation tool, drive seal in until outer edge is flush with housing.
4. Remove electrical tape from shaft.
5. Lubricate prop shaft O-ring and install prop shaft.
6. Align roll pin holes on front gearcase and prop shaft.
7. Drive new roll pin into place until flush with prop shaft.



CHAPTER 9
BRAKES

Front Brake Caliper All 1996 to Current Models/1997 Rear caliper 6x6		
Item	**Standard**	**Service Limit**
Brake Pad Thickness	.275″ / 7.0mm	.150″ / 3.81mm
Caliper Piston Bore I.D.	1.191-1.192″ / 30.252-30.277mm	1.193″
Caliper Piston O.D.	1.186-1.1875″ / 30.125-30.163mm	1.1855″
Brake Disc Thickness	.150-.164″ / 3.810-4.166mm	.140″ / 3.556mm
Brake Disc Thickness Variance Between Measurements	-	.002″ / .051mm
Brake Disc Runout	-	.020″ / .50mm

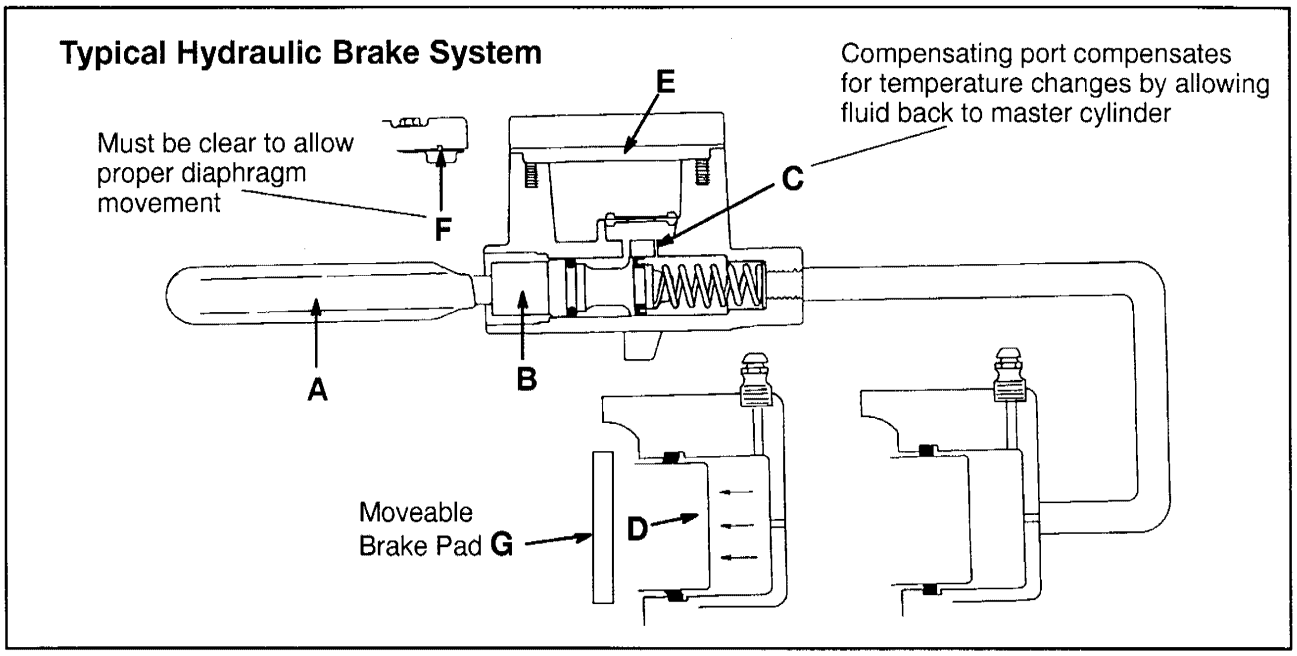
Output Shaft Brake Caliper All 1996 to Current Models		
Item	**Standard**	**Service Limit**
Brake Pad Thickness	.275″ / 7.0mm	.150″ / 3.81mm
Caliper Piston Bore I.D.	1.003-1.004″ /25.476-25.502mm	1.005″
Caliper Piston O.D.	.9970-.9985″ / 25.324-25.362mm	.9965
Brake Disc Thickness	.177-.187″ /4.496-4.750mm	.167″ / 4.242mm
Brake Disc Thickness Variance Between Measurements	-	.002″ / .051mm
Brake Disc Runout	-	.010″ / .25mm

Rear Axle Brake Caliper 1996 6X6 Models		
Item	**Standard**	**Service Limit**
Brake Pad Thickness	.490″ / 12.45mm	.150″ / 3.81mm
Caliper Piston Bore I.D.	1.745-1.746″ / 44.32 -44.35mm	1.748″ / 44.40
Caliper Piston O.D.	1.740″ / 44.20mm	1.739 / 44.17
Brake Disc Thickness	.177-.187″ /4.496-4.750mm	.167″ / 4.242mm
Brake Disc Thickness Variance Between Measurements	-	.002″ / .051mm
Brake Disc Runout	-	.010″ / .25mm

Master Cylinder					
Type	**Application**	**Bore I.D.**	**Piston O.D.**	**Fluid Type**	**Identification**
III	All 1996 (L.H.) Except: Trail Blazer ES, Sport, and Scrambler	.750	.746	Dot 3	Black; Cast Aluminum Reservoir
IV	1996 Trail Blazer ES, Sport, Scrambler All 1997	.750	.746	Dot 3	Black; Aluminum Body; Plastic Reservoir
V	1998 Scrambler 400/500; 1998 Sportsman 500 Hydraulic Auxiliary Brake	.500	.496	Dot 3	Auxiliary (Foot) Brake Remote Reservoir
VI	1996 6X6 (Right Hand Side)	.625	.621	Dot 3	Black; Aluminum Body; Plastic Reservoir

Torque Specifications

Item	Torque (ft. lbs. except where noted*)	Torque (kg-m)
Front Caliper Mounting Bolts	18.0	2.48
Output Shaft Caliper Mounting Bolts	15.0	2.07
Rear Axle Caliper Mounting Bolts (6x6) and Dual Hydraulic Rear Axle Caliper (1998 Scrambler 400/500)	18.0	2.48
Master Cylinder Mounting Bolts	*55 in. lbs.	.62
Master Cylinder Reservoir Cover Bolt	*45 in. lbs.	.52
Brake Line Banjo Bolt	12.0	1.66
Front Brake Disc	18.0	2.48
Rear Brake Disc (6x6)	24.0	



The Polaris brake system consists of the following components or assemblies: brake lever; master cylinder; hydraulic hose; brake calipers (slave cylinder); brake pads; and brake discs, which are secured to the drive line.

When the hand activated brake lever (A) is applied it contacts a piston (B) within the master cylinder. As the master cylinder piston moves inward it closes a small opening (compensating port) (C) within the cylinder and starts to build pressure within the brake system. As the pressure within the system is increased, the piston (D) located in the brake caliper moves outward and applies pressure to the moveable brake pad. This pad contacts the brake disc and moves the caliper in its floating bracket, pulling the stationary side pad into the brake disc. The resulting friction reduces brake disc and vehicle speed. As the lever pressure is increased, the braking affect is also increased.

The friction applied to the brake pads will cause the pads to wear. As these pads wear, the piston within the caliper moves further outward and becomes self adjusting. Fluid from the reservoir fills the additional area created when the caliper piston moves outward.

Brake fluid level is critical to proper system operation. Too little fluid will allow air to enter the system and cause the brakes to feel spongy. Too much fluid could cause brakes to drag due to fluid expansion.

Located within the master cylinder is the compensating port (C) which is opened and closed by the master cylinder piston assembly. The port is open when the lever is released and the master cylinder piston is outward. As the temperature within the hydraulic system changes, this port compensates for fluid expansion (heated fluid) or contraction (cooled fluid). During system service, be sure this port is open. Due to the high temperatures created within the system during heavy braking, it is very important that the master cylinder reservoir have adequate space to allow for fluid expansion. **Never overfill the reservoir!** Fill to 1/4″ - 5/16″ (.64 - .80 cm) from top of the cylinder.

This system also incorporates a diaphragm (E) as part of the cover gasket; and a vent port (F) located between the gasket and the cover. The combination diaphragm and vent allow for the air above the fluid to equalize pressure as the fluid expands or contracts. Make sure the vent is open and allowed to function. If the reservoir is over filled or the diaphragm vent is plugged the expanding fluid may build pressure in the brake system leading to brake failure.

When servicing Polaris ATV brake systems use only Polaris DOT 3 high temperature brake fluid (PN 2870990). Polaris brake fluid is sold in 5.5 oz. bottles. **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 from the air. This causes the boiling temperature of the brake fluid to drop, which can lead to early brake fade and the possibility of serious injury.

BRAKES
Fluid Replacement/Bleeding Procedure

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.

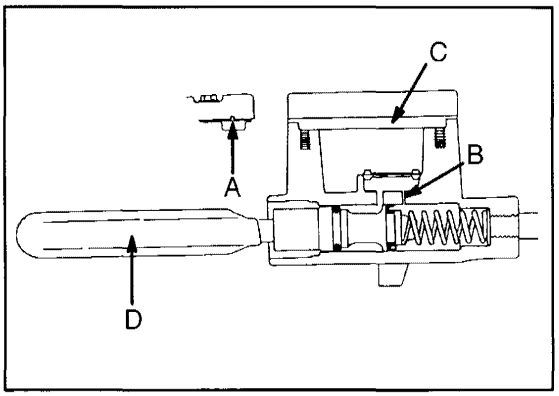
Brake Bleeding - Fluid Change

This procedure should be used to change fluid or bleed brakes during regular maintenance.

1. Clean reservoir cover thoroughly.
2. Remove screws, cover, and diaphragm from reservoir.
3. Inspect vent slots (A) in cover and remove any debris or blockage.
4. If changing fluid, remove fluid from reservoir with a Mity Vac™ pump or similar tool.

NOTE: Do not remove brake lever when reservoir fluid level is low.

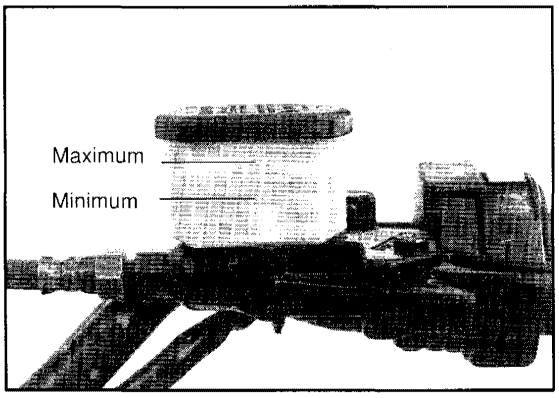
Mity Vac™ PN 2870975



5. Add brake fluid to within 1/4-5/16″ (6 - 8 mm) of reservoir top.

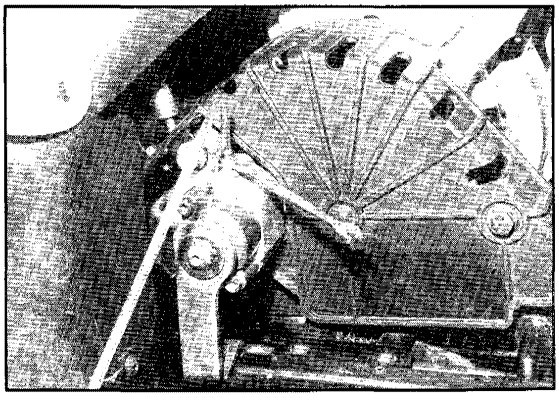
Polaris DOT 3 Brake Fluid

PN 2870990



6. Install a box end wrench on caliper bleeder screw fitting. Attach a clean, clear hose to fitting and place the other end in a clean container. Be sure the hose fits tightly on fitting.

NOTE: Fluid may be forced from compensation port (B) when brake lever is pumped. Place diaphragm (C) in reservoir to prevent spills. Do not install cover.



Brake Bleeding - Fluid Change Cont.

7. *Slowly* pump lever (D) until pressure builds and holds.
8. While maintaining lever pressure, open bleeder screw. Close bleeder screw and release brake lever. **NOTE:** Do not release lever before bleeder screw is tight or air may be drawn into caliper.
9. Repeat procedure until clean fluid appears in bleeder hose and all air has been purged. Add fluid as necessary to maintain level in reservoir.

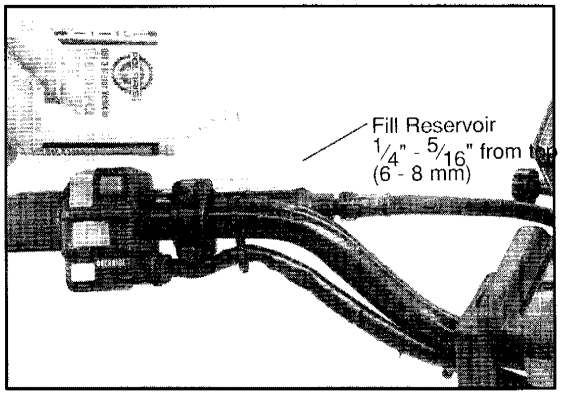
CAUTION:

Maintain at least 1/2″ (1.27 cm) of brake fluid in the reservoir to prevent air from entering the master cylinder.

10. Tighten bleeder screw securely and remove bleeder hose.
11. Repeat procedure steps 5-9 for the front right caliper.
12. Repeat procedure steps 5-9 for the front left caliper.
13. Add brake fluid to the proper level.

Master Cylinder Fluid Level

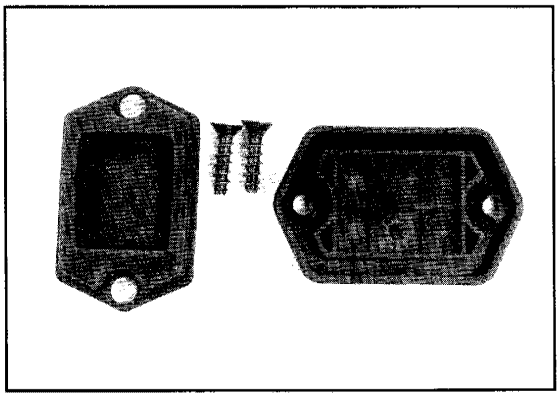
1/4″ - 5/16″ (6 - 8 mm) below top of master cylinder



14. Install diaphragm, cover, and screws. Tighten screws to specification.

Reservoir Cover Torque -

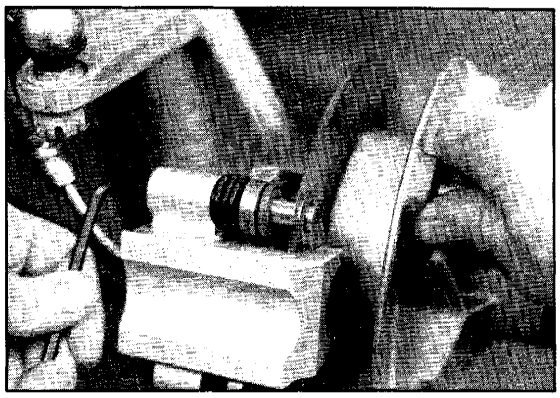
45 in. lbs. (.52 kg-m)



15. Field test machine at low speed before putting into service. Check for proper braking action and lever reserve. With lever firmly applied, lever reserve should be no less than 1/2″ (1.3 cm) from handlebar.
16. Check brake system for fluid leaks.

BRAKES
Front Pad Replacement
Front Pad Removal

1. Elevate and support front of machine.



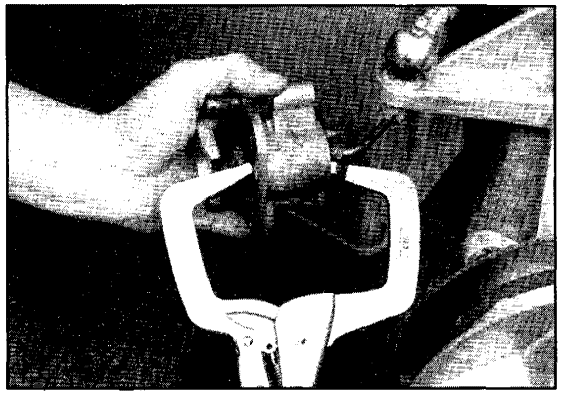
CAUTION:

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 and take pad adjuster screw out.

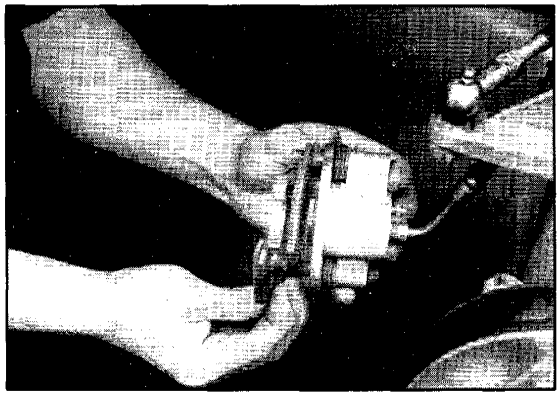
3. Remove caliper.

4. Push caliper piston into caliper bore slowly using a C-clamp or locking pliers with pads installed.

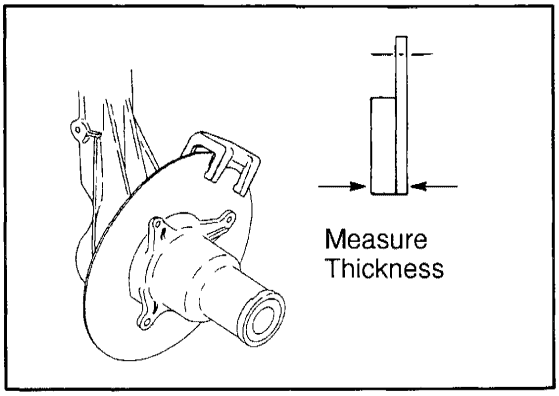


NOTE: Brake fluid will be forced through compensating port into master cylinder fluid reservoir when piston is pushed back into caliper. Remove excess fluid from reservoir as required.

5. Push upper pad retainer pin inward and slip outer brake pad past edge. Remove inner pad.



6. Measure the thickness of the pad material. Replace pads if worn beyond the service limit.



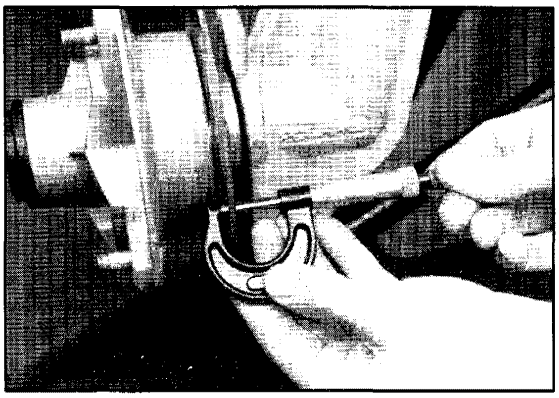
Front Brake Pad Thickness	
New	.275"/7.0 mm
Service Limit	.150" / 3.81 mm

Front Pad Removal Cont.

7. Remove mounting bracket and pin assembly.
8. Remove dust boots.
9. Clean and inspect pins. They must be free of rust or corrosion. Replace boots.

Inspection

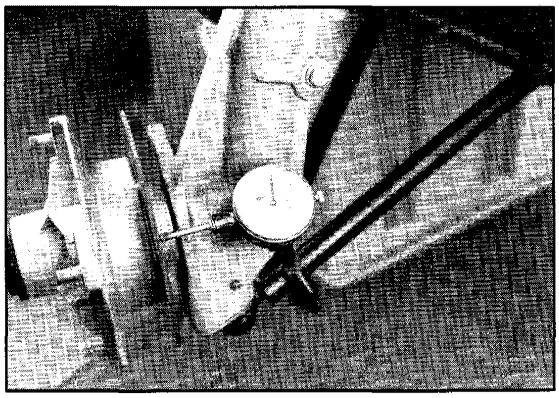
1. Visually inspect the brake disc for nicks, scratches, or damage.
2. Measure the disc thickness at 8 different points around the pad contact surface using a 0-1″ micrometer. Replace disc if worn beyond service limit.



Brake Disc Thickness
New .150-.164″ (3.810-4.166 mm)
Service Limit .140″ / 3.556 mm

Brake Disc Thickness Variance
Service Limit .002″ (.051 mm) difference between measurements.

3. Mount dial indicator as shown to measure disc runout. Slowly rotate the disc and read total runout on the dial indicator. Replace the disc if runout exceeds specifications.



Brake Disc Runout
Service Limit .020″ (.50 mm)

Front Pad Replacement

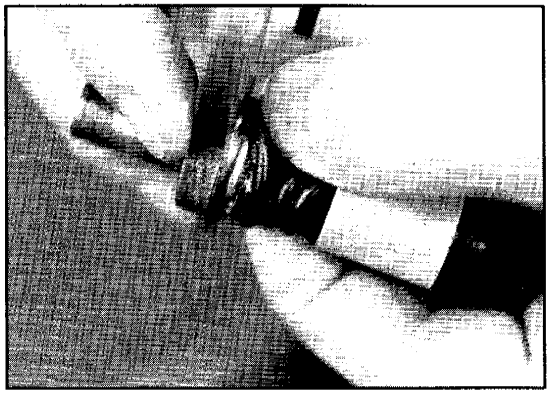
Assembly

1. Lubricate mounting bracket pins with a light film of Polaris Premium All Seasons Grease, and install rubber dust seal boots.

Polaris Premium All Season Grease

PN 2871423

2. Compress mounting bracket and make sure dust seals are fully seated. Install pads with friction material facing each other. Be sure pads and disc are free of dirt or grease.

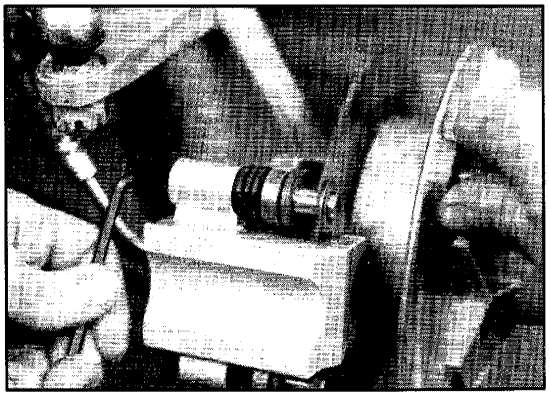


3. Install caliper on hub strut, and torque mounting bolts.

Front Caliper Mounting Bolts

Torque 18 ft. lbs. (2.48 kg-m)

4. Slowly pump the brake lever until pressure has been built up. Maintain at least 1/2″ (12.7 mm) of brake fluid in the reservoir to prevent air from entering the brake system.
5. Install the adjuster screw and turn until stationary pad contacts disc, then back off 1/2 turn.



Master Cylinder Fluid Level

1/4″ - 5/16″ (6 - 8 mm) below top of master cylinder

Assembly Cont.

6. Install wheels and torque wheel nuts.

7. It is recommended 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. Repeat procedure 10 times.

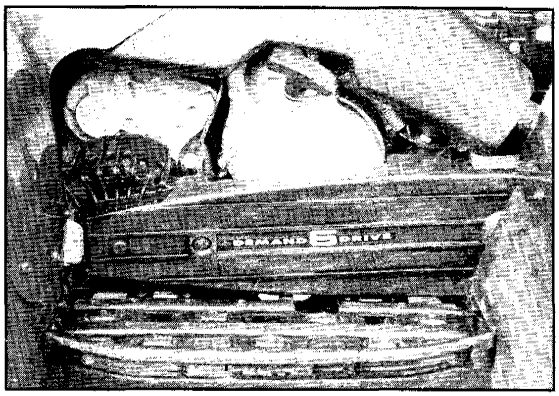
Front Wheel Nut Torque
15 ft. lbs. (2.07 kg-m)

Output Shaft Brake Pad Replacement/Adjustment

Removal

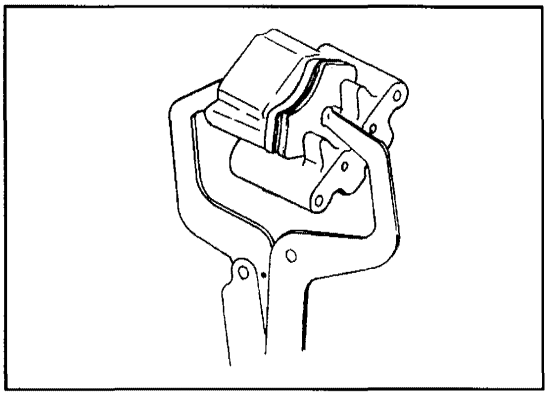
1. Remove fenders, guards, footrests, etc. as required to gain access to caliper mounting bolts.
2. Disconnect the auxiliary brake lever linkage rod.
3. Remove caliper.

NOTE: When removing caliper, be careful not to damage brake line. Support caliper so as not to kink or bend brake line.

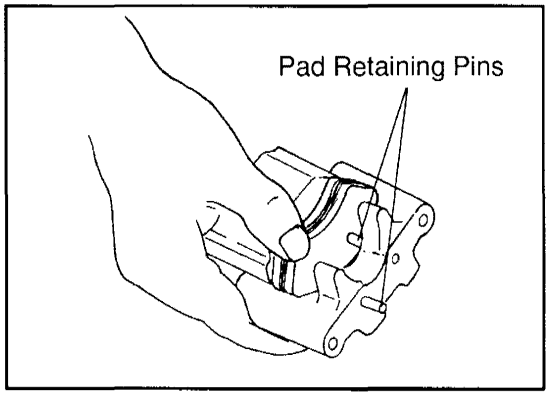


4. Push caliper piston into caliper bore slowly with C-clamp or locking pliers with pads installed.

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.

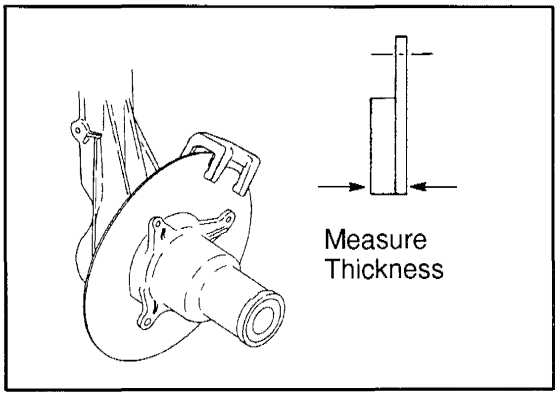


5. Using a pair of needle nose pliers, slide pad retaining pins out rear of caliper. Press the pads against the anti-rattle spring to make it easier to remove the pins.
6. Clean pad retainer pins with a wire brush.
7. Clean the caliper w/ brake cleaner or alcohol.



8. Measure the thickness of the pad material. Replace pads if worn beyond the service limit.

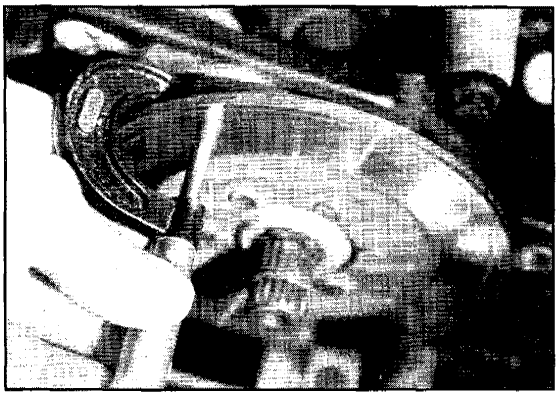
Output Shaft Brake Pad Thickness
New .275" (7.0 mm)
Service Limit .150" (3.81 mm)



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 disc thickness at 8 different points around perimeter of disc. Replace disc if worn beyond service limit.



Brake Disc Thickness
New .177-.187″ (4.496-4.750 mm)
Service Limit .167″ (4.242 mm)

Brake Disc Thickness Variance
Service Limit .002″ (.051 mm)
difference between measurements

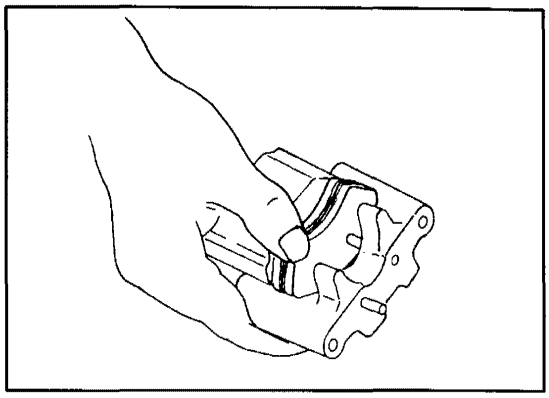
3. Mount dial indicator and measure disc runout. Replace the disc if runout exceeds specifications.

Brake Disc Runout
Service Limit .010″ (.25 mm)

Output Shaft Brake Pad Replacement/Adjustment

Assembly

1. Install new pads in caliper body. Make sure pins slide freely into body. **Do Not Force.** Press the pads against the anti-rattle spring to make it easier to install the pins.
2. Install caliper and torque mounting bolts.



Output Shaft Brake Caliper

Torque 18 ft. lbs. (2.48 kg-m)

3. Slowly pump the brake lever until pressure has been built up. Maintain at least 1/2″ (12.7 mm) of brake fluid in the reservoir to prevent air from entering the master cylinder.

Master Cylinder Fluid Level

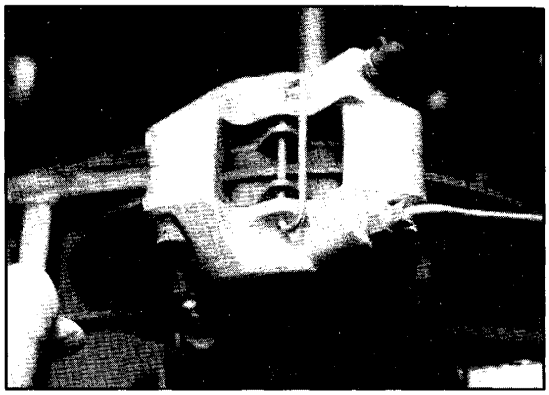
1/4″ - 5/16″ (6 - 8 mm) below top of master cylinder

4. It is recommended 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. Repeat procedure 10 times.

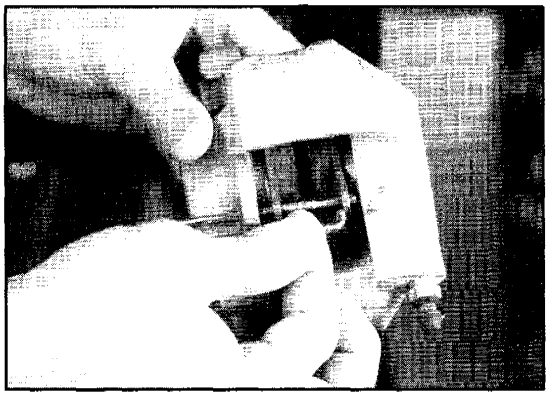
Removal

1. Clean caliper area before removing pads. Using a dull, flat instrument between the old pads and brake disc, slowly pry back the pads to push caliper piston into bore. Be careful not to damage brake disc.

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.

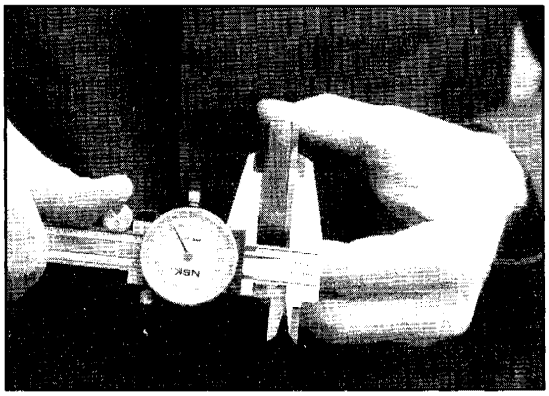


2. Remove brake pad retaining pin. Do not open pin farther than is necessary to remove the pin or pin tension may be lost.



3. Measure the thickness of the pad material. Replace pads if worn beyond the service limit.

Front Brake Pad Thickness	
New	.490" (12.45 mm)
Service Limit	.150" (3.81 mm)

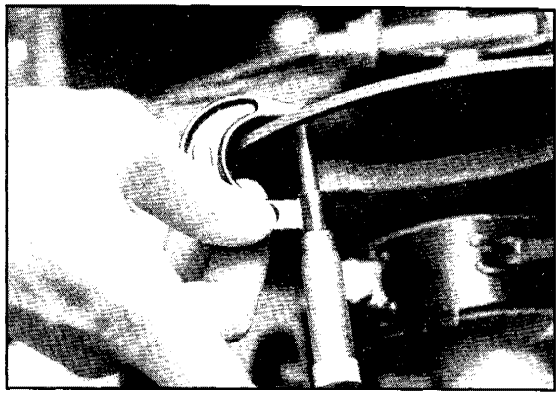


4. Clean disc and caliper with brake cleaner or alcohol.

Inspection

1. Visually inspect disc for scoring, scratches, or gouges. Replace the disc if any deep scratches are evident.

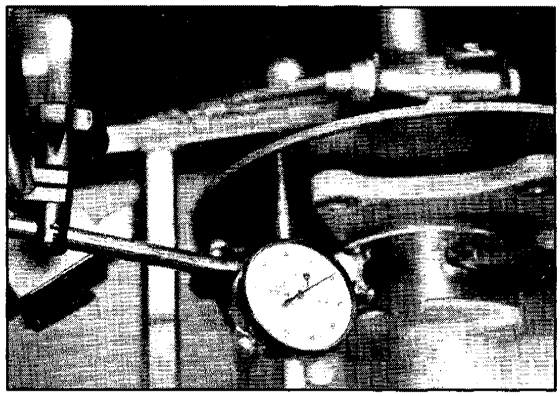
2. Use a 0-1″ micrometer and measure disc thickness at 8 different points around perimeter of disc. Replace disc if worn beyond service limit.



Brake Disc Thickness
New .177-.187″(4.496 - 4.750 mm)
Service Limit .167″ (4.242 mm)

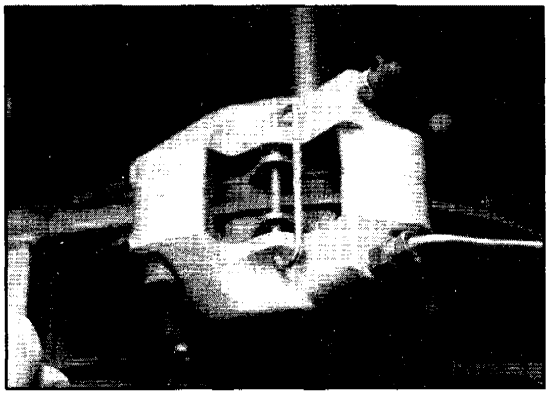
Brake Disc Thickness Variance
Service Limit .002″ (.051 mm)
difference between measurement

3. Mount dial indicator and measure disc runout. Replace the disc if runout exceeds specifications.



Brake Disc Runout
Service Limit .010″ (.25 mm)

Assembly



1. Install brake pads in caliper body so they are facing each other. Hold brake pads in place and install retaining pin.
2. Slowly pump the brake lever until pressure has been built up. Maintain at least 1/2″ (12.7 mm) of brake fluid in the reservoir to prevent air from entering the brake system.

Master Cylinder Fluid Level

1/4″ - 5/16″ (6 - 8 mm) below top of master cylinder

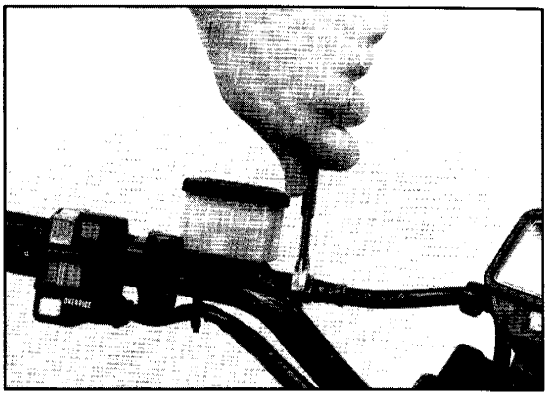
3. It is recommended that a burnishing procedure be performed after installation of new brake pads to extend service life and reduce noise. Start machine and slowly increase speed to 30 mph, gradually apply brakes to stop machine. Repeat procedure 10 times.

Master Cylinder

Disassembly (Typical)

1. Clean master cylinder and reservoir assembly. Make sure you have a clean work area to disassemble caliper.

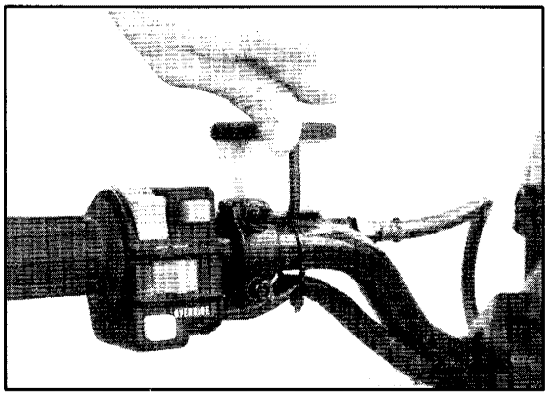
2. Loosen brake line 1/4 to 1/2 turn. On models with banjo bolt, remove bolt and sealing washers.



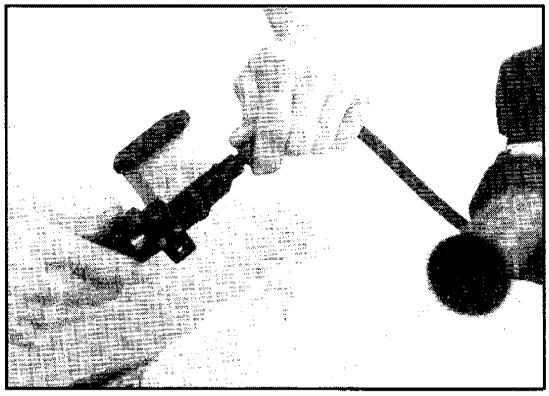
CAUTION:

Do not rotate line any further at this time or damage may result. Brake fluid will damage finished surfaces. Do not allow brake fluid to come in contact with finished surfaces.

3. Remove master cylinder from handlebars.



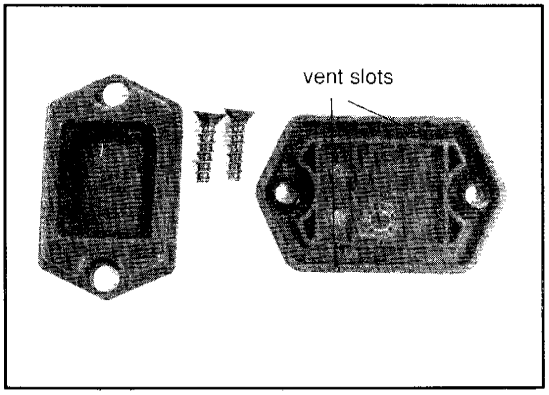
4. Place shop towels beneath master cylinder to protect painted surfaces. Hold brake line upright and continue to remove master cylinder. Cover brake line to avoid spillage.



5. Remove cover and diaphragm from master cylinder and dispose of the fluid properly.

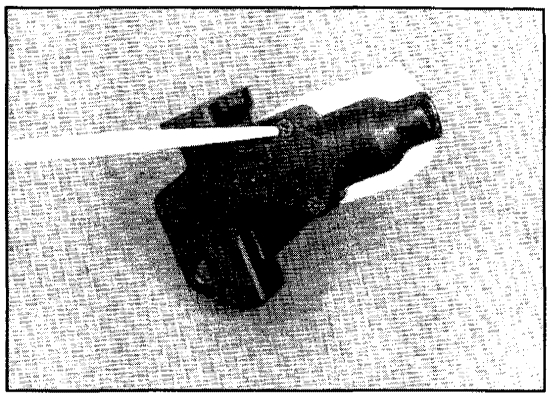
6. Be sure vents in cover are clean and unobstructed.

7. Remove brake lever.

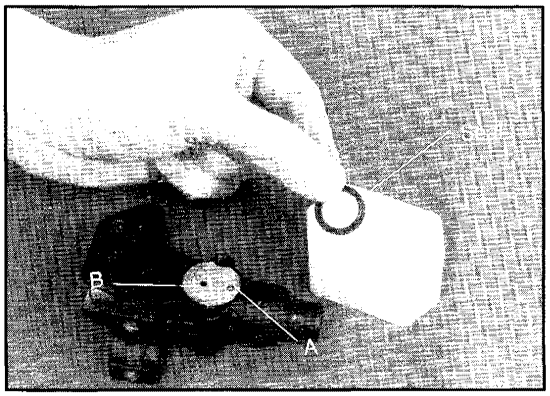


Disassembly Cont. (Typical)

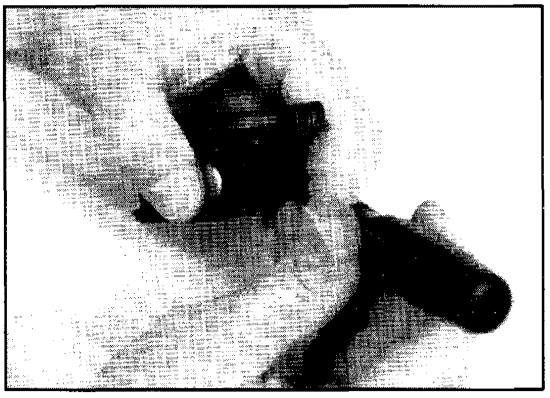
8. Remove reservoir screws and reservoir.



9. Inspect reservoir seal and replace if worn or damaged. Clean surfaces of the reservoir and master cylinder body. Be sure compensating (A) and supply (B) ports are clean before reassembly.

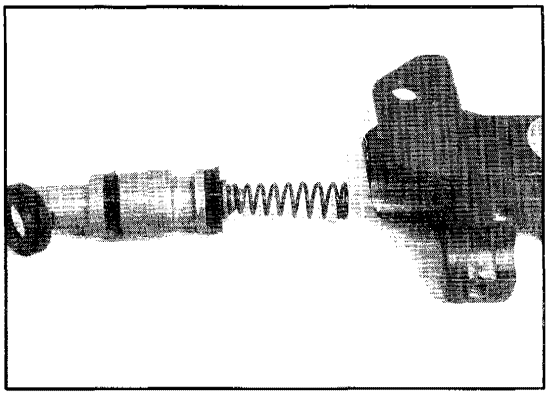


10. Remove outer dust seal. Be ready to catch piston assembly. **NOTE:** The return spring will force piston out when dust seal has been removed.



11. Remove piston, return spring, and washer from master cylinder. Remove primary and secondary seals from piston and discard.

12. Clean seal grooves thoroughly to remove all residue. Do not use a sharp instrument or grooves in piston may be damaged.



Master Cylinder

Inspection (Typical)

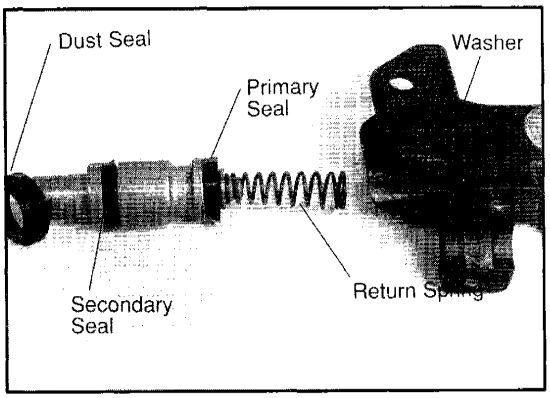
1. Clean the master cylinder assembly with clean Dot 3 brake fluid, brake parts cleaner, or alcohol. Dry thoroughly. Inspect the bore for nicks, scratches or wear. Measure master cylinder bore size and compare to specifications on page 9.1 Replace if damage is evident or if worn beyond service limit.

2. Measure piston diameter in several locations and compare to specifications on page 9.1. Replace if damage is evident or if worn beyond service limit.

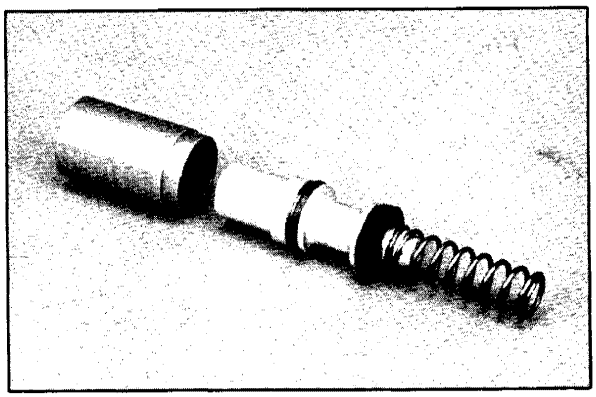
3. Inspect parking brake for wear. If teeth are worn, replace lever.

Assembly (Typical)

1. Install new primary and secondary seals on the piston.



2. Install washer into master cylinder bore (where applicable). Select the appropriate master cylinder piston installation tool (see page 9.2 for master cylinder type) and insert into master cylinder bore. A typical installation tool is shown at right.



Installation Tool P/N	
Type III	**2870962**
Type IV	**2200879**
Type V (Hydraulic Auxiliary Brake)	**2200880**

Assembly (Typical)

3. Dip piston in clean DOT 3 brake fluid, attach spring to piston, and install assembly into installation tool.

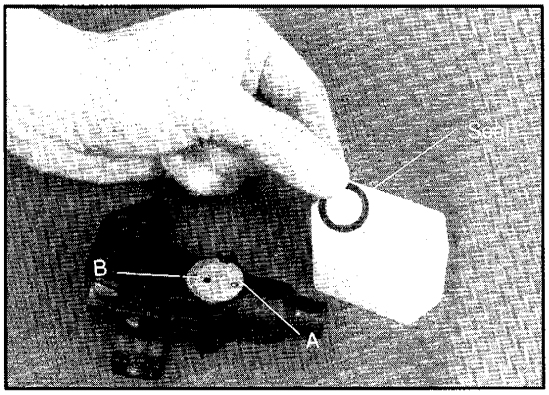
CAUTION:

Do not attempt to install the piston without the required installation tool. Do not allow the lip of the seals to turn inside out or fold.

4. Push the piston assembly through the installation tool sleeve using the plunger handle (included with installation tool kit). Continue pushing until plunger is solid against installation tool. Both tools can now be removed.

5. Hold piston assembly inward, and install a new dust seal. Be sure dust seal is completely seated in the groove.

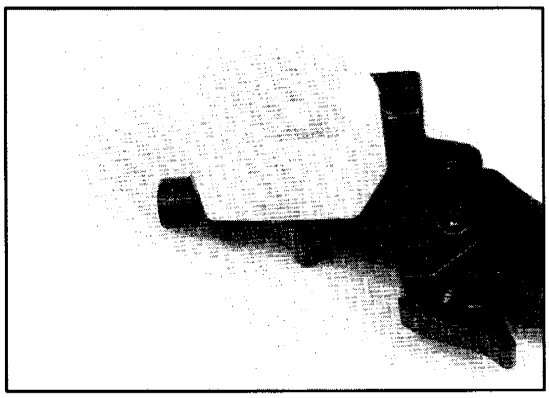
NOTE: The Piston assembly should spring back against the seal when compressed.



6. Install reservoir with new seal. Be careful to install and torque screws evenly.

7. Apply a light film of grease to the lever bolt. Install lever and tighten bolt securely.

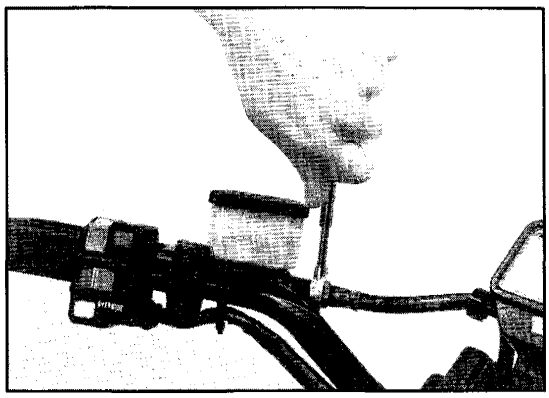
8. Install parking brake lever assembly.



Installation (Typical)

NOTE: To speed up the brake bleeding procedure the master cylinder can be purged of air before it is installed on the brake line. Fill with DOT3 brake fluid and pump lever slowly two to three times with finger over the outlet end to purge master cylinder of air.

1. Install master cylinder on brake line *hand tight.*
2. Install master cylinder on handlebars, torquing mounting bolts to 55 in. lbs. (.62 Kg-m).
3. Using a line wrench, tighten brake line an additional 1/2 turn.
4. On models with banjo bolt, replace sealing washers and torque bolt to specification.



Master Cylinder Mounting Bolt
Torque 55 in. lbs. (.62 kg-m)

Brake Line Banjo Bolt Torque (6x6):
12 ft. lbs. (1.66 kg-m)

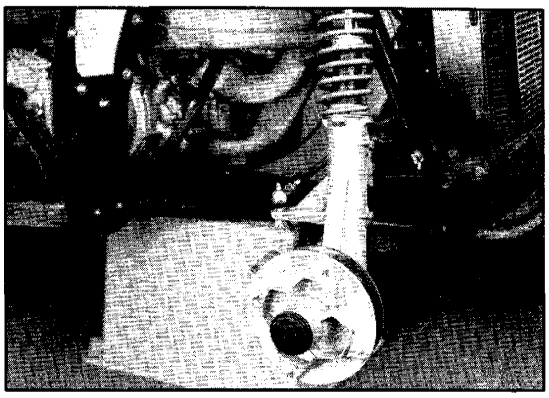
5. Fill reservoir with DOT 3 fluid.
6. Follow bleeding procedure on page 9.4.

Polaris DOT 3 Brake Fluid

PN 2870990

Disassembly

1. Clean and support front of machine.

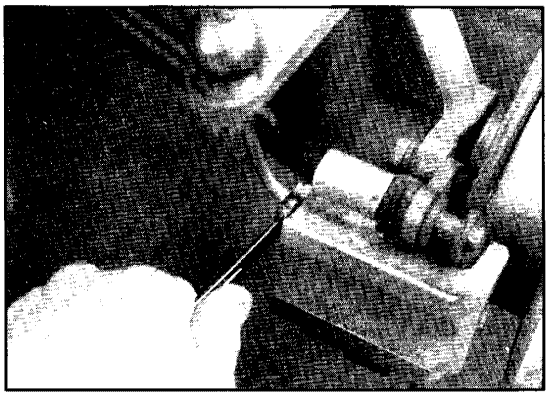


CAUTION:

Use care when supporting vehicle so that it does not tip or fall. Severe injury may occur if machine tips or falls.

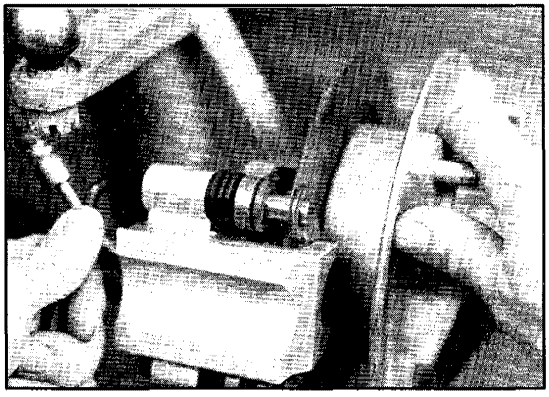
2. Remove front wheel.

3. Using a line wrench, loosen and remove brake line to caliper. Place a container under caliper to catch fluid draining from brake line.

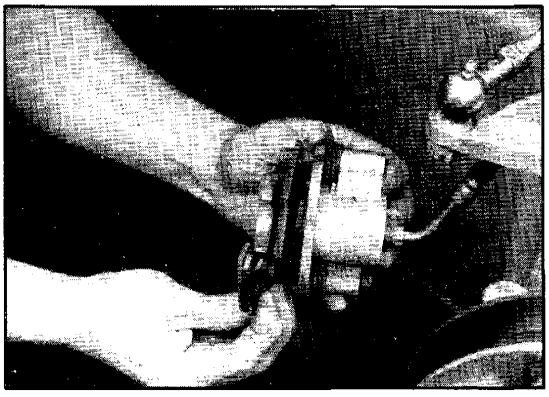


4. Remove brake pad adjuster screw.

5. Remove caliper.

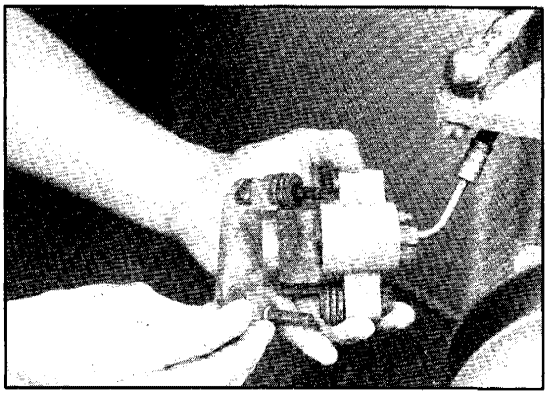


6. Push upper pad retainer pin inward and slip brake pads past edge.



Disassembly Cont.

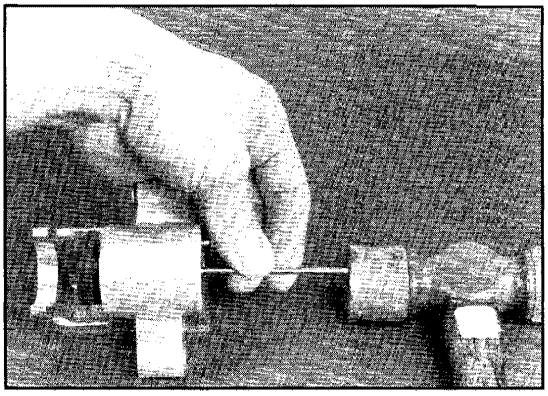
7. Remove mounting bracket, pin assembly and dust boot.



8. Remove piston, dust seal and piston seal.

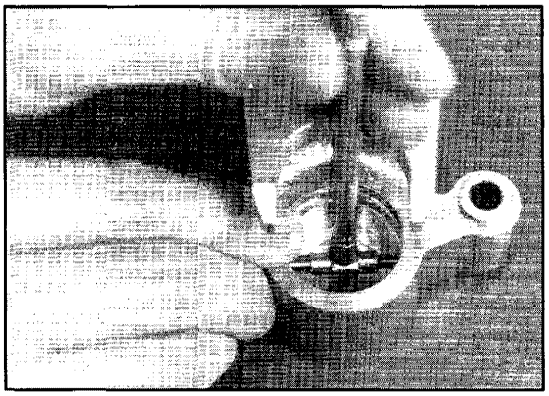
9. Clean the caliper body, piston, and retaining bracket with brake cleaner or alcohol.

NOTE: Be sure to clean seal grooves in caliper body.



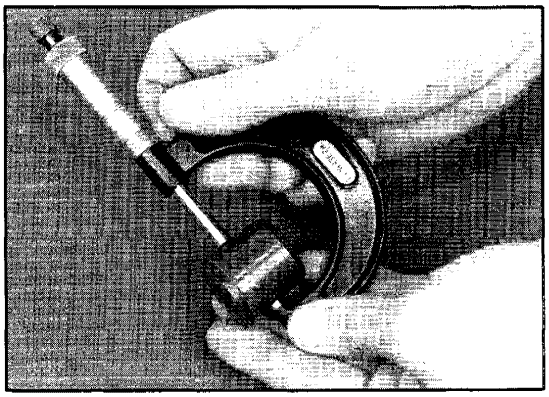
Inspection

1. Inspect caliper body for nicks, scratches or wear. Measure bore size and compare to specifications. Replace if damage is evident or if worn beyond service limit.



Front Caliper Piston Bore I.D.
Std. 1.191-1.192″ (30.25-30.28 mm) Service Limit 1.193″ (30.30 mm)

2. Inspect piston for nicks, scratches, wear or damage. Measure diameter and replace if damaged or worn beyond service limit.

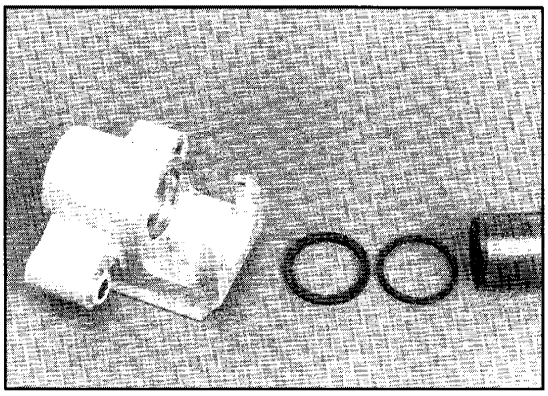


Front Caliper Piston O.D.
Std. 1.186-1.1875″ (30.13-30.16 mm) Service Limit 1.1855″ (30.11 mm)

3. Inspect the brake disc and pads as outlined for brake pad replacement this section.

Assembly

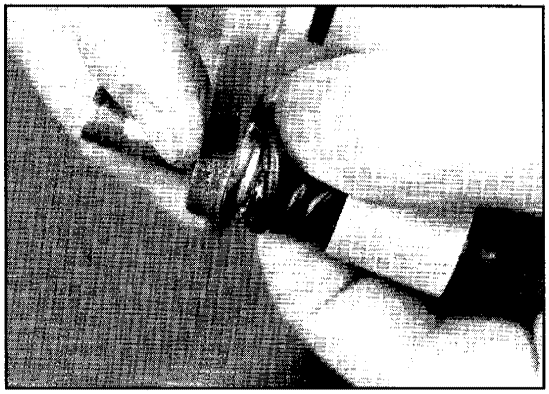
1. Install new O-rings in the caliper body.
2. Coat piston with clean DOT 3 brake fluid and install in caliper body.



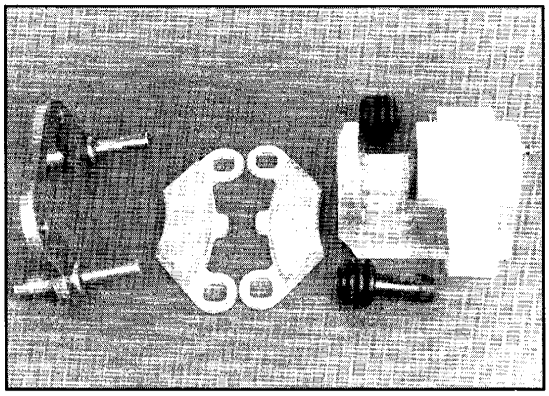
3. Lubricate the mounting bracket pins with Polaris Premium All Seasons Grease, and install the rubber dust seal boots.

Polaris Premium All Season Grease

PN 2871423



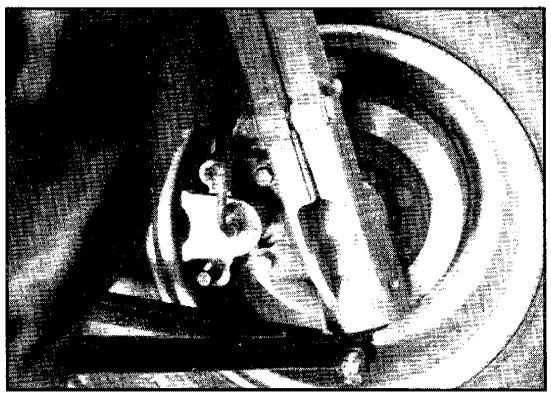
4. Compress the mounting bracket and make sure the dust seals are fully seated. Install the pads as shown. Clean the disc and pads with brake parts cleaner or alcohol to remove any dirt, oil or grease.



Installation

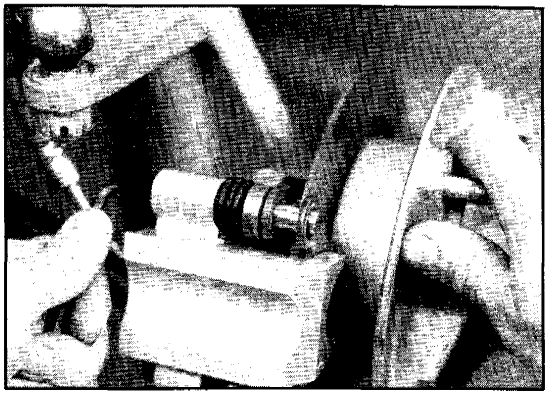
1. Install caliper on hub strut, and torque mounting bolts.

Front Caliper Mounting Bolt Torque
18 ft. lbs. (2.48 kg-m)



Installation Cont.

2. Install brake line and tighten securely with a line wrench.
3. Install the adjuster screw and turn until stationary pad contacts disc, then back off 1/2 turn.
4. Follow brake bleeding procedure outlined on page 9.4.
5. Install wheels and torque wheel nuts to specification.

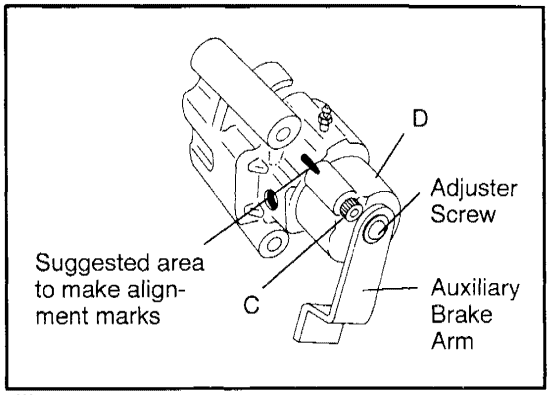


Front Wheel Nut Torque
15 ft. lbs. (2.07 kg-m).

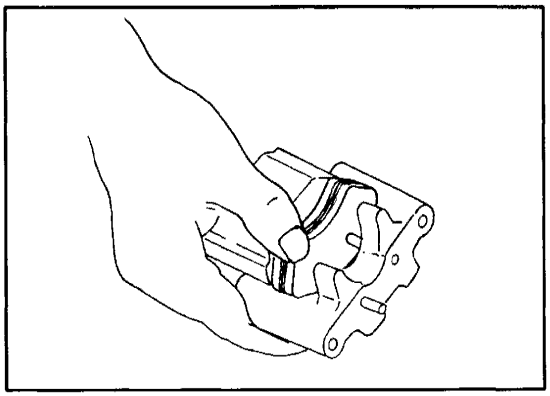
NOTE: If new brake pads are installed, it is recommended that a burnishing procedure be performed to extend pad service life and reduce noise. Start machine and slowly increase speed to 30 mph, gradually apply brakes to stop machine. Repeat procedure 10 times.

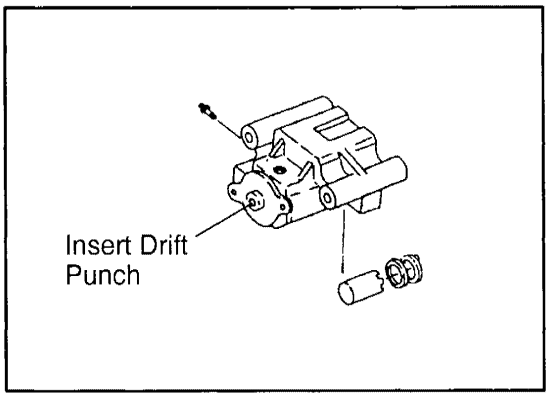
Disassembly

1. Make alignment marks on stationary ramp and caliper housing as shown in Ill.1.
2. Remove cotter pin and washer from actuator rod at brake arm.
3. Remove stationary ramp attaching screws (C).
4. Remove ramp assembly (D). It is not necessary to remove auxiliary brake arm unless brake arm or piston pin are being replaced. **NOTE:** To remove auxiliary brake arm or pin, turn the adjuster screw clockwise with a 3/16″ Allen wrench until the piston pin falls out. To remove brake arm, insert a deep well socket into moveable cam to hold lock nut while backing out the adjuster screw.
5. Apply downward pressure on brake pads directly over retaining pin, releasing pin pressure. Shake pin out of caliper or use a needle nose pliers to remove pin. **NOTE:** If pins are corroded it may be necessary to spray penetrating oil on pins.
6. Remove pins and brake pads.
7. Insert a drift punch in piston pin hole and tap with a soft face hammer. This will drive out the caliper piston. See Ill. 3.
8. By hand, walk caliper piston back and forth until it can be pulled out of caliper or remove with a caliper piston pliers (internal expanding).
9. Straighten a large paper clip and form a small hook on one end. Polish the end of the clip so there are no sharp edges. **CAUTION:** Extreme care must be used to avoid scratching the cylinder bore seal ring groove surfaces.
10. Position clip in cylinder bore. With a pushing, twisting action remove large inside seal and small outer dust seal and two small O-ring seals from brake caliper pin hole.
11. **Important:** Flush cylinder bore with brake fluid and clean with compressed air.



Ill. 1

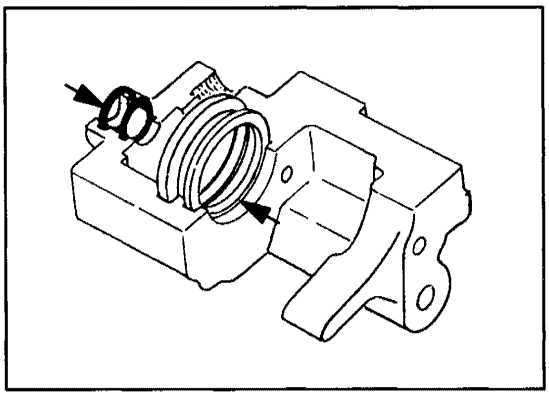

Ill. 2



Ill. 3

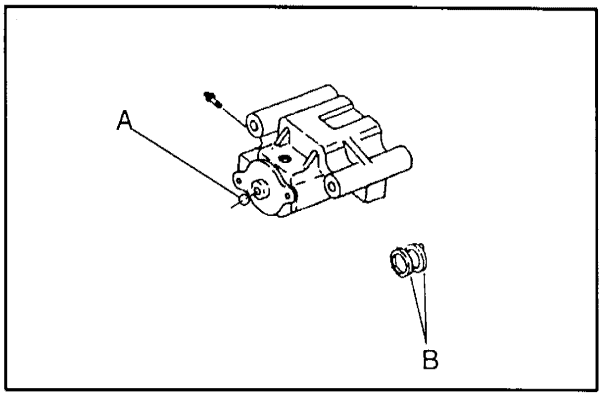
Inspection

1. Inspect cylinder bore for scoring, pitting, or corrosion. A corroded or scored casting should be replaced; light scores and stains may be removed by polishing. Polish any discolored or stained area with **crocus cloth only**. **CAUTION:** If you are cleaning the cylinder bore, use finger pressure and rotate the cloth. Do not slide the cloth in or out of bore while applying pressure as scratches may result. **Do not use any other type of abrasive or abrasive cloth.**
2. Inspect piston.


Ill. 4

Reassembly

NOTE: Clean and inspect all components before reassembling.

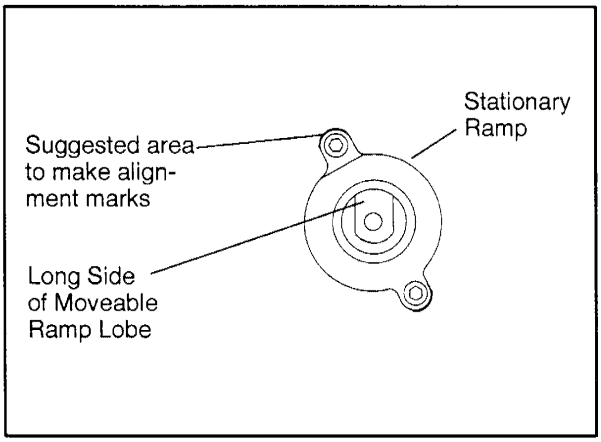


1. Lubricate new O-rings (A) with brake fluid and install into caliper pin bore.
2. Lubricate new seals (B) with brake fluid and install into caliper.
3. If piston pin or axillary brake arm were removed, lubricate all sliding surfaces of stationary and moveable brake ramps with a thin coat of Polaris high temp grease.

Polaris High Temp Grease

PN 2870616

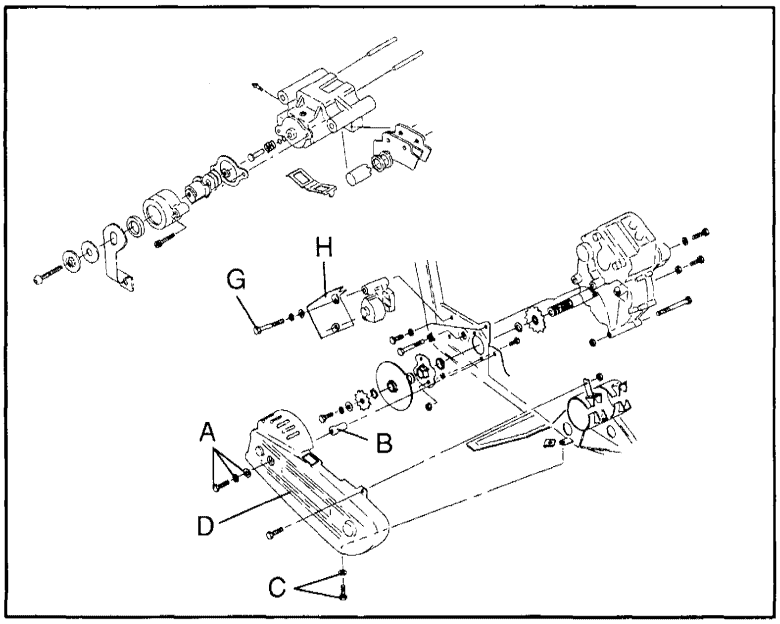
4. Align mark of stationary and moveable cam so long side of lobe is in the up position and just to the right of mark on stationary. Alignment marks must be matched and cam positioned correctly, as there are six possible combinations.
5. Reassemble adjuster screw through arm and moveable cam. Install washer on screw inside of cam. Reinstall lock nut and tighten until seated, then turn an additional 1/2 turn tighter.
6. Using a new gasket, assemble ramp to brake caliper. **NOTE:** Align marks of stationary and caliper made in step 1. Torque bolts to 5-6 ft. lbs.
7. Hold caliper so that the brake line fitting hole can be covered with your finger. Close bleeder fitting and add approximately 1/4 ounce of brake fluid to piston bore. **CAUTION:** Brake fluid will cause damage to painted surfaces. Wipe up any spills at once.



8. Lubricate piston with brake fluid and install in caliper piston bore, flat beveled end first.
9. Compress piston until seated in caliper and wipe off excess brake fluid from piston area.
10. Attach brake line to caliper assembly and tighten fitting with a flare nut wrench. **CAUTION:** Brake fluid will cause damage to painted surfaces. Wipe up any spills at once.
11. Reinstall spring plate, brake pads and pad pins to caliper.
12. Pump the handle 10 to 15 times to purge any fluid which may have accumulated between the seals during assembly.
13. Thoroughly wipe the piston and caliper dry.
14. Pressurize the brake system for approximately one minute. **NOTE:** The parking brake may be used to hold the pressure.
15. Check for "low pressure" leaks by lightly pumping the handle 5 to 10 times.
16. Compress piston into caliper until seated.

NOTE: The brake pads will need to be spread enough to accept the brake disc when reinstalling the caliper assembly.

Installation



1. Reinstall caliper assembly onto brake disc.
2. Install upper and lower caliper bolts, lock washers, and flat washers (G) to caliper shield (H) and secure caliper assembly to its mounting.
3. Torque caliper mount bolts to specification.
4. Install pedal rod on brake arm with existing washer and a new cotter key.
5. Adjust foot pedal at 1/2″ to 3/4″ (12.7 - 19.05 mm) travel of the pedal by turning adjuster screw clockwise.
6. (4 x 4 Models) Reinstall the middle chain guard (D) with rear most bolt, lock washer, flat washer (A) and spacer (B). Bolt the forward end of chain guard to the mounting brackets with hardware (C).
7. Reinstall right front and rear mud flap bolt in footrest.
8. Refill master cylinder with DOT 3 brake fluid and reinstall cover and diaphragm.
9. Refer to brake bleeding instructions in this chapter and bleed system.
10. Field test unit for proper braking action before putting into service. Inspect for fluid leaks and firm brakes. Make sure the brake is not dragging when lever/pedal is released. If the brake drags, re-check assembly, installation and adjustment.
11. Machine should be stopped at least ten (10) times from at least 30 miles per hour using the auxiliary brake pedal only.

Caliper Mount Bolt Torque

10 - 12 ft. lbs. (1.4 - 1.7 kg-m)

Polaris DOT 3 Brake Fluid

PN 2870990

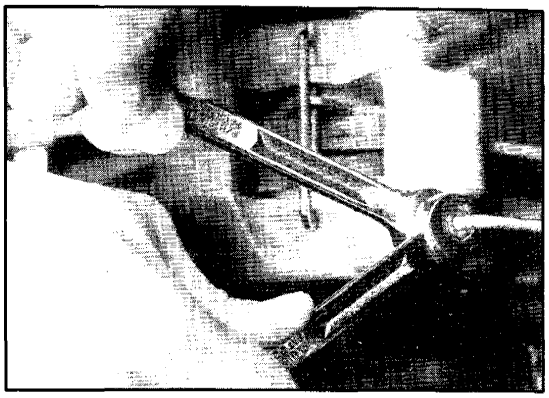
Master Cylinder Fluid Level

1/4″ - 5/16″ (6 - 8 mm) below top of master cylinder

6x6 Rear Caliper

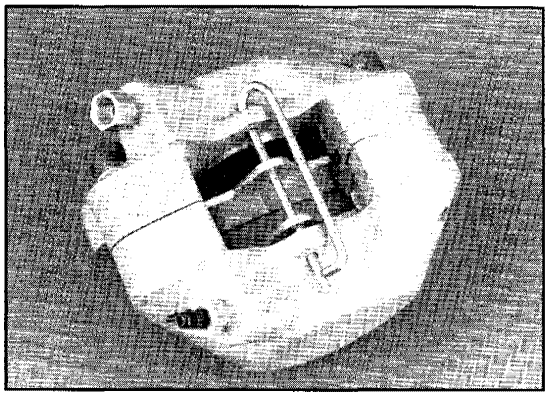
Removal

1. Clean caliper area before removal.
2. Using a flare nut wrench, remove brake line. Place a container to catch brake fluid draining from brake line.
3. Remove caliper.



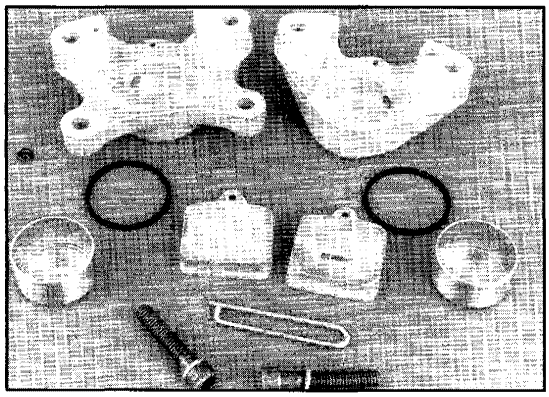
4. Remove brake pad retaining pin.

NOTE: This is a spring pin, do not spread apart farther than necessary to remove it.



5. Separate caliper halves and remove pistons with piston pliers.

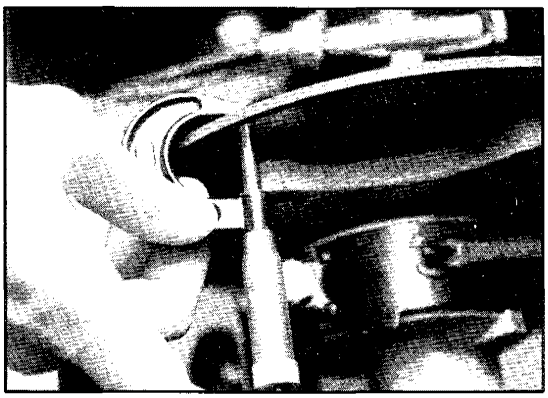
NOTE: The 6 x 6 rear caliper pistons can be removed without separating the caliper halves. Slowly pump brake lever to force pistons out of caliper.



6. Remove O-ring and clean O-ring groove.
7. Clean disc, caliper body, and pistons with brake cleaner or alcohol.

Inspection

1. Visually inspect the brake disc and replace if cracked, deeply scored, or damaged.
2. Measure brake disc thickness at 8 different points around perimeter of disc. If thickness varies more than the service limit, replace disc.



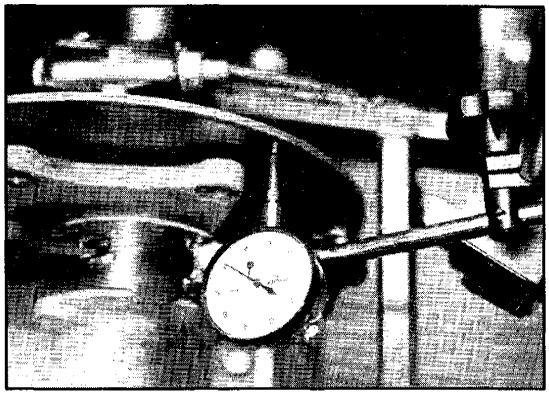
6x6 Rear Axle Brake Disc Thickness

Std. .177-.187″ (4.496-4.750 mm)
Service Limit .167″ (4.242 mm)

Variance between measurement points should not exceed .002″ (.051 mm)

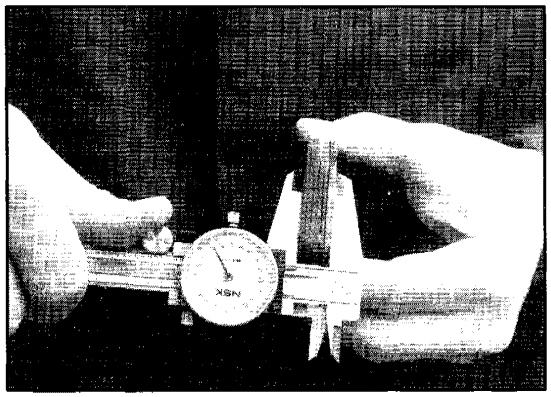
Inspection Cont.

3. Mount a dial indicator so indicator is measuring the disc runout as shown. Replace the disc if runout exceeds specified service limit.



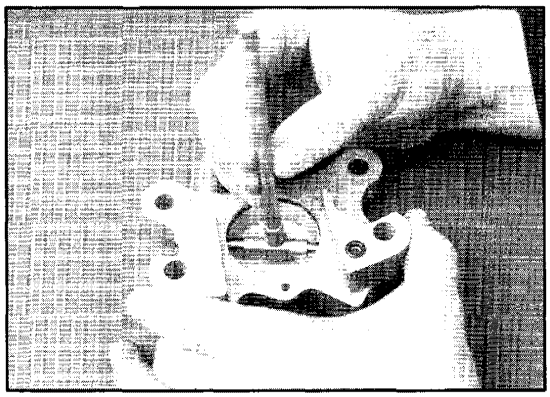
6x6 Rear Axle Brake Disc Runout	
Service Limit	.010″ (.25 mm)

4. Measure total thickness of brake pad. Replace brake pads if worn beyond the service limit.



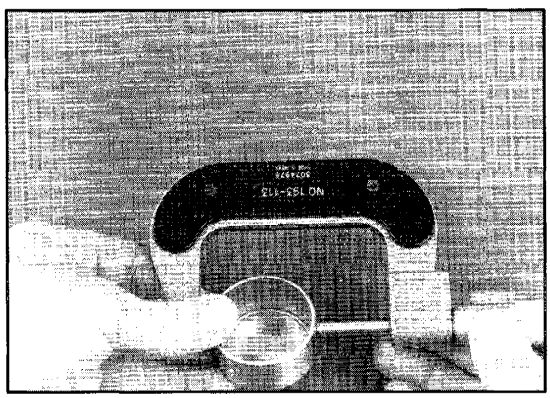
Brake Pad Thickness	
Standard	.490″ (12.45 mm)
Service Limit	.150″ (3.81 mm)

5. Inspect caliper piston bore for scratches, severe corrosion, or galling and replace if necessary. Measure bore with a telescoping gauge or an inside micrometer, and replace caliper if worn beyond service limit.



Caliper Piston Bore I.D.	
Std.	1.745-1.746″ (44.32-44.35 mm)
Service Limit	1.748″ (44.40 mm)

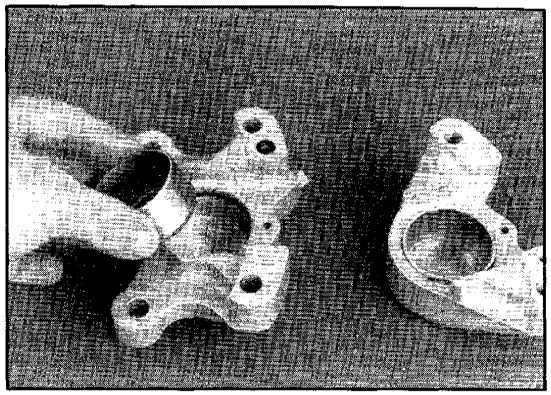
6. Inspect surface of caliper piston for nicks, scratches, or damage and replace if necessary. Measure diameter of piston and replace if worn beyond service limit.



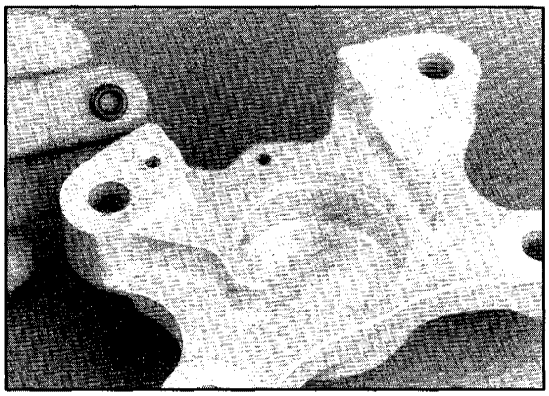
Caliper Piston O.D.	
Standard	1.740″ (44.20 mm)
Service Limit	1.739″ (44.17 mm)

Assembly

1. Install new O-ring in caliper body. Apply brake fluid to pistons and install until fully seated. Be sure O-ring groove is thoroughly cleaned of all residue or piston may bind in bore.

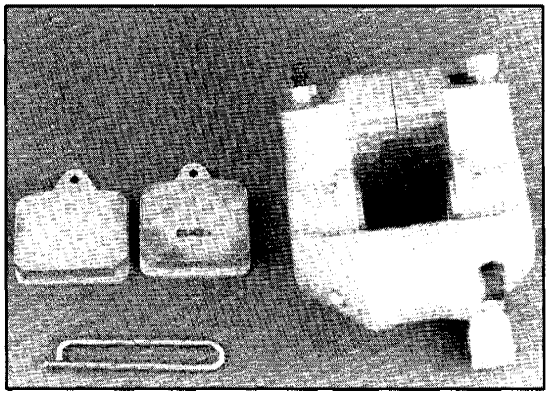


2. Install new O-ring between caliper halves.
3. Carefully assemble caliper body making sure O-ring is properly positioned in groove. Torque body screws evenly to 18 ft. lbs.



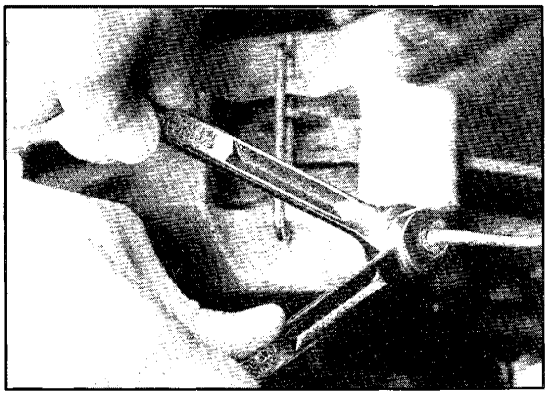
Caliper Body Torque
18 ft. lbs. (2.49 kg-m)

4. Install brake pads in caliper body with friction material facing each other. Install retaining pin.
5. Install caliper and torque mounting bolts.



Caliper Mounting Bolt Torque
18 ft. lbs. (2.49 kg-m)

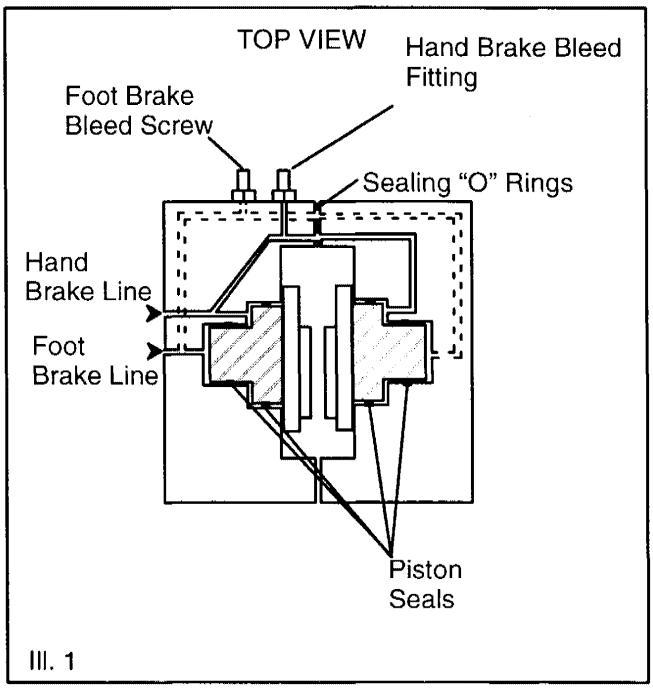
6. Install brake line and tighten with a flare nut wrench.
7. Follow bleeding procedure outlined on page 9.4 of this section.
8. Field test unit for proper braking action before putting into service. Inspect for fluid leaks and firm brakes. Make sure the brake is not dragging when lever is released. If the brake drags, re-check assembly and installation.



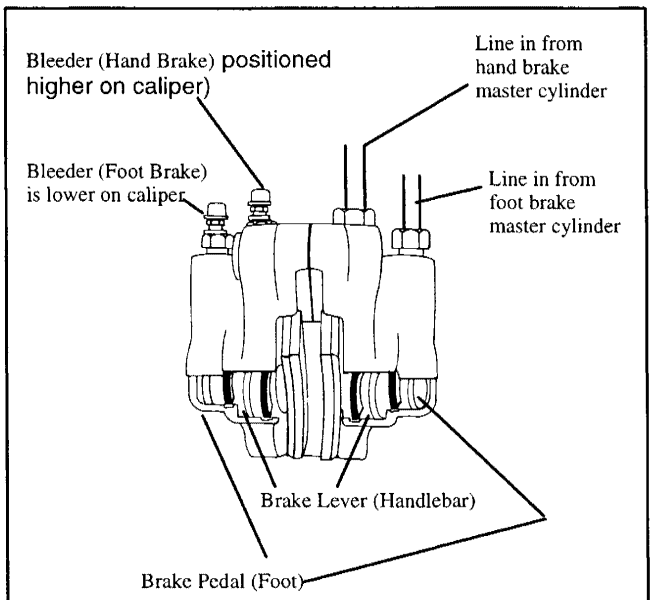
Dual Hydraulic Caliper Bleeding

The new Dual Hydraulic or "DH" rear brake caliper is used on the 1998 Sportsman 500 and 1998 Scrambler 400 and 500. This caliper is a dual opposed piston design, with two independent hydraulic systems contained in the same caliper body (**see Ill.1**). The caliper pistons are T-shaped, which allows both hand and foot brake to use the same caliper piston, but remain separated by seals. The hand brake system applies hydraulic pressure to both front calipers and only the *outer* diameter of the rear caliper pistons. The auxiliary (foot) brake applies pressure to the inner portion of the rear caliper pistons. Because the hand and foot brake hydraulic systems are separate, there are also two bleed screws – one for the outer fluid chamber (hand brake), and one for the inner fluid chamber (foot brake). The basic procedure for bleeding the brake system is the same as outlined on page 9.4 - 9.5, however, each system must be bled separately.

Hydraulic Auxiliary Brake inspection and adjustment is outlined on page 9.30b.



Ill. 1

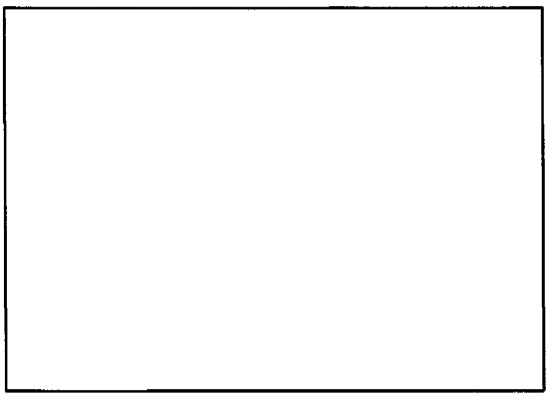


Ill. 2 **Cutaway View Of DH Caliper**

NOTE: Caliper style and location of brake lines and bleeder screws may differ

Upper bleed screw and brake line (A) is for hand brake system.

Lower bleed screw and brake line (B) is for auxiliary (foot) brake system.

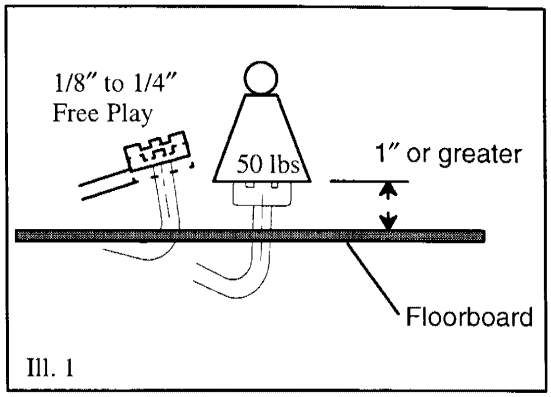


Scrambler Style DH Caliper

Auxiliary Brake Adjustment (Hydraulic)

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

1. First check foot brake effectiveness by applying a 50 lb. (approx.) downward force on the pedal. The top of the pedal should be at least 1, (25.4mm) above the surface of the footrest (**see Ill. 1**). If less than one inch, two things need to be examined:



Ill. 1

Free Play:

Free play of the brake pedal should be 1/8 - 1/4 inch (3.2 - 6.35 mm).

Free play is adjusted by altering the length of the link connected to the brake pedal (the link is located behind the footrest).

- To adjust, remove the cotter pin and clevis pin at the brake pedal. Loosen clevis adjuster lock nut. To increase free play, shorten the link. To decrease free play, lengthen the link. Install the clevis on the brake pedal and secure with a new cotter pin.

Bleeding:

If the free play is correct, then air is trapped somewhere in the system. Bleeding the auxiliary brake system is accomplished in a conventional manner, except that there are two brake lines and bleeder screws on the Dual Hydraulic caliper. Refer to page 9.30a for theory of operation and page 9.4 - 9.5 for bleeding procedure.

Brakes Squeal

- Dirty/contaminated friction pads
- Improper alignment
- Worn disc
- Worn disc splines

Poor Brake Performance

- Air in system
- Water in system (brake fluid contaminated)
- Caliper/disc misaligned
- Caliper dirty or damaged
- Brake line damaged or lining ruptured
- Worn disc and/or friction pads
- Incorrectly adjusted lever
- Incorrectly adjusted stationary pad
- Worn or damaged master cylinder or components
- Improper clearance between lever and switch

Lever Vibration

- Disc damaged
- Disc worn (runout or thickness variance exceeds service limit)

Caliper Overheats (Brakes Drag)

- Compensating port plugged
- Pad clearance set incorrectly
- Auxiliary brake pedal incorrectly adjusted
- Brake lever or pedal binding or unable to return fully
- Parking brake left on
- Residue build up under caliper seals
- Operator riding brakes

Brakes Lock

- Alignment of caliper to disc.

CHAPTER 10
ELECTRICAL

Special Tools

See page 1.18 for tool ordering information.

Tektronix DMM 155 Digital Multi-Meter	PN 2870659
Strobe Timing Light	PN 2870630
Hydrometer	PN 2870836
Tachometer	PN 8712100 or PN 8712500

1996 Electrical Specifications

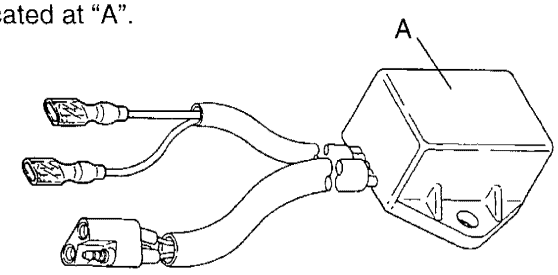
Alternator/Ignition

Machine Model	Engine Model	Alternator Output (Watts)	Headlamp (Watts)	Flywheel I.D.** Cast Mark (I.D. Stamp)	CDI Box I.D.	Ignition Timing* Degrees BTDC	Spark Plug Type	Spark Plug Gap (In./mm)
Trail Blazer E.S.	EC25PFE-09	150	12V 55W	FF45 (64)	CU2167	25° @ 3000	NGK BR8ES	.028/.7
Trail Boss 250	EC25PFE-08	150	12V 60/60W	FF45 (64)	CU2167	25° @ 3000	NGK BR8ES	.028/.7
Xpress 300	EC28PFE-01	150	(2) 12V 30/30W	FF95 (4574)	CU2513	25° @ 3000	NGK BR8ES	.028/.7
Xplorer 300	EC28PFE-01	150	(2) 12V 30/30W	FF95 (4574)	CU2513	25° @ 3000	NGK BR8ES	.028/.7
Sport 400L	EC38PLE-05	150	12V 55W	FF95 (4576)	CU2515	23.5° @ 3000	NGK BR8ES	.028/.7
Scrambler 4x4	EC38PLE-05	150	12V 60W	FF95 (4576)	CU2515	23.5° @ 3000	NGK BR8ES	.028/.7
Xpress 400L	EC38PLE-04	200	12V 60/55W	FF95 (04)	CU2510	23.5° @ 3000	NGK BR8ES	.028/.7
Xplorer 400L	EC38PLE-04	200	12V 60W (2) 37.5W	FF95 (04)	CU2510	23.5° @ 3000	NGK BR8ES	.028/.7
Sportsman 4x4	EC38PLE-04	200	12V 60W (2) 37.5W	FF95 (04)	CU2510	23.5° @ 3000	NGK BR8ES	.028/.7
Big Boss 6x6 400L	EC38PLE-04	200	12V 60W (2) 37.5W	FF95 (04)	CU2510	23.5° @ 3000	NGK BR8ES	.028/.7
Magnum 2x4	EH42PLE-01	200	12V 60/60W	FF95 (02)	CU2535	30° @ 3500	NGK BKR5ES	.025/.6
Magnum 4x4 Magnum 6x6	EH42PLE-01	200	12V 60W (2) 37.5W	FF95 (02)	CU2535	30° @ 3500	NGK BKR5ES	.025/.6
Sportsman 500	EH50PLE-01	200	12V 60W (2) 37.5W	FF95 (02)	CU2535	30° @ 3500	NGK BKR5ES	.025/.6

* Ignition timing must be inspected with engine at room temperature (68°F / 20°C) and at proper RPM. See page 10.12 for degrees-to-piston position (BTDC) conversion chart.

** Refer to Flywheel Identification on page 10.3b.

Typical CDI Module Shown
Identifiction "CU" number is located at "A".



1997 Electrical Specifications

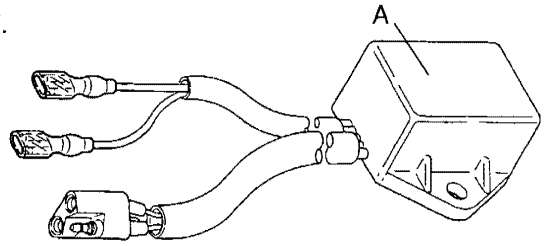
Alternator/Ignition

Machine Model	Engine Model	Alternator Output (Watts)	Headlamp (Watts)	Flywheel I.D.** Cast Mark (I.D. Stamp)	CDI Box I.D.	Ignition Timing* Degrees BTDC	Spark Plug Type	Spark Plug Gap (In./mm)
Trail Blazer	EC25PFE-09	150	12V 55W	FF45 (64)	CU2167	25° @ 3000	NGK BR8ES	.028/.7
Trail Boss	EC25PFE-08	150	12V 60/60W	FF45 (64)	CU2167	25° @ 3000	NGK BR8ES	.028/.7
Xpress 300	EC28PFE-01	150	(2) 12V 30/30W	FF95 (4574)	CU2513	25° @ 3000	NGK BR8ES	.028/.7
Xplorer 300	EC28PFE-01	150	(2) 12V 30/30W	FF95 (4574)	CU2513	25° @ 3000	NGK BR8ES	.028/.7
Sport	EC38PLE-07	150	12V 55W	FF95 (4576)	CU2515	23.5° @ 3000	NGK BR8ES	.028/.7
Scrambler 400L	EC38PLE-07	150	(2) 12V 30/30W	FF95 (4576)	CU2515	23.5° @ 3000	NGK BR8ES	.028/.7
Xpress 400L	EC38PLE-06	200	12V 60/55W	FF95 (04)	CU2510	23.5° @ 3000	NGK BR8ES	.028/.7
Xplorer 400L	EC38PLE-06	200	12V 60W (2)12V 30/30W	FF95 (04)	CU2510	23.5° @ 3000	NGK BR8ES	.028/.7
Sportsman 400	EC38PLE-06	200	12V 60W (2)12V 30/30W	FF95 (04)	CU2510	23.5° @ 3000	NGK BR8ES	.028/.7
400L 6x6	EC38PLE-06	200	12V 60W (2)12V 30/30W	FF95 (04)	CU2510	23.5° @ 3000	NGK BR8ES	.028/.7
Magnum 2x4	EH42PLE-02	200	12V 60/60W	FF95 (02)	CU2544	30° @ 3500	NGK BKR5ES	.025/.6
Magnum 4x4	EH42PLE-02	200	12V 60W (2)12V 30/30W	FF95 (02)	CU2544	30° @ 3500	NGK BKR5ES	.025/.6
Magnum 6x6	EH42PLE-02	200	12V 60W (2)12V 30/30W	FF95 (02)	CU2544	30° @ 3500	NGK BKR5ES	.025/.6
Xplorer 500	EH50PLE-01	200	(2) 12V 30/30W	FF95 (02)	CU2535	30° @ 3500	NGK BKR5ES	.025/.6
Sportsman 500	EH50PLE-01	200	12V 60W (2)12V 30/30W	FF95 (02)	CU2535	30° @ 3500	NGK BKR5ES	.025/.6
Scrambler 500	EH50PLE-02	250	12V 30/30W	FF97 (06)	CU2544	30° @ 3500	NGK BKR5ES	.025/.6

*Ignition timing must be inspected with engine at room temperature (68°F / 20°C) and at proper RPM. See page 10.12 for piston position chart.

** Refer to Flywheel Identification on page 10.3b.

Typical CDI Module Shown
Identifiction "CU" number is located at "A".



1998 Electrical Specifications

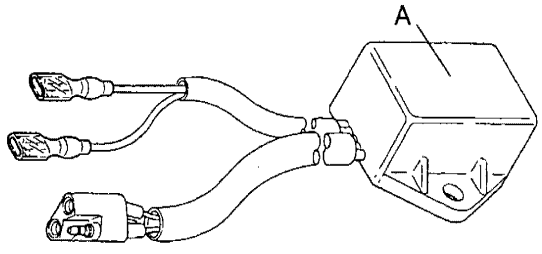
Alternator/Ignition

Machine Model	Engine Model	Alterna-tor Output (Watts)	Headlamp (Watts)	Flywheel I.D.** Cast Mark (I.D. Stamp)	CDI Box I.D.	Ignition Timing* Degrees BTDC	Spark Plug Type	Spark Plug Gap (In./mm)
Trail Boss	EC-25PFE-10	150	12V 60/60W	FF45 (64)	CU2167	25° @ 3000	NGK BR8ES	.028/.7
Trail Blazer	EC-25PFE-11	150	12V 55W	FF45 (64)	CU2167	25° @ 3000	NGK BR8ES	.028/.7
Xpress 300	EC-28PFE-02	150	(2) 12V 30/30W	FF95 (4574)	CU2513	25° @ 3000	NGK BR8ES	.028/.7
Xplorer 300	EC-28PFE-02	150	(2) 12V 30/30W	FF95 (4574)	CU2513	25° @ 3000	NGK BR8ES	.028/.7
Sport 400	EC38PLE-07	150	12V 55W	FF95 (4576)	CU2515	23.5° @ 3000	NGK BR8ES	.028/.7
Scrambler 400	EC38PLE-09	150	(2) 12V 30/30W	FF95 (4576)	CU2515	23.5° @ 3000	NGK BR8ES	.028/.7
Xplorer 400	EC38PLE-06	200	12V 60W (2)12V 27W	FF95 (04)	CU2510 CU2558	23.5° @ 3000	NGK BR8ES	.028/.7
Magnum 2x4	EH-42PLE-02	200	12V 60/60W	FF95 (02)	CU2544 CU2557	30° @ 3500	NGK BKR5ES	.025/.6
Magnum 4x4	EH-42PLE-02	200	12V 60W (2)12V 27W	FF95 (02)	CU2544 CU2557	30° @ 3500	NGK BKR5ES	.025/.6
Scrambler 500	EH-50PLE-04	250	(2) 12V 30/30W	FF97 (06)	CU2544 CU2557	30° @ 3500	NGK BKR5ES	.025/.6
Sportsman 500	EH-50PLE-07	250	12V 60W (2)12V 27W	FF97 (06)	CU2544 CU2557	30° @ 3500	NGK BKR5ES	.025/.6
Big Boss 500 6x6	EH-50PLE-06	250	12V 60W (2)12V 27W	FF97 (06)	CU2544 CU2557	30° @ 3500	NGK BKR5ES	.025/.6

* Ignition timing must be inspected with engine at room temperature (68°F / 20°C) and at proper RPM. See page 10.12 for degrees-to-piston position (BTDC) conversion chart.

** Refer to Flywheel Identification on page 10.3b.

Typical CDI Module Shown Below
Identifiction "CU" number is located at "A".



1996 Stator Resistance Specifications

NOTE: Refer to wiring diagrams for more information.

		250	300	400 (150W)	400 (200W)	425/500 (200W)
		RESISTANCE (OHMS)				
Exciter	(R to Grn)	-	-	-	-	3.2
Exciter	(Blk/R to Green)	-	-	-	-	446
Exciter	(Blk/R to R)	-	-	-	226	450
Exciter	(Blk/R to Brn/W)	120	120	120	-	-
Pulser (Trigger)	(W/R to W)	-	-	-	97	97
Lighting	(Y to Y/R)	.3	.3	.3	.34	.37
Lighting	(Y to Y/Brn)	-	-	-	.17	.17
Primary	(Coil Tab to Coil Ground)	.3	.3	.3	.3	.3
Secondary	(Coil Tab to Plug Wire End) (Spark Plug Cap Removed)	6.3 K	6.3 K	6.3 K	6.3 K	6.3 K
Spark Plug Cap Resistance		3.7 K - - - - - - - - - to - - - - - - - - - - 6.3 K				5.0 K
Engine Timing @ 3000 RPM		25	25	23.5	23.5	30° (3500 RPM)
Engine Timing @ 6000 RPM		20	17	18	18	-

NOTE: All resistance readings are +/- 20% @ 68° F (20° C).
Readings were obtained using a Fluke™ 73 Digital VOM or Tektronix DMM155. Readings obtained with other meters may differ.

Battery Type

All batteries are Yuasa™ YB14A-A2 - Maximum charge rate 1.4 amps

All Tail/Brake Lamps Are 8.26/26.9W

ELECTRICAL
Stator Specifications

1997 Stator Resistance Specifications

NOTE: Refer to wiring diagrams for more information.

		250	300	400 (150W)	400 (200W)	425/500 (200W)	500 (250W)
		RESISTANCE (OHMS)					
Exciter	(R to Grn)	-	-	-	-	3.2	1.6
Exciter	(Blk/R to Green)	-	-	-	-	446	446
Exciter	(Blk/R to R)	-	-	-	226	450	450
Exciter	(Blk/R to Brn/W)	120	120	120	-	-	-
Pulser (Trigger)	(W/R to W)	-	-	-	97	97	97
Lighting	(Y to Y/R)	.3	.3	.3	.34	.37	.13
Lighting	(Y to Y/Brn)	-	-	-	.17	.17	-
Primary Ground)	(Coil Tab to Coil	.3	.3	.3	.3	.3	.3
Secondary	(Coil Tab to Plug Wire End) (Spark Plug Cap Removed)	6.3 K	6.3 K	6.3 K	6.3 K	6.3 K	6.3 K
Spark Plug Cap Resistance		3.7 K - - - - - - - - - to - - - - - - - - - - - 6.3 K				5.0 K	5.0 K
Engine Timing @ 3000 RPM		25	25	23.5	23.5	30° (3500 RPM)	30° (3500 RPM)
Engine Timing @ 6000 RPM		20	17	18	18	-	-

NOTE: All resistance readings are +/- 20% @ 68° F (20° C).
Readings were obtained using a Fluke™ 73 Digital VOM or Tektronix DMM155. Readings obtained with other meters may differ.

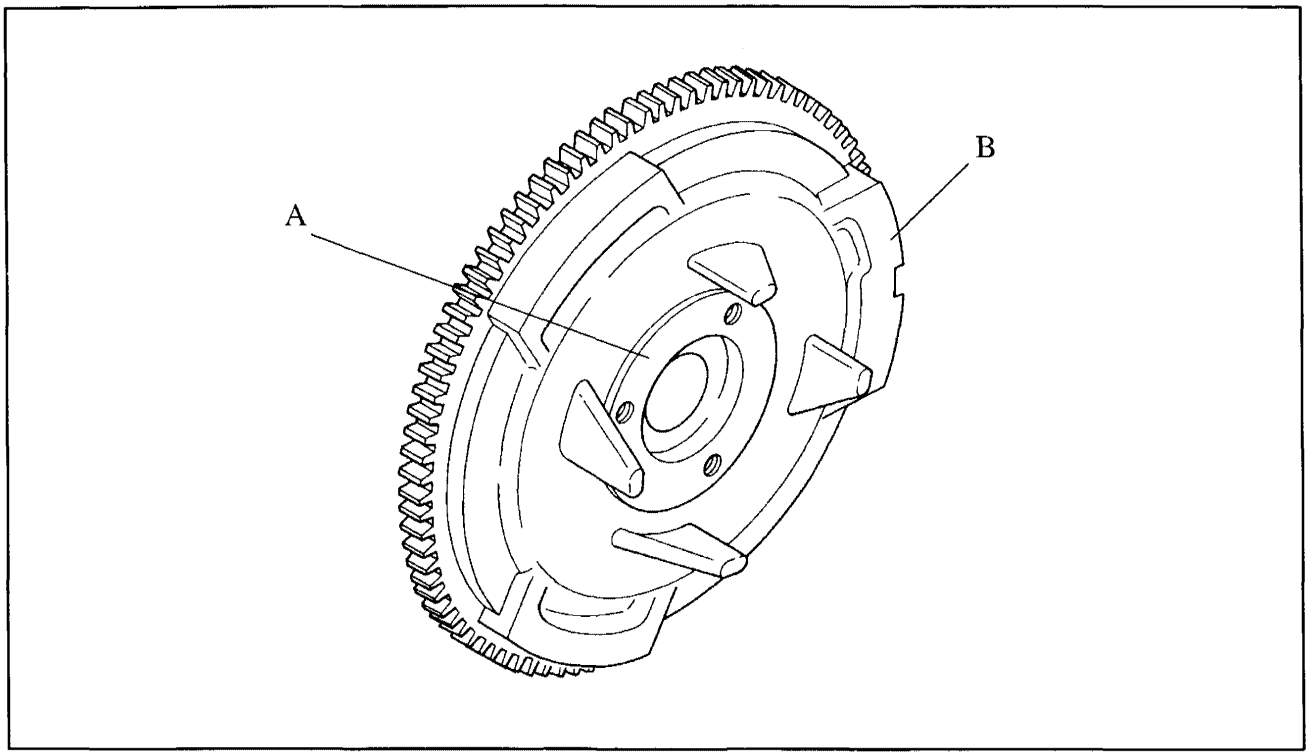
Battery Type

All batteries are Yuasa™ YB14A-A2 - Maximum charge rate 1.4 amps

All Tail/Brake Lamps Are 8.26/26.9W

1998 Stator Resistance Specifications

NOTE: Refer to wiring diagrams for stator resistance specifications and more information.



Flywheel Identification Stamp Location

The flywheel can be identified by the stamp mark in location A or B. Refer to "I.D." location in chart below. Do not use the cast mark to determine flywheel application.

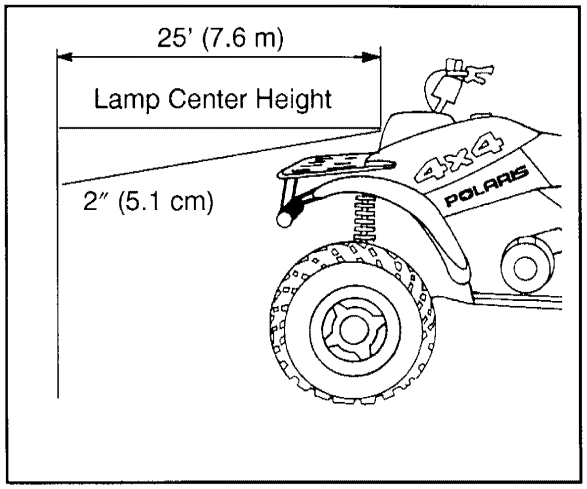
Type	Cast	Stamp	Comment	Application	I.D.
FF4564	FF45	64	EC25 With Ring Gear	EC25PFE05, EC25PFE08, EC25PFE09 EC25PFE10, EC25PFE11,	B
FF4568	FF45	68	EC25 W/O Ring Gear	EC25PF07, EC25PF09	B
FF4574	FF95	4574	EC28	EC28PFE01, EC28PFE02,	A
FF4576	FF95	4576	EC38 150W	EC38PLE02, EC38PLE03, EC38PLE05, EC38PLE07, EC38PLE09,	A
FF9502	FF95	02	EH42/50 200W	EH42PLE01, EH42PLE02, EH50PLE01, EH50PLE02 EH50PLE07,	A
FF9504	FF95	04	EC38 200W	EC38PLE01, EC38PLE04, EC38PLE06	A
FF9706	FF97	06	EH42/50 250W	EH50PLE02, EH50PLE04,	A

Headlamp Service (Gen II)

Headlight Adjustment (Gen II)

The high beam headlight can be adjusted to any position desired by turning the four screws at the outer corners of the lamp housing. Use the following procedure:

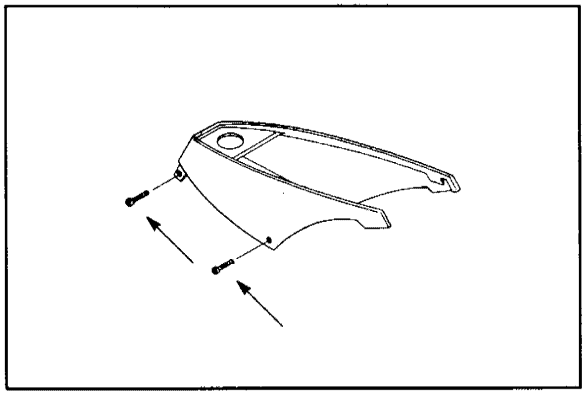
1. Place the vehicle on a level surface with the headlight approximately 25' (7.6 m) from a wall.
2. Measure the distance from the floor to the center of the headlight and make a mark on the wall.
3. Shift transmission to neutral, start engine and turn headlight switch to high beam.
4. Observe headlight aim. The most intense part of the headlight beam should be aimed 2″ (5.1 cm) below the mark placed on the wall in step 2. **NOTE:** Rider weight must be included on the seat. For machines with separate low beam lights, the drop should be 8″ (20.3 cm) in 25'.
5. Adjust screws at outer corners of lamp housing to achieve proper aim.

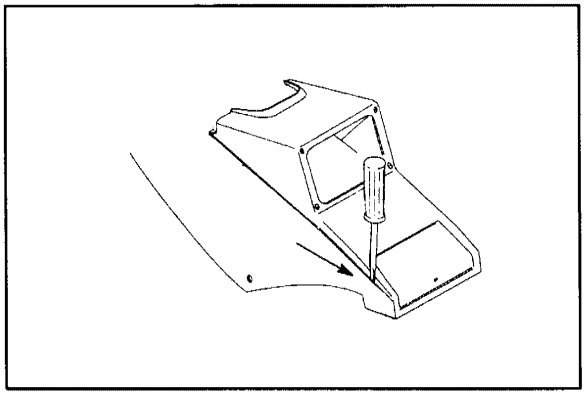


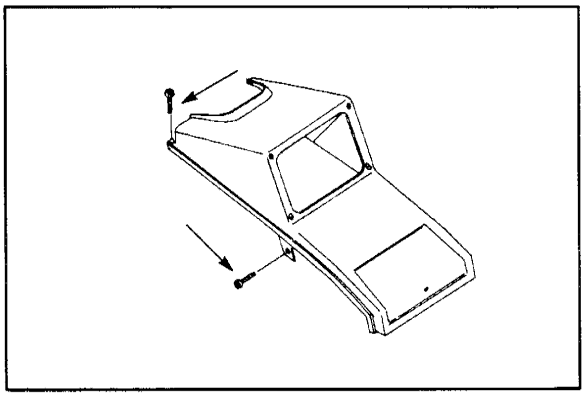
Headlight Lamp Replacement (Gen II)

⚠ **WARNING:** Due to the nature of ATVs and where they are ridden, headlight lenses become dirty. Frequent washing is necessary to maintain lighting quality. Riding with poor lighting can result in severe injury or death.

1. Remove the seat.
2. Remove the plastic panel surrounding the upper portion of the gas tank by first removing the gas tank cap.
3. Remove the Phillips screws on either side of the panel at the junction of this panel, the lower panels, and the rear of the front fenders.
4. Remove the Phillips screws on either side of the rear of the upper panel which were revealed by the removal of the seat.
5. Remove the door on the front of the ATV covering the radiator cap by turning the fastener one quarter turn.
6. Disengage the tabs at the front of the upper panel where they snap into the lower panel surrounding the headlight assembly. Also disengage the tabs on the upper panel which engage with the lower triangular panels on either side of the machine. Lift off the upper panel and set it aside.
7. Reinstall the gas tank cap.
8. Remove the panel surrounding the headlight by removing the Phillips screws from either side of this panel. Also remove the two Torx™ screws at the rear of this panel.
9. Ease the panel forward and up to allow you to reach the socket connected to the headlight lamp.







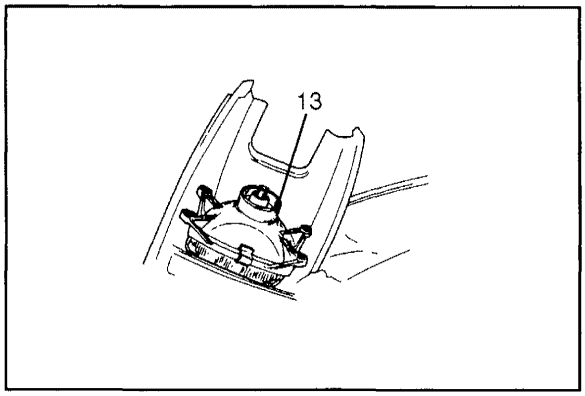
Headlight Lamp Replacement (Gen II)

10. Carefully unplug the socket from the lamp. Remove the panel and set it aside.

CAUTION: Do not service while headlight is hot. Serious burns may result.

11. Stand the panel containing the headlight assembly on end to allow access to the back of the headlight assembly.
12. Disengage the wire bail holding the headlight lamp in place and move it out of the way.
13. Grasp the base of the lamp and lift it out.
14. Reverse the previous steps to replace the lamp and reassemble the panels.

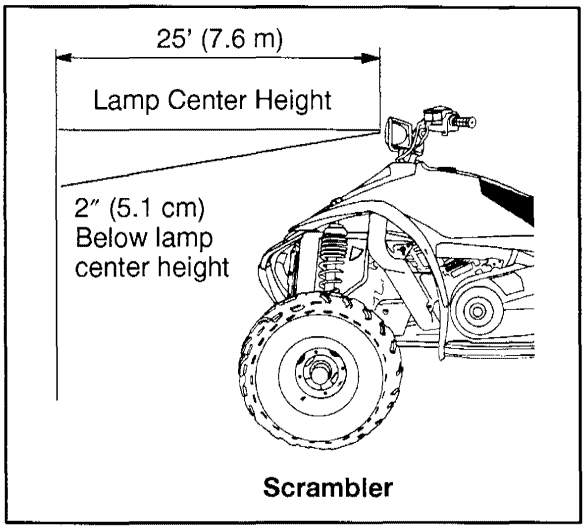
NOTE: Do not touch a halogen lamp with bare fingers. Oil from your skin leaves a residue, causing a hot spot which will shorten the life of the lamp. Hold the lamp by the base.



Headlight Adjustment (Gen III -Scrambler, Trail Blazer E.S. and Sport)

The headlight beam can be adjusted up and down and side to side.

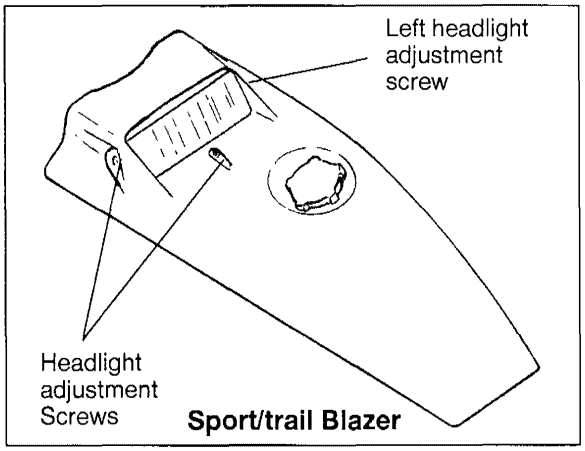
1. Place the vehicle on a level surface with the headlight approximately 25' (7.6 m) from a wall.
2. Measure the distance from the floor to the center of the headlight and make a mark on the wall at the same height.
3. Start the engine and turn the headlight switch to high beam.
4. Observe headlight aim. The most intense part of the headlight beam should be aimed 2″ (5.1 cm) below the mark placed on the wall in step 2. **NOTE:** Rider weight must be included on the seat.
5. On Scrambler models, loosen nut and bolt securing lamp to handlebars.
6. Adjust beam to desired position.
7. Tighten nut and bolt.



Scrambler

Adjustment - Trail Blazer E.S. and Sport

8. adjust beam to desired position by turning adjustment screws in headlight cover. Turning right screw clockwise moves the intense spot of light up to the left. Turning the left screw clockwise moves intense spot of light up to the right. Turning the bottom screw clockwise adjusts the light upwards.



Sport/trail Blazer

Headlight Lamp Replacement (Gen III)

NOTE: Do not touch a halogen lamp with bare fingers. Oil from your skin leaves a residue, causing a hot spot which will shorten the life of the lamp. Hold the bulb by the base only.

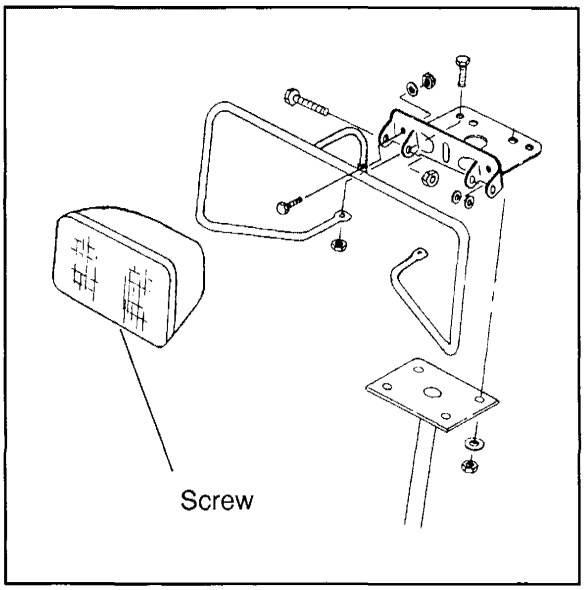
Trail Blazer E.S. and Sport

1. Remove rubber cap from back of headlight to reveal retention screw.
2. Remove small phillips head screw and carefully remove bulb from housing.
3. Unplug headlight lead wire from yellow jumper, and ground wire from terminal board.
4. Insert new bulb into housing and tighten retention screw.
5. Plug lead and ground wire back into terminal board and jumper.
6. Insert light assembly back into front cover and mount cover on machine.
7. Properly adjust headlight aim.

Headlight Lamp Replacement (Gen III)

Scrambler

1. Remove Phillips screw from bottom of headlamp.
2. Remove plastic lens retaining bracket.
3. Grasp base of bulb at back of housing and twist. Carefully remove bulb from housing.
4. Gently pull back locking tabs on wire harness terminal until base of bulb is released. Unplug bulb from harness.
5. Plug new bulb into wire harness, making sure it snaps into place.
6. Carefully insert bulb into back of housing. Twist to lock in place.
7. Reinstall plastic lens retaining bracket.
8. Reinstall Phillips screw in bottom of headlamp.

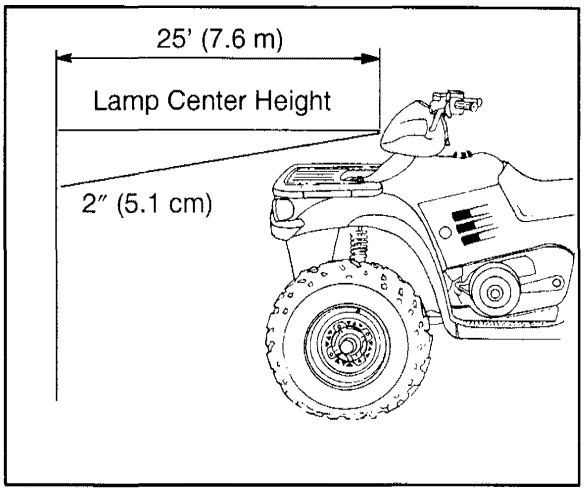


Headlamp Service - Gen IV

High Beam Headlight Adjustment (Gen IV)

The headlight beam can be adjusted to any position desired by turning the adjusting knob located on the bottom right side of the headlight pod.

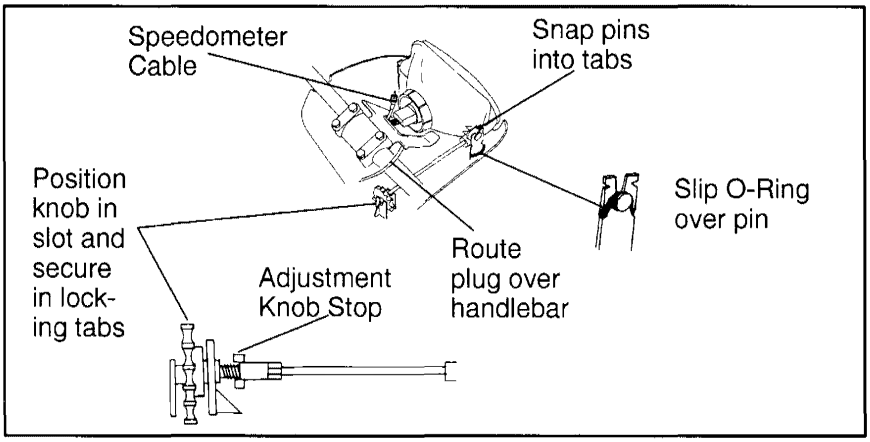
1. Place the vehicle on a level surface with the headlight approximately 25' (7.6 m) from a wall.
2. Measure the distance from the floor to the center of the headlight and make a mark on the wall at the same height.
3. Start the engine and turn the headlight switch to high beam.
4. Observe headlight aim. The most intense part of the headlight beam should be aimed 2″ (5.1 cm) below the mark placed on the wall in step 2. **NOTE:** Rider weight must be included on the seat. On machines with separate low beam lights, the drop should be 8″ (20.3 cm) in 25' from the center of the low beam lamp.
5. Adjust beam to desired position .



Headlight Lamp Replacement (Gen IV)

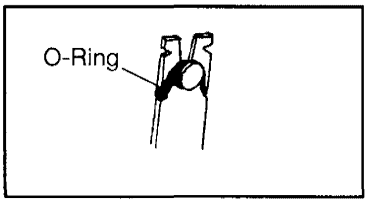
CAUTION: Do not service while headlight is hot. Serious burns may result.

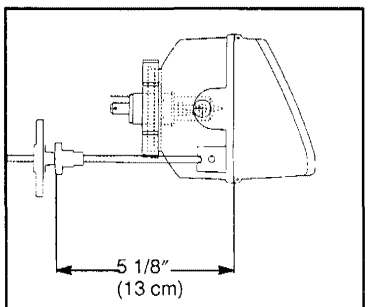
1. Remove Phillips screw from bottom of headlamp.
2. Remove plastic lens retaining bracket.
3. Grasp base of bulb at back of housing and twist. Carefully remove bulb from housing.
4. Gently pull back locking tabs on wire harness terminal until base of bulb is released. Unplug bulb from harness.



Headlight Housing Replacement (Gen IV)

1. Remove three Phillips screws at back of headlight pod.
2. Remove Phillips screws from bottom of headlight pod at each front corner. **NOTE:** To aid in accessing these screws, it may be helpful to turn handlebars to left or right and use a short, stubby screwdriver. Removal of the front rack and cover will also allow easier access.
3. Lift pod cover up. Using a pliers, disconnect speedometer cable. Unplug indicator lights from harness and remove pod cover.
4. Unplug headlamp from wiring harness.
5. Remove O-Ring from headlight pivot pins.
6. Pull headlight housing up to release from locking tabs.
7. Lift adjusting knob up to remove from locking tabs.
8. Carefully pull assembly up and out of pod.
9. Reverse steps to install new housing and reassemble pod.
10. Adjust headlight aim by turning adjusting knob.



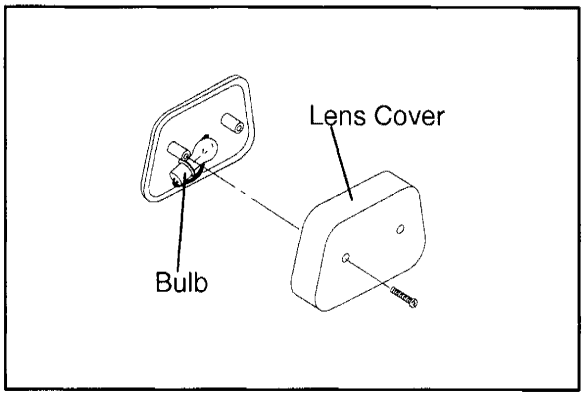


Distance from headlamp parting line to end of adjustment knob stop is 5 1/8″ (13 cm).

Taillight/Brakelight Lamp Replacement

If the taillight/brakelight does not work the lamp may need to be replaced.

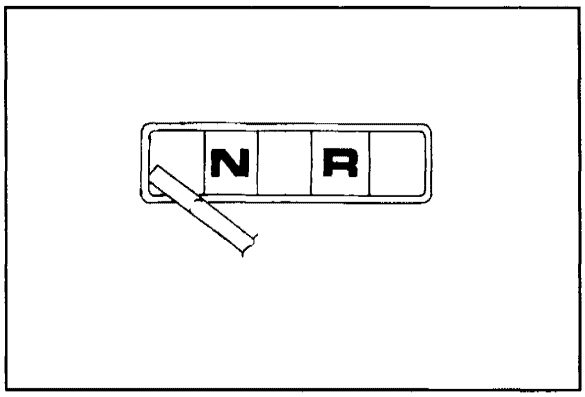
1. From the rear of the taillight remove two screws holding lens cover in place and remove lens cover.
2. Remove lamp and replace it with recommended lamp. Apply dielectric grease PN 2871027.
3. Reinstall the lens cover removed in step 1.
4. Test the taillight/brakelight to see that it's working.



Indicator Lamp Replacement (Gen II)

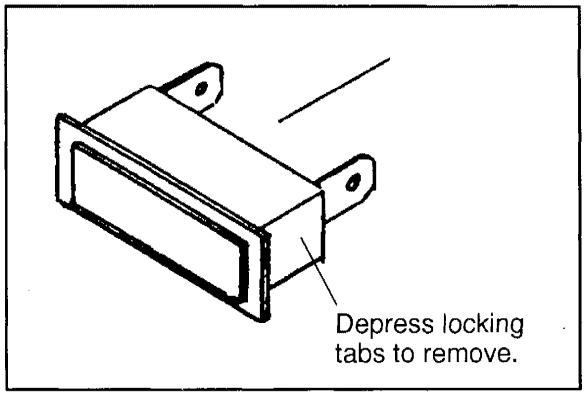
1. With a small, flat screwdriver gently pry loose the indicator light cover.
2. Using a small flexible tube (such as an oil delivery hose) grasp the burned out lamp and remove it.
3. Replace the removed lamp with a Polaris PN 4030042.
4. Replace the indicator light cover.

NOTE: Check all lights daily for proper operation replace or repair if necessary.



Indicator Lamp Replacement (Gen III and Gen IV)

1. Follow steps 1 - 3 of Headlight Housing Replacement above.
2. Unplug light from harness, depress locking tabs and remove from pod.
3. Install new light and reassemble pod.



Timing Check Procedures

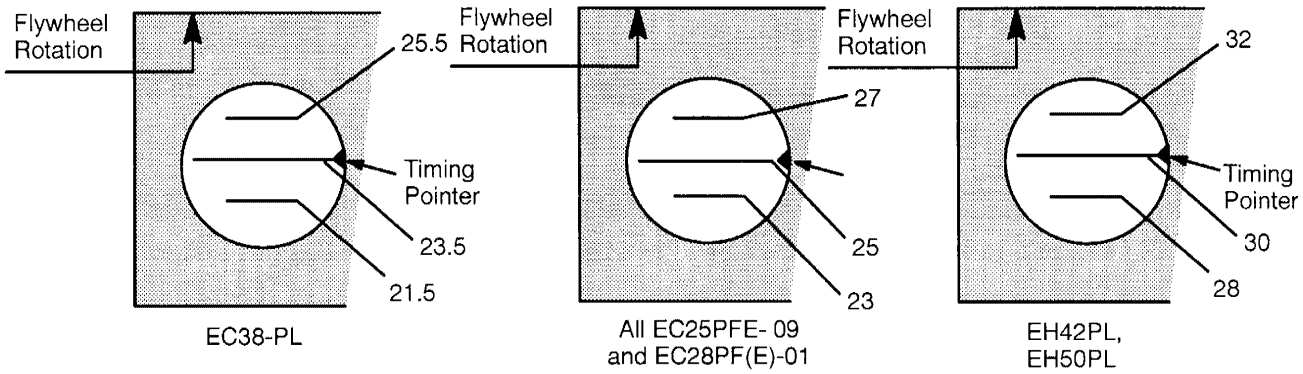
1. The ignition timing check hole is in the starter recoil/magneto housing. Remove the check plug.

NOTE: The ignition timing marks are stamped on the outside of the flywheel. Ignition timing must be inspected with the engine at room temperature (68°F / 20° C).

2. With the transmission in neutral, start the engine and set engine speed to 3000 +/- 200 RPM (3500 ± 200 RPM for EH42PL, EH50PL).

3. Direct the timing light at the ignition timing check hole and check the ignition timing. **NOTE:** Do not allow the engine to warm up. The timing will retard approximately 2° when the engine is warm.

If the ignition timing is not within the specified range, adjust the stator plate position as described below.



All Engines

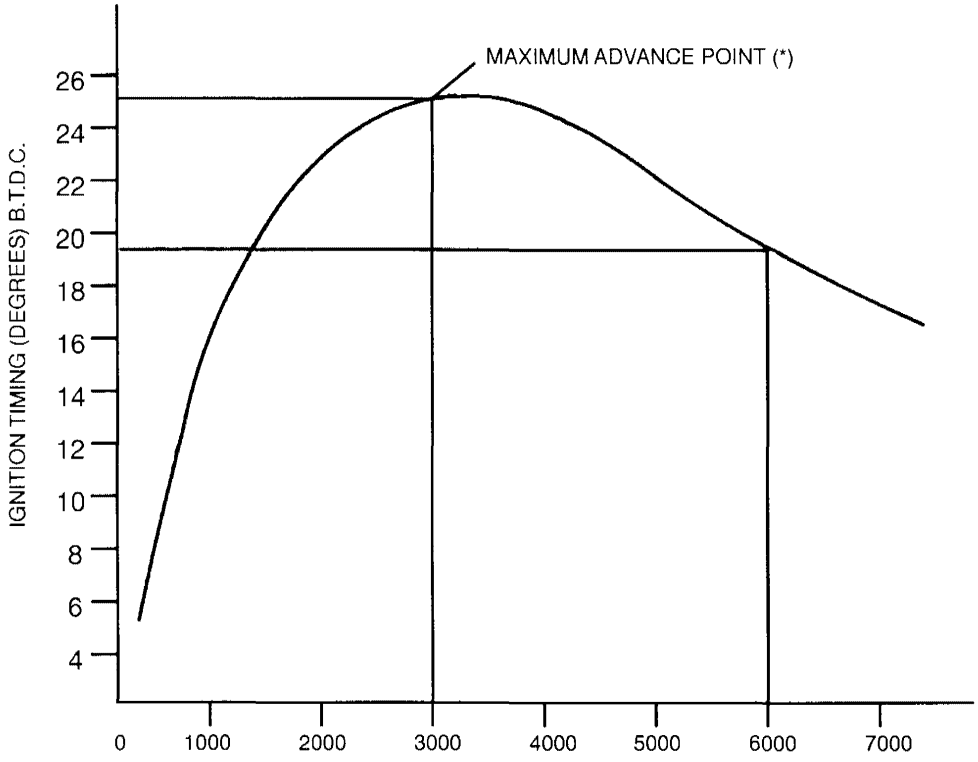
1. Remove the magneto housing.

2. Remove the flywheel.

3. Loosen the stator plate screws and adjust the stator plate position. **NOTE:** Moving the stator plate clockwise retards (delays) the ignition timing. Moving the plate counterclockwise advances it.

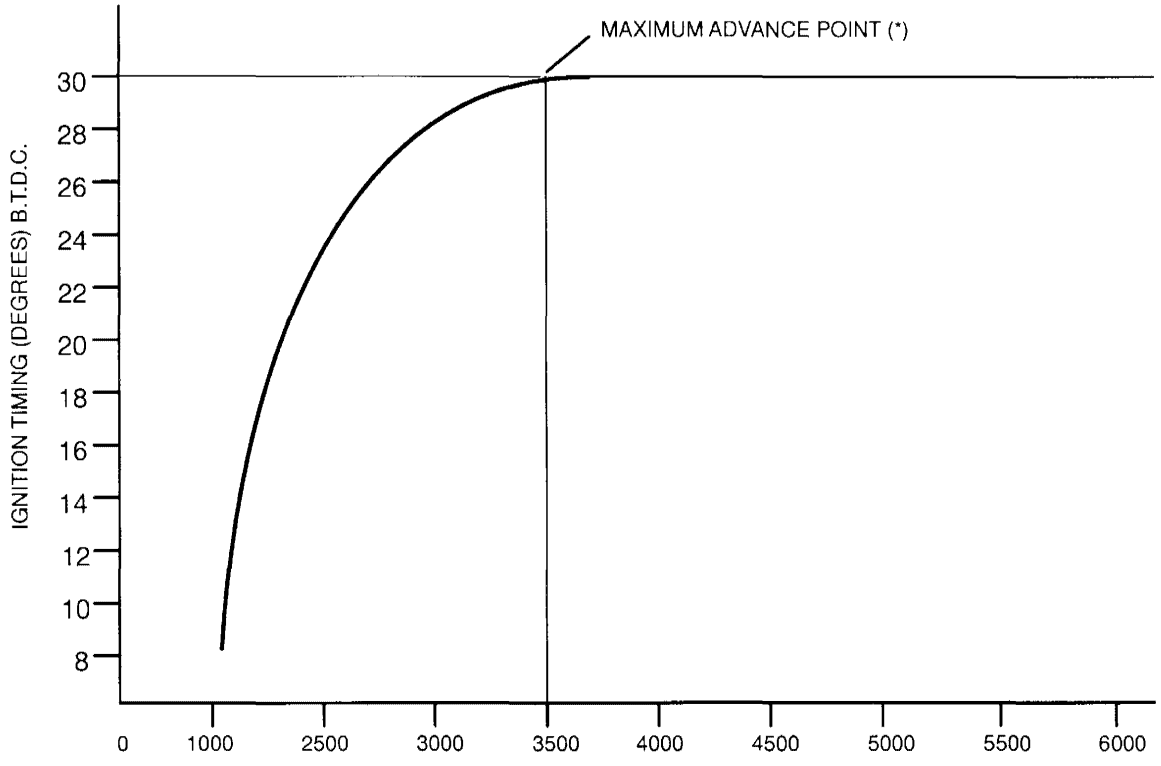
* Actual advance point may vary by several hundred RPM either above or below 3000. Use the point of maximum advance when checking ignition timing.

Typical 2-Stroke



Typical 4-Stroke

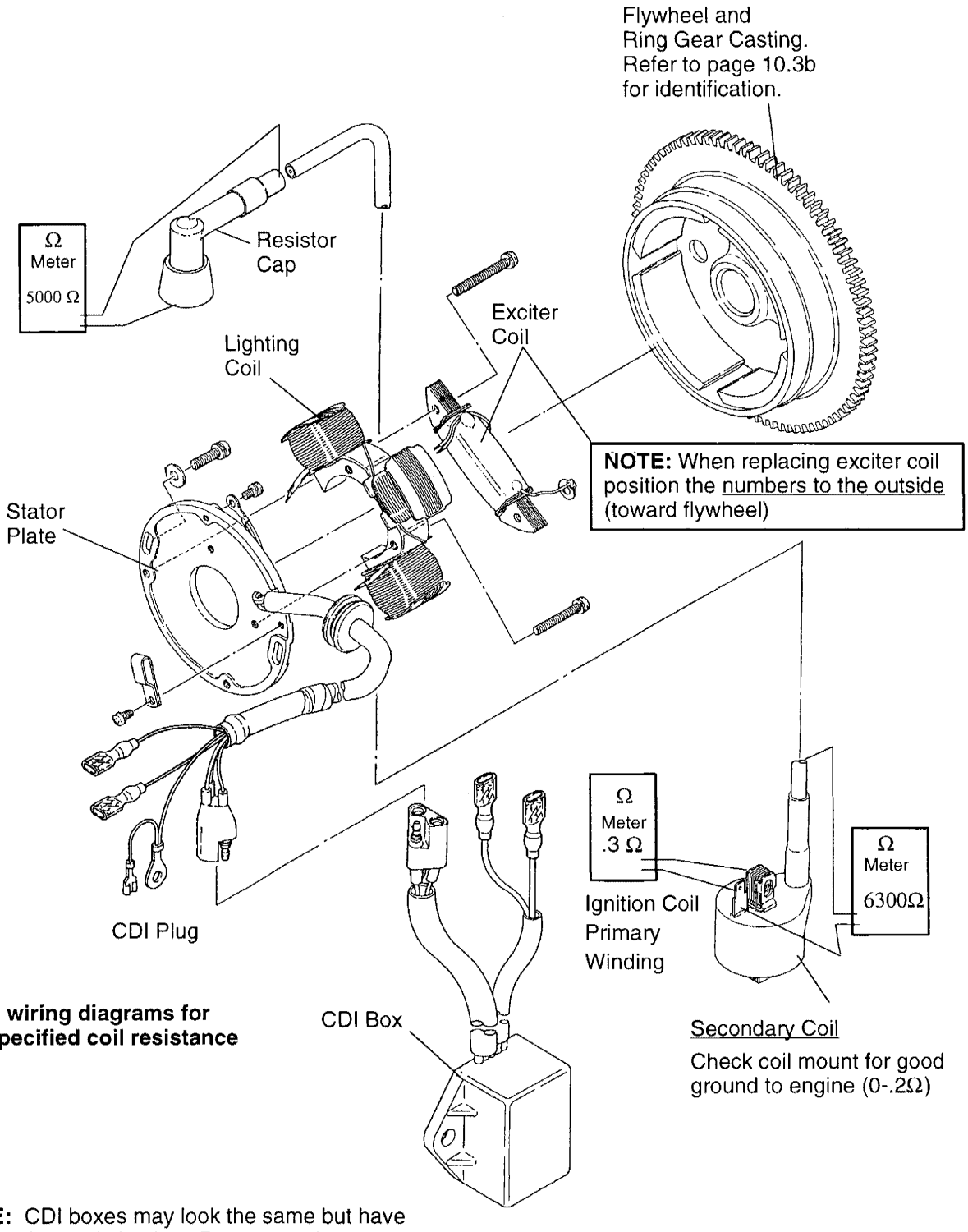
* Actual advance point may vary by several hundred RPM either above or below 3500. Use the point of maximum advance when checking ignition timing.



Crankshaft Degree to Piston Position Conversion Chart (2 Stroke Engines)

Degrees	120 MM Rod 60 MM Stroke		120 MM Rod 65 MM Stroke		130 MM Rod 70 MM Stroke	
	EC25PF		EC28PF		EC35/38PL	
	MM	Inch	MM	Inch	MM	Inch
1	.006	.0002	.006	.0002	.007	.0003
2	.023	.0010	.025	.0010	.027	.0011
3	.051	.0020	.056	.0022	.061	.0024
4	.091	.0040	.100	.0040	.108	.0043
5	.143	.0060	.157	.0062	.169	.0070
6	.205	.0080	.226	.0089	.243	.0100
7	.279	.0110	.307	.0121	.331	.0130
8	.365	.0140	.401	.0158	.432	.0170
9	.461	.0180	.508	.0200	.546	.0220
10	.569	.0220	.626	.0247	.674	.0270
11	.688	.0270	.757	.0298	.815	.0320
12	.818	.0320	.900	.0355	.969	.0380
13	.959	.0380	1.055	.0416	1.136	.0450
14	1.111	.0440	1.223	.0482	1.316	.0520
15	1.274	.0500	1.402	.0552	1.509	.0590
16	1.447	.0570	1.593	.0627	1.714	.0680
17	1.632	.0640	1.796	.0707	1.933	.0760
18	1.827	.0720	2.011	.0792	2.164	.0850
19	2.033	.0800	2.238	.0881	2.407	.0950
20	2.249	.0890	2.476	.0975	2.663	.1050
21	2.475	.0970	2.725	.1073	2.931	.1150
22	2.712	.1070	2.985	.1175	3.211	.1260
23	2.959	.1170	3.257	.1282	3.504	.1380
24	3.216	.1270	3.540	.1394	3.808	.1500
25	3.482	.1370	3.633	.1509	4.124	.1620
26	3.759	.1480	4.138	.1629	4.451	.1750
27	4.045	.1590	4.453	.1753	4.790	.1890
28	4.341	.1710	4.778	.1881	5.140	.2020
29	4.646	.1830	5.114	.2013	5.501	.2170
30	4.960	.1950	5.459	.2149	5.872	.2310

Components of EC25/28PL 150 Watt Alternator (Exploded View)



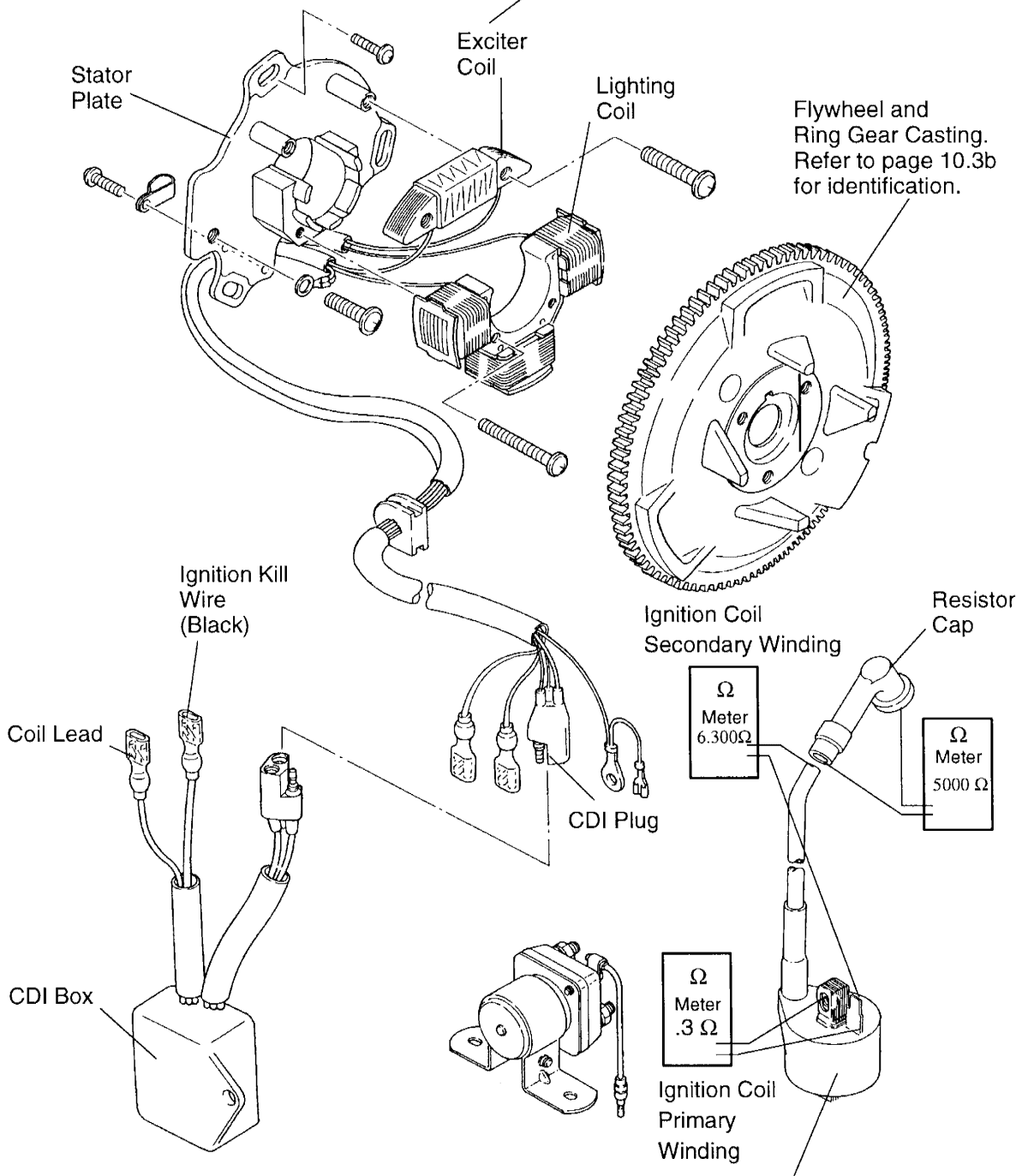
Refer to wiring diagrams for stator specified coil resistance

NOTE: CDI boxes may look the same but have different internal circuitry. Be sure to always use the correct CDI box part number.

Components of EC38PL 150 Watt Alternator (Exploded View)

Refer to wiring diagrams for specified stator coil resistance

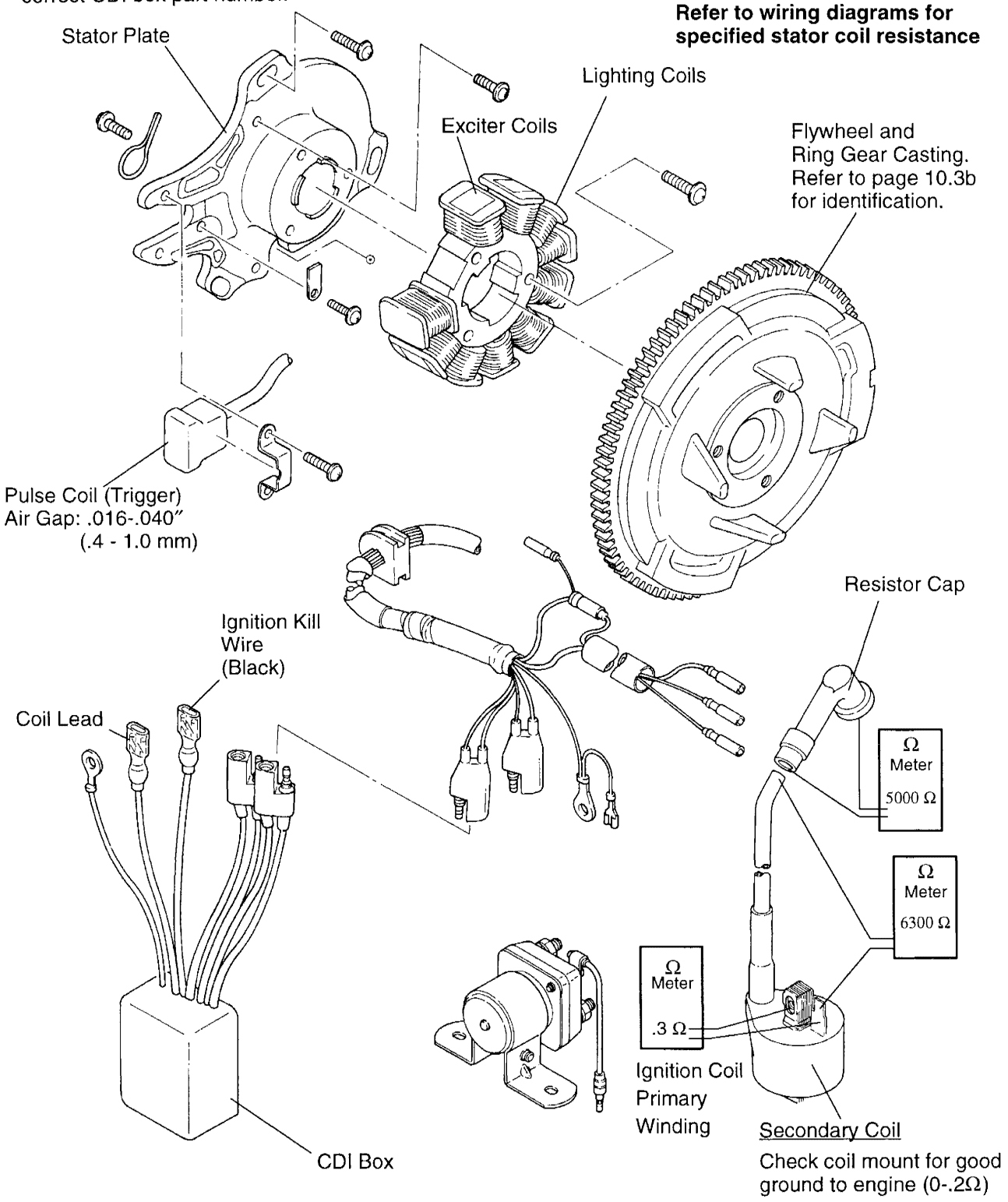
NOTE: When replacing exciter coil position the numbers to the outside (toward flywheel).



NOTE: CDI boxes may look the same but have different internal circuitry. Be sure to always use the correct CDI box part number.

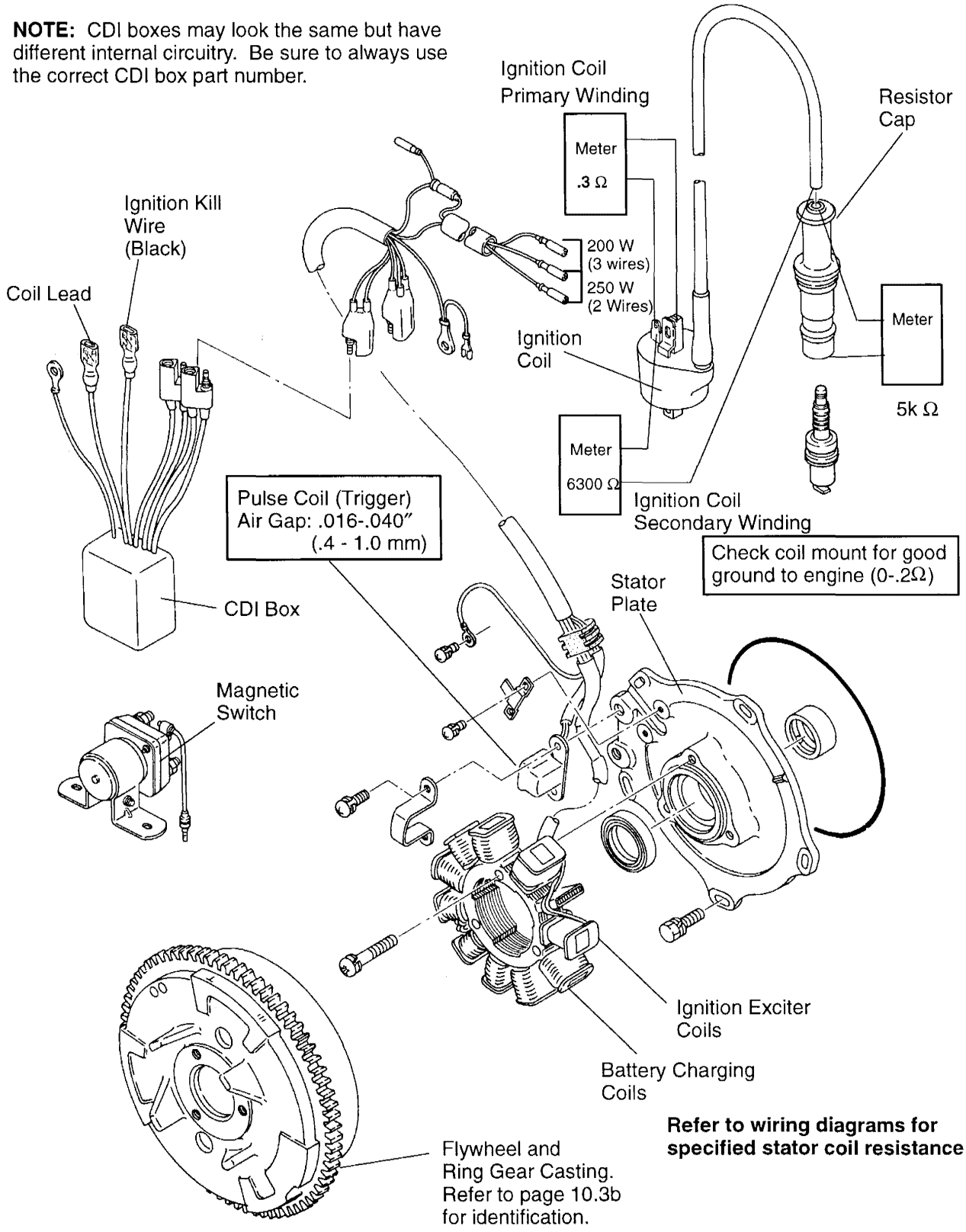
Components of EC38PL 200 Watt Alternator (Exploded View)

NOTE: CDI boxes may look the same but have different internal circuitry. Be sure to always use the correct CDI box part number.



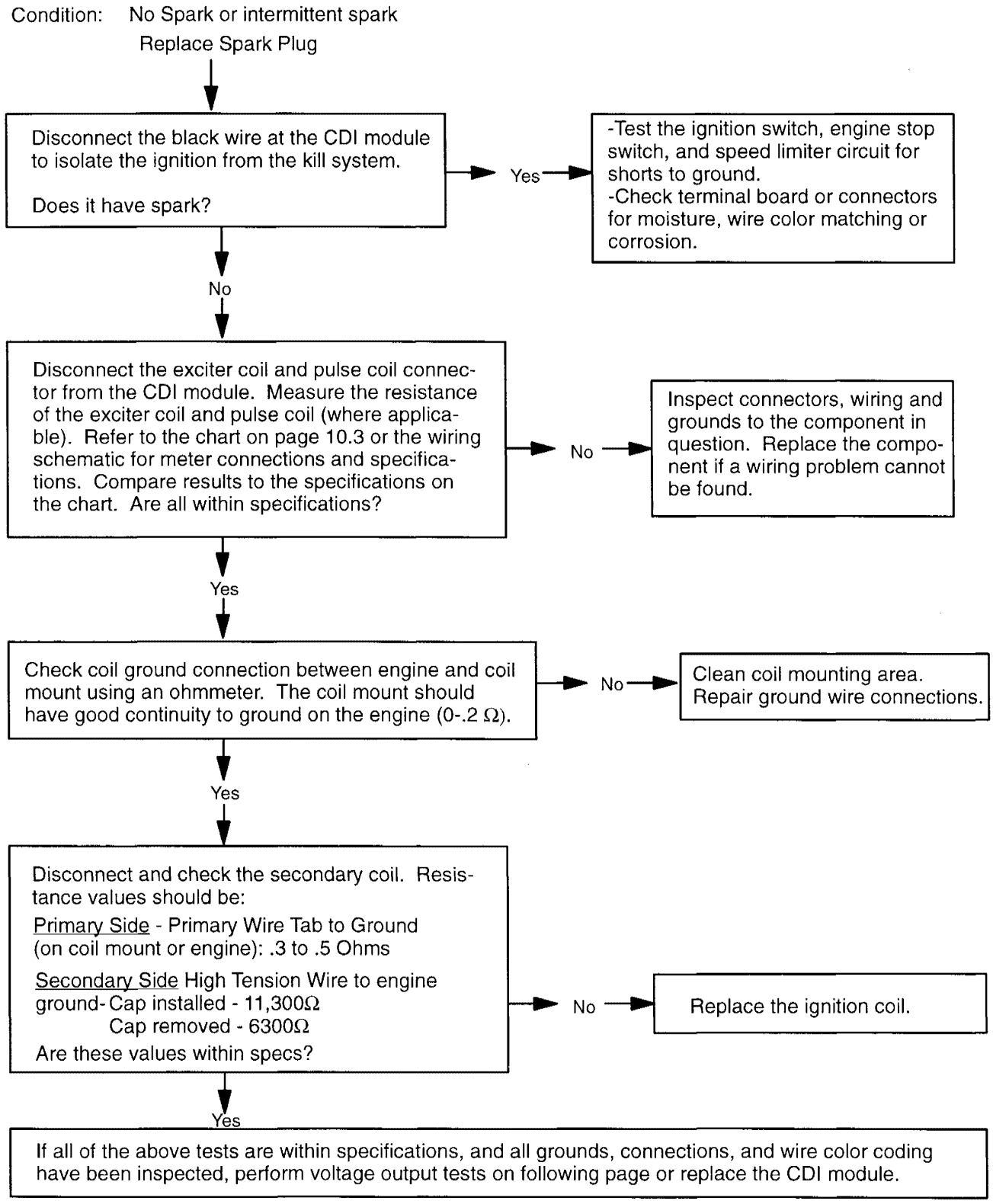
Components of EH42PL/EH50PL 200 / 250 Watt Alternator (Exploded View)

NOTE: CDI boxes may look the same but have different internal circuitry. Be sure to always use the correct CDI box part number.



Ignition System

Whenever troubleshooting an electrical problem you should first check all terminal connections to be sure they are clean and tight. Also be sure that colors match when wires are connected. Use the following pages as a guide for troubleshooting. The resistance values are also given on the specification pages.



Cranking Output Test With Peak Reading Voltmeter

The following peak voltage tests will measure the amount of output directly from each component. A peak reading voltmeter must be used to perform the tests. A variety of peak reading adaptors are commercially available for use with the Fluke ™ 73 Digital Multitester, Tektronix DMM155, and other digital VOMs which will allow peak voltage tests to be performed accurately. Follow the directions provided with the adaptor. All measurements are indicated in DC Volts. Readings obtained without a peak reading adaptor will be significantly different.

Disconnect the stator connectors from the CDI module. Test output from exciter coil, pulse (trigger) coil, and compare to the chart. The following measurements are obtained when cranking the engine with the electric starter, spark plug installed. The starter system must be in good condition and the battery fully charged.

200 / 250 Watt 4 Stroke

Coil	Connect Meter Wires To:	Reading (With Peak Reading Volt meter)
Exciter 1	Black/Red and Red	140 DCV
Exciter 2	Black/Red and Green	140 DCV
Exciter 3	Green and Red	5 DCV
Pulse (Trigger)	White/Red and White	2.5 DCV

200 Watt 2 Stroke

Coil	Connect Meter Wires To:	Reading (With Peak Reading Volt meter)
Exciter	Black/Red - Red	140 DCV
Pulse (Trigger)	White/Red -White	2.5 DCV

150 Watt 2 Stroke

Coil	Connect Meter Wires To:	Reading (With Peak Reading Volt meter)
Exciter	Black/Red - Brn/White	130 DCV

CDI Output Test Using Peak Reading Adaptor

Re-connect all CDI wires to stator wires. Disconnect CDI module wire from ignition coil primary terminal. Connect one meter lead to engine ground and the other to the ignition coil primary wire leading from the CDI module. Crank engine and check output of CDI wire to coil (130 DCV). Reconnect coil wire to CDI.

Output w/ Peak output tester
130 DCV
Average Output w/ DVM only
20 DCV

Ignition System Troubleshooting

No Spark, Weak or Intermittent Spark

- •Spark plug gap incorrect
- •Fouled spark plug
- •Faulty spark plug cap or poor connection to high tension lead
- •Related wiring loose, disconnected, shorted, or corroded
- •Engine Stop switch or ignition switch faulty
- •ETC switch misadjusted or faulty
- •Terminal board or connections wet, corroded
- •Poor ignition coil ground (e.g. coil mount loose or corroded)
- •Faulty stator (measure resistance of all ignition related windings)
- •Incorrect wiring (inspect color coding in connectors etc)
- •Faulty ignition coil winding (measure resistance of primary and secondary)
- •Worn magneto (RH) end Crankshaft bearings
- •Sheared flywheel key
- •Flywheel loose or damaged
- •Trigger coil air gap too wide (where applicable) - should be .016-.040″ (.4-1.0 mm)
- •Excessive crankshaft runout on magneto (RH) end - should not exceed .005″
- •White stator wire (150W alternators) not grounded to engine
- •Faulty CDI module**

NOTE: 200 and 250 Watt Alternators - If CDI module is replaced, be sure to use the correct module for the year and model you are working on. 1998-current CDI modules are not compatible with pre-1998 Speed Limiter Modules. If the CDI module from a 1998 model is installed on a *pre-1998* model, intermittent ignition problems may result unless the equivalent 1998 speed limiter module is installed with the CDI module.

Speed Limiter Module	CDI Module	
	Pre-1998 CDI	1998-Current CDI
Pre-1998 SLM	Yes	No - (Yes if 1998 SLM is installed)
1998-Current SLM	Yes	Yes

Initial Battery Service

⚠ 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. If battery acid gets on anyone, wash the affected area with large quantities of cool water and seek immediate medical attention.

CAUTION: Do not start the engine with battery disconnected. Damage will occur to lamps and electronic speed limiter.

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.

1. Remove vent plug from vent fitting.
2. Fill battery with electrolyte to upper level marks on case.
3. Set battery aside and allow it to cool and stabilize for 30 minutes.
4. Add electrolyte to bring level back to upper level mark on case. **NOTE:** This is the last time that electrolyte should be added. If the level becomes low after this point, add only distilled water.
5. Charge battery at 1/10 of its amp/hour rating. Examples: 1/10 of 9 amp battery = .9 amp; 1/10 of 14 amp battery = 1.4 amp; 1/10 of 18 amp battery = 1.8 amp (recommended charging rates).
6. Check specific gravity of each cell with a hydrometer to assure each has a reading of 1.270 or higher.

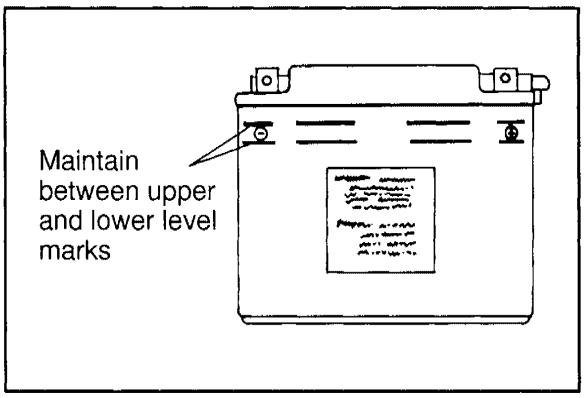
Battery Terminals/Terminal Bolts

Use Polaris corrosion resistant dielectric grease (PN 2871027) on battery bolts. See Battery Installation on page 10.21.

Battery Inspection/Removal

The battery is located under the left rear fender.

Inspect the battery fluid level. When the battery fluid nears the lower level, the battery should be removed and distilled water should be added to the upper level line. To remove the battery:



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

⚠ CAUTION

Whenever removing or reinstalling the battery, disconnect the negative (black) cable first and reinstall the negative cable last!

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

⚠ To refill use only distilled water. Tap water contains minerals which are harmful to a battery.

⚠ Do not allow cleaning solution or tap water to enter the battery. It will shorten the life of the battery.

6. Reinstall the battery caps.

Battery Installation

1. Clean battery cables and terminals with a stiff wire brush. Corrosion can be removed using a solution of one cup water and one tablespoon baking soda. Rinse will with clean water and dry thoroughly.
2. Reinstall battery, attaching positive (+) (red) cable first and then the negative (-) (black) cable. Coat terminals and bolt threads with Polaris dielectric grease PN 2871027.
3. 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 battery electrolyte, severe burns could result. If electrolyte contacts the vehicle frame, corrosion will occur.
4. Route cables so they are tucked away in front and behind battery.
5. Reinstall battery cover and holder strap.

⚠ Do not start the engine with the battery disconnected. Vehicle lamps will burn out if battery is disconnected during vehicle operation. Also, the reverse speed limiter can be damaged.

Battery Testing

Whenever a service complaint is related to either the starting or charging systems, the battery should be checked first.

Following are three tests which can easily be made on a battery to determine its condition: OCV Test, Specific Gravity Test and Load Test.

OCV - Open Circuit Voltage Test

Battery voltage should be checked with a digital multitester. Readings of 12.6 or less require further battery testing and charging. See charts and Load Test on page 10.22.

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.

Specific Gravity Test

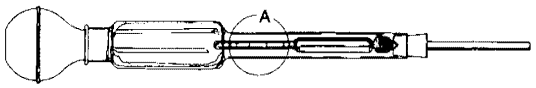
A tool such as a Battery Hydrometer (PN 2870836) can be used to measure electrolyte strength or specific gravity. As the battery goes through the charge/discharge cycle, the electrolyte goes from a heavy (more acidic) state at full charge to a light (more water) state when discharged. The hydrometer 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.

OPEN CIRCUIT VOLTAGE		
State of charge	Conventional Lead-acid	YuMicron™ Type
100% Charged	12.60V	12.70V
75% Charged	12.40V	12.50V
50% Charged	12.10V	12.20V
25% Charged	11.90V	12.0V
0% Charged	less than 11.80V	less than 11.9V

SPECIFIC GRAVITY		
State of charge*	Conventional lead-acid	YuMicron™ Type
100% Charged	1.265	1.275
75% Charged	1.210	1.225
50% Charged	1.160	1.175
25% Charged	1.120	1.135
0% Charged	less than 1.100	less than 1.115

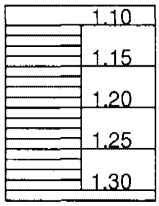
* At 80°F

NOTE: Subtract .01 from the specific gravity reading at 40° F.



Polaris PN 2870876

Detail A



Load Test

CAUTION: Remove spark plug high tension leads and connect securely to engine ground before proceeding.

NOTE: This test can only be performed on machines with electric starters. This test cannot be performed with an engine or starting system that is not working properly.

A battery may indicate a full charge condition in the OCV test and the specific gravity test, but still may not have the storage capacity necessary to properly function in the electrical system. For this reason, a battery capacity or load test should be conducted whenever poor battery performance is encountered. To perform this test, hook a multitester to the battery in the same manner as was done in the OCV test. The reading should be 12.6 volts or greater. Engage the electric starter and view the registered battery voltage while cranking the engine. Continue the test for 15 seconds. During this cranking period, the observed voltage should not drop below 9.5 volts. If the beginning voltage is 12.6 or higher and the cranking voltage drops below 9.5 volts during the test, replace the battery.

Off Season Storage

To prevent battery damage during extended periods of non-use, the following basic battery maintenance items must be performed:

- Remove the battery from the machine and wash the case and battery tray with a mild solution of baking soda and water. Rinse with lots of fresh water after cleaning. **NOTE:** Do not get any of the baking soda into the battery or the acid will be neutralized.
- Using a wire brush or knife, remove any corrosion from the cables and terminals.
- Make sure that the electrolyte is at the proper level. Add distilled water if necessary.
- Charge at a rate no greater than 1/10 of the battery's amp/hr capacity until the electrolyte's specific gravity reaches 1.270 or greater.
- Store the battery either in the machine with the cables disconnected, or put it on a piece of wood and store in a cool place. **NOTE:** Stored batteries lose their charge at the rate of 1% per day. They should be recharged to a full charge every 30 to 60 days during a non-use period. If the battery is stored during the winter months the electrolyte will freeze at a higher temperature as the battery discharges. The chart at right indicates freezing points by specific gravity.

Charging Procedure

Charge the battery with a charger no larger than 1/10 of the battery's amp/hr rating for as many hours as needed to raise the specific gravity to 1.270 or greater.

Electrolyte Freezing Points	
Specific Gravity of Electrolyte	Freezing Point
1.265	-75° F
1.225	-35° F
1.200	-17° F
1.150	+5° F
1.100	+18° F
1.050	+27° F

1. Install battery in vehicle with positive terminal toward the front. Coat threads of battery bolt with Polaris corrosion resistant dielectric grease.

Polaris Dielectric Grease

PN 2871027

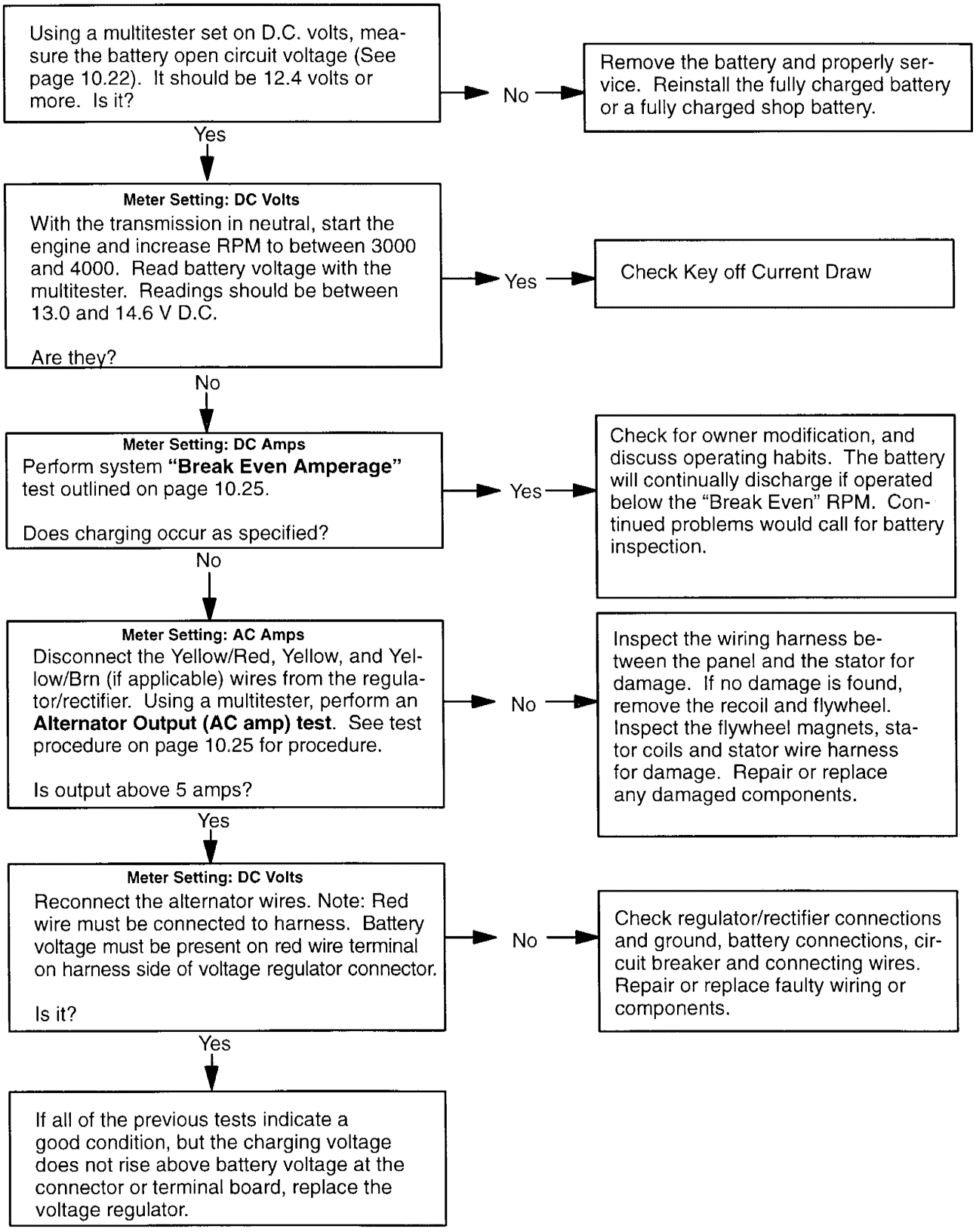
⚠ WARNING

To avoid the possibility of explosion, connect positive (red) cable first and negative (black) cable last.

2. Connect battery cables.
3. After connecting the battery cables, install the cover on the battery and attach the hold down strap.
4. Install clear battery vent tube from vehicle to battery vent. **WARNING:** Vent tube must be free from obstructions and kinks and securely installed. If not, battery gases could accumulate and cause an explosion. Vent should be routed away from frame and body to prevent contact with electrolyte. Avoid skin contact with battery electrolyte, severe burns could result. If electrolyte contacts the vehicle frame, corrosion will occur.
5. Route cables so they are tucked away in front and behind battery.

Charging System Testing

Whenever charging system problems are suspected, proceed with the following system check.



Current Draw - Key Off

CAUTION: Do not connect or disconnect the battery cable or ammeter with the engine running. Damage will occur to light bulbs and speed limiter.

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 .02 DCA (20 MA)

Charging System "Break Even" Test

CAUTION: Do not connect or disconnect the battery cable or ammeter with the engine running. Damage will occur to light bulbs and speed limiter.

CAUTION: Never use the electric starter with the ammeter connected, or damage to the meter may result. Do not run test for extended period of time. Do not run test with high amperage accessories.

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.

Connect an ammeter set to DC amps in series between the negative battery cable and terminal. Connect a tachometer according to manufacturer's instructions. With engine off and the key and kill switch in the ON position, the ammeter should read negative amps (battery discharge). Reverse meter leads if a positive reading is indicated. Shift transmission into neutral. Start engine with recoil *only*. Increase engine RPM while observing ammeter and tachometer. Note RPM at which the battery starts to charge (ammeter indication is positive). With lights and other electrical load off, this should occur at approximately 1500 RPM or lower on both 150 and 200 watt alternators. Turn the lights on and lock parking brake to keep brake light on. Repeat test, observing ammeter and tachometer. With lights on, charging should occur at or below 3000 RPM on 150 watt alternators and 2000 RPM on 200 watt alternators.

Alternator Output Test (AC amp)

This test measures AC amperage from the alternator.
Maximum alternator output will be indicated on the meter. It is *not* necessary to increase engine RPM above idle. Place the red lead on the tester in the 10A jack. Turn the selector dial to the AC amps (A~) position. Connect the meter leads to the Yellow and Yellow/Red wires leading from the alternator. Start the engine and let it idle. Reading should be a minimum of 5A at idle.

Alternator Current Output:
Minimum of 5 AC Amps

Starter System Troubleshooting

Starter Motor Does Not Turn

- •Battery discharged - low specific gravity
- •Loose or faulty battery cables or corroded connections (see Voltage Drop Tests)
- •Related wiring loose, disconnected, or corroded
- •Poor ground connections at battery cable, starter motor or starter solenoid (see Voltage Drop Tests)
- •Faulty starter button
- •Faulty ignition switch (Do other systems function?)
- •Faulty starter solenoid or starter motor.
- •Engine problem - seized or binding (Can engine be rotated easily with recoil starter?)

Starter Motor Turns Over Slowly

- •Battery discharged - low specific gravity
- •Excessive circuit resistance - poor connections (see Voltage Drop Test below)
- •Engine problem - seized or binding (Can engine be rotated easily with recoil starter?)
- •Faulty or worn brushes in starter motor
- •Automatic compression release inoperative

Starter Motor Turns - Engine Does Not Rotate

- •Faulty starter drive
- •Faulty starter drive gears or starter motor gear
- •Faulty flywheel gear or loose flywheel

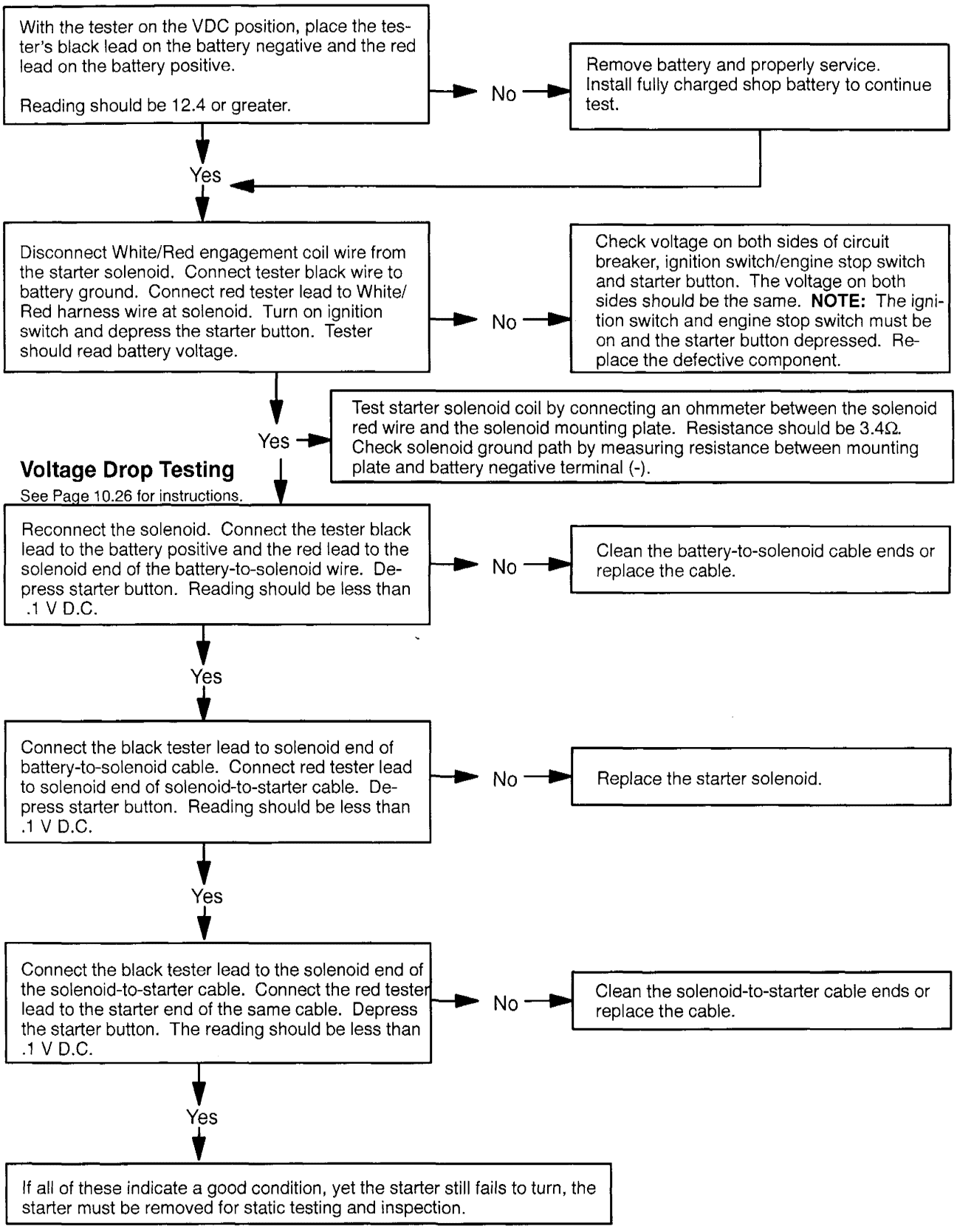
Voltage Drop Test

The Voltage Drop Test is used to test for bad connections. When performing the test, you are putting the Volt meter in place of the wire and connection you are testing (meter in parallel). Because electricity will flow in the path of least resistance, current will flow thru the meter if there is a poor or corroded connection. This will show up as a voltage reading. Voltage shown on the meter when testing connections should not exceed .1 VDC per connection or component.

To perform the test, place the meter on DC volts and place the meter leads across the connection to be tested. Refer to the chart on next page to perform voltage drop tests on the starter system.

Voltage should not exceed:
.1 DC volts per connection

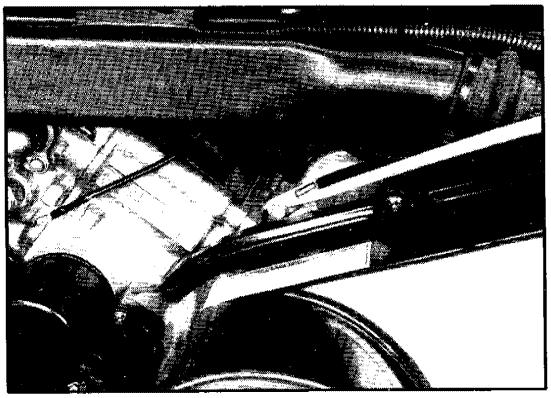
Condition: Starter fails to turn motor. **NOTE:** Make sure engine crankshaft is free to turn before proceeding with dynamic testing of starter system. A digital multitester must be used for this test.



Starter Motor Removal (EH42PL, EH50PL)

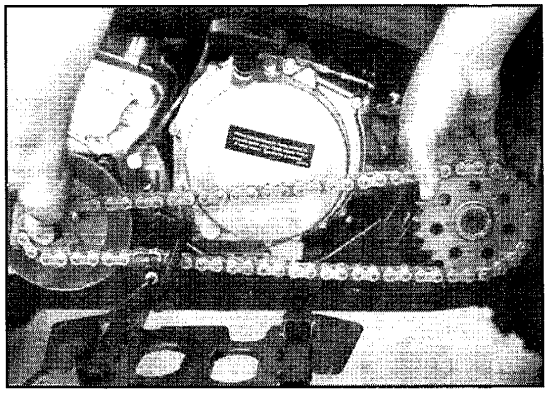
CAUTION: Turn ignition switch *off* and disconnect the battery ground (-) cable from the battery before removing the starter motor.

1. Remove the two 6mm starter motor mounting bolts. Note the position of the ground cable.
2. Disconnect starter motor positive (+) cable at the motor.
3. Remove starter motor.
4. Inspect the O-Ring on the end of the starter motor for wear, cracks, or damage. Replace if necessary.

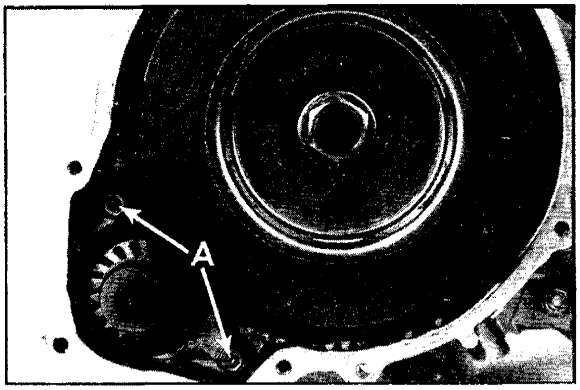


Starter Motor Removal (EC38PL)

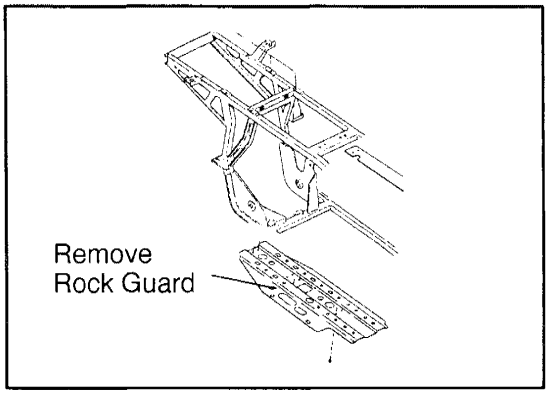
1. Disconnect battery ground (–) cable.
2. Remove components to gain access to recoil housing (i.e. chains, chain cover, body panels, etc.)



3. Remove two starter bolts as shown.

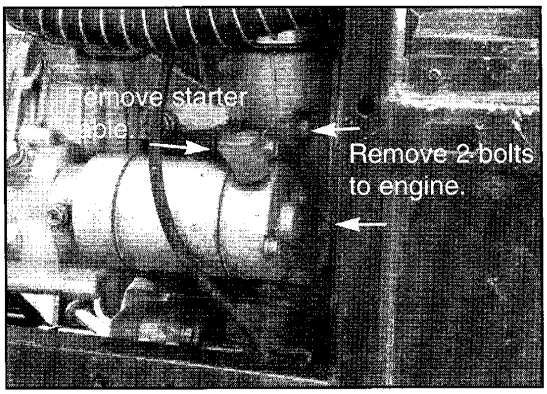


4. Remove rock guard from bottom of vehicle.



Starter Motor Removal, Cont. (EC38PL)

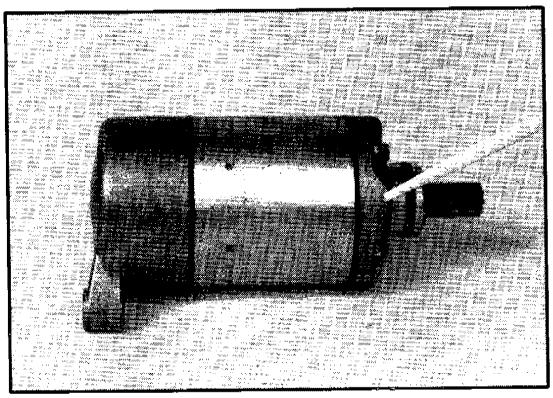
5. Remove starter cable.
6. Using a 10mm wrench, remove the two screws attaching the starter support bracket to the engine.
7. Remove the bolt securing the starter to the magneto housing.
8. Remove starter with bracket attached through bottom of frame.



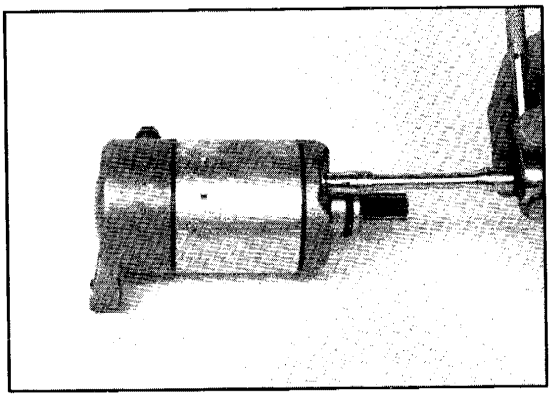
Starter Motor Disassembly (Typical)

NOTE: Use electrical contact cleaner to clean starter motor parts. Some solvents may leave a residue or damage internal parts and insulation.

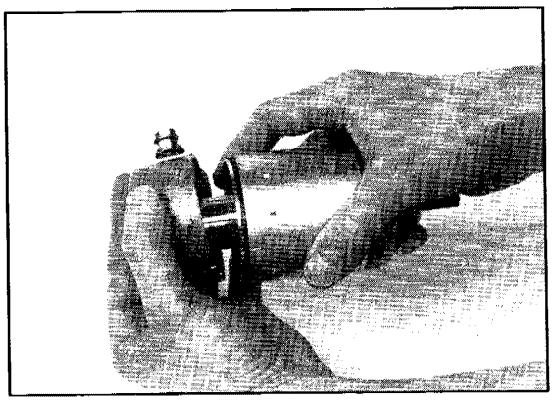
1. Note the alignment marks on both ends of the starter motor casing. These marks must align during reassembly.



2. Remove the two bolts, washers, and sealing O-Rings. Inspect O-Rings and replace if damaged.

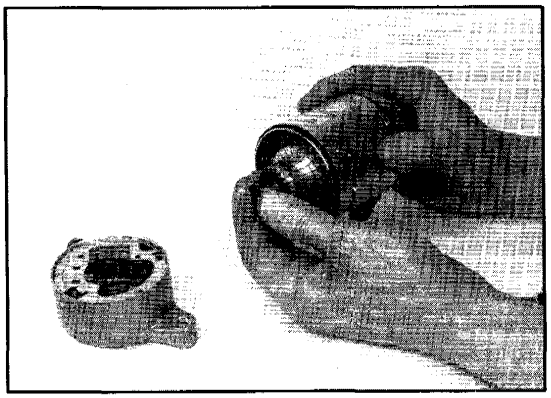


3. Remove brush terminal end of housing while holding other two sections together.



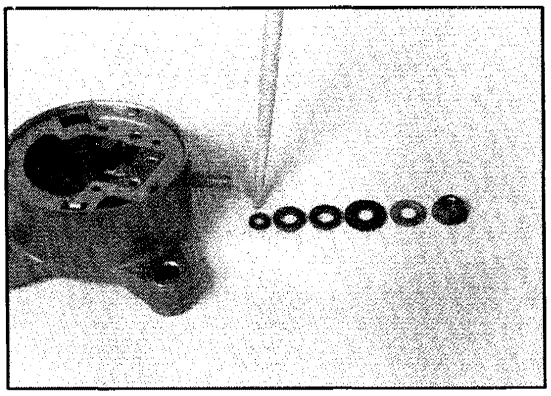
Disassembly (Typical)

4. Remove shims from armature shaft. **NOTE:** All shims must be replaced during reassembly.

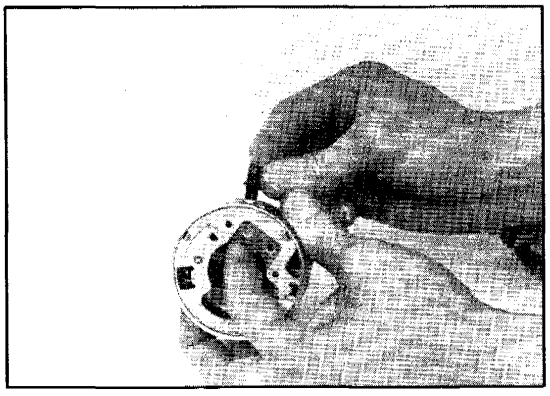


Brush Inspection/Replacement

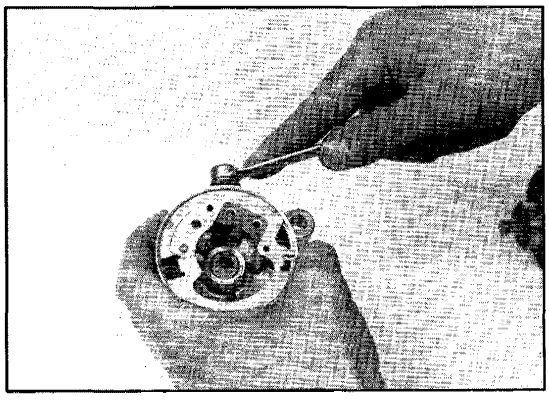
1. Using a digital multitester, measure the resistance between the cable terminal and the insulated brush. The reading should be .3 ohms or less. Measure the resistance between the cable terminal and brush housing. Make sure the brush is not touching the case. The reading should be infinite.
2. Remove nut, flat washer, large phenolic washer, two small phenolic washers, and O-Ring from brush terminal. Inspect the O-Ring and replace if damaged.
3. Remove brush plate and brushes. Measure length of brushes and replace if worn past the service limit. Replace springs if they are discolored or have inadequate tension.



Brush Length Service Limit:
5/16″ (.8 cm)



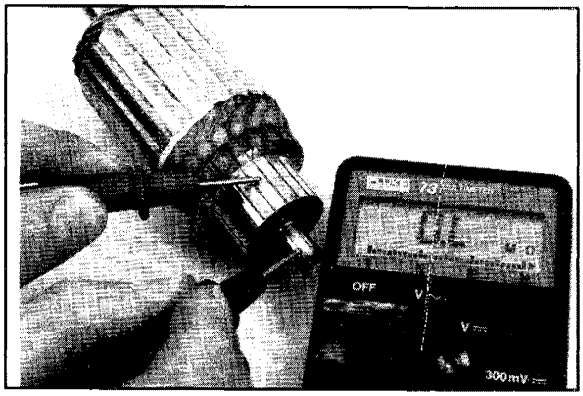
4. Inspect surface of commutator for wear or discoloration. See steps 3-6 of armature testing on page 10.30.
5. Install a new carbon brush assembly in the brush housing. **NOTE:** Be sure that the terminal bolt insulating washer is properly seated in the housing, and the tab on the brush plate engages the notch in the brush plate housing.
6. Place a wrap of electrical tape on the threads of the terminal bolt to prevent O-Ring damage during reinstallation.
7. Install the O-Ring over the bolt. Make sure the O-ring is fully seated.
8. Remove the electrical tape and reinstall the two small phenolic washers, the large phenolic washer, flat washer, and nut.



Armature Testing

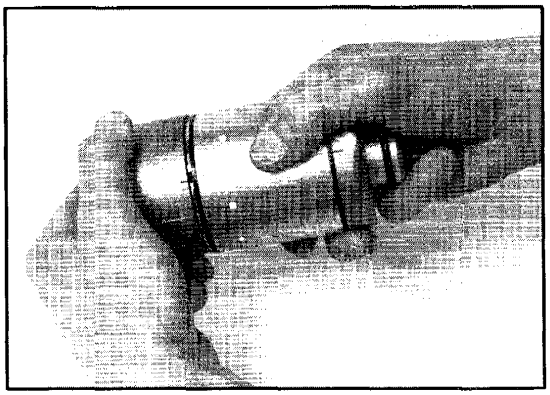
1. Remove armature from starter casing. Note order of shims on drive end for reassembly.
2. Inspect surface of commutator. Replace if excessively worn or damaged.
3. Using a digital multitester, measure the resistance between each of the commutator segments. The reading should be .3 ohms or less.

4. Measure the resistance between each commutator segment and the armature shaft. The reading should be infinite (no continuity).
5. Check commutator bars for discoloration. Bars discolored in pairs indicate shorted coils, requiring replacement of the starter motor.
6. Place armature in a growler. Turn growler on and position a hacksaw blade or feeler gauge lengthwise 1/8″ (.3 cm) above armature coil laminates. Rotate armature 360°. If hacksaw blade is drawn to armature on any pole, the armature is shorted and must be replaced.



Starter Assembly

1. Place armature in field magnet casing.
2. Place shims on drive end of armature shaft with phenolic washer outermost on shaft. Engage tabs of stationary washer in drive end housing, holding it in place with a light film of grease.
3. Install case sealing O-Ring. Make sure O-Ring is in good condition and not twisted on the case. Lubricate needle bearing and oil seal with a light film of grease, and install housing, aligning marks.
4. Install O-Ring on other end of field magnet casing. Make sure it is in good condition and not twisted on the case.
5. Align casing marks and install housing, pushing back brushes while installing shaft in bushing.



6. Reinstall starter motor housing bolts.
   EH42PL, EH50PL: Make sure O-Rings are in good condition and seated in groove.
   EC38PL, EC28PF, EC25PF: Install new gasket on starter flange.
7. Inspect permanent magnets in starter housing. Make sure they are not cracked or separated from housing.

CAUTION:

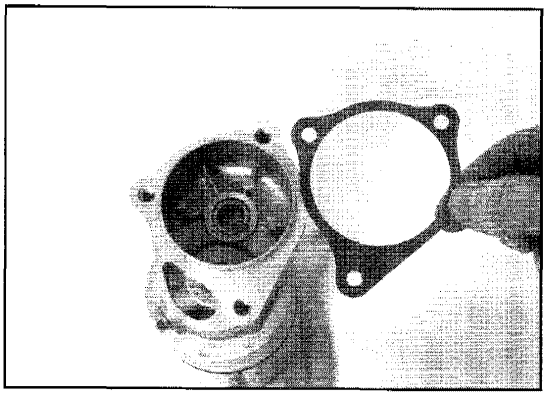
Use care when handling starter housing. Do not drop or strike the housing as magnet damage is possible. If magnets are damaged, starter must be replaced.

Starter Motor Installation (EC38PL)

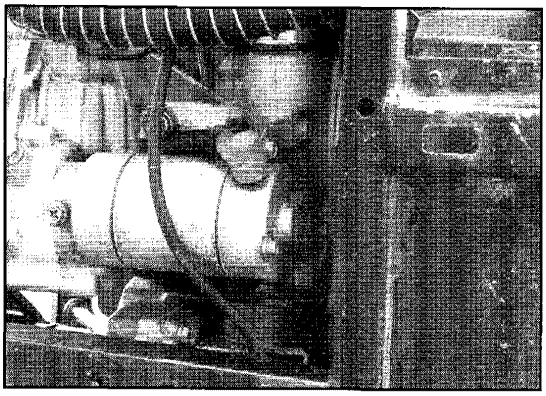
1. Loosely assemble support bracket to starter.

NOTE: Bracket bolts must be loose to allow installation of support bracket to engine bolts.

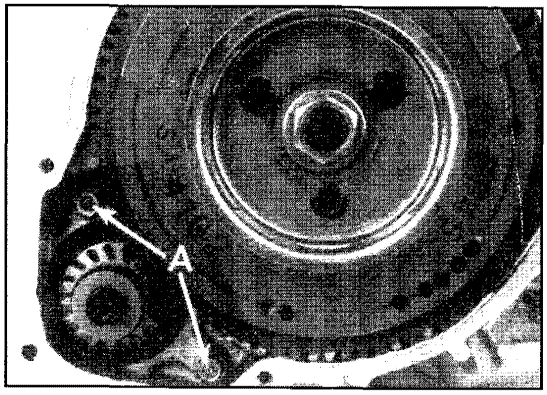
2. Install a new gasket and place the starter motor in place.



3. Install the starter motor to magneto housing bolt first.
4. Install both support bracket to engine bolts.
5. Tighten all support bracket bolts.
6. Install starter motor cable. Make sure red protective cover is properly in place.
7. Install rock guard.



8. Install two bolts to starter from inside magneto housing.
9. Install magneto housing.
10. Install all components removed to gain access to magneto housing.



Starter Drive

Pinion Gear - Anti Kick-out Shoe, Garter Spring Replacement

If the garter spring is damaged, the overrun clutch may fail to return properly. The replacement spring is PN 7042039. Use either of the following methods to remove and install a new garter spring.

Polaris Premium Starter Drive Grease

PN 2871460

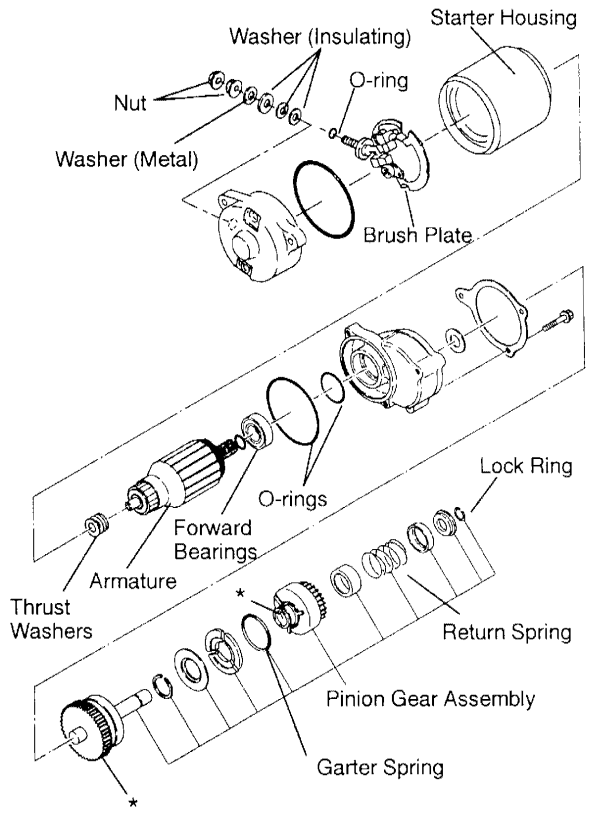
1. Screw the overrun clutch out to the engaged position on the pinion shaft assembly. Use a small piece of wire with the end bent in a hook and pick the old spring out of its channel. Slide it off the end of the shaft. Slide the new spring over the overrun clutch and into the spring groove. Make sure that the spring is positioned between the shoe alignment pins and the back flange of the anti kick-out shoes.

2. Remove the lock ring, end washer, spring retainers and clutch return spring. Screw the overrun clutch off the end of the pinion shaft. Remove the old spring and install a new one. Lightly grease the pinion shaft and reinstall the clutch, spring, retainers, end washer and lock ring in the reverse order. Make sure the end washer is positioned properly so that it will hold the lock ring in its groove.

Starter Solenoid Bench Test

It is difficult to test the high amp side of the solenoid accurately on the bench. The only test which can be done on the bench is the pull-in coil resistance. The reading should be 3.4 ohms.

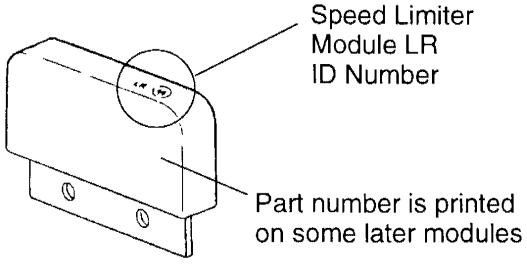
Starter Motor Exploded View



*Lubricate spiral gear with Polaris Premium Starter Drive Grease.

Limiter Specifications

NOTE: The part number is printed on some late model LR modules. Whenever possible, use part number to identify the module. Modules may have same "LR" I.D. number, with different part numbers, terminals, and internal function.



LIMIT SPECIFICATIONS (Refer to parts manual or microfiche for part number and application.)			
PART NO.	**TYPE**	**FUNCTION / LIMIT RPM**	**COMMENTS**
4060085	LR44	Reverse Limit - 3500 ETC Limit - 1900	1996 - Current 250 and 300cc Models (150 Watt alternators). Terminal board wire terminals.
4060112	LR44-2	Reverse Limit - 3100 ETC Limit - 1200	Terminal board wire terminals. (200 Watt alternators).
4060159	LR44-2	Reverse Limit - 3100 ETC Limit - 1200	Same as 4060112; except multi-pin connector wiring harness.
4060203	LR44-2	Reverse Limit - 3100 ETC Limit - 1200	"Anti-splash" version of 4060112. Can be used on models that originally used 4060112. Terminal board wire terminals.
4060204	LR44-2	Reverse Limit - 3100 ETC Limit - 1200	Same as 4060203 except multi-pin connector wiring harness. Has Gray/orange reverse override wire (not Green).
4060114	LR49	Reverse Limit - 2800 ETC Limit - 1200	1996 - Current Sport; Scrambler 400 (150 Watt alternators). Terminal board wire terminals.
4060135	LR83	Reverse Limit - 3100 ETC Limit - 1400	Shaft Drive ATVs with hub engagement limiter function (Hub Limit - 3700) Terminal board wire terminals.
4060205	LR83	Reverse Limit - 3100 ETC Limit - 1400	"Anti-splash" version of 4060135. Can be used on models that originally used 4060135. Terminal board wire terminals.
4060201	LR83-2	Reverse Limit - 3100 ETC Limit - 1400	Same as 4060205 except multi-pin connector wiring harness.
4060199	LR83-1		For 150 Watt Alternators.

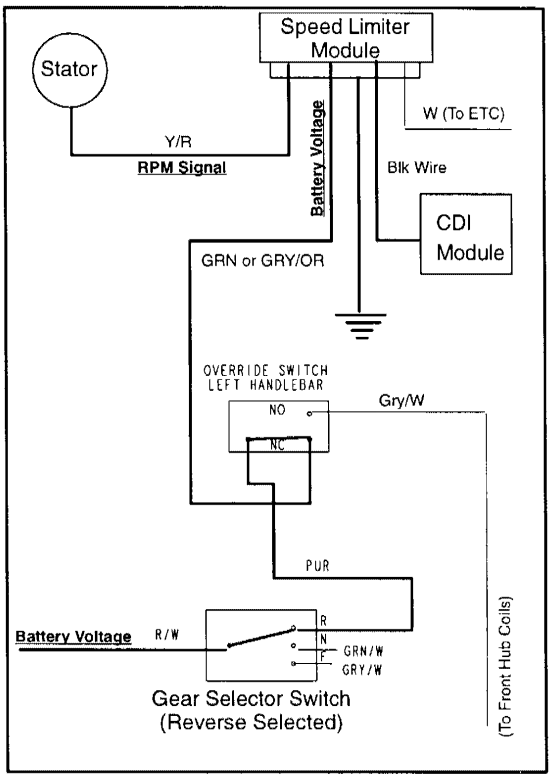
Speed Limiter System - Theory of Operation

The Speed Limiter system controls vehicle speed by electronically limiting engine RPM in reverse, or in the event of a mechanical problem in the throttle control mechanism. There are two separate limiting systems - the Reverse Speed Limiter system and the Electronic Throttle Control (ETC) system. Although the two systems are independent of each other, they share a common part – the limiter module. When activated, the limiter module grounds the ignition stop circuit through the CDI black wire, creating a "misfire" which prevents engine RPM from going above the "Reverse Limit" or "ETC Limit" RPM. The limits are designed into the limiter module for a given model, and cannot be changed or adjusted.

Reverse Speed Limiter System - In order to fully understand and troubleshoot the Reverse Speed Limiter system, it is important to remember that limiting will occur whenever two input "signals" are present at the limiter module:

1. The limiter module must receive voltage through the reverse light circuit (Green or Gray/Orange wire).
and...
2. Engine RPM must be at or above the "Reverse Limit". The RPM signal is delivered to the limiter module via the Yellow/Red alternator wire.

When both of these inputs are present, the system will limit. Below the "reverse limit" RPM, the ignition system will operate normally.



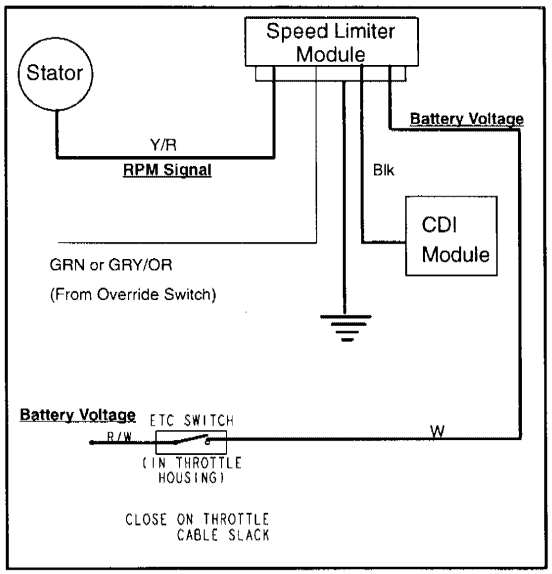
Speed Limiter Circuit (Typical)
Speed Limiter Circuit Wires Shown In **Bold**

Electronic Throttle Control (ETC) - Theory of Operation

The limiter also incorporates a throttle safety feature called the Electronic Throttle Control (ETC). When there is a mechanical problem in the throttle mechanism (throttle plate, throttle shaft, or cable) and the throttle lever is released, the ETC switch contacts close. Power is delivered to the limiter module through the white wire, and engine RPM is limited to the "ETC limit". It is important to remember that ETC limiting will occur whenever two input "signals" are present at the limiter module:

1. The limiter module must receive voltage through the ETC switch circuit (White wire).
and...
2. Engine RPM must be at or above the "ETC Limit". The RPM signal is delivered to the limiter module via the Yellow/Red alternator wire.

Refer to following pages for test procedure.



Electronic Throttle Control Circuit (Typical)
Electronic Throttle Control Circuit Wires Shown In **Bold**

NOTE: The reverse RPM limit will override the ETC Limit when both are receiving voltage.

Speed Limiter System Testing

CAUTION: Pre-1998 Models (except 1997 Scrambler 500) The speed limiter control module may be permanently damaged if the machine is operated with the voltage regulator damaged and/or the battery disconnected.

WARNING: The speed limiter is a safety feature and should never be disabled, except for testing purposes. Serious injury or death may result if the limiter system is disabled.

When problems occur that sound like a spark-related "miss", the speed limiter system may be at fault. To determine if the limit system is causing the problem, the system can be temporarily disabled.

1. Disconnect the black wire from the CDI module. The limiter system will then be disabled. If the problem still exists, the limit system is not the cause. If the problem goes away, re-connect the black wire and proceed with limiter system tests on the following pages. Verify all wires are clean and tight.

Module Wire Color Function

NOTE: Refer to the model specific wiring diagram for wire colors. Modules may not have all wires indicated below.

Black wire - provides ignition control to the CDI module

Green or Gray/Orange wire - receives reverse gear indicator light signal from purple wire through override button

White wire - receives a voltage signal from the ETC switch

Yellow/Red wire - receives the engine speed/ RPM signal from alternator

SYMPTOM	CAUSE	CURE
Limits in forward — High Limit (Reverse Limit)	-Voltage to Green or Gray/Orange wire in forward gear	-Check circuit to determine reason for voltage to green in forward gear
Limits in forward — Low Limit (ETC Limit)	-Voltage to white wire. Most often caused by moisture in ETC switch. -Inadequate throttle cable tension.	-Clean, dry, repair or replace the ETC switch assembly as required, inspect/adjust throttle cable/ETC switch, or determine reason for voltage on white wire
Engine miss at idle or rough idle	-ETC switch adjusted incorrectly -Idle speed adjusted incorrectly	-Adjust ETC switch until switch plunger is completely depressed. No plunger Clearance. 1/16-1/8" throttle lever free play. (Readjust Idle)
Backfire on deceleration (disappears when black wire is disconnected from speed limiter)	-ETC switch adjusted incorrectly	-Adjust ETC switch until switch plunger is completely depressed. No plunger Clearance.1/16-1/8" throttle lever free play. (Readjust Idle)
	-Faulty ETC switch	-Dry out switch with electrical contact cleaner, replace switch, or adjust throttle cable freeplay
No limit in reverse	-12V not present on Green or Gray/Orange speed limiter module wire	-Check and repair reverse light circuit or gear selector switch. NOTE: if reverse light functions properly, the gear selector switch is not the problem
	-Black wire from limiter module not connected to CDI module black	-Repair black wire between limiter and CDI
	-Yellow/Red wire on limiter module not receiving an RPM signal	-Check wiring and alternator output
	-Override switch not closing	-Test override switch function
	-Faulty or incorrect limiter module	-Replace module
Limits at wrong RPM	-Improperly charged battery	-Charge or replace battery
	-Incorrect limiter module for machine application	-Check parts manual application
	-Incorrect alternator output	-Check wiring and alternator output
	-Faulty limiter module	-Replace limiter module

All Wheel Drive Activation In Reverse: For AWD in reverse gear, the override button must be pushed in addition to selecting "All Wheel Drive". Power is delivered through the transmission switch, the override button, the AWD button, and then to the front wheel coils.

All Wheel Drive (AWD) Testing

The All Wheel Drive (AWD) system is activated when battery voltage is supplied to the front wheel coils. Always check battery voltage when an AWD problem is encountered. Charge battery and check charging system if necessary. If only one wheel hub does not engage, test wheel coil resistance and inspect wheel coil wires for damage. Check for a mechanical problem if resistance measurements are within specifications.

1. Remove cover(s) as required to gain access to terminal board.
2. Turn ignition key on and shift transmission to a forward gear.
3. Select AWD with AWD button.
4. Check for battery voltage on gray terminal at terminal board or harness connector. **NOTE:** If power is present and bulb is good, All Wheel Drive lamp will be lit.

   *If voltage is present:

   - •Disconnect Gray and Brown wheel coil wires and test resistance across the small wheel coil wires. There should be 25-30Ω of resistance.
   - •Test Gray wire to ground on strut casting. It should be an open circuit (∞). Move wheel coil wiring harness while performing the tests to check for an intermittent open or short.

AWD Wheel Coil Resistance	
Gray to Brown	25-30Ω
(No continuity to ground on strut casting)	

   - •Repair wiring harness or replace wheel coil if necessary.

   *If no voltage is present on the Gray terminal check the AWD switch and transmission switch. (If voltage is present on the Gray/White terminal transmission switch is functioning properly.) Refer to AWD and Transmission Switch Testing this section.

No AWD in Reverse

If AWD functions properly in forward but not in reverse, perform the following tests:

NOTE: Override button must be pushed for AWD in reverse.

1. Turn ignition key on and shift transmission to reverse.
2. If reverse lamp is on, the gear selector switch is functioning properly. If reverse lamp is off (not illuminated), check the bulb and test gear selector switch and related wiring (Page 10.38).
3. Check for battery voltage on Purple wire in left hand switch wire harness.

   *If battery voltage is present:
4. Press the override button and check for voltage on any Gray/White wire.

   - •Check override switch and related wiring if voltage is not present on Gray/White wire(s).

If the entire AWD circuit tests correctly, inspect the wheel hubs for a mechanical problem.

No All Wheel Drive (AWD) on Shaft Drive Models Equipped With Hub Safety Module

(Refer to specific wiring diagram for application).

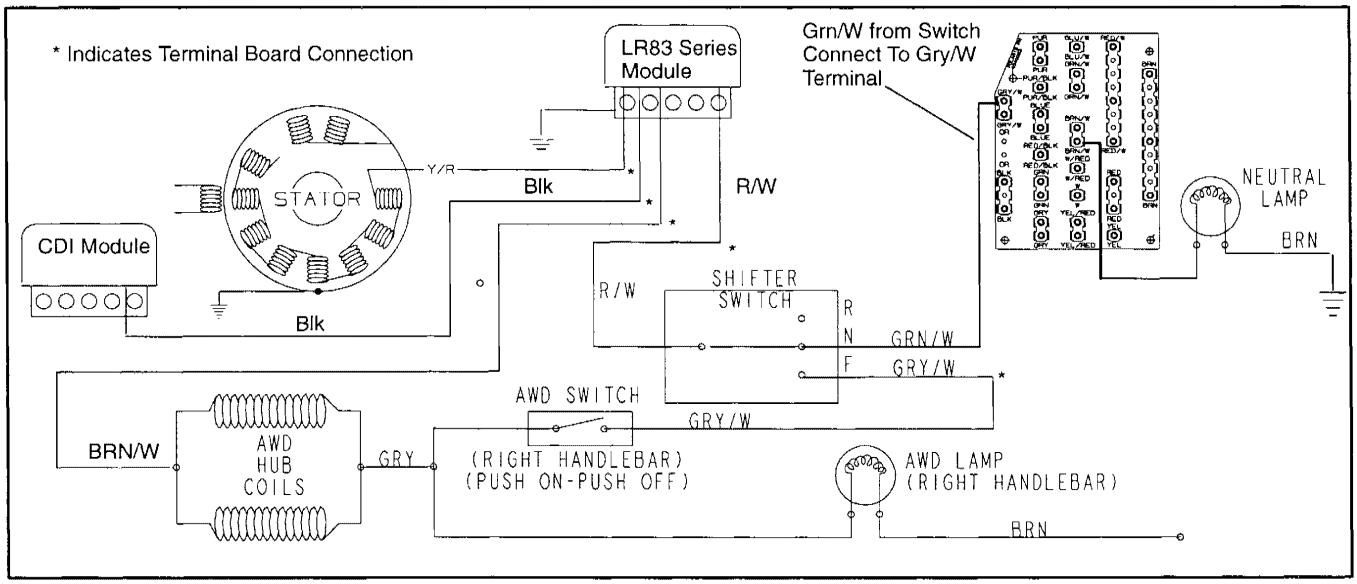
1. Perform circuit tests above. If the tests are within specifications, proceed with the following module by-pass test.
2. Inspect the Red/White and Brown/White wires leading from hub safety module to the terminal board. Connections must be clean, tight, and properly color-matched to the terminals.
3. Disconnect Brown/White wheel coil wires from terminal board and connect to Brown (ground) terminals. If All Wheel Drive functions properly, replace wires on proper terminals and proceed with next step.
4. Disconnect the Yellow/Red wire from the Hub Safety module.
5. Test AC voltage input at the Yellow/Red wire (on alternator side). Voltage should be a minimum 5 AC volts at idle. Refer to charging system testing if voltage is below 5 AC volts.
6. If voltage is present on the Yellow/Red wire and the system does not function correctly, replace the module.

ELECTRICAL
All Wheel Drive System
Front Hub Engagement Limiter (Front Shaft Drive Models)

Front Shaft Drive Models are equipped with a front hub engagement limiter system which prevents engagement of All Wheel Drive (AWD) if engine RPM is above 4000. This is accomplished by the use of an LR83 module (attached to the bulkhead under the front cover), which monitors engine RPM via the Yellow/Red alternator wire. AWD must be selected (button pushed) prior to reaching 4000 RPM, or the Hub Limiter Module will electronically disconnect the ground path for the front hub coils (Brown/White wire) until RPM falls below 4000. If AWD is selected (button pushed) below 4000 RPM, the connection to ground will be maintained by the module at any RPM. The ground path is interrupted only if an attempt is made to engage the front hubs with engine RPM above 4000. Refer to the diagram and test procedure below.

WARNING: The engagement limiter is a safety feature designed to protect the front drive components and should never be disabled, except for testing purposes. Serious injury or death may result if the limiter system is disabled or left in the testing mode. Return all wires to the proper terminal on the terminal board (according to color) and verify proper neutral light operation after testing.

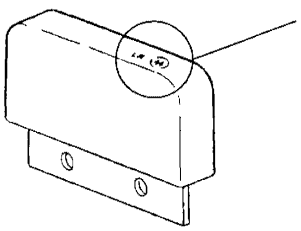
CAUTION: The speed limiter control module may be permanently damaged if the machine is operated with the voltage regulator damaged and/or the battery disconnected.

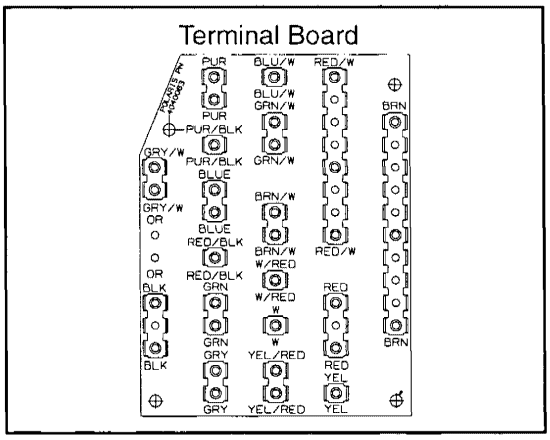


Hub Engagement Limiter RPM Test

Perform this test to check hub engagement limiter RPM.

1. To perform this test, the neutral light must function properly and the battery must be in a good state of charge. Turn the key and engine stop switch on. Shift transmission to neutral and check for proper neutral light function. Repair neutral light if necessary before proceeding. Turn key to OFF position.
2. Remove front rack and terminal board cover (where applicable).
3. Verify all electrical connections are clean, tight, and on the proper terminal. Make sure voltage is present on the Red/White terminal with the key on.
4. Locate shift selector switch harness (R/W, PUR,GRY/W, and GRN/W wires.
5. Locate Green/White wire in switch harness and follow it to the terminal board. Disconnect this Green/White wire from the board and connect it to Gray/White terminal on terminal board.

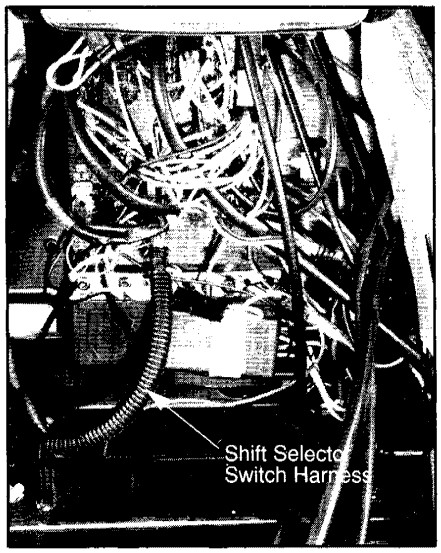




Hub Engagement Limiter RPM Test Procedure, cont.

6. Disconnect the remaining (neutral light) Green/White wire from the Green/White terminal on the board and connect it to the Brown/White terminal on the board.
7. Connect the Green/White wire disconnected in step 6 to the Brown/White terminal on the terminal board.
8. Connect a tachometer following manufacturer's instructions.
9. Apply and lock the parking brake.
10. Start the engine. Be sure the machine is in neutral before starting.
11. Place the All Wheel Drive (AWD) switch in the OFF position (button out - no AWD).
12. Slowly increase RPM above 4000.
13. Push the AWD button to select All Wheel Drive. The neutral light should light up, indicating an interrupted ground path through the LR83 (power on the Brown/White terminal is finding ground through the neutral light bulb.
14. Slowly let RPM drop back to idle. The neutral light should go out below approximately 4000 RPM, indicating a good ground through the LR83 module. The neutral light should not illuminate whenever AWD is selected below 4000 RPM.

WARNING: The procedures outlined above are for testing purposes only. Return all wires to the proper terminal on the terminal board (according to color) after testing. Verify proper neutral light operation.

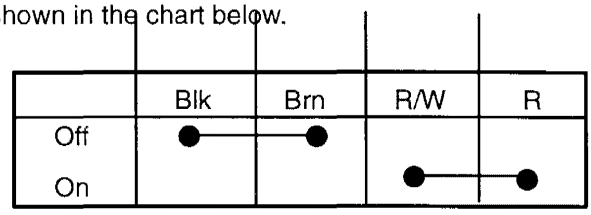


Most of the switches on the vehicle can be tested at the terminal board or at the harness connectors located under the front panel (Gen III / Gen IV) or tank cover (Gen II). To access the terminal board or connectors:

- Remove seat and top fuel tank cover (Gen II models). Refer to Chapter 5.
- Remove front rack (if equipped) and front cover under headlight (Gen III & Gen IV models). Refer to Chapter 5.

Key Switch/Auxiliary Shut Off (Kill) Switch

Turn key (and engine stop switch) "ON" and check for battery voltage on Red/White terminal or harness side of connector. If battery voltage is present, switch function is O.K. Disconnect switch wires at terminal board or connector. Check continuity of wires in each switch position. Continuity should exist between color coded wires as shown in the chart below.



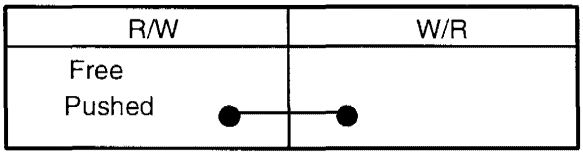
"Off" Continuity between Black and Brown wires. No continuity between Red/White and Red wires.

"On" Continuity between Red/White and Red wires. No continuity between Black and Brown wires.

Starter Switch

Check starter switch at terminal board or at the harness connector. Terminal boards - Disconnect the White/Red wire from the switch at the panel. Turn key (and engine stop switch) "ON". The wire should show battery voltage when the starter button is depressed. Connector style harness - perform continuity test below with coupler disconnected.

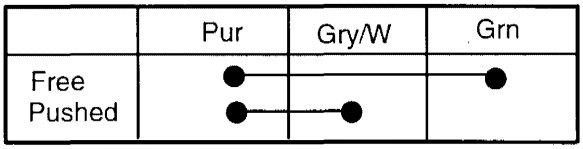
Continuity Test - Turn key off. Disconnect Red/White and White/Red switch wires at terminal board or connector. Continuity should exist between color coded wires as shown in the chart below.



Replace the switch if resistance is indicated or if voltage drop is greater than .1 DCV.

Override Button

Disconnect the Purple, Gray/White, and Green wires at the terminal board or connector. Continuity should exist between color coded wires as shown in the chart below. Make sure to verify no continuity as well as continuity.



All Wheel Drive (AWD) Switch (4x4 Model)

Disconnect the AWD switch at the terminal board or harness connector. Continuity should exist between color coded wires as shown in the chart below.

	Gry/W	Gry	AWD Light	Brn
Out (Off) In (On)	●	●		
	●		●	●

Gear Selector Switch/Neutral Light

The transmission switch can be tested at the terminal board or harness connector. Turn ignition switch (and engine stop switch) to "On" position. Shift transmission and check for battery voltage on each of the wires when the specific range is selected.

	R/W	Gry/W	Grn/W	Purple
Forward	●	●		
Neutral	●		●	
Reverse	●			●

NOTE: Make sure transmission linkage is adjusted correctly or disconnect linkage rods before testing switch. Inspect wiring between switch and terminal board and repair or replace if damaged. Replace the switch if battery voltage is not indicated or if voltage is present when the selector is moved out of the specific range.

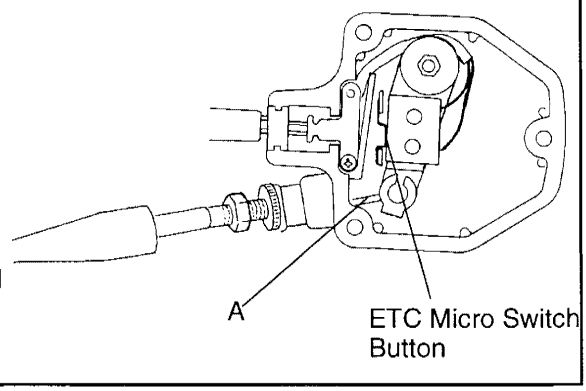
Electronic Throttle Control (ETC) Switch

The Emergency Throttle Control (ETC) system is designed to limit the engine RPM of an ATV in the event of a mechanical problem with the throttle mechanism. The ETC switch is mounted independently of the throttle actuator lever inside the throttle block assembly. This is a normally closed switch, and is held in the open position (micro switch button depressed) by throttle cable tension. The switch is "open" in normal operation regardless of throttle lever position. In the event of a mechanical problem in the throttle mechanism (cable tension is lost), the switch contacts close (switch pin released) and deliver power to the Speed Limiter module via the white wire.

Test the ETC switch at the terminal board or harness connector. **NOTE:** Adjust throttle cable freeplay (ETC switch) and make sure throttle mechanism is functioning properly before testing switch. Refer to Maintenance Chapter 2 for procedure. Terminal board models - Disconnect White wire on terminal board that leads from the ETC switch. Turn ignition key (and engine stop switch) "On". If voltage is present on the White wire, replace the ETC switch.

	R/W	W
Normal		
Fault	●	●

Electronic Throttle Control (ETC) Switch



ETC Operation Test

Remove throttle block cover.

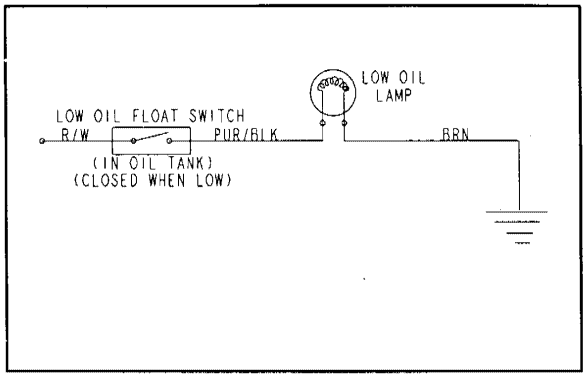
Place transmission in neutral and apply parking brake.

Start engine and open throttle lever slightly until engine RPM is above the "ETC Limit" (see page 10.32 for LR module ETC limits.

Hold throttle cable with fingers at point "A" as shown at right and release throttle lever. If the ETC system is functioning properly engine RPM will be limited to the specified "ETC Limit" RPM. Refer to Speed Limiter System Testing on page 10.34.

Oil Level Sensor Testing (2 Stroke Models)

1. Disconnect Purple/Black and Red/White sensor wires.
2. Test for continuity between the wires with the float on the bottom (oil level empty or low), and off the bottom (safe level).
3. The wires should have continuity when oil level is low or empty, and no continuity when float is off the bottom.



	PUR/BLK	R/W
Empty/Low	●	●
Safe Level		

Oil Level Warning Light Testing (2 Stroke Models)

1. Disconnect Purple/Black and Red/White wires from sensor to remove the sensor from the circuit.
2. With ignition key off, connect the wires (on the harness side) together.
3. Turn key (and auxiliary switch) on. The light should illuminate. If not, check for battery voltage on R/W wire to sensor, check bulb condition, and related wiring.

Coolant Temperature Sensor Test (Hot Light)

With the ignition switch (and engine stop switch) "ON", power is delivered to the hot light via the Red/White wire. The Blue/White wire (ground) out of the light socket is connected to the coolant temperature sensor on the cylinder head. In normal operating conditions, the temperature sensor is non-conductive (open). If engine coolant reaches the specified temperature, the sensor becomes conductive completing the ground path for the light.

With engine cold, disconnect lead and measure resistance of sensor between connector terminal and ground. There should be no continuity or very high resistance (megohms). To test the "ON" temperature, heat the switch in a water bath to the temperature shown in table below. The switch should become conductive (low resistance) at indicated temperature. Do not immerse switch past the threads or allow switch to contact container when heating.

	Scrambler and Sport	**All Liquid Cooled Except Scrambler and Sport**
Hot Light On - 4 Strokes	-	221° F (105° C)
Hot Light On - 2 Strokes	205° F (96° C)	205° F (96° C)

Hot Light Circuit Test

Disconnect temperature sensor wire lead and short it to ground on the cylinder head. Turn key and auxilliary switch to "ON" position. The hot lamp should come on. Check the bulb and related wiring if the lamp does not illuminate.

Fan Control Circuit Operation / Testing

The fan switch is located on top of the radiator on liquid cooled models, and at the rear of the cylinder head on air cooled models. Power is supplied to the fan switch via the Red/White wire when the ignition key and auxiliary shut off switch are ON. When the fan switch reaches the specified temperature, it becomes conductive and sends power to the fan motor. The ground path for the fan motor is through the Brown harness wire.

CAUTION: Keep hands away from fan blades during this procedure. Serious personal injury could result.

NOTE: The fan switch may not function or operation may be delayed if coolant level is low or if air is trapped in the cooling system. Be sure cooling system is full and purged of air. Refer to Maintenance chapter 2.

Fan Control Switch Bypass Test

•Wire Harness Style Switch (Early)

1. Remove fuel tank if required for access to fan switch wire harness connectors. Disconnect the Red/White wire.
2. Place a jumper wire between the Red/White wire (to the fan) and the Red/White terminal on the terminal board.
3. Turn ignition key (and engine stop switch) "ON". The fan should start running.
4. If the fan runs with the jumper wire installed (direct battery voltage applied), check the fan control switch and related wiring. If the fan does not run or runs slowly with direct battery voltage applied, check the fan motor wiring, ground, and motor condition (refer to Fan Motor Testing this section). Repair or replace as necessary.

•Connector Style Switch (Late)

1. Disconnect harness from fan switch on radiator.
2. Place a jumper wire between the wires in the connector.
3. Turn ignition key (and engine stop switch) "ON". The fan should start running.
4. If the fan runs with the jumper wire installed, check the fan control switch and connector terminals. If the fan does not run or runs slowly with the jumper wire installed, check the fan motor wiring, ground, and motor condition (refer to Fan Motor Testing this section). Repair or replace as necessary.

Fan Control Switch Operation Test

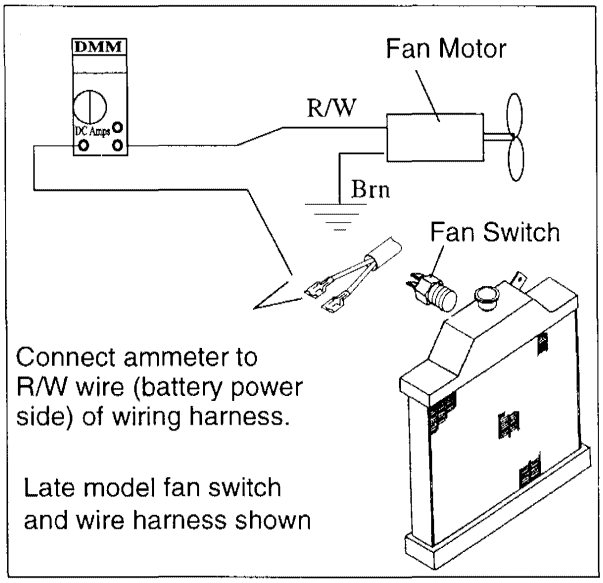
1. Place switch in a water bath and submerse it to the base of the threads. Do not allow threads to contact container or inaccurate reading will result.
2. Heat the coolant slowly and monitor the temperature with a thermometer or Fluke™ meter pyrometer. The switch should be closed (conductive) at the "ON" temperature indicated in the chart, and stay conductive until the "OFF" temperature is reached.

REFER TO PARTS MANUAL FOR FAN SWITCH APPLICATION		
Fan Switch Part Number	**Continuity (On)**	**No Continuity (Off)**
4110099	174° F (79° C) ± 5°F	154° F (68° C) ± 5°F
4110114	235° F (113° C) ± 10°F	210° F (99° C) ± 8°F
4110178	190° F (92° C) ± 5°F	175° F (79° C) ± 5°F
4110189	185° F (85° C) ± 7°F	165° F (74° C) ± 8°F
4110201		
4110225	185° F (85° C) ± 7°F	157° F (69° C) ± 7°F
4110226	174° F (79° C) ± 7°F	146° F (63° C) ± 7°F
4110256	185° F (85° C) ± 7°F	165° F (74° C) ± 8°F

Fan Motor Current Draw

A current draw test will provide a good indication of fan motor condition. A worn or damaged fan motor will draw more current, which causes a reduction in blade speed and reduced cooling.

1. Disconnect the Red/White wire from the fan motor.
2. Connect a DC ammeter in series between the battery and fan motor as shown at right. Use the Red/White wire in the wiring harness as the power supply.
3. Be sure fan blade is free to rotate.
4. Turn ignition key and engine stop switch to "ON" position. Read the current draw on ammeter with fan running.
5. If the fan motor draws more than 6.5 Amps, replace the motor.



Fan Motor Current Draw:

Less Than 6.5 Amps

Brake Light Switch

1. Remove fuel tank.
2. Disconnect wire harness from switch.
3. Connect an ohmmeter across switch contacts. Reading should be infinite (∞).
4. Apply brake at handlebar lever and check for continuity between switch contacts. Replace switch if there is no continuity or greater than .5 ohms resistance when the brake is applied with slight pressure.

Headlamp Switch

Remove the fuel tank and top cover. Disconnect the headlamp switch wires (Red/White, Green, and Yellow) at the panel or connector (R/W) and from the headlamp high beam harness (Y) and low beam harness. Test the switch connections and compare to the chart.

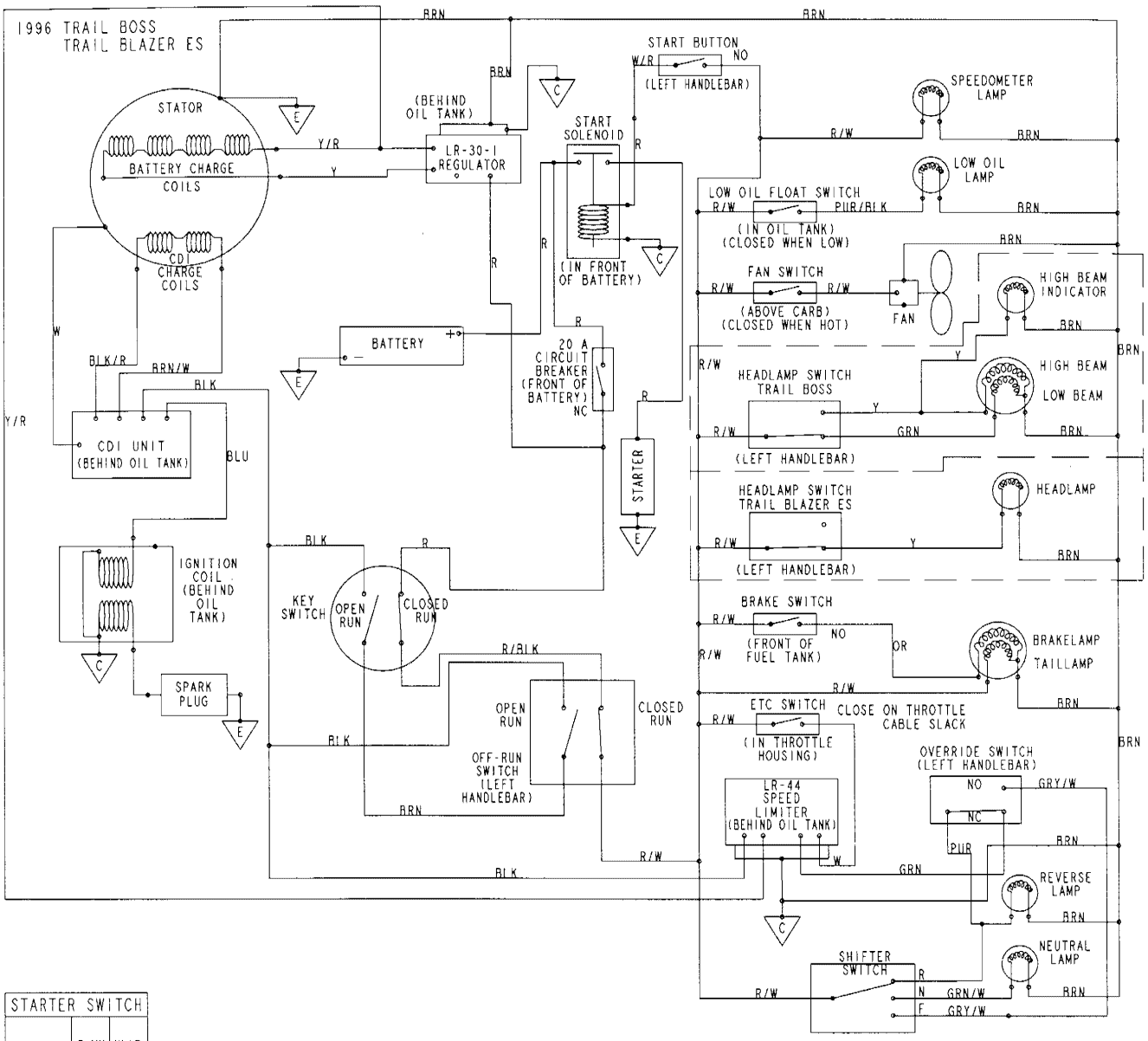
Continuity

	R/W	Grn	Y
Off			
Low	●	●	
High	●		●

Neutral Light Circuit Operation

Power is supplied to the transmission switch from the Red/White wire when the key is on. When neutral is selected, power flows through the switch to the Green/White wire, through the lamp and to ground via the Brown wire.

If the light is not on when neutral is selected, check the bulb. If the bulb is good, check the wiring, transmission switch, and lamp socket ground path.



STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O	O

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O	O	
HI	O	O	O

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O	O		
N	O		O	
REV	O			O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O	O		
RUN			O	O

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	O		O
PUSHED	O	O	

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O	O		
ON			O	O

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O	O

RESISTANCES (±20% @ 68°F/20°C)		
STATOR	BLK/R TO BRN/W	120 OHMS
	Y/R TO Y	0.3 OHMS
	BLK/R TO GROUND	NO CONNECTION
	Y TO GROUND	NO CONNECTION
	W TO GROUND	0 OHMS
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)

E = ENGINE GROUND
C = CHASSIS GROUND

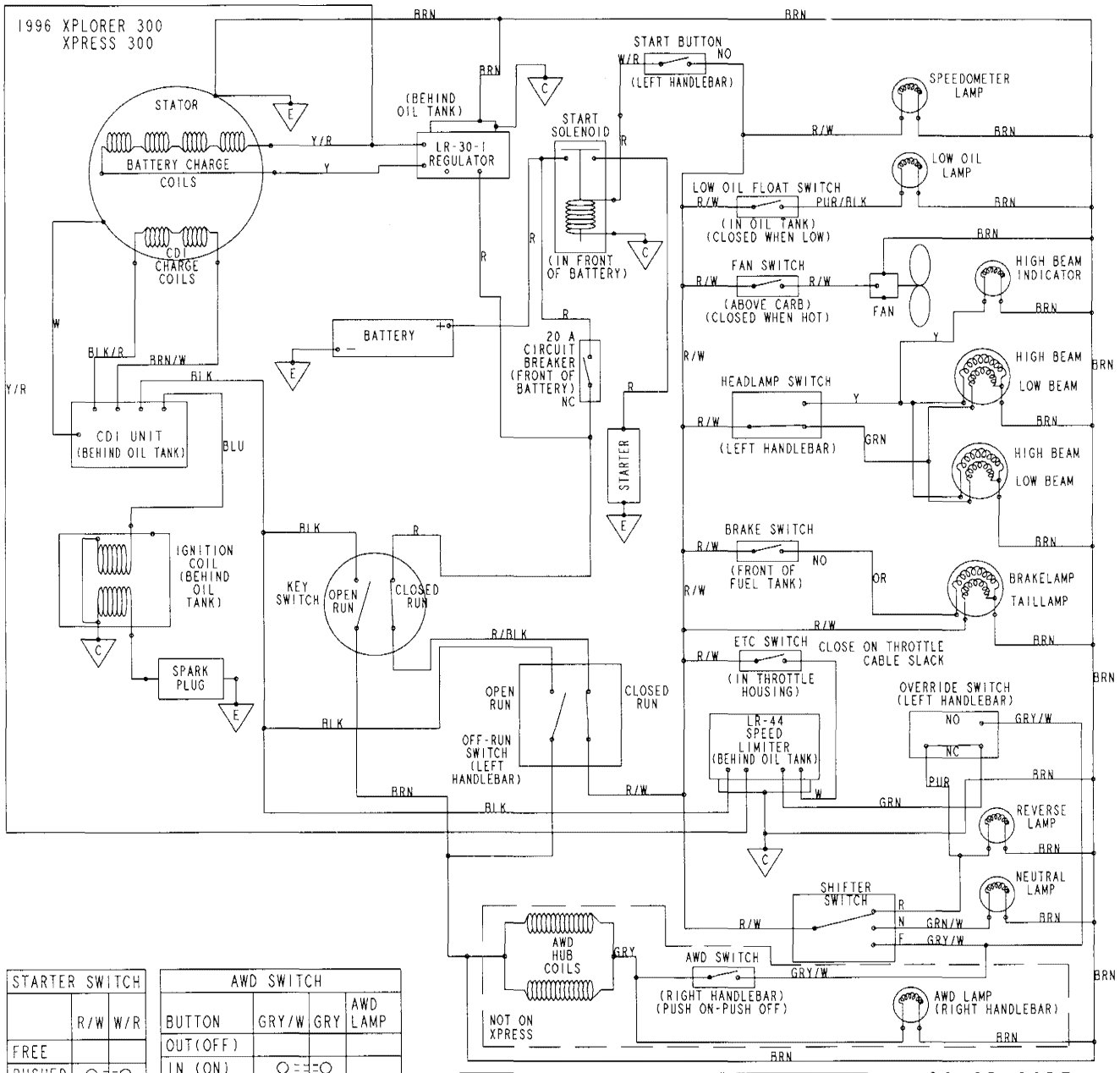
NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

COLOR CODE

BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
GRY = GRAY
OR = ORANGE
Y = YELLOW
R = RED
W = WHITE

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE: R/Y = RED WITH YELLOW TRACER.

ELECTRICAL
Wiring Diagram 1996 Xpress 300, Xplorer 300



STARTER SWITCH	R/W	W/R
FREE		
PUSHED	O	O

AWD SWITCH	GRY/W	GRY	AWD LAMP
BUTTON OUT (OFF)			
IN (ON)	O	O	
IN (ON)	O	O	O

HEADLAMP SWITCH	R/W	GRN	Y
OFF			
LO	O	O	
HI	O	O	O

TRANSMISSION SWITCH	R/W	GRY/W	GRN/W	PUR
FWD	O	O		
N	O		O	
REV	O		O	O

AUX SHUT OFF SWITCH	BLK	BRN	R/W	R/BLK
OFF	O	O		
RUN			O	O

OVERRIDE SWITCH	PUR	GRY/W	GRN
FREE	O		O
PUSHED	O	O	

KEY SWITCH	BLK	BRN	R/BLK	R
OFF	O	O		
ON			O	O

ETC SWITCH	R/W	W
NORMAL		
FAULT	O	O

RESISTANCES (±20% @ 68°F/20°C)		
STATOR	BLK/R TO BRN/W	120 OHMS
	Y/R TO Y	0.3 OHMS
	BLK/R TO GROUND	NO CONNECTION
	Y TO GROUND	NO CONNECTION
	W TO GROUND	0 OHMS
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)
FRONT WHEEL DRIVE COILS	GRY TO BRN	24 OHMS (EACH)

COLOR CODE

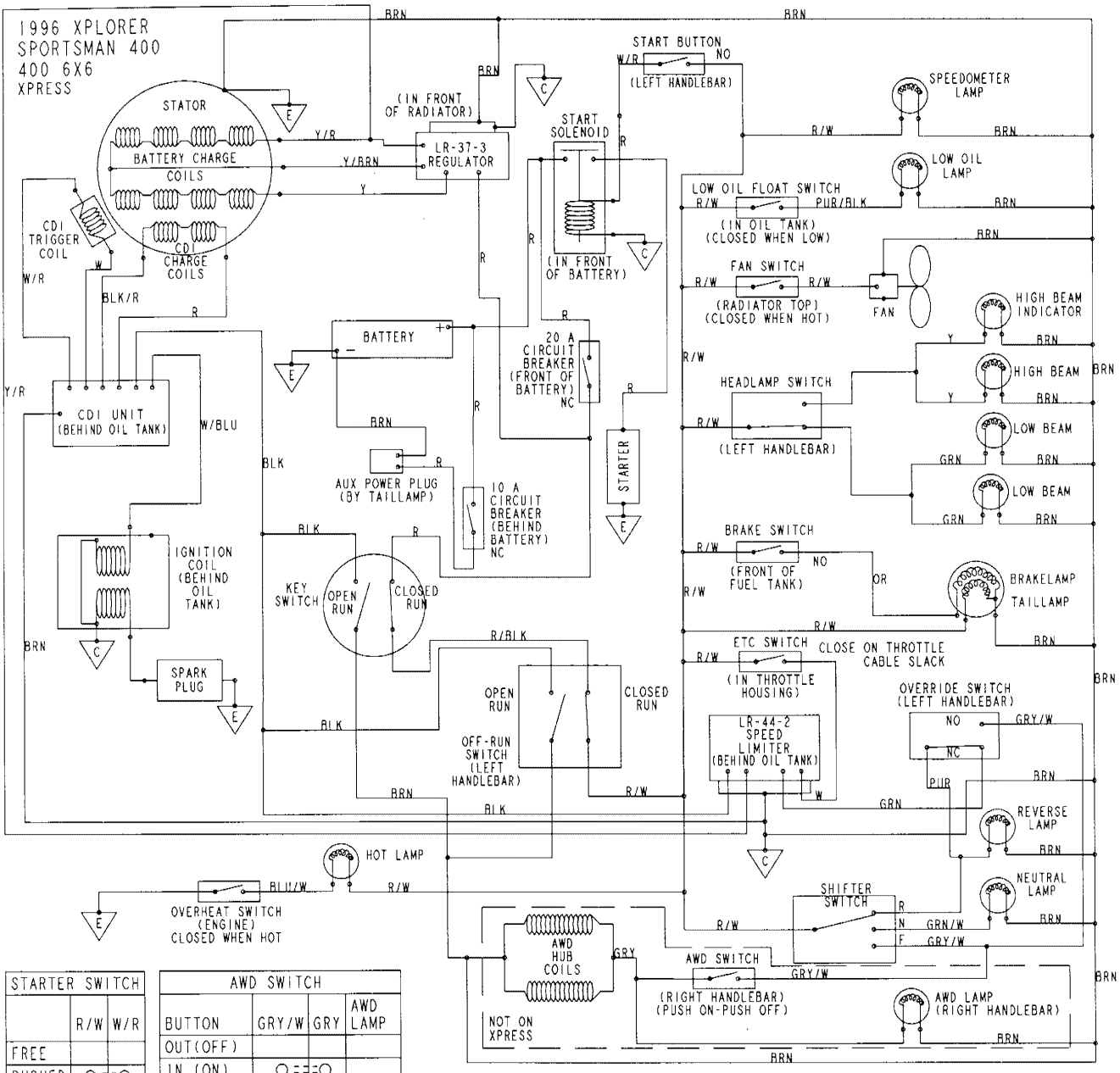
BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
GRY = GRAY
OR = ORANGE
Y = YELLOW
R = RED
W = WHITE

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE: R/Y = RED WITH YELLOW TRACER.

E = ENGINE GROUND
C = CHASSIS GROUND

NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

Wiring Diagram 1996 Xpress 400, Xplorer 400, Sportsman 4x4, 400 6x6



STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O	O

AWD SWITCH			
BUTTON	GRY/W	GRY	AWD LAMP
OUT(OFF)			
IN (ON)	O	O	
IN (ON)	O	O	O

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O	O	
HI	O	O	O

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O	O		
N	O	O	O	
REV	O	O	O	O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O	O		
RUN			O	O

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	O	O	O
PUSHED	O	O	

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O	O		
ON			O	O

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O	O

RESISTANCES (±20% @ 68°F/20°C)		
STATOR	R TO BLK/R	226 OHMS
	W TO W/R	97 OHMS
	Y TO Y/BRN	0.17 OHMS
	Y/R TO Y/BRN	0.17 OHMS
	Y TO GROUND	NO CONNECTION
	R TO GROUND	NO CONNECTION
	W TO GROUND	NO CONNECTION
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)
FRONT WHEEL DRIVE COILS	GRY TO BRN	24 OHMS (EACH)

E = ENGINE GROUND
C = CHASSIS GROUND

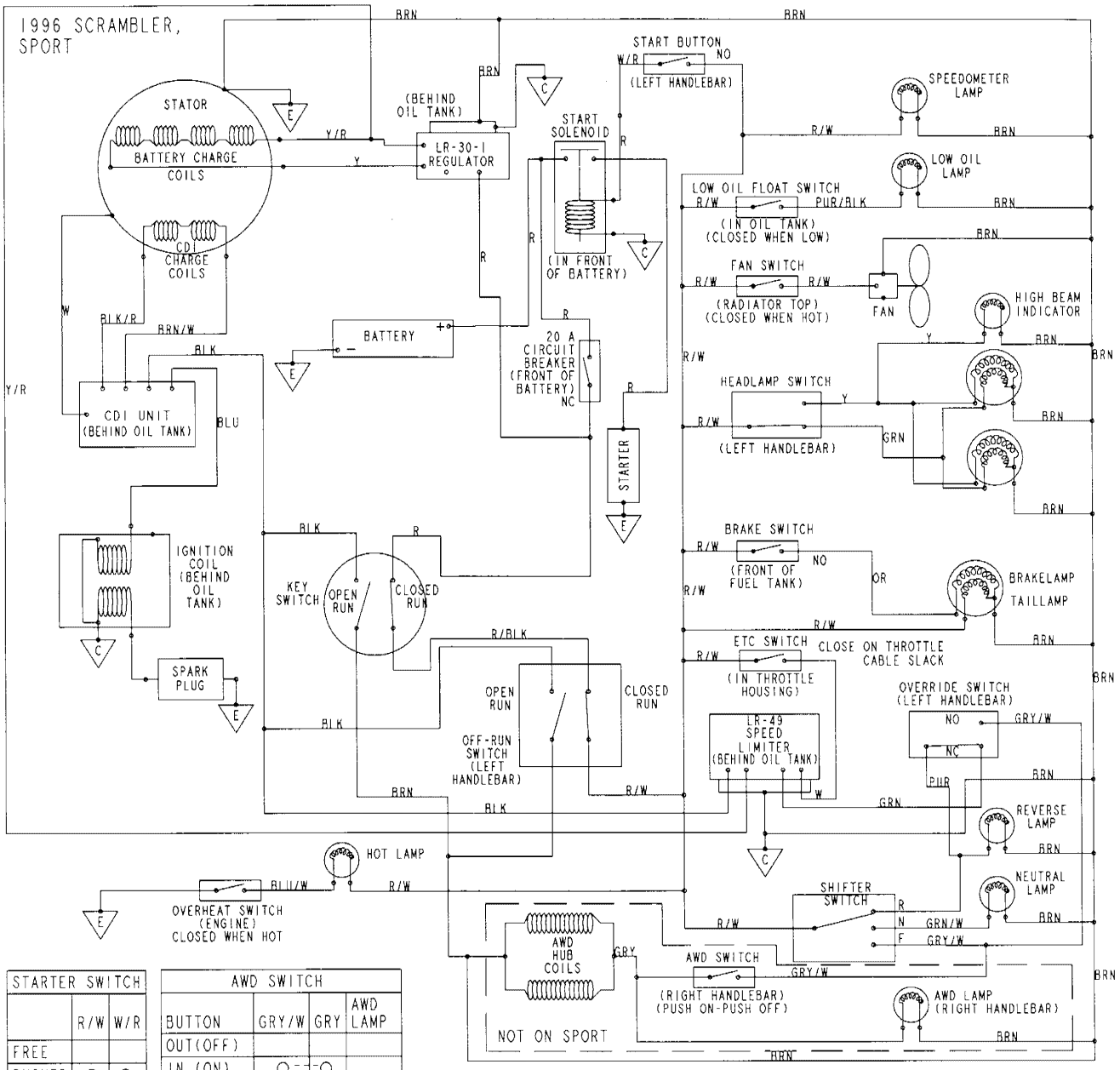
NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

COLOR CODE

BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
GRY = GRAY
OR = ORANGE
Y = YELLOW
R = RED
W = WHITE

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE: R/Y = RED WITH YELLOW TRACER.

Wiring Diagram 1996 Scrambler, Sport



STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O	O

AWD SWITCH			
BUTTON	GRY/W	GRY	AWD LAMP
OUT (OFF)			
IN (ON)	O	O	
IN (ON)	O	O	O

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O	O	
HI	O	O	O

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O	O		
N	O			O
REV	O		O	O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O	O		
RUN			O	O

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	O	O	
PUSHED	O	O	

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O	O		
ON			O	O

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O	O

RESISTANCES (±20% @ 68°F/20°C)		
STATOR	BLK/R TO BRN/W	120 OHMS
	Y/R TO Y	0.3 OHMS
	BLK/R TO GROUND	NO CONNECTION
	Y TO GROUND	NO CONNECTION
	W TO GROUND	0 OHMS
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)
FRONT WHEEL DRIVE COILS	GRY TO BRN	24 OHMS (EACH)

E = ENGINE GROUND
C = CHASSIS GROUND

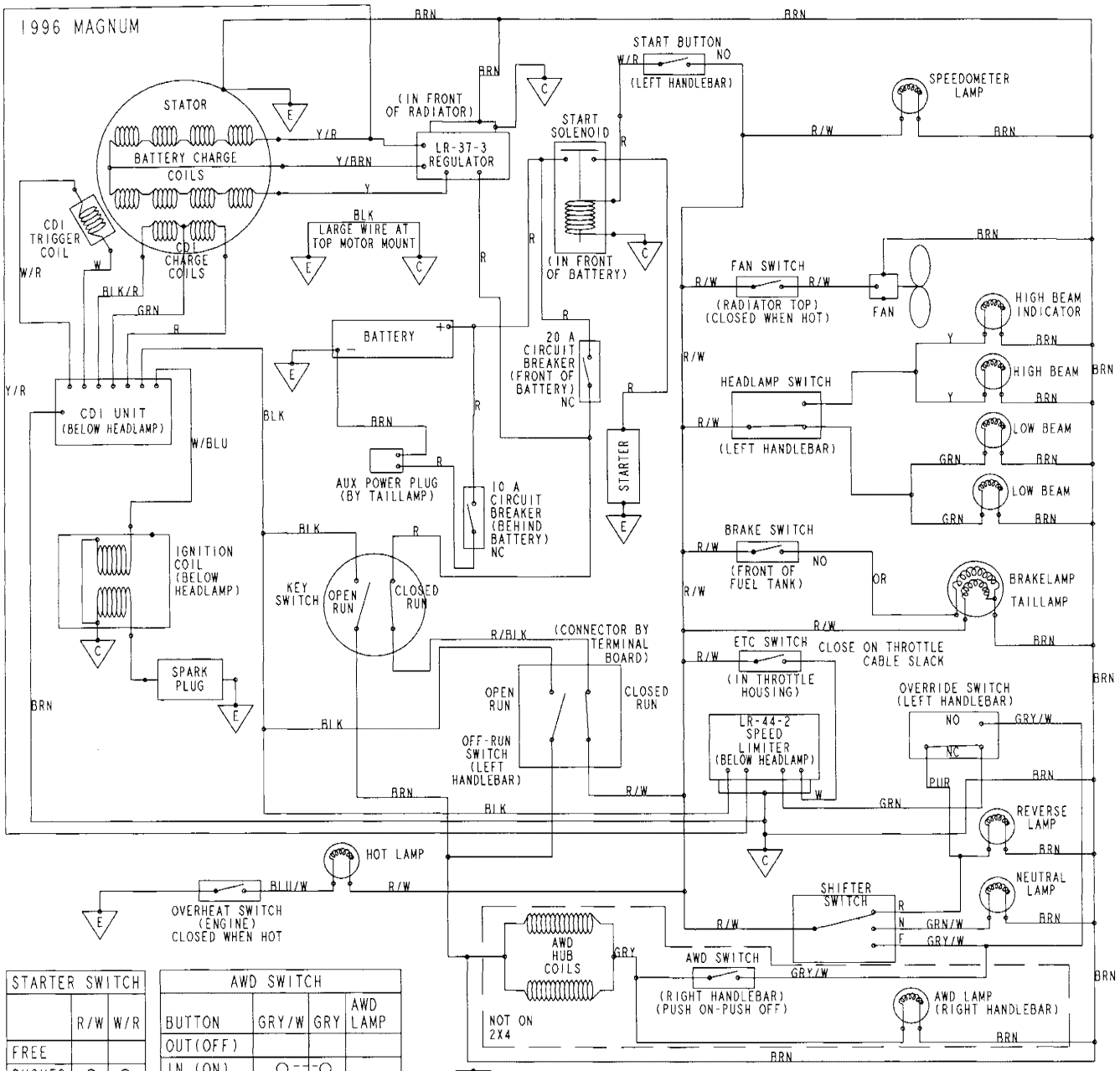
NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

COLOR CODE

BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
GRY = GRAY
OR = ORANGE
Y = YELLOW
R = RED
W = WHITE

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE: R/Y = RED WITH YELLOW TRACER.

Wiring Diagram 1996 Magnum 2x4, 4x4, 6x6



STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	○	○

AWD SWITCH			
BUTTON	GRY/W	GRY	AWD LAMP
OUT (OFF)			
IN (ON)	○	○	
IN (ON)	○	○	○

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	○	○	
HI	○	○	○

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	○	○		
N	○	○		
REV	○	○		○

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	○	○		
RUN			○	○

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	○	○	○
PUSHED	○	○	

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	○	○		
ON			○	○

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	○	○

RESISTANCES (±20% @ 68°F/20°C)		
STATOR	GRN TO BLK/R	446 OHMS
	GRN TO R	3.2 OHMS
	W TO W/R	97 OHMS
	Y TO Y/BRN	0.17 OHMS
	Y/R TO Y/BRN	0.17 OHMS
	Y TO GROUND	NO CONNECTION
	R TO GROUND	NO CONNECTION
	W TO GROUND	NO CONNECTION
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)
FRONT WHEEL DRIVE COILS	GRY TO BRN	24 OHMS (EACH)

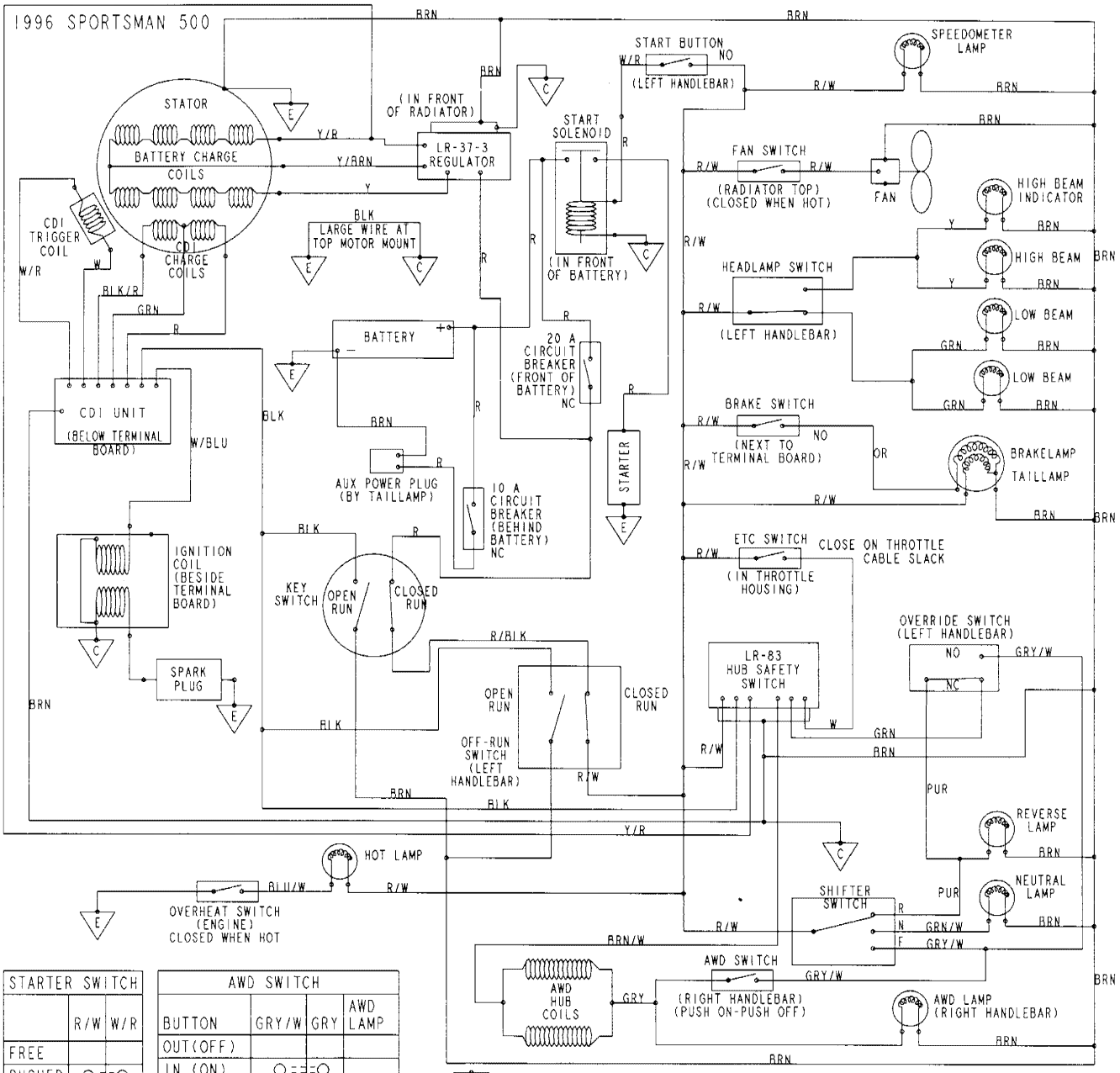
E = ENGINE GROUND
C = CHASSIS GROUND
NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

COLOR CODE

BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
GRY = GRAY
OR = ORANGE
Y = YELLOW
R = RED
W = WHITE

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE: R/Y = RED WITH YELLOW TRACER.

ELECTRICAL
Wiring Diagram Sportsman 500



STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O	O

AWD SWITCH			
BUTTON	GRY/W	GRY	AWD LAMP
OUT (OFF)			
IN (ON)	O	O	
IN (ON)	O	O	O

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O	O	
HI	O	O	O

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O	O		
N	O			O
REV	O		O	O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O	O		
RUN			O	O

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	O		O
PUSHED	O	O	

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O	O		
ON			O	O

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O	O

E = ENGINE GROUND
C = CHASSIS GROUND
NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

RESISTANCES (±20% @ 68°F/20°C)		
STATOR	GRN TO BLK/R	446 OHMS
	GRN TO R	3.2 OHMS
	W TO W/R	97 OHMS
	Y TO Y/BRN	0.17 OHMS
	Y/R TO Y/BRN	0.17 OHMS
	Y TO GROUND	NO CONNECTION
	R TO GROUND	NO CONNECTION
	W TO GROUND	NO CONNECTION
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)
FRONT WHEEL DRIVE COILS	GRY TO BRN	24 OHMS (EACH)

COLOR CODE

BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
GRY = GRAY
OR = ORANGE
Y = YELLOW
R = RED
W = WHITE

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE: R/Y = RED WITH YELLOW TRACER.

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

R

S

T

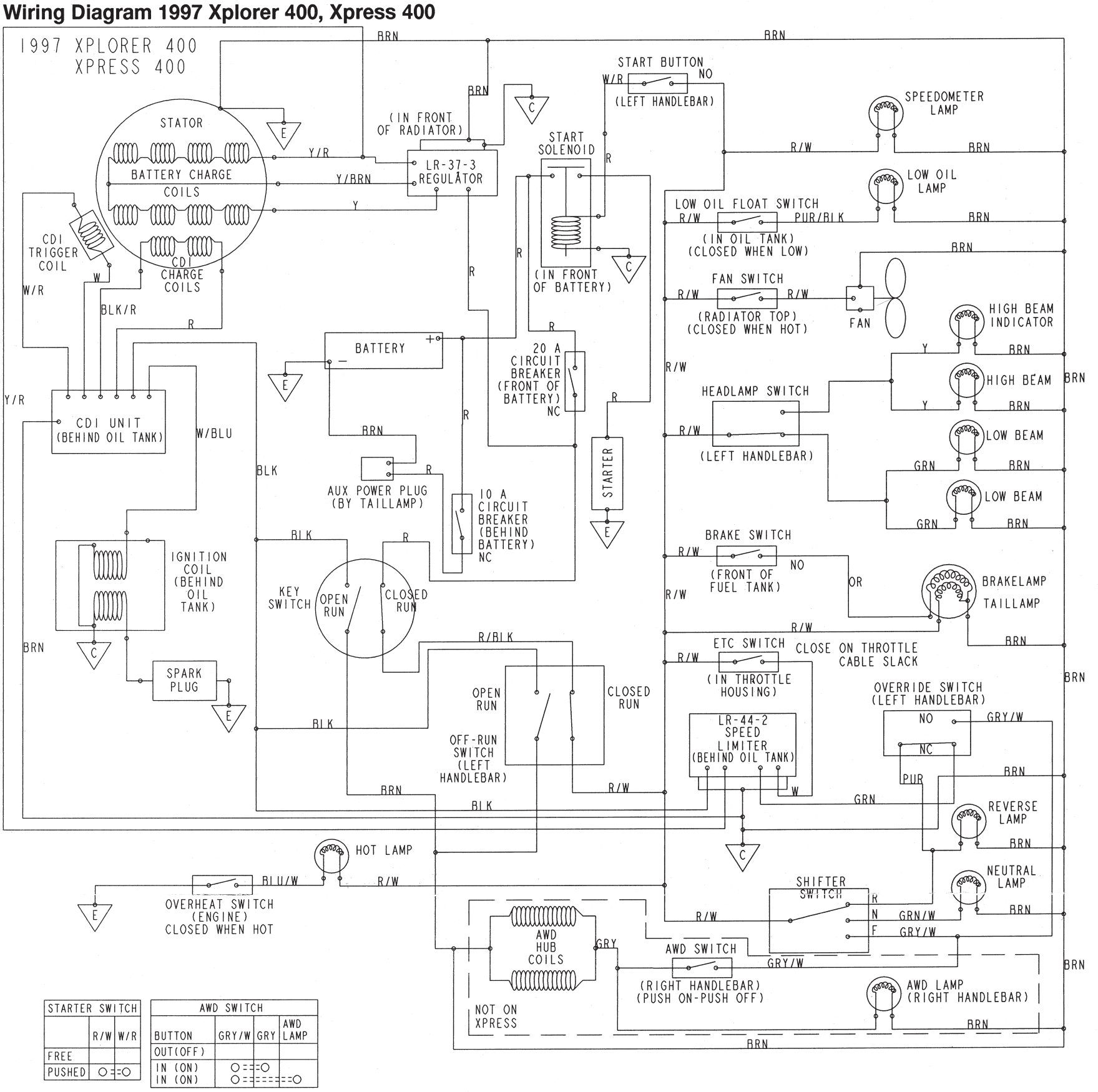
U

V

W

Y

ELECTRICAL
Wiring Diagram 1997 Xplorer 400, Xpress 400



STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O	O

AWD SWITCH			
BUTTON	GRY/W	GRY	AWD LAMP
OUT(OFF)			
IN (ON)	O	O	
IN (ON)	O	O	O

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O	O	
HI	O	O	O

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O	O		
N	O	O	O	
REV	O	O	O	O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O	O		
RUN			O	O

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	O	O	O
PUSHED	O	O	

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O	O		
ON			O	O

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O	O

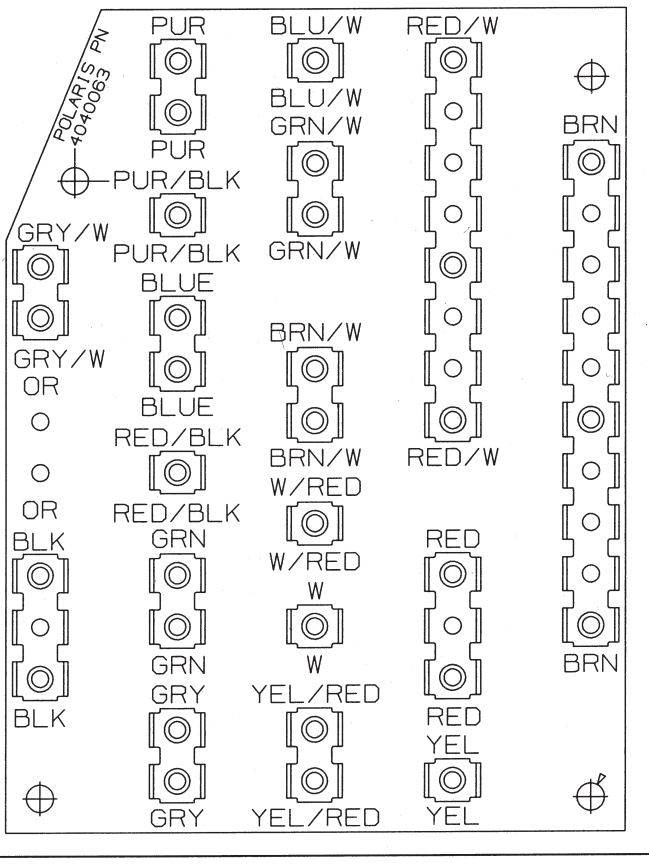
RESISTANCES (±20% @ 68°F/20°C)		
STATOR	R TO BLK/R	226 OHMS
	W TO W/R	97 OHMS
	Y TO Y/BRN	0.17 OHMS
	Y/R TO Y/BRN	0.17 OHMS
	Y TO GROUND	NO CONNECTION
	R TO GROUND	NO CONNECTION
	W TO GROUND	NO CONNECTION
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)
FRONT WHEEL DRIVE COILS	GRY TO BRN	24 OHMS (EACH)

COLOR CODE

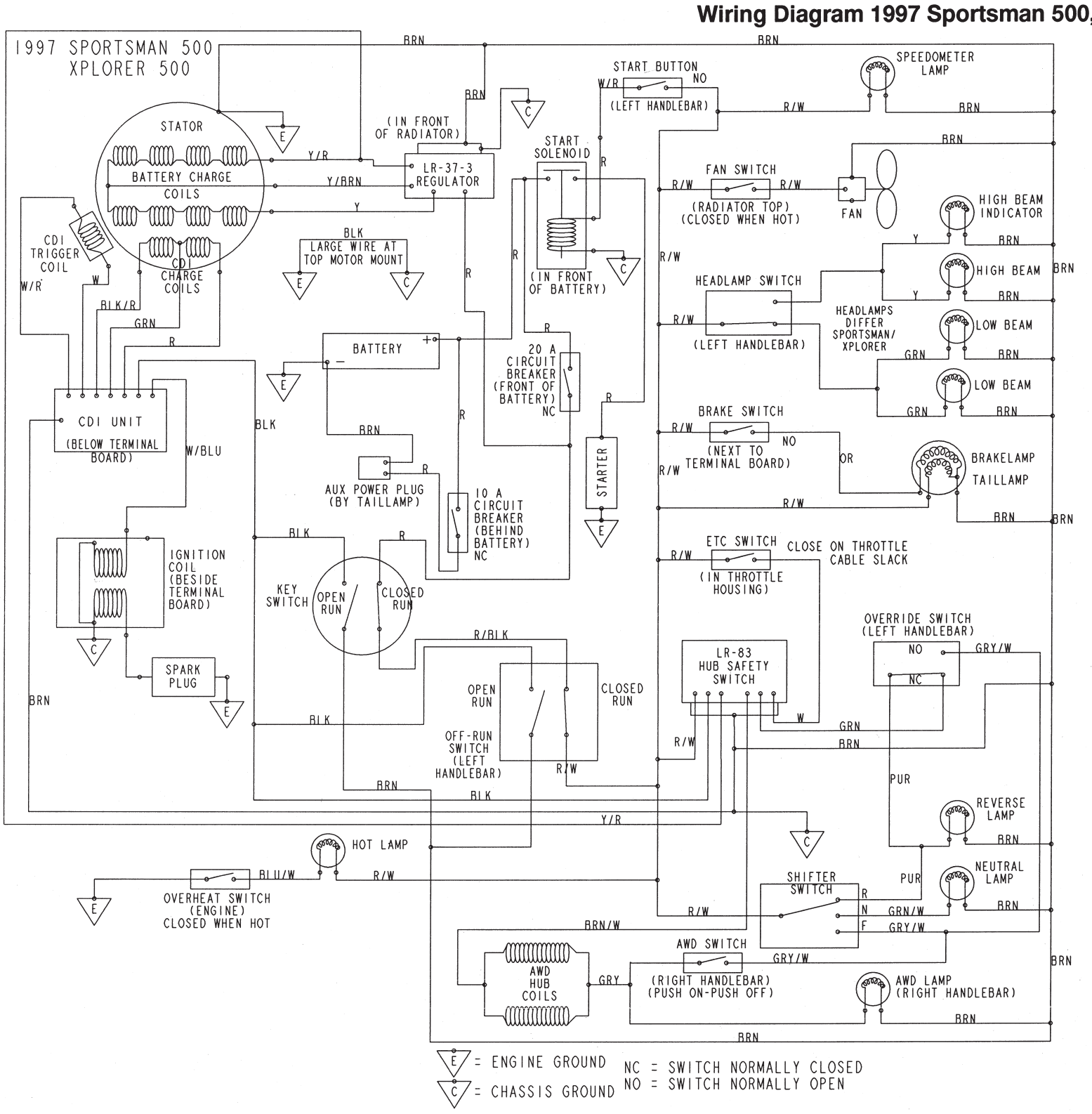
BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
GRY = GRAY
OR = ORANGE
Y = YELLOW
R = RED
W = WHITE

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE: R/Y = RED WITH YELLOW TRACER.

1997 400 XPLORER-XPRESS



Wiring Diagram 1997 Sportsman 500, Xplorer 500



STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O	O

AWD SWITCH			
BUTTON	GRY/W	GRY	AWD LAMP
OUT(OFF)			
IN (ON)	O	O	
IN (ON)	O	O	O

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O	O	
HI	O	O	O

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O	O		
N	O		O	
REV	O			O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O	O		
RUN			O	O

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	O		O
PUSHED	O	O	

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O	O		
ON			O	O

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O	O

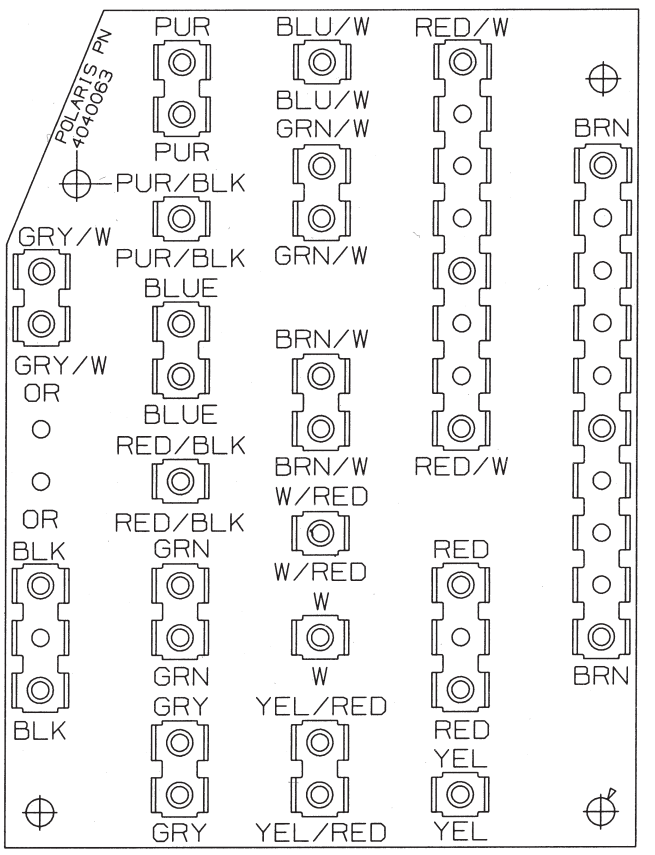
RESISTANCES (±20% @ 68°F/20°C)		
STATOR	GRN TO BLK/R	446 OHMS
	GRN TO R	3.2 OHMS
	W TO W/R	97 OHMS
	Y TO Y/BRN	0.17 OHMS
	Y/R TO Y/BRN	0.17 OHMS
	Y TO GROUND	NO CONNECTION
	R TO GROUND	NO CONNECTION
	W TO GROUND	NO CONNECTION
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)
FRONT WHEEL DRIVE COILS	GRY TO BRN/W	24 OHMS (EACH)

COLOR CODE

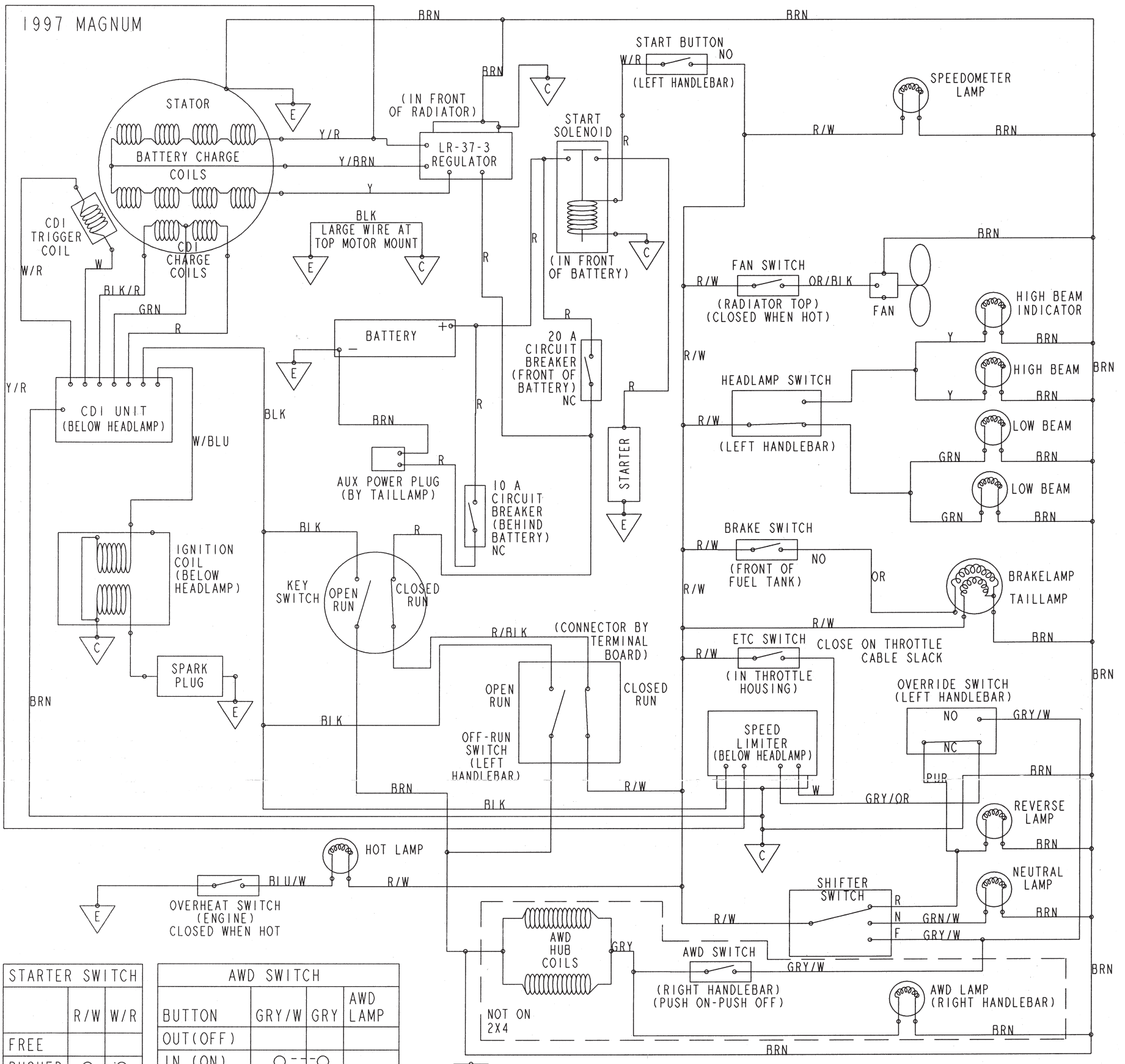
BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
GRY = GRAY
OR = ORANGE
Y = YELLOW
R = RED
W = WHITE

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE: R/Y = RED WITH YELLOW TRACER.

1997 SHAFTDRIVE 500



ELECTRICAL
Wiring Diagram 1997 Magnum 2x4, Magnum 4x4, Magnum 6x6



STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O	O

AWD SWITCH			
BUTTON	GRY/W	GRY	AWD LAMP
OUT(OFF)			
IN (ON)	O	O	
IN (ON)	O		O

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O	O	
HI	O		O

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O	O		
N	O		O	
REV	O			O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O	O		
RUN			O	O

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	O		O
PUSHED	O	O	

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O	O		
ON			O	O

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O	O

E = ENGINE GROUND
C = CHASSIS GROUND

NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

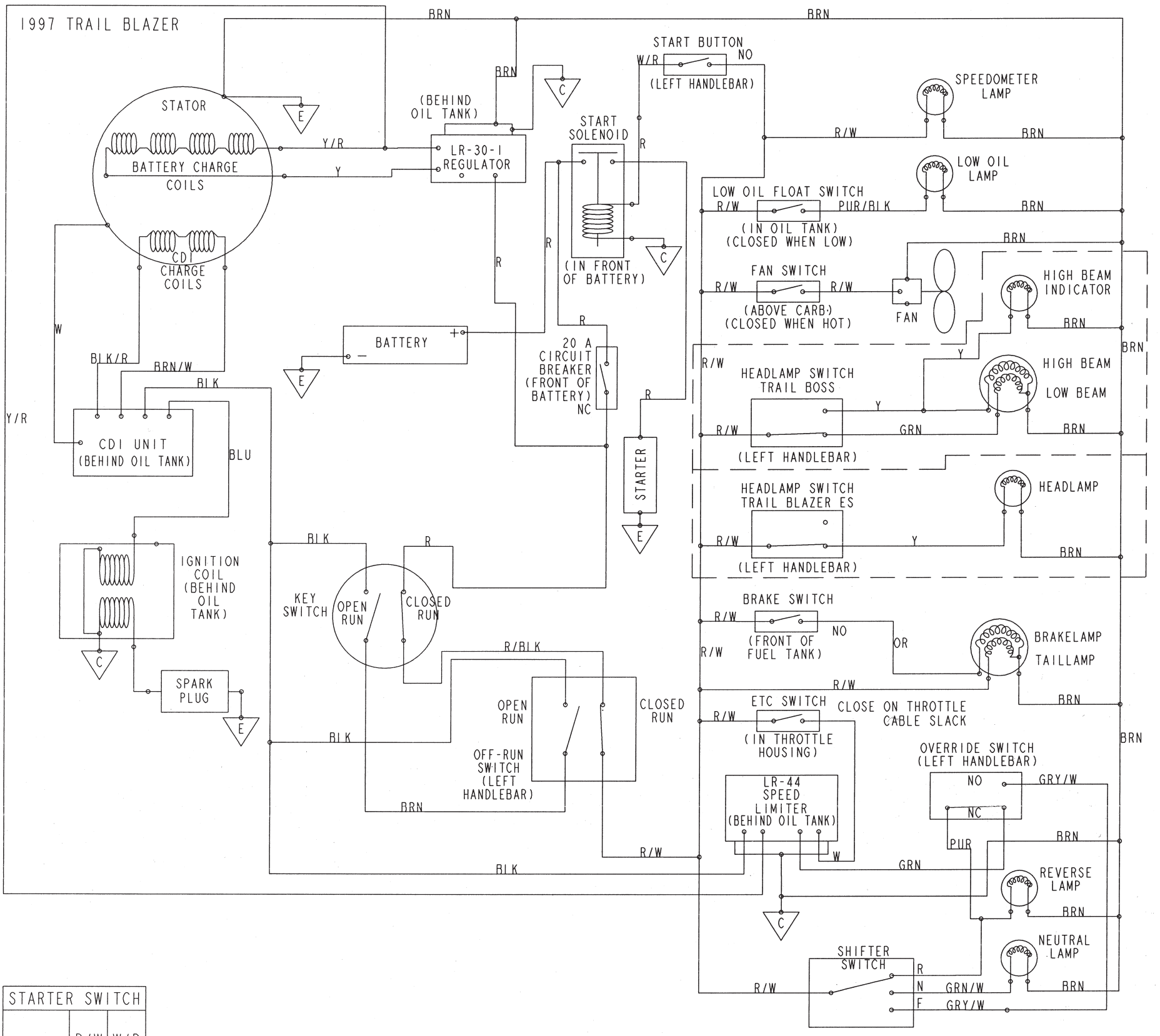
RESISTANCES (±20% @ 68°F/20°C)		
STATOR	GRN TO BLK/R	446 OHMS
	GRN TO R	3.2 OHMS
	W TO W/R	97 OHMS
	Y TO Y/BRN	0.17 OHMS
	Y/R TO Y/BRN	0.17 OHMS
	Y TO GROUND	NO CONNECTION
	R TO GROUND	NO CONNECTION
	W TO GROUND	NO CONNECTION
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)
FRONT WHEEL DRIVE COILS	GRY TO BRN	24 OHMS (EACH)

COLOR CODE

BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
GRY = GRAY
OR = ORANGE
Y = YELLOW
R = RED
W = WHITE

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE: R/Y = RED WITH YELLOW TRACER.

1997 MAGNUM



STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O=O	

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O=O		
HI	O=O		O=O

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O=O			
N	O=O		O=O	
REV	O=O		O=O	O=O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O=O			
RUN			O=O	

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	O=O		
PUSHED	O=O		

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O=O			
ON			O=O	

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O=O	

RESISTANCES (±20% @ 68°F/20°C)		
STATOR	BLK/R TO BRN/W	120 OHMS
	Y/R TO Y	0.3 OHMS
	BLK/R TO GROUND	NO CONNECTION
	Y TO GROUND	NO CONNECTION
	W TO GROUND	0 OHMS
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)

E = ENGINE GROUND
C = CHASSIS GROUND

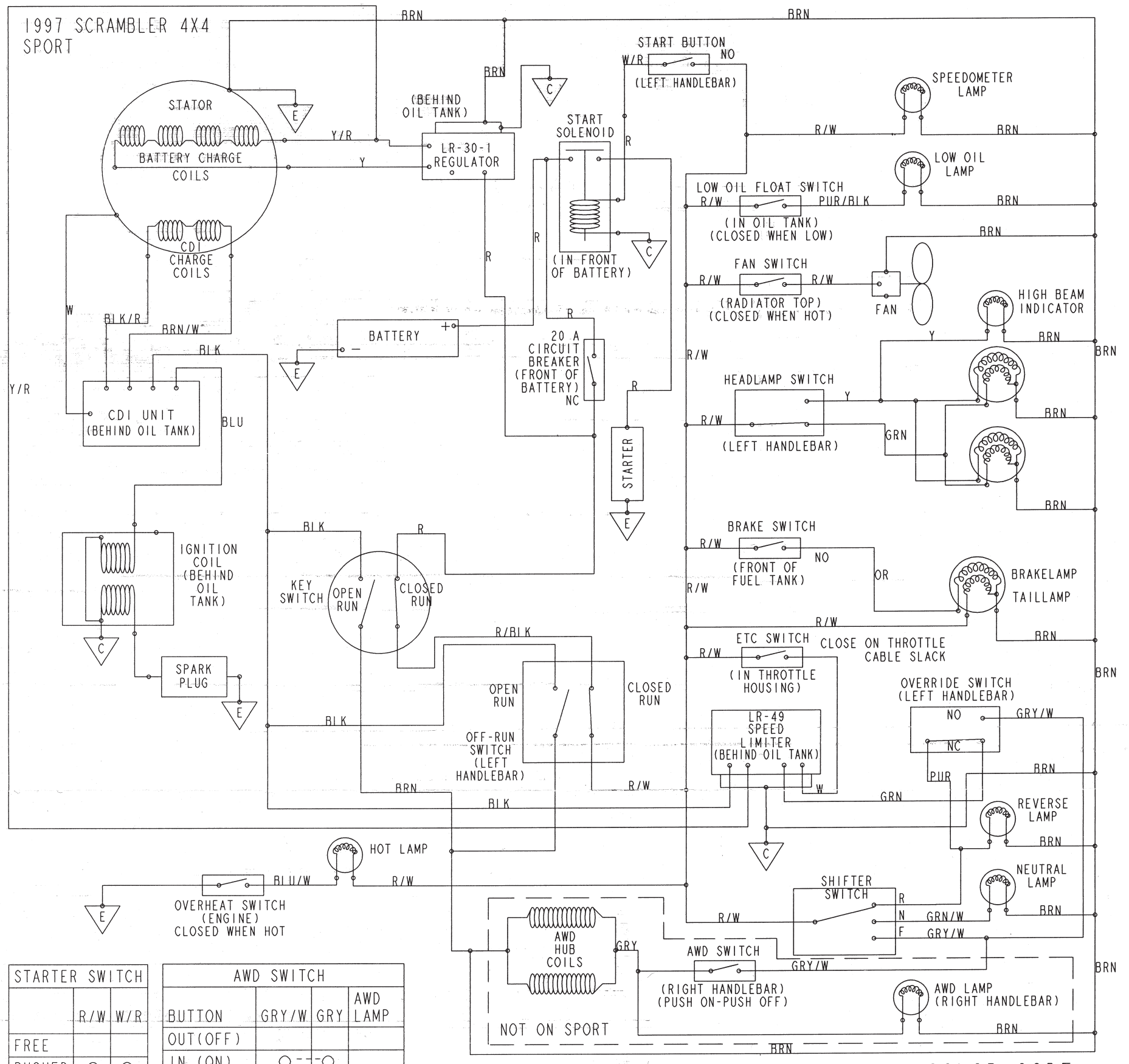
NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

COLOR CODE

BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
GRY = GRAY
OR = ORANGE
Y = YELLOW
R = RED
W = WHITE

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE: R/Y = RED WITH YELLOW TRACER.

1997 TRAIL BLAZER



STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O	O

AWD SWITCH			
BUTTON	GRY/W	GRY	AWD LAMP
OUT (OFF)			
IN (ON)	O	O	
IN (ON)	O	O	O

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O	O	
HI	O	O	O

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O	O		
N	O		O	
REV	O			O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O	O		
RUN			O	O

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	O		O
PUSHED	O	O	

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O	O		
ON			O	O

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O	O

E = ENGINE GROUND
C = CHASSIS GROUND

NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

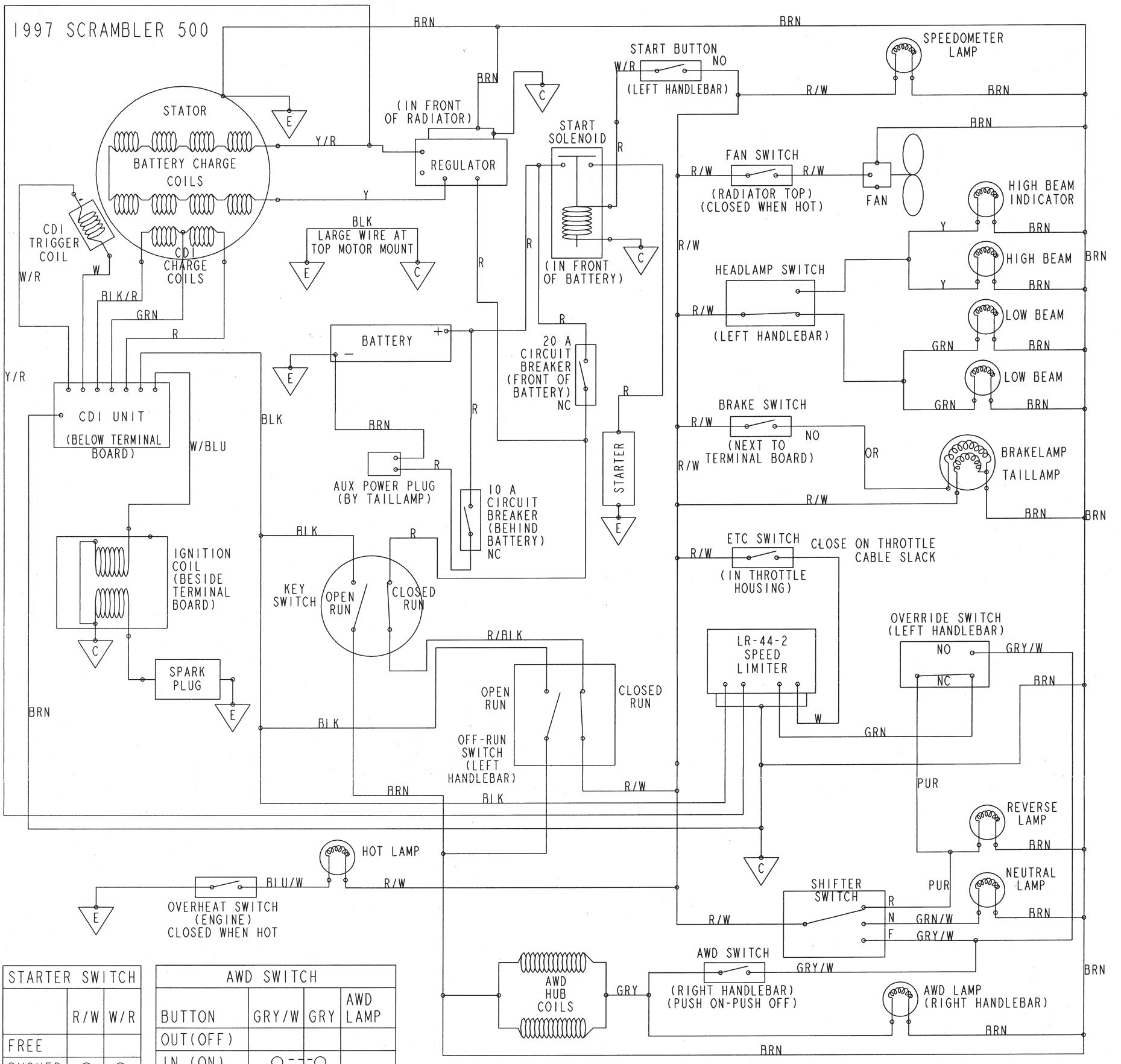
RESISTANCES (±20% @ 68°F/20°C)		
STATOR	BLK/R TO BRN/W	120 OHMS
	Y/R TO Y	0.3 OHMS
	BLK/R TO GROUND	NO CONNECTION
	Y TO GROUND	NO CONNECTION
	W TO GROUND	0 OHMS
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)
FRONT WHEEL DRIVE COILS	GRY TO BRN	24 OHMS (EACH)

COLOR CODE

BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
GRY = GRAY
OR = ORANGE
Y = YELLOW
R = RED
W = WHITE

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE: R/Y = RED WITH YELLOW TRACER.

1997 400 SCRAMBLER, SPORT



STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	○=○	

AWD SWITCH			
BUTTON	GRY/W	GRY	AWD LAMP
OUT(OFF)			
IN (ON)	○=○		
IN (ON)	○=○		○

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	○=○		
HI	○=○		○

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	○=○			
N	○		○	
REV	○			○

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	○=○			
RUN			○=○	

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	○		○
PUSHED	○=○		

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	○=○			
ON			○=○	

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	○	○

E = ENGINE GROUND
C = CHASSIS GROUND

NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

RESISTANCES (±20% @ 68°F/20°C)		
STATOR	GRN TO BLK/R	446 OHMS
	GRN TO R	1.6 OHMS
	W TO W/R	97 OHMS
	Y TO Y/R	0.13 OHMS
	Y TO GROUND	NO CONNECTION
	R TO GROUND	NO CONNECTION
	W TO GROUND	NO CONNECTION
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)
FRONT WHEEL DRIVE COILS	GRY TO BRN	24 OHMS (EACH)

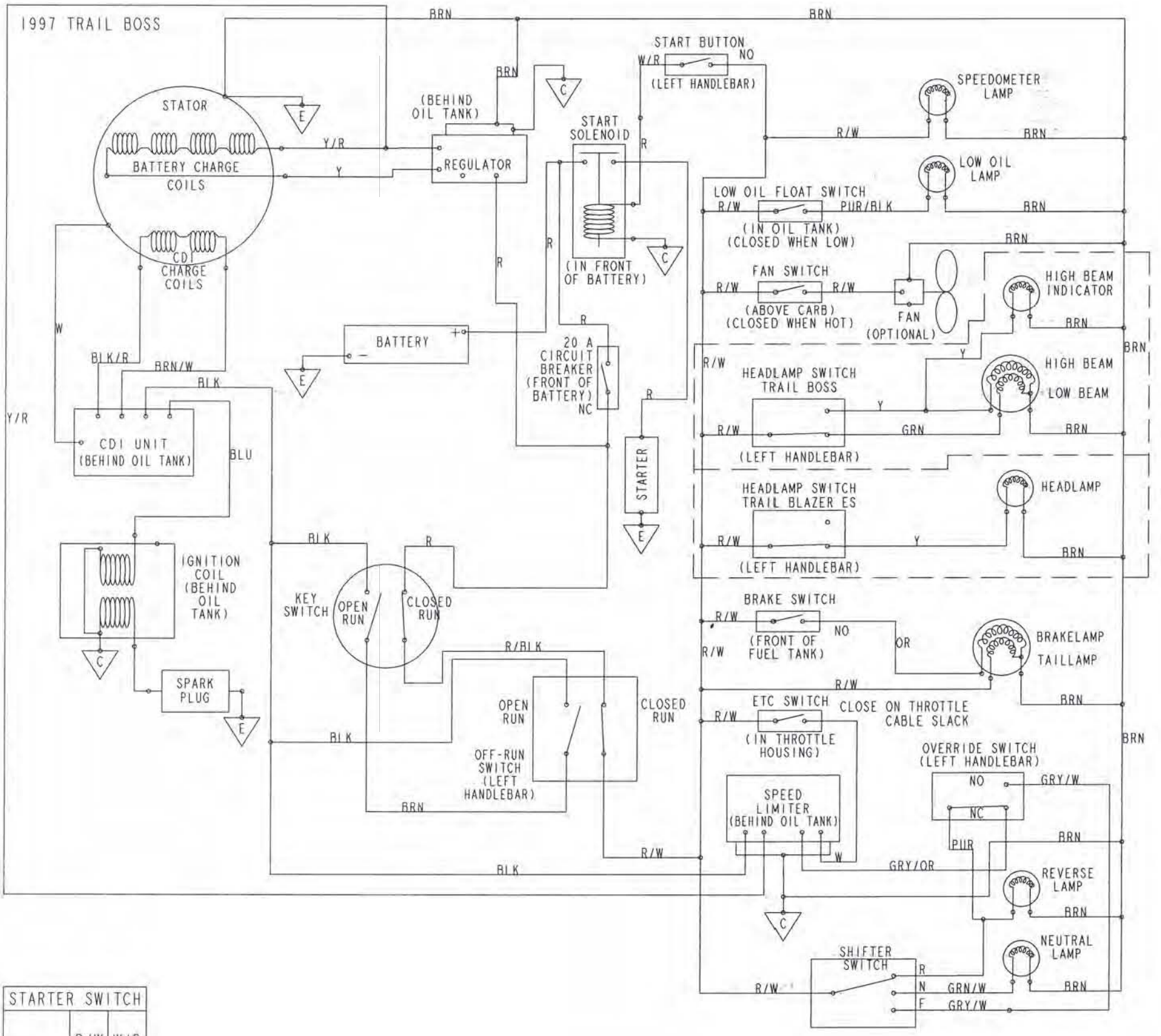
COLOR CODE

BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
GRY = GRAY
OR = ORANGE
Y = YELLOW
R = RED
W = WHITE

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE: R/Y = RED WITH YELLOW TRACER.

1997 SCRAMBLER 500

ELECTRICAL
Wiring Diagram 1997 Trail Boss



STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O=O	

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O=O		
HI	O=O		O=O

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O=O			
N	O=O		O	
REV	O=O		O	O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O=O			
RUN			O=O	

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	O		O
PUSHED	O=O		

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O=O			
ON			O	O

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O	O

RESISTANCES (±20% @ 68°F/20°C)		
STATOR	BLK/R TO BRN/W	120 OHMS
	Y/R TO Y	0.3 OHMS
	BLK/R TO GROUND	NO CONNECTION
	Y TO GROUND	NO CONNECTION
	W TO GROUND	0 OHMS
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)

E = ENGINE GROUND
C = CHASSIS GROUND

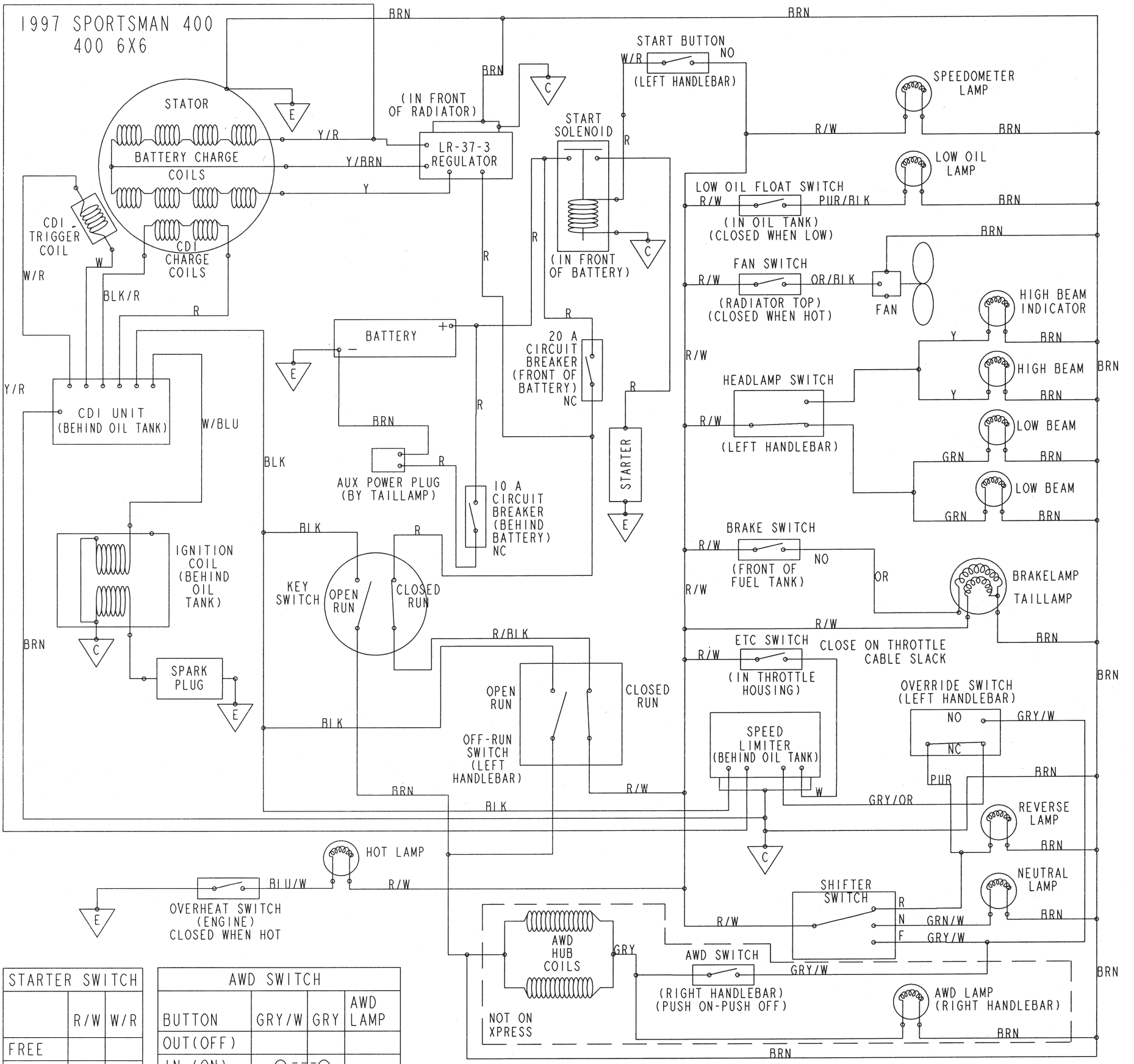
NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

COLOR CODE

BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
GRY = GRAY
OR = ORANGE
Y = YELLOW
R = RED
W = WHITE

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE: R/Y = RED WITH YELLOW TRACER.

1997 TRAIL BOSS



STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O=O	

AWD SWITCH			
BUTTON	GRY/W	GRY	AWD LAMP
OUT (OFF)			
IN (ON)	O=O		
IN (ON)	O=O		O

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O=O		
HI	O=O		O

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O=O			
N	O=O		O	
REV	O=O		O	O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O=O			
RUN			O=O	

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	O=O		
PUSHED	O=O		

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O=O			
ON			O=O	

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O=O	

RESISTANCES (±20% @ 68°F/20°C)		
STATOR	R TO BLK/R	226 OHMS
	W TO W/R	97 OHMS
	Y TO Y/BRN	0.17 OHMS
	Y/R TO Y/BRN	0.17 OHMS
	Y TO GROUND	NO CONNECTION
	R TO GROUND	NO CONNECTION
	W TO GROUND	NO CONNECTION
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)
FRONT WHEEL DRIVE COILS	GRY TO BRN	24 OHMS (EACH)

E = ENGINE GROUND
C = CHASSIS GROUND

NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

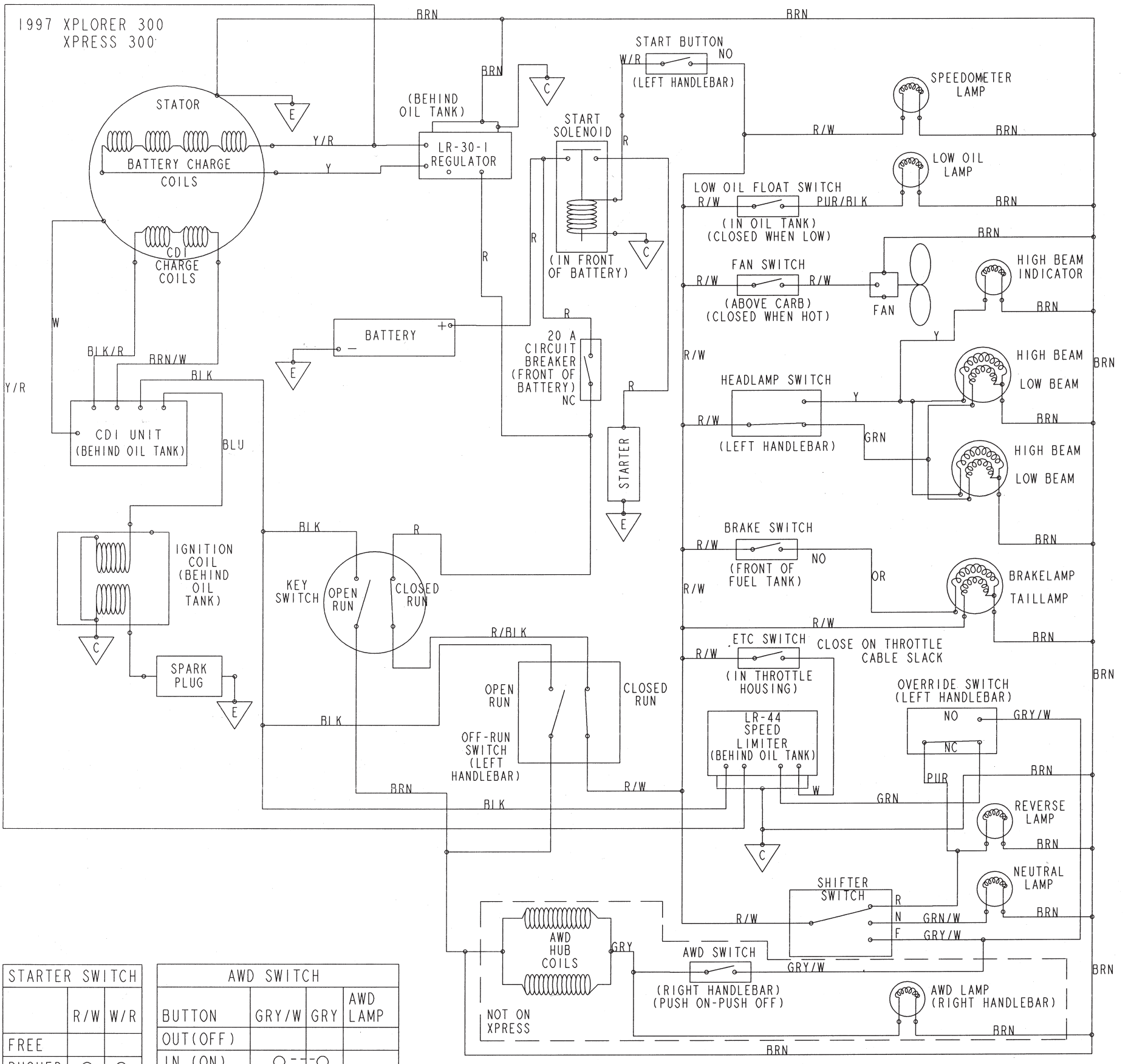
COLOR CODE

BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
GRY = GRAY
OR = ORANGE
Y = YELLOW
R = RED
W = WHITE

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE: R/Y = RED WITH YELLOW TRACER.

1997 400 SPORTSMAN, 6X6

ELECTRICAL
Wiring Diagram 1997 Xplorer 300, Xpress 300



STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O=O	

AWD SWITCH			
BUTTON	GRY/W	GRY	AWD LAMP
OUT (OFF)			
IN (ON)	O=O		
IN (ON)	O=O		O

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O=O		
HI	O=O		O

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O=O			
N	O=O		O	
REV	O=O		O	O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O=O			
RUN			O=O	

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	O		O
PUSHED	O=O		

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O=O			
ON			O=O	

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O	O

RESISTANCES (±20% @ 68°F/20°C)		
STATOR	BLK/R TO BRN/W	120 OHMS
	Y/R TO Y	0.3 OHMS
	BLK/R TO GROUND	NO CONNECTION
	Y TO GROUND	NO CONNECTION
	W TO GROUND	0 OHMS
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)
FRONT WHEEL DRIVE COILS	GRY TO BRN	24 OHMS (EACH)

E = ENGINE GROUND
C = CHASSIS GROUND

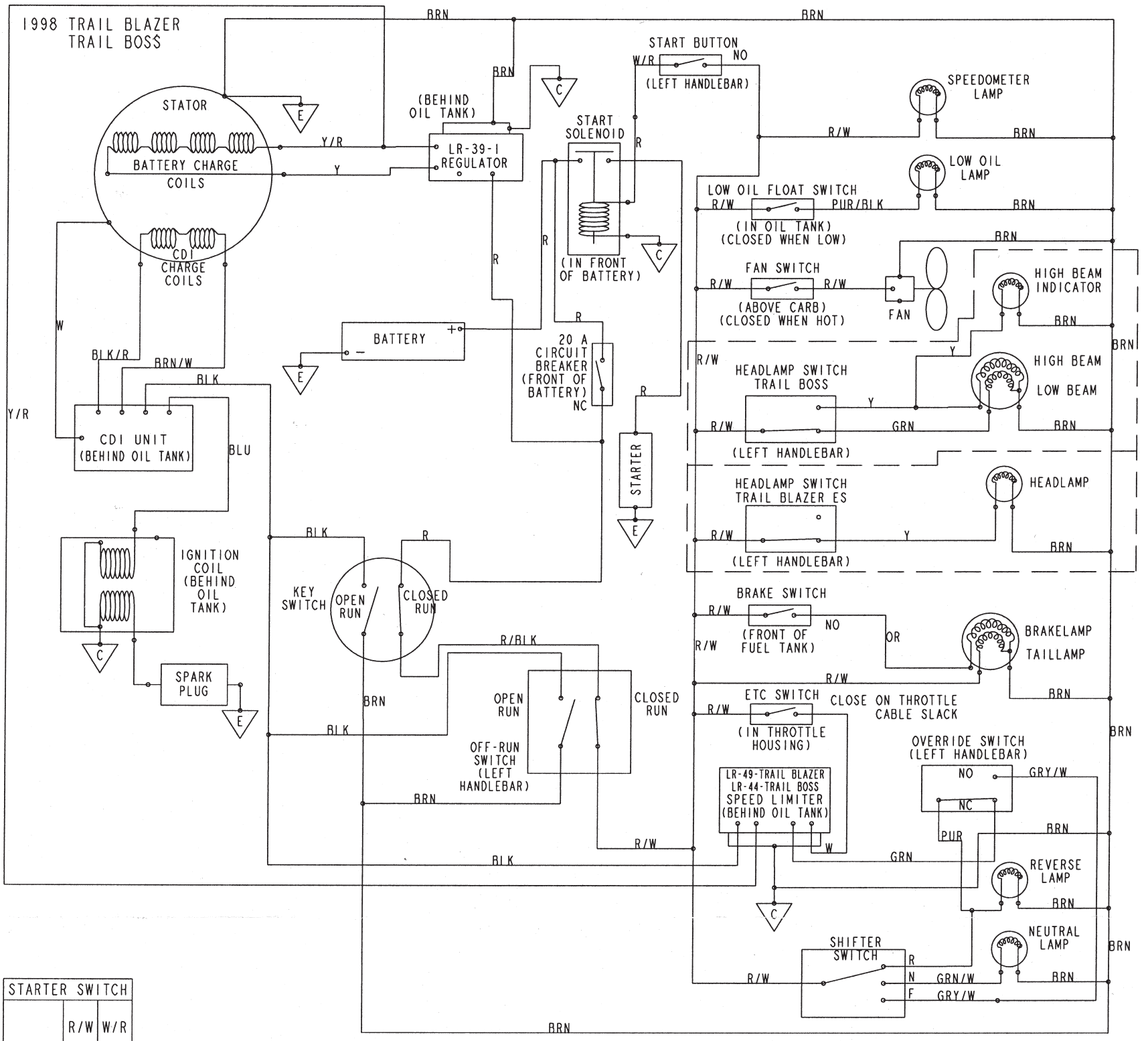
NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

COLOR CODE

BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
GRY = GRAY
OR = ORANGE
Y = YELLOW
R = RED
W = WHITE

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE: R/Y = RED WITH YELLOW TRACER.

1997 300



STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O=O	

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O=O		
HI	O=O		O=O

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O=O			
N	O=O		O=O	
REV	O=O		O=O	O=O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O=O			
RUN			O=O	

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	O=O		
PUSHED	O=O		

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O=O			
ON			O=O	

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O=O	

RESISTANCES (±20% @ 68°F/20°C)		
STATOR	BLK/R TO BRN/W	120 OHMS
	Y/R TO Y	0.3 OHMS
	BLK/R TO GROUND	NO CONNECTION
	Y TO GROUND	NO CONNECTION
	W TO GROUND	0 OHMS
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)

E = ENGINE GROUND
C = CHASSIS GROUND

NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

COLOR CODE

BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
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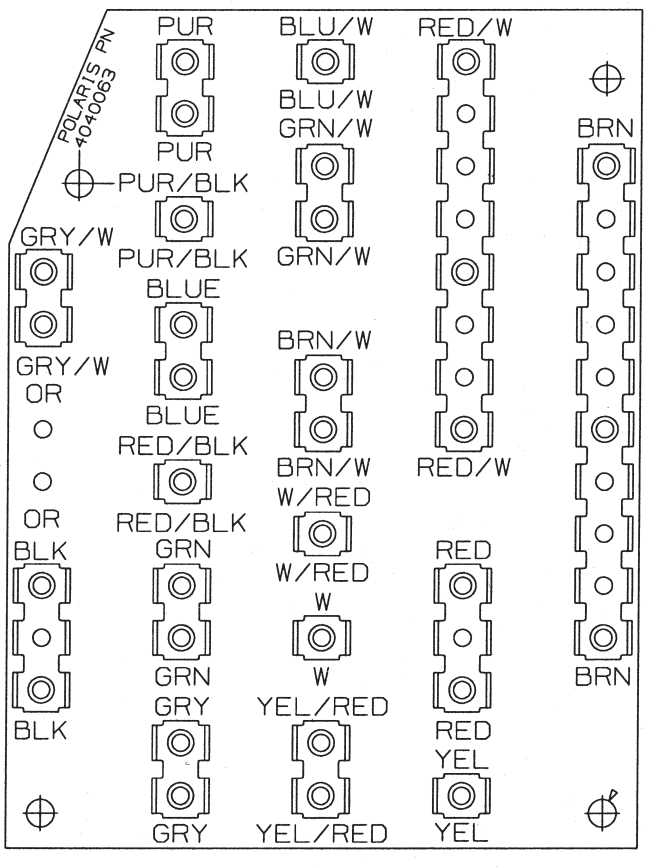
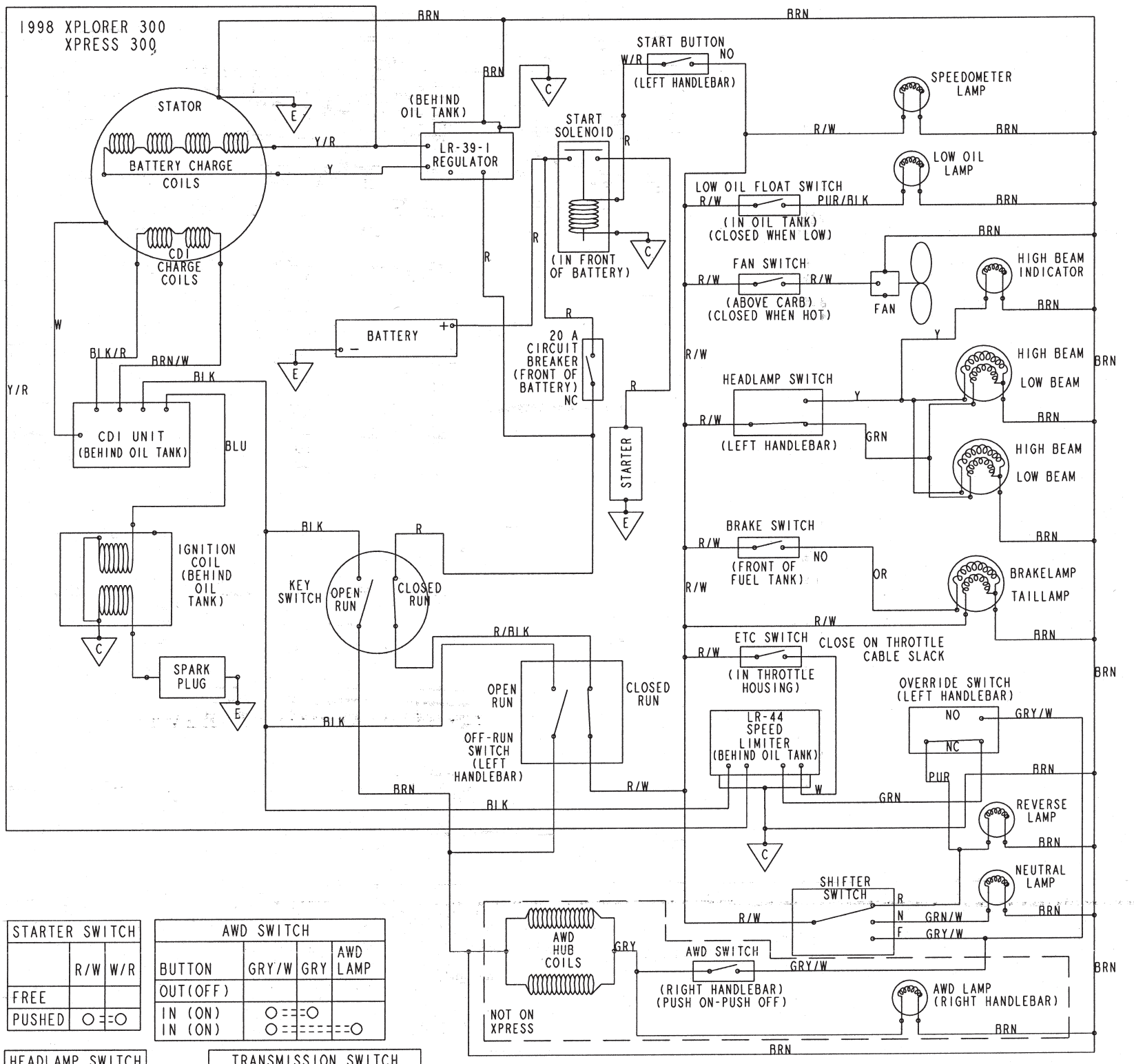


ELECTRICAL
Wiring Diagram 1998 Xplorer 300 / Xpress 300



STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O	O

AWD SWITCH			
BUTTON	GRY/W	GRY	AWD LAMP
OUT (OFF)			
IN (ON)	O	O	
IN (ON)	O		O

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O	O	
HI	O		O

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O	O		
N	O		O	
REV	O			O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O	O		
RUN			O	O

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	O		O
PUSHED	O	O	

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O	O		
ON			O	O

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O	O

E = ENGINE GROUND
C = CHASSIS GROUND

NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

COLOR CODE

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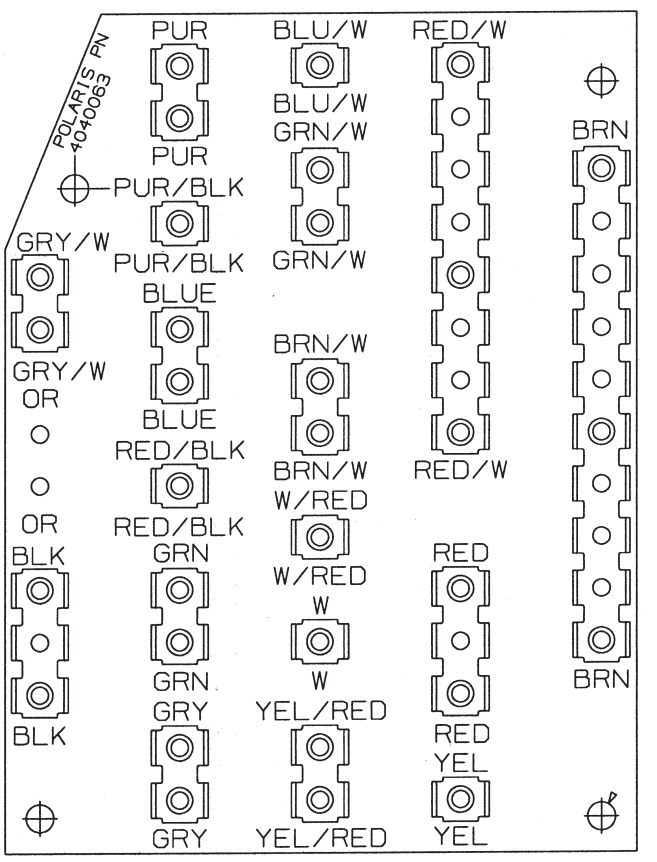
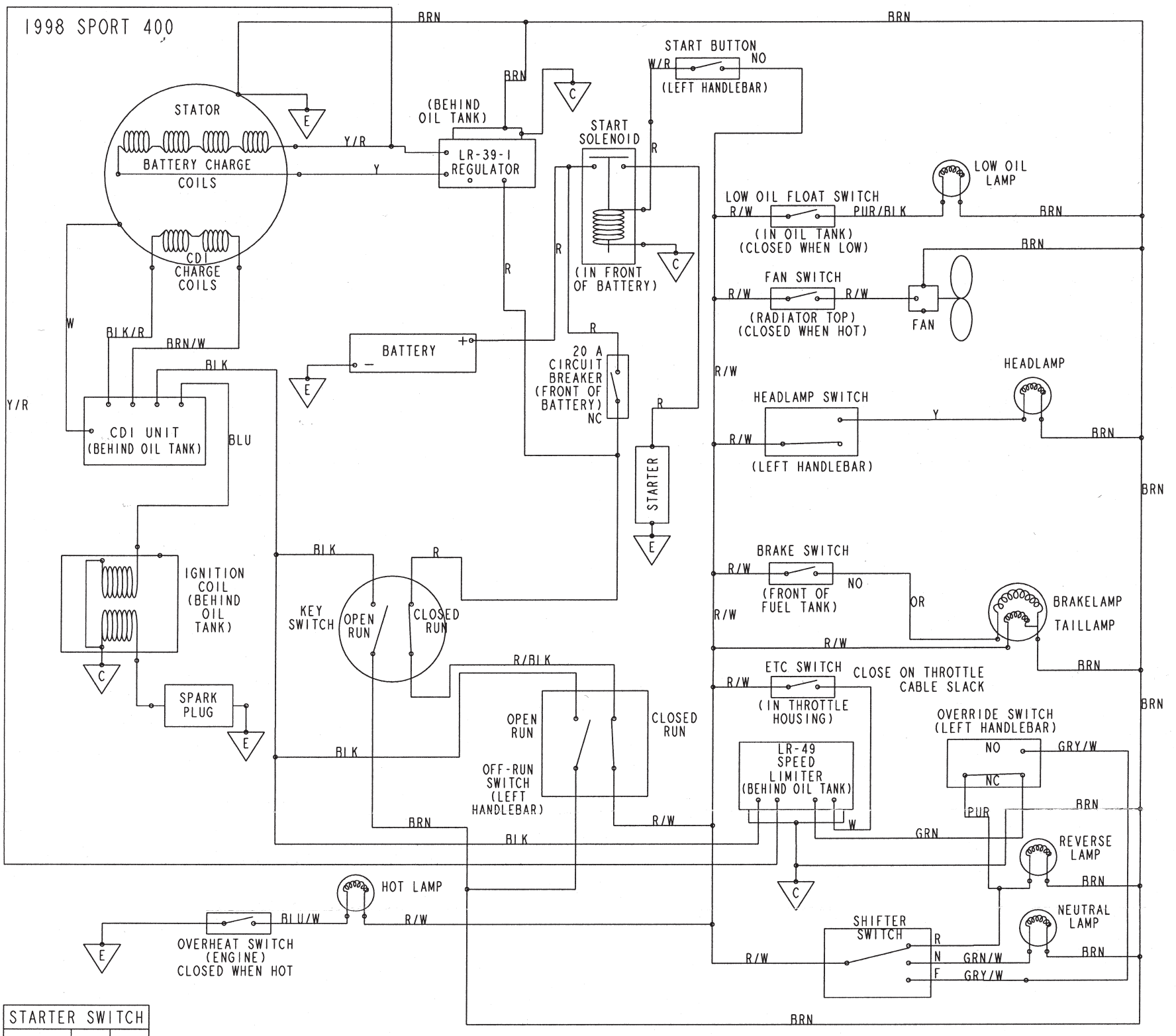


RESISTANCES (±20% @ 68°F/20°C)		
STATOR	BLK/R TO BRN/W	120 OHMS
	Y/R TO Y	0.3 OHMS
	BLK/R TO GROUND	NO CONNECTION
	Y TO GROUND	NO CONNECTION
	W TO GROUND	0 OHMS
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)
FRONT WHEEL DRIVE COILS	GRY TO BRN	24 OHMS (EACH)



STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O=O	

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O=O		
HI	O=O		O=O

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O=O			
N	O=O			O=O
REV	O=O			O=O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O=O			
RUN			O=O	

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	O=O		
PUSHED	O=O		

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O=O			
ON			O=O	

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O=O	

E = ENGINE GROUND
C = CHASSIS GROUND

NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

RESISTANCES (±20% @ 68°F/20°C)		
STATOR	BLK/R TO BRN/W	120 OHMS
	Y/R TO Y	0.3 OHMS
	BLK/R TO GROUND	NO CONNECTION
	Y TO GROUND	NO CONNECTION
	W TO GROUND	0 OHMS
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)

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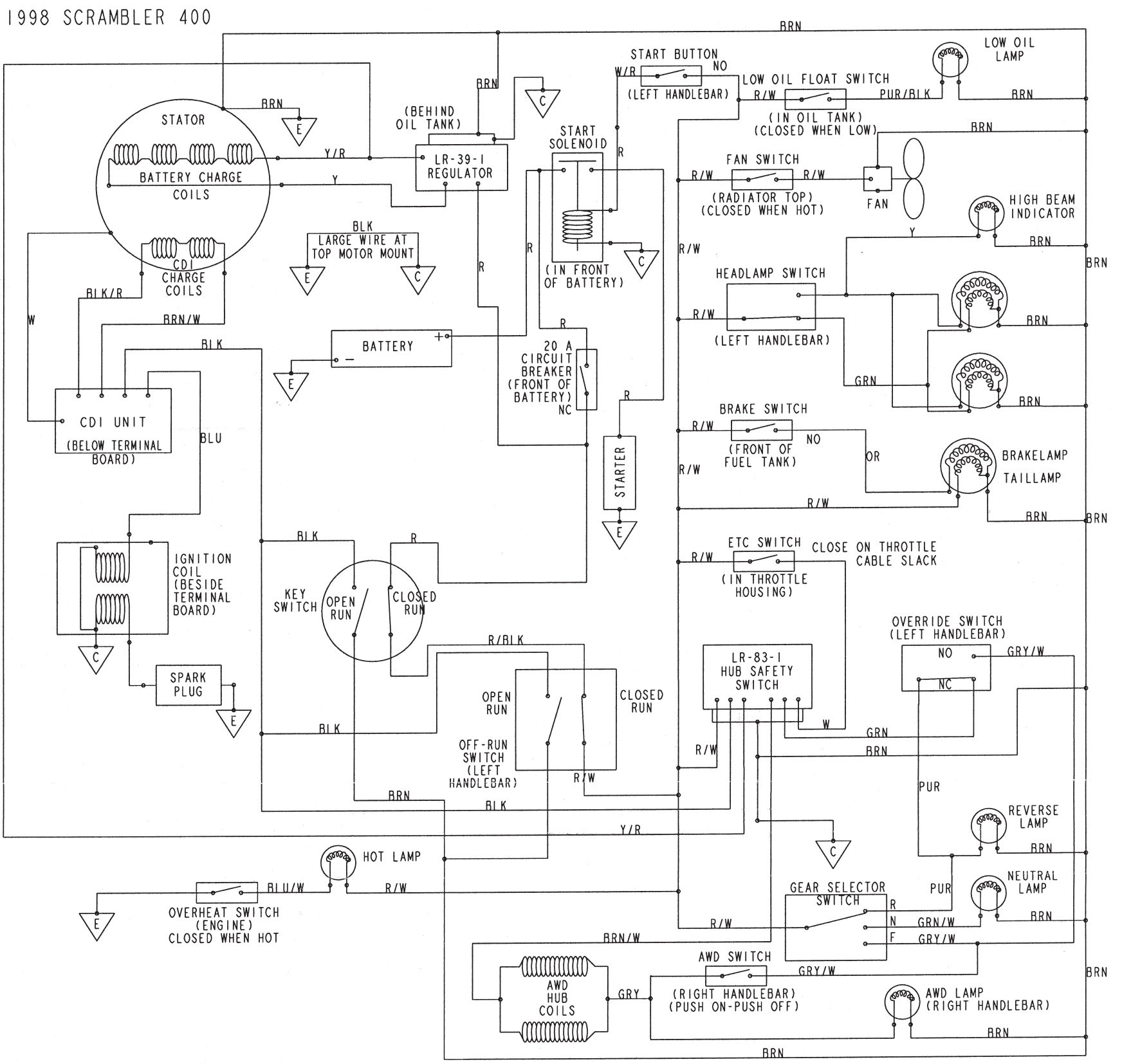
1998 SPORT 400



E = ENGINE GROUND
C = CHASSIS GROUND

NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O	O

AWD SWITCH			
BUTTON	GRY/W	GRY	AWD LAMP
OUT(OFF)			
IN (ON)	O	O	
IN (ON)	O		O

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O	O	
HI	O		O

GEAR SELECTOR SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O	O		
N	O		O	
REV	O			O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O	O		
RUN			O	O

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	O		O
PUSHED	O	O	

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O	O		
ON			O	O

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O	O

RESISTANCES (±20% @ 68°F/20°C)		
STATOR	BLK/R TO BRN/W	120 OHMS
	Y/R TO Y	0.3 OHMS
	BLK/R TO GROUND	NO CONNECTION
	Y TO GROUND	NO CONNECTION
	W TO GROUND	0 OHMS
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)
FRONT WHEEL DRIVE COILS	GRY TO BRN/W	24 OHMS (EACH)

COLOR CODE

BLK = BLACK
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PUR = PURPLE
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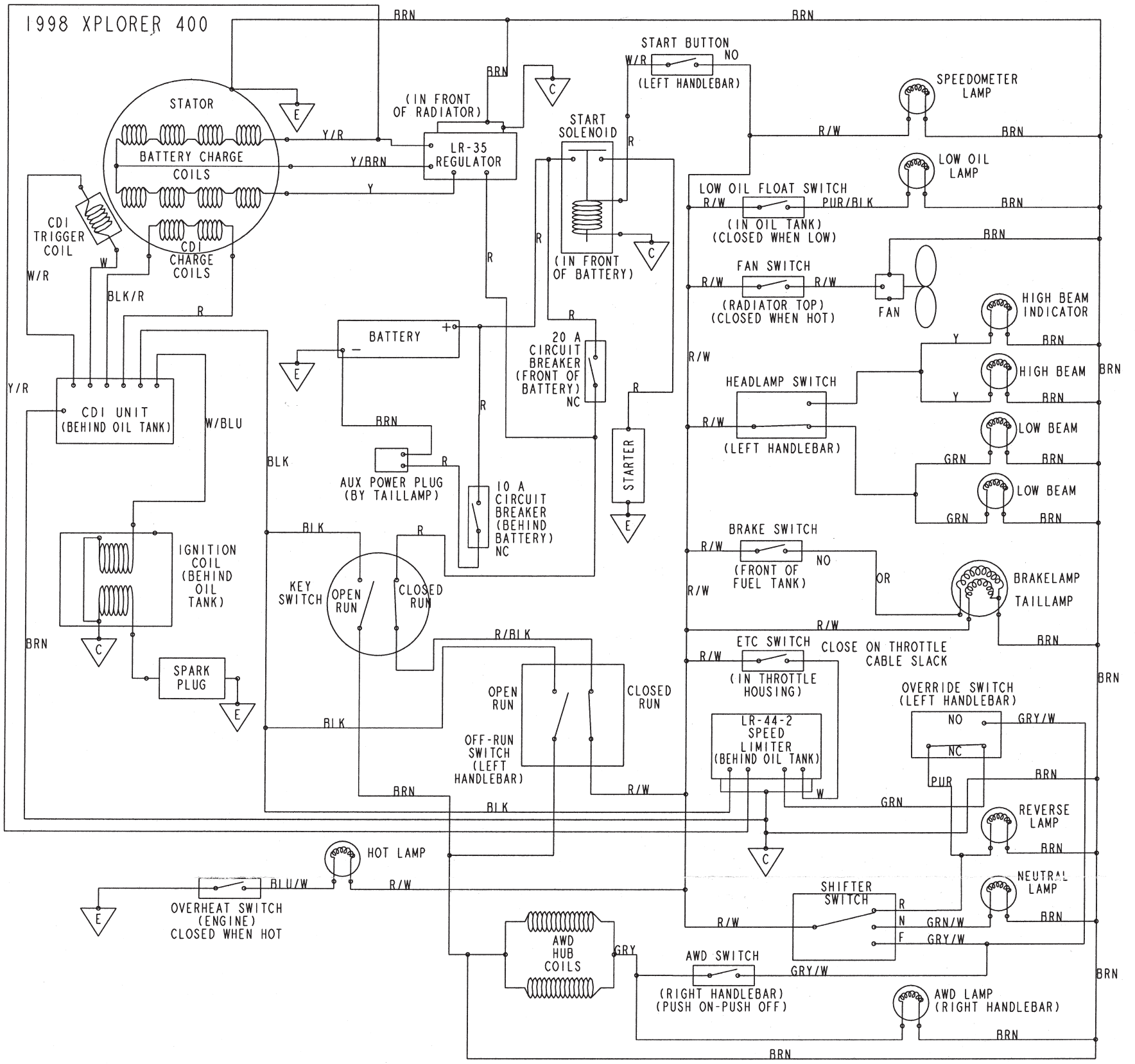

E = ENGINE GROUND
C = CHASSIS GROUND

NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O	O

AWD SWITCH			
BUTTON	GRY/W	GRY	AWD LAMP
OUT(OFF)			
IN (ON)	O	O	
IN (ON)	O		O

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O	O	
HI	O		O

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O	O		
N	O		O	
REV	O			O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O	O		
RUN			O	O

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	O		O
PUSHED	O	O	

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O	O		
ON			O	O

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O	O

RESISTANCES (±20% @ 68°F/20°C)		
STATOR	R TO BLK/R	226 OHMS
	W TO W/R	97 OHMS
	Y TO Y/BRN	0.17 OHMS
	Y/R TO Y/BRN	0.17 OHMS
	Y TO GROUND	NO CONNECTION
	R TO GROUND	NO CONNECTION
	W TO GROUND	NO CONNECTION
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)
FRONT WHEEL DRIVE COILS	GRY TO BRN	24 OHMS (EACH)

COLOR CODE

BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
GRY = GRAY
OR = ORANGE
Y = YELLOW
R = RED
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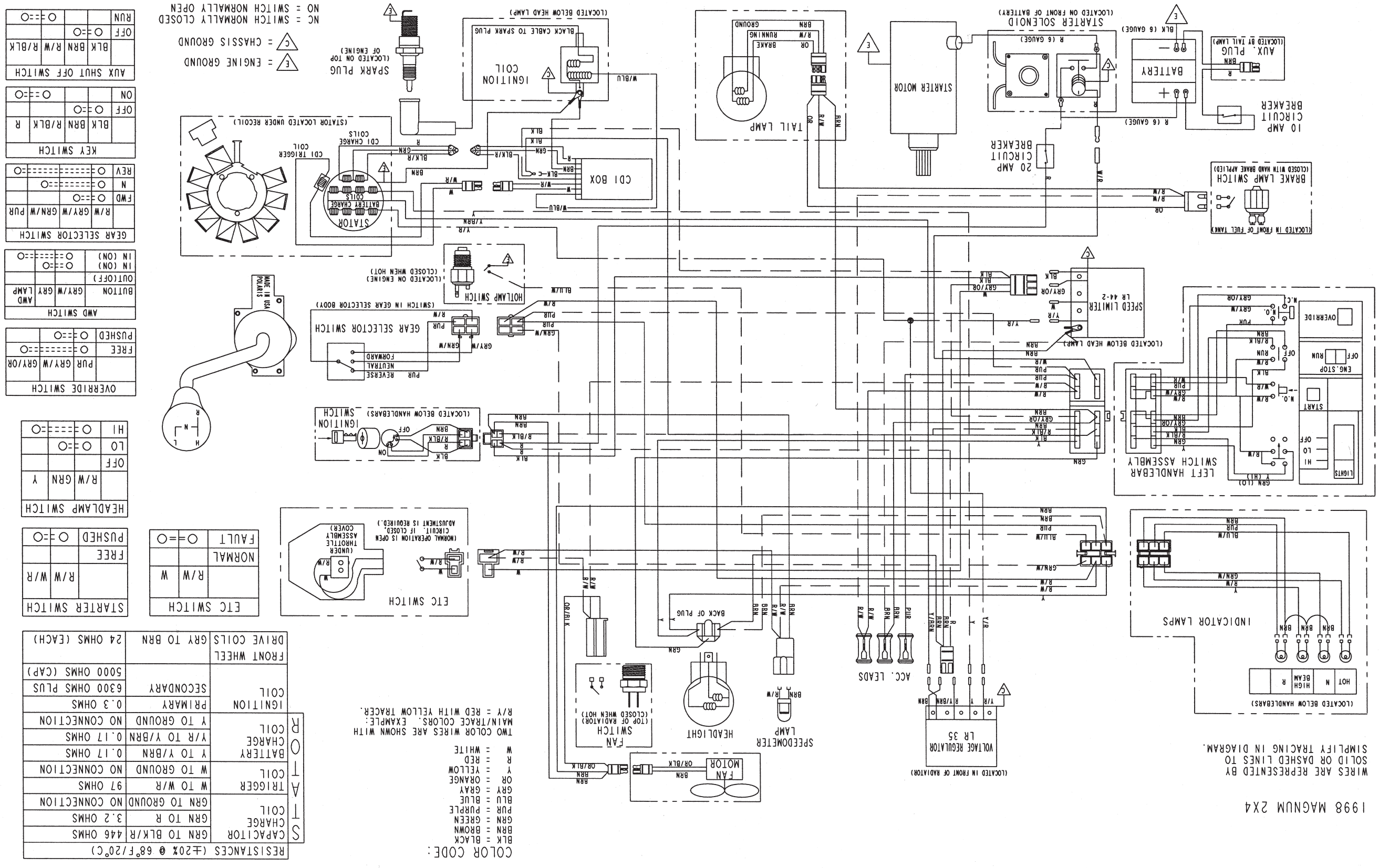
TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE: R/Y = RED WITH YELLOW TRACER.

ELECTRICAL
Wiring Diagram 1998 Magnum 2x4

1998 MAGNUM 2X4

WIRES ARE REPRESENTED BY SOLID OR DASHED LINES TO SIMPLIFY TRACING IN DIAGRAM.



AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O	=O		
RUN	O			=O

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O	=O		
ON	O			=O

GEAR SELECTOR SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O	=O		
N	O	=O		
REV	O	=O		

AWD SWITCH			
BUTTON	GRY/W	GRY	AWD LAMP
OUT(OFF)			
IN (ON)	O	=O	
IN (ON)	O	=O	

OVERRIDE SWITCH			
	PUR	GRY/W	GRY/OR
FREE	O	=O	
PUSHED	O	=O	

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O	=O	
HI	O	=O	

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O	=O

STARTER SWITCH			
	R/W	W/R	
FREE			
PUSHED	O	=O	

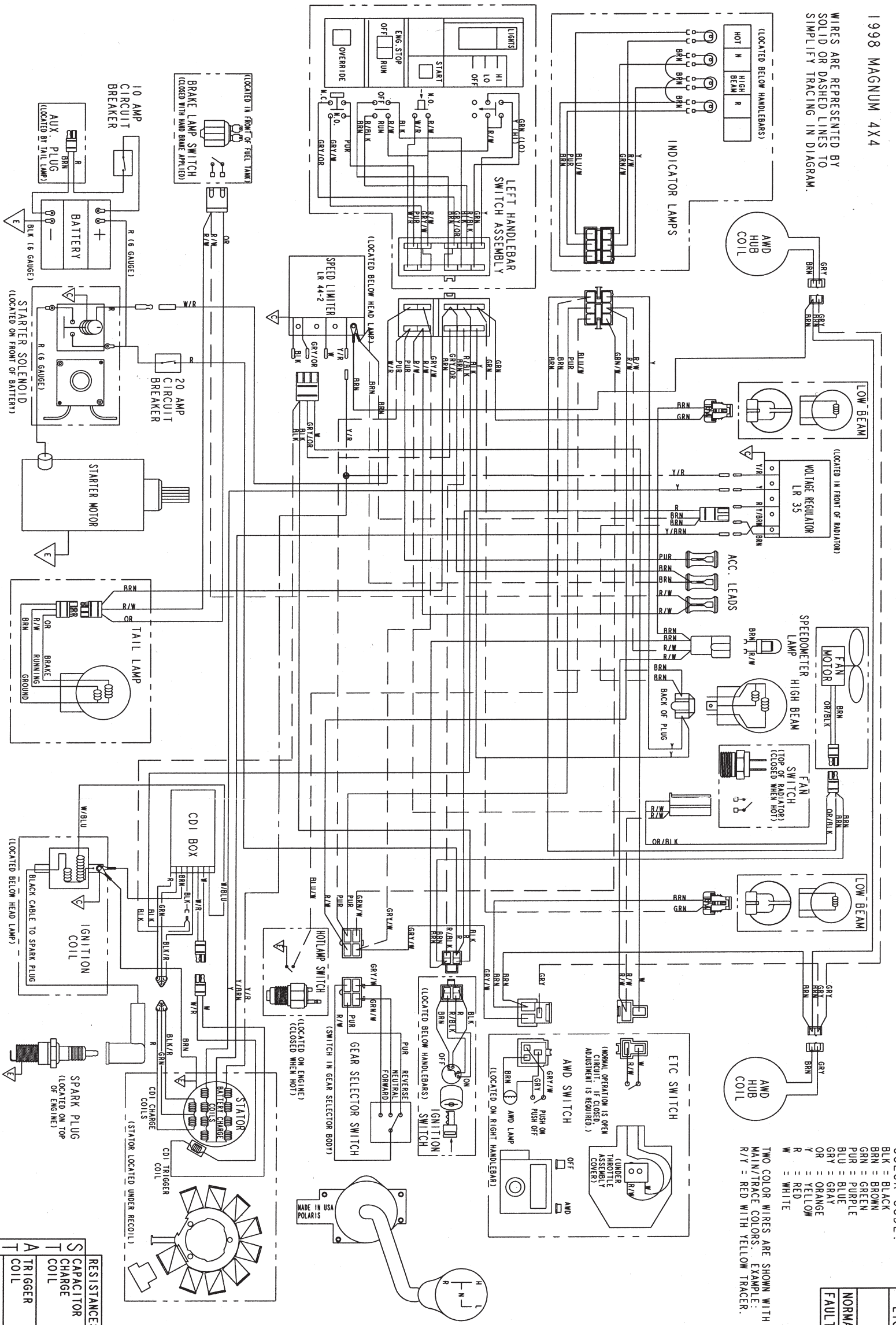
STATOR			
		RESISTANCES (±20% @ 68°F/20°C)	
TRIGGER	W TO W/R	97 OHMS	NO CONNECTION
CHARGE COIL	GRN TO GROUND	3.2 OHMS	NO CONNECTION
	GRN TO R		
CAPACITOR	GRN TO BLK/R	446 OHMS	
BATTERY CHARGE COIL	Y TO Y/BRN	0.17 OHMS	NO CONNECTION
	Y/R TO Y/BRN	0.17 OHMS	
IGNITION COIL	PRIMARY	0.3 OHMS	NO CONNECTION
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)	
FRONT WHEEL DRIVE COILS	GRY TO BRN	24 OHMS (EACH)	

COLOR CODE:

BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
GRY = GRAY
OR = ORANGE
Y = YELLOW
R = RED
W = WHITE

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE:
R/Y = RED WITH YELLOW TRACER.

ELECTRICAL
Wiring Diagram 1998 Magnum 4x4



ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O=O	

STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O=O	

AWD SWITCH			
BUTTON	GRY/W	GRY	AWD LAMP
OUT(OFF)			
IN (ON)	O=O		
IN (ON)	O=O	O=O	

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O=O		
HI	O=O	O=O	

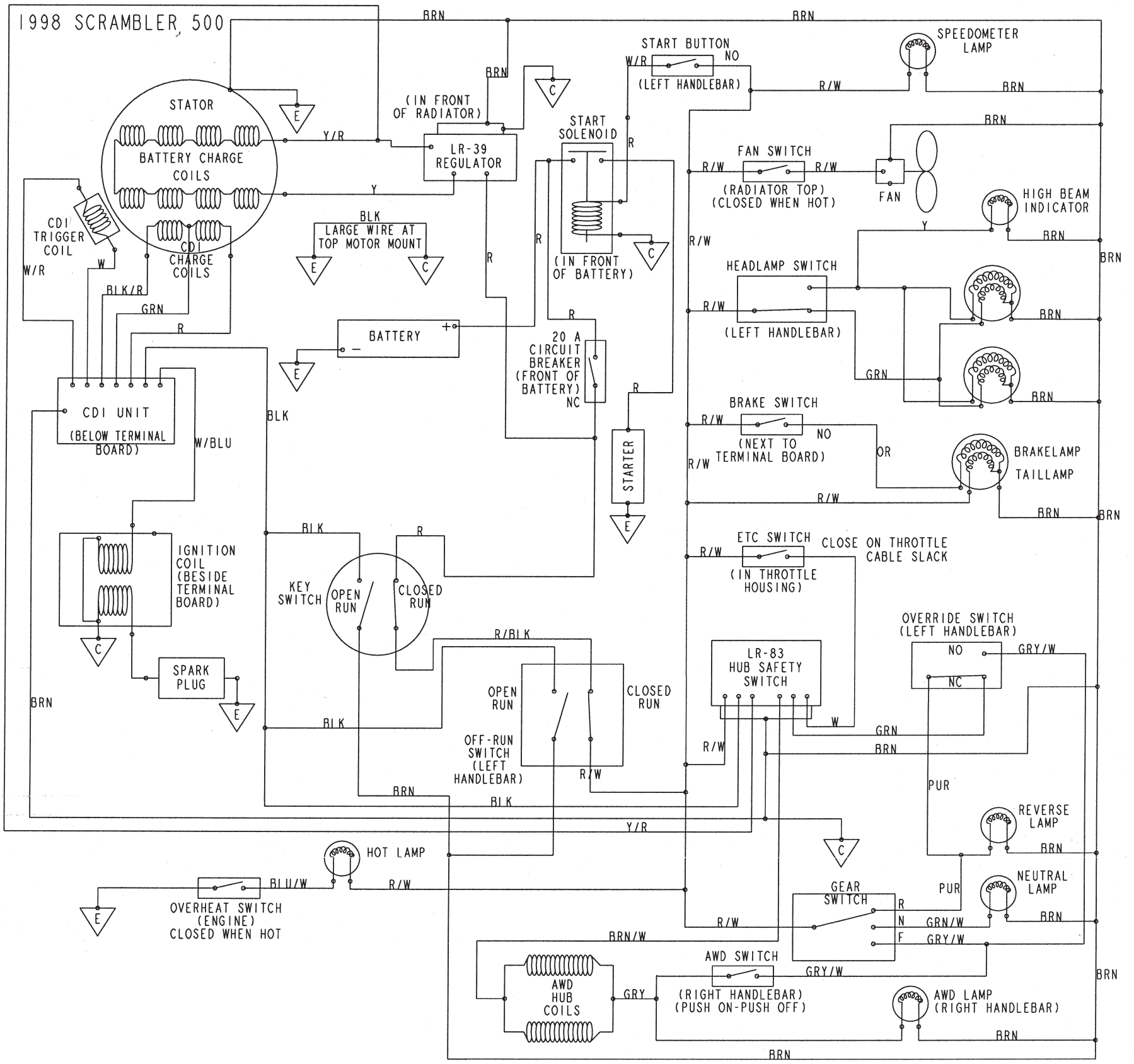
GEAR SELECTOR SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O=O			
N	O=O	O=O		
REV	O=O	O=O	O=O	

OVERRIDE SWITCH			
	PUR	GRY/W	GRY/OR
FREE	O=O	O=O	O
PUSHED	O=O		

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O=O			
RUN			O=O	

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O=O			
ON			O=O	O=O

RESISTANCES (±20% @ 68°F/20°C)		
STATOR	CAPACITOR CHARGE COIL	GRN TO BLK/R 446 OHMS
		GRN TO R 3.2 OHMS
		GRN TO GROUND NO CONNECTION
	TRIGGER COIL	W TO W/R 97 OHMS
		W TO GROUND NO CONNECTION
	BATTERY CHARGE COIL	Y TO Y/BRN 0.17 OHMS
		Y/R TO Y/BRN 0.17 OHMS
		Y TO GROUND NO CONNECTION
IGNITION COIL		PRIMARY 0.3 OHMS
		SECONDARY 6300 OHMS PLUS 5000 OHMS (CAP)
FRONT WHEEL DRIVE COILS		GRY TO BRN 24 OHMS (EACH)



E = ENGINE GROUND
C = CHASSIS GROUND

NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O	O

AWD SWITCH			
BUTTON	GRY/W	GRY	AWD LAMP
OUT(OFF)			
IN (ON)	O	O	
IN (ON)	O		O

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O	O	
HI	O		O

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O	O		
N	O		O	
REV	O			O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O	O		
RUN			O	O

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	O		O
PUSHED	O	O	

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O	O		
ON			O	O

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O	O

RESISTANCES (±20% @ 68°F/20°C)		
STATOR	GRN TO BLK/R	446 OHMS
	GRN TO R	1.6 OHMS
	W TO W/R	97 OHMS
	Y TO Y/R	0.13 OHMS
	Y TO GROUND	NO CONNECTION
	R TO GROUND	NO CONNECTION
	W TO GROUND	NO CONNECTION
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)
FRONT WHEEL DRIVE COILS	GRY TO BRN/W	24 OHMS (EACH)

COLOR CODE

BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
GRY = GRAY
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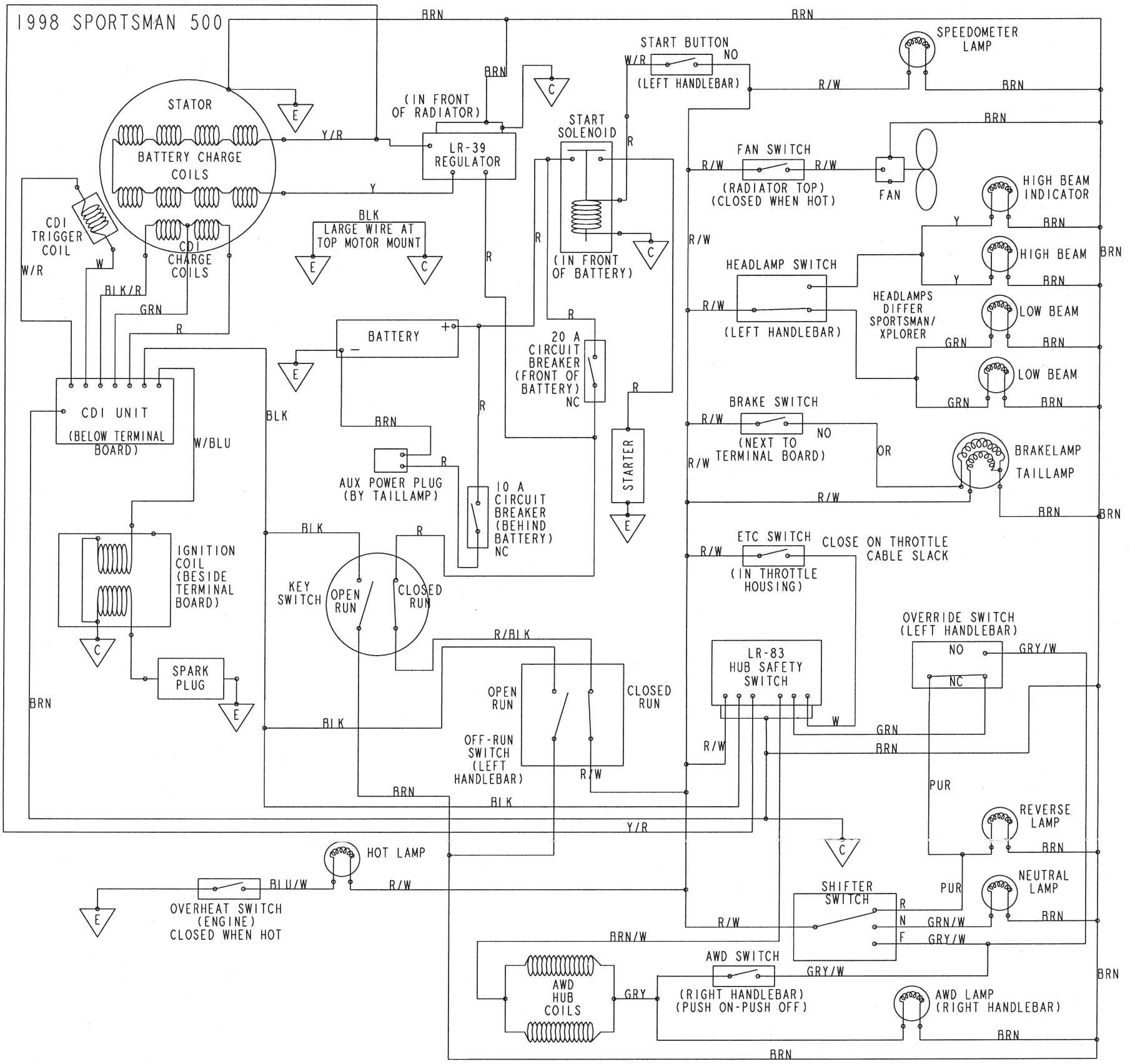
W = WHITE

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE: R/Y = RED WITH YELLOW TRACER.



E = ENGINE GROUND
C = CHASSIS GROUND

NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O	O

AWD SWITCH			
BUTTON	GRY/W	GRY	AWD LAMP
OUT(OFF)			
IN (ON)	O	O	
IN (ON)	O		O

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O	O	
HI	O		O

TRANSMISSION SWITCH				
	R/W	GRY/W	GRN/W	PUR
FWD	O	O		
N	O		O	
REV	O			O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O	O		
RUN			O	O

OVERRIDE SWITCH			
	PUR	GRY/W	GRN
FREE	O		O
PUSHED	O	O	

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O	O		
ON			O	O

ETC SWITCH		
	R/W	W
NORMAL		
FAULT	O	O

RESISTANCES (±20% @ 68°F/20°C)		
STATOR	GRN TO BLK/R	446 OHMS
	GRN TO R	3.2 OHMS
	W TO W/R	97 OHMS
	Y TO Y/BRN	0.17 OHMS
	Y/R TO Y/BRN	0.17 OHMS
	Y TO GROUND	NO CONNECTION
	R TO GROUND	NO CONNECTION
	W TO GROUND	NO CONNECTION
COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS 5000 OHMS (CAP)
FRONT WHEEL DRIVE COILS	GRY TO BRN/W	24 OHMS (EACH)

COLOR CODE

BLK = BLACK
BRN = BROWN
GRN = GREEN
PUR = PURPLE
BLU = BLUE
GRY = GRAY
OR = ORANGE
Y = YELLOW
R = RED
W = WHITE

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE: R/Y = RED WITH YELLOW TRACER.

ELECTRICAL
Wiring Diagram 1998 Big Boss 500 6x6

1998 500 6X6

WIRES ARE REPRESENTED BY SOLID OR DASHED LINES TO SIMPLIFY TRACING IN DIAGRAM.

(LOCATED BELOW HANDLEBARS)

HOT | N | HIGH BEAM | R

INDICATOR LAMPS

LEFT HANDLEBAR SWITCH ASSEMBLY

OVERRIDE | ENG.STOP | START | HI | LO | OFF | L16H1S

(LOCATED IN FRONT OF FUEL TANK)

BRAKE LAMP SWITCH (CLOSED WITH HAND BRAKE APPLIED)

10 AMP CIRCUIT BREAKER

AUX. PLUG (LOCATED BY TAIL LAMP)

BATTERY

R (6 GAUGE)

BLK (6 GAUGE)

STARTER SOLENOID (LOCATED ON FRONT OF BATTERY)

20 AMP CIRCUIT BREAKER

STARTER MOTOR

TAIL LAMP

BRAKE | GROUND

(LOCATED BELOW HEAD LAMP)

SPEED LIMITER LR 44-2

(LOCATED BELOW HEAD LAMP)

VOLTAGE REGULATOR LR 39

(LOCATED IN FRONT OF RADIATOR)

SPEEDOMETER LAMP

HIGH BEAM

ACC. LEADS

FAN MOTOR

FAN SWITCH (TOP OF RADIATOR) (CLOSED WHEN HOT)

HOLLAMP SWITCH (LOCATED ON ENGINE) (CLOSED WHEN HOT)

LOW BEAM

LOW BEAM

AWD HUB COIL

AWD HUB COIL

(LOCATED BELOW HEAD LAMP)

IGNITION COIL

SPARK PLUG (LOCATED ON TOP OF ENGINE)

(STATOR LOCATED UNDER RECOIL)

STATOR

BATTERY CHARGE COILS

CDI CHARGE COILS

CDI TRIGGER COIL

CDI BOX

(SWITCH IN GEAR SELECTOR BODY)

GEAR SELECTOR SWITCH

FORWARD | NEUTRAL | REVERSE

(LOCATED BELOW HANDLEBARS)

IGNITION SWITCH

OFF | ON

(LOCATED ON RIGHT HANDLEBAR)

AWD LAMP

AWD SWITCH

PUSH ON PUSH OFF

AWD | OFF

(NORMAL OPERATION IS OPEN CIRCUIT. IF CLOSED, ADJUSTMENT IS REQUIRED.)

(UNDER THROTTLE ASSEMBLY COVER)

ETC SWITCH

BACK OF PLUG

FUSE 30 AMP MAIN

E = ENGINE GROUND

C = CHASSIS GROUND

NC = SWITCH NORMALLY CLOSED
NO = SWITCH NORMALLY OPEN

COLOR CODE:

BLK	BLACK
BRN	BROWN
GRN	GREEN
PUR	PURPLE
BLU	BLUE
GRY	GRAY
OR	ORANGE
Y	YELLOW
R	RED
W	WHITE

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE:
R/Y = RED WITH YELLOW TRACER.

STATOR		
RESISTANCES (±20% @ 68°F/20°C)		
CAPACITOR CHARGE COIL	GRN TO BLK/R	446 OHMS
	GRN TO R	1.6 OHMS
	GRN TO GROUND	NO CONNECTION
TRIGGER COIL	W TO W/R	97 OHMS
	W TO GROUND	NO CONNECTION
BATTERY CHARGE COIL	Y TO Y/R	0.13 OHMS
	Y TO GROUND	NO CONNECTION
IGNITION COIL	PRIMARY	0.3 OHMS
	SECONDARY	6300 OHMS PLUS
		5000 OHMS (CAP)
FRONT WHEEL DRIVE COILS	GRY TO BRN	24 OHMS (EACH)

AWD SWITCH			
BUTTON	GRY/W	GRY	AWD LAMP
OUT(OFF)			
IN (ON)	O	=O	
IN (ON)	O	=O	

KEY SWITCH				
	BLK	BRN	R/BLK	R
OFF	O	=O		
ON			O	=O

AUX SHUT OFF SWITCH				
	BLK	BRN	R/W	R/BLK
OFF	O	=O		
RUN			O	=O

OVERRIDE SWITCH				
	PUR	GRY/W	GRY/OR	
FREE	O	=========		=O
PUSHED			O	=O

GEAR SELECTOR SWITCH				
	R/W	GRY/W	GRN/W	PUR
REV	O	=========		=O
N	O	=========	=O	
FWD	O	=O		

HEADLAMP SWITCH			
	R/W	GRN	Y
OFF			
LO	O	=O	
HI	O	=========	=O

ETC SWITCH		
NORMAL		
FAULT	O	=O

STARTER SWITCH		
	R/W	W/R
FREE		
PUSHED	O	=O