POLARIS
The Way Out.

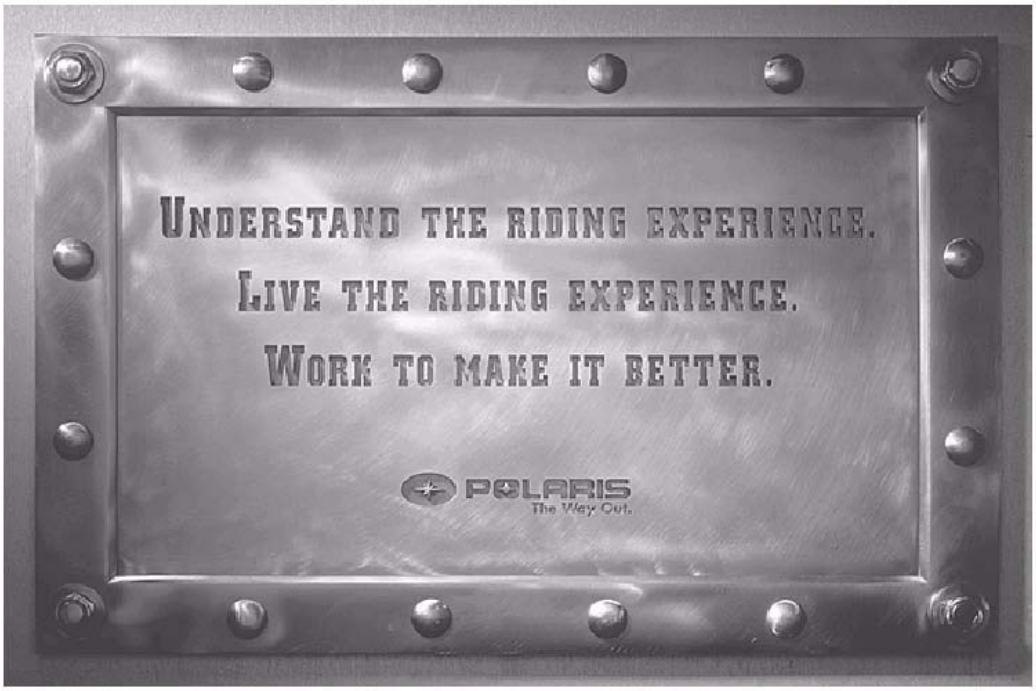
2000 - 2007

120 Youth Snowmobile

SERVICE MANUAL

2000 120 XCR
2001 120 XC SP
2002 120 XC SP
2003 120 XC SP
2004 120 PRO X
2005 120 PRO X
2006 120 PRO X
2007 120 Dragon

PN 9920517



2000-2007 120 YOUTH SNOWMOBILE SERVICE MANUAL

FOREWORD

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

Some procedures outlined in this manual require a sound knowledge of mechanical theory, tool use, and shop procedures in order to perform the work safely and correctly. Technicians should read the text and be familiar with service procedures before starting the work. Certain procedures require the use of special tools. Use only the proper tools as specified.

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

2000-2007 120 Youth Snomobile Service Manual PN 9920517

UNDERSTANDING MANUAL SAFETY LABELS AND DIRECTIONS

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

⚠ WARNING

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

⚠ CAUTION

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

CAUTION

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

NOTE:

NOTE provides key information by clarifying instructions.

IMPORTANT:

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

 = In. / mm.

MEASUREMENT provides a key for a determined measurement specification.

 = T

TORQUE provides a key for a required torque value.

TRADEMARKS

POLARIS ACKNOWLEDGES THE FOLLOWING PRODUCTS MENTIONED IN THIS MANUAL:

Loctite, Registered Trademark of the Loctite Corporation
Nyogel, Trademark of Wm. F. Nye Co.
Fluke, Registered Trademark of John Fluke Mfg. Co.
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M-10, Registerd Trademark of FAST, Inc

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

CHAPTER 1
MODEL SPECIFICATIONS

1

SPECIFICATIONS

2007 DRAGON 120

ENGINE	
Engine type	Fuji
Engine displacement	121
Bore in/mm	2.36/60
Stroke in/mm	1.69/43
Piston to cylinder clearance in/mm	.0006-.0029/.015-.074
Piston ring end gap in/mm	.008-.016/.2-.4
Operating RPM±200	3600
Idle RPM±200	1650
Clutch engagement RPM ±200	1900

FUEL DELIVERY	
Type	Mikuni BV 18
Main Jet	70
Pilot Jet	50
Jet Needle/Clip position	NA
Needle Jet	NA
Throttle gap under cutaway in/mm	NA
Valve seat	1.6mm
Starter jet	NA
Pilot air jet	1.3mm
Fuel screw setting	1.75 Turns
Air screw setting	NA
Recommended fuel octane (R+M/2)	Min 87 non-oxy

JETTING								
Altitude meters (feet)	Ambient Temperature							
	< -25°F/<-35°C	-30°F to -10°F/-34°C to -23°C	-15°F to +5°F/-26°C to -15°C	0°F to +20°F/-18°C to -7°C	+15°F to +35°F/-9°C to +2°C	+30°F to +50°F/-1°C to +10°C	+45°F to +65°F/+7°C to +18°C	>+60°F/>+16°C
0-600 (0-2000)	72.5 55	72.5 55	70 50	70 50	70 50	67.5 50	67.5 45	67.5 45
600-1200 (2000-4000)	70 50	70 50	70 50	67.5 50	67.5 50	67.5 50	65 45	65 45
1200-1800 (4000-6000)	67.5 50	67.5 50	67.5 50	65 50	65 50	65 45	62.5 45	62.5 45
1800-2400 (6000-8000)	65 50	65 50	65 50	65 50	65 45	62.5 45	62.5 45	60 45
2400-3000 (8000-10000)	65 50	65 50	62.5 50	62.5 45	60 45	60 45	60 45	60 45
3000-3700 (10000-12000)	62.5 50	62.5 50	60 45	60 45	60 45	57.5 45	57.5 45	57.5 45
Main jet is the first number and the pilot jet is the second number								

CLUTCHING		
Altitude meters (feet)	Driven Helix	Gearing
0-900 (0-3000)	Red	10-42:74P #40
900-1800 (3000-6000)	Red	10-42:74P #40
1800-2700 (6000-9000)	Red	10-42:74P #40
2700-3700 (9000-12000)	Red	10-42:74P #40

CAPACITIES	
Fuel gal/l	.5/1.9
Oil qts/l	.6/.6
Brake fluid type	Mechanical

TRACK DIMENSIONS	
Width in/cm	10/25
Length in/cm	69/175
Lug height in/cm	.79/2.1
Track tension sag in/cm with 10 lbs/4.54kg placed 8 in/20.3cm ahead of rear idler shaft	.75/1.9

FRONT SUSPENSION	
Suspension type	IFS
IFS shocks	Arvin
IFS spring rate lbs-in/kg-mm	80/1.43
IFS Spring installed length in/mm	6.75/17.1
Front vertical travel in/cm	3.0/7.62
Ski Center Distance	30/76.2
Camber in/mm	N/A
Toe in/mm	.125/.3175

REAR SUSPENSION	
Suspension type	Mini Indy
Front track shock (FTS)	N/A
FTS Spring Rate lbs-in/kg-mm	N/A
FTS pre-load	N/A
Rear track shock	N/A
Rear travel in/cm	4.5/11.4
* notes that shock is rebuildable	
Torsion spring PNs (LH/RH)	7041844-067 LH 7041845-067 RH
Torsion spring diameter in/mm	.406

SLED DIMENSIONS	
Width in/cm	34/86
Length in/cm	75/191
Height in/cm	31/79
Est dry weight lb/kg	145/65.8

ELECTRICAL	
Ignition timing	23°@3600
Spark plug gap in/mm	.028/.70
Spark plug	NGK BR6ES
Voltage regulator/output	50w@3600

2006 120 PRO X

ENGINE	
Engine type	Fuji
Engine displacement	121
Bore in/mm	2.36/60
Stroke in/mm	1.69/43
Piston to cylinder clearance in/mm	.0006-.0029/.015-.074
Piston ring end gap in/mm	.008-.016/.2-.4
Operating RPM±200	3600
Idle RPM±200	1650
Clutch engagement RPM ±200	1900

FUEL DELIVERY	
Type	Mikuni BV 18
Main Jet (Engine S# 0600001 and above)	70
Main Jet (Engine S# up to 0502779)	72.5
Pilot Jet	50
Jet Needle/Clip position	N/A / N/A
Needle Jet	N/A
Throttle gap under cutaway in/mm	N/A
Throttle slide cutaway	170 Throttle Valve
Valve seat	1.6mm
Starter jet	N/A
Pilot air jet	1.3mm
Fuel screw setting (Engine S# up to 0502779)	1.5
Fuel screw setting (Engine S# 0600001 and above)	1.75
Air screw setting	N/A
Recommended fuel octane (R+M/2)	87 Oct. Non oxy/89 Oct. Oxy

JETTING FOR ENGINE S# 0600001 AND ABOVE

Altitude meters (feet)	Ambient Temperature							
	< -25°F/<-35°C	-30°F to -10°F/-34°C to -23°C	-15°F to +5°F/-26°C to -15°C	0°F to +20°F/-18°C to -7°C	+15°F to +35°F/-9°C to +2°C	+30°F to +50°F/-1°C to +10°C	+45°F to +65°F/+7°C to +18°C	>+60°F/>+16°C
0-600 (0-2000)	72.5 55	72.5 55	70 50	70 50	70 50	67.5 50	67.5 45	67.5 45
600-1200 (2000-4000)	70 50	70 50	70 50	67.5 50	67.5 50	67.5 50	65 45	65 45
1200-1800 (4000-6000)	67.5 50	67.5 50	67.5 50	65 50	65 50	65 45	62.5 45	62.5 45
1800-2400 (6000-8000)	65 50	65 50	65 50	65 50	65 45	62.5 45	62.5 45	60 45
2400-3000 (8000-10000)	65 50	65 50	62.5 50	62.5 45	60 45	60 45	60 45	60 45
3000-3700 (10000-12000)	62.5 50	62.5 50	60 45	60 45	60 45	57.5 45	57.5 45	57.5 45

Main jet is the first number and the pilot jet is the second number

JETTING FOR ENGINE BELOW S# 0502779

Altitude meters (feet)	Ambient Temperature					
	< -30°F/<-34°C	-30°F to -10°F/-34°C to -23°C	-10°F to +10°F/-23°C to -12°C	+10°F to +30°F/-12°C to -1°C	+30°F to +50°F/-1°C to +10°C	>50°F />+10°C
0-600 (0-2000)	75	72.5	72.5	72.5	70	70
600-1200 (2000-4000)	75	72.5	72.5	72.5	70	70
1200-1800 (4000-6000)	72.5	70	70	70	67.5	67.5
1800-2400 (6000-8000)	70	67.5	67.5	67.5	65	65
2400-3000 (8000-10000)	67.5	65	65	65	65	65
3000-3700 (10000-12000)	65	65	65	65	65	65

CLUTCHING		
Altitude meters (feet)	Driven Helix	Gearing
0-900 (0-3000)	Red	10-42:74P #40
900-1800 (3000-6000)	Red	10-42:74P #40
1800-2700 (6000-9000)	Red	10-42:74P #40
2700-3700 (9000-12000)	Red	10-42:74P #40

CAPACITIES	
Fuel gal/l	.5/1.9
Oil qts/l	.6/.6
Brake fluid type	Mechanical

TRACK DIMENSIONS	
Width in/cm	10/25
Length in/cm	69/175
Lug height in/cm	.79/2.1
Track tension sag in/cm with 10 lbs/4.54kg placed 8 in/ 20.3cm ahead of rear idler shaft	.75/1.9

FRONT SUSPENSION	
Suspension type	IFS
IFS shocks	Arvin
IFS spring rate lbs-in/kg-mm	80/1.43
IFS Spring installed length in/mm	6.75/17.1
Front vertical travel in/cm	3.0/7.62
Ski Center Distance	30/76.2
Camber in/mm	N/A
Toe in/mm	.125/.3175

REAR SUSPENSION	
Suspension type	Mini Indy
Rear travel in/cm	4.5/11.4
* notes that shock is rebuildable	
Torsion spring PNs (LH/RH)	7041844-067 LH 7041845-067 RH
Torsion spring diameter in/ mm	.406

SLED DIMENSIONS	
Width in/cm	34/86
Length in/cm	75/191
Height in/cm	31/79
Est dry weight lb/kg	145/65.8

ELECTRICAL	
Ignition timing	23°@3600
Spark plug gap in/mm	.028/.70
Spark plug	NGK BR6ES
Voltage regulator/output	50w@3600

2005 PRO X 120

ENGINE	
Engine Model Number	EH122PM015
Engine type	Fuji
Engine displacement	121
Bore in/mm	2.36/60
Stroke in/mm	1.69/43
Piston to cylinder clearance in/mm	.0006-.0029/.015-.074
Piston ring end gap in/mm	.008-.016/.2-.4
Operating RPM±100	3600
Idle RPM±200	1600
Clutch engagement RPM ±200	1900

FUEL DELIVERY	
Type	Mikuni BV 18
Main Jet	72.5
Pilot Jet	50
Jet Needle/Clip position	N/A / N/A
Needle Jet	N/A
Throttle gap under cutaway in/mm	N/A
Throttle slide cutaway	170 Throttle Valve
Valve seat	1.6mm
Starter jet	N/A
Pilot air jet	1.3mm
Fuel screw setting	1.5
Air screw setting	N/A
Recommended fuel octane (R+M/2)	87 Oct. Non oxy/89 Oct. Oxy

JETTING						
Altitude meters (feet)	Ambient Temperature					
	< -30°F/<-34°C	-30°F to -10°F/-34°C to -23°C	-10°F to +10°F/-23°C to -12°C	+10°F to +30°F/-12°C to -1°C	+30°F to +50°F/-1°C to +10°C	>50°F />+10°C
0-600 (0-2000)	75	72.5	72.5	72.5	70	70
600-1200 (2000-4000)	75	72.5	72.5	72.5	70	70
1200-1800 (4000-6000)	72.5	70	70	70	67.5	67.5
1800-2400 (6000-8000)	70	67.5	67.5	67.5	65	65
2400-3000 (8000-10000)	67.5	65	65	65	65	65
3000-3700 (10000-12000)	65	65	65	65	65	65

CLUTCHING		
Altitude meters (feet)	Driven Helix	Gearing
0-900 (0-3000)	Red	10-42:74P #40
900-1800 (3000-6000)	Red	10-42:74P #40
1800-2700 (6000-9000)	Red	10-42:74P #40
2700-3700 (9000-12000)	Red	10-42:74P #40

CAPACITIES	
Fuel gal/l	.5/1.9
Oil qts/l	.6/.6
Coolant qts/l	N/A
Chaincase oz/ml	N/A
Brake fluid type	Mechanical

TRACK DIMENSIONS	
Width in/cm	10/25
Length in/cm	69/175
Lug height in/cm	.79/2.1
Track tension sag in/cm with 10 lbs/4.54kg placed 8 in/20.3cm ahead of rear idler shaft	.75/1.9

FRONT SUSPENSION	
Suspension type	IFS
IFS shocks	Arvin

REAR SUSPENSION	
Suspension type	Mini Indy
Rear travel in/cm	6.9/17.5
* notes that shock is rebuildable	
Torsion spring PNs (LH/RH)	7041844-067 LH 7041845-067 RH
Torsion spring diameter in/mm	.406

SLED DIMENSIONS	
Width in/cm	34/86
Length in/cm	75/191
Height in/cm	31/79
Est dry weight lb/kg	147/67

ELECTRICAL	
Ignition timing	26°@3600
Spark plug gap in/mm	.028/.70
Spark plug	NGK BR6ES
Voltage regulator/output	50w@3600

2004 120 PRO X - 2003 120XC SP

ENGINE	
Engine Model Number	2004-EH122PM014 2003-EH122PM013
Engine type	Fuji
Engine displacement cc's	121
Bore in/mm	2.36(60)
Stroke in/mm	1.57(43)
Piston to cylinder clearance in/mm	.0006-.0029/.015-.074
Piston ring end gap in/mm	.008-.016/.2-.4
Operating RPM±100	3600
Idle RPM±200	1600
Clutch engagement RPM ±200	1900

FUEL DELIVERY	
Type	Mikuni BV 18
Main Jet	72.5
Pilot Jet	50
Jet Needle/Clip position	NA/NA
Needle Jet	NA
Throttle gap under cutaway in/mm	NA
Throttle slide cutaway	170 Throttle Valve
Valve seat	1.6mm
Starter jet	NA
Pilot air jet	1.3mm
Fuel screw setting	1.5 Turns
Air screw setting	NA
Recommended fuel octane (R+M/2)	87 Oct Non Oxy/89 Oct Oxy

JETTING						
Altitude meters (feet)	Ambient Temperature					
	< -30°F/<-34°C	-30°F to -10°F/-34°C to -23°C	-10°F to +10°F/-23°C to -12°C	+10°F to +30°F/-12°C to -1°C	+30°F to +50°F/-1°C to +10°C	>50°F />+10°C
0-600 (0-2000)	75	72.5	72.5	72.5	70	70
600-1200 (2000-4000)	75	72.5	72.5	72.5	70	70
1200-1800 (4000-6000)	72.5	70	70	70	67.5	67.5
1800-2400 (6000-8000)	70	67.5	67.5	67.5	65	65
2400-3000 (8000-10000)	67.5	65	65	65	65	65
3000-3700 (10000-12000)	65	65	65	65	65	65

CLUTCHING		
Altitude meters (feet)	Driven Helix	Gearing
0-900 (0-3000)	Red	10-42:74P #40
900-1800 (3000-6000)	Red	10-42:74P #40
1800-2700 (6000-9000)	Red	10-42:74P #40
2700-3700 (9000-12000)	Red	10-42:74P #40

CAPACITIES	
Fuel gal/l	.5/1.9
Oil qts/l	.6/.6
Coolant qts/l	N/A
Chaincase oz/ml	N/A
Brake fluid type	Mechanical

TRACK DIMENSIONS	
Width in/cm	10/25
Length in/cm	69/175
Lug height in/cm	.79/2.1
Track tension sag in/cm with 10 lbs/4.54kg placed 8 in/20.3cm ahead of rear idler shaft	.75/1.9

FRONT SUSPENSION	
Suspension type	IFS
IFS shocks	Arvin

REAR SUSPENSION	
Suspension type	Mini Indy
Rear travel in/cm	6.9/17.5
* notes that shock is rebuildable	
Torsion spring PNs (LH/RH)	7041844-067 LH 7041845-067 RH
Torsion spring diameter in/mm	.406

SLED DIMENSIONS	
Width in/cm	34/86
Length in/cm	75/191
Height in/cm	31/79
Est dry weight lb/kg	147/67

ELECTRICAL	
Ignition timing	23°@3600
Spark plug gap in/mm	.028/.70
Spark plug	NGK BR6ES
Voltage regulator/output	50w@3600

2002 120 XC SP -2001 120 XCR

ENGINE	
Engine Model Number	2001-EH122PM012 2001-EH122PM011
Engine type	Fuji
Engine displacement cc's	121
Bore in/mm	2.36(60)
Stroke in/mm	1.57(43)
Piston to cylinder clearance in/mm	.0006-.0029/.015-.074
Piston ring end gap in/mm	.008-.016/.2-.4
Operating RPM±100	3600
Idle RPM±200	1600
Clutch engagement RPM ±200	1900

FUEL DELIVERY	
Type	Mikuni BV 18
Main Jet	72.5
Pilot Jet	50
Jet Needle/Clip position	NA/NA
Needle Jet	NA
Throttle gap under cutaway in/mm	NA
Throttle slide cutaway	170 Throttle Valve
Valve seat	1.6mm
Starter jet	NA
Pilot air jet	1.3mm
Fuel screw setting	1.5 Turns
Air screw setting	NA
Recommended fuel octane (R+M/2)	87 Oct Non Oxy/89 Oct Oxy

JETTING						
Altitude meters (feet)	Ambient Temperature					
	< -30°F/<-34°C	-30°F to -10°F/-34°C to -23°C	-10°F to +10°F/-23°C to -12°C	+10°F to +30°F/-12°C to -1°C	+30°F to +50°F/-1°C to +10°C	>50°F />+10°C
0-600 (0-2000)	75	72.5	72.5	72.5	70	70
600-1200 (2000-4000)	75	72.5	72.5	72.5	70	70
1200-1800 (4000-6000)	72.5	70	70	70	67.5	67.5
1800-2400 (6000-8000)	70	67.5	67.5	67.5	65	65
2400-3000 (8000-10000)	67.5	65	65	65	62.5	62.5
3000-3700 (10000-12000)	65	62.5	52.5	62.5	60	60

CLUTCHING		
Altitude meters (feet)	Driven Helix	Gearing
0-900 (0-3000)	Red	10-42:74P #40
900-1800 (3000-6000)	Red	10-42:74P #40
1800-2700 (6000-9000)	Red	10-42:74P #40
2700-3700 (9000-12000)	Red	10-42:74P #40

CAPACITIES	
Fuel gal/l	.5/1.9
Oil qts/l	.6/.6
Coolant qts/l	N/A
Chaincase oz/ml	N/A
Brake fluid type	Mechanical

TRACK DIMENSIONS	
Width in/cm	10/25
Length in/cm	69/175
Lug height in/cm	.79/2.1
Track tension sag in/cm with 10 lbs/4.54kg placed 8 in/20.3cm ahead of rear idler shaft	.75/1.9

FRONT SUSPENSION	
Suspension type	IFS
IFS shocks	Arvin

REAR SUSPENSION	
Suspension type	Mini Indy
Rear travel in/cm	6.9/17.5
* notes that shock is rebuildable	
Torsion spring PNs (LH/RH)	7041844-067 LH 7041845-067 RH
Torsion spring diameter in/mm	.406

SLED DIMENSIONS	
Width in/cm	34/86
Length in/cm	75/191
Height in/cm	31/79
Est dry weight lb/kg	147/67

ELECTRICAL	
Ignition timing	23°@3600
Spark plug gap in/mm	.028/.70
Spark plug	NGK BR6ES
Voltage regulator/output	50w@3600

2000 120 XCR

ENGINE / DRIVETRAIN	
Engine Model Number	2000-EH122PM010
Bore/Stroke (in/mm)	2.36x1.57 (60x43)
Cylinder Liner	Iron
Displacement (cc)/Cylinders/ Type	121cc/1/Fan
Ignition	Solid State
Exhaust	Single
Induction Type	4 Stroke OHV
Brake System	Mechanical Drum
Parking Brake	N/A

FUEL DELIVERY	
Type	Mikuni BV 18
Main Jet	72.5
Pilot Jet	50
Jet Needle/Clip position	NA/NA
Needle Jet	NA
Throttle gap under cutaway in/mm	NA
Throttle slide cutaway	170 Throttle Valve
Valve seat	1.6mm
Starter jet	NA
Pilot air jet	1.3mm
Fuel screw setting	1.5 Turns
Air screw setting	NA
Recommended fuel octane (R+M/2)	87 Oct Non Oxy/89 Oct Oxy

SUSPENSION	
FRONT	
Type	Mini IFS
Travel (in/cm)	3/7.6
IFS Shock/Spring	Mini/Washer
Ski Type	Composite
Torsion Bar	N/A
Rear	
Type	Mini
Travel (in/cm)	6.9/17.5

SUSPENSION	
Front Track Shock/Rear Shock	N/A
Track (WxLxLug)(in/cm)	10x69x.79 (25.4x175.3x2)

JETTING	Ambient Temperature					
Altitude meters (feet)	< -30°F/<-34°C	-30°F to -10°F/-34°C to -23°C	-10°F to +10°F/-23°C to -12°C	+10°F to +30°F/-12°C to -1°C	+30°F to +50°F/-1°C to +10°C	>50°F />+10°C
0-600 (0-2000)	75	72.5	72.5	72.5	70	70
600-1200 (2000-4000)	75	72.5	72.5	72.5	70	70
1200-1800 (4000-6000)	72.5	70	70	70	67.5	67.5
1800-2400 (6000-8000)	70	67.5	67.5	67.5	65	65
2400-3000 (8000-10000)	67.5	65	65	65	65	65
3000-3700 (10000-12000)	65	65	65	65	65	65

CLUTCHING		
Altitude meters (feet)	Driven Helix	Gearing
0-900 (0-3000)	Red	10-42:74P #40
900-1800 (3000-6000)	Red	10-42:74P #40
1800-2700 (6000-9000)	Red	10-42:74P #40
2700-3700 (9000-12000)	Red	10-42:74P #40

DIMENSIONS / CAPACITIES	
Estimated Dry Weight (lb./kg)	140/63.5
Recommended Rider Weight (lb./kg)	130/59
Length (in/cm)	75/191
Width (in/cm)	34/86.4
Ski Center (in/cm)	30/76.2
Height (in/cm)	31/78.7
Fuel Capacity (gal/l)	.5/1.9

CHAPTER 2
GENERAL

HOW TO USE THIS MANUAL

MODELS LISTED

The set up of the specification section is grouped by engine size.

GEARING

Gearing that is called out in the clutching table is stated as TOP GEAR (total number of teeth): BOTTOM GEAR (total number of teeth) - CHAIN PITCH (total number of links)

Example 22:39-76

- Top Gear = 22 tooth
- Bottom Gear = 39 tooth
- Drive Chain = 76 pitch (links)

Production setting is designated in the shaded areas

JETTING

Jetting chart is called out in the Jetting table.

ABBREVEATIONS

The following chart explains the abbreviations that are used throughout this section.

ABBREVIATION	MEANING
PTO	Power Take Off
MAG	Magneto
RTA	Rear Torque Arm
FTA	Front Torque Arm
cc	cubic centimeters
RPM	Revolutions Per Minuet
PERC	Polaris Electric Reverse Control
ft-lb	foot pounds
Nm	newton meters
CDI	Capacitor Discharge Ignition
kg-mm	kilograms per millimeter
lb.-in	pounds per inch
FS	Four Stroke (Non-Turbo)
FST	Four Stroke Turbo

SNOWMOBILE NUMBER DESIGNATIONS

MODEL NUMBER DESIGNATION EXAMPLE

S06MC6FS (2006 600 HO DRAGON FUSION)

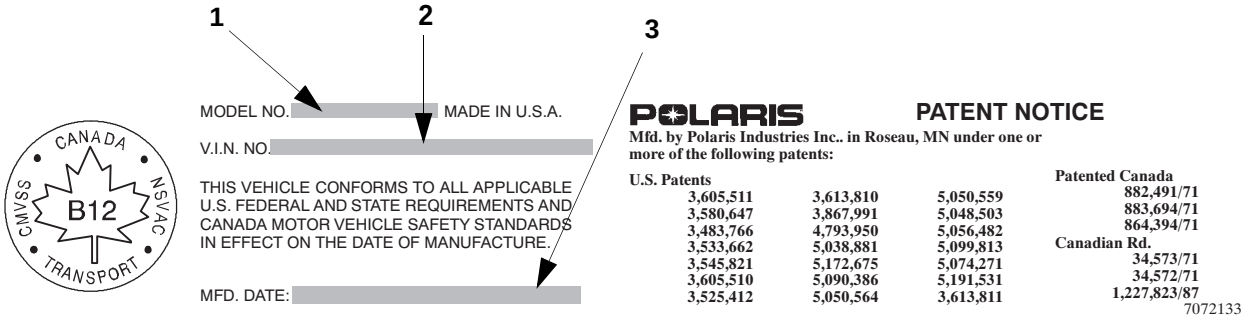
IDENTIFIER	MODEL YEAR	MODEL LINE	MODEL TYPE	ENGINE MODIFIER		VIN IDENTIFIER	OPTION IDENTIFIER
1st digit	2/3rd digit	4th digit	5th digit	6th digit*	7th digit*	8th digit	9th digit**
S	06	P	S	8	D	S	A
S=Snow	07=2007 06=2006 05=2005 04=2004	M=Race IQ N=Edge P= IQ S=GenII W=Mini Indy	C=Dragon 121 D=Classic F=Classic LTD J=136 RMK K=144 RMK L=155 Assault M=155 RMK N=166 RMK P=Performance S=Switchback T=Touring U=Utility Touring Limited	1A=121 F/C OHV 4 Cycle Fuji 3A=340 F/C Piston Port 4B=488 L/C Piston Port 4C=440 EV L/C Piston Port 5B=544 F/C Cylinder Reed 5C=500 EV L/C Case Reed 2 Cyl Liberty 6F=600 EV L/C Case Reed HP 2 Cyl Liberty 6H=600 EV L/C Case Reed SDI 2 Cyl Liberty 7E=750 2 Cyl FS Webber 7F=750 Turbo2 Cyl FS Webber 7H=755 EV SDI Case Reed Liberty 7J=700 EV L/C Case Reed SDI 2 Cyl Liberty 8D=866 EV SDI Case Reed Liberty		E=Europe Unit M=Military R=Rolling Chassis S=Standard Production Unit V= Validation	Option Identifier

*=digits that would transfer to 17 digit VIN and are used in digits 4-8 respectively
**=9th digit will be used on color/featured versions of models (not including the base)
First 3 digits and 9th digit are sued in model number only. They are not used with the 17 digit VIN.

VEHICLE IDENTIFICATION NUMBER (VIN)

TUNNEL DECAL

The Tunnel Decal has the Model Number (1), V.I.N. Number (2), and the Manufactured Date (3).These numbers should be referred to in any correspondence regarding warranty, service or replacement parts.The machine model and V.I.N. number identification decal is located on the right front side of the tunnel. The V.I.N (2) number is permanently stamped into the tunnel. The model number is embossed on the decal.



VIN NUMBER DESIGNATION

World Mfg. ID			Vehicle Descriptors						Vehicle Identifiers							
			Body Style	Type	Engine Size	Engine Modifier	Series	Check Digit	Model Year	Mfg. Location	Individual Serial No.					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
S	N	1	S	B	5	B	S	0	2	2	0	0	0	0	0	0

PUBLICATION PART NUMBERS

Misc. Publications

YEAR	PUBLICATION	PART NUMBER
2007	2007 Specification/Quick Reference Manual	9920653
2007	2007 Wiring Diagrams	9920688
ALL	Track Diagnosis Poster	9918459
2006	2006 Specification/Quick Reference Manual	9920147
2006	2006 Wiring Diagrams	9920672
ALL	Monotube Shock Rebuilding Video	9917736
ALL	Remote Reservoir Shock Rebuilding	9917737

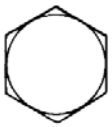
2007 Service Publications

2007 MODEL	MODEL NUMBER	OWNER'S MANUAL	OWNER'S MANUAL SUPPLEMENT	PARTS BOOK	PARTS MICROFISCHE	ASSEMBLY INSTRUCTIONS	SERVICE MANUAL
440 IQ	S07MX4CS	9920432	9920433	9920434	9920435	9919882	9920436
340 Edge LX	S07ND3AS	9920437	9920438	9920442	9920443	9916508	9920444
550 Edge LX	S07ND5BS	9920437	9920439	9920445	9920446	9916508	9920444
Trail RMK	S07NJ5BS	9920449	9920450	9920451	9920452	9919882	9920444
Supersport EDGE	S07NP5BS	9920437	9920440	9920445	9920446	9916508	9920444
500 XCSP	S07NP5CS	9920437	9920441	9920447	9920448	9916508	9920444
Indy 340 Touring	S07NT3AS	9920449	9920453	9920454	9920455	9916508	9920444
Trail Touring Deluxe	S07NT5BS	9920449	9920456	9920457	9920458	9916508	9920444
Trail Touring Deluxe Opt.	S07NT5BSA	9920449	9920456	9920457	9920458	9916508	9920444
700 SDI IQ Dragon	S07PC7JS	9920648	9920460	9920461	9920462	9919882	9920463
600 SDI IQ LX	S07PD6HS	9920464	9920465	9920466	9920467	9916508	9920463
FST IQ LX	S07PD7FS	9920468	9920473	9920474	9920475	9916508	9920472
FST IQ LX LTD	S07PF7FS	9920468	9920473	9920474	9920475	9916508	9920472
600 RMK 144	S07PK6FS	9920476	9920477	9920478	9920479	9919882	9920463
700 RMK Dragon	S07PL7JS						
600 RMK 155 F/O	S07PM6FS	9920476	9920483	9920478	9920479	9919882	9920463
600 RMK 155 Stock A	S07PM6FSA	9920476	9920483	9920478	9920479	9919882	9920463
600 HO IQ	S07PP6FS	9920459	9920460	9920461	9920462	9919882	9920463
600 HO IQ Stock A	S07PP6FSA	9920459	9920460	9920461	9920462	9919882	9920463

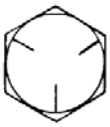
2007 MODEL	MODEL NUMBER	OWNER'S MANUAL	OWNER'S MANUAL SUPPLEMENT	PARTS BOOK	PARTS MICROFISCHE	ASSEMBLY INSTRUCTIONS	SERVICE MANUAL
600 HO IQ Stock B	S07PP6FSB	9920459	9920460	9920461	9920462	9919882	9920463
600 SDI IQ	S07PP6HS	9920464	9920487	9920466	9920467	9919882	9920463
600 SDI IQ Stock A	S07PP6HSA	9920464	9920487	9920466	9920467	9919882	9920463
600 SDI IQ Stock B	S07PP6HSB	9920464	9920487	9920466	9920467	9919882	9920463
FST IQ	S07PP7FS	9920468	9920488	9920474	9920475	9919882	9920472
600 HO IQ Switchback F/	S07PS6FS	9920459	9920597	9920598	9920599	9916508	9920463
600 HO IQ Switchback F/	S07PS6FSA	9920459	9920597	9920598	9920599	9916508	9920463
600 SDI IQ Switchback F/	S07PS6HS	9920464	9920495	9920496	9920497	9916508	9920463
600 SDI IQ Switchback F/	S07PS6HSA	9920464	9920495	9920496	9920497	9916508	9920463
FST IQ Switchback	S07PS7FS	9920468	9920498	9920499	9920500	9916508	9920463
600 SDI IQ Touring	S07PT6HS	9920464	9920501	9920502	9920503	9916508	9920463
FS IQ Touring	S07PT7ES	9920468	9920504	9920505	9920506	9916508	9920472
FST IQ Touring	S07PT7FS	9920468	9920507	9920508	9920509	9916508	9920472
FST IQ Touring LTD	S07PY7FS	9920468	9920507	9920508	9920509	9916508	9920472
Widetrak LX	S07SU4BS	9920449	9920510	9920511	9920512	9916508	9920444
120	S07WB1AS	9920513	no supply.	9920515	9920516	9916891	9920517

GENERAL REFERENCE

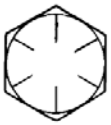
STANDARD BOLT TORQUE SPECIFICATION



Grade 2



Grade 5



Grade 8

Bolt Size	Threads/In	Grade 2 ft-lb(Nm)	Grade 5 ft-lb(Nm)	Grade 8 ft-lb(Nm)
1/4	20	5 (7)	8 (11)	12 (16)
1/4	28	6 (8)	10 (14)	14 (19)
5/16	18	11 (15)	17 (23)	25 (35)
5/16	24	12 (16)	19 (26)	29 (40)
3/8	16	20 (27)	30 (40)	45 (62)
3/8	24	23 (32)	35 (48)	50 (69)
7/16	14	30 (40)	50 (69)	70 (97)
7/16	20	35 (48)	55 (76)	80 (110)
1/2	13	50 (69)	75 (104)	110 (152)
1/2	20	55 (76)	90 (124)	120 (166)
ft.-lb. x 1.356 = Nm Nm x.7376 = ft.-lb.				

2 STROKE GASOLINE / OIL PRE MIX

GALLONS OF FUEL	OZ OF OIL NEEDED TO ACHIEVE A **20:1** RATIO	OZ OF OIL NEEDED TO ACHIEVE A **32:1** RATIO
1	6	4
2	13	8
3	19	12
4	26	16
5	32	20
6	38	24

To figure out the correct fuel to oil ratio per gallon, you will need to use different formulas for the ratio that you are looking for. Example of a fuel/oil ratio of 20:1 is figured out by taking the gallons of the fuel mixing container (1 gallon) and converting it to ounces (128 oz.) divided by the ratio that you are looking for (20), this will give you the amount of oil that you need (6.4 oz.) to add to the fuel in the mixing container.

1 gallon has 128oz. / 20 = 6.4 oz. of oil needed to mix to each 1 gallon of gasoline. For a 5 gallon mixture, you would need add 32 oz. of oil to the gasoline.

GASOLINE VOLATILITY

Maximum Reid Vapor		Ambient Air Temp Range	
CLASS	PRESSURE	LOW	HIGH
A	7.0 psi (0.5 bar)	60° F (16° C)	110° F+ (43° C+)
B	9.0 psi (0.6 bar)	50° F (10° C)	110° F (43° C)
C	10.5psi (0.7 bar)	40° F (4° C)	97° F (36° C)
D	12.0psi (0.8 bar)	30° F (-1° C)	85° F (29° C)
E	13.5psi (0.9 bar)	20° F (-7° C)	69° F (21° C)
Add 2.45° Ffor each 1000 ft (305m) above sea level			

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

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

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

If winter blend fuel is being used during the summer months, it may cause vapor lock (boiling fuel) inside the fuel lines, fuel pump, or carburetor. This will cause warm engine drive ability problems and hard starting when warm.

SAE TAP DRILL SIZES

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

METRIC TAP DRILL SIZES

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

DECIMAL EQUIVALENTS

1/64	.0156	
1/32	.0312	1 mm= .0394"
3/64	.0469	
1/16	.0625	
5/64	.0781	2 mm = .0787"
3/32	.0938	
7/64	.1094	3 mm =.1181"
1/8	.1250	
9/64	.1406	
5/32	.1563	4 mm = .1575"
11/64	.1719	
3/16	.1875	5mm= .1969"
13/64	.2031	
7/32	.2188	
15/64	.2344	6 mm = .2362"
1/4	.25	
17/64	.2656	7 mm = .2756"
9/32	.2813	
19/64	.2969	
5/16	.3125	8mm= .3150"
21/64	.3281	
11/32	.3438	9 mm = .3543"
23/64	.3594	
3/8	.375	
25/64	.3906	10 mm = .3937"
13/32	.4063	
27/64	.4219	11 mm =.4331"
7/16	.4375	
29/64	.4531	
15/32	.4688	12 mm = .4724"
31/64	.4844	
1/2	.5	13mm = .5118"
33/64	.5156	
17/32	.5313	
35/64	.5469	14 mm = .5512"
9/16	.5625	
37/64	.5781	15 mm = .5906"
19/32	.5938	
39/64	.6094	
5/8	.625	16mm=. 6299"
41/64	.6406	
21/32	.6563	17 mm =.6693"
43/64	.6719	
11/16	.6875	
45/64	.7031	18 mm = .7087"
23/32	.7188	
47/64	.7344	19 mm = .7480"
3/4	.75	
49/64	.7656	
25/32	.7813	20 mm = .7874"
51/64	.7969	
13/16	.8125	21 mm =.8268"
53/64	.8281	
27/32	.8438	
55/64	.8594	22 mm = .8661"
7/8	.875	
57/64	.8906	23 mm = .9055"
29/32	.9063	
59/64	.9219	
15/16	.9375	24 mm = .9449"
61/64	.9531	
31/32	.9688	25 mm = .9843"
63/64	.9844	
1	1.0	

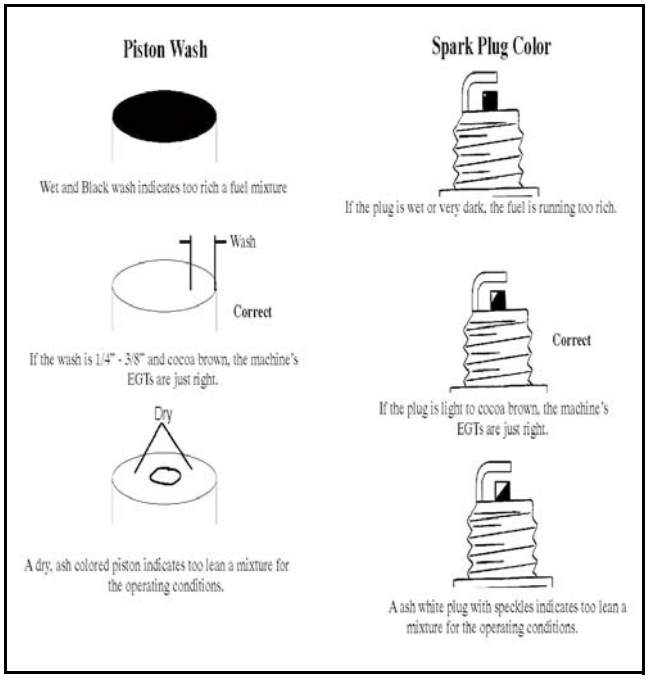
MEASUREMENT CONVERSION CHART

UNIT OF MEASURE	MULTIPLIED BY	CONVERTS TO
ft-lb	x 12	= in-lb
in-lb	x.0833	= ft-lb
ft-lb	x 1.356	= Nm
in-lb	x.0115	= kg-m
Nm	x.7376	= ft-lb
kg-m	x 7.233	= ft-lb
kg-m	x 86.796	= in-lb
kg-m	x 10	= Nm
in	x 25.4	= mm
mm	x.03937	= in
in	x 2.54	= cm
mile	x 1.6	= km
km	x.6214	= mile
Ounces (oz)	x 28.35	= grams (g)
grams (g)	x.035	= Ounces (oz)
cc's	x.03381	= Fluid Ounces (oz)
lbs	x.454	= kg
kg	x 2.2046	= lbs
Cubic Inches	x 16.387	= Cubic Centermeters
Cubic Centimeters	x.061	= Cubic Inches
Imperial pints	x.568	= liters (l)
liters (l)	x 1.76	= Imperial pints
Imperial quarts	x 1.137	= liters (l)
liters (l)	x.88	= Imperial quarts
Imperial quarts	x 1.201	= US quarts
US quarts	x.833	= Imperial quarts
US quarts	x.946	= liters
liters	x 1.057	= US quarts
US gallon	x 3.785	= liter
liter	x.264	= US gallon
Pounds force per square inch (psi)	x 6.895	= Kilo pascals (kPa)
Kilo pascals (kPa)	x.145	= Pounds force per square inch (psi)

PISTON WASH / SPARK PLUG READING

Changing temperature, barometer, altitude, and fuel supply are just a few of the factors that can affect the day to day performance of your engine. That is why using Exhaust Gas Temperatures (EGT) are important for maintaining optimum performance. There are two methods for helping you determine what the EGTs are for your machine. Piston wash and the coloring of your spark plug.The piston wash is by far the most valuable tool in concluding EGTs, with the spark plug color running a distant second. Use the illustrations below to help you establish the EGTs for your machine.

Once the proper jetting is established, you can reference the EGT gauge for your baseline numbers. Then, if there is a rise or fall of 25 degrees, you must jet accordingly to return your EGTs to the baseline numbers.



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.
Center Distance: Distance between center of crankshaft and center of driven clutch shaft.
Chain Pitch: Distance between chain link pins (No. 35 = 3/8" or 1 cm). Polaris measures chain length in number of pitches.
CI: Cubic inches.
Clutch Buttons: Plastic bushings which aid rotation of the movable sheave in the drive and driven clutch.
Clutch Offset: Drive and driven clutches are offset so that drive belt will stay nearly straight as it moves along the clutch face.
Clutch Weights: Three levers in the drive clutch which relative to their weight, profile and engine RPM cause the drive clutch to close and grip the drive belt.
Crankshaft Run-Out: Run-out or "bend" of crankshaft measured with a dial indicator while crankshaft is supported between centers on V blocks or resting in crankcase. Measure at various points especially at PTO.
CVT: Centrifugal Variable Transmission (Drive Clutch System)
DCV: Direct current voltage.
Dial Bore Gauge: A cylinder measuring instrument which uses a dial indicator. Good for showing taper and out-of-round in the cylinder bore.
Electrical Open: Open circuit. An electrical circuit which isn't complete.
Electrical Short: Short circuit. An electrical circuit which is completed before the current reaches the intended load. (i.e. a bare wire touching the chassis).
End Seals: Rubber seals at each end of the crankshaft.

Engagement RPM: Engine RPM at which the drive clutch engages to make contact with the drive belt.
ft.: Foot/feet.
Foot Pound: Ft. lb. A force of one pound at the end of a lever one foot in length, applied in a rotational direction.
g: Gram. Unit of weight in the metric system.
gal.: Gallon.
ID: Inside diameter.
in.: Inch/inches.
Inch Pound: In. lb. 12 in. lbs. = 1 ft. lb.
kg/cm^2: Kilograms per square centimeter.
kg-m: Kilogram meters.
Kilogram/meter: A force of one kilogram at the end of a lever one meter in length, applied in a rotational direction.
l or ltr: Liter.
lbs/in^2: Pounds per square inch.
Left or Right Side: Always referred to based on normal operating position of the driver.
m: Meter/meters.
Mag: Magneto.
Magnetic Induction: As a conductor (coil) is moved through a magnetic field, a voltage will be generated in the windings. Mechanical energy is converted to electrical energy in the stator.
mi.: Mile/miles.
mm: Millimeter. Unit of length in the metric system. 1 mm = approximately .040".
Nm: Newton meters.
OD: Outside diameter.
Ohm: The unit of electrical resistance opposing current flow.
oz.: Ounce/ounces.
Piston Clearance: Total distance between piston and cylinder wall.
psi.: Pounds per square inch.
PTO: Power take off.
qt.: Quart/quarts.
Regulator: Voltage regulator. Regulates battery charging system output at approx. 14.5 DCV as engine RPM increases.
Reservoir Tank: The fill tank in the liquid cooling system.
Resistance: In the mechanical sense, friction or load. In the electrical sense, ohms, resulting in energy conversion to heat.
RPM: Revolutions per minute.
Seized Piston: Galling of the sides of a piston. Usually there is a transfer of aluminum from the piston onto the cylinder wall.
Possible causes: 1) improper lubrication; 2) excessive temperatures; 3) insufficient piston clearance; 4) stuck piston rings.
Stator Plate: The plate mounted under the flywheel supporting the battery charging coils.
TDC: Top dead center. Piston's most outward travel from crankshaft.
Volt: The unit of measure for electrical pressure of electromotive force. Measured by a voltmeter in parallel with the circuit.
Watt: Unit of electrical power. Watts = amperes x volts.

WOT: Wide open throttle.

SPECIAL TOOLS

SPECIAL TOOLS

PS-47152 $4.00
Fuel Line Disconnect Tool
This is a quick disconnect tool to unlock the couplers on the Polaris high pressure fuel lines.

2870975 **MITY-VAC PRESSURE TEST TOOL**

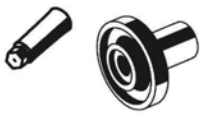
Source of vacuum and pressure. For carburetor needle & seat testing, brake bleeding and cooling system testing.

2201519 **THROTTLE POSITION SENSOR TESTER KIT**

To test T.P.S. on all 2-stroke Snow models with T.P.S.

PV-43506 **FUEL PRESSURE GAUGE**

Used to measure fuel pressure for fuel injection diagnostic work.

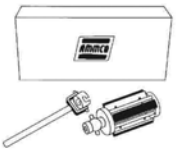


2871846
2871847

WATER PUMP SEAL INSTALLATION TOOLS

Used to install water pump mechanical seal (PN 3610050) on '97 and '98 600 & 700 cc domestic twin cylinder engines and '97 440 XCR.

Both required.
2871846 Guide
2871847 Driver



2870303

AMMCO HONE KIT

Rigid hone to correct tapered and out of round cylinders. Range: 47.6 mm – 69.8 mm (1⅞" – 2¾").
Contains 60 and 220 grit stones, driveshank with depth stop and metal storage box. Oversize stone kits increase range to 92 mm (3⅝").

Replacement Stone Kits
2870304 47.6 – 69.8 mm, 60 grit
2870305 47.6 – 69.8 mm, 220 grit
2870306 69.8 – 92 mm, 60 grit
2870307 69.8 – 92 mm, 220 grit
2871536 47.6 – 69.8 mm for Ni-Ca-Sil deglazing

2870588

HONING OIL

12 oz can with dispensing tip. Promotes better finishes, faster cutting and longer stone life.

2870386

PISTON PIN PULLER

Removes 18 mm piston pins from many Polaris pistons. Required for many Polaris puller attachments.

Note: Some engines require adapters.

2871342

PISTON PIN PULLER ADAPTER

For EC 58 snowmobile engines. Needed for proper positioning of piston pin puller on piston to prevent damage to piston. Requires use of 2870386 piston pin puller.

2871445

PISTON PIN PULLER ADAPTER

For domestic Liberty™ engines. Needed to position piston pin puller correctly on to piston to prevent damage to piston. Piston Pin puller 2870386 needed to use this tool.

2870390

PISTON SUPPORT BLOCK

Safely supports piston while disassembling or assembling engine top end.

2870569

CRANKSHAFT TRUING STAND

For holding crankshaft while checking runout for all Polaris engines.

2870773

C-CLIP INSTALLATION TOOL

For installing piston pin c-clips on most Polaris engines.

2871043

HEAVY DUTY FLYWHEEL PULLER – 6 BOLT

Removes all current Polaris flywheels.

Parts also sold separately
5130910 Heavy Duty F.W.P. Plate
5020648 Center bolt for puller
2872112 Center bolt for puller (length 2")
5020650 Flywheel puller cap. 1992 PWC only
3080706 6 mm bolts (4)
221537 8 mm bolt (1)

2871989

ENGINE MOUNT SOCKETS

For removing and installing all snowmobile engines that have drive tabs. Low profile small diameter.

PS-45384 For removing tall rubber mounts that have drive tabs. Large diameter.

2870402

CLUTCH PIN INSTALLATION TOOL

For installing cold rolled pin for shift weight pin on early clutches.

2870507

CLUTCH PIN PUNCH

To remove and replace spider weight pins.

2870576

TAPERED REAMER FOR DIVE CLUTCH BORE

To ensure proper fit between drive clutch bore and engine crankshaft.

2870910-A

ROLLER PIN TOOL

This tool has been updated so it can be used with all Polaris aluminum Drive Clutches to service Drive Rollers and their bushings.

2870914

P-90 SNOWMOBILE CLUTCH OFFSET ALIGNMENT TOOL

Establishes correct offset and alignment on P-90 clutches.

2870985

DRIVE CLUTCH BUTTON REMOVAL TOOL

Removes tight spider buttons.

2871025

CLUTCH BUSHING REPLACEMENT TOOL KIT

Needed to remove and replace clutch drive and drive bushings on all Polaris clutches. Requires piston pin puller 2870386 (sold separately).

Parts also separately:
5020627 P-85 clutch bushing installation tool
5020628 P-90 clutch bushing installation tool
5020629 Drive cover bushing remover and installer
5020630 P-85 driver bushing installation tool
5020631 P-90 driven clutch bushing removal tool
5020632 Main puller adapter
5020633 #2 puller adapter
5010279 Adapter reducer
5130862 P-85 driven sheave removal tool
5222768 P-85 driven sheave removal bridge

2871173

DRIVE CLUTCH COMPRESSION TOOL

Compresses drive clutch while still on engine.

2871358

DRIVE CLUTCH HOLDING FIXTURE

Holds all Polaris aluminum drive clutches.

PS-46998

P-85 CLUTCH ALIGNMENT TOOL

This clutch alignment tool provides an accurate method to check ⅝" clutch offset and alignment by referencing both stationary sheaves.

PU-45779

CLUTCH PILOT TOOL

Used with the 2871358 to compress the clutch.

2872010 **WATER PUMP SEAL INSTALLATION TOOL**

For installing water pump mechanical seal to depth of 8.4 mm on 1998 – Present small block domestic twins (440, 500 and 600 EV).

2872389 **WATER PUMP SEAL INSTALLATION TOOL**

For installing water pump mechanical seal to depth of 8.9 mm on 1999 – Present Big Block domestic twins (600,700 & 800).

2872401 **20 MM C-CLIP TOOL**

To install C-clip on small bore domestic twin engines.

2872622A **22 MM C-CLIP TOOL**

To install C-clip on Big Block domestic twin engines and 1200 PWC.

5131135 **EC68PL & EC59PL WATER PUMP INSTALLATION TOOL**

For installing water pump seal on EC68PL & EC59PL engines. Does not include bolt, nut or washers.

PA-44995 **WATER PUMP MECHANICAL SEAL INSTALLER**

Used to install and set the mechanical seal properly into the mag end gear case.

Application: Domestic ATV 4-stroke and Frontier

PA-45401 **WATER PUMP SEAL SAVER**

Used to protect the water pump seal while installing the mag end gear cover.

Application: Domestic ATV 4-stroke and Frontier

PA-45483 **MAIN SEAL INSTALLER**

Used to install the crankshaft mag end seal into the gear cover.

Application: Domestic ATV 4-stroke and Frontier

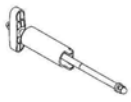
PA-45658 **MAIN CRANKSHAFT SEAL SAVER**

Used to set the seal lips in the correct position and protect the seal when the mag end gear cover is installed.

Application: Domestic ATV 4-stroke and Frontier

PA-46502 **VALVE SPRING COMPRESSOR**

Used to compress the valve springs on all Polaris FUJI 4-stroke engines.



PU-45255 **PISTON PIN PULLER**

Requires Adapters for 800 Series Snow, 1200 Series Watercraft and 500 Series ATV applications.

PU-45248 **PISTON PIN PULLER ADAPTER**

Adapter for 800 Series Snow, 1200 Series Watercraft and 500 Series ATV applications. Must be used with PU-45255.

2870338 **DRIVE CLUTCH SPIDER NUT SOCKET**

For removing and installing spider jam nut on P-85 clutches.

2870341-A **DRIVE CLUTCH SPIDER REMOVAL AND INSTALLATION TOOL**

For removing and re-torquing clutch spider. Fits all aluminum drive clutch spiders.

2870401 **PIN CENTERING TOOL**

To center spider pin for early model Snow Drive Clutches.

2871855 **DRIVE CLUTCH PULLER**

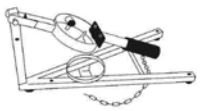
For domestic engines 1999 and earlier (14 mm thread size). For 500, 600, 700 and 800 cc domestic twins (Replacement T-handle 5020326).

2872084 **DRIVE CLUTCH PULLER**

⅜-16x¾". (1999-2001) 440 Fan and 550 Fuji/Robin air cooled engines and drive clutch puller (Replacement T-Handle 5020326).

2872085 **DRIVE CLUTCH PULLER**

⅜-16x14 mm. 1999-2001 700/800 XCR Fuji/Robin 3 cylinder engine drive clutch puller (Replacement T-Handle 5020326). 2000-2001 domestic engines.

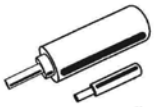


8700220 **CLUTCH COMPRESSION TOOL**

To compress drive clutch for assembly and disassembly. Also helps in disassembly and assembly of driven clutch.

PS-45909 **CLUTCH COMPRESSION EXTENSIONS**

Used with 8700220 to compress the Team clutches.



8700221 **SPIDER ASSEMBLY TOOL**

Spring loaded mandrel to line up spider, roller and spacer washers. Mandrel retracts into tool when roller pin is installed.

2870623 **SHOCK ABSORBER SPRING COMPRESSION TOOL**

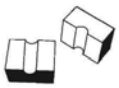
Compresses shock springs for removal and installation.

2870803 **SHOCK SPRING PRE-LOAD ADJUSTMENT TOOL**

Adjusts spring compression.

2871071 **SHOCK BODY HOLDING TOOL**

Safely holds gas shock body during rebuilding. Requires shop vice.



2871352 **SHOCK ROD HOLDING TOOL – ¼" ROD**
2872429 **SHOCK ROD HOLDING – ⅜" ROD**

Safely secures shock damper rod during rebuilding without damage to rod. Use with shop vise (not included).

2871095 **REPLACEMENT TOOL KIT SPANNER WRENCH**

For IFS shock spring pre-load cam adjuster.

2871232 **GAS SHOCK SPANNER**

To adjust gas shocks that have threaded spring pre-load adjusters.

2871351 **GAS SHOCK IFP DEPTH TOOL**

For removing Internal Floating Piston and setting proper IFP depth for reassembly.

2871537 **TRAVEL LOCATION BAR KIT**

To set camber and toe-in on CRC front ends.

Parts also sold separately:
5211822 Travel location bar, 1997 CRC, 11.65"
5211713 Travel location bar, 15.20"
5211714 Travel location bar, 13.70"
102050 Travel location fasteners
RS-3400-1250 Travel location Hex lock nut
5333508 Travel location CRC ski alignment bar, 46"

PA-46355 **ACE SUSPENSION DIAGNOSTIC HARNESS**

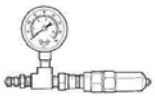
This interface harness is used to perform diagnostic procedures on the M-10 ACE-equipped snowmobiles. Also used to power up the ECU on 2005 866/900 IQ for digital wrench.

PS-44925 **SHOCK TUBE PULLER**

Required to remove inner piston sleeve on welded dome PPS Shocks.

PS-45152 **THIN OPEN END WRENCH**

Needed to hold bushing while removing rear torque arm bolts from tunnel on Edge models.



PS-45259 **GAS FILL TOOL**

Gauge and needles to properly recharge Ryde FX™ Shocks. Comes with 5 needles. Replacement needles PS-45259-1 (20 pack). Does not include regulator or nitrogen tank.

PS-45260 **LOWER RETAINER SPANNER WRENCH**

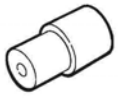
To adjust lower retainer on Ryde FX™ Shocks.

PS-45261 **IFP POSITIONING/EXTRACTION TOOL**

For Ryde FX™ Shocks.

PS-45262 **CYLINDER HEAD WRENCH**

Spanner wrench for cylinder head on Ryde FX™ Shocks.



PS-45263 **WEAR BAND TOOL**

To properly install wear band on Ryde FX™ Shocks.

PS-45280 **SHOCK COLLAR TOOL**

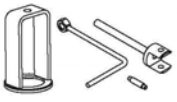
For removal of shock collar on Ryde FX™ Shocks.

PS-45629
PS-45281
SHOCK BODY HOLDER
SHOCK RESERVOIR HOLDER

To hold Ryde FX™ Shocks in vise for service.

PS-45678 **SHOCK SHAFT SEAL PROTECTOR**

This tool is used to protect the seal during installation on .51 diameter shock shaft.



PS-45683 **SHOCK SPRING COMPRESSOR**

A new shock spring compressor has been created to com press and aid in the removal of the coil springs from the M-10 and many other shocks.

2871337 **CAMOPLAST TRACK CLIP REMOVAL TOOL**

Removes track guides and clips from Camoplast tracks.

2871296 **JACKSHAFT INSTALLATION TOOL**

For larger diameter shafts on XTRA suspension models (15 spline jackshaft). Prevents seal damage.

2871188 **TUNNEL RIVET INSTALLATION TOOL**

For installing buck rivets in snowmobile tunnels.

2871535 **JACKSHAFT ALIGNMENT TOOL**

For larger diameter shafts on XTRA suspension models. Ensures proper chaincase jackshaft bearing alignment.

PS-45484 **RIVET PUNCH**

Used to remove the self-piercing rivets used in 2000 and newer Snowmobile bulkheads and tunnels.

PU-45485 **EXHAUST VALVE SPRING TOOL**

Used to remove the exhaust springs.

PS-45908 **T-HANDLE TOOL**

Used to remove and install the floating piston of the Walker Evans shock. The tool can also be used to set the floating piston height.

Application: Walker Evans Shocks

PU-45779 **CLUTCH PILOT TOOL**

Used with the 2871358 Clutch Holding Fixture to guide the Driven Clutch Helix into place over the stationary shaft on assembly.

Application: P-85 Drive Clutch only

2201519 **THROTTLE POSITION SENSOR TESTER KIT**

To test T.P.S. on all 2-stroke Snow models with T.P.S.

2870509 **UNI-SYN GAUGE**

Visual method of synchronizing carburetors on multi-carbureted engine.

2871174 **GREASE GUN ADAPTER**

For lubricating some driveshaft bearings.

2872126 **FLOAT HEIGHT GAUGE, KEIHIN**

For setting float heights at 16 mm on all Keihin PWK 39 mm carburetors. Determines if floats are parallel to each other.

8717024 **TAMPER RESISTANT TORX BIT - T20**

To remove Torx screws on some Mikuni & Keihin carburetors and T.P.S.

PU-47063 **DIGITAL WRENCH**

This diagnostic kit assists the technicians with powerful computer diagnostic capabilities. An all new "guided diagnostics" feature offers step-by-step diagnosis and repair, wire diagrams, photos and more. The kit contains the EFI diagnostic software CD, PU-47151 Interface Cable and instruction manual.

PU-47151 **REPLACEMENT INTERFACE CABLE**

This is the primary interface cable for the Digital Wrench.

CHAPTER 3
MAINTENANCE

MAINTENANCE PROGRAM

POLARIS RECOMMENDED PROGRAM

To ensure many trouble-free miles of snowmobiling enjoyment, follow recommended regular maintenance and service checks outlined in this manual.The recommended maintenance schedule on your snowmobile calls for service and maintenance inspections at 150 miles (240 km), 1000 miles (1600 km), and 2000 miles (3200 km). These inspections should be performed by a qualified service technician. For continued optimum performance and component life, continue maintenance checks at 1000 mile (1600 km) intervals. All necessary replacement parts and labor incurred, with the exception of authorized warranty repairs, become the responsibility of the registered owner. If, during the course of the warranty period, part failures occur as a result of owner neglect in performing recommended regular maintenance, the cost of repairs are the responsibility of the owner.

Personal safety is critical when attempting to service or adjust your snowmobile. If you're not familiar with safe service or adjustment procedures and the use of tools, or if you don't feel comfortable performing these tasks yourself, contact an authorized Polaris dealer for service.

The following chart is a guide based on average riding conditions. You may need to increase frequency based on riding conditions. When inspection reveals the need for replacement parts, always use genuine Polaris parts, available from your Polaris dealer.

ITEM	PRE-RIDE	FREQUENCY MILES (KM)				PRE-SEASON
		150 (240)	500 (240)	1000 (1600)	2000 (3200)	
CLUTCH						
Clutch Alignment Offset (without belt)			I	I	I	
Drive Belt Condition	I		I	I	I	I
Clutches (disassemble)			C	C	C	
Belt Tension			I	I	I	I
Clutch Sheaves			I	I	I	I
ENGINE/COOLING						
Engine Mounts			I	I	I	I
Heat Exchangers		I	I	I	I	I
Recoil Rope	I		I	I	I	I
Engine Torque Stop			I	I	I	I
Cylinder Head Bolts			I	I	I	
Cylinder Base Nuts		I	I	I	I	
Ignition Timing BTDC			I	I	I	
VES System			C	C	C	I
Coolant Level	I		I	I	R	I
Coolant Hose			I	I	I	I
Coolant Circulation			I	I	I	
Coolant Leaks			I	I	I	I
Spark Plug Condition		I	I	I	R	I
Exhaust Pipe					I	I
Exhaust Retaining Springs			I	I	I	I
BRAKES						
Hose Routing			I	I	I	I
Hose Condition			I	I	I	I
Fluid Leaks			I	I	I	I
Brake Pads			I	I	I	I
Brake Disc			I	I	I	I
Parking Brakes	I		I	I	I	I
Brake System						I
Brake Fluid					R	
FUEL MANAGEMENT						
Pilot Air Screws			I	I	I	
Carburetor (synchronize)			I	I	I	
Idle RPM			I	I	I	
Throttle Lever		I	I	I	I	I
Oil Pump Lever (synchronize)			I	I	I	
Throttle Cable			L	L	L	
Choke Cable			L	L	L	
Choke			I	I	I	
Vent Lines			I	I	I	I
Throttle Position Sensor			I	I	I	
Fuel Lines		I	I	I	I	I
Fuel Filter				R	R	
Oil Filter				R	R	
Oil Lines				I	I	I
Air Box		I	I	I	I	I
Drain and Water Traps			I	I	I	
ELECTRICAL						
Auxiliary Shut-Off Switch	I	I	I	I	I	I
Throttle Safety Switch	I	I	I	I	I	I
Ignition Switch	I	I	I	I	I	I
Taillight	I	I	I	I	I	I
Brakelight	I	I	I	I	I	I
Headlight	I	I	I	I	I	I

I:INSPECT (CLEAN, ADJUST, TIGHTEN, LUBRICATE, REPLACE IF NECESSARY) **C:**CLEAN **R:**REPLACE **L:**LUBRICATE

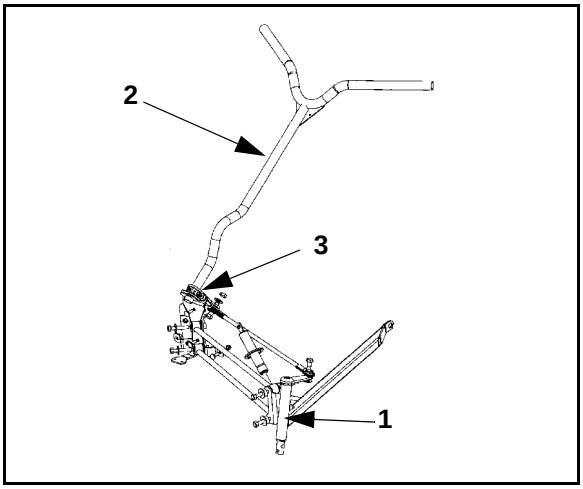
ITEM	PRE-RIDE	FREQUENCY MILES (KM)				PRE-SEASON
		150 (240)	500 (240)	1000 (1600)	2000 (3200)	
Tether Switch and Strap	I	I	I	I	I	I
CHASSIS						
Ski Toe Alignment			I	I	I	
Suspension Mounting Bolts	I	I	I	I	I	I
Steering Fasteners		I	I	I	I	C
Rear Suspension Fasteners		I	I	I	I	I
Suspension Shock Oil			I	I	I	I
Cooling Fins and Shroud			I	I	I	I
Drive Shaft Bearing			L	L	L	I
Jackshaft Bearings			L	L	L	I
Skags (Wear Bars)	I	I	I	I	I	I
Ski Saddle/ Spindle Bolts	I	I	I	I	I	I
Drive Chain Tension		I	I	I	I	I
Hood Straps	I	I	I	I	I	I
Seat Latches	I					
Rear Wheel Idler Bolts	I	I	I	I	I	I
Idler Bolt Jam Nut		I	I	I	I	I
Rear Suspension Pivot Shafts			L	L		L
Handle Bar U-Joint			L	L		L
Camber Alignment			I	I	I	
Handlebar Centering						I
Track Alignment	I	I	I	I	I	I
Track Tension		I	I	I	I	I
Rail Slide Condition	I					I
Chaincase Oil	I	I	I	I	R	I
Injection Oil Level	I					

I:INSPECT (CLEAN, ADJUST, TIGHTEN, LUBRICATE, REPLACE IF NECESSARY) **C:**CLEAN **R:**REPLACE **L:**LUBRICATE

LUBRICATION

Lubricate the following fittings with Polaris Premium All Season grease annually or approximately every 50 hours (except where noted on maintenance chart)

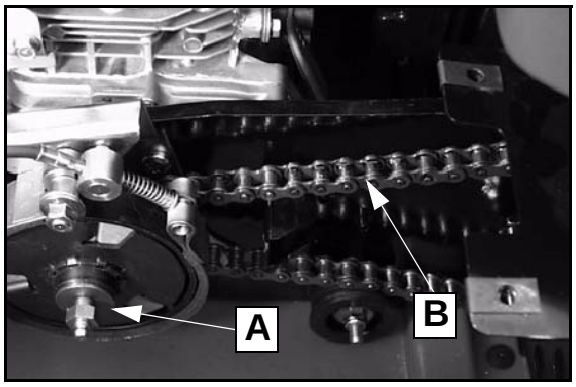
- Spindles (left and right) (1).
- Grease Clutch Fitting (1/2 pump to 1 pump every 10 hours).
- Rear Suspension pivot shafts.
- Use an aerosol lubrication on the steering post support bracket (2).
- Grease steering post lower pivot (3).
- Grease center steering arm (bell crank), pitman arm, and idler arm (where applicable).



Clutch Greasing

Pump 1/2 to 1 pump of grease in drive clutch shaft fitting (A) every 10 hours.

NOTE: Over greasing may reduce clutch performance. Performance can be regained by disassembling and cleaning the clutch.



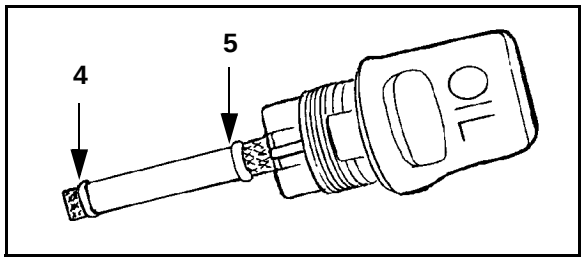
CHAIN MAINTENANCE

Spray chain (B) with aerosol chain lube every 10 hours.

Aerosol Chain Lubricant: PN 2872348

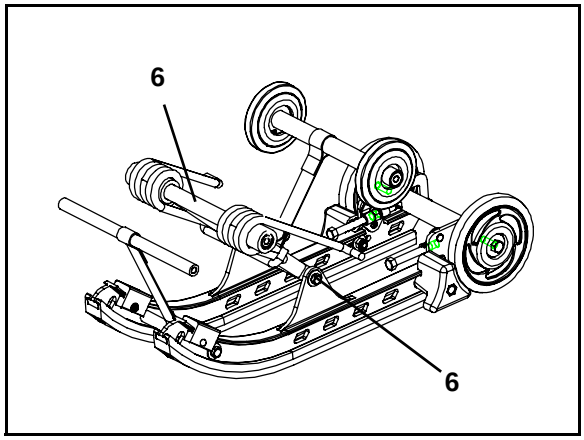
OIL LEVEL

Remove dipstick and wipe free of oil. Insert dipstick and screw in completely. Remove dipstick and observe oil marking. Maintain the oil level between the safe marks (4,5) on the dipstick.



SUSPENSION

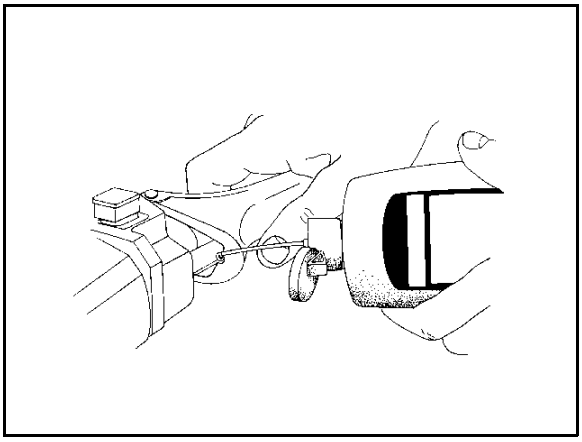
To maintain rider comfort and to retard wear of the pivot shafts (6), the suspension pivot shafts should be lubricated with Polaris Premium All Season Grease, PN 2871423, several times during the season and again before summer storage each year. The riding characteristics of the snowmobile will be affected by lack of lubrication of these shafts.



NOTE: A grease gun kit complete with grease and adaptors is available to lubricate all fittings on Polaris snowmobiles. Order PN 2871312.

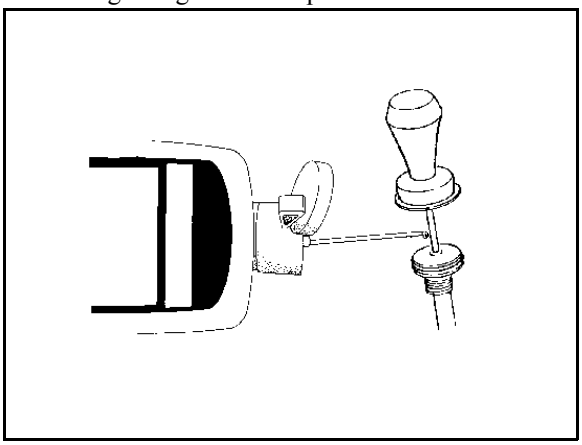
THROTTLE CABLE LUBRICATION

With the engine off, lubricate the throttle cable occasionally. Turn the handlebars to the left and lubricate liberally using LPS1, WD-40, etc.



CHOKE CABLE LUBRICATION

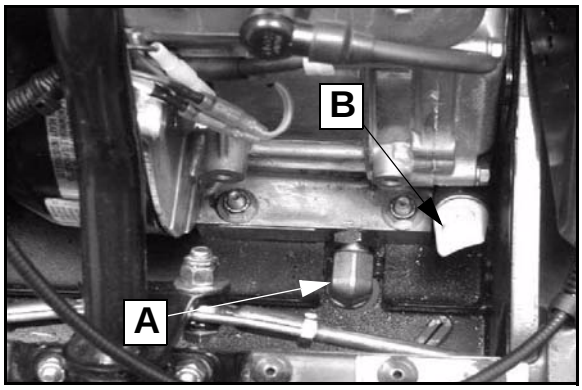
Lubricate the choke slide and cables as noted in the maintenance chart at the beginning of this chapter.



FLUID CHANGE

OIL CHANGE

Change the oil after the initial 20 hours of operation and again after each 50 hours.



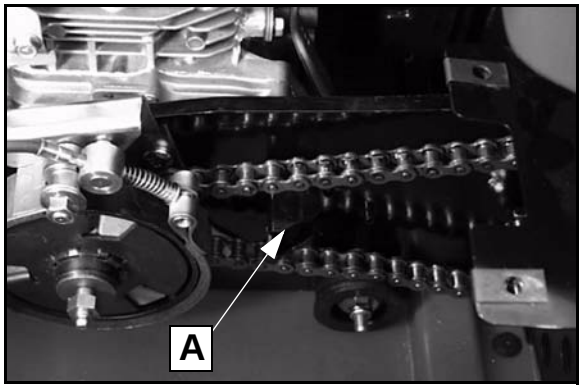
1. Locate and remove the oil drain plug (A) located under the bulkhead and in front of the engine.
2. Elevate and secure the rear of the machine so that the engine is slightly tilted forward allowing the oil to drain completely.

NOTE: To allow oil to drain quickly remove the dipstick (B).

3. When oil has been drained, make sure that the drain plug has the o-ring installed and install the drain plug.
4. Using a long funnel, add 20 oz. (.6L) of Polaris 0W-40 to the crankcase through the opening where you removed the dipstick.
5. Clean the dipstick with a lint free cloth.
6. Insert the clean dipstick and screw into place completely.
7. Remove the dipstick and observe the oil level marking.
8. Maintain the oil level between the safe marks on the dipstick.

CHAIN TENSIONER

CHAIN TENSIONER INSPECTION



Inspect the chain when the chain comes within 1/8” of the muffler mount bracket (A) on the chassis, the chain has been stretched and must be replaced.

To tighten the chain tension adjust the roller so that chain slack is not too tight and not too loose. Inspect the sprockets as they also can become worn and often need replacement when the chain is replaced.

Periodic chain adjustment is required. Inspect the tensioner roller. If surface is worn or out of round, replace.

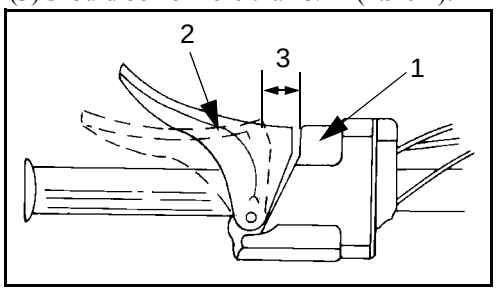
Excessive travel indicates a need to adjust the brake cable adjuster.

CABLE INSPECTION/ADJUSTMENT

BRAKE CABLE INSPECTION

If excessive brake lever to brake block clearance is evident, the brake cable or caliper should be adjusted using the following methods.

Measure the clearance between the lever (1) and brake block(2). Inspection should be made with the lever firmly depressed. The distance (3) should be no more than 3/4” (1.9 cm).



= In. / mm.

The distance (3) should be no more than 3/4” (1.9 cm).

⚠ WARNING

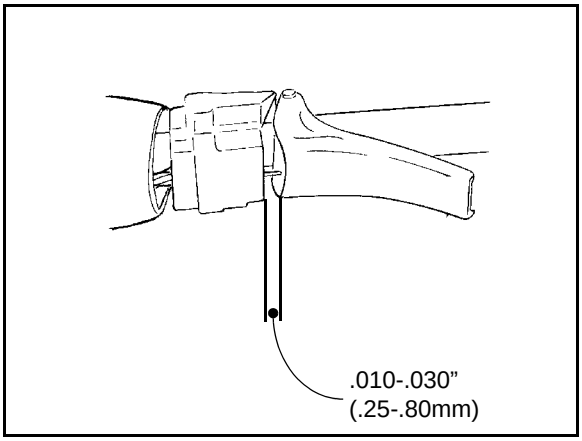
Improper brake adjustment could result in brake failure which could result in severe injury or death.

BRAKE CABLE ADJUSTMENT

1. Slide the two rubber covers that are in the center of the brake cable and expose the barrel nut.
2. Using a 8mm open end wrench, hold the barrel nut.
3. Loosen the jam nut with a 10mm open end wrench.
4. Rotate the barrel nut until you have reached the proper brake lever adjustment.
5. Check the actuator linkage to ensure there is adequate freedom of movement for positive brake operation. Also make sure that all floating parts move freely and that all parts are mounted securely. Tighten hardware as required.
6. Tighten the adjuster jam nut and slide the rubber protectors back onto the adjuster.
7. The brake band is adjusted correctly when there is 1/4"-3/8" (6-10mm) brake lever free play, and clearance between the brake lever (2) and brake block (1) with the lever fully depressed is no more than 3/4” (1.9 cm.) at (3).

THROTTLE LEVER FREE PLAY

Throttle lever free play must always provide a specified clearance between throttle lever and throttle block. This clearance is controlled by the throttle cable at the carburetor.



= In. / mm.

Proper lever free play is .010-.030” (.25-.80mm)

TRACK MAINTENANCE

TRACK MAINTENANCE WARNINGS

⚠ WARNING

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

⚠ WARNING

Never make this maintenance check with the engine running as serious personal injury can result. Using a hoist, safely lift and support the rear of the snowmobile off the ground. Rotate the track by hand to check for any possible damage. To inspect track rods, carefully examine the track along the entire length of each rod, bending the track and inspecting for breakage. The three most common places where breakage occurs are shown in the illustration. If any rod damage is found, the track should be replaced.

⚠ WARNING

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

TRACK ALIGNMENT

Track alignment affects track tension. Misalignment will cause excessive wear to the track and slide rail. A periodic check should be made to see that the track is centered and running evenly on the slide rails. Misalignment will cause excessive wear to the track and slide rail.

1. Safely support the rear of the machine with the track off the ground.
2. Turn the track slowly at least five complete revolutions.
3. Inspect track alignment by looking through the track window to make sure the rails are evenly spaced on each side. If the track runs to the left, loosen left locknut and tighten the left adjusting bolt. If the track runs to the right, loosen right locknut and tighten the right adjusting bolt.
4. After adjustments are complete, be sure to torque locknuts and idler shaft bolts.

= T
35-40 ft.lb (48-55Nm)

TRACK TENSION

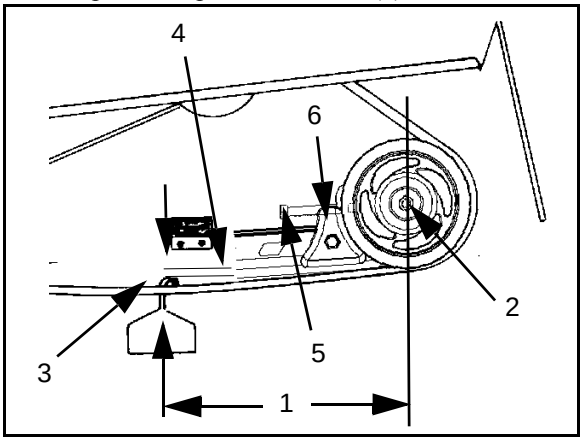
Track adjustment is critical for proper handling. Always maintain correct tension and alignment. Tension adjustments should be made only after the track is warmed up and limber.

NOTE: The 120 track has molded in track clips. It is common for a thin layer of rubber to detach from clip area and peel off during initial use.

1. Turn the machine off.
2. Lift the rear of the machine and safely support it off the ground.
3. Hang a 10 pound weight 8 inches (1) from the center of the rear idler wheel (2). The deflection (3) at this point with this amount of weight should measure 3/4, between the bottom of hi-fax and the inside of the track.

NOTE: Measure from where the weight is hanging.

4. Check for specified slack between the wear surface of the track clip and the plastic rail slide (4).



If the track needs adjustment:

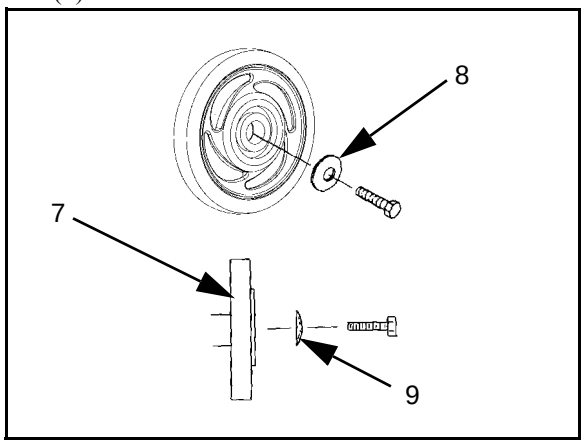
5. Loosen rear idler shaft bolt (2).
6. Tighten or loosen the track adjusting screws (5) as necessary to provide equal adjustment on both sides of the track.
7. Repeat measurement on the other side of the track.
8. Tighten idler shaft bolt (2).

NOTE: Check more frequently when the machine is new.

9. Start machine and slowly rotate the track at least five revolutions, let the track stop rotating by itself (do not apply brakes).
10. Turn engine off.
11. Check track alignment (side to side) by comparing the distance from the guide clip to Hi-fax on both sides. Readjust until centered.
12. Tighten Idler Shaft Bolt (2)
13. Readjust the toe block (6) to within 1/8" (3.18mm) and tighten.

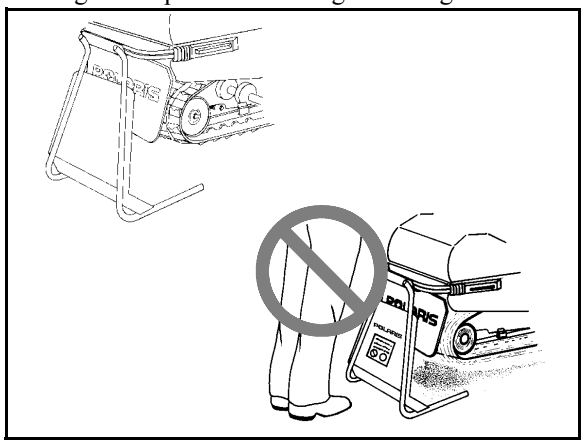
REAR IDLER WHEELS

If idler wheel (7) assembly washers (8) are removed, be sure to install them so that the domed side of the washer is facing outward (9).



TRACK WARM UP

When storing your snowmobile outside overnight, it is recommended that the track be warmed up prior to driving the snowmobile. This reduces drive clutch wear. To warm up the track, safely support the rear of the snowmobile off the ground, start the engine and abruptly engage the clutch. Allow the track to turn for a short time. Release the throttle, apply the brakes and shut the engine off prior to lowering it to the ground.



⚠ WARNING

The snowmobile is propelled by a revolving track which must be partially exposed for proper operation. Serious injuries may be caused by operator carelessness resulting in hands, feet, or clothing becoming entangled in the track. Be alert. Remember, being properly seated keeps you clear of the track.

Never hold the snowmobile up or stand behind it while warming up the track. A loose track or flying debris could cause serious personal injury or death.

SPARK PLUG

SPARK PLUG SELECTION

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

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

⚠ CAUTION

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

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

***Use recommended spark plug (NGK BR6ES)**
***Proper electrode gap is.025,/0.635mm**
***Spark plug torque is 12-14 ft. lbs. (16.5-19.3 Nm)**
***Always carry spare spark plugs**

NOTE: Incorrect fuel mixture can often cause a spark plug to appear to be too dark or too light in color. Before changing spark plug heat ranges, be sure the correct main jet is installed in the

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

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

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

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

⚠ CAUTION
A wire brush or coated abrasive should not be used to clean spark plugs. Repeat fouling or engine damage may result

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

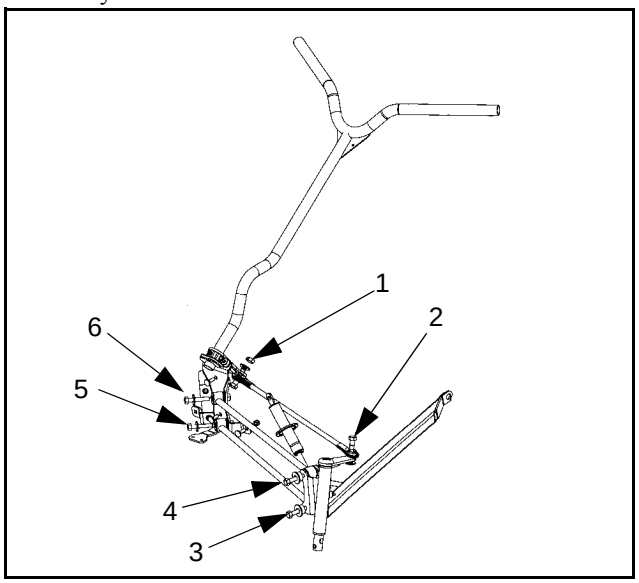
= T
12-14 ft.lb (16.5-19.3 Nm)

STEERING SYSTEM

The steering systems on Polaris snowmobiles can be adjusted with ski toe alignment. Improper toe alignment can cause erratic steering.

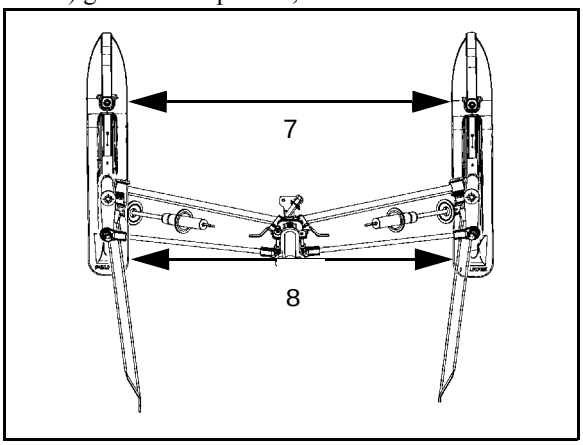
STEERING INSPECTION

The steering assembly of the machine should be checked periodically for loose nuts and bolts. See 1-6 below.



STEERING ADJUSTMENT

With handlebars in straight ahead position and measuring from the straight edge of the skis (across from the ski hoop fastener), the measurement between the skis at point 7 should be 1/8" (3.175mm) greater than point 8, as shown below.



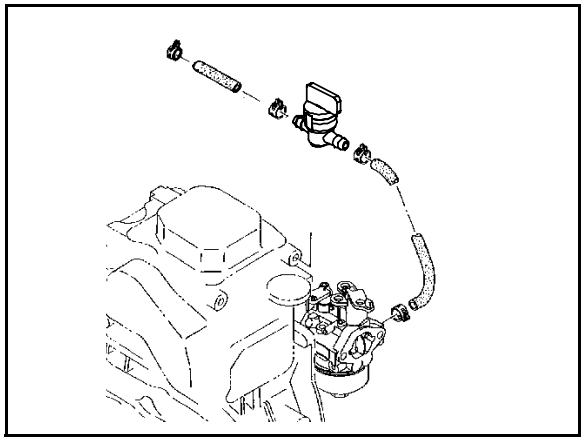
NOTE: This measurement should be taken with the vehicle weight compressing the suspension.

= In. / mm.
The measurement between the skis at point 7 should be 1/8" (3.175mm) greater than point 8, as shown above.

FUEL VALVE & FUEL LINES

⚠ CAUTION

The fuel valve and the fuel lines should be inspected regularly. Special attention should be given to the system's fuel line condition after periods of storage. Normal deterioration from weather and fuel compounds can occur. Replace lines that show any signs of cracking or leaking.



CARBURETOR

GENERAL CARBURETOR INFORMATION

The number size stamped in the end of the main jet indicates the jet size which was installed at the time of manufacture.

The installed main jet is not necessarily correct for your elevation.

⚠ WARNING

Carburetor adjustments should be performed only by a knowledgeable service technician at a Polaris servicing dealer using the proper tools, procedures and specifications.

CARBURETOR ADJUSTMENTS

Proper carburetor adjustments include the following:

- Carburetor component changes for specific altitude and ambient temperatures
- Choke adjustment
- Air screw settings, if applicable
- Idle RPM adjustments
- Throttle safety switch checks and servicing
- Throttle lever free play adjustment

ELECTRICAL

ELECTRICAL CONNECTIONS

Separate electrical connector blocks and clean corrosive build up from connectors. Lubricate or pack connector blocks with Nyogelt grease (PN 2871329) and re-connect. Replace worn or frayed electrical wire and connectors. Be sure wiring harness is properly secured away from sharp edges, steering linkage, moving parts, and hot exhaust.

EXHAUST

EXHAUST INSPECTION

At approximately 50 hours it is a good idea to check the exhaust system for wear or damage. To inspect, allow engine and exhaust system to cool completely. Open the hood and inspect the muffler and pipes for cracks or damage. Check for weak or missing retaining springs or damper/support grommets.

⚠ WARNING

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

CLEANING

AIR FILTER

NOTE: Do not operate a machine with the intake filters removed in the summer. This may cause carburetor intaking debris resulting poor fuel economy or engine damage.

NOSEPAN CARE

If your nosepan becomes dirty with soot, you can use Polaris Carbon Clean (PN 2872890) to remove the soot.

STORAGE

CHASSIS AND HOOD

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

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

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

FRONT SUSPENSION

To minimize fatigue on the front shocks and springs during extended storage, it is recommended that the front end of the machine be safely blocked off the ground to remove tension from the shocks and springs.

CLUTCH AND DRIVE SYSTEM

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

CONTROLS AND LINKAGE

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

ELECTRICAL CONNECTIONS

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

CARBURETOR/THROTTLE BODY

Fog engine with Polaris Fogging Oil (aerosol type) according to directions on can.

FUEL SYSTEM

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

CORROSION

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

SHOCKS

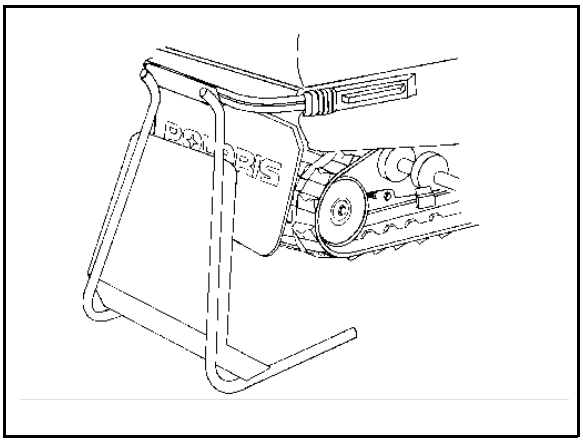
Use T-9 Metal Protection (or equivalent) on shock absorber shafts to help prevent corrosion.

BATTERY

Disconnect and remove the battery. Clean the terminals and cables. Apply dielectric grease to the terminals. Store in a cool dry place for storage.

TRACK & SUSPENSION

Under normal conditions moderate track tension should be maintained during summer storage. The rear of the machine should be supported off the ground to allow free hanging of the track.



TRANSPORTING & TOWING

TRANSPORTING

Whenever the snowmobile is transported the following measures should be taken:

1. Turn the fuel valve to “Off”.
2. Be certain the fuel cap is installed correctly.
3. Always tie the snowmobile to the transporting unit securely using suitable straps.

TOWING

Do not use this snowmobile to tow.

If a situation arises requiring the snowmobile to be towed by another snowmobile, attach the tow rope to the spindles, not to the ski loops.

CHAPTER 4

ENGINE / CARBURETOR / CLUTCH

WARNINGS

WARNINGS

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

⚠ WARNING
Always stop the engine and refuel outdoors or in a well ventilated area

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

⚠ WARNING
Do not overfill the tank. Do not fill the tank neck.

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

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

⚠ WARNING
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.

GENERAL INFORMATION

SERVICE PRECAUTIONS

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

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

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

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

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

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

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

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

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

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

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

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

Whenever removing or reinstalling batteries, care should be taken to avoid the possibility of explosion resulting in serious burns. Always disconnect the negative (black) cable first and

reconnect it last. Battery electrolyte contains 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.

TORQUE SPECIFICATIONS

ENGINE TORQUE SPECIFICATIONS

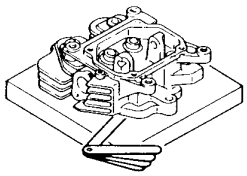
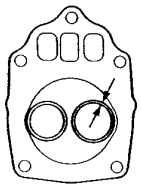
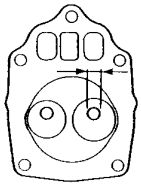
APPLICATION	TORQUE (FT.LB)	TORQUE (NM)
Connecting Rod	6.5-8.3	9-11
Main Bearing Cover	6-7	8-9.5
Cylinder Head (3 steps)	3.6 / 7.2 / 17-30	5 / 10 / 23-26
Spark Plug	12-14	16-19
Intake Manifold	7-10	10-14
Exhaust Manifold	7-10	10-14
Flywheel Nut	43-47	59-63
Muffler and Muffler Cover	16-20	22-27
Engine Mount Bolts	15-17	20-23
Recoil Guide Plate	3	4

NOTE: "STD" in the following table is the parts dimension from brand new engine parts. "Limit" shows the maximum allowance for the parts to be used on the engine. "If the measurement exceeds beyond the limit", the parts need to be replaced and/or repaired.

CLEARANCE DATA & LIMITS

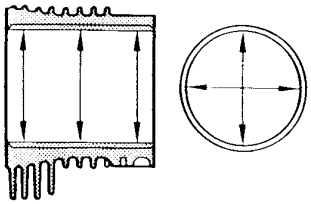
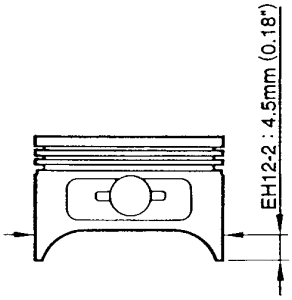
CYLINDER HEAD

Unit : mm (in)

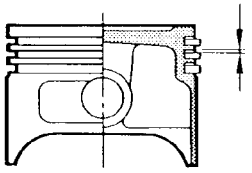
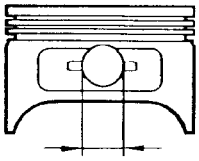
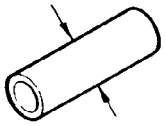
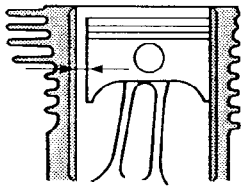
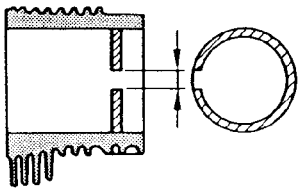
ITEM		STD	Limit
CYLINDER HEAD ● Flatness 		LESS THAN 0.05 (0.002)	0.1 (0.004)
● Valve seat contact width 	IN. EX.	0.7 ~ 1.0 (0.028 ~ 0.039)	2.0 (0.079)
● Valve guide inside dia. 		5.500 ~ 5.518 (0.2165 ~ 0.2172)	5.65 (0.2224)

CYLINDER / PISTON

Unit : mm (in)

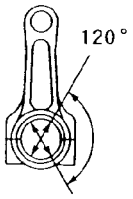
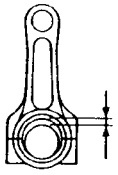
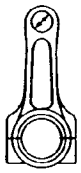
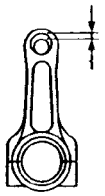
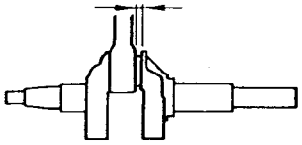
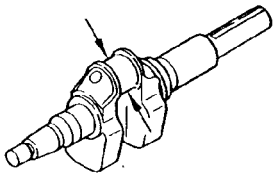
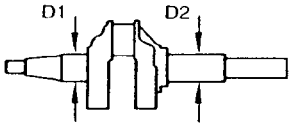
ITEM		STD	Limit
CYLINDER ● Inside dia. 	STD	60.000 ~ 60.019 (2.3622 ~ 2.3630)	To be rebored when the difference between max. and min. of diameter reaches to 0.1 (0.004).
	1st reboring	60.250 ~ 60.269 (2.3720 ~ 2.3728)	
	2nd reboring	60.500 ~ 60.519 (2.3819 ~ 2.3826)	
● Out-of-Round		LESS THAN 0.01 (0.004)	
● Cylinder Taper		LESS THAN 0.015 (0.0006)	
PISTON ● Piston size (At skirt in thrust direction) 	STD	59.96 ~ 59.98 (2.3606 ~ 2.3614)	59.87 (2.3571)
	1st o/s	60.21 ~ 60.23 (2.3705 ~ 2.3713)	60.12 (2.3669)
	2nd o/s	60.46 ~ 60.48 (2.3803 ~ 2.3811)	60.37 (2.3768)

Uni : mm (in)

ITEM		STD	Limit
● Ring groove side clearance 	Top	0.030 ~ 0.075 (0.0012 ~ 0.0030)	0.15 (0.006)
	2nd	0.030 ~ 0.075 (0.0012 ~ 0.0030)	0.15 (0.006)
	Oil ring	0.020 ~ 0.075 (0.0008 ~ 0.0030)	0.15 (0.006)
● Piston pin hole 		12.991 ~ 13.002 (0.5115 ~ 0.5119)	13.035 (0.5132)
● Piston pin outside dia. 		12.992 ~ 13.000 (0.5115 ~ 0.5118)	12.960 (0.5102)
● Clearance between piston and cylinder at skirt area. 		0.015 ~ 0.074 (0.0006 ~ 0.0029)	0.25 (0.010)
● Piston ring end gap 	Top 2nd	0.2 ~ 0.4 (0.008 ~ 0.016)	1.5 (0.0591)
	oil ring	0.2 ~ 0.4 (0.008 ~ 0.016)	1.5 (0.0591)

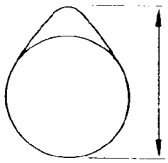
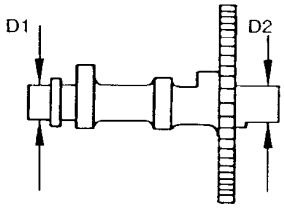
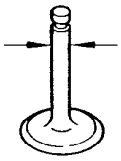
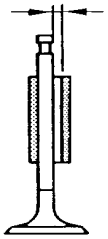
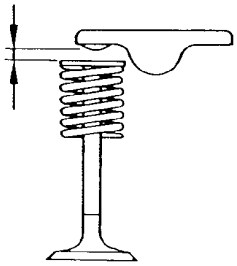
CONNECTING ROD

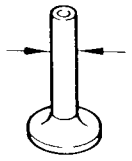
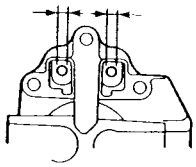
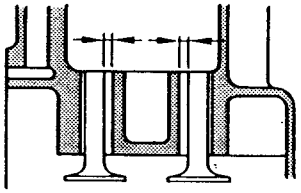
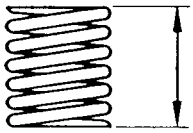
Unit : mm (in)

ITEM	STD	Limit
CONNECTING ROD ● Big end inside dia. 	26.000 ~ 26.013 (1.0236 ~ 1.0241)	26.1 (1.0276)
● Clearance between big end and crankpin 	0.020 ~ 0.046 (0.0008 ~ 0.0018)	0.2 (0.008)
● Small end inside dia. 	13.010 ~ 13.021 (0.5122 ~ 0.5126)	13.08 (0.5150)
● Clearance between small end and piston pin 	0.010 ~ 0.029 (0.0004 ~ 0.0011)	0.12 (0.0047)
● Big end side clearance 	0.1 ~ 0.7 (0.004 ~ 0.028)	1.0 (0.040)
CRANKSHAFT ● Crankpin outside dia. 	25.967 ~ 25.980 (1.0223 ~ 1.0228)	25.85 (1.0177)
● Journal dia. 	D1, D2 24.988 ~ 24.997 (0.9839 ~ 0.9841)	———

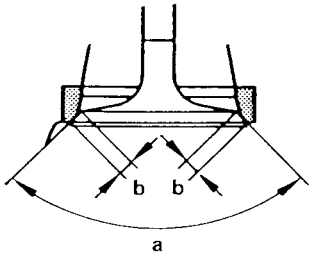
CAM SHAFT / VALVES

Unit : mm (in)

ITEM		STD	Limit
CAMSHAFT ● Cam height 	IN.EX. CAMS	29.6 ~ 29.8 (1.165 ~ 1.173)	29.45 (1.159)
● Journal outside dia. "D" type 	D1	16.973 ~ 16.984 (0.6682 ~ 0.6687)	16.95 (0.6673)
	D2	14.973 ~ 14.984 (0.5895 ~ 0.5899)	14.95 (0.5886)
VALVE ● Valve stem outside dia. 	IN.	5.440 ~ 5.455 (0.2142 ~ 0.2148)	5.35 (0.2106)
	EX.	5.426 ~ 5.444 (0.2136 ~ 0.2143)	5.35 (0.2106)
● Clearance between valve stem dia. and valve guide 	IN.	0.045 ~ 0.078 (0.0018 ~ 0.0031)	0.3 (0.012)
	EX.	0.056 ~ 0.092 (0.0022 ~ 0.0036)	0.3 (0.012)
● Valve clearance 	IN./EX. (cold)	0.08 ~ 0.12 (0.0031 ~ 0.0047)	———

ITEM	STD	Limit
TAPPET ● Stem outside dia. 	7.960 ~ 7.975 (0.3134 ~ 0.3140)	
● Guide inside dia. 	8.000 ~ 8.015 (0.3150 ~ 0.3156)	
● Tappet guide clearance 	0.025 ~ 0.055 (0.0010 ~ 0.0022)	———
VALVE SPRING FREE LENGTH 	30.5 (1.2)	———

Unit : mm (in)

ITEM	STD	Limit
VALVE SEAT ANGLE(IN. EX.) ● Valve cutter angle(a) ● Valve contact width(b) 	(45° seat) a : 90° b : 0.7 ~ 1.0 (0.028 ~ 0.039)	2.0 (0.079)

ENGINE MAINTENANCE

DAILY MAINTENANCE

Maintenance	Remarks
Clean away dust and debris from engine	Governor linkage is especially sensitive to dust
Check fuel leakage from fuel system. If any, re-tighten fasteners or replace necessary parts	
Inspect for loose hardware and re-tighten if necessary	Loose bolts and nuts may come off and result in breakage of other parts
Check oil level and add to full mark	

INITIAL 20 HOURS MAINTENANCE

Maintenance	Remarks
Change Crankcase Oil	Removes any foreign material

INITAL 50 HOURS MAINTENANCE

Maintenance	Remarks
Change crankcase oil.	Removes any foreign material
Check and clean spark plug	If wore or damaged, replace
Chain Tension Inspection	Inspect and adjust tension

EVERY 100-200 HOURS MAINTENANCE

Maintenance	Remarks
Clean fuel filter inside fuel tank	
Inspect cooling system and remove dirt and debris	Remove blower housing and clean up between fins and housing
Inspect exhaust system for cracks or leaks	

EVERY 500-600 HOURS MAINTENANCE

Maintenance	Remarks
Remove carbon from cylinder head	Clean or replace parts. Replace piston rings and other necessary parts
Replace fuel lines	Avoid hazards caused by fuel leakage

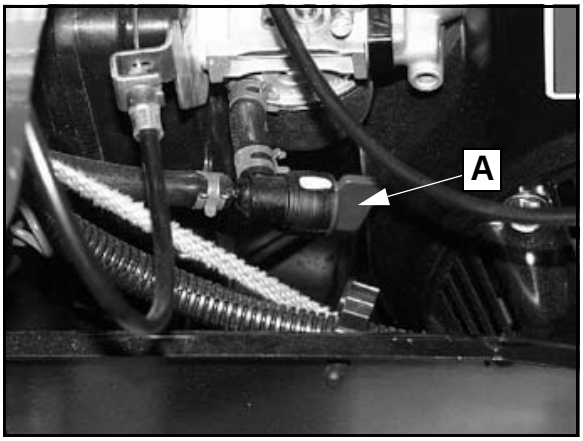
EVERY 1000 HOURS MAINTENANCE

Maintenance	Remarks
Overhaul engine	Clean or replace parts. Replace piston rings and other necessary parts
Replace fuel lines	Avoid hazards caused by fuel leakage

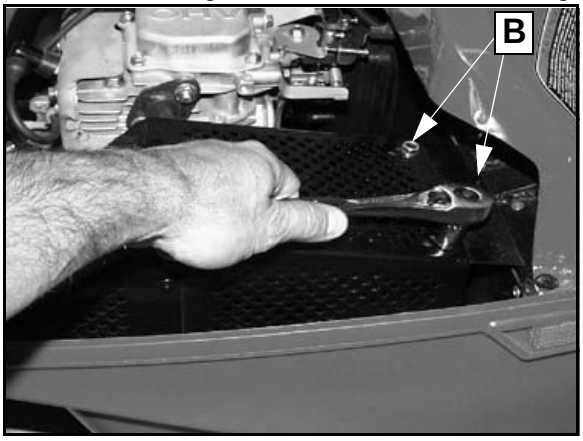
ENGINE REMOVAL

REMOVAL

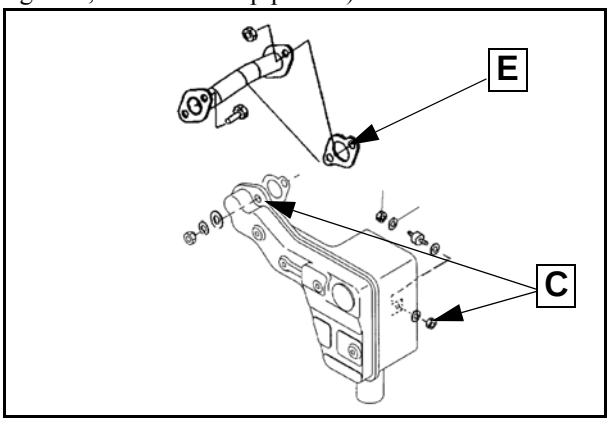
1. Shut off fuel.



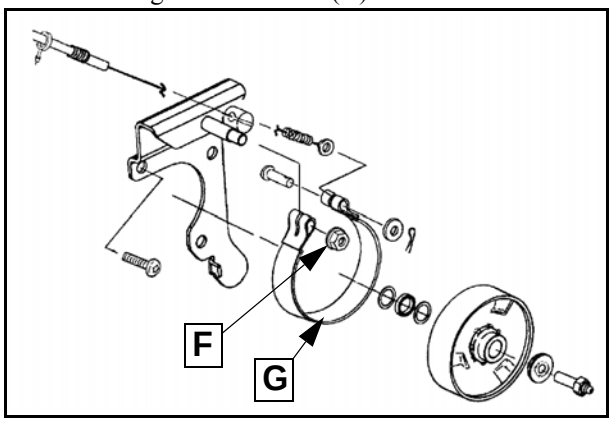
2. Remove the clutch guard bolts and remove the clutch guard.



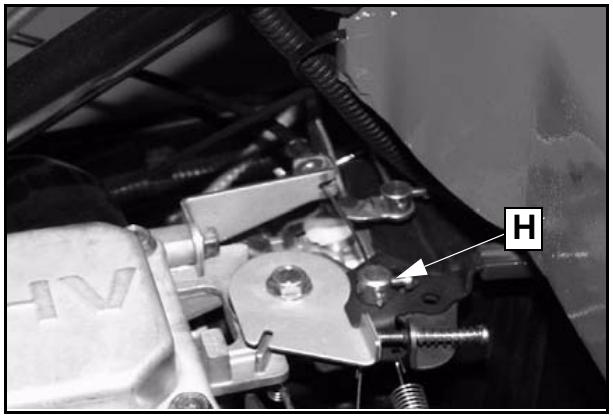
3. Remove the muffler mounting nuts (C) and remove the exhaust (D) and the exhaust gasket (E). (Raised edge on gasket, faces exhaust pipe side).



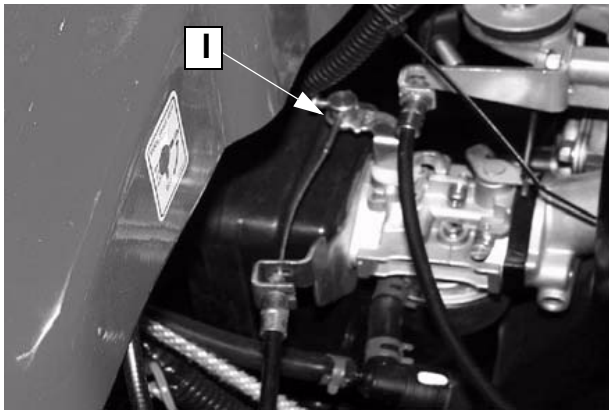
4. Remove nut (F) retaining brake band (G). Pull cable (H) out from housing. Remove band (G).



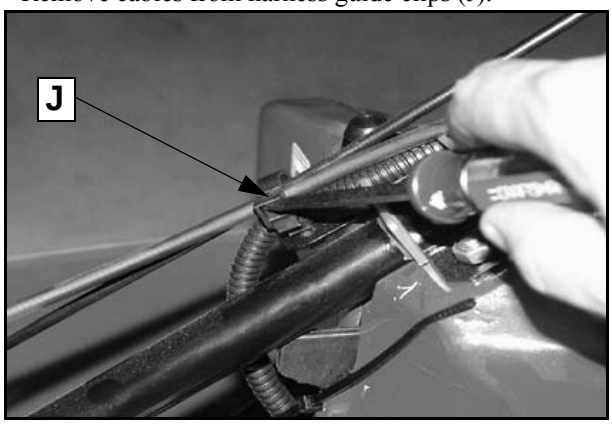
5. Disconnect throttle cable at holder (H) using a screw driver to loosen set screw, and remove cable bracket bolt. Slide cable out and set aside



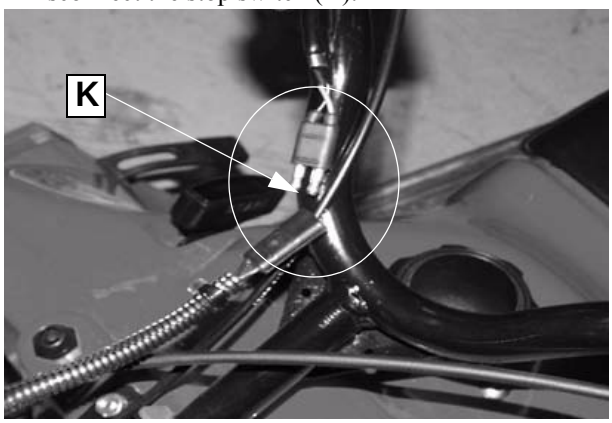
6. Disconnect choke cable from holder (I) and remove E-clip from mount bracket. Slide cable out and set aside.



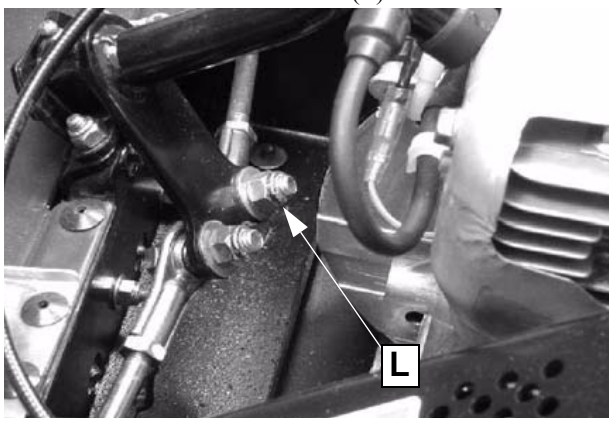
7. Remove cables from harness guide clips (J).



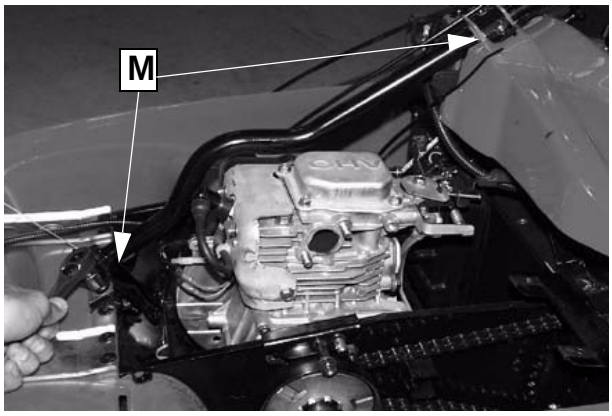
8. Disconnect the stop switch (K).



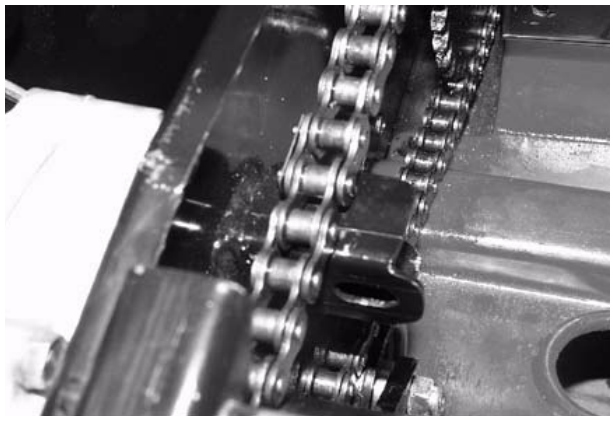
9. Remove the inner tie rod bolts (L).



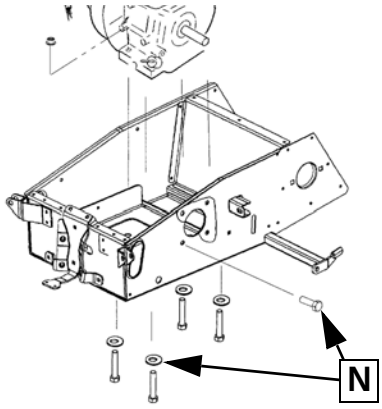
10. Remove steering post fasteners (M).



11. Remove the steering post.
12. Find master link on drive chain. Remove keeper and slide master link out. Do not re-use master link. Always replace with new. Remove the chain.



13. Hold shoulder of clutch with adjustable pliers and remove clutch bolt. Slide clutch off drive shaft.
14. Free recoil rope from chassis. Be sure to tie knot in rope upon removal from handle or rope will retract inside recoil housing.
15. Remove fuel line from fuel tank to carburetor. Have container or shop cloth ready to catch any spilled fuel.
16. Remove eight (8) motor mount bolts (N). Four are located at the base of the engine and protrude through bottom of bulkhead. The other four are located on clutch side of bulkhead as shown.



17. Remove engine by tilting engine toward PTO side and sliding engine to MAG side. Lift engine out.

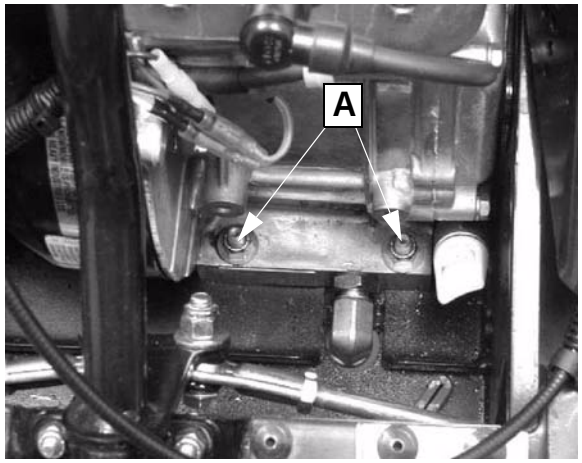
ENGINE INSTALLATION

Engine Installation Torques

Item	ft.lb. (in.lb)	Nm
Mounting fastener	17ft.lb	23.5Nm
Steering post fastener	(50 in.lbs)	5.8 Nm
Steering tie rod fastener	18 ft.lb	25Nm
Clutch fastener	10 ft.lb	14Nm
Exhaust mounting fasteners	18 ft.lb	25Nm
Clutch cover fasteners	36 in.lb	4Nm

INSTALLING THE ENGINE

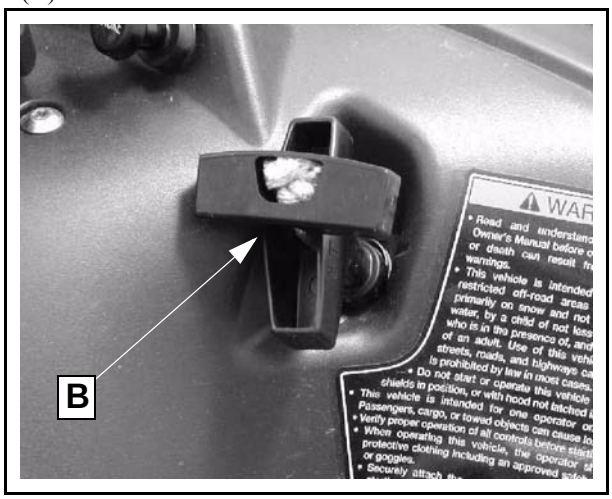
1. Prepare chassis for engine installation by moving cables and wiring out of the way.
2. Set engine into chassis.
3. Insert engine mounting bolts (A) and torque to specification.



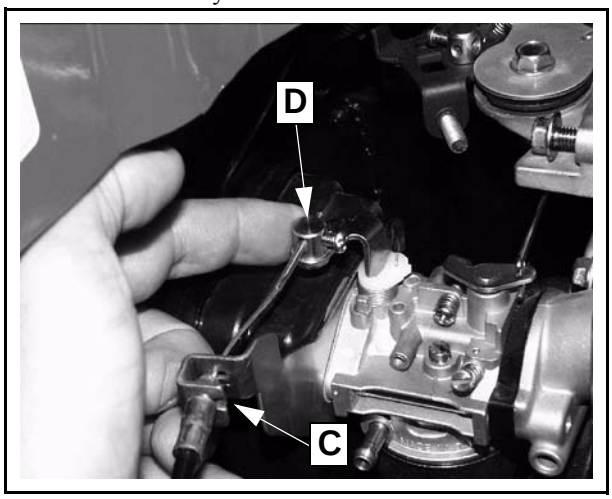
= T

17 ft.lb (23.5Nm)

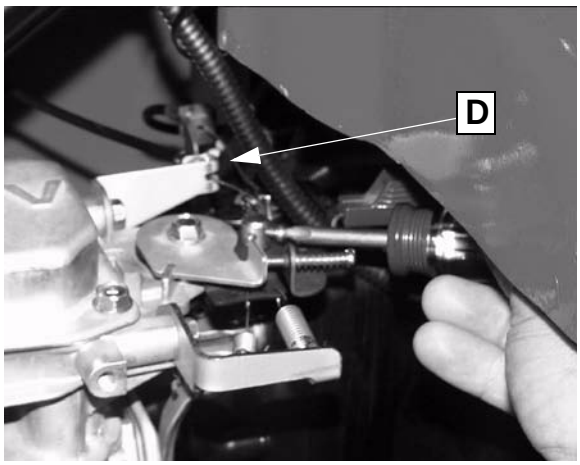
4. Insert chain tensioner and install four bottom mounting bolts.
5. Connect engine wires. Apply a light film of grease to all connections.
6. Remove knot in recoil rope by feeding the end through the recoil hole in chassis.
7. Insert the recoil handle and tie a secure knot in recoil handle (B).



8. Insert choke cable through bracket and thread cable through lock barrel.
9. Insert E-clip (B) through bracket to secure cable.
10. Pull choke knob on dash to choke “closed”.
11. Move choke lever on carburetor to closed position (full choke) (C).
12. Tighten set screw on lock barrel.
13. Choke cable is set when butterfly is completely closed with choke knob is fully extended.



14. Install throttle cable bracket (D) and thread cable through lock barrel. Tighten set screw on barrel when throttle lever free play is between .010"-.030"(.25-.8 mm) before throttle opens.



= In. / mm.

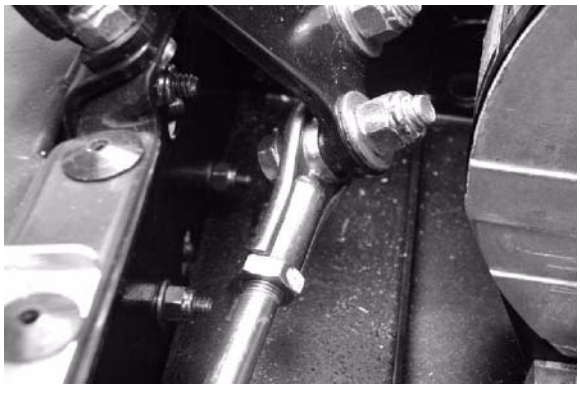
Throttle Lever Freeplay .010"-.030" (.25-.80mm)

15. Install steering post and torque bolts to 50 in.lb (5.8Nm).

= T

Steering Post Bolts 50 in.lb. (5.8Nm)

16. Install steering tie rod ends into steering post. Bolts are installed from bottom. Torque to 18 ft.lb. (25Nm).



= T

Steering rod ends 18 ft.lb. (25Nm)

17. Grease PTO shaft with Polaris Premium All Season Grease.

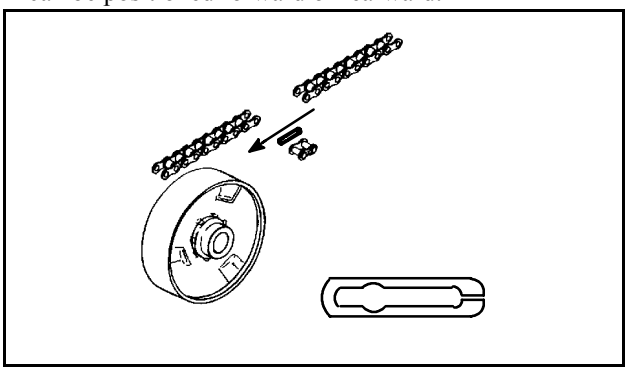
NOTE: Inspect key on clutch before installation and replace clutch if needed.

18. Hold shoulder of clutch with adjustable pliers and torque bolt to 10 ft.lb. (14Nm).

= T

Clutch Nut 10 ft.lb. (14Nm)

19. With new master link, connect drive chain, the slotted end can be positioned forward or rearward.

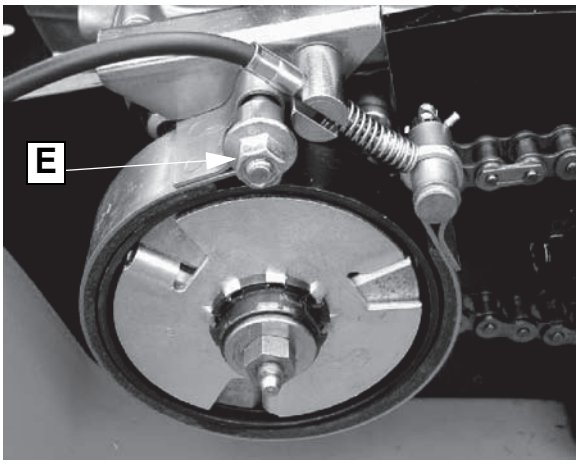


20. Install brake band.
21. Route cable through cable housing.
22. The brake band is adjusted correctly when there is .1250 - .375" (6-10mm) brake lever free play, and clearance between brake lever and block with lever fully depressed is no more than .75" (1.9cm).

= In. / mm.

Brake Lever Freeplay .125" - .375" (6-10mm)

23. Torque band nut (E) to 6 ft.lbs (8.3Nm).



= T
Band nut 6 ft.lbs (8.3Nm)

24. Route cables through harness guide clips.
25. Place gasket so raised edge is toward exhaust pipe.
26. Install exhaust to engine.
27. Torque manifold nuts to 18 ft.lb (25Nm).

= T
Manifold Nuts 18 ft.lb (25Nm)

28. Torque exhaust mounting bolt to 18 ft.lb (25Nm).

= T
Exhaust Mounting Fasteners 18 ft.lb (25Nm)

29. Install the clutch guard and torque the fasteners to 36 in.lb (4Nm).

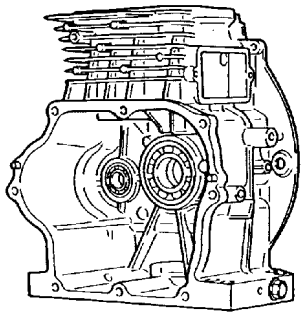
= T
Clutch guard fasteners 36 in.lb (4Nm)

30. Connect the fuel line to the carburetor.
31. Fill fuel tank with fuel.
32. Fill engine crankcase with oil.
33. Start engine and check operation.

ENGINE COMPONENTS

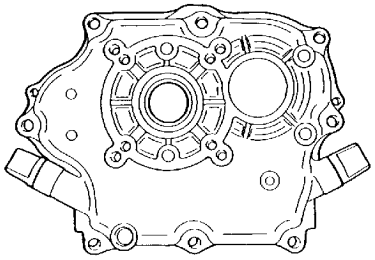
CYLINDER & CRANKCASE

The cylinder and crankcase assembly is a single piece of aluminum diecasting. The cylinder liner, made of special cast iron, is molded into the aluminum casting. The crankcase has a mounting surface on the output shaft side, where the main bearing cover is attached.



MAIN BEARING COVER

The main bearing cover is an aluminum diecasting, which is mounted on the output shaft side of the crankcase. Remove the main bearing cover to inspect the inside of the engine.



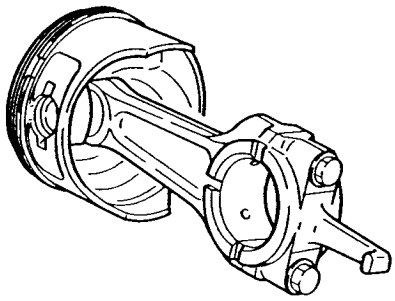
CRANKSHAFT

The crankshaft is forged carbon steel, and the crank pin is induction-hardened. The output end of the shaft has a crankshaft gear, which is pressed into position.

CONNECTING ROD AND PISTON

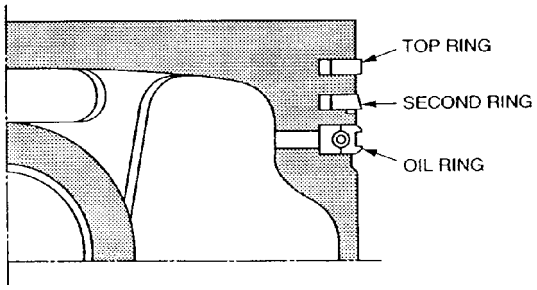
The connecting rod is an aluminum alloy diecasting, and its large and small ends function as bearings. The piston is an

aluminum alloy casting, and carries two compression rings and one oil control ring.



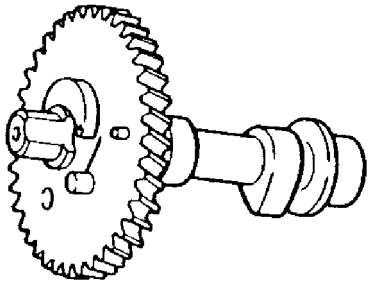
PISTON RINGS

The piston rings are made of special cast iron. The profile of the top ring is barrel face and the second ring has a tapered face. The oil ring consists of a cutter ring and a coil expander for better sealing and less oil consumption.



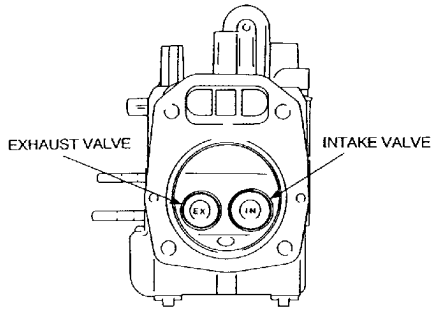
CAMSHAFT

The camshaft is made of special cast iron and camshaft gears are cast together in one piece. Both sides of the shaft fit into the plane bearings on the crankcase and main bearing cover.



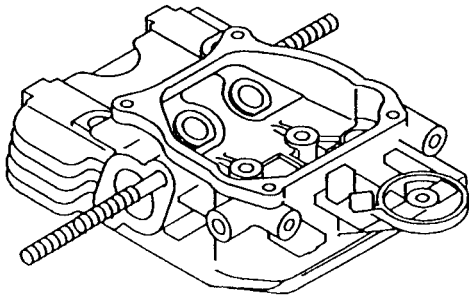
VALVE ARRANGEMENT

The intake valve is located on flywheel side of the cylinder head. The hard alloy valve seats are molded in the cylinder head and stellite is fused to the exhaust valve face. The cylinder baffle leads cooling air to the exhaust valve area for optimum cooling



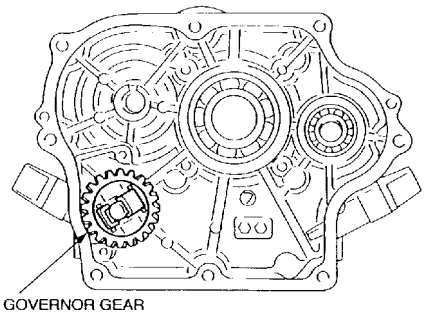
CYLINDER HEAD

The cylinder head is an aluminum die casting which utilizes wedge type combustion chamber for the highest combustion efficiency.



GOVERNOR SYSTEM

The governor is a centrifugal flyweight type which ensures constant operation at the selected speed against load variations. The governor gear with governor weights is installed on the main bearing cover.

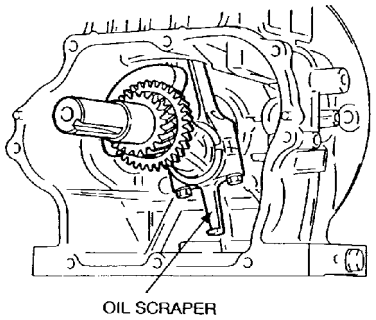


COOLING SYSTEM

The large fins on the flywheel provide sufficient cooling air capacity for the inlet and exhaust area and cylinder. The cylinder baffle helps the cooling air flow efficiently.

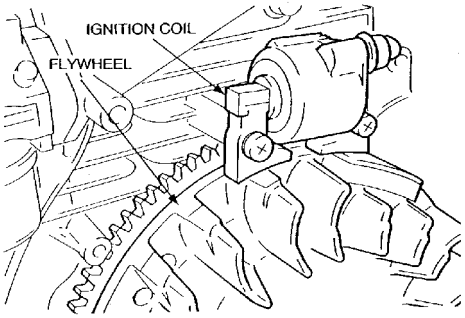
LUBRICATION

All rotating and sliding parts are splash lubricated by the oil scraper on the connecting rod.



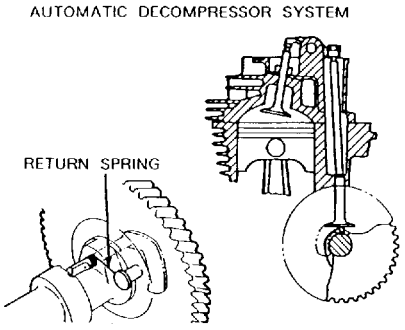
IGNITION SYSTEM

The ignition system is a transistor controlled magneto ignition system which consists of a flywheel and an ignition coil with a built in transistor. This system has an ignition timing advance for easy starting. Ignition timing is fixed by location of parts. No adjustment is required.



DECOMPRESSION SYSTEM

An automatic decompression mechanism which opens the exhaust valve before the piston reaches compression top is assembled on the camshaft for easy starting.



CARBURETOR

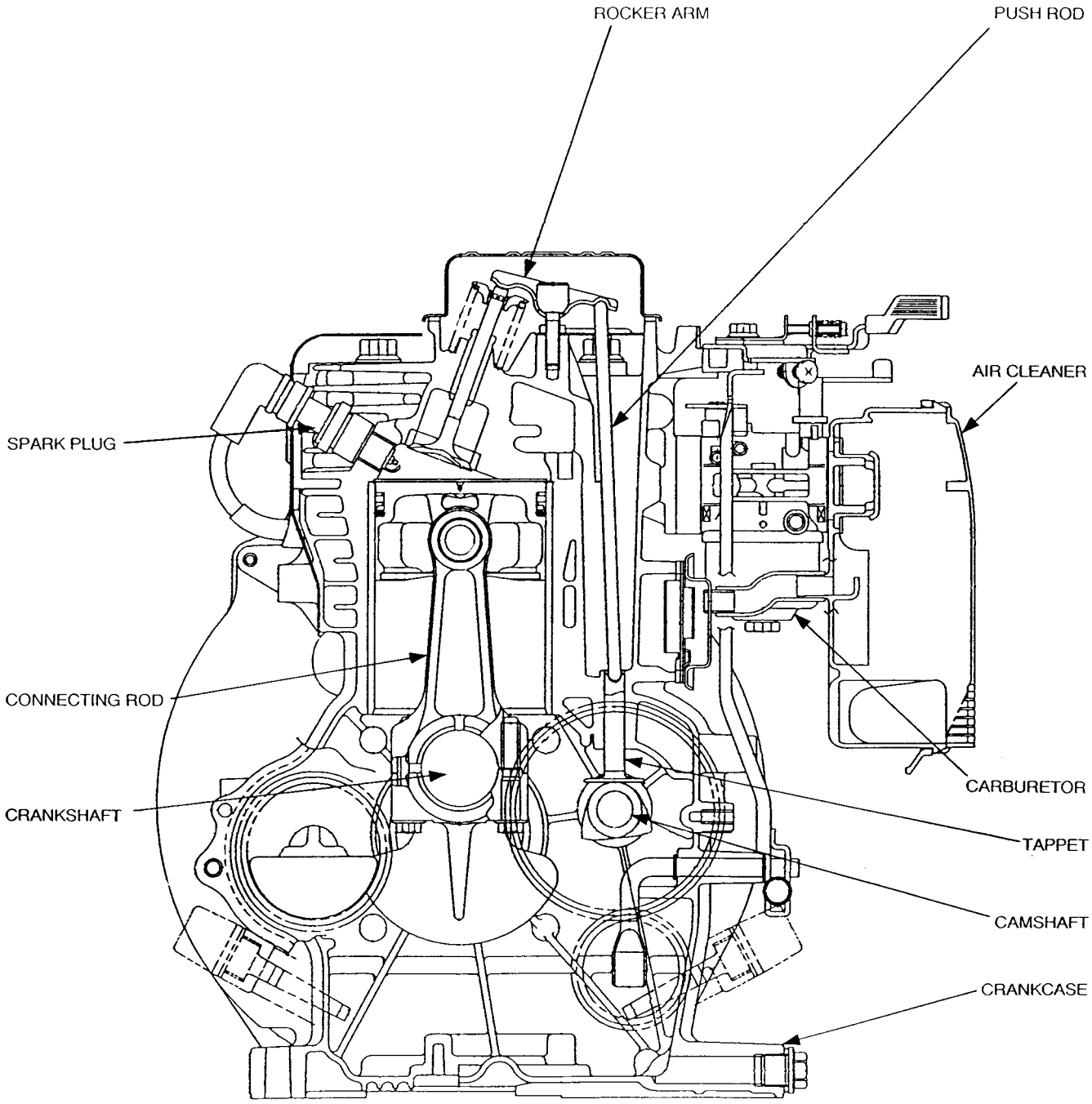
The carburetor has a float controlled fuel system. The carburetor is calibrated carefully for good cold weather starting, good acceleration, low fuel consumption, and sufficient output.

AIR FILTER

There is no air filter element in the 120.

NOTE: An air filter is not required for operation in winter conditions. However, an air filter is included with the 120 wheel accessory package, PN 2873124. The kit allows the 120 to operate in the summertime. Remove the filter for wintertime use.

ENGINE COMPONENT LOCATIONS



ENGINE DISASSEMBLY

PREPERATIONS & SUGGESTIONS

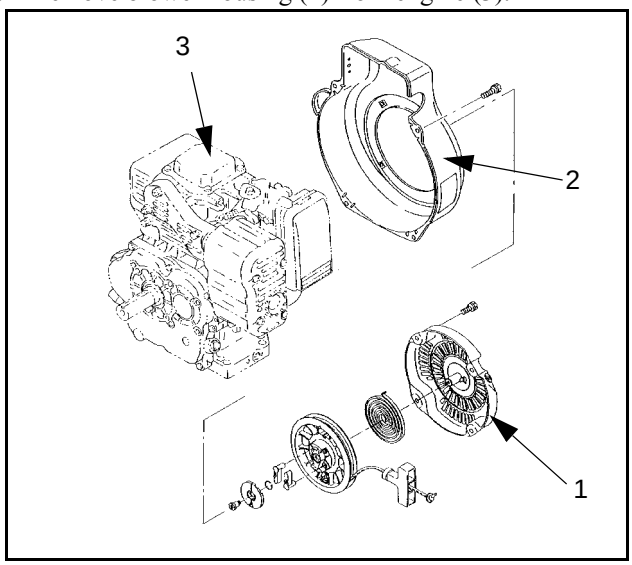
1. When disassembling the engine, memorize the locations of individual parts so that they can be reassembled correctly. If you are uncertain of identifying some parts, it is suggested that tags be attached to them.
2. Have boxes ready to keep disassembled parts by group.
3. To prevent losing and misplacing, temporarily assemble each group of disassembled parts.
4. Carefully handle disassembled parts, and clean them with washer solvent if necessary.
5. Use the correct tools in the correct way.

ENGINE DESASSEMBLY

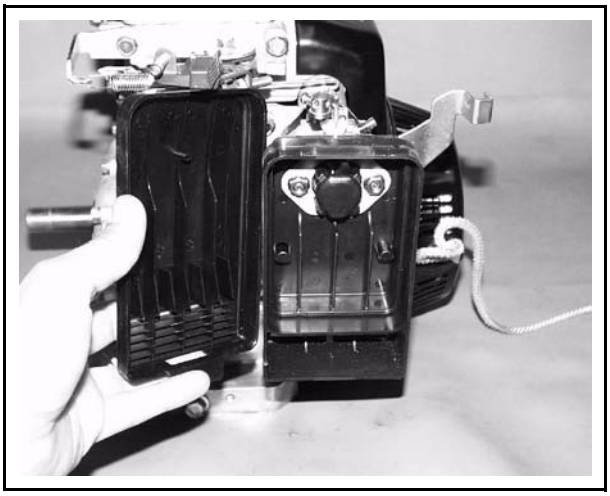
1. Drain oil as outlined in Chapter 2.

NOTE: To discharge oil quickly, remove oil dipstick.

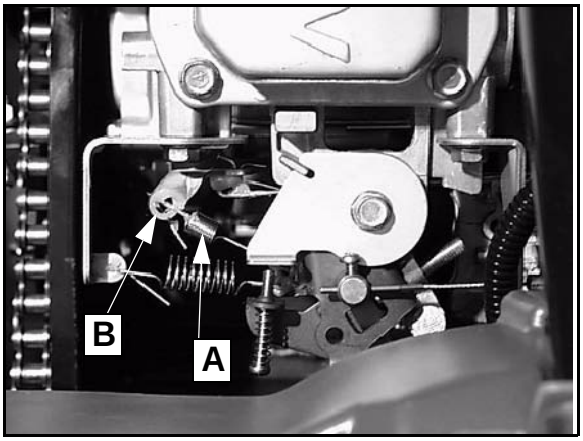
2. Remove recoil (1) from blower housing (2).
3. Remove blower housing (2) from engine (3).



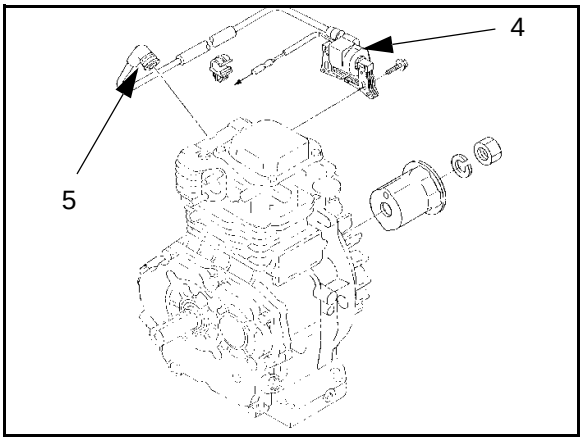
4. Remove the air box cover.



5. Remove cleaner case.
6. Unhook governor spring (A) from speed control lever (B).
7. Remove governor lever from governor shaft.
8. Detach governor lever, governor rod and rod spring from carburetor.

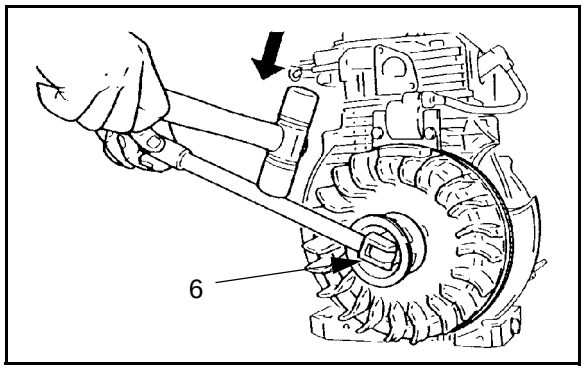


9. Remove the carburetor.
10. Remove stop plate, friction plate, and speed control lever.
11. Remove intake pipe from cylinder head.
12. Disconnect spark plug cap (4) and remove ignition coil (5) from crankcase.

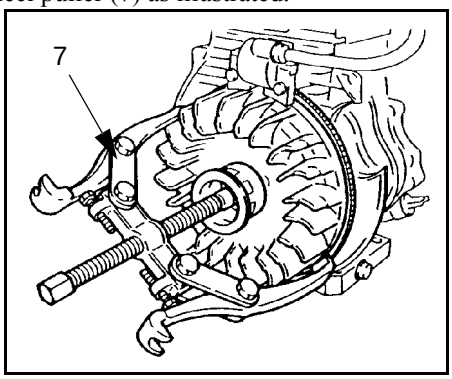


13. Remove starter pulley (6) from flywheel. Place 19 mm socket wrench on flywheel nut and strike tip of lever with a soft face hammer to loosen nut.

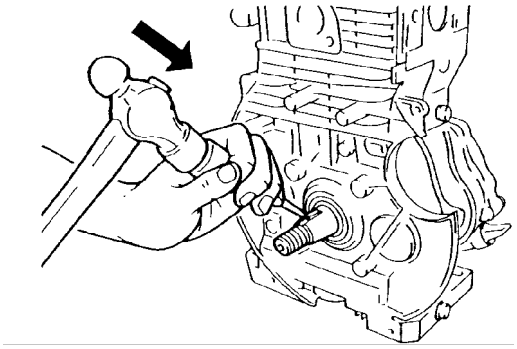
NOTE: Do not place a bar or screw driver in flywheel fins to hold flywheel for removal. Breakage can occur.



14. Remove flywheel and flywheel key from crankshaft. Using flywheel puller (7) as illustrated.

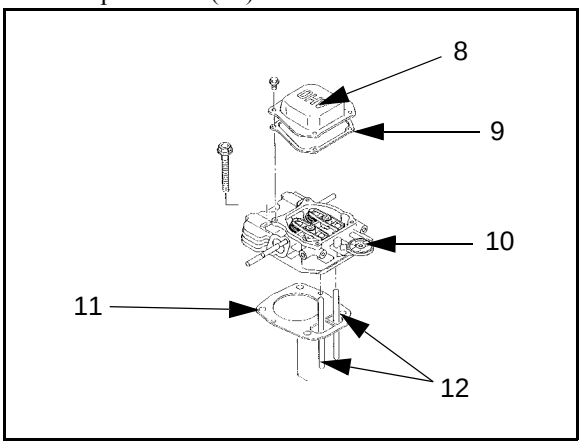


NOTE: To aid in removal of flywheel key, tap with screw driver lightly with hammer to unseat.

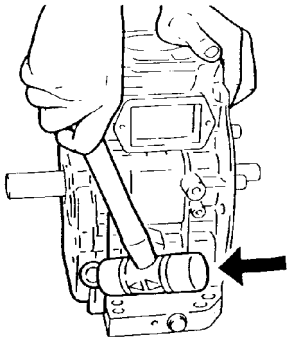


15. Remove spark plug from cylinder head.

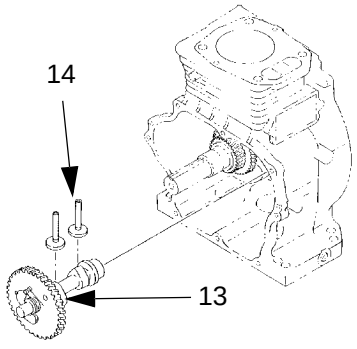
16. Remove rocker cover (8) and gasket (9) from cylinder head (10).
17. Remove cylinder head from crankcase.
18. Remove the cylinder head gasket (11) from the cylinder head.
19. Remove push rods (12).



20. Remove main bearing cover fastening bolts.
21. Remove main bearing cover using plastic hammer.

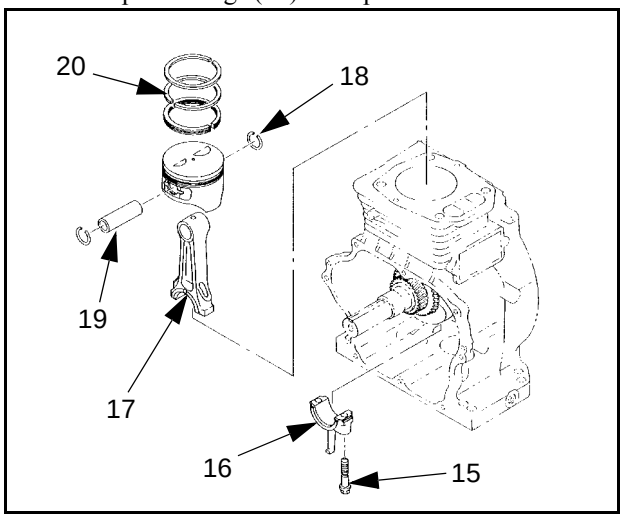


22. Remove cam shaft (13) from crankcase.
23. Remove tappets (14) from crankcase.



24. Remove connecting rod bolt (15) after scraping off carbon from cylinder and piston.
25. Remove connecting rod cap (16).
26. Remove connecting rod (17) from upper side of crankcase after rotating crankshaft so that piston comes up to top dead center.

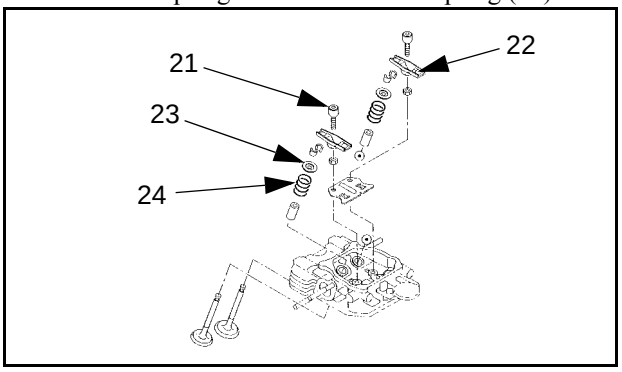
27. Remove clips (18) and piston pin (19).
28. Remove piston from connecting rod.
29. Remove piston rings (20) from piston.



30. Remove crankshaft by tapping the flywheel end with a rubber mallet.
31. Loosen the cam lock nut and remove pivot bolt (21).
32. Remove rocker arms (22).

> **⚠ CAUTION**
>
> Wear eye protection to prevent injury.

33. Press down spring retainer (23), take out valve collets (24), then remove spring retainer and valve spring (25).



34. Remove intake and exhaust valves.

ENGINE ASSEMBLY

Engine Assembly Torques

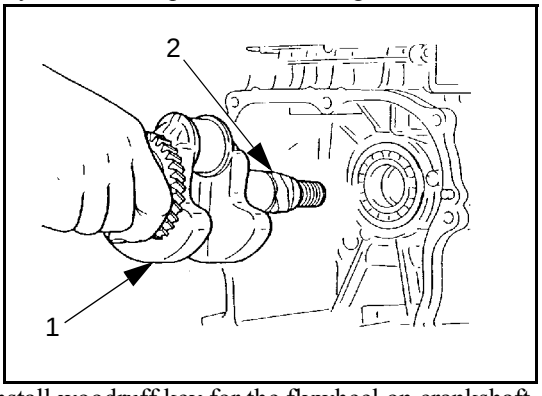
Item	ft.lb	Nm
Connecting Rod Cab Bolt	6.5-8.3	8.8-11.2
Crankcase Bolt Torque	6-7	8-9.5
Cylinder Head (Step 1)	3.6	5
Cylinder Head (Step 2)	7.2	10
Cylinder Head (StepFinal)	17-20	23-27
Spark Plug	12-14	16.6-19.3
Flywheel Nut	43-47	59-63
Ignition Coil Fasteners	6.5-8	8.8-11

PRECAUTIONS FOR REASSEMBLY

1. Clean parts thoroughly before reassembly. Pay attention to cleanliness of piston, cylinder, crankshaft, connecting rod, and bearings.
2. Scrape off all carbon deposits from cylinder head, piston top and piston ring grooves.
3. Replace oil seal. Apply oil to the lip before reassembly.
4. Replace all the gaskets with new ones.
5. Replace keys, pins, bolts, nuts, etc., if necessary.
6. Torque bolts and nuts to specification.
7. Apply oil to rotating and sliding portions.
8. Check and adjust clearances and end plays where specified in this manual.

ENGINE REASSEMBLY

1. Install crankshaft in crankcase wrapping the shaft with vinyl electrical tape to avoid damage to oil seal.

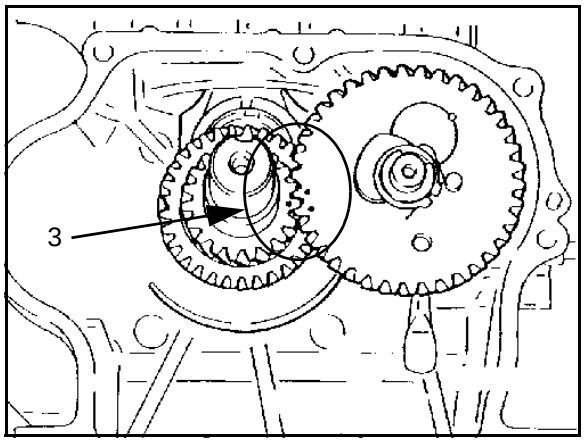


2. Install woodruff key for the flywheel on crankshaft.
3. Oil tappets and install them in their original position. Push in fully to avoid damage during installation of camshaft.

4. Lubricate bearing surfaces of camshaft. Align the timing mark on the crankshaft gear with the timing mark on the camshaft (3) and install the camshaft in the crankcase as shown in the illustration.

⚠ CAUTION

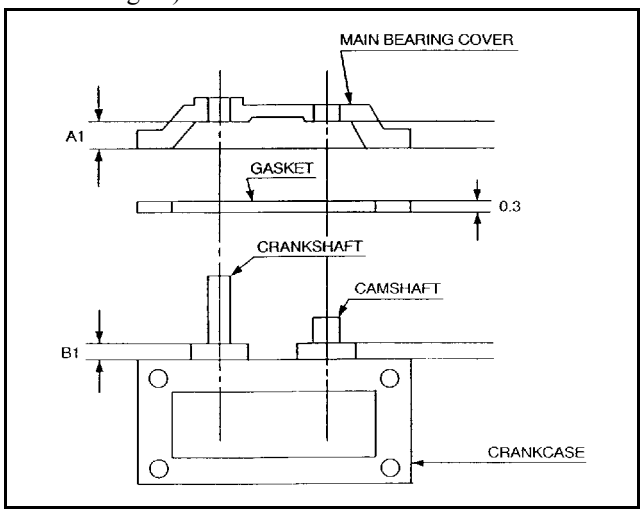
Incorrect valve timing will cause engine malfunction.



5. Adjust end play to the specified values using the proper spacer. The proper spacer may be determined in the following manner.

   • Measure the depth A1 (From mating surface to the inner race of the ball bearing).

   • Measure the height B1 (From mating surface to the crank gear).



= In. / mm.

***MM=(A1+0.3)-B1=SIDE Clearances)**

***SIDE CLEARANCE-0.2 = THICKNESS OF CRANKSHAFT SHIM(mm) required**

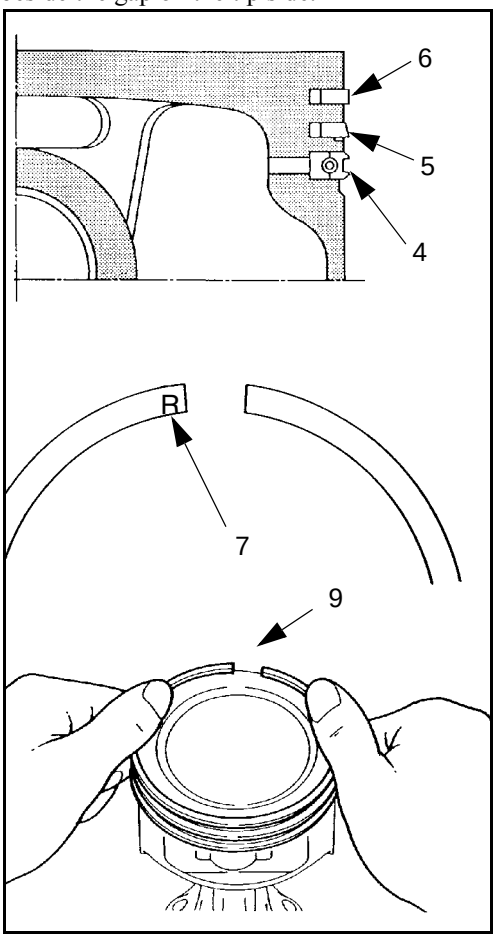
****STD=(A1+0.012”)-B1=SIDE CLEARANCE (inches)**

****SIDE CLEARANCE-0.008” = THICKNESS OF CRANKSHAFT SHIM(inches) required**

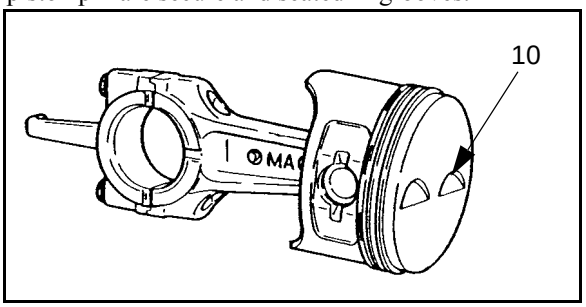
Following are available spacer shims.

Size	Crankshaft
T=0.6mm (0.024")	3086537
T=0.8mm (0.031")	3086538
T=1.0mm (0.039")	3086539

6. Install the oil ring first (4), then second ring (5), then top ring (6). Spread the ring only far enough to slip over the piston and into the correct groove (7). Use care not to distort the ring. Install the second ring with the punched mark "R" (8) beside the gap on the tip side.



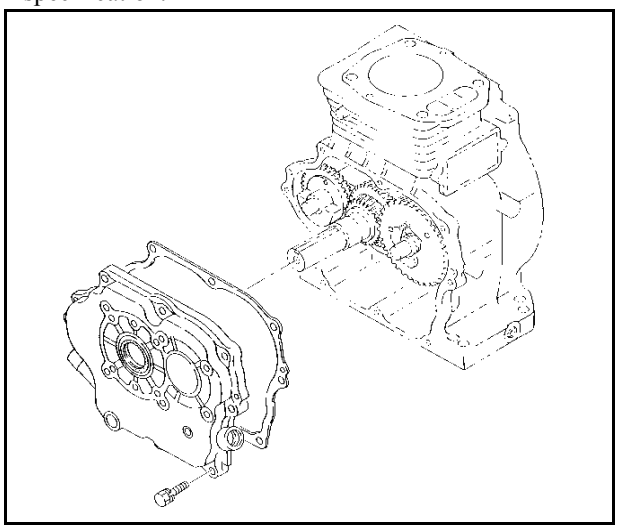
7. When installing the piston on the connecting rod, place the valve recess (10) of the piston crown as shown in the illustration to the "MAG" side of the connecting rod. Apply oil to the small end of the connecting rod, piston and piston pin before installation. Be sure clips on both ends of the piston pin are secure and seated in grooves.



8. Install connecting rod cap.
9. Torque Connecting Rod to specification.

= T
Connecting Rod Cap Bolt 6.5-8.3 ft.lb (8.8-11.2Nm)

10. Lubricate the oil seal and bearing surfaces. Add a light film of oil to the main bearing cover face to hold the gasket in place. Place spacers chosen on crankshaft and camshaft. Carefully install cover, guiding oil seal over shaft to avoid seal damage and to prevent spring from dislodging when installing the main bearing cover. Tap the cover into place with a soft face hammer. Tighten crankcase bolts to specification.



= T
Crankcase Bolts 6-7 ft.lb. (8-9.5Nm)

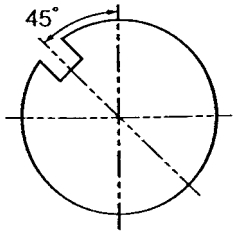
11. Clean carbon and gum deposits from the valves, seats, ports, and guides. Inspect the valves, valve seats, and valve guides
12. Replace valves that are badly burned, pitted, or warped.
13. When installing valves in cylinder head, oil valve stems and insert them into the valve guide. Then place cylinder head on a flat table, install the valve springs, spring retainers, and valve collets.
14. Valve guides should be replaced when the valve stem clearance exceeds specifications. Draw the valve guides out and press the new guides in. See "CLEARANCE DATA & LIMITS" on page 4.5. After replacing the valves and guides, lap valves in place until a uniform ring shows around the face of the valve. Clean valves and wash cylinder head thoroughly.

15. Install cylinder head to cylinder with new head gasket. Tighten four flange bolts evenly in three steps by the following tightening torque:

= T
Cylinder Head
1st step 3.6 ft.lb (5Nm)
2nd Step 7.2 ft.lb (10Nm)
Final Step 17-20 ft.lb. (23-27Nm)

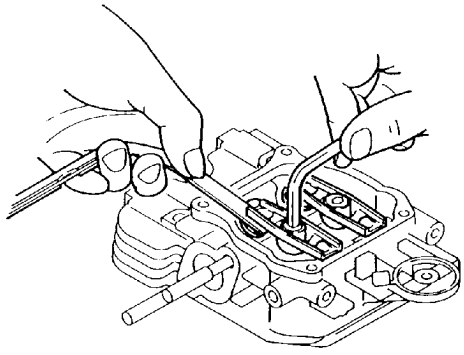
16. Insert push rods into crankcase. Put push rod tip in the hollow of tappet top.
17. Apply oil to the rocker arms and assemble them to the cylinder head using pivot bolt and guide plate.
18. Position the piston at top dead center of the compression stroke. Top dead center may be obtained by placing the key slot of the power take off shaft to 10 o'clock position.

Top Dead Center



PTO shaft end view

19. Loosen nut under rocker arm and turn the pivot bolt to adjust the clearance between the rocker arm and valve stem end. Tighten the lock nut under rocker arm.



= In. / mm.
Valve Clearance (Intake & Exhaust): .0031"-.0047" (.08-.12mm)

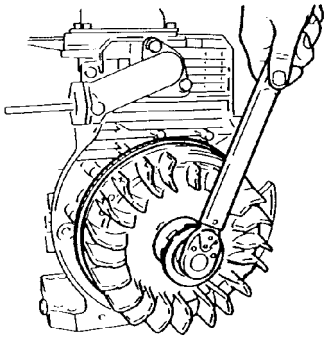
NOTE: Check and adjust valve clearance while engine is cold. Check operation of valves by turning crankshaft. Recheck valve clearance.

20. Install rocker cover and new gasket.
21. Install spark plug in cylinder head.
    - NGK BR6ES

= T
Spark Plug 12-14 ft.lbs. (17-19Nm)

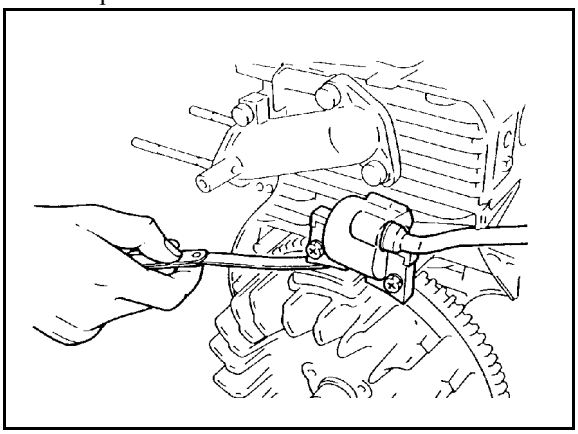
22. Insert woodruff key in key way of crankshaft. Wipe off grease and oil thoroughly from tapered portion of the crankshaft and flywheel center hole.

Install flywheel to crankshaft. Hold flywheel with strap wrench to keep from turning. Tighten flywheel nut with starter pulley.



= T
Flywheel Nut 43-47 ft.lb. (59-63Nm)

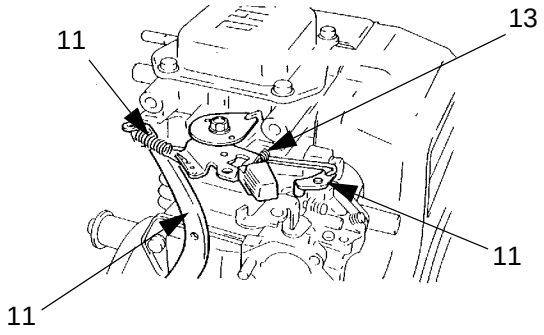
23. Install ignition coil to crankcase. Adjust air gap between ignition coil and flywheel using a feeler gauge and tighten bolts to specification.



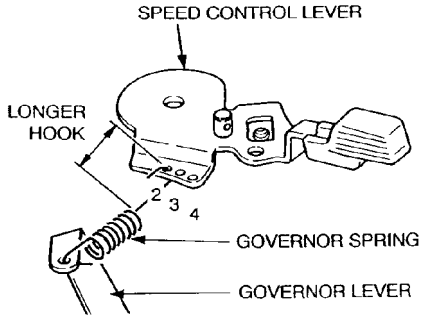
= In. / mm.
Ignition Coil Air Gap: .012"-.020" (.3-.5mm)

= T
Ignition Coil Fasteners: 6.5-8 ft.lb. (8.8-11Nm)

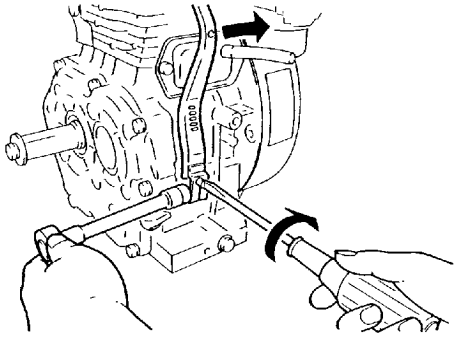
24. Install carburetor and gasket to intake pipe.
25. Connect governor lever (11) and throttle lever on carburetor with governor rod (13) and rod spring (13). Install the governor lever on the governor shaft.



26. Install speed control lever to cylinder head.
27. Connect speed control lever and governor lever with governor spring. The governor spring should be hooked to the number 2 hole on the speed control lever.



28. Turn speed control lever all the way toward high speed position and make sure the throttle valve in carburetor is at wide open position.



29. Turn governor shaft clockwise all the way using a screw driver, and tighten lock bolt and nut.
30. Install the air cleaner gasket and air cleaner case and tighten flange nuts.
31. Install blower housing and recoil. Insert the high tension lead from ignition coil into notch of blower housing so not to pinch the lead.

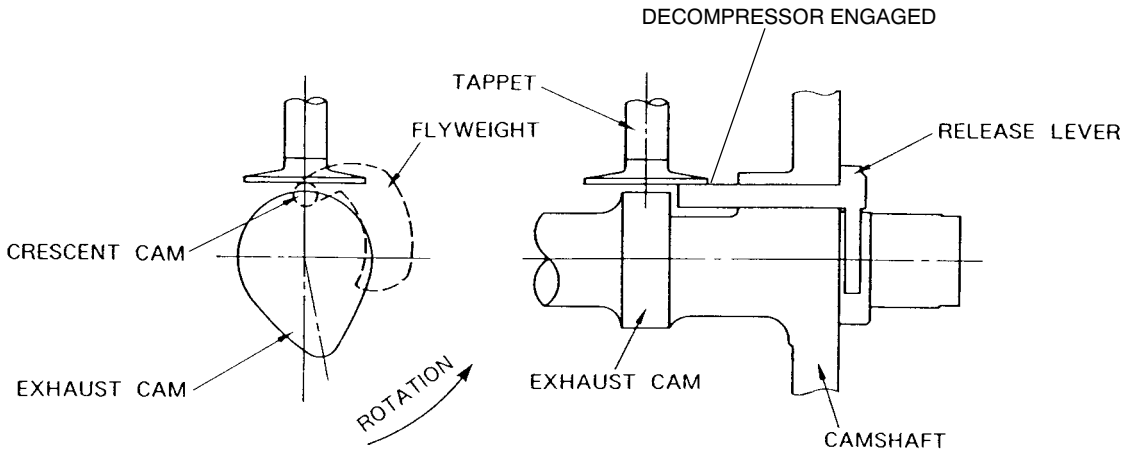
ENGINE BREAK IN

An engine that has been completely overhauled by being fitted with new piston, rings, valves, and connecting rod should be thoroughly "broke-in" before being put back into service. Four cycle engine break-in period is defined as the first 2 hours of engine operation, or 2 full tanks of fuel. Good bearing surfaces and running clearances between various parts can only be established by operating the engine under reduced speed and loads for a short period of time. While the engine is being tested, check for oil leaks. Make final carburetor adjustments and regulate the engine operating speed.

DECOMPRESSION SYSTEM

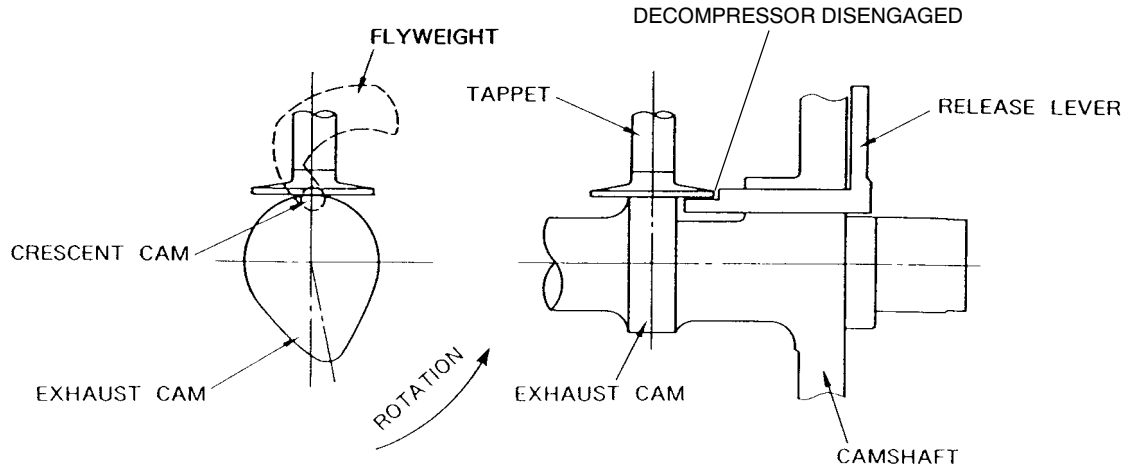
EH12-2 engines are employing an automatic decompression system as a standard feature. This enables easy and light starting of the engine. The automatic decompression system releases the compression of the engine by opening the exhaust valve slightly at cranking. Following is an example of how the system works.

At the end of the compression process, the release lever lifts the tappet which in turn opens the exhaust valve slightly to release compression. The release lever has a flyweight on one end, and a crescent cam on the other end. When the engine is cranked, the crescent cam projects the camshaft cam profile and lifts up the tappet because the gravity force on the weight is larger than the centrifugal force on the weight.



Low Speed

When crank speed reaches a certain revolution, the crescent cam is retracted into the camshaft cam profile because the centrifugal force applied to the flyweight becomes larger than the gravity force and the weight is shifted to the position shown in the illustration below.

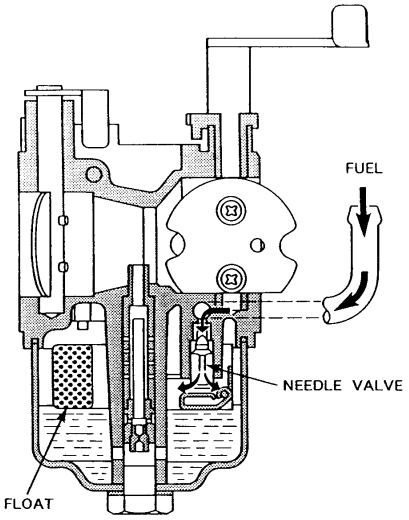


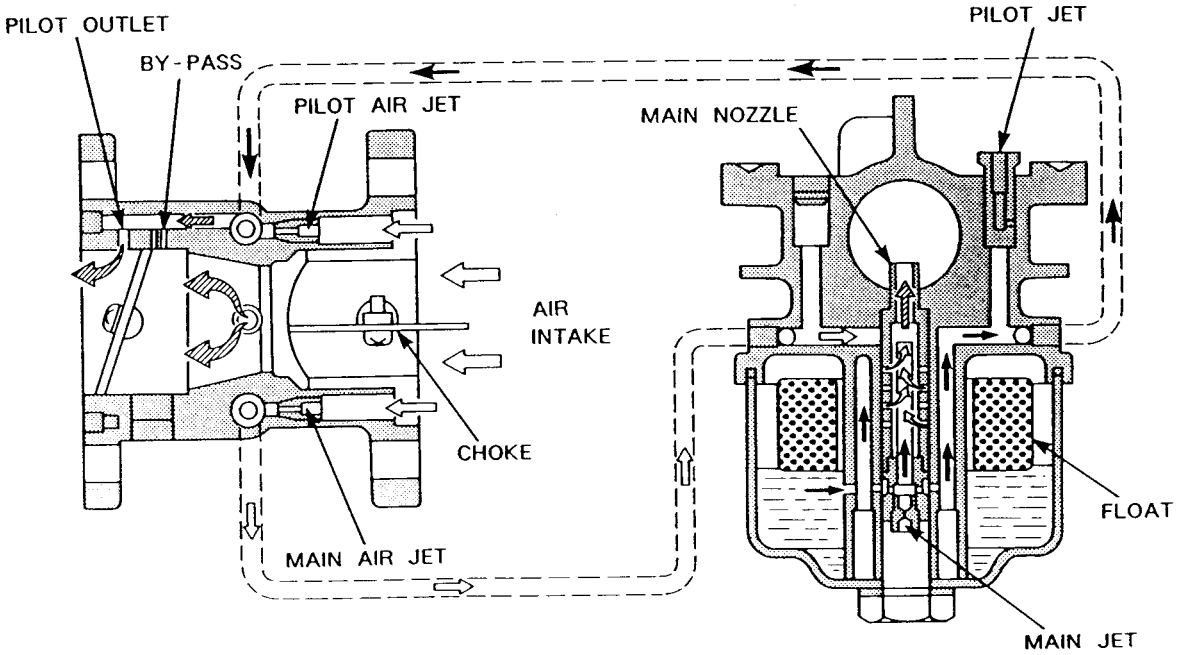
High Speed (After Start Up)

FUEL DELIVERY

The float chamber is located below the carburetor body, and, with a float and a needle valve, maintains a constant fuel level during engine operation.

Fuel flows from the fuel tank into the float chamber through the needle valve. When fuel rises to a specific level, the float rises. When its buoyancy and fuel pressure are balanced, the needle valve shuts off the fuel, thereby keeping the fuel at a predetermined
level.





PILOT SYSTEM

The pilot system feeds fuel to the engine during idling and low speed operation. Fuel is fed through the main jet to the pilot jet, where it is metered and mixed with air metered by the pilot air jet. The fuel/air mixture is fed to the engine through the pilot outlet and bypass. At idling speed, fuel is mainly fed from the pilot outlet.

MAIN SYSTEM

The main system feeds fuel to the engine at mid and high speed operation. Fuel is metered by the main jet and fed to the main nozzle. Air metered by the main air jet is mixed with fuel through bleed holes in the main nozzle, and the mixture is atomized out of the main bore. It is mixed again with air taken through the air cleaner to create an optimum fuel/air mixture which is supplied to the engine.

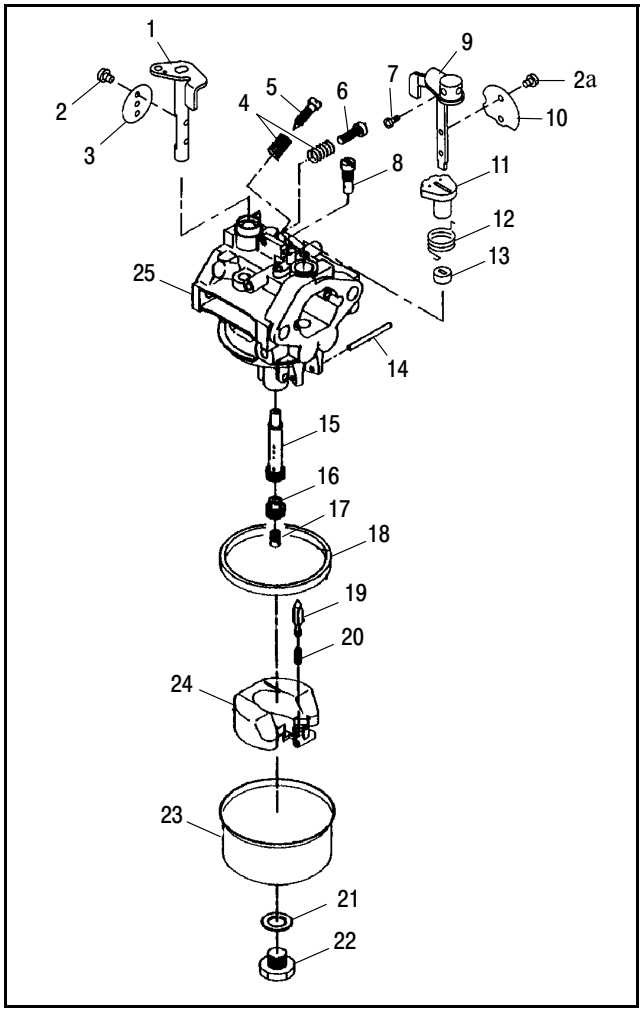
CHOKE SYSTEM

The choke may be used for easy starting when the engine is cold. When the engine is cranked with a closed choke, the negative pressure applied to the main nozzle increases and draws more fuel accordingly, starting the engine easier.

DISASSEMBLY AND REASSEMBLY

The choke may be used for easy starting when the engine is cold. When the engine is cranked with a closed choke, the negative pressure applied to the main nozzle increases and draws more fuel accordingly, starting the engine easier.

1. Remove phillips head screw (2) and throttle valve (3). Pull out throttle shaft (1).
2. The springs (4) can be taken out by removing throttle stop screw (6).
3. Remove the phillips head screw (2a) and choke valve (10). Pull out choke shaft (9)
4. When reassembling choke shaft, make sure that the cutout in the choke valve faces the main air jet. Meanwhile, when reassembling, set the rings (11 and 12) to the correct position.
5. Remove pilot jet (8) using proper tools to avoid damage.
6. When reassembling, tighten pilot jet securely, otherwise fuel may leak causing engine malfunction.
7. Remove bolt (22) and take out float bowl (23).
8. From the body (25) remove main nozzle (15), remove main jet (17) and guide holder (16) from main nozzle (15).
9. Reassembly: Fasten main jet securely to body, otherwise fuel may become too rich and cause engine malfunction.
10. Bolt tightening torque is 60 In.lbs (7 Nm). Be sure to set gasket (18) and washer (21) on float body (23)
11. Pull out float pin (14) and remove float (24), then remove clip (20) and needle valve (19). If needle valve needs to be replaced, replace it with genuine Polaris parts.
12. When removing needle valve and float, gently tap one side using a rod thinner than the float pin.
13. Float level height is set and is non-adjustable. If float is damaged or not working correctly in any way, it must be replaced.



#	ITEM	#	ITEM
1	Throttle Shaft	13	Ring
2	Screw	14	Pin
3	Throttle Valve	15	Main Nozzle
4	Spring	16	Jet Holder
5	Adjuster	17	Main Jet
6	Screw	18	packing
7	Screw	19	Needle
8	Pilot Jet	20	Spring
9	Choke Lever	21	Packing
10	Choke Valve	22	Bolt
11	Ring	23	Body Float
12	Return Spring	24	Float

RECOIL STARTER

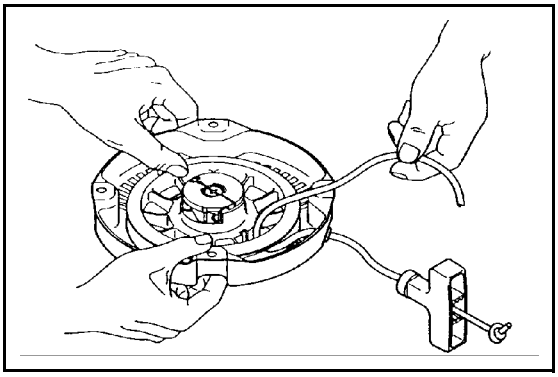
Equipment needed: Screwdriver, pliers, and protective glasses.

> **⚠ WARNING**
>
> Before starting disassembly, make sure to wear protective glasses.

DISSASSEMBLY

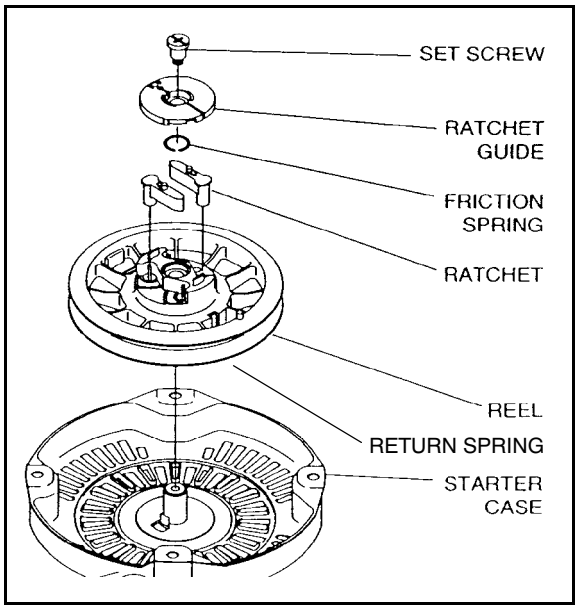
1. Hold starter knob and extract starter rope.
2. Extract rope fully and hold rope so knob of rope in reel makes direct line with rope guide.
3. Push and hold reel with thumbs of both hands firmly so that rope will not wind back.
4. Pull knot of rope out of reel. Unfasten knot and pull it off to the direction of starter knob. (2 persons required)
5. By controlling the reel with the thumbs of both hands, unwind rope gently until rotation of reel stops.

> **⚠ WARNING**
>
> Spring tension is highest when rope is fully extracted. Therefore, do not abruptly lift your hand or loosen finger pressure unintentionally



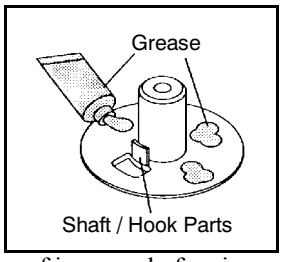
6. Secure the case in a vise or clamp and loosen set screw.
7. Remove set screw, ratchet guide, friction spring, and ratchet in order shown in diagram.
8. Push reel lightly so that it will not float up. Move reel clockwise and counterclockwise about one quarter circle several times until it moves smoothly.
9. Lift up reel gradually and slowly, pulling it away from the case.
10. If spring in reel is close to popping up, re-perform previous steps.

> **⚠ WARNING**
>
> Do not drop or shake the reel. Hold the spring in the reel when removing. Put it on a level table because there is a spring set in the disassembled reel.

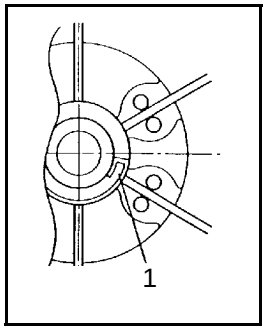


ASSEMBLY

1. Apply grease to case as shown.

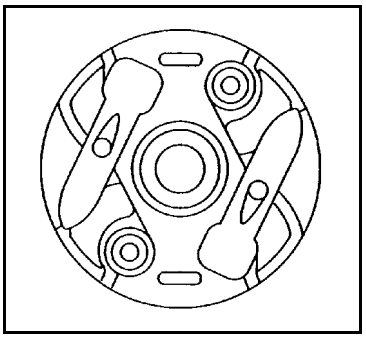


2. Adjust position of inner end of spring, which is set in reel. The position of the end touches the rib of the bearing (1).

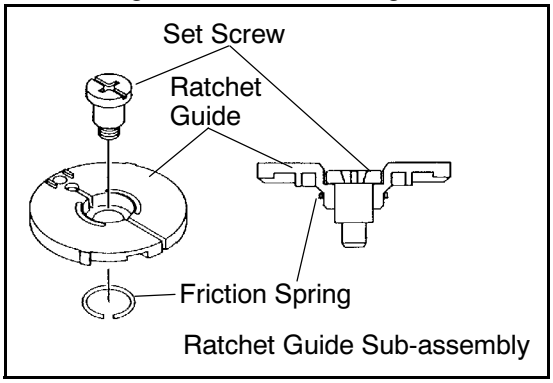


3. Hold reel so shaft/hook part and inner end of spring are hooked together. Drop reel gently from above into case.

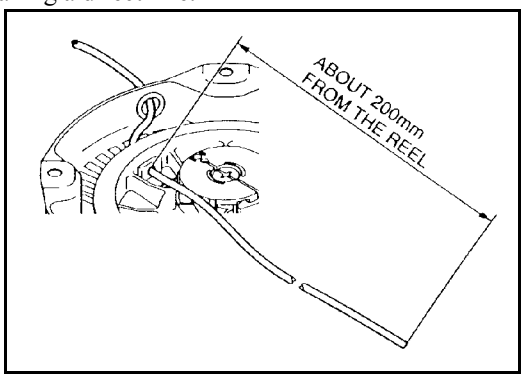
4. Move reel slightly counter-clockwise and make sure spring is hooked.
5. Set ratchet into reel.



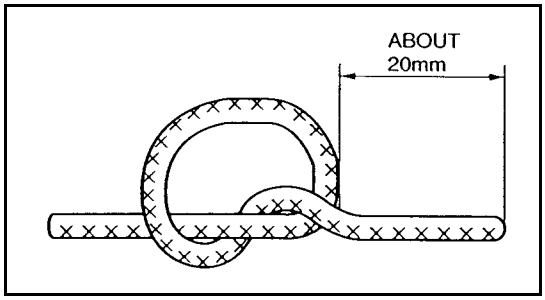
6. While holding ratchet, install ratchet guide sub-assembly.



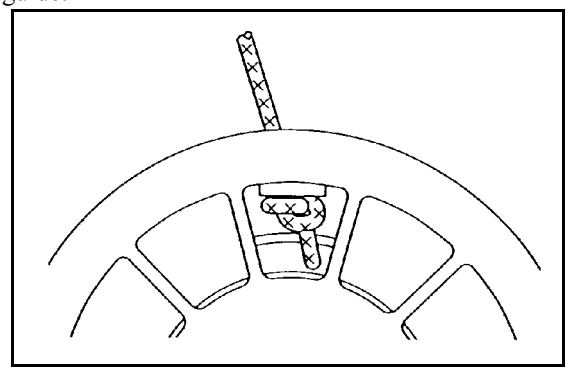
7. Push ratchet guide lightly by hand so that the ratchet guide won't move and tighten set screw
8. Hold case tight and using both hands, wind reel counter-clockwise 6 times.
9. Stop the reel so the hole of the reel and rope guide line up making a direct line.



10. Install rope through rope guide and rope hole of reel and pull the end about 20 cm out of the reel.



11. Fasten end of rope.
12. Insert rope into reel. Make sure rope will not float up.
13. Hold rope firmly with one hand at a point about 50 cm from rope guide. Keep rope slightly pulled so that rope will not be wound in.
14. Lift your hand off reel gently while guiding rope through guide under pressure of spring until knob reaches rope guide.



15. Test operation of recoil starter to see if rope recoils correctly and the ratchets project and retract properly. Mount recoil starter to the engine.
16. If spring escapes from reel when disassembling recoil, hook outer end of spring onto notch of reel and rewind spring into housing.
17. Lubricate rotating parts, sliding parts, and spring with Polaris Premium All Season Grease when reassembling recoil and prior to long term storage.

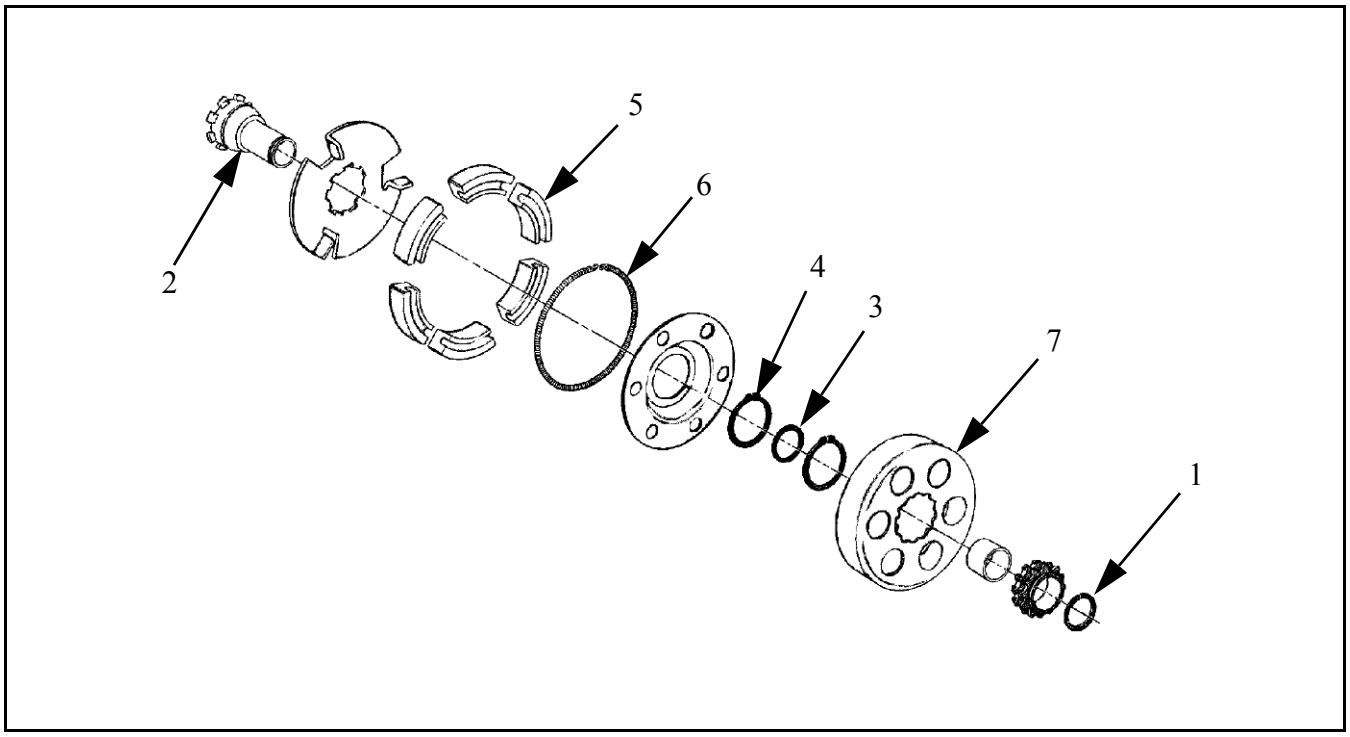
⚠ WARNING

Spring tension is highest when reel is being wound. Do not abruptly lift your hand or loosen pressure of your fingers unintentionally

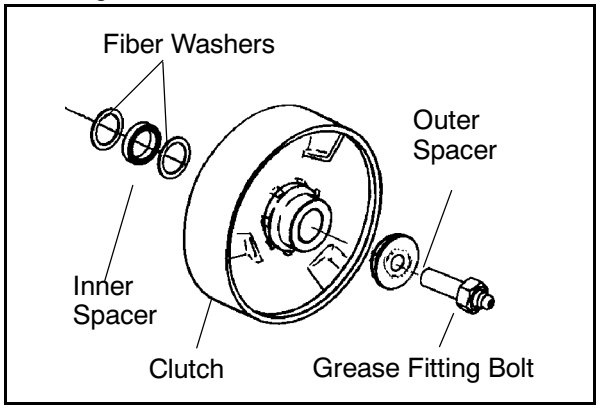
CLUTCH

The 120 clutch has no service parts and can only be replaced as an assembly. However, if too much grease is introduced into the clutch, there may be lack of performance due to clutch weights slipping too much on drum. The clutch may be taken apart and cleaned using parts washer solvent and air.

CLUTCH SERVICE



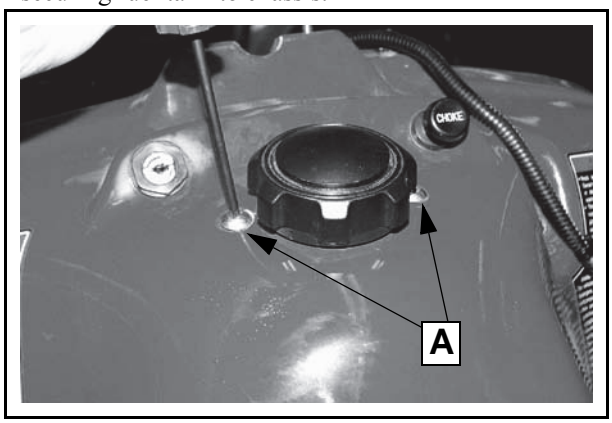
1. Remove snap ring (1) and separate drum (2) from clutch.
2. Remove grease seal fiber washer (3).
3. Remove clutch weight holder snap ring (4).
4. Separate the clutch parts and wash thoroughly in parts washer.
5. Assemble clutch weights (5) and spring (6).
6. Assemble clutch and install snap ring (4).
7. Install grease seal fiber washer (3).
8. Install drum (7) and snap ring (1)
9. When clutch is installed and torqued to specification, pump two (2) pumps initially of Polaris Premium All Season grease in fitting. After initial greasing, pump 1/2 to 1 pump every 10 hours
10. When assembling clutch on shaft, it is important to assemble in correct order.



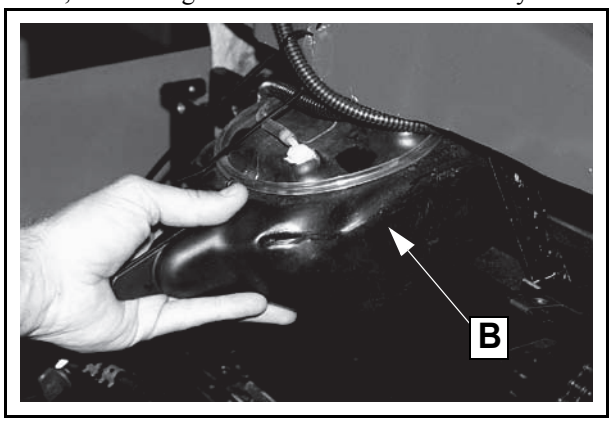
FUEL TANK

FUEL TANK REMOVAL

1. Drain fuel from tank.
2. With engine removed, loosen the two Torx™ screws (A) securing fuel tank to chassis.



3. Remove fuel tank (B) by sliding filler neck through top hole first, and sliding tank out front of seat assembly.



FUEL TANK INSTALLATION

= T
Fuel Tank Fasteners 6 ft.lb (8.3Nm)

1. Installation is reverse order of removal.
2. Torque the fuel tank fastening screws to 6 ft.lb (8.3Nm).

TROUBLE SHOOTING

FUEL SYSTEM

1. Carburetor not choked sufficiently when engine is cold.
2. Water, dust, or gum in gasoline interfering with fuel flow to carburetor.
3. Inferior grade gasoline or poor quality gasoline not vaporized enough to produce correct fuel/air mixture.
4. Carburetor needle valve held open by dirt or gum. This trouble can be detected as fuel flows out of the carburetor when engine is idling.
5. If carburetor overflows, excessive fuel runs into the cylinder when starting the engine, making the fuel/air mixture too rich to burn. If this happens, remove the spark plug and pull the recoil a few turns to let the rich fuel/air mixture dissipate through the spark plug hole. Keep the choke open during this operation. Dry the spark plug thoroughly, screw it in to place, torque to specification, and try to start again.

IGNITION SYSTEM

1. Wires of the ignition coil and/or spark plug disconnected.
2. Ignition coil damaged or shorted.
3. Spark plug cable wet or soaked with oil.
4. Spark plug dirty or wet.
5. Spark plug electrode gap incorrect.
6. Spark plug electrode is connected or bridged.
7. Incorrect spark timing.

COMPRESSION SYSTEM

If starting difficulties and loss of power are not due to the fuel or ignition system, the following must be checked for possible lack of compression.

1. Cylinder walls are dry and free of oil due to a period of long storage.
2. Loose or broken spark plug. This causes a hissing sound made by mixture gas escaping from cylinder in compression stroke during cranking.
3. Damaged head gasket or loose cylinder head. A similar hissing sound is produced during compression stroke.
4. Incorrect valve clearance:

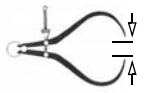
If the correct compression is not obtained even after remedying the above, disassemble the engine and check further as follows:

a) Valve stuck open due to carbon or gum on the valve stem.

b) If piston rings are stuck on piston, remove piston and connecting rod from engine. Clean or replace parts.

ENGINE MISFIRES

1. Incorrect or worn spark plug electrode gap. Adjust to .025” (0.635 mm).



Sparkplug Gap: .025" (.635mm)

2. Ignition cable worn or cracked.
3. Spark weak.
4. Ignition wire connections loose.
5. Water in gasoline.
6. Insufficient compression.

ENGINE STOPS

1. Fuel tank empty. Water, dirt, gum, etc. in gasoline.
2. Vapor lock, i.e. gasoline evaporating in fuel lines due to overheat around engine.
3. Vapor lock in fuel lines or carburetor due to use of too volatile winter gas in warm season.
4. Air vent hole in fuel tank cap plugged.
5. Bearing parts seized due to lack of oil.
6. Magneto or ignition coil faulty.

ENGINE OVER HEATS

1. Crankcase oil level low. Add oil immediately.
2. Spark timing incorrect.
3. Low grade gasoline used, or engine is overloaded.
4. Cooling air circulation restricted.
5. Cooling air path misdirected causes loss of cooling efficiency.
6. Cylinder head cooling fins clogged up with dirt.
7. Engine operated in an enclosed space without sufficient cooling air.
8. Exhaust system restricted, or carbon deposits in combustion chamber.
9. Engine running on low octane gasoline detonates due to heavy load at low speed.

ENGINE KNOCKS

1. Poor quality gasoline.
2. Engine operating under heavy load at low speed.
3. Carbon deposits on cylinder head.
4. Spark timing incorrect.
5. Loose connecting rod bearing due to wear.
6. Loose piston pin due to wear.

ENGINE BACKFIRES THROUGH CARBURETOR

1. Water or dirt in gasoline, or low grade gasoline.
2. Intake valve stuck.
3. Valves overheated, or hot carbon particles in combustion chamber.
4. Engine cold.

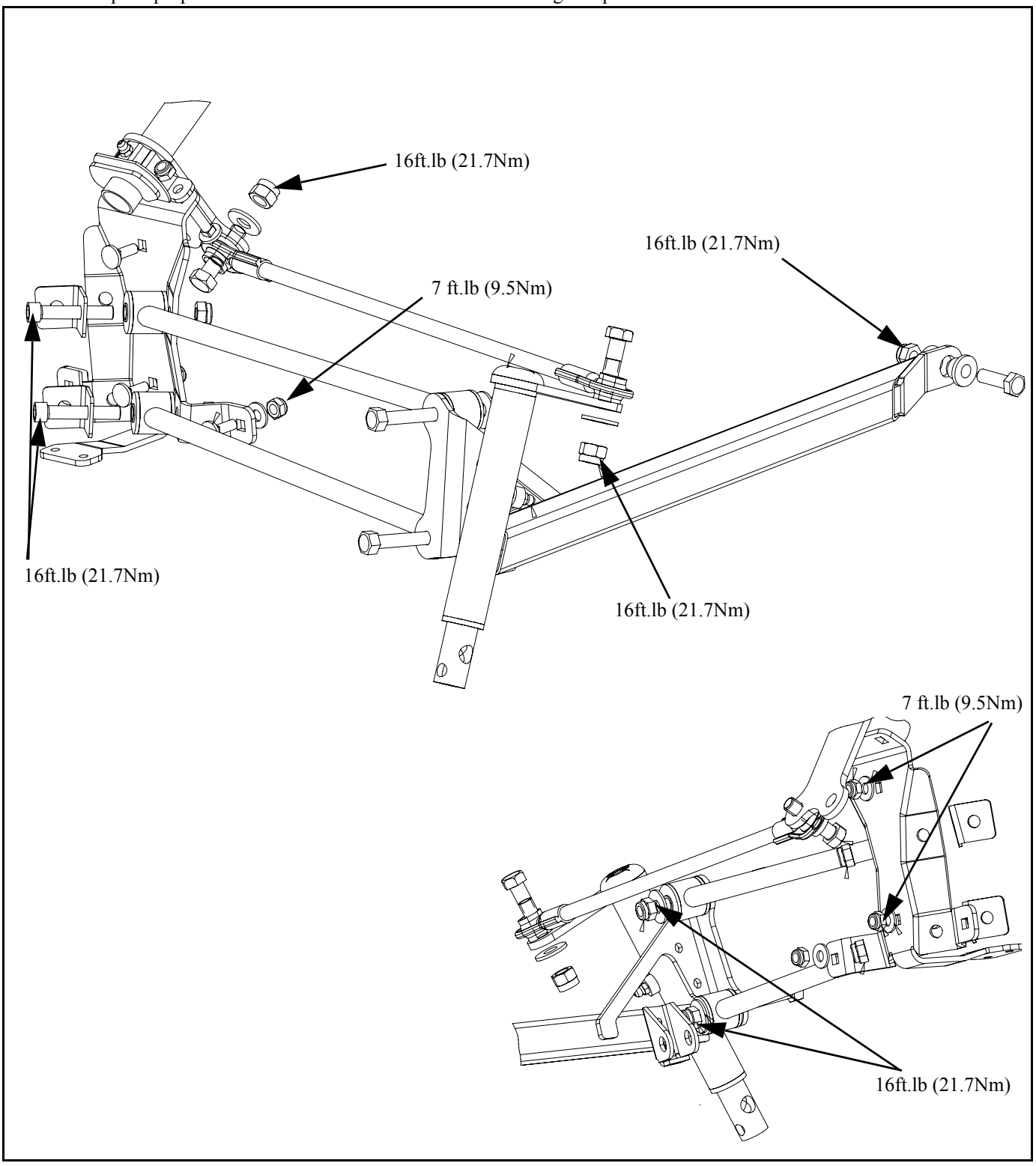
CHAPTER 5
BODY/STEERING

5

TORQUE APPLICATIONS

Due to the special grade bolts and nuts required for specific applications, observe the following torque values in the areas specified. Refer to exploded views for torque values and orientation of components and fasteners.

Illustration depicts proper orientation of rod ends and bolts on steering components.



STEERING

INSPECTION

Prior to performing steering alignment, inspect all steering and suspension components for wear or damage and replace parts as necessary. Refer to steering assembly exploded views in this chapter for identification of components and torque values of fasteners. While disassembling, make notes of what direction a bolt goes through a part and what type of nut is used in an application.

Some of the fasteners used in the IFS are special and cannot be purchased at a hardware store. Always use genuine Polaris parts and hardware when replacing front end components.

The following components must be inspected at this time:

- Tie rods and tie rod ends
- Radius rods and radius rod ends
- Handlebars and steering post assembly
- Spindles and bushings
- Trailing arms and bushings
- Skis and skags
- Steering arms
- Shock absorbers, shock mounts, springs
- All related fasteners - check torque. Refer to steering exploded views at the beginning of this section.
- Grease all fittings.

HANDLEBAR ADJUSTMENT

Handlebars on the 2002 - current 120's can be adjusted to accommodate rider preference.

1. Turn the fuel valve to the off position, then remove the handlebar pad.
2. Loosen the lower handlebar bolt (Do not remove).
3. Remove the top handlebar bolt from the current position.

4. There are 3 positions to adjust the handlebar.
5. Insert upper carriage bolt and torque both upper and lower carriage bolts to 15 ft. lb. (20.3Nm).

= T
Handlebar Carriage Bolts 15 ft.lb (20Nm)

6. Replace the handlebar pad.

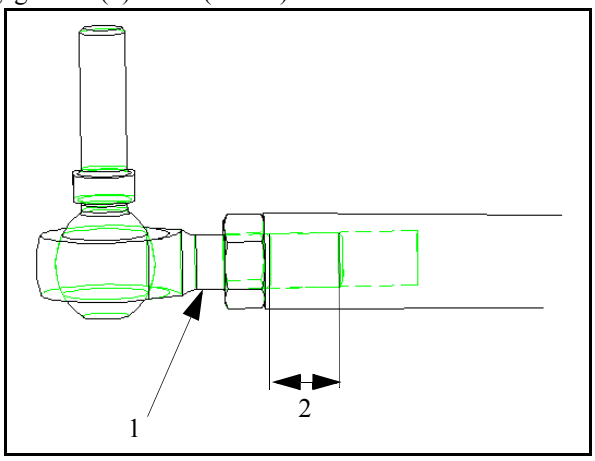
ROD END PROCEDURE

Rod ends must be parallel to their respective mounting surface after tightening jam nut. Hold the rod end and tighten jam nut. If possible, support the edge of the rod end to keep it from rotating out of position until jam nut is tight. When rod ends are properly tightened, the rod should rotate freely approximately 1/8 turn.

ROD END ENGAGEMENT

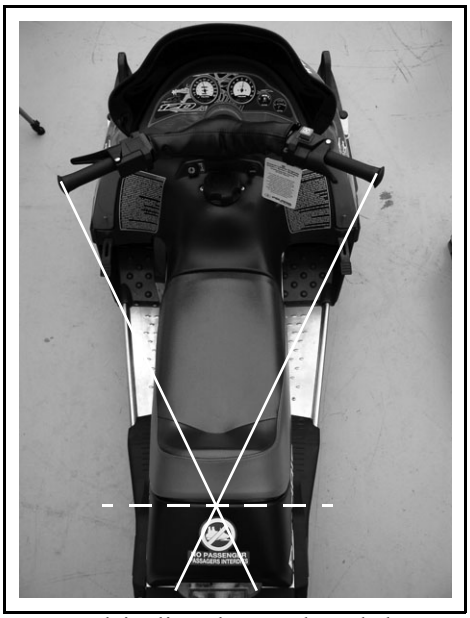
Rod ends must engage the rod a minimum of 2x the thread diameter when adjustment is complete.

Example: .4375" (11mm) rod end (1) X 2 = minimum thread engagement (2) .875" (22mm).

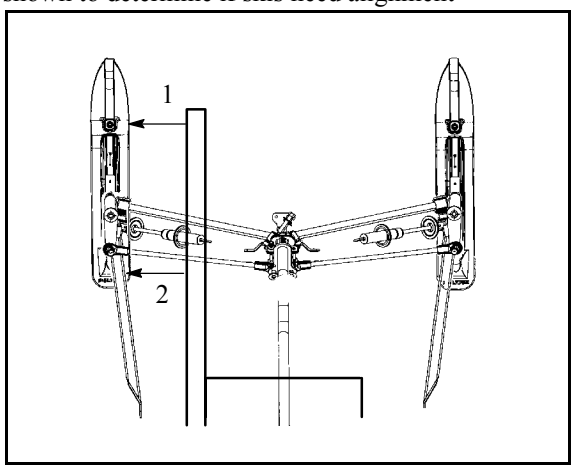


TOE ADJUSTMENT

1. With tape measure, measure from handlebar to a common point on both sides of machine to center handlebars.



2. Make sure track is aligned correctly and place a straight rod tightly against track. Take measurements at locations (1,2) shown to determine if skis need alignment



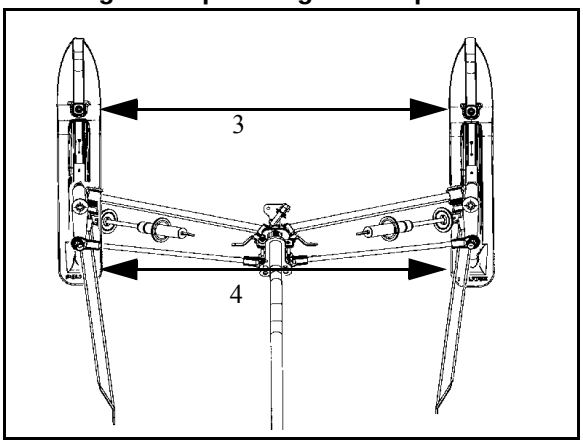
3. If skis do not measure equally, loosen tie rod end jam nuts (inner and outer) and turn tie rod until equal measurements are achieved.

4. Once you have skis in straight ahead position, measure from the straight edge of the skis. The measurement between the skis at point 3 should be 1/8 inches greater than point 4, as shown.

 = **In. / mm.**

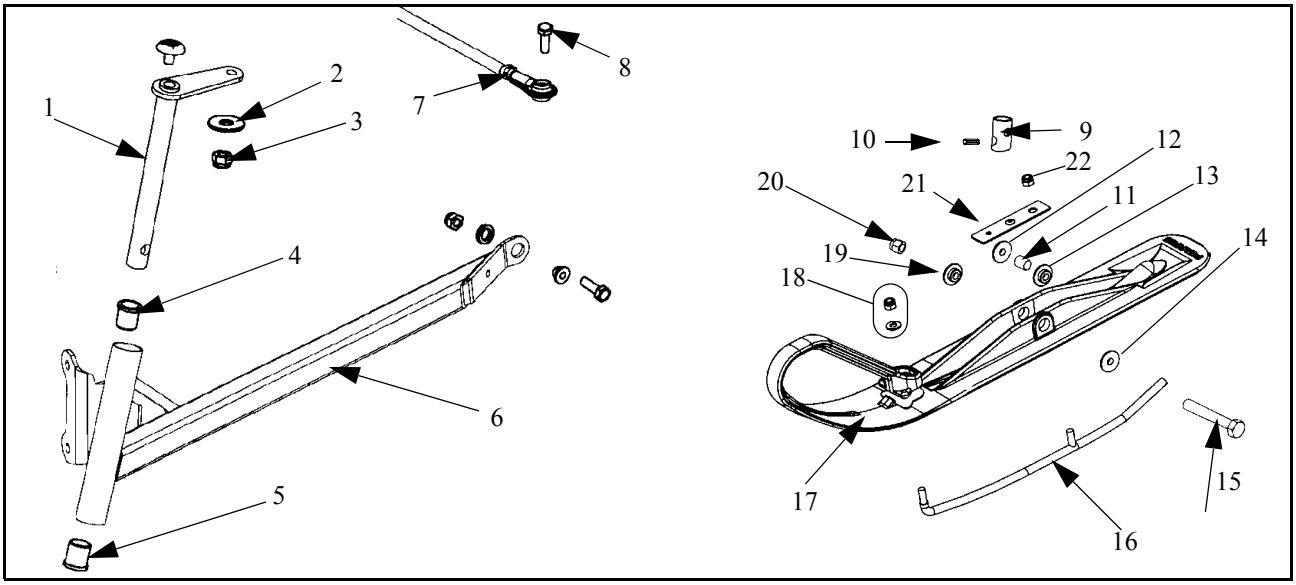
The measurement between the skis at point 7 should be 1/8” (3.175mm) greater than point 8, as shown below.

NOTE: This measurement should be taken with the vehicle weight compressing the suspension.



5. Once you have achieved the above measurements, tighten all tie rod jam nuts.

SKI SPINDLE/BUSHING REMOVAL



ITEM #	ITEM	ITEM #	ITEM
1	Spindle	12	Ski Bushing
2	Washer	13	Ski Bushing
3	Nylock Nut	14	Ski Bushing
4	Spindle Bushing (top)	15	Ski Bolt
5	Spindle Bushing (bottom)	16	Skag
6	Trailing Arm	17	Ski
7	Nylock nut	18	Nylock Nut/Washer
8	Bushing (inner)	19	Ski Bushing
9	Spindle Spacer	20	Nylock nut
10	Roll Pin	21	Ski Stop Bracket
11	Bushing	22	Nylock Nut

1. Elevate front of sled. Be sure the machine is stable and solidly supported before proceeding. Serious injury may result if machine tips or falls.
2. Remove outer steering tie rod bolt (8), washer (2) and nut (3). (Steering arm is welded to the top of the spindle).
3. Remove the tie rod (7) from the spindle.
4. Remove ski bolt (4) and nut (5) and remove the ski.
5. Using a punch remove the spindle roll pin (10).
6. Slide the spindle spacer tube (9) off the bottom of the spindle.
7. Slide the spindle (1) out from top of the trailing arm (6) and keep track of the top (4) and bottom (5) bushings.

SKI SPINDLE/BUSHING INSTALLATION

1. Grease spindle and bushings liberally with Polaris Premium All Season grease.
2. Install spindle (1), through the top bushing (4) and then into the trailing arm (6).
3. Place the bottom bushing (5) onto the spindle.
4. Place the spindle spacer tube (9) onto the spindle and align the holes.
5. Push roll pin (10) into spacer tube and press into the spindle.

NOTE: The angled part of spacer tube faces forward.

6. Install bushing (11) into the spindle.

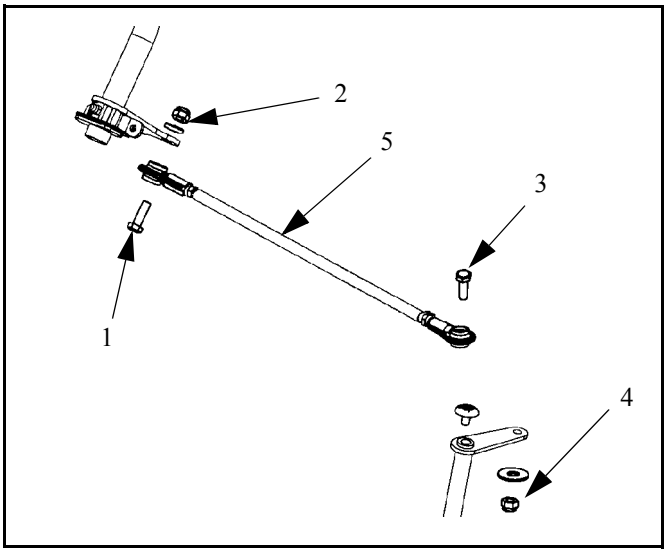
7. Install the ski assembly (11-14, 16-19 and 21-22).
8. Install the ski bolt (15) and Nylock Nut (20).
9. Insert the tie rod bolt (8) through the tie rod end and the spindle.
10. Place the washer (2) on the bottom along with the Nylock nut (3) and torque to 16 ft.lb (22 Nm).

= T
Steering Rod End: 16 ft.lb (22Nm)

SKAG REPLACEMENT

1. Remove nut (22), nut and washer (18).
2. Push down on skag studs and remove skag (16).
3. Install new skag.
4. Tighten down the fasteners.

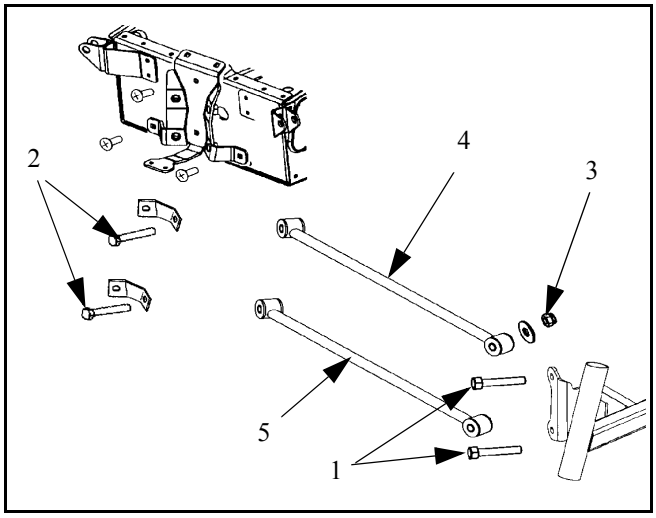
TIE ROD REPLACEMENT



1. Remove inner tie rod bolt (1), nut and washer (2).
2. Also remove the outer tie rod bolt (3), nut and washer (4).
3. Slide tie rod assembly (5) out through chassis.
4. Slide in replacement tie rod assembly.
5. Torque fasteners (2,4) to 16 ft.lb (22 Nm).

= T
Rod End Fasteners: 16 ft.lb (22Nm)

RADIUS ROD REPLACEMENT



This procedure is for either upper or lower radius rods.

1. Lift and support front end of machine.

NOTE: Be sure the machine is stable and solidly supported before proceeding. Serious injury may result if machine tips or falls.

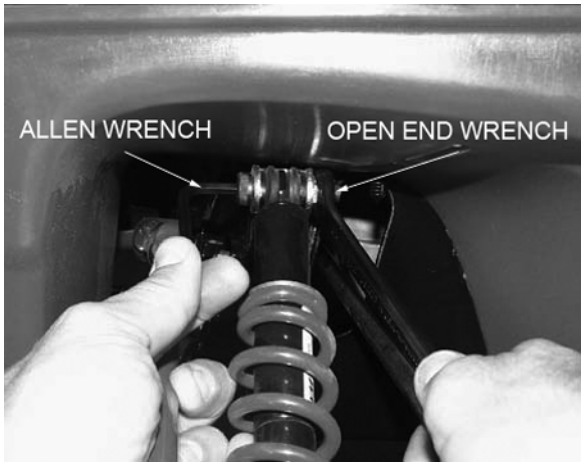
2. Remove outer radius rod bolts (1) and nuts.
3. Remove the inner radius rod bolts (2) and nuts (3).
4. Remove bushings and replace with new radius rod(4, 5).
5. Insert new radius rod in reverse of disassembly and torque bolts to 16 ft.lb (22 Nm).

= T
Radius Rod End: 16 ft.lb (22Nm)

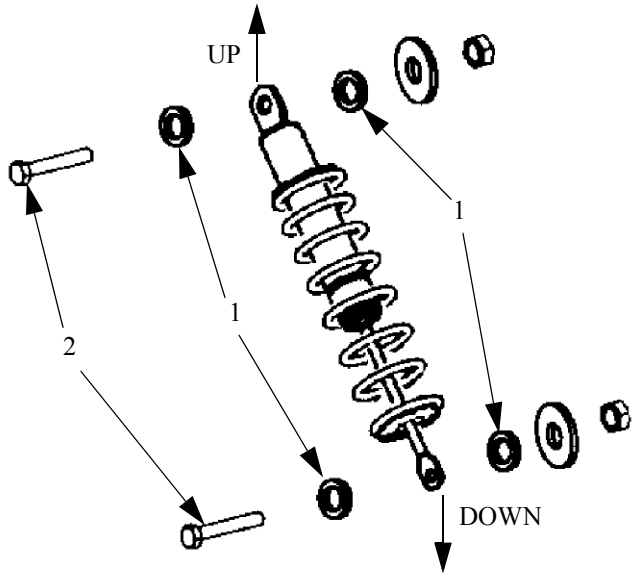
BODY

IFS SHOCK REPLACEMENT

1. Lift and support front end of machine.
2. Be sure the machine is stable and solidly supported before proceeding. Serious injury may result if machine tips or falls.
3. Using 1/2" wrench and 3/16" allen wrench, loosen and remove shock bolts.



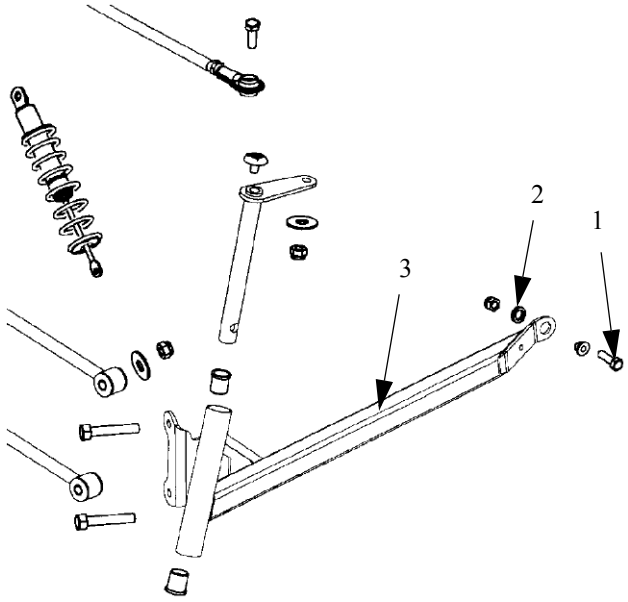
4. Remove the shock. DO NOT LOSE RUBBER GROMMETS (1).



5. Insert shock with grommets(1) installed into the eyelets so that the shock rod is facing downward. Then torque shock mounting bolts (2) to 17 ft.lb (24Nm).

= T
Shock Mounting Bolts 17 ft.lb. (24Nm)

TRAILING ARM REPLACEMENT



1. Lift and support front end of machine.

CAUTION
Be sure the machine is stable and solidly supported before preceding. Serious injury may result if machine tips or falls.

2. Remove ski, spindle, radius rods, tie rod, and shock as described previously. See "SKI SPINDLE/BUSHING REMOVAL" on page 5.5.
3. Remove rear trailing arm bolt (1). Be sure not to lose rubber washer (2).
4. Install trailing arm (3) and assemble in reverse order of disassembly. Torque all bolts to specifications.
5. Torque Trailing Arm Bolt to 16 ft.lb (22Nm).

= T
Trailing Arm Fastener: 16 ft.lb (22Nm)

6. Check alignment of skis.

DECALS

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

> **⚠ WARNING**
>
> The following procedure involves the use of an open flame. Perform this procedure in a well ventilated area, away from gasoline of other flammable materials. Be sure the area to be flame treated is clean and free of gasoline or flammable residue.

To flame treat the decal area:

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

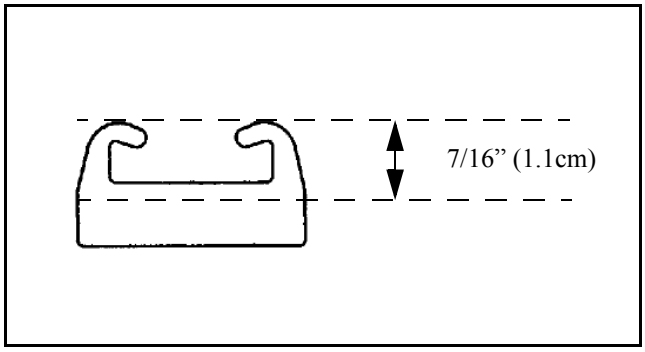
TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Machine darts from side to side	-Incorrect ski toe alignment -Loose or worn steering components or fasteners -Cracked or broken skis, or skags	-Adjust to correct toe alignment -Tighten or replace -Replace if necessary
Tie rod hits trailing arm	-Steering arm installed incorrectly -Tie rod ends worn	-Index correctly in relation to - spindle -Replace if necessary
Steering has excessive free play	-Steering bellcrank bushing worn or loose -Steering post loose -Steering post bushings worn -Tie rod ends worn -Spindle bushings worn	-Tighten or replace if necessary -Tighten as needed -Replace if necessary -Tighten as needed -Replace if necessary
Front end sags	-IFS shock spring preload too soft	-Replace shock assembly with spring

CHAPTER 6
SUSPENSION

RAIL SLIDES

RAILSLIDE REPLACEMENT

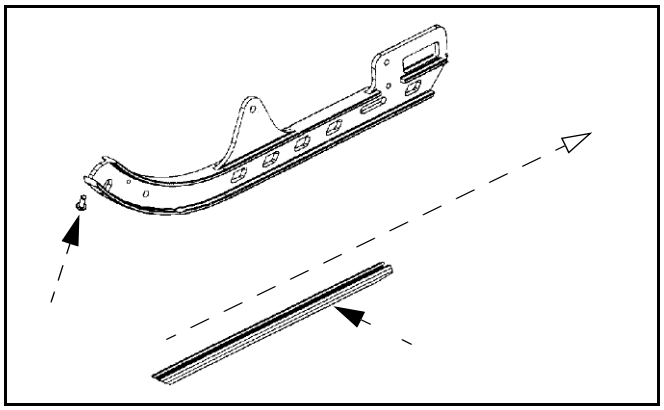


The 120 uses XTRA Lite style rail slide. When any area of the rail slide is worn to 7/16”(1.1 cm), it should be replaced. This will save wear on other vital components.

The rail slide is designed to operate in conditions with adequate snow cover to provide sufficient lubrication. Excessive wear may be due to improper alignment, improper track adjustment or machine operation on surfaces without snow.

New rail sliders are best used in deep snow conditions. Marginal snow or hard-pack conditions are better suited to worn rail sliders, or rail sliders which have been cured or broken in.

RAIL SLIDE REMOVAL

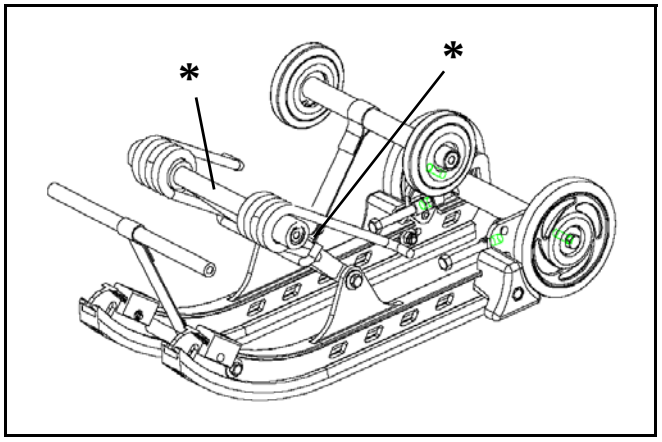


1. Remove suspension from machine.
2. Remove front rail slider retaining bolt (1).
3. Use a block of wood or a drift punch and hammer to drive rail slider (2) rearward off the slide rail.
4. With the rail slider at room temperature, install new rail slider by reversing steps 1 - 3.

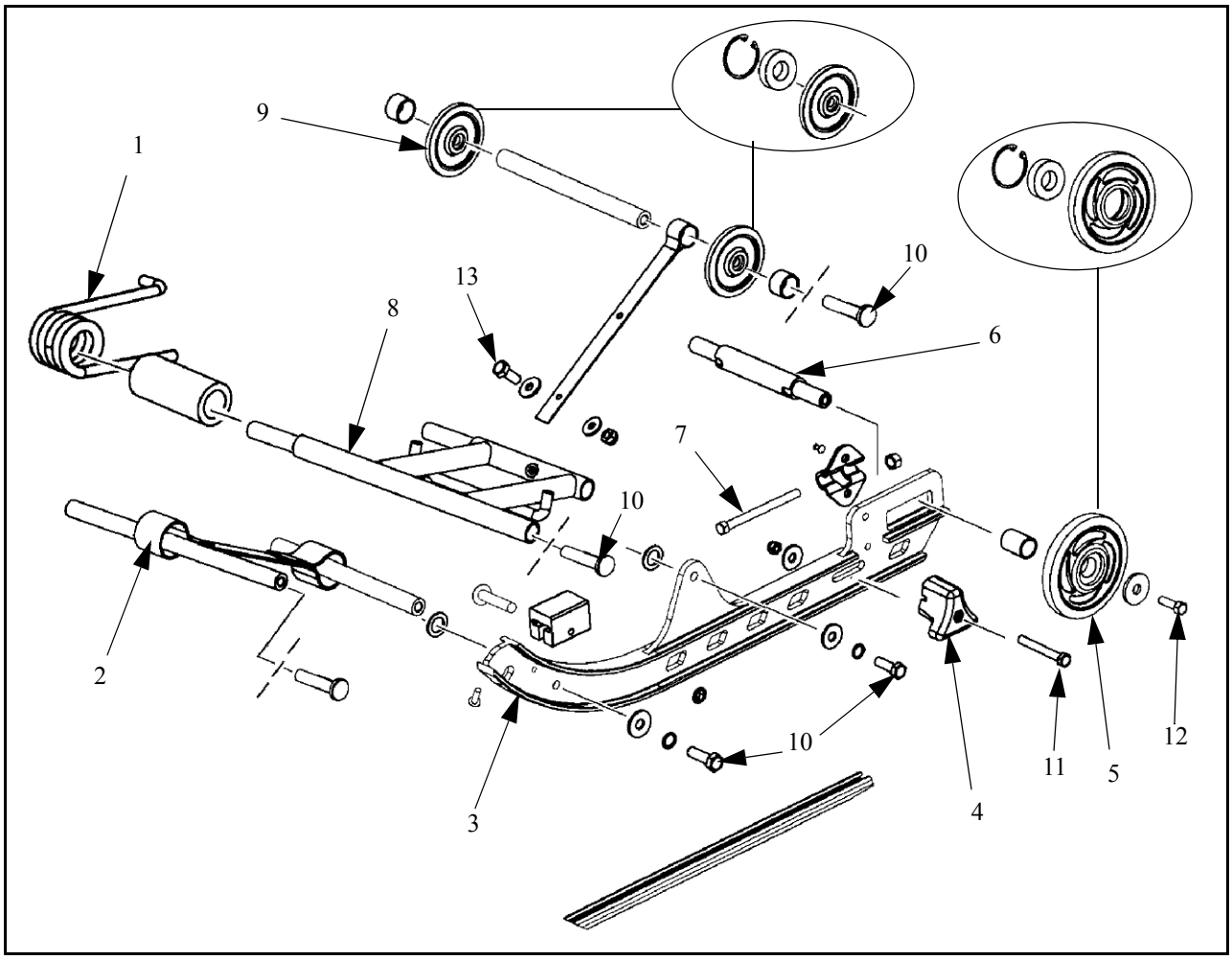
NOTE: Lightly coat rail slider track clip area with a lubricant such as LPS2 or WD-40 to ease installation.

REAR SUSPENSION

REAR SUSPENSION GREASE POINTS*



REAR SUSPENSION EXPLODED VIEW



SUSPENSION ITEMS

#	DESCRIPTION	#	DESCRIPTION	#	DESCRIPTION
1	Torsion Spring	4	Toe Block	7	Track Adjuster
2	Front Limiter Strap	5	Idler Wheel	8	Torque Arm
3	Rail	6	Rear Idler Shaft	9	Carrier Wheel

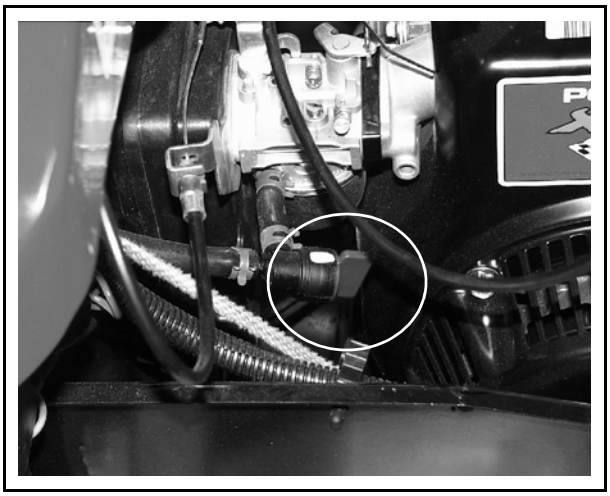
TORQUE TABLE

#	TORQUE
10	15-17 FT.LB (20-23Nm)
11	100 in.lb (11Nm)
12	40 ft.lb (54Nm)
13	6 ft.lb (8Nm)

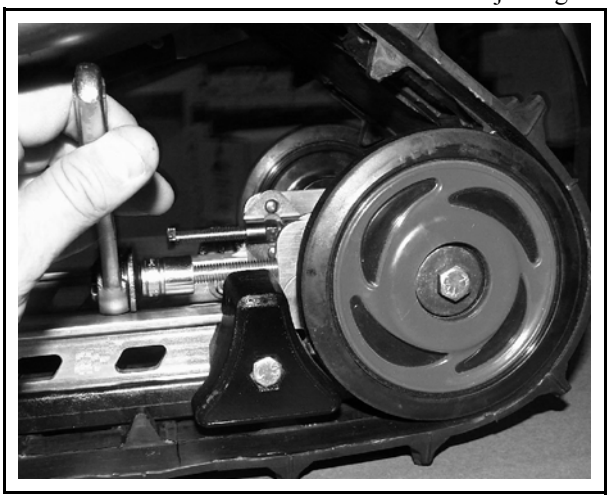
Apply Premium All Season grease (PN 2871322) to all grease fittings.

SUSPENSION REMOVAL

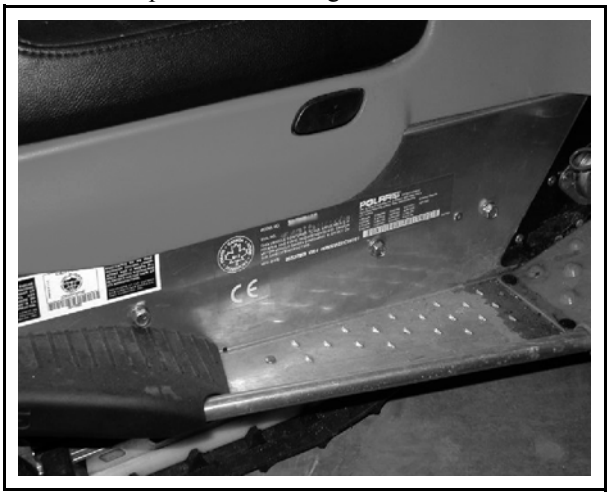
1. Shut off fuel.



2. Loosen idler wheel bolts and loosen track adjusting bolts.



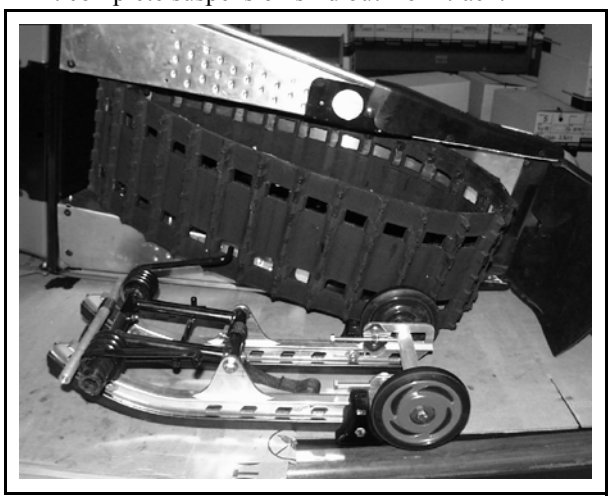
3. Place rubber mat or similar material aside right of machine and tip sled on its side (throttle side).
4. Remove suspension mounting bolts.



5. When all suspension bolts have been removed, slide skid

out and remove upper carrier wheels and shaft. Remove one wheel and spacer and slide shaft out of limiter strap.

6. Lift complete suspension skid out from track.



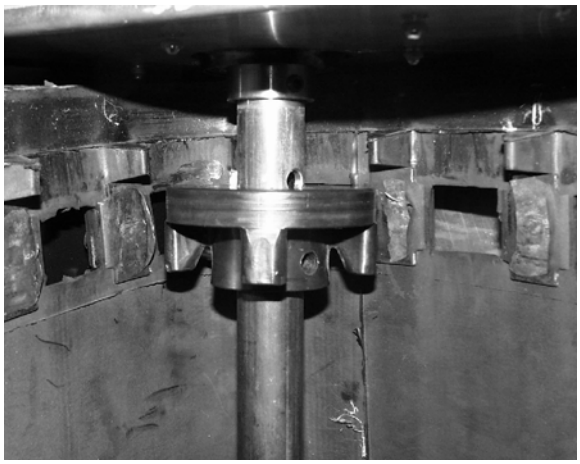
DRIVE SPROCKET & DRIVESHAFT REMOVAL

To ease rivet removal, punch out center f the rivet with a center punch prior to removal.

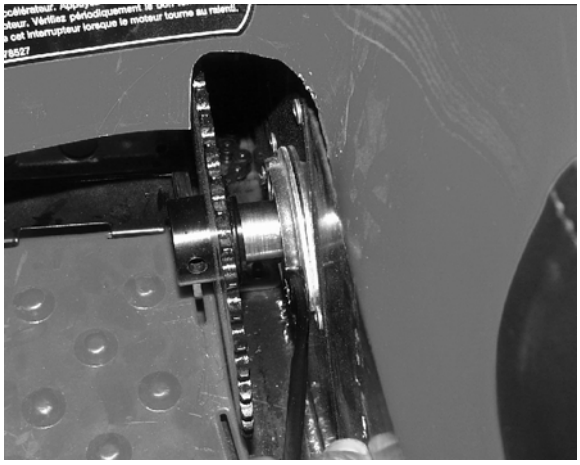
1. Drill five (5) rivets from rear sprocket guard. Remove sprocket guard by pulling back toward rear of sled.

2. Remove clutch guard, exhaust, and drive chain.
3. Drive pin out from sprocket.

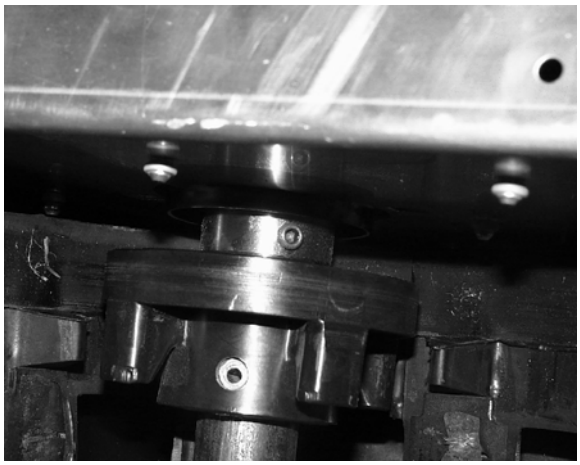
4. Drive pin out of left side (brake side) drive sprocket. Slide driver down shaft.



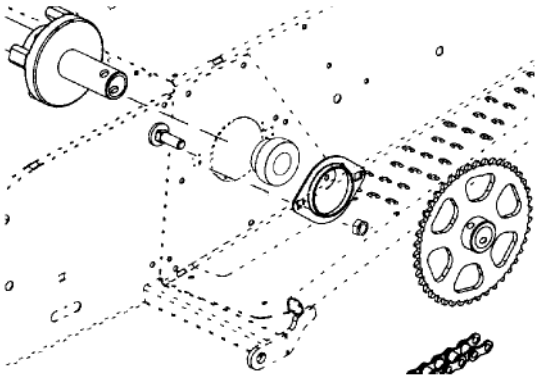
5. Remove flangettes on both sides of driveshaft.



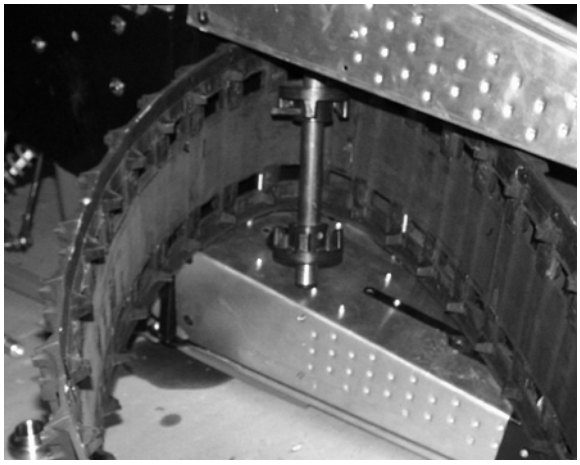
6. Loosen 1/8, allen set screws on both drive shaft bearings. (Two (2) per bearing).



7. Slide bearing out from right side of sled (clutch side) and slide drive shaft through. Now there is enough clearance to remove drive chain sprocket.

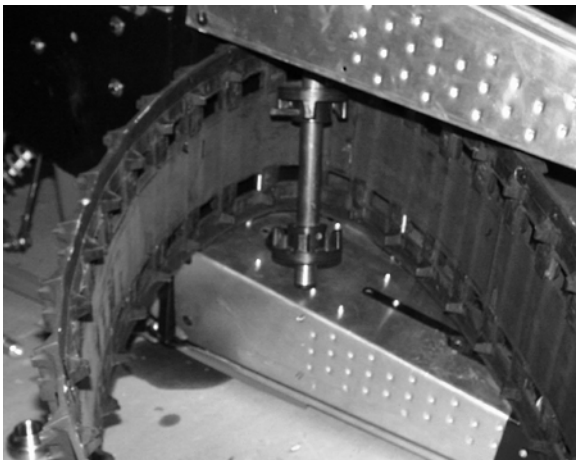


8. With drive chain sprocket removed and left side drive shaft driver loose, slide drive shaft through left side of machine (brake side) and remove drive shaft and left side bearing.

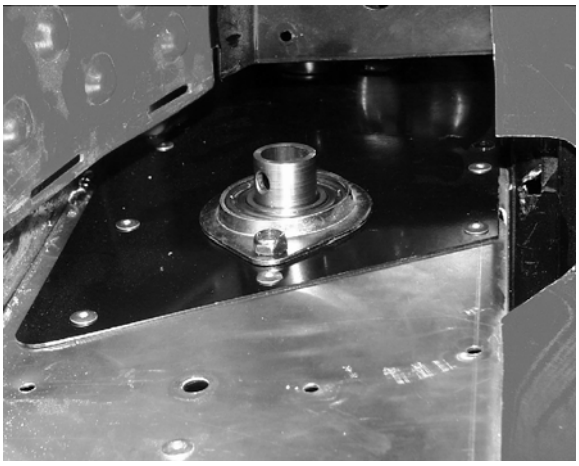


DRIVE SPROCKET & DRIVESHAFT INSTALLATION

1. Insert track and drive shaft. Make sure track is installed so it will turn in proper direction.

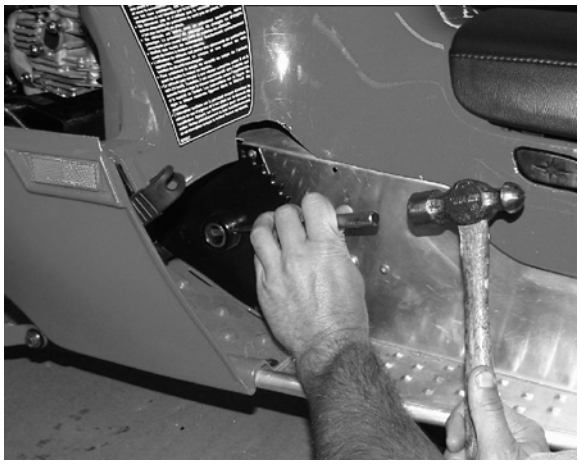


2. Install LEFT side (brake side) bearing and flangette. Tighten flangette to specification. Do NOT tighten bearing set screws at this time.



3. Set drive chain sprocket on drive shaft. Do not replace pin at this time.
4. Install RIGHT side (throttle side) bearing and flangette. Tighten flangette to specification. Do NOT tighten bearing set screws at this time.

5. With both bearings and flangettes in place, install pin in drive chain sprocket. The shoulder on the sprocket will align the bearings to the proper position on drive shaft.



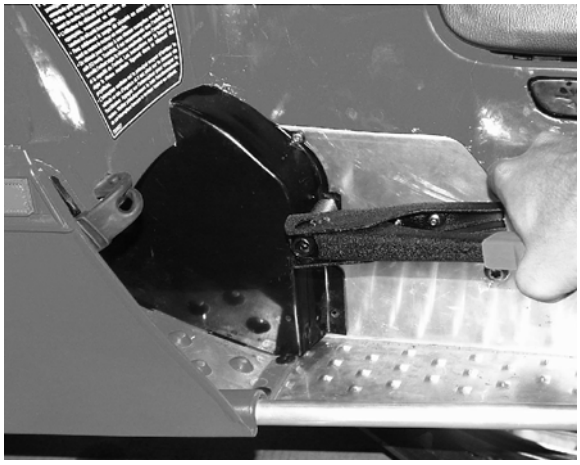
6. Slide drive shaft driver into position and install pin and insert the rear suspension.

REAR SUSPENSION INSTALLATION

1. Insert suspension skid into track. The rear carrier wheels should be installed with circlip in (toward center of sled).

2. Install suspension mounting screws and torque to specification.

3. Tip machine upright. Install drive chain outlined in Chapter 2.
4. Install drive sprocket guard and install five (5) rivets.



5. Tighten and align track. Ensure that driven sprocket is positioned against bearing.
6. Tighten drive shaft bearing set screws to 30 in.lb (3.4Nm)

= T
Drive Shaft Bearing Set Screw 30 in.lb (3Nm)

NOTES

CHAPTER 7
ELECTRICAL

IGNITION SYSTEM

OVERVIEW

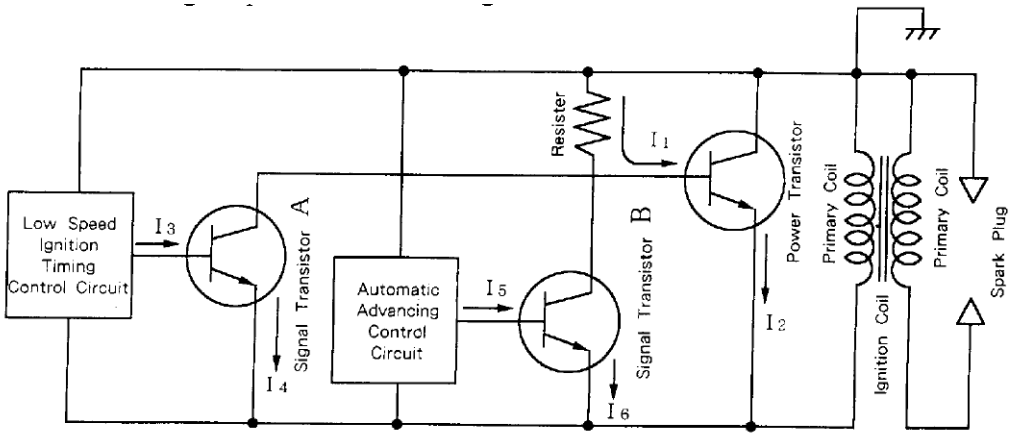
The engine uses the U.T.C.I. (Universal type Transistor Controlled Ignition) pointless ignition system.

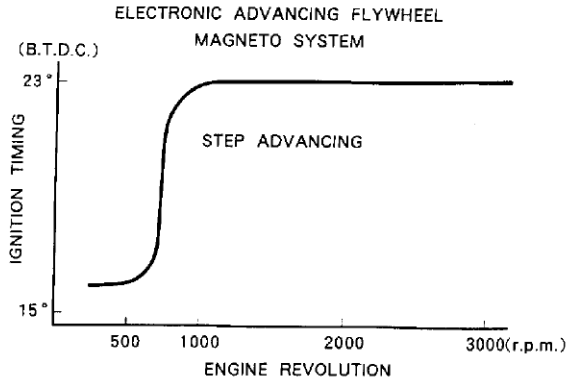
BASIC THEORY

To ensure the easy starting of the engine, the step advancing ignition timing system is incorporated in the ignition coil. This system enables the engine to have basically two different ignition timings according to the engine speed. Following are the explanations of how this system works.

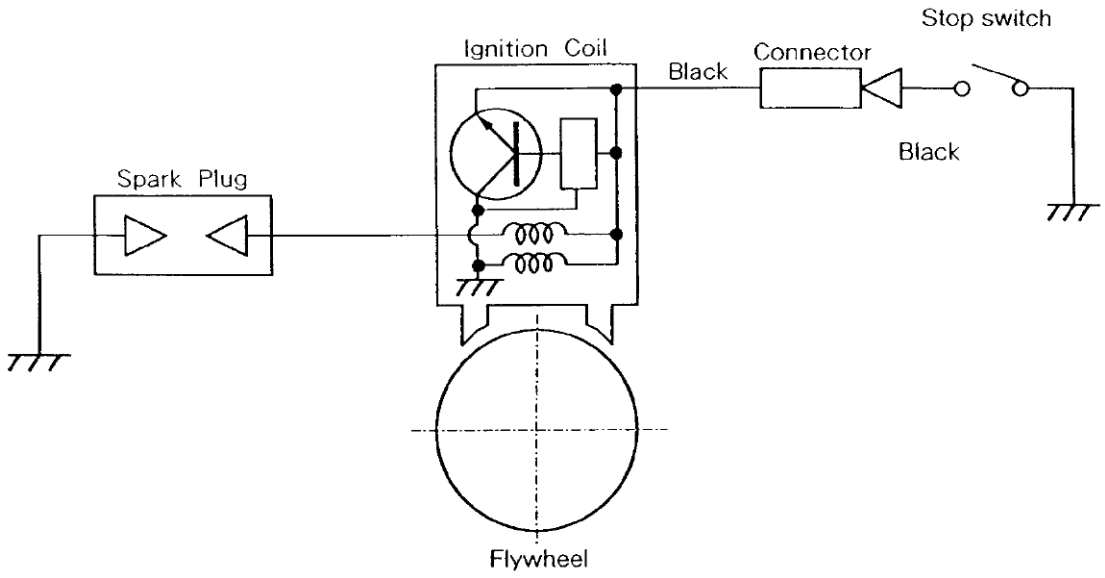
At lower engine speed, rotation of the flywheel induces current I1, as this current flows through the base terminal of the power transistor, it is activated and the current L2 is starts flowing. As the engine reaches ignition timing, the ignition timing control circuit for the lower engine speed is activated and lets the current L3 flow through the base terminal of the power transistor. This generates the collector current I4, which will bypass the current I1 and abruptly shut off the current I2 because the power transistor is turned off. This sudden current change generates a high voltage on the secondary side of the ignition coil and which sparks the spark plug.

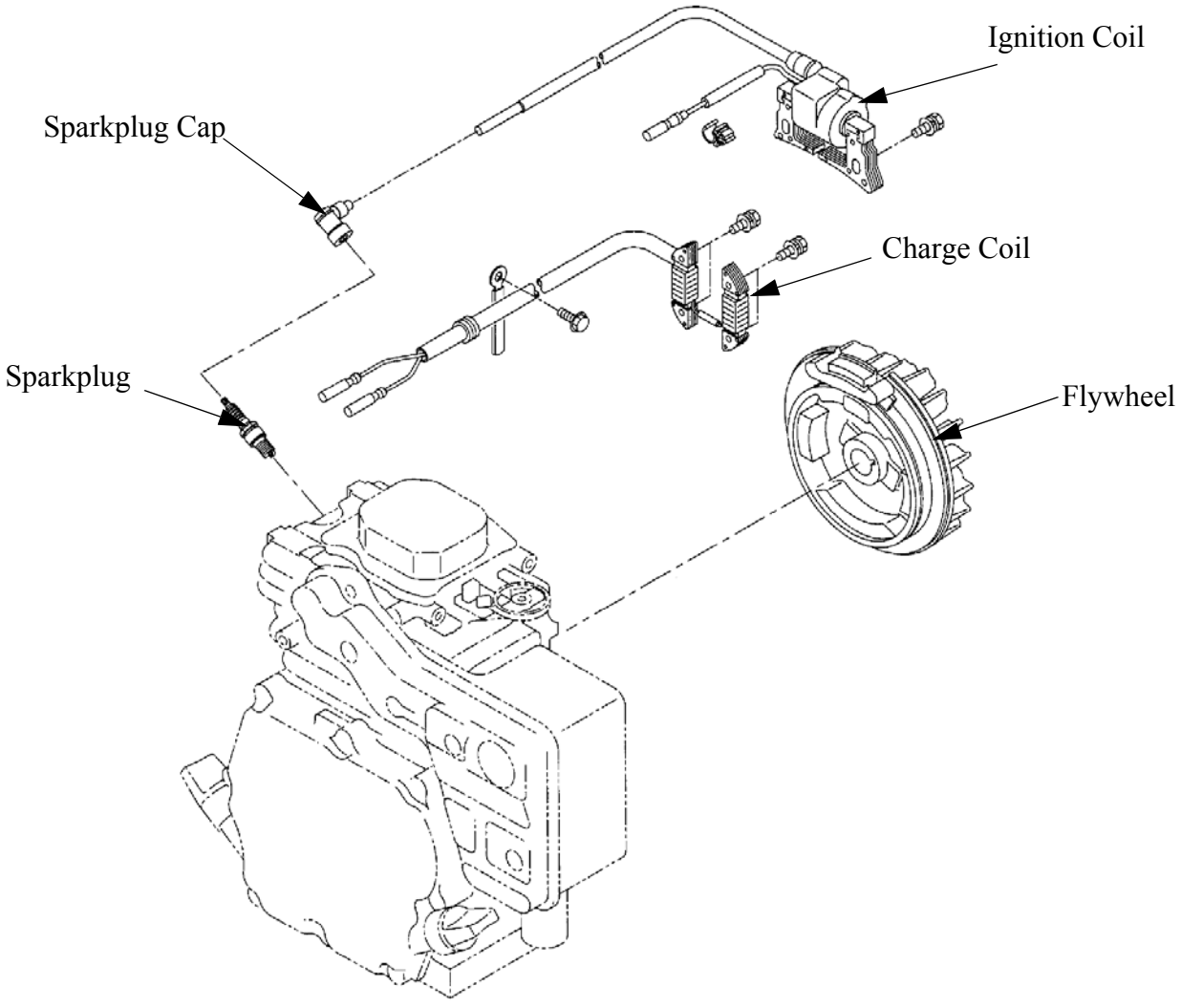
At higher engine speed rotation of the flywheel generates the current I1. As this current flows through the base terminal of the power transistor, it is activated and the current I2 starts to flow. As the engine reaches ignition timing, the ignition timing control circuit for higher engine speed is activated and provides the base current I5 to the power transistor. This current induces the collector current I6 and will bypass the current I1 to shut down the current I2 abruptly because the power transistor is turned off. This sudden current change generates high voltage on the secondary side of the ignition coil, which will spark the spark plug. This ignition timing control circuit for higher engine speed is activated sooner than the control circuit for lower speed and is not activated when engine speed is in a lower range.





ENGINE ELECTRICAL DIAGRAM





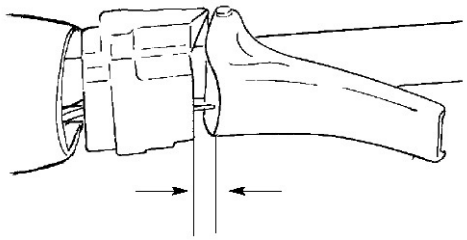
THROTTLE

SPEED CONTROL ASSURANCE SWITCH ADJUSTMENT

Throttle lever free play must always provide a specified clearance between throttle lever and throttle block. This clearance is controlled by the throttle cable sleeve(s) and the idle speed screw(s). If the idle speed screw(s) is adjusted inward and the cable sleeve(s) is not adjusted to take up the throttle lever to throttle block clearance, the engine may misfire or kill upon initial throttle opening.

⚠ CAUTION

AFTER ANY IDLE SPEED ADJUSTMENTS ARE MADE, THE THROTTLE LEVER TO THROTTLE BLOCK CLEARANCE AND OIL PUMP ADJUSTMENT MUST BE CHECKED AND ADJUSTED.



.010-.030″ (.25-.8 mm)

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

SPEED CONTROL ASSURANCE REPLACEMENT

Auxiliary shut-off and speed control assurance switches are connected and replaced as a unit from the back side of the throttle block.

1. Remove the handlebar pad and/or throttle block backing plate.
2. Slide out the auxiliary shut-off portion of the switch.
3. Remove the two screws securing the two speed control assurance switches.
4. Remove the switches noting their placement in the throttle block.
5. Replace the assembly and check its operation.

ELECTRICAL TESTING

REV LIMITER / REGULATOR TESTING

With the engine running at idle, open hood and locate governor arm (See Engine chapter). Push governor arm toward carburetor. If the engine misses and sputters, the rev limiter is working correctly. If the engine does not miss, stop the engine and check for continuity between the blue to black wires at the throttle. With the throttle depressed, blue to black should be an open circuit. With the throttle untouched, blue to black should show continuity.

SPEED CONTROL ASSURANCE TESTING

With engine idling, hold the throttle pivot and open the throttle slightly. The engine should stop running. If it does not stop running, check for continuity between the black and brown wires from the throttle assembly. The two speed control switches must make a complete circuit to kill the engine. To check the switches, pull the throttle lever out away from the throttle block. With the switch plungers outward and the auxiliary shut-off switch in the RUN position, connect the multitester to the black and brown wires. The multitester must read less than .4 ohms resistance. Inspect wires and repair if damaged, or replace switch assembly.

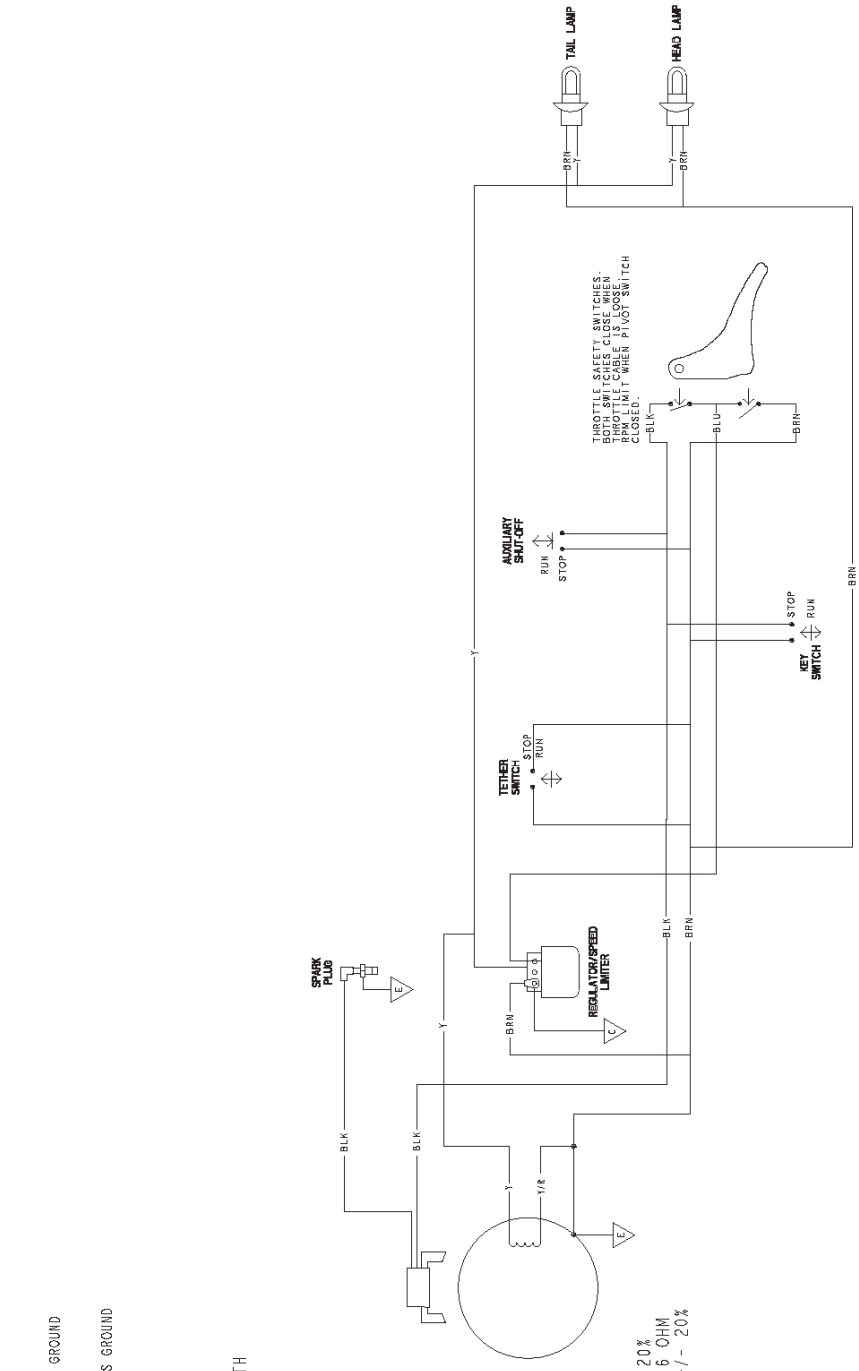
OPEN CIRCUIT (RUN)

With the auxiliary shut-off switch in the RUN position, connect the multitester to the black and brown wires. The multitester should read an open circuit (OL). As the throttle lever is moved from idle to off idle, the tester should continue to read an open circuit. If the tester fluctuates and the throttle lever to throttle block clearance is adjusted properly, the switch assembly must be replaced.

AUXILIARY SHUT-OFF

With the multitester connected between the black and brown wires, the multitester should read less than.4 ohms in the OFF position and an open circuit in the RUN position. Inspect wires and repair if damaged, or replace switch assembly.

120 WIRING DIAGRAM



NOTES

Numerics

A

B

C

D

E

F

G

W