



# CHAPTER 1 SPECIFICATIONS

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## 340 CLASSIC

### MODEL S06ND3AS

**Table 1-1: Engine**

Engine type	Fuji
Engine displacement	339cc
Bore in/mm	2.45/62.3
Stroke in/mm	2.19/55.6
Piston to cylinder clearance in/mm	.003-.005/.076-.127
Piston ring end gap	.008-.014/.20-.35
Operating RPM±200	7000
Idle RPM±200	1600
Clutch engagement RPM ±200	4100

**Table 1-2: Fuel Delivery**

Type	VM30SS
Main Jet	170
Pilot Jet	35
Jet Needle/Clip position	5DP13/3
Needle Jet	O-6 (169)
Throttle gap under cutaway in/mm	.240/6.1
Throttle slide cutaway	2.5AL
Valve seat	1.5Viton
Starter jet	1.5
Pilot air jet	2.5
Fuel screw setting	N/A
Air screw setting	1.5
Recommended fuel octane (R+M/2)	87 NonOxy/89 Oxy Min

**Table 1-3: 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
0-600 (0-2000)	185 #4	180 #3	170 #3	170 #3	165 #3	160 #3	155 #3
600-1200 (2000-4000)	175 #3	170 #3	160 #3	160 #3	155 #3	150 #3	140 #2
1200-1800 (4000-6000)	165 #3	160 #3	155 #3	150 #3	145 #3	140 #2	130 #2
1800-2400 (6000-8000)	155 #3	150 #3	140 #3	135 #3	135 #2	130 #2	120 #1
2400-3000 (8000-10000)	145 #3	140 #3	130 #2	130 #2	125 #2	120 #1	110 #1
3000-3700 (10000-12000)	135 #3	130 #2	120 #2	115 #2	115 #1	110 #1	100 #1

**Table 1-4: Clutching**

Altitude meters (feet)	Drive Clutch (P-85)		Driven Clutch (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-900 (0-3000)	10	Black-2287	Red/Black	S36ER	16:41-72
900-1800 (3000-6000)	10-M Blue	Black-2287	Red/Black	S36ER	16:41-72
1800-2700 (6000-9000)	10MW	Black-2287	Red/Black	S36ER	16:41-72
2700-3700 (9000-12000)	10MR	Black-2287	Red/Black	S36ER	16:41-72

Drive clutch bolt torque 50 ft-lbs(69Nm)

**Table 1-5: Belt**

Belt part number	3211078
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2

**Table 1-6: Chaincase**

Center distance in/cm	7.92/20.1
Reverse type	PERC





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**Table 1-7: Fluids and capacities**

Fuel gal/l	11.8/44.7
Oil qts/l	3.25/3.1
Coolant qts/l	N/A
Chaincase oz/ml	9/266.2
Brake fluid type	DOT4

**Table 1-8: Track**

Width in/cm	15/38
Length in/cm	121/307
Lug height in/cm	.82/2.1
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/ 40.6cm ahead of rear idler shaft	.375-.5/1-1.3

**Table 1-9: Front Suspension**

Suspension type	Edge
IFS shocks	Arvin/7041932
IFS spring rate lbs-in/kg-mm	100/1.79
IFS Spring pre-load in/mm	.625/16
Front vertical travel in/cm	10/25.4
Ski center distance in/cm	42.5/108
Camber in/mm	.59±.31/15.0±7.9
Toe in/mm	.12-.25/3.0-6.35

**Table 1-10: Rear Suspension**

Suspension type	Edge
Front track shock (FTS)	Arvin/7041939
FTS Spring Rate lbs-in/kg-mm	200/3.58
FTS pre-load	Fixed
Rear track shock	Fox/7042120*
Rear travel in/cm	13.9/35.3
* notes that shock is rebuildable	

**Table 1-11: Torsion spring**

Torsion spring PNs (LH/RH)	7041629/7041630
Torsion spring diameter in/mm	.359/9.12
Torsion spring tail angle	77°

**Table 1-12: Dimensions**

Width in/cm	48/122
Length in/cm	113/287
Height in/cm	48/122
Est dry weight lb/kg	517/234.7

**Table 1-13: Electrical**

Ignition timing	26.5° @3000RPM
Spark plug gap in/mm	.028/.71
Spark plug	NGK BR8ES
Voltage regulator/output	240watt
Magneto pulse	6
CDI marking	CU7245



## 500 CLASSIC

### MODEL S06ND4BS

**Table 1-14: Engine**

Engine type	Fuji
Engine displacement	488cc
Bore in/mm	2.83/72
Stroke in/mm	2.36/60
Piston to cylinder clearance in/mm	.0035-.0049/.090-.125
Piston ring end gap	.0079-.016/.20-.40
Operating RPM $\pm$ 200	7800
Idle RPM	1600
Clutch engagement RPM $\pm$ 200	4000

**Table 1-15: Fuel Delivery**

Type	TM38
Main Jet	360
Pilot Jet	40
Jet Needle/Clip position	9DFY1-54/2
Needle Jet	P-2(825)
Throttle gap under cutaway in/mm	.078/2.0
Throttle slide cutaway	2
Valve seat	1.5 Viton
Starter jet	145
Pilot air jet	0.9
Fuel screw setting	1.5
Air screw setting	N/A
Recommended fuel octane (R+M/2)	Min 87 NonOxy/89 Oxy Min

**Table 1-16: 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)	390 #4	370 #3	360 #3	360 #2	340 #2	320 #2
600-1200 (2000-4000)	370 #3	350 #3	340 #2	320 #2	310 #2	300 #2
1200-1800 (4000-6000)	350 #3	330 #3	320 #2	300 #2	290 #2	270 #1
1800-2400 (6000-8000)	320 #3	310 #3	300 #2	380 #2	370 #1	250 #1
2400-3000 (8000-10000)	300 #3	290 #2	270 #2	260 #1	240 #1	230 #1
3000-3700 (10000-12000)	280 #2	270 #2	250 #1	240 #1	220 #1	210 #1

**Table 1-17: Clutching**

Altitude meters (feet)	Drive Clutch (P-85)		Driven Clutch (P-85)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-900 (0-3000)	10-M5	Gold	Black	36 D Button #2	21:40-74
900-1800 (3000-6000)	10-M Blue	Gold	Black	36 D Button #2	21:40-74
1800-2700 (6000-9000)	10 MW	Dark Blue/White	Black	36 D Button #2	21:40-74
2700-3700 (9000-12000)	10M Red	Dark Blue/White	Black	36 D Button #2	21:40-74
Drive clutch bolt torque 50 ft-lbs(69Nm)					

**Table 1-18: Belt**

Belt part number	3211078
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2

**Table 1-19: Chaincase**

Center distance in/cm	7.92/20.1
Reverse type	Mechanical





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**Table 1-20: Fluids and capacities**

Fuel gal/l	11.8/44.7
Oil qts/l	3.25/3.1
Coolant qts/l	4.8/4.5
Chaincase oz/ml	9/266.2
Brake fluid type	DOT4

**Table 1-21: Track**

Width in/cm	15/38
Length in/cm	121/307
Lug height in/cm	1/2.5
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/ 40.6cm ahead of rear idler shaft	.875-.1.13/2.2-2.9

**Table 1-22: Front Suspension**

Suspension type	Edge
IFS shocks	Arvin/7041918
IFS spring rate lbs-in/kg-mm	100/1.79
IFS Spring pre-load in/cm	1/2.54
Front vertical travel in/cm	10/25.4
Ski center distance in/cm	42.5/108
Camber in/mm	.59±.31/15.0±7.9
Toe in/mm	.12-.25/3.0-6.35

**Table 1-23: Rear Suspension**

Suspension type	Edge M-10
Front track shock (FTS)	Fox/7042224*
FTS spring rate lbs-in/kg-mm	160/2.86
FTS pre-load in/mm	.90/23
Rear track shock (RTS)	Fox/7042216*
RTS Springs	7041935-7041936
RTS Spring Rate lbs-in/kg-mm	185 VAR-1000/3.3-17.9
RTS spring installed length in/cm	10.5/25.4
Rear travel in/cm	14/35.6
* notes that shock is rebuildable	

**Table 1-24: Dimensions**

Width in/cm	48/122
Length in/cm	113/287
Height in/cm	48/122
Est dry weight lb/kg	471/213.8

**Table 1-25: Electrical**

Ignition timing	26° @3000
Spark plug gap in/mm	.028/.71
Spark plug	Champion RN3C
Voltage regulator/output	200watt
Magneto pulse	2
CDI marking	IU2212



## 550 CLASSIC

### MODEL S06ND5BS

**Table 1-26: Engine**

Engine type	Fuji
Engine displacement	544cc
Bore in/mm	2.87/73
Stroke in/mm	2.56/65
Piston to cylinder clearance in/mm	.0045-.0053/.11-.13
Piston ring end gap	.016-.022/.40-.55
Operating RPM $\pm$ 200	7000
Idle RPM	1600
Clutch engagement RPM $\pm$ 200	3800
Exhaust valve spring	N/A

**Table 1-27: Fuel Delivery**

Type	VM34
Main Jet	280 PTO/270 MAG
Pilot Jet	40
Jet Needle/Clip position	6BGY41/3
Needle Jet	Q-4 (480)
Throttle gap under cutaway in/mm	.250/6.35
Throttle slide cutaway	3
Valve seat	1.5 Viton
Starter jet	1.5
Pilot air jet	2.5
Fuel screw setting	N/A
Air screw setting	.75
Recommended fuel octane (R+M/2)	87 NonOxy/89 Oxy Min

**Table 1-28: 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)	300/290 #4	290/280 #3	280/270 #3	270/260 #3	260/250 #3	250/240 #2
600-1200 (2000-4000)	290/280 #3	270/260 #3	260/250 #3	250/240 #3	240/230 #3	230/220 #2
1200-1800 (4000-6000)	270/260 #3	260/250 #3	250/240 #3	240/230 #2	230/220 #2	220/210 #2
1800-2400 (6000-8000)	250/240 #3	240/230 #3	230/220 #2	220/210 #2	210/200 #1	200/190 #1
2400-3000 (8000-10000)	240/230 #3	230/220 #2	220/210 #2	200/190 #2	190/180 #1	180/170 #1
3000-3700 (10000-12000)	220/210 #2	210/200 #2	200/190 #2	190/180 #1	180/170 #1	170/160 #1
Jetting listed as PTO/MAG						

**Table 1-29: Clutching**

Altitude meters (feet)	Drive Clutch (P-85)		Driven Clutch (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-900 (0-3000)	10-62	Dark Blue/White	Red/Blue	S40 ER	19:39- 72
900-1800 (3000-6000)	10-60	Dark Blue/White	Red/Blue	S40 ER	19:39- 72
1800-2700 (6000-9000)	10-60	Dark Blue/White	Red/Blue	S40 ER	19:39- 72
2700-3700 (9000-12000)	10-58	Dark Blue/White	Red/Blue	S40 ER	19:39- 72
Drive clutch bolt torque 50 ft-lbs(69Nm)					

**Table 1-30: Belt**

Belt part number	3211078
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2

**Table 1-31: Chaincase**

Center distance in/cm	7.92/20.1
Reverse type	PERC





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**Table 1-32: Fluids and capacities**

Fuel gal/l	11.8/44.7
Oil qts/l	3.25/3.1
Coolant qts/l	N/A
Chaincase oz/ml	9/266.2
Brake fluid type	DOT4

**Table 1-33: Track**

Width in/cm	15/38
Length in/cm	121/307
Lug height in/cm	.82/2.1
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/ 40.6cm ahead of rear idler shaft	.375-.5/1-1.3

**Table 1-34: Front Suspension**

Suspension type	Edge
IFS shocks	Arvin/7041932
IFS spring rate lbs-in/kg-mm	100/1.79
IFS spring installed length in/cm	9.81/24.9
Front vertical travel in/cm	10/25.4
Ski center distance in/cm	42.5/108
Camber in/mm	.59±.31/15.0±7.9
Toe in/mm	.12-.25/3.0-6.35

**Table 1-35: Rear Suspension**

Suspension type	Edge
Front track shock (FTS)	Arvin/7041939
FTS Spring rate lbs-in/kg-mm	100/1.79
FTS Installed length	Fixed
Rear track shock	Fox/7042129*
Rear travel in/cm	13.9/35.3
* notes that shock is rebuildable	

**Table 1-36: Torsion spring**

Torsion spring PNs (LH/RH)	7041629/7041630
Torsion spring diameter in/mm	.359/9.12
Torsion spring tail angle	77°

**Table 1-37: Dimensions**

Width in/cm	48/122
Length in/cm	113/287
Height in/cm	48/122
Est dry weight lb/kg	489/222

**Table 1-38: Electrical**

Ignition timing	27° @ 3000 14° @ 6500
Spark plug gap in/mm	.028/.71
Spark plug	NGK BR9ES
Voltage regulator/output	240watt
Magneto pulse	6
CDI marking	CU7242



## 600 CLASSIC

### MODEL S06ND6ES

**Table 1-39: Engine**

Engine type	Liberty
Engine displacement	599
Bore in/mm	3.04/77.25
Stroke in/mm	2.52/64
Piston to cylinder clearance in/mm	.0045-.0059/.115-.149
Piston ring end gap	.014-.020/.0356-.508
Operating RPM $\pm$ 200	8100
Idle RPM	1200
Clutch engagement RPM $\pm$ 200	4000
Exhaust valve spring	Green/Yellow

**Table 1-40: Fuel Delivery**

Type	TM38
Main Jet	440
Pilot Jet	45
Jet Needle/Clip position	9DFH7-60/3
Needle Jet	P-8
Throttle gap under cutaway in/mm	.079/2
Throttle slide cutaway	2.5
Valve seat	1.5
Starter jet	140
Pilot air jet	N/A
Fuel screw setting	2.5
Air screw setting	1
Recommended fuel octane (R+M/2)	87 Min. NonOxy

**Table 1-41: 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
0-600 (0-2000)	480 #4	460 #4	440 #3	430 #3	420 #3	400 #3	390 #2
600-1200 (2000-4000)	450 #4	430 #4	420 #4	410 #3	400 #3	380 #2	360 #2
1200-1800 (4000-6000)	420 #4	400 #4	390 #3	380 #3	370 #2	350 #2	330 #2
1800-2400 (6000-8000)	400 #4	380 #3	360 #2	350 #2	340 #2	330 #2	310 #2
2400-3000 (8000-10000)	370 #3	350 #2	340 #2	330 #2	320 #2	300 #2	280 #2
3000-3700 (10000-12000)	340 #2	330 #2	310 #2	300 #2	290 #2	270 #1	260 #1
When using non oxygenated fuel with a research octane Number (RON) of greater than 93, decrease the main jet number on the above chart by 30.							

**Table 1-42: Clutching**

Altitude meters (feet)	Drive Clutch (P-85)		Driven Clutch (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-900 (0-3000)	10-58	Dark Blue/White	Red/Blue	58/42-36 ER	23:39-74
900-1800 (3000-6000)	10-56	Dark Blue/White	Red/Blue	58/42-36 ER	23:39-74
1800-2700 (6000-9000)	10-54	Dark Blue/White	Red/Blue	58/42-36 ER	23:39-74
2700-3700 (9000-12000)	10	Dark Blue/White	Red/Blue	58/42-36 ER	22:39-74
Drive clutch bolt torque 50 ft-lbs(69Nm)					

**Table 1-43: Belt**

Belt part number	3211080
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2



**Table 1-44: Chaincase**

Center distance in/cm	7.92/20.1
Reverse type	PERC

**Table 1-45: Fluids and capacities**

Fuel gal/l	11.8/44.7
Oil qts/l	3.25/3.1
Coolant qts/l	5.6/5.3
Chaincase oz/ml	9/266.2
Brake fluid type	DOT4

**Table 1-46: Track**

Width in/cm	15/38
Length in/cm	121/307
Lug height in/cm	1/2.5
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	.875-1.13/2.2-2.9

**Table 1-47: Front Suspension**

Suspension type	Edge
IFS shocks	Arvin/7041918
IFS spring rate lbs-in/kg-mm	90-180/1.6-3.2
IFS Spring installed length in/cm	9.5/24.1
Front vertical travel in/cm	10.25.4
Ski center distance in/cm	42.5/108
Camber in/mm	.59±.31/15.0±7.9
Toe in/mm	.12-.25/3.0-6.35

**Table 1-48: Rear Suspension**

Suspension type	Edge M-10
Front track shock (FTS)	Fox/7042224*
FTS spring rate in-lbs/kg-mm	160/2.86
FTS pre-load in/mm	.90/23
Rear track shock (RTS)	Fox/7042216*
RTS Springs	7041935-7041936
RTS Spring Rate lbs-in/kg-mm	185 VAR-1000/3.3-17.9
RTS spring installed length in/cm	10.5/25.4
Rear travel in/cm	14/35.6
* notes that shock is rebuildable	

**Table 1-49: Dimensions**

Width in/cm	47.25/120
Length in/cm	113/287
Height in/cm	48/122
Est dry weight lb/kg	497/255.6

**Table 1-50: Electrical**

Ignition timing	24°@3500RPM
Spark plug gap in/mm	.025/.64
Spark plug	Champion RN57YCC
Voltage regulator/output	280watt
Magneto pulse	6
CDI marking	4010830



## 700 CLASSIC

### MODEL S06PD7HS

**Table 1-51: Engine**

Engine type	Liberty
Engine displacement	755
Bore in/mm	3.05/77.5
Stroke in/mm	3.15/80
Piston to cylinder clearance in/mm	.0045-.0074/.114-.188
Piston ring end gap	.014-.020/.35-.50
Operating RPM $\pm$ 200	7600
Idle RPM	1700
Clutch engagement RPM $\pm$ 200	3700
Exhaust valve spring	Purple

**Table 1-52: Fuel Delivery**

Type	Cleanfire
Throttle body size in/mm	2.0/51
Fuel pressure psi/bar	116/8
Recommended fuel octane (R+M/2)	91

**Table 1-53: Idle TPS voltage setting**

Altitude meters/feet	Voltage $\pm$ .01v
0-1800(0-6000)	.93
1800-2700(6000-9000)	.95
> 2700 (>9000)	.97

**Table 1-54: Clutching**

ALTITUDE meters (feet)	DRIVE CLUTCH (P-85)		DRIVEN CLUTCH (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-600 (0-2000)	10-72	Dark Blue / White	Red/Black	62/42-46 ER	23:39-76
600-1200 (2000-4000)	10-72	Dark Blue / White	Red/Black	62/42-46 ER	23:39-76
1200-1800 (4000-6000)	10-70	Dark Blue / White	Red/Black	62/42-46 ER	23:39-76
1800-2400 (6000-8000)	10-68	Black / Green	Red/Black	62/38-36 ER	22:40-76
2400-3000 (8000-10000)	10-66	Black / Green	Red/Black	62/38-36 ER	20:41-76
3000-3600 (10000-12000)	10-64	Black / Green	Red/Black	62/38-36 ER	20:41-76

Drive clutch bolt torque 96 ft-lbs (130Nm)

**Table 1-55: Belt**

Belt part number	3211080
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2

**Table 1-56: Chaincase**

Center distance in/cm	8.373/21.27
Reverse type	PERC

**Table 1-57: Fluids and capacities**

Fuel gal/l	9.2/34.8
Oil qts/l	3/2.8
Coolant qts/l	6.7/6.3
Chaincase oz/ml	11/325.3
Brake fluid type	DOT 4

**Table 1-58: M-10 Track**

Width in/cm	15/38
Length in/cm	128/325
Lug height in/cm	1.25/3.2
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	7/8" - 1 1/8" (2.2 - 2.9cm)



**Table 1-59: Front Suspension**

Suspension type	IQ 42.5
IFS shocks	Arvin/7043054
IFS spring rate lbs-in/kg-mm	120/2.1
Spring installed length in/cm	9.95/25.3
Front vertical travel in/cm	10/25.4
Ski center distance in/cm	42.5/108
Camber in/cm	2.25±.31/5.7±.79
Toe in/mm	0-.12/0-3.0

**Table 1-60: M-10 Rear Suspension**

Suspension type	M-10 128
Front track shock (FTS)	Fox/7043123*
FTS spring rate lbs-in/kg-mm	160/2.9
FTS spring installed length in/cm	8/20.3
Rear track shock	Fox/7043190*
Lower outer spring lbs-in/kg-mm	715/12.8
Lower inner spring lbs-in/kg-mm	425/7.6
Upper spring lbs-in/kg-mm	273/4.9
Rear travel in/cm	13/33
* notes that shock is rebuildable	

**Table 1-61: Dimensions**

Width in/cm	48/121.9
Length in/cm	115/292.1
Height in/cm	53/134.6
Est dry weight lb/kg	524/237

**Table 1-62: Electrical**

Stator output	400w@4000RPM
Ignition timing @ 9.6-12.7% throttle	16° @3500
Spark plug gap in/mm	.025/.64
Spark plug	Champion RN57YCC



## 500 INDY

### MODEL S06NB4BS

**Table 1-63: Engine**

Engine type	Fuji
Engine displacement	488cc
Bore in/mm	2.83/72
Stroke in/mm	2.36/60
Piston to cylinder clearance in/mm	.0035-.0049/.090-.125
Piston ring end gap	.008-.016/.20-.40
Operating RPM $\pm$ 200	7800
Idle RPM	1600
Clutch engagement RPM $\pm$ 200	4000
Exhaust valve spring	N/A

**Table 1-64: Fuel Delivery**

Type	TM38
Main Jet	360
Pilot Jet	40
Jet Needle/Clip position	9DFY1-54/2
Needle Jet	P-2 (825)
Throttle gap under cutaway in/mm	.078/2.0
Throttle slide cutaway	2
Valve seat	1.5 Viton
Starter jet	145
Pilot air jet	0.9
Fuel screw setting	1.5
Air screw setting	N/A
Recommended fuel octane (R+M/2)	87 NonOxy/89 Oxy Min

**Table 1-65: 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)	390 #4	370 #3	360 #3	360 #2	340 #2	320 #2
600-1200 (2000-4000)	370 #3	350 #3	340 #2	320 #2	310 #2	300 #2
1200-1800 (4000-6000)	350 #3	330 #3	320 #2	300 #2	290 #2	270 #1
1800-2400 (6000-8000)	320 #3	310 #3	300 #2	280 #2	270 #1	250 #1
2400-3000 (8000-10000)	300 #3	290 #2	270 #2	260 #1	240 #1	230 #1
3000-3700 (10000-12000)	280 #2	270 #2	250 #1	240 #1	220 #1	210 #1

**Table 1-66: Clutching**

Altitude meters (feet)	Drive Clutch (P-85)		Driven Clutch (P-85)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-900 (0-3000)	10-M5	Gold	Black	36 D Button #2	21:40-74
900-1800 (3000-6000)	10-M Blue	Gold	Black	36 D Button #2	21:40-74
1800-2700 (6000-9000)	10 MW	Dark Blue/White	Black	36 D Button #2	21:40-74
2700-3700 (9000-12000)	10M Red	Dark Blue/White	Black	36 D Button #2	21:40-74
Drive clutch bolt torque 50 ft-lbs					

**Table 1-67: Belt**

Belt part number	3211078
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2

**Table 1-68: Chaincase**

Center distance in/cm	7.92/20.1
Reverse type	PERC





## SPECIFICATIONS

**Table 1-69: Fluids and capacities**

Fuel gal/l	11.8/44.7
Oil qts/l	3.25/3.1
Coolant qts/l	4.5/4.3
Chaincase oz/ml	9/266.2
Brake fluid type	DOT4

**Table 1-70: Track**

Width in/cm	15/38
Length in/cm	121/307
Lug height in/cm	.82/2.1
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	.375-.5/1-1.3

**Table 1-71: Front Suspension**

Suspension type	Edge
IFS shocks	Nitrex/7041932
IFS spring rate lbs-in/kg-mm	100/1.79
Spring installed length in/cm	9.81/24.9
Front vertical travel in/cm	10/25.4
Ski center distance in/cm	42.5/108
Camber in/mm	.59±.31/15.0±7.9
Toe in/mm	.12-.25/3.0-6.35

**Table 1-72: Rear Suspension**

Suspension type	Edge
Front track shock (FTS)	Arvin/7041939
FTS spring rate lbs-in/kg-mm	200/3.58
FTS spring installed length	Fixed
Rear track shock	Fox/7042129*
Rear travel in/cm	13.9/35.3
* notes that shock is rebuildable	

**Table 1-73: Torsion spring**

Torsion spring PNs (LH/RH)	7041942/7041943
Torsion spring diameter in/mm	.375/9.5
Torsion spring tail angle	77°

**Table 1-74: Dimensions**

Width in/cm	48/122
Length in/cm	113/287
Height in/cm	48/122
Est dry weight lb/kg	469/212.9

**Table 1-75: Electrical**

Ignition timing	26° @ 3000
Spark plug gap in/mm	.028/.71
Spark plug	Champion RN3C
Voltage regulator/output	200watt
Magneto pulse	2
CDI marking	IU2212



## SUPERSPORT

### MODEL S06N(E,P)5BS(A,B)

**Table 1-76: Engine**

Engine type	Fuji
Engine displacement	544cc
Bore in/mm	2.87/73
Stroke in/mm	2.56/65
Piston to cylinder clearance in/mm	.0045-.0053/.11-.13
Piston ring end gap	.016-.022/.40-.55
Operating RPM±200	7000
Idle RPM±200	1600
Clutch engagement RPM ±200	3800
Exhaust valve spring	N/A

**Table 1-77: Fuel Delivery**

Type	VM34
Main Jet	280 PTO/270 MAG
Pilot Jet	40
Jet Needle/Clip position	6BGY41/3
Needle Jet	Q-4 (480)
Throttle gap under cutaway in/mm	.250/6.35
Throttle slide cutaway	3
Valve seat	1.5 Viton
Starter jet	1.5
Pilot air jet	2.5
Fuel screw setting	N/A
Air screw setting	.75
Recommended fuel octane (R+M/2)	87 NonOxy/98 Oxy Min

**Table 1-78: 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)	300/290 #4	290/280 #3	280/270 #3	270/260 #3	260/250 #3	250/240 #2
600-1200 (2000-4000)	290/280 #3	270/260 #3	260/250 #3	250/240 #3	240/230 #2	230/220 #2
1200-1800 (4000-6000)	270/260 #3	260/250 #3	250/240 #3	240/230 #2	230/220 #2	220/210 #2
1800-2400 (6000-8000)	250/240 #3	240/230 #3	230/220 #2	220/210 #2	210/200 #1	200/190 #1
2400-3000 (8000-10000)	240/230 #3	230/220 #2	220/210 #2	200/190 #2	190/180 #1	180/170 #1
3000-3700 (10000-12000)	220/210 #2	210/200 #2	200/190 #2	190/180 #1	180/170 #1	170/160 #1
Jetting listed as PTO/MAG						

**Table 1-79: Clutching**

Altitude meters (feet)	Drive Clutch (P-85)		Driven Clutch (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-900 (0-3000)	10-62	Dark Blue/White	Red/Blue	S40 ER	19:39- 72
900-1800 (3000-6000)	10-60	Dark Blue/White	Red/Blue	S40 ER	19:39- 72
1800-2700 (6000-9000)	10-60	Dark Blue/White	Red/Blue	S40 ER	19:39- 72
2700-3700 (9000-12000)	10-58	Dark Blue/White	Red/Blue	S40 ER	19:39- 72
Drive clutch bolt torque 50 ft-lbs					

**Table 1-80: Belt**

Belt part number	3211078
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2

**Table 1-81: Chaincase**

Center distance in/cm	7.92/18.52
Reverse type	PERC





**Table 1-82: Fluids and capacities**

Fuel gal/l	11.8/44.7
Oil qts/l	3.25/3.1
Coolant qts/l	N/A
Chaincase oz/ml	9/266.2
Brake fluid type	DOT4

**Table 1-83: IQ Track**

Width in/cm	15/38
Length in/cm	121/307
Lug height in/cm	.82/2.1
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	.375-.5/1-1.3

**Table 1-84: M-10 Track**

Width in/cm	15/38
Length in/cm	121/307
Lug height in/cm	1/2.5
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	.875-1.13/2.2-2.9

**Table 1-85: Front Suspension**

Suspension type	Edge
IFS shocks	Arvin/7041932
IFS spring rate lbs-in/kg-mm	100/1.79
Spring installed length in/cm	9.81/24.9
Front vertical travel in/cm	10/25.4
Ski center distance in/cm	42.5/108
Camber in/mm	.59±.31/15.0±7.9
Toe in/mm	.12-.25/3.0-6.35

**Table 1-86: Edge Rear Suspension**

Front track shock (FTS)	Arvin/7041939*
FTS spring rate lbs-in/kg-mm	200 Var/ 3.6Var
FTS spring installed length in/cm	7.5/19.1
Rear track shock	Fox/7042129*
Rear travel in/cm	13.9/35.3
* notes that shock is rebuildable	

**Table 1-87: M-10 Rear Suspension**

Front track shock	Fox/7042224*
Front track shock spring rate lbs-in/kg-mm	160/2.9
Spring installed length in/cm	8.375/21.3
Rear track shock	Fox/7042216*
Rear track shock spring (RTS) part number	7041935-7041936
RTS spring rate lbs-in/kg-mm	185 Var-1000/3.3-17.9
RTS Installed length	10.5/26.7
Rear travel in/cm	13.9/35.3
* notes that shock is rebuildable	

**Table 1-88: Dimensions**

Width in/cm	47.25/120
Length in/cm	113/287
Height in/cm	46/117
Est dry weight lb/kg	EDGE 477/216.4 M-10 470/213.2

**Table 1-89: Electrical**

Ignition timing	27° @3000
Spark plug gap in/mm	.028/.70
Spark plug	NGK BR9ES
Voltage regulator/output	240watt
Magneto pulse	6
CDI marking	CU7242



## 340 INDY TOURING

### MODEL S06NT3AS

**Table 1-90: Engine**

Engine type	Fuji
Engine displacement	339cc
Bore in/mm	2.45/62.3
Stroke in/mm	2.19/55.6
Piston to cylinder clearance in/mm	.003-.005/.080-.130
Piston ring end gap	.008-.014/.20-.350
Operating RPM $\pm$ 200	7000
Idle RPM	1600
Clutch engagement RPM $\pm$ 200	3700

**Table 1-91: Fuel Delivery**

Type	VM30SS
Main Jet	170
Pilot Jet	35
Jet Needle/Clip position	5DP13/3
Needle Jet	O-6(169)
Throttle gap under cutaway in/mm	.240/6.1
Throttle slide cutaway	2.5AL
Valve seat	1.5 Viton
Starter jet	1.5
Pilot air jet	2.5
Fuel screw setting	N/A
Air screw setting	1.5
Recommended fuel octane (R+M/2)	87 non Oxy/89 Oxy Min

**Table 1-92: 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
0-600 (0-2000)	185 #4	180 #3	170 #3	170 #3	165 #3	160 #3	155 #3
600-1200 (2000-4000)	175 #3	170 #3	160 #3	160 #3	155 #3	150 #3	140 #2
1200-1800 (4000-6000)	165 #3	160 #3	155 #3	150 #3	145 #3	140 #2	130 #2
1800-2400 (6000-8000)	155 #3	150 #3	140 #3	135 #3	135 #2	130 #2	120 #1
2400-3000 (8000-10000)	145 #3	140 #3	130 #2	130 #2	125 #2	120 #1	110 #1
3000-3700 (10000-12000)	135 #3	130 #2	120 #2	115 #2	115 #1	110 #1	100 #1

**Table 1-93: Clutching**

Altitude meters (feet)	Drive Clutch (P-85)		Driven Clutch (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-900 (0-3000)	10	Black-2287	Blue/Black	54/38-25ER	17:41-72
900-1800 (3000-6000)	10-M Blue	Black-2287	Blue/Black	54/38-25ER	17:41-72
1800-2700 (6000-9000)	10 MW	Black-2287	Blue/Black	54/38-25ER	17:41-72
2700-3700 (9000-12000)	10 MR	Black-2287	Blue/Black	54/38-25ER	17:41-72

Drive clutch bolt torque 50 ft-lbs(69Nm)

**Table 1-94: Belt**

Belt part number	3211078
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2

**Table 1-95: Chaincase**

Center distance in/cm	7.92/20.1
Reverse type	PERC





## SPECIFICATIONS

**Table 1-96: Fluids and capacities**

Fuel gal/l	12.25/46.4
Oil qts/l	3.25/3.1
Coolant qts/l	N/A
Chaincase oz/ml	9/266.2
Brake fluid type	DOT 4

**Table 1-97: Track**

Width in/cm	15/38
Length in/cm	136/345
Lug height in/cm	1/2.5
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	3/8" - 1/2" (.95-1.27cm)

**Table 1-98: Front Suspension**

Suspension type	Edge
IFS shocks	Arvin/7041932
IFS spring rate lbs-in/kg-mm	100/1.79
Spring installed length in/cm	9.81/24.9
Front vertical travel in/cm	10/25.4
Ski center distance in/cm	42.5/108
Camber in/mm	.59±.31/15.0±7.9
Toe in/mm	.12-.25/3.0-6.35

**Table 1-99: Rear Suspension**

Suspension type	Edge
Front track shock (FTS)	Arvin/7041939
FTS spring rate lbs-in/kg-mm	200 Var/3.6
FTS spring installed length in/cm	7.5/19.1
Rear track shock	Arvin/7042138
Rear travel in/cm	13.9/35.3
* notes that shock is rebuildable	

**Table 1-100: Torsion spring**

Torsion spring PNs (LH/RH)	7041940/7041941
Torsion spring diameter in/mm	.405/10.3
Torsion spring tail angle	77°

**Table 1-101: Dimensions**

Width in/cm	48/121.9
Length in/cm	128/325.1
Height in/cm	49.5/125.7
Est dry weight lb/kg	517/234.7

**Table 1-102: Electrical**

Ignition timing	26.5° @ 3000RPM
Spark plug gap in/mm	.028/.70
Spark plug	NGK BR8ES
Voltage regulator/output	240watt
Magneto pulse	6
CDI marking	CU7245



## TRAIL TOURING

### MODEL S06N(T,U)5BS(A)

**Table 1-103: Engine**

Engine type	Fuji
Engine displacement	544cc
Bore in/mm	2.87/73
Stroke in/mm	2.56/65
Piston to cylinder clearance in/mm	.0045-.0053/.11-.13
Piston ring end gap	.016-.022/.40-.55
Operating RPM $\pm$ 200	7000
Idle RPM	1600
Clutch engagement RPM $\pm$ 200	3800

**Table 1-104: Fuel Delivery**

Type	VM 34
Main Jet	280 PTO / 270 MAG
Pilot Jet	40
Jet Needle/Clip position	6BGY41/3
Needle Jet	Q-4 (480)
Throttle gap under cutaway in/mm	.250/6.35
Throttle slide cutaway	3
Valve seat	1.5 Viton
Starter jet	1.5
Pilot air jet	2.5
Fuel screw setting	N/A
Air screw setting	0.75
Recommended fuel octane (R+M/2)	87 NonOxy/89 Oxy Min

**Table 1-105: 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)	300/290 #4	290/280 #3	280/270 #3	270/260 #3	260/250 #3	250/240 #2
600-1200 (2000-4000)	290/280 #3	270/260 #3	260/250 #3	250/240 #3	240/230 #2	230/220 #2
1200-1800 (4000-6000)	270/260 #3	260/250 #3	250/240 #3	240/230 #2	230/220 #2	220/210 #2
1800-2400 (6000-8000)	250/240 #3	240/230 #3	230/220 #2	220/210 #2	210/200 #1	200/190 #1
2400-3000 (8000-10000)	240/230 #3	230/220 #2	220/210 #2	200/190 #2	190/180 #1	180/170 #1
3000-3700 (10000-12000)	220/210 #2	210/200 #2	200/190 #2	190/180 #1	180/170 #1	170/160 #1
Jetting listed as PTO/MAG						

**Table 1-106: Clutching**

Altitude meters (feet)	Drive Clutch (P-85)		Driven Clutch (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-900 (0-3000)	10-62	Dark Blue/White	Red/Blue	S40ER	19:41-74
900-1800 (3000-6000)	10-62	Dark Blue/White	Red/Blue	S40ER	19:41-74
1800-2700 (6000-9000)	10-60	Dark Blue/White	Red/Blue	S40ER	19:41-74
2700-3700 (9000-12000)	10-58	Dark Blue/White	Red/Blue	S40ER	19:41-74
Drive clutch bolt torque 50 ft-lbs(69Nm)					

**Table 1-107: Belt**

Belt part number	3211078
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2

**Table 1-108: Chaincase**

Center distance in/cm	7.92/20.1
Reverse type	PERC





**Table 1-109: Fluids and capacities**

Fuel gal/l	12.25/46.4
Oil qts/l	3.25/3.1
Coolant qts/l	N/A
Chaincase oz/ml	9/266.2
Brake fluid type	DOT4

**Table 1-110: Track**

Width in/cm	15/38
Length in/cm	136/345
Lug height in/cm	1/2.5
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	.75-1.0/1.9-2.5

**Table 1-111: Front Suspension**

Suspension type	Edge
IFS shocks	Arvin/7041918
IFS spring rate lbs-in/kg-mm	90-180/1.6-3.2
IFS Spring installed length in/cm	9.5/24.1
Front vertical travel in/cm	10/25.4
Ski center distance in/cm	42.5/108
Camber in/mm	.59±.31/15.0±7.9
Toe in/mm	.12-.25/3.0-6.35

**Table 1-112: Rear Suspension**

Suspension type	Edge Touring
Front track shock (FTS)	Arvin/7041486
FTS spring rate	90-150/1.6-2.7
FTS spring installed length	10.375/26.4
Rear track shock (RTS)	Arvin/7042141*
RTS spring rate lbs-in/kg-mm	180-900/3.2-16.1
RTS spring installed length in/cm	10/25.4
Rear travel in/cm	15.2/38.6
* notes that shock is rebuildable	

**Table 1-113: Torsion spring**

Torsion spring PNs (LH/RH)	7042240/7042241
Torsion spring diameter in/mm	.405/10.3
Torsion spring tail angle	77°

**Table 1-114: Dimensions**

Width in/cm	48/122
Length in/cm	128/325
Height in/cm	49.5/126
Est dry weight lb/kg	570/258.8

**Table 1-115: Electrical**

Ignition timing	27°@3000 14°@6500
Spark plug gap in/mm	.028/.70
Spark plug	NGK BR9ES
Voltage regulator/output	240watt
Magneto pulse	6
CDI marking	CU7242



## 600 EDGE TOURING

### MODEL S06PK6FS(A,B)

**Table 1-116: Engine**

Engine type	Liberty
Engine displacement	599
Bore in/mm	3.04/77.25
Stroke in/mm	2.52/64
Piston to cylinder clearance in/mm	.0045-.0059/.115-.149
Piston ring end gap	.014-.020/.356-.508
Operating RPM $\pm$ 200	8000
Idle RPM	1500
Clutch engagement RPM $\pm$ 200	3800
Exhaust valve spring	Green/White

**Table 1-117: Fuel Delivery**

Type	TM38
Main Jet	420
Pilot Jet	50
Jet Needle/Clip position	9DGI01-60/4
Needle Jet	P-6
Throttle gap under cutaway in/mm	.079/2
Throttle slide cutaway	1.5
Valve seat	1.5
Starter jet	140
Pilot air jet	N/A
Fuel screw setting	1.5
Air screw setting	.5
Recommended fuel octane (R+M/2)	87 Min NonOxy

**Table 1-118: 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
0-600 (0-2000)	450 #5	430 #5	420 #4	410 #4	400 #4	380 #4	370 #4
600-1200 (2000-4000)	410 #5	390 #4	380 #4	370 #4	360 #4	340 #4	330 #3
1200-1800 (4000-6000)	380 #4	360 #4	350 #4	340 #4	330 #4	320 #3	300 #3
1800-2400 (6000-8000)	360 #4	340 #4	330 #4	320 #3	300 #3	290 #3	280 #3
2400-3000 (8000-10000)	340 #4	320 #4	310 #3	300 #3	290 #3	270 #3	260 #3
3000-3700 (10000-12000)	330 #4	310 #3	300 #3	290 #3	270 #3	260 #3	240 #3
3700-4500 (12000-15000)	310 #4	290 #3	280 #3	270 #3	260 #3	240 #3	230 #3

When using non oxygenated fuel with a research octane Number (RON) of greater than 93, decrease the main jet number on the above chart by 30.

**Table 1-119: Clutching**

Altitude meters (feet)	Drive Clutch (P-85)		Driven Clutch (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-900 (0-3000)	10-62	Black/Green	Red/Green	64/42-65 ER	21:41-74
900-1500 (3000-5000)	10-60	Black/Green	Red/Green	64/42-65 ER	21:41-74
1500-2100 (5000-7000)	10-58	Black/Green	Red/Green	64/42-65 ER	21:41-74
2100-2700 (7000-9000)	10-56	Black/Green	Red/Green	64/42-65 ER	21:41-74
2700-3350 (9000-11000)	10-54	Black/Green	Red/Green	64/42-65 ER	21:41-74
3350-4000 (11000-13000)	10AL	Black/Green	Red/Green	64/42-65 ER	21:41-74

Drive clutch bolt torque 50 ft-lbs

**Table 1-120: Belt**

Belt part number	3211080
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2



**Table 1-121: Chaincase**

Center distance in/cm	7.92/20.1
Reverse type	PERC

**Table 1-122: Fluids and capacities**

Fuel gal/l	12.25/46.4
Oil qts/l	3.25/3.1
Coolant qts/l	5.8/5.5
Chaincase oz/ml	9/266.2
Brake fluid type	DOT 4

**Table 1-123: Track**

Width in/cm	15/38
Length in/cm	136/345
Lug height in/cm	1/2.5
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	.75-1.0/1.9-2.5

**Table 1-124: Front Suspension**

Suspension type	Edge
IFS shocks	Arvin/7041918
IFS spring rate in-lbs/kg-mm	90-180/1.6-3.2
Spring installed length in/cm	9.5/24.1
Front vertical travel in/cm	10/25.4
Ski center distance in/cm	42.5/108
Camber in/mm	.59±.31/15.0±7.9
Toe in/mm	.12-.25/3.0-6.35

**Table 1-125: Rear Suspension**

Suspension type	Edge Touring
Front track shock (FTS)	Arvin/7041486
FTS spring rate lbs-in/kg-mm	90-150/1.6-2.7
FTS spring installed length in/cm	10.375/26.4
Rear track shock	Arvin/7042141*
Rear travel in/cm	15.2/38.6
* notes that shock is rebuildable	

**Table 1-126: Torsion spring**

Torsion spring PNs (LH/RH)	7042240/7042241
Torsion spring diameter in/mm	.405/10.3
Torsion spring tail angle	77°

**Table 1-127: Dimensions**

Width in/cm	48/121.9
Length in/cm	128/325
Height in/cm	49.5/126
Est dry weight lb/kg	578/262.4

**Table 1-128: Electrical**

Ignition timing	24° @ 3000
Spark plug gap in/mm	.025/.64
Spark plug	Champion RN57YCC
Voltage regulator/output	280watt
Magneto pulse	6
CDI marking	4010830



## 700 TOURING

### MODEL S06PT7HS

**Table 1-129: Engine**

Engine type	Liberty
Engine displacement	755
Bore in/mm	3.05/77.5
Stroke in/mm	3.15/80
Piston to cylinder clearance in/mm	.0045-.0074/.114-.188
Piston ring end gap	.014-.020/.35-.50
Operating RPM $\pm$ 200	7600
Idle RPM	1700
Clutch engagement RPM $\pm$ 200	3700
Exhaust valve spring	Purple

**Table 1-130: Fuel Delivery**

Type	Cleanfire
Throttle body size in/mm	2.0/51
Fuel pressure psi/bar	116/8
Recommended fuel octane (R+M/2)	91

**Table 1-131: Idle TPS voltage setting**

Altitude meters/feet	Voltage $\pm$ .01v
0-1800(0-6000)	.93
1800-2700(6000-9000)	.95
> 2700 (>9000)	.97

**Table 1-132: Clutching**

ALTITUDE meters (feet)	DRIVE CLUTCH (P-85)		DRIVEN CLUTCH (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-600 (0-2000)	10-72	Dark Blue / White	Red/Black	62/42-46 ER	23:39-76
600-1200 (2000-4000)	10-72	Dark Blue / White	Red/Black	62/42-46 ER	23:39-76
1200-1800 (4000-6000)	10-70	Dark Blue / White	Red/Black	62/42-46 ER	23:39-76
1800-2400 (6000-8000)	10-68	Black / Green	Red/Black	62/38-36 ER	22:40-76
2400-3000 (8000-10000)	10-66	Black / Green	Red/Black	62/38-36 ER	20:41-76
3000-3600 (10000-12000)	10-64	Black / Green	Red/Black	62/38-36 ER	20:41-76

Drive clutch bolt torque 96 ft-lbs (130Nm)

**Table 1-133: Belt**

Belt part number	3211080
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2

**Table 1-134: Chaincase**

Center distance in/cm	8.373/21.27
Reverse type	PERC

**Table 1-135: Fluids and capacities**

Fuel gal/l	10.8/40.9
Oil qts/l	3/2.8
Coolant qts/l	6.7/6.3
Chaincase oz/ml	11/325.3
Brake fluid type	DOT 4





## SPECIFICATIONS

**Table 1-136: IQ Track**

Width in/cm	15/38
Length in/cm	136/345
Lug height in/cm	1/2.5
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	.875-1.13/2.2-2.9

**Table 1-137: Front Suspension**

Suspension type	IQ 42.5
IFS shocks	Arvin/7043054
IFS spring rate lbs-in/kg-mm	120/2.2
Spring installed length in/cm	9.95/25.3
Front vertical travel in/cm	10/25.4
Ski center distance in/cm	42.5/108
Camber in/cm	2.25±.31/5.7±.79
Toe in/mm	0-.12/0-3.0

**Table 1-138: M-10 Rear Suspension**

Suspension type	M-10 136
Front track shock	Fox/7043123*
Front track shock spring rate lbs-in/kg-mm	220/3.9
Spring installed length in/cm	8.5/21.6
Rear track shock	Fox/7043190*
Upper Spring lbs-in/kg-mm	273/4.9
Lower outer spring lbs-in/kg-mm	715/12.8
Lower inner spring lbs-in/kg-mm	425/7.6
Rear travel in/cm	14/35.6
* notes that shock is rebuildable	

**Table 1-139: Dimensions**

Width in/cm	48/121.9
Length in/cm	129/327.7
Height in/cm	53/134.6
Est dry weight lb/kg	598/271.5

**Table 1-140: Electrical**

Stator output	400w@4000RPM
Ignition timing @ 9.6-12.7% throttle	16° @3500
Spark plug gap in/mm	.025/.64
Spark plug	Champion RN57YCC



## WIDETRAK LX

### MODEL S06SU4BS

**Table 1-141: Engine**

Engine type	Fuji
Engine displacement	488cc
Bore in/mm	2.83/72
Stroke in/mm	2.36/60
Piston to cylinder clearance in/mm	.0035-.0049/.089-.125
Piston ring end gap in/mm	.0070-.016/.18-.41
Operating RPM±200	7800
Idle RPM±200	1600
Clutch engagement RPM ±200	3800
Exhaust valve spring	N/A

**Table 1-142: Fuel Delivery**

Type	VM34SS
Main Jet	195
Pilot Jet	35
Jet Needle/Clip position	6EJ26/2
Needle Jet	P-6 (166)
Throttle gap under cutaway in/mm	.240/6.1
Throttle slide cutaway	3
Valve seat	1.5 Viton
Starter jet	1.5
Pilot air jet	N/A
Fuel screw setting	N/A
Air screw setting	.5
Recommended fuel octane (R+M/2)	87 NonOxy/89 Oxy Min

**Table 1-143: 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)	210 #2	200 #2	195 #2	185 #2	175 #2	170 #2
600-1200 (2000-4000)	195 #2	185 #2	180 #2	170 #2	165 #2	155 #2
1200-1800 (4000-6000)	185 #2	175 #2	170 #2	160 #2	155 #1	145 #1
1800-2400 (6000-8000)	170 #2	165 #2	155 #2	150 #1	140 #1	135 #1
2400-3000 (8000-10000)	160 #2	155 #2	145 #1	140 #1	130 #1	120 #1
3000-3700 (10000-12000)	150 #2	140 #1	135 #1	125 #1	120 #1	110 #1

**Table 1-144: Clutching**

Altitude meters (feet)	Drive Clutch (P-85)		Driven Clutch (P-85)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-900 (0-3000)	10	Brown	Silver	36D #2	19:41-66
900-1800 (3000-6000)	10	Red/White	Silver	36D #2	19:41-66
1800-2700 (6000-9000)	10-M Blue	Red/White	Silver	36D #2	19:41-66
2700-3700 (9000-12000)	10 MW	Red/White	Silver	36D #2	19:41-66

Drive clutch bolt torque 50 ft-lbs

**Table 1-145: Belt**

Belt part number	3211070
Belt width in/cm	1.375/3.49
Belt side angle	28°
Outside diameter in/cm	47.25/120
Clutch center distance in/cm	12/30.5

**Table 1-146: Chaincase**

Center distance in/cm	N/A
Reverse type	Hi/Low/Reverse





**Table 1-147: Fluids and capacities**

Fuel gal/l	11/41.6
Oil qts/l	2/1.9
Coolant qts/l	3.4/3.2
Gearcase oz/ml	20/591.5
Brake fluid type	DOT4

**Table 1-148: Track**

Width in/cm	20/51
Length in/cm	156/396
Lug height in/cm	1/2.5
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	.75-1.0/1.9-2.5

**Table 1-149: Front Suspension**

Suspension type	38"
IFS shocks	Arvin/7041535
IFS spring rate lbs-in/kg-mm	105/1.9
Spring installed length in/cm	9.25/23.5
Front vertical travel in/cm	7.25/18.4
Ski center distance in/cm	38/96.5
Camber in/mm	.82±.72/20.8±18.3
Toe in/mm	0-.12/0-3

**Table 1-150: Rear Suspension**

Suspension type	Slide Rail Coupled
Front track shock (FTS)	Arvin 7041742
FTS spring rate lbs-in/kg-mm	181/3.2
FTS spring installed length in/cm	Fixed
Rear track shock	Arvin/7042309
Rear travel in/cm	9/22.9
* notes that shock is rebuildable	

**Table 1-151: Torsion spring**

Torsion spring PNs (LH/RH)	7041239/7041240
Torsion spring diameter in/mm	.468/11.9
Torsion spring tail angle	N/A

**Table 1-152: Dimensions**

Width in/cm	43.5/110
Length in/cm	128/325
Height in/cm	51/130
Est dry weight lb/kg	643/291.9

**Table 1-153: Electrical**

Ignition timing	28° @3000
Spark plug gap in/mm	.028/.71
Spark plug	Champion RN3C
Voltage regulator/output	200watt
Magneto pulse	2
CDI marking	IU2212



## 500 XC SP

### MODEL S06NP5CSB

**Table 1-154: Engine**

Engine type	Liberty
Engine displacement	500
Bore in/mm	2.78/70.5
Stroke in/mm	2.52/64
Piston to cylinder clearance in/mm	.0045-.0059/.11-.15
Piston ring end gap	.014-.020/.356-.508
Operating RPM±200	8250-8500
Idle RPM	1500
Clutch engagement RPM +/- 200	4200
Exhaust valve spring	Pink/Yellow

**Table 1-155: Fuel Delivery**

Type	TM38
Main Jet	410
Pilot Jet	45
Jet Needle/Clip position	9DFH6-57/2
Needle Jet	P-8
Throttle gap under cutaway in/mm	.079/2
Throttle slide cutaway	2
Valve seat	1.5
Starter jet	145
Pilot air jet	N/A
Fuel screw setting	3
Air screw setting	1.25
Recommended fuel octane (R+M/2)	87 Min NonOxy

**Table 1-156: 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)	440 #3	430 #3	410 #2	390 #2	380 #2	360 #2
600-1200 (2000-4000)	420 #3	400 #2	390 #2	370 #2	350 #2	340 #1
1200-1800 (4000-6000)	390 #2	380 #2	360 #2	340 #2	330 #1	310 #1
1800-2400 (6000-8000)	370 #2	350 #2	340 #2	320 #1	300 #1	290 #1
2400-3000 (8000-10000)	340 #2	330 #2	310 #1	300 #1	280 #1	260 #1
3000-3700 (10000-12000)	320 #2	300 #1	290 #1	270 #1	250 #1	240 #1

**Table 1-157: Clutching**

Altitude meters (feet)	Drive Clutch (P-85)		Driven Clutch (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-900 (0-3000)	10-56	Black/Green	Red/Black	56/42-36 ER	22:40-74
900-1800 (3000-6000)	10-54	Black/Green	Red/Black	56/42-36 ER	22:40-74
1800-2700 (6000-9000)	10	Black/Green	Red/Black	56/42-36 ER	21:40-74
2700-3700 (9000-12000)	10M Blue	Black/Green	Red/Black	56/42-36 ER	21:40-74

Drive clutch bolt torque 50 ft-lbs

**Table 1-158: Belt**

Belt part number	3211080
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2

**Table 1-159: Chaincase**

Center distance in/cm	7.92/20.1
Reverse type	PERC





## SPECIFICATIONS

**Table 1-160: Fluids and capacities**

Fuel gal/l	11.8/44.7
Oil qts/l	3.25/3.1
Coolant qts/l	5.6/5.3
Chaincase oz/ml	9/266.2
Brake fluid type	DOT4

**Table 1-161: Track**

Width in/cm	15/38
Length in/cm	121/307
Lug height in/cm	.91/2.3
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/ 40.6cm ahead of rear idler shaft	.375-.5/1-1.3

**Table 1-162: Front Suspension**

Suspension type	Edge
IFS shocks	Arvin/7042211
IFS spring rate lbs-in/kg-mm	68-160/1.22-2.9
IFS Spring installed length in/cm	10.5/26.7
Front vertical travel in/cm	10.3/26.2
Ski center distance in/cm	42.5/108
Camber in/mm	.59±.31/15.0±7.9
Toe in/mm	.12-.25/3.0-6.35

**Table 1-163: Rear Suspension**

Front track shock	Arvin/7041975
FTS Spring rate lbs-in/kg-mm	160 Var/2.86 Var
FTS Spring installed length	7.46/18.9
Rear track shock	Fox/7042129*
Rear travel in/cm	13.9/35.3
* notes that shock is rebuildable	

**Table 1-164: Torsion spring**

Torsion spring PNs (LH/RH)	7041935/7041936
Torsion spring diameter in/mm	.375/9.5
Torsion spring tail angle	77

**Table 1-165: Dimensions**

Width in/cm	48/122
Length in/cm	113/287
Height in/cm	46/117
Est dry weight lb/kg	481/218.4

**Table 1-166: Electrical**

Ignition timing	25°@2500RPM
Spark plug gap in/mm	.025/.64
Spark plug	Champion RN57YCC
Voltage regulator/output	280watt
Magneto pulse	6
CDI marking	4010829



## 600 HO STANDARD FUSION

### MODEL S06M(E,P)6FS(A,B)

**Table 1-167: Engine**

Engine type	600 Liberty
Engine displacement	599cc
Bore in/mm	3.04/77.25
Stroke in/mm	2.52/64
Piston to cylinder clearance in/mm	.0045-.0059/.114-.150
Piston ring end gap	.014-.020/.36-.51
Operating RPM	8100
Idle RPM	1500
Clutch engagement RPM $\pm$ 200	3800
Exhaust valve spring	Pink

**Table 1-168: Fuel Delivery**

Type	TM38
Main Jet	420
Pilot Jet	50
Jet Needle/Clip position	9DGN6-57/2
Needle Jet	P-8
Throttle gap under cutaway in/mm	.083/2.1
Throttle slide cutaway	1.5 Notch
Valve seat	1.5
Starter jet	145
Pilot air jet	.6
Fuel screw setting	1.25
Air screw setting	N/A
Recommended fuel octane (R+M/2)	91

**Table 1-169: 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
0-600 (0-2000)	440 #3	430 #3	420 #2	400 #2	390 #2	380 #2	370 #1
600-1200 (2000-4000)	410 #3	400 #3	390 #2	370 #2	360 #2	350 #2	340 #1
1200-1800 (4000-6000)	370 #3	360 #2	350 #2	340 #2	330 #2	320 #1	310 #1
1800-2400 (6000-8000)	340 #3	320 #2	310 #2	300 #2	280 #2	280 #1	270 #1
2400-3000 (8000-10000)	310 #2	300 #2	290 #2	280 #1	270 #1	260 #1	250 #1
3000-3700 (10000-12000)	290 #2	280 #2	270 #1	250 #1	240 #1	230 #1	220 #1
When using non oxygenated fuel with an octane number greater than 93, decrease the main jet number in the above chart by 10 and insert the E-clip one position. If already in position #1 install washer on top when using the above fuel.							

**Table 1-170: Clutching**

Altitude meters (feet)	Drive Clutch (P-85)		Driven Clutch (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-600 (0-2000)	10-62	Black/ Green	Red/ Black	56/42-36	20:41-76
600-1200 (2000-4000)	10-60	Black/ Green	Red/ Black	56/42-36	20:41-76
1200-1800 (4000-6000)	10-58	Black/ Green	Red/ Black	56/42-36	20:41-76
1800-2400 (6000-8000)	10-56	Black/ Green	Red/ Black	56/42-36	20:41-76
2400-3000 (8000-10000)	10-54	Black/ Green	Red/ Black	56/42-36	20:41-76
3000-3700 (10000-12000)	10AL	Black/ Green	Red/ Black	56/42-36	20:41-76
Drive clutch bolt torque 50 ft-lbs(69Nm)					

**Table 1-171: Belt**

Belt part number	3211080
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2



**Table 1-172: Chaincase**

Center distance in/cm	8.373/21.27
Reverse type	PERC

**Table 1-173: Fluids and capacities**

Fuel gal/l	10.8/40.9
Oil qts/l	3.4/3.2
Coolant qts/l	5.6/5.3
Chaincase oz/ml	11/325.3
Brake fluid type	DOT 4

**Table 1-174: IQ Track**

Width in/cm	15/38
Length in/cm	121/307
Lug height in/cm	1/2.5
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	7/8" - 1 1/8" (2.2 - 2.9cm)

**Table 1-175: M-10 Track**

Width in/cm	15/38
Length in/cm	128/325
Lug height in/cm	1.25/3.2
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	.875-1.13/2.2-2.9

**Table 1-176: Front Suspension**

Suspension type	IQ 42.5
IFS shocks	Arvin/7042258*
IFS spring rate lbs-in/kg-mm	100/1.8
Spring installed length in/cm	10.55/26.8
Front vertical travel in/cm	10/25.4
Ski center distance in/cm	42.5/108
Camber in/mm	2.25±.31/5.7±.79
Toe in/mm	0-.12/0-3.0

**Table 1-177: M-10 Rear Suspension**

Suspension type	M-10 128
Front track shock	Fox/7043123*
Front track shock spring rate lbs-in/kg-mm	180/3.2
Spring installed length in/cm	8.75/22.2
Rear track shock	Fox/7043190*
Lower outer lbs-in/kg-mm	715/12.8
Lower inner lbs-in/kg-mm	425/7.6
Upper lbs-in/kg-mm	273/4.9
Rear travel in/cm	13.9/35.3
* notes that shock is rebuildable	

**Table 1-178: IQ Rear Suspension**

Suspension type	IQ 121
Front track shock (FTS)	Arvin/7043178*
FTS spring rate lbs-in/kg-mm	130-270/2.3-4.8
FTS spring installed length in/cm	7.97/20.2
Rear track shock	Fox/7043177*
Rear idler wheel travel in/cm	13.9/35.3
* notes that shock is rebuildable	

**Table 1-179: Torsion spring**

Torsion spring PNs (LH/RH)	7043070/7043071
Torsion spring diameter in/mm	.347/8.8
Torsion spring tail angle	80°

**Table 1-180: Dimensions**

Width in/cm	47.25/120
Length in/cm	115/292
Height in/cm	47/119
Est dry weight lb/kg	480/217.9

**Table 1-181: Electrical**

Stator output	400w@4000RPM
Ignition timing @ 9.6-12.7% throttle	16° @3500
Spark plug gap in/mm	.025/.64
Spark plug	Champion RN57YCC



## 600 HO DRAGON FUSION

### MODEL S06MC6FS

**Table 1-182: Engine**

Engine type	600 Liberty
Engine displacement	599cc
Bore in/mm	3.04/77.25
Stroke in/mm	2.52/64
Piston to cylinder clearance in/mm	.0045-.0059/.114-.150
Piston ring end gap	.014-.020/.36-.51
Operating RPM	8100
Idle RPM	1500
Clutch engagement RPM +/- 200	3800
Exhaust valve spring	Pink

**Table 1-183: Fuel Delivery**

Type	TM38
Main Jet	420
Pilot Jet	50
Jet Needle/Clip position	9DGN6-57/2
Needle Jet	P-8
Throttle gap under cutaway in/mm	.083/2.1
Throttle slide cutaway	1.5 Notch
Valve seat	1.5
Starter jet	145
Pilot air jet	.6
Fuel screw setting	1.25
Air screw setting	N/A
Recommended fuel octane (R+M/2)	91

**Table 1-184: 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
0-600 (0-2000)	440 #3	430 #3	420 #2	400 #2	390 #2	380 #2	370 #1
600-1200 (2000-4000)	410 #3	400 #3	390 #2	370 #2	360 #2	350 #2	340 #1
1200-1800 (4000-6000)	370 #3	360 #2	350 #2	340 #2	330 #2	320 #1	310 #1
1800-2400 (6000-8000)	340 #3	320 #2	310 #2	300 #2	280 #2	280 #1	270 #1
2400-3000 (8000-10000)	310 #2	300 #2	290 #2	280 #1	270 #1	260 #1	250 #1
3000-3700 (10000-12000)	290 #2	280 #2	270 #1	250 #1	240 #1	230 #1	220 #1
When using non oxygenated fuel with an octane number greater than 93, decrease the main jet number in the above chart by 10 and insert the E-clip one position. If already in position #1 install washer on top when using the above fuel.							

**Table 1-185: Clutching**

Altitude meters (feet)	Drive Clutch (P-85)		Driven Clutch (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-600 (0-2000)	10-62	Black/ Green	Red/ Black	56/42-36	20:41-76
600-1200 (2000-4000)	10-60	Black/ Green	Red/ Black	56/42-36	20:41-76
1200-1800 (4000-6000)	10-58	Black/ Green	Red/ Black	56/42-36	20:41-76
1800-2400 (6000-8000)	10-56	Black/ Green	Red/ Black	56/42-36	20:41-76
2400-3000 (8000-10000)	10-54	Black/ Green	Red/ Black	56/42-36	20:41-76
3000-3700 (10000-12000)	10AL	Black/ Green	Red/ Black	56/42-36	20:41-76
Drive clutch bolt torque 50 ft-lbs					

**Table 1-186: Belt**

Belt part number	3211080
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2



**Table 1-187: Chaincase**

Center distance in/cm	8.373/21.27
Reverse type	PERC

**Table 1-188: Fluids and capacities**

Fuel gal/l	10.8/40.9
Oil qts/l	3/2.8
Coolant qts/l	5/4.7
Chaincase oz/ml	11/325.3
Brake fluid type	DOT 4

**Table 1-189: Track**

Width in/cm	15/38
Length in/cm	121/307
Lug height in/cm	1/2.5
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	7/8" - 1 1/8" (2.2 - 2.9cm)

**Table 1-190: Front Suspension**

Suspension type	IQ 42.5
IFS shocks	Walker/7043095*
IFS spring rate lbs-in/kg-mm	100/1.8
Spring installed length in/cm	10.55/26.8
Front vertical travel in/cm	10/25.4
Ski center distance in/cm	42.5/108
Camber in/cm	2.25±.31/5.7±.79
Toe in/mm	0-.12/0-3.0

**Table 1-191: Rear Suspension**

Suspension type	IQ 121
Front track shock	Walker/7043096*
FTS spring rate lbs-in/kg-mm	130-270
FTS spring installed length in/cm	7.97/20.2
Rear track shock	Walker/7043097*
Rear travel in/cm	13.9/35.3
* notes that shock is rebuildable	

**Table 1-192: Torsion spring**

Torsion spring PNs (LH/RH)	7043070/7043071
Torsion spring diameter in/mm	.347/8.8
Torsion spring tail angle	80°

**Table 1-193: Dimensions**

Width in/cm	46.5/118.1
Length in/cm	128/325.1
Height in/cm	46.5/118.1
Est dry weight lb/kg	489/222

**Table 1-194: Electrical**

Ignition timing	26° @3500 w/TPS unplugged
Spark plug gap in/mm	.025/.64
Spark plug	Champion RN57YCC
Voltage regulator/output	400w@4000RPM
CDI marking	4011033



## 700 FUSION

**MODEL NUMBER: S06M(E,P)7HS(A,B)**

**Table 1-195: Engine**

Engine type	Liberty
Engine displacement	755cc
Bore in/mm	3.05/77.5
Stroke in/mm	3.15/80
Piston to cylinder clearance in/mm	.0045-.0074/.114-.188
Piston ring end gap	.014-.020/.35-.50
Operating RPM $\pm$ 200	7600
Idle RPM	1700
Clutch engagement RPM $\pm$ 200	3700
Exhaust valve spring	Purple

**Table 1-196: Fuel Delivery**

Type	Cleanfire
Throttle body size in/mm	2.0/51
Fuel pressure psi/bar	116/8
Recommended fuel octane (R+M/2)	91

**Table 1-197: Idle TPS voltage setting**

Altitude meters/feet	Voltage $\pm$ .01v
0-1800(0-6000)	.93
1800-2700(6000-9000)	.95
> 2700 (>9000)	.97

**Table 1-198: Clutching**

ALTITUDE meters (feet)	DRIVE CLUTCH (P-85)		DRIVEN CLUTCH (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-600 (0-2000)	10-72	Dark Blue / White	Red/Black	62/42-46 ER	26:40-78
600-1200 (2000-4000)	10-72	Dark Blue / White	Red/Black	62/42-46 ER	26:40-78
1200-1800 (4000-6000)	10-70	Dark Blue / White	Red/Black	62/42-46 ER	26:40-78
1800-2400 (6000-8000)	10-68	Black / Green	Red/Black	62/38-36 ER	24:41-78
2400-3000 (8000-10000)	10-66	Black / Green	Red/Black	62/38-36 ER	22:43-78
3000-3600 (10000-12000)	10-64	Black / Green	Red/Black	62/38-36 ER	22:43-78

Drive clutch bolt torque 96 ft-lbs (130Nm)

**Table 1-199: Belt**

Belt part number	3211080
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2

**Table 1-200: Chaincase**

Center distance in/cm	8.373/21.27
Reverse type	PERC

**Table 1-201: Fluids and capacities**

Fuel gal/l	10.8/40.9
Oil qts/l	3.4/3.2
Coolant qts/l	6.7/6.3
Chaincase oz/ml	11/325.3
Brake fluid type	DOT 4



**Table 1-202: IQ Track**

Width in/cm	15/38
Length in/cm	121/307
Lug height in/cm	1.25/3.2
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	.875-1.125/2.2-.9

**Table 1-203: M-10 Track**

Width in/cm	15/38
Length in/cm	128/325
Lug height in/cm	1.25/3.2
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	7/8" - 1 1/8" (2.2 - 2.9cm)

**Table 1-204: Front Suspension**

Suspension type	IQ 42.5
IFS shocks	Arvin/7042258*
IFS spring rate lbs-in/kg-mm	120/2.2
Spring installed length in/cm	11.17/28.4
Front vertical travel in/cm	10/25.4
Ski center distance in/cm	42.5/108
Camber in/cm	2.25±.31/5.7±.79
Toe in/mm	0-.12/0-3.0

**Table 1-205: IQ Rear Suspension**

Suspension type	IQ 121
Front track shock (FTS)	Arvin/7043178*
FTS spring rate lbs-in/kg-mm	130-270/2.3-4.8
FTS spring installed length in/cm	7.97/20.2
Rear track shock	Fox/7043177*
Rear vertical travel in/cm	13.9/35.3
* notes that shock is rebuildable	

**Table 1-206: IQ Torsion spring**

Torsion spring PNs (LH/RH)	7043070/7043071
Torsion spring diameter in/mm	.347
Torsion spring tail angle	80°

**Table 1-207: M-10 Rear Suspension**

Suspension type	M-10 128
Front track shock (FTS)	Fox/7043123
FTS spring rate in-lbs/kg-mm	160/2.9
FTS spring installed length in/cm	8/20.3
Rear track shock	Fox/7043190*
Lower outer spring lbs-in/kg-mm	715/12.8
Lower inner spring lbs-in/kg-mm	425/7.6
Upper spring lbs-in/kg-mm	273/4.9
Rear ravel in/cm	13/33
* notes that shock is rebuildable	

**Table 1-208: Dimensions**

Width in/cm	47.25/120
Length in/cm	117/297
Height in/cm	47/119
Est dry weight lb/kg	524/237.9

**Table 1-209: Electrical**

Stator output	400w@4000RPM
Ignition timing @ 9.6-12.7% throttle	16° @3500
Spark plug gap in/mm	.025/.64
Spark plug	Champion RN57YCC



## 900 FUSION

**MODEL NUMBER: S06M(E,P)8DS(A,B)**

**Table 1-210: Engine**

Engine type	Liberty
Engine displacement	866cc
Bore in/mm	3.27/83
Stroke in/mm	3.15/80
Piston to cylinder clearance in/mm	.0045-.0074/.114-.188
Piston ring end gap	.016-.022/.41-.56
Operating RPM $\pm 200$	7600
Idle RPM $\pm 200$	1700 @ specified TPS setting
Clutch engagement RPM $\pm 200$	3700
Exhaust valve spring	Purple

**Table 1-211: Fuel Delivery**

Type	Cleanfire Injection
Throttle body size in/mm	2/51
Fuel pressure psi/bar	116/8
Recommended fuel octane (R+M/2)	91

**Table 1-212: Idle TPS voltage setting**

Altitude meters/feet	Voltage $\pm .01$ v
0-1800(0-6000)	.93
1800-2700(6000-9000)	.95
> 2700 (>9000)	.97

**Table 1-213: Clutching**

ALTITUDE meters (feet)	DRIVE CLUTCH (P-85)		DRIVEN CLUTCH (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-600 (0-2000)	10-74	Dark Blue / White	Red/Black	62/42-46 ER	25:37-76
600-1200 (2000-4000)	10-72	Dark Blue / White	Red/Black	62/42-46 ER	25:37-76
1200-1800 (4000-6000)	10-72	Dark Blue / White	Red/Black	62/42-46 ER	25:37-76
1800-2400 (6000-8000)	10-70	Black / Green	Red/Black	62/38-36 ER	22:39-76
2400-3000 (8000-10000)	10-68	Black / Green	Red/Black	62/38-36 ER	21:40-76
3000-3600 (10000-12000)	10-66	Black / Green	Red/Black	62/38-36 ER	21:40-76

Drive clutch bolt torque 96 ft-lbs (130Nm)

**Table 1-214: Belt**

Belt part number	3211080
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2

**Table 1-215: Chaincase**

Center distance in/cm	8.373/21.27
Reverse type	PERC

**Table 1-216: Fluids and capacities**

Fuel gal/l	10.8/40.9
Oil qts/l	3.4/3.2
Coolant qts/l	6.7/6.3
Chaincase oz/ml	11/325.3
Brake fluid type	DOT 4





## SPECIFICATIONS

**Table 1-217: IQ Track**

Width in/cm	15/38
Length in/cm	121/307
Lug height in/cm	1.25/3.175
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	7/8" - 1 1/8" (2.2 - 2.9cm)

**Table 1-218: M-10 Track**

Width in/cm	15/38
Length in/cm	128/325
Lug height in/cm	1.25/3.175
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	7/8" - 1 1/8" (2.2 - 2.9cm)

**Table 1-219: Front Suspension**

Suspension type	IQ 42.5
IFS shocks	Arvin/7042258*
IFS spring rate lbs-in/kg-mm	120/2.2
Spring installed length in/cm	11.17/28.4
Front vertical travel in/cm	10/25.4
Ski center distance in/cm	42.5/108
Camber in/cm	2.25±.31/5.7±.79
Toe in/mm	0-.12/0-3.0

**Table 1-220: IQ Rear Suspension**

Suspension type	IQ 121
Front track shock	Arvin/7043178*
Front track shock spring rate lbs-in/kg-mm	130-270/2.3-4.8
Spring installed length in/cm	7.97/20.2
Rear track shock	Fox/7043177*
Rear travel in/cm	13.9/35.3
* notes that shock is rebuildable	

**Table 1-221: M-10 Rear Suspension**

Suspension type	M-10 128
Front track shock	Fox/7043123*
Front track shock spring rate lbs-in/kg-mm	160/2.9
Spring installed length in/cm	8/20.3
Rear track shock	Fox/7043190*
Lower outer spring lbs-in/kg-mm	715/12.8
Lower inner spring lbs-in/kg-mm	425/7.6
Upper spring lbs-in/kg-mm	273/4.9
Rear vertical travel in/cm	10/25.4
Rear idler wheel travel in/cm	13.06/33.2
* notes that shock is rebuildable	

**Table 1-222: Torsion spring**

Torsion spring PNs (LH/RH)	7043070/7043071
Torsion spring diameter in/mm	.347/8.8
Torsion spring tail angle	80°

**Table 1-223: Dimensions**

Width in/cm	46.5/118
Length in/cm	128/325
Height in/cm	46.5/118
Est dry weight lb/kg	489/222

**Table 1-224: Electrical**

Stator output	400w@4000RPM
Ignition timing @ 9.6-12.7% throttle	16° @ 3500
Spark plug gap in/mm	.025/.64
Spark plug	Champion RN57YCC



## 600 HO SWITCHBACK

### MODEL S06PS6FS(A)

**Table 1-225: Engine**

Engine type	Liberty
Engine displacement	599cc
Bore in/mm	3.04/77.25
Stroke in/mm	2.52/64
Piston to cylinder clearance in/mm	.0045-.0059/.114-.150
Piston ring end gap	.014-.020/.36-.51
Operating RPM±200	8100
Idle RPM±200	1500
Clutch engagement RPM ±200	3800
Exhaust valve spring	Pink
Head volume installed	27.5-28.3cc
Head volume bench	35.2 ±.5cc

**Table 1-226: Fuel Delivery**

Type	TM38
Main Jet	420
Pilot Jet	50
Jet Needle/Clip position	9DGN6-57/2
Needle Jet	P-8
Throttle gap under cutaway in/mm	.13/3.4
Throttle slide cutaway	1.5 Notch
Valve seat	1.5
Starter jet	145
Pilot air jet	.6
Fuel screw setting	1.25
Air screw setting	N/A
Recommended fuel octane (R+M/2)	91

**Table 1-227: 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
0-600 (0-2000)	440 #3	430 #3	420 #2	400 #2	390 #2	380 #2	370 #1
600-1200 (2000-4000)	410 #3	400 #3	390 #2	370 #2	360 #2	350 #2	340 #1
1200-1800 (4000-6000)	370 #3	360 #2	350 #2	340 #2	330 #2	320 #1	310 #1
1800-2400 (6000-8000)	340 #3	320 #2	310 #2	300 #2	280 #1	280 #1	270 #1
2400-3000 (8000-10000)	310 #2	300 #2	290 #2	280 #1	270 #1	260 #1	250 #1
3000-3700 (10000-12000)	290 #2	280 #2	270 #1	250 #1	240 #1	230 #1	220 #1

When using non oxygenated fuel with an octane number greater than 93, decrease the main jet number in the above chart by 10 and insert the E-clip one position. If already in position #1 install washer on top when using the above fuel.

**Table 1-228: Clutching**

Altitude meters (feet)	Drive Clutch (P-85)		Driven Clutch (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-600 (0-2000)	10-62	Black/ Green	Red/ Black	64/42-36 ER	22:39-76
600-1200 (2000-4000)	10-60	Black/ Green	Red/ Black	64/42-36 ER	22:39-76
1200-1800 (4000-6000)	10-58	Black/ Green	Red/ Black	64/42-36 ER	22:39-76
1800-2400 (6000-8000)	10-56	Black/ Green	Red/ Black	64/42-36 ER	20:41-76
2400-3000 (8000-10000)	10-54	Black/ Green	Red/ Black	64/42-36 ER	20:41-76
3000-3700 (10000-12000)	10AL	Black/ Green	Red/ Black	64/42-36 ER	20:41-76

Drive clutch bolt torque 50 ft-lbs

**Table 1-229: Belt**

Belt part number	3211080
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2



**Table 1-230: Chaincase**

Center distance in/cm	8.373/21.27
Reverse type	PERC

**Table 1-231: Fluids and capacities**

Fuel gal/l	10.8/40.9
Oil qts/l	3/2.8
Coolant qts/l	5/4.7
Chaincase oz/ml	11/325.3
Brake fluid type	DOT 4

**Table 1-232: Track**

Width in/cm	15/38
Length in/cm	144/366
Lug height in/cm	1.25/3.2
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	.375-.50/1-1.3

**Table 1-233: Front Suspension**

Suspension type	IQ 42.5
IFS shocks	Arvin/7043141*
IFS spring rate lbs-in/kg-mm	100/1.79
Spring installed length in/cm	10.55/26.8
Front vertical travel in/cm	10/25.4
Ski center distance in/cm	42.5/108
Camber in/cm	2.25±.31/5.7±.79
Toe in/mm	0-.12/0-3.0

**Table 1-234: Rear Suspension**

Suspension type	IQ RMK 144
Front track shock (FTS)	Arvin/7043142*
FTS spring rate lbs-in/kg-mm	170/3.0
FTS spring installed length in/cm	7.25/18.4
Rear track shock	Arvin/7043143*
Rear travel in/cm	16.5/41.9
* notes that shock is rebuildable	

**Table 1-235: Torsion spring**

Torsion spring PNs (LH/RH)	7041629/7041630
Torsion spring diameter in/mm	.359/9.12
Torsion spring tail angle	77°

**Table 1-236: Dimensions**

Width in/cm	46.5/118
Length in/cm	128/325
Height in/cm	46.5/118
Est dry weight lb/kg	489/222

**Table 1-237: Electrical**

Ignition timing	26°@3500 w/TPS unplugged
Spark plug gap in/mm	.025/.64
Spark plug	Champion RN57YCC
Voltage regulator/output	400w@4000RPM
CDI marking	4011033



## 900 SWITCHBACK

**MODEL NUMBER: S06PS8DS(A)**

**Table 1-238: Engine**

Engine type	Liberty
Engine displacement	866cc
Bore in/mm	3.27/83
Stroke in/mm	3.15/80
Piston to cylinder clearance in/mm	.0045-.0074/.114-.188
Piston ring end gap	.016-.022/.41-.56
Operating RPM $\pm$ 200	7600
Idle RPM $\pm$ 200	1700 @ specified TPS setting
Clutch engagement RPM $\pm$ 200	3700
Exhaust valve spring	Purple

**Table 1-239: Fuel Delivery**

Type	Cleanfire Injection
Throttle body size in/mm	2/51
Fuel pressure psi/bar	116/8
Recommended fuel octane (R+M/2)	91

**Table 1-240: Idle TPS voltage setting**

Altitude meters/feet	Voltage $\pm$ .01v
0-1800(0-6000)	.93
1800-2700(6000-9000)	.95
> 2700 (>9000)	.97

**Table 1-241: Clutching**

ALTITUDE meters (feet)	DRIVE CLUTCH (P-85)		DRIVEN CLUTCH (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-600 (0-2000)	10-74	Dark Blue / White	Red/Black	64/42-46 ER	25:40-78
600-1200 (2000-4000)	10-72	Dark Blue / White	Red/Black	64/42-46 ER	25:40-78
1200-1800 (4000-6000)	10-72	Dark Blue / White	Red/Black	64/42-46 ER	25:40-78
1800-2400 (6000-8000)	10-70	Black / Green	Red/Black	64/38-36 ER	24:41-78
2400-3000 (8000-10000)	10-68	Black / Green	Red/Black	64/38-36 ER	22:43-78
3000-3600 (10000-12000)	10-66	Black / Green	Red/Black	64/38-36 ER	22:43-78

Drive clutch bolt torque 96 ft-lbs (130Nm)

**Table 1-242: Belt**

Belt part number	3211080
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2

**Table 1-243: Chaincase**

Center distance in/cm	8.373/21.27
Reverse type	PERC

**Table 1-244: Fluids and capacities**

Fuel gal/l	10.8/40.9
Oil qts/l	3/2.8
Coolant qts/l	6.8/6.4
Chaincase oz/ml	11/325.3
Brake fluid type	DOT 4



**Table 1-245: IQ Track**

Width in/cm	15/38
Length in/cm	144/366
Lug height in/cm	1.25/3.2
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	.375-.50/1-1.3

**Table 1-250: Electrical**

Stator output	400w@4000RPM
Ignition timing @ 9.6-12.7% throttle	16° @3500
Spark plug gap in/mm	.025/.64
Spark plug	Champion RN57YCC

**Table 1-246: Front Suspension**

Suspension type	IQ 42.5
IFS shocks	Fox/7043141*
IFS spring rate lbs-in/kg-mm	120/2.2
Spring installed length in/cm	11.17/28.4
Front vertical travel in/cm	10/25.4
Ski center distance in/cm	42.5/108
Camber in/mm	2.25±.31/5.7±.79
Toe in/mm	0-.12/0-3.0

**Table 1-247: IQ Rear Suspension**

Suspension type	IQ RMK 144
Front track shock	Fox/7043142*
Front track shock spring rate lbs-in/kg-mm	170/3.2
Spring installed length in/cm	7.25/18.4
Rear track shock	Fox/7043143*
Rear vertical travel in/cm	16.5/41.9
* notes that shock is rebuildable	

**Table 1-248: Torsion spring**

Torsion spring PNs (LH/RH)	7041629/7041630
Torsion spring diameter in/mm	.359/9.1
Torsion spring tail angle	77°

**Table 1-249: Dimensions**

Width in/cm	47.25/120
Length in/cm	128/325
Height in/cm	48.5/123
Est dry weight lb/kg	528/239.7



## TRAIL RMK

### MODEL S06NJ5B(E,S)(A)

**Table 1-251: Engine**

Engine type	Fuji
Engine displacement	544cc
Bore in/mm	2.87/73
Stroke in/mm	2.56/65
Piston to cylinder clearance in/mm	.0045-.0053/.11-.14
Piston ring end gap	.0035-.0049/.090-.125
Operating RPM $\pm$ 200	7000
Idle RPM	1600
Clutch engagement RPM $\pm$ 200	3800
Exhaust valve spring	N/A

**Table 1-252: Fuel Delivery**

Type	VM34 ACCS
Main Jet	260 PTO/250 MAG
Pilot Jet	35
Jet Needle/Clip position	6DEH11/3
Needle Jet	Q-0 (480)
Throttle gap under cutaway in/mm	.250/6.35
Throttle slide cutaway	3
Valve seat	1.5 Viton
Starter jet	1.5
Pilot air jet	N/A
Fuel screw setting	N/A
Air screw setting	1.0
Recommended fuel octane (R+M/2)	87 NonOxy/89 Oxy Min

**Table 1-253: 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)	290/280 #3	280/270 #3	270/260 #3	260/250 #3	250/240 #3	240/230 #3
600-1200 (2000-4000)	290/280 #3	280/270 #3	270/260 #3	260/250 #3	250/240 #3	240/230 #3
1200-1800 (4000-6000)	290/280 #3	280/270 #3	270/260 #3	260/250 #3	250/240 #3	240/230 #3
1800-2400 (6000-8000)	290/280 #3	280/270 #3	270/260 #3	260/250 #3	250/240 #3	240/230 #3
2400-3000 (8000-10000)	290/280 #3	280/270 #3	270/260 #3	260/250 #3	250/240 #3	240/230 #3
3000-3700 (10000-12000)	290/280 #3	280/270 #3	270/260 #3	260/250 #3	250/240 #3	240/230 #3
Jetting listed as PTO/MAG						

**Table 1-254: Clutching**

Altitude meters (feet)	Drive Clutch (P-85)		Driven Clutch (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-900 (0-3000)	10-64	Dark Blue/White	Red/Blue	S40ER	19:43-74
900-1800 (3000-6000)	10-62	Dark Blue/White	Red/Blue	S40ER	19:43-74
1800-2700 (6000-9000)	10-60	Dark Blue/White	Red/Blue	S40ER	19:43-74
2700-3700 (9000-12000)	10-58	Dark Blue/White	Red/Blue	S40ER	19:43-74
Drive clutch bolt torque 50 ft-lbs(69Nm)					

**Table 1-255: Belt**

Belt part number	3211078
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2



**Table 1-256: Chaincase**

Center distance in/cm	7.92/20.1
Reverse type	PERC

**Table 1-257: Fluids and capacities**

Fuel gal/l	11.8/44.7
Oil qts/l	3.25/3.1
Coolant qts/l	Air
Chaincase oz/ml	9/266.2
Brake fluid type	DOT 4

**Table 1-258: Track**

Width in/cm	15/38
Length in/cm	136/345
Lug height in/cm	1.25/3.2
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	.375-.50/1-1.3

**Table 1-259: Front Suspension**

Suspension type	Edge RMK
IFS shocks	Arvin/7042197
IFS spring rate lbs-in/kg-mm	80/1.4
Spring installed length in/cm	9.75/24.8
Front vertical travel in/cm	7.6/19.3
Ski center distance in/cm	41/104
Camber in/mm	.735±.31/18.7±7.9
Toe in/mm	0-.12

**Table 1-260: Rear Suspension**

Suspension type	Edge RMK
Front track shock	Arvin/7042085
FTS spring rate lbs-in/kg-mm	170/3.0
FTS spring installed length in/cm	7.375/18.7
Rear track shock	7042058
Rear travel in/cm	13.8/35.1
* notes that shock is rebuildable	

**Table 1-261: Torsion spring**

Torsion spring PNs (LH/RH)	7041627/7041628
Torsion spring diameter in/mm	.347/8.8
Torsion spring tail angle	77°

**Table 1-262: Dimensions**

Width in/cm	45.5/115.6
Length in/cm	124/315
Height in/cm	48/121.9
Est dry weight lb/kg	475/215.7

**Table 1-263: Electrical**

Ignition timing	27° @ 3000 RPM 14° @ 6500 RPM
Spark plug gap in/mm	.028/.71
Spark plug	NGK BR9ES
Voltage regulator/output	240 watts
Magneto pulse	6
CDI marking	CU7236



## 600 HO RMK

### MODEL#S06PK6FS(A,B)

**Table 1-264: Engine**

Engine type	600 Liberty
Engine displacement	599cc
Bore in/mm	3.04/77.25
Stroke in/mm	2.52/64
Piston to cylinder clearance in/mm	.0045-.0059/.114-.150
Piston ring end gap	.014-.020/.36-.51
Operating RPM $\pm$ 200	8100
Idle RPM	1500
Clutch engagement RPM $\pm$ 200	3800
Exhaust valve spring	Pink
Head volume installed	27.5-28.3cc
Head volume bench	35.2 $\pm$ .5cc

**Table 1-265: Fuel Delivery**

Type	TM38
Main Jet	280
Pilot Jet	50
Jet Needle/Clip position	9DGN6-57/1
Needle Jet	P-8
Throttle gap under cutaway in/mm	.13/3.4
Throttle slide cutaway	2.5
Valve seat	1.5
Starter jet	145
Pilot air jet	.6
Fuel screw setting	1
Air screw setting	N/A
Recommended fuel octane (R+M/2)	91

**Table 1-266: 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
0-600 (0-2000)	440 #3	430 #3	420 #2	400 #2	390 #2	380 #2	370 #1
600-1200 (2000-4000)	410 #3	400 #3	390 #2	370 #2	360 #2	350 #2	340 #1
1200-1800 (4000-6000)	370 #3	360 #2	350 #2	340 #2	330 #2	320 #1	310 #1
1800-2400 (6000-8000)	340 #3	320 #2	310 #2	300 #2	280 #1	280 #1	270 #1
2400-3000 (8000-10000)	310 #2	300 #2	290 #2	280 #1	270 #1	260 #1	250 #1
3000-3700 (10000-12000)	290 #2	280 #2	270 #1	250 #1	240 **	230 **	220 **

\*\* Denotes clip in position #1 with the washer on top.

When using non oxygenated fuel with an octane number greater than 93, decrease the main jet number in the above chart by 10 and insert the E-clip position to \*\*. If already in position \*\* no adjustment is needed.

**Table 1-267: Clutching**

Altitude meters (feet)	Drive Clutch (P-85)		Driven Clutch (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-600 (0-2000)	10-62	Black/ Green	Red/ Black	56/42-36	20:41-76
600-1200 (2000-4000)	10-60	Black/ Green	Red/ Black	56/42-36	20:41-76
1200-1800 (4000-6000)	10-58	Black/ Green	Red/ Black	56/42-36	20:41-76
1800-2400 (6000-8000)	10-56	Black/ Green	Red/ Black	56/42-36	20:41-76
2400-3000 (8000-10000)	10-54	Black/ Green	Red/ Black	56/42-36	20:41-76
3000-3700 (10000-12000)	10AL	Black/ Green	Red/ Black	56/42-36	20:41-76

Drive clutch bolt torque 50 ft-lbs

**Table 1-268: Belt**

Belt part number	3211080
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2



**Table 1-269: Chaincase**

Center distance in/cm	8.373/21.27
Reverse type	PERC

**Table 1-270: Fluids and capacities**

Fuel gal/l	10.8/40.9
Oil qts/l	3/2.8
Coolant qts/l	5/4.7
Chaincase oz/ml	11/325.3
Brake fluid type	DOT 4

**Table 1-271: Track**

Width in/cm	15/38
Length in/cm	144/366
Lug height in/cm	2/5
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	.375-.50/1-1.3

**Table 1-272: Front Suspension**

Suspension type	IQ Mountain
IFS shocks	Arvin/7043049
IFS shocks option	Arvin/7043090*
IFS spring rate lbs-in/kg-mm	100/1.79
IFS spring installed length in/cm	10.35/26.3
Front vertical travel in/cm	9/22.9
Ski center distance in/cm	41/104
Camber in/cm	2.17±.31/5.5±.79
Toe in/mm	0-.12/0-3.0

**Table 1-273: Rear Suspension**

Suspension type	IQ RMK 144
Front track shock (FTS)	Arvin/7043048
FTS spring rate lbs-in/kg-mm	170/3.0
FTS spring installed length in/cm	7.4/18.8
Front track shock option	Arvin/7042335*
FTS option spring rate lbs-in/kg-mm	170/3.0
FTS option spring installed length in/cm	7.25/18.4
Rear track shock	Arvin/7043047*
Rear track shock option	Arvin/7043046*
Rear travel in/cm	16.5/41.9
* notes that shock is rebuildable	

**Table 1-274: Torsion spring**

Torsion spring PNs (LH/RH)	7041629/7041630
Torsion spring diameter in/mm	.359/9.12
Torsion spring tail angle	77°

**Table 1-275: Dimensions**

Width in/cm	46.5/118
Length in/cm	128/325
Height in/cm	46.5/118
Est dry weight lb/kg	489/222

**Table 1-276: Electrical**

Ignition timing	26° @3500 w/TPS unplugged
Spark plug gap in/mm	.025/.64
Spark plug	Champion RN57YCC
Voltage regulator/output	400w@4000RPM
CDI marking	4011033



## 700 RMK

**MODEL NUMBER: S06P(K,L,M)7HS(A,B)**

**Table 1-277: Engine**

Engine type	Liberty
Engine displacement	755cc
Bore in/mm	3.05/77.5
Stroke in/mm	3.15/80
Piston to cylinder clearance in/mm	.0045-.0074/.114-.188
Piston ring end gap	.014-.020/.35-.50
Operating RPM $\pm$ 200	7600
Idle RPM $\pm$ 200	1600 @ specified TPS setting
Clutch engagement RPM $\pm$ 200	3700
Exhaust valve spring	Purple

**Table 1-278: Fuel Delivery**

Type	Cleanfire
Throttle body size in/mm	2.0/51
Fuel pressure psi/bar	116/8
Recommended fuel octane (R+M/2)	91

**Table 1-279: Idle TPS voltage setting**

Altitude meters/feet	Voltage $\pm$ .01v
0-1800(0-6000)	.93
1800-2700(6000-9000)	.95
> 2700 (>9000)	.97

**Table 1-280: Clutching**

ALTITUDE meters (feet)	DRIVE CLUTCH (P-85)		DRIVEN CLUTCH (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-600 (0-2000)	10-74	Black/Green	Red/Black	64/36-25 ER	20:41-76
600-1200 (2000-4000)	10-72	Black/Green	Red/Black	64/36-25 ER	20:41-76
1200-1800 (4000-6000)	10-70	Black/Green	Red/Black	64/36-25 ER	20:41-76
1800-2400 (6000-8000)	10-68	Black/Green	Red/Black	64/36-25 ER	20:41-76
2400-3000 (8000-10000)	10-66	Black/Green	Red/Black	64/36-25 ER	20:41-76
3000-3600 (10000-12000)	10-64	Black/Green	Red/Black	64/36-25 ER	20:41-76

Drive clutch bolt torque 96 ft-lbs (130Nm)

**Table 1-281: Belt**

Belt part number	3211080
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2

**Table 1-282: Chaincase**

Center distance in/cm	8.373/21.27
Reverse type	PERC

**Table 1-283: Fluids and capacities**

Fuel gal/l	10.8/40.9
Oil qts/l	3/2.8
Coolant qts/l	6.9/6.5
Chaincase oz/ml	11/325.3
Brake fluid type	DOT 4





## SPECIFICATIONS

**Table 1-284: Track**

Width in/cm	15/38
144 Length in/cm	144/366
151 Length in/cm	151/384
159 Length in/cm	159/404
144/151 Lug height in/cm	2/5
159 Lug height in/cm	2.4/6.1
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	.375-.50/1-1.3

**Table 1-285: Front Suspension**

Suspension type	IQ RMK Adjustable
IFS shocks	Arvin 7043049
IFS spring rate in-lbs/kg-mm	110/2.0
Spring installed length in/cm	Fixed
IFS shock option	Arvin/7043090*
IFS option spring rate lbs-in/kg-mm	100/1.8
IFS option spring installed length in/cm	10/25.4
Front vertical travel in/cm	9/22.9
Ski center distance in/cm	41/104
Camber in/cm	2.17±.31/5.5±.79
Toe in/mm	0-.12/0-3.0

**Table 1-286: IQ Rear Suspension**

Suspension type	IQ RMK
Front track shock	Arvin/7043048
Front track shock (FTS) spring rate lbs-in/kg-mm	170/3.0
FTS spring installed length in/cm	7.40/18.8
FTS option	Arvin/7042335*
FTS option spring rate lbs-in/kg-mm	170/3.0
FTS option spring installed length in/cm	7.25/18.4
Rear track shock (RTS)	7043047
RTS option	7043046*
144/151 Rear travel in/cm	16.5/41.9
159 Rear travel in/cm	17.5/44.5
* notes that shock is rebuildable	

**Table 1-287: Torsion spring**

Torsion spring PNs (LH/RH)	7041629/7041630
Torsion spring diameter in/mm	.359/9.12
Torsion spring tail angle	77°

**Table 1-288: Dimensions**

Width in/cm	46.33/118
144/151 Length in/cm	128/325
159 Length in/cm	134/340.4
Height in/cm	46.5/118
144 Est dry weight lb/kg	529/240
151 Est dry weight lb/kg	532/241.5
159 Est dry weight lb/kg	539/244.7

**Table 1-289: Electrical**

Stator output	400w@4000RPM
Ignition timing @ 9.6-12.7% throttle	16° @ 3500
Spark plug gap in/mm	.025/.64
Spark plug	Champion RN57YCC



## 900 RMK

**MODEL NUMBER: S06PN8DS(A)**

**Table 1-290: Engine**

Engine type	Liberty
Engine displacement	866cc
Bore in/mm	3.27/83
Stroke in/mm	3.15/80
Piston to cylinder clearance in/mm	.0045-.0074/.114-.188
Piston ring end gap	.016-.022/.41-.56
Operating RPM $\pm$ 200	7600
Idle RPM $\pm$ 200	1600 @ specified TPS setting
Clutch engagement RPM $\pm$ 200	3700
Exhaust valve spring	Purple

**Table 1-291: Fuel Delivery**

Type	Cleanfire Injection
Throttle body size in/mm	2/51
Fuel pressure psi/bar	116/8
Recommended fuel octane (R+M/2)	91

**Table 1-292: Idle TPS voltage setting**

Altitude meters/feet	Voltage $\pm$ .01v
0-1800(0-6000)	.93
1800-2700(6000-9000)	.95
> 2700 (>9000)	.97

**Table 1-293: Clutching**

ALTITUDE meters (feet)	DRIVE CLUTCH (P-85)		DRIVEN CLUTCH (TEAM)		
	Shift Weight	Clutch Spring	Clutch Spring	Driven Helix	Gearing
0-600 (0-2000)	10-78CS	Black/ Green	Red/Black	64/38- .25ER	20:41-76
600-1200 (2000-4000)	10-76CS	Black/ Green	Red/Black	64/38- .25ER	20:41-76
1200-1800 (4000-6000)	10-74	Black/ Green	Red/Black	64/38- .25ER	20:41-76
1800-2400 (6000-8000)	10-72	Black/ Green	Red/Black	64/38- .25ER	20:41-76
2400-3000 (8000-10000)	10-70	Black/ Green	Red/Black	64/38- .25ER	20:41-76
3000-3600 (10000-12000)	10-68	Black/ Green	Red/Black	64/38- .25ER	20:41-76
Drive clutch bolt torque 96 ft-lbs (130Nm)					

**Table 1-294: Belt**

Belt part number	3211080
Belt width in/cm	1.438/3.65
Belt side angle	28°
Outside diameter in/cm	46.625/118.4
Clutch center distance in/cm	11.5/29.2

**Table 1-295: Chaincase**

Center distance in/cm	8.373/21.27
Reverse type	PERC

**Table 1-296: Fluids and capacities**

Fuel gal/l	10.8/40.9
Oil qts/l	3/2.8
Coolant qts/l	6.9/6.5
Chaincase oz/ml	11/325.3
Brake fluid type	DOT 4





## SPECIFICATIONS

**Table 1-297: Track**

Width in/cm	15/38
Length in/cm	151/384
Length in/cm	159/404
Length in/cm	166/422
151 Lug height in/cm	2/5
159/166 Lug height in/cm	2.4/6.1
Track tension sag in/cm with 10 lbs/4.54kg placed 16 in/40.6cm ahead of rear idler shaft	.375-.50/1-1.3

**Table 1-298: Front Suspension**

Suspension type	IQ Mountain
IFS shocks	Arvin/7043049
IFS spring rate lbs-in/kg-mm	100/1.8
Spring installed length in/cm	Fixed
Front vertical travel in/cm	9/22.9
IFS option shocks	Arvin/7043090*
IFS option spring rate lbs-in/kg-mm	100/1.8
IFS option spring installed length in/cm	10/25.4
Ski center distance in/cm	41/104
Camber in/cm	2.17±.31/5.5±.79
Toe in/mm	0-.12/0-3.0

**Table 1-299: IQ Rear Suspension**

Suspension type	IQ RMK
Front track shock (FTS)	7043048
FTS spring rate lbs-in/kg-mm	170/3.0
FTS spring installed length in/cm	Fixed
Front track shock (FTS) option	Arvin/7042335*
FTS option spring rate lbs-in/kg-mm	170/3.0
FTS option spring installed length in/cm	7.25/18.4
Rear track shock (RTS)	Arvin/7043047
RTS option	Arvin/7043046*
151 Rear travel in/cm	16.5/41.9
159 Rear travel in/cm	17.5/44.5
166 Rear travel in/cm	18.5/47
* notes that shock is rebuildable	

**Table 1-300: Torsion spring**

Torsion spring PNs (LH/RH)	7041629/7041630
Torsion spring diameter in/mm	.359/9.1
Torsion spring tail angle	77°

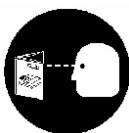
**Table 1-301: Dimensions**

Width in/cm	46.33/118
151 Length in/cm	128/325
159/161 Length in/cm	134/340
Height in/cm	46.5/118
151 Est dry weight lb/kg	532/241.5
159 Est dry weight lb/kg	539/244.7
166 Est dry weight lb/kg	550/249.7

**Table 1-302: Electrical**

Stator output	400w@4000RPM
Ignition timing @ 9.6-12.7% throttle	16° @ 3500
Spark plug gap in/mm	.025/.64
Spark plug	Champion RN57YCC

## This image shows a full page of blank white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page, providing a template for writing or drawing. There are no margins, text, or other markings present.



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## **HOW TO USE THIS MANUAL**

### **LOCATING INFORMATION**

This manual is divided into chapters that cover each of the main components of the snowmobile.

To quickly find the information that you are interested in, the first page of each chapters lists the tale of contents within the chapter.

The first page of each chapters lists the Table of Contents within the chapter.

An index is provided at the end of this book. This will help you locate the information that you may need.

### **EXPLANATION METHOD OF THIS MANUAL**

The step by step sections of this manual are listed in numerical order and will have a heading for removal or installation.

Page numbers are listed as chapter number and page number. Chapter number is separated by a period. Example of this is “3.12”. The first number (3) designates the chapter, the second number (12) is the page number.

The steps may have a reference other data that is found in the manual. These references will state the title and page number that is is located in.

Special tools that are needed for the given process may be called out in the steps.

Illustrations and/or photos are provided in some processes to aid the user for visual understanding.

The illustrations/photos will point out the item that is addressed in the process step. The call out may be a number(s) or letter(s). The name of the item(s) may also be listed.

Torque values may also be specified within the illustration/photo. Torque is called out as ft-lb. first and Newton Meters in parentheses (Nm).



## SNOWMOBILE MODEL NUMBER DESIGNATION

### EXAMPLE:

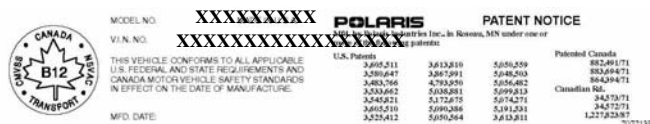
**S06PS8DSA (900 SWITCHBACK STOCK A)**

**Table 2-1: Model Number Designation**

Identifier	Model Year	Model Line	Model Type	Engine Modifier		VIN Identifier	Option Identifier
S	06	P	S	8	D	S	A
S=Snow	06=2006 05=2005 04=2004	M=IQ N=Edge P=IQ RMK S=GenII W=Mini Indy	B=Std D=Classic E=M-10 J=136 RMK K=144 RMK L=151 RMK M=159 RMK N=166 RMK P=Performance S=Switchback T=Touring U=Utility X=Racer	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 6E=600 EV L/C Case Reed 2 Cyl (Dom) 6F=600 EV L/C Case Reed HP 2 Cyl (Dom) 7E=750 NA 7F=750 HO 7H=755 EV DSDI Case Reed 8D=866 EV SDI Case Reed		E=Europe Unit S=Standard Production Unit	Option Identifier

## TUNNEL DECAL

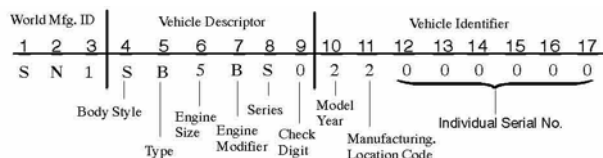
### TUNNEL DECAL LOCATED ON THE RIGHT HAND SIDE OF THE SLED



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



## VIN (Vehicle Identification Number)



## VIN EXPLANATION

Current snowmobiles have a 17 digit Vehicle Identification Number (VIN). The VIN is organized as follows:

Digits 1-3: World Manufacturer Identifier. For Polaris, this is SN1.

Digits 4-9: Vehicle Descriptor Section.

Digits 10-17: Vehicle Indicator Section.

Digits 4-8 of the VIN identify the body style, type, engine type, and series. The VIN and the model number must be used with any correspondence regarding service or repair.

**Table 2-2: VIN Vehicle Descriptor (4th - 8th digits)**

4th	5th	6th	7th	8th	9th	10th	11	12-17
Body Style	Type	Engine Modifier		Series	Ck digit	Model Year	Asm Line	Ser #
M=IQ N=Edge P= IQ RMK S=GenII W=Mini Indy	B=Standard D=Classic E=M-10 J=136 RMK K=144 RMK L=151 RMK M=159 RMK N=166 RMK P=Performance S=Switchback T=Touring U=Utility X=Racer	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 6E=600 EV L/C Case Reed 2 Cyl (Dom) 6F=600 EV L/C Case Reed HP 2 Cyl (Dom) 7E=750 NA 7F=750 HO 7H=755 EV DSDI Case Reed 8D=866 EV SDI Case Reed		E=Europe Unit S=Standard Production Unit	Check digit	6=2006	A B C D	Sequential Serial Numbers

## PUBLICATION PART NUMBERS

### 2006 PART NUMBERS

**Table 2-3: Publication Part Numbers**

Model	Model Number	Owner's Manual	Owner's Manual Supplement	Parts Manual	Microfiche	Assembly Instruction	Service Manual
340 Classic	S06ND3AS	9919667	9919683	9919719	9919720	9916508	9919763
500 Classic	S06ND4BS	919667	9919938	9919939	9919940	9916508	9919763
550 Classic	S06ND5BS	9919667	9919684	9919721	9919722	9916508	9919763
600 Classic	S06ND6ES	9919667	9919884	9919885	9919886	9916508	9919763
600 Edge Touring	S06NT6ES	9919669	9919887	9919888	9919889	9916508	9919763
700 HO Classic	S06PD7HS	9919666	9919694	9919735	9919736	9916508	9919763
700 HO Touring	S06PT7HS	9919674	-	9919753	9919754	9916508	9919763
FS/FST Classic	S06PD7E(F)S	9919670	9919692	9919733	9919734	9916508	9919765



Table 2-3: Publication Part Numbers

Model	Model Number	Owner's Manual	Owner's Manual Supplement	Parts Manual	Microfiche	Assembly Instruction	Service Manual
FS/FST IQ Touring	S06PT7E(F)S	9919673	9919710	9919751	9919752	9916508	9919765
Indy 340 Touring	S06NT3AS	9919669	9919690	9919729	9919730	9916508	9919763
Trail Touring (DLX)	S06NT5BS(A)	9919669	9919691	9919731	9919732	9916508	9919763
Widetrak LX	S06SU4BS	9919669	9919712	9919755	9919756	9916508	9919763
600 HO RMK	S06PK6FS(A)	9920058	9919696	9919739	9919740	9919882	9919763
600 Switchback	S06PS6FS(A)	9920058	9919707	9919745	9919746	9916508	9919763
700 HO RMK	S06PK(L,M)7HS(A)	9919671	9919700	9919743	9919744	9919882	9919763
900 RMK	S06P(M,N,R)8DS(A,B)	9920103	9919701	9919743	9919744	9919882	9919763
900 Switchback	S06PS8DS(A)	9920103	9919709	9919749	9919750	9916508	9919763
FST Switchback	S06PS7FS	9919672	9919708	9919747	9919748	9916508	9919765
Trail RMK	S06NJ5BS(A)	9919668	-	9919727	9919728	9919882	9919763
120	S06WB1AS	9919675	-	9919757	9919758	9916891	9919766
500 Indy	S06NB4BS	9919667	9919935	9919936	9919937	9916508	9919763
500 XC SP Edge/M-10	S06NE(P)5CS(A,B)	9919667	9919686	9919725	9919726	9916508	9919763
600 HO Fusion	S06MP6FS(A,B)	9920057	9919680	9919713	9919714	9919882	9919763
600 HO Fusion Lux	S06ME6FS	9920057	9919677	9919713	9919714	9919882	9919763
700 HO Fusion	S06MP7HS(A,B)	9919666	9919681	9919715	9919716	9919882	9919763
700 HO Fusion Lux	S06ME7HS	9919666	9919678	9919715	9919716	9919882	9919763
900 Fusion	S06MP(E)8DS(A,B)	9920102	9919682	9919715	9919716	9919882	9919763
Supersport Edge/M-10	S06N(E)P5BS(A,B)	9919667	99196859919688	9919723	9919724	9916508	9919763

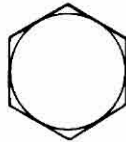
Table 2-4: Misc. Publications

Publication	PN
Track Diagnosis Poster	9918459
2006 Specification Handbook/Quick Reference Manual	9920147

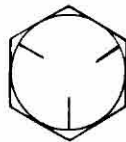


## GENERAL REFERENCE

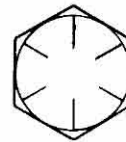
### STANDARD BOLT SPECIFICATIONS



Grade 2



Grade 5



Grade 8

**Table 2-5: Standard Bolt Specifications**

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				

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

**SAE TAP DRILL SIZES**

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

**METRIC TAP DRILL SIZES**

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

**DECIMAL EQUIVALENTS**

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



## MESUREMENT CONVERSION CHART

**Table 2-6: 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 Centimeters
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)

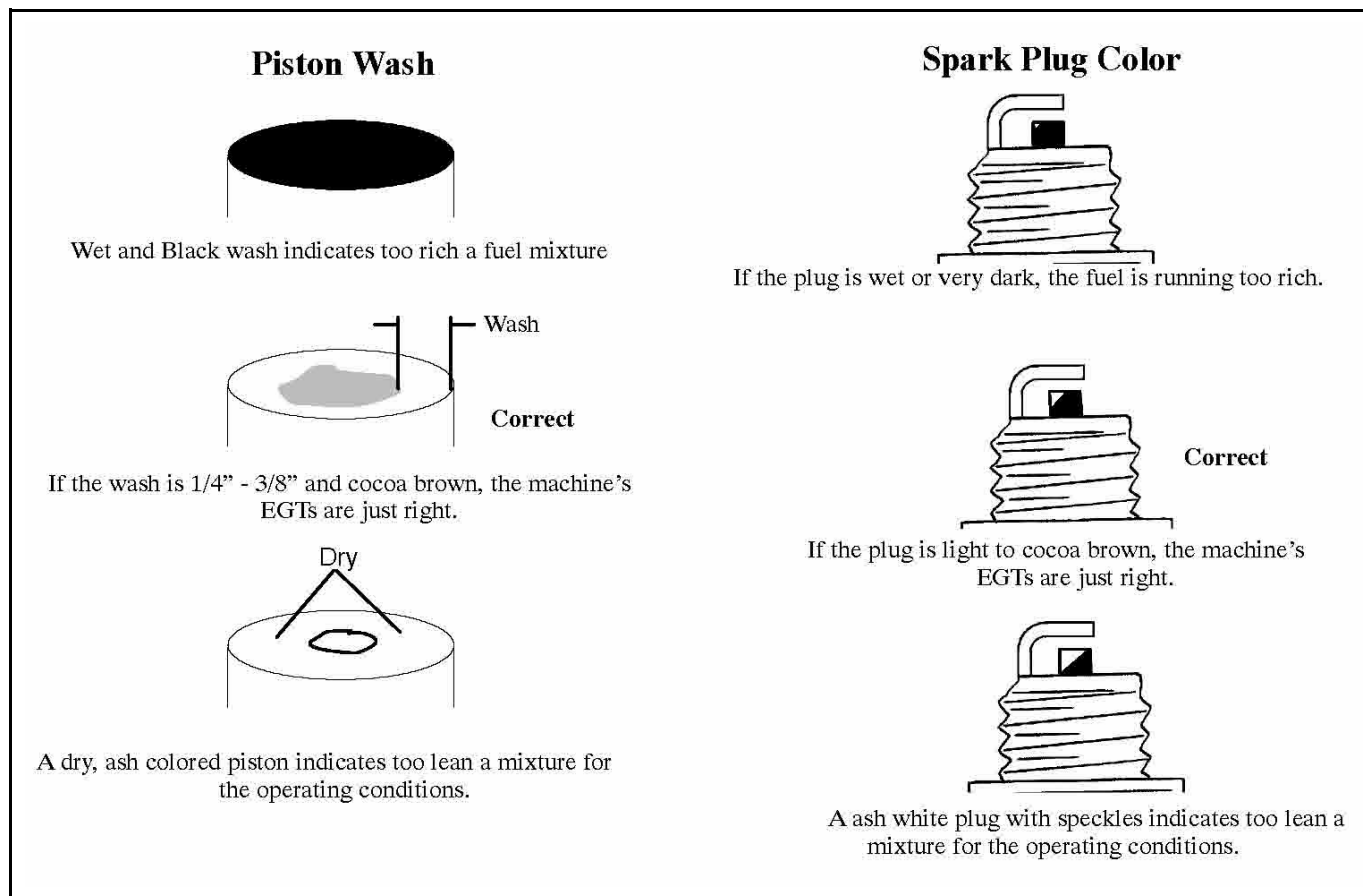


## PISTON WASH / SPARK PLUG READING

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.



## GASOLINE INFORMATION

### GASOLINE VOLATILITY

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. Some states are limiting the Reid Vapor number to 9.0 PSI year around to help meet evaporative emissions standards.

**Table 2-7: Gasoline Volatility**

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

## 2 STROKE GASOLINE / OIL PRE MIX

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.

**Table 2-8:**

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



## **SPECIAL TOOLS**

### **Fuel Pressure Gauge (PV-43506-A)**



PV-43506

FUEL PRESSURE GAUGE

Used to measure fuel pressure for fuel injection diagnostic work.

### **Throttle Position Sensor Tester Kit (2201519)**



2201519

THROTTLE POSITION SENSOR TESTER KIT

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

### **Fuel Line Disconnection Tool (PS-47152)**

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.



### **Mity-Vac Pressure Test Kit (2870975)**



2870975












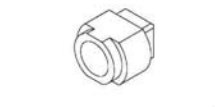

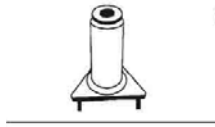

MITY-VAC PRESSURE TEST TOOL

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

















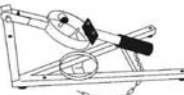





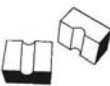



## SPECIAL TOOLS

	<p><b>2871846</b> <b>2871847</b></p> <p><b>WATER PUMP SEAL INSTALLATION TOOLS</b></p> <p>Used to install water pump mechanical seal (PN 3610050) on '97 and '98 600 &amp; 700 cc domestic twin cylinder engines and '97 440 XCR.</p> <p>Both required. 2871846 Guide 2871847 Driver</p>
	<p><b>2870303</b></p> <p><b>AMMCO HONE KIT</b></p> <p>Rigid hone to correct tapered and out of round cylinders. Range: 47.6 mm – 69.8 mm (1 7/8" – 2 3/4"). Contains 60 and 220 grit stones, driveshaft with depth stop and metal storage box. Oversize stone kits increase range to 92 mm (3 5/8").</p> <p>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</p>
	<p><b>2870588</b></p> <p><b>HONING OIL</b></p> <p>12 oz can with dispensing tip. Promotes better finishes, faster cutting and longer stone life.</p>
	<p><b>2870386</b></p> <p><b>PISTON PIN PULLER</b></p> <p>Removes 18 mm piston pins from many Polaris pistons. Required for many Polaris puller attachments.</p> <p><b>Note:</b> Some engines require adapters.</p>
	<p><b>2871342</b></p> <p><b>PISTON PIN PULLER ADAPTER</b></p> <p>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.</p>
	<p><b>2871445</b></p> <p><b>PISTON PIN PULLER ADAPTER</b></p> <p>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.</p>
	<p><b>2870390</b></p> <p><b>PISTON SUPPORT BLOCK</b></p> <p>Safely supports piston while disassembling or assembling engine top end.</p>
	<p><b>2870569</b></p> <p><b>CRANKSHAFT TRUING STAND</b></p> <p>For holding crankshaft while checking runout for all Polaris engines.</p>
	<p><b>2870773</b></p> <p><b>C-CLIP INSTALLATION TOOL</b></p> <p>For installing piston pin c-clips on most Polaris engines.</p>
	<p><b>2871043</b></p> <p><b>HEAVY DUTY FLYWHEEL PULLER – 6 BOLT</b></p> <p>Removes all current Polaris flywheels.</p> <p>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)</p>
	<p><b>2871989</b></p> <p><b>ENGINE MOUNT SOCKETS</b></p> <p>For removing and installing all snowmobile engines that have drive tabs. Low profile small diameter.</p> <p>PS-45384 For removing tall rubber mounts that have drive tabs. Large diameter.</p>

	<p><b>2872010</b></p> <p><b>WATER PUMP SEAL INSTALLATION TOOL</b></p> <p>For installing water pump mechanical seal to depth of 8.4 mm on 1998 – Present small block domestic twins (440, 500 and 600 EV).</p>
	<p><b>2872389</b></p> <p><b>WATER PUMP SEAL INSTALLATION TOOL</b></p> <p>For installing water pump mechanical seal to depth of 8.9 mm on 1999 – Present Big Block domestic twins (600, 700 &amp; 800).</p>
	<p><b>2872401</b></p> <p><b>20 MM C-CLIP TOOL</b></p> <p>To install C-clip on small bore domestic twin engines.</p>
	<p><b>2872622A</b></p> <p><b>22 MM C-CLIP TOOL</b></p> <p>To install C-clip on Big Block domestic twin engines and 1200 PWC.</p>
	<p><b>5131135</b></p> <p><b>EC68PL &amp; EC59PL WATER PUMP INSTALLATION TOOL</b></p> <p>For installing water pump seal on EC68PL &amp; EC59PL engines. Does not include bolt, nut or washers.</p>
	<p><b>PA-44995</b></p> <p><b>WATER PUMP MECHANICAL SEAL INSTALLER</b></p> <p>Used to install and set the mechanical seal properly into the mag end gear case.</p> <p>Application: Domestic ATV 4-stroke and Frontier</p>
	<p><b>PA-45401</b></p> <p><b>WATER PUMP SEAL SAVER</b></p> <p>Used to protect the water pump seal while installing the mag end gear cover.</p> <p>Application: Domestic ATV 4-stroke and Frontier</p>
	<p><b>PA-45483</b></p> <p><b>MAIN SEAL INSTALLER</b></p> <p>Used to install the crankshaft mag end seal into the gear cover.</p> <p>Application: Domestic ATV 4-stroke and Frontier</p>
	<p><b>PA-45658</b></p> <p><b>MAIN CRANKSHAFT SEAL SAVER</b></p> <p>Used to set the seal lips in the correct position and protect the seal when the mag end gear cover is installed.</p> <p>Application: Domestic ATV 4-stroke and Frontier</p>
	<p><b>PA-46502</b></p> <p><b>VALVE SPRING COMPRESSOR</b></p> <p>Used to compress the valve springs on all Polaris FUJI 4-stroke engines.</p>
	<p><b>PU-45255</b></p> <p><b>PISTON PIN PULLER</b></p> <p>Requires Adapters for 800 Series Snow, 1200 Series Watercraft and 500 Series ATV applications.</p>
	<p><b>PU-45248</b></p> <p><b>PISTON PIN PULLER ADAPTER</b></p> <p>Adapter for 800 Series Snow, 1200 Series Watercraft and 500 Series ATV applications. Must be used with PU-45255.</p>
	<p><b>2870338</b></p> <p><b>DRIVE CLUTCH SPIDER NUT SOCKET</b></p> <p>For removing and installing spider jam nut on P-85 clutches.</p>
	<p><b>2870341-A</b></p> <p><b>DRIVE CLUTCH SPIDER REMOVAL AND INSTALLATION TOOL</b></p> <p>For removing and re-torquing clutch spider. Fits all aluminum drive clutch spiders.</p>
	<p><b>2870401</b></p> <p><b>PIN CENTERING TOOL</b></p> <p>To center spider pin for early model Snow Drive Clutches.</p>



	<b>2870402</b>	<b>CLUTCH PIN INSTALLATION TOOL</b> For installing cold rolled pin for shift weight pin on early clutches.
	<b>2870507</b>	<b>CLUTCH PIN PUNCH</b> To remove and replace spider weight pins.
	<b>2870576</b>	<b>TAPERED REAMER FOR DIVE CLUTCH BORE</b> To ensure proper fit between drive clutch bore and engine crankshaft.
	<b>2870910-A</b>	<b>ROLLER PIN TOOL</b> This tool has been updated so it can be used with all Polaris aluminum Drive Clutches to service Drive Rollers and their bushings.
	<b>2870914</b>	<b>P-90 SNOWMOBILE CLUTCH OFFSET ALIGNMENT TOOL</b> Establishes correct offset and alignment on P-90 clutches.
	<b>2870985</b>	<b>DRIVE CLUTCH BUTTON REMOVAL TOOL</b> Removes tight spider buttons.
	<b>2871025</b>	<b>CLUTCH BUSHING REPLACEMENT TOOL KIT</b> 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
	<b>2871173</b>	<b>DRIVE CLUTCH COMPRESSION TOOL</b> Compresses drive clutch while still on engine.
	<b>2871358</b>	<b>DRIVE CLUTCH HOLDING FIXTURE</b> Holds all Polaris aluminum drive clutches.
	<b>PS-46998</b>	<b>P-85 CLUTCH ALIGNMENT TOOL</b> This clutch alignment tool provides an accurate method to check $\frac{1}{8}$ " clutch offset and alignment by referencing both stationary sheaves.
	<b>PU-45779</b>	<b>CLUTCH PILOT TOOL</b> Used with the 2871358 to compress the clutch.

	<b>2871855</b>	<b>DRIVE CLUTCH PULLER</b> For domestic engines 1999 and earlier (14 mm thread size). For 500, 600, 700 and 800 cc domestic twins (Replacement T-handle 5020326).
	<b>2872084</b>	<b>DRIVE CLUTCH PULLER</b> $\frac{3}{8}$ -16x $\frac{1}{4}$ ". (1999-2001) 440 Fan and 550 Fuji/Robin air cooled engines and drive clutch puller (Replacement T-Handle 5020326).
	<b>2872085</b>	<b>DRIVE CLUTCH PULLER</b> $\frac{3}{8}$ -16x14 mm. 1999-2001 700/800 XCR Fuji/Robin 3 cylinder engine drive clutch puller (Replacement T-Handle 5020326). 2000-2001 domestic engines.
	<b>8700220</b>	<b>CLUTCH COMPRESSION TOOL</b> To compress drive clutch for assembly and disassembly. Also helps in disassembly and assembly of driven clutch.
	<b>PS-45909</b>	<b>CLUTCH COMPRESSION EXTENSIONS</b> Used with 8700220 to compress the Team clutches.
	<b>8700221</b>	<b>SPIDER ASSEMBLY TOOL</b> Spring loaded mandrel to line up spider, roller and spacer washers. Mandrel retracts into tool when roller pin is installed.
	<b>2870623</b>	<b>SHOCK ABSORBER SPRING COMPRESSION TOOL</b> Compresses shock springs for removal and installation.
	<b>2870803</b>	<b>SHOCK SPRING PRE-LOAD ADJUSTMENT TOOL</b> Adjusts spring compression.
	<b>2871071</b>	<b>SHOCK BODY HOLDING TOOL</b> Safely holds gas shock body during rebuilding. Requires shop vice.
	<b>2871352</b> <b>2872429</b>	<b>SHOCK ROD HOLDING TOOL – <math>\frac{1}{2}</math>" ROD</b> <b>SHOCK ROD HOLDING – <math>\frac{1}{4}</math>" ROD</b> Safely secures shock damper rod during rebuilding without damage to rod. Use with shop vise (not included).
	<b>2871095</b>	<b>REPLACEMENT TOOL KIT SPANNER WRENCH</b> For IFS shock spring pre-load cam adjuster.
	<b>2871232</b>	<b>GAS SHOCK SPANNER</b> To adjust gas shocks that have threaded spring pre-load adjusters.
	<b>2871351</b>	<b>GAS SHOCK IFP DEPTH TOOL</b> For removing Internal Floating Piston and setting proper IFP depth for reassembly.



	<p><b>2871537 TRAVEL LOCATION BAR KIT</b></p> <p>To set camber and toe-in on CRC front ends.</p> <p>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"</p>
	<p><b>PA-46355 ACE SUSPENSION DIAGNOSTIC HARNESS</b></p> <p>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.</p>
	<p><b>PS-44925 SHOCK TUBE PULLER</b></p> <p>Required to remove inner piston sleeve on welded dome PPS Shocks.</p>
	<p><b>PS-45152 THIN OPEN END WRENCH</b></p> <p>Needed to hold bushing while removing rear torque arm bolts from tunnel on Edge models.</p>
	<p><b>PS-45259 GAS FILL TOOL</b></p> <p>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.</p>
	<p><b>PS-45260 LOWER RETAINER SPANNER WRENCH</b></p> <p>To adjust lower retainer on Ryde FX™ Shocks.</p>
	<p><b>PS-45261 IFP POSITIONING/EXTRACTION TOOL</b></p> <p>For Ryde FX™ Shocks.</p>
	<p><b>PS-45262 CYLINDER HEAD WRENCH</b></p> <p>Spanner wrench for cylinder head on Ryde FX™ Shocks.</p>
	<p><b>PS-45263 WEAR BAND TOOL</b></p> <p>To properly install wear band on Ryde FX™ Shocks.</p>
	<p><b>PS-45280 SHOCK COLLAR TOOL</b></p> <p>For removal of shock collar on Ryde FX™ Shocks.</p>
	<p><b>PS-45629 SHOCK BODY HOLDER PS-45281 SHOCK RESERVOIR HOLDER</b></p> <p>To hold Ryde FX™ Shocks in vise for service.</p>
	<p><b>PS-45678 SHOCK SHAFT SEAL PROTECTOR</b></p> <p>This tool is used to protect the seal during installation on .51 diameter shock shaft.</p>
	<p><b>PS-45683 SHOCK SPRING COMPRESSOR</b></p> <p>A new shock spring compressor has been created to compress and aid in the removal of the coil springs from the M-10 and many other shocks.</p>

	<p><b>2871337 CAMOPLAST TRACK CLIP REMOVAL TOOL</b></p> <p>Removes track guides and clips from Camoplast tracks.</p>
	<p><b>2871296 JACKSHAFT INSTALLATION TOOL</b></p> <p>For larger diameter shafts on XTRA suspension models (15 spline jackshaft). Prevents seal damage.</p>
	<p><b>2871188 TUNNEL RIVET INSTALLATION TOOL</b></p> <p>For installing buck rivets in snowmobile tunnels.</p>
	<p><b>2871535 JACKSHAFT ALIGNMENT TOOL</b></p> <p>For larger diameter shafts on XTRA suspension models. Ensures proper chaincase jackshaft bearing alignment.</p>
	<p><b>PS-45484 RIVET PUNCH</b></p> <p>Used to remove the self-piercing rivets used in 2000 and newer Snowmobile bulkheads and tunnels.</p>
	<p><b>PU-45485 EXHAUST VALVE SPRING TOOL</b></p> <p>Used to remove the exhaust springs.</p>
	<p><b>PS-45908 T-HANDLE TOOL</b></p> <p>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.</p> <p>Application: Walker Evans Shocks</p>
	<p><b>PU-45779 CLUTCH PILOT TOOL</b></p> <p>Used with the 2871358 Clutch Holding Fixture to guide the Driven Clutch Helix into place over the stationary shaft on assembly.</p> <p>Application: P-85 Drive Clutch only</p>
	<p><b>2201519 THROTTLE POSITION SENSOR TESTER KIT</b></p> <p>To test T.P.S. on all 2-stroke Snow models with T.P.S.</p>
	<p><b>2870509 UNI-SYN GAUGE</b></p> <p>Visual method of synchronizing carburetors on multi-carbureted engine.</p>
	<p><b>2871174 GREASE GUN ADAPTER</b></p> <p>For lubricating some driveshaft bearings.</p>
	<p><b>2872126 FLOAT HEIGHT GAUGE, KEIHIN</b></p> <p>For setting float heights at 16 mm on all Keihin PWK 39 mm carburetors. Determines if floats are parallel to each other.</p>
	<p><b>8717024 TAMPER RESISTANT TORX BIT - T20</b></p> <p>To remove Torx screws on some Mikuni &amp; Keihin carburetors and T.P.S.</p>
	<p><b>PU-47063 DIGITAL WRENCH</b></p> <p>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.</p>
	<p><b>PU-47151 REPLACEMENT INTERFACE CABLE</b></p> <p>This is the primary interface cable for the Digital Wrench.</p>



# CHAPTER 3

## MAINTENANCE

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## 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.

**Table 3-1: Maintenance Intervals**

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
I:Inspect (clean, adjust, tighten, lubricate, replace if necessary) C:Clean R:Replace L:Lubricate						



**Table 3-1: Maintenance Intervals**

Item	Pre-Ride	Frequency Miles (km)				Pre-Season
		150 (240)	500 (240)	1000 (1600)	2000 (3200)	
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
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
I:Inspect (clean, adjust, tighten, lubricate, replace if necessary) C:Clean R:Replace L:Lubricate						



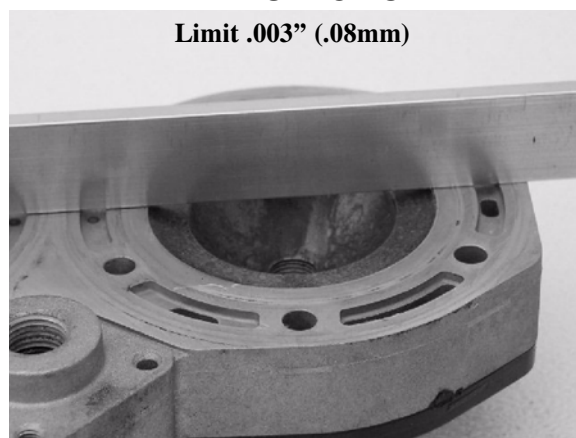
**Table 3-1: Maintenance Intervals**

Item	Pre-Ride	Frequency Miles (km)				Pre-Season
		150 (240)	500 (240)	1000 (1600)	2000 (3200)	
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

## INSPECTONS

### CYLINDER HEAD INSPECTION



Inspect each piston dome area of the cylinder head for warping by placing a straight edge across the dome area.

With a feeler gauge measure any gap under the straight edge.

Replace cylinder head if measurement exceeds the service limit of .003" (.08mm).

**NOTE: Cylinder head warp service limit is:  
.003"(.08mm).**



## CYLINDER MEASUREMENT

Inspect each cylinder for wear, scratches, or damage. If no damage is evident, measure the cylinder for taper and out of round with a telescoping gauge or a dial bore gauge. Measure the bore 1/2" from the top of the cylinder; in line with the

piston pin and 90° to the pin to determine if the bore is out of round. Repeat the measurements at the middle of the cylinder and the bottom of the cylinder to determine taper or out of round at the bottom. Use the chart below and record all measurements.

**Table 3-2: Cylinder Measurement Worksheet**

TOP	
Tx	Ty
MIDDLE	
Mx	My
BOTTOM	
Bx	By
Out of round = Tx - Ty and By - Bx	
Taper limit = Ty - By and Tx - Bx	
Cylinder taper limit is .002"(.051mm) Max Cylinder out of round limit is .002"(.051mm)	

Top

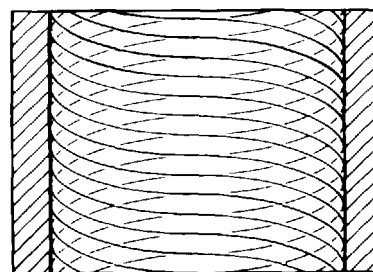
Middle

Bottom

## CYLINDER HONING

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

**NOTE: A Nikasil cylinder can be lightly honed with a soft stone hone but an not be oversized.**



EXAMPLE OF A CROSS HATCH PATTERN



## HONING PROCEDURE

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

## HONING TO OVER SIZE (340/550/500 FUJI ENGINES ONLY)

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

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

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

**NOTE: Portable rigid hones are not recommended for oversizing cylinders, cylinder boring, and finish honing. The use of an arbor type honing machine is recommended. Always check piston to cylinder clearance and piston ring installed gap after boring/honing is complete.**

## CLEANING THE CYLINDER AFTER HONING

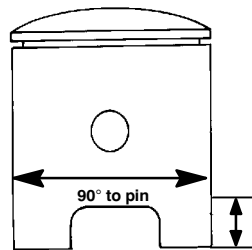
It is very important that the cylinder be thoroughly cleaned after honing to remove all grit material. Wash the cylinder in a solvent, then in hot soapy water. Pay close attention to areas where the cylinder sleeve meets the aluminum casting

(transfer port area). Use electrical contact cleaner if necessary to clean these areas. Rinse thoroughly, dry with compressed air, and oil the bore immediately with Polaris Premium 2 Cycle Lubricant.

**NOTE: Always check piston to cylinder clearance and piston ring installed gap after honing or boring is complete.**

## PISTON INSPECTION

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



DOMESTIC ENGINES - Measure 3/8" (10.0mm) up from bottom of skirt

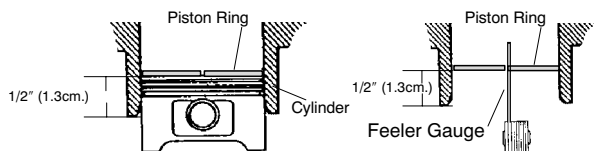
FUJI ENGINES - Measure 1/2" (12.7mm) up from bottom of skirt

**NOTE: The piston is measured at this point to provide an accurate piston to cylinder measurements.**

Subtract this measurement from the minimum cylinder measurement (90° to the pin) recorded previously when you recorded the cylinder measurements. If clearance exceeds the service limit, the cylinder should be re-bored and new pistons and rings installed. Refer to piston to cylinder clearance limits in the General Information section listed per model.

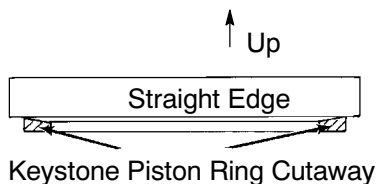


## PISTON RING INSTALLED GAP



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

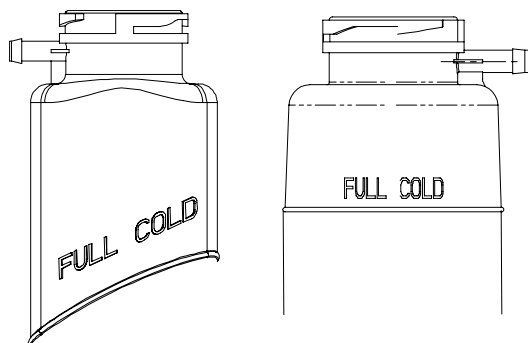
**NOTE:** A difference in end gap indicates cylinder taper. The cylinder should be measured for excessive taper and out of round. Replace rings if the installed end gap exceeds the service limit. Always check piston ring installed gap after re-boring a cylinder or when installing new rings.



Piston rings are installed with marking or beveled side up see diagram above.

## COOLANT LEVEL

Coolant level in the coolant bottle must be maintained to prevent overheating and serious engine damage. Check the coolant with the engine temperature cold. The coolant level should be at the FULL COLD level mark. If it is not add coolant to the FULL COLD mark on the bottle. If you have coolant over the FULL COLD level you may have air in the system and need to "bleed" the air out of the system.



## RECOMMENDED COOLANT

Polaris snowmobiles use a premium 60/40 pre-mix antifreeze. This premium antifreeze is mixed with deionized water for better protection for aluminum cooling. This pre-mix is good for temperatures down to -62°F (-52°C). Replace coolant every 2 years or if contaminated.

- 60/40 Pre-mix Quart PN 2871534
- 60/40 Pre-mix Gallon PN 2871323
- 60/40 Pre-mix 2.5 Gallon PN 2872278

## COOLING SYSTEM BLEEDING

1. Allow the cooling system to cool completely.
2. Check the coolant reservoir and make sure it is at the FULL COLD mark.
3. Place the snowmobile in its normal riding position and apply the parking brake and run the engine at the specified idle RPM until the thermostat opens up.
4. Open the bleed screw (A) at the top of the water outlet



manifold. Only open slightly, do not remove the screw.



500 Fuji



500/600 Liberty™



700/900 Liberty™

5. Cycle the RPM from idle to 3000-4000 so that the coolant can move around the system and push out the air from the system.
6. Tighten the bleed screw when coolant starts to come out of the screw area.
7. Turn off the machine and release the parking brake.
8. Allow the system to cool completely and recheck the coolant level.

**NOTE: It is important that the thermostat stays open! When the thermostat opens it will draw in cold coolant from the heat exchangers and the cold coolant may close the thermostat again. Make sure the thermostat opens and stays open! Cycle the RPM from idle to enough RPM (4000) to get coolant to flow but not enough RPM to engage the clutch. This allows air to bleed from the rear crossover tube. It is important to get enough coolant flow to purge the air from the front close-off cooler and observe this air reaching the bottle.**

**NOTE: ON EDGE MODELS:** Once the thermostat is open tip the snowmobile slightly on its right side and cycle the RPM from idle to enough RPM (4000) to get coolant to flow but not enough RPM to engage the clutch. Then tilt the machine slightly on its left side so that the coolant bottle is the highest point in the cooling system and cycle the RPM from idle to enough RPM (4000) to get coolant to flow but not enough RPM to engage the clutch.



### WARNING

When performing the following checks and adjustments, stay clear of all moving parts to avoid serious personal injury. Never remove the pressure cap when the engine is warm or hot. If the pressure cap is to be removed, the engine must be cool. Severe personal injury could result from steam or hot liquid.

## BEARING FIT



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

With case halves cleaned, press a replacement bearing into each of the main bearing journals to determine a basic amount of press fit.

Do a comparison check of all journals by manually forcing the bearing into the bearing seats noting if any are noticeably loose or tight. Normal hand installation will be an indication of the recommended interference fit. If the bearing falls out of the case when the case is inverted, or if the crankcase bearing surface is severely galled or damaged, the case should be replaced.

**NOTE: Crankcase bearing interference fit is .001-.002" (.026-.051mm).**

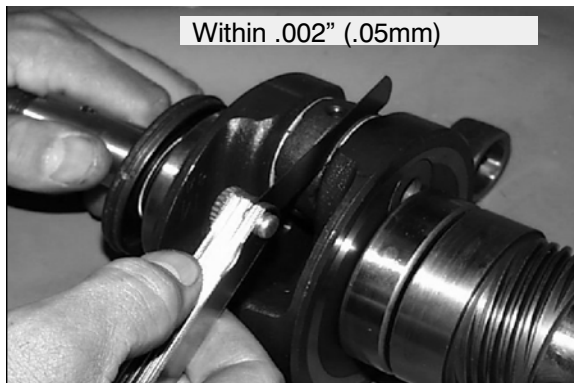


## MAIN BEARING

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

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

## CONNECTING ROD (BIG END) BEARING



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

Measure connecting rod big end side clearance with a feeler gauge. 500/600 Liberty™ engines should have a clearance of .011 - .030" (.28 - .75mm) and 700/800/900 Liberty™ engines should have .011 - .028" (.28 - .70mm) and be equal on all rods within .002" (.05mm).

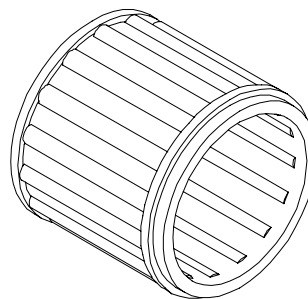
Rotate the connecting rod on the crankshaft and feel for any rough spots. Check radial end play in rod by supporting rod against one thrust washer and alternately applying up and down pressure. Replace bearing, pin, and thrust washers if

side clearance is excessive or if there is any up and down movement detectable in the big end bearing.



## WRIST PIN BEARING

1. Clean the end of the connecting rod and inspect inner bore with a magnifying glass. Look for any surface irregularities including pitting, wear, or dents.

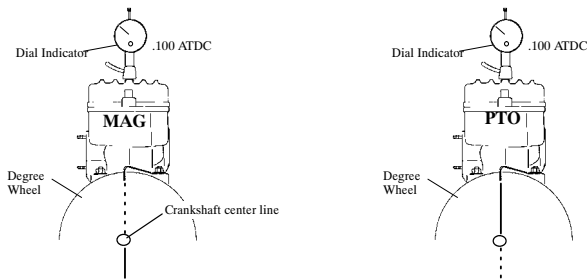


NEEDLE BEARING

2. Run your fingernail around the inside of the rod and check for rough spots, galling, or wear.
3. Oil and install needle bearing and pin in connecting rod.
4. Rotate pin slowly and check for rough spots or any resistance to movement.
5. Slide pin back and forth through bearing while rotating and check for rough spots.
6. With pin and bearing centered in rod, twist ends back and forth in all directions to check for excessive axial play.
7. Pull up and down evenly on both ends of pin to check for radial play.
8. Replace pin and bearing if there is any resistance to rotation or excessive axial or radial movement. If play or roughness is evident with a new pin and bearing, replace the connecting rod.



## CRANKSHAFT INDEXING



### CAUTION

Disconnect the battery ground cable and ALL spark plug high tension leads. Ground high tension leads to the engine. Disconnect lanyard (if equipped) and/or press the engine stop switch before proceeding with the following procedure.

Polaris uses crankshafts that are pressed together. The connecting rod journal center lines are indexed 180°(twins).

It is sometimes necessary to check multi-cylinder crankshafts to verify that one cylinder has not been forced out of position relative to the other cylinder. Some causes for a “out of index” crankshaft include but are not limited to the following:

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

## CHECKING CRANKSHAFT INDEX

1. Remove the drive belt, see DRIVE BELT in Chapter 7.
2. Remove the drive clutch, see “DRIVE CLUTCH REMOVAL” on page 7.10.
3. Securely fasten a large degree wheel on the flywheel or PTO end of the crankshaft. Make sure that it is mounted concentrically with the crankshaft center line.
4. With a section of wire (wire coat hanger), anchor it to a convenient spot. Bend one end at the outer perimeter of the degree wheel as shown above.
5. Install a dial indicator into the magneto end cylinder spark plug hole. The ignition timing is referenced by the magneto end.
6. Locate TDC as accurately as possible by finding the center of the point where there is no piston movement note the “Zero” the dial indicator at this point.
7. Continue to rotate the crankshaft in the normal direction of rotation until the dial indicator reads .100" (2.54mm) after top dead center (ATDC).

8. Bend the pointer or move the degree wheel until the pointer aligns with a 180° mark on the degree wheel.
9. With the pointer aligned, make sure the degree wheel and pointer are secured and will not move out of position. Re-check accuracy of this location a few times. The pointer should align with the 180° mark when the dial indicator reads .100" (2.54mm) ATDC.

**NOTE: Do not move the crankshaft, degree wheel or pointer after the initial setting on the MAG end cylinder - simply read the wheel and dial indicator.**

10. Remove the dial indicator and install in PTO cylinder. Repeat finding TDC. Note the degree wheel indication when the dial indicator reads .100" ATDC. It should be 180° (+/-2°) from the MAG cylinder mark.

Symptoms of an out of index crankshaft can include but are not limited to the following:

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

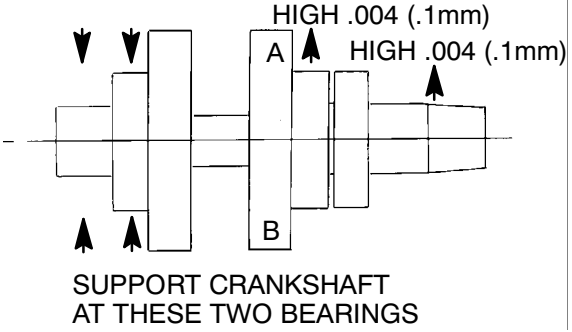
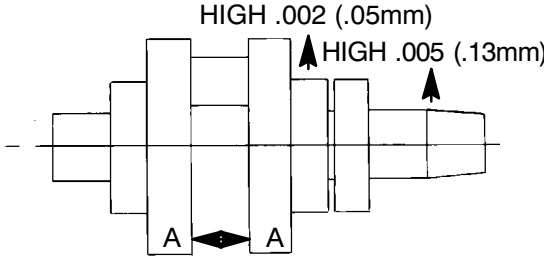
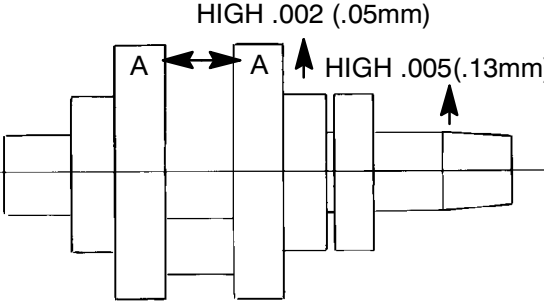
## CRANKSHAFT TRUING

Lubricate the bearings and clamp the crankshaft securely in the holding fixture. If truing the crankshaft requires striking with a hammer, always be sure to re-check previously straightened areas to verify truing. Refer to the illustrations below. Use Crankshaft alignment kit PN 2870569.



**NOTE:** The Rod Pin position in relation to the dial indicator tells you what action is required to straighten the shaft.

**Table 3-3: Truing Examples**

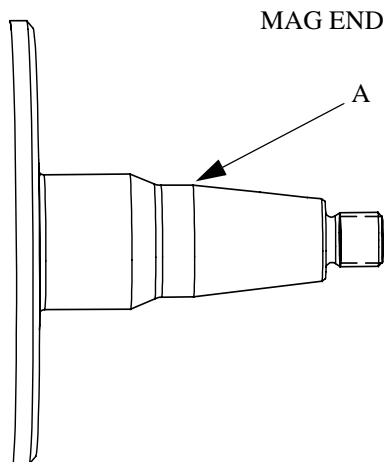
<p>To correct a situation like this. Strike the shaft at point A with a brass hammer.</p>	
<p>To correct a situation like the one shown in this. Squeeze the crankshaft at point A. You will use the tool from the alignment kit PN 2870569.</p>	
<p>If the crank rod pin location is 180° from the dial indicator (opposite of above), it will be necessary to spread the crankshaft at the A position as shown in illustration 3. When rebuilding and straightening a crankshaft, straightness is of utmost importance. Runout must be as close to zero as possible.</p>	

## CRANKSHAFT RUNOUT INSPECTION

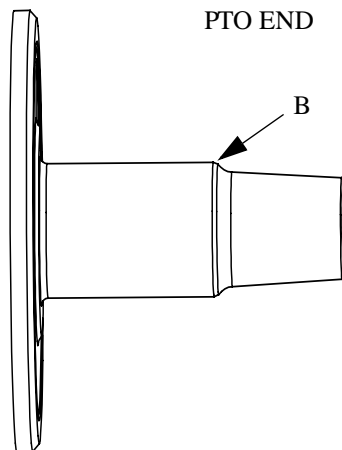
Crankshaft runout can be checked with the engine in the machine. Using a dial indicator with the crankshaft holding fixture (PN 2870569) will yield the most accurate results.



When checking the crankshaft runout on the **MAG** side. Place the dial indicator end at 1/2" (12.7mm) from the bearing flat (A).

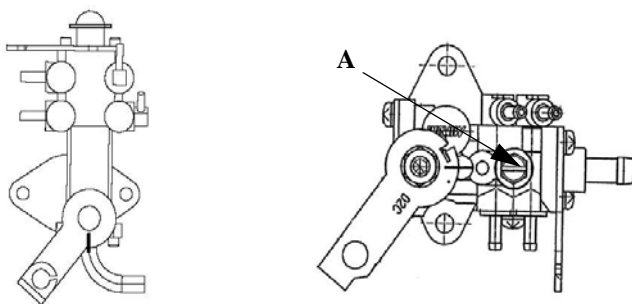


When checking the crankshaft runout from the **PTO** side. Place the dial indicator end where the taper starts after the bearing flat (B).



**NOTE:** Acceptable crankshaft runout (in a crank fixture) is 0 - .0015" (0 - .04mm) on Liberty™ engines. 0 - .0025" (0 - .07mm) on Fuji engines.

## OIL PUMP BLEEDING



1. To aid in bleeding the air out of the oil lines, fill oil

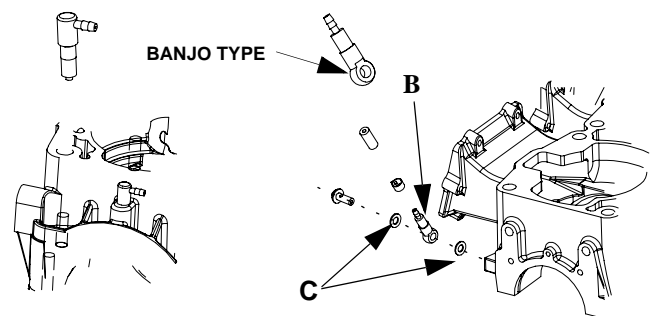
reservoir with the appropriate Polaris injector oil. This will add pressure to the oil lines.

2. Loosen the bleed screw (A). After approximately 30 seconds oil should flow from beneath the screw head. This will indicate the pump is free of the air.
3. Tighten bleed screw (A) securely.

**NOTE:** Any time that the engine is disassembled or repaired, it is important that the oil supply from the oil pump be checked and full of oil.

**IMPORTANT:** The oil pump must always be bled following any service to the oil injection system or engine.

## FITTING TYPES



## VERIFYING CHECK VALVE OPERATION

1. To check the operation of the fittings, fill the oil reservoir, bleed the pump.
2. Remove the check valve (A,B) from the component.
3. Place the oil line (with check valve) in a safe area where no moving engine part will make contact with it.
4. Start the engine and let it idle for approximately 1-2 minutes.
5. Drops of oil should be visible from the check valve after the engine has idled 1 to 2 minutes, with a drop occurring every few seconds.
6. If oil does not flow from one of the check valves, remove the oil line from the check valve and repeat step 4, if oil is present during this test replace the faulty check valve.

**NOTE:** Valves should open with 2-7 lbs of pressure.

**NOTE:** Install new sealing washers (C) upon installation on either side of the banjo check valve.

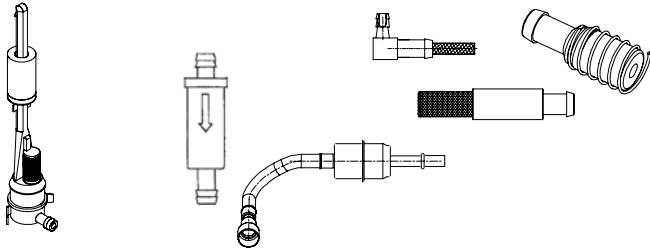
If oil does not flow with the check valves removed from their feed lines, check the following

- In line filter blocked
- Air may not be bled from the oil pump
- Feed lines leaking



- Oil tank vent restricted or kinked
- Defective pump

## OIL / FUEL FILTER



### CAUTION

The in tank fuel filter and fuel lines should be inspected regularly. Special attention should be given to the fuel line condition after periods of Summer storage. Normal deterioration from weather and fuel can occur during this storage period. Do not damage fuel lines when removing them. If a fuel line has been damaged or kinked it must be replaced.

**NOTE:** The direction of the arrow indicates the direction of the flow through the filter. After changing the oil filter, the oil injection system must be bled of all trapped air. see “OIL PUMP BLEEDING” on page 3.13.

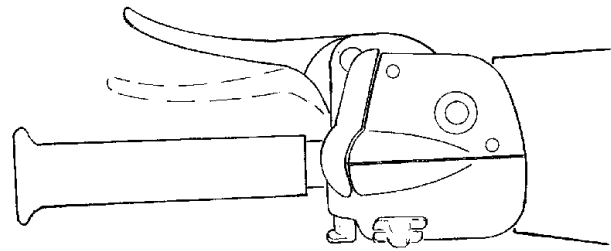
Most models use an oil and fuel filters which are of a special design and must not be substituted. These filters should be changed and the oil and fuel lines should be inspected annually or every 1000 miles (1600 km).

These filters may have an arrow on the filter or line. This arrow is the direction of flow. Install accordingly.

**EDGE** models utilize a special oil filter that is built into the oil sending unit located in the bottom of the oil tank. It should be replaced every two years or 2400 miles (3862 km).

**700/900 FUSION/RMK** models use the in-line filter and should be replaced every two years or 2400 miles (3862 km).

## BRAKE LEVER TRAVEL



The brake lever travel should have a clearance no less than 1/2" (1.27cm) from the handlebar grip. Inspection should be made with the lever firmly depressed. If the lever has less than this amount you may need to bleed the brake system, see “BRAKE FLUID REPLACEMENT & BLEEDING” on page 8.3.

## BRAKE FLUID



### WARNING

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

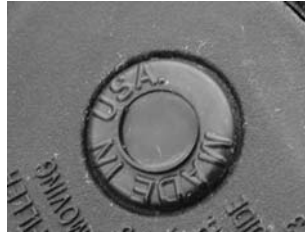
Inspect the reservoir to be sure it contains the correct amount of fluid. Use only Polaris DOT 4 high temperature brake fluid. Change fluid every 2 years or whenever the fluid is dark or contamination is suspected.



**NOTE:** A low brake fluid level can be indicated through the sight glass on the cover. If the fluid is low this sight glass will glow a brighter color.



LOW



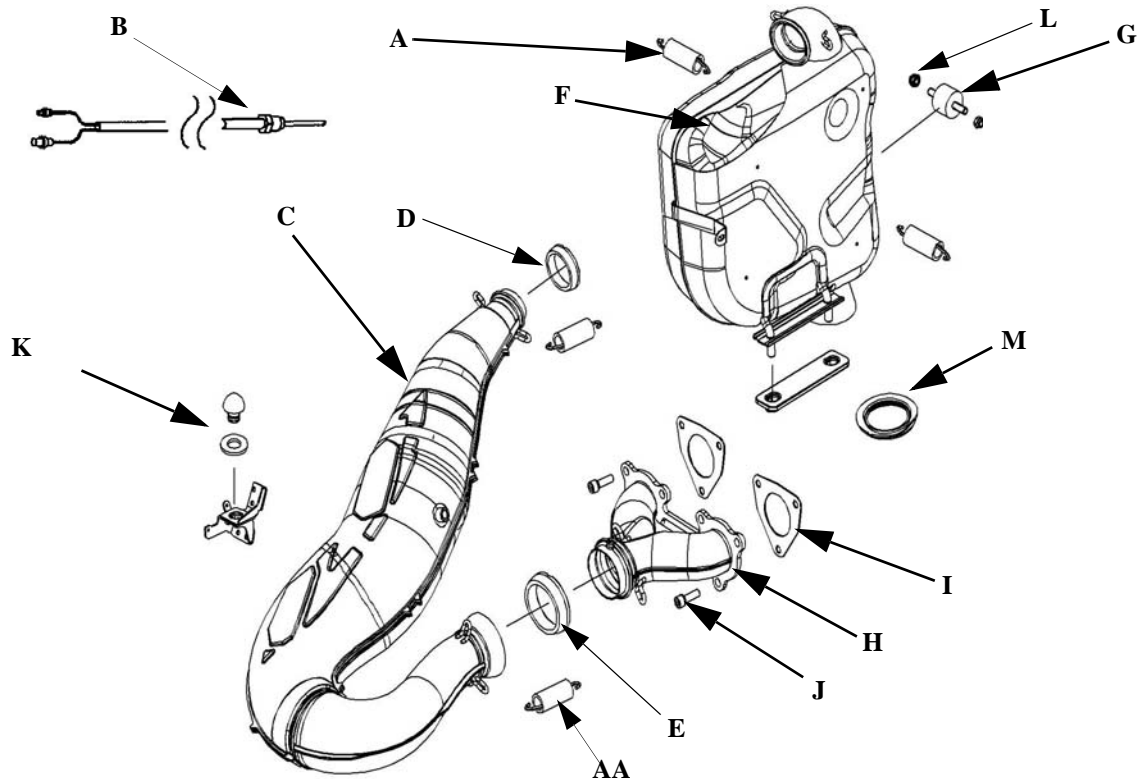
FULL

### BRAKE FLUID BLEEDING

see “BRAKE FLUID REPLACEMENT & BLEEDING” on page 8.3.



## EXHAUST SYSTEM



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

Springs are installed in such a way so that the opening of the hook that you are pulling on is facing the item being held.

Stainless steel (gray color) springs (AA) are located at the header pipe. Other (gold color) springs (A) are everywhere else.

### EXHAUST REMOVAL

1. Let engine and exhaust system to cool completely before performing any service.
2. Disconnect and remove all the exhaust springs (A and AA).

**NOTE: The stainless steel springs (gray in color), hold the exhaust pipe to the manifold are designed to handle higher temperature ranges than the other springs.**

3. Disconnect the exhaust temperature sensor (if equipped).

4. Remove the exhaust pipe (C), resonator seal (D) and manifold seal (E).
5. Remove the resonator (F). Some models use rubber isolators (G) and will need the nut (L) removed in order to remove the resonator.
6. Remove the manifold (H) and gaskets (I) by removing the manifold mounting bolts (J).
7. Check the condition of the vibration dampener (K) and replace if damaged.
8. Check the condition of the resonator outlet boot (M) and replace if damaged.

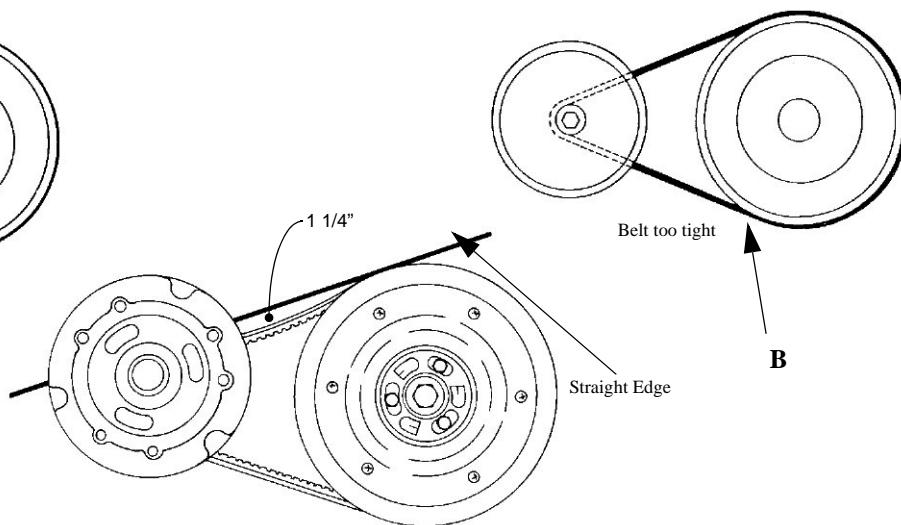
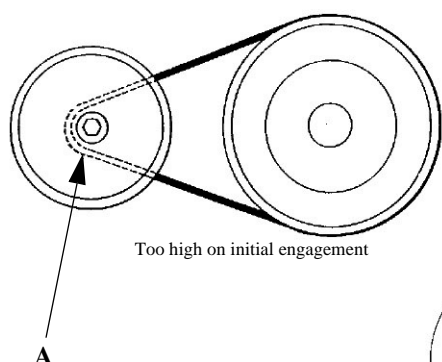
### EXHAUST INSTALLATION

1. Install new exhaust manifold gaskets (I).
2. Place the exhaust manifold (H) on to the engine and torque the mounting bolts (J) to 18 ft-lb(24Nm).
3. Install the resonator (F). Some models utilize resonator locating tabs (M) that need to be lined up and pushed down to assure the correct position.
4. If rubber isolators (G) are used on the resonator, secure them by installing the isolator nuts (L).
5. Check the condition of the vibration dampener (K) and replace if it is damaged.
6. Insert the exhaust seals (D,E) onto the manifold (H) and



the exhaust pipe (C).

7. Install the exhaust pipe on the manifold and resonator.
8. Install all the exhaust springs.



Belt deflection is critical for optimum belt performance and belt life. It should be checked at 500 miles (800km) and then in 1000 mile (1600km) increments after that.

Too much belt deflection is when the belt is too long or the center distance is too short. The initial starting ratio will be too high, resulting in performance loss. This is due to the belt rising too high in the drive clutch sheaves upon engagement (A).

Not enough belt deflection (B) is when the belt is too short or the center distance is too long. The initial starting ratio will be too low. In addition, the machine may creep when the engine idles, causing damage to the internal face of the drive belt.

## MEASURING BELT DEFLECTION

1. Measure the belt deflection with both clutches at rest and in their full neutral position.
2. Place a straight edge across the tow clutches, on top the belt.
3. Apply downward pressure to the belt and measure the distance at point (D).
4. The measurement should be 1 1/4" (3.2cm).
5. If the measurement is not correct adjust driven clutch, See "TEAM BELT DEFLECTION" on page 26.

## BELT DEFLECTION

## LUBRICATION

### GREASE POINTS

**NOTE: A grease gun kit (PN 2871312) comes with grease and adapters to lubricate all the fittings needed to service Polaris snowmobiles.**

Lubricate the following fittings with Polaris Premium All Season grease every 1000 miles (1600 km) and before summer storage. When applying grease to these points, free up all the weight from the component being greased to permit better penetration.

- Ski spindles
- Ski pivots
- Steering post pivots
- Rear suspension pivot shafts
- Jackshaft
- Driveshaft

### JACKSHAFT BEARING

1. Loosen the driven clutch retaining bolt and pull the clutch away from the flange fitting to expose the bearing grease point.
2. Apply grease with the grease gun with just a few pumps.
3. Install the driven clutch see "DRIVEN CLUTCH INSTALLATION" on page 7.20.

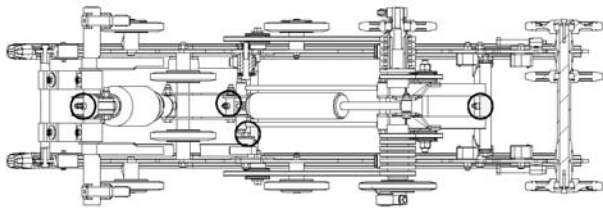


## DRIVESHAFT BEARING

1. Locate the driveshaft bearing grease zerk that is located on the flange of the bearing cover.
2. Apply a few pumps of grease into the grease zerk and clean up any residual grease on the fitting.

## REAR SUSPENSION

To maintain rider comfort and to retard wear of the pivot shafts, the suspension pivot shafts should be lubricated with Polaris Premium All Season Grease at 500 miles (800 km) initially; 1000 miles (1600 km) and before summer storage each year. The riding characteristics of the snowmobile will be affected by lack of lubrication of these shafts.



## CHAINCASE

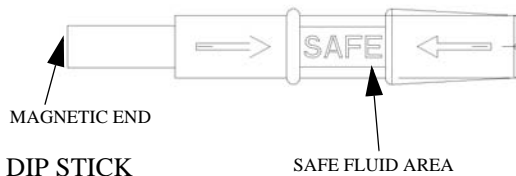
The drive chain is continuously immersed in the chaincase oil. Depending on the style chaincase the proper oil level is determined by checking on the dipstick or sight glass. To get an accurate level reading the machine must be placed on a level surface.



**CAUTION**

Do not mix or use improper types of lubricants in the chaincase. Excessive wear to chain, sprockets and bearings may result.

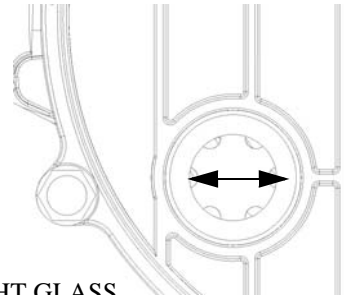
## DIP STICK



If your chaincase has a dip stick, the correct level will be indicated between the “SAFE” markings. To add fluid to this style chaincase you can add it through the dipstick hole.

The dip stick also has safety magnetic tip that catches any metal shavings that are in the system. This magnetic tip should be cleaned every time you check the fluid level. It is common to see shavings during break in of a new gear(s) or chain.

## SIGHT GLASS

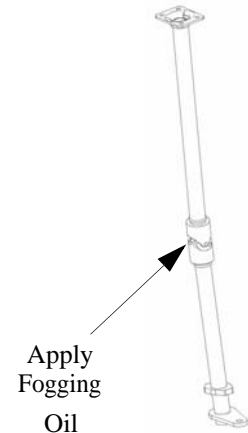


If your chaincase uses a sight glass, make sure that the level of fluid is even with the mark on the glass. To add fluid to this style chaincase, add fluid through the fill cover.

The drain plug is magnetic so that any shavings are collected here. You should remove any shavings from this drain plug when changing the fluid.

## STEERING U JOINT

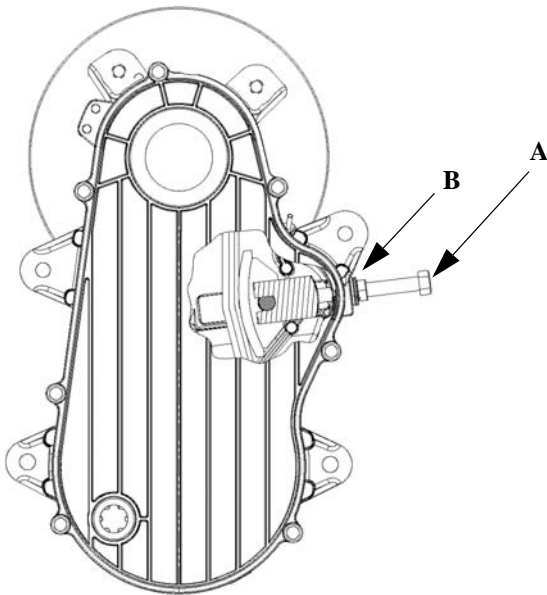
The steering U joint should be lubricated with Polaris fogging oil (PN 2870791). Follow the maintenance chart at the beginning of this chapter.





## **ADJUSTMENT**

### **CHAINCASE DRIVE TENSION**

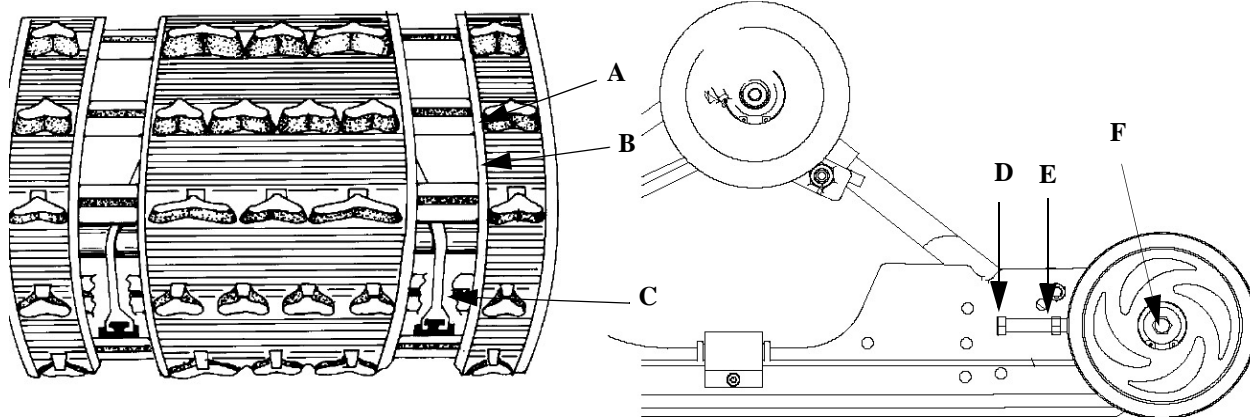


1. Elevate the rear of the machine so that the track is off the floor.
2. Rotate the driven clutch counterclockwise to move all the chain slack to the tensioner side.
3. Lock the parking brake.
4. Loosen the adjuster bolt jam nut (B)
5. Finger tighten the adjuster bolt (A).
6. Back off the adjuster bolt 1/4 turn out (counterclockwise).
7. Tighten the jam nut while holding the adjuster bolt.
8. Release parking brake.

**NOTE: It may be necessary to remove the exhaust pipe and resonator to access this area.**



## TRACK ALIGNMENT



**NOTE:** *Track alignment affects track tension. Misalignment of the track will cause excessive wear to the track, rail slides, and rail.*

**NOTE:** *Excessive rail slide wear occurs due to running in inadequate snow conditions.*

Periodically check that the track is centered and running evenly on the slide rails. Misalignment will cause excessive wear to the track and slide rails.

1. Safely lift and support the rear of the snowmobile off the ground.
2. Rotate the track by hand to check for any possible damage.
3. Inspect the track rods (A) carefully and examine the track along the entire length of each rod, bending the track edge and inspecting it for breakage. If any rod damage is found, the track should be replaced.
4. Warm up the track by starting the engine and apply a small amount of throttle so the track runs slowly at least five complete revolutions.
5. Stop the engine and turn the ignition off.
6. Inspect track alignment by carefully looking through the track window (B) to make sure the rails (C) are evenly spaced on each side.
7. Before any adjustments are made loosen up the rear idler shaft (F).
8. If the track runs to the left, loosen the left locknut and tighten the left adjusting bolt (D). If the track runs to the right, loosen the right locknut and tighten the right adjusting bolt. It may be necessary to check this with the engine rotating the track. Be sure to SHUT THE MACHINE OFF before making any further adjustments.
9. After any adjustments are complete, be sure to torque the locknuts (E) to 35 ft-lb (48Nm).

10. Torque both idler shaft bolts (F) to 35 ft-lb (48Nm).



### WARNING

Broken track rods can cause a rotating track to come off the machine. Never operate or rotate a damaged track under power with a broken rod. Serious injury or death may occur.



### WARNING

When performing the following checks and adjustments, stay clear of all moving parts to avoid personal injury. Never make any adjustments with the engine running, as serious personal injury can result.

## TRACK LUBRICATION



### WARNING

Operating with insufficient lubrication between the rail slide and track guide clips can cause track failure, loss of vehicle control and loss of braking ability, which can result in serious injury or death. Avoid operating vehicle on ice and other surfaces that have little or no snow conditions.

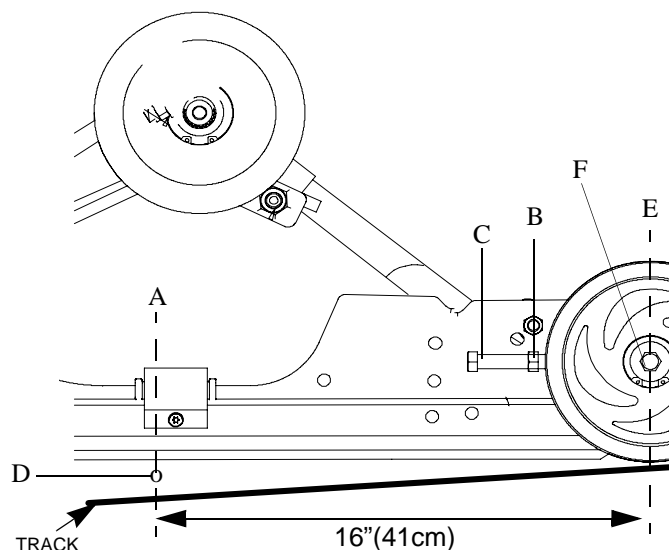
The slide rail needs snow for lubrication and cooling. Excessive wear indicates insufficient lubrication. A new rail slide can cause faster heat build-up in limited lubrication, resulting in excessive wear.

**NOTE:** *If excessive rail slide wear occurs due to poor snow conditions additional wheel kits can be added.*



**NOTE: Track damage or failure caused by operation on ice or under other poor lubrication conditions will void the tracks warranty.**

## TRACK TENSION



Track tension is critical for maintaining correct suspension operation. If the track tension is too loose it may cause the track to slip or “ratchet” on the drive shaft drivers and cause the track and rear suspension durability problems. If the track is too tight the track will wear down the rail slides, reduce top

speeds, cause rear suspension vibration and cause track and rear suspension durability problems.

1. Lift the rear of the machine and place a jack stand or secure the rear of the machine so that the track is off of the ground.
2. Start the engine and slowly let the engine turn the track over. This will warm up the track for a correct measurement.
3. Shut off the engine.
4. Place a 10 lbs. (4.54kg) weight at point (A). Point (A) is 16" (41cm) ahead of the rear idler shaft (E).
5. Measure the distance (D) between the rail slider and the track. This measurement should fall within the measurement range for the appropriate vehicle.
6. If adjustment is needed, loosen up the lock nuts (B) on each side.
7. Loosen up the idler shaft bolts (F).
8. Turn each adjuster bolt (C) toward the idler wheel (clockwise) if you need less of a measurement. Turn the adjuster bolt (C) toward the front of the sled (counterclockwise) if you need a greater measurement.
9. When you achieve the correct tension listed below, torque the lock nuts (B) and idler shaft bolts on each side to 35 ft-lb (48Nm).

**NOTE: Track alignment affects track tension. Misalignment will cause excessive wear to the track and slide rails. Excessive slide wear will appear on units with the track tension set too tight (or below measurement specification).**

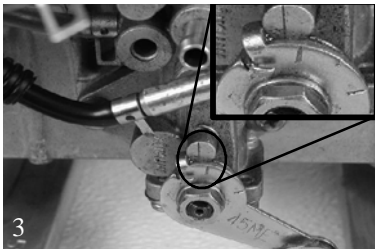
**Table 3-4: Track Tension Data**

SUSPENSION	MEASUREMENT
EDGE / EDGE RMK / SWITCHBACK/ IQ RMK / IQ SWITCHBACK	3/8" - 1/2" (1 - 1.3cm)
IQ FUSION	7/8" - 1 1/8" (2.2 - 2.9cm)
M-10	7/8" - 1 1/8" (2.2 - 2.9cm)
M-10 128"	7/8" - 1 1/8" (2.2 - 2.9cm)
M-10 136"	7/8" - 1 1/8" (2.2 - 2.9cm)
EDGE TOURING / WIDETRAK	3/4" - 1" (1.9 - 2.5cm)
EDGE 136"	7/8" - 1 1/8" (2.2 - 2.9cm)
120 PRO X	3/8" (.95cm)

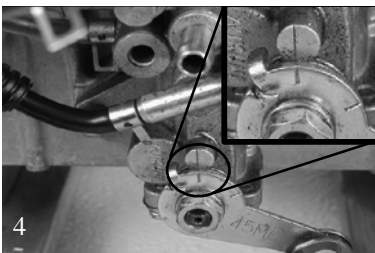


## OIL PUMP ADJUSTMENT

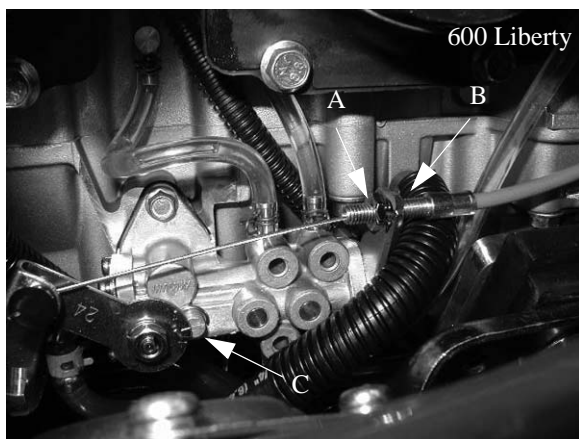
1. On some engines the oil pump is located under the intake boots and you may have to remove the air box and may need to unplug the CDI box and coils.
2. Verify carburetor synchronization see "THROTTLE VALVE SYNCRONIZATION" on page 4.13.
3. Loosen the carburetor boot adapters and carefully move them so that you can see and adjust the oil pump cable.



4. Verify that the oil pump alignment lines are aligned at the point where the carburetor slides begin to raise from their resting positions.



5. If they are not aligned make the necessary adjustments by adjusting the oil pump cable. In small increments, loosen the lock nut that is closest to the oil pump (A), and move the mark that is on the oil pump arm by tightening or loosening the adjustment nut (B) as needed to get the line to the desired position (550 has alignment marginal at wide open throttle).



6. Lock the lock nut (A).
7. Verify that the oil pump marks line up as outlined in step

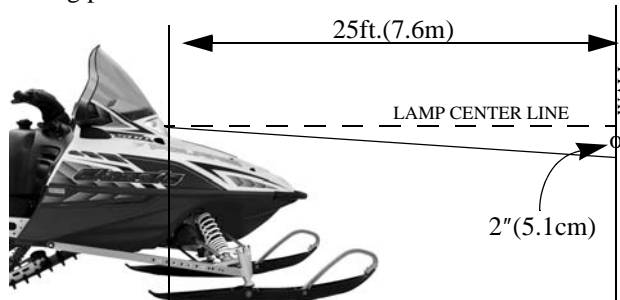
4.

8. Re-install carburetors, air box and plug in the CDI and coils if they were taken off in step 1.
9. Check idle to specification and adjust if needed.

**NOTE: A mirror may aid in checking the oil line markings.**

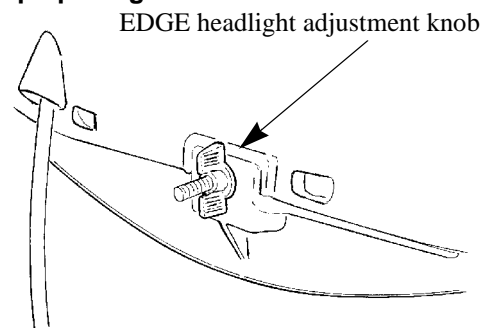
## HEADLIGHT ADJUSTMENT

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



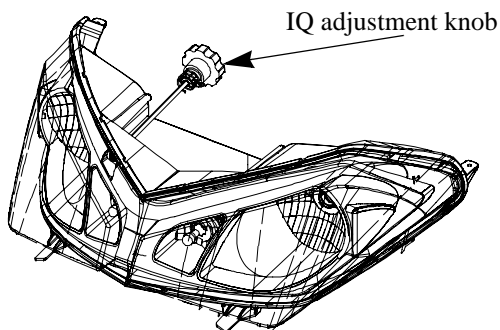
1. Place the snowmobile on a flat level surface with the headlight approximately 25 feet (7.6m) from a wall.
2. With a tape measure, measure the center line of the headlight on the vehicle. You may have to eye up the center line.
3. Mark the headlight center line distance that you found on step 4, and mark it on the wall that the machine is facing.
4. Apply and lock the parking brake.
5. Start the engine.
6. Set the headlight switch to HIGH beam.
7. With the rider in full gear and the sled at ride height continue to step 8.
8. Observe the headlight aim. The most intense part of the headlight beam should be aimed 2" (5.1cm) below the mark placed on the wall in step 3.

**NOTE: On Edge models you can adjust the headlight by turning the adjusting knob that is located on the under side of the hood, just below the head lamp opening.**

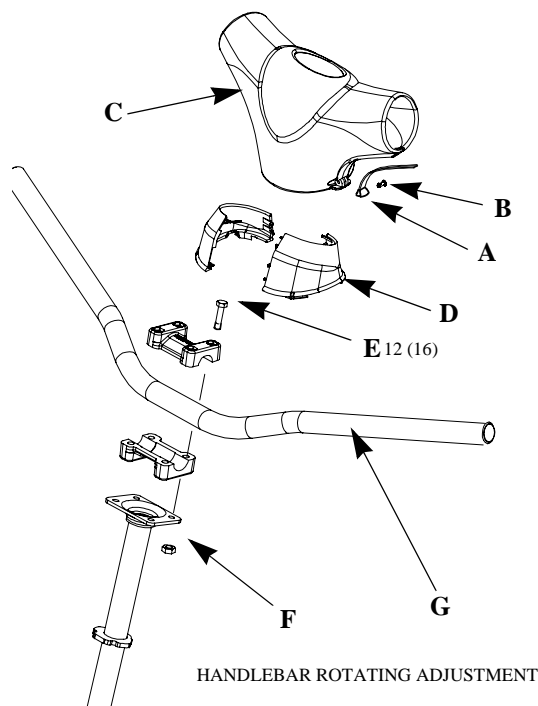




**NOTE:** On IQ models you can adjust the headlight by turning the adjustment knob that is located on the top side of the hood, next to the MFD gauge.



### HANDLEBAR ADJUSTMENT



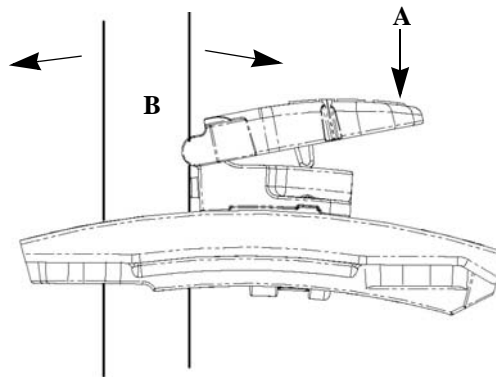
#### WARNING

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

1. Remove the handle bar cover slides (A) and then the dart clips (B) that holds on the handle bar cover (C).
2. Remove the handle bar cover.
3. Remove the console covers (D) if equipped.
4. Loosen the handle bar block bolts (E) and nuts (F).
5. Rotate the handle bar (G) in the desired position.

6. While holding the handlebar in the desired position tighten the handle bar block bolts and torque to 12 ft-lb (16Nm) starting with the front bolts.
7. Replace the console covers (if equipped), handle bar cover, handle bar cover slides, and dart clips.

### HANDLEBAR RIDING POSITION ADJUSTMENT (Rider Select only)



IQ RIDING ADJUSTMENT



#### WARNING

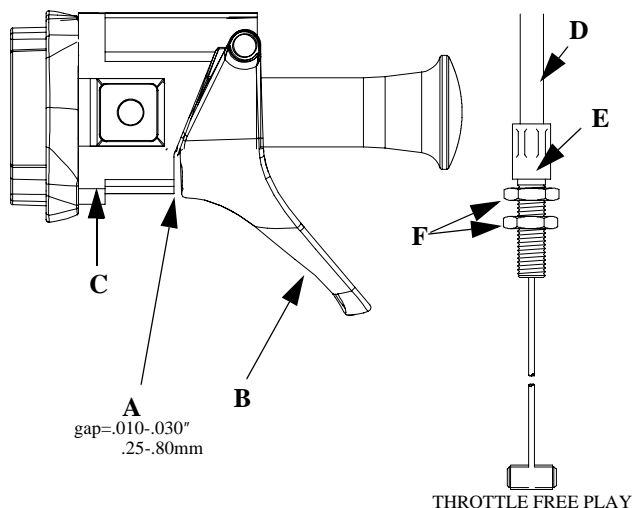
Do not attempt to adjust the riding position while vehicle is in motion. Loss of steering may result in personal injury or death.

On the IQ vehicles you have the option of seven (7) different riding positions.

1. While sitting in the riding position on the vehicle, press down on the adjustable steering lever (A).
2. Adjust the handle bar (B) position to the desired position and let go of the steering lever.
3. Push handle bars forward and then pull backward on them to verify that the position is locked.



## THROTTLE LEVER FREE PLAY



Throttle lever free play must always be at a specified clearance (A) .010"-.030" (.25-.80 mm) between the throttle lever (B) and the throttle block (C). This clearance is controlled by the throttle cable (D).

If adjustment is needed follow these steps:



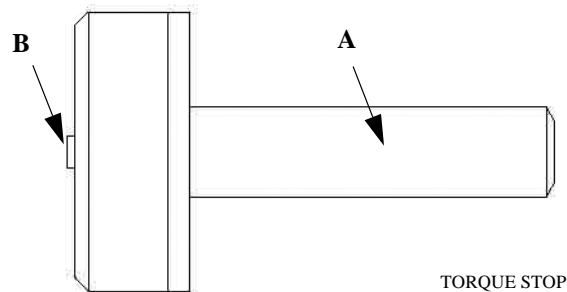
### CAUTION

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

1. Check the idle RPM and verify it is within the specified range.
2. Shut off engine.
3. Locate the throttle cable that is attached to the carburetors and adjust the throttle free play by adjusting the barrel nut (E) and lock nuts (F).
4. Once you achieve the proper free play of .010"-.030" (.25-.80mm), tighten the lock nuts.
5. Verify the oil pump index marks are with in range.
6. Check the idle RPM and verify it is within the specified range.

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

## TORQUE STOP



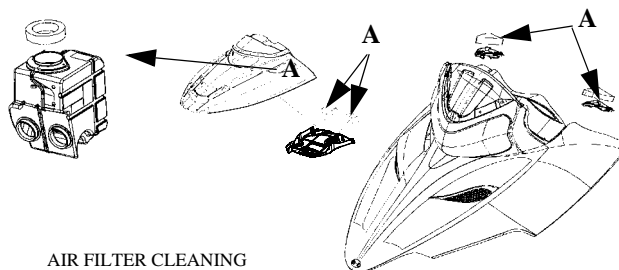
After aligning clutches, adjust torque stop (A) by loosening the lock nut and rotating the stop so that the clearance is .010" - .030" (.25 - .75mm) from the whole surface of the torque stop.

If replacing a new torque stop, adjust the torque stop so that the tip (B) is touching the engine case.

Hold torque stop and tighten jam nut to 15-17 ft-lb. (21-24 Nm).

## CLEANING

### AIR FILTER



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

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



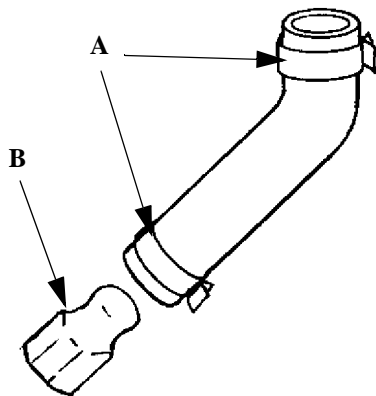
## WATER SEDIMENT TRAP



### WARNING

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

Most Polaris snowmobiles incorporate a patented carburetor bowl water / sediment traps which are located at the bottom of each carburetor. The trap consists of a hose with a plug which should be inspected for contamination every 1000 miles (1600 km).



1. Turn the fuel tank supply valve to the "OFF" position.
2. Position a container or shop towels under the work area to help catch some of the contaminated gasoline.
3. Slide the clamp (A) away from the drain plug (B) and remove it from the sediment tube and drain the contaminated material from the bowl. Repeat for each carburetor.
4. Wipe off the residue from the plug and reinstall the clamps.

## 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.

## 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 flange 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 Protectant (or equivalent) on shock absorber shafts to help prevent corrosion.

## BATTERY

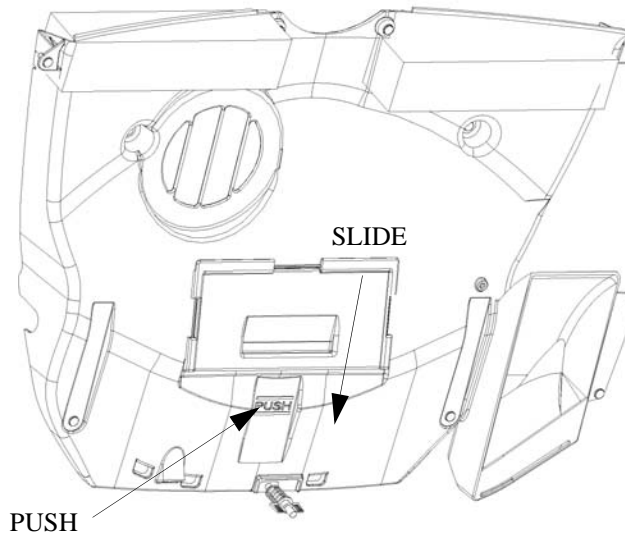
Disconnect and remove the battery. Clean the terminals and cables. Apply dielectric grease to the terminals. Store in a cool dry place for storage.

## REPLACEMENT

### HEADLIGHT BULB REPLACEMENT

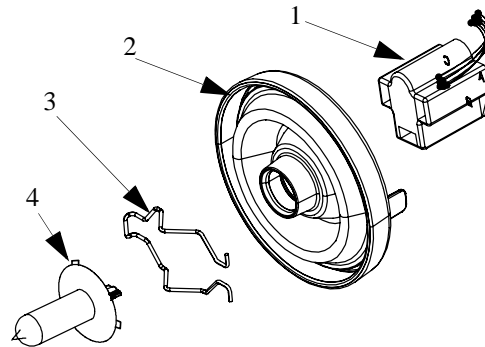
**NOTE:** Do not touch the bulb with your fingers. The grease from body oil will cause a hot spot on the bulb and cause bulb failure. If you do touch the bulb clean the bulb with isopropyl alcohol.

### EDGE HEADLIGHT BULB REPLACEMENT

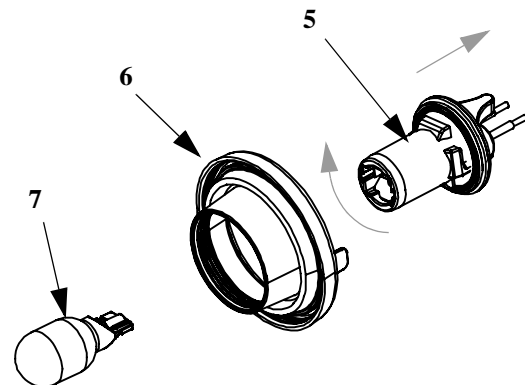


1. Push in on the "PUSH" section of the plenum.
2. Slide the access panel down to gain access to the bulb.
3. Squeeze and move the bulb clip up.
4. Replace the bulb, clip and access panel.

### IQ HEADLIGHT BULB REPLACEMENT



1. Unplug the headlight harness (1) from the bulb.
2. Remove the rubber boot (2) from the housing.
3. Pinch the ends of the spring (3) together and lift it until it releases from the spring retainer.
4. Lift spring carefully around the wire harness and flip it to the outside of the housing.
5. Grasp the bulb (4) by the metal base and carefully separate the bulb from the harness.
6. Install new bulb by the base and reverse the process for installation.



### IQ SNOW BEAM BULB REPLACEMENT

1. Twist the light base (5) counterclockwise and pull it out from the housing.
2. Remove the rubber boot (6).
3. Remove the bulb (7) by pulling it straight out from the housing.
4. Replace bulb with new and reverse the process for installation.



# CHAPTER 4

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## **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.

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.

## **GENERAL INFORMATION**

### **SERVICE PRECAUTIONS**

In order to perform service work efficiently and to prevent costly errors, the technician should read the text in this



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 of water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil.

Call physician immediately. Eyes - Flush with water for 15 minutes and get prompt medical attention.

## GASOLINE VOLATILITY

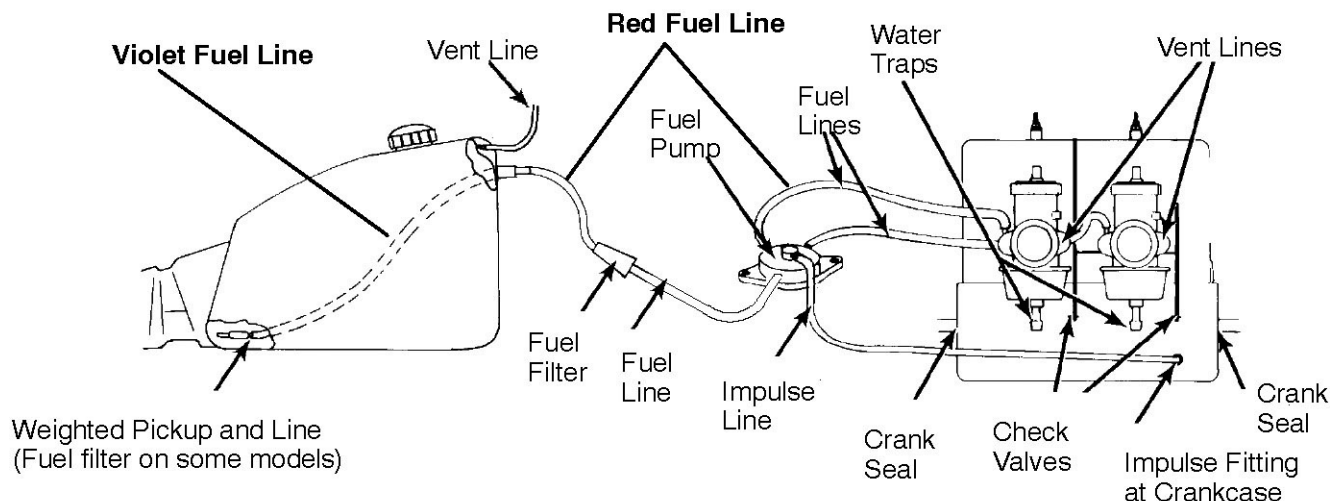
See "GASOLINE VOLATILITY" on page 2.9.

## 2 STROKE GASOLINE / OIL PRE MIX

see "2 STROKE GASOLINE / OIL PRE MIX" on page 2.10

## FUEL DELIVERY SYSTEM (Carbureted)

### CARBURETED SYSTEM OVERVIEW



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

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

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

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

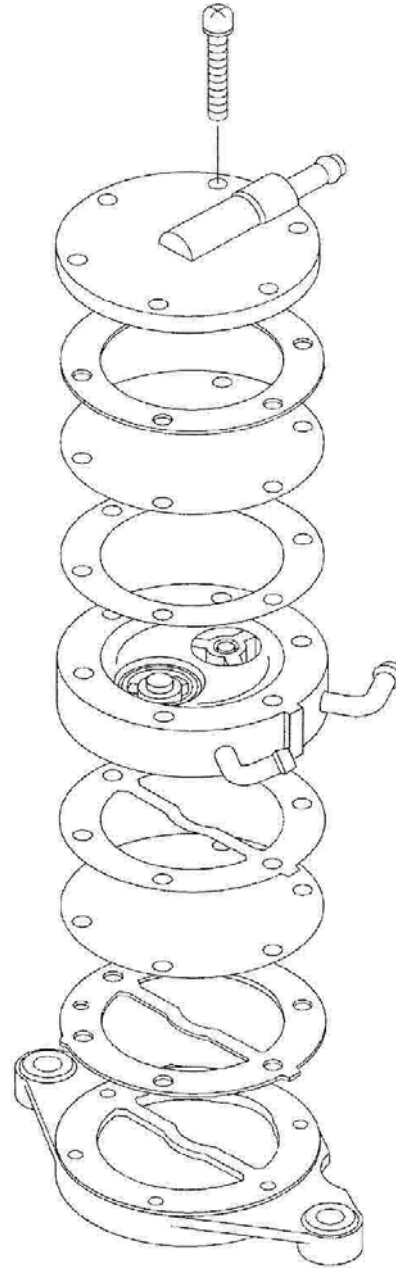
**NOTE: Some models use fuel filters that are located inside the fuel tank. To inspect/replace filter, remove fuel cap and use a long clean wire, bend one end in a hook shape. Pull the fuel line that is in the tank up through the filler hole. Inspect filter on end of fuel pick up line. Replace if worn or clogged.**

Red fuel line is the exterior line for outside the tank. The violet line is the interior line for inside the fuel tank. They cannot be interchanged! The violet line used inside the tank will fade and turn clear after a relatively short time. This does not affect the function or durability of the line.



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

### **FUEL PUMP (non-injected units)**



### **FUEL PUMP OVERVIEW**

The fuel pumps (340/550 style shown). The differences are in the size and location of the pumps. Pumps may be mounted to the engine, air/oil box or to the chassis.

In the two cycle engine, the pressure in the crankcase changes with the up and down stroke of the piston. The amplitudes of pressure vary according to the RPM and degree of throttle



opening. Whether idling or at full throttle, the pressure built up in the crankcase has enough amplitude to operate the pump.

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

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

## MAINTENANCE

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

## OPERATION

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

## CLEANING

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

## INSPECTION

Disconnect impulse line from pump. Connect a Mity Vac to impulse fitting (or line) and apply 4-6 PSI pressure. Diaphragm should hold pressure indefinitely.

The diaphragms and check valves must be carefully examined for cracks, holes, or other damage. If in doubt as to the condition of any internal parts, replace all diaphragms, check valves, and gaskets.

## MIKUNI JET NEEDLE

### OVERVIEW

This needle (example) is a 9DH01-57. The first number is the approximate overall length in 10mm increments of the jet needle. The 9 indicates the needle is approximately 90mm but less than 100mm in length.

The letters on the jet needle indicate the angle of both tapers. The first letter designates the taper angle of the top section (closest to the grooves) and the second letter designates the angle of the bottom taper. The taper angles are graduated in 15' (15 minute) increments. The jet needle marked 9DH01-57 would have a top taper of 1°0' and a bottom taper of 2°0'.

The number following the letters on the jet needle is the serial number and it varies with individual jet needles.

The last number, 57 indicates that the outside diameter is 2.57mm. The smaller the O.D., the richer the mixture.

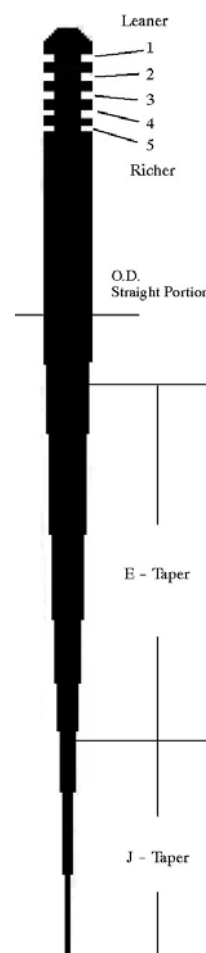
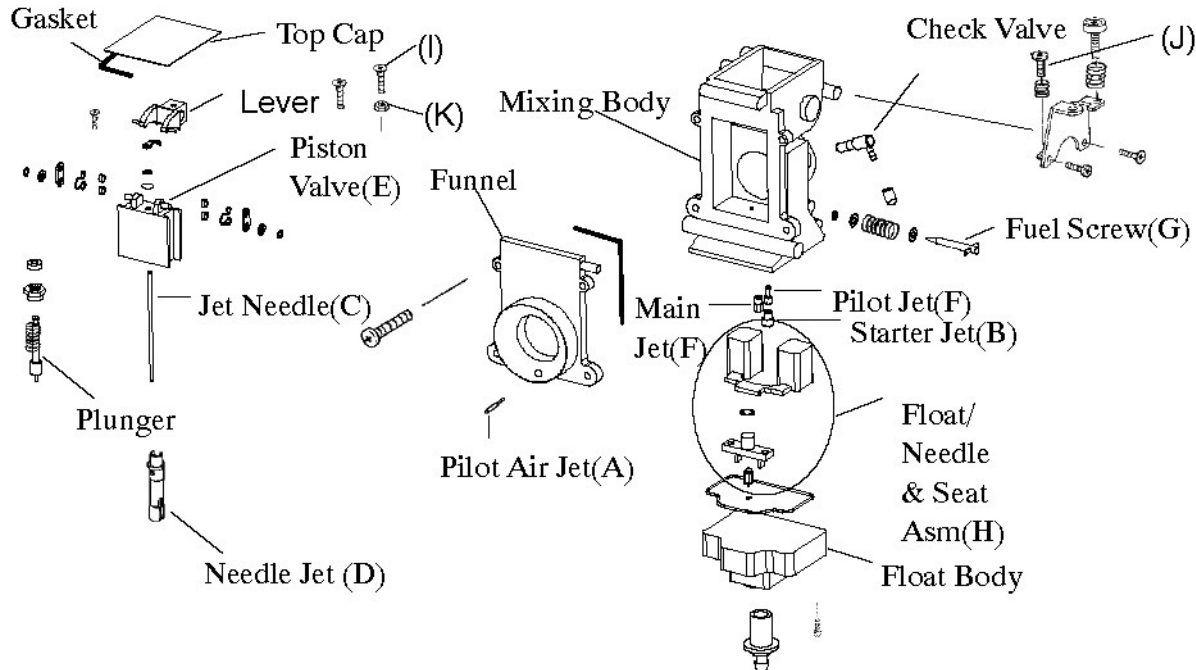


Table 4-1: Mikuni Jet Needle

DESIGNATOR	DESCRIPTION
9	Overall length in 10mm increments
D	Taper of the <b>top</b> section of the needle
H	taper of the <b>bottom</b> section of the needle
01	Serial number
-57	Outside diameter (O.D.) of the straight portion



## MIKUNI TM 38



### CARBURETOR OVERVIEW

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

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

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

**Jet Needle (C):** The jet needle performs the same functions as on Mikuni VM carburetors. However, the needles in the TM-38 carburetors are longer and are not interchangeable with VM needles. To raise or lower the needle, remove the top cap (D) and loosen the 2.5mm Allen screw holding the needle in

place. Reach inside with a long nose pliers and pull the needle out. The C-clip can then be adjusted for the desired effect.

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

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

**Main Jet and Pilot Jet (F):** The main jets (hex) and pilot jets (air bleed type) are identical in style and function as the Mikuni VM carbs. There is washer on main jet that is staked and should not come out. The part numbers for main jets and pilot jets are the same as Mikuni VM round slide carburetors.

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

**Float/Needle & Seat Assembly (H):** The float/needle & seat are sold as an assembly and cannot be replaced as individual



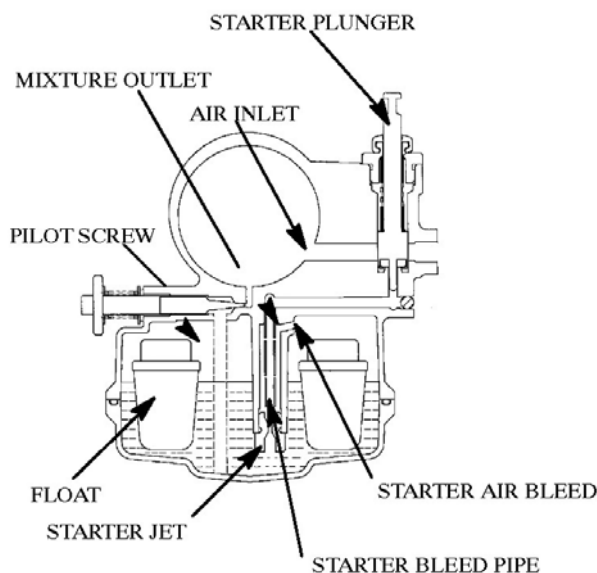
components. The float level is pre-set in the molding and cannot be adjusted.

### WARNING

DO NOT pressurize the fuel system by forcing compressed air through the fuel tank. Forcing air through the needle and seat will cause damage and the float/needle & seat assembly will have to be replaced.

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

## MIKUNI CARBURETOR



## FUNCTION

The function of a carburetor is to produce a combustible air/fuel mixture by breaking fuel into tiny particles in the form of

vapor, to mix the fuel with air in a proper ratio, and to deliver the mixture to the engine. A proper ratio means an ideal air/fuel mixture which can burn without leaving an excess of fuel or air. Whether the proper mixture ratio is maintained or not is the key to efficient engine operation.

The engine of a vehicle is operated under a wide range of conditions, from idling with the throttle valve remaining almost closed, to full load or maximum output with the throttle valve fully opened. In order to meet the requirements for the proper mixture ratio under these varying conditions, a low speed fuel system, or pilot system, and a main fuel system are provided in Mikuni type carburetors. The Mikuni carburetor has varying operations depending upon varying driving conditions. It is constructed of a float system, pilot system, main system, and starter system or initial starting device.

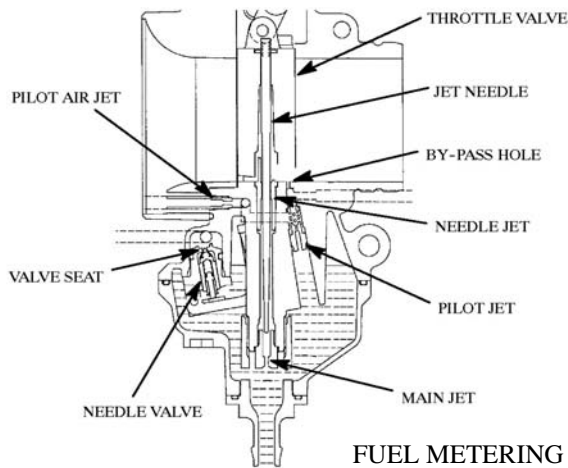
## FLOAT SYSTEM

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

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



## FUEL METERING



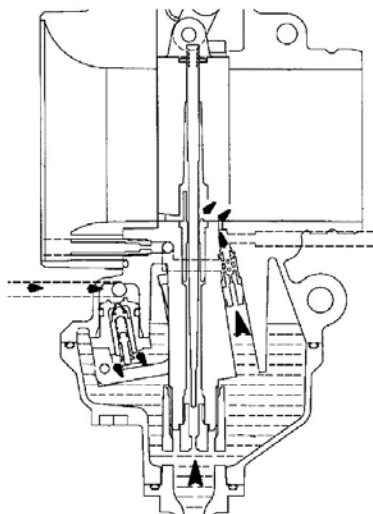
FUEL METERING

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

## FUEL DELIVERY

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

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



FUEL DELIVERY

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

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

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

## PILOT JET

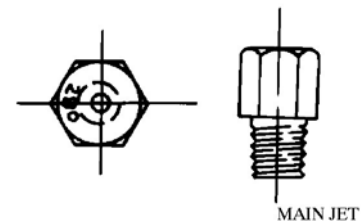
From idling to low speeds, the fuel supply is metered by the pilot jet. There are several air bleed openings in the sides of the pilot jet which reduce the fuel to mist. The number stamped on the jet is an indication of the amount of fuel in cc's which passes through the jet during a one minute interval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

## PILOT AIR SCREW

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

## MAIN JET

When the throttle opening becomes greater and the area between the needle jet and jet needle increases, fuel flow is metered by the main jet. The number on the jet indicates the amount of fuel cc's



MAIN JET



which will pass through it in one minute under controlled conditions. Larger numbers give a greater flow, resulting in a richer mixture. Main jets are screwed directly into the needle jet base.

## JETTING GUIDELINES

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

Verify the production setting for your specific model. All carburetors must be re-calibrated if operated outside the production temperature and/or altitude range. The main jet installed in production is not correct for all altitudes and/or temperatures. Refer to the jetting chart in the Specifications Chapter of this manual for correct jetting for altitude/temperature ranges.

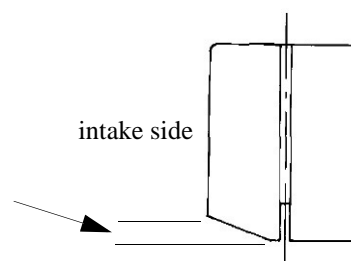
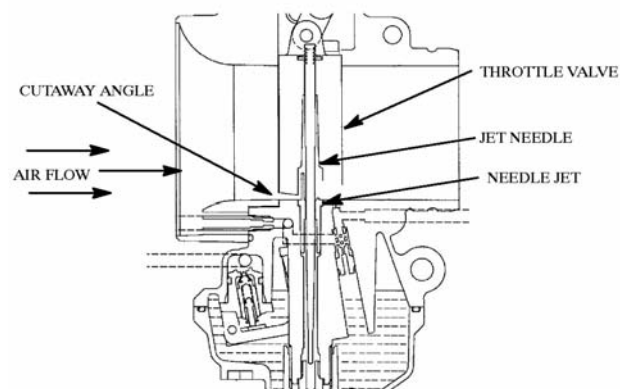
**NOTE: It is the owner's responsibility to ensure that the correct jets are installed in the machine for a geographical area. Be very careful when jetting down in warm weather. As the weather turns colder it will be necessary to re-jet upward to prevent engine damage. When selecting the proper main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



### CAUTION

A Main Jet that is too small will cause a lean operation condition and may cause serious engine damage. Jet the carburetors carefully for elevation and temperature according to the jetting charts in the Specifications Chapter of this manual or the models Owners Manual Supplements

## PISTON VALVE or THROTTLE VALVE



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

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

## JET NEEDLE / NEEDLE JET

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

## JET NEEDLE

The jet needle tapers off at one end and the clearance between the jet needle and the needle jet increases as the throttle valve opening gets wider. The air/fuel mixture ratio is controlled by the height of the "E" ring inserted into one of the five slots



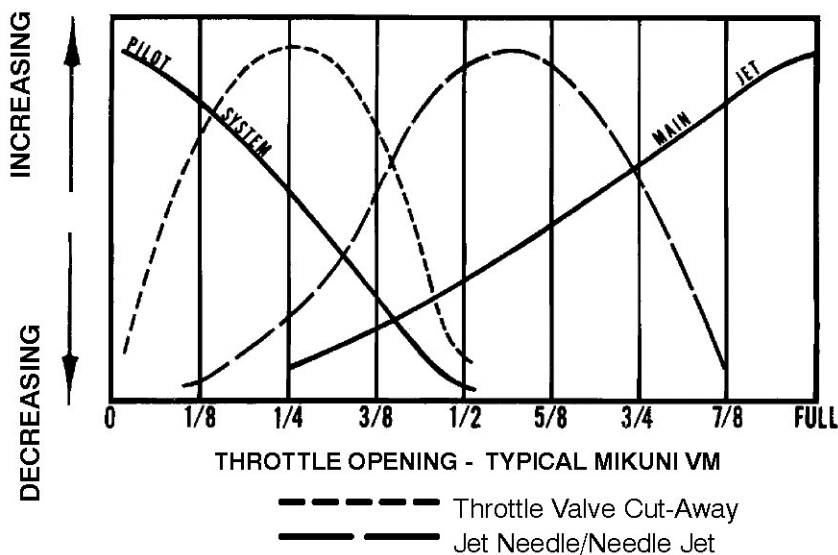
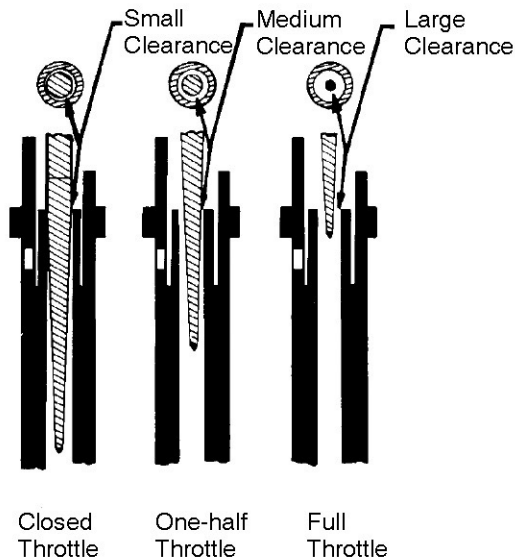
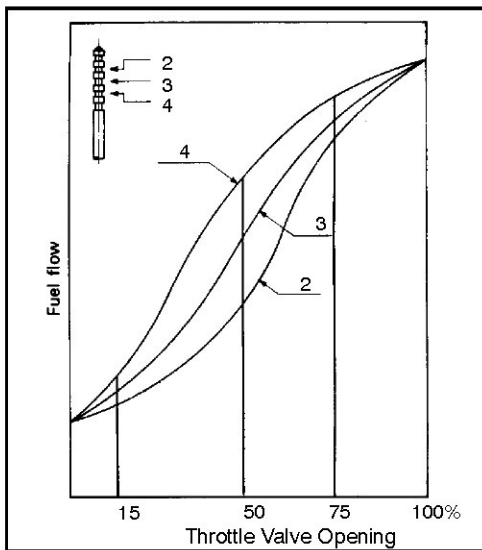
provided in the head of the jet needle. The chart at right shows the variation of fuel flow based on the height of the "E" ring.

## NEEDLE JET

The needle jet works in conjunction with the jet needle to regulate fuel flow rate. An air bleed opening in the side of the

needle jet brings in air measured by the air jet. This air initiates the mixing and atomizing process inside the needle jet. Mixing is augmented by a projection at the needle jet outlet, called the primary choke. The letter number code stamped on the jet indicates jet inside diameter.

## THROTTLE OPENING VS FUEL FLOW





## MIKUNI TM38 FLAT SLIDE SERVICE

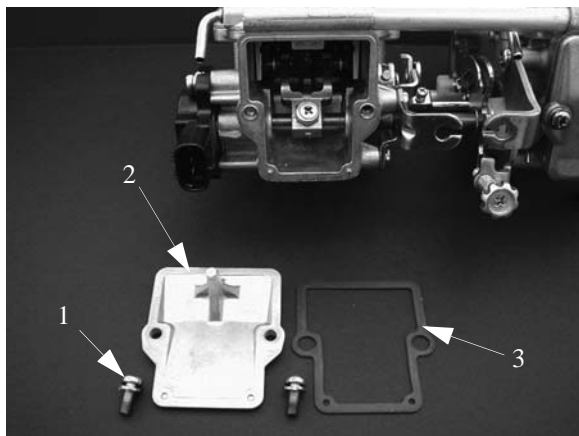
### DISASSEMBLY



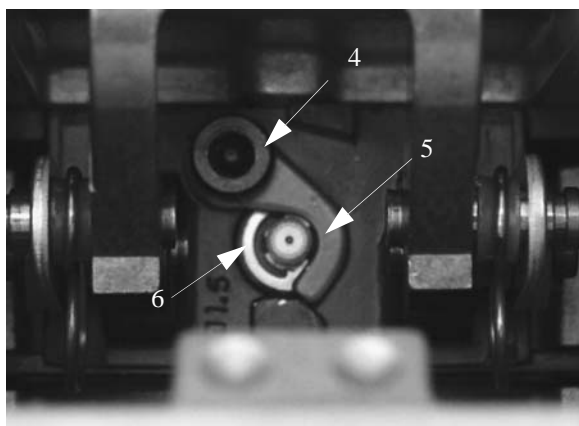
CAUTION

WEAR EYE PROTECTION WHEN USING COMPRESSED AIR OR WHEN USING CLEANING SOLVENTS. REVIEW ALL FUEL SYSTEM WARNINGS LOCATED AT THE BEGINNING OF THIS CHAPTER BEFORE PROCEEDING.

1. Remove the carburetor from the engine before disassembling. Clean the outside of the carburetor thoroughly with solvent. Do not use compressed air to dry at this time. The float chamber could become pressurized resulting in damage to the floats or inlet needle and seat.
2. Remove all top cap screws (1), top cap (2) and gasket (3).



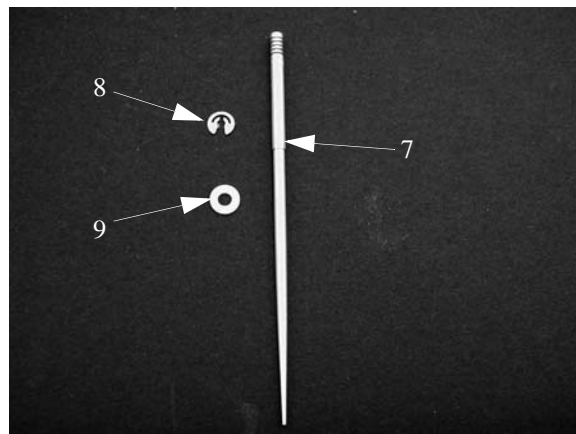
3. Locate the arm screw (4) and loosen it just enough to move the arm (5) out of the way so that you can remove the needle (6) e-clip and the plastic washer from the throttle slide.



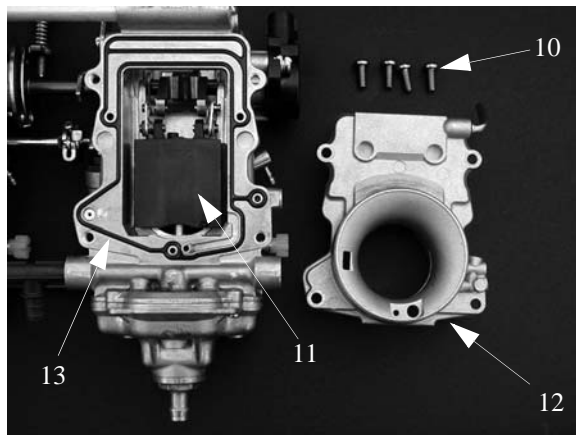
**NOTE:** Keep track of the plastic washer (G), and place it so it is on the top of the throttle valve when

installing the needle and e-ring back into the carburetor.

4. Inspect the needle (7), e-clip (8), and plastic washer (9) for wear.

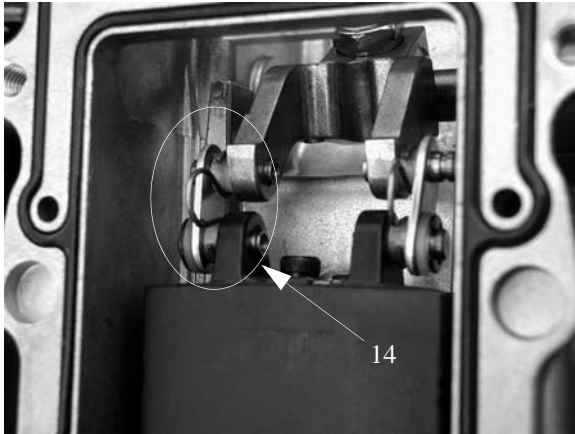


5. Remove the four screws (10) on the funnel face.
6. Turn throttle shaft so the throttle slide (11) slides open all the way.
7. With slide fully open, pull funnel (12) out from the bottom first. Inspect the gasket (13).
8. Check for wear on the faces of the slides,.





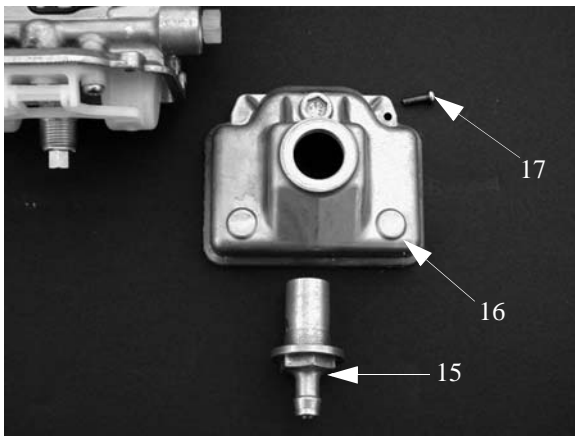
9. Inspect e-rings, plate, spring, and rings (14) connecting the slide to the lever if needed.



10. Remove water trap/drain plug (15) and single screw (16) on the bottom of the carburetor.

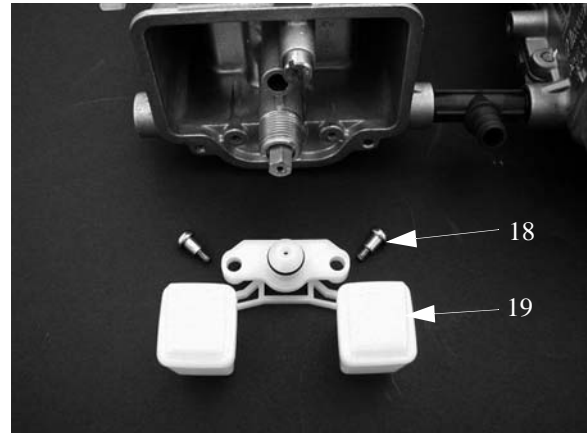
11. Remove and drain the float bowl (17).

**NOTE: Float bowl will not come off unless the water trap/drain plug and screw are removed.**



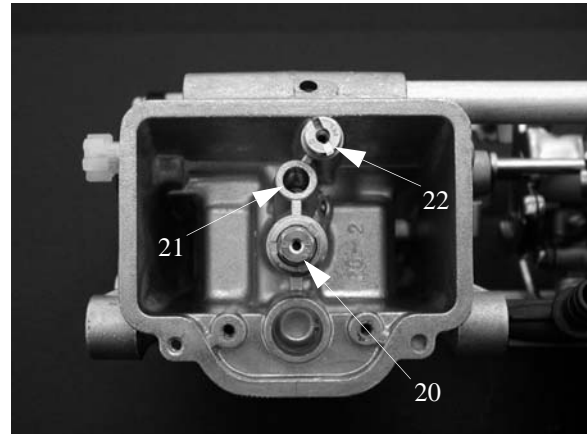
12. Remove the two screws (18) holding the float/needle and seat assembly (19) in position and remove this assembly.

13. Inspect the contents for wear and debris.



14. Remove and inspect the main jet (20), pilot jet (21) and starter jet (22) and clean them out.

15. Remove the air jet screw if so equipped.



16. Clean out all passages in carburetor body with carburetor cleaner. Dry all passages and jets with compressed air.

17. Replace gaskets and any parts that show wear or damage.

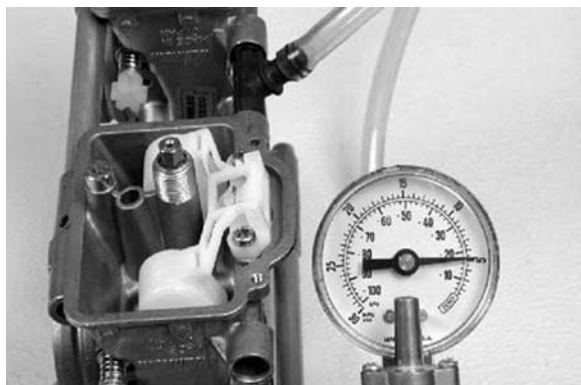
18. Repeat steps 1-18 for disassembly for the other carburetor if needed.

## ASSEMBLY

1. Install the main jet (20), pilot jet (21) and starter jet (22).
2. Install float/needle & seat assembly (19).
3. Place carburetor in an inverted position.
4. Connect a pressure tester (PN 2870975) to fuel inlet fitting. Apply 5 psi pressure and observe for one minute. The needle and seat should hold pressure indefinitely. If the pressure drops, carefully inspect the needle and the needle seat. The needle can be replaced (needle comes



with float and seat).



5. Carefully inspect float bowl gasket and replace if necessary.
6. Install float bowl (16) on carburetor with water trap/drain plug (15) and single screw (16) on the bottom of the carburetor.
7. If throttle slide was removed, install throttle slide (11) so that the wider face is facing the engine side of the carburetor.
8. Install the funnel gasket (13) and funnel (12) onto the carburetor. You will have to lift the throttle slide up and place the smaller face into the funnel area.
9. Install funnel screws (10).
10. Install the e-clip (8) in the desired position on the jet needle (7).
11. Slide the plastic washer (9) on the jet needle so that it is positioned to rest on top of the throttle valve when assembled.
12. Install carburetors on engine.
13. Synchronize the carburetors. See “THROTTLE VALVE SYNCHRONIZATION” on page 4.13.
14. Replace top cap gaskets (3), cover (2) and screws (1).
15. Check throttle lever free play. See “THROTTLE LEVER FREE PLAY” on page 3.24.

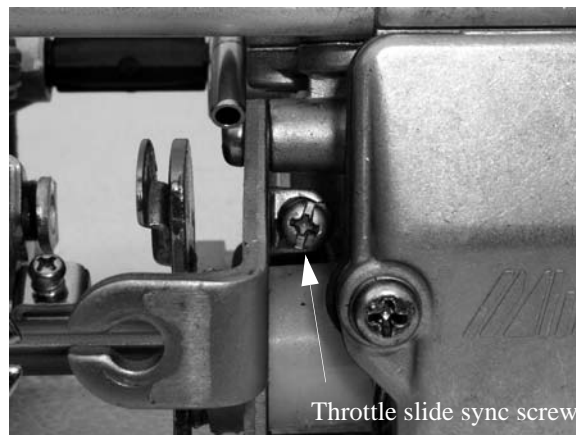
## **CARBURETOR SYNCHRONIZATION**

### **THROTTLE VALVE SYNCHRONIZATION**

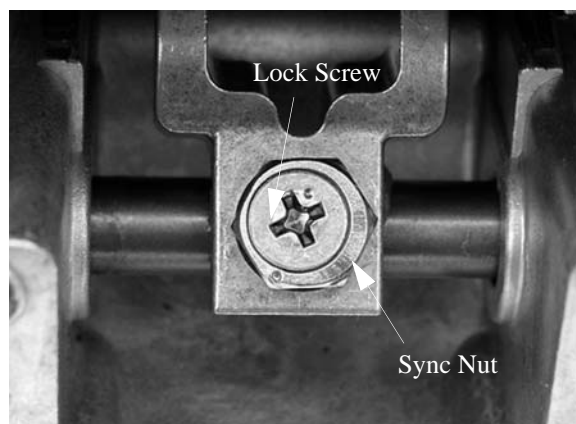
Mikuni TM style carburetors are synchronized at wide open throttle with out the engine running. The MAG side carburetor is the adjusting carburetor, the PTO side carburetor has a non adjustable set screw on the throttle shaft. The PTO carburetor is considered the base carburetor. All adjustments are made to the MAG carburetor

1. Remove the air box.

2. Remove the carburetor tops.
3. Hold the throttle wide open with the bellcrank on the carburetor.
4. The bottom of the throttle valve should be flush with the top of the carburetor intake area.
5. If they are not flush, hold the PTO carburetor flush with the top of the intake area of the carburetor.
6. Turn the throttle slide synchronization screw until both of the throttle slides are flush with the top of the intake area of the carburetor.



7. Once the PTO carburetor side is flush, loosen the Phillips head screw, located under the top cover on the MAG carburetor.
8. While holding the PTO carburetor slide flush to the top of the carburetor, rotate the synchronization nut clockwise to raise the slide and counterclockwise to lower the slide.



9. Adjust the synchronization nut until it is even with the PTO slide.
10. Once this is flush, lock the locking screw.
11. Replace the tops of the carburetor.
12. Install carburetor back onto the sled.
13. Install all cables.
14. Install all vent lines, and fuel lines.



15. Check throttle free play.see “THROTTLE LEVER FREE PLAY” on page 3.24.

## THROTTLE POSITION SENSOR

The main job of the throttle position sensor (TPS) is for the CDI box to read the throttle position. This indicated throttle position will determine the timing map for the conditions that the engine is running at. The CDI box will look for the TPS opening value and water temperature value and determine which timing map to give the engine. The TPS setting is critical for correct timing and run ability.

### SETTING THE TPS

The TPS comes set form the factory and should not need any adjustments. However, if the TPS was moved or removed for any reason, Polaris has developed a TPS sensor tool that will assist you in correctly setting the TPS to specification.

1. Verify that the carburetors are synchronized (See “THROTTLE VALVE SYNCRONIZATION” on page 4.13.).
2. Verify that the throttle freeplay is with in specification (See “THROTTLE LEVER FREE PLAY” on page 3.24.).
3. Once steps 1 and 2 are verified, you can set the TPS.



4. Set up your TPS sensor tool (PN 2201519) as per the instructions that came with the tool.
5. Make sure that you have a good 9v battery and place it in the TPS sensor tool.
6. With your volt meter, place the black probe lead to the black terminal.
7. Place the red probe lead to the Pink terminal.
8. Turn your meter to the VDC setting.
9. Your voltage reading on your meter should read 4.99 - 5.01 VDC. If not replace the 9v battery with a new one.
10. Remove the probes from the TPS sensor tool.

11. Remove the TPS connector from the TPS on the carburetor.
12. Plug in the TPS connector on the TPS sensor tool to the TPS on the carburetor.



13. Insert the Red probe from you meter to the Yellow terminal on the TPS sensor tool.
14. Insert the Black probe form your meter to the Black terminal on the TPS sensor tool.
15. Turn your meter to the VDC setting.
16. Slowly open the throttle and watch your meter for a smooth voltage increase.

**NOTE: You may see a O.L. momentarily when the throttle is open. This is normal.**

**TPS Volts at wide open throttle for Domestic engines with carburetors:  
4.0 - 4.2 VDC**

17. If the specification is not correct, you will need to turn the TPS on the carburetor.
18. To increase the voltage you must turn the TPS counterclockwise.
19. To decrease the voltage you must tun the TPS clockwise.
20. When the TPS is set to specification, torque the TPS holding screws to 31 in-lb (3.5Nm).
21. Make sure that the voltage is within the specification after torquing the screws.
22. Disconnect the TPS sensor tool.
23. Connect the TPS connector back on the TPS.
24. Disconnect the 9v battery form the TPS sensor tool and place both in storage.



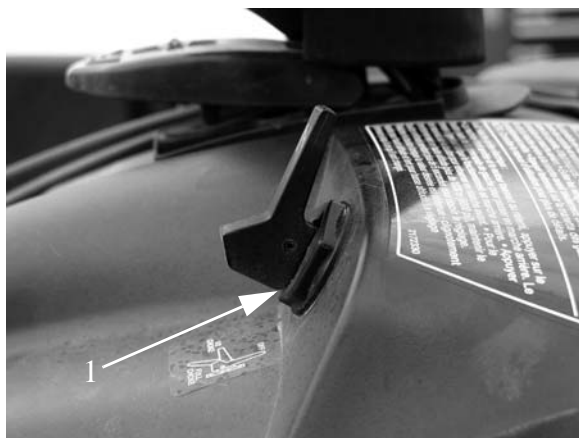
## **CARBURETOR CABLE ADJUSTMENTS**

### **CHOKE ADJUSTMENT**

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

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

1. Flip the choke toggle to the full off position (1).

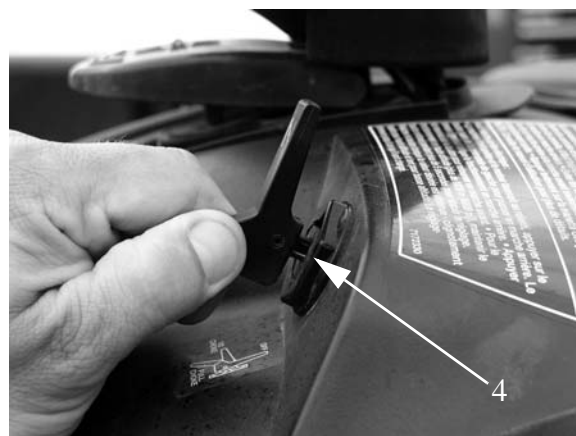


2. Loosen adjustment locknut (2) on the carburetor.



3. Turn cable sleeve adjusting nut (3) counterclockwise until toggle has no freeplay, then rotate it clockwise until .125-

.250in (.3-.6cm) toggle free play(4).



4. Tighten adjustment locknut (2).
5. For VM carburetors, repeat steps 4 and 5 for remaining carburetor.

### **THROTTLE LEVER FREEPLAY**

See "THROTTLE LEVER FREE PLAY" on page 3.24.



## CARBURETOR COMPONENT PART NUMBERS

### MIKUNI PILOT JETS

Table 4-2: Mikuni Pilot Jets

PILOT JET NUMBER	PART NUMBER
25	3130064
30	3130065
35	3130066
40	3130067
45	3130068
50	3130629
55	3130070
60	3130071

### MIKUNI MAIN JETS

Table 4-3: Mikuni Hex Head Main Jets

MAIN JET	PART NUMBER	MAIN JET	PART NUMBER	MAIN JET	PART NUMBER	MAIN JET	PART NUMBER
95	3130102	175	3130118	310	3130134	470	3130147
100	3130103	180	3130119	320	3130135	490	3130148
105	3130104	185	3130120	330	3130136	500	3130149
110	3130105	190	3130121	340	3130137	510 N	3131400
115	3130106	195	3130122	350	3130138	520 N	3131401
120	3130107	200	3130123	360	3130139	530 N	3131402
125	3130108	210	3130124	370	3130290	540 N	3131408
130	3130109	220	3130125	380	3130140	550 N	3131409
135	3130110	230	3130126	390	3130480	560 N	3131410
140	3130111	240	3130127	400	3130141		
145	3130112	250	3130637	410	3130599		
150	3130113	260	3130129	420	3130142		
155	3130114	270	3130130	430	3130143		
160	3130115	280	3130131	440	3130144		
165	3130116	290	3130132	450	3130145		
170	3130117	300	3130133	460	3130146		

### MIKUNI JET NEEDLES

Table 4-4: Mikuni Jet Needles

JET NEEDLE	PART NUMBER
J8-9FH04-57	3130794
J8-9EH01-57	3130795
J8-9DH01-54	3130796
J8-8BEY01	3131250
J8-9DFH06-57	3131253
J8-9EFH01-60	3131207
J8-9DFH07-60	3131268
J8-9DFH10-57	3131313
J8-9DGI01-60	3131377
J8-9DGJ02-57	3131378
J8-9EFY02-61	3131202

### MIKUNI STARTER JETS

Table 4-5: Mikuni Starter Jets

STARTER JET	PART NUMBER
130	3130805
135	3130767
140	3130768
145	3130769
150	3130770
155	3130771
160	3130772

**MIKUNI PILOT AIR JETS****Table 4-6: Mikuni Pilot Air Jets (SHORT)**

AIR JET	PART NUMBER
0.5	3130773
0.6	3130774
0.7	3130775
0.8	3130776
0.9	3130777
1.0	3130778
1.1	3130799
1.2	3130780
1.3	3130781
1.4	3130782
1.5	3130783
1.6	3130784
1.7	3130785
1.8	3130786
1.9	3130787
2.0	3130788

**MIKUNI PISTON VALVES****Table 4-8: Mikuni Piston Valves**

PISTON VALVE	PART NUMBER
1.5	3130940
2.0	3131252
2.5	3130790
3.0	3130791
3.5	3130792
4.0	3130793

**MIKUNI PILOT AIR JETS****Table 4-7: Mikuni Pilot Air Jets (LONG)**

AIR JET	PART NUMBER
0.5	3131255
0.6	3131249
0.7	3131256
0.8	3131254
0.9	3131203
1.0	3131257
1.1	3131258
1.2	3131259
1.3	3131260
1.4	3131261
1.5	3131262
1.6	3131263
1.7	3131264
1.8	3131265
1.9	3131266
2.0	3131267





# CHAPTER 5

## CLEANFIRE FUEL

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WHEN EVER SERVICING THE CARBURETOR OR FUEL SYSTEM, IT IS IMPORTANT TO HEED THE FOLLOWING WARNINGS.5.2	
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GASOLINE VOLTALITY ..... 5.2	
2 STROKE GASOLINE / OIL PRE MIX ..... 5.2	
FUEL DELIVERY SYSTEM (CLEANFIRE) .....	5.2
CLEANFIRE SYSTEM OVERVIEW..... 5.2	
PUMP FLANGE ASSEMBLY.....	5.3
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FUEL RAIL/INJECTOR REMOVAL ..... 5.3	
FUEL RAIL/INJECTOR INSTALLATION ..... 5.3	
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FUEL FILTER INSTALLATION ..... 5.6	



## 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

### GASOLINE VOLATILITY

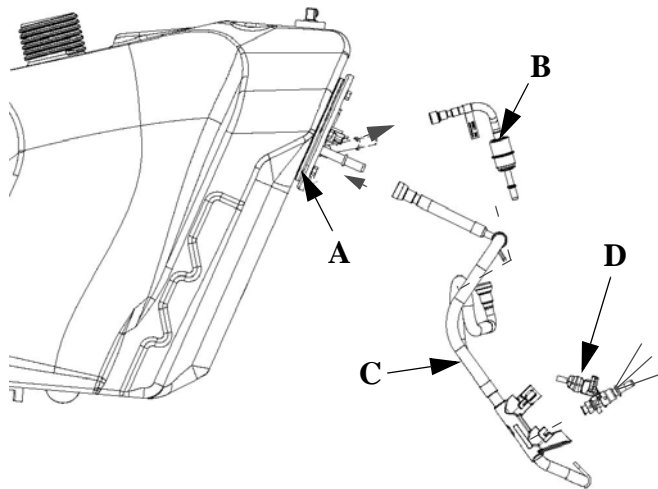
See "GASOLINE VOLATILITY" on page 2.9.

## 2 STROKE GASOLINE / OIL PRE MIX

see "2 STROKE GASOLINE / OIL PRE MIX" on page 2.10

## FUEL DELIVERY SYSTEM (Cleanfire™)

### CLEANFIRE SYSTEM OVERVIEW



The Cleanfire fuel system uses a fuel pump (A) that is located in side the fuel tank, a fuel rail (C) with in-line fuel filter (B), and injectors (D). The fuel /pump will create a pressure in the system and deliver the fuel mixture to the injectors. The injectors get a signal from the engine controller unit (ECU) and sprays into the engine.

The only maintenance that is needed with this system is that the fuel filter (B) needs to be changed every 1,000 miles (1600km).

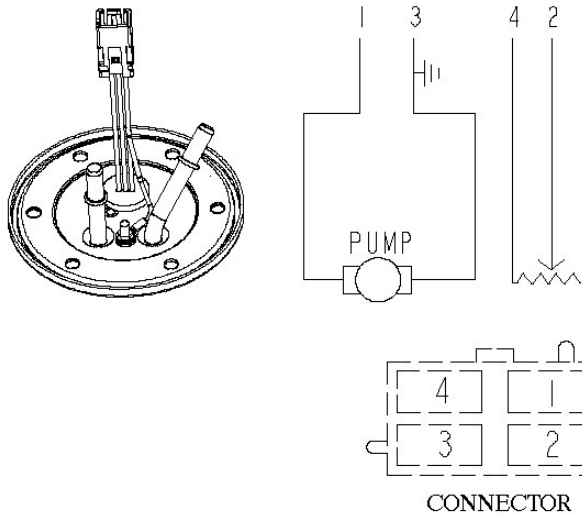
Fittings should be inspected for cracks or leaks. Do not use pliers or other tools that may damage fuel lines when installing or removing fuel rail.

Fuel travels from the fuel pump through the fuel filter and to the injectors. Any fuel that is not delivered through the injectors will travel back to the fuel tank through the return line.



## PUMP FLANGE ASSEMBLY

### FUEL PUMP



This fuel pump is non-serviceable and can not be replaced. If fuel pump fails you will need to replace the whole fuel tank assembly.

**FUEL PUMP:** Located inside tank. It provides system with fuel at 116psi (8bar) pressure. If the fuel pressure is suspect to be defective apply 12 VDC to the fuel pump prime (Red (#1) and the Brown (#3) wires) and check for audible fuel pump operation as well as fuel rail pressure. The fuel pump should sound when pumping and the pressure should show 116psi (8 bar) pressure.

**Table 5-1: Fuel Pump Connector**

PIN	COLOR	ITEM
#1	Red	power to the pump
#2	Violet/White	fuel level signal
#3	Brown	ground
#4	Brown	fuel level ground

### FUEL LEVEL

If the fuel gauge is suspect to failure you can check the continuity from the fuel sender to the gauge. The given

resistance below is from the Violet/White (#2) wire to the Brown (#4) wire located at the front of the fuel pump.

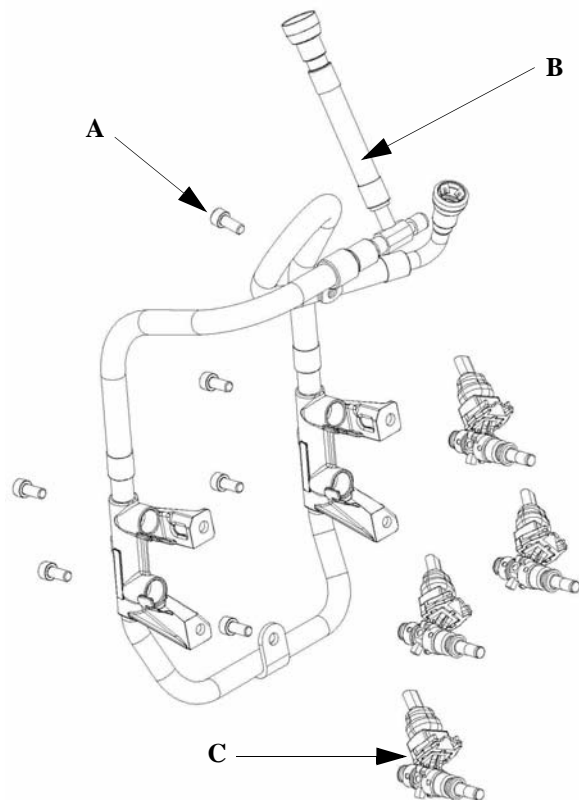
**Table 5-2: Level Sender Resistance**

TANK LEVEL	RESISTANCE ( $\Omega$ )
FULL	2 - 4 $\Omega$
EMPTY	85 - 95 $\Omega$

## FUEL RAIL

### FUEL RAIL/INJECTOR REMOVAL

1. Remove the engine. See See “700/900 LIBERTY ENGINE REMOVAL” on page 6.6.
2. Remove the fuel rail fasteners (A).
3. Remove the fuel rail (B).
4. Remove the injectors and o-rings from the fuel rail.



### FUEL RAIL/INJECTOR INSTALLATION

**IMPORTANT:** Make sure that the o-rings are correctly placed.

1. Insert fuel injector into the fuel rail.
2. Place fuel rail onto engine.



3. Torque the fuel rail fasteners to 108 in-lb (12Nm).

## FUEL RAIL BLEEDING

The fuel pressure gauge (PN PV-43506-A) is used to check the pressure in the fuel rail lines or to bleed the fuel rail pressure from the fuel rail. You will need to bleed off the fuel pressure if any service is needed to the fuel system or if engine is to be removed.



1. Attach the gauge to the Schrader valve.
2. Once the gauge is onto the Schrader valve the pressure gauge will indicate the pressure in the fuel rail.
3. To bleed the pressure form the fuel rail you can turn the bleeder valve on the gauge and bleed the system.
4. Now the fuel rail is ready for service.

## INJECTOR

The Cleanfire system utilizes 3 different color injectors. If you are replacing an injector you must replace it with the same color injector that you are removing. The color is indicated on the short wire harness that is attached to the injector, and is also indicated on the label of the ECU. If the color injector is not available you may replace all injectors with a different color and you must program the ECU to this color.

**Table 5-3: Cleanfire Injector Colors**

INJECTOR	COLOR
1202853-053	Yellow
1202853-027	Blue
1202853-015	Red

## INJECTOR REPLACEMENT

If it is verified that a injector needs to be replaced, you must first find out what injector color is on the unit. You can do this by checking the decal that is located on the top portion of the ECU or looking at the color wiring cover is on the injectors.

1. Remove the plenum. See “IQ 700/900 AIR INTAKE REMOVAL” on page 12.7.
2. Remove the drive belt.
3. Bleed the fuel rail. See “FUEL RAIL BLEEDING” on page 5.4.
4. Remove the seat and fuel tank. See “IQ RMK SEAT REMOVAL/INSTALLATION” on page 12.4.
5. Remove the engine. See “700/900 LIBERTY ENGINE REMOVAL” on page 6.6.
6. Replace the injectors.
7. Install engine. See “700/900 LIBERTY ENGINE INSTALLATION” on page 6.8.
8. Re-flash ECU with Digital Wrench.
9. Test run.

## THROTTLE BODY

### SETTING THE THROTTLE BODY TPS

The throttle body has two settings that need to be meet. The first is the base line and then the idle voltage.

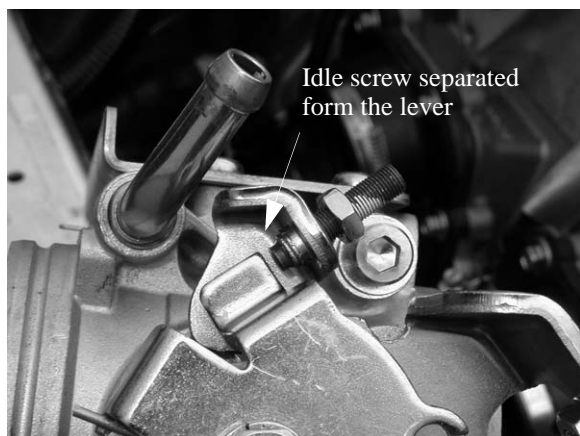
### SETTING THE BASE LINE VOLTAGE

You can perform this with the throttle body removed or in the machine. It is easier to set the base line voltage with the throttle body removed. See “THROTTLE BODY REMOVAL” on page 5.6.

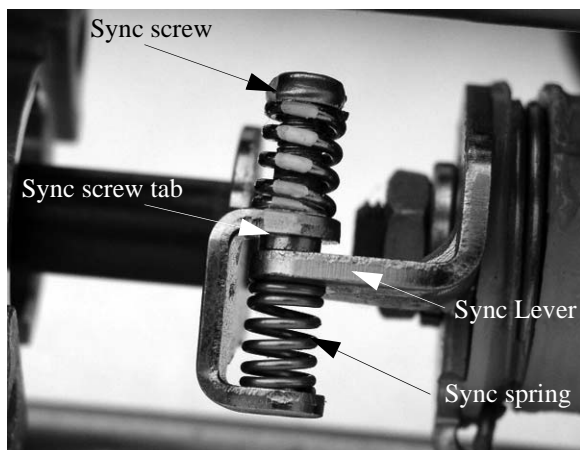
1. Remove the drive clutch to gain access to the oil cable lock nut.
2. Disconnect the TPS harness.
3. Loosen the oil cable lock nut and remove the oil cable from the throttle body.
4. Remove the throttle cable from the throttle body.
5. Back off the idle lock nut and back out the idle screw until



the tip separates from the lever tab.

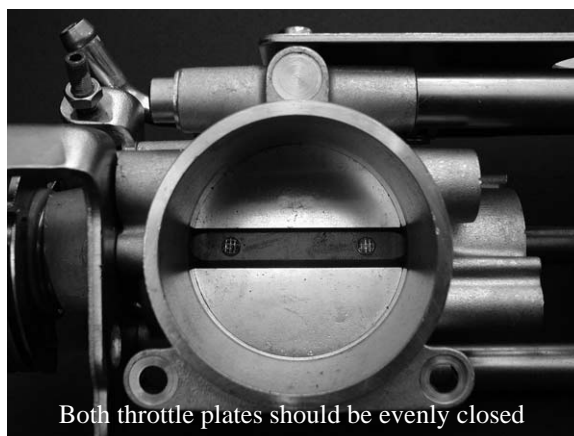


6. Turn the synchronization screw out (counterclockwise) until the synchronization lever is touching the synchronization screw tab. You do not need to remove the synchronization screw.



7. Carefully remove the synchronization spring from the throttle body. Place a shop towel around the spring area to keep from losing the spring. You may even thread a thin wire around the spring.
8. Gently open and close the throttle plates with the throttle

lever. Make sure that both throttle plates are full closed.



9. Connect the TPS tool. Make sure it is set up correctly before it is connected. See "TPS SET UP" on page 13.16.

**NOTE: Note the voltage at this point.**



10. If you are replacing the TPS sensor, set the TPS so that it reads around the .700 voltage range.
11. Tighten the TPS screws into place.
12. Insert the synchronization spring.
13. Turn the synchronization screw clockwise until your meter read .710 volts.
14. Turn the idle set screw until the meter reads the correct voltage for your elevation. See Table 5-4 for voltage.



15. Lock the idle set screw lock nut.



16. Voltage should stay the setting you set it at in step 14.

## SETTING THE IDLE VOLTAGE

The idle voltage needs to be set for the given elevation that the unit is to be run at.

**Table 5-4: Idle Voltage for Elevation**

<b>ALTITUDE (Meters/Feet)</b>	<b>Voltage (+/- .01v)</b>
0-1800 (0-6000)	0.93
1800-2700 (6000-9000)	0.95
Above 2700 Above (9000)	0.97

1. Disconnect the TPS on the throttle body.
2. Hook up the TPS tester (PN 2201519) to the throttle body.
3. Turn your meter to read VDC.
4. the reading that you see is the current setting.
5. if you need to adjust this setting for elevation, un lock the idle lock nut.
6. Slowly turn the idle screw clockwise to increase the idle voltage, and counterclockwise to decrease the idle voltage.
7. When you have the desired setting, lock the idle set screw.

## THROTTLE BODY REMOVAL

1. Remove Plenum and Boost Box, see “IQ 700/900 AIR INTAKE REMOVAL” on page 12.7.
2. Remove the Exhaust system, see “EXHAUST REMOVAL” on page 3.16.

3. Remove the drive clutch.
4. Loosen the throttle cable lock nut and remove cable from throttle body.
5. Loosen the oil cable lock nut and remove the cable from the throttle body.
6. Remove the coolant lines from the throttle body.
7. Disconnect the TPS connection and remove the cable tie from the TPS housing.
8. Loosen the boot clamps and remove the throttle body from the engine.
9. Separate the throttle body from the intake boots.
10. Remove the throttle body from the engine.

## FUEL FILTER

### FUEL FILTER REMOVAL

1. Carefully unsnap the fuel filter from the bracket. Be careful to pull on the upper hose if the fuel filter is going to be reused.
2. Remove the fuel line clip. See “FUEL CLIP REMOVAL” on page 12.3.
3. Using the 3/8” fuel line disconnection tool to remove the fuel line from the fuel filter.
4. Remove the fuel filter.

### FUEL FILTER INSTALLATION

1. Dip the male end of the fuel filter line in 30w engine oil.
2. Snap the male end into the fuel line.
3. Snap the filter into the fuel filter holder.



# CHAPTER 6

## ENGINE

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## GENERAL ENGINE INFORMATION

### EXHAUST VALVE REMOVAL



#### 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.

1. Remove the exhaust pipe.
2. Remove the fasteners and hardware that hold on the exhaust valve cap.



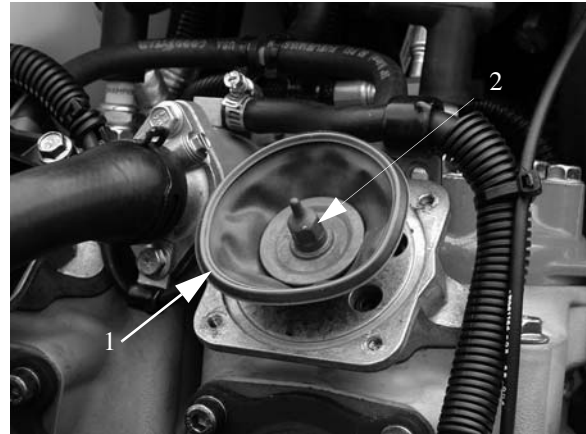
#### CAUTION

Exhaust valve cover is under spring pressure. Hold the cover in place until all bolts are removed.

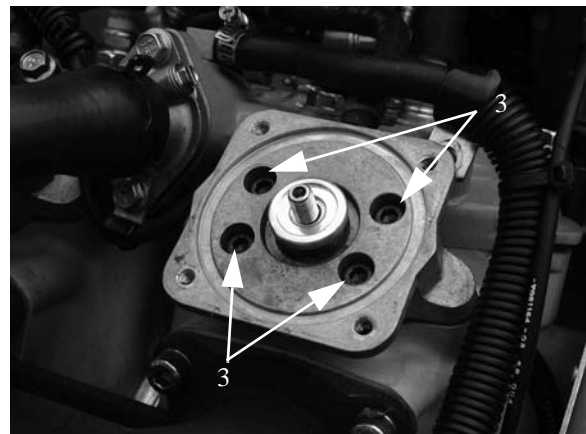
3. Remove the cap.



4. Fold the bellows up and remove the spring (1) and bellows nut (2) from the guillotine.



5. Remove the bellows and the washer that is located under the bellows.
6. Remove the four fasteners (3) holding on the exhaust valve base.



7. Remove the base and base gasket.



8. Remove the exhaust valve guillotine (4).
9. Clean base and the guillotine with carbon clean.



10. Remove any gasket material from the base mating surface on the cylinder.

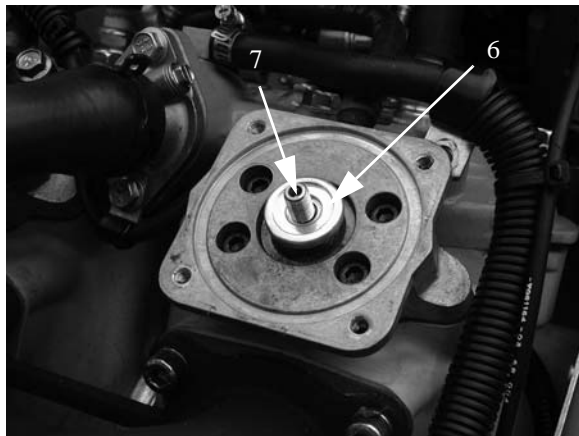
## EXHAUST VALVE INSTALLATION

1. Place a new gasket on the valve base.
2. Place the guillotine in to the cylinder.

**IMPORTANT:** The guillotine is orientated into the cylinder so that the larger shoulder (5) is located at the bottom and matches the cylinder area.

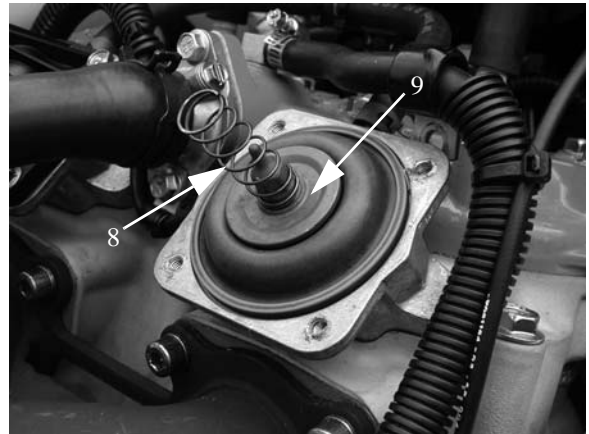


3. Install the base so that the solenoid vent line is facing upward
4. Insert the base bolts and torque to 144 in-lb (16Nm).
5. Place the solenoid vent line onto the base.
6. Place the bellows washer (6) onto the guillotine shaft.



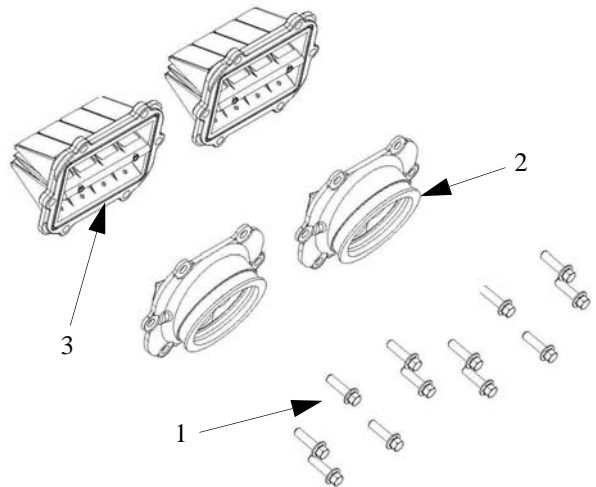
7. Apply Loctite 242 to the threads of the guillotine shaft (7) and torque the bellows nut to 144in-lb (16Nm).
8. Insert spring (8) onto the bellows nut (9).
9. Place cover and hardware on to the base and torque the

fasteners to 108 in-lb (12Nm).



## REED VALVE DISASSEMBLY

**NOTE:** Reeds should be cleaned if belt failure occurs or if plenum damage is present after a belt failure.



1. Remove the carburetors or the throttle body. Throttle body, See "THROTTLE BODY REMOVAL" on page 5.6
2. Remove the intake boot fasteners (1).
3. Remove the throttle body adapters (2).
4. Remove the reed stuffer if they are used.
5. Remove the reeds (3).

**NOTE:** Measure the air gap between the fiber reed and the reed block. The air gap should not exceed .015"(.38mm). If clearance is excessive DO NOT attempt to reverse the reeds to reduce the air gap. Always replace them if damaged or worn. Check each fiber reed for white stress marks or missing material.



## REED VALVE ASSEMBLY

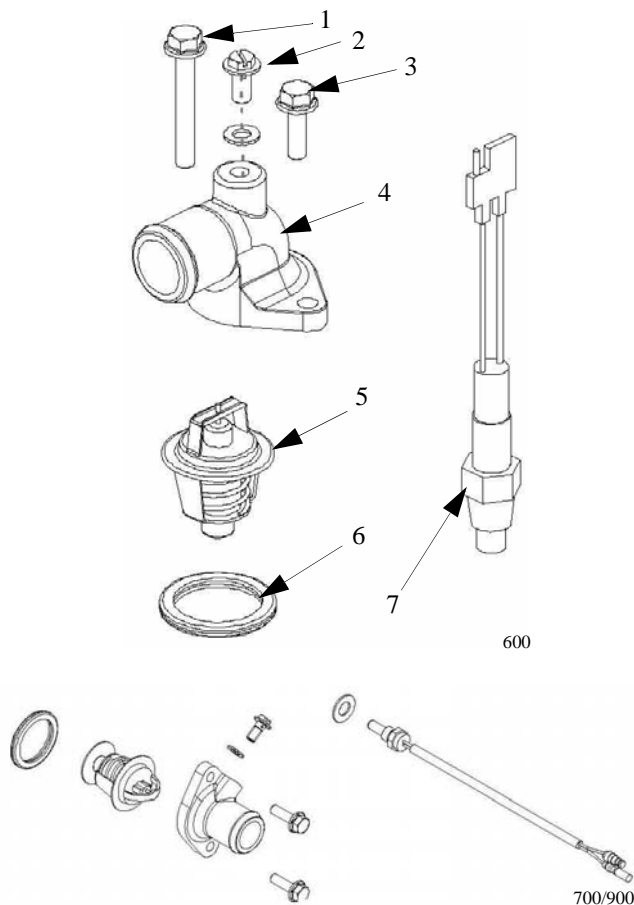
1. Place the reeds (3) and throttle body adapters (2) onto the engine case.
2. Torque the throttle body adapter fasteners (1) to 108 in-lb (12Nm).

## EXHAUST VALVE SPRINGS

**Table 6-1: Exhaust Valve Springs**

SPRING #	COLOR	FREE LENGTH
7041704-01	Blue	1.752
7041704-02	Orange	1.729
7041704-03	Pink	1.734
7041704-04	Purple	1.726
7041704-05	Yellow	1.734
7041704-06	White	1.537

## THERMOSTAT REPLACEMENT



1. Remove the thermostat cover, by removing the cover bolts.
2. Check the o-ring condition and replace it if it is cracked or pinched.
3. Replace the thermostat. Make sure that the spring side is facing downward.
4. Replace cover onto the thermostat and install the longer cover fastener on the intake side of the engine. Place the shorter fastener on the exhaust side of the cover.
5. Torque the fasteners to 9 ft-lb (12Nm).
6. Make sure that the bleed screw and washer is installed.

## WATER TEMPERATURE SENSOR REPLACEMENT

1. Remove the sensor.
2. Replace the sensor and apply Loctite 242 to the threads and torque to 30 ft-lb (40Nm).



## **700/900 ENGINE**

### **700/900 TORQUE SPECIFICATIONS**

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

The most common units of torque in the English system are ft-lb (foot pounds) and in-lb (inch pounds). In the Metric system, torque is commonly expressed in units of Nm (Newton Meter).

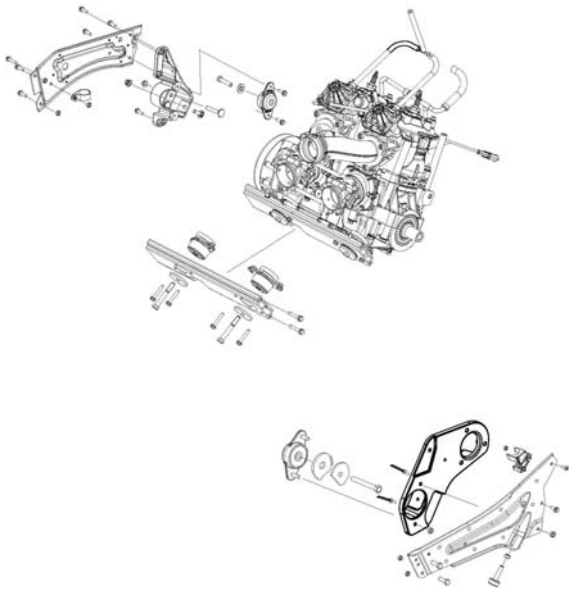
**Table 6-2:**

ENGINE	700/900
SPARK PLUG	18 ft-lb (24Nm)
CYLINDER HEAD	27ft-lb (37Nm) <sup>1,3</sup>
BLEEDER SCREW	48 in-lb (4.5Nm)
THERMOSTAT HOUSING	108 in-lb (12Nm)
WATER TEMPERATURE SENSOR	216 in-lb (24Nm) <sup>2</sup>
WATER INLET PIPE	N/A
DETIONATION SENSOR	168 in-lb(19Nm)
CYLINDER BASE NUTS	40 ft-lb (54Nm) <sup>3</sup>
EXHAUST VALVE COVER BOLTS	108 in-lb (12Nm)
EXHAUST VALVE NUT	144 in-lb (16Nm) <sup>1</sup>
EXHAUST MANIFOLD BOLTS	22 ft-lb (30Nm)
CARB ADAPTER BOLTS	108 in-lb (12Nm)
OIL PUMP MOUNTING BOLTS	7 ft-lb (9Nm)
CRANKCASE PLUGS	75 in-lb (8.5Nm)
WATER PUMP IMPELLER NUT	120 in-lb (14Nm)
WATER PUMP COVER BOLTS	108 in-lb (12Nm)
CRANKCASE 6mm	N/A
CRANKCASE 8mm	25ft-lb (34Nm) <sup>1,3</sup>
CRANKCASE 10mm	28 ft-lb (38Nm) <sup>1,3</sup>
ENGINE STRAP to CHASSIS NUT	22ft-lb (30Nm)
ENGINE STRAP to ENGINE BOLT	25ft-lb (34Nm)
STATOR BOLTS	144 in-lb (16Nm) <sup>1</sup>
TRIGGER COIL BOLTS	48 in-lb (5Nm)
FLYWHEEL	90ft-lb (122Nm) <sup>1</sup>
RECOIL CUP BOLTS	108 in-lb (12Nm)
RECOIL COVER COLTS	108 in-lb (12Nm)
DRIVE CLUTCH BOLT	96 ft-lb (130Nm)
7/16" ENGINE MOUNT STRAP BOLTS	N/A
REAR MOTOR MOUNTS BRACKET	29 ft-lb (39Nm)
FRONT MOTOR MOUNT PLATE	22 ft-lb (30Nm)

<sup>1</sup> =Apply Loctite 242 to threads of bolt.

<sup>2</sup>= Apply Pipe sealant to threads.

<sup>3</sup>= See torque sequence.



## 700/900 LIBERTY ENGINE REMOVAL

**NOTE:** Inspect all parts for wear or damage during disassembly. Replace all seals, o-rings, and gaskets with Genuine Pure Polaris parts during assembly. Refer to the ‘INSPECTONS’ on page 3.5 for general inspection procedures.

**NOTE:** Make a note of the orientation and placement of every wire tie, hose clamp and spring clamp during engine removal.



**CAUTION**

Wear eye protection to prevent eye injury.

1. Remove the side panels.
2. Disconnect battery ground (-) if applicable.
3. Remove the plenum and boost box. ‘IQ 700/900 AIR INTAKE REMOVAL’ on page 12.7
4. Remove the belt. ‘DRIVE BELT REMOVAL WITH TEAM CLUTCH’ on page 7.5.
5. Remove the exhaust system. ‘EXHAUST REMOVAL’ on page 3.16
6. Remove the drive and driven clutches. ‘DRIVE CLUTCH REMOVAL’ on page 7.10 and ‘DRIVEN CLUTCH REMOVAL’ on page 7.20
7. Drain coolant. (Drain the coolant, by disconnecting the hose to the thermostat and apply air pressure to the thermostat side while holding the disconnected hose into a container).

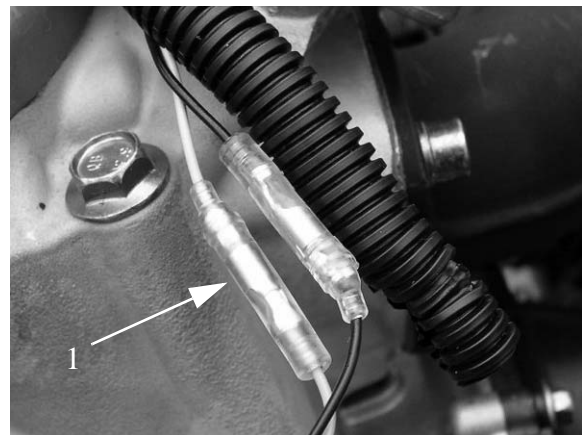
8. Remove the seat. ‘SEAT and FUEL TANK’ on page 12.4
9. Remove the fuel tank. ‘IQ FUEL TANK REMOVAL’ on page 12.5
10. Remove both fender plugs to access the fasteners for the side braces.

**NOTE:** Keep track of the orientation and placement of all fasteners, and cable ties.

11. Remove the left hand side brace and fuel filter.
12. Remove the right hand brace. The middle front fastener has the hose guide.
13. Remove the two fasteners that hold the oil tank on the chassis.
14. Drain the oil from the oil tank.
15. Remove the center shaft oil supply line from the oil tank.
16. Remove the fasteners that hold the coolant/oil tank onto the chassis.
17. Remove the coolant bottle. ‘COOLANT TANK REMOVAL’ on page 12.3
18. Remove the oil tank. ‘OIL TANK REMOVAL’ on page 12.3
19. Disconnect the exhaust valve hose from the base of the exhaust valve base, and secure them out of the way.
20. Loosen the throttle adjustment lock nut and remove throttle cable from the throttle body.
21. Disconnect the throttle cable from the throttle body.
22. Remove the coolant line that goes to the coolant bottle.

**NOTE:** You may remove the throttle body at this time or when it is out of the chassis. See ‘THROTTLE BODY REMOVAL’ on page 5.6

23. Disconnect the water temperature sensor connection (1) from the harness, and move this harness out of the way. The water temperature connectors are located in the convoluted tubing near the cylinder base.



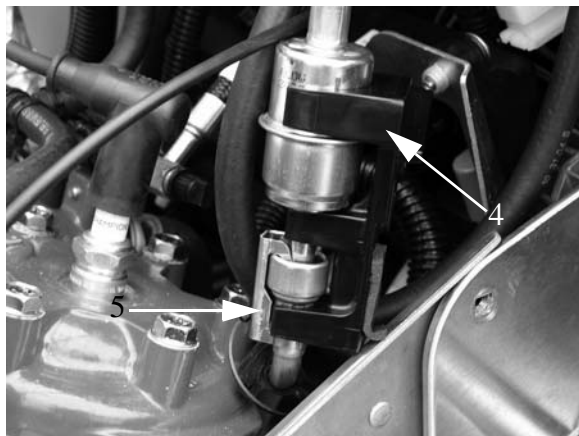
24. Remove the cable tie (2) that holds the TPS and water sensor wires to the stator harness.
25. Disconnect the 4 fuel injector connectors (3) from the



wiring harness located under the ECU area. Each injector should be labeled.

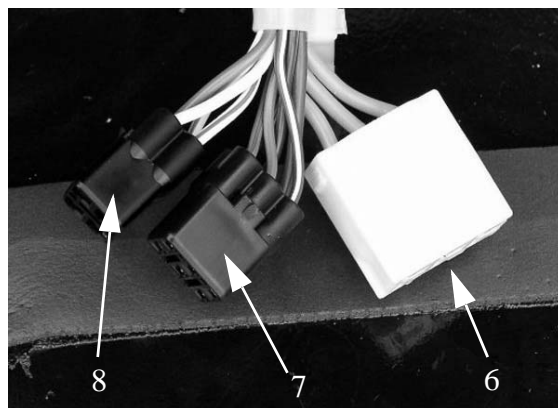


26. Locate the fuel filter and remove the filter bracket (4), to make room to remove the fuel line clip (5).

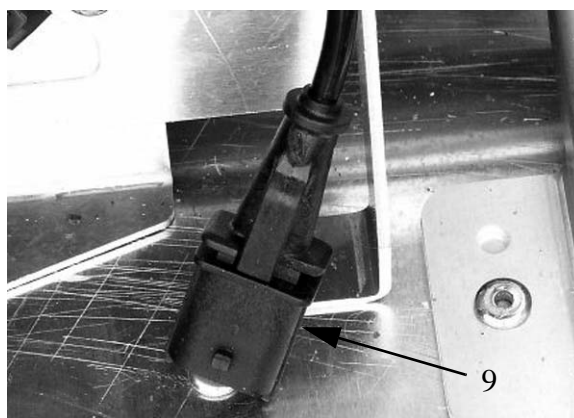


27. Remove the 3/8" fuel clip from the line and remove the fuel filter. The supply line will stay with the engine. 'FUEL CLIP REMOVAL' on page 12.3
28. Remove the fuel filter.
29. Disconnect the Regulator Rectifier (6) (yellow wires) connector.
30. Disconnect the Stator Coil connector (7).

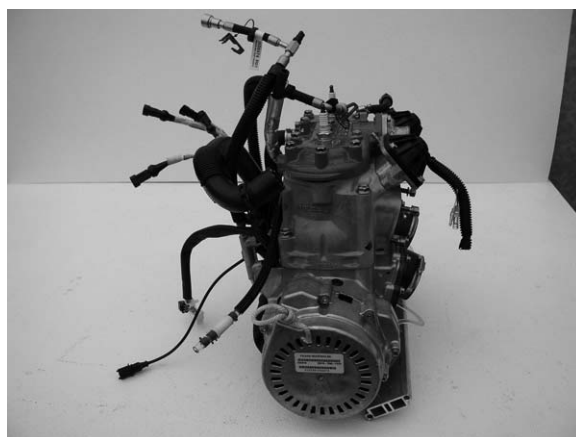
31. Disconnect the Crank Position Sensor connector (8).



32. Disconnect the DET sensor harness (9).



33. Route these connections through the chassis so that they can come out with the engine.
34. Tilt the engine forward and route the rear cooling hoses, oil lines, fuel lines and wiring so that the engine can be removed.
35. Tilt the engine back and remove the two fasteners that hold the front engine mount plate in the chassis.



36. Have an engine lift, lifting with slight pressure on the engine and pull the engine forward to gain access to the



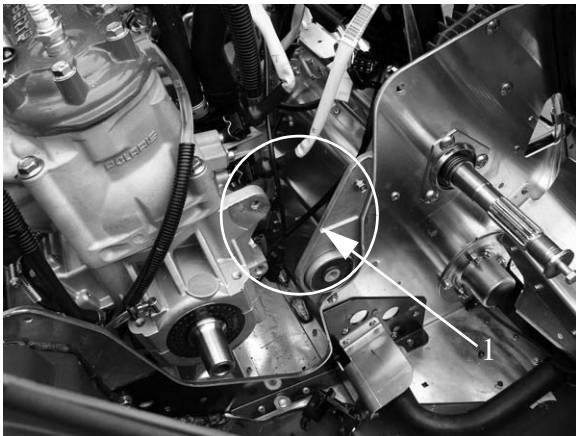
cooling hoses, injectors and harness.

37. Place engine at work station.

## 700/900 LIBERTY ENGINE INSTALLATION

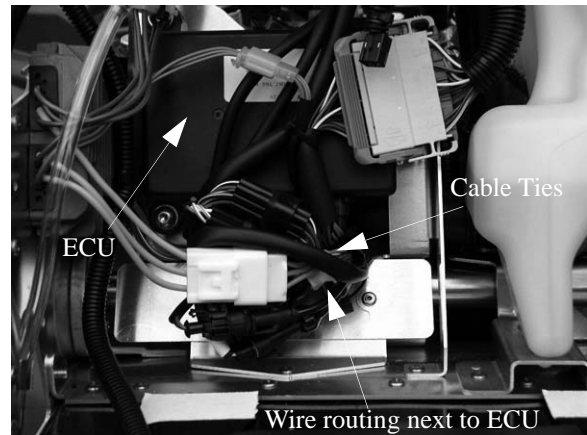
**IMPORTANT: ALL Oil lines should have no air present in the lines.**

1. Make sure that you have everything on the engine as you had when you removed the engine.
2. Carefully lower the engine into the chassis.
3. Align the front motor mount plate so that you can loosely install the top plate fasteners. Do not tighten these at this time.
4. Tilt the engine forward and place a brace (1) between the left rear motor mount and the bulkhead.

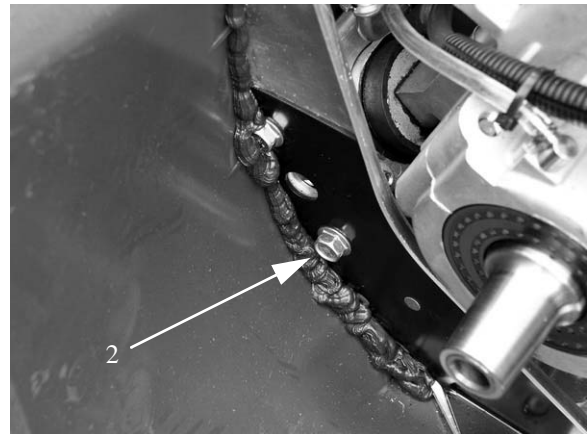


5. Route coolant hoses, oil supply lines, wires and connections around to the appropriate locations.
6. Route the stator wires through the chassis, next to the ECU.
7. Route the DET connection through the chassis, next to the ECU.
8. First route the Mag side injector connectors through the chassis, next to the ECU, then the PTO end injector connectors.
9. Hook up these connectors: PTO injectors, MAG injectors, Stator, CPS. Make sure that the TPS and Water temp sensor wires are routed behind the fuel lines.
10. Insert a new cable tie strap in the holder around these wires.

11. Orientate these connectors like they were as best you can.



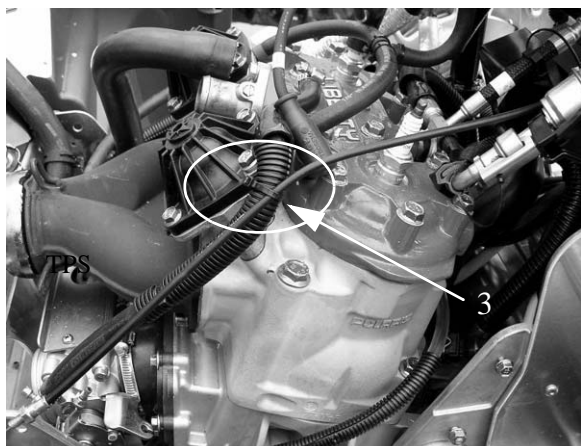
12. Tilt the engine back into the chassis and loosely install both rear engine motor mount fasteners.
13. Install the lower front engine mount plate fasteners (2).



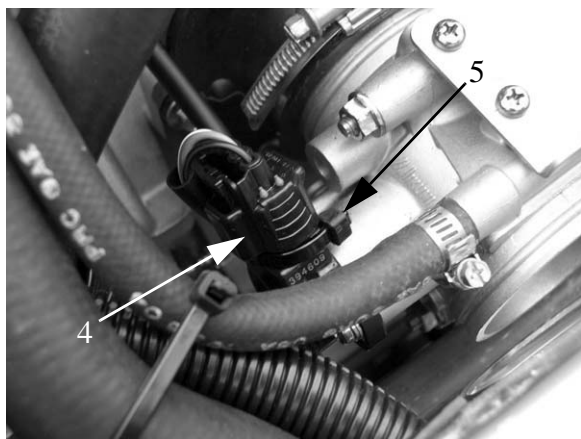
14. Torque the rear engine mounts to 29 ft-lb (39Nm).
15. Torque the front engine mount plate fasteners to 12 ft-lb (16Nm).
16. Insert the throttle and oil cables onto the throttle body assembly.



17. Insert a cable tie (3) around the coolant line and the throttle cable at the top of the coolant line.

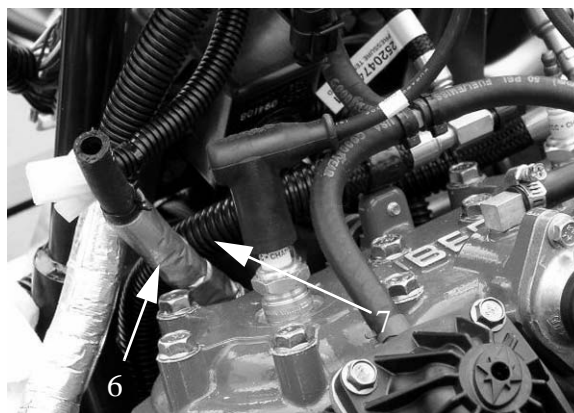


18. Install the throttle body on the intake boots.  
19. Tighten the clamps on the throttle body.  
20. Check oil pump alignment, and adjust to specification if needed. 'OIL PUMP ADJUSTMENT' on page 3.22  
21. Check throttle cable free play, and adjust to specification. 'THROTTLE LEVER FREE PLAY' on page 3.24  
22. Attach the TPS harness (4) to the TPS sensor, and route a cable tie (5) around the base of the sensor and the harness.

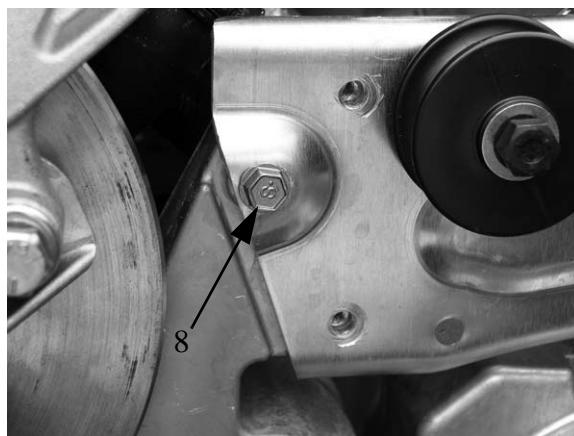


23. Attach the coolant line coming from the head to the right hand side of the throttle body.  
24. Install oil tank. 'OIL TANK INSTALLATION' on page 12.3  
25. Install the coolant bottle. See "COOLANT TANK INSTALLATION" on page 12.3  
26. Hook up the exhaust valve lines back onto the base of the exhaust valve.

27. Orientate the center crankshaft supply line (6) so that it is closer to the engine and the fuel line (7) and the wiring harness away from the engine. This supply line has heat tape on the outside to protect it from heat.



28. Install the fasteners to the oil/coolant bottles.  
29. Install the thermostat hose to the front of the head.  
30. Insert the right hand engine brace by loosely installing the rear center fastener (8) in first. This will enable you to move the brace to center it.



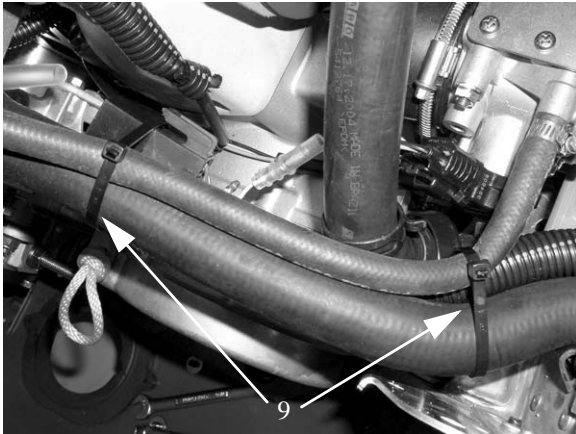
31. Adjust the front of the brace so that the centering rivet is in its place on the brace.  
32. Install the three other fasteners on the front portion of the brace.

**NOTE: The middle front fastener has the hose holder on the back side.**

33. Torque all fasteners to 12 ft-lb (16Nm).  
34. Install the fender plug.



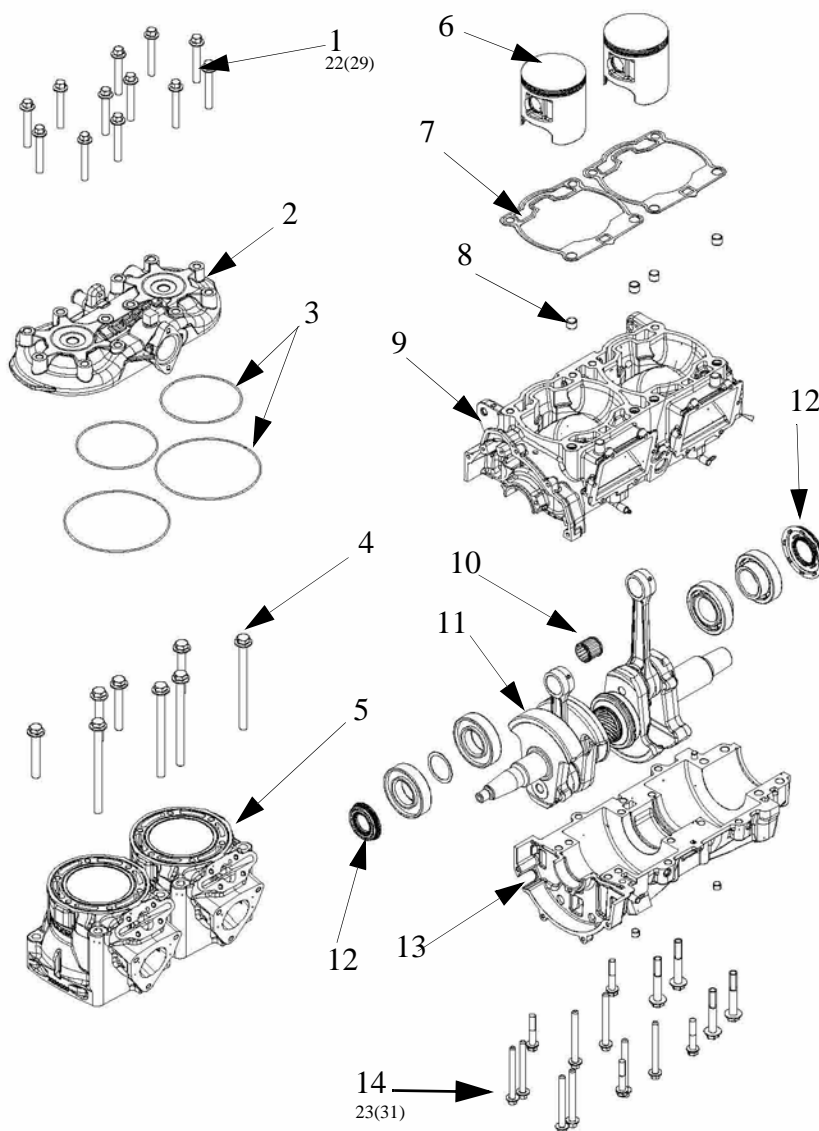
35. Install a cable strap (9) around the coolant lines and the wiring harness at the relay area of the wiring harness and at the shock tower area.



36. Install the left hand brace onto the left side of the bulkhead in the same manner as the right side.
  37. Hook up the fuel filter.
  38. Install the fuel filter bracket
- NOTE: The fuel filter and holder are located on the top rear faster on the brace.**
39. Torque all fasteners to 12 ft-lb (16Nm).
  40. Install the fender plug.
  41. Check engine torque stop and adjust if needed. ‘TORQUE STOP’ on page 3.24
  42. Install exhaust gaskets and header. Torque the header fasteners to 22 ft-lb (30Nm).
  43. Install the boost box to the throttle body.
  44. Tighten the boot clamps.
  45. Hook up the intake air sensor.
  46. Install the fuel tank, and seat. ‘SEAT and FUEL TANK’ on page 12.4
  47. Install the console. ‘IQ CONSOLE REMOVAL / INSTALLATION’ on page 12.6
  48. Route recoil rope through the chassis and install recoil handle.
  49. Install the clutches and belt. ‘DRIVE CLUTCH INSTALLATION’ on page 7.19 or ‘DRIVEN CLUTCH INSTALLATION’ on page 7.20 ‘BELT INSTALLATION (Team Driven Clutch)’ on page 7.5
  50. Install the exhaust system. ‘EXHAUST INSTALLATION’ on page 3.16
  51. Hook up plug wires to spark plugs. Plug wires are labeled.
  52. Install the plenum. ‘IQ 700/900 AIR INTAKE INSTALLATION’ on page 12.7
  53. Install side panels.



## 700/900 ENGINE REBUILDING



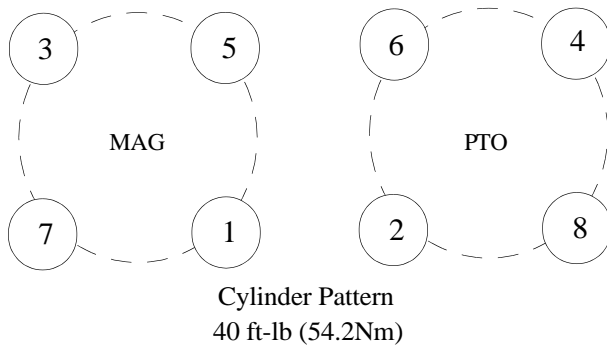
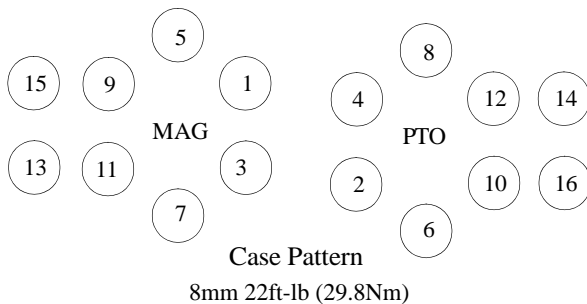
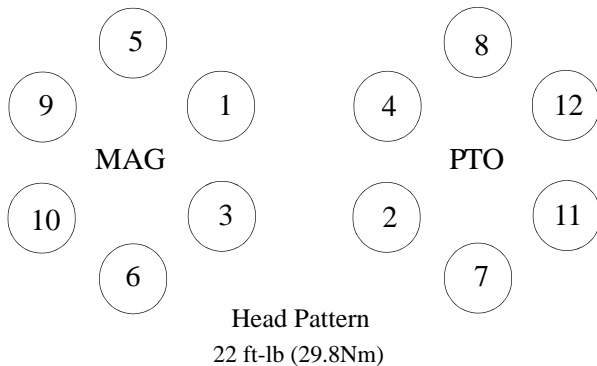
### 700/900 DISASSEMBLY

1. Remove the recoil housing and stator. See “700/900 RECOIL/STATOR DISASSEMBLY” on page 6.14
2. Remove the fuel rail. See “FUEL RAIL/INJECTOR REMOVAL” on page 5.3
3. Remove the throttle body. See “THROTTLE BODY REMOVAL” on page 5.6
4. Remove the reeds. See “REED VALVE DISASSEMBLY” on page 6.3
5. Remove the exhaust valve assembly. ‘EXHAUST VALVE REMOVAL” on page 6.2
6. Remove the head bolts (1).
7. Remove the head (2) and o-rings (3).
8. Remove the cylinder bolts (4).
9. Remove the cylinders (5).
10. Remove the MAG side piston c-clips from the pistons.
11. Remove the piston pins using the piston pin removal/installation tool (PN 2870386).
12. Remove the pistons (6) and pin bearings from the crankshaft.
13. Remove the base gaskets (7).
14. Account for all the cylinder locating pins (8).
15. Remove the oil pump and all oil lines from the crankcases.
16. Flip the engine over and remove the loser case bolts (14).
17. Separate the upper and lower cases (9,13).
18. Remove the crankshaft assembly (11) from the lower case.



19. Refer to the General section for general engine component inspections and measurement procedures.

## 700/900 TORQUE PATTERNS



## 700/900 ASSEMBLY

1. Lubricate all the crankshaft seals (12) with Polaris All Season grease. Make sure that the seals are positioned properly with the lip and spring facing inward toward the center of the crankshaft.
2. Install the crankshaft assembly in the lower crankcase.

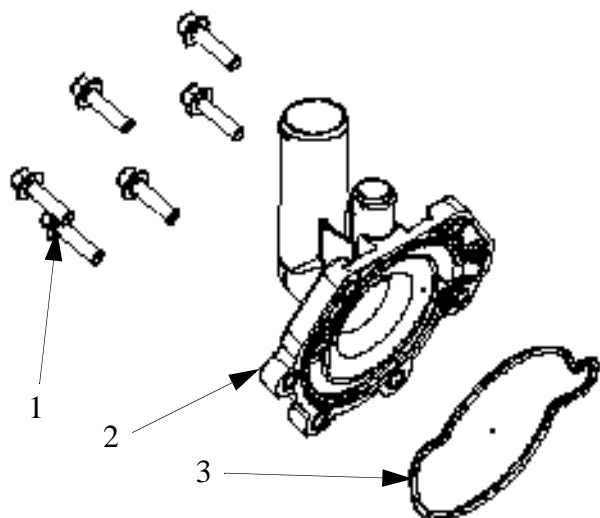
3. Fill in the cross shaft area with engine assembly lubricant (PN 2872435).
  4. Apply a thin bead of 3 Bond 1215 sealant (PN 2871557) to the lower case (13) matting surface.
  5. Assemble the upper case (9) to the lower case (13), making sure that the seals and bearings fit in the locations on the upper case half.
  6. Follow the crankcase bolt torque pattern and torque the lower case bolts to 23 ft-lb (31Nm).
  7. Lubricate the piston pin bearings and the piston pins with Polaris 2 stroke oil and install the piston onto the crankshaft with the piston pin removal/installation tool.
  8. Install new c-clips in the piston grooves with the gap facing correctly, (MAG c-clip in the 10:00 position) or (PTO c-clip in the 2:00 position). Make sure that the c-clip is fully seated in the piston groove.
  9. Install the piston rings onto the piston with the bevel side up and the gap facing the piston ring locating pin.
  10. If old base gaskets are damaged, install new ones.
- NOTE: New base gaskets have a rib that faces upward.**
11. Lubricate the cylinders and pistons with Polaris 2 stroke oil and install the cylinders onto the pistons by squeezing the piston rings onto the locating pins in the piston ring groove, rock the cylinder gently back and forth until the cylinder can be installed onto the upper case matting surface.
  12. Install the cylinder base bolts and torque to 34 ft-lb (46Nm) in the sequence found on page 6.12.
  13. Install new head o-rings if the old ones are damaged.
  14. Install the head onto the cylinders.
  15. Torque the head bolts to 22 ft-lb (29Nm) in the sequence found on page 6.12.
  16. Install water pump cover.
  17. Install the reeds. See "REED VALVE ASSEMBLY" on page 6.4.
  18. Install the fuel rail. See "FUEL RAIL/INJECTOR REMOVAL" on page 5.3.
  19. Assemble the recoil/stator. See "700/900 RECOIL/STATOR ASSEMBLY" on page 6.14.
  20. Install the front motor mount, and torque the fasteners to 25 ft-lb (34Nm).

## 700/900 WATER/OIL PUMP CROSS SHAFT DISASSEMBLY

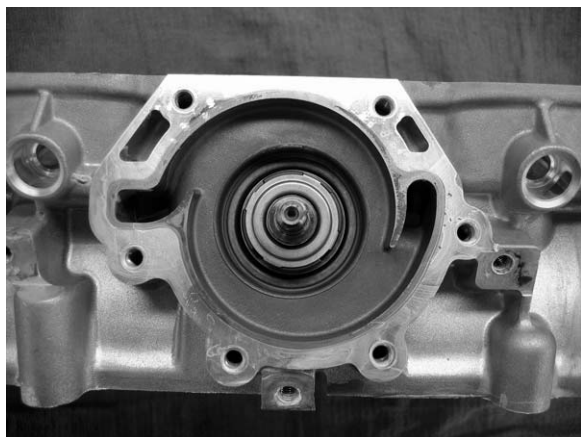
1. Remove the water pump cover bolts (1)



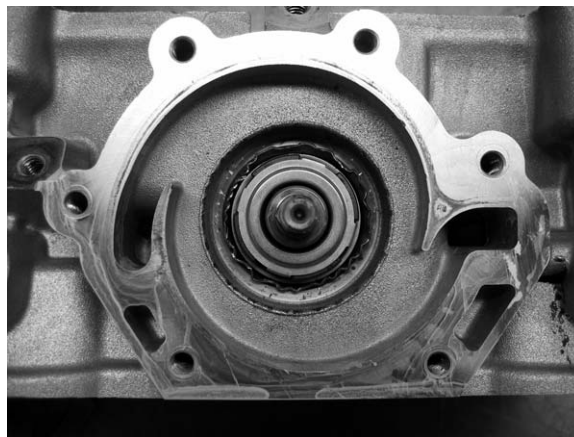
2. Remove the water pump cover (2) and gasket (3).



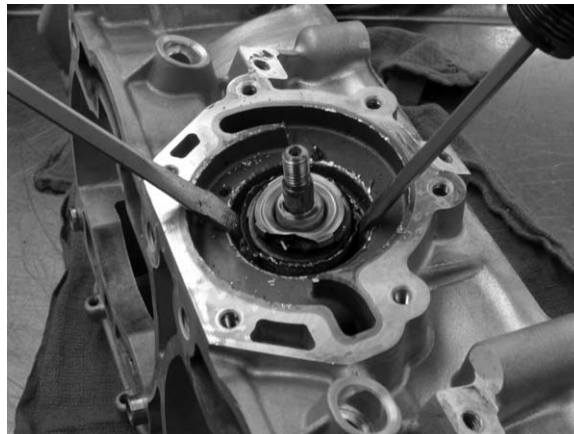
3. Remove the impeller nut and washer.
4. Remove the impeller.



5. With two flat head screw drivers pry the water pump seal out by lifting up on the seal flange. This will crush the flange upward.



6. Pry the mechanical seal out of the case.



**NOTE: You will destroy the oil seal when you remove it from the case. You will also mar up the case while you are removing the mechanical seal. This seal can not be reused.**

7. Remove the oil seal by screwing in a screw into the oil seal and pulling it out of the case.



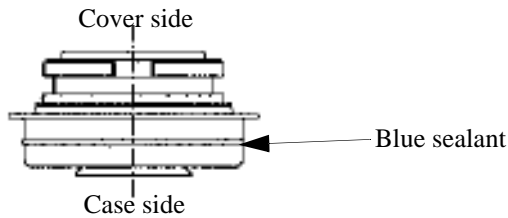


8. Remove the snap ring from the case.
9. Remove the cross shaft and bearings.

## 700/900 WATER/OIL PUMP CROSS SHAFT ASSEMBLY

**NOTE:** Cross shaft assembly (PN) comes with the shaft, gear, seal, snap ring, mechanical seal.

1. Insert the cross shaft and bearings into the crankcase.
2. Install the snap ring into the groove in the crankcase.
3. Press in the oil seal into the crankcase.
4. Place the mechanical seal onto the cross shaft so that the blue sealant is facing the crankcase.



5. Press the mechanical seal into the case with the seal installation tool (PN PW-46986).



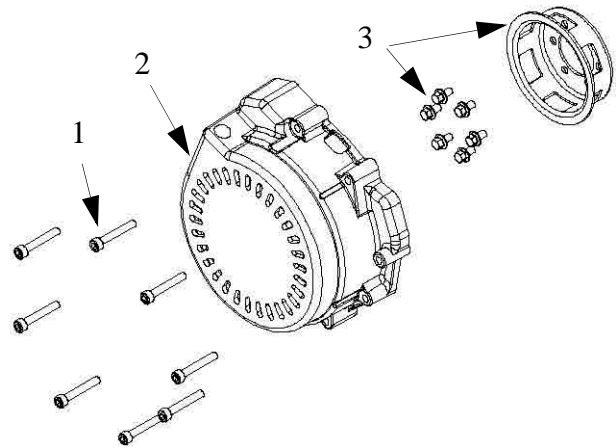
### WARNING

Do not use a hammer to press in the mechanical seal or damage to the seal will occur. The mechanical seal needs to be pressed in with an arbor press and installation tool. The installation tool will set the mechanical seal at a pre-determined installation height for correct operation.

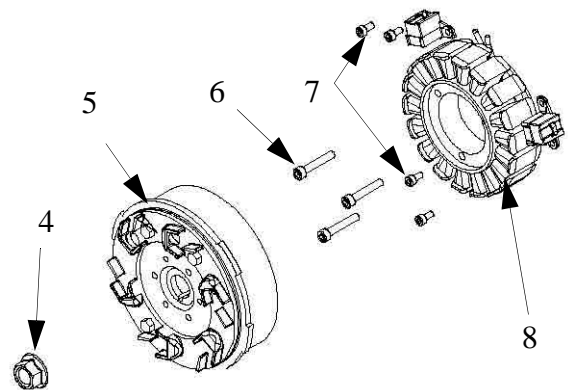
6. Install the impeller, washer, and nut.
7. Torque the impeller nut to 120 in-lb (14Nm).
8. Place o-ring, and cover on to the upper case.
9. Torque the cover fasteners to 108 in-lb (12Nm).

## 700/900 RECOIL/STATOR DISASSEMBLY

1. Remove the recoil housing fasteners (1).



2. Separate the housing (2) from the engine. Service the recoil at this point if needed.
3. Remove the recoil basket fasteners (3) and remove the recoil basket from the flywheel.
4. Remove the flywheel nut (4).



5. Hold the flywheel (5) with holding tool (PN 8700229).
6. Place the flywheel puller tool (PN 2871043) onto the flywheel and remove the flywheel.
7. Remove the wire keeper darts from the case.
8. Remove the fasteners from the stator pick ups (7).
9. Remove the stator fasteners (6) from the stator (8).
10. Remove the stator from the crankcase.

## 700/900 RECOIL/STATOR ASSEMBLY

1. Replace the stator wires through the crankcase.
2. Replace the plastic wire keeper darts into the case so that they hold the harness in place.
3. Replace the stator bolts and torque them to 144 in-lb (16Nm).
4. Replace the stator pick up fasteners and torque them to 48 in-lb (5.4Nm).



5. Replace the flywheel onto the crankshaft end and hold the flywheel with the holding tool (PN 8700229).
6. Torque the flywheel holding nut to 90 ft-lb(122Nm).
7. Replace the recoil basket fasteners to 108 in-lb (12Nm).
8. Replace the recoil housing.
9. Torque the recoil housing fasteners to 108 in-lb (12Nm).

## 500/600 HO ENGINE

### 500/600 HO TORQUE SPECIFICATIONS

Table 6-3:

ENGINE	500/600/600HO
SPARK PLUG	18 ft-lb (24Nm)
CYLINDER HEAD	22ft-lb (30Nm) <sup>1,3</sup>
BLEEDER SCREW	70 in-lb (8Nm)
THERMOSTAT HOUSING	9 ft-lb (12Nm)
WATER TEMPERATURE SENSOR	18-40ft-lb (24-54Nm) <sup>2</sup>
WATER INLET PIPE	75ft-lb (102Nm) <sup>2</sup>
DETIONATION SENSOR	168 in-lb(19Nm)
CYLINDER BASE NUTS	32 ft-lb (43Nm) <sup>3</sup>
EXHAUST VALVE COVER BOLTS	12 ft-lb (16Nm)
EXHAUST VALVE NUT	144 in-lb (16Nm) <sup>1</sup>
EXHAUST MANIFOLD BOLTS	22 ft-lb (30Nm)
CARB ADAPTER BOLTS	108 in-lb (12Nm)
OIL PUMP MOUNTING BOLTS	7 ft-lb (9Nm)
CRANCASE PLUGS	10ft-lb (14Nm) <sup>2</sup>
WATER PUMP IMPELLER NUT	120 in-lb (14Nm)
WATER PUMP COVER BOLTS	108 in-lb (12Nm)
CRANKCASE 6mm	9ft-lb (12Nm) <sup>1,3</sup>
CRANKCASE 8mm	22ft-lb (30Nm) <sup>1,3</sup>
CRANKCASE 10mm	N/A
ENGINE STRAP to CHASSIS NUT	18ft-lb (24Nm)
ENGINE STRAP to ENGINE BOLT	45 ft-lb (61Nm)
STATOR BOLTS	60 in-lb(7Nm) <sup>1</sup>
TRIGGER COIL BOLTS	48 in-lb (5Nm)
FLYWHEEL	90ft-lb (122Nm) <sup>1</sup>
RECOIL CUP BOLTS	108 in-lb (12Nm)
RECOIL COVER COLTS	108 in-lb (12Nm)
DRIVE CLUTCH BOLT	50 ft-lb(68Nm)
7/16" ENGINE MOUNT STRAP BOLTS	45 ft-lb (61Nm)
REAR MOTOR MOUNTS BRACKET	29 ft-lb (39Nm)
FRONT MOTOR MOUNT PLATE	N/A

<sup>1</sup> =Apply Loctite 242 to threads of bolt.

<sup>2</sup>= Apply Pipe sealant to threads.

<sup>3</sup>= See torque sequence.

## 600 HO IQ ENGINE REMOVAL

**NOTE: Inspect all parts for wear or damage during disassembly. Replace all seals, o-rings, and gaskets with Genuine Pure Polaris parts during assembly. Refer to the 'INSPECTONS' on page 3.5 for general inspection procedures.**

1. Remove the side panels.
2. Disconnect battery ground (-) if applicable.
3. Turn the fuel valve to the "OFF" position (1).



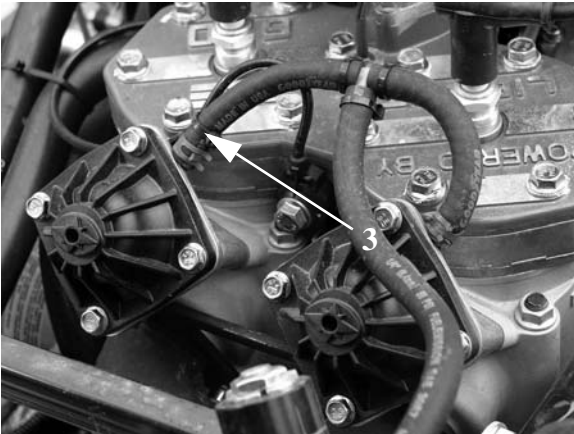
4. Remove the exhaust system. See "EXHAUST REMOVAL" on page 3.16
5. Disconnect the CDI box and harness from the air box.
6. Pull up the air box and disconnect the vent lines and coil connections.
7. Remove the spark plug caps from the spark plugs.
8. Remove the air box.
9. Remove the recoil handle and secure the recoil rope (2).



10. Remove the drive belt, driven clutch and drive clutch. "DRIVE CLUTCH REMOVAL" on page 7.10 and "DRIVEN CLUTCH REMOVAL" on page 7.20.



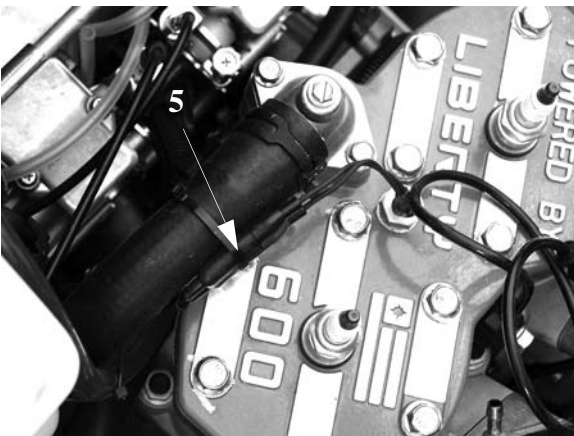
11. Remove the cable tie (3) that secures the DET wire to the exhaust valve vent line.



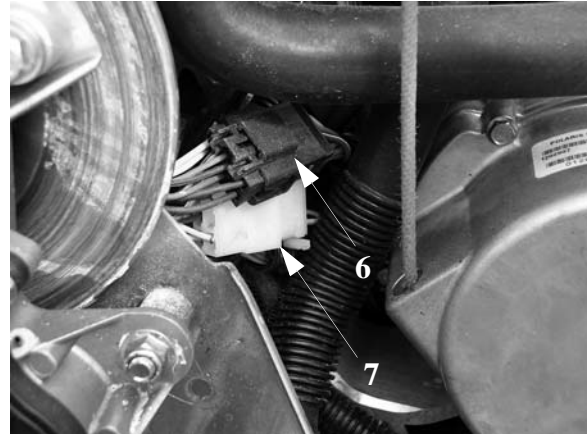
12. Squeeze the vent line clamps and remove the exhaust valve vent lines from the top of the exhaust valve base.
13. Disconnect the DET connections (4) that is located above the carburetors and intake boots.



14. Remove the cable tie holding the water temperature sensor to the thermostat hose and disconnect the water temperature sensor (5).



15. Disconnect the throttle position sensor (TPS) from the carburetor.
16. Disconnect the Regulator Rectifier (6) and the Stator connections (7). These are located behind the brake disc area.



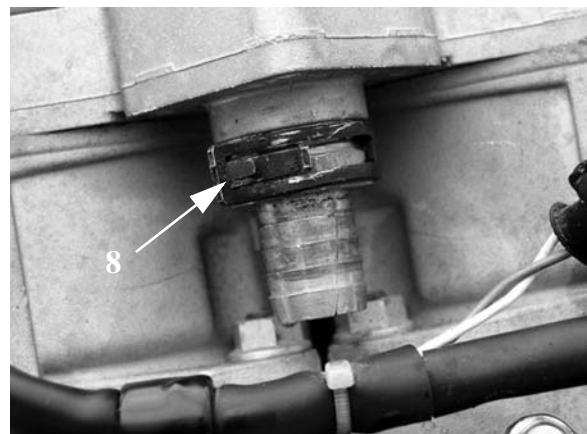
17. Loosen up the boot clamps that hold the carburetor onto the intake.
18. Separate the carburetors from the engine.
19. Disconnect the oil supply lines from the carburetor and secure the carburetor assembly out of the way.

**NOTE: Plug the carburetor areas with a clean shop towel to keep any debris from entering the carburetors.**

20. Drain the engine coolant.

**NOTE: Disconnect the thermostat hose (5) and place the end into a container. Compress air in to the system through the thermostat and coolant should come out of the hose.**

21. Move the thermostat hose clamp up onto the shoulder of the thermostat fitting (8). Remove the hose and secure it out of the way.





22. Move the hose clamp (9) and remove this front radiator hose from the coolant bottle, and secure it out of the way.



23. Remove the coolant supply hose that is located at the bottom of the coolant bottle and secure it out of the way. This will come out with the engine.
24. Remove the rear (10) and left (11) motor mounts located on the right hand side of the engine.

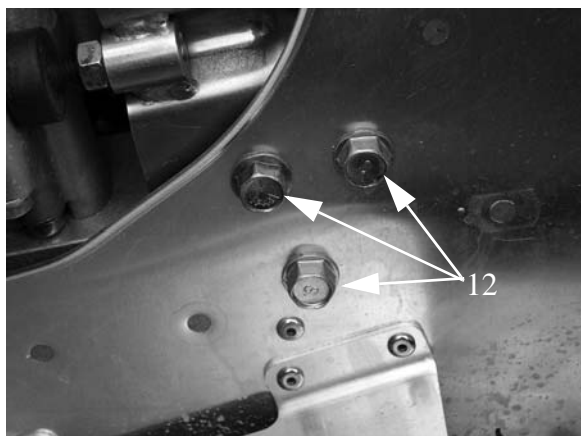


RH Rear

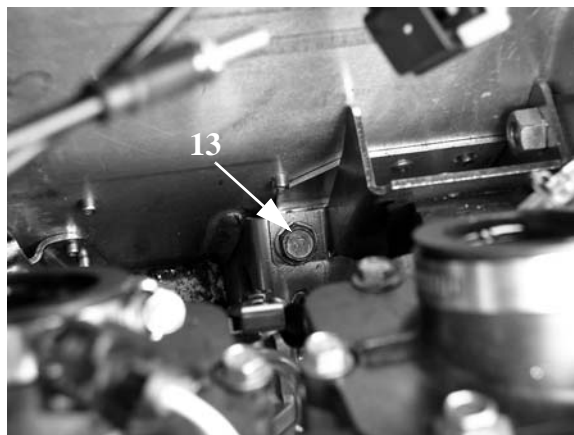


RH Front

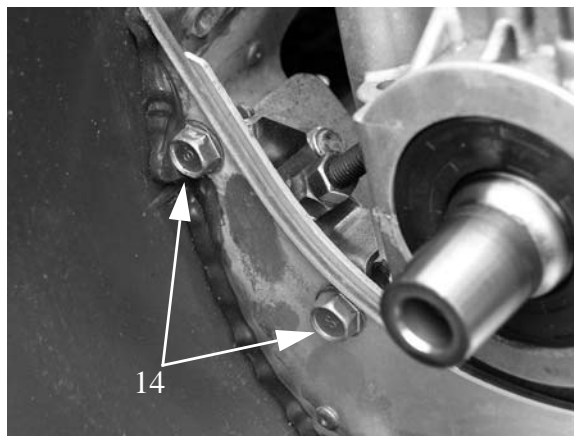
25. Remove the left hand rear torque stop fasteners (12)



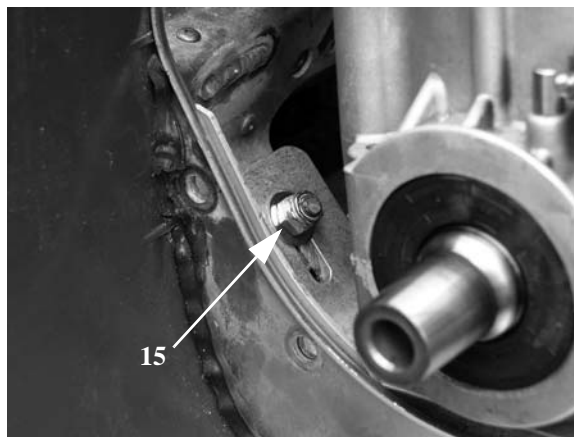
26. Remove the inside motor mount fastener (13), located under the PTO carburetor boot.



27. Remove the rear torque stop plate.
28. Remove the front left hand torque stop assembly fasteners (14) and then remove the torque stop assembly.

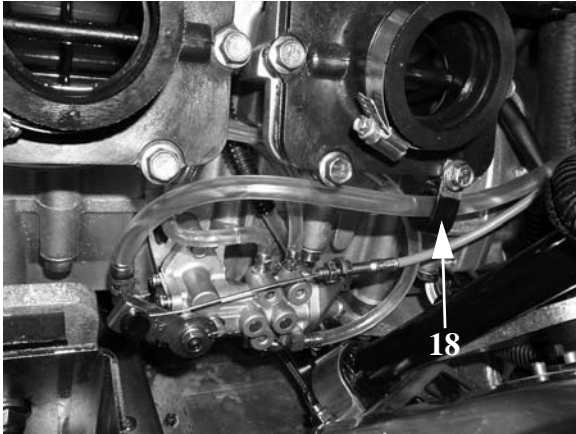


29. Remove the LH front motor mount nylock nut (15) and washer.

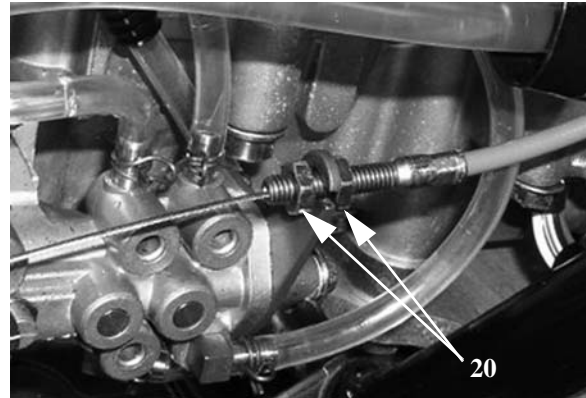




30. Remove the LH nose pan plug located on the nose pan next to the shock tower. This will allow access to the front fasteners for the LH chassis brace.
31. Remove and plug the oil supply line going to the oil pump, and route it through the guide (18).

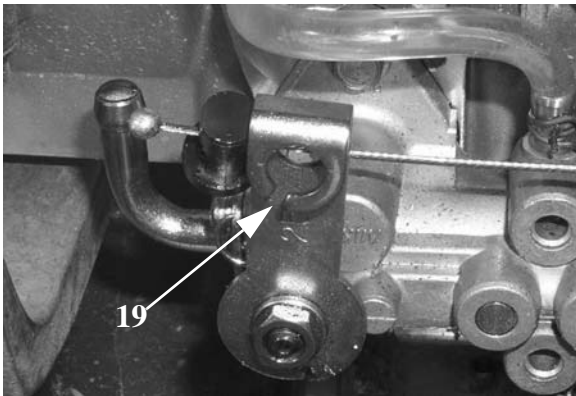


35. Remove the cable from the engine. Loosen up the lock nuts (20).



36. Remove the engine from the chassis.

32. Lift the front of the engine up and then tilt the rear so that the engine straps clear the motor mount studs.
33. Carefully place the engine on top of the shock tower brace.
34. Remove the oil cable from the oil pump lever by holding the pump open and rotating the cable and keeper to the slot (19) in the pump arm.



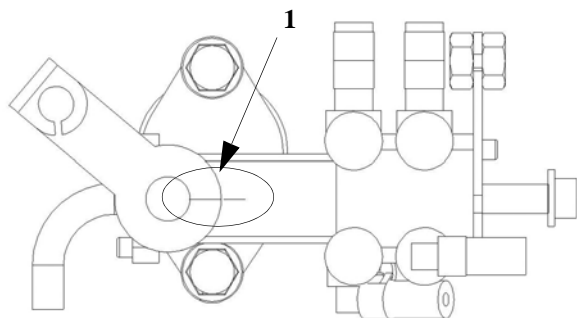


## 600 IQ ENGINE INSTALLATION

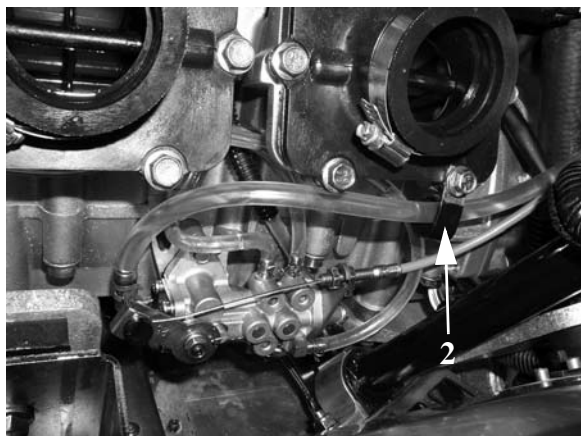
1. Make sure that you have the engine assembled so that it is in the same state as it was when it was removed.



2. Place the engine on the shock tower bar and install the oil pump cable.
3. Adjust the oil cable line so that the line is even (1) with the index mark.



4. Install the oil supply line through the guide (2) on the MAG intake.

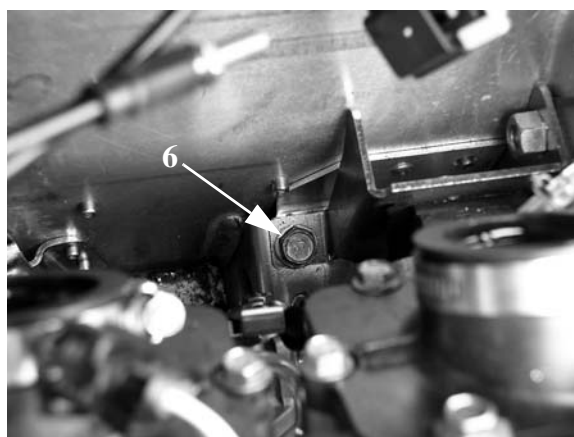


5. Place the engine into the bulk head and make sure that it is lined up with the motor mounts.

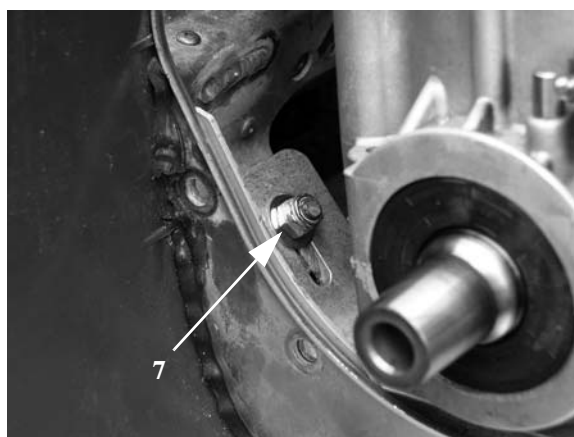
6. Insert the LH rear torque stop plate (3) between the motor mount and the bulk head.
7. Apply blue Loctite to the fastener (4) and torque all the outside fasteners (4,5) to 28 ft-lb(38Nm).



8. Install the LH rear motor mount fastener (6) and torque to 28 ft-lb (38Nm).

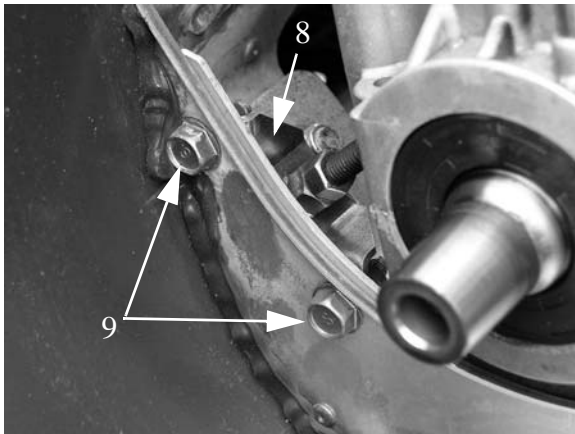


9. Insert the front engine strap washer and nylock nut (7) onto the motor mount stud and torque to 28 ft-lb (38Nm).

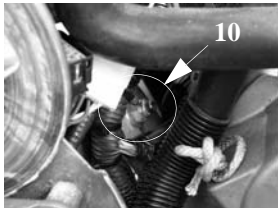




10. Insert the front torque stop assembly (8) and torque the fasteners (9) to 28 ft-lb (38Nm).



11. Install the RH rear (10) and front (11) motor mount washers and nylock nuts onto the motor mount studs. Torque to 28 ft-lb (38Nm).

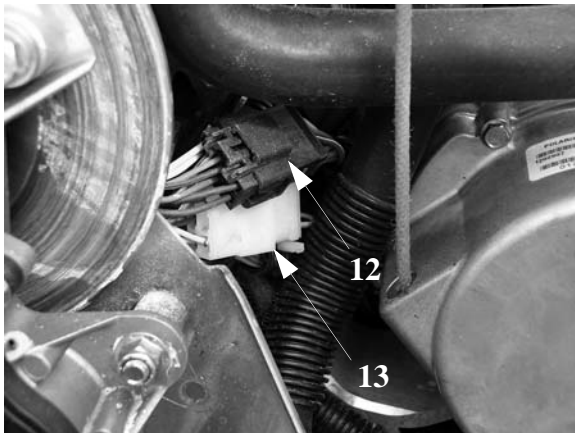


RH Rear

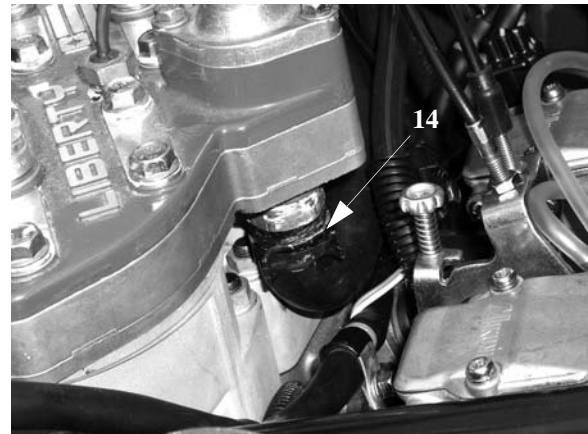


RH Front

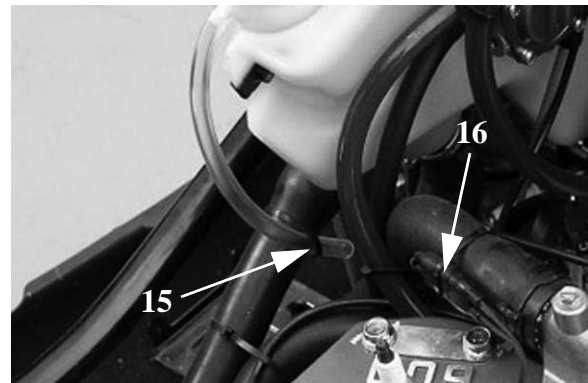
12. Adjust both torque stops so that you have a clearance of .010"-.030" (.25-.75mm).
13. Connect the Regulator Rectifier (12) and Stator (13) connections.



14. Connect the thermostat cooling hose and secure it with the clamp (14).



15. Connect the cooling hose going to the water pump (front of engine) to the water bottle and secure it with the clamp.
16. Connect the impulse line from the fuel pump to the crankcase.
17. Route the over fill hose (15) and secure it with a cable tie.
18. Connect the water temp sensor (16) and secure it to the thermostat hose with a cable tie.

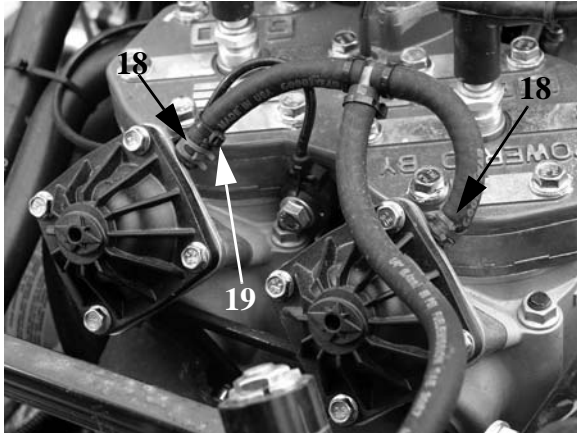


19. Connect the DET sensor (17) and secure it to the cooling hoses with a cable tie.



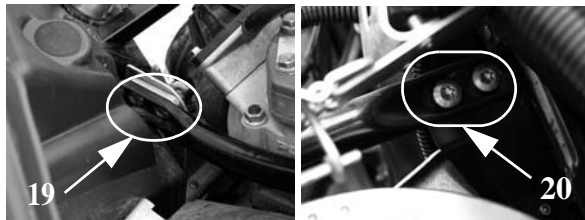


20. Connect the exhaust valve vent lines (18). Secure the DET sensor wire with a cable tie (19).



21. Install the oil supply lines to each of the carburetors.
22. Install the carburetors onto the carburetor boots and tighten the clamps.
23. Connect the TPS sensor to the carburetors.
24. Install the two, nylock nuts and two T40 Torx bolts to the front (19) and the two T40 to the rear (20) of the LH chassis brace and remove the brace.

**NOTE: Install the long bolts and the spacer on the front portion of the bar before inserting it into the mounting area.**

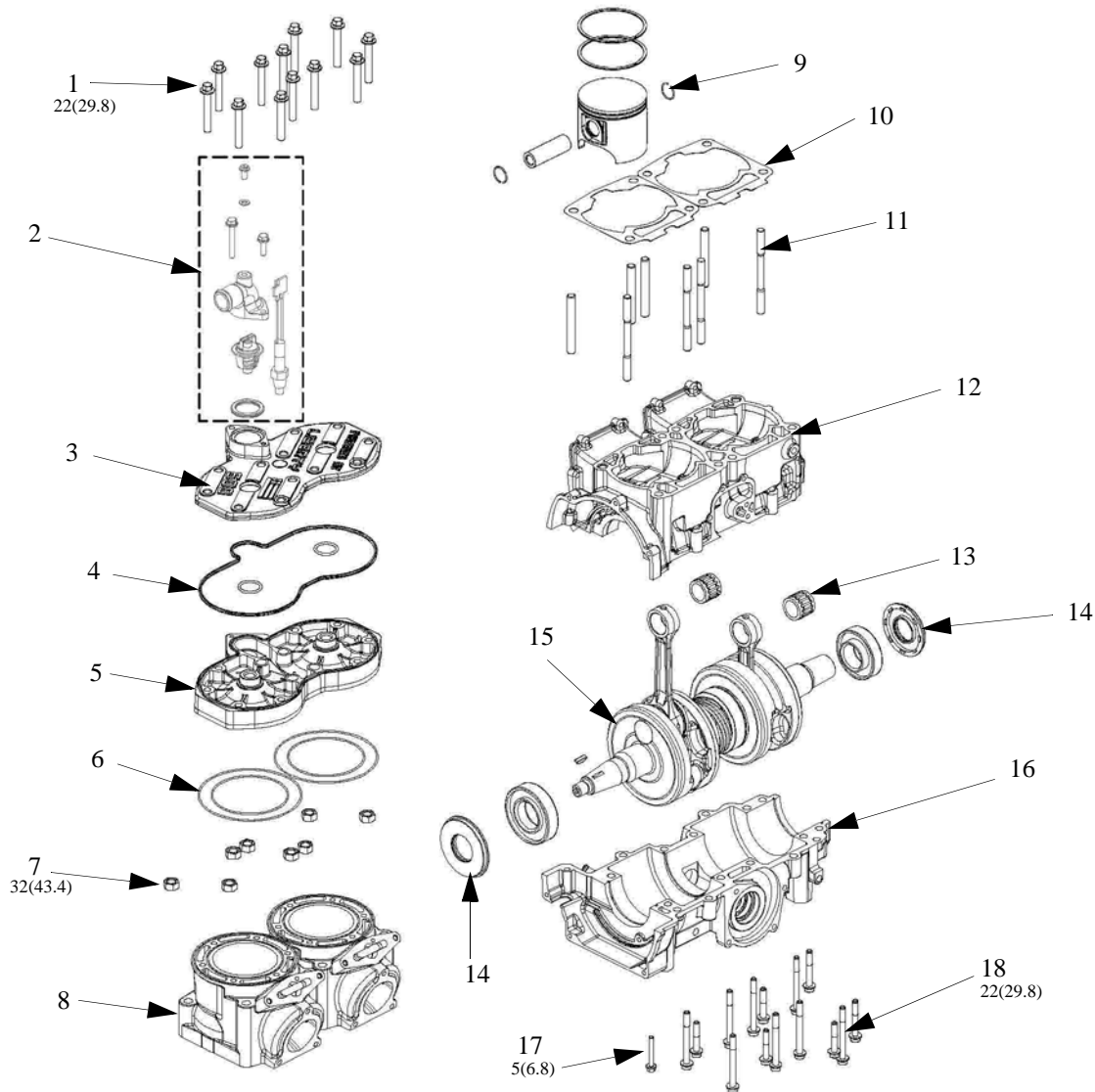


25. Replace the nosepan plugs.
26. Install the air box. See 'IQ CARBURETED AIR INTAKE REMOVAL' on page 12.7.
27. Install the drive clutch. 'DRIVE CLUTCH INSTALLATION' on page 7.19.
28. Install drive belt. 'BELT INSTALLATION (Team Driven Clutch)' on page 7.5
29. Route the recoil rope through the console and secure the recoil handle.
30. Install the exhaust system. 'EXHAUST INSTALLATION' on page 3.16.
31. Add coolant and bleed the cooling system. 'COOLING SYSTEM BLEEDING' on page 3.8.
32. Re-torque Drive Clutch to 50 ft-lb (69Nm).



## 500/600 HO ENGINE REBUILDING

### 500/600 LIBERTY ENGINE DISASSEMBLY



1. Remove reed valve assembly
2. Remove the head bolts (1).
3. Remove the head cover (3) and the rubber head seals (4).
4. Remove the head (5) and cylinder o-rings (6).
5. Remove the VES assembly. "EXHAUST VALVE REMOVAL" on page 6.2.
6. Remove the cylinder nuts (7) and carefully remove the cylinders (8) with a slight rocking motion.
7. Remove the c-clips that hold the wrist pin into the piston (9).
8. Using the piston pin puller PN 2870386 remove the piston pins, and the piston from the crankshaft (15).
9. Remove the water pump cover.
10. Remove the water/oil pump assembly. "500/600 LIBERTY WATER/OIL PUMP CROSS SHAFT DISASSEMBLY" on page 6.24.
11. If removing the engine mounting straps (these straps are mounted to the engine and bulkhead) label the direction and placement of each engine strap.
12. Remove the cylinder base gaskets (10) and replace if damaged.
13. Turn over the crankcase and remove the bottom crankcase

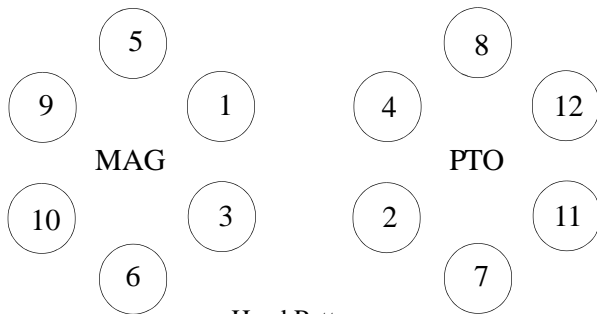


bolts (17,18).

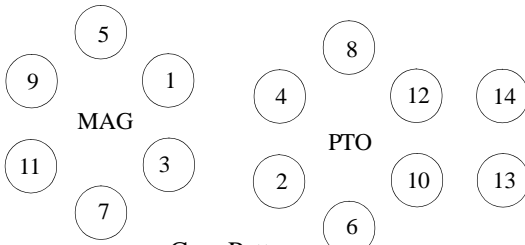
14. Turn the crankcase assembly back over and remove the top of the crankcase (12).
15. Remove the crankshaft, and refer to the General chapter for general engine component inspections and measurement procedures.



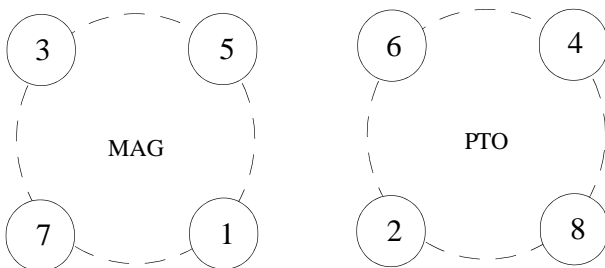
## 500/600 HO/600 LIBERTY TORQUE PATTERNS



Head Pattern  
22 ft-lb (29.8Nm)



Case Pattern  
10mm 22ft-lb (29.8Nm)



Cylinder Base Pattern  
32 ft-lb (43.4Nm)

1. Assemble the oil/water pump cross shaft as outlined on '500/600 LIBERTY WATER/OIL PUMP CROSS SHAFT ASSEMBLY' on page 6.25.
2. Set the crankshaft (15) with bearings and seals (14) into the lower crankcase (16).

3. If replacing the crankcase see the NOTE below.

**NOTE: If you are replacing the small block crankcase, '600 LIBERTY CYLINDER STUD INSTALLATION' on page 6.25.**

4. Fill the cross shaft section with cross shaft break in lube PN 2872435.
5. Place the top crankcase (12) on top of the lower crankcase and crankshaft assembly.
6. Apply Loctite 242 to the threads of the crankcase bolts (16).
7. Assemble the crankcase bolts into the crankcases. Torque the bolts to 22 ft-lb(30Nm) in the case pattern shown in the left column.
8. Lubricate the small end bearings (13) and the piston pins with Polaris 2 stroke oil and install the piston onto the crankshaft with the piston pin removal/installation tool PN 2870386.
9. Install new c-clips in the piston grooves with the gap facing straight up (12:00 position) or straight down (6:00 position). Make sure that the c-clip is fully seated in the piston groove. Use c-clip installation tool PN 2872622.
10. Install the piston rings onto the piston with the bevel side up and the gap facing the piston ring locating pin.
11. Install the base gaskets (10) on the upper crankcase.
12. Lubricate the cylinders and pistons with Polaris 2-stroke oil and carefully install the cylinder onto the pistons by squeezing the piston rings onto the locating pins and rocking the cylinder gently from the intake and exhaust sides.
13. Install the cylinder base nuts (7) and torque to 32 ft-lb(43.4Nm) in the Cylinder Base pattern shown in the left column.
14. Install o-rings (6).
15. Install the cylinder head (3) onto the cylinders.
16. Install head cover o-rings (4) with the head cover (3) on the head.
17. Apply Loctite 242 on head bolt threads (1) and torque to 22ft-lb (29Nm).
18. Install VES. 'EXHAUST VALVE INSTALLATION' on page 6.3.

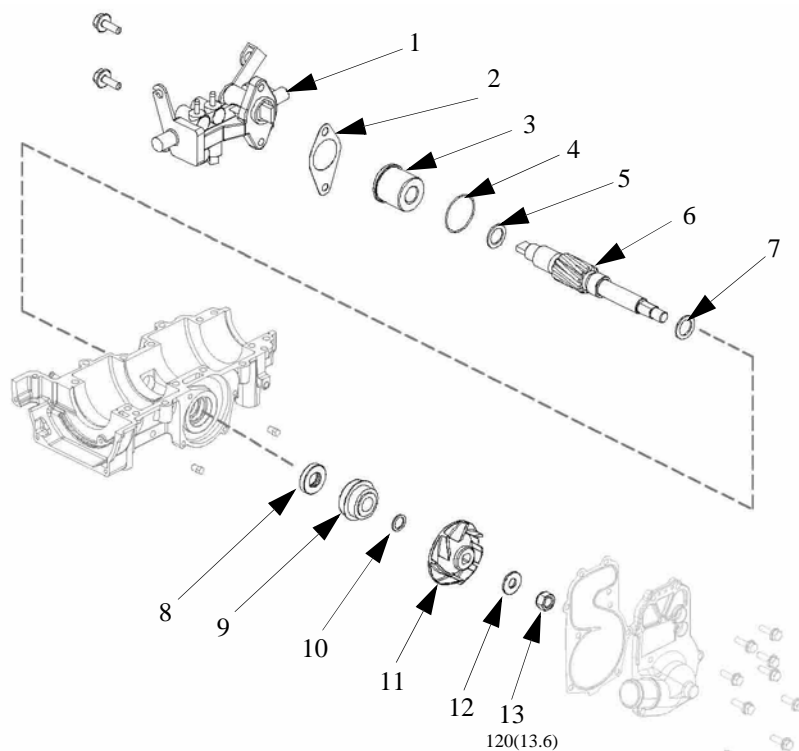
## 500/600 LIBERTY WATER/OIL PUMP CROSS SHAFT DISASSEMBLY

**NOTE: Inspect all parts for wear or damage during disassembly. Replace all seals, o-rings, and gaskets**



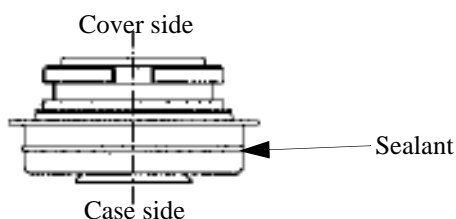
with Genuine Pure Polaris parts during assembly. Refer General chapter for general inspection procedures.

1. Remove the and disassemble engine
2. Remove the oil pump (1) and gasket (2).
3. Carefully pull out the brass bushing (3) and o-ring (4).
4. With the crankshaft installed, remove the impeller nut (5) and washer (6).
5. Remove the impeller (7) and flat washer (8).
6. Remove the cross shaft (9) by hitting the shaft from the waterpower side with a rubber hammer.
7. Press out the water pump shaft (10) out toward the oil pump side.
8. Remove the mechanical water pump seal (11).
9. Pry out the seal (12) that is behind the mechanical seal.
10. Remove the thrust washers from the shaft (13).



## 500/600 LIBERTY WATER/OIL PUMP CROSS SHAFT ASSEMBLY

1. Install the seal (8) into the case.
2. Insert the cross shaft (6) with the thrust washers (5,7) into the case from the intake side.
3. Install the flanged pump bearing (3) with the o-ring (4) on to the cross shaft.
4. Install the water pump mechanical seal (9). Use water pump seal installation tool PN 2872010 and press it into the case. Make sure that the sealant on the seal is facing toward the crankcase.



5. Install oil pump (1) with the gasket (2) onto the crankcase and torque the bolts to 84 in-lb (31Nm).
6. Place the flat washer (10), impeller (11), washer (12) and impeller nut (13) onto the other side of the cross shaft.
7. Torque the impeller nut (13) to 120 in-lb (44Nm).

## 600 LIBERTY CYLINDER STUD INSTALLATION

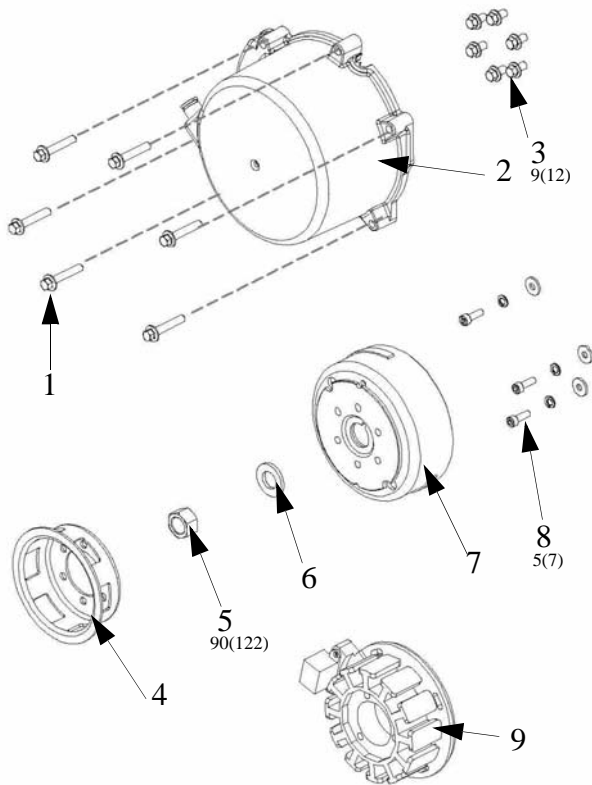
If you are replacing the small block crankcase, the new case will come with the studs loose, you will need to assemble the cylinder studs to a determined length.

You will need to thread in the Dri-Lok treated portion of the stud into the case. After stud assembly remove the Dri-Lok residue from the case assembly before assembly.



The long studs are installed to a height of 3.66" (93mm). The small studs are installed to a height of 2.16" (55mm).

## 500/600 RECOIL/STATOR REMOVAL



1. Remove the recoil cover (2).
2. Remove the recoil basket bolts (1) and the recoil basket (4).
3. Using a strap wrench PN PU-45419 hold the flywheel while taking the flywheel nut (5) and washer (6) off.
4. Using the Flywheel Puller PN 2871043, thread the puller bolts into the flywheel. Do not install puller bolts more than 5/16, (7mm) into flywheel threads or stator damage may result.
5. Tighten the center bolt and remove the flywheel (7).
6. Note the ignition timing marks that match up with the stator to the crankcase or scribe additional marks for reference for assembly.
7. Remove the stator bolts (8), and remove the stator (9). Be careful when removing the wires of the stator.

## 500/600 RECOIL/STATOR ASSEMBLY

**NOTE:** Inspect all parts for wear or damage during disassembly. Replace all seals, o-rings, and gaskets with Genuine Pure Polaris parts during assembly. Refer General chapter for general inspection procedures.

1. Install the stator (9) and align the timing marks that was noted earlier.
2. Apply Loctite 242 to the first few threads of the stator bolts (8) and torque to 5 ft-lb (7Nm).
3. Install the flywheel (7) so that it matches up with the index of the woodruff key.
4. Apply Loctite 242 to the threads of the flywheel nut (5) and place the washer (6) and nut onto the end of the crankshaft.
5. Holding the flywheel with the strap wrench, torque the flywheel nut to 90 ft-lb (122Nm).
6. Install the recoil basket (4) and the recoil basket bolts (3) on the flywheel and torque the bolts to 9 ft-lb (12Nm).
7. Install recoil assembly (2) and torque the recoil assembly bolts (1) to 9 ft-lb (12Nm).

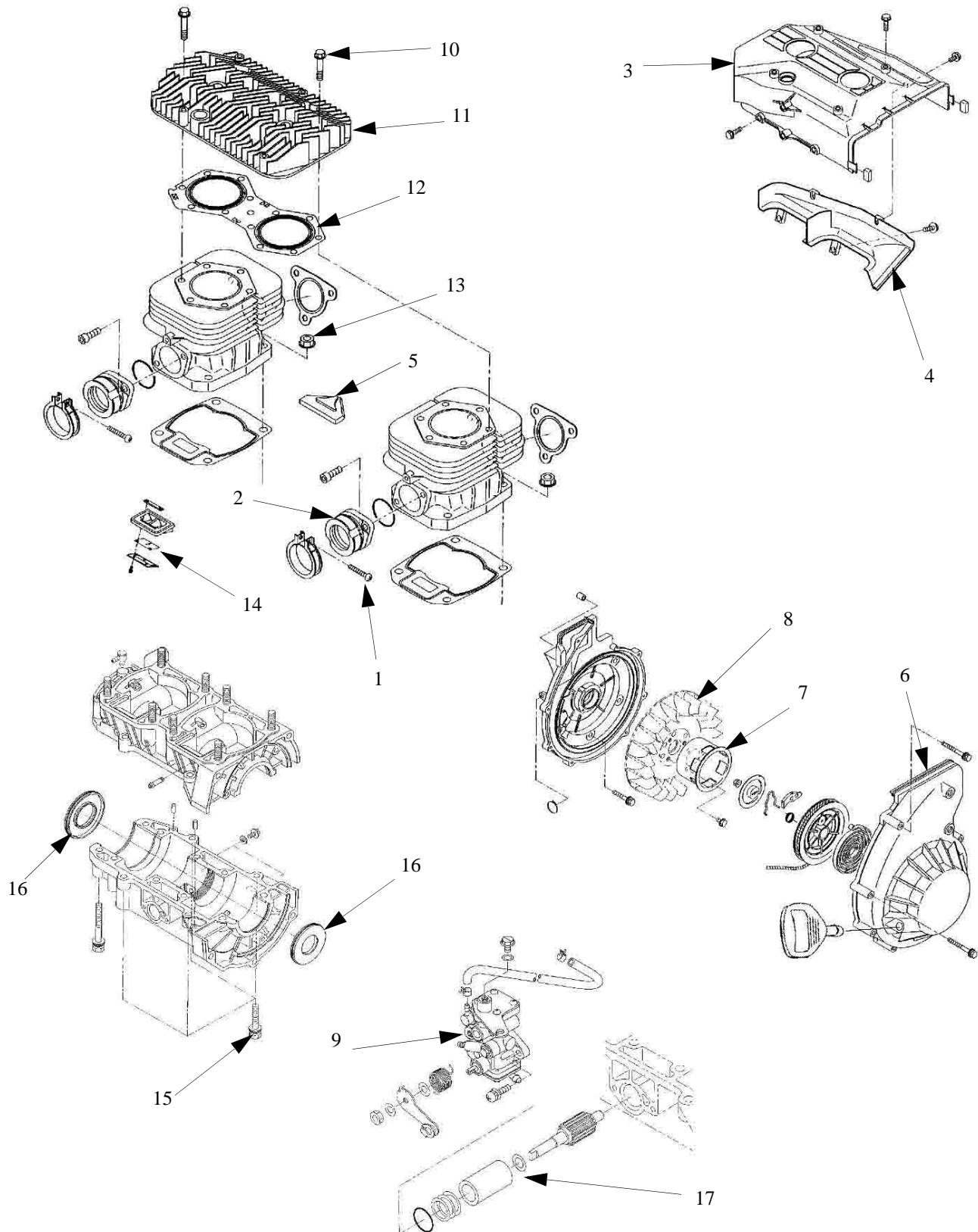
## 340/550 FUJI ENGINE/500 LIBERTY

### 340/550 FUJI/500 LIBERTY ENGINE REMOVAL/INSTALLATION

1. Turn the fuel valve to the "OFF" position.
2. Remove the exhaust system.
3. Disconnect the battery ground (-) if applicable.
4. Disconnect the CDI box.
5. Remove the spark plug leads from the spark plugs.
6. Disconnect the stator connection(s).
7. Remove the air box.
8. Remove the drive belt.
9. Remove the drive and driven clutches.
10. Remove the recoil handle and secure the rope so that it is on the recoil housing.
11. Loosen the carburetor clamps that are holding the carburetor onto the boots.
12. Separate the carburetors and secure them out of the way for engine removal.
13. Disconnect the oil pump cable from the oil pump.
14. Disconnect the oil supply line at the oil pump, and plug the end with a clean bolt.
15. Remove the fuel pump impulse line from the engine.
16. Remove all the motor mount nuts.
17. Remove the engine.
18. Install in reverse order.



## **340/550 ENGINE REBUILDING**





## 340/550 ENGINE DISASSEMBLY

**NOTE: Inspect all parts for wear or damage during disassembly. Replace all seals, o-rings, and gaskets with Genuine Pure Polaris parts during assembly. Refer to the 'INSPECTONS' on page 3.5 for general inspection procedures.**

1. Disconnect the coil pack from the recoil cover and the wiring harness.
2. Loosen the carburetor clamps (1) and remove the carburetors from the mounting boots.
3. Note where the oil lines are routed and remove the oil lines from the carburetors.
4. Remove the carburetor mounting boots (2) from the cylinders.
5. Remove both the cylinder head (3) and the exhaust side fan (4) shrouds from the engine assembly.
6. After removing the fan shrouds, take note of the vibration dampener (5) located between the cylinders month intake side.
7. Remove the CDI from the flywheel cover.
8. Remove the flywheel cover (6).
9. Remove the recoil cup (7).
10. Hold the flywheel with the holding wrench PN 8700229 and remove the flywheel nut and washer.
11. Using a flywheel puller (PN 2871043), remove the flywheel (8) from the engine. Do not install the puller bolts in any more than 5/16" of an inch/7.9mm into the flywheel threads or stator damage may result.
12. Remove the flywheel and woodruff key.
13. Remove the stator plate.
14. Remove the oil pump (9). Note the o-ring and shim placement.
15. Remove the cylinder head bolts (10).
16. Remove the cylinder head (11).
17. Remove the head gasket (12). During the removal process note that the gasket has a EX for exhaust side and UP for the orientation.
18. Remove the cylinder base nuts (13) and carefully remove each cylinder.
19. Remove the reed valve assembly (14) from the crankcase.
20. Remove the wrist pin c-clips
21. Using a piston pin puller (PN 2870386) remove the wrist pins from the pistons.
22. Turn the crankcase over and remove the crankcase bolts (15).
23. Carefully turn the case back over and separate the case halves.
24. Remove the crankcase seals (16).
25. Remove the oil pump bushing, spacer, and cross shaft (17)

and inspect for any wear or damage.

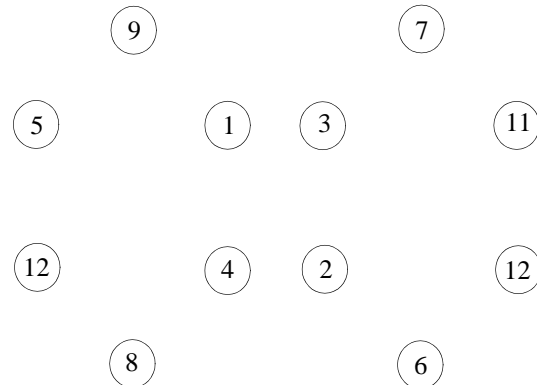
## 340/550 ENGINE ASSEMBLY

1. Insert the oil pump cross shaft, spacer and bushing.
2. Install a new o-ring on the oil pump.
3. Place the oil pump aside for later installation.
4. Set the crankshaft into the lower case half.

**NOTE: Make sure that the crankshaft rotates smoothly and does not bind. Rotate the bearings so that the anti-rotation pins are testing in their appropriate galleries.**

5. Apply 3-Bond (PN 2871557) sealer to the top half of the crankcase.
6. Apply Polaris 2-Stroke engine oil to the oil pump cross shaft in the lower half of the crankcase.
7. Install new crankcase oil seals.
8. Match up the top half of the crankcase to the lower case and hold the case halves together and turn it upside down.
9. Install the crankcase bolts and torque to 18 ft-lb (25Nm). in the pattern shown below.

CRANKCASE TORQUE PATTERN-FUJI



10. Turn the crankcase over and install the pistons with the arrow on the piston crown facing the flywheel (MAG) side. This will orientate the piston so that the piston ring locating pins will be in the intake side of the engine.
11. Apply Polaris 2-Stroke engine oil to the wrist pins and the small end bearings and install them onto the crankshaft with the piston installation tool (PN 2830386).
12. Lubricate rings and the pistons with Polaris 2-Stroke oil and install the rings with the letter, mark or beveled side facing upward.
13. Install the c-clips into the piston so that the opening of the "C" is positioned at the 12:00 or 6:00 position.
14. Install the reed valves in to the intake of the crankcase.
15. Install new base gaskets.
16. Compress the piston rings and install each cylinder onto the crankcase.

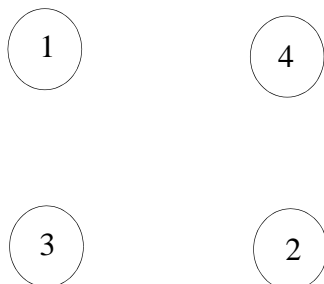


17. Torque the cylinder base nuts to:

•340 = 17-18 ft-lb (23-25Nm)

•550 = 25-30 ft-lb (34-40Nm)

#### CYLINDER BASE TORQUE PATTERN-FUJI



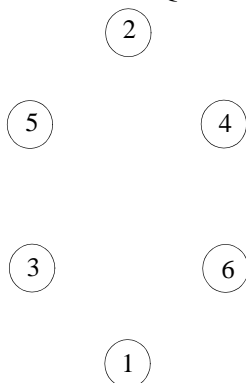
18. Install a new head gasket with the “EX” facing the exhaust side. Also make sure that the “UP” is facing the intake side of the engine.

19. Insert the head bolts and torque to:

•340 = 18-21 ft-lb (25-28 Nm)

•550 = 17-21 ft-lb (23-28 Nm)

#### CYLINDER HEAD TORQUE PATTERN-FUJI



20. Insert the dowels on the stator housing that match up with the crankcase.

21. Route the stator wires harness correctly.

22. Install the flywheel, lock washer, woodruff key, and flywheel nut onto the shaft.

23. Torque the flywheel nut to:

• 340 = 61-70 ft-lb (83-90Nm)

• 550 = 58-72 ft-lb (79-98Nm)

24. Install the recoil cup onto the flywheel.

25. Install the recoil cover.

26. Install the CDI box on the flywheel cover.

27. Insert the vibration dampener in between the cooling fins that are located between the two cylinders on the intake side.

28. Install the two fan deflectors.

**NOTE: Make sure that the fan deflectors interlock before tightening down.**

29. Install the oil pump onto the lower case half.

**NOTE: Install all oil pump shims.**

30. Apply Blue Loctite 243 to the oil pump mounting screw threads and torque to 48-72 in-lb (5.5-8.3Nm).

31. Route each oil line on the oil pump in the correct positions.

32. Install intake boots.

33. Install the boot clamps onto the boots.

34. Install the carburetors onto the boots.

35. Tighten the boot clamps.

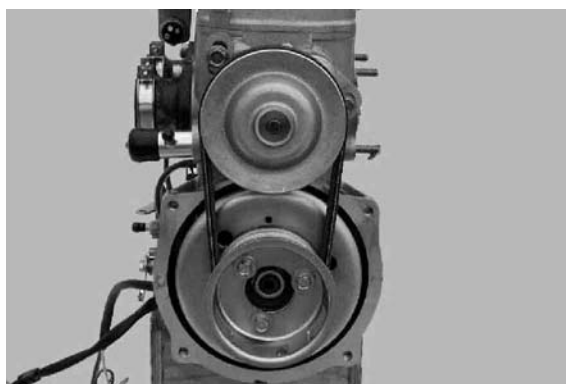
36. Insert engine into the chassis.

## **500 FUJI**

### **DISASSEMBLY**

**NOTE: Inspect all parts for wear or damage during disassembly. Replace all seals, O-rings, and gaskets with Genuine Polaris parts during assembly. Refer to General Section for Inspection Procedures.**

1. Remove carburetors, recoil housing and exhaust manifold.
2. Remove water pump, and starter recoil cup with water pump drive pulley and flywheel nut.



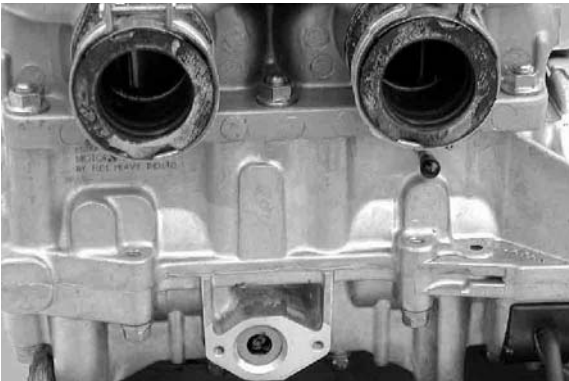
3. Install flywheel puller PN 2871043. Use all flywheel bolt holes. Do not install puller bolts more than 5/16, (7mm) into flywheel or stator damage may result.



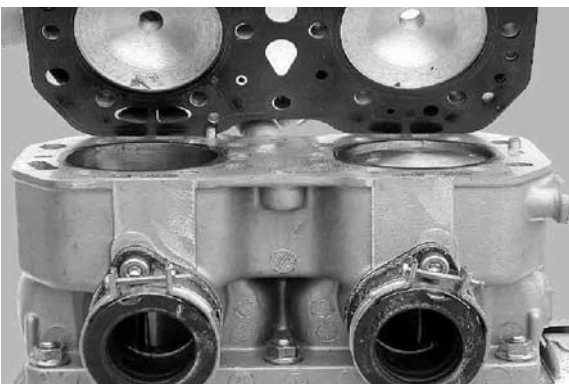
4. Mark stator plate and crankcase for reference when reassembling the engine.



5. Using a screwdriver, remove stator screws.
6. Remove oil pump, oil pump feed lines from cylinders. Clean and inspect all components.



7. Remove the cylinder head.
8. Remove head gasket. Note the position of head gasket inlet and outlet hole sizes for reference during reassembly. Always replace head gasket after disassembly.

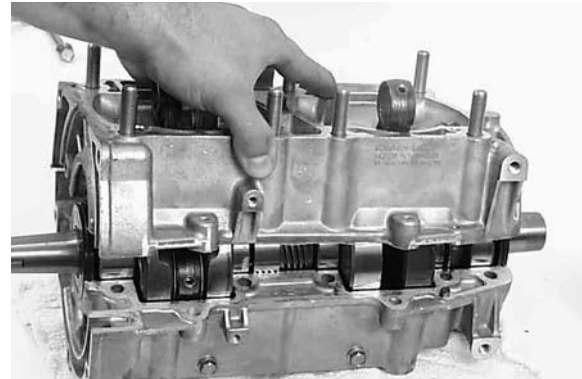


9. Remove cylinder.
10. Remove C-clip retainers from pistons.
11. Using piston pin puller, remove piston pin from piston.
12. Remove crankcase bolts.
13. Refer to 'INSPECTONS' on page 3.5 for engine

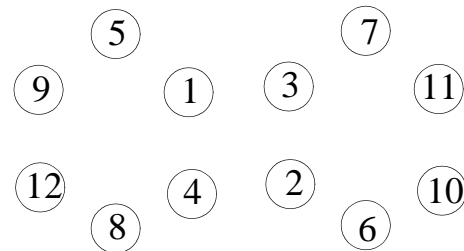
component inspection (i.e. crankshaft and crankcase inspection, piston clearance, oil pump drive gear end play etc.).

## ASSEMBLY

1. Grease oil pump drive gear area. Seals should be installed with spring and lip facing inward toward crankshaft.
2. Turn bearing until anti-rotation pins are positioned in the proper location.
3. Apply 3-Bond sealant to crankcase halves.



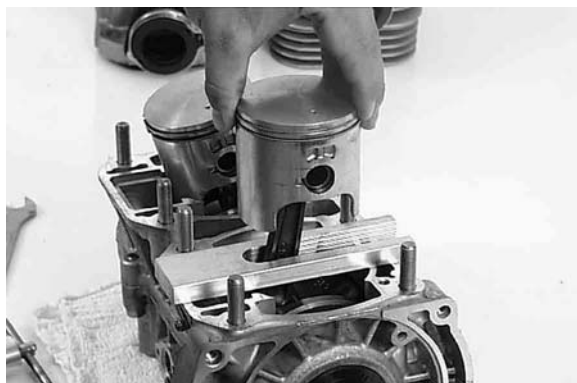
4. Torque crankcase bolts following sequence outlined in beginning of this chapter. Lubricate crankshaft main bearings through access holes. Torque 8mm Bolts to 17-18 f.-lb (22-23Nm), and 10mm bolts to 23-25 ft.-lb (32-35Nm).



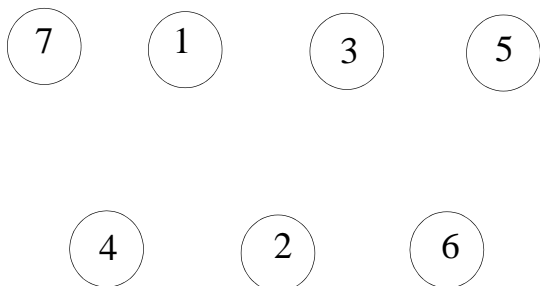
CRANKCASE PATTERN



5. Install pistons with F" mark or arrow toward flywheel.



6. Install C-clip using installation tool PN 2870773.
7. Install new base gasket. Mount gasket with the white sealing material facing up.
8. Lubricate rings and pistons with two stroke oil. Install rings with letter, mark, or beveled side facing upward.
9. Lubricate rings and cylinder with Premium 2 Cycle Lubricant and compress rings with fingers, aligning end gaps with locating pins. Install cylinder with a gentle front-to-back rocking motion, being careful not to damage rings.
10. Install cylinder base nuts in pattern and torque to 27-31 ft-lb (37-43Nm)

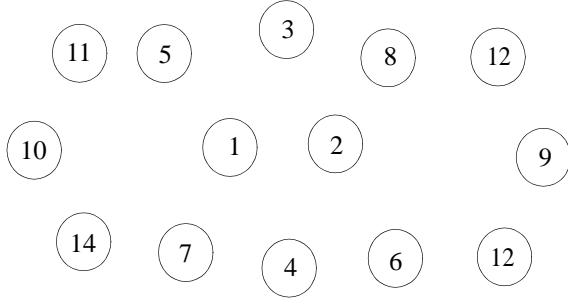


#### CYLINDER BASE

11. Install head gasket. Note proper position of gasket, "UP" facing upward, small intake hole on right (mag) side, large hole on left (PTO) side.

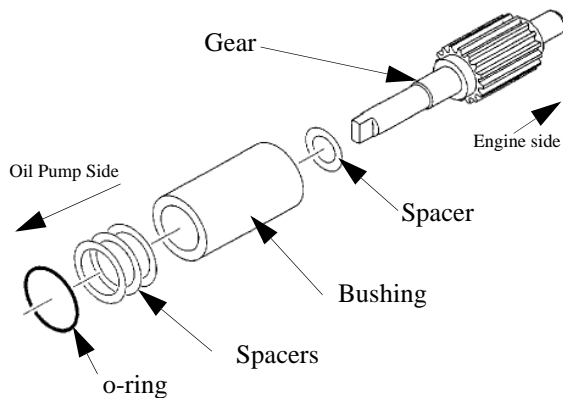


12. Install cylinder head and torque cylinder head nuts to 18 - 19.5 ft-lb (25-27Nm) following the torque pattern.

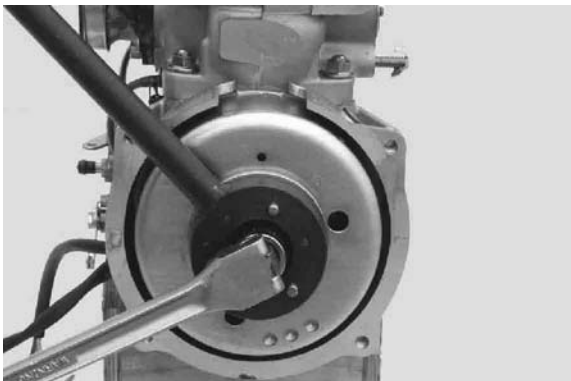


CYLINDER HEAD TORQUE PATTERN

13. Before installing oil pump drive gear, refer to Oil Pump end play adjustment.
14. Install oil pump drive gear in the sequence shown in diagram at the right.



15. Install oil pump.
16. Connect oil feed lines to the cylinders.
17. Align stator as previously marked on stator plate and secure with screws.
18. Install flywheel and torque flywheel nut to 60-65 ft-lb (83-90Nm) using the flywheel holding tool PN 8700229.



19. Install water pump and recoil starter cup. make sure that the thicker end of the drive pulley is towards the flywheel as shown.

20. Adjust tension on water pump belt by loosening mounting bolts, applying tension, and re-tightening bolts.
21. Install recoil housing and carburetors.
22. Bleed the oil pump.
23. Connect CDI to stator plug connector.
24. Pre-mix (32:1) the first tank of fuel. See '2 STROKE GASOLINE / OIL PRE MIX" on page 2.10 for premix chart.



# CHAPTER 7

## CLUTCHING

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## **SPECIAL CLUTCH TOOLS**

### **CLUTCH TOOLS**

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

Because of the critical nature and precision balance incorporated into the drive clutch, it is absolutely essential that no attempt at clutch disassembly and/or repair be made without factory authorized tools and service procedures. Refer to the Service Tool Catalog (PN PU03-141) for photos and descriptions of all tools. A tool catalog update may be available through the SPX parts department (Phone Number 1-800-328-6657). ♦ = Required Dealer Tool

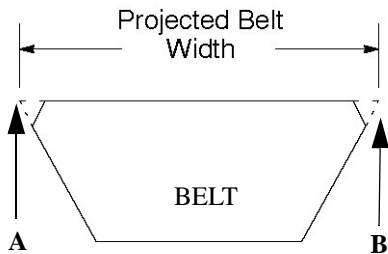
**Table 7-1: Clutch Tools**

Offset Alignment Tool	PS-46998
♦ 1999 - Current 440, 550 Fuji Engine Drive Clutch Puller	2872084
♦ 1999 - Current 600,700,800 Domestic Engine Clutch Puller	2871855
♦ 1999 - 2001 700,800 XCR Triple Fuji Engine Clutch Puller	2872085
Replacement Handle for ALL Clutch Pullers	5020326
♦ Drive Clutch Holding Wrench	9314177-A
Strap Wrench	PU-45419
Replacement Strap	305085
Drive Clutch Spider Nut Socket	2870338
Drive Clutch Spider Removal and Spider Installation Tool	2870341-A
Pin Centering Tool	2870401
Clutch Pin Installation Tool	2870402
Clutch Pin Punch	2870507
♦ Tapered Reamer for Drive Clutch Bore	2870576
♦ Roller Pin Tool	2870910-A
♦ Drive Clutch Button Removal Tool	2870985
♦ Clutch Bushing Replacement Tool Kit	2871025
♦ Primary Clutch Compression Tool	8700220
♦ Clutch Holding Fixture	2871358
♦ Clutch Compression Tool	8700220
♦ Spider Assembly Tool	8700221
♦ Clutch Compression Tool Extensions for TEAM driven	PS-45909
♦ Clutch Pilot Tool (used with the 2871358 to compress the clutch)	PU-45779
Drive Clutch Compression Tool (compresses drive clutch whole still on the engine)	2871173



## DRIVE BELT

### BELT INSPECTION



1. Measure the belt width and replace it if it is worn severely. Generally a belt should be replaced if the clutches can no longer be adjusted to provide the proper belt deflection.

- Top Edges have been trimmed on some drive belts. It will be necessary to project the side profiles and measure from corner to corner.
- Place a straight edge on each side of the drive belt and measure the distance where the straight edges intersect at the top (A,B).

2. Inspect the belt for loose cords, missing cogs, cracks, abrasions, thin spots or excessive wear spots. Replace if necessary.
3. Inspect the belt for hour glassing (extreme circular wear in at least one spot and on both sides of the belt). Hour glassing occurs when the drive train does not move and the drive clutch engages the belt. Example would be taking off while the track is frozen to the ground. Remember to always warm up the track and free it from the ground.

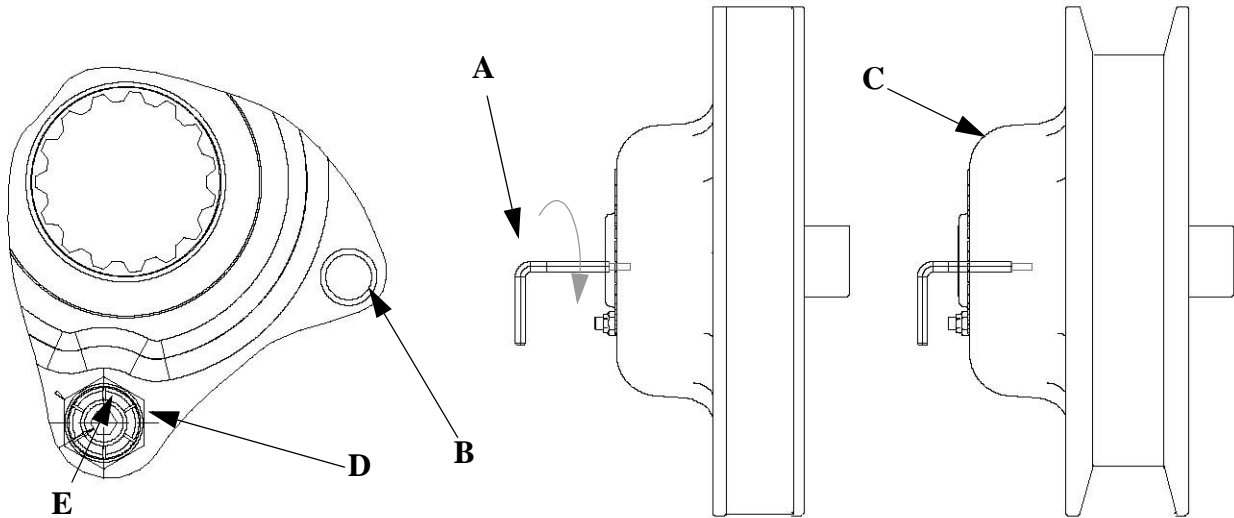
### BELT DIAGNOSIS

**Table 7-2: BELT WEAR / BURN DIAGNOSIS**

POSSIBLE CAUSE	SOLUTION
Driving at or about engagement RPM for extended periods of time in any type of snow condition.	Drive at higher RPM if possible. Gear the machine down. Make sure belt deflection is at 1 1/4" to achieve optimum starting ratio.
Cold weather startups	Be patient. Warm up engine at least 5 minutes or until it readily responds to throttle input. For the quickest most efficient drive away in extreme cold weather, take drive belt off machine and bring it in to a warm environment. Break skis and track loose from the snow. Engage throttle aggressively for short durations for initial cold drive away
Towing another machine at or about engagement RPM	When possible, do not go in deep snow when towing another machine. Use fast, effective throttle to engage the clutch. Not all machines are intended for pulling heavy loads or other machines.
Spinning track while vehicle is stuck (high RPM, low vehicle speed, high ambient temp. Example: 8000 RPM, 10mph actual vehicle speed and 60 m.p.h. indicated on speedometer.	Lower the gear ratio. Remove windage plates from driven clutch. If possible, move to better snow conditions and reduce RPM. Avoid riding in very high ambient temperatures
Ice and snow piled up between track and tunnel overnight or after stopping for a long period of time (enough to re-freeze the snow).	Break loose snow and ice under tunnel. Allow longer than normal warm-up. Allow belt to warm sufficiently and increase grip ability on clutch sheaves. Use fast, effective throttle when engaging clutch.
Poor running engine (Bog, Miss, Backfire, etc.)	Maintain good state of tune including throttle and choke synchronization. Check for fouled spark plug(s). Check for foreign material in carbs. Make sure no water or ice is present in the fuel tank, lines, or carburetors.
Loading machine on trailer	Use caution when loading machine. Carbide skags may gouge into trailer and prevent drive train from spinning freely. Use enough speed to drive completely onto trailer. If machine cannot be driven completely onto trailer, it may need to be pulled or pushed to avoid belt wear / burning.
Clutch malfunction	Check for correct clutch components, or damage on the clutch
Slow, easy belt engagement - easing on the throttle	Use fast, effective throttle to engage the clutch.



## DRIVE BELT REMOVAL WITH TEAM CLUTCH



**NOTE:** *Before attempting to remove the drive belt, verify the engine is in forward mode, not reverse (PERC) or, the chaincase is in forward mode (PERC 4). Turn the key to the "OFF" position and allow the engine to come to a complete stop.*

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

1. Remove the clutch guard retaining pin, and open the clutch guard.
2. Apply and lock the parking brake.
3. Insert the "L" wrench (A) into the threaded hole (B) located on the driven clutch, and turn it clockwise until the clutch sheaves are in the open position (C).

**NOTE:** *L wrench PN 2874857*

4. Remove the drive belt.

## BELT INSTALLATION (Team Driven Clutch)

1. With the "L" wrench inserted into the threaded into hole (B) and the sheaves in the open position (C), install the drive belt.

**NOTE:** *Install belt so that the numbers can be read correctly on the left side of the machine.*

2. Turn the "L" wrench counter clockwise until the driven clutch sheaves are in the closed position.

3. Remove the "L" wrench.



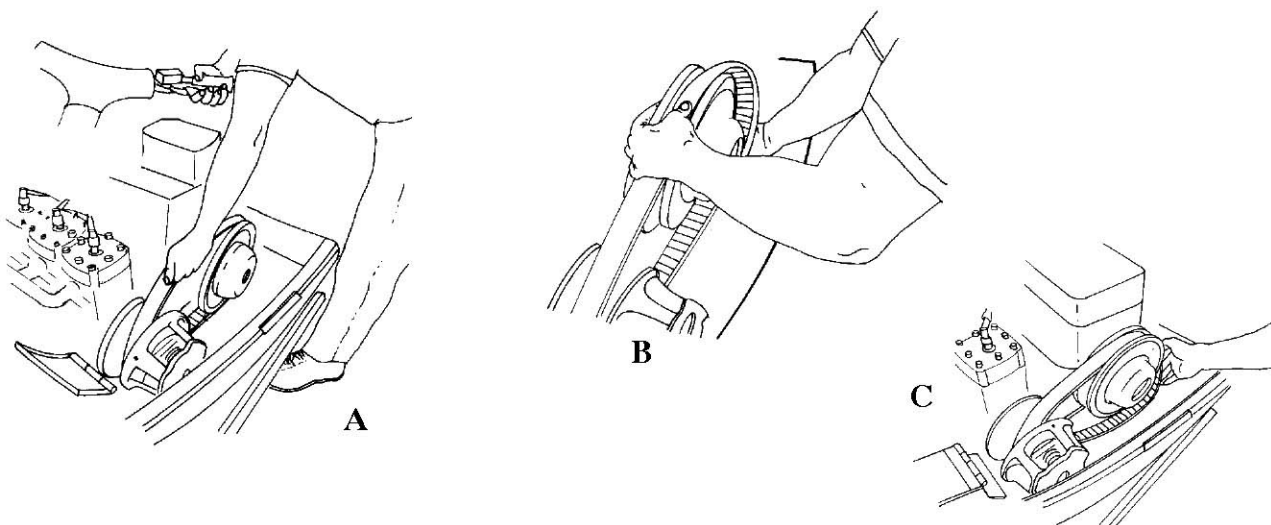
### WARNING

It is very important to remove the L wrench after the belt is installed or damage to the clutch will occur.

4. Close the clutch cover and secure the cover with the cover pin.



## DRIVE BELT REMOVAL WITH POLARIS DRIVEN CLUTCH



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



### WARNING

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

## BELT INSTALLATION (POLARIS DRIVEN CLUTCH)

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

Before attempting to remove the drive belt, make certain that the snowmobile was in forward motion. Turn the key off so that the engine has come to a complete stop.

1. Remove the clutch guard retaining pin and open the clutch guard.
2. Apply and lock the parking brake.
3. Grasp belt firmly midway between clutches and pull upward and rearward to open the driven clutch sheaves (A). Remove the belt from the driven clutch and then from the drive clutch (B, C).
4. Release the parking brake.



## **DRIVE SYSTEM TERMINOLOGY**

### **SYSTEM OVERVIEW**



#### **CAUTION**

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

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

### **DRIVE SPRING**

The drive spring opposes the shift force generated by the clutch weights, and determines the neutral RPM, engagement RPM, and whether the engine RPM remains flat, rises, or falls during shift out. When changing only the drive spring, installing a spring with a lower pre-load rate will result in a lower engagement RPM speed, while installing a spring with a higher pre-load rate will result in a higher engagement RPM.

### **CLUTCH WEIGHT**

The clutch weights generate centrifugal force as the drive clutch rotates. The force generated changes in relation to the engine RPM and with specified weight of each clutch weight. When changing only the clutch weights, a lighter weight will result in a higher engagement RPM, lower shifting force, and higher shift out RPM. Installing heavier weights has the opposite effect.

### **NEUTRAL SPEED**

Engine RPM when the force generated by the clutch weights is less than the pre-load force generated by the drive spring. In this mode, the drive clutch is disengaged.

### **ENGAGEMENT RPM**

Engine RPM when the force generated by the clutch weights overcomes the drive spring pre-load force and the moveable sheave begins to close or "pinch" the drive belt. The engagement mode continues until no more belt slippage occurs in the drive clutch. Once 100% belt engagement is achieved, the sled will accelerate along the low ratio line until the drive clutch up shift force overcomes the opposing shift force generated by the driven clutch.

### **SHIFT OUT OVERREV**

Engine RPM that spikes above the desired operating RPM speed. The shift out RPM should come down to the desired operating RPM, but never below, after the driven clutch begins to open.

### **SHIFT OUT RPM**

Engine RPM at which the up shift force generated by the drive clutch overcomes the shift force within the driven clutch. In this mode, the drive clutch will move the belt outwards, and the driven clutch will allow the drive belt to be pulled down into the sheaves.

During WOT operation, the shift out RPM can be seen as the maximum, sustained RPM displayed on the tachometer. The shift out RPM should be the same RPM as the recommended engine operating RPM. If the shift out RPM is above the recommended engine operating RPM, install heavier drive clutch weights. If the shift out RPM is below the recommended engine operating RPM, install lighter drive clutch weights.

The shift out RPM should remain constant during both the upshift and back shift modes.

### **DRIVEN SPRING**

A compression spring (Team driven clutch) or torsional spring (Polaris P-85 driven clutch) works in conjunction with the helix, and controls the shift rate of the driven clutch. The spring must provide enough side pressure to grip the belt and prevent slippage during initial acceleration. A higher spring rate will provide more side pressure and quicker back shifting but decreases drive system efficiency. If too much spring tension exists, the driven clutch will exert too much force on the belt and can cause premature belt failure.



## BACK-SHIFTING

Back-shifting occurs when the track encounters an increased load (demand for more torque). Back-shifting is a function of a higher shift force within the driven clutch than within the drive clutch. Several factors, including riding style, snowmobile application, helix angles, and vehicle gearing determine how efficient the drive system back-shifts. The desired engine operating RPM should never fall below 200 RPM when the drive system back-shifts.

## FINAL GEARING

The final drive gear ratio plays an important role in how much vehicle load is transmitted back to the helix. A tall gear ratio (lower numerical number) typically results in lower initial vehicle acceleration, but a higher top-end vehicle speed. A lower gear ratio (higher numerical number) typically results in a higher initial vehicle acceleration, but a lower top-end vehicle speed.

Choosing the proper gear ratio is important to overall drive system performance. Lowering the final drive gear ratio will compress the MPH scale between the low and high ratio lines, while raising the final drive gear ratio will expand the MPH scale between the low and high ratio lines.

When deciding on which gear ratio to use, the operator must factor in the decision where the snowmobile will be ridden, what type of riding will be encountered, and the level of performance the operator hopes to achieve.

Gearing a snowmobile too low for extended high-speed runs may cause damage to the drive belt and drive system, while gearing a snowmobile too high for deep-snow, mountain use may cause premature belt and clutch wear.

Typically, it is recommended to gear the snowmobile with a slightly higher ratio than the actual top speed the snowmobile will ever achieve.

## 1:1 Shift Ratio

A 1:1 shift ratio occurs when the drive clutch and the driven clutch are rotating at the same RPM. In this mode, the drive system is at its highest efficiency. Drive system efficiency falls off past the 1:1 shift ratio.

The mathematical vehicle speed for a given gear ratio at a 1:1 shift ratio is represented in the chaincase gearing charts located in the Final Drive Chapter.

## LOW / HIGH RATIO LINES

The low ratio line is the mechanical position when the drive belt is all the way down into the drive clutch, and all the way out on the driven clutch. The high ratio line represents when the drive belt is all the way out on the drive clutch, and all the way in on the driven clutch.

Note that the high ratio line is past the ideal 1:1 shift ratio.

## DRIVEN HELIX / RAMP

The helix cam is the primary torque feedback component within the driven clutch, regardless of driven clutch type. The beginning angle of the helix must transmit enough torque feedback to the moveable sheave in order to pinch the drive belt while minimizing belt slip. The flatter or lower the helix angle, the more side force will be exerted on the moveable sheave, while the steeper, or higher the helix angle, the less side force will be exerted on the moveable sheave.



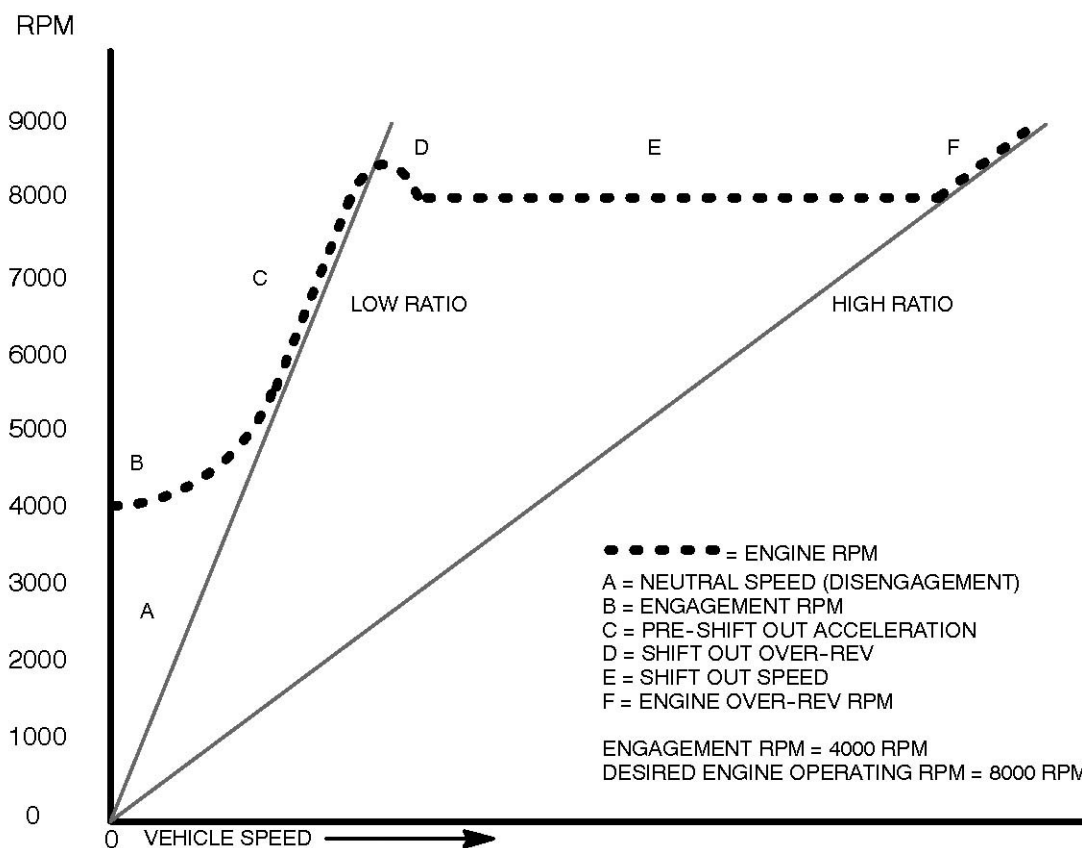
## CENTRIFUGAL DRIVE SYSTEM

### THEORY OF OPERATION

The graph illustrates what occurs in a properly tuned snowmobile drive system during an idle speed to WOT (wide open throttle) pull. Note that the shift out overrev occurs for a brief amount of time and drops back to the desired engine

operating RPM. The low and high ratio lines are a function of component design.

**NOTE: Shift out overrev is not detrimental to overall efficiency of the drive system as long as the RPM drop does not fall below the desired operating RPM. The use of the new drive system technologies, tighter tolerance components and refined drive system calibration in Polaris snowmobiles has virtually eliminated shift out overreving.**



## DRIVE CLUTCH

### OPERATION

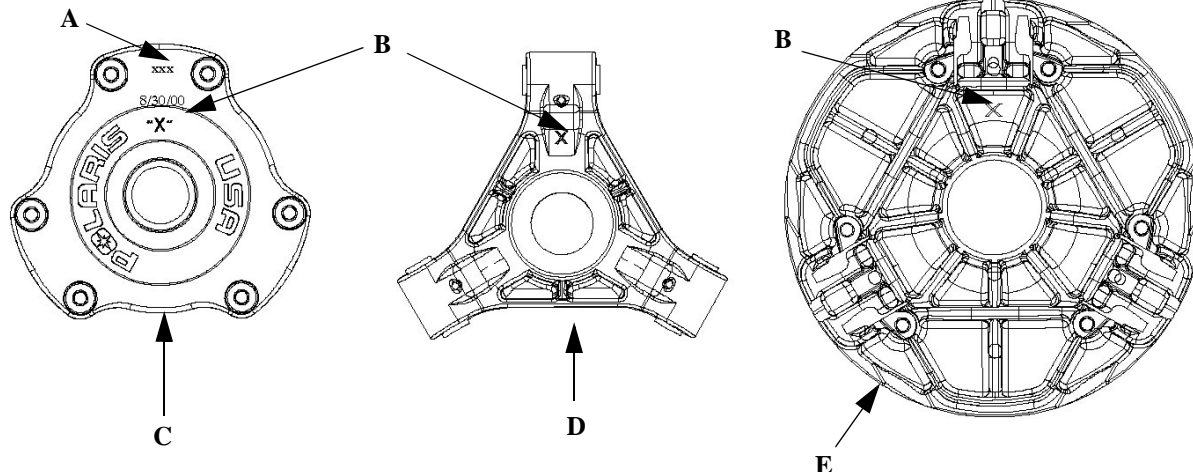
The drive, or primary, clutch is an RPM sensing device. The main functions of the drive clutch is to control the neutral RPM speed, initial engagement RPM, and desired engine operating RPM. The drive clutch works by using the principle of centrifugal force to react to engine RPM. At idle speed, the moveable sheave is held open by the drive spring pre-load force. As engine speed increases, the centrifugal force generated by the clutch weights will overcome the drive spring

pre-load force, and begin to close the moveable sheave. This action engages, or "pinches" the drive belt.

In a properly tuned clutch, the desired operating RPM should be reached immediately after clutch engagement under full throttle (WOT) conditions. The desired engine operating RPM is the recommended operating RPM listed for each model. This information can be found in each models' general specification table. To ensure optimum power, the recommended operating RPM must be maintained throughout the upshift and backshift modes.



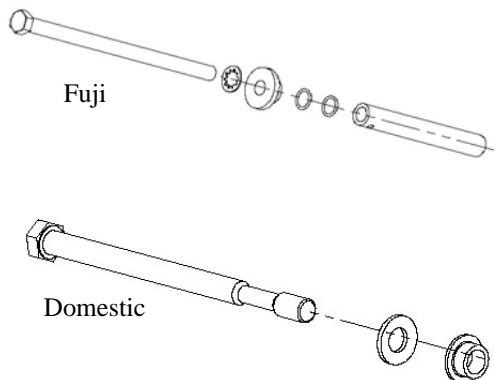
## DRIVE CLUTCH IDENTIFICATION



Every clutch will have the last three digits of the clutch part number etched on to the cover (A). The “X” (B) marking is an index mark where the clutch cover (C), clutch spider (D) and the stationary sheave (E) should line up when the clutch is assembled.

the clutch does not “pop” off, continue to tighten the clutch puller, and repeat this step.

## DRIVE CLUTCH REMOVAL



**CAUTION**

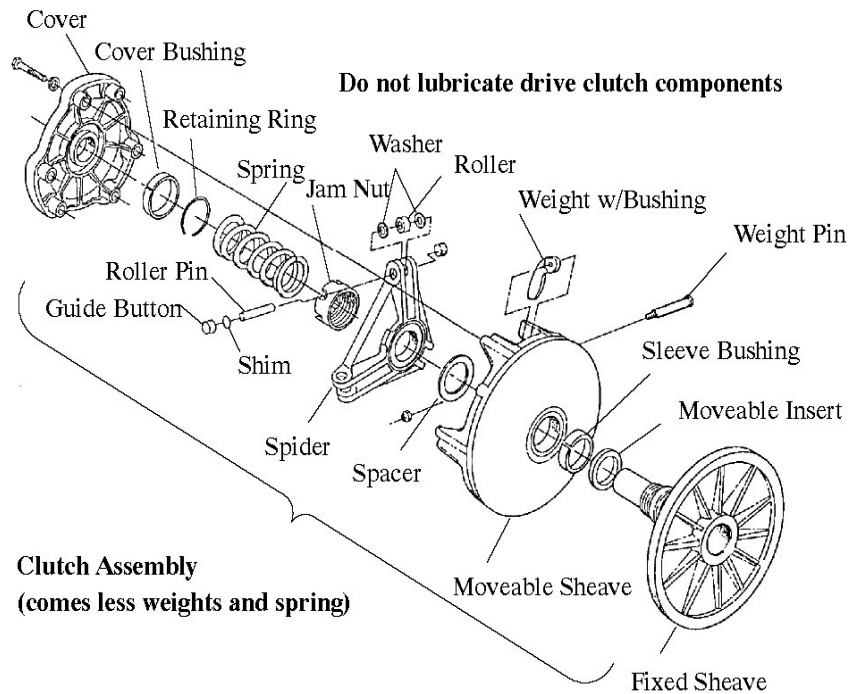
Do not use a impact wrench to remove or install the clutch bolt or clutch puller. Damage to the clutch and/or crankshaft can occur.

**NOTE: All clutch tools can be found at the beginning of this chapter.**

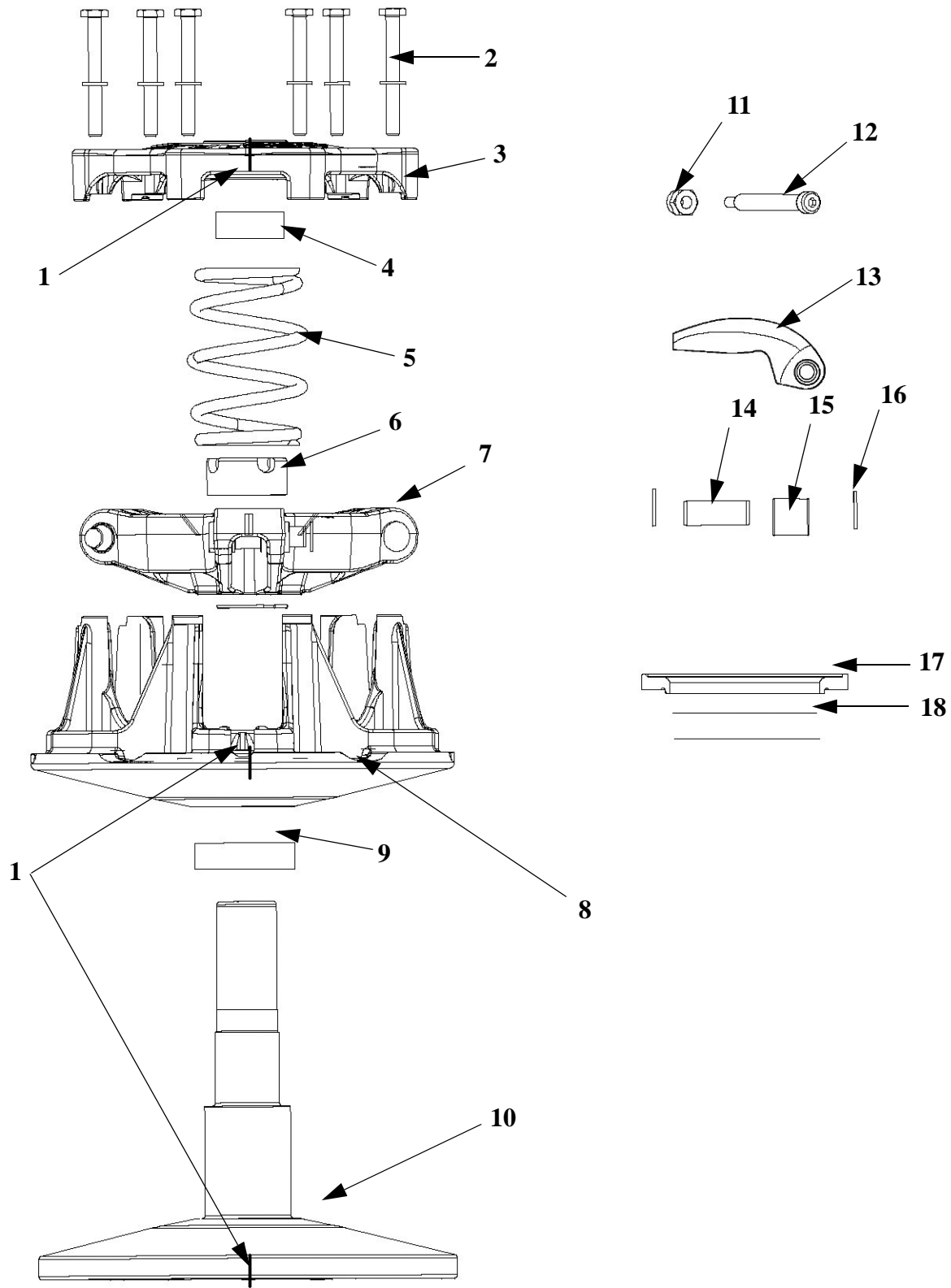
6. Remove the belt See “DRIVE BELT” on page 7.4.
7. Place the clutch holding tool (PN 9314177-A) on the drive clutch.
8. Remove the drive clutch retaining bolt. Note the placement and number of washers that are on retaining bolt.
9. Place the correct clutch puller for the engine that you are working on into the retaining bolt hole.
10. Tighten the puller into the clutch. If the clutch does not come off, strike the clutch puller head with a hammer. If



## DRIVE CLUTCH COMPONENTS



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



**DRIVE CLUTCH DISASSEMBLY****Table 7-3: Drive Clutch Service Components**

ITEM	DESCRIPTION	TORQUE SPECIFICATION/ NOTES
1	Index mark	
2	Cover bolts and washers	90in-lb (10Nm)
3	Clutch cover	
4	Cover bushing	
5	Clutch spring	
6	Spider nut	
7	Spider	
8	Moveable sheave	
9	Moveable sheave bushing	
10	Stationary sheave	
11	Clutch weight pin nut	This should facing the trailing side of the clutch
12	Clutch weight pin	This should be facing the leading side of the clutch
13	Clutch weight	
14	Pin	
15	Roller	
16	Shim	
17	Stepped washer	Make sure that the stepped washer is on top of the washer stack and that the washer has the step facing the sheave side.
18	Washer stack	

**CAUTION**

Eye protection must be worn during disassembly.

**CAUTION**

Sheaves must be marked to provide a reference point for clutch balance and spider indexing. If the sheaves are not marked and the spider washers are changed or misplaced, the clutch will be out of balance and damage to the clutch may result.

**WARNING**

Clutch spring is under extreme tension, use caution when disassembling the clutch.

1. In a straight line, mark the sheaves and the cover with a black marker (1).
2. Remove the clutch. See “DRIVE CLUTCH REMOVAL” on page 7.10
3. Place the drive clutch in the clutch compression tool (PN

8700220).

4. Compress the clutch in the compression tool and lock the compression tool, making sure that all cover bolts (2) are accessible.
5. Remove the cover bolts and washers (2) evenly and carefully. Do not allow side loading or misalignment of the cover (3), or the bushing (4) can be damaged.
6. Carefully remove the tension from the compression tool.
7. Remove the cover (3) and inspect the cover bushing (E) and replace it if it is damaged or worn.
8. Remove the spring (5).

**NOTE: Replace the cover bushing if the inside diameter is over 1.40” (28.95mm)**

9. Mount the drive clutch securely in a drive clutch holding fixture (PN 2871358).
10. Remove the jam nut (6) in a counterclockwise direction (standard thread) using the drive clutch spider nut socket (PN 2871358).
11. Install the spider removal tool (PN 2870341), and remove the spider (7) in a counterclockwise direction (standard thread).
12. Measure the total thickness of the spacer washers (18) that are installed under the stepped washer (17) and record the thickness of these spacer washers. Make sure that you note that the stepped washer is on the top of the spacer stack.
13. Inspect both sheave surfaces (8,10) for wear or damage.
14. Inspect the moveable sheave bushing (9) for wear or damage.
15. Remove all three drive clutch weights (13).
16. Inspect each weight. The surface should be smooth, with no waves or galling. Place bolt inside weight to check flyweight bushing and pin surface for wear by rocking the weight back and forth.
17. Inspect all the rollers (15), bushings (16) and roller pins (14) by pulling a flat metal rod across the roller.
18. Roller can also be inspected by rolling with a finger to feel for flat spots, roughness, or loose bushing.

**NOTE: The flyweight bushing is not replaceable. If flyweight bushing is damaged both the flyweight, pin and nut will need to be replaced.**

19. Also inspect to see if the roller and bushing are separating.
20. Bushing must fit tightly in roller.
21. Replace roller and pin if roller fails to roll smoothly (no flat spots) or if the bushing is loose or worn.
22. Assembly is the reverse order of disassembly. Note the specifications and notes in See “Drive Clutch Service Components” on page 7.13

**CLUTCH ASSEMBLY**

1. Assemble the rollers, bushings and roller pins if they were

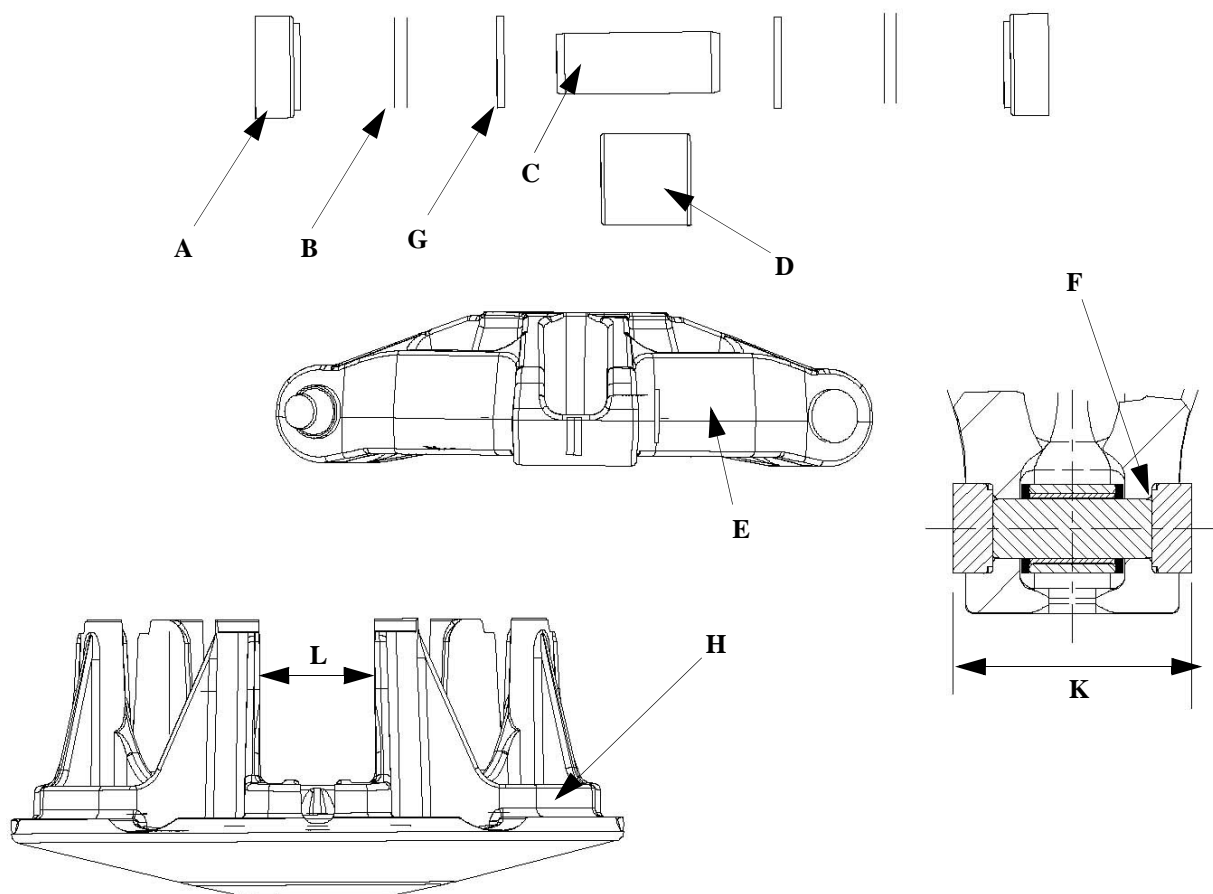


removed.

2. Install the head of the weight pin (12) so that it is on the leading side of rotation. This will orientate the nut (11) on the trailing side of rotation.
3. Torque weight pin to 30 in-lb (3Nm).
4. Place the moveable sheave (8) onto the stationary sheave (10).
5. Place the same number of spacers (18) under the stepped washer (17) onto the shaft of the stationary sheave.
6. Thread the spider onto the stationary sheave shaft.
7. Index the spider. See "SPIDER INDEXING" on page 7.15
8. Using the spider tool (PN 2870341) torque to 200 ft-lb (276Nm).
9. Install the jam nut (6) onto the shaft and torque it to 235 ft-lb (324 Nm).
10. Place the drive spring on the shaft.
11. Place the cover (3) onto the clutch and torque the cover fasteners (2) to 90 in-lb (10Nm).

**NOTE: DO not allow side loading or mis-alignment of the cover or the bushing may become damaged.**

## DRIVE CLUTCH SPIDER REMOVAL/INSTALLATION



## ROLLER REMOVAL

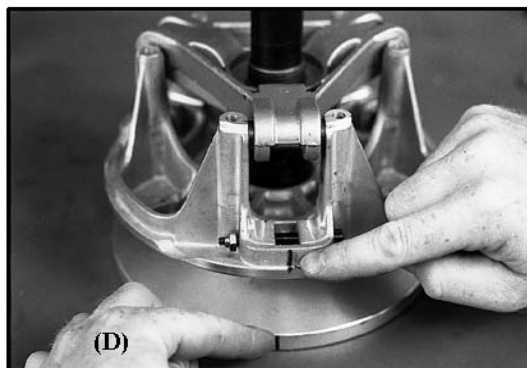
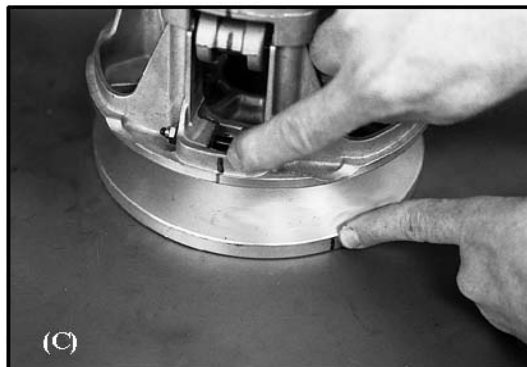
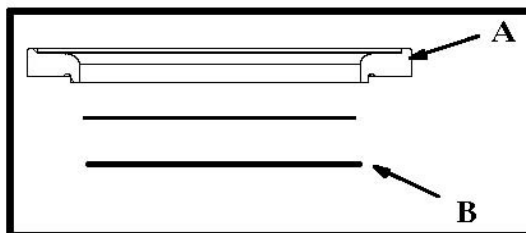
1. With the spider in a vise start removing the spider buttons (1) by drilling a 0.18" hole in the center of a button on one side of the spider.
2. Place spider (6) on a vise or in an arbor press.
3. Place a pin punch through the spider button hole and drive the opposite button and pin (4) out.
4. Remove shims (2) (if any are installed) and note their location.
5. Flip the spider over and tap out the holed button.



## ROLLER INSTALLATION

1. CAUTION: Use care to start the pin straight. Aluminum burrs could pass through into the roller bushing causing it to bind and stick. Also use care to make sure the roller remains aligned when the pin is driven through. The roller bushing could be damaged causing premature wear and roller failure.
2. Drive pin into the spider leg .100"  $\pm$  .125" (0.25 - 0.32cm) beyond the first land of the spider leg (8).
3. Install one washer (3) on the portion of the pin that is protruding from the spider leg.
4. Install new buttons into the spider
5. Place roller (5) in spider leg and center it on the pin.
6. Place a second washer on the other side of the roller.
7. Place the spider on a vise.
8. Install pin centering tool (PN 2870401).
9. Drive the roller pin through the second land of the spider.
10. Repeat this for each roller.
11. Measure the width of the spider leg with the buttons installed (9) and record the measurement. Specification for the width of the spider with buttons installed is 1.496" (37.99mm).
12. Measure the width of the moveable sheave towers (10) and record the measurement. Specification for the width of the opening of the moveable sheave towers are 1.50" (38.1mm).
13. Subtract the spider measurement from the tower measurement. The clearance between the spider buttons and the moveable sheave towers is .002" - .004" (.05 - .10mm).

## SPIDER INDEXING



**NOTE: Spider indexing effects belt to sheave clearance and clutch balance. Please read all procedures before proceeding.**

1. Remove and Disassemble clutch See "DRIVE CLUTCH DISASSEMBLY" on page 7.13
2. Add or remove spider washers as required to achieve desired belt to sheave clearance. Make sure that the stepped washer (A) is on the top of the spacer stack (B).

For example: If belt to sheave clearance is 0.020" too large, removing one 0.020 shim will position the movable sheave closer to the fixed sheave reducing belt to sheave clearance by 0.020".

3. Place the correct number of space washers (B) beneath the spider. The following washers are available for fine tuning.

PN 5210754.050" (1.3mm)

PN 5210753.032" (.8mm)



PN 5210752.020" (.5mm)

4. Install spider washer(s) and spider aligning the "X" with the moveable sheave's "X". Notice as the spider seat location is changed, the sheave marks made before disassembly no longer align (C). There are two ways to bring the sheave marks into alignment.

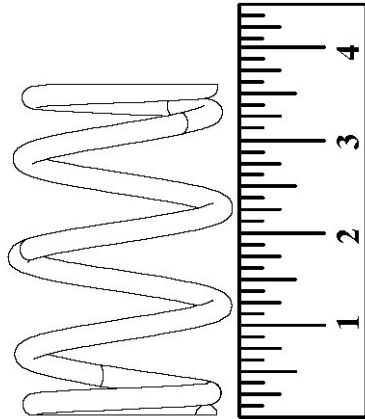
Vary the amount and thickness of spacer washers (washer thickness may vary slightly). Re-index marked spider leg to another tower. This can be done because spider has little effect on overall clutch balance.

Re-indexing the spider 1/3 turn clockwise, or 1 leg, will allow the realignment of the moveable and stationary sheaves as previously marked (D). For EXAMPLE: 0.020" or 0.032" (0.5 - 0.8mm) washer removed - re-index spider clockwise 1/3 turn.

**NOTE: Alignment marks on the sheaves should be with in 1" (.25mm) after final assembly and torquing.**

## SPRING FREE LENGTH

Maximum efficiency of the variable speed drive system is dependent upon many factors. Included in these are clutch offset and alignment,



belt tension, belt to sheave clearance, and internal condition of the drive and driven clutch components. One of the most critical and easily serviced parts is the drive clutch spring. Due to the severe stress the spring is subject to during operation, it should always be inspected and checked for tolerance limits during any clutch operation diagnosis or repair.

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

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



## CAUTION

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

New springs that are introduced will be black in color with the last four digits of the spring part number, and the load rating in white ink on the outer diameter of the spring located and the mid height of the spring.

EXAMPLE: Spring PN 7042287 has a load rating of 110/290. The designation printed on the spring would be "2287 110/290".

**Table 7-4: Drive Clutch Springs**

PART NUMBER	COLOR	WIRE DIAMETER (inches)	FREE LENGTH +/- .125"	FORCE LBS. @2.50" - 1.19" (+/- 12 LBS.)	LOAD RATE (lbs./inch)
7041021	No paint color	.157"	4.14	70-130	44
7041022	Black	.140"	4.25"	44-77	25
7041063	Purple	.168	4.37	75-135	53
7041062	Silver	.207	3.12	75-243	151
7041065	Pink	.177	4.69	112-200	64
7041060	Orange	.196	3.37	70-199	98

**Table 7-4: Drive Clutch Springs**

<b>PART NUMBER</b>	<b>COLOR</b>	<b>WIRE DIAMETER (inches)</b>	<b>FREE LENGTH +/- .125"</b>	<b>FORCE LBS. @ 2.50" - 1.19" (+/- 12 LBS.)</b>	<b>LOAD RATE (lbs./ inch)</b>
7041083	Red	.192	3.77	120-245	94
7041102	Yellow	.192	2.92	44-185	105
7041061	Brown	.200	3.14	69-212	109
7041132	White	.177	2.92	34-141	81
7041168	Green	.177	3.05	42-142	76
7041148	Gold	.207	3.25	100-275	133
7041150	Red/White	.192	3.59	100-220	91
7041286	Silver/Gold	.218	3.05	77-240	163
7041080	Blue	.207	3.55	120-300	137
7041781	Dark Blue/White	.225	3.42	120-310	145
7041945	Almond	.218	3.65	140-330	145
7041645	Almond/Gold	.207	4.00	150-290	107
7041818	Black/White	.218	3.52	140-320	137
7041816	Almond/Black	.200	3.75	165-310	111
7041922	Almond/Blue	.218	3.75	150-310	122
7041988	Almond/Red	.207	4.27	165-310	110
7042083	Black/Green	.218	3.38	120-340	168
7043076	Black - 3076	.225	2.67	40-340	229
7043120	Black - 3120	.225	2.78	60-340	213
7043077	Black - 3077	.255	2.90	80-340	198
7043121	Black - 3121	.255	3.05	100-340	183
7042287	Black - 2287	.207	3.40	110-290	137



## Drive Clutch Weights

**Table 7-5: Full Tail Weights**

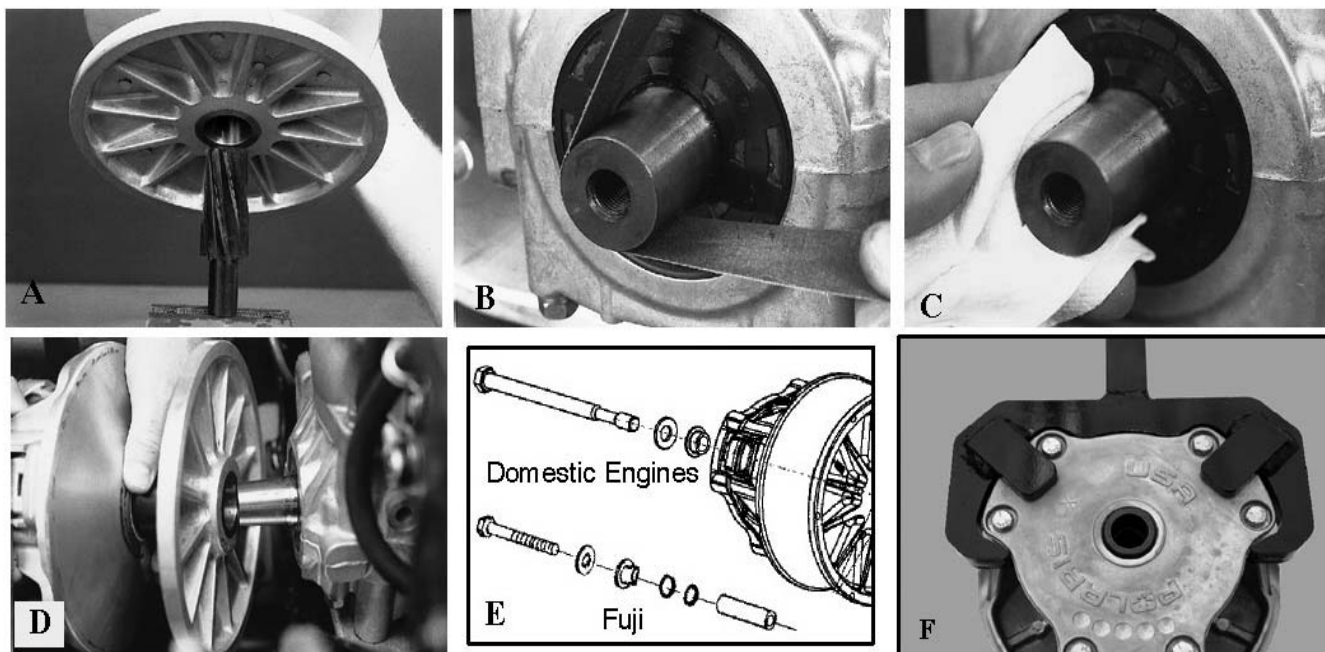
WEIGHT	GRAMS	PART NUMBER
S43H	43	1321849
S45H	45	1321850
S47H	47	1321851
S49H	49	1321730
S51H	51	1321731
S53H	53	1321759
S55H	53	1322004

**Table 7-6: 10 Series Weights**

WEIGHT	GRAMS(+/- 1g)	PART NUMBER
10M-R Bushed	44	1321530
10M-W Bushed	46	1321527
10M Blue Bushed	47.5	1321529
10M Bushed	49.5	1321531
10 Bushed	51	1321531
10 AL Bushed	53	1321589
10-54	54	1321685
10-56	56	1321684
10-58	58	1321588
10-60	60	1321587
10-62	62	1321586
10-62M	61.5	1321614
10-64	64	1321585
10-64M	63.5	1321615
10-66	66	1321584
10-68	68	1322427
10-70	70	1322414
10-72	72	1322428
10-74	74	1322429
10-76	76	1322478
10-76	76	1322585
10-78	78	1322586

**Table 7-7: 11 Series Weights**

WEIGHT GRAMS(+/- .8g)	PART NUMBER
11-50	1322589
11-52	1322595
11-64	1322604
11-66	1322559
11-68	1322558
11-70	1322523
11-72	1322524
11-74	1322525
11-76	1322526

**DRIVE CLUTCH INSTALLATION**

**NOTE:** Always clean the clutch taper before re-installing clutch on engine.

1. Place a clutch taper reamer (PN 2870576) in a vise (A) and lubricate the cutting edges with cutting oil. Clean the clutch taper by manually rotating the clutch clockwise on the reamer one or two revolutions. Only use the weight of the clutch and do not push down on the clutch while turning. This will clean up any galling or scoring of the bore taper.
2. Check crankshaft taper for galling or scoring. If necessary clean the taper evenly with 200 grit emery cloth (B).
3. The clutch taper and the crankshaft taper should be clean and dry. Do not use harsh cleaners which may cause clutch taper to corrode, or damage to the crank seal. This may cause difficulty when removing clutch in the future.
4. Clean clutch taper with lacquer thinner or isopropyl alcohol (C).
5. Slide clutch fully onto crankshaft taper (D).
6. Install the retaining bolt with all spacers and washers or o-rings (E) that were on the bolt when it was removed.
7. Hold the clutch with the holding wrench (F) PN 931417-A. Re-check torque after first operation or test ride.
8. Torque retaining bolt to specification see Table 7-8.
9. Run engine then re-torque the retaining bolt to specification.

**Table 7-8: Drive Clutch Bolt Torque**

ENGINE	BOLT	TORQUE
Fuji 340/500/550	7/16" - 20	40-45 ft-lb (55-62Nm)
Liberty 440/500/600	14 mm	50 ft-lb (68Nm)
Liberty 700 / 900	14mm	96 ft-lb
FS/FST	14mm	50 ft-lb (68Nm)



## DRIVEN CLUTCH

### DRIVEN CLUTCH OVERVIEW

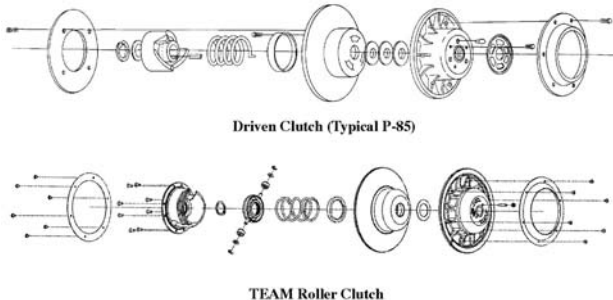
The driven, or secondary, clutch is a torque (load) sensing device. The driven clutch performs several important roles in the drive system. First, the driven clutch must provide enough side force on the drive belt to transmit the engine torque to the ground while minimizing both belt slippage and excessive belt wear. Second, the driven clutch must act as a load feedback device (drive shaft torque) to the drive clutch and backshift to compensate.

The vehicle load from the track is transmitted through the snowmobile's gearing to the helix ramps via the drive shaft and jackshaft. The helix ramps function like a torque multipliers and are in constant contact with the moveable sheave rollers or buttons.

The driven clutch components, along with the final drive gearing and vehicle load, combine to generate their own shift force which opposes the shift force generated by the drive clutch. This shift force always wants to close the moveable sheave.

The driven clutch will open, or upshift, when the shift force generated by the drive clutch is greater than the shift force generated by the driven clutch. The driven clutch will close, or backshift, whenever the driven clutch shift force is greater than the shift force generated by the drive clutch.

### DRIVEN CLUTCH TYPES

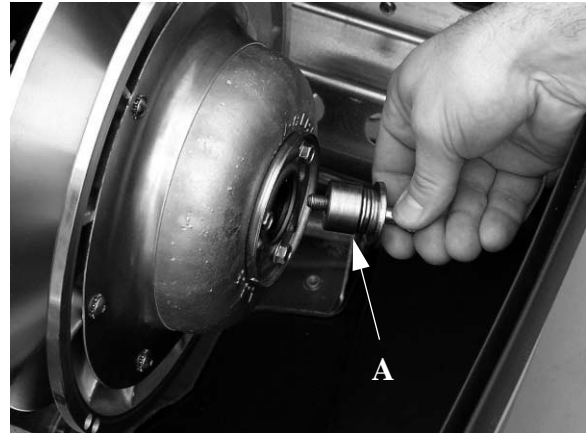


Polaris utilizes two types of driven clutches, the P-85 driven clutch and the Team driven clutch.

**NOTE: Replacement driven clutches do not come with a spring or the helix (ramp).**

**NOTE: To service the Team driven clutches, use the clutch compression tool extensions with the clutch compression tool. Tool part numbers can be found on Table 7-1 on page 7.3.**

### DRIVEN CLUTCH REMOVAL

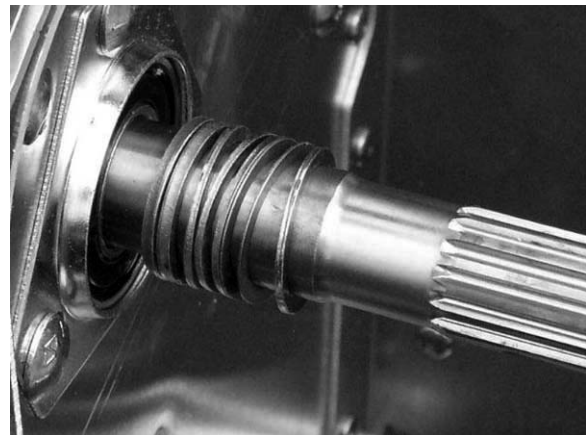


1. Remove the belt See “DRIVE BELT” on page 7.4.
2. Apply and lock the parking brake.
3. Remove the driven clutch bolt and washers (A).

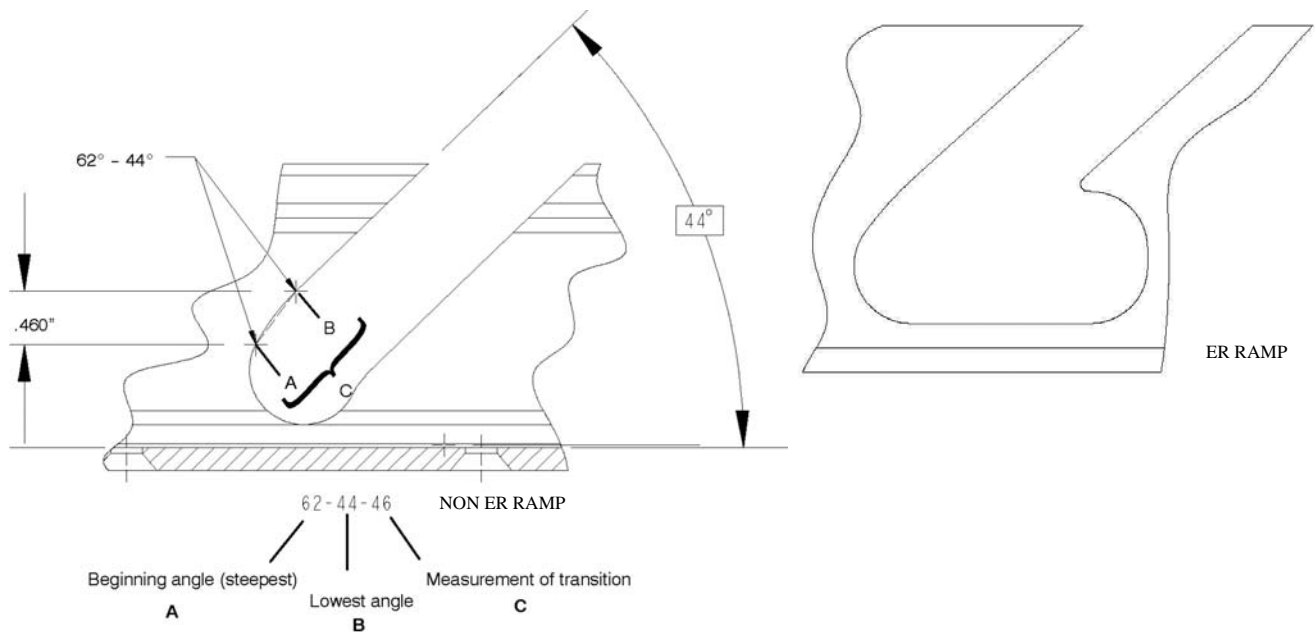
**NOTE: Keep track of the washers and how they are placed on the bolt.**

4. Slide the driven clutch off the jackshaft.
5. Inspect the keyway if equipped and replace the key if any damage is found.

### DRIVEN CLUTCH INSTALLATION



1. Install the driven clutch bolt with the same amount of washers (B) at removal.
2. Torque the bolt to 17 ft-lb (23Nm).
3. Check for correct belt deflection see page See “BELT DEFLECTION” on page 3.17.

**TEAM RAMPS EXPLAINED**

The ramps for the Team roller clutch is designated by the angle and length of the angle on the back side of the ramp. You will see that the first number (A) designates the steepest angle, which is the starting angle of the ramp. The second number (B) designates the lowest angle that it progresses to. The last number (C) is the measurement (length) at which the transition takes place. Electric reverse ramps have only one set of angles.

The non reverse ramps have two sets of angles that can be used for the desired angles. The non reverse ramps can not be used on a sled that has electric reverse. Using reverse with a non reverse ramp may cause damage to the driven clutch.

**Table 7-9: Team Driven Ramps for Non Electric Reverse**

PART NUMBER	DESCRIPTION
5133321	66/44-46 70/48-36
5133491	74/48-46 70/48-46
5133492	74/48-46 74/40-46
5133493	72/44-46 72/40-46
5133494	70/44-46 70/40-46
5133495	68/44-46 68/40-46
5133496	66/48-46 66/40-46
5133497	64/44-46 64/40-46
5133498	62/44-46 62/40-46
5133499	58/44-46 58/40-46
5133721	66/44-46 70/48-46
5134566	58/42-36 56/40-40
5134746	64/38-65 66/40-55
5134861	58/34-46 60/34-65
5135375	62/40-46 64/40-55
5135376	64/38-65 64/38-46

**Table 7-10: Team Driven Ramps for Electric Reverse**

PART NUMBER	DESCRIPTION	PART NUMBER	DESCRIPTION
5133687	58/44-46 ER	5134055	54/42-36 ER
5133771	58/42-46 ER	5134095	56/42-36 ER
5133772	62/46-46 ER	5134132	58/42-36 ER
5133773	62/42-46 ER	5134204	64/44-65 ER
5133784	58/40-46 ER	5134226	60/42-75 ER
5133785	62/40-46 ER	5134263	54/38-25 ER
5133786	62/44-46 ER	5134264	64/42-65 ER
5133787	62/48-46 ER	5134721	62/46-36 ER
5133788	66/44-46 ER	5134722	62/42-36 ER
5133789	60/46-46 ER	5134877	64/38-36 ER
5133886	54/42-46 ER	5135057	62/38-36 ER
5133887	S40 ER	5133904	S36 ER
		5135256	64/42-36 ER
5135242	64/38-25 ER	5135243	64/36-25 ER

**POLARIS P-85 HELIX****Table 7-11: P-85 Helix**

PART NUMBER	DESCRIPTION	DEGREES
5130896	34 D	34
5130895	36 D	36
5131287	R1	40-32
5131289	R3	45-32
5131290	R4	50-32
5131291	R5	40-34
5131294	R8	50-34
5131295	R9	40-36
5131297	R11	45-36
5131623	R32	50-34
5131298	R12	50-36
5630383	36.5	36.5
5133023	R49	60-23

The helix spring should always be adjusted within its limits before a helix change is performed. The normal rate of change between helix angle steps is 250 RPM under full throttle. This is approximately the same result as in going from the No. 1 to No. 4 spring position (P-85).

**NOTE: Increasing spring tension increases engine RPM. RPM changes may not be evident if other drive or driven clutch components are substandard.**

**NOTE: All R-Series, Mod(M), T1, and 40-36 helix ramps are cut 0.060, deeper in the snap ring pocket. These are made so the driven clutch can open far enough for full shift out with wide 1 7/16, belts.**

If these helix ramps are used with narrow belts, 2 (two) additional (for a total of three) .030, / .8 mm washers (PN 7556804) should be installed under the snap ring to prevent the belt from touching the inner hub at full shift which can cause belt failure. Wide belt models use only the existing washer under the snap ring.



## DRIVEN SPRINGS

Table 7-12: TEAM Driven Spring Data

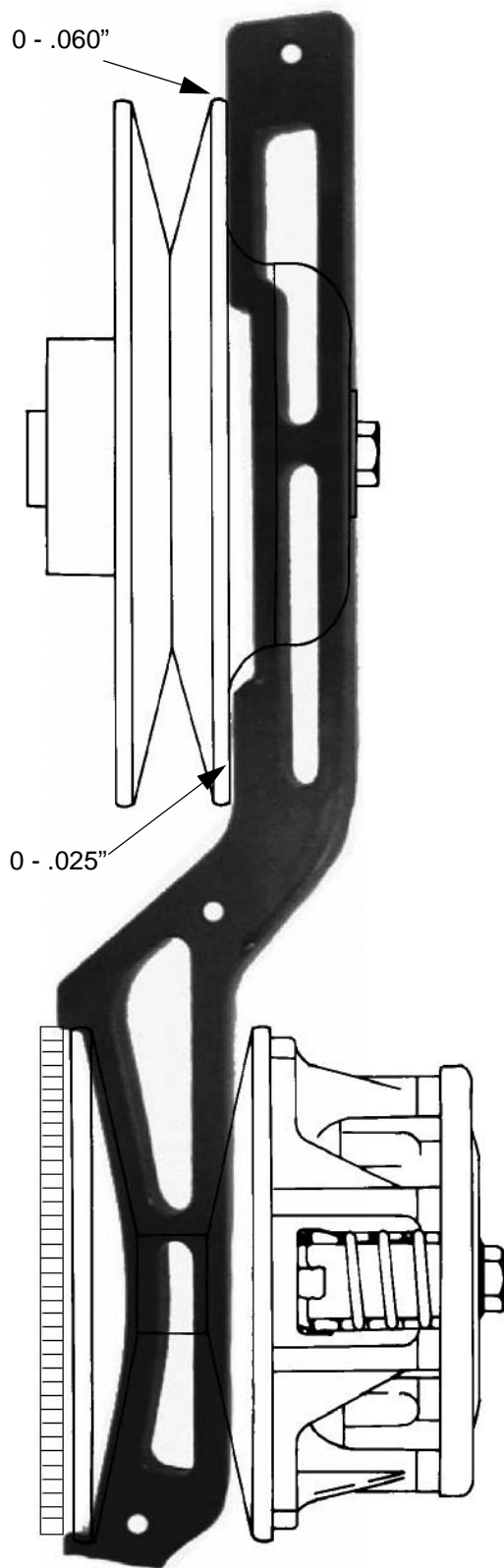
PART NUMBER	COLOR	WIRE DIAMETER	LOAD @ 2.2"(lbs)	LOAD @ 1.1"(lbs)	Rate (Lbs. per inch)
7042181	Black/Yellow	.200	145	208	56
7043058	Red/Black	.218	140	240	90
7043059	Red/Green	.218	120	220	90
7042066	Green/Black	.200	135	198	56
7043061	Red/Silver	.207	125	175	45
7043062	Red/Yellow	.207	100	150	45
7043057	Red/Blue	.218	140	200	54
7043063	Black/Red	.218	155	222	65
7043064	Blue/Black	.218	123	203	73
7043060	Red/White	.218	100	200	91
7043069	Red/Pink	.235	140	260	110

Table 7-13: Polaris Driven Spring Data

PART NUMBER	COLOR	WIRE DIAMETER	LOAD @ 2.5"(lbs)	LOAD @ 1.375"(lbs)
7041198	Red	.170	21	45
7041296	Blue	.192	29	64
7041499	Silver	.188	25	55
7041646	Silver/Blue	.183	42	75
7041782	Black	.177	24	49
7041501	Gold	.188	24	49
7042022	Blue/Orange	.192	56	90



## **DRIVE SYSTEM ADJUSTMENTS**



CLUTCH ALIGNMENT TOOL

## **CLUTCH ALIGNMENT**

The engine is mounted into the bulk head so that when the torque of the belt is under power it, will produce clutches that are aligned.

### **CLUTCH ALIGNMENT INSPECTION**

1. Remove drive belt, See "DRIVE BELT REMOVAL WITH TEAM CLUTCH" on page 7.5
2. Install alignment tool PN PS-46998.
3. Ideal set up would be that both front and rear portions of the clutch would be touching. If any gap is present it should not exceed .060" (3mm) at the rear and .025" (.63mm).

### **CLUTCH ALIGNMENT ADJUSTMENT**

1. Loosen engine mounting bolts.
2. Adjust the engine torque stop until the clutches are in proper alignment.
3. Tighten engine mounts securely.
4. Re-check both clutch offset and clutch alignment.
5. Verify proper torque stop adjustment. See "TORQUE STOP" on page 3.24

## **CLUTCH OFFSET**

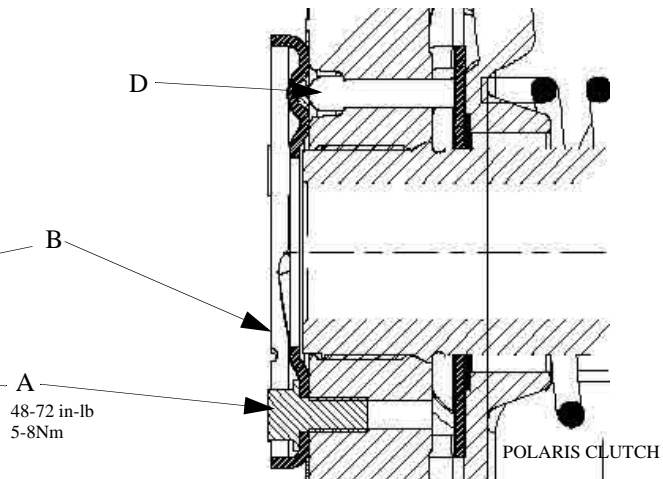
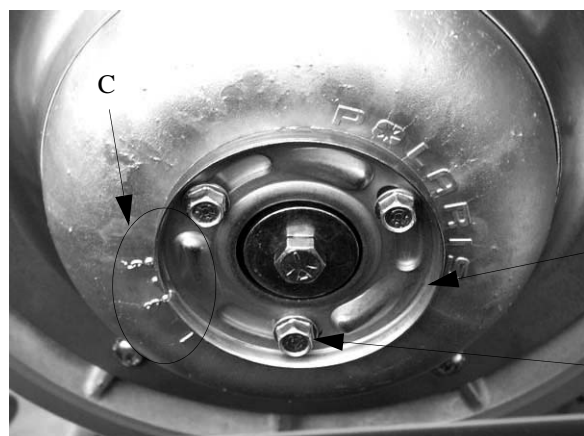
Clutch off set is a combination of engine mounting, clutch sheave angles, clutch diameters and casting thickness. These are built into the alignment tool PN PS-46998.

### **OFF SET ADJUSTMENT**

1. Determine direction driven clutch needs to be adjusted. (Refer to Clutch Offset Inspection procedure above).
2. Remove driven clutch retaining bolt, and remove driven clutch.
3. Add or take out washers on jackshaft between the driven clutch and jackshaft bearing to achieve proper offset.
4. Most models require the driven clutch to float on the jackshaft. After adjusting offset, add or remove shim washers from the retaining bolt to provide a +/- 0.030" (.75mm) of float on the jackshaft.

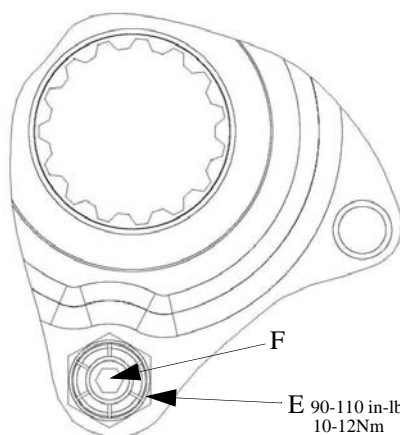


## POLARIS BELT DEFLECTION



1. Pull belt into driven clutch to slightly open sheaves.
2. Loosen three bolts (A) on adjustment cam.
3. Turn cam (B) counterclockwise to reduce distance between sheaves, and turn it clockwise to increase the distance between the sheaves.
4. The cam has an indicator (C) that will indicate what position it is in. The clutch has 5 different marks for settings.
5. This cam will apply pressure to the clutch pin (D) to open or close the clutch sheaves. Do not rotate past the #1 position.
6. Torque the adjustment cam bolts to 48-72 in.lbs (5-8Nm).

## TEAM BELT DEFLECTION



TEAM CLUTCH

1. Loosen the jam nut (E) by turning it counter clockwise.
2. Using an 1/8" Allen head wrench, turn the stud (F) counterclockwise to decrease belt deflection and clockwise to increase belt deflection.
3. This will apply pressure on the deflection spacer to increase or decrease the belt deflection.
4. When the proper belt deflection is achieved torque the lock nut (E) to 90-110 in-lb (10-12Nm).

**DRIVE BELT****DATA****Table 7-14:**

Part Number	Belt Width (Projected)* in/mm	Side Angle Overall*	Center to Center in/cm*	Outer Circumference in/cm	Notes
3211042	1.375/34.9	32°	12/30	47.25/120	Common production belt.
3211045	1.375/34.9	32°	12/30	47.125/119.7	Close tolerance version of 3211042
3211058	1.250/31.75	28°	11/28	43.313/110	P-90 belt
3211059	1.250/31.75	28°	12/30	45.125/114.6	Longer P-90 belt
3211061	1.375/34.9	32°	12/30	47.188/119.9	CVT version of 3211045
3211065	1.438/36.5	28°	12.5/31.75	48.375/122.9	CVT Double Cog Storm belt
3211066	1.375/34.9	28°	12/30	47.25/120	Double Cog-CVT- thicker than the 3211070.
3211067	1.375/34.9	28°	12/30	47.25/120	Double Cog-Good for short runs on higher horsepower engines-Good for low horsepower trail riding.
3211070	1.375/34.9	28°	12/30	47.25/120	Late model P-85 systems
3211073	1.438/36.5	28°	12.5/31.75	48.375/122.9	Double Cog-Good for short runs on higher horsepower engines-Good for low horsepower trail riding.
3211074	1.438/36.5	28°	12/30	47.625/121	Double Cog-Good for short runs on higher horsepower engines-Good for low horsepower trail riding.
3211075	1.438/36.5	28°	12/30	47.625/121	Double Cog CVT
3211080	1.438/36.5	28°	11.5/29.2	46.625/118.4	Double Cog CVT version of 3211078
3211078	1.438/36.5	28°	11.5/29.2	46.625/118.4	Standard drive belt
3211111	1.537/39	28°	14.562/37	47.674/121	Super Cog Belt

\*Belt dimensions are given in nominal dimensions. There is a +/- variance for all critical dimensions. Clutch set up must be inspected when a new belt is installed and, if necessary adjusted.

The drive belt is an important component of the converter system. In order to achieve maximum efficiency from the converter, drive belt tension (deflection), clutch offset, and alignment must be adjusted properly.



## GENERAL BELT SELECTION GUIDELINES

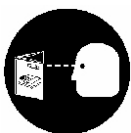
Refer to appropriate parts manual for proper belt fit.  
Production belt is recommended unless tuning for specific application.

### CVT

- Increased service life for high horsepower and extended high speed running.
- Need 1-2 grams heavier drive clutch weight.
- Good for prolonged high speed running.
- Good for aggressive riders.

### Standard Compound

- More aggressive at low speeds
- Reduced heat and drive clutch sheave wear.
- Good trail belt for lower horsepower engines.



# CHAPTER 8

## FINAL DRIVE

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## **GEARING CHARTS**

### **CHAINCASE SPEED CHARTS**

**Table 8-1: Chaincase Speed Cart**

Top Gear	26	26	26	26	25	25	25	25	25	25	25	25	25	24	24	24	24	24
Bottom Gear	35	36	39	40	36	37	38	39	40	41	42	43	44	37	38	39	40	41
7.92	NR	NR	NR	NR	NR	74	74	NR	76	76	NR	NR	NR	74	74	74	NR	76
8.373	NR	76	NR	78	76	76	NR	NR	78	78	NR	NR	80	NR	NR	NR	NR	78
11.35	92	92	94	94	92	92	NR	NR	94	94	NR	NR	NR	92	92	NR	NR	94
8.424	NR	NR	78	NR	NR	NR	NR	NR	78	NR	NR	NR	NR	NR	NR	NR	78	78
Gear Ratio	1.35	1.38	1.50	1.54	1.44	1.48	1.52	1.56	1.60	1.64	1.68	1.72	1.76	1.54	1.58	1.63	1.67	1.71
Jackshaft RPM	MPH																	
6000	96	93	86	84	89	87	85	83	81	79	77	75	73	84	81	79	77	75
6250	100	97	89	87	93	91	88	86	84	82	80	78	76	87	85	83	81	79
6500	104	101	93	91	97	94	92	89	87	85	83	81	79	91	88	86	84	82
6750	108	105	97	94	101	98	95	93	91	88	86	84	82	94	92	89	87	85
7000	112	109	100	98	104	102	99	96	94	92	89	87	85	98	95	93	90	88
7250	116	112	104	101	108	105	102	100	97	95	93	91	88	101	98	96	93	91
7500	120	116	107	105	112	109	106	103	101	98	96	94	92	104	102	99	97	94
7750	124	120	111	108	116	112	110	107	104	101	99	97	95	108	105	102	100	97
8000	128	124	115	112	119	116	113	110	107	105	102	100	98	111	109	106	103	101
8250	132	128	118	115	123	120	117	114	111	108	105	103	101	115	112	109	106	104
8500	136	132	122	119	127	123	120	117	114	111	109	106	104	118	115	112	110	107
8750	140	136	125	122	131	127	124	120	117	115	112	109	107	122	119	116	113	110
9000	144	140	129	126	134	131	127	124	121	118	115	112	110	125	122	119	116	113
9250	148	143	132	129	138	134	131	127	124	121	118	116	113	129	125	122	119	116
9500	152	147	136	133	142	138	134	131	128	124	121	119	116	132	129	126	122	119
9750	156	151	140	136	145	141	138	134	131	128	125	122	119	136	132	129	126	123
10000	160	155	143	140	149	145	141	138	134	131	128	125	122	139	136	132	129	126

**Table 8-2: Chaincase Speed Cart**

Top Gear	24	24	23	23	23	23	23	23	23	23	22	22	22	22	22	22	22	22
Bottom Gear	42	43	37	38	39	40	41	42	43	46	37	38	39	40	41	42	43	46
7.92	76	NR	NR	74	74	NR	NR	76	76	NR	72	NR	74	74	NR	NR	76	NR
8.373	78	NR	NR	NR	76	NR	NR	78	NR	NR	NR	NR	76	76	NR	NR	78	NR
11.35	94	NR	NR	92	92	NR	NR	94	94	NR	NR	NR	92	92	NR	NR	94	NR
8.424	NR	NR	NR	NR	NR	NR	NR	NR	NR	80	NR	NR	NR	NR	NR	NR	NR	80
Gear Ratio	1.75	1.79	1.61	1.65	1.70	1.74	1.78	1.83	1.87	2.00	1.68	1.73	1.77	1.82	1.86	1.91	1.95	2.09
Jackshaft RPM	MPH																	
6000	74	72	80	78	76	74	72	71	69	64	77	75	73	71	69	68	66	62
6250	77	75	83	81	79	77	75	74	72	67	80	78	76	74	72	70	69	64
6500	80	78	87	84	82	80	78	76	75	70	83	81	79	77	75	73	71	67
6750	83	81	90	88	85	83	81	79	78	72	86	84	82	80	78	76	74	69
7000	86	84	93	91	89	86	84	82	80	75	89	87	85	83	81	79	77	72
7250	89	87	97	94	92	90	87	85	83	78	93	90	88	86	84	82	80	74
7500	92	90	100	97	95	93	90	88	86	81	96	93	91	89	86	84	82	77
7750	95	93	103	101	98	96	93	91	89	83	99	96	94	92	89	87	85	80
8000	98	96	107	104	101	99	96	94	92	86	102	99	97	95	92	90	88	82
8250	101	99	110	107	104	102	99	97	95	89	105	103	100	97	95	93	91	85
8500	104	102	113	110	108	105	102	100	98	91	109	106	103	100	98	96	93	87
8750	107	105	117	114	111	108	105	103	101	94	112	109	106	103	101	98	96	90
9000	110	108	120	117	114	111	108	106	103	97	115	112	109	106	104	101	99	92
9250	114	111	123	120	117	114	111	109	106	99	118	115	112	109	107	104	102	95
9500	117	114	127	123	120	117	114	112	109	102	121	118	115	112	109	107	104	98
9750	120	117	130	127	123	120	117	115	112	105	125	121	118	115	112	110	107	100
10000	123	120	134	130	127	123	120	118	115	107	128	124	121	118	115	113	110	103


**Table 8-3: Chaincase Speed Cart**

Top Gear	21	21	21	21	21	21	21	21	21	21	20	20	20	20	20	20	20	20
Bottom Gear	37	38	39	40	41	42	43	44	46	47	37	38	39	40	41	42	43	45
7.92	72	NR	NR	74	74	NR	76	NR	NR	NR	72	72	NR	NR	74	74	NR	NR
8.373	NR	NR	NR	76	NR	NR	NR	78	NR	NR	NR	NR	NR	NR	76	NR	NR	78
11.35	90	NR	NR	92	92	NR	NR	NR	NR	NR	90	90	NR	NR	92	92	NR	NR
8.424	NR	NR	NR	NR	NR	NR	NR	NR	80	80	NR	NR	NR	NR	NR	NR	NR	NR
Gear Ratio	1.76	1.81	1.86	1.90	1.95	2.00	2.05	2.10	2.19	2.24	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.25
Jackshaft RPM	MPH																	
6000	73	71	69	68	66	64	63	62	59	58	70	68	66	64	63	61	60	57
6250	76	74	72	70	69	67	66	64	61	60	73	71	69	67	65	64	62	60
6500	79	77	75	73	72	70	68	67	64	62	75	73	72	70	68	66	65	62
6750	82	80	78	76	74	72	71	69	66	65	78	76	74	72	71	69	67	64
7000	85	83	81	79	77	75	73	72	69	67	81	79	77	75	73	72	70	67
7250	88	86	84	82	80	78	76	74	71	70	84	82	80	78	76	74	72	69
7500	91	89	87	85	83	81	79	77	74	72	87	85	83	81	79	77	75	72
7750	94	92	90	87	85	83	81	79	76	74	90	88	85	83	81	79	77	74
8000	98	95	93	90	88	86	84	82	78	77	93	90	88	86	84	82	80	76
8250	101	98	95	93	91	89	87	85	81	79	96	93	91	89	86	84	82	79
8500	104	101	98	96	94	91	89	87	83	82	99	96	94	91	89	87	85	81
8750	107	104	101	99	96	94	92	90	86	84	102	99	96	94	92	89	87	84
9000	110	107	104	101	99	97	94	92	88	86	104	102	99	97	94	92	90	86
9250	113	110	107	104	102	99	97	95	91	89	107	105	102	99	97	95	92	88
9500	116	113	110	107	105	102	100	97	93	91	110	107	105	102	100	97	95	91
9750	119	116	113	110	107	105	102	100	96	94	113	110	107	105	102	100	97	93
10000	122	119	116	113	110	107	105	103	98	96	116	113	110	107	105	102	100	95



Table 8-4: Chaincase Speed Cart

Top Gear	19	19	19	19	19	19	19	19	18	18	18	18	18	18	18	17	17	17	17	17	17	17
Bottom Gear	37	38	39	40	41	42	43	46	37	38	39	40	41	42	43	37	38	39	40	41	42	43
7.92	NR	72	72	NR	74	74	74	NR	NR	NR	72	72	NR	74	74	70	NR	72	72	72	NR	74
8.373	NR	74	NR	NR	NR	76	NR	78	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
11.35	NR	90	90	NR	NR	92	92	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
8.424	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Gear Ratio	1.95	2.00	2.05	2.11	2.16	2.21	2.26	2.42	2.06	2.11	2.17	2.22	2.28	2.33	2.39	2.18	2.24	2.29	2.35	2.41	2.47	2.53
Jackshaft RPM	MPH																					
6000	66	64	63	61	60	58	57	53	63	61	59	58	57	55	54	59	58	56	55	53	52	51
6250	69	67	65	64	62	61	59	55	65	64	62	60	59	58	56	62	60	59	57	56	54	53
6500	72	70	68	66	65	63	62	58	68	66	64	63	61	60	58	64	62	61	59	58	57	55
6750	74	72	71	69	67	66	64	60	71	69	67	65	64	62	61	67	65	63	62	60	59	57
7000	77	75	73	71	70	68	66	62	73	71	69	68	66	64	63	69	67	66	64	62	61	59
7250	80	78	76	74	72	70	69	64	76	74	72	70	68	67	65	72	70	68	66	65	63	62
7500	83	81	78	77	75	73	71	67	78	76	74	72	71	69	67	74	72	70	68	67	65	64
7750	85	83	81	79	77	75	74	69	81	79	77	75	73	71	70	76	74	73	71	69	67	66
8000	88	86	84	82	80	78	76	71	84	81	79	77	75	74	72	79	77	75	73	71	70	68
8250	91	89	86	84	82	80	78	73	86	84	82	80	78	76	74	81	79	77	75	73	72	70
8500	94	91	89	87	85	83	81	75	89	86	84	82	80	78	76	84	82	80	78	76	74	72
8750	97	94	92	89	87	85	83	78	91	89	87	85	83	81	79	86	84	82	80	78	76	74
9000	99	97	94	92	90	87	85	80	94	92	89	87	85	83	81	89	86	84	82	80	78	76
9250	102	99	97	94	92	90	88	82	97	94	92	89	87	85	83	91	89	87	84	82	80	79
9500	105	102	99	97	95	92	90	84	99	97	94	92	90	87	85	94	91	89	87	85	83	81
9750	108	105	102	99	97	95	93	86	102	99	97	94	92	90	88	96	94	91	89	87	85	83
10000	110	107	105	102	100	97	95	89	104	102	99	97	94	92	90	99	96	94	91	89	87	85



## **GEARS AND CHAINS**

### **GEARS**

**Table 8-5: Chaincase Gears**

<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>CHAINCASE FIT</b>
3221093	17T, 3/4W, 15 SPL, HYVO, PM	7.92 8.37 11.35
3221094	18T, 3/4W, 15 SPL, HYVO, PM	
3221095	19T, 3/4W, 15 SPL, HYVO, PM	
3221096	20T, 3/4W, 15 SPL, HYVO, PM	
3221097	21T, 3/4W, 15 SPL, HYVO, PM	
3221098	22T, 3/4W, 15 SPL, HYVO, PM	
3221099	23T, 3/4W, 15 SPL, HYVO, PM	
3221101	24T, 3/4W, 15 SPL, HYVO, PM	
3221102	25T, 3/4W, 15 SPL, HYVO, PM	
3222127	26T, 3/4W, 15 SPL, HYVO, PM	
3222126	36T, 3/4W, 15 SPL, HYVO, PM	7.92 8.37 11.35
2900010	37T, 3/4W, 15 SPL, HYVO, CM	
3222125	37T, 3/4W, 15 SPL, HYVO, PM	
2900011	38T, 3/4W, 15 SPL, HYVO, CM	
3222108	39T, 3/4W, 15 SPL, HYVO, PM	
3222099	40T, 3/4W, 15 SPL, HYVO, PM	
3222101	41T, 3/4W, 15 SPL, HYVO, PM	
2900005	42T, 3/4W, 15 SPL, HYVO, CM	
2900016	43T, 3/4W, 15 SPL, HYVO, CM	
3221188	43T, 3/4W, 15 SPL, HYVO, PM	
1341243	39T, REVERSE, 3/4W, 15 SPL, HYVO, PM	7.92
1341227	40T, REVERSE, 3/4W, 15 SPL, HYVO, PM	
1341228	41T, REVERSE, 3/4W, 15 SPL, HYVO, PM	
3221164	18T, 7/8W, 15 SPL, HYVO, CM	7.92 8.37 11.35
3221165	19T, 7/8W, 15 SPL, HYVO, CM	
3221166	20T, 7/8W, 15 SPL, HYVO, CM	
3221167	21T, 7/8W, 15 SPL, HYVO, CM	
3221168	22T, 7/8W, 15 SPL, HYVO, CM	
3221169	23T, 7/8W, 15 SPL, HYVO, CM	
3221170	24T, 7/8W, 15 SPL, HYVO, CM	
3221171	25T, 7/8W, 15 SPL, HYVO, CM	

**CM** = Cut Metal Sprocket    **PM** = Powder Metal Sprocket

**CD** = Center Distance between top and bottom sprocket.



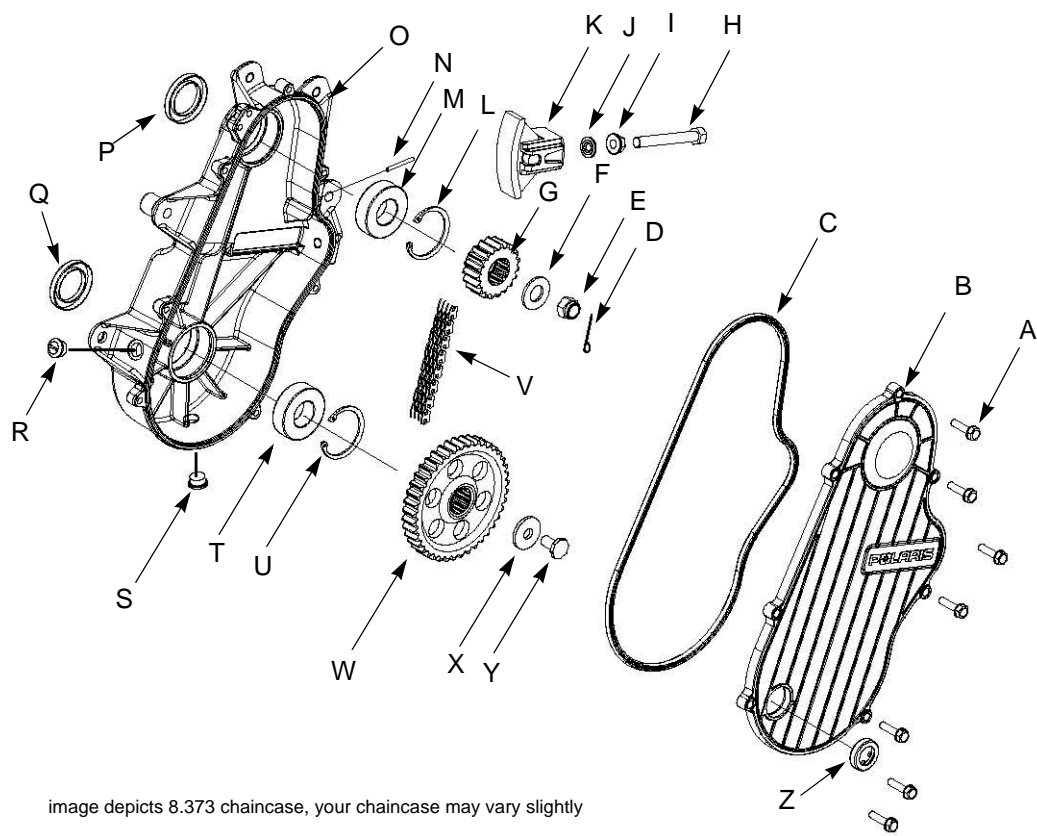
DRIVE CHAIN

Table 8-6: Drive Chains

PART NUMBER	DESCRIPTION	CHAINCASE FIT
3221114	64P, 3/4W, HYVO CHAIN	7.92 8.37 11.35
3221113	66P, 3/4W, HYVO CHAIN	
3221112	68P, 3/4W, HYVO CHAIN	
3221115	70P, 3/4W, HYVO CHAIN	
3221110	72P, 3/4W, HYVO CHAIN	
3221109	74P, 3/4W, HYVO CHAIN	
3221108	76P, 3/4W, HYVO CHAIN	
3221158	90P, 3/4W, HYVO CHAIN	
3221157	92P, 3/4W, HYVO CHAIN	11.35
3221156	94P, 3/4W, HYVO CHAIN	
3221161	96P, 3/4W, HYVO CHAIN	
3222131	74P, 7/8W, HYVO CHAIN	
3222132	76P, 7/8W, HYVO CHAIN	7.92 8.37 11.35

CHAIN CASE

EXPLODED VIEW





**Table 8-7: Chaincase**

ITEM	DESCRIPTION	TORQUE SPECIFICATION / NOTES
A	Cover bolts	8 ft-lb(11Nm)
B	Chaincase cover	
C	Cover gasket	make sure that the gasket is not pinched during assembly
D	Cotter pin	bend the ends over the nut flats when installing
E	Jackshaft nut	50 ft-lb (62.5Nm)
F	Washer	
G	Top sprocket	Install so that the shoulder is facing the bearing
H	Chain tensioner adjuster	Torque only finger tight during assembly
I	Tensioner lock nut	
J	Fastener Seal	Thread this onto the adjuster bolt during assembly
K	Tensioner Assembly	
L	Upper c-clip	Install so that the chamfered edge is facing the bearing
M	Upper bearing	Loctite 680 when assembled
N	Breather roll pin	
O	Chaincase	
P	Upper seal	Install so that the lip is facing the chaincase
Q	Lower seal	Install so that the lip is facing the chaincase
R	Fill plug	
S	Drain plug	8 ft-lb (11Nm)
T	Lower bearing	Loctite 680 when assembled
U	Lower c-clip	Install so that the chamfered edge is facing the bearing
V	Chain	
W	Lower sprocket	Install so that the shoulder is facing the bearing
X	Washer	
Y	Lower sprocket retaining bolt	19 ft-lb (26Nm)
Z	Sight glass	Only remove if replacing

## 8.37 CHAINCASE REMOVAL

- Support the rear of the machine and loosen up the track tension.
- Remove RH side panel.
- Remove the exhaust system, see “EXHAUST REMOVAL” on page 3.16.
- Remove the plenum.
- Remove drain plug and drain the chaincase fluid.
- Once fluid is drained replace drain plug and torque to 8 ft-lb (11Nm).
- Remove the speedo drive on the drive shaft to gain access to the drive shaft retaining nuts.
- Remove driveshaft retaining nuts.
- Remove the torx screw that holds on the cowling on the LH side.
- Remove the torx screws that hold the oil/coolant bottles to the bracket. This will give you room to remove the caliper later.
- Move the LH cowling away from the footrest and remove the LH storage compartment by prying the top and sides of the compartment in to clear the foot rest. This will give you room to access the chaincase retaining bolts.
- Apply the parking brake.
- Tip machine over on its LH side.
- Remove the chaincase cover and clean it.
- Remove the lower sprocket bolt and washer (X,Y).
- Remove the cotter pin (D) on the jackshaft.
- Remove the jam nut (E) and washer (F) on the jackshaft (upper sprocket).
- Release the parking brake.
- Release the tension on the chaincase tensioner (H).
- Remove the sprockets (G,W) and chain (V) from the chaincase.
- Remove the brake caliper bolts.
- Push the coolant hose enough to remove the caliper out of the way of the chaincase.
- Remove the rear suspension.
- Carefully slide the driveshaft down so that it clears the chaincase, and remove the driveshaft.
- Remove the track from the chassis.
- Remove the chaincase retaining bolts.
- Slide the chaincase out of the chassis.
- Inspect the o-ring and seal sleeve on the jackshaft and replace the o-ring.
- Service the chaincase outlined in “CHAINCASE SEAL/ BEARING REPLACEMENT” on page 10.



### **8.37 CHAINCASE INSTALLATION**

1. Install the seal sleeve and o-ring onto jackshaft. The seal sleeve goes on first then the o-ring.
2. Install jackshaft installation tool PN 2870974 onto the jackshaft. This will prevent damage to the seal.
3. Install assembled chaincase onto the jackshaft in chassis.
4. Insert carriage bolts through the back side of the chassis and install the nylock nuts loosely.
5. Insert the track.
6. Insert the driveshaft and carefully guide it through the lower bearing of the chain case.
7. Loosely install the lower sprocket on the drive shaft with the retaining bolt. This will keep the driveshaft from falling through the other side.
8. Install the rear suspension.
9. Tip machine over so that it is upright.
10. Support the rear of the machine with a jack stand.
11. Center the track so that it is contacting the drive shaft drivers correctly.
12. Remove the jackshaft installation tool from the jackshaft.
13. Install the jackshaft alignment tool on jackshaft and torque enough so that the jackshaft is aligned with the chaincase bearing.
14. Torque all chaincase retaining bolts to 28-30 ft-lb (38-41Nm).
15. Remove the jackshaft alignment tool from jackshaft.
16. Install brake caliper and torque the retaining bolts to 19-21 ft-lb.(26-28 Nm).
17. Install the driveshaft by replacing the flange nuts on the speedo drive side. torque to 19-21 ft-lb.(26-28 Nm).
18. Replace the speedo drive cover.
19. Torque the speedo drive cover nuts to 11 ft-lb. (15Nm).
20. Remove the loosely placed lower gear and retaining bolt.
21. Place the upper sprocket, lower sprocket into the chain, and install it onto the shafts in the chaincase.
22. Lock the parking brake.
23. Replace the top sprocket retaining nut. Torque to 50 ft-lb.
24. Install cotter pin and bend the ends around the jackshaft end.
25. Install the lower sprocket retaining bolt. Torque to 19-21 ft-lb.(26-28 Nm).
26. Release the parking brake.
27. Adjust the chain tensioner by hand and back off 1/4 turn.
28. Lock the adjuster lock nut.
29. Install the chaincase cover, and torque the cover bolts to 10 ft-lb (13.5Nm).
30. Remove the fill cover and fill chaincase to the appropriate level.

31. Check for leaks.
32. Adjust track tension to the specified tension. See "Track Tension Data" on page 3.21
33. Install the LH storage compartment into the LH footwell area.
34. Insert the lower tabs on the cowl in the LH footwell.
35. Replace the torx screw that holds the cowl onto the steering hoop.

### **7.92 CHAINCASE REMOVAL**

1. Support the rear of the machine and loosen up the track tension.
2. Remove the exhaust system, see "EXHAUST REMOVAL" on page 3.16..
3. Remove the air box.
4. Remove drain plug and drain the chaincase fluid.
5. Once fluid is drained replace drain plug and torque to 8 ft-lb (11Nm).
6. Remove the speedo drive.
7. Apply the parking brake.
8. Shut the fuel off and drain the fuel from the fuel tank.
9. Tip machine over on its LH side.
10. Remove the chaincase cover.
11. Remove the lower sprocket bolt.
12. Remove the cotter pin on the jackshaft.
13. Remove the jam nut and washer on the jackshaft (upper sprocket).
14. Release the parking brake.
15. Release tension on the chain tensioner.
16. Remove the sprockets and chain from the chaincase.
17. Remove the brake caliper bolts.
18. Lift the caliper out of the way.
19. Carefully slide the driveshaft down so that it clears the chaincase.
20. Remove the chaincase retaining bolts.
21. Slide the chaincase out of the chassis.
22. Inspect the o-ring and seal sleeve on the jackshaft and replace the o-ring.
23. Service the chaincase outlined in "CHAINCASE SEAL/ BEARING REPLACEMENT" on page 10.

### **7.92 CHAINCASE ASSEMBLY**

1. Install the o-ring and then the seal sleeve onto the jackshaft.
2. Install jackshaft installation tool PN 2870974 onto the jackshaft. This will prevent damage to the seal.
3. Install chaincase onto the jackshaft in chassis.
4. Remove the jackshaft installation tool from the jackshaft.



5. Insert carriage bolts through the back side of the chassis and install the nylock nuts loosely.
6. Install the jackshaft alignment tool on jackshaft and torque enough so that the jackshaft is aligned with the chaincase bearing.
7. Torque all chaincase retaining bolts to 20 ft-lb (27Nm).
8. Install the track in the chassis.
9. Install the o-ring and then the seal sleeve onto the driveshaft.
10. Carefully guide the drive shaft through the lower bearing of the chain case.
11. Loosely install the lower sprocket on the drive shaft with the retaining bolt. This will keep the driveshaft from falling through the other side.
12. Install the rear suspension.
13. Tip machine over so that it is upright.
14. Turn the fuel valve on.
15. Support the rear of the machine.
16. Center the track so that it is contacting the drive shaft drivers correctly.
17. Install brake caliper and torque the retaining bolts to 30 ft-lb.(41 Nm).
18. Remove the loosely placed lower gear and retaining bolt.
19. Place the upper sprocket, lower sprocket into the chain, and install it onto the shafts in the chaincase.
20. Lock the parking brake.
21. Replace the top sprocket retaining nut. Torque to 50 ft-lb.
22. Install cotter pin and bent the ends around the jackshaft end.
23. Install the lower sprocket retaining bolt. Torque to 19 ft-lb. (26Nm).
24. Release the parking brake.
25. Adjust the chain tensioner by hand and back of 1/4 turn.
26. Lock the adjuster lock nut.
27. Install the chaincase cover, and torque the cover bolts to 8 ft-lb (11Nm).
28. Remove the fill cover and fill chaincase to the appropriate level.
29. Check for leaks.
30. Adjust track tension to the specified tension. See "Track Tension Data" on page 3.21

chain case so that the bearings drop out of the front. If the bearing pushes out hard, warm the area to expand the chaincase bore slightly.

**NOTE: When removing always push out the bearing towards the snap ring side of the chaincase.**

5. Clean the chaincase.
6. Apply Loctite 680 to the outer race of the new bearings and press them into the chaincase from the snap ring side.

**NOTE: Press on the bearing outer race only, or damage may occur to bearing.**

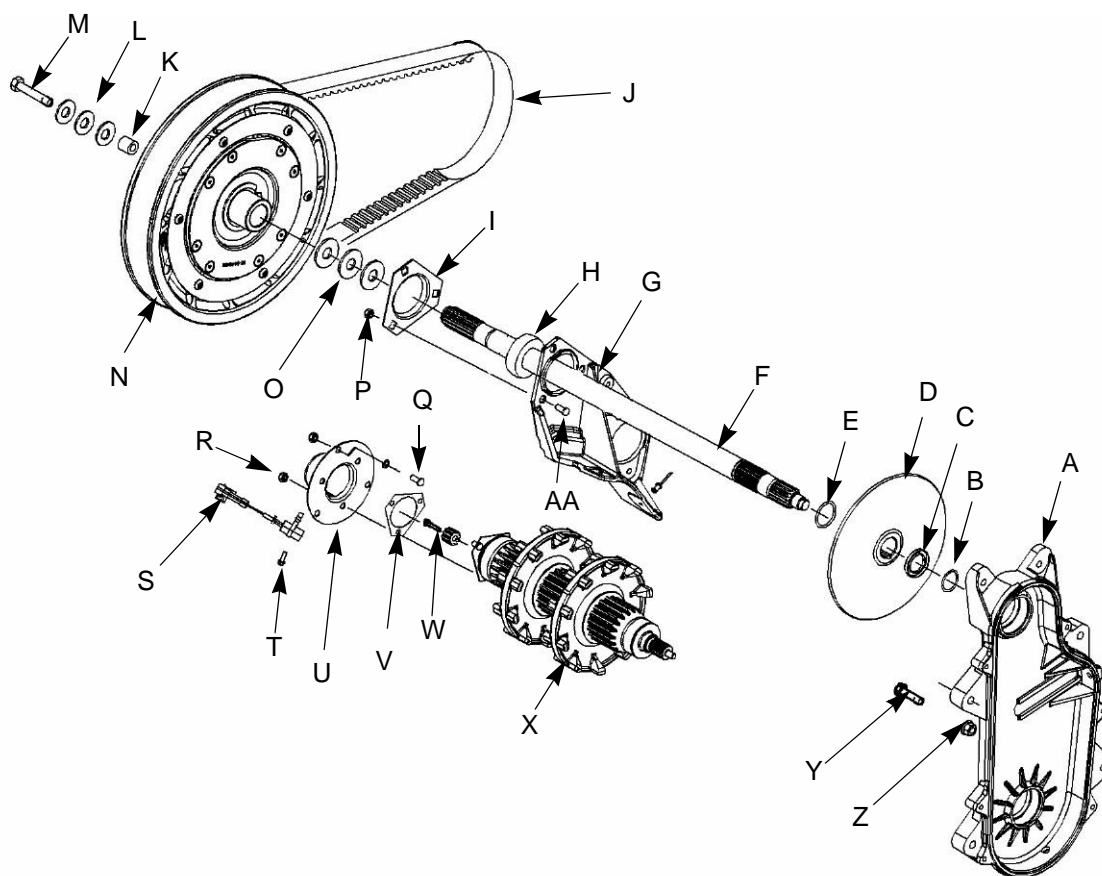
7. Replace the snap rings (L,U).
8. Press in new seals (P,Q) in the back of the chaincase until the outer edge of the seal is flush with the chaincase shoulder.

### CHAINCASE SEAL/BEARING REPLACEMENT

1. Remove the chaincase as described above.
2. Pry out the old seals (P,Q) from the back side of the chaincase.
3. Remove bearing retaining snap rings (L,U).
4. Press out the old bearings (M,T) from the back side of the



## DRIVE TRAIN



## JACKSHAFT EXPLODED VIEW

Table 8-8: Jackshaft

ITEM	DESCRIPTION	TORQUE SPECIFICATION / NOTES
A	Chaincase	7.92, 8.37, 8.47
B	O-ring	8.37 chaincase - install seal sleeve (C) first, then o-ring (B) on jackshaft
C	Seal	7.92 chaincase - install o-ring (B) first then seal sleeve (C) on jackshaft.
D	Brake Disk	Minimum thickness = .193" (4.9mm)
E	Retaining Ring	included on jackshaft
F	Jackshaft	
G	Bulkhead area	
H	Bearing	
I	Flangette	
J	Belt	
K	Spacer	
L	Washers	
M	Driven clutch retaining bolt	17 ft-lb (23Nm)
N	Driven Clutch	
O	Washers	Note the placement
P	Flangette Nuts	11 ft-lb (15Nm)
Q	Driveshaft Flangette Carriage Bolts	
R	Nylock Nut	11 ft-lb (15 Nm)
S	Speedo Pick Up (Speed Sensor)	
T	Speed Sensor Bolt	5 ft-lb (7Nm)
U	Speedo Pick Up Housing	
V	Speedo Pick Up Gasket	



**Table 8-8: Jackshaft**

ITEM	DESCRIPTION	TORQUE SPECIFICATION / NOTES
W	Speedo Wheel Pick Up and bolt	12-15 ft-lb (8.8-11Nm)
X	Drive Shaft	7.92 chaincase - install o-ring (B) first then seal sleeve (C) on driveshaft.
Y	Chaincase Carriage Bolt	
Z	Nylock Nut	20 ft-lb (27 Nm)

## JACKSHAFT REMOVAL

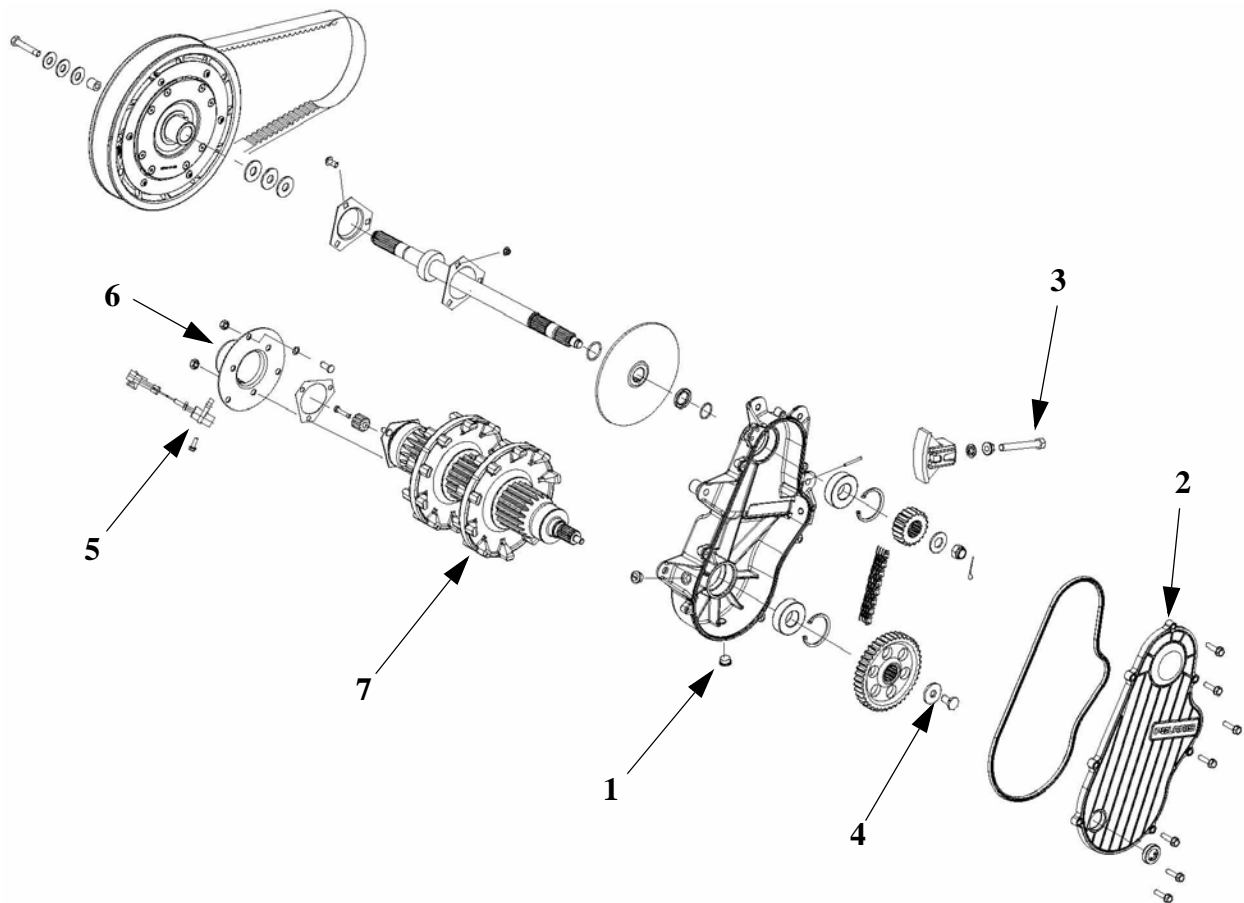
1. Remove the drive belt (J).
2. Remove the driven clutch (N) and make note of the placement of the washers (O).
3. Drain the chaincase fluid.
4. Remove the chaincase cover.
5. Remove the cotter pin on the upper sprocket.
6. Apply parking brake.
7. Remove the upper sprocket nut.
8. Remove the lower sprocket retaining bolt.
9. Loosen the chain tensioner.
10. Remove the upper and lower sprockets and chain from chaincase.
11. Release the parking brake.
12. Remove the bearing flange on the driven clutch side (I).
13. Remove the jackshaft assembly (E,F,H) from the brake disc (D) and chassis by tapping on the end of the jackshaft (F) with a soft face hammer.
14. This will also remove the o-ring (B) and seal (C).
15. Inspect jackshaft in bearing contact area. If diameter is 0.001" (.025 mm) less than non-contact area, replace the jackshaft.
10. Place the same amount of washers (O) on the drive clutch end of the jackshaft.
11. Install the driven clutch, spacer (K), and washers (L) and torque the retaining bolt (M) to 17 ft-lb (23Nm).
12. Install the belt.
13. Check clutch alignment See "CLUTCH ALIGNMENT INSPECTION" on page 25.

## JACKSHAFT INSTALLATION

1. Install jackshaft installation tool PN 2871296 onto the threads of the jackshaft.
2. Insert the new jackshaft assembly through the brake disk and install a new seal (C) and o-ring (B).
3. Remove the jackshaft installation tool.
4. With the jackshaft through the chaincase, install the jackshaft alignment tool PN 2871535 and secure with the flat washer and castle nut.
5. Tighten the castle nut securely to ensure positive bearing and jackshaft seating to chaincase.
6. If shaft is not centered, tap shaft with a soft faced hammer until centered. This will align the upper chaincase bearing in the chaincase bore.
7. Once the correct jackshaft alignment has been achieved, install lock nuts on the chaincase mounting bolts and torque them to 20 ft-lb (27Nm).
8. Remove the jackshaft alignment tool from chaincase.
9. Install jackshaft flange (I) and bolts (AA). Align grease



## **DRIVESHAFT**



### **DRIVE SHAFT REMOVAL**

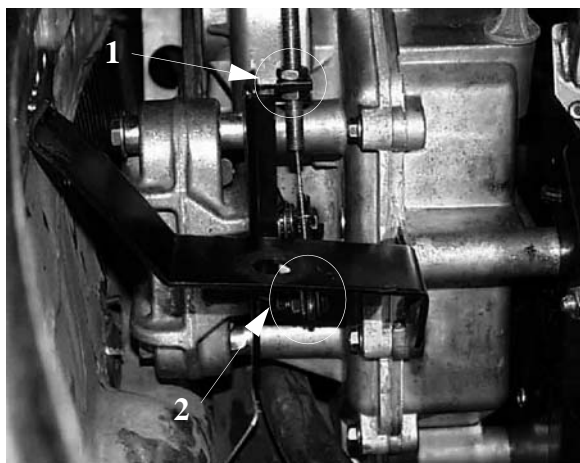
1. Remove the side panels.
2. Remove the intake plenum.
3. Remove the drain plug (1) and drain the chaincase fluid.
4. Replace the chaincase drain plug and torque it to 8 ft-lb (11Nm).
5. Remove the chaincase cover (2).
6. Loosen the tensioner (3).
7. Remove the lower sprocket bolt and washer (4).
8. Shut off the fuel valve if so equipped.
9. Remove the exhaust system See "EXHAUST REMOVAL" on page 3.16.
10. Remove the speedo drive pickup (5).
11. Remove the speedo drive housing (6).
12. Remove the rear skid See "REAR SUSPENSION REMOVAL" on page 11.13.
13. With the sled over on its left side and the rear skid removed, remove the drive shaft (7).



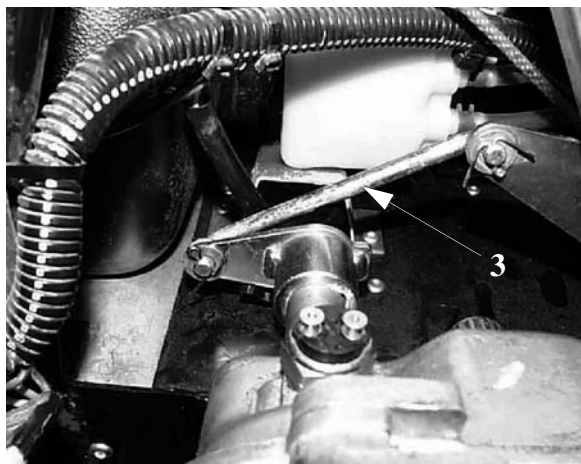
## WIDETRAK TRANSMISSION

### REMOVAL

1. Hood can be removed to prevent damage. Mark hood hinges for ease of alignment when reassembling unit.
2. Remove battery.
3. Turn off fuel valve. Move oil tank for access.
4. Remove air intake and coolant recovery bottle from its mounting.(do not remove entirely).
5. Remove drive belt.
6. Remove driven clutch retaining bolt assembly and drive clutch. Note number of spacers which are behind driven clutch for installation during reassembly procedures.
7. Remove muffler springs and muffler from unit.
8. Loosen brake cable jam nut (1) and remove cable bolt, nut and spacer (2. Use care not to lose spacer).

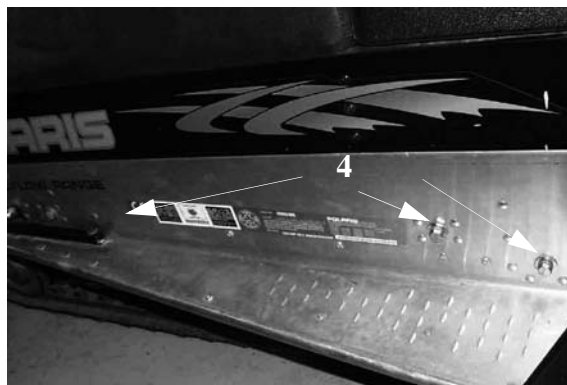


9. Remove cable from transmission.
10. Note location of shift linkage on transmission to assure proper location during reassembly. Remove cotter pin, washers, and pin from transmission arm (3).



11. Remove brake light wire connector from sensor.

12. Loosen rear idler wheels and bolts.
13. Loosen jam nuts on adjustment bolts on both sides. Back out adjustment bolts to allow rear idler assembly to come forward, relieving track tension.
14. Tighten idler wheel bolts so that spacers on shafts do not rotate and lose alignment.
15. Remove front and rear carrier shaft bolts (4), and front and rear suspension bolts from both sides.



16. Place a protective mat on the floor. Tip unit onto right side and remove suspension.
17. Remove (2) bolts, nuts, and flange supporting jackshaft bearing. Loosen and slide back lock ring from transmission end of jackshaft.
18. Remove jackshaft by pulling towards driven clutch side and lifting upward through bulkhead. It may be necessary to lightly tap on bearing collar to free coupler of jackshaft from transmission end.
19. Inspect bearing. If loose on the shaft the shaft must be replaced. If bearing is rough when turned, the bearing must be replaced. The bearing is pressed onto the shaft and will require a puller for removal.
20. Loosen and remove three carriage bolts and nuts retaining angle drive housing and flange.





21. Remove angle drive housing, adaptor key, flangette, gasket, and bearing from drive shaft and tunnel.

**NOTE: It is not necessary to remove speedometer cable from angle drive. Replace adaptor key any time drive train assembly is serviced.**

22. Tip machine back onto floor.
23. Remove bolt retaining rear of bumper to foot rest.
24. Bend muffler mount out of the way to allow transmission removal.
25. Remove three transmission retaining bolts. Note all alignment shim quantities and locations for reassembly.

**NOTE: Retaining bolts have to be held in place from underside while removing nuts. The lower front bolt cannot be removed at this time. It must be lowered to the drive sprocket.**

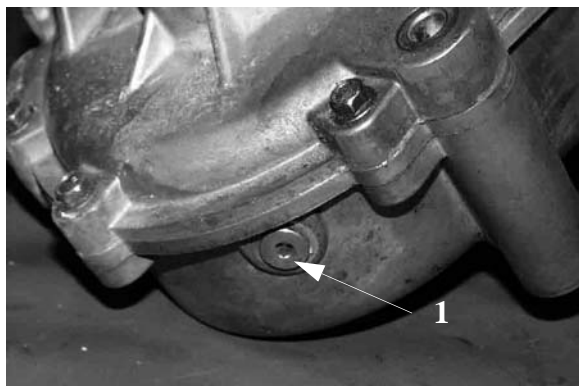
26. Lift and maneuver transmission to free drive shaft coupler.
27. Lower drive shaft and remove lower front bolt.
28. Maneuver transmission until it can be removed from the unit. Use care not to damage coolant lines.
29. With transmission removed, tip unit onto right side. Notice direction of track rotation for reassembly. The arrow in the photo at right indicates track bottom, rear of unit.
30. Remove front and rear carrier shafts.
31. Remove suspension by pulling rear of track out of tunnel. Slide suspension forward to driveshaft. Lift up and out at the rear.

**NOTE: NOTE: On some models it may be necessary to unhook rear torque arm springs to allow torque arm to lower.**

32. Inspect transmission, brakes, suspension and track for excessive wear. Check bearings for excessive movement or rough feeling. Replace if necessary.

### INSPECTION

1. Remove drain plug (1) and drain transmission oil into suitable container.



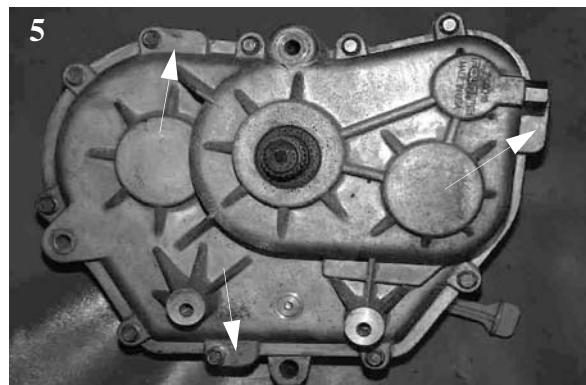
2. Remove snap ring, spacer washer, and brake disc.

**NOTE: Note position of spacer washers behind disc for proper alignment upon reassembly.**

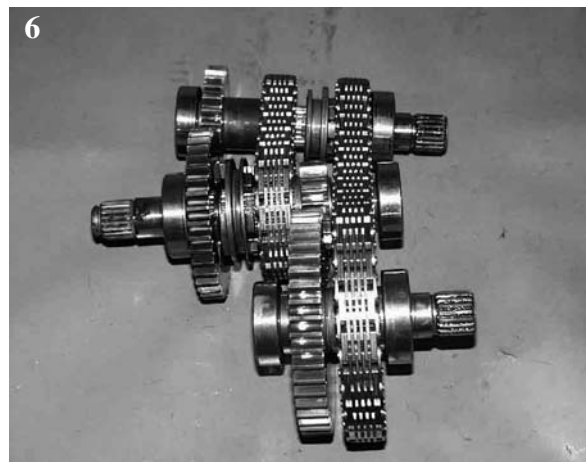
3. Remove detente spring and ball.



4. Remove case bolts evenly in a criss-cross pattern.
5. Tap cases apart with soft faced hammer in the reinforced areas (2). Tap end of brake shaft to be sure it remains in case.

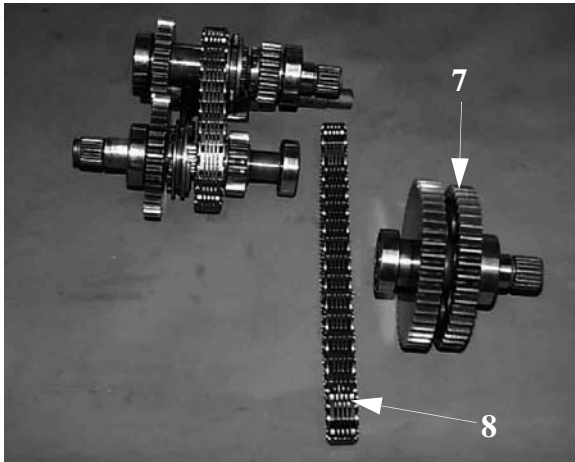


6. Remove shift arm.
7. Remove shaft and gear assembly (6) from case by tapping with a soft faced hammer evenly on end of shafts.

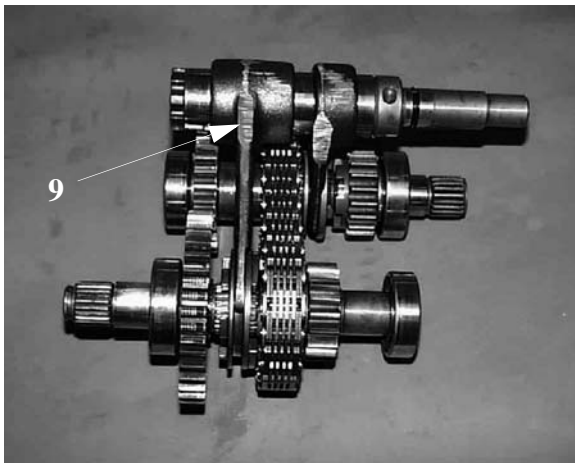




8. Remove output gear assembly (7) and chain (8). Mark chain direction for reference during reassembly. Inspect gear teeth for damage. Inspect chain for worn, cracked, or broken link plates.



9. Remove shift fork shaft (9) from gear cluster. Inspect surface of fork for wear or bending.

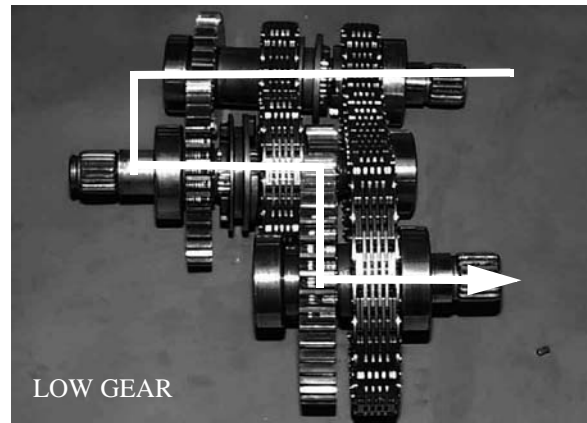


10. Remove chain from input and reverse shaft. Inspect gear teeth for damage. Inspect chain for worn, cracked, or broken link plates.
11. Inspect dog gears and slots in mating gears closely. Rounded edges will cause gears to disengage under load. Replace both dog gear and mating gear if edge of dog and/or slot is rounded. Inspect gears for chipped, cracked, or broken teeth.

12. Gear, shaft, and chain cluster assembly shown.



13. Low gear output power flow...



14. High gear output power flow...





15. Reverse output power flow...



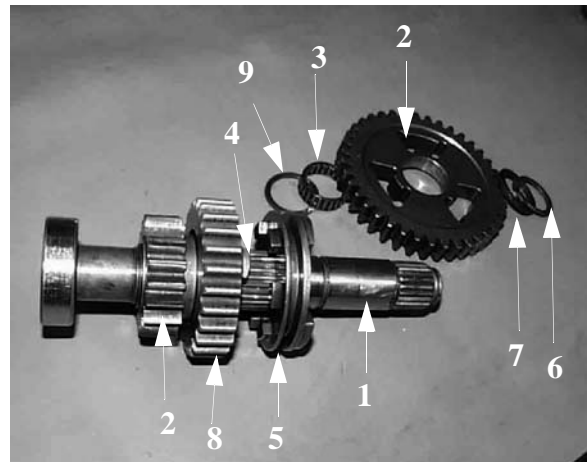
### LOW/REVERSE SHAFT DISASSEMBLY

1. Press bearing from end of shaft using a bearing separator.



2. Remove snap ring and spacer washer.

3. Remove low reverse shaft (1), low gear (2), needle bearing (3), thrust washer (4), low/reverse dog gear (5).
4. Remove Snap ring (6), thrust washer (7) (.125"), reverse idler (8), and thrust washer (9) (.065").

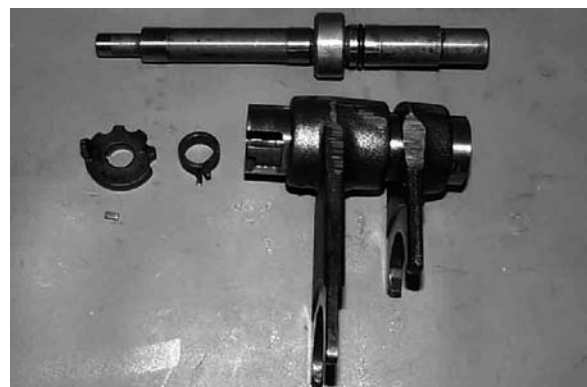


5. Closely inspect drive dogs. Replace gear and mating gear if rounded, chipped or broken.
6. Inspect needle bearings for wear or cracks on cage. Shiny spots on cage indicate wear and the bearing should be replaced. Inspect shaft and thrust washers for galling or wear. Always replace snap rings if removed.

### SHIFT FORK DISASSEMBLY

1. Remove the detente cam, spring and shaft.
2. Check condition of key way and key. Inspect indicator, spring legs and detente areas for wear. Replace parts as required.

**NOTE: The spring must be pre-loaded upon installation. Refer to photo and illustration below.**

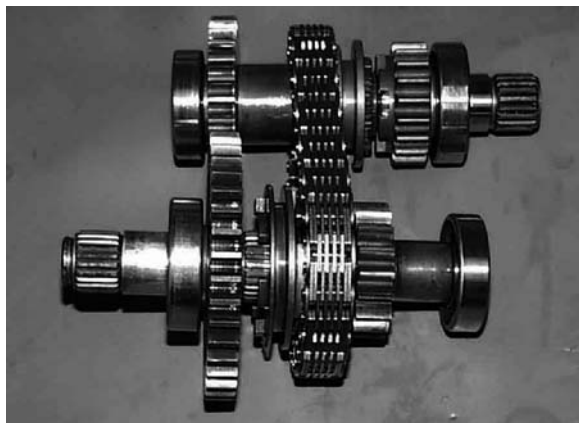




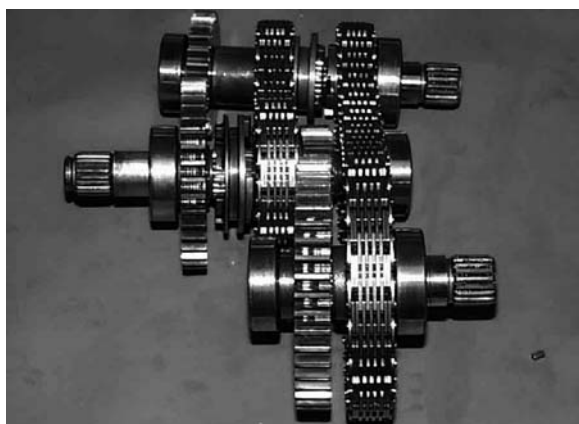
## TRANSMISSION ASSEMBLY

Lubricate all parts before assembly with Premium Synthetic Chaincase Lubricant.

1. Install chain on input and reverse shaft.



2. Add output gear assembly with chain.



3. Add shift fork assembly.
4. Install entire assembly in case half.
5. Apply 3 BondE 1215 Sealant to case halves.
6. Install outer case half and replace brake cable bracket. Torque bolts in three steps to 8-10 ft. lbs. (11-14 Nm) using a criss-cross pattern. Remove dowel from tensioner and install access plug (where applicable).
7. Install seals, shift arm, brake disc and caliper. Install detente ball, spring, and spring guide. Fill with 20 ounces (600cc) Polaris Premium Synthetic 0W-40 Oil.

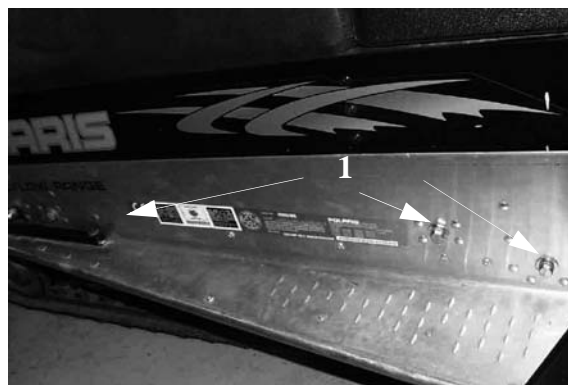
## TRANSMISSION INSTALLATION

1. Tip unit onto right side.
2. Insert track in unit, making sure direction of rotation is correct.
3. Place drive shaft in unit, aligning drive sprockets and track drive lugs.

4. Install lock collar, flangette, bearing, gasket, and flangette on drive shaft, positioning bearing flush with end of drive shaft.
5. Lightly tighten set screws to hold bearing in place.
6. Align flangette holes with tunnel.
7. Replace adaptor key in drive shaft. Install angle drive housing aligning adaptor key with angle drive.
8. Install nuts and finger tighten.
9. Tip machine onto its left side.
10. Replace O-rings on input and output shafts. Apply Polaris All Season Grease to drive shaft coupler splines.
11. Reinstall transmission, using care not to damage coolant hoses. Be sure transmission shift linkage is properly located.
12. Install lower front mounting bolt (3) before coupling to shaft. Once bolt is started into transmission housing, align coupling with drive shaft and jack shaft splines. Keep transmission flat and lower gradually to prevent binding of couplers.
13. Install remaining transmission mounting bolts. Reinstall shim washers in original positions and tighten bolts securely.

**NOTE: Proper transmission/jackshaft alignment is critical for bearing service life. Use a standard nut and flat washer for initial installation of transmission, and install new mounting hardware after jackshaft alignment is complete.**

14. Tip machine onto its right side.
15. Loosen set screws and seat drive shaft in transmission coupler stub shaft. For ease of assembly, make sure track has no pressure against drive shaft.
16. Tighten nuts retaining angle drive housing to tunnel. Torque to specification.
17. Reinstall suspension inside track and align with tunnel mounting holes.
18. Install and hand tighten suspension bolts (1).



19. Install front carrier shaft assembly inside track and mount to tunnel with bolts. Hand tighten bolts.

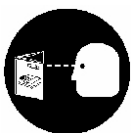


20. Install rear carrier shaft assembly. Make sure bolts are not cross threaded and hand tighten.
21. Tip machine back onto floor and tighten all suspension bolts to specification.
22. If jackshaft was removed from unit, grease coupler spline with Polaris Premium All Season Grease and install on transmission.



23. Reattach transmission shift linkage and brake light connector. Check transmission fluid level and fill if necessary
24. Attach brake cable to transmission mounting with bolt, nut and spacer.
25. Install bumper onto footrest bolt and tighten.
26. Reinstall bumper plug.
27. Reinstall and secure muffler.
28. Install battery, air box, oil tank, and coolant recovery bottle.
29. Loosen rear idler bolts.
30. Reinstall driven clutch and spacers onto jackshaft and tighten.
31. Reinstall clutch offset washers on jackshaft and install driven clutch. Using the clutch alignment tool adjust driven clutch to achieve proper offset.
32. WideTrak models have no float on driven clutches. Use shim washers (PN 7555734) to create gap between shaft and cover washer only.
33. Torque driven clutch retaining bolt to specification.
34. Lift and support rear of unit and align track to specifications found in the Maintenance section. Make sure rear idler wheel spacer location is correct before tightening idler wheels.





# CHAPTER 9

## BRAKES

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## HYDRAULIC BRAKE SYSTEM

### OVERVIEW

The Polaris snowmobile hydraulic brake system consists of the following components or assemblies: brake lever, master cylinder, hydraulic hose, brake caliper (slave cylinder), brake pads, and a brake disc which is secured to the drive line.

When the hand activated brake lever (A) is applied, it contacts a piston (B) within the master cylinder. As the master cylinder piston moves inward it closes a small opening called a compensating port (C) within the cylinder and starts to build pressure within the brake system. As the pressure within the system is increased, the pistons (D) located in the brake caliper move toward the disc and applies pressure to the moveable brake pads. As the lever pressure is increased, the braking effect is increased.

The friction applied to the brake pads will cause the pads to wear. As the pads wear, the piston within the caliper self-adjusts and moves further outward.

Brake fluid level is critical to proper system operation. A low fluid level allows air to enter the system causing the brakes to feel spongy.

### COMPENSATING PORT

Located within the master cylinder is a small compensating port (C) which is opened and closed by the master cylinder piston assembly. The port is open when the brake lever is released and the piston is outward. As the temperature within the hydraulic system changes, this port compensates for fluid expansion caused by heat, or contraction caused by cooling. During system service, be sure this port is open. Due to the high temperatures created within the system during heavy braking, it is very important that the master cylinder reservoir have adequate space to allow for the brake fluid to expand. Master cylinder reservoirs should be filled to the top of the fluid level mark on the inside of the reservoir, 1/4" - 5/16" (.6 - .8 cm) below lip of reservoir opening.

This system also incorporates a diaphragm (E) as part of the cover gasket and a vent port (F) located between the gasket and the cover. The combination diaphragm and vent allow for the air above the fluid to equalize pressure as the fluid expands or contracts. Be sure the vent is open and allowed to function. If the reservoir is overfilled or the diaphragm vent is plugged, the expanding fluid may build pressure in the brake system and lead to brake failure.

### GENERAL GUIDELINES



#### WARNING

Contaminated brake discs or brake pads greatly reduce braking performance and increase stopping distance. Do not attempt to clean contaminated pads. Replace them. Clean the brake disc with brake cleaner.

This brake system requires ethylene-glycol based fluid (DOT 4). Do not use or mix different types of fluid such as silicone-based or petroleum-based.

Do not use brake fluid taken from old, used or unsealed containers. Never reuse brake fluid.

Keep brake fluid tightly sealed and out of reach of children. Brake fluid can accumulate moisture, reducing its effectiveness.

A soft, spongy feeling in the brake lever and/or brake pedal could indicate a hazardous condition in the brake system. Do not operate the motorcycle until the failure in the brake system is corrected.

An unsafe condition exists when air is trapped in the hydraulic brake system. Air in the brake hydraulic system acts like a soft spring and absorbs a large percentage of the pressure developed by the master cylinder. Without this pressure, the braking system cannot develop full braking force to allow for safe, controlled stops. It is extremely important to bleed the brakes properly after any brake system work has been performed or when inspection reveals spongy brakes.



#### CAUTION

Pressure bleeding is not recommended. When fluid surges through the fittings, it is possible to cavitate the fluid and create air in the system. In addition, the fluid stored in a pressure bleeder may be contaminated. Always use fresh DOT 4 brake fluid from a sealed container.

Keep these points in mind when bleeding hydraulic brakes:

- The master cylinder reservoirs have limited capacities. It is easy to empty them during the bleeding procedure. This introduces air into the system which you are trying to purge. Watch the reservoir closely and add fluid when necessary to prevent air from entering the system.
- Apply only light to moderate pressure to the lever or pedal when bleeding the brake system. Extreme pressure will cause a surge of fluid through the small orifices of the brake system when the bleeder screw is opened and introduce air into the system by means of cavitation.



- Small amounts of air can become trapped in the banjo bolt fittings at the master cylinder(s) and junction points of brake lines. These fittings can be purged of air by following a standard bleeding procedure at these fittings (instead of the bleed screw on caliper) if necessary to speed the bleeding process. This is usually only needed if system was completely drained of fluid. Bleed each line connection, starting with the fitting closest to the master cylinder, working toward the caliper, and ending with the bleed screw.
- Always torque banjo bolts and other brake system fittings to specified torque.
- Change fluid every 2 years, or when fluid is dark or contamination is suspected.

## **BRAKE FLUID REPLACEMENT & BLEEDING**

This procedure should be used to change fluid or bleed brakes during regular maintenance, or after complete brake service. Brake fluid may damage painted or plastic surfaces. Take care not to spill, and wipe up any spills immediately. Cover parts to avoid damage.

1. Clean the reservoir cover.



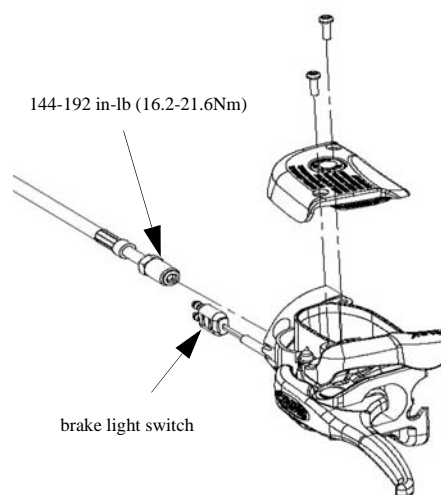
2. Remove the two T-15 Torx screws from the cover.
3. Carefully remove the cover and diaphragm assembly from the reservoir.
4. Under the cover, inspect the vent slots under the bellows and remove any debris or blockage.
5. Bleed or replace the fluid by attaching a clear hose from the caliper bleeder fitting to a clean container. Be sure the hose fits tightly on the bleeder fitting.
6. Pump the brake lever a few times and hold.
7. Slowly open the bleeder fitting and let the old fluid or air escape. You will feel the lever release as you let the fluid or air escape.
8. Pump the brake lever a few times and hold it again.
9. Repeat steps 7 and 8 until you see new brake fluid coming from the caliper bleeder fitting or if you are bleeding the

air, repeat this step until you see only fluid coming out. This may take several intervals.



10. Torque the bleeder screw to 8-11 ft-lb (11-15Nm).
11. When adding fluid, add DOT 4 brake fluid to 1/4-5/16" (.6-.8 cm) from the reservoir top.
12. Install cover and diaphragm assembly.
13. Tighten the cover screws to 16-20 in-lb (1.8-2.3Nm).
14. Field test machine before putting into service. Check for proper braking action and lever reserve. Lever reserve is when the lever is firmly applied, the lever reserve should be no less than 1/2" (1.3 cm) from the handlebar. See "BRAKE LEVER TRAVEL" on page 3.14.
15. Verify that the sight glass indicates a full reservoir.
16. Check brake system for any fluid leaks.

## **BRAKE LINE REPLACEMENT**

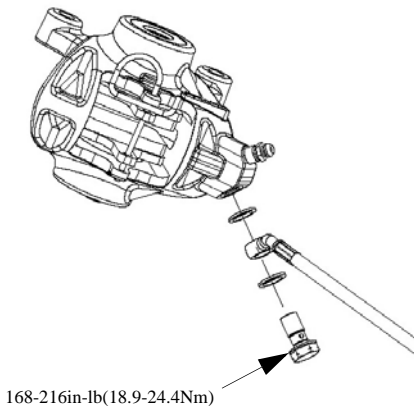


Follow these steps if the brake line is to be replaced.

1. If needed bleed the brake system by attaching a clear hose to the caliper bleed fitting.

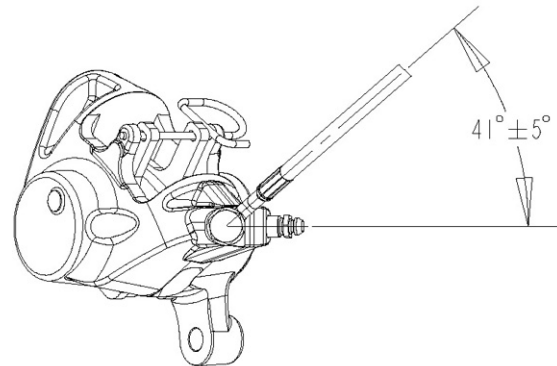


2. Attach the other end to a Mity Vac or similar vacuum tool.
3. Bleed the system of brake fluid.
4. Note the orientation of the brake line. The brake line will need to be replaced in the same orientation.
5. Remove the brake line from the caliper. Cap or cover the end to catch any brake fluid that may still be in the line.
6. Loosen the brake line from the master cylinder 1/4 to 1/2 turn.
7. Remove the 4 screws that hold the master cylinder to the handlebar. This will separate the master cylinder from the switch pack.



8. Unplug the brake light switch harness from the master cylinder.
9. Remove the brake line from the master cylinder.
10. Install new brake line on caliper and orientate it as noted in step 4.
11. Torque the caliper banjo bolt to 168-216 in-lb (18.9-24.4Nm).
12. Insert the new brake line and install into the master cylinder. Torque the brake line to 144-192 in-lb (16.2-21.6Nm).
13. Tighten the brake line into the master cylinder in an orientation so that the line does not have any sharp bends when it is installed on the handlebar.
14. Route the brake light switch in the harness correctly.
15. Place the switch pack with the master cylinder onto the handle bar. Two smaller screws should be placed on the top and the longest screw is placed on the lower right.
16. Follow the bleeding procedure as outlined in "BRAKE

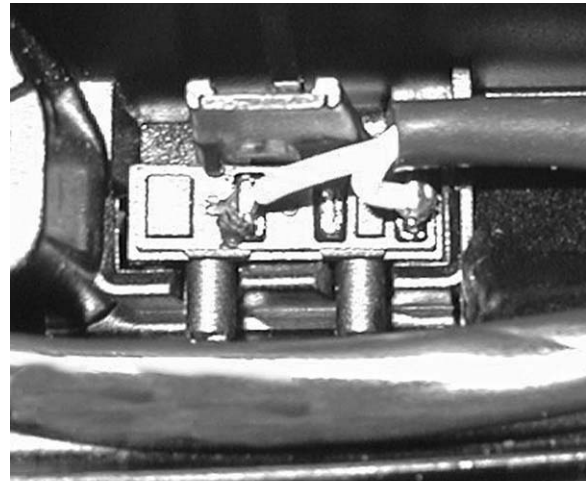
FLUID REPLACEMENT & BLEEDING" on page 9.3.



500 INDY, 340 Classic, 550 Classic, 340 Touring, Trail Touring, Trail Touring Deluxe

## BRAKE LIGHT SWITCH REPLACEMENT

1. Remove the 4 screws that hold the master cylinder to the handlebar. This will separate the master cylinder from the switch pack.



2. Unplug the brake light switch harness from the master cylinder.
3. Unplug the brake light switch from the master cylinder.
4. Replace faulty brake light switch into the master cylinder and route wires correctly.
5. Plug the brake switch back into the harness.
6. Replace the master cylinder to the switch pack and insert the smaller screws on the top, the longest one goes into the lower right side.

## CALIPER

### CALIPER REMOVAL

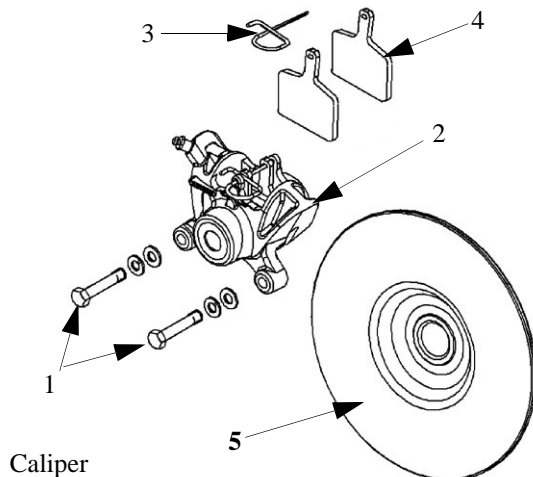
1. Remove the two caliper bolts that hold the caliper to the chaincase.
2. Remove the caliper from the brake disc.



## CALIPER REPLACEMENT

The only serviceable item in the brake caliper is the brake pads. If any service is required of the caliper a new caliper is available.

1. The brake line will need to go in the same orientation as it was when it is replaced. Note the orientation of the brake line before removing it.
2. Remove the banjo bolt from the brake line and tie up so that all the brake fluid does not leak out.
3. On a liquid cooled caliper, you will need to drain the coolant from the coolant hoses.



4. Remove the two bolts (1) holding the caliper (2) to the chaincase.
5. Remove the caliper from the chaincase.

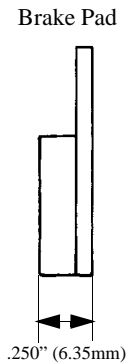
## CALIPER ASSEMBLY

1. Replace caliper bolts (1) and torque them to 18-20 ft-lb (24-27Nm).
2. On a liquid cooled caliper, hook up the coolant lines.
3. Place the brake line on the caliper in the same orientation as it was before it was removed.
4. Clean the threads of the banjo bolt and the threads in the caliper.
5. Install banjo bolt into the caliper and torque it to 168-216 in-lb (18.9-24.4Nm).
6. Bleed the brakes. See "BRAKE FLUID REPLACEMENT & BLEEDING" on page 9.3.
7. On a liquid cooled caliper you will need to bleed the cooling system of any trapped air, See "COOLING SYSTEM BLEEDING" on page 3.8.

## BRAKE PAD REPLACEMENT

Brake pads need to be replaced if the total thickness of the pads and backing are less than .250" (6.35mm).

1. Remove brake pad retaining pin (3).
2. Remove the brake pads (4).
3. Inspect the brake disc (5) for any wear.
4. Replace brake pads in reverse order of removal.



## BRAKE DISC REPLACEMENT

The brake disc should be replaced if the thickness of the disc is below .193" (.49cm).

1. Remove the chaincase, see See "8.37 CHAINCASE REMOVAL" on page 7.8..
2. Slide the brake disc from the jackshaft.
3. Check the jackshaft for any damage.
4. Replace the o-ring on the jackshaft
5. Replace the brake disk.
6. Assemble the chaincase.

## WIDETRAK BRAKE CALIPER

### REMOVAL

1. Remove brake cable.
2. Remove retaining bolts, making note of location of hex head bolt (with flat washer) and recessed Allen bolt.

**NOTE: Before performing next step, note position of two spring clips.**

3. Remove upper guide bushing and pads. Remove lower guide bushing. Inspect pads and replace if worn beyond service limit.
4. With actuating arm facing up, carefully remove tension



from the return spring.



5. Remove the arm using care not to lose the balls, ball spacer, or lifter ramp.
6. Inspect balls, ball spacer, lifter ramp and caliper housing for galling or wear. Replace if necessary.



## ASSEMBLY

1. Apply a light film of grease to balls and ball spacer. Install in caliper housing.
2. Install lifter ramp.

**NOTE:** Ramp may be installed in any position.

3. Install spring and arm with arm located in 2:00 position.



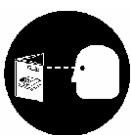
4. Install lower guide bushing and both spring clips. Place pads against lower bushing spring clip and tip into position.
5. Install upper guide bushing.

## INSTALLATION

1. Install hex head bolt with washer in top guide bushing. Install Allen head bolt in recessed bushing.



2. Reinstall brake actuating cable and adjust as needed. Tighten cable lock nuts securely.



# CHAPTER 10

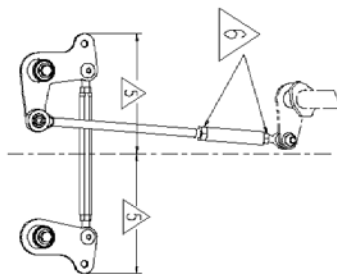
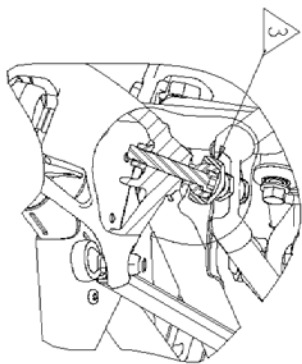
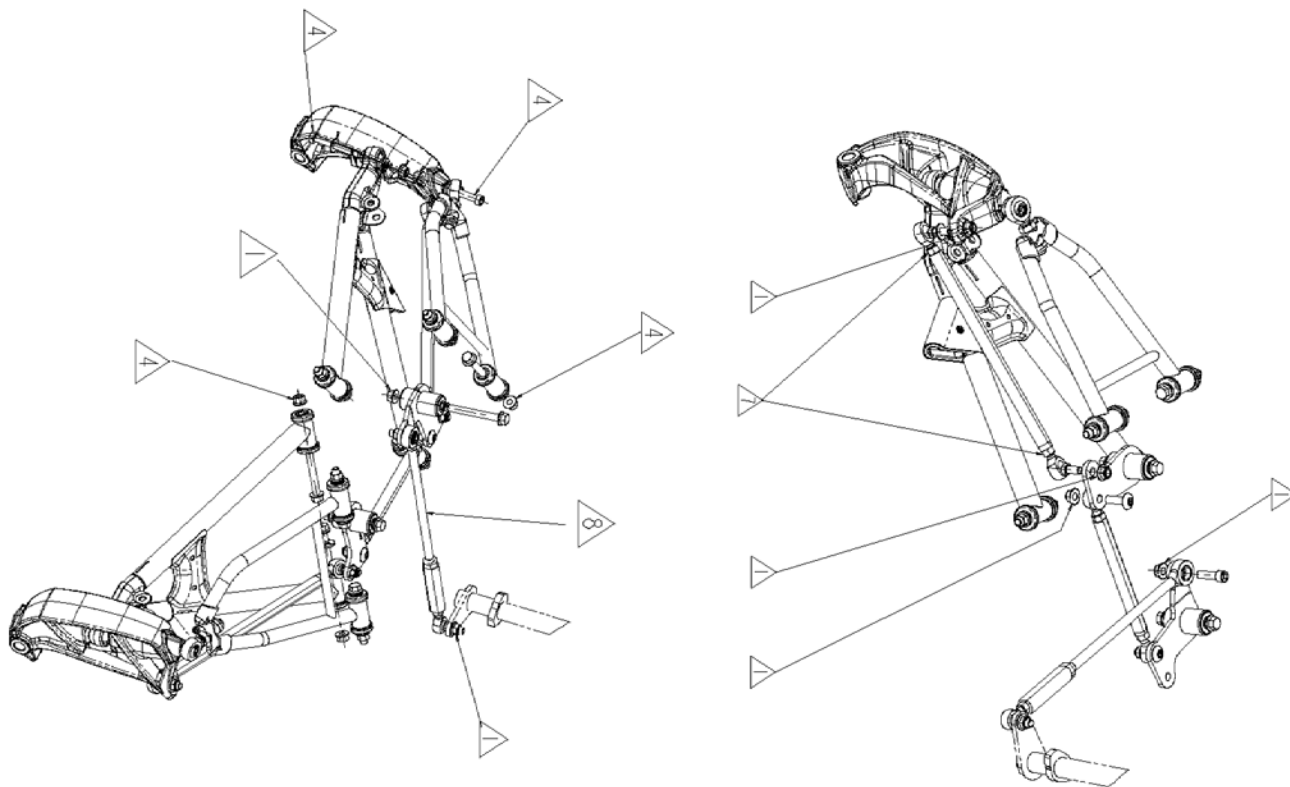
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10

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HANDLEBAR CENTERING .....	10.17
TOE ADJUSTMENT .....	10.17
SKI STANCE .....	10.18
ADJUSTMENT (RMK ONLY) .....	10.18



## FUSION/IQ RMK

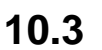


- NOTES:
- △ FASTENER TORQUE SPEC: 29±10% FT-LBS.
  - △ UPPER CONTROL ARM ROD END SHOULD BE PARALLEL ±2° TO THE MOUNTING SURFACE IN THIS VIEW.
  - △ FASTENER TORQUE SPEC: 40±10% FT-LBS.
  - △ PITMAN AND IDLER DIMENSION TO CHASSIS TO BE EQUAL ±.03.
  - △ FASTENER TORQUE SPEC: 15±10% FT-LBS.
  - △ FASTENER TORQUE SPEC: 11±10% FT-LBS.
  - △ ASSEMBLY LENGTH (14.42") 600 RMK/Fusion = 14.78"
9. SET UP INFORMATION:  
 CAMBER: 2.17°+/- .31°  
 TOE: 0°-.12° MEASURED OVER 20°  
 WIDTH: (38.67")



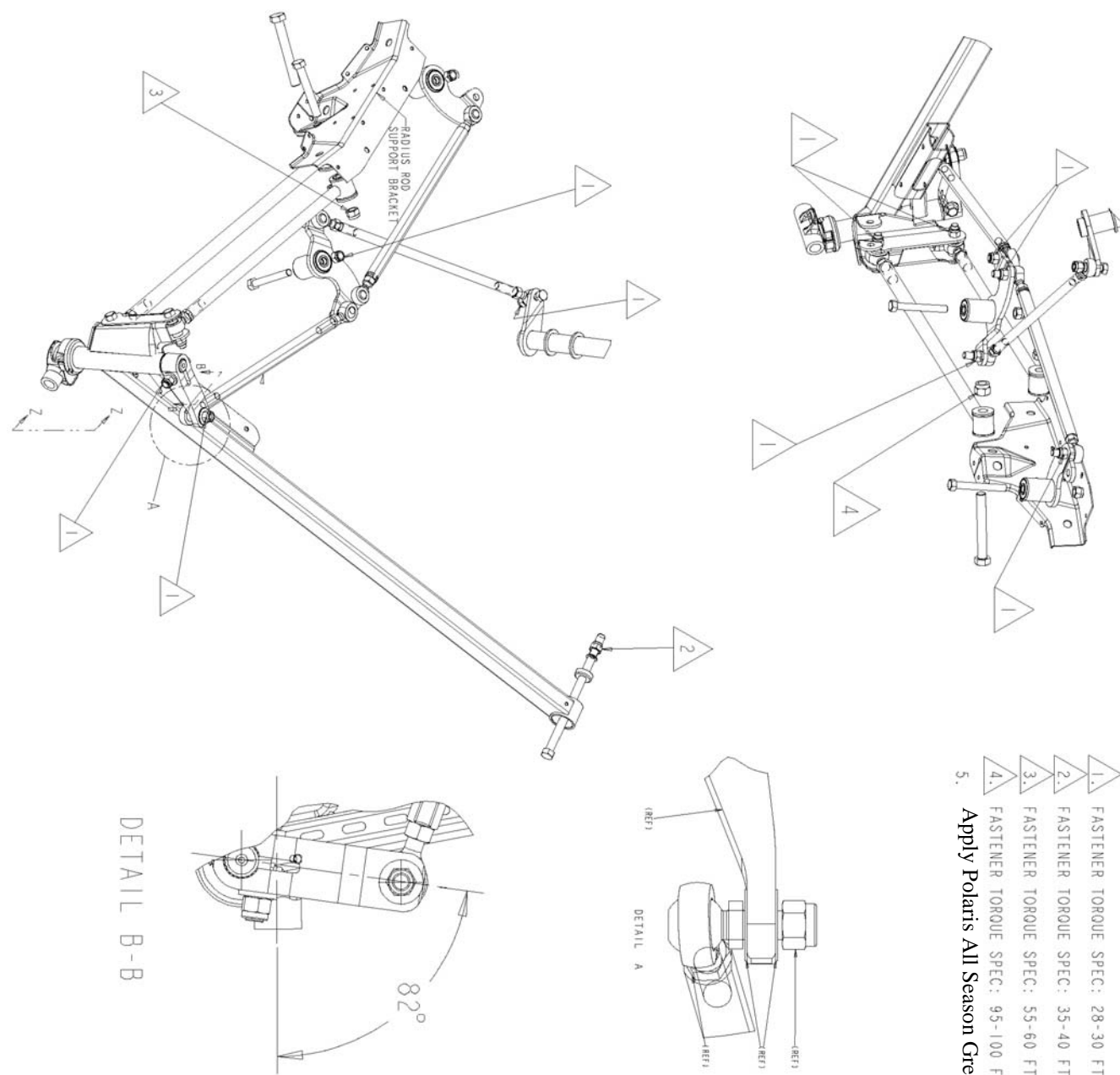
## NOTES:

1. FASTENER TORQUE SPEC: 28-30 FT-LBS
2. FASTENER TORQUE SPEC: 35-40 FT-LBS
3. FASTENER TORQUE SPEC: 60±6.0 FT-LBS
4. FASTENER TORQUE SPES: 150±15.0 FT-LBS  
FROM BOLT SIDE ONLY





**42.5 EDGE**



NOTES:

- 1. FASTENER TORQUE SPEC: 28-30 FT-LBS
- 2. FASTENER TORQUE SPEC: 35-40 FT-LBS
- 3. FASTENER TORQUE SPEC: 55-60 FT-LBS
- 4. FASTENER TORQUE SPEC: 95-100 FT-LBS
- 5. Apply Polaris All Season Grease to all zerks

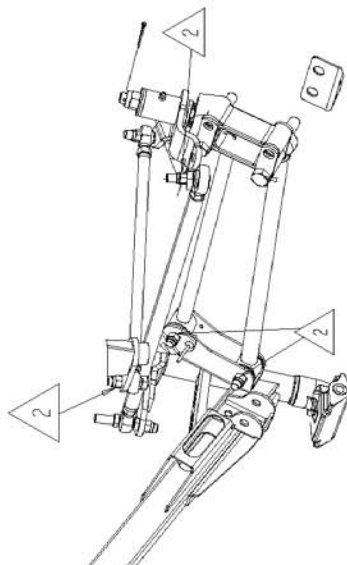


## WIDETRAK

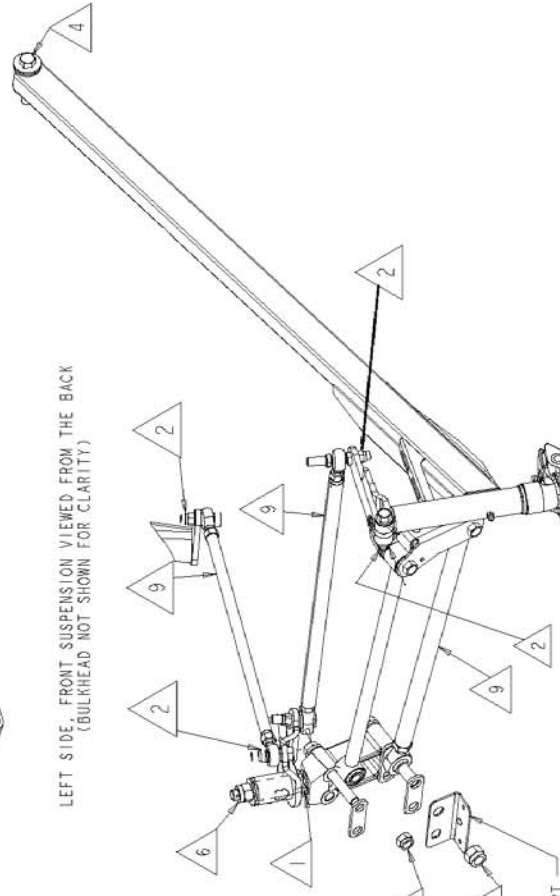
## FRONT SUSPENSION/STEERING

### NOTES:

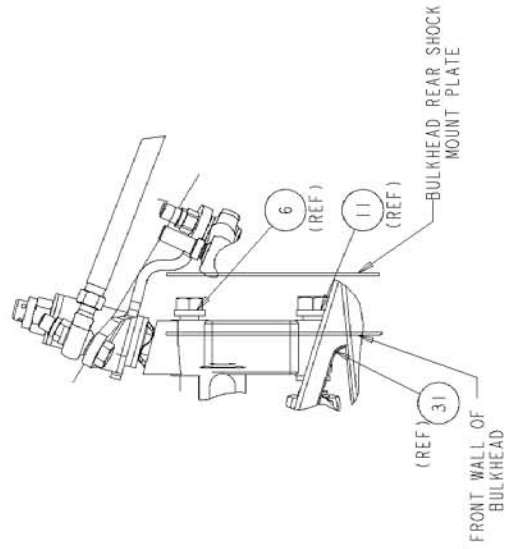
- 1 SHOWN IN NON-COMPRESSED STATE.
- 2 FASTENER TORQUE SPEC:  $29 \pm 2.9$  FT-LBS.
- 3 FASTENER TORQUE SPEC:  $38 \pm 3.8$  FT-LBS.
- 4 FASTENER TORQUE SPEC:  $43 \pm 4.3$  FT-LBS.
- 5 FASTENER TORQUE SPEC:  $48 \pm 4.8$  FT-LBS.
- 6 FASTENER TORQUE SPEC:  $58 \pm 5.8$  FT-LBS.
- 7 Apply Polaris All Season Grease to all zerks
- 8 ITEMS 9 AND 13 TO BE ASSEMBLED AS SHOWN IN RESPECT TO PAN SUPPORT BRACKET.
- 9 NUT TORQUE SPEC:  $8-14$  FT LBS



LEFT SIDE, FRONT SUSPENSION VIEWED FROM THE BACK  
(BULKHEAD NOT SHOWN FOR CLARITY)



LEFT SIDE, FRONT SUSPENSION VIEWED FROM THE FRONT  
(BULKHEAD NOT SHOWN FOR CLARITY)





# FRONT SUSPENSION ADJUSTMENT PROCEDURES

## SET UP AND ADJUSTMENTS

Spring preload is one of the adjustment options which affects ride. Preload is the amount of pressure at which the spring is held. The longer the installed length of the spring, the less the amount of pre-load; the shorter the installed length of the spring, the more the amount of pre-load. An increase in IFS shock spring pre-load will result in an increase in ski pressure.

To adjust front spring preload on threaded adjust models, grasp the spring and turn in a clockwise direction (as viewed from the bottom of the shock) to increase the preload. Turn in a counterclockwise direction to decrease preload.

In the adjacent illustration, high preload and low preload positions are depicted.

When adjusting, be sure springs on both the left and right sides of the machine are at the same adjustment.

For the best ride the spring preload should be as low as possible. Set the preload to use the full travel of the ski shock with occasional light bottoming.



### CAUTION

If the plastic nut is unscrewed from the threaded body the nut will break. Always leave one thread showing above the plastic nut or the spring coils will stack, resulting in damage.

For the best ride the spring preload should be as low as possible. Set the preload to use the full travel of the ski shock with occasional light bottoming. To determine if your machine is using full travel, push the shock jounce bumper down as far as it will go on the shock rod and test ride the machine.

The bumper will move up on the rod in direct relation to the amount of travel. For example, if the shock travel is full, the bumper will be seated at the top of the shock.

Remove the existing spring and install the next highest rate spring, or Reduce the preload on the existing spring and change the shock valving to obtain the desired effect.

**NOTE: Shock valving can only be adjusted or changed on models that can be serviced.**

**IFS SHOCK SPRINGS****Table 10-1: IFS Shock Springs**

<b>Part Number</b>	<b>Total # of Coils</b>	<b>Rate #/in)</b>	<b>Free Length</b>	<b>Wire Via.</b>	<b>I.D."</b>	<b>O.D."</b>	<b>Tabbed?</b>
7041261	13	105	10.25	0.312	1.84	2.6	NO
7041396	13.35	50	11.88"	.283"	1.89"	2.82	Yes
7041398	12.72	75	11.88"	.312"	1.89"	2.88	Yes
7041405	13.40	65	11.88"	.306"	1.89"	2.82	Yes
7041489	14.70	74/120	11.30"	.312"	1.89"	2.75	Yes
7041491	13	185	13.50"	.438"	1.90"	3.60	Yes
7041520	10.60	90	10.50"	.283"	1.89"	2.57	No
7041528	17.57	74/160 var	11.30"	.306"	1.89"	2.53	Yes
7041529	19.39	50/140 var	11.30"	.283"	1.89"	2.50	Yes
7041530	14.42	70/105 var	10.50"	.283"	1.89"	2.50	Yes
7041549	9.17	140	10.75"	.331"	1.89"	2.75	Yes
7041550	8.29	120	10.80"	.306"	1.89"	2.75	Yes
7041551	9.55	100	10.75"	.306"	1.89"	2.75	Yes
7041552	9.09	80	10.75"	.283"	1.89"	2.75	Yes
7041553	11.46	60	11.33"	.283"	1.89"	2.75	Yes
7041554	9.09	80	10.75"	.283"	1.89"	2.75	Yes
7041571	10.40	70	10.50"	.263"	1.89"	2.53	No
7041573	9.28	160	10"	.331"	1.89"	2.91	Yes
7041574	10.32	140	10.25"	.331"	1.89"	2.91	Yes
7041575	10.36	120	11.42"	.331"	1.89"	2.87	Yes
7041576	9.55	100	10.80"	.306"	1.89"	2.86	Yes
7041591	12.79	80	12.25"	.306"	1.89"	2.75	Yes
7041598	9.71	105	9.33"	.312"	1.89"	2.894	Yes
7041613	14.01	75	11.88"	.295"	1.89"	2.62	Yes
7041668	6.94	70	4"	.219"	1.89"	2.34	No
7041669	6.27	80	4"	.218"	1.89"	2.33	No
7041670	6.28	90	4"	.225"	1.89"	2.35	No
7041671	11.71	160	9"	.331"	1.89"	2.56	No
7041672	10.63	180	9"	.331"	1.89"	2.56	No
7041673	12.72	200	9"	.362"	1.89"	2.62	No
7041674	12.72	220	9"	.362"	1.89"	2.62	No
7041677	10.43	140	9"	.306"	1.89"	2.52	No
7041678	8.65	100	7"	.262"	1.89"	2.43	No
7041683	12.12	80	11.88"	.312"	1.89"	2.87	Yes
7041698	5.84	100	4"	.225"	1.89"	2.35	No
7041699	5.75	120	4"	.235"	1.89"	2.37	No



**Table 10-1: IFS Shock Springs**

Part Number	Total # of Coils	Rate #/in)	Free Length	Wire Via.	I.D."	O.D."	Tabbed?
7041701	10.57	120	9"	.295"	1.89"	2.49	No
7041820	5.98	140	4"	.250"	1.89"	2.43	No
7041821	5.91	160	4"	.262"	1.89"	2.49	No
7041826	9.19	160	7"	.306"	1.89"	2.54	No
7041826	8.85	180	7"	.312"	1.89"	2.54	No
7041828	9.61	200	7"	.331"	1.89"	2.59	No
7041829	8.92	220	7"	.331"	1.89"	2.59	No
7041927	16.15	68/160	13"	.295"	1.89"	2.54	Yes
7041950	13.80	68/160	11.57"	.331"	1.89"	3.125	Yes
7042052	11.7	110	12	0.343	1.87	3	NO
7042074	11.625	90/180 Var	10.65	0.343	1.89	3.2	YES
7042187	13.76	68/160	12.55	0.343	1.89	3.18	YES
7042195	14	90/180 Var	13	0.362	1.89	3.2	YES
7042263		80/110 Var	10.78	0.331	1.89	3.25	YES
7042314	10.64	75	10.01	0.281	1.89	2.71	YES
7042315	10.89	55	9.85	0.262	1.89	2.66	YES

## SPRINGS

Two types of springs are employed in Polaris suspensions, coil springs and torsion springs. Following is some of the terminology used when referring to coil springs.

- Free length - the length of a coil spring with no load applied to the spring
- Installed length - the length of the spring between the spring retainers. If the installed length of the spring is less than the free length, it will be pre-loaded.
- Spring rate - the amount of force required to compress a coil spring one inch. For example, if 150 pounds of force are required to compress a spring 1 inch, the spring rate would be 150 #/in.
- Straight rate spring - the spring requires the same amount of force to compress the last one inch of travel as the first one inch of travel. For example, if a 150 #/in. spring requires 150 pounds of force to compress it one inch, 300 pounds of force would compress it two inches, 450 pounds of force would compress it three inches, etc.
- Progressively wound spring - the rate of the spring increases as it is compressed. For example, a 100/200 #/in. rate spring requires 100 pounds of force to compress the first one inch, but requires 200 additional pounds to compress the last one inch.

When a bump is encountered by the suspension, the force of the bump compresses the spring. If the force were 450 pounds, a 100 #/in. spring would compress 4.5 inches. A 150 #/in. spring would only compress 3 inches. If the suspension had 4 inches of spring travel the 100 #/in. spring would bottom out, while the 150 #/in. spring would have one inch of travel remaining.

## COMPRESSION DAMPING ADJUSTABLE SHOCKS

Snowmobiles equipped with the Indy Select or Ryde FX shocks allow the driver to make adjustments to the compression valving by turning the screw located near the base of the shock.

Locate the adjustment screw near the base of the shock.

By turning the screw clockwise (a small screwdriver or dime work well), the compression valving is increased, stiffening the ride. To soften the ride, reduce the compression by turning the screw counter-clockwise. A great deal of ride performance is accomplished with a mere 1/2 to 1 turns. There are approximately 3 full turns of adjustment available.

If the suspension is "bottoming," tighten the compression screw clockwise in 1/2 turn increments until the bottoming



stops. Backing off 1/4 turn counter-clockwise at this point should give you the best possible ride ensuring use of the full travel of the suspension. The opposite procedure should be used if the suspension is too stiff upon initial set-up.

If bottoming continues after the screw is turned in full clockwise, the compression spring should be adjusted with the threaded adjustment collar. Back the screw out to the original starting position after the compression spring has been adjusted.

Riding conditions are ever changing. Keep in mind the compression damping adjustable screw can be adjusted at any time to achieve the best possible ride in any condition.

**NOTE: Whenever shocks are replaced or reinstalled for any reason, the adjustment screw should be located toward the inside of the suspension. Access to the adjuster is not possible if installed differently.**

## SHOCK INFORMATION

### IFS SHOCK SPECIFICATIONS

**Table 10-2: IFS Shocks**

SHOCK PN	BRAND	Extended Length (in)	Collapsed Length (in)	Stroke (in)	Shock Rod (in)	IFP Depth (in)	Shaft PN	PSI
7041535	Arvin	13.3	10.64	4.47	.49	N/A	N/A	N/A
7042258*	Arvin	18.00	11.8	6.2	.49	6.92 t	1700228	200
7043054	Arvin	17.97	11.83	6.14	.49	N/A	N/A	N/A
7043141*	Fox	18.00	11.80	6.20	.50	1.420 b	1500713	200
7043095*	Walker	18.00	11.738	6.27	.625	2.250	1800102	200
7043049	Arvin	17.02	12.77	5.75	.49	N/A	N/A	N/A
7043090*	Arvin	17.00	11.20	5.80	.49	6.54 t	1700231	200
7041932	Arvin	16.28	12.89	5.15	.49	N/A	N/A	N/a
7041918	Arvin	16.35	11.09	5.26	.49	N/A	N/A	N/A
7042197	Arvin	17.28	13.78	5.26	.49	N/A	N/A	N/A
7043082*	Arvin	16.25	12.76	5.25	.49	6.27 t	1700025	280

\*=Rebuildable shock

b=IFP depth measured form the bottom of the shock body

t=IFP depth measured form the top of the shock body.



## IFS SHOCK PRODUCTION VALVING

The valving charts are listed in compression sections and rebound sections. A compression stack will be located nearest the eyelet of the shock rod. A rebound stack will be located nearest the threaded end of the shock rod.

**Table 10-3: IFS 7042258**

COMPRESSION	.700x.015
	.800x.006
	.900x.006
	1.000x.006
	1.100x.008
	1.250x.006
	.800x.008
	1.100x.006
	1.300x.008
	Piston orifice .060
REBOUND	1.250x.008
	1.100x.008
	1.000x.008
	.900x.008
	.800x.008
	.700x.008

**Table 10-4: IFS 7043141**

COMPRESSION	1.125x.093
	.700x.012
	.700x.012
	.900x.008
	1.000x.008
	1.100x.008
	1.250x.008
	.800x.008
	1.100x.008
	1.300x.006
	Piston orifice .078
REBOUND	1.250x.008
	.700x.008
	1.100x.010
	1.000x.010
	.900x.012
	.800x.012
	.700x.012
	.620x.093

**Table 10-5: IFS 7043095**

COMPRESSION	.875x.090
	.625x.065
	.700x.006
	.800x.006
	.900x.006
	1.000x.006
	1.100x.006
	.900x.012
REBOUND	1.200x.006
	1.000x.012
	1.300x.006
	Piston orifice .052
	1.200x.008
	1.100x.008
	1.000x.008
	.900x.010
ADJUSTER	.800x.010
	.700x.010
	.625x.065
	1.100x.025
	1.000x.025
	.625x.065

**Table 10-6: IFS 7043090**

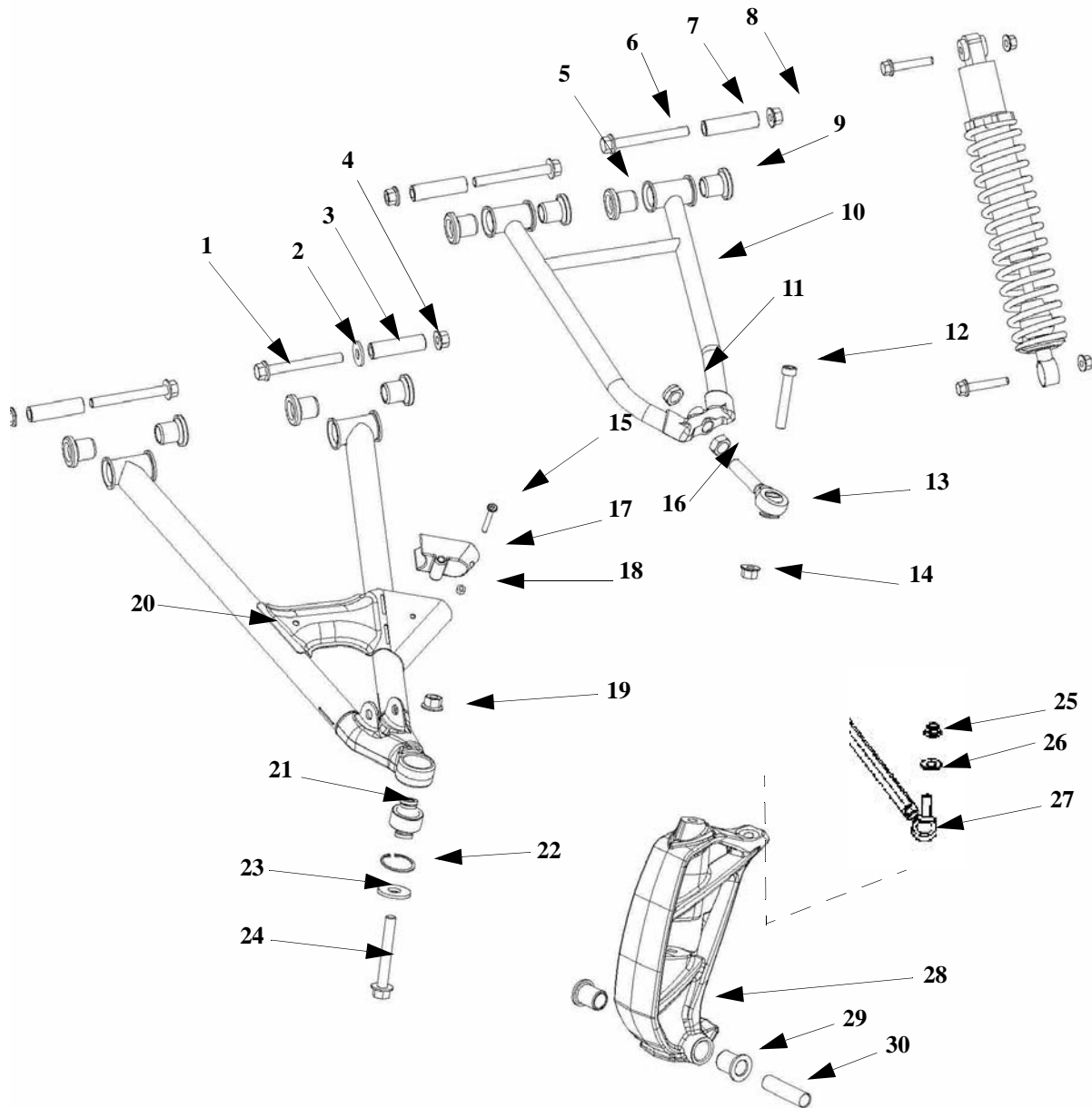
COMPRESSION	.700x.015
	.800x.006
	.900x.006
	1.000x.006
	1.100x.008
	1.250x.006
	.800x.008
	1.100x.006
	1.300x.008
	Piston orifice .081
REBOUND	1.250x.008
	1.100x.008
	1.000x.008
	.900x.008
	.800x.008
	.700x.008

**Table 10-7: IFS 7043082**

COMPRESSION	.800x.012
	.900x.012
	1.000x.012
	1.100x.010
	1.250x.008
	1.300x.010
	.900x.006
	1.250x.008
	1.300x.008
Piston orifice .093	
REBOUND	1.250x.006
	1.100x.010
	1.000x.010
	.900x.010
	.800x.010



## IQ FRONT SUSPENSION



**Table 10-8: IQ Front Suspension**

ITEM	DESCRIPTION	TORQUE SPECIFICATION / NOTES
1	Lower A-Arm pivot bolt	
2	Flat washer	Critical for spacing the bolt from the sway bar.
3	Pivot Shaft	
4	Flanged nut	40 ft-lb (54Nm)
5	Pivot Bushing	
6	Upper A-Arm pivot bolt	
7	Pivot shaft	
8	Flanged nut	40 ft-lb (54Nm)
9	Pivot Bushing	
10	Upper control arm	
11	Camber lock nut	
12	Rod end bolt	
13	Rod end	
14	Flanged nut	35 ft-lb (47Nm)
15	Screw	
16	Jam nut	
17	Swaybar slide	
18	Nylok nut	
19	Nut	29ft-lb (39Nm)
20	Lower control arm	
21	Bearing	
22	Retaining ring	
23	Washer	
24	Bolt	
25	Steering arm nut	29ft-lb (39Nm)
26	Steering arm	
27	Washer	
28	Spindle	
29	Bushing ski pivot bushing	
30	Pivot bushing	



## SPINDLE REMOVAL

1. Securely support the front of the machine so that it is off the floor.
2. Remove the ski(s).
3. Remove the flanged nut (14) on bottom of the lower spherical bearing (13).
4. Remove the camber bolt (12) from the top of the spindle.
5. Remove the steering arm (26) from the spindle, by removing the nut (27) and bolt (25).
6. Remove the flanged nut (19) from the lower spherical bearing.
7. Remove the lower spherical bearing bolt (24) and washer (23).
8. Remove the spindle (28).

## SPINDLE ASSEMBLY

1. Replace the steering arm and torque the bolt (25) to 29 ft-lb (39Nm).
2. Replace the retainer ring (22) on to the lower portion of the spherical bearing.
3. Place the spindle onto the lower spherical bearing.
4. Place the flanged nut (19) on the lower spherical bearing bolt (24) and torque to 29 ft-lb (39Nm).
5. Place the camber bolt (12) and torque the jam nut (14) to 35 ft-lb (47Nm).

## LOWER SPHERICAL BEARING REPLACEMENT

1. Remove the spindle.
2. Remove the snap ring (22) from the lower spherical bearing.
3. Replace the lower spherical bearing (21).
4. Replace snap ring (22).
5. Install spindle.
6. Install the ski(s).

## UPPER / LOWER CONTROL ARM REMOVAL

1. Remove the spindle(s) and shock(s).
2. Remove the upper and lower control arm(s) bulk head bolts (1,6).
3. Remove the upper or lower control arm (10,20) and remove all pivot bushings (5,9), and all pivot shafts (7).

## UPPER / LOWER CONTROL ARM INSTALLATION

1. Replace the upper or lower control arm bushings (5,9) in the control arm(s).
2. Replace the upper or lower control arm(s) into the

bulkhead.

3. Replace the upper or lower control arm bolts (1,6). Torque to 40 ft-lb (54Nm).

**NOTE: The washer (2) is only located on the rearward lower control arm mounting, and should be located at the bolt head.**

## 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, what type of nut is used in an application, in which direction do the steering arms go on - weld up or weld down, etc.

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

The following components must be inspected at this time.

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

Always follow rod end engagement guidelines. Maximum setup width must be checked whenever front suspension components are adjusted or replaced.



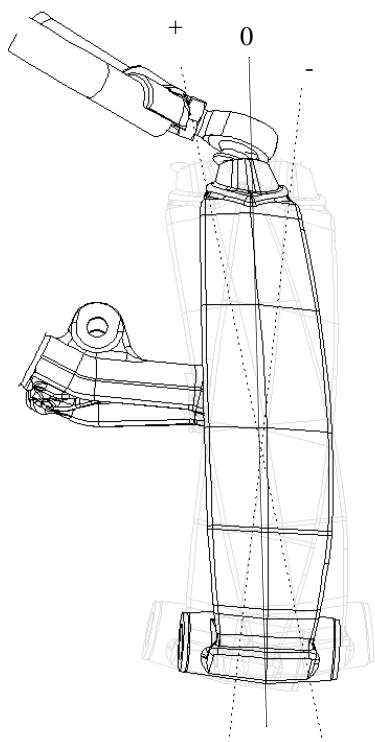
### ALIGNMENT BAR SPECIFICATIONS

- DIAMETER: .623"-.625" (15.824-15.875mm)
- LENGTH: 45" (114.3cm)
- MATERIAL: C-1018

### CAMBER DEFINITION

The following definitions of camber use automotive terminology to describe positive and negative positions.

- 0 = Neutral camber. The spindle is 90° (perpendicular) to the ground.
- + = Positive camber. The bottom of the spindle is canted inward toward the chassis.
- - = Negative camber. Spindle bottom is canted outward from the chassis.



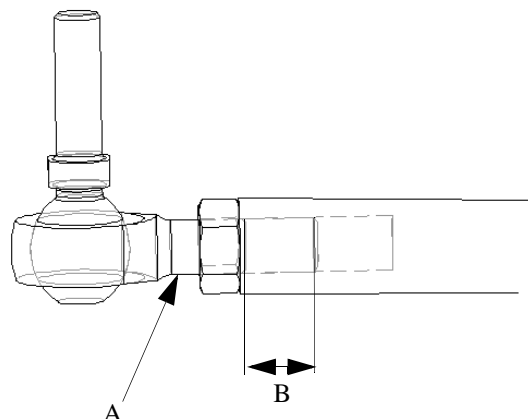
### ROD END PROCEDURE

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 (A) X 2 = minimum thread engagement (B) .875" (22mm).



### CAMBER & TOE SPECIFICATIONS

The following table is the factory specifications for the 2006 Polaris Snowmobile front suspension set up.

Maximum width and camber measurements are to be taken with the front end elevated and shocks at full extension.

Toe alignment is measured at ride height. This means that the machine is on the ground and resting at normal ride height, not full rebound. Measure at a point 10" (2.54cm) forward of the ski mount bolt and 10" (2.54cm) behind the ski mount bolt, preferably on the center line of the carbide skags.

Width is measured from the center of the spindles.

Camber measurement is taken from the top of the alignment bar to the top of the ski mount hole in the spindle with the bushing removed.

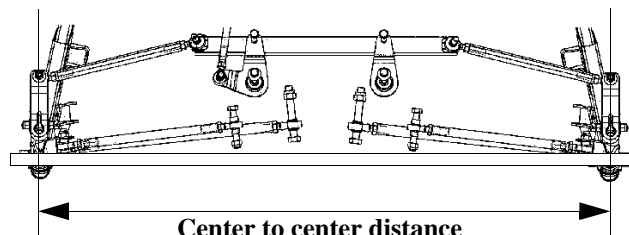


**Table 10-9: 2006 Camber & Toe Specifications**

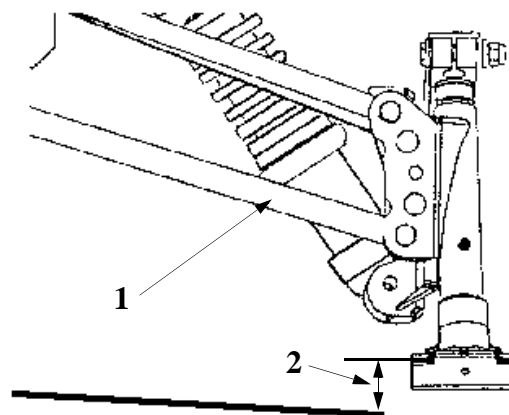
SUSPENSION	MAXIMUM SET UP WIDTH in/cm (± .25in/.6cm)	CAMBER in/mm	TOE OUT (At ride height) in/mm
IQ 42.5	42.5/108	2.25±.31/ 57.2±7.9	0-.12/0-3.05
EDGE	42.5/108	.59±.31/ 14.97±7.9	.12-.25/3.05- 6.35
IQ RMK	41/104	2.17±.31/ 55.1±7.9	0-.12/0-3.05
Trail RMK	41/104	.735±.31/ 18.7±7.9	0-.12/0-3.05
Widetrack LX	38/96.5	.82±.72/ 20.8±18.3	0-.12/0-3.05

4. Disconnect the torsion bar.
5. Measure spindle to chassis centering and record the measurement.
6. The spindle centering and set up width is controlled by adjusting the radius rod lengths, and must not exceed the maximum set up width listed.

**NOTE: Both spindle centers should be an equal distance  $\pm 1/8"$  (3mm) from the center of the chassis.**



## EDGE CAMBER ADJUSTMENT



## ALIGNMENT ADJUSTMENTS

Alignment adjustments should be performed in this order.

### EDGE SET UP WIDTH

Prior to performing steering alignment, the suspension should be inspected for damage or wear and replacement parts installed as required.

**IMPORTANT: Camber, width are dimensions that depend on each other. If any adjustments have been made, each one should be checked.**



### WARNING

A maximum set up width is listed in Table 10-9 in this chapter. Maximum set up width is the maximum allowable distance between ski spindle centers at ride height. The Maximum Set Up Width specifications are maximum width measurements, and are critical to ensure adequate torsion bar engagement with the Trailing/Control Arms. If the suspension is set too wide, the torsion bar may disengage from trailing arm. Do not attempt to set the suspension wider than the specified maximum set up width.

1. Make sure that the track is properly aligned. Track alignment is critical because this will be used as a reference point for final toe out measurement. See "TRACK ALIGNMENT" on page 3.20.
2. Support the front of the machine is at ride height.
3. Remove the skis and ski pivot bushings.



### WARNING

After camber adjustment is complete, be sure to measure set up width outlined in this chapter and compare to model specifications listed. Do not attempt to set suspension wider than the specified maximum set up width. If set up width exceeds maximum, adjust upper and lower radius rods equally to maintain camber adjustment.

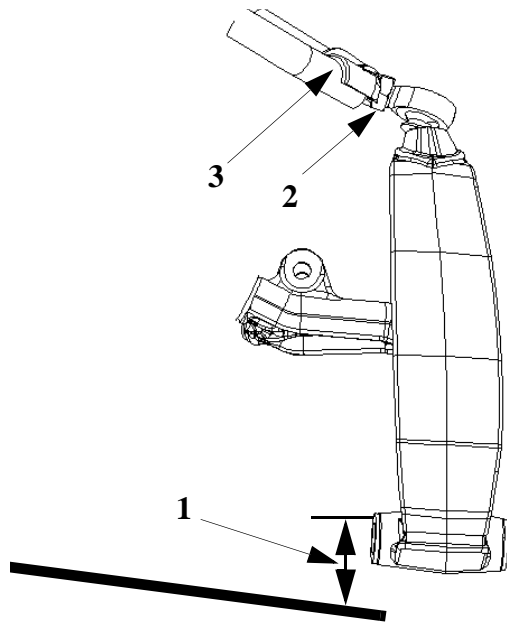
1. Raise the front of the machine so that the skis are off the floor 3" (7.62cm). The shocks should be at full extension.
2. Remove the skis.
3. Determine which spindle requires the greatest amount of correction by installing the alignment bar through one spindle to the other spindle. Measure the distance (2) from the top of the alignment bar to the top of the ski mount hole with the bushing(s) removed. Record measurement.
4. Remove the alignment bar and install it to the opposite



side. Measure the distance (2) from the top of the alignment bar to the top of the ski mount hole with the bushing(s) removed. Record measurement

5. To adjust the camber, change the lower radius rod (1) length until alignment bar measurement is within the specified range for each spindle.
6. Once the specification is achieved, tighten all jam nut(s) and torque them to 8-14 ft-lb (11-19Nm).
7. Re-check the set up width and compare to specification.

### IQ CAMBER ADJUSTMENT



#### WARNING

After camber adjustment is complete, be sure to measure set up width outlined in this chapter and compare to model specifications listed. Do not attempt to set suspension wider than the specified maximum set up width. If set up width exceeds maximum, adjust upper and lower radius rods equally to maintain camber adjustment.

1. Raise the front of the machine so that the skis are off the floor 3" (7.62cm). The shocks should be at full extension
2. Remove the skis.
3. Determine which spindle requires the greatest amount of correction by installing the alignment bar through one spindle to the other spindle. Measure the distance (1) from the top of the alignment bar to the top of the ski mount hole with the bushing(s) removed. Record measurement.
4. Remove the alignment bar and install it to measure the opposite side. Measure the distance (1) from the top of the alignment bar to the top of the ski mount hole with the

bushing(s) removed. Record measurement

5. To adjust the camber, unlock the lock nut (2) and adjust the camber with the adjuster nut (3) until alignment bar measurement is within the specified range for each spindle.
6. Once the specification is achieved, tighten all jam nut(s) and torque them 32-37 ft-lb (142-165Nm).
7. Re-check the set up width and compare to specification.

### HANDLEBAR CENTERING

1. Raise the front of the machine off the floor so that the spindles are off the floor 3" (7.62cm).
2. Insert the alignment bar through both ski bolt holes in each spindles.
3. Adjust Toe until handlebar is centered.

### TOE ADJUSTMENT

Toe is adjusted with the shocks and skis installed. Track alignment must be correct before starting this process. See "TRACK ALIGNMENT" on page 3.20.

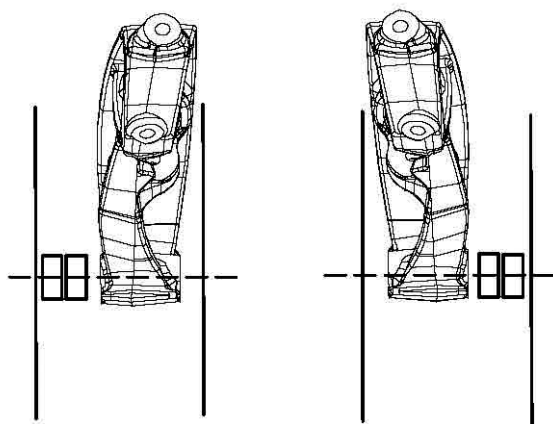
Toe alignment is measured at ride height.

1. Lift front of the machine off the floor rock the front end up and down and then set it down gently. This will set the unit at ride height.
2. Measure and make a mark 10" (2.54cm) forward of the ski mount bolt and 10" (2.54cm) behind the ski mount bolt, preferably on the center line of the carbide skags.
3. Place a straight edge along the one side of the track. Make sure that the straight edge is touching along the length of the track.
4. Record the measurements from the edge of the straight edge to the forward ski mark and the rearward ski mark.
5. Adjust the tie rod so that both measurements are the same.
6. Place the straight edge on the opposite side of the track and measure the opposite ski marks.
7. Adjust the tie rod so that both measurements are the same.
8. Verify that the ski center distances are within specification from the forward marks and the rearward marks.



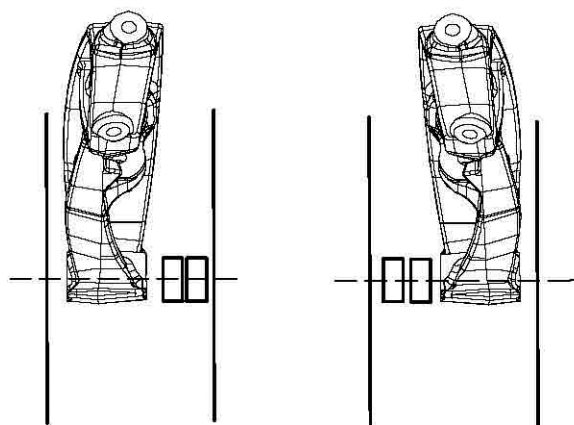
## SKI STANCE

### ADJUSTMENT (RMK ONLY)



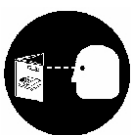
#### **WIDE SKI STANCE**

For maximum stability, install both of the spacers to the outside of the spindle



#### **NARROW SKI STANCE**

For maximum maneuverability, install both of the spacers to the inside of the spindle.



# CHAPTER 11

## REAR SUSPENSION

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## **REAR SUSPENSION SPECIFICATIONS**

### **MOUNTING TORQUE SPECIFICATIONS**

3/8" top shock mounting bolts.....28-30 ft. lbs. (39 - 41 Nm)

3/8" suspension mounting bolts....35 - 40 ft. lbs. (49 - 55 Nm)

7/16" suspension mounting bolts...55 - 60 ft. lbs. (76 - 83 Nm)

Shock rod bolts(do not over torque)\*Shock rods must pivot freely after torquing.....12 ft. lbs. (17 Nm)

## **REAR SUSPENSION OPERATION**

### **OPERATION**

The primary function of the rear suspension is to provide a comfortable ride in all types of riding conditions. It separates the rider from the ground, while allowing for complete vehicle control. The rear suspension also must provide weight transfer and maintain track tension.

The rear suspension has many adjustable features for fine tuning to achieve optimum comfort. The suspension can be adjusted to suit rider preference and deliver excellent performance for a given set of conditions. It should be noted, however, that suspension adjustments involve a compromise or trade off. A machine set up to perform well in the moguls would not suit the preference of a groomed trail rider.

### **WEIGHT TRANSFER**

The shifting of weight from the skis to the track is called weight transfer. As engine torque is applied to the drive axle the torque is transferred to the track, pulling it forward. This energy also tries to pull the suspension forward. The front torque arm reacts to this force by pushing down on the front of the track, in effect applying more weight to the front of the track and reducing the weight on the skis. It is important to note that energy used to lift the front of the machine is not available to push the vehicle forward.

Changing the angle of the front torque arm changes the suspension's reaction to the force. Adjusting the length of the limiter strap will change the front torque arm angle. Shortening the strap limits the extension of the front of the suspension; reducing the angle of the torque arm and increasing ski pressure during acceleration. Lengthening the strap allows the front of the suspension to extend further;

increasing the angle of the torque arm and decreasing ski pressure during acceleration. Limiter strap adjustment has a great affect on weight transfer. Limiter straps only affect acceleration. It is important to check track tension whenever limiter strap length is changed.

Front track shock spring preload also affects weight transfer. A stiffer spring and/or more preload on the spring transfers more weight to the track. A softer spring and/or less preload keeps more weight on the skis. Keep your riding application in mind when choosing springs and setting spring preload. Soft springs/preload will increase ski pressure, but may bottom out. Stiff springs/preload will provide more track pressure (reduced ski pressure), but may result in a less comfortable ride

During acceleration, the rear of the suspension will compress and the IFS will extend, pivoting the machine about the front torque arm. Because of this pivoting effect, rear spring and spring preload also have some effect on weight transfer. Softer rear springs, or less preload, allow more weight transfer to the track and reduce ski pressure. Stiffer rear springs, or increased preload, allow less weight transfer to the track and increase ski pressure. The main function of the rear torque arm is to support the weight of the vehicle and rider, as well as to provide enough travel to absorb bumps and jumps.

Shock valving also has an effect on weight transfer. Refer to shock tuning information in this chapter. Scissor stops also affect weight transfer. See scissor stop information also in this chapter.

Rear Scissor blocks also have a big effect on weight transfer. see "SCISSOR STOP ADJUSTMENTS" on page 11.4.

### **SUSPENSION COUPLING**

On all Polaris snowmobile rear suspensions, there are two torque arms that control the movement of the rail beam. Prior to the advent of suspension coupling, these torque arms could move independently of each other. Rear suspension coupling links the movement of the front and rear torque arms to each other.

The front rear scissor stop (FRSS) couples the movement of the front torque arm with the rear torque arm and limits the amount of independence between the movement of the front torque arm and the rear torque arm.

When hitting a bump, the front torque arm starts to compress. The FRSS links that movement to the rear torque arm, causing it to compress and raise the rear suspension up as one, allowing the suspension to hit the bump only once and



eliminating kickback. The factory setting are usually adequate for all riders in all conditions.

The rear rear scissor stop (RRSS) couples the movement of the rear torque arm with the front torque arm and limits the amount of independent movement between the rear torque arm and the front torque arm.

Adjusting the RRSS either allows more weight to transfer to the rear for more traction, or allows less weight to transfer to the rear, resulting in improved cornering performance. An adjustment dot is located on the RRSS. This dot is at the higher end of the scissor stop.

Moving the RRSS to a higher position will reduce weight transfer, improve chatter bump ride and improve cornering performance.

### REAR TORSION SPRING TENSION ADJUSTMENT

Rear spring tension adjustments are made by rotating the eccentric spring block. The block provides three spring tension positions. This adjustment is easier if the long spring leg is lifted over the roller and replaced after the block is properly positioned. Always maintain equal adjustment on both sides.

Torsion springs are much like coil springs, although shaped differently. The rate of the torsion spring is controlled by the wire diameter of the spring, and the number of coils. Pre-load is controlled by the free opening angle. see "TORSION SPRING ADJUSTMENT" on page 11.5.

## **REAR SUSPENSION ADJUSTMENTS AND SETTINGS**

### REAR SUSPENSION ADJUSTMENT PROCEDURES

It is a good idea to have customers break the suspension in for approximately 150 miles (240 km) before fine tuning adjustments are made.

All settings will vary from rider to rider, depending on rider weight, vehicle speed, riding style, and trail conditions. We recommend starting with factory settings and then customizing each adjustment individually to suit rider preference. The machine should be methodically tested under the same conditions after each adjustment (trail and snow conditions, vehicle speed, riding position, etc.) until a satisfactory ride is achieved. Adjustments should be made to one area at a time, in order to properly evaluate the change.

The purpose of the front rear scissor stop (FRSS) is to control the bump attitude of the rear suspension. As the front torque arm (FTA) hits the bump, it forces the rear scissor to collapse a predetermined amount, depending on the FRSS block position.

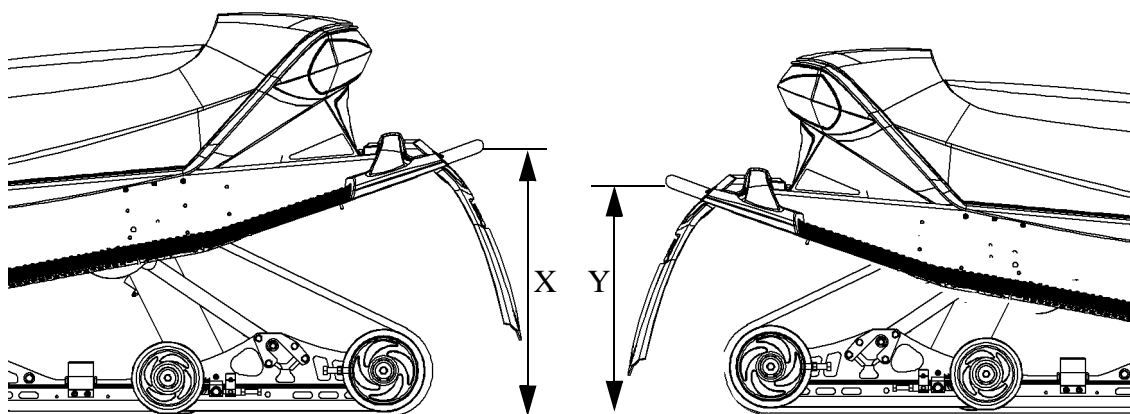
This accomplishes two important things, it allows a lighter spring rate on the FTA because it can borrow spring rate from the rear torsion springs; and it prepares the rear portion of the suspension for the bump, reducing secondary kick back.

The FRSS is made of a resilient material allowing smooth action and preventing any suspension component damage.

This unique feature is applied to the EDGE rear suspensions.



## SETTING REAR SUSPENSION RIDE HEIGHT

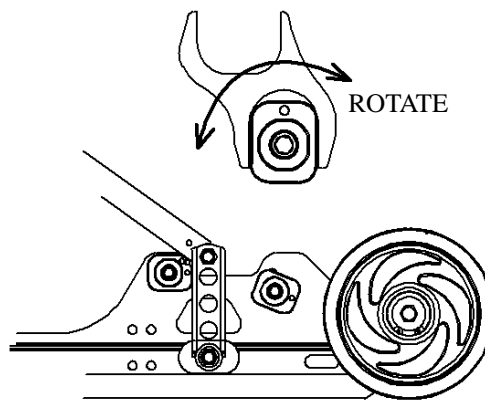


1. To set up the rear suspension torsion spring preload, measure the distance between the ground and rear bumper with out the rider on the seat and the suspension at full extension. This can be achieved by lifting the rear of the machine so that the suspension is off the ground and carefully setting the machine down. Write this down as measurement "X".
2. Have the rider in full gear drop down on the seat, work the suspension slightly by bouncing up and down and sit in the seated riding position. With the rider in the seated position measure from the ground to the bumper in the same spot as you did for measurement "X" and write it down as measurement "Y".
3. To determine the correct ride height, subtract measurement X from measurement Y. ( $X - Y = \text{ride height}$ ).
4. The ideal ride height is:
  - IQ Fusion (700/900) = 2" (5cm)
  - IQ Fusion (600) = 4-5" (10-13cm)
  - IQ RMK = 5" (13cm)
  - IQ M-10 = 3-4" (8-10cm)
  - Switchback = 5" (13cm)
  - EDGE RMK/EDGE = 4" (10cm)
  - EDGE M-10 = 3-5" (8-13cm)
  - Widetrak = 1.5" (4cm)
5. Adjust for the desired ride height by rotating the torsion spring cams located on the rear of the torsion spring.

If the rear suspension ride height can not be adjusted to the correct dimension, optional torsion springs may be required. This is only an initial setup, and final spring preload may vary

based on rider preference and riding conditions.

## SCISSOR STOP ADJUSTMENTS



The RRSS controls weight transfer from the rear suspension to the skis. It also influences the stiffness of the ride by controlling the amount of coupling action between the front and rear torque arms. To decrease weight transfer, the RRSS should be set in the high position.

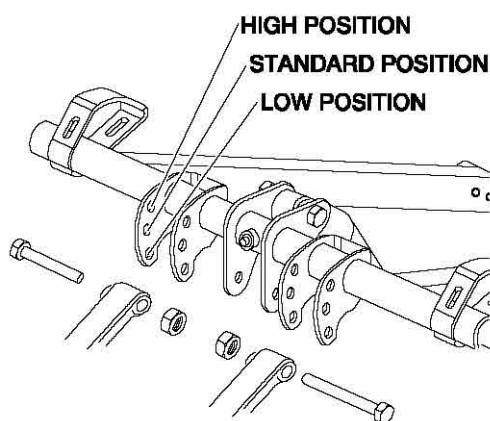
The RRSS can be totally removed for maximum weight transfer. However, unless the torsion springs and rear shock valving are changed, the ride will be compromised. Always maintain equal adjustment on both sides.

To adjust the scissor stops place the scissor tool onto the scissor block and turn to the desired position. Ensure that the rear scissor stop face is square with the face of the scissor arm to ensure complete contact.



The dot is an indicator of the HIGH position. The sides are the LOW position and the bottom is the MEDIUM position.

### FRONT TORQUE ARM LIMITER STRAP ADJUSTMENT



One method of changing ski-to-snow pressure is to change the length of the front torque arm limiter straps. The limiter strap is normally mounted in the fully extended position. Both limiter straps must be adjusted evenly and remain equal in length to avoid improper Hi-Fax and track wear.

- Lengthening the straps decreases ski pressure under acceleration.
- Shortening the straps increases ski pressure under acceleration.

#### RMK Set up Recommendations for Optimum Performance

- DEEP POWDER SNOW: FTA in LOW position for maximum lift and flotation
- POWDER-HARDBACK: FTA in STANDARD position for overall handling and speed over snow.
- HARDBACK: FTA in HIGH position for increased control and less transfer.

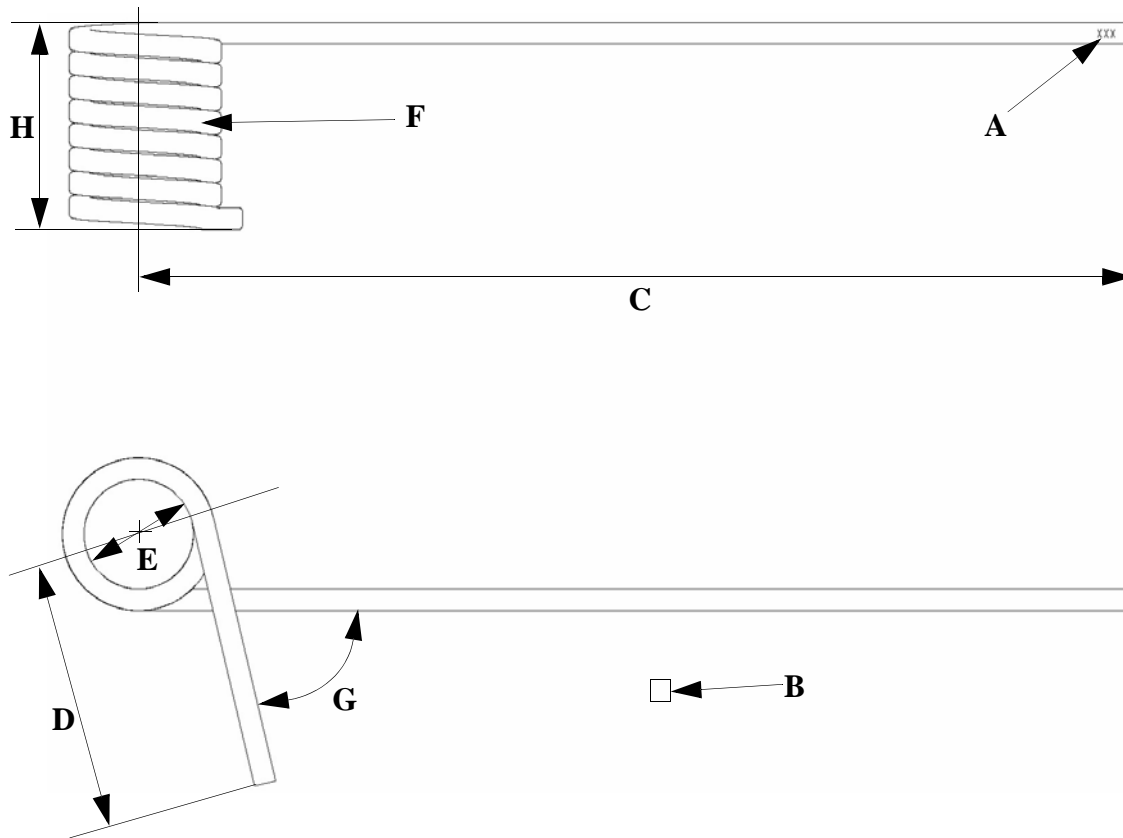
### TORSION SPRING ADJUSTMENT

To adjust the rear torsion spring, rotate the adjuster cam to the desired adjustment. The cam has three sides, LOW, MEDIUM and HIGH.





## TORSION SPRINGS



The torsion spring tension is determined by the following factors.

1. Wire Diameter (B).
2. Number of coils (F).
3. Degree of the open angle (G).

**Table 11-1: Square Torsion Springs**

SPRING PN (last 3 digits (A))	WIRE DIAMETER inches (B)	LEG 1 inches (C)	LEG 2 inches (D)	COIL ID inches (E)	# OF COILS inches (F)	DEGREES OPEN ANGLE (G)	SPRING WIDTH inches (H)
7042068 LH 7042069 RH	.359	16.5	4.5	1.95-2.01	8.64	47	3.75
7041911 LH 7041912 RH	.347	16.5	4.5	1.82-1.88	7.75	90	3.49
7041627 LH 7041628 RH	.347	16.5	4.5	1.82-1.88	7.71	77	3.45
7042064 LH 7042065 RH	.359	16.5	4.5	1.95-2.01	7.63	50	3.45
7042159 LH 7042160 RH	.347	15.625	3.75	1.89-1.91	6.71	77	3.45
7041902 LH 7041903 RH	.359	16.5	4.5	1.79-1.85	7.75	90	3.5
7041629 LH 7041630 RH	.359	16.5	4.5	1.79-1.85	7.71	77	3.46

**Table 11-1: Square Torsion Springs**

<b>SPRING PN (last 3 digits (A))</b>	<b>WIRE DIAMETER inches (B)</b>	<b>LEG 1 inches (C)</b>	<b>LEG 2 inches (D)</b>	<b>COIL ID inches (E)</b>	<b># OF COILS inches (F)</b>	<b>DEGREES OPEN ANGLE (G)</b>	<b>SPRING WIDTH inches (H)</b>
7041856 LH 7041857 RH	.359	16.5	4.5	1.79-1.85	7.71	85	3.46
7042079 LH 7042080 RH	.375	16.5	4.5	1.98	8.64	47	3.94
7042101 LH 7042102 RH	.347	15.625	3.75	1.69-1.71	6.71	77	3.45
7042139 LH 7042140 RH	.375	17.7	4	2.35	6.71	77	3.1
7042157 LH 7042158 RH	.359	15.625	3.75	1.82-1.84	6.71	77	3.46
7041631 LH 7041632 RH	.375	16.5	4.5	1.86-1.92	7.71	77	3.74
7041942 LH 7041943 RH	.375	16.5	4.5	2.225	6.71	77	3.52
7041895 LH 7041896 RH	.375	16.5	4.5	2.225	6.71	90	3.52
7042240 LH 7042241 RH	.405	17.7	4	2.35	6.71	77	3.25
7041655 LH 7041656 RH	.405	16.5	4.5	1.86-1.92	7.71	77	4
7041897 LH 7041898 RH	.405	16.5	4.5	2.225	6.75	90	3.55
7041940 LH 7041941 RH	.405	16.5	4.5	2.232	6.71	77	3.55
7043070 LH 7043071 RH	.347	14.75	4.5	1.80-1.84	6.72	80	3.20
7042157 LH 7042158 RH	.359	15.625	3.75	1.82-1.84	6.71	77	3.46
7042242 LH 7042243 RH	.359	17.70	3.25	2.35	6.71	77	3.1
7042253 LH 7042254 RH	.359	14.63	4.5	1.88-1.90	6.75	90	3.00
7042282 LH 7042283 RH	.421	17.70	4	2.45	6.71	71	3.4
7042321 LH 7042322 RH	.347	13.63	4.5	2.16-2.20	5.72	80	2.54
7043042 LH 7043043 RH	.347	14.75	4.5	1.80-1.82	6.72	80	3.2
7043079 LH 7043080 RH	.359	14.75	4.5	1.80-1.84	6.72	80	3.1
7043124 LH 7043125 RH	.405	17.70	4	2.35	6.71	77	3.44



**Table 11-1: Square Torsion Springs**

<b>SPRING PN (last 3 digits (A))</b>	<b>WIRE DIAMETER inches (B)</b>	<b>LEG 1 inches (C)</b>	<b>LEG 2 inches (D)</b>	<b>COIL ID inches (E)</b>	<b># OF COILS inches (F)</b>	<b>DEGREES OPEN ANGLE (G)</b>	<b>SPRING WIDTH inches (H)</b>
7043128 LH 7043129 RH	.405	14.75	4.5	2.5	6.72	80	3.40
7043130 RH 7043131 LH	.359	14.75	4.5	2.5	5.72	80	3.75



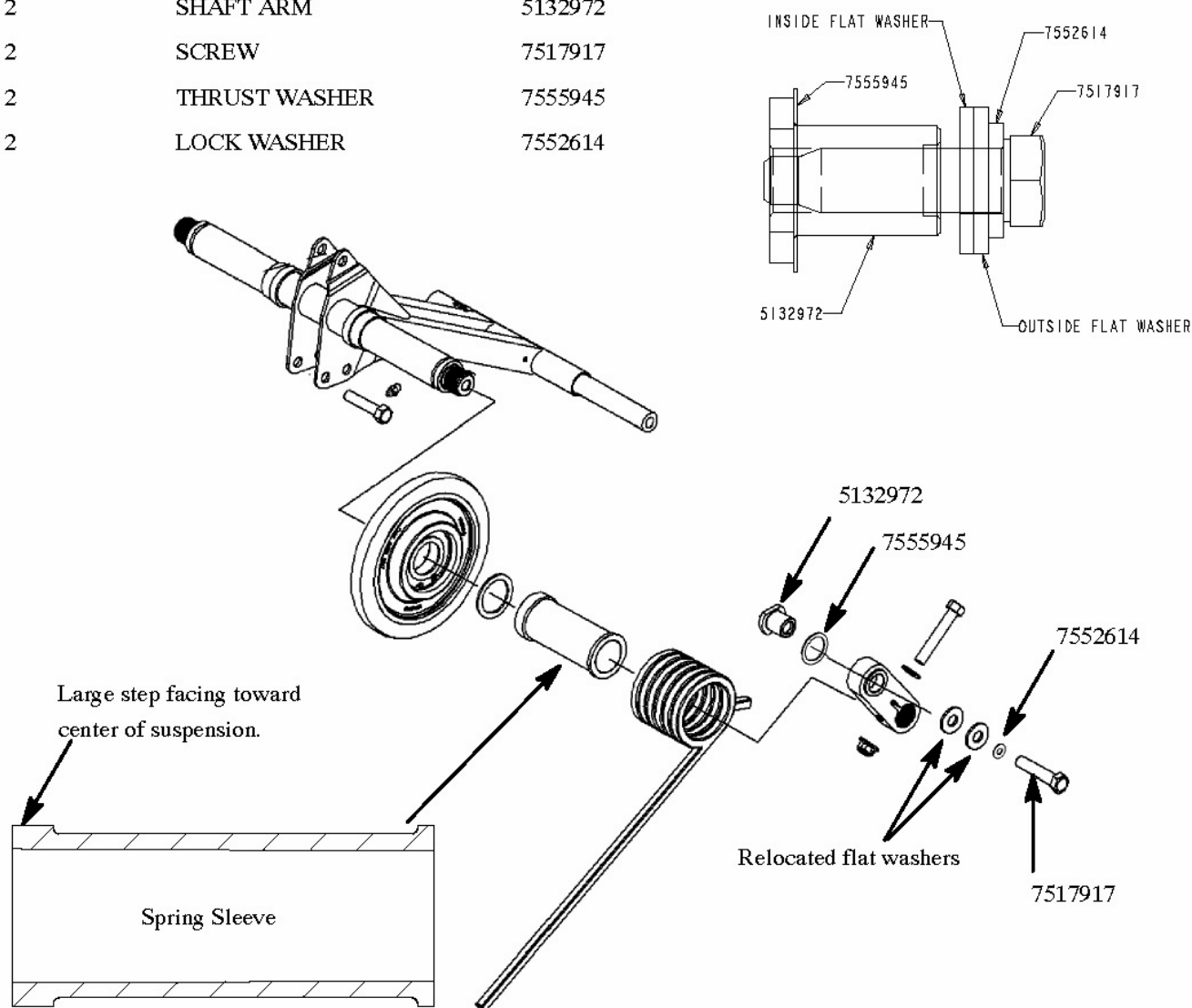
### INSTALLING HEAVIER SPRINGS ON A FUSION SUSPENSION

Please reference the following information when installing heavy torsion springs on 2005 Fusion sleds. The issue that arises when installing the heavy spring on a Fusion sled is that

the coil stack of the torsion spring is wide enough to interfere with the suspension arm clamp nut. To work around this issue you will need to order two (one for each side) of the following parts. Relocate the two washers that are next to the clamp nut to the outside of the link arm.

#### Parts Needed:

QUANT.	DESCRIPTION	PART NUMBER
2	SHAFT ARM	5132972
2	SCREW	7517917
2	THRUST WASHER	7555945
2	LOCK WASHER	7552614



Torsion spring sleeve

NOTE: Install so that the larger step is facing toward the center of the suspension



## M-10 SUSPENSION

### M-10 OVERVIEW

The FAST M-10 rear suspension has been designed and set up to deliver a soft ride under average riding conditions. Rider weight, riding styles, trail conditions, and vehicle speed each affect suspension action.

The suspension can be adjusted to suit rider preference and deliver excellent performance for a given set of conditions. It should be noted, however, that suspension adjustments involve a compromise or trade off. A machine set up to

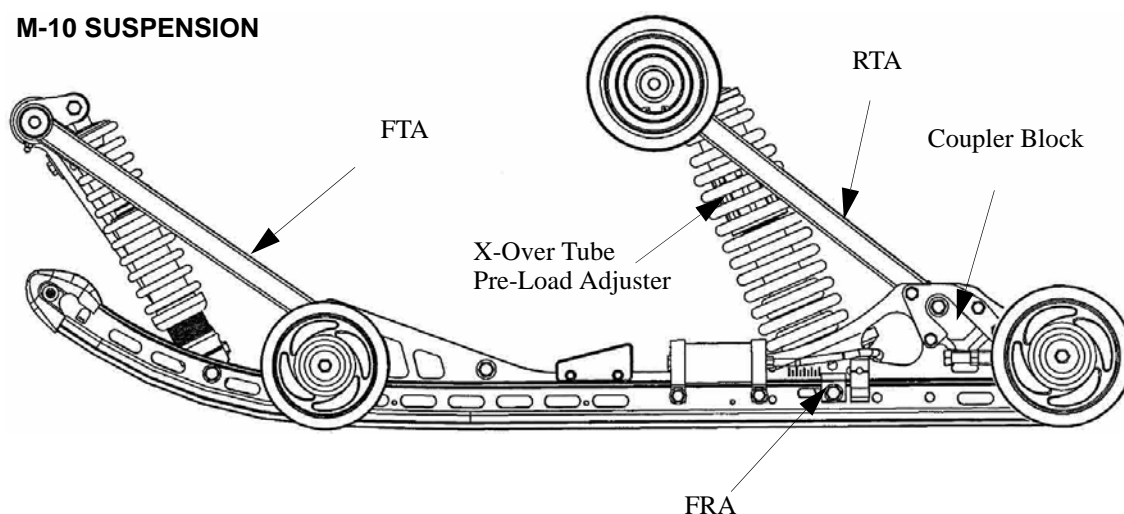
perform well in the moguls would not suit the preference of a groomed trail rider.

### M-10 ADJUSTMENTS

- Full Range Adjuster (FRA)
- Threaded Pre-load adjuster
- Rear Compression Spring Adjuster
- X-Over Tube Length Adjustment

**IMPORTANT:** The M-10 rear suspension has been designed to be very sensitive to rider weight. Changes in rider weight of 25 lbs. or more may require appropriate changes in FRA settings.

M-10 SUSPENSION



### M-10 TERMINOLOGY

- **Couple Blocks:** Plastic blocks located at the rear of each rail. Blocks facilitate the couple function.
- **Full Range Adjuster (FRA):** FRA refers to the adjustable lower rear shock attachments. Changing the FRA location has two effects on tuning. First, moving the shock forward increases shock speed, resulting in firmer damping on compression and rebound. Second, it also increases the effect of the rear spring by displacing it further.
- **Sag Settings:** The difference in rear bumper height from the sleds fully extended position to its lower height with the rider seated on the sled.



## M-10 ADJUSTMENTS

The primary adjustment on the M-10 suspension is the Full Range Adjustment (FRA). Adjusting the FRA will have to MOST effect on rear suspension performance.

Polaris recommends that you allow between 25 to 200 miles for the suspension to break in before performing any adjustments to the suspension.

This chart is a guideline to be used for initial suspension setups. Your setup may vary based on your desired riding style.

**Table 11-2: M-10 128**

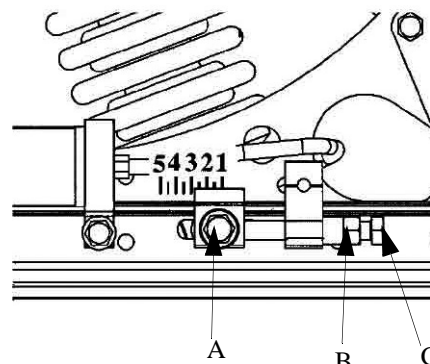
Rider weight with gear (lbs.)	Suggested FRA Range (Lower number is softer)
Under 100	1 to 1 1/2
100-150	1 1/2 to 2
150-200	2 to 2 1/2
200-250	2 1/2 to 3
250-300	3 to 3 1/2
300-350*	3 1/2 to 4
Over 350*	4 to 5

**Table 11-3: M-10 136**

Rider weight with gear (lbs.)	Suggested FRA Range (Lower number is softer)
Under 100*	1 to 1 1/2
100-150*	1 1/2 to 2
150-200*	2 to 2 1/2
200-250	2 1/2 to 3
250-300	3 to 3 1/2
300-350	3 1/2 to 4
Over 350	4 to 5

\*=You may prefer an optional rear track middle spring retainer, see Table Table 11-4.

## M-10 FRA INITIAL SET UP REFERENCE



The FRA setting is the primary rear suspension adjustment. It will have the MOST effect on the rear suspension performance. To adjust the FRA:

1. Refer to the initial set-up reference chart (see Table 11-2 and Table 11-3) to determine the desired FRA position.
2. To adjust, loosen the hex bolts (A) attaching the rear lower shock cross shaft to the rail beam.
3. Using a 9/16" wrench, loosen the jam nuts (B) on the preload bolts.
4. Adjust the preload bolts (C) to the desired FRA position.
5. Tighten the jam nuts.

**NOTE: Make sure the preload bolt contacts the slide block before tightening the jam nut.**

6. Tighten the hex bolts and torque to 35 ft. lbs. (47 Nm)

**NOTE: When the M-10 suspension is new, it will take from 25 to 200 miles (40-300 km) to properly break in the springs and shocks, at which time the suspension will be softer and may require FRA re-adjustment.**



## M-10 REAR SPRING PRELOAD

If FRA position alone does not allow the setup of the proper amount of sag, the center retainer of the rear track shock can be replaced with optional retainers to adjust the preload and change the sag.

**Table 11-4: Optional Retainers**

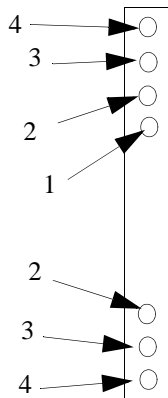
Retainer insert Part Number	Retainer part Number	Preload	Sag
5436109	5135077 (std. on M10/128)	Least	Most
	5134923	Middle	Middle
	5135080 (std. on M10/136)	Most	Least

**NOTE:** Whenever ordering any of the retainers listed in the chart, always order the retainer insert as well. The insert is not removable once installed, so a new insert is needed when installing a new retainer.

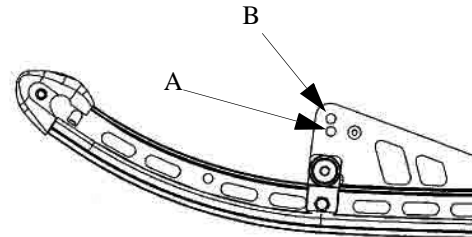
## M-10 SKI PRESSURE

Ski pressure is set at the factory to deliver the optimum balance between ride and handling. If a rider prefers more ski pressure for improved steering performance, adjustments can be made to the front limiter strap and front arm mount.

1. Determine if the rider prefers comfort or control. Lean toward the #4 setting for comfort and toward the #3 setting for aggressive riding.
2. For full hole adjustments, remove the 5/16" nut and flat washers from the lower attachments of the limiter straps and relocate the straps to the desired position (i.e. move from position 4 to 3). Replace the nut and washer. Tighten securely.
3. For half-hole increments (such as 3/4), the limiter straps have slots at the upper pinch bolt. These slots allow the bolts to be loosened (rather than removed) for half-step adjustments. Re-tighten the pinch bolts.
4. There are also two front arm mounting holes in the slide rail that can adjust ski pressure. The lower hole (A) increases ski pressure while the upper hole (B) decreases ski pressure.



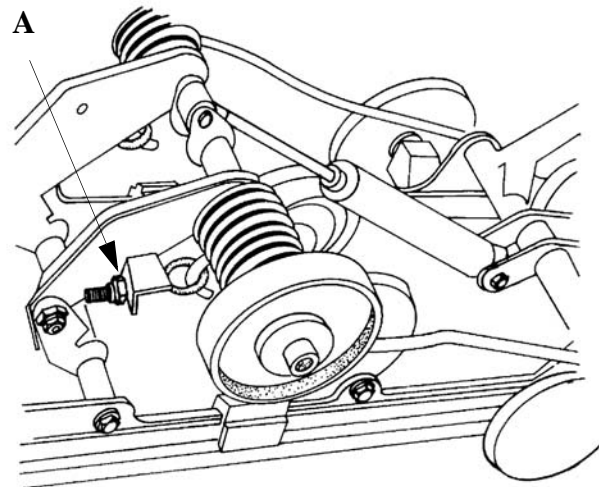
**NOTE:** By design, the BIASED COUPLE design of the M-10 suspension displaces the rear arm as the front arm is compressed. This means that when you raise the front limiter strap, at some point you will collapse the rear suspension arm, which will affect SAG height and reduce rear suspension travel.



## WIDETRAK SUSPENSION

### WIDETRAK REAR SPRING ADJUSTMENTS

Rear spring adjustment is primarily a control for riding comfort. To check for the recommended settings:



1. Lift the rear of the machine to relieve the rear springs.
2. Slowly lower the machine and measure the distance between the ground and the running board.
3. Without letting the suspension settle, the rider should carefully mount the snowmobile.
4. Measure the distance between the ground and the same spot on the running board. The difference between the two readings should be approximately 1 1/2" (3.8 cm). If the difference is greater than 1 1/2" the rear spring should be adjusted equally on both sides until the desired 1 1/2" drop



is obtained.

Compensating adjustments for heavy or light drivers or cargo loads can be made by adjusting the rear spring eye bolt (A) length. Adjust spring tension so there is equal tension on the long leg of each spring.

**NOTE: Rear spring settings will affect ski-to-ground pressure. If ski pressure is too light it may be desirable to tighten the rear springs for an increase in ski-to-ground pressure.**

## **RAIL SLIDER**

### **RAIL SLIDE WEAR LIMIT**

Hi-Fax replacement on all Polaris models is similar. When any area of the Hi-Fax is worn to 1/8" (3 mm), it should be replaced. This will save wear on other vital components. The slide rail is designed to operate in conditions with adequate snow cover to provide sufficient lubrication. Excessive wear may be due to improper alignment, improper track adjustment or machine operation on surfaces without snow. Replace Hi-Fax when worn down to 7/16".

### **RAIL SLIDE REMOVAL**

1. Remove the rear suspension.

**NOTE: Some models may allow the rail sliders to be removed by sliding it through track windows with the suspension mounted in the machine.**

2. Remove front rail slider retaining bolt, located at the rail tip.
3. Use a block of wood or a drift punch and hammer to drive the Hi-Fax rearward off the slide rail.
4. With the rail slider at room temperature, install a 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.**

### **RAIL SLIDER BREAK IN**

After installing new rail sliders they must be "broke in" for longer life and better wear patterns. When performing the breaking in procedure ride the sled on a surface that has adequate snow conditions with deeper snow nearby. Run the sled on the adequate snow surface and dip into the deeper snow every so often.

## **REAR SUSPENSION**

## **REAR SUSPENSION REMOVAL / INSTALLATION**

### **REAR SUSPENSION REMOVAL**

1. Support the rear of the machine so that the track is off the floor.
2. Loosen the rear idler bolts and move the rear idler shaft all the way toward the front of the suspension. This will help give you more room to work with while removing the suspension.
3. Remove the four suspension bolts that hold the rear suspension to the chassis.
4. Place a protective mat on the floor and tip the unit over on the left side, supporting the sled on the end of the handlebar.
5. Remove the suspension from the tunnel.

### **REAR SUSPENSION INSTALLATION**

1. With the unit on its left side, place the suspension in the tunnel and carefully turn the unit upright.
2. Support the rear of the unit.
3. Lower the unit so that you can start all four of the new suspension mounting bolts.

**IMPORTANT: It is strongly suggested that you replace the rear suspension mounting bolts with new bolts. These bolts are treated with a special locking agent. Use of any other locking agent may cause damage to the suspension or suspension hardware.**

4. Torque the rear suspension mounting bolts to the correct specification, see "MOUNTING TORQUE SPECIFICATIONS" on page 11.2.
5. Align the track guides/clips with the suspension rails.
6. Adjust the rear idler to achieve the correct amount of track sag, see "TRACK TENSION" on page 3.21.



## SHOCK INFORMATION

**Table 11-5: Front Track Shocks**

SHOCK PN	BRAND	Extended Length (in)	Collapsed Length (in)	Stroke (in)	Shock Rod (in)	IFP Depth (in)	Shaft PN	PSI
7041939	Arvin	12.16	8.58	3.59	.50	N/A	N/A	N/A
7043096*	Walker	12.10	8.60	3.50	.625	2.25 rr	1800227	200
7042085	Arvin	12.49	8.92	3.58	.43	N/A	N/A	N/A
7041486	Arvin	18.04	13.03	5.99	.49	N/A	N/A	N/A
7041975*	Arvin	12.10	8.60	3.5	.49	4.61 t	1700026	200
7043178*	Arvin	12.10	8.60	3.5	.49	4.68 t	1700026	200
7042224*	Fox	12.52	5.78	3.34	.49	1.150 b	1500247	300
7043123*	Fox/M-10 128/136	12.53	5.78	3.34	.49	1.250 b	1500736	300
7042335*	Arvin	12.51	8.92	3.59	.49	4.77 t	1700182	200
7043048	Arvin	12.49	8.92	3.58	.43	N/A	N/A	N/A
7043142*	Fox	12.51	8.92	3.59	.49	.840 b	1500713	200

**Table 11-6: Rear Track Shocks**

SHOCK PN	BRAND	Extended Length (in)	Collapsed Length (in)	Stroke (in)	Shock Rod (in)	IFP Depth (in)	Shaft PN	PSI
7041920	Arvin	16.71	10.96	5.75	.49	N/A	N/A	N/A
7042129*	Fox	16.65	11.05	5.60	.49	1.10 b	1500487	200
7042138	Arvin	16.71	10.96	5.75	.49	N/A	N/A	N/A
7042058	Arvin	16.71	10.96	5.75	.49	N/A	N/A	N/A
7042141*	Arvin	13.47	8.82	4.64	.49	N/A	1700215	300
7043097*	Walker	15.60	10.56	5.04	.625	2.25 rr	1800228	200
7043177*	Fox	15.60	10.56	5.04	.49	1.22 b	1500599	200
7042216*	Fox	14.12	9.40	4.66	.62	2.25-2.40 rr	1500447	300
7043190*	Fox	14.12	N/A	N/A	.498	2.40 rr	1500562	300
7043047	Arvin	16.71	10.96	5.75	.49	N/A	N/A	N/A
7043046*	Arvin	16.61	10.97	5.64	.49	1.80	1700220	200
7043143*	Fox	16.60	N/A	5.69	.498	1.75 rr	1500715	200

\*=Rebuildable shock

b=IFP depth measured form the bottom of the shock body

t=IFP depth measured form the top of the shock body.

rr=top of remote reservoir



## VALVING SPECIFICATIONS

### REAR SUSPENSION FRONT TRACK SHOCK (FTS) STOCK VALVING

**Table 11-7: FTS 7043096**

COMPRESSION	.875x.090
	1.00xx.025
	1.10x.025
	.700x.010
	.800x.010
	.900x.010
	1.00x.008
	1.10x.008
	1.20x.008
	.800x.010
	1.30x.008
	Piston orifice .067
REBOUND	1.25x.010
	1.10x.010
	1.00x.010
	.900x.010
	.800x.010
	.700x.010
	.625x.065
	1.10x.010
ADJUSTER	1.00x.012
	1.00x.012
	.700x.010
	.875x.090

**Table 11-8: FTS 7041975**

COMPRESSION	.800x.008
	.900x.008
	1.000x.008
	1.100x.010
	1.300x.008
	1.000x.006
REBOUND	1.300x.008
	Piston orifice .070
	1.250x.008
	1.100x.010
	1.000x.010
	.900x.010
	.800x.012

**Table 11-9: FTS 7043178**

COMPRESSION	.800x.008
	.900x.010
	1.000x.010
	1.100x.008
	1.250x.008
	.900x.008
	1.100x.006
	1.300x.008
REBOUND	Piston orifice .070
	1.250x.010
	1.100x.010
	1.000x.010
	.900x.010
	.800x.012
	.700x.010



**Table 11-10: FTS 7041975**

COMPRESSION	.800x.008
	.900x.008
	1.000x.008
	1.100x.010
	1.300x.008
	1.000x.006
	1.300x.008
Piston orifice .070	
REBOUND	1.250x.008
	1.100x.010
	1.000x.010
	.900x.010
	.800x.012

**Table 11-12: FTS 7043123**

COMPRESSION	1.125x.093
	1.100x.006
	1.300x.015
	1.000x.004
	1.300x.015
	1.300x.015
Piston orifice .093	
REBOUND	1.250x.010
	1.100x.008
	.900x.008
	.800x.008
	.620x.093

**Table 11-11: FTS 7042224**

COMPRESSION	1.125x.093
	1.100x.015
	1.300x.015
	1.000x.004
	1.300x.015
	1.300x.015
	1.300x.015
Piston orifice .093	
REBOUND	1.250x.010
	1.100x.008
	.900x.008
	.800x.008
	.620x.093

**Table 11-13: FTS 7042335**

COMPRESSION	.700x.012
	.800x.008
	.900x.010
	1.000x.008
	1.100x.008
	1.250x.012
	.900x.008
	1.300x.006
Piston orifice .070	
REBOUND	1.250x.010
	1.100x.012
	1.000x.010
	.900x.010
	.800x.010
	.700x.010

**Table 11-14: FTS 7043142**

COMPRESSION	1.125x.093
	.700x.012
	.700x.012
	.900x.008
	1.100x.008
	1.250x.008
	.900x.008
	1.250x.008
	1.300x.008
Piston orifice .078	
REBOUND	1.250x.008
	.800x.008
	1.100x.010
	1.000x.010
	1.000x.010
	.900x.012
	.900x.012
	.800x.015
	.700x.015
	.620x.093

**REAR SUSPENSION REAR TRACK SHOCK  
(RTS) STOCK VALVING****Table 11-15: RTS 7042129**

COMPRESSION	1.125x.093
	.900x.010
	1.000x.010
	1.100x.010
	1.250x.012
	1.000x.006
	1.300x.010
Piston orifice .063	
REBOUND	1.250x.015
	1.250x.012
	1.100x.012
	1.000x.010
	.900x.010
	.800x.010
	.620x.093

**Table 11-16: RTS 7042141**

COMPRESSION	.700x.010
	.800x.006
	.900x.006
	1.000x.006
	1.100x.006
	1.250x.006
	1.300x.006
Piston orifice .041	
REBOUND	1.250x.012
	1.250x.006
	1.100x.006
	1.250x.012
	1.250x.012
	1.250x.012
	1.250x.012
	1.100x.012
	1.100x.012
	1.000x.012
	.900x.012
	.800x.012



**Table 11-17: RTS 7043097**

COMPRESSION	.875x.090
	.625x.065
	.700x.008
	.800x.008
	.900x.010
	1.000x.010
	1.100x.008
	.900x.008
	1.100x.008
	.700x.010
	1.250x.010
	1.300x.010
	Piston orifice .040
REBOUND	1.250x.012
	.800x.008
	1.100x.010
	1.000x.010
	.900x.010
	.800x.010
	.700x.010
	.625x.065
ADJUSTER	1.100x.025
	1.000x.015
	1.000x.015
	.700x.010
	.875x.090

**Table 11-18: RTS 7042216**

COMPRESSION	1.125x.093
	.900x.008
	1.300x.012
	1.300x.012
	1.300x.012
	.800x.010
	1.300x.008
	1.300x.006
	1.300x.008
	Piston orifice .070
REBOUND	1.300x.012
	1.100x.010
	1.250x.012
	1.250x.012
	1.250x.012
	1.250x.012
	1.250x.012
	1.250x.012
	1.250x.012
	.900x.010
	.800x.010
	.700x.010
	.620x.093

**Table 11-19: RTS 7043190**

COMPRESSION	1.125x.093
	.900x.008
	1.300x.008
	1.300x.008
	1.300x.010
	.800x.010
	1.300x.006
	1.300x.008
Piston orifice .055	
REBOUND	1.250x.012
	1.100x.010
	1.125x.093
	.620x.093

**Table 11-20: RTS 7043177**

COMPRESSION	1.125x.093
	.900x.010
	1.000x.010
	1.100x.012
	1.100x.010
	1.100x.008
	1.000x.006
	1.300x.008
	1.300x.008
Piston orifice .093	
REBOUND	1.250x.010
	1.250x.010
	1.100x.012
	1.000x.012
	.900x.012
	.800x.012
	.620x.093



### **SHOCK VALVE PART NUMBERS**

Shock valves are used in a stack on the top and on the bottom of the shock piston. These stacks can be adjusted so that it can control the amount of fluid that is forced by as the piston travels through its motion. Below is a chart that has the part numbers of these valves, proceeding the part number is the size of the washer (out side diameter x thickness). A thick washer (.700 x .010) will try to keep the fluid from passing through the piston as it travels.

Refer to the appropriate parts manual for a complete listing of shock parts.

**RYDE FX™ SHOCK VALVE PART NUMBERS**

**NOTE:** *The cart below groups the valves by thickness*

**Table 11-21: RYDE FX VALVE PART NUMBERS**

PART NUMBER	SIZE	THICKNESS
1700080	0.700	0.004
1700086	0.800	
1700092	0.900	
1700081	0.700	0.006
1700087	0.800	
1700093	0.900	
1700121	1.000	
1700129	1.100	
1700134	1.250	
1700139	1.300	0.008
1700094	0.900	
1700122	1.000	
1700130	1.100	
1700135	1.250	
1700140	1.300	0.009
1700082	0.700	
1700088	0.800	0.010
1700083	0.700	
1700089	0.800	
1700095	0.900	
1700126	1.000	
1700131	1.100	
1700136	1.250	0.012
1700141	1.300	
1700084	0.700	
1700090	0.800	
1700096	0.900	
1700127	1.000	
1700132	1.100	0.015
1700137	1.250	
1700142	1.300	
1700085	0.700	
1700091	0.800	
1700120	0.900	
1700128	1.000	0.015
1700133	1.100	
1700138	1.250	
1700143	1.300	

**FOX™ SHOCK VALVE PART NUMBERS**

**NOTE:** *The cart below groups the valves by thickness*

**Table 11-22: FOX Valve Part Numbers**

PART NUMBER	SIZE	THICKNESS
1500055	0.700	0.006
1500054	0.800	
1500053	0.900	
1500048	1.000	
1500049	1.100	
1500050	1.250	
1500052	1.300	0.008
1500029	0.700	
1500028	0.800	
1500033	0.900	
1500032	1.000	
1500031	1.100	
1500051	1.250	0.010
1500030	1.300	
1500044	0.700	
1500047	0.800	
1500046	0.900	
1500045	1.000	
1500027	1.100	0.012
1500026	1.250	
1500062	1.300	
1500056	0.700	
1500057	0.800	
1500058	0.900	
1500059	1.000	0.015
1500060	1.100	
1500078	1.250	
1500079	1.300	
1500081	0.700	
1500082	0.800	
1500083	0.900	0.015
1500084	1.000	
1500085	1.100	
1500086	1.250	
1500087	1.300	



## WALKER EVANS SHOCK VALVE PART NUMBERS

**Table 11-23:**

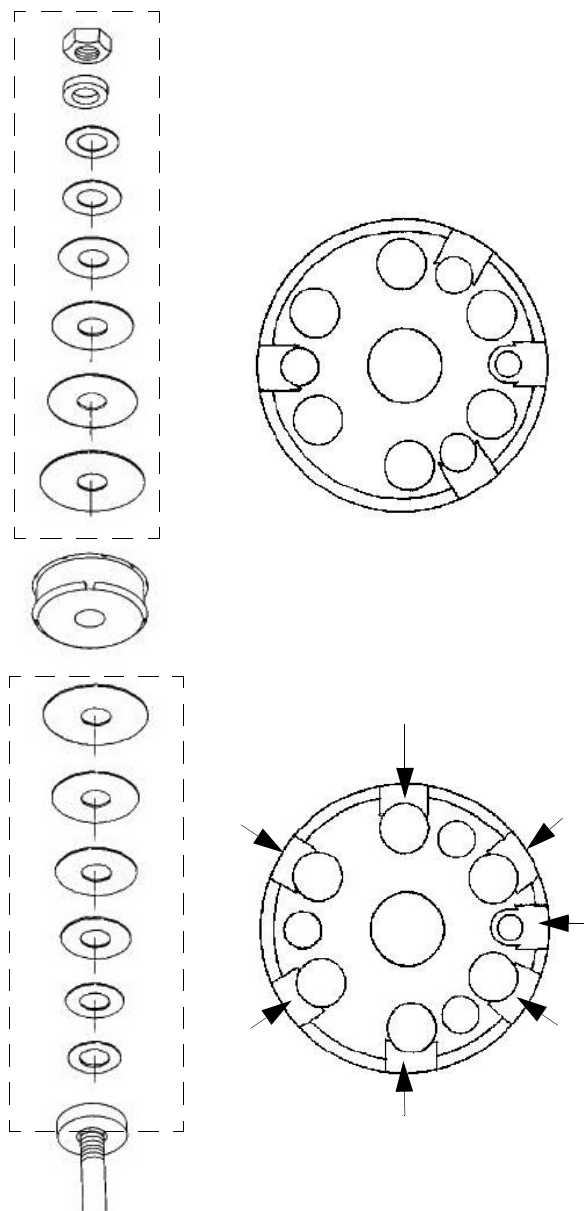
PART NUMBER	SIZE	THICKNESS
1800051	.700	.006
1800075	.800	
1800076	.900	
1800077	1.000	
1800078	1.100	
1800079	1.200	
1800080	1.300	
1800081	.700	.008
1800082	.800	
1800083	.900	
1800084	1.000	
1800085	1.100	
1800086	1.200	
1800087	1.250	
1800088	1.300	
1800052	.700	.010
1800053	.800	
1800054	.900	
1800055	1.000	
1800056	1.100	
1800057	1.200	
1800058	1.300	
1800059	.700	.012
1800060	.800	
1800061	.900	
1800062	1.000	
1800063	1.100	
1800064	1.200	
1800089	1.250	
1800072	1.300	
1800066	.700	.015
1800067	.800	
1800068	.900	
1800069	1.000	
1800070	1.100	
1800071	1.250	
1800072	1.300	
1800090	1.000	.025
1800091	1.100	
1800092	1.200	
1800093	1.300	
1800050	.625	.065
1800204	.875	.090

## SHOCK VALVING ARRANGEMENT

Shown below is an example of how valving stacks are arranged. The Production Shock Information contain production valving specifications and piston orifice sizes.

Parts in the box below are an example of standard valving.

**NOTE:** Note the direction of the valve piston before disassembly. The side with the greater number of relief slots (1) should face the nut end (2) of the shaft.





## **SPECIAL TOOLS**

### **SHOCK REBUILDING TOOLS**

**Table 11-24: Special Tools**

<b>PART NUMBER</b>	<b>DESCRIPTION</b>
2200421	Gas Shock Recharging Kit
2201639	Shock Shaft Seal Protector 1/2" Diameter
2201640	Shock Shaft Seal Protector 5/8" Diameter
2870623	Shock Absorber Spring Compression Tool
2870803	Shock Spring Pre-Load Adjustment Too
PS-45259	Gas Fill Tool
9917736	VIDEO-Rebuilding Mono Tube Shocks
9917737	VIDEO-Rebuilding Remote Reservoir Shocks

**Table 11-25: Ryde FX Shock Special Tools**

<b>PART NUMBER</b>	<b>DESCRIPTION</b>
PS-45259	Gas Fill Tool and Gauge (Incl. 5 needles)
PS-45259-1	Gas Fill Needles replacement pack
PS-45259-2	Gas Fill Gauge (replacement)
PS-45260	Lower Retainer Wrench
PS-45261	IFP Positioning / Extraction tool
PS-45262	Cylinder Head Wrench
PS-45263	Wear Band Tool
PS-45629	Arvin Shock Body Holder
PS-45280	Shock Collar Tool
PS-45821	Shock Reservoir Holder

**Table 11-26: FOX Shock Special Tools**

<b>PART NUMBER</b>	<b>DESCRIPTION</b>
2871021	Shock Body Holding Tool
2871352	Shock Rod Holding Tool 1/2" rod
2872429	Shock Rod Holding Tool 5/8" rod
2871232	Fox Shock Spanner
2871351	Fox Shock IFP Depth Tool
PS-44925	Fox Inner Tube Puller PS 2

## **SHOCK MAINTENANCE**

### **SHOCK MAINTENANCE**

Changing oil on Shocks is recommended annually and should be included when performing end of season storage preparation. This oil change is necessary to avoid any chance of corrosion which could be caused by moisture contamination.

When performing maintenance on Shocks, use Gas Shock Recharging Kit PN 2200421. It consists of the necessary valves, pressure gauge, and fittings to deflate and pressurize

the shocks. The Body Holder Tool, Internal Floating Piston (IFP), and Shock Rod Holding Tool are not included in the Recharging Kit and must be ordered separately. Refer to your SPX Specialty Tool catalog for part numbers. Videos on shock



rebuilding are also available. Monotube shocks 9917736, Remote Reservoir 9917737.

### CAUTION

EXTREME CAUTION SHOULD BE OBSERVED WHILE HANDLING AND WORKING WITH HIGH PRESSURE SERVICE EQUIPMENT. WEAR A FACE SHIELD, SAFETY GLASSES, AND EAR PROTECTION DURING SERVICE OF THESE SHOCKS. CARE SHOULD BE OBSERVED WHILE HANDLING THE INFLATER NEEDLE AND PRESSURE GAUGES. MAINTAIN YOUR EQUIPMENT AND KEEP IT IN GOOD WORKING CONDITION. IF INJURY SHOULD OCCUR, CONSULT A PHYSICIAN IMMEDIATELY. EXTREME CLEANLINESS IS OF UTMOST IMPORTANCE DURING ALL DISASSEMBLY AND REASSEMBLY OPERATIONS TO PREVENT ANY DIRT OR FOREIGN PARTICLES FROM GETTING INTO THE SHOCKS. KEEP THE PARTS IN ORDER AS THEY ARE DISASSEMBLED. NOTE THE DIRECTION AND POSITION OF ALL INTERNAL PARTS FOR REASSEMBLY.

## RYDE FX MONO-TUBE SHOCK DISASSEMBLY

Procedures for the proper disassembly and assembly of RydeFX gas charged IFP and emulsion mono-tube shock absorbers.

### CAUTION

BEFORE SERVICING A GAS SHOCK IT IS IMPORTANT THAT ALL THE GAS PRESSURE BE DISCHARGED FROM THE UNIT. REFER TO THE INSTRUCTIONS LISTED BELOW FOR THE PROPER PROCEDURE OF DISCHARGING THE GAS PRESSURE FROM A SHOCK. PROTECTIVE EYE WEAR SHOULD BE WORN TO AVOID RISK OF INJURY WHILE SERVICING RY-DEFX GAS CHARGED MONO-TUBE SHOCKS.

1. Remove the shock(s) from the vehicle.
2. Before unscrewing pre-load springs, measure the compressed length of the installed spring and mark position for reinstallation.
3. If the shock incorporates a spring, remove the spring and all collateral retainers.

### CAUTION

WHEN REMOVING THE SPRING FROM A SHOCK THAT UTILIZES A FIXED LOWER RETAINER; THE USE OF A PROPER SPRING COMPRESSOR SHOULD BE USED TO AVOID RISK OF BODILY INJURY.

4. Wash the shock body in parts cleaner; then dry with compressed air to remove sand and dirt.

### WARNING

WHEN USING COMPRESSED AIR TO DRY COMPONENTS, PROTECTIVE EYE WEAR SHOULD BE WORN TO AVOID RISK OF INJURY.

5. Remove bearing, sleeve and/or bushings from lower shock mount eyelet. Secure the lower mount of the shock in a vise. The use of soft jaws is recommend to prevent damage or marks to the shock.

### CAUTION

IT IS IMPORTANT THAT THE GAS SHOCK BE RETAINED IN THE VISE BY THE LOWER MOUNT. ANY OTHER METHOD OF SECURING THE SHOCK BODY DURING THESE PROCEDURES MAY DEFORM THE SHOCK BODY CYLINDER.

6. Remove the small button head screw from the pressure valve assembly.
7. Depressurize the shock.

### WARNING

NITROGEN GAS IS UNDER EXTREME PRESSURE. USE CAUTION WHEN RELEASING NITROGEN GAS FROM SHOCK. PROTECTIVE EYE WEAR SHOULD BE WORN TO AVOID RISK OF INJURY.

8. Internal Floating Piston Shocks, using a slotted screwdriver, loosen the pressure valve assembly counter-clockwise two full revolutions allowing the gas pressure to fully escape past the pressure valve assembly O-ring.
9. Emulsion Shocks: With the shock inverted and the piston rod fully extended, secure the lower mount of the shock in a vise. Allow a couple of minutes for the gas pressure to separate from the oil and rise to the top. Using a rag as a shield to prevent spraying gas and oil; place rag over top the pressure valve assembly and slowly loosen the valve assembly with slotted screw driver three full revolutions, allowing all the gas pressure to escape past the pressure valve assembly O-ring.
10. Allow all the gas pressure to escape before proceeding with the removal of the pressure valve assembly. Pressurized gas and shock oil could eject the valve assembly from the cylinder resulting in bodily injury.
11. Using a slotted screwdriver, remove the pressure valve assembly from the lower end mount. Account for an O-ring.
12. Using an adjustable face spanner (PN PS45262), fully



loosen and remove cylinder head assembly.

13. Pour the oil out of the shock body. Discard old oil into an approved storage container and dispose appropriately. Never reuse damper oil during shock rebuild.
14. Using the I.F.P extraction tool thread the tool into the I.F.P and pull upwards, removing the I.F.P from the shock body. Account for wear band and an O-ring. Note: Not applicable for emulsion shock
15. Clean the inside of the shock body using clean parts-cleaning solvent and blow dry using compressed air.
16. Place the shock piston rod upper mount in bench vise, begin piston and valve removal. Arrange parts removed in the sequence of disassembly. The piston should have the flat slots facing the nut end (as highlighted in black).
17. Items to inspect: Piston rod for straightness, nicks or burrs. Cylinder Head Assembly / DU Bearing clean, inspect, or replace. Inside of shock body for scratches, burrs or excessive wear. Teflon piston and I.F.P wear band for cuts, chipped or nicked edges, or excessive wear. O-rings for nicks, cuts, or cracks. Cap and rod seals for nicks, cuts or cracks. Valve discs for kinks or waves. Compression bumpers (ski shocks only) for chipping, cracking or missing. Should any of these items be in question replacement is recommended.

### RYDE FX MONO-TUBE SHOCK ASSEMBLY

1. Place the piston rod upper mount into the vise. Reassemble damper rod assembly in the reverse order of disassembly. Special attention should be paid the order of the Rebound and Compression disc (shim) stacks, ensuring that they are in the same order prior to disassembly. Tighten the lock nut to 15-20 ft-lb. of torque. **DO NOT OVER-TORQUE.** If excessive torque is applied, damage to the piston and valves will occur.
2. Secure the shock body by its lower mount in vise. The use of soft jaws is recommend to prevent damage or marks to the shock. It is important that the gas shock be retained in the vice by the lower mount. Any other method of securing the shock body during these procedures may deform the shock body cylinder.

**NOTE: The next points on IFP are not applicable for emulsion shocks. Proceed to assembly of the pressure valve.**

3. Thread the positioning head onto the I.F.P locator tool and adjust the top of the value indicator to the appropriate measurement. Depending on which shock absorber is being worked on, adjust the piston location tool to the specified depth indicated in the shock specification chart.
4. Apply a thin film of oil onto the floating wear band and O-ring and install the floating piston into the top of the shock body, positioning it below the counterbore.
5. Using the tool as a handle, push the floating piston down

into the shock body, being careful not to damage I.F.P wear band and O-ring, until the value indicator knob comes in contact with the shock body. The piston should now be located correctly.

6. Screw the pressure valve assembly into the valve port by hand with a slotted head screwdriver; and tighten to 100-110 in.lb of torque.
7. Fill the shock body with shock oil. Internal Floating Piston Shocks: Fill the shock body with shock oil to the bottom of the thread within the cylinder. Emulsion Shocks: Fill shock body with 110cc's of oil. This will allow for the required air space to properly gas charge the shock with nitrogen gas.

**NOTE: After filling the shock body with oil, allow a couple of minutes for all air bubbles to rise to the top.**

8. With the cylinder head assembly pushed down against the piston, carefully, insert the piston rod and assembly into the cylinder; Slightly oscillating the piston rod to allow piston to enter shock body bore. A light coating of oil on the piston wear band will ease installation.
9. Slowly push the piston rod and assembly into shock body until the cylinder head assembly bottoms on the cylinder counterbore. Slight up and down movement may be required to allow all air to pass through piston assembly.
10. During installation, some shock oil will overflow. Wrap a shop cloth around shock body to catch possible oil overflow. Fast installation of the piston rod and assembly may displace the floating piston from its original position. This must not occur if the damper is expected to perform as designed.
11. Using an open face spanner wrench tighten cylinder head securely into the shock cylinder.
12. Pressurize the shock, through the pressure valve, with nitrogen gas to the specified pressure.
13. If using RydeFX inflation tool Refer to Procedures for use of replaceable inflation needle instruction manual found in the RydeFX inflation tool case.
14. After being compressed, the piston rod should fully extend from the shock body once the shock has been pressurized.
15. Install the small button head screw in the pressure valve assembly and tighten securely.
16. Reinstall sleeve and bushings in lower shock mount.

### FOX PS-5 DISASSEMBLY

1. Remove the shock from the vehicle.
2. Remove the steel sleeve from the eyelet using the mallet and an appropriate sized socket.
3. Pry the polyurethane bushings out using the flat blade screwdriver, being careful not to scratch the body cap.
4. Clean the entire shock assembly with soapy water. Try to



remove as much dirt and grime as possible by scrubbing with a soft bristle brush. Never pressure wash your shock, as this can force water and debris inside which will damage the seals. Dry the shock assembly with compressed air, if available, or use clean towels.

5. Use a 3/32" Hex Key to remove the button head screw from the FOX air valve in the shock body.
6. Securely clamp Fox Nitrogen Safety Needle in vice.



### CAUTION

Point air valve away from face and body when charging or discharging any shock.

7. Insert the Fox Safety Needle squarely into center of gas valve.
8. Using a blunt object, depress the air valve core to release pressure.
9. When the shock is FULLY DISCHARGED, pull reservoir away from the Fox Safety Needle in a straight, smooth motion.
10. Clamp the body end eyelet of the shock securely in vice with shaft side up.
11. Using the 1 3/8" wrench, loosen and unscrew the bearing assembly from the shock body. If the body cap unscrews instead of the bearing, that is OK. You will need to remove both for this rebuild procedure.
12. Clamp the shock in the vice using the body clamp blocks. If the bearing is still in the body, use the 1 3/8" end wrench to loosen and unthread the bearing. If the body cap is what needs removal, use the large crescent wrench to loosen and unthread the body cap.
13. Remove the shaft assembly from the body tube, and place on a clean, lint free paper towel. Remove the shock from the vice and pour shock oil from body tube into a proper disposal container. Do not re-use old shock oil.
14. Using the handle of the mallet, push the IFP out of the shock body on to a folded shop towel.
15. Remove the bleed screw from the IFP using the 1/8" T-Handle
16. Clean the IFP with solvent. Dry with compressed air in a well ventilated area. If compressed air is not available, dry parts using clean, lint free paper towels and let sit in a well ventilated area to allow the solvents to evaporate.
17. Set body assembly aside on a clean, lint free towel.
18. Clamp the shaft eyelet securely in vice with the piston end up.
19. Using a 9/16" wrench, remove the piston lock nut from the end of the shaft.
20. Hold the tip of the Phillips Head Screwdriver against the end of shaft. Hold the piston assembly under the top-out

plate and lift upwards. Slide the piston assembly onto the shaft of the screwdriver. Pull the Screwdriver away from shock shaft while supporting the piston assembly. Set this on a clean, lint free towel. There are many pieces to the piston assembly, and the assembly order of these pieces is critical to the proper performance of your shock. This step ensures that the proper order is kept.

21. Slide bearing assembly off of shaft. Use extreme caution not to scratch inside of the bearing assembly when passing it over the threads at end of shaft and set it on a clean, lint free towel.
22. Remove the bleed screw from the IFP and set them both on a clean, lint free towel.

## FOX PS-5 ASSEMBLY

1. Using a small pair of snap ring pliers, remove the snap ring from the bearing housing. Using your fingers, remove the FIST scraper from the housing. Use a scribe or a dental pick to remove the o-ring from the inside of the FIST scraper by "spearing" the seal with the point of the scribe and pulling it out. Use extreme caution when using a scribe to remove seals. Always "spear" the seal with the point of the scribe. Do not wedge the point of the scribe in behind the seal. This can scratch the surface of the seal groove which will compromise the performance and reliability of the shock absorber.
2. Use the scribe to remove the u-cup wiper and o-ring seals from the bearing housing. Be careful not to scratch the seal grooves or the DU bushing that is pressed into the bearing.
3. Thoroughly clean the FIST scraper, bearing housing, and piston assembly with solvent. Dry with compressed air in a well ventilated area. If compressed air is not available, dry parts using clean, lint free paper towels and let sit in a well ventilated area, to allow the remaining solvent to evaporate.
4. Use a scribe or dental pick to remove the o-ring seal from the IFP.
5. Install the new, well lubricated, o-ring into the FIST scraper. Check to make sure the seal is properly seated, and is not twisted. If a tool is required to aid in proper seating of o-ring, use the non-writing end of a pen, or a similar soft, blunt object, to push it in.
6. Install the new, well lubricated, o-rings into the bearing housing. Correct placement of the shaft seal o-ring is in the groove next to the DU bushing. Check to make sure the seals are properly seated, and are not twisted. If a tool is required to aid in proper seating of o-ring, use the non-writing end of a pen, or a similar soft, blunt object, to push it in.
7. Install the new U-cup seal into bearing. U-cup should be installed so the cupped end is facing the DU bushing inside of bearing. Check to make sure seal is properly



seated. If a tool is required to aid in proper seating of U-cup seal, use the non-writing end of a pen, or a similar soft, blunt object, to push it in.

8. Install FIST bearing into housing. Check for proper orientation of the FIST bearing. The stepped side of the FIST bearing should be visible.
9. Using a small pair of snap-ring pliers, install the snap-ring into the bearing housing. Check for proper orientation of the snap ring. The flat side of the snap-ring should be

visible. Check to make sure the snap-ring is properly seated.

10. Install the new, well greased o-ring onto the IFP.

11. Install the new, well greased o-ring on the IFP bleed screw.

## **REAR SUSPENSION** **TROUBLESHOOTING**

**Table 11-27:**

<b>PROBLEM</b>	<b>SOLUTION</b>
Rear suspension bottoms too easily	Increase rear shock compression valving by turning screw clockwise (if equipped with optional Indy Select shock) or refer to optional valving on Suspension Wall chart for Fox equipped models.
	Increase torsion spring preload
Rides too stiff in rear	Check for binding suspension shafts and grease all pivot points.
	Decrease torsion spring preload adjustments.
	Decrease rear shock compression valving by turning screw counterclockwise (if equipped with optional Indy Select shock) or refer to optional valving on Suspension Wall chart for Fox equipped models.
Setting up for deep snow operation	Change worn rail slides.
	Increase front limiter strap length
	Based on rider preference, RRSS may be removed to increase weight transfer





# CHAPTER 12

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## **HOOD**

### **REMOVAL / INSTALLATION**



#### **WARNING**

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

1. On Edge models disconnect the speedo cable from the speedo.
2. Unplug the hood wiring harness connections.
3. Remove the hood retention cable(s) from hood.
4. Remove the hinge bolts.
5. Remove the hood.
6. Install in reverse order of removal.

### **HOOD REPAIR**

Currently there is no procedures or materials recommended by Polaris for repairing hoods. Hoods are made of Thermoplastic Olefin (TPO) and cannot be repaired. If a hood is broken it must be replaced. For small cracks you may drill a small hole on both ends of the crack to limit spreading. This procedure is called "stop drilling".

## **INSTRUMENT / MFD**

### **EDGE INSTRUMENT REMOVAL / INSTALLATION**

1. Remove the plenum from the underside of the hood and keep track of the plenum filters.
2. Remove the instrument holder from the back of the gauge.
3. Pull the gauge out from the front.
4. Installation is the reverse of removal.

### **IQ MFD REMOVAL / INSTALLATION**

1. Remove the intake from the under side of the hood (C).
2. Disconnect the MFD harness from the gauge.
3. Remove the MFD screws (D).
4. Remove the MFD (E).
5. Installation is the reverse of removal.

## **BUMPER**

### **IQ FRONT BUMPER REMOVAL / INSTALLATION**

1. Open front Nosepan flap and remove the four (4) bumper screws.
2. Remove the center bumper nylock nut and bolt.
3. Remove bumper.
4. Installation is reverse of removal.

## **HEADLIGHT**

### **IQ HEADLIGHT REMOVAL / INSTALLATION**

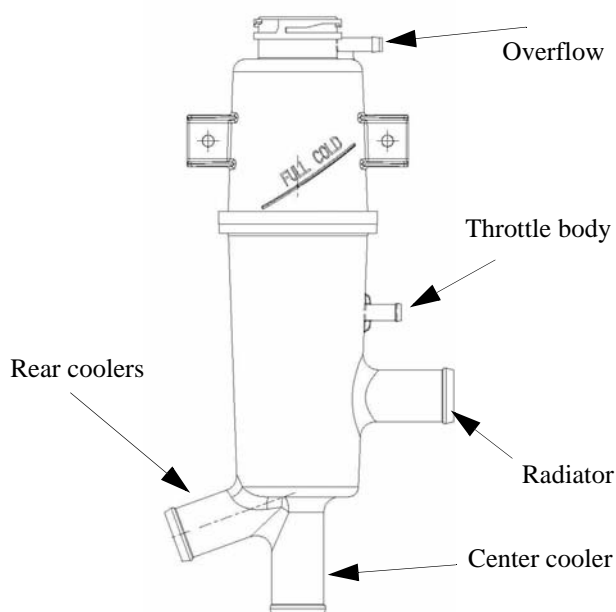
1. Disconnect all the headlight connections.
2. Remove the headlight adjuster guide.
3. Remove the headlight screws that hold the headlight assembly on.
4. Remove the headlight.
5. Installation is the reverse of removal.

### **EDGE HEADLIGHT REMOVAL / INSTALLATION**

1. Remove the plenum from the bottom of the hood.
2. Disconnect the head light connections.
3. Remove the 4 screws holding the headlight in place.
4. Installation is the reverse of removal.



## **COOLANT/OIL TANK**



### **COOLANT TANK REMOVAL**

1. Drain coolant.
2. Remove the 2 torx screws that hold the coolant tank to the oil tank.
3. Remove the coolant lines from bottle.
4. Remove coolant bottle.

### **COOLANT TANK INSTALLATION**

1. Connect coolant lines to the bottle.
2. Tighten the fasteners that hold the coolant bottle to the oil tank.
3. Fill to the correct fluid level.
4. Bleed the cooling system.

## **OIL TANK**

### **OIL TANK REMOVAL**

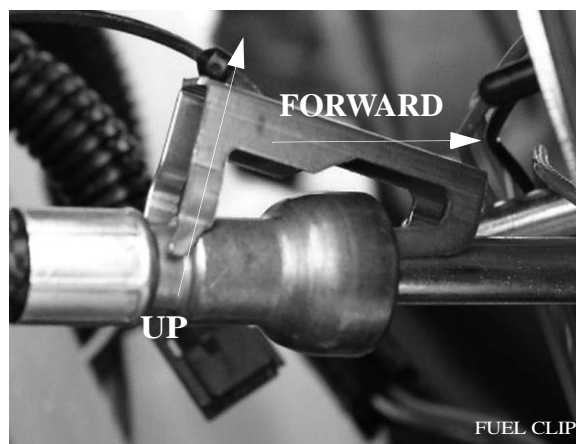
1. Remove the two fasteners that hold the tank to the chassis.
2. Remove the two fasteners that hold the cooling bottle on the oil tank.
3. Remove the cross shaft oil supply line.
4. Lift the rear of the tank and remove the supply line.
5. Disconnect the oil sender connections.
6. Remove tank.

### **OIL TANK INSTALLATION**

1. Attach the supply line to the supply fitting at the bottom of the oil tank.
2. Attach the cross shaft supply line to the fitting on the right hand side.
3. Line up the centering shafts with the chassis centering bracket.
4. Install the coolant bottle on the oil tank.
5. Install the fasteners that hold the tank to the chassis.

## **FUEL CLIPS**

Polaris utilizes two different sizes of fuel supply lines. When removing the fuel lines from the chassis use the special fuel line removal tools. The fuel clips will also have the indicated line use labled on the clamp.



### **FUEL CLIP REMOVAL**

**NOTE:** Note the orentation of the clip for installation

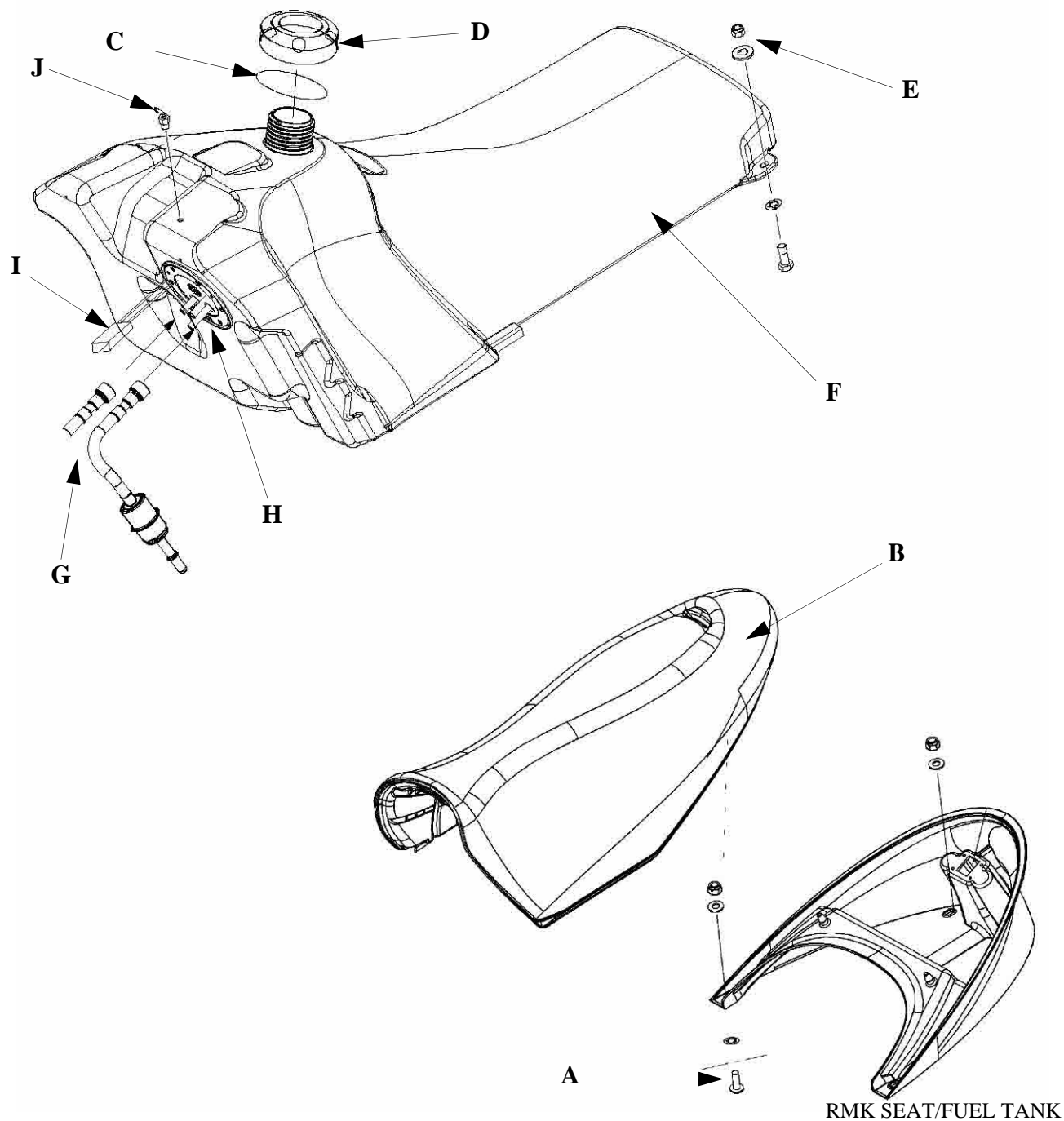
1. Lift the rear of the clip off the hose.
2. Push forward to remove the clip from the hose.

### **FUEL CLIP INSTALLATION**

1. Orentate the clip in its original orentation.
2. Push backward to insert the locking portion of the clip into the fuel line.
3. Push down on the rear of the clip to lock it into place.



## SEAT and FUEL TANK



### FUSION SEAT AND BASE REMOVAL/INSTALLATION

1. Remove the two bolts (A) that hold the seat base on the tunnel.
2. Remove the seat (B).
3. Installation is reverse order of removal. Torque the seat

fasteners to 8-12 ft-lb (11-16Nm)

### IQ RMK SEAT REMOVAL/INSTALLATION

1. RMK seats have a small lever at the rear portion of the seat.
2. Lift lever and remove seat.



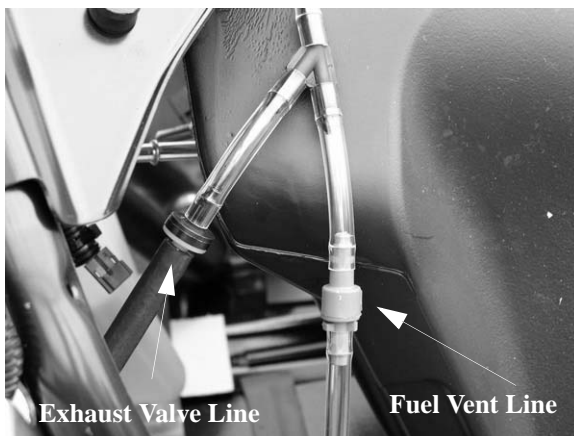
3. Replace in reverse order.

## **IQ RMK SEAT BASE REMOVAL/ INSTALLATION**

1. Remove seat.
2. Remove the fasteners that hold the base onto the chassis.
3. Install in reverse order, torque the seat base fasteners to 8-12 ft-lb (11-16Nm).

## **IQ FUEL TANK REMOVAL**

1. Remove the seat as outlined above.
2. Remove the seat base.
3. Drain any fuel from the fuel tank.
4. Remove the console. See “IQ CONSOLE REMOVAL / INSTALLATION” on page 6.
5. Using the fuel pressure bleeding tool release the pressure in the fuel rail. See “FUEL RAIL BLEEDING” on page 4.
6. RMK units will need to remove the bolts (A) that hold the seat base on the tunnel.
7. Remove the console see page See “IQ CONSOLE REMOVAL / INSTALLATION” on page 6.



8. Remove the fuel line clips, See “FUEL CLIP REMOVAL” on page 3.
9. Remove the fuel lines from the ridged fuel lines using the fuel line removal tool (PS-47152).
10. Remove the two nylock nuts (E) that hold the fuel tank (F) onto the chassis.
11. Carefully lift the rear of the fuel tank and slide the fuel tank back so that you can reach the fuel pump harness, and disconnect the harness.
12. Disconnect the exhaust valve solenoid line from the fuel tank vent/over flow line at the T fitting.
13. Disconnect the fuel tank vent line (J) from the side of the tank at the T fitting.
14. Remove the fuel tank from the chassis.

## **IQ FUEL TANK INSTALLATION**

- 1.



## EDGE SEAT REMOVAL / INSTALLATION

1. Remove the two bolts that hold the rear of the seat located underneath the tunnel area.
2. Lift the seat and disconnect the electrical connection.
3. Remove the seat.

## SEAT COVER REPLACEMENT

1. Remove seat.
2. Remove the old covering by removing the staples that hold it on the base.
3. If replacing the tail light assembly see "TAIL LIGHT ASSEMBLY REPLACEMENT" on page 6
4. Drape the new cover over the seat foam.
5. Turn the assembly over and begin upholstering by lining up the seat cover vinyl side flaps with the indented square location indicators located on the plastic seat base.



### WARNING

Apply staples in the stapling channel only. If you apply staples outside the channel, you will damage the fuel tank reservoir in the seat base. If this happens you will have to replace the entire seat assembly.

6. Using a staple gun, tack each side of the vinyl cover in place using two staples (1). If cover has a Polaris® emblem carefully align emblem with the bottom edge of the seat. This will help ensure that the cover is positioned properly.
7. Align the two sewn seams located at the rear of the seat cover with the two back corners of the seat base.
8. Pull the vinyl tight and tack the seat cover to the plastic seat base in each corner. Use two or three staples per corner.
9. Now that the cover is positioned, and tacked to the plastic seat base in four places, turn the assembly over and inspect it. If the seat cover seems to fit correctly and everything looks straight, including the tool compartment flap, continue.
10. Staple the remainder of the unattached seat cover to the plastic seat base. Always staple between two existing staples and follow this procedure until the seat cover is completely stapled to the seat base see the staple sequence above.
11. Turn the seat cushion assembly over and inspect for wrinkles or imperfections. If imperfections are visible, remove the staples in the affected area and staple correctly.
12. Trim excess vinyl from the bottom around the back of the seat area only after a satisfactory fit is obtained.

## IQ SEAT COVER REPLACEMENT

### CONSOLE

## IQ CONSOLE REMOVAL / INSTALLATION

1. Place the adjustable steering in the center.
2. Remove the two T25 Torx screws (A).
3. Remove filler cap and the threaded filler retainer (B).
4. Remove the two T25 Torx screws on each side of the shroud (C).
5. You can set the console aside with the starter rope still installed or you can carefully un-tie the knot in the recoil handle and route it through the chassis, then secure a knot and let the rope rest on the recoil housing.

## EDGE CONSOLE REMOVAL / INSTALLATION

### TAIL LIGHT

## TAIL LIGHT ASSEMBLY REPLACEMENT

1. After removal of seat cover, drill out three rivets from top of taillight.
2. Remove taillight assembly and wire harness.
3. Install new taillight assembly and rivet into place.
4. Connect taillight wire harness. Taillight harness wires must be routed away from any possible contact with seat cover staples to prevent electrical shorts.
5. Pull seat cover tightly and evenly into position and re-staple to seat pan.
6. Inspect cover for a wrinkle-free finish before reinstalling on the snowmobile.

### AIR INTAKE REMOVAL

The IQ air intake system supplies the engine with air. The system will ingest air from the hood vents and direct it into the boost box, which forces it into the throttle bodies. The throttle bodies meter the amount of air into the engine case where the air is mixed with a designated amount of fuel to create the fuel to air mixture ready for making power.

## EDGE AIR BOX REMOVAL

1. Lift off the air filter.
2. Lift the rubber fastener from the rear of the air box.
3. Unplug the CDI box.
4. Unplug the ignition coils.
5. Remove the carburetor venting tubes from the air box.
6. Push down on the front and lift the rear of the air box out

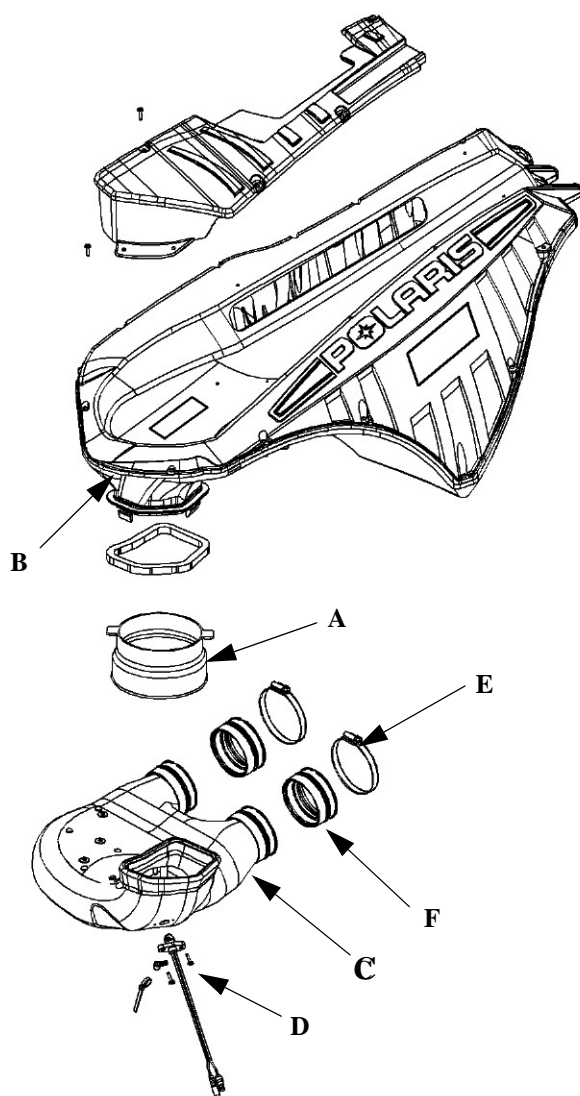


of the chassis.

## EDGE AIR BOX INSTALLATION

1. Place the air box in the chassis.
2. Align the carburetor intake with the air box carburetor boots.
3. Push the rear of the air box down so that it is seated with the carburetors.
4. Attach the carburetor vent tubes to the air box.
5. Plug in the CDI box and the coils.
6. Lift the rubber fastener over the rear latch.
7. Replace the air filter.

## IQ 700/900 AIR INTAKE REMOVAL



1. Roll the lower lip of the duct boot (A) up.
2. With force, pull the front part of the plenum (B) upward.
3. Pull the rear part of the plenum forward and remove it from the machine.

4. If removing the boost box (C), unplug the intake air sensor (D).
5. Loosen the narrow clamps (E).
6. Pull the boost box (C) forward from the boots (F), and remove it from the machine.

## IQ 700/900 AIR INTAKE INSTALLATION

1. If the boost box was removed install the intake air sensor (D).
2. Push the boost box (C) toward the boots (F),.
3. Tighten the narrow clamps (E).
4. Push the rear part of the plenum toward the plenum tab holder in the chassis.
5. Push the front part of the plenum (B) downward into the boost box.
6. Roll the lower lip of the duct boot (A) down.

## IQ CARBURETED AIR INTAKE REMOVAL

1. Remove the air filter.
2. Remove the top air box strap.

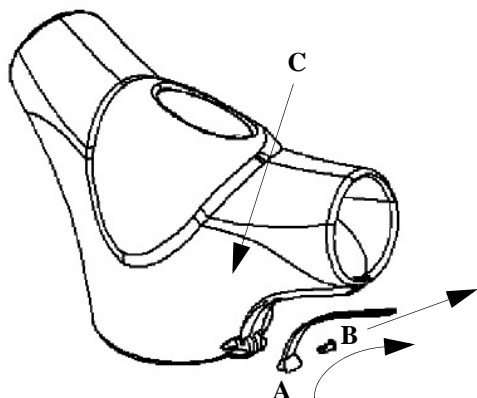


3. Remove the CDI from the air box.
4. Unplug the CDI connection.
5. Disconnect the spark plug caps from the spark plugs.
6. Pull air box straight up to access the carburetor vent lines and coil connection.
7. Label and remove the vent lines.
8. Disconnect the coil connection.
9. Remove the air box.



### HANDLEBAR COVER

#### HANDLE BAR COVER REMOVAL/ INSTALTION



1. Slide handle bar covers slide (A) off on each side.
2. Remove the handle bar cover darts (B) on each side.
3. Remove handle bar cover (C).
4. Installation is in reverse order of removal.

### SKIS

#### SKI REMOVAL

1. Securely lift the front of the machine off the ground.
2. Remove the ski to spindle bolt and washers.
3. Remove ski, bushing and ski bumper.

#### SKI INSTALLATION

1. Place ski, bushing and bumper onto spindle.
2. Insert the ski to spindle bolt through the ski and spindle.

**NOTE: The ski bumper is orientated so that the "FRONT" label is installed toward the toe of the ski.**

3. Tighten the nuts.

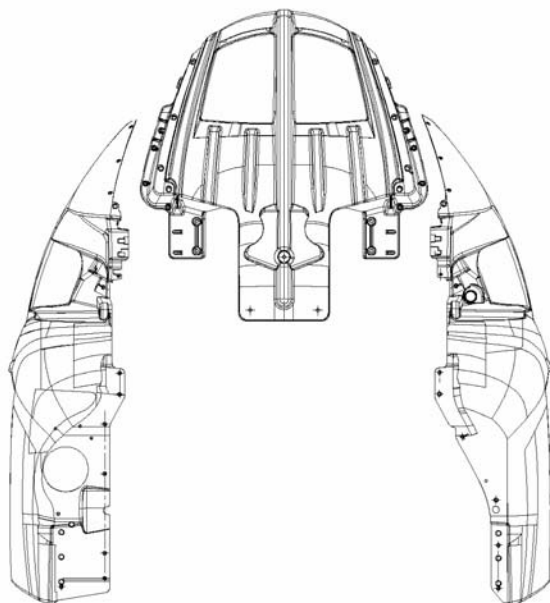


## **NOSEPAN**

### **REPLACEMENT**

**IMPORTANT:** When installing a replacement nosepan, the open circles represent rivets installed from inside the nosepan through the bottom. The filled in circles represent rivets installed from the under side of nosepan through to the top.

**NOTE:** Rivet holes may require drilling into the bulkhead. When transfer drilling holes do not force the nosepan into a position which is not uniform to the other side. Rivet holes across from each other.



## **DECALS**

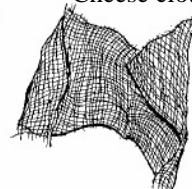
### **DECAL REMOVAL**

Before you begin, read these instructions and check to be sure all parts and tools are accounted for.

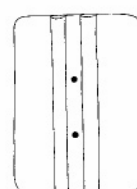
Cleaning Solution



Cheese cloth



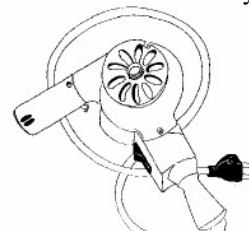
Squeegee



3M™ cleaner



Hair dryer



You will need the following items:

- Squeegee
- Cheese Cloth or a non abrasive cloth
- Paper Shop Towels
- Hair Drier or Heat Gun
- Wallpaper seam roller or similar roller
- 3M™ citrus based clear (3M™ PN 62-4615-430-5) available at most auto parts stores
- Cleaning solution (99% water 1% mild dish washing detergent)
- Scotch® 233 Performance masking tape

Perform the decal removal procedures carefully! If care is not taken, the possibility exists that paint could peel from the hood. Follow each step thoroughly and completely to avoid hood damage! **Polaris is not responsible for any hood or**



paint damage resulting from this decal replacement procedure.



### CAUTION

USE SAFETY GLASSES AND RUBBER GLOVES WHEN PERFORMING THIS PROCEDURE.

1. Using masking tape, tape off all decals that are not going to be replaced. If you do not tape off the other decals, the cleaning solution used later in the process may cause the adhesive to break down in the non-affected decals.



2. Using a hair dryer (preferable) or low setting on a heat gun, carefully heat the decal to loosen the adhesive. Heat until the decal is warm to touch. **DO NOT OVER HEAT! Overheating may cause damage to the paint and to the integrity of the hood.** Polaris is not responsible for any hood damage resulting from this decal replacement procedure.
3. Once the decal is warm to touch and the adhesive is loose, peel the decal off slowly and evenly. **Use of a hair dryer or heat gun is required!** If heat is not applied, the decal will be very hard to remove and paint from the hood may peel off with the decal.
4. After the decal is removed, apply 3M™ citrus based cleaner to the decal area to remove the adhesive. Be sure to follow the instructions and the precautions on the container, and use rubber gloves and safety glasses. Spray the cleaner on the adhesive and let set for 15-20 seconds. Using a squeegee, wipe the adhesive from the hood and deposit it in a paper shop towel. You may have to repeat this process several times to remove all of the adhesive from the hood. Use care not to get the cleaner on any other

decals.



5. When the bulk of the adhesive is removed from the hood by using the squeegee, remove any left over residue with a clean, non-abrasive shop towel or cheese cloth that is wet with the 3M™ cleaner.
6. Once all of the adhesive is removed from the decal area, follow with a cleaning solution of 99% water to 1% mild dishwasher detergent. Use a non-abrasive cloth with the solution to remove dirt, grease, cleaning solvent, and finger prints. Always clean the surface where the decal will be applied.



### WARNING

IT IS EXTREMELY IMPORTANT TO REMOVE ALL TRACES OF DIRT AND DEBRIS FROM THE HOOD WHERE THE DECAL IS TO BE APPLIED. LEFT OVER DEBRIS WILL BE MAGNIFIED THROUGH THE CHROME DECALS.

## DECAL INSTALLATION

All decals should be applied indoors, free from dust, dirt, cold air, and humidity. Room temperature must be between 40° and 100°F (4 - 38°C). These decals are to be applied dry.

1. Make sure the surface area of the hood where the decal is



to be placed is free of any dirt, debris, or adhesive.



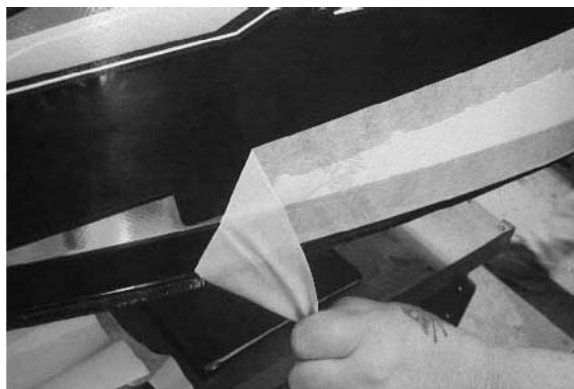
2. Place the decal in the area to be installed and make sure that everything lines up properly.
3. When you're ready to install the decal, carefully peel away the adhesive side of the decal.
4. Apply the decal and slowly work the decal down the side of the hood using a clean squeegee to lay the decal straight and to avoid creating air bubbles. Do NOT remove the decal mask until the decal is fully applied. If you attempt to use a squeegee on the decal with the chrome exposed, the chrome will be damaged.



### CAUTION

ONCE THE ADHESIVE STICKS, IT CAN BE VERY DIFFICULT TO PULL THE DECAL BACK OFF OF THE HOOD. USE EXTREME CARE! IF YOU ENCOUNTER AIR BUBBLES DO NOT ATTEMPT TO USE A STRAIGHT PIN TO POKE THE BUBBLE AND LET THE AIR OUT. A HOLE POKED IN A CHROME DECAL WILL BE VERY NOTICEABLE.

5. When finished installing the decal, carefully remove the decal mask at a 180° angle.



6. Peel the backing off and install the urocal in the appropriate places. These also have strong adhesives and once applied they cannot be removed easily. Use a wall paper roller to adhere all surfaces of the urocal. Urocal decals are rigid and need to be rolled to ensure good adhesion, particularly on the edges.







# CHAPTER 13

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## **MULTIMETER**

### **MULTI METER USEAGE**

The easiest and most accurate method for testing modern electrical components is with a digital multimeter. Any good quality multimeter will work. However, due to ease of operation and durability, Polaris recommends the Fluke Model 73 (PN 2870659), or Tektronix DMM155. See photo at right. This instrument will provide a digital readout of the measured value of the test being performed.

Please see your Multimeter Owners Manual for operation.

## **IGNITION TIMING (Carburetor units)**

### **IGNITION TIMING**

**NOTE: Always verify timing of engine at room temperature (68° F / 20° C) only, and at the proper RPM. If applicable make sure the key switch is in the PREMIUM mode and the TPS is unplugged.**

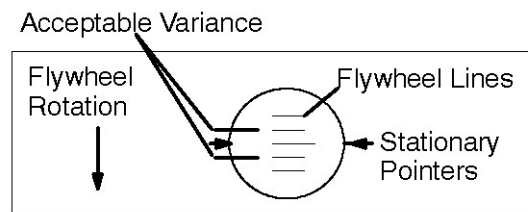
To obtain the best ignition timing accuracy and reduce the chance of error, the ignition timing specification is given at a flat" portion of the advance curve. This flat portion on the curve is where the base ignition timing is specified. Refer to the specification chapter for model specific timing specification. Ignition timing must be checked at the specified RPM, or an inaccurate timing will result.

If engine damage has occurred due to a suspected ignition related problem, verify the ignition timing is correct at the specified operating RPM.

### **TIMING PROCEDURE (Carburetor units)**

1. Refer to the timing specification charts at the beginning of this section to determine the proper ignition timing for the engine you are working on.
2. Use a dial indicator to place the piston in the proper timing position and mark the flywheel at this point (follow

procedure outlined in this chapter).



**NOTE:** Acceptable variance is usually one line on either side of the dial indicated timing mark.

### **Liquid Cooled**

3. Connect an accurate tachometer and a good quality timing light to the engine according to manufacturer's instructions. Disconnect the TPS (Throttle Position Sensor) connector from carburetors on models with TPS.
4. Start engine and increase RPM to the point specified in the timing specifications in Chapter 1. Hold the throttle to maintain specified timing RPM.
5. Point the timing light at the timing inspection hole.
6. With your head positioned so there is a straight line between your eye, the stationary pointer and the crankshaft center line, note the relative position between the marked flywheel line and the stationary pointer. If the stationary pointer is aligned with the mark made in Step 2, (or within the acceptable + variance) the timing is correct.
7. If the pointer is outside the variance, the stator will have to be rotated either with crankshaft rotation (to retard the timing) or against rotation to advance it.

**NOTE: Rotate stator plate approximately the same distance as the marks must move. In most cases, the recoil starter housing, recoil drive hub, and flywheel must be removed to loosen the stator bolts and change the timing. On some engines, the stator plate retaining screws can be accessed through the flywheel.**

8. Torque stator plate screws and flywheel nut to specified torque. Apply Loctite 262 (red) to crankshaft flywheel taper if required. Refer to the Specifications section for torque specifications and flywheel installation procedure for engine type.

### **TIMING CHART (Carburetor units)**

If the ignition timing specification is listed in degrees only, convert to either inches or mm BTDC and use a dial indicator



to verify timing marks. Disconnect the TPS (Throttle Position Sensor) connector from carburetors on models with TPS.

**Table 13-1:**

	EH12		EC34-2PM		EC50PL		EC55PM		Domestic 500/600		Domestic 700/900	
ROD/ STROKE (mm)	73mm ROD / 43mm STROKE		103mm ROD / 55.6mm STROKE		112mm ROD / 60mm STROKE		120mm ROD / 65mm STROKE		128mm ROD / 64mm STROKE		152mm ROD / 80mm STROKE	
Degrees BTDC	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches
1	0.0042	0.0002	0.0054	0.0002	0.0058	0.0002	0.0063	0.0002	0.0061	0.0002	0.0077	0.0003
2	0.0170	0.0007	0.0215	0.0008	0.0232	0.0009	0.0252	0.0010	0.0244	0.0010	0.0308	0.0012
3	0.0381	0.0015	0.0484	0.0019	0.0521	0.0021	0.0566	0.0022	0.0548	0.0022	0.0692	0.0027
4	0.0678	0.0027	0.0860	0.0034	0.0926	0.0036	0.1006	0.0040	0.0974	0.0038	0.1231	0.0048
5	0.1059	0.0042	0.1343	0.0053	0.1447	0.0057	0.1571	0.0062	0.1522	0.0060	0.1922	0.0076
6	0.1524	0.0060	0.1933	0.0076	0.2083	0.0082	0.2261	0.0089	0.2190	0.0086	0.2766	0.0109
7	0.2073	0.0082	0.2630	0.0104	0.2833	0.0112	0.3076	0.0121	0.2979	0.0117	0.3763	0.0148
8	0.2706	0.0107	0.3432	0.0135	0.3698	0.0146	0.4016	0.0158	0.3889	0.0153	0.4913	0.0193
9	0.3422	0.0135	0.4341	0.0171	0.4677	0.0184	0.5079	0.0200	0.4919	0.0194	0.6213	0.0245
10	0.4222	0.0166	0.5355	0.0211	0.5770	0.0227	0.6265	0.0247	0.6068	0.0239	0.7665	0.0302
11	0.5104	0.0201	0.6474	0.0255	0.6976	0.0275	0.7575	0.0298	0.7336	0.0289	0.9267	0.0365
12	0.6068	0.0239	0.7698	0.0303	0.8294	0.0327	0.9006	0.0355	0.8723	0.0343	1.1018	0.0434
13	0.7114	0.0280	0.9025	0.0355	0.9724	0.0383	1.0559	0.0416	1.0227	0.0403	1.2918	0.0509
14	0.8242	0.0324	1.0456	0.0412	1.1265	0.0444	1.2232	0.0482	1.1849	0.0466	1.4965	0.0589
15	0.9450	0.0372	1.1989	0.0472	1.2917	0.0509	1.4026	0.0552	1.3586	0.0535	1.7159	0.0676
16	1.0738	0.0423	1.3624	0.0536	1.4678	0.0578	1.5938	0.0628	1.5439	0.0608	1.9499	0.0768
17	1.2106	0.0477	1.5359	0.0605	1.6548	0.0652	1.7969	0.0707	1.7406	0.0685	2.1984	0.0866
18	1.3552	0.0534	1.7195	0.0677	1.8526	0.0729	2.0117	0.0792	1.9487	0.0767	2.4612	0.0969
19	1.5077	0.0594	1.9130	0.0753	2.0611	0.0811	2.2380	0.0881	2.1681	0.0854	2.7382	0.1078
20	1.6679	0.0657	2.1163	0.0833	2.2802	0.0898	2.4759	0.0975	2.3986	0.0944	3.0292	0.1193
21	1.8358	0.0723	2.3294	0.0917	2.5098	0.0988	2.7252	0.1073	2.6402	0.1039	3.3342	0.1313
22	2.0112	0.0792	2.5521	0.1005	2.7497	0.1083	2.9857	0.1175	2.8927	0.1139	3.6530	0.1438
23	2.1941	0.0864	2.7843	0.1096	3.0000	0.1181	3.2574	0.1282	3.1560	0.1243	3.9855	0.1569
24	2.3844	0.0939	3.0260	0.1191	3.2603	0.1284	3.5401	0.1394	3.4300	0.1350	4.3314	0.1705
25	2.5821	0.1017	3.2769	0.1290	3.5307	0.1390	3.8336	0.1509	3.7146	0.1462	4.6906	0.1847
26	2.7869	0.1097	3.5370	0.1393	3.8110	0.1500	4.1379	0.1629	4.0096	0.1579	5.0630	0.1993
27	2.9989	0.1181	3.8062	0.1499	4.1010	0.1615	4.4528	0.1753	4.3149	0.1699	5.4484	0.2145
28	3.2178	0.1267	4.0843	0.1608	4.4007	0.1733	4.7782	0.1881	4.6303	0.1823	5.8466	0.2302
29	3.4437	0.1356	4.3712	0.1721	4.7098	0.1854	5.1138	0.2013	4.9558	0.1951	6.2573	0.2464
30	3.6763	0.1447	4.6667	0.1837	5.0282	0.1980	5.4595	0.2149	5.2911	0.2083	6.6805	0.2630
31	3.9156	0.1542	4.9708	0.1957	5.3559	0.2109	5.8152	0.2289	5.6361	0.2219	7.1159	0.2802
32	4.1615	0.1638	5.2832	0.2080	5.6926	0.2241	6.1807	0.2433	5.9907	0.2359	7.5633	0.2978
33	4.4139	0.1738	5.6039	0.2206	6.0381	0.2377	6.5559	0.2581	6.3546	0.2502	8.0225	0.3158
34	4.6725	0.1840	5.9326	0.2336	6.3924	0.2517	6.9405	0.2732	6.7278	0.2649	8.4933	0.3344
35	4.9374	0.1944	6.2693	0.2468	6.7552	0.2660	7.3343	0.2888	7.1099	0.2799	8.9754	0.3534
36	5.2083	0.2051	6.6138	0.2604	7.1263	0.2806	7.7372	0.3046	7.5010	0.2953	9.4687	0.3728
37	5.4852	0.2160	6.9658	0.2742	7.5057	0.2955	8.1491	0.3208	7.9007	0.3111	9.9729	0.3926
38	5.7679	0.2271	7.3253	0.2884	7.8931	0.3108	8.5696	0.3374	8.3089	0.3271	10.4878	0.4129
39	6.0562	0.2384	7.6920	0.3028	8.2883	0.3263	8.9986	0.3543	8.7254	0.3435	11.0131	0.4336
40	6.3501	0.2500	8.0659	0.3176	8.6912	0.3422	9.4360	0.3715	9.1501	0.3602	11.5486	0.4547



## BATTERY

### PREPARING A NEW BATTERY FOR SERVICE

To ensure maximum service life and performance from a battery, it must have proper initial servicing. To service a new battery, the following steps must be taken.

**NOTE:** *Do not service the battery unless it will be put into regular service within 30 days.*

1. Remove vent plug from vent fitting.
2. Fill battery with electrolyte to the upper level marks on the case.
3. Set battery aside and allow it to cool and stabilize for 30 minutes.
4. Add electrolyte to bring the level back to the upper level mark on the case.

**NOTE:** *This is the last time that electrolyte should be added. If the level becomes low after this point, add only distilled water.*

5. Charge battery at 1/10 of its amp/hour rating. Example: 1/10 of 9 amp battery = .9 amps, 1/10 of 14 amp battery = 1.4 amps, 1/10 of 18 amp battery = 1.8 amps (recommended charging rates).
6. Check specific gravity of each cell with a hydrometer to ensure each has a reading of 1.270 or higher.

### BATTERY TESTING

There are three easy tests which can determine battery condition. Whenever the complaint is related to either the starting or charging systems, the battery should be checked first. Lead-acid batteries should be kept at or as near full charge as possible. If the battery is stored or used in a partially charged condition, hard crystal sulfation will form on the plates, reducing their efficiency and possibly ruining the battery.

#### OPEN CIRCUIT VOLTAGE TESTING (OCV)

Battery voltage should be checked with a digital multimeter. Readings of 12.6v or less require further battery testing and charging.

#### SPECIFIC GRAVITY TEST

A tool such as the battery hydrometer (PN 2870836) can be used to measure electrolyte strength or specific gravity. As the battery goes through the charge/discharge cycle, the electrolyte goes from a heavy, more acidic state at full charge to a light, more water state when discharged. The hydrometer

can measure state of charge and differences between cells in a multi-cell battery. Readings of 1.270 or greater should be observed in a fully charged battery. Differences of more than .025 between the lowest and highest cell readings indicate a need to replace the battery.

**Table 13-2: Battery Voltage**

STATE OF CHARGE	CONVENTIONAL LEAD-ACID	YUMACRON TYPE
100% CHARGED	12.60v	12.70v
75% CHARGED	12.40v	12.50v
50% CHARGED	12.10v	12.20v
25% CHARGED	11.90v	12.00v
0% CHARGED	< 11.80v	< 11.90v
<b>Battery voltage per cell</b>		
100% CHARGED	1.265v	1.275v
75% CHARGED	1.210v	1.225v
50% CHARGED	1.160v	1.175v
25% CHARGED	1.120v	1.135v
0% CHARGED	< 1.100v	< 1.115v

### LOAD TEST

**NOTE:** *This test can only be performed on machines equipped with electric start. This test cannot be performed if the engine or starting system is not working properly.*

A battery may indicate a fully charge condition on the OCV test and the specific gravity test, but still not have the storage capacity necessary to properly function in the electrical system. For this reason, a battery capacity or load test should be conducted whenever poor battery performance is encountered.

To perform the test, hook a multimeter to the battery in the same manner as in the OCV test. The reading should be 12.6 volts or greater. Engage the electric starter and view the registered battery voltage while cranking the engine. Continue the test for 15 seconds. During this cranking period, the observed voltage should not drop below 9.5 volts. If the beginning voltage is 12.6 or higher and the cranking voltage drops below 9.5 volts during the test, replace the battery.

### REFILLING A LOW BATTERY

The normal charge/discharge cycle of a battery causes the cells to give off gases. These gases, hydrogen and oxygen, are the



components of water. Because of the loss of these gases and the lowering of the electrolyte level, it will be necessary to add pure, clean distilled water to bring the fluid to the proper level. After filling, charge the battery to raise the specific gravity to 1.270 or greater.

## OFF SEASON STORAGE

To prevent battery damage during extended periods of non-use, the following basic maintenance items must be performed.

1. Remove battery from machine and wash the case and battery tray with a mild solution of baking soda and water. Rinse with lots of fresh water after cleaning.



### CAUTION

DO NOT ALLOW ANY OF THE BAKING SODA SOLUTION TO ENTER THE BATTERY OR THE ACID WILL BE NEUTRALIZED.

2. Using a wire brush or knife, remove any corrosion from the cables and terminals.
3. Make sure the electrolyte is at the proper level. Add distilled water if necessary.
4. Charge at a rate no greater than 1/10 of the battery's amp/hr. capacity until the electrolyte's specific gravity reaches 1.270 or greater.
5. The battery may be stored either in the machine with the cables disconnected, or on a piece of wood in a cool place.

**NOTE:** *Stored batteries lose their charge at the rate of 1% per day. They should be fully recharged every 30 to 60 days during a non-use period. If stored during winter months, the electrolyte will freeze at higher temperatures as the battery discharges. The chart indicates freezing points by specific gravity.*

**Table 13-3: Specific Gravity Freezing Point**

Specific Gravity of Electrolyte	Freezing Point
1.265	-75°F (-59°C)
1.225	-35°F (-37°C)
1.200	-17°F (-27°C)
1.150	5°F (-15°C)
1.100	18°F (-8°C)
1.050	27°F (-3°C)



### WARNING

BATTERY ELECTROLYTE IS POISONOUS. IT CONTAINS ACID!

SERIOUS BURNS CAN RESULT FROM CONTACT WITH THE SKIN, EYES, OR CLOTHING.

#### ANTIDOTE:

EXTERNAL: FLUSH WITH WATER.

INTERNAL: DRINK LARGE QUANTITIES OF WATER OR MILK. FOLLOW WITH MILK OF MAGNESIA, BEATEN EGG, OR VEGETABLE OIL. CALL PHYSICIAN IMMEDIATELY.

EYES: FLUSH WITH WATER FOR 15 MINUTES AND GET PROMPT MEDICAL ATTENTION.

BATTERIES PRODUCE EXPLOSIVE GASES. KEEP SPARKS, FLAME, CIGARETTES, ETC. AWAY. VENTILATE WHEN CHARGING OR USING IN CLOSED SPACE. ALWAYS SHIELD EYES WHEN WORKING NEAR BATTERIES.

KEEP OUT OF REACH OF CHILDREN.

## CHARGING PROCEDURE

Charge battery with a charger no larger than 1/10 of the battery's amp/hr. rating and for as many hours as needed to raise the specific gravity to 1.270 per cell or greater.



### WARNING

THE GASES GIVEN OFF BY A BATTERY ARE EXPLOSIVE. ANY SPARK OR OPEN FLAME NEAR A BATTERY CAN CAUSE AN EXPLOSION WHICH WILL SPRAY BATTERY ACID ON ANYONE CLOSE TO IT. IF BATTERY ACID GETS ON ANYONE, WASH THE AFFECTED AREA WITH LARGE QUANTITIES OF COOL WATER AND SEEK IMMEDIATE MEDICAL ATTENTION.

## STARTER SYSTEM

### DYNAMIC TESTING OF THE ELECTRIC STARTER SYSTEM

CONDITION: Starter fails to turn the starter motor or it turns the starter motor slowly

**NOTE:** *Be sure the engine crankshaft is free to turn before proceeding. For this test a digital multimeter*



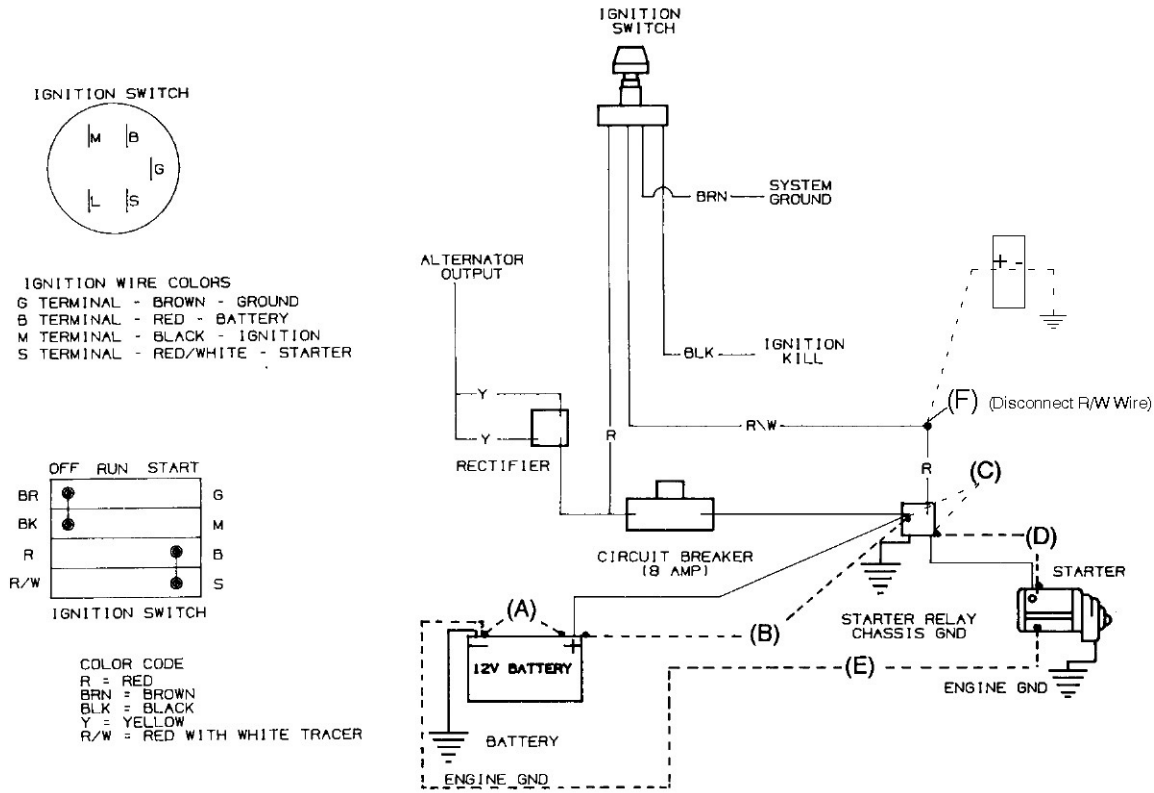
**must be used. Meter connections are shown later in this chapter.**

**Table 13-4: Electric starter troubleshooting**

With tester on VDC, place tester black lead on battery negative (-) terminal and tester red lead on battery positive (+) terminal. (A) Page 13.9. Reading should be 12.6V or greater. Is it?	NO	Remove battery, test and/or service. Install a fully charged shop battery to continue the test and continue with left column
YES		
Disconnect red engagement coil wire from start solenoid. Connect black tester wire to an appropriate ground and red lead to red harness wire at solenoid. Rotate ignition key to the start position. Meter should read battery voltage. Does it?	NO	With black tester lead on ground, check for voltage at large relay in terminal, circuit breaker in and out terminals, and across both sides (red and red/white) of the ignition switch with switch on start. Repair or replace any defective parts.
YES		
Reconnect solenoid, connect tester black lead to battery positive terminal and red tester lead to solenoid end of battery to solenoid cable. (B) Page 13.9. Turn key to start position. The reading must be less than .1V DC. Is it?	NO	Clean battery to solenoid cable ends or replace cable.
YES		
Connect black tester lead to solenoid end of solenoid to starter cable and red tester lead to starter end of same cable. (D) Page 13.9. Turn key to start position. The reading must be less than .1V DC. Is it?	NO	Replace starter solenoid.
YES		
Connect black tester lead to starter frame. Connect red tester lead to battery negative (-) terminal. (E) Page 13.9. Turn key to start position. The reading should be less than .1V DC. Is it?	NO	Clean ends of engine to battery negative cable or replace cable.
If all these tests indicate a good condition, yet the starter still fails to turn, or turns slowly, the starter must be remove for static testing and inspection.		



## STARTER MOTOR STATIC TESTING



1. Remove starter motor and disassemble. (See page 9.14 for exploded view) Mark end covers and housing for proper reassembly.
2. Remove pinion retaining snap ring, spring and pinion gear.
3. Remove brush end bushing dust cover.
4. Remove housing through bolts.
5. Slide brush end frame off end of starter.

**NOTE: The electrical input post must stay with the field coil housing.**

6. Slide positive brush springs to the side, pull brushes out of their guides and remove brush plate.
7. Clean and inspect starter components.

**NOTE: Some cleaning solvents may damage the insulation in the starter. Care should be exercised when selecting an appropriate solvent. The brushes must slide freely in their holders. If the commutator needs cleaning, use only an electrical contact cleaner and/or a non-metallic grit sandpaper. Replace brush assembly when worn to 5/16, (.8 cm) or less.**

## STARTER HOUSING AND FIELD COIL INSPECTION

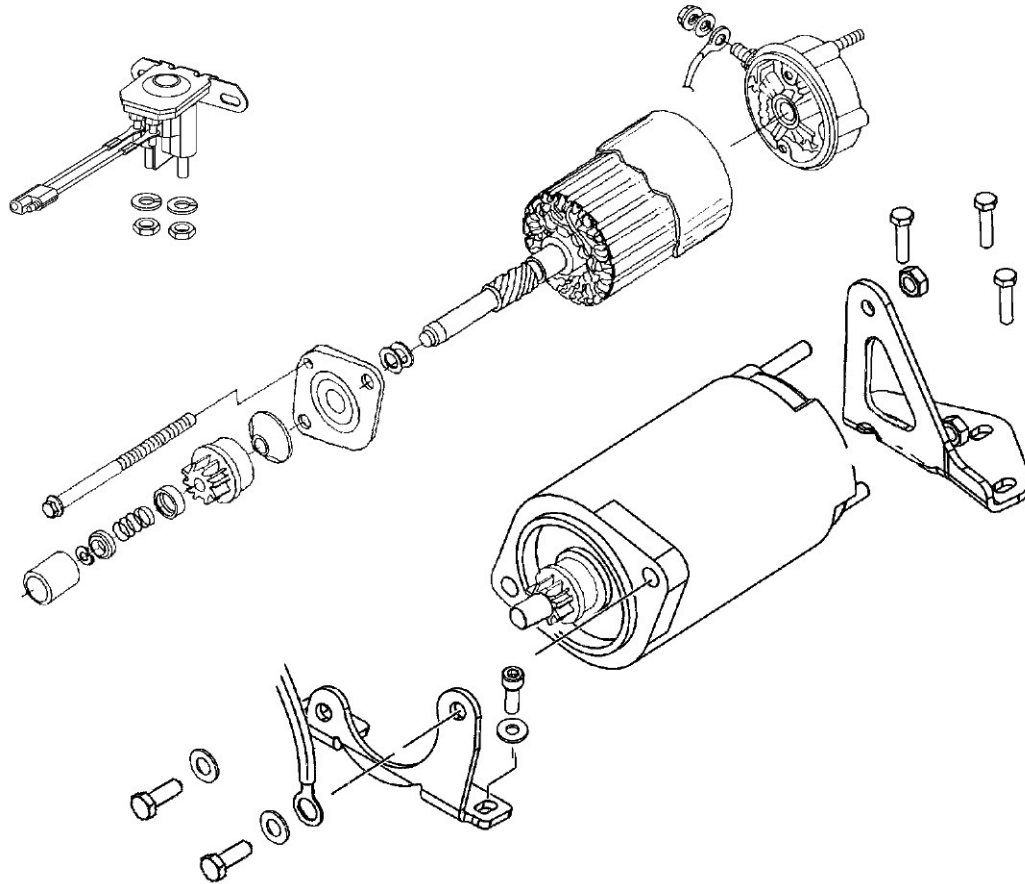
1. Using a digital multimeter, measure resistance between starter input terminal and insulated brushes. The reading should be .3 ohms or less.
2. Measure resistance between insulated brushes and field coil housing. The reading should be infinite.
3. Inspect insulated brush wire and field coil insulation for damage. Repair or replace components as required.

## ARMATURE TESTING

1. Using a digital multimeter, measure resistance between each of the segments of the commutator. The reading should indicate .3 ohms or less.
2. Measure resistance between commutator and armature shaft. Reading should be infinity.
3. Place armature in a growler. With the growler on, position a hacksaw blade lengthwise 1/8, (.03 cm) above armature coil laminates. Rotate armature 360°. If hacksaw blade is drawn to the armature on any pole, the armature is shorted and must be replaced.



## STARTER ASSEMBLY



1. Slide armature into field coil housing.
2. Lightly grease drive end bushing and install drive end frame on armature.
3. Mount starter vertically in a vice with brush end up.
4. While holding negative brushes out against their springs, slide brush plate down onto the commutator.
5. While holding positive brush springs to the side, slide positive brushes into their holders and correctly position the springs on top of the brushes.
6. Using a non-petroleum grease, lubricate brush end bushing and slide it onto end of armature.
7. Align threaded holes in brush plate and install dust cover and screws.
8. Reinstall through bolts and properly tighten all screws.
9. Lightly grease pinion shaft and install pinion, spring stopper and snap ring.

## STARTER SOLINOID BENCH TEST

The only test which can be done on the bench is the pull in coil resistance, which should be 3.4 ohms.

## STARTER INSTALLATION

1. Position starter motor so there is no less than .100, clearance between the ring gear and the starter motor pinion gear.
2. Torque through bolt mount bracket nuts to specification.
3. Torque 8mm (drive end) mount bolts to specification.
4. Torque 6mm (brush end) bracket to specification.

## VOLTAGE

### UNREGULATED VOLTAGE

1. Test resistance of lighting coil and compare to specifications in the model specific wiring diagram. Reminder: Meter resistance must be subtracted from reading.

**NOTE:** *0.3 to 0.5 ohms may be less than the internal resistance of your meter leads or meter. Before measuring the stator resistance, short the meter leads together and read the display and record this measurement. Subtract this reading from the stator resistance readings.*



**EXAMPLE:** Short meter leads together, meter reads 0.7 ohms. Measure stator resistance, meter reads 1.10 ohms. Subtract 0.7 ohms (meter/lead resistance) from 1.10 ohms (reading obtained when checking yellow lead to brown lead). True reading is: 1.10 ohms (observed reading when checking stator) - .7ohms (meter/lead resistance) = 0.4 ohms (true stator resistance).

2. Turn the multimeter dial to the Volts AC (V~) position.
3. Disconnect the alternator to main harness connector at engine.
4. Connect one of the tester leads to the yellow alternator wire and the other lead to the brown alternator wire. **NOTE:** On floating alternators, the yellow/red stator wire should connect to the brown stator wire. If it does not, the system will not have a ground and will not operate.
5. Start the engine. While observing the voltage reading, increase the engine speed to about 3000 RPM. Readings of between 15 and 45 VAC are considered normal.

## REGULATED VOLTAGE

1. Connect the alternator to main harness connector.
2. Insert one of the tester leads along the side of the yellow regulator wire connector between the insulation and the terminal.
3. Ground the other tester lead.
4. Start engine and observe headlight output. Increase engine RPM. If the headlights seem dim above 3500 RPM, let the engine return to idle and disconnect the yellow wire from the regulator. Carefully observe the voltage reading. Do not allow voltage to increase above 14.0 volts.
5. Slowly increase RPM. Voltage above 12 volts at 2500 - 3000 and a bright headlight, indicates a good lighting coil. Voltage below 10 volts at 3000 indicates excessive system loads, poor flywheel magnets, lighting coil problems, or wires harness problems. Check for partially grounded (shorted) yellow wire.
6. Reconnect the yellow regulator wire and increase the RPM. If the headlight was bright with the regulator disconnected and dim when connected at the same RPM, the regulator or regulator ground is at fault.

## SHORT CIRCUIT CURRENT (AC Amp Test)

1. Turn multimeter dial to A~.
2. Connect red lead to 10A terminal.
3. Connect black lead to Com (-) meter terminal.
4. Disconnect lighting/charge coil wires from system. Connect meter leads to coil wires leading to stator coils.
5. Start and idle engine. Readings should be above 5 amps. Refer to Amps AC on page 13.2. **CAUTION:** Can blow

meter fuse if used on big alternators.



**CAUTION**

Can blow meter fuse if used on big alternators.

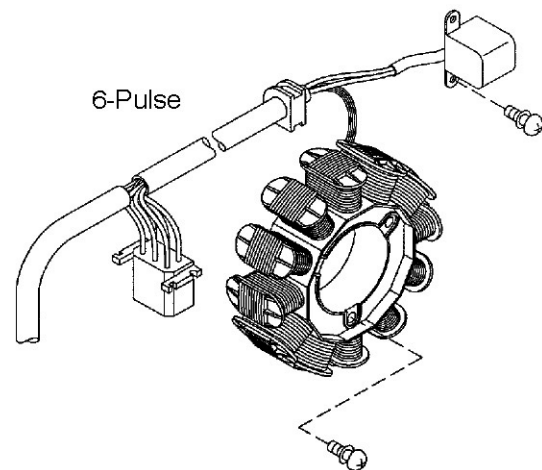
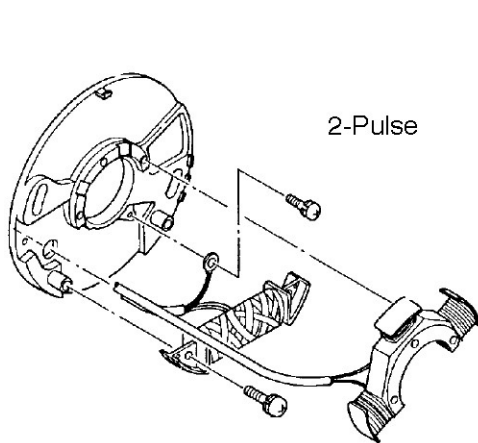
## ALTERNATORS

The difference between a 2 pulse and 6 pulse alternator system is the number of AC sine waves created by the alternator in one revolution of the crankshaft. For example, on a 6 pulse system, the alternator will create 6 pulses, or 6 complete AC sine waves, in one crankshaft revolution. The tachometer reads these sine waves, therefore giving you accurate RPM readings. Refer to the following for applications.

500 Classic = 2 pulse



340, 550, 600 Classics = 6 pulse



## **ELECTRICAL TESTING**

### **HEADLIGHT BULB FILIMENT CONTINUITY TEST**

1. Turn the Multitester dial to the ohms ( $\Omega$ ) position.
2. Disconnect the wire harness from the headlight bulb.
3. Viewing the back of the bulb with the terminal blades at the 9, 12 and 3 o'clock position, connect the black multitester lead to the 9 o'clock blade.
4. Touch the red tester lead to the 12 o'clock terminal and then to the 3 o'clock terminal, noting the resistance value of each. A reading of between 2 and 5 ohms is good. An open reading indicates a bad element.

### **HI / LOW BEAM SWITCH TESTING**

1. Set the multitester dial to the ohms ( $\Omega$ ) position.
2. If the Hi/Lo switch has not been removed from the machine, disconnect the switch to harness plug-in connector.
3. With the Hi/Lo switch in the Lo beam position, check the resistance between the yellow and the green switch wires. The reading should be less than .4 ohms.
4. Turn the Hi/Lo switch to the Hi beam position and the multitester should indicate an open circuit (OL) reading.
5. Move one of the tester leads from the green to the red switch wire. The multitester should now read less than .4 ohms.
6. Turn the Hi/Lo Switch back to the Lo beam position and the meter should again read an open circuit (OL).

### **SEAT HARNESS TROUBLESHOOTING**

1. Remove the taillight lens.

2. Remove the two taillight bulbs and the brake light bulb.
3. Separate the seat harness from the main harness by unplugging the connector at the right rear of the tank.
4. With the multitester dial set on ohms ( $\Omega$ ) connect either meter test lead to the brown seat harness wire.
5. Touch the other tester lead to first the yellow wire and then the orange wire. Observe the readings. Readings other than an open circuit (O.L.) indicate a shorted harness or bulb socket.

**NOTE: The bulb socket tangs sometimes short to ground with the bulb removed.**

6. Check between the yellow and orange wires in the same manner to check for a short between the brake and running lights. If damaged wiring is found, remove the seat.
7. Tip the seat over and remove the right side seat cover staples. Locate and repair the harness problem.
8. Reinstall the staples and re-check the seat harness.

### **IGNITION SWITCH TESTING (NON-ELECTRIC START)**

1. Set the multitester dial to the ohms ( $\Omega$ ) position. Connect one of the tester leads to either of the switch terminals and the other tester lead to the other switch terminal.
2. With the switch off, the reading should be less than .4 ohms. With the switch on, the reading must be an open circuit (OL).
3. Check the resistance between each of the switch terminals and the switch body. With the switch still in the on position, there must be an open circuit (OL) reading. Readings other than those listed indicate a defective switch.



## IGNITION SWITCH TESTING (ELECTRIC START MODELS)

Refer to the appropriate model and year wiring diagram for ignition switch wire colors and connections.

1. Disconnect wires. Set the multitester dial to the ohms  $\Omega$  position.
2. With the key in the off position, check the resistance between the G (Ground, brown) terminal and the M (Mag, black) terminal. This reading must be less than .4 ohms.
3. Turn the key to the on position. The multitester should now read an open circuit (OL).
4. Move the tester lead from the G terminal to the switch housing and re-check the reading. It should also be an open circuit (OL).
5. Place one of the tester leads on the B (Battery, red) terminal and the other tester lead on the S (Starter, blue) terminal. With the key in the on position, there must be an open circuit (OL) reading.
6. Turn the key to the start position. The reading should be less than .4 ohms. Readings other than the ones listed indicate a defective switch.

## 500/600 TEMPERATURE LIGHT

Models with TPS are fitted with a thermistor sensor. This sensor outputs a variable resistance with temperature. This allows more capability for control when the over heat indicator light illuminates. Higher throttle positions require lower temperature for the light to come on, possibly leading the operator to believe it to be a blinking light.

For example, the TEMP light will come on at idle (under 2000 RPM, 0% throttle) if coolant temperature reaches 230°F (110°C). Timing retard initiates at 176°F if the TPS input is over 80-100%. For more severe conditions, the engine fail-safe is turned on at high TPS input and high temperatures.

At room temperature 68° F (20° C) the thermistor should read 2189 to 2675 ohms. See chart below for other temperature resistances.



### CAUTION

IF ATTEMPTING TO HEAT THE SENSOR, HEAT ONLY IN A WATER BATH. NEVER SUBJECT THE SENSOR TO AN OPEN FLAME TO ATTEMPT TO CLOSE THE CONTACTS AS SENSOR DAMAGE MAY RESULT.

**Table 13-5: Temp and Ohms Resistance Range**

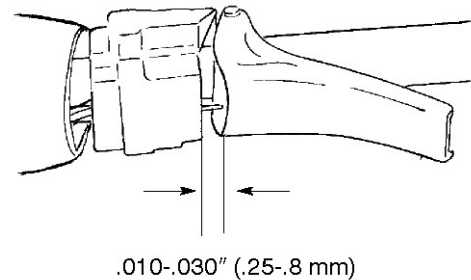
TEMP °F (°C)	OHMS $\Omega$ RESISTANCE RANGE
68 (20)	2189 - 2675
149 (65)	455 - 556
203 (95)	197 - 270
239 (115)	120 - 147
275 (135)	77 - 94

## SPEED CONTROL ASSURANCE SWITCH

The speed control assurance consists of two series connected switches. If one or both switch plungers are positioned inward, the circuit is open and the engine will run. At idle, with the throttle lever properly adjusted, the bottom switch circuit is open and the plunger is inward. The top switch circuit is closed, and the plunger is outward. The speed control circuit is open, allowing the engine to run. As the throttle lever is actuated to an off idle position, the top switch circuit is opened (plunger in) and the bottom switch circuit is closed (plunger out). The speed control circuit is still open, allowing the engine to run. In the event the carburetor or controls malfunction and allow the throttle cable to become slack, the circuit will close (both switch plungers out), grounding the ignition system and causing the engine to stop.

## SPEED CONTROL ASSURANCE 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.

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

**AUXILIARY SHUT-OFF SWITCH TESTING**

1. Set the multimeter in the ohms ( $\Omega$ ) position.
2. Disconnect the switch harness from the main wire harness.
3. Connect the two multimeter leads to the two switch wires.

**TEST 1 - OPEN CIRCUIT (RUN)**

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

**TEST 2 - CLOSED CIRCUIT (OFF)**

The two speed control switches must make a complete circuit to kill the engine. To check the switches, pull the throttle lever out away from the throttle block. With the switch plungers outward and the auxiliary shut-off switch in the ON position, the multimeter must read less than .4 ohms resistance. Inspect wires and repair if damaged, or replace switch assembly.

**TEST 3 - AUXILIARY SHUT-OFF**

The multimeter should read less than .4 ohms in the OFF position and an open circuit in the ON position. Inspect wires and repair if damaged, or replace switch assembly.

**FUEL SENDER TESTING**

Use the multimeter ohmmeter to test the resistance of the fuel sender.

**Table 13-6: Fuel Sender Testing Range**

POSITION	OHMS $\Omega$	OHMS RANGE
EMPTY	95 $\Omega$	90 - 97.5 $\Omega$
FULL	7 $\Omega$	4.5 - 13 $\Omega$



## TROUBLESHOOTING CHARTS

### NO SPARK

**Table 13-7: No Spark Condition**

Disconnect the single black (black/white) wire from the CDI Module to the ignition kill circuit. Does it have a spark?	NO →	Check the ignition switch, wire harness, throttle safety switches and kill switch for proper adjustment or short to ground. Repair or replace as necessary.
YES ↓		
Disconnect the stator to CDI module wires. Test the resistance values of the stator coils as per the wiring diagrams. Are the resistance values within specs?	NO →	All except 3 cylinders: If the parts of the ignition system under the flywheel check OK, the only remaining component is the coil/CDI module assembly. Replace the module with another with the same number. (See ignition data)
YES ↓		
Isolate which component's resistance is not within specs. Remove the flywheel and stator. Recheck the resistances; look for pinched or bare harness wires; or replace the coil.		All 3 cylinders: Disconnect and check the secondary ignition coil resistances. Refer to the resistance values listed in wiring diagrams. If the coil resistance values are within specs, replace the CDI module.

**Table 13-8: Incorrect Timing (Advanced/Retard)**

Follow the engine timing procedure for checking running timing at recommended RPM. Is the timing within limits?	NO →	Adjust the ignition timing by rotating the stator plate to correct the timing. After adjusting the recommended RPM timing, continue with operating RPM timing if poor performance exists. (Continue on with left column.)
YES ↓		
Remove the ignition kill circuit by disconnecting the single black wire between the CDI module and the machine harness. Is the timing now correct?	NO →	Check the ignition switch, throttle safety switches, kill switch and harness for damage which can cause intermittent shorting problems. Correct the problem.
YES ↓		
Verify the correct CDI module by comparing the CU code on the box to the information listed in the ignition data charts at the beginning of this section. Is it the right module?	NO →	Replace the module with the correct part and readjust the ignition timing.
YES ↓		
Check the resistance of the coils under the flywheel. Compare these to values on wiring diagram. Are they within limits?	NO →	Check the wiring connecting the coils and/or replace the coils as necessary.



## IQ BLINK CODES

A warning system is incorporated into the speedometer that will inform the rider of a code that has been set by a sensor that was operated beyond the normal operating ranges.

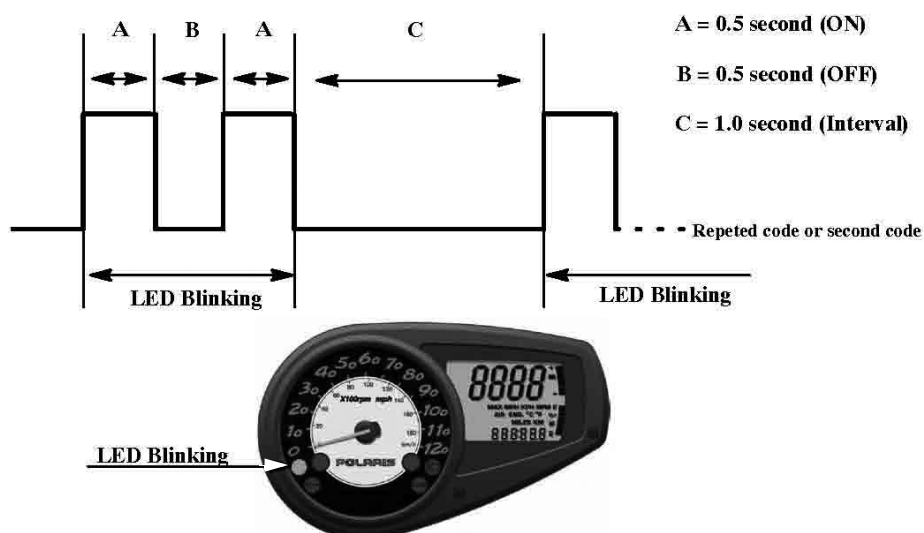
The check engine LED will display a blink code when ever the ECU determines there is a problem with one or more of the

sensor listed. Hook up Digital Wrench to troubleshoot, fix and clear the codes.

The blinking LED can be de-coded for diagnosis and if two or more codes are present at the same time the code will blink in turn of each other.

When a blink code is displayed, the CHECK ENGINE light will illuminate for 1/2 second “on” and 1/2 second “off” with a 1 second “off” interval between close.

### WATER TEMPERATURE SENSOR EXAMPLE



**Table 13-9: IQ Blink Codes**

SENSOR	LED	EXPLANATION
Throttle Sensor	1	Sensor signal is below 0.7 volts or above 4.39 volts
Water Temperature Sensor	2	Sensor signal is below 0.1 volts or above 4.8 volts
Air Temperature Sensor	3	Sensor signal is below 0.19 volts or above 4.9 volts
Barometric Pressure Sensor	4	Sensor signal is below 1.25 volts or above 3.23 volts
Exhaust Temperature Sensor	5	This code is set if the engine has been running above 3000 RPM for more than 2 minutes and the sensor voltage is below 0.06 volts or above 4.9 volts.
Detonation Sensor	6	This blink code is set if the engine speed is above 6000 RPM and the DET signal is below 1.23 volts or above 4.3 volts for more than 2 seconds
Injector	7	Injector disconnect
EV Solenoid	8	An “open circuit” condition is detected in the exhaust valve solenoid.
Ignition	9	Ignition coil disconnection
Crank Position Sensor	10	5 and 2 tooth disconnection



## TPS TOOL SET UP

The TPS comes set from the factory and should not need adjustment. However, upon removal of the TPS, you must mark the TPS position on the carburetor and replace it in the exact same position as removal. Polaris has developed a TPS test kit for aid in setting the Throttle Position Sensor to specification.

### TPS SET UP

1. Illustration at right shows the TPS sensor kit PN 2201519.

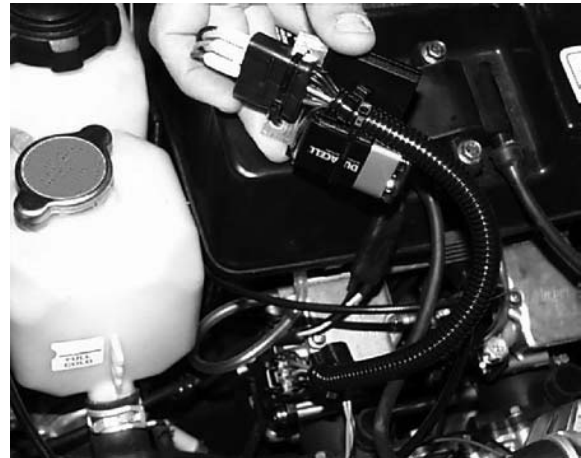


2. Make sure your 9 volt battery is in good condition by inserting the black volt meter probe from your Fluke meter in the black terminal and the red probe into the pink terminal. Voltage should read 4.99 to 5.01 volts. If not, try a new 9 volt battery.

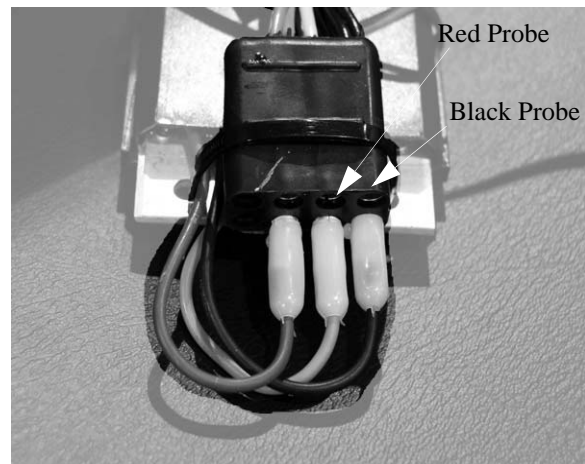


3. Remove the connector from the TPS.

4. Install test harness connector on TPS.



5. Insert red voltmeter lead into yellow terminal, and black lead to black terminal. Slowly open throttle and check for smooth voltage change.



**NOTE:** The fluke meter will change scales and show O.L. momentarily when throttle is opening.

### TPS ADJUSTMENT

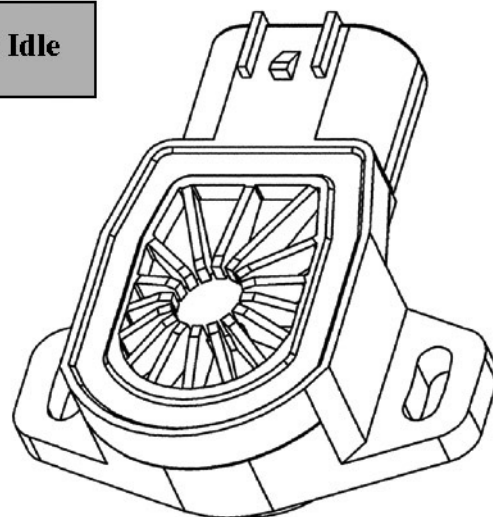
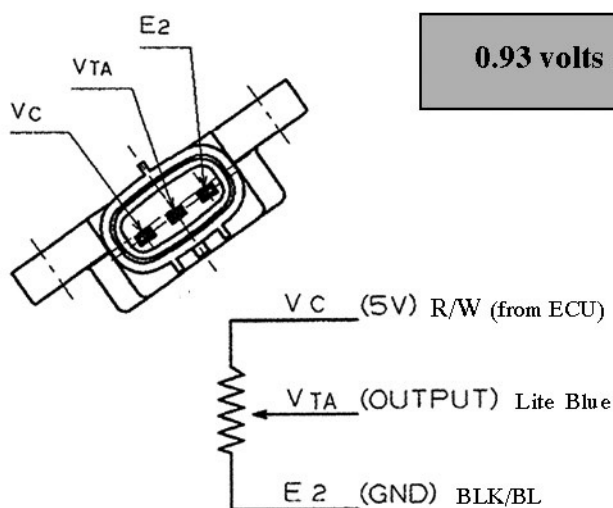
1. Loosen the two screws that hold the TPS on the carburetors.
2. Turn the TPS **clockwise** to decrease voltage, or **counterclockwise** to increase voltage.
3. When the TPS is set to the desired voltage, tighten the holding screws and verify voltage is 4.0 - 4.2 volts at wide open throttle.
4. When the TPS is set and voltage is verified, remove the tester and re-install the snowmobile TPS harness.
5. When storing the TPS tester, remove the red terminal of the tester and insert it in the blank terminal of the harness.



## CLEAN FIRE ELECTRICAL

### IQ THROTTLE POSITION SENSOR

When the sensor is inoperative or disconnected the system will switch to a LIMP HOME" mode. Limp Home mode reduces performance to a default value and monitors other sensors.



### IQ TEMPERATURE LIGHT

The TEMP light (A) is controlled by the CDI using water temperature input from the water temp sensor (B), throttle position input (TPS) and RPM input. The water temp sensor is a thermistor. As the temperature increases the resistance decreases. Each input has thresholds programmed into the CDI for when to illuminate the TEMP light according to coolant temp, throttle position (TPS) and engine speed (RPM).

For example, the TEMP light will come on at idle (under 2000 RPM, 0% throttle) and coolant temperature of 230°F (110°C). Timing retard initiates at 176°F and a TPS of over 80-100%. For more severe conditions, the engine fail-safe is turned on at high TPS input and high temps.

### LAMP CIRCUIT TEST

1. Ground the Black/White wire from the Temperature light.
2. Run the machine, and light should be on.

### THERMISTOR SENSOR TEST

At room temperature 68° F (20° C) the Thermistor should read 2190 to 2575  $\Omega$ . See chart below for other temperature resistances.

**Table 13-10: IQ Temperature Sensor Resistance Range**

TEMPERATURE °F (°C)	$\Omega$ RESISTANCE RANGE
68 (20)	2189 - 2675
149 (65)	455 - 566
203 (95)	197 - 240
239 (115)	120 - 147
275 (135)	77 - 94



### CAUTION

IF ATTEMPTING TO HEAT THE SENSOR, HEAT ONLY IN A WATER BATH. NEVER SUBJECT THE SENSOR TO AN OPEN FLAME TO ATTEMPT TO CLOSE THE CONTACTS AS SENSOR DAMAGE MAY RESULT.



### **IQ DETONATION ELIMINATION SENSOR (DET)**

A detonation sensor monitors the engine and responds to detonation by automatically reducing the engine timing and adding fuel. The activated sensor reduces engine detonation by compensation of timing and fuel. This results in decreased engine RPM and performance.

This sensor detects engine knock by converting pressure pulses from the engine and converting the pulses to a voltage. The ECU has a threshold voltage to differentiate between normal and damaging detonation. This system operates similar to existing DET system, but this system can compensate with timing and fuel delivery.



## DET TROUBLESHOOTING

Use this chart to determine causes and solutions for detonation. If none of these conditions exists and the sensor remains activated you may need to remove the sensor from the engine and test run the unit, and if the conditions are gone you will need to check the possible causes again. If the conditions remain the same you may need to replace the sensor.

**Table 13-11: DET Troubleshooting**

POSSIBLE CAUSE	SOLUTION
Poor quality fuel	Replace with higher quality fuel
Improper engine modifications	Do not modify the engine

## EFFECT OF DET

Basic concept of the detonation system is to avoid damage to the engine from detonation while developing the maximum power of the engine safely. The system starts with a predetermined engine perimeters. If the system senses detonation that is beyond a preset limit, the system retards the ignition timing to reduce the detonation and prevent engine

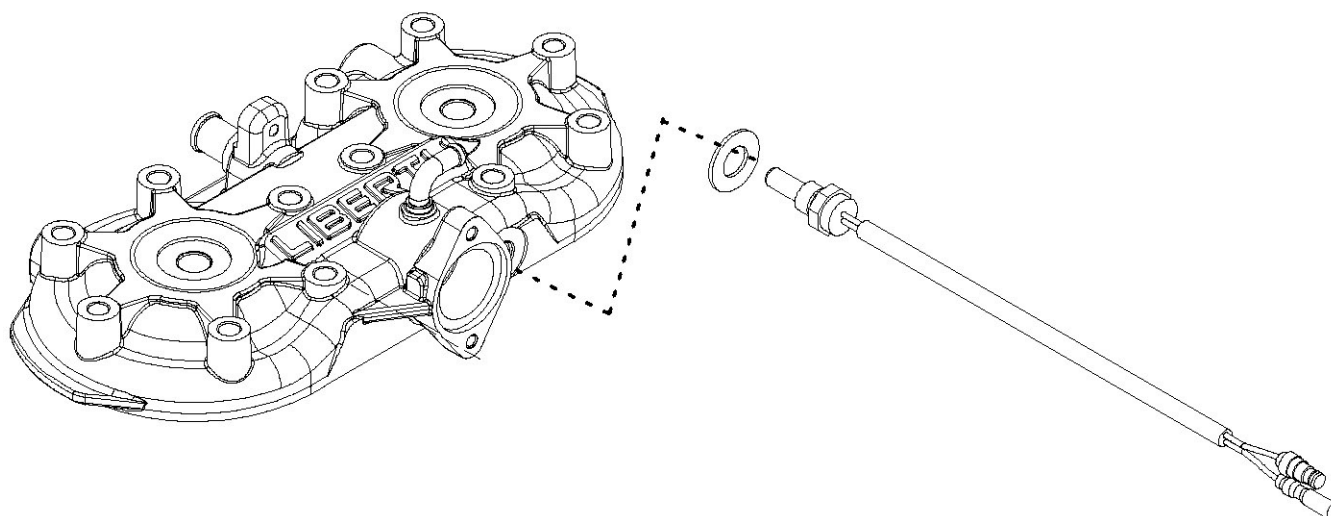
damage. When the detonation returns to a permissible level, the system will incrementally advance the spark to increase the output of the engine in a safe manner.

## SENSOR FAIL SAFE

The Detonation Elimination Technology also includes a sensor fail-safe system to prevent the engine from damage, when the sensor has failed, been disconnected or is unable to detect detonation. DET failure will add 10% injector duration and the ECU will use other sensors. The rider will experience a loss in power. The sensor will need to be reconnected or repaired to once again achieve full power. Check engine light will flash 6 times if the sensor fails or becomes disconnected. The ECU will default the DET value to a set percentage and will monitor other sensors for reduced performance.

## IQ TEMPERATURE SENSOR

Resistive sensor which the resistive characteristics change due to temperature. The ECU uses engine coolant temperature, throttle opening and engine RPM information to adjust fuel and ignition maps to warm up or cool down the engine. Disconnected or Default temperature is 77.5°F (25°C).



**Table 13-12: IQ Temperature Sensor Specifications**

Operating Temperature Range	-22°F - +248 °F (-30°C - 120°C)
Resistance	2.4 - 2.6KΩ@ 68°F (20°C)
Installation Torque	29 ft.lbs. (39.2Nm)

## EXHAUST TEMPERATURE SENSOR

K-Type resistive sensor with resistive characteristics that change due to temperature. The ECU senses this change in resistance and uses this information to correct fuel and/or timing. This sensor is difficult to measure if temperature is



below 392°F (200°C). Disconnected or Default temperature is 1100°F (593°C).

**Table 13-13: Exhaust Temperature Sensor Specifications**

Resistance Values	2.3MΩ @ 392°F (200°C) - 76Ω @ 1652°F (900°C)
-------------------	--

## INTAKE AIR TEMPERATURE SENSOR

Resistive sensor with resistive characteristics that change due to temperature. The intake air temperature sensor is located in the lower air intake. The ECU senses this change in resistance and uses this information to correct fuel and/or timing based on intake air temperature. In case of circuit failure ECU goes to calibrated default air temperature. Default temperature is -20°F (-28°C).

**Table 13-14: Air Temperature Sensor Specifications**

Operating Temperature Range	-22 °F - +248 °F (-30°C - 120°C)
Resistance	77°F(25°C) 9.7 - 10.3 KΩ

## BAROMETRIC PRESSURE SENSOR

Internal ECU sensor that provides ECU with Altitude information to adjust fuel and ignition. This sensor is located in side the ECU and is not serviceable. Default setting is 28.74 inches of mercury.

## CRANKSHAFT POSITION SENSOR (CPS)

The 5 tooth crank position sensor (A) picks up all 5 flywheel teeth (C).

The 2 tooth crank position sensor (B) picks up 2 off set flywheel teeth (D).

Both crank position sensors will have a gap (E) to the flywheel pick up of .035" (.90mm).

These sensors must be in the correct position or the engine will not run as expected. A sheared flywheel key will cause the engine to not start or kill if running.

The 2 tooth pick up detects the crank angle and obtains minimal information of the crank angle when control enters into limp home mode.

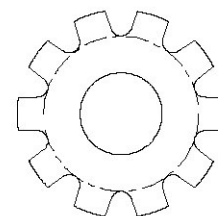
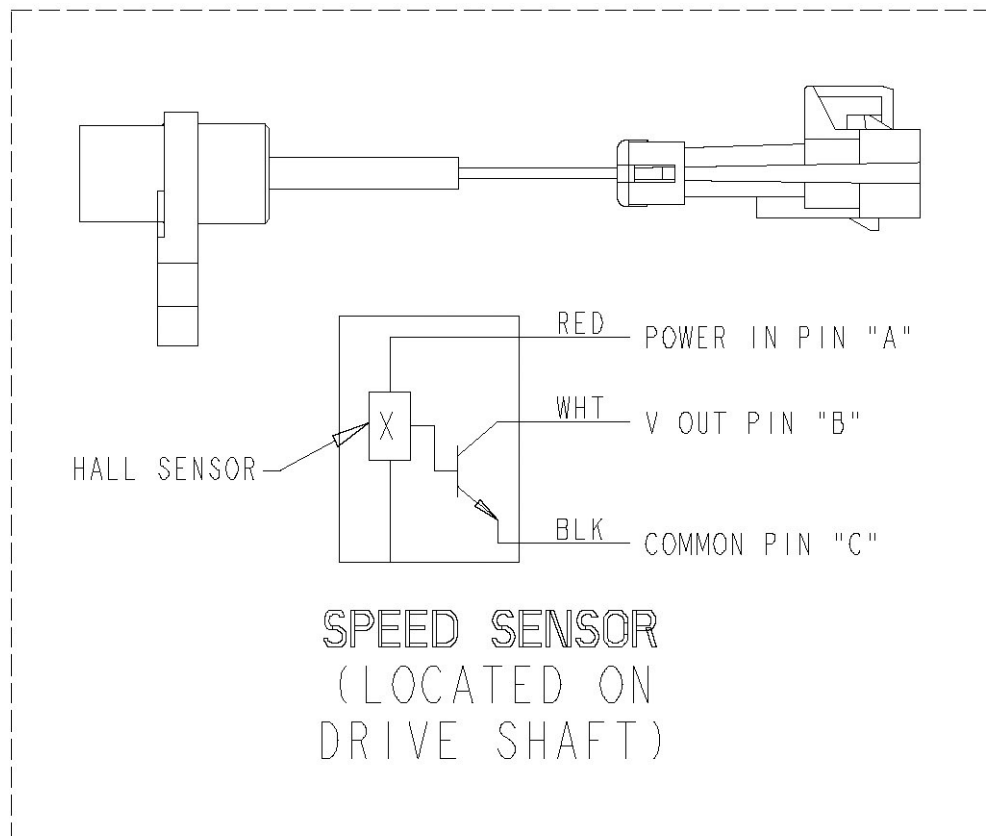
5 tooth pickup is to obtain the following information in combination with the 2 tooth pickup.

- Judge direction of rotation (forward and backward)
- Ignition advance angle control
- Injector drive angle control
- Excess advance ignition control at reverse

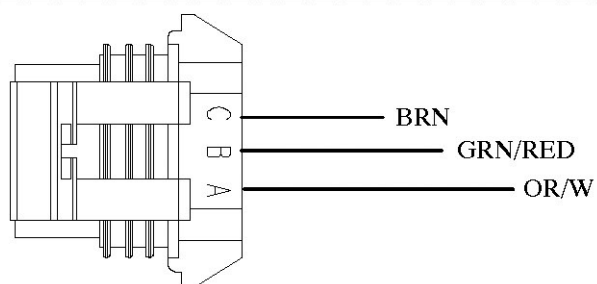


## SPEED SENSOR

This is a hall effect sensor that measures the speed of the drive shaft to give you the speed of the track.



Speedo Pick up  
located on the drive shaft

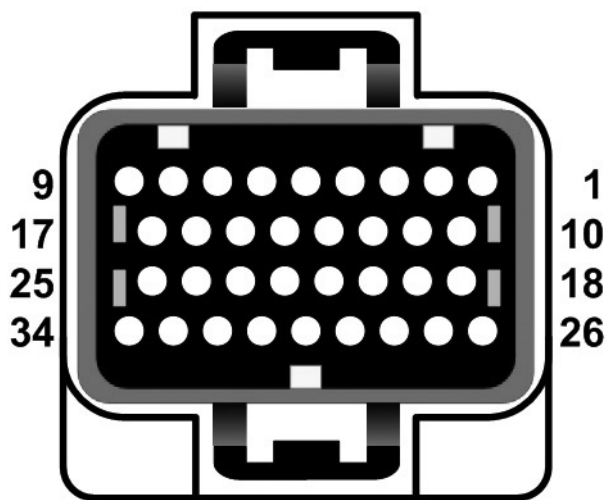


**Table 13-15: Speed Sensor Testing**

PIN #	COLOR	ITEM	VALUE
A	Red	Gauge	Power 5 volts (powered by gauge)
B	White	Speed Signal to Gauge	Checking with Hall sensor
C	Black	Signal to Ground	Continuity to ground



## ECU PLUG #1



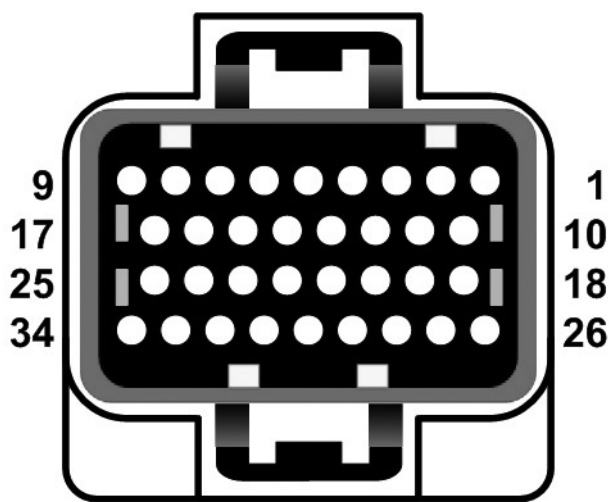
As viewed unplugged

Table 13-16:

PIN	WIRE COLOR	COMPONENT	PIN	WIRE COLOR	COMPONENT
1	Orange	Reg Rec (power)	18	Orange	Reg Rec (power)
2	-	-	19	Red/Black	External Battery Voltage
3	-	-	20	Black/Blue	Exhaust/Air Temp sensor (ground)
4	Yellow/Red	Tachometer (signal)	21	Black	Auxiliary Kill Switch
5	Blue/Red	Water temp (signal)	22	Black/Red	software kill
6	Green	PTO Injector full load (ground)	23	Blue	Air Temp
7	Green/White	PTO Injector part load (ground)	24	White/Black	Exhaust temp sensor
8	Yellow	MAG Injector full load (ground)	25	Green/Blue	EV Solenoid (ground)
9	Yellow/White	MAG Injector part load (ground)	26	Red	Voltage Reg (power)
10	Orange	Reg Rec (power)	27	-	-
11	White/Blue	Chassis Relay Coil	28	Brown	Ground (ECU)
12	-	-	29	Black/White	Dianostic LED
13	Gray	Reverse Switch	30	Green/Blue	Hot lamp
14	Red/Blue	PTO Injector full load (power)	31	White	Reverse lamp
15	Red/Blue	PTO Injector part load (power)	32	-	-
16	Red/Blue	MAG Injector full load (power)	33	Orange/Green	Battery Relay Coil
17	Red/Blue	MAG Injector part load (power)	34	-	-



## ECU PLUG #2



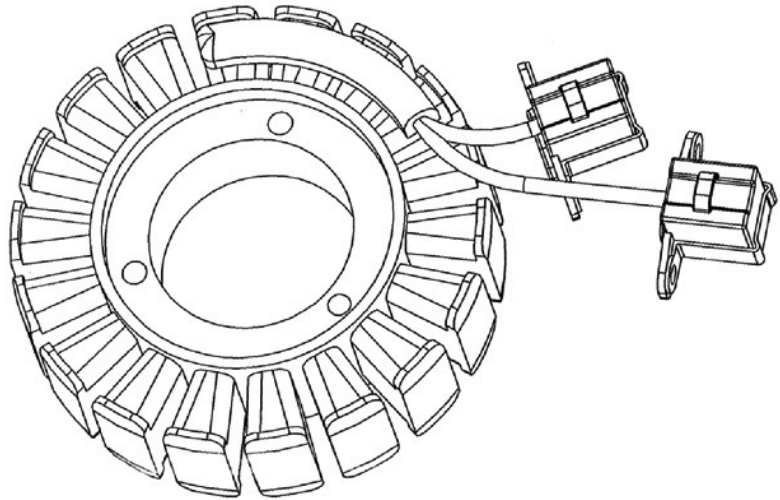
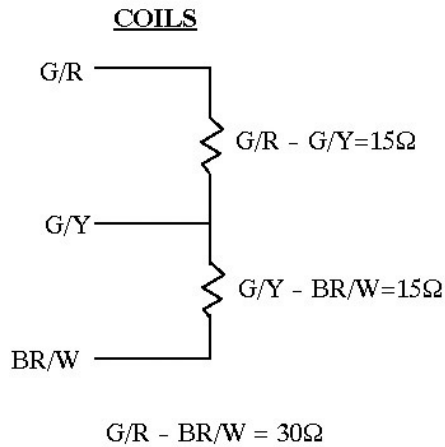
As viewed unplugged

Table 13-17:

PIN	WIRE COLOR	COMPONENT	PIN	WIRE COLOR	COMPONENT
1	White	CPS (2 tooth) ground	18	-	-
2	White/Red	CPS (2 tooth) signal	19	Purple	Detonation sensor signal
3	Green	CPS (5 tooth) ground	20	Black/Blue	Detonation sensor ground
4	White/Green	CPS (5tooth) signal	21	Black/Blue	Coolant temperature sensor/TPS ground
5	-		22	Black/Blue	External power ground
6	-		23	Black	PTO Ignition coil (ground)
7	Pink	Digital Wrench	24	Black	MAG Ignition coil (ground)
8	Orange	External Power (+)	25	Brown	Exciter Coil (ground)
9	White	PTO Ignition coil	26	Red	EV Solenoid (power)
10	-		27	White/Yellow	EV Solenoid
11	Yellow	Coolant Temp Sensor	28	-	
12	Aqua	TPS signal	29	-	
13	-		30	Red/White	Power Supply (5 volts)
14	Red/Blue	Digital Wrench	31	Blue/Yellow	Injector Coil
15	Gray	Digital Wrench	32	Blue/Yellow	Injector Coil
16	Black/White	Diagnostic Lamp	33	Green/Red	Exciter Coil (+)
17	White	MAG Ignition coil (power)	34	Green/Yellow	Exciter Coil (center)



## STATOR



The stator supplies the system with 3 Phase AC current to power the electrical system 300 watts.

If the gauge and lights cut out above 3500 RPM the charge coils are suspect to failure. When the brown/white wire is disconnected it will have no continuity to ground.

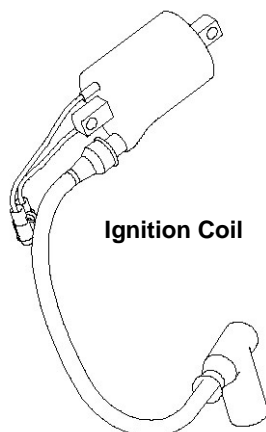
**Table 13-18:**

ITEM	COLOR	SYSTEM FUNCTION	VALUE
CHARGE	YELLOW	Charge coil	Resistance between the coils = .13W +15% No continuity between any Yellow to ground
	YELLOW	Charge coil	
	YELLOW	Charge coil	
CRANK POSITION SENSOR (CPS)	GRN/GRN WHITE	Crank Position Sensor (5 Tooth) Ignition timing. machine will not run with out.	Resistance between and Green/ Green White 190 W+15%
	RED/RED WHITE	Crank Position Sensor (2 Tooth) Locates TDC and RPM. Machine will not run with out.	Resistance between White/Red and White = 190 W+15%
COILS	Green/Red	Exciter Coil - Powers the Ignition Coils	Resistance between Green/Red and Green/Yellow = 15W
	Green/Yellow		Resistance between Green/Red and Brown/White = 30W
	Brown/White		Ground
INJECTORS	Blue/Yellow	Injector Coil - Powers Injectors to 16 Volts	Resistance between Blue/Yellow and Blue/Yellow - 2.4W



## IGNITION COIL

Ignition coils provide ignition spark for each spark plug. Below are the values for each coil.



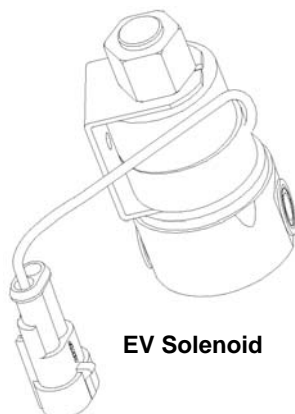
**Table 13-19: Ignition Coils**

PRIMARY COIL #1 (MAG)			PRIMARY COIL #2 (PTO)		
COLOR	ITEM	VALUE	COLOR	ITEM	VALUE
BLACK/RED	ECU	=.38 -.52OHMS	BLACK/ YELLOW	ECU	.38 -.52OHMS
BROWN	Ground		BROWN	Ground	
SECONDARY COIL			SECONDARY COIL		
White/Black		18k ohms	White/Black		18k Ohms

## EXHAUST VALVE SOLINOID

This solenoid will open and close the exhaust port vacuum at a calibrated TPS and RPM. Helps provide maximum power across the power band. 15Ω from White/Yellow to RED on the solenoid. Fail safe mode will keep the valves closed and the unit will have no top end. This solenoid

valve type a 2 way and is normally closed.



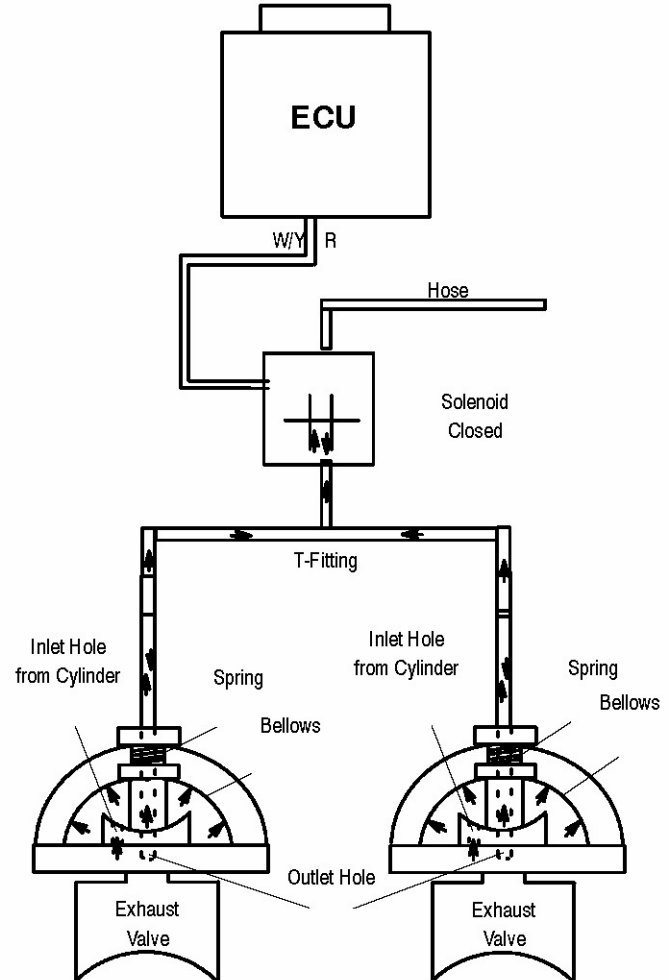
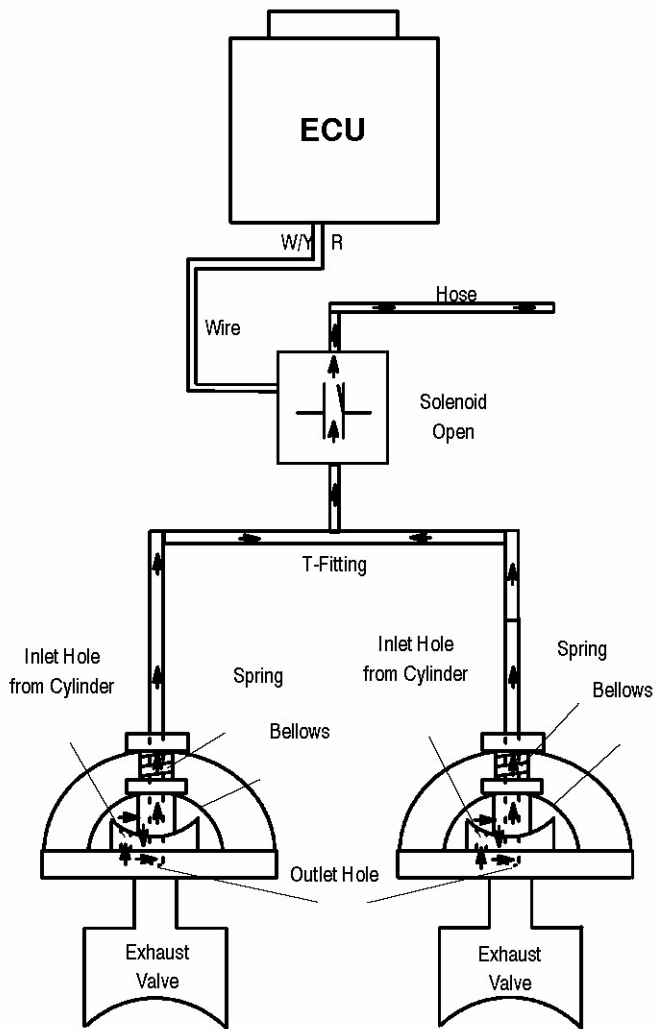
**Table 13-20: EV Solenoid**

COLOR	ITEM	VALUE
W/Y	ECU	Switches to ground
Red	Batt + (12VDC)	Battery Voltage



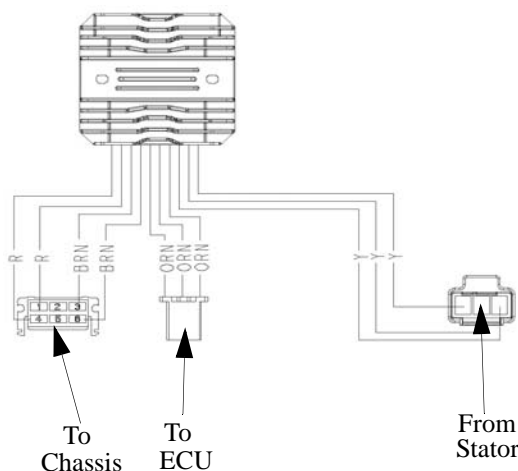
**Below 6800 RPM** Exhaust Valves Closed

**Above 6800 RPM** Exhaust Valves Fully Open





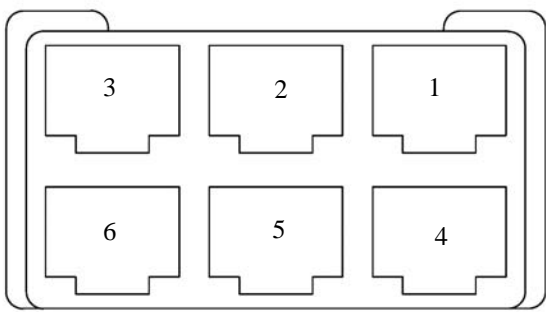
REGULATOR RECTIFIER



The rectifier converts the AC current to DC current by passing the AC signal from the stator through diodes in a bridge configuration. The regulator is used to limit the DC voltage to a stable 14.5 Volts. This is necessary because the AC Voltage can range from 0 - 80+ volts that is directly proportional to engine RPM.

Table 13-21: Regulator Rectifier connections

CONNECTOR	WIRE COLORS	ITEM
STATOR	YELLOW	AC Power from stator charge coils to the Reg Rec for converting it to DC voltage
ECU	ORANGE	Provides DC power to ECU for low voltage situations
CHASSIS	BROWN	Provides DC power to the chassis
	RED	



Chassis connector from Regulator Rectifier

Table 13-22: Chassis connector from Reg Rec

PIN	COLOR	TO/FROM
1	Red (23)	To Chassis Relay
	Red (52)	To Chassis Relay
2	-	-
3	Brown (12)	Ground
	Brown (46)	To Chassis/Hood #1
4	Red (05)	To engine/chassis connector
	Red (65)	To Chassis relay (power)
	Red (66)	To Fuel Pump (power)
5	Orange (06)	To Chassis/Hood #1
	Orange (09)	To Tail light
	Orange (24)	To Brake light switch
6	Brown (39)	Diagnostic (ground)
	Brown (67)	Fuel Pump (ground)

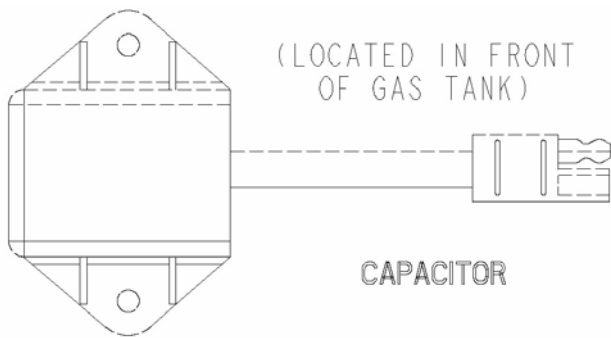


## CAPACITOR

The function of the capacitor is to act like a battery in a non-battery system. The capacitor makes the chassis side power signal stable. Without the capacitor in the system the unit will not run correctly at idle.

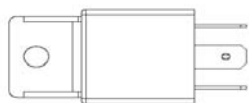
### TESTING THE CAPACITOR

1. Use a 12 volt battery and hook up the positive (+) to the Red/White wire and the negative (-) to the brown wire. Let the capacitor take a charge for 10 seconds.
2. Using a multi meter check the power that is in the capacitor. The power may slowly go down.



## CHASSIS RELAY

Controls the power distribution to the chassis separate from the rest of the system. The relay will close at a set RPM, when the system can support the chassis load, and open when engine RPM drops past a calibrated histories or 700 RPM. Voltage Boost kicks in at 700 RPM, the relay opens, the stator power is boosted and allocated to the fuel system and ignition components.



Chassis Relay



Chassis Relay Connector

Table 13-23: From Chassis Relay

CONNECTOR #	COLOR	TO/FROM
85	Red (52)	From Regulator
86	White/Blue (73)	To Engine/Chassis
87	Red/White (17)	To Left Handlebar switch
	Red/White (68)	To Red/White splice saver

## CHASSIS GROUND

Located behind the left hand foot well the chassis ground provides current path to ground. If ground is disconnected, all the current will run through ECU and damage the internal components of the ECU.

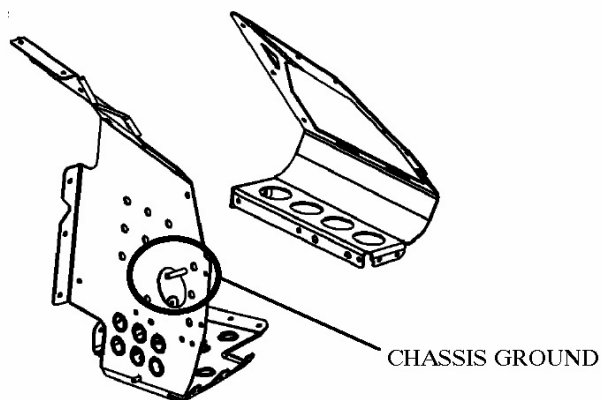


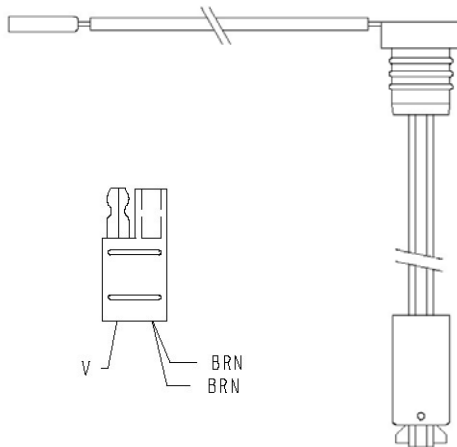
Table 13-23: From Chassis Relay

CONNECTOR #	COLOR	TO/FROM
30	Red (23)	From Regulator
	Red (65)	From Regulator



## **GENERAL ELECTRICAL ITEMS**

### **OIL LEVEL SENDER**



The float (A) moves up and down the sender shaft (B) and ECU sends a signal to the MFD when the level get to the point where you need to add more oil. The oil level signal is measured in resistance, FULL is open and  $<10\Omega$  at lower level.

**Table 13-24:**

COLOR	ITEM	VALUE
Violet	Oil Level	Turns on lamp in gauge when at low level
Brown	Ground	Ground



## **POLARIS ELECTRONIC REVERSE CONTROL (PERC)**

### **OPERATION**

Some models are equipped with Polaris electric reverse control (PERC). The operation of the electronic reverse system is achieved by automatically reversing the engine rotation with a push of a button. When in reverse you will have an indicator light that will flash, notifying you that the machine is in the reverse mode. The design of the clutches are matched to the specifications that will allow the backwards rotation of the engine to move the sled in reverse. To get back to forward is as easy as pushing the button again.

### **REVERSE OPERATION**



#### **WARNING**

Reverse operation, even at low speeds, may cause loss of control, resulting in serious injury or death. To avoid loss of control, always:  
LOOK BEHIND BEFORE AND WHILE BACKING.  
AVOID SHARP TURNS.  
SHIFT TO OR FROM REVERSE ONLY WHEN STOPPED.  
APPLY THROTTLE SLOWLY.



#### **CAUTION**

To avoid personal injury and/or engine damage, do not operate the electric start or recoil while engine is running.

1. Ensure that the vehicle is stopped and the engine is warmed up and running at idle.

**NOTE: The system will only engage in reverse if the engine is below 4000 RPM. If engine is above 4000 RPM the system can not be activated.**

2. Ensure that the path behind you is clear.
3. Push and hold the yellow reverse button on the left hand control for 1 second and then release the button. The reverse light on the instrument panel will flash when engine is in reverse motion.

**NOTE: The engine will automatically reduce RPM and it will reverse the rotation of the engine when the RPM is at the lowest RPM point.**

4. Ensure that the path behind you is clear.
5. Slowly apply throttle until the sled starts to move in reverse, and carefully direct the sled in the direction that you want.

**NOTE: Maximum RPM in reverse is 6000 RPM.**

**NOTE: If the engine stops running or is shut off while in reverse. The engine will start in forward gear.**

### **FORWARD OPERATION**

1. If unit was operated in reverse, ensure that the path ahead is clear, and push and hold the reverse button for 1 second and then release the button. The engine will now automatically change direction from reverse to forward and the reverse light on the instrument panel will stop flashing.

**NOTE: When servicing clutches, ensure that the vehicle is in forward gear. If not damage to the driven clutch may occur when removing the belt.**

### **ALTITUDE SETTING**

If your engine is carbureted, you can adjust the elevation setting of the Polaris electric reverse control (PERC). If your engine is a Cleanfire system, this is automatically done through the engine controller unit (ECU), and you do not need to do any setting.

At higher elevations over 6000 ft (1829m), the engine requires a different ignition RPM setting to improve the operation of the reverse system.

To set the altitude settings:

1. With the engine running, push and hold the reverse button for 5 - 6 seconds and then release the button.
2. The reverse light will flash rapidly on the instrument panel.
3. You have now set the PERC system to the higher elevation setting.
4. To go back to the low elevation setting repeat step 1. The reverse light will flash slowly indicating that the system is now in the lower elevation setting.

**NOTE: The elevation setting will be set in the memory (engine running or not) until it is changed.**

### **PERC NOTES**

- Max RPM for shifting into reverse = 4000 RPM
- Max RPM for operating in reverse = 6000 RPM
- Engine must first reach 900 RPM at start up before the reverse system can be used. The system works between 900 and 4000 RPM.
- If the button is pushed above 4000 RPM the system is bypassed and nothing will happen.



- Flashing light on the instrument panel indicates that the system is in reverse. On carbureted units a slow flash indicates that the system is set for low elevation, and a fast flash indicates the system is set up for high elevation. Push and hold the reverse button for longer than 5 seconds to toggle back and forth from high and low elevation settings. On Cleanfire units this is automatically done through the engine controller unit (ECU).
- Elevation above 6000 ft (1829m) requires a different timing curve to eliminate a “kick-back” effect.
- If engine is shut off or dies in forward or reverse gear, the engine when started will automatically be in forward gear.
- When servicing clutches, ensure that the vehicle is in the forward gear.

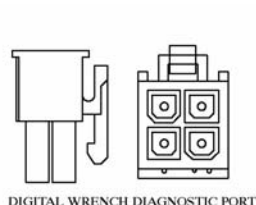
Apply 12 VDC to this plug by using the M-10 ACE tool (PN PV-46355) and it will power up all the light circuits. This is helpful for checking any grounds for lights.

## FUEL PUMP PRIME

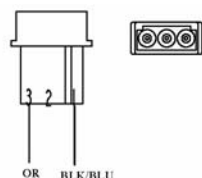
Applying 12 VDC to this by using the M-10 ACE pig tail tool (PN PA-46355-2). This will cycle the fuel pump and pressurize the fuel rail. Apply positive (+) power to the RED wire and the negative (-) to the BROWN wire. This will be used when priming the fuel pump after engine rebuild.

## DIGITAL WRENCH

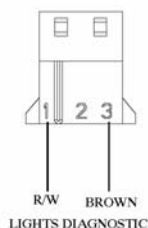
### CONNECTIONS



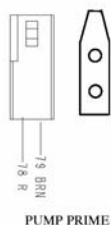
DIGITAL WRENCH DIAGNOSTIC PORT



ECU POWER UP FOR DIGITAL WRENCH



LIGHTS DIAGNOSTIC



PUMP PRIME

### DIAGNOSTIC PORT

The diagnostic port is used with the Digital Wrench diagnostic program. The communication cable hooks to this port to communicate to the ECU when powered up with the power up port.

### ECU POWER UP PORT

The power up port is used to give the ECU power so that the Digital Wrench can communicate with the ECU. To power up the ECU use the M-10 ACE power cable (PN PV-46355)

### DIAGNOSTIC PULG FOR LIGHTS





2006 600 FUSION/HO HOOD

2006 RMK 600HO (HOOD)

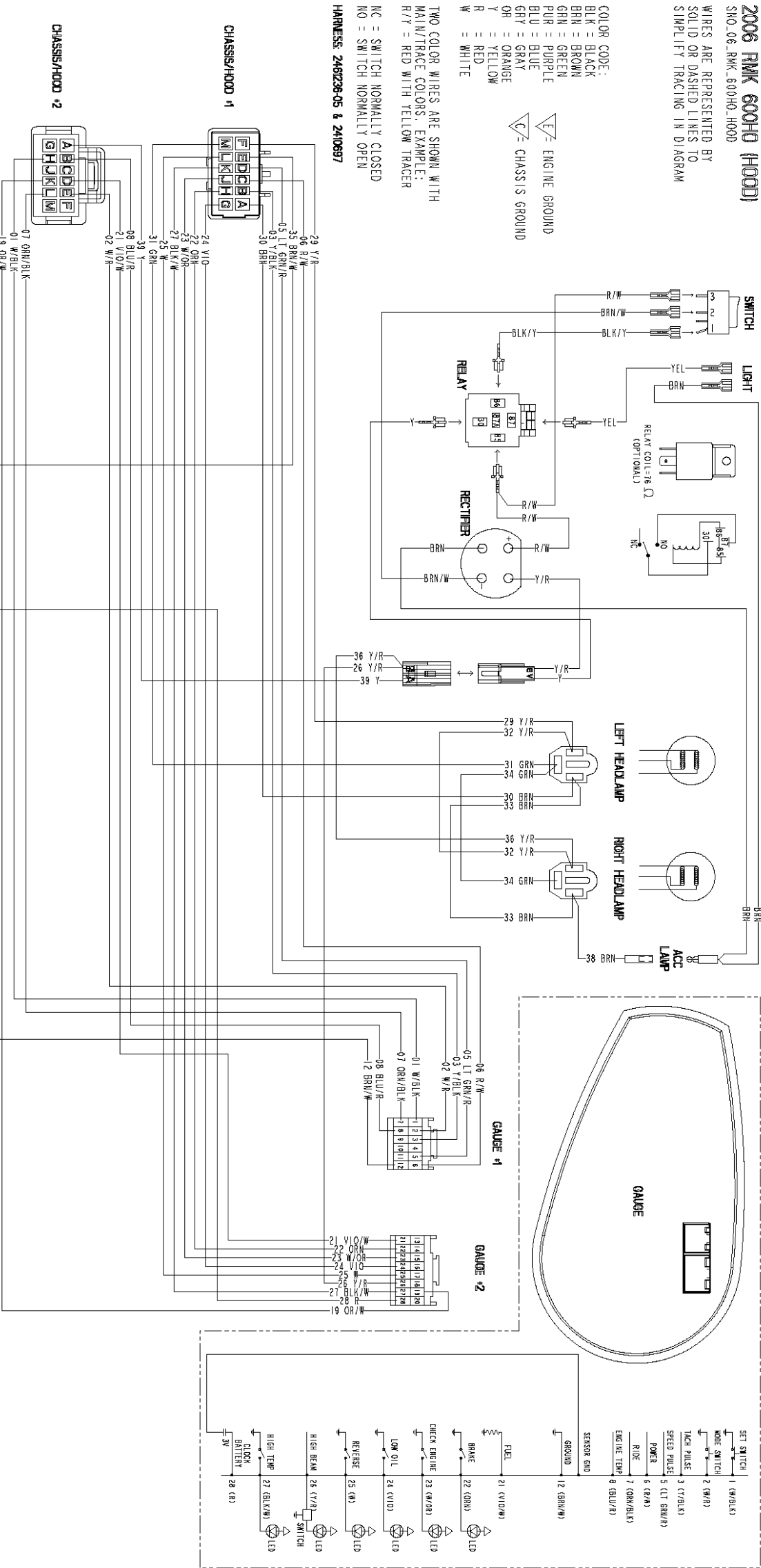
SNO-06-RMK-600HO-HOOD

WIRES ARE REPRESENTED BY SOLID OR DASHED LINES TO SIMPLIFY TRACING IN DIAGRAM

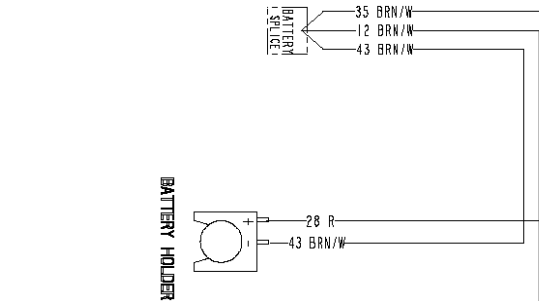
- COLOR CODE:
- BLK = BLACK
  - BRN = BROWN
  - GRN = GREEN
  - PUR = PURPLE
  - BLU = BLUE
  - GRY = GRAY
  - OR = ORANGE
  - Y = YELLOW
  - R = RED
  - W = WHITE
- ⏏ = ENGINE GROUND
- ⏏ = CHASSIS GROUND

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE:  
R/Y = RED WITH YELLOW TRACER  
NC = SWITCH NORMALLY CLOSED  
NO = SWITCH NORMALLY OPEN

HARNESSES: 246236-05 & 240697

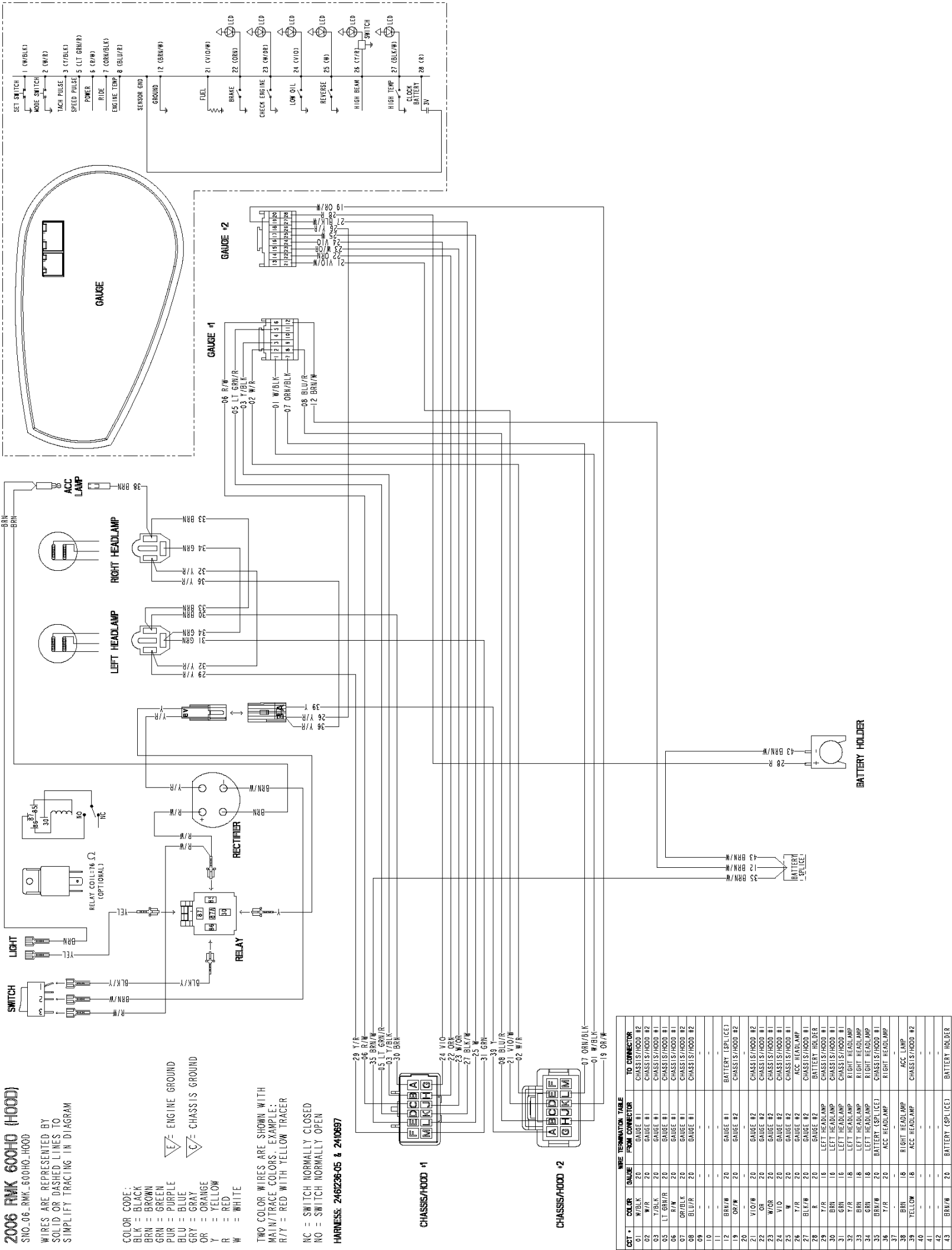


WIRE TERMINATION TABLE			
CCT #	COLOR	GAUGE FROM CONNECTOR	TO CONNECTOR
01	W/BLK	20 GAUGE #1	CHASSIS/HOOD #2
02	W/R	20 GAUGE #1	CHASSIS/HOOD #2
03	Y/BLK	20 GAUGE #1	CHASSIS/HOOD #1
05	LT GRN/R	20 GAUGE #1	CHASSIS/HOOD #1
06	R/W	20 GAUGE #1	CHASSIS/HOOD #1
07	OR/BLK	20 GAUGE #1	CHASSIS/HOOD #2
08	BLU/R	20 GAUGE #1	CHASSIS/HOOD #2
09	-	-	-
10	-	-	-
11	-	-	-
12	BRN/W	20 GAUGE #1	BATTERY (SP LICE)
19	OR/W	20 GAUGE #2	CHASSIS/HOOD #2
20	-	-	-
21	V/O/W	20 GAUGE #2	CHASSIS/HOOD #2
22	OR	20 GAUGE #2	CHASSIS/HOOD #1
23	W/OR	20 GAUGE #2	CHASSIS/HOOD #1
24	V/O	20 GAUGE #2	CHASSIS/HOOD #1
25	W	20 GAUGE #2	CHASSIS/HOOD #1
26	V/R	20 GAUGE #2	ACC HEADLAMP
27	BLK/W	20 GAUGE #2	CHASSIS/HOOD #1
28	BLK/W	20 GAUGE #2	CHASSIS/HOOD #1
29	Y/R	20 GAUGE #2	CHASSIS/HOOD #1
30	BRN	16 LEFT HEADLAMP	CHASSIS/HOOD #1
31	GRN	16 LEFT HEADLAMP	CHASSIS/HOOD #1
32	V/R	18 LEFT HEADLAMP	RIGHT HEADLAMP
33	BRN	18 LEFT HEADLAMP	RIGHT HEADLAMP
34	GRN	18 LEFT HEADLAMP	RIGHT HEADLAMP
35	BRN/W	20 BATTERY (SP LICE)	CHASSIS/HOOD #1
36	V/R	20 ACC HEADLAMP	RIGHT HEADLAMP
37	-	-	-
38	BRN	18 RIGHT HEADLAMP	ACC LAMP
39	YELLOW	18 ACC HEADLAMP	CHASSIS/HOOD #2
40	-	-	-
41	-	-	-
42	-	-	-
43	BRN/W	20 BATTERY (SP LICE)	BATTERY HOLDER





2006 HO/RMK HOOD





**POLARIS**  
The Way Out.





600 HO/FUSION/RMK CHASSIS CALL OUTS

WIRE TERMINATION TABLE HARNESS PART NUMBER 40MT/5					
CCT NO	COLOR	GUAGE	FROM CONNECTOR	TO CONNECTOR	FUNCTION
E1	WHITE	18	CDI MODULE	IGNITION COIL	IGNITION
E2	RED	18	CDI MODULE	EXCITER COIL	EXCITER COIL (+)
E3					
E4	WHITE/RED	18	CDI MODULE	CRANK SENSOR	PULSER COIL (+)
E5	BLK	18	CDI MODULE	CHASSIS/ENGINE	HARD STOP
E6	BLK/RED	18	CDI MODULE	CHASSIS/ENGINE	SOFT STOP
E7	GRY	18	CDI MODULE	CHASSIS/ENGINE	REVERSE SIGNAL
E8	BLU/RED	18	CDI MODULE	CHASSIS/ENGINE	WATER TEMP
E9					
E10					
E11	BLK	18	CDI MODULE	COOLANT SENSOR	WATER TEMP SIGNAL
E12	BRN	18	CDI MODULE	COOLANT SENSOR	WATER TEMP GND
E13					
E14					
E15					
E16					
E17	GRN	18	CDI MODULE	DET SENSOR	DET SENSOR GND
E18	BLK	18	CDI MODULE	IGNITION COIL	IGN COIL GND
E19	GRN	18	CDI MODULE	EXCITER COIL	EXCITER COIL (CENTER)
E20	BLK	18	CDI MODULE	CRANK SENSOR	STATOR GROUND
E21	WHITE	18	CDI MODULE	CRANK SENSOR	PULSER COIL (-)
E22	YELLOW/RED	18	CDI MODULE	CHASSIS/ENGINE	TACHOMETER
E23	WHITE/YELLOW	18	CDI MODULE	CHASSIS/ENGINE	EV SOLENOID GND
E24	BLU/WHITE	18	CDI MODULE	CHASSIS/ENGINE	HOT LED
E25	WHITE	18	CDI MODULE	CHASSIS/ENGINE	REVERSE LED
E26	BLU/YELLOW	18	CDI MODULE	CHASSIS/ENGINE	DET LED
E27					
E28	PINK	18	CDI MODULE	TPS SENSOR	TPS {SV}
E29	YELLOW	18	CDI MODULE	TPS SENSOR	TPS SIGNAL
E30	BLACK	18	CDI MODULE	TPS SENSOR	TPS GND
E31					
E32					
E33					
E34	GREEN	18	CDI MODULE	DET SENSOR	DET SIGNAL

WIRE TERMINATION TABLE HARNESS PART NUMBER 24H0729					
CT NO	COLOR	GUAGE	FROM CONNECTOR	TO CONNECTOR	FUNCTION
C1	BLACK/WHITE		CHASSIS/ENGINE	CHASSIS/HOOD #1	HOT LIGHT
C2	VIOLET		OIL LIGHT SENSOR	CHASSIS/HOOD #1	LOW OIL INDICATOR
C3	YELLOW/RED	16	LEFT HANDLEBAR	CHASSIS/HOOD #1	LH HIGH BEAM POWER
C4	BROWN	16	REGULATOR	CHASSIS/HOOD #1	AC GROUND
C5	VIOLET/WHITE		FUEL LEVEL	CHASSIS/HOOD #2	FUEL LEVEL INDICATOR
C6	ORANGE/BLACK		REGULATOR	CHASSIS/HOOD #1	DC BRAKE SIGNAL
C7	GREEN	16	LEFT HANDLEBAR	CHASSIS/HOOD #1	LH LOW BEAM POWER
C8	YELLOW	16	REGULATOR	CHASSIS/HOOD #2	AC POWER
C9	ORANGE		BRAKE LIGHT SWITCH	REGULATOR	AC BRAKE SIGNAL
C10	RED/WHITE		REGULATOR	RED/WHITE SPLICE	DC SOFT POWER
C11	WHITE/RED		IGNITION SWITCH	START SOLENOID	SWITCHED IGN POWER
C12	ORANGE/WHITE	20	CHASSIS/HOOD #2	CAPACITOR	SPEED SENSOR POWER
C13	BROWN		BRAKE LIGHT SWITCH	STOP SWITCH	STOP SWITCH GROUND
C14	BROWN	16	TETHER	TAILLIGHT	TAILLIGHT GROUND
C15	WHITE/ORANGE		CHASSIS ENGINE	CHASSIS/HOOD #1	DET LIGHT
C16	YELLOW	16	DIAGNOSTIC	STARTER LOCKOUT	AC POWER
C17	YELLOW	16	YELLOW SPLICE	LEFT HANDLEBAR	AC POWER
C18	BROWN/WHITE		ACCESSORY	OIL LEVEL	OIL LIGHT GROUND
C19	BLACK	20	CHASSIS/ENGINE	TETHER SWITCH	HARD STOP
C20	BROWN		STARTER LOCKOUT	IGNITION SWITCH	AC GROUND
C21	BROWN/WHITE		BROWN/WHITE SPLICE #1	BROWN/WHITE SPLICE #2	DC SOFT GROUND
C22	RED/WHITE		RED/WHITE SPLICE	POWER POINT	DC SOFT POWER
C23	BROWN/WHITE		POWER POINT	BROWN/WHITE SPLICE #2	DC SOFT GROUND
C24	ORANGE		BRAKE LIGHT SWITCH	TAILLIGHT	BRAKE LIGHT GROUND
C25	BROWN		DIAGNOSTIC	BRAKE LIGHT SWITCH	AC GROUND
C26	YELLOW	16	STARTER LOCKOUT	TAILLIGHT	AC POWER
C27	BROWN/WHITE	20	BROWN/WHITE SPLICE #1	FUEL LEVEL	FUEL SENSOR GROUND
C28	RED		CIRCUIT BREAKER	IGNITION SWITCH	IGNITION POWER
C29	BLACK	20	TETHER SWITCH	IGNITION SWITCH	HARD STOP
C30	BROWN		TETHER SWITCH	IGNITION SWITCH	GROUND
C31	BLACK	20	IGNITION SWITCH	STOP SWITCH	HARD STOP
C32	BROWN	20	RIGHT HANDWARMER	LEFT HANDWARMER	AC GROUND
C33	BLUE/RED	20	LEFT HANDLEBAR	RIGHT HANDWARMER	LEFT HAND HIGH
C34	ORANGE/GRAY	20	LEFT HANDLEBAR	THUMBWARMER	THUMB LOW
C35	BLUE/RED	20	LEFT HANDWARMER	RIGHT HANDWARMER	RIGHT HAND HIGH
C36	BLUE	20	LEFT HANDLEBAR	RIGHT HANDWARMER	RIGHT HAND LOW
C37	BLUE	20	RIGHT HANDWARMER	LEFT HANDWARMER	LEFT HAND LOW
C38	WHITE	20	LEFT HANDWARMER	BRAKE LIGHT SWITCH	AC GROUND
C39	WHITE/GRAY	20	LEFT HANDLEBAR	THUMBWARMER	THUMB HIGH
C40	BROWN		STOP SWITCH	THUMBWARMER	AC GROUND
C41	BROWN	16	GROUND	STARTER LOCKOUT	AC GROUND
C42	WHITE		CHASSIS/ENGINE	CHASSIS/HOOD #1	REVERSE LAMP
C43	GRAY	20	CHASSIS/ENGINE	LEFT HANDLEBAR	REVERSE COMMAND
C44	BROWN	20	LEFT HANDLEBAR	THUMBWARMER	AC GROUND (REV)
C45	BROWN/WHITE		REGULATOR	BROWN/WHITE SPLICE #2	DC SOFT GROUND
C46	YELLOW	16	YELLOW SPLICE	REGULATOR	AC POWER
C47	BROWN	16	REGULATOR	DIAGNOSTIC	AC GROUND
C48	BROWN/WHITE		POWER POINT	ACCESSORY	DC SOFT GROUND
C49	RED/WHITE		POWER POINT	ACCESSORY	DC SOFT POWER
C50	BLACK/RED		CHASSIS/ENGINE	STOP SWITCH	SOFT STOP
C51	BROWN/WHITE		BROWN/WHITE SPLICE #2	CHASSIS/HOOD #1	DC SOFT GROUND
C52	RED	16	REGULATOR	CIRCUIT BREAKER	BATTERY POWER
C53	BROWN	16	REGULATOR	GROUND	AC GROUND
C54	YELLOW	16	YELLOW SPLICE	DIAGNOSTIC	AC POWER
C55	GREEN/WHITE		STARTER LOCKOUT	START SOLENOID	STARTER LOCKOUT (GND)
C56	-		-	-	-
C57	BROWN/WHITE	20	BROWN/WHITE SPLICE #1	LEFT HANDLEBAR	DC SOFT GROUND
C58	-		-	-	-
C59	RED/WHITE		RED/WHITE SPLICE	CHASSIS/HOOD #1	DC SOFT POWER
C60	-		-	-	-
C61	BROWN/WHITE	20	BROWN/WHITE SPLICE #1	CAPACITOR	SPEED SENSOR GROUND
C62	LT GREEN/RED		SPEED SENSOR	CHASSIS/HOOD #1	GROUND SPEED SIGNAL
C63	WHITE/YELLOW		CHASSIS/ENGINE	EV SOLENOID	EV SOLENOID CONTROL
C64	RED/WHITE		RED/WHITE SPLICE	EV SOLENOID	EV POWER
C65	BLUE/RED		CHASSIS/ENGINE	CHASSIS/HOOD #2	ENGINE TEMP OUTPUT
C66	YELLOW/BLACK		CHASSIS/ENGINE	CHASSIS/HOOD #1	DC TACHOMETER
C67	-		-	-	-
C68	-		-	-	-
C69	WHITE/RED	20	LEFT HANDLEBAR	CHASSIS/HOOD #2	M-10/MODE SWITCH
C70	WHITE/BLACK	20	LEFT HANDLEBAR	CHASSIS/HOOD #2	M-10/SET SWITCH
C71	BROWN/WHITE	20	CAPACITOR	SPEED SENSOR	SPEED SENSOR GROUND
C72	ORANGE/WHITE	20	CAPACITOR	SPEED SENSOR	SPEED SENSOR POWER

**Wiring Diagram for 2004 Polaris Outlaw 500**

**Legend:**

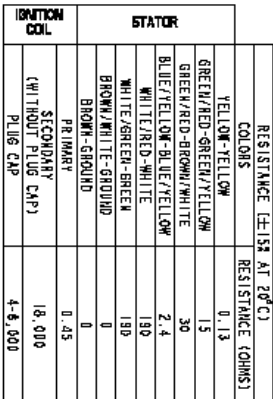
- 30 BRN/W
- 60 BRN/W
- 33 BRN/W
- 42 BLK/BLU
- 61 BLK/BLU
- 50 BLK/BLU
- 44 GRN
- 62 GRN
- 47 GRN
- 45 R/BLU
- 63 R/BLU
- 46 R/BLU
- 56 BLK/BLU
- 59 BLK/BLU
- 64 BLK/BLU
- 47 GRN
- 46 R/BLU
- 43 PNK
- 63 R/BLU
- 62 GRN
- 61 BLK/BLU

**Diagnostic Lamp:** 30 AMP Ignition Switch

**Coolant Temp Sensor:** BLK, Y

**Throttle Position Sensor:** 64 BLK/BLU, 50 BLK/BLU, 57 R/W

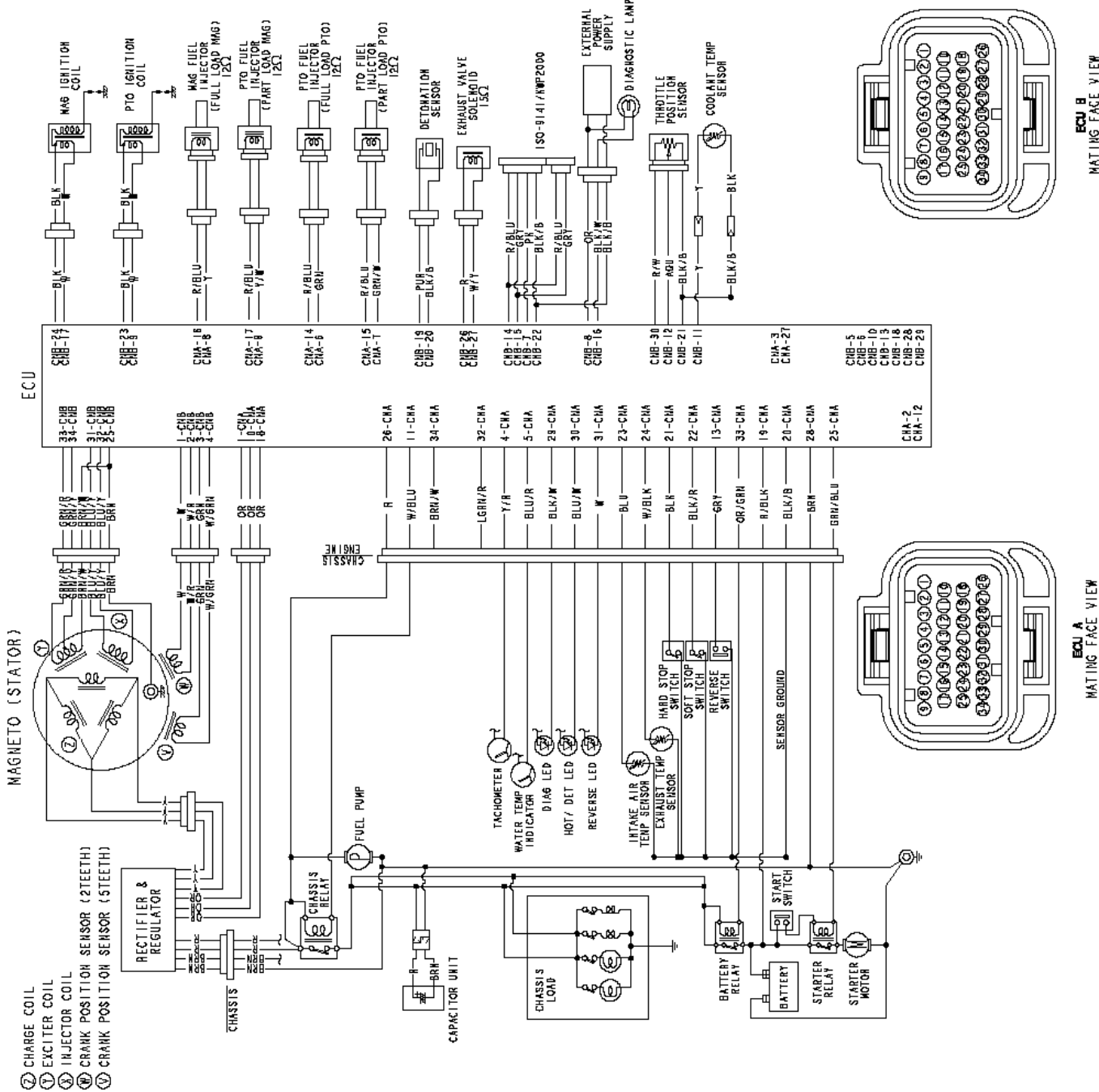
TEMPERATURE	RESISTANCE (Ω/10%)
20°C / 68°F	2300
25°C / 77°F	2044
110°C / 212°F	191





700 / 900 ENGINE AND ENGINE CALL OUTS

2008 FUSION/RMK 900 (ENGINE)  
S40.16\_FUSION\_RMK\_900\_ENG1UE  
PAGE 2 OF 2

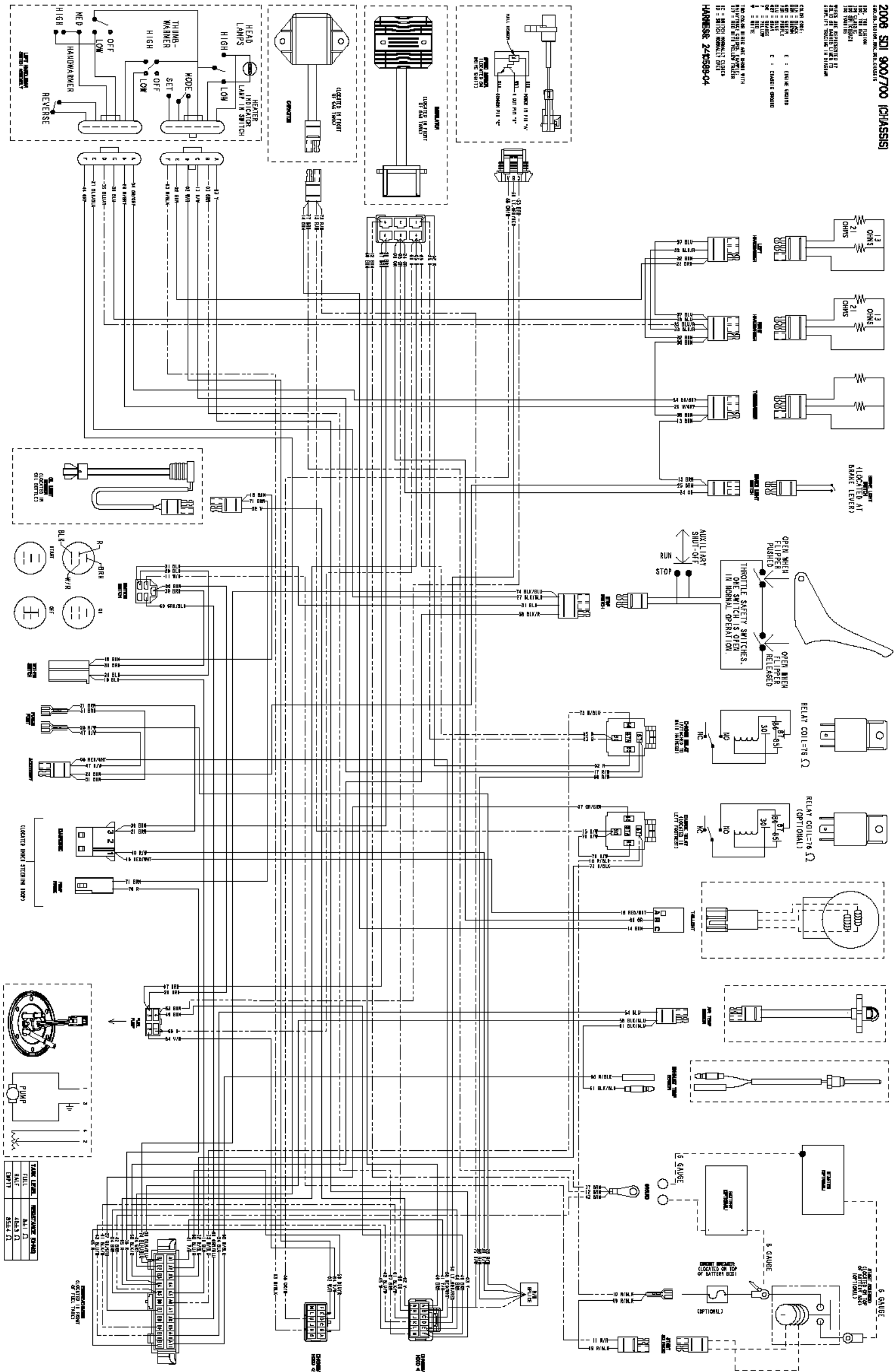


WIRE TERMINATION TABLE HARNESS: 4012030-01				
ECU #	COLOR	GAUGE	FROM CONNECTOR	TO CONNECTOR
01	ORANGE	18	ECU A	1
02	ORANGE	18	ECU A	10
03	ORANGE	18	ECU A	18
04	RED/BLUE	18	ECU A	16
05	YELLOW	18	ECU A	8
06	RED/BLUE	18	ECU A	14
07	GREEN	18	ECU A	6
08	YELLOW/RED	20	ECU A	4
09	BLUE/RED	20	ECU A	5
10	RED/BLACK	20	ECU A	19
11	BLACK	18	ECU A	21
12	WHITE/BLUE	18	ECU A	11
13	LT GREEN/RED	18	ECU A	32
14	GREEN/BLUE	18	ECU A	23
15	BLUE	20	ECU A	23
16	WHITE/BLACK	20	ECU A	24
17	BLACK/BLUE	20	ECU A	13
18	GRAY	20	ECU A	20
19	BLACK/RED	20	ECU A	22
20	RED	18	ECU A	26
21	BROWN	18	ECU A	28
22	ORANGE/GREEN	18	ECU A	33
23	BROWN/WHITE	18	ECU A	34
24	BLACK/WHITE	20	ECU A	29
25	BLUE/WHITE	20	ECU A	30
26	WHITE	20	ECU A	31
27	-	-	-	-
55	RED/WHITE	18	ECU A	17
56	YELLOW/WHITE	18	ECU A	9
57	RED/WHITE	18	ECU A	15
58	GREEN/WHITE	18	ECU A	7

WIRE TERMINATION TABLE HARNESS: 4012030-01				
ECU #	COLOR	GAUGE	FROM CONNECTOR	TO CONNECTOR
28	GREEN/RED	20	ECU B	33
29	GREEN/YELLOW	20	ECU B	34
30	BROWN/WHITE	20	ECU B	28
31	BLUE/YELLOW	20	ECU B	31
32	BLUE/YELLOW	20	ECU B	32
33	BROWN	20	ECU B	-
34	WHITE	20	ECU B	1
35	WHITE/RED	20	ECU B	2
36	GREEN	20	ECU B	3
37	WHITE/GREEN	20	ECU B	4
38	VIOLET	18	ECU B	19
39	BLACK/BLUE	18	ECU B	20
40	RED	18	ECU B	24
41	WHITE/YELLOW	18	ECU B	27
42	BLACK/BLUE	20	ECU B	22
43	PINK	20	ECU B	7
44	GRAY	20	ECU B	15
45	RED/BLUE	20	ECU B	14
46	RED/BLUE	20	SPlice #4	-
47	GRAY	20	SPlice #3	-
48	ORANGE	18	ECU B	8
49	BLACK/WHITE	20	ECU B	16
50	BLACK/BLUE	18	SPlice #2	-
51	WHITE	20	ECU B	17
52	BLACK	20	ECU B	24
53	WHITE	20	ECU B	9
54	BLACK	20	ECU B	23
55	YELLOW	20	ECU B	11
56	BLACK/BLUE	20	ECU B	21
57	RED/WHITE	20	ECU B	30
58	LT BLUE	20	ECU B	12
59	BLACK/BLUE	20	SPlice #5	-
60	BROWN	20	SPlice #1	-
61	BLACK/BLUE	20	SPlice #2	-
62	GRAY	20	SPlice #3	-
63	RED/BLUE	20	SPlice #4	-
64	BLACK/BLUE	20	SPlice #5	-



700 / 900 CHASSIS





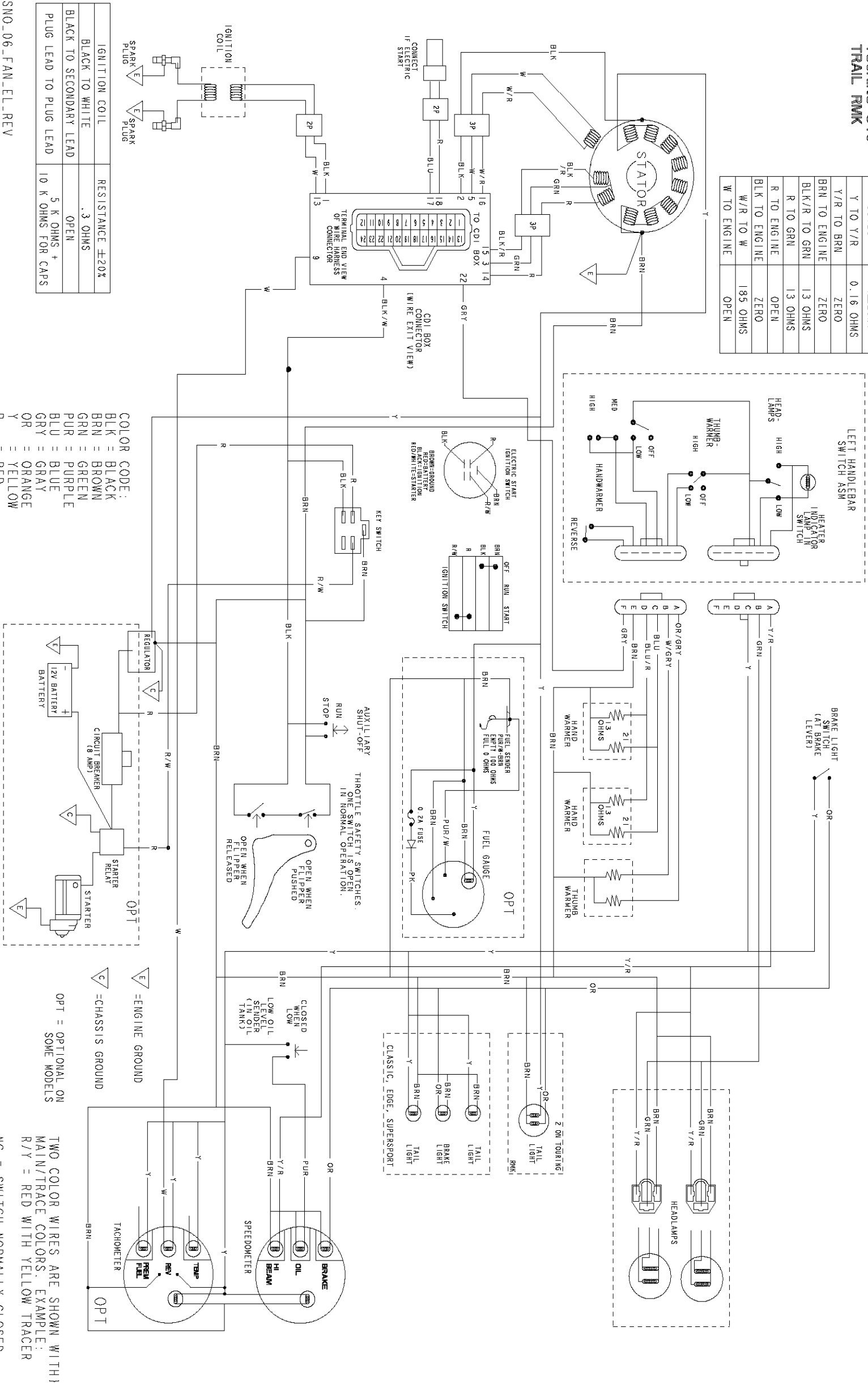
700/900 CHASSIS CALLOUT

Table 14-1:

Wire #	Color	From Connector	To Conector	Wire #	Color	From Connector	To Conector
1	BLK/W	ENGINE/CHASSIS	CHASSIS/HOOD #1	46	BRN	REGULATOR	CHASSIS/HOOD #1
2	V	OIL LIGHT SENSOR	CHASSIS/HOOD #1	47	BRN	REGULATOR	R/W & BRN SPLICE SAVER
3	Y	LEFT HANDLEBAR	CHASSIS/HOOD #1	48	OR/W	CHASSIS/HOOD #2	SPEED SENSOR
4	BRN	ENGINE/CHASSIS	CHASSIS/HOOD #1	49	BRN	CHASSIS/HOOD #1	FUEL PUMP
5	R	ENGINE/CHASSIS	REGULATOR	50	LT GRN/R	TEST PLUG	SPEED SENSOR
6	OR	REGULATOR	CHASSIS/HOOD #1	51	-	-	-
7	GRN	LEFT HANDLEBAR	CHASSIS/HOOD #1	52	R	REGULATOR	CHASSIS RELAY
8	R/W	R/W & BRN SPLICE SAVER	CHASSIS/HOOD #1	53	BRN	FUEL PUMP	SPEED SENSOR
9	-	-	-	54	BLU	ENGINE/CHASSIS	AIR TEMP SENSOR
10	R/BLK	CIRCUIT BREAKER	CHARGE RELAY	55	W/BLK	ENGINE/CHASSIS	EXHAUST TEMP SENSOR
11	W/R	IGNITION SWITCH	START SOLENOID	56	BLK/BLU	ENGINE/CHASSIS	AIR TEMP SENSOR
12	BRN	REGULATOR	GROUND	57	OR/GRN	ENGINE/CHASSIS	CHARGE RELAY
13	BRN	THUMBWARMER	R/W & BRN SPLICE SAVER	58	BLK/R	ENGINE/CHASSIS	STOP SWITCH
14	BRN	OIL LIGHT SENSOR	TAILLIGHT	59	BLU/R	ENGINE/CHASSIS	CHASSIS/HOOD #2
15	R/W	CAPACITOR	CHARGE RELAY	60	GRN/BLU	ENGINE/CHASSIS	IGNITION
16	R/W	R/W & BRN SPLICE SAVER	TAILLIGHT	61	BLK/BLU	EXHAUST TEMP SENSOR	AIR TEMP SENSOR
17	R/W	CHASSIS RELAY	LEFT HANDLEBAR	62	W/R	CHASSIS/HOOD #2	LEFT HANDLEBAR
18	BRN	R/W & BRN SPLICE SAVER	OIL LIGHT SENSOR	63	W/BLK	CHASSIS/HOOD #2	LEFT HANDLEBAR
19	BLK	ENGINE/CHASSIS	TETHER	64	V/W	CHASSIS/HOOD #2	FUEL PUMP
20	BRN	R/W & BRN SPLICE SAVER	IGNITION	65	R	REGULATOR	CHASSIS RELAY
21	BRN	REGULATOR	POWER POINT	66	R	REGULATOR	FUEL PUMP
22	BRN	R/W & BRN SPLICE SAVER	LEFT HANDLEBAR	67	-	-	-
23	R	REGULATOR	CHASSIS RELAY	68	R/W	CHASSIS RELAY	R/W & BRN SPLICE SAVER
24	OR	BRAKE LIGHT SWITCH	REGULATOR	69	R/BLK	CIRCUIT BREAKER	START SOLENOID
25	BRN	R/W & BRN SPLICE SAVER	BRAKE LIGHT SWITCH	70	R/W	CHARGE RELAY	CHARGE RELAY
26	W/GRY	LEFT HANDLEBAR	THUMBWARMER	71	W/GRN	ENGINE/CHASSIS	SPEED LIMIT
27	BLK/BLU	STOP SWITCH	LEFT HANDLEBAR	72	R/BLK	CHARGE RELAY	ENGINE/CHASSIS
28	R/W	POWER POINT	R/W & BRN SPLICE SAVER	73	W/BLU	ENGINE/CHASSIS	CHASSIS RELAY
29	BLK	TETHER	IGNITION	74	BLK/BLU	ENGINE/CHASSIS	SPEED LIMIT
30	BRN	TETHER	IGNITION	75	R/W	CAPACITOR	R/W & BRN SPLICE SAVER
31	BLK	IGNITION	STOP SWITCH	76	BLK/BLU	STOP SWITCH	SPEED LIMIT
32	BRN	RIGHT HANDWARMER	LEFT HANDWARMER	77	BRN	CAPACITOR	GROUND
33	BLU/R	RIGHT HANDWARMER	LEFT HANDWARMER	78	R	PUMP PRIME	ENGINE/CHASSIS
34	OR/GRY	LEFT HANDLEBAR	THUMBWARMER	79	BRN	PUMP PRIME	FUEL PUMP
35	BLU/R	LEFT HANDLEBAR	RIGHT HANDWARMER	80	Y/R	TEST PLUG	ENGINE/CHASSIS
36	BLU	LEFT HANDLEBAR	RIGHT HANDWARMER	81	LT GRN/R	TEST PLUG	CHASSIS/HOOD #1
37	BLU	RIGHT HANDWARMER	LEFT HANDWARMER	82	-	-	-
38	BRN	RIGHT HANDWARMER	THUMBWARMER	83	BRN	FUEL PUMP	R/W & BRN SPLICE SAVER
39	BRN	POWER POINT	DIAGNOSTIC	84	BRN	ACCESSORY	R/W & BRN SPLICE SAVER
40	R/W	R/W & BRN SPLICE SAVER	DIAGNOSTIC	85	R/W	ACCESSORY	POWER POINT
41	Y/R	ENGINE/CHASSIS	CHASSIS/HOOD #1	86	-	-	-
42	BRN	ENGINE/CHASSIS	GROUND	87	OR	REGULATOR	TAILLIGHT
43	BLU/W	ENGINE/CHASSIS	CHASSIS/HOOD #1	88	-	-	-
44	GRY	ENGINE/CHASSIS	LEFT HANDLEBAR	89	-	-	-
45	W	ENGINE/CHASSIS	CHASSIS/HOOD #1	90	-	-	-

2006 TRAIL TOURING DELUXE  
CLASSIC 340  
SUPERSPORT  
CLASSIC 550  
TOURING 340  
TRAIL RMK

KOKUSAN	
STATOR COILS	RESISTANCE (±20%)
Y TO Y/R	0.16 OHMS
Y/R TO BRN	ZERO
BRN TO ENGINE	ZERO
BLK/R TO GRN	13 OHMS
R TO GRN	13 OHMS
R TO ENGINE	OPEN
BLK TO ENGINE	ZERO
W/R TO W	185 OHMS
W TO ENGINE	OPEN

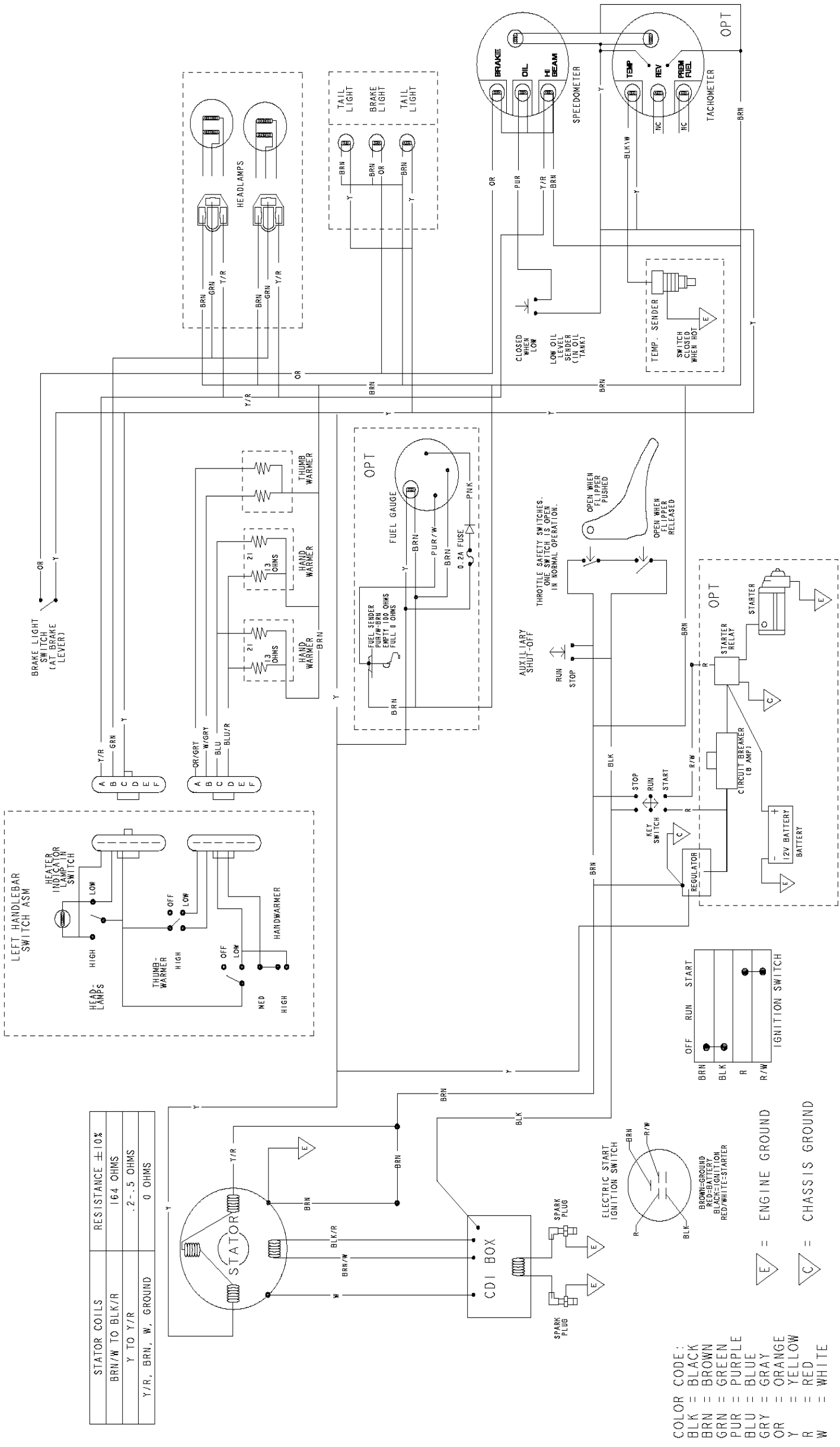


340/550 FUJI FAN ENGINE/CHASSIS



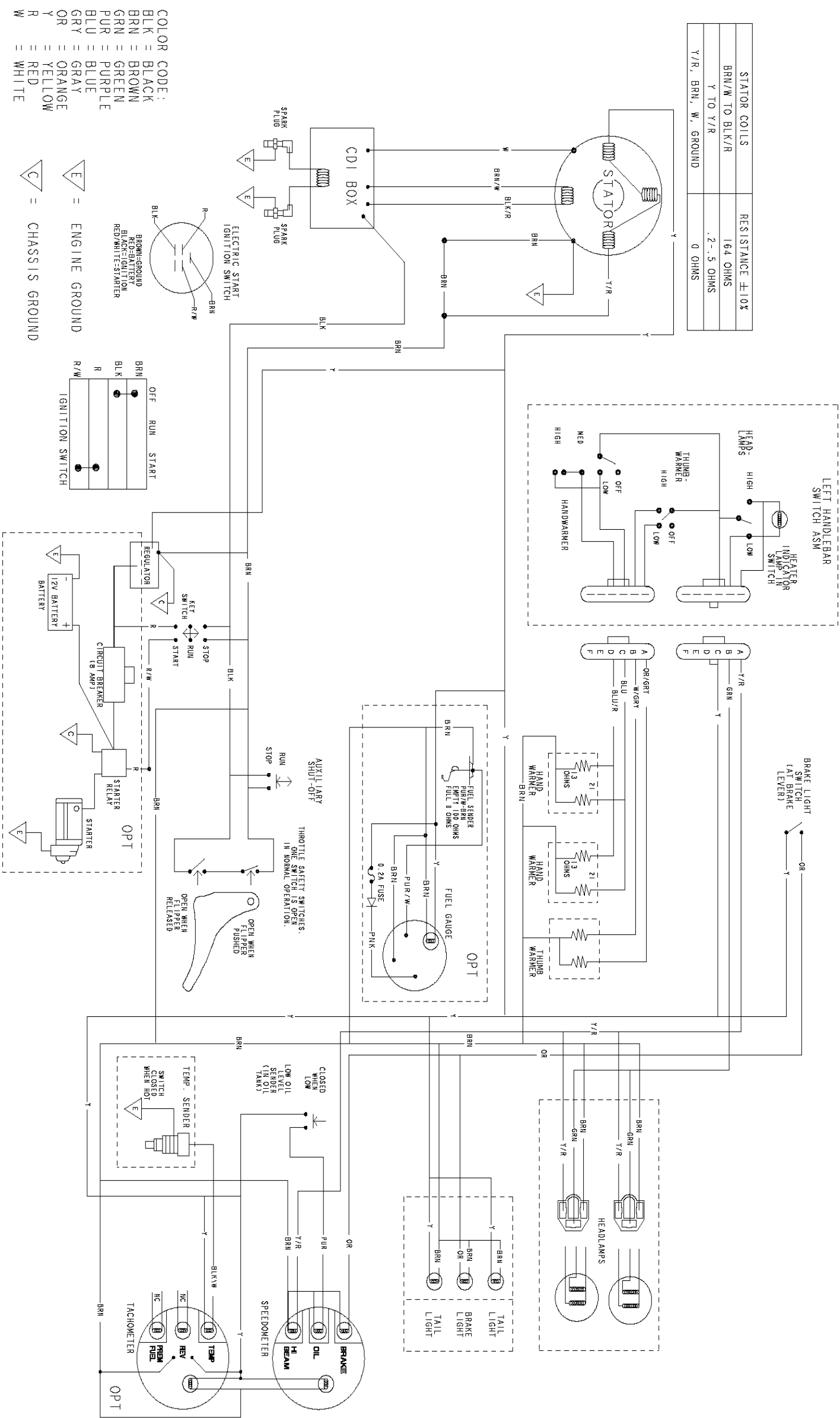
500 FUJI ENGINE/CHASSIS

2006 INDY 500  
2006 CLASSIC 500  
SNO-06\_FUJI-L1Q2



2006 INDY 500  
2006 CLASSIC 500  
SNO-06-FUJI-L102

STATOR COILS	RESISTANCE ±10%
BRN/W TO BLK/R	164 OHMS
Y TO Y/R	.2-.5 OHMS
Y/R, BRN, W, GROUND	0 OHMS

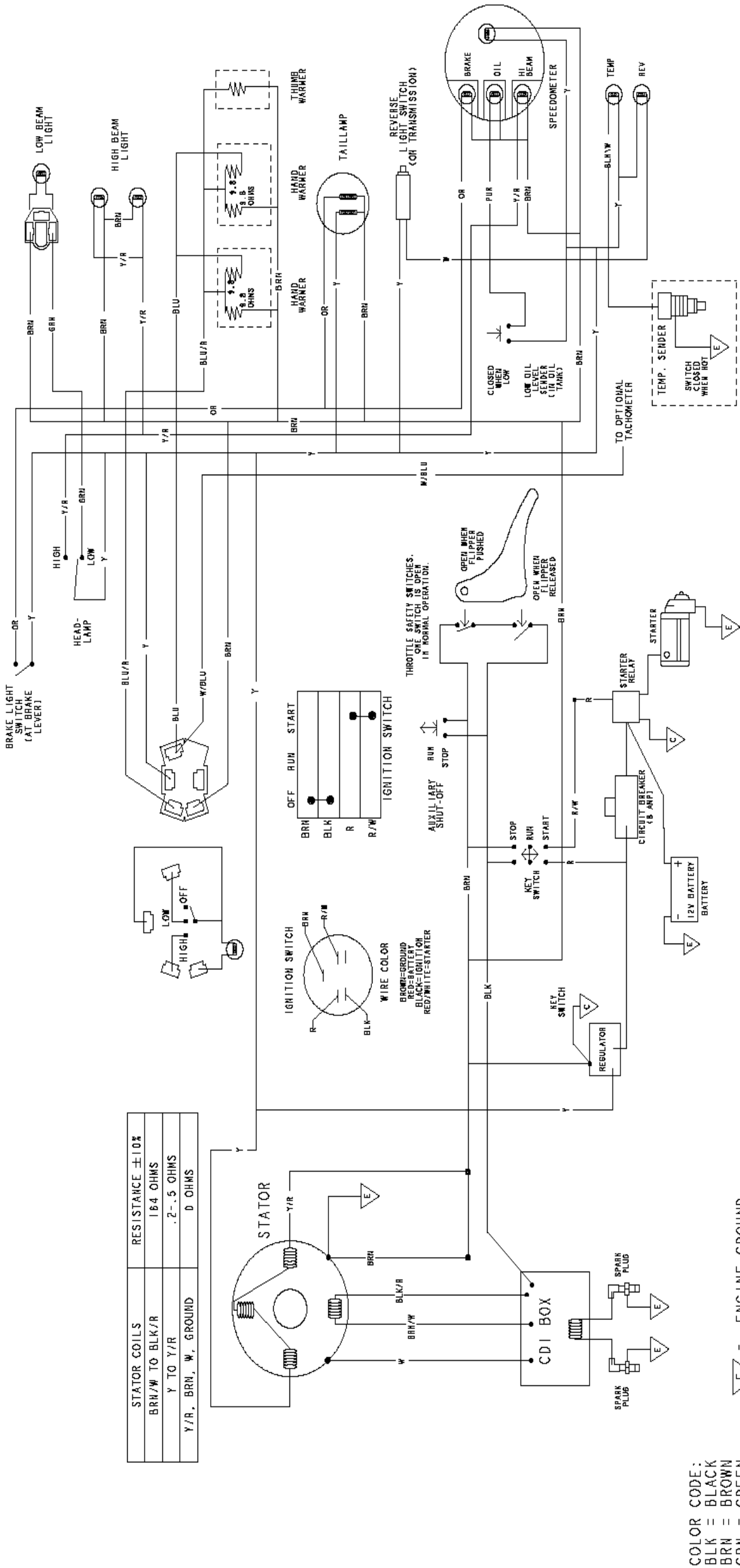


500/600 IBERTY ENGINE/CHASSIS



WIDETRAK ENGINE/CHASSIS

2006 WIDETRAK LX  
SNO-06\_WIDETRAK\_LX (MODEL NO: S06SU4BS)  
DRAFTED BY: K.ESPE 18-MAY-05  
APPROVED BY: B.TEUBNER 18-MAY-05



COLOR CODE:  
BLK = BLACK  
BRN = BROWN  
GRN = GREEN  
PUR = PURPLE  
BLU = BLUE  
GRY = GRAY  
OR = ORANGE  
Y = YELLOW  
R = RED  
W = WHITE

△ E = ENGINE GROUND  
△ C = CHASSIS GROUND

TWO COLOR WIRES ARE SHOWN WITH MAIN/TRACE COLORS. EXAMPLE: R/Y = RED WITH YELLOW TRACER

NC = SWITCH NORMALLY CLOSED  
NO = SWITCH NORMALLY OPEN