REPAIR PRO

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SECTION 1 - GENERAL INFORMATION

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Specifications*
(250)

VALVES AND GUIDES		
Valve Face Diameter	(intake) (exhaust)	33 mm (1.3 in.) 28 mm (1.1 in.)
Valve/Tappet Clearance (cold engine)	(intake) (exhaust)	0.03-0.08 mm (0.001-0.003 in.) 0.08-0.13 mm (0.003-0.005 in.)
Valve Guide/Stem Clearance	(intake) (exhaust)	0.010-0.037 mm (0.0004-0.0015 in.) 0.030-0.057 mm (0.0012-0.0024 in.)
Valve Guide/Valve Stem Deflection (wobble method)	(max)	0.35 mm (0.014 in.)
Valve Guide Inside Diameter		5.500-5.512 mm (0.2165-0.2170 in.)
Valve Stem Outside Diameter	(intake) (exhaust)	5.475-5.490 mm (0.2156-0.2161 in.) 5.455-5.470 mm (0.2148-0.2154 in.)
Valve Stem Runout	(max)	0.05 mm (0.002 in.)
Valve Head Thickness	(max)	0.5 mm (0.02 in.)
Valve Stem End Length	(max)	2.7 mm (0.11 in.)
Valve Face/Seat Width		0.9-1.1 mm (0.035-0.043 in.)
Valve Seat Angle	(intake) (exhaust)	45° 45°
Valve Face Radial Runout	(max)	0.03 mm (0.001 in.)
Valve Spring Free Length (max)	(inner) (outer)	35.1 mm (1.38 in.) 39.9 mm (1.57 in.)
Valve Spring Tension @ 32.5 mm (1.28 in.)	(inner)	7.1-9.2 kg (15.7-20.3 lb)
Valve Spring Tension @ 36.0 mm (1.42 in.)	(outer)	17.3-21.3 kg (38.1-47.0 lb)
CAMSHAFT AND CYLINDER HEAD		
Cam Lobe Height (min)	(intake) (exhaust)	33.820 mm (1.331 in.) 33.490 mm (1.318 in.)
Camshaft Journal Oil Clearance	(max)	0.15 mm (0.0059 in.)
Camshaft Journal Holder Inside Diameter		22.012-22.025 mm (0.8666-0.8671 in.)
Camshaft Journal Outside Diameter		21.959-21.980 mm (0.8645-0.8654 in.)
Camshaft Runout	(max)	0.10 mm (0.004 in.)
Rocker Arm Inside Diameter		12.000-12.018 mm (0.472-0.473 in.)
Rocker Arm Shaft Outside Diameter		11.977-11.995 mm (0.4715-0.4722 in.)
Cylinder Head Distortion	(max)	0.05 mm (0.002 in.)
Cylinder Head Cover Distortion	(max)	0.05 mm (0.002 in.)

CYLINDER, PISTON, AND RINGS		
Piston Skirt/Cylinder Clearance	(max)	0.12 mm (0.0047 in.)
Cylinder Bore	(max)	66 mm (2.598 in.)
Piston Diameter 18 mm (0.71 in.) from Skirt End		68.380 mm (2.6921 in.)
Piston Ring Free End Gap	(1st ring) (2nd ring)	6.2-7.8 mm (0.24-0.31 in.) 7.3-9.1 mm (0.29-0.36 in.)
Bore x Stroke		66 x 72 mm (2.60 x 2.84 in.)
Cylinder Trueness	(max)	0.05 mm (0.002 in.)
Piston Ring End Gap - Installed (max)	(1st ring) (2nd ring)	0.70 mm (0.0276 in.) 1.0 mm (0.039 in.)
Piston Ring to Groove Clearance (max)	(1st) (2nd)	0.180 mm (0.0071 in.) 0.150 mm (0.0059 in.)
Piston Ring Groove Width	(1st) (2nd) (oil)	1.01-1.04 mm (0.040-0.041 in.) 1.22-1.24 mm (0.048-0.049 in.) 2.01-2.03 mm (0.079-0.080 in.)
Piston Ring Thickness	(1st) (2nd)	0.97-0.99 mm (0.038-0.039 in.) 1.17-1.19 mm (0.046-0.047 in.)
Piston Pin Bore	(max)	17.03 mm (0.6705 in.)
Piston Pin Outside Diameter	(min)	16.98 mm (0.6685 in.)
CRANKSHAFT		
Connecting Rod (small end inside diameter)	(max)	17.040 mm (0.6709 in.)
Connecting Rod (big end side-to-side)		0.1-1.0 mm (0.004-0.039 in.)
Connecting Rod (big end width)		17.95-18.00 mm (0.707-0.709 in.)
Connecting Rod (small end deflection)	(max)	3 mm (0.12 in.)
Crankshaft (web-to-web)		54.9-55.1 mm (2.161-2.169 in.)
Crankshaft Runout (max)	(left) (right)	0.05 mm (0.002 in.) 0.08 mm (0.003 in.)
Oil Pump Reduction Ratio		1.566 (47/30)
Oil Pressure at 60°C (140°F) @3000 RPM	(above) (below)	0.7 kg/cm² (10 psi) 2.8 kg/cm² (40 psi)

CLUTCH	
Clutch Release Screw	1/8 turn back
Drive Plate (fiber) Thickness (min)	2.42 mm (0.094 in.)
Drive Plate (fiber) Tab (min)	11 mm (0.43 in.)
Driven Plate (warpage) (max)	0.1 mm (0.004 in.)
Clutch Spring Length (min)	27.5 mm (1.08 in.)
Clutch Wheel Inside Diameter (max)	Scuffing of contact surface
Starter Clutch Shoe	No groove at any part
Clutch Engagement RPM	1900 ± 200
Clutch Lock-Up RPM	3400 ± 300
Primary Reduction Ratio	3.150 (63/20)
Secondary Reduction Ratio	1.125 (18/16)
Final Reduction Ratio (front) (rear)	3.090 (34/11) 3.647 (62/17)
Secondary Transmission Reduction Ratio (super low) (low) (high)	3.176 (17/18 x 25/11 x 37/25) 1.480 (37/25) 1.112 (11/25 x 18/17 x 43/18)
Gear Ratios (1st) (2nd) (3rd) (4th) (5th) (reverse)	3.083 (37/12) 1.933 (29/15) 1.388 (25/18) 1.095 (23/21) 0.913 (21/23) 2.833 (29/12 x 34/29)
Shift Fork To Groove (side clearance)	0.10-0.50 mm (0.004-0.020 in.)
Secondary Transmission Fork to Groove (side clearance)	0.05-0.50 mm (0.002-0.020 in.)
Reverse Fork to Groove (side clearance)	0.10-0.50 mm (0.004-0.020 in.)
Shift Fork Groove Width (#1, #2, & #3) (secondary transmission - #1 & #2) (reverse)	4.5-4.6 mm (0.177-0.181 in.) 5.45-5.55 mm (0.215-0.219 in.) 4.0-4.1 mm (0.157-0.161 in.)
Shift Fork Thickness (#1, #2, & #3) (secondary transmission-#1 & #2) (reverse)	4.3-4.4 mm (0.169-0.173 in.) 5.3-5.4 mm (0.209-0.213 in.) 3.8-3.9 mm (0.150-0.154 in.)
Engine Oil Thermo-Switch Operating Temperature (off↔on) (on↔off)	160°C (320°F) 140°C (284°F)
CARBURETOR	
Type	Keihin CVK32
Main Jet	138
Slow Jet	38
Pilot Screw Setting (turns)	1 3/4
Jet Needle	N8TT
Needle Jet	4.0/3.4
Idle RPM	1400-1600
Starter Jet	60
Float Arm Height	17 mm (0.7 in.)
Throttle Cable Free-Play (at lever)	3-6 mm (1/8-1/4 in.)

ELECTRICAL	
Ignition Timing	5° BTDC below 1800 RPM 35° BTDC above 3800 RPM
Spark Plug Type	NGK DR7EA
Spark Plug Gap	0.6-0.7 mm (0.024-0.028 in.)
Spark Plug Cap	8000-12,000 ohms
Ignition Coil Resistance (primary) (secondary)	0.1-0.5 ohm (terminal to ground) 5200-7800 ohms (high tension - plug cap removed - to ground)
Magneto Coil Resistance (trigger) (charging)	80-150 ohms (black/yellow to green/white) 0.1-1.0 ohm (yellow to yellow)
Magneto Output (approx)	220W @ 5000 RPM
CHASSIS	
Dry Weight (approx)	2x4 - 248 kg (545 lb) 4x4 - 263 kg (580 lb)
Length (overall)	202 cm (79.5 in.)
Height (overall)	114 cm (45 in.)
Width (overall)	114 cm (45 in.)
Suspension Travel	16.5 cm (6.5 in.)
Ground Clearance	20.3 cm (8.0 in.)
Brake Type	Hydraulic w/Brake Lever Lock and Mechanical Foot Brake
Wheelbase	127 cm (50 in.)
Tracking	89 cm (35 in.)
Tire Size	Front - AT23 x 8-12 Rear - AT24 x 9-12
Tire Inflation Pressure	0.35 kg/cm² (5 psi)
Turning Radius	3.0 m (9.85 ft)
MISCELLANY	
Gas Tank Capacity (rated)	17.98 L (4.75 U.S. gal.)
Reserve Capacity	2.46 L (0.65 U.S. gal.)
Engine Oil Capacity	3.9 L (4.1 U.S. qt)
Gasoline (recommended)	87 Octane Regular Unleaded
Engine Oil (recommended)	SAE 10W-40
Differential Capacity (front - 4x4)	275 ml (9.3 fl oz)
Differential Lubricant (front - 4x4)	SAE Approved 80W-90 Hypoid
Brake Fluid	DOT 4
Taillight/Brakelight	12V/5W/27W
Headlight	12V/27W (2)
Starting System	Electric w/Manual Recoil (Emergency)

* Specifications subject to change without notice.

Specifications*
(300)

VALVES AND GUIDES		
Valve Face Diameter	(intake) (exhaust)	33 mm (1.3 in.) 28 mm (1.1 in.)
Valve/Tappet Clearance (cold engine)	(intake) (exhaust)	0.03-0.08 mm (0.001-0.003 in.) 0.17-0.22 mm (0.007-0.009 in.)
Valve Guide/Stem Clearance	(intake) (exhaust)	0.010-0.037 mm (0.0004-0.0015 in.) 0.030-0.057 mm (0.0012-0.0024 in.)
Valve Guide/Valve Stem Deflection (wobble method)	(max)	0.35 mm (0.014 in.)
Valve Guide Inside Diameter		5.500-5.512 mm (0.2165-0.2170 in.)
Valve Stem Outside Diameter	(intake) (exhaust)	5.475-5.490 mm (0.2156-0.2161 in.) 5.455-5.470 mm (0.2148-0.2154 in.)
Valve Stem Runout	(max)	0.05 mm (0.002 in.)
Valve Head Thickness	(max)	0.5 mm (0.02 in.)
Valve Stem End Length	(max)	2.7 mm (0.11 in.)
Valve Face/Seat Width		0.9-1.1 mm (0.035-0.043 in.)
Valve Seat Angle	(intake) (exhaust)	45° 45°
Valve Face Radial Runout	(max)	0.03 mm (0.001 in.)
Valve Spring Free Length (max)	(inner) (outer)	35.1 mm (1.38 in.) 39.9 mm (1.57 in.)
Valve Spring Tension @ 32.5 mm (1.28 in.)	(inner)	7.1-9.2 kg (15.7-20.3 lb)
Valve Spring Tension @ 36.0 mm (1.42 in.)	(outer)	17.3-21.3 kg (38.1-47.0 lb)
CAMSHAFT AND CYLINDER HEAD		
Cam Lobe Height (min)	(intake) (exhaust)	33.820 mm (1.331 in.) 33.490 mm (1.318 in.)
Camshaft Journal Oil Clearance	(max)	0.15 mm (0.0059 in.)
Camshaft Journal Holder Inside Diameter		22.012-22.025 mm (0.8666-0.8671 in.)
Camshaft Journal Outside Diameter		21.959-21.980 mm (0.8645-0.8654 in.)
Camshaft Runout	(max)	0.10 mm (0.004 in.)
Rocker Arm Inside Diameter		12.000-12.018 mm (0.472-0.473 in.)
Rocker Arm Shaft Outside Diameter		11.977-11.995 mm (0.4715-0.4722 in.)
Cylinder Head Distortion	(max)	0.05 mm (0.002 in.)
Cylinder Head Cover Distortion	(max)	0.05 mm (0.002 in.)

CYLINDER, PISTON, AND RINGS		
Piston Skirt/Cylinder Clearance	(max)	0.12 mm (0.0047 in.)
Cylinder Bore	(max)	68.580 mm (2.700 in.)
Piston Diameter 18 mm (0.71 in.) from Skirt End		68.380 mm (2.6921 in.)
Piston Ring Free End Gap	(1st ring) (2nd ring)	6.2-7.8 mm (0.24-0.31 in.) 7.3-9.1 mm (0.29-0.36 in.)
Bore x Stroke		68.5 x 76 mm (2.69 x 2.99 in.)
Cylinder Trueness (max)		0.05 mm (0.002 in.)
Piston Ring End Gap - Installed (max)	(1st ring) (2nd ring)	0.70 mm (0.0276 in.) 1.0 mm (0.039 in.)
Piston Ring to Groove Clearance (max)	(1st) (2nd)	0.180 mm (0.0071 in.) 0.150 mm (0.0059 in.)
Piston Ring Groove Width	(1st) (2nd) (oil)	1.01-1.04 mm (0.040-0.041 in.) 1.22-1.24 mm (0.048-0.049 in.) 2.01-2.03 mm (0.079-0.080 in.)
Piston Ring Thickness	(1st) (2nd)	0.97-0.99 mm (0.038-0.039 in.) 1.17-1.19 mm (0.046-0.047 in.)
Piston Pin Bore	(max)	17.03 mm (0.6705 in.)
Piston Pin Outside Diameter	(min)	16.98 mm (0.6685 in.)
CRANKSHAFT		
Connecting Rod (small end inside diameter)	(max)	17.040 mm (0.6709 in.)
Connecting Rod (big end side-to-side)		0.1-1.0 mm (0.004-0.039 in.)
Connecting Rod (big end width)		17.95-18.00 mm (0.707-0.709 in.)
Connecting Rod (small end deflection)	(max)	3 mm (0.12 in.)
Crankshaft (web-to-web)		54.9-55.1 mm (2.161-2.169 in.)
Crankshaft Runout (max)	(left) (right)	0.05 mm (0.002 in.) 0.08 mm (0.003 in.)
Oil Pump Reduction Ratio		1.566 (47/30)
Oil Pressure at 60°C (140°F) @3000 RPM	(above) (below)	0.7 kg/cm² (10 psi) 2.8 kg/cm² (40 psi)

CLUTCH	
Clutch Release Screw	1/8 turn back
Drive Plate (fiber) Thickness (min)	2.42 mm (0.094 in.)
Drive Plate (fiber) Tab (min)	11 mm (0.43 in.)
Driven Plate (warpage) (max)	0.1 mm (0.004 in.)
Clutch Spring Length (min)	27.5 mm (1.08 in.)
Clutch Wheel Inside Diameter (max)	Scuffing of contact surface
Starter Clutch Shoe	No groove at any part
Clutch Engagement RPM	1900 ± 200
Clutch Lock-Up RPM	3400 ± 300
Primary Reduction Ratio	3.150 (63/20)
Secondary Reduction Ratio	1.125 (18/16)
Final Reduction Ratio (front) (rear)	3.090 (34/11) 3.647 (62/17)
Secondary-Transmission Reduction Ratio (super low) (low) (high)	3.176 (17/18 x 25/11 x 37/25) 1.480 (37/25) 1.112 (11/25 x 18/17 x 43/18)
Gear Ratios (1st) (2nd) (3rd) (4th) (5th) (reverse)	3.083 (37/12) 1.933 (29/15) 1.388 (25/18) 1.095 (23/21) 0.913 (21/23) 2.833 (29/12 x 34/29)
Engine Fork To Groove (side clearance)	0.10-0.50 mm (0.004-0.020 in.)
Secondary Transmission Fork to Groove (side clearance)	0.05-0.50 mm (0.002-0.020 in.)
Reverse Fork to Groove (side clearance)	0.10-0.50 mm (0.004-0.020 in.)
Shift Fork Groove Width (#1, #2, & #3) (secondary transmission-#1 & #2) (reverse)	4.5-4.6 mm (0.177-0.181 in.) 5.45-5.55 mm (0.215-0.219 in.) 4.0-4.1 mm (0.157-0.161 in.)
Shift Fork Thickness (#1, #2, & #3) (secondary transmission-#1 & #2) (reverse)	4.3-4.4 mm (0.169-0.173 in.) 5.3-5.4 mm (0.209-0.213 in.) 3.8-3.9 mm (0.150-0.154 in.)
Engine Oil Thermo-Switch Operating Temperature (off↔on) (on↔off)	160°C (320°F) 140°C (284°F)
CARBURETOR	
Type	Keihin CVK32
Main Jet	135
Slow Jet	38
Pilot Screw Setting (turns)	2 1/4
Jet Needle	N8TT
Needle Jet	4.0/3.4
Idle RPM	1400-1600
Starter Jet	65
Float Arm Height	17 mm (0.7 in.)
Throttle Cable Free-Play (at lever)	3-6 mm (1/8-1/4 in.)

ELECTRICAL	
Ignition Timing	5° BTDC @ 1800 RPM 30° BTDC @ 3800 RPM
Spark Plug Type	NGK DR7EA
Spark Plug Gap	0.6-0.7 mm (0.024-0.028 in.)
Spark Plug Cap	8000-12,000 ohms
Ignition Coil Resistance (primary) (secondary)	0.1-0.5 ohm (terminal to ground) 5200-7800 ohms (high tension - plug cap removed - to ground)
Magneto Coil Resistance (trigger) (charging)	80-150 ohms (black/yellow to green/white) 0.1-1.0 ohm (yellow to yellow)
Magneto Output (approx)	220W @ 5000 RPM
CHASSIS	
Dry Weight (approx)	2x4 - 250 kg (550 lb) 4x4 - 266 kg (585 lb)
Length (overall)	202 cm (79.5 in.)
Height (overall)	114 cm (45 in.)
Width (overall)	114 cm (45 in.)
Suspension Travel	16.5 cm (6.5 in.)
Ground Clearance	20.3 cm (8.0 in.)
Brake Type	Hydraulic w/Brake Lever Lock and Mechanical Foot Brake
Wheelbase	127 cm (50 in.)
Tracking	89 cm (35 in.)
Tire Size (2x4)	Front - AT23 x 8-12 Rear - AT25 x 10-12
Tire Size (4x4)	Front - AT24 x 9-12 Rear - AT25 x 10-12
Tire Inflation Pressure	0.35 kg/cm² (5 psi)
Turning Radius	2.7 m (8.9 ft)
MISCELLANY	
Gas Tank Capacity (rated)	17.98 L (4.75 U.S. gal.)
Reserve Capacity	2.46 L (0.65 U.S. gal.)
Differential Capacity (front - 4x4)	275 ml (9.3 fl oz)
Engine Oil Capacity	3.4 L (3.5 U.S. qt)
Gasoline (recommended)	87 Octane Regular Unleaded
Engine Oil (recommended)	SAE 10W-40
Differential Lubricant (front - 4x4)	SAE Approved 80W-90 Hypoid
Brake Fluid	DOT 4
Taillight/Brakelight	12V/5W/27W
Headlight	12V/27W (2)
Starting System	Electric w/Manual Recoil (Emergency)

* Specifications subject to change without notice.

Specifications*
(375)

VALVES AND GUIDES		
Valve Face Diameter	(intake) (exhaust)	30.6 mm (1.20 in.) 27.0 mm (1.06 in.)
Valve/Tappet Clearance (cold engine)	(intake) (exhaust)	0.05-0.10 mm (0.002-0.004 in.) 0.17-0.22 mm (0.007-0.009 in.)
Valve Guide/Stem Clearance	(intake) (exhaust)	0.010-0.037 mm (0.0004-0.0015 in.) 0.030-0.057 mm (0.0012-0.0022 in.)
Valve Guide/Valve Stem Deflection (wobble method)	(max)	0.35 mm (0.014 in.)
Valve Guide Inside Diameter		5.000-5.012 mm (0.1969-0.1973 in.)
Valve Stem Outside Diameter	(intake) (exhaust)	4.975-4.990 mm (0.1959-0.1965 in.) 4.955-4.970 mm (0.1951-0.1957 in.)
Valve Stem Runout	(max)	0.05 mm (0.002 in.)
Valve Head Thickness	(max)	0.5 mm (0.02 in.)
Valve Stem End Length	(max)	2.3 mm (0.09 in.)
Valve Face/Seat Width		0.9-1.1 mm (0.035-0.043 in.)
Valve Seat Angle	(intake) (exhaust)	45° 45°
Valve Face Radial Runout	(max)	0.03 mm (0.001 in.)
Valve Spring Free Length (max)	(inner) (outer)	35.1 mm (1.38 in.) 37.8 mm (1.49 in.)
Valve Spring Tension @ 28 mm (1.10 in.)	(inner)	5.4-6.4 kg (12-14 lb)
Valve Spring Tension @ 31.5 mm (1.24 in.)	(outer)	13.2-15.0 kg (29-33 lb)

CAMSHAFT AND CYLINDER HEAD		
Cam Lobe Height (min)	(intake) (exhaust)	32.830 mm (1.293 in.) 32.830 mm (1.293 in.)
Camshaft Journal Oil Clearance	(max)	0.15 mm (0.0059 in.)
Camshaft Journal Holder Inside Diameter	(right & center) (left)	22.012-22.025 mm (0.8666-0.8671 in.) 17.512-17.525 mm (0.6894-0.6900 in.)
Camshaft Journal Outside Diameter	(right & center) (left)	21.959-21.980 mm (0.8645-0.8654 in.) 17.466-17.484 mm (0.6876-0.6883 in.)
Camshaft Runout	(max)	0.10 mm (0.004 in.)
Rocker Arm Inside Diameter		12.000-12.018 mm (0.472-0.473 in.)
Rocker Arm Shaft Outside Diameter		11.973-11.984 mm (0.4714-0.4718 in.)
Cylinder Head Distortion	(max)	0.05 mm (0.002 in.)
Cylinder Head Cover Distortion	(max)	0.05 mm (0.002 in.)

CYLINDER, PISTON, AND RINGS		
Piston Skirt/Cylinder Clearance		0.065-0.075 mm (0.0026-0.0030 in.)
Cylinder Bore		82.000-82.015 mm (3.2283-3.2289 in.)
Piston Diameter 15 mm (0.6 in.) from Skirt End		81.930-81.945 mm (3.2256-3.2262 in.)
Piston Ring Free End Gap (max)	(1st ring) (2nd ring)	8.9 mm (0.3504 in.) 8.3 mm (0.3268 in.)
Bore x Stroke		82 x 71.2 mm (3.29 x 2.80 in.)
Cylinder Trueness	(max)	0.05 mm (0.002 in.)
Piston Ring End Gap - Installed (max)		0.50 mm (0.020 in.)
Piston Ring to Groove Clearance (max)	(1st) (2nd)	0.180 mm (0.0071 in.) 0.150 mm (0.0059 in.)
Piston Ring Groove Width	(1st) (2nd) (oil)	1.01-1.03 mm (0.0398-0.0406 in.) 1.01-1.03 mm (0.0398-0.0406 in.) 2.01-2.03 mm (0.0791-0.0799 in.)
Piston Ring Thickness	(1st) (2nd)	0.97-0.99 mm (0.0381-0.0389 in.) 0.97-0.99 mm (0.0381-0.0389 in.)
Piston Pin Bore	(max)	20.03 mm (0.789 in.)
Piston Pin Outside Diameter	(min)	19.98 mm (0.787 in.)

CRANKSHAFT		
Connecting Rod (small end inside diameter)	(max)	21.04 mm (0.8283 in.)
Connecting Rod (big end side-to-side)		0.1-1.0 mm (0.004-0.039 in.)
Connecting Rod (big end width)		21.95-22.00 mm (0.8642-0.8661 in.)
Connecting Rod (small end deflection)	(max)	3 mm (0.12 in.)
Crankshaft (web-to-web)		60.9-61.1 mm (2.398-2.406 in.)
Crankshaft Runout	(max)	0.08 mm (0.003 in.)
Oil Pump Reduction Ratio		1.59 (29/20)
Oil Pressure at 60°C (140°F) @3000 RPM	(above) (below)	1.53 kg/cm² (21.7 psi) 3.57 kg/cm² (50.8 psi)
Engine Oil Thermo-Switch Operating Temperature	(off↔on) (on↔off)	160°C (320°F) 140°C (284°F)

CARBURETOR	
Type	Keihin CVK32
Main Jet	150
Slow Jet	38
Pilot Screw Setting (turns)	2 1/8
Jet Needle	N8TV
Needle Jet	4.0/3.4
Idle RPM	1200-1350
Starter Jet	60
Float Arm Height	17 mm (0.7 in.)
Throttle Cable Free-Play (at lever)	3-6 mm (1/8-1/4 in.)

ELECTRICAL	
Ignition Timing	10° BTDC @ 3000 RPM
Spark Plug Type	NGK CR7E
Spark Plug Gap	0.7-0.8 mm (0.028-0.032 in.)
Spark Plug Cap	8000-12,000 ohms
Ignition Coil Resistance (primary) (secondary)	0.05-0.5 ohm (terminal to ground) 4000-9000 ohms (high tension - plug cap removed - to ground)
Magneto Coil Resistance (trigger) (source/charge) (charging)	130-250 ohms (green to blue) 0.03-1.2 ohms (yellow to white) 0.1-1.0 ohm (black to black)
Magneto Output (approx)	220W @ 5000 RPM
CHASSIS	
Dry Weight (approx)	2x4 - 274 kg (605 lb) 4x4 - 293 kg (645 lb)
Length (overall)	205 cm (81 in.)
Height (overall)	122 cm (48 in.)
Width (overall)	112 cm (44.25 in.)
Suspension Travel (front)	21.5 cm (8.45 in.)
Suspension Travel (rear)	18.2 cm (7.2 in.)
Ground Clearance	20.3 cm (8 in.)
Brake Type	Hydraulic w/Brake Lever Lock and Mechanical Foot Brake

CHASSIS (Cont)	
Wheelbase	127 cm (50 in.)
Wheel Stance	89 cm (35 in.)
Tire Size	Front - AT25 x 8-12 Rear - AT25 x 10-12
Tire Inflation Pressure (front)	0.32 kg/cm² (4.5 psi)
Tire Inflation Pressure (rear)	0.25 kg/cm² (3.5 psi)
Turning Radius	2.7 m (8.9 ft)
MISCELLANY	
Gas Tank Capacity (rated)	17.98 L (4.75 U.S. gal.)
Reserve Capacity	2.46 L (0.65 U.S. gal.)
Rear Drive Capacity	275 ml (9.3 fl oz)
Differential Capacity (front - 4x4)	275 ml (9.3 fl oz)
Engine Oil Capacity	3.08 L (3.25 U.S. qt)
Gasoline (recommended)	87 Octane Regular Unleaded
Engine Oil (recommended)	SAE 10W-40
Differential/Rear Drive Lubricant	SAE Approved 80W-90 Hypoid
Brake Fluid	DOT 4
Taillight/Brakelight	12V/5W/27W
Headlight	12V/27W (2)
Starting System	Electric w/Manual Recoil (Emergency)

* Specifications subject to change without notice.

Specifications*
(400)

VALVES AND GUIDES		
Valve Face Diameter	(intake) (exhaust)	30.6 mm (1.20 in.) 27.0 mm (1.06 in.)
Valve/Tappet Clearance (cold engine)	(intake) (exhaust)	0.05-0.10 mm (0.002-0.004 in.) 0.17-0.22 mm (0.007-0.009 in.)
Valve Guide/Stem Clearance	(intake) (exhaust)	0.010-0.037 mm (0.0004-0.0015 in.) 0.030-0.057 mm (0.0012-0.0022 in.)
Valve Guide/Valve Stem Deflection (wobble method)	(max)	0.35 mm (0.014 in.)
Valve Guide Inside Diameter		5.000-5.012 mm (0.1969-0.1973 in.)
Valve Stem Outside Diameter	(intake) (exhaust)	4.975-4.990 mm (0.1959-0.1965 in.) 4.955-4.970 mm (0.1951-0.1957 in.)
Valve Stem Runout	(max)	0.05 mm (0.002 in.)
Valve Head Thickness	(max)	0.5 mm (0.02 in.)
Valve Stem End Length	(max)	1.8 mm (0.07 in.)
Valve Face/Seat Width		0.9-1.1 mm (0.035-0.043 in.)
Valve Seat Angle	(intake) (exhaust)	45° 45°
Valve Face Radial Runout	(max)	0.03 mm (0.001 in.)
Valve Spring Free Length	(max) (inner) (outer)	 35.1 mm (1.38 in.) 37.8 mm (1.49 in.)
Valve Spring Tension @ 28 mm (1.10 in.)	(inner)	5.3-6.5 kg (11.7-14.3 lb)
Valve Spring Tension @ 31.5 mm (1.24 in.)	(outer)	13.1-15.1 kg (28.9-33.3 lb)

CAMSHAFT AND CYLINDER HEAD		
Cam Lobe Height (min)	(intake) (exhaust)	33.150 mm (1.305 in.) 33.220 mm (1.308 in.)
Camshaft Journal Oil Clearance	(max)	0.15 mm (0.0059 in.)
Camshaft Journal Holder Inside Diameter	(right & center) (left)	22.012-22.025 mm (0.8666-0.8671 in.) 17.512-17.525 mm (0.6894-0.6900 in.)
Camshaft Journal Outside Diameter	(right & center) (left)	21.959-21.980 mm (0.8645-0.8654 in.) 17.465-17.484 mm (0.6876-0.6883 in.)
Camshaft Runout	(max)	0.10 mm (0.004 in.)
Cam Chain Length	(max)	128.9 mm (5.07 in.)
Rocker Arm Inside Diameter		12.000-12.018 mm (0.472-0.473 in.)
Rocker Arm Shaft Outside Diameter		11.973-11.984 mm (0.4714-0.4718 in.)
Cylinder Head Distortion	(max)	0.05 mm (0.002 in.)
Cylinder Head Cover Distortion	(max)	0.05 mm (0.002 in.)

CYLINDER, PISTON, AND RINGS		
Piston Skirt/Cylinder Clearance		0.045-0.120 mm (0.0018-0.0047 in.)
Cylinder Bore		84.000-84.085 mm (3.3071-3.3104 in.)
Piston Diameter 15 mm (0.6 in.) from Skirt End		83.880-83.965 mm (3.3024-3.3057 in.)
Piston Ring Free End Gap (approx)	(1st ring) (2nd ring)	8.4-10.5 mm (0.33-0.41 in.) 9.5-11.8 mm (0.37-0.46 in.)
Bore x Stroke		84 x 67 mm (3.30 x 2.64 in.)
Cylinder Trueness	(max)	0.05 mm (0.002 in.)
Piston Ring End Gap - Installed	(max)	0.50 mm (0.020 in.)
Piston Ring to Groove Clearance	(1st) (2nd)	0.180 mm (0.0071 in.) 0.150 mm (0.0059 in.)
Piston Ring Groove Width	(1st) (2nd) (oil)	1.21-1.23 mm (0.0476-0.0484 in.) 1.21-1.23 mm (0.0476-0.0484 in.) 2.51-2.53 mm (0.0988-0.0996 in.)
Piston Ring Thickness	(1st) (2nd)	1.17-1.19 mm (0.046-0.047 in.) 1.17-1.19 mm (0.046-0.047 in.)
Piston Pin Bore	(max)	21.03 mm (0.828 in.)
Piston Pin Outside Diameter	(min)	20.98 mm (0.826 in.)

CRANKSHAFT		
Connecting Rod (small end inside diameter)	(max)	21.04 mm (0.8283 in.)
Connecting Rod (big end side-to-side)		0.1-1.0 mm (0.004-0.039 in.)
Connecting Rod (big end width)		25.95-26.00 mm (1.022-1.024 in.)
Connecting Rod (small end deflection)	(max)	3 mm (0.12 in.)
Crankshaft (web-to-web)		70.9-71.1 mm (2.796-2.804 in.)
Crankshaft Runout	(max)	0.05 mm (0.002 in.)
Oil Pump Reduction Ratio		1.45 (29/20)
Oil Pressure at 60°C (140°F) @3000 RPM	(above) (below)	1.3 kg/cm² (18 psi) 1.7 kg/cm² (24 psi)

CLUTCH	
Clutch Release Screw	1/8 turn back
Drive Plate (fiber) Thickness (min)	2.62 mm (0.103 in.)
Drive Plate (fiber) Tab	13-14 mm (0.50-0.55 in.)
Driven Plate (warpage) (max)	0.1 mm (0.004 in.)
Clutch Spring Length (min)	33.7 mm (1.33 in.)
Clutch Wheel Inside Diameter	139.8-140.2 mm (5.504-5.520 in.)
Clutch Shoe	No groove at any part
Clutch Engagement RPM	1700 ± 200
Clutch Lock-Up RPM	3500 ± 300
Primary Reduction Ratio	2.392 (67/28)
Secondary Reduction Ratio	1.133 (17/15)
Final Reduction Ratio (front) (rear)	3.6 (36/10) 3.6 (36/10)
Secondary-Transmission (low) Reduction Ratio (high)	2.363 (22/23 x 28/17 x 42/ 28) 1.5 (42/28)
Gear Ratios (1st) (2nd) (3rd) (4th) (5th) (reverse)	3.09 (34/11) 1.75 (28/16) 1.2 (24/20) 0.956 (22/23) 0.8 (20/25) 2.636 (24/11 x 29/24)
Engine Fork To Groove (side clearance)	0.1-0.3 mm (0.004-0.012 in.)
Secondary Transmission Fork (max) to Groove (side clearance)	0.2 mm (0.008 in.)
Reverse Fork to Groove (max) (side clearance)	0.3 mm (0.012 in.)
Shift Fork Groove (#1 and #2) Width (secondary transmission) (reverse)	5.5-5.6 mm (0.217-0.220 in.) 5.4-5.5 mm (0.213-0.217 in.) 5.0-5.1 mm (0.197-0.201 in.)
Shift Fork Thickness (#1 and #2) (secondary transmission) (reverse)	5.3-5.4 mm (0.209-0.213 in.) 5.3-5.4 mm (0.209-0.213 in.) 4.8-4.9 mm (0.189-0.193 in.)
Thermostat Valve Opening Temperature	48.5-51.5°C (119.3-124.7°F)
Thermostat Valve Lift	Over 3 mm (0.12 in.) at 65°C (149°F)
Cooling Fan	Constant
Water Temperature (off↔on) Warning Light Switch	95°C (203°F)

CARBURETOR	
Type	Keihin CVK34
Main Jet	145
Slow Jet	38
Pilot Screw Setting (turns)	2 1/4
Jet Needle	N601
Needle Jet	6.0/4.0
Idle RPM	1400-1600
Starter Jet	90
Float Arm Height	17 mm (0.7 in.)
Throttle Cable Free-Play (at lever)	3-6 mm (1/8-1/4 in.)

ELECTRICAL	
Ignition Timing	10° BTDC @ 1500 RPM
Spark Plug Type	NGK CR6E
Spark Plug Gap	0.7-0.8 mm (0.028-0.032 in.)
Spark Plug Cap	8000-12,000 ohms
Ignition Coil Resistance (primary) (secondary)	0.1-1.0 ohm (terminal to ground) 4500-10,000 ohms (high tension - plug cap removed - to ground)
Magneto Coil Resistance (trigger) (source/charge) (charging)	150-300 ohms (green to blue) 0.05-1.0 ohm (yellow to white) 0.1-1.0 ohm (black to black)
Magneto Output (approx)	325 W @ 5000 RPM

CHASSIS	
Dry Weight (approx)	2x4 - 277 kg (611 lb) 4x4 - 295 kg (651 lb)
Length (overall)	205 cm (81 in.)
Height (overall)	122 cm (48 in.)
Width (overall)	112 cm (44.25 in.)
Suspension Travel (front)	21.5 cm (8.45 in.)
Suspension Travel (rear)	18.2 cm (7.2 in.)
Ground Clearance	20.3 cm (8 in.)
Brake Type	Hydraulic w/Brake Lever Lock and Mechanical Foot Brake
Wheelbase	127 cm (50 in.)
Wheel Stance	89 cm (35 in.)
Tire Size	Front - AT25 x 8-12 Rear - AT25 x 10-12
Tire Inflation Pressure (front)	0.32 kg/cm² (4.5 psi)
Tire Inflation Pressure (rear)	0.25 kg/cm² (3.5 psi)
Turning Radius	2.7 m (8.9 ft)

MISCELLANY	
Gas Tank Capacity (rated)	17.98 L (4.75 U.S. gal.)
Reserve Capacity	2.46 L (0.65 U.S. gal.)
Coolant Capacity	2.9 L (3.0 U.S. qt)
Rear Drive Capacity	275 ml (9.3 fl oz)
Differential Capacity (front - 4x4)	275 ml (9.3 fl oz)
Engine Oil Capacity	3.08 L (3.25 U.S. qt)
Gasoline (recommended)	87 Octane Regular Unleaded
Engine Oil (recommended)	SAE 10W-40
Differential/Rear Drive Lubricant	SAE Approved 80W-90 Hypoid
Brake Fluid	DOT 4
Taillight/Brakelight	12V/5W/27W
Headlight	12V/27W (2)
Starting System	Electric w/Manual Recoil (Emergency)

* Specifications subject to change without notice.

Specifications*
(500 - Manual Transmission)

VALVES AND GUIDES		
Valve Face Diameter	(intake) (exhaust)	30.6 mm (1.20 in.) 27.0 mm (1.06 in.)
Valve/Tappet Clearance (cold engine)	(intake) (exhaust)	0.05-0.10 mm (0.002-0.004 in.) 0.17-0.22 mm (0.007-0.009 in.)
Valve Guide/Stem Clearance	(intake) (exhaust)	0.010-0.037 mm (0.0004-0.0015 in.) 0.030-0.057 mm (0.0012-0.0022 in.)
Valve Guide/Valve Stem Deflection (wobble method)	(max)	0.35 mm (0.014 in.)
Valve Guide Inside Diameter		5.000-5.012 mm (0.1969-0.1973 in.)
Valve Stem Outside Diameter	(intake) (exhaust)	4.975-4.990 mm (0.1959-0.1965 in.) 4.955-4.970 mm (0.1951-0.1957 in.)
Valve Stem Runout	(max)	0.05 mm (0.002 in.)
Valve Head Thickness	(max)	0.5 mm (0.02 in.)
Valve Stem End Length	(max)	1.8 mm (0.07 in.)
Valve Face/Seat Width		0.9-1.1 mm (0.035-0.043 in.)
Valve Seat Angle	(intake) (exhaust)	45° 45°
Valve Face Radial Runout	(max)	0.03 mm (0.001 in.)
Valve Spring Free Length	(max) (inner) (outer)	 35.1 mm (1.38 in.) 37.8 mm (1.49 in.)
Valve Spring Tension @ 28 mm (1.10 in.)	(inner)	5.3-6.5 kg (11.7-14.3 lb)
Valve Spring Tension @ 31.5 mm (1.24 in.)	(outer)	13.1-15.1 kg (28.9-33.3 lb)

CAMSHAFT AND CYLINDER HEAD		
Cam Lobe Height (min)	(intake) (exhaust)	33.150 mm (1.305 in.) 33.220 mm (1.308 in.)
Camshaft Journal Oil Clearance	(max)	0.15 mm (0.0059 in.)
Camshaft Journal Holder Inside Diameter	(right & center) (left)	22.012-22.025 mm (0.8666-0.8671 in.) 17.512-17.525 mm (0.6894-0.6900 in.)
Camshaft Journal Outside Diameter	(right & center) (left)	21.959-21.980 mm (0.8645-0.8654 in.) 17.465-17.484 mm (0.6876-0.6883 in.)
Camshaft Runout	(max)	0.10 mm (0.004 in.)
Cam Chain Length	(max)	128.9 mm (5.07 in.)
Rocker Arm Inside Diameter		12.000-12.018 mm (0.472-0.473 in.)
Rocker Arm Shaft Outside Diameter		11.973-11.984 mm (0.4714-0.4718 in.)
Cylinder Head Distortion	(max)	0.05 mm (0.002 in.)
Cylinder Head Cover Distortion	(max)	0.05 mm (0.002 in.)

CYLINDER, PISTON, AND RINGS		
Piston Skirt/Cylinder Clearance		0.038-0.076 mm (0.0015-0.0030 in.)
Cylinder Bore		87.500-87.515 mm (3.4448-3.4454 in.)
Piston Diameter 15 mm (0.6 in.) from Skirt End		87.465-87.470 mm (3.4435-3.4437 in.)
Piston Ring Free End Gap (max)	(1st ring) (2nd ring)	11.3 mm (0.4448 in.) 9.7 mm (0.3818 in.)
Bore x Stroke		87.5 x 82 mm (3.40 x 3.22 in.)
Cylinder Trueness	(max)	0.05 mm (0.002 in.)
Piston Ring End Gap - Installed (max)		0.70 mm (0.0276 in.)
Piston Ring to Groove Clearance (max)	(1st) (2nd)	0.180 mm (0.0071 in.) 0.150 mm (0.0059 in.)
Piston Ring Groove Width	(1st) (2nd) (oil)	1.01-1.03 mm (0.0397-0.0405 in.) 1.21-1.23 mm (0.0476-0.0484 in.) 2.51-2.53 mm (0.0988-0.0996 in.)
Piston Ring Thickness	(1st) (2nd)	0.97-0.99 mm (0.0382-0.0389 in.) 1.17-1.19 mm (0.046-0.047 in.)
Piston Pin Bore	(max)	23.03 mm (0.907 in.)
Piston Pin Outside Diameter	(min)	22.98 mm (0.905 in.)

CRANKSHAFT		
Connecting Rod (small end inside diameter)	(max)	23.04 mm (0.9070 in.)
Connecting Rod (big end side-to-side)		0.1-1.0 mm (0.004-0.039 in.)
Connecting Rod (big end width)		24.95-25.00 mm (0.9822-0.9842 in.)
Connecting Rod (small end deflection)	(max)	3 mm (0.12 in.)
Crankshaft (web-to-web)		70.9-71.1 mm (2.796-2.804 in.)
Crankshaft Runout (max)		0.08 mm (0.003 in.)
Oil Pump Reduction Ratio		1.45 (29/20)
Oil Pressure at 60°C (140°F) @3000 RPM	(above) (below)	1.3 kg/cm² (18 psi) 1.7 kg/cm² (24 psi)

CLUTCH	
Clutch Release Screw	1/4-1/2 turn back
Drive Plate (fiber) Thickness	2.92-3.08 mm (0.1149-0.1212 in.)
Drive Plate (fiber) Tab	13.05 mm (0.5137 in.)
Driven Plate (warpage) (max)	0.1 mm (0.004 in.)
Clutch Spring Length (min)	33.7 mm (1.33 in.)
Clutch Wheel Inside Diameter	140.0-140.2 mm (5.511-5.520 in.)
Clutch Shoe	No groove at any part
Clutch Engagement RPM	1700 ± 200
Clutch Lock-Up RPM	3600 ± 300
Primary Reduction Ratio	2.392 (67/28)
Secondary Reduction Ratio	1.133 (17/15)
Final Reduction Ratio (front/rear)	3.6 (36/10)
Secondary-Transmission Reduction Ratio (high) (low)	1.5 (42/28) 2.363 (22/23 x 28/17 x 42/28)
Gear Ratios (1st) (2nd) (3rd) (4th) (5th) (reverse)	3.09 (34/11) 1.75 (28/16) 1.2 (24/20) 0.956 (22/23) 0.8 (20/25) 2.636 (24/11 x 29/24)
Engine Fork To Groove (side clearance)	0.1-0.3 mm (0.004-0.012 in.)
Secondary Transmission Fork to Groove (side clearance) (max)	0.2 mm (0.008 in.)
Reverse Fork to Groove (side clearance) (max)	0.2 mm (0.008 in.)
Shift Fork Groove Width (#1 and #2) (secondary transmission) (reverse)	5.5-5.6 mm (0.217-0.220 in.) 5.4-5.5 mm (0.213-0.217 in.) 4.9-5.0 mm (0.193-0.197 in.)
Shift Fork Thickness (#1 and #2) (secondary transmission) (reverse)	5.3-5.4 mm (0.209-0.213 in.) 5.3-5.4 mm (0.209-0.213 in.) 4.8-4.9 mm (0.189-0.193 in.)
Thermostat Valve Opening Temperature	73.5-76.5°C (164-170°F)
Thermostat Valve Lift	Over 3 mm (0.12 in.) at 65°C (149°F)
Cooling Fan Thermo-Switch Operating Temperature (off↔on) (on↔off)	88-93°C (190-200°F) 81°C (177°F) (min)

CARBURETOR	
Type	Keihin CVK34
Main Jet	148
Slow Jet	38
Pilot Screw Setting (turns)	2 1/4
Jet Needle	N601
Needle Jet	6.0/4.0
Idle RPM	1200-1350
Starter Jet	102
Float Arm Height	17 mm (0.7 in.)
Throttle Cable Free-Play (at lever)	3-6 mm (1/8-1/4 in.)

ELECTRICAL	
Ignition Timing	10° BTDC @ 1500 RPM
Spark Plug Type	NGK CR6E
Spark Plug Gap	0.7-0.8 mm (0.028-0.032 in.)
Spark Plug Cap	8000-12,000 ohms
Ignition Coil Resistance (primary) (secondary)	0.1-1.0 ohm (terminal to ground) 4500-10,000 ohms (high tension - plug cap removed - to ground)
Magneto Coil Resistance (trigger) (source/charge) (charging)	150-300 ohms (green to blue) 0.05-1.0 ohm (yellow to white) 0.1-1.0 ohm (black to black)
Magneto Output (approx)	325W @ 5000 RPM

CHASSIS	
Dry Weight (approx)	295 kg (651 lb)
Length (overall)	205 cm (81 in.)
Height (overall)	122 cm (48 in.)
Width (overall)	112 cm (44.25 in.)
Suspension Travel (front)	21.5 cm (8.45 in.)
Suspension Travel (rear)	18.2 cm (7.2 in.)
Ground Clearance	20.3 cm (8 in.)
Brake Type	Hydraulic w/Brake Lever Lock and Mechanical Foot Brake
Wheelbase	127 cm (50 in.)
Tracking	89 cm (35 in.)
Tire Size	Front - AT25 x 8-12 Rear - AT25 x 10-12
Tire Inflation Pressure (front)	0.32 kg/cm² (4.5 psi)
Tire Inflation Pressure (rear)	0.25 kg/cm² (3.5 psi)
Turning Radius	2.7 m (8.9 ft)

MISCELLANY	
Gas Tank Capacity (rated)	17.98 L (4.75 U.S. gal.)
Reserve Capacity	2.46 L (0.65 U.S. gal.)
Coolant Capacity	2.9 L (3.0 U.S. qt)
Differential Capacity (front)	275 ml (9.3 fl oz)
Rear Drive Capacity	275 ml (9.3 fl oz)
Engine Oil Capacity	3.4 L (3.5 U.S. qt)
Gasoline (recommended)	87 Octane Regular Unleaded
Engine Oil (recommended)	SAE 10W-40
Differential/Rear Drive Lubricant	SAE Approved 80W-90 Hypoid
Brake Fluid	DOT 4
Taillight/Brakelight	12V/5W/27W
Headlight	12V/27W (2)
Starting System	Electric w/Manual Recoil (Emergency)

* Specifications subject to change without notice.

Specifications*
(500 - Automatic Transmission)

VALVES AND GUIDES		
Valve Face Diameter	(intake) (exhaust)	30.6 mm (1.20 in.) 27.0 mm (1.06 in.)
Valve/Tappet Clearance (cold engine)	(intake) (exhaust)	0.05-0.10 mm (0.002-0.004 in.) 0.17-0.22 mm (0.007-0.009 in.)
Valve Guide/ Stem Clearance	(intake) (exhaust)	0.010-0.037 mm (0.0004-0.0015 in.) 0.030-0.057 mm (0.0012-0.0022 in.)
Valve Guide/Valve Stem Deflection (wobble method)	(max)	0.35 mm (0.014 in.)
Valve Guide Inside Diameter		5.000-5.012 mm (0.1969-0.1973 in.)
Valve Stem Outside Diameter	(intake) (exhaust)	4.975-4.990 mm (0.1959-0.1965 in.) 4.955-4.970 mm (0.1951-0.1957 in.)
Valve Stem Runout	(max)	0.05 mm (0.002 in.)
Valve Head Thickness	(max)	0.5 mm (0.02 in.)
Valve Stem End Length	(max)	1.8 mm (0.07 in.)
Valve Face/Seat Width		0.9-1.1 mm (0.035-0.043 in.)
Valve Seat Angle	(intake) (exhaust)	45° 45°
Valve Face Radial Runout	(max)	0.03 mm (0.001 in.)
Valve Spring Free Length (max)	(inner) (outer)	35.1 mm (1.38 in.) 37.8 mm (1.49 in.)
Valve Spring Tension @ 28 mm (1.10 in.)	(inner)	5.3-6.5 kg (11.7-14.3 lb)
Valve Spring Tension @ 31.5 mm (1.24 in.)	(outer)	13.1-15.1 kg (28.9-33.3 lb)

CAMSHAFT AND CYLINDER HEAD		
Cam Lobe Height (min)	(intake) (exhaust)	33.150 mm (1.305 in.) 33.220 mm (1.308 in.)
Camshaft Journal Oil Clearance	(max)	0.15 mm (0.0059 in.)
Camshaft Journal Holder Inside Diameter	(right & center) (left)	22.012-22.025 mm (0.8666-0.8671 in.) 17.512-17.525 mm (0.6894-0.6900 in.)
Camshaft Journal Outside Diameter	(right & center) (left)	21.959-21.980 mm (0.8645-0.8654 in.) 17.465-17.484 mm (0.6876-0.6883 in.)
Camshaft Runout	(max)	0.10 mm (0.004 in.)
Cam Chain Length	(max)	128.9 mm (5.07 in.)
Rocker Arm Inside Diameter		12.000-12.018 mm (0.472-0.473 in.)
Rocker Arm Shaft Outside Diameter		11.973-11.984 mm (0.4714-0.4718 in.)
Cylinder Head Distortion	(max)	0.05 mm (0.002 in.)
Cylinder Head Cover Distortion	(max)	0.05 mm (0.002 in.)

CYLINDER, PISTON, AND RINGS		
Piston Skirt/Cylinder Clearance		0.038-0.076 mm (0.0015-0.0030 in.)
Cylinder Bore		87.500-87.515 mm (3.4448-3.4454 in.)
Piston Diameter 15 mm (0.6 in.) from Skirt End		87.465-87.470 mm (3.4435-3.4437 in.)
Piston Ring Free End Gap (max)	(1st ring) (2nd ring)	11.3 mm (0.4448 in.) 9.7 mm (0.3818 in.)
Bore x Stroke		87.5 x 82 mm (3.40 x 3.22 in.)
Cylinder Trueness	(max)	0.05 mm (0.002 in.)
Piston Ring End Gap - Installed (max)		0.70 mm (0.0276 in.)
Piston Ring to Groove Clearance (max)	(1st) (2nd)	0.180 mm (0.0071 in.) 0.150 mm (0.0059 in.)
Piston Ring Groove Width	(1st) (2nd) (oil)	1.01-1.03 mm (0.0397-0.0405 in.) 1.21-1.23 mm (0.0476-0.0484 in.) 2.51-2.53 mm (0.0988-0.0996 in.)
Piston Ring Thickness	(1st) (2nd)	0.97-0.99 mm (0.0382-0.0389 in.) 1.17-1.19 mm (0.046-0.047 in.)
Piston Pin Bore	(max)	23.03 mm (0.907 in.)
Piston Pin Outside Diameter	(min)	22.98 mm (0.905 in.)

CRANKSHAFT		
Connecting Rod (small end inside diameter)	(max)	23.04 mm (0.9070 in.)
Connecting Rod (big end side-to-side)		0.1-1.0 mm (0.004-0.039 in.)
Connecting Rod (big end width)		24.95-25.00 mm (0.9822-0.9842 in.)
Connecting Rod (small end deflection)	(max)	3 mm (0.12 in.)
Crankshaft (web-to-web)		70.9-71.1 mm (2.796-2.804 in.)
Crankshaft Runout	(max)	0.08 mm (0.003 in.)
Oil Pump Reduction Ratio		1.45 (29/20)
Oil Pressure at 60°C (140°F) @3000 RPM	(above) (below)	1.9 kg/cm² (27 psi) 2.5 kg/cm² (36 psi)
Cooling Fan Thermo-Switch Operating Temperature	(off↔on) (on↔off)	88-93°C (190-200°F) 81°C (177°F) (min)

CARBURETOR	
Type	Keihin CVK34
Main Jet	148
Slow Jet	38
Pilot Screw Setting (turns)	2 1/4
Jet Needle	N601
Needle Jet	6.0/4.0
Idle RPM	1200-1350
Starter Jet	102
Float Arm Height	17 mm (0.7 in.)
Throttle Cable Free-Play (at lever)	3 -6 mm (1/8-1/4 in.)
ELECTRICAL	
Ignition Timing	10° BTDC @ 1500 RPM
Spark Plug Type	NGK CR6E
Spark Plug Gap	0.7-0.8 mm (0.028-0.032 in.)
Spark Plug Cap	8000-12,000 ohms
Ignition Coil Resistance (primary) (secondary)	0.1-1.0 ohm (terminal to ground) 4500-10,000 ohms (high tension - plug cap removed - to ground)
Magneto Coil Resistance (trigger) (source/charge) (charging)	150-300 ohms (green to blue) 0.05-1.0 ohm (yellow to white) 0.1-1.0 ohm (black to black)
Magneto Output (approx)	325W @ 5000 RPM

CHASSIS	
Dry Weight (approx)	300 kg (661 lb)
Length (overall)	205 cm (81 in.)
Height (overall)	122 cm (48 in.)
Width (overall)	112 cm (44.25 in.)
Suspension Travel (front)	21.5 cm (8.45 in.)
Suspension Travel (rear)	18.2 cm (7.2 in.)
Ground Clearance	20.3 cm (8 in.)
Brake Type	Hydraulic w/Brake Lever Lock and Mechanical Foot Brake
Wheelbase	127 cm (50 in.)
Tracking	89 cm (35 in.)
Tire Size	Front - AT25 x 8-12 Rear - AT25 x 10-12
Tire Inflation Pressure (front)	0.32 kg/cm² (4.5 psi)
Tire Inflation Pressure (rear)	0.25 kg/cm² (3.5 psi)
Turning Radius	2.7 m (8.9 ft)
MISCELLANY	
Gas Tank Capacity (rated)	17.98 L (4.75 U.S. gal.)
Reserve Capacity	2.46 L (0.65 U.S. gal.)
Coolant Capacity	2.9 L (3.0 U.S. qt)
Differential Capacity (front)	275 ml (9.3 fl oz)
Rear Drive Capacity	275 ml (9.3 fl oz)
Engine Oil Capacity	2.5 L (2.6 U.S. qt)
Gasoline (recommended)	87 Octane Regular Unleaded
Engine Oil (recommended)	SAE 10W-40
Differential/Rear Drive Lubricant	SAE Approved 80W-90 Hypoid
Brake Fluid	DOT 4
Taillight/Brakelight	12V/5W/27W
Headlight	12V/27W (2)
Starting System	Electric w/Manual Recoil (Emergency)

* Specifications subject to change without notice.

Break-In Procedure

A new ATV and an overhauled ATV engine require a "break-in" period. The first 10 hours (or 200 miles) are most critical to the life of this ATV. Proper operation during this break-in period will help assure maximum life and performance from the ATV.

During the first 10 hours (or 200 miles) of operation, always use less than 1/2 throttle. Varying the engine RPM during the break-in period allows the components to "load" (aiding the mating process) and then "unload" (allowing components to cool). Although it is essential to place some stress on the engine components during break-in, care should be taken not to overload the engine too often. Do not pull a trailer or carry heavy loads during the 10-hour break-in period.

When the engine starts, allow it to warm up properly. Idle the engine several minutes until the engine has reached normal operating temperature. Do not idle the engine for excessively long periods of time.

During the break-in period, a maximum of 1/2 throttle is recommended; however, brief full-throttle accelerations and variations in driving speeds contribute to good engine break-in.

During the break-in period (or whenever the brake pads are replaced), the hydraulic brake pads must be burnished. Slow disc-speed hydraulic brakes must be properly burnished in order to achieve maximum stopping power.

⚠ CAUTION

BRAKE PADS MUST BE BURNISHED TO ACHIEVE FULL BRAKING EFFECTIVENESS. Braking distance will be extended until brake pads are properly burnished.

TO PROPERLY BURNISH THE BRAKES, USE FOLLOWING PROCEDURE:

- **Choose an area sufficiently large to safely accelerate ATV to 30 mph and to brake to a stop.**
- **Accelerate to 30 mph; then compress brake lever to decelerate to 0-5 mph.**
- **Repeat procedure 5 times until brakes are burnished.**
- **This procedure burnishes the brake pads, stabilizes the pad material, and extends the life of the brake pads.**

⚠ WARNING

Do not attempt sudden stops or put the ATV into a situation where a sudden stop will be required until the brake pads are properly burnished.

■ **NOTE: Do not be reluctant to heat up the brake pads during the burnishing procedure.**

After the completion of the break-in period, the engine oil and oil filter should be changed. Other maintenance after break-in should include checking of all prescribed adjustments and tightening of all fasteners.

Gasoline - Oil - Lubricant

RECOMMENDED GASOLINE

The recommended gasoline to use is 87 minimum octane regular unleaded. In many areas, oxygenates (either ethanol or MTBE) are added to the gasoline. Oxygenated gasolines containing up to 10% ethanol, 5% methane, or 5% MTBE are acceptable gasolines.

When using ethanol blended gasoline, it is not necessary to add a gasoline antifreeze since ethanol will prevent the accumulation of moisture in the fuel system.

⚠ CAUTION

Do not use white gas. Only Arctic Cat approved gasoline additives should be used.

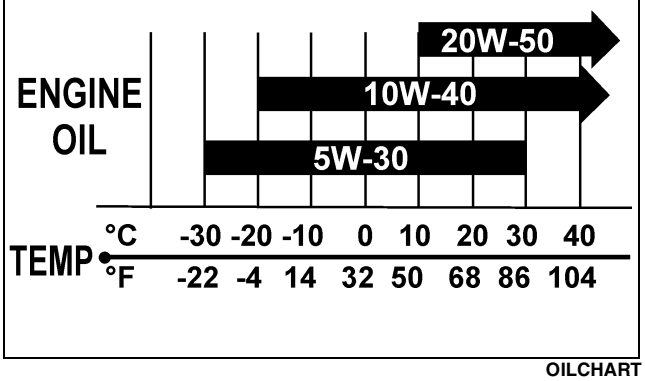
RECOMMENDED ENGINE/ TRANSMISSION OIL

⚠ CAUTION

Any oil used in place of the recommended oil could cause serious engine damage. Do not use oils which contain graphite or molybdenum additives. These oils can adversely affect clutch operation. Also, not recommended are racing, vegetable, non-detergent, and castor-based oils.

The recommended oil to use is Arctic Cat 4-Cycle Engine Oil (p/n 0436-005) or an equivalent oil which is rated SE, SF, or SG under API service classification. These oils meet all of the lubrication requirements of the Arctic Cat ATV engine. The recommended engine oil viscosity is SAE 10W-40. Ambient temperature should determine the correct weight of oil. See the following viscosity chart for details.

VISCOSITY CHART



OILCHART

RECOMMENDED FRONT DIFFERENTIAL/REAR DRIVE LUBRICANT

The recommended lubricant is Arctic Cat Gear Lube (p/n 0436-007) or an equivalent gear lube which is SAE approved 80W-90 hypoid. This lubricant meets all of the lubrication requirements of the Arctic Cat ATV front differentials and rear drives.

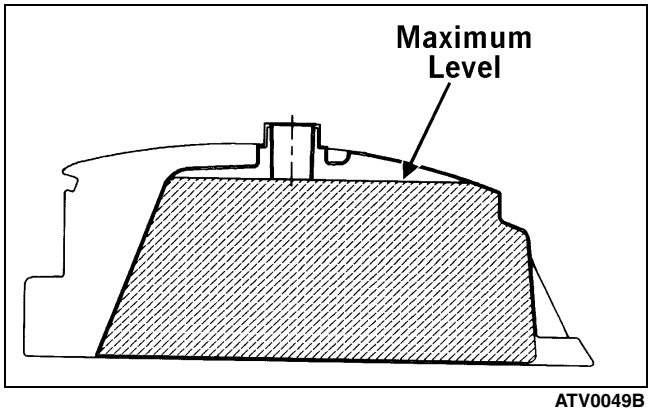
⚠ CAUTION

Any lubricant used in place of the recommended lubricant could cause serious front differential/ rear drive damage.

FILLING GAS TANK

⚠ WARNING

Always fill the gas tank in a well-ventilated area. Never add fuel to the ATV gas tank near any open flames or with the engine running. DO NOT SMOKE while filling the gas tank.



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Since gasoline expands as its temperature rises, the gas tank must be filled to its rated capacity only. Expansion room must be maintained in the tank particularly if the tank is filled with cold gasoline and then moved to a warm area.

⚠ WARNING

Do not overflow gasoline when filling the gas tank. A fire hazard could materialize. Always allow the engine to cool before filling the gas tank.

Tighten the gas tank cap securely after filling the tank.

⚠ WARNING

Do not over-fill the gas tank.

Genuine Parts

When replacement of parts is necessary, use only genuine Arctic Cat ATV parts. They are precision-made to ensure high quality and correct fit. Refer to the appropriate Illustrated Parts Manual for the correct part number, quantity, and description.

Load Capacity Ratings Chart

Arctic Cat ATV Load Capacity Ratings		
ITEM	Specifications	
	(lb)	(kg)*
Max Load Capacity	500	227
Front Rack (max)	100	45
Rear Rack (max)	200	90
Tongue Weight	35	16
Tongue and Rear Cargo Weight	200	90
Towing Capacity (max) - 250/300	850	386
Towing Capacity (max) - 375/400/500	1050	477

* Rounded off

ATV Load Capacity - Total weight of rider, tongue weight, and cargo on front and rear racks.

Tongue Weight - Weight on trailer tongue.

Accessory Weight - Winch, gun scabbard brackets, etc.

Tongue and Rear Cargo Weight - Total weight on trailer tongue and rear rack.

Towing Capacity - Total weight of trailer and all cargo in the trailer.

■ **NOTE: Tongue and accessory weight must be included as part of the front and rear rack weights.**

Loading and Accessories - Use extra caution when operating an ATV with additional loads such as accessories and/or cargo. Handling of the ATV may be adversely affected. Reduce speed when adding additional loads.

Preparation For Storage

⚠ CAUTION

Prior to storing the ATV, it must be properly serviced to prevent rusting and component deterioration.

Arctic Cat recommends the following procedure to prepare the ATV for storage.

1. Clean the seat cushion (cover and base) with a damp cloth and allow it to dry.
2. Clean the ATV thoroughly by washing dirt, oil, grass, and other foreign matter from the entire ATV. Allow the ATV to dry thoroughly. DO NOT get water into any part of the engine or air intake.
3. Either drain the gas tank or add Fuel Stabilizer (p/n 0638-165) to the gas in the gas tank. Remove the air filter housing cover and air filter. Start the engine and allow it to idle; then using Arctic Cat Engine Storage Preserver (p/n 0636-177), rapidly inject the preserver into the air filter opening for a period of 10 to 20 seconds; then stop the engine. Install the air filter and housing cover.
4. Drain the carburetor float chamber.
5. Plug the exhaust hole in the exhaust system with a clean cloth.
6. Apply light oil to the upper steering post bushing and plungers of the shock absorbers.
7. Tighten all nuts, bolts, cap screws, and screws. Make sure rivets holding components together are tight. Replace all loose rivets. Care must be taken that all calibrated nuts, cap screws, and bolts are tightened to specifications.
8. On liquid cooled models, fill the cooling system to the bottom of the stand pipe in the radiator neck with properly mixed coolant.
9. Clean the ATV thoroughly.
10. Disconnect the battery cables; then remove the battery, clean the battery posts and cables, and store in a clean, dry area.
11. Store the ATV indoors in a level position.

⚠ CAUTION

Avoid storing outside in direct sunlight and avoid using a plastic cover as moisture will collect on the ATV causing rusting.

Preparation After Storage

Taking the ATV out of storage and correctly preparing it will assure many miles and hours of trouble-free riding. Arctic Cat recommends the following procedure to prepare the ATV.

1. Clean the ATV thoroughly.
2. Clean the engine. Remove the cloth from the exhaust system.
3. Check all control wires and cables for signs of wear or fraying. Replace if necessary.
4. Change the engine/transmission oil and filter.
5. On liquid cooled models, check the coolant level and add properly mixed coolant as necessary.
6. Charge the battery; then install. Connect the battery cables.
7. Check the entire brake systems (fluid level, pads, etc.), all controls, headlights, taillight, brakelight, and headlight aim; adjust or replace as necessary.
8. Tighten all nuts, bolts, cap screws, and screws making sure all calibrated nuts, cap screws, and bolts are tightened to specifications.
9. Check tire pressure. Inflate to recommended pressure as necessary.
10. Make sure the steering moves freely and does not bind.
11. Check the spark plug. Clean or replace as necessary.
12. Inspect the air filter and air cleaner housing for obstructions.

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NOTES

SECTION 2 - PERIODIC MAINTENANCE/TUNE-UP

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Periodic Maintenance Chart

A = Adjust
C = Clean
D = Drain
I = Inspect
L = Lubricate
R = Replace

Item	Initial Service After Break-In (First Mo or 200 Mi)	Every Day	Every Month or Every 100 Miles	Every 3 Months or Every 300 Miles	Every 6 Months or Every 500 Miles	Every Year or Every 1500 Miles	As Needed
Battery	I		I				C
Fuses				I			R
Air Filter/Drain Tube	I	I	C*				R
Valve/Tappet Clearance	I				I		A
Engine Compression						I	
Spark Plug				I			R (4000 Mi or 18 Mo)
Muffler/Spark Arrester						C	R
Gas/Vent Hoses		I					C
Gas Tank Valve						I	C
Throttle Cable	I	I			C-L		A-R
Carb Float Chamber				D*			
Engine RPM (Idle)	I				I		A
Engine-Transmission Oil Level		I					A
Engine-Transmission Oil/Filter	R		I		R*		R
Oil Strainer	I				I		C
Front Differential/Rear Drive Lubricant	I		I	I	I	R	
Clutch	I				I		A
Tires				I			R
Steering Components	I	I		I			R
V-Belt	I				I		R
Suspension (Ball joint boots, drive axle boots front and rear, tie rods, differential and rear drive bellows)				I*			R
Nuts/Cap Screws/Screws	I			I	I		A
Ignition Timing						I	
Headlight/Taillight-Brakelight	I	I					R
Switches		I					R
Reverse Shift Lever					I		A-L
Choke Cable				I	C-L		R
Recoil Starter		I					C-R
Handlebar Grips		I					R
Handlebars		I					R
Gauges/Indicators		I					R
Frame/Welds/Racks			I		I		
Electrical Connections					I		C
Complete Brake System (Hydraulic & Mechanical)	I	I		C			L-R
Brake Pads	I			I*			R
Brake Fluid	I			I			R (2 Yrs)
Brake Hoses	I			I			R (4 Yrs)
Coolant/Cooling System	I		I				R (2 Yrs)

* Service/Inspect more frequently when operating in adverse conditions.

Lubrication Points

It is advisable to lubricate certain components periodically to ensure free movement. Apply light oil to the components using the following list as reference.

A. Throttle Lever Pivot/Cable Ends

B. Brake Lever Pivot/Cable Ends

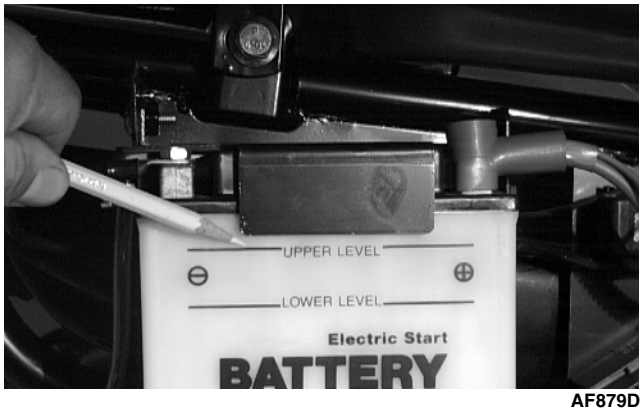
C. Mechanical Brake Cable Ends

D. Choke Cable Upper End

E. Reverse Lever Cable End

F. Idle RPM Screw (Carburetor)

Battery



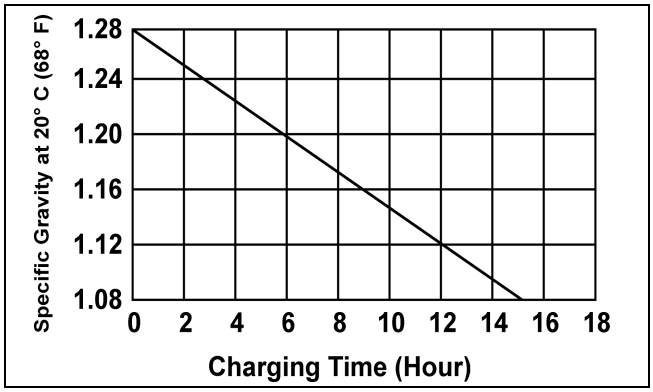
AF879D

The level of the battery fluid must be kept between the upper and lower level lines at all times. If the level drops below the lower level line, add only **distilled water** until it reaches upper level line.

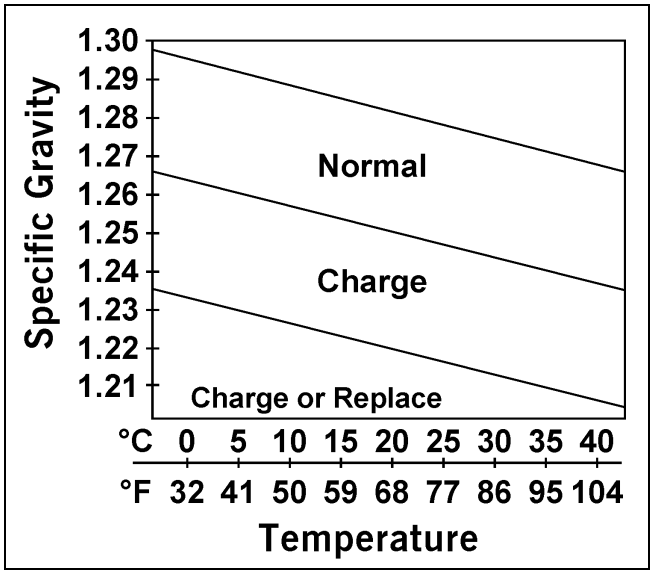
⚠ WARNING

Battery acid is harmful if it contacts eyes, skin, or clothing. Care must be taken whenever handling a battery.

If the battery is discharged, remove the battery from the ATV and charge the battery at the standard charging rate of 1.4A x 10 hr.



ChargTim



Charge

To remove and charge the battery, use the following procedure.

⚠ WARNING

Anytime service is performed on a battery, the following must be observed: keep sparks, open flame, cigarettes, or any other flame away. Always wear safety glasses. Protect skin and clothing when handling a battery. When servicing battery in enclosed space, keep the area well-ventilated. Make sure battery venting is not obstructed.

1. Remove the battery hold-down bracket.
2. Remove the negative battery cable; then remove the positive cable and the battery vent tube. Remove the battery from the ATV. Care should be taken not to damage the vent tube.

⚠ WARNING

Avoid spillage and contact with skin, eyes, and clothing.

⚠ CAUTION

Do not charge the battery while it is in the ATV with the battery terminals connected.

3. Remove the vent plugs; then (if necessary) fill the battery with **distilled water** to the upper level indicated on the battery.

4. Trickle charge the battery at 1.4 amps for 10 hours.

⚠ CAUTION

Never exceed the standard charging rate.

5. After charging, check fluid level and fill with distilled water as necessary; then install vent plugs.

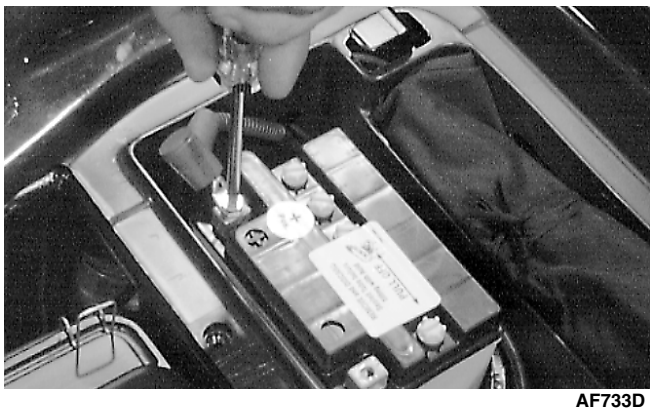
⚠ CAUTION

Before installing the battery, make sure the ignition switch is in the OFF position.

6. Place the battery into position in the ATV and secure with the hold-down bracket.

7. Attach the vent tube and check the vent tube to make sure it is not crimped or obstructed in any way and that it is properly routed through and secured to the frame.

8. Connect cables to the proper terminals: positive cable to the positive terminal (+) and negative cable to the negative terminal (-). Connect the negative cable last.



AF733D

⚠ CAUTION

Connecting cables in reverse (positive to negative and negative to positive) can cause serious damage to the electrical system.

Fuses

The main (30 Amp) fuse is located on the frame near the right rear tire and protected by a snap-on cover.

■ NOTE: To remove the fuse, compress the locking tabs on either side of the fuse case and lift out.

The remaining fuses are located under the center cover in the front fender assembly (on the 250/300) or under the seat in the battery compartment (on the 375/400/500).

If there is any type of electrical system failure, always check the fuses first.

⚠ CAUTION

Always replace a blown fuse with a fuse of the same type and rating.

Air Cleaner
(250/300)

The two-part air filter inside the air cleaner must be kept clean to provide good engine power and gas mileage. If the ATV is used under normal conditions, service the filter at the intervals specified. If operated in dusty, wet, or muddy conditions, inspect and service the filter more frequently.

CLEANING AND INSPECTING FILTER

⚠ CAUTION

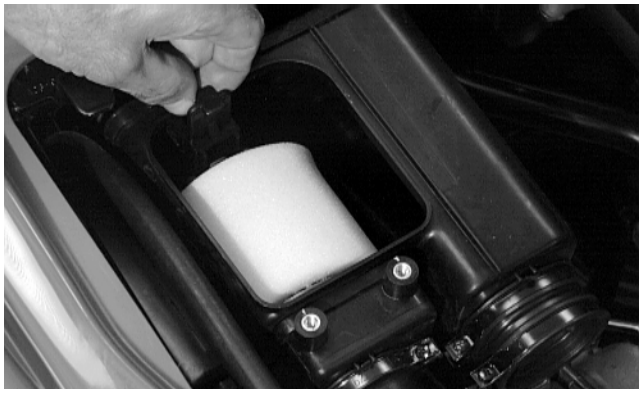
Failure to inspect the air filter frequently if the ATV is used in dusty, wet, or muddy conditions can damage the ATV engine.

1. Remove the seat.

2. Remove the two machine screws securing the air cleaner housing cover.

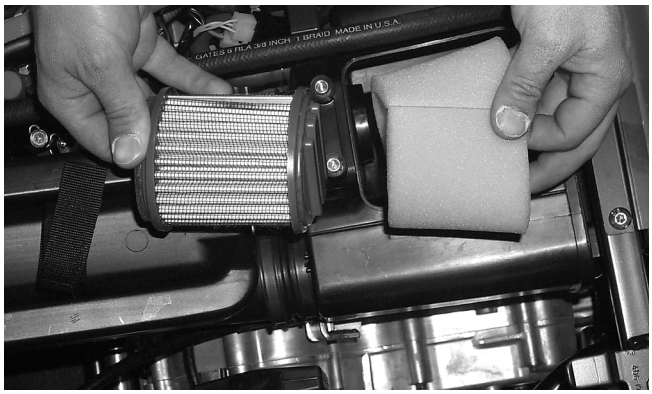
CH044D

3. Pull the retainer out and remove the filter with foam wrap.



CH045D

4. Remove the foam wrap from the filter.



AL642D

5. Wash the polyester filter and the foam wrap with warm soapy water and rinse.

6. Allow the foam wrap to air dry thoroughly.

■ **NOTE: Either allow the polyester filter to air dry or blow dry using low-pressure compressed air. Direct the compressed air through the filter from the opposite direction as normal operation air flow.**

⚠ CAUTION

Do not put oil on either the filter or the foam wrap.

7. Place the foam wrap around the air filter; then install the filter with wrap into the air cleaner making sure it is properly in position and properly seated and secure with the retainer.

CH046D

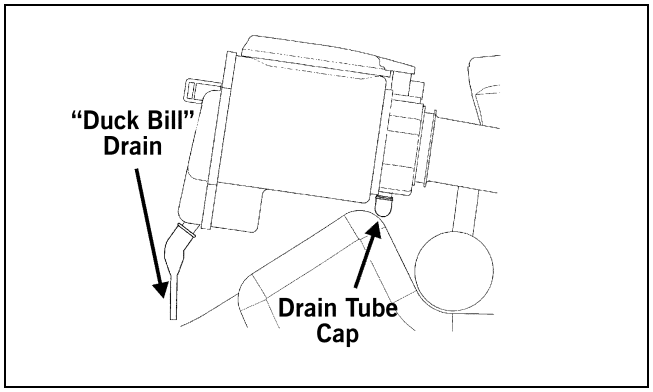
CH045D

8. Install the air cleaner housing cover and secure with the machine screws; then install the seat making sure the seat is properly secured.

CH044D

9. Check the drain tube for gasoline or oil accumulation. If noticed, remove the drain tube cap from beneath the cleaner, drain the gasoline or oil into a suitable container, and install and secure the tube cap.

10. Inspect “duck bill” drain beneath the air cleaner for debris and sealing.



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REMOVING AIR CLEANER

1. Remove the seat; then remove the air-intake snorkel.

CH040D

CH041D

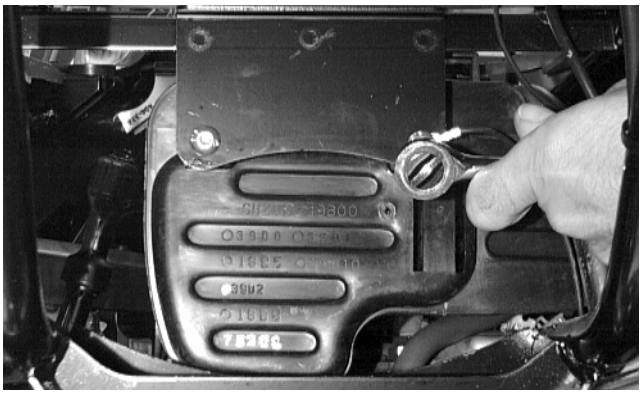
2. Remove the two machine screws securing the air cleaner housing cover.

CH044D

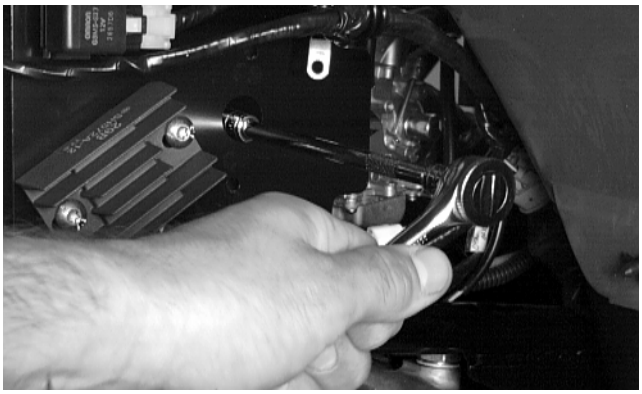
3. Pull the retainer out and remove the filter with foam wrap.

CH045D

4. Remove the machine screws securing the air cleaner to the frame.



CH047D

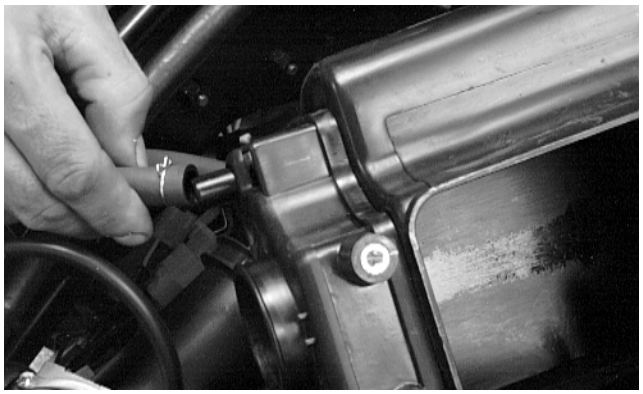


CH048D

5. Loosen the clamp securing the air cleaner to the carburetor boot.

CH049D

6. Remove the crankcase breather hose from the air cleaner.



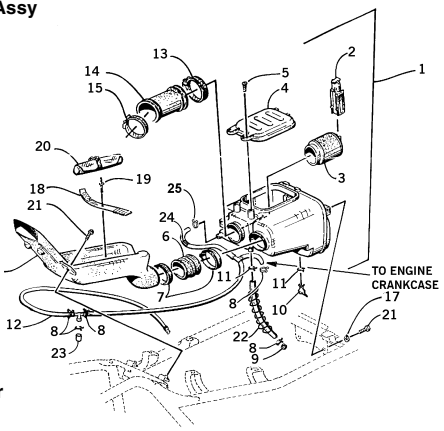
CH050D

7. Remove the air cleaner from the frame.

INSTALLING AIR CLEANER

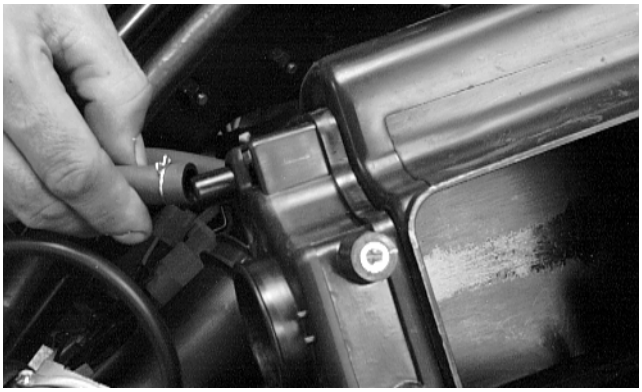
KEY

1. Air Cleaner Assy
2. Retainer
3. Filter
4. Cap
5. Cap Screw
6. Joint
7. Clamp
8. Clamp
9. Drain Plug
10. Valve
11. Clamp
12. Hose Assy
13. Clamp
14. Boot
15. Clamp
16. Snorkel
17. Lock Washer
18. Strap
19. Plug
20. Tool Kit
21. Cap Screw
22. Spring
23. Plug
24. Check Valve
25. Clip



0735-424

1. Place the air cleaner into the frame; then connect the crankcase breather hose.



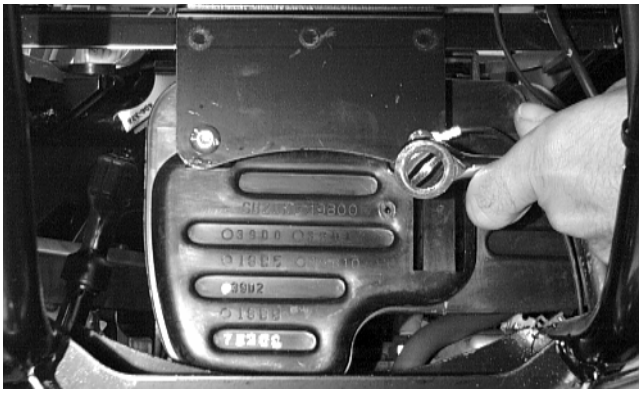
CH050D

2. Secure the carburetor boot to the air cleaner.

CH049D

3. Install the machine screws securing the air cleaner to the frame.

CH048D



CH047D

4. Install the filter with foam wrap into the air cleaner; then secure with the retainer.

CH045D

5. Install the air cleaner housing cover and secure with the machine screws.

CH044D

6. Install the air-intake snorkel.

CH041D

CH040D

7. Install the seat making sure it is properly secured.

Air Cleaner/Filter (375/400/500)

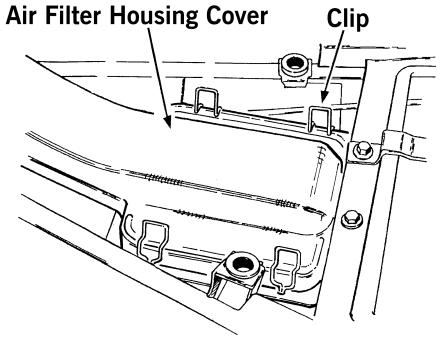
The air filter inside the air filter housing must be kept clean to provide good engine power and gas mileage. If the ATV is used under normal conditions, service the filter at the intervals specified. If operated in dusty, wet, or muddy conditions, inspect and service the filter more frequently. Use the following procedure to remove the filter and inspect and/or clean it.

CLEANING AND INSPECTING FILTER

⚠ CAUTION

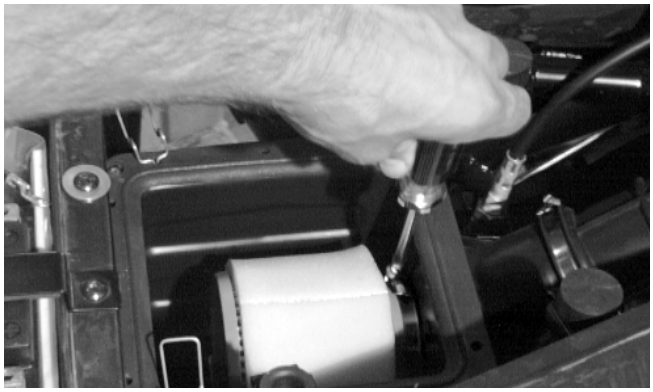
Failure to inspect the air filter frequently if the vehicle is used in dusty, wet, or muddy conditions can damage the engine.

1. Remove the seat.
2. Remove the air filter housing cover from the retaining clips.



733-444A

3. Loosen the clamp; then remove the filter.



AF640DA

CH046D

4. Fill a wash pan larger than the filter with a non-flammable cleaning solvent; then dip the filter in the solvent and wash it.

■ NOTE: Foam Filter Cleaner (p/n 0436-194) and Foam Filter Oil (p/n 0436-195) are available from Arctic Cat.

5. Dry the filter.

6. Put the filter in a plastic bag; then pour in air filter oil and work the filter.

⚠ CAUTION

A torn air filter can cause damage to the ATV engine. Dirt and dust may get inside the engine if the element is torn. Carefully examine the element for tears before and after cleaning it. Replace the element with a new one if it is torn.

7. Clean any dirt or debris from inside the air cleaner. Be sure no dirt enters the carburetor.

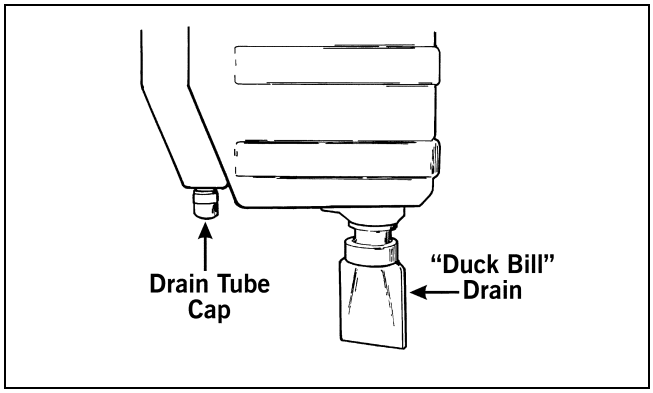
8. Place the filter in the air filter housing making sure it is properly in position and properly seated and secure with the clamp.

9. Install the air filter housing cover and secure with the retaining clips; then install the seat making sure the seat is properly secured.

CHECKING/DRAINING DRAIN TUBE

1. Periodically check the drain tube for gasoline or oil accumulation. If noticed, remove the drain tube cap from beneath the front housing, drain the gasoline or oil into a suitable container, and install and secure the tube cap.

2. Inspect "duck bill" drain beneath the main housing for debris and for proper sealing.



ATV-0087

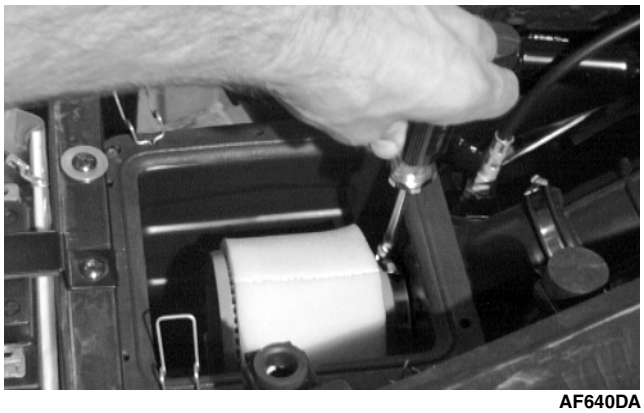
REMOVING AIR CLEANER

1. Remove the seat.

2. Remove the air cleaner cover from the retaining clips.

AL645D

3. Loosen the clamp and remove the filter.



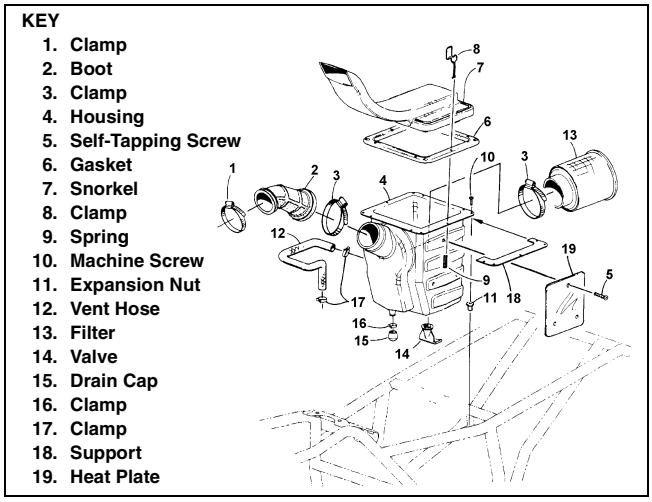
AF640DA

4. Loosen the clamp securing the air cleaner to the front boot; then loosen the clamp securing the air cleaner to the rear filter sleeve.

5. Remove the machine screws securing the air cleaner to the flange support and frame.

6. Remove the air cleaner from the frame.

INSTALLING



0735-595

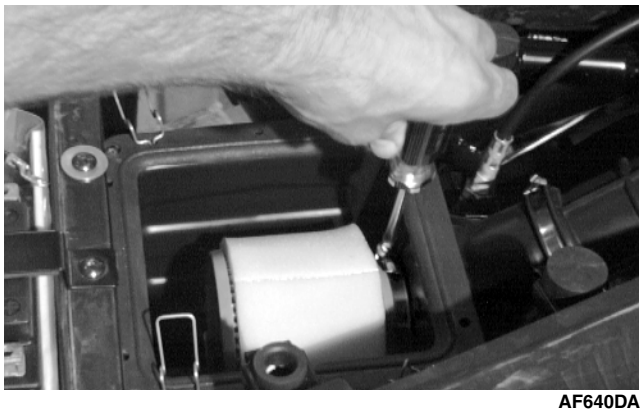
1. Place the air cleaner into the frame.

2. Install the machine screws securing the air cleaner to the flange support and frame.

3. Install the rear filter sleeve onto the air cleaner; then tighten the clamp securely.

4. Install the front boot onto the air cleaner; then tighten the clamp securely.

5. Install the filter with foam wrap into the air cleaner; then tighten the clamp securely.



AF640DA

6. Place the air cleaner cover into position and secure with the retaining clips.

AL645D

7. Install the seat making sure the seat is properly secured.

Valve/Tappet Clearance
(Feeler Gauge Procedure)

To check and adjust valve/tappet clearance, use the following procedure.

■ NOTE: On the 250/300, the seat and air-intake snorkel must be removed for this procedure.

■ NOTE: On the 375/400/500, the seat assembly, side panels, and gas tank must be removed for this procedure.

1. Remove the timing inspection plug; then remove the tappet covers (for more detailed information, see Section 3 - Servicing Top-Side Components).

2. Rotate the crankshaft to the TDC position on the compression stroke.

■ NOTE: At this point, the rocker arms and adjuster screws must not have pressure on them.

3. Using a feeler gauge, check each valve/tappet clearance. If clearance is not within specifications, loosen the jam nut and rotate the tappet adjuster screw until the clearance is within specifications. Tighten each jam nut securely after completing the adjustment.

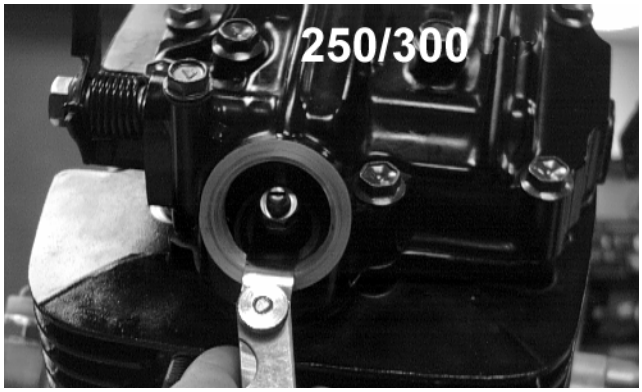
⚠ CAUTION

The feeler gauge must be positioned at the same angle as the valve and valve adjuster for an accurate measurement of clearance. Failure to measure the valve clearance accurately could cause valve component damage.

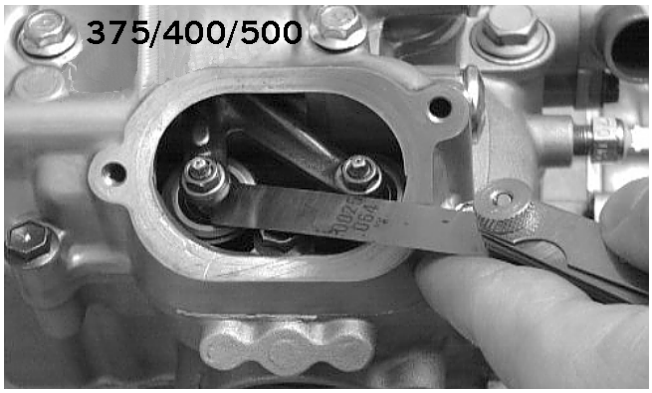
VALVE/TAPPET CLEARANCE (250)	
Intake	0.03-0.08 mm (0.001-0.003 in.)
Exhaust	0.08-0.13 mm (0.003-0.005 in.)

VALVE/TAPPET CLEARANCE (300)	
Intake	0.03-0.08 mm (0.001-0.003 in.)
Exhaust	0.17-0.22 mm (0.007-0.009 in.)

VALVE/TAPPET CLEARANCE (375/400/500)	
Intake	0.05-0.10 mm (0.002-0.004 in.)
Exhaust	0.17-0.22 mm (0.007-0.009 in.)



CC409DA



CC007DA

4. Install the timing inspection plug.
5. Place the two tappet covers into position making sure the proper cap screws are with the proper cover. Tighten the cap screws securely.

Valve/Tappet Clearance
(Valve Adjuster Procedure)

To check and adjust valve/tappet clearance, use the following procedure.

■ NOTE: On the 250/300, the seat and air-intake snorkel must be removed for this procedure.

■ NOTE: On the 375/400/500, the seat assembly, side panels, and gas tank must be removed for this procedure.

1. Remove the timing inspection plug; then remove the tappet covers (for more detailed information, see Section 3 - Servicing Top-Side Components).
2. Rotate the crankshaft to the TDC position on the compression stroke.

■ NOTE: At this point, the rocker arms and adjuster screws must not have pressure on them.

■ NOTE: Use Valve Gap Adjuster (p/n 0444-092) for the 250/300 or Valve Clearance Adjuster (p/n 0444-078) for the 375/400/500 for this procedure.

3. Place the valve adjuster onto the jam nut securing the tappet adjuster screw; then rotate the valve adjuster dial clockwise until the end is seated in the tappet adjuster screw.
4. While holding the valve adjuster dial in place, use the valve adjuster handle and loosen the jam nut; then rotate the tappet adjuster screw clockwise until friction is felt.
5. Align the valve adjuster handle with one of the marks on the valve adjuster dial.
6. While holding the valve adjuster handle in place, rotate the valve adjuster dial counterclockwise until proper valve/tappet clearance is attained.

■ NOTE: Refer to the appropriate Specifications for the proper valve/tappet clearance.

■ NOTE: Rotating the valve adjuster dial counter-clockwise will open the valve/tappet clearance by 0.05 mm (0.002 in.) per mark.

7. While holding the adjuster dial at the proper clearance setting, tighten the jam nut securely with the valve adjuster handle.
8. Place the two tappet covers with O-rings into position; then tighten the covers securely.

CC366D

9. Install the spark plug; then install the timing inspection plug.

CC411D

Testing Engine Compression

To test engine compression, use the following procedure.

1. Remove the high tension lead from the spark plug.
2. Using compressed air, blow any debris from around the spark plug.

⚠ WARNING

Always wear safety glasses when using compressed air.

3. Remove the spark plug; then attach the high tension lead to the plug and ground the plug on the cylinder head well away from the spark plug hole.
4. Attach the Compression Gauge (p/n 0444-096).

■ NOTE: The engine must be warm and the battery must be fully charged for this test.

5. While holding the throttle lever in the full-open position, crank the engine over with the electric starter until the gauge shows a peak reading (five to 10 compression strokes).

■ NOTE: For the 250/300, the compression should be within a range of 157.5-192.5 psi in the full-open throttle position. For the 375/400/500, the compression should be within a range of 63-77 psi in the full-open throttle position.

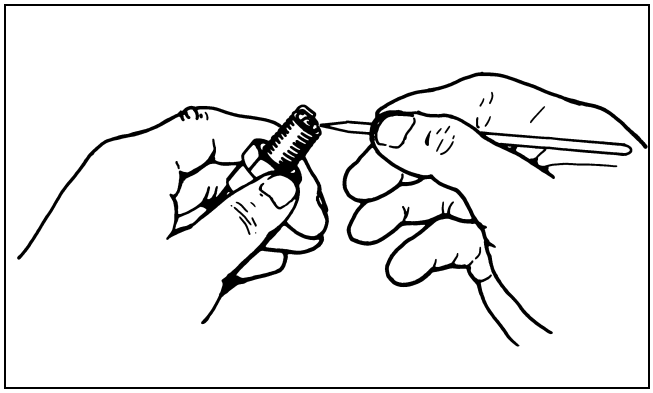
6. If compression is abnormally low, inspect the following items.
   A. Verify starter cranks engine over.
   B. Gauge is functioning properly.
   C. Throttle lever in the full-open position.
   D. Valve/tappet clearance correct.
   E. Valve bent or burned.
   F. Valve seat burned.

■ NOTE: To service valves, see Section 3.

7. Pour 29.5 ml (1 fl oz) of oil into the spark plug hole, reattach the gauge, and retest compression.
8. If compression is now evident, service the piston rings (see Section 3).

Spark Plug

A light brown insulator indicates that the plug is correct. A white or dark insulator indicates that the engine may need to be serviced or the carburetor may need to be adjusted. To maintain a hot, strong spark, keep the plug free of carbon.

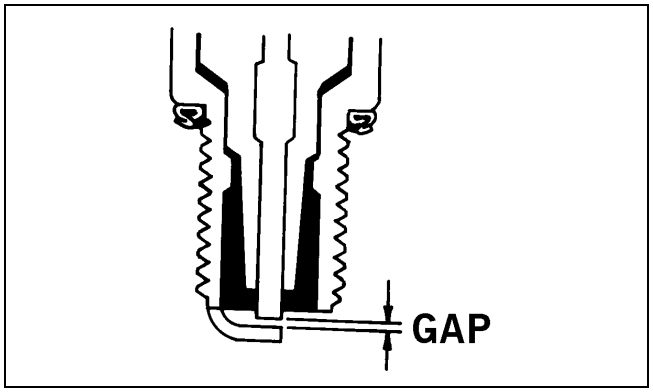


ATV-0051

⚠ CAUTION

Before removing the spark plug, be sure to clean the area around the spark plug. Dirt could enter engine when removing or installing the spark plug.

Adjust the gap to 0.6 - 0.7 mm (0.024 - 0.028 in.) on the 250/300 or to 0.7 - 0.8 mm (0.028 - 0.032 in.) on the 375/400/500 for proper ignition. Use a feeler gauge to check the gap.



ATV0052B

When installing the spark plug, be sure to tighten it securely. A new spark plug should be tightened 1/2 turn once the washer contacts the cylinder head. A used spark plug should be tightened 1/8 - 1/4 turn once the washer contacts the cylinder head.

Muffler/Spark Arrester

The muffler has a spark arrester which must be periodically cleaned. At the intervals shown in the Periodic Maintenance Chart, clean the spark arrester using the following procedure.

⚠ WARNING

Wait until the muffler cools to avoid burns.

1. Elevate the front of the ATV on a safety stand until the muffler is horizontal.
2. Shift the transmission into neutral and set the parking brake.
3. Remove the plug from the bottom of the muffler.

AN600D

4. Start the engine and increase RPM to "blow out" the accumulated carbon particles.
5. Stop the engine. Wait until the muffler cools; then install the plug and tighten securely.

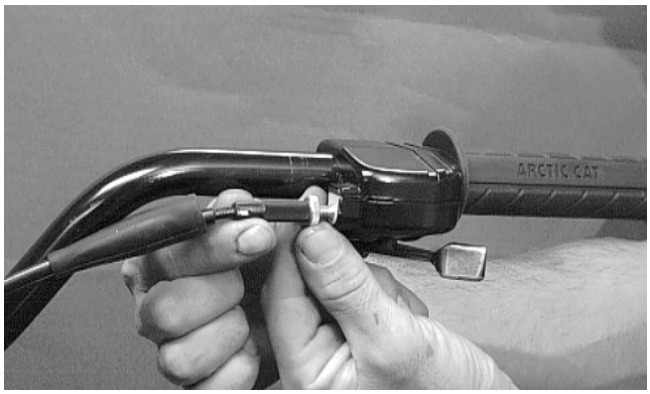
Gas/Vent Hoses

Replace the gas hose every two years. Damage from aging may not always be visible. Do not bend or obstruct the routing of the carburetor vent hose. Make certain that the vent hose is securely connected to the carburetor and the opposite end is always open.

Adjusting Throttle Cable

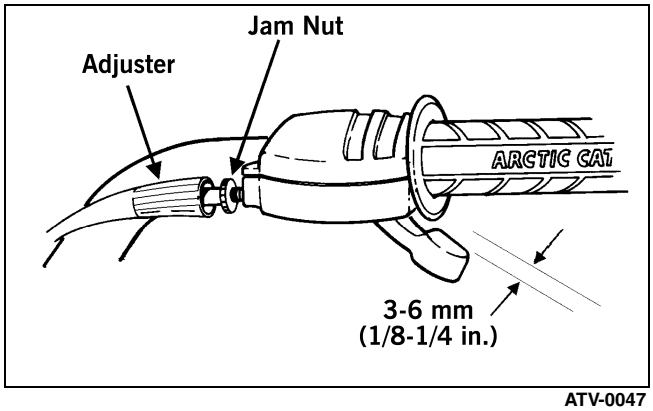
To adjust the throttle cable free-play, follow this procedure.

1. Slide the rubber boot away; then loosen the jam nut from the throttle cable adjuster.



AL611D

2. Slide the rubber boot away and turn the adjuster until the throttle cable has proper free-play of 3-6 mm (1/8 - 1/4 in.) at the lever.



ATV-0047

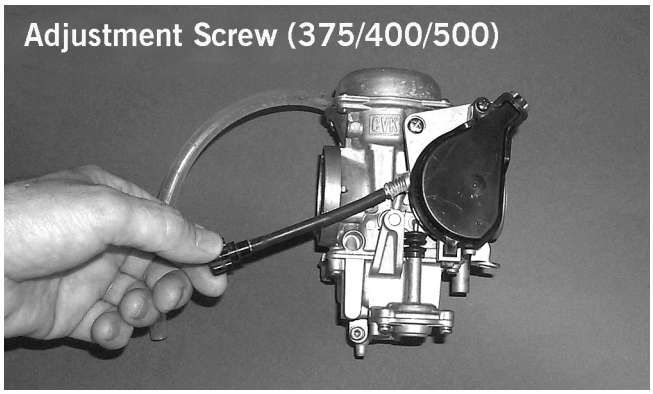
3. Tighten the jam nut against the throttle cable adjuster securely; then slide the rubber boot over the adjuster.

Adjusting Engine RPM
(Idle)

To properly adjust the idle RPM, a tachometer is necessary. To adjust idle RPM, use the following procedure.

1. With the transmission in neutral, start the engine and warm it up to normal operating temperature.
2. Turn the idle adjustment screw clockwise one turn past the recommended RPM setting; then turn it counterclockwise to the correct RPM setting.

CC795B



AF920C

IDLE RPM	
MODEL	**RPM**
250/300/400	1400-1600
375/500	1200-1350

⚠ WARNING

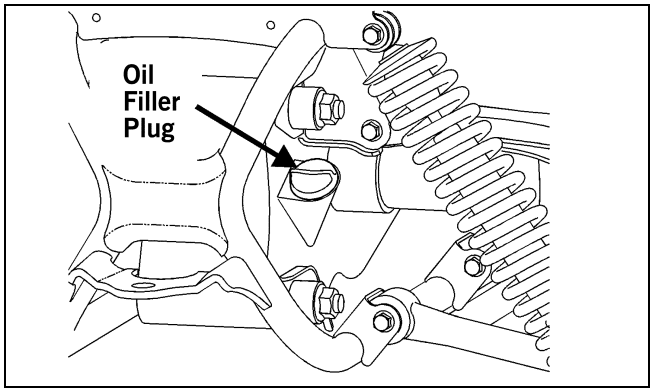
Adjust the idle to the correct RPM. Make sure the engine is at normal operating temperature before adjusting the idle RPM.

Engine/Transmission Oil - Filter - Strainer
(250/300)

OIL - FILTER

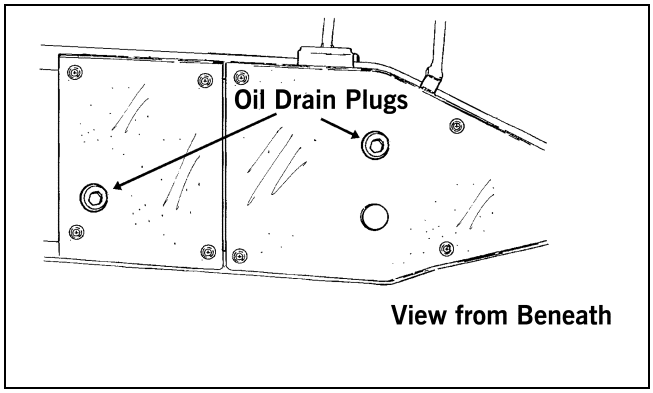
Change the engine oil and oil filter at the scheduled intervals. The engine should always be warm when the oil is changed so the oil will drain easily and completely.

1. Park the ATV on level ground.
2. Remove the oil filler plug.



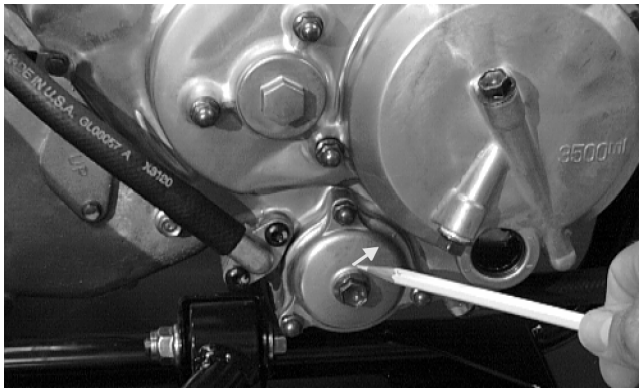
733-714A

3. Remove both drain plugs from the bottom of the engine and drain the oil into a drain pan.



733-441C

4. Remove the nuts securing the filter cover.
5. Noting the position of the arrow on the oil filter cover, remove the oil filter cover; then pull out the oil filter element.



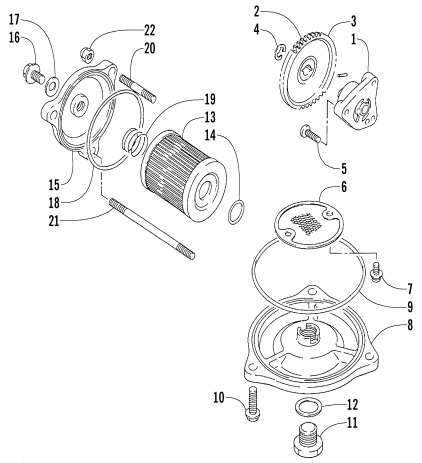
CH080DA

■ **NOTE: Clean up any excess oil after removing the filter.**

6. Apply oil to the O-rings and check to make sure they are positioned correctly in the cover and crankcase; then with the open end of the filter element directed toward the center of the engine, install the element making sure the spring is between the cover and the element.

KEY

1. Engine Oil Pump
2. Driven Gear
3. Pin
4. Circlip
5. Cap Screw
6. Strainer
7. Cap Screw
8. Cap
9. O-Ring
10. Cap Screw
11. Drain Plug
12. Gasket
13. Filter
14. Filter O-Ring
15. Cap
16. Check Plug
17. Gasket
18. Cap O-Ring
19. Spring
20. Stud Bolt
21. Stud Bolt
22. Nut



0733-752

⚠ CAUTION

If the oil filter element is installed backwards, engine damage will occur due to lack of oil flow.

7. Place the filter cover in position and secure with the nut. Tighten securely.

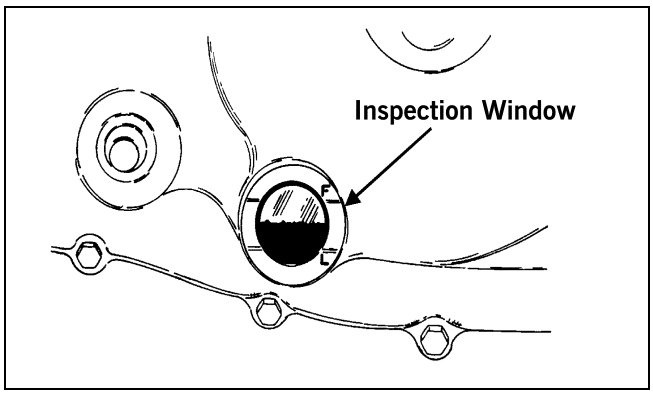
8. Install the engine drain plug and tighten to 2.2 kg-m (16 ft-lb). Pour 3.9 L (4.1 U.S. qt) for the 250 or 3.4 L (3.5 U.S. qt) for the 300 of the recommended oil in the filler hole; then install the filler plug.

⚠ CAUTION

Any oil used in place of the recommended oil could cause serious engine damage. Do not use oils which contain graphite or molybdenum additives. These oils can adversely affect clutch operation. Also, not recommended are racing, vegetable, non-detergent, and castor-based oils.

9. Start the engine (while the ATV is outside on level ground) and allow it to idle for a few minutes.

10. Turn the engine off and wait approximately one minute. Recheck the oil level in the engine oil inspection window. The oil level should be visible through the window. If oil is not visible, add recommended oil until the oil level is visible between the lines of the window.



ATV-0074

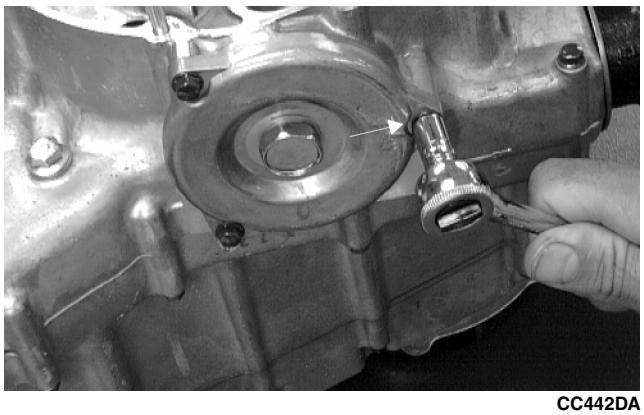
11. Inspect the area around the drain plug and oil filter for leaks.

STRAINER

To check the oil strainer, use the following procedure.

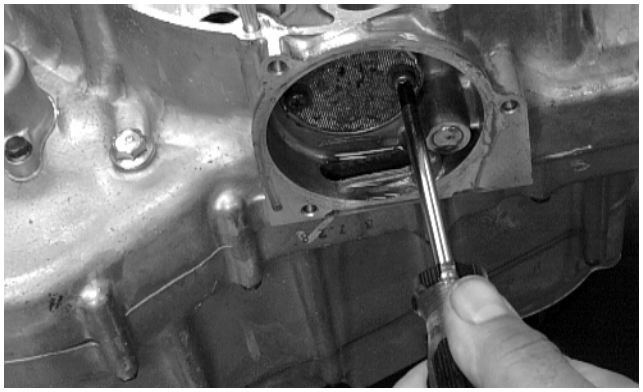
1. Remove the skid plate.

2. Remove the Phillips-head cap screws securing the oil strainer cap; then remove the cap. Note the directional arrow on the cap for assembly purposes.



CC442DA

3. Remove the Phillips-head screws securing the strainer; then remove the strainer.



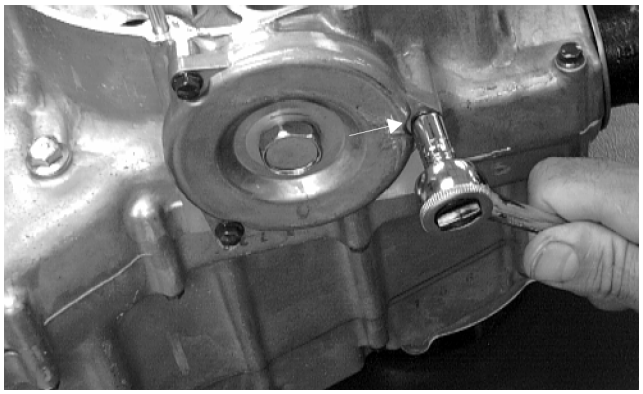
CC443D

■ **NOTE: To service the oil strainer, see Section 3.**

4. Place the oil strainer into position and secure with the Phillips-head screws.

CC443D

5. Place the strainer cap into position on the crankcase; then secure with the Phillips-head cap screws (coated with red Loctite #271). Tighten securely.



CC442DA

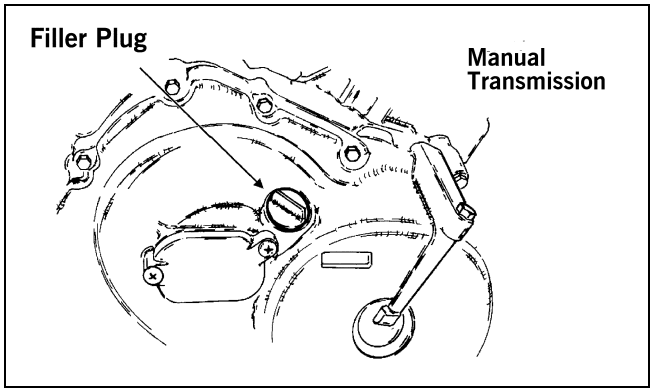
6. Install the skid plate.

Engine/Transmission Oil - Filter - Strainer (375/400/500)

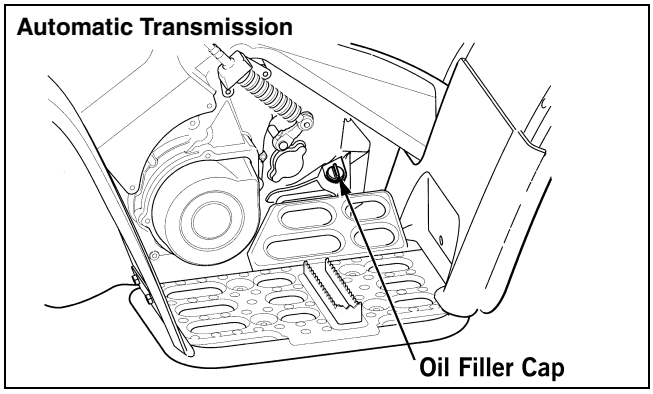
OIL - FILTER

Change the engine oil and oil filter at the scheduled intervals. The engine should always be warm when the oil is changed so the oil will drain easily and completely.

1. Park the ATV on level ground.
2. Remove the oil filler plug/cap.

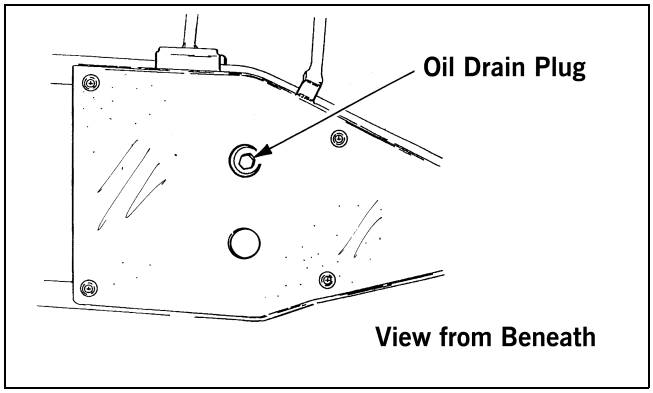


ATV-0108



0735-505

3. Remove the drain plug from the bottom of the engine and drain the oil into a drain pan.



733-441A

4. Remove the oil filter plug from the filter mounting boss (located on the front-right side of the transmission case) and allow the filter to drain completely.

5. Using the Oil Filter Wrench (p/n 0444-042) and a ratchet handle (or a socket or box-end wrench), remove the old oil filter.

■ **NOTE: Clean up any excess oil after removing the filter.**

6. Apply oil to the O-ring and check to make sure it is positioned correctly; then install the new oil filter. Tighten securely.

■ **NOTE: Install a new O-ring each time the filter is replaced.**

7. Install the oil filter drain plug and tighten securely.

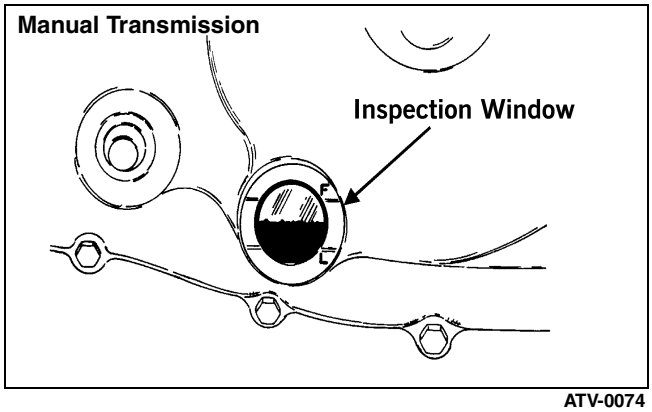
8. Install the engine drain plug and tighten to 2.2 kg-m (16 ft-lb). Pour 3.08 L (3.25 U.S. qt) - 375/400, 3.4 L (3.5 U.S. qt) - 500 manual, or 2.5 L (2.6 U.S. qt) - 500 automatic of the recommended oil in the filler hole. Install the oil filler plug/cap.

⚠ CAUTION

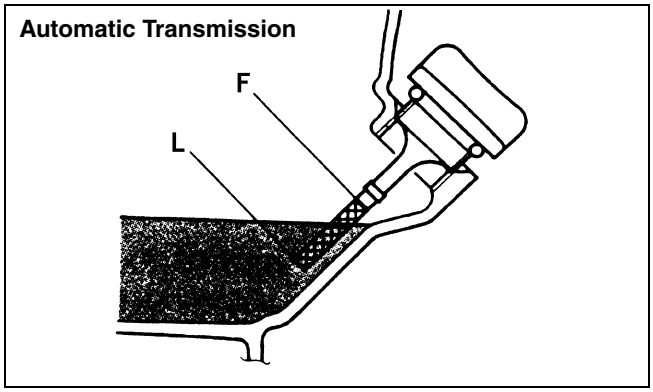
Any oil used in place of the recommended oil could cause serious engine damage. Do not use oils which contain graphite or molybdenum additives. These oils can adversely affect clutch operation. Also, not recommended are racing, vegetable, non-detergent, and castor-based oils.

9. Start the engine (while the ATV is outside on level ground) and allow it to idle for a few minutes.

10. Turn the engine off and wait approximately one minute. Recheck the oil level.



ATV-0074



ATV-0100

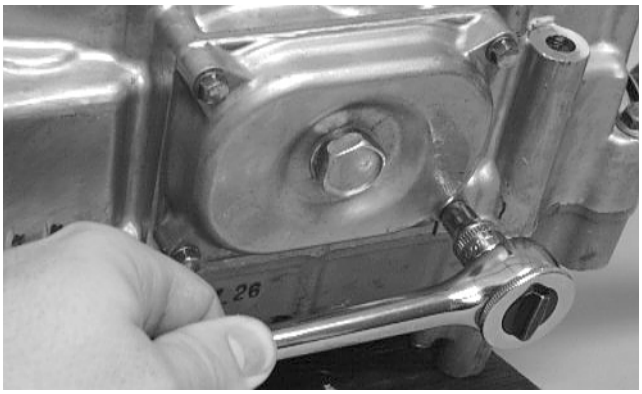
11. Inspect the area around the drain plug and oil filter for leaks.

STRAINER

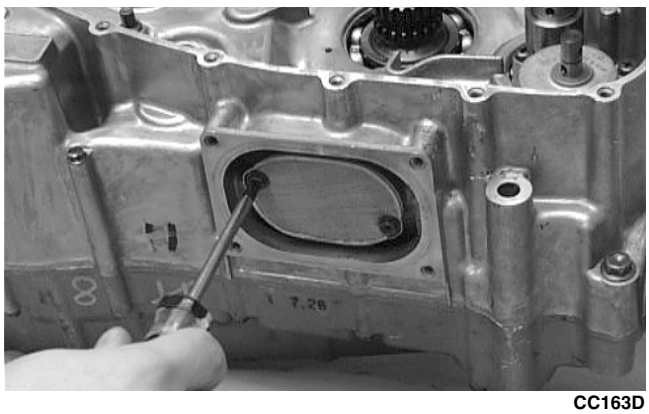
To check the oil strainer, use the following procedure.

1. Remove the skid plate.

2. Remove the cap screws securing the oil strainer cap; then remove the cap. Account for the O-ring.

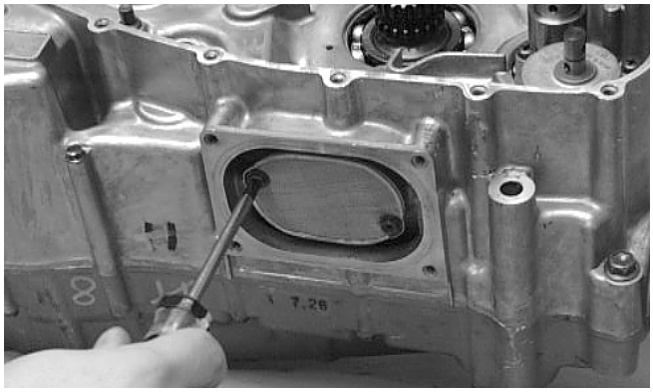

CC091D

3. Remove the two Phillips-head cap screws securing the strainer.


CC163D

■ **NOTE: To service oil strainer, see Section 3.**

4. Place the oil strainer into position beneath the crankcase and secure with the Phillips-head cap screws. Tighten securely.



CC163D

5. Place the strainer cap into position on the strainer making sure the O-ring is properly installed; then secure with the cap screws. Tighten securely.

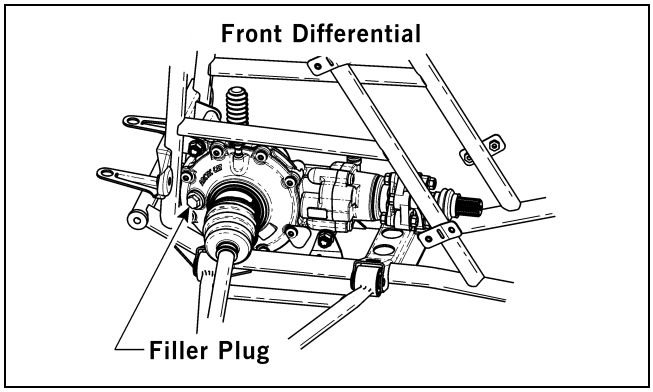
CC091D

6. Install the skid plate.

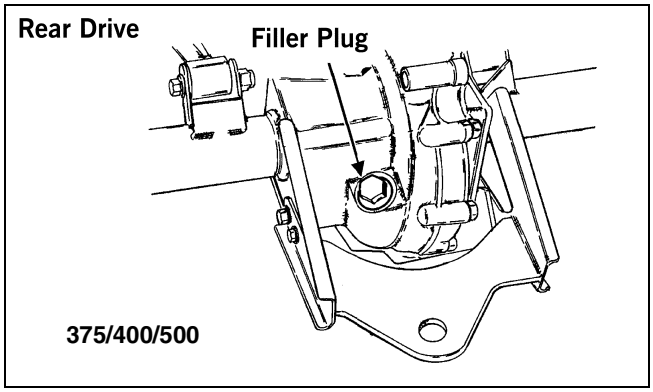
Front Differential/Rear Drive Lubricant

Inspect and change the lubricant according to the Periodic Maintenance Chart. When changing the lubricant, use approved SAE 80W-90 hypoid gear lube. To change lubricant, use the following procedure.

1. Place the ATV on level ground.
2. Remove each oil filler plug.

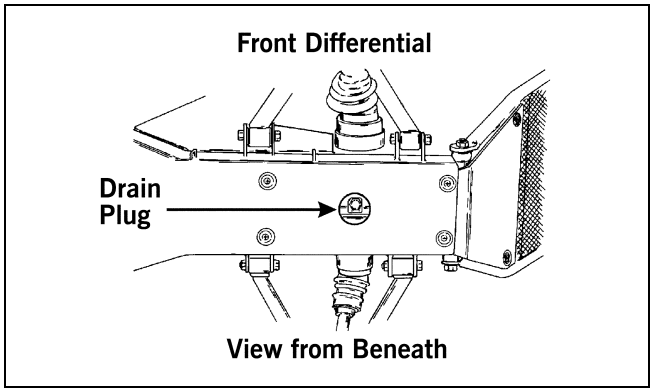


0736-568



ATV-0077

3. Drain the oil into a drain pan by removing in turn the drain plug from each.



ATV0082A

4. After all the oil has been drained, install the drain plugs and tighten to 0.5 kg-m (3.5 ft-lb).
5. Pour recommended oil into the filler hole until the oil level reaches a point 25.4 mm (1.0 in.) below the oil filler hole.
6. Install the filler plugs.

■ **NOTE: If the differential/rear drive oil is contaminated with water, inspect the drain plug, filler plug, and/or bladder.**

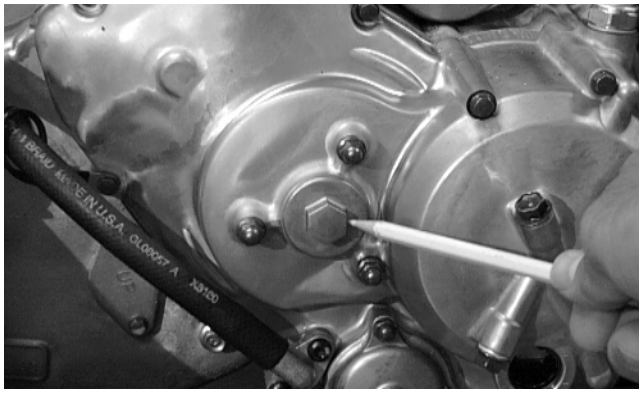
⚠ CAUTION

Water entering the outer end of the axle will not be able to enter the rear drive unless the seals are damaged.

Adjusting Clutch (250/300)

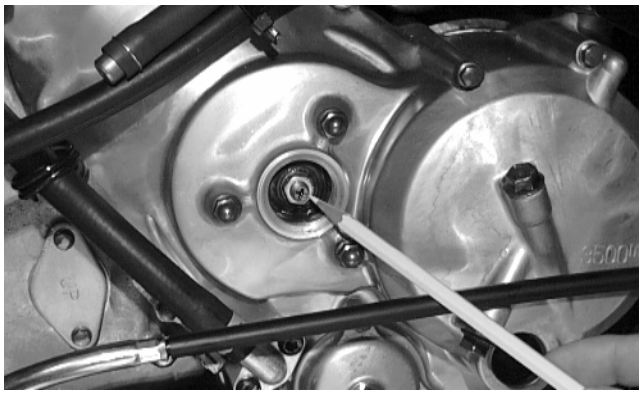
To adjust the clutch, use the following procedure.

1. Using an impact driver, remove the cover. Account for the O-ring.



CH081D

2. Loosen the jam nut securing the adjustment screw.



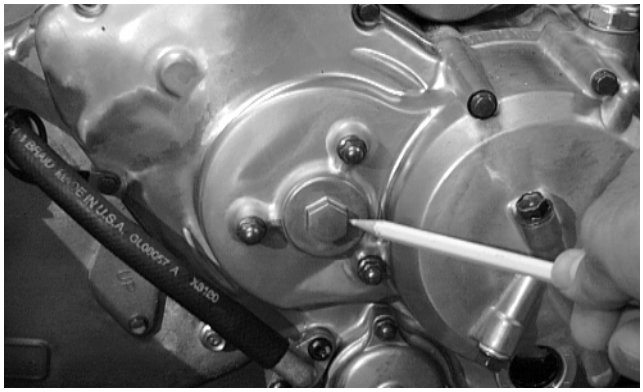
CH086D

3. Rotate the adjustment screw clockwise until it stops.

4. Rotate the adjustment screw counterclockwise 1/8 turn; then lock the jam nut securing the adjustment screw.

■NOTE: At this point the clutch should be adjusted correctly. Test ride the ATV to ensure accurate adjustment.

5. Secure the cover making sure the O-ring is properly positioned.



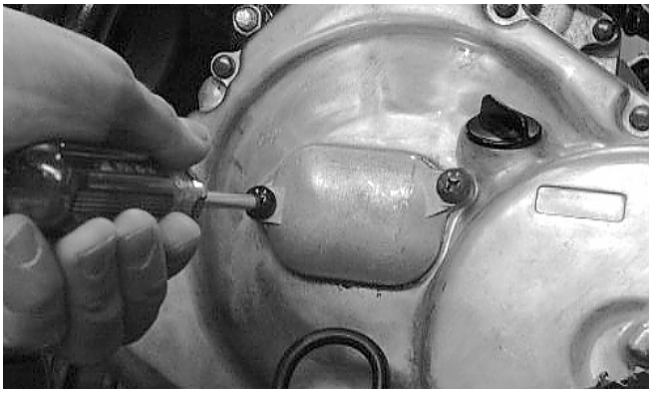
CH081D

Adjusting Clutch (400/500 Manual Transmission)

2

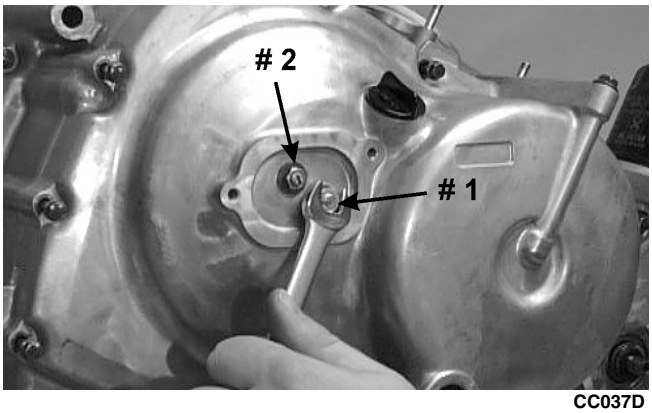
To adjust the clutch, use the following procedure.

1. Using an impact driver, remove the screws securing the cover and remove the cover. Account for the O-ring.



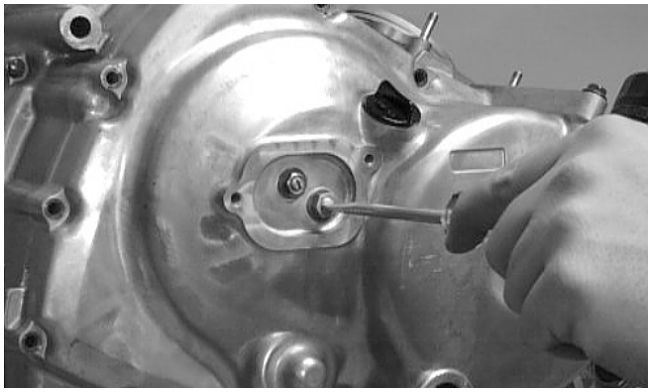
AM600D

2. Loosen the jam nuts securing adjustment screw #1 (forward) and adjustment screw #2 (rearward).



CC037D

3. Rotate adjustment screw #1 counterclockwise until it stops.



CC038D

4. Rotate adjustment screw #2 alternately clockwise and counterclockwise to ensure free movement without binding; then lock the jam nut securing adjustment screw #2.

5. Rotate adjustment screw #1 clockwise 1/8 turn; then lock the jam nut securing adjustment screw #1.

■**NOTE: At this point the clutch should be adjusted correctly. Test to ensure accurate adjustment.**

6. Install the cover making sure the O-ring is properly positioned; then secure with the screws.

Tires

TIRE SIZES

The ATV is equipped with low-pressure tubeless tires of the size and type listed. Do not under any circumstances substitute tires of a different type or size.

250	Front	Rear
Size	AT23 x 8-12	AT24 x 9-12
300	**Front**	**Rear**
Size (4x4)	AT24 x 9-12	AT25 x 10-12
Size (2x4)	AT23 x 8-12	AT25 x 10-12
375/400/500	**Front**	**Rear**
Size	AT25 x 8-12	AT25 x 10-12

⚠ WARNING

Always use the size and type of tires specified. Always maintain proper tire inflation pressure.

TIRE INFLATION PRESSURE

On 250/300 models, front and rear tire inflation pressure should be 0.35 kg-cm² (5.0 psi).

On 375/400/500 models, front tire inflation pressure should be 0.32 kg-cm² (4.5 psi) and the rear tire inflation pressure should be 0.25 kg-cm² (3.5 psi).

A low-pressure gauge is provided in the tool kit to measure the air pressure in the tires. Check the air pressure in all tires before each use of the ATV.

Steering Components

The following steering components should be inspected periodically to ensure safe and proper operation.

A. Handlebar grips not worn, broken, or loose.
B. Handlebar not bent, cracked, and has equal and complete full-left and full-right capability.
C. Steering post bearing assembly/bearing housing not broken, worn, or binding.
D. Ball joints not worn, cracked, or damaged.
E. Tie rods not bent or cracked.
F. Knuckles not worn, cracked, or damaged.
G. Cotter pins not damaged or missing.

Driveshaft/Coupling

The following drive system components should be inspected periodically to ensure proper operation.

A. Spline lateral movement (slop).
B. Rubber coupling cracked, damaged, or worn.

Suspension/Shock Absorbers/Bushings

The following suspension system components should be inspected periodically to ensure proper operation.

A. Shock absorber rods bent, pitted, or damaged.
B. Rubber damper cracked, broken, or missing.
C. Shock absorber body damaged, punctured, or leaking.
D. Shock absorber eyelets broken, bent, or cracked.
E. Shock absorber eyelet bushings worn, deteriorated, cracked, or missing.
F. Shock absorber spring broken or sagging.

Nuts/Bolts/Cap Screws

Tighten all nuts, bolts, and cap screws. Make sure rivets holding components together are tight. Replace all loose rivets. Care must be taken that all calibrated nuts, bolts, and cap screws are tightened to specifications. For proper torque values, see Section 10.

Ignition Timing

The ignition timing cannot be adjusted; however, verifying ignition timing can aid in troubleshooting other components. To verify engine timing, use the following procedure.

1. Attach the engine Timing Light (p/n 0644-197) to the spark plug high tension lead; then remove the timing inspection plug from the left-side crankcase cover.
2. Using the Arctic Cat Engine Tachometer (p/n 0644-275), start the engine and run at the recommended RPM; ignition timing should be the recommended degrees BTDC.

IGNITION TIMING	
MODEL	**TIMING/RPM**
250	5° BTDC below 1800 35° BTDC above 3800
300	5° BTDC @ 1800 30° BTDC @ 3800
375	10° BTDC @ 3000
400/500	10° BTDC @ 1500

3. Install the timing inspection plug.

If ignition timing cannot be verified, the rotor may be damaged, the key may be sheared, the trigger coil bracket may be bent or damaged, or the CDI unit may be faulty.

Headlight/Taillight-Brakelight

Each time the ATV is used, lights should be checked for proper function. Rotate the ignition switch to the lights position; the headlights and taillight should illuminate. Test the brakelight by compressing the brake lever. The brakelight should illuminate.

HEADLIGHT

■ NOTE: The bulb portion of the headlight is fragile. HANDLE WITH CARE. When replacing the headlight bulb, do not touch the glass portion of the bulb. If the glass is touched, it must be cleaned with a dry cloth before installing. Skin oil residue on the bulb will shorten the life of the bulb.

⚠ WARNING

Do not attempt to remove the bulb when it is hot. Severe burns may result.

To replace the headlight bulb, use the following procedure.

1. Remove the wiring harness connector from the back of the headlight.
2. Grasp the bulb housing, turn it counterclockwise, and remove the bulb.
3. Install the new bulb into the housing and rotate it completely clockwise.
4. Install the wiring harness connector.

TAILLIGHT-BRAKELIGHT

To replace the taillight-brakelight bulb, use the following procedure.

1. Remove the two screws and remove the lens cover.
2. Push the bulb in and turn it counterclockwise.
3. Install the new bulb by turning it clockwise while pushing in.
4. Install the lens cover.

⚠ CAUTION

Tighten the lens cover screws only until they are snug.

CHECKING/ADJUSTING HEADLIGHT AIM

The headlights can be adjusted vertically and horizontally. The geometric center of the HIGH beam light zone is to be used for vertical and horizontal aiming.

1. Position the ATV on a level floor so the headlights are approximately 6.1 m (20 ft) from an aiming surface (wall or similar aiming surface).

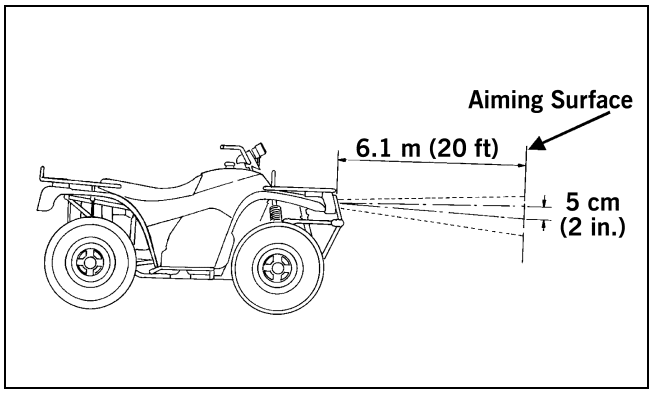
■ NOTE: There should be an average operating load on the ATV when adjusting the headlight aim.

2. Measure the distance from the floor to the mid-point of each headlight.
3. Using the measurements obtained in step 2, make horizontal marks on the aiming surface.

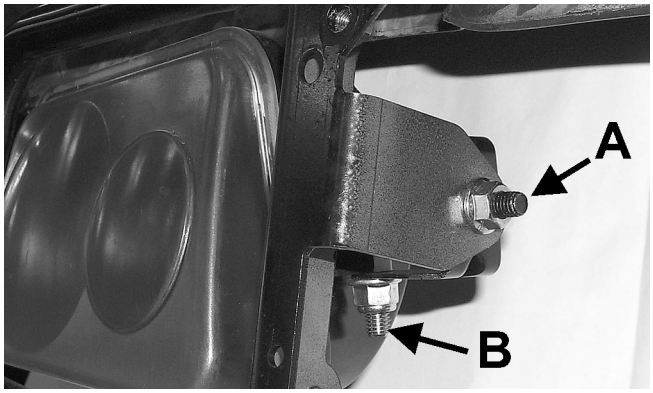
4. Make vertical marks which intersect the horizontal marks on the aiming surface directly in front of the headlights.

5. Switch on the lights. Make sure the HIGH beam is on. DO NOT USE LOW BEAM.

6. Observe each headlight beam aim. Proper aim is when the most intense beam is centered on the vertical mark 5 cm (2 in.) below the horizontal mark on the aiming surface.



ATV-0070



AF926A

7. Adjust each headlight until correct aim is obtained.

   A. Horizontal — Loosen nut (A) and adjust for proper aiming. Tighten the nut securely.

   B. Vertical— Loosen nut (B) and adjust for proper aiming. Tighten the nut securely.

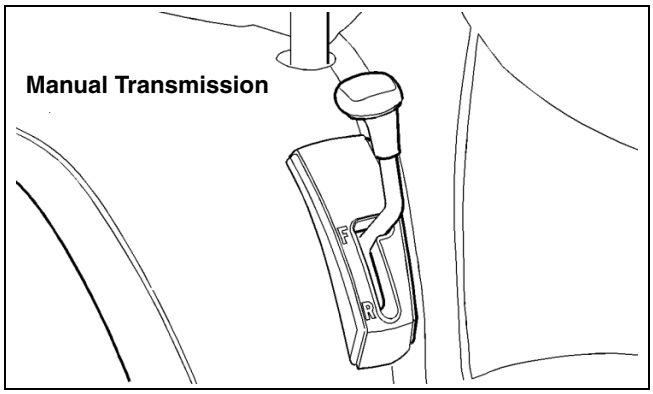
Switches

Each time the ATV is used, switches should be checked for proper operation. Use the following list for reference.

A. Ignition switch — engine will start.
B. Emergency stop switch — engine will stop.
C. Reverse switch — reverse indicator light illuminates.
D. Hi/Lo switch — headlight beam bright and dim.
E. Brake switches — rear brakelight illuminates.

Shift Lever

CHECKING ADJUSTMENT



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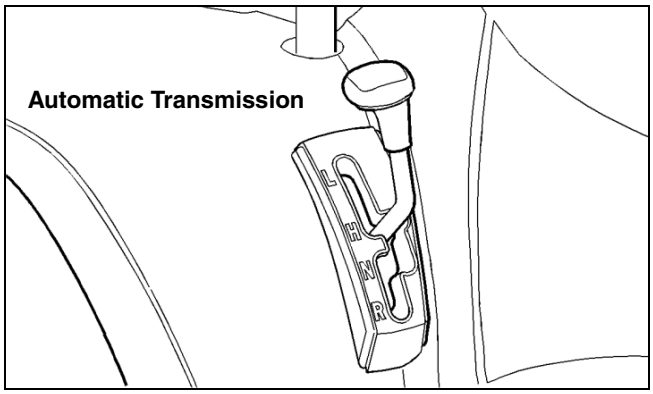


0736-565

Stop the ATV completely and shift the transmission into the R position. The reverse gear indicator light should be illuminated.

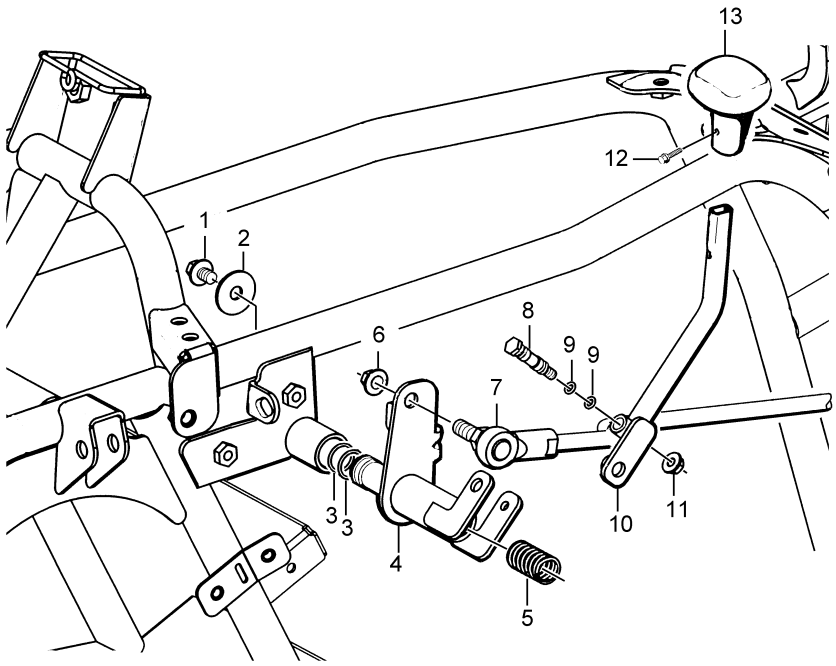
⚠ WARNING

Never shift the ATV into reverse gear when the ATV is moving as it could cause the ATV to stop suddenly throwing the operator from the ATV.

If the reverse lever light does not illuminate when shifted to the reverse position, the switch may be faulty, the fuse may be blown, the bulb may be faulty, a connection may be loose or corroded, or the lever may need adjusting. To adjust, proceed to Adjusting Shift Lever.

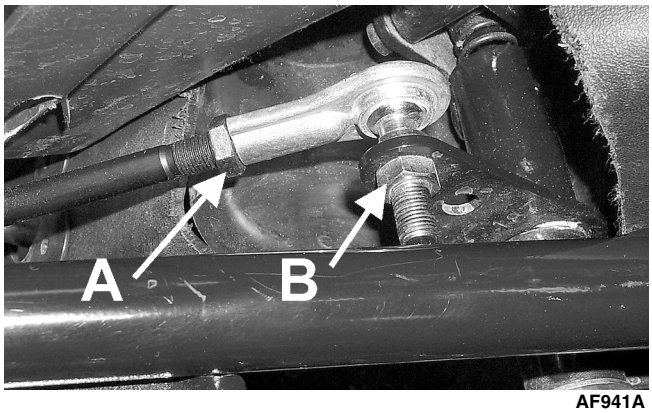
ADJUSTING SHIFT LEVER

KEY
1. Cap Screw
2. Washer
3. O-Ring
4. Upper Shift Arm
5. Spring
6. Lock Nut
7. Shift Rod
8. Axle
9. O-Ring
10. Shift Lever
11. Lock Nut
12. Set Screw
13. Handle



0736-823

1. Place the shift lever in the R position.
2. Remove the seat.
3. Remove the gas tank (see Section 4).
4. Loosen shift rod end jam nut (A).

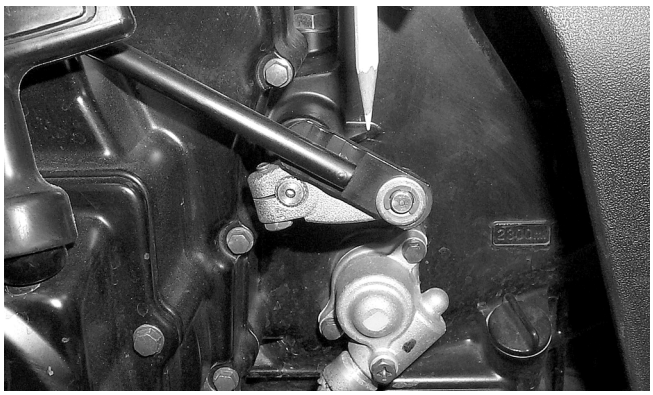


AF941A

5. Using two open-end wrenches, remove lock nut (B) securing the shift rod to the upper shift arm. Discard the lock nut.

■ **NOTE: Never reuse a lock nut. Once a lock nut has been removed, it must be replaced with a new lock nut.**

6. Push the upper shift arm down completely.



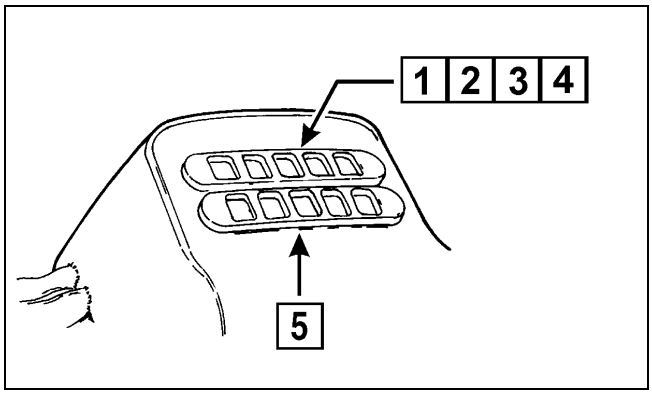
AF942

7. Rotate the shift rod end as necessary to align its threaded shaft with the hole in the upper shift arm. Secure with a new lock nut (B). Tighten securely.
8. Tighten jam nut (A) to secure the adjustment.
9. Install the gas tank (see Section 4); then install the seat.

Indicator/ Gear Position Lights

Each time the ATV is used, the lights should be checked for proper function. Use the following for reference.

■NOTE: The number and functions of the indicator and gear position lights will vary from model to model.



ATV0086C

1. **High Beam Indicator** — A blue light will illuminate when the lights are on high beam. The light will not be illuminated when the lights are switched to low beam.
2. **Temperature Indicator** — A red light will illuminate if the engine overheats. The light should be off during normal operation.

⚠ CAUTION

Continued operation of the ATV with high engine temperature may result in engine damage or premature wear.

■NOTE: High engine RPM, low vehicle speed, or heavy load can raise engine temperature. Decreasing engine RPM, reducing load, and selecting an appropriate transmission gear can lower the temperature.

■NOTE: Debris in front of the engine (or packed between the cooling fins of the radiator on the 400/500 or packed between the oil cooler cooling fins on the 250/300/375) can reduce cooling capability. Using a hose, pressure-wash the radiator (engine and oil cooler on the 250/300/375) to remove any debris preventing air flow to the radiator.

3. **Neutral Indicator** — A green light will illuminate when the transmission is in neutral and the ignition switch is on. The light will go out when shifted into any gear other than neutral.
4. **Reverse Indicator** — An orange light will illuminate when the transmission is shifted into reverse gear. The light will go off when shifted out of reverse.
5. **Gear Position Indicator (Manual Transmission)** — A yellow light will illuminate to indicate which gear (1-5) the transmission is shifted into.

Frame/Welds/Racks

The frame, welds, and racks should be checked periodically for damage, bends, cracks, deterioration, broken components, and missing components. If replacement or repair constitutes removal, see Section 8.

Electrical Connections

The electrical connections should be checked periodically for proper function. In case of an electrical failure, check fuses, connections (for tightness, corrosion, damage), and/or bulbs. If an electrical component needs to be tested for proper function, see Section 5.

Hydraulic Hand Brake System

CHECKING/BLEEDING

The hydraulic brake system has been filled and bled at the factory. To check and/or bleed the hydraulic brake system, use the following procedure.

1. With the master cylinder in a level position, check the fluid level. It must be visible in the sight glass.

AF924A

2. Compress the brake lever several times to check for a firm lever. If the lever is not firm, the brake system must be bled.

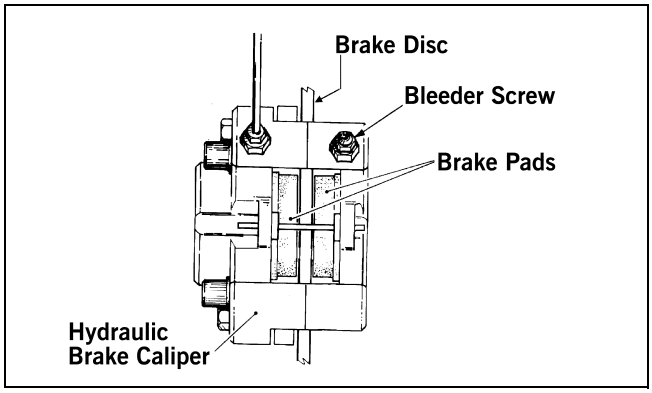
3. To bleed the brake system, use the following procedure.

   A. Remove the cover and fill the master cylinder with DOT 4 Hi-Temp Brake Fluid (p/n 1639-799).

   B. Install and secure the cover; then slowly compress the brake lever several times.

   C. Remove the protective cap, install one end of a clear hose onto one FRONT bleeder screw, and direct the other end into a container; then while holding slight pressure on the brake lever, open the bleeder screw and watch for air bubbles. Close the bleeder screw before releasing the brake lever. Repeat this procedure until no air bubbles are present.

AF637D



730-434B

■ NOTE: During the bleeding procedure, watch the master cylinder reservoir very closely to make sure there is always a sufficient amount of brake fluid. If the fluid level gets below the bottom line on the reservoir, refill the reservoir before the bleeding procedure is continued.

   D. Repeat step C until the brake lever is firm.

   E. At this point, perform step B, C, and D on the other FRONT bleeder screw; then move to the REAR bleeder screw and follow the same procedure.

4. Carefully check the entire hydraulic brake system that all hose connections are tight, the bleed screws are tight, the protective caps are installed, and no leakage is present.

⚠ CAUTION

This hydraulic brake system is designed to use high-temperature DOT 4 brake fluid only. If brake fluid must be added, care must be taken as brake fluid is very corrosive to painted surfaces.

⚠ WARNING

Using the Operator's Manual as a guide, instruct the customer on the proper use, care, burnishing procedure, and maintenance of the hydraulic brake system.

INSPECTING HOSES

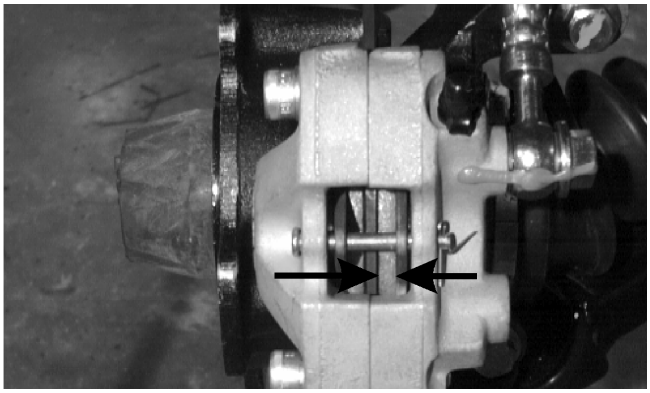
Carefully inspect the hydraulic brake hoses for cracks or other damage. If found, the brake hoses must be replaced.

CHECKING/REPLACING PADS

The clearance between the brake pads and brake discs is adjusted automatically as the brake pads wear. The only maintenance that is required is replacement of the brake pads when they show excessive wear. Check the thickness of each of the brake pads as follows.

1. Remove a front wheel.

2. Measure the thickness of each brake pad.



AF739DB

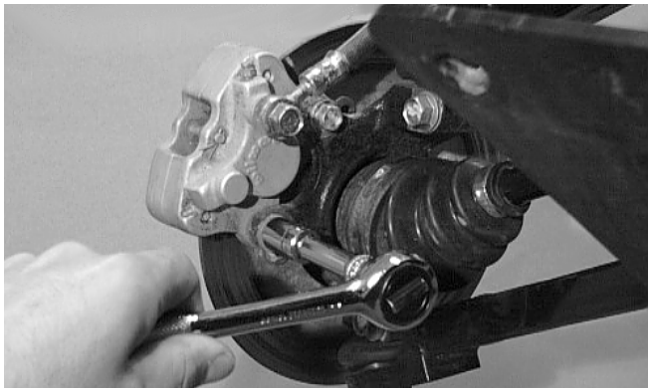
3. If thickness of either brake pad is less than 3.2 mm (0.125 in.), the brake pads must be replaced.

■ NOTE: The brake pads should be replaced as a set.

4. To replace the brake pads, use the following procedure.

   A. Remove the wheel.

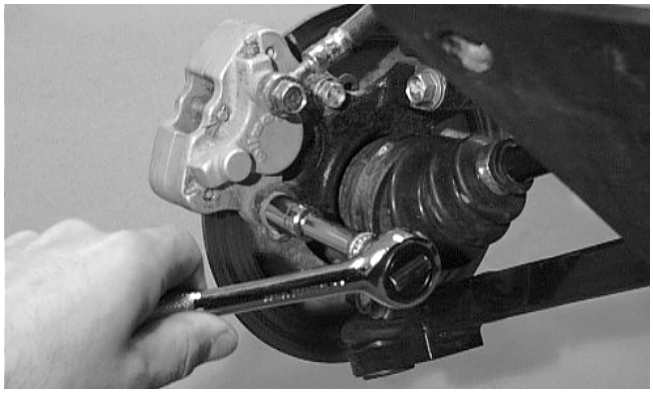
   B. Remove the cap screws securing the caliper to the bracket; then remove the cotter pin securing the pads and remove the pads.



AF615D

C. Install the new brake pads; then secure with the pin and cotter pin. Spread the cotter pin.

D. Secure the caliper to the knuckle and/or axle housing with the cap screws. Tighten to 2.8 kg-m (20 ft-lb).



AF615D

E. Install the wheel. Tighten to 5.5 kg-m (40 ft-lb).

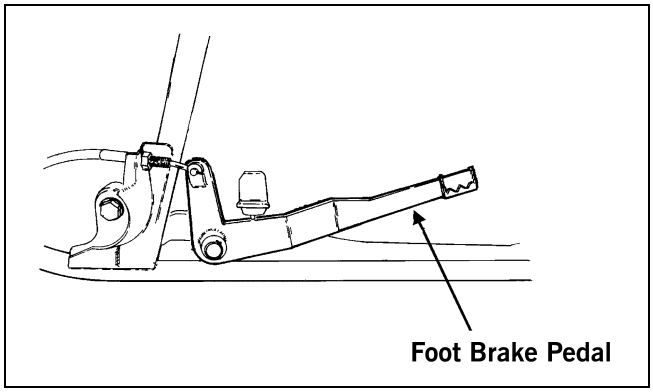
5. Burnish the brake pads (see Burnishing Brake Pads in this section).

Mechanical Foot Brake

CHECKING

Although the rear brake has been adjusted at the factory, the brake should be checked for proper operation. The mechanical brake must be maintained to be fully functional.

1. With the engine off, transmission in neutral, and the reverse lever in the forward position, press the foot brake pedal and attempt to move the ATV.



ATV0088D

2. If the rear wheels are locked, it is adjusted properly.

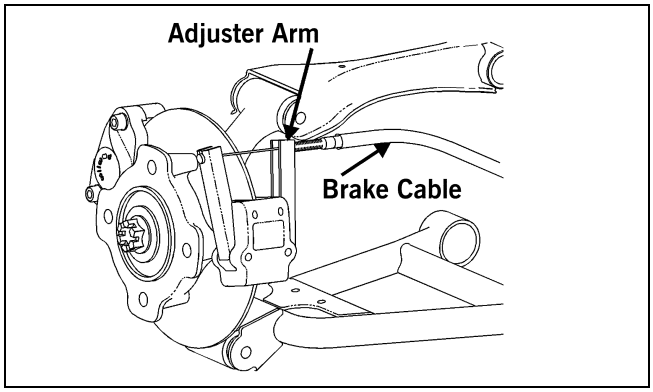
3. If the rear wheels are not locked, it must be adjusted (set up).

ADJUSTING

To adjust (set up) the mechanical brake, use the following procedure.

■ NOTE: Removal of the right, rear wheel enhances access to the brake components.

1. Loosen the right-hand jam nut (wheel-side when viewing from behind) of the adjuster arm.



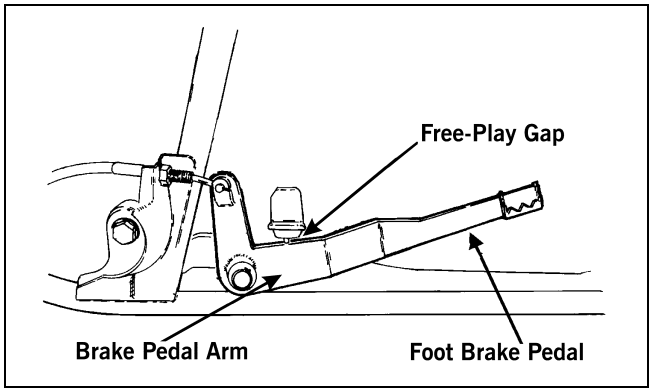
733-730B

2. Pull the brake cable to the left and push the adjuster arm to the right.

3. While holding the cable and adjuster arm in this position, finger-tighten the left-hand jam nut until it contacts the adjuster arm; then loosen it 1 turn.

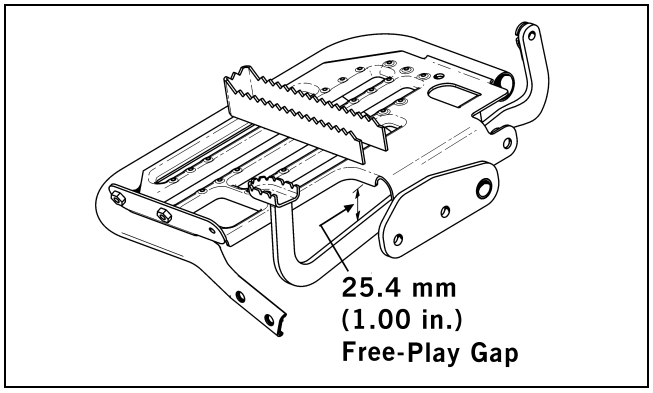
4. Tighten the right-hand jam nut securely against the adjuster arm.

■ NOTE: On the 250/300, there should be 3.2 mm (1/8 in.) free-play gap between the brake pedal arm and the brake pedal bracket.



ATV0088E

■ **NOTE: On the 375/400/500, there should be 25.4 mm (1 in.) free-play gap between the foot pedal and the footrest.**



736-569A

5. If the free-play gap is not within tolerance, readjust the jam nuts of the adjuster arm in 1/4 turn increments until the correct free-play gap is attained.

■ **NOTE: Apply the foot brake a number of times to ensure the wheels lock and the brakelight illuminates properly.**

6. If the rear cable adjustment is inadequate to attain the proper brake pedal arm free-play gap, make adjustment at the front cable adjuster jam nuts.

⚠ CAUTION

If adjusting the rear cable at both ends does not attain proper brake pedal arm free-play, the brake pads must be replaced.

MEASURING/REPLACING BRAKE PADS

Removing

1. Support the ATV on a suitable stand.
2. Remove the right rear wheel and account for the cap screws.
3. Loosen the rear cable adjuster jam nuts; then remove the cap screws securing the mechanical brake to the axle housing.
4. Remove the brake pads from the caliper.

Inspecting and Measuring

1. Inspect the pads for gouges, chips, or wear.
2. Inspect the disc for gouges, grooves, cracks, and warpage.
3. Using a calipers, measure the thickness of each brake pad.
4. If the thickness of either brake pad is less than 3.2 mm (0.125 in.), the brake pads must be replaced.

■ **NOTE: The brake pads should be replaced as a set.**

Installing

1. Place the brake pads into the caliper.

■ **NOTE: The metal backing of the pad will be facing the adjuster arms when installed properly.**

2. Slide brake caliper assembly over the brake disc and into position on the knuckle; then secure the caliper with the cap screws tightened to 2.1 kg-m (15 ft-lb).
3. Install the wheel and secure. Tighten to 5.5 kg-m (40 ft-lb).
4. Adjust the brake (see Adjusting in this sub-section).
5. Remove the ATV from the support stand.

■ **NOTE: Whenever installing new pads, the new pads must be burnished (see Burnishing Brake Pads in this section).**

Burnishing Brake Pads

Brake pads (both hydraulic and mechanical) must be burnished to achieve full braking effectiveness. Braking distance will be extended until brake pads are properly burnished. To properly burnish the brake pads, use the following procedure.

⚠ WARNING

Failure to properly burnish the brake pads could lead to premature brake pad wear or brake loss. Brake loss can result in severe injury.

1. Choose an area large enough to safely accelerate the ATV to 30 mph and to brake to a stop.
2. Accelerate to 30 mph; then compress brake lever or apply the mechanical foot brake to decelerate to 0-5 mph.

3. Repeat procedure on each brake system 5 times until brake pads are burnished.
4. Adjust the mechanical brake (if necessary).
5. Verify that the brakelight illuminates when the hand lever is compressed or the brake pedal is depressed.

Coolant
(400/500)

The cooling system capacity is approximately 2.9 L (3 U.S. qt). The cooling system should be inspected daily for leakage and damage. Also, the coolant level should be checked periodically.

When filling the cooling system, use premixed Arctic Cat Antifreeze (p/n 0638-395). While the cooling system is being filled, air pockets may develop; therefore, run the engine for five minutes after the initial fill, shut the engine off, and then fill the cooling system to the bottom of the stand pipe in the radiator neck.

AN604D

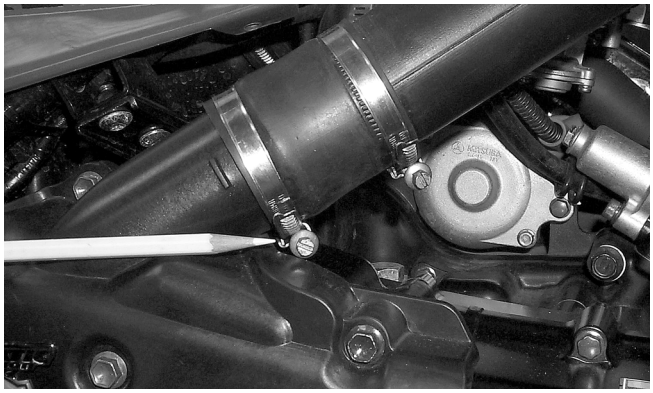
⚠ CAUTION

After operating the ATV for the initial 5-10 minutes, stop the engine, allow the engine to cool down, and check the coolant level. Add coolant as necessary.

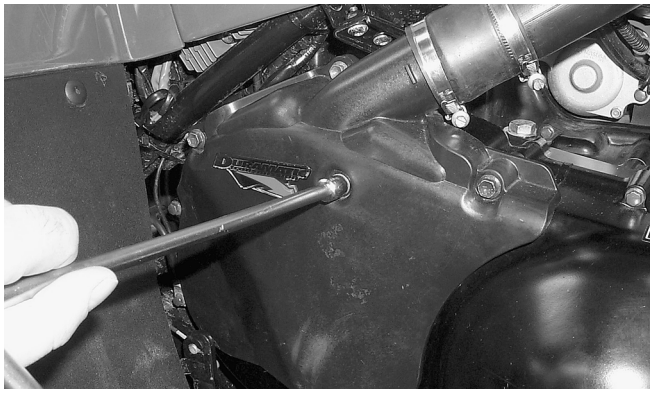
Checking/Replacing V-Belt
(Automatic Transmission)

REMOVING

1. Remove the right-side footrest (see Section 8).
2. Loosen the clamp securing the cooling shroud to the cooling duct.

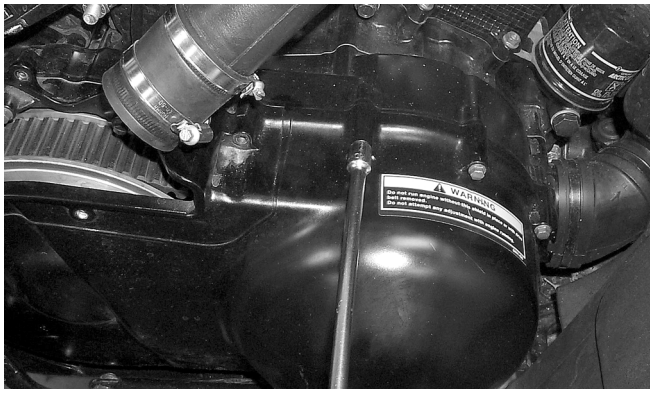

AF931

3. Remove the cap screws securing the cooling shroud to the V-belt cover; then remove the cooling shroud.

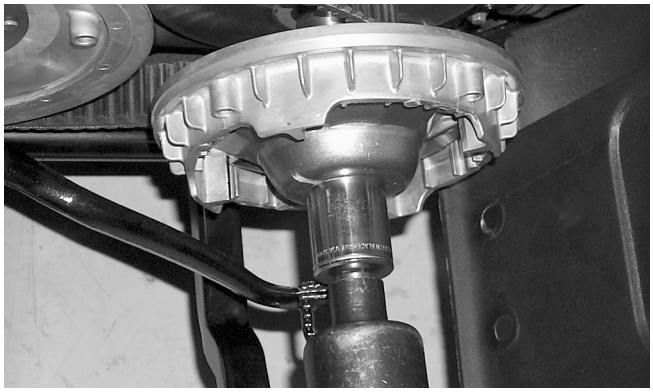

AF932

4. Remove the cap screws securing the V-belt cover noting the location of the different-lengthed cap screws for installing purposes; then using a rubber mallet, gently tap on the cover tabs to loosen the cover. Remove the cover.

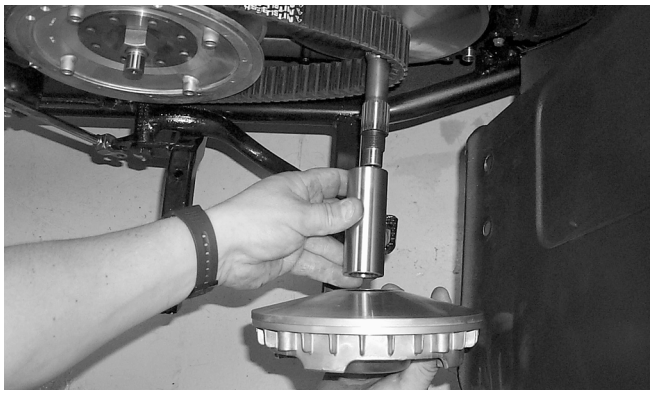
■ NOTE: Note the location of the main engine ground wire for installing purposes.


AF933

5. Remove the nut securing the movable drive face; then remove the face. Account for the spacer.



CC546



CC547

6. Remove the V-belt.

CC550

INSTALLING

1. Spread the faces of the driven clutch by pushing the inner face toward the engine while turning it counterclockwise; then when the faces are separated, insert a wedge (approximately 3/8 in. thick) between the faces. Release the inner face.

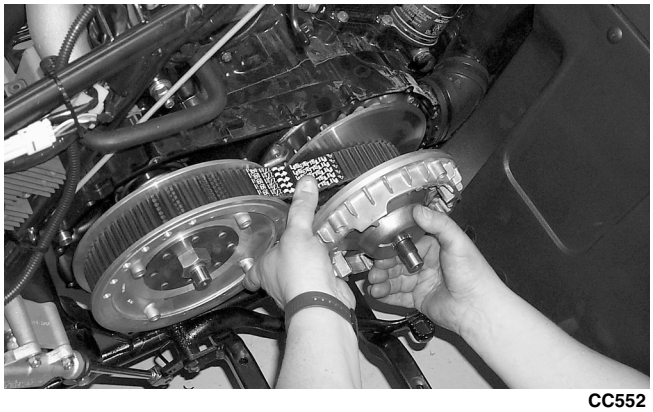
CC549

2. Place the V-belt into position on the driven clutch and over the front shaft.

CC550

■ NOTE: The arrow on the V-belt should point forward.

3. Pinch the V-belt together near its center and slide the spacer and movable drive face onto the driveshaft. Secure the drive face with a nut. Tighten the nut to 10.4-11.8 kg-m (75-85 ft-lb).

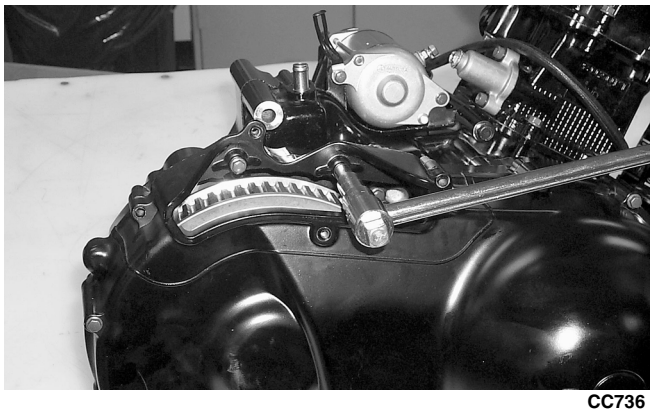


CC552

■ NOTE: At this point, the wedge can be removed from between the driven clutch faces.

4. Rotate the V-belt and clutches until the V-belt is flush with the top of the driven clutch.

5. Place the V-belt cover gasket into position; then install the cover and secure with the cap screws making sure the different-lengthed cap screws are in their proper location. Tighten the cap screws to 1.1 kg-m (8 ft-lb).

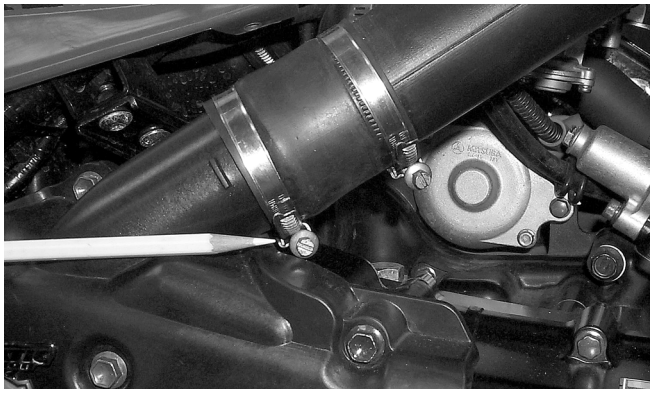


CC736

■ **NOTE: Make sure the main engine ground wire is installed and secured in the proper location.**

6. Place the cooling shroud into position on the V-belt cover; then secure with cap screws. Tighten securely.

7. Tighten the clamp securing the cooling shroud to the cooling duct.



AF931

8. Secure the front fender to the footrest with the two cap screws. Tighten securely.

9. Install the right-side footrest (see Section 8).

SECTION 3 - ENGINE/TRANSMISSION

3

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Engine/Transmission

This section has been organized into sub-sections which show a progression for the complete servicing of the Arctic Cat ATV engine/transmission.

To service the center crankcase halves, the engine/transmission must be removed from the frame.

To service top-side, left-side, and right-side components, the engine/transmission does not have to be removed from the frame.

■ NOTE: Arctic Cat recommends the use of new gaskets, lock nuts, and seals and lubricating all internal components when servicing the engine/transmission.

■ NOTE: Some photographs and illustrations used in this section are used for clarity purposes only and are not designed to depict actual conditions.

Specifications*
(250/300)

VALVES AND GUIDES		
Valve Face Diameter	(intake) (exhaust)	33 mm (1.3 in.) 28 mm (1.1 in.)
Valve/Tappet Clearance (cold engine)	(intake) (exhaust) (exhaust)	0.03-0.08 mm (0.001-0.003 in.) 0.08-0.13 mm (0.003-0.005 in.)** 0.17-0.22 mm (0.007-0.009 in.)
Valve Guide/Stem Clearance	(intake) (exhaust)	0.010-0.037 mm (0.0004-0.0015 in.) 0.030-0.057 mm (0.0012-0.0024 in.)
Valve Guide/Valve Stem Deflection (wobble method)	(max)	0.35 mm (0.014 in.)
Valve Guide Inside Diameter		5.500-5.512 mm (0.2165-0.2170 in.)
Valve Stem Outside Diameter	(intake) (exhaust)	5.475-5.490 mm (0.2156-0.2161 in.) 5.455-5.470 mm (0.2148-0.2154 in.)
Valve Stem Runout	(max)	0.05 mm (0.002 in.)
Valve Head Thickness	(max)	0.5 mm (0.02 in.)
Valve Stem End Length	(max)	2.7 mm (0.11 in.)
Valve Face/Seat Width		0.9-1.1 mm (0.035-0.043 in.)
Valve Seat Angle	(intake) (exhaust)	45° 45°
Valve Face Radial Runout	(max)	0.03 mm (0.001 in.)
Valve Spring Free Length (max)	(inner) (outer)	35.1 mm (1.38 in.) 39.9 mm (1.57 in.)
Valve Spring Tension @ 32.5 mm (1.28 in.)	(inner)	7.1-9.2 kg (15.7-20.3 lb)
Valve Spring Tension @ 36.0 mm (1.42 in.)	(outer)	17.3-21.3 kg (38.1-47.0 lb)

CAMSHAFT AND CYLINDER HEAD		
Cam Lobe Height (min)	(intake) (exhaust)	33.820 mm (1.331 in.) 33.490 mm (1.318 in.)
Camshaft Journal Oil Clearance	(max)	0.15 mm (0.0059 in.)
Camshaft Journal Holder Inside Diameter		22.012-22.025 mm (0.8666-0.8671 in.)
Camshaft Journal Outside Diameter		21.959-21.980 mm (0.8645-0.8654 in.)
Camshaft Runout	(max)	0.10 mm (0.004 in.)
Rocker Arm Inside Diameter		12.000-12.018 mm (0.472-0.473 in.)
Rocker Arm Shaft Outside Diameter		11.977-11.995 mm (0.4715-0.4722 in.)
Cylinder Head Distortion	max)	0.05 mm (0.002 in.)
Cylinder Head Cover Distortion	(max)	0.05 mm (0.002 in.)

CYLINDER, PISTON, AND RINGS			
Piston Skirt/Cylinder Clearance	(max)	0.12 mm (0.0047 in.)	
Cylinder Bore	(max)	68.580 mm (2.700 in.)	66 mm** (2.598 in.)**
Piston Diameter 18 mm (0.71 in.) from Skirt End		68.380 mm (2.6921 in.)	
Piston Ring Free End Gap	(1st ring) (2nd ring)	6.2-7.8 mm (0.24-0.31 in.) 7.3-9.1 mm (0.29-0.36 in.)	
Bore x Stroke		68.5 x 76 mm (2.69 x 2.99 in.)	66 x 72 mm** (2.60 x 2.84 in.)**
Cylinder Trueness	(max)	0.05 mm (0.002 in.)	
Piston Ring End Gap - Installed (max)	(1st ring) (2nd ring)	0.70 mm (0.0276 in.) 1.0 mm (0.039 in.)	
Piston Ring to Groove Clearance (max)	(1st) (2nd)	0.180 mm (0.0071 in.) 0.150 mm (0.0059 in.)	
Piston Ring Groove Width	(1st) (2nd) (oil)	1.01-1.04 mm (0.040-0.041 in.) 1.22-1.24 mm (0.048-0.049 in.) 2.01-2.03 mm (0.079-0.080 in.)	
Piston Ring Thickness	(1st) (2nd)	0.97-0.99 mm (0.038-0.039 in.) 1.17-1.19 mm (0.046-0.047 in.)	
Piston Pin Bore	(max)	17.03 mm (0.6705 in.)	
Piston Pin Outside Diameter	(min)	16.98 mm (0.6685 in.)	

CRANKSHAFT		
Connecting Rod (small end inside diameter)	(max)	17.040 mm (0.6709 in.)
Connecting Rod (big end side-to-side)		0.1-1.0 mm (0.004-0.039 in.)
Connecting Rod (big end width)		17.95-18.00 mm (0.707-0.709 in.)
Connecting Rod (small end deflection)	(max)	3 mm (0.12 in.)
Crankshaft (web-to-web)		54.9-55.1 mm (2.161- 2.169 in.)
Crankshaft Runout (max)	(left) (right)	0.05 mm (0.002 in.) 0.08 mm (0.003 in.)
Oil Pump Reduction Ratio		1.566 (47/30)
Oil Pressure at 60°C (140°F) @3000 RPM	(above) (below)	0.7 kg/cm (10 psi) 2.8 kg/cm (40 psi)

Specifications*
(375)

CLUTCH		
Clutch Release Screw		1/8 turn back
Drive Plate (fiber) Thickness	(min)	2.42 mm (0.094 in.)
Drive Plate (fiber) Tab	(min)	11 mm (0.43 in.)
Driven Plate (warpage)	(max)	0.1 mm (0.004 in.)
Clutch Spring Length	(min)	27.5 mm (1.08 in.)
Clutch Wheel Inside Diameter	(max)	Scuffing of contact surface
Starter Clutch Shoe		No groove at any part
Clutch Engagement	RPM	1900 ± 200
Clutch Lock-Up	RPM	3400 ± 300
Primary Reduction Ratio		3.150 (63/20)
Secondary Reduction Ratio		1.125 (18/16)
Final Reduction Ratio	(front) (rear)	3.090 (34/11) 3.647 (62/17)
Secondary-Transmission Reduction Ratio	(super low) (low) (high)	3.176 (17/18 x 25/11 x 37/25) 1.480 (37/25) 1.112 (11/25 x 18/17 x 43/18)
Gear Ratios	(1st) (2nd) (3rd) (4th) (5th) (reverse)	3.083 (37/12) 1.933 (29/15) 1.388 (25/18) 1.095 (23/21) 0.913 (21/23) 2.833 (29/12 x 34/29)
Engine Fork To Groove (side clearance)		0.10-0.50 mm (0.004-0.020 in.)
Secondary Transmission Fork to Groove (side clearance)		0.05-0.50 mm (0.002-0.020 in.)
Reverse Fork to Groove (side clearance)		0.10-0.50 mm (0.004-0.020 in.)
Shift Fork Groove Width	(#1, #2, & #3) (secondary transmission - #1 & #2) (reverse)	4.5-4.6 mm (0.177-0.181 in.) 5.45-5.55 mm (0.215-0.219 in.) 4.0-4.1 mm (0.157-0.161 in.)
Shift Fork Thickness	(#1, #2, & #3) (secondary transmission - #1 & #2) (reverse)	4.3-4.4 mm (0.169-0.173 in.) 5.3-5.4 mm (0.209-0.213 in.) 3.8-3.9 mm (0.150-0.154 in.)
Engine Oil Thermo-Switch Operating Temperature	(off↔on) (on↔off)	160°C (320°F) 140°C (284°F)

* Specifications subject to change without notice.

**250

VALVES AND GUIDES		
Valve Face Diameter	(intake) (exhaust)	30.6 mm (1.20 in.) 27.0 mm (1.06 in.)
Valve/Tappet Clearance (cold engine)	(intake) (exhaust)	0.05-0.10 mm (0.002-0.004 in.) 0.17-0.22 mm (0.007-0.009 in.)
Valve Guide/Stem Clearance	(intake) (exhaust)	0.010-0.037 mm (0.0004-0.0015 in.) 0.030-0.057 mm (0.0012-0.0022 in.)
Valve Guide/Valve Stem Deflection (wobble method)	(max)	0.35 mm (0.014 in.)
Valve Guide Inside Diameter		5.000-5.012 mm (0.1969-0.1973 in.)
Valve Stem Outside Diameter	(intake) (exhaust)	4.975-4.990 mm (0.1959-0.1965 in.) 4.955-4.970 mm (0.1951-0.1957 in.)
Valve Stem Runout	(max)	0.05 mm (0.002 in.)
Valve Head Thickness	(max)	0.5 mm (0.02 in.)
Valve Stem End Length	(max)	2.3 mm (0.09 in.)
Valve Face/Seat Width		0.9-1.1 mm (0.035-0.043 in.)
Valve Seat Angle	(intake) (exhaust)	45° 45°
Valve Face Radial Runout	(max)	0.03 mm (0.001 in.)
Valve Spring Free Length	(max) (inner) (outer)	 35.1 mm (1.38 in.) 37.8 mm (1.49 in.)
Valve Spring Tension @ 28 mm (1.10 in.)	(inner)	5.4-6.4 kg (12-14 lb)
Valve Spring Tension @ 31.5 mm (1.24 in.)	(outer)	13.2-15.0 kg (29-33 lb)
CAMSHAFT AND CYLINDER HEAD		
Cam Lobe Height (min)	(intake) (exhaust)	32.830 mm (1.293 in.) 32.830 mm (1.293 in.)
Camshaft Journal Oil Clearance	(max)	0.15 mm (0.0059 in.)
Camshaft Journal Holder Inside Diameter	(right & center) (left)	22.012-22.025 mm (0.8666-0.8671 in.) 17.512-17.525 mm (0.6894-0.6900 in.)
Camshaft Journal Outside Diameter	(right & center) (left)	21.959-21.980 mm (0.8645-0.8654 in.) 17.466-17.484 mm (0.6876-0.6883 in.)
Camshaft Runout	(max)	0.10 mm (0.004 in.)
Rocker Arm Inside Diameter		12.000-12.018 mm (0.472-0.473 in.)
Rocker Arm Shaft Outside Diameter		11.973-11.984 mm (0.4714-0.4718 in.)
Cylinder Head Distortion	(max)	0.05 mm (0.002 in.)
Cylinder Head Cover Distortion	(max)	0.05 mm (0.002 in.)

Specifications*
(400/500)

■ **NOTE: Specifications for the clutch components apply to the manual transmission models only.**

CYLINDER, PISTON, AND RINGS		
Piston Skirt/Cylinder Clearance		0.065-0.075 mm (0.0026-0.0030 in.)
Cylinder Bore		82.000-82.015 mm (3.2283-3.2289 in.)
Piston Diameter 15 mm (0.6 in.) from Skirt End		81.930-81.945 mm (3.2256-3.2262 in.)
Piston Ring Free End Gap (max)	(1st ring) (2nd ring)	8.9 mm (0.3504 in.) 8.3 mm (0.3268 in.)
Bore x Stroke		82 x 71.2 mm (3.29 x 2.80 in.)
Cylinder Trueness	(max)	0.05 mm (0.002 in.)
Piston Ring End Gap - Installed	(max)	0.50 mm (0.020 in.)
Piston Ring to Groove Clearance (max)	(1st) (2nd)	0.180 mm (0.0071 in.) 0.150 mm (0.0059 in.)
Piston Ring Groove Width	(1st) (2nd) (oil)	1.01-1.03 mm (0.0398-0.0406 in.) 1.01-1.03 mm (0.0398-0.0406 in.) 2.01-2.03 mm (0.0791-0.0799 in.)
Piston Ring Thickness	(1st) (2nd)	0.97-0.99 mm (0.0381-0.0389 in.) 0.97-0.99 mm (0.0381-0.0389 in.)
Piston Pin Bore	(max)	20.03 mm (0.789 in.)
Piston Pin Outside Diameter	(min)	19.98 mm (0.787 in.)
CRANKSHAFT		
Connecting Rod (small end inside diameter)	(max)	21.04 mm (0.8283 in.)
Connecting Rod (big end side-to-side)		0.1-1.0 mm (0.004-0.039 in.)
Connecting Rod (big end width)		21.95-22.00 mm (0.8642-0.8661 in.)
Connecting Rod (small end deflection)	(max)	3 mm (0.12 in.)
Crankshaft (web-to-web)		60.9-61.1 mm (2.398-2.406 in.)
Crankshaft Runout	(max)	0.08 mm (0.003 in.)
Oil Pump Reduction Ratio		1.59 (29/20)
Oil Pressure at 60°C (140°F) @3000 RPM	(above) (below)	1.53 kg/cm² (21.7 psi) 3.57 kg/cm² (50.8 psi)
Engine Oil Thermo-Switch Operating Temperature	(off↔on) (on↔off)	160°C (320°F) 140°C (284°F)

* Specifications subject to change without notice.

VALVES AND GUIDES		
Valve Face Diameter	(intake) (exhaust)	30.6 mm (1.20 in.) 27.0 mm (1.06 in.)
Valve/Tappet Clearance (cold engine)	(intake) (exhaust)	0.05-0.10 mm (0.002-0.004 in.) 0.17-0.22 mm (0.007-0.009 in.)
Valve Guide/Stem Clearance	(intake) (exhaust)	0.010-0.037 mm (0.0004-0.0015 in.) 0.030-0.057 mm (0.0012-0.0022 in.)
Valve Guide/Valve Stem Deflection (wobble method)	(max)	0.35 mm (0.014 in.)
Valve Guide Inside Diameter		5.000-5.012 mm (0.1969-0.1973 in.)
Valve Stem Outside Diameter	(intake) (exhaust)	4.975-4.990 mm (0.1959-0.1965 in.) 4.955-4.970 mm (0.1951-0.1957 in.)
Valve Stem Runout	(max)	0.05 mm (0.002 in.)
Valve Head Thickness	(max)	0.5 mm (0.02 in.)
Valve Stem End Length	(max)	1.8 mm (0.07 in.)
Valve Face/Seat Width		0.9-1.1 mm (0.035-0.043 in.)
Valve Seat Angle	(intake) (exhaust)	45° 45°
Valve Face Radial Runout	(max)	0.03 mm (0.001 in.)
Valve Spring Free Length (max)	(inner) (outer)	35.1 mm (1.38 in.) 37.8 mm (1.49 in.)
Valve Spring Tension @ 28 mm (1.10 in.)	(inner)	5.3-6.5 kg (11.7-14.3 lb)
Valve Spring Tension @ 31.5 mm (1.24 in.)	(outer)	13.1-15.1 kg (28.9-33.3 lb)
CAMSHAFT AND CYLINDER HEAD		
Cam Lobe Height (min)	(intake) (exhaust)	33.150 mm (1.305 in.) 33.220 mm (1.308 in.)
Camshaft Journal Oil Clearance	(max)	0.15 mm (0.0059 in.)
Camshaft Journal Holder Inside Diameter	(right & center) (left)	22.012-22.025 mm (0.8666-0.8671 in.) 17.512-17.525 mm (0.6894-0.6900 in.)
Camshaft Journal Outside Diameter	(right & center) (left)	21.959-21.980 mm (0.8645-0.8654 in.) 17.465-17.484 mm (0.6876-0.6883 in.)
Camshaft Runout	(max)	0.10 mm (0.004 in.)
Cam Chain Length	(max)	128.9 mm (5.07 in.)
Rocker Arm Inside Diameter		12.000-12.018 mm (0.472-0.473 in.)
Rocker Arm Shaft Outside Diameter		11.973-11.984 mm (0.4714-0.4718 in.)
Cylinder Head Distortion	(max)	0.05 mm (0.002 in.)
Cylinder Head Cover Distortion	(max)	0.05 mm (0.002 in.)

CYLINDER, PISTON, AND RINGS

Piston Skirt/Cylinder Clearance		0.045-0.120 mm (0.0018-0.0047 in.)	0.038-0.076 mm** (0.0015-0.0030 in.)**
Cylinder Bore		84.000-84.085 mm (3.3071-3.3104 in.)	87.500-87.515 mm** (3.4448-3.4454 in.)**
Piston Diameter 15 mm (0.6 in.) from Skirt End		83.880-83.965 mm (3.3024-3.3057 in.)	87.465-87.470 mm** (3.4435-3.4437 in.)**
Piston Ring Free End Gap	(1st ring)	8.4-10.5 mm (approx) (0.33-0.41 in.)	11.3 mm (max)** (0.4448 in.)**
	(2nd ring)	9.5-11.8 mm (approx) (0.37-0.46 in.)	9.7 mm (max)** (0.3818 in.)**
Bore x Stroke		84 x 67 mm (3.30 x 2.64 in.)	87.5 x 82 mm** (3.40 x 3.22 in.)**
Cylinder Trueness	(max)	0.05 mm (0.002 in.)	
Piston Ring End Gap - Installed	(max)	0.50 mm (0.020 in.)	0.70 mm** (0.0276 in.)**
Piston Ring to Groove Clearance (max)	(1st)	0.180 mm (0.0071 in.)	
	(2nd)	0.150 mm (0.0059 in.)	
Piston Ring Groove Width	(1st)	1.21-1.23 mm (0.0476-0.0484 in.)	1.01-1.03 mm** (0.0397-0.0405 in.)**
	(2nd)	1.21-1.23 mm (0.0476-0.0484 in.)	
	(oil)	2.51-2.53 mm (0.0988-0.0996 in.)	
Piston Ring Thickness	(1st)	1.17-1.19 mm (0.046-0.047 in.)	0.97-0.99 mm** (0.0382-0.0389 in.)**
	(2nd)	1.17-1.19 mm (0.046-0.047 in.)	
Piston Pin Bore	(max)	21.03 mm (0.828 in.)	23.03 mm** (0.907 in.)**
Piston Pin Outside Diameter	(min)	20.98 mm (0.826 in.)	22.98 mm** (0.905 in.)**

CRANKSHAFT

Connecting Rod (small end inside diameter)	(max)	21.04 mm (0.8283 in.)	23.04 mm** (0.9070 in.)**
Connecting Rod (big end side-to-side)		0.1-1.0 mm (0.004-0.039 in.)	
Connecting Rod (big end width)		25.95-26.00 mm (1.022-1.024 in.)	24.95-25.00 mm** (0.9822-0.9842 in.)**
Connecting Rod (small end deflection)	(max)	3 mm (0.12 in.)	
Crankshaft (web-to-web)		70.9-71.1 mm (2.796-2.804 in.)	
Crankshaft Runout	(max)	0.05 mm (0.002 in.)	0.08 mm** (0.003 in.)**
Oil Pump Reduction Ratio		1.45 (29/20)	
Oil Pressure at 60°C (140°F) @3000 RPM	(above)	1.3 kg/cm² (18 psi)	1.9 kg/cm² (27 psi)***
	(below)	1.7 kg/cm² (24 psi)	2.5 kg/cm² (36 psi)***

CLUTCH

Clutch Release Screw		1/8 turn back	1/4-1/2 turn back**
Drive Plate (fiber) Thickness	(min)	2.62 mm (0.103 in.)	2.92-3.08 mm** (0.1149-0.1212 in.)**
Drive Plate (fiber) Tab		13-14 mm (0.50-0.55 in.)	13.05 mm (min)** (0.5137 in.)**
Driven Plate (warpage)	(max)	0.1 mm (0.004 in.)	
Clutch Spring Length	(min)	33.7 mm (1.33 in.)	
Clutch Wheel Inside Diameter		139.8-140.2 mm (5.504-5.520 in.)	140.0-140.2 mm** (5.511-5.520 in.)**
Starter Clutch Shoe		No groove at any part	
Clutch Engagement	RPM	1700 ± 200	
Clutch Lock-Up	RPM	3500 ± 300	3600 ± 300**
Primary Reduction Ratio		2.392 (67/28)	
Secondary Reduction Ratio		1.133 (17/15)	
Final Reduction Ratio	(front)	3.6 (36/10)	
	(rear)	3.6 (36/10)	
Secondary-Transmission Reduction Ratio	(low)	2.363 (22/23 x 28/17 x 42/28)	
	(high)	1.5 (42/28)	
Gear Ratios	(1st)	3.09 (34/11)	
	(2nd)	1.75 (28/16)	
	(3rd)	1.2 (24/20)	
	(4th)	0.956 (22/23)	
	(5th)	0.8 (20/25)	
	(reverse)	2.636 (24/11 x 29/24)	
Engine Fork To Groove (side clearance)		0.1-0.3 mm (0.004-0.012 in.)	
Secondary Transmission Fork to Groove (side clearance)	(max)	0.2 mm (0.008 in.)	
Reverse Fork to Groove (side clearance)	(max)	0.3 mm (0.012 in.)	0.2 mm** (0.008 in.)**
Shift Fork Groove Width	(#1and #2)	5.5-5.6 mm (0.217-0.220 in.)	
	(secondary transmission)	5.4-5.5 mm (0.213-0.217 in.)	
	(reverse)	5.0-5.1 mm (0.197-0.201 in.)	4.9-5.0 mm** (0.193-0.197 in.)**
Shift Fork Thickness	(#1 and #2)	5.3-5.4 mm (0.209-0.213 in.)	
	(secondary transmission)	5.3-5.4 mm (0.209-0.213 in.)	
	(reverse)	4.8-4.9 mm (0.189-0.193 in.)	
Thermostat Valve Opening Temperature		48.5-51.5°C (119.3-124.7°F)	73.5-76.5°C** (164-170°F)**
Thermostat Valve Lift		Over 3 mm (0.12 in.) @ 65° C (149° F)	
Cooling Fan Thermo-Switch Operating Temperature	(off↔on)	Constant	88-93°C** (190-200°F)**
	(on↔off)	Constant	81°C** (177°F)** (min)

* Specifications subject to change without notice.

** 500

*** 500 Automatic Transmission

3

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(250/300)

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Removing Engine/ Transmission

Many service procedures can be performed without removing the engine/transmission from the frame. Closely observe the note introducing each sub-section for this important information.

☞ AT THIS POINT

If the technician's objective is to service/replace left-side cover oil seals (3), front output joint oil seal (1), rear output joint oil seal (1), and/or the oil strainer (from beneath the engine/ transmission), the engine/transmission does not have to be removed from the frame.

Secure the ATV on a support stand to elevate the wheels.

⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

1. Remove the seat.
2. Disconnect the battery by removing the negative cable first and then the positive cable.
3. Remove the battery hold-down bracket; then remove the battery.

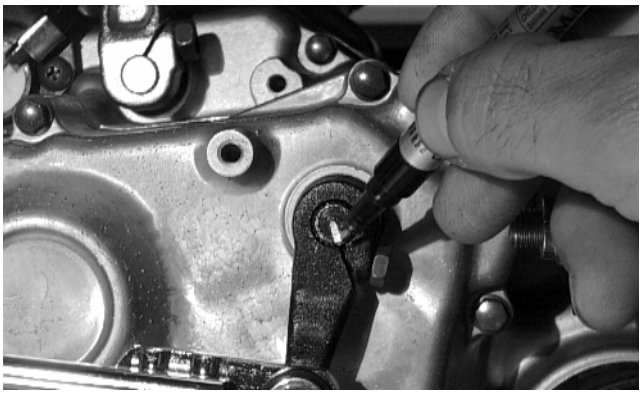
⚠ CAUTION

Battery acid is harmful if it contacts eyes, skin, or clothing. Care must be taken whenever handling a battery.

4. Drain the oil from the engine/transmission.

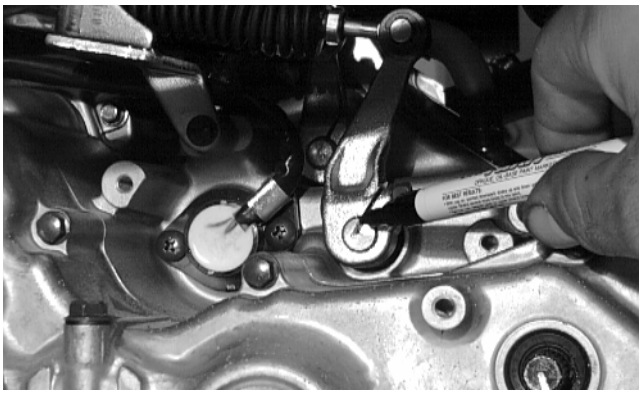
■ NOTE: To drain the oil completely, both the engine and transmission plugs must be removed.

5. Turn the gas tank valve to the OFF position.
6. Remove the springs securing the exhaust header pipe to the engine.
7. Loosen the exhaust pipe from the muffler and the frame; then remove the exhaust pipe. Account for grafoil gaskets.
8. Mark the position of the hi/low range shifter arm; then remove the hi/low range shifter arm.



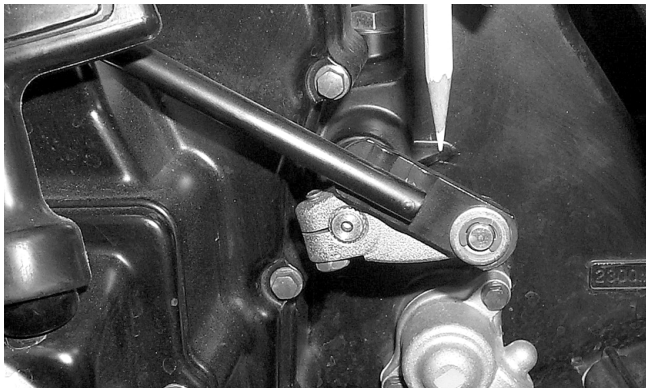
CH057D

9. Mark the gear shifter arm; then remove the cap screw securing the gear shifter arm.



CH059D

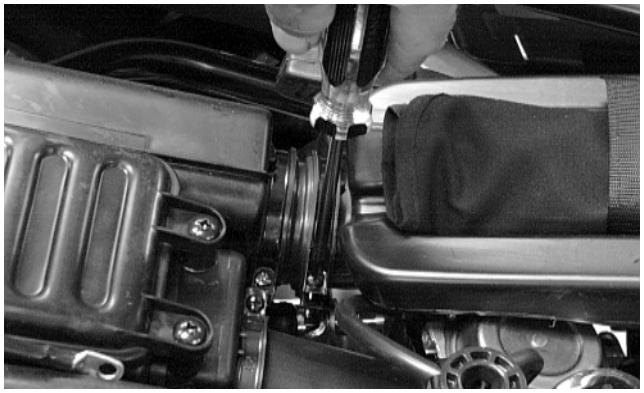
10. Mark the reverse gear shaft arm to the reverse shift shaft to aid in installing; then remove the cap screw securing the reverse gear shaft arm to the reverse shift shaft.



AF942

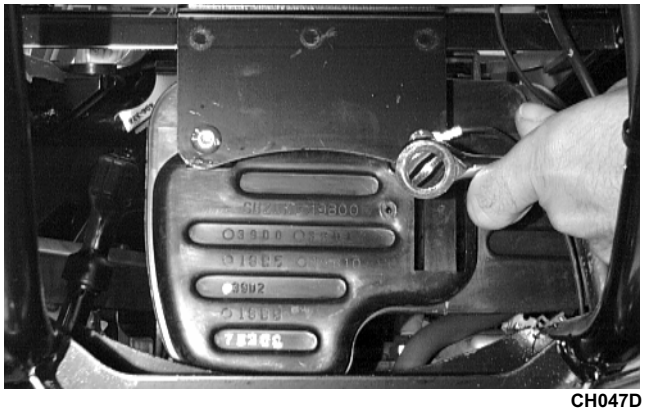
11. Remove the cap screws securing the air-intake snorkel to the frame; then loosen the hose clamp at the air-cleaner assembly.

12. Loosen the clamps securing the carburetor boots to the air intake and the engine.



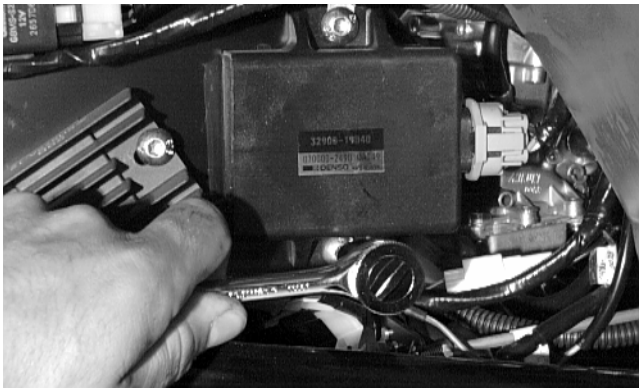
CH041D

13. Remove the cap screws securing the air-cleaner assembly to the rear of the ATV.



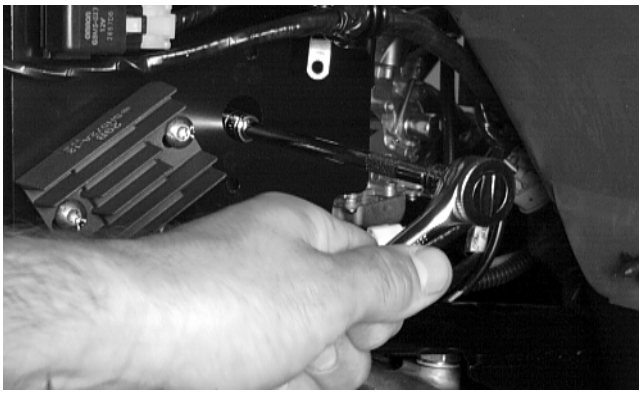
CH047D

14. Remove the cap screws securing the CDI unit.



AF882D

15. Remove the remaining cap screw securing the air-cleaner assembly to the frame; then remove the crankcase breather hoses from the air-cleaner assembly and remove the assembly.



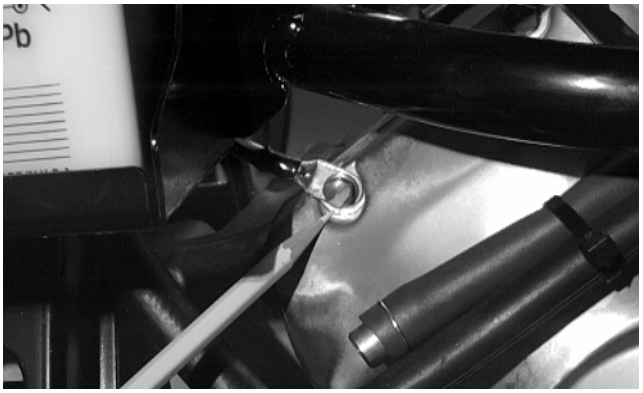
CH048D

16. Route the carburetor assembly up and away from the engine.

■ **NOTE: It will not be necessary to disconnect the choke cable. Also, use cable ties or tape to secure the carburetor assembly to keep it from interfering with the removal procedure.**

17. Disconnect the positive cable from the starter motor.

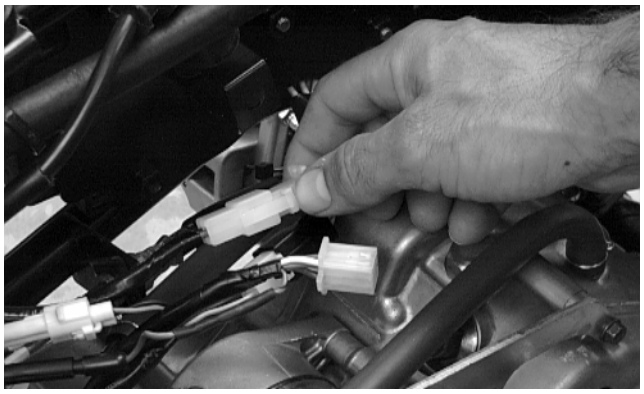
18. Disconnect the battery ground (negative) cable from the crankcase cover.



CH064D

19. Disconnect the high tension lead from the spark plug.

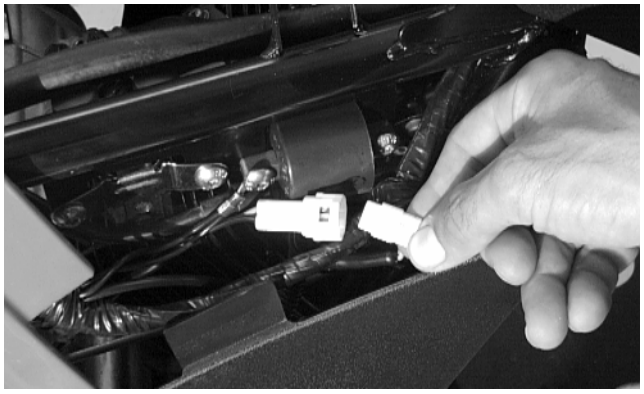
20. Disconnect the main wiring harness connectors.



CH065D

21. Remove the right-hand side panel.

22. Disconnect the oil light switch.



CH067D

23. Remove the rear hydraulic brake caliper.

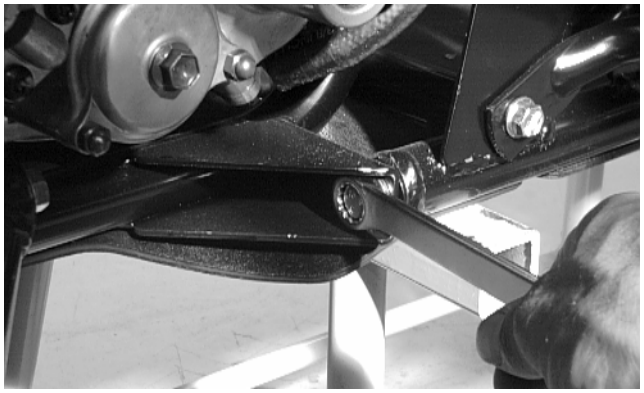
24. Remove the mechanical foot brake.

25. Remove the torx-head screw securing the brake hose to the upper suspension arm.

26. Remove the two oil cooler hoses from the engine.

27. Remove the skid plate from the rear end assembly.

28. Remove the two lower cap screws securing the sub-frame/engine assembly to the frame.



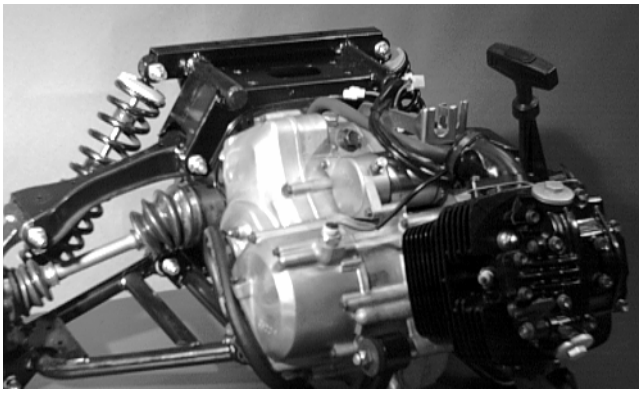
CH071D

29. Secure the upper rear of the ATV to the support stand using tie-down straps to help prevent the ATV from falling forward when the engine/sub-frame assembly is removed.

⚠ WARNING

Support the ATV so it doesn't fall off the support stand when the engine/sub-frame assembly is removed from the frame or severe damage, injury, or death may result.

30. Place a large floor/transmission jack under the engine assembly; then remove the upper four cap screws securing the sub-frame to the frame. Place the engine assembly on a suitable work stand and remove the wheels.



CH073D

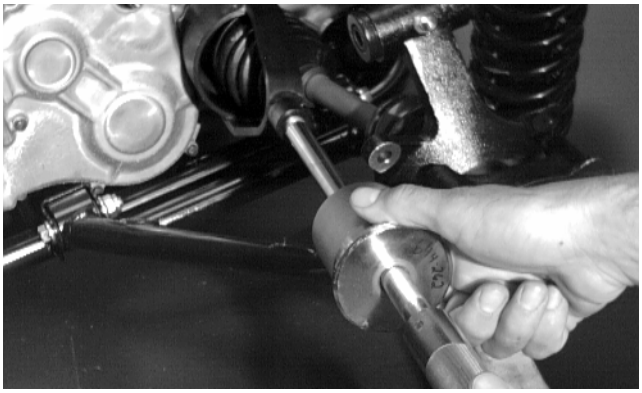
31. Remove the cap screw securing the front engine mount to the sub-frame. Account for spacers.

32. Remove the upper shock mount cap screw to allow access for removal of the two rear engine mount cap screws.

33. Remove the two rear cap screws and flat washers securing the engine to the sub-frame.

34. Remove the rear upper A-arm cap screws.

35. Using Side Case Puller (p/n 0644-262) with an adapter, remove each drive axle assembly.



CH078D

Top-Side Components

■**NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.**

☞ AT THIS POINT
To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

■**NOTE: The engine/transmission does not have to removed from the frame for this procedure.**

Removing Top-Side Components

A. Valve Cover
B. Cylinder Head

■**NOTE: Remove the spark plug and timing inspection plug; then using the recoil starter, rotate the crankshaft to top-dead-center of the compression stroke.**

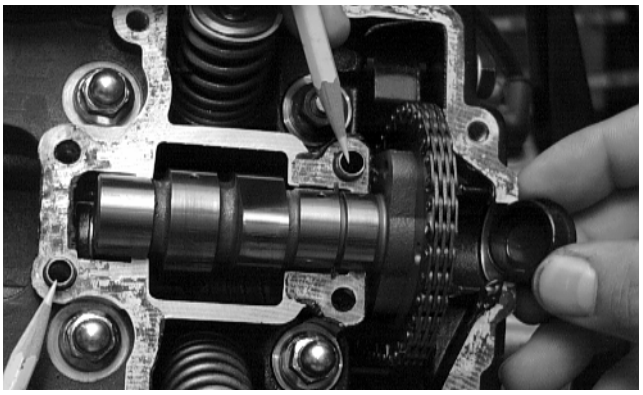
CC411D

1. Remove the cap screws securing the two tappet covers; then remove the covers. Account for the O-rings.

CC366D

2. Remove the cap screws securing the valve cover to the head; account for the locations of any rubber washers on top side cap screws. Remove the valve cover. Account for the cylinder head plug. Note the location of two alignment pins.

■**NOTE: If removing the valve cover only, the two cap screws w/rubber washers next to the compression release lever do not have to be removed.**

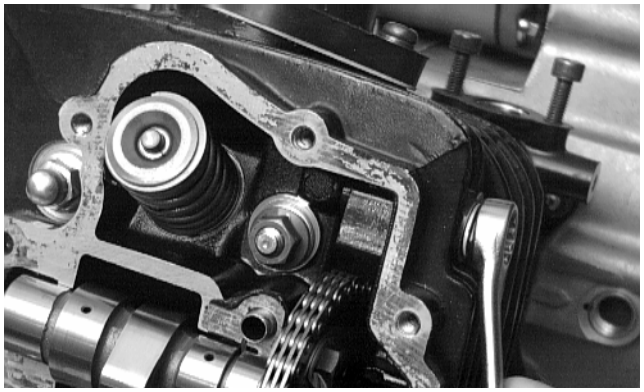


CC368D

3. Loosen the cap screw on the end of the chain tensioner; then remove the two Allen-head cap screws securing the tensioner adjuster assembly and remove the assembly. Account for a gasket.

CC524D

4. Remove the cap screw securing the chain tensioner pad (account for a washer).



CC371D

5. Bend the washer tabs and remove the two cap screws securing the sprocket to the camshaft; then drop the sprocket off the camshaft. While holding the chain, slide the sprocket and camshaft out of the cylinder head. Account for an alignment pin.

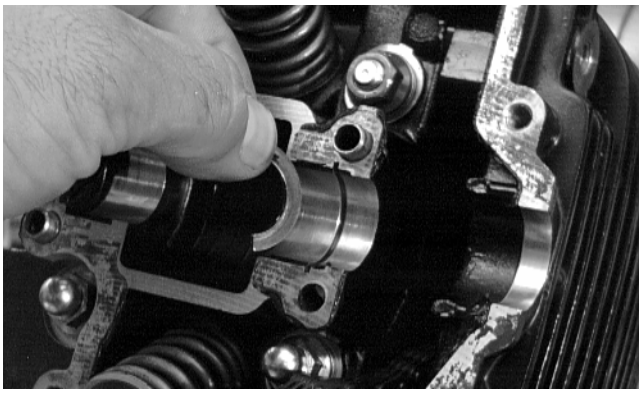
CC372D

CC373D

■ NOTE: Loop the chain over the cylinder and secure it with a wire to keep it from falling into the crankcase.

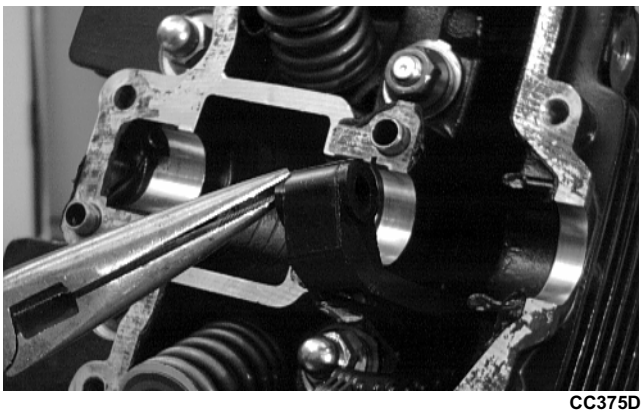
6. Using an awl, rotate the C-ring in its groove until it is out of the cylinder head; then remove the C-ring.

■ NOTE: Care should be taken not to drop the C-ring down into the crankcase.



CC374D

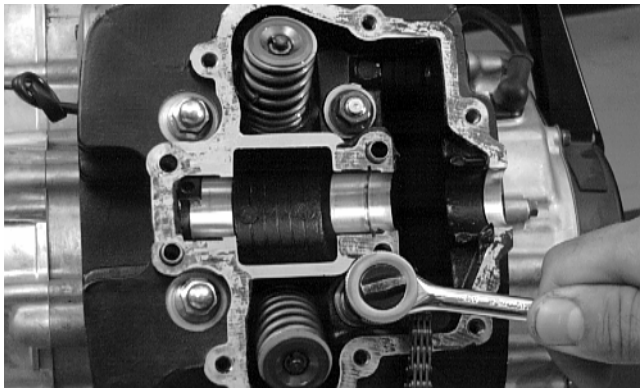
7. Using a pair of needle-nose pliers, remove the chain tensioner pad.



CC375D

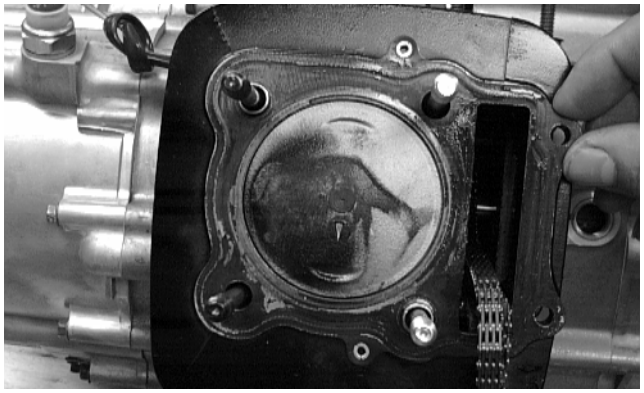
8. Remove the nuts securing the cylinder head to the cylinder; then remove the three cylinder head cap nuts and one nut with copper washers (note location of the cap nuts and nuts).

CC376D



CC377D

9. Remove the cylinder head from the cylinder, remove the gasket, and account for two alignment pins.



CC378D

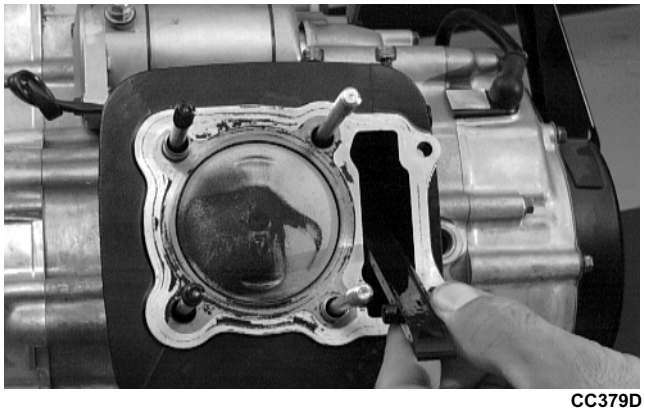
☞ AT THIS POINT

To service valves and cylinder head, see Servicing Top-Side Components sub-section.

10. Remove the cam chain guide.

☞ AT THIS POINT

To inspect cam chain guide, see Servicing Top-Side Components sub-section.



CC379D

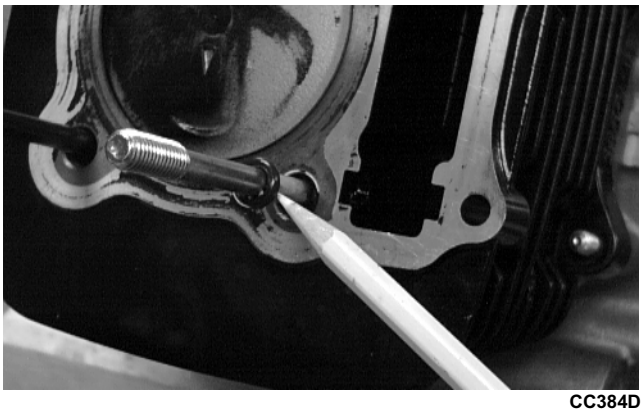
C. Cylinder
D. Piston

■ NOTE: Steps 1-10 in the preceding sub-section must precede this procedure.

11. Remove the two nuts securing the cylinder to the crankcase.

12. Lift the cylinder off the crankcase taking care not to allow the piston to drop against the crankcase. Account for the gasket and two alignment pins.

■ NOTE: It may be necessary to remove the stud w/O-ring to aid in removing the cylinder; however, there is no stud O-ring on the 250.



CC384D

CC381D

☞ AT THIS POINT

To service cylinder, see Servicing Top-Side Components sub-section.

⚠ CAUTION

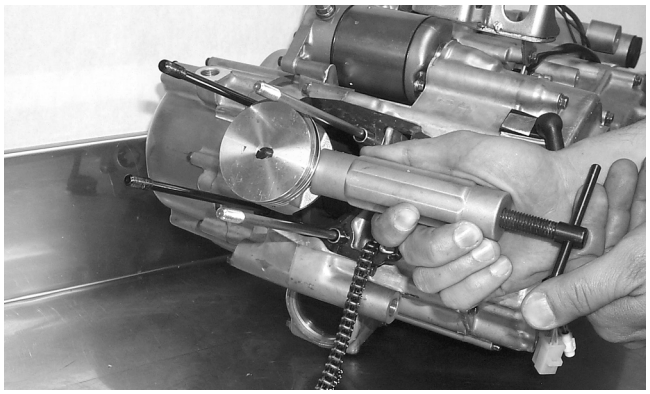
When removing the cylinder, be sure to support the piston to prevent damage to the crankcase and piston.

13. Using an awl, remove one piston-pin circlip.

CC382D

14. Using a piston-pin puller, remove the piston pin. Account for the opposite-side circlip. Remove the piston.

■NOTE: It is advisable to remove the opposite-side circlip prior to using the puller.



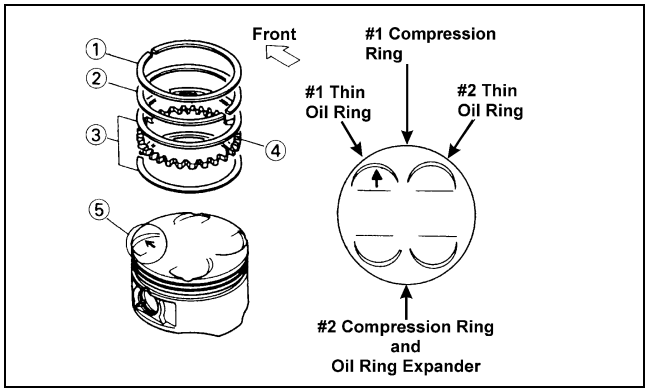
CC526D

■NOTE: Support the connecting rod with rubber bands to avoid damaging the rod or install a connecting rod holder.

⚠ CAUTION

Do not allow the connecting rod to go down inside the crankcase. If the rod is down inside the crankcase and the crankshaft is rotated, severe damage will result.

■NOTE: If the existing rings will not be replaced with new rings, note the location of each ring for proper installation. When replacing with new rings, replace as a complete set only. If the piston rings must be removed, remove them in this sequence.



ATV-1085

A. Starting with the top ring, slide one end of the ring out of the ring-groove.

B. Remove each ring by working it toward the dome of the piston while rotating it out of the groove.

☞ AT THIS POINT

To service piston, see Servicing Top-Side Components sub-section.

☞ AT THIS POINT

To service center crankcase components only, proceed to Removing Left-Side Components.

Left-Side Components

■NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.

☞ AT THIS POINT

To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

■NOTE: The engine/transmission does not have to be removed from the frame for this procedure.

Removing Left-Side Components

A. Recoil Starter
B. Starter Cup
C. Cover/Stator Assembly

1. Remove the cap screws securing the recoil starter assembly to the left-side cover; then remove the starter noting the location of the single washer. Account for the gasket.

☞ AT THIS POINT

To service the recoil starter, see Servicing Left-Side Components sub-section.

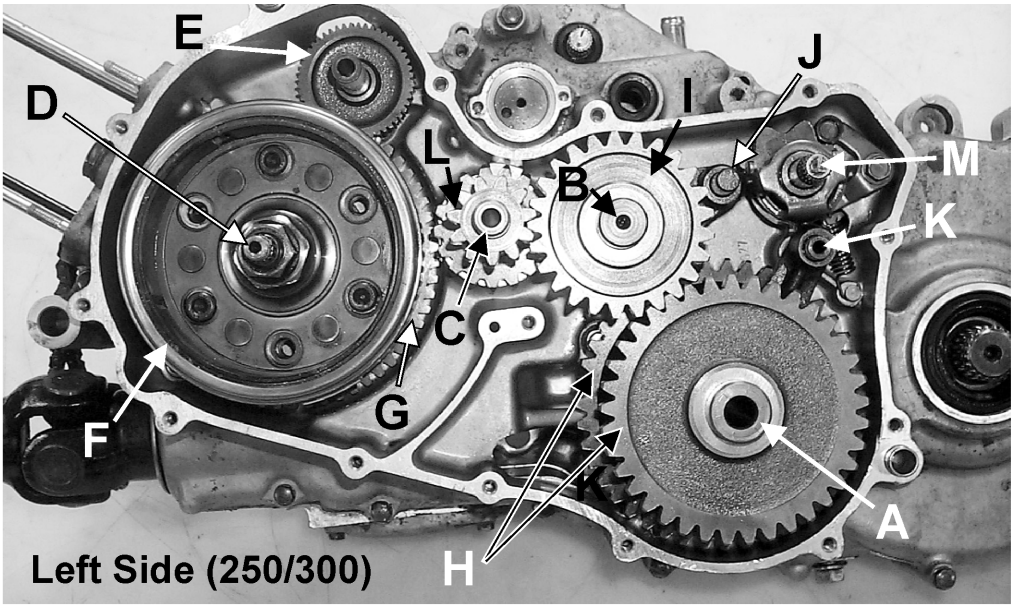
2. Remove the nut and lock washer securing the starter cup to the crankshaft; then remove the starter cup. Account for the O-ring inside the cup.

3. Lay the engine/transmission on its right side; then remove the cap screws securing the left-side cover to the crankcase and note the location of the different-sized cap screws.

4. Remove the left-side cover w/stator assembly. Account for a gasket, two alignment pins, and a starter idler gear spacer.

■NOTE: Inspect the inside of the left-side cover for any shaft washers that may have come off with the cover. Make sure they are returned to their respective shafts and that the starter idler gear spacer is on the shaft or in the cover.

■NOTE: For steps 5-21, refer to illustration CC846A.



KEY CC846A

A. Sub-Transmission Shaft	H. Driven Gear Assembly
B. Driveshaft	I. Drive Gear Assembly
C. Countershaft	J. Shift Shaft with Fork (Short)
D. Crankshaft	K. Shift Shaft with Fork (Long, 4x4 only)
E. Starter Idler Gear Assembly	L. Idler Gear with Two Washers
F. Magneto Rotor Assembly	M. Sub-Transmission Gear Cam
G. Starter Clutch Gear Assembly	

CC846A

■NOTE: To aid in installing, it is recommended that the assemblies are kept together and IN ORDER.

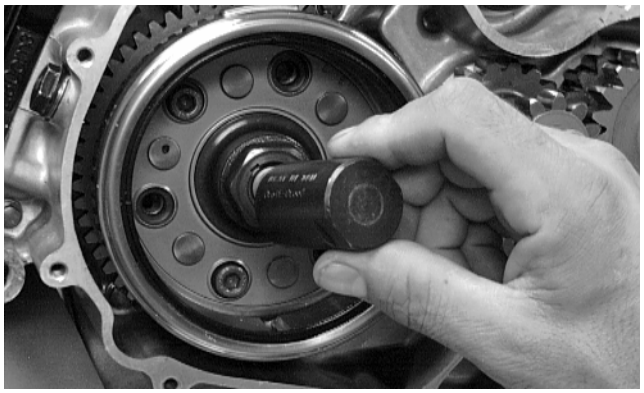
5. Remove the nut securing the magneto rotor to the crankshaft (D).

6. Remove the starter idler gear assembly (E); then account for the spacer, the starter idler gear, and shaft.

D. Magneto Rotor
E. Idle Gear Assembly

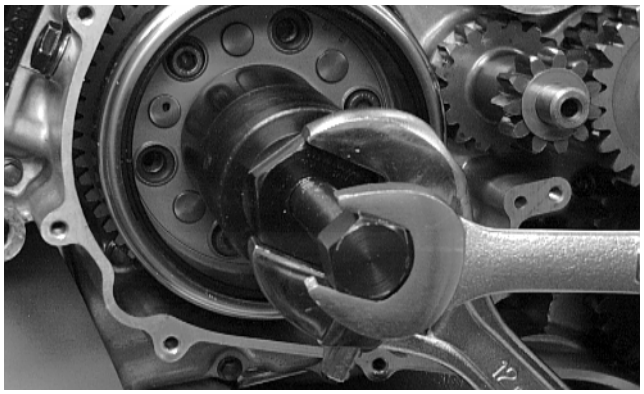
■NOTE: Steps 1-6 in the preceding sub-section must precede this procedure.

7. Install the magneto rotor puller adapter.



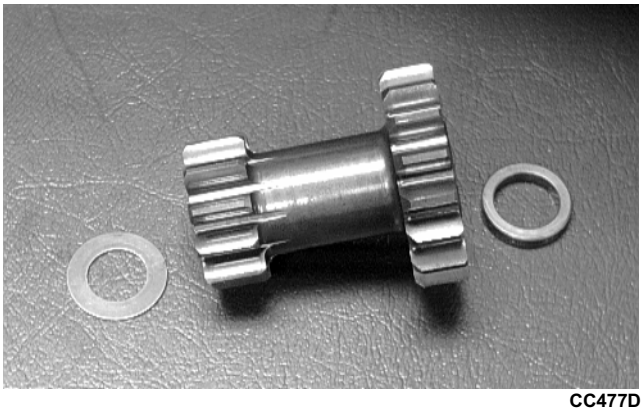
CC417D

8. Using a magneto rotor remover; remove the magneto rotor assembly (F) from the crankshaft. Account for the key.



CC456D

9. Remove the starter clutch gear assembly (G) from the crankcase.
10. Remove the driven gear assembly (H) w/washer from the crankcase.
11. Remove the outer drive gear assembly (I) w/washer from the driveshaft.
12. Remove the short shift shaft (J) from the crankcase.
13. Remove the short shift fork.
14. Remove the long shift shaft (K) from the crankcase (4x4).
15. Remove the long shift fork (4x4).
16. Remove the driven gear dog from the sub-transmission shaft (A).
17. Remove the drive gear dog from the driveshaft (B).
18. Remove the idler gear and washers from the countershaft (C). Account for the thick washer on the inside.



CC477D

19. Remove the sub-transmission gear cam (M) from the crankcase.
20. Remove the circlip and washer from the sub-transmission shaft (A); then remove the driven gear assembly (H). Account for a washer.
21. Remove the inner drive gear circlip from the driveshaft (B); then remove the inner drive gear and washer from the driveshaft. Account for a bushing and a spacer. Note the location of the oil hole in the bushing for installing purposes.

CC476D

22. Remove the Phillips-head screws securing the shift-indicator sending unit; then remove the sending unit. Account for an O-ring, neutral contact, and spring.

CC478D

CC479D

☞ AT THIS POINT

To service center crankcase components only, proceed to Removing Right-Side Components.

Right-Side Components

■ NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.

☞ AT THIS POINT

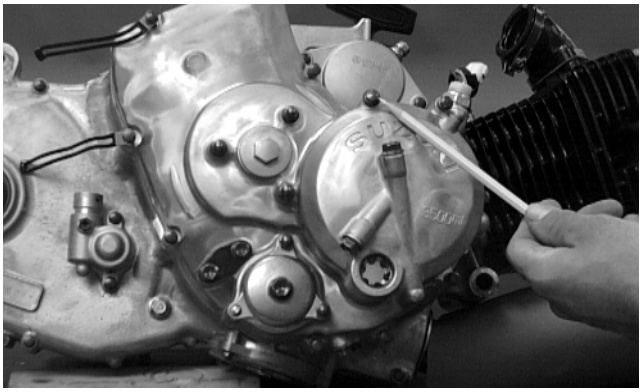
To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

■ NOTE: The engine/transmission does not have to be removed from the frame for this procedure.

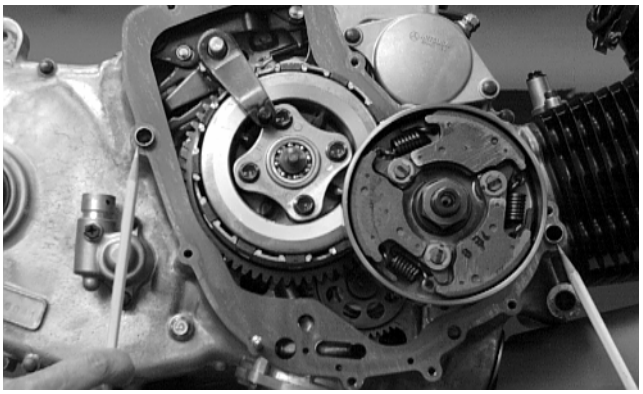
Removing Right-Side Components

A. Cover

1. Turn the gas tank valve to the OFF position and lay the ATV on its side; then remove the cap screws securing the right-side cover to the crankcase. Remove the cover. Note the locations of the long cap screw and rubber washer and the two wire forms. Account for the gasket and for two alignment pins.



CC421D



CC423D

■ NOTE: It will be necessary to remove the lower rear oil filter cover stud and the upper arm cap screws to provide clearance for removing the cover.

B. Release Roller Assembly
C. Starter Clutch Shoe
D. Starter Clutch Housing
E. Primary Driven Clutch

■ NOTE: Step 1 in the preceding sub-section must precede this procedure.

2. Slide the clutch release arm and gear shift shaft out of the crankcase; then in a crisscross pattern, remove the four cap screws securing the clutch release roller assembly.

CC424D

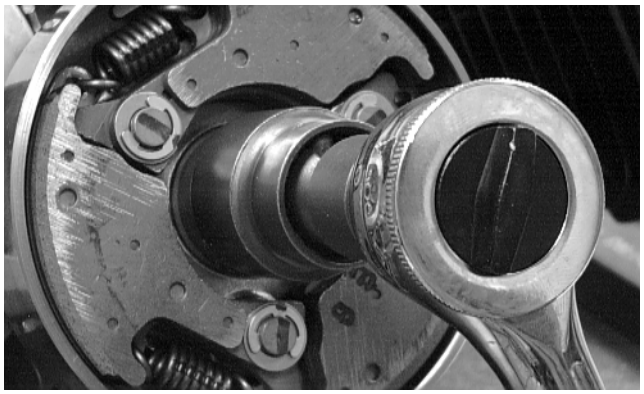
CC425D

3. Remove the release roller assembly. Account for four springs.

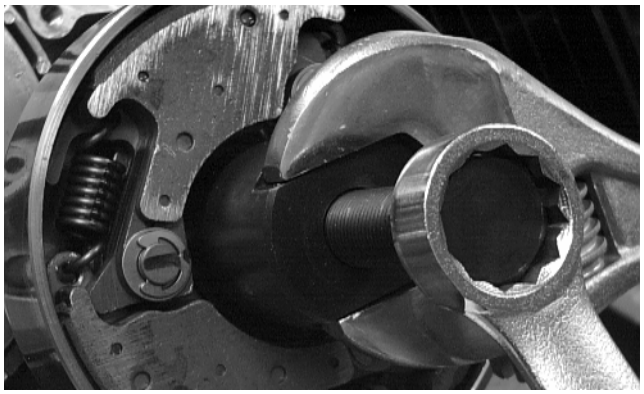
4. Remove the starter clutch-shoe nut (left-hand threads) and washer from the driveshaft; then using a clutch shoe remover, remove the clutch shoe.

⚠ CAUTION

Care must be taken when removing the nut; it has "left-hand" threads.



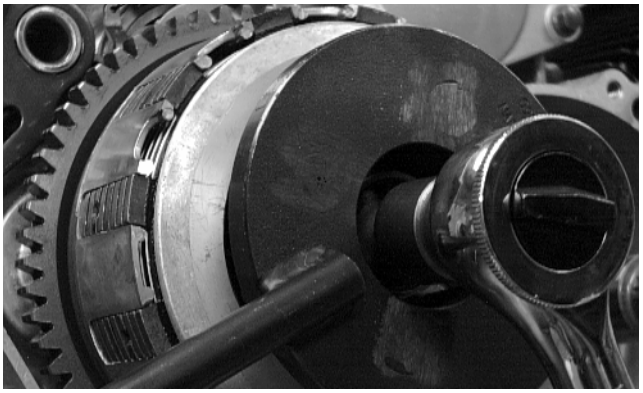
CC426D



CC427D

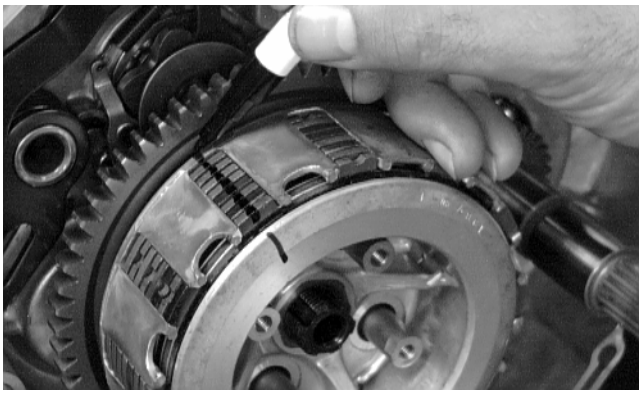
5. Remove the primary drive one-way clutch; then remove the starter clutch housing.

6. Using a clutch sleeve hub holder to hold the clutch hub, remove the nut and washer.



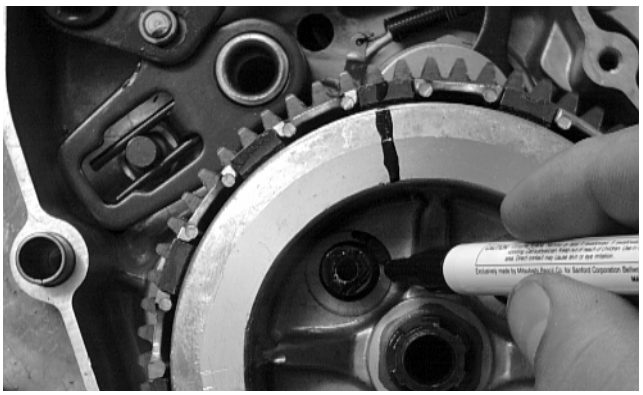
CC428D

7. Scribe a line across the primary driven clutch to aid in assembly.



CC429D

8. Remove the primary driven clutch assembly from the countershaft. Account for the sleeve and washers.



CC430D

☞ AT THIS POINT

To service clutch components, see Servicing Right-Side Components sub-section.

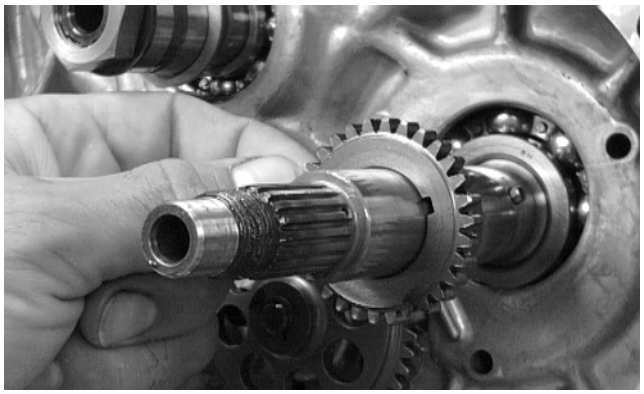
F. Gear Shifting Arm
G. Oil Pump/Oil Strainer

■ **NOTE: Steps 1-8 in the preceding sub-sections must precede this procedure.**

☞ AT THIS POINT

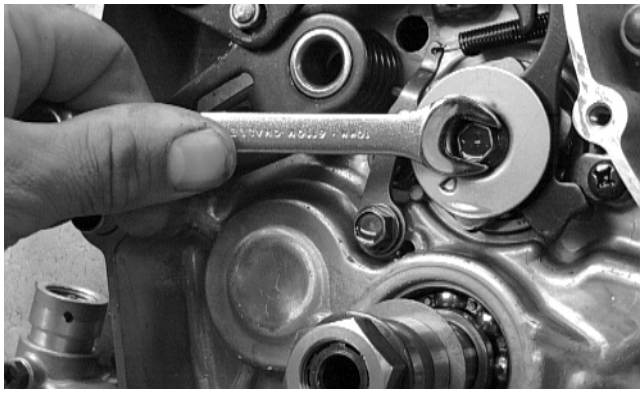
To service cam chain, see Servicing Right-Side Components sub-section.

9. Remove the oil pump drive gear from the crankshaft; then account for the pin.



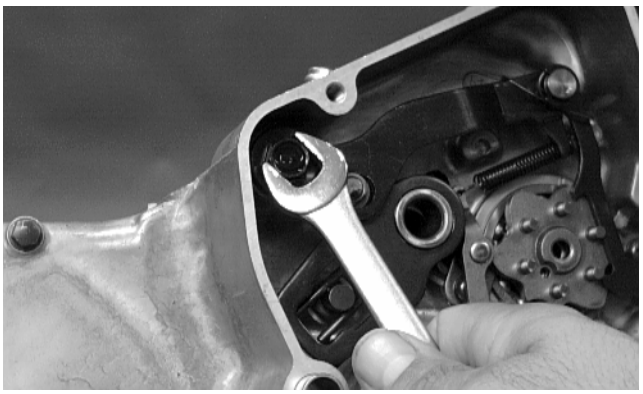
CC432D

10. Remove the cap screw securing the gear shift stopper plate pin retainer; then remove the retainer.

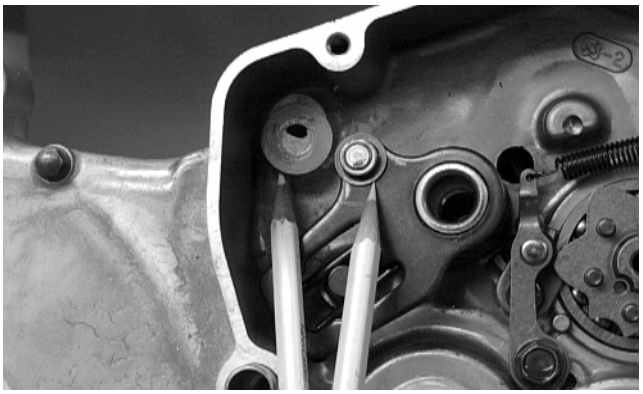


CC433D

11. Remove the cap screw securing the gear shifting arm assembly; remove the assembly and account for a washer and a roller.

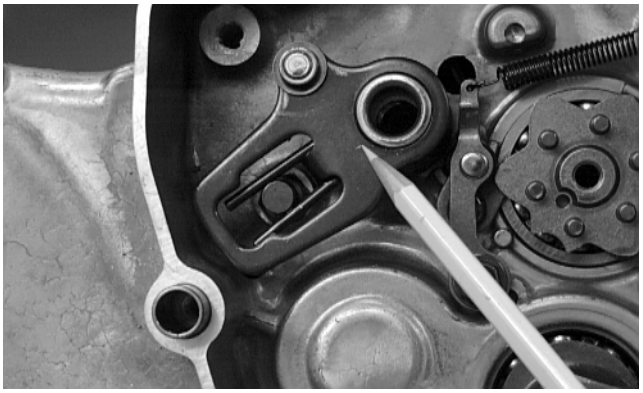


CC434D



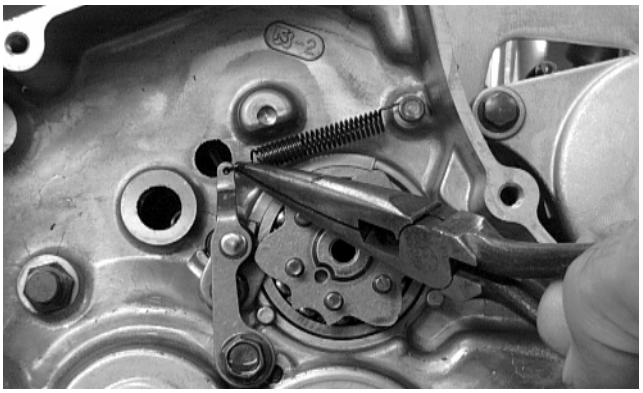
CC435D

12. Remove the link arm and account for the spring and the roller.



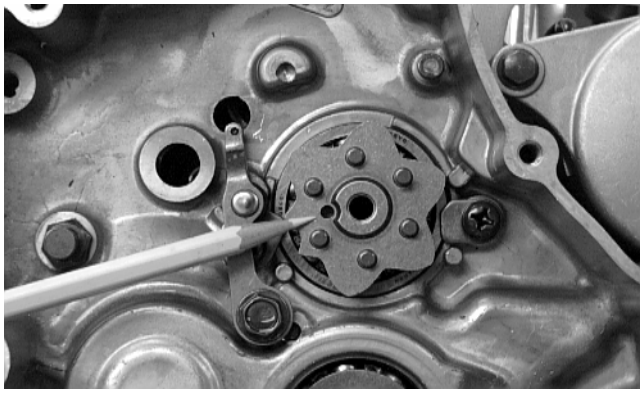
CC436D

13. Remove the spring from the cam stopper.



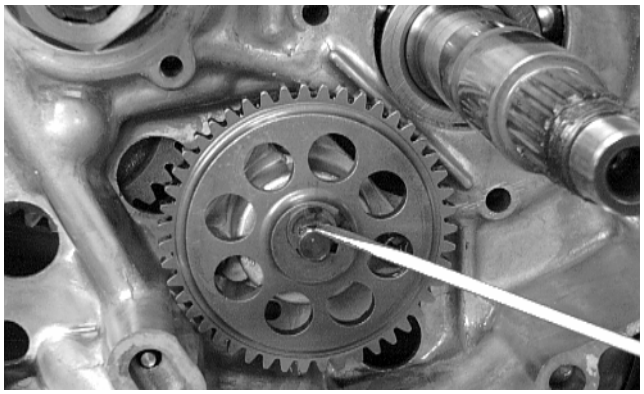
CC437D

14. Remove the stopper plate and account for six pins. Note the location of the alignment pin.



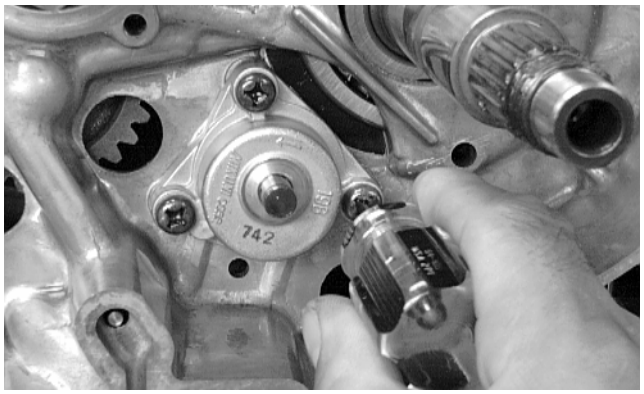
CC438D

15. Remove the circlip securing the oil pump driven gear; then remove the gear. Account for the pin.



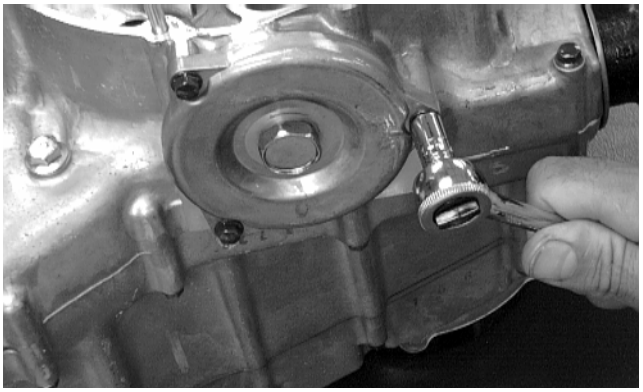
CC439D

16. Remove the Phillips-head screws securing the oil pump; then remove the pump.



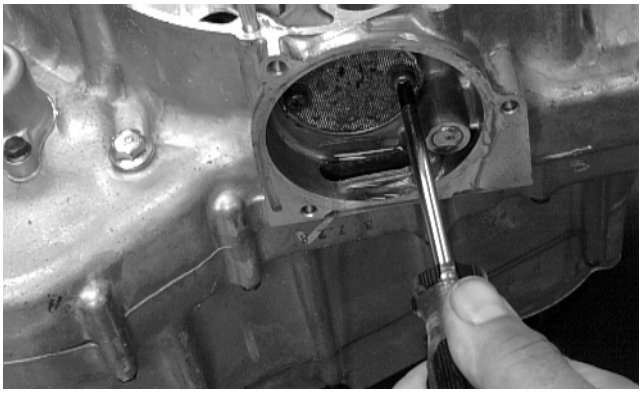
CC440D

17. Remove the Phillips-head cap screws securing the oil strainer cap. Note the arrow on the cap for assembly purposes.



CC442D

18. Remove the Phillips-head screws securing the strainer; then remove the strainer.



CC443D

☞ AT THIS POINT
To service center crankcase components only, proceed to Separating Crankcase Halves.

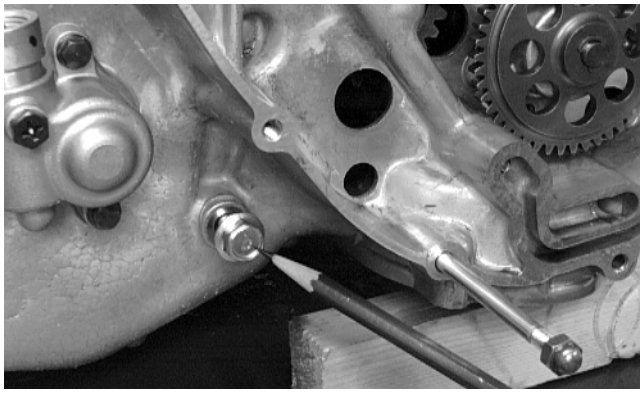
Center Crankcase Components

■ NOTE: This procedure cannot be done with the engine/transmission in the frame. Complete Removing procedures for Top-Side, Left-Side, and Right-Side must precede this procedure.

■ NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.

Separating Crankcase Halves

1. Remove the right-side cap screws securing the crankcase halves. Note the location of the cap screw with the copper washer.



CC481D

2. Remove the left-side cap screws securing the crankcase halves. Note the location of the different-lengthed cap screws.

3. Using a crankcase separator and tapping lightly with a rubber mallet, separate the crankcase halves. Account for two alignment pins and an O-ring and remove a washer from the reverse shifting cam.

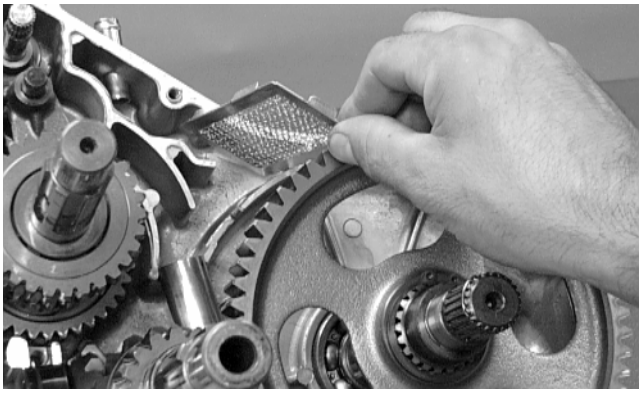
■ **NOTE: To keep the shaft/gear assemblies intact for identification, tap the shafts toward the right-side crankcase half when separating the halves.**

CC484D

CC486D

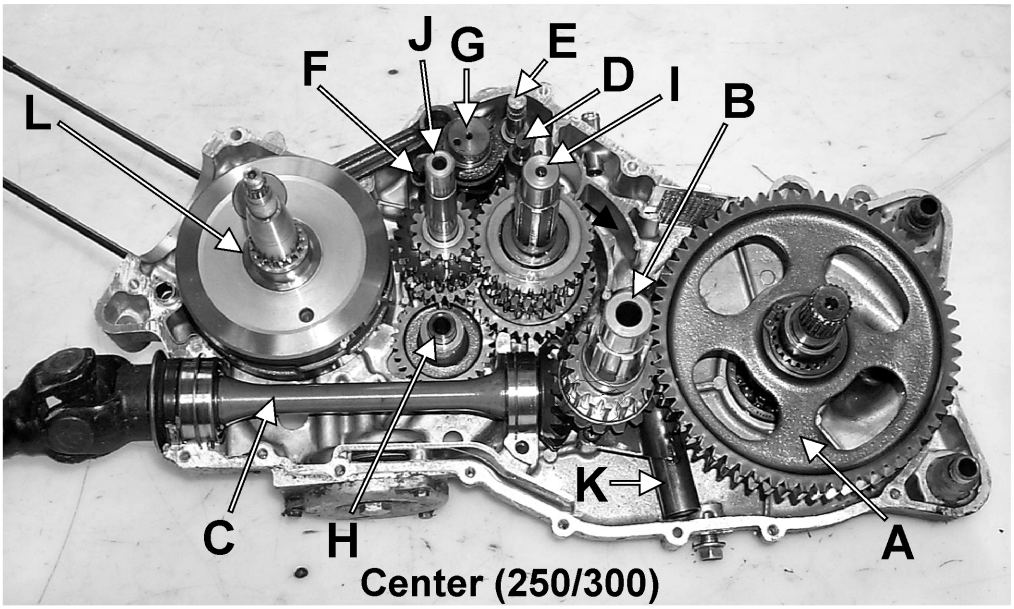
Disassembling Crankcase Half

1. On the 300, remove the oil breather screen from the crankcase. Note the direction of the tabs for assembling purposes.



CC487D

■**NOTE: For steps 2-17, refer to illustration CC836A.**



KEY CC836A

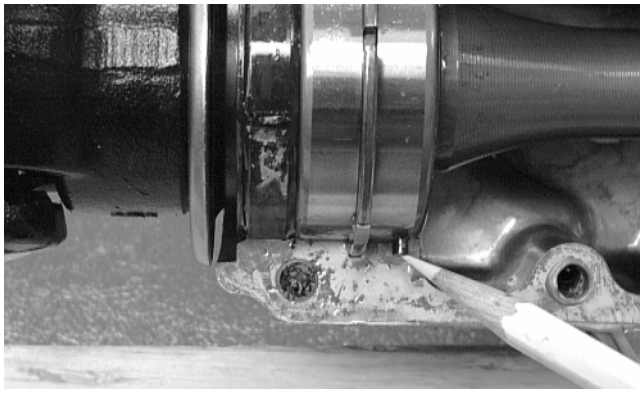
A. Final Driven Gear with Shaft	F. Shift Shaft (Short) with 1 Fork
B. Sub-Transmission Shaft Assembly	G. Gear Shifting Cam
C. Secondary Output Shaft (4x4 only)	H. Reverse Idle Shaft Assembly
D. Shift Shaft (Long) with 3 Forks	I. Driveshaft Assembly
E. Reverse Shifting Cam	J. Countershaft Assembly
	K. Oil Pipe
	L. Crankshaft Assembly

CC836A

■**NOTE: To aid in assembling, it is recommended that the assemblies are kept together and IN ORDER.**

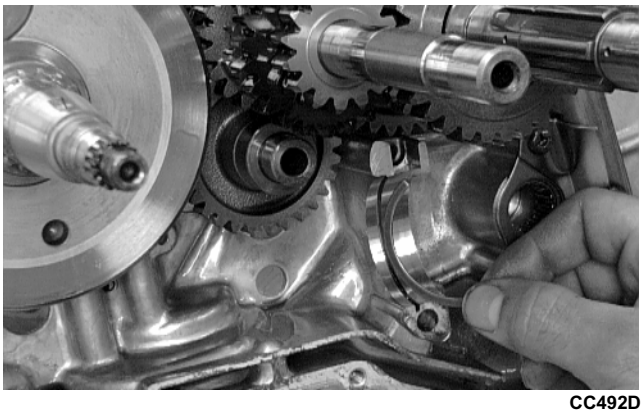
2. Remove the rear final driven gear w/shaft (A).
3. Remove the sub-transmission shaft assembly (B).

■**NOTE: On the 4x4, note the location of the bearing alignment pin on the secondary output shaft (C).**



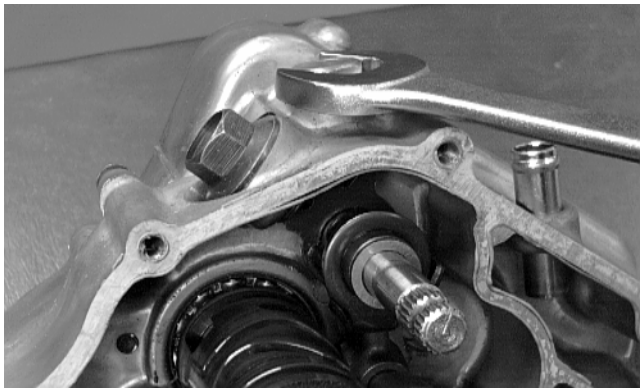
CC490D

4. On the 4x4, remove the secondary output shaft (C); then account for the C-ring.



CC492D

5. Remove the cam stopper detent and gasket from the crankcase.

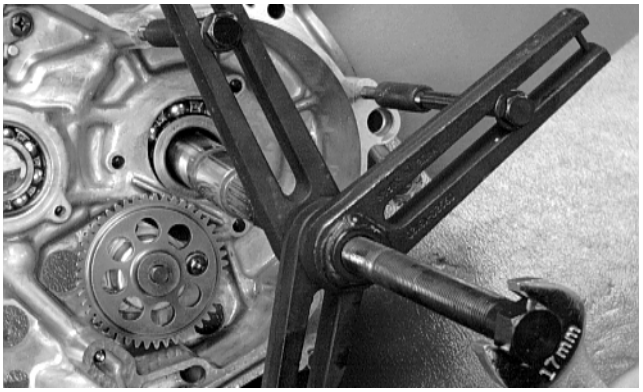


CC493D

6. Remove the long shift shaft (D).
7. Remove the outer fork and center fork noting the difference in the forks for assembling purposes.
8. Remove the reverse shifting cam (E).
9. Remove the inner fork (from the same shaft as in step 7).
10. Remove the short shift shaft (F).
11. Remove the fork.
12. Remove the gear shifting cam (G).
13. Remove the spacer from the reverse idle shaft assembly (H).
14. Remove the reverse idle shaft assembly (H). Account for the gear, bushing, and washer.
15. Simultaneously, remove the driveshaft assembly (I) and countershaft assembly (J) from the crankcase.

CC505D

16. Using a crankshaft remover, push the crankshaft assembly (L) out of the crankcase.



CC507D

☞ AT THIS POINT

To service crankshaft assembly, see Servicing Center Crankcase Components sub-section.

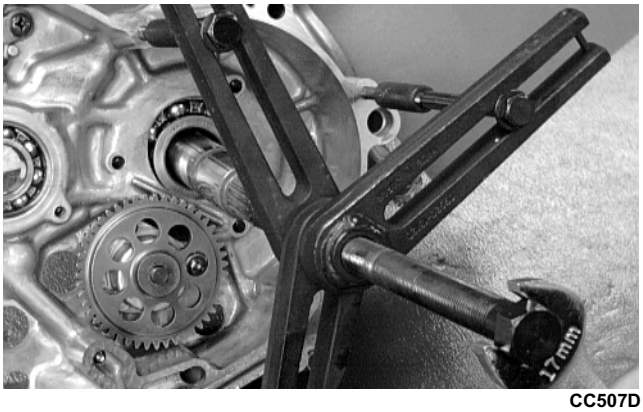
17. Remove the Phillips-head screws securing the oil pipe (K) to the crankcase.

Assembling Crankcase Half

■ NOTE: For ease of assembly, install components on the right-side crankcase half.

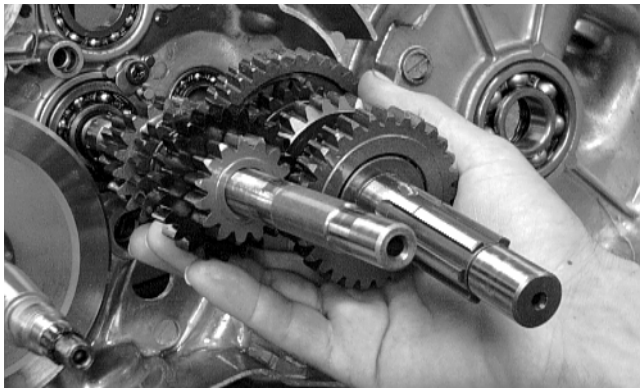
■ NOTE: If the output shaft was removed, make sure that the proper shim is installed.

1. Place the oil pipe in position and secure to the crankcase with the Phillips-head screws coated with red Loctite #271.
2. Using a crankshaft installer, install the crankshaft assembly.



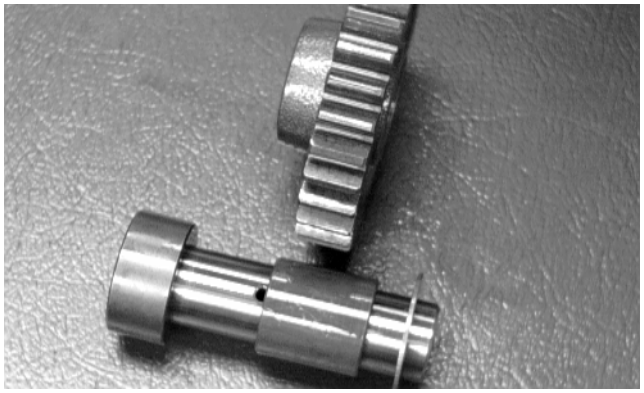
CC507D

3. Simultaneously, install the driveshaft and countershaft assemblies into the crankcase.



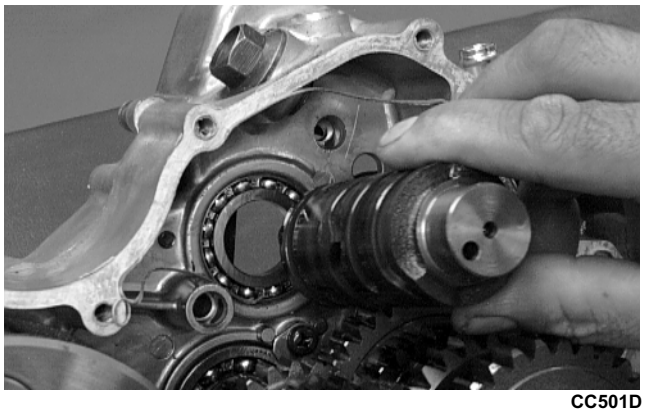
CC505D

4. Install the reverse idle shaft; then install a washer, bushing, reverse idle gear, and a spacer.



CC504D

5. Install the gear shifting cam.

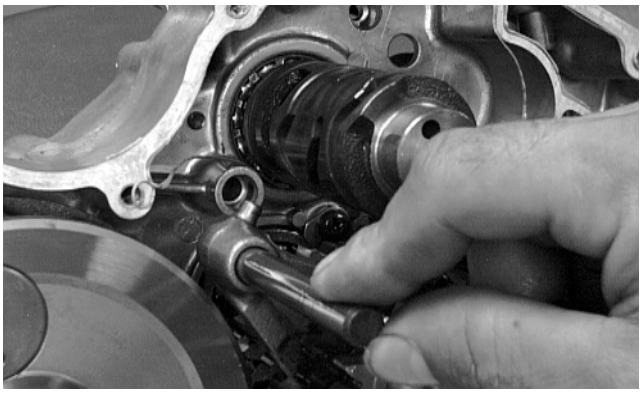


CC501D

6. Install the front gear shifting fork.

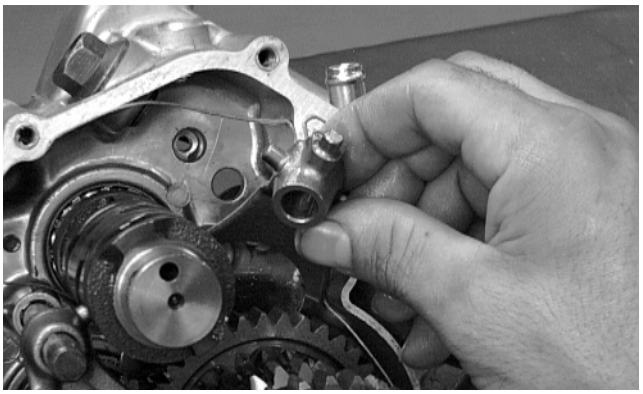
CC500D

7. Install the short gear shifting fork shaft.



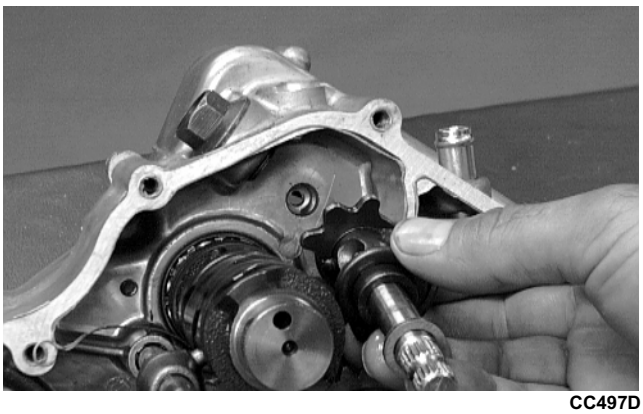
CC499D

8. Install the inner shifting fork.



CC498D

9. Install the reverse shifting cam and washer.

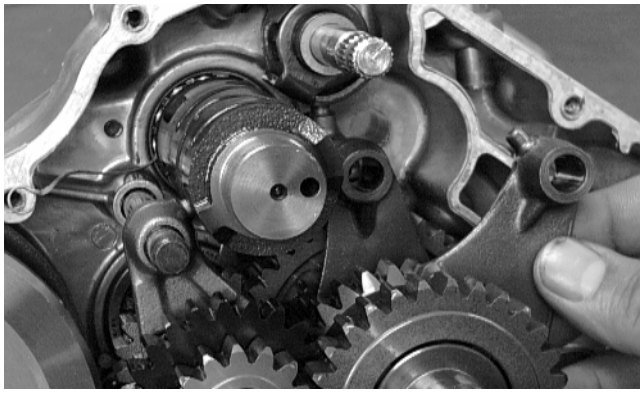


CC497D

CC486D

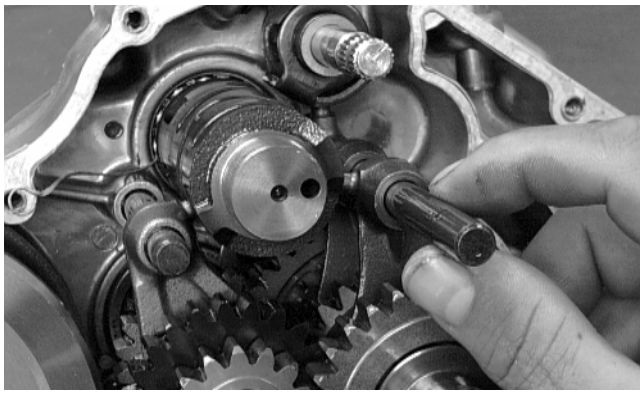
10. Install the center and outer shifting forks.

CC496D



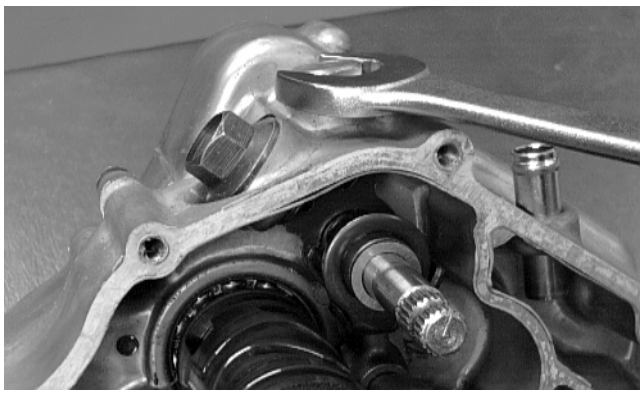
CC495D

11. Install the long gear shifting fork shaft.



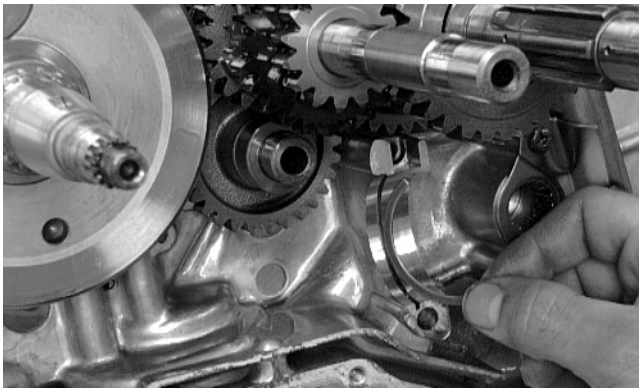
CC494D

12. Install the cam stopper detent with gasket onto the crankcase.

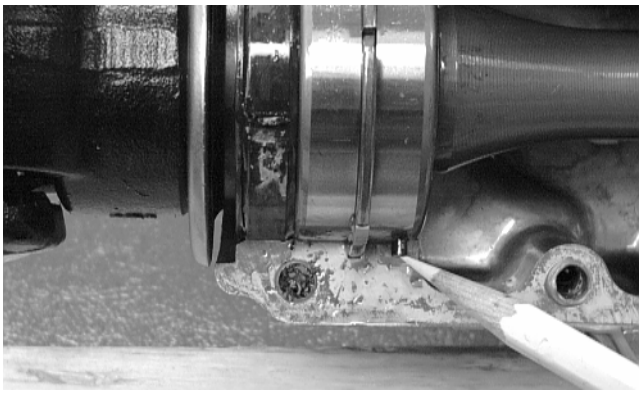


CC493D

13. On the 4x4, place the C-ring into position; then install the secondary output shaft noting the location of the bearing alignment pin from disassembly.



CC492D

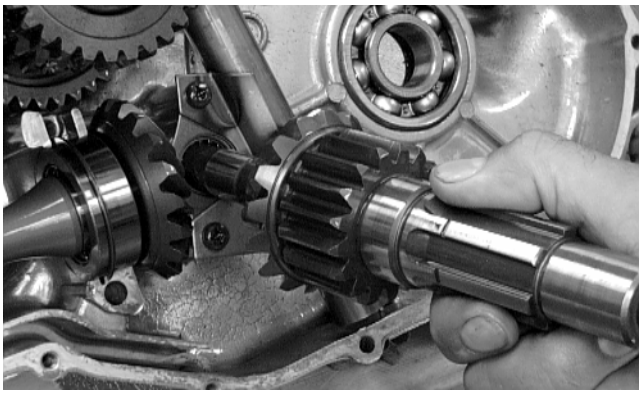


CC490D

14. Install the sub-transmission shaft assembly.

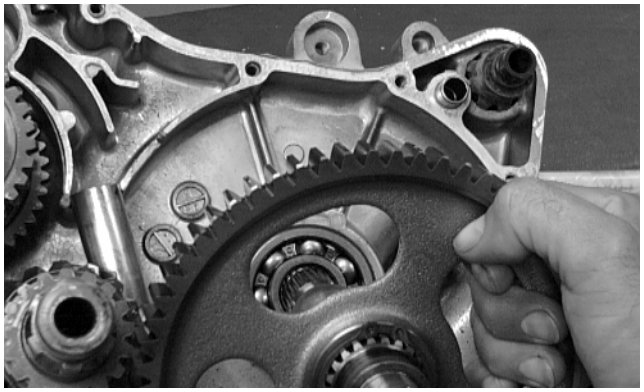
⚠ CAUTION

Make sure the speedometer drive slot lines up with the groove in the sub-transmission shaft.



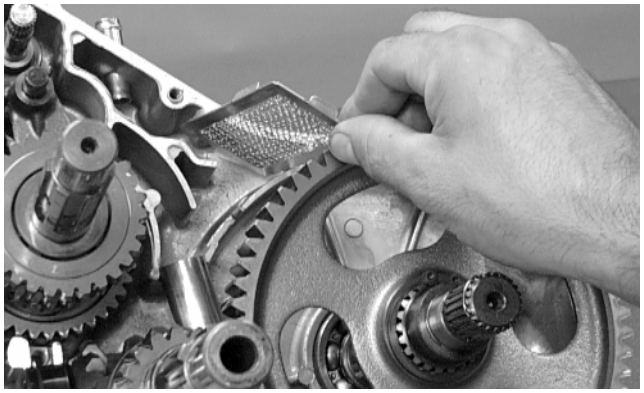
CC489D

15. Install the final driven shaft and gear.



CC488D

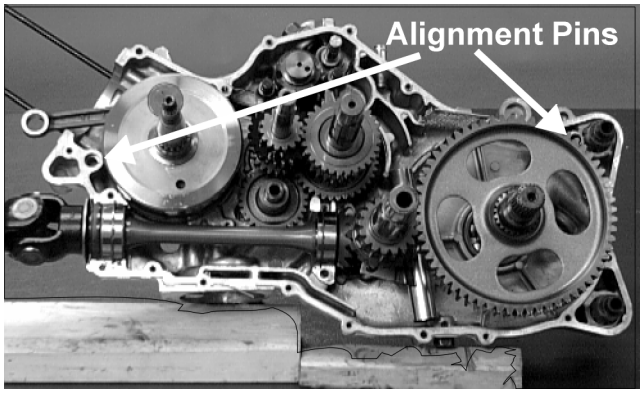
16. On the 300, install the oil breather screen noting the direction of the tabs from disassembly.



CC487D

Joining Crankcase Halves

1. Verify that the alignment pins are in place and that both case halves are clean and grease free. Apply Three Bond Sealant (p/n 0636-070) to the mating surfaces. Place the right-side half onto the left-side half.

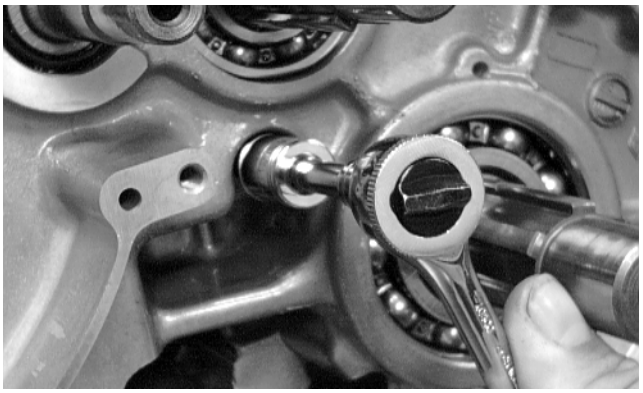


CC485DA

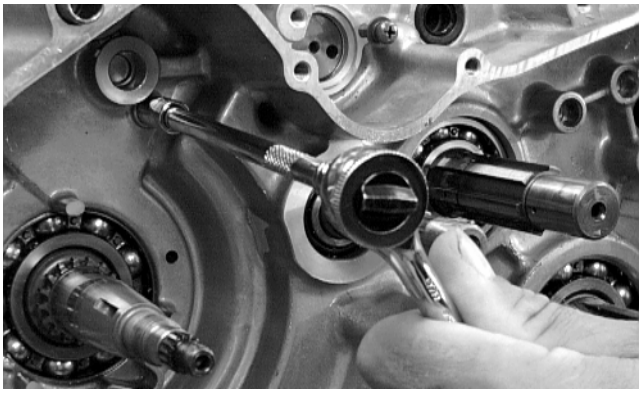
2. Using a plastic mallet, lightly tap the case halves together until cap screws can be installed.

3. From the left side, install the shift cable bracket and the crankcase cap screws noting the location of the different-lengthed cap screws; then tighten only until snug.

■ NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs while tightening the cap screws.



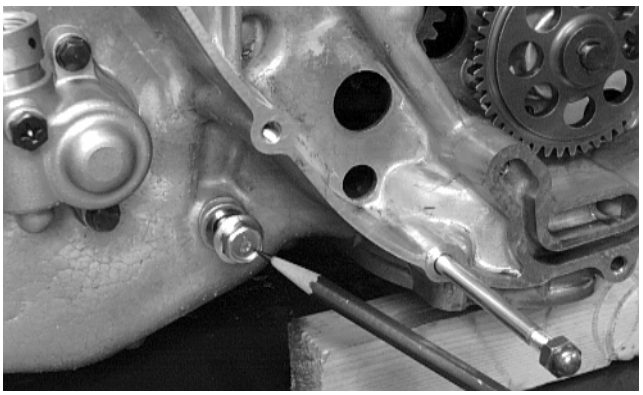
CC483D



CC482D

4. From the right side, install the cap screws noting the location of the cap screw with the copper washer; then tighten only until snug.

■ NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs while tightening the cap screws.



CC481D

CC480D

5. In a crisscross/case-to-case pattern, tighten the 8 mm cap screws until the halves are correctly joined; then tighten to 2-2.4 kg-m (14.5-17 ft-lb).

■NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs.

6. In a crisscross/case-to-case pattern, tighten the 6 mm cap screws to 0.9-1.3 kg-m (6.5-9.5 ft-lb).

■NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs.

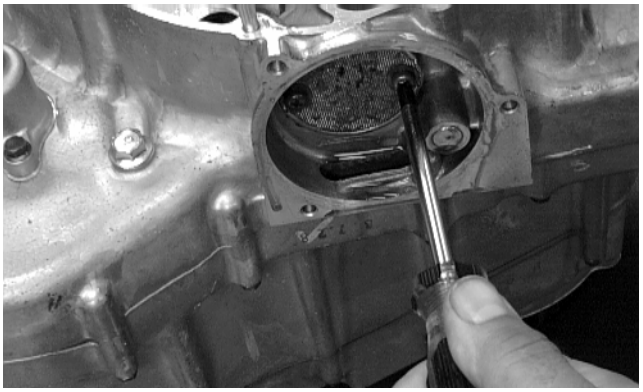
☞ AT THIS POINT
After completing center crankcase components, proceed to Installing Right-Side Components, to Installing Left-Side Components, and to Installing Top-Side Components.

Installing Right-Side Components

A. Oil Strainer/Oil Pump
B. Gear Shifting Arm

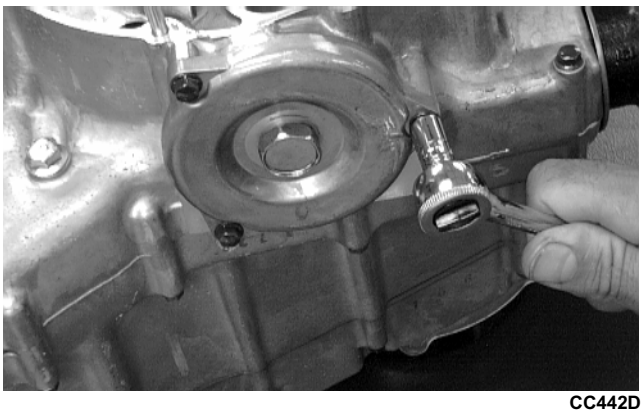
1. Place the oil strainer into position beneath the crankcase and tighten with the Phillips-head cap screws (coated with red Loctite #271) securely.

⚠ CAUTION
The legs of the strainer must be directed out.



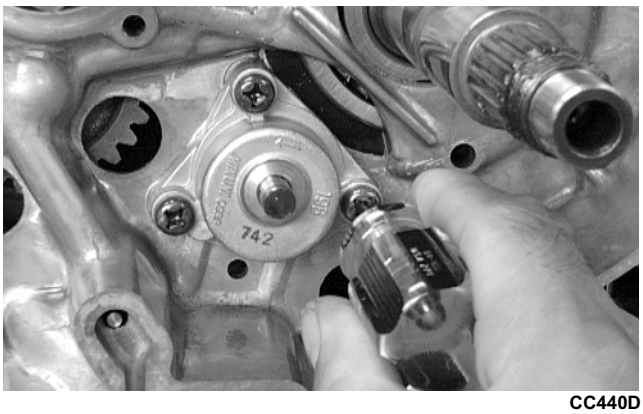
CC443D

2. Noting the arrow from disassembly, place the strainer cap into position on the crankcase making sure the O-ring is properly installed and secure with the cap screws; then tighten the oil drain plug to 2.2 kg-m (16 ft-lb).



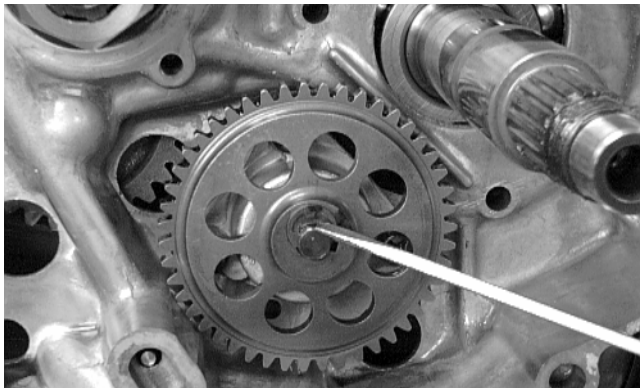
CC442D

3. Place the oil pump into position on the crankcase and secure with the Phillips-head screws coated with blue Loctite #243. Tighten to 1 kg-m (7 ft-lb).



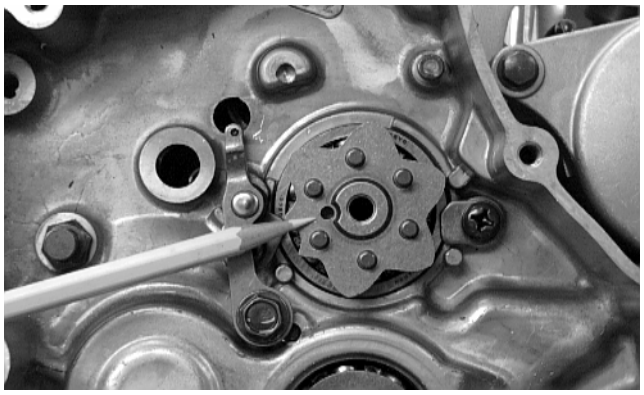
CC440D

4. Place the pin into position on the oil pump shaft, install the oil pump driven gear making sure the recessed side of the gear is directed inward, and secure with the circlip.



CC439D

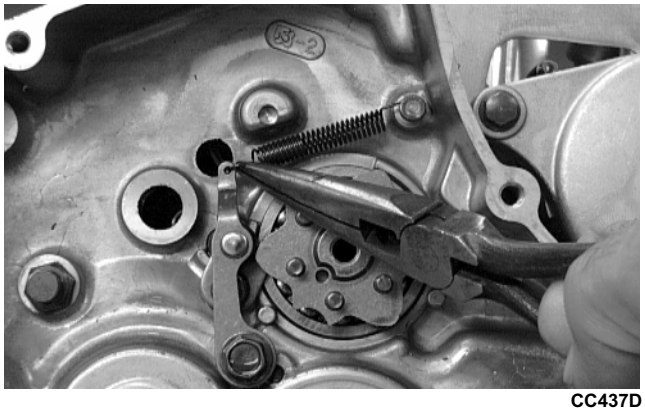
5. Place the stopper plate pins and the pin retainer into position noting the alignment pin. Secure assembly with the cap screw coated with red Loctite #271. Tighten securely.



CC438D

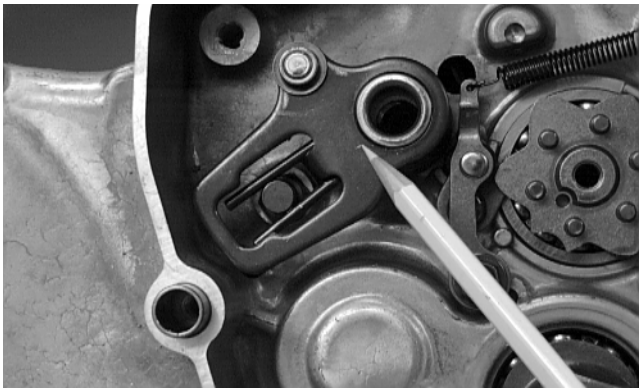
■ **NOTE: The detent in the pin retainer must be straddling a pin.**

6. Install the spring onto the cam stopper.



CC437D

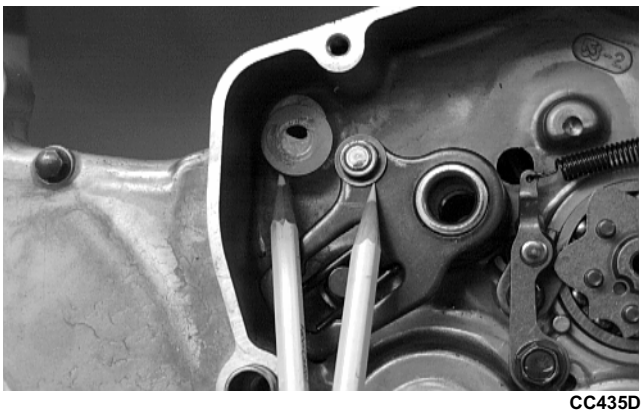
7. Install the link arm making sure the spring and roller are in position.



CC436D

8. Install the gear shifting arm assembly making sure the washer and roller are properly positioned. Secure with the cap screw coated with red Loctite #271.

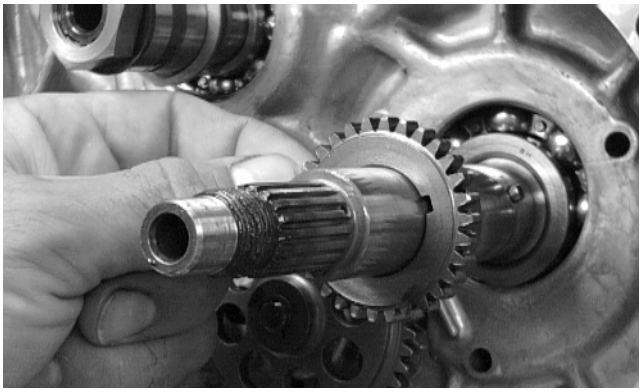
■ **NOTE: When installing the arm assembly, make sure to lift the spring loaded portion to install between the pin retainer and stopper plate. Also, make sure the link arm roller is in its hole.**



CC435D

CC449D

CC451D



CC432D

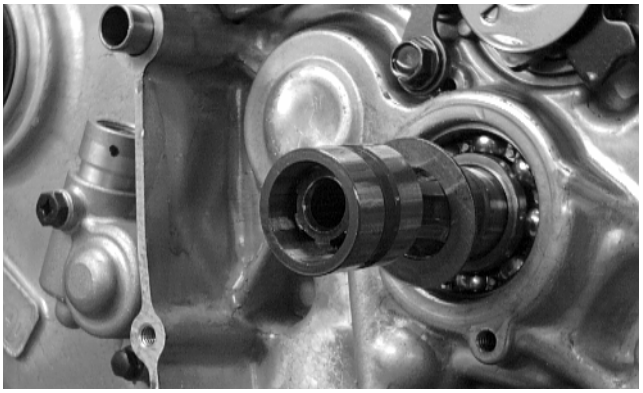
C. Primary Gear Assembly
D. Primary Driven Clutch
E. Starter Clutch Shoe

■ NOTE: Steps 1-8 in the preceding sub-section must precede this procedure.

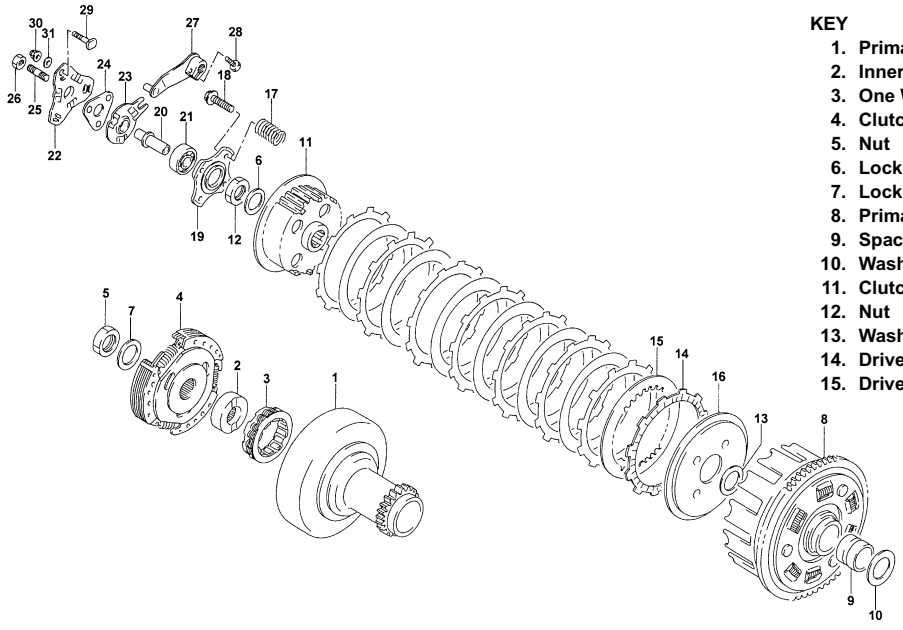
9. Install the oil pump drive gear onto the crankshaft making sure the pin is properly positioned.

■ NOTE: The shoulder of the gear must be directed inward.

10. Install the primary driven washer and sleeve onto the countershaft.



CC431D



KEY

1. Primary Drive Gear
2. Inner Race
3. One Way Clutch
4. Clutch Assy
5. Nut
6. Lock Washer
7. Lock Washer
8. Primary Gear Assy
9. Spacer
10. Washer
11. Clutch Hub
12. Nut
13. Washer
14. Drive Plate
15. Driven Plate
16. Pressure Disc
17. Spring
18. Cap Screw
19. Release Plate
20. Push Piece
21. Bearing
22. Guide Ball - Outer
23. Guide Ball - Inner
24. Release Ball
25. Adjuster Screw
26. Adjuster Nut
27. Release Arm
28. Cap Screw
29. Cap Screw
30. Nut
31. Cap Screw Seal

0733-753

11. Install the primary gear assembly housing onto the countershaft; then install the washer.

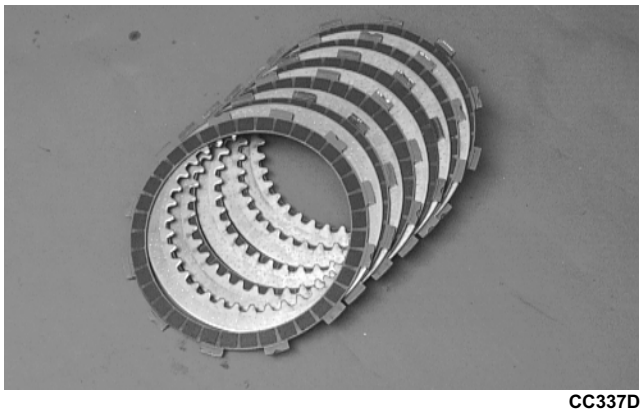
CC452D

CC453D

12. Place the clutch hub on a work bench; then alternately install the 6 drive clutch fiber plates and the 5 driven clutch steel plates onto the hub making sure the marks made during servicing on the hub and plates align.

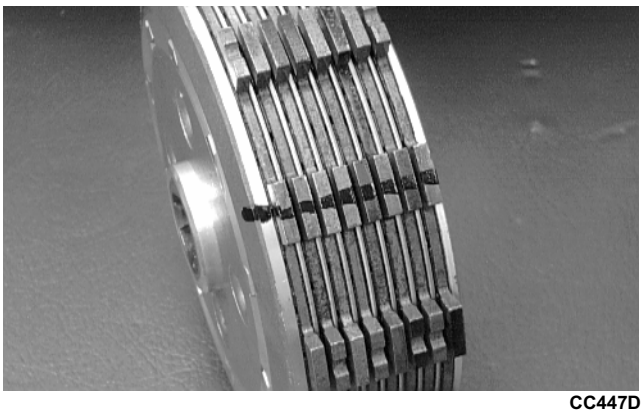
⚠ CAUTION

The six drive clutch fiber plates and the five driven clutch steel plates must be alternately installed starting and ending with a drive clutch fiber plate.



CC337D

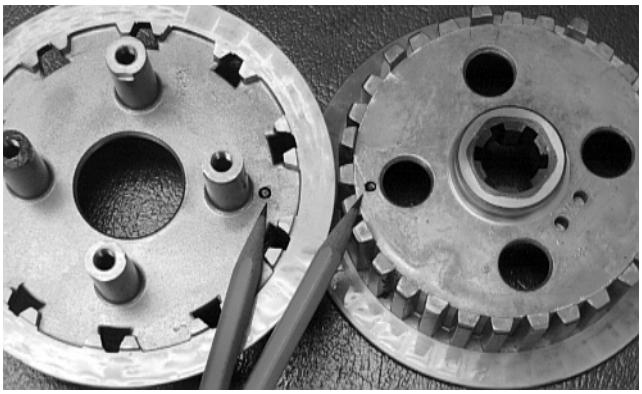
13. Install the pressure disc onto the plates making sure the marks scribed during removing are aligned.



CC447D

■ NOTE: If alignment marks were not scribed during removing, it may be necessary to reposition the clutch hub and the clutch pressure disc until the two components seat correctly with no clearance between them.

■ NOTE: The alignment dots must also be aligned to assure that the clutch assembly works properly.



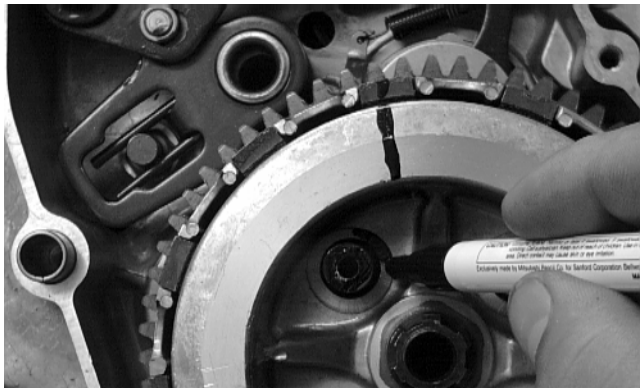
CC448D

⚠ CAUTION

The clutch hub and the clutch pressure disc must be seated in the proper position. If any of the incorrect positions are used, the hub and disc will have clearance between them and they will not operate properly.

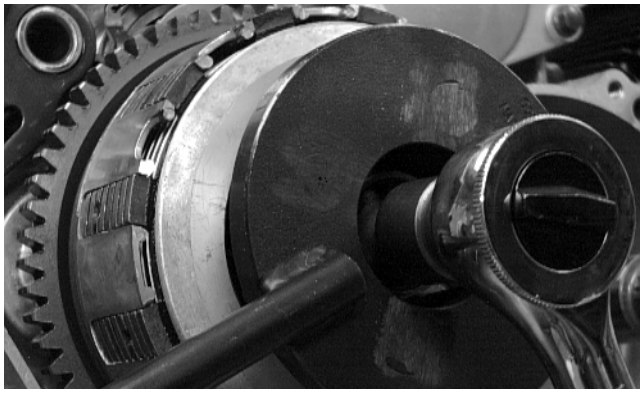
14. Place the primary driven clutch assembly onto the countershaft.

■ NOTE: Note the alignment mark scribed on the primary driven gear assembly during removing.



CC430D

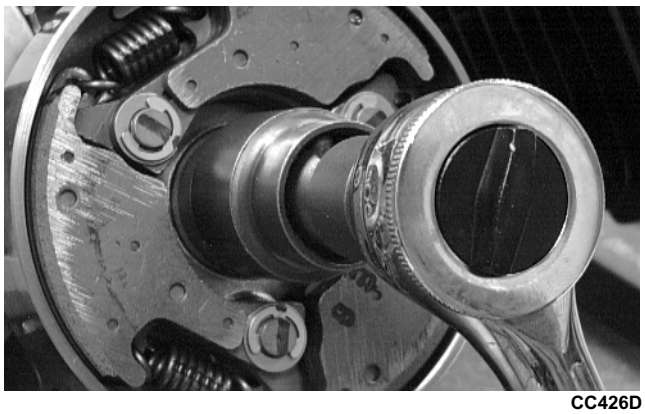
15. Using a clutch sleeve hub holder, install the nut and washer. Tighten to 8 kg-m (58 ft-lb).



CC428D

16. Place the primary drive one-way clutch housing onto the crankshaft.

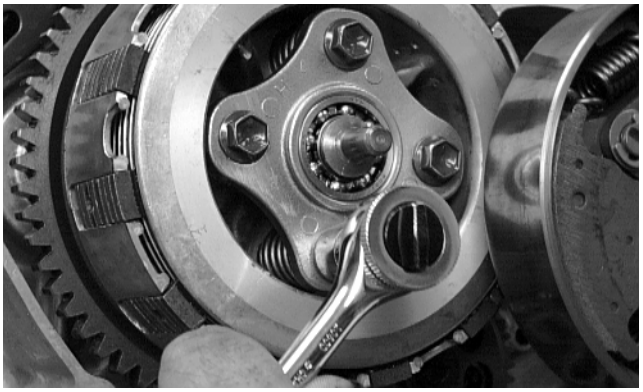
17. Install the clutch shoe and washer; then secure with the starter clutch-shoe nut (left-hand threads). Tighten to 11 kg-m (79.5 ft-lb).



CC426D

18. Install the release roller assembly making sure the four springs are in position; then using a crisscross pattern, tighten the four cap screws securely.

■ **NOTE: Tighten the four roller assembly cap screws in a crisscross pattern making sure there is no clearance between the clutch plates when secured.**



CC425D

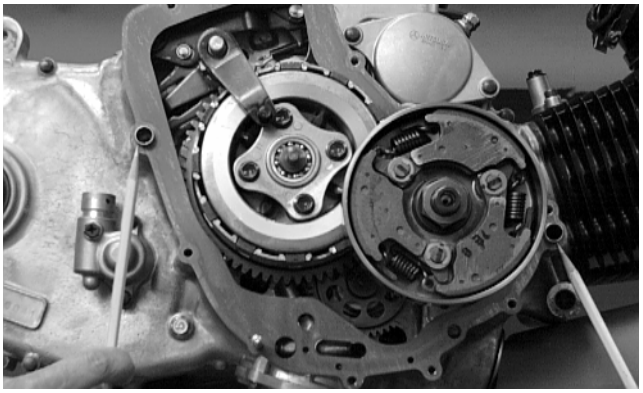
19. Slide the clutch release arm and gear shift shaft into the crankcase.

CC424D

F. Release Roller Guide
G. Cover

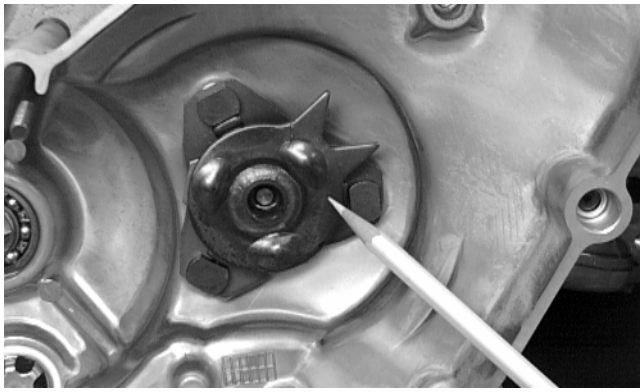
■ **NOTE: Steps 1-19 of the preceding sub-sections must precede this procedure.**

■ **NOTE: At this time, care should be taken that the alignment pins are installed in the crankcase and the gasket is in position.**

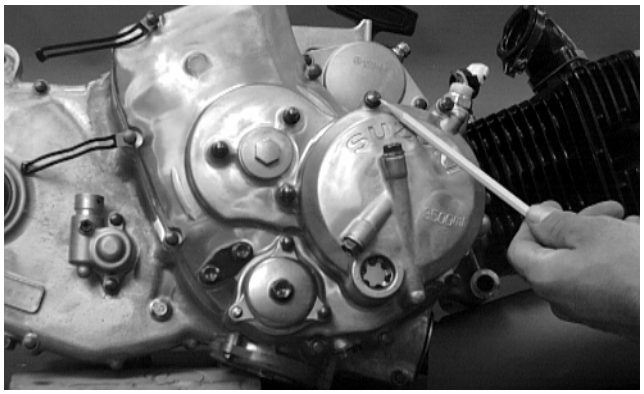


CC423D

20. Install the right-side cover onto the right side crankcase half making sure the release roller guide remains correctly positioned; then install the cap screws. Note the proper locations of the long cap screw with rubber washer and the two wire forms.



CC422D



CC421D

21. Tighten the cap screws in a crisscross pattern to 0.9-1.3 kg-m (6.5-9.5 ft-lb).

Installing Left-Side Components

A. Idle Gear Assembly
B. Magneto Rotor

1. Place the shift-indicator sending unit into position making sure the neutral contact and spring are inside the case and a well-oiled O-ring is properly positioned. Secure with Phillips-head screws.

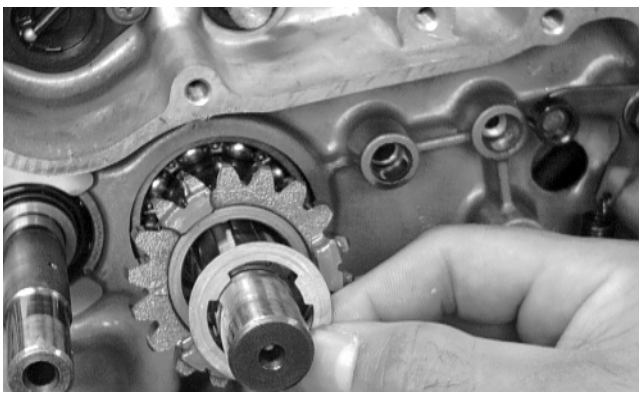
CC479D

CC478D

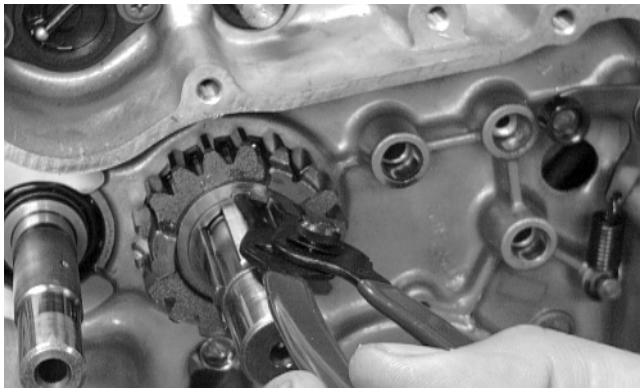
2. Place the spacer and bushing (noting the location of the oil hole) onto the driveshaft and place the gear and washer onto the driveshaft; then secure with the circlip.

CC476D

CC475D



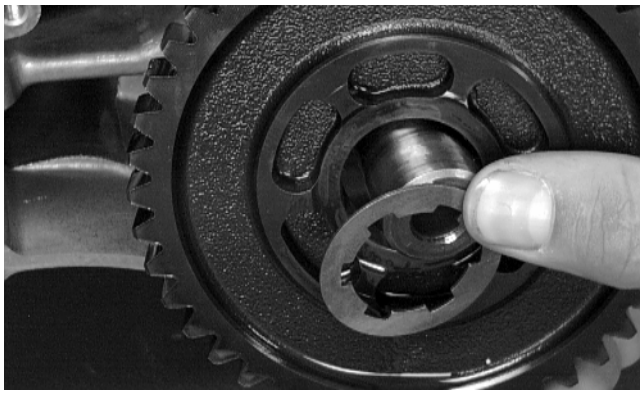
CC474D



CC473D

3. Place a round washer onto the sub-transmission shaft; then install the driven gear and notched washer. Secure with a circlip.

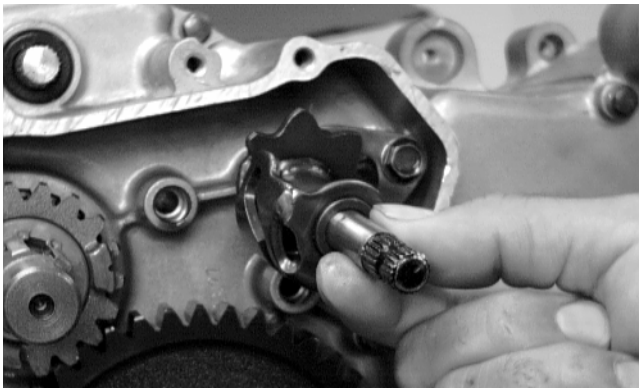
■ NOTE: The slots in the gear must face towards the left-side cover when installed.



CC471D

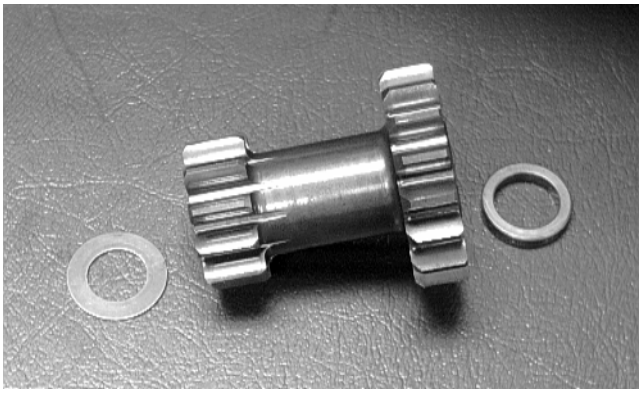
CC470D

4. Install the sub-transmission gear cam.

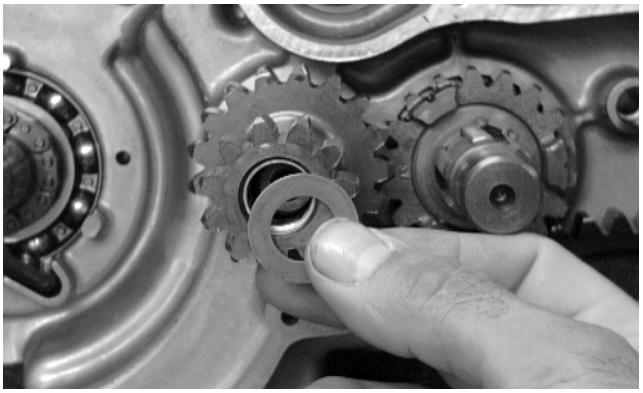


CC469D

5. Install the idler gear and washers noting the thick washer on the inside from disassembly.



CC477D



CC468D

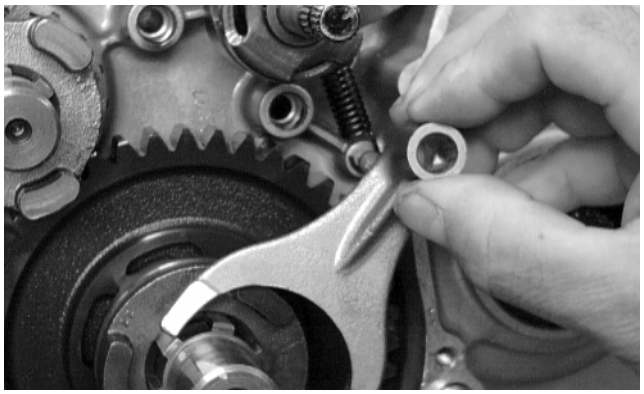
6. Install the drive gear dog onto the driveshaft.

CC467D

7. Place the driven gear dog onto the sub-transmission shaft.

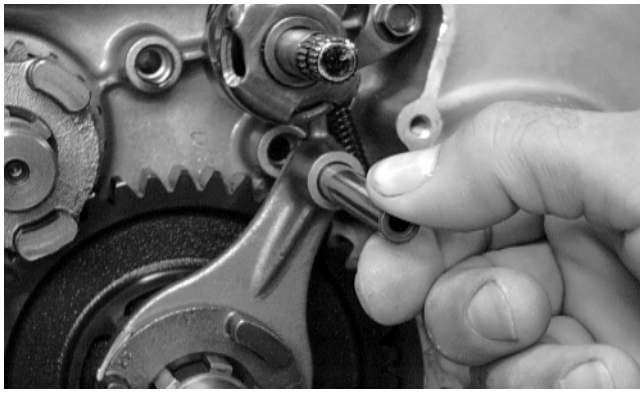
CC466D

8. Install the long shift fork.



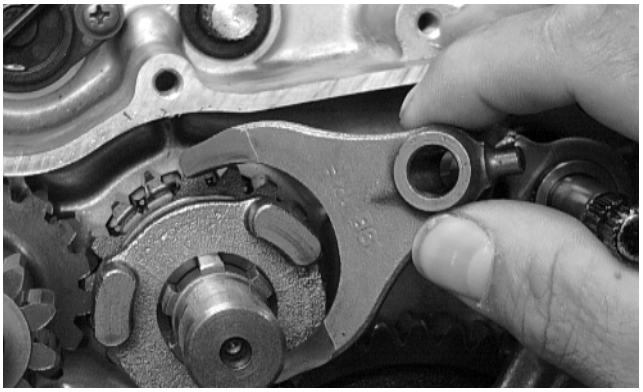
CC465D

9. Install the long shift fork shaft.



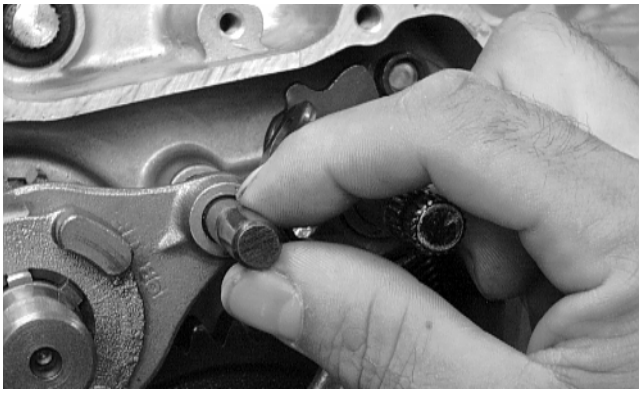
CC464D

10. Install the short shift fork.



CC463D

11. Install the short shift fork shaft.



CC462D

12. Place the drive gear and washer on the driveshaft.

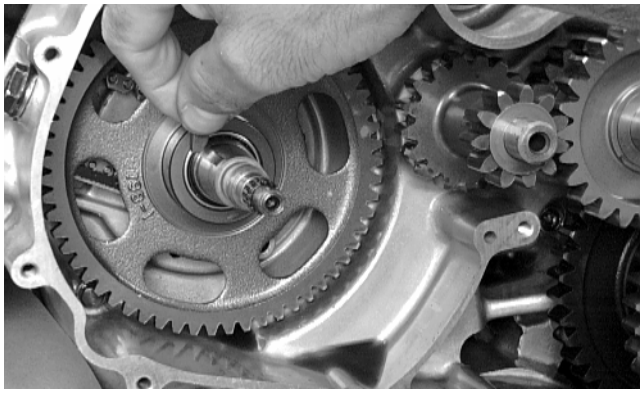
13. Install the driven gear and washer.

CC460D

14. Install the cam chain; then install the starter clutch gear assembly.

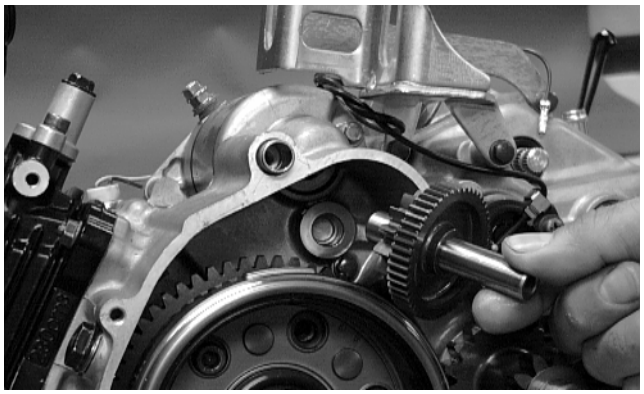
CC459D

15. Place the magneto rotor into position on the crankshaft making sure the key is in place.

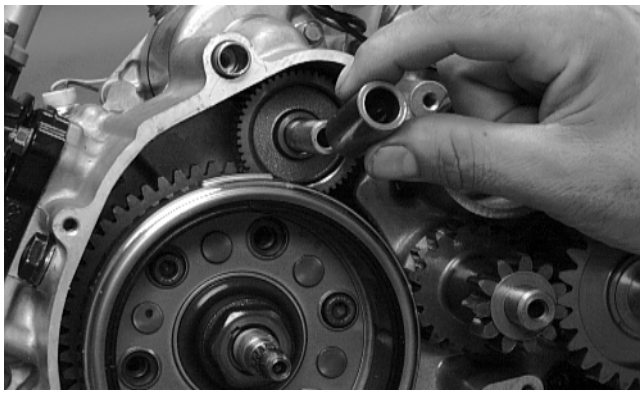


CC458D

16. Install the starter idler gear and shaft; then install the spacer.



CC455D

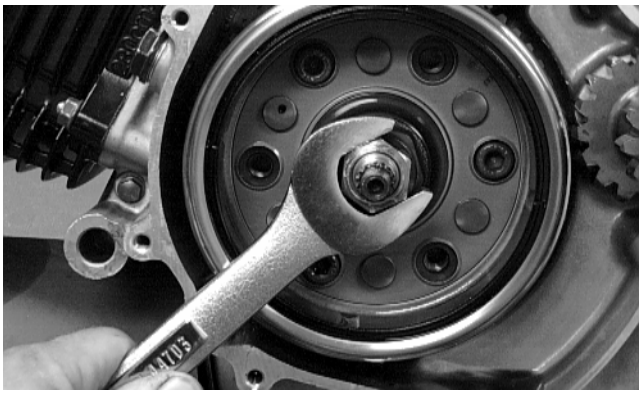


CC454D

C. Stator Assembly/Cover
D. Starter Cup
E. Recoil Starter

■ **NOTE: Steps 1-16 in the preceding sub-section must precede this procedure.**

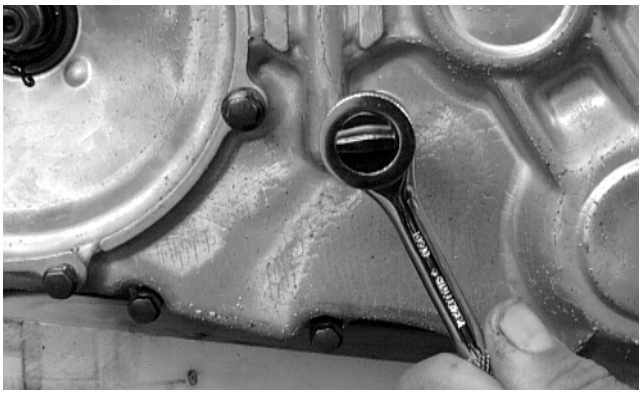
17. Install the magneto rotor nut on the crankshaft and tighten until the rotor is properly seated; then tighten to 16 kg-m (116 ft-lb).



CC416D

18. Place the gasket and left-side cover into position on the crankcase making sure the alignment pins are in place.

19. Install the cap screws to secure the left-side cover noting the location of the different-sized cap screws; then tighten to 0.9-1.3 kg-m (6.5-9.5 ft-lb).

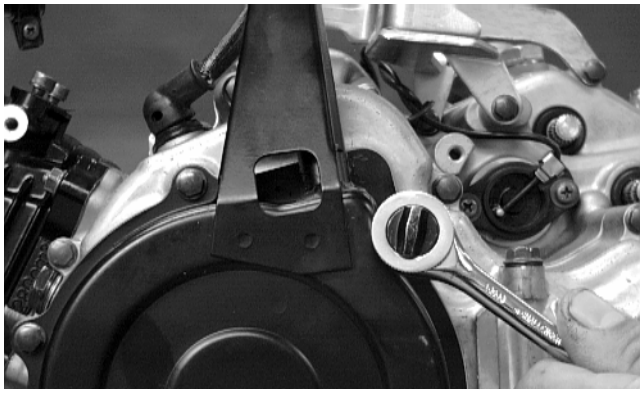


CC414D

20. Place the starter cup into position on the crankshaft making sure a new, lubricated O-ring is inside the cup. Tighten the nut with lock washer to 3.5 kg-m (25 ft-lb).

CC413D

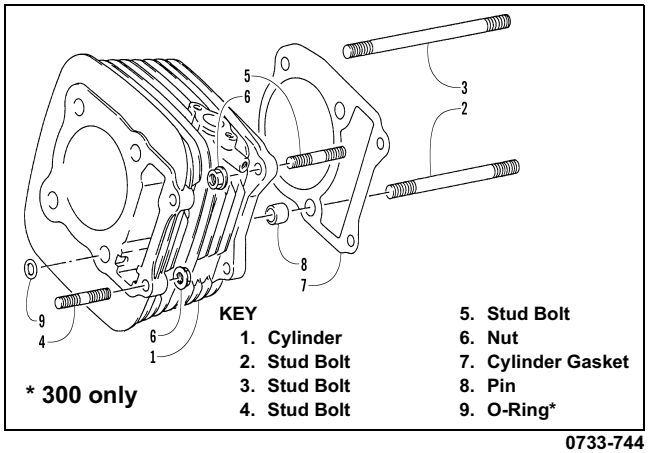
21. Place the gasket and recoil starter assembly into position on the left-side cover noting the location of the single washer; then tighten the cap screws to 0.8 kg-m (6 ft-lb).



CC412D

Installing Top-Side Components

A. Piston
B. Cylinder

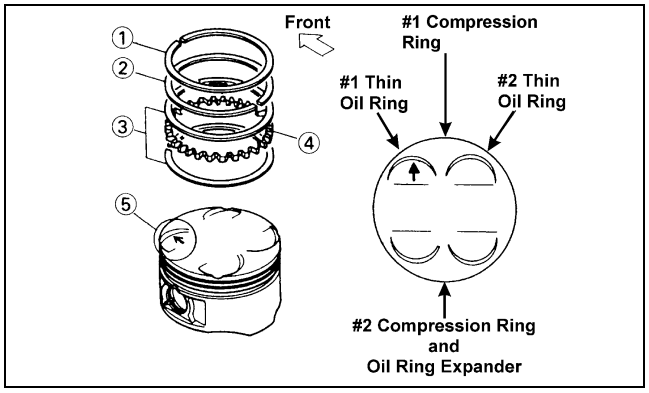


0733-744

■ **NOTE: If the piston rings were removed, install them in this sequence.**

A. Install a thin oil ring, corrugated oil ring, and thin oil ring in the bottom groove of the piston.

CC400D



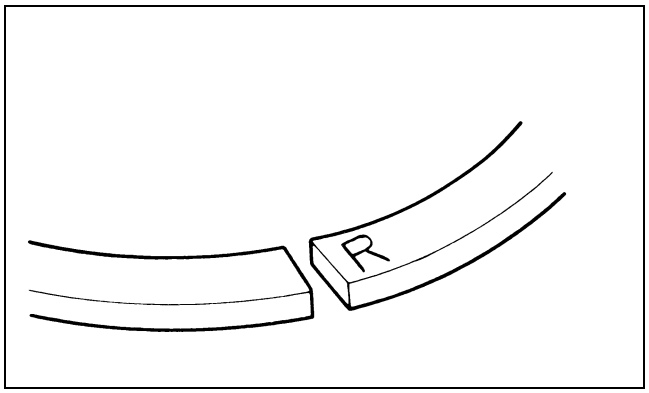
ATV-1085

B. Stagger the gaps of the upper and lower thin rings.

■ **NOTE: To be installed correctly, the ends of the corrugated oil ring must touch.**

⚠ CAUTION

Install the middle and upper oil rings so the letter on the top surface of each ring faces the dome of the piston.



ATV-1024

⚠ CAUTION

Incorrect installation of the piston rings will result in engine damage.

1. Install the piston on the connecting rod making sure there is a circlip on each side and the open end of the circlip faces upwards.

■ NOTE: The piston should be installed so the arrow points towards the front.

CC383D

CC382D

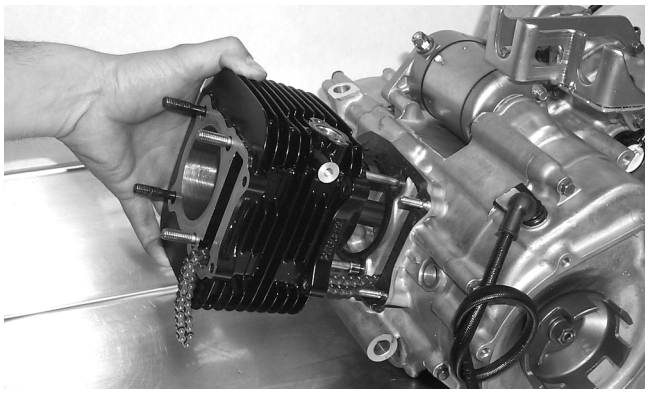
2. Place the two alignment pins into position. Place the cylinder gasket into position; then place a piston holder (or suitable substitute) beneath the piston skirt and square the piston in respect to the crankcase.

CC381D

3. Lubricate the inside wall of the cylinder; then using a ring compressor or the fingers, compress the rings and slide the cylinder over the piston. Route the cam chain up through the cylinder cam chain housing; then remove the piston holder and seat the cylinder firmly on the crankcase.

⚠ CAUTION

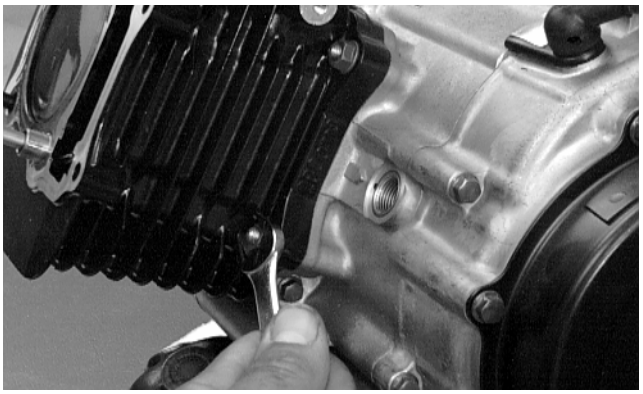
The cylinder should slide on easily. Do not force the cylinder or damage to the piston, rings, cylinder, or crankshaft assembly may occur.



CC525D

4. Loosely install the two nuts which secure the cylinder to the crankcase.

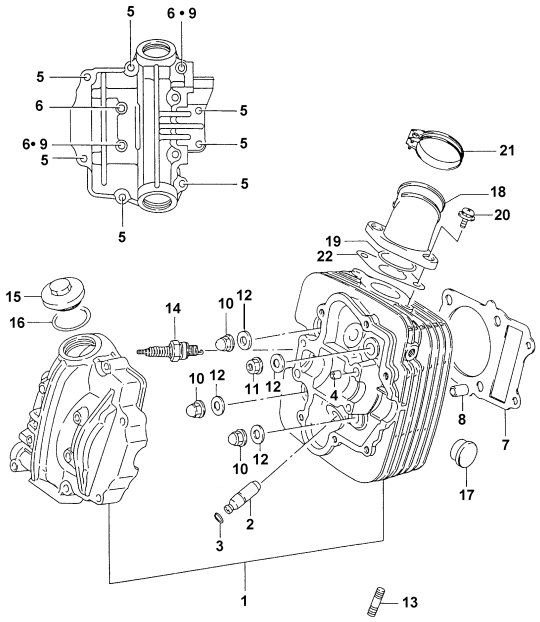
■ NOTE: The two cylinder-to-crankcase nuts will be tightened in step 10.



CC380D

C. Cylinder Head
D. Valve Cover

KEY
1. Cylinder Head Assy
2. Valve Guide
3. O-Ring
4. Pin
5. Cap Screw
6. Cap Screw
7. Cylinder Head Gasket
8. Pin
9. Gasket
10. Nut
11. Nut
12. Gasket
13. Stud Bolt
14. Spark Plug
15. Inspection Cap
16. O-Ring
17. Cylinder Head Plug
18. Intake Pipe Assy
19. O-Ring
20. Cap Screw
21. Clamp
22. Gasket



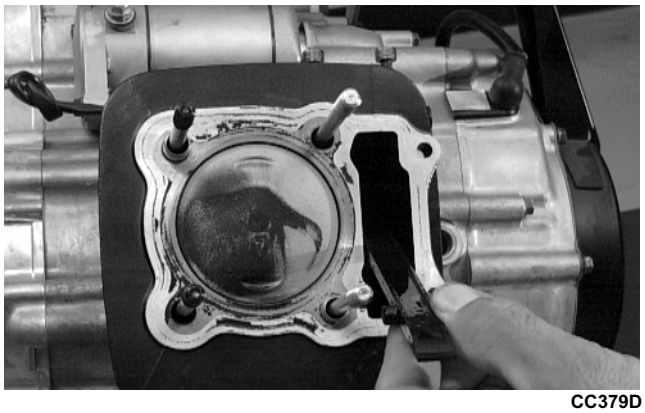
0733-743

■**NOTE: Steps 1-4 in the preceding sub-section must precede this procedure.**

5. Place the chain guide into the cylinder.

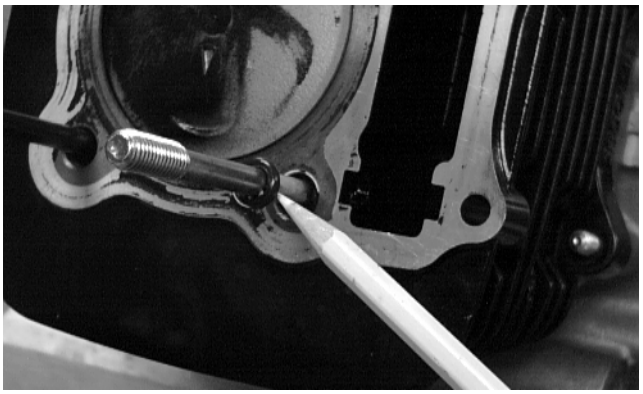
⚠ CAUTION

Care should be taken that the bottom of the chain guide is secured in the crankcase boss.



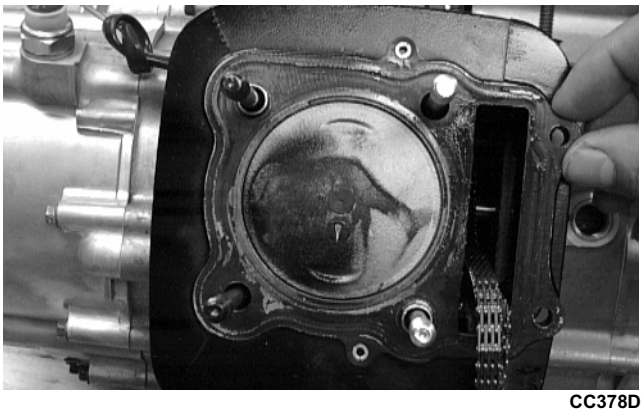
CC379D

6. On the 300, install the O-ring onto the front left-side stud.



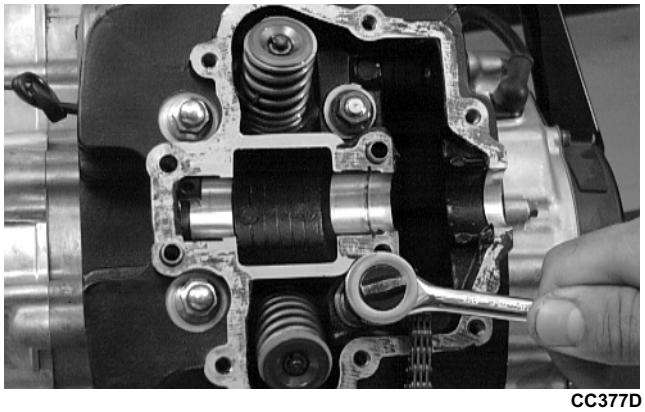
CC384D

7. Place the head gasket into position on the cylinder. Place the alignment pins into position; then place the head assembly into position on the cylinder making sure the chain is routed through the chain cavity.



CC378D

8. Install the three cylinder head cap nuts and one nut with copper washers (note the locations of the cap nuts and nut). Tighten only until snug.



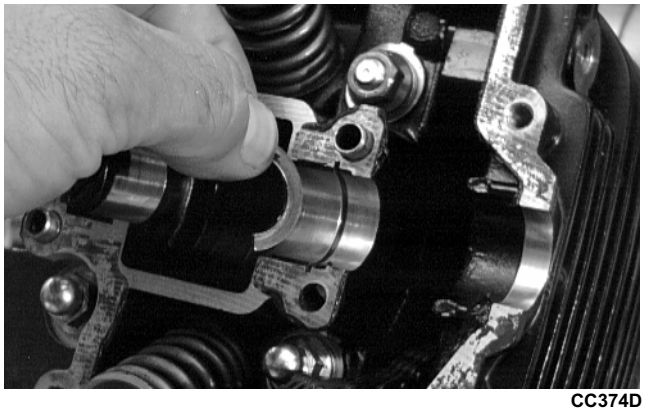
CC377D

9. Loosely install the remaining cylinder head nuts.

CC376D

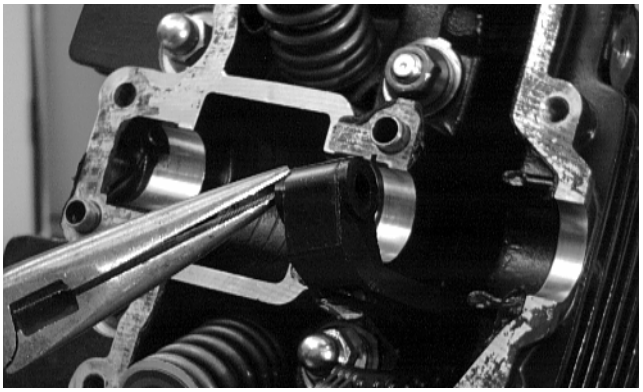
10. In a crisscross pattern, tighten the three cylinder head cap nuts and one nut to 2.5 kg-m (18 ft-lb). Tighten the remaining head nuts and the cylinder-to-crankcase nuts to 1.1 kg-m (8 ft-lb).

11. Place the C-ring into position in its groove in the cylinder head.



CC374D

12. Install the chain tensioner pad into the cylinder head.



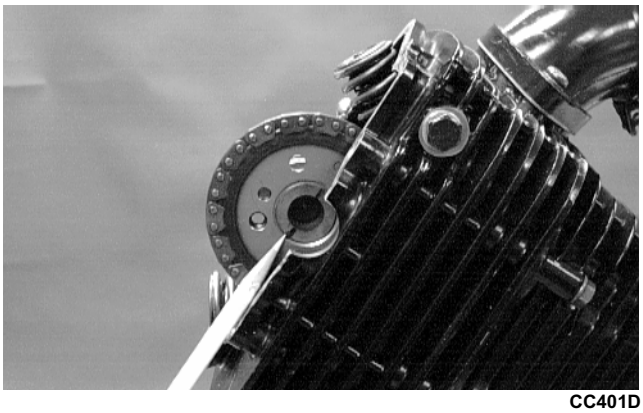
CC375D

■ **NOTE: At this point, oil the camshaft bearings, cam lobes, and the three seating journals on the cylinder.**

13. With the alignment pin installed in the camshaft and the cam lobes directed down (toward the piston), place the camshaft in its seating position; then loop the chain over the sprocket and install the sprocket onto the camshaft.

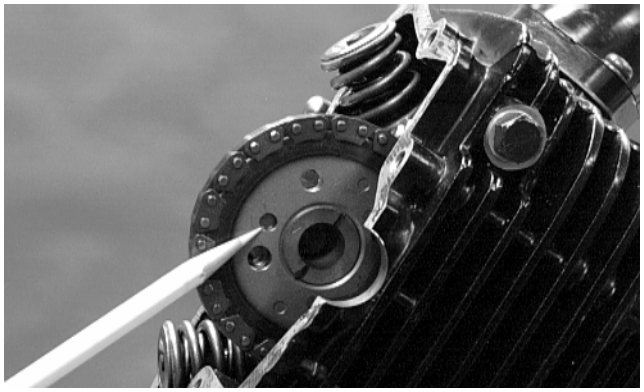
CC373D

■ **NOTE: Note the position of the alignment marks on the end of the camshaft. They must be parallel with the valve cover mating surface. If rotating the camshaft is necessary for alignment, do not allow the chain and sprocket to rotate and be sure the cam lobes end up in the down position.**



CC401D

■ **NOTE: When the camshaft assembly is seated, make sure the alignment pin in the camshaft aligns with the smallest hole in the sprocket.**



CC402D

14. When the camshaft assembly is seated, ensure the following.

    A. Piston still at top-dead-center.

    B. Camshaft lobes directed down (toward the piston).

    C. Camshaft alignment marks parallel to the valve cover mating surface.

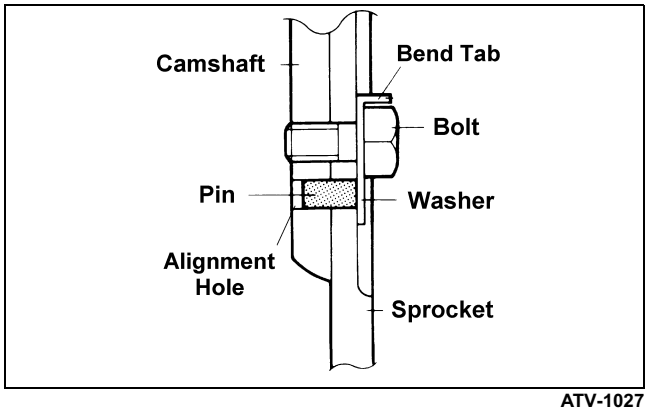
    D. Recessed side of the sprocket directed toward the cam lobes.

    E. Camshaft alignment pin and sprocket alignment hole (smallest) are aligned.

⚠ CAUTION

If any of the above factors are not as stated, go back to step 13 and carefully proceed.

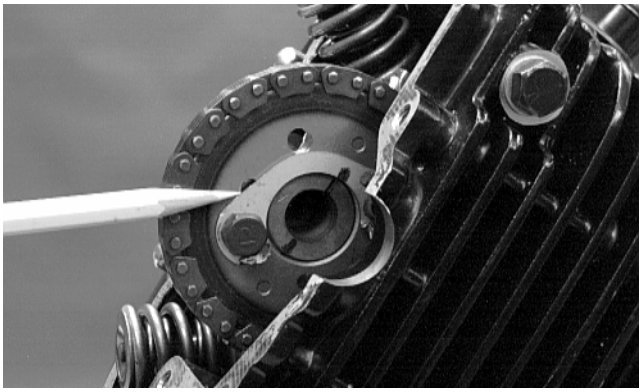
15. Place the tab washer onto the sprocket making sure it covers the pin in the alignment hole.



ATV-1027

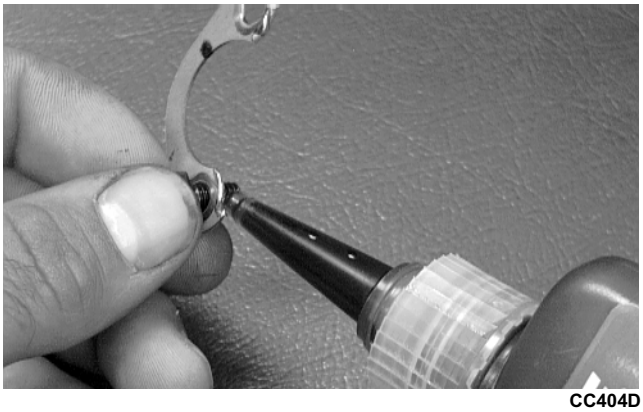
⚠ CAUTION

Care must be taken that the tab washer is installed correctly to cover the alignment hole on the sprocket. If the alignment pin falls out, severe engine damage will result.



CC403D

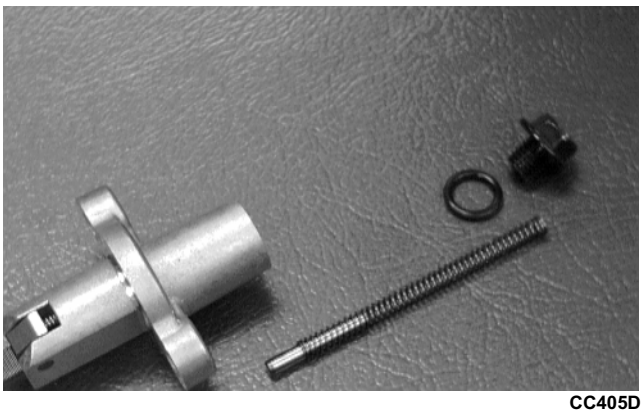
16. Install the first cap screw securing the sprocket and tab washer to the camshaft. Tighten only until snug.



CC404D

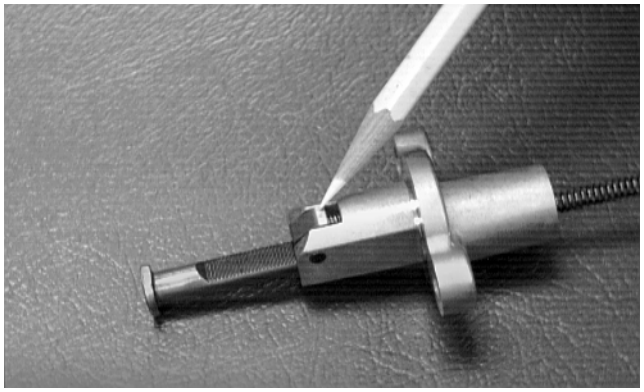
17. Install the cylinder head plug in the cylinder head.

18. Remove the cap screw from the end of the chain tensioner. Account for the plunger, spring, and O-ring.



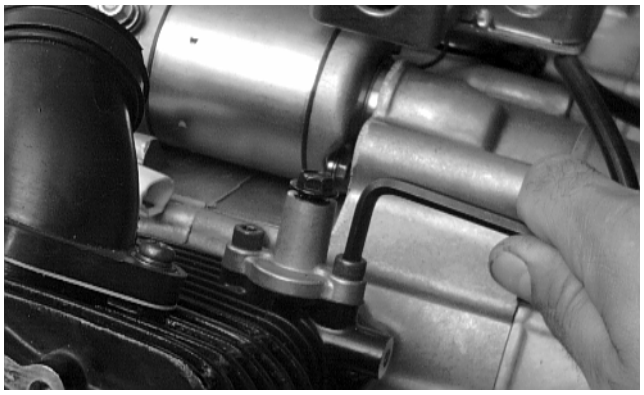
CC405D

19. Depress the spring-loaded lock and push the plunger into the tensioner.



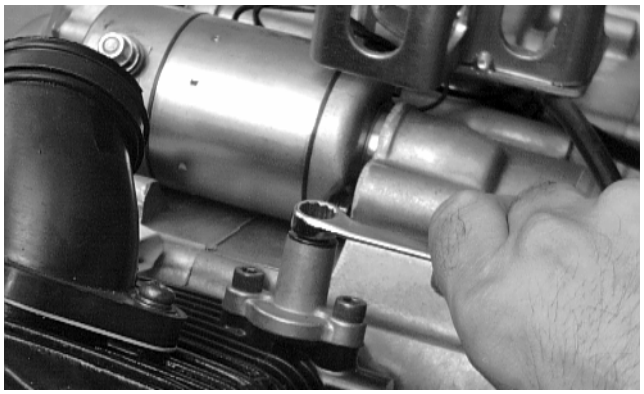
CC406D

20. Place the chain tensioner assembly and gasket into the cylinder making sure the ratchet side is facing toward the top of the cylinder and secure with the two Allen-head cap screws.



CC370D

21. Install the cap screw into the end of the chain tensioner.



CC369D

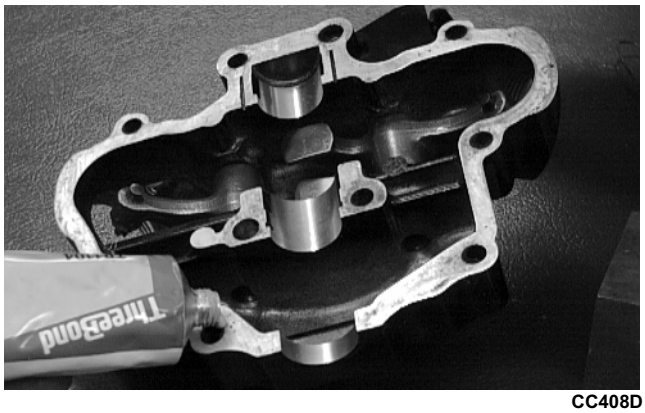
22. Rotate the crankshaft until the second cap screw securing the sprocket to the camshaft can be installed; then install the cap screw and tighten to 1.15 kg-m (8.5 ft-lb). Bend the tab to secure the cap screw.

23. Rotate the crankshaft until the first cap screw securing the sprocket to the camshaft can be addressed; then tighten to 1.15 kg-m (8.5 ft-lb). Bend the tab to secure the cap screw.

24. Loosen the adjuster screw jam nuts; then loosen the adjuster screws on the rocker arms in the valve cover.

CC407D

25. Apply a thin coat of Three Bond Sealant (p/n 0636-070) to the mating surface of the valve cover.



CC408D

26. Place the valve cover into position.

■ **NOTE: At this point, the rocker arms and adjuster screws must not have pressure on them.**

27. Install the top side valve cover cap screws into the head noting the locations of any with rubber washers; then install the remaining cap screws. Tighten only until snug.

CC367D

28. In a crisscross pattern starting from the center and working outward, tighten the cap screws to 1 kg-m (7 ft-lb).

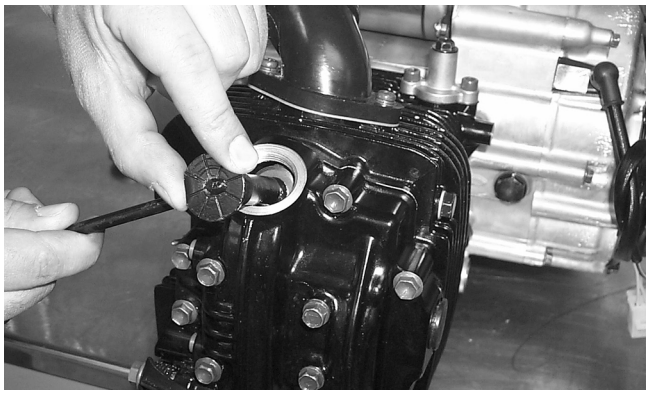
29. Adjust valve/tappet clearance using the following procedure.

■ NOTE: Use Valve Gap Adjuster (p/n 0444-092) for this procedure.

A. Turn the engine over until the piston reaches top dead center on the compression stroke.

B. Place the valve adjuster onto the jam nut securing the tappet adjuster screw; then rotate the valve adjuster dial clockwise until the end is seated in the tappet adjuster screw.

C. While holding the valve adjuster dial in place, use the valve adjuster handle and loosen the jam nut; then rotate the tappet adjuster screw clockwise until friction is felt.



CC522D

D. Align the valve adjuster handle with one of the marks on the valve adjuster dial.

E. While holding the valve adjuster handle in place, rotate the valve adjuster dial counterclockwise until proper valve/tappet clearance is attained.

■ NOTE: Refer to the appropriate Specifications for the proper valve/tappet clearance.

■ NOTE: Rotating the valve adjuster dial counter-clockwise will open the valve/tappet clearance by 0.05 mm (0.002 in.) per mark.

F. While holding the adjuster dial at the proper clearance setting, tighten the jam nut securely with the valve adjuster handle.

30. Place the two tappet covers with O-rings into position; then tighten the covers securely.

CC366D

31. Install the spark plug and tighten to 1.7 kg-m (12 ft-lb); then install the timing inspection plug.

CC411D

Installing Engine/Transmission

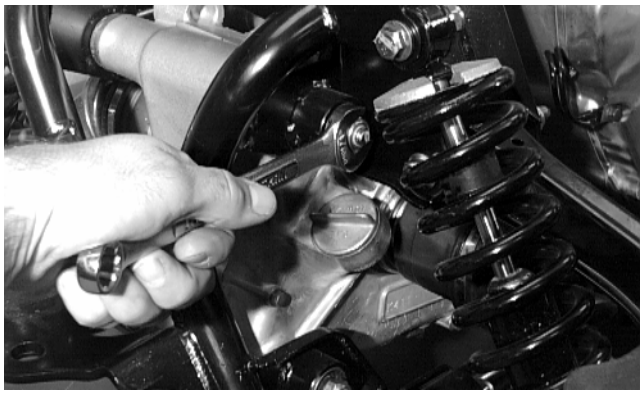
■ NOTE: Arctic Cat recommends that new gaskets and O-rings be installed whenever servicing the ATV.

1. Install the engine into the sub-frame assembly.
2. Connect each drive axle to the engine output shafts.
3. Secure the upper A-arms with cap screws. Tighten to 4.8 kg-m (35 ft-lb).

CH077D

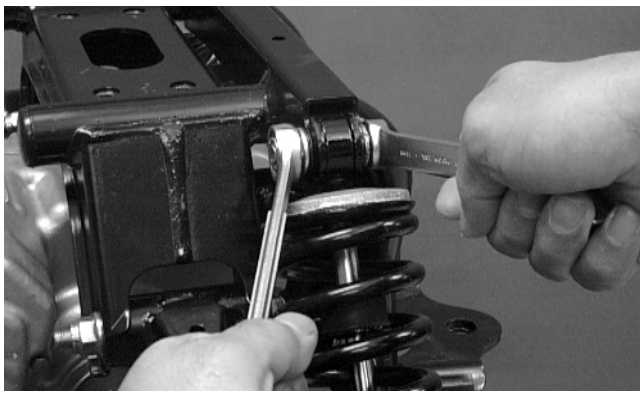
4. Secure the rear of the engine to the sub-frame with cap screws and flat washers. Tighten to 5.5 kg-m (40 ft-lb).

■ **NOTE: The washers must be located next to the head of the cap screw.**



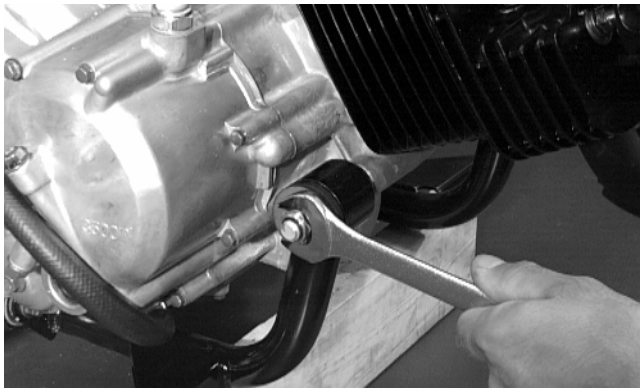
CH075D

5. Secure the upper shock mount to the sub-frame. Tighten to 4.8 kg-m (35 ft-lb).



CH076D

6. Secure the front of the engine to the sub-frame using a cap screw and spacers. Tighten to 5.5 kg-m (40 ft-lb).



CH074D

7. Secure the rear wheels to the hubs. Tighten to 5.5 kg-m (40 ft-lb).

8. Place the engine/sub-frame assembly onto a large floor/transmission jack and place the sub-frame assembly up and into position; then loosely start all six mounting cap screws.

⚠ WARNING

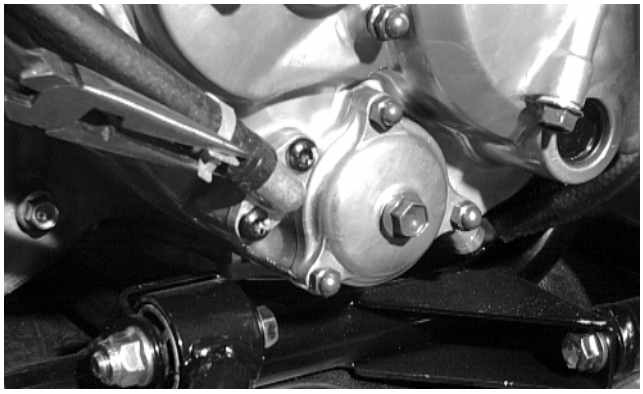
Support the ATV so it doesn't fall off the work stand when the engine/sub-frame assembly is installed into the frame or severe damage, injury, or death may result.

9. Tighten the four upper sub-frame mounting cap screws in a crisscross pattern to 5.5 kg-m (40 ft-lb).

10. Tighten the two lower sub-frame mounting cap screws to 5.5 kg-m (40 ft-lb).

11. Secure the skid plate to the rear end assembly. Tighten securely.

12. Secure the two oil cooler hoses to the engine.



CH070D

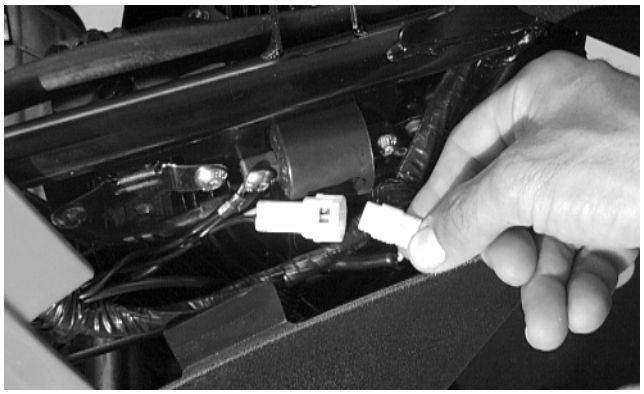
13. Secure the brake hose holder to the upper suspension arm with a torx-head screw. Tighten securely.

14. Tighten the rear hydraulic brake caliper to 2.8 kg-m (20 ft-lb).

CH068D

15. Tighten the mechanical foot brake caliper to 2.1 kg-m (15 ft-lb).

16. Secure the oil light switch to its connector.

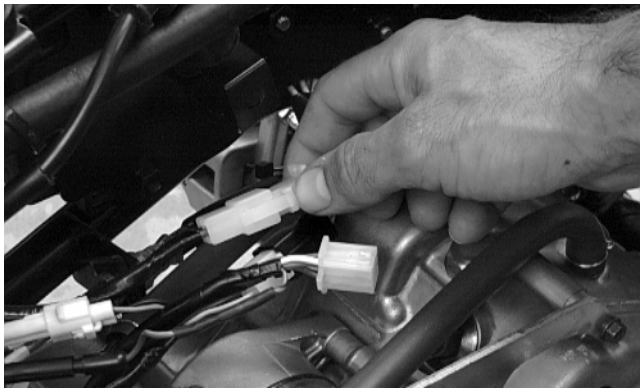


CH067D

17. Secure the right-hand side panel.

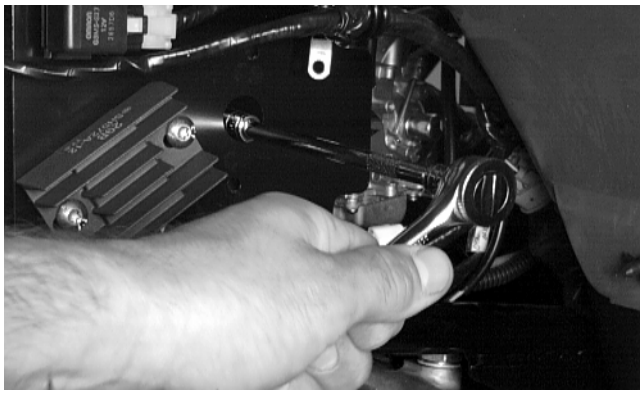
CH066D

18. Secure the remaining connectors to the main wiring harness.

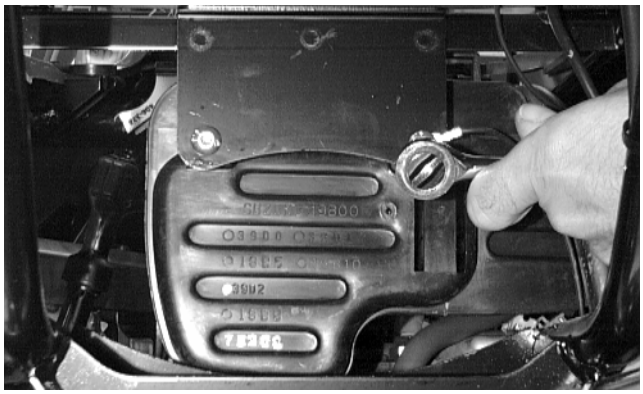


CH065D

19. Install the air-cleaner assembly into the frame and connect the crankcase breather hoses; then secure the air-cleaner assembly to the frame. Tighten securely.

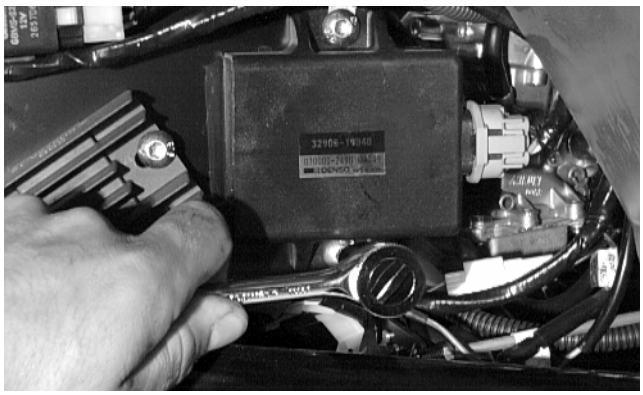


CH048D



CH047D

20. Secure the CDI unit to the frame. Tighten securely.



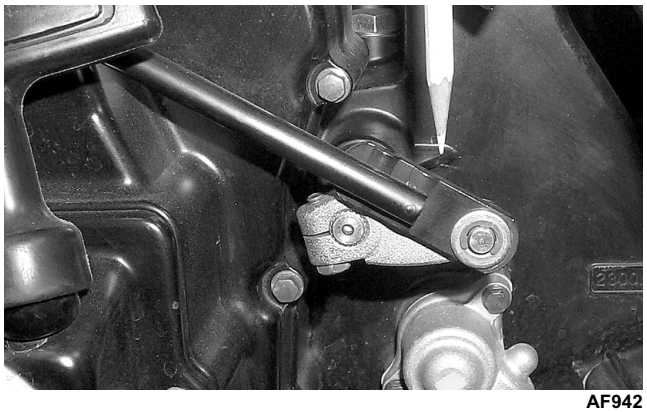
AF882D

21. Install the carburetor into the air-intake boots; then tighten the clamps. Route the vent hoses in the seat stop holes.

CH043D

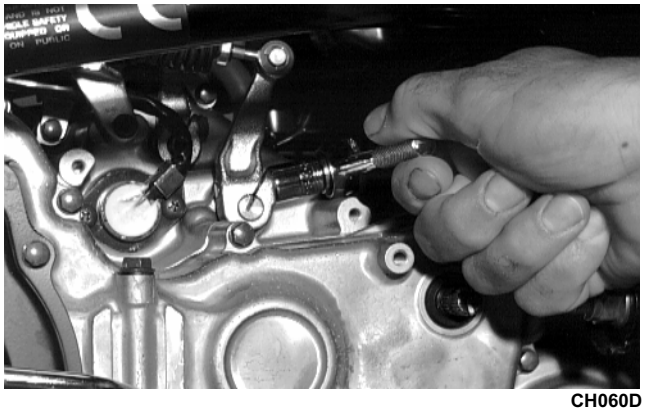
22. Secure the air-intake snorkel to the air-cleaner assembly and frame.

23. Secure the reverse gear shaft arm to the reverse shift shaft making sure that the alignment marks made during removing align. Tighten securely.



AF942

24. Secure the shifter arm to the shifter arm shaft making sure that the alignment marks made during removing align. Tighten securely.

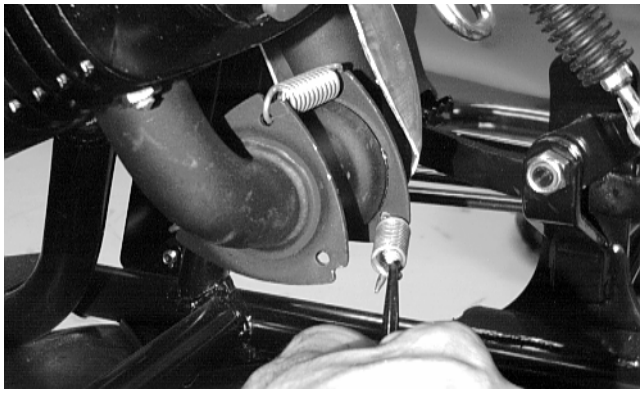


CH060D

25. Secure the hi/lo shifter arm to the shifter arm shaft making sure that the alignment marks made during removing align. Tighten securely.

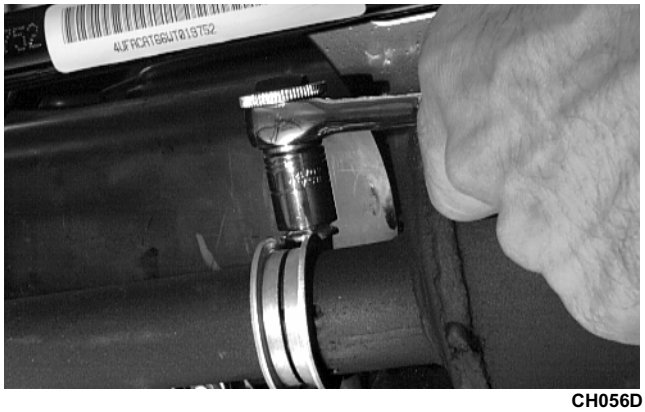
CH058D

26. Place the exhaust header pipe up to the engine with the existing grafoil gaskets and springs.



CH055D

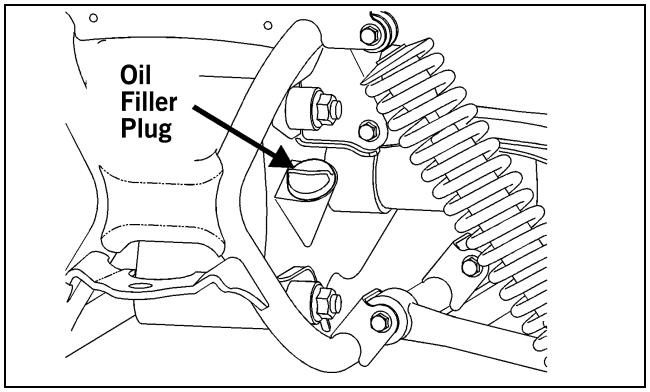
27. Secure the muffler and exhaust pipe. Tighten securely.



CH056D

28. Turn the gas tank valve to the ON position.

29. Fill the engine with the correct motor oil (viscosity and quantity).



733-714A

30. Install the battery and the battery hold-down bracket.
31. Connect the positive cable to the battery first; then the negative cable.
32. Install the seat.
33. Adjust the mechanical foot brake to within specifications.
34. Remove the tie-down straps; then remove the ATV from the support stand.

⚠ CAUTION

If the engine had a major overhaul or if any major part was replaced, proper engine break-in procedures must be followed (see Section 1). If the proper engine break-in procedures are not followed, severe engine damage may result.

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Removing Engine/ Transmission

Many service procedures can be performed without removing the engine/transmission from the frame. Closely observe the note introducing each sub-section for this important information.

☞ AT THIS POINT

If the technician's objective is to service/replace left-side cover oil seals (3), front output joint oil seal (1), rear output joint oil seal (1), and/or the oil strainer (from beneath the engine/ transmission), the engine/transmission does not have to be removed from the frame.

Secure the ATV on a support stand to elevate the wheels.

⚠ WARNING

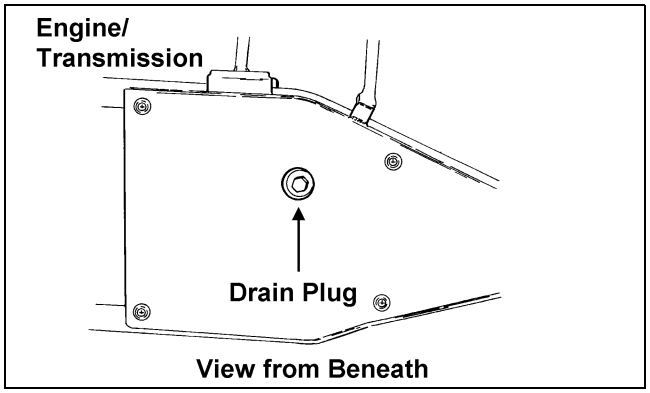
Make sure the ATV is solidly supported on the support stand to avoid injury.

1. Remove the seat.
2. Remove the battery by removing the negative cable first and then the positive cable.

⚠ CAUTION

Battery acid is harmful if it contacts eyes, skin, or clothing. Care must be taken whenever handling a battery.

3. Drain the oil from beneath the engine/transmission; then drain the cooling system.



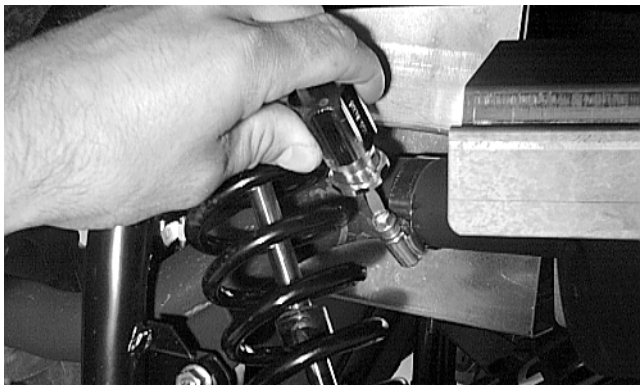
ATV-0109

4. Remove the gas tank (see Section 4).

5. Remove the front fenders and the front rack (see Section 8).

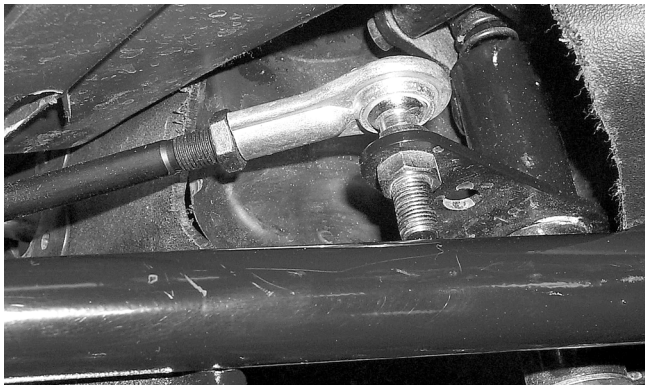
6. Remove the two cap screws securing the exhaust header pipe to the engine; then free the pipe from the engine. Account for a grafoil gasket.

7. Loosen the exhaust pipe from the muffler at the juncture in front of the muffler; then remove the exhaust pipe.

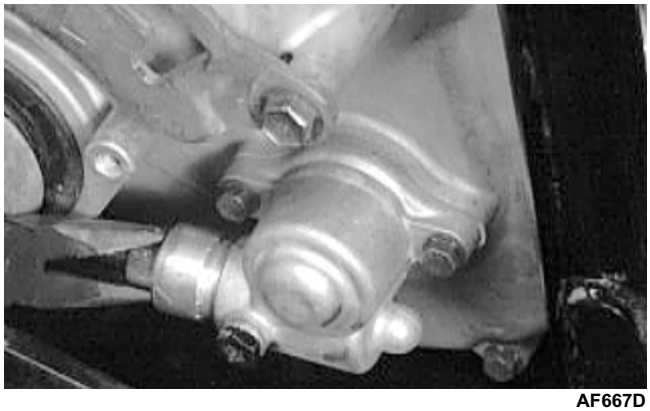

AF775D

8. Remove the cap screws securing the fender extensions to the footrests; then remove the footrests.

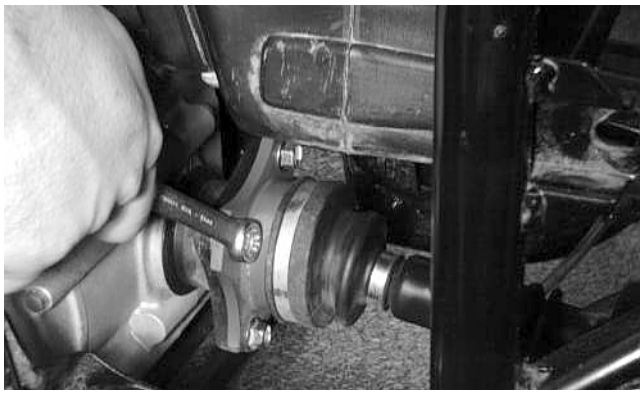
9. Mark the reverse gear shaft arm to the reverse shift shaft to aid in assembly and remove the cap screw securing the reverse gear shaft arm to the reverse shift shaft; then remove the lock nut securing the upper shift rod end to the shift lever arm. Remove the shift rod.


AF941

10. Detach the speedometer cable by loosening the knurled nut and routing the cable away from the engine/transmission.


AF667D

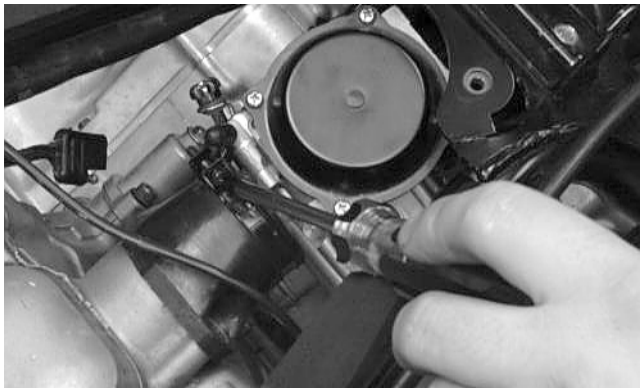
11. Remove the four cap screws securing the rear output joint to the transmission and push the shaft away from the transmission.


CC119D

12. On 4x4 models, remove the cap screws and nuts securing the propeller shaft to the front differential coupler.

13. Detach the carburetor using the following procedure.

    A. Loosen the clamps securing the carburetor boot and the air inlet boot.



CC120D

■ **NOTE: It will not be necessary to disconnect the choke cable.**

B. Route the carburetor assembly up and away from the engine.

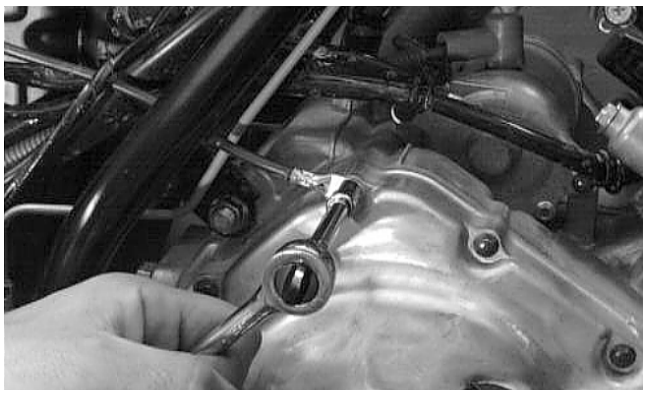
■ **NOTE: Use cable ties or tape to secure the carburetor assembly above the handlebars to keep it from interfering with the removal procedure.**

14. Remove the clamp securing the upper coolant hose to the thermostat housing; then disconnect the hose.

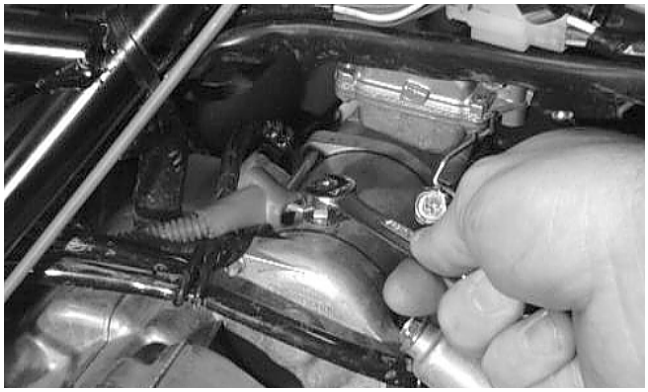
CC335D

15. Disconnect the high tension lead from the spark plug.

16. Disconnect the battery ground (negative) cable from the crankcase cover; then disconnect the positive cable from the starter motor.



AR600D

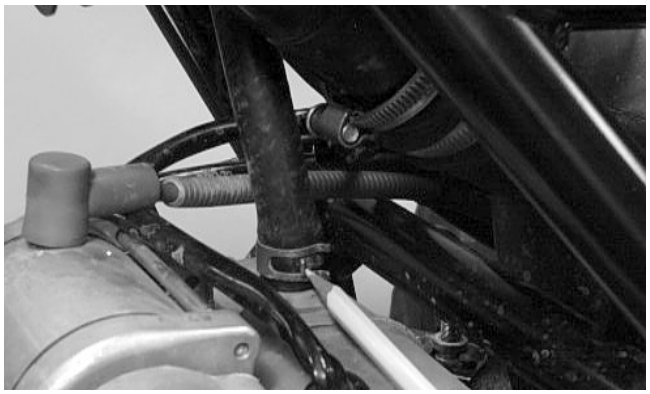


AR604D

17. Remove the clamp securing the lower coolant hose to the water pump housing; then disconnect the hose.

CC334D

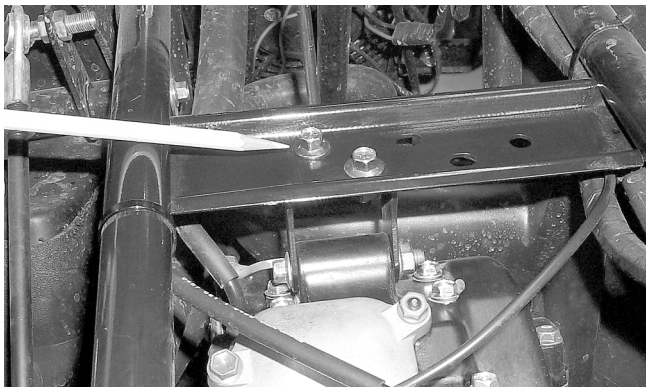
18. Loosen the clamp on the crankcase breather vent hose; then disconnect the hose and route it away from the engine.



CC122D

19. Remove the engine/transmission mounting fasteners in the following sequence:

A. Upper front: Two cap screws (inside the bracket) and one cap screw and nut (topside of the engine).



AF939

B. Lower front: One cap screw, nut, spacer, and washer.

CC123D

C. Upper rear: One cap screw and nut with flat washer; then two left-side engine mount-to-frame cap screws.

CC125D

D. Lower rear: One cap screw and nut with flat washer.

CC126D

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

Top-Side Components

■**NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.**

☞ AT THIS POINT
To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

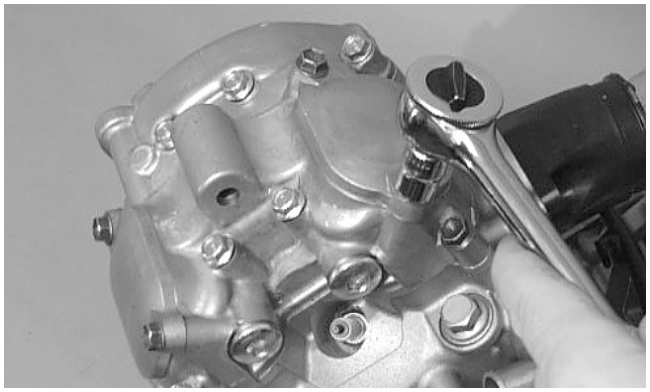
■**NOTE: The engine/transmission does not have to removed from the frame for this procedure.**

Removing Top-Side Components

A. Valve Cover
B. Cylinder Head

■**NOTE: Remove the spark plug and timing inspection plug; then using the recoil starter, rotate the crankshaft to top-dead-center of the compression stroke.**

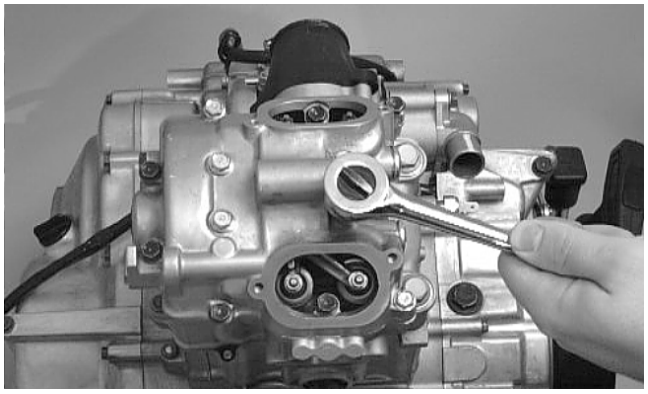
1. Remove the two tappet covers.



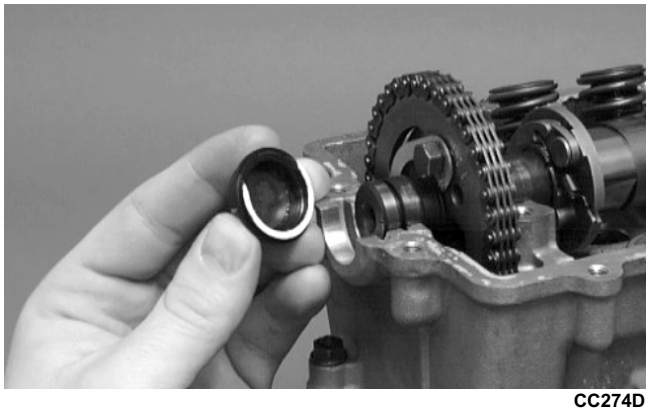
CC001D

■**NOTE: Keep the mounting hardware with the covers for assembly purposes or thread them back into the head to keep them separated.**

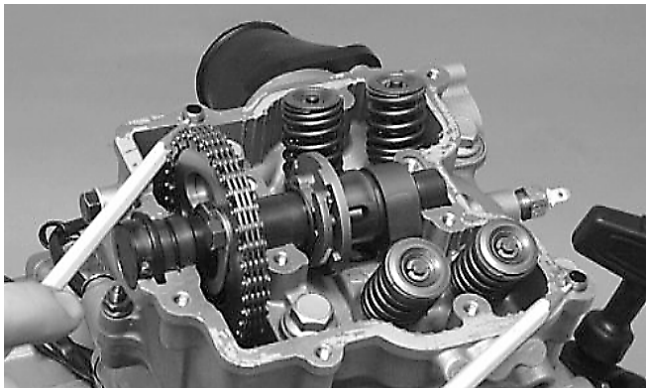
2. Remove the 12 cap screws securing the valve cover to the head; account for the four rubber washers on the top side cap screws. Remove the valve cover. Account for and note the orientation of the cylinder head plug. Note the location of two alignment pins.



CC003D

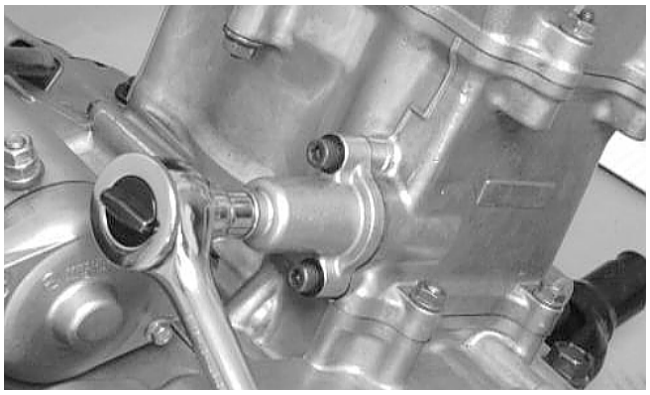


CC274D

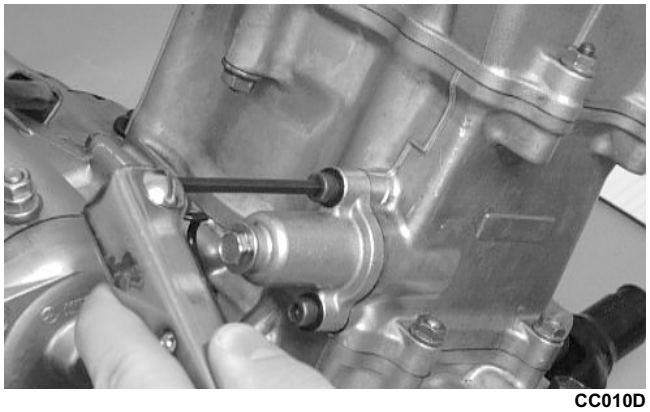


CC273D

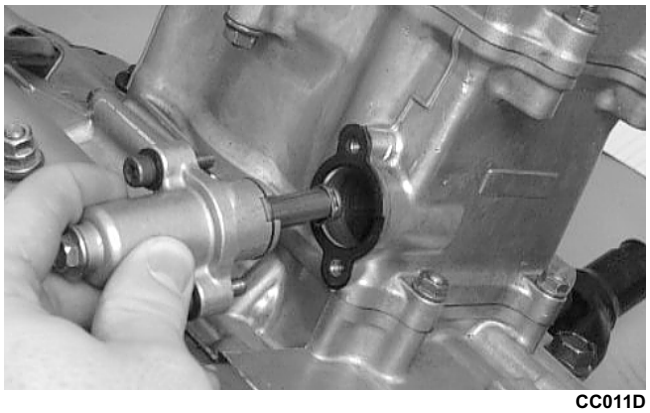
3. Loosen the cap screw on the end of the tensioner; then remove the two Allen-head cap screws securing the tensioner adjuster assembly and remove the assembly. Account for a gasket.



CC009D

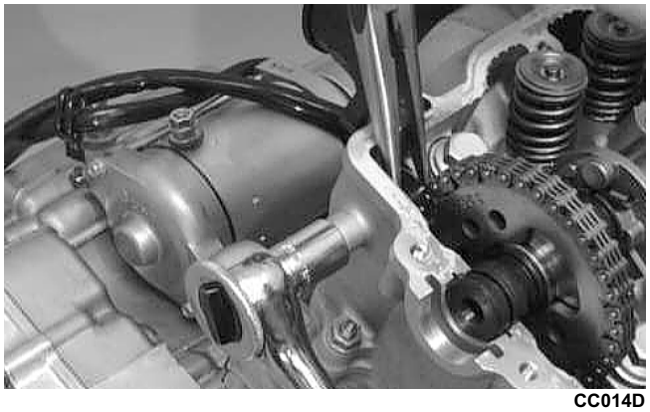


CC010D



CC011D

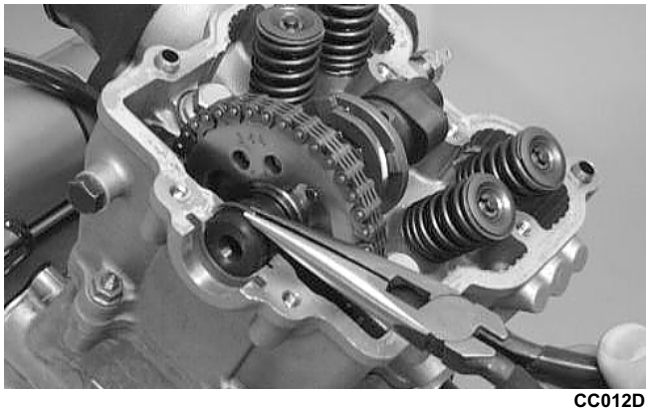
4. Remove the cap screw securing the chain tensioner (account for a washer); then remove the tensioner.



CC014D

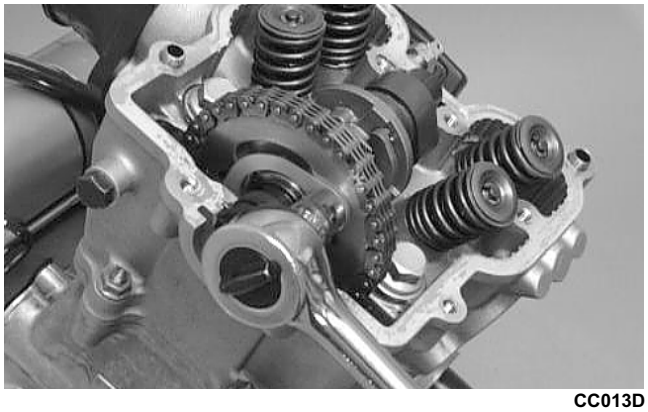
5. Using an awl, rotate the C-ring in its groove until it is out of the cylinder head; then remove the C-ring.

■NOTE: Care should be taken not to drop the C-ring down into the crankcase.

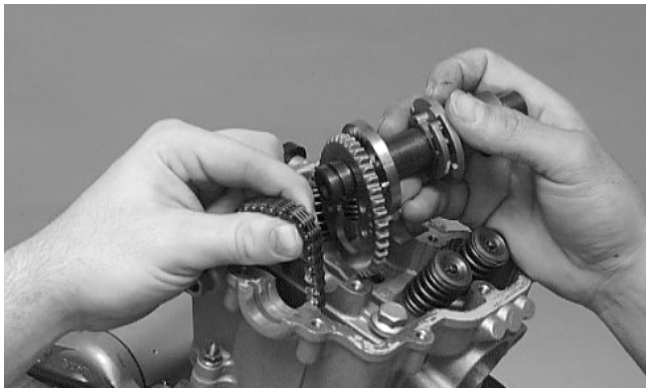


CC012D

6. Bend the washer tabs and remove the two cap screws securing the sprocket to the camshaft; then drop the sprocket off the camshaft. While holding the chain, slide the sprocket and camshaft out of the cylinder head.



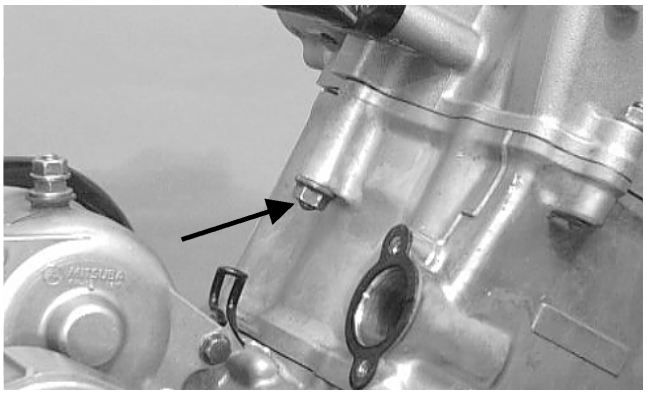
CC013D



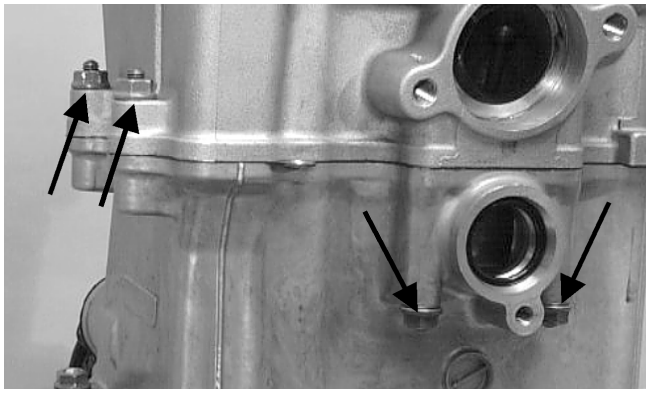
CC266D

■NOTE: Loop the chain over the cylinder and secure it with a wire to keep it from falling into the crankcase.

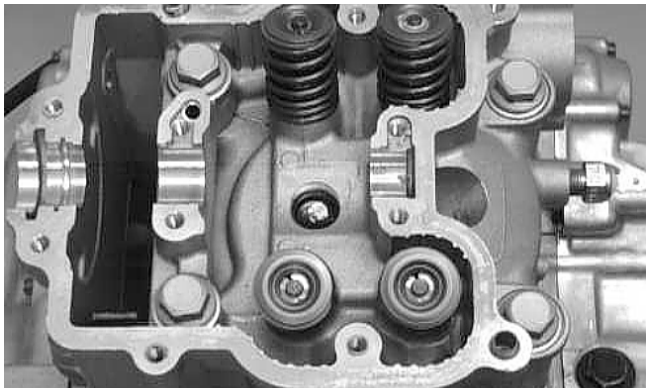
7. Remove the five nuts securing the cylinder head to the cylinder; then remove the four cylinder head cap screws with copper washers (note location of the different-sized cap screws and nuts).



CC017D

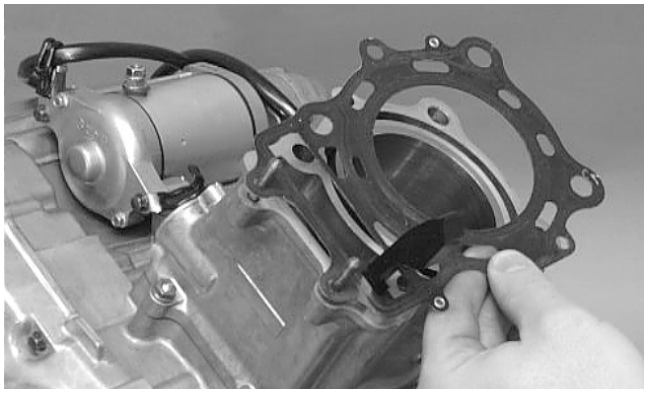


CC018D



CC016D

8. Remove the cylinder head from the cylinder, remove the gasket, and account for two alignment pins.



CC020D

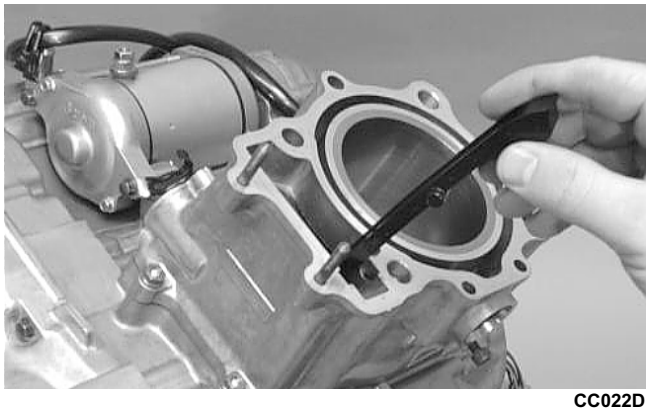
☞ AT THIS POINT

To service valves and cylinder head, see Servicing Top-Side Components sub-section.

9. Remove the cam chain guide.

☞ AT THIS POINT

To inspect cam chain guide, see Servicing Top-Side Components sub-section.



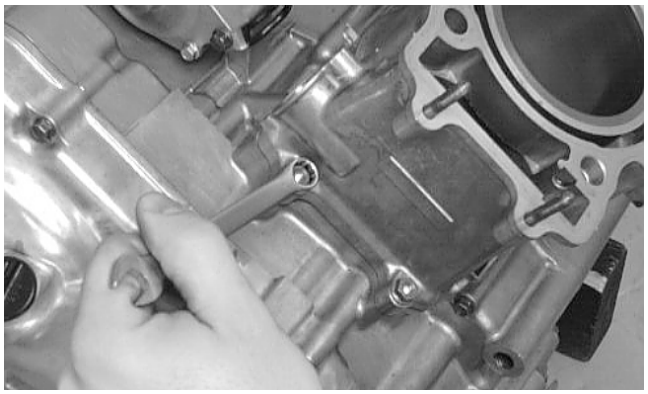
CC022D

C. Cylinder
D. Piston

■ NOTE: Steps 1-9 in the preceding sub-section must precede this procedure.

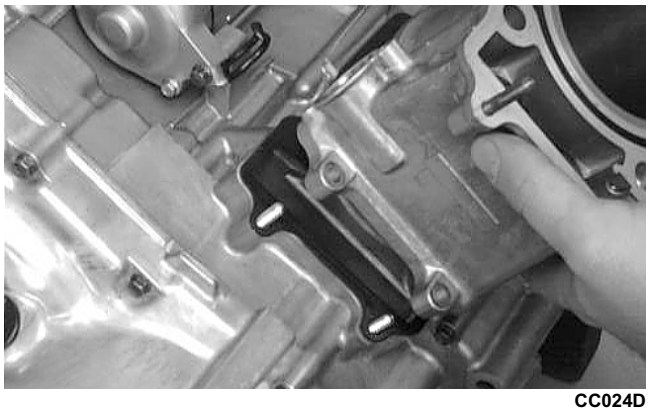
10. Loosen the clamp securing the coolant hose to the union; then detach the hose.

11. Remove the two nuts securing the cylinder to the crankcase.

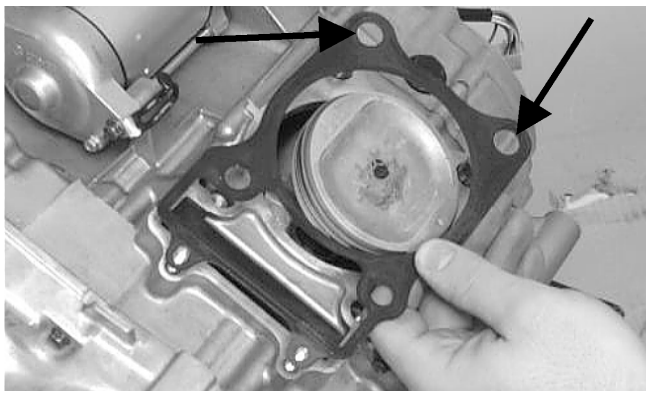


CC023D

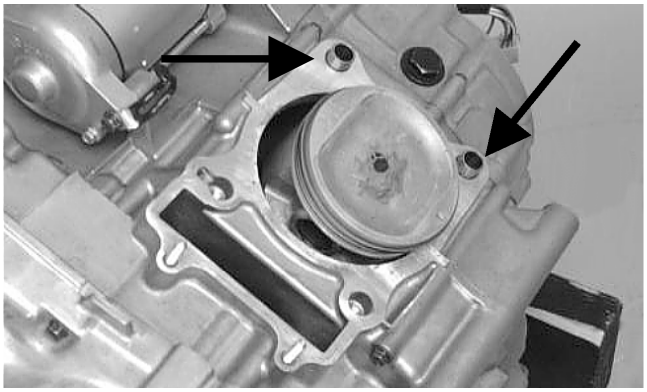
12. Lift the cylinder off the crankcase taking care not to allow the piston to drop against the crankcase. Account for the gasket and two alignment pins.



CC024D



CC025D



CC026D

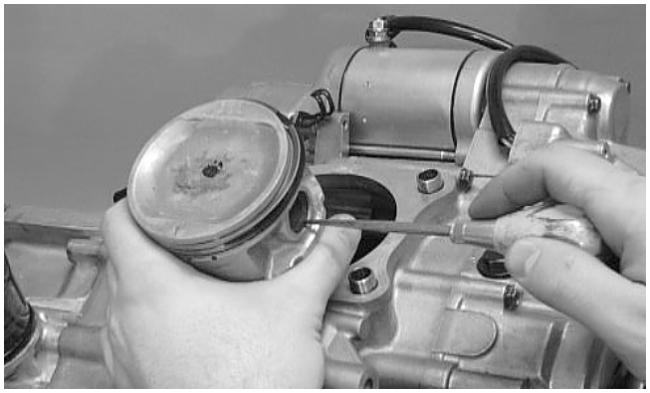
☞ AT THIS POINT

To service cylinder, see Servicing Top-Side Components sub-section.

⚠ CAUTION

When removing the cylinder, be sure to support the piston to prevent damage to the crankcase and piston.

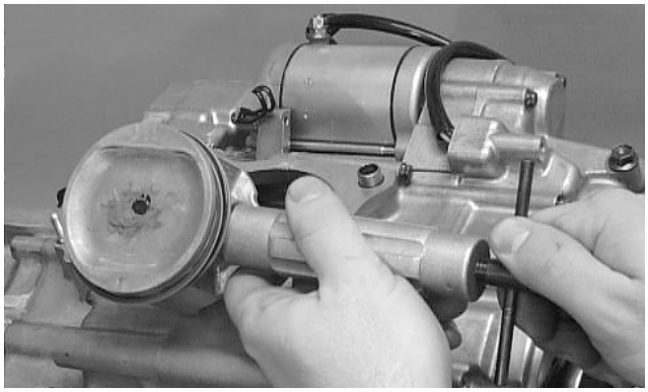
13. Using an awl, remove one piston-pin circlip.



CC032D

14. Using the Piston-Pin Puller (p/n 0644-328), remove the piston pin. Account for the opposite-side circlip. Remove the piston.

■NOTE: It is advisable to remove the opposite-side circlip prior to using the puller.



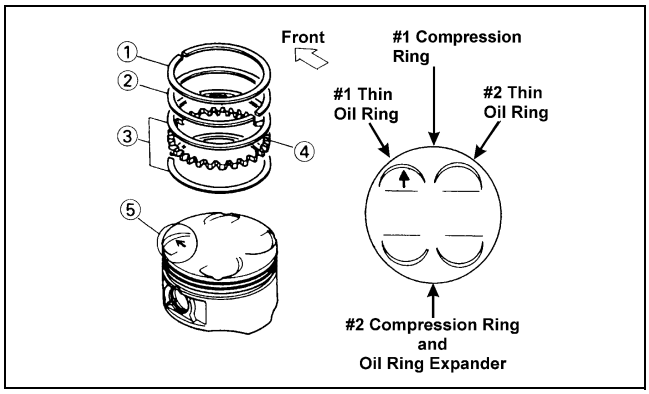
CC033D

■NOTE: Support the connecting rod with rubber bands to avoid damaging the rod or install the Connecting Rod Holder (p/n 0444-006).

⚠ CAUTION

Do not allow the connecting rod to go down inside the crankcase. If the rod is down inside the crankcase and the crankshaft is rotated, severe damage will result.

■NOTE: If the existing rings will not be replaced with new rings, note the location of each ring for proper installation. When replacing with new rings, replace as a complete set only. If the piston rings must be removed, remove them in this sequence.



ATV-1085

A. Starting with the top ring, slide one end of the ring out of the ring-groove.

B. Remove each ring by working it toward the dome of the piston while rotating it out of the groove.

☞ AT THIS POINT

To service piston, see Servicing Top-Side Components sub-section.

☞ AT THIS POINT

To service center crankcase components only, proceed to Removing Left-Side Components.

Left-Side Components

■**NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.**

☞ AT THIS POINT
To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

■**NOTE: The engine/transmission does not have to be removed from the frame for this procedure.**

Removing Left-Side Components
(400 2x4)

A. Cover/Stator Assembly

1. Remove the four cap screws securing the recoil cover to the left-side cover; then remove recoil cover. Account for the gasket.

CC509D

2. Remove the flange nut securing the spacer to the crankshaft; then remove the spacer.

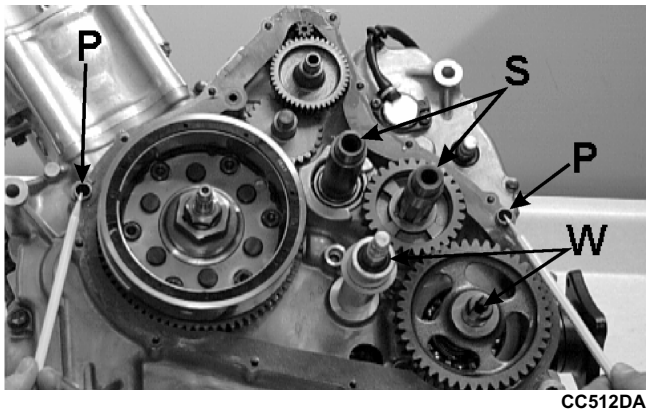
CC510D

3. Lay the engine/transmission on its right side; then remove the fourteen cap screws securing the left-side cover to the crankcase and note the location of the long cap screw with rubber washer.

CC511D

4. While continuously tapping in on the shift shaft, remove the left-side cover w/stator assembly. Account for a gasket and two alignment pins.

■**NOTE: Inspect the inside of the left-side cover for any shaft washers (W) and spacers (S) that may have come off with the cover. Make sure they are returned to their respective shafts. Also, make sure the alignment pins (P) are in place.**

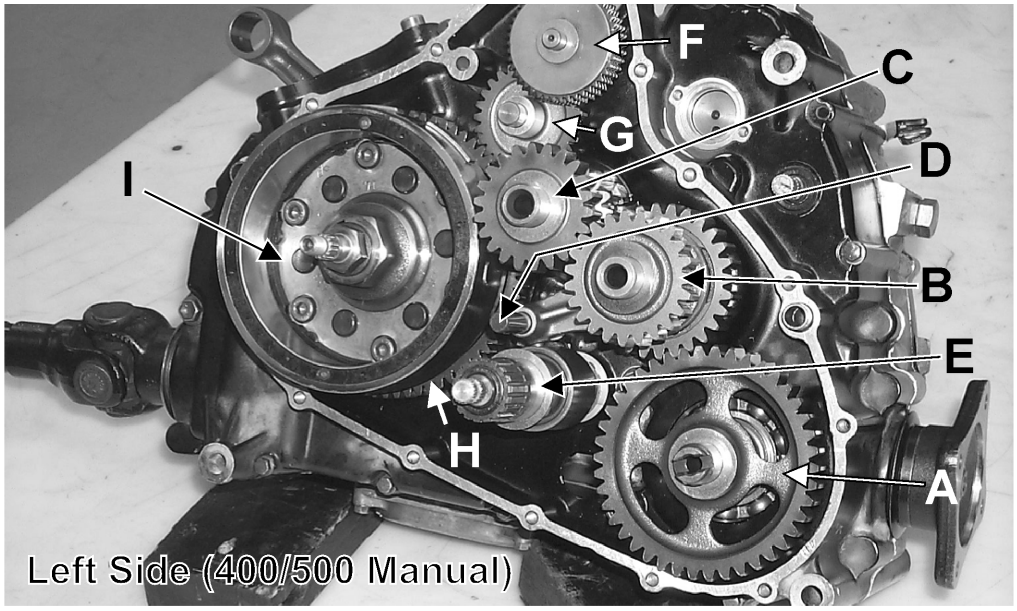


CC512DA

B. Magneto Rotor
C. Idle Gear Assembly

■**NOTE: Steps 1-4 in the preceding sub-section must precede this procedure.**

■**NOTE: For steps 5-8, refer to illustration CC820A.**



KEY CC820A

A. Output Shaft with Driven Gear	F. Starter Gear
B. High-Low Shift Gears	G. Starter Idle Gear
C. Idle Gear	H. Starter Clutch Gear Assembly
D. Shift Fork with Shaft	I. Magneto Rotor
E. Shift Shaft	

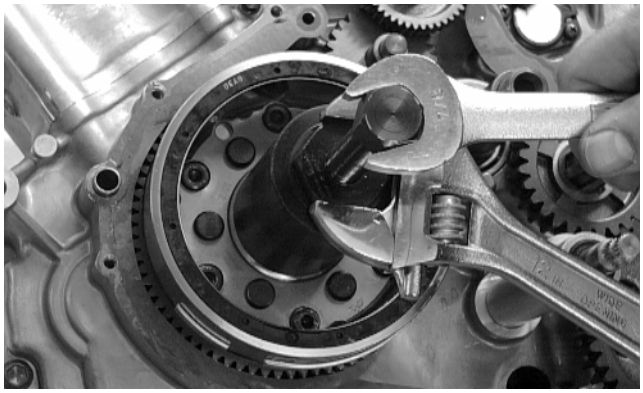
CC820A

■**NOTE: To aid in installing, it is recommended that the assemblies are kept together and IN ORDER.**

5. Remove the nut securing the magneto rotor (I) to the crankshaft; then install the magneto rotor puller adapter.

CC514D

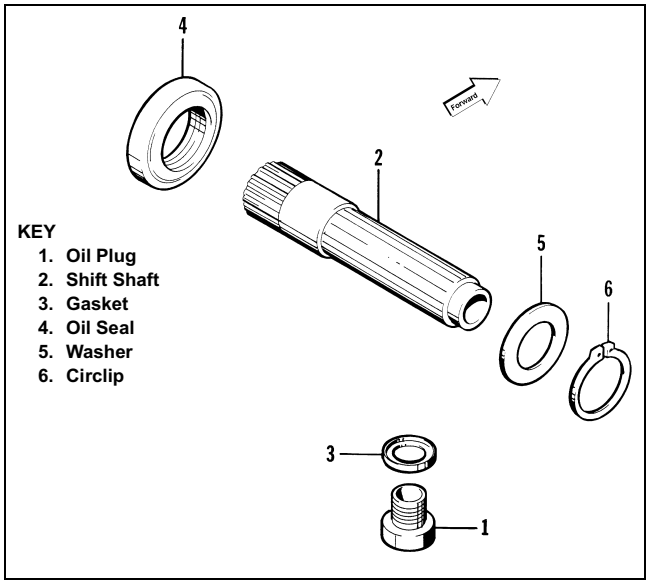
6. Using the Magneto Rotor Remover (p/n 0444-075), remove the magneto rotor assembly from the crankshaft. Account for the key; then remove the starter clutch gear assembly (H) w/washer.



CC515D

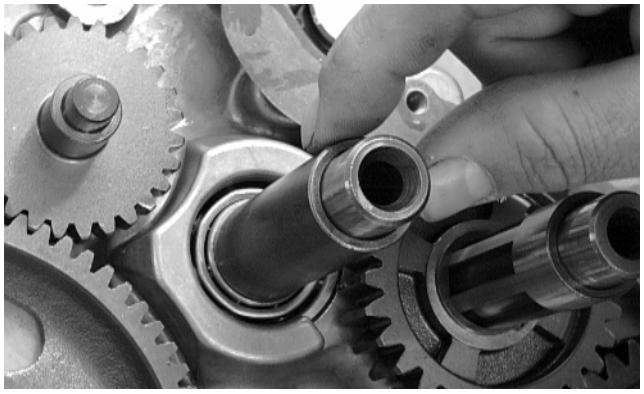
7. Remove the starter idle gear (G) from the crankcase; then remove the pin.

8. Remove the shift shaft (E). Account for a circlip and a washer.



0732-938

9. Remove the spacer from the idle gear.



CC518D

10. Remove the spacer from the driveshaft.

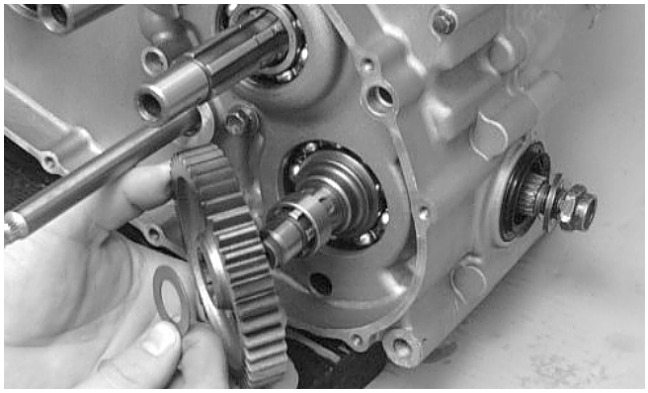
CC519D

11. Remove the circlip and washer from the driveshaft; then remove the #1 gear. Account for a washer and a spacer.

CC059D

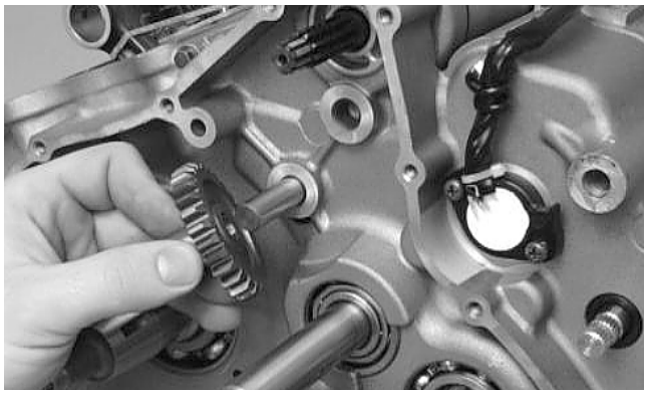
CC062D

12. Remove the washer and the driven gear from the output shaft; then account for the spacer.



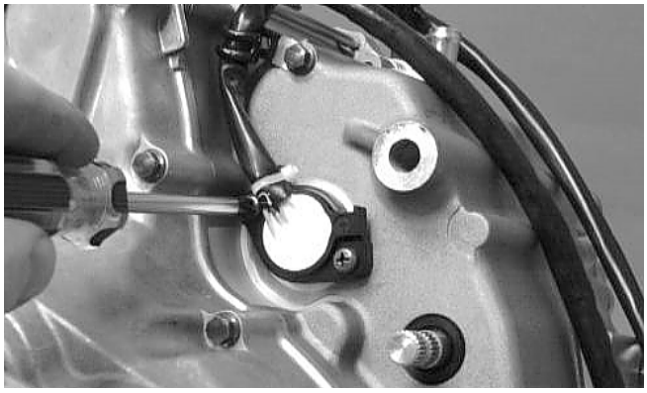
CC063D

13. Remove the starter idle gear from the pin; then remove the pin.

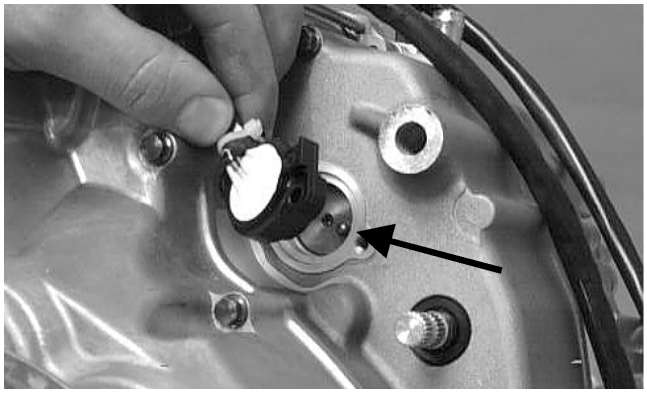


CC064D

14. Remove the Phillips-head screws securing the shift-indicator sending unit; then remove the sending unit. Account for an O-ring, neutral contact, and spring.

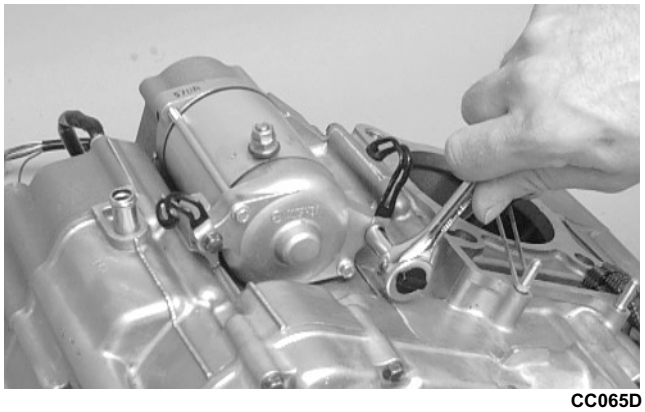


CC048D



CC049D

15. Remove the two cap screws securing the starter to the crankcase; then remove the starter. Account for the wiring forms.



CC065D

☞ AT THIS POINT

To service center crankcase components only, proceed to Removing Right-Side Components.

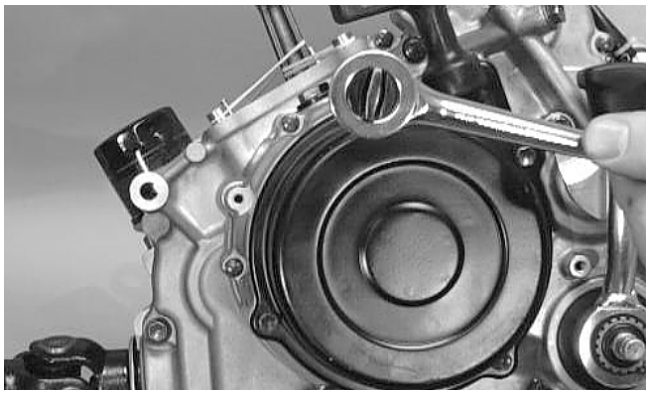
Removing Left-Side Components

A. Recoil Starter
B. Hi/Low Shifter Assembly
C. Speedometer Drive
D. Cover

1. Remove the cap screws securing the recoil starter assembly to the left-side cover; then remove the recoil starter. Account for the gasket.

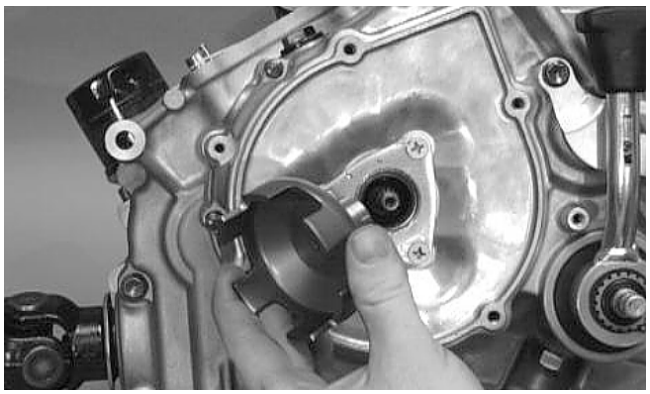
☞ AT THIS POINT

To service the recoil starter, see Servicing Left-Side Components sub-section.



CC039D

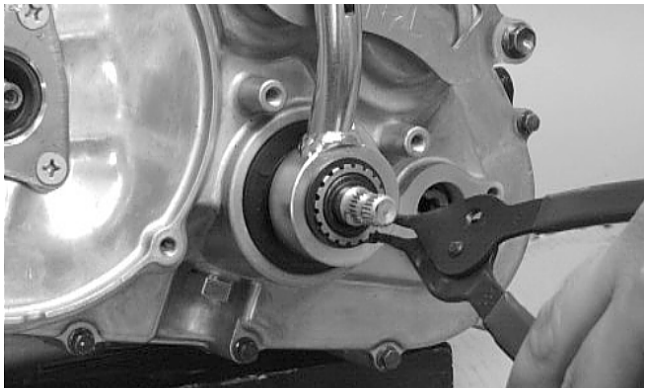
2. Remove the flange nut securing the starter cup to the crankshaft; then remove the starter cup. Account for the O-ring inside the cup.



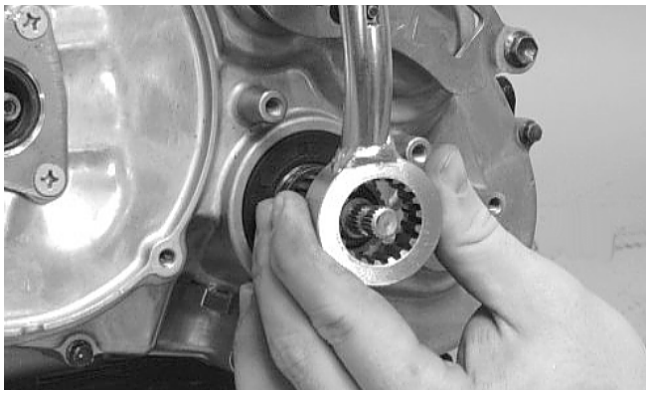
CC041D

3. Put the shift lever into the hi-range position and remove the circlip from the hi/low range shift shaft; then remove the shift lever.

■ NOTE: It will be necessary to lift slightly on the shift lever to remove it from the shaft and plate.

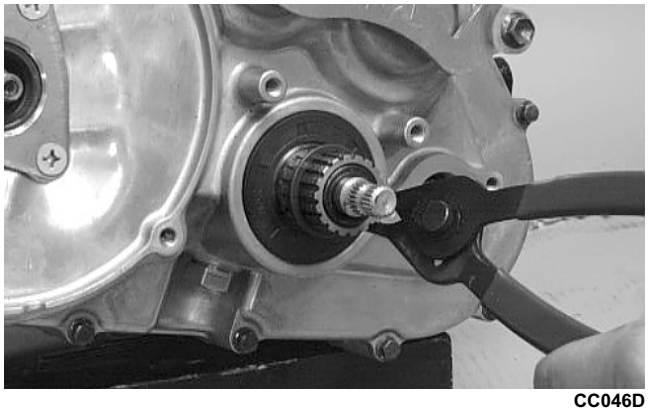


CC044D



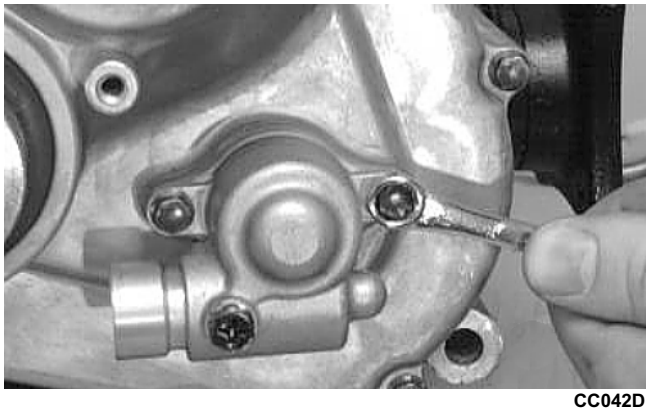
CC045D

4. Remove the inside circlip.

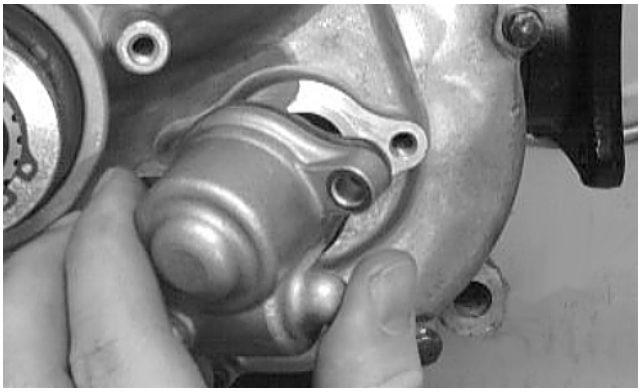


CC046D

5. Remove the two cap screws securing the speedometer drive adapter; then remove the adapter. Account for the gasket.

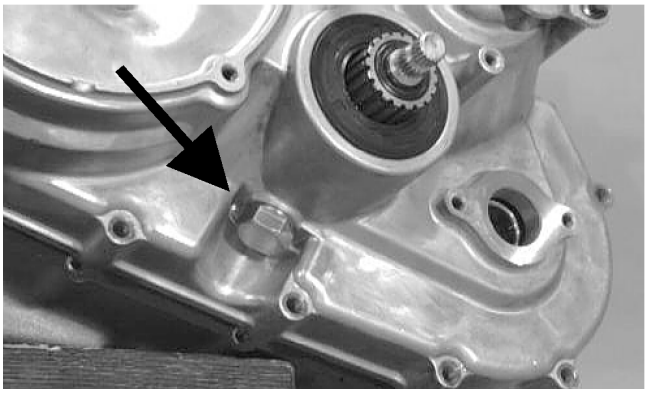


CC042D



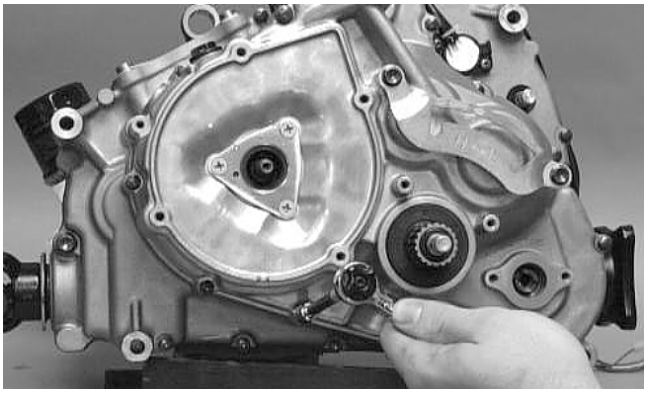
CC043D

6. Remove the shift stop housing assembly from beneath the shift shaft housing. Account for the stopper and spring.

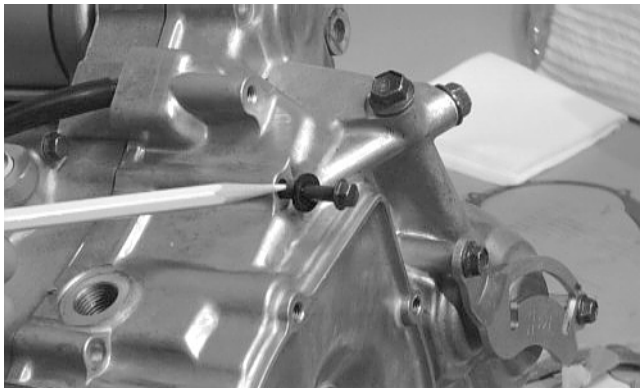


CC054D

7. Lay the engine/transmission on its right side; then remove the fourteen cap screws securing the left-side cover to the crankcase and note the location of the long cap screw with rubber washer.



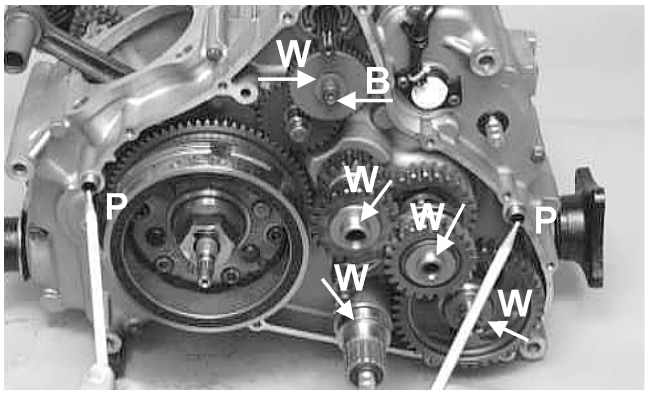
CC047D



CC055D

8. Using Side Case Puller (p/n 0644-262), remove the side cover. Account for a gasket, two alignment pins, and an idle gear limiter bushing.

■**NOTE: Inspect the inside of the left-side cover for any shaft washers that may have come off with the cover. Make sure they are returned to their respective shafts and that the idle gear bushing is on the shaft or in the cover.**

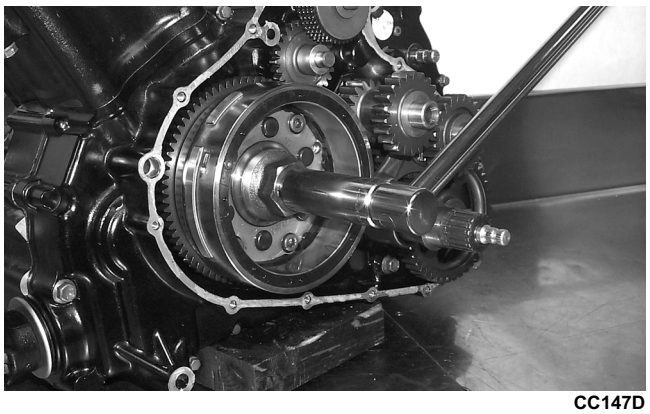


CC326D

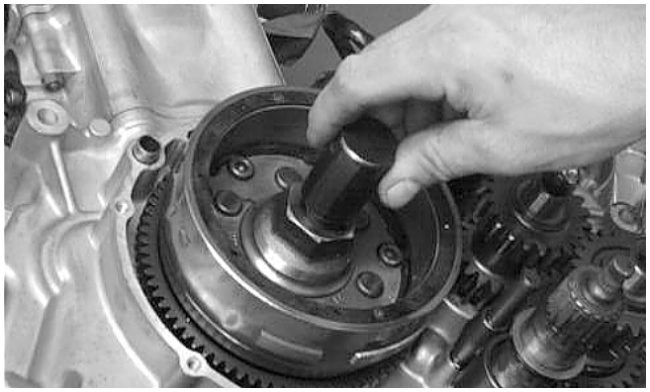
E. Magneto Rotor
F. Idle Gear Assembly

■**NOTE: Steps 1-8 in the preceding sub-section must precede this procedure.**

9. Remove the nut securing the rotor to the crankshaft; then install the magneto rotor puller adapter.

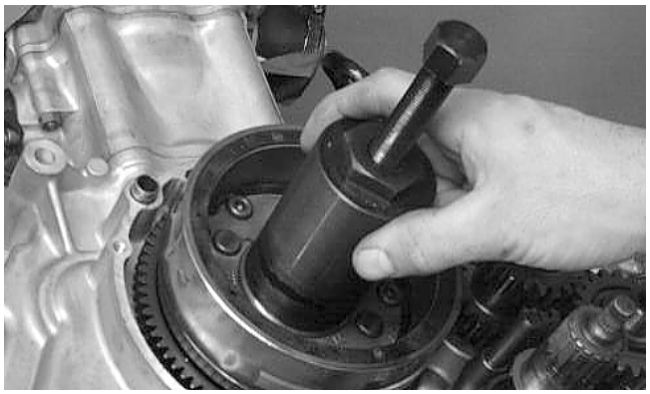


CC147D



CC327D

10. Using the Magneto Rotor Remover (p/n 0444-075), remove the rotor assembly from the crankshaft. Account for the key; then remove the starter clutch gear assembly and washer.



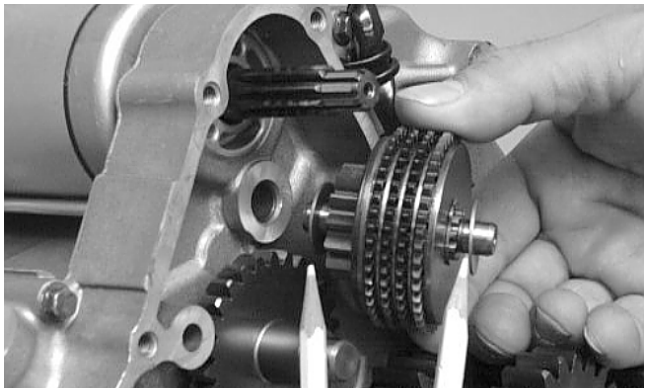
CC149D

CC150D

11. Remove the starter gear assembly from the crankcase; then account for a washer on each end of the assembly.

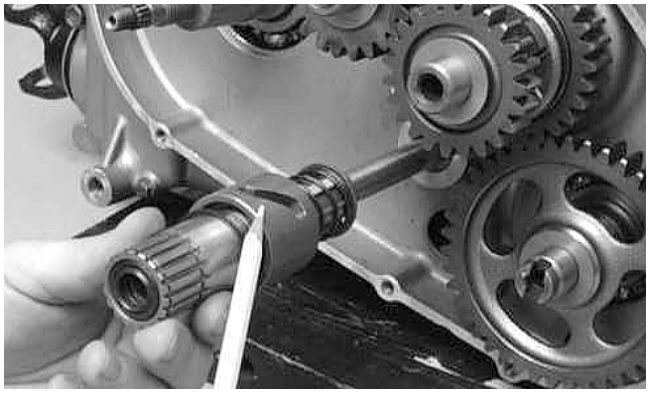
■**NOTE: Each end of the shaft should have a bushing. The bushings may stay on the shaft or in the case halves (500).**

3



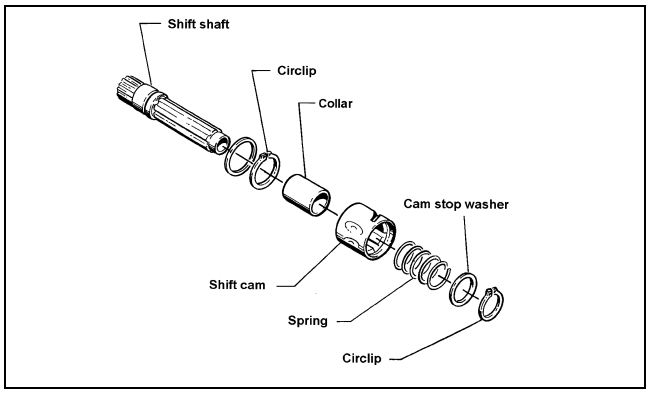
CC157D

12. Remove the fork shaft from the crankcase boss; then remove the shift fork. Remove the shift shaft assembly from the gear shift shaft.



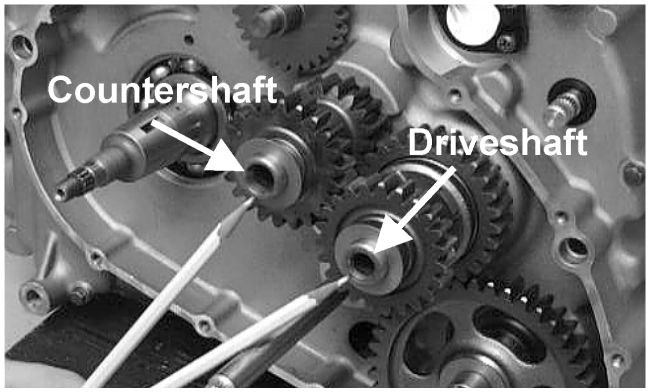
CC057D

■ **NOTE: If servicing the shift shaft assembly, care must be taken not to install the shift cam improperly or the transmission will not shift properly.**



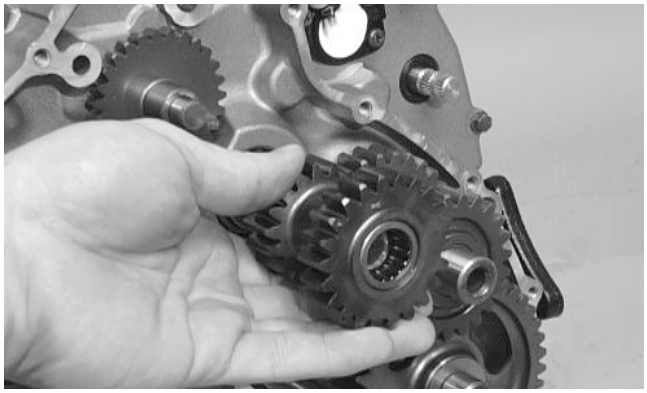
0735-355

13. Remove a washer from the countershaft and from the output shaft.



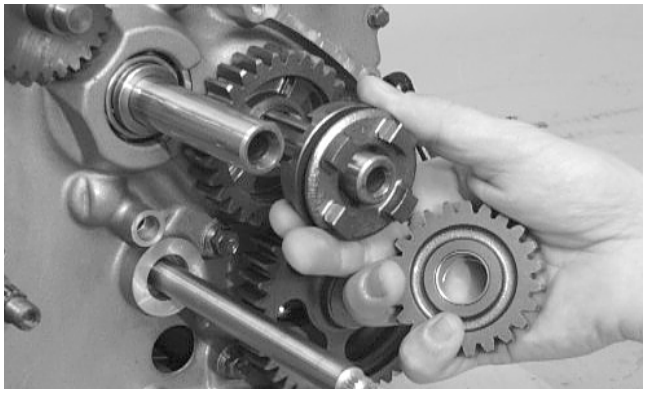
CC058DA

14. Remove the idle gear and spacer from the countershaft.



CC060D

15. Remove the #2 gear and the select sliding dog gear from the output shaft. Account for a bushing and a washer.

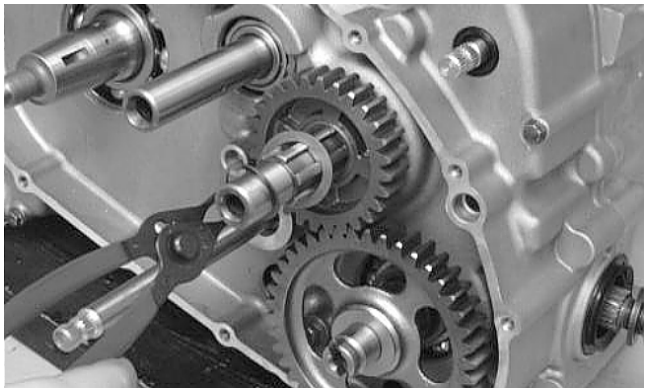


CC061D

☞ AT THIS POINT

To service gear shift fork, see Servicing Left-Side Components sub-section.

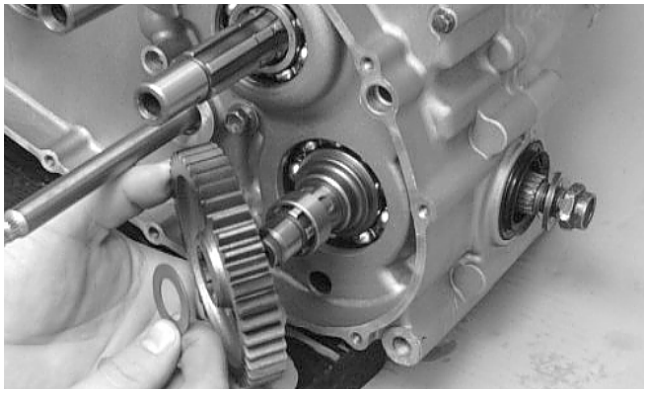
16. Remove the circlip and washer from the output shaft; then remove the driven gear. Account for a splined bushing and a spacer.



CC059D

CC062D

17. Remove the washer and the #1 gear from the output shaft; then account for the bushing.

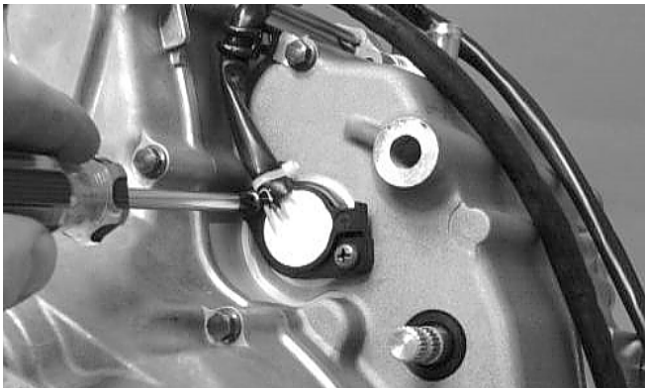


CC063D

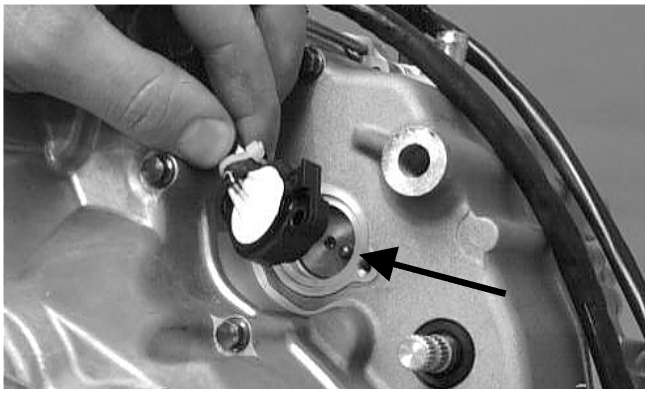
18. Remove the starter idle gear from the pin; then remove the pin.

CC064D

19. Remove the Phillips-head screws securing the shift-indicator sending unit; then remove the sending unit. Account for an O-ring, neutral contact, and spring.

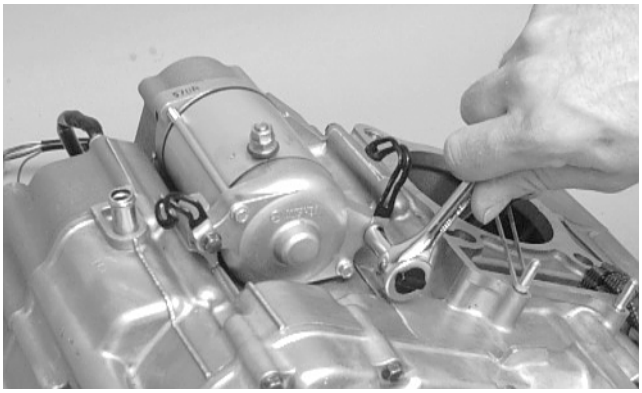


CC048D



CC049D

20. Remove the two cap screws securing the starter to the crankcase; then remove the starter. Account for the wiring forms.



CC065D

☞ AT THIS POINT

To service center crankcase components only, proceed to Removing Right-Side Components.

Right-Side Components

■**NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.**

☞ AT THIS POINT
To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

■**NOTE: The engine/transmission does not have to be removed from the frame for this procedure.**

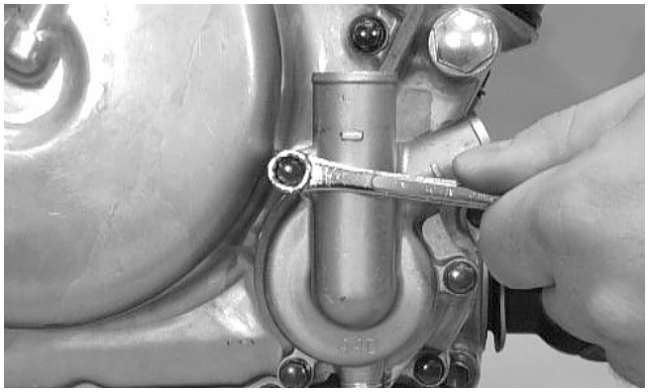
Removing Right-Side Components

A. Oil Filter
B. Water Pump

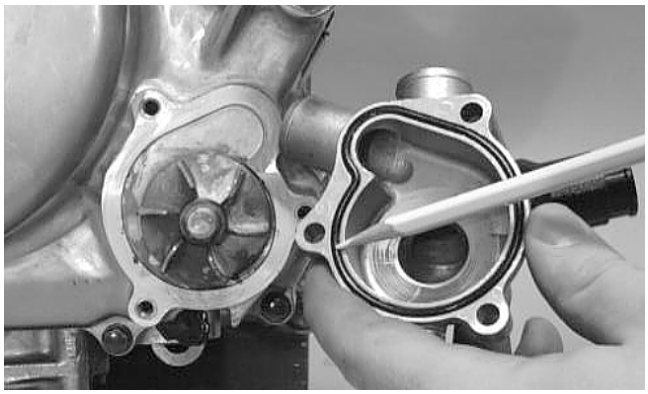
1. Remove the clamp securing the coolant hose to the water pump; then remove the hose.
2. Using the Oil Filter Wrench (p/n 0444-042), remove the oil filter.

CC067D

3. Remove the three cap screws securing the water pump cover to the right-side cover; then remove the water pump cover. Account for the O-ring.

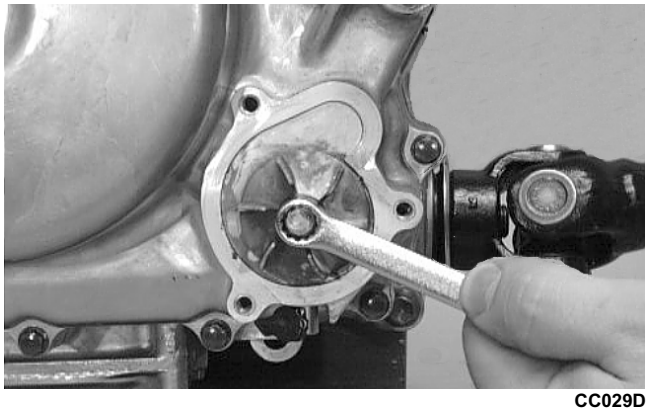


CC027D

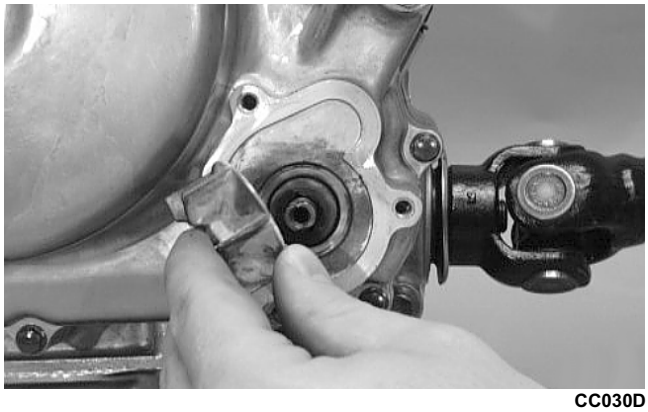


CC028D

4. Remove the cap screw securing the impeller to the impeller shaft; then remove the impeller. Account for the rubber retainer and porcelain seal.

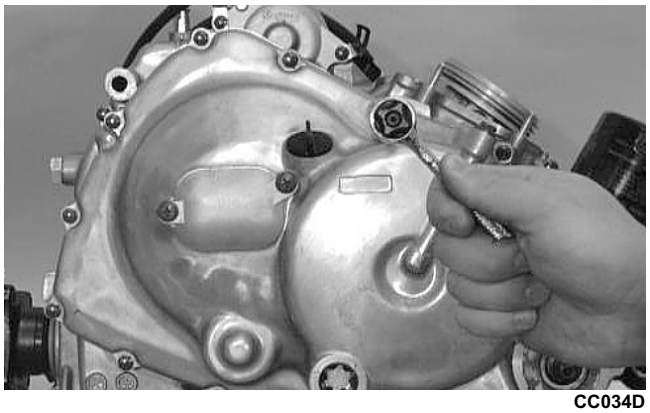


CC029D



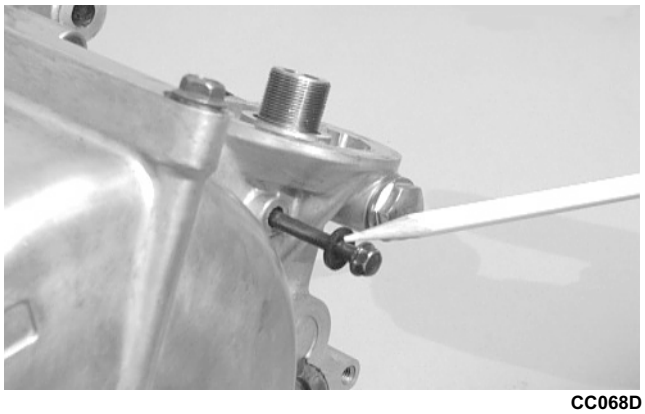
CC030D

5. Lay the ATV on its left side; then remove the fifteen cap screws securing the right-side cover to the crankcase. Remove the cover. Note the location of the long cap screw and rubber washer. Account for the gasket and for two alignment pins.



CC034D

■**NOTE: The water pump housing does not have to be removed when removing the right-side cover.**

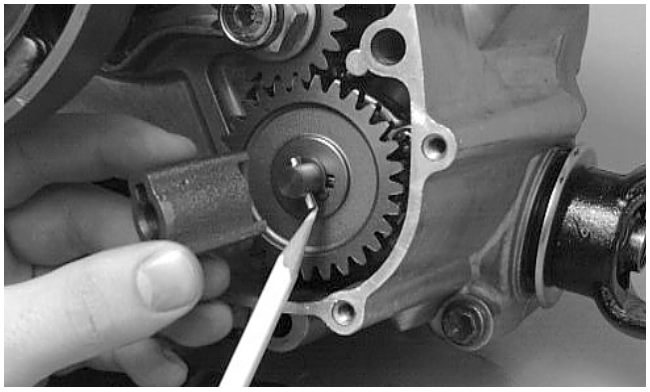


CC068D

■**NOTE: When removing the right-side cover, account for the release roller guide that it does not fall and cause damage.**

CC070D

6. Remove the water pump drive joint from the water pump shaft. Account for the pin.

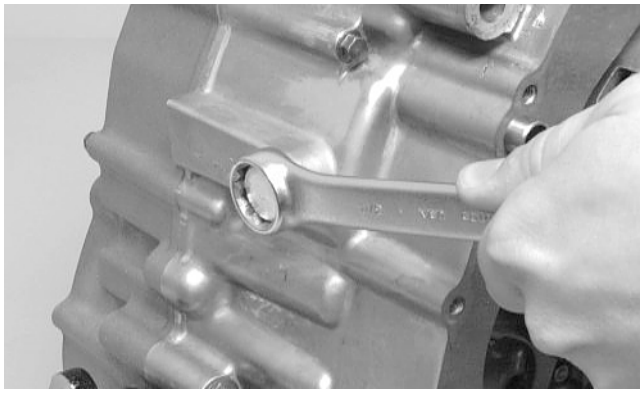


CC082D

C. Primary Clutch Shoe
D. Primary Driven Clutch
E. Starter Clutch Housing

■**NOTE: Steps 1-6 in the preceding sub-section must precede this procedure.**

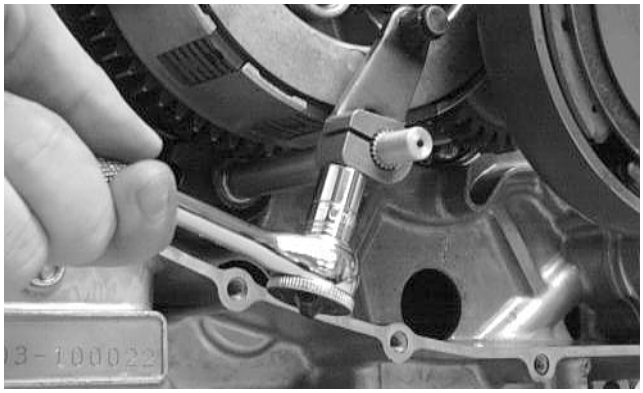
7. Remove the reverse cam stopper housing and gasket and account for a stopper and spring.



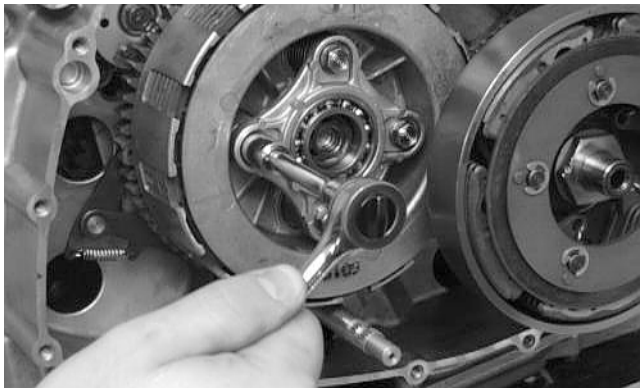
CC069D

8. Remove the cap screw securing the clutch release arm and remove the arm; then in a crisscross pattern, remove the four cap screws securing the clutch release roller assembly.

■**NOTE: Scribe a reference mark with a marker on the arm and shaft to aid in assembly.**



CC073D



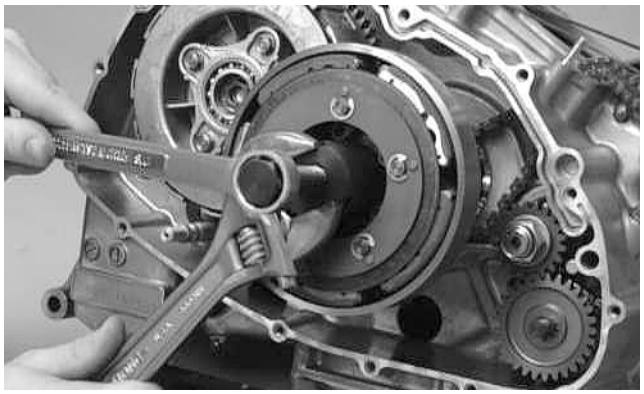
CC074D

9. Remove the release roller assembly. Account for four springs.

10. Remove the starter clutch-shoe nut (left-hand threads) and washer from the driveshaft; then using a primary clutch shoe remover, remove the clutch shoe.

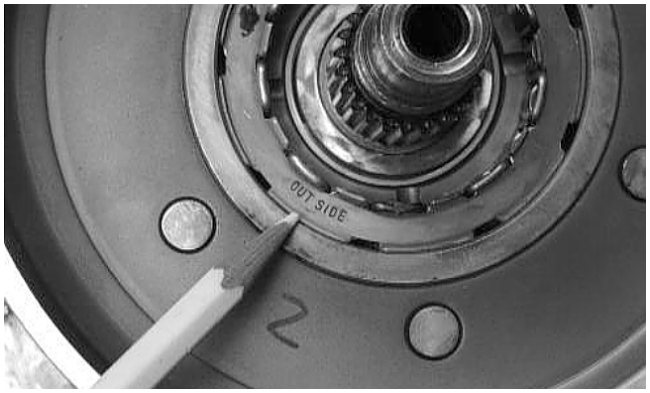
⚠ CAUTION

Care must be taken when removing the nut; it has "left-hand" threads.



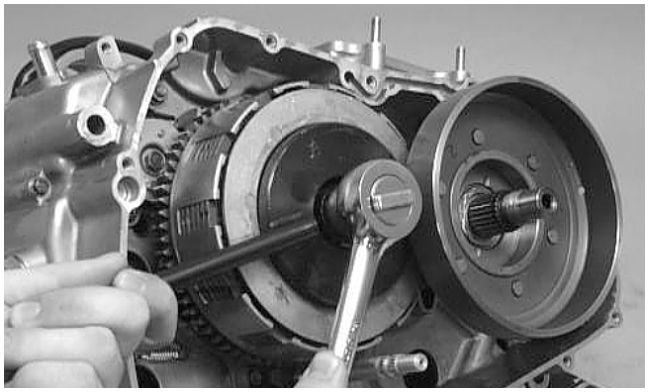
CC072D

11. Remove the primary drive one-way clutch from the starter clutch housing. Note the word OUTSIDE stamped on the clutch for assembly purposes.



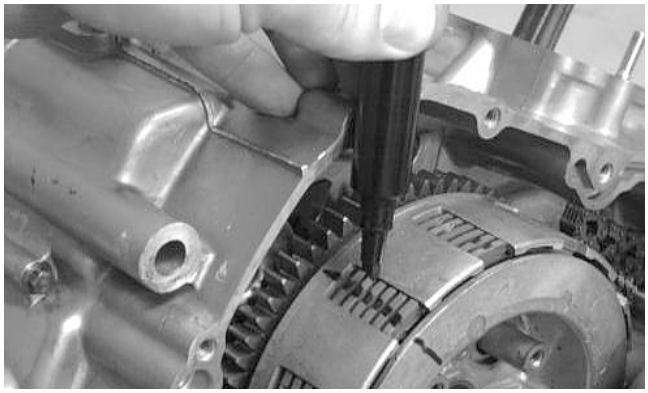
CC075D

12. Using the Clutch Sleeve Hub Holder (p/n 0444-007) to hold the clutch sleeve hub, remove the nut and washer.



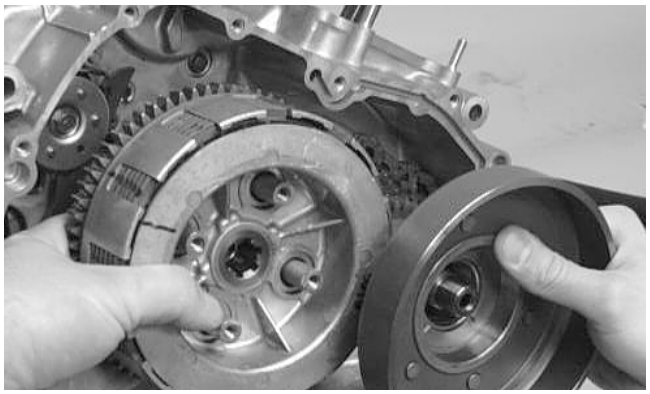
CC076D

13. Scribe a line across the primary driven clutch assembly to aid in assembly.



CC077D

14. Simultaneously, remove the primary driven clutch assembly and starter clutch housing from their respective shafts. Account for the sleeve and washers.



CC078D

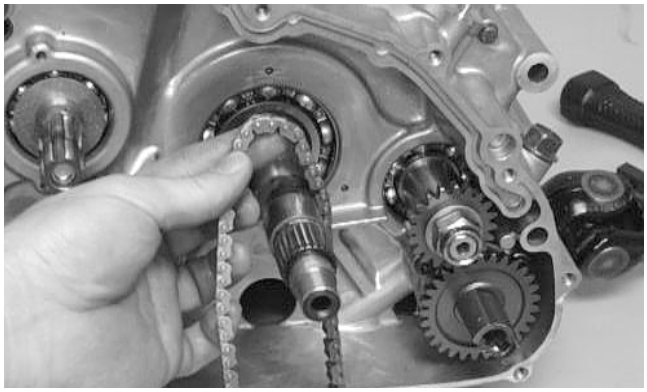
☞ AT THIS POINT

To service clutch components, see Servicing Right-Side Components sub-section.

F. Gear Shift Cam Plate/Guide
G. Oil Pump/Oil Strainer

■ NOTE: Steps 1-14 in the preceding sub-sections must precede this procedure.

15. Remove the chain from the crankcase.

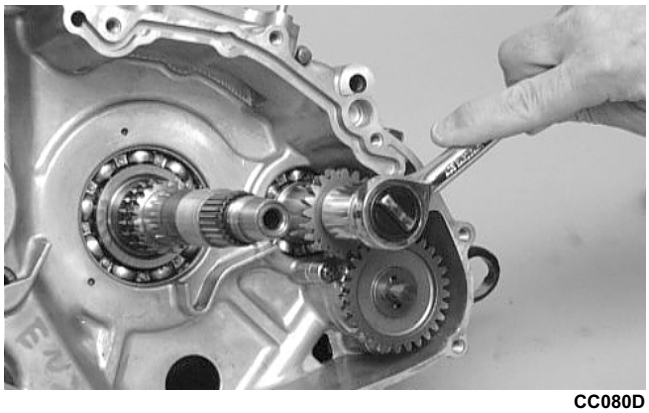


CC079D

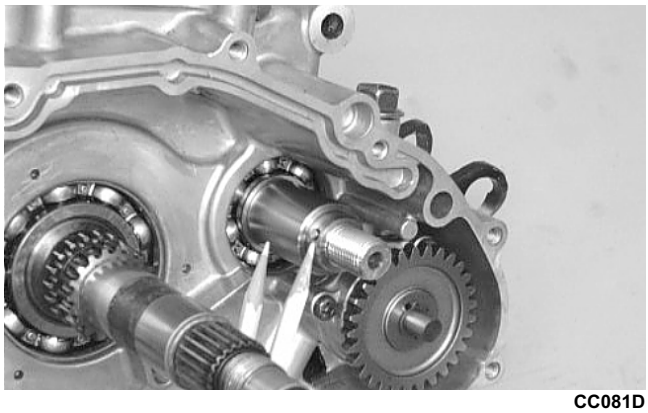
☞ AT THIS POINT

To service cam chain, see Servicing Right-Side Components sub-section.

16. Remove the nut and washer securing the oil pump drive gear to the crank balancer shaft; then remove the gear and account for the pin and the spacer.

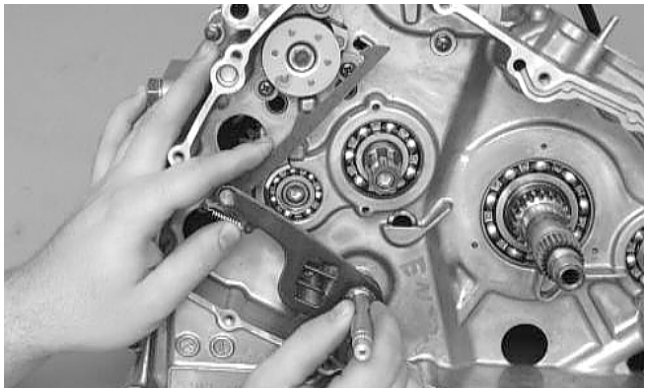


CC080D



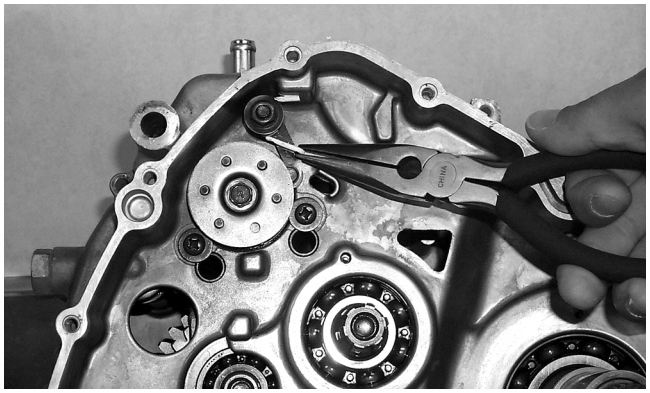
CC081D

17. Remove the gear shift shaft from the crankcase.



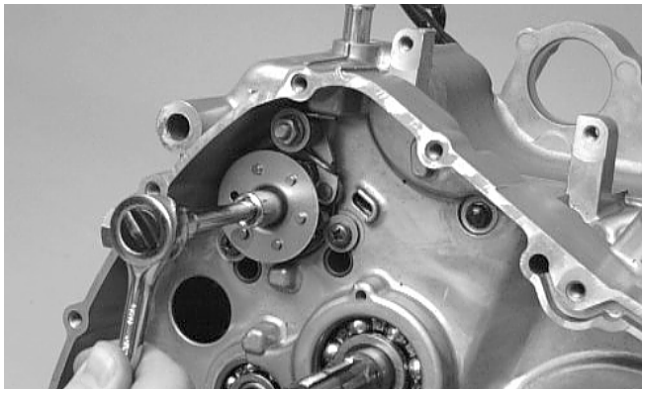
CC085D

18. Release the tension from the gear shift cam stopper arm spring.



CC086D

19. Remove the cap screw securing the gear shift cam plate and guide to the gear shift cam; then remove the cam plate and guide.



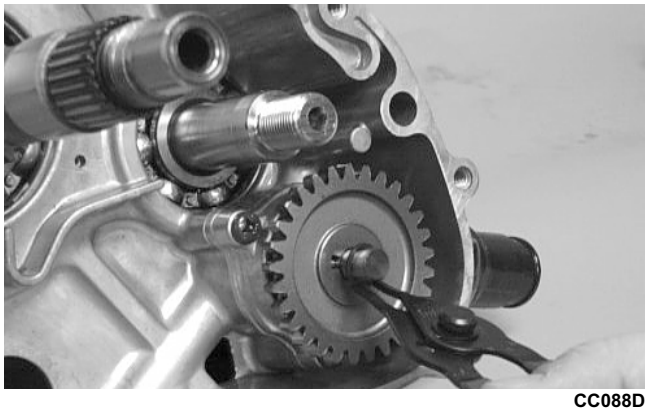
CC164D

⚠ CAUTION

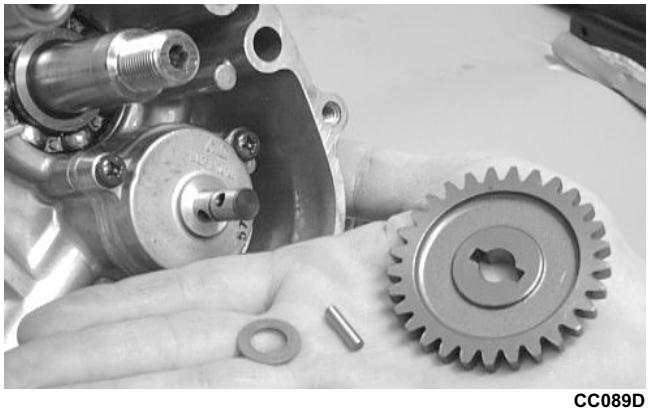
If servicing of the engine/transmission is due to a lubrication-related problem, replace the oil pump.

■NOTE: For general servicing, it is advisable to disassemble, clean, and inspect the oil pump. If any wear or damage is suspected, replace the oil pump.

20. Remove the circlip securing the oil pump driven gear; then remove the gear. Account for the pin and the washer.

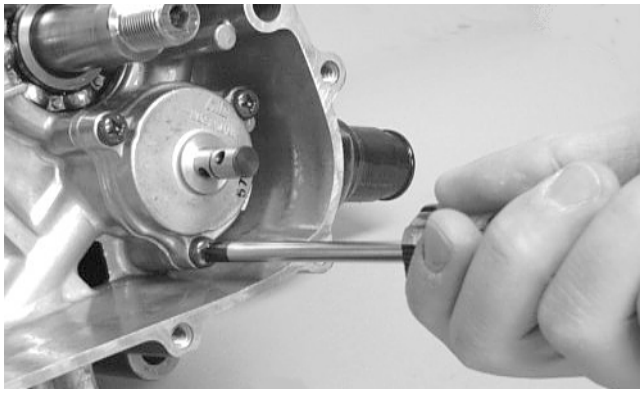


CC088D



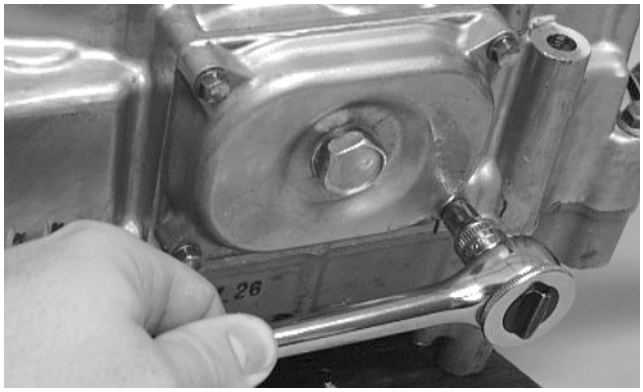
CC089D

21. Remove the three Phillips-head screws securing the oil pump; then remove the oil pump.



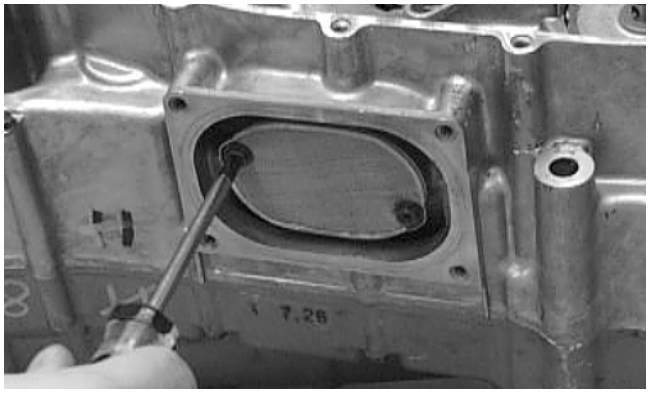
CC090D

22. Remove the cap screws securing the oil strainer cap; then remove the cap. Account for the O-ring.



CC091D

23. Remove the two Phillips-head cap screws securing the strainer.



CC163D

☞ AT THIS POINT

To service center crankcase components only, proceed to Separating Crankcase Halves.

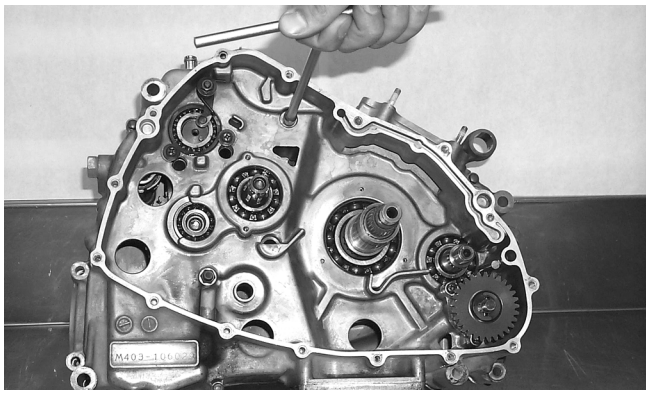
Center Crankcase Components

■ NOTE: This procedure cannot be done with the engine/transmission in the frame. Complete Removing procedures for Top-Side, Left-Side, and Right-Side must precede this procedure.

■ NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.

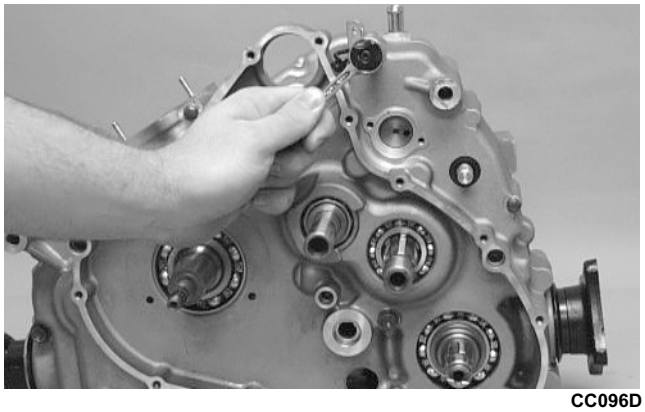
Separating Crankcase Halves

1. Remove the five right-side 6 mm cap screws (one from inside the case) securing the crankcase halves. Note the location of the different-lengthed cap screws.



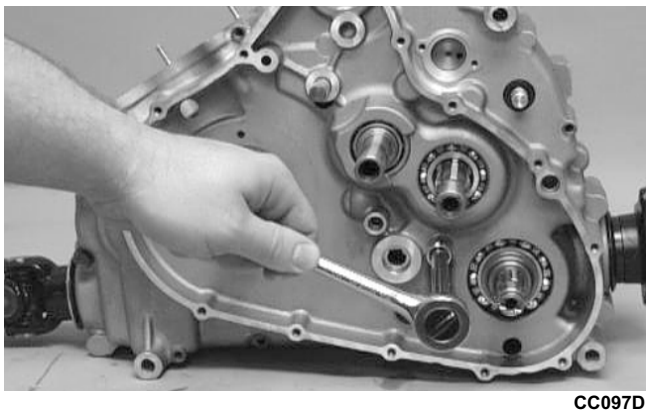
CC530D

2. Remove the seven left-side 6 mm cap screws securing the crankcase halves. Note the location of the wiring form. Note the location of the different-lengthed cap screws.



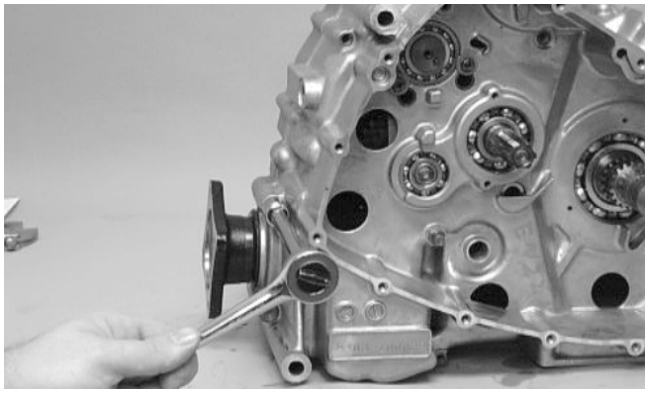
CC096D

3. Remove the three left-side 8 mm cap screws (two from inside the case) securing the crankcase halves. Note the location of the different-lengthed cap screws.



CC097D

4. Remove the three right-side 8 mm cap screws securing the crankcase halves.

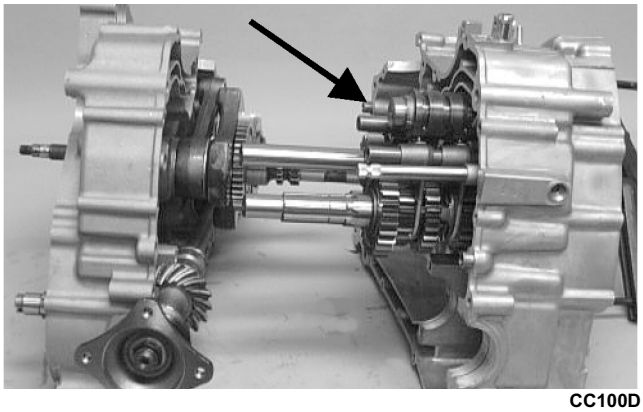


CC098D

5. Using the Crankcase Separator/Crankshaft Remover (p/n 0444-009) and tapping lightly with a rubber mallet, separate the crankcase halves. Account for two alignment pins, an O-ring, and a washer.

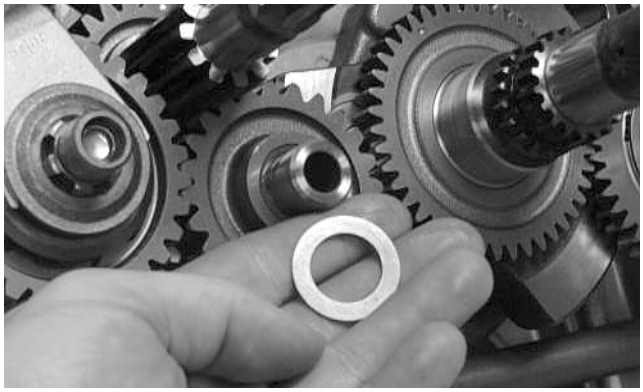
■ NOTE: To keep the shaft/gear assemblies intact for identification, tap the shafts toward the left-side crankcase half when separating the halves.

CC099D



CC100D

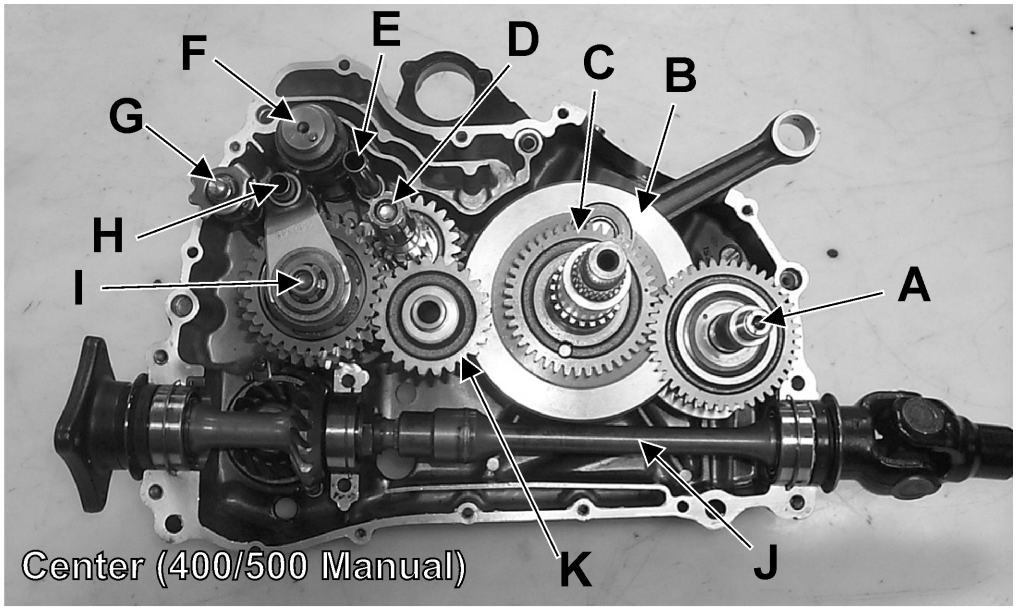
CC101D



CC102D

Disassembling Crankcase Half

■**NOTE: For steps 1-10, refer to illustration CC803A.**



KEY CC803A

A. Crank Balancer Assembly	G. Reverse Shift Cam
B. Crankshaft	H. Shift Shaft with 3 Forks
C. Balancer Drive Gear with Pin	I. Driveshaft Assembly
D. Countershaft Assembly	J. Output Shaft (4x4 Shown)
E. Shift Shaft with Fork	K. Reverse Idle Gear
F. Gear Shift Cam	

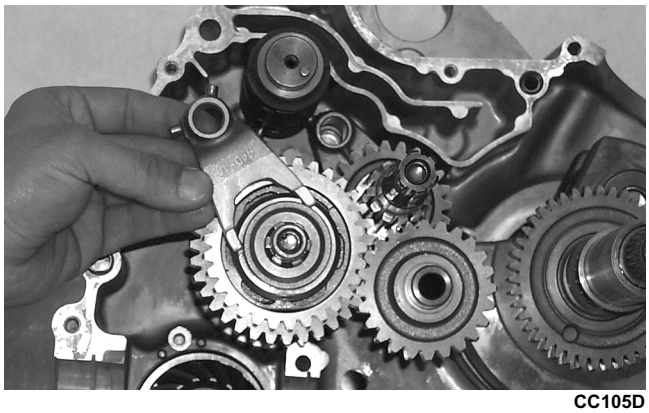
CC803A

■**NOTE: To aid in assembling, it is recommended that the assemblies are kept together and IN ORDER.**

1. Remove the two shift shafts (E and H).

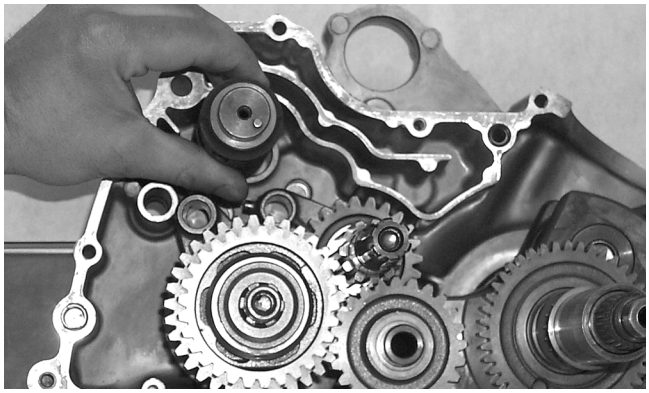
2. Remove the reverse shift cam (G) and spacer.

3. Disengage four forks from the gear shift cam (F); then remove the reverse shifter fork.



CC105D

4. Remove the gear shift cam (F).



CC106D

5. Remove the three remaining forks noting their positions for assembling purposes.

☞ AT THIS POINT

To service gear shift forks, see Servicing Center Crankcase Components sub-section.

6. Remove the reverse idle gear (K) w/shaft. Account for the bushing, two washers, and the circlip.

7. Simultaneously, remove the driveshaft assembly (I) and countershaft assembly (D). Account for the washer on the countershaft.

☞ AT THIS POINT

To service the driveshaft and/or countershaft, see Servicing Center Crankcase Components sub-section.

■NOTE: For efficiency, if the driveshaft and/or countershaft are not being serviced, it is preferable to leave them assembled. The technician should use discretion and sound judgment.

8. Remove the front output shaft (4x4) (J) and rear shaft assemblies. Account for the bearing C-ring.

■NOTE: Note the alignment marks on the crank balancer driven gear and balancer drive gear to aid in assembly.

CC166D

9. Remove the driven gear from the crank balancer assembly (A). Account for a key.

CC165D

☞ AT THIS POINT

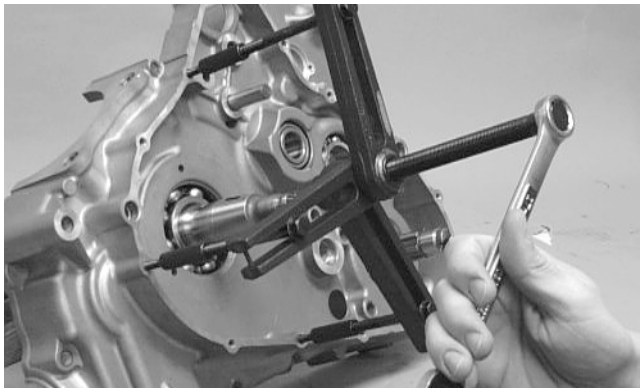
To service the driven gear, see Servicing Center Crankcase Components sub-section.

■NOTE: For efficiency, if the driven gear is not being serviced, it is preferable to leave it assembled. The technician should use discretion and sound judgment.

10. Remove the crank balancer assembly (A).

■NOTE: When removing the crank balancer assembly, rotate the crankshaft counterweight away from the crank balancer assembly counterweight.

11. Using the Crankcase Separator/Crankshaft Remover (p/n 0444-009), push the crankshaft assembly out of the crankcase.



CC115D

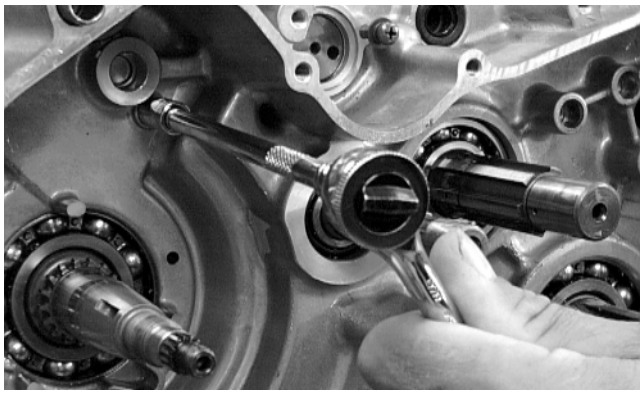
☞ AT THIS POINT

To service crankshaft assembly, see Servicing Center Crankcase Components sub-section.

⚠ CAUTION

Do not remove the remaining output shaft assembly unless absolutely necessary. If the shaft is removed, the shaft nut must be replaced with a new one and the shaft must be re-shimmed.

12. To remove the output shaft and gear, remove the nut, slide the gear off the shaft (account for a shim or shims), and drive the shaft out with a plastic mallet (account for a shim or shims).



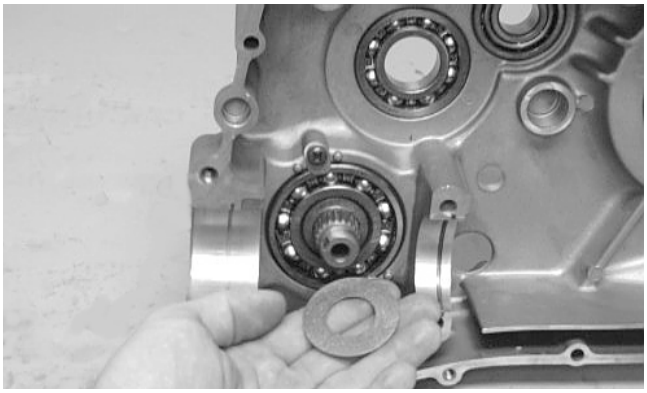
CC482D

Assembling Crankcase Half

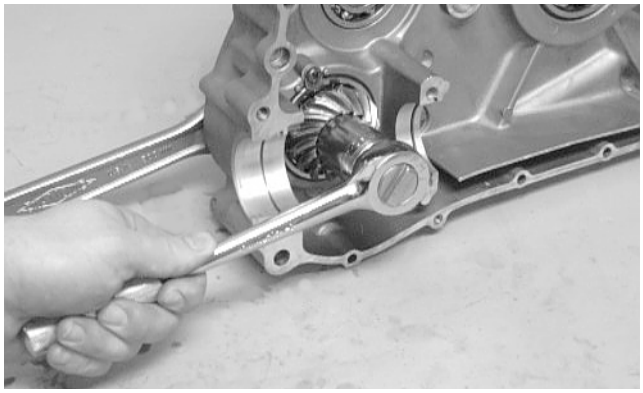
■ NOTE: For ease of assembly, install components on the left-side crankcase half.

■ NOTE: If the output shaft and gear were removed, make sure that the proper shim is installed.

1. To install the output shaft and gear, place the shaft into position with proper shims, slide the gear onto the shaft, and secure with a new nut tightened to 10 kg-m (72 ft-lb).

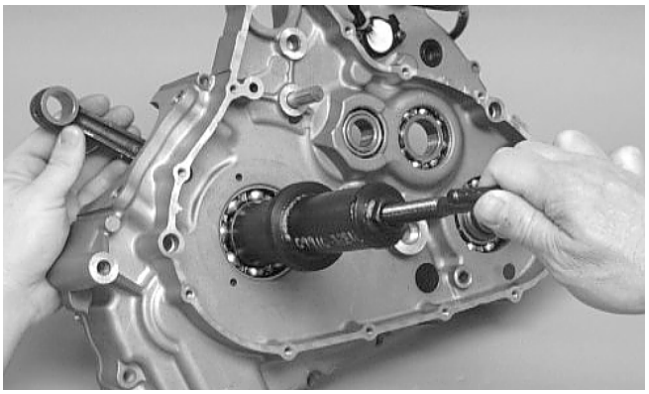


CC117D



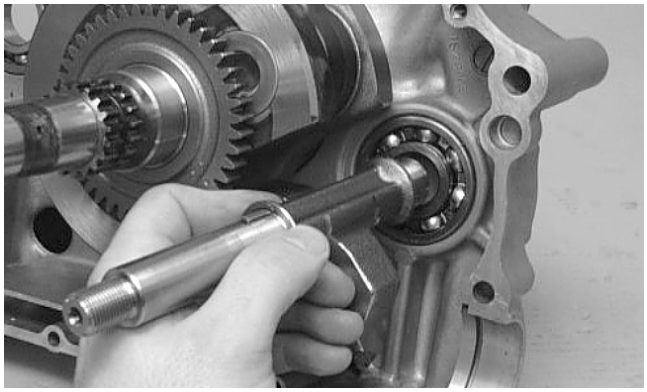
CC116D

2. Using the Crankshaft Installer (p/n 0444-018), install the crankshaft.



CC151D

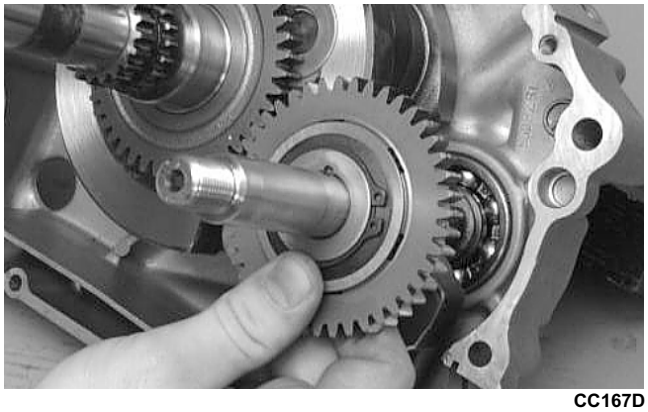
3. Install the crank balancer.



CC168D

4. With the key in position, slide the driven gear onto the crank balancer making sure the timing marks are aligned.

CC165D



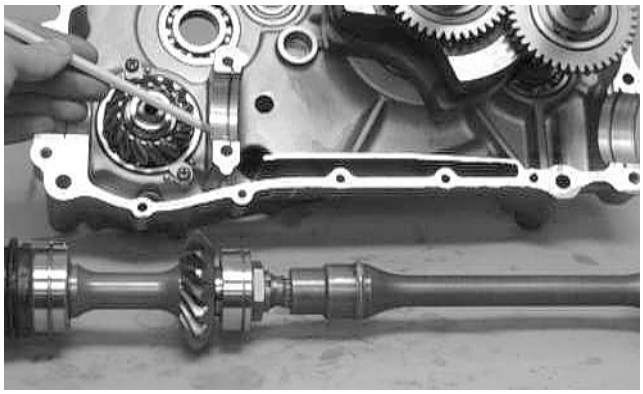
CC167D

CC166D

5. Place the bearing C-ring into position in the crankcase; then install the front shaft (4x4) and rear shaft assemblies.

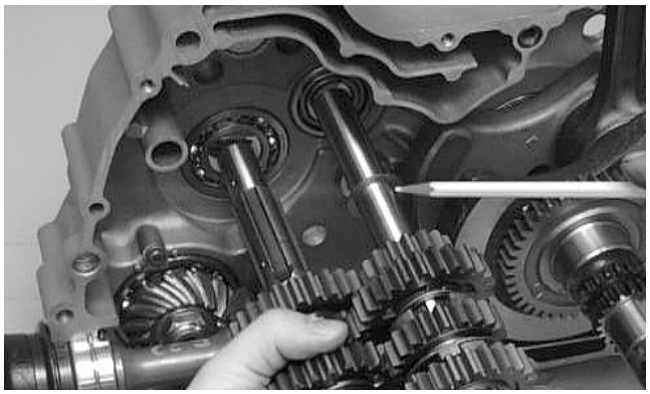
⚠ CAUTION

The bearing pins must be positioned into the crankcase.



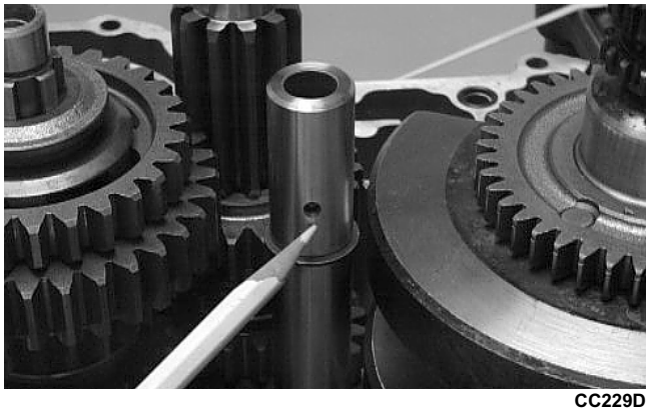
CC110D

6. Simultaneously, install the driveshaft and countershaft assemblies making sure the washer is on the countershaft.

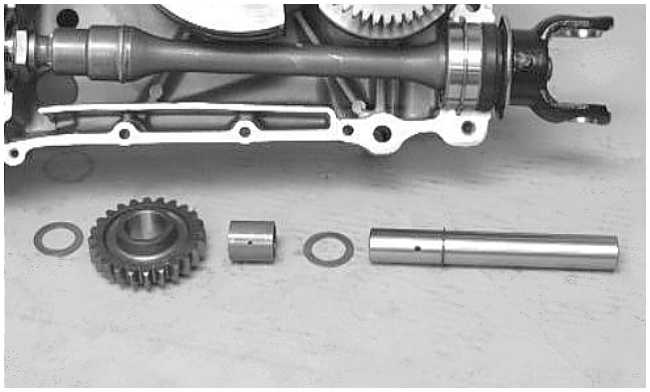


CC197D

7. Install the reverse idle shaft with circlip making sure the oil hole in the shaft is facing downward; then install a washer, bushing, reverse idle gear, and a washer.

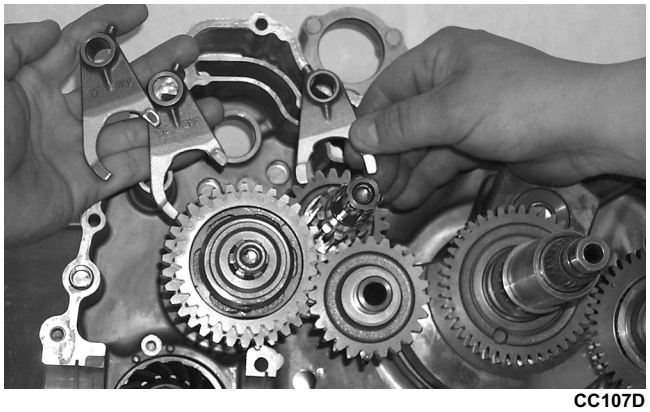


CC229D



CC231D

8. Place each of the four shift forks into its respective gear or dog as noted during disassembling; then install the gear shift cam.

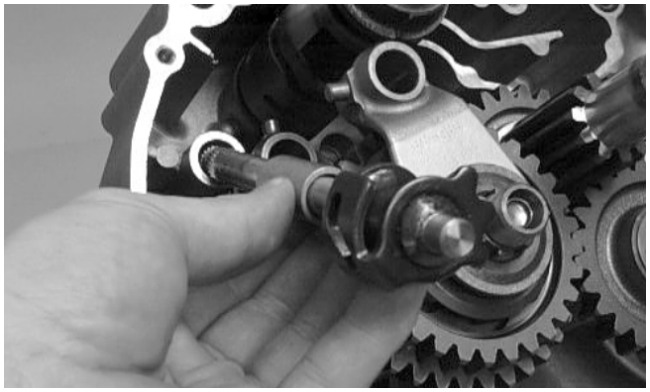


CC107D

CC106D

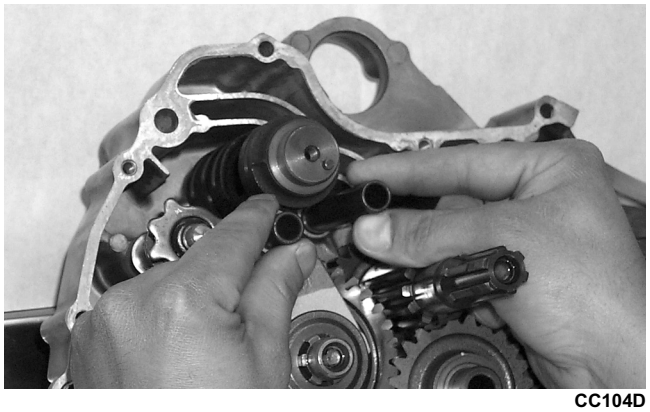
9. Engage the four forks to the gear shift cam; then install the reverse shift cam and spacer.

CC105D



CC103D

10. Install the two gear shift fork shafts; then verify that the two crankcase half alignment pins are in place.



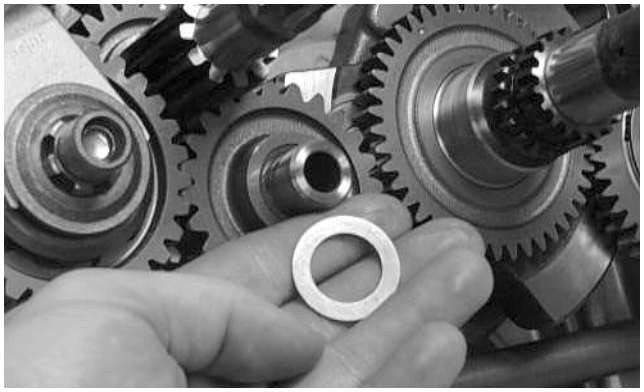
CC104D

■ **NOTE: Prior to joining crankcase halves, turn the shift cam to ensure all gears shift properly.**

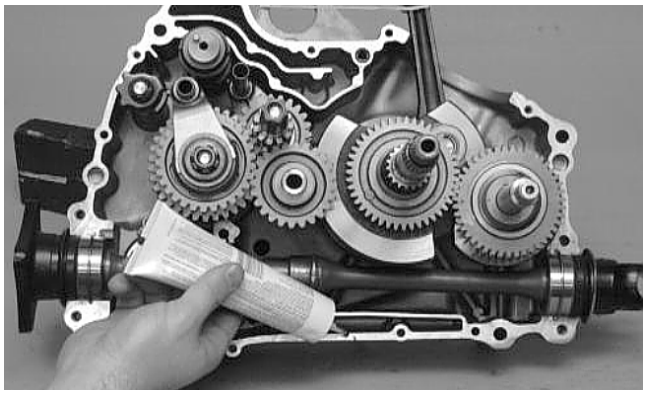
Joining Crankcase Halves

1. Place the O-ring in the left-side crankcase half and verify that the shim washer is on the idler shaft; then apply Three Bond Sealant (p/n 0636-070) to the mating surfaces. Place the right-side half onto the left-side half.

CC101D



CC102D

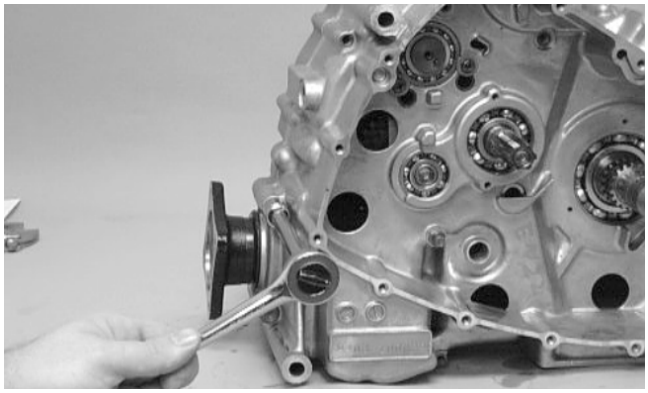


CC234D

2. Using a plastic mallet, lightly tap the case halves together until cap screws can be installed.

3. From the left side, install the three case half 8 mm cap screws; then tighten only until snug.

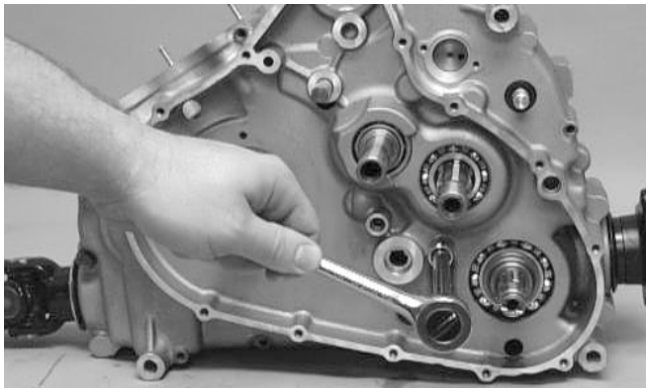
■ NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs.



CC098D

4. From the right side, install the three case half 8 mm cap screws (two inside the case); then tighten only until snug.

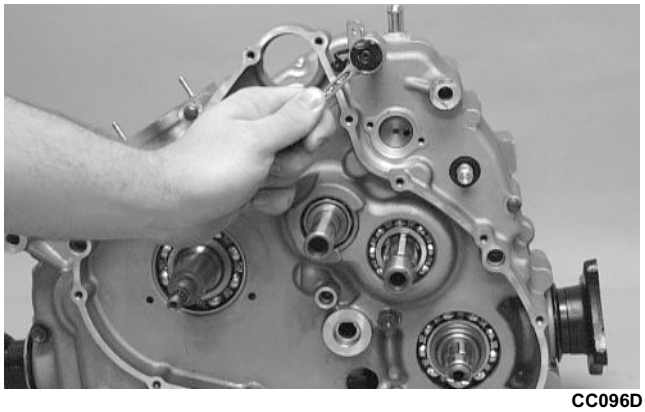
■ NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs.



CC097D

5. From the left side, install the seven case half 6 mm cap screws; then tighten only until snug.

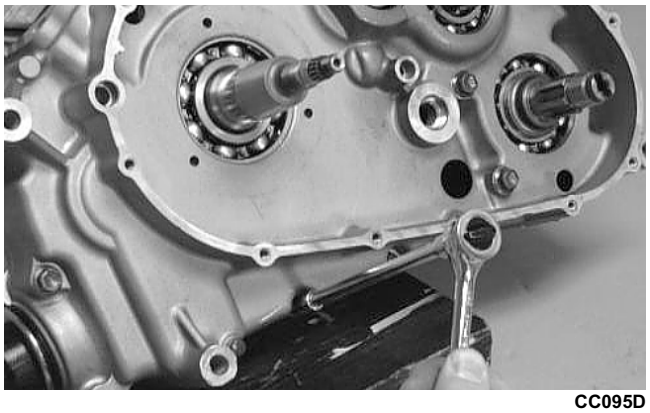
■ NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs.



CC096D

6. From the right side, install the five case half 6 mm cap screws (one inside the case); then tighten only until snug.

■ NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs.



CC095D

7. In a crisscross/case-to-case pattern, tighten the 8 mm cap screws (from step 4) until the halves are correctly joined; then tighten to 2-2.4 kg-m (14.5-17 ft-lb).

■ NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs.

8. In a crisscross/case-to-case pattern, tighten the 6 mm cap screws (from steps 5-6) to 0.9-1.3 kg-m (6.5-9.5 ft-lb).

■ NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs.

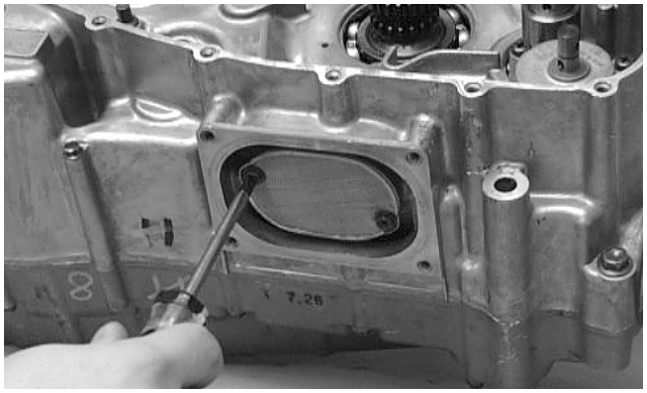
⚠ CAUTION

After completing center crankcase components, proceed to Installing Right-Side Components, to Installing Left-Side Components, and to Installing Top-Side Components.

Installing Right-Side Components

A. Oil Strainer/Oil Pump
B. Gear Shift Shaft

1. Place the oil strainer with a new O-ring into position beneath the crankcase and tighten securely with the Phillips-head cap screws.

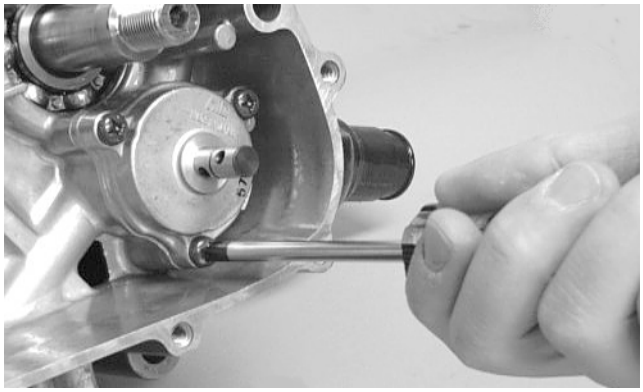


CC163D

2. Place the strainer cap into position on the strainer making sure the O-ring is properly installed and secure with the cap screws; then install and tighten the oil drain plug to 2.2 kg-m (16 ft-lb).

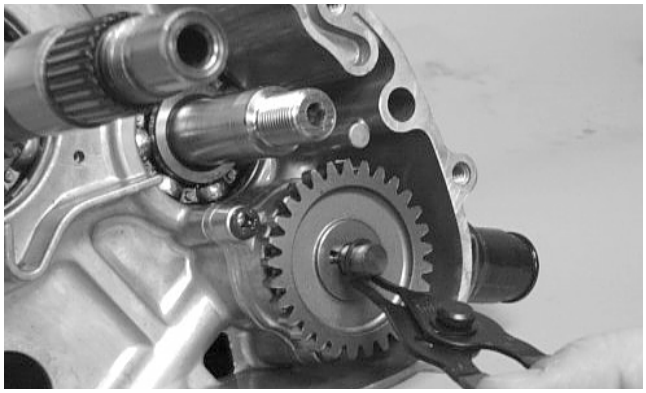
CC091D

3. Place the oil pump into position in the crankcase and secure with the three Phillips-head screws coated with blue Loctite #243. Tighten to 1 kg-m (7 ft-lb).



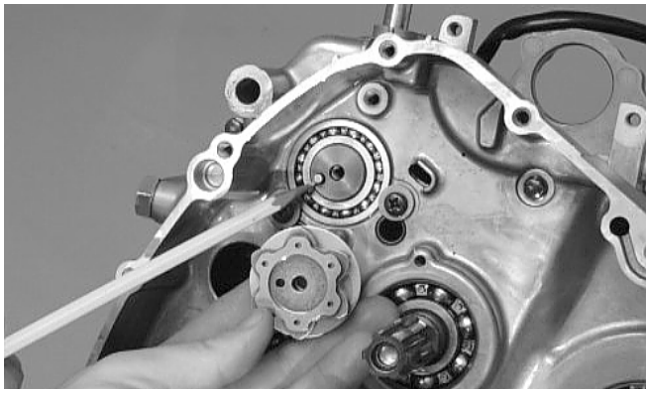
CC090D

4. Place the pin and washer into position on the oil pump shaft, install the oil pump driven gear, and secure with the circlip.

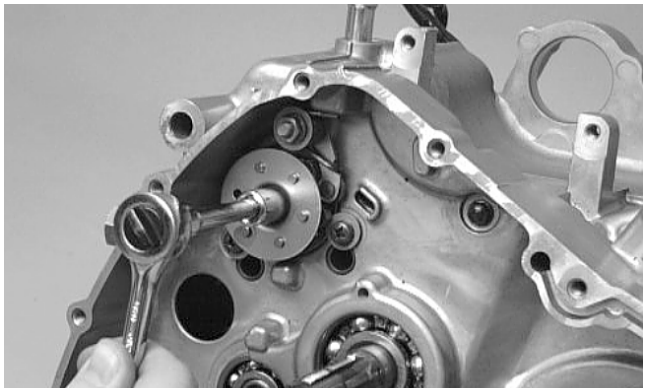


CC088D

5. Place the gear shift cam plate and guide onto the gear shift cam making sure the alignment pin was installed. Secure assembly with the cap screw coated with blue Loctite #243. Tighten securely.

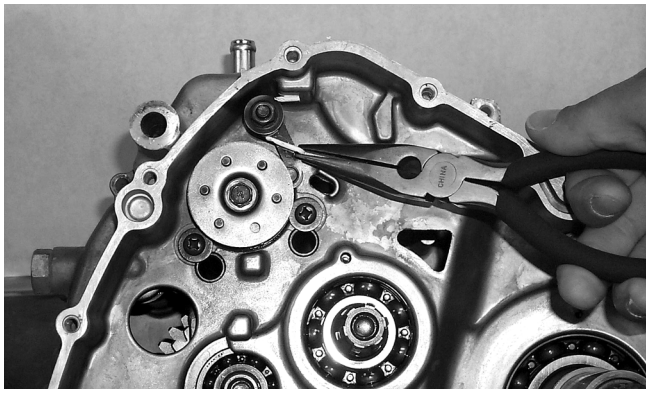


CC087D

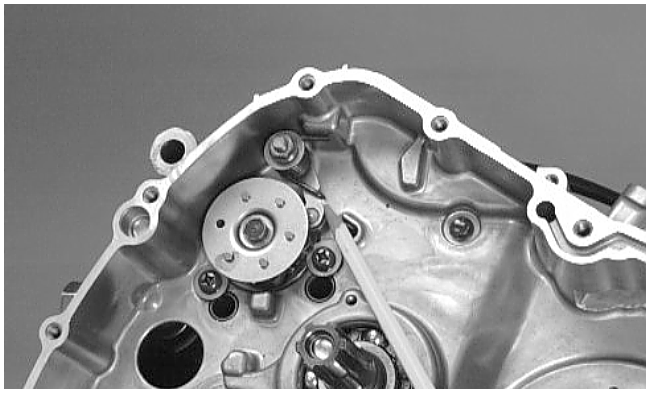


CC164D

6. Attach the spring to the gear shift cam stopper arm.



CC086D



CC153D

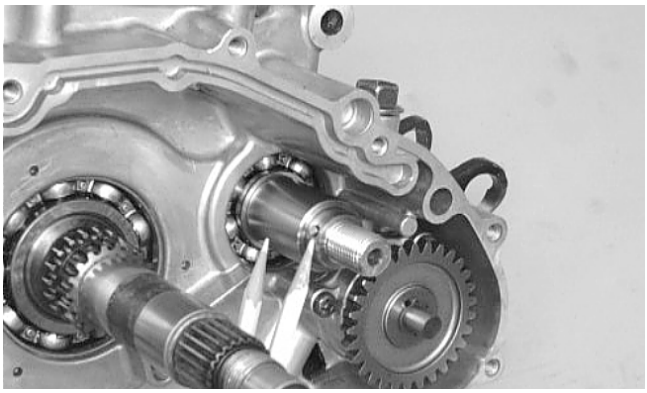
7. Install the gear shift shaft.

CC085D

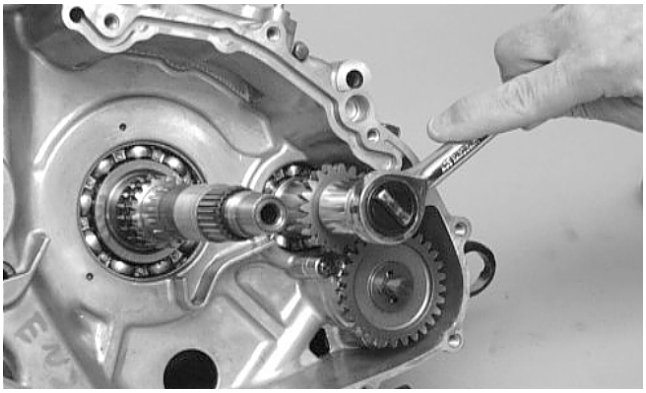
C. Primary Driven Gear
D. Primary Driven Clutch
E. Starter Clutch Shoe

■ **NOTE: Steps 1-7 in the preceding sub-section must precede this procedure.**

8. Install the spacer, pin, and oil pump drive gear onto the crank balancer shaft making sure the shoulder of the drive gear is facing inward toward the crankcase; then secure with the washer and nut tightened to 8 kg-m (58 ft-lb).



CC081D

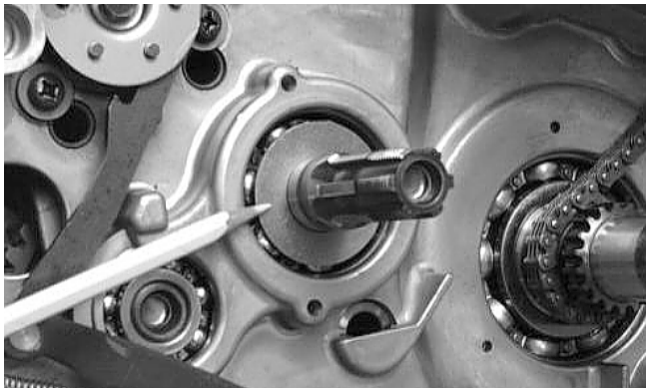


CC080D

9. Place the chain into the crankcase; then secure it from the top side with a wire for ease of assembly.

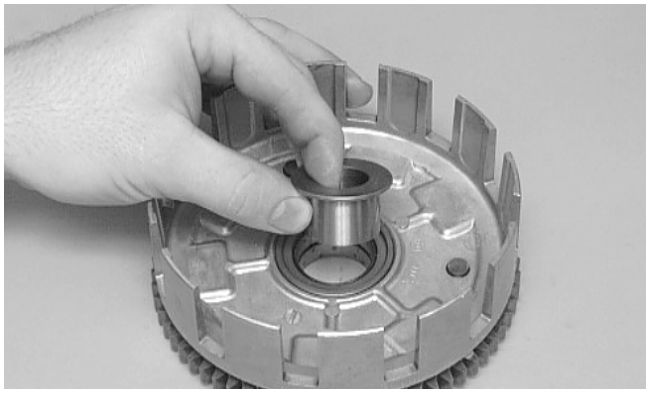
CC079D

10. Install the primary driven washers onto the driveshaft and crankshaft.

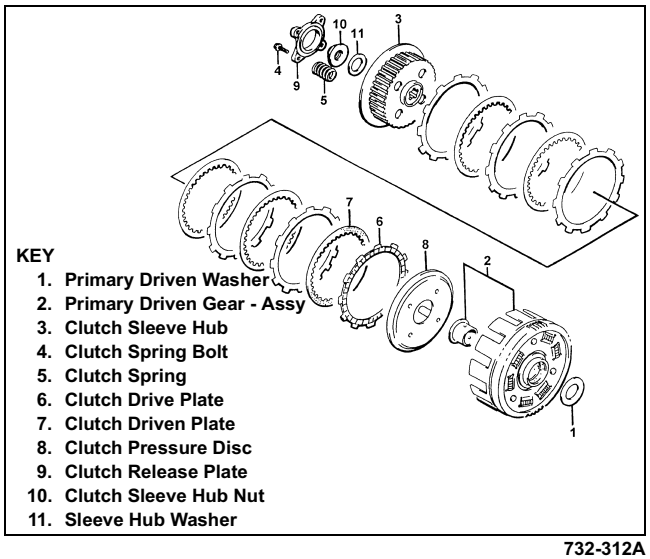


CC232D

11. Install the bushing into the primary driven gear.



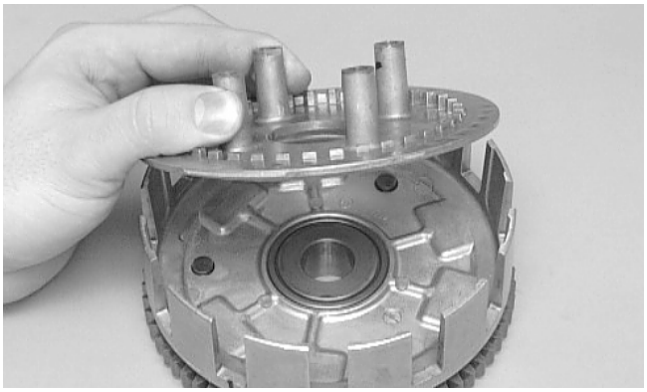
CC239D



KEY
1. Primary Driven Washer
2. Primary Driven Gear - Assy
3. Clutch Sleeve Hub
4. Clutch Spring Bolt
5. Clutch Spring
6. Clutch Drive Plate
7. Clutch Driven Plate
8. Clutch Pressure Disc
9. Clutch Release Plate
10. Clutch Sleeve Hub Nut
11. Sleeve Hub Washer

732-312A

12. Install the clutch pressure disc.

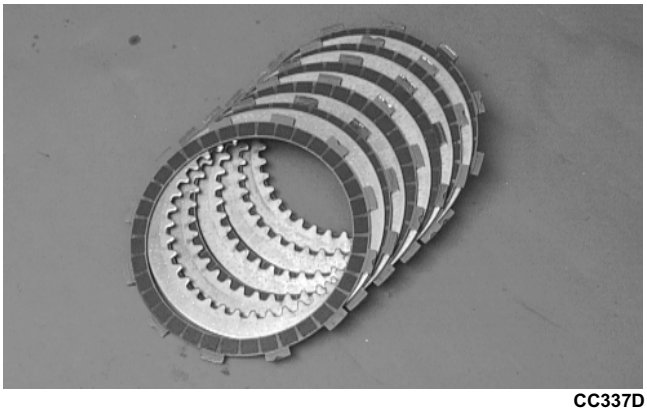


CC238D

13. Alternately install the 6 drive clutch fiber plates and the 5 driven clutch steel plates.

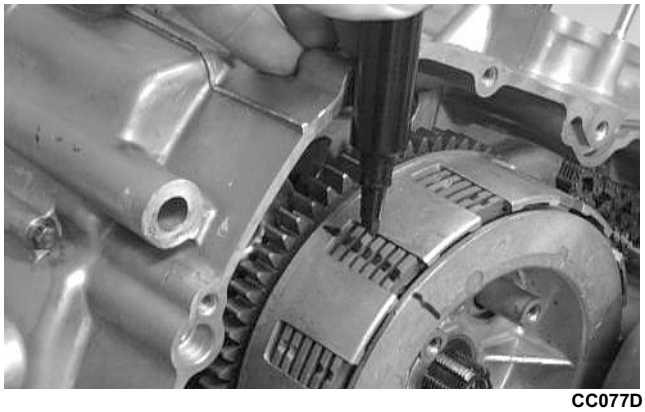
⚠ CAUTION

The six drive clutch fiber plates and the five driven clutch steel plates must be alternately installed starting and ending with a drive clutch fiber plate.

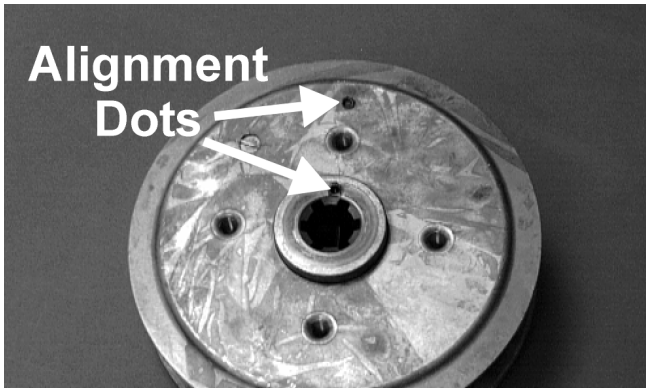


CC337D

14. Install the clutch sleeve hub making sure the marks scribed in removing are aligned. The alignment dots must also be aligned to assure that the clutch assembly works properly.

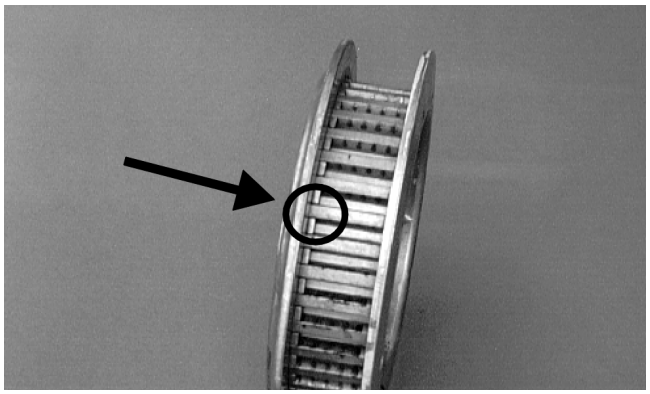


CC077D



CC364A

■ **NOTE: If alignment marks were not scribed during removing, it may be necessary to reposition the clutch sleeve hub and the clutch pressure disc until the two components seat correctly with no clearance between them.**


CC365A

⚠ CAUTION

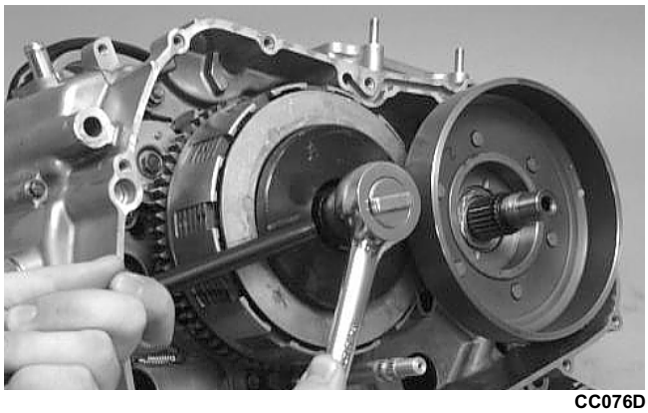
The clutch sleeve hub and the clutch pressure disc must be seated in the proper position. If any of the incorrect positions are used, the hub and disc will have clearance between them and they will not operate properly.

15. Simultaneously, place the primary driven clutch assembly and the starter clutch housing on their respective shafts making sure the sleeve is properly positioned in the primary assembly.

CC078D

■ **NOTE: Note the alignment mark scribed on the primary driven gear assembly during disassembly.**

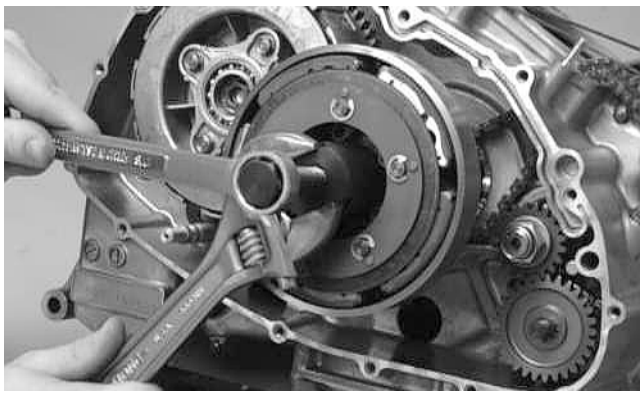
16. Using the Clutch Sleeve Hub Holder (p/n 0444-007), install the nut and washer. Tighten to 10 kg-m (72 ft-lb).


CC076D

17. Place the primary drive one-way clutch into the starter clutch housing noting the word OUTSIDE for proper placement.

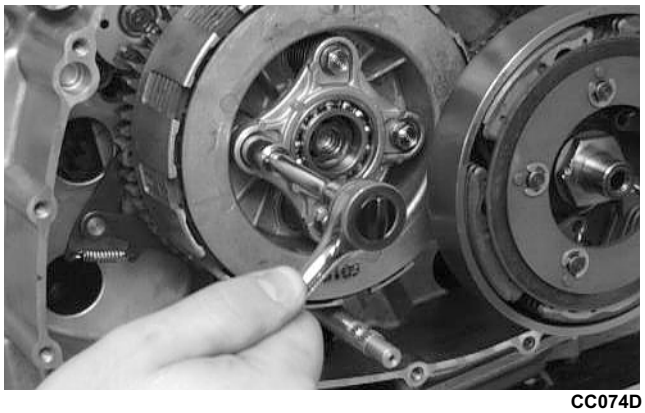
CC075D

18. Install the clutch shoe and washer; then secure with the starter clutch-shoe nut (left-hand threads). Tighten to 13 kg-m (94 ft-lb); then using a center punch, stake the nut.


CC072D

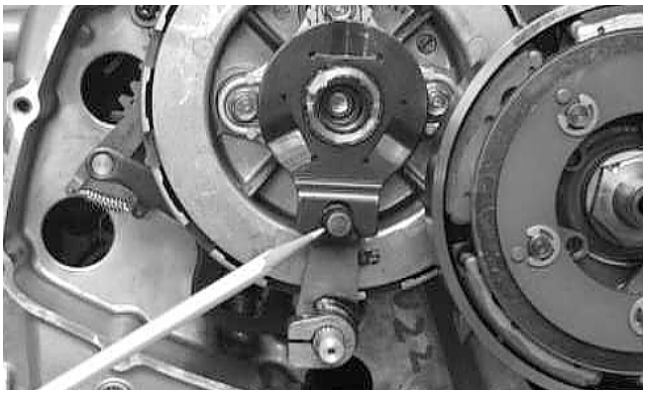
19. Install the release roller assembly making sure the four springs are in position; then using a crisscross pattern, tighten the four cap screws securely.

■ **NOTE: Tighten the four roller assembly cap screws in a crisscross pattern making sure there is no clearance between the clutch plates when secured.**



CC074D

20. Install the clutch release arm and release roller guide making sure the release roller and guide are aligned.

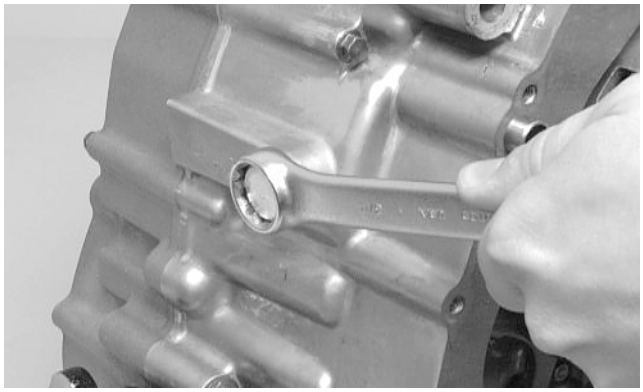


CC162D

21. Secure the clutch release arm with the cap screw coated with blue Loctite #243. Tighten securely.

CC073D

22. Install the reverse cam stopper housing and gasket making sure the stopper and spring are correctly positioned. Tighten to 2.3 kg-m (16.5 ft-lb).



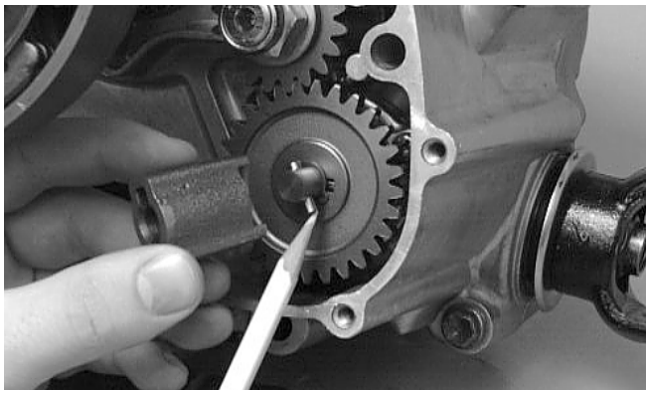
CC069D

F. Water Pump
G. Oil Filter

■ **NOTE: Steps 1-22 of the preceding sub-sections must precede this procedure.**

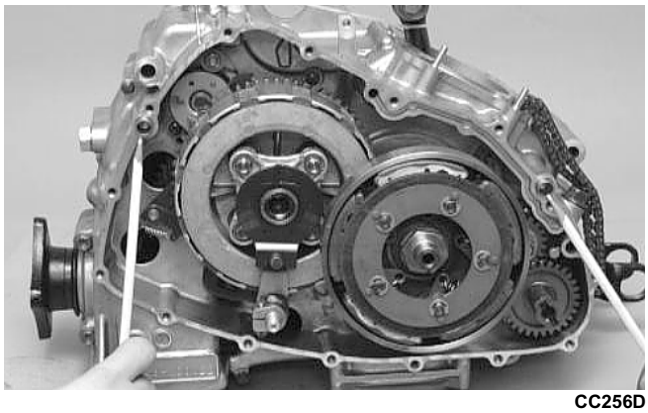
■ **NOTE: Lubricate all internal components with 10W-40 oil prior to installing the right-side cover.**

23. Place the water pump drive joint into position on the water pump shaft making sure the pin is properly positioned.



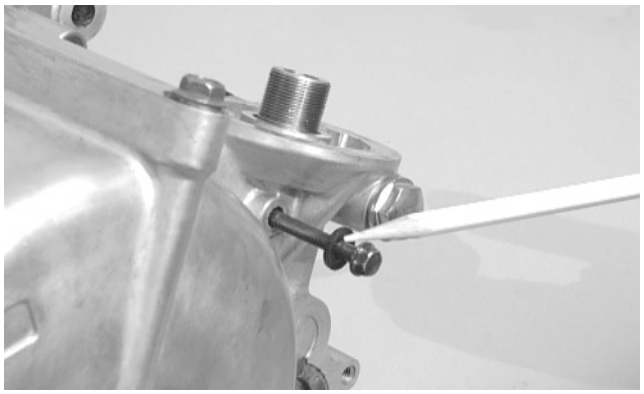
CC082D

■ **NOTE: Care should be taken that the alignment pins are installed in the right-side cover.**



CC256D

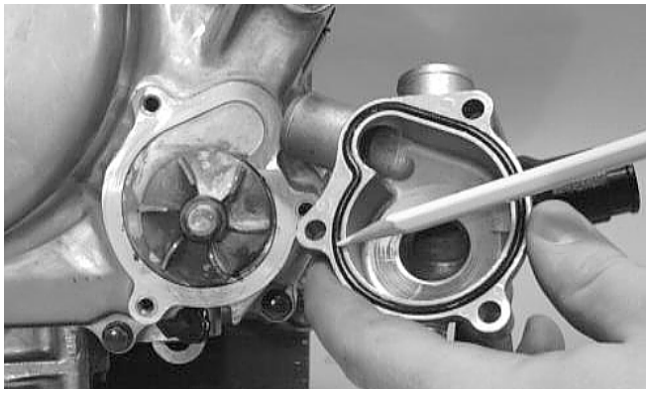
24. Place the gasket and right-side cover into position making sure the release roller guide remains correctly positioned and that the water pump drive adapter aligns; then install the fifteen cap screws. Note the proper location of the long cap screw with rubber washer.



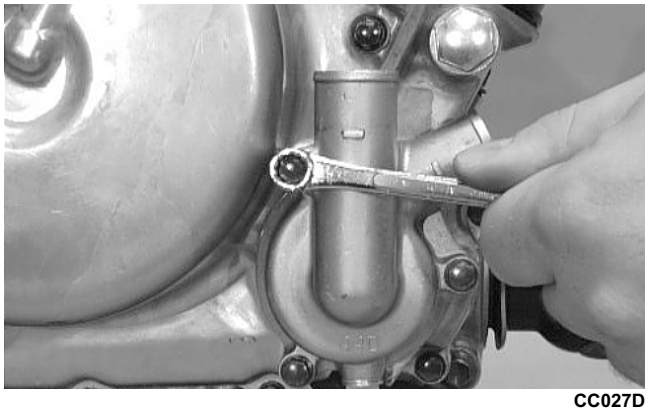
CC068D

25. Tighten the cap screws in a crisscross pattern to 0.9-1.3 kg-m (6.5-9.5 ft-lb).

26. Place the water pump cover onto the right-side cover making sure the new O-ring is properly positioned. Tighten securely with the three cap screws.



CC028D



CC027D

27. Using the oil filter wrench, install a new oil filter.

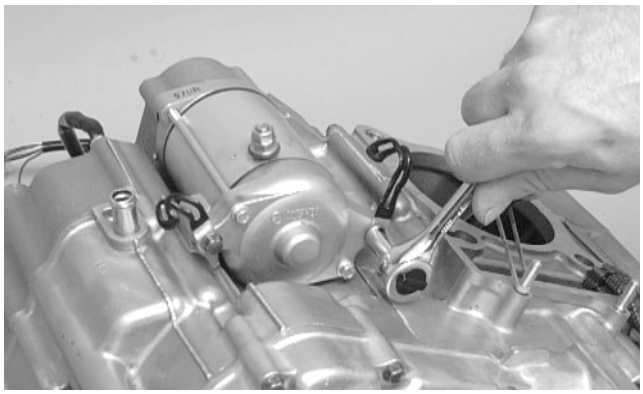
CC067D

28. Install the coolant hose on the water pump and secure with the clamp.

Installing Left-Side Components
(400 2x4)

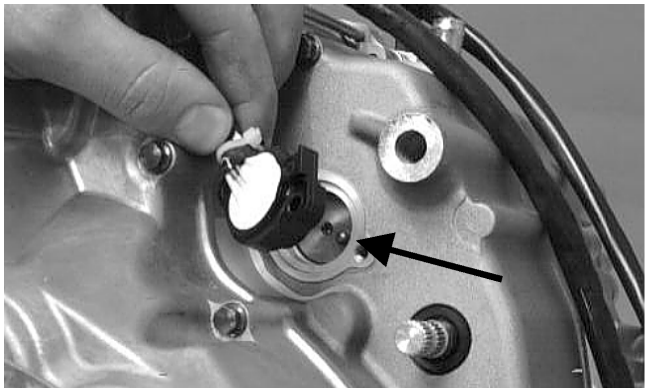
A. Idle Gear Assembly
B. Magneto Rotor

1. Place the starter into position on the crankcase and secure with the cap screws. Note the position of the wiring form.

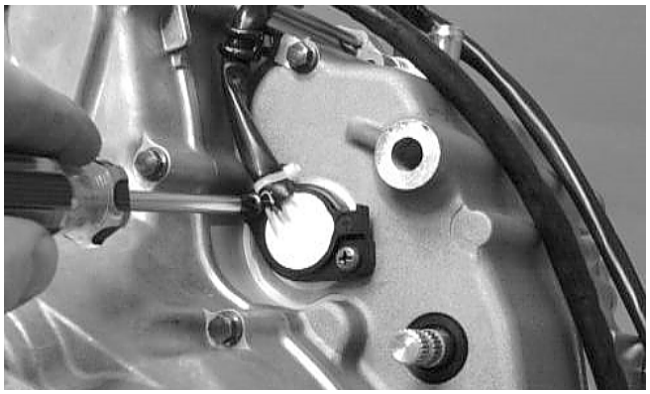


CC065D

2. Place the shift-indicator sending unit into position making sure the neutral contact and spring are inside the case and a well-oiled O-ring is properly positioned. Secure with Phillips-head screws.



CC049D



CC048D

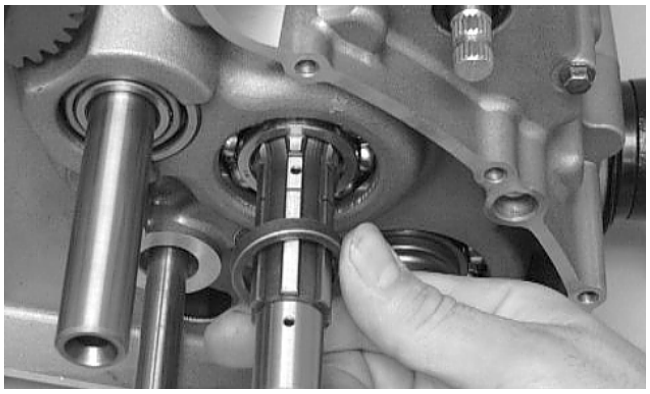
3. Install the starter idle gear pin into the crankcase; then with the beveled side of the idle gear facing the crankcase, install the idle gear.

CC064D

4. Place the drive spacer onto the output spacer; then install the driven gear and washer.

CC063D

5. Install a spacer and a washer onto the driveshaft.

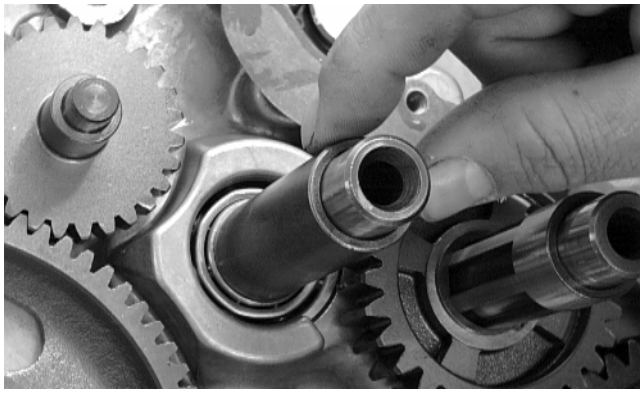


CC258D

6. In turn on the driveshaft, install the #1 gear and splined washer; then secure with the circlip.

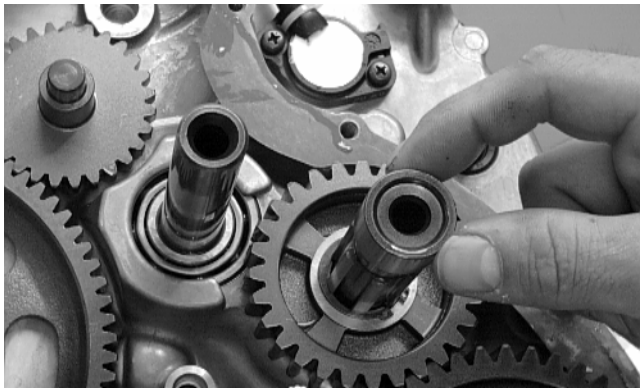
CC059D

7. Place the idle gear spacer onto the countershaft.



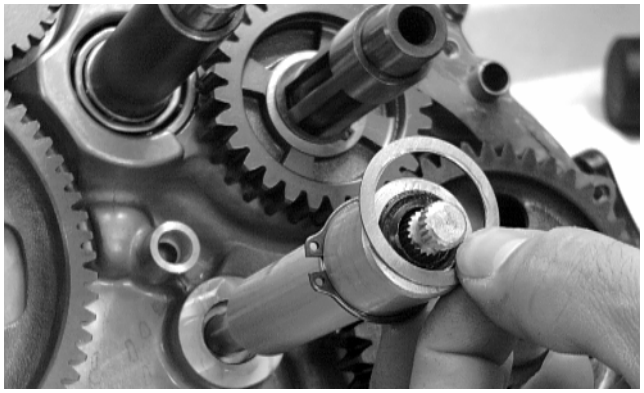
CC518D

8. Place a spacer on the driveshaft.



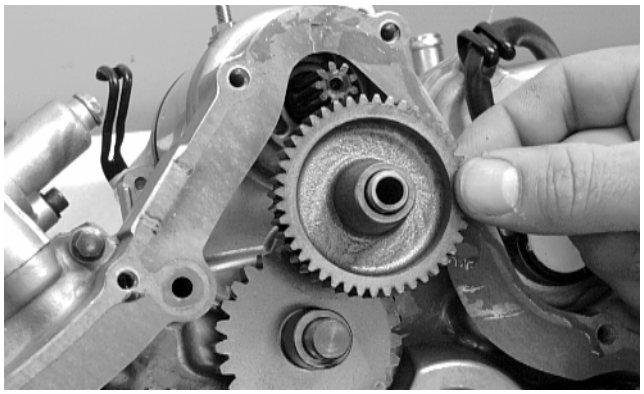
CC519D

9. Install the shift shaft on the gear shift shaft; then install the circlip and a washer.



CC517D

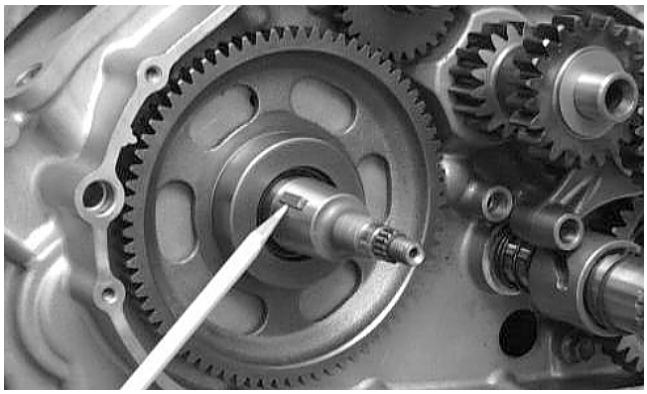
10. Install the starter idle gear and pin in the crankcase.



CC516D

11. Place the starter clutch gear assemlby onto the crankshaft; then place the key into its notch.

CC521D



CC332D

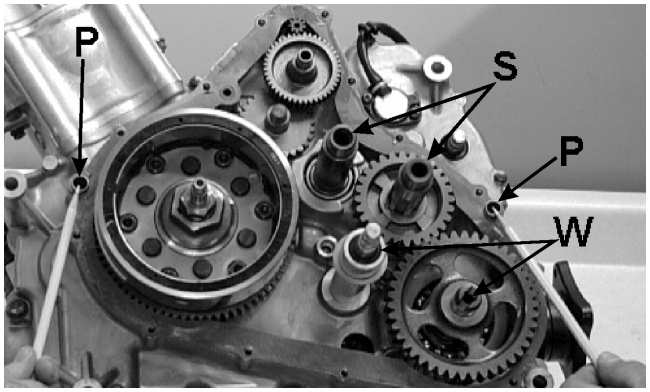
12. Place the magneto rotor into position on the crankshaft; then install the magneto rotor nut on the crankshaft and tighten until the rotor is properly seated. Tighten to 16 kg-m (116 ft-lb).

CC513D

13. Install the two alignment pins into the left crankcase half.

■ **NOTE: Make sure that two washers (W), two alignment pins (P), and two spacers (S) are in place.**

3



CC512DA

C. Cover

■ **NOTE: Steps 1-13 in the preceding sub-section must precede this procedure.**

14. Place the gasket and left-side cover into position on the crankcase.

■ **NOTE: It may be necessary to push or pull the shift shaft to establish cover/crankcase mating.**

15. Install the fourteen cap screws to secure the left-side cover. Note the location of the long cap screw with rubber gasket.

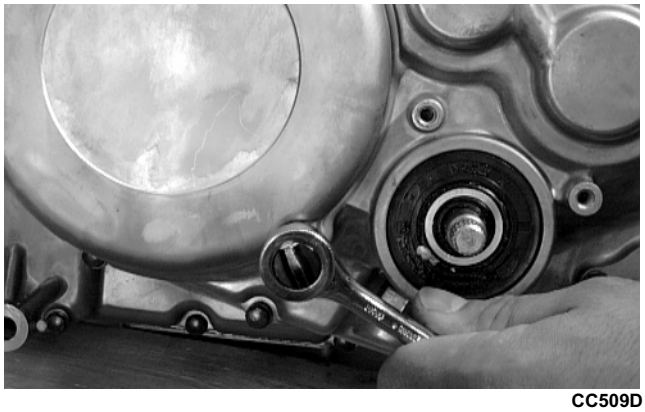
CC511D

16. In a crisscross pattern, tighten the cap screws to 0.9-1.3 kg-m (6.5-9.5 ft-lb).

17. Install the spacer onto the crankshaft; then secure with a flange nut.

CC510D

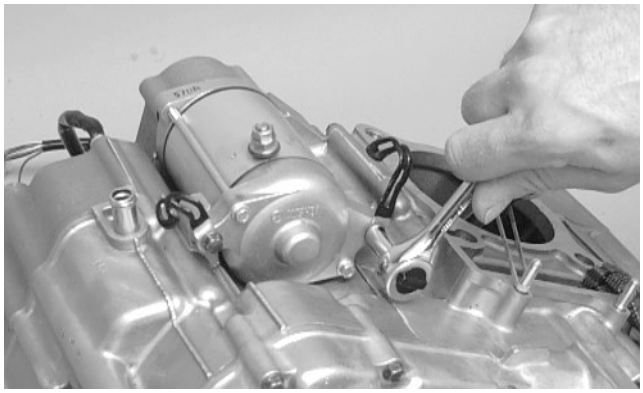
18. Place the gasket and recoil cover into position on the left-side cover; then tighten four cap screws to 0.8 kg-m (6 ft-lb).


CC509D

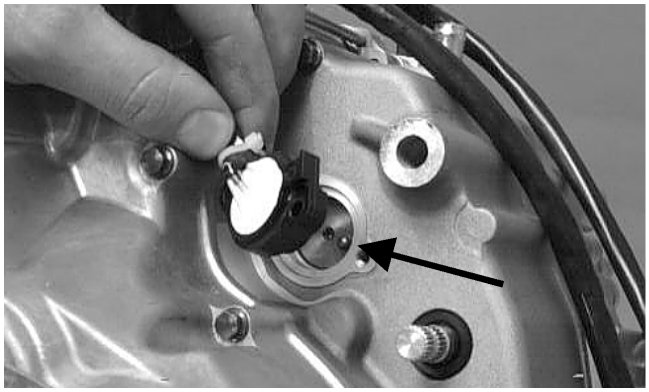
Installing Left-Side Components

A. Idle Gear Assembly
B. Magneto Rotor

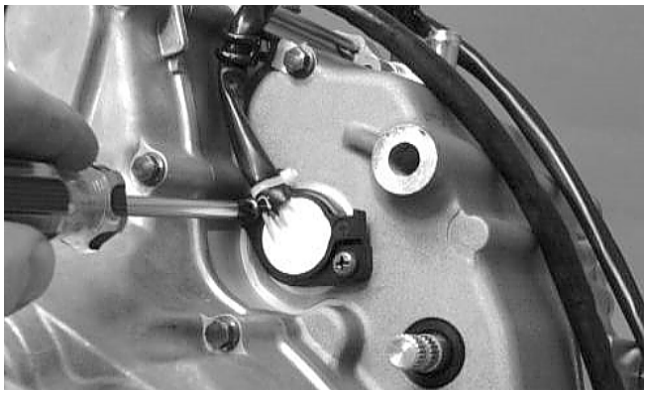
1. Place the starter into position on the crankcase and secure with the cap screws. Note the position of the wiring form.


CC065D

2. Place the shift-indicator sending unit into position making sure the neutral contact and spring are inside the case and a well-oiled O-ring is properly positioned. Secure with Phillips-head screws.



CC049D



CC048D

3. Install the starter idle gear pin into the crankcase; then with the beveled side of the idle gear facing the crankcase, install the idle gear.

CC064D

4. Place the spacer onto the output shaft; then install the driven gear and washer.

CC063D

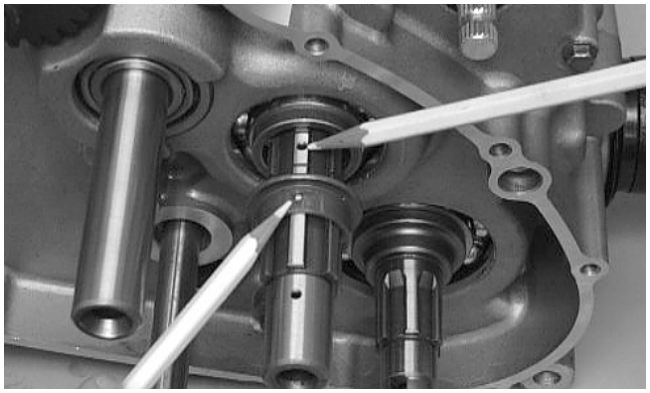
5. Install the spacer onto the driveshaft.

CC258D

6. Place the splined driven bushing onto the driveshaft making sure the oil hole of the splined bushing aligns with the oil hole of the driveshaft.

⚠ CAUTION

It is important that the oil holes in the splined bushing and driveshaft align. If they are not aligned, major damage will occur from lack of lubrication.

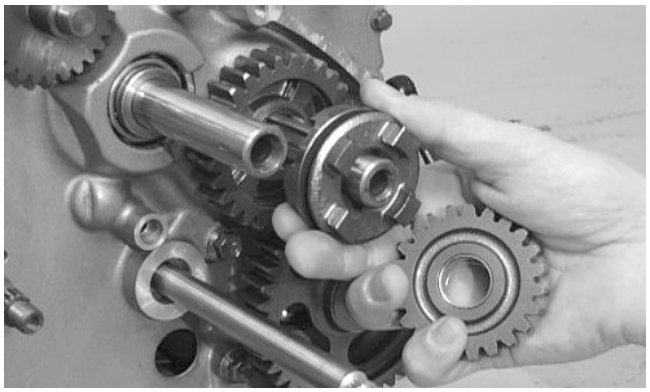


CC259D

7. In turn on the driveshaft, install the drive gear and splined washer; then secure with the circlip.

CC059D

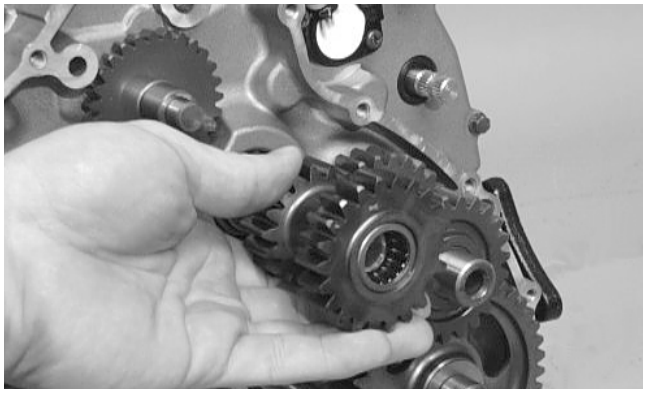
8. Place the select sliding dog gear and washer onto the driveshaft; then place the #2 gear onto the driveshaft.



CC061D

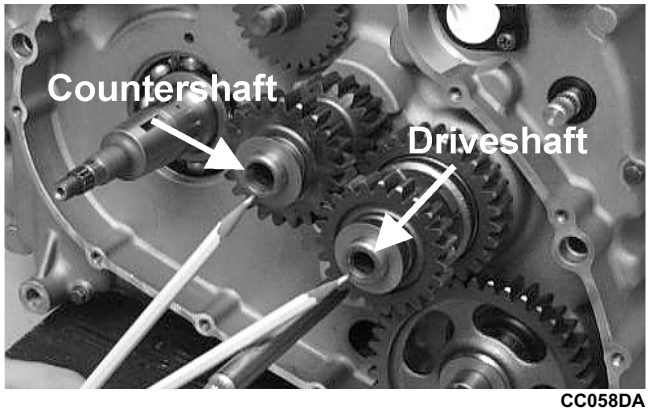
9. Place the idle gear spacer and idle gear onto the countershaft.

CC262D



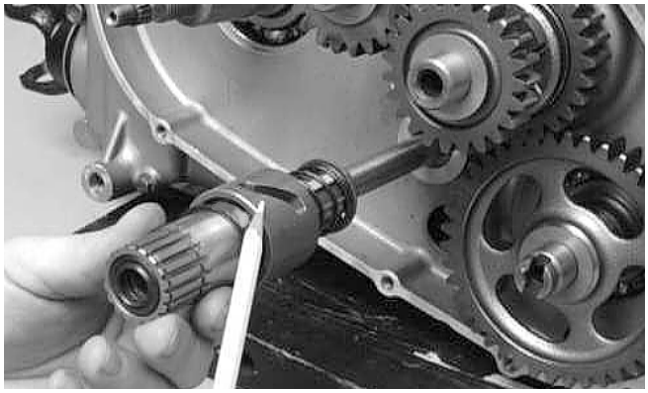
CC060D

10. Place a washer on both the driveshaft and the countershaft.



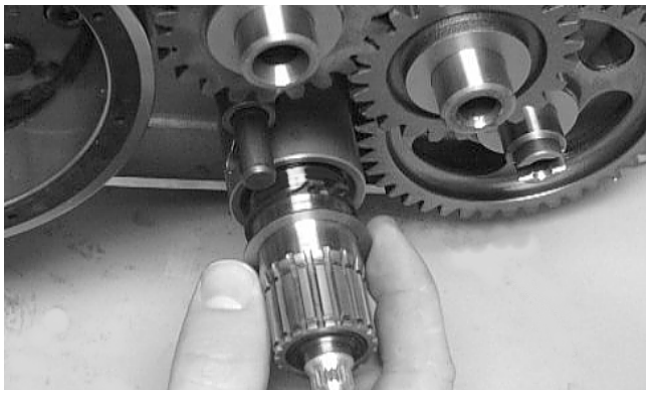
CC058DA

11. With the slot in the shift shaft assembly facing upward, place the assembly on the gear shift shaft.



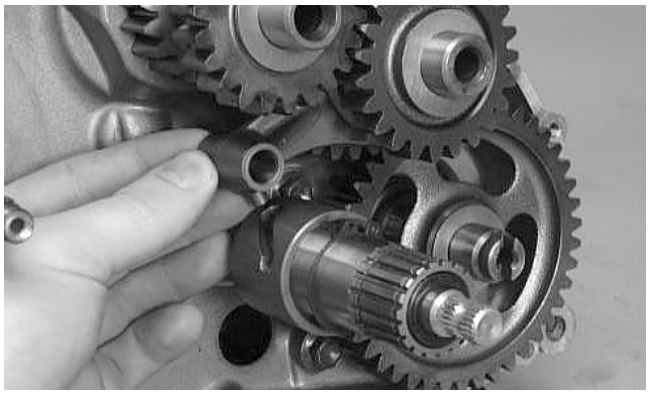
CC328D

12. Place the left shaft washer on the shift shaft.



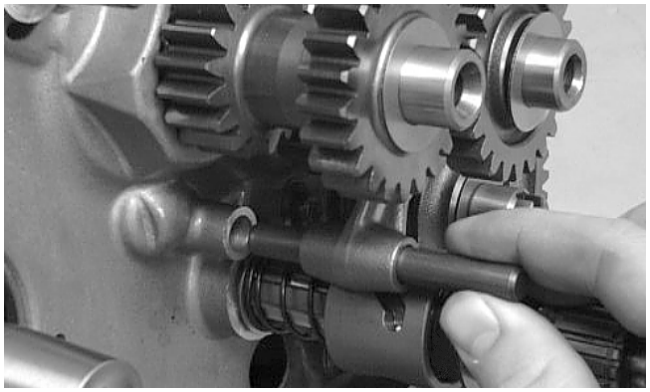
CC333D

13. With the shift fork peg positioned in the shift shaft assembly slot, install the shift fork in the sliding dog gear.



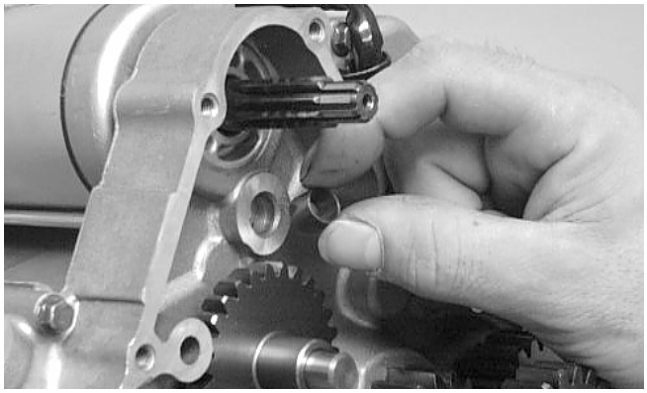
CC329D

14. Slide the shift fork shaft through the shift fork and into the crankcase.



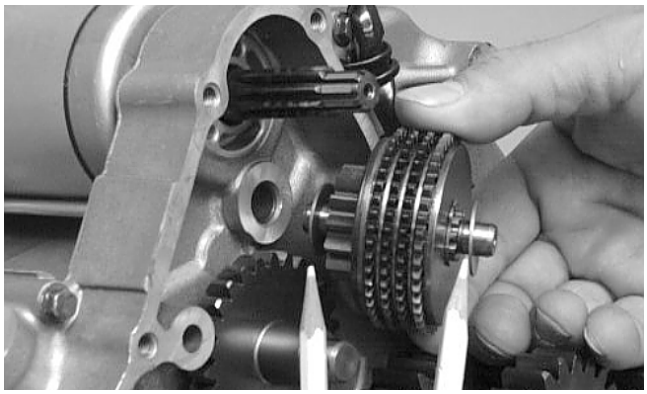
CC330D

15. Insert a bushing into the idle gear limiter boss in the crankcase.



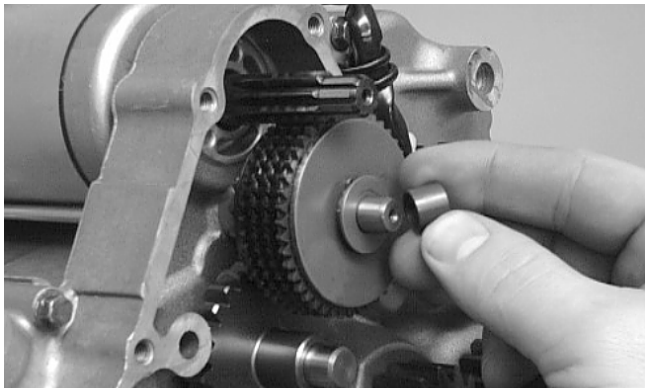
CC156D

16. Place a washer on each end of the idle gear limiter assembly and install in the crankcase.



CC157D

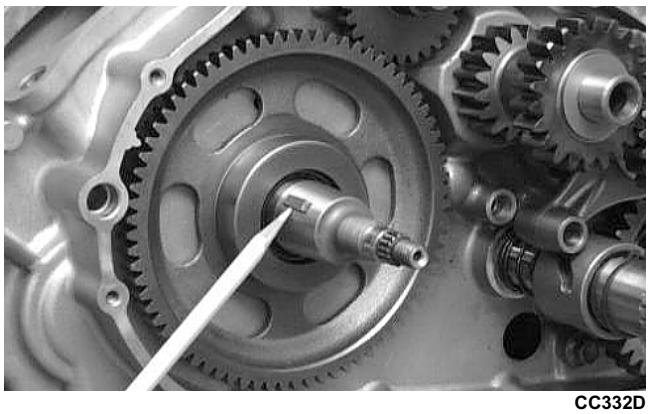
17. Place the remaining bushing on the idle gear limiter shaft.



CC158D

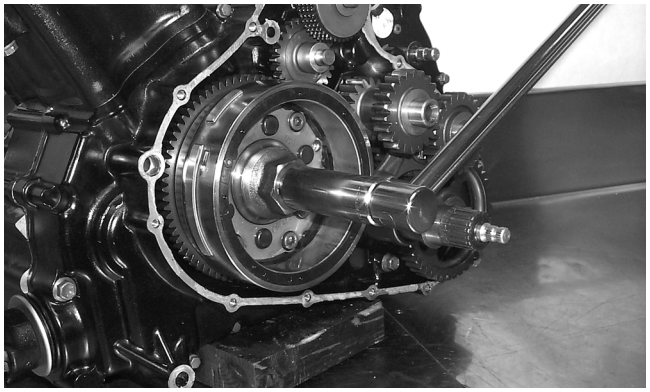
18. Place a thrust washer onto the crankshaft; then install the starter clutch gear assembly onto the crankshaft. Place the key into its notch.

CC331D



CC332D

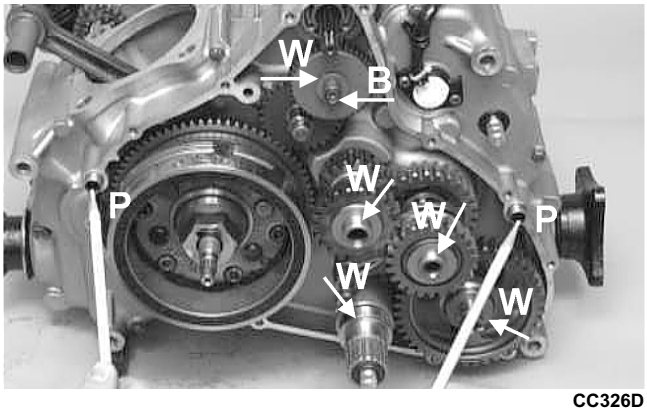
19. Place the magneto rotor into position on the crankshaft; then install the magneto rotor nut on the crankshaft and tighten until the rotor is properly seated. Tighten to 16 kg-m (116 ft-lb).



CC147D

20. Install the two alignment pins into the left crankcase half.

■**NOTE: Make sure that five washers, one bushing, and two alignment pins are in place.**



CC326D

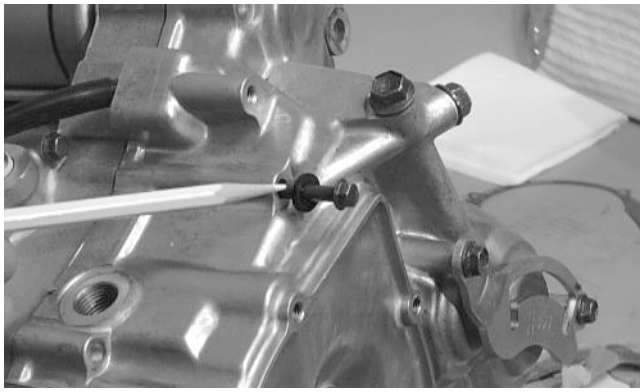
C. Cover
D. Speedometer Drive
E. Hi/Low Shifter Assembly
F. Recoil Starter

■**NOTE: Steps 1-20 in the preceding sub-section must precede this procedure.**

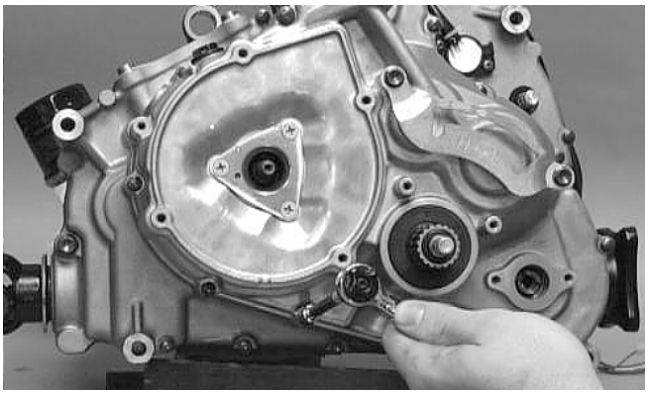
21. Place the gasket and left-side cover into position on the crankcase.

■**NOTE: It may be necessary to push or pull the splined Hi/Low range shift shaft to establish cover/crankcase mating.**

22. Install the fourteen cap screws to secure the left-side cover. Note the location of the long cap screw with rubber gasket.



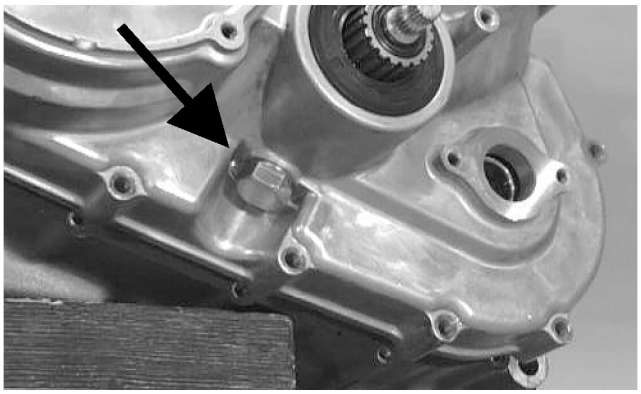
CC055D



CC047D

23. In a crisscross pattern, tighten the cap screws to 0.9-1.3 kg-m (6.5-9.5 ft-lb).

24. Place the shift stop housing assembly into position beneath the shift shaft housing making sure the spring and stopper are correctly positioned. Tighten to 2.3 kg-m (16.5 ft-lb).

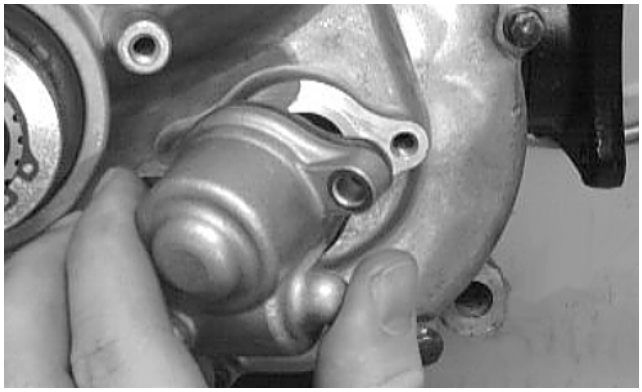


CC054D

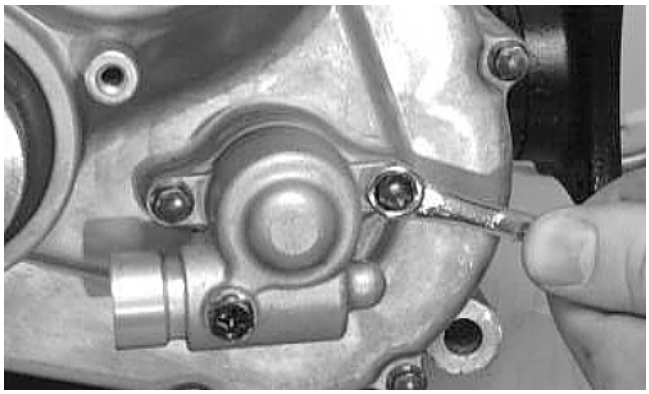
25. Place the speedometer drive adapter and gasket into position and secure with the two cap screws. Tighten securely.

⚠ CAUTION

Make sure the speedometer gear and output shaft gear match up during assembly.



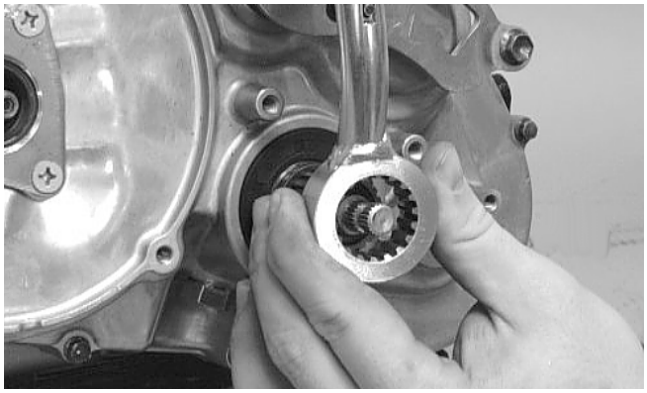
CC043D



CC042D

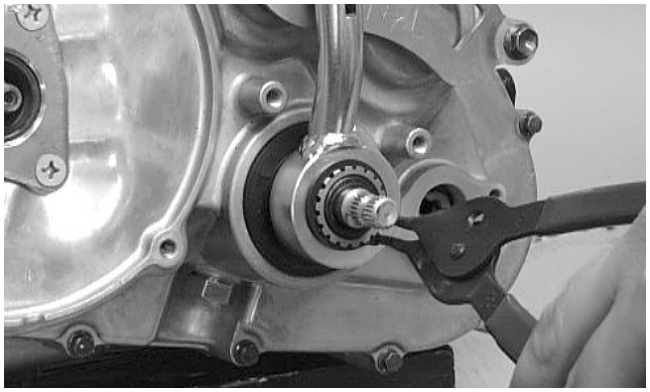
26. Install the inside circlip onto the hi/low range shift shaft with the sharp side of the circlip facing the engine; then place the shift lever assembly part way onto the shaft.

■ **NOTE: Position the shift lever part way onto the splines and verify the subtransmission is in hi range. If not, shift into hi range.**



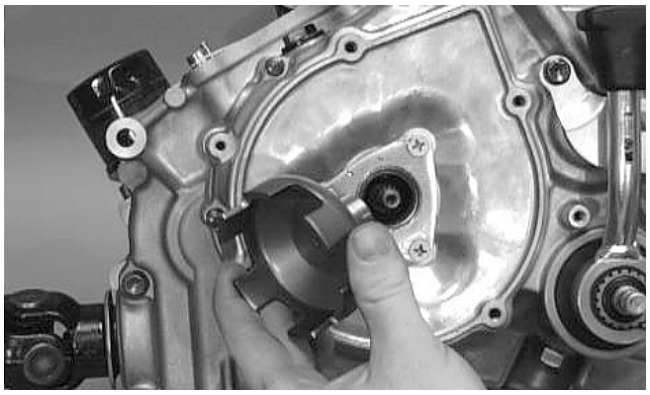
CC045D

27. Pull up on the hi/low shift T-handle and guide the T-handle stop pin into the hi range lever stop plate slot; then slide the shift lever assembly the rest of the way onto the shift shaft. Secure with the outer circlip making sure the sharp side of the circlip faces away from the hi/low-range lever.



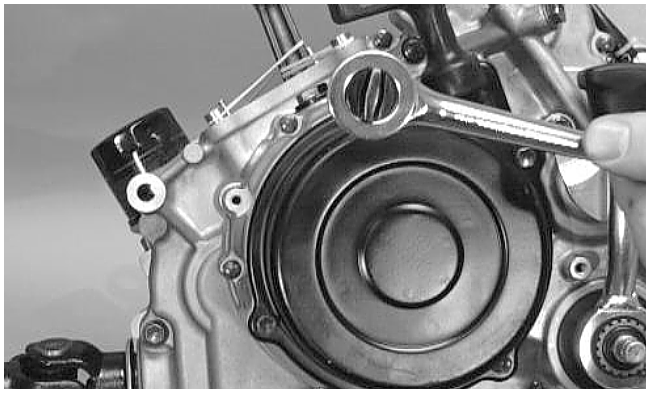
CC044D

28. Place the starter cup into position on the crankshaft making sure a new, lubricated O-ring is inside the cup. Tighten the flange nut to 3.5 kg-m (25 ft-lb).



CC041D

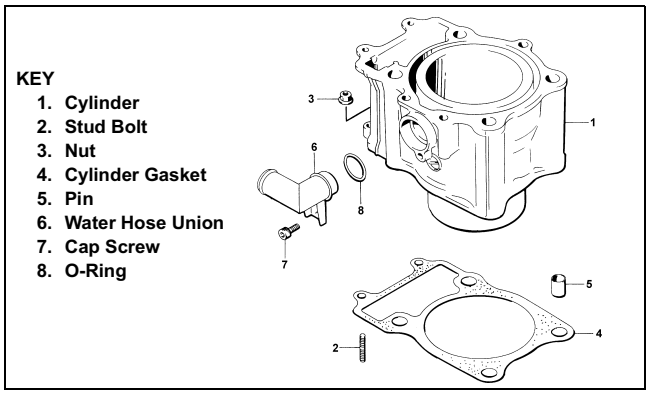
29. Place the gasket and recoil starter assembly into position on the left-side cover; then tighten four cap screws to 0.8 kg-m (6 ft-lb).



CC039D

Installing Top-Side Components

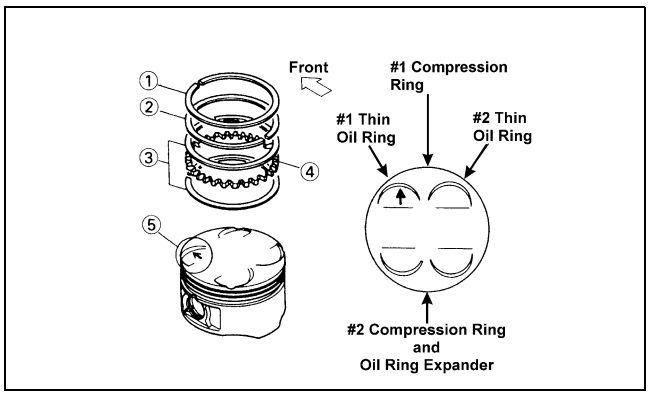
A. Piston
B. Cylinder



0732-301

■**NOTE: If the piston rings were removed, install them in this sequence.**

A. Install a thin oil ring, corrugated oil ring, and thin oil ring in the bottom groove of the piston.



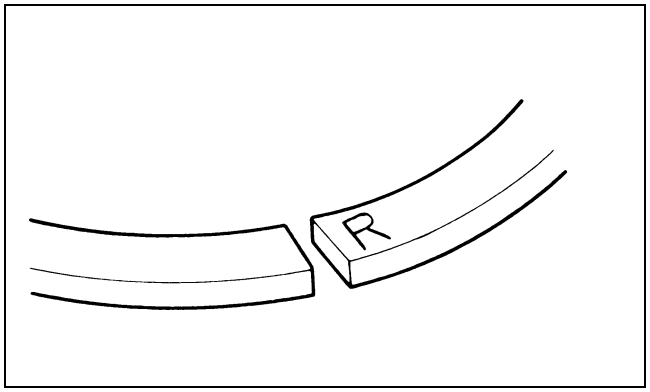
ATV-1085

B. Stagger the gaps of the upper and lower thin rings.

■**NOTE: To be installed correctly, the ends of the corrugated oil ring must touch.**

⚠ CAUTION

Install the middle and upper oil rings so the letter on the top surface of each ring faces the dome of the piston.



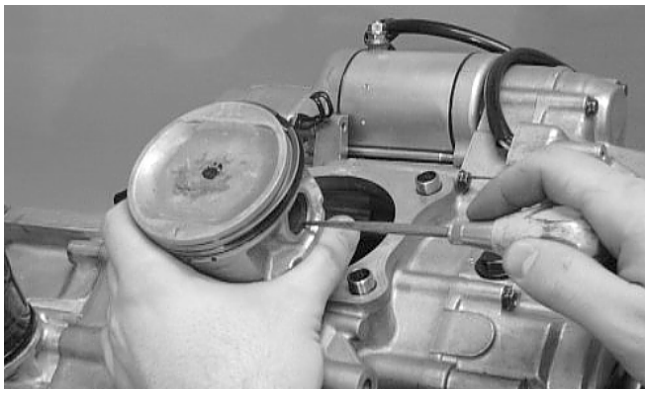
ATV-1024

⚠ CAUTION

Incorrect installation of the piston rings will result in engine damage.

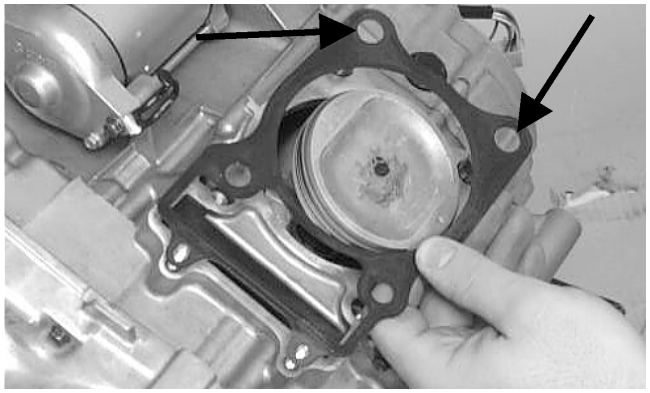
1. Install the piston on the connecting rod making sure there is a circlip on each side and the open end of the circlip faces upwards.

■**NOTE: The piston should be installed so the arrow points toward the front.**



CC032D

2. Place the two alignment pins into position. Place the cylinder gasket into position; then place a piston holder (or suitable substitute) beneath the piston skirt and square the piston in respect to the crankcase.

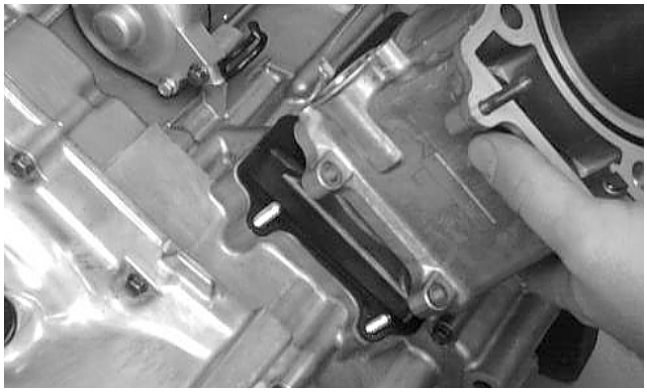


CC025D

3. Lubricate the inside wall of the cylinder; then using a ring compressor or the fingers, compress the rings and slide the cylinder over the piston. Route the cam chain up through the cylinder cam chain housing; then remove the piston holder and seat the cylinder firmly on the crankcase.

⚠ CAUTION

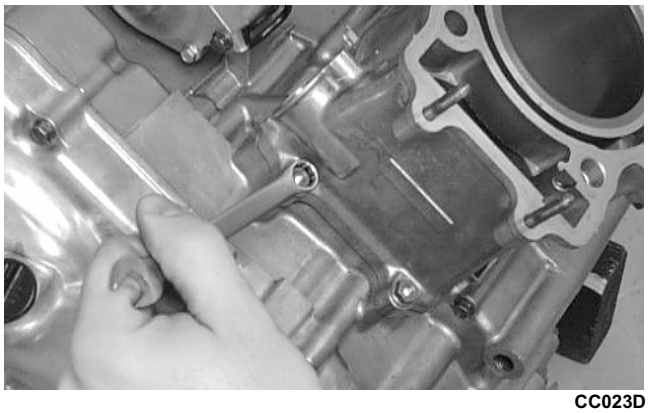
The cylinder should slide on easily. Do not force the cylinder or damage to the piston, rings, cylinder, or crankshaft assembly may occur.



CC024D

4. Loosely install the two nuts which secure the cylinder to the crankcase.

■NOTE: The two cylinder-to-crankcase nuts will be tightened in step 10.



CC023D

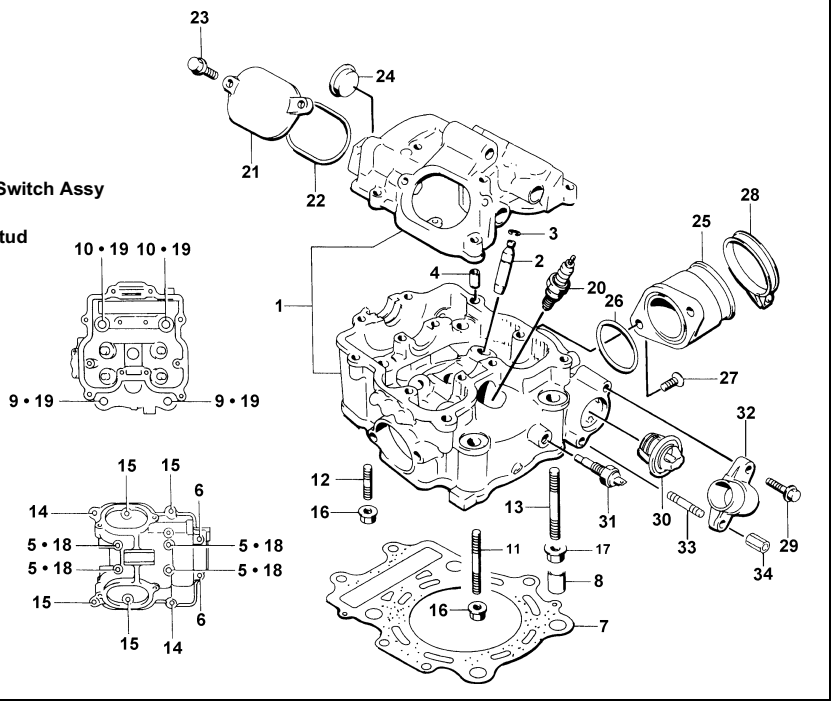
5. Install the coolant hose onto the crankcase union and tighten the clamp.

3

C. Cylinder Head
D. Valve Cover

KEY

1. Cylinder Head Assy
2. Valve Guide
3. Circlip
4. Pin
5. Cap Screw
6. Cap Screw
7. Cylinder Head Gasket
8. Pin
9. Cap Screw
10. Cap Screw
11. Cylinder Head Stud Bolt
12. Cylinder Head Stud Bolt
13. Stud Bolt
14. Cap Screw
15. Cap Screw
16. Nut
17. Nut
18. Gasket
19. Head Nut Gasket
20. Spark Plug
21. Inspection Cap
22. O-Ring
23. Cap Screw
24. Cylinder Head Plug
25. Intake Pipe Assy
26. O-Ring
27. Cap Screw
28. Clamp
29. Cap Screw
30. Thermostat
31. Water Temperature Switch Assy
32. Thermostat Cover
33. Thermostat Cover Stud
34. Nut



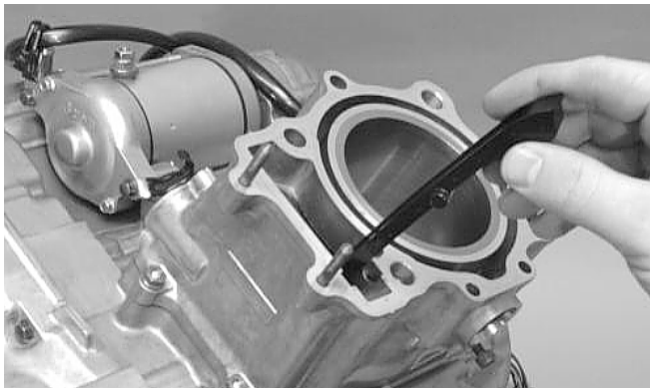
0734-324

■NOTE: Steps 1-5 in the preceding sub-section must precede this procedure.

6. Place the chain guide into the cylinder.

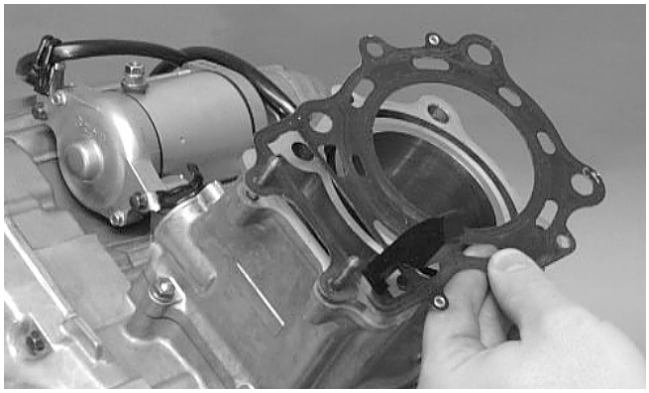
⚠ CAUTION

Care should be taken that the bottom of the chain guide is secured in the crankcase boss.

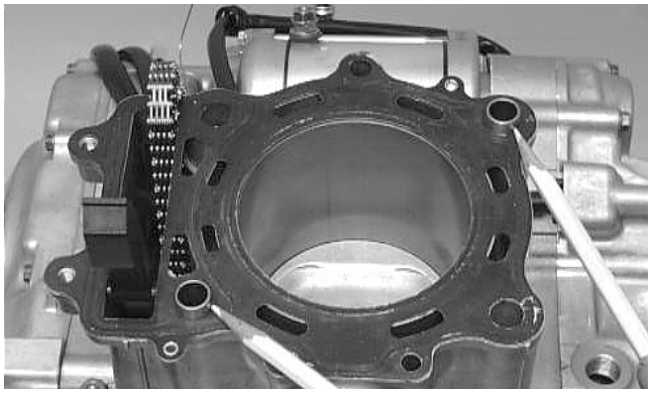


CC022D

7. Place the head gasket into position on the cylinder. Place the alignment pins into position; then place the head assembly into position on the cylinder.

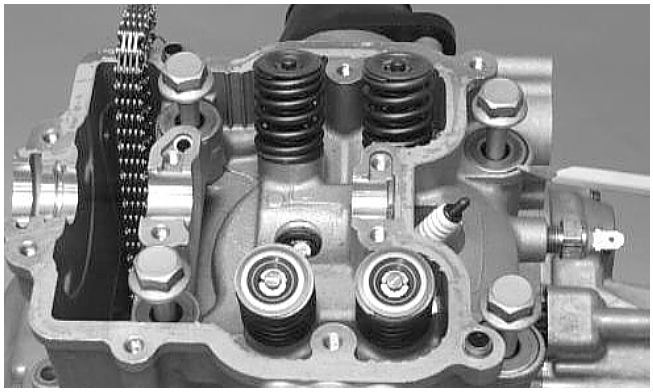


CC020D



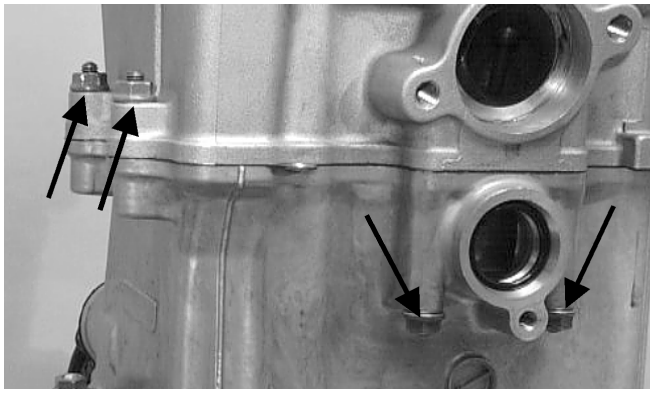
CC265D

8. Install the four cylinder head cap screws with copper washers (note the locations of the different-lengthed cap screws). Tighten only until snug.

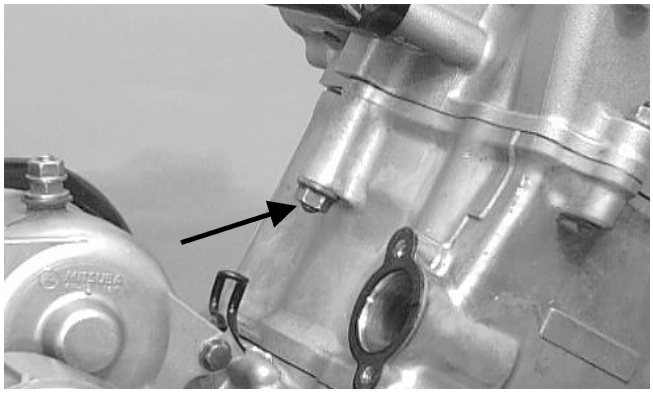


CC272D

9. Loosely install the five cylinder head nuts.



CC018D

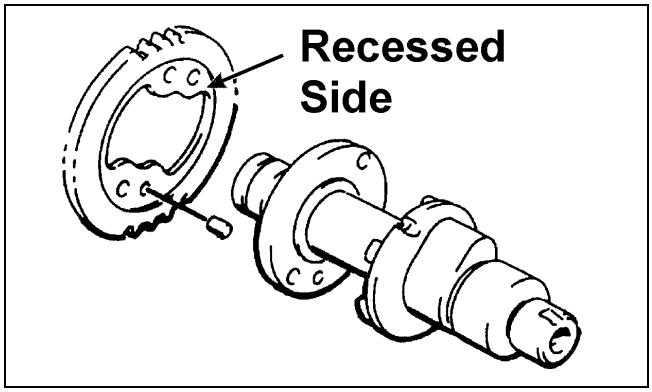


CC017D

10. In a crisscross pattern, tighten the four cylinder head cap screws (from step 8) to 3.8 kg-m (27.5 ft-lb); then tighten the 8 mm nut (from step 9) to 2.5 kg-m (18 ft-lb). Using a crisscross pattern, tighten the four 6 mm nuts (from step 9) to 1.1 kg-m (8 ft-lb). Tighten the two cylinder-to-crankcase nuts securely.

11. With the timing inspection plug removed and the chain held tight, rotate the crankshaft until the piston is at top-dead-center.

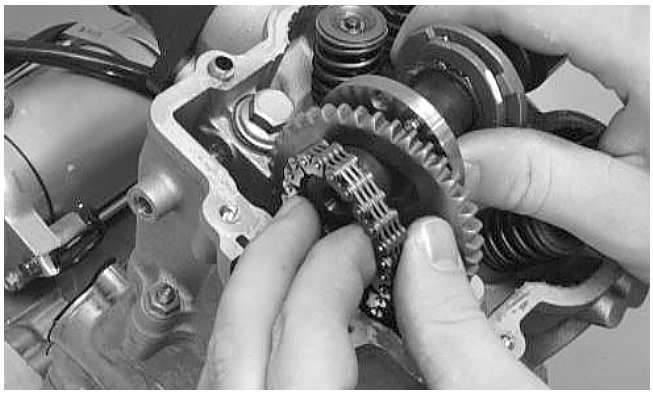
12. With the alignment pin installed in the camshaft, loosely place the cam sprocket (with the recessed side facing the cam shaft lobes) onto the camshaft. At this point, do not “seat” the sprocket onto the shaft.



732-307B

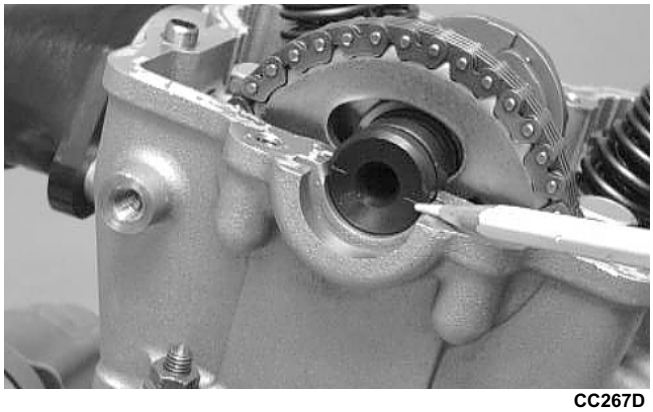
■**NOTE: At this point, oil the camshaft bearings, cam lobes, and the three seating journals on the cylinder.**

13. With the cam lobes directed down (toward the piston), maneuver the camshaft/sprocket assembly through the chain and towards its seating position; then loop the chain over the sprocket.



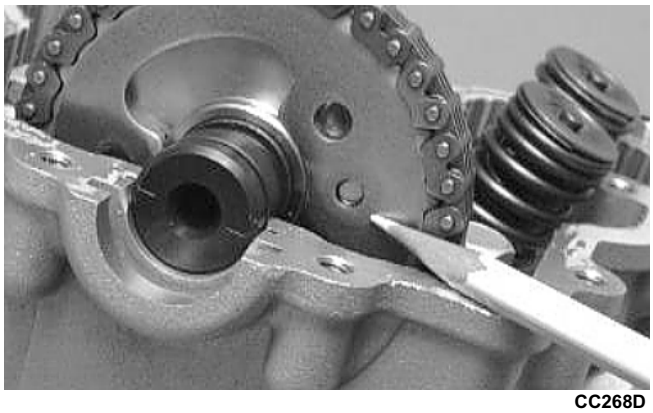
CC015D

■**NOTE: Note the position of the alignment marks on the end of the camshaft. They must be parallel with the valve cover mating surface. If rotating the camshaft is necessary for alignment, do not allow the chain and sprocket to rotate and be sure the cam lobes end up in the down position.**



CC267D

14. Seat the cam sprocket onto the camshaft making sure the alignment pin in the camshaft aligns with the smallest hole in the sprocket; then place the camshaft/sprocket assembly onto the cylinder ensuring the following.



CC268D

A. Piston still at top-dead-center.

B. Camshaft lobes directed down (toward the piston).

C. Camshaft alignment marks parallel to the valve cover mating surface.

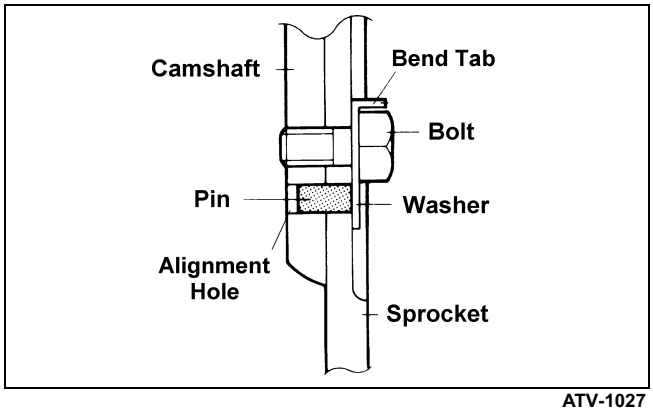
D. Recessed side of the sprocket directed toward the cam lobes.

E. Camshaft alignment pin and sprocket alignment hole (smallest) are aligned.

⚠ CAUTION

If any of the above factors are not as stated, go back to step 11 and carefully proceed.

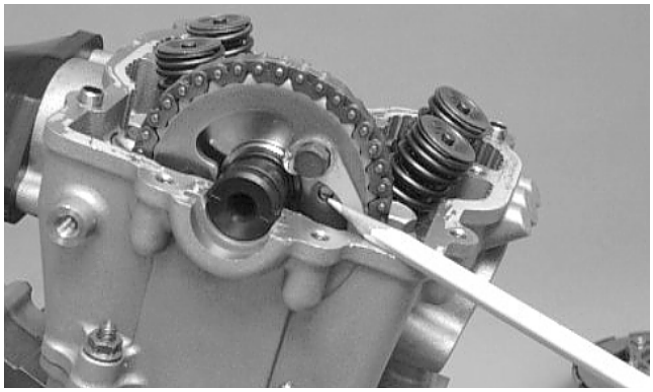
15. Place the tab-washer onto the sprocket making sure it covers the pin in the alignment hole.



ATV-1027

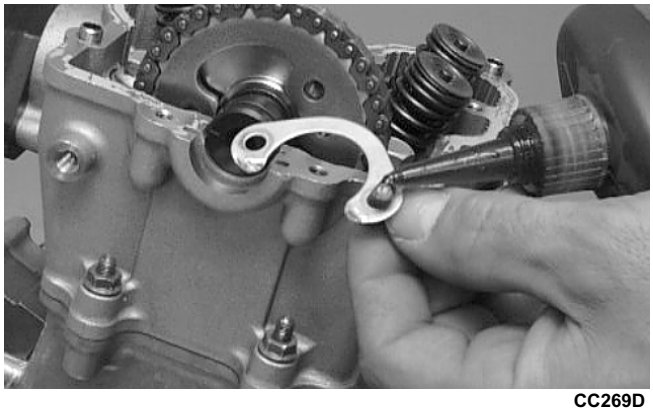
⚠ CAUTION

Care must be taken that the tab-washer is installed correctly to cover the alignment hole on the sprocket. If the alignment pin falls out, severe engine damage will result.



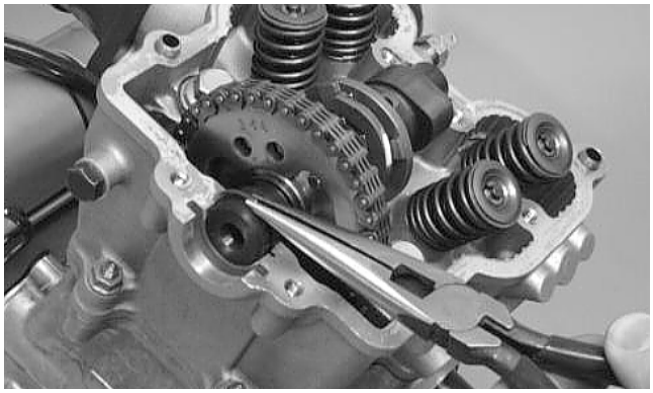
CC270D

16. Install the first cap screw securing the sprocket and tab-washer to the cam shaft. Tighten only until snug.



CC269D

17. Place the C-ring into position in its groove in the cylinder.

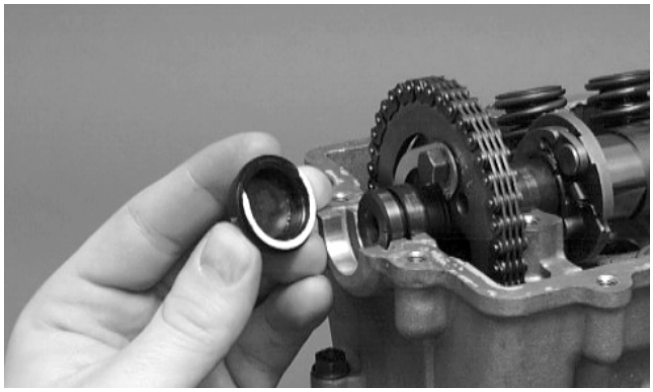


CC012D

18. Install the cylinder head plug in the cylinder head with the open end facing upward and toward the inside.

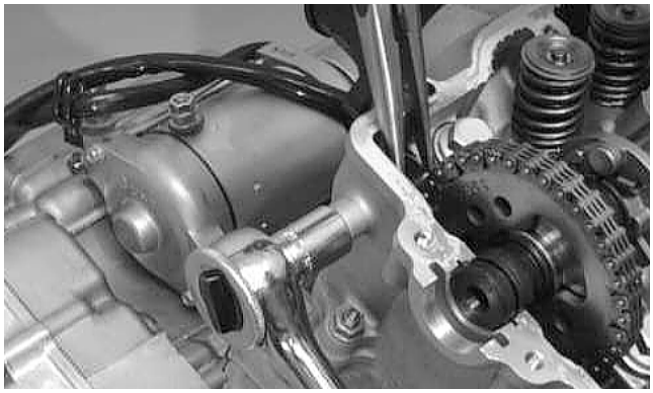
⚠ CAUTION

The open end of the plug must be positioned upward.



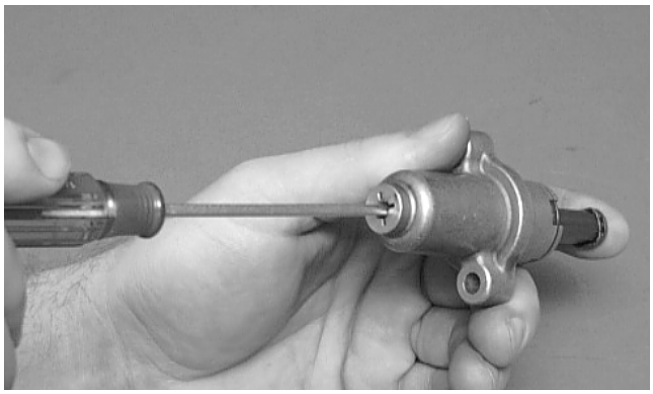
CC274D

19. Place the chain tensioner into position and secure with the cap screw and washer.



CC014D

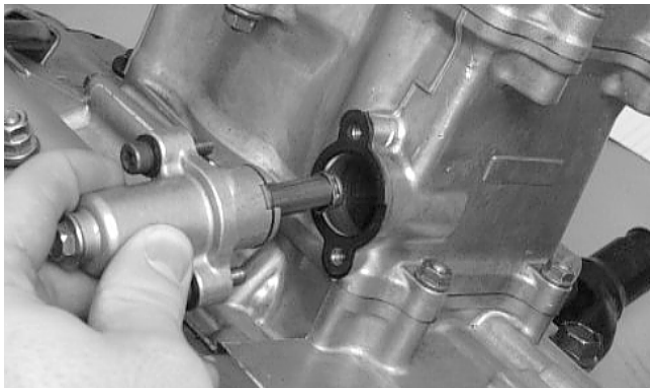
20. Remove the cap screw from the end of the chain tensioner; then using a flat-blade screwdriver, rotate the adjuster screw inside the tensioner clockwise until the screw bottoms.



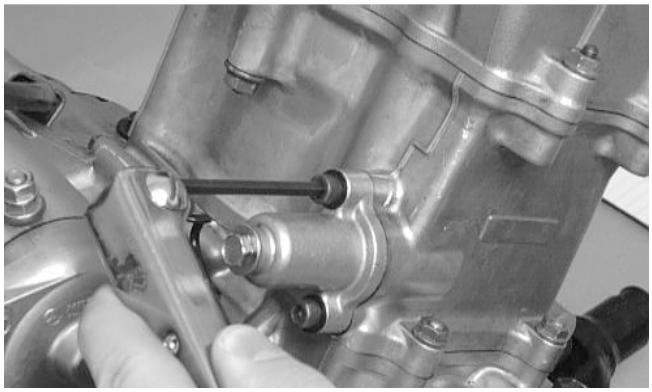
CC309D

■ **NOTE: The adjuster shaft will be drawn into the tensioner as the adjuster screw is rotated clockwise. The adjuster shaft tension will be released in step 22.**

21. Place the chain tensioner adjuster assembly and gasket into position on the cylinder and secure with the two Allen-head cap screws.

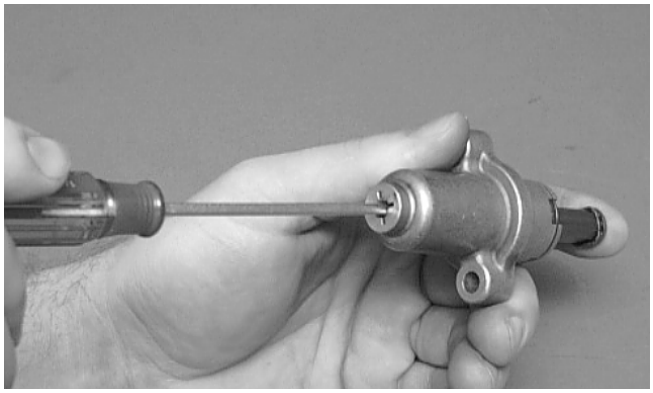


CC011D

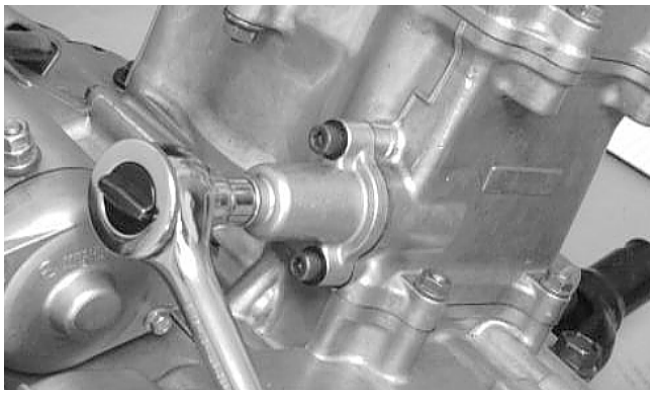


CC010D

22. Using a flat-blade screwdriver, rotate the adjuster screw inside the tensioner counterclockwise until all tension is released; then install the cap screw into the end of the chain tensioner.



CC309D



CC009D

23. Rotate the crankshaft until the second cap screw securing the sprocket to the camshaft can be installed; then install the cap screw and tighten to 1.5 kg-m (11 ft-lb). Bend the tab to secure the cap screw.

24. Rotate the crankshaft until the first cap screw (from step 16) securing the sprocket to the camshaft can be addressed; then tighten to 1.5 kg-m (11 ft-lb). Bend the tab to secure the cap screw.

25. Loosen the four adjuster screw jam nuts; then loosen the four adjuster screws on the rocker arms in the valve cover.

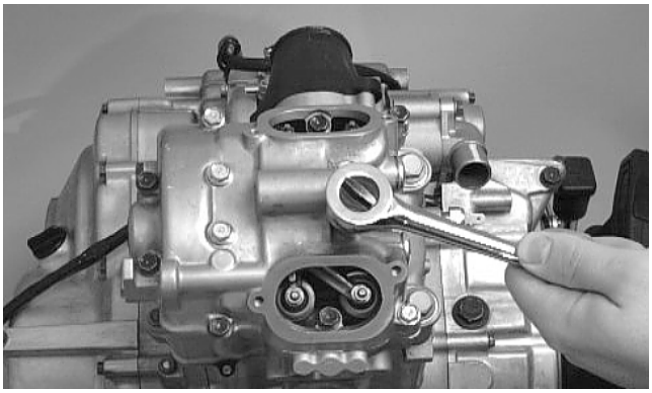
26. Apply a thin coat of Three Bond Sealant (p/n 0636-070) to the mating surfaces of the cylinder head and valve cover.

CC275D

27. Place the valve cover into position.

■ **NOTE: At this point, the rocker arms and adjuster screws must not have pressure on them.**

28. Install the four top side valve cover cap screws with rubber washers; then install the remaining cap screws. Tighten only until snug.



CC003D

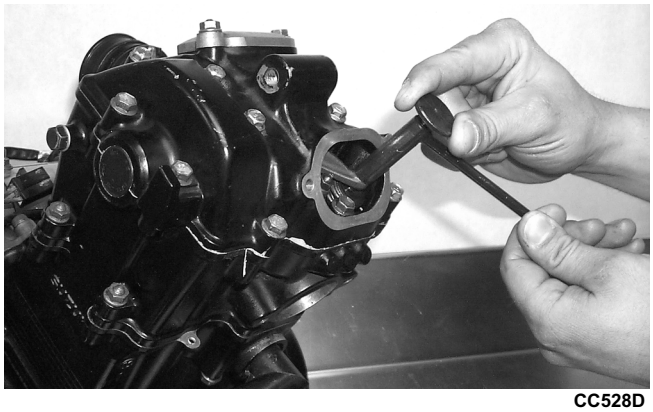
29. In a crisscross pattern starting from the center and working outward, tighten the cap screws securely.

30. Adjust valve/tappet clearance using the following procedure.

■**NOTE: Use Valve Clearance Adjuster (p/n 0444-078) for this procedure.**

A. Turn the engine over until the piston reaches top dead center on the compression stroke.

B. Place the valve adjuster onto the jam nut securing the tappet adjuster screw; then rotate the valve adjuster dial clockwise until the end is seated in the tappet adjuster screw.



CC528D

C. While holding the valve adjuster dial in place, use the valve adjuster handle and loosen the jam nut; then rotate the tappet adjuster screw clockwise until friction is felt.

D. Align the valve adjuster handle with one of the marks on the valve adjuster dial.

E. While holding the valve adjuster handle in place, rotate the valve adjuster dial counterclockwise until proper valve/tappet clearance is attained.

■**NOTE: Refer to the appropriate Specifications for the proper valve/tappet clearance.**

■**NOTE: Rotating the valve adjuster dial counterclockwise will open the valve/tappet clearance by 0.05 mm (0.002 in.) per mark.**

F. While holding the adjuster dial at the proper clearance setting, tighten the jam nut securely with the valve adjuster handle.

31. Place the two tappet covers into position making sure the proper cap screws are with the proper cover. Tighten the cap screws securely.

CC001D

32. If removed, install the spark plug and tighten to 1.7 kg-m (12 ft-lb).

Installing Engine/Transmission

■**NOTE: Arctic Cat recommends that new gaskets and O-rings be installed whenever servicing the ATV.**

1. From the left side, place the engine/transmission into the frame.

2. Install the mounting fasteners securing the engine/transmission in the following sequence.

A. Lower rear: One cap screw and nut with flat washer. Tighten only until snug.

CC126D

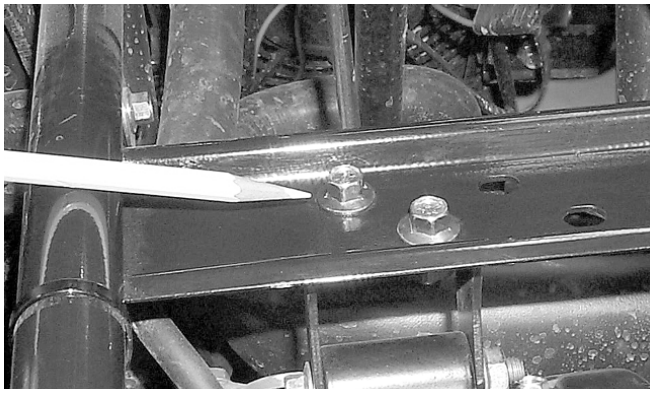
B. Upper rear: Loosely fasten the left-side engine mount-to-frame cap screws; then install the cap screw w/nut and flat washer. Tighten only until snug.

CC125D

C. Lower front: One cap screw, nut, spacer, and washer. Tighten only until snug.

CC123D

D. Upper front: Two cap screws (inside the bracket) and one cap screw and nut (topside of engine). Tighten only until snug.



AF939

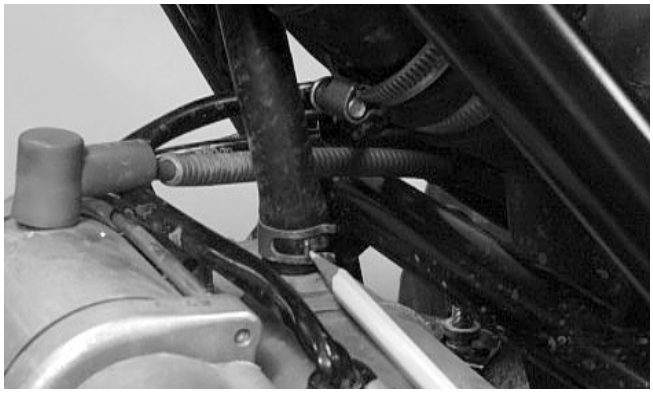
3. Tighten the engine mounting fasteners to the following specifications.

   A. Lower rear and Lower front to 5.5 kg-m (40 ft-lb).

   B. Upper front (inside the bracket) and Upper front (topside of engine) to 2.8 kg-m (20 ft-lb).

   C. Upper rear left-side engine mount-to-frame cap screws to 1.7 kg-m (12 ft-lb) and engine to engine mount cap screw with nut and flat washer to 5.5 kg-m (40 ft-lb).

4. Connect the crankcase breather vent hose and secure with the clamp.



CC122D

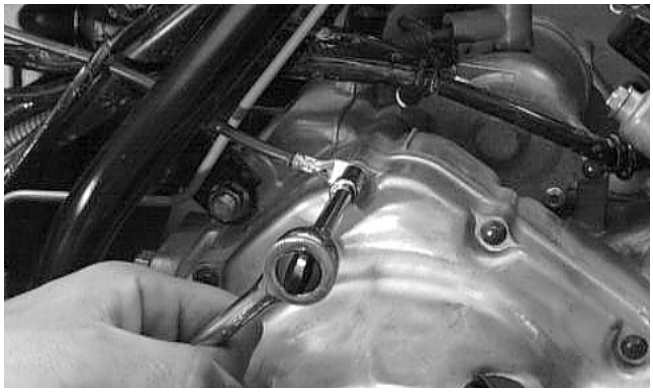
5. Connect the lower coolant hose to the water pump housing and secure with the clamp.

CC124D

6. Connect the positive cable to the starter motor and install the protective boot.

AR604D

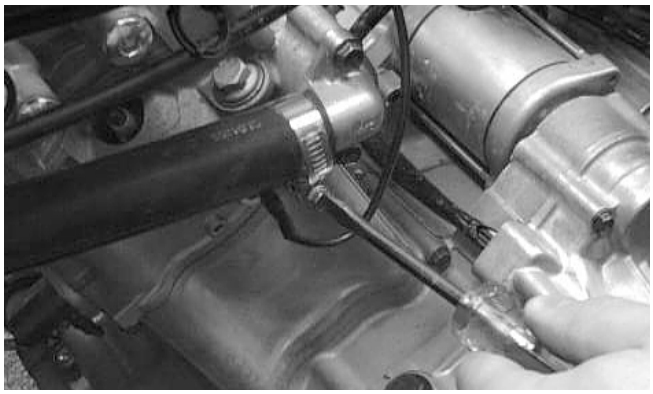
7. Connect the battery ground (negative) cable to the crankcase cover.



AR600D

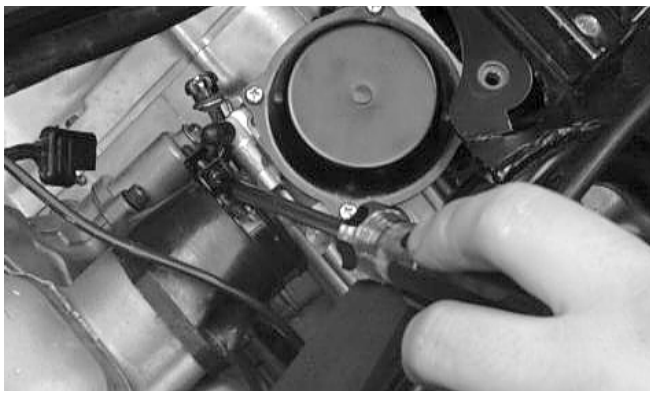
8. Install the high tension lead on the spark plug.

9. Connect the upper coolant hose to the thermostat housing and secure with the clamp.



CC121D

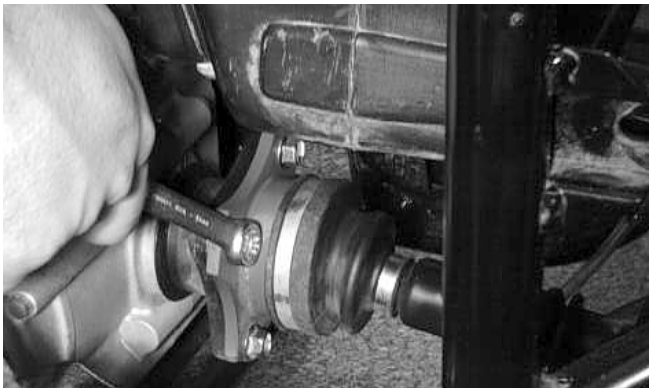
10. Install the carburetor assembly and secure the intake manifold and air inlet boot.



CC120D

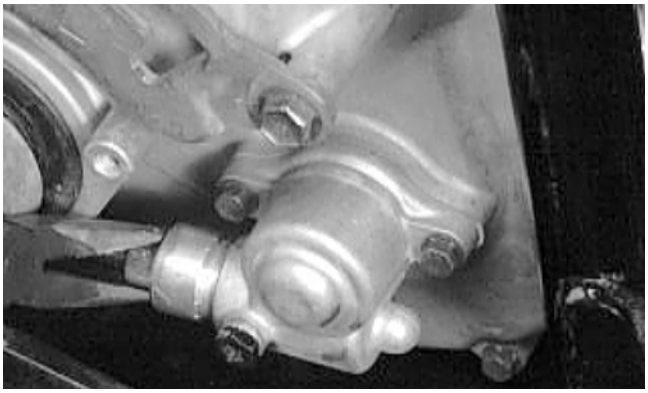
11. Route the two vent hoses through the slots in the frame.

12. Place the rear output shaft into position on the rear output joint; then install the four cap screws and tighten to 2.8 kg-m (20 ft-lb).



CC119D

13. Place the speedometer cable into position and tighten the knurled nut.



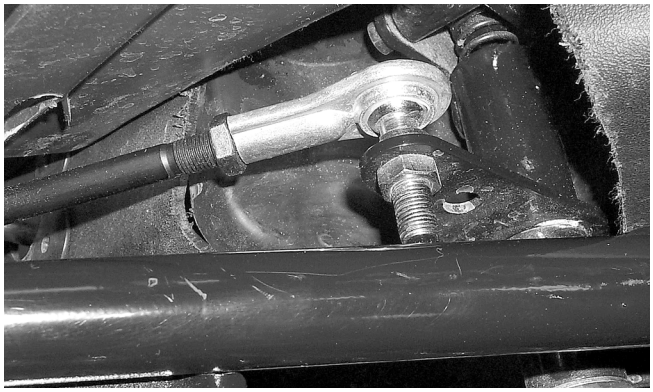
AF667D

14. To install the reverse shift rod, use the following procedure:

    A. Place the reverse shift arm onto the engine reverse shift shaft (with the marks made during disassembly aligned) and secure with the cap screw.

CC118D

    B. Secure the upper end of the reverse shift rod to the shift lever arm with a new lock nut. Tighten securely.



AF941

15. Place the footrests into position on the frame. Tighten the 10 mm cap screws to 5.5 kg-m (40 ft-lb) and the 8 mm cap screws to 2.8 kg-m (20 ft-lb); then secure the fender extensions to the footrests with existing hardware.

16. Place the exhaust pipe into position inside the frame and connect to the muffler at the juncture.

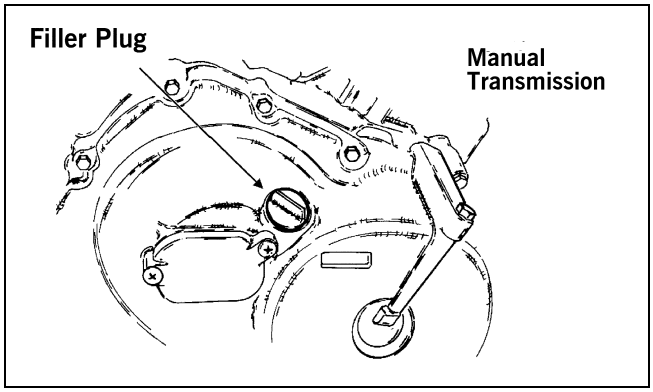
■ **NOTE: If the muffler was removed, see Section 8.**

17. Place the exhaust pipe with new grafoil gasket into position on the engine; install and tighten the cap screws to 2.8 kg-m (20 ft-lb).

18. Install the front fenders and the front rack (see Section 8).

19. Install the gas tank (see Section 4).

20. Pour the correct amount of recommended oil into the engine/transmission filler hole; install the filler plug.



ATV-0108

21. Pour 2.9 L (3 U.S. qt) of premixed Arctic Cat Antifreeze (p/n 0638-395) into the cooling system. Allow coolant to settle and then fill to the bottom of the stand pipe in the radiator neck.

AN604D

22. Connect all remaining electrical connections; then install the battery making sure to connect the positive battery cable first and the negative cable last.

23. Install the seat making sure it “locks” into position.

⚠ CAUTION

If the engine had a major overhaul or if any major part was replaced, proper engine break-in procedures must be followed (see Section 1). If the proper engine break-in procedures are not followed, severe engine damage may result.

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Removing Engine/ Transmission
(375/500 Automatic)

Many service procedures can be performed without removing the engine/transmission from the frame. Closely observe the note introducing each sub-section for this important information.

☞ AT THIS POINT

If the technician's objective is to service/replace left-side cover oil seals (3), front output joint oil seal (1), rear output joint oil seal (1), and/or the oil strainer (from beneath the engine/ transmission), the engine/transmission does not have to be removed from the frame.

Secure the ATV on a support stand to elevate the wheels.

⚠ WARNING

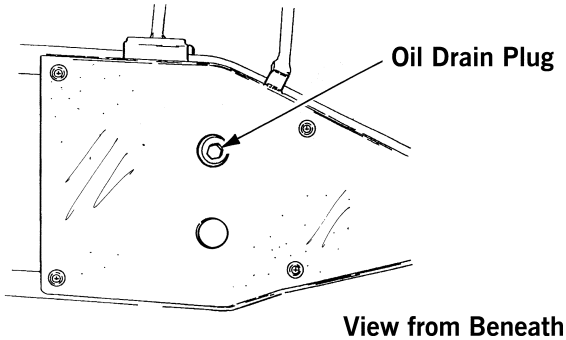
Make sure the ATV is solidly supported on the support stand to avoid injury.

1. Remove the seat.
2. Remove the negative cable from the battery; then remove the positive cable. Remove the battery hold-down strap and the battery vent hose; then remove the battery.

⚠ CAUTION

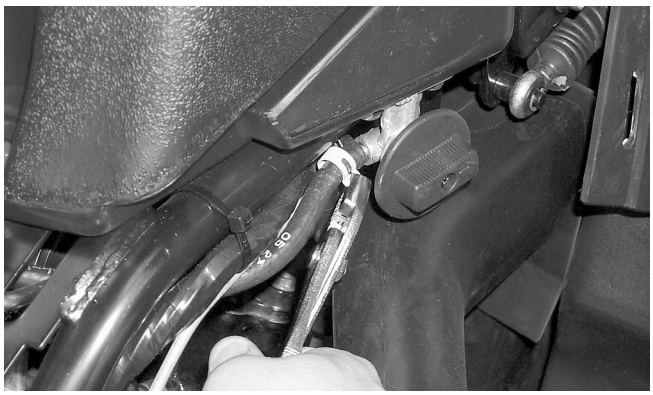
Battery acid is harmful if it contacts eyes, skin, or clothing. Care must be taken whenever handling a battery.

3. Drain the engine oil; then drain the cooling system.



733-441A

4. Remove the hardware securing the right-side and left-side panels; then remove the panels.
5. Turn the gas tank valve to the OFF position; then remove the fuel hose.

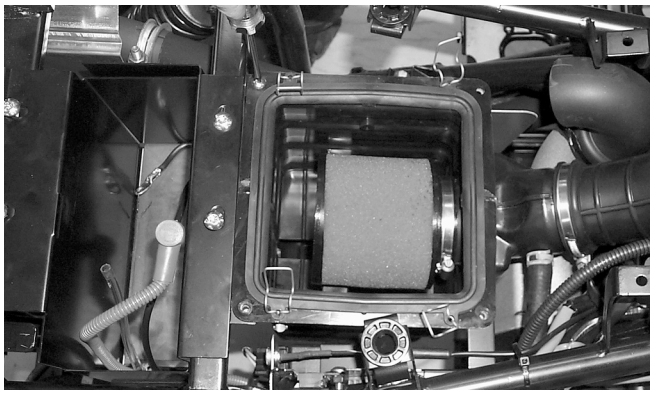


CC533

6. Remove the two torx-head machine screws securing the gas tank to the frame.
7. Disconnect the gas tank vent hose; then remove the gas tank.

8. Remove the rear rack/fender assembly (see Section 8).

9. Remove the hardware securing the air cleaner housing to the frame.



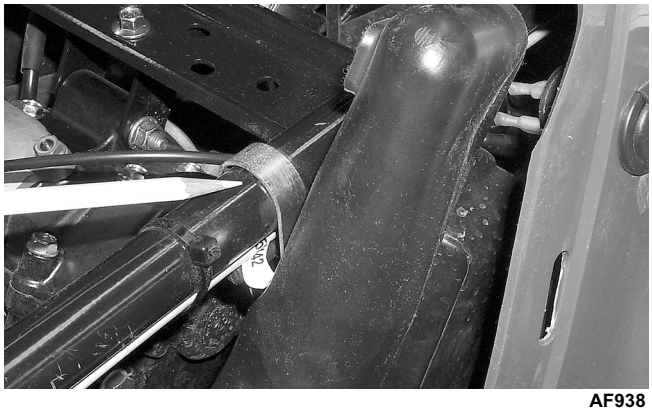
CC535

10. Disconnect the crankcase vent hose from the air cleaner housing.

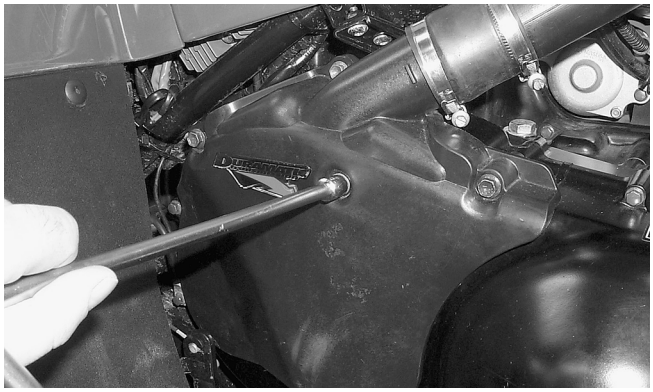
CC536

11. Remove the clamps securing the air intake hose to the carburetor; then remove the air cleaner housing.

12. Remove the hardware securing the cooling duct assembly to the frame; then remove the cooling duct shroud from the V-belt cover.

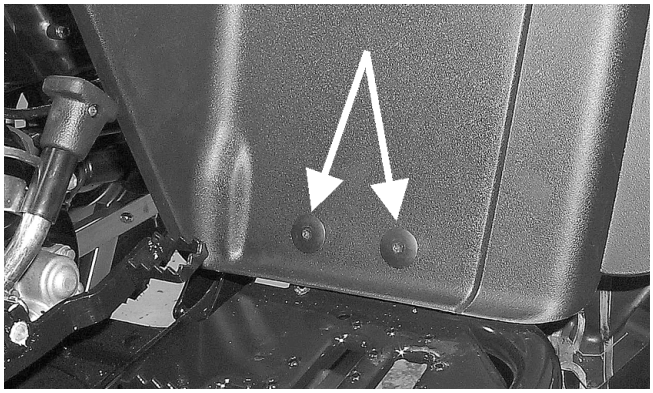


AF938



AF932

13. Remove the hardware securing both footrests to the frame and front fender.

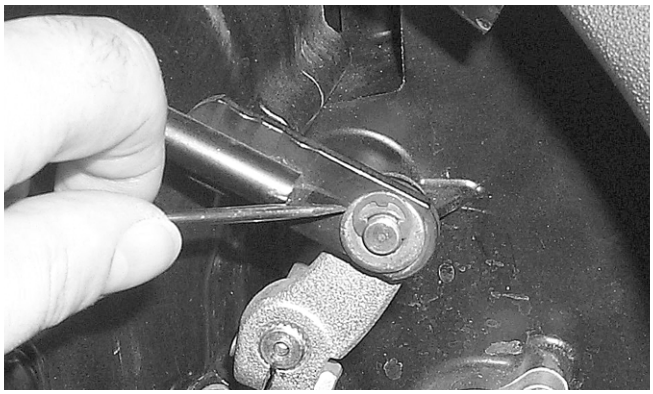


CC861A

14. Loosen the clamp securing the carburetor to the intake.

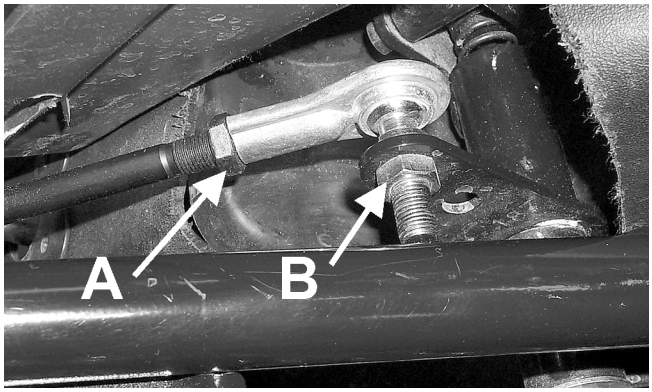
15. Route the carburetor assembly up and away from the engine.

16. Remove the E-clip securing the shift rod to the engine shift arm.



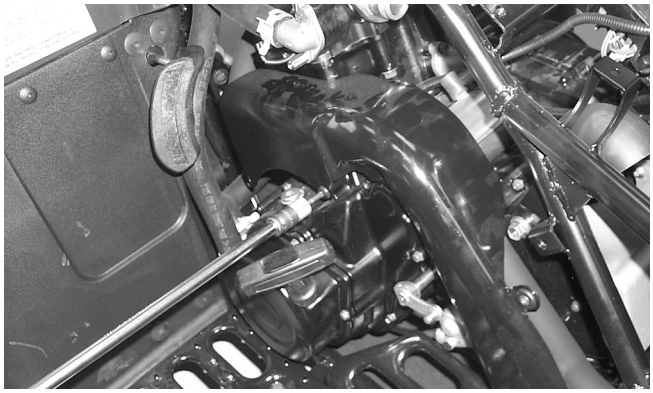
AF962

17. Remove the lock nut (B) securing the shift rod to the shift lever arm; then remove the shift rod.



AF941A

18. Remove the torx-head screws securing the exhaust pipe shroud; then remove the shroud.


CC560

19. Remove the four (two on each side) torx-head screws securing the inner front fenders to the frame and footrests.

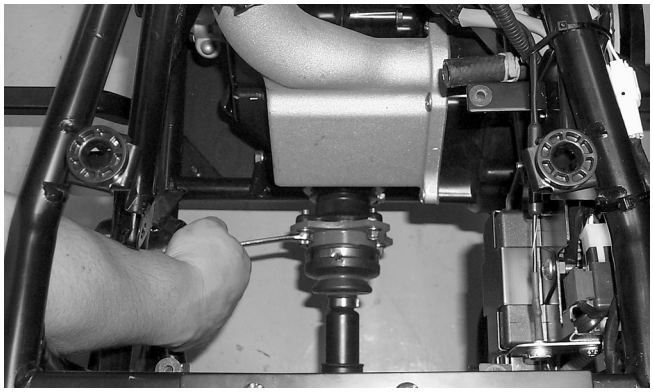
■ **NOTE: It is not necessary to remove the front fender to remove the engine; however, removing the screws securing the inner front fenders will allow the fender to be moved to accommodate the removing of the exhaust pipe and engine.**

20. Remove the hardware securing the exhaust pipe to the muffler, frame, and engine; then remove the exhaust pipe.

21. Remove the two coolant/oil hoses from the engine. Route the hoses out of the way.

■ **NOTE: On the 375, there will be a substantial amount of oil draining from the oil hoses when removing. Place a drain pan beneath the hoses prior to removing the oil hoses.**

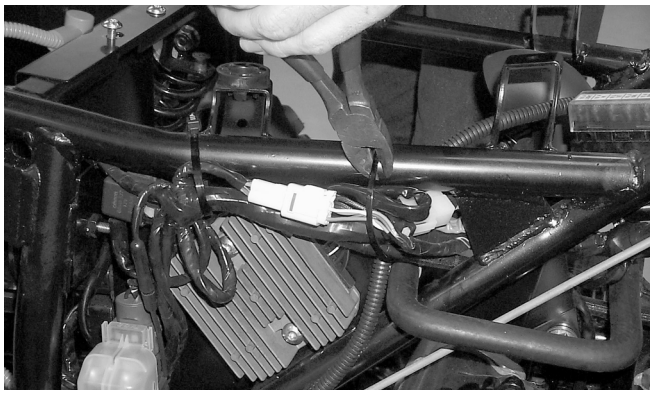
22. Remove the hardware securing the front and rear driveshafts.


CC565

CC566

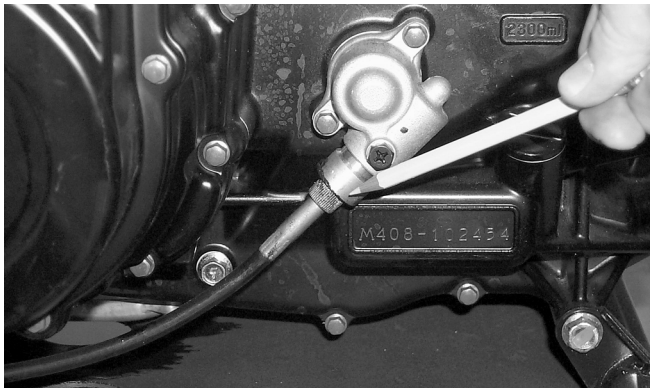
■ **NOTE: It is advisable to lock the brake when loosening the cap screws securing the front driveshaft.**

23. On the right side, cut the cable ties securing the wiring harness to the frame.


CC567

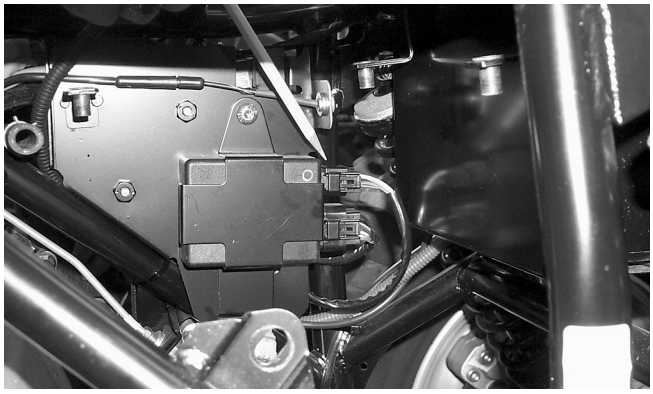
24. Remove the positive cable from the starter motor and route it out of the way.

25. Remove the speedometer cable from the speedometer gear housing.



CC568

26. Disconnect the top connector at the CDI unit.

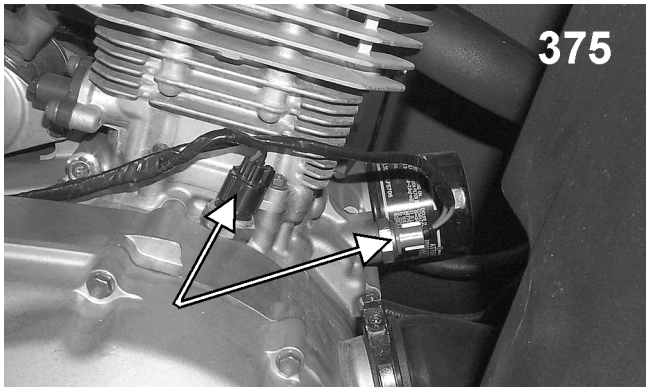

CC569

27. Disconnect the stator-to-rectifier/regulator connector.

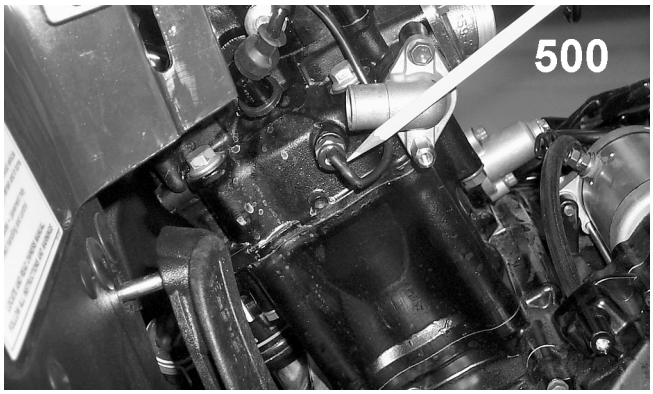
CC570

28. Remove the temperature sensor wire(s) from the engine.

■**NOTE: On the 375, there are two temperature sensors.**

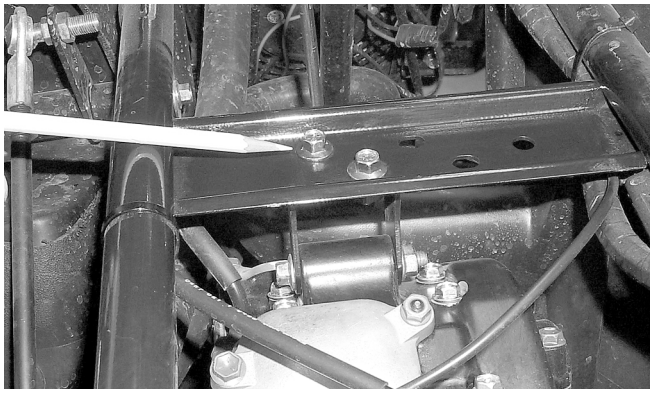


AF964A



CC571A

29. Remove the two cap screws securing the front upper engine mount to the frame.


AF939

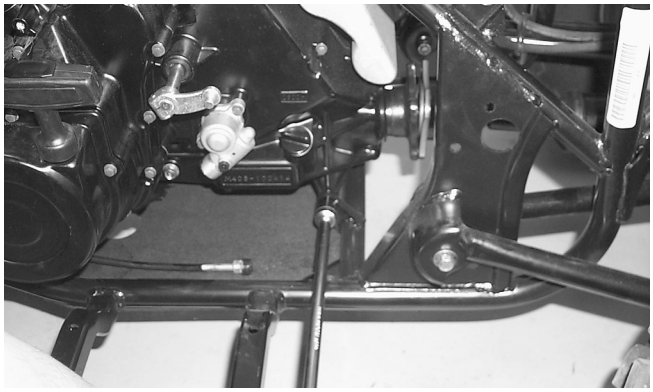
30. Remove the cap screw and flange nut securing the upper engine bracket to the engine; then remove the bracket.

31. Remove the spark plug wire from the spark plug.

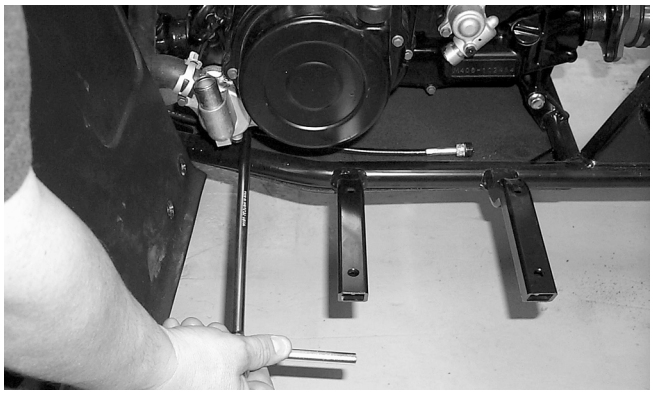
32. Remove the shift indicator connector from the main wiring harness.

33. Remove the cap screw securing the engine ground wire to the engine.

34. Remove the three engine mounting through-bolts. Account for a washer on the upper bolt and a spacer on the lower front bolt.



CC576



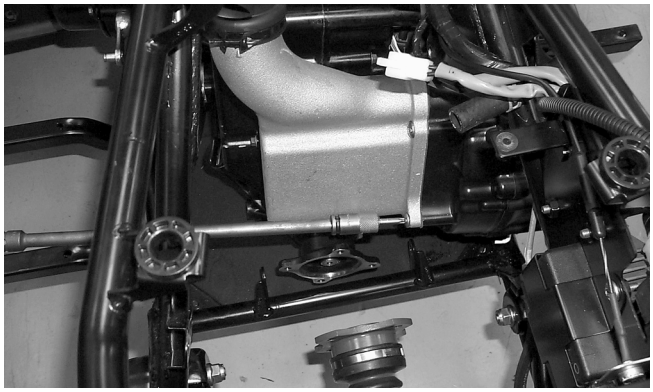
CC577

35. Remove the caps screws securing the two upper rear engine mounts to the frame.

36. Slightly raise the front of the engine; then remove the front driveshaft coupler from the engine.

CC578

37. Remove the torx-head screws securing the clutch plenum to the engine; then remove the plenum and account for a gasket.



CC579

38. Remove the engine from the right side by moving the engine forward while raising the engine in the rear and rotating the engine counterclockwise. The engine will come out the right side of the frame.

Top-Side Components (375)

■ **NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.**

☞ AT THIS POINT
To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

■ **NOTE: The engine/transmission does not have to removed from the frame for this procedure.**

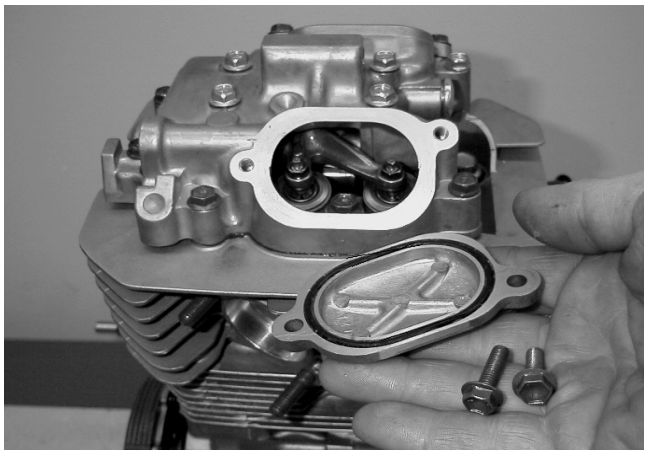
Removing Top-Side Components

A. Valve Cover
B. Cylinder Head

■ **NOTE: Remove the spark plug and timing inspection plug; then using the recoil starter, rotate the crankshaft to top-dead-center of the compression stroke.**

■ **NOTE: Arctic Cat recommends the use of new gaskets, lock nuts, and seals and lubricating all internal components when servicing the engine/transmission.**

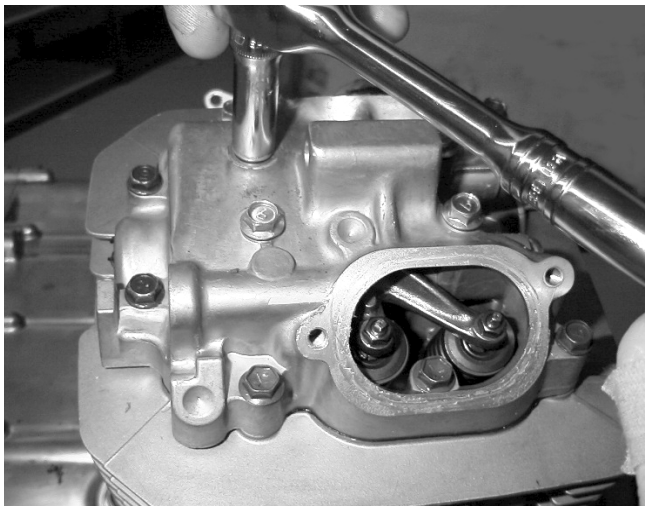
1. Remove the cap screws securing the two tappet covers. Remove the two tappet covers. Account for the O-rings.



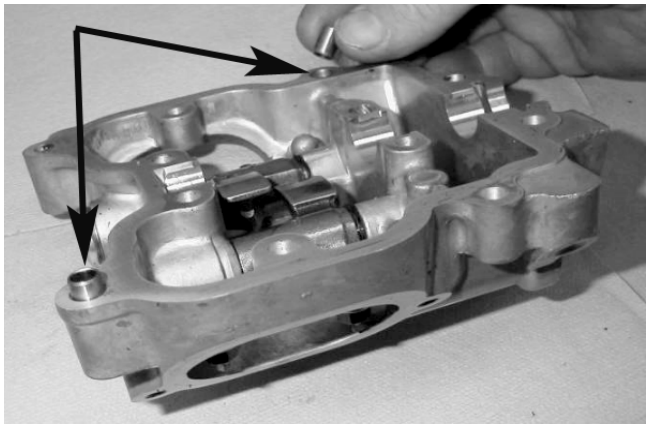
MD1264

■**NOTE: Keep the mounting hardware with the covers for assembly purposes.**

2. Remove the 12 valve cover cap screws. Note the rubber washers on the four top-side cap screws; remove the valve cover. Note the orientation of the cylinder head plug and remove it. Note the location of the two alignment pins.

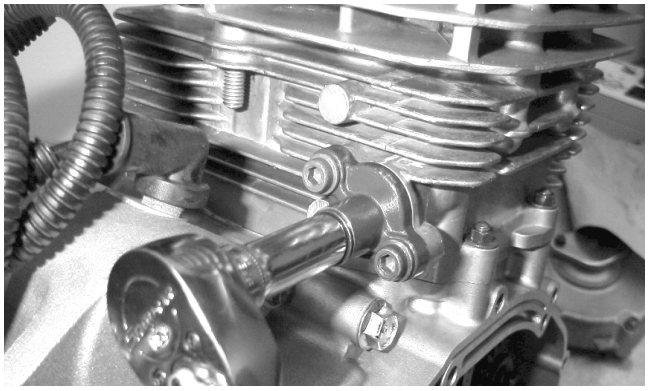


MD1261

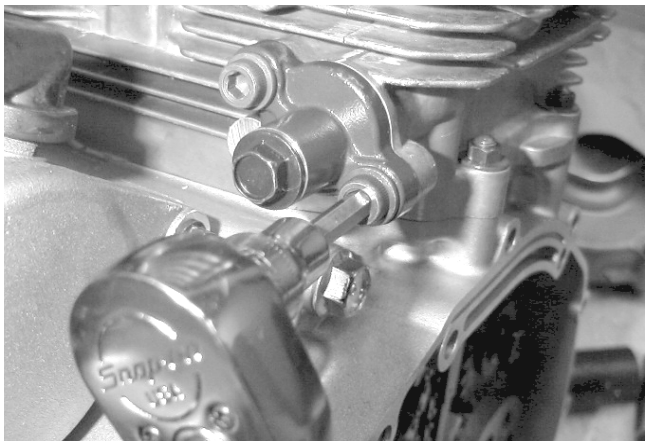


MD1354

3. Loosen the cap screw on the end of the cam chain tensioner; then remove the two Allen-head screws securing the cam chain tensioner assembly. Remove the tensioner assembly and gasket.

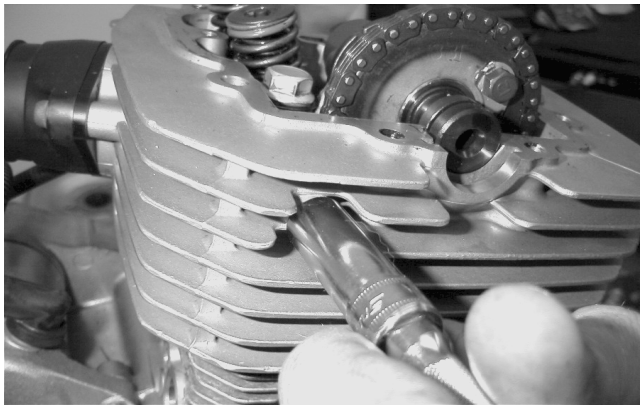


MD1245



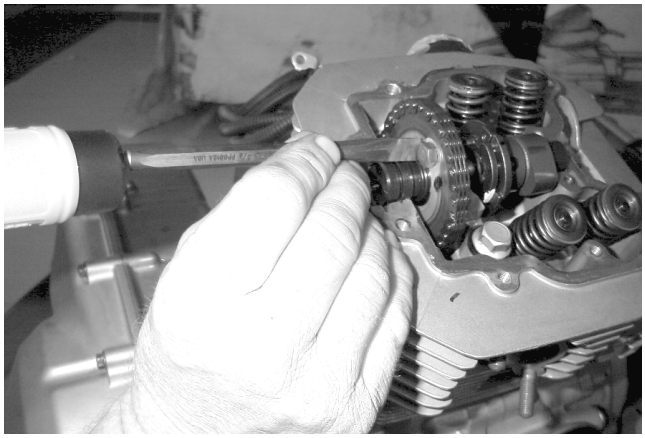
MD1254

4. Remove the cam chain tensioner pivot cap screw and washer.

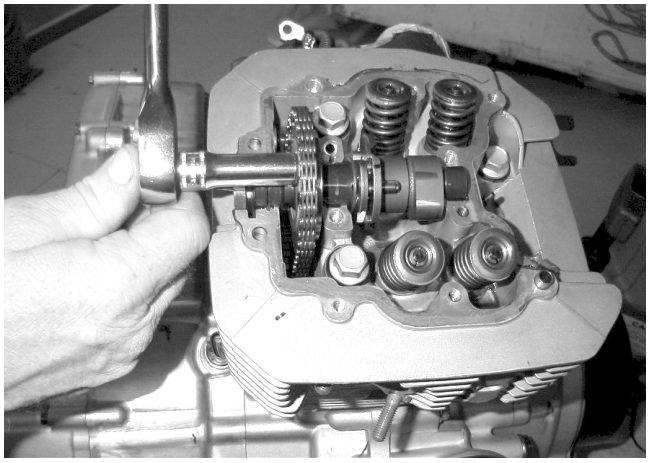


MD1251

5. Bend the washer tabs and remove the two cap screws securing the sprocket to the camshaft.



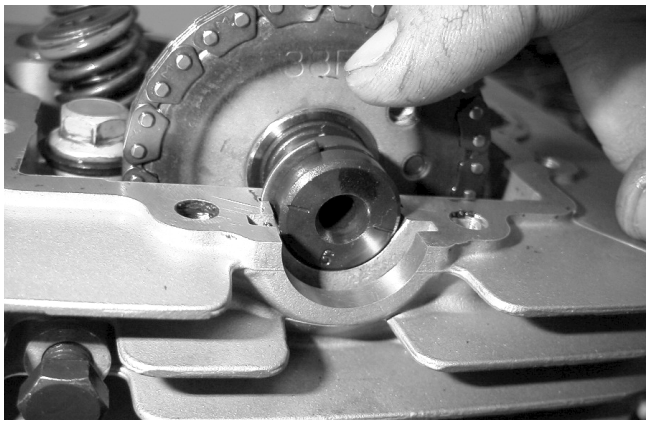
MD1136



MD1137

6. Using an awl, rotate the C-ring in its groove until it is out of the cylinder head; then remove the C-ring.

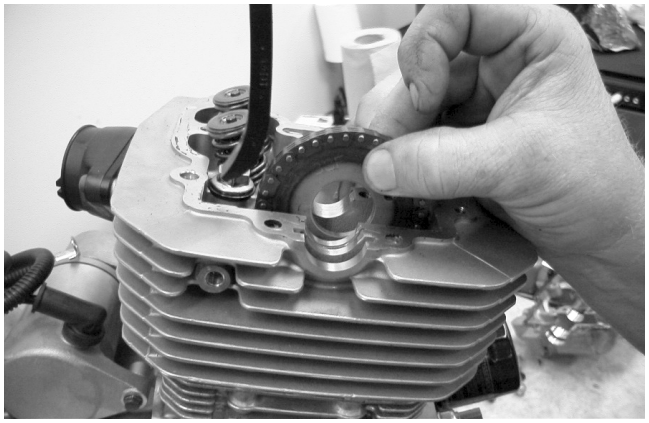
■NOTE: Care should be taken not to drop the C-ring down into the crankcase.



MD1131

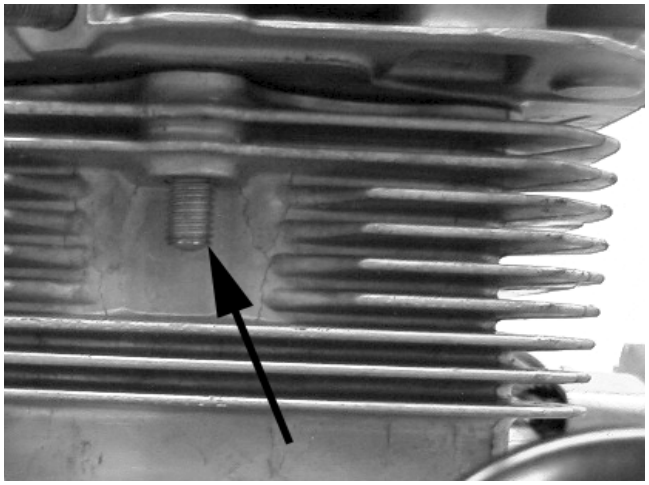
7. Noting the timing marks for installing purposes, drop the sprocket off the camshaft. While holding the cam chain, slide the sprocket and camshaft out of the cylinder head. Account for an alignment pin.

■NOTE: Loop the chain over the cylinder and secure it with a wire to keep it from falling into the crankcase.



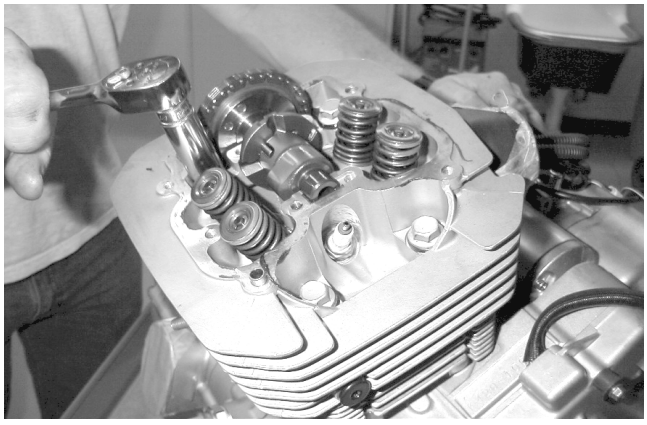
MD1132

8. Remove the cam chain tensioner by lifting it from the chain cavity; then remove the two lower nuts securing the cylinder head to the cylinder, one in front and one in rear.



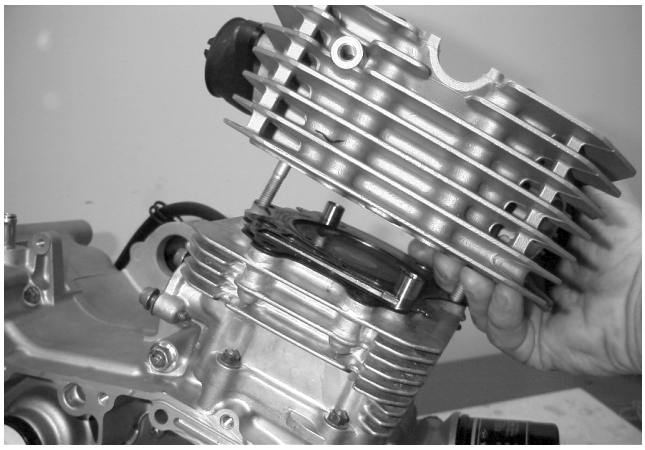
MD1192

9. Remove the four cylinder head cap screws and washers. Note that the two cap screws on the right side of the cylinder head nearest the cam sprocket are longer than the two cap screws on the left (spark plug) side.



MD1167

10. Remove the cylinder head from the cylinder, remove the gasket, and account for two alignment pins.



MD1163

☞ AT THIS POINT

To service valves and cylinder head, see Servicing Top-Side Components sub-section.

11. Remove the cam chain guide.

☞ AT THIS POINT

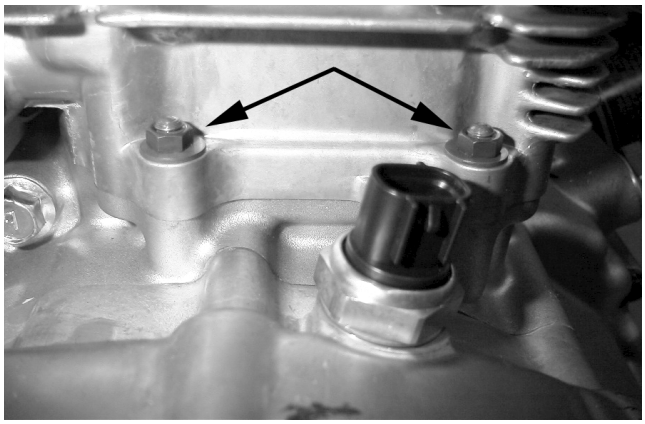
To inspect cam chain guide, see Servicing Top-Side Components sub-section.

MD1173

C. Cylinder
D. Piston

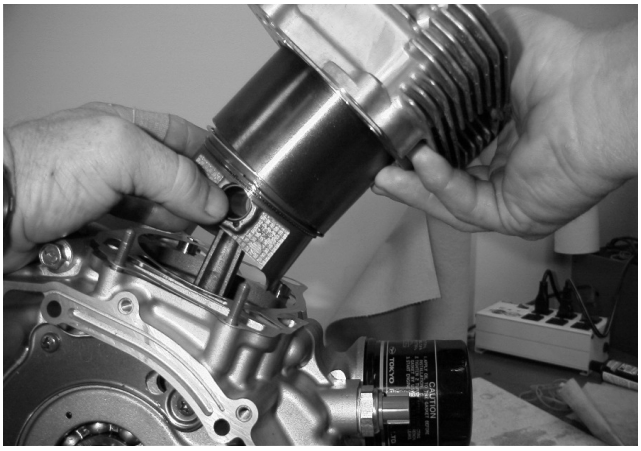
■NOTE: Steps 1-11 in the preceding sub-section must precede this procedure.

12. Remove the two nuts securing the right side of the cylinder to the right-side crankcase half. Account for the washers.



MD1226

13. Lift the cylinder off the crankcase taking care not to allow the piston to drop against the crankcase. Account for the gasket and two alignment pins.



MD1214

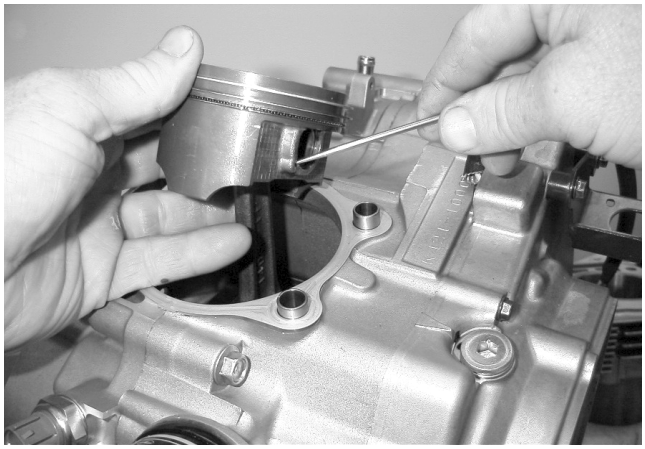
☞ AT THIS POINT

To service cylinder, see Servicing Top-Side Components sub-section.

⚠ CAUTION

When removing the cylinder, be sure to support the piston to prevent damage to the crankcase and piston.

14. Using an awl, remove one piston-pin circlip. Take care not to drop it into the crankcase.



MD1213

15. Using Piston-Pin Puller (p/n 0644-328), remove the piston pin. Account for the opposite-side circlip. Remove the piston.

■NOTE: It is advisable to remove the opposite-side circlip prior to using the puller.

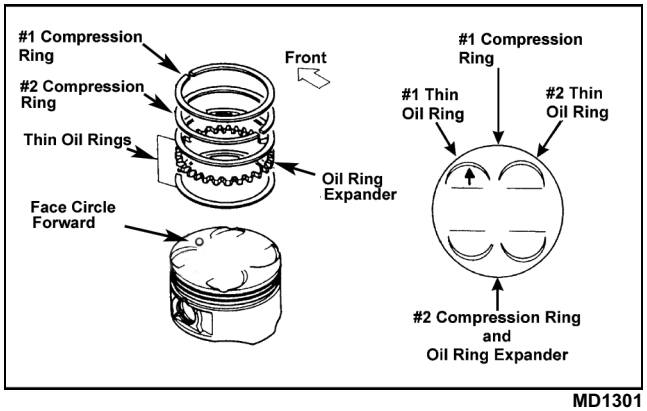
MD1219

■NOTE: Support the connecting rod with rubber bands to avoid damaging the rod or install a connecting rod holder.

⚠ CAUTION

Do not allow the connecting rod to go down inside the crankcase. If the rod is down inside the crankcase and the crankshaft is rotated, severe damage will result.

■NOTE: If the existing rings will not be replaced with new rings, note the location of each ring for proper installation. When replacing with new rings, replace as a complete set only. If the piston rings must be removed, remove them in this sequence.



MD1301

MD1211

A. Starting with the top ring, slide one end of the ring out of the ring-groove.

B. Remove each ring by working it toward the dome of the piston while rotating it out of the groove.

☞ AT THIS POINT

To service piston, see Servicing Top-Side Components sub-section.

☞ AT THIS POINT

To service center crankcase components only, proceed to Removing Left-Side Components.

Left-Side Components
(375)

■ **NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.**

☞ AT THIS POINT
To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

■ **NOTE: The engine/transmission does not have to be removed from the frame for this procedure.**

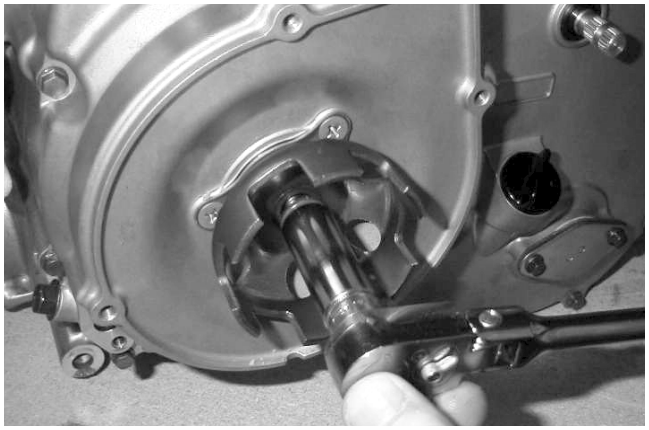
Removing Left-Side Components

A. Recoil Starter
B. Starter Cup
C. Cover/Stator Assembly

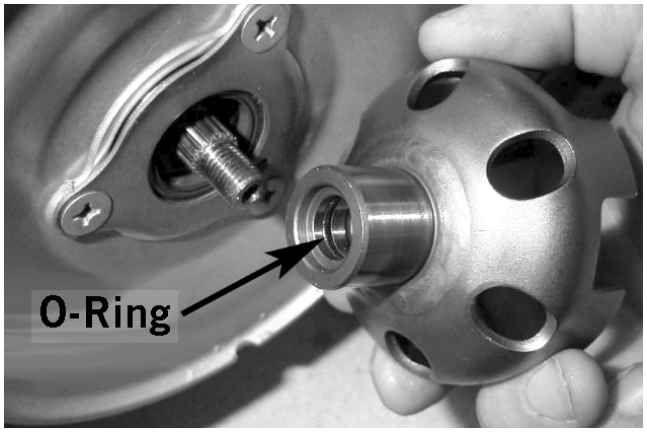
1. Remove the four recoil starter cover cap screws. Remove the recoil starter assembly noting the location of the single washer. Note the condition of the recoil cover gasket. Replace if damaged.

☞ AT THIS POINT
To service the recoil starter, see Servicing Left-Side Components sub-section.

2. Remove the nut and lock washer securing the starter cup to the crankshaft; then remove the starter cup. Account for the O-ring inside the cup.

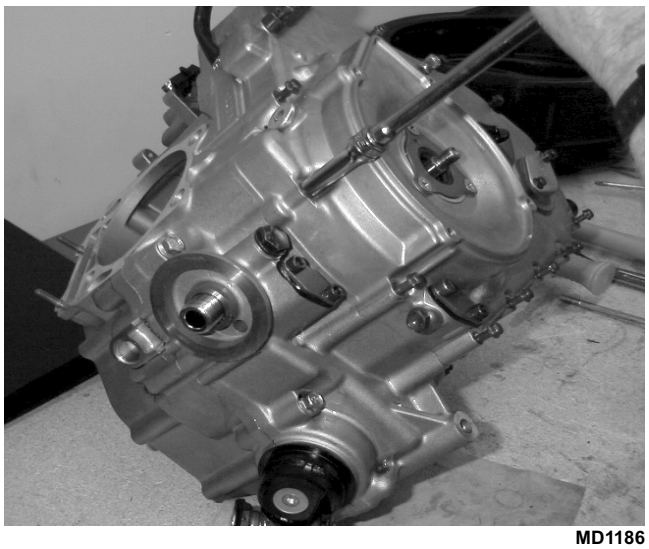


MD1303



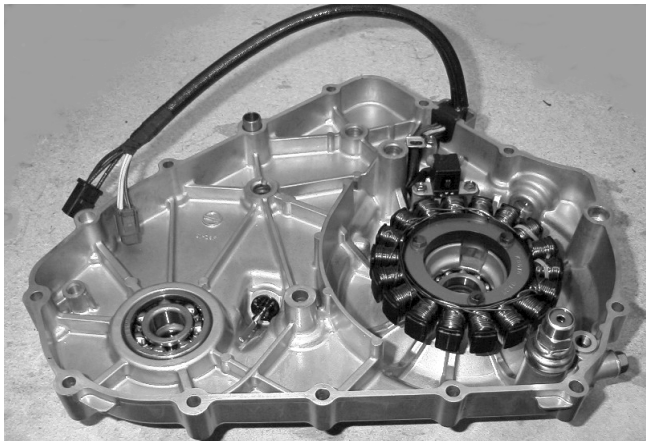
MD1304

3. Lay the engine/transmission on its right side. Remove the 14 left-side cover-to-crankcase mounting cap screws noting the location of the long cap screw with the washer near the middle of the left-side cover. Keep the different-lengthed 6 mm cap screws in order for installing purposes.



MD1186

4. Using Side Case Puller (p/n 0644-262) and the 6 mm adapter, remove the left-side cover w/stator assembly. Note the condition of the gasket. Replace if necessary. Account for the two alignment pins and the position of the shifter bracket for installing purposes.



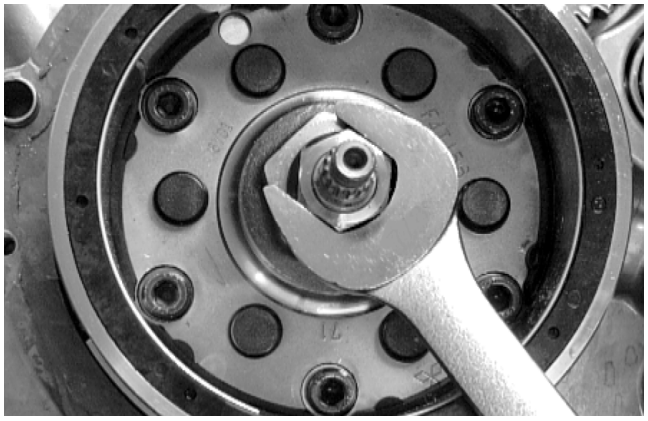
MD1188

■**NOTE: Inspect the inside of the left-side cover for any shaft washers that may have come off with the cover. Make sure they are returned to their respective shafts and that the starter idler gear spacer is on the shaft or in the cover.**

D. Magneto Rotor
E. Starter Motor

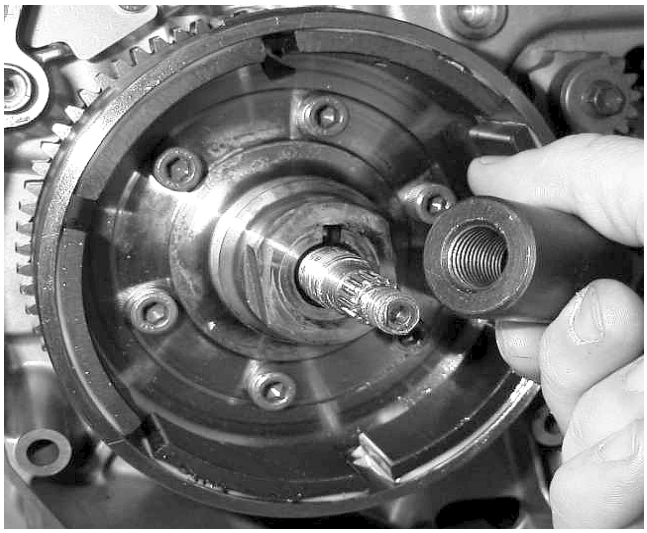
■**NOTE: Steps 1-4 in the preceding sub-section must precede this procedure.**

5. Remove the magneto rotor nut.



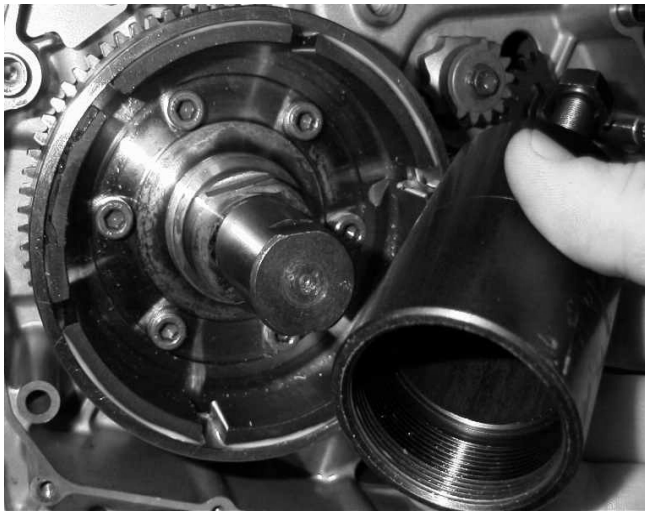
MD1194

6. Install Magneto Rotor Remover Adapter (p/n 0444-075).



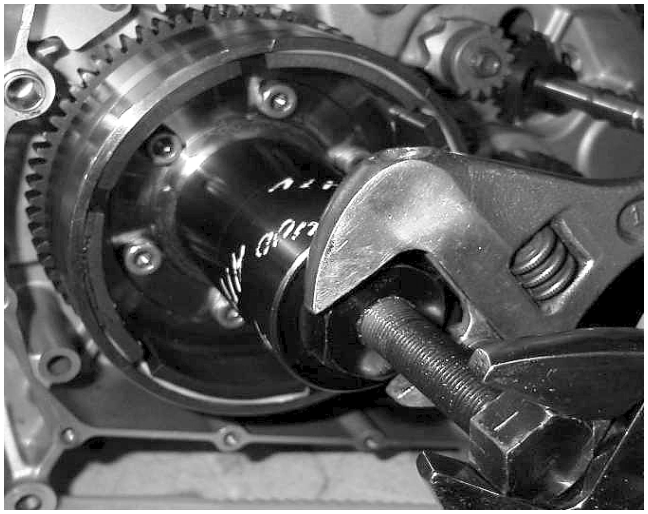
MD1365

7. Using Magneto Rotor Remover (p/n 0444-075), break the rotor assembly loose from the crankshaft. Remove the remover, the adapter, the rotor, and the ring gear. Account for the key.



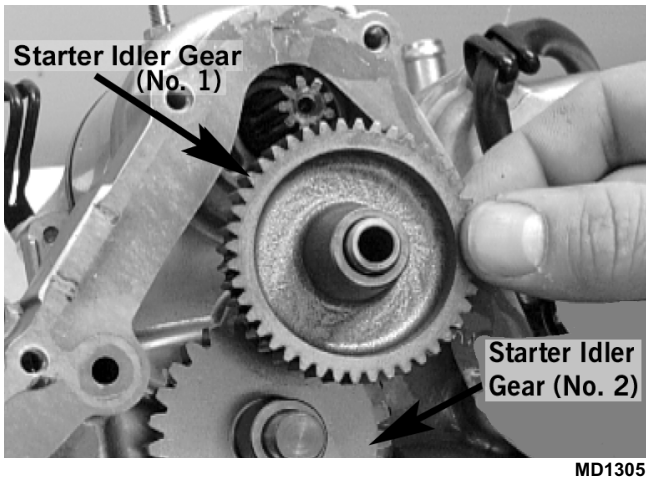
MD1368

MD1369



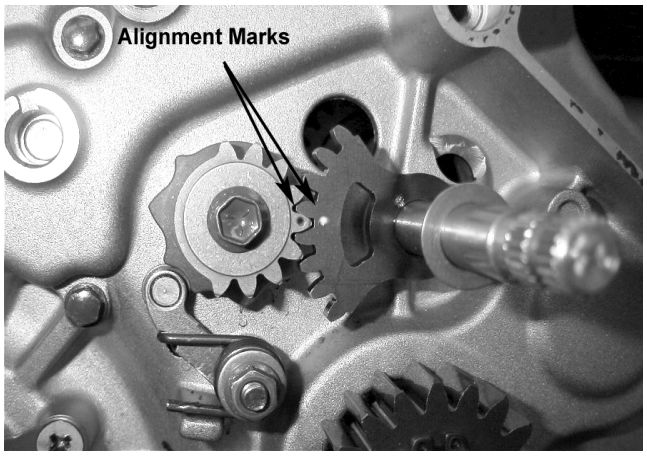
MD1370

8. Remove the starter idler gear (No. 1) and starter idler gear (No. 2).



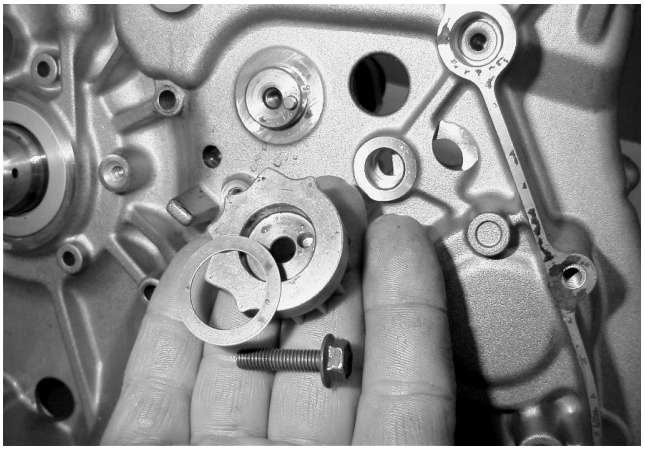
MD1305

9. Remove the gear shift shaft assembly and washer from the left-side crankcase. Note the positions of the alignment marks and washer for installing purposes.



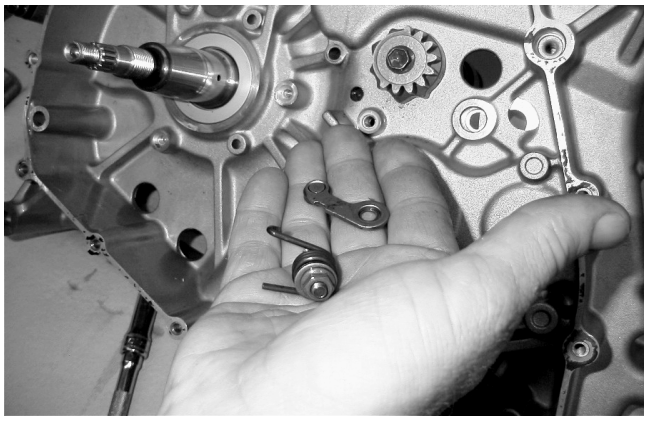
MD1239

10. Remove the shift detent cam. Note position of spacer for installing purposes.

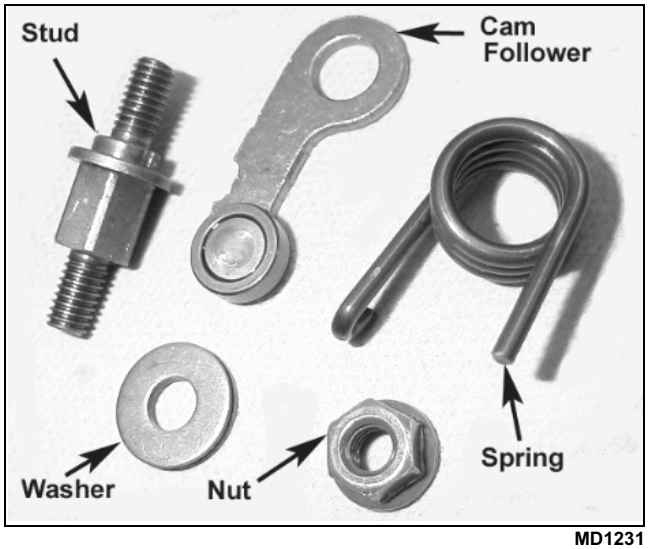


MD1086

11. Remove the cam follower assembly.

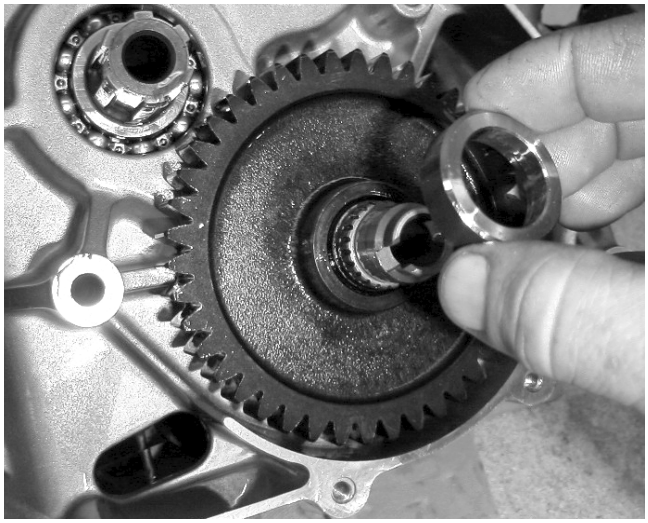


MD1076



MD1231

12. Remove the spacer from the driveshaft noting the direction of the stepped side for installing purposes.

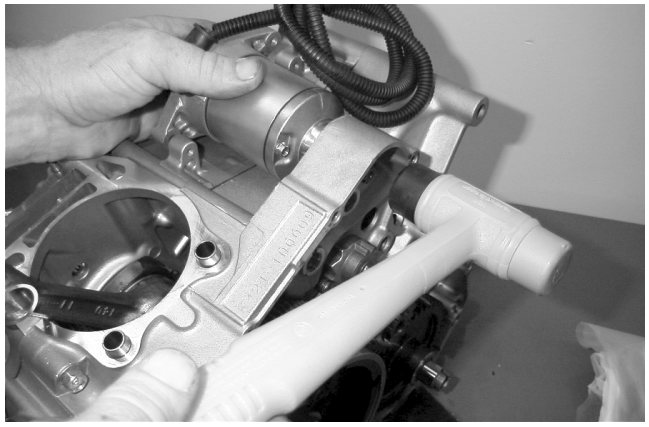


MD1224

13. Remove two starter motor cap screws.

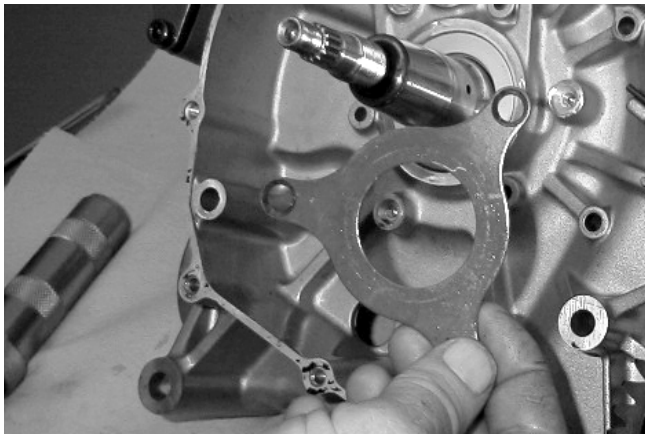
MD1078

14. Remove starter motor by tapping lightly with a mallet.



MD1077

15. Using an impact screwdriver, remove the three Phillips-head screws holding the crankshaft bearing retainer. Remove the crankshaft bearing retainer.



MD1122

Right-Side Components
(375)

☞ AT THIS POINT
To service center crankcase components only, proceed to Removing Right-Side Components.

■ NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.

☞ AT THIS POINT
To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

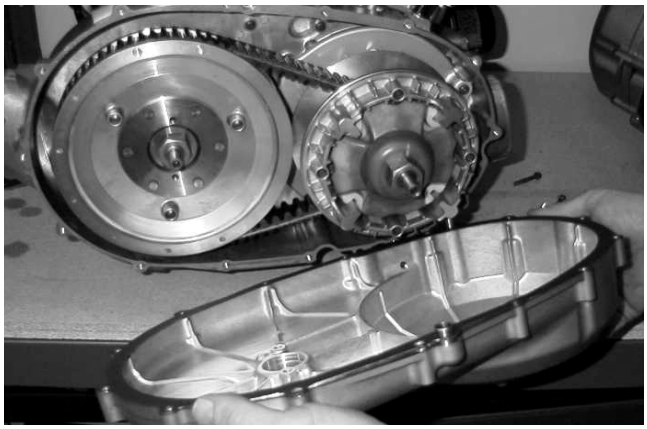
■ NOTE: The engine/transmission does not have to be removed from the frame for this procedure.

Removing Right-Side Components

A. V-Belt Cover
B. Driven Clutch
C. Clutch Cover

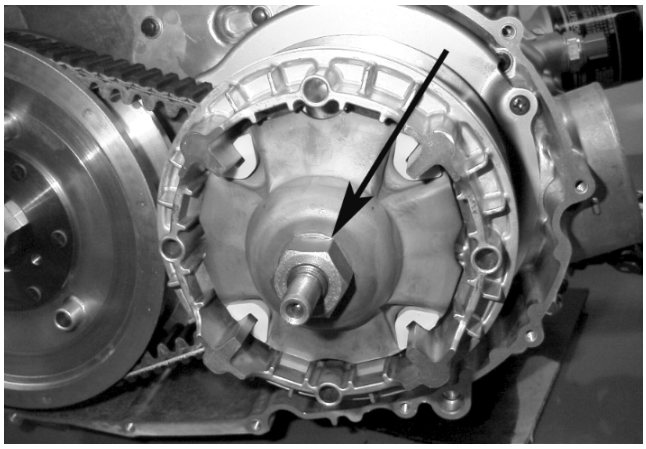
1. If the engine is still in the frame, turn the gas tank valve to the OFF position and lay the ATV on its side. Remove the cap screws securing the right-side V-belt cover to the clutch cover. Remove the cover. Note the locations of the long cap screws and rubber washer and the two wire forms. Account for the gasket and for two alignment pins.

MD1306



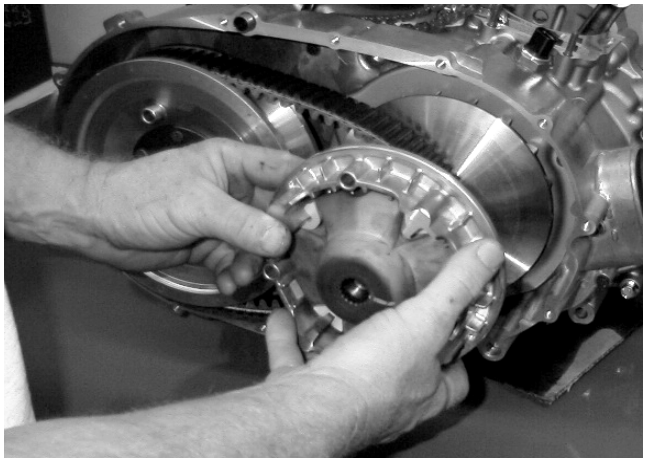
MD1307

2. Remove the nut holding the movable drive face onto the crankshaft.

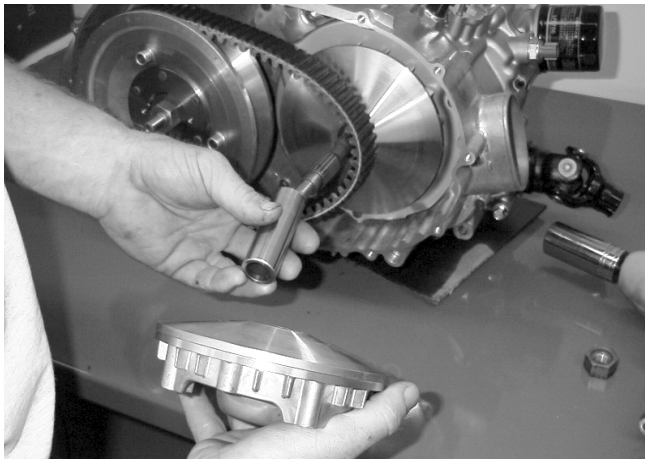


MD1033

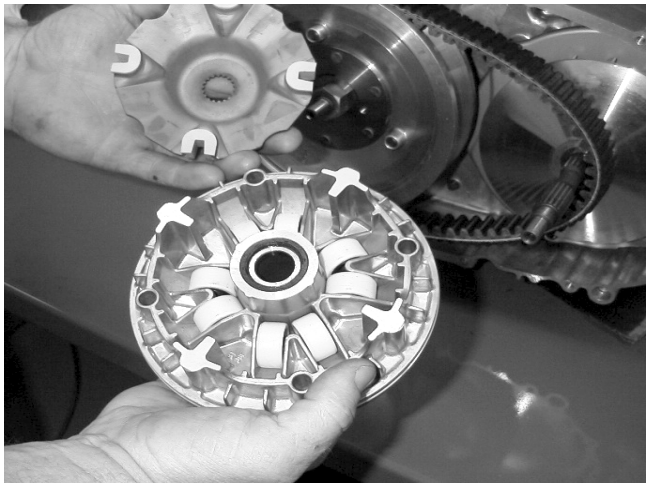
3. Remove the movable drive face and spacer. Account for the eight movable drive face rollers and outer drive face cover.



MD1035

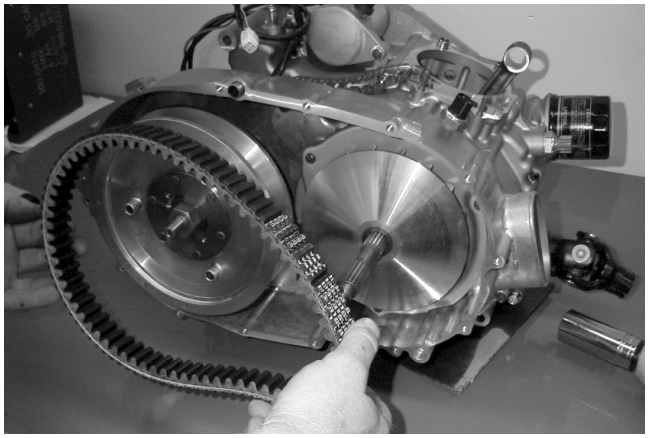


MD1034



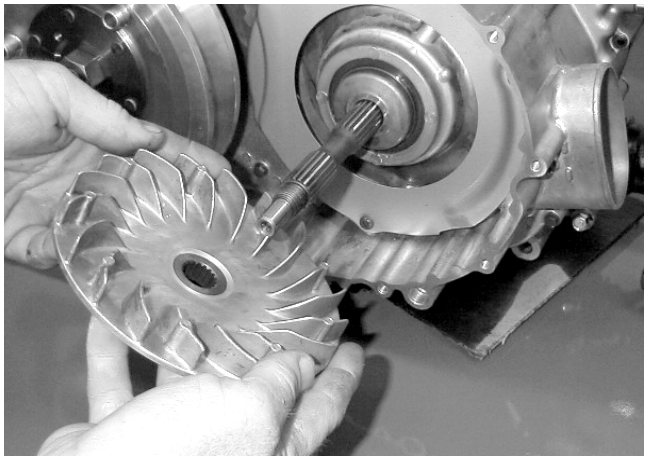
MD1036

4. Remove the V-belt.



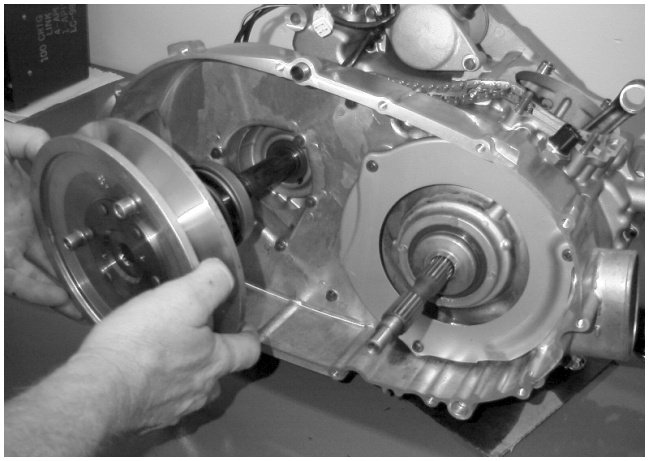
MD1118

5. Remove the fixed drive face.



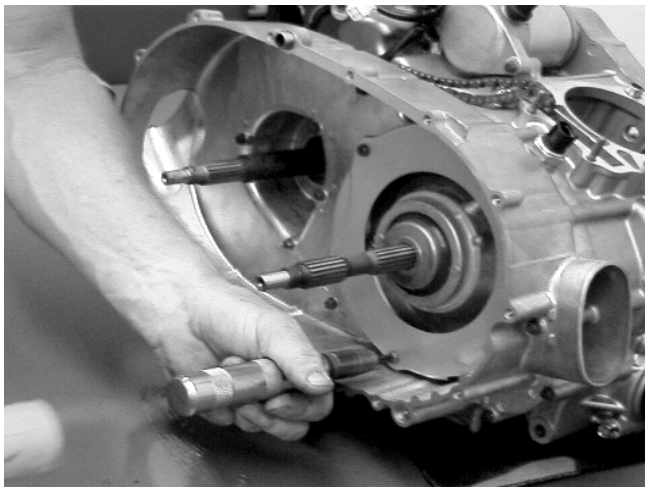
MD1094

6. Remove the nut holding the driven clutch assembly; then remove the driven clutch assembly.



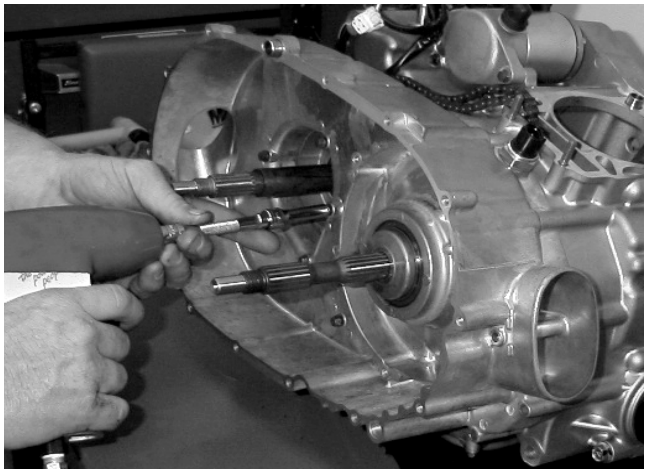
MD1068

7. Using an impact screwdriver, remove the three Phillips-head cap screws holding the air intake plate. Remove the air intake plate.



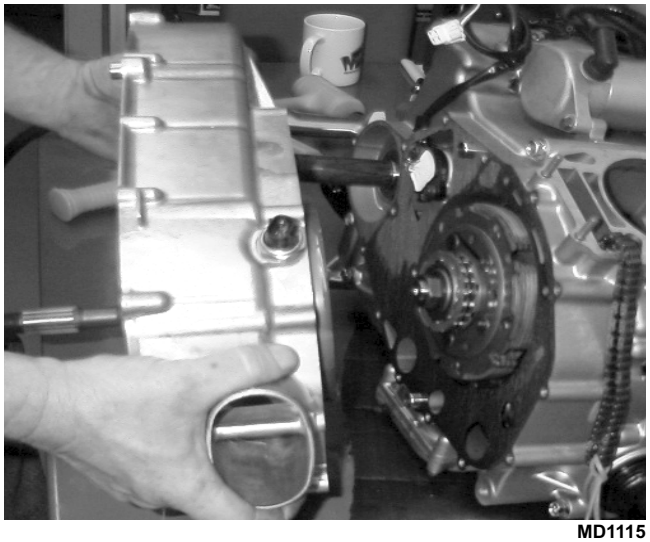
MD1092

8. Remove the cap screws holding the clutch cover onto the right-side crankcase half. Note the positions of the different-lengthed cap screws for installing purposes.



MD1117

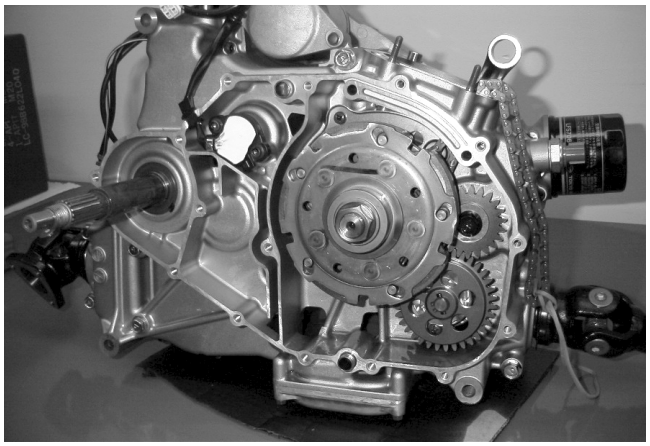
9. Using a rubber mallet, loosen the clutch cover; then pull it away from the right-side crankcase half. Account for two alignment pins and gasket.



MD1115

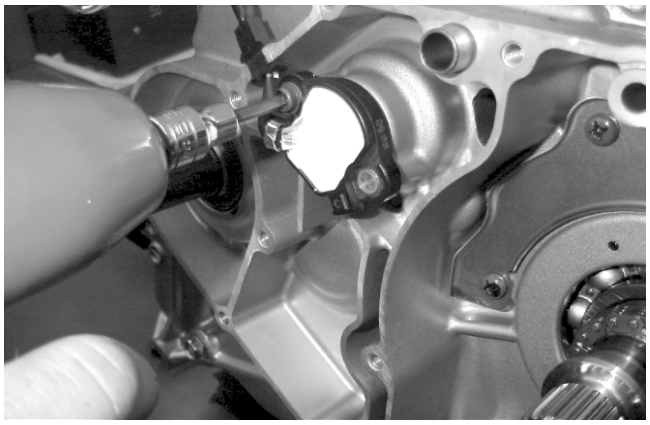
D. Gear Position Switch
E. Centrifugal Clutch Assembly
F. Oil Pump Drive Gear
G. Oil Pump Driven Gear

■**NOTE: Steps 1-9 in the preceding sub-section must precede this procedure.**



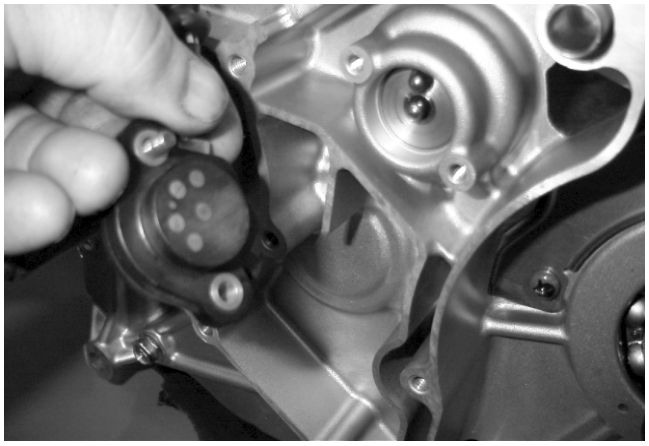
MD1072

10. Remove the cap screws holding the gear position indicator switch onto the right-side crankcase half.

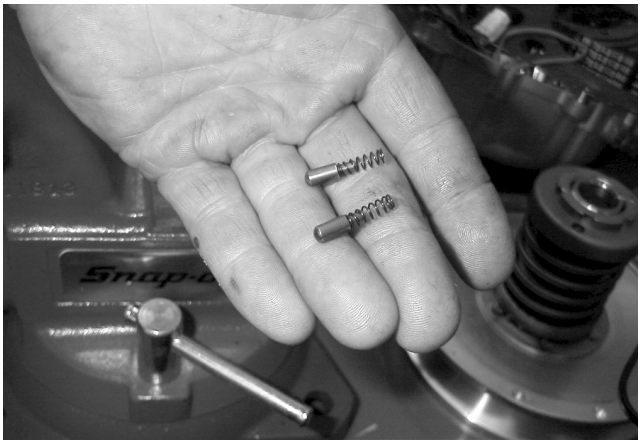


MD1041

11. Remove the gear position indicator switch. Account for two contact pins and two springs.

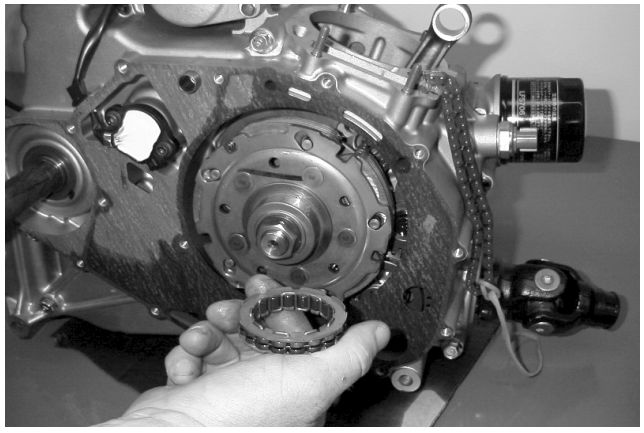


MD1040



MD1043

12. Remove the one-way sprag clutch noting the direction of the green dot or the stamp tag OUTSIDE for installing purposes.

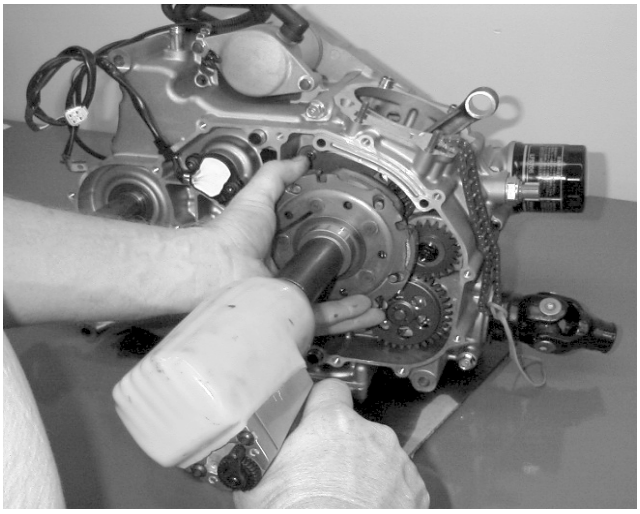


MD1286

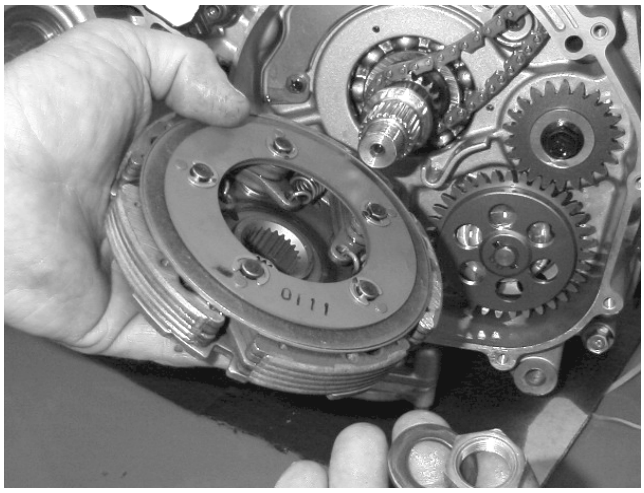
13. Remove the left-hand threaded nut holding the centrifugal clutch assembly.

⚠ CAUTION

Care must be taken when removing the nut; it has "left-hand" threads.



MD1014

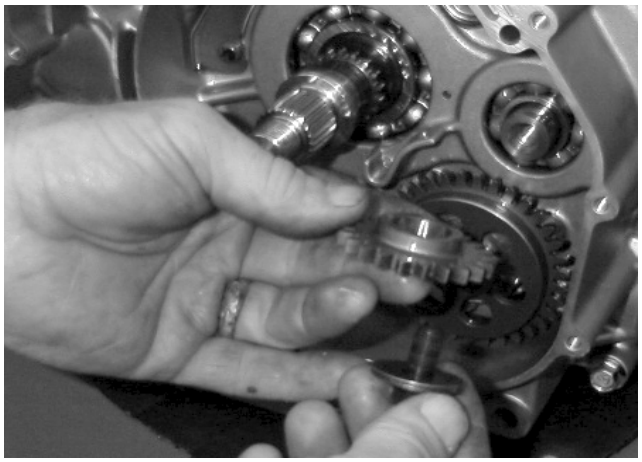


MD1016

14. Remove the oil pump drive gear cap screw.

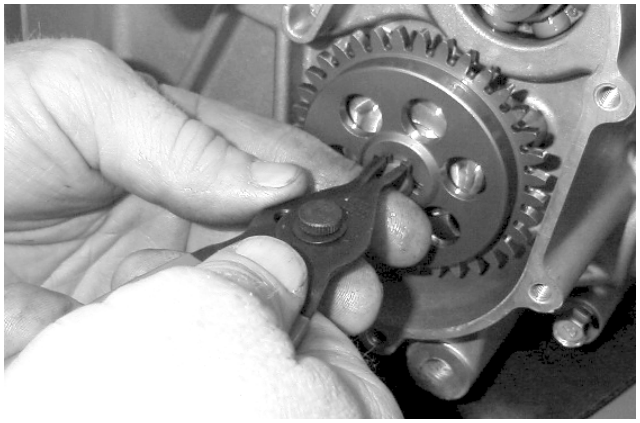
MD1018

15. Remove oil pump drive gear. Account for the pin.



MD1017

16. Remove the snap ring holding the oil pump driven gear.



MD1019

17. Remove oil pump driven gear. Account for the pin.

MD1020

18. Remove the cam chain.

MD1335

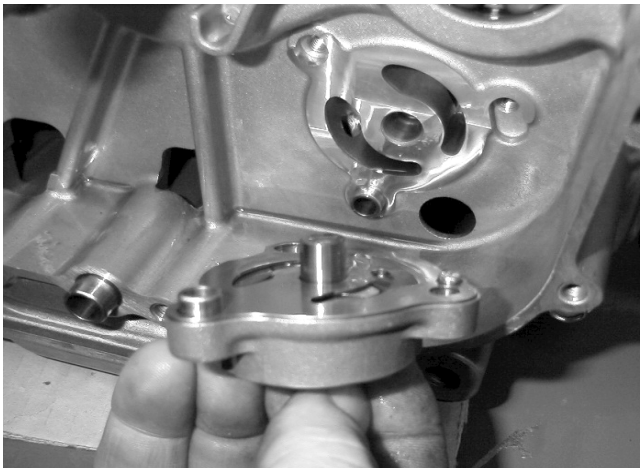
☞ AT THIS POINT
To service clutch components, see Servicing Right-Side Components sub-section.

H. Oil Pump/Oil Strainer

■ **NOTE: Steps 1-18 in the preceding sub-sections must precede this procedure.**

☞ AT THIS POINT
To service cam chain, see Servicing Right-Side Components sub-section.

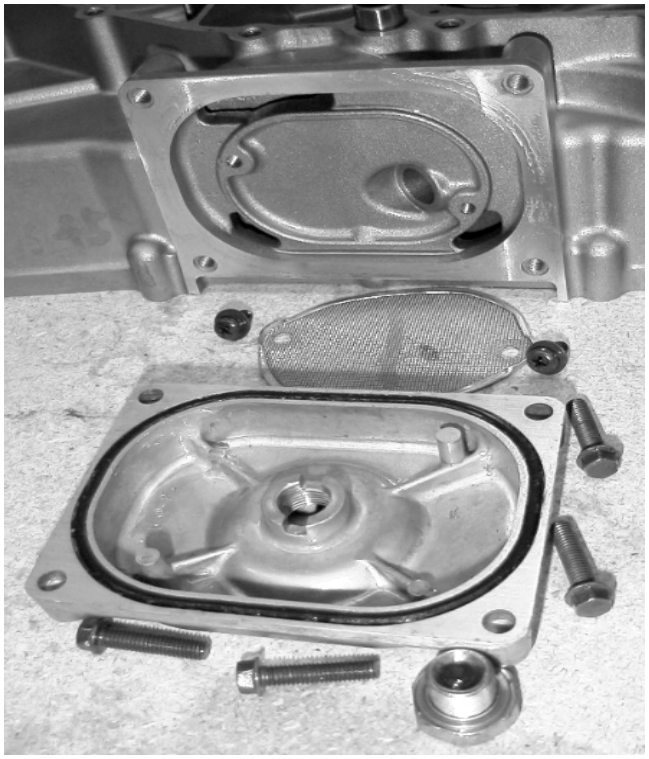
19. Remove three Phillips-head screws holding the oil pump and remove the oil pump. Account for two alignment pins.



MD1060

20. Remove the four cap screws securing the oil strainer cover; then remove the Phillips-head screws securing the oil strainer. Account for O-rings.

■ **NOTE: Note the directional arrow for installing purposes.**



MD1207

☞ AT THIS POINT
To service center crankcase components only, proceed to Separating Crankcase Halves.

Center Crankcase Components

(375)

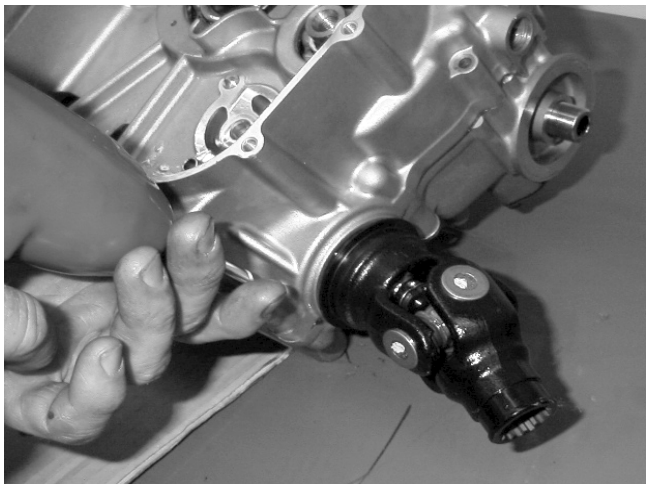
■ **NOTE: This procedure cannot be done with the engine/transmission in the frame. Complete Removing procedures for Top-Side, Left-Side, and Right-Side must precede this procedure.**

■ **NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.**

Separating Crankcase Halves

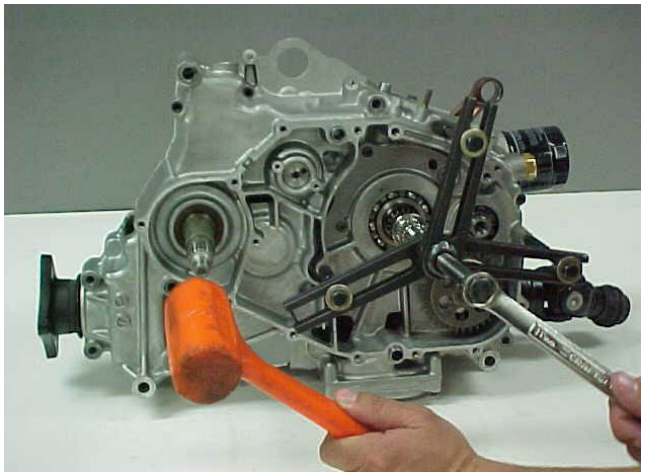
1. Remove the left-side and right-side cap screws securing the crankcase halves noting the position of the different-sized cap screws for joining purposes.

MD1006



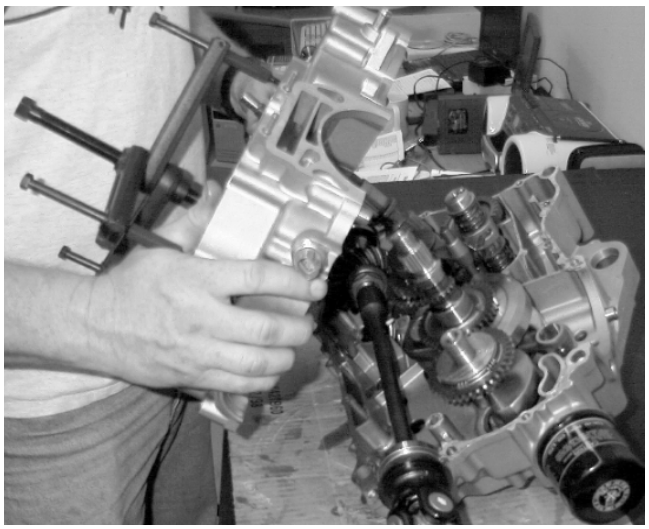
MD1012

2. Using Crankcase Separator/Crankshaft Remover (p/n 0444-009) and tapping lightly with a rubber mallet, separate the crankcase halves. Account for two alignment pins.



CC869

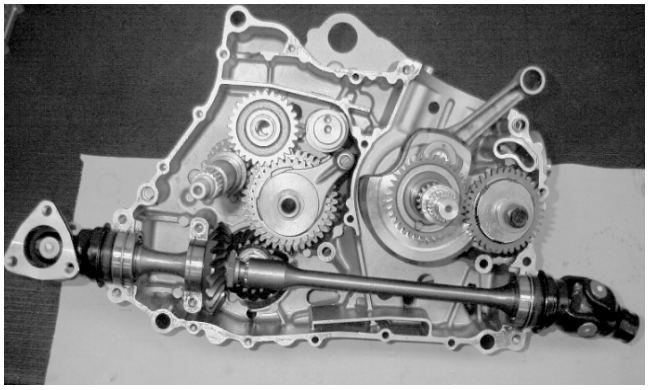
■ **NOTE: To keep the shaft/gear assemblies intact for identification, tap the shafts toward the left-side crankcase half when separating the halves.**



MD1313

Disassembling Crankcase Half

1. Remove the secondary (4x4 models) and primary driveshaft assemblies. Account for the bearing alignment C-ring on the bearing boss next to the pinion gear.



MD1317

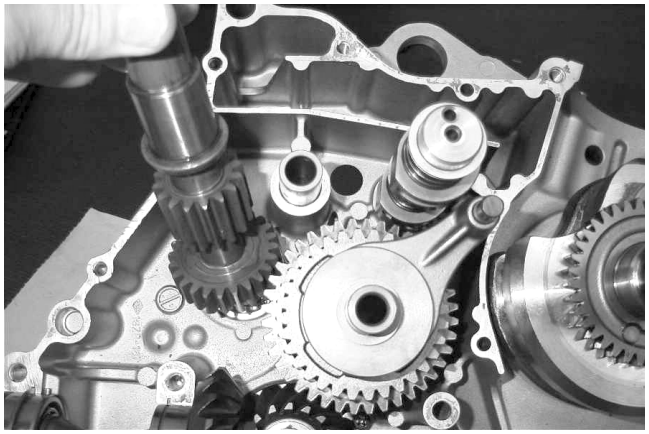
■ **NOTE: On the 4x4, note the location of the bearing alignment pin on the secondary output shaft.**

2. Remove the reverse idler gear, spacer, and sleeve. Account for the washers.

MD1325

CC870

3. Remove the driveshaft.

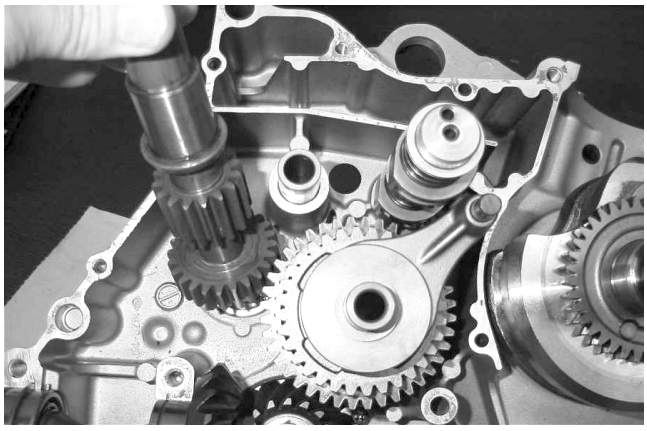


MD1326

4. Remove the shift fork shaft and the outer shift fork.

MD1327

5. Remove snap ring and gear from the output side of the gear cluster. Remove the gear cluster and the inner shift fork together. Account for snap ring, gear, and washer.



MD1328

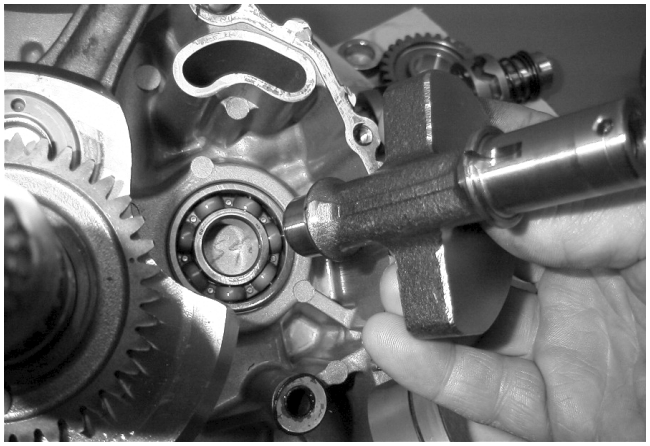
6. Noting the position of the two holes on the end, remove the shift cam assembly. Account for inner and outer washers.

3

MD1329

7. Remove the counterbalance gear. Account for the key and inner and outer thrust washers.

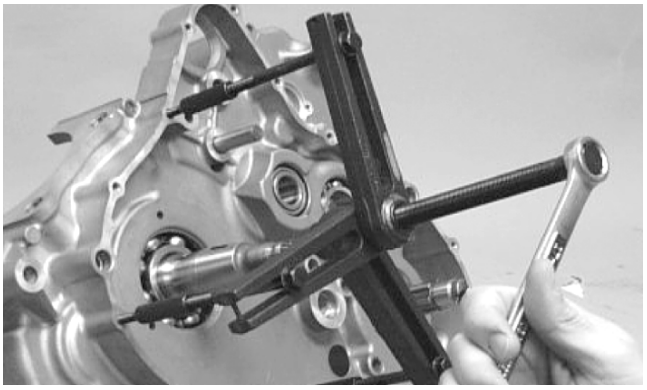
8. Remove the counterbalance shaft.



MD1024

MD1100

9. Using Crankcase Separator/Crankshaft Remover (p/n 0444-009), remove the crankshaft.

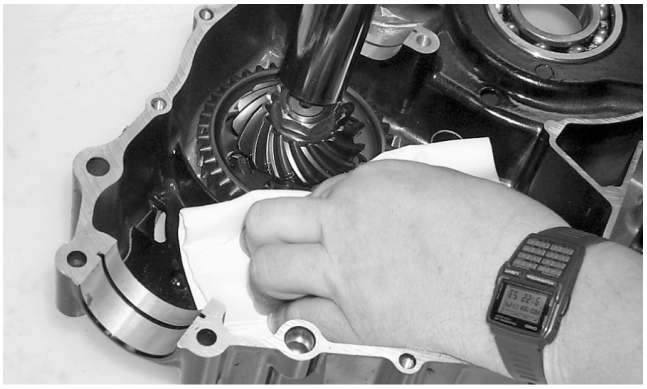


MD1330

⚠ CAUTION

Do not remove the remaining output shaft assembly unless absolutely necessary. If the shaft is removed, the shaft nut must be replaced with a new one and the shaft must be re-shimmed.

10. Remove the secondary drive gear/secondary driven gear retaining nut. From inside the crankcase using a rubber mallet, drive out the output shaft assembly. Account for the output shaft, a shim, a washer, and the nut.



MD1331

☞ AT THIS POINT

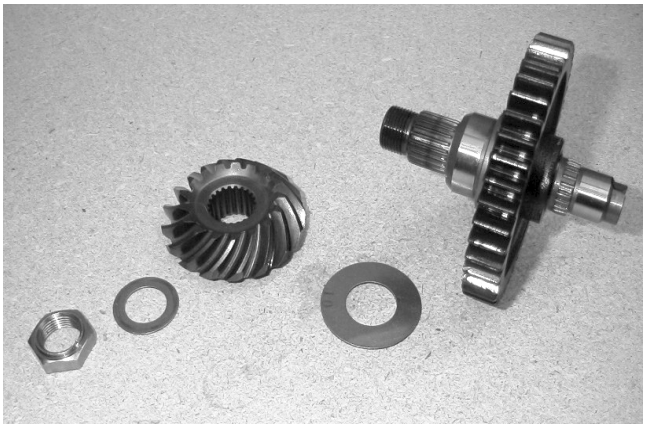
To service crankshaft assembly, see Servicing Center Crankcase Components sub-section.

Assembling Crankcase Half

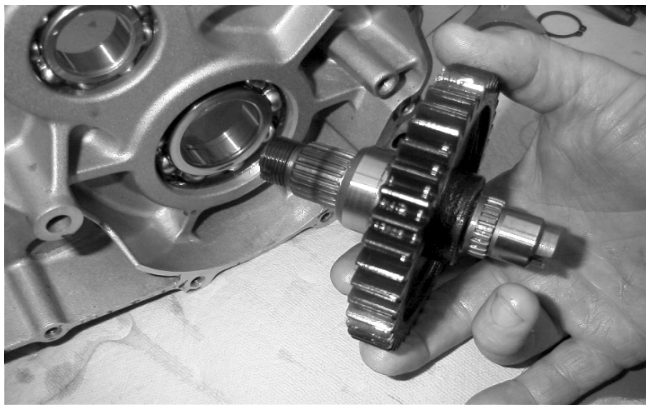
■ NOTE: For ease of assembly, install components on the right-side crankcase half.

■ NOTE: If the output shaft was removed, make sure that the proper shim is installed.

1. Install the output shaft into the crankcase making sure the two gears, shim, washer, and nut are in the correct order.



MD1199



MD1079

2. Apply red Loctite #271 to the threads of the output shaft. Install and tighten the nut to 10 kg-m (72 ft-lb). Using a punch, peen the nut.

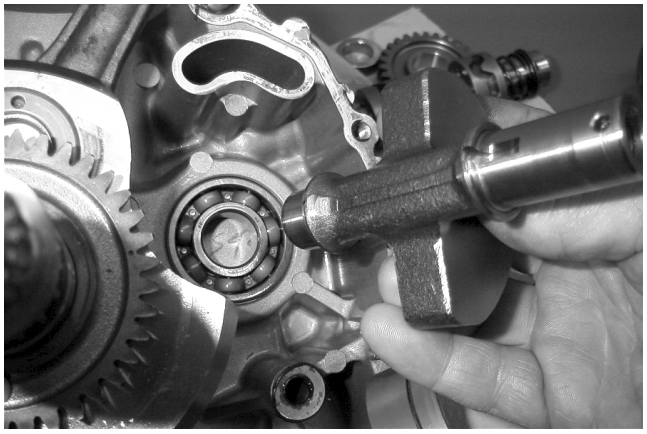
MD1333

3. Apply a liberal amount of oil to the crankshaft bearing. Using a propane torch, heat the bearing until the oil begins to smoke; then slide the crankshaft assembly into place.

MD1334

■ **NOTE: If heating the bearing is not possible, the crankshaft can be installed using a crankshaft installer.**

4. Rotate the crankshaft so the counterweight is toward the rear of the engine. Install the counterbalance shaft.



MD1024

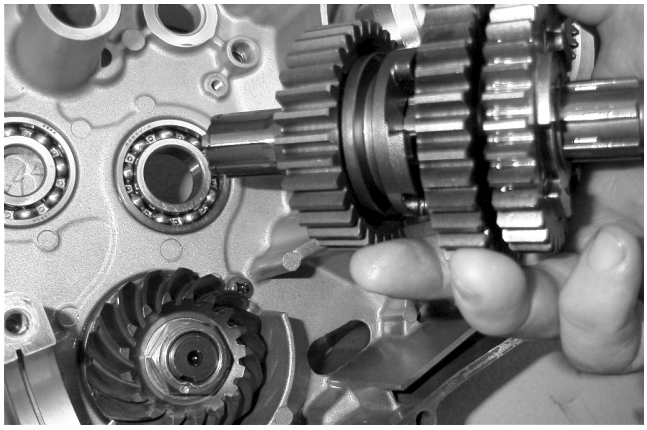
5. Keeping the counterbalance gear timing mark aligned with the the one on the crankshaft gear, install the large thrust washer, key, counterbalance gear, and second large thrust washer.

MD1102

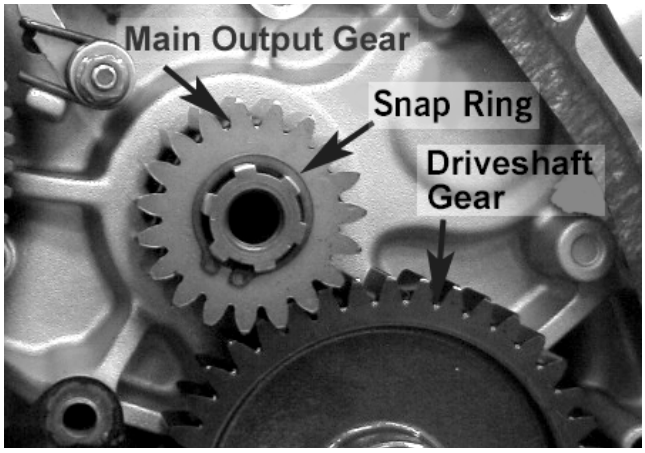
6. Keeping the two holes facing up, install the shift cam and inner and outer washers.

MD1329

7. Align the inner shift fork with the gear cluster and with the inner washer in place, install the gear cluster and inner shift fork. While holding the gear cluster in place, install the washer, gear, and snap ring.



MD1032

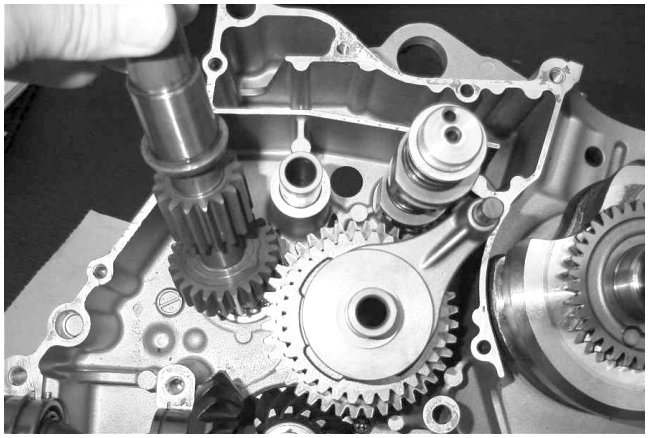


MD1198

8. Install the outer shift fork and the shift fork shaft.

MD1327

9. Install the input driveshaft.



MD1326

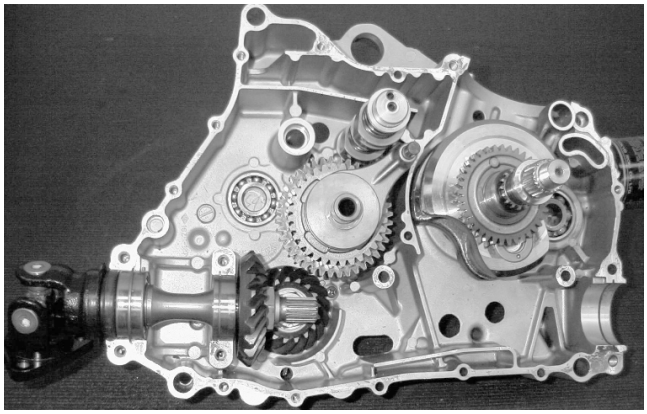
CC870

10. Install the washer, spacer, sleeve, reverse idler gear, and washer.

MD1357

11. Install the secondary (4x4 models) and primary driveshaft assemblies. Account for the bearing alignment C-ring on the bearing boss next to the pinion gear.

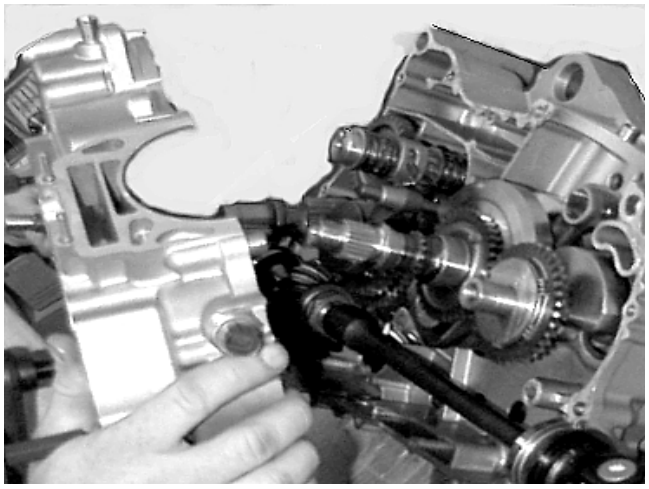
■NOTE: On the 4x4, align the bearing alignment pin on the secondary output shaft.



MD1316

Joining Crankcase Halves

1. Verify that the two alignment pins are in place and that both case halves are clean and grease free. Apply Three Bond Sealant (p/n 0636-070) to the mating surfaces. Place the right-side half onto the left-side half.

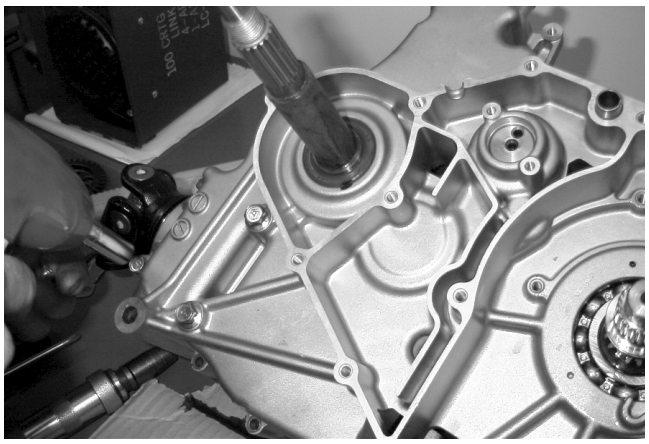


MD1336

2. Using a plastic mallet, lightly tap the case halves together until cap screws can be installed.

3. From the right side, install the crankcase cap screws noting the location of the different-sized cap screws; then tighten only until snug.

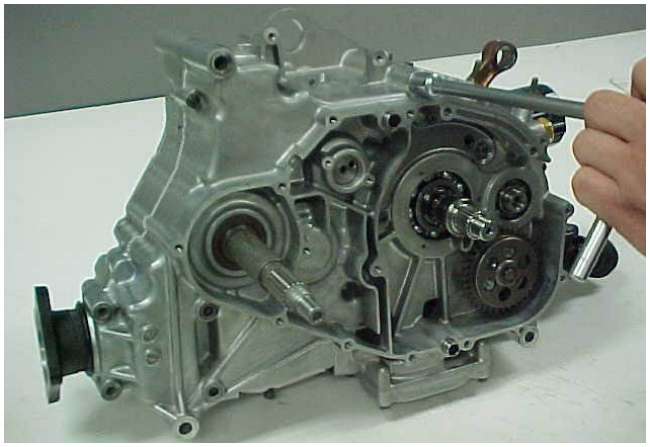
■NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs while tightening the cap screws.



MD1008

4. From the left side, install the remaining crankcase cap screws; then tighten only until snug.

■NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs while tightening the cap screws.



CC871

5. In a crisscross/case-to-case pattern, tighten the 8 mm cap screws until the halves are correctly joined; then tighten to 2-2.4 kg-m (14.5-17 ft-lb).

■NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs.

6. In a crisscross/case-to-case pattern, tighten the 6 mm cap screws to 0.9-1.3 kg-m (6.5-9.5 ft-lb).

■NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs.

☞ AT THIS POINT

After completing center crankcase components, proceed to Installing Right-Side Components, to Installing Left-Side Components, and to Installing Top-Side Components.

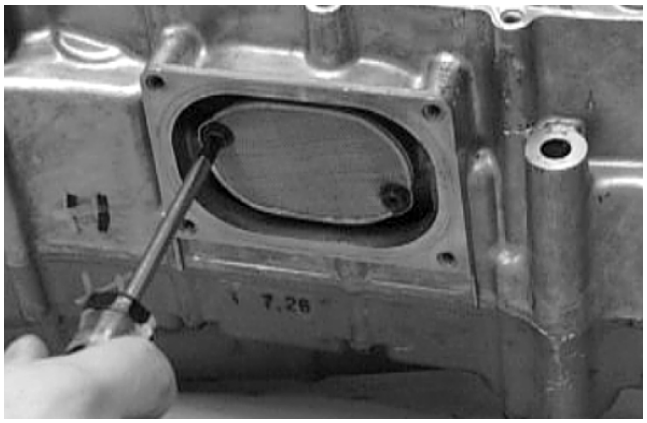
Installing Right-Side Components

A. Oil Strainer/Oil Pump

1. Place the oil strainer and new O-ring into position beneath the crankcase. Tighten the Phillips-head screws (coated with red Loctite #271) securely.

⚠ CAUTION

The legs of the strainer must be directed out.

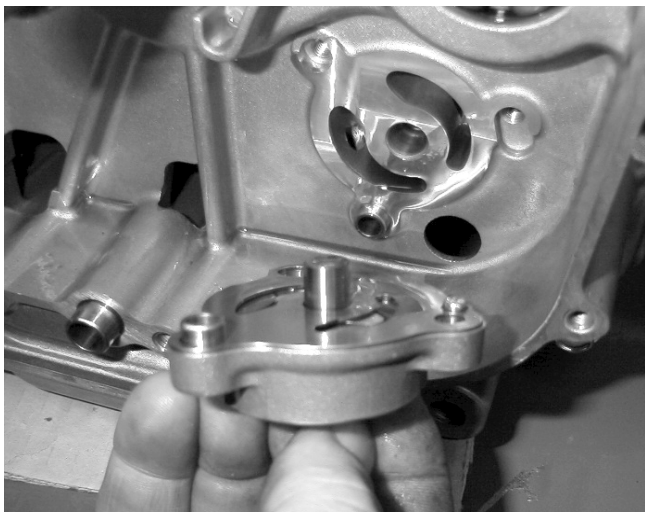


MD1337

2. Noting the directional arrow from removing, place the strainer cover into position on the crankcase making sure the O-ring is properly installed and secure with the four cap screws; then tighten the oil drain plug to 2.2 kg-m (16 ft-lb).

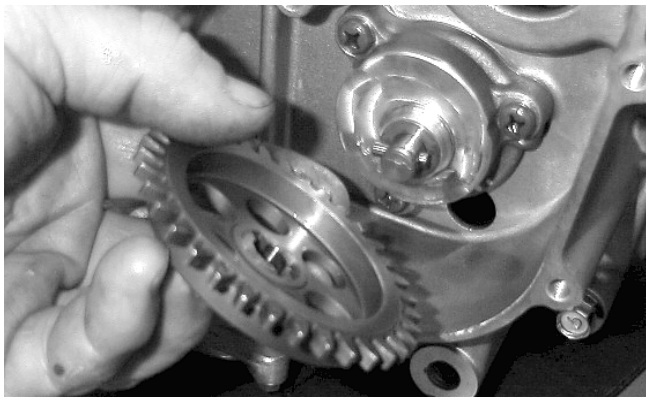
MD1208

3. Place two alignment pins and the oil pump into position on the crankcase and secure with the Phillips-head screws coated with blue Loctite #243. Tighten to 1 kg-m (7 ft-lb).

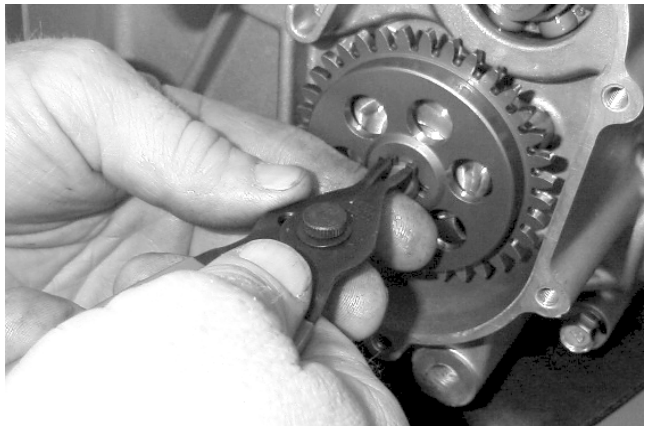


MD1060

4. Place the pin into position on the oil pump shaft, install the oil pump driven gear making sure the recessed side of the gear is directed inward, and secure with the snap ring.



MD1020



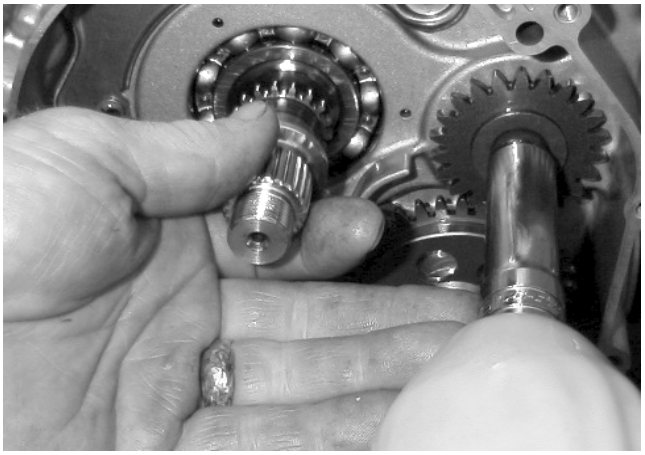
MD1019

5. Install the cam chain.

■ **NOTE: Keep tension on the cam chain to avoid damaging the crankcase boss.**

6. Place the pin into position, install the oil pump drive gear, and tighten the cap screw (coated with red Loctite #271) securely.

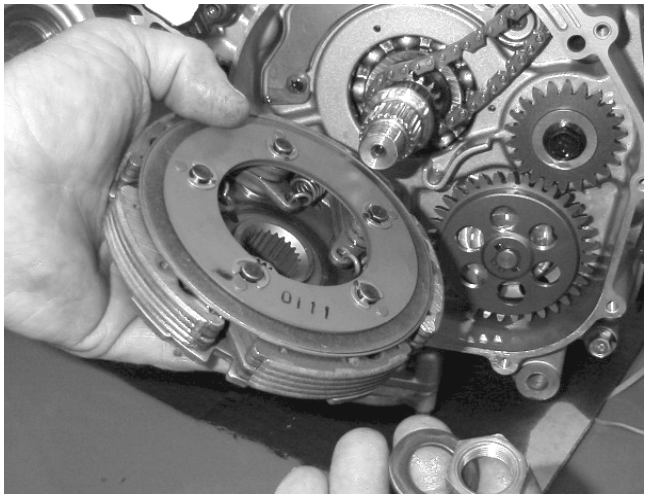
MD1017



MD1018

7. Install the centrifugal clutch assembly and left-hand threaded nut. Tighten securely.

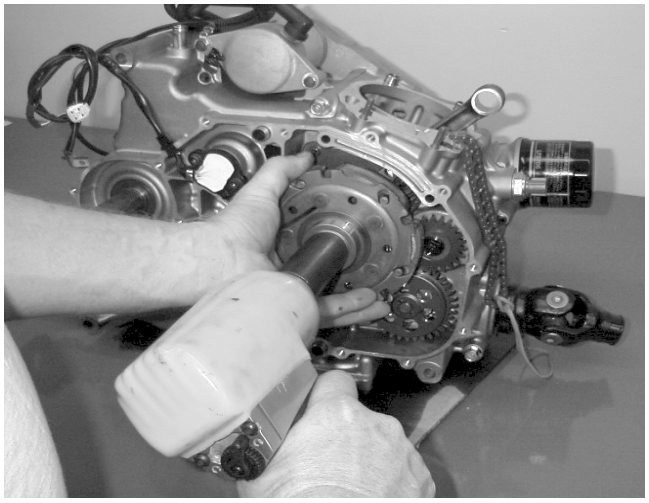
■ **NOTE: The flat side of the left-hand threaded nut should be towards the clutch.**



MD1016

⚠ CAUTION

Care must be taken when installing the nut; it has "left-hand" threads.

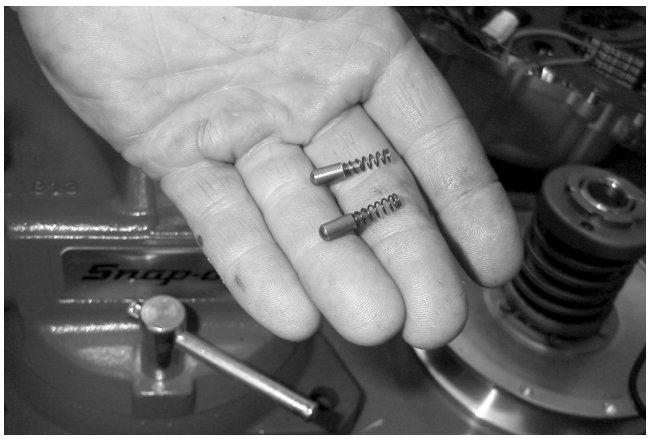


MD1014

8. Install the one-way sprag clutch making sure that the green dot or the stamp tag OUTSIDE is facing out.

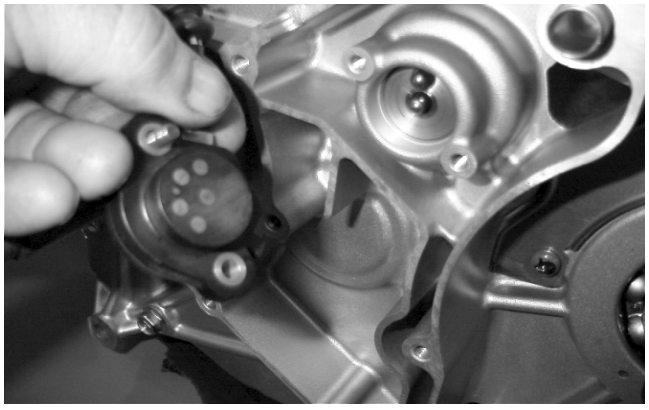
MD1286

9. Install gear position indicator switch contact pins and springs into the end of the shift cam.



MD1043

10. Install gear position indicator switch making sure the O-ring is well-oiled and properly positioned. Tighten cap screws securely.

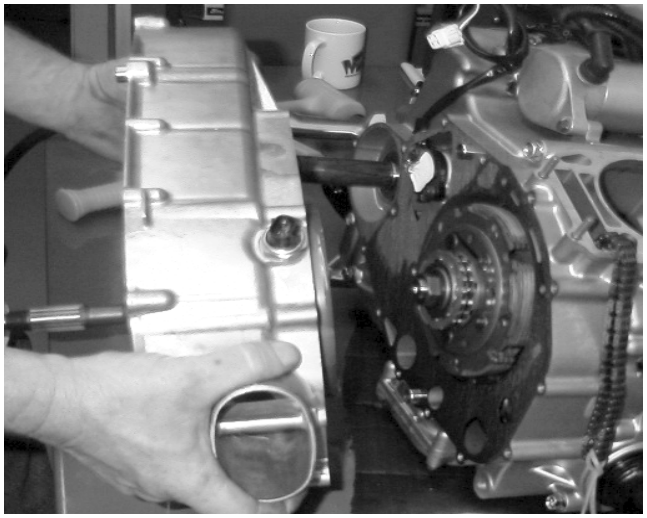


MD1040

B. Clutch Cover
C. Fixed Drive Face
D. Movable Drive Face

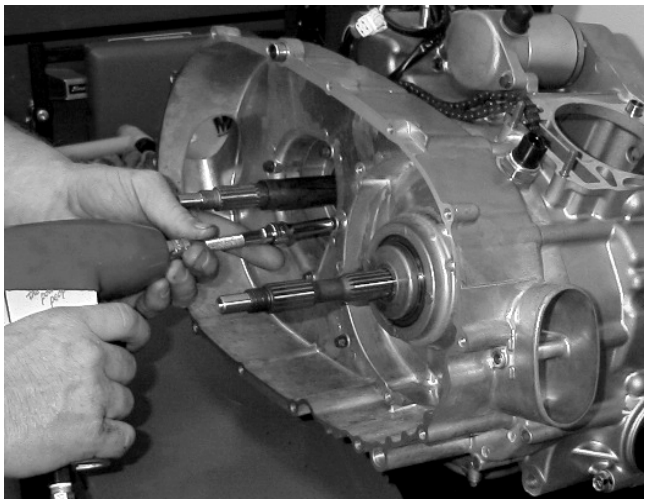
■ **NOTE: Steps 1-10 in the preceding sub-section must precede this procedure.**

11. Install two alignment pins and place the clutch cover gasket into position. Install the clutch cover.



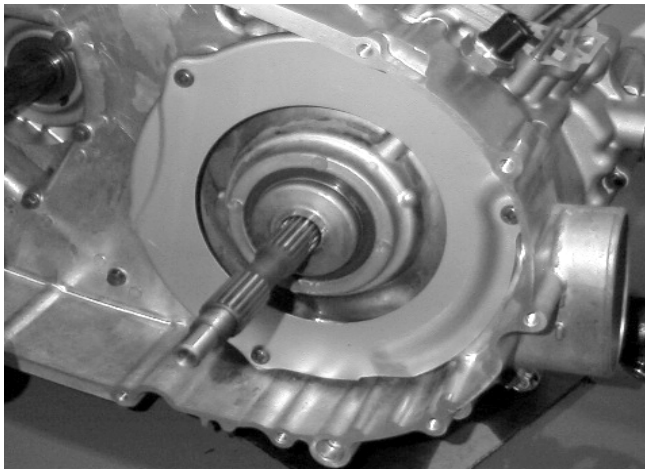
MD1115

12. Tighten the clutch cover cap screws securely.



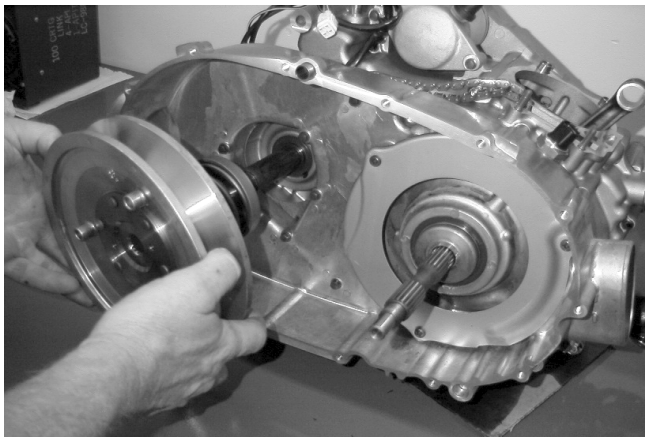
MD1117

13. Install the air intake plate. Apply red Loctite #271 to the threads of the three Phillips-head cap screws; then install and tighten securely.

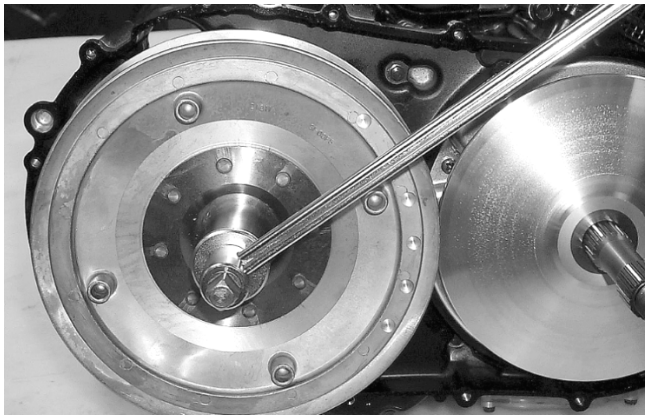


MD1342

14. Place the driven clutch assembly into position and secure with the nut (threads coated with red Loctite #271). Tighten to 10.4-11.8 kg-m (75-85 ft-lb).



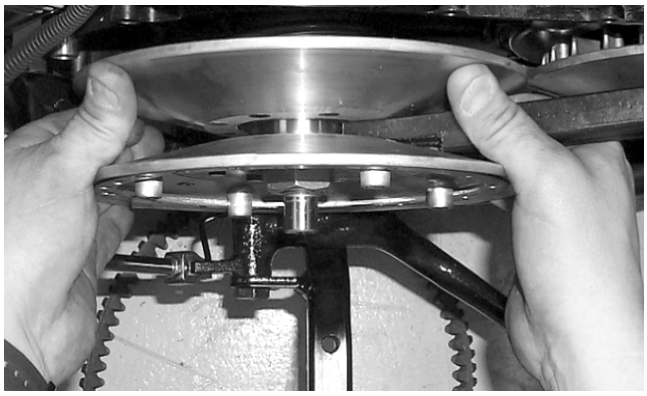
MD1068



MD1339

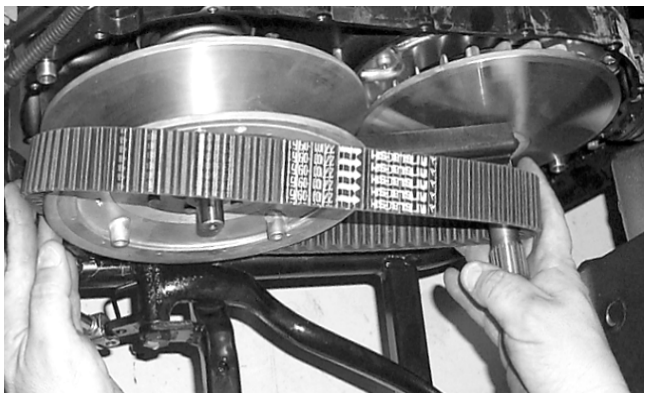
15. Slide the fixed drive face assembly onto the front shaft.

16. Spread the faces of the driven clutch by pushing the inner face toward the engine while turning it counterclockwise; then when the faces are separated, insert a wedge (approximately 3/8 in. thick) between the faces. Release the inner face.



MD1340

17. Place the V-belt into position on the driven clutch and over the front shaft.

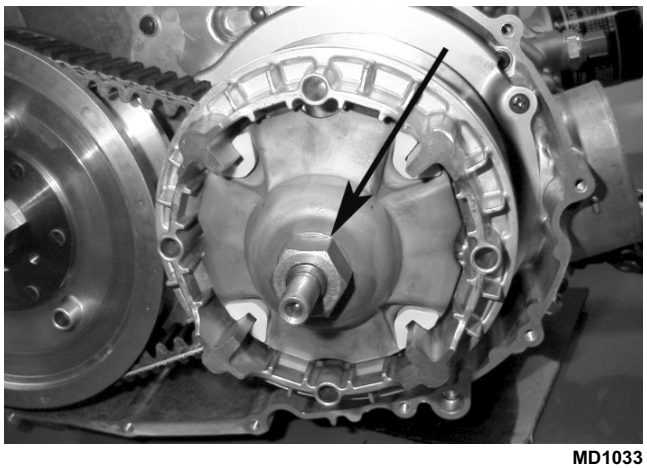


MD1341

■ NOTE: The arrows on the V-belt should point forward.

18. Making sure the eight movable drive face rollers are in position, pinch the V-belt together near its center and slide the spacer and movable drive face onto the shaft. Coat the threads of the nut with red Loctite #271 and secure the movable drive face. Tighten the nut to 10.4-11.8 kg-m (75-85 ft-lb).

MD1338



MD1033

■ NOTE: At this point, the wedge can be removed from between the driven clutch faces.

19. Rotate the V-belt and drive assemblies until the V-belt is flush with the top of the driven clutch.

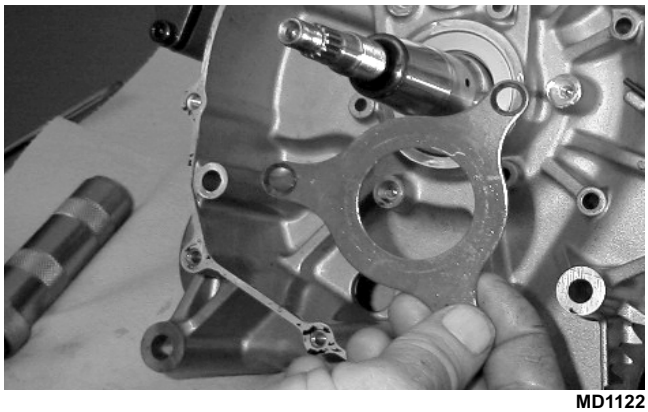
20. Install two alignment pins and place the V-belt cover gasket into position on the clutch cover. Install the V-belt cover noting the position of the long cap screws and rubber washer and two wire forms. In a crisscross pattern, tighten cap screws to 1.1 kg-m (8 ft-lb).

MD1306

Installing Left-Side Components

A. Starter Idler Gears
B. Magneto Rotor

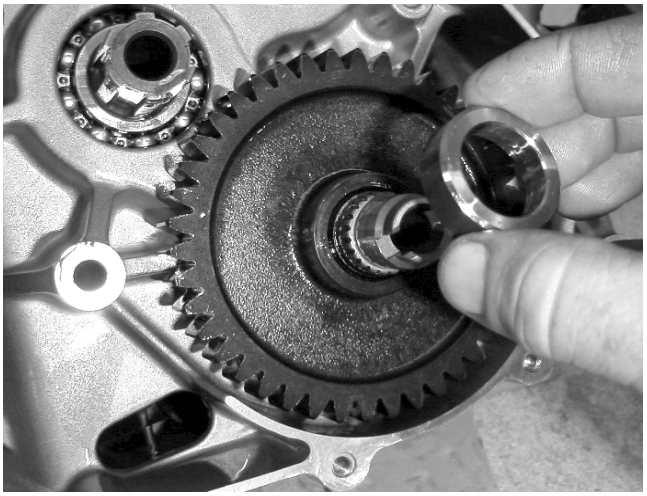
1. Place the crankshaft bearing retainer into position. Apply red Loctite #271 to the three Phillips-head screws. Install and tighten the three Phillips-head screws securely.



MD1122

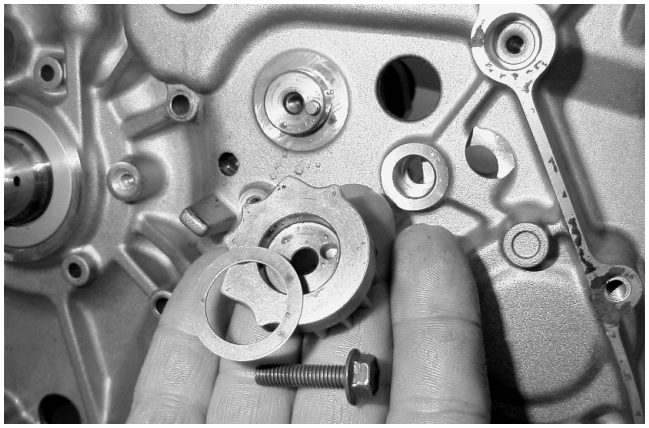
2. Install the starter motor and tighten the two cap screws securely.

3. Install the driveshaft spacer making sure the stepped side is to the inside.



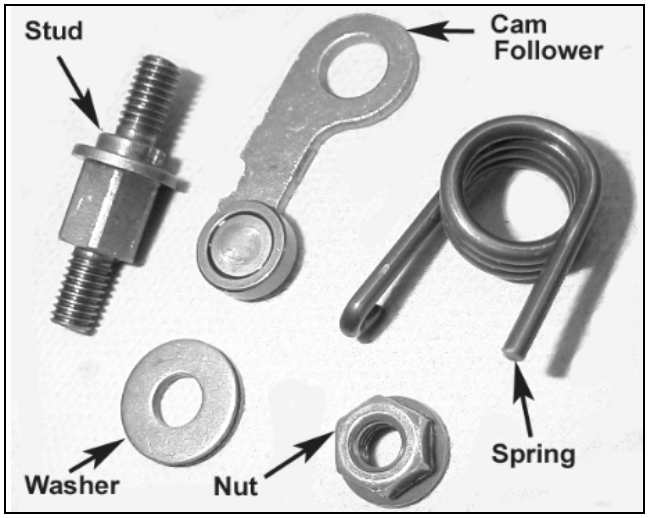
MD1224

4. Install the shift detent cam making sure the spacer is properly positioned.



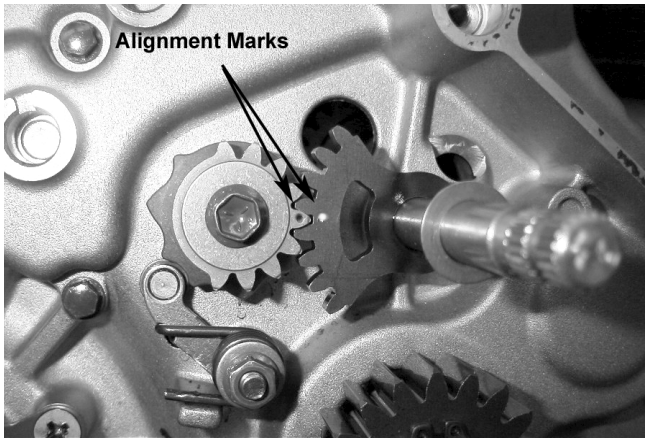
MD1086

5. Install the cam follower assembly.



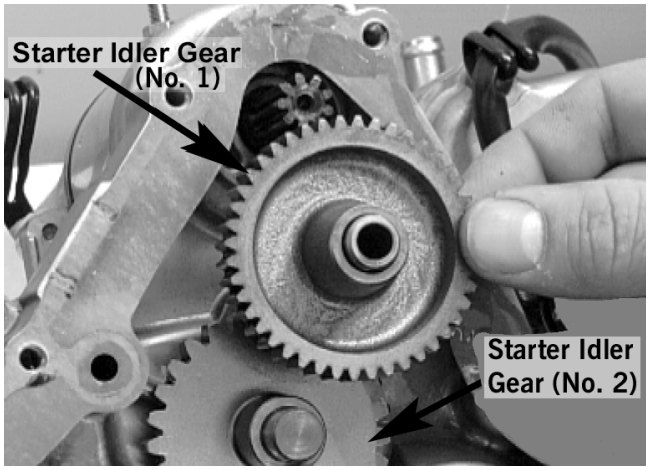
MD1231

6. Install the gear shift shaft assembly and washer making sure to align the alignment marks.



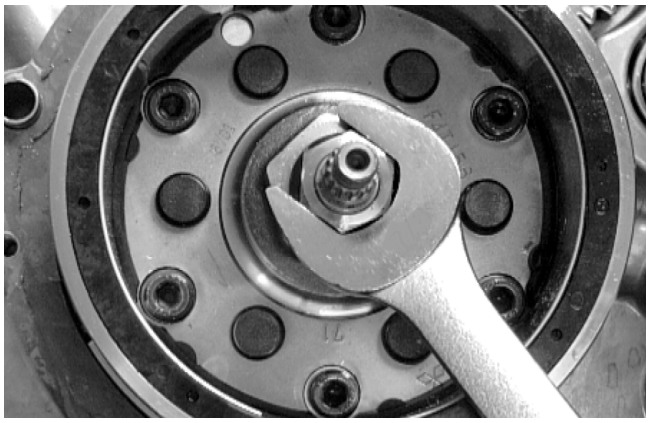
MD1239

7. Install starter idler gear (No. 1) and starter idler gear (No. 2).



MD1305

8. Place the key into its notch; then slide the magneto rotor (with the ring gear in place) over the crankshaft. Tighten the nut to 16 kg-m (116 ft-lb).



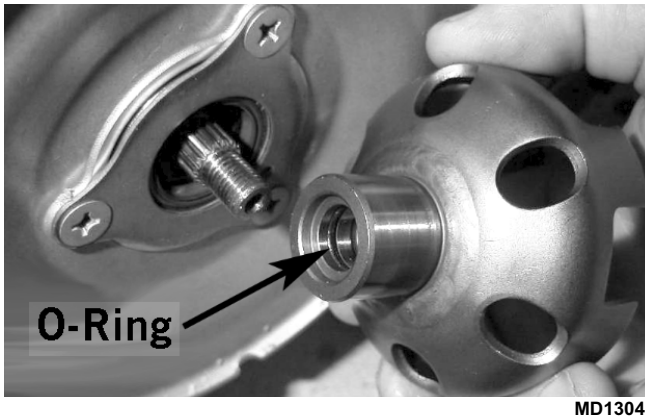
MD1194

C. Cover
D. Recoil Starter

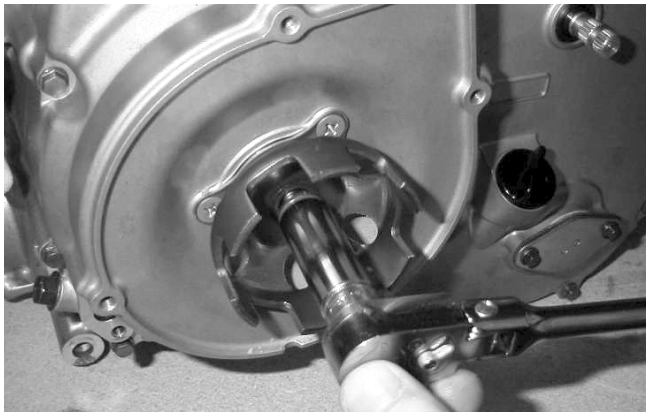
9. Install two alignment pins and place the left-side cover gasket into position. Install the left-side cover. Noting the different-lengthed 6 mm cap screws, the position of the shifter bracket, and the location of the long cap screw with the washer, tighten cap screws in a crisscross pattern to 0.9-1.3 kg-m (6.5-9.5 ft-lb).

MD1186

10. Install the starter cup making sure that the O-ring is in place inside the starter cup. Tighten the nut w/lock washer to 3.5 kg-m (25 ft-lb).



MD1304



MD1303

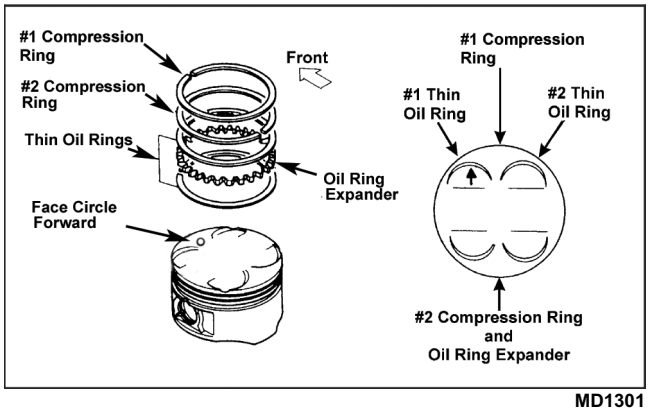
11. Place the gasket, recoil starter assembly, and cover into position on the left-side cover making sure the single washer is properly positioned; then install and tighten the four cap screws to 0.8 kg-m (6 ft-lb).

Installing Top-Side Components

A. Piston
B. Cylinder

■**NOTE: If the piston rings were removed, install them in this sequence.**

A. Install a thin oil ring, corrugated oil ring, and thin oil ring in the bottom groove of the piston. Stagger the gaps of the upper and lower thin rings.

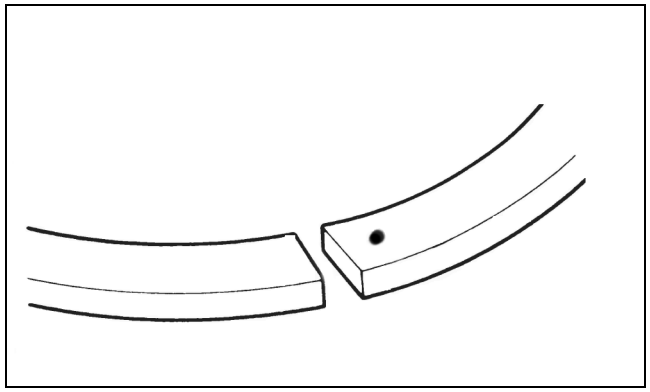


MD1301

■**NOTE: To be installed correctly, the ends of the corrugated oil ring must touch.**

⚠ CAUTION

Install the middle and upper oil rings so the mark on the top surface of each ring faces the dome of the piston.



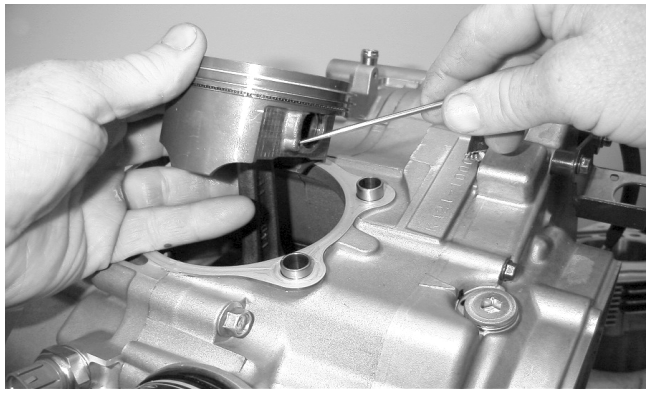
MD1343

⚠ CAUTION

Incorrect installation of the piston rings will result in engine damage.

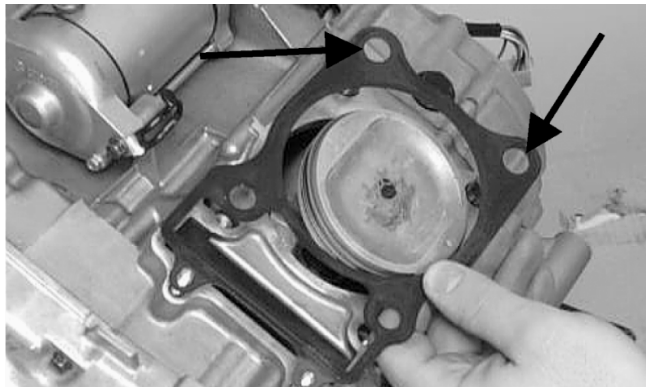
1. Install the piston on the connecting rod making sure there is a circlip on each side and the open end of the circlip faces upwards.

■**NOTE: The piston should be installed so the arrow points towards the front.**



MD1213

2. Place the two alignment pins into position. Place the cylinder gasket into position; then place a piston holder (or suitable substitute) beneath the piston skirt and square the piston in respect to the crankcase.

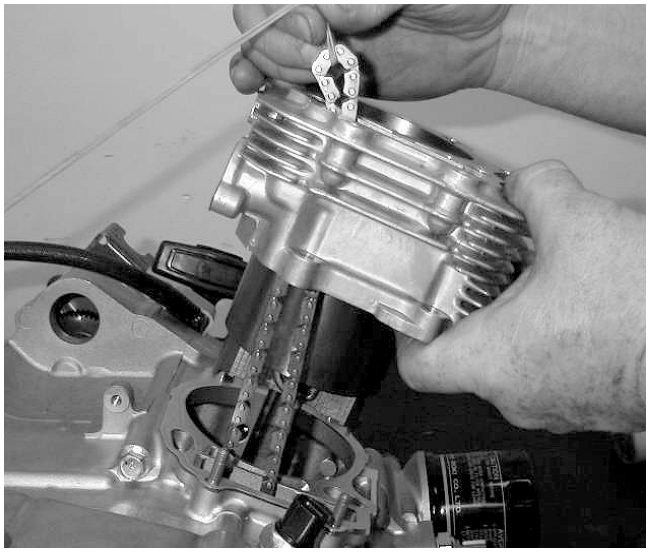


MD1344

3. Lubricate the inside wall of the cylinder; then using a ring compressor or the fingers, compress the rings and slide the cylinder over the piston. Route the cam chain up through the cylinder cam chain housing; then remove the piston holder and seat the cylinder firmly on the crankcase.

⚠ CAUTION

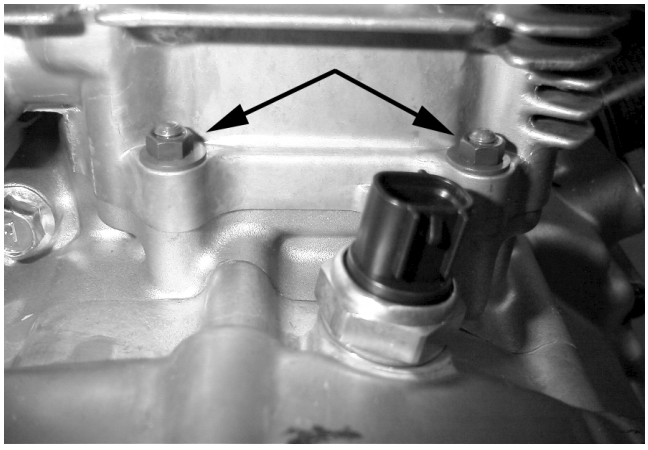
The cylinder should slide on easily. Do not force the cylinder or damage to the piston, rings, cylinder, or crankshaft assembly may occur.



MD1345

4. Loosely install the two nuts with washers which secure the cylinder to the right-side crankcase half.

■NOTE: The two cylinder-to-crankcase nuts will be tightened in step 9.



MD1226

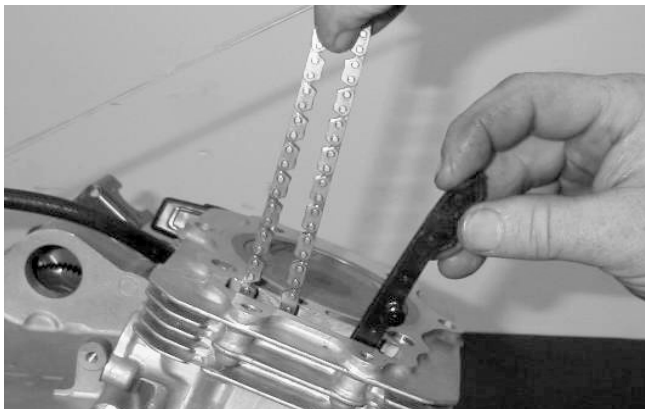
C. Cylinder Head
D. Valve Cover

■NOTE: Steps 1-4 in the preceding sub-section must precede this procedure.

5. While keeping tension on the cam chain, place the front cam chain guide into the cylinder.

⚠ CAUTION

Care should be taken that the bottom of the chain guide is secured in the crankcase boss.

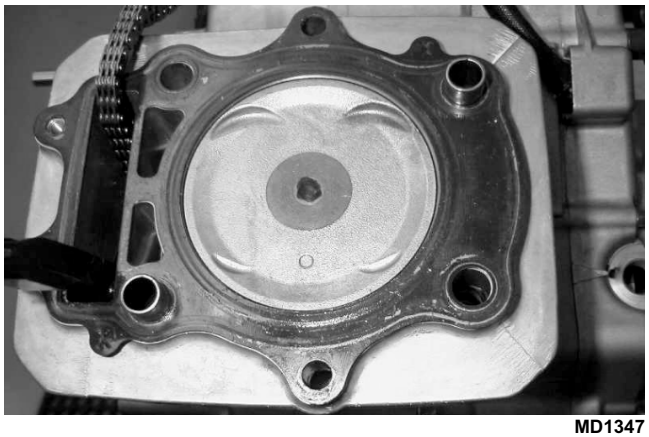


MD1349

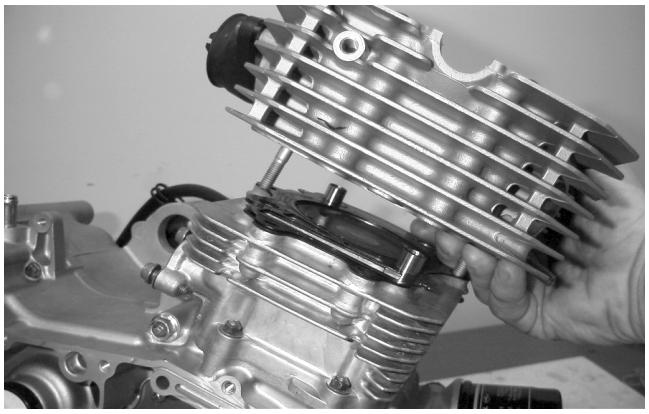
6. Place the head gasket into position on the cylinder. Place the alignment pins into position; then place the head assembly into position on the cylinder making sure the cam chain is routed through the chain cavity.

⚠ CAUTION

Keep tension on the cam chain to avoid damaging the crankcase boss.

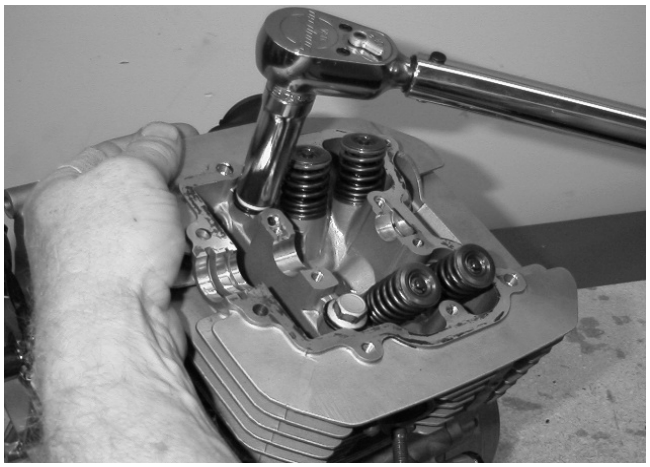


MD1347



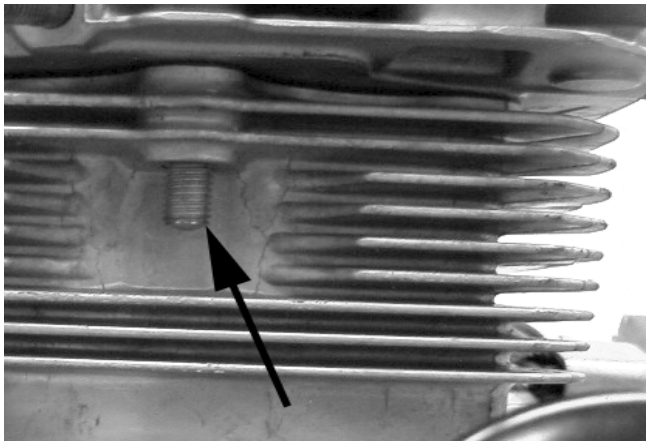
MD1163

7. Install the four cylinder head cap screws with washers. Note that the two cap screws on the right side of the cylinder head nearest the cam sprocket are longer than the two cap screws on the left (spark plug) side. Tighten only until snug.



MD1270

8. Install the two lower nuts securing the cylinder head to the cylinder, one in front and one in rear.

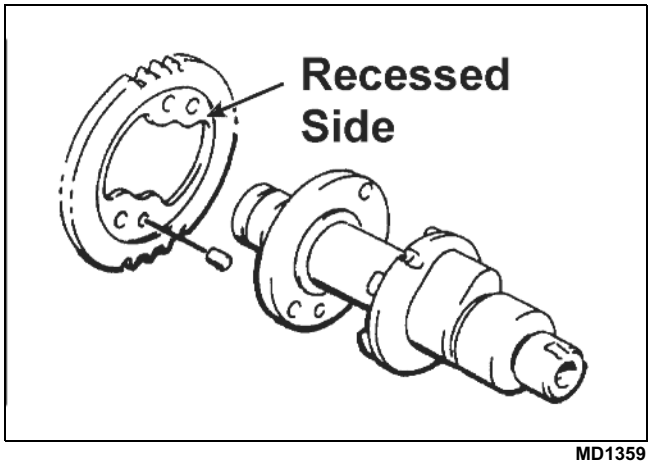


MD1192

9. In a crisscross pattern, tighten the four cylinder head cap screws to 3.8 kg-m (27.5 ft-lb). Tighten the two lower cylinder head nuts to 2.5 kg-m (18 ft-lb) and the cylinder-to-crankcase nuts to 1.1 kg-m (8 ft-lb).

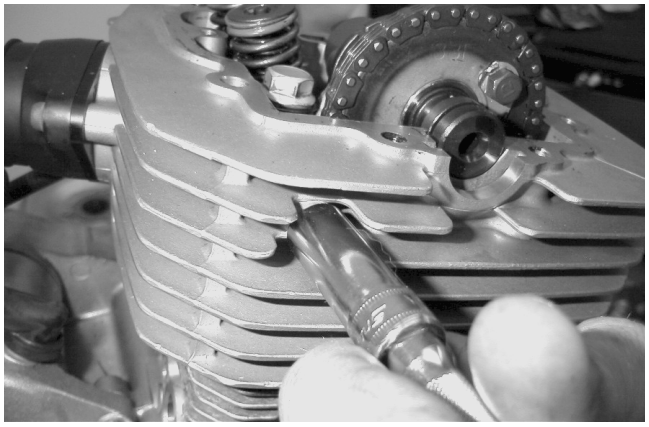
10. With the timing inspection plug removed and the cam chain held tight, rotate the crankshaft until the piston is at top-dead-center.

11. With the alignment pin installed in the camshaft, loosely place the cam sprocket (with the recessed side facing the camshaft lobes) onto the camshaft and place it into position with the cam chain over the sprocket.



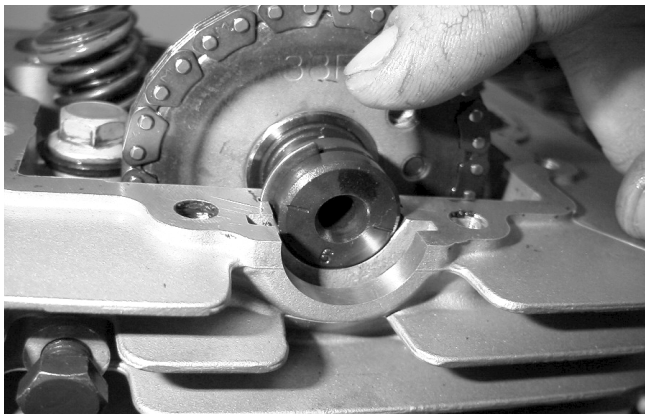
MD1359

12. While holding the cam chain sprocket to the side, install the rear cam chain tensioner guide into the cylinder head. Install the pivot cap screw and washer.



MD1251

13. Place the C-ring into position in its groove in the cylinder head.



MD1131

■ **NOTE: At this point, oil the camshaft bearings, cam lobes, and the three seating journals on the cylinder.**

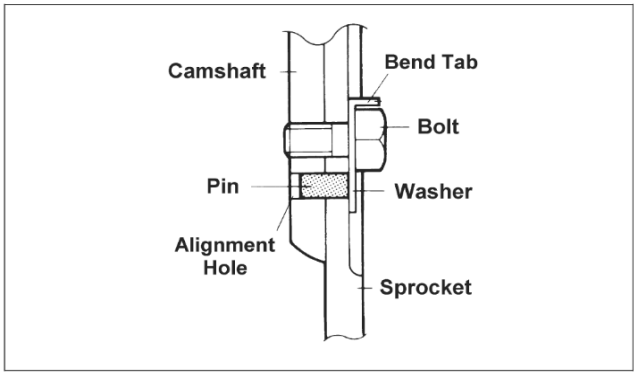
14. With the alignment pin installed in the camshaft and the cam lobes directed down (toward the piston), place the camshaft in position and verify that the timing mark on the magneto is visible through the inspection plug and that the timing marks on the camshaft sprocket are parallel with the valve cover mating surface.

■ NOTE: When the camshaft assembly is seated, make sure the alignment pin in the camshaft aligns with the smallest hole in the sprocket.

MD1362

15. Apply red Loctite #271 to the cap screws; then install the cap screws and tab washer to the camshaft sprocket. Tighten cap screws to 1.5 kg-m (11 ft-lb).

■ NOTE: Place the tab washer on the sprocket making sure it covers the pin in the alignment hole.



MD1363

■ NOTE: Note the position of the alignment marks on the end of the camshaft. They must be parallel with the valve cover mating surface. If rotating the camshaft is necessary for alignment, do not allow the chain and sprocket to rotate and be sure the cam lobes end up in the down position.

16. When the camshaft assembly is seated, ensure the following.

    A. Piston still at top-dead-center.

    B. Camshaft lobes directed down (toward the piston).

    C. Camshaft alignment marks parallel to the valve cover mating surface.

    D. Recessed side of the sprocket directed toward the cam lobes.

    E. Camshaft alignment pin and sprocket alignment hole (smallest) are aligned.

⚠ CAUTION

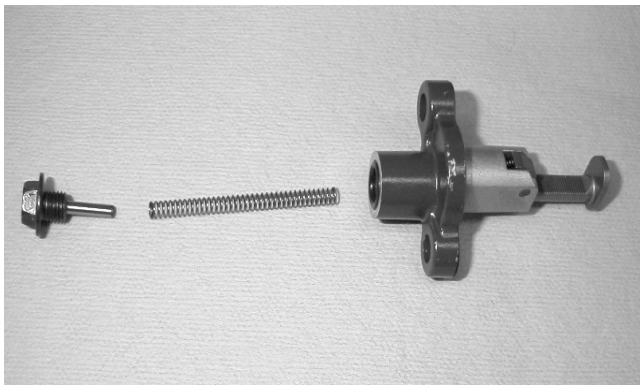
If any of the above factors are not as stated, go back to step 13 and carefully proceed.

⚠ CAUTION

Care must be taken that the tab washer is installed correctly to cover the alignment hole on the sprocket. If the alignment pin falls out, severe engine damage will result.

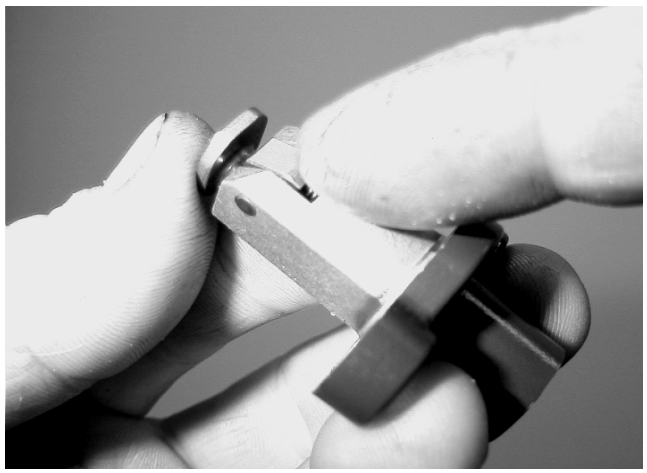
17. Install the cylinder head plug with the open end facing the camshaft.

18. Remove the cap screw from the end of the chain tensioner. Account for the plunger, spring, and O-ring.



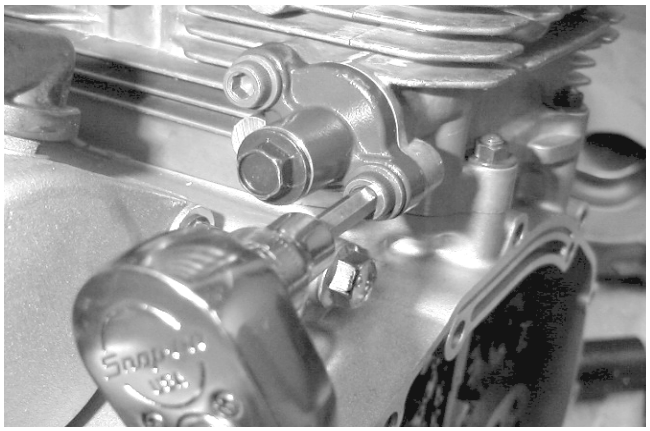
MD1248

19. Depress the spring-loaded lock and push the plunger into the tensioner.



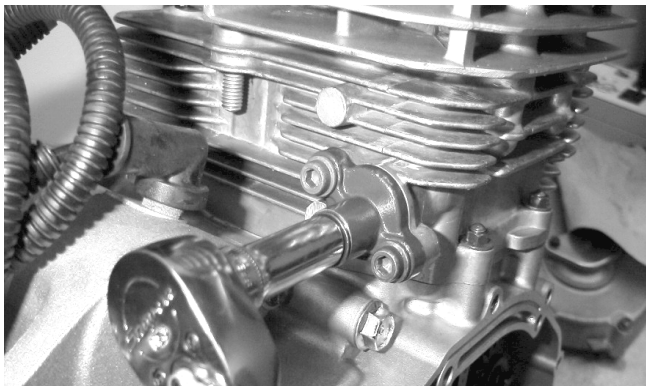
MD1146

20. Place the cam chain tensioner assembly and gasket into the cylinder making sure the ratchet side is facing toward the top of the cylinder and secure with the two Allen-head screws.



MD1254

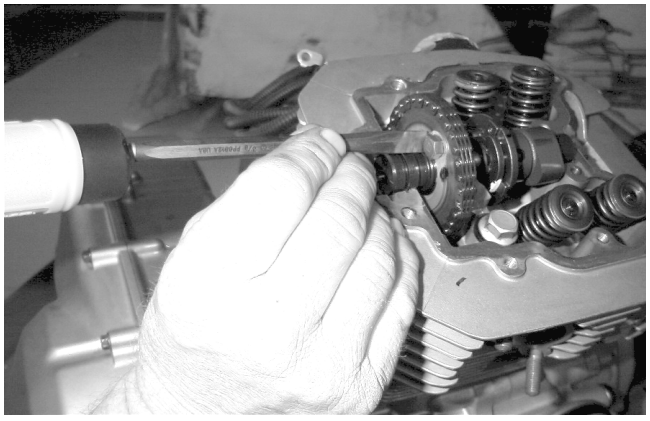
21. Install the cap screw and spring into the end of the cam chain tensioner. Tighten securely.



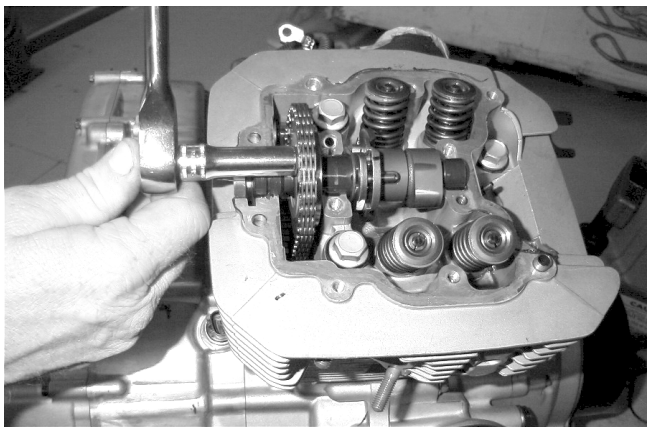
MD1245

22. Rotate the crankshaft until the first cap screw securing the sprocket to the camshaft can be installed; then install the cap screw. Do not tighten at this time.

23. Rotate the crankshaft until the second cap screw securing the sprocket to the camshaft can be installed; then install the cap screw. Do not tighten at this time.



MD1136



MD1137

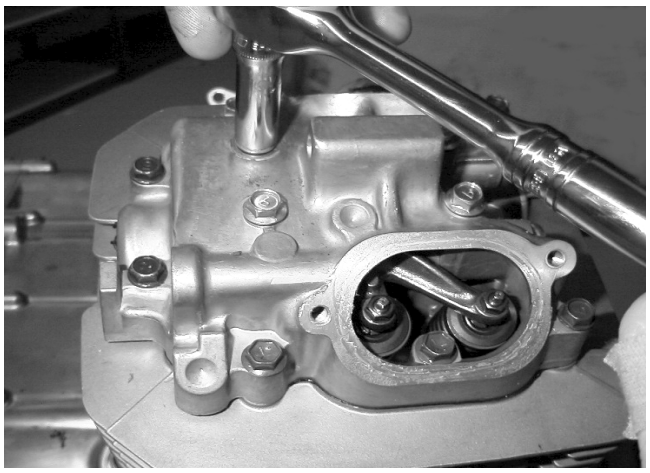
24. Tighten the cap screws (from steps 22 and 23) to 1.15 kg-m (8.5 ft-lb). Bend the washer tabs to secure the cap screws.

25. Loosen the adjuster screw jam nuts; then loosen the adjuster screws on the rocker arms in the valve cover.

26. Apply a thin coat of Three Bond Sealant (p/n 0636-070) to the mating surface of the valve cover; then place the valve cover into position. Note that the two alignment pins are properly positioned.

■ NOTE: At this point, the rocker arms and adjuster screws must not have pressure on them.

27. Install the four top-side cap screws with rubber washers; then install the remaining cap screws. Tighten only until snug.



MD1261

28. In a crisscross pattern starting from the center and working outward, tighten the cap screws (from step 27) to 1 kg-m (7 ft-lb).

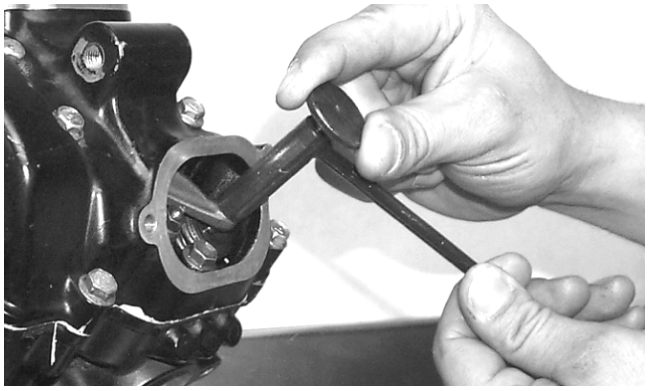
29. Adjust valve/tappet clearance using the following procedure.

■ NOTE: Use Valve Clearance Adjuster (p/n 0444-078) for this procedure.

A. Turn the engine over until the piston reaches top-dead-center on the compression stroke.

B. Place the valve adjuster onto the jam nut securing the tappet adjuster screw; then rotate the valve adjuster dial clockwise until the end is seated in the tappet adjuster screw.

C. While holding the valve adjuster dial in place, use the valve adjuster handle and loosen the jam nut; then rotate the tappet adjuster screw clockwise until friction is felt.



MD1364

D. Align the valve adjuster handle with one of the marks on the valve adjuster dial.

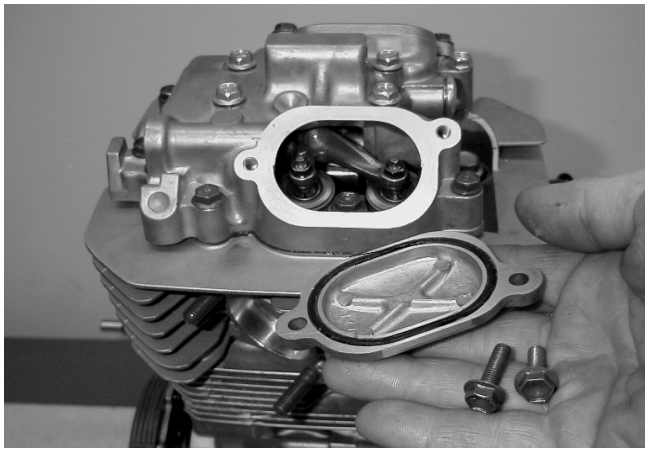
E. While holding the valve adjuster handle in place, rotate the valve adjuster dial counterclockwise until proper valve/tappet clearance is attained.

■NOTE: Refer to the appropriate Specifications for the proper valve/tappet clearance.

■NOTE: Rotating the valve adjuster dial counter-clockwise will open the valve/tappet clearance by 0.05 mm (0.002 in.) per mark.

F. While holding the adjuster dial at the proper clearance setting, tighten the jam nut securely with the valve adjuster handle.

30. Place the two tappet covers with O-rings into position; then install and tighten the cap screws securely.



MD1264

31. Install the spark plug and tighten to 1.7 kg-m (12 ft-lb); then install the timing inspection plug.

Top-Side Components
(500 Automatic)

■NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.

☞ AT THIS POINT
To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

■NOTE: The engine/transmission does not have to removed from the frame for this procedure.

Removing Top-Side Components

A. Valve Cover
B. Cylinder Head

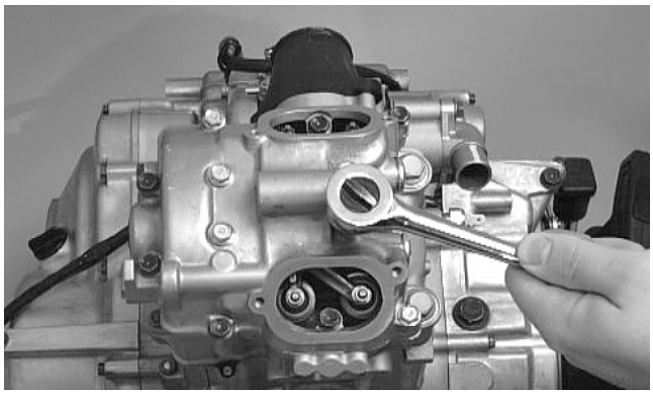
■NOTE: Remove the spark plug and timing inspection plug; then using the recoil starter, rotate the crankshaft to top-dead-center of the compression stroke.

1. Remove the two tappet covers.

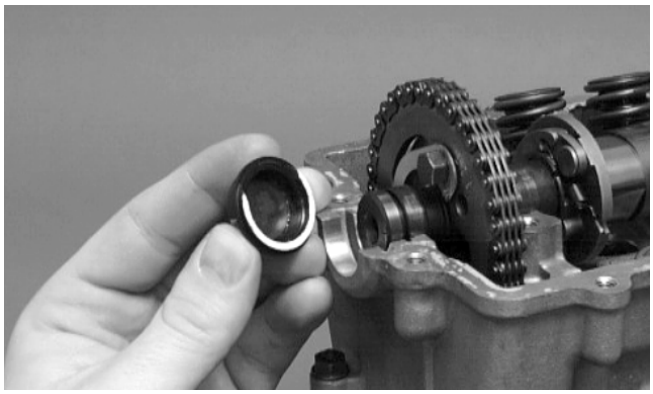
CC001D

■NOTE: Keep the mounting hardware with the covers for assembly purposes or thread them back into the head to keep them separated.

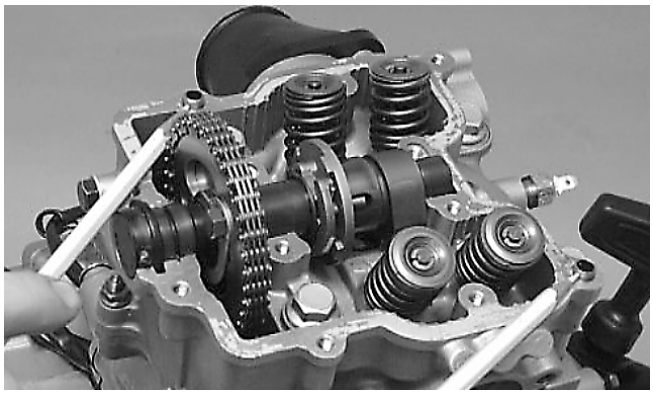
2. Remove the 12 cap screws securing the valve cover to the head; account for the four rubber washers on the top side cap screws. Remove the valve cover. Account for and note the orientation of the cylinder head plug. Note the location of two alignment pins.



CC003D

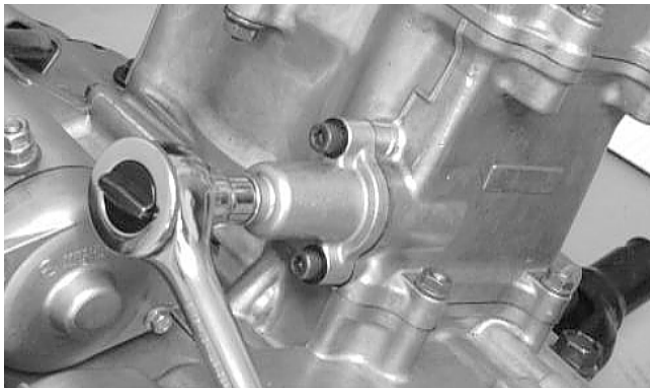


CC274D

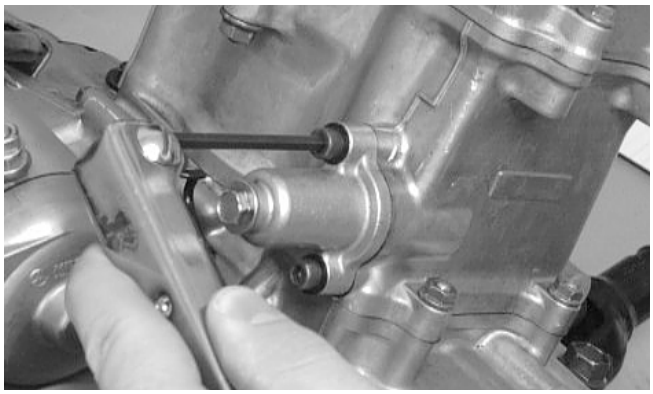


CC273D

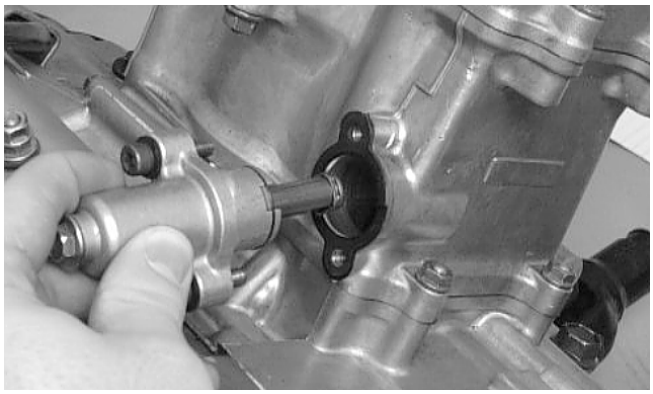
3. Loosen the cap screw on the end of the tensioner; then remove the two Allen-head cap screws securing the tensioner adjuster assembly and remove the assembly. Account for a gasket.



CC009D

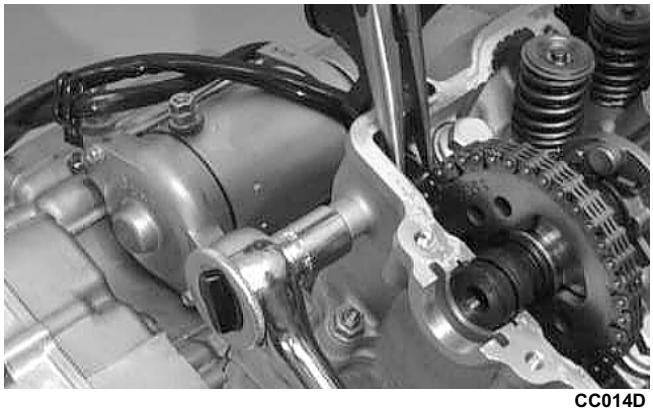


CC010D



CC011D

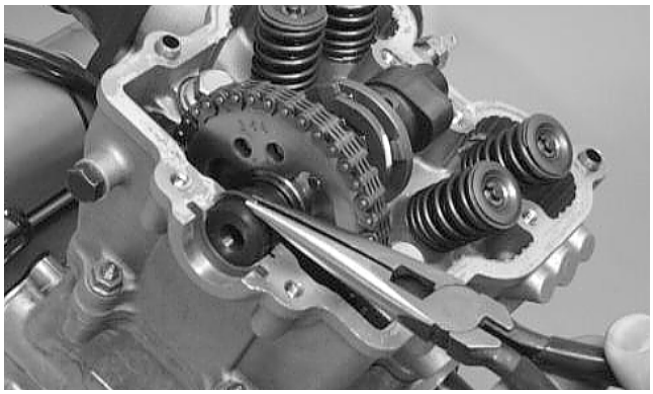
4. Remove the cap screw securing the chain tensioner (account for a washer); then remove the tensioner.



CC014D

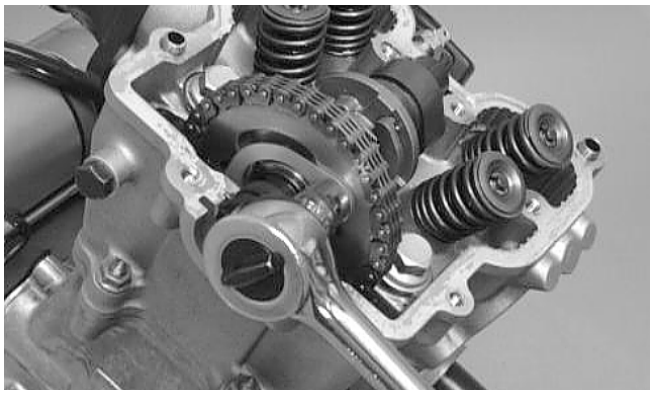
5. Using an awl, rotate the C-ring in its groove until it is out of the cylinder head; then remove the C-ring.

■ NOTE: Care should be taken not to drop the C-ring down into the crankcase.

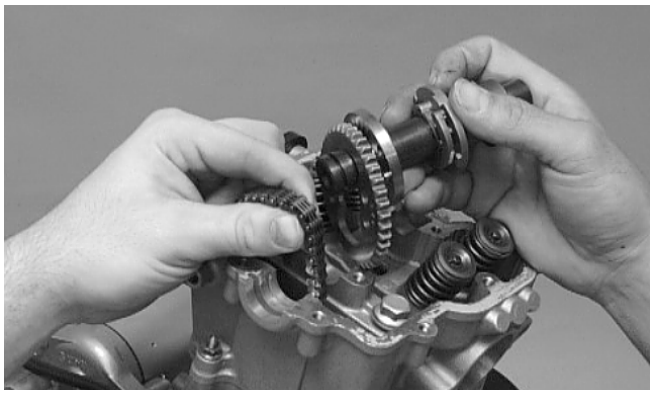


CC012D

6. Bend the washer tabs and remove the two cap screws securing the sprocket to the camshaft; then drop the sprocket off the camshaft. While holding the chain, slide the sprocket and camshaft out of the cylinder head.



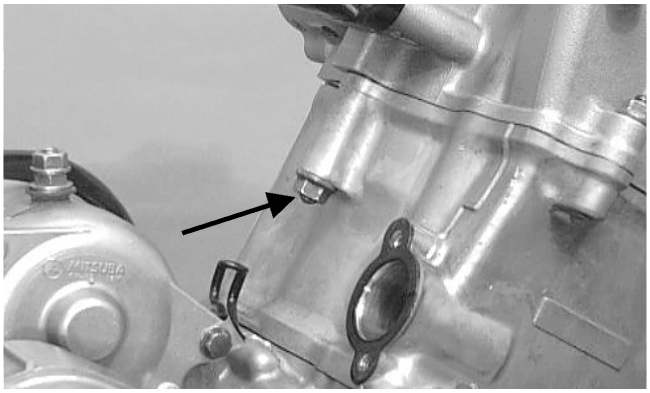
CC013D



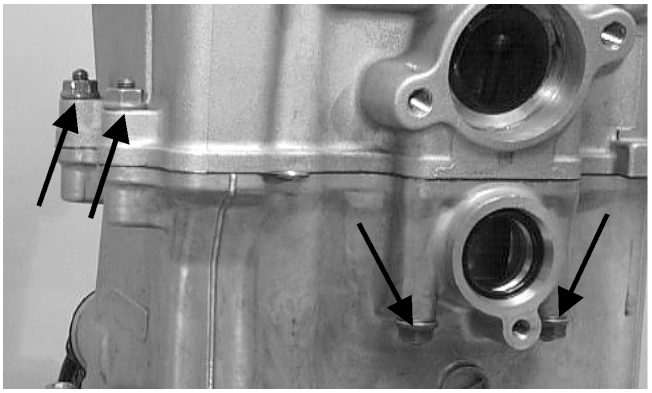
CC266D

■ NOTE: Loop the chain over the cylinder and secure it with a wire to keep it from falling into the crankcase.

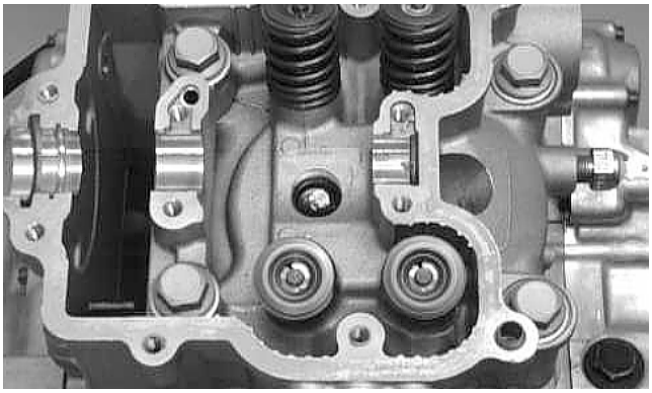
7. Remove the five nuts securing the cylinder head to the cylinder; then remove the four cylinder head cap screws with copper washers (note location of the different-sized cap screws and nuts).



CC017D

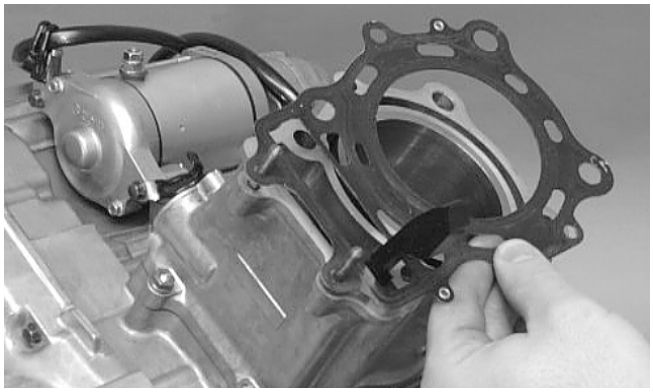


CC018D



CC016D

8. Remove the cylinder head from the cylinder, remove the gasket, and account for two alignment pins.

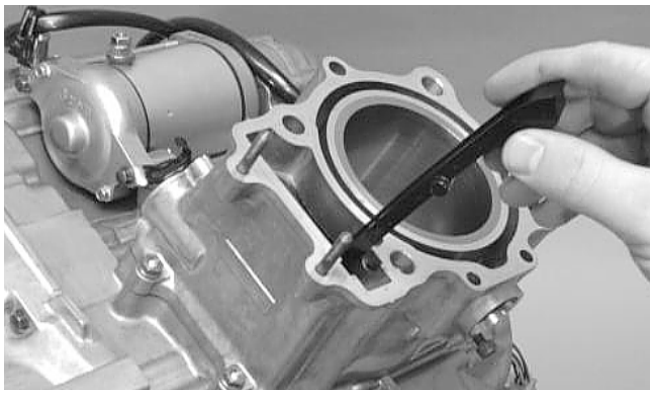


CC020D

☞ AT THIS POINT
To service valves and cylinder head, see Servicing Top-Side Components sub-section.

9. Remove the cam chain guide.

☞ AT THIS POINT
To inspect cam chain guide, see Servicing Top-Side Components sub-section.

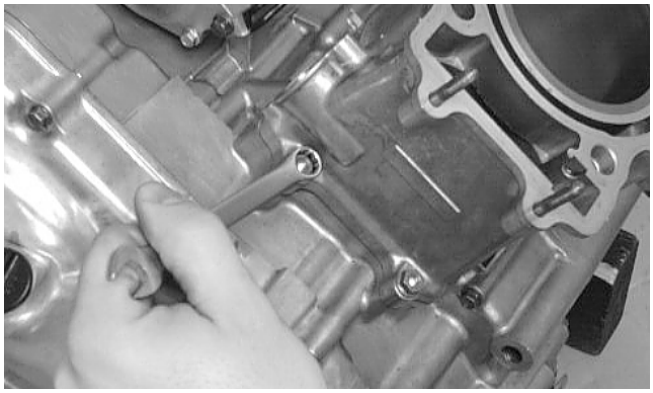


CC022D

C. Cylinder
D. Piston

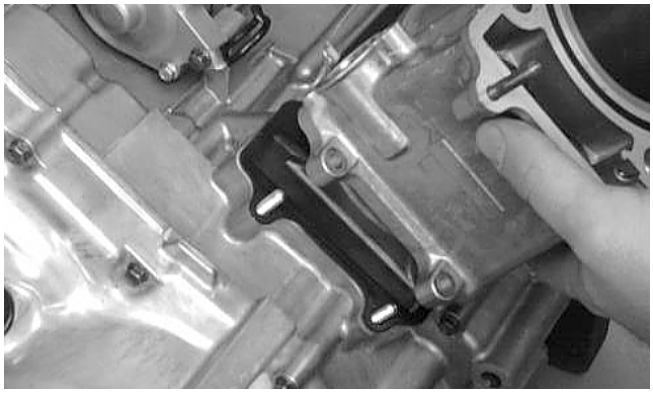
■ **NOTE: Steps 1-9 in the preceding sub-section must precede this procedure.**

10. Loosen the clamp securing the coolant hose to the union; then detach the hose.
11. Remove the two nuts securing the cylinder to the crankcase.

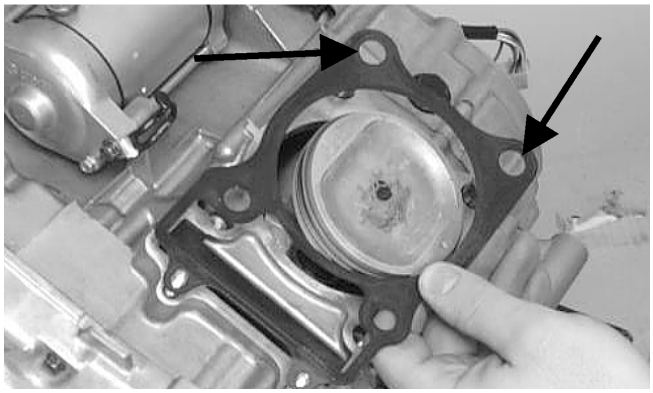


CC023D

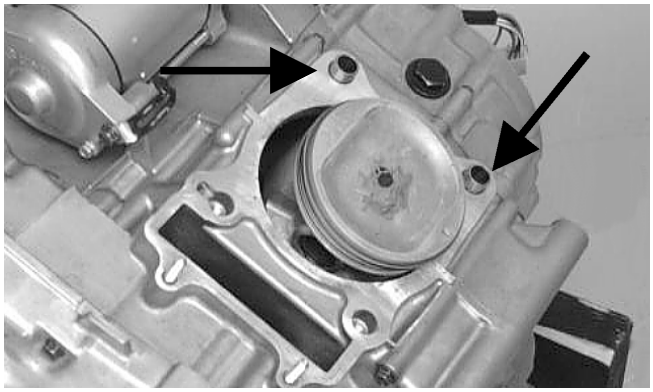
12. Lift the cylinder off the crankcase taking care not to allow the piston to drop against the crankcase. Account for the gasket and two alignment pins.



CC024D



CC025D



CC026D

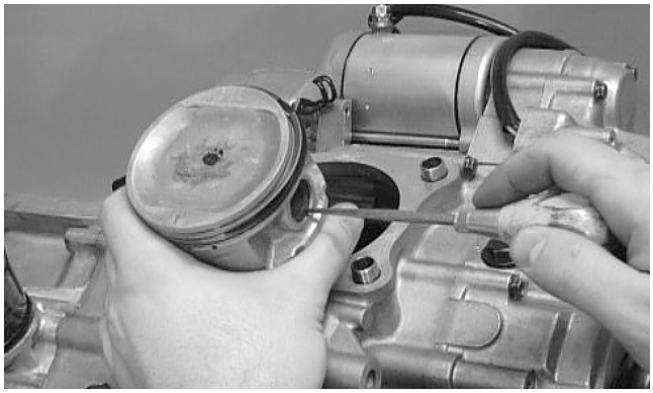
☞ AT THIS POINT

To service cylinder, see Servicing Top-Side Components sub-section.

⚠ CAUTION

When removing the cylinder, be sure to support the piston to prevent damage to the crankcase and piston.

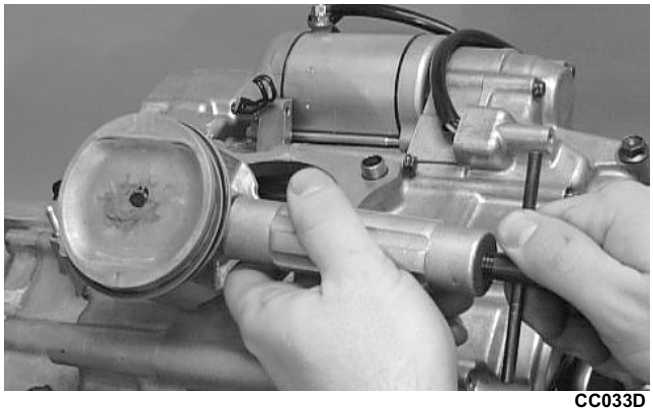
13. Using an awl, remove one piston-pin circlip.



CC032D

14. Using the Piston-Pin Puller (p/n 0644-328), remove the piston pin. Account for the opposite-side circlip. Remove the piston.

■NOTE: It is advisable to remove the opposite-side circlip prior to using the puller.



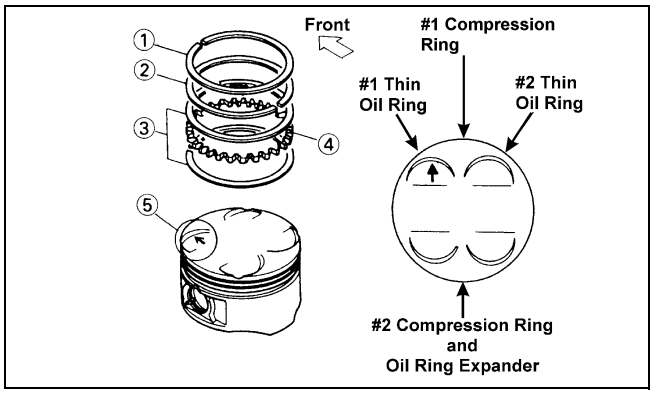
CC033D

■NOTE: Support the connecting rod with rubber bands to avoid damaging the rod or install the Connecting Rod Holder (p/n 0444-006).

⚠ CAUTION

Do not allow the connecting rod to go down inside the crankcase. If the rod is down inside the crankcase and the crankshaft is rotated, severe damage will result.

■NOTE: If the existing rings will not be replaced with new rings, note the location of each ring for proper installation. When replacing with new rings, replace as a complete set only. If the piston rings must be removed, remove them in this sequence.



ATV-1085

A. Starting with the top ring, slide one end of the ring out of the ring-groove.

B. Remove each ring by working it toward the dome of the piston while rotating it out of the groove.

☞ AT THIS POINT

To service piston, see Servicing Top-Side Components sub-section.

☞ AT THIS POINT

To service center crankcase components only, proceed to Removing Left-Side Components.

Left-Side Components
(500 Automatic)

■**NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.**

☞ AT THIS POINT
To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

■**NOTE: The engine/transmission does not have to be removed from the frame for this procedure.**

Removing Left-Side Components

A. Recoil Starter
B. Water Pump
C. Cover
D. Magneto Rotor

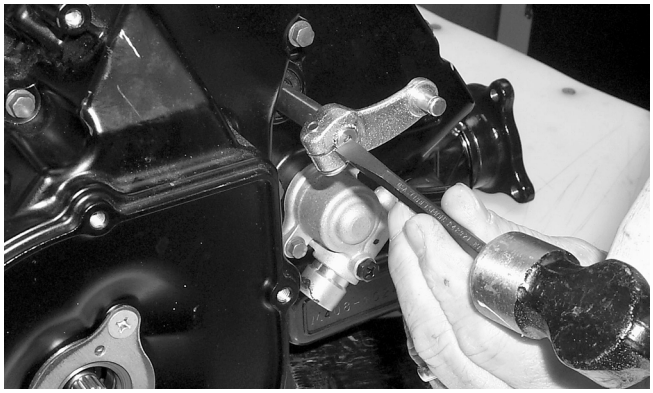
1. Remove the four cap screws securing the recoil starter assembly to the left-side cover; then remove the recoil starter. Account for the gasket.

☞ AT THIS POINT
To service the recoil starter, see Servicing Left-Side Components sub-section.

CC615

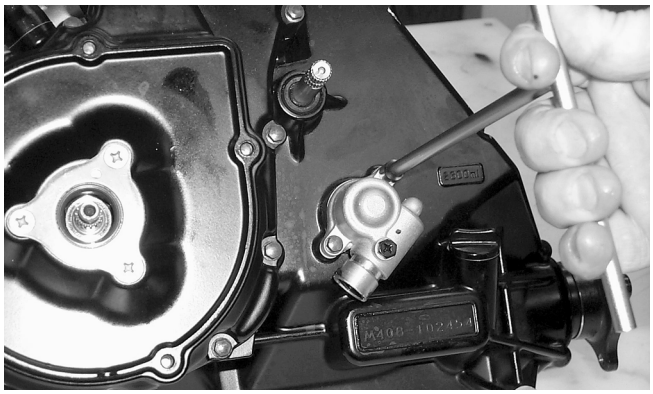
2. Remove the flange nut securing the starter cup to the crankshaft; then remove the starter cup. Account for the O-ring inside the cup.

3. Using a cold chisel, scribe a mark showing the relative position of the shift arm to the shift arm shaft to aid in installing; then remove the shift arm.



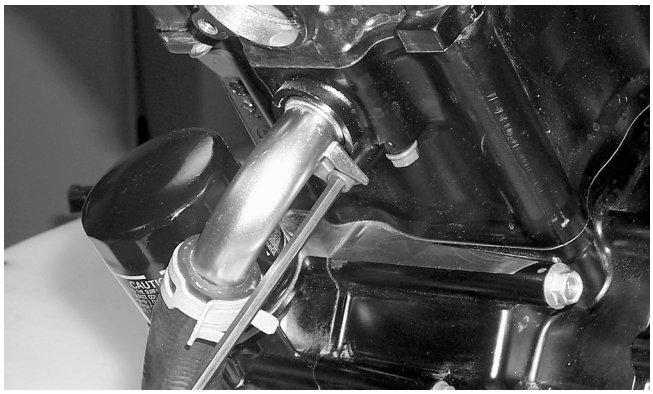
CC621

4. Remove the two cap screws securing the speedometer gear housing; then remove the housing. Account for the gasket.



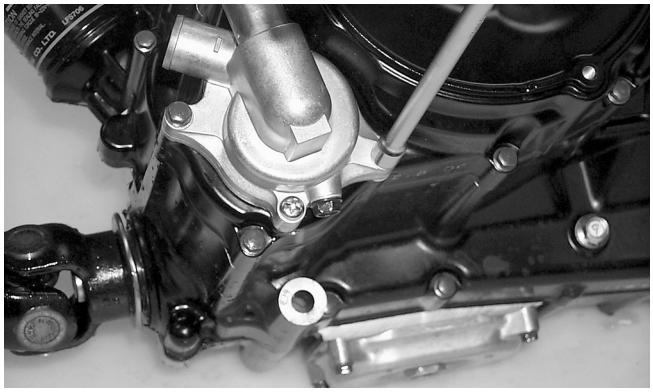
CC625

5. Loosen the clamps securing the coolant hose to the water pump; then remove the crossover tube from the cylinder head. Account for an O-ring.



CC620

6. Remove the two cap screws securing the water pump to the engine; then remove the water pump.

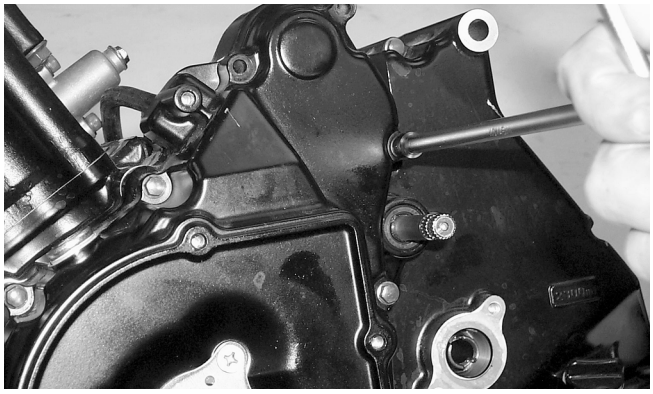


CC623

☞ AT THIS POINT

To service the water pump, see Section 4.

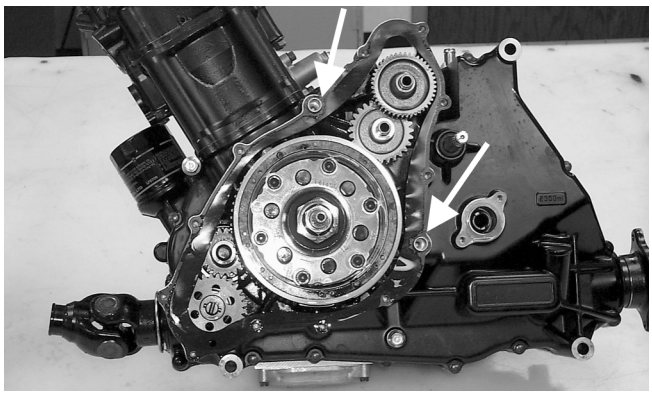
7. Remove the 13 cap screws securing the left-side cover to the crankcase noting the location of the different-sized cap screws for installing purposes.



CC626

8. Using Side Case Puller (p/n 0644-262), remove the side cover. Account for a gasket and two alignment pins.

■ **NOTE: Inspect the inside of the left-side cover for any shaft washers that may have come off with the cover. Make sure they are returned to their respective shafts and that the starter idler gear spacer is on the shaft or in the cover.**

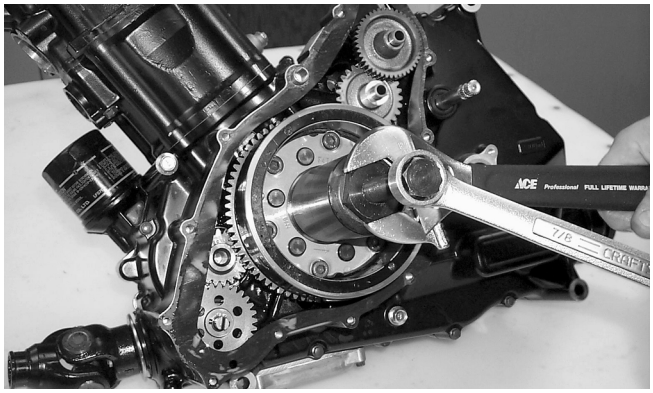


CC629A

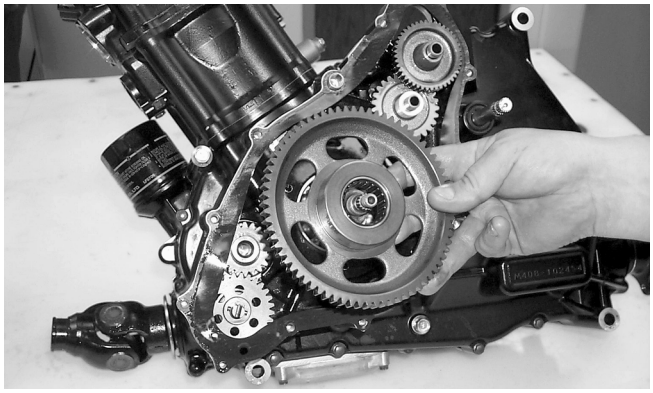
9. Remove the nut securing the magneto rotor to the crankshaft; then install the magneto rotor puller adapter.

■ **NOTE: The puller has left-hand threads.**

10. Using Magneto Rotor Remover Set (p/n 0444-075), remove the magneto rotor assembly from the crankshaft. Account for the key; then remove the starter clutch gear assembly and washer.



CC632

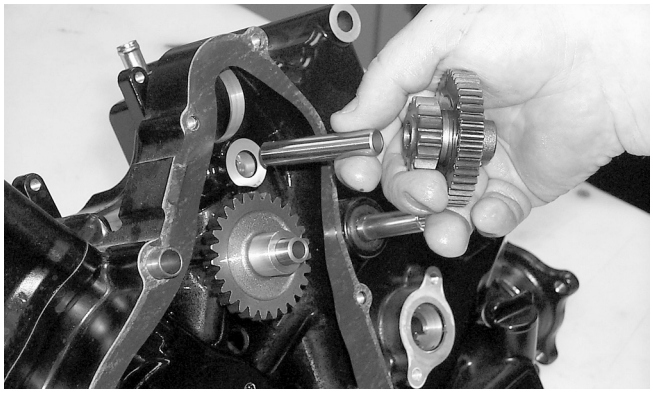


CC634

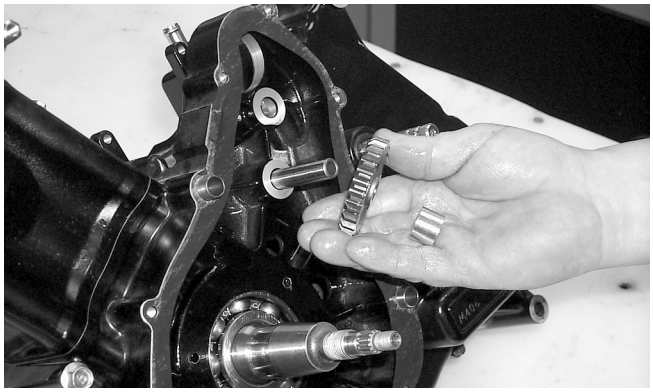
☞ AT THIS POINT

To service the magneto assembly, see Section 5.

11. Remove the two starter gears from the crankcase noting the direction of the beveled side of the gears for installing purposes; then remove the two starter gear shafts.



CC636



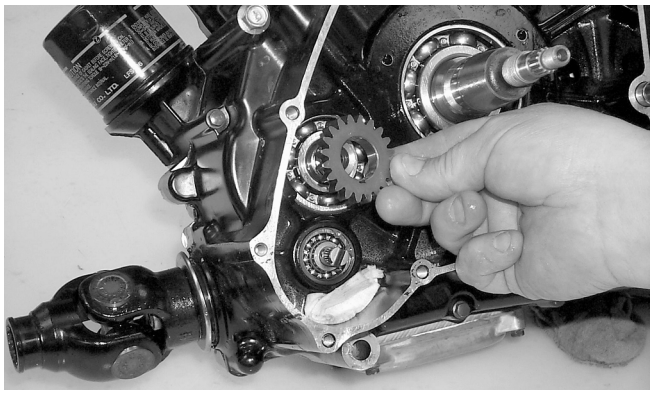
CC637

12. Remove the snap ring securing the water pump driven gear; then remove the gear noting the direction of the sides of the gear for installing purposes. Account for the driven gear alignment pin.

CC638

■**NOTE: There is an oil passage beneath the driven gear/drive gear assembly. This passage should be plugged prior to removing the driven gear and drive gear. Failure to do so could result in the loss of an alignment pin into the crankcase.**

13. Remove the snap ring securing the water pump drive gear; then remove the gear noting the direction of the sides of the gear for installing purposes. Account for the drive gear alignment pin.



CC641

Right-Side Components

(500 Automatic)

■**NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.**

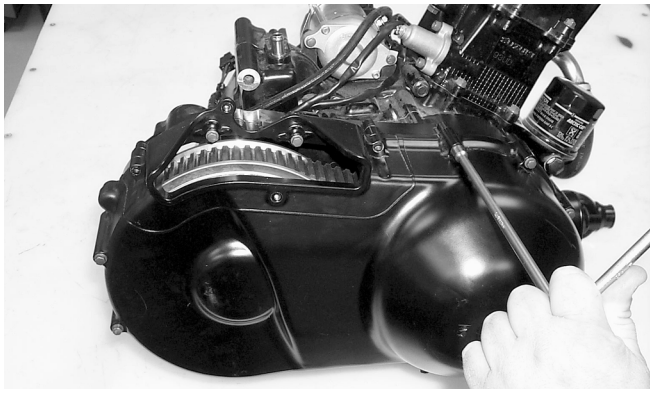
☞ AT THIS POINT

To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

■**NOTE: The engine/transmission does not have to be removed from the frame for this procedure.**

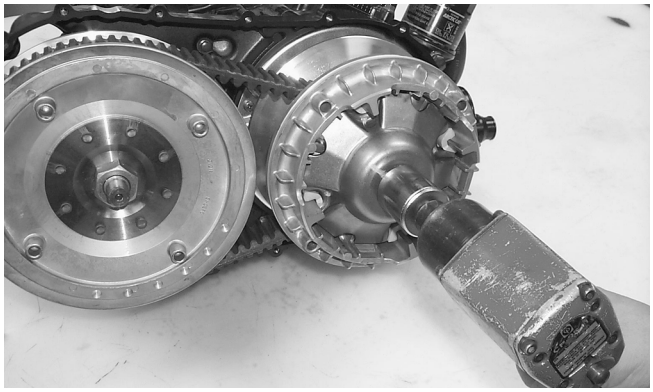
Removing Right-Side Components

1. Remove the cap screws securing the V-belt cover noting the location of the different-lengthed cap screws for installing purposes; then using a rubber mallet, gently tap on the cover tabs to loosen the cover.

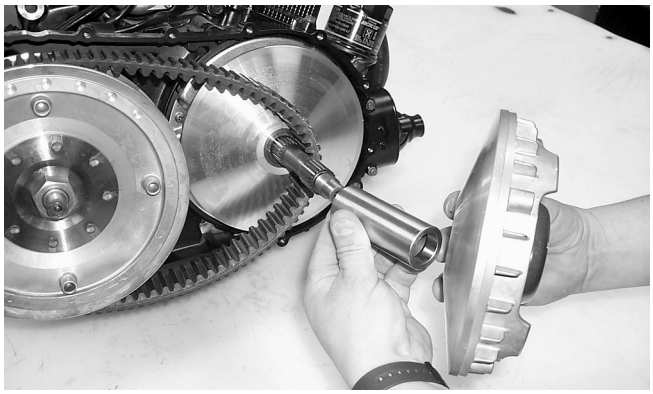


CC580

2. Remove the nut securing the movable drive face; then remove the face. Account for a spacer.



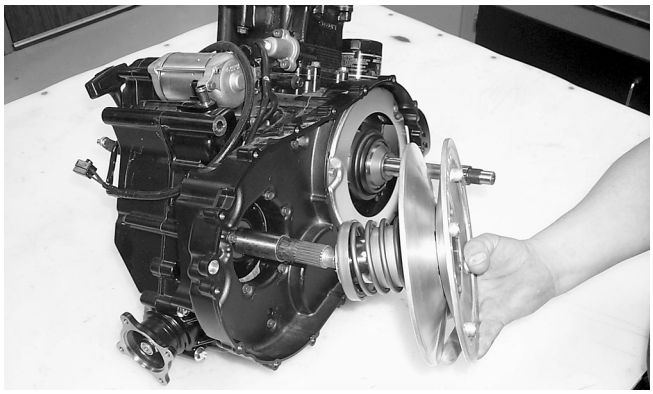
CC581



CC582

3. Remove the V-belt.

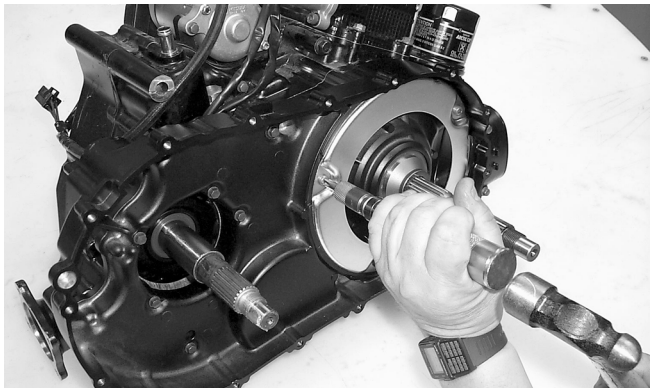
4. Remove the nut securing the fixed driven assembly; then remove the assembly.



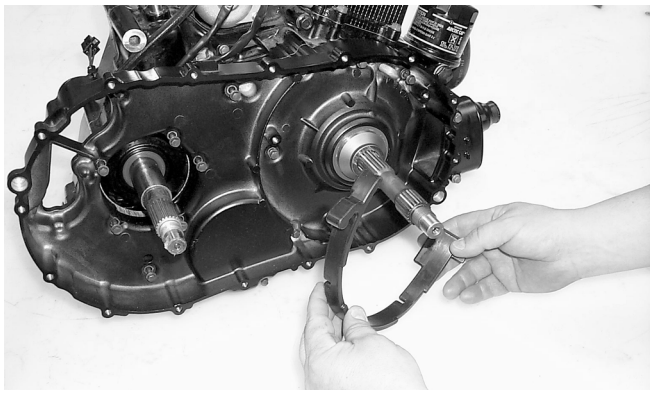
CC585

5. Remove the fixed drive face.

6. Using an impact driver, remove the Phillips-head screws securing the air intake plate; then remove the plate cushion.



CC587

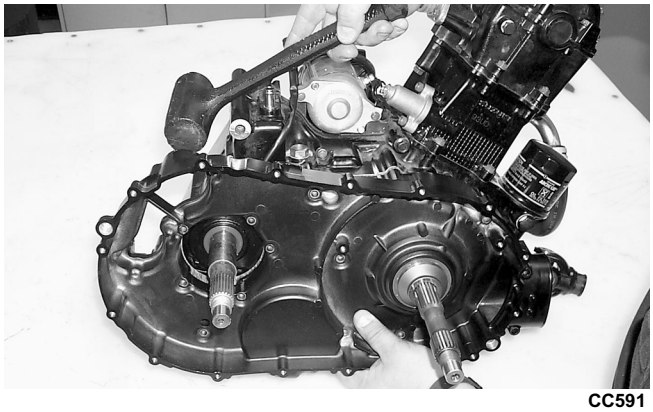


CC590

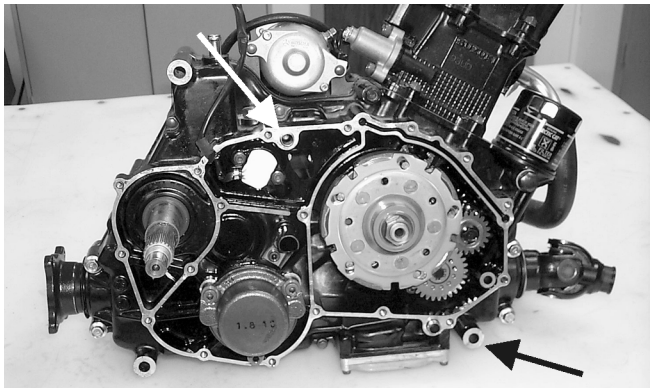
7. Remove the cap screws securing the clutch cover. Note the location of the different-lengthed cap screws for installing purposes. Using a rubber mallet, carefully remove the cover. Account for two alignment pins.

⚠ CAUTION

Care must be taken when removing the cover so the cover gasket is not damaged.

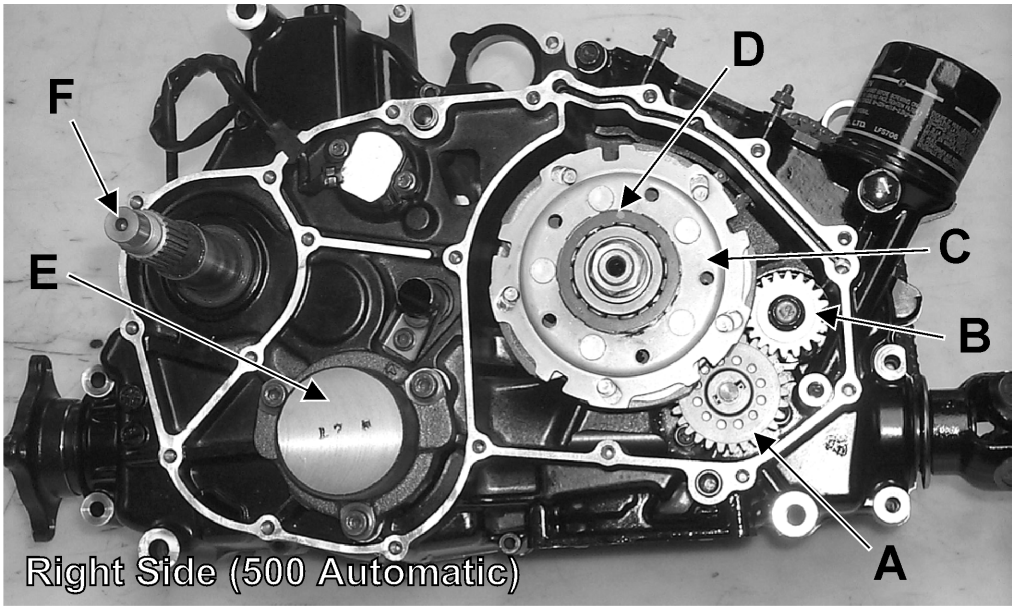


CC591



CC600A

■**NOTE: For steps 8-14, refer to illustration CC829A.**



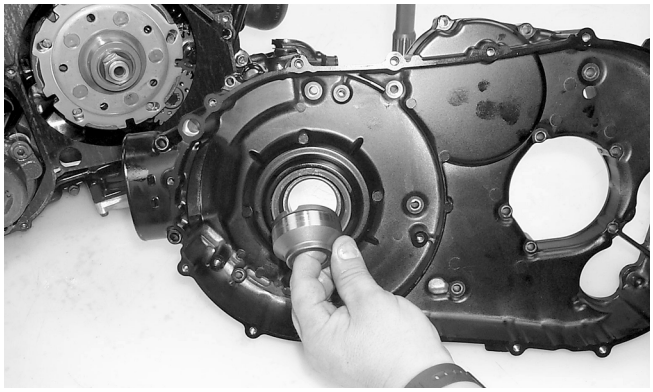
KEY CC829A

A. Oil Pump Driven Gear	E. Final Drive Carrier Bearing Housing
B. Oil Pump Drive Gear	F. Input Shaft
C. Clutch Shoe Assembly	
D. One- Way Clutch (Green Dot MUST show)	

CC829A

■**NOTE: To aid in installing, it is recommended that the assemblies are kept together and IN ORDER.**

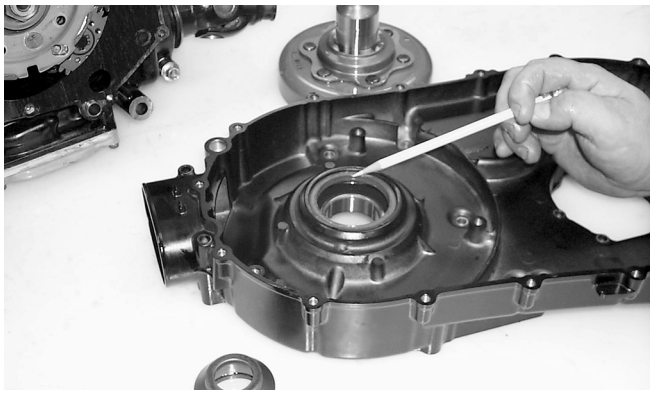
8. Remove the one-way clutch (D) from the clutch housing. Note the location of the green alignment dot (or the word OUTSIDE) for installing purposes.
9. Using a hydraulic press, remove the clutch housing assembly from the clutch cover. Account for the left fixed drive spacer and an O-ring inside the fixed drive spacer.



CC595

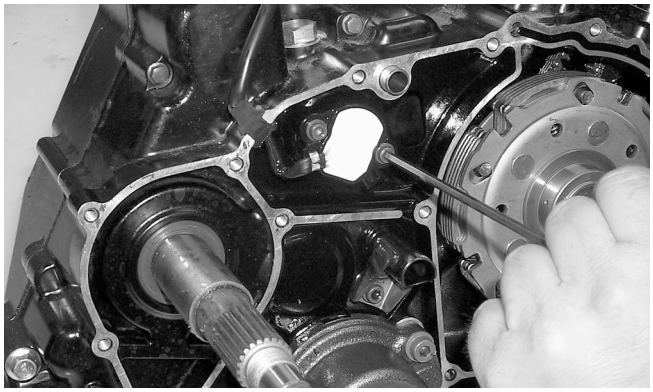
CC596

■ **NOTE: Account for and inspect the clutch housing seal.**

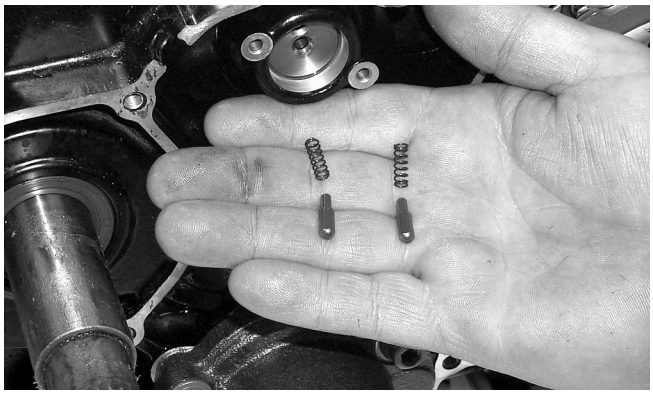


CC597

10. Remove the two Allen-head screws securing the shift indicator sending unit; then remove the unit. Account for two neutral contact pins and two springs.



CC602

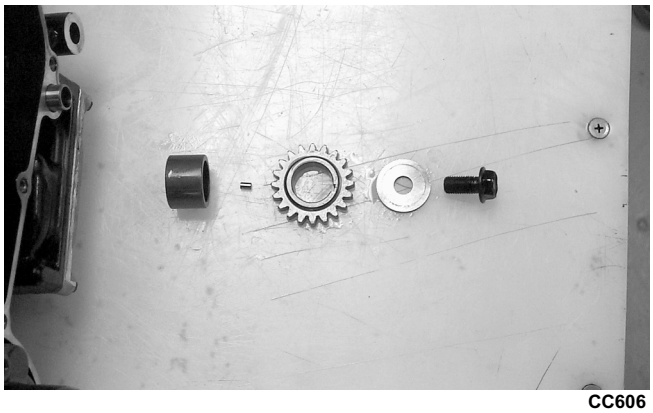


CC603

11. Remove the nut (left-hand threads) securing the clutch shoe assembly (C). Account for a washer.

■ **NOTE: The washer is also directional. The flat side of the washer must face toward the clutch assembly when installing.**

12. Remove the cap screw securing the oil pump drive gear (B). Account for a cap screw, washer, pin, and spacer.

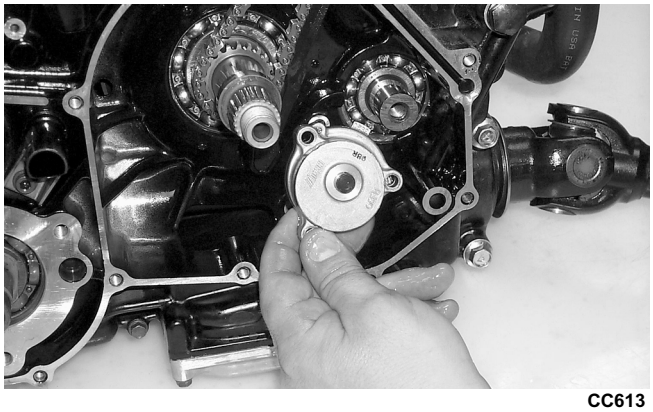


CC606

13. Using an impact driver, remove the Allen-head screws securing the final drive carrier bearing housing (E); then remove the housing and account for two alignment pins.

14. Remove the snap ring securing the oil pump driven gear (A); then remove the gear noting the direction of the sides of the gear for installing purposes. Account for a pin and a washer.

15. Using an impact driver, remove the three Phillips-head screws securing the oil pump; then remove the pump.



CC613

Center Crankcase Components

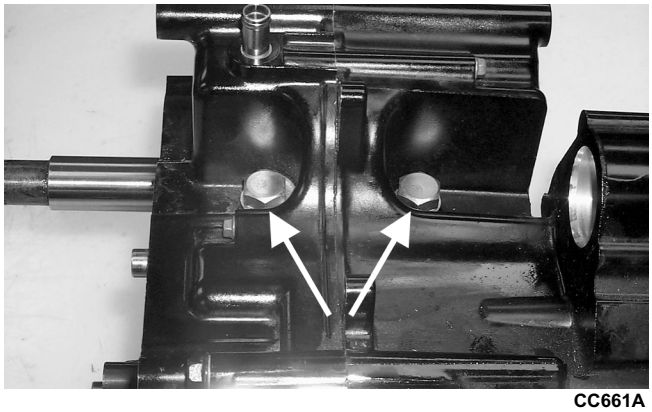
(500 Automatic)

■**NOTE: This procedure cannot be done with the engine/transmission in the frame. Complete Removing procedures for Top-Side, Left-Side, and Right-Side must precede this procedure.**

■**NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.**

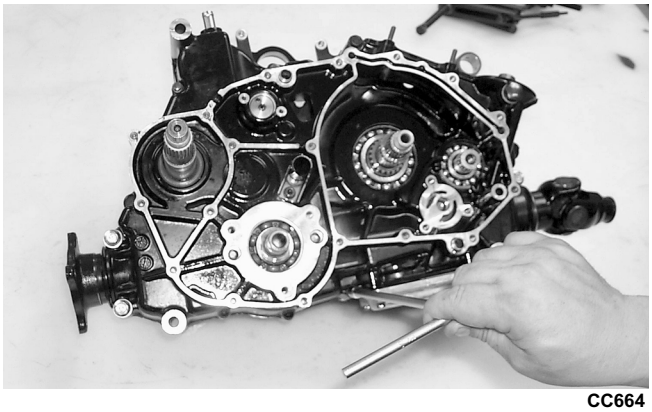
Separating Crankcase Halves

1. Remove the two shift cam stoppers from the top of the crankcase.



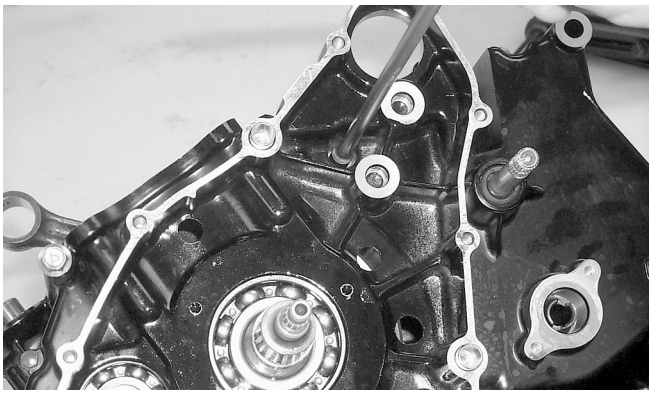
CC661A

2. Remove the right-side cap screws securing the crankcase halves. Note the location of the different-lengthed cap screws.



CC664

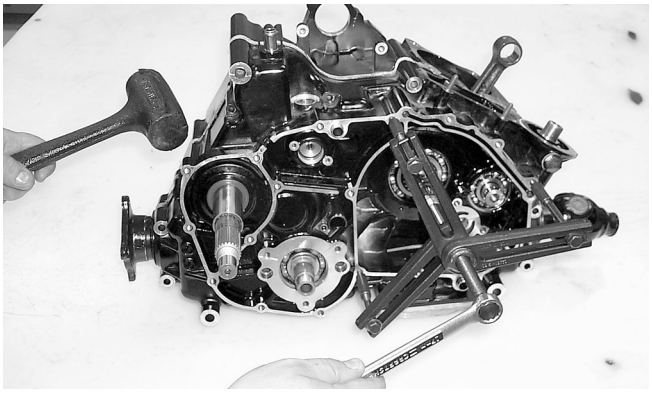
3. Remove the left-side cap screws securing the crankcase halves. Note the location of the different-lengthed cap screws.



CC663

4. Using the Crankcase Separator/Crankshaft Remover (p/n 0444-009) and tapping lightly with a rubber mallet, separate the crankcase halves. Account for two alignment pins.

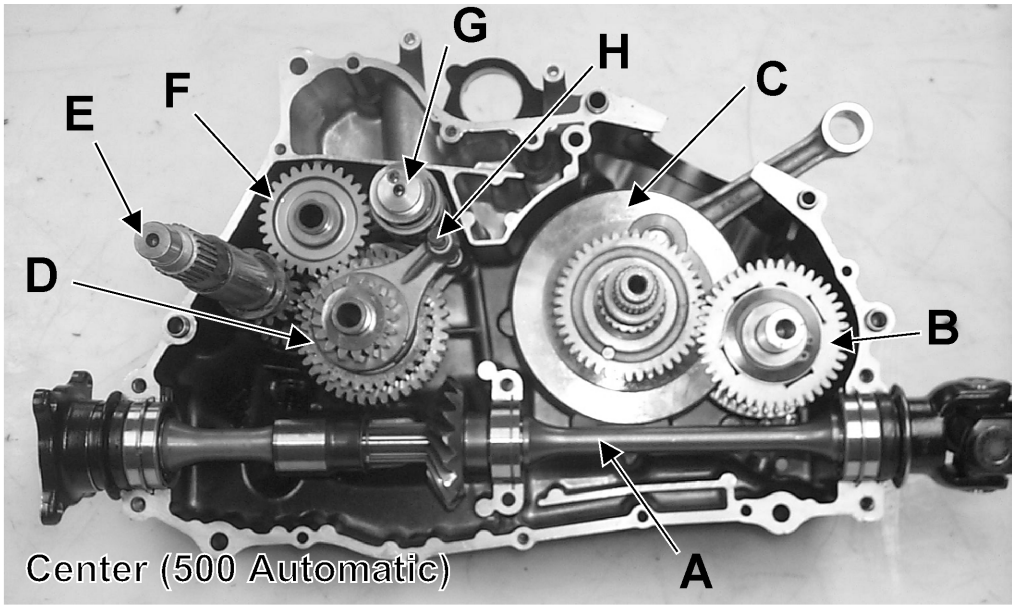
■**NOTE: To keep the shaft/gear assemblies intact for identification, tap the shafts toward the left-side crankcase half when separating the halves.**



CC665

Disassembling Crankcase Half

■**NOTE: For steps 1-7, refer to illustration CC821A.**



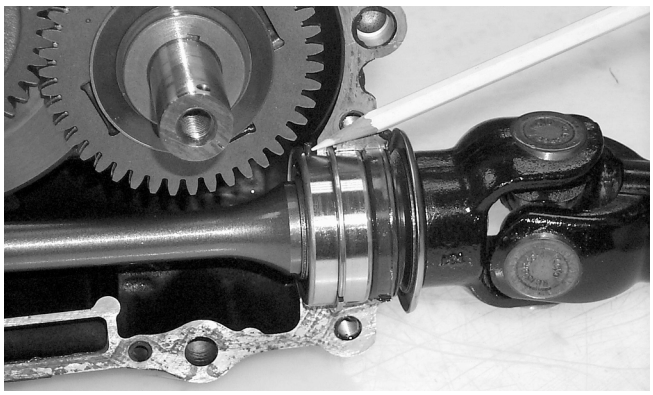
KEY CC821A

A. Secondary Driven Shaft Assembly
B. Crank Balancer Assembly
C. Crankshaft
D. Countershaft Assembly
E. Driveshaft
F. Reverse Idler Gear Assembly
G. Gear Shift Shaft
H. Shift Shaft with 2 Forks

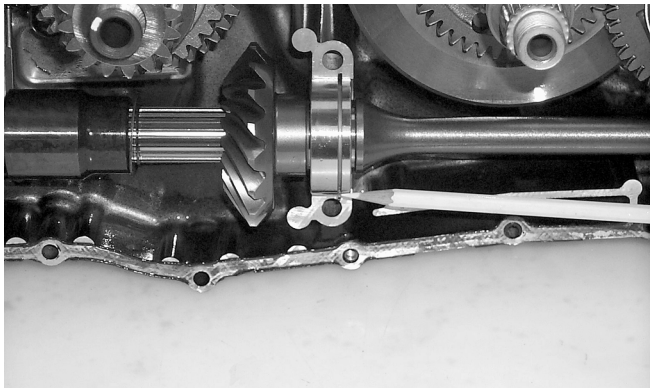
CC821A

■**NOTE: To aid in installing, it is recommended that the assemblies are kept together and IN ORDER.**

1. Remove the secondary driven shaft assembly (A) noting the location of the bearing locating pins. Account for the bearing C-ring.

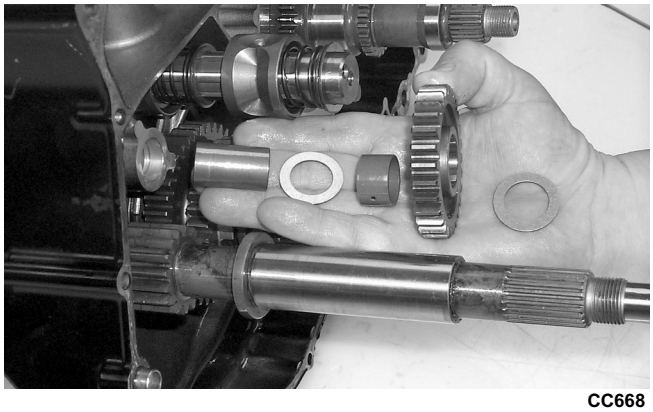


CC666



CC667

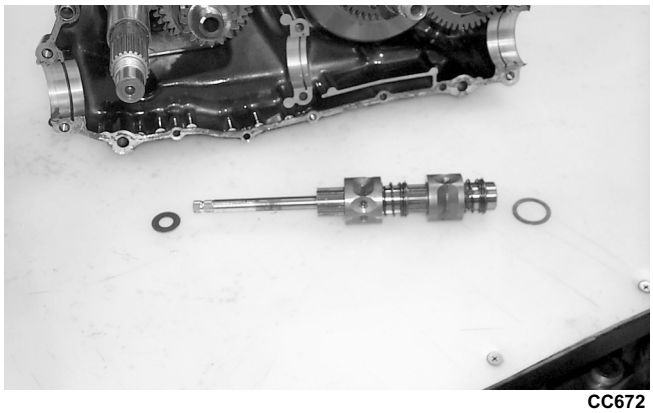
2. Remove the reverse idler gear assembly (F). Account for all washers, shaft, bushing, and the gear.



CC668

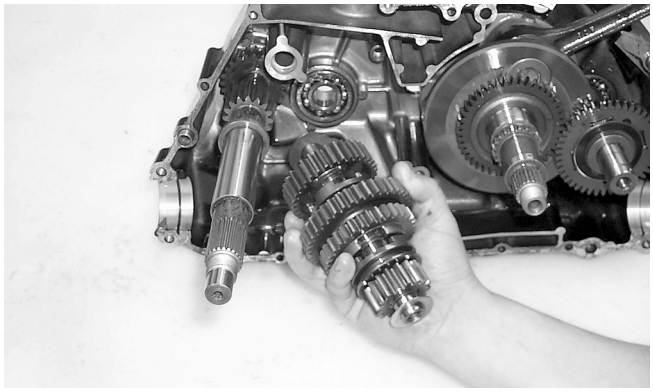
3. Remove the shift shaft (H); then remove the two forks taking note of the direction of the tabs on the forks for assembling purposes.

4. Remove the gear shift shaft (G) noting the location of the two holes on the end of the shaft. Account for two washers.



CC672

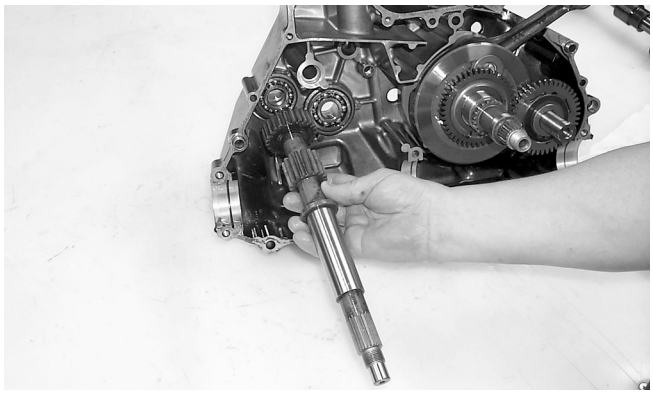
5. Remove the countershaft assembly (D). Account for a washer on each end of the countershaft.



CC674

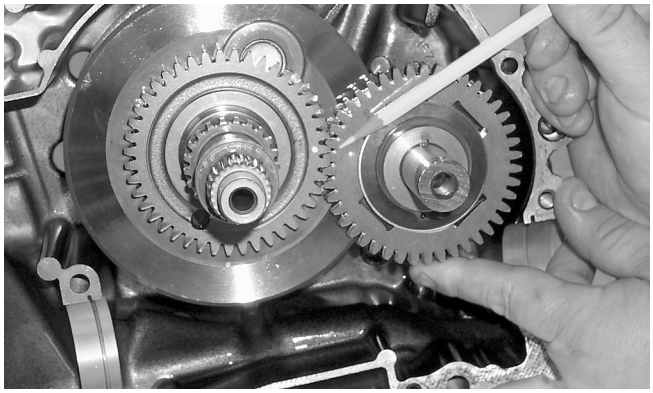
■ **NOTE: Do not disassemble the countershaft assembly unless necessary. If necessary, see Servicing Center Crankcase Components sub-section.**

6. Using a rubber mallet, tap on the crankcase to remove the driveshaft.



CC675

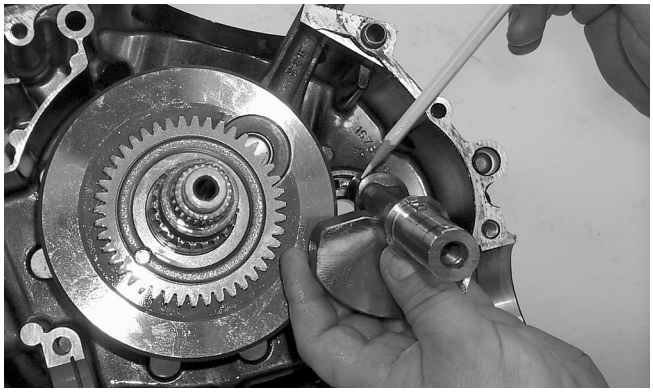
7. Note the alignment dots on the crank balancer assembly (B) gear and crankshaft (C) gear for assembling purposes; then slide the crank balancer gear off the crank balancer. Account for the key in the keyway.



CC676

8. Remove the crank balancer.

■ **NOTE: There is a flat spot on the crank balancer to allow clearance past the crankshaft.**



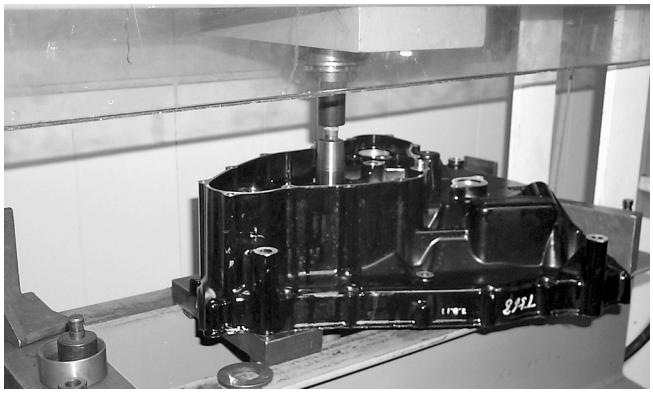
CC678

9. Remove the snap ring securing the water pump driven gear shaft.

CC679

10. Using a hydraulic press, remove the crankshaft assembly.

■ NOTE: Use a protective end cap to prevent damage to the crankshaft threads.



CC680

11. Remove the cap screws securing the oil strainer cap; then remove the cap. Account for the cap O-ring.

CC681

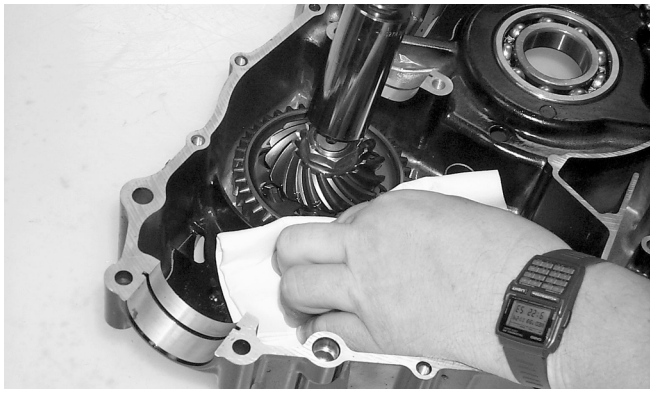
12. Using an impact driver, remove the two screws securing the oil strainer; then remove the strainer.

CC682

⚠ CAUTION

Do not remove the remaining output shaft assembly unless absolutely necessary. If the shaft is removed, the shaft nut must be replaced with a new one and the shaft must be re-shimmed.

13. To remove the assembly, remove the nut securing the secondary drive gear and secondary driven gear; then from the inside of the crankcase using a rubber mallet, remove the output shaft assembly. Account for the output shaft, two gears, a shim, a washer, and the nut.



CC683

CC686

Assembling Crankcase Half

1. Install the output shaft assembly into the crankcase making sure the two gears, shim, washer, and nut are properly sequenced.

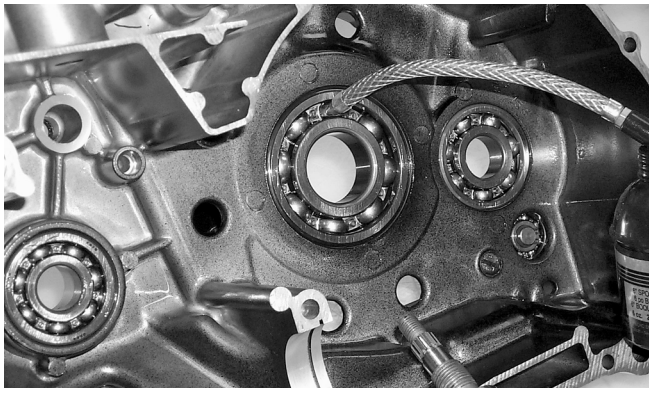
CC686

■ **NOTE: The beveled side of the secondary drive gear must face upward.**

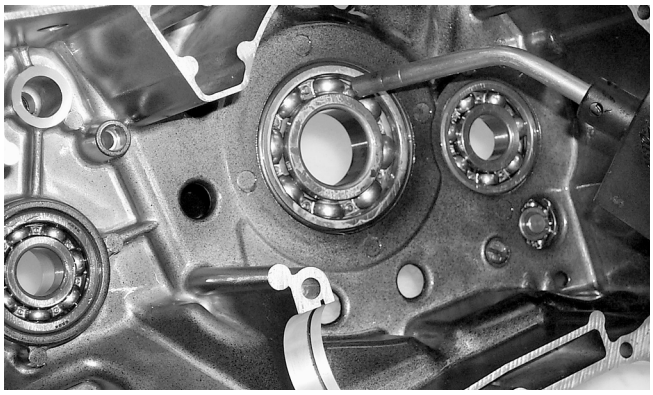
2. Apply red Loctite #271 to the threads of the output shaft; then secure with the nut. Tighten nut to 10 kg-m (72 ft-lb); then using a punch, peen the nut.

CC687

3. Apply a liberal amount of engine oil to the crankshaft bearing. Using a propane torch, heat the bearing until the oil begins to smoke; then slide the crankshaft assembly into place.

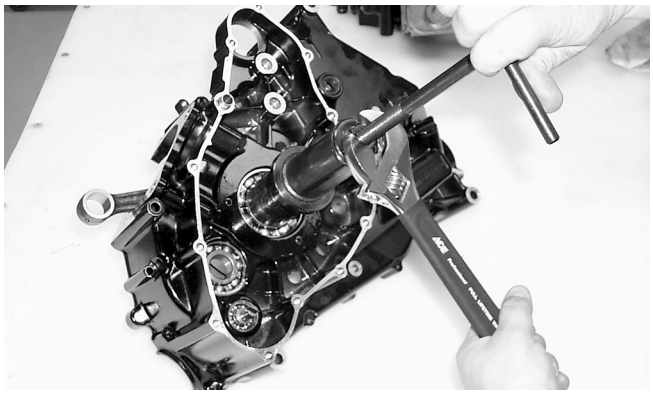


CC688



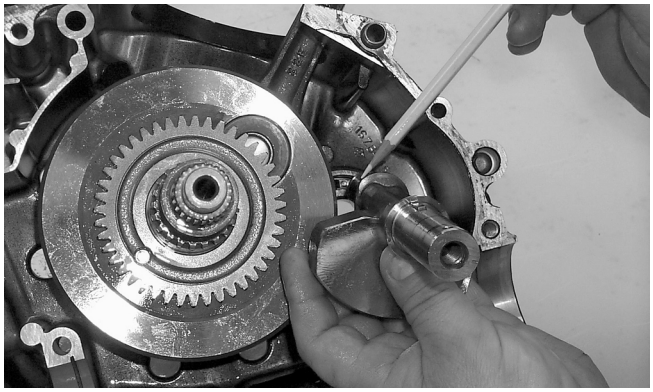
CC689

■ **NOTE: If heating the bearing is not possible, the crankshaft can be installed using a crankshaft installing tool.**



CC690

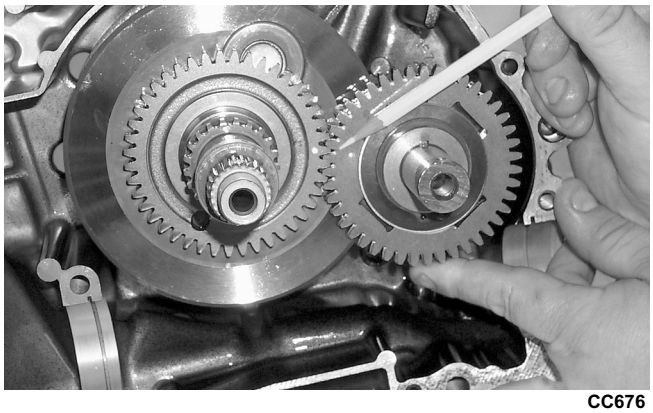
4. Install the crank balancer.



CC678

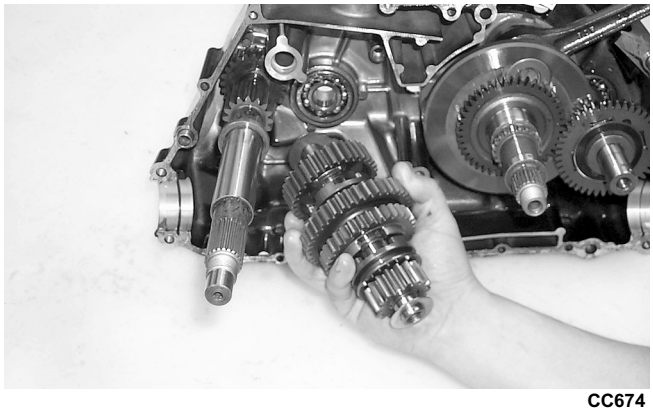
■**NOTE: It will be necessary to rotate the crank balancer until the counterweight is facing away from the crankshaft; then rotate the crankshaft clockwise into the journal area to allow the crank balancer to be fully seated.**

5. Place the key into the crank balancer keyway; then install the crank balancer gear making sure the alignment dots on the crank balancer gear and the crankshaft gear align.



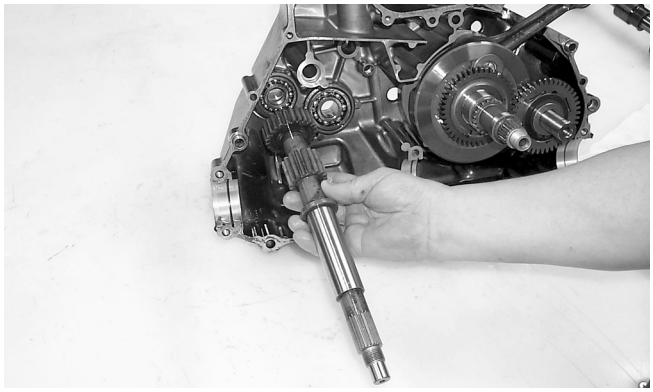
CC676

6. Place a washer on each end of the countershaft assembly; then install the assembly.



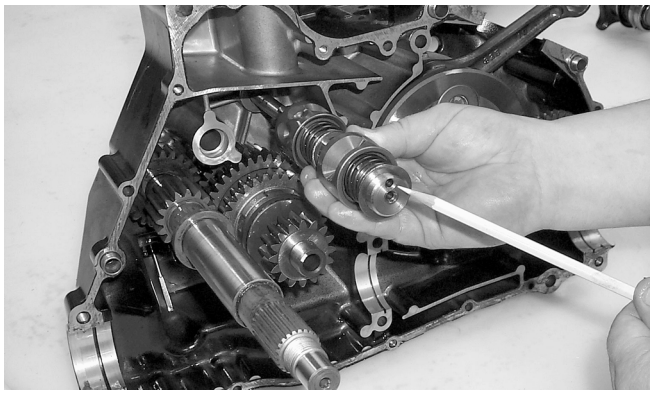
CC674

7. Install the driveshaft.



CC675

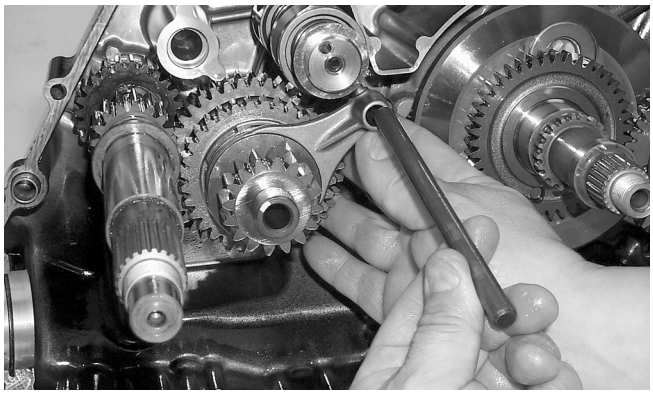
8. Place a washer on each end of the gear shift shaft; then install the shaft assembly making sure the two holes on the end of the shaft are positioned vertically.



CC671

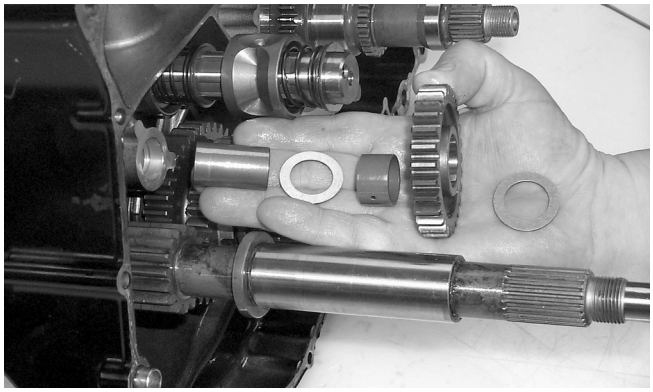
9. Insert the two shift forks into the sliding dogs noting the direction of the tabs from disassembling; then install the shift fork shaft.

■**NOTE: Make sure the shift fork tabs face upward and that they are properly seated into the shift cams.**



CC669

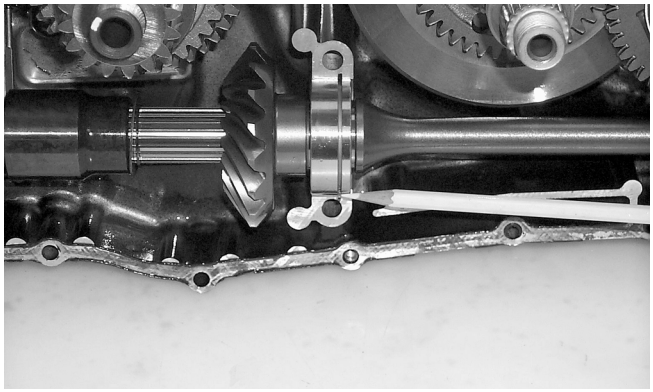
10. Install the reverse idler gear assembly noting the positioning of the two washers, gear, bushing, and shaft.



CC668

11. Install the front and rear secondary driven shaft assemblies into the left side of the crankcase making sure the bearing locating pins are facing upward and the bearing C-ring is fully seated in the crankcase.

CC666



CC667

12. Place the oil strainer into position; then secure with the two screws.

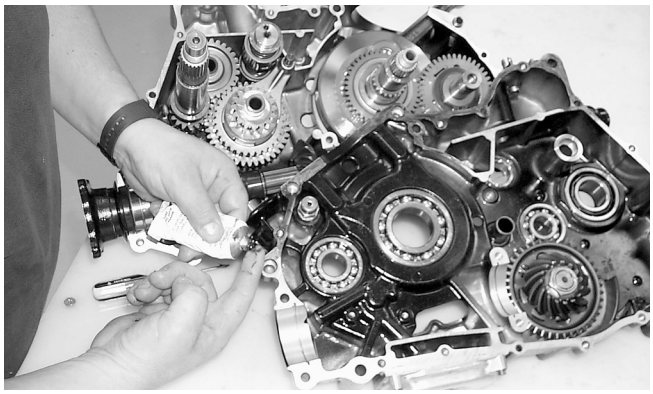
CC682

13. Place the oil strainer cap into position making sure the O-ring is in position; then secure the cap with cap screws. Tighten securely.

CC681

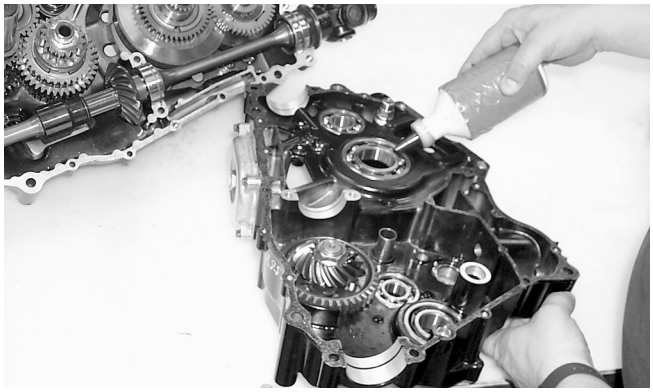
Joining Crankcase Halves

1. Apply High-Temp Sealant (p/n 0636-069) to the left-side mating surface.

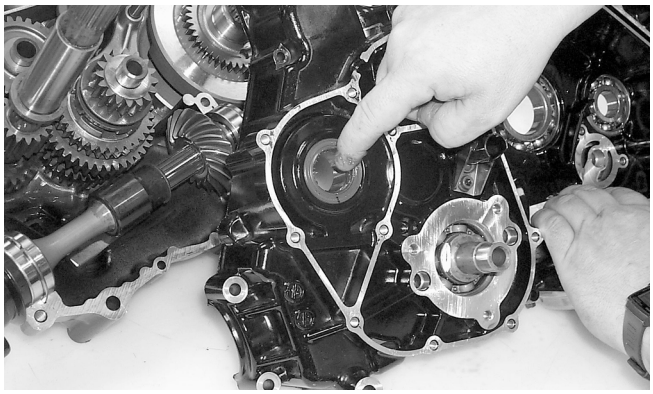


CC693

2. Lightly oil all bearings and grease all shafts in the right-side crankcase.



CC694



CC696

3. Using a propane torch, heat the right-side crankshaft bearing until the oil begins to smoke; then join the two crankcase halves.

CC695

4. Using a plastic mallet, lightly tap the case halves together until cap screws can be installed.

5. From the right side, install the 8 mm cap screws; then tighten only until snug.

■ NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs.

6. From the left side, install the remaining 8 mm cap screws (two inside the case); then tighten only until snug.

■ NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs.

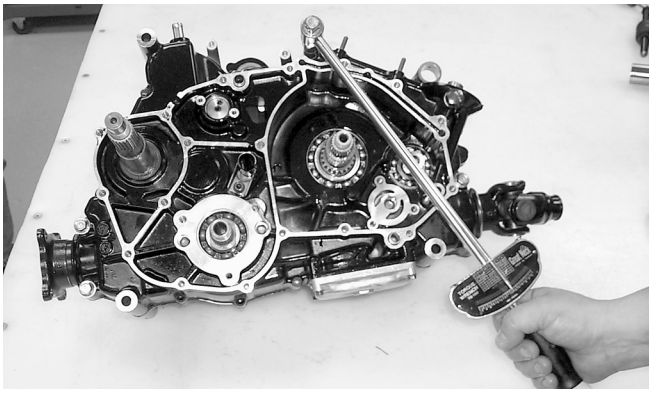
7. From the left side, install the eight case half 6 mm cap screws; then tighten only until snug.

■ NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs.

8. From the right side, install the 6 mm cap screws; then tighten only until snug.

■ NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs.

9. In a crisscross/case-to-case pattern, tighten the 8 mm cap screws until the halves are correctly joined; then tighten to 2-2.4 kg-m (14.5-17 ft-lb).



CC697

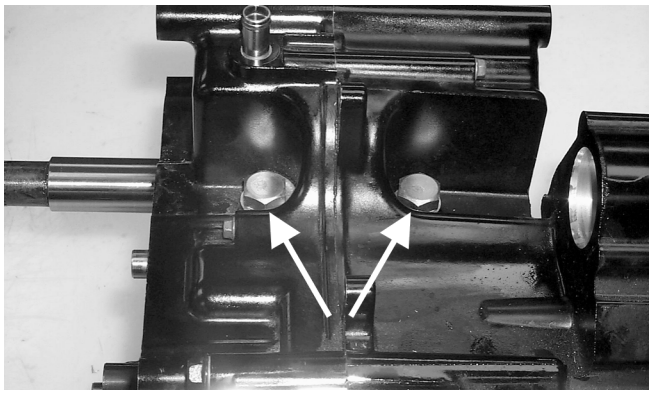
■ NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs.

10. In a crisscross/case-to-case pattern, tighten the 6 mm cap screws to 0.9-1.3 kg-m (6.5-9.5 ft-lb).

■ NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs.

11. Using a liberal amount of grease, assemble the shift cam stoppers; then install them into the top of the engine.

■ NOTE: The grease will hold the springs and cam stoppers in position while installing the assemblies into the engine.



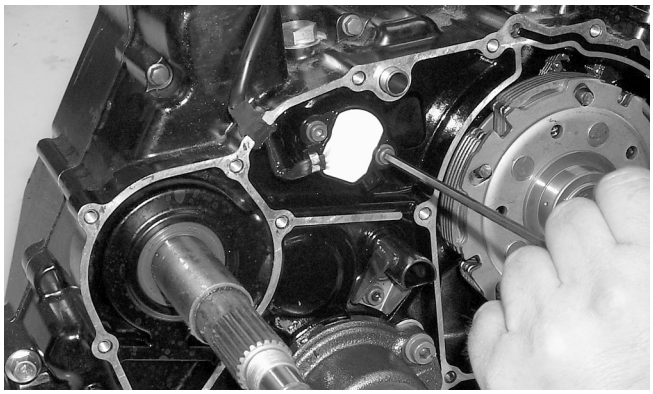
CC661A

☞ AT THIS POINT

After completing center crankcase components, proceed to Installing Right-Side Components, to Installing Left-Side Components, and to Installing Top-Side Components.

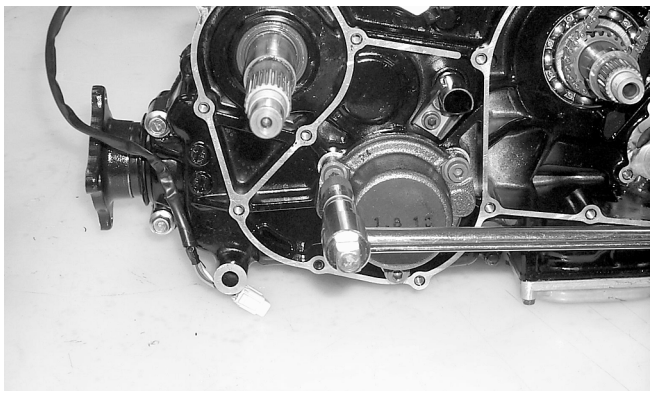
Installing Right-Side Components

1. Install the shift indicator sending unit making sure the two neutral contact pins and the two springs are properly positioned. Tighten the Allen-head screws securely.



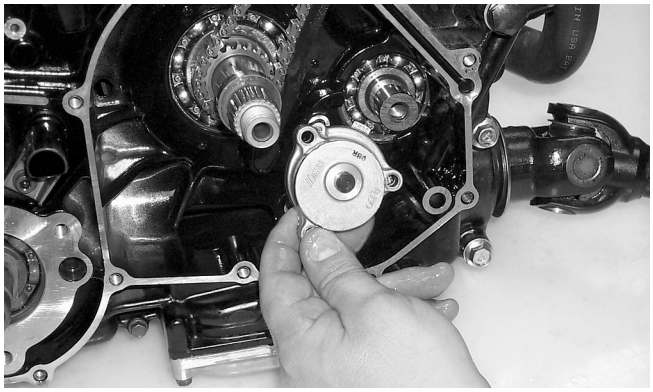
CC602

2. Install the secondary shaft bearing housing making sure the two alignment pins are properly positioned. Tighten the Allen-head screws securely.



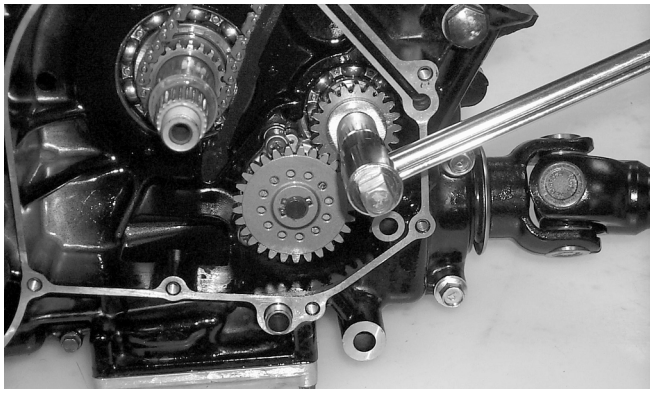
CC711

3. Install the oil pump onto the engine; then tighten the Phillips-head screws securely.



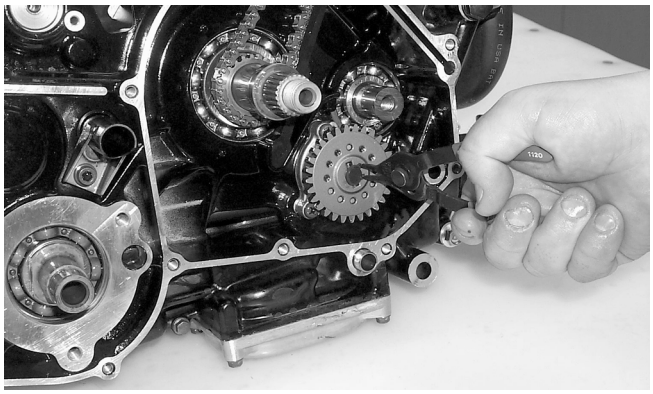
CC613

4. Install the oil pump drive gear spacer onto the crank balancer shaft. Grease the pin and insert it into the shaft; then install the drive gear making sure the raised side of the gear is facing toward the inside. Secure the gear with the cap screw (threads coated with red Loctite #271) and the washer. Tighten the cap screw to 5 kg-m (36 ft-lb).



CC712

5. Grease the driven gear pin and insert it into the oil pump shaft; then install the driven gear (noting the direction of the sides of the gear from removing). Secure with a snap ring.



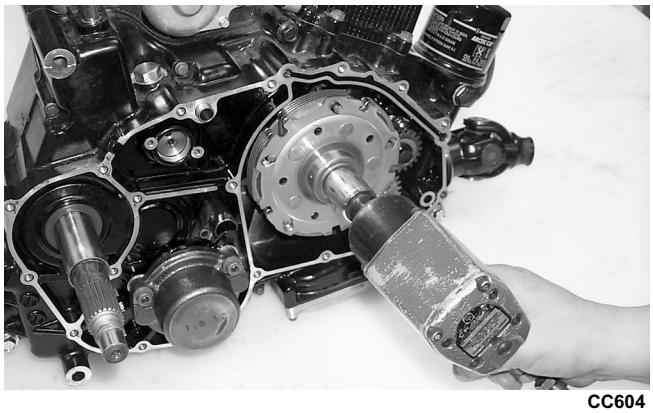
CC609

■ **NOTE: When installed correctly, the sides of the drive and driven gears will be flush with each other.**

6. Install the clutch shoe assembly and secure with the washer (with the flat side facing the assembly as noted in removing) and the nut (threads coated with red Loctite #271). Tighten to 13 kg-m (94 ft-lb).

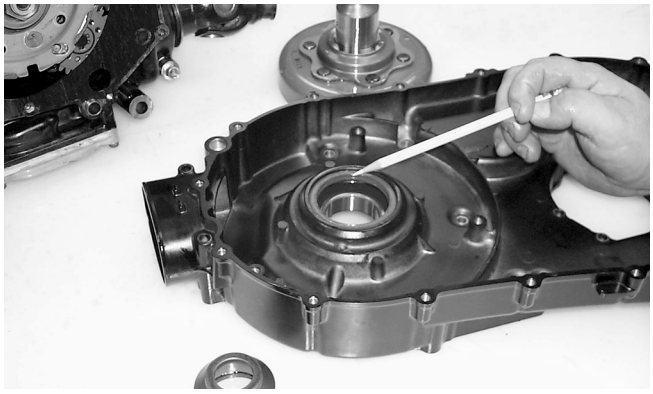
⚠ CAUTION

Care must be taken that the directional washer be installed correctly and note that the nut has left-hand threads.

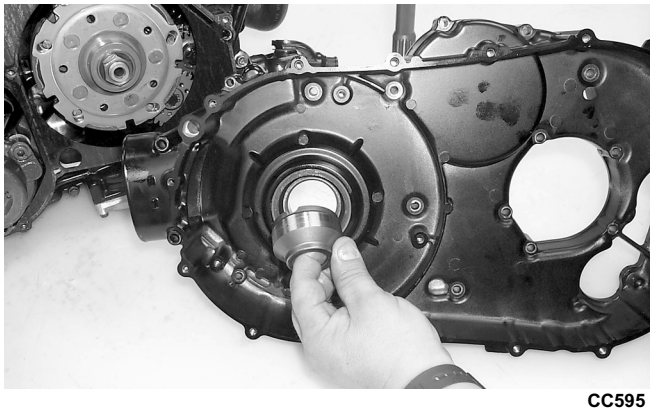


CC604

7. Lightly grease the clutch housing seal; then insert the left fixed drive spacer.



CC597

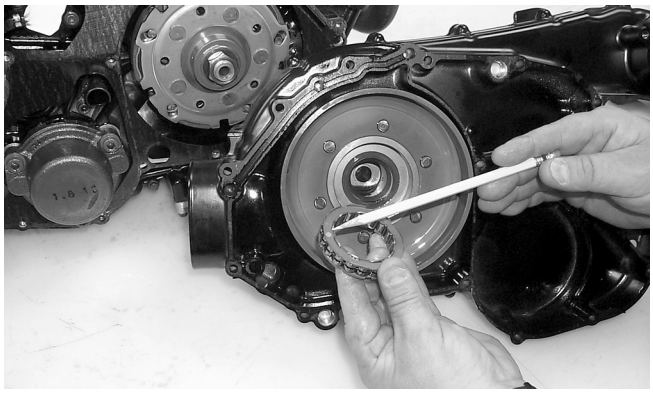


CC595

8. Install the clutch cover alignment pins into the crankcase, apply oil to the cover gasket, and install the gasket onto the crankcase.

9. Apply grease to the outer edges of the clutch housing; then from inside the clutch cover, install the clutch housing into the cover using a rubber mallet.

10. Install the one-way clutch onto the clutch shoe assembly.



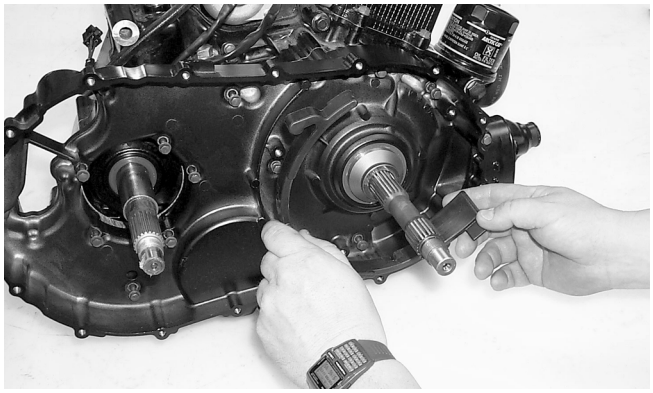
CC592

⚠ CAUTION

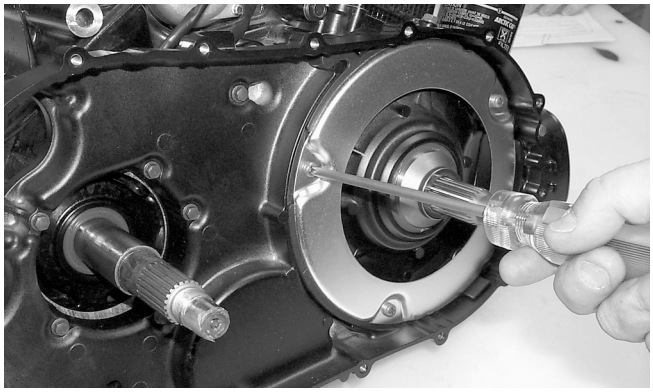
When installed correctly, the green alignment dot (or the word OUTSIDE) on the one-way clutch DOES NOT SHOW.

11. Place the clutch cover/clutch housing assembly into position on the crankcase; then secure with the cap screws making sure the different-lengthed cap screws are in their proper location. Tighten to 1.1 kg-m (8 ft-lb).

12. Place the air intake plate cushion into position; then install the air intake plate. Tighten the Phillips-head screws (threads treated with a small amount of red Loctite #271) securely.

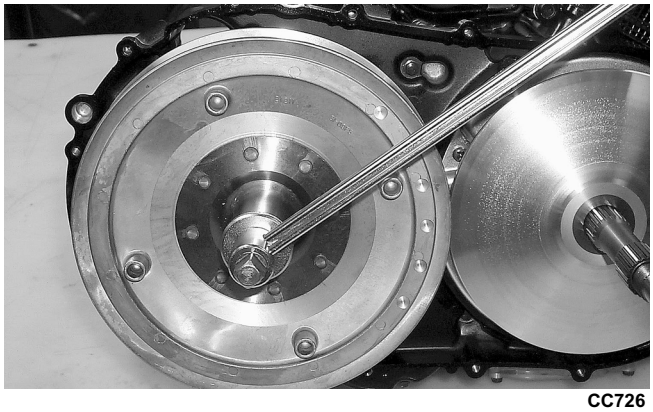


CC589



CC586

13. Place the fixed driven assembly into position and secure with the nut. Tighten to 10.4-11.8 kg-m (75-85 ft-lb).



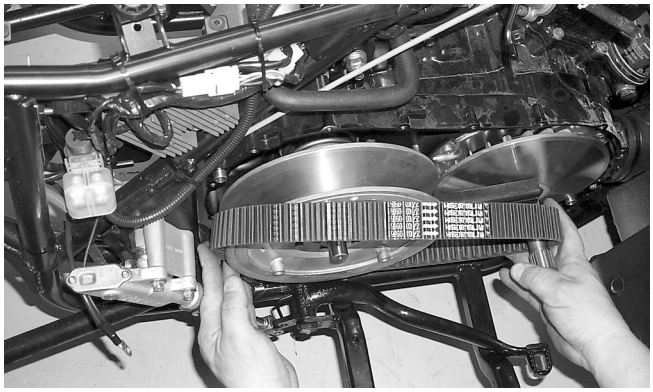
CC726

14. Slide the fixed drive face onto the shaft.

15. Spread the faces of the driven clutch by pushing the inner face toward the engine while turning it counterclockwise; then when the faces are separated, insert a wedge (approximately 3/8 in. thick) between the faces. Release the inner face.

CC549

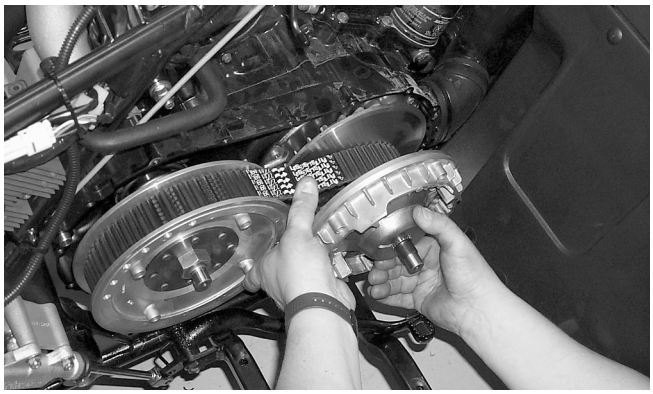
16. Place the V-belt into position on the driven clutch and over the front shaft.



CC550

■ **NOTE: The arrows on the V-belt should point forward.**

17. Pinch the V-belt together near its center and slide the spacer and movable drive face onto the shaft. Secure the drive face with a nut (threads coated with red Loctite #271). Tighten the nut to 10.4-11.8 kg-m (75-85 ft-lb).

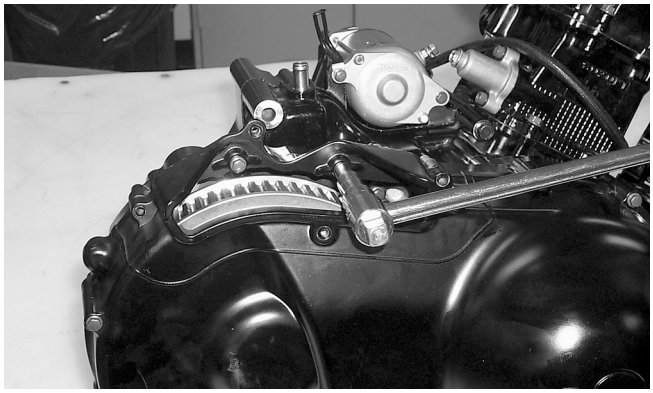


CC552

■ **NOTE: At this point, the wedge can be removed from between the driven clutch faces.**

18. Rotate the V-belt and clutches until the V-belt is flush with the top of the driven clutch.

19. Place the V-belt cover gasket into position; then install the cover and secure with the cap screws making sure the different-lengthed cap screws are in their proper location. Tighten the cap screws to 1.1 kg-m (8 ft-lb).

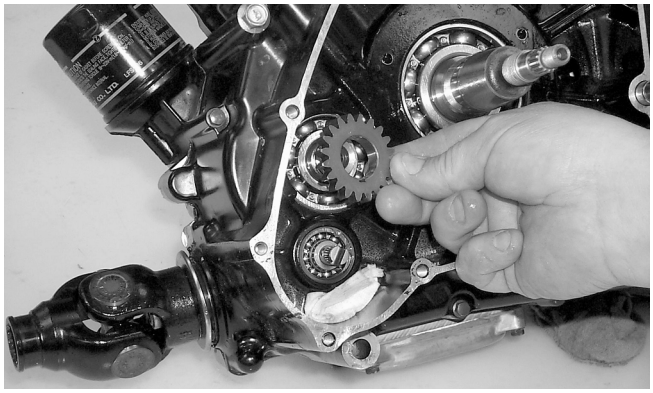


CC736

Installing Left-Side Components

■**NOTE: Plug the oil passage in the crankcase housing prior to installing the drive gear/driven gear assembly to prevent loss of an alignment pin.**

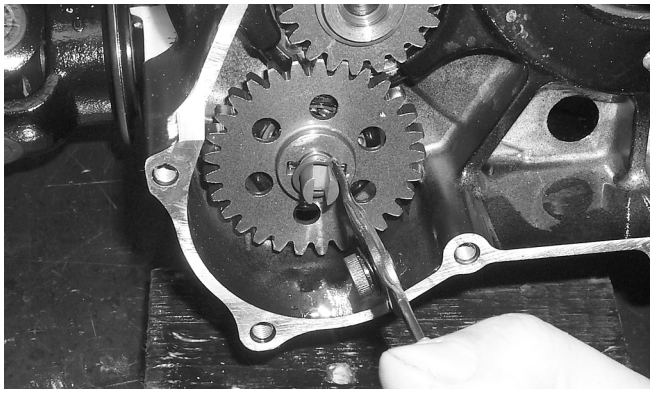
1. Install the water pump drive gear alignment pin and the drive gear (with the flat side of the gear facing outward as noted in removing); then secure with the snap ring.



CC641

■**NOTE: The sharp side of the snap ring should be facing outward.**

2. Install the water pump driven gear alignment pin and the driven gear (with the beveled side of the gear facing outward as noted in removing); then secure with the snap ring.

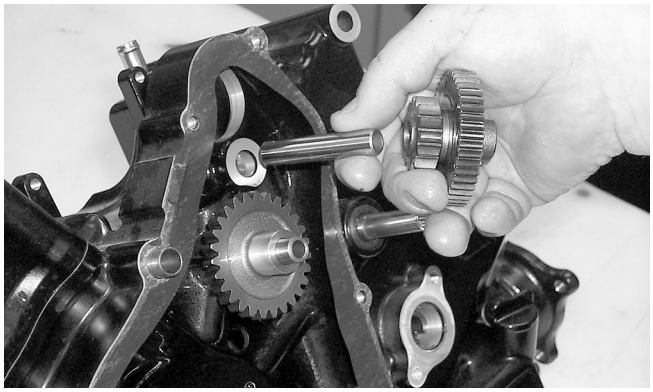


CC845

■**NOTE: The sharp side of the snap ring should be facing outward.**

■**NOTE: Once the gears are secured, remove the oil passage plug from the crankcase.**

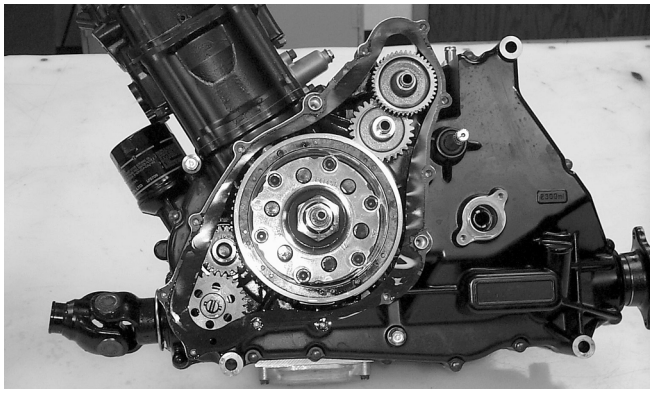
3. Install the two starter gear shafts; then install the two starter gears (with the beveled side of the intermediate gear facing inward as noted in removing).



CC636

4. In order on the crankshaft, install a washer, ring gear, key, and the magneto rotor. Secure with the nut (threads coated with red Loctite #271). Tighten to 16 kg-m (116 ft-lb).

5. Lubricate the magneto cover gasket with fresh engine oil; then place it into position on the two dowel pins.



CC629

6. Install the magneto cover and secure with existing hardware. Tighten to 1.1 kg-m (8 ft-lb).

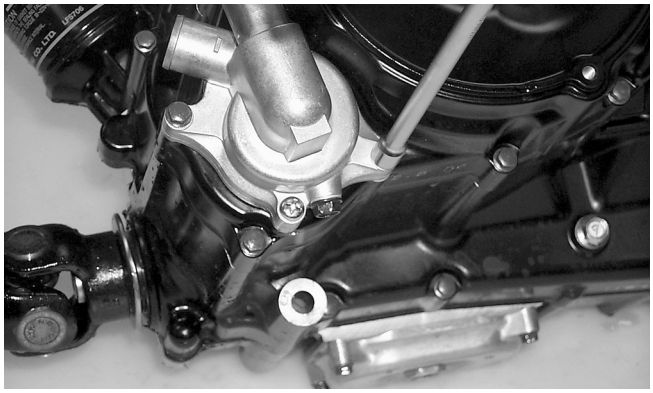
7. Place the speedometer gear housing and gasket into position and secure with the two cap screws. Tighten securely.

CC709

⚠ CAUTION

Make sure the speedometer gear and output shaft gear match up during assembly.

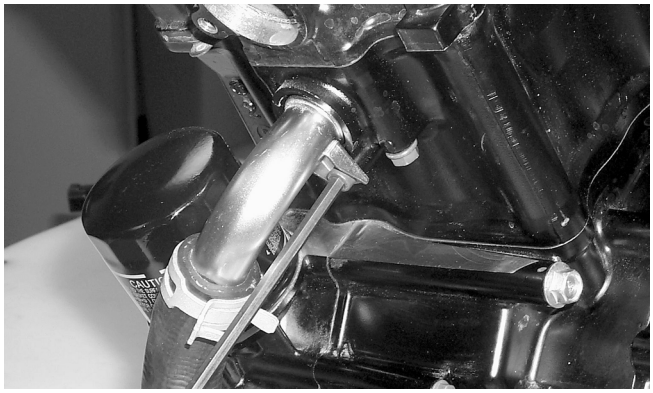
8. Place the water pump into position and secure with two cap screws. Tighten securely.



CC623

9. Install the crossover tube on the water pump and cylinder head making sure the O-ring is properly positioned.

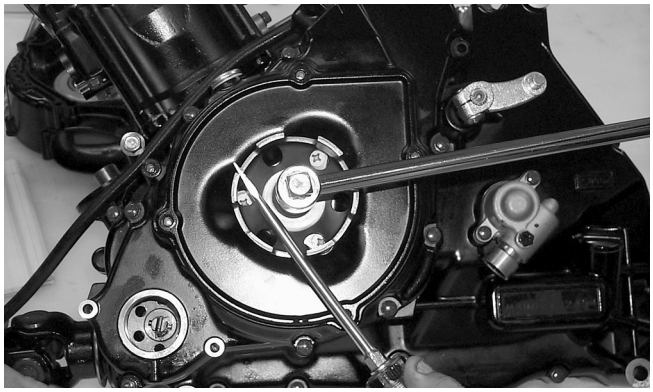
CC619



CC620

10. Install the shift arm on the shift arm shaft making sure the scribed marks (from removing) are aligned. Tighten securely.

11. Place the starter cup into position on the crankshaft making sure a new, lubricated O-ring is inside the cup. Tighten the flange nut to 3.5 kg-m (25 ft-lb).



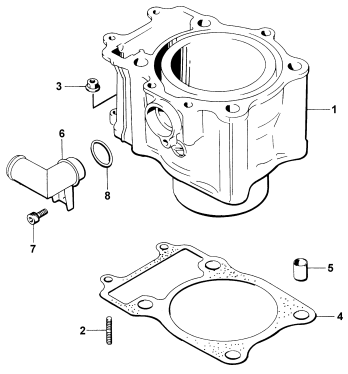
CC710

12. Place the gasket and recoil starter assembly into position on the left-side cover; then tighten four cap screws to 0.8 kg-m (6 ft-lb).

Installing Top-Side Components

A. Piston
B. Cylinder

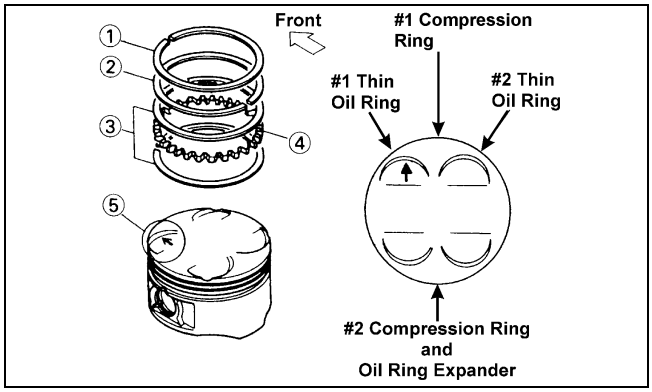
KEY
1. Cylinder
2. Stud Bolt
3. Nut
4. Cylinder Gasket
5. Pin
6. Water Hose Union
7. Cap Screw
8. O-Ring



0732-301

■ **NOTE: If the piston rings were removed, install them in this sequence.**

A. Install a thin oil ring, corrugated oil ring, and thin oil ring in the bottom groove of the piston.



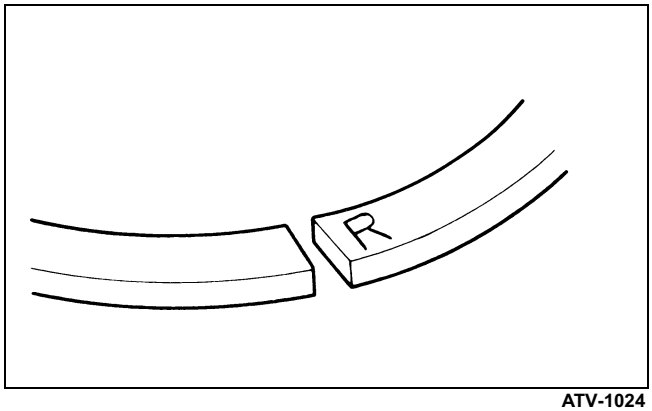
ATV-1085

B. Stagger the gaps of the upper and lower thin rings.

■**NOTE: To be installed correctly, the ends of the corrugated oil ring must touch.**

⚠ CAUTION

Install the middle and upper oil rings so the letter on the top surface of each ring faces the dome of the piston.



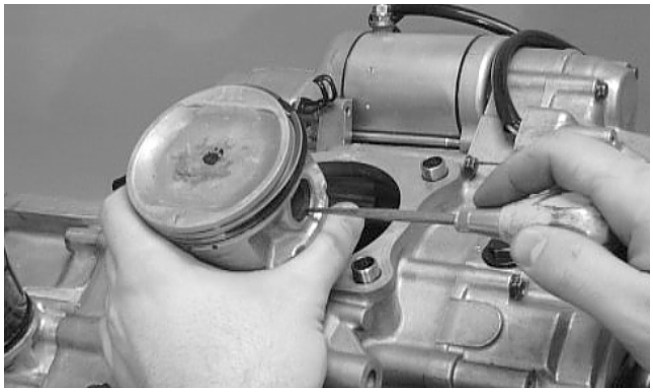
ATV-1024

⚠ CAUTION

Incorrect installation of the piston rings will result in engine damage.

1. Install the piston on the connecting rod making sure there is a circlip on each side and the open end of the circlip faces upwards.

■**NOTE: The piston should be installed so the arrow points toward the front.**


CC032D

2. Place the two alignment pins into position. Place the cylinder gasket into position; then place a piston holder (or suitable substitute) beneath the piston skirt and square the piston in respect to the crankcase.

CC025D

3. Lubricate the inside wall of the cylinder; then using a ring compressor or the fingers, compress the rings and slide the cylinder over the piston. Route the cam chain up through the cylinder cam chain housing; then remove the piston holder and seat the cylinder firmly on the crankcase.

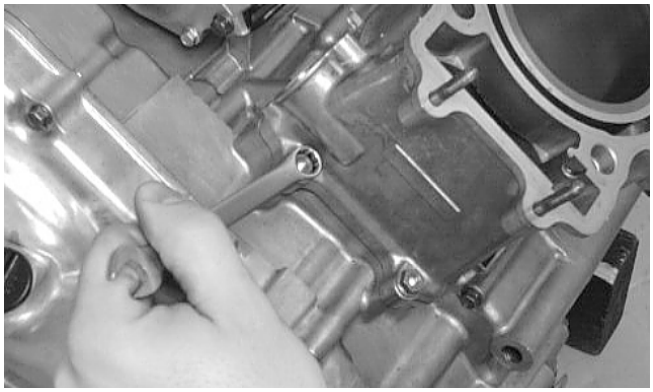
⚠ CAUTION

The cylinder should slide on easily. Do not force the cylinder or damage to the piston, rings, cylinder, or crankshaft assembly may occur.

CC024D

4. Loosely install the two nuts which secure the cylinder to the crankcase.

■**NOTE: The two cylinder-to-crankcase nuts will be tightened in step 10.**



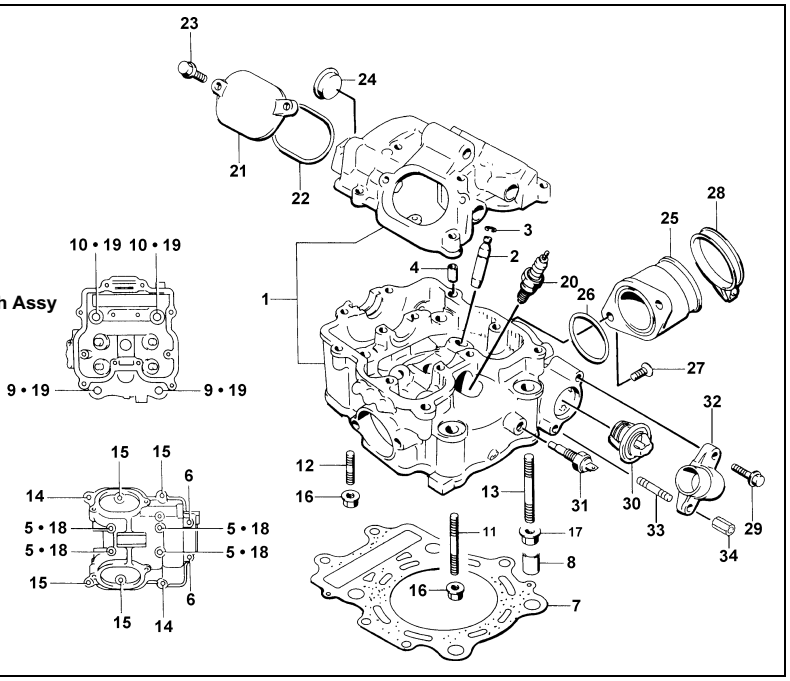
CC023D

5. Install the coolant hose onto the crankcase union and tighten the clamp.

C. Cylinder Head
D. Valve Cover

KEY

1. Cylinder Head Assy
2. Valve Guide
3. Circlip
4. Pin
5. Cap Screw
6. Cap Screw
7. Cylinder Head Gasket
8. Pin
9. Cap Screw
10. Cap Screw
11. Cylinder Head Stud Bolt
12. Cylinder Head Stud Bolt
13. Stud Bolt
14. Cap Screw
15. Cap Screw
16. Nut
17. Nut
18. Gasket
19. Head Nut Gasket
20. Spark Plug
21. Inspection Cap
22. O-Ring
23. Cap Screw
24. Cylinder Head Plug
25. Intake Pipe Assy
26. O-Ring
27. Cap Screw
28. Clamp
29. Cap Screw
30. Thermostat
31. Water Temperature Switch Assy
32. Thermostat Cover
33. Thermostat Cover Stud
34. Nut



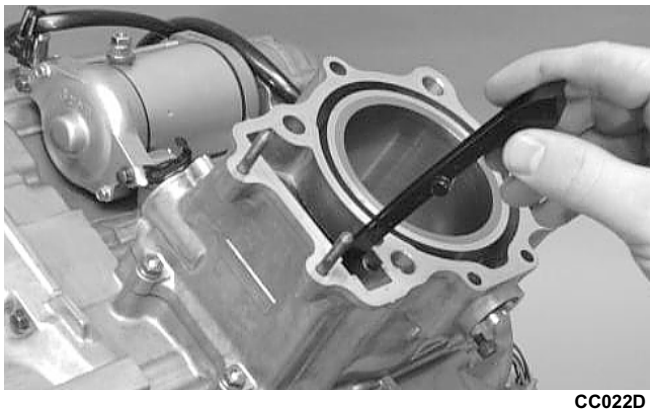
0734-324

■**NOTE: Steps 1-5 in the preceding sub-section must precede this procedure.**

6. Place the chain guide into the cylinder.

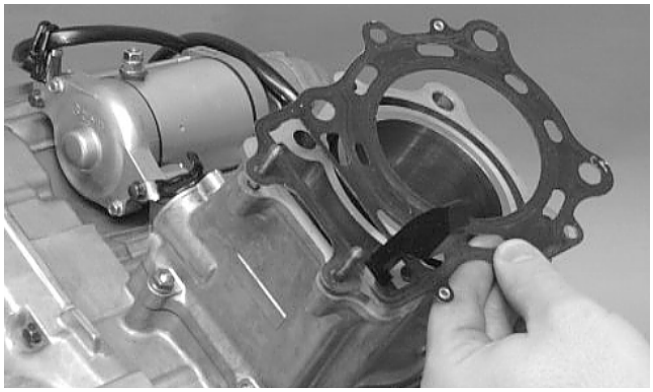
⚠ CAUTION

Care should be taken that the bottom of the chain guide is secured in the crankcase boss.

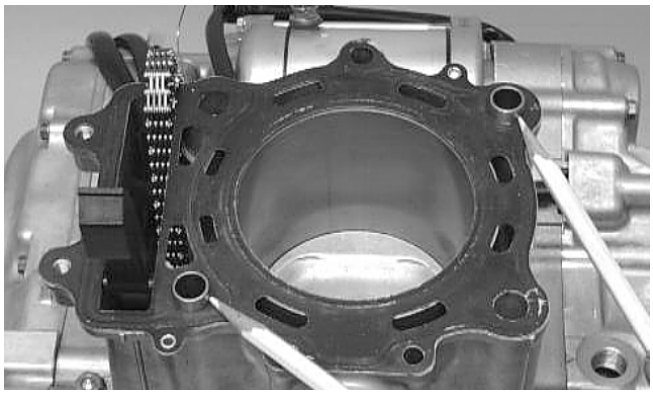


CC022D

7. Place the head gasket into position on the cylinder. Place the alignment pins into position; then place the head assembly into position on the cylinder.

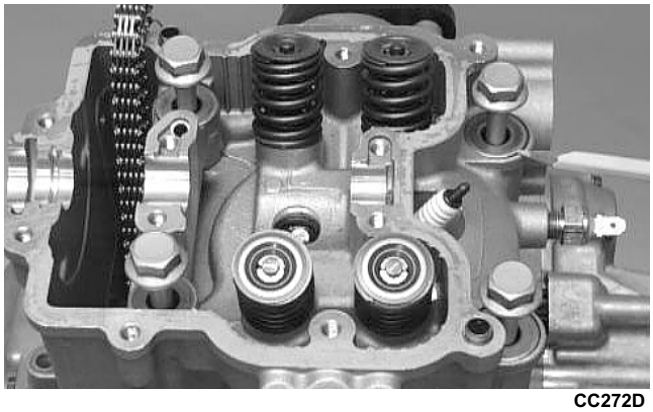


CC020D



CC265D

8. Install the four cylinder head cap screws with copper washers (note the locations of the different-lengthed cap screws). Tighten only until snug.



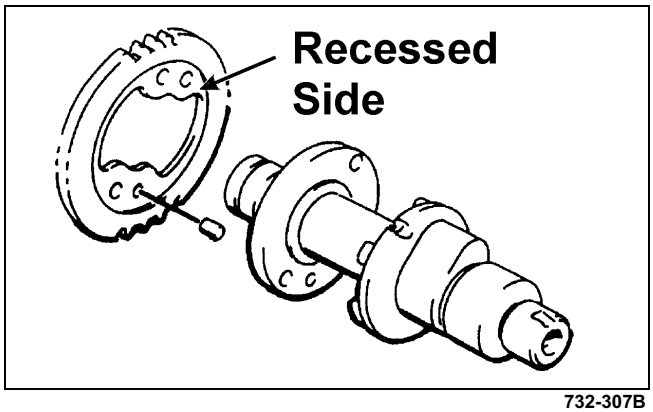
CC272D

9. Loosely install the five cylinder head nuts.

10. In a crisscross pattern, tighten the four cylinder head cap screws to 3.8 kg-m (27.5 ft-lb); then tighten the 8 mm nut to 2.5 kg-m (18 ft-lb). Using a crisscross pattern, tighten the 6 mm nuts to 1.1 kg-m (8 ft-lb). Tighten the two cylinder-to-crankcase nuts securely.

11. With the timing inspection plug removed and the chain held tight, rotate the crankshaft until the piston is at top-dead-center.

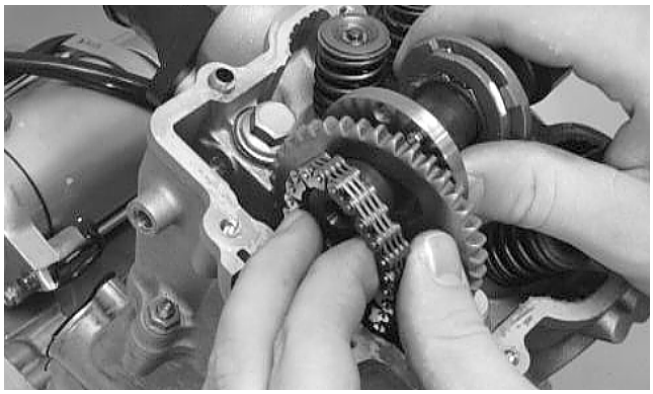
12. With the alignment pin installed in the camshaft, loosely place the cam sprocket (with the recessed side facing the cam shaft lobes) onto the camshaft. At this point, do not "seat" the sprocket onto the shaft.



732-307B

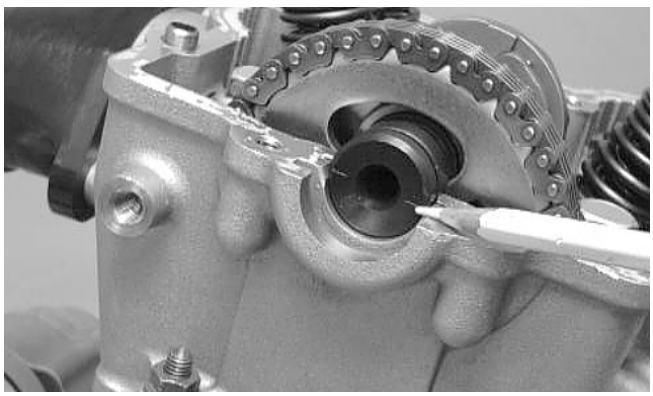
■ **NOTE: At this point, oil the camshaft bearings, cam lobes, and the three seating journals on the cylinder.**

13. With the cam lobes directed down (toward the piston), maneuver the camshaft/sprocket assembly through the chain and towards its seating position; then loop the chain over the sprocket.



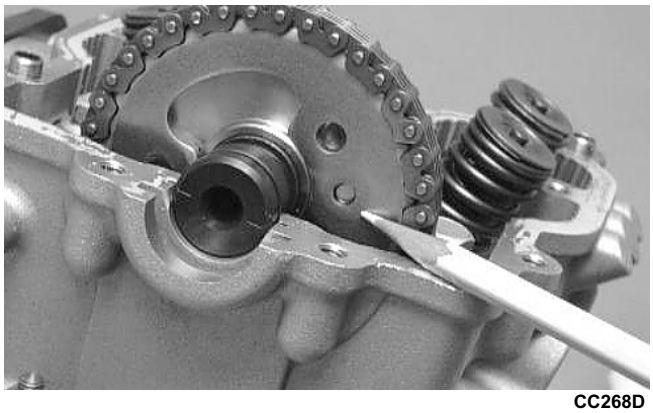
CC015D

■ **NOTE: Note the position of the alignment marks on the end of the camshaft. They must be parallel with the valve cover mating surface. If rotating the camshaft is necessary for alignment, do not allow the chain and sprocket to rotate and be sure the cam lobes end up in the down position.**



CC267D

14. Seat the cam sprocket onto the camshaft making sure the alignment pin in the camshaft aligns with the smallest hole in the sprocket; then place the camshaft/sprocket assembly onto the cylinder ensuring the following.



CC268D

A. Piston still at top-dead-center.

B. Camshaft lobes directed down (toward the piston).

C. Camshaft alignment marks parallel to the valve cover mating surface.

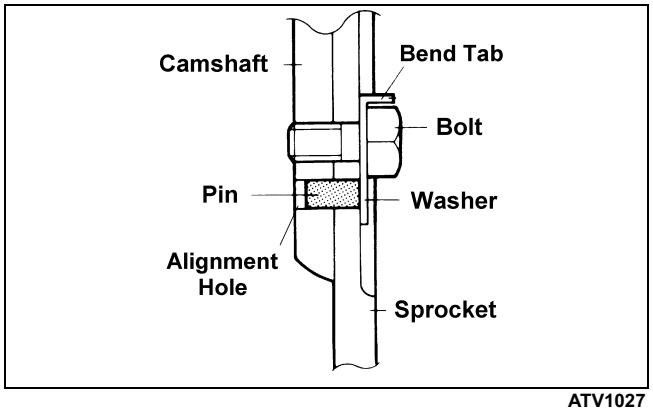
D. Recessed side of the sprocket directed toward the cam lobes.

E. Camshaft alignment pin and sprocket alignment hole (smallest) are aligned.

⚠ CAUTION

If any of the above factors are not as stated, go back to step 11 and carefully proceed.

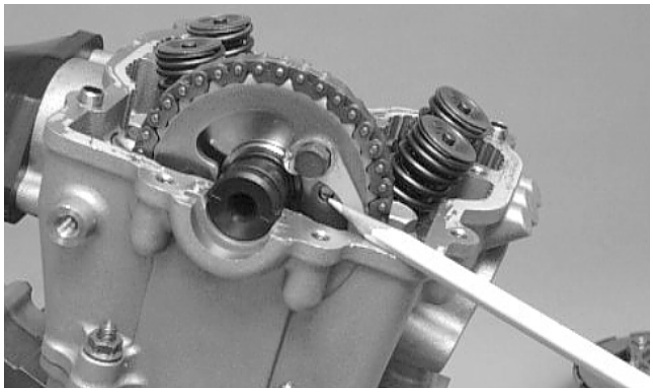
15. Place the tab-washer onto the sprocket making sure it covers the pin in the alignment hole.



ATV1027

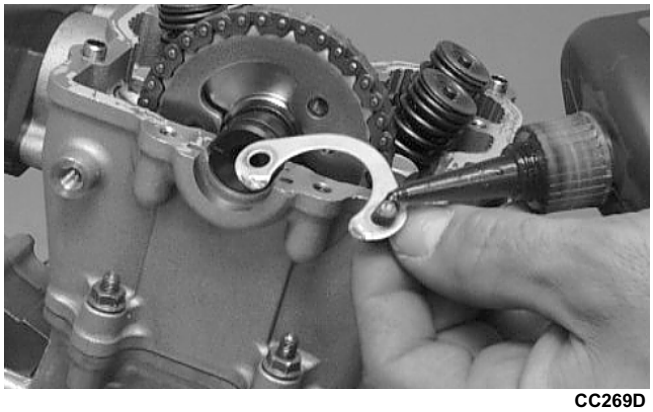
⚠ CAUTION

Care must be taken that the tab-washer is installed correctly to cover the alignment hole on the sprocket. If the alignment pin falls out, severe engine damage will result.



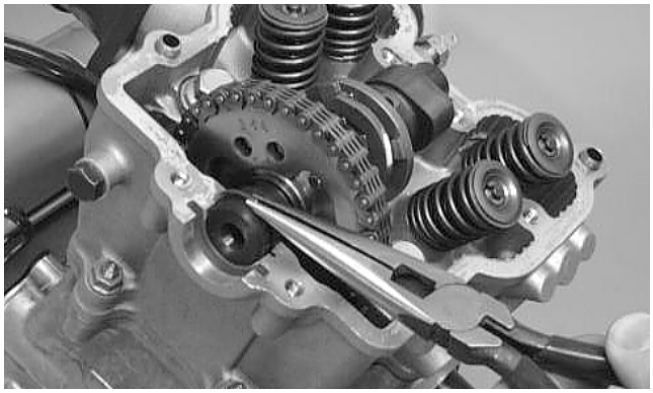
CC270D

16. Install the first cap screw (coated with red Loctite #271) securing the sprocket and tab-washer to the cam shaft. Tighten only until snug.



CC269D

17. Place the C-ring into position in its groove in the cylinder.

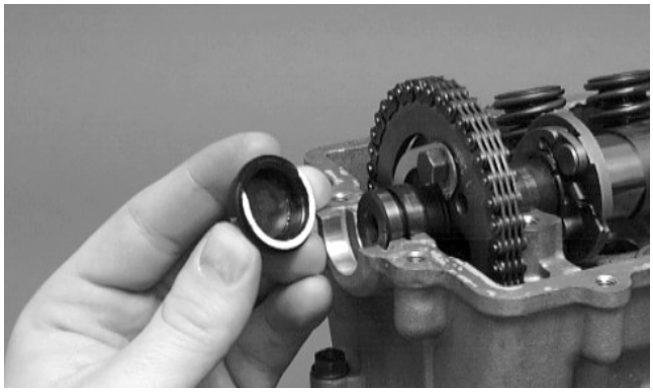


CC012D

18. Install the cylinder head plug in the cylinder head with the open end facing upward and toward the inside.

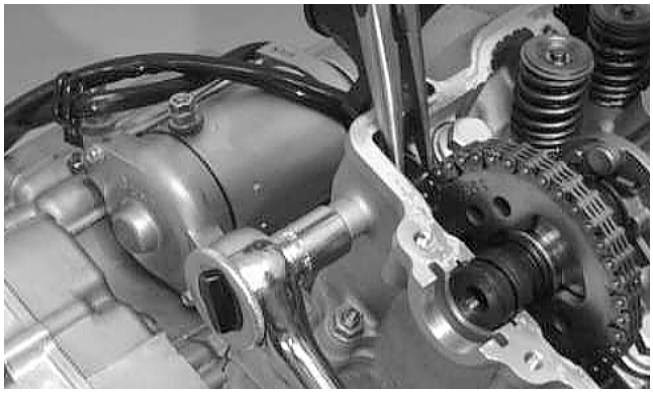
⚠ CAUTION

The open end of the plug must be positioned upward.



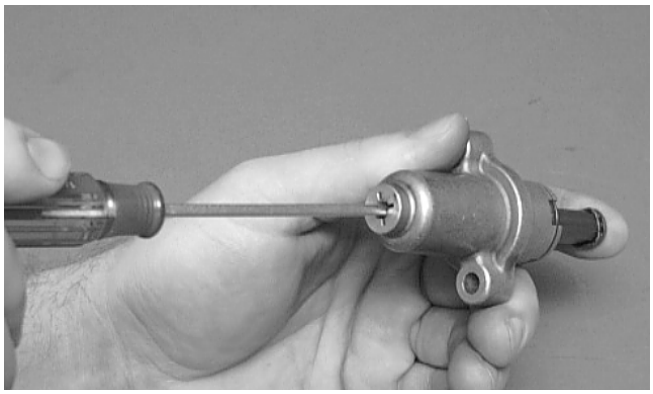
CC274D

19. Place the chain tensioner into position and secure with the cap screw and washer.



CC014D

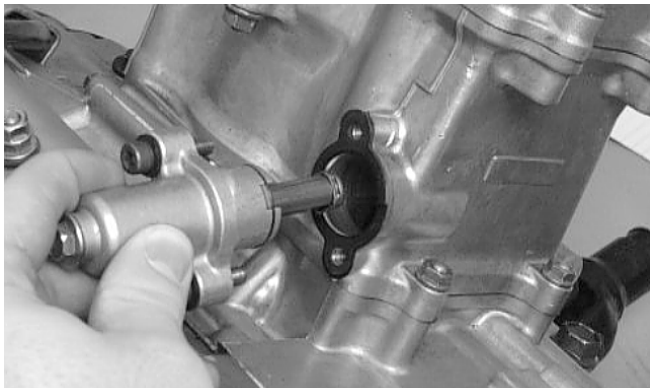
20. Remove the cap screw from the end of the chain tensioner; then using a flat-blade screwdriver, rotate the adjuster screw inside the tensioner clockwise until the screw bottoms.



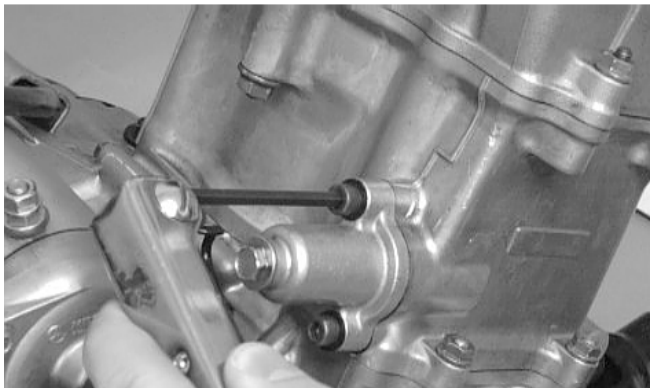
CC309D

■ **NOTE: The adjuster shaft will be drawn into the tensioner as the adjuster screw is rotated clockwise. The adjuster shaft tension will be released in step 22.**

21. Place the chain tensioner adjuster assembly and gasket into position on the cylinder and secure with the two Allen-head cap screws.

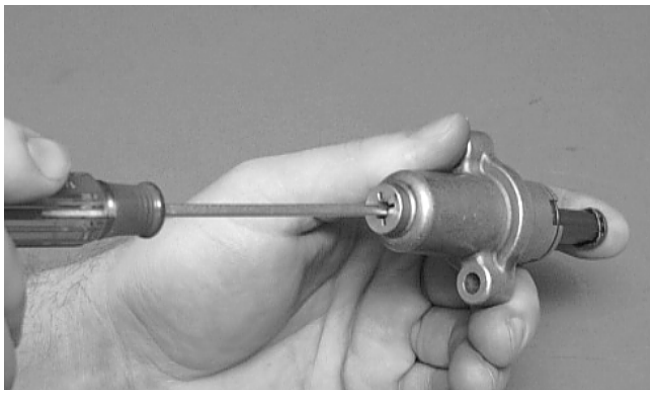


CC011D

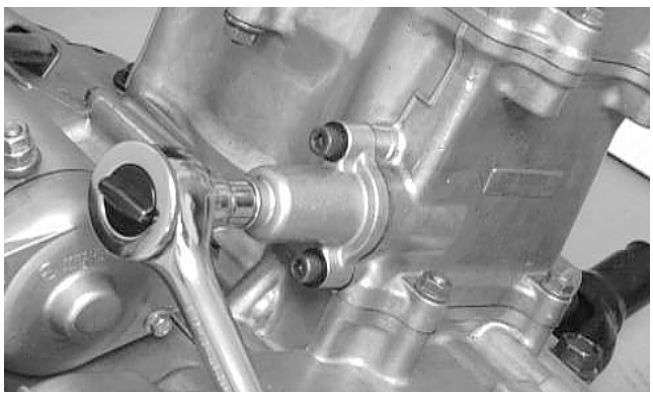


CC010D

22. Using a flat-blade screwdriver, rotate the adjuster screw inside the tensioner counterclockwise until all tension is released; then install the cap screw into the end of the chain tensioner.



CC309D



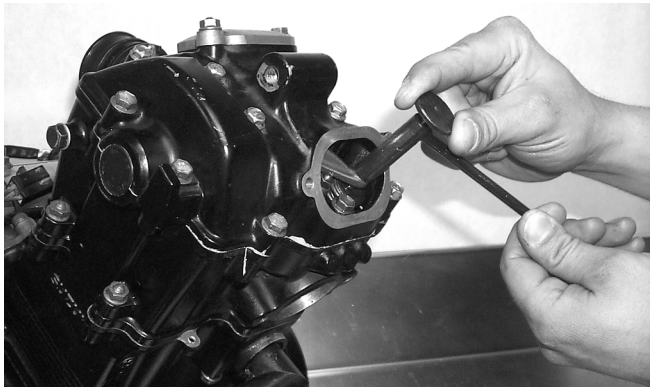
CC009D

3

23. Rotate the crankshaft until the second cap screw securing the sprocket to the camshaft can be installed; then install the cap screw (coated with red Loctite #271) and tighten to 1.5 kg-m (11 ft-lb). Bend the tab to secure the cap screw.

24. Rotate the crankshaft until the first cap screw securing the sprocket to the camshaft can be addressed; then tighten to 1.5 kg-m (11 ft-lb). Bend the tab to secure the cap screw.

25. Loosen the four adjuster screw jam nuts; then loosen the four adjuster screws on the rocker arms in the valve cover.



CC528D

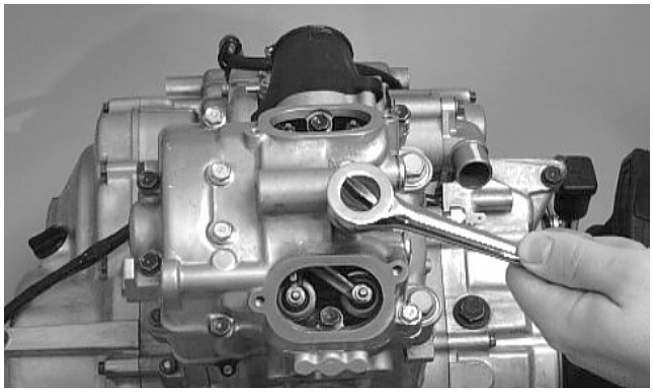
26. Apply a thin coat of Three Bond Sealant (p/n 0636-070) to the mating surfaces of the cylinder head and valve cover.

CC275D

27. Place the valve cover into position.

■NOTE: At this point, the rocker arms and adjuster screws must not have pressure on them.

28. Install the four top side cap screws with rubber washers; then install the remaining cap screws. Tighten only until snug.



CC003D

29. In a crisscross pattern starting from the center and working outward, tighten the cap screws securely.

30. Adjust valve/tappet clearance using the following procedure.

■NOTE: Use Valve Clearance Adjuster (p/n 0444-078) for this procedure.

A. Turn the engine over until the piston reaches top dead center on the compression stroke.

B. Place the valve adjuster onto the jam nut securing the tappet adjuster screw; then rotate the valve adjuster dial clockwise until the end is seated in the tappet adjuster screw.

C. While holding the valve adjuster dial in place, use the valve adjuster handle and loosen the jam nut; then rotate the tappet adjuster screw clockwise until friction is felt.

D. Align the valve adjuster handle with one of the marks on the valve adjuster dial.

E. While holding the valve adjuster handle in place, rotate the valve adjuster dial counterclockwise until proper valve/tappet clearance is attained.

■NOTE: Refer to the appropriate Specifications for the proper valve/tappet clearance.

■NOTE: Rotating the valve adjuster dial counter-clockwise will open the valve/tappet clearance by 0.05 mm (0.002 in.) per mark.

F. While holding the adjuster dial at the proper clearance setting, tighten the jam nut securely with the valve adjuster handle.

31. Place the two tappet covers into position making sure the proper cap screws are with the proper cover. Tighten the cap screws securely.

CC001D

32. If removed, install the spark plug. Tighten to 1.7 kg-m (12 ft-lb).

Installing Engine/Transmission (375/500 Automatic)

■ **NOTE: Arctic Cat recommends that new gaskets and O-rings be installed whenever servicing the ATV.**

1. From the right side, place the engine/transmission into the frame making sure it is properly positioned in the frame with the front and rear driveshafts properly aligned.

2. Slightly raise the front of the engine and insert the front driveshaft coupler.

CC578

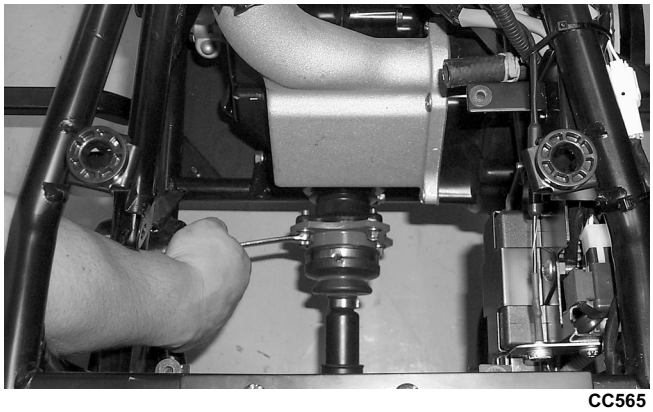
3. Position the two upper rear engine mounts in place on the frame and loosely secure with existing hardware; then install the three engine mounting through-bolts making sure to account for a washer on the upper bolt and a spacer on the lower front bolt. Tighten only until snug.

4. Align the front and rear driveshafts and secure with existing hardware. Tighten only until snug.

5. Secure the front upper engine mount to the frame with the cap screws. Tighten to 2.8 kg-m (20 ft-lb).

6. Secure the upper engine bracket to the engine with the existing cap screw and flange nut. Tighten to 2.8 kg-m (20 ft-lb).

7. Tighten all engine mounting through-bolts to 5.5 kg-m (40 ft-lb); then tighten the cap screws securing the rear CV joint to 2.8 kg-m (20 ft-lb). Tighten the front driveshaft to 5.5 kg-m (40 ft-lb); then tighten the two upper rear engine mounts to 1.7 kg-m (12 ft-lb).

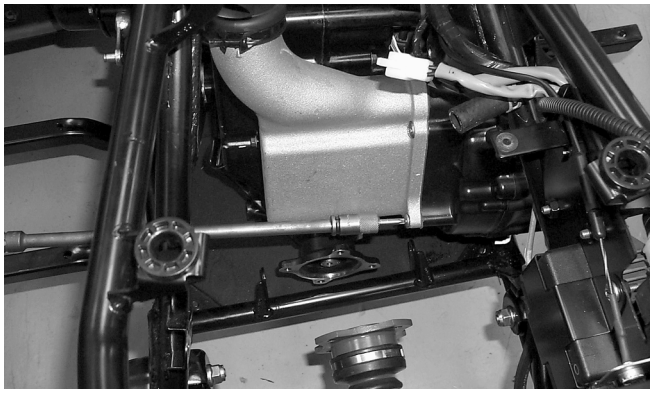


CC565

CC566

8. Secure the exhaust pipe to the engine, frame, and muffler using existing hardware. The cap screws securing the exhaust pipe to the engine and to the frame should be tightened to 2.8 kg-m (20 ft-lb).

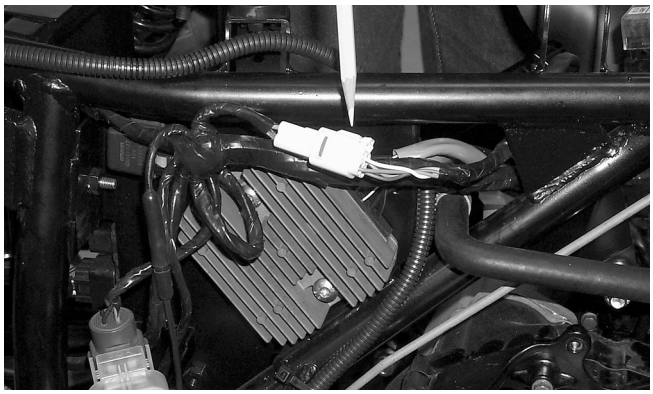
9. Install the left-side clutch plenum with existing hardware making sure the gasket is properly positioned. Tighten securely.



CC579

10. Secure the engine ground wire to the engine with a cap screw. Tighten to 1.1 kg-m (8 ft-lb).

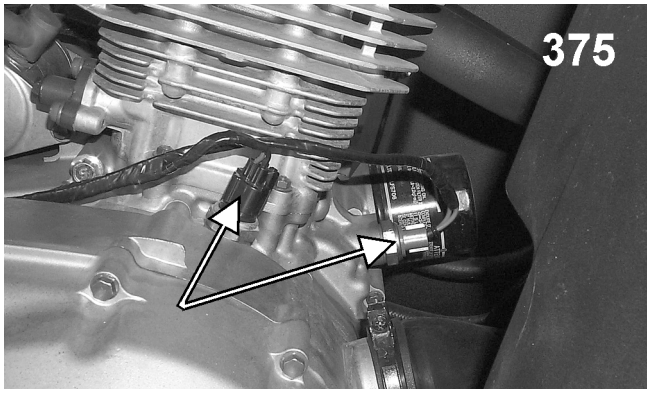
11. Install the shift indicator connector to the main wiring harness.



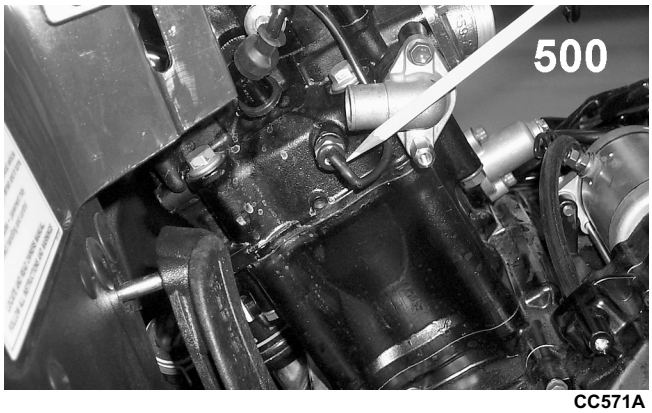
CC573

12. Connect the temperature sensor wire(s) to the engine.

■ **NOTE: On the 375, there are two temperature sensors.**

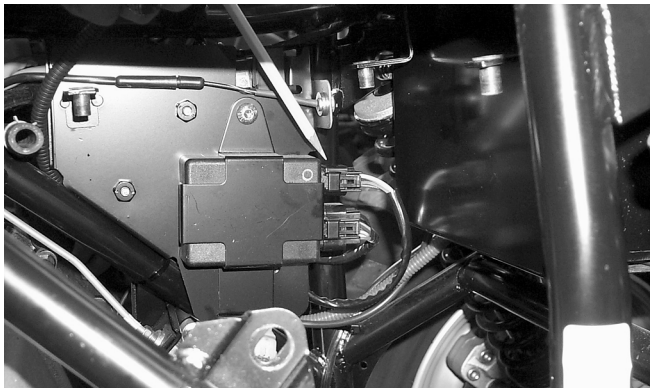


AF964A



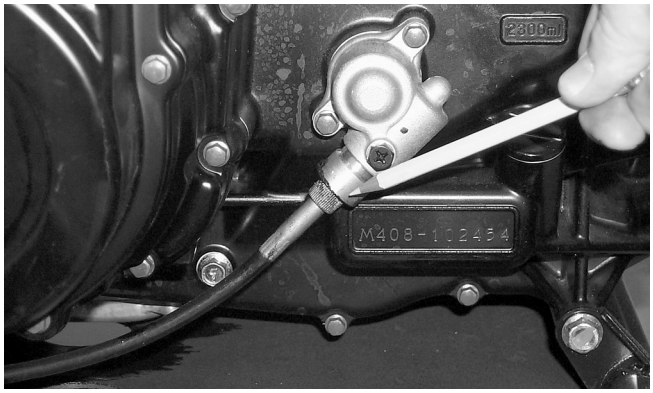
CC571A

13. Secure the stator wires to the CDI unit.



CC569

14. Secure the speedometer cable to the speedometer gear housing.



CC568

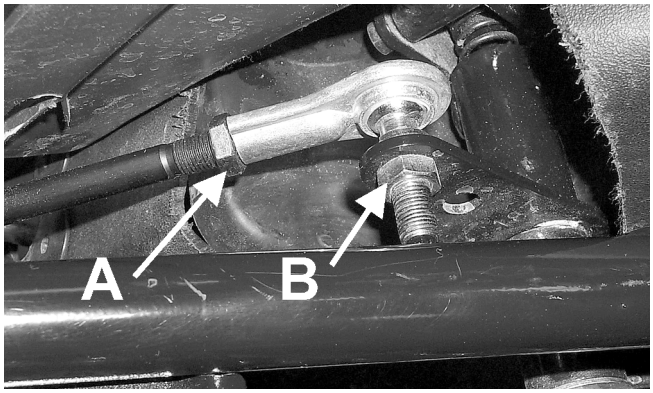
15. Secure the positive cable to the starter motor.

16. Secure all wiring to the frame and upper engine bracket with cable ties.

17. Secure the two coolant/oil hoses to the engine.

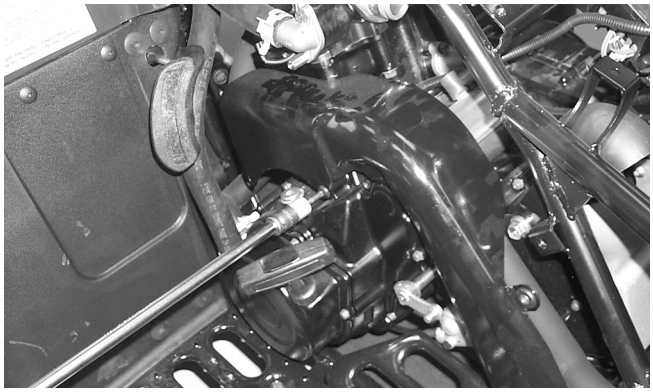
18. Secure the crankcase vent hose to the air cleaner housing.

19. Secure the shift rod to the engine with a new E-clip; then secure the shift rod to the shift lever arm with a new lock nut. Tighten securely.



AF941A

20. Install the exhaust pipe cover and secure with the existing torx-head screws. Tighten securely.



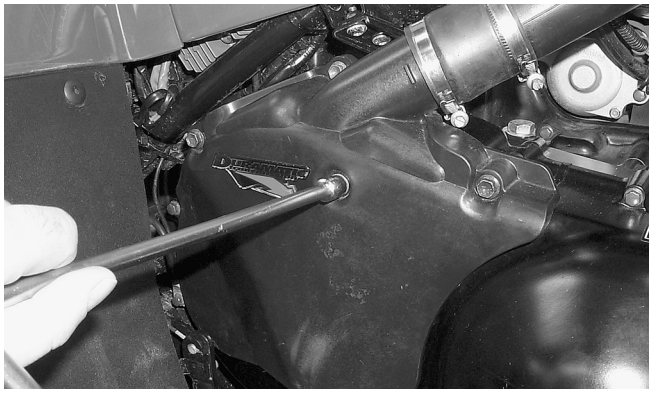
CC560

21. Install the carburetor into the intake hose. Tighten the hose clamp.

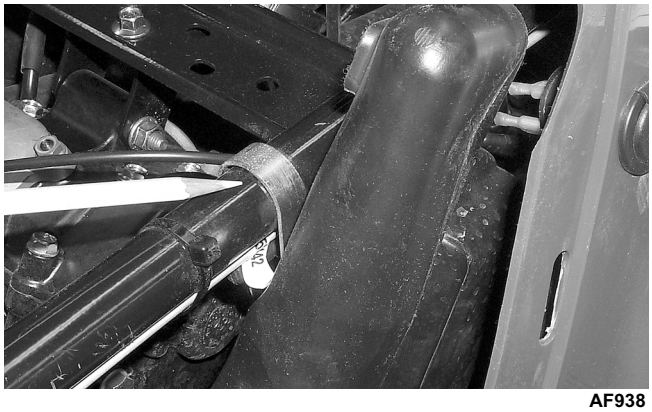
22. Place the footrests in position on the frame; then secure with existing hardware. Tighten the 10 mm cap screws to 5.5 kg-m (40 ft-lb) and the 8 mm cap screws to 2.8 kg-m (20 ft-lb).

23. Secure the fender extensions to the footrest using existing hardware.

24. Install the cooling duct shroud; then secure the cooling duct assembly to the frame.



AF932



AF938

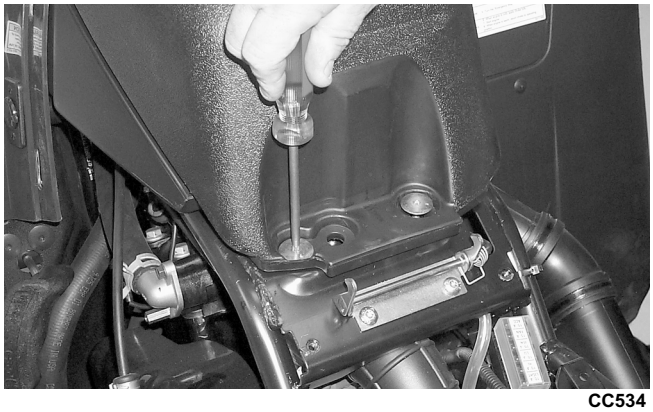
25. Install the air cleaner housing and secure the air intake hose to the carburetor; then secure the crankcase vent hose to the air cleaner housing.

CC536

26. Install the rear rack/fender assembly with existing hardware. Tighten securely.

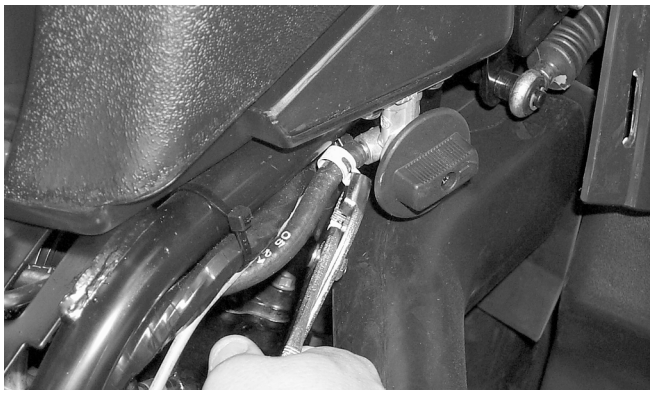
27. Connect the taillight wiring harness to the main harness and secure with cable ties.

28. Install the gas tank; then connect the vent hose.



CC534

29. Connect the fuel hose to the gas tank valve.



CC533

30. Install the left-side and right-side panels.

31. Place the battery into position in the battery compartment; then install the battery cables and vent hose. Secure with the hold-down strap.

⚠ CAUTION

Battery acid is harmful if it contacts eyes, skin, or clothing. Care must be taken whenever handling a battery.

32. Add proper amounts of engine/transmission oil and coolant.

33. Install the seat.

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Servicing Top-Side Components

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

VALVE ASSEMBLY

When servicing valve assembly, inspect valve seats, valve stems, valve faces, and valve stem ends for pits, burn marks, or other signs of abnormal wear.

■NOTE: The technician should reference the appropriate illustration and/or photograph for the model being serviced.

■NOTE: Whenever a valve is out of tolerance, it must be replaced.

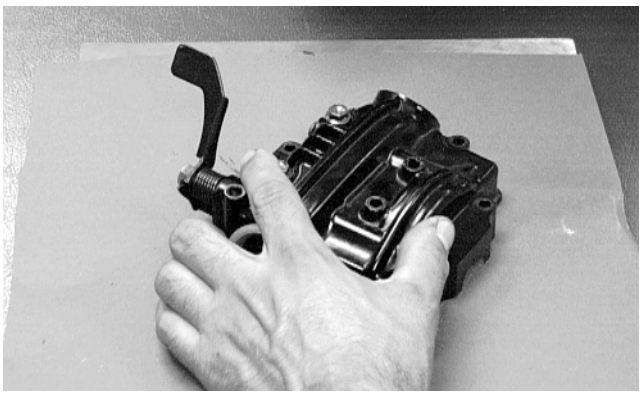
Cleaning/Inspecting Valve Cover

■NOTE: If the valve cover cannot be trued, the cylinder head assembly must be replaced.

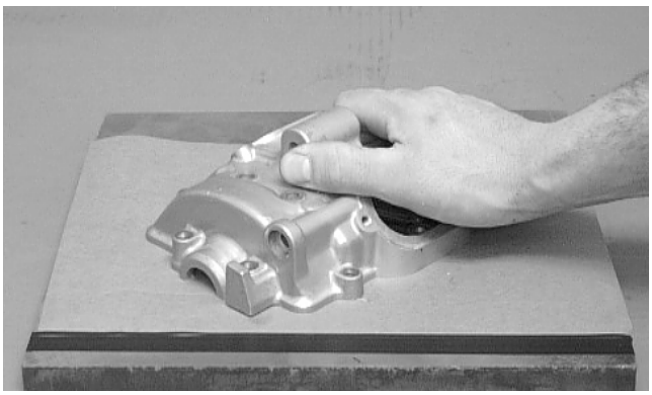
1. Wash the valve cover in parts-cleaning solvent.
2. Place the valve cover on the Surface Plate (p/n 0644-016) covered with #400 grit wet-or-dry sandpaper. Using light pressure, move the valve cover in a figure eight motion. Inspect the sealing surface for any indication of high spots. A high spot can be noted by a bright metallic finish. Correct any high spots before assembly by continuing to move the valve cover in a figure eight motion until a uniform bright metallic finish is attained.

⚠ CAUTION

Do not remove an excessive amount of the sealing surface or damage to the camshaft will result. Always check camshaft clearance when resurfacing the valve cover.



CC385D



CC130D

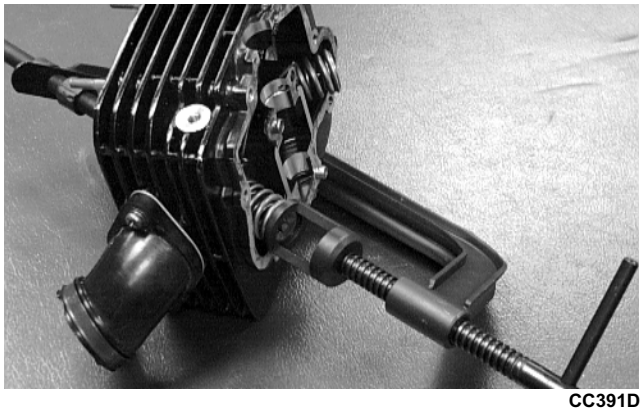
⚠ CAUTION

Water or parts-cleaning solvent must be used in conjunction with the wet-or-dry sandpaper or damage to the sealing surface may result.

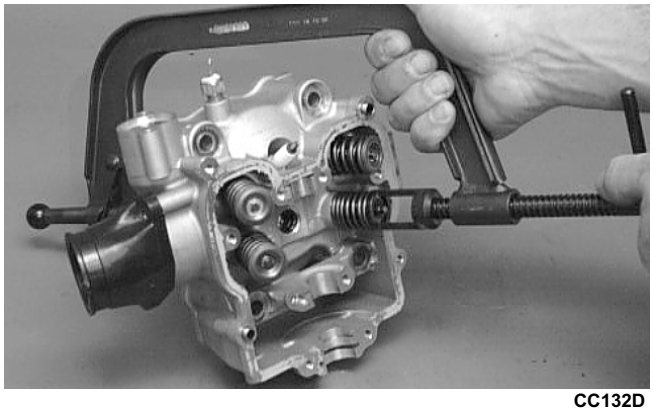
Removing Valves

■ **NOTE: Keep all valves and valve components as a set. Note the original location of each valve set for use during installation. Return each valve set to its original location during installation.**

1. Using a valve spring compressor, compress the valve springs and remove the valve cotters. Account for an upper spring retainer.

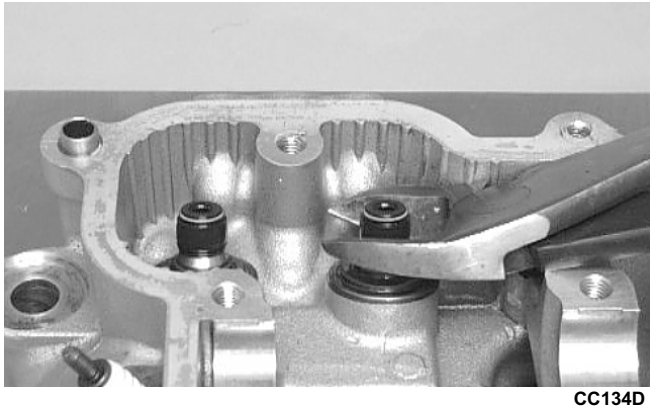


CC391D

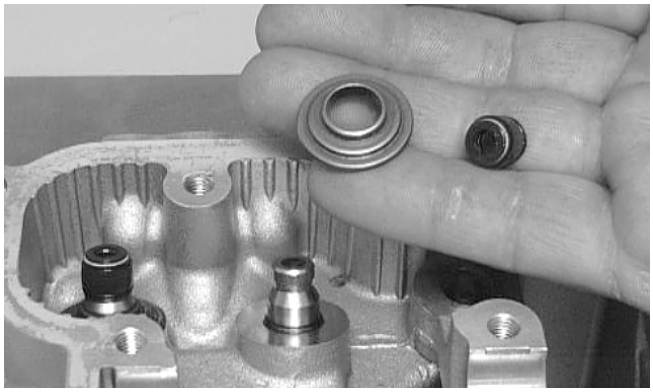


CC132D

2. Remove the valve seal and the lower remaining spring seat. Discard the valve seal.



CC134D



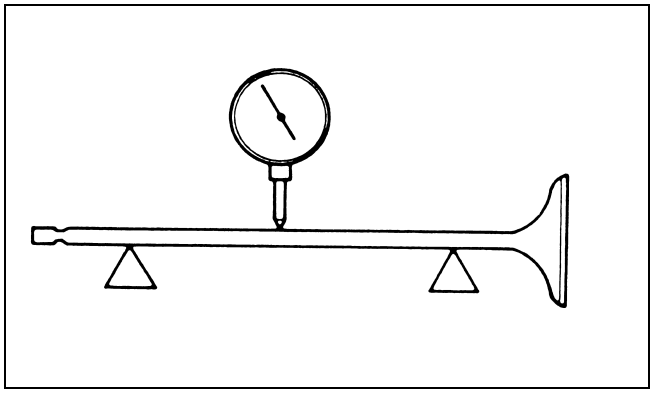
CC136D

■ **NOTE: The valve seals must be replaced.**

3. Remove the valve springs; then invert the cylinder head and remove the valves.

Measuring Valve Stem Runout

1. Support each valve stem end with the V Blocks (p/n 0644-022); then check the valve stem runout using a dial indicator.



ATV-1082

2. Maximum runout is 0.05 mm (0.002 in.).

Measuring Valve Stem Outside Diameter

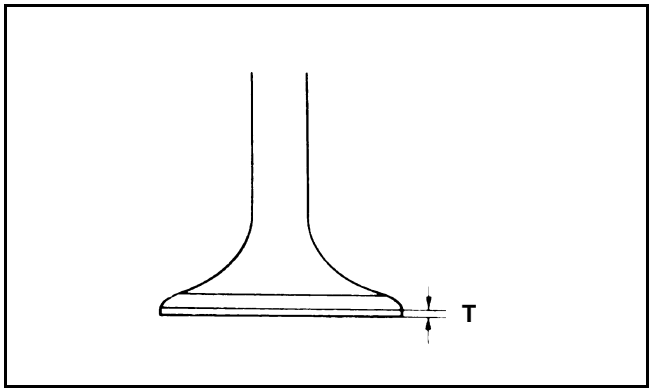
1. Using a micrometer, measure the valve stem outside diameter.

2. Acceptable diameter range (intake valve) is 5.475-5.490 mm (0.2156-0.2161 in.) for the 250/300 and 4.975 - 4.990 mm (0.1959 - 0.1965 in.) for the 375/400/500.

3. Acceptable diameter range (exhaust valve) is 5.455-5.470 mm (0.2148-0.2154 in.) for the 250/300 and 4.955 - 4.970 mm (0.1951 - 0.1957 in.) for the 375/400/500.

Measuring Valve Face/Seat Width

1. Using a micrometer, measure the width of the valve face.



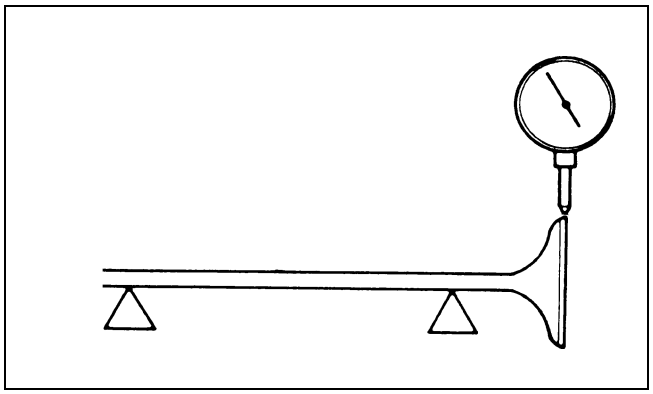
ATV-1004

2. Acceptable width range is 0.9-1.1 mm (0.035-0.043 in.).

Measuring Valve Face Radial Runout

1. Mount a dial indicator on the surface plate; then place the valve stem on a set of V blocks.

2. Position the dial indicator contact point on the outside edge of the valve face; then zero the indicator.



ATV1082A

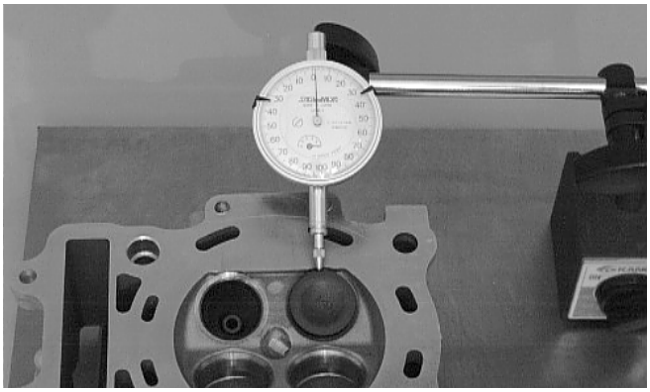
3. Rotate the valve in the V blocks.

4. Maximum runout is 0.03 mm (0.001 in.).

Measuring Valve Guide/Valve Stem Deflection (Wobble Method)

1. Mount a dial indicator and base on the surface plate; then place the cylinder head on the surface plate.

2. Install the valve into the cylinder head; then position the dial indicator contact point against the outside edge of the valve face. Zero the indicator.



CC131D

3. Push the valve from side to side; then from top to bottom.

4. Maximum "wobble" deflection is 0.35 mm (0.014 in.).

Measuring Valve Guide (Inside Diameter)

1. Insert a snap gauge 1/2 way down into each valve guide bore; then remove the gauge and measure it with a micrometer.

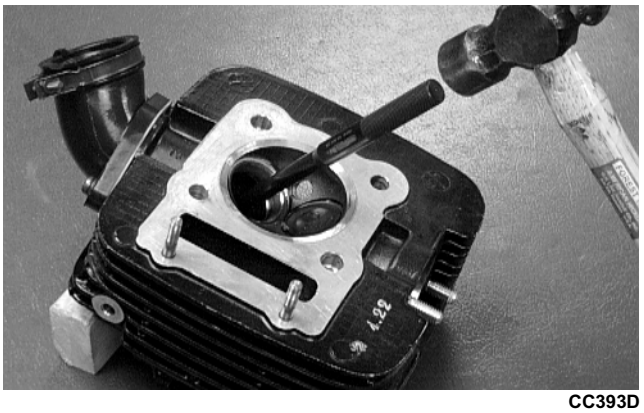
2. Acceptable inside diameter range is 5.500-5.512 mm (0.2165-0.2170 in.) for the 250/300 and 5.000 - 5.012 mm (0.1969 - 0.1973 in.) for the 375/400/500.

3. If a valve guide is out of tolerance, it must be replaced.

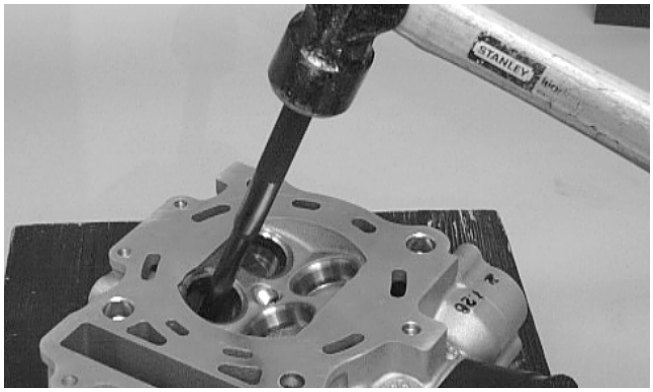
Replacing Valve Guide

■ NOTE: If a valve guide is worn or damaged, it must be replaced.

1. If a valve guide needs replacing, insert a valve guide remover into the valve seat side of the valve guide. Using a hammer, gently drive the valve guide out of the cylinder head.

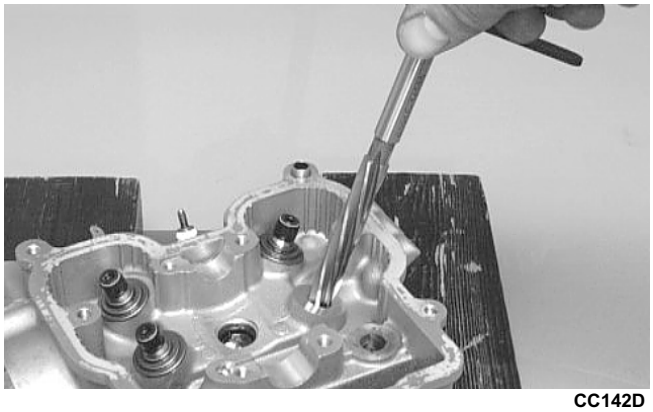


CC393D



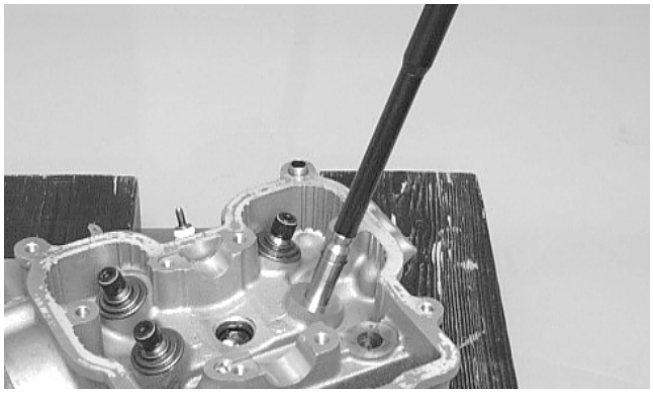
CC137D

2. Using the Standard Valve Guide Reamer (p/n 0444-017), remove any burrs or tight areas from the valve guide journals.



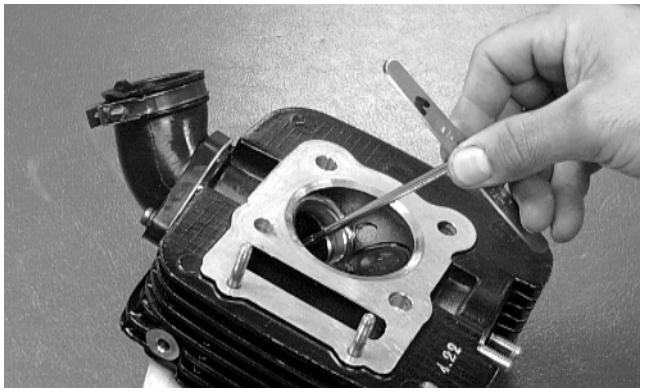
CC142D

3. To install a valve guide, use a valve guide installer and gently drive a valve guide with a retaining clip into the bore from the valve spring side until the retaining clip just contacts the cylinder head.

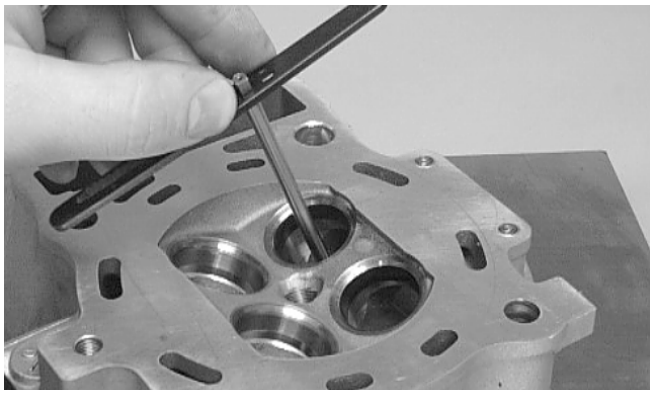


CC143D

4. After installing the guide, use the standard valve guide reamer to remove all burrs and tight areas that may remain in each valve guide.

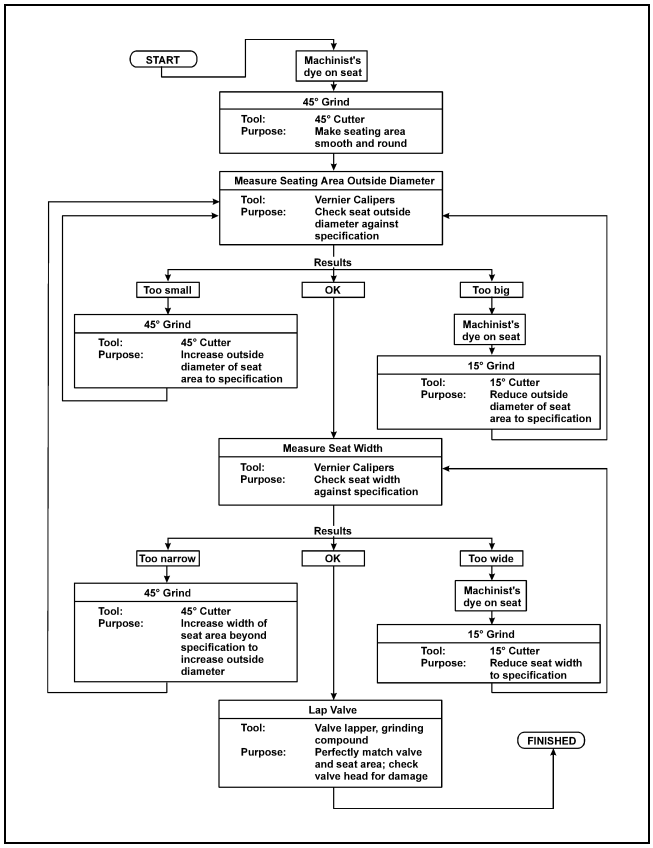


CC394D



CC138D

Valve Seat/Guide Servicing Flow Chart

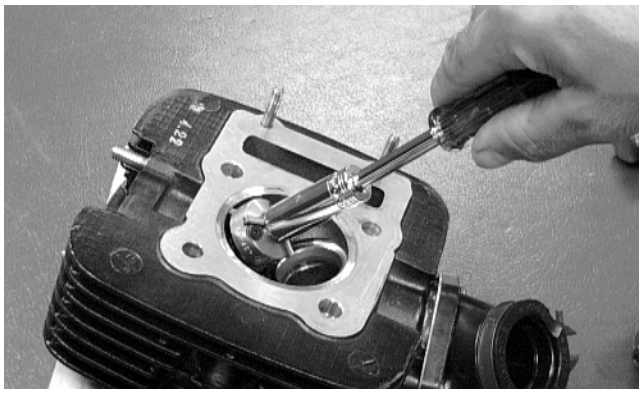


ATV-0107

Grinding Valve Seats

■ **NOTE: If the valve seat is beyond servicing, the cylinder head must be replaced.**

1. Insert an exhaust valve seat pilot shaft into an exhaust valve guide. Slide an exhaust valve seat grinding tool onto the pilot shaft; then using light pressure on a driver handle and a deep socket, grind the exhaust valve seat until within specifications.

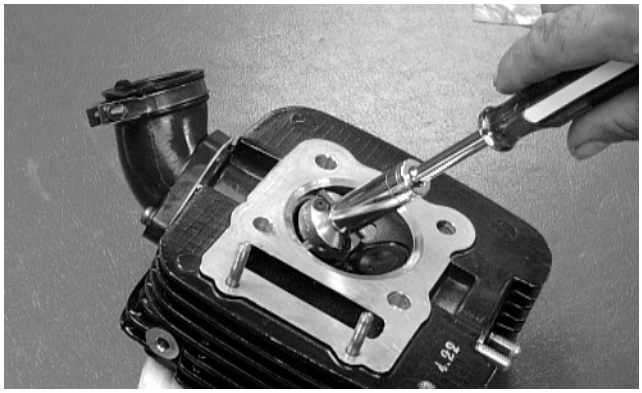


CC396D

■ **NOTE: If applicable, repeat procedure on the remaining exhaust valve.**

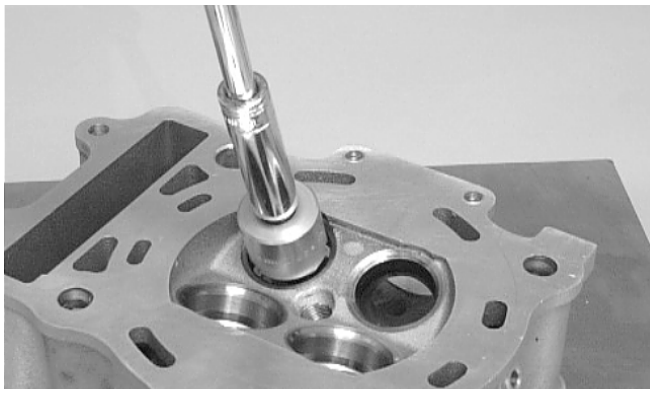
CC139D

2. Insert an intake valve seat pilot shaft into one of the intake valve guides. Slide the intake valve seat grinding tool onto the pilot shaft; then using light pressure on a driver handle and a deep socket, grind the intake valve seat until within specifications.



CC395D

■ **NOTE: If applicable, repeat procedure on the remaining intake valve.**



CC140D

Lapping Valves

■ **NOTE: Do not grind the valves. If a valve is damaged, it must be replaced.**

1. Remove all carbon from the valves.
2. Lubricate each valve stem with light oil; then apply a small amount of valve lapping compound to the entire seating face of each valve.
3. Attach the suction cup of a valve lapping tool to the head of the valve.
4. Rotate the valve until the valve and seat are evenly polished.
5. Clean all compound residue from the valve and seat.

Measuring Rocker Arm (Inside Diameter)

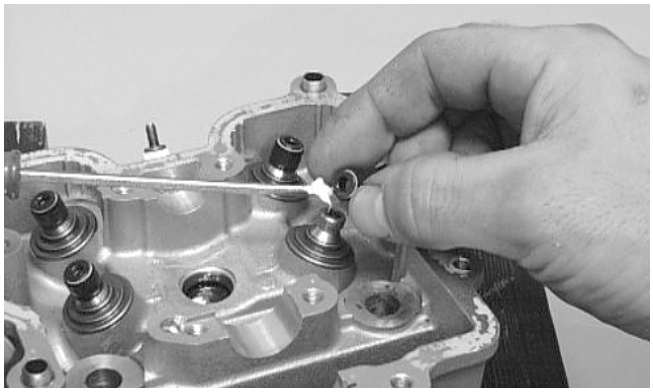
1. Using a dial calipers, measure the inside diameter of the rocker arm.
2. Acceptable inside diameter range is 12.000-12.018 mm (0.472-0.473 in.).

Measuring Rocker Arm Shaft (Outside Diameter)

1. Using a micrometer, measure the outside diameter of the rocker arm shaft.
2. Acceptable outside diameter range is 11.977-11.995 mm (0.4715-0.4722 in.) for the 250/300 and 11.973-11.984 mm (0.4714-0.4718 in.) for the 375/400/500.

Installing Valves

1. Apply grease to the inside surface of the valve seals; then place a lower spring seat and valve guide seal over each valve guide.

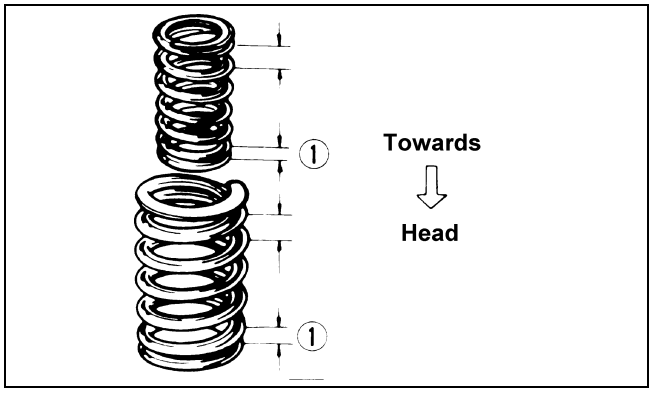


CC144D

2. Insert each valve into its original valve location.

3. Install the valve springs with the painted end of the spring facing away from the cylinder head.

■ **NOTE: If the painted end is not visible, install the ends of the springs with the closest coils toward the head.**

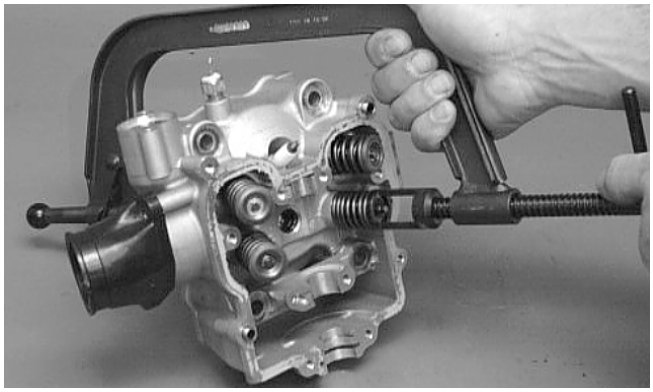


ATV-1011

■ **NOTE: The 250 has only the larger spring.**

4. Place a spring retainer over the valve springs; then using the valve spring compressor, compress the valve springs and install the valve cotters.

CC391D



CC132D

PISTON ASSEMBLY

■ **NOTE: Whenever a piston, rings, or pin are out of tolerance, they must be replaced.**

Cleaning/Inspecting Piston

1. Using a non-metallic carbon removal tool, remove any carbon buildup from the dome of the piston.

2. Inspect the piston for cracks in the piston pin, dome, and skirt areas.

3. Inspect the piston for seizure marks or scuffing. Repair with #400 grit wet-or-dry sandpaper and water or honing oil.

AN135

■ **NOTE: If scuffing or seizure marks are too deep to correct with the sandpaper, replace the piston.**

4. Inspect the perimeter of each piston for signs of excessive “blowby.” Excessive “blowby” indicates worn piston rings or an out-of-round cylinder.

Removing Piston Rings

1. Starting with the top ring, slide one end of the ring out of the ring-groove.

CC400D

2. Remove each ring by working it toward the dome of the piston while rotating it out of the groove.

■ NOTE: If the existing rings will not be replaced with new ones, note the location of each ring for proper installation. When installing new rings, install as a complete set only.

Cleaning/Inspecting Piston Rings

1. Take an old piston ring and snap it into two pieces; then grind the end of the old ring to a 45° angle and to a sharp edge.

2. Using the sharpened ring as a tool, clean carbon from the ring-grooves. Be sure to position the ring with its tapered side up.

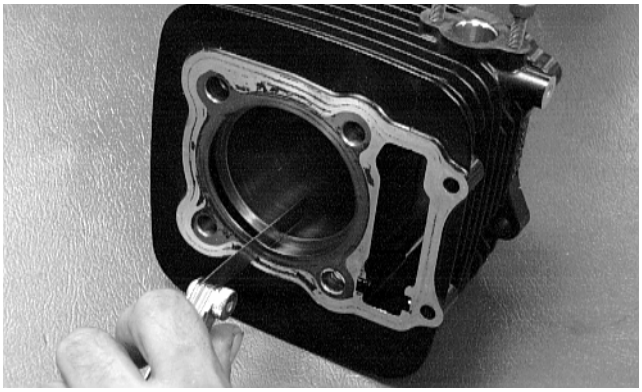
⚠ CAUTION

Improper cleaning of the ring-grooves by the use of the wrong type of ring-groove cleaner will result in severe damage to the piston.

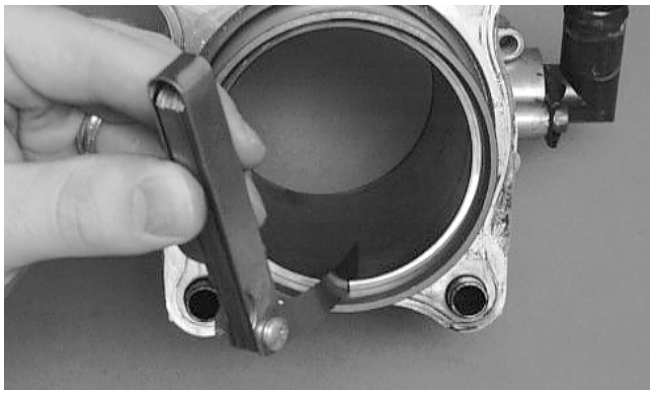
Measuring Piston-Ring End Gap (Installed)

1. Place each piston ring in the wear portion of the cylinder. Use the piston to position each ring squarely in the cylinder.

2. Using a feeler gauge, measure each piston-ring end gap. Acceptable ring end gap must be a maximum 0.70 mm (0.0276 in.) 1st ring and 1.0 mm (0.039 in.) 2nd ring for the 250/300, a maximum 0.50 mm (0.020 in.) both rings for the 375/400, and a maximum 0.70 mm (0.0276 in.) both rings for the 500.



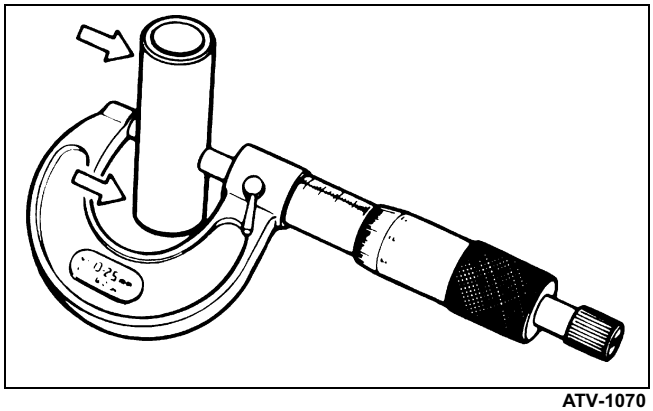
CC386D



CC280D

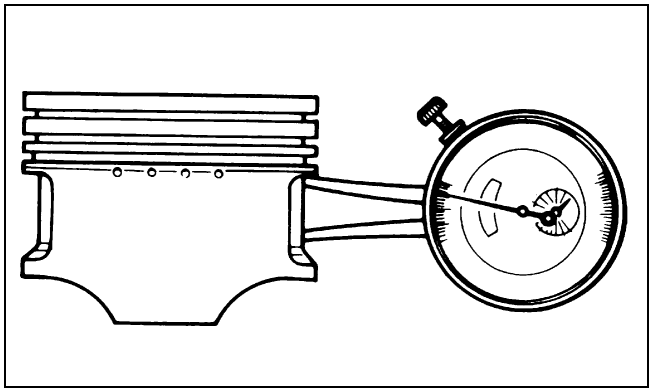
Measuring Piston Pin (Outside Diameter) and Piston-Pin Bore

1. Measure the piston pin outside diameter at each end and in the center. If measurement is less than 16.98 mm (0.6685 in.) for the 250/300, 19.98 mm (0.787 in.) for the 375, 20.98 mm (0.826 in.) for the 400, and 22.98 mm (0.905 in.) for the 500, the piston pin must be replaced.



ATV-1070

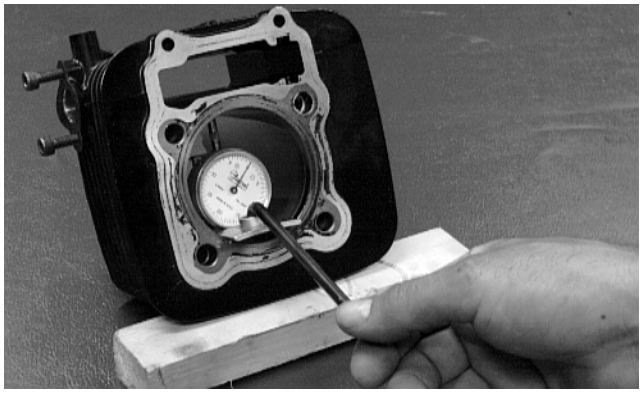
2. Insert an inside dial indicator into the piston-pin bore. The diameter must be a maximum 17.03 mm (0.6705 in.) for the 250/300, 20.03 mm (0.789 in.) for the 375, 21.03 mm (0.828 in.) for the 400, and 23.03 mm (0.907 in.) for the 500. Take two measurements to ensure accuracy.



ATV-1069

Measuring Piston Skirt/ Cylinder Clearance

1. Measure the cylinder front to back in six places.

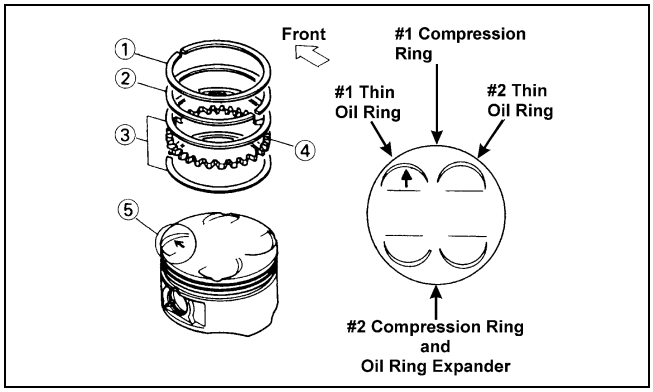


CC397D

2. Measure the corresponding piston diameter at a point 18 mm (0.71 in.) for the 250/300 and 15 mm (0.6 in.) for the 375/400/500 above the piston skirt at a right angle to the piston-pin bore. Subtract this measurement from the measurement in step 1. The difference (clearance) must be a maximum 0.12 mm (0.0047 in.) for the 250/300 and within a range of 0.065-0.075 mm (0.0026-0.0030 in.) for the 375, 0.045-0.120 mm (0.0018-0.0047 in.) for the 400, or 0.038-0.076 mm (0.0015-0.0030 in.) for the 500.

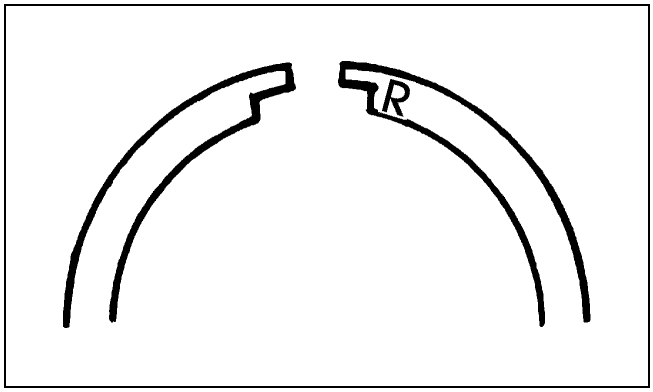
Installing Piston Rings

1. Install a thin ring, corrugated ring, and thin ring in the bottom groove of the piston. Stagger the gaps of the upper and lower thin rings.



ATV-1085

2. Install the middle and upper rings so the letter on the top surface of each ring faces the dome of the piston. Rotate the rings until the ring gaps are on directly opposite sides of the piston.



726-306A

⚠ CAUTION

Incorrect installation of the piston rings will result in engine damage.

CYLINDER/CYLINDER HEAD ASSEMBLY

■NOTE: If the cylinder/cylinder head assembly cannot be trued, they must be replaced.

Cleaning/Inspecting Cylinder Head

⚠ CAUTION

The cylinder head studs must be removed for this procedure.

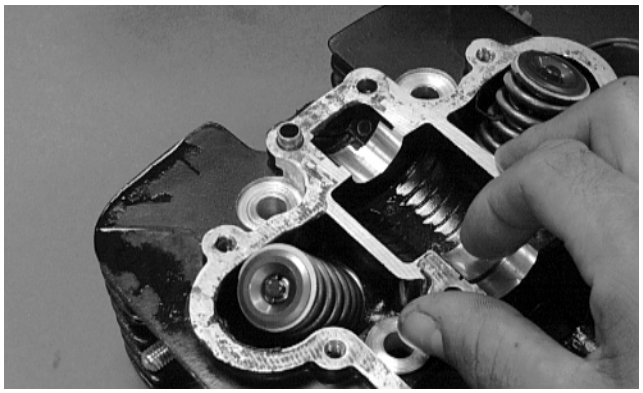
1. Using a non-metallic carbon removal tool, remove any carbon buildup from the combustion chamber being careful not to nick, scrape, or damage the combustion chamber or the sealing surface.

2. Inspect the spark plug hole for any damaged threads. Repair damaged threads using a "heli-coil" insert.

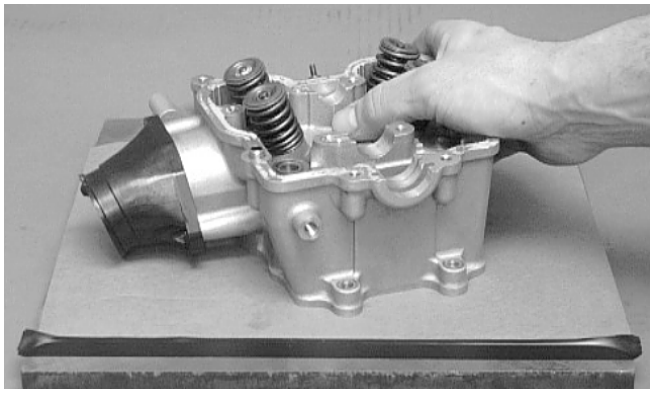
3. Place the cylinder head on the surface plate covered with #400 grit wet-or-dry sandpaper. Using light pressure, move the cylinder head in a figure eight motion. Inspect the sealing surface for any indication of high spots. A high spot can be noted by a bright metallic finish. Correct any high spots before assembly by continuing to move the cylinder head in a figure eight motion until a uniform bright metallic finish is attained.

⚠ CAUTION

Water or parts-cleaning solvent must be used in conjunction with the wet-or-dry sandpaper or damage to the sealing surface may result.



CC387D



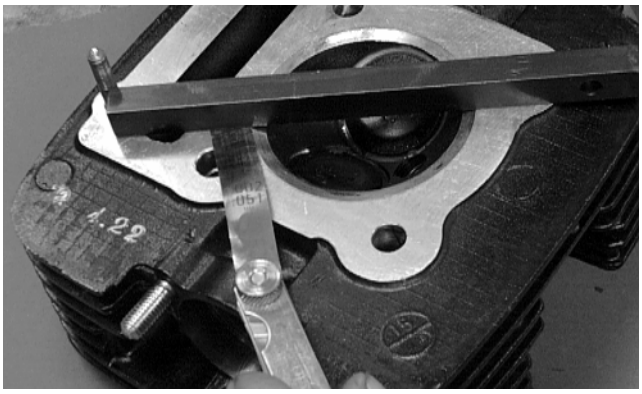
CC128D

Measuring Cylinder Head Distortion

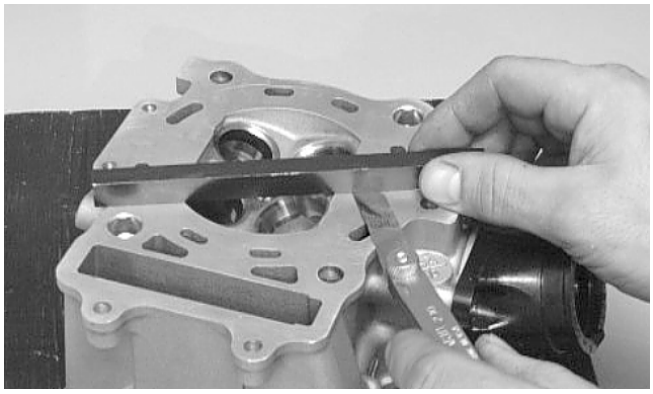
1. Remove any carbon buildup in the combustion chamber.

2. Lay a straightedge across the cylinder head; then using a feeler gauge, check the distortion factor between the head and the straightedge.

3. Maximum distortion is 0.05 mm (0.002 in.).



CC388D



CC141D

Cleaning/Inspecting Cylinder

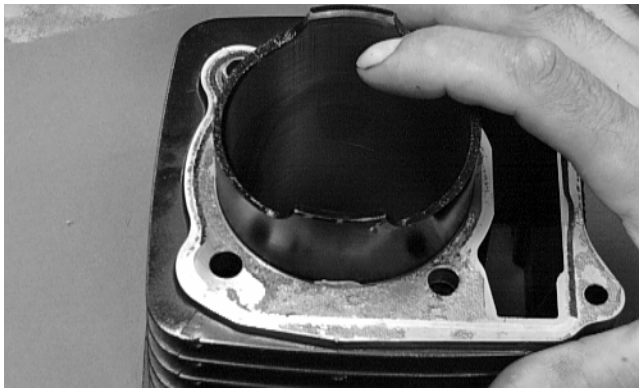
1. Wash the cylinder in parts-cleaning solvent.

2. Inspect the cylinder for pitting, scoring, scuffing, warpage, and corrosion. If marks are found, repair the surface using a cylinder hone (see Honing Cylinder in this sub-section).

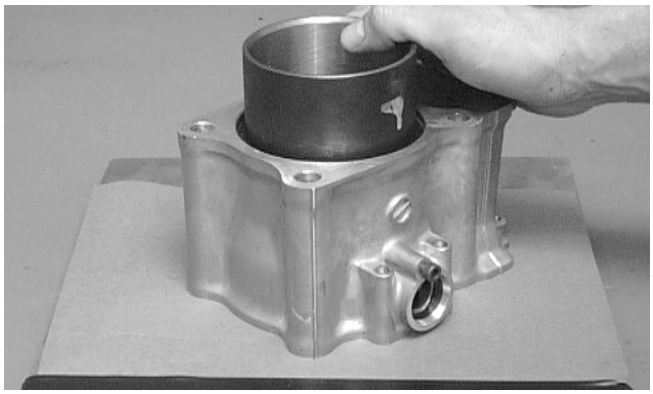
3. Place the cylinder on the surface plate covered with #400 grit wet-or-dry sandpaper. Using light pressure, move the cylinder in a figure eight motion. Inspect the sealing surface for any indication of high spots. A high spot can be noted by a bright metallic finish. Correct any high spots before assembly by continuing to move the cylinder in a figure eight motion until a uniform bright metallic finish is attained.

⚠ CAUTION

Water or parts-cleaning solvent must be used in conjunction with the wet-or-dry sandpaper or damage to the sealing surface may result.



CC389D



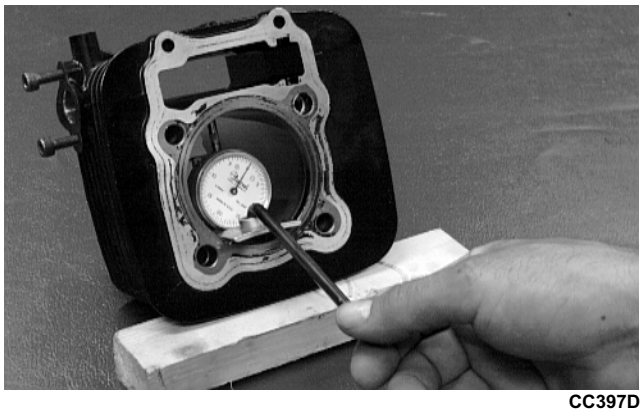
CC129D

Inspecting Cam Chain Guide

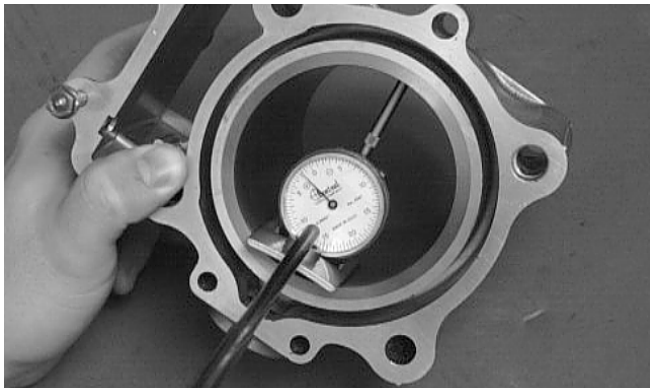
1. Inspect cam chain guide for cuts, tears, breaks, or chips.
2. If the chain guide is damaged, it must be replaced.

Honing Cylinder

1. Using a slide gauge and a dial indicator or a snap gauge, measure the cylinder bore diameter in three locations from top to bottom and again from top to bottom at 90° from the first measurements for a total of six measurements. The trueness (out-of-roundness) is the difference between the highest and lowest reading. Maximum trueness (out-of-roundness) must be 0.05 mm (0.002 in.).



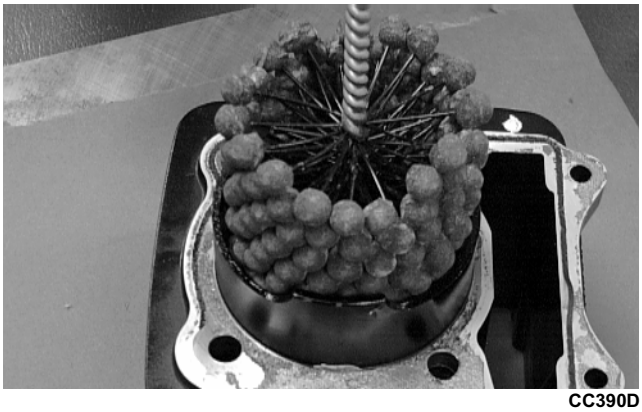
CC397D



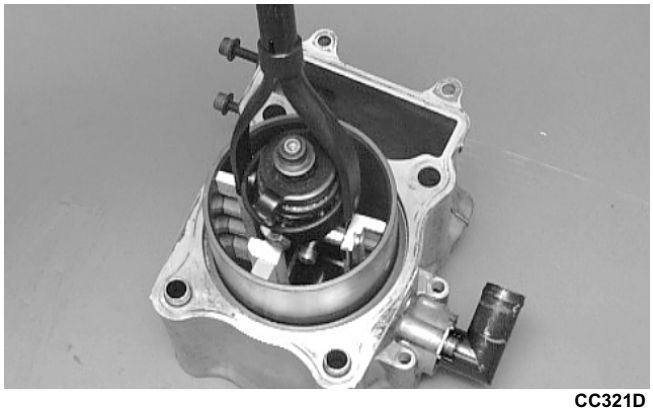
CC127D

2. Wash the cylinder in parts-cleaning solvent.
3. Inspect the cylinder for pitting, scoring, scuffing, and corrosion. If marks are found, repair the surface using a rigid cylinder hone.

■ NOTE: To produce the proper 60° cross-hatch pattern, use a low RPM drill (600 RPM) at the rate of 30 strokes per minute. If honing oil is not available, use a lightweight petroleum-based oil. Thoroughly clean cylinder after honing using soap and hot water. Dry with compressed air; then immediately apply oil to the cylinder bore. If the bore is severely damaged or gouged, replace the cylinder.



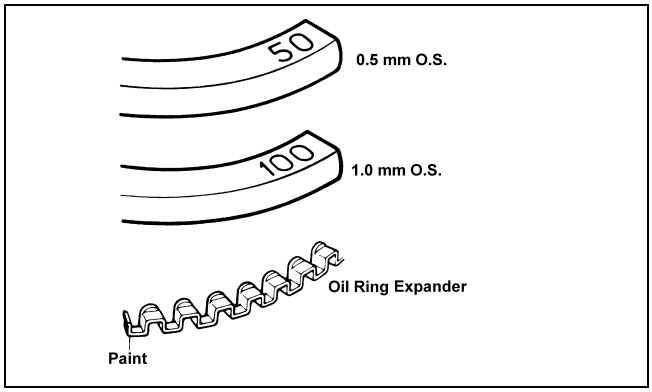
CC390D



CC321D

4. If any measurement exceeds the limit, hone the cylinder and install an oversized piston or replace the cylinder.

■ NOTE: Oversized piston and rings are available. The oversized piston and rings are marked for identification.

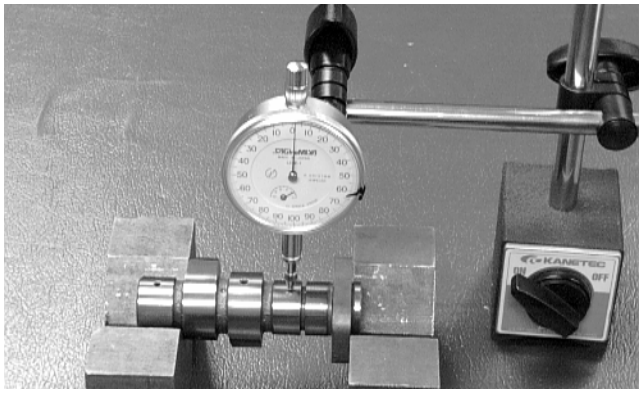


ATV-1068

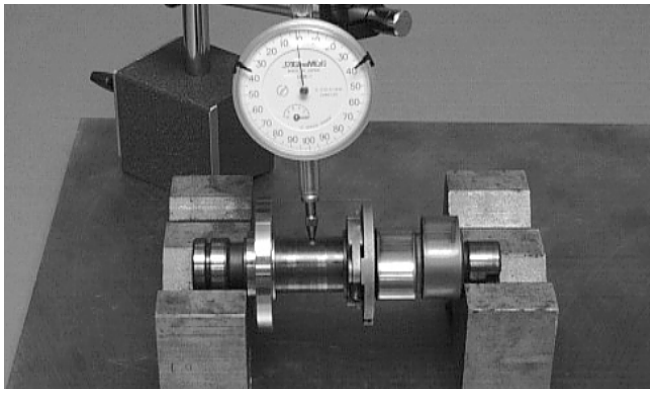
Measuring Camshaft Runout

■ **NOTE: If the camshaft is out of tolerance, it must be replaced.**

1. Place the camshaft on a set of V blocks; then position the dial indicator contact point against the shaft and zero the indicator.



CC398D

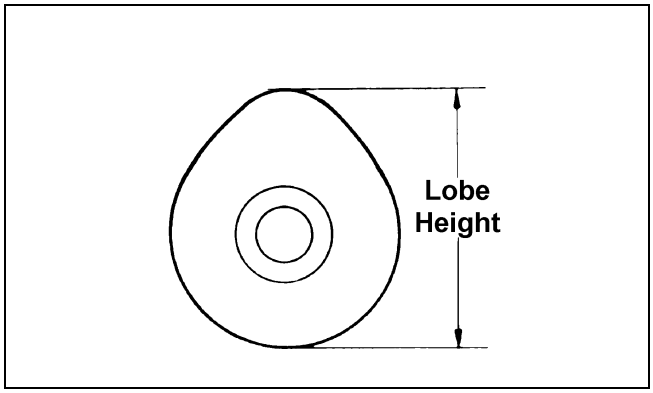


CC283D

2. Rotate the camshaft and note runout; maximum tolerance is 0.10 mm (0.004 in.).

Measuring Camshaft Lobe Height

1. Using a calipers, measure each cam lobe height.



ATV1013A

2. On the 250/300, the intake lobe height must be a minimum 33.820 mm (1.331 in.); exhaust lobe height must be a minimum 33.490 mm (1.318 in.). On the 375, the intake/exhaust lobe heights must be 32.830 mm (1.293 in.). On the 400/500, intake lobe height must be a minimum 33.150 mm (1.305 in.); exhaust lobe height must be a minimum 33.220 mm (1.308 in.).

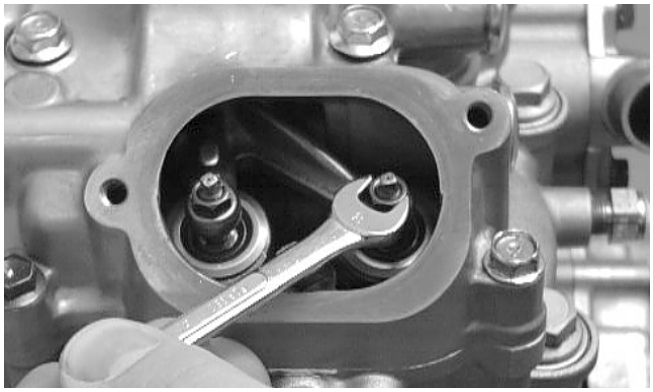
Inspecting Camshaft Bearing Journal

1. Inspect the bearing journal for scoring, seizure marks, or pitting.
2. If excessive scoring, seizure marks, or pitting is found, the cylinder head assembly must be replaced.

Measuring Camshaft to Cylinder Head Clearance

1. Remove the adjuster screws and jam nuts.

CC407D



CC005D

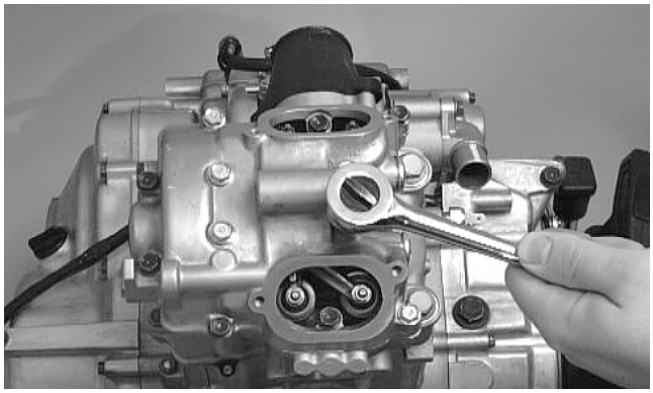
2. Place a strip of plasti-gauge in each of the camshaft lands in the cylinder head.

3. Place the valve cover on the cylinder head and secure with the valve cover cap screws. Tighten securely.

■ NOTE: Do not rotate the camshaft when measuring clearance.

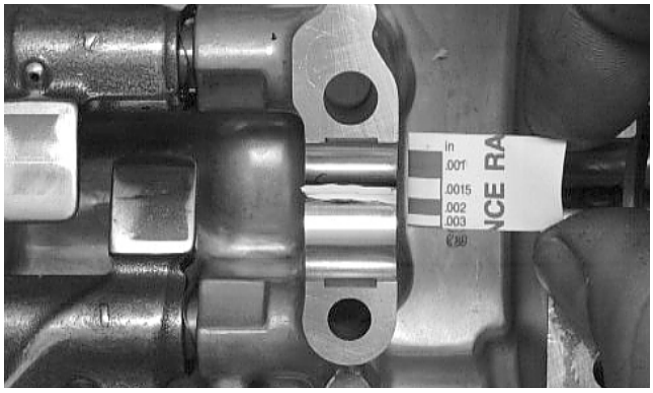
4. Remove the cap screws securing the valve cover to the cylinder; then remove the valve cover and camshaft.

CC367D



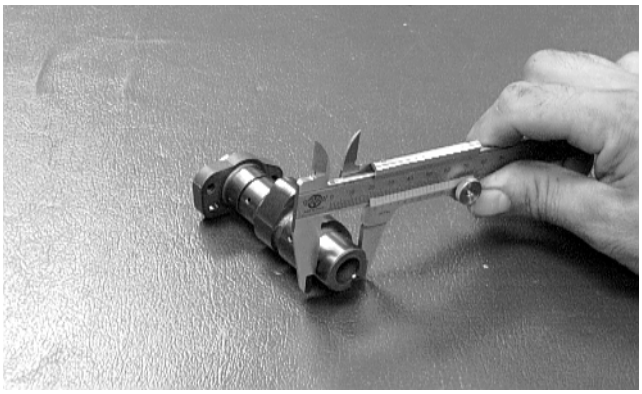
CC003D

5. Match the width of the plasti-gauge with the chart found on the plasti-gauge packaging to determine camshaft to cylinder head and valve cover clearance.

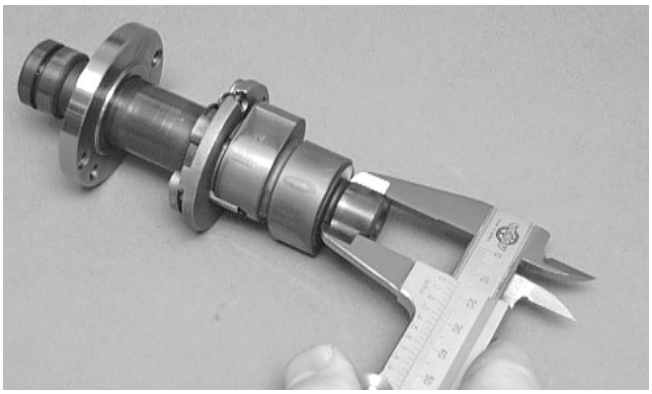


CC145D

6. If clearance is excessive, measure the journals of the camshaft.



CC399D

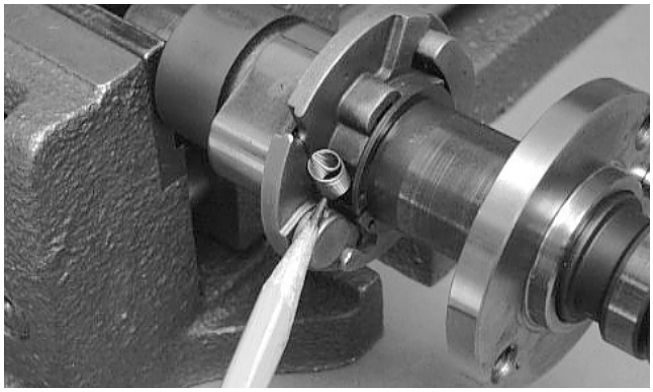


CC287D

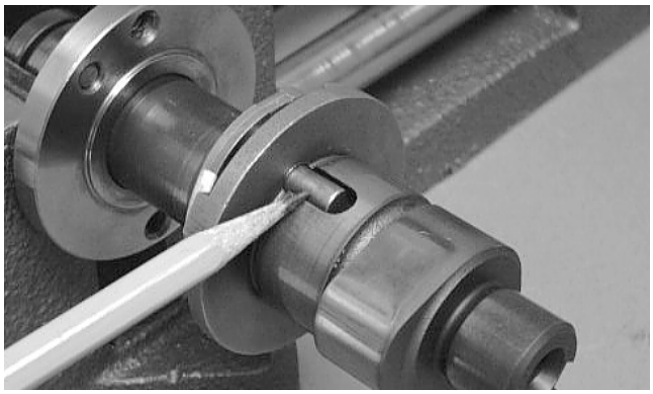
■ NOTE: If the journals are worn, replace the camshaft; then measure the clearance again. If it is still out of tolerance, replace the cylinder head.

Inspecting Camshaft Spring/Drive Pin (400/500)

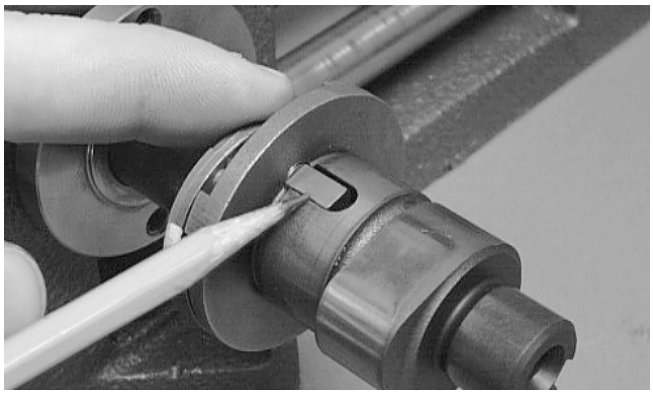
1. Inspect the spring and drive pin for damage.



CC304D



CC306D



CC308D

2. If damaged, the camshaft must be replaced.

Servicing Left-Side Components

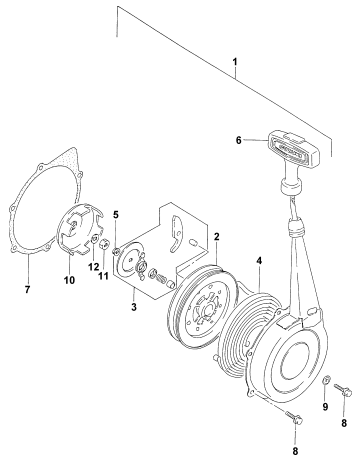
RECOIL STARTER

■**NOTE: The technician should reference the appropriate illustration for the model being serviced.**

250/300

KEY

1. Recoil Starter Assy
2. Reel
3. Ratchet Assy
4. Spring
5. Nut
6. Rope Assy
7. Gasket
8. Cap Screw
9. Gasket
10. Starter Cap
11. Nut
12. Lock Washer

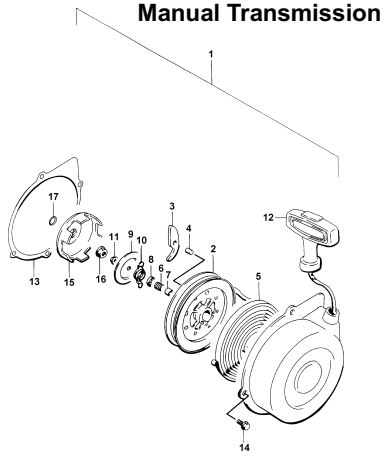


0733-751

400/500 **Manual Transmission**

KEY

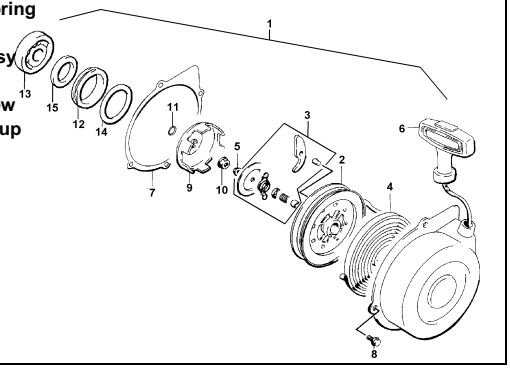
1. Recoil Starter Assy
2. Reel
3. Ratchet
4. Pin
5. Spring
6. Spring
7. Shaft
8. Spring Cover
9. Friction Plate
10. Ratchet Guide
11. Nut
12. Rope Assy
13. Gasket
14. Bolt
15. Starter Cup
16. Nut
17. O-Ring



0732-309

KEY **Automatic Transmission**

1. Recoil Starter Assy
2. Reel
3. Ratchet Assy
4. Spiral Spring
5. Nut
6. Rope Assy
7. Gasket
8. Cap Screw
9. Starter Cup
10. Nut
11. O-Ring
12. Spacer
13. Bearing
14. O-Ring
15. Oil Seal



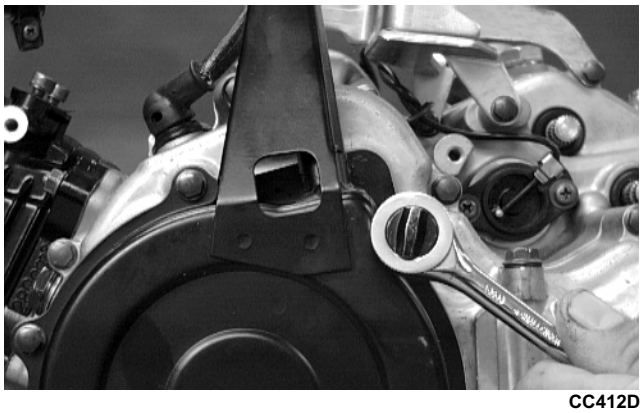
0735-614

⚠ WARNING

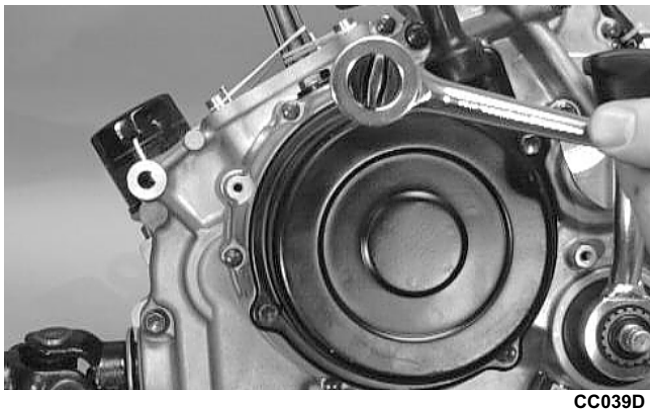
Always wear safety glasses when servicing the recoil starter.

Removing/Disassembling

1. Remove the cap screws securing the recoil starter assembly to the left-side cover; then remove the starter noting (on the 250/300) the location of the single washer closest to the center of the crankcase. Account for a gasket.



CC412D

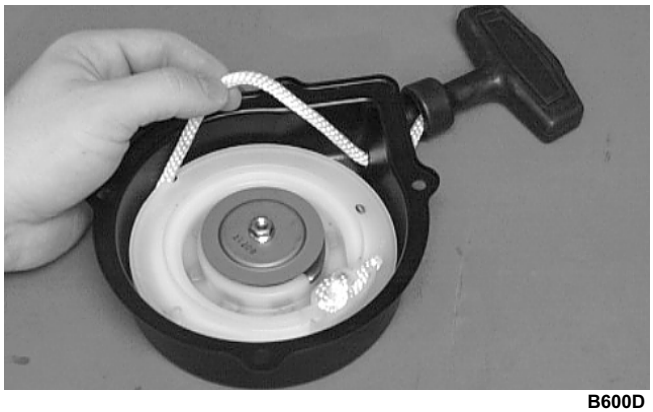


CC039D

⚠ WARNING

During the disassembly procedure, continuous downward pressure must be exerted on the reel so it does not accidentally disengage and cause injury.

2. Rotate the reel counterclockwise until the notch of the reel is near the rope guide in the case. Guide the rope into the notch and slowly allow the reel to retract until all spiral spring tension is released.

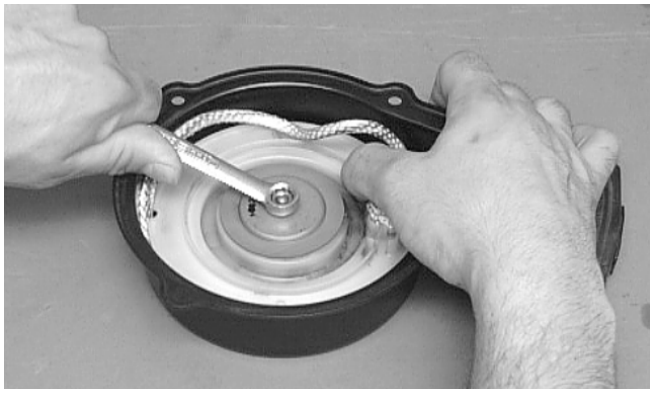


B600D

⚠ CAUTION

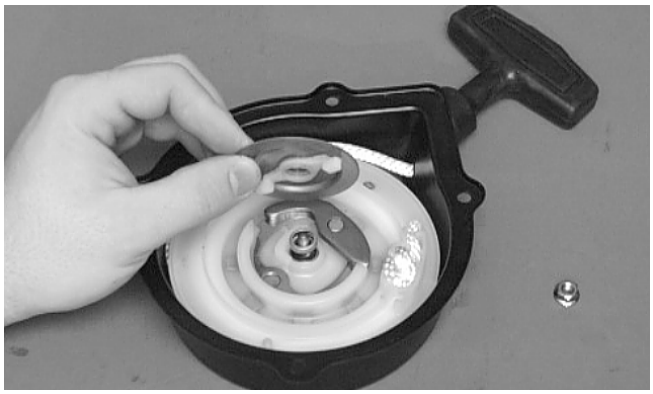
During the disassembly procedure, make sure all spring tension is released before continuing.

3. Remove the nut.



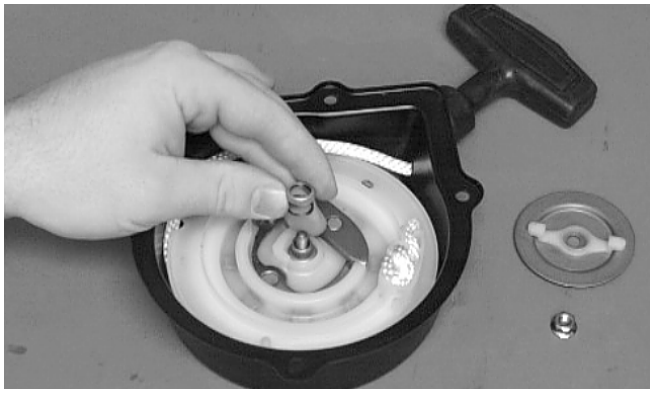
B601D

4. Slowly release the friction plate and lift the plate with ratchet guide free of the recoil housing; then remove the ratchet guide from the friction plate.



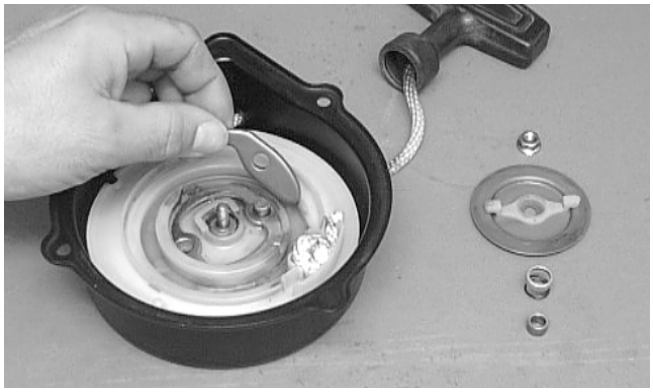
B602D

5. Remove the spring, collar, and friction spring.



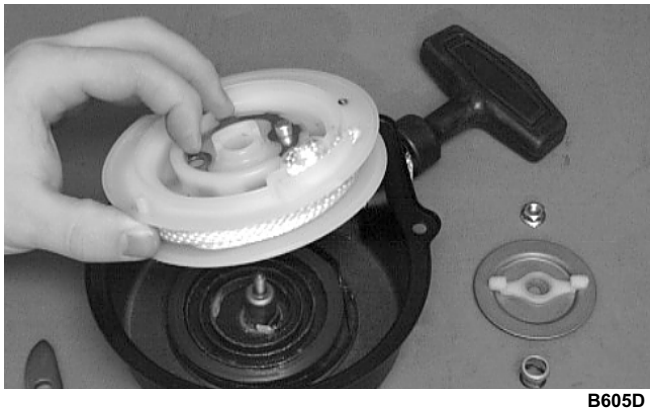
B603D

6. Remove the ratchet.



B604D

7. Carefully lift the recoil free of the case making sure the spring does not accidentally disengage from the case.



B605D

⚠ WARNING

Care must be taken when lifting the recoil free of the case. Wear safety glasses to avoid injury.

8. Remove the protective cover from the starter handle and pull the rope out of the handle; then untie the knot in the rope and remove the handle.

■ NOTE: Do not remove the spiral spring unless replacement is necessary. It should be visually inspected in place to save time. If replacement is necessary, follow steps 9-10.

9. Remove the spring from the housing by lifting the spring end up and out. Hold the remainder of the spring with thumbs and alternately release each thumb to allow the spring to gradually release from the housing.

10. Unwind the rope from the reel and remove the rope.

Cleaning and Inspecting

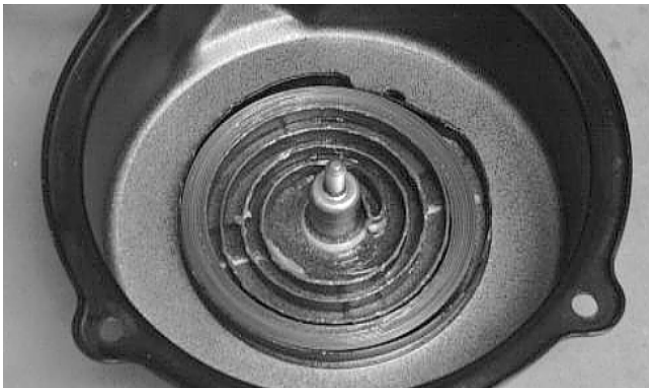
■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all components.
2. Inspect the springs and ratchet for wear or damage.
3. Inspect the reel and housing for cracks or damage.
4. Inspect the shaft for wear, cracks, or damage.
5. Inspect the rope for breaks or fraying.
6. Inspect the spiral spring for cracks, crystallization, or abnormal bends.
7. Inspect the handle for damage, cracks, or deterioration.

Assembling/Installing

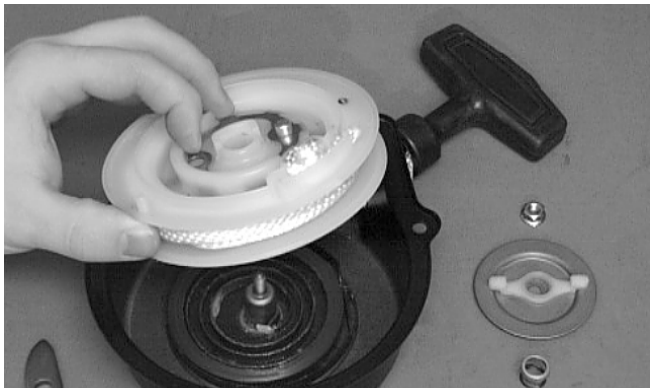
1. If removed, insert the spring into the housing with the outer end of the spring around the mounting lug in the housing; then wind it in a counterclockwise direction until the complete spring is installed.

■ NOTE: The recoil spring must seat evenly in the recoil case.



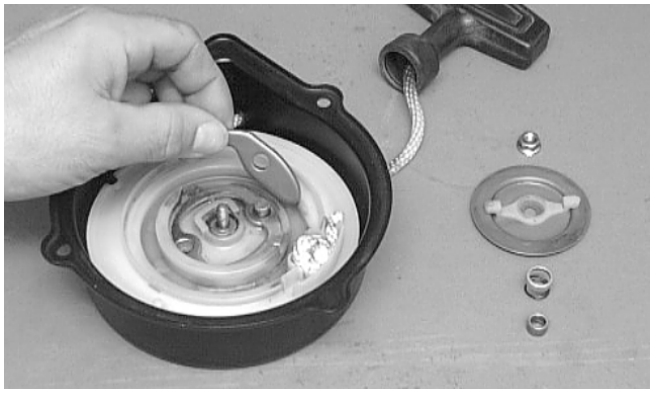
B606D

2. Insert the rope through the hole in the reel and tie a knot in the end; then wrap the rope counter-clockwise around the reel leaving approximately 50 cm (20 in.) of rope free of the reel.
3. Apply low-temperature grease to the spring and hub.
4. Thread the end of the rope through the guide hole of the housing; then thread the rope through the handle and secure it with a double knot. Install the protective cover into the handle.
5. Align the inner hook of the spring with the notch in the reel.



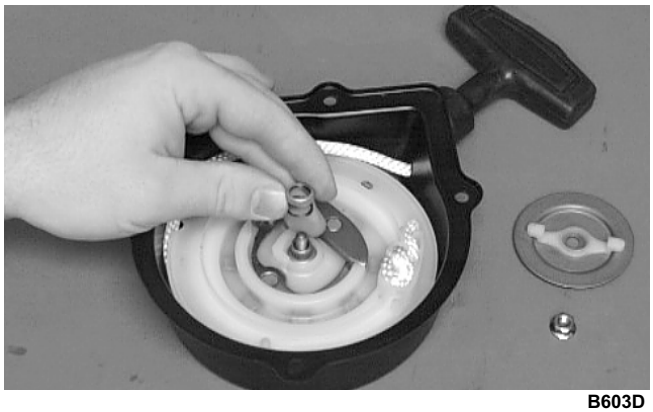
B605D

6. Install the ratchet making sure the end is properly installed on the reel.



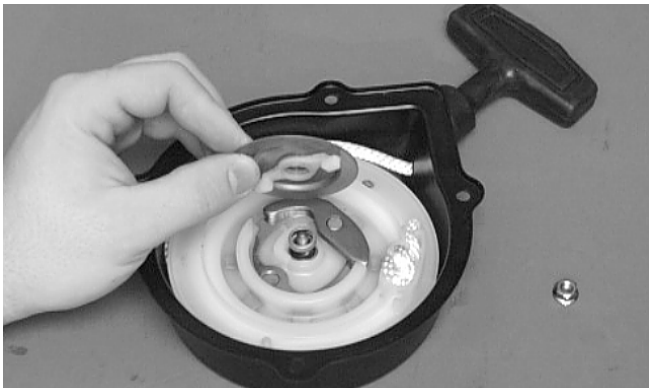
B604D

7. Install the friction spring and the spring cover.



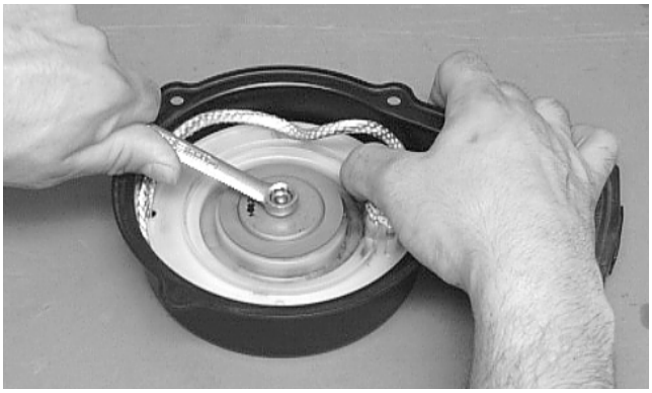
B603D

8. Install the friction plate with the ratchet guide fitting into the ratchet.



B602D

9. While pushing down on the reel, install the nut. Tighten securely.



B601D

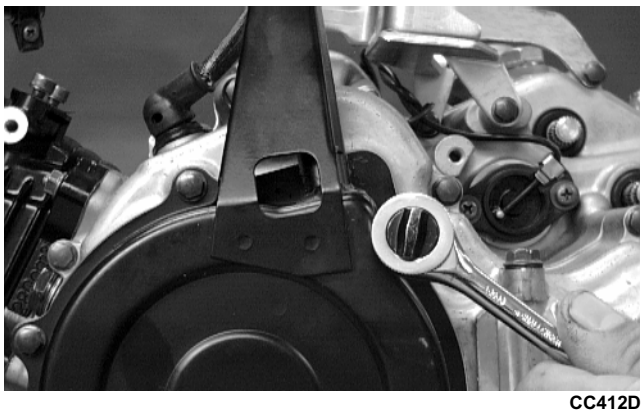
10. With the 50 cm (20 in.) of rope exposed, hook the rope in the notch of the reel.

11. Rotate the reel four turns counterclockwise; then release the rope from the notch and allow the rope to retract.

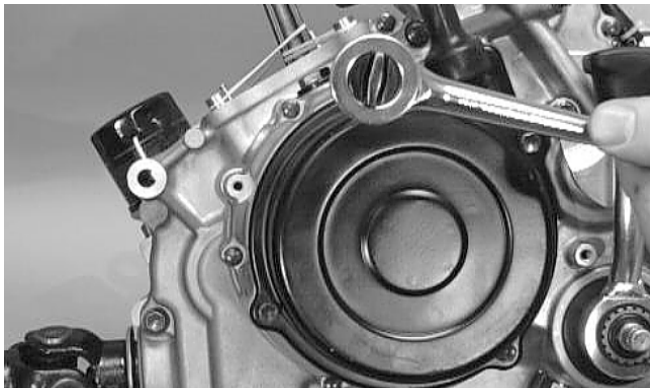
12. Pull the rope out two or three times to check for correct tension.

■ **NOTE: Increasing the rotations in step 11 will increase spring tension.**

13. Place the gasket and recoil starter assembly into position on the left-side cover noting the location of the single washer; then tighten the cap screws to 0.8 kg-m (6 ft-lb).



CC412D



CC039D

MEASURING SHIFT FORK (Thickness)

■ **NOTE: Whenever a shift fork is out of tolerance, replacement is necessary.**

1. Using a calipers, in turn measure the thickness of the machined tip of each shift fork.

CC296D

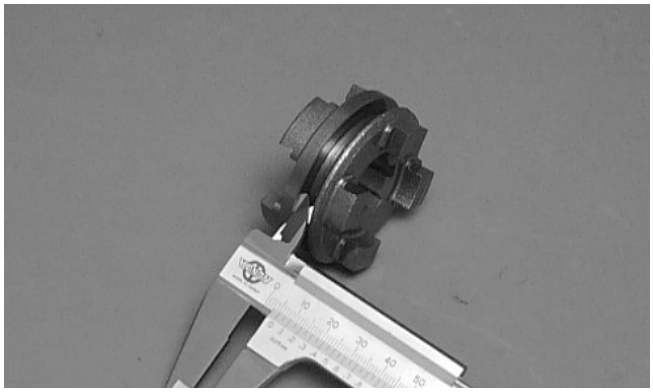
2. Shift fork thickness must be within the specified range.

SHIFT FORK THICKNESS (250/300)	
#1, #2, and #3	4.3-4.4 mm (0.169-0.173 in.)
Secondary Transmission #1 and #2	5.3-5.4 mm (0.209-0.213 in.)
Reverse	3.8-3.9 mm (0.150-0.154 in.)

SHIFT FORK THICKNESS (400/500)	
#1 and #2	5.3-5.4 mm (0.209-0.213 in.)
Secondary Transmission	5.3-5.4 mm (0.209-0.213 in.)
Reverse	4.8-4.9 mm (0.189-0.193 in.)

MEASURING SHIFT FORK GROOVE (Width)

1. Using a calipers, in turn measure the width of each shift fork groove.



CC288D

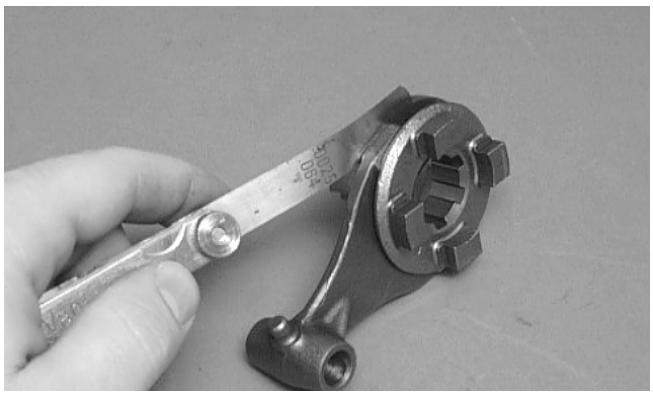
2. Shift fork groove width must be within the specified range.

SHIFT FORK GROOVE WIDTH (250/300)	
#1, #2, and #3	4.5-4.6 mm (0.177-0.181 in.)
Secondary Transmission #1 and #2	5.45-5.55 mm (0.215-0.219 in.)
Reverse	4.0-4.1 mm (0.157-0.161 in.)

SHIFT FORK GROOVE WIDTH (400/500)		
#1 and #2		5.5-5.6 mm (0.217-0.220 in.)
Secondary Transmission		5.4-5.5 mm (0.213-0.217 in.)
Reverse	400	5.0-5.1 mm (0.197-0.201 in.)
	500	4.9-5.0 mm (0.193-0.197 in.)

MEASURING SHIFT FORK TO GROOVE (Side Clearance)

1. In turn, insert each shift fork into its groove.
2. Using a feeler gauge, measure the clearance between the shift fork and the groove.



CC292D

3. Shift fork to groove side clearance must be within specifications.

SHIFT FORK TO GROOVE SIDE CLEARANCE (250/300)	
Engine	0.10-0.50 mm (0.004-0.020 in.)
Secondary Transmission	0.05-0.50 mm (0.002-0.020 in.)
Reverse	0.10-0.50 mm (0.004-0.020 in.)

SHIFT FORK TO GROOVE SIDE CLEARANCE (400/500)		
Engine		0.1-0.3 mm (0.004-0.012 in.)
Secondary Transmission (max)		0.2 mm (0.008 in.)
Reverse	400 (max)	0.3 mm (0.012 in.)
	500 (max)	0.2 mm (0.008 in.)

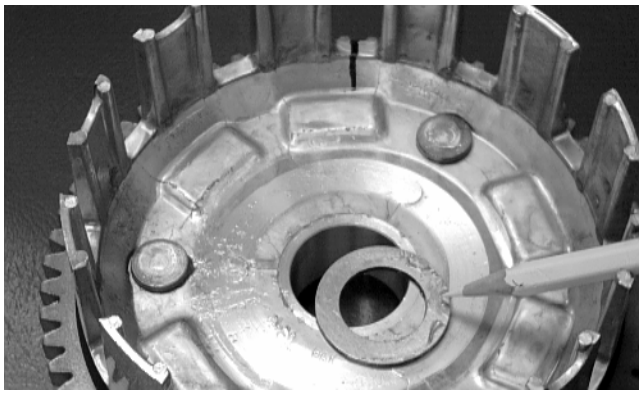
Servicing Right-Side Components

■**NOTE: The technician should reference the appropriate illustration and/or photograph for the model being serviced.**

■**NOTE: Whenever a part is worn excessively, cracked, damaged in any way, or out of tolerance, replacement is necessary.**

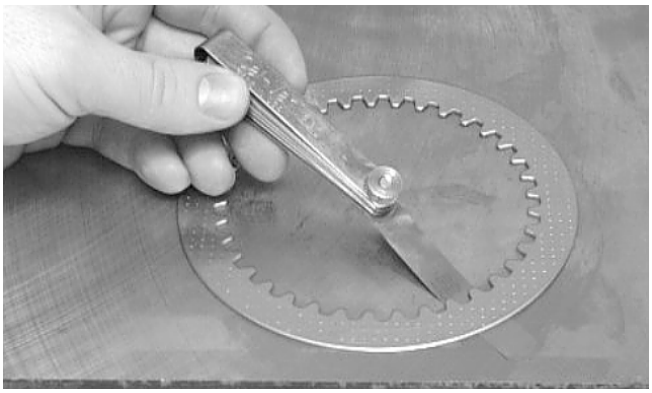
INSPECTING/MEASURING CLUTCH DRIVEN PLATE WARPAGE

■**NOTE: On the 250/300 after removing the clutch hub and clutch plates, account for the washer beneath the clutch hub.**



CC444D

1. Inspect each driven plate for warpage and burn marks.
2. In turn place each driven plate on the surface plate; then using a feeler gauge, measure warpage in several locations.

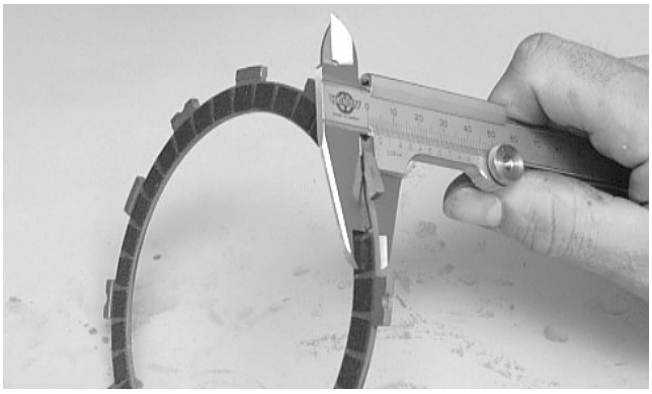


CC245D

3. Maximum driven plate warpage must be 0.1 mm (0.004 in.).

MEASURING CLUTCH DRIVE PLATE (Fiber) THICKNESS

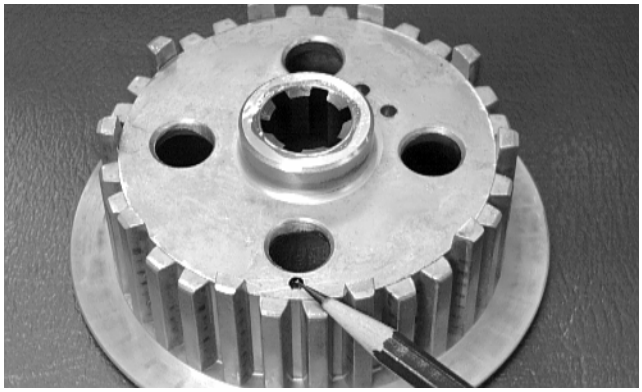
1. Using a calipers, in turn measure the thickness of each drive plate in several locations.



CC243D

2. Drive plate thickness must be a minimum of 2.42 mm (0.094 in.) for the 250/300, a minimum of 2.62 mm (0.103 in.) for the 400, and within a range of 2.92-3.08 mm (0.1149-0.1212 in.) for the 500.
3. If the fiber plate tabs are damaged, the plate must be replaced.
4. Inspect the clutch hub (clutch sleeve hub on the 400/500) for grooves or notches. If grooves or notches are present, replace the hub.

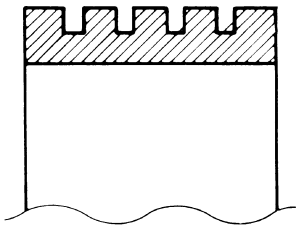
■**NOTE: On the 250/300, note the location of the timing mark on the hub for assembly purposes.**



CC445D

INSPECTING STARTER CLUTCH SHOE

1. Inspect the starter clutch shoe for uneven wear, chips, cracks, or burns.
2. Inspect the groove on the shoe for wear or damage.
3. If any damage to the shoe or any groove wear is noted, the shoe must be replaced.



Inspecting clutch shoe groove

ATV1014

INSPECTING STARTER CLUTCH HOUSING

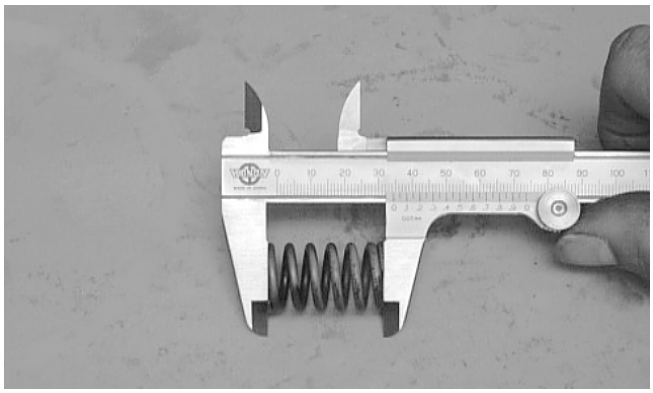
1. Inspect the starter clutch housing for burns, marks, scuffs, cracks, scratches, or uneven wear.
2. If the housing is damaged in any way, the housing must be replaced.

INSPECTING PRIMARY ONE-WAY DRIVE

1. Insert the drive into the clutch housing.
2. Rotate the inner race by hand and verify the inner race rotates only one direction.
3. If the inner race is locked in place or rotates both directions, the drive assembly must be replaced.

MEASURING CLUTCH SPRING LENGTH

1. Using a calipers, measure the overall free length of the clutch spring.

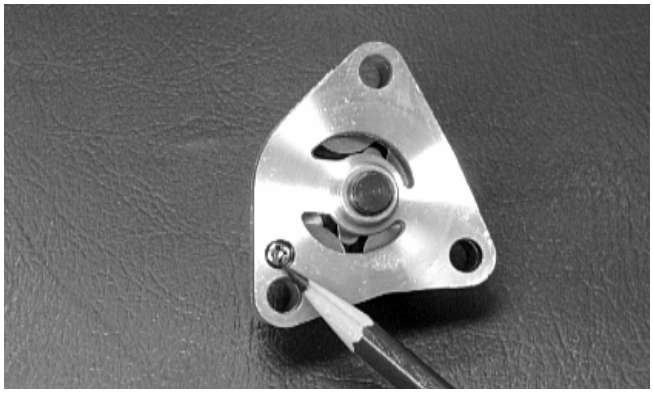


CC247D

2. Overall length must be a minimum of 27.5 mm (1.08 in.) for the 250/300 and 33.7 mm (1.33 in.) for the 400/500.

INSPECTING OIL PUMP

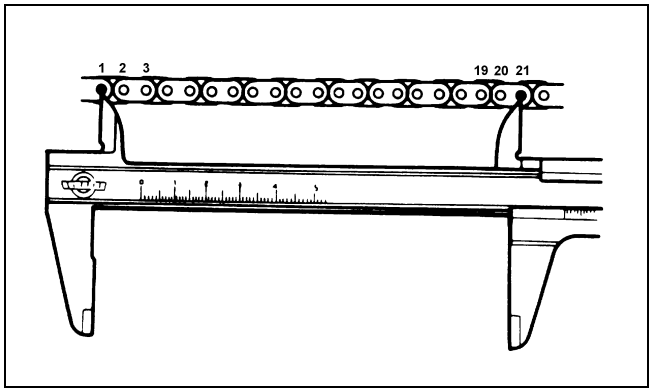
1. Inspect the pump for damage.
2. It is inadvisable to remove the screw securing the pump halves. If the oil pump is damaged, it must be replaced.



CC446D

MEASURING CAM CHAIN LENGTH (400/500)

1. Apply approximately 13 kg (28.5 lb) of force to both ends of the cam chain.
2. With the chain extended, use a calipers to measure the length along 20 pins.



ATV-1060

3. Standard length is 127.00-127.36 mm (4.99-5.00 in.).
4. Maximum length must be 128.9 mm (5.07 in.).

Servicing Center Crankcase Components

■NOTE: Whenever a part is worn excessively, cracked, damaged in any way, or out of tolerance, replacement is necessary.

■NOTE: The technician should reference the appropriate illustration and\or photograph for the model being serviced.

SECONDARY GEARS

■NOTE: When checking and correcting secondary gear backlash and tooth contact, the universal joint must be secured to the front shaft or false measurements will occur.

Checking Backlash

■NOTE: The rear shaft and bevel gear must be removed for this procedure. Also, always start with the original shims on the rear shaft.

1. Place the left-side crankcase cover onto the left-side crankcase half to prevent runout of the secondary transmission output shaft.
2. Install the secondary driven output shaft assembly onto the crankcase.
3. Mount the indicator tip of the dial indicator on the secondary driven bevel gear.
4. While rocking the driven bevel gear back and forth, note the maximum backlash reading on the gauge.
5. Acceptable backlash range is 0.05-0.33 mm (0.002-0.013 in.).

Correcting Backlash

■NOTE: If backlash measurement is within the acceptable range, no correction is necessary.

1. If backlash measurement is less than specified, remove an existing shim, measure it, and install a new thinner shim.
2. If backlash measurement is more than specified, remove an existing shim, measure it, and install a thicker shim.

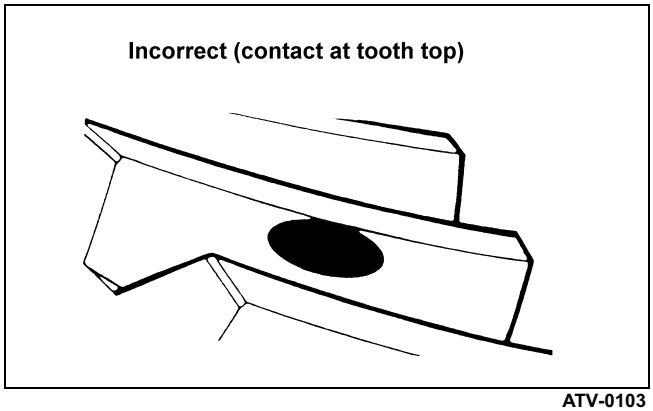
■NOTE: Continue to remove, measure, and install until backlash measurement is within tolerance. Note the following chart.

Backlash Measurement	Shim Correction
Under 0.05 mm (0.002 in.)	Decrease Shim Thickness
At 0.05-0.33 mm (0.002-0.013 in.)	No Correction Required
Over 0.33 mm (0.013 in.)	Increase Shim Thickness

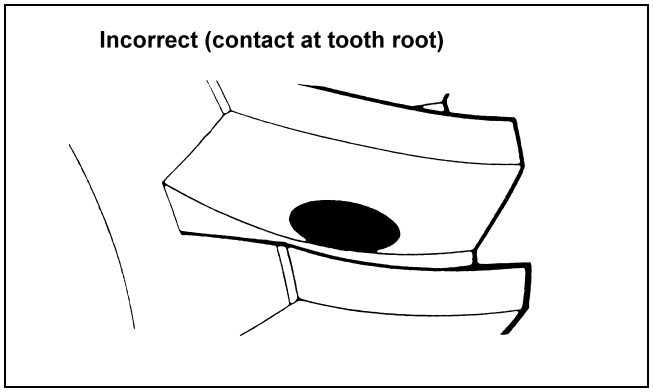
Checking Tooth Contact

■NOTE: After correcting backlash of the secondary driven bevel gear, it is necessary to check tooth contact.

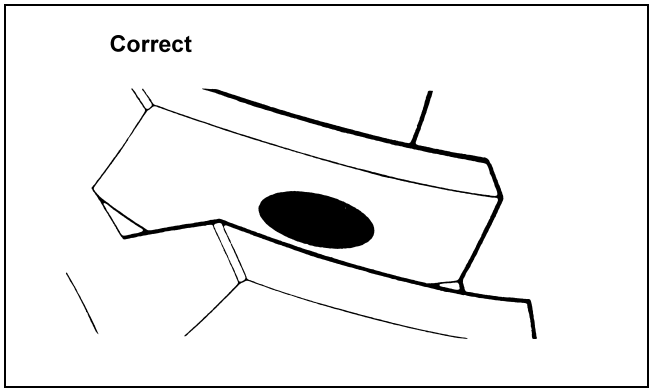
1. Remove the secondary driven output shaft assembly from the left-side crankcase half.
2. Clean the secondary driven bevel gear teeth of old oil and grease residue.
3. Apply a thin, even coat of a machinist-layout dye to several teeth of the gear.
4. Install the secondary driven output shaft assembly.
5. Rotate the secondary driven bevel gear several revolutions in both directions.
6. Examine the tooth contact pattern in the dye and compare the pattern to the illustrations.



ATV-0103



ATV-0105



ATV-0104

Correcting Tooth Contact

■NOTE: If tooth contact pattern is comparable to the correct pattern illustration, no correction is necessary.

1. If tooth contact pattern is comparable to an incorrect pattern, correct tooth contact according to the following chart.

Tooth Contact	Shim Correction
Contacts at Top	Decrease Shim Thickness
Contacts at Root	Increase Shim Thickness

■NOTE: To correct tooth contact, steps 1 and 2 (with NOTE) of "Correcting Backlash" must be followed and the above "Tooth Contact/Shim Correction" chart must be consulted.

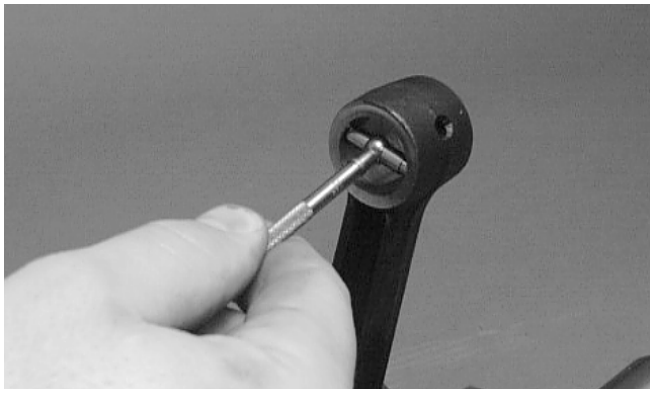
⚠ CAUTION

After correcting tooth contact, backlash must again be checked and corrected (if necessary). Continue the correcting backlash/correcting tooth contact procedures until they are both within tolerance values.

CRANKSHAFT ASSEMBLY

Measuring Connecting Rod (Small End Inside Diameter)

1. Insert a snap gauge into the upper connecting rod small end bore; then remove the gauge and measure it with micrometer.



CC290D

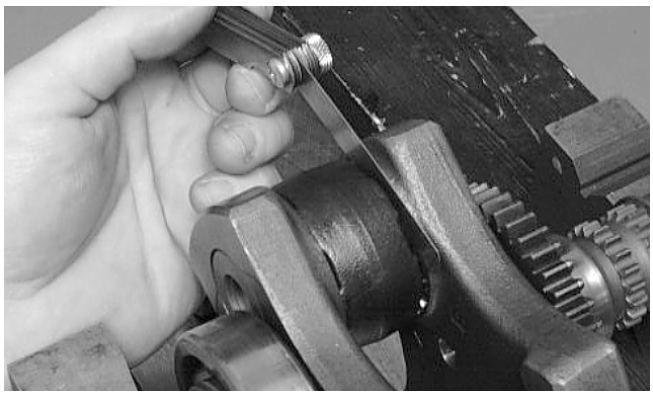
2. Maximum diameter is 17.040 mm (0.6709 in.) for the 250/300, 21.04 mm (0.8283 in.) for the 375/400, and 23.04 mm (0.9070 in.) for the 500.

Measuring Connecting Rod (Small End Deflection)

1. Place the crankshaft on a set of V-blocks and mount a dial indicator and base on the surface plate. Position the indicator contact point against the center of the connecting rod small end journal.
2. Zero the indicator and push the small end of the connecting rod away from the dial indicator.
3. Maximum deflection is 3 mm (0.12 in.).

Measuring Connecting Rod (Big End Side-to-Side)

1. Push the lower end of the connecting rod to one side of the crankshaft journal.
2. Using a feeler gauge, measure the gap between the connecting rod and crankshaft journal.



CC289D

3. Acceptable gap range is 0.1-1.0 mm (0.004-0.039 in.).

Measuring Connecting Rod (Big End Width)

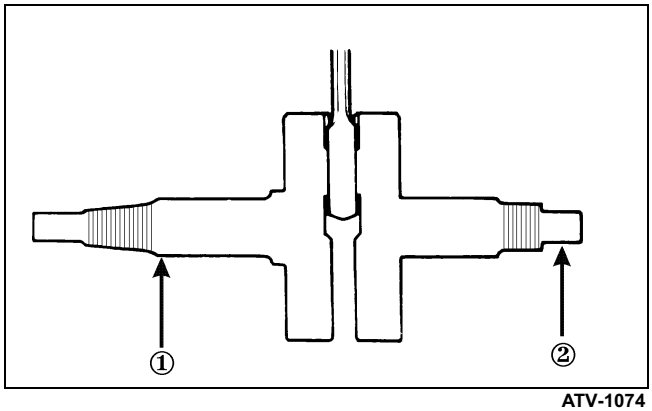
1. Using a calipers, measure the width of the connecting rod at the big-end bearing.

2. Acceptable width range is 17.95-18.00 mm (0.707-0.709 in.) for the 250/300, 21.95-22.00 mm (0.8642-0.8661 in.) for the 375, 25.95-26.00 mm (1.022-1.024 in.) for the 400, and 24.95-25.00 mm (0.9822-0.9842 in.) for the 500.

Measuring Crankshaft (Runout)

1. Place the crankshaft on a set of V blocks.

2. Mount a dial indicator and base on the surface plate. Position the indicator contact at point 1 of the crankshaft.



ATV-1074

3. Zero the indicator and rotate the crankshaft slowly.

⚠ CAUTION

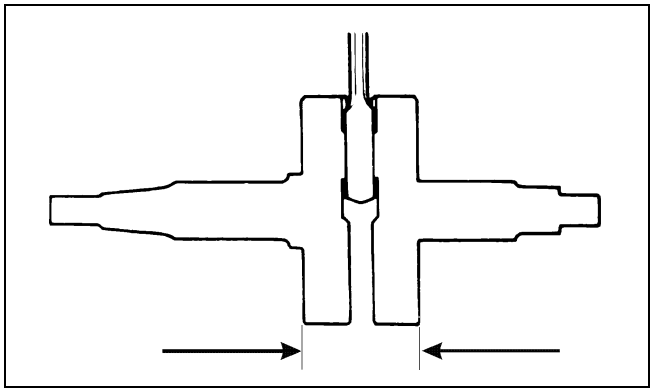
Care should be taken to support the connecting rod when rotating the crankshaft.

4. Maximum runout is 0.05 mm (0.002 in.) for the left side and 0.08 mm (0.003 in.) for the right side on the 250/300, 0.05 mm (0.002 in.) for both sides on the 400, and 0.08 mm (0.003 in.) for both sides on the 375/500.

■ NOTE: Proceed to check runout on the other end of the crankshaft by positioning the indicator contact at point 2 and following steps 2-4.

Measuring Crankshaft (Web-to-Web)

1. Using a calipers, measure the distance from the outside edge of one web to the outside edge of the other web.


ATV-1017

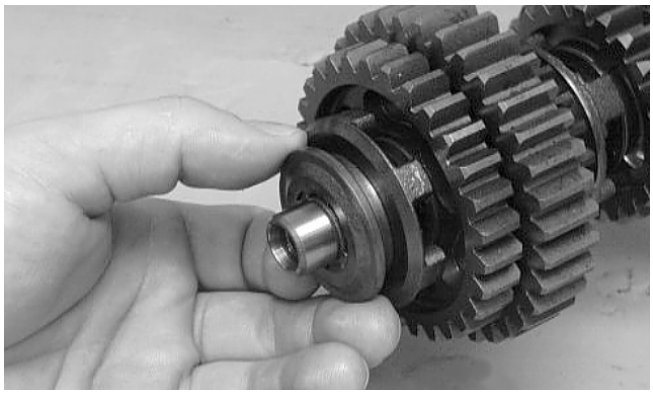
2. Acceptable width range is 54.9-55.1 mm (2.161-2.169 in.) for the 250/300 and within a range of 60.9-61.1 mm (2.398-2.406 in.) for the 375 and 70.9-71.1 mm (2.796-2.804 in.) for the 400/500.

DRIVESHAFT (Manual Transmission)

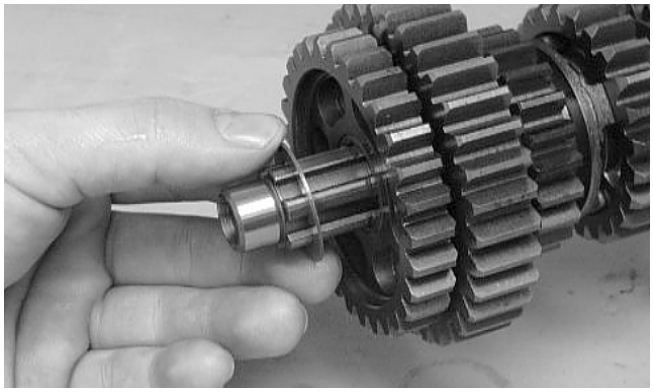
3

Disassembling

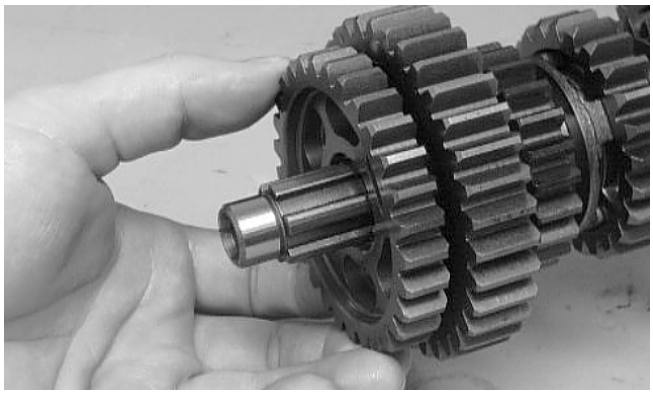
1. In order, remove the reverse dog, circlip, washer (lock washer on the 250/300), reverse driven gear, and bushing from the driveshaft.


CC228D

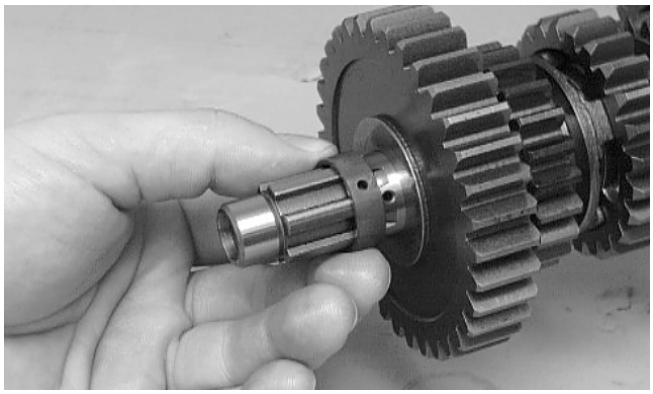
CC227D



CC226D



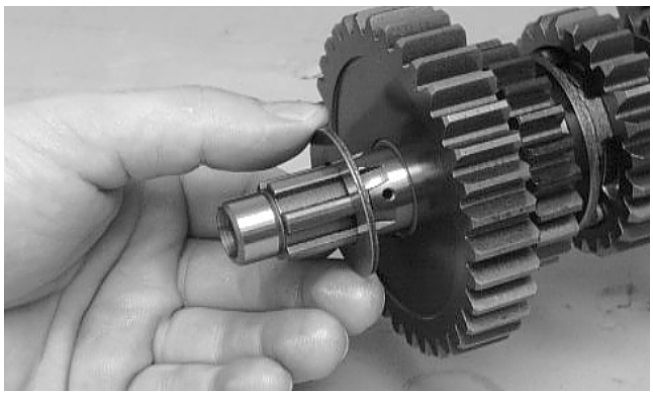
CC225D



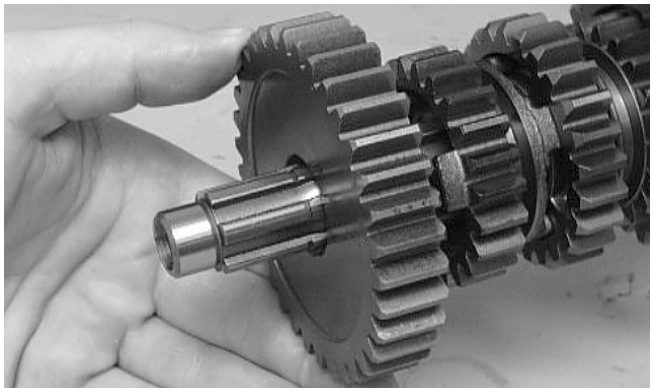
CC224D

■ **NOTE: The teeth on the bushing must face the 1st driven gear.**

2. Remove the 1st driven washer (right side); then remove the 1st driven gear from the driveshaft.

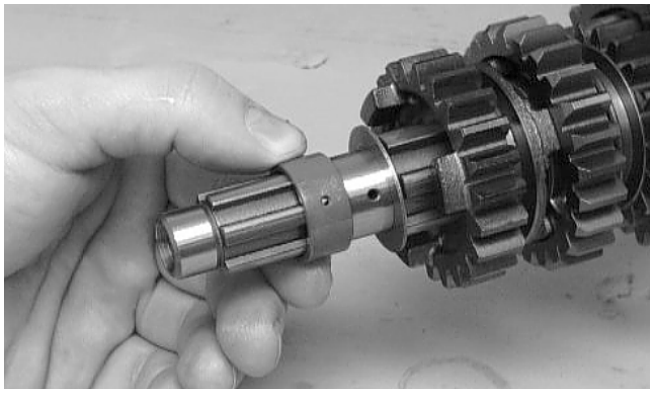


CC223D

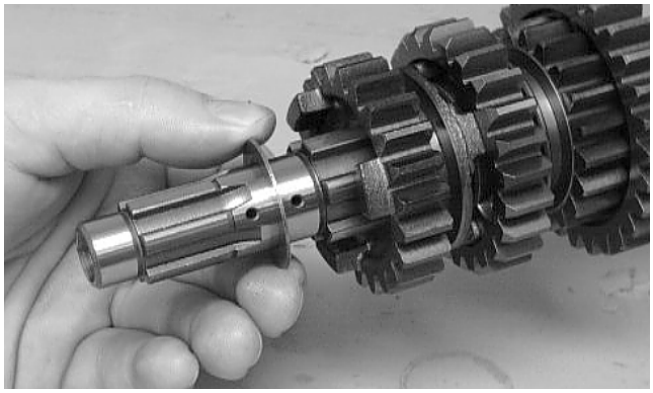


CC222D

3. Remove the 1st driven bushing; then remove the 1st driven washer (left side) from the shoulder of the splined shaft.

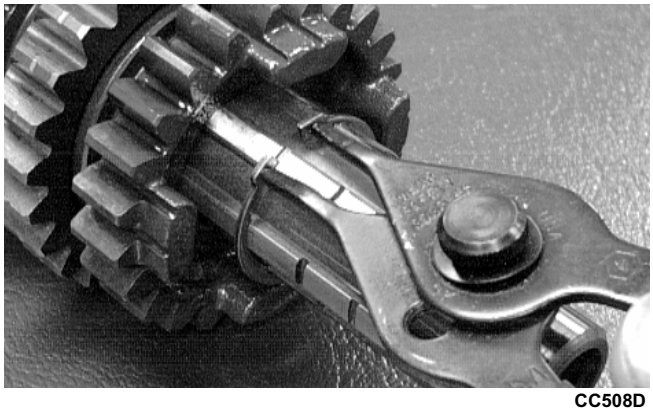


CC221D



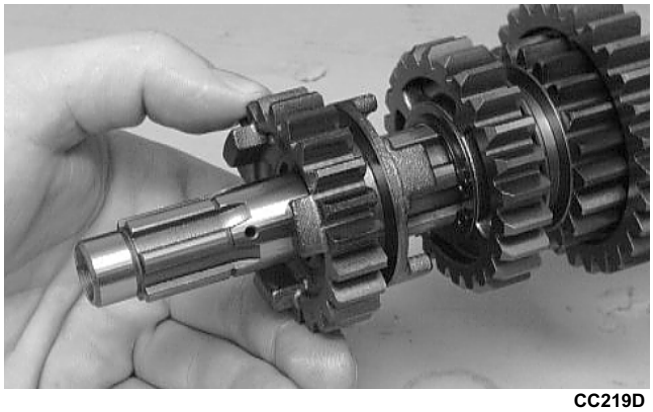
CC220D

■ **NOTE: On the 250/300, remove the 4th driven circlip.**



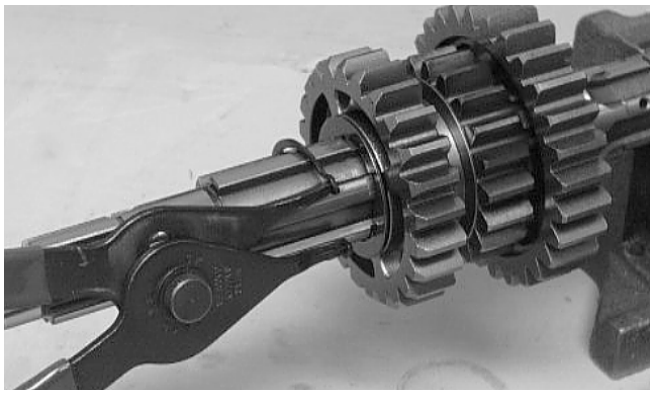
CC508D

4. Remove the 4th driven gear from the driveshaft. Note the four small dogs facing toward the 3rd driven gear for assembly purposes.

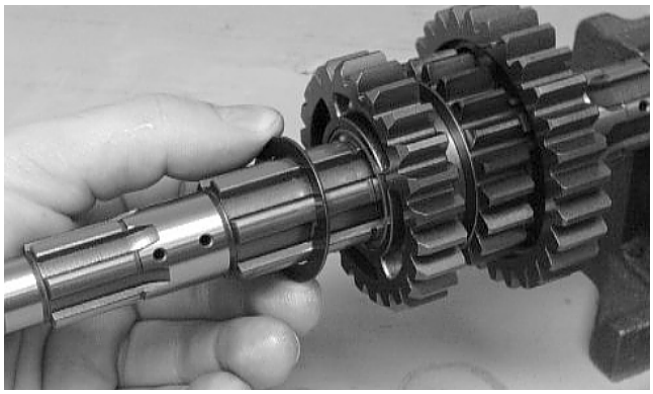


CC219D

5. Remove the 3rd driven circlip; then remove the 3rd driven washer (lock washer on the 250/300) from the driveshaft.

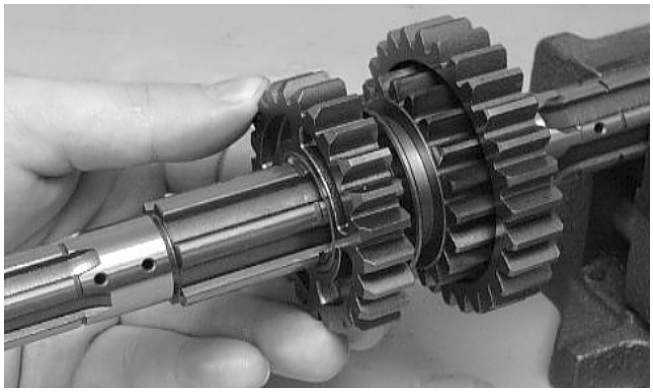


CC216D



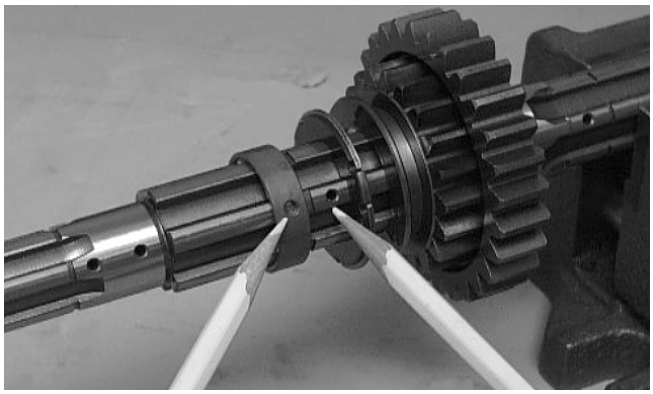
CC215D

6. Remove the 3rd driven gear from the driveshaft.



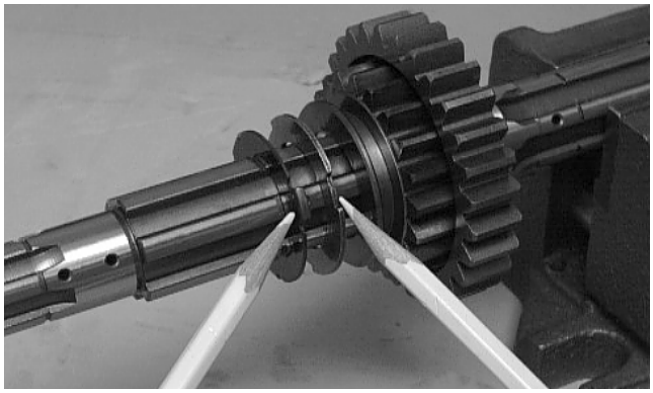
CC214D

7. Remove the 3rd driven bushing from the driveshaft. Note the location of the oil feed hole in the bushing and the matching oil supply hole in the driveshaft for assembly purposes.



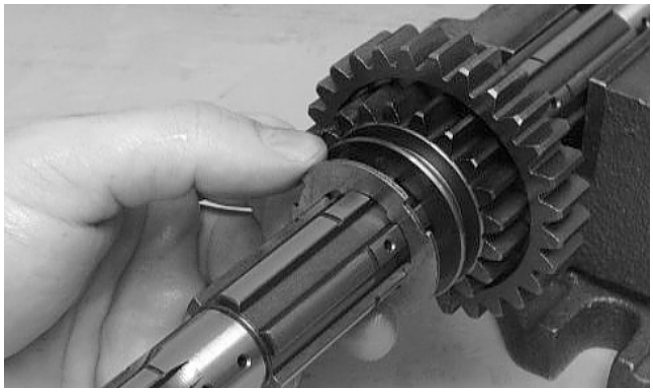
CC213D

8. Remove the 3rd driven washer (lock washer on the 250/300) from the driveshaft. Note the tabs facing toward the 5th driven gear for assembly purposes.



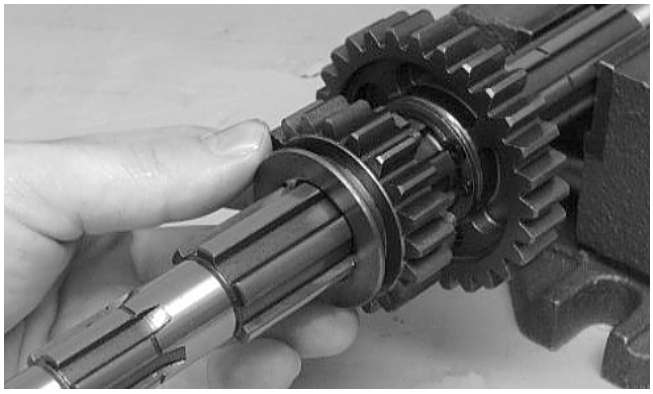
CC212D

9. Remove the 3rd driven washer (lock washer on the 250/300) by rotating it out of the groove. Note the groove closest to the 5th driven gear for assembly.



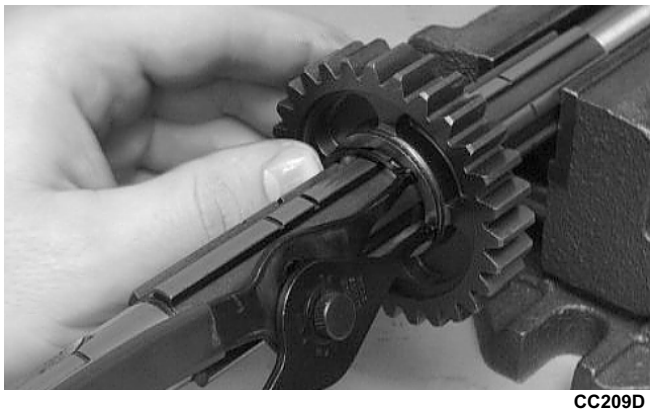
CC211D

10. Remove the 5th driven gear from the driveshaft.

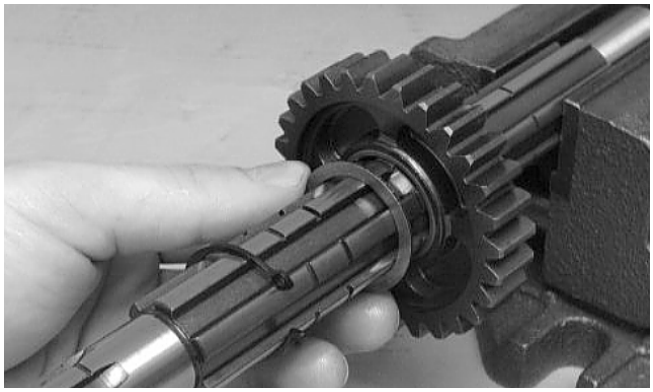


CC210D

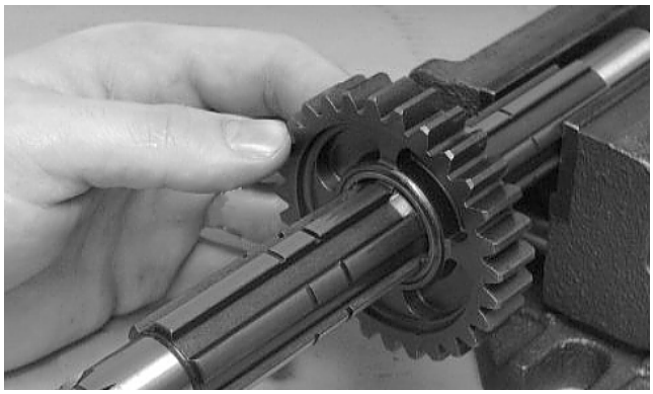
11. In order, remove the 2nd driven circlip, washer, gear, and bushing from the driveshaft.



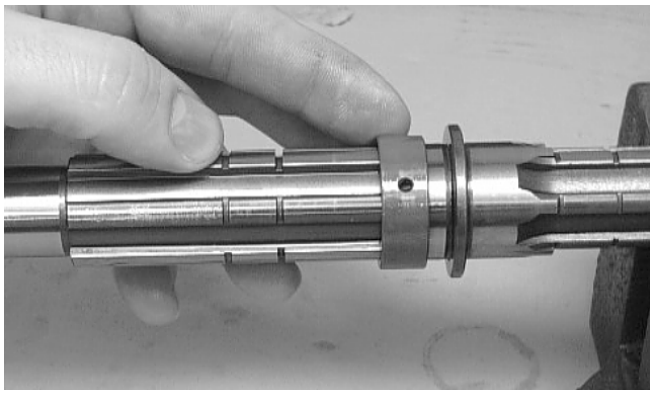
CC209D



CC208D



CC207D

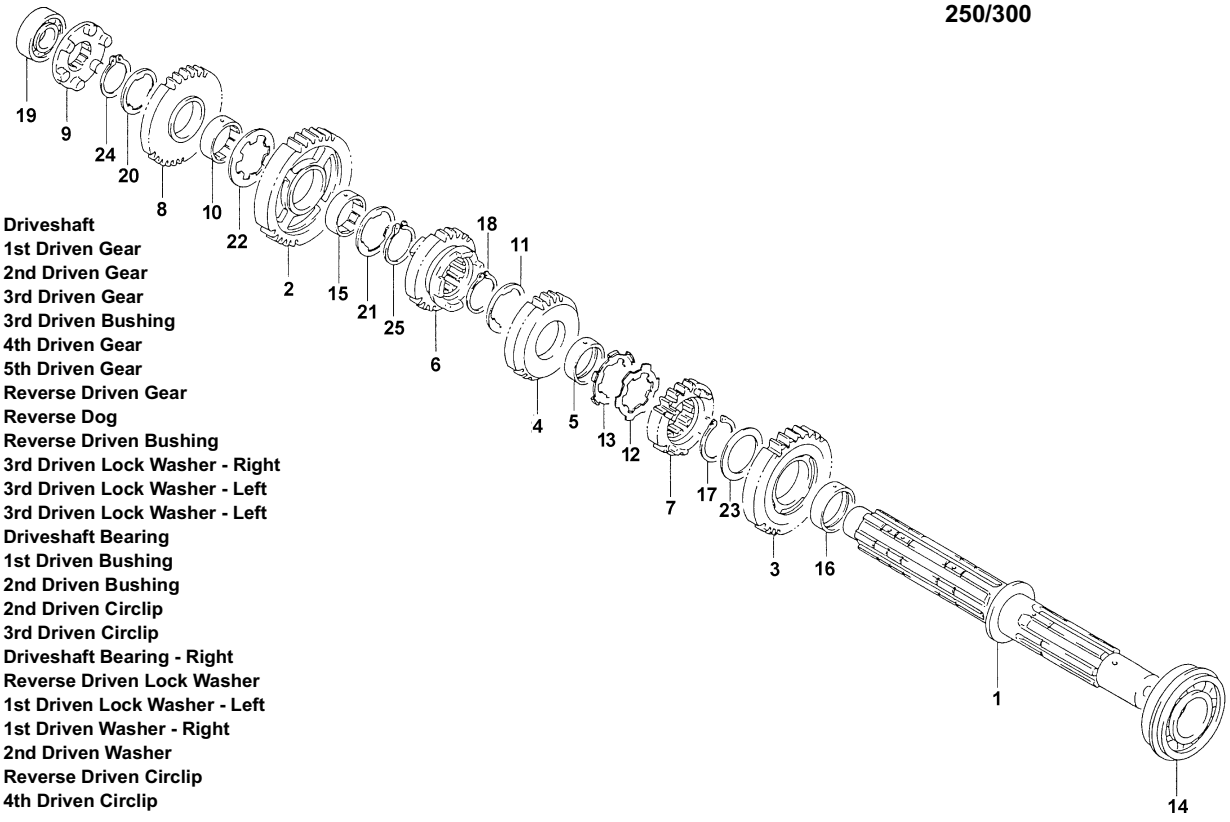


CC206D

☞ AT THIS POINT

To service secondary gears, see Servicing Center Crankcase Components in this sub-section.

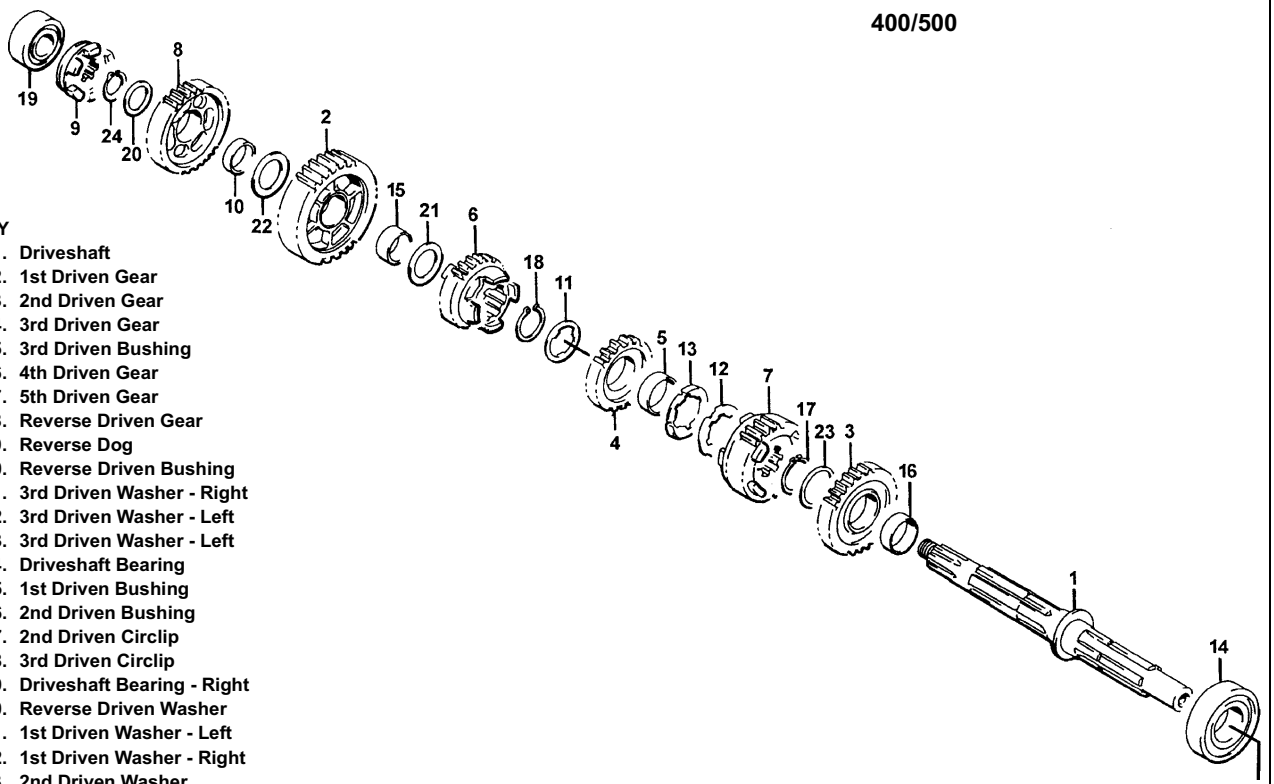
250/300



KEY
1. Driveshaft
2. 1st Driven Gear
3. 2nd Driven Gear
4. 3rd Driven Gear
5. 3rd Driven Bushing
6. 4th Driven Gear
7. 5th Driven Gear
8. Reverse Driven Gear
9. Reverse Dog
10. Reverse Driven Bushing
11. 3rd Driven Lock Washer - Right
12. 3rd Driven Lock Washer - Left
13. 3rd Driven Lock Washer - Left
14. Driveshaft Bearing
15. 1st Driven Bushing
16. 2nd Driven Bushing
17. 2nd Driven Circlip
18. 3rd Driven Circlip
19. Driveshaft Bearing - Right
20. Reverse Driven Lock Washer
21. 1st Driven Lock Washer - Left
22. 1st Driven Washer - Right
23. 2nd Driven Washer
24. Reverse Driven Circlip
25. 4th Driven Circlip

733-754B

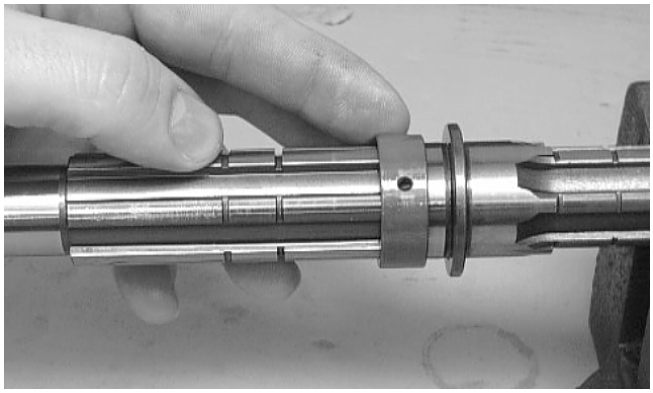
400/500



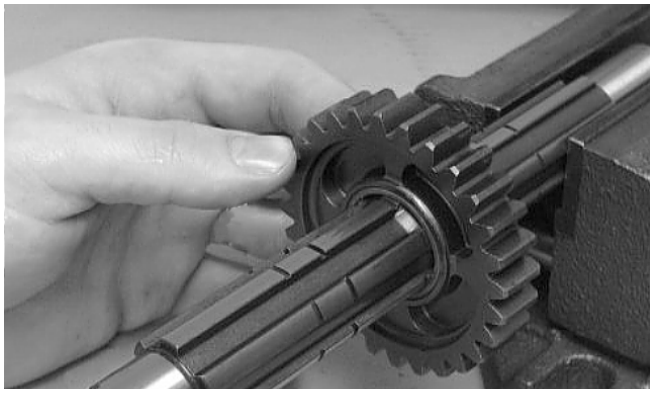
KEY
1. Driveshaft
2. 1st Driven Gear
3. 2nd Driven Gear
4. 3rd Driven Gear
5. 3rd Driven Bushing
6. 4th Driven Gear
7. 5th Driven Gear
8. Reverse Driven Gear
9. Reverse Dog
10. Reverse Driven Bushing
11. 3rd Driven Washer - Right
12. 3rd Driven Washer - Left
13. 3rd Driven Washer - Left
14. Driveshaft Bearing
15. 1st Driven Bushing
16. 2nd Driven Bushing
17. 2nd Driven Circlip
18. 3rd Driven Circlip
19. Driveshaft Bearing - Right
20. Reverse Driven Washer
21. 1st Driven Washer - Left
22. 1st Driven Washer - Right
23. 2nd Driven Washer
24. Reverse Driven Circlip

734-328A

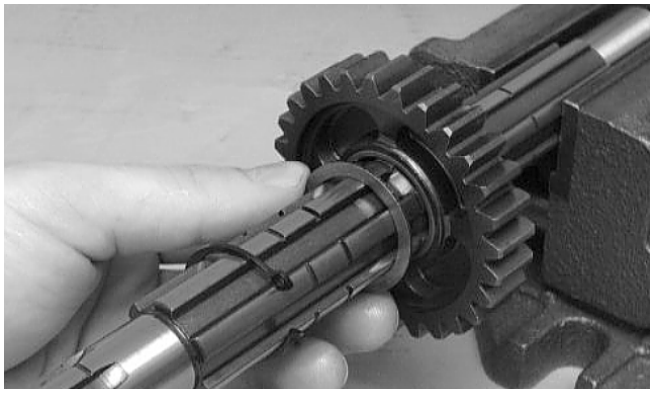
1. In order, install the 2nd driven bushing, gear, washer, and circlip onto the driveshaft.



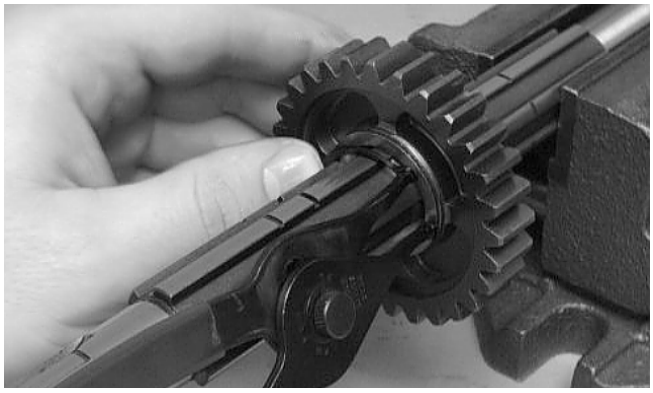
CC206D



CC207D

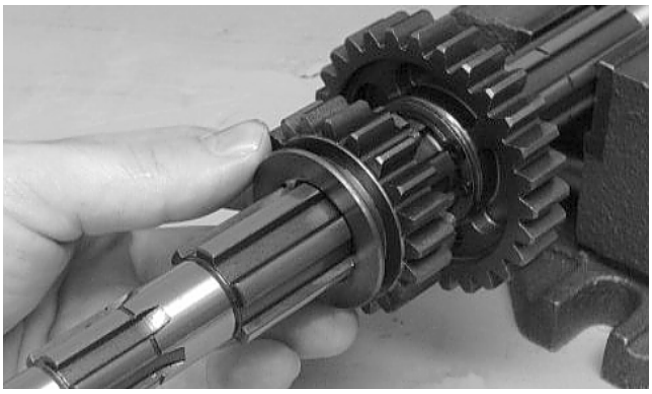


CC208D



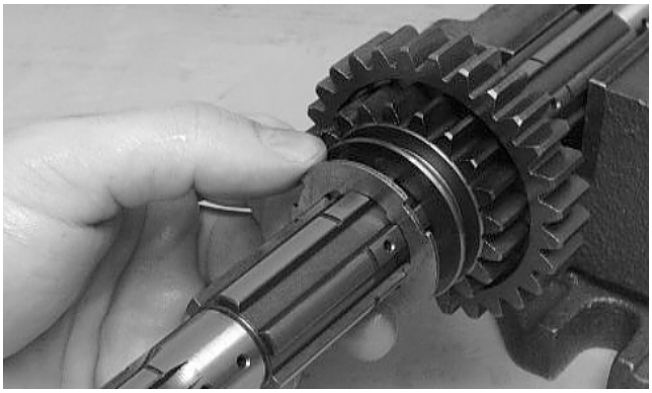
CC209D

2. Install the 5th driven gear onto the driveshaft.



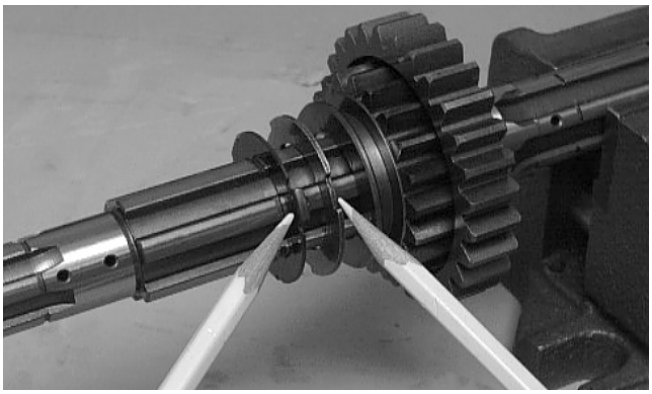
CC210D

3. Install the 3rd driven washer (lock washer on the 250/300). Lock it into the groove closest to the 5th driven gear (as noted in disassembly) by rotating it when it is in the groove.



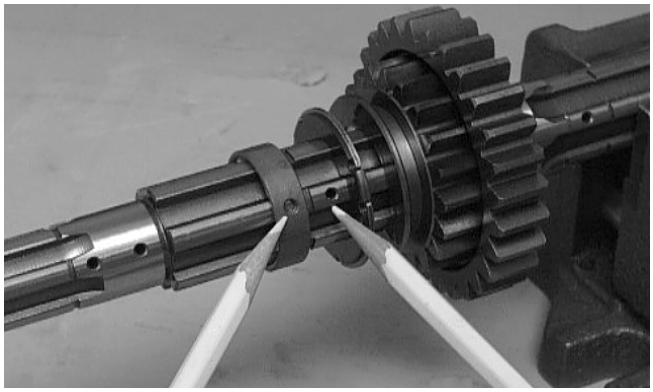
CC211D

4. Install the 3rd driven washer (lock washer on the 250/300) onto the driveshaft making sure the tabs are facing toward the 5th driven gear. Make sure the tabs intertwine with the 3rd driven washer on the 400/500.



CC212D

5. Install the 3rd driven bushing onto the driveshaft making sure the oil feed hole in the bushing aligns with the appropriate oil supply hole in the driveshaft (as noted in disassembly).

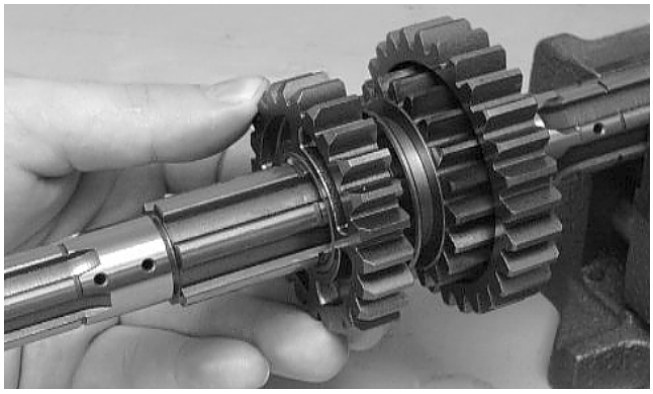


CC213D

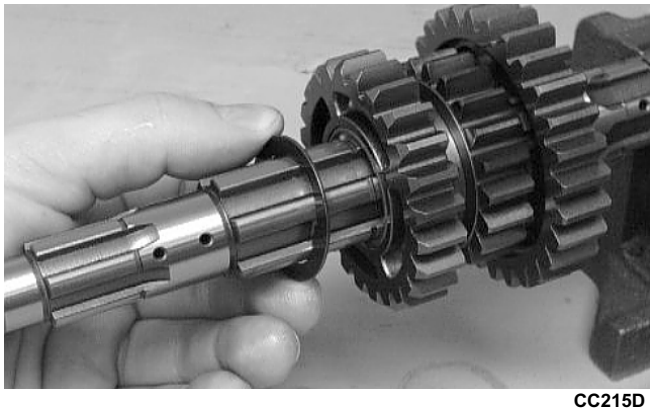
⚠ CAUTION

It is very important to assure the oil feed hole in the bushing and oil supply hole in the driveshaft align. If not aligned, engine damage will result.

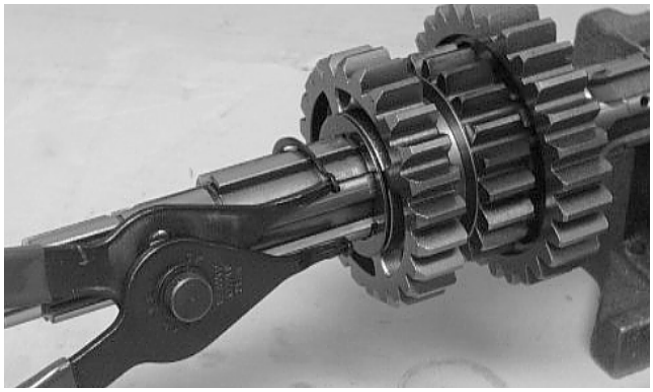
6. In order, install the 3rd driven gear, washer (lock washer on the 250/300), and circlip onto the driveshaft.



CC214D

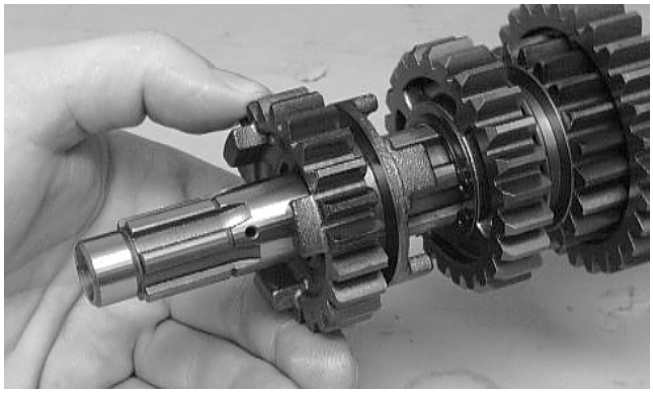


CC215D



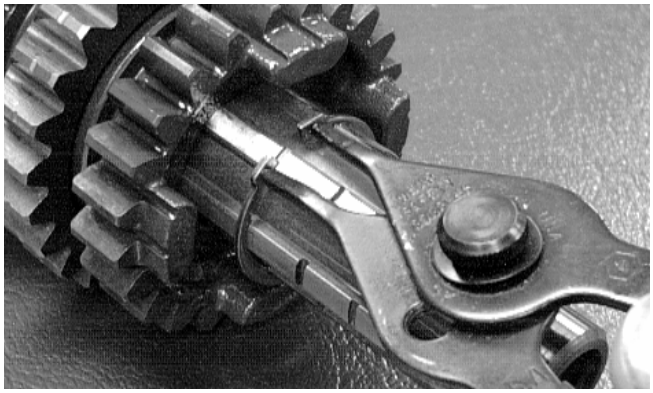
CC216D

7. Install the 4th driven gear onto the driveshaft making sure the four small dogs are facing toward the 3rd driven gear as noted in disassembly.



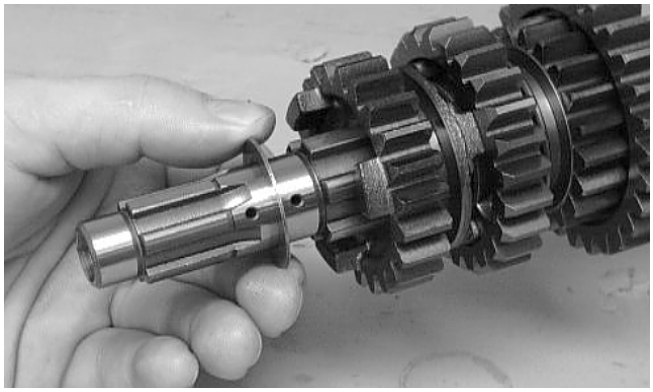
CC219D

■ **NOTE: On the 250/300, secure with the circlip.**

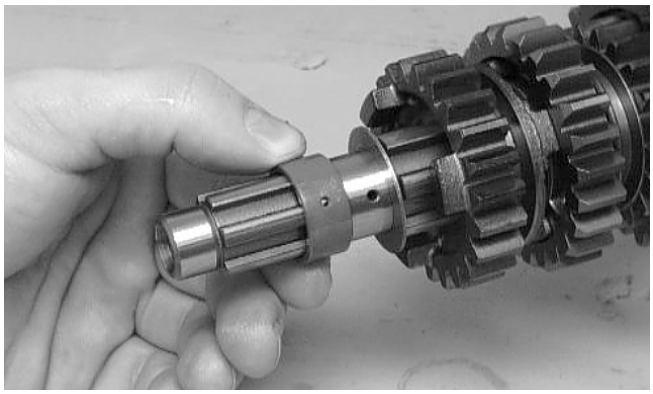


CC508D

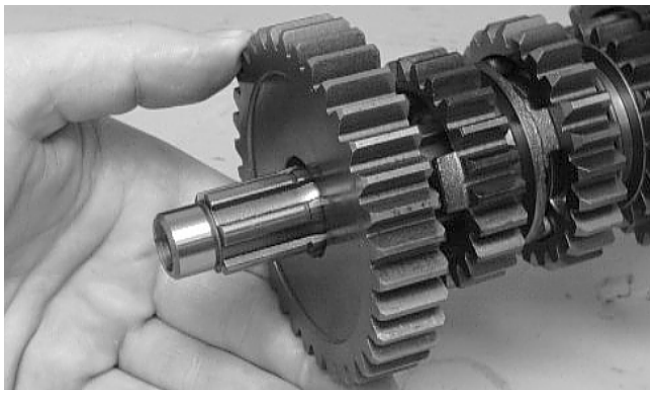
8. Install the 1st driven washer onto the shoulder of the splined shaft; then install the 1st driven bushing and gear.



CC220D

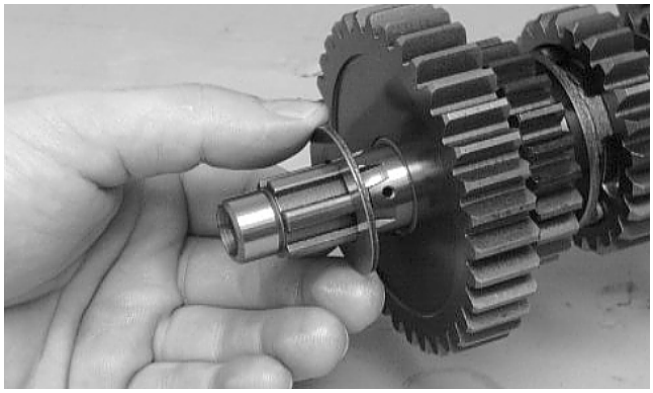


CC221D



CC222D

9. Install the washer on the shaft making sure it lines up with the groove in the shaft; then turn the washer locking it on the shaft.



CC223D

10. Slide the reverse driven gear bushing onto the shaft making sure the oil port in the bushing aligns with the oil port on the shaft.

CC842

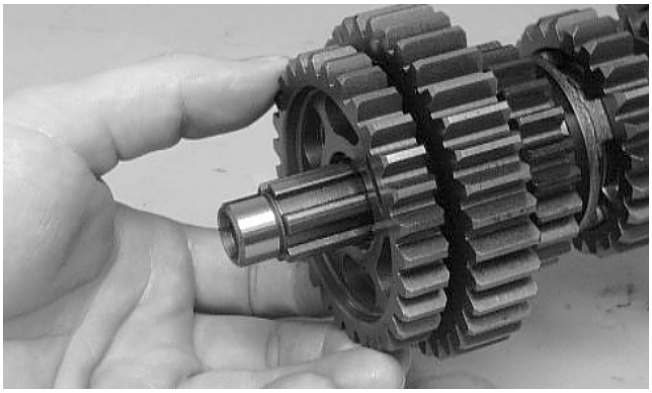
⚠ CAUTION

Failure to align the oil ports will result in serious engine damage.

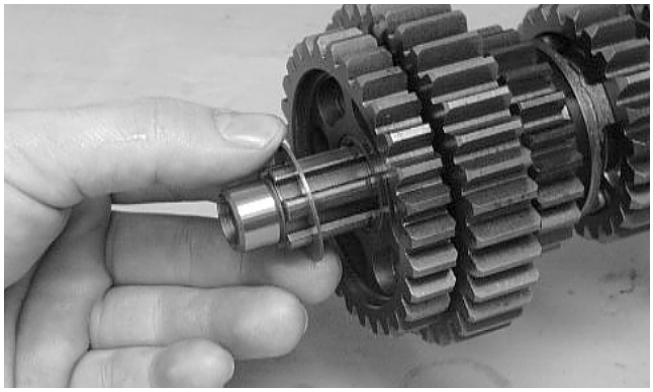
11. Move the washer in the shaft groove until the notches in the washer align with the tabs on the bushing; then slide the bushing up tight against the washer.

CC843

12. In order, install the reverse driven gear, washer (lock washer on the 250/300), circlip, and reverse dog onto the driveshaft.

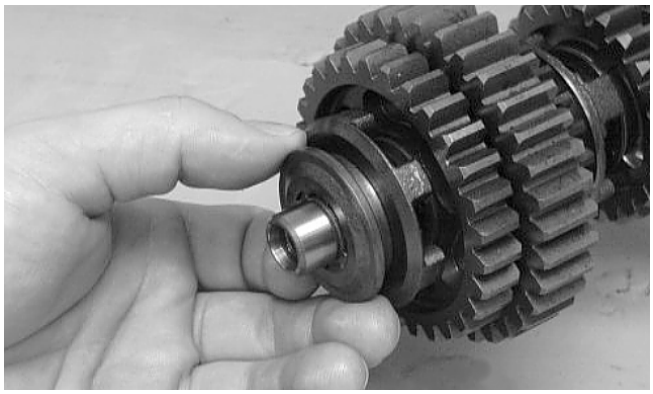


CC225D



CC226D

CC227D



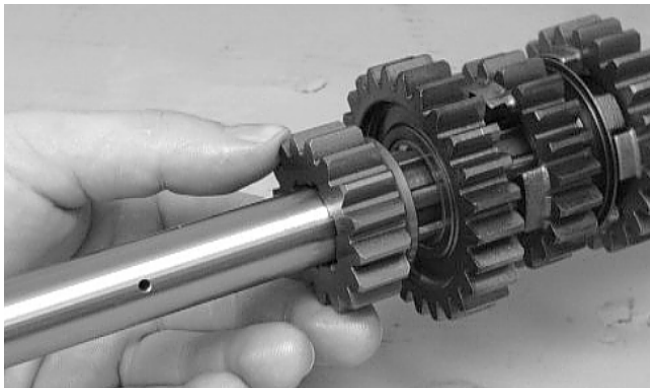
CC228D

■ **NOTE: The driveshaft is now completely assembled for installation.**

COUNTERSHAFT (Manual Transmission)

Disassembling

1. On the 400/500, remove the 2nd drive washer; then remove the 2nd drive gear from the countershaft.



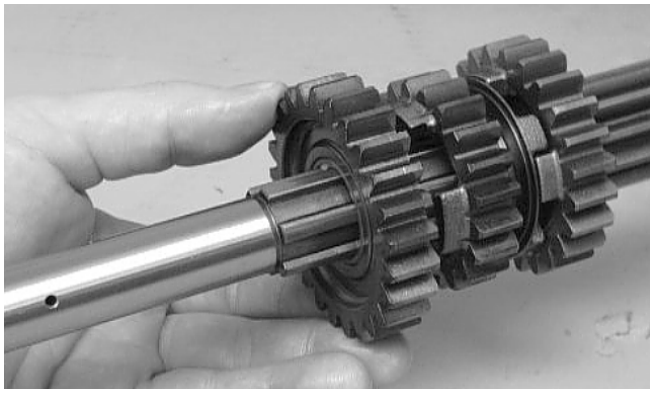
CC204D

■ **NOTE: On the 250/300, remove the 2nd drive gear from the countershaft using a bearing separator and a hydraulic press.**

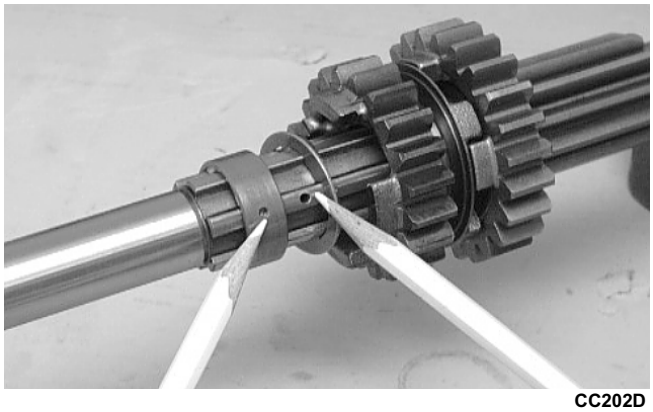
⚠ CAUTION

Pressing the 2nd drive gear off may be done twice before shaft replacement is necessary.

2. Remove the 5th drive gear from the countershaft. On the 400/500, account for the 5th drive bushing.

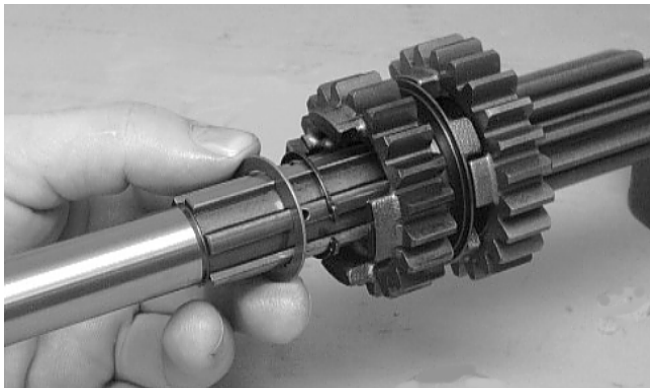


CC203D

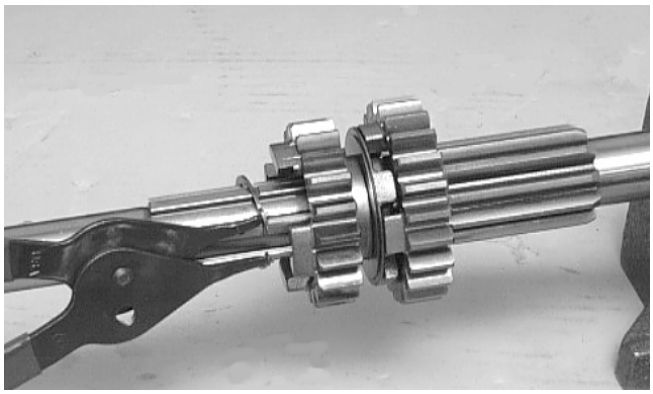


CC202D

3. Remove the 5th drive washer and 5th drive circlip from the countershaft.



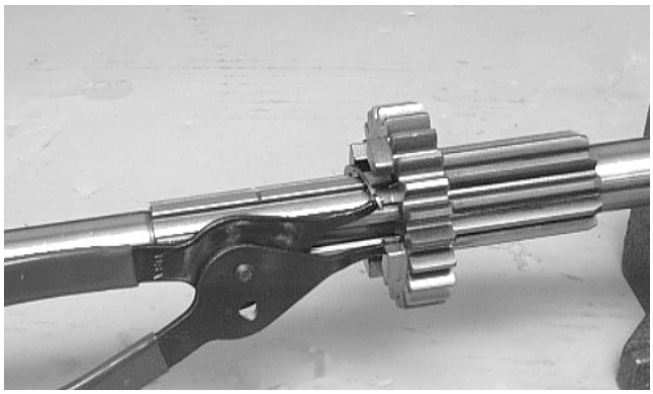
CC201D



CC200D

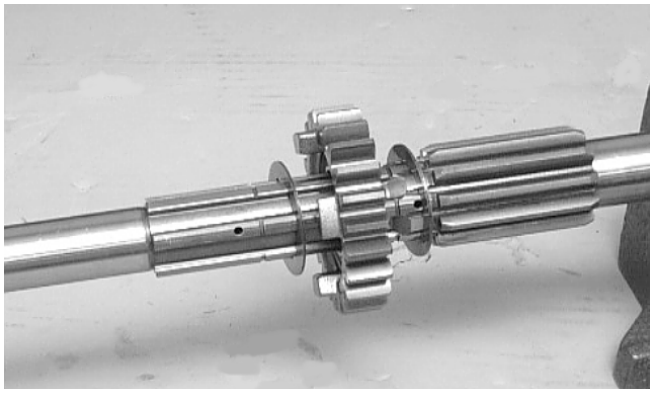
4. Remove the 3rd drive gear from the countershaft.

5. Remove the circlip securing the 4th drive gear on the countershaft; then remove the washer and 4th drive gear.



CC199D

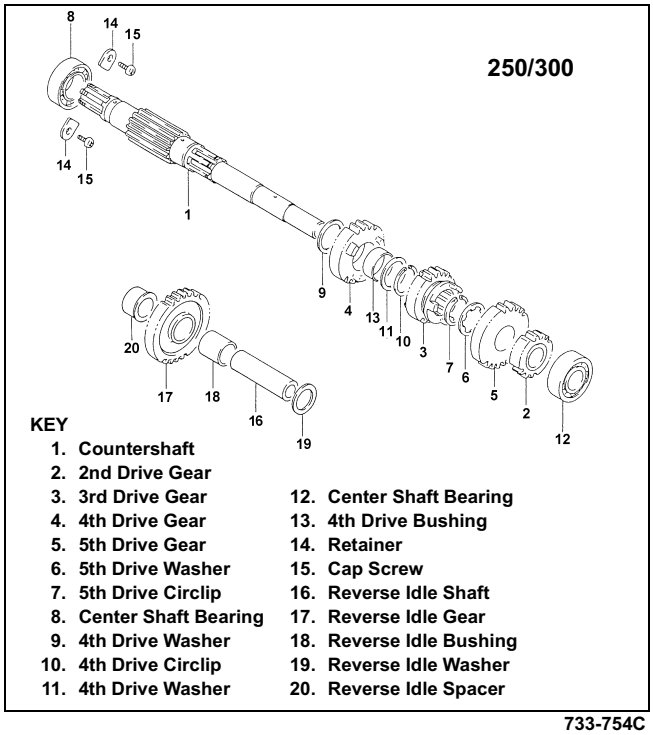
■ **NOTE: On the 250/300, account for the bushing in front of the gear. On the 400/500, account for the bushing in back of the gear.**



CC198D

6. Remove the 4th drive washer from the countershaft.

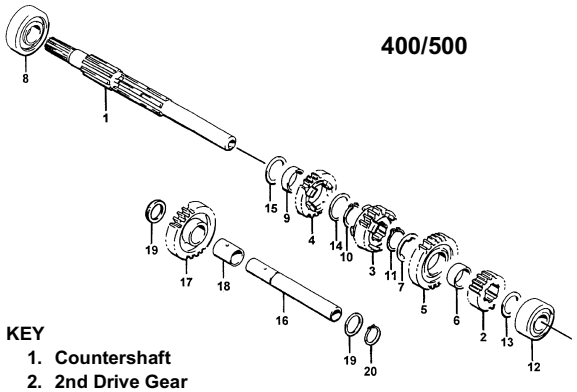
Assembling



KEY

1. Countershaft
2. 2nd Drive Gear
3. 3rd Drive Gear
4. 4th Drive Gear
5. 5th Drive Gear
6. 5th Drive Washer
7. 5th Drive Circlip
8. Center Shaft Bearing
9. 4th Drive Washer
10. 4th Drive Circlip
11. 4th Drive Washer
12. Center Shaft Bearing
13. 4th Drive Bushing
14. Retainer
15. Cap Screw
16. Reverse Idle Shaft
17. Reverse Idle Gear
18. Reverse Idle Bushing
19. Reverse Idle Washer
20. Reverse Idle Spacer

733-754C

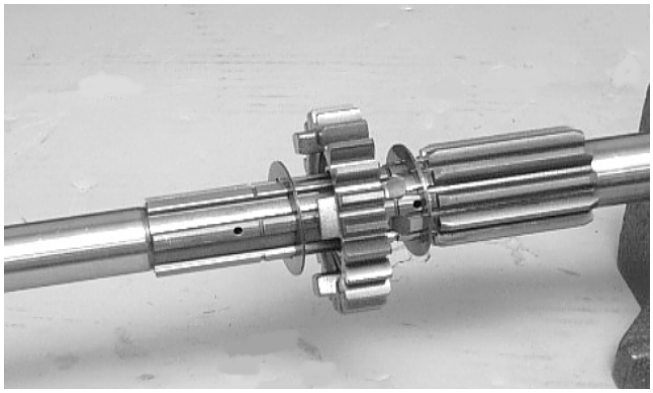


KEY

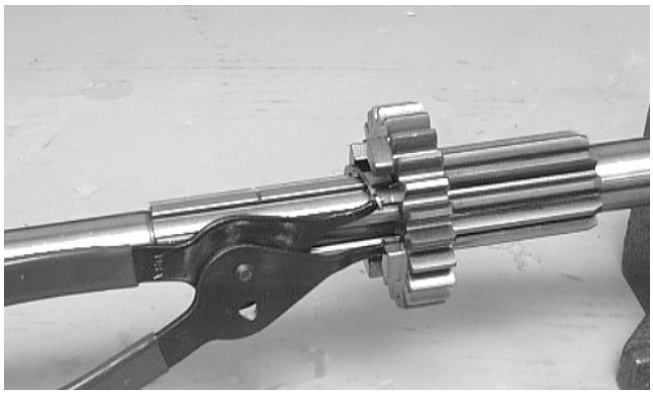
1. Countershaft
2. 2nd Drive Gear
3. 3rd Drive Gear
4. 4th Drive Gear
5. 5th Drive Gear
6. 5th Drive Bushing
7. 5th Drive Washer
8. Center Shaft Bearing - Right
9. 4th Drive Bushing
10. 4th Drive Circlip
11. 5th Drive Circlip
12. Center Shaft Bearing
13. 2nd Drive Washer
14. 4th Drive Washer
15. 4th Drive Washer
16. Reverse Idle Shaft
17. Reverse Idle Gear
18. Reverse Idle Bushing
19. Reverse Idle Washer
20. Reverse Idle Circlip

734-328B

1. Install the 4th drive washer onto the countershaft.
2. Install the 4th drive gear making sure the bushing is in back of the gear on the 400/500 or that it is in front of the gear on the 250/300; then install the 4th drive washer onto the countershaft. Secure with the circlip.

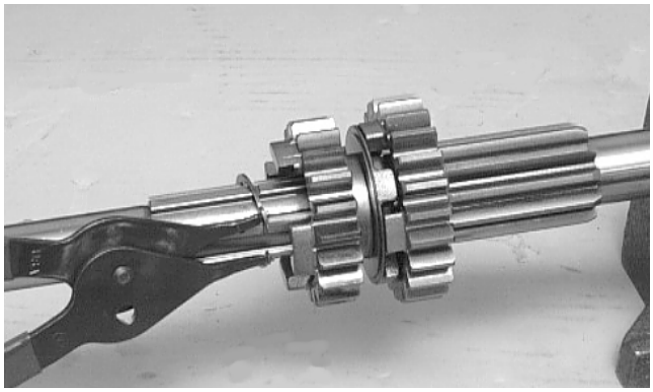


CC198D



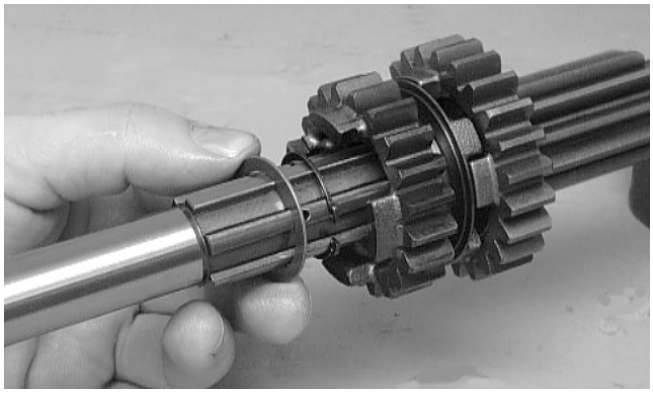
CC199D

3. Install the 3rd drive gear; then install the 5th drive circlip onto the countershaft.

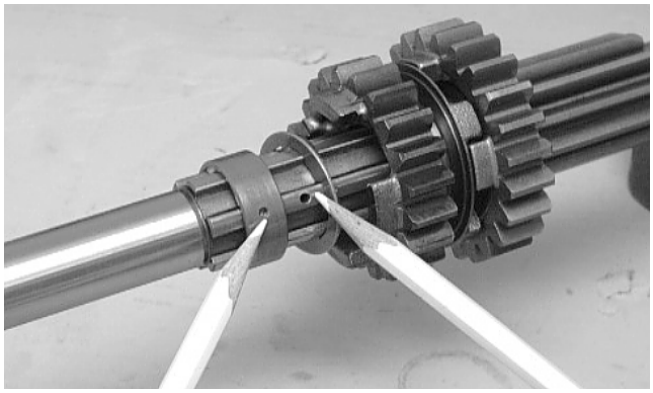


CC200D

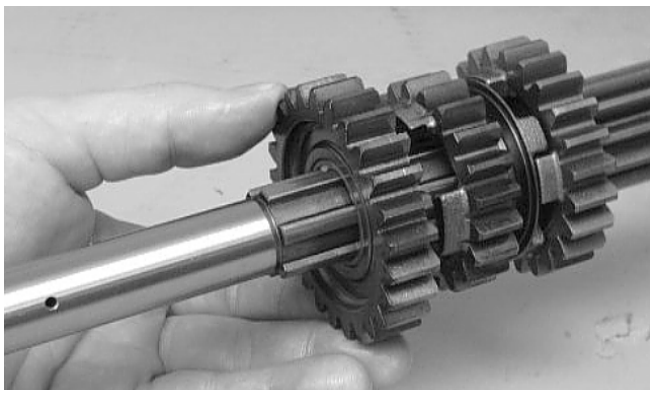
4. Install the 5th drive washer and 5th drive gear onto the countershaft making sure the oil holes align.



CC201D



CC202D



CC203D

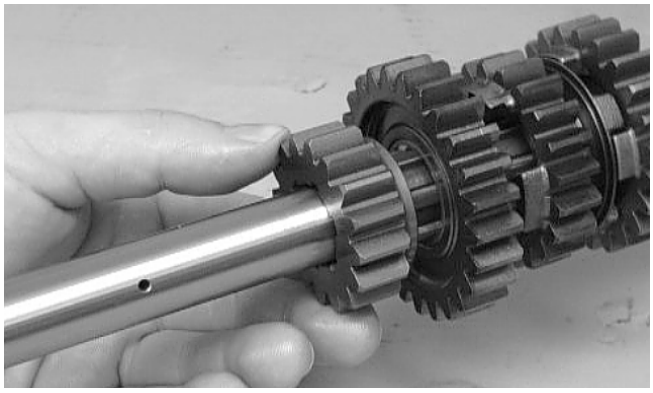
5. On the 250/300, press the 2nd drive gear onto the countershaft leaving an 0.25 mm (0.010 in.) gap between the 2nd and 5th drive gears.

■**NOTE: When pressing the 2nd drive gear onto the countershaft, the inside of the gear must be oil free; then apply a thin, even coat of green Loctite #620 being careful not to get Loctite on the other gears.**

⚠ CAUTION

Pressing the 2nd drive gear off may be done twice before shaft replacement is necessary.

6. On the 400/500, install the 2nd drive gear and 2nd drive washer onto the countershaft.



CC204D

■**NOTE: The countershaft is now completely assembled for installation.**

COUNTERSHAFT (Automatic Transmission)

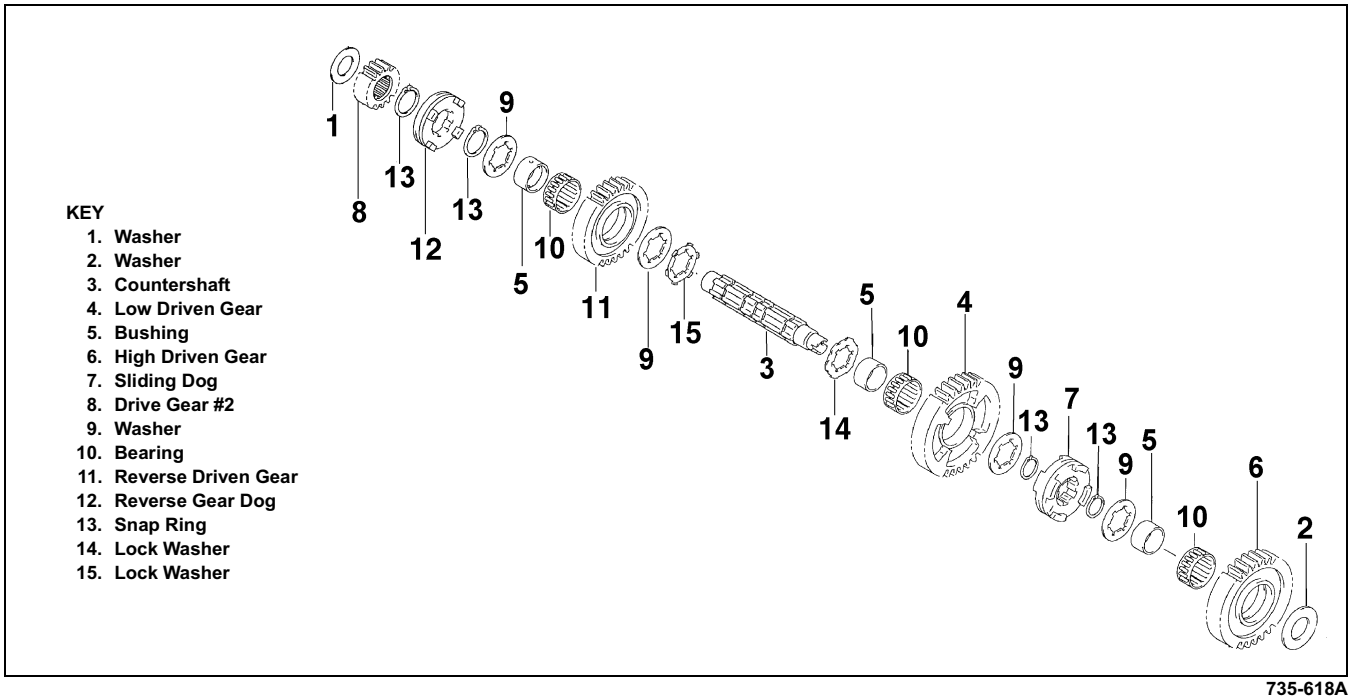
⚠ CAUTION

When disassembling the countershaft, care must be taken to note the direction each major component (dog, gear) faces. If a major component is installed facing the wrong direction, transmission damage may occur and/or the transmission will malfunction. In either case, complete disassembly and assembly will be required.

Disassembling

1. Remove drive gear #2; then remove the snap ring securing the reverse gear dog.
2. Remove the reverse gear dog; then remove the snap ring securing the reverse driven gear.
3. Remove the reverse driven gear and account for the washer, bushing, and bearing.
4. Remove the low driven gear washer and lock washers; then remove the low driven gear. Account for the bushing and bearing.
5. Remove the washer; then remove the snap ring securing the sliding dog. Remove the sliding dog.
6. Remove the high driven gear snap ring; then remove the high driven gear. Account for the washer, bushing, and bearing.

Assembling



735-618A

1. Place the high driven gear onto the countershaft making sure the bearing, bushing, and washer are properly positioned. Secure with the snap ring.
2. Place the sliding dog onto the countershaft; then secure with the snap ring. Place the washer next to the snap ring.

3. Place the low driven gear onto the countershaft making sure the bearing and bushing are properly positioned; then place the lock washers and washer onto the shaft.

4. Place the reverse driven gear onto the countershaft making sure the bearing, bushing, and washer are properly positioned; then secure with the snap ring.

5. Place the reverse gear dog onto the countershaft; then secure with the snap ring.

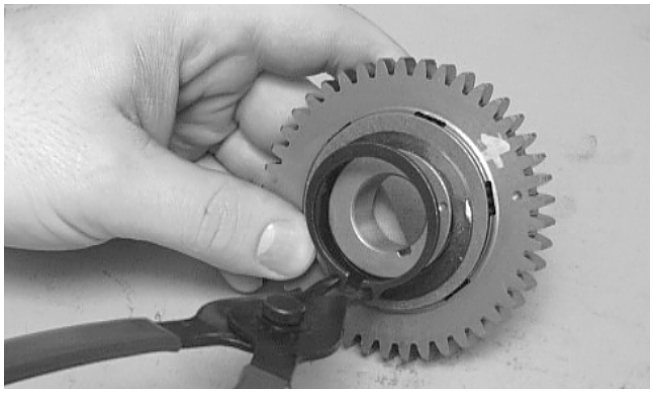
6. Place drive gear #2 onto the countershaft.

■ NOTE: When installing the countershaft assembly, account for the washer on each end of the shaft.

DRIVEN GEAR (400/500)

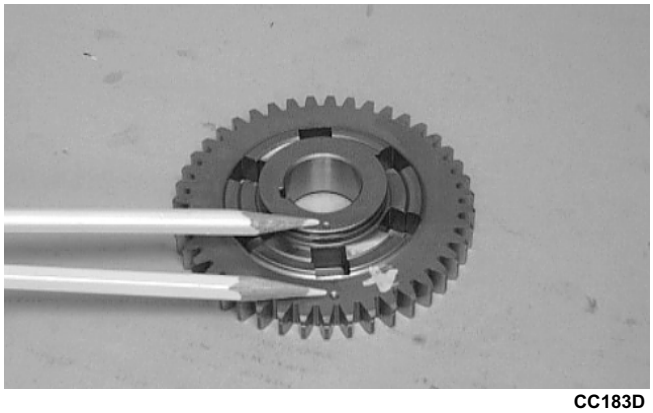
Disassembling

1. Remove the circlip securing the driven gear. Account for a spring washer and thrust washer.



CC182D

2. Note the position of the alignment marks for installation; then remove the driven gear with inner race. Account for three pins and six springs.



CC183D

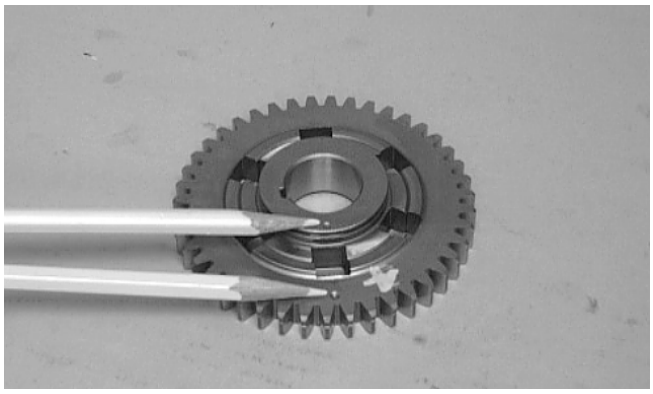
Inspecting

1. Inspect the gear, pins, and keyway for wear.

2. Inspect the springs for damage or fatigue.

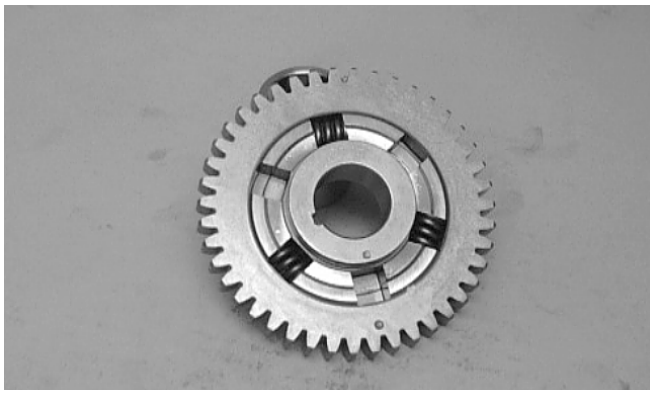
Assembling

1. Align the alignment marks of the driven gear and inner race.



CC183D

2. Install three springs (every other one) proceeding away from the alignment marks.

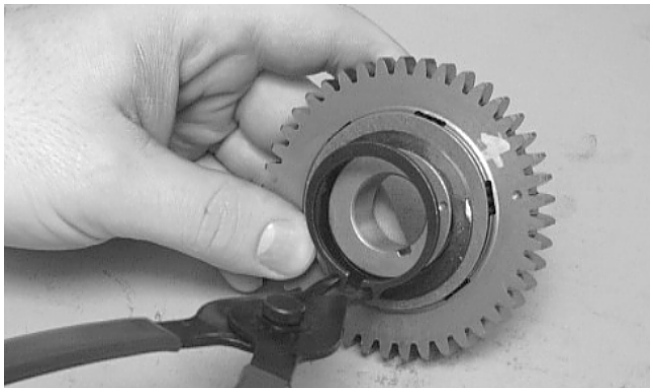


CC184D

3. Using a pair of needle-nose pliers, insert each remaining spring part way into the slot; then install a pin and push the spring/pin assembly into the slot.

CC185D

4. Install the thrust washer and spring washer (with its raised inner portion directed away from the gear); then install the circlip with the sharp edge facing away from the gear.



CC182D

■ **NOTE: The driven gear is now completely assembled for installation.**

SECTION 4 - FUEL/LUBRICATION/COOLING

4

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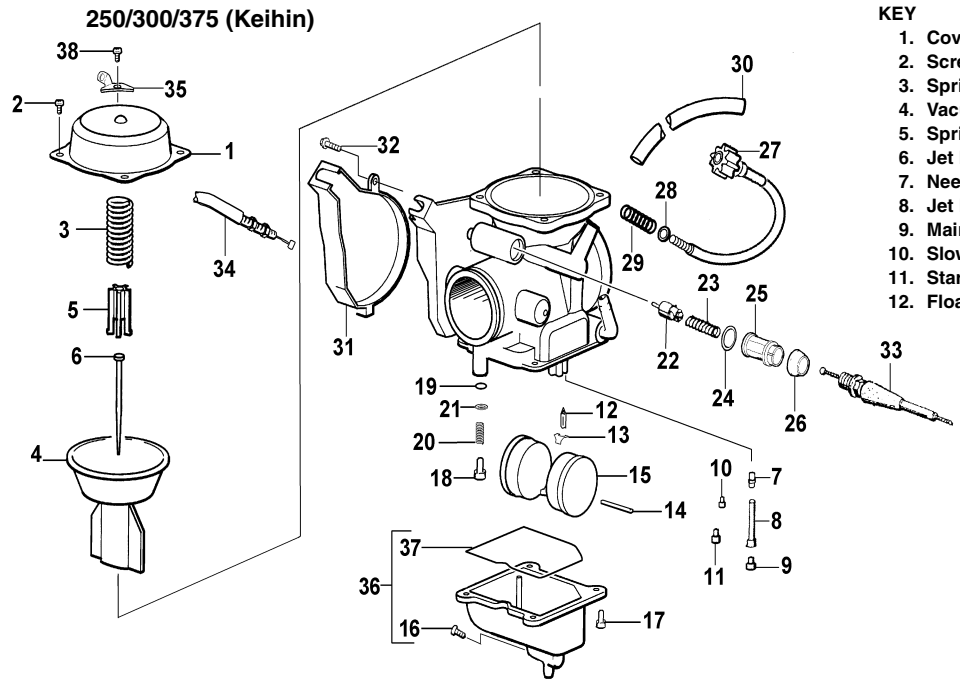
Carburetor Specifications

ITEM	250	300	375	400	500
Type	Keihin CVK32	Keihin CVK32	Keihin CVK32	Keihin CVK34	Keihin CVK34
Main Jet	138	135	150	145	148
Slow Jet	38	38	38	38	38
Pilot Air Screw Setting (turns)	1 3/4	2 1/4	2 1/8	2 1/4	2 1/4
Needle Jet	4.0/3.4	4.0/3.4	4.0/3.4	6.0/4.0	6.0/4.0
Jet Needle	N8TT	N8TT	N8TV	N601	N601
Idle RPM	1400-1600	1400-1600	1200-1350	1400-1600	1200-1350
Starter Jet	60	65	60	90	102
Float Arm Height	17 mm (0.7 in.)	17 mm (0.7 in.)	17 mm (0.7 in.)	17 mm (0.7 in.)	17 mm (0.7 in.)
Throttle Cable Free-Play (at lever)	3-6 mm (1/8-1/4 in.)	3-6 mm (1/8-1/4 in.)	3-6 mm (1/8-1/4 in.)	3-6 mm (1/8-1/4 in.)	3-6 mm (1/8-1/4 in.)

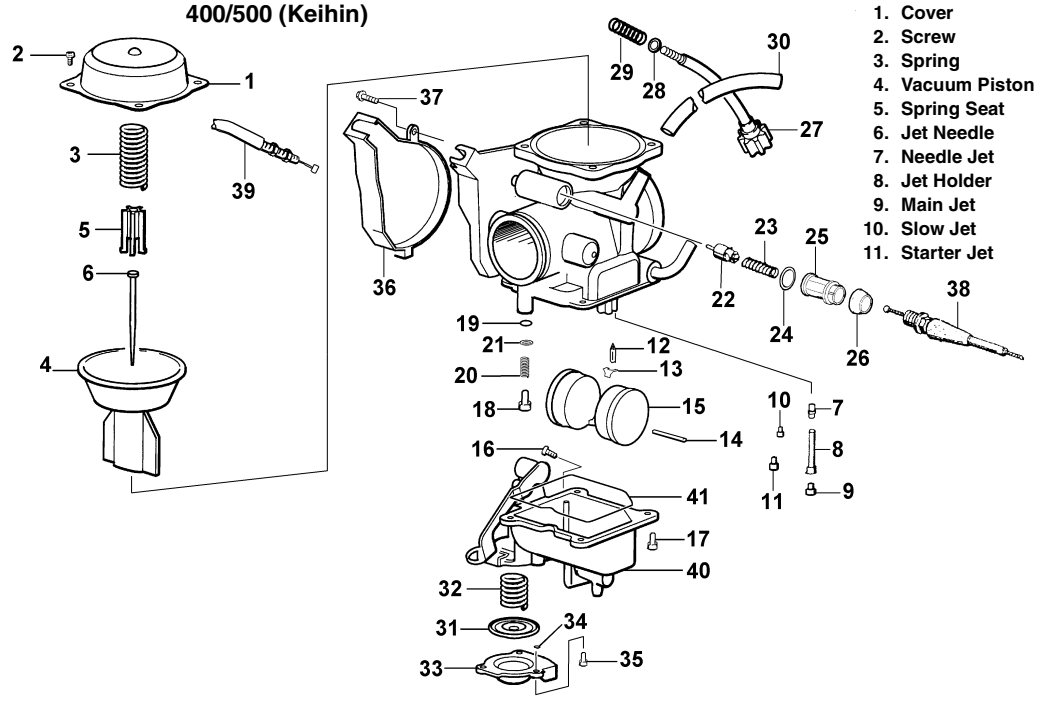
Carburetor Schematics



KEY

1. Cover
2. Screw
3. Spring
4. Vacuum Piston
5. Spring Seat
6. Jet Needle
7. Needle Jet
8. Jet Holder
9. Main Jet
10. Slow Jet
11. Starter Jet
12. Float Valve
13. Clip
14. Float Pin
15. Float
16. Drain Plug
17. Screw
18. Pilot Air Screw
19. O-Ring
20. Spring
21. Washer
22. Starter Valve
23. Spring
24. O-Ring
25. Cap
26. Rubber Cap
27. Stop Screw
28. Washer
29. Spring
30. Tube
31. Cover
32. Screw
33. Choke Cable
34. Throttle Cable
35. Idle Adjust Bracket

0735-876



KEY

1. Cover
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19. O-Ring
20. Spring
21. Washer
22. Starter Valve
23. Spring
24. O-Ring
25. Cap
26. Rubber Cap
27. Stop Screw
28. Washer
29. Spring
30. Tube
31. Diaphragm Assy
32. Spring
33. Pump Housing
34. U-Ring
35. Screw
36. Cover
37. Screw
38. Choke Cable
39. Throttle Cable
40. Float Chamber Assy
41. O-Ring

0736-053

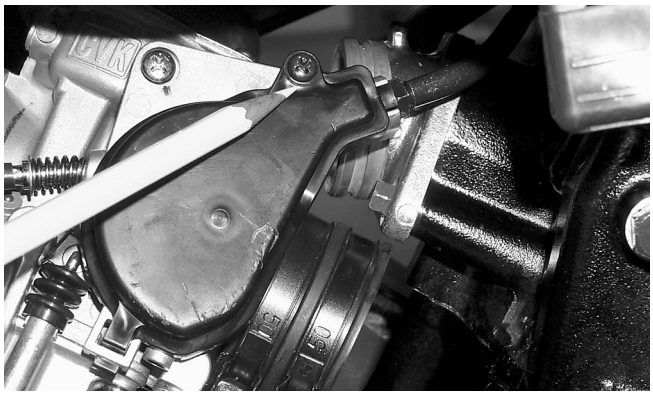
Carburetor

⚠ WARNING

Whenever any maintenance or inspection is performed on the fuel system during which there may be fuel leakage, there should be no welding, smoking, open flames, etc., in the area.

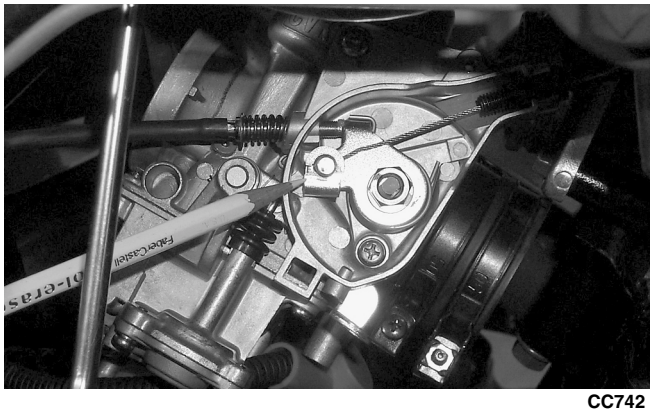
REMOVING

1. Turn the gas tank valve to the OFF position.
2. Remove the seat.
3. Remove the air-intake snorkel (250/300) or the air cleaner housing cover (375/400/500).
4. Disconnect the hose from the carburetor to the gas tank at the gas tank valve connection.
5. Loosen the flange clamps; then remove the carburetor from the two carburetor boots.
6. Remove the screw securing the throttle actuator cover to the carburetor; then remove the cover.



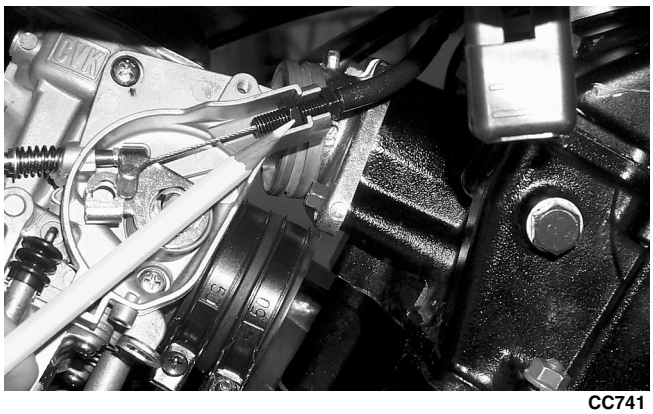
CC743

7. Remove the throttle cable from the actuator arm.



CC742

8. Loosen the outer jam nut securing the throttle cable to the carburetor body; then route the cable out of the way.



CC741

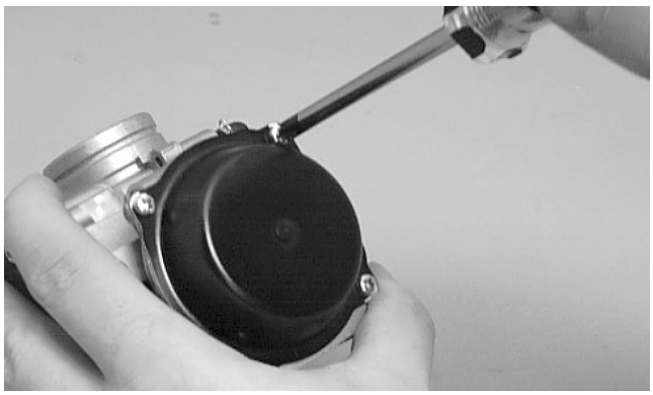
9. By unscrewing the plastic choke cable end, disconnect the choke cable from the carburetor.

CC740A

10. Disconnect the gas and vent hoses; then remove the carburetor.

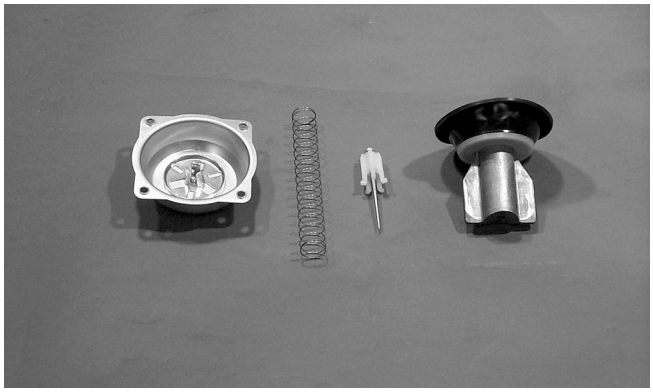
DISASSEMBLING

1. Remove the four Phillips-head screws securing the top cover; then remove the cover.



CH015D

2. Remove the vacuum piston assembly from the carburetor body. Account for a spring, spring seat, and the jet needle.

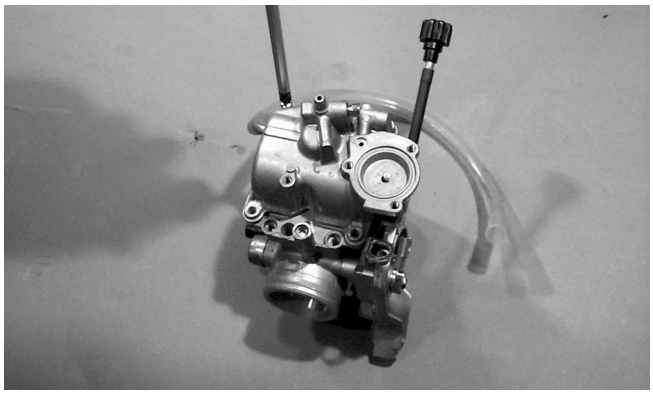


CC746

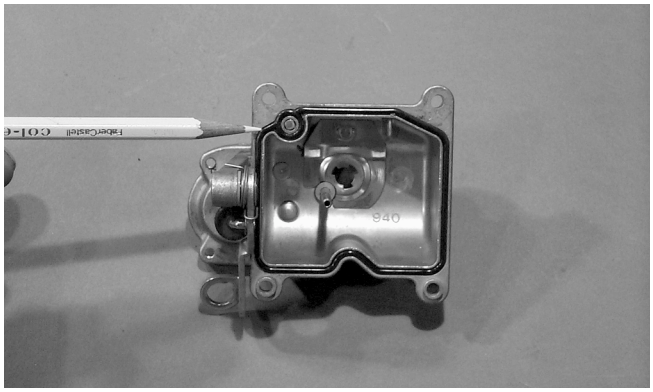
3. Remove the three screws securing the primer housing. Account for the diaphragm assembly, spring, and U-ring (in the housing).

CC748

4. Remove the Phillips-head screws securing the float chamber; then remove the chamber. Account for the O-ring.

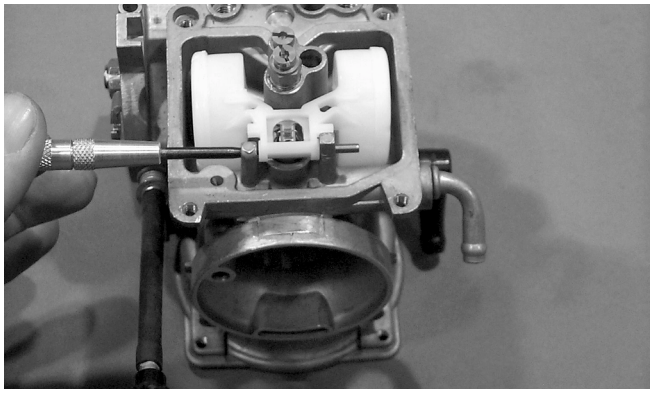


CC749



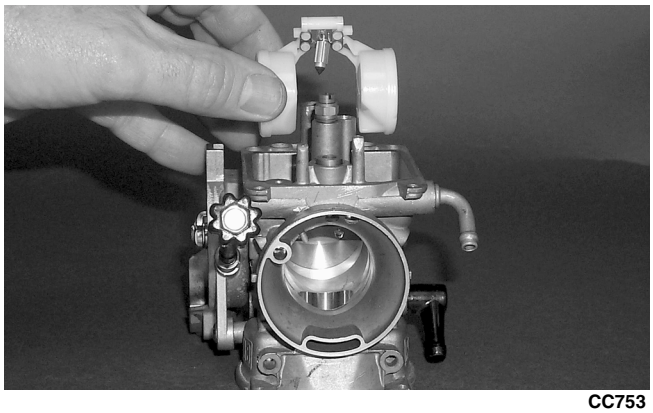
CC750

5. Remove the float pin.



CC752

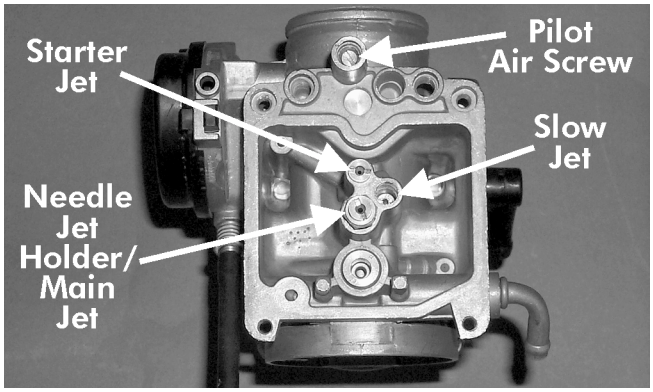
6. Lift the float assembly from the carburetor. Account for the float needle valve.



CC753

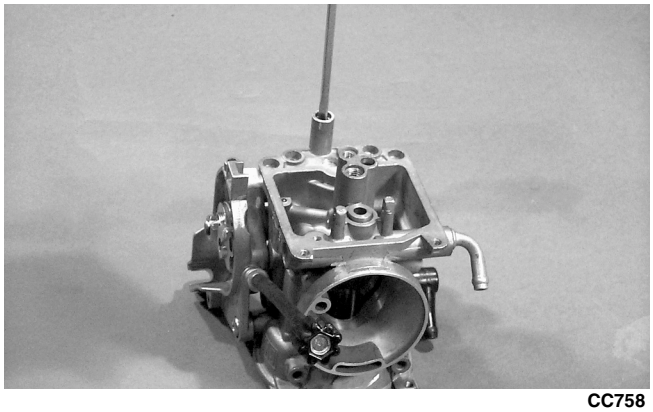
■ **NOTE: Note the locations of the jets, air screw, and holder for disassembling procedures.**

4



CC761A

7. Secure the needle jet holder with a wrench; then remove the main jet.
8. Remove the needle jet holder; then remove the slow jet and the starter jet.
9. Remove the pilot air screw.

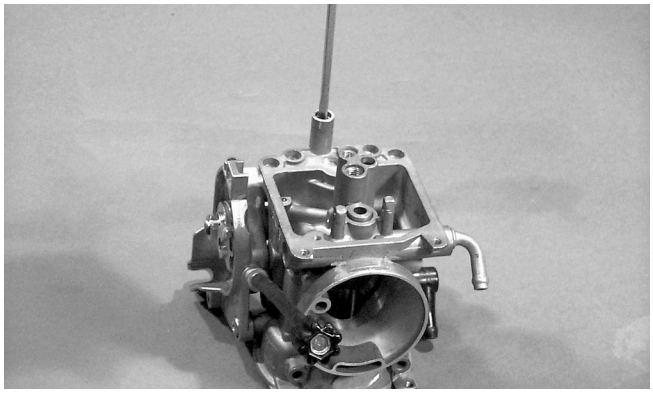


CC758

10. Unscrew and remove the idle speed adjuster assembly. Account for the spring and washer.

ASSEMBLING

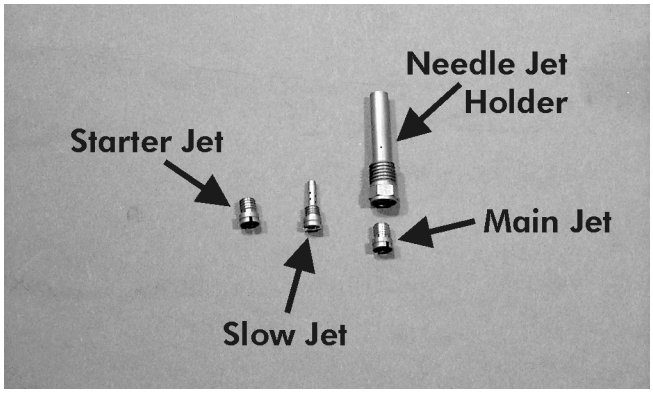
1. Screw the idle speed adjuster into the carburetor making sure the washer and spring are properly positioned.
2. Install the pilot air screw.



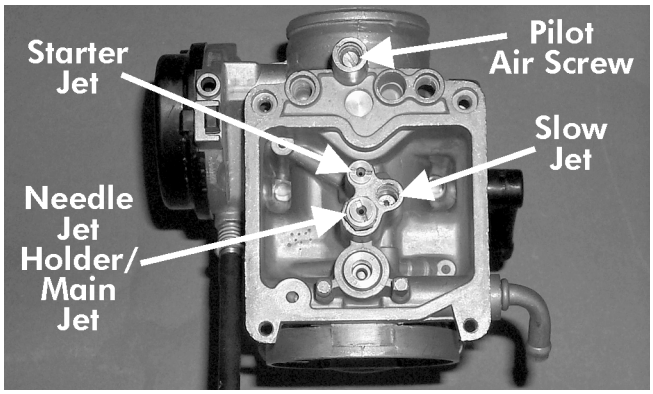
CC758

■ NOTE: Turn the pilot air screw clockwise until it is lightly seated; then turn it counterclockwise the recommended number of turns as an initial setting.

■ NOTE: Note the locations of the jets and holder during assembling procedures.

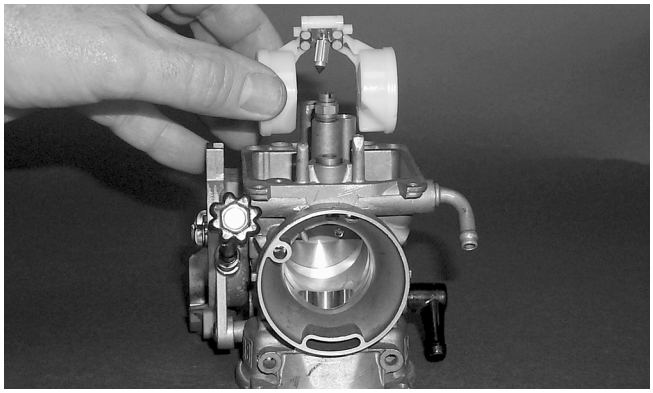


CC759A



CC761A

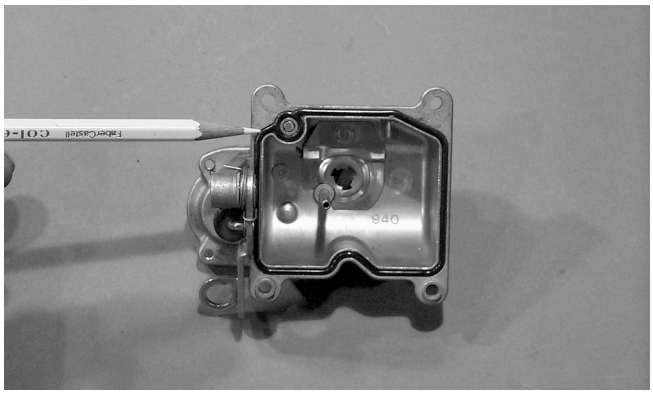
3. Install the slow jet. Tighten securely.
4. Install the main jet into the needle jet holder and tighten securely; then install the needle jet holder assembly into the carburetor and tighten securely.
5. Place the float assembly (with float needle valve) into position and secure to the carburetor with the float pin.



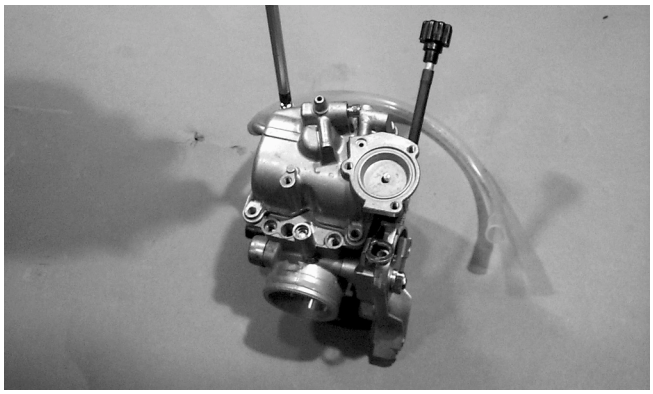
CC753

■**NOTE: Check float arm height by inverting the carburetor freeing the float arm; then measure with a caliper the height when the float arm is in contact with the needle valve. Float arm height should be 17 mm (0.7 in.).**

6. Place the float chamber into position making sure the O-ring is properly positioned; then secure with the Phillips-head screws.

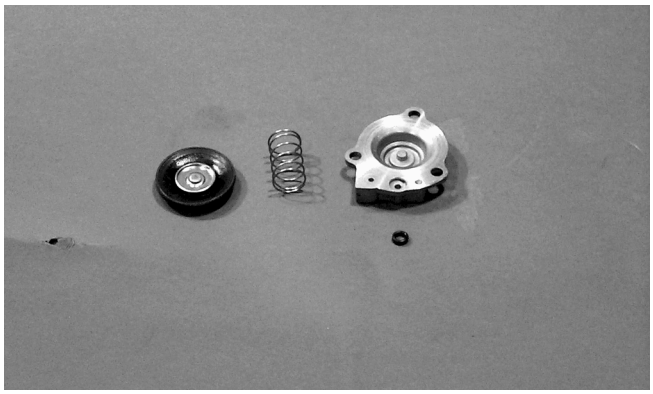


CC750



CC749

7. Place the U-ring into the primer housing. Position the spring and diaphragm assembly (lip toward the carburetor) onto the carburetor; then secure the assembly with the primer housing and three screws. Tighten securely.

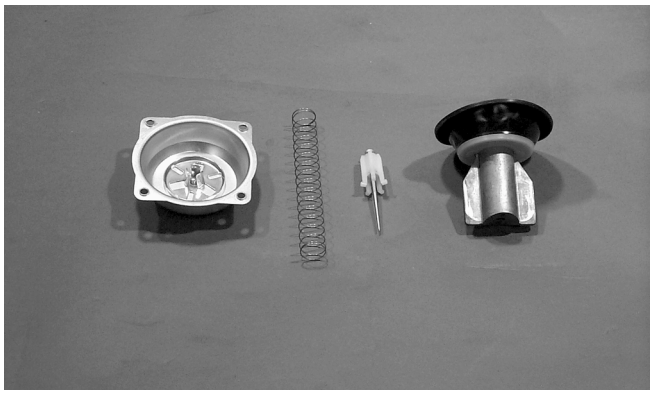


CC748

⚠ CAUTION

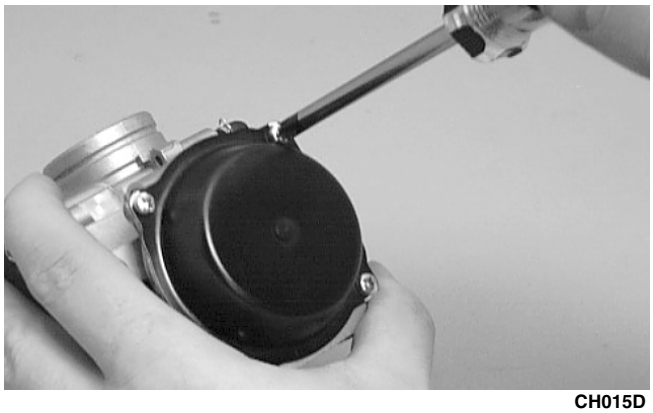
It is important to press down on the primer housing until it contacts the carburetor to make sure the diaphragm lip is properly seated in the groove in the carburetor. If the diaphragm is not properly seated, leakage will occur.

8. Place the jet needle, spring seat, and spring into the vacuum piston; then place the assembly down into the carburetor.



CC746

9. Place the top cover into position; then secure with the Phillips-head screws. Tighten securely.

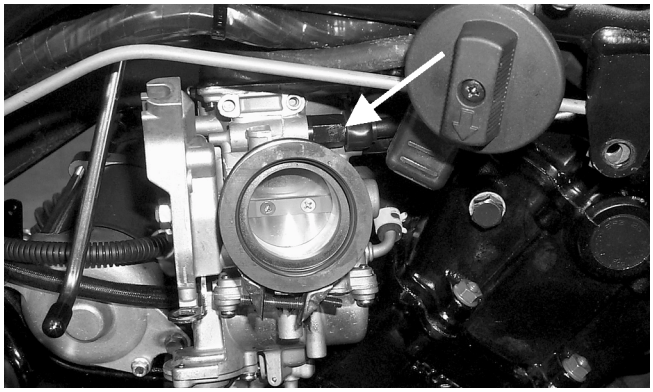


CH015D

INSTALLING

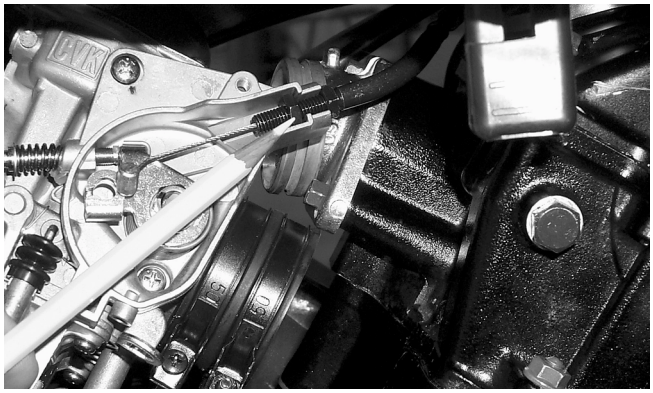
1. Connect the gas and vent hoses onto the carburetor.

2. Connect the choke cable by screwing the plastic choke cable end onto the carburetor.



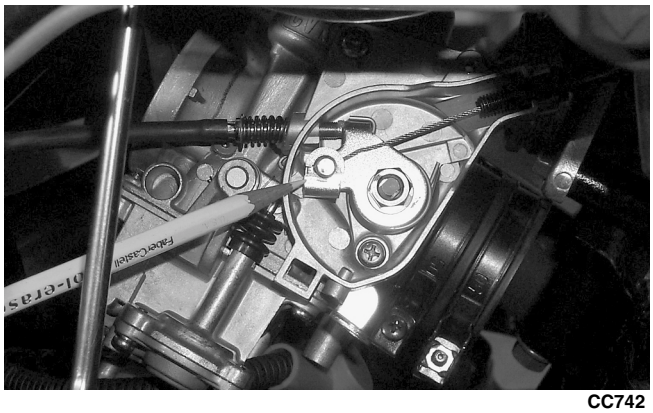
CC740A

3. Place the throttle cable into position and secure by tightening the outer jam nut.



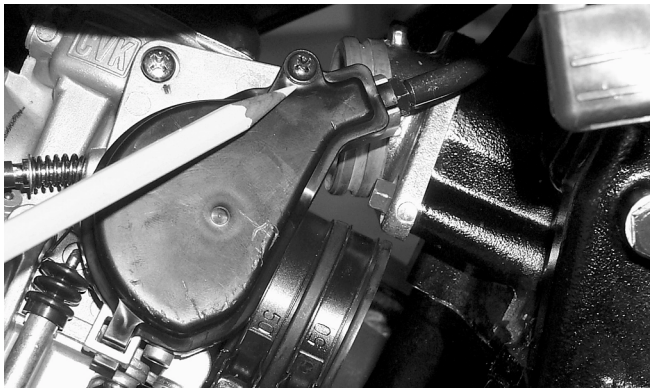
CC741

4. Connect the throttle cable to the actuator arm.



CC742

5. Place the throttle actuator cover into position on the carburetor; then secure with the screw.



CC743

6. Position the carburetor in the air cleaner boot and intake pipe assembly; then secure with the clamps.
7. Connect the hose at the gas tank valve connection.
8. Secure the air-intake snorkel (250/300) or the air cleaner housing cover (375/400/500).
9. Install the seat; then turn the gas tank valve to the ON position.

Cleaning and Inspecting Carburetor

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

⚠ WARNING

When drying components with compressed air, always wear safety glasses.

⚠ CAUTION

DO NOT place any non-metallic components in parts-cleaning solvent because damage or deterioration will result.

1. Place all metallic components in a wire basket and submerge in carburetor cleaner.
2. Soak for 30 minutes; then rinse with fresh parts-cleaning solvent.
3. Wash all non-metallic components with soap and water. Rinse thoroughly.
4. Dry all components with compressed air only making sure all holes, orifices, and channels are unobstructed.
5. Inspect the carburetor body for cracks, nicks, stripped threads, and any other imperfections in the casting.

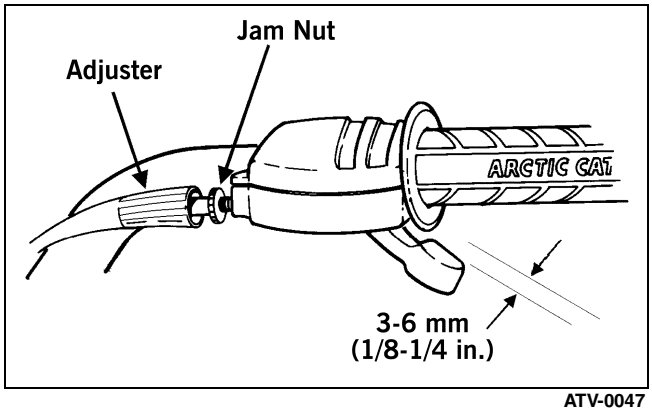
6. Inspect the vacuum piston/diaphragm for cracks, imperfections in the casting, or cracks and tears in the rubber.
7. Inspect float for damage.
8. Inspect gasket and O-rings for distortion, tears, or noticeable damage.
9. Inspect tips of the jet needle, pilot screw, and the inlet needle valve for wear, damage, or distortion.
10. Inspect the pilot jet/slow jet and main jet for obstructions or damage.

■ **NOTE: If the pilot jet is obstructed, the mixture will be extremely lean at idle and part-throttle operation.**

11. Inspect the plunger assembly/starter valve and seat for wear or damage.
12. Inspect the carburetor mounting flange for damage and tightness.

Throttle Cable Free-Play

1. Check throttle cable free-play at the lever; free-play should be 3-6 mm (1/8 - 1/4 in.).
2. To adjust, slide the rubber boot away from the adjuster located near the throttle lever. Loosen the jam nut and rotate the adjuster in the appropriate direction until proper free-play is attained. Tighten the jam nut against the adjuster; then slide the rubber boot over the adjuster.



ATV-0047

Engine RPM (Idle)

To properly adjust the idle RPM, a tachometer is necessary.

To adjust idle RPM, use the following procedure.

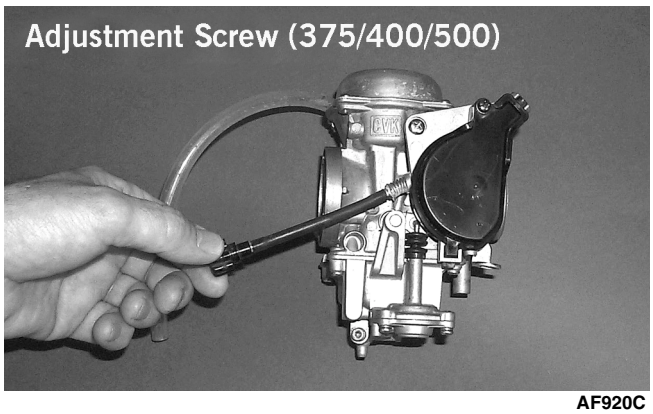
1. Start the engine and warm it up to operating temperature.
2. Turn the idle adjustment screw clockwise or counterclockwise until the engine idles at recommended RPM.

⚠ WARNING

Adjust the idle to the correct RPM. Make sure the engine is fully warm before adjusting the idle RPM.

Engine Idle RPM	
250/300/400	1400-1600
375/500	1200-1350

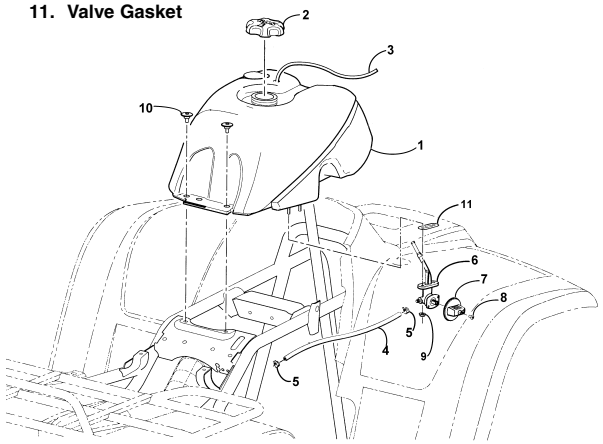
CC795B



AF920C

Gas Tank

KEY
1. Gas Tank Assy
2. Tank Cap
3. Vent Hose
4. Fuel Hose
5. Hose Clamp
6. Gas Tank Valve
7. Valve Knob
8. Screw
9. Lock Nut
10. Screw
11. Valve Gasket



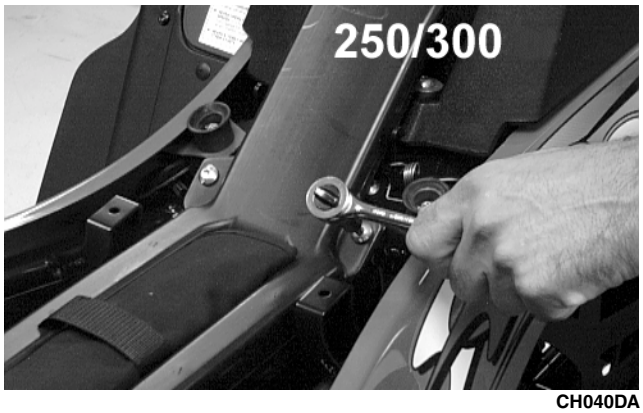
0735-524

⚠ WARNING

Whenever any maintenance or inspection is made on the fuel system during which there may be fuel leakage, there should be no welding, smoking, open flames, etc., in the area.

REMOVING

1. Turn the gas tank valve to the OFF position.
2. Remove the seat.
3. Remove the air-intake snorkel (250/300) or the air cleaner housing cover (375/400/500).

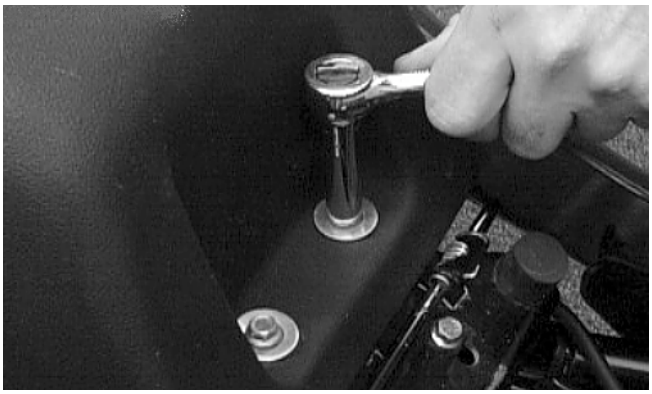


CH040DA

CH041DA

AL645DA

4. Disconnect the hose from the carburetor to the gas tank at the tank connection.
5. Cut the tie-down securing the fuel hose to the cables and hoses.
6. Remove the torx-head screws securing the gas tank to the frame.



AL617D

7. Remove the vent hose; then remove the gas tank.

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean all gas tank components with parts-cleaning solvent.
2. Inspect all hoses for cracks or leaks.

3. Inspect gas tank valve, tank cap, and tank for leaks, holes, and damaged threads.

4. Inspect the gas gauge for proper operation.

INSTALLING

1. Place the gas tank into position on the frame; then install the torx-head screws. Tighten securely.

2. Connect the fuel hose from the carburetor; then secure hose to cables and hoses with a cable tie.

3. Install the air-intake snorkel (250/300) or the air cleaner housing cover (375/400/500).

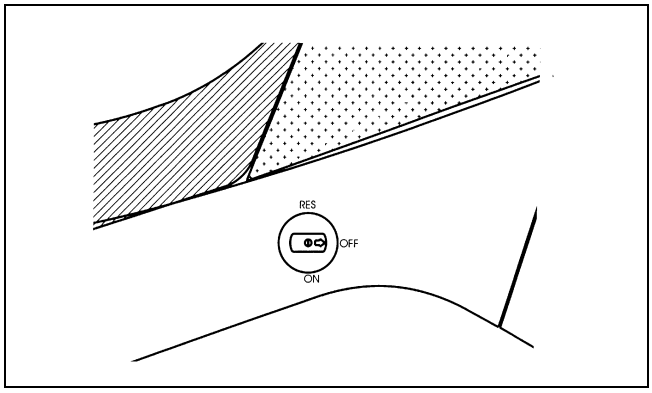
4. Install the vent hose; then fill the gas tank with gasoline.

5. Turn the gas tank valve to the ON position and inspect for leakage.

6. Install the seat.

Gas Tank Valve

The ATV has a valve incorporated into the bottom of the gas tank. There are three positions: ON, RES, and OFF.



ATV-1098

In the OFF position, the valve will not allow gasoline to flow to the carburetor. In the ON position (the normal operating position), gasoline will flow from the tank to the carburetor. In this position 2.46 l (0.65 U.S. gal.) will remain in the tank as a reserve quantity. Moving the valve to the RES position will allow the operator to use the remaining gasoline in the tank. When turning the valve to any of the three positions, be sure the indicator is pointed directly at the position desired.

REMOVING/INSPECTING

⚠ WARNING

Drain the gas tank prior to this procedure.

1. Remove the gas hose from the valve by releasing the spring clamp.

2. Remove the two nuts securing the valve; then remove the valve. Account for the gasket.

3. Inspect the gasket and valve/tank mating surfaces for damage or deterioration.

4. Inspect for and remove any obstructions in the valve.

INSTALLING

1. Place the valve and gasket into position on the tank and secure with the nuts. Tighten to 0.1 kg-m (1 ft-lb).

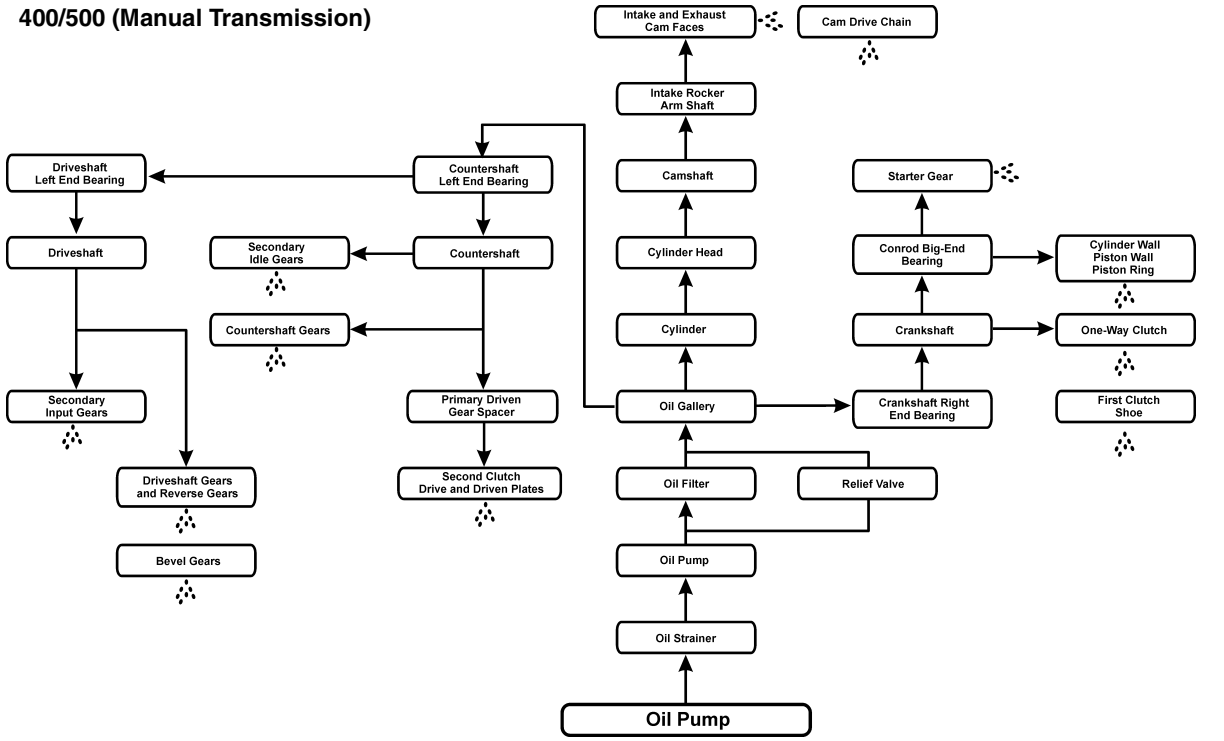
2. Install the gas hose onto the valve with the spring clamp.

Gas/Vent Hoses

Replace the gas hose every two years. Damage from aging may not always be visible. Do not bend or obstruct the routing of the carburetor vent hose. Make certain that the vent hose is securely connected to the carburetor and the opposite end is always open.

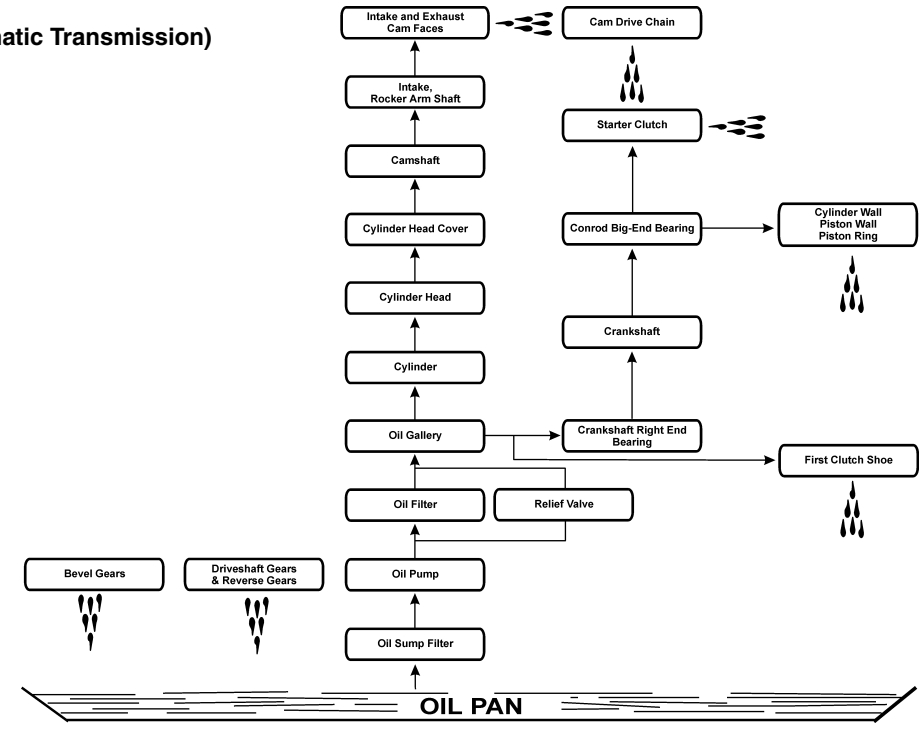
Oil Flow Charts

400/500 (Manual Transmission)

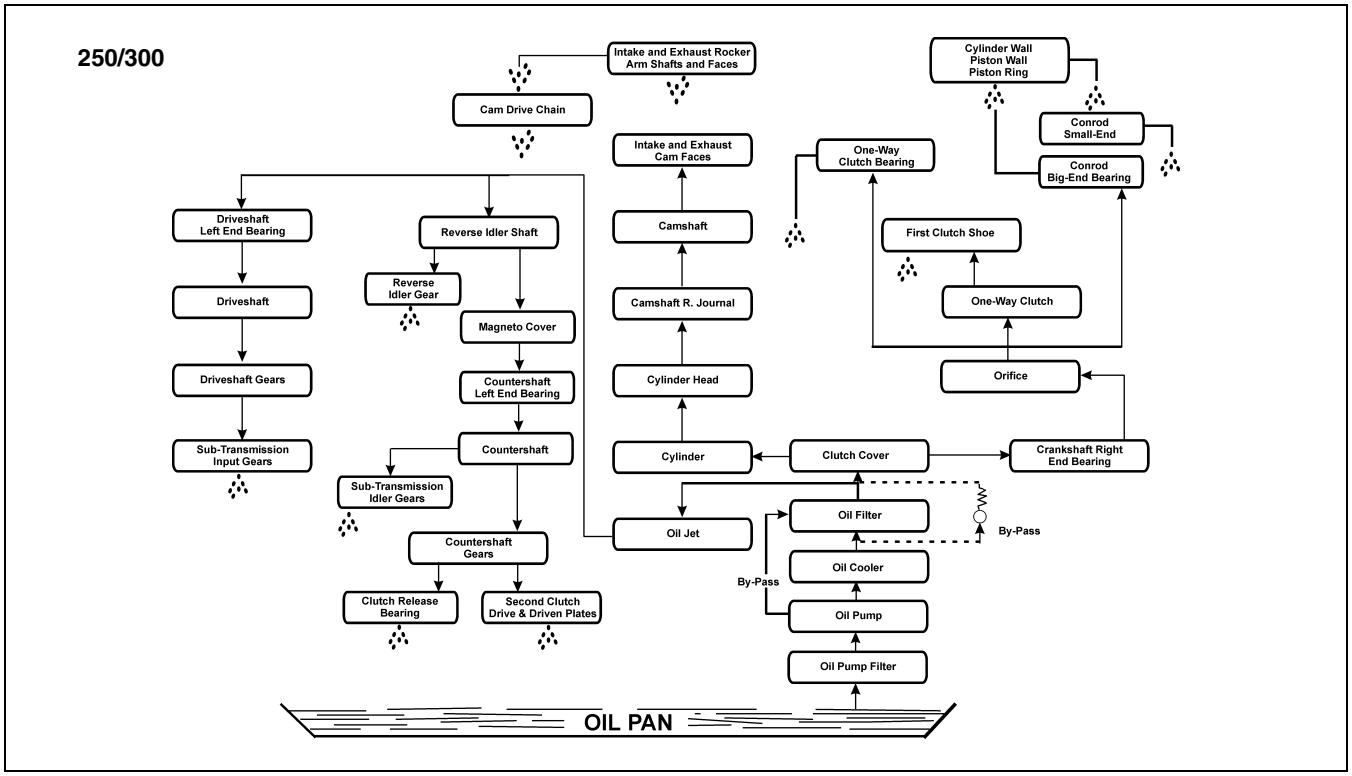


ATV-0111

375/500 (Automatic Transmission)



ATV-1102



ATV-0106

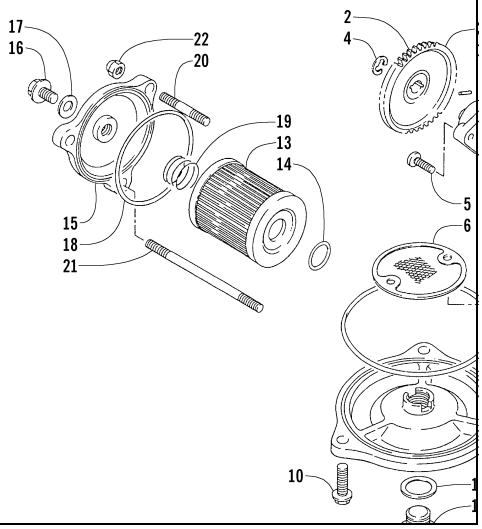
4

Oil Pump

■**NOTE: Whenever internal engine components wear excessively or break and whenever oil is contaminated, the oil pump should be disassembled, cleaned and inspected, and serviced as necessary.**

KEY

1. Engine Oil Pump
2. Driven Gear
3. Pin
4. Circlip
5. Cap Screw
6. Strainer
7. Cap Screw
8. Cap
9. O-Ring
10. Cap Screw
11. Drain Plug
12. Gasket
13. Filter
14. Filter O-Ring
15. Cap
16. Check Plug
17. Gasket
18. Cap O-Ring
19. Spring
20. Stud Bolt
21. Stud Bolt
22. Nut

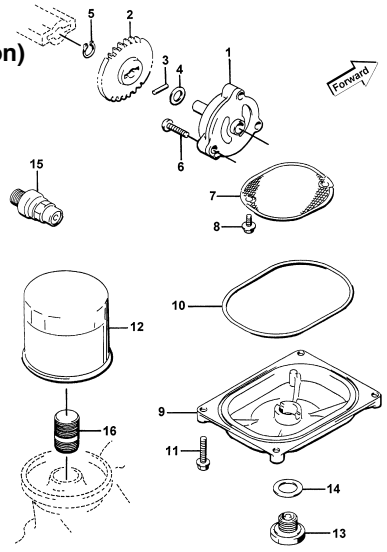


0733-752

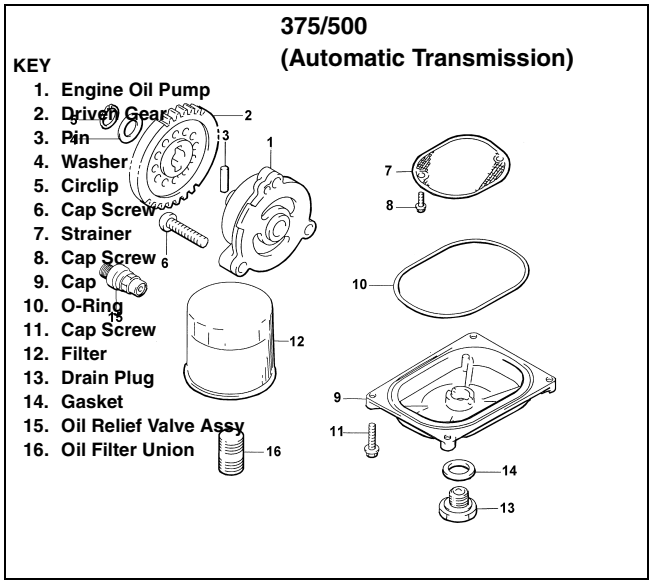
400/500
(Manual Transmission)

KEY

1. Engine Oil Pump
2. Driven Gear
3. Pin
4. Washer
5. Circlip
6. Cap Screw
7. Strainer
8. Cap Screw
9. Cap
10. O-Ring
11. Bolt
12. Filter
13. Drain Plug
14. Gasket
15. Oil Relief Valve Assy
16. Oil Filter Union



0732-310



0735-615

REMOVING/DISASSEMBLING

1. Remove the oil pump from the engine (see Right-Side Components in Section 3).
2. Remove the Phillips-head screw on the back side of the pump and separate the pump housing and cover. Note the position of the inner and outer rotors and alignment pin for assembly.
3. Remove oil pump components.

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean all oil-pump components.
2. Inspect the rotors for scoring and gouges.
3. Inspect the alignment pin for damage.
4. Inspect the pump housing and cover for cracks or damage.

ASSEMBLING/INSTALLING

1. Place the rotors into the pump housing making sure the alignment pin is in the groove of the rotor.
2. Place the cover onto the pump housing.
3. Secure the pump with the Phillips-head screw coated with red Loctite #271.
4. Install the oil pump into the engine (see Right-Side Components in Section 3).

Testing Oil Pump Pressure

■ **NOTE: The engine must be warmed up to operating temperature for this test.**

1. Connect the Arctic Cat Engine Tachometer (p/n 0644-275) to the engine.
2. Connect the Oil Pressure Gauge (p/n 0444-039) to the oil filter drain plug.

■ **NOTE: Some oil seepage may occur when installing the oil pressure gauge. Wipe up oil residue with a cloth.**

3. Start the engine and run at the specified RPM.
4. The oil pressure gauge must read as specified.

250/300
OIL PRESSURE @ 3000 RPM
0.7-2.8 kg/cm²
(10-40 psi)
Oil Temperature - 60°C (140°F)

375
OIL PRESSURE @ 3000 RPM
1.53-3.57 kg/cm²
(21.7-50.8 psi)
Oil Temperature - 60°C (140°F)

400/500 (Manual Transmission)
OIL PRESSURE @ 3000 RPM
1.3-1.7 kg/cm²
(18-24 psi)
Oil Temperature - 60°C (140°F)

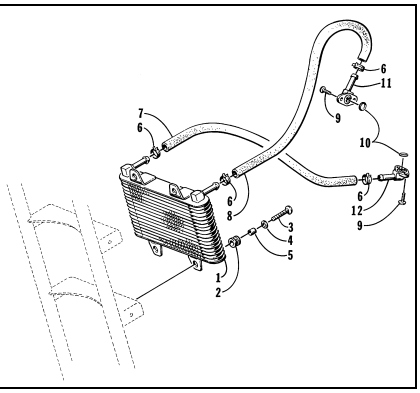
500 (Automatic Transmission)
OIL PRESSURE @ 3000 RPM
1.9-2.5 kg/cm²
(27-36 psi)
Oil Temperature - 60°C (140°F)

■ **NOTE: If the oil pressure is lower than specified, check for an oil leak, damaged oil seal, or a defective oil pump.**

■ **NOTE: If the oil pressure is higher than specified, check for too heavy engine oil weight (see Section 2), clogged oil passage, clogged oil filter, or improper installation of the oil filter.**

Oil Cooler
(250/300/375)

KEY
1. Oil Cooler
2. Grommet
3. Cap Screw
4. Washer
5. Collar
6. Hose Clamp
7. Hose (Output)
8. Hose (Input)
9. Cap Screw
10. O-Ring
11. Fitting (Angled)
12. Fitting



0733-727

REMOVING

■ NOTE: It is not necessary to drain the engine oil for this procedure.

1. Remove the input and output hoses from the fittings on the cooler.

⚠ CAUTION

Elevate and secure the hoses to avoid oil spillage.

2. Remove the torx-head screws securing the oil cooler to the frame. Account for grommets, collars, and washers.

AL651D

3. Remove the oil cooler from the frame.

INSTALLING

1. Place the collar into position in the frame.
2. Secure the cooler to the frame with the torx-head screws, washers, collars, and spacers.

AL651D

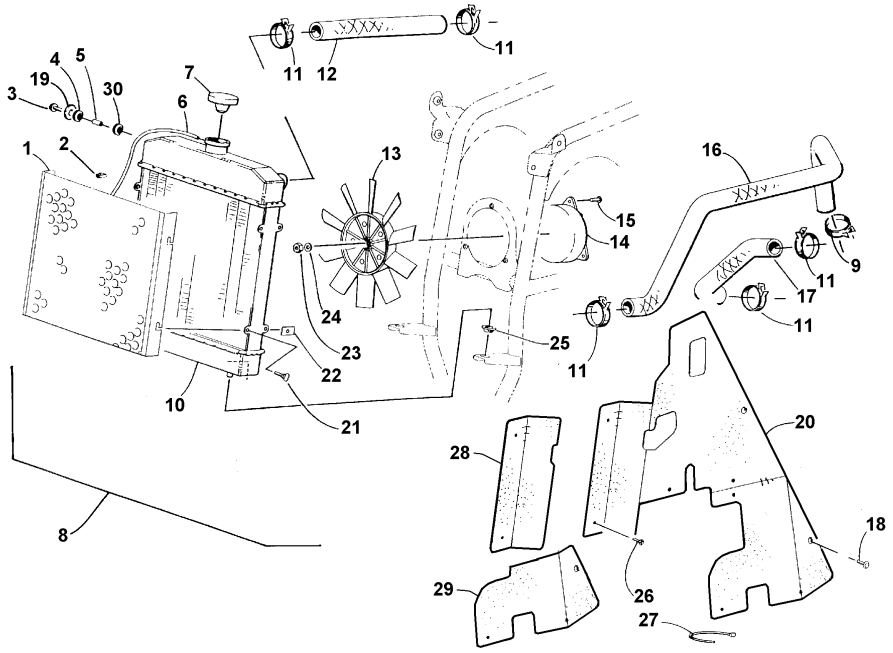
3. Install the hoses onto their respective fittings and secure with the clamps.

4

Liquid Cooling System
(400/500)

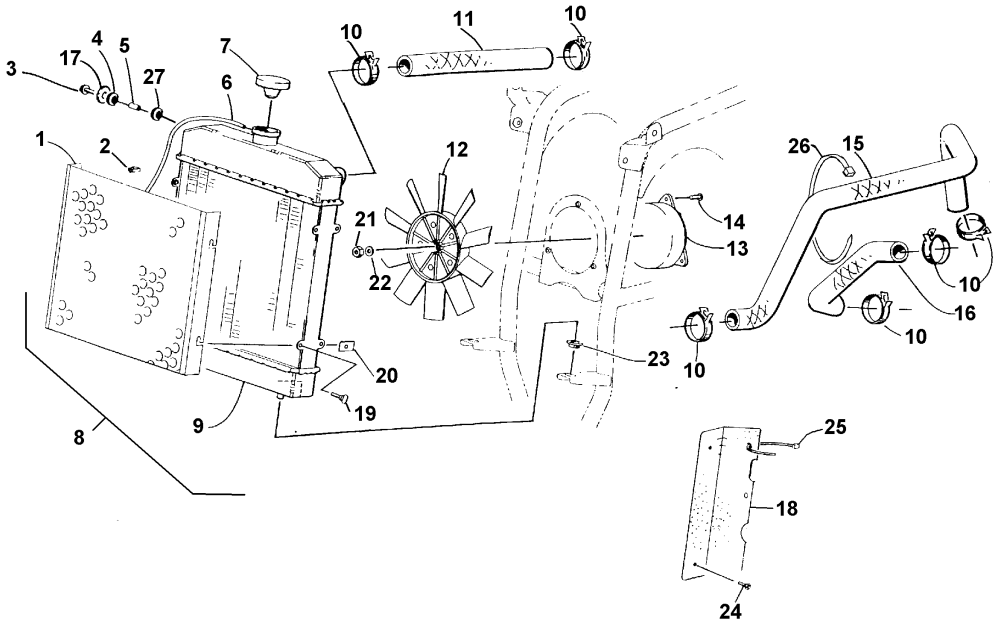
KEY
1. Radiator Screen
2. Wire Clamp
3. Cap Screw
4. Grommet
5. Collar
6. Hose
7. Radiator Cap
8. Radiator Assy
9. Hose Clamp
10. Radiator
11. Hose Clamp
12. Coolant Hose
13. Fan Blade
14. Fan Motor
15. Machine Screw
16. Coolant Hose
17. Coolant Hose
18. Machine Screw
19. Washer
20. Fender Panel
21. Thumb Screw
22. Speed Nut
23. Nut
24. Washer
25. Stem Bushing
26. Machine Screw
27. Cable Tie
28. Fan Shroud
29. Fender Panel
30. Flange Nut

400/500
(Manual Transmission)



0735-912

500
(Automatic Transmission)



KEY
1. Radiator Screen
2. Wire Clamp
3. Cap Screw
4. Grommet
5. Collar
6. Vent Hose
7. Radiator Cap
8. Radiator Assy
9. Radiator
10. Clamp
11. Coolant Hose
12. Fan Blade
13. Fan Motor
14. Machine Screw
15. Coolant Hose
16. Coolant Hose
17. Washer
18. Fan Shroud
19. Thumb Screw
20. Speed Nut
21. Nut
22. Washer
23. Stem Bushing
24. Machine Screw
25. Cable Tie
26. Cable Tie
27. Flange Nut

0735-528

The cooling system capacity is approximately 2.9 L (3 U.S. qt). The cooling system should be inspected daily for leakage and damage. Also, the coolant level should be checked periodically.

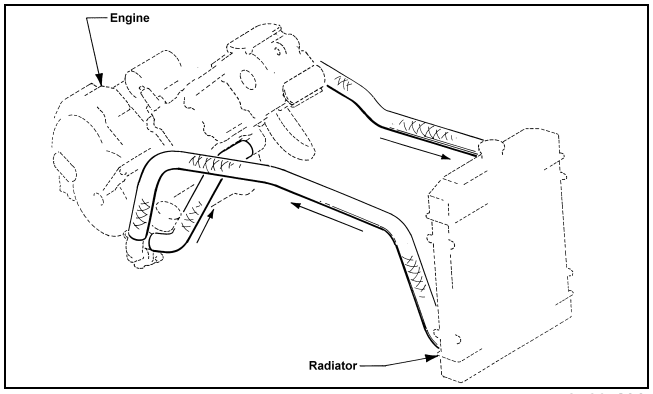
When filling the cooling system, use premixed Arctic Cat Antifreeze (p/n 0638-395). While the cooling system is being filled, air pockets may develop; therefore, run the engine for five minutes after the initial fill, shut the engine off, and then fill the cooling system to the bottom of the stand pipe in the radiator neck.

AN604D

⚠ CAUTION

After operating the ATV for the initial 5-10 minutes, stop the engine, allow the engine to cool down, and check the coolant level. Add coolant as necessary.

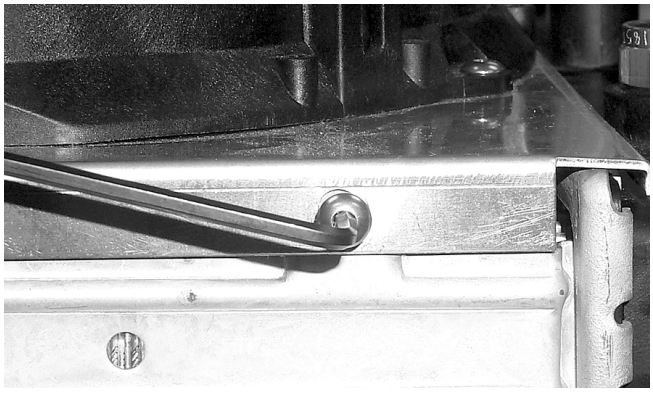
Radiator



0732-411

REMOVING

1. Drain the coolant at the engine.
2. Remove the front rack (see Section 8).
3. Remove the front bumper and grille assembly (see Section 8).
4. Remove the upper and lower coolant hoses.
5. Remove the two cap screws and nuts securing the radiator to the frame.
6. Disconnect the fan wiring from the main wiring harness; then remove the radiator/fan assembly and account for the two grommets with collar inserts.
7. Remove the fan/fan shroud assembly from the radiator.



CC863

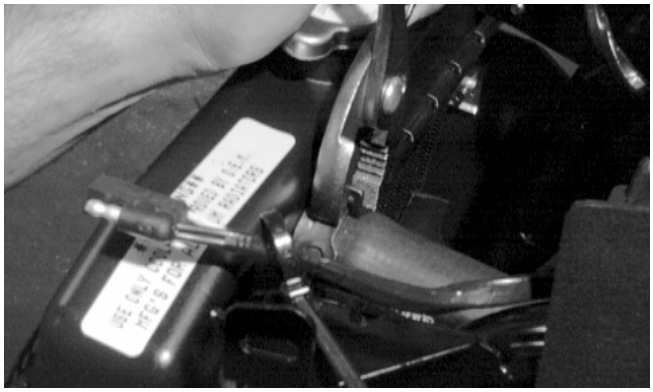
CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Flush the radiator with water to remove any contaminants.
2. Inspect the radiator for leaks and damage.
3. Inspect all hoses for cracks and deterioration.
4. Inspect all fasteners and grommets for damage or wear.

INSTALLING

1. Position the fan/fan shroud assembly on the radiator; then secure with existing hardware.
2. Place the radiator with grommets and collar inserts into position on the frame; then install the two cap screws and nuts. Tighten securely.
3. Install the upper and lower coolant hoses; then secure with hose clamps.



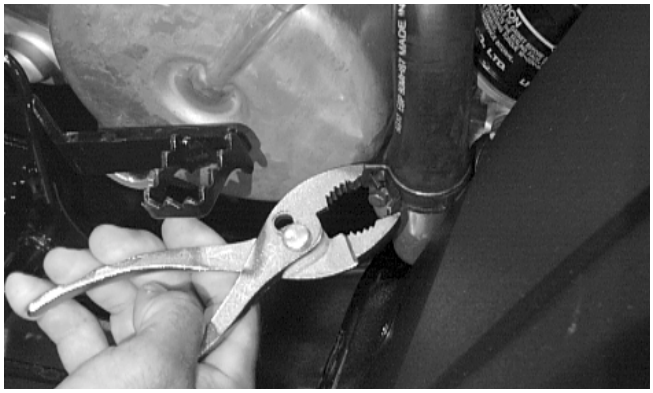
AF734D

4. Install the front bumper and grille assembly (see Section 8).
5. Install the front rack (see Section 8).
6. Fill the cooling system (2.9 L or 3 U.S. qt) with antifreeze. Check for leakage.
7. Connect the fan wiring to the main wiring harness.

Hoses/Thermostat

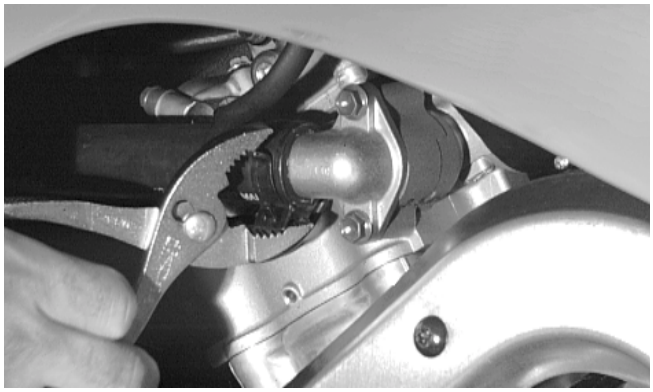
REMOVING

1. Drain the coolant from the cooling system.
2. Remove the hose clamps securing the lower coolant hose to the water pump housing and to the radiator; then remove the lower hose.



CC334D

3. Remove the clamps securing the upper coolant hose to the thermostat housing and to the radiator; then remove the upper hose.



CC335D

4. Remove the clamps securing the crossover coolant hose to the water pump and to the engine water inlet.
5. Remove the two cap screws securing the thermostat housing to the cylinder head. Account for an O-ring and a thermostat.

INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect the thermostat for corrosion, wear, or spring damage.
2. Using the following procedure, inspect the thermostat for proper operation.
   A. Suspend the thermostat in a container filled with water.
   B. Heat the water and monitor the temperature with a thermometer.
   C. The thermostat should start to open at 48.5-51.5°C (119.3-124°F).
   D. If the thermostat does not open, it must be replaced.
3. Inspect all coolant hoses, connections, and clamps for deterioration, cracks, and wear.

■ NOTE: All coolant hoses and clamps should be replaced every four years or 4000 miles.

INSTALLING

1. Place the thermostat and O-ring into the thermostat housing; then secure the thermostat housing to the cylinder head with the two cap screws.
2. Install the crossover coolant hose onto the water pump and engine water inlet. Secure with the two hose clamps.
3. Slide the upper hose onto the thermostat housing and radiator. Secure with the two hose clamps.

4. Install the lower coolant hose onto the water pump housing and radiator. Secure with the two hose clamps.

5. Fill the cooling system (2.9 L or 3 U.S. qt) with antifreeze. Check for leakage.

Fan

REMOVING

1. Remove the radiator (see Radiator in this section).

2. Remove the fan assembly from the radiator.

CC862

INSTALLING

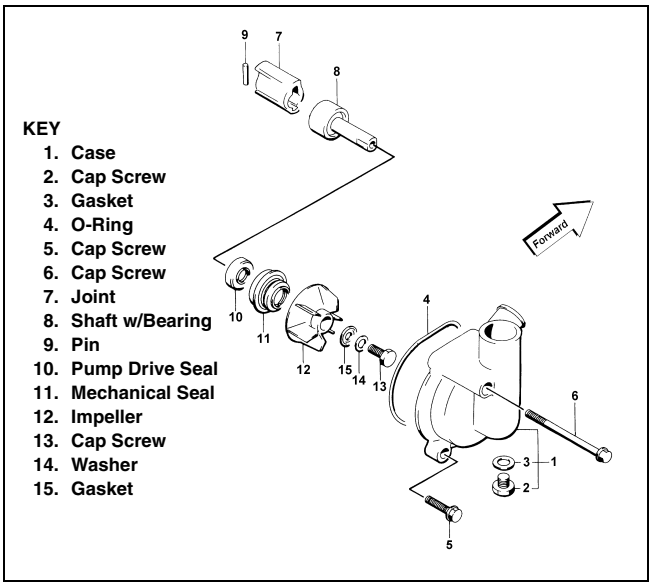
1. Position the fan assembly on the radiator; then secure with existing hardware.

■ NOTE: The fan wiring must be in the upper-right position.

2. Install the radiator (see Radiator in this section).

Servicing Water Pump
(400/500 - Manual Transmission)

REMOVING/DISASSEMBLING



0732-311

1. Drain the coolant.

2. Remove the three cap screws securing the water pump case. Note the position of the long cap screw and account for the O-ring.

3. Remove the impeller cap screw, washer, and gasket.

4. Remove the mechanical seal using this procedure.

   A. Tap the tip of a small sheet metal screw into the inner-metal edge of the seal.

   B. Grip the screw with a pair of vise-grip pliers and pull the seal out. Account for the pump drive seal.

CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all pump components in solvent.

2. Inspect the mechanical seal and pump drive seal for damage.

■ NOTE: If the mechanical seal and/or pump drive seal are damaged, they must be replaced as a set.

3. Inspect the impeller for corrosion or damage.

ASSEMBLING/INSTALLING

■ NOTE: Treat seals and O-rings with clean antifreeze for initial lubrication.

1. Press the mechanical seal with pump drive seal into the impeller by hand.
2. Install the mechanical seal assembly onto the water pump shaft and secure with the cap screw, washer, and gasket. Tighten the cap screw securely.
3. Place the water pump case into position and secure with the three cap screws. Note the position of the long cap screw from removal.
4. Fill the cooling system (2.9 l or 3 U.S. qt) with antifreeze.

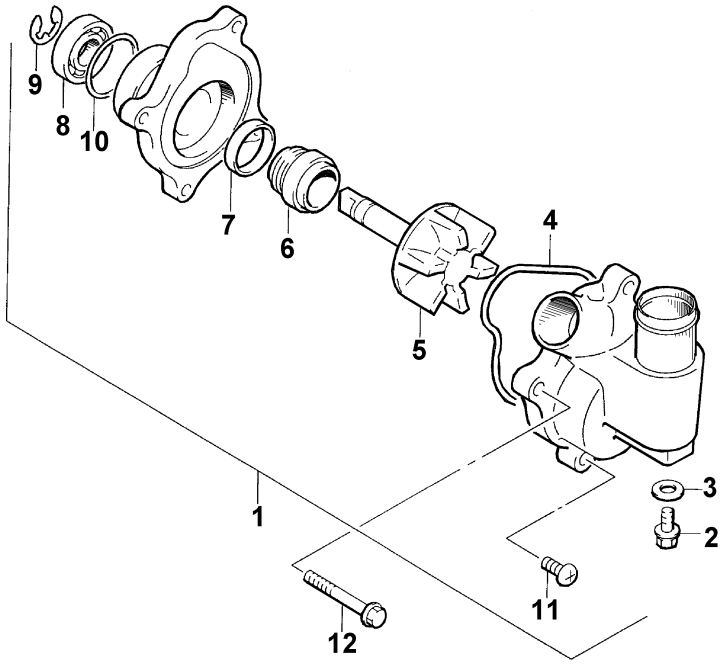
■ NOTE: While the cooling system is being filled, air pockets may develop; therefore, run the engine for five minutes after the initial fill, shut the engine off, and then fill the cooling system.

5. Check the entire cooling system for leakage.

Servicing Water Pump
(500 - Automatic Transmission)

■ NOTE: When servicing the water pump, it will be necessary to install a new Oil Seal (p/n 3402-465) and a new Mechanical Seal/Ceramic Seal Assembly (p/n 3402-360).

KEY
1. Water Pump Assy
2. Bolt
3. Gasket
4. O-Ring
5. Impeller/Shaft
6. Mechanical Seal/Ceramic Seal Assy
7. Oil Seal
8. Bearing
9. E-Ring
10. O-Ring
11. Screw
12. Cap Screw



735-616A

REMOVING

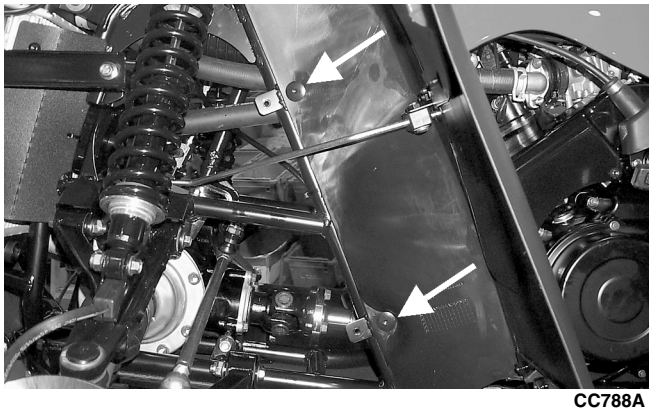
1. Remove the radiator cap; then remove the water pump drain plug and drain the coolant.

CC789

2. Drain the oil from the engine/transmission.

3. Remove the four torx-head cap screws securing the front and rear fenders to the footrest; then remove the four cap screws securing the footrest to the frame. Remove the footrest.

4. From inside the left-front wheel-well, remove the two torx-head cap screws securing the fender to the frame.

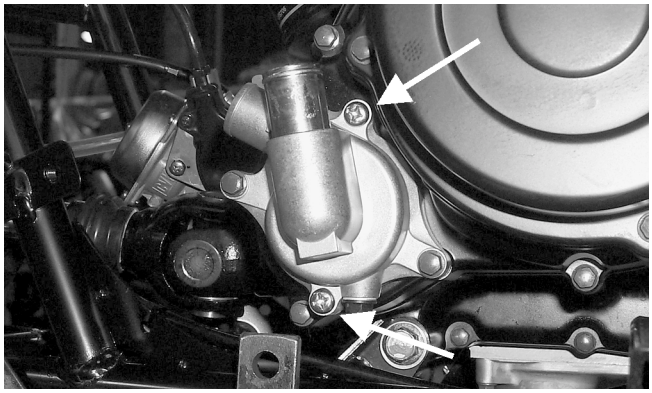


CC788A

5. Compress the tabs on the coolant hose clamps and slide the clamps away from the hose ends approximately 51 mm (2 in.); then remove both hoses from the water pump.

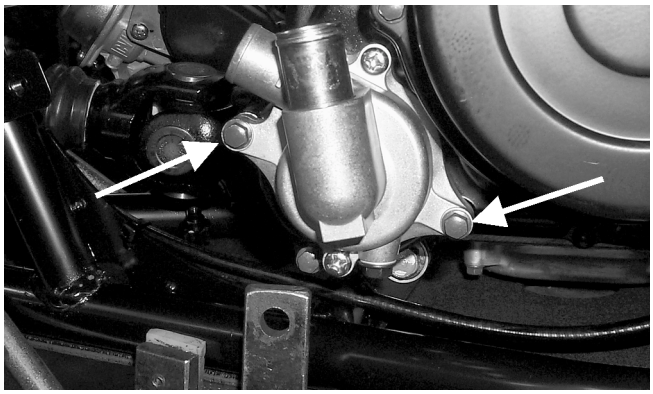
CC784

6. Using an impact driver, loosen but do not remove the two Phillips-head water pump cover screws.



CC785A

7. Remove the two cap screws securing the water pump to the engine; then remove the water pump.



CC786A

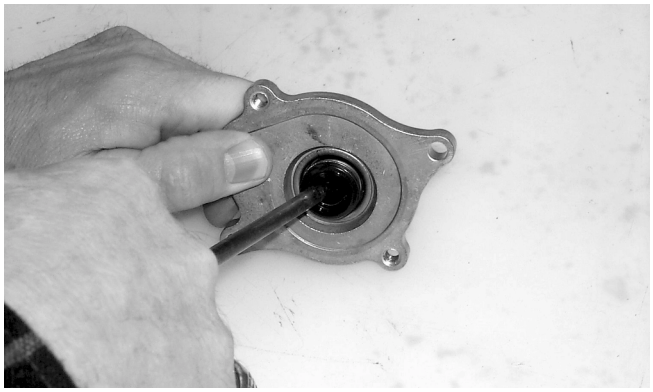
DISASSEMBLING

1. Finish removing the two Phillips-head cap screws securing the cover to the bearing housing; then remove the cover. Account for the O-ring.

2. Remove the E-ring securing the impeller/shaft to the bearing housing; then remove the impeller/shaft.

CC781

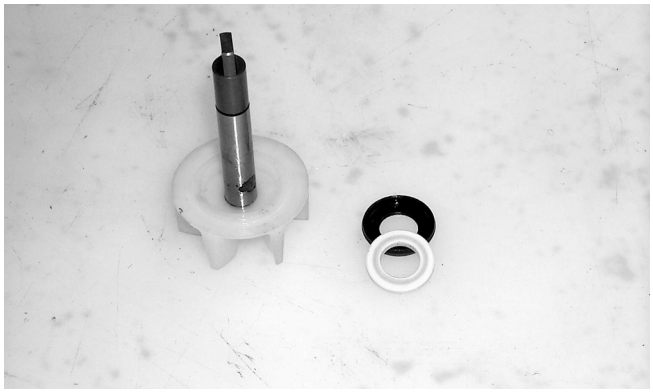
3. Using Seal Removal Tool (p/n 0644-072), remove the mechanical seal and the oil seal from the bearing housing.



CC772

4. Using a small screwdriver, pry up and remove the ceramic seal from the impeller/shaft; then remove the seal seat.

CC773



CC775

CLEANING AND INSPECTING

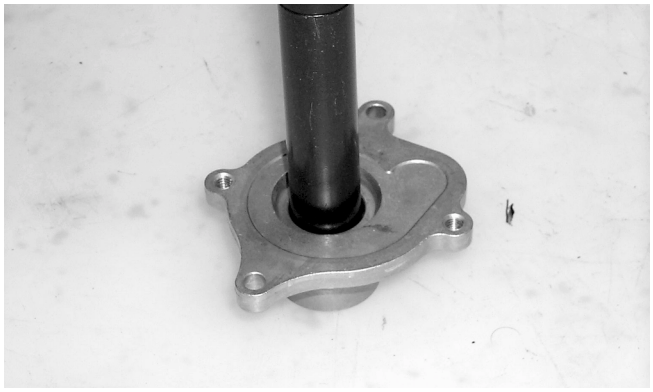
■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all oil-pump components in cleaning solvent.

2. Inspect the impeller/shaft for corrosion or damage.

ASSEMBLING

1. Place the new oil seal into the bearing housing; then using a seal driver, gently tap the seal down until it is fully seated.



CC778

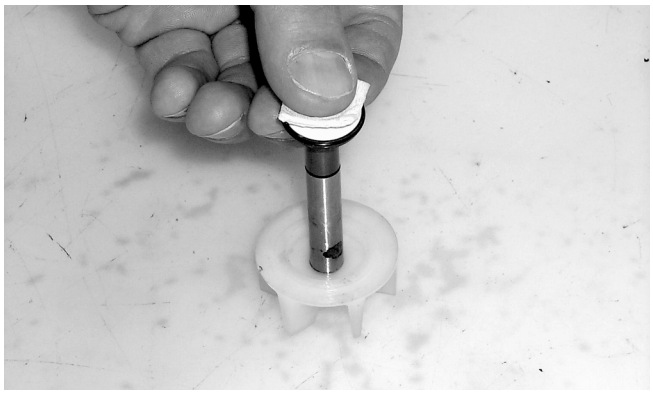
2. Place the new mechanical seal into the bearing housing; then tap it down until it is fully seated.

■NOTE: A large deep-well socket can be used to drive the seal down evenly.

3. Using the protective cloth provided, slide the new ceramic seal (red markings down) and seal seat onto the impeller/shaft. Touch the assembly ONLY with the protective cloth provided.

⚠ CAUTION

If the protective cloth is not used and the seal/seat assembly is touched, permanent damage to the assembly will occur and replacement will be necessary.



CC776

4. Install the impeller/shaft assembly into the bearing housing; then secure with the E-ring.

CC781

■ **NOTE: Make sure the E-ring is fully seated and the impeller rotates freely.**

5. While holding the bearing housing assembly in position on the engine, slowly rotate the impeller until the impeller/shaft engages properly with its slot in the driven shaft.

■ **NOTE: The bearing housing will be flush with the engine when the two shafts are properly engaged.**

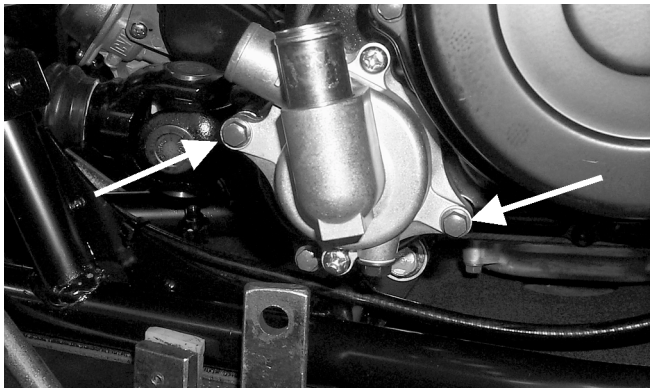
⚠ CAUTION

Failure to properly engage the two shafts could cause serious engine damage.

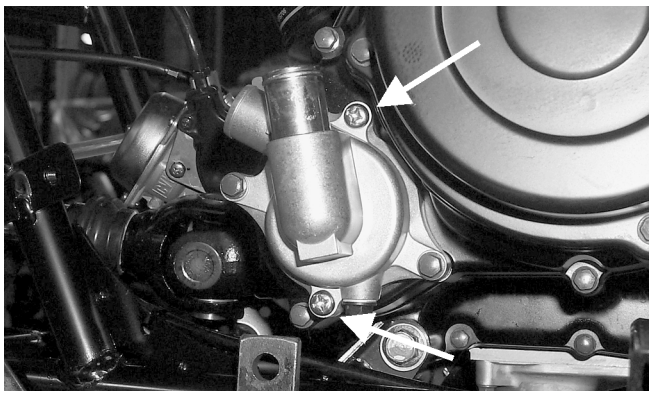
6. With the bearing housing assembly in position on the engine, place the cover (with O-ring installed) into position on the housing; then loosely secure with the two Phillips-head cap screws.

INSTALLING

1. Secure the water pump to the engine with the two cap screws tightened securely; then tighten the two Phillips-head cap screws securely.

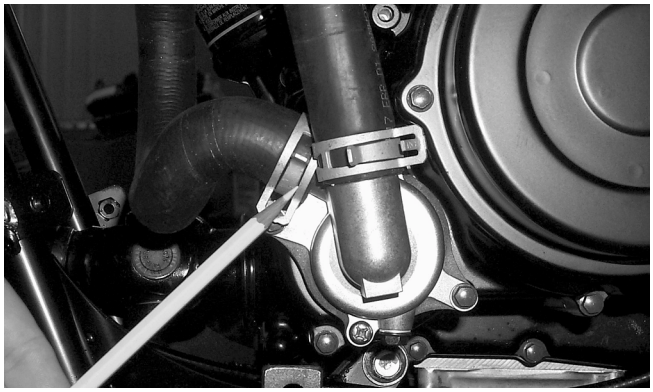


CC786A



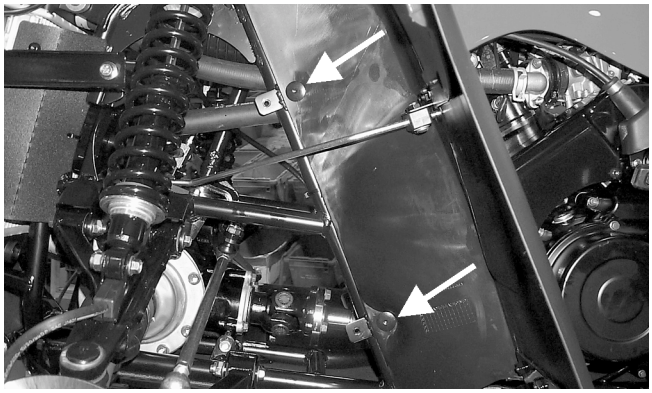
CC785A

2. Connect the two coolant hoses to the water pump and secure with the clamps.



CC784

3. From inside the left-front wheel-well, secure the fender to the frame with the two torx-head cap screws. Tighten securely.



CC788A

4. Place the footrest into position on the frame and loosely secure with four cap screws; then secure the front and rear fenders to the footrest with the four torx-head cap screws. Tighten the four torx-head cap screws securely; then tighten the two 8 mm cap screws to 2.8 kg-m (20 ft-lb) and the two 10 mm cap screws to 5.5 kg-m (40 ft-lb).

5. Fill the engine/transmission with the proper amount of recommended oil.

6. Fill the cooling system with the proper amount of recommended coolant.

AN604D

■ **NOTE: While the cooling system is being filled, air pockets may develop; therefore, run the engine for five minutes after the initial fill, shut the engine off, and then fill the cooling system.**

7. Check the entire cooling system for leakage.

⚠ CAUTION

After operating the ATV for the initial 5-10 minutes, stop the engine, allow the engine to cool down, and check the coolant level. Add coolant as necessary.

SECTION 5 - ELECTRICAL SYSTEM

5

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Specifications

250	
IGNITION	
Ignition Timing	5° BTDC below 1800 RPM 35° BTDC above 3800 RPM
Spark Plug Type	NGK DR7EA
Spark Plug Gap	0.6-0.7 mm (0.024-0.028 in.)
Spark Plug Cap	8000-12,000 ohms
Ignition Coil Resistance (primary) (secondary)	 0.1-0.5 ohm (terminal to ground) 5200-7800 ohms (high tension - plug cap removed - to ground)
MAGNETO	
Magneto Coil Resistance (trigger) (charging)	 80-150 ohms (black/yellow to green/white) 0.1-1.0 ohm (yellow to yellow)
Magneto Output (approx)	220W @ 5000 RPM

300	
IGNITION	
Ignition Timing	5° BTDC @ 1800 RPM 30° BTDC @ 3800 RPM
Spark Plug Type	NGK DR7EA
Spark Plug Gap	0.6-0.7 mm (0.024-0.028 in.)
Spark Plug Cap	8000-12,000 ohms
Ignition Coil Resistance (primary) (secondary)	 0.1-0.5 ohm (terminal to ground) 5200-7800 ohms (high tension - plug cap removed - to ground)
MAGNETO	
Magneto Coil Resistance (trigger) (charging)	 80-150 ohms (black/yellow to green/white) 0.1-1.0 ohm (yellow to yellow)
Magneto Output (approx)	220W @ 5000 RPM

375	
IGNITION	
Ignition Timing	10° BTDC @ 3000 RPM
Spark Plug Type	NGK CR7E
Spark Plug Gap	0.7-0.8 mm (0.028-0.032 in.)
Spark Plug Cap	8000-12,000 ohms
Ignition Coil Resistance (primary) (secondary)	 0.05-0.5 ohm (terminal to ground) 4000-9000 ohms (high tension - plug cap removed - to ground)
MAGNETO	
Magneto Coil Resistance (trigger) (source/charge) (charging)	 130-250 ohms (green to blue) 0.03-1.2 ohms (yellow to white) 0.1-1.0 ohm (black to black)
Magneto Output (approx)	220W @ 5000 RPM

400	
IGNITION	
Ignition Timing	10° BTDC @ 1500 RPM
Spark Plug Type	NGK CR6E
Spark Plug Gap	0.7-0.8 mm (0.028-0.032 in.)
Spark Plug Cap	8000-12,000 ohms
Ignition Coil Resistance (primary) (secondary)	 0.1-1.0 ohm (terminal to ground) 4500-10,000 ohms (high tension - plug cap removed - to ground)
MAGNETO	
Magneto Coil Resistance (trigger) (source/charge) (charging)	 150-300 ohms (green to blue) 0.05-1.0 ohm (yellow to white) 0.1-1.0 ohm (black to black)
Magneto Output (approx)	325W @ 5000 RPM

500	
IGNITION	
Ignition Timing	10° BTDC @ 1500 RPM
Spark Plug Type	NGK CR6E
Spark Plug Gap	0.7-0.8 mm (0.028-0.032 in.)
Spark Plug Cap	8000-12,000 ohms
Ignition Coil Resistance (primary)	0.1-1.0 ohm (terminal to ground)
(secondary)	4500-10,000 ohms (high tension - plug cap removed - to ground)
MAGNETO	
Magneto Coil Resistance (trigger)	150-300 ohms (green to blue)
(source/charge)	0.05-1.0 ohm (yellow to white)
(charging)	0.1-1.0 ohm (black to black)
Magneto Output (approx)	325W @ 5000 RPM

Battery

⚠ WARNING

Anytime service is performed on a battery, the following must be observed: keep sparks, open flame, cigarettes, or any other flame away. Always wear safety glasses. Protect skin and clothing when handling a battery. When servicing battery in enclosed space, keep the area well-ventilated. Make sure venting tube of battery is always open once battery is filled with electrolyte.

1. Remove the battery from the ATV.

⚠ WARNING

Remove the negative cable first; then remove the positive cable.

⚠ CAUTION

Do not charge the battery while it is in the ATV with the battery terminals connected.

2. Remove the vent plugs; then fill the battery with electrolyte to the UPPER level indicated on the battery.

■ NOTE: Electrolyte should be at room temperature before filling. Do not use water or any other liquid to activate a battery.

⚠ WARNING

Electrolyte is a sulfuric acid solution. Avoid spillage and contact with skin, eyes, and clothing.

3. Allow the battery to stand for 15-30 minutes after filling. Electrolyte level may fall during this time. Refill with electrolyte to UPPER level line.

4. Trickle-charge the battery at 1.4 amps for 8-10 hours.

5. After charging, check electrolyte level and fill with DISTILLED WATER as necessary; then install the vent plugs. Wash off acid spillage with water and dry the battery.

⚠ CAUTION

Before installing the battery, make sure the ignition switch is in the OFF position.

6. Place the battery into position in the ATV and secure; then connect the vent hose to the battery.

7. Connect cables to the proper terminals: positive cable to the positive terminal (+) and negative cable to the negative terminal (-). Connect the negative cable last.

⚠ CAUTION

Connecting cables in reverse (positive to negative and negative to positive) can cause serious damage to the electrical system.

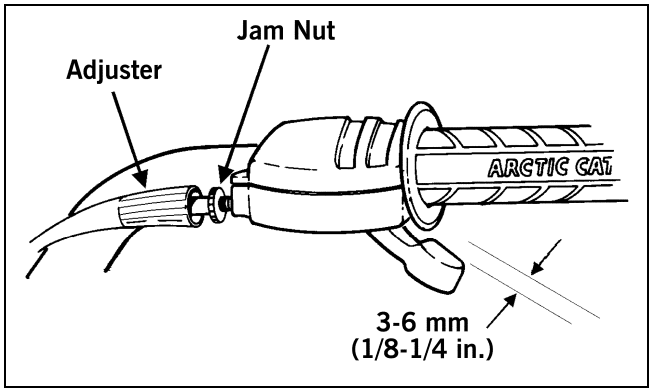
8. Check the vent tube to make sure it is not pinched or obstructed in any way and that it is properly routed down through the frame.

RPM Limiter

The ATV has an RPM limiter system to limit the engine RPM. One way to eliminate the activation of the RPM limiter is to utilize the throttle limiter screw at the throttle lever.

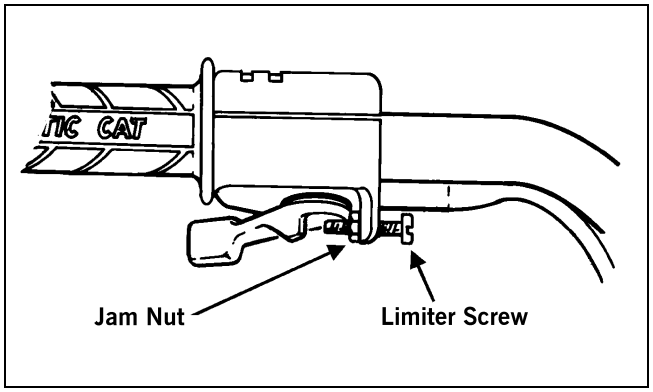
■ NOTE: The ATV is equipped with a CDI unit that retards ignition timing when maximum RPM is approached. When the RPM limiter is activated, it could be misinterpreted as a high-speed misfire.

1. Ensure that the throttle cable is adjusted correctly at 3-6 mm (1/8-1/4 in.) free-play at the lever.



ATV-0047

2. Loosen the jam nut of the limiter screw and rotate the screw clockwise until RPM is limited to under 9000 RPM (250/300) or under 8300 RPM (375/400/500); then tighten the jam nut.

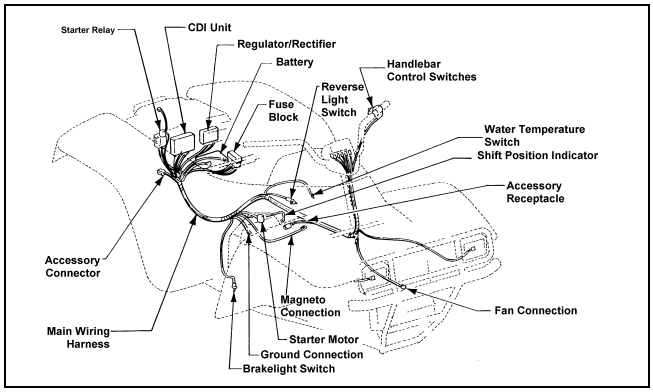


ATV-0053

Testing Electrical Components

All of the electrical tests should be made using the Fluke Model 73 Multimeter (p/n 0644-191). If any other type of meter is used, readings may vary due to internal circuitry. When troubleshooting a specific component, always verify first that the fuse(s) are good, that the bulb(s) are good, that the connections are clean and tight, that the battery is fully charged, and that all appropriate switches are activated.

■ **NOTE: For absolute accuracy, all tests should be made at room temperature of 68° F.**



732-410D

Accessory Receptacle/Connector (375/400/500)

■ **NOTE: This test procedure is for either the receptacle or the connector.**

VOLTAGE

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the red/white wire or the positive connector; then connect the black tester lead to ground.

AR606D

3. The meter must show battery voltage.

■ **NOTE: If the meter shows no battery voltage, troubleshoot the battery, fuse, receptacle, connector, or the main wiring harness.**

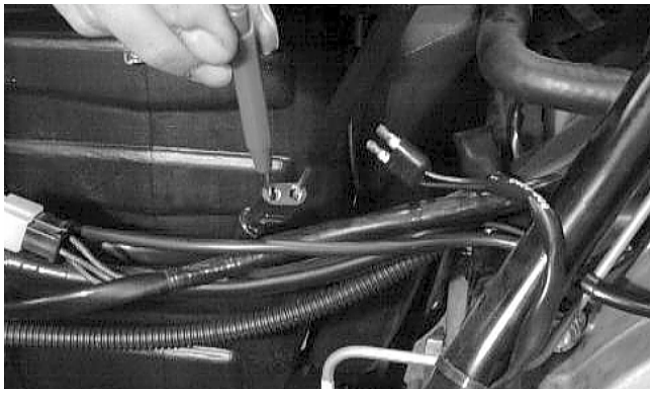
Brakelight Switch
(Foot)

The switch connector is the two-prong connector on the right side of the engine directly above the brake cable adjuster.

■ NOTE: The ignition switch must be in the ON position.

VOLTAGE
(Wiring Harness Side)

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester to the orange wire; then connect the black tester lead to ground.



AR627D

3. The meter must show battery voltage.

■ NOTE: If the meter shows no battery voltage, troubleshoot the battery, fuse, switch, or the main wiring harness.

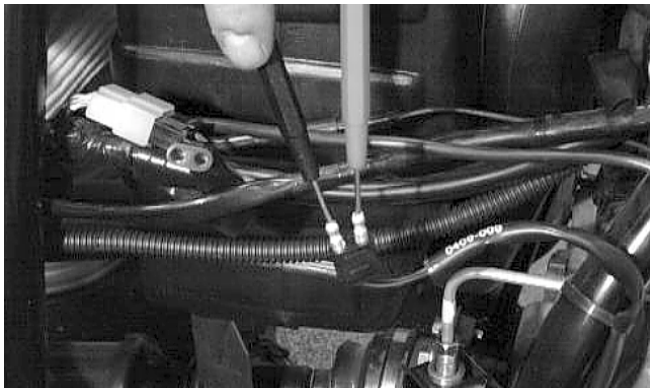
■ NOTE: If the meter shows battery voltage, the main wiring harness is good; proceed to test the switch/component, the connector, and the switch wiring harness for resistance.

RESISTANCE
(Brakelight Switch Connector)

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to one black wire; then connect the black tester lead to the other black wire.



AR626D

3. When the brake pedal is depressed, the meter must show less than 1 ohm.

■ NOTE: If the meter shows more than 1 ohm of resistance, troubleshoot or replace the switch/component, the connector, or the switch wiring harness.

Brakelight Switch
(Handlebar Control)

The switch connector is the two-prong black connector in front of the steering post. To access the connector, the front rack and front fenders must be removed (see Section 8).

■ NOTE: The ignition switch must be in the ON position.

VOLTAGE
(Wiring Harness Connector)

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the orange wire; then connect the black tester lead to ground.

AR622D

3. The meter must show battery voltage.

■ NOTE: If the meter shows no battery voltage, troubleshoot the battery, fuse, switch, or the main wiring harness.

■**NOTE: If the meter shows battery voltage, the main wiring harness is good; proceed to test the switch/component, the connector, and the switch wiring harness for resistance.**

RESISTANCE
(Brakelight Switch Connector)

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

■**NOTE: The brake lever must be compressed for this test. Also, the ignition switch must be in the OFF position.**

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to one black wire; then connect the black tester lead to the other black wire.

AR621D

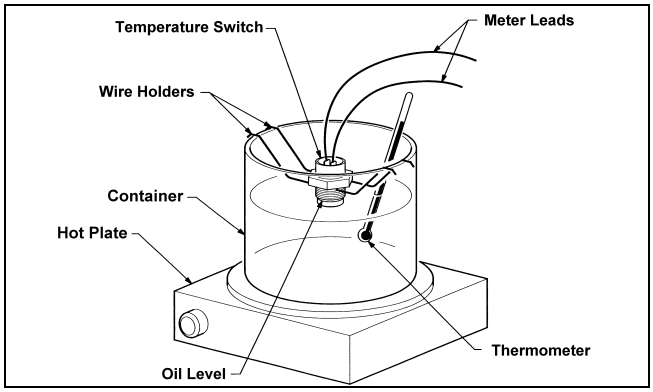
3. When the lever is compressed, the meter must show less than 1 ohm.

■**NOTE: If the meter shows more than 1 ohm of resistance, troubleshoot or replace the switch/component, the connector, or the switch wiring harness.**

Oil Temperature Switch
(250/300/375)

1. Connect the meter leads (selector in the OHMS position) to the temperature switch contacts.
2. Suspend the temperature switch and a thermometer in a container of oil; then heat the oil.

■**NOTE: Neither the temperature switch nor the thermometer should be allowed to touch the bottom of the container or inaccurate readings will occur. Use wire holders to suspend switch and thermometer.**



733-554B

3. When the oil temperature reaches 160° C (320° F), the meter should read a closed circuit.
4. Allow the oil to cool, and when the temperature is at (or just before) a temperature of 140° C (284° F), the meter should read an open circuit.
5. If the readings are not as indicated, the temperature switch must be replaced.
6. Apply teflon tape to the threads of the switch; then install the switch and tighten securely.
7. Connect the temperature switch leads.

Fan Motor
(375/400/500)

To access the connector (located directly behind the fan), the front rack and front fenders must be removed (see Section 8).

■**NOTE: The ignition switch must be in the ON position.**

VOLTAGE
(Main Harness Connector to Fan Motor)

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the black/red wire (the black 2-prong at the fan motor); then connect the black tester lead to ground.
3. The meter must show battery voltage.

■**NOTE: If the meter shows no battery voltage, troubleshoot the battery, fuse, motor, or the main wiring harness.**

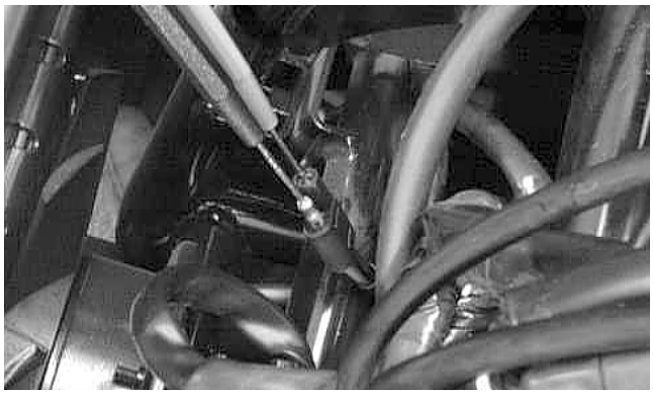
■**NOTE: If the meter shows battery voltage, the main wiring harness is good. The connector should be checked for resistance.**

RESISTANCE
(Fan Motor Connector)

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to the blue wire; then connect the black tester lead to the black wire.



AR645D

3. The meter must show less than 1 ohm.

■ NOTE: If the meter shows more than 1 ohm of resistance, troubleshoot or replace the switch/component, the connector, or the switch wiring harness.

■ NOTE: To determine if the fan motor is good, connect the blue wire from the fan connector to a 12 volt D.C. power supply; then connect the black wire from the fan connector to ground. The fan should operate.

⚠ CAUTION

Care should be taken to keep clear of the fan blades.

Fuse Block

The main (30 Amp) fuse is located on the frame near the right rear tire and protected by a snap-on cover.

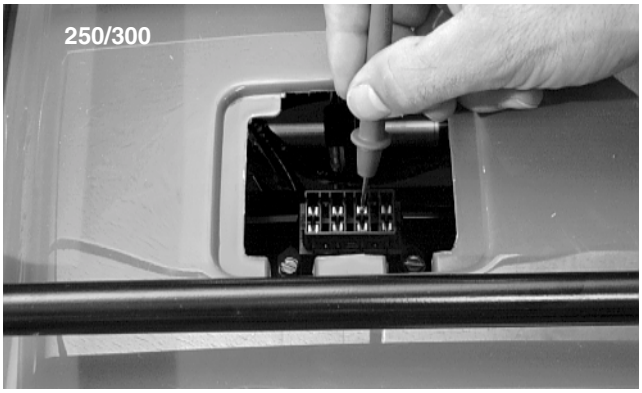
■ NOTE: To remove the fuse, compress the locking tabs on either side of the fuse case and lift out.

The remaining fuses are located under the center cover in the front fender assembly (on the 250/300) or under the seat in the battery compartment (on the 375/400/500). If there is any type of electrical system failure, always check the fuses first.

■ NOTE: If all voltage is lost at the fuse block, check the condition of the fuses.

■ NOTE: The ignition switch must be in the LIGHTS position.

1. Remove all fuses from the fuse box.
2. Set the meter selector to the D.C. Voltage position.
3. Connect the black tester lead to ground.
4. Using the red tester lead, contact each end of the fuse holder connector terminals individually.



CH095D

5. The meter must show battery voltage from one side of the connector terminal ends.

■ NOTE: Battery voltage will be indicated from only one side of the fuse holder connector terminal; the other side will show an open circuit.

■ NOTE: When testing the HI fuse holder, the headlight dimmer switch must be in the HI position; when testing the LO fuse holder, the headlight dimmer switch must be in the LO position.

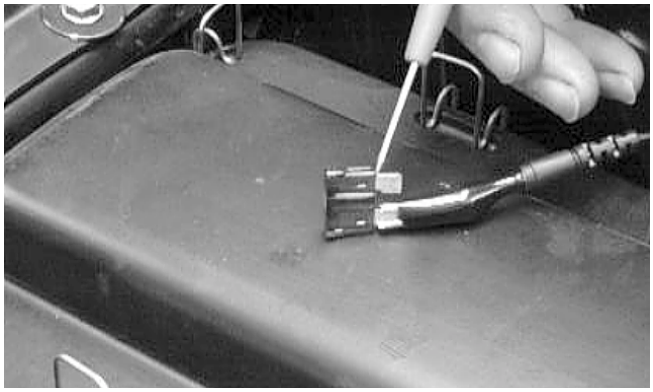
■ NOTE: If the meter shows no battery voltage, troubleshoot the battery, switches, fuse block, or the main wiring harness.

Fuses

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to one spade end of the fuse; then connect the black tester lead to the other spade end.



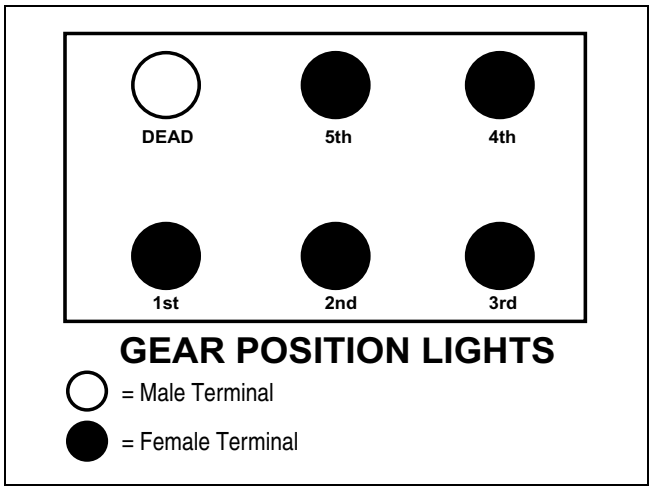
AR610D

3. The meter must show less than 1 ohm resistance. If the meter reads open, replace the fuse.

■ **NOTE: Make sure the fuses are returned to their proper position according to amperage. Refer to the fuse block cover for fuse placement.**

Gear Position Lights
(Manual Transmission)

The Gear Position Lights connector being tested is the black six-terminal connector (5 female and 1 male) coming from the gear position light wiring harness.

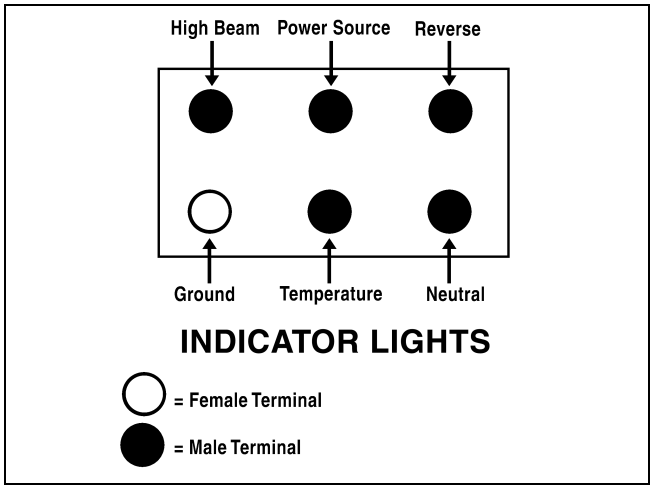


ATV-GPL

To access the gear position light connector for testing purposes, use the following procedure.

1. Remove the three machine screws and key cover securing the instrument pod.
2. Remove the light bar from the instrument pod; then cut the cable tie securing the instrument pod wiring to the steering post.
3. Push the instrument pod wiring with light bar downward to access the gear position light connector; then disconnect the connector from the main wiring harness.

■ **NOTE: For testing purposes, the Indicator Lights connector must also be disconnected to access the power source terminal.**



ATV-ILA

■ **NOTE: For these tests, a 12-volt power supply "jumper" should be used to supply power.**

FIRST GEAR

1. Connect the jumper positive wire to the power source terminal on the indicator light connector.
2. Connect the jumper ground wire to the first gear terminal on the gear position light connector.
3. The first gear position indicator light should illuminate.

SECOND GEAR

1. Connect the jumper positive wire to the power source terminal on the indicator light connector.
2. Connect the jumper ground wire to the second gear terminal on the gear position light connector.
3. The second gear position indicator light should illuminate.

THIRD GEAR

1. Connect the jumper positive wire to the power source terminal on the indicator light connector.
2. Connect the jumper ground wire to the third gear terminal on the gear position light connector.
3. The third gear position indicator light should illuminate.

FOURTH GEAR

1. Connect the jumper positive wire to the power source terminal on the indicator light connector.
2. Connect the jumper ground wire to the fourth gear terminal on the gear position light connector.

3. The fourth gear position indicator light should illuminate.

FIFTH GEAR

1. Connect the jumper positive wire to the power source terminal on the indicator light connector.
2. Connect the jumper ground wire to the fifth gear terminal on the gear position light connector.
3. The fifth gear position indicator light should illuminate.

■ NOTE: If the gear position indicator lights work properly, the gear position wiring harness, connectors, and bulbs are good. Troubleshoot the gear position switch.

After testing procedures are completed, use the following procedure.

1. Connect both light connectors to the main wiring harness.
2. Pull the instrument pod wiring with light bar upward and install the light bar into the instrument pod.
3. Secure the instrument pod with existing hardware; then secure the instrument pod wiring to the steering post using a cable tie.

Gear Position Switch
(Manual Transmission)

■ NOTE: The ignition switch must be in the OFF position. Also, the tests should be made at the white connector directly behind the reverse lever. Test the lower end of the connector (coming from the switch).

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

NEUTRAL POSITION

■ NOTE: For these tests, the meter selector should be set to the OHMS position.

1. Connect the red tester lead to the red/black wire; then connect the black tester lead to ground.
2. With the shifter in the neutral position, the meter must show less than 1 ohm.

FIRST GEAR

1. Connect the red tester lead to the white/yellow wire; then connect the black tester lead to ground.
2. With the shifter in the first gear position, the meter must show less than 1 ohm.

SECOND GEAR

1. Connect the red tester lead to the green/red wire; then connect the black tester lead to ground.
2. With the shifter in the second gear position, the meter must show less than 1 ohm.

THIRD GEAR

1. Connect the red tester lead to the brown/red wire; then connect the black tester lead to ground.
2. With the shifter in the third gear position, the meter must show less than 1 ohm.

FOURTH GEAR

1. Connect the red tester lead to the yellow/blue wire; then connect the black tester lead to ground.
2. With the shifter in the fourth gear position, the meter must show less than 1 ohm.

FIFTH GEAR

1. Connect the red tester lead to the green/blue wire; then connect the black tester lead to ground.
2. With the shifter in the fifth gear position, the meter must show less than 1 ohm.

■ NOTE: If any of the above tests show more than 1 ohm, the switch/harness and/or the connectors must be replaced.

Ignition Coil

On the 250/300, the ignition coil is attached to the upper frame behind the right-hand side panel. To access the coil, the seat and right-hand side panel must be removed (see Section 8).

On the 375/400/500, the ignition coil is on top of the engine. To access the coil, the seat and gas tank (see Section 4) must be removed.

VOLTAGE (Primary Side)

■ NOTE: The ignition switch must be in the ON position; the emergency stop switch must be in the RUN position. Also, the white/blue wire must be disconnected from the coil.

1. Set the meter selector to the D.C. Voltage position.

2. Connect the black tester lead to the white/blue wire; then connect the red tester lead to ground.
3. The meter must show 31V ± 20%.
4. With the tester leads connected, depress the starter button.
5. The meter must show 130V ± 20%.

■ **NOTE: If the voltage is not as specified in one or both of the above tests, inspect the main wiring harness, connectors, source/charge coil, magneto rotor and magnets, magneto rotor key, or the CDI unit.**

RESISTANCE

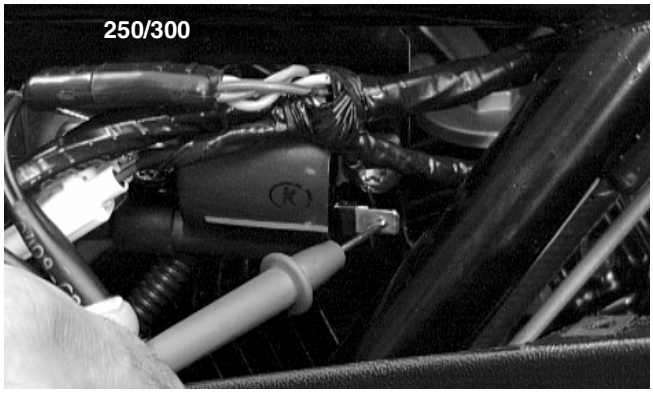
⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

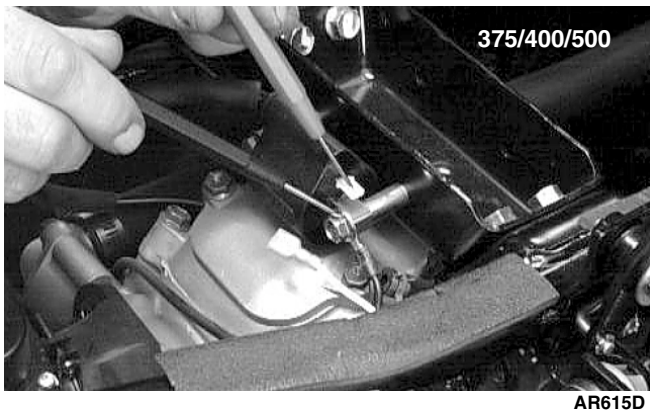
■ **NOTE: For these tests, the meter selector should be set to the OHMS position.**

Primary Winding

1. Connect the red tester lead to the terminal (with the wire removed); then connect the black tester lead to ground.



CH097D

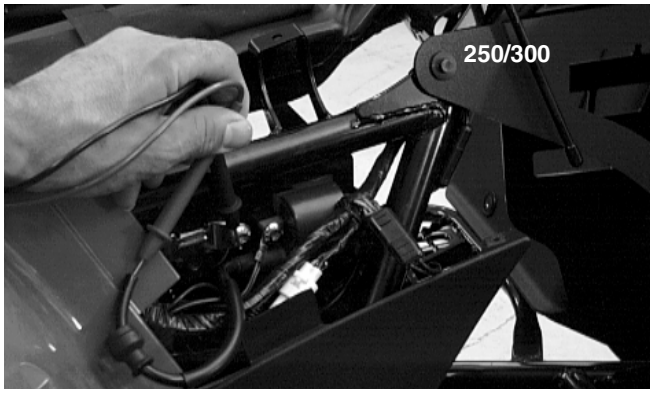


AR615D

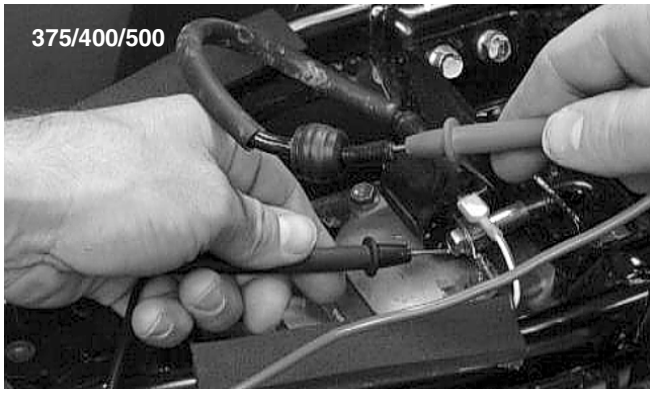
2. The meter must show 0.1- 0.5 ohm (250/300), 0.05-0.5 ohm (375), or 0.1-1.0 ohm (400/500).

Secondary Winding

1. Connect the red tester lead to the high tension lead (plug cap removed); then connect the black tester lead to ground.



CH098D



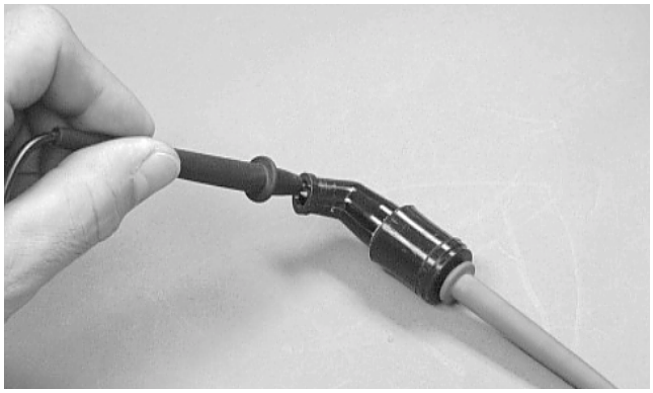
AR601D

2. The meter must show 5200-7800 ohms (250/300), 4000-9000 ohms (375), or 4500-10,000 ohms (400/500).

■ **NOTE: If the meter does not show as specified, replace ignition coil.**

Spark Plug Cap

1. Connect the red tester lead to one end of the cap; then connect the black tester lead to the other end of the cap.

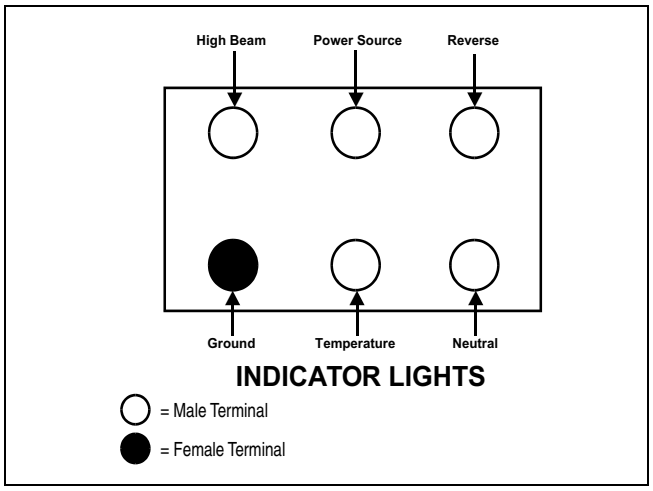

AR603D

2. The meter must show 8000-12,000 ohms.

■**NOTE: If the meter does not read as specified, replace the spark plug cap.**

Indicator Lights

The Indicator Lights connector being tested is the black six-terminal connector (1 female and 5 male) coming from the indicator light wiring harness.



ATV-IL

To access the indicator light connector for testing purposes, use the following procedure.

1. Remove the three machine screws and key cover securing the instrument pod.
2. Remove the light bar from the instrument pod; then cut the cable tie securing the instrument pod wiring to the steering post.
3. Push the instrument pod wiring with light bar downward to access the indicator light connector; then disconnect the connector from the main wiring harness.

■**NOTE: For these tests, a 12-volt power supply "jumper" should be used to supply power.**

TEMPERATURE LIGHT

1. Connect the jumper positive wire to the power source terminal on the indicator light connector.
2. Connect the jumper ground wire to the temperature terminal on the indicator light connector.
3. The temperature warning indicator light should illuminate.

NEUTRAL POSITION LIGHT

1. Connect the jumper positive wire to the power source terminal on the indicator light connector.
2. Connect the jumper ground wire to the neutral terminal on the indicator light connector.
3. The neutral position indicator light should illuminate.

REVERSE POSITION LIGHT

1. Connect the jumper positive wire to the power source terminal on the indicator light connector.
2. Connect the jumper ground wire to the reverse terminal on the indicator light connector.
3. The reverse position indicator light should illuminate.

HI BEAM LIGHT

1. Connect the jumper positive wire to the high beam terminal on the indicator light connector.
2. Connect the jumper ground wire to the female terminal on the indicator light connector.
3. The HI beam indicator light should illuminate.

■**NOTE: If a light fails to illuminate in any one of the indicator light tests, the connector, wiring harness, or a bulb must be replaced.**

After testing procedures are completed, use the following procedure.

1. Connect the indicator light connector to the main wiring harness.
2. Pull the instrument pod wiring with light bar upward and install the light bar into the instrument pod.
3. Secure the instrument pod with existing hardware; then secure the instrument pod wiring to the steering post using a cable tie.

HI BEAM INDICATOR VOLTAGE

■**NOTE: The ignition switch must be in the LIGHTS position. Also, the dimmer switch must be in the HI position, and the test must be performed on the lower side of the connector.**

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the yellow wire; then connect the black tester lead to the black wire.
3. The meter must show battery voltage.

■**NOTE: The meter may show less than 12 volts due to the draw from the headlights.**

OIL TEMPERATURE LIGHT VOLTAGE (250/300/375)

■**NOTE: The ignition switch must be in the ON position, and the test must be performed on the lower side of the switch.**

1. Set the meter selector to the D.C. Voltage position.
2. Disconnect the white oil temperature switch connector from the switch (on the top right side of the engine) and ground the violet wire to the engine. The temperature light should illuminate.
3. Connect the red tester lead to the violet wire (main harness side); then connect the black tester lead to a ground.
4. The meter must show battery voltage.

WATER TEMPERATURE LIGHT VOLTAGE (400/500)

■ NOTE: The ignition switch must be in the ON position, and the test must be performed on the lower side of the switch.

1. Set the meter selector to the D.C. Voltage position.
2. Remove the violet water temperature switch wire connector from the switch (on the left side of the engine below the water hose) and ground it to the engine.
3. Connect the red tester lead to the red/black wire from the fan temperature switch; then connect the black tester lead to the violet wire from the water temperature switch.
4. The meter must show battery voltage.

NEUTRAL POSITION VOLTAGE

■ NOTE: The ignition switch must be in the ON position. Also, the shifter must be in the NEUTRAL position, and the test must be performed on the lower side of the connection.

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the red/black wire; then connect the black tester lead to the blue/white wire.
3. The meter must show battery voltage.

REVERSE POSITION VOLTAGE

■ NOTE: The ignition switch must be in the ON position. Also, the reverse lever must be in the REVERSE position, and the test must be performed on the lower side of the connector.

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the red/black wire; then connect the black tester lead to the blue wire.
3. The meter must show battery voltage.

■ NOTE: If the meter fails to show voltage in any of the above tests, the connector, fuse, switch, or wiring harness must be replaced.

Ignition Switch

The connector is the green one beneath the console. To access the connector, the speedometer and instrument pod must be removed.

VOLTAGE

■ NOTE: Perform this test on the lower side of the connector.

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red meter lead to the red wire; then connect the black meter lead to ground.
3. Meter must show battery voltage.

■ NOTE: If the meter shows no battery voltage, troubleshoot the battery or the main wiring harness.

RESISTANCE

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

■ NOTE: Perform this test on the upper side of the connector.

1. Turn the ignition switch to the ON position.
2. Set the meter selector to the OHMS position.
3. Connect the red tester lead to the red wire; then connect the black tester lead to the orange wire.
4. The meter must show less than 1 ohm.
5. Turn the ignition switch to the LIGHTS position.
6. Connect the red tester lead to the red wire; then connect the black tester lead to the orange wire.
7. The meter must show less than 1 ohm.
8. Connect the red tester lead to the red wire; then connect the black tester lead to the gray wire.
9. The meter must show less than 1 ohm.
10. With the switch in the OFF position, connect the red tester lead to the red wire and the black tester lead to each of the remaining wires (orange and gray). The meter must show an open circuit on both wires.

■ NOTE: If the meter shows more than 1 ohm of resistance, troubleshoot or replace the switch/component, the connector, or the switch wiring harness.

Handlebar Control Switches

The connector is the yellow one in front of the steering post. To access the connector, the front rack and front fenders must be removed (see Section 8).

■NOTE: These tests should be made on the top side of the connector.

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

RESISTANCE (HI Beam)

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to the yellow wire; then connect the black tester lead to the gray wire.
3. With the dimmer switch in the HI position, the meter must show less than 1 ohm.

■NOTE: If the meter shows more than 1 ohm of resistance, troubleshoot or replace the switch/component, the connector, or the switch wiring harness.

RESISTANCE (LO Beam)

1. Connect the red tester lead to the white wire; then connect the black tester lead to the gray wire.
2. With the dimmer switch in the LO position, the meter must show an open circuit.

■NOTE: If the meter reads resistance, troubleshoot or replace the switch/component, the connector, or the switch wiring harness.

RESISTANCE (Starter Button)

1. Set the meter selector to the Diode position.
2. Connect the red tester lead to the orange/white wire; then connect the black tester lead to the yellow/green wire.
3. With the starter button depressed, the meter must show 0.5 - 0.7 ohm.
4. With the starter button released, the meter must show an open circuit.
5. Connect the red tester lead to the yellow/green wire; then connect the black tester lead to the orange/white wire.
6. With the starter button depressed, the meter must show an open circuit.

■NOTE: If the meter does not show as specified, replace the switch/component, connector, or switch harness.

RESISTANCE (Emergency Stop)

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to the orange wire; then connect the black tester lead to the orange/white wire.
3. With the switch in the OFF position, the meter must show an open circuit.
4. With the switch in the RUN position, the meter must show less than 1 ohm.

■NOTE: If the meter shows more than 1 ohm of resistance, troubleshoot or replace the switch/component, the connector, or the switch wiring harness.

RESISTANCE (Reverse Override)

The connector is the four-prong white one in front of the steering post. To access the connector, the front rack and front fenders must be removed (see Section 8).

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to one red/yellow wire (red/white wire on some models); then connect the black tester wire to the other red/yellow wire (red wire on some models). The meter must show less than 1 ohm.
3. Depress and hold the reverse override button. The meter must show an open circuit.
4. Connect the red tester lead to the blue wire (blue/white wire on some models); then connect the black meter lead to the black wire (blue wire on some models). The meter must show an open circuit.
5. Depress and hold the reverse override button. The meter must show less than 1 ohm.

■NOTE: If the meter does not show as specified, replace the switch/component, connector, or switch harness.

Magneto Assembly

VOLTAGE (Charging Coils - Output)

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the positive battery post; then connect the black tester lead to the negative battery post.
3. With the engine running at a constant 5000 RPM (with the headlights on), the meter must show 14-15.5 D.C. volts.

⚠ CAUTION

Do not run the engine at high RPM for more than 10 seconds.

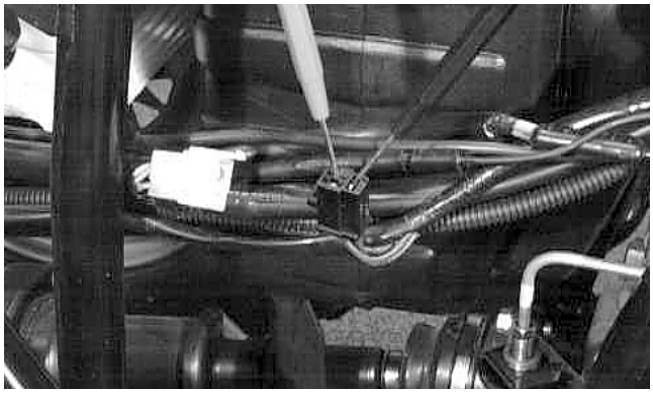
■ NOTE: If voltage is lower than specified, test charging coils - no load.

VOLTAGE (Charging Coils - No Load)

The connector is the black and white one on the right side of the engine just above the brake cable adjuster.

■ NOTE: Test the connector that comes from the engine.

1. Set the meter selector to the A.C. Voltage position.
2. Test between the three yellow wires (250/300) for a total of three tests or the three black wires (375/400/500) for a total of three tests.



AR630D

3. With the engine running at a constant 5000 RPM, all wire tests must show 60 A.C. volts.

⚠ CAUTION

Do not run the engine at high RPM for more than 10 seconds.

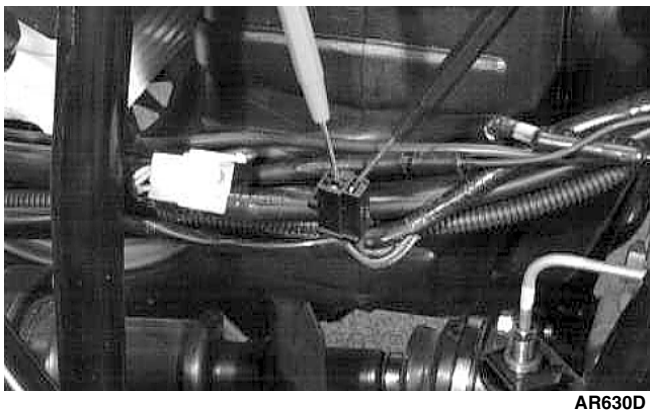
■ NOTE: If both charging coil tests failed, check all connections, etc., and test again. If no voltage is present, replace the stator assembly.

RESISTANCE (Charging Coils)

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

1. Set the meter selector to OHMS position.
2. Test between the three yellow wires (250/300) for a total of three tests or the three black wires (375/400/500) for a total of three tests.



AR630D

3. In all tests, the meter must show 0.1 - 1.0 ohm.

RESISTANCE (Trigger Coil)

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

1. Set the meter selector to the OHMS position.
2. On the 250/300, connect the red tester lead to the black/yellow wire; then connect the black tester lead to the green/white wire. The meter must show 80-150 ohms.
3. On the 375/400/500, connect the red tester lead to the green wire; then connect the black tester lead to the blue wire. The meter must show 130-250 ohms on the 375 or 150-300 ohms on the 400/500.

RESISTANCE (Source/Charge Coil - 375/400/500)

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to the yellow wire; then connect the black tester lead to the white wire.
3. The meter must show 0.03-1.2 ohms on the 375 or 0.05-1.0 ohm on the 400/500.

■ NOTE: If the meter shows other than specified in any resistance test, replace the stator assembly.

Starter Motor

REMOVING/DISASSEMBLING

1. Disconnect the battery.

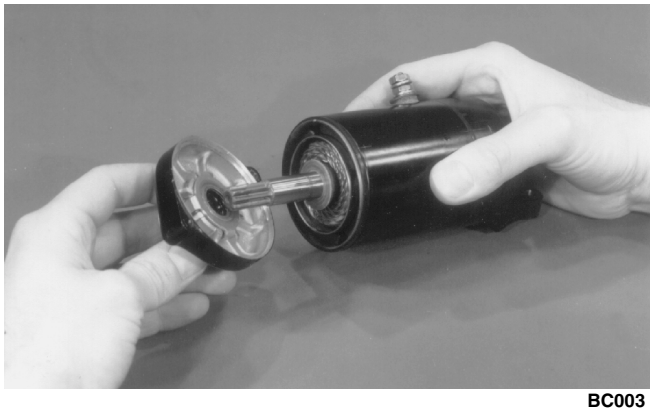
⚠ CAUTION

Always disconnect the negative battery cable from the battery first; then disconnect the positive cable.

2. Remove the nut securing the positive cable to the starter; then remove the cable from the starter.
3. Remove the two cap screws securing the starter to the crankcase; then remove the starter. Account for the wiring forms and an O-ring.
4. For assembly purposes, scribe a line across the outside of the starter assembly.

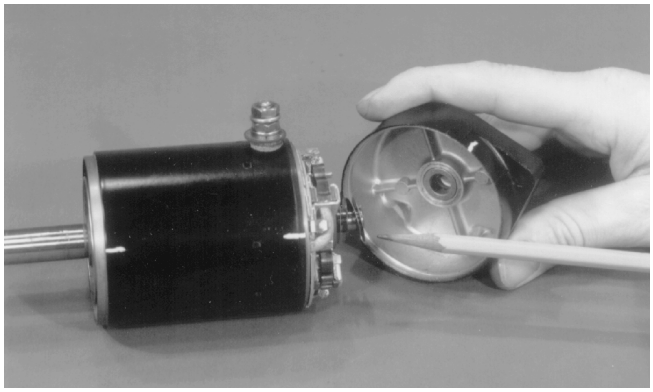
AR652D

5. Remove the two long starter cap screws securing the starter components.
6. Remove the front cover from the starter housing and armature shaft. Account for a seal protector and three washers.



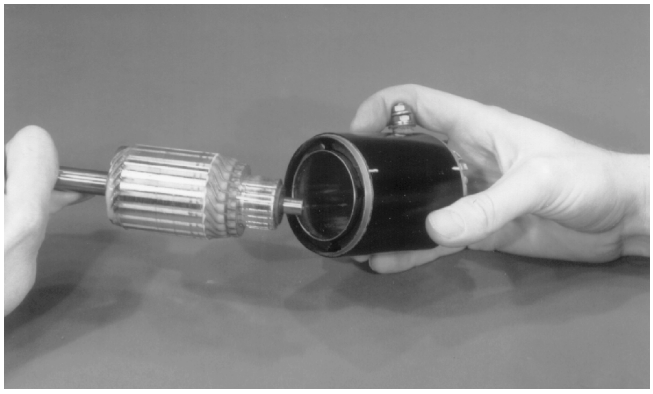
BC003

7. Remove the rear cover.



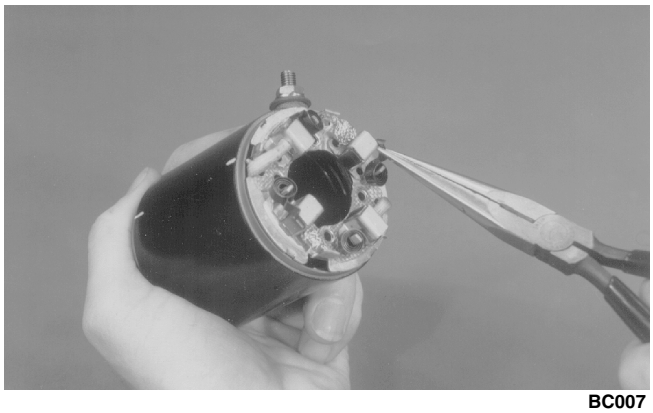
BC005

8. Slide the armature free of the starter housing.



BC006

9. Bend the two positive brushes outward; then remove the brush holder.

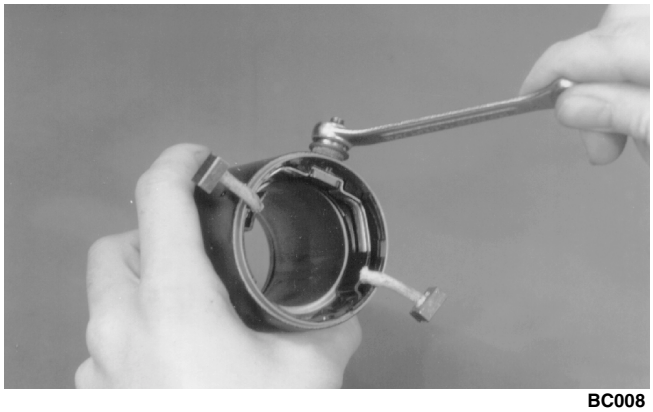


BC007

BC010

5

10. Remove the nut from the positive post. Account for the lock washer, flat washer, a fiber washer, and an O-ring.



BC008

11. Remove the positive brush assembly from the starter housing.

BC009

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Thoroughly clean all components except the armature and brushes in parts-cleaning solvent; then dry with compressed air.

⚠ CAUTION

Do not wash the armature and brushes in any kind of solvent. Use only compressed air and a clean dry, lint-free cloth.

2. Inspect all threaded areas for damage or stripped threads.

3. Inspect the brush holder assembly and brushes for damage or wear. Using a caliper, measure the length of the brushes. If brush measurement is less than 10.1 mm (0.40 in.), replace with new brushes and brush springs as a set.

4. Inspect the brush leads for cracks, wear, or fraying. If any of these conditions exist, replace with new brushes and brush springs as a set.

5. Inspect the rear cover bushing for wear.

6. Inspect the front cover bearing for wear.

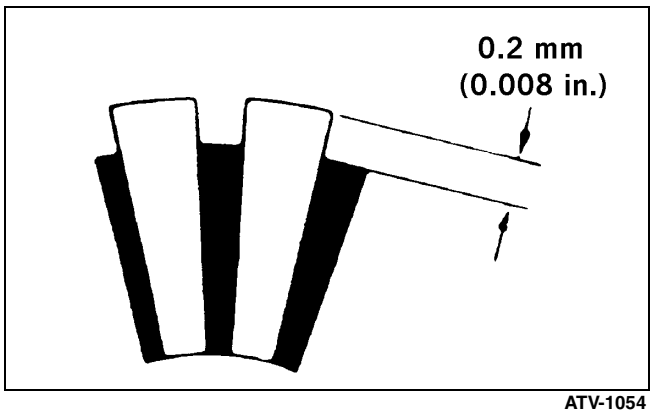
7. Inspect the brass commutator end of the armature for any burned spots or damage. If the commutator is lightly burned or damaged, the armature must be replaced. This is a molded commutator and turning it down in a lathe should not be attempted.

⚠ CAUTION

Do not use emery cloth to clean the commutator as emery particles will become imbedded in the brass commutator resulting in a short circuit. Use only #200 grit sandpaper.

8. Inspect the commutator end of the armature for buildup in the grooves. Carefully remove any buildup by undercutting using a thinly ground hacksaw blade. Do not undercut any deeper than the original groove which can be seen by looking at the end of the commutator.

9. Using a caliper, measure the undercut. Maximum undercut groove must be 0.2 mm (0.008 in.).



ATV-1054

⚠ CAUTION

Buildup in the grooves must be removed to prevent any chance of an electrical arc between individual sections of the commutator.

10. Inspect the commutator for shorting using a multimeter and the following procedure.

    A. Set the selector to the OHMS position.

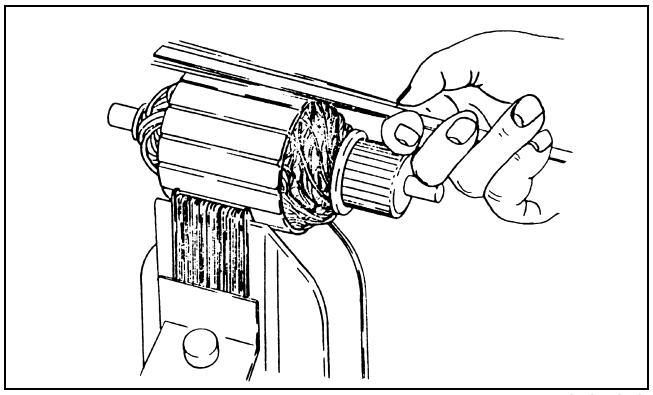
    B. Touch the black lead to the armature shaft.

    C. Using the red tester lead, probe the commutator end of the armature. The meter indicator should not change. If the indicator shows resistance, the armature is shorted and must be replaced.

11. Inspect the armature for shorting using a "growler" and the following procedure.

    A. Place the armature in the "growler."

B. While holding a metal strip on the armature, rotate the armature an entire revolution. If the metal strip vibrates at any point on the armature, the armature is shorted and must be replaced.



0725-653

12. Inspect the ground brushes to make sure they are properly grounded. Use a multimeter and the following procedure.

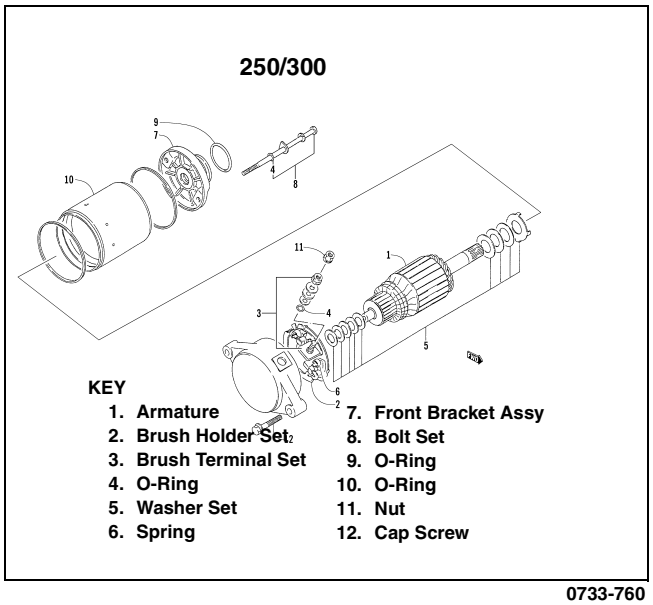
    A. Set the selector to the OHMS position.

    B. Touch the black tester lead to a ground brush.

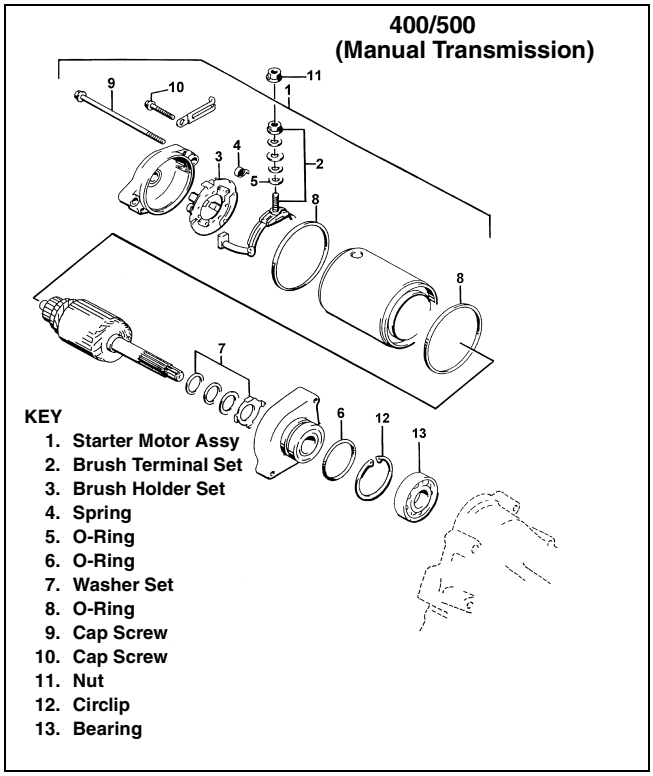
    C. Touch the red tester lead to the brush holder assembly.

■NOTE: If no resistance is indicated, check the ground connection for tightness and for cleanliness. If there is still no meter indication, replace the brush assembly.

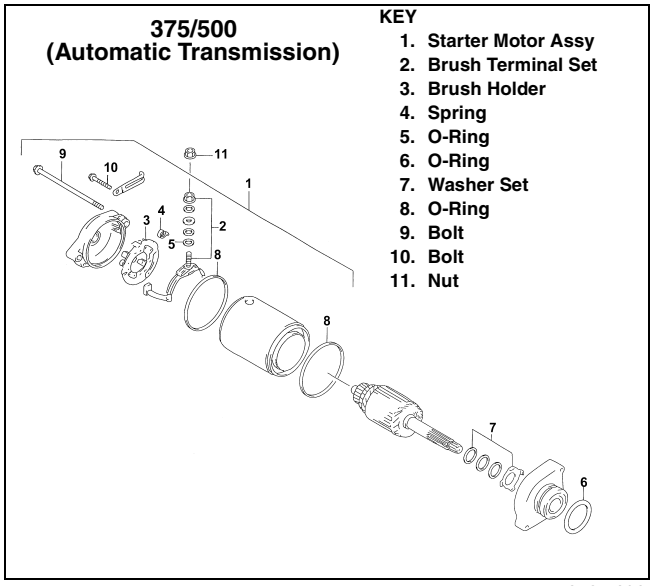
ASSEMBLING/INSTALLING



0733-760



0732-320

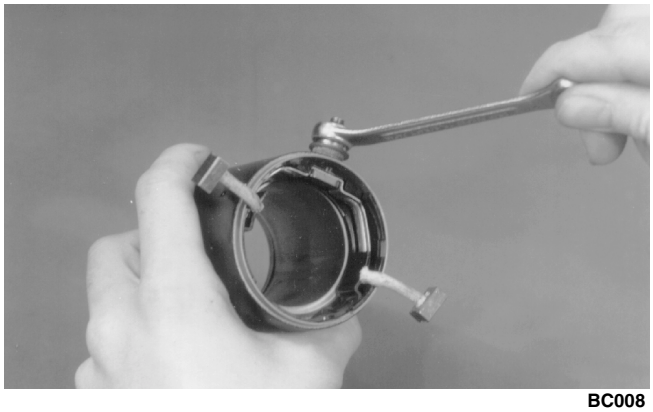


0735-623

1. Install the positive post on the positive brush assembly; then install on the starter housing.

BC009

2. On the positive post, install an O-ring washer, a fiber washer, a flat washer, and a lock washer. Secure with the nut.

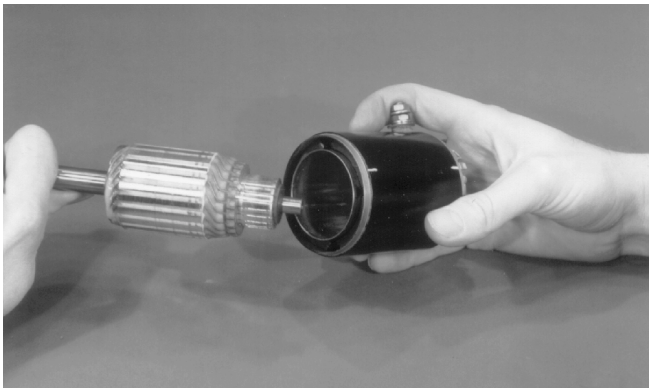


BC008

3. Align the tab on the brush holder with the notch in the starter housing; then install.

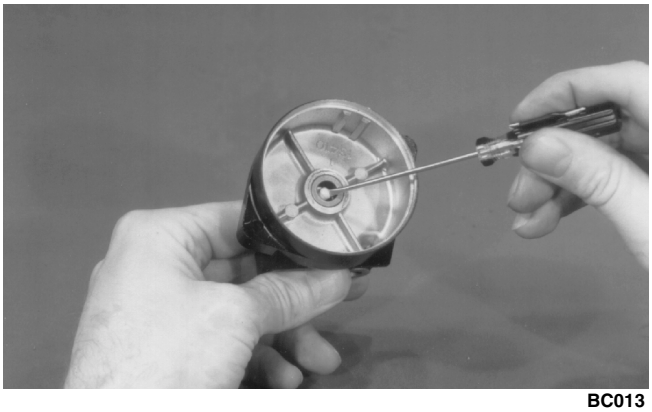
BC010

4. Install the armature into the starter housing; then while holding the brushes out, slide the commutator into the brush holder.



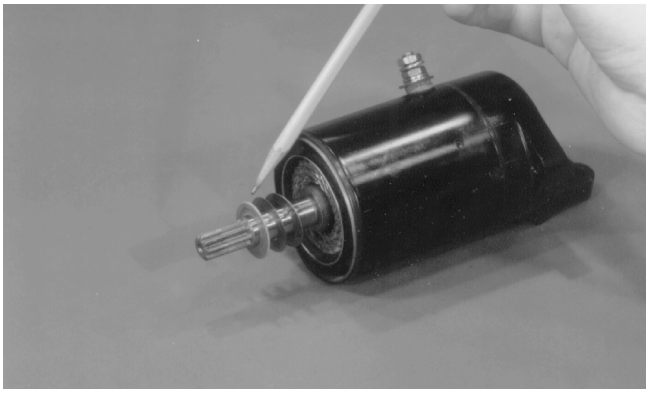
BC006

5. Apply a small amount of grease to the rear cover bushing; then install the cover on the starter housing making sure the reference marks align.



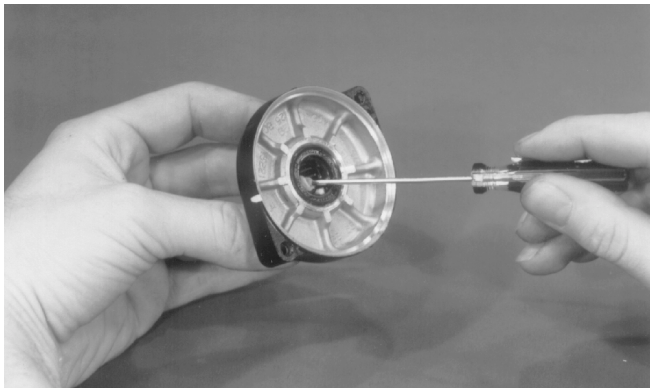
BC013

6. In order, install the thick metal washer, thin metal washer, and the fiber washer on the armature shaft; then install the housing O-ring on the starter housing.

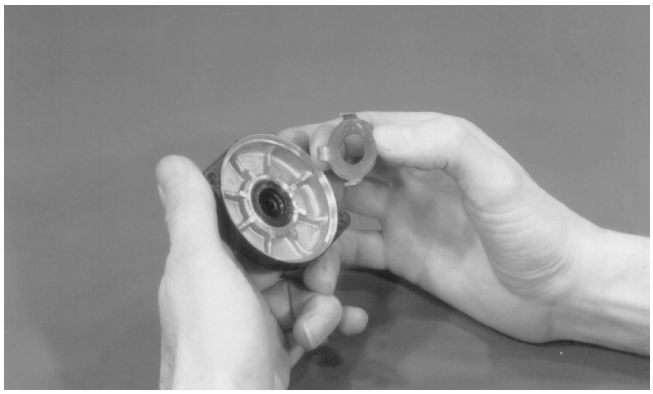


BC014

7. Apply a small amount of grease to the front cover bearing and seal; then install the seal protector.



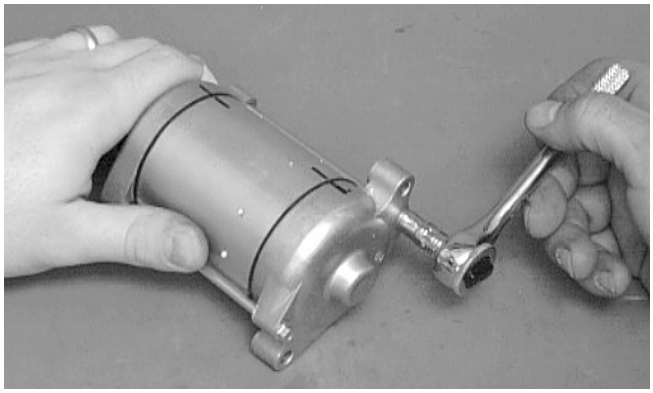
BC015



BC004

8. Place the front cover onto the starter housing making sure it seats properly.

9. Apply red Loctite #271 to the threads of the two long cap screws and install. Tighten to 0.8-1.2 kg-m (6-9 ft-lb).



AR653D

10. Apply a small amount of grease to the O-ring seal on the starter; then install the starter into the crankcase. Secure with two cap screws and wiring forms.

11. Secure the positive cable to the starter with the nut.

12. Connect the battery.

TESTING VOLTAGE

Perform this test on the starter motor positive terminal. To access the terminal, slide the boot away.

■ NOTE: The ignition switch must be in the ON position, the emergency stop switch in the RUN position, the reverse lever (on manual transmission models) in the FORWARD position, and the shift lever (on automatic transmission models) in the NEUTRAL position.

1. Set the meter selector to the D.C. Voltage position.

2. Connect the red tester lead to the starter terminal; then connect the black tester lead to ground.

3. With the starter button depressed, the meter must show battery voltage and the starter motor should operate.

AR607D

■ NOTE: If the meter showed battery voltage but the starter did not operate or operated slowly, inspect battery voltage (at the battery), starter motor condition, and/or ground connections.

■ NOTE: If the meter showed no battery voltage, inspect the main fuse, ground connections, starter motor lead, battery voltage (at the battery), or the switches.

Starter Relay (250/300)

RESISTANCE

⚠ CAUTION

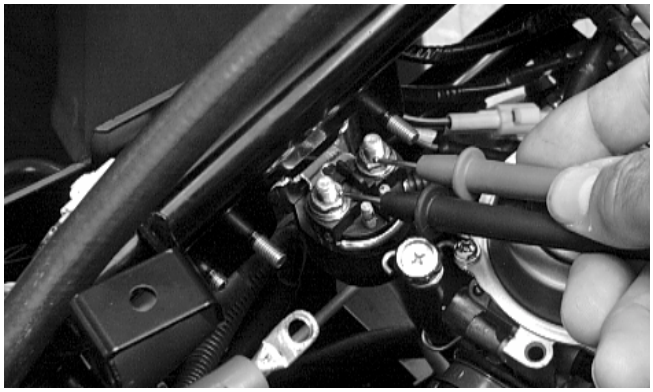
Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

1. Disconnect the battery; then verify that the ignition fuse is good. Disconnect all wires from the solenoid.

2. Set the meter selector to the OHMS position.

3. Connect the tester leads to each of the heavy posts of the solenoid.

4. The meter must show an open circuit.



CH099D

■**NOTE: Leave the tester leads connected to the solenoid posts for the following procedure.**

■**NOTE: An external 12-volt power supply "jumper" (positive and negative connections) must be used for this test. Also, it is very important that the meter leads and power supply connections are made to the appropriate terminals of the relay or damage to the multimeter will result.**

5. Connect the power supply leads to each small terminal of the solenoid. There should be an audible "click" from the relay, and the meter must show less than 1 ohm.

CH100D

■**NOTE: If there was no audible "click" from the relay or if the meter shows more than 1 ohm, it must be replaced. If there was a "click," continue to test resistance.**

6. With the 12-volt power supply still connected, connect the red tester lead to the heavy battery cable terminal; then connect the black tester lead to the heavy starter motor cable terminal.

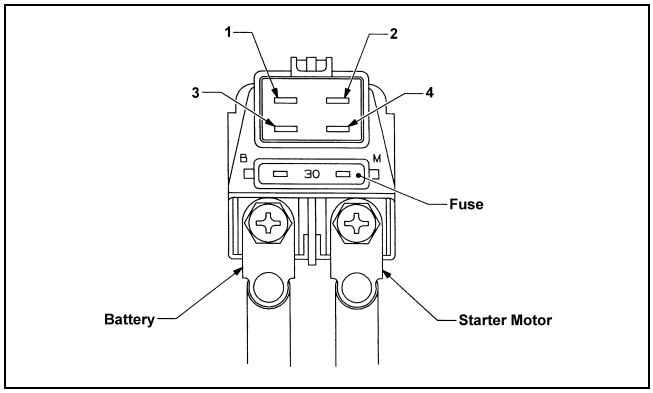
7. The meter must show less than 1 ohm.

8. With the 12-volt power supply disconnected, connect the tester leads to each small terminal of the solenoid.

9. The meter must show 4.3 ohms ± 20%.

■**NOTE: If the meter shows no resistance, the relay is out of tolerance or it must be replaced.**

Starter Relay
(375/400/500)



0732-513

RESISTANCE

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

1. Disconnect the battery; then verify that the starter relay 30-amp fuse is good.

2. Set the meter selector to the OHMS position.

3. Connect the red tester lead to terminal #1; then connect the black tester to terminal #2.

4. The meter must show an open circuit.

■**NOTE: Leave the tester leads connected to the terminals for the following procedure.**

■**NOTE: An external 12-volt power supply "jumper" (positive and negative connections) must be used for this test. Also, it is very important that the meter leads and power supply connections are made to the appropriate terminals of the relay or damage to the multimeter will result.**

5. Connect the power supply (positive) to terminal #3; then connect the power supply (negative) to terminal #4. There should be an audible "click" from the relay, and the meter must show less than 1 ohm.

■**NOTE: If there was no audible "click" from the relay or if the meter shows more than 1 ohm, it must be replaced. If there was a "click," continue to test resistance.**

6. With the 12-volt power supply still connected, then connect the red tester lead to the heavy battery cable terminal; then connect the black tester lead to the heavy starter motor cable terminal.

7. The meter must show less than 1 ohm.
8. With the 12-volt power supply disconnected, connect the red tester lead to terminal #3; then connect the black tester lead to terminal #4.
9. The meter must show 3.6 ohms ± 20%.

■ NOTE: If the meter shows no resistance, the relay is out of tolerance or it must be replaced.

CDI Unit
(250/300)

The CDI is located beneath the right rear fender panel near the battery.

The CDI is rarely the cause for electrical problems; however, if the CDI is suspected, test resistance values thoroughly and completely. Also, if the CDI is suspected (resistance test values are slightly out of specification), substitute another CDI unit to verify the suspected one is defective.

RESISTANCE

⚠ CAUTION

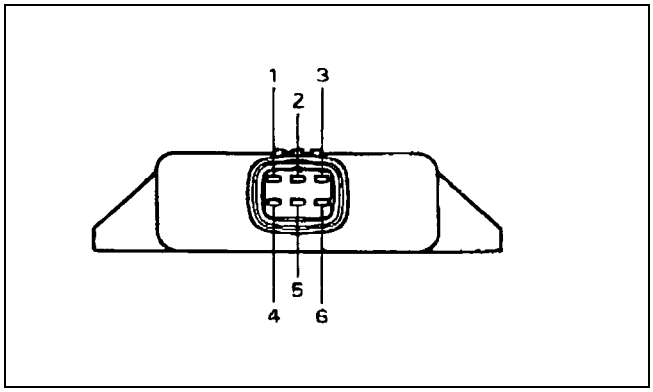
Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

1. Set the meter selector to the OHMS position.
2. Test each combination as found in the following chart. Write down each test value for each test for comparison with the value in the chart.

■ NOTE: As an example, connect the red tester lead to terminal #2; then connect the black tester lead to terminal #3. The meter must show 20-100 k-ohms.

⚠ CAUTION

Before determining the CDI unit is defective, perform every test combination shown in the chart.



ATV0099A

CDI UNIT ELECTRICAL TEST SPECIFICATIONS (k-ohms)

Negative Meter Lead To:	Positive Meter Lead To: 1	2	3	4	5	6
1	—	2-10	50-150	×	2-10	2-10
2	×	—	20-80	×	0	0
3	×	20-100	—	×	20-100	20-100
4	×	1-7	50-150	—	1-7	1-7
5	×	0	20-80	×	—	0
6	×	0	20-80	×	0	—

× = Infinity

Regulator/Rectifier
(250/300)

The regulator/rectifier is located near the battery.

RESISTANCE

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

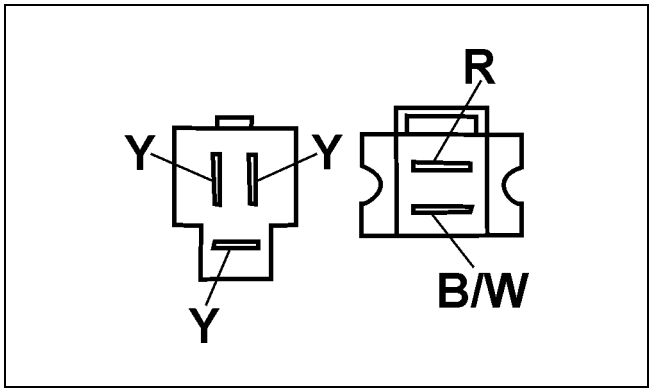
1. Set the meter selector to the OHMS position.
2. Test each combination as found in the following chart.

■ NOTE: As an example, connect the red tester lead to the R terminal; then connect the black tester lead to a Y terminal. The meter must show 7-k ohms.

⚠ CAUTION

Before determining the regulator/rectifier is defective, perform every test combination shown in the chart.

5



ATV1087B

REGULATOR/RECTIFIER SPECIFICATIONS (k-ohms)

Negative Meter Lead To:	Positive Meter Lead To:					
		Y	Y	Y	R	B/W
	Y	—	×	×	7	×
	Y	×	—	×	7	×
	Y	×	×	—	7	×
	R	×	×	×	—	×
	B/W	7	7	7	30-50	—

× = Infinity

CDI Unit
(375/400/500)

The CDI is located beneath the seat and fender panel near the battery.

The CDI is rarely the cause for electrical problems; however, if the CDI is suspected, test resistance values thoroughly and completely. Also, if the CDI is suspected (resistance test values are slightly out of specification), substitute another CDI unit to verify the suspected one is defective.

RESISTANCE

⚠ CAUTION

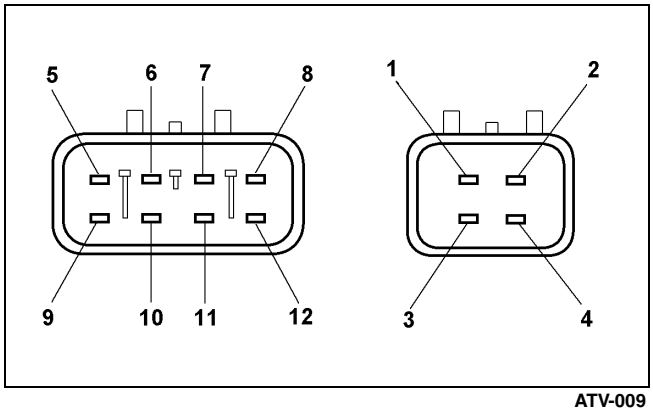
Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

1. Set the meter selector to the OHMS position.
2. Test each combination as found in the following chart. Write down each test value for each test for comparison with the value in the chart.

■ NOTE: As an example, connect the red tester lead to terminal #1; then connect the black tester lead to terminal #3. The meter must show 5-22 k-ohms.

⚠ CAUTION

Before determining the CDI unit is defective, perform every test combination shown in the chart.



ATV-009

CDI UNIT ELECTRICAL TEST SPECIFICATIONS (k-ohms)

Negative Meter Lead To:	Positive Meter Lead To:												
		1	2	3	4	5	6	7	8	9	10	11	12
	1	—	0	5-22	11-45	×	×	0	0	60-400	300~	×	×
	2	0	—	5-22	11-45	×	×	5-22	5-22	60-400	300~	×	×
	3	5-22	5-22	—	—	×	×	×	×	60-400	300~	×	×
	4	15-60	15-60	24-100	—	×	×	×	×	80-500	300~	×	×
	5	×	×	×	×	—	×	×	×	×	×	×	×
	6	×	×	×	×	×	—	×	×	×	×	×	×
	7	0	0	5-22	11-45	×	×	—	0	60-500	300~	×	×
	8	0	0	5-22	11-45	×	×	0	—	60-500	300~	×	×
	9	1-6	1-6	9-35	22-90	×	×	1-7	1-7	—	300~	×	×
	10	2-9	2-9	10-40	26-100	×	×	2-9	2-9	80-500	—	×	×
	11	×	×	×	×	×	×	×	×	×	×	—	×
	12	×	×	×	×	×	×	×	×	×	×	×	—

Regulator/Rectifier
(375/400/500)

The regulator/rectifier is located beneath the seat near the air-cleaner housing.

RESISTANCE

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

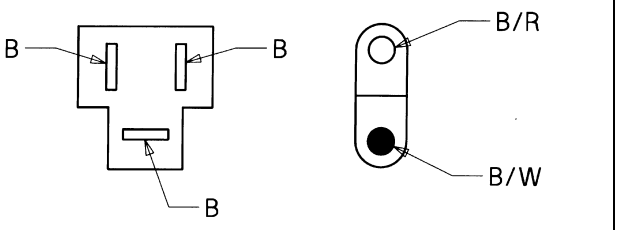
1. Set the meter selector to the OHMS position.
2. Test each combination as found in the following chart.

■NOTE: As an example, connect the red tester lead to the B/R terminal; then connect the black tester lead to a B terminal. The meter must show 1-10 k-ohms.

⚠ CAUTION

Before determining the regulator/rectifier is defective, perform every test combination shown in the chart.

REGULATOR/RECTIFIER TERMINALS



0735-352

REGULATOR/RECTIFIER SPECIFICATIONS (k-ohms)

Negative Meter Lead To:	Positive Meter Lead To: B/R	B	B	B	B/W	Body
B/R	—	×	×	×	×	×
B	1–10	—	×	×	×	×
B	1–10	×	—	×	×	×
B	1–10	×	×	—	×	×
B/W	3-15	1-10	1-10	1-10	—	×
Body	×	×	×	×	×	—

× = Infinity

REG/REC SPEC

Neutral Start Relay

The connector is the white 4-prong one near the battery.

VOLTAGE (Connector)

■NOTE: The ignition switch must be in the ON position.

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the orange wire; then connect the black tester lead to ground.
3. The meter must show battery voltage.

■NOTE: If the meter shows no battery voltage, inspect the fuses, wiring harness, connectors, or ignition switch.

■NOTE: In the following test, the ignition switch must be in the ON position and the emergency stop switch must be in the RUN position.

4. With the black tester lead still connected to ground, connect the red tester lead to the yellow/green wire.
5. Depress the starter button. The meter must show battery voltage.

■NOTE: If the meter shows no battery voltage, inspect fuses, wiring harness, connectors, and switches.

RESISTANCE (Relay - Brass Terminals)

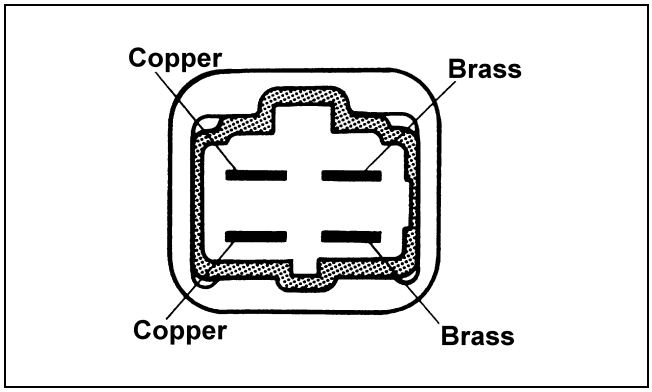
⚠CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

■NOTE: An external 12-volt power supply "jumper" (positive and negative connections) must be used for this test. Also, it is very important that the meter leads and power supply connections are made to the appropriate terminals of the relay or damage to the multimeter will result.

1. Set the meter selector to the OHMS position.
2. Connect the power supply (positive) to one copper terminal; then connect the power supply (negative) to the other copper terminal. There should be an audible "click" from the relay.

5



ATV-1075

■ **NOTE: If there was no audible "click" from the relay, it must be replaced. If there was a "click," continue to test resistance.**

3. Set the meter selector to the OHMS position.
4. With the power supply still connected, connect the red tester lead to one brass terminal; then connect the black tester lead to the other brass terminal.
5. The meter must show less than 1 ohm.

■ **NOTE: If the meter shows more than 1 ohm (even though the "click" was heard in the power supply test), the relay must be replaced.**

RESISTANCE (Relay - Copper Terminals)

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

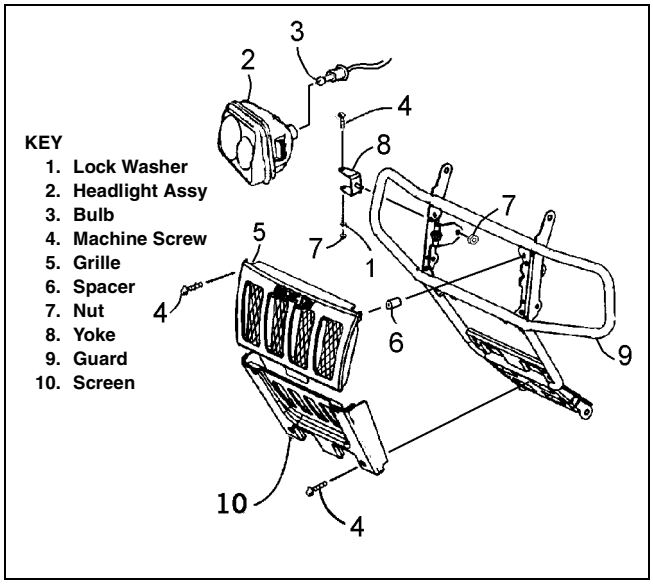
■ **NOTE: The external power supply will not be used for this test.**

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to one copper terminal; then connect the black tester lead to the other copper terminal.
3. The meter must show 90 ohms ± 20%.

■ **NOTE: If the meter shows no resistance, replace the relay.**

Headlights

The connectors are the two 3-prong ones secured to the front bumper supports (one on each side) with cable ties.



736-825A

BULB VERIFICATION (Low and High Beam)

■ **NOTE: Perform this test on each headlight bulb. Also, a 12-volt external power supply w/jumpers will be needed.**

1. Disconnect the wiring harness from the bulb to be tested.
2. Connect the power supply (positive) to one bulb contact; then connect the power supply (negative) to the remaining bulb contact.
3. The bulb should illuminate.
4. If the bulb fails to illuminate, it must be replaced.

VOLTAGE

■ **NOTE: Perform this test in turn on the main harness side of all four connectors. Also, the ignition switch must be in the LIGHTS position.**

■ **NOTE: The LO beam is the inside bulb, and the HI beam is the outside bulb.**

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to one wire; then connect the black tester lead to the other wire.
3. With the dimmer switch in the LO position, test the two inside connectors (LO beam). The meter must show battery voltage.
4. With the dimmer switch in the HI position, test the two outside connectors (HI beam). The meter must show battery voltage.

■ **NOTE: If battery voltage is not shown in any test, inspect the fuses, battery, main wiring harness, connectors, or the left handlebar switch.**

Taillight - Brakelight

The connector is the 3-prong one located under the rear fender assembly.

BULB VERIFICATION

■NOTE: Perform this test on the taillight-brakelight side of the connector. Also, a 12-volt external power supply (jumper) will be needed.

1. Connect the power supply (positive) to the yellow wire; then connect the power supply (negative) to the brown wire.
2. The taillight should illuminate.
3. With the negative power supply still connected, connect the positive supply wire to the red wire.
4. The brakelight should illuminate.

■NOTE: If either the taillight or brakelight fails to illuminate, inspect the bulb, the connectors, or the component wiring harness.

VOLTAGE (Taillight)

■NOTE: Perform this test on the main harness side of the connector. Also, the ignition switch should be in the LIGHTS position.

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the pink wire; then connect the black tester lead to the black wire.
3. With the ignition key in the LIGHTS position, the meter must show battery voltage.

■NOTE: If the meter shows no voltage, inspect fuses, wiring harness, connectors, and switches.

VOLTAGE (Brakelight)

■NOTE: Perform this test on the main harness side of the connector. Also, the ignition switch should be in the ON position and the brake (either foot pedal or hand lever) must be applied.

■NOTE: Make sure the brake lever (hand) and brake pedal (foot) are properly adjusted for this procedure.

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the red/blue wire; then connect the black tester lead to the black wire.
3. With either brake applied, the meter must show battery voltage.

■NOTE: If the meter shows no voltage, inspect bulb, fuses, wiring harness, connectors, and switches.

Ignition Timing

The ignition timing cannot be adjusted; however, verifying ignition timing can aid in troubleshooting other components. To verify engine timing, use the following procedure.

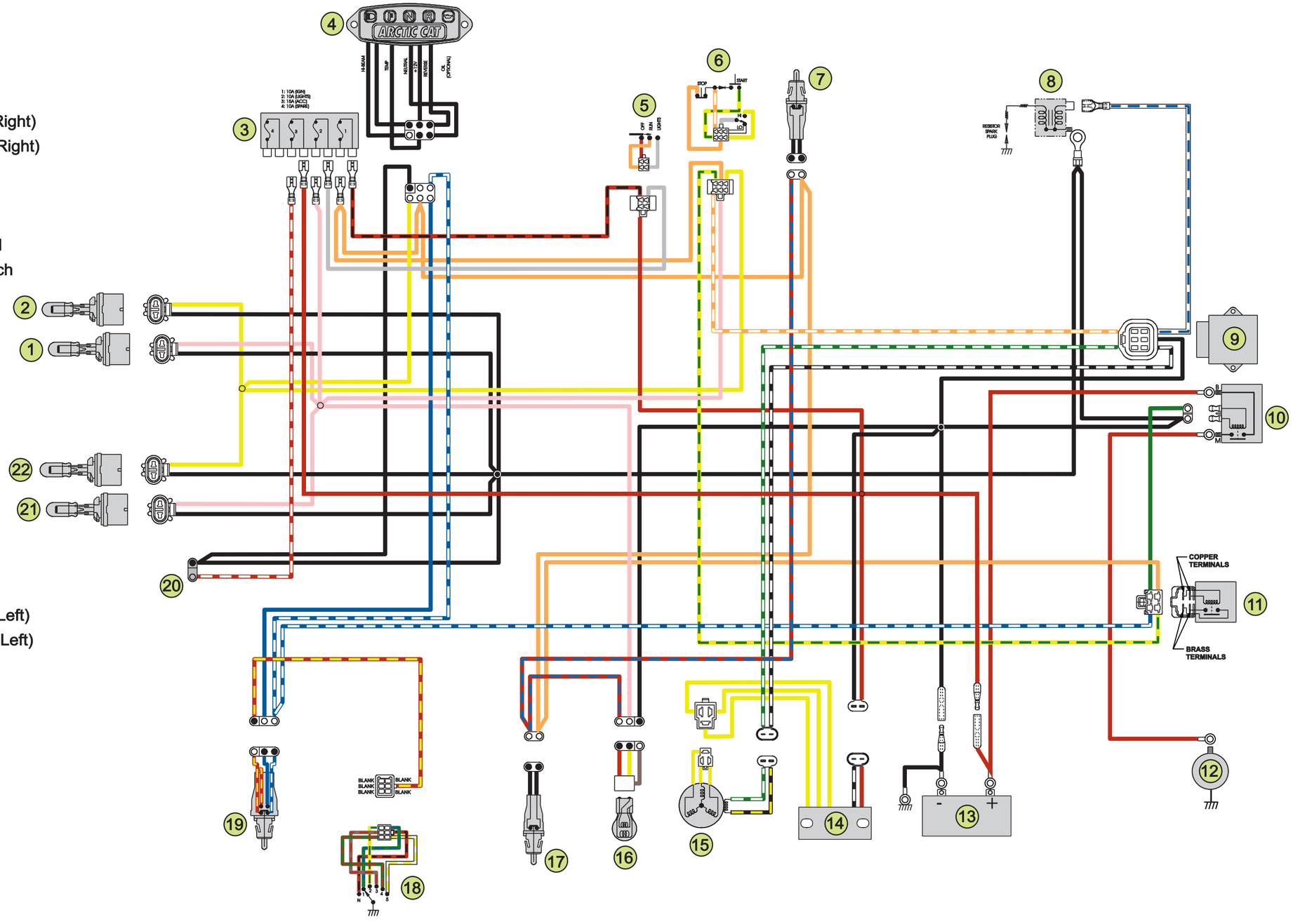
1. Attach the engine Timing Light (p/n 0644-197) to the spark plug high tension lead; then remove the timing inspection plug from the left-side crankcase cover.
2. With the Arctic Cat Engine Tachometer (p/n 0644-275) connected, start the engine and run at the specified RPM.
3. Ignition timing should be according to specifications.

Model	Timing
250	5° BTDC below 1800 RPM 35° BTDC above 3800 RPM
300	5° BTDC @ 1800 RPM 30° BTDC @ 3800 RPM
375	10° BTDC @ 3000 RPM
400/500	10° BTDC @ 1500 RPM

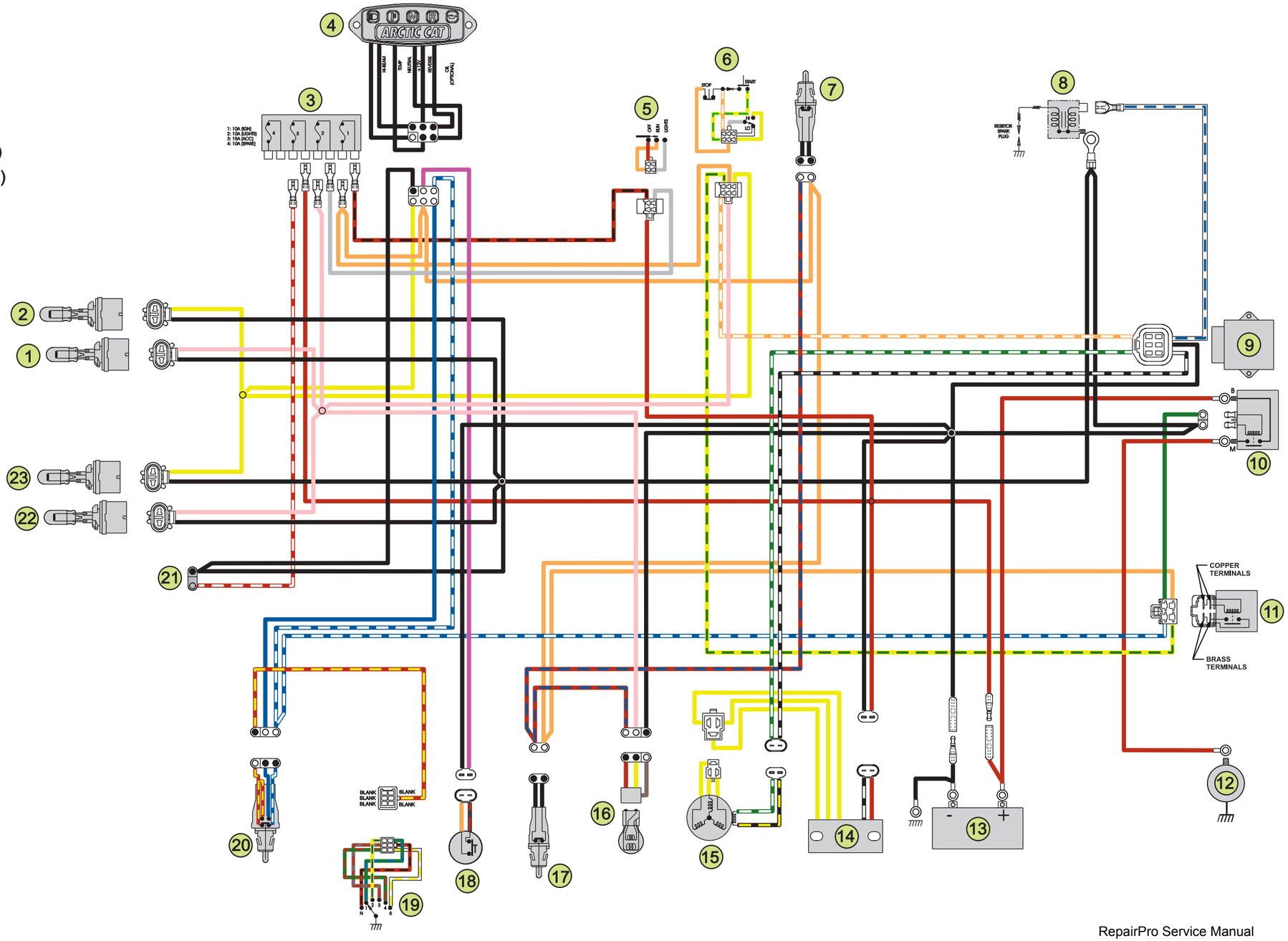
4. Install the timing inspection plug.

If ignition timing cannot be verified, the rotor may be damaged, the key may be sheared, the trigger coil bracket may be bent or damaged, or the CDI unit may be faulty.

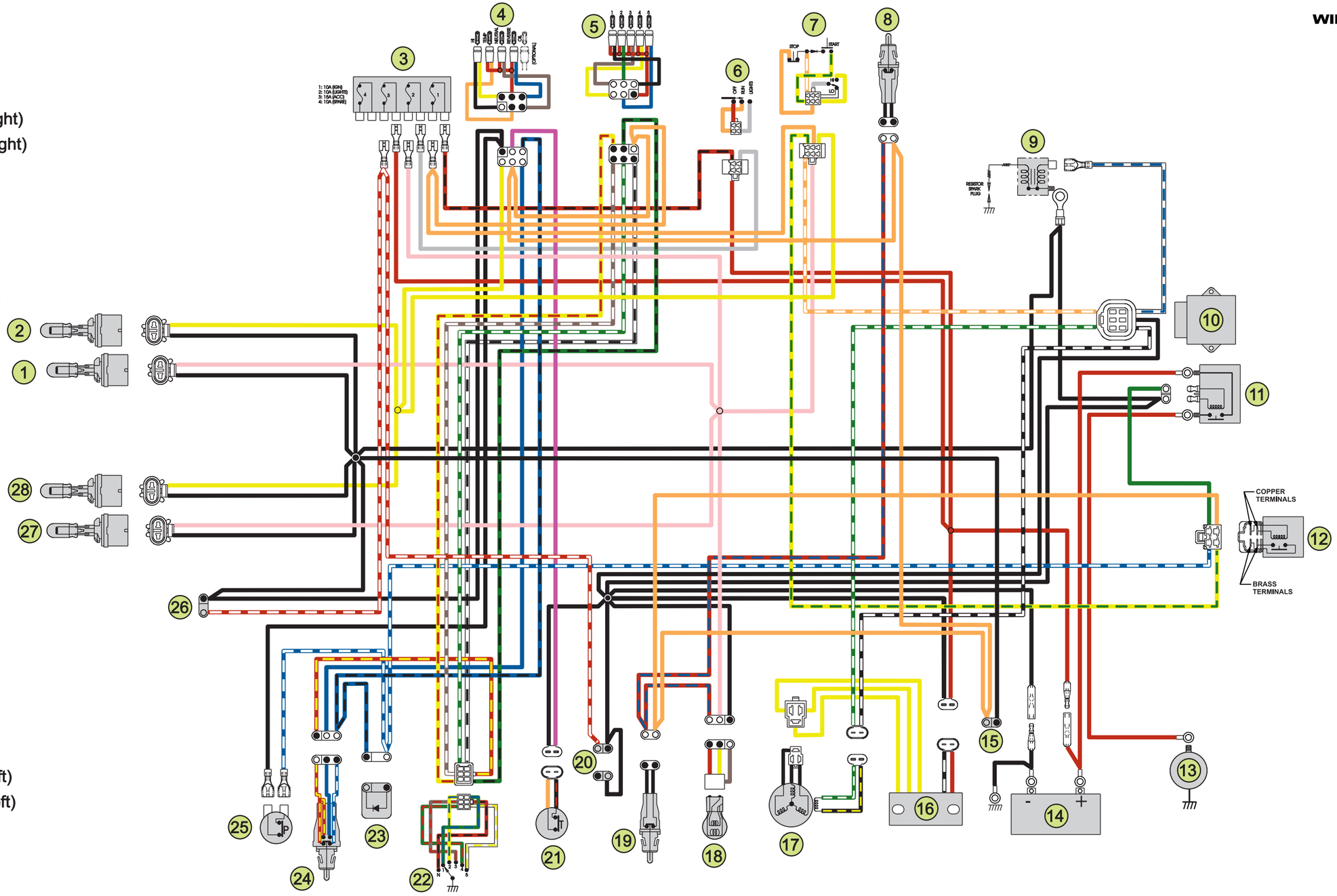
1. Low Beam Headlight (Right)
2. High Beam Headlight (Right)
3. Fuse Box
4. Indicator Lights
5. Key Switch
6. Left Handle Bar Control
7. Brake Handle Bar Switch
8. Ignition Coil
9. CDI Unit
10. Starter Relay
11. Neutral Relay
12. Starter Motor
13. 12V Battery
14. Regulator/Rectifier
15. Magneto
16. Taillight
17. Foot Brake Switch
18. Gear Switch
19. Reverse Switch
20. Accessory
21. Low Beam Headlight (Left)
22. High Beam Headlight (Left)



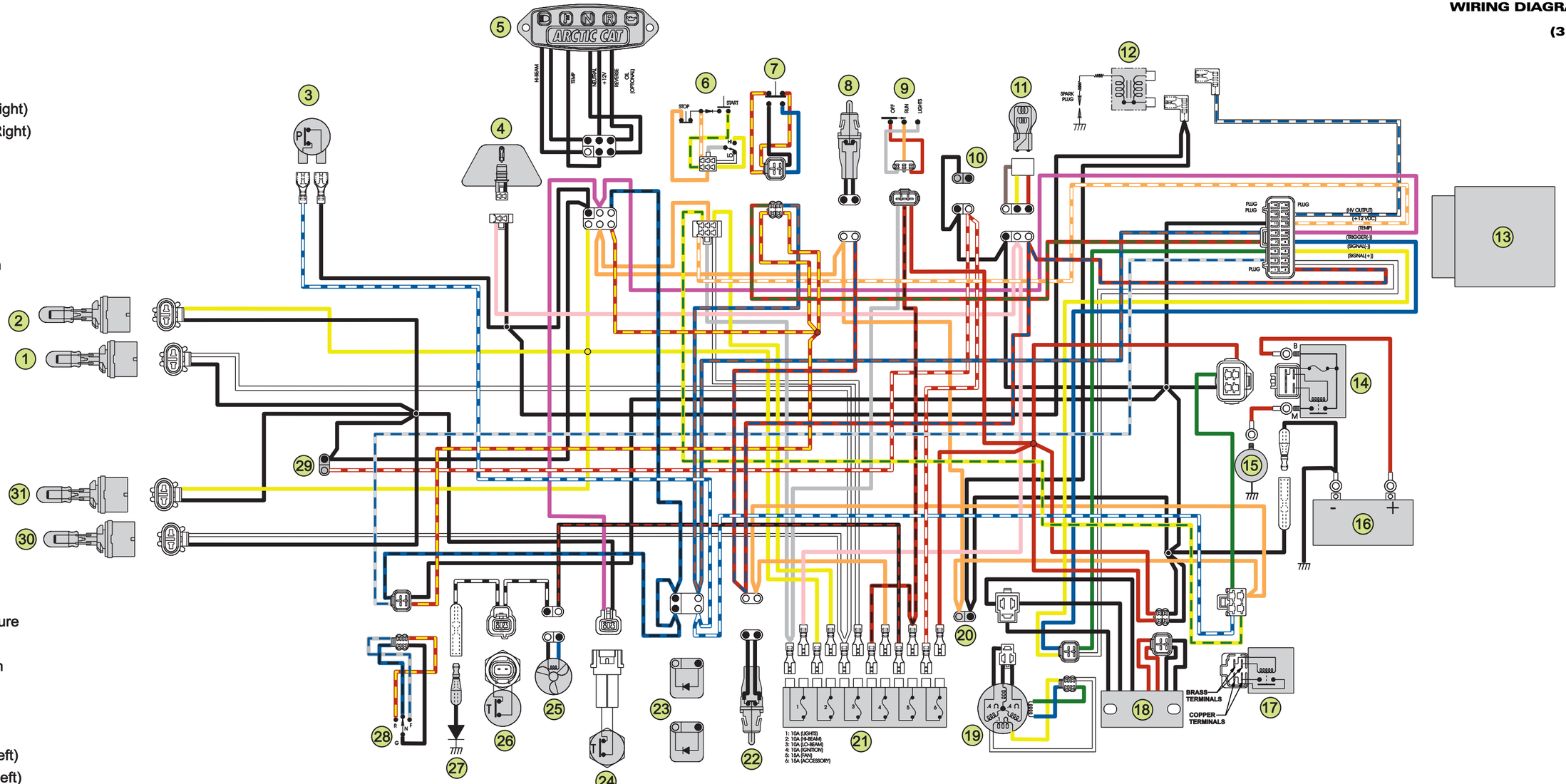
1. Low Beam Headlight (Right)
2. High Beam Headlight (Right)
3. Fuse Box
4. Indicator Lights
5. Key Switch
6. Left Handle Bar Control
7. Brake Handle Bar Switch
8. Ignition Coil
9. CDI Unit
10. Starter Relay
11. Neutral Relay
12. Starter Motor
13. 12V Battery
14. Regulator/Rectifier
15. Magneto
16. Taillight
17. Foot Brake Switch
18. Oil Temperature Switch
19. Gear Switch
20. Reverse Switch
21. Accessory
22. Low Beam Headlight (Left)
23. High Beam Headlight (Left)



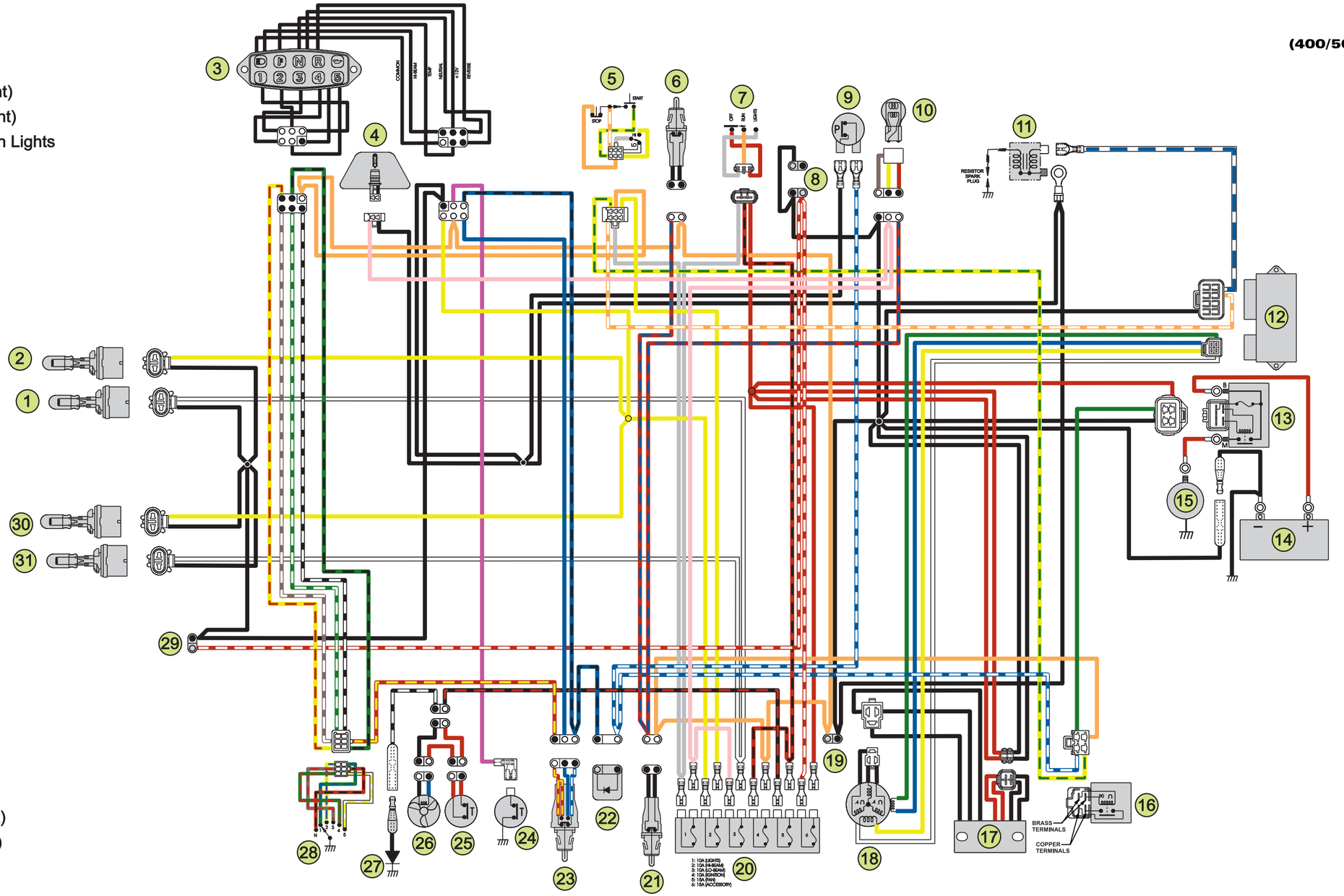
1. Low Beam Headlight (Right)
2. High Beam Headlight (Right)
3. Fuse Box
4. Indicator Lights
5. Gear Position
6. Key Switch
7. Left Handle Bar Control
8. Brake Handle Bar Switch
9. Ignition Coil
10. CDI Unit
11. Starter Relay
12. Neutral Relay
13. Starter Motor
14. 12V Battery
15. Switched Accessory
16. Regulator/Rectifier
17. Magneto
18. Taillight
19. Foot Brake Switch
20. Accessory Rear
21. Oil Temperature Switch
22. Gear Switch
23. Diode Assembly
24. Reverse Switch
25. Brake Pressure Switch
26. Accessory (Front)
27. Low Beam Headlight (Left)
28. High Beam Headlight (Left)



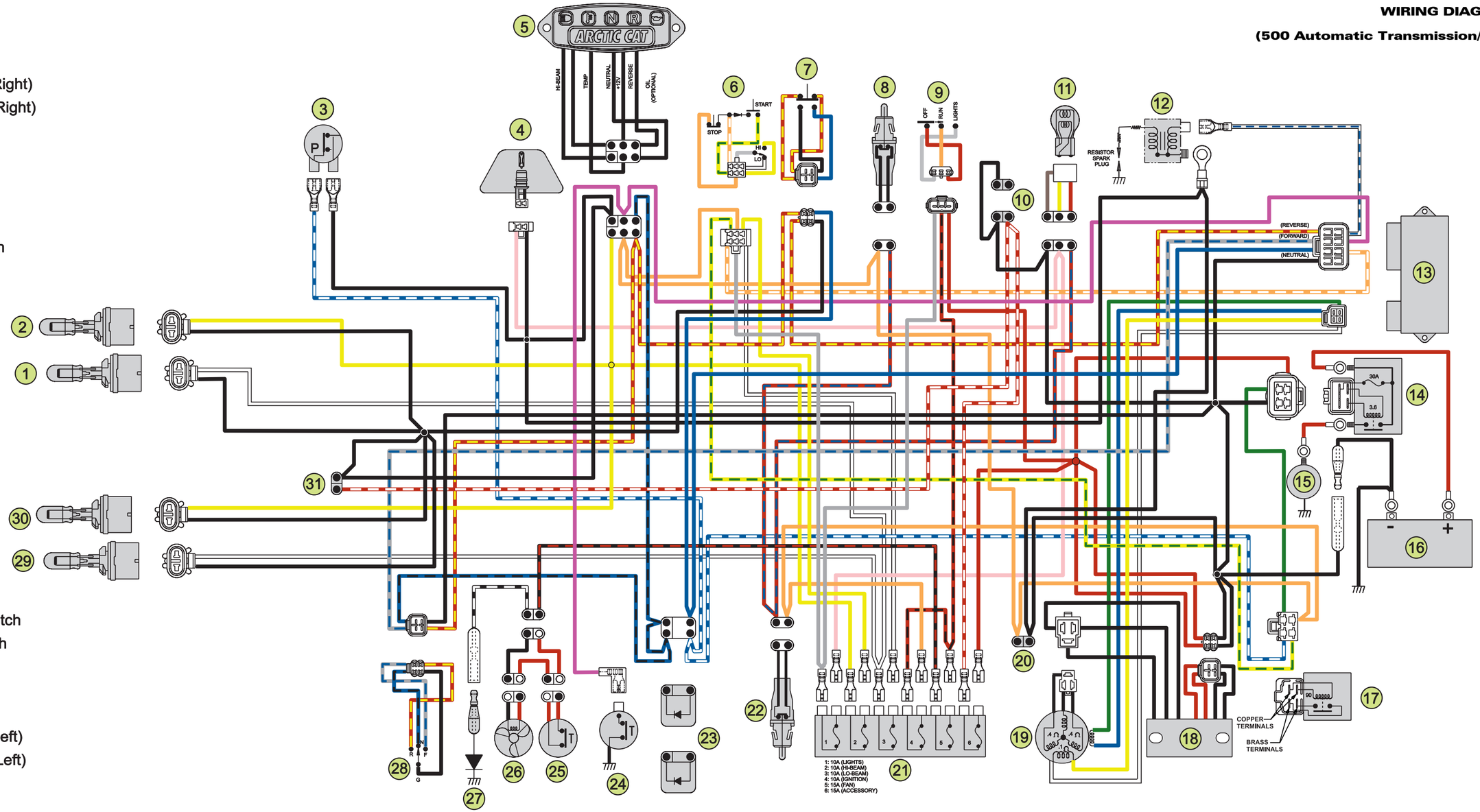
1. Low Beam Headlight (Right)
2. High Beam Headlight (Right)
3. Brake Pressure Switch
4. Speedometer
5. Indicator Lights
6. Left Handlebar Control
7. Reverse Override
8. Brake Handlebar Switch
9. Key Switch
10. Accessory (Rear)
11. Taillight
12. Ignition Coil
13. CDI Unit
14. Starter Relay
15. Starter Motor
16. 12v Battery
17. Neutral Relay
18. Regulator/Rectifier
19. Magneto
20. Switched Accessory
21. Fuse Box
22. Foot Brake Switch
23. Diode Assembly
24. Switch Light - Temperature
25. Fan Motor
26. Temperature Fan Switch
27. Fan Diode
28. Gear Switch
29. Accessory (Front)
30. Low Beam Headlight (Left)
31. High Beam Headlight (Left)



1. Low Beam Headlight (Right)
2. High Beam Headlight (Right)
3. Indicator and Gear Position Lights
4. Speedometer
5. Left Handle Bar Control
6. Brake Handle Bar Switch
7. Key Switch
8. Accessory (Rear)
9. Brake Pressure Switch
10. Taillight
11. Ignition Coil
12. CDI Unit
13. Starter Relay
14. 12V Battery
15. Starter Motor
16. Neutral Relay
17. Regulator/Rectifier
18. Magneto
19. Switched Accessory
20. Fuse Box
21. Foot Brake Switch
22. Diode Assembly
23. Reverse Switch
24. Water Temperature Switch
25. Temperature Fan Switch
26. Fan Motor
27. Fan Diode
28. Gear Switch
29. Accessory (Front)
30. High Beam Headlight (Left)
31. Low Beam Headlight (Left)



1. Low Beam Headlight (Right)
2. High Beam Headlight (Right)
3. Brake Pressure Switch
4. Speedometer
5. Indicator Lights
6. Left Handlebar Control
7. Reverse Override
8. Brake Handlebar Switch
9. Key Switch
10. Accessory (Rear)
11. Taillight
12. Ignition Coil
13. CDI Unit
14. Starter Relay
15. Starter Motor
16. 12V Battery
17. Neutral Relay
18. Regulator/Rectifier
19. Magneto
20. Switched Accessory
21. Fuse Box
22. Foot Brake Switch
23. Diode Assembly
24. Water Temperature Switch
25. Temperature Fan Switch
26. Fan Motor
27. Fan Diode
28. Gear Switch
29. Low Beam Headlight (Left)
30. High Beam Headlight (Left)
31. Accessory (Front)



SECTION 6 - DRIVE SYSTEM

6

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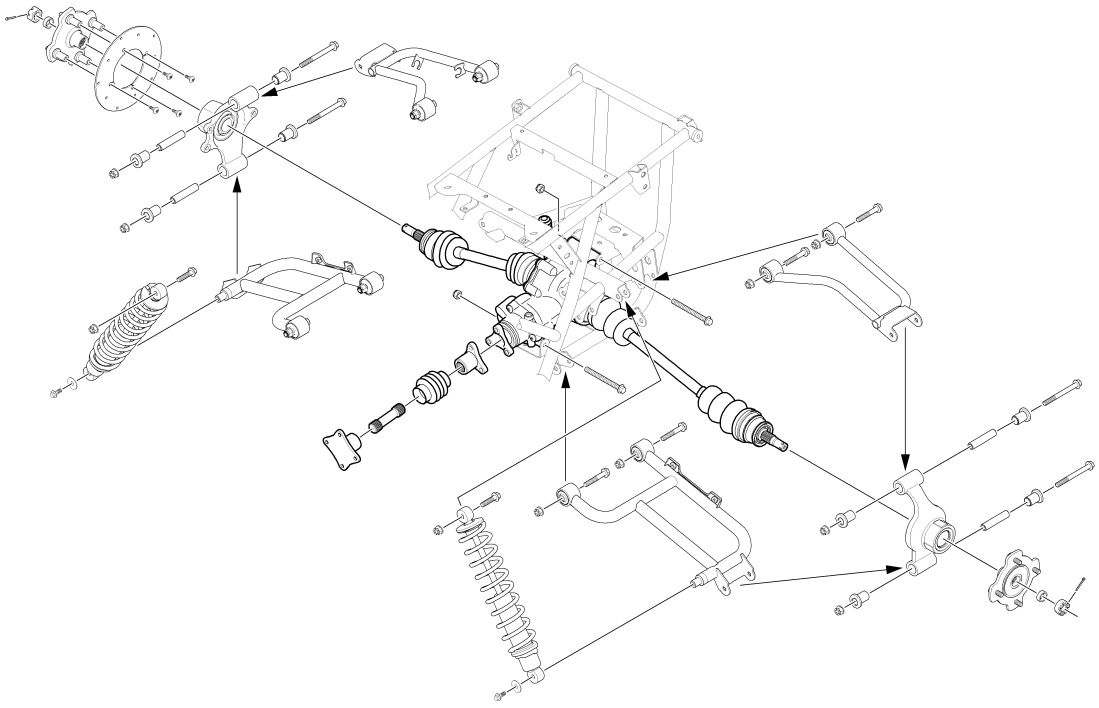
Rear Drive Axle Assembly Schematics

REAR AXLE GEAR ASSEMBLY - FULLY INDEPENDENT REAR SUSPENSION

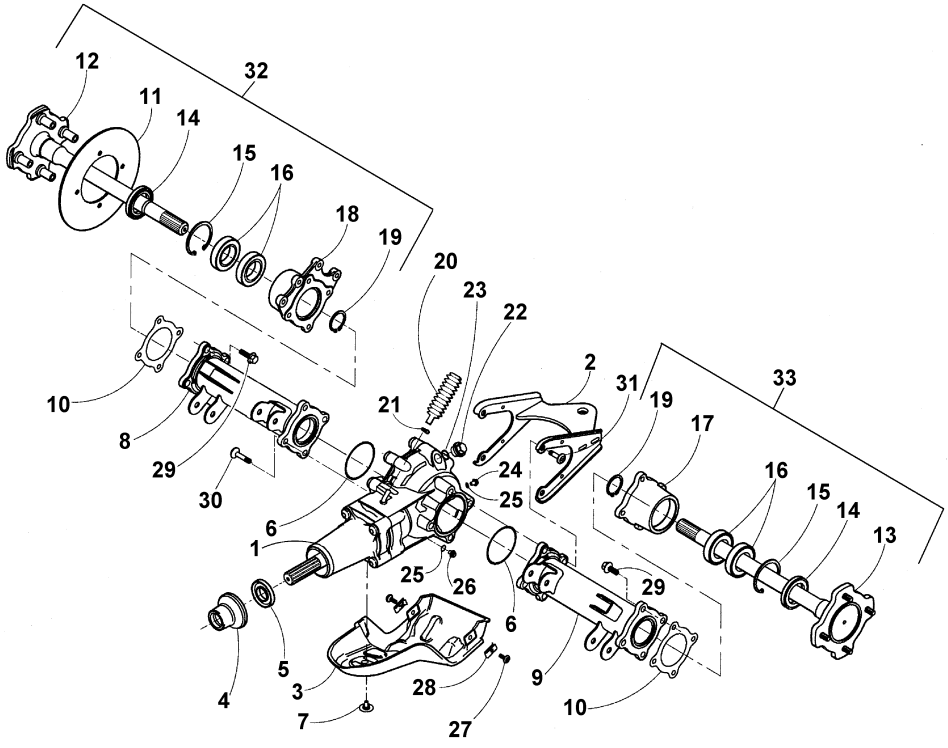


0736-860

REAR AXLE GEAR ASSEMBLY - ACT - INDEPENDENT REAR SUSPENSION

KEY

1. Gear Case Assy
2. Hitch
3. Panel (R)
4. Slinger (R)
5. Seal
6. O-Ring
7. Body Screw
8. Housing (R)
9. Housing (L)
10. Gasket
11. Brake Disc
12. Axle Assy (R)
13. Axle Assy (L)
14. Seal
15. Retaining Ring
16. Bearing
17. Housing (L)
18. Housing (R)
19. Retaining Ring
20. Bladder
21. Clamp
22. Plug
23. O-Ring
24. Drain Plug
25. O-Ring
26. Magnetic Drain Plug
27. Machine Screw
28. Speed Nut
29. Cap Screw
30. Self-Tapping Screw
31. Self-Tapping Screw
32. Axle Retainer Assy (R)
33. Axle Retainer Assy (L)



0735-675

Front Differential

REMOVING

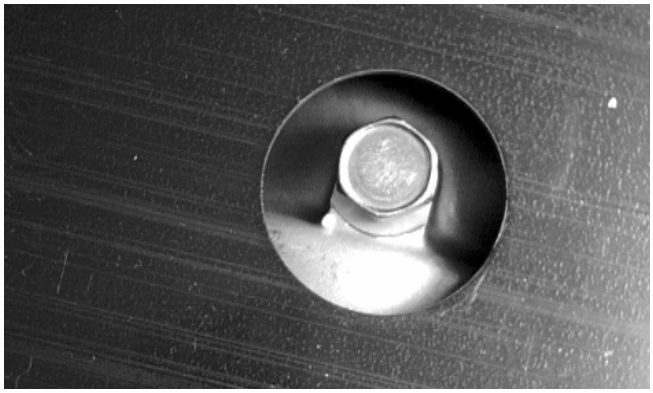
The front differential is a non-serviceable component. If it is damaged or worn, it must be replaced.

1. Secure the ATV on a support stand to elevate the wheels.

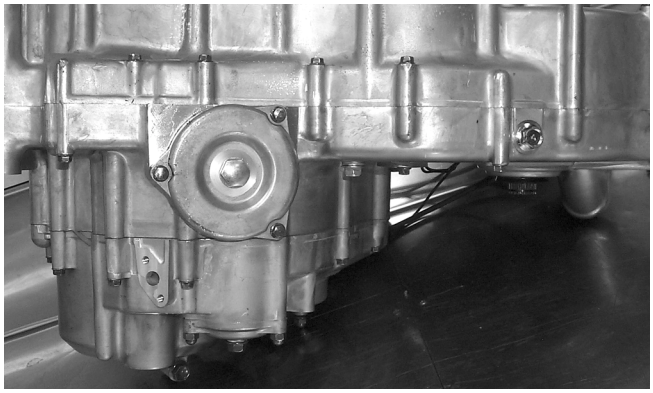
⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

2. Remove the drain plug and drain the gear lubricant into a drain pan; then reinstall the plug.

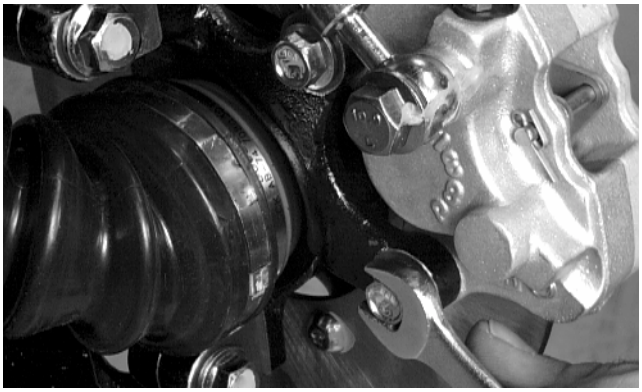


AF893D



CC527D

3. Remove the wheels.
4. Remove the brake calipers. Account for the cap screws.



AF894D

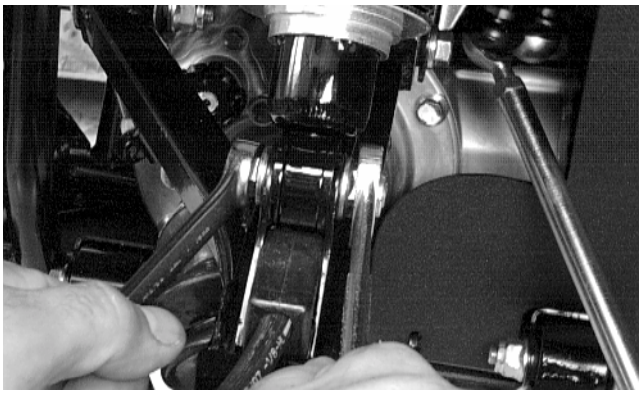
5. Remove the tie rod cotter pins.

AF895D

6. Remove the tie rod lock nuts.

AF896D

7. Remove the lower shock bolts. Account for the lock nuts.



AF897D

8. Remove the boot guards.

AF934

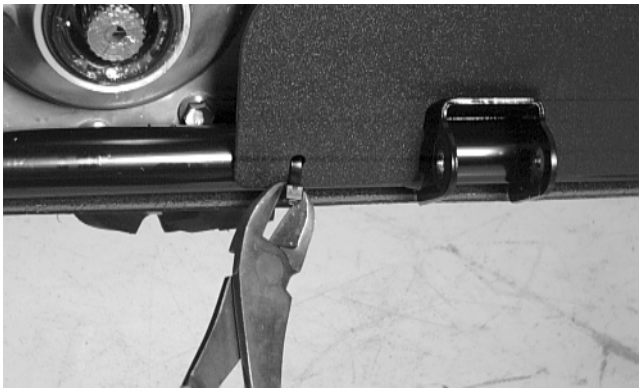
9. Remove the A-arm lock nuts and cap screws.

AF898D

10. Using a slide hammer, remove the front axles.

AF899D

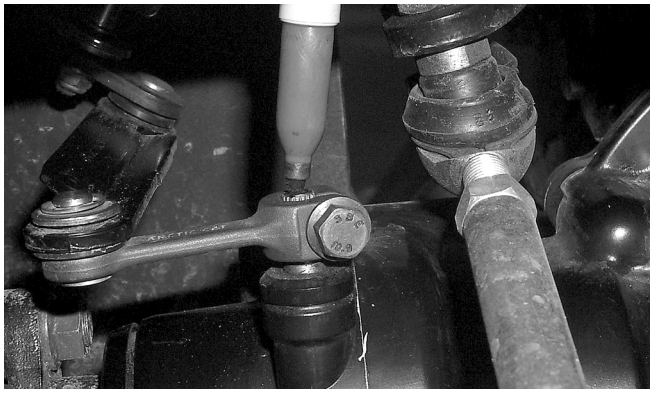
11. Remove the inner fender panels.



AF902D

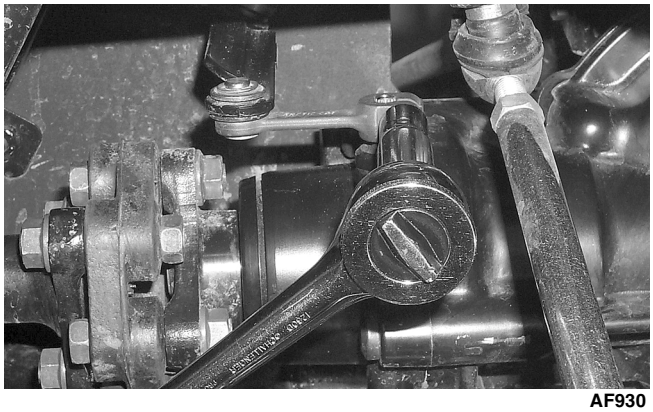
■ **NOTE: To remove the panels, there will be a torx-head screw and three cable ties per side.**

12. Mark the cam arm for assembly purposes.



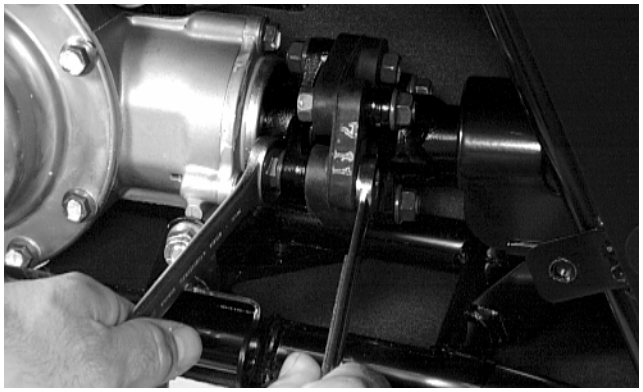
AF929

13. Remove the cam arm.



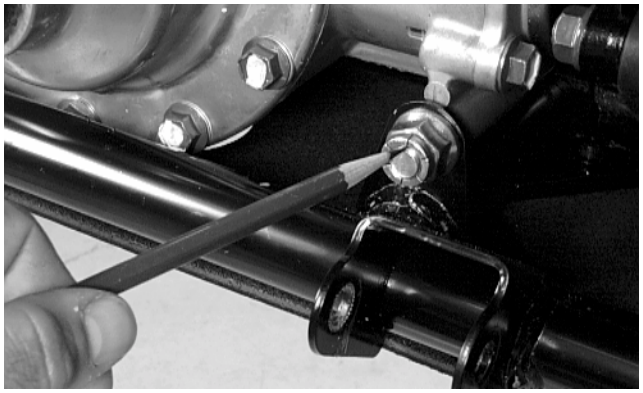
AF930

14. Remove the coupler cap screws. Account for the lock nuts.



AF903D

15. Remove the lower differential mounting cap screw. Account for a lock nut.



AF904D

16. Remove the upper differential mounting cap screws.

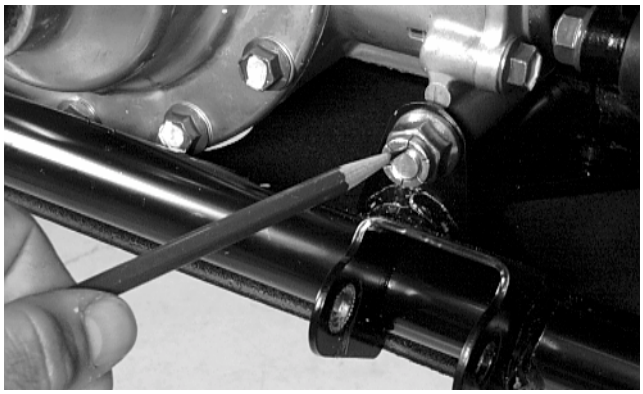
AF905D

17. Remove the differential from the frame.

INSTALLING

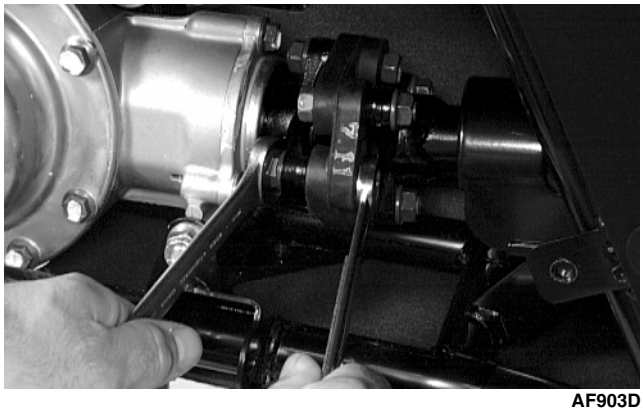
1. Place the differential into position on the frame and install the cap screws (coated with blue Loctite #243) and lock nut. Tighten to 5.5 kg-m (40 ft-lb).

AF905D



AF904D

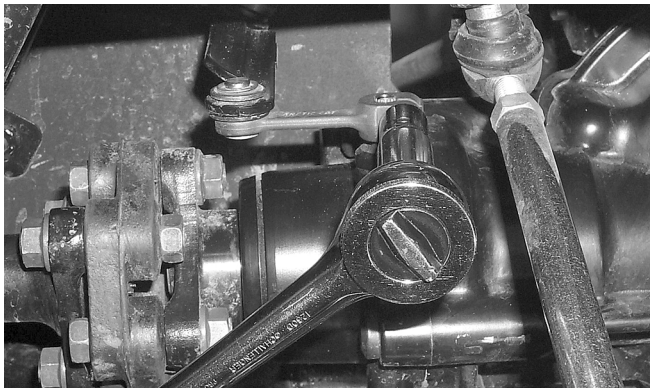
2. Secure the front driveshaft (coupler) with cap screws (coated with red Loctite #271) and lock nuts. Tighten to 5.5 kg-m (40 ft-lb).



AF903D

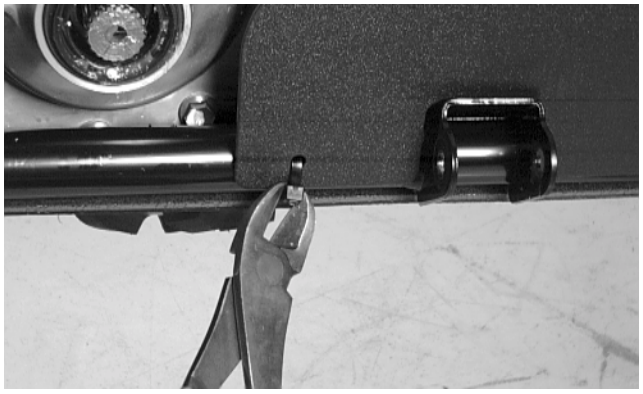
3. Pour 275 ml (9.3 fl oz) of SAE 80W-90 hypoid lubricant into the differential and install the filler plug. Tighten securely.

4. Install the cam arm making sure the marks made during removing align.



AF930

5. Install the inner fender panels.



AF902D

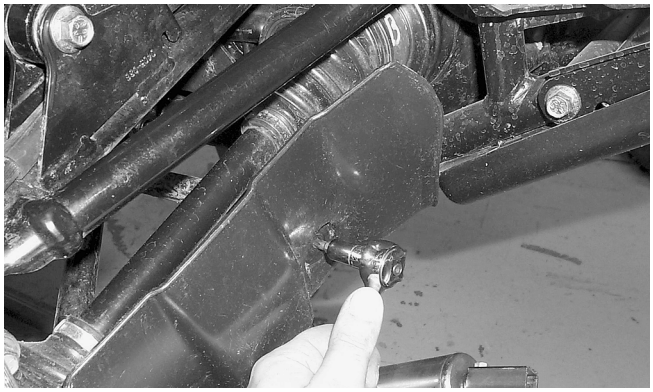
■ **NOTE: To secure the side panels, use a torx-head screw and three cable ties per side.**

6. Install the front axles.

7. Secure the A-arms with cap screws and lock nuts. Tighten to 4.8 kg-m (35 ft-lb).

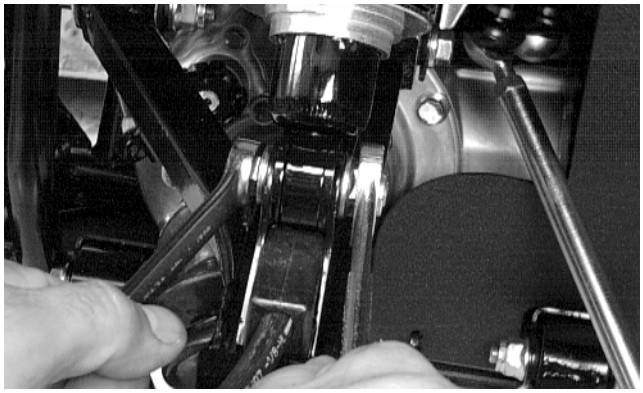
AF898D

8. Install the boot guards.



AF934

9. Secure the lower shock eyelets with cap screws and lock nuts. Tighten to 4.8 kg-m (35 ft-lb).



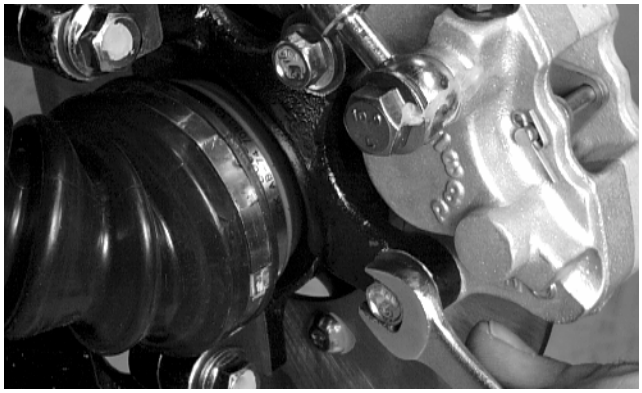
AF897D

10. Secure the tie rods with the lock nuts. Tighten securely; then install and spread the cotter pins.

AF896D

AF895D

11. Install the brake calipers. Secure with the cap screws tightened to 2.8 kg-m (20 ft-lb).



AF894D

12. Install the wheels and tighten to 5.5 kg-m (40 ft-lb).

AF611D

13. Remove the ATV from the support stand.

Drive Axles

REMOVING REAR DRIVE AXLE (Fully Independent Rear Suspension)

1. Secure the ATV on a support stand to elevate the wheels.

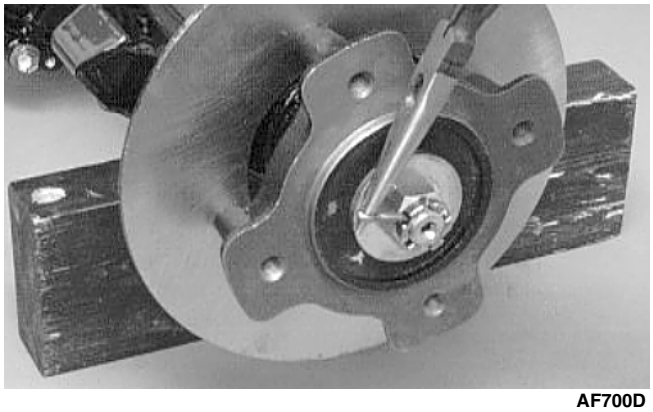
⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

2. Pump up the hand brake; then engage the brake lever lock.

3. Remove the wheel and rubber wheel cap.

4. Remove the cotter pin securing the hex nut; then remove the hex nut and washer. Release the brake lever lock.



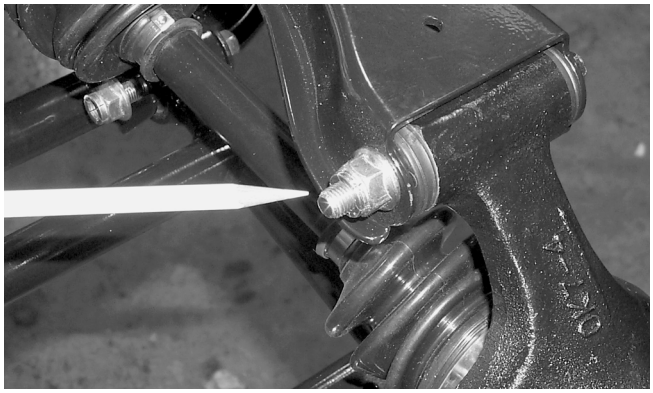
AF700D

5. Remove the two brake calipers (right side only).

■ NOTE: Do not allow the brake calipers to hang from their cable/hose.

6. Slide the hub out of the knuckle and set aside.

7. Remove the cap screw and lock nut securing the knuckle to the upper A-arm. Discard the lock nut.

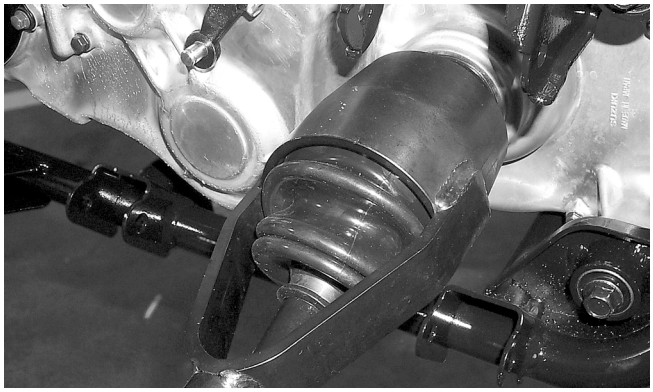


AF936

■ NOTE: Never reuse a lock nut. Once a lock nut has been removed, it must be replaced with a new lock nut.

8. While holding the drive axle stationary, pull the top of the knuckle out and down until it is free of the drive axle.

9. Place a drain pan under the ATV to contain any oil leakage; then using a slide hammer, remove the drive axle.



AF935

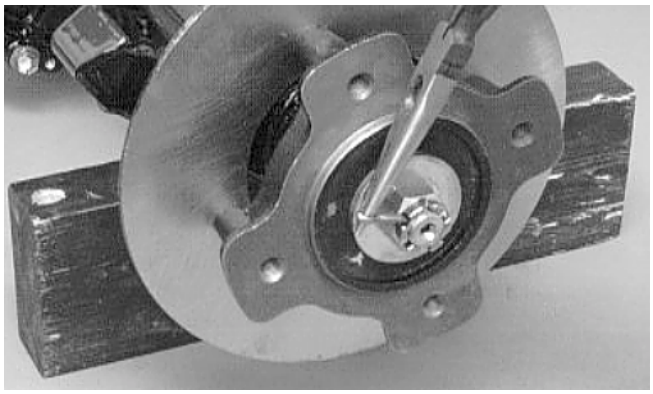
REMOVING FRONT DRIVE AXLE (4x4 Models)

1. Secure the ATV on a support stand to elevate the wheels.

⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

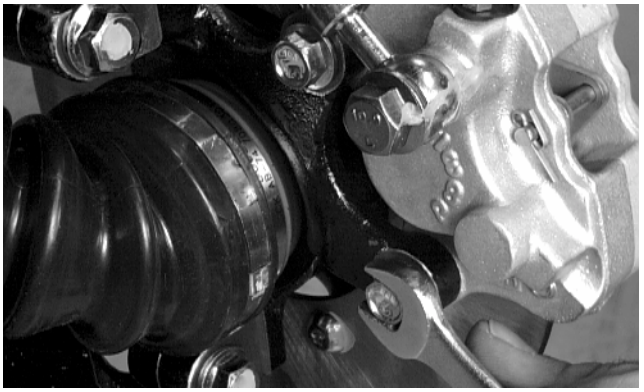
2. Pump up the hand brake; then engage the brake lever lock.
3. Remove the wheel and rubber wheel cap.
4. Remove the cotter pin securing the hex nut; then remove the hex nut and washer. Release the brake lever lock.



AF700D

5. Remove the brake caliper.

■ NOTE: Do not allow the caliper to hang from its hose.



AF894D

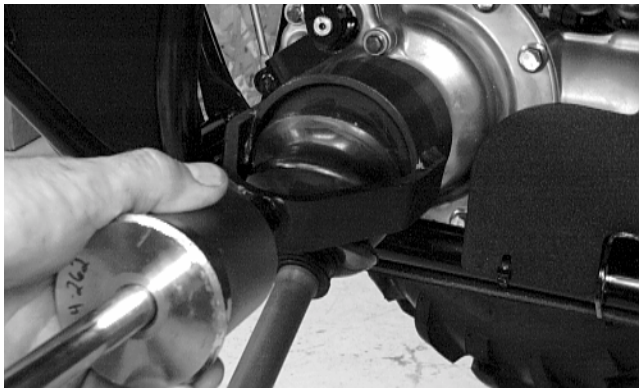
6. Slide the hub w/brake disc out of the steering knuckle and set aside.
7. Remove the tie rod from the steering knuckle.

AF896D

8. Remove the cap screw and lock nut securing the lower shock eyelet to the upper A-arm. Discard the lock nut.

■ NOTE: Never reuse a lock nut. Once a lock nut has been removed, it must be replaced with a new lock nut.

9. Remove the cap screw securing the upper A-arm ball joint to the steering knuckle; then disengage the ball joint from the knuckle.
10. While holding the drive axle stationary, pull the top of the steering knuckle out and down until it is free of the drive axle.
11. Place a drain pan under the ATV to contain any oil leakage; then using a slide hammer, remove the drive axle.



AF899D

CLEANING AND INSPECTING

■ NOTE: Always clean and inspect the drive axle components to determine if any service or replacement is necessary.

1. Using a clean towel, wipe away any oil or grease from the axle components.

AF883D

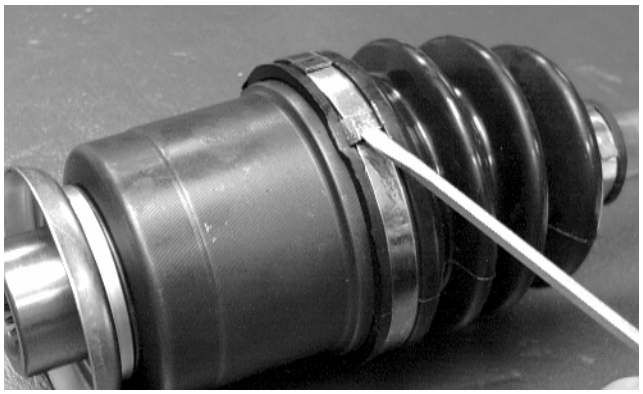
2. Inspect boots for any tears, cracks, or deterioration.

■ NOTE: If a boot is damaged in any way, it must be replaced with a boot kit.

3. Inspect clamps for looseness or damage; replace as necessary.

DISASSEMBLING

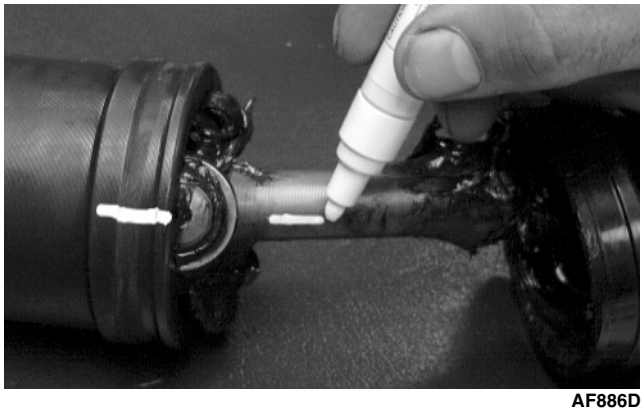
1. Loosen the large clamp and slide it off the boot.



AF884D

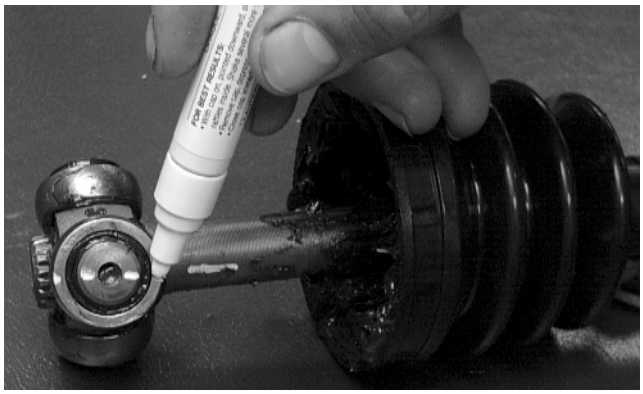
2. Wipe away excess grease to access the retaining ring. Using an awl or circlip pliers, remove the circlip; then mark the housing to the bearing ring.

AF885D



AF886D

3. Mark the bearing ring to the shaft.



AF887D

4. Using a snap ring pliers, remove the circlip securing the bearing ring to the shaft.

AF888D

5. Note the difference inside each bearing ring end for assembly purposes; then remove the bearing ring.

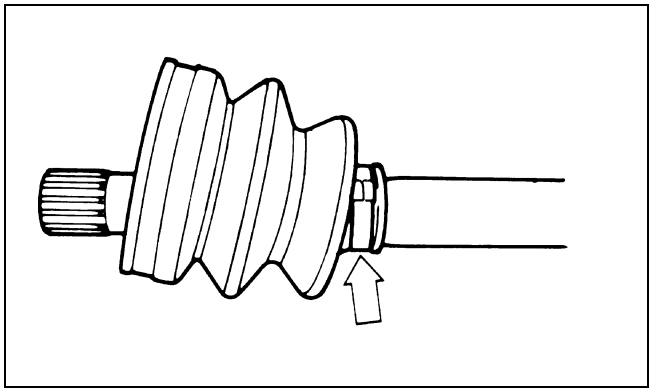
■ **NOTE: The end without splines must face inward.**

AF890D

6. Inspect the splines of the shaft, the bearing ring, and the housing for damage.

■ **NOTE: If any damage is apparent to the splines, the bearing ring, and/or the housing, the drive axle must be replaced as an assembly.**

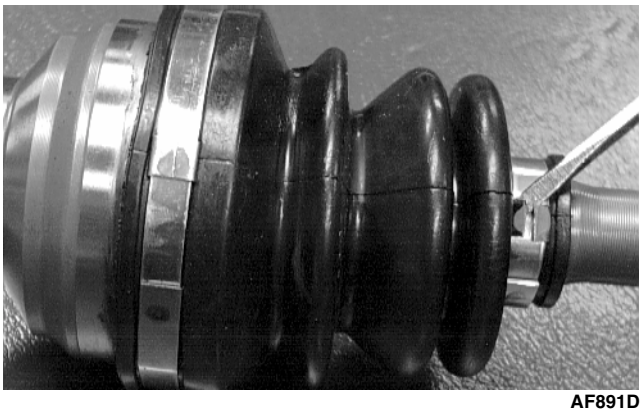
7. Loosen the small clamp and slide the clamp and boot off the shaft.



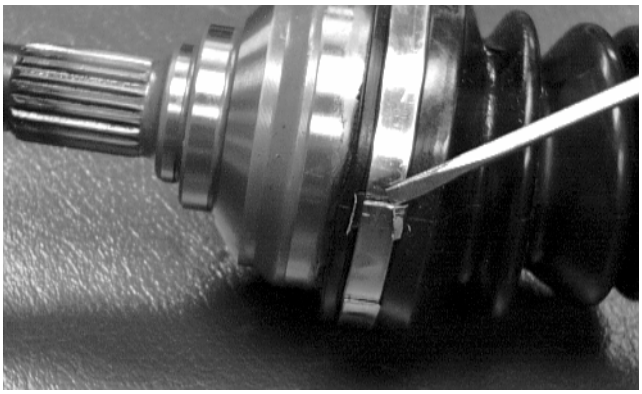
ATV-1048

■ **NOTE: At this point if the outer boot is damaged, continue with step 8.**

8. Loosen both outer boot clamps and slide the outer boot off the shaft. Note the position of the different-sized clamps for installation purposes.



AF891D



AF892D

9. Apply grease from the kit into the knuckles and the new outer boot.

■ **NOTE: The large grease pack is for the inner drive axle bearing and boot assembly.**

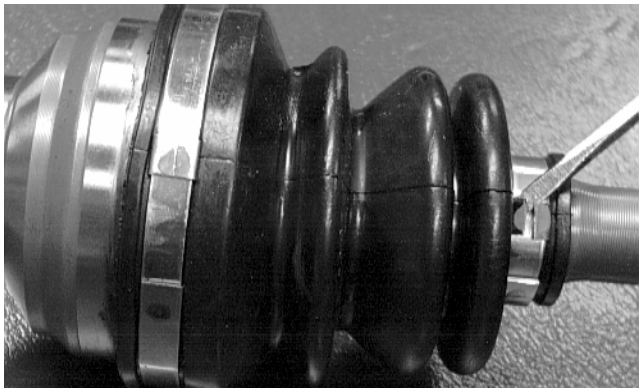
10. Slide the new outer boot onto the shaft with the new clamps positioned as shown. Note the different-sized clamps from removal.

■ **NOTE: The boot is positioned correctly when the small end of the boot seats down into the recessed groove.**

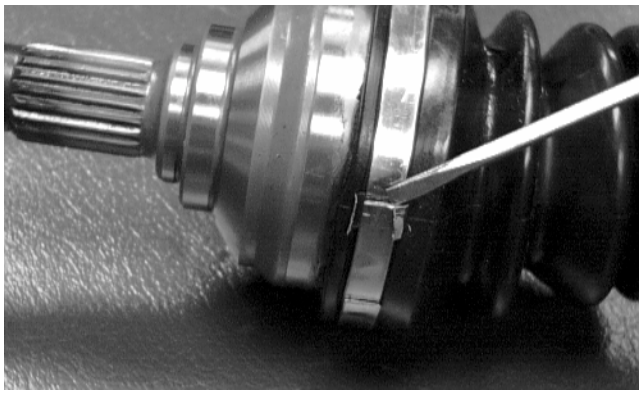
11. Secure both outer boot clamps.

⚠ CAUTION

It is important that the clamps are positioned correctly or they may loosen when in motion.



AF891D



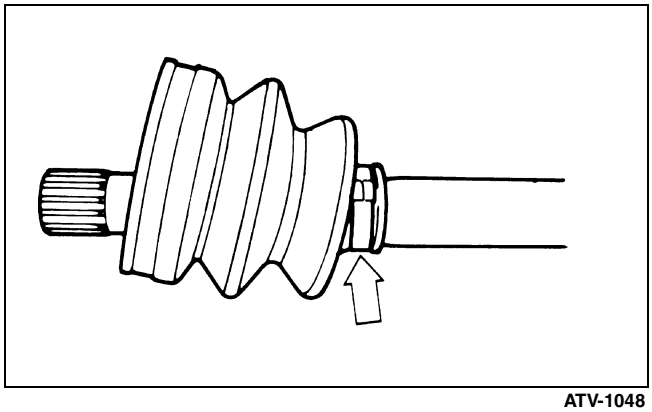
AF892D

ASSEMBLING

1. Install the inner boot with the small clamp making sure the ends of the clamps are positioned correctly.

■ NOTE: The boot is positioned correctly when the small end of the boot seats down into the recessed groove.

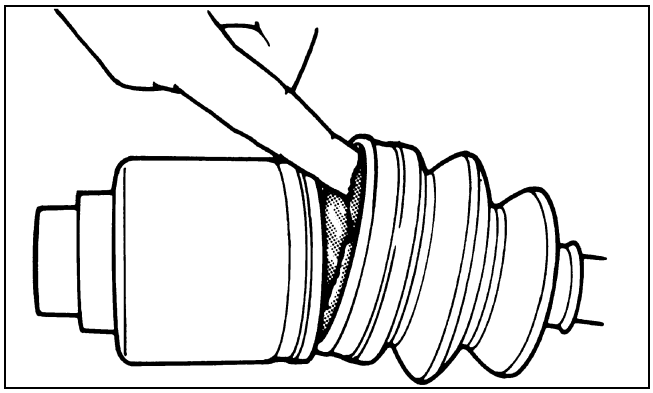
2. Secure the small clamp of the inner boot.



ATV-1048

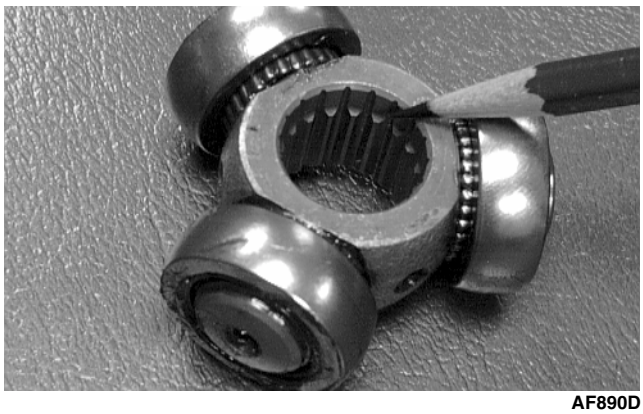
3. Apply grease from the kit onto the bearing ring making sure grease is on both the inner and outer sides; then apply the remainder of the grease into the housing and boot.

■ NOTE: The large grease pack is for the inner drive axle bearing and boot assembly.



ATV-1052

4. Install the bearing onto the shaft making sure the side without splines goes onto the shaft first.



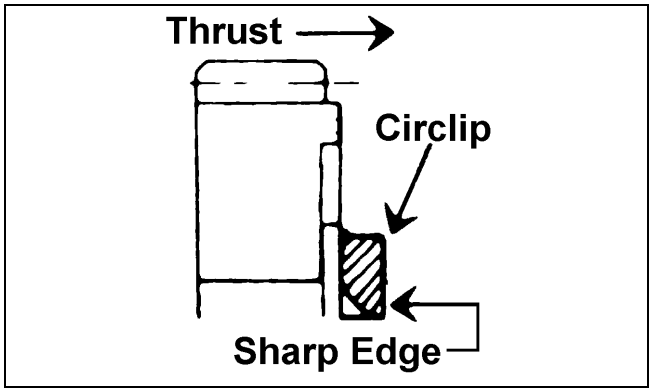
AF890D

⚠ CAUTION

The bearing ring must go onto the shaft with the side without splines facing toward the small clamp of the inner boot or severe damage will result.

5. Secure the bearing ring with the circlip making sure the sharp side of the circlip faces away from the boot.

AF888D

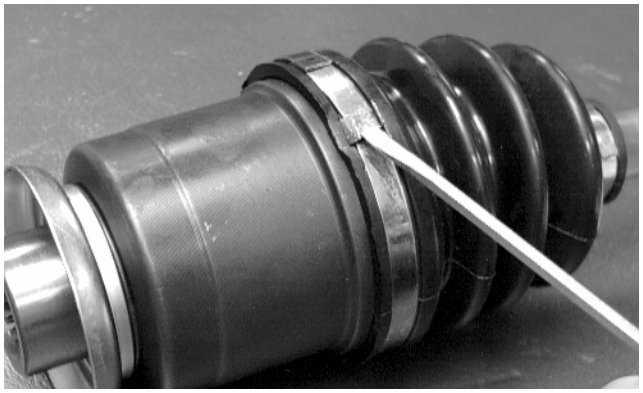


ATV1073A

6. Making sure the marks made during disassembly align, slide the housing over the bearing ring; then install the circlip.

AF885D

7. Slide the boot over the housing and secure the boot with the clamp.


AF884D

8. Inspect the axle components for correct positioning of the four clamps. Also, inspect the boots for being correctly positioned on the shaft.

INSTALLING REAR DRIVE AXLE (Fully Independent Rear Suspension)

1. Slide the drive axle into place in the engine.

2. Swing the knuckle up and onto the drive axle; then place the knuckle into place in the upper A-arm. Secure the knuckle to the A-arm with a cap screw and a new lock nut. Tighten to 4.8 kg-m (35 ft-lb).

3. Place the hub into position on the axle followed by a washer and hex nut. Tighten the hex nut finger-tight at this time.

4. If the brake calipers were removed, position them on the knuckle and secure with existing cap screws. Tighten the mechanical caliper cap screws to 2.1 kg-m (15 ft-lb). Tighten the hydraulic caliper cap screws to 2.8 kg-m (20 ft-lb).

5. Pump up the hand brake; then engage the brake lever lock.

6. Tighten the hex nut (from step 3) to 10.4 kg-m (75 ft-lb).

7. Install the wheel. Tighten to 5.5 kg-m (40 ft-lb).

8. Remove the ATV from the support stand and release the brake lever lock.

9. Check the engine/transmission oil level and add oil as necessary.

INSTALLING FRONT DRIVE AXLE (4x4 Models)

1. Position the drive axle in the engine and steering knuckle; then insert the upper A-arm ball joint into the steering knuckle. Secure with a cap screw tightened to 4.8 kg-m (35 ft-lb).

2. Place the brake hose into position on the upper A-arm; then secure the lower shock eyelet to the A-arm with a cap screw and a new lock nut. Tighten to 4.8 kg-m (35 ft-lb).

3. Secure the tie rod to the steering knuckle with a new lock nut. Tighten securely; then install and spread a new cotter pin.

4. Slide the hub w/brake disc into position in the steering knuckle followed by a washer and hex nut. Tighten finger-tight at this time.

5. Install the brake caliper on the steering knuckle. Tighten to 2.8 kg-m (20 ft-lb); then pump up the hand brake and engage the brake lever lock.

6. Tighten the hub hex nut (from step 4) to 10.4 kg-m (75 ft-lb); then install and spread a new cotter pin.

7. Install the wheel and tighten to 5.5 kg-m (40 ft-lb).

8. Remove the ATV from the support stand and release the brake lever lock.

9. Check the front differential oil level and add oil as necessary.

ACT - Independent Rear Suspension
(Including TBX Model)

REMOVING

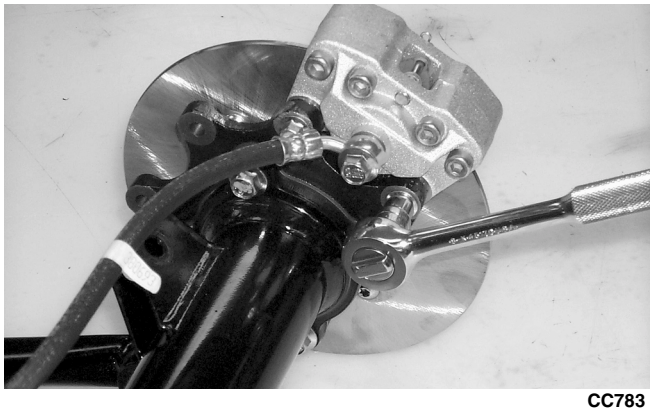
1. Place the ATV on a support stand (positioned just in front of and behind the footrest on each side) so the wheels are off the floor.

⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

2. Remove the rear wheels.

3. Remove the cap screws securing the brake calipers to the bearing housing; then remove the calipers and lay aside.



CC783

⚠ CAUTION

Care should be taken not to damage the brake cable/hose when laying the calipers aside. Do not allow the calipers to hang from the brake cable/hose.

4. Remove the lower shock absorber cap screws and hex nuts; then disengage the shock absorbers from the axle housings.

■ NOTE: The TBX model has a single shock absorber mounted to the swing arm.

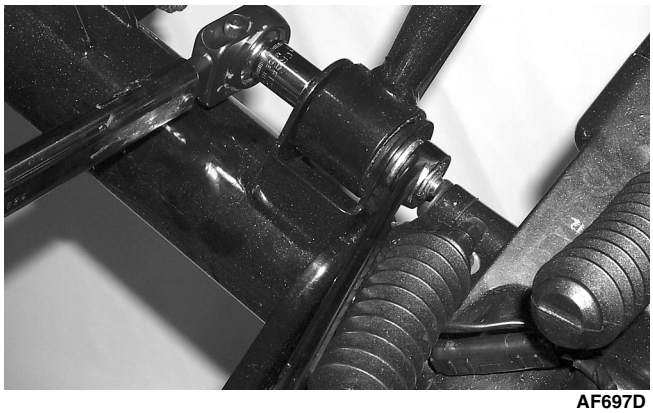
⚠ CAUTION

Ensure that the rear gear case is properly supported BEFORE removing the shock absorber assembly/assemblies.

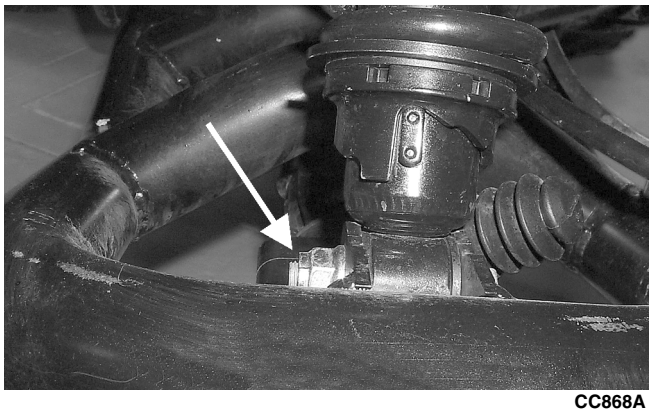
AF772D

5A. Remove the four cap screws and nuts securing the rear of the swing arm(s) to the axle housing.

5B. For the TBX model, refer to illustration CC868A.



AF697D



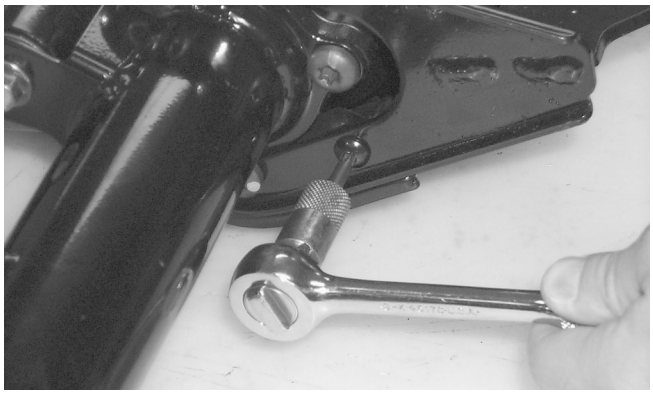
CC868A

6A. Maneuver the axle assembly rearward allowing the propeller shaft to disengage and the final drive boot to separate from the drive housing.

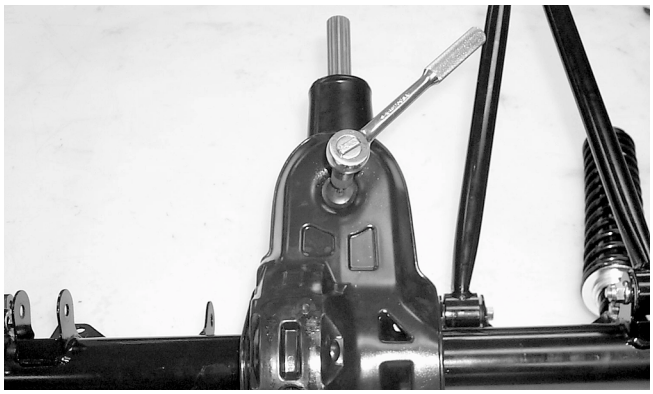
6B. For the TBX model, remove the three cap screws securing the rear gear case U-joint to the driveshaft.

DISASSEMBLING

1. Remove the cap screws securing the gear case panel; then remove the panel from the gear case.

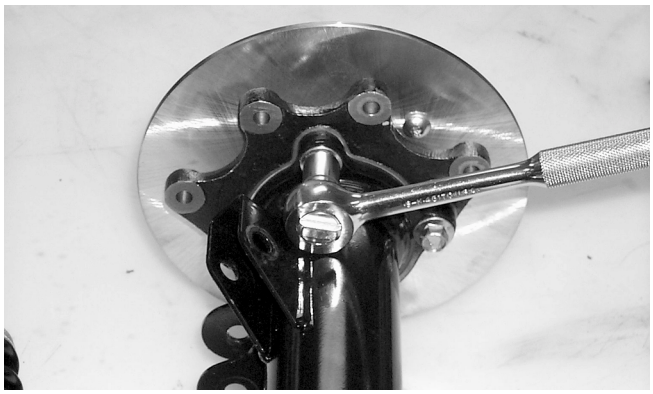


CC762

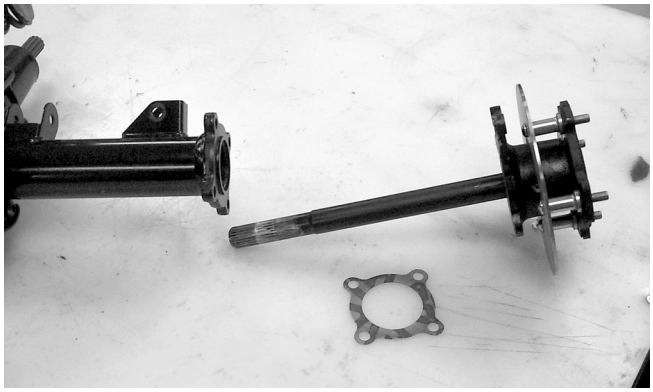


CC763

2. Remove the cap screws securing the axle assembly to the axle housing; then remove the axle assembly from the housing. Account for a gasket.

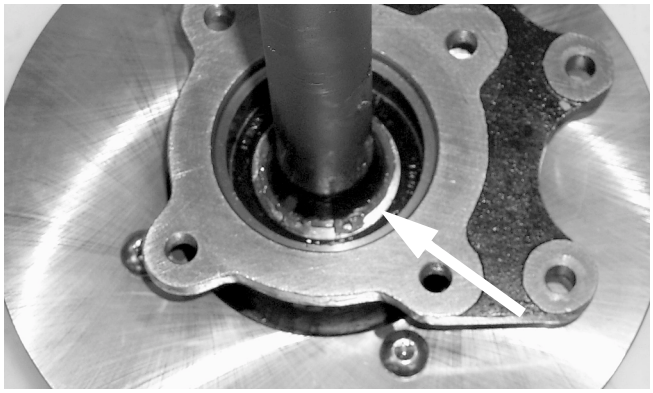


CC764



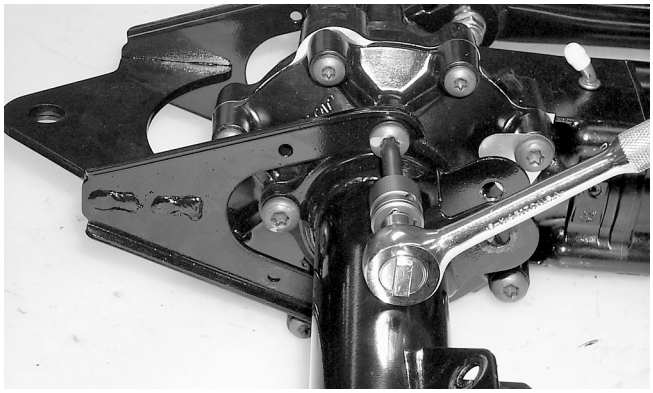
CC765

3. Remove the snap ring securing the bearing housing to the axle shaft; then slide the bearing housing off the shaft.



CC768A

4. Remove the four cap screws securing the hitch to the gear case; then remove the hitch.

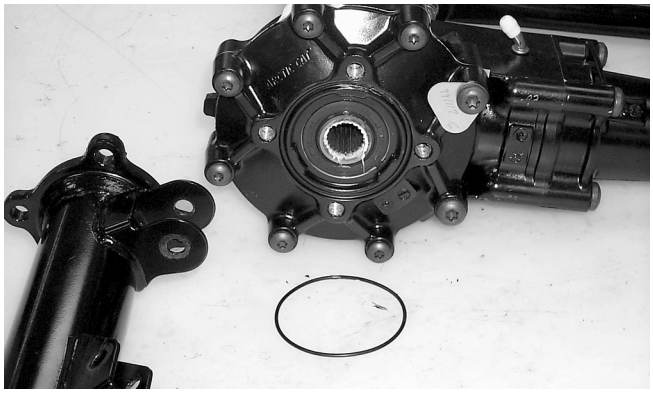


CC769

5. Remove the two cap screws securing the axle housing to the gear case.

CC770

6. Remove the axle housing from the gear case. Account for a gasket.



CC771

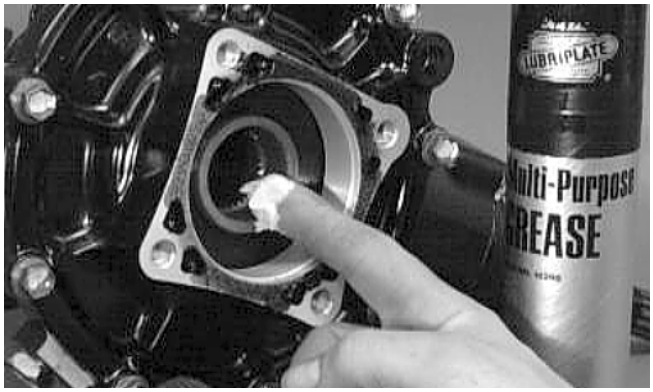
CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean all external components with parts-cleaning solvent.
2. Inspect the case for leaks or damage.
3. Inspect splines for wear.
4. Inspect the seal for damage.
5. Inspect housing mounting bosses for wear or elongated holes.
6. Inspect the frame welds for cracking or bending.
7. Inspect the rear drive and plug threads for stripping or damage.
8. Inspect the axle bearings. Rotate the bearings by hand, and if any roughness or binding is noted, replace the bearings.

ASSEMBLING

1. Grease the splines of the axle housing.



AF705D

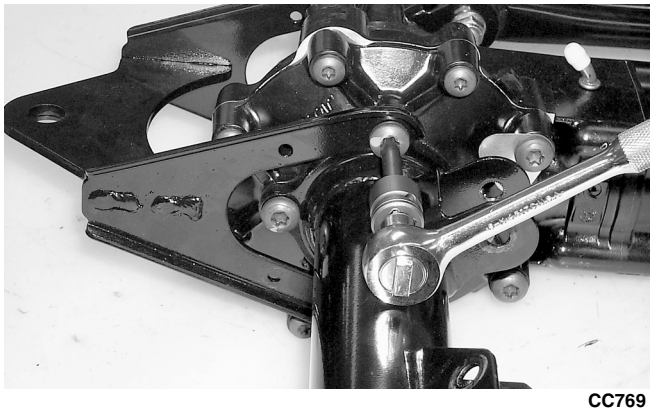
2. Make sure the rear gear case/axle housing seal is properly positioned; then secure the axle housing to the rear gear case with two cap screws. Tighten to 4.8 kg-m (35 ft-lb).

■ **NOTE: If a new rear gear case is being installed, tighten the cap screws to 5.5 kg-m (40 ft-lb).**

CC770

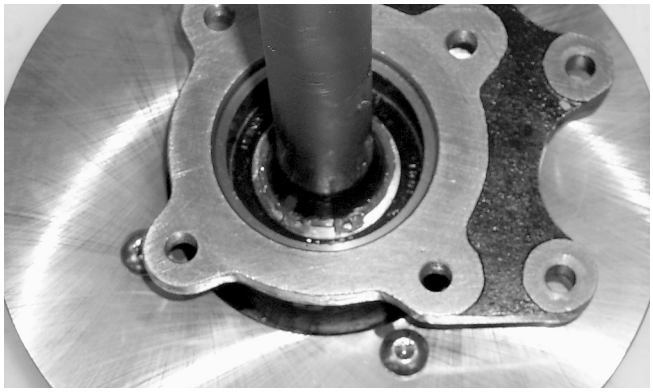
3. Secure the axle housing to the rear gear case with four cap screws. Tighten to 4.8 kg-m (35 ft-lb).

■ **NOTE: If a new rear gear case is being installed, tighten the cap screws to 5.5 kg-m (40 ft-lb).**



CC769

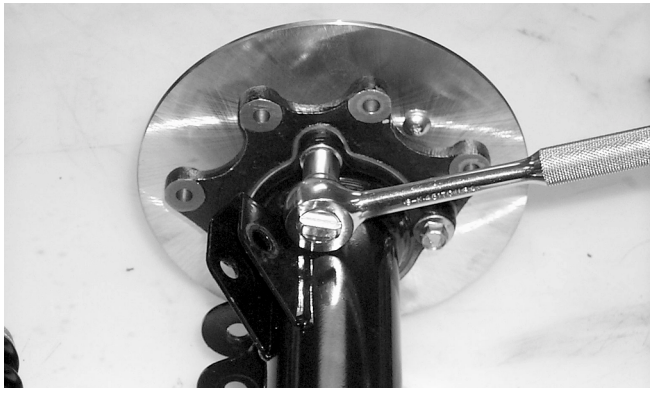
4. Lightly grease the bearing housing seal; then slide the bearing housing onto the axle shaft. Secure with the snap ring.



CC768

5. Place the axle gasket on the axle housing. Rotate the axle shaft slightly to ensure proper engagement with the gear case splines.

6. Rotate the bearing housing until the brake caliper mounting holes are on the top side; then secure the axle retainer assembly/axle assembly to the axle housing with four cap screws. Tighten to 5.5 kg-m (40 ft-lb).



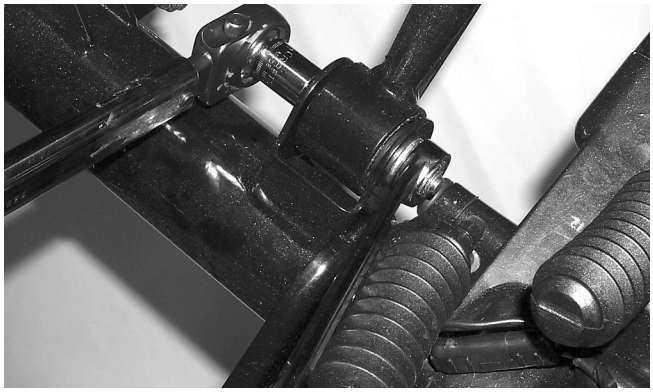
CC764

INSTALLING

1A. Maneuver the axle assembly forward making sure propeller shaft splines engage properly and the final drive boot is positioned over the drive housing.

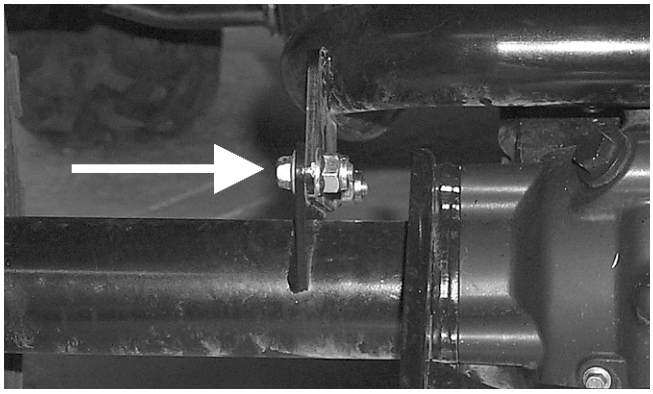
1B. For the TBX model, maneuver the axle assembly forward and secure the rear gear case U-joint to the driveshaft with cap screws coated with red Loctite #271. Tighten to 5.5 kg-m (40 ft-lb).

2A. Place the rear of the swing arm(s) into position on the axle housings and case; then secure with four cap screws and hex nuts. Tighten to 4.8 kg-m (35 ft-lb).



AF697D

2B. For the TBX model, refer to illustration CC867A.



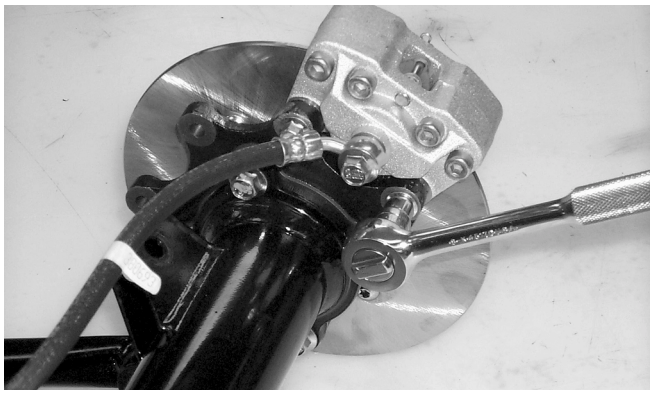
CC867A

3. Place the shock absorber into the frame mounts and secure using the cap screws and hex nuts tightened to 4.8 kg-m (35 ft-lb).

⚠ CAUTION

Do not tighten nuts beyond the 4.8 kg-m (35 ft-lb) specification or the shock eyelet or mount WILL be damaged.

4. Place the brake calipers into position on the axle retainer assembly; then secure with the cap screws. Tighten the mechanical caliper to 2.1 kg-m (15 ft-lb) and the hydraulic caliper to 2.8 kg-m (20 ft-lb).

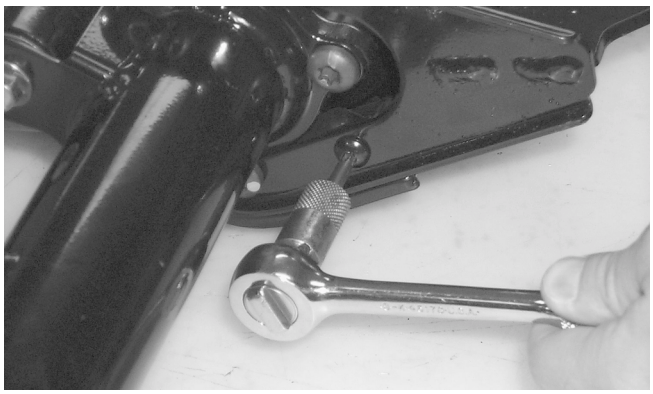


CC783

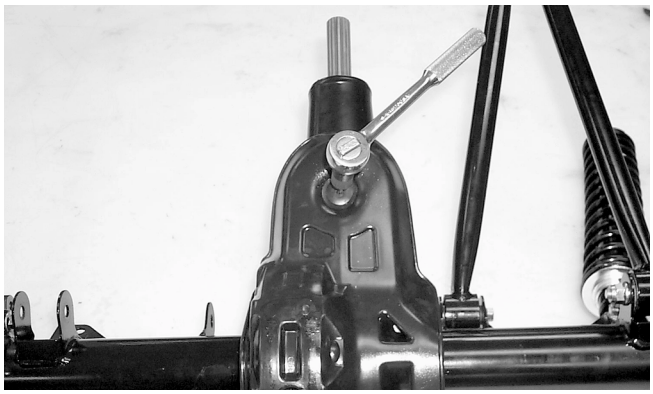
⚠ CAUTION

Care should be taken not to damage or kink the brake cable/hose when installing the calipers.

5. Place the gear case panel into position and secure with the three cap screws. Tighten securely.



CC762



CC763

6. Install the wheels and tighten to 5.5 kg-m (40 ft-lb).

7. Remove the ATV from the support stand.

■ NOTE: Check all fasteners for tightness and check the brakes for proper operation before test riding.

Rear Gear Case
(400 Models)

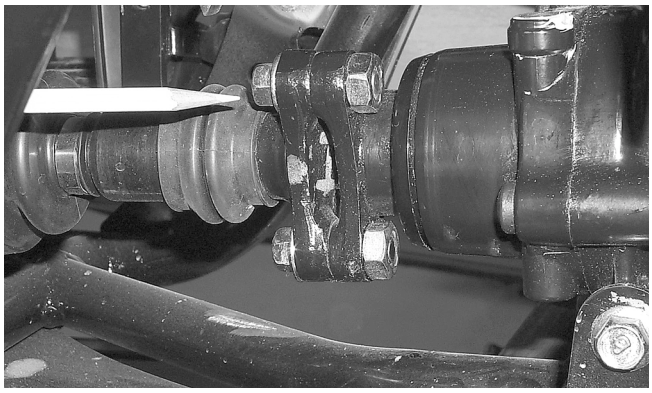
The rear gear case is a non-serviceable component. If it is damaged or worn, it must be replaced.

REMOVING

1. Remove the left-side rear A-arms (see Rear A-Arms in Section 7).

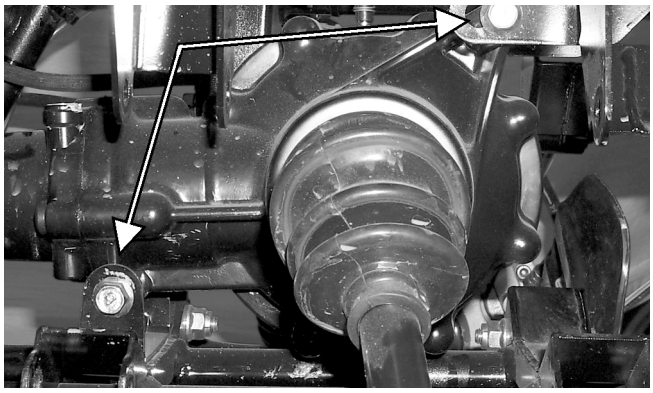
2. Remove both of the rear drive axles (see Drive Axles in this section).

3. Remove the three cap screws and lock nuts securing the engine output shaft to the rear gear case input flange.



AF959

4. Remove the two cap screws and lock nuts securing the rear gear case to the frame; then remove the gear case through the left side.



AF960A

INSTALLING

1. Slide the gear case into position through the left side of the frame; then secure it to the frame with cap screws and lock nuts. Tighten to 4.8 kg-m (35 ft-lb).

■ NOTE: If a new rear gear case is being installed, tighten the cap screws to 5.5 kg-m (40 ft-lb).

2. Secure the engine output shaft to the rear gear case input flange with three cap screws (coated with red Loctite #271) and lock nuts. Tighten to 4.8 kg-m (35 ft-lb).

3. Install the rear drive axles (see Drive Axles in this section).

4. Install the left-side rear A-arms (see Rear A-Arms in Section 7).

Hub

REMOVING

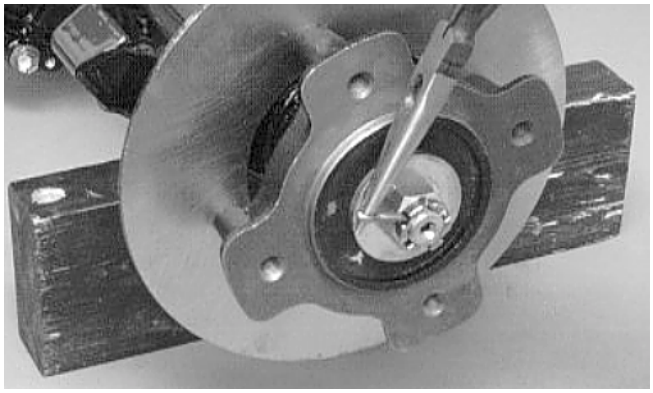
1. Secure the ATV on a support stand to elevate the wheel; then remove the wheel.

⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

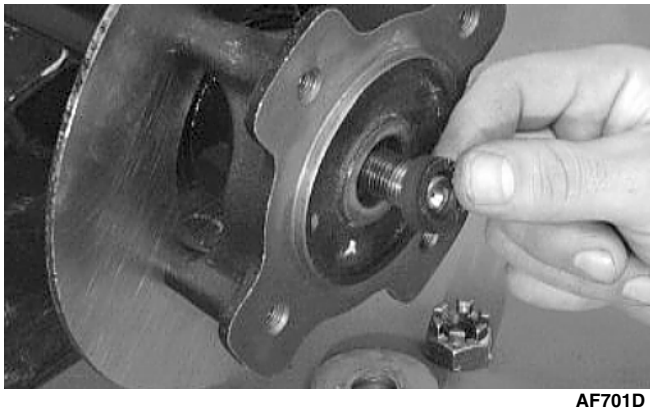
2. Remove the wheel cap from the hub; then remove the cotter pin from the nut.

■ NOTE: During assembly, new cotter pins should be installed.



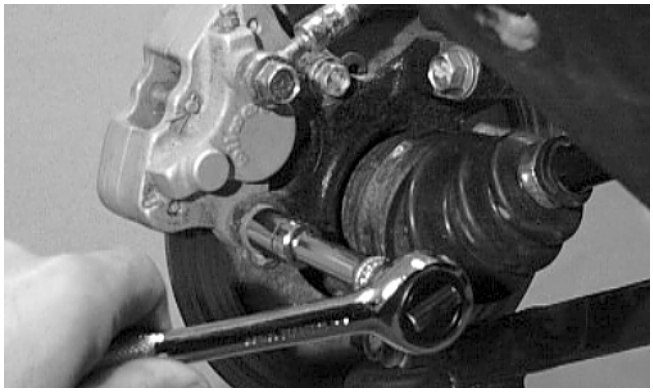
AF700D

3. Remove the nut securing the hub. Account for a washer and a hub seal.



AF701D

4. Remove the brake caliper.



AF615D

5. Remove the hub assembly.

6. Remove the four cap screws securing the brake disc.

CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all hub components.

2. Inspect all threads for stripping or damage.

3. Inspect the brake disc for cracks or warping.

4. Inspect the sealing area of the hub for pits.

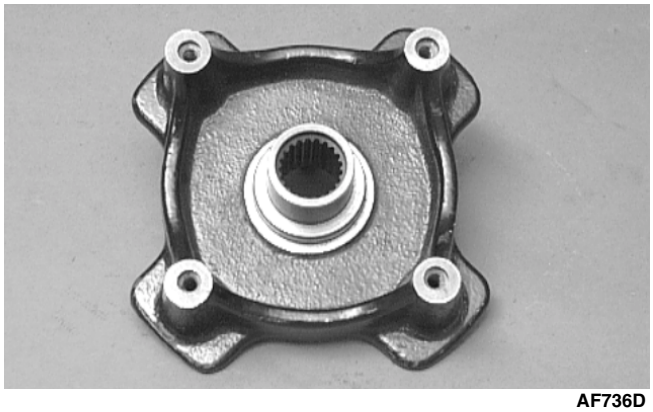
5. Inspect the hub splines for signs of wear.

6. Inspect the hub for cracks.

INSTALLING

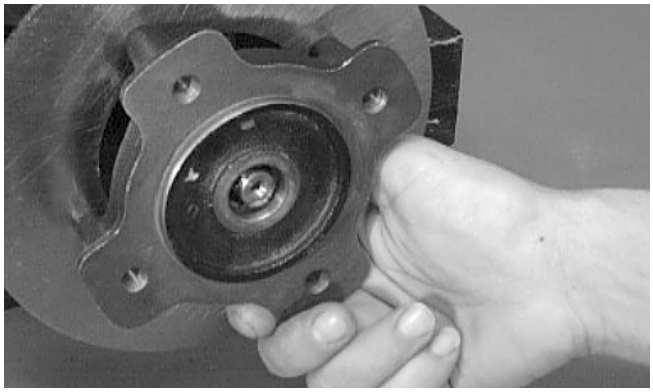
1. Secure the brake disc to the hub with the four cap screws coated with blue Loctite #243. Tighten to 2.1 kg-m (15 ft-lb).

2. Apply grease to hub sealing area and on the splines.



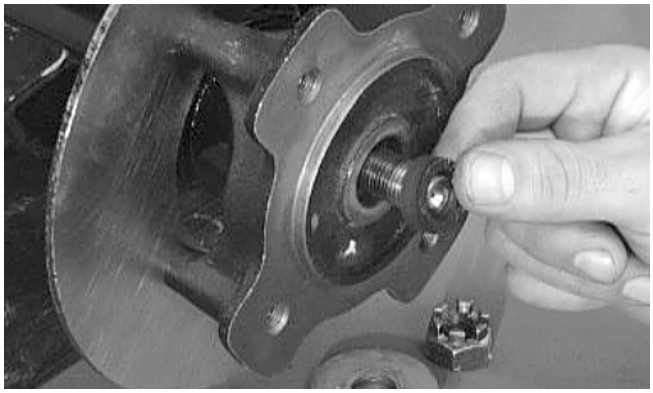
AF736D

3. Install the hub assembly onto the splines of the shaft.



AF702D

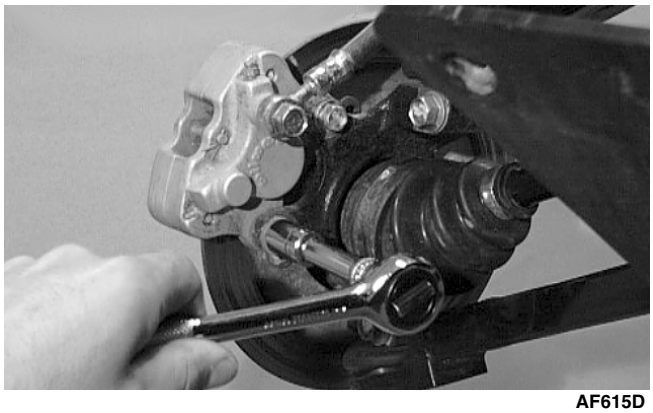
4. Insert the hub seal onto the shaft; then position it into the hub.



AF701D

5. Place the washer onto the shaft; then secure the hub assembly with the nut. Tighten only until snug.

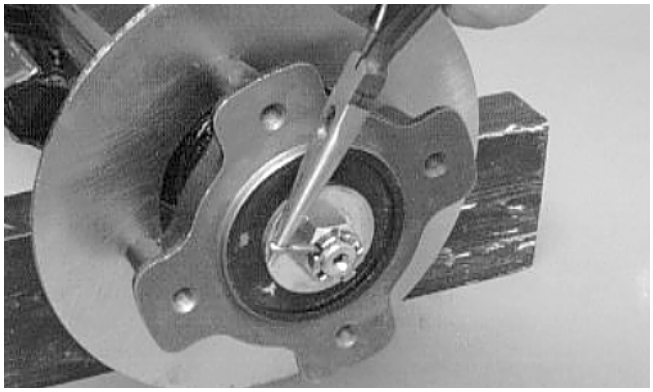
6. Secure the brake caliper to the knuckle with the two cap screws. Tighten the mechanical caliper to 2.1 kg-m (15 ft-lb). Tighten the hydraulic caliper to 2.8 kg-m (20 ft-lb).



AF615D

7. Secure the hub nut to the shaft/axle. Tighten to 10.4 kg-m (75 ft-lb).

8. Install a new cotter pin and spread the pin to secure the nut.



AF700D

9. Install the wheel cap.

10. Install the wheel and tighten to 5.5 kg-m (40 ft-lb).

AF611D

11. Remove the ATV from the support stand.

6

Hydraulic Brake Caliper

■NOTE: The brake caliper is a non-serviceable component; it must be replaced as an assembly.

REMOVING/DISASSEMBLING

1. Secure the ATV on a support stand to elevate the wheel; then remove the wheel.

⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

2. Drain the brake fluid from the entire hydraulic system (master cylinder, hoses, and caliper).

AF637D

⚠ CAUTION

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the ATV and do not reuse brake fluid.

3. Remove the brake hose from the caliper; then remove the caliper.

AF636D

CLEANING AND INSPECTING

1. Clean all caliper components (except the brake pads) with parts-cleaning solvent.
2. Inspect the brake pads for damage and excessive wear.

■ **NOTE: For measuring brake pads, see Section 2.**

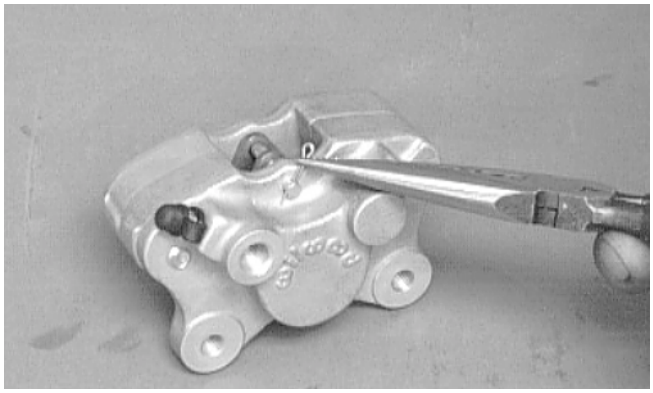
ASSEMBLING/INSTALLING

1. Push the pistons into the caliper as far as they will go to allow clearance for the brake pads.

⚠ CAUTION

Care should be taken that the piston and cylinder are not scratched.

2. Install the brake pads and secure with the pin and cotter pin.



AF718D

3. Place the brake caliper assembly into position and secure with the cap screws. Tighten the mechanical caliper to 2.1 kg-m (15 ft-lb). Tighten the hydraulic caliper to 2.8 kg-m (20 ft-lb).
4. Place a new flat washer on each side of the brake hose fitting and install it on the caliper. Tighten to 4.2 kg-m (30 ft-lb).
5. Fill the master cylinder; then bleed the brake system (see Section 2).
6. Install the wheel. Tighten to 5.5 kg-m (40 ft-lb).

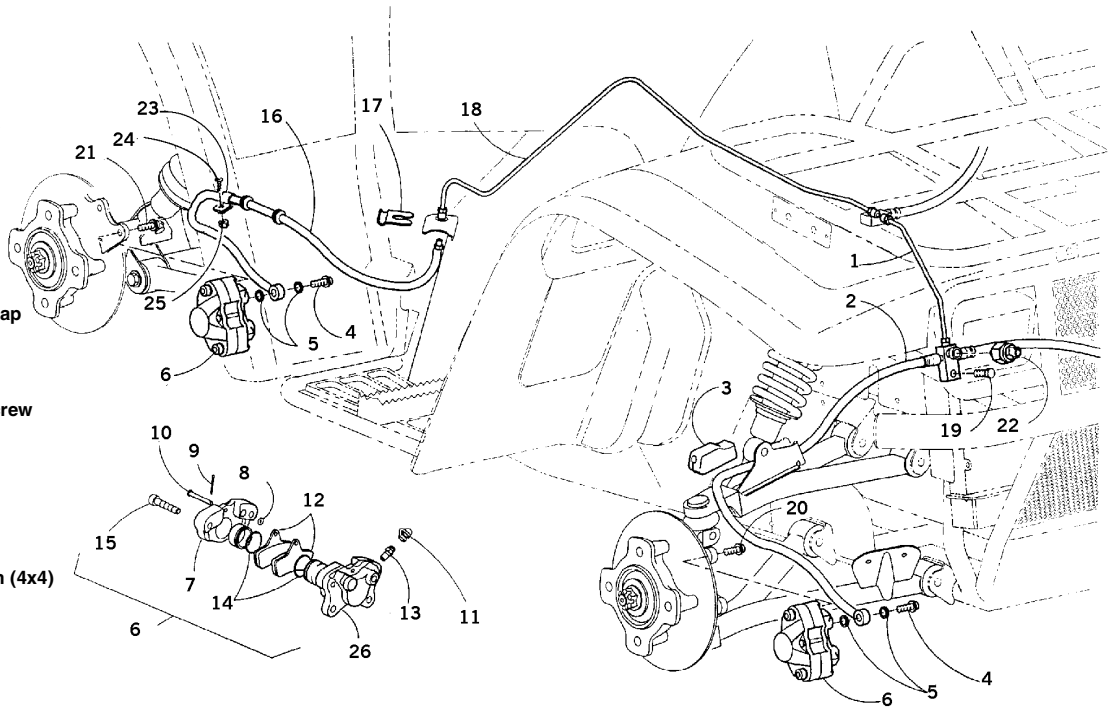
AF611D

7. Remove the ATV from the support stand and verify brake operation.

Hydraulic Brake Assembly Schematics

250/300

KEY
1. Tube - Front
2. Hose - Front
3. Mounting Block
4. Oil Bolt
5. Crush Washer
6. Caliper
7. Housing
8. O-Ring
9. Cotter Pin
10. Pin
11. Bleeder Valve Cap
12. Brake Pad
13. Bleeder Valve
14. O-Ring
15. Socket-Head Screw
16. Hose - Rear
17. Clip
18. Tube - Rear
19. Machine Screw
20. Cap Screw
21. Cap Screw
22. Pressure Switch (4x4)
23. Clamp
24. Machine Screw
25. Nut
26. Housing

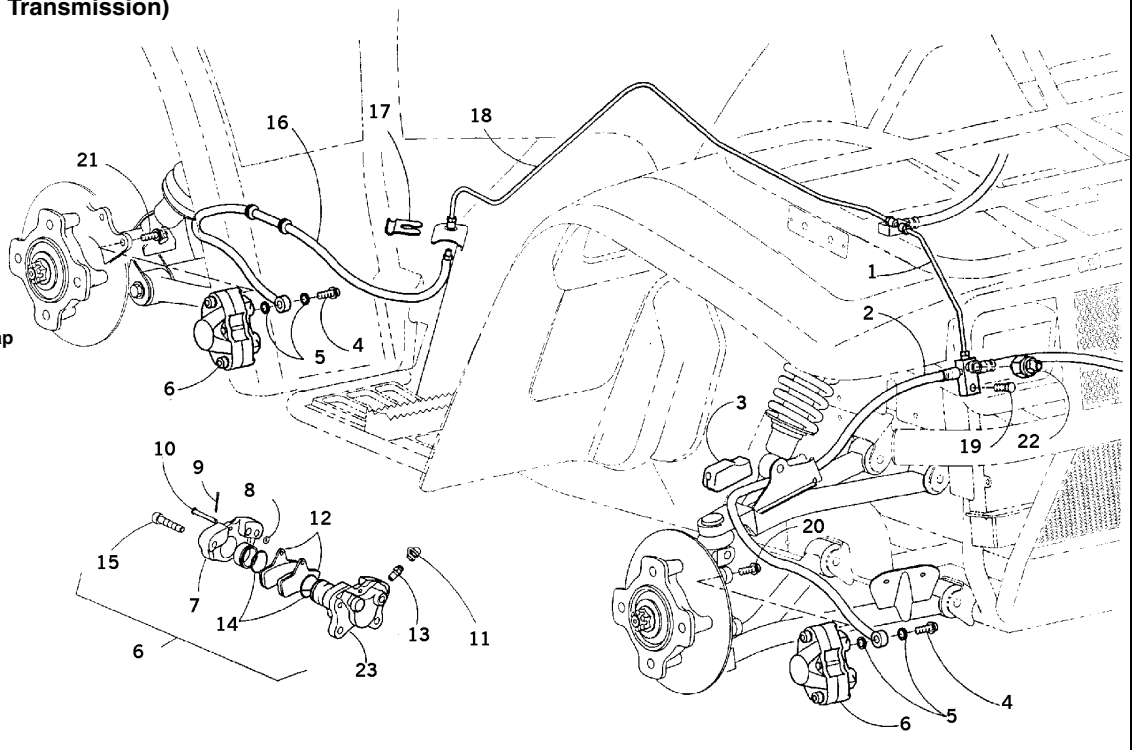


0735-441

6

400/500 (Manual Transmission)

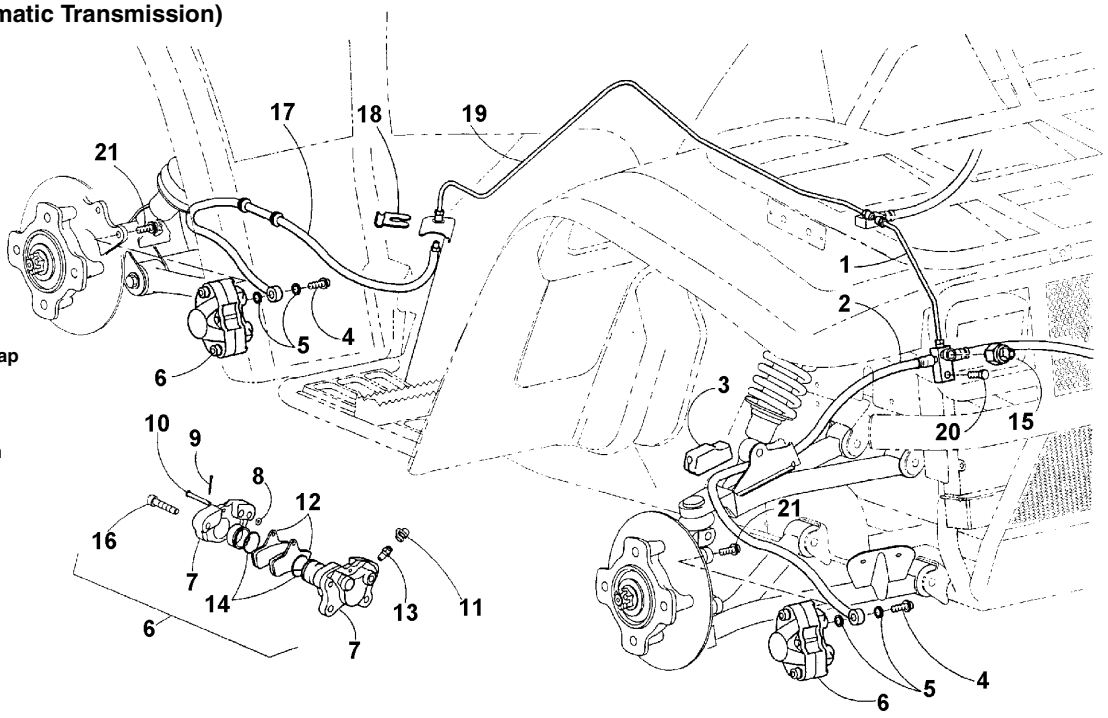
KEY
1. Tube - Front
2. Hose - Front
3. Mounting Block
4. Oil Bolt
5. Crush Washer
6. Caliper
7. Housing
8. O-Ring
9. Cotter Pin
10. Pin
11. Bleeder Valve Cap
12. Brake Pad
13. Bleeder Valve
14. O-Ring
15. Cap Screw
16. Hose - Rear
17. Clip
18. Tube - Rear
19. Cap Screw
20. Cap Screw
21. Cap Screw
22. Pressure Switch
23. Housing



0735-395

375/500 (Automatic Transmission)

KEY
1. Front Tube
2. Front Hose
3. Mounting Block
4. Oil Bolt
5. Crush Washer
6. Caliper Assy
7. Housing
8. O-Ring
9. Cotter Pin
10. Pin
11. Bleeder Valve Cap
12. Brake Pad
13. Bleeder Valve
14. O-Ring
15. Pressure Switch
16. Cap Screw
17. Rear Hose
18. Clip
19. Rear Tube
20. Cap Screw
21. Cap Screw



0735-672

SECTION 7 - SUSPENSION

7

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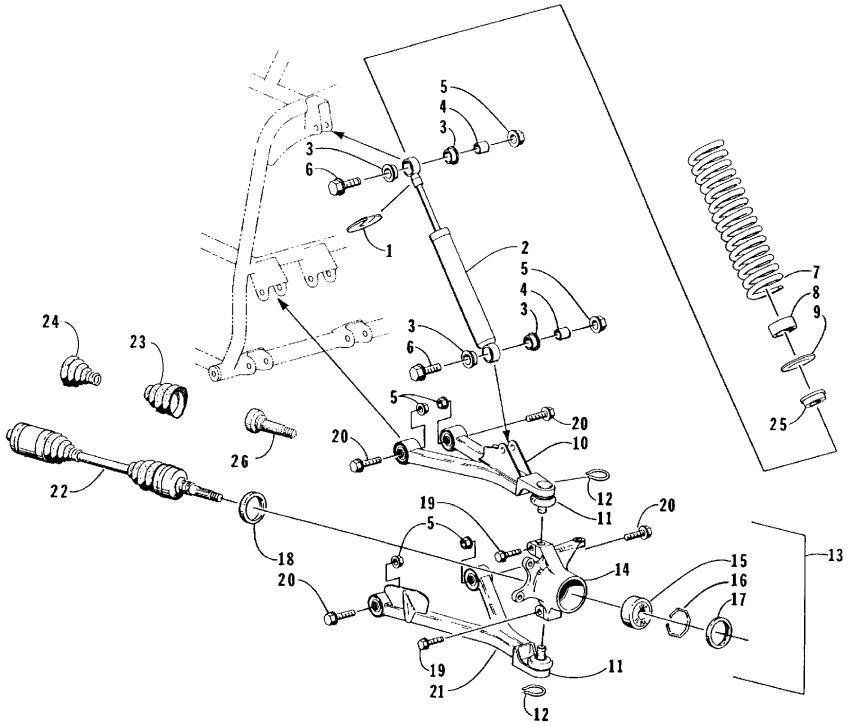
Front and Rear Suspension Assembly Schematics

250/300 - FRONT

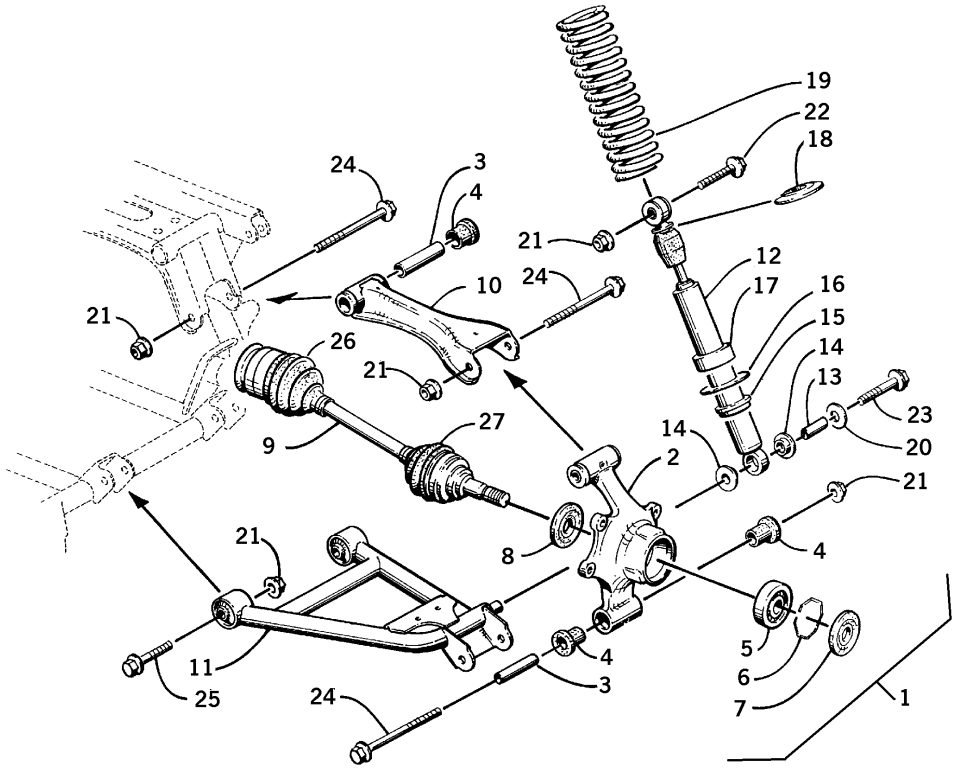
KEY
1. Retainer
2. Shock Absorber
3. Bushing
4. Sleeve
5. Lock Nut
6. Cap Screw
7. Spring
8. Spring Collar
9. Spring Washer
10. A-Arm
11. Ball Joint
12. Ball Joint Clip
13. Knuckle Assy
14. Knuckle
15. Bearing
16. Bearing Clip
17. Seal
18. Seal
19. Cap Screw
20. Cap Screw
21. A-Arm
22. Drive Axle (4x4)
23. Outer Boot Repair Kit (4x4)
24. Inner Boot Repair Kit (4x4)
25. Retainer
26. Stub Axle (2x4)



0735-394

250/300 - REAR

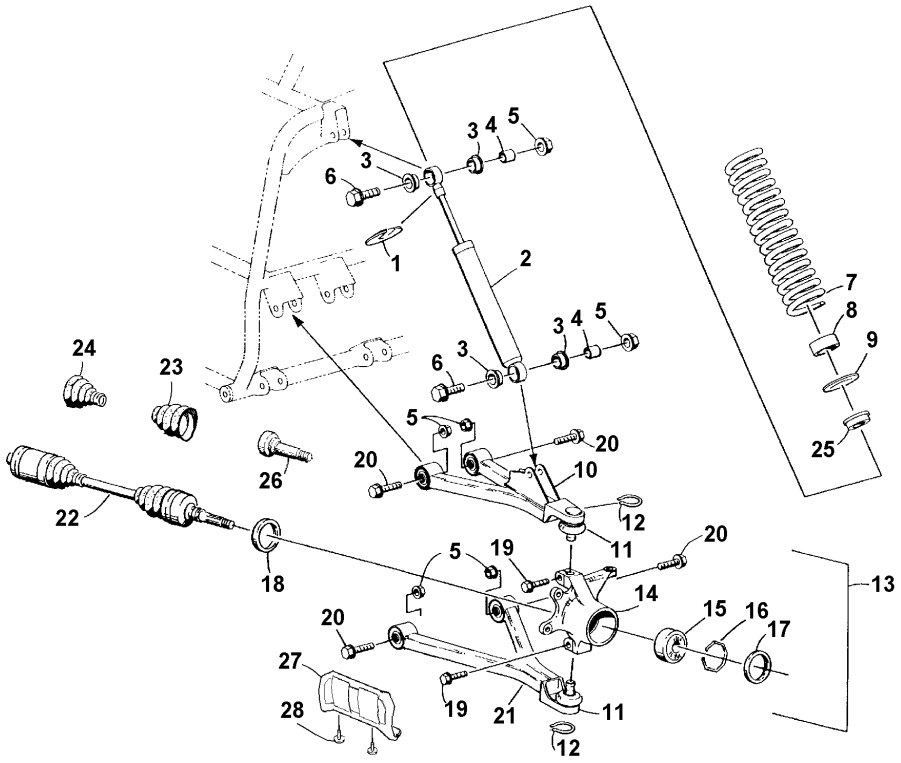
KEY
1. Knuckle Assy
2. Knuckle
3. Collar
4. Bushing
5. Wheel Hub Bearing
6. Bearing Clip
7. Seal
8. Seal
9. Drive Axle
10. Rear Arm
11. A-Arm
12. Shock Absorber
13. Sleeve
14. Bushing
15. Spring Retainer
16. Spring Adjuster Washer
17. Collar
18. Retainer
19. Spring
20. Washer
21. Lock Nut
22. Cap Screw
23. Cap Screw
24. Cap Screw
25. Cap Screw
26. Inner Boot Repair Kit
27. Outer Boot Repair Kit



0735-825

375/400/500 - FRONT

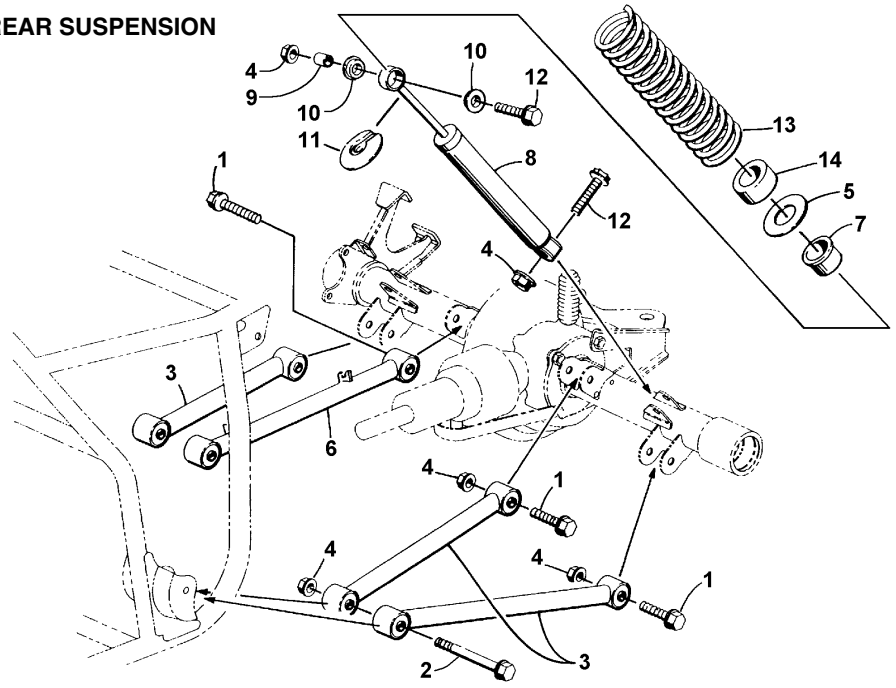
KEY
1. Retainer
2. Shock Absorber
3. Bushing
4. Sleeve
5. Lock Nut
6. Cap Screw
7. Spring
8. Spring Collar
9. Spring Washer
10. A-Arm
11. Ball Joint
12. Ball Joint Clip
13. Knuckle Assy
14. Knuckle
15. Wheel Hub Bearing
16. Bearing Clip
17. Seal
18. Seal
19. Cap Screw
20. Cap Screw
21. A-Arm
22. Drive Axle
23. Outer Boot Repair Kit
24. Inner Boot Repair Kit
25. Retainer
26. Stub Axle (2x4)
27. Boot Guard
28. Body Screw



0735-910

ACT - INDEPENDENT REAR SUSPENSION

KEY
1. Cap Screw
2. Cap Screw
3. Swing Arm
4. Lock Nut
5. Spring Adjustment Washer
6. Swing Arm
7. Retainer
8. Shock Absorber
9. Sleeve
10. Bushing
11. Retainer
12. Cap Screw
13. Spring
14. Collar



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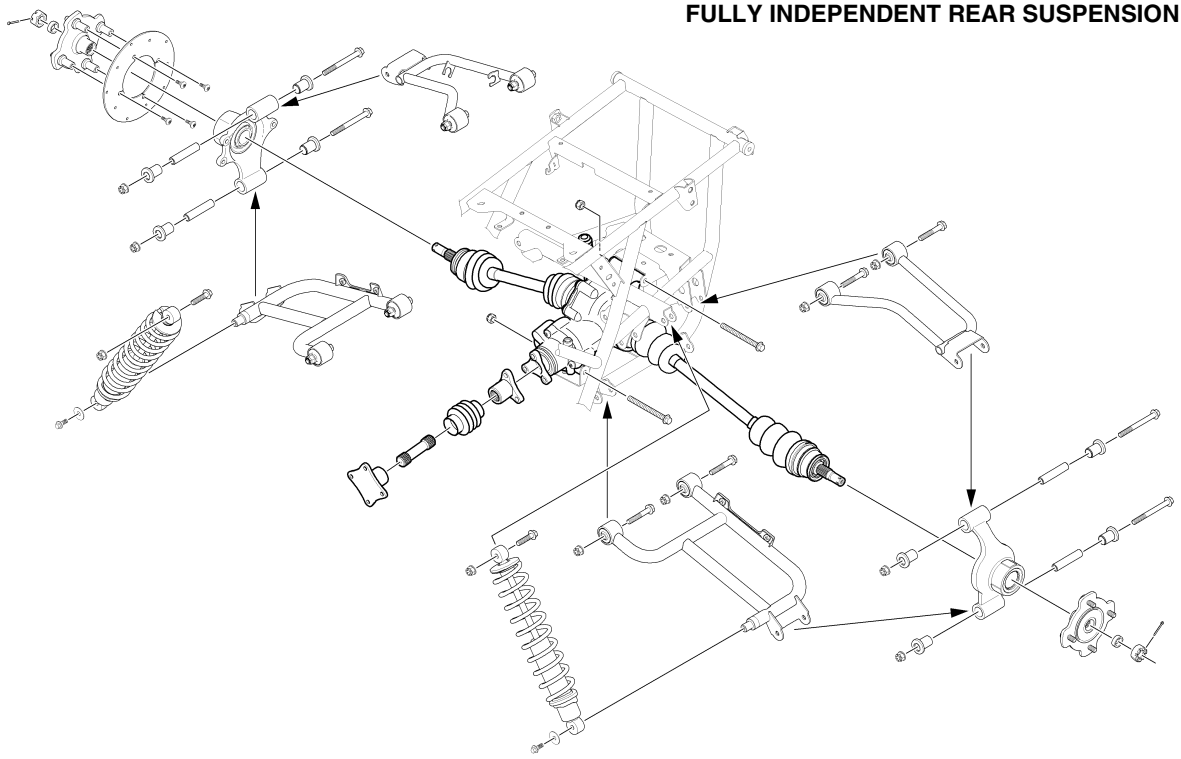
7

FULLY INDEPENDENT REAR SUSPENSION



0736-860

Shock Absorbers

REMOVING

1. Secure the ATV on a support stand to elevate the wheels and to release load on the suspension.

⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

2. Remove the two cap screws and nuts securing each front shock absorber to the frame. Account for bushings and sleeves from each.

AF605D

⚠ CAUTION

On the ACT independent rear suspension, additional support stands are necessary to support the rear axle when the shock absorbers are removed or damage may occur.

3. Remove the two cap screws and nut securing each rear shock absorber to the frame and rear suspension. Account for bushings and sleeves from each.

AF626D

4. Compress the shock absorber spring, remove the retainer, and remove the spring.

AF730D

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all shock absorber components in parts-cleaning solvent.
2. Inspect each shock rod for nicks, pits, rust, bends, and oily residue.
3. Inspect all springs, spring retainers, shock rods, dampers, bushings, shock bodies, and eyelets for cracks, leaks, and bends.

INSTALLING

1. Place the shock absorber spring over the shock absorber, compress the spring, and install the retainer.
2. Place bushings and sleeves (where appropriate) into shock eyelet; then install shock with two cap screws and nuts. Tighten all nuts to 4.8 kg-m (35 ft-lb).

⚠ CAUTION

Do not tighten the nuts beyond the 4.8 kg-m (35 ft-lb) specification or the shock eyelet or mount WILL be damaged.

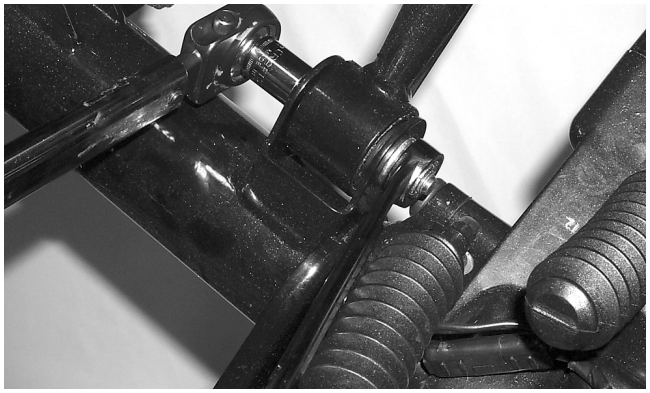
■NOTE: On the fully independent rear suspension models, the rear shock absorber-to-lower A-arm torque factor is 2.8 kg-m (20 ft-lb).

3. Remove the ATV from the support stand.

Swing Arms
(ACT - Independent Rear Suspension)

REMOVING

1. Remove the cap screws and lock nuts securing the front of the swing arms to the frame brackets.
2. On the left side, remove the cap screws and lock nuts securing the rear of the swing arms to the axle housing; then remove the swing arms.



AF697D

3. On the right side, remove the cap screw and lock nut securing the outer swing arm to the axle housing; then remove the cap screw and lock nut securing the inner swing arm to the axle housing. Remove the hose grommets from the hose guides.
4. Remove the swing arms and note the location of the hose guides on the inner swing arm (for installing purposes).

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all swing arm components in parts-cleaning solvent.
2. Inspect all swing arm weldments for cracks or unusual bends.
3. Inspect all tubing for cracks or unusual bends.

INSTALLING

1. On the right side, place the inner swing arm into position and secure it to the axle housing with a cap screw and lock nut. Do not tighten at this time.
2. On the right side, place the outer swing arm into position and secure to the axle housing with a cap screw and lock nut. Do not tighten at this time.

3. Secure the two right side swing arms to the frame brackets with cap screws and hex nuts. Do not tighten at this time.

4. On the left side, secure the swing arms to the axle housing and frame brackets with cap screws and hex nuts; then tighten all fasteners to 4.8 kg-m (35 ft-lb).

Swing Arms
(TBX Model)

REMOVING

1. Secure the ATV on a support stand to elevate the wheels and to release the load on the suspension.

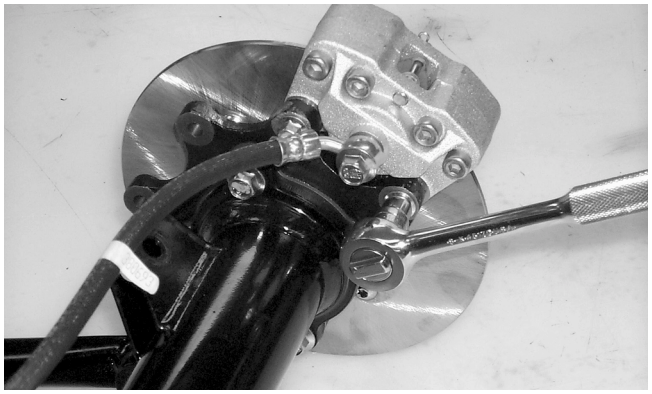
⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

2. Place a floor jack under the rear gear case to support the gear case once the shock absorber has been removed.

3. Remove the rear wheels.

4. Remove both brake calipers. Ensure that the hydraulic brake hose is free from the swing arm.



CC783

■NOTE: Note the routing of the brake hose for installing purposes.

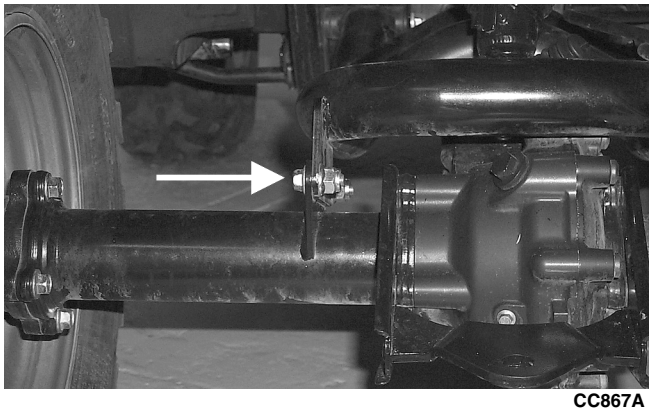
⚠ CAUTION

Care should be taken not to damage or kink the brake cable/hose.

5. Remove the three cap screws securing the rear gear case U-joint to the driveshaft.

6. Remove the cap screw and lock nut securing the shock assembly to the swing arm. Discard the lock nut.

■NOTE: Never reuse a lock nut. Once a lock nut has been removed, it must be replaced with a new lock nut.



CC867A

7. Remove the two cap screws and lock nuts securing the swing arm to the frame. Discard the lock nuts.

CC864

8. Lower the floor jack and remove the swing arm/rear drive assembly.

9. Remove the four cap screws and lock nuts securing the swing arm to the axle housing; then remove the swing arm.

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

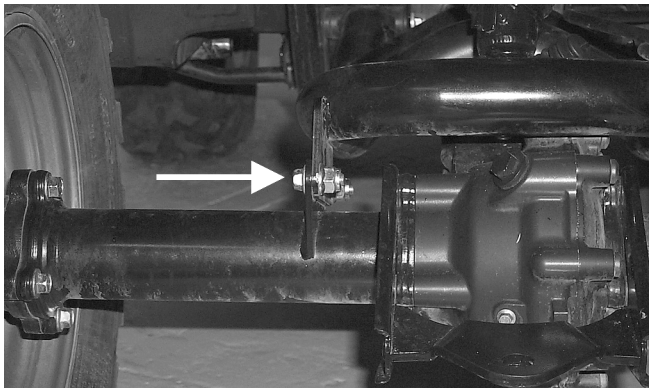
1. Clean all swing arm components in parts-cleaning solvent.

2. Inspect all swing arm weldments for cracks or unusual bends.

3. Inspect all tubing for cracks or unusual bends.

INSTALLING

1. Place the swing arm into position on the axle housing; then secure with cap screws and new lock nuts. Tighten to 4.8 kg-m (35 ft-lb).



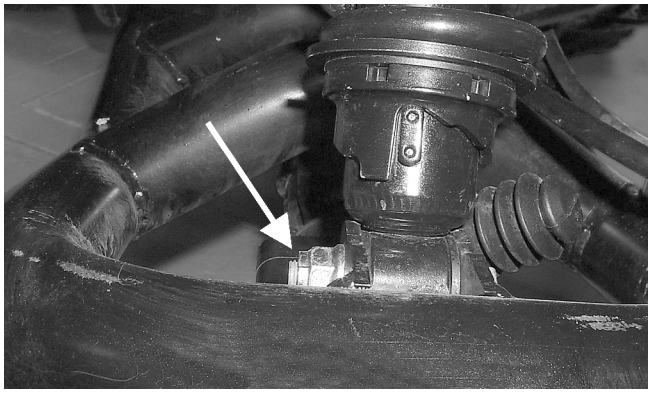
CC867A

2. Place the axle housing/swing arm assembly on a floor jack and maneuver the assembly into position in the frame.

3. Secure the swing arm to the frame with cap screws and new lock nuts. Tighten to 5.5 kg-m (40 ft-lb).

CC864

4. Secure the shock absorber to the swing arm with a cap screw and new lock nut. Tighten to 4.8 kg-m (35 ft-lb).

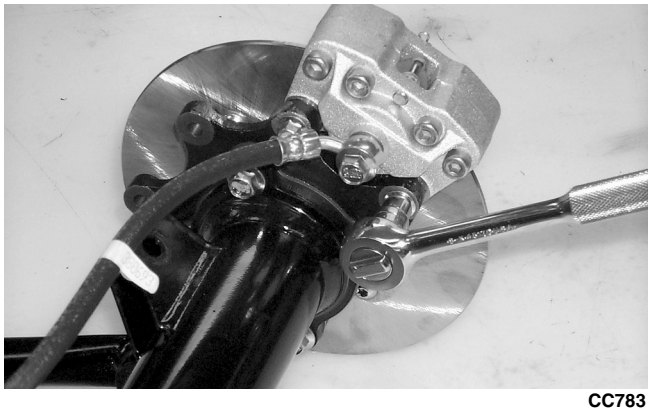


CC868A

5. Secure the rear gear case U-joint to the driveshaft with three cap screws coated with red Loctite #271. Tighten to 5.5 kg-m (40 ft-lb).

6. Secure the brake calipers to the bearing housing with existing hardware. Tighten the mechanical caliper to 2.1 kg-m (15 ft-lb) and the hydraulic caliper to 2.8 kg-m (20 ft-lb).

■ **NOTE: Ensure that the brake hose is properly routed and secured on the swing arm as noted during removing.**



CC783

7. Install the wheels and tighten to 5.5 kg-m (40 ft-lb).

8. Remove the ATV from the support stand.

Front A-Arms

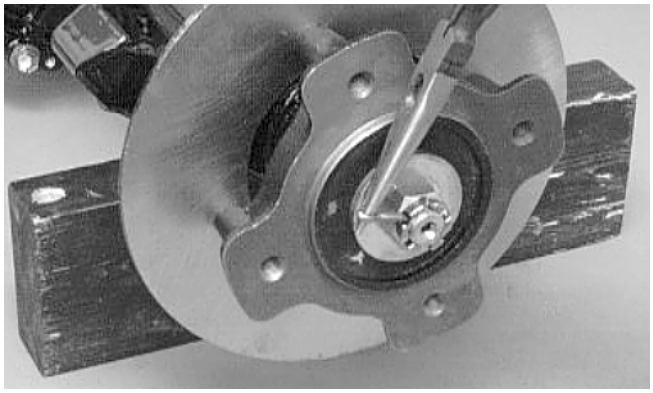
REMOVING

1. Secure the ATV on a support stand to elevate the wheel; then remove the wheel.

⚠ WARNING

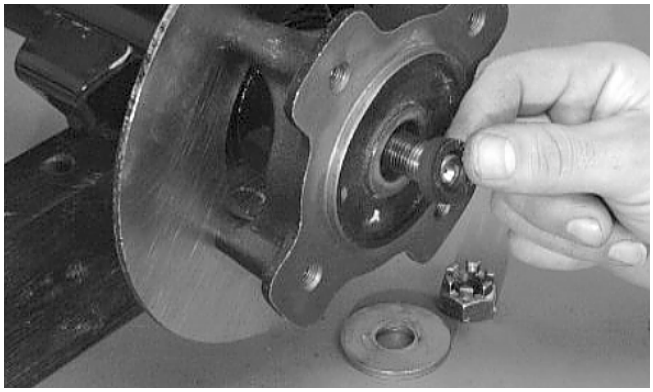
Make sure the ATV is solidly supported on the support stand to avoid injury.

2. Remove the wheel cap from the hub; then remove the cotter pin from the nut.



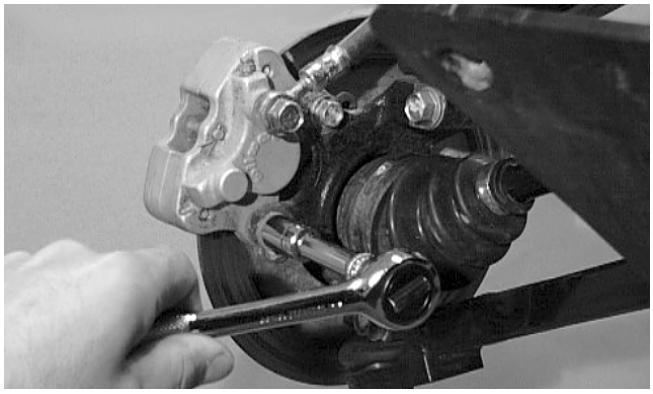
AF700D

3. Remove the nut securing the hub. Account for a washer and a hub seal.



AF701D

4. Remove the brake caliper.



AF615D

5. Remove the hub assembly.

6. Remove the cotter pin and slotted nut securing the tie rod end to the knuckle; then remove the tie rod end from the knuckle.

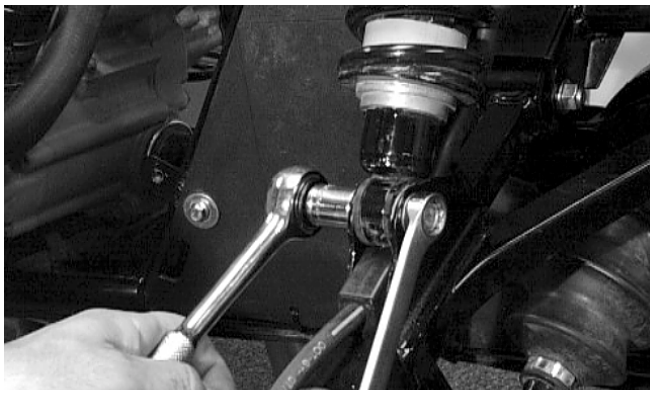
AF618D

7. Remove the cap screws securing the ball joints to the knuckle.

AF628D

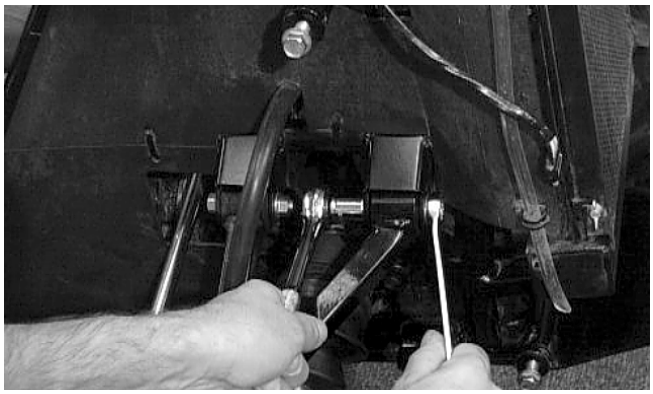
8. Tap the ball joints out of the knuckle; then remove the knuckle.

9. Remove the lower shock absorber eyelet from the upper A-arm.



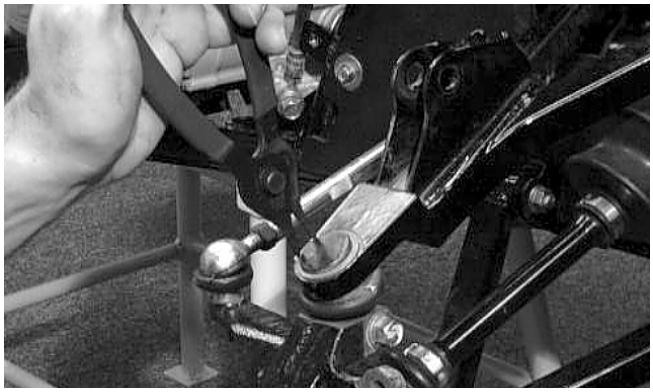
AF626D

10. Remove the cap screws securing the A-arms to the frame.



AF610D

11. Remove the circlip from the ball joint; then remove the ball joint from the A-arm.



AF616D

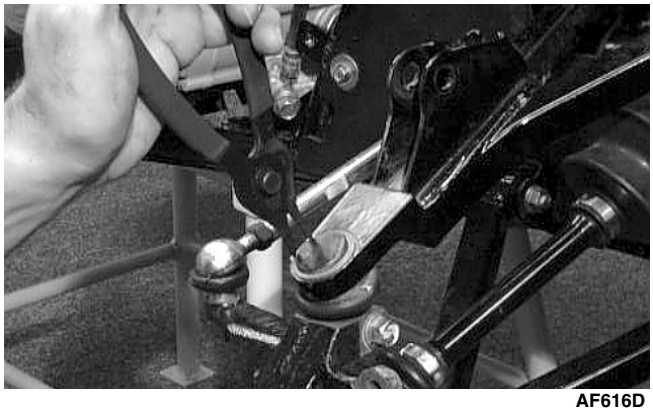
CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all A-arm components in parts-cleaning solvent.
2. Clean the ball joint mounting hole of all residual Loctite, grease, oil, or dirt for installing purposes.
3. Inspect the A-arm for bends, cracks, and worn bushings.
4. Inspect the ball joint mounting holes for cracks or damage.
5. Inspect the frame mounts for signs of damage, wear, or weldment damage.

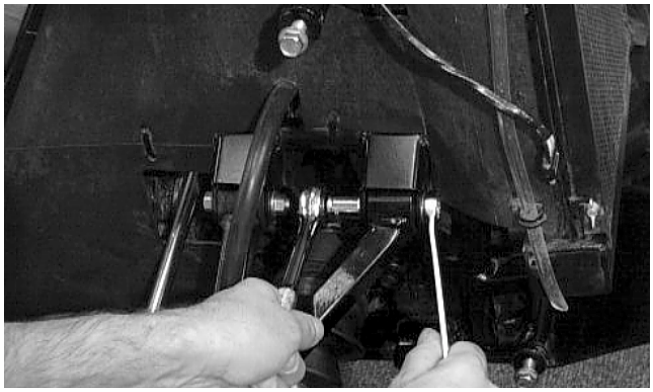
INSTALLING

1. Apply green Loctite #609 to the entire outside diameter of the ball joint; then install the ball joint into the A-arm and secure with the circlip.



AF616D

2. Install the A-arm assemblies into the frame mounts and secure with the cap screws. Only finger-tighten at this time.



AF610D

3. Route the brake hose through the upper A-arm shock absorber mount.

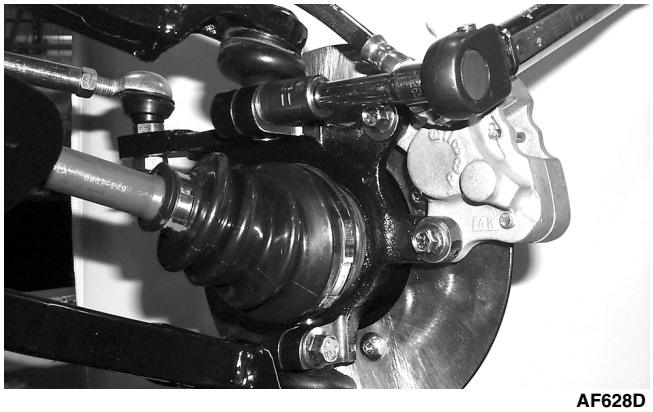
AF627D

4. Secure the lower eyelet of the shock absorber to the upper A-arm. Tighten nut to 4.8 kg-m (35 ft-lb).
5. Secure the A-arm assemblies to the frame mounts (from step 2). Tighten the cap screws to 4.8 kg-m (35 ft-lb).

⚠ CAUTION

Do not tighten the nut beyond the 4.8 kg-m (35 ft-lb) specification or the shock eyelet or mount WILL be damaged.

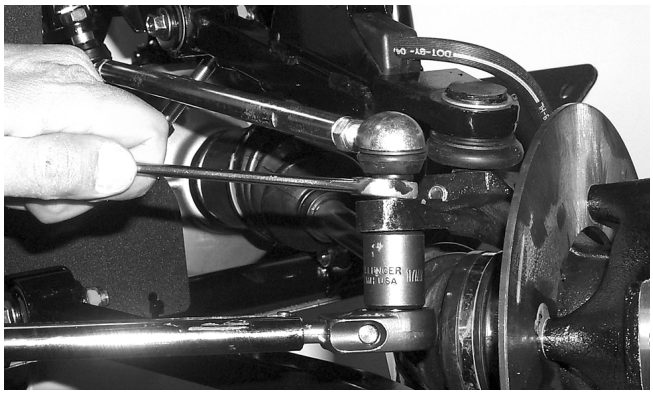
6. Install the knuckle assembly onto the ball joints and secure with cap screws. Tighten to 4.8 kg-m (35 ft-lb).



AF628D

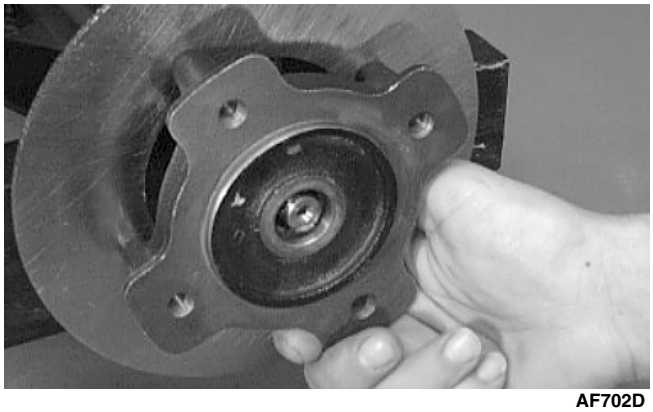
7. Install the tie rod end and secure with the nut. Tighten to 4.2 kg-m (30 ft-lb); then install a new cotter pin and spread the pin to secure the nut.

■ NOTE: During assembly, new cotter pins should be installed.



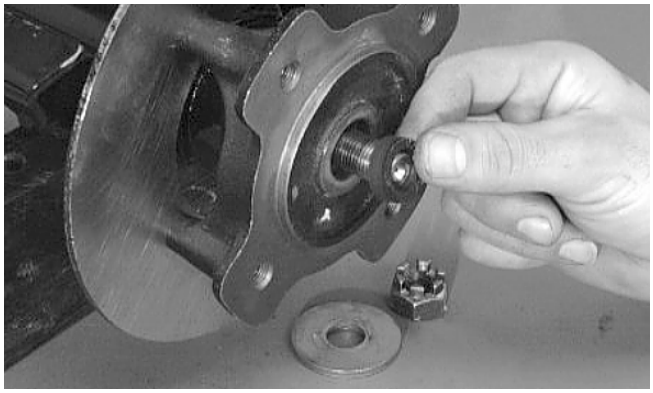
AF618D

8. Apply grease to hub sealing area and on the drive axle splines; then install the hub assembly onto the drive axle.



AF702D

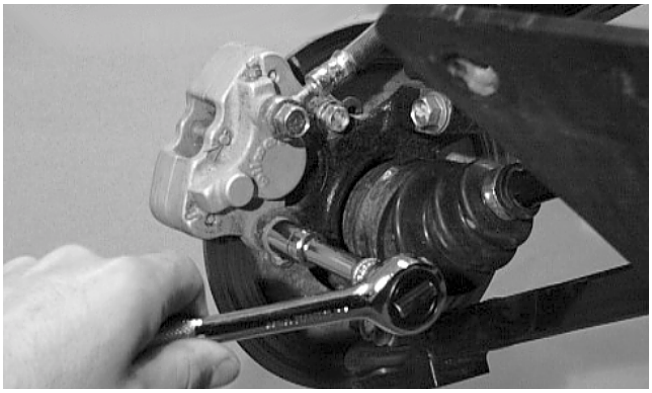
9. Insert the hub seal onto the drive axle; then position it into the hub.



AF701D

10. Place the washer onto the shaft; then secure the hub assembly with the nut. Tighten only until snug.

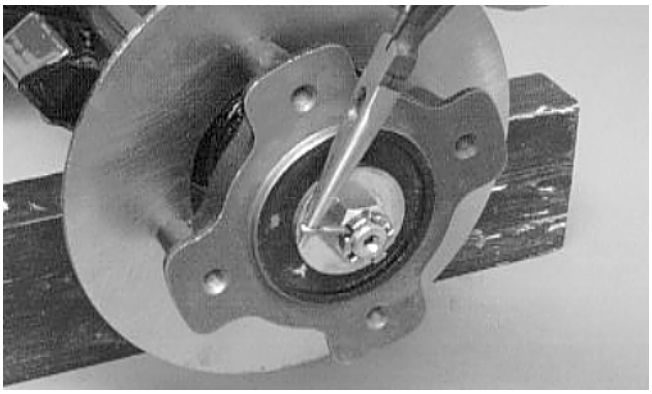
11. Secure the brake caliper to the knuckle with the two cap screws. Tighten to 2.8 kg-m (20 ft-lb).



AF615D

12. Secure the hub nut (from step 10) to the shaft/axle. Tighten to 10.4 kg-m (75 ft-lb).

13. Install a new cotter pin and spread the pin to secure the nut.



AF700D

14. Install the wheel cap.

15. Install the wheel and tighten to 5.5 kg-m (40 ft-lb).

AF611D

16. Remove the ATV from the support stand.

Rear A-Arms
(Fully Independent Rear Suspension)

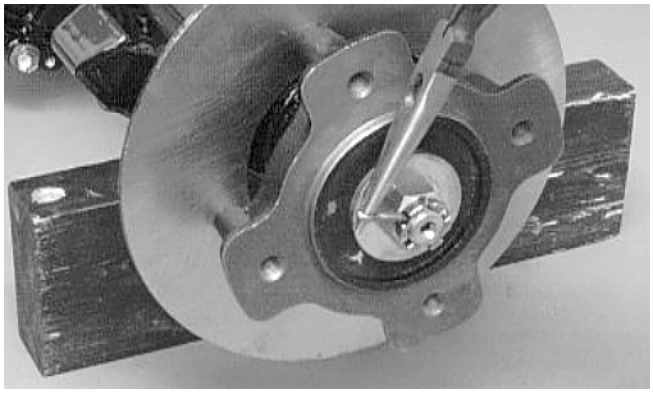
REMOVING

1. Secure the ATV on a support stand to elevate the wheels.

⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

2. Pump up the hand brake; then engage the brake lever lock.
3. Remove the wheel and rubber wheel cap.
4. Remove the cotter pin securing the hex nut; then remove the hex nut and washer. Release the brake lever lock.

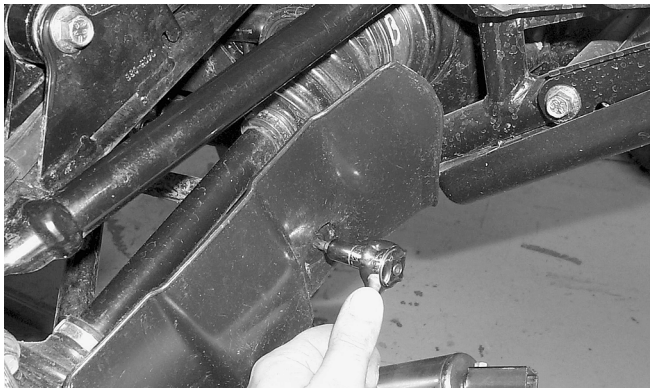


AF700D

5. Remove the two brake calipers (right side only).

■ NOTE: Do not allow the brake calipers to hang from their cable/hose.

6. Remove the cap screws and lock nut securing the shock absorber to the frame and lower A-arm; then remove the shock absorber.
7. Remove the cap screws securing the boot guard to the lower A-arm.



AF934

8. Slide the hub out of the knuckle and set aside.
9. Remove the cap screws and lock nuts securing the knuckle to the A-arms. Discard the lock nuts.

AF936

■ NOTE: Never reuse a lock nut. Once a lock nut has been removed, it must be replaced with a new lock nut.

10. Remove the cap screws and lock nuts securing the A-arms to the frame; then remove the A-arms.

■ NOTE: If removing the upper right A-arm, it will be necessary to disconnect the brake hose and brake cable from the A-arm.

CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all A-arm components in parts-cleaning solvent.
2. Inspect the A-arm for bends, cracks, and worn bushings.
3. Inspect the frame mounts for signs of damage, wear, or weldment damage.

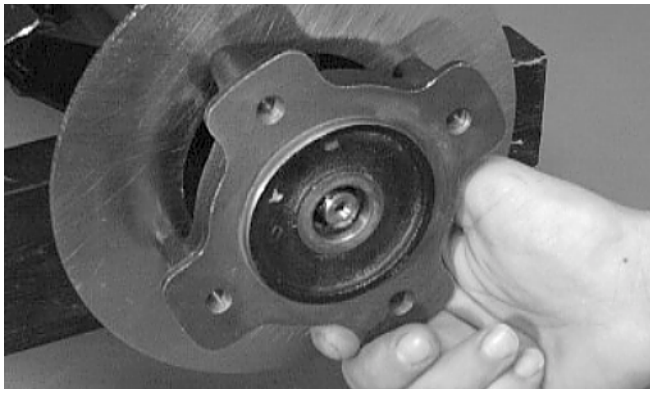
INSTALLING

1. Install the A-arm assemblies into the frame mounts and secure with the cap screws and new lock nuts. Only finger-tighten at this time.

2. Slide the knuckle onto the drive axle and into position on the A-arms; then secure the knuckle to the A-arms with cap screws and new lock nuts. Tighten to 4.8 kg-m (35 ft-lb).

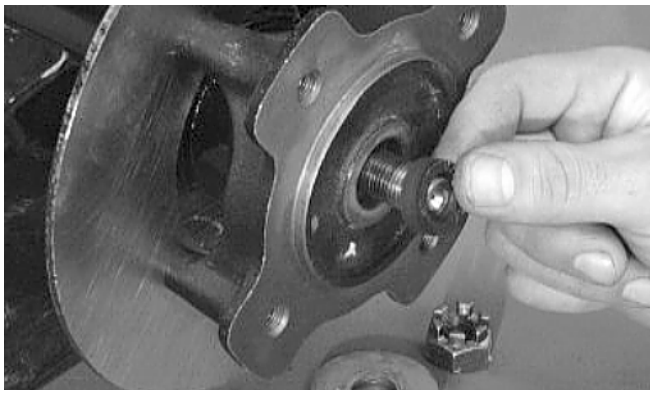
3. Tighten the hardware securing the A-arms to the frame mounts (from step 1) to 4.8 kg-m (35 ft-lb).

4. Apply grease to hub sealing area and on the drive axle splines; then install the hub assembly onto the drive axle.



AF702D

5. Insert the hub seal onto the shaft; then position it into the hub.



AF701D

6. Place the washer onto the drive axle; then secure the hub assembly with the nut. Tighten only until snug.

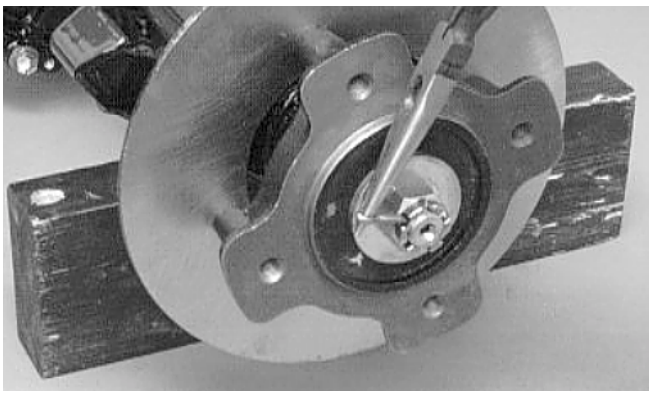
7. Secure the brake caliper to the knuckle with the two cap screws (right side only). Tighten the mechanical caliper to 2.1 kg-m (15 ft-lb). Tighten the hydraulic caliper to 2.8 kg-m (20 ft-lb).

■ NOTE: Ensure that the brake hose and brake cable are properly routed and secured to the upper A-arm.

AF615D

8. Secure the hub nut (from step 6) to the drive axle. Tighten to 10.4 kg-m (75 ft-lb).

9. Install a new cotter pin and spread the pin to secure the nut.



AF700D

10. Secure the shock absorber to the frame with a cap screw and new lock nut. Tighten to 4.8 kg-m (35 ft-lb).

11. Secure the shock absorber to the lower A-arm with a cap screw and new lock nut. Tighten to 2.8 kg-m (20 ft-lb).

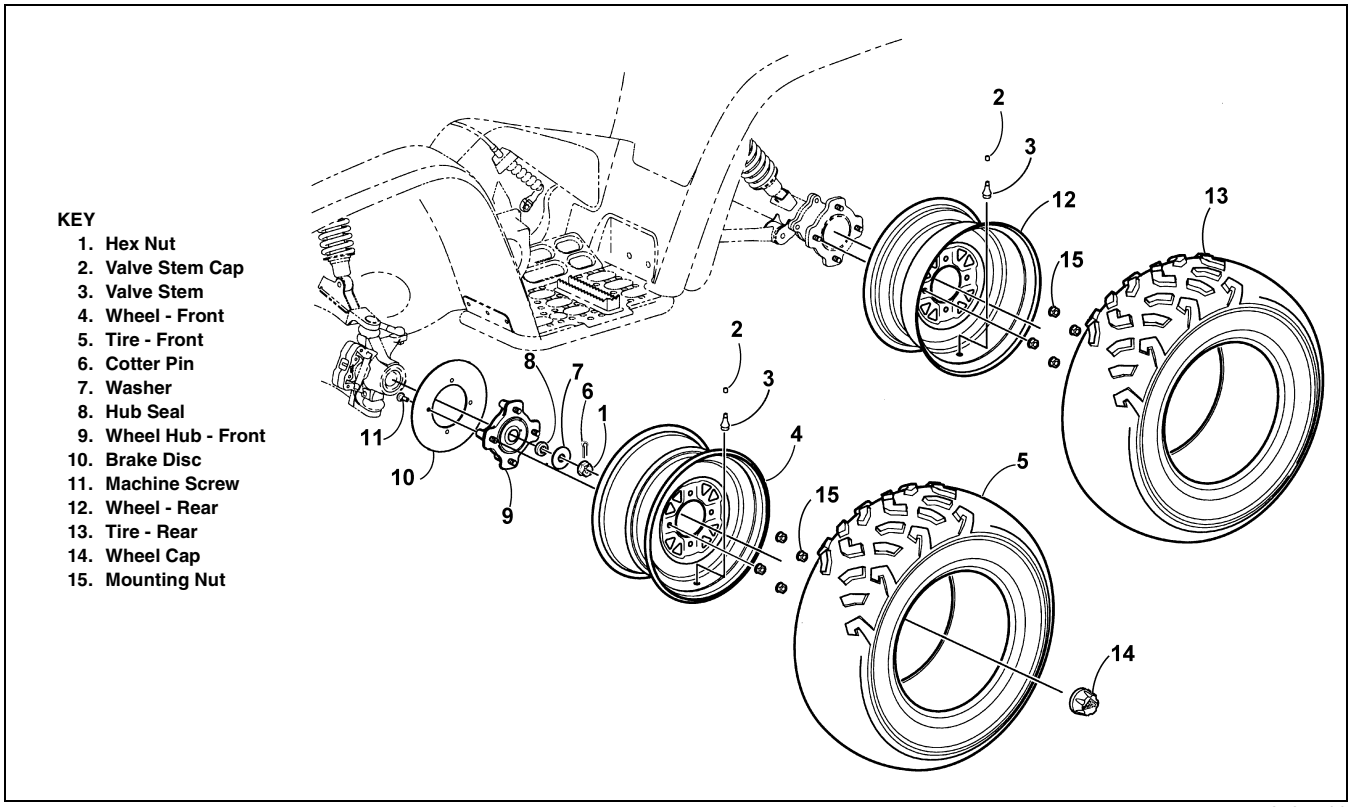
12. Secure the boot guard to the lower A-arm with the two cap screws. Tighten securely.

13. Install the wheel cap.

14. Install the wheel and tighten to 5.5 kg-m (40 ft-lb).

15. Remove the ATV from the support stand.

Wheels and Tires



0735-522

TIRE SIZE

⚠ WARNING

Use only Arctic Cat approved tires when replacing tires. Failure to do so could result in unstable ATV operation.

The ATV is equipped with low-pressure tubeless tires of the size and type listed below. Do not under any circumstances substitute tires of a different type or size.

250	Front	Rear
Size	AT23 x 8-12	AT24 x 9-12

300	Front	Rear
Size (4x4)	AT24 x 9-12	AT25 x 10-12
Size (2x4)	AT23 x 8-12	AT25 x 10-12

375/400/500	Front	Rear
Size	AT25 x 8-12	AT25 x 10-12

⚠ WARNING

Do not mix tire tread patterns. Use the same pattern type on front and rear. Failure to heed warning could cause poor handling qualities of the ATV and could cause excessive drive train damage not covered by warranty.

TIRE INFLATION PRESSURE

On 250/300 models, front and rear tire inflation pressure should be 0.35 kg/cm² (5.0 psi).

On 375/400/500 models, front tire pressure should be 0.32 kg-cm² (4.5 psi) and the rear tire pressure should be 0.25 kg-cm² (3.5 psi).

⚠ WARNING

Always maintain proper tire inflation pressure.

REMOVING

1. Secure the ATV on a support stand to elevate the wheels.

⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

2. Remove the wheels.

■ NOTE: Keep left-side and right-side wheels separated for installing them on their proper sides.

AF611D

CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean the wheels and hubs with parts-cleaning solvent.
2. Clean the tires with soap and water.
3. Inspect each wheel for cracks, dents, or bends.
4. Inspect each tire for cuts, wear, missing lugs, and leaks.

INSTALLING

1. Install each wheel on its hub.

AF611D

■ NOTE: Make sure each wheel is installed on its proper hub as noted in removing (the "rotation arrow" must indicate forward direction of rotation).

AF612D

2. Tighten to 5.5 kg-m (40 ft-lb).

CHECKING/INFLATING

1. Using an air pressure gauge, measure the air pressure in each tire. Adjust the air pressure as necessary to meet the recommended inflation pressure.

AL628D

2. Inspect the tires for damage, wear, or punctures.

⚠ WARNING

Do not operate the ATV if tire damage exists.

■ NOTE: If repair is needed, follow the instructions found on the tire repair kit or remove the wheel and have it repaired professionally.

■ NOTE: Be sure all tires are the specified size and have identical tread pattern.

3. Check the front wheel toe-in and toe-out and adjust as necessary (see Section 8).
4. Test drive the ATV on a dry, level surface and note any pulling to the left or right during acceleration, deceleration, and braking.

■ **NOTE: If pulling is noted, measure the circumference of the front and rear tires on the pulling side. Compare the measurements with the tires on the opposite side. If pulling is noted during braking only, check and adjust the brakes as necessary and recheck operation (see Section 2).**

5. Increase the air pressure in the tires with the smallest circumference measurement until all tires are equal in circumference.

6. Repeat steps 4-5 as necessary to ensure proper handling.

NOTES

SECTION 8 - STEERING/FRAME

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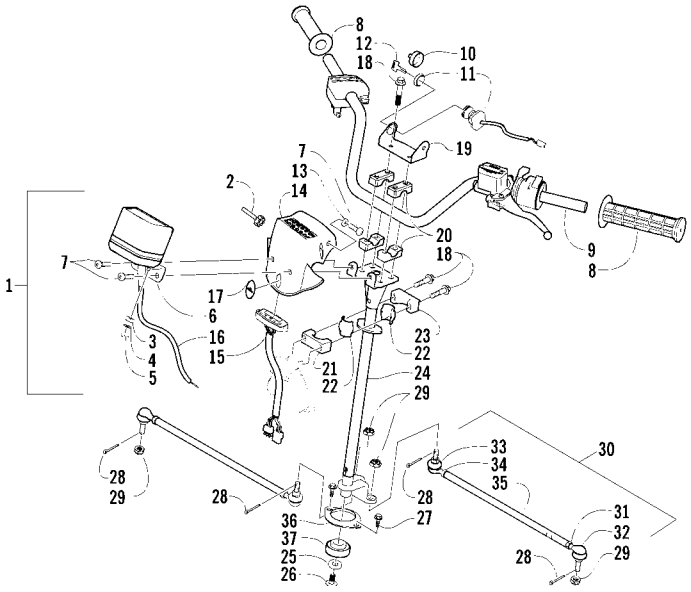
Steering Post/ Tie Rods

KEY

1. Speedometer*
2. Knob*
3. Rubber Mount*
4. Washer*
5. Retainer Pin*
6. Bracket*
7. Machine Screw
8. Handlebar Grip
9. Handlebar
10. Key Cover
11. Ignition Switch Assy
12. Key
13. Body Collar
14. Instrument Pod
15. LED Panel
16. Speedometer Cable*
17. Plug**
18. Cap Screw
19. Bracket
20. Cap
21. Bearing Housing
22. Bearing
23. Bearing Housing
24. Steering Post
25. Washer
26. Cap Screw
27. Cap Screw
28. Cotter Pin
29. Lock Nut

250/300



30. Tie Rod Assy
31. Nut
32. Ball Joint
33. Ball Joint
34. Nut
35. Tie Rod
36. Bearing Flange
37. Bearing w/Oil Seal

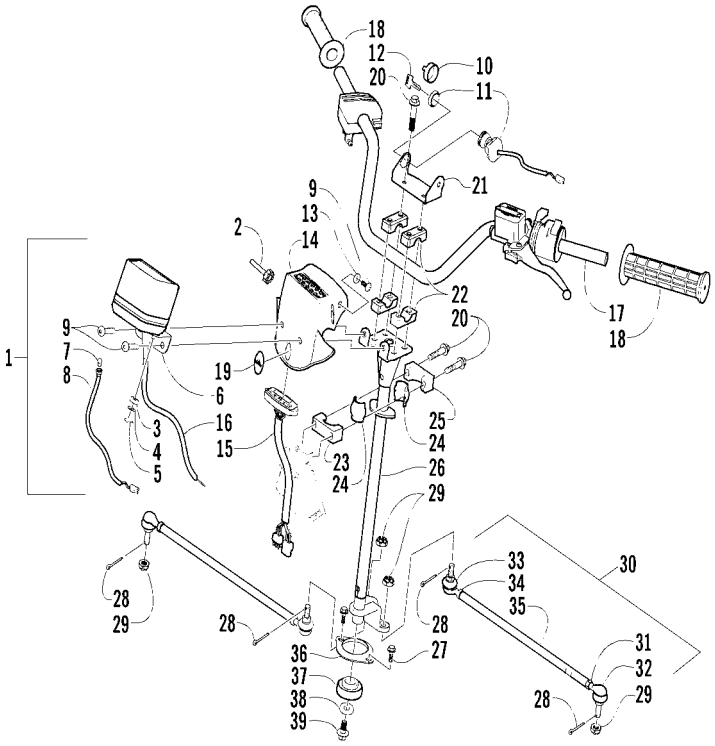
* 300 4x4 ** 2x4 Models

0737-835

KEY

1. Speedometer*
2. Knob*
3. Rubber Mount*
4. Washer*
5. Retainer Pin*
6. Bracket*
7. Bulb*
8. Harness*
9. Machine Screw
10. Key Cover
11. Ignition Switch
12. Key
13. Body Collar
14. Instrument Pod
15. LED Panel
16. Speedometer Cable*
17. Handlebar
18. Handlebar Grip
19. Plug**
20. Cap Screw
21. Bracket
22. Cap
23. Bearing Housing
24. Bearing
25. Bearing Housing
26. Steering Post
27. Cap Screw
28. Cotter Pin
29. Lock Nut

400/500



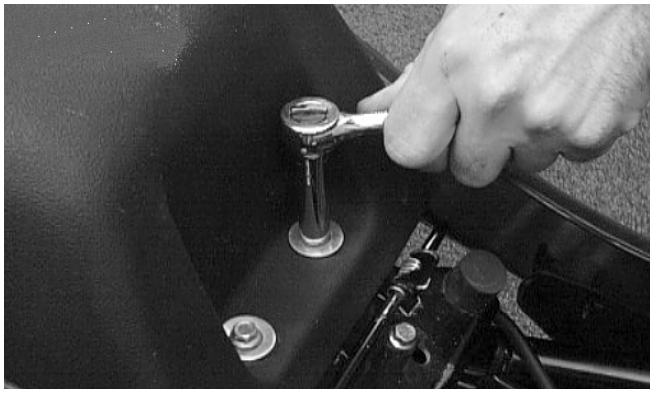
30. Tie Rod Assy
31. Nut
32. Ball Joint
33. Ball Joint
34. Nut
35. Tie Rod
36. Bearing Flange
37. Bearing w/Oil Seal
38. Washer
39. Cap Screw

* 4x4 Models ** 2x4 Models

0737-562

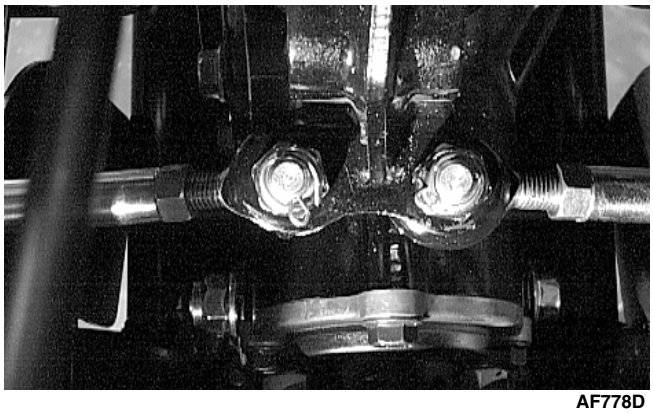
REMOVING

1. Remove the seat (see Seat in this section).
2. Turn the gas tank valve to the OFF position; then remove the left-side panel (see Front Fender/Side Panels in this section).
3. Disconnect the fuel hose to the carburetor.
4. Remove the screws and washers securing the gas tank.



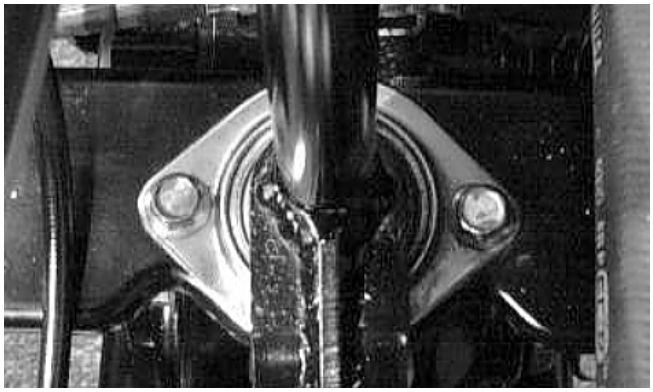
AL617D

5. Remove the cotter pin and slotted nut securing each tie rod end to the steering post arm. Remove the tie rod ends from the arm.



AF778D

6. Remove the cotter pin and slotted nut securing the side tie rod ends to the knuckles. Remove the tie rod ends from the knuckles; then remove the tie rods.
7. Remove the cap screws securing the steering post bearing flange.

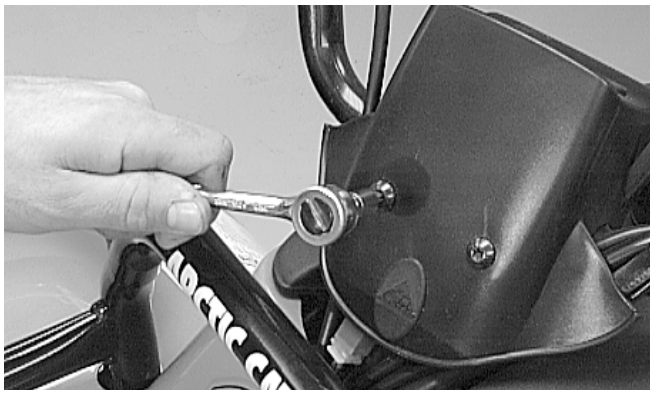


AL600D

8. On the 250/300 models, remove the screws securing the console. Account for a spacer.

CH084D

9. On the 400/500 models, remove the cap screws securing the instrument pod.

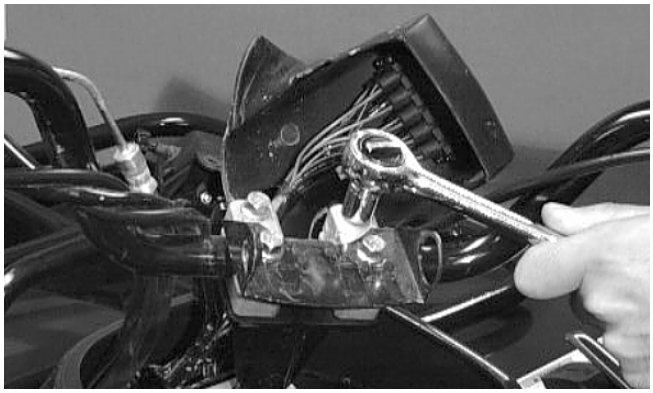


AL647D

10. Remove the retaining ring securing the ignition switch; then remove the machine screw (opposite the retaining ring). Account for a body collar.

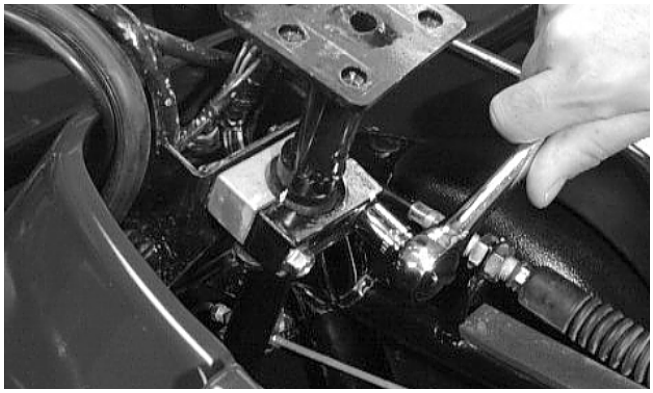
AF757D

11. Remove the four cap screws securing the handlebar caps (blocks) to the steering post; then move the handlebar out of the way.



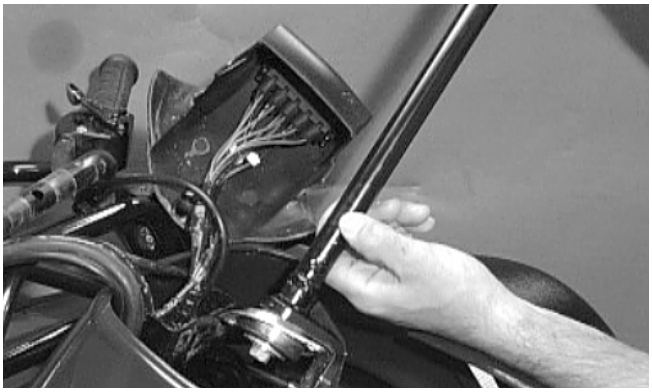
AL614D

12. Remove the two cap screws securing the upper steering post bearing housings to the frame.



AL619D

13. Remove the steering post.



AL618D

CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Wash the tie rod ends in parts-cleaning solvent. Dry with compressed air. Inspect the pivot area for wear. Apply a low-temperature grease to the ends.

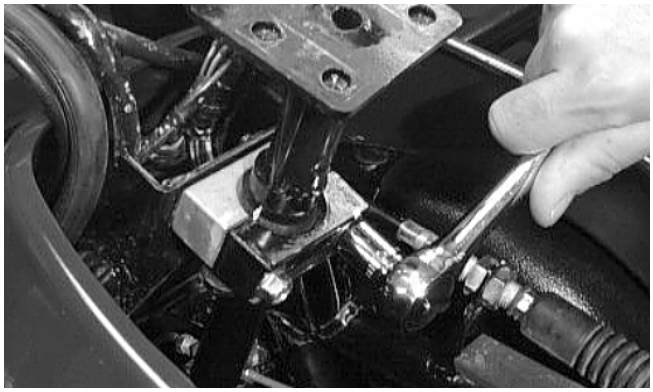
⚠ WARNING

Always wear safety glasses when using compressed air.

2. Inspect the tie rods for damaged threads or wear.
3. Inspect the tie rods for cracks or unusual bends.
4. Inspect all welded areas for cracks or deterioration.
5. Inspect the steering post and steering-post brackets for cracks, bends, or wear.
6. Inspect the bearing halves, bearing caps, and bearing housings for cracks or wear.
7. Inspect the handlebar tube for cracks, wear, or unusual bends.
8. Inspect the handlebar grips for damage or wear.

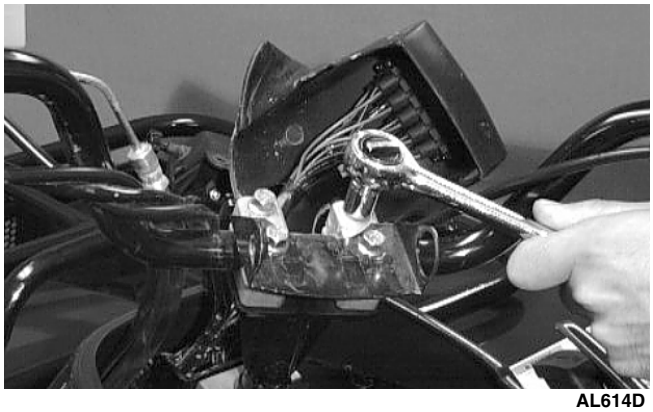
INSTALLING

1. Place the steering post into position; then place the upper steering post bearings and housings on the steering post and install the two cap screws through the housings and into the frame. Tighten the cap screws to 2.8 kg-m (20 ft-lb).



AL619D

2. Place the handlebar into position and secure with the handlebar caps (blocks). Tighten the four cap screws to 2.8 kg-m (20 ft-lb).



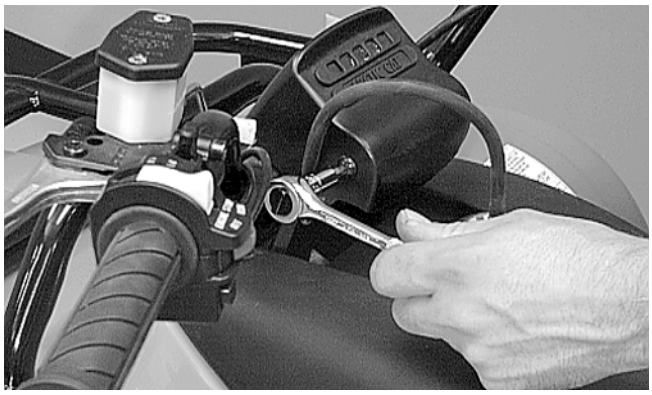
AL614D

3. On the 250/300 models, place the ignition switch into position; then place the console in position and secure with the screws, a spacer, and the retaining ring (opposite the screw).

CH087D

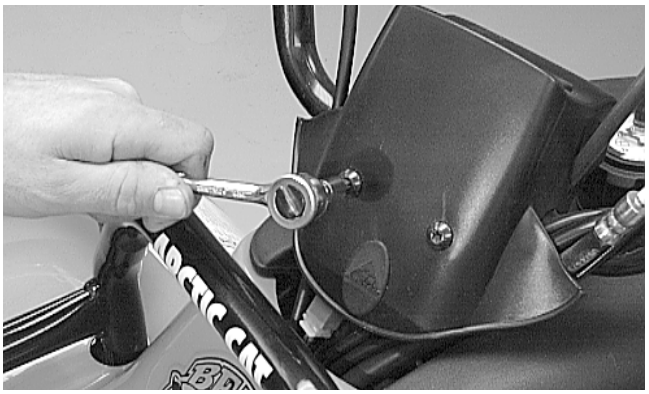
CH084D

4. On the 400/500 models, place the ignition switch into position; then place the instrument pod into position and secure with the machine screw, body collar, and the retaining ring (opposite the screw).



AF757D

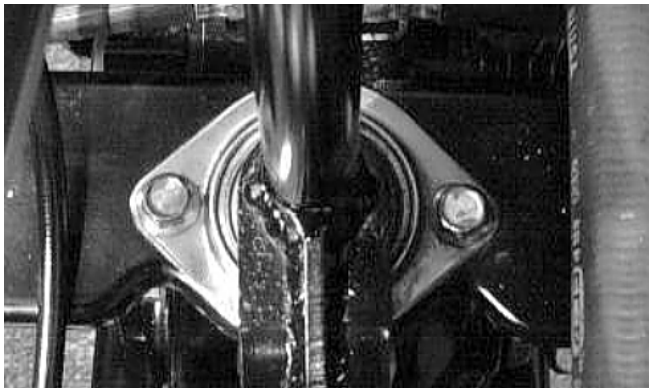
5. On the 400/500 models, secure the front of the instrument pod with cap screws.



AL647D

6. Place the steering post bearing flange into position. Secure with the cap screws tightened to 2.8 kg-m (20 ft-lb).

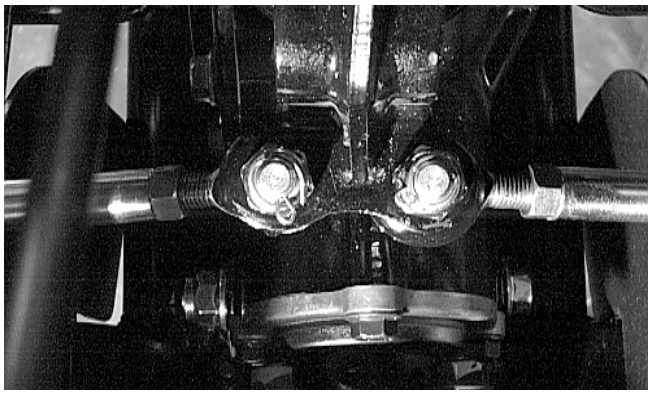
8



AL600D

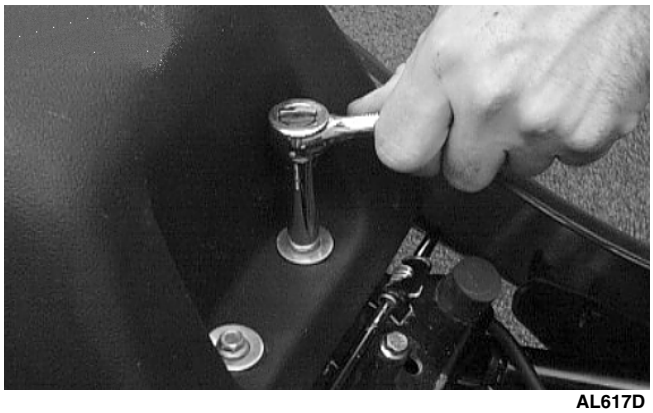
7. Insert the tie rod ends into the knuckles; then install the slotted nuts and tighten to 4.2 kg-m (30 ft-lb). Lock the nuts with new cotter pins.

8. Insert the tie rod ends into the steering post arm; then install the slotted nuts and tighten to 4.2 kg-m (30 ft-lb). Lock the nuts with new cotter pins.



AF778D

9. Place the gas tank into position. Secure with screws and washers.



AL617D

10. Connect the fuel hose to the carburetor.

11. Install the left-side panel (see Front Fender/Side Panels in this section); then install the seat (see Seat in this section).

■ NOTE: Turn the gas tank valve to the ON position only if starting the engine.

Handlebar Grip

REMOVING

1. Remove the plug from the head of the rivet.

2. Using a 1/8-in. drill bit, drill out the rivet.

3. Using compressed air between the grip and the handlebar, twist the grip back and forth until it slides free of the handlebar.

INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect the grip for wear, cuts, or cracks.

2. Inspect the grip for deterioration.

INSTALLING

■ NOTE: Before installing a grip, use contact spray or alcohol to clean the inside of the grip and the handlebar of glue residue, oil, or any other contaminant.

1. Apply a liberal amount of Handlebar Grip Adhesive (p/n 0636-071) to the inside of the grip.

2. Align the rivet hole in the grip with the rivet hole in the handlebar; then align the notch (inside the grip) with the slot in the handlbar and slide the grip onto the handlebar until it is fully seated.

3. Wipe off any excess glue; then secure the grip with a new rivet.

4. Install the plug on the head of the rivet.

Steering Knuckles

REMOVING AND DISASSEMBLING

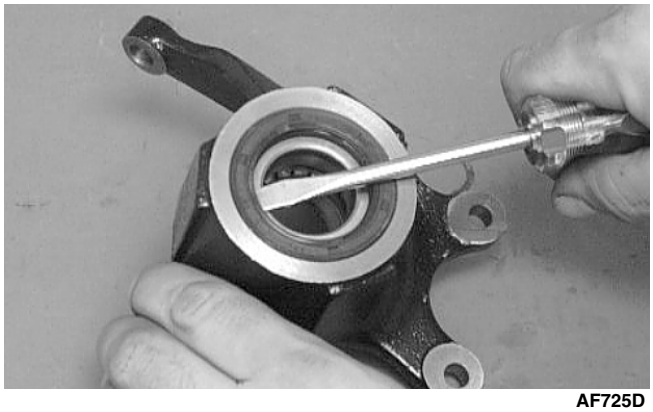
1. Secure the ATV on a support stand to elevate the wheel; then remove the wheel.

⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

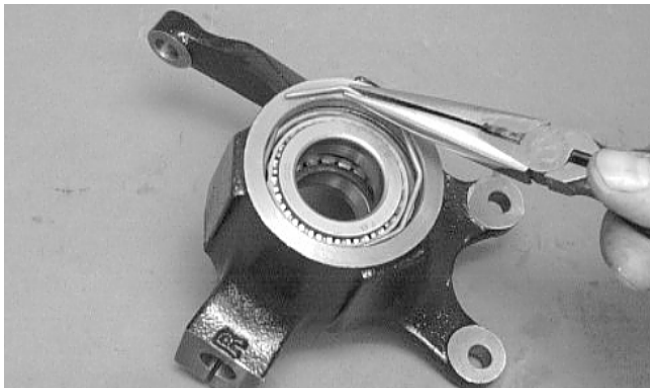
2. Remove the wheel cap from the hub; then remove the cotter pin from the nut.

3. Remove the nut securing the hub. Account for a washer and a hub seal.
4. Remove the brake caliper.
5. Remove the hub assembly.
6. Remove the cotter pin from the tie rod end and remove the tie rod end from the knuckle.
7. Remove the two cap screws securing the ball joints in the knuckle.
8. Tap the ball joint end out of the knuckle; then remove the knuckle.
9. Remove the seal from the knuckle.



AF725D

10. Remove the bearing retainer.



AF726D

11. Remove the bearings.

⚠ CAUTION

Use extreme care when removing the bearing. If the bearing is allowed to fall, it will be damaged and will have to be replaced.

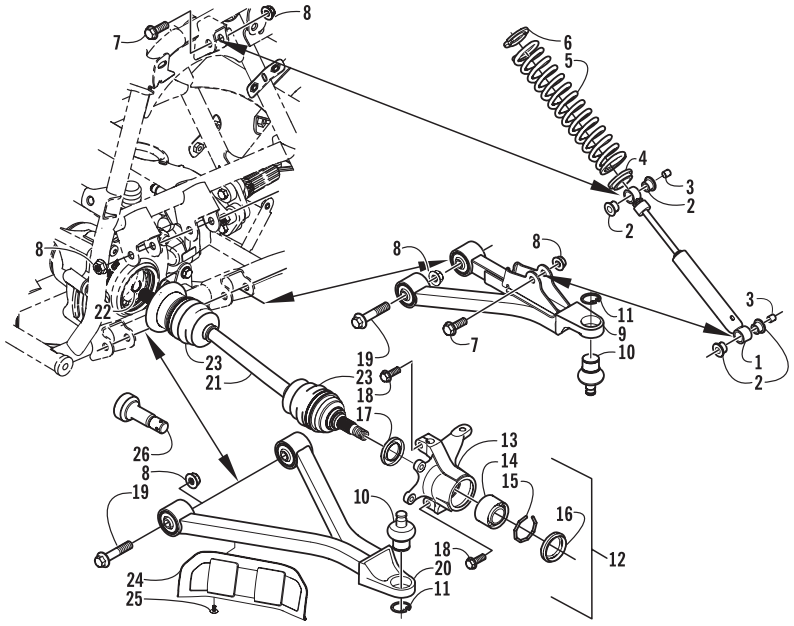
CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all knuckle components.
2. Inspect the bearing for pits, gouges, rusting, or premature wear.
3. Inspect the knuckle for cracks, breaks, or porosity.
4. Inspect threads for stripping or damage.

FRONT - 250/300

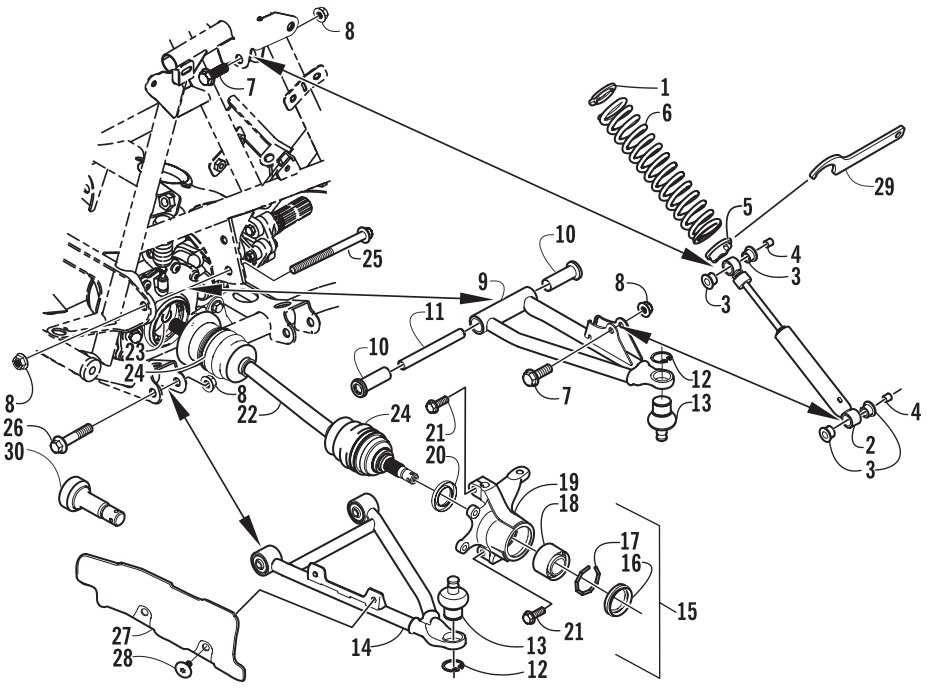
KEY
1. Shock Absorber
2. Bushing
3. Sleeve
4. Retainer
5. Spring
6. Retainer
7. Cap Screw
8. Lock Nut
9. A-Arm Assy
10. Ball Joint
11. Ball Joint Clip
12. Knuckle Assy
13. Knuckle
14. Bearing
15. Bearing Clip
16. Seal
17. Seal
18. Cap Screw
19. Cap Screw
20. A-Arm
21. Drive Axle (4x4)
22. Clip (4x4)
23. Boot Repair Kit (4x4)
24. Boot Guard (4x4)
25. Body Screw
26. Stub Axle (2x4)



0737-469

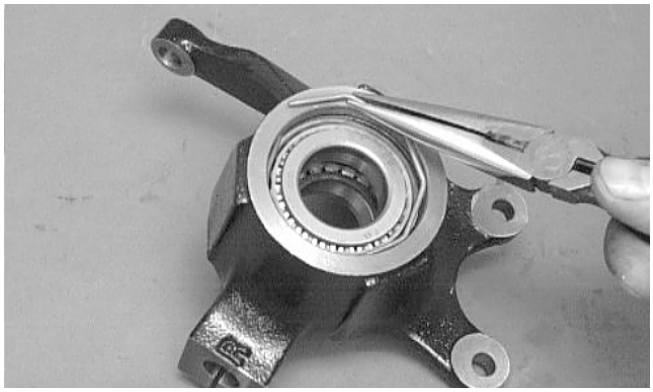
FRONT - 400/500

KEY
1. Retainer
2. Shock Absorber
3. Bushing
4. Sleeve
5. Adjuster Cam
6. Spring
7. Cap Screw
8. Lock Nut
9. A-Arm Assy
10. Bushing
11. Collar
12. Ball Joint Clip
13. Ball Joint
14. A-Arm
15. Knuckle Assy
16. Seal
17. Bearing Clip
18. Wheel Hub Bearing
19. Knuckle
20. Seal
21. Cap Screw
22. Drive Axle (4x4)
23. Clip (4x4)
24. Boot Repair Kit (4x4)
25. Cap Screw
26. Cap Screw
27. Boot Guard (4x4)
28. Body Screw
29. Spanner Wrench
30. Stub Axle (2x4)



0737-578

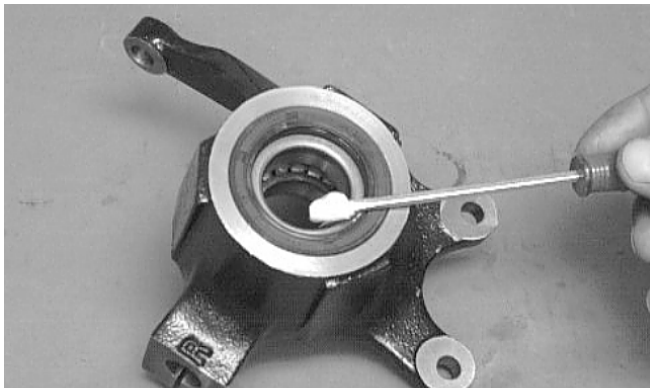
1. Install the bearing.
2. Install the bearing retainer.



AF726D

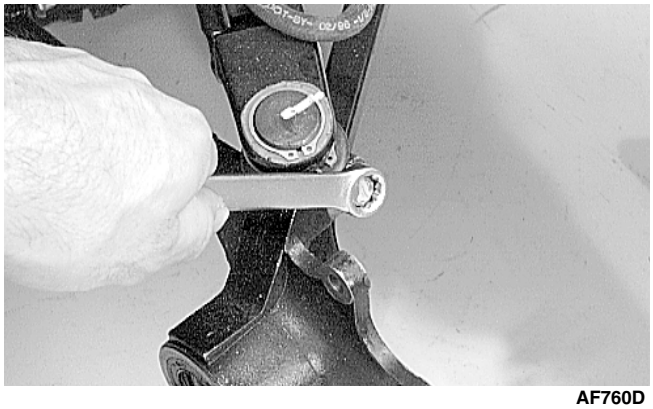
3. Install a new seal into the knuckle making sure the seal is flush with the knuckle.

4. Apply grease to the seal.



AF724D

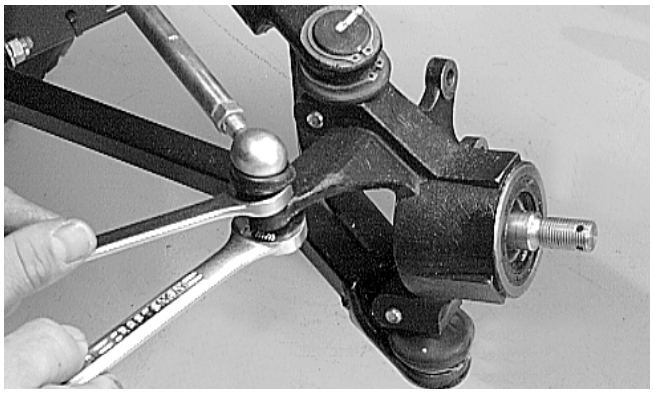
5. Install the knuckle to the upper and lower ball joints and secure with the two cap screws. Tighten to 4.8 kg-m (35 ft-lb).



AF760D

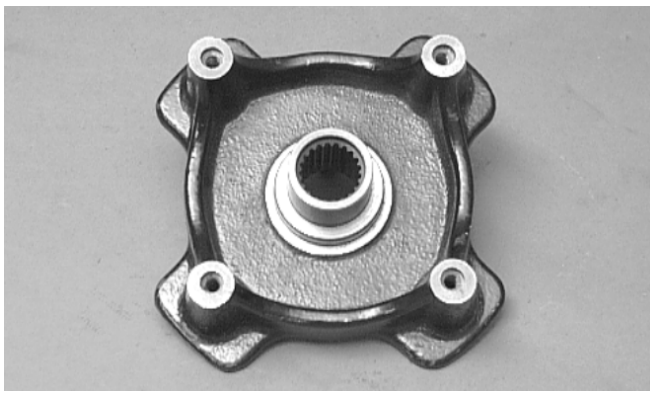
6. Install the tie rod end and secure with the nut. Tighten to 4.2 kg-m (30 ft-lb); then install a new cotter pin and spread the pin.

■ **NOTE: During assembling, new cotter pins should be installed.**



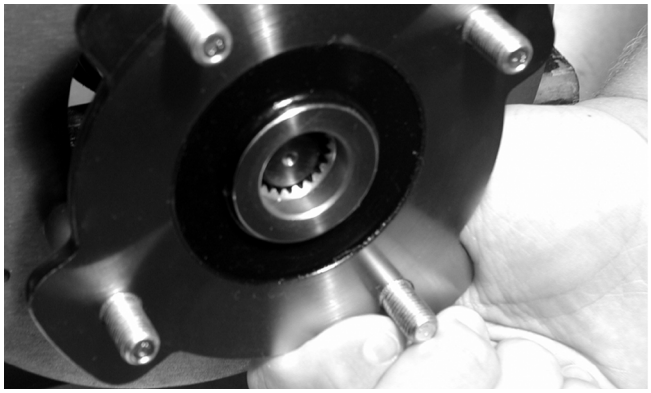
AF759D

7. Apply a small amount of grease to the hub sealing area and on the splines.



AF736D

8. Install the hub assembly onto the splines of the shaft.



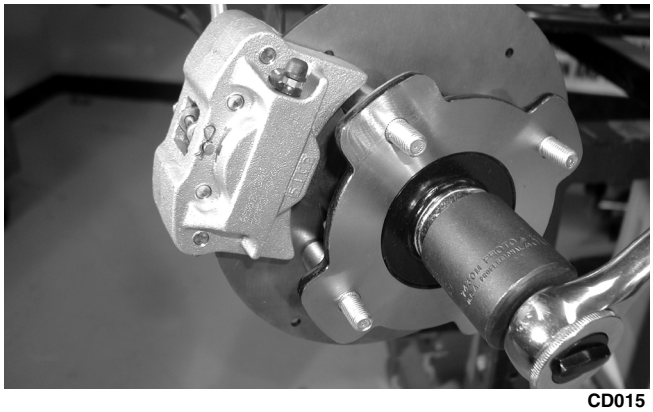
CD009

9. Insert the hub seal onto the shaft; then position it into the hub.

8

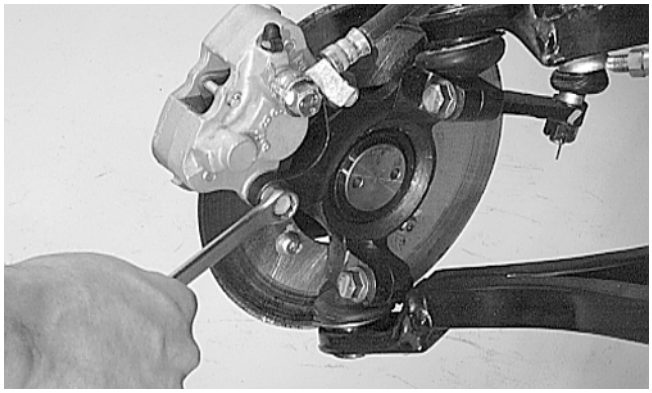
CD010

10. Place the washer onto the shaft; then secure the hub assembly with the nut. Tighten only until snug.



CD015

11. Secure the brake caliper to the knuckle with the two cap screws. Tighten to 2.8 kg-m (20 ft-lb).



AF746D

12. Secure the hub nut (from step 10) to the shaft. Tighten to 10.4 kg-m (75 ft-lb).
13. Install a new cotter pin and spread the pin to secure the nut.
14. Install the wheel cap.
15. Install the wheel and tighten to 5.5 kg-m (40 ft-lb).

CD006

16. Remove the ATV from the support stand.

Measuring/Adjusting Toe-In/Toe-Out

1. Thoroughly wash the ATV to remove excess weight (mud, etc.).
2. Refer to the specifications and ensure the tires are properly inflated to the recommended pressure.

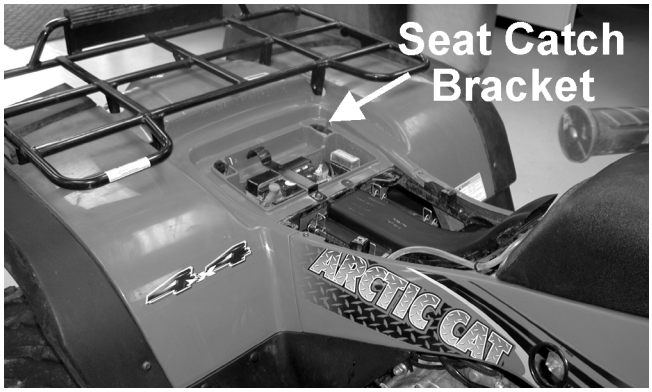
■ NOTE: Ensure the inflation pressure is correct in the tires or inaccurate measurements can occur.

CD005

3. Place the ATV in a level position taking care not to push down or lift up on the front end; then turn the handlebar to the straight ahead position.

■ NOTE: When measuring and adjusting, there should be a normal operating load on the ATV (without an operator but with Arctic Cat approved accessories).

4. Measure the distance from the outside edge of each handlebar grip to the seat catch brackets.



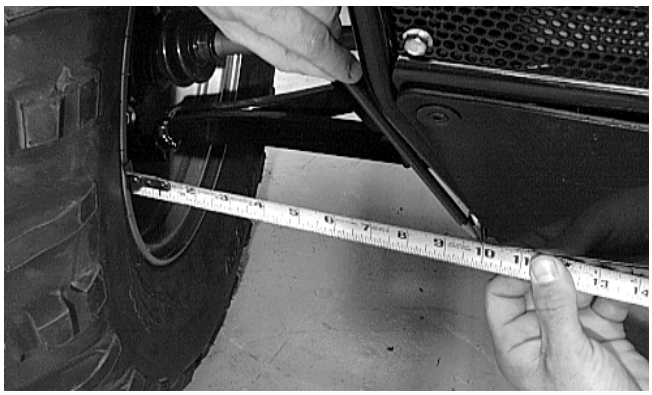
CD012A

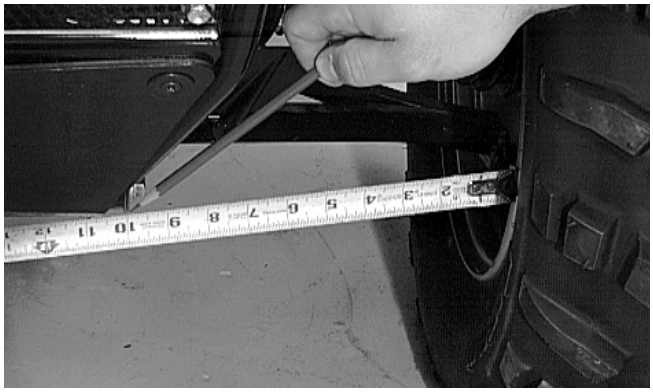
5. Adjust the handlebar direction until the two measurements are equal; then secure the handlebar to the rear rack using tie-down straps.

■ NOTE: Care must be taken not to allow the handlebar to turn while securing it.

CD014

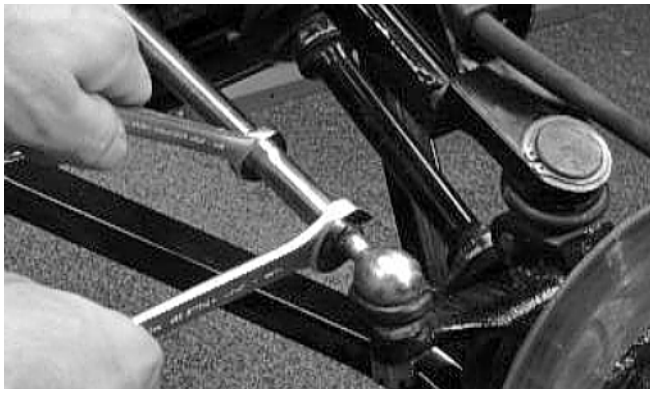
6. Measure the distance from the inside of each front rim to the lower frame tube.

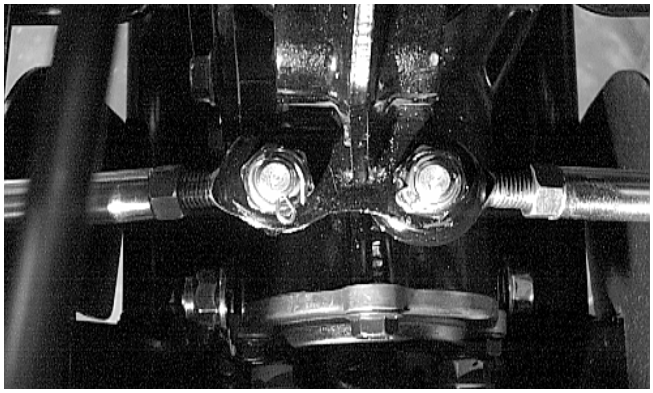

AF785D


AF786D

■ NOTE: The distances from the inside rims to the frame tubes should be equal. If the measurements are equal, proceed to step 8; if the measurements are not equal, proceed to step 7.

7. To make the measurements equal, loosen the appropriate tie rod jam nuts and adjust accordingly; then proceed to step 8.


AF617D


AF778D

■ NOTE: The front wheels do not have to be removed to adjust the tie rod. Also, care should be taken not to disturb the handlebar position.

8. Using a permanent marker of some type, mark the center of each front tire (at a height parallel to the belly panel).

AF789D

9. Measure the overall width of the front tires (at a height parallel to the belly panel) at the front side; then record the measurement.

10. Push the ATV forward until the marks are parallel to the belly panel on the back side; then measure the overall width of the front tires at the rear side.

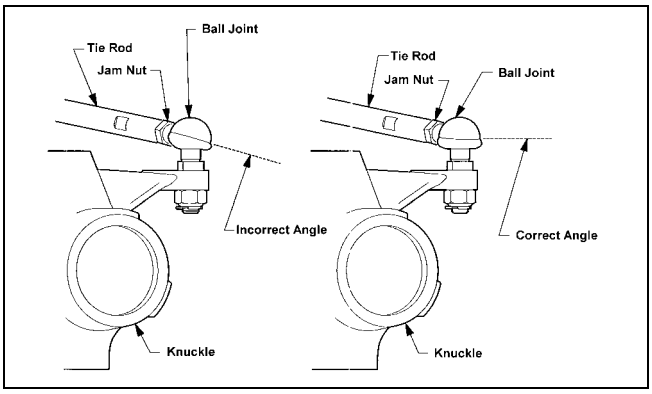
CD013

11. The difference in the measurements must show 6.4 mm (1/4 in.) toe-in (the front measurement 6.4 mm (1/4 in.) less than the rear measurement).

■ NOTE: The 6.4 mm (1/4 in.) toe-in difference is per side.

12. If the difference in the measurements does not show a 6.4 mm (1/4 in.) toe-in, adjust both tie rods equally in until within specification.

■ NOTE: Prior to locking the jam nuts, make sure the ball joints are at the center of their normal range of motion and at the correct angle.



733-559A

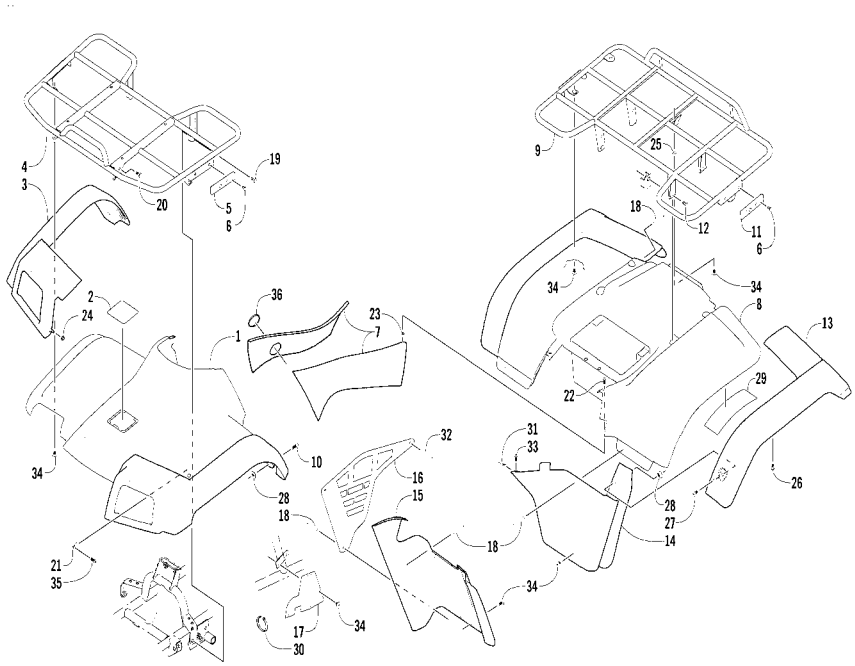
Body Panel Assembly Schematics

■ **NOTE: Some components may vary from model to model. The technician should use discretion and sound judgment.**

250/300

KEY

1. Fender Panel
2. Access Cover
3. Flare*
4. Rack
5. Reflector
6. Clip
7. Side Panel
8. Fender Panel
9. Rack
10. Screw
11. Reflector
12. Screw
13. Flare*
14. Fender Extension
15. Kick Panel
16. Deflector Panel
17. Fender Panel*
18. Rivet
19. Screw
20. Screw
21. Speed Nut
22. Screw
23. Expansion Nut
24. Stamped Nut
25. Rubber Washer
26. Screw*
27. Screw
28. T-Nut
29. Foil Tape
30. Cable Tie*
31. Clip
32. Plastic Rivet
33. Screw
34. Screw
35. Screw
36. Grommet



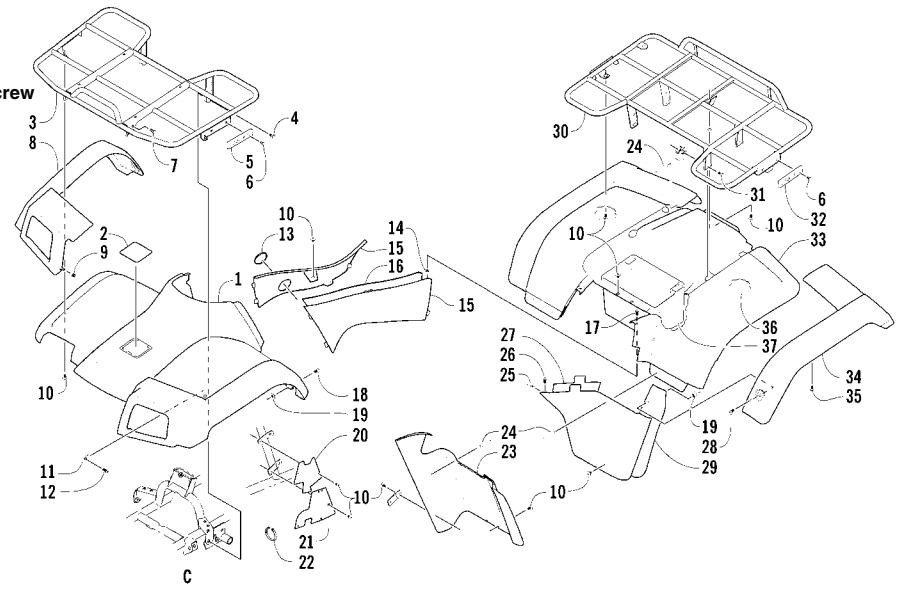
* 4x4 Models

0737-605

400/500

KEY

1. Fender Panel
2. Access Cover
3. Rack
4. Cap Screw
5. Reflector
6. Clip
7. Cap Screw
8. Flare*
9. Stamped Nut*
10. Body Screw
11. Speed Nut
12. Machine Screw
13. Grommet
14. Expansion Nut
15. Side Panel
16. Heat Shield
17. Machine Screw
18. Screw
19. T-Nut w/Teeth
20. Fender Panel
21. Fender Panel
22. Cable Tie
23. Kick Panel
24. Plastic Rivet
25. Clip
26. Self-Tapping Screw
27. Heat Shield
28. Screw
29. Fender Extension
30. Rack
31. Cap Screw
32. Reflector
33. Fender Panel
34. Flare
35. Self-Tapping Screw
36. Heat Shield
37. Heat Shield



* 4x4 Models

0737-567

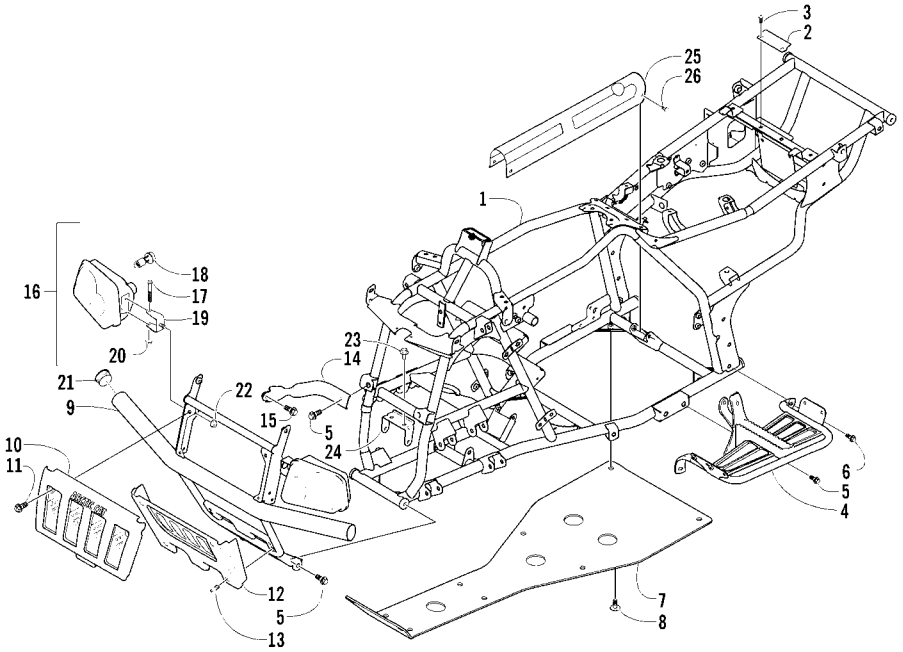
Frame/Exhaust Assembly Schematics

■**NOTE: Some components may vary from model to model. The technician should use discretion and sound judgment.**

KEY

1. Main Frame
2. Bracket
3. Machine Screw
4. Footrest
5. Cap Screw
6. Cap Screw
7. Belly Panel
8. Body Screw
9. Bumper
10. Grille
11. Machine Screw
12. Grille
13. Machine Screw
14. Bumper
15. Cap Screw
16. Headlight Assy
17. Cap Screw
18. Bulb
19. Bracket
20. Nut
21. Bumper Cap (300 4x4)
22. Nut
23. Cap Screw*
24. Bracket*
25. Driveshaft Cover*
26. Cap Screw*

250/300



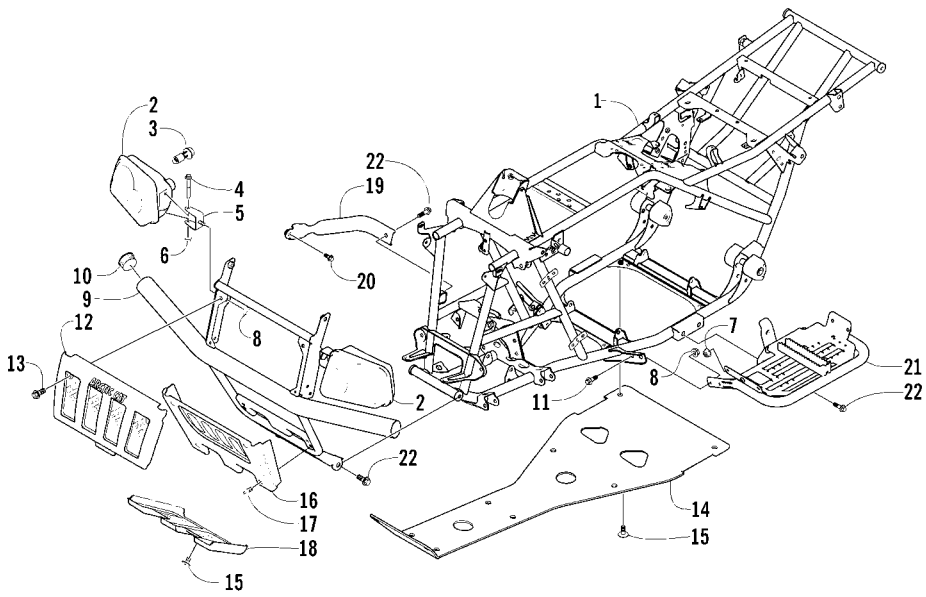
* 4x4 Models

0737-752

KEY

1. Main Frame
2. Headlight Assy
3. Bulb
4. Cap Screw
5. Bracket
6. Nut
7. Nut
8. Nut
9. Bumper
10. Cap
11. Cap Screw
12. Grille
13. Machine Screw
14. Belly Panel
15. Body Screw
16. Grille
17. Machine Screw
18. Skid Plate
19. Mounting Channel
20. Cap Screw
21. Footrest
22. Cap Screw

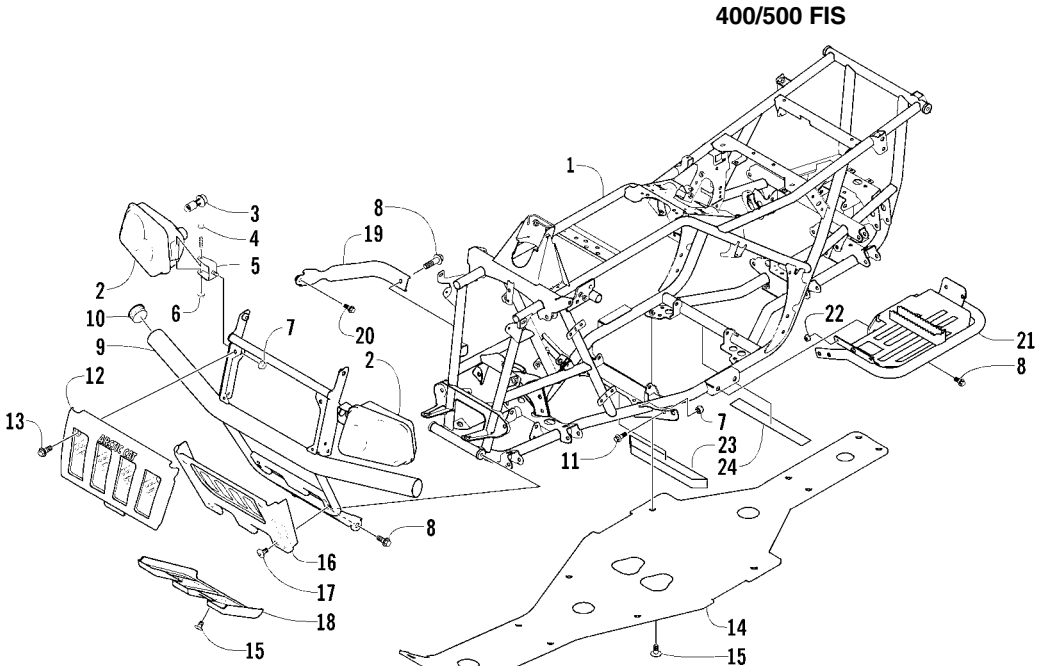
400/500 ACT



0737-594

KEY

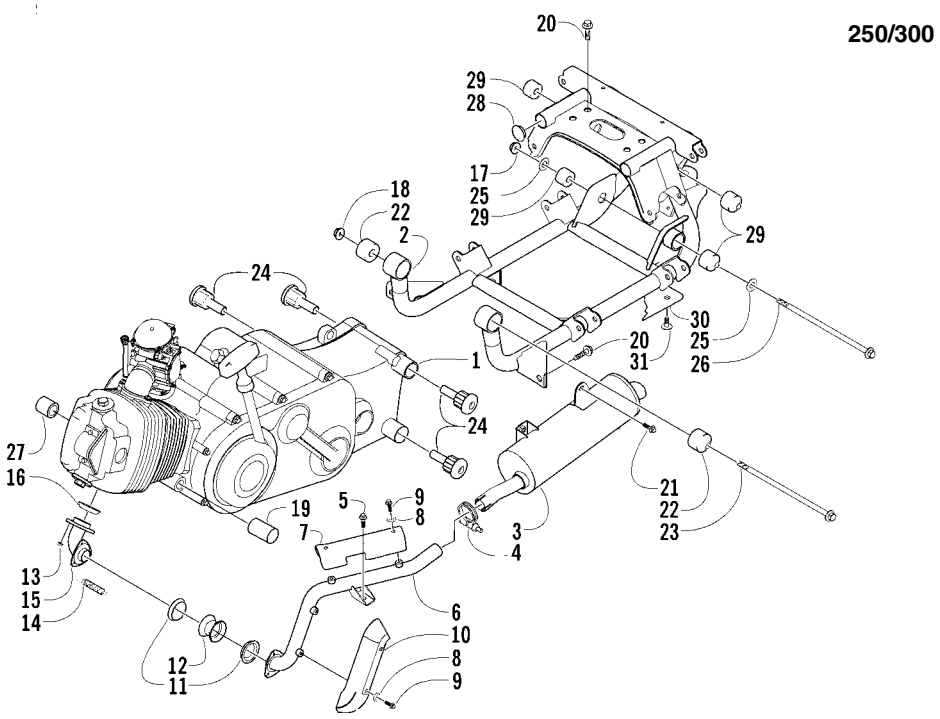
1. Main Frame
2. Headlight Assy
3. Bulb
4. Cap Screw
5. Bracket
6. Nut
7. Nut
8. Cap Screw
9. Bumper
10. Cap (4x4)
11. Cap Screw
12. Grille
13. Machine Screw
14. Belly Panel
15. Body Screw
16. Grille
17. Screw
18. Skid Plate
19. Mounting Channel
20. Cap Screw
21. Footrest
22. Nut



0737-584

KEY

1. Engine
2. Sub-Frame
3. Muffler
4. Clamp
5. Cap Screw
6. Exhaust Pipe
7. Cover
8. Lock Washer
9. Cap Screw
10. Cover
11. Gasket
12. Coupler
13. Nut
14. Extension Spring
15. Header Pipe
16. Seal
17. Nut
18. Nut
19. Spacer
20. Cap Screw
21. Cap Screw
22. Engine Mount
23. Cap Screw
24. Engine Mount
25. Washer
26. Cap Screw
27. Spacer
28. Cap
29. Engine Mount
30. Belly Panel*
31. Body Screw*



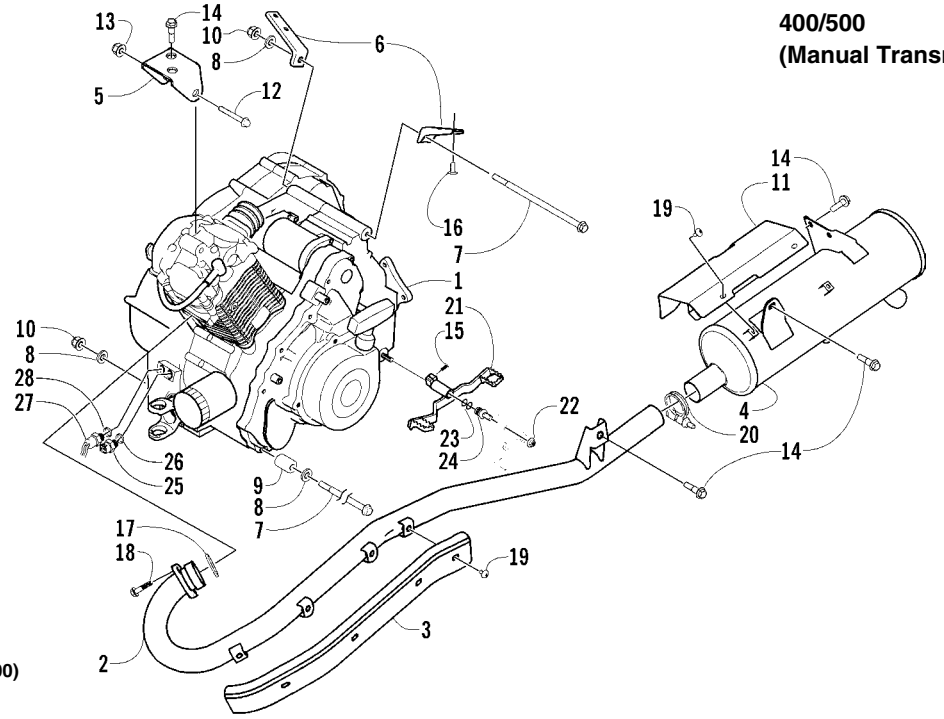
0737-750

* 300 4x4

KEY

1. Engine
2. Exhaust Pipe
3. Cover
4. Muffler
5. Engine Bracket
6. Bracket
7. Cap Screw
8. Washer
9. Spacer
10. Lock Nut
11. Cover
12. Cap Screw
13. Nut
14. Cap Screw
15. Machine Screw
16. Screw
17. Exhaust Seal
18. Cap Screw
19. Machine Screw
20. Clamp
21. Shift Lever
22. Nut
23. O-Ring
24. Pin
25. Fan Switch (400)
26. Gasket (400)
27. Oil Light Switch (400)
28. Gasket (400)

400/500
(Manual Transmission)

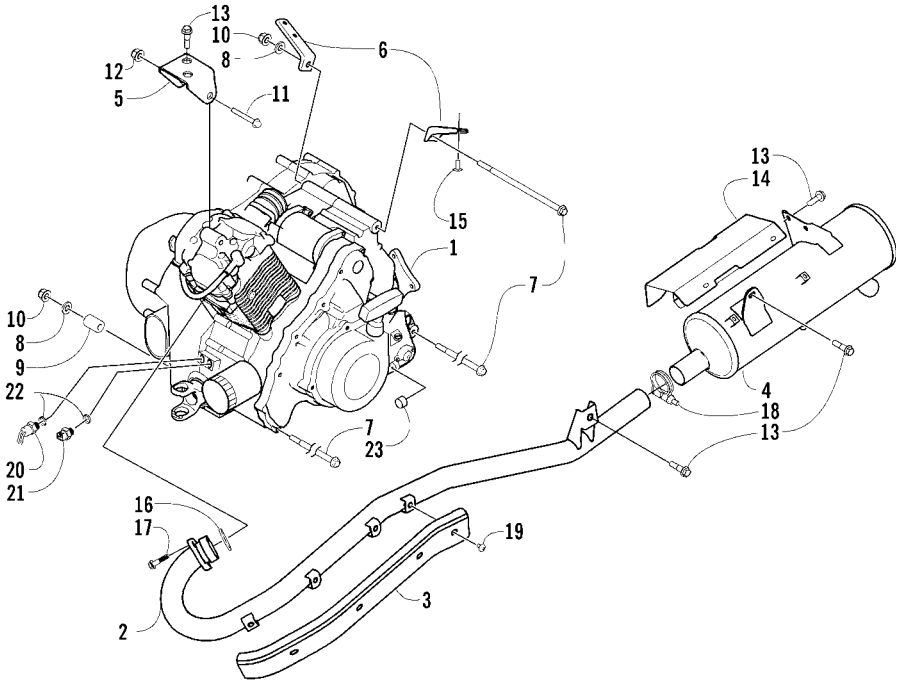


0737-597

KEY

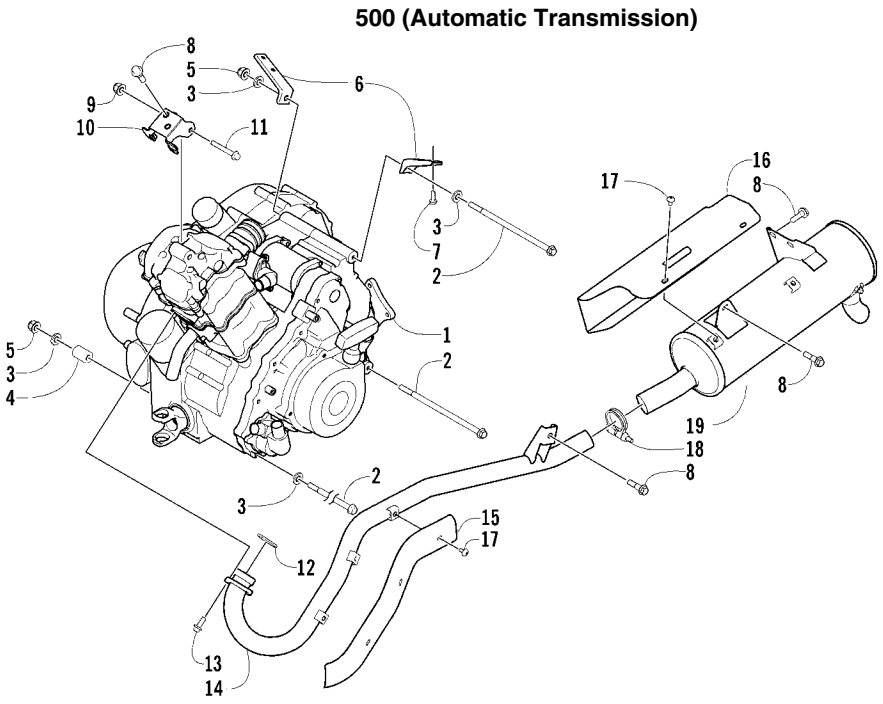
1. Engine
2. Exhaust Pipe
3. Cover
4. Muffler
5. Upper Bracket
6. Bracket
7. Cap Screw
8. Washer
9. Spacer
10. Lock Nut
11. Cap Screw
12. Nut
13. Cap Screw
14. Cover
15. Cap Screw
16. Exhaust Seal
17. Cap Screw
18. Clamp
19. Machine Screw
20. Fan Switch
21. Oil Light Switch
22. Gasket
23. Cap (2x4)

400 (Automatic Transmission)



0737-595

KEY
1. Engine
2. Cap Screw
3. Washer
4. Spacer
5. Lock Nut
6. Bracket
7. Cap Screw
8. Cap Screw
9. Nut
10. Bracket
11. Cap Screw
12. Seal
13. Cap Screw
14. Exhaust Pipe
15. Cover
16. Cover
17. Machine Screw
18. Clamp
19. Muffler

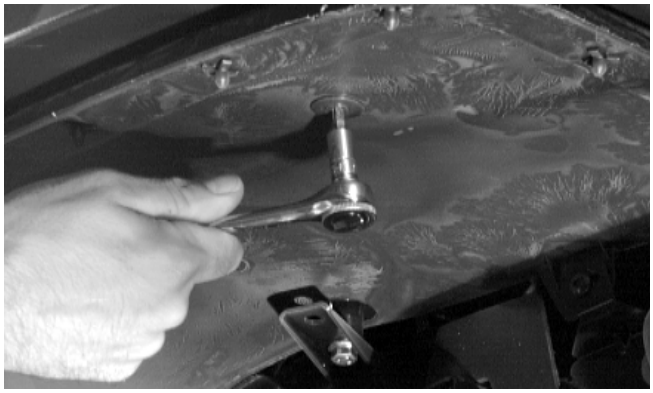


0737-700

Front Rack

REMOVING

1. Remove the two cap screws securing the fenders to the rack.



AF600DA

2. Remove the cap screws securing the rack to the frame and front bumper assembly.
3. Remove the front rack from the ATV.

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all rack components with parts-cleaning solvent.
2. Inspect all welds for cracking or bending.
3. Inspect threaded areas of all mounting bosses for stripping.
4. Inspect for missing decals and/or reflectors.

INSTALLING

1. Place the rack into position on the frame and bumper. Start the cap screws and finger-tighten only.
2. Install the two cap screws securing the rack to the fenders. Tighten all hardware securely.

Front Bumper Assembly

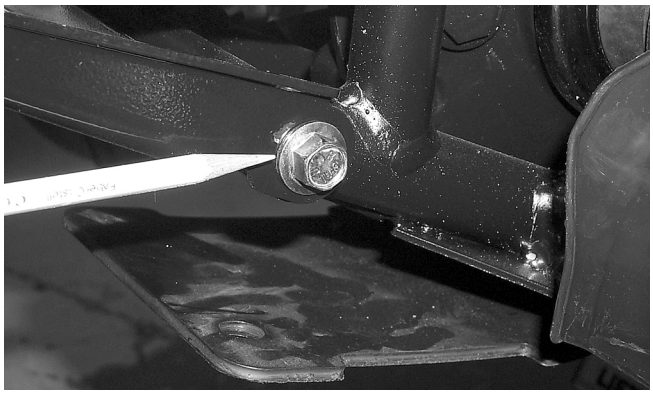
REMOVING

■ **NOTE: Remove the headlights with the front bumper.**

1. Remove the main wiring harness connectors from the four headlights.
2. Remove the two screws securing the grille to the front bumper.
3. Remove the two push nuts securing the fender extension to the front bumper. Push the fender extension studs out of the front bumper.

CC856

4. Remove the four cap screws securing the front skid plate to the front bumper.
5. Remove the two cap screws securing the front bumper to the frame.



CC858

6. Remove the two cap screws securing the front bumper to the front bumper supports.

CC857

7. Remove the front bumper with headlights.

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean all bumper components with parts-cleaning solvent.
2. Inspect all welds for cracking or bending.
3. Inspect threaded areas of all mounting bosses for stripping.
4. Inspect the wiring harness and headlights for damage.
5. Inspect the screen for damage or air-flow obstructions.

INSTALLING

1. Place the front bumper assembly into position on the frame and secure with four cap screws. Tighten securely.
2. Secure the front skid plate to the front bumper with the four cap screws. Tighten securely.
3. Place the two fender extension studs through the front bumper and secure with the existing push nuts.

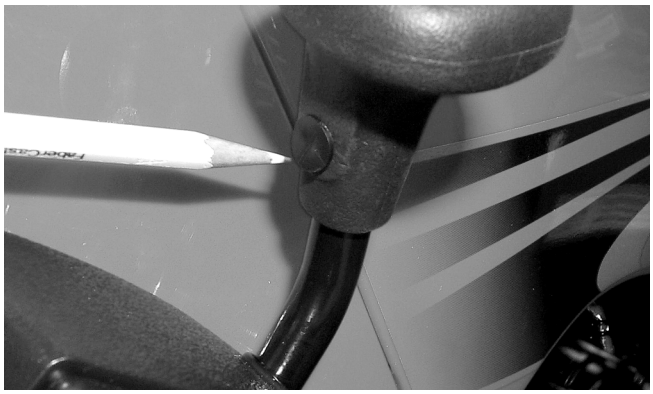
CC856

4. Position the grille in the front bumper and secure.
5. Connect the wiring to each of the headlights.

Front Fender/ Side Panels

REMOVING

1. Remove the front rack (see Front Rack in this section).
2. Remove the three cap screws securing the two side panels to the frame and rear fenders; then remove the side panels.
3. Using a small flat-blade screwdriver, carefully remove the retaining pin securing the gear shift knob to the shift lever; then remove the knob from the lever.



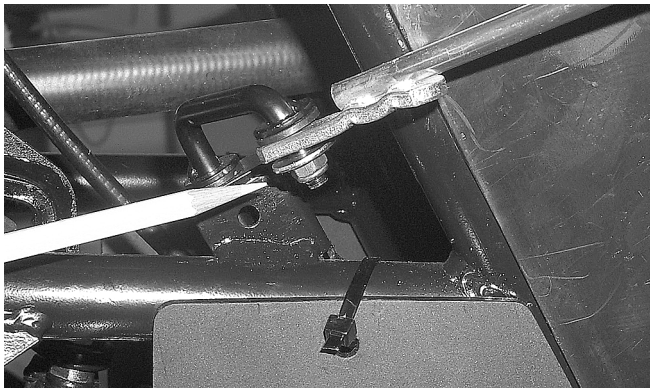
CC852

4. Remove the three machine screws securing the gear shift linkage cover to the fender and remove the cover.

■ **NOTE: The cover is located inside the left-front wheel well.**

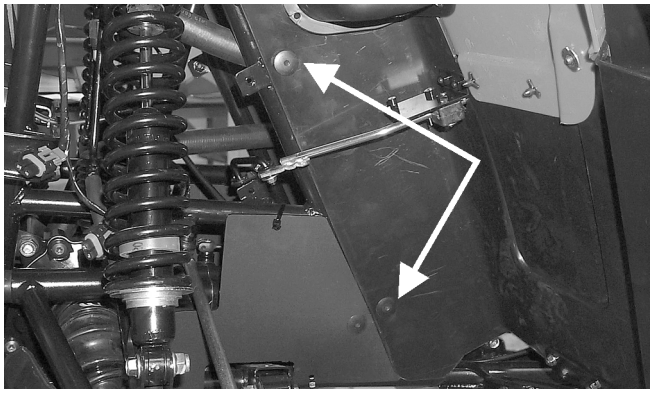
CC851

5. Remove the nut securing the drive selector linkage. Account for a washer and bushing.

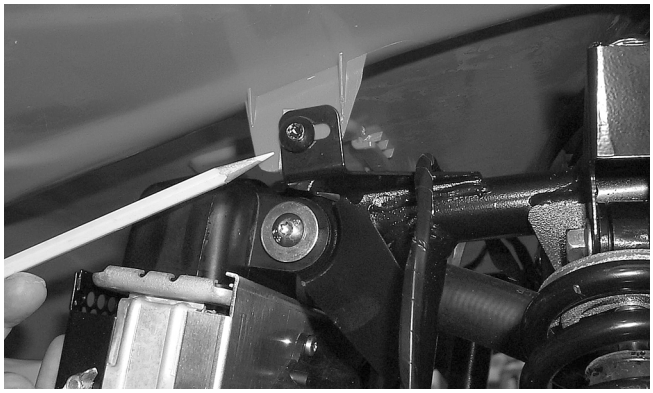


CC853

6. Remove the six cap screws securing the fender to the frame.

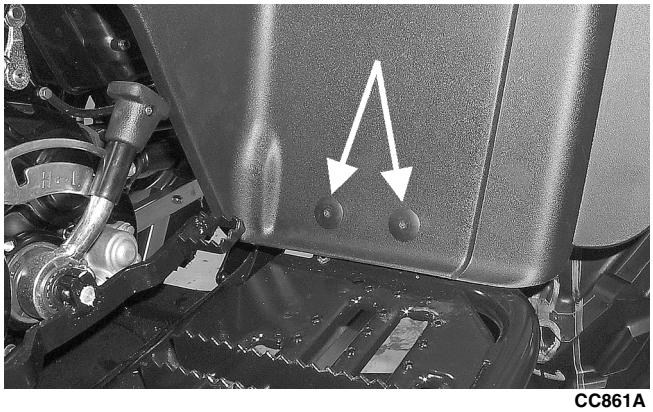


CC854A



CC855

7. Remove the four cap screws and nuts securing the fender to the footrests.



CC861A

8. Disconnect the wires from the accessory plug (if equipped); then remove the accessory plug from the fender.

9. Remove the fenders from the ATV.

CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all fender components with part-cleaning solvent and soap and water.

2. Inspect fenders for cracks and/or loose rivets.

3. Inspect for any missing decals.

INSTALLING

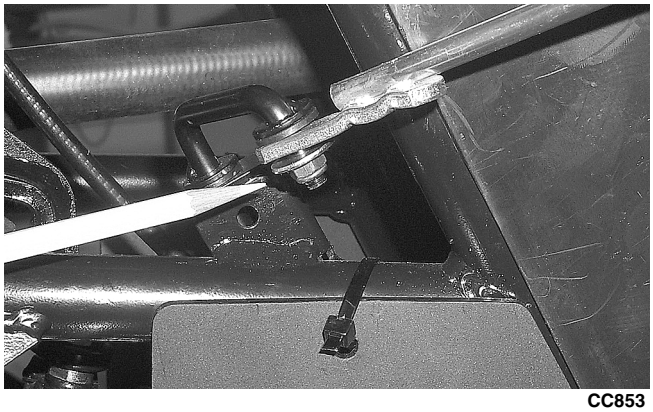
1. Place the fenders into position on the ATV.

2. Install the accessory plug (if equipped) into the fender; then connect the two accessory plug wires.

■ NOTE: The accessory plug red wire goes on the center connector.

3. Install the cap screws (five per side) securing the fenders to the frame and footrests and finger-tighten; then tighten the ten fasteners securely.

4. Connect the drive selector linkage using existing hardware. Tighten securely.



CC853

5. Install the gear shift linkage cover in the left-front fender well. Tighten securely.

CC851

6. Place the gear shift knob into position on the shift lever and secure with the retaining pin.

7. Place the side panels into position and secure.

8. Install the front rack (see Front Rack in this section).

Fender Flares/ Extensions

REMOVING

1. Using a side-cutter, remove the appropriate plastic rivets.

■ NOTE: To remove a front extension, first remove the grille; then remove the push nuts securing the extension to the bumper.

2. Remove the cap screws securing the extensions or flares to the frame and footrest.

3. Remove the self-tapping screws securing the extension to the fender.

INSTALLING

1. Place the flare or extension into position. Using the Plastic Rivet Setter (p/n 0444-056), secure with Plastic Rivets (p/n 0423-046) or suitable substitute.

2. Secure the extensions or flares with the cap screws and self-tapping screws.

Footrests

REMOVING

1. Remove the cap screws securing the fender extension to the footrest. Account for all cap screws and one nut.

■ NOTE: It will be easiest to remove the front inner cap screw by removing the nut from inside the wheel well.

2. On the right-side footrest, disconnect the foot brake switch from the main wiring harness.

3. Remove the cap screws securing the footrest to the frame; then remove the footrest.

■ NOTE: On the right-side footrest, it will be necessary to remove the foot brake cable from the brake pedal.

CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean the footrest in parts-cleaning solvent.

2. Inspect the footrest weldments for cracks or unusual bends.

3. Inspect all tubing for cracks or unusual bends.

INSTALLING

1. Connect the foot brake cable to the brake pedal (right-side footrest).

2. Place the footrest into position on the frame and loosely secure with the four cap screws.

3. Secure the fender extension to the footrest with existing hardware. Tighten securely.

4. Tighten the 10 mm footrest cap screws (from step 2) to 5.5 kg-m (40 ft-lb); then tighten the 8 mm cap screws (from step 2) to 2.8 kg-m (20 ft-lb).

5. Connect the foot brake switch to the main wiring harness. Ensure that the harness is properly secured to the frame and away from any moving parts.

Belly Panel

REMOVING

1. Remove the machine screws and shoulder washers securing the belly panel to the underside of the frame.

2. Remove the belly panel.

INSTALLING

1. Place the belly panel into position on the underside of the frame.

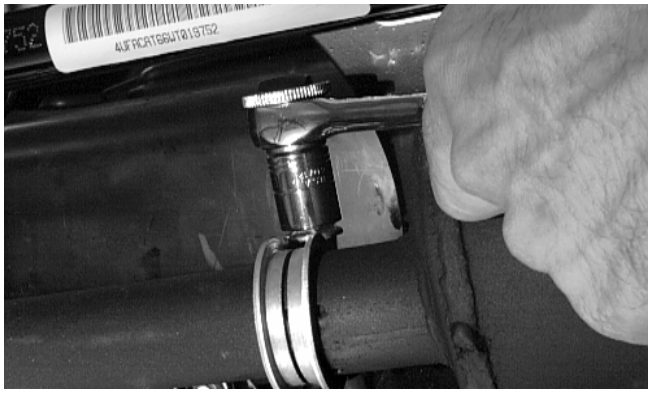
2. Install the machine screws and shoulder washers. Tighten securely.

Exhaust System

REMOVING MUFFLER

1. Remove the cap screws securing the muffler to the frame and account for all mounting hardware.

2. Loosen the clamp at the muffler/exhaust pipe juncture; then remove the muffler.



CH056D

INSPECTING MUFFLER

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

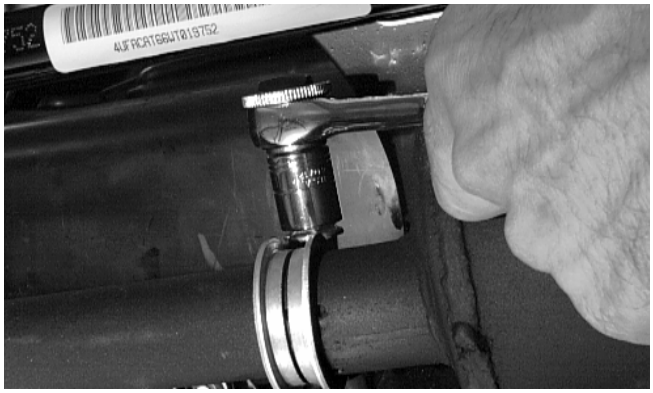
1. Inspect muffler externally for cracks, holes, and dents.

2. Inspect the muffler internally by shaking the muffler back and forth and listening for rattles or loose debris inside the muffler.

■ NOTE: For additional details on cleaning the muffler/spark arrester, see Section 2.

INSTALLING MUFFLER

1. Install the muffler on the frame and into the muffler/exhaust pipe juncture accounting for all mounting hardware.
2. Tighten cap screws securely; then tighten the juncture clamp.



CH056D

Rear Rack

REMOVING

1. Remove the cap screws securing the rear rack to frame and rear fenders. Account for any washers.
2. Lift the rack upward and remove from the frame.

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all rear rack components with parts-cleaning solvent.
2. Inspect all welds for cracking or bending.
3. Inspect threaded areas of all mounting bosses for stripping.
4. Inspect for missing decals and/or reflectors.

INSTALLING

1. Place the rack into position on the frame; then install the cap screws and any washers.
2. Tighten all fasteners securely.

Rear Fender

REMOVING

1. Remove the seat (see Seat in this section).
2. Remove the rear rack (see Rear Rack in this section).
3. Remove side panels (see Front Fender/Side Panels in this section).
4. Remove the cap screws and washers securing the fender to the frame and footrests.
5. On the 400/500 models:
   A. Remove the battery hold-down and tool kit and disconnect the battery cables (negative cable first) and the vent hose; then remove the battery.
   B. Remove the two screws securing the fuse panel to the fender; then disconnect all wires from the back of the panel.
   C. Route the battery cables, fuse panel wiring, and vent hose out of the fender through the hole at the bottom of the battery compartment.
6. Disconnect the taillight wiring harness three-prong connector; then remove the fender.

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all rear fender components with parts-cleaning solvent and soap and water.
2. Inspect side panels, fender extensions, and rear fenders for cracks and loose rivets.
3. Inspect threaded areas of all mounting bosses for stripping.
4. Inspect for missing decals.

INSTALLING

1. Place the fender into position on the frame.
2. On the 400/500 models:
   A. Route the battery cables, fuse panel wiring, and vent hose into the fender through the hole at the bottom of the battery compartment.
   B. Using the cover of the fuse panel and the appropriate wiring diagram (see Section 5) as guides, connect the fuse panel wires.

C. Secure the fuse panel to the fender with the two screws. Tighten securely.

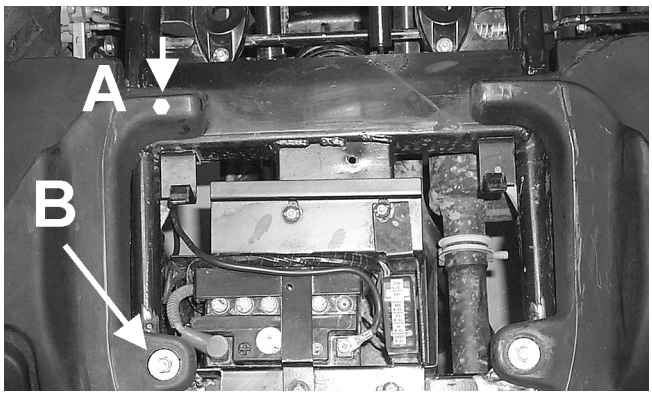
3. Secure the fender to the frame and footrests with existing cap screws and washers. Tighten securely.
4. On the 400/500, place the battery in position in the compartment; then install the vent hose, battery cables (positive cable first), the tool kit, and the battery hold-down.
5. Route the taillight wiring harness over the rear frame; then connect the three-prong connector.
6. Install the side panels (see Front Fender/Side Panels in this section).
7. Install the rear rack (see Rear Rack in this section).
8. Install the seat (see Seat in this section).

Side Box
(TBX Model)

REMOVING

1. Pull the cargo box release lever (located on the left side between the cargo box and the rear tire) and fully raise the cargo box.
2. Pull the seat lock lever forward (located below the right side of the seat), raise the front end of the seat, and slide it forward and off the ATV.
3. Remove the two cap screws (located inside the side box) securing the side box to the footrest.
4. Remove the screw securing the side box to the side panel.
5. Remove the two cap screws (A and B) securing the side box to the frame.

■NOTE: Cap screw (A) is in the position shown and is accessed from under the frame.



CC865A

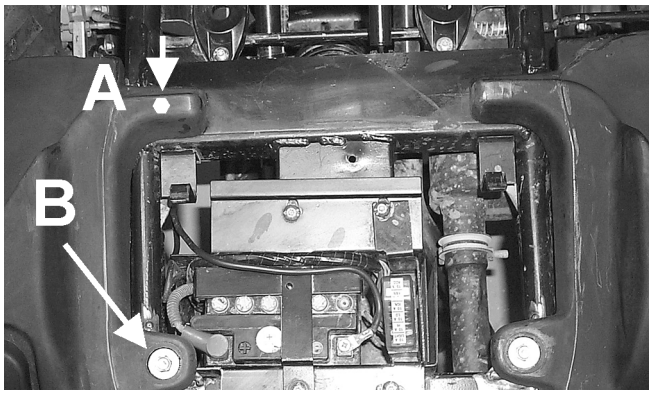
CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all side box components with soap and water.
2. Inspect the side box for cracks, tears, and loose mounting hardware.
3. Inspect the side box hatch O-ring seals for cuts or tears.

INSTALLING

1. Place the side box into position on the frame; then secure with the two cap screws (A and B). Tighten cap screw (A) to 2.5 kg-m (18 ft-lb) and cap screw (B) to 2.8 kg-m (20 ft-lb).



CC865A

2. Secure the side box to the side panel with the existing screw.
3. Secure the side box to the footrest with existing hardware. Tighten securely.
4. Install the seat.
5. Lower and latch the cargo box.

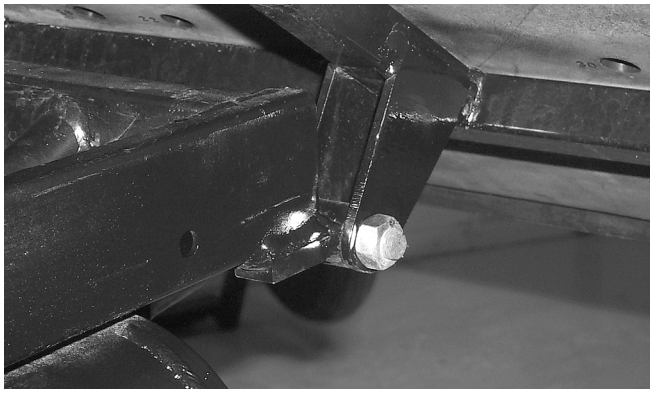
Cargo Box
(TBX Model)

REMOVING

1. Pull the cargo box release lever (located on the left side between the cargo box and the rear tire) and fully raise the cargo box.
2. Remove the hairpin clip and clevis pin securing the cargo box support arm to the cargo box frame; then lower the cargo box.

3. Remove the two cap screws and lock nuts securing the cargo box to the frame; then remove the cargo box and discard the lock nuts.

■ NOTE: Never reuse a lock nut. Once a lock nut has been removed, it must be replaced with a new lock nut.



CC866

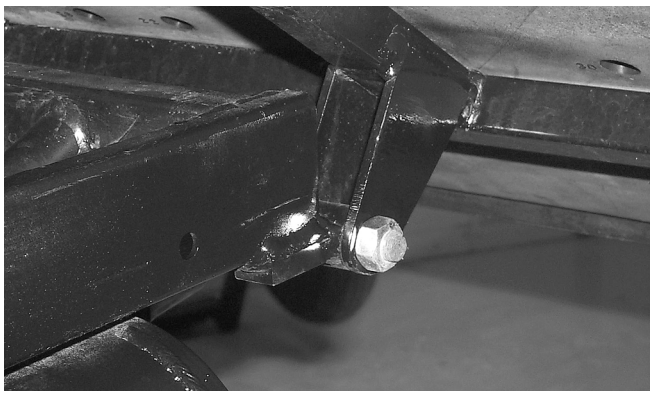
CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all cargo box components with soap and water.
2. Inspect the cargo box for cracks, tears, and loose mounting hardware.
3. Inspect the welds of the cargo box frame for cracking or bending.
4. Inspect the cargo box gate latches for smooth operation.

INSTALLING

1. Place the cargo box into position on the frame. Secure with cap screws and new lock nuts. Tighten to 4.8 kg-m (35 ft-lb).



CC866

2. While an assistant holds the cargo box in the raised position, secure the cargo box support arm to the cargo box frame with a clevis pin and hair-pin clip.
3. Lower and latch the cargo box.

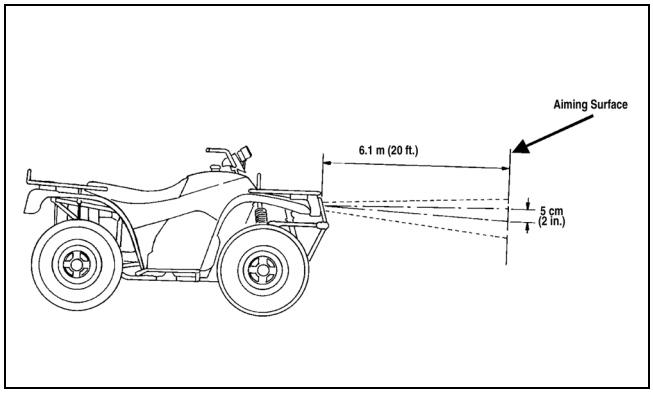
Adjusting Headlight

The headlights can be adjusted vertically and horizontally. The geometric center of the HIGH beam light zone is to be used for vertical and horizontal aiming.

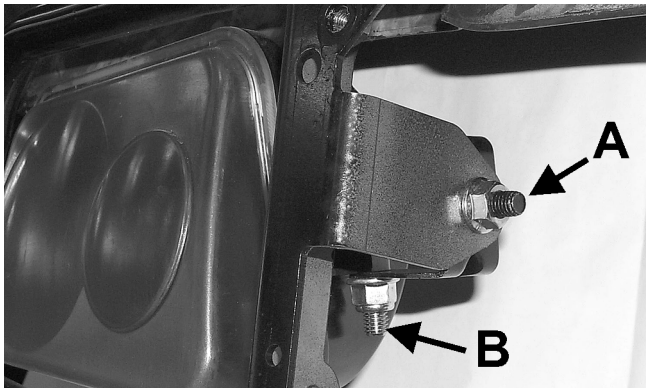
1. Position the ATV on a level floor so the headlights are approximately 6.1 m (20 ft) from an aiming surface (wall or similar aiming surface).

■ NOTE: There should be an average operating load on the ATV when adjusting the headlight aim.

2. Measure the distance from the floor to the mid-point of each headlight.
3. Using the measurements obtained in step 2, make horizontal marks on the aiming surface.
4. Make vertical marks which intersect the horizontal marks on the aiming surface directly in front of the headlights.
5. Switch on the lights. Make sure the HIGH beam is on. DO NOT USE LOW BEAM.
6. Observe each headlight beam aim. Proper aim is when the most intense beam is centered on the vertical mark 5 cm (2 in.) below the horizontal mark on the aiming surface.



ATV-0070



AF926A

7. Adjust each headlight until correct aim is obtained.

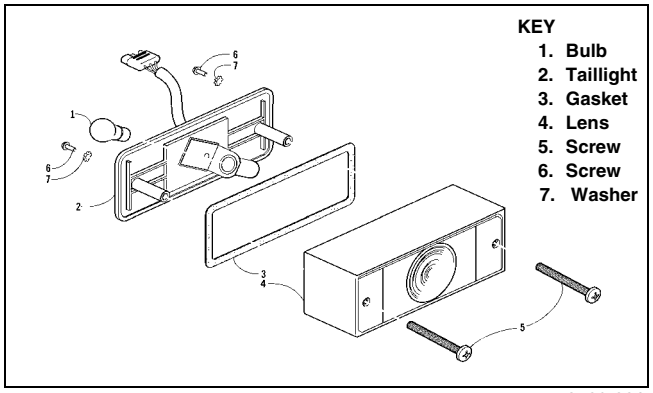
   A. Horizontal - Loosen nut (A) and adjust for proper aiming. Tighten the nut securely.

   B. Vertical - Loosen nut (B) and adjust for proper aiming. Tighten the nut securely.

⚠ WARNING

Do not operate the ATV unless the headlight beam is adjusted properly. An incorrectly adjusted beam will not provide the operator the optimum amount of light.

Taillight Assembly



0732-336

REMOVING

1. Unplug the three-prong connector and free the taillight wiring harness from the frame.
2. Remove the torx-head cap screws securing the taillight assembly to the frame. Account for any washers.
3. Remove the taillight assembly.

INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect wiring harness, three-prong connector, lens, base, cap screws, and socket for damage.
2. Inspect all wires for corroding, pinching, and cracking.
3. Inspect the bulb for wattage, voltage, and proper operation.

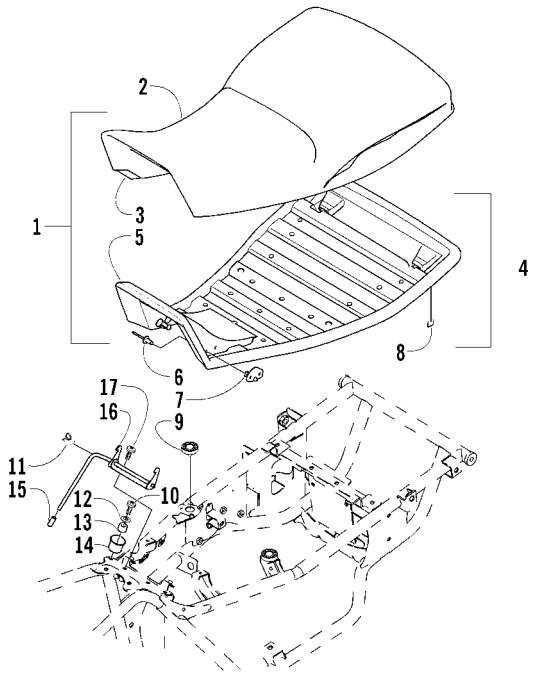
INSTALLING

1. Place the assembly into position on the frame and secure with torx-head cap screws and any washers.
2. Tighten the cap screws securely.
3. Route the wiring harness over the rear frame; then connect the three-prong connector.

Seat

REMOVING/INSTALLING (250/300)

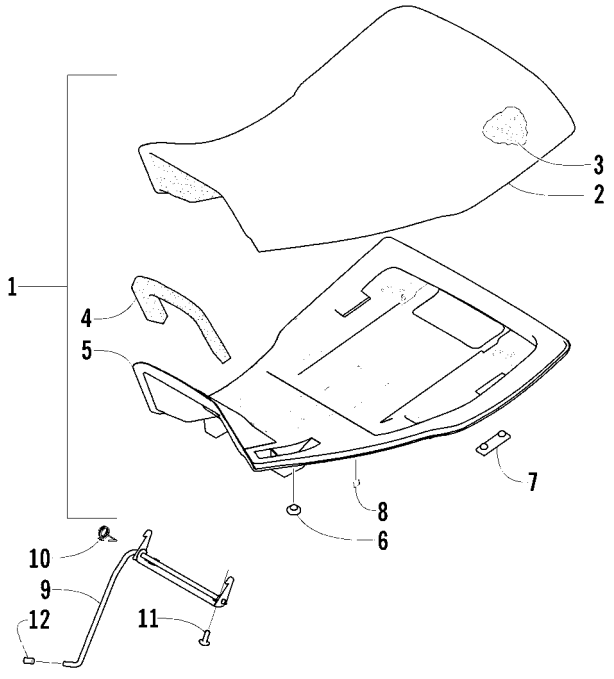
KEY
1. Seat Assy
2. Cover
3. Foam
4. Base Assy
5. Base
6. Rivet
7. Base Pin
8. Staple
9. Grommet
10. Cap Screw
11. Spring
12. Washer
13. Collar
14. Base Bumper
15. Protector Cap
16. Seat Latch Assy
17. Machine Screw



0737-462

REMOVING/INSTALLING (500 TBX)

KEY
1. Seat Assy
2. Cover
3. Foam
4. Foam
5. Base Assy
6. Base Bumper
7. Base Bumper
8. Staple
9. Seat Latch
10. Spring
11. Screw
12. Protector Cap

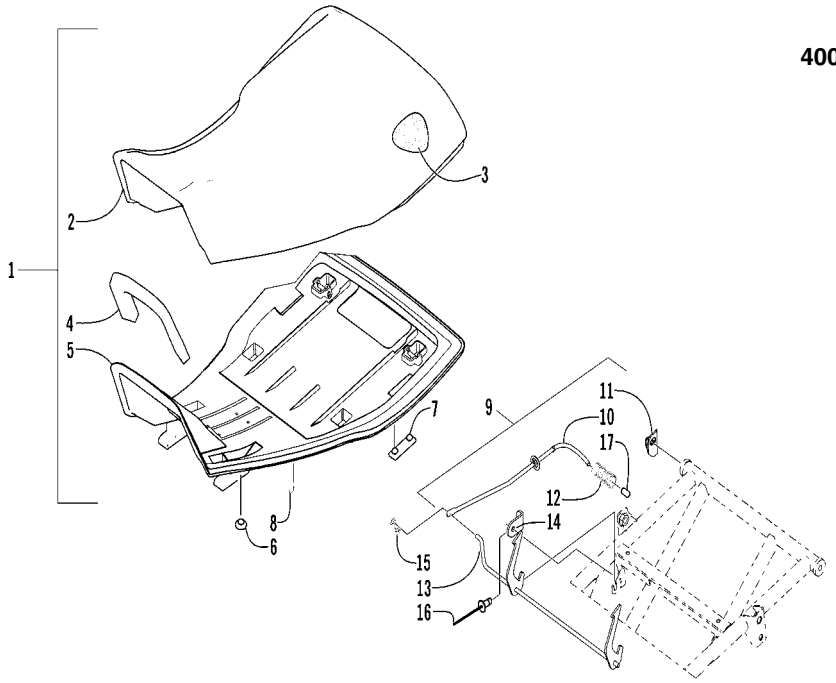


737-906A

1. To remove the seat, pull the seat lock lever forward (located below the right side of the seat). Raise the front end of the seat and slide it forward.
2. To lock the seat into positon, slide the front of the seat into the seat retainers and push down firmly on the rear of seat. The seat should automatically lock into position.

REMOVING/INSTALLING (400/500)

KEY
1. Seat Assy
2. Cover
3. Foam
4. Foam
5. Base Assy
6. Base Bumper
7. Base Bumper
8. Staple
9. Release Rod Assy
10. Release Rod
11. Bracket
12. Spring
13. Seat Latch
14. Plate
15. Clip
16. Rivet
17. Protector Cap



0737-561

1. To remove the seat, pull the seat lock lever backward (located under the rear rack between the storage compartment and the frame). Raise the rear of the seat and slide it rearward.

2. To lock the seat into positon, slide the front of the seat into the seat retainers and push down firmly on the rear of seat. The seat should automatically lock into position.

NOTES

SECTION 9 - CONTROLS/INDICATORS

9

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Hand Brake Lever/ Master Cylinder Assembly

■ NOTE: The master cylinder is a non-serviceable component; it must be replaced as an assembly.

REMOVING

1. Slide a piece of flexible tubing over one of the wheel bleeder valves and direct the other end into a container. Remove the reservoir cover; then open the bleeder valve. Allow the brake fluid to drain completely.

AF637D

2. Place an absorbent towel around the connection to absorb brake fluid. Remove the brake hose from the master cylinder.

AF774D

⚠ CAUTION

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the ATV.

3. Remove the clamp screws securing the brake assembly to the handlebar; then remove the assembly from the handlebar.

AF656D

DISASSEMBLING

1. Remove the lever mounting bolt and lock nut securing the brake lever to the master cylinder.

2. Remove the two screws securing the reservoir to the master cylinder; then remove the reservoir. Account for the gasket, the cover, and the O-ring.

INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

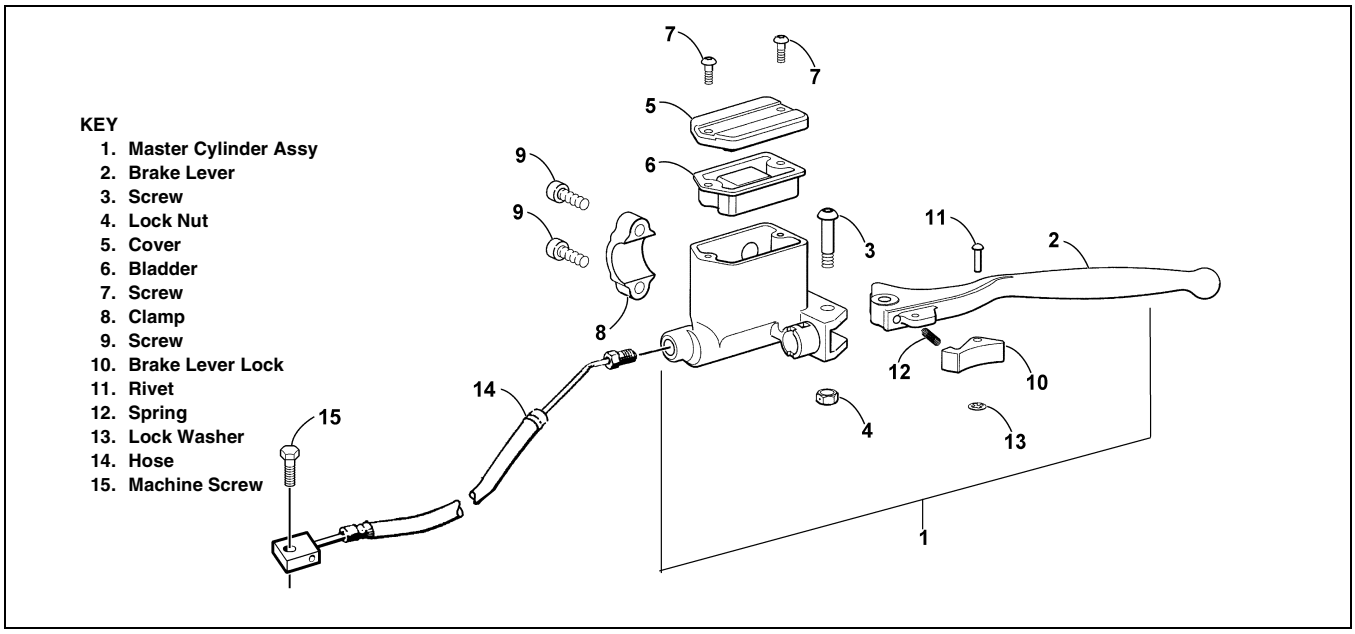
1. Inspect the bolt securing the brake lever for wear and for cracked, stretched, or damaged threads.

2. Inspect the O-ring for deterioration and distortion.

3. Inspect the reservoir for cracks and leakage.

4. Inspect the brake hose for cracks and deterioration and the condition of the fittings (threaded and compression).

ASSEMBLING



0735-650

1. Install the O-ring, reservoir, gasket, and cover on the master cylinder. Tighten the two screws to 0.03 kg-m (10 in.-lb).

2. Install the brake lever onto the master cylinder and secure with the lever mounting bolt and new lock nut. Tighten the lock nut just to the point of ensuring free brake lever movement.

⚠ WARNING

Do not over-tighten the lock nut. Over-tightening the lock nut will cause the brake lever to bind. The lever must work freely and fully return to its stop after installation.

⚠ WARNING

A new lock nut must be used to secure the brake lever.

INSTALLING

1. Position the brake assembly on the handlebar. Secure with clamp screws; then tighten securely.

AF656D

2. Install the brake hose on the master cylinder. Tighten to 0.8 kg-m (6 ft-lb).

AF774D

3. Bleed the brake system (see Section 2).

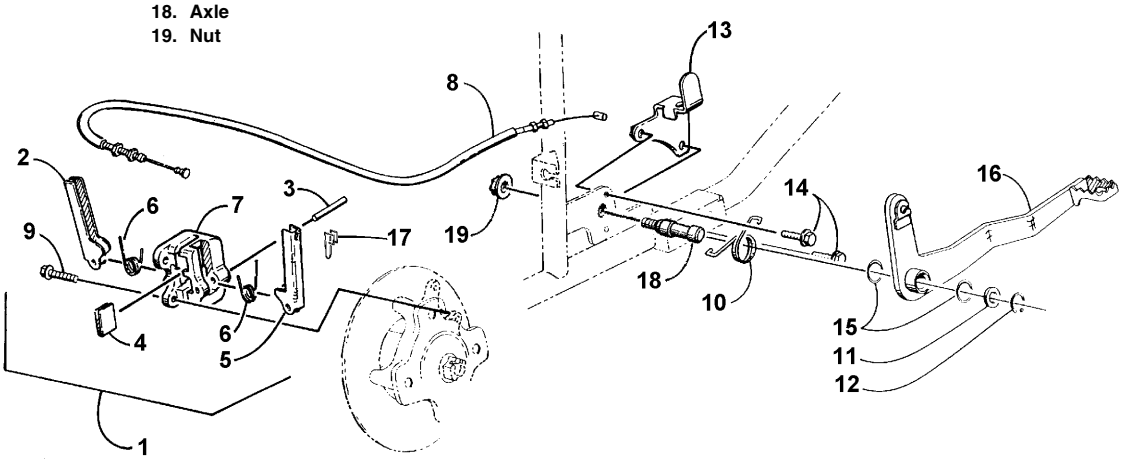
9

Mechanical Foot Brake Assembly Schematic

Pressing the mechanical foot brake pedal downward will apply the mechanical brake to the rear wheels.

KEY

1. Mechanical Brake Assy
2. Inner Arm
3. Arm Pin
4. Pad
5. Outer Arm
6. Arm Spring
7. Housing
8. Cable
9. Cap Screw
10. Spring
11. Washer
12. Snap Ring
13. Bracket
14. Cap Screw
15. O-Ring
16. Foot Brake Pedal
17. Wire Form
18. Axle
19. Nut

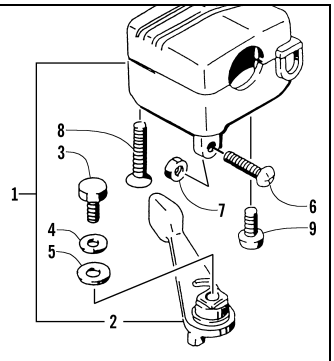


0735-824

Throttle Control

KEY

1. Throttle Case Assy
2. Lever
3. Cap Screw
4. Lock Washer
5. Washer*
6. Screw
7. Nut
8. Screw
9. Cap Screw

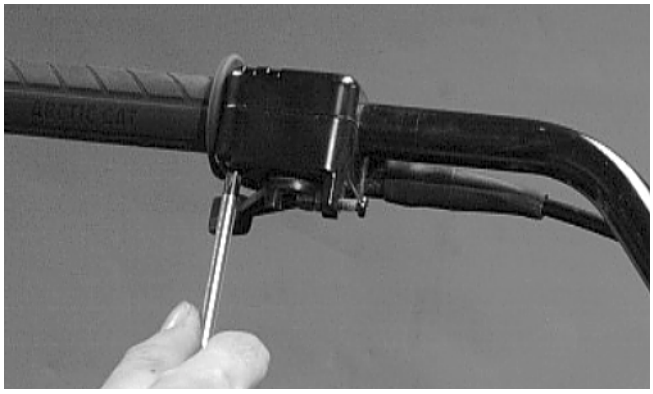


* Manual Transmission Models

0732-324

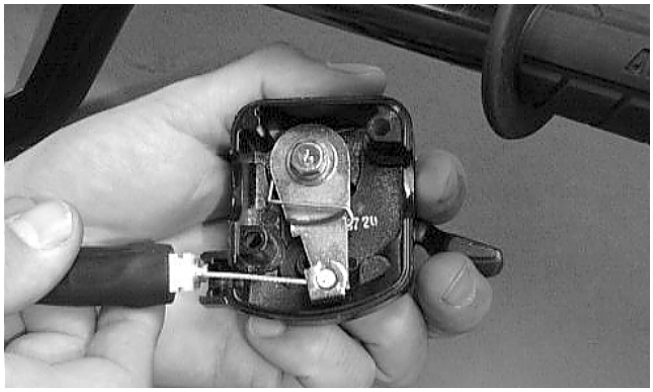
REMOVING

1. Remove the two machine screws securing the throttle control to the handlebar.



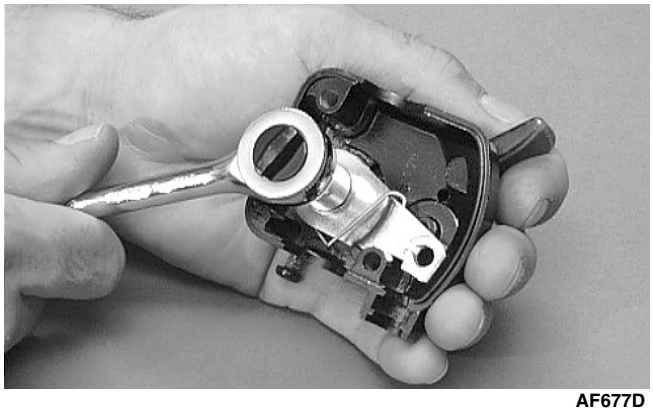
AL610D

2. Slide the grommet out of the lower half of the throttle control; then remove the cable from the actuator arm.



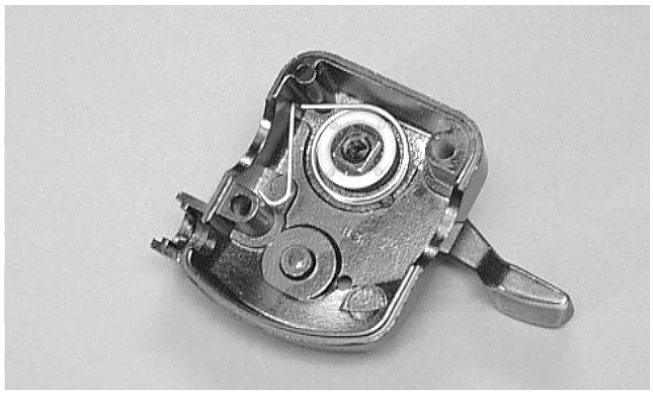
AF676D

3. Remove the cap screw, lock washer, and washer securing the actuator arm to the throttle control lever.



AF677D

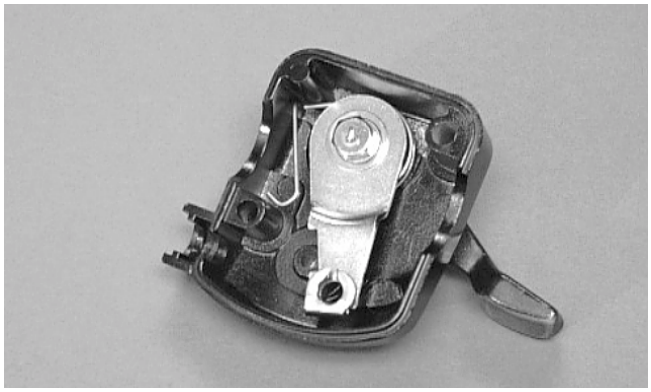
4. Remove the actuator arm and account for a bushing. Note the position of the return spring for installing purposes.



AF678D

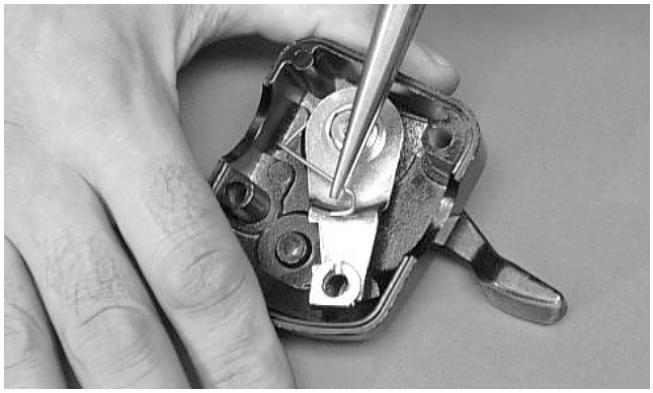
INSTALLING

1. Place the return spring into the throttle control; then place the bushing and actuator arm into position. Secure with the cap screw, lock washer, and washer.



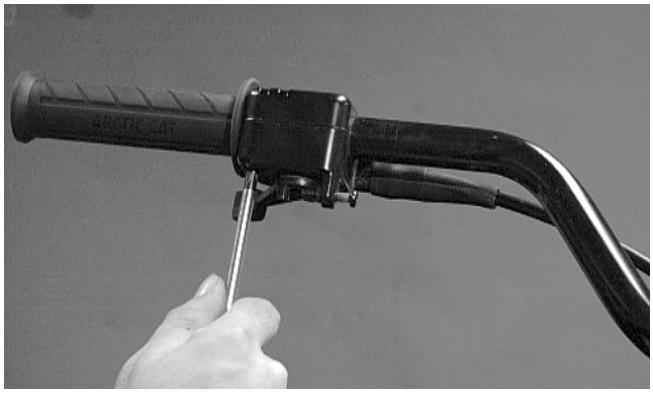
AF679D

2. Using a pair of needle-nose pliers, place the spring into position on the actuator arm.



AF680D

3. Place the two halves of the throttle control onto the handlebars and secure with the two machine screws.

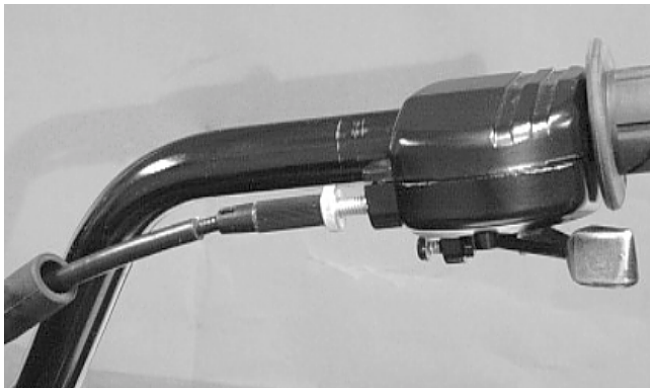


AL610D

ADJUSTING

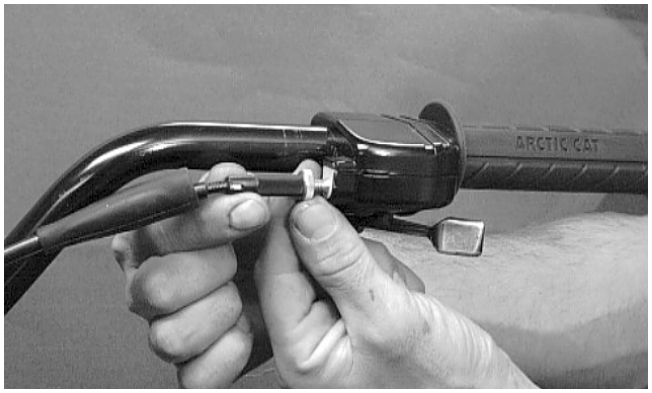
1. Slide the boot back to reveal the jam nut; then loosen the jam nut.

9



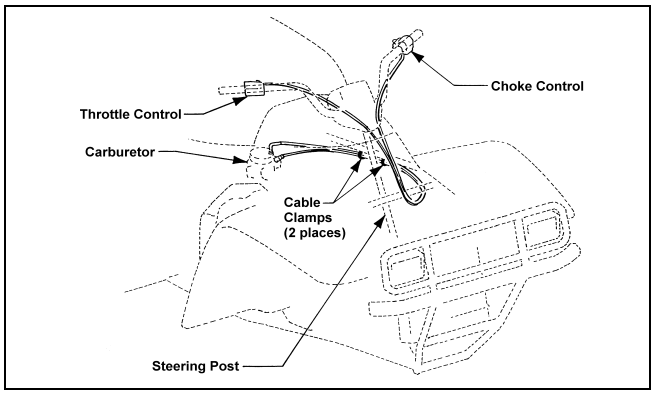
AF682D

2. Rotate the adjuster sleeve until 0.5-1.0 mm (0.02-0.04 in.) is attained.



AL611D

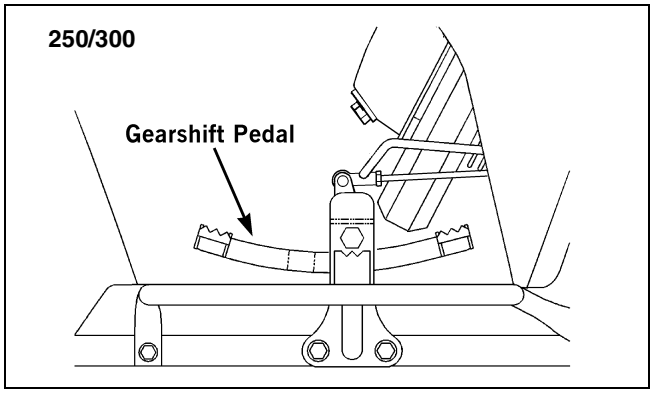
3. Secure the adjustment by tightening the jam nut; then slide the boot over the jam nut.



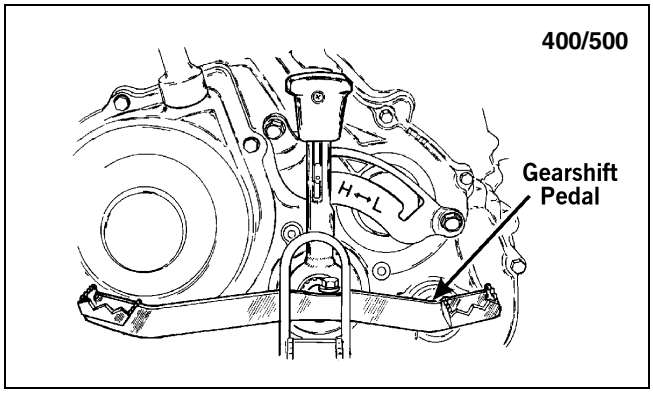
0732-412

Gearshift Pedal
(Manual Transmission)

The gearshift pedal is attached to a ratchet mechanism in the transmission. Each time a gear is selected, the gearshift pedal will return to its normal position ready to select the next gear. To return to neutral, press down repeatedly (once for each gear) on the front of the pedal. Shift into gears by pressing down on the back of the pedal once for each gear. The ratchet mechanism makes it impossible to upshift or downshift more than one gear at a time.



736-567B

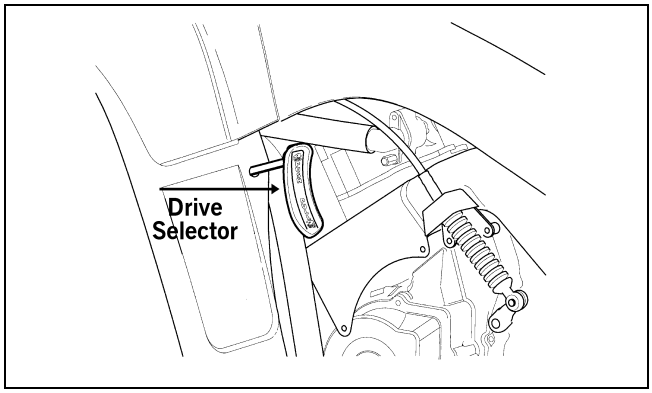


ATV0078B

Drive Selector
(300/375/400 4x4 Models/500)

The mechanical drive selector allows the operator to operate in either 2-wheel drive (rear wheels) or 4-wheel drive (all wheels). For normal riding on flat, dry, hard surfaces, 2-wheel drive should be sufficient. In situations of aggressive trail conditions, 4-wheel drive would be the desired choice.

To either engage or disengage the front wheels, come to a complete stop; then either push in (to engage) or pull out (to disengage) the front wheel differential. Apply slight throttle until positive engagement of the differential has been observed.



735-508A

⚠ CAUTION

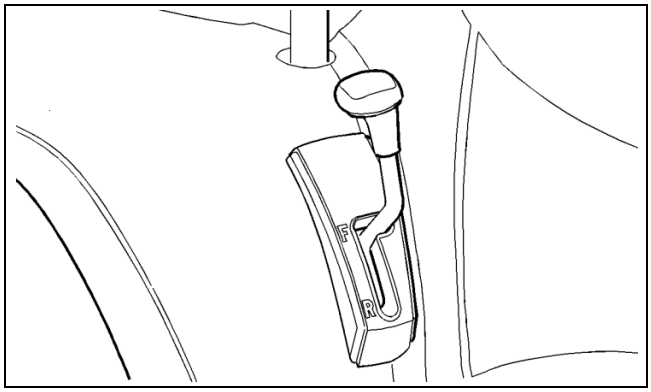
Do not attempt to either engage or disengage the front differential while the ATV is moving.

Reverse Shift Lever
(Manual Transmission)

To shift into reverse gear, stop the ATV completely and shift the transmission into neutral. Pull the reverse shift lever fully rearward to the "R" position. When the ATV is in reverse gear, the gearshift pedal will not function.

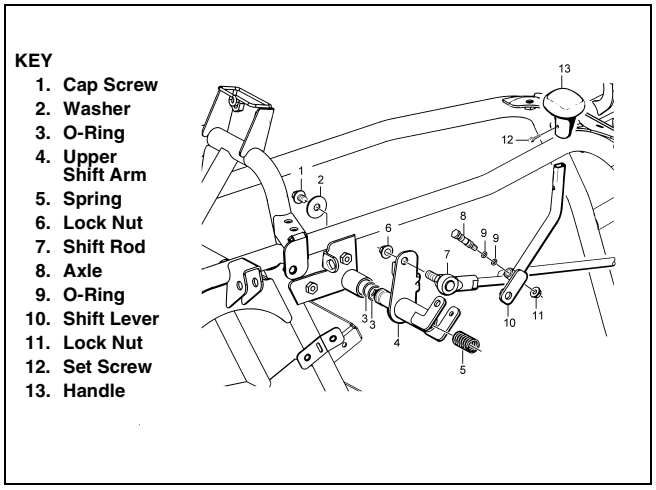
⚠ WARNING

Never shift the ATV into reverse gear when the ATV is moving as it could cause the ATV to stop suddenly throwing the operator from the ATV.



0736-566

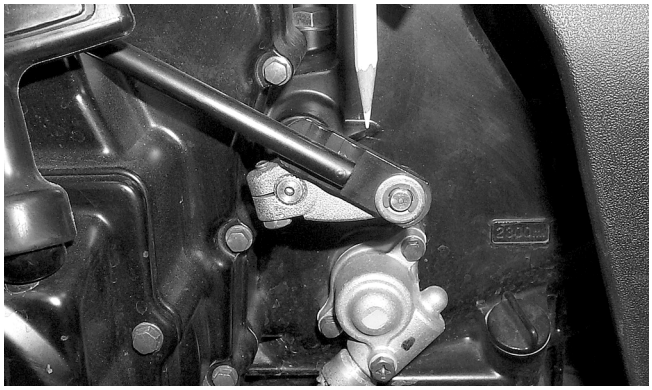
Shift Lever and Shift Rod



0736-823

REMOVING

1. Remove the seat (see Section 8).
2. Remove the gas tank (see Section 4).
3. Remove the three machine screws securing the left-side panel to the frame and rear fender; then remove the left-side panel.
4. Remove the E-clip securing the shift rod to the engine shift arm.



AF942

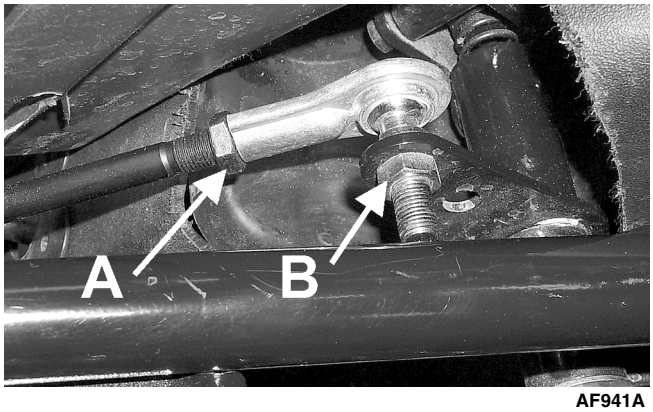
5. Remove the three machine screws securing the gear shift linkage cover to the fender and remove the cover.

■ **NOTE: The cover is located inside the left-front wheel well.**

CC851

6. Remove the axle and nut securing the shift lever to the upper shift arm; then remove the shift lever. Account for the spring and two O-rings on the axle.

7. Using two open-end wrenches, remove the lock nut (B) securing the shift rod to the upper shift arm. Remove the shift rod and discard the lock nut.

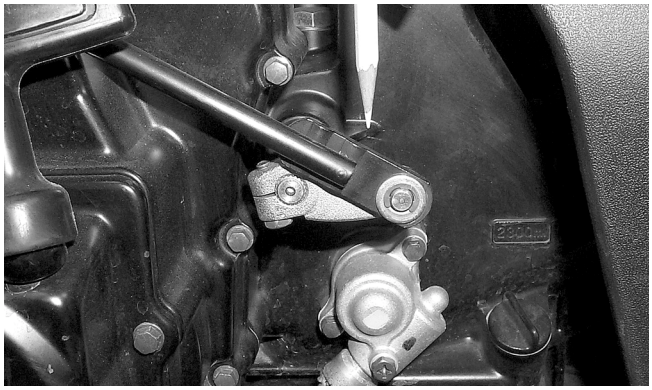


AF941A

■ **NOTE: Never reuse a lock nut. Once a lock nut has been removed, it must be replaced with a new lock nut.**

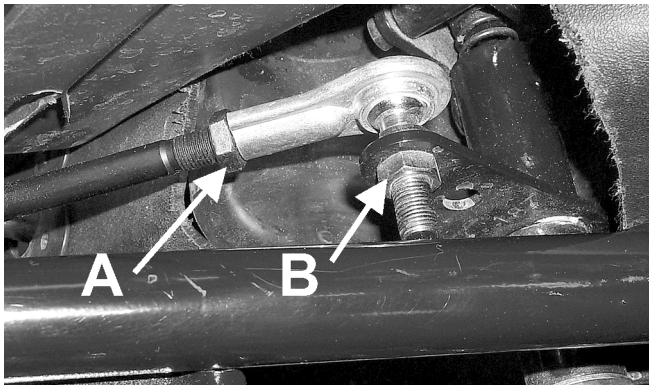
INSTALLING

1. Place the shift rod into position on the engine shift arm and secure with the existing E-clip.



AF942

2. Using a new lock nut, secure the shift rod to the upper shift arm; then using two open-end wrenches, tighten securely.



AF941A

3. Place the spring into position between the upper shift arm and shift lever; then making sure the O-rings are in place on the axle, secure the shift lever to the arm with the existing axle and nut.

4. Install the gas shift linkage cover on the fender in the left-front wheel well. Tighten the three machine screws securely.

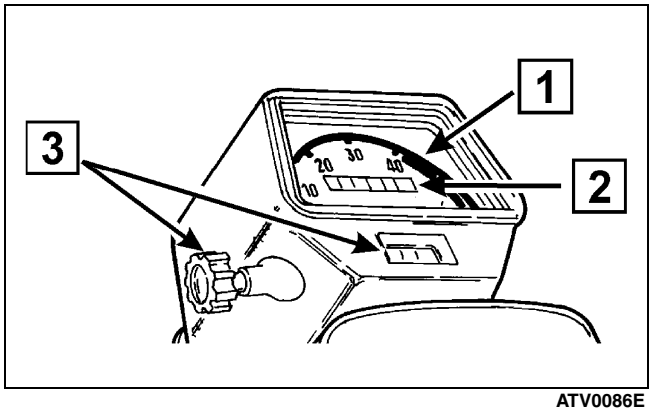
5. Place the left-side panel into position on the frame and secure with the three machine screws.

6. Install the gas tank (see Section 4); then install the seat (see Section 8).

7. Check shift lever adjustment (see Section 2).

Speedometer/Indicator/ Gear Position Lights

SPEEDOMETER

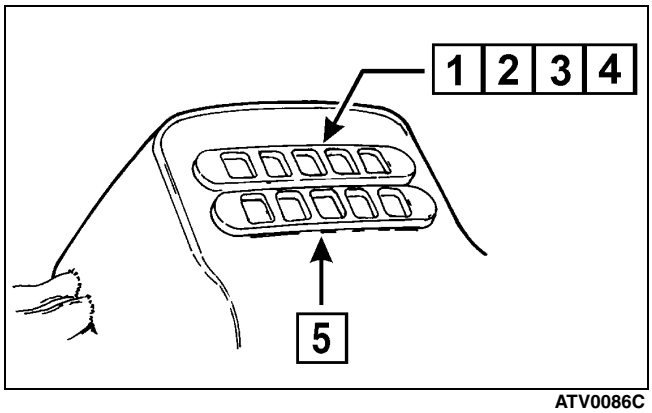


ATV0086E

1. **Speedometer** - The speedometer shows approximate speed.
2. **Odometer** - The odometer shows the total distance traveled.
3. **Trip Meter** - The trip meter is an odometer which can be reset. It can be used to show the distance traveled on short trips or between gas stops. Turning the knob counterclockwise resets the trip meter to zero.

INDICATOR/GEAR POSITION LIGHTS

■NOTE: The number and functions of indicator and gear position lights will vary from model to model.



ATV0086C

1. **High Beam Indicator** - A blue light will illuminate when the lights are on high beam. The light will not be illuminated when the lights are switched to low beam.
2. **Temperature Indicator** - A red light will illuminate if the engine overheats. The light should be off during normal operation.

⚠ CAUTION

Continued operation of the ATV with high engine temperature may result in engine damage or premature wear.

■NOTE: High engine RPM, low vehicle speed, or heavy load can raise engine temperature. Decreasing engine RPM, reducing load, and selecting an appropriate transmission gear can lower the temperature.

■NOTE: Debris in front of the engine (or packed between the cooling fins of the radiator on the 400/500 or packed between the oil cooler cooling fins on the 250/300/375) can reduce cooling capability. Using a hose, pressure-wash the radiator (engine and oil cooler on the 250/300/375) to remove any debris preventing air flow to the radiator.

3. **Neutral Indicator** - A green light will illuminate when the transmission is in neutral and the ignition switch is on. The light will go out when shifted into any gear other than neutral.
4. **Reverse Indicator** - An orange light will illuminate when the transmission is shifted into reverse gear. The light will go off when shifted out of reverse.
5. **Gear Position Indicator (Manual Transmission)** - A yellow light will illuminate to indicate which gear (1-5) the transmission is shifted into.

NOTES

SECTION 10 - AIDS FOR MAINTENANCE

10

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Torque Specifications
(250/300)

DRIVE TRAIN COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Front Driveshaft (Coupler)**	Flange	4.2	30
Engine	Sub-Frame (Front/Rear)	5.5	40
Engine/Sub-Frame	Frame	5.5	40
Frame*	Front Diff Bracket/Upper	4.2	30
Front Differential*	Frame/Diff Bracket/Lower	5.5	40
Diff Housing Cover***	Diff Housing	2.6	19
Drive Bevel Gear Nut***	Shaft	11-13	79.5-94
Differential Gear Case***	Hub	2.3-3	16.5-22
Hub Nut	Front/Rear Shaft/Axle (max)	10.4	75
Oil Drain Plug	Front Diff	0.5	3.5
Oil Fill Plug	Front Diff	2.2	16
Oil Drain Plug	Engine	2.2	16
Oil Fittings*	Engine	1.1	8
Shift Arm	Engine	1.4	10
High/Low Shift Arm	Engine	1.1	8
2W/4W Shift Arm	Front Diff	1.1	8
Wheel	Hub	5.5	40

EXHAUST COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Header Pipe	Engine	1.1	8

ELECTRICAL COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Ground Cable	Engine	1.1	8

STEERING COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Handlebar Block	Steering Post	2.8	20
Steering Post Bearing Housings	Frame	2.8	20
Steering Post Bearing Flange	Frame	2.8	20
Lower Steering Bearing Washer Cap Screw***	Steering Post	5.5	40
Tie Rod End	Knuckle/Steering Post	4.2	30

BRAKE COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Brake Disc*	Hub	2.1	15
Brake Hose	Caliper	4.2	30
Brake Hose	Master Cylinder	0.8	6
Foot Brake Lever	Frame	9.7	70
Master Cylinder Cover	Master Cylinder	.03	10 in.-lb
Brake Pressure Switch	Front Brake Block	2.1	15
Hydraulic Caliper	Knuckle	2.8	20
Mechanical Caliper	Knuckle	2.1	15

CHASSIS COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Sub-Frame	Frame	5.5	40
Footrest	Frame (8 mm)	2.8	20
Footrest	Frame (10 mm)	5.5	40
Foot Shift Lever	Footrest	9.7	70
Gas Tank Valve	Gas Tank	0.1	1
Reverse Shift Lever *	Frame	2.8	20

SUSPENSION COMPONENTS (Front)			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
A-Arm (All)	Frame	4.8	35
Ball Joint Cap Screw	Knuckle	4.8	35
Shock Absorber	Frame	4.8	35
Shock Absorber	Upper A-Arm	4.8	35

SUSPENSION COMPONENTS (Rear)			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Rear Shock	Sub-Frame	4.8	35
Rear Shock	Lower A-Arm	2.8	20
A-Arms (All)	Sub-Frame	4.8	35
Rear Knuckles	A-Arms	4.8	35

ENGINE/TRANSMISSION			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Air Cleaner Assy	Frame	1.1	8
Clutch Shoe	Crankshaft	11	79.5
Clutch Sleeve Hub	Countershaft	8	58
Crankcase Half (6 mm)	Crankcase Half	0.9-1.3	6.5-9.5
Crankcase Half (8 mm)	Crankcase Half	2-2.4	14.5-17
Cylinder Head Cap Nuts/Nut	Cylinder	2.5	18
Cylinder Head/Crankcase	Cylinder	1.1	8
Hi/Lo Shifter Arm	Shifter Arm Shaft	1.1	8
Left-Side Cover	Crankcase Half	0.9-1.3	6.5-9.5
Oil Pump*	Crankcase	1	7
Recoil Starter	Left-Side Cover	0.8	6
Reverse Gear Shaft	Reverse Shift Shaft	1.1	8
Right-Side Cover	Crankcase Half	0.9-1.3	6.5-9.5
Magneto Rotor Nut	Crankshaft	16	116
Shifter Arm	Shifter Arm Shaft	1.1	8
Cam Sprocket	Camshaft	1.15	8.5
Starter Cup	Crankshaft	3.5	25
Valve Cover	Cylinder	1	7
Spark Plug	Engine	1.7	12

* w/Blue Loctite #243
** w/Red Loctite #271
*** w/Green Loctite #609

Torque Specifications

(400/500 - Manual Transmission)

DRIVE TRAIN COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Front Driveshaft (Coupler)**	Rubber Coupler	5.5	40
Rubber Coupler**	Front Diff/Input Flange	5.5	40
Engine (Lower Rear/Front)	Frame	5.5	40
Engine (Upper Front Inside Bracket/Topside)	Frame Bracket	2.8	20
Engine Mount (Left-Side Upper Rear)	Frame	1.7	12
Engine (Left-Side Upper Rear)	Mount	5.5	40
Front Differential*	Frame/Diff Bracket	5.5	40
Bearing Housing/Axle Assy	Axle Housing	5.5	40
Diff Housing Cover***	Diff Housing	2.6	19
Drive Bevel Gear Nut***	Shaft	11-13	79.5-94
Differential Gear Case***	Hub	2.3-3	16.5-22
Hub Nut	Front/Rear Shaft/Axle (max)	10.4	75
Oil Drain Plug	Front Diff/Rear Dr	0.5	3.5
Oil Fill Plug	Front Diff/Rear Dr	2.2	16
Oil Drain Plug	Engine	2.2	16
Inspection Plug	Rear Dr	0.5	3.5
2W/4W Shift Arm	Front Diff	1.1	8
Wheel	Hub	5.5	40

EXHAUST COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Exhaust Pipe	Engine	2.8	20

ELECTRICAL COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Coil*	Head Bracket	1.7	12
Ground Wire	Engine	1.1	8

STEERING COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Handlebar Block	Steering Post	2.8	20
Steering Post Bearing Housings	Frame	2.8	20
Steering Post Bearing Flange	Frame	2.8	20
Lower Steering Bearing Washer Cap Screw***	Steering Post	5.5	40
Tie Rod End	Knuckle/Steering Post	4.2	30

BRAKE COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Brake Disc*	Hub	2.1	15
Brake Hose	Caliper	4.2	30
Brake Hose	Master Cylinder	0.8	6
Master Cylinder Cover	Master Cylinder	.03	10 in.-lb
Brake Pressure Switch	Front Brake Block	2.1	15
Foot Brake Lever	Footrest	9.7	70
Hydraulic Caliper	Knuckle/Axle Retainer Assy	2.8	20
Mechanical Caliper	Knuckle/Axle Retainer Assy	2.1	15

CHASSIS COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Footrest	Frame (8 mm)	2.8	20
Footrest	Frame (10 mm)	5.5	40
Gas Tank Valve	Gas Tank	0.1	1
Reverse Shift Lever*	Frame	2.8	20

SUSPENSION COMPONENTS (Front)			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
A-Arm (All)	Frame	4.8	35
Ball Joint Cap Screw	Knuckle	4.8	35
Shock Absorber	Frame	4.8	35
Shock Absorber	Upper A-Arm	4.8	35

SUSPENSION COMPONENTS (Rear)			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Axle Retainer Assy	Axle Housing	5.5	40
Axle Housing/Hitch	Rear Gear Case	4.8	35
Axle Housing/Hitch	Rear Gear Case (New)	5.5	40
Shock Absorber	Axle Housing/Frame	4.8	35
Swing Arm	Axle Housing	4.8	35
Swing Arm **	Frame	4.8	35

ENGINE/TRANSMISSION			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Clutch Shoe	Crankshaft	13	94
Clutch Sleeve Hub	Countershaft	10	72
Crankcase Half (6 mm)	Crankcase Half	0.9-1.3	6.5-9.5
Crankcase Half (8 mm)	Crankcase Half	2-2.4	14.5-17
Cylinder Head (Cap Screws)	Cylinder	3.8	27.5
Cylinder Head (6 mm Nuts)	Cylinder	1.1	8
Cylinder Head (8 mm Nut)	Cylinder	2.5	18
Left-Side Cover	Crankcase Half	0.9-1.3	6.5-9.5
Mechanical Water Pump Impeller	Pump Shaft	1.05	7.5
Oil Pump Drive Gear	Crank Balancer Shaft	8	58
Oil Pump*	Crankcase	1	7
Output Shaft Gear	Output Shaft	10	72
Rear Output Shaft	Output Joint	2.8	20
Recoil Starter	Left-Side Cover	0.8	6
Reverse Cam Stopper Housing	Crankcase	2.3	16.5
Right-Side Cover	Crankcase	0.9-1.3	6.5-9.5
Magneto Rotor Nut	Crankshaft	16	116
Shift Stop Housing	Crankcase	2.3	16.5
Cam Sprocket	Camshaft	1.5	11
Starter Cup	Crankshaft	3.5	25
Spark Plug	Engine	1.7	12

* w/Blue Loctite #243
** w/Red Loctite #271
*** w/Green Loctite #609

Torque Specifications

(375/500 - Automatic Transmission)

DRIVE TRAIN COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Front Driveshaft**	Front Flange	5.5	40
Engine Mount (Front Upper)	Frame	2.8	20
Engine Bracket (Upper)	Engine	2.8	20
Engine Mounting Through-Bolts	Frame	5.5	40
Engine Mount (Upper Rear)	Frame	1.7	12
Front Differential*	Frame/Diff Bracket	5.5	40
Rear Output Joint Assy	Engine	2.8	20
Bearing Housing/Axle Assy	Axle Housing	5.5	40
Diff Housing Cover***	Diff Housing	2.6	19
Drive Bevel Gear Nut***	Shaft	11-13	79.5-94
Differential Gear Case***	Hub	2.3-3	16.5-22
Hub Nut	Front/Rear Shaft/Axle (max)	10.4	75
Oil Drain Plug	Front Diff/Rear Dr	0.5	3.5
Oil Fill Plug	Front Diff/Rear Dr	2.2	16
Oil Drain Plug	Engine	2.2	16
Inspection Plug	Rear Drive	0.5	3.5
2W/4W Shift Arm	Front Diff	1.1	8
Wheel	Hub	5.5	40

EXHAUST COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Exhaust Pipe	Engine/Frame	2.8	20

ELECTRICAL COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Coil*	Head Bracket	1.7	12
Ground Wire	Engine	1.1	8

STEERING COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Handlebar Block	Steering Post	2.8	20
Steering Post Bearing Housings	Frame	2.8	20
Steering Post Bearing Flange	Frame	2.8	20
Lower Steering Bearing Washer Cap Screw***	Steering Post	5.5	40
Tie Rod End	Knuckle/Steering Post	4.2	30

BRAKE COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Brake Disc*	Hub	2.1	15
Brake Hose	Caliper	4.2	30
Brake Hose	Master Cylinder	0.8	6
Master Cylinder Cover	Master Cylinder	.03	10 in.-lb
Brake Pressure Switch	Front Brake Block	2.1	15
Foot Brake Lever	Footrest	9.7	70
Hydraulic Caliper	Axle Retainer Assy	2.8	20
Mechanical Caliper	Axle Retainer Assy	2.1	15

CHASSIS COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Footrest	Frame (8 mm)	2.8	20
Footrest	Frame (10 mm)	5.5	40
Gas Tank Valve	Gas Tank	0.1	1
Reverse Shift Lever*	Frame	2.8	20

SUSPENSION COMPONENTS (Front)			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
A-Arm (All)	Frame	4.8	35
Ball Joint Cap Screw	Knuckle	4.8	35
Shock Absorber	Frame	4.8	35
Shock Absorber	Upper A-Arm	4.8	35

SUSPENSION COMPONENTS (Rear)			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Axle Retainer Assy	Axle Housing	5.5	40
Axle Housing/Hitch	Rear Gear Case	4.8	35
Axle Housing/Hitch	Rear Gear Case (New)	5.5	40
Swing Arms	Axle Housing	4.8	35
Swing Arms**	Frame	4.8	35
Shock Absorber	Axle Housing/Frame	4.8	35

SUSPENSION COMPONENTS (Rear) TBX Model			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Axle Retainer Assy	Axle Housing	5.5	40
Axle Housing	Rear Gear Case	4.8	35
Axle Housing	Rear Gear Case (New)	5.5	40
Swing Arm	Frame	5.5	40
Shock Absorber	Frame	4.8	35
Shock Absorber	Swing Arm	4.8	35
Cargo Box Frame	ATV Frame	4.8	35
Cargo Box (Plastic)	Cargo Box Frame	1.7	12
Axle Housing	Swing Arm	4.8	35
Side Box (Upper)	Frame	2.8	20
Side Box (Lower)	Frame	2.5	18
Rear Gear Case U-Joint**	Driveshaft	5.5	40

* w/Blue Loctite #243
** w/Red Loctite #271
*** w/Green Loctite #609

ENGINE/TRANSMISSION			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Clutch Shoe	Crankshaft	13	94
Clutch Cover/ Housing Assy	Crankcase	1.1	8
Crankcase Half (6 mm)	Crankcase Half	0.9-1.3	6.5-9.5
Crankcase Half (8 mm)	Crankcase Half	2-2.4	14.5-17
Cylinder Head (Cap Screws)	Crankcase	3.8	27.5
Cylinder Head (6 mm)	Cylinder	1.1	8
Cylinder Head (8 mm)	Cylinder	2.5	18
Fixed Driven	Clutch Shaft	10.4-11.8	75-85
Ground Wire	Engine	1.1	8
Magneto Cover	Crankcase	1.1	8
Mechanical Water Pump Impeller	Pump Shaft	1.05	7.5
Movable Drive Face	Driveshaft	10.4-11.8	75-85
Oil Pump Drive Gear	Crank Balancer Shaft	5	36
Output Shaft Gear	Output Shaft	10	72
Recoil Starter	Left-Side Cover	0.8	6
Magneto Rotor Nut	Crankshaft	16	116
Cam Sprocket	Camshaft	1.5	11
Starter Cup	Crankshaft	3.5	25
V-Belt Cover	Crankcase	1.1	8
Plenum***	Engine	1.1	8
Spark Plug	Engine	1.7	12

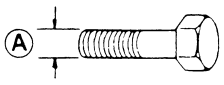
* w/Blue Loctite #243
** w/Red Loctite #271
*** w/Green Loctite #609

Torque Conversions

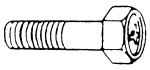
ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m
1	0.1	21	2.9	41	5.7	61	8.4	81	11.2
2	0.3	22	3.0	42	5.8	62	8.6	82	11.3
3	0.4	23	3.2	43	5.8	63	8.7	83	11.5
4	0.6	24	3.3	44	6.1	64	8.9	84	11.6
5	0.7	25	3.5	45	6.2	65	9.0	85	11.8
6	0.8	26	3.6	46	6.4	66	9.1	86	11.9
7	1.0	27	3.7	47	6.5	67	9.3	87	12.0
8	1.1	28	3.9	48	6.6	68	9.4	88	12.2
9	1.2	29	4.0	49	6.8	69	9.5	89	12.3
10	1.4	30	4.2	50	6.9	70	9.7	90	12.5
11	1.5	31	4.3	51	7.1	71	9.8	91	12.6
12	1.7	32	4.4	52	7.2	72	10.0	92	12.8
13	1.8	33	4.6	53	7.3	73	10.1	93	12.9
14	1.9	34	4.7	54	7.5	74	10.2	94	13.0
15	2.1	35	4.8	55	7.6	75	10.4	95	13.1
16	2.2	36	5.0	56	7.7	76	10.5	96	13.3
17	2.4	37	5.1	57	7.9	77	10.7	97	13.4
18	2.5	38	5.3	58	8.0	78	10.8	98	13.6
19	2.6	39	5.4	59	8.2	79	10.9	99	13.7
20	2.8	40	5.5	60	8.3	80	11.1	100	13.8

Tightening Torque
(General Bolts)

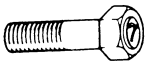
Type of Bolt	Thread Diameter Ⓐ (mm)	Tightening Torque	
		kg-m	ft-lb
(Conventional or 4 Marked Bolt)	5	0.2-0.4	1.5-3.0
	6	0.4-0.7	3.0-5.0
	8	1.0-1.6	7.0-11.5
	10	2.2-3.5	16.0-25.5
(7 Marked Bolt)	5	0.3-0.6	2.0-4.5
	6	0.8-1.2	6.0-8.5
	8	1.8-2.8	13.0-20.0
	10	4.0-6.0	29.0-43.5



Conventional Bolt



4 Marked Bolt



7 Marked Bolt

SECTION 11 - TROUBLESHOOTING

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Engine

■ **NOTE: A Condition/Remedy marked with an asterisk (*) is for manual transmission models only.**

Problem: Engine will not start or is hard to start (Compression too low)	
Condition	**Remedy**
1. **Valve clearance** out of adjustment	1. Adjust clearance
2. **Valve guides** worn - seated poorly	2. Repair - replace guides
3. **Valves** mistimed	3. Adjust valve timing
4. **Piston rings** worn excessively	4. Replace rings
5. **Cylinder bore** worn	5. Replace - rebore cylinder
6. **Spark plug** seating poorly	6. Tighten plug
7. **Starter motor** cranks too slowly - does not turn	7. See Electrical in this section
Problem: Engine will not start or is hard to start (No spark)	
Condition	**Remedy**
1. **Spark plug** fouled	1. Clean - replace plug
2. **Spark plug** wet	2. Clean - dry plug
3. **Magneto** defective	3. Replace magneto
4. **CDI unit** defective	4. Replace CDI unit
5. **Ignition coil** defective	5. Replace ignition coil
6. **High-tension lead** open - shorted	6. Replace high tension lead
Problem: Engine will not start or is hard to start (No fuel reaching the carburetor)	
Condition	**Remedy**
1. **Gas tank vent hose** obstructed	1. Clean vent hose
2. **Carburetor inlet needle** defective	2. Replace needle
3. **Fuel hose** obstructed	3. Clean - replace hose
4. **Fuel screens** obstructed	4. Clean - replace inlet screen - valve screen
Problem: Engine stalls easily	
Condition	**Remedy**
1. **Spark plug** fouled	1. Clean plug
2. **Magneto** defective	2. Replace magneto
3. **CDI unit** defective	3. Replace CDI unit
4. **Carburetor jets** obstructed	4. Clean jets
5. **Valve clearance** out of adjustment	5. Adjust clearance
Problem: Engine noisy (Excessive valve chatter)	
Condition	**Remedy**
1. **Valve clearance** too large	1. Adjust clearance
2. **Valve spring(s)** weak - broken	2. Replace spring(s)
3. **Rocker arm** - **rocker arm shaft** worn	3. Replace arm - shaft
4. **Camshaft** worn	4. Replace camshaft

Problem: Engine noisy (Noise seems to come from piston)	
Condition	**Remedy**
1. **Piston - cylinder** worn	1. Replace - service piston - cylinder
2. **Combustion chamber carbon** buildup	2. Clean chamber
3. **Piston pin - piston pin bore** worn	3. Replace - service pin - bore
4. **Piston rings - ring groove(s)** worn	4. Replace rings - piston
Problem: Engine noisy (Noise seems to come from timing chain)	
Condition	**Remedy**
1. **Chain** stretched	1. Replace chain
2. **Sprockets** worn	2. Replace sprockets
3. **Tension adjuster** malfunctioning	3. Repair - replace adjuster
Problem: Engine noisy (Noise seems to come from clutch)	
Condition *	**Remedy ***
1. **Crankshaft splines - bearings** worn	1. Replace crankshaft - bearings
2. **Countershaft - hub splines** worn	2. Replace countershaft - hub
3. **Clutch plate teeth** worn	3. Replace clutch plate(s)
4. **Driven - drive clutch plates** distorted - broken	4. Replace clutch plate(s)
5. **Clutch dampers** weak	5. Replace dampers
Problem: Engine noisy (Noise seems to come from crankshaft)	
Condition	**Remedy**
1. **Bearing** worn - burned	1. Replace bearing
2. **Lower rod-end bearing** worn - burned	2. Replace bearing
3. **Connecting rod side clearance** too large	3. Replace thrust washer(s)
Problem: Engine noisy (Noise seems to come from transmission)	
Condition	**Remedy**
1. **Gears** worn - rubbing	1. Replace gears
2. **Splines** worn	2. Replace shaft(s)
3. **Primary gears** worn - rubbing	3. Replace gears
4. **Bearings** worn	4. Replace bearings
5. **Bushing** worn	5. Replace bushing
Problem: Engine noisy (Noise seems to come from secondary-transmission/left-side cover)	
Condition *	**Remedy ***
1. **Gears - shaft(s)** worn	1. Replace gears - shafts
2. **Bearing(s)/bushing(s)** damaged	2. Replace bearing(s)/bushing(s)
Problem: Engine noisy (Noise seems to come from secondary bevel gear and final driven shaft)	
Condition	**Remedy**
1. **Drive - driven bevel gears** damaged - worn	1. Replace gears
2. **Backlash** excessive	2. Adjust backlash
3. **Tooth contact** improper	3. Adjust contact
4. **Bearing** damaged	4. Replace bearing
5. **Gears** worn - rubbing	5. Replace gears
6. **Splines** worn	6. Replace shaft(s)
7. **Final driven shaft thrust clearance** too large	7. Replace thrust washer(s)

Problem: Clutch slipping	
Condition *	**Remedy ***
1. **Release roller** out of adjustment - loss of freeplay	1. Adjust clutch bolts 1 & 2
2. **Clutch springs** weak	2. Replace springs
3. **Clutch shoes** worn	3. Replace shoes
4. **Pressure disc** worn - distorted	4. Replace disc
5. **Clutch plates (driven - drive)** distorted	5. Replace plates
Problem: Clutch dragging	
Condition *	**Remedy ***
1. **Clutch release roller** out of adjustment - too much freeplay	1. Adjust clutch bolts 1 & 2
2. **Clutch springs** weak	2. Replace springs
3. **Pressure disc - clutch plates** distorted	3. Replace disc - plates
4. **Clutch release mechanism** worn - damaged	4. Adjust - replace mechanism
Problem: Transmission will not shift	
Condition *	**Remedy ***
1. **Gearshift cam** broken	1. Replace cam
2. **Gearshift forks** distorted	2. Replace forks
3. **Gearshift shaft** worn	3. Replace shaft
4. **Clutch release mechanism** worn - damaged	4. Adjust - replace mechanism
5. **Reverse cable** adjusted improperly	5. Adjust cable
6. **Gearshift cable** adjusted improperly	6. Adjust cable
Problem: Transmission will not shift back	
Condition *	**Remedy ***
1. **Reverse shift cam** broken	1. Replace cam
2. **Shift shafts** rubbing - sticking	2. Repair shafts
3. **Gearshift forks** distorted - worn	3. Replace forks
4. **Gearshift lever return spring** broken - damaged	4. Replace spring
Problem: Transmission jumps out of gear	
Condition *	**Remedy ***
1. **Shifting gears (driveshaft - countershaft)** worn	1. Replace gears
2. **Gearshift forks** distorted - worn	2. Replace forks
3. **Cam stopper spring (gearshift cam)** weak	3. Replace spring
4. **Gearshift lever stopper pin** worn	4. Replace pin
Problem: Secondary-transmission will not shift or shift back	
Condition *	**Remedy ***
1. **Sliding dog** broken - worn	1. Replace dog
2. **Gearshift fork** broken - worn	2. Replace fork
3. **Hi/Low shift lever** out of adjustment	3. Adjust lever
4. **Gearshift cam** worn	4. Replace cam
5. **Cam stopper spring** weak	5. Replace spring
6. **Gearshift fork shaft** worn	6. Replace shaft

Problem: Engine idles poorly	
Condition	**Remedy**
1. **Valve clearance** out of adjustment	1. Adjust clearance
2. **Valve seating** poor	2. Replace - service seats - valves
3. **Valve guides** defective	3. Replace guides
4. **Rocker arms - arm shaft** worn	4. Replace arms - shafts
5. **Magneto** defective	5. Replace magneto
6. **CDI unit** defective	6. Replace CDI unit
7. **Spark plug** fouled - **gap** too wide	7. Adjust gap - replace plug
8. **Ignition coil** defective	8. Replace ignition coil
9. **Float** out of adjustment	9. Adjust float height
10. **Jets** obstructed	10. Clean jets
11. **Pilot screw setting** improper	11. Adjust pilot screw
Problem: Engine runs poorly at high speed	
Condition	**Remedy**
1. **High RPM "cut out"** against RPM limiter	1. Shift into higher gear - decrease speed
2. **Valve springs** weak	2. Replace springs
3. **Valve timing** out of adjustment	3. Adjust timing
4. **Cams - rocker arms** worn	4. Replace cams - arms
5. **Spark plug gap** too narrow	5. Adjust gap
6. **Ignition coil** defective	6. Replace ignition oil
7. **Float level** too low	7. Adjust float height
8. **Air cleaner element** obstructed	8. Clean element
9. **Fuel hose** obstructed	9. Clean - prime hose
Problem: Exhaust smoke dirty or heavy	
Condition	**Remedy**
1. **Oil (in the engine)** overfilled - contaminated	1. Drain excess oil - replace oil
2. **Piston rings - cylinder** worn	2. Replace - service rings - cylinder
3. **Valve guides** worn	3. Replace guides
4. **Cylinder wall** scored - scuffed	4. Replace - service cylinder
5. **Valve stems** worn	5. Replace valves
6. **Stem seals** defective	6. Replace seals

Problem: Engine lacks power	
Condition	**Remedy**
1. **Valve clearance** incorrect	1. Adjust clearance
2. **Valve springs** weak	2. Replace springs
3. **Valve timing** out of adjustment	3. Adjust timing
4. **Piston ring(s) - cylinder** worn	4. Replace - service rings - cylinder
5. **Valve seating** poor	5. Repair seats
6. **Spark plug** fouled	6. Clean - replace plug
7. **Rocker arms - shafts** worn	7. Replace arms - shafts
8. **Spark plug gap** incorrect	8. Adjust gap - replace plug
9. **Carburetor jets** obstructed	9. Clean jets
10. **Float level** out of adjustment	10. Adjust float height
11. **Air cleaner element** obstructed	11. Clean element
12. **Oil (in the engine)** overfilled - contaminated	12. Drain excess oil - change oil
13. **Intake manifold** leaking air	13. Tighten - replace manifold
14. **Cam chain** worn	14. Replace cam chain
Problem: Engine overheats	
Condition	**Remedy**
1. **Carbon deposit (piston crown)** excessive	1. Clean piston
2. **Oil** low	2. Add oil
3. **Octane** low - **gasoline** poor	3. Drain - replace gasoline
4. **Oil pump** defective	4. Replace pump
5. **Oil circuit** obstructed	5. Clean circuit
6. **Gasoline level (in float chamber)** too low	6. Adjust float height
7. **Intake manifold** leaking air	7. Tighten - replace manifold
8. **Coolant level** low	8. Fill - examine system for leaks
9. **Fan** malfunctioning	9. Check fan fuse - replace fan
10. **Fan switch** malfunctioning	10. Replace fan switch
11. **Thermostat** stuck - closed	11. Replace thermostat
12. **Radiator hoses - cap** damaged - obstructed	12. Clear obstruction - replace hoses

Problem: Power not transmitted from engine to wheels	
Condition	**Remedy**
1. **Rear axle shaft serration** worn - broken	1. Replace shaft
Problem: Power not transmitted from engine to either front wheel	
Condition	**Remedy**
1. **Secondary drive - driven gear teeth** broken	1. Replace gear(s)
2. **Propeller shaft serration** worn - broken	2. Replace shaft
3. **Coupling** damaged	3. Replace coupling
4. **Coupling joint serration** worn - damaged	4. Replace joint
5. **Front drive - driven bevel gears** broken - damaged	5. Replace gear(s)
6. **Front differential gears/pinions** broken - damaged	6. Replace gears - pinions
7. **Sliding dog/shaft/fork** worn - damaged	7. Replace gear(s)
8. **Front drive axle** worn - damaged	8. Replace axle
9. **Front drive axle serration** worn - damaged	9. Replace axle

Problem: Starting impaired	
Condition	**Remedy**
1. **Starter jet** obstructed	1. Clean jet
2. **Starter tube** obstructed	2. Clean tube
3. **Starter body - carburetor** leaking air	3. Tighten - adjust - replace gasket
4. **Starter plunger** not operating properly	4. Check - adjust plunger
Problem: Idling or low speed impaired	
Condition	**Remedy**
1. **Pilot jet - pilot air jet** obstructed - loose	1. Clean - tighten jet(s)
2. **Pilot outlet - bypass** obstructed	2. Clean outlet - bypass
3. **Pilot screw setting** incorrect	3. Adjust pilot screw
4. **Starter plunger** not fully closed	4. Adjust plunger
5. **Float height** incorrect	5. Adjust float height
Problem: Medium or high speed impaired	
Condition	**Remedy**
1. **High RPM "cut out"** against RPM limiter	1. Shift into higher gear - decrease speed
2. **Main jet - main air jet** obstructed	2. Clean main jet - air jet
3. **Needle jet** obstructed	3. Clean needle jet
4. **Throttle valve** not operating properly	4. Check throttle valve operation
5. **Filter** obstructed	5. Clean filter
6. **Float height** incorrect	6. Adjust float height
7. **Starter plunger** not fully closed	7. Close plunger
Problem: Overflow and fuel level fluctuations	
Condition	**Remedy**
1. **Needle valve** worn - damaged	1. Replace needle valve
2. **Needle valve spring** broken	2. Replace spring
3. **Float** not working properly	3. Adjust float height - replace float
4. **Needle valve** dirty	4. Clean needle valve
5. **Fuel level** too high - too low	5. Adjust float height

Problem: Spark absent or weak	
Condition	**Remedy**
1. **Ignition coil** defective	1. Replace ignition coil
2. **Spark plug** defective	2. Replace plug
3. **Magneto** defective	3. Replace magneto
4. **CDI unit** defective	4. Replace CDI unit
5. **Pick-up coil** defective	5. Replace pick-up coil
Problem: Spark plug fouled with carbon	
Condition	**Remedy**
1. **Mixture** too rich	1. Adjust carburetor
2. **Idling RPM** too high	2. Adjust carburetor
3. **Gasoline** incorrect	3. Change to correct gasoline
4. **Air cleaner element** dirty	4. Clean element
5. **Spark plug** incorrect (too cold)	5. Replace plug
Problem: Spark plug electrodes overheat or burn	
Condition	**Remedy**
1. **Spark plug** incorrect (too hot)	1. Replace plug
2. **Engine** overheats	2. Service cooling system
3. **Spark plug** loose	3. Tighten plug
4. **Mixture** too lean	4. Adjust carburetor
Problem: Magneto does not charge	
Condition	**Remedy**
1. **Lead wires/connections** shorted - loose - open	1. Repair - replace - tighten lead wires
2. **Magneto coils** shorted - grounded - open	2. Replace magneto coils
3. **Regulator/rectifier** shorted - punctured	3. Replace regulator/rectifier
Problem: Magneto charges, but charging rate is below the specification	
Condition	**Remedy**
1. **Lead wires** shorted - open - loose (at terminals)	1. Repair - tighten lead wires
2. **Stator coils (magneto)** grounded - open	2. Replace stator coils
3. **Regulator/rectifier** defective	3. Replace regulator/rectifier
4. **Electrolyte** low	4. Add distilled water
5. **Cell plates (battery)** defective	5. Replace battery

Problem: Magneto overcharges	
Condition	**Remedy**
1. **Internal battery** short circuited	1. Replace battery
2. **Regulator/rectifier resistor** damaged - defective	2. Replace resistor
3. **Regulator/rectifier** poorly grounded	3. Clean - tighten ground connection
Problem: Charging unstable	
Condition	**Remedy**
1. **Lead wire** intermittently shorting	1. Replace lead wire
2. **Magneto** internally shorted	2. Replace magneto
3. **Regulator/rectifier** defective	3. Replace regulator/rectifier
Problem: Starter button not effective	
Condition	**Remedy**
1. **Battery charge** low	1. Recharge - replace battery
2. **Switch contacts** defective	2. Replace switch
3. **Starter motor brushes** not seating	3. Repair - replace brushes
4. **Starter relay** defective	4. Replace relay
5. **Emergency stop - ignition switch** off	5. Turn on switches
6. **Wiring connections** loose - disconnected	6. Connect - tighten - repair connections
Problem: Battery “sulfation” (Acidic white powdery substance or spots on surfaces of cell plates)	
Condition	**Remedy**
1. **Charging rate** too low - too high	1. Replace battery
2. **Battery electrolyte** excessive - insufficient	2. Keep electrolyte to prescribed level
3. **Specific gravity** too high - too low	3. Charge battery - add distilled water
4. **Battery** run-down - damaged	4. Replace battery
5. **Electrolyte** contaminated	5. Recharge - replace battery
Problem: Battery discharges too rapidly	
Condition	**Remedy**
1. **Electrolyte** contaminated	1. Replace battery
2. **Specific gravity** too high	2. Charge battery - add distilled water
3. **Charging system (charging operation)** not set properly	3. Check magneto - regulator/rectifier - circuit connections - adjust for specified charging operation
4. **Cell plates** overcharged - damaged	4. Replace battery - correct charging system
5. **Battery** short-circuited	5. Replace battery
6. **Specific gravity** too low	6. Recharge battery
7. **Electrolyte** contaminated	7. Replace battery
Problem: Battery polarity reversed	
Condition	**Remedy**
1. **Battery** incorrectly connected	1. Reverse connections - replace battery

Problem: Handling too heavy or stiff	
Condition	**Remedy**
1. **Front wheel alignment** incorrect	1. Adjust alignment
2. **Lubrication** inadequate	2. Lubricate appropriate components
3. **Tire inflation pressure** incorrect	3. Adjust pressure
4. **Tie rod ends** seizing	4. Replace tie rod ends
5. **Linkage connections** seizing	5. Repair - replace connections
Problem: Steering oscillation	
Condition	**Remedy**
1. **Tires** inflated unequally	1. Adjust pressure
2. **Wheel(s)** wobbly	2. Replace wheel(s)
3. **Wheel hub cap screw(s)** loose - missing	3. Tighten - replace cap screws
4. **Wheel hub bearing** worn - damaged	4. Replace bearing
5. **Tie rod ends** worn - loose	5. Replace - tighten tie rod ends
6. **Tires** defective - incorrect	6. Replace tires
7. **A-arm bushings** damaged	7. Replace bushings
8. **Bolts - nuts (frame)** loose	8. Tighten bolts - nuts
Problem: Steering pulling to one side	
Condition	**Remedy**
1. **Tires** inflated unequally	1. Adjust pressure
2. **Front wheel alignment** incorrect	2. Adjust alignment
3. **Wheel hub bearings** worn - broken	3. Replace bearings
4. **Frame** distorted	4. Repair - replace frame
5. **Shock absorber** defective	5. Replace shock absorber
Problem: Steering impaired	
Condition	**Remedy**
1. **Tire pressure** too high	1. Adjust pressure
2. **Steering linkage connections** worn	2. Replace connections
3. **Cap screws (suspension system)** loose	3. Tighten cap screws
Problem: Tire wear rapid or uneven	
Condition	**Remedy**
1. **Wheel hub bearings** worn - loose	1. Replace bearings
2. **Front wheel alignment** incorrect	2. Adjust alignment
Problem: Steering noise	
Condition	**Remedy**
1. **Caps screws - nuts** loose	1. Tighten cap screws - nuts
2. **Wheel hub bearings** broken - damaged	2. Replace bearings
3. **Lubrication** inadequate	3. Lubricate appropriate components

Problem: Suspension too soft	
Condition	**Remedy**
1. **Spring(s)** weak	1. Replace spring(s)
2. **Shock absorber** damaged	2. Replace shock absorber
Problem: Suspension too stiff	
Condition	**Remedy**
1. **A-arm-related bushings** worn	1. Replace bushing
Problem: Suspension noisy	
Condition	**Remedy**
1. **Cap screws (suspension system)** loose	1. Tighten cap screws
2. **A-arm-related bushings** worn	2. Replace bushings
Problem: Rear wheel oscillation	
Condition	**Remedy**
1. **Rear wheel hub bearings** worn - loose	1. Replace bearings
2. **Tires** defective - incorrect	2. Replace tires
3. **Wheel rim** distorted	3. Replace rim
4. **Wheel hub cap screws** loose	4. Tighten cap screws
5. **Axle shaft nut** loose (Manual Transmission)	5. Tighten nut (Manual Transmission)
6. **Rear brake** adjusted incorrectly	6. Adjust brake
7. **Rear suspension arm-related bushing** worn	7. Replace bushing
8. **Rear shock absorber** damaged	8. Replace shock absorber
9. **Rear suspension arm nut** loose	9. Tighten nut

Brakes

Problem: Braking poor	
Condition	**Remedy**
1. **Pad** worn	1. Replace pads
2. **Pedal free-play** excessive	2. Adjust free-play
3. **Brake fluid** leaking	3. Repair - replace hydraulic system
4. **Hydraulic system** leaking air	4. Bleed hydraulic system
5. **Master cylinder/brake cylinder seal** worn	5. Replace seal(s)
Problem: Brake lever travel excessive	
Condition	**Remedy**
1. **Hydraulic system** entrapped air	1. Bleed hydraulic system
2. **Brake fluid** low	2. Add fluid to proper level
3. **Brake fluid** incorrect	3. Replace with correct fluid
4. **Piston seal - cup** worn	4. Replace seal - cup
Problem: Brake fluid leaking	
Condition	**Remedy**
1. **Connection joints** loose	1. Tighten joints
2. **Hose** cracked	2. Replace hose
3. **Piston seal** worn	3. Replace seal