

KYMCO UXV500I/UXV700I EPS Service Information



Using this manual

This manual has been designed to assist trained mechanics in servicing the models listed above. If you do not have the proper training or tools to perform a particular task it is best if you seek out a service professional.

This manual was written using the latest information available at the time of publication. Illustrations in this manual are shown to help you with the basics of performing the jobs listed. The pictures in this manual may not depict the actual vehicle you're working on, however the procedures will be similar.

Inexperienced technicians without the correct tools and knowledge may not be able to perform these jobs as intended. Caution needs to be taken for the vehicle and its operator as serious injury can occur. Always read a procedure in its entirety before attempting any repairs.

Topics that are explained in greater detail are referenced and linked to.

While the instructions, photographs and illustrations in this manual have been reviewed for accuracy it is up to the individual performing the procedures to use good judgement when performing any procedures described. Every precaution has been taken in the manufacture of this manual however the publisher assumes no responsibility for errors and omissions. Furthermore, no liability or responsibility is assumed for damages to property or injury to persons resulting from the use of the information contained in this guide. Use of this information to perform service procedures is done entirely at your own risk.

1.Quick Reference

This chapter provides a quick reference source of technical specifications and information.

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2.Periodic Maintenance

This chapter covers the location and servicing of the periodic maintenance items.

This chapter includes all information necessary to perform recommended inspections and adjustments. These preventive maintenance procedures, if followed, will ensure more reliable vehicle operation and a longer service life. The need for costly overhaul work will be greatly reduced. This information applies to vehicles already in service as well as new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

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WARNING

- Before running the engine, make sure that the working area is well-ventilated. Never run the engine in a closed area. The exhaust contains poisonous carbon monoxide gas which may cause death to people.
- Gasoline is extremely flammable and is explosive under some conditions. The working area must be well-ventilated and do not smoke or allow flames or sparks near the working area or fuel storage area.

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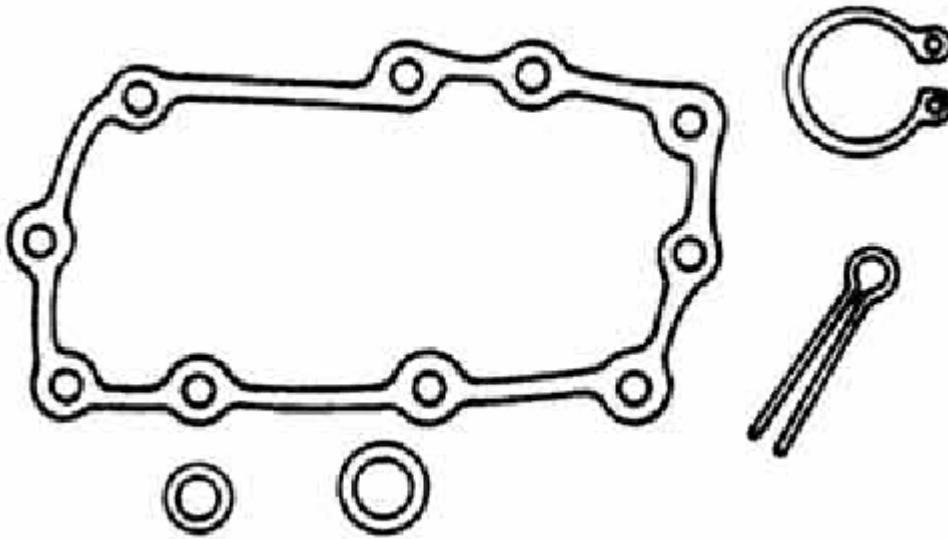
Diagnostic Trouble Codes (DTCs)

To evaluate the DTCs see the [Check Engine Lamp \(CELP\)](#) and [Diagnostic Tool](#) topics.

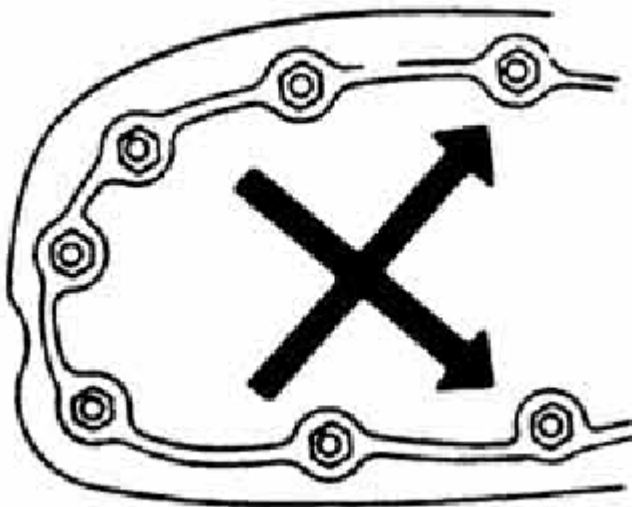
Blinks	Failure Codes	Fault description	Priority	Fault management
1	P0217	Engine temperature overheat	1	1.Stop immediately and check CELP code. 2. Check if the engine temperature sensor or electric circuit is faulty. 3. Check engine lubrication and cooling systems. 4. Check engine ignition and fuel systems.
2	P0335	Crankshaft position sensor or circuit malfunction	2	1. Check if the crankshaft position sensor, its connector, or wiring is faulty. 2. Make sure the generator rotor is aligned with the crankshaft position sensor.
3	P1120	Throttle position sensor setting value problem	2	1.Check if the TPS connector or wiring is faulty. 2.Check if the TPS is adjusted.
4	P1121	Throttle position sensor output range problem	2	1. Make sure the TPS connector is connected correctly. 2. Inspect the TPS
5	P1122	Throttle position sensor movement speed problem	2	1. Make sure the TPS connector is connected correctly. 2. Inspect the TPS
6	P0560	Battery voltage malfunction	1	1. Check the battery voltage. 2. Inspect the charging system.
7	P0110	Intake air temperature circuit malfunction	2	Inspect the T-MAP sensor
8	P0410	Idle air valve circuit malfunction	2	1. Check if the ISC connector or wiring is faulty. 2. Check the resistance of the idle air valve.
9	P0505	Idle speed volume control range problem	3	1.Check the ISC steps range with the diagnostic tool. 2. Check throttle body for carbon deposits. 3. Check intake for air leaks
10	P0251	Injector or electric circuit problem	2	1. Make sure the fuel injector connector is connected correctly. 2. Check if the ECU sends a signal to the injector. 3. Check the power source and resistance of the injector. 4. Make sure the battery is fully charged and connected correctly.

Blinks	Failure Codes	Fault description	Priority	Fault management
11	P0350	Ignition coil or electric circuit malfunction	2	<ol style="list-style-type: none"> 1. Make sure the ignition coil connector is connected correctly. 2. Check if the ECU sends a signal to the ignition coil. 3. Check the ignition coil power source and resistance. 4. Make sure the battery is fully charged and connected correctly.
12	P0230	Fuel pump relay or electric circuit malfunction	2	<ol style="list-style-type: none"> 1. Make sure the relay and pump connectors are connected correctly. 2. Check if the ECU sends a signal to relay. 3. Check the fuel pump relay resistance
13	P0219	Engine speed has exceeded top speed	2	Check if the CVT belt is broken.
14	P1560	Sensor doesn't receive power source from ECU	2	<ol style="list-style-type: none"> 1. ECU output to each sensor should be 5 DCV. 2. Check if the power source for all sensors is 5 DCV. 3. Check for a problem in the wiring harness. 4. If the CELP still blinks replace the ECU with a new item even if the output power source of ECU is normal.
15	P0700	Engine starting speed exceed CVT speed limited	2	Not used.
16	P0115	Engine temperature sensor or electric circuit malfunction	2	<ol style="list-style-type: none"> 1. Make sure the WTS connector is connected correctly. 2. Check if the ECU pin is broken. 3. Check if the resistance of the sensor is out of specification.
17	P1561	Temperature gauge electric circuit malfunction	2	Not used.
18	P0650	CELP electric circuit malfunction	3	<ol style="list-style-type: none"> 1. Check if the CELP bulb is faulty. 2. Check the CELP wires for damage.
21	P0105	Atmospheric Pressure Sensor/Circuit Malfunction	2	<ol style="list-style-type: none"> 1. Make sure the MAP sensor connector is connected correctly. 2. Check if the ECU pin is broken. 3. Check the sensor voltage. 4. Use Diagnostic Tool to check the pressure.
22	P0110	Roll sensor or electric circuit malfunction	2	<ol style="list-style-type: none"> 1. Make sure the sensor is installed in the correct position. 2. Check the sensor voltage. 3. Check if the ECU pin is broken.

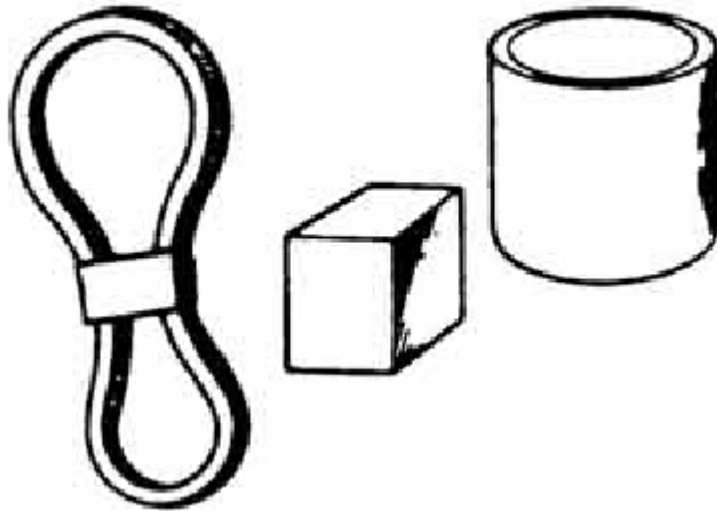
General Information



Make sure to install new gaskets, O-rings, circlips, cotter pins, etc. when reassembling.



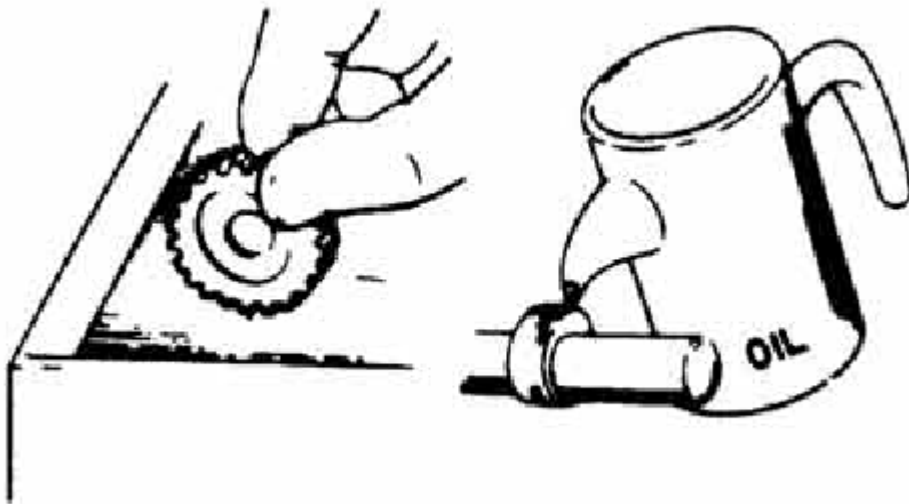
When tightening bolts or nuts, begin with larger-diameter and move to smaller ones. Tighten bolts evenly and tighten to the specified torque diagonally.



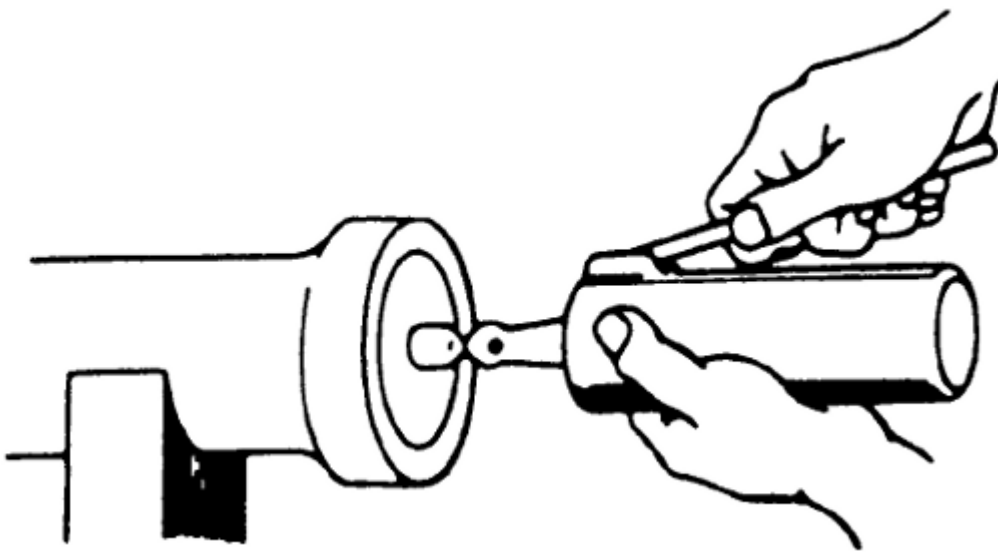
Use genuine parts and lubricants.



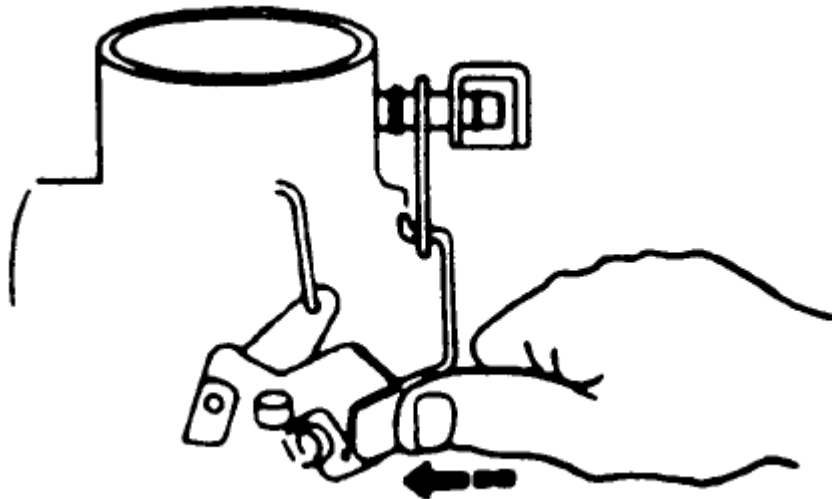
When servicing the motorcycle, be sure to use the indicated special tools for removal and installation.



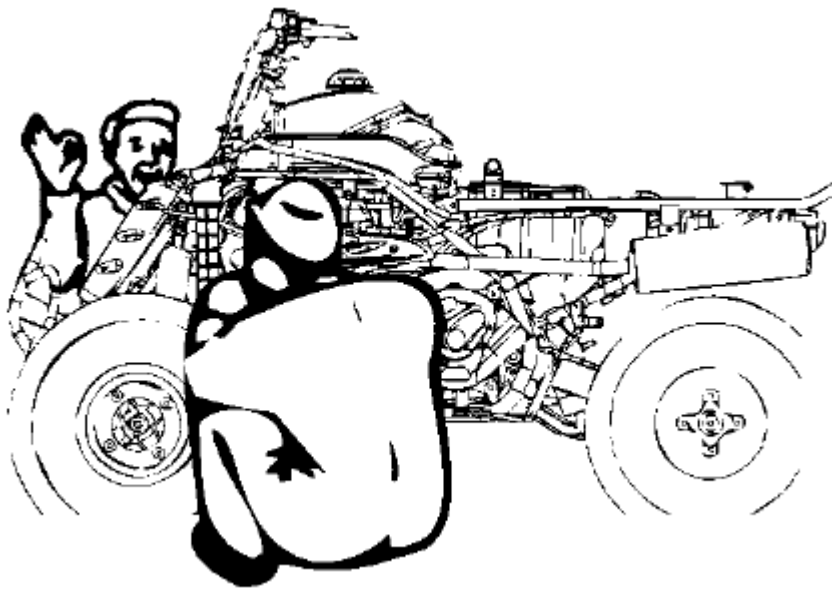
After disassembly, clean and inspect the removed parts. Lubricate sliding surfaces with engine oil before reassembly.



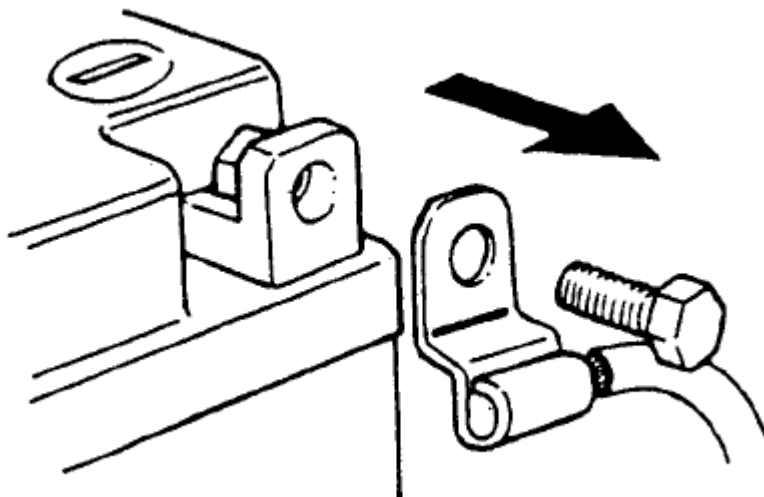
Apply or add designated greases and lubricants to the specified lubrication points.



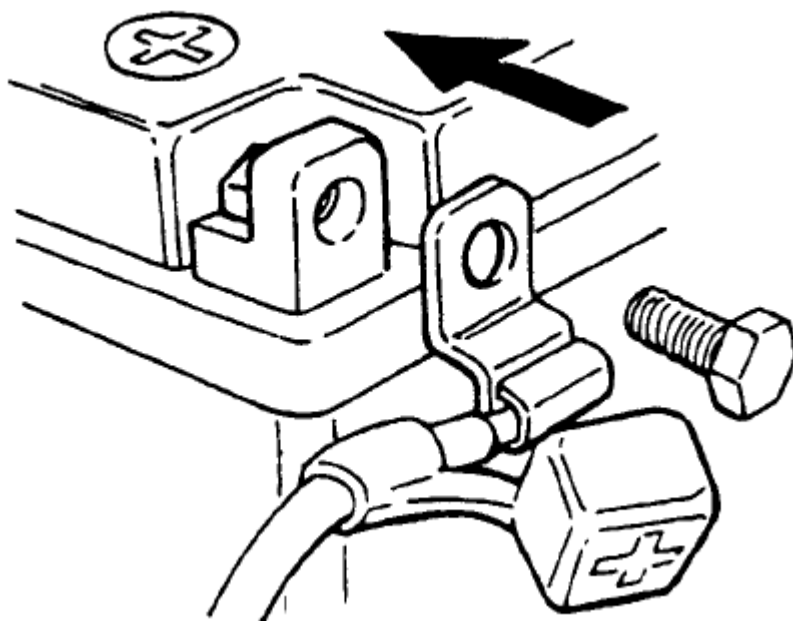
After reassembly, check all parts for proper tightening and operation.



When two persons work together, pay attention to the mutual working safety.



Disconnect the battery negative (-) terminal before working on the vehicle. When using a spanner or other tools, make sure not to damage the motorcycle surface.



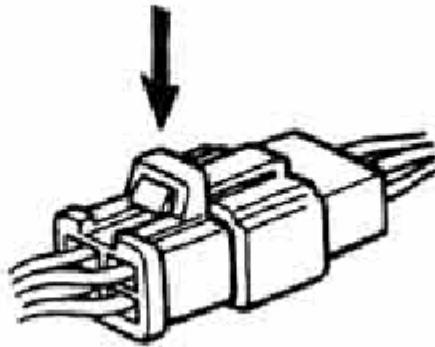
After working on the vehicle, check all connecting points, fasteners, and lines for proper connection and installation. When connecting the battery, the positive (+) terminal must be connected first. After connection, apply grease to the battery terminals. Terminal caps must be installed securely.



If the fuse is burned out find the cause and repair it. Replace the fuse with a new one according to the specified capacity.



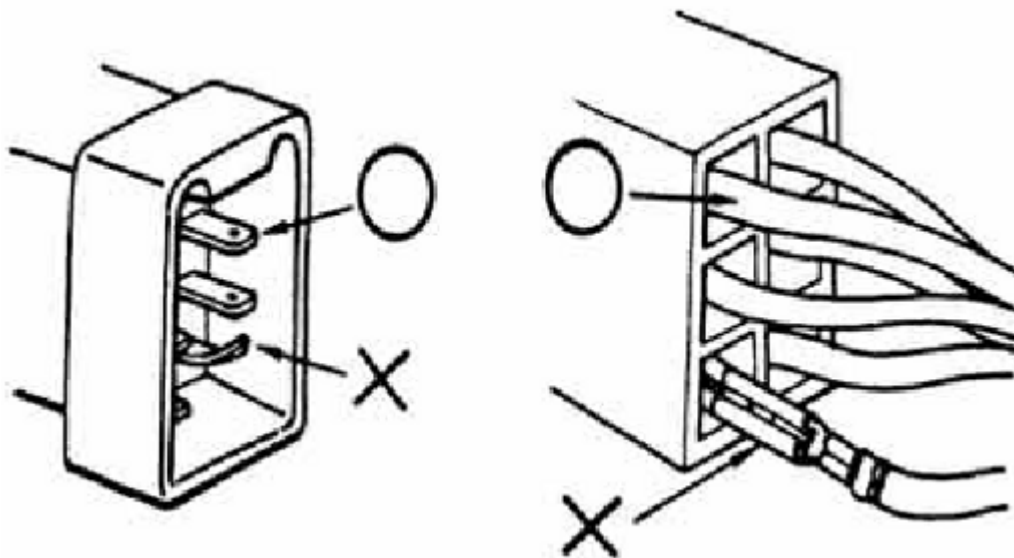
After working on the vehicle make sure terminal caps shall have been installed securely.



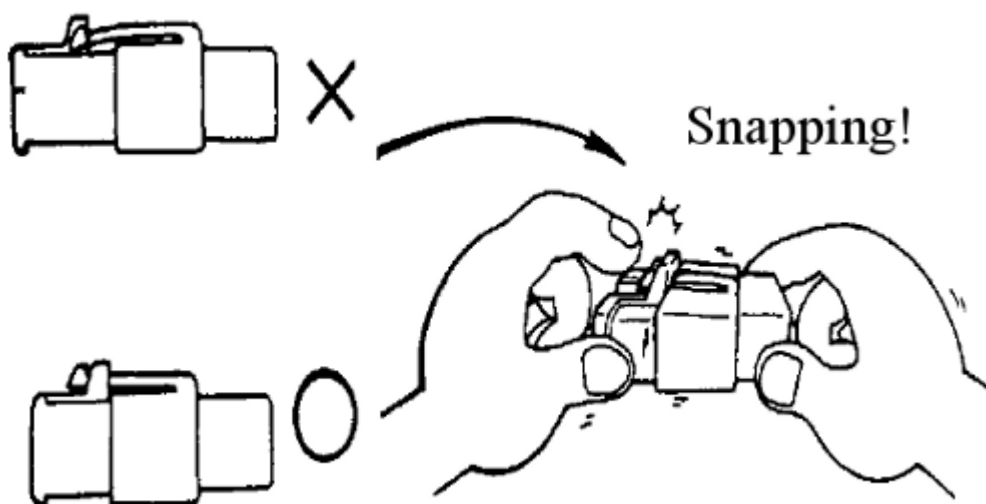
Disengage the lock on locking electrical connectors before attempting to unplug them.



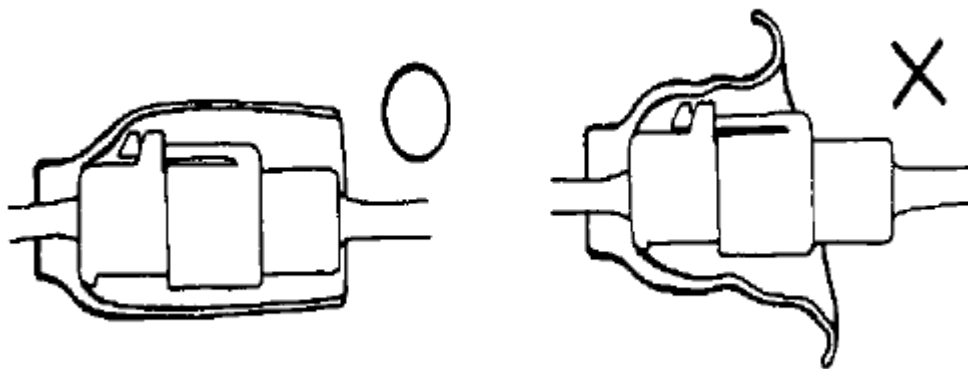
Hold the connector body when connecting or disconnecting it. Do not pull the connector wire.



Check for faulty connector terminals. There shouldn't be any bent, protruding or loose terminals.



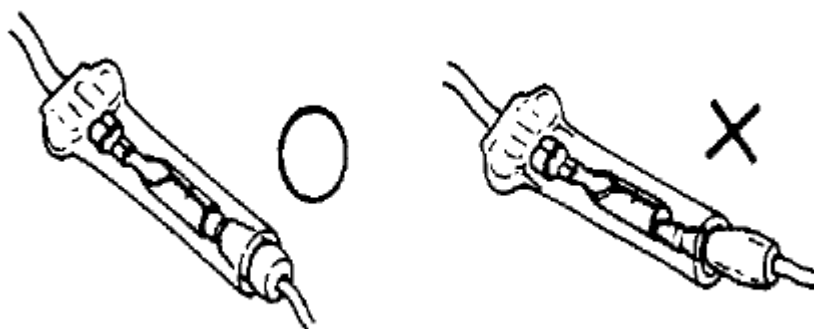
Make sure the connector is plugged in completely. Make sure the connector locks correctly if a lock is present. Make sure there are not any loose wires.



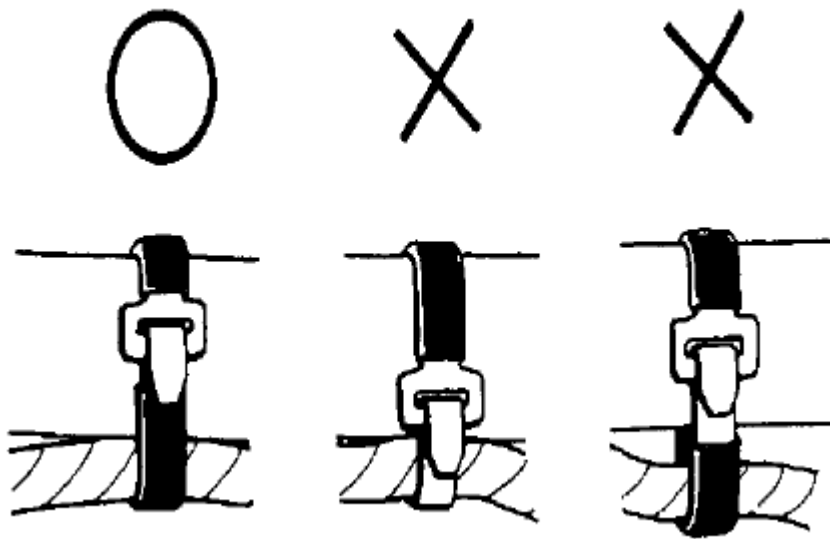
Before connecting an electrical connector, check for damaged terminal cover or loose negative terminal.



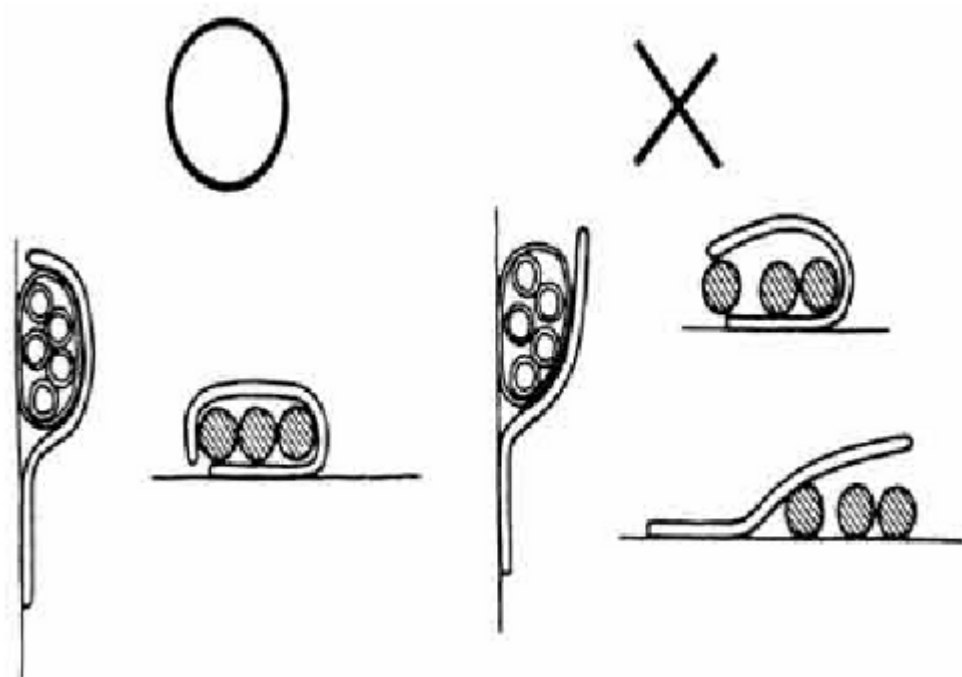
Check the bullet connector cover for proper coverage and installation.



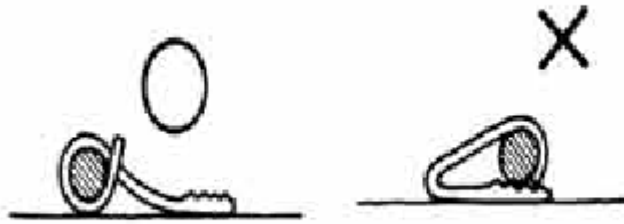
Join the terminals completely in bullet connectors. Check the cover for proper coverage. Do not make the cover opening face up.



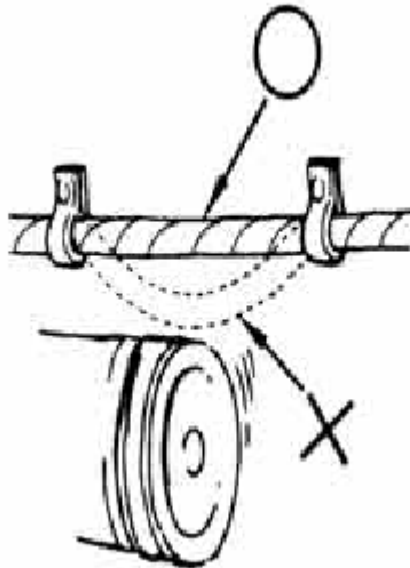
Secure wire harnesses to the frame with the respective wire bands at the designated locations. Tighten the bands so that only the insulated surfaces contact the wire harnesses.



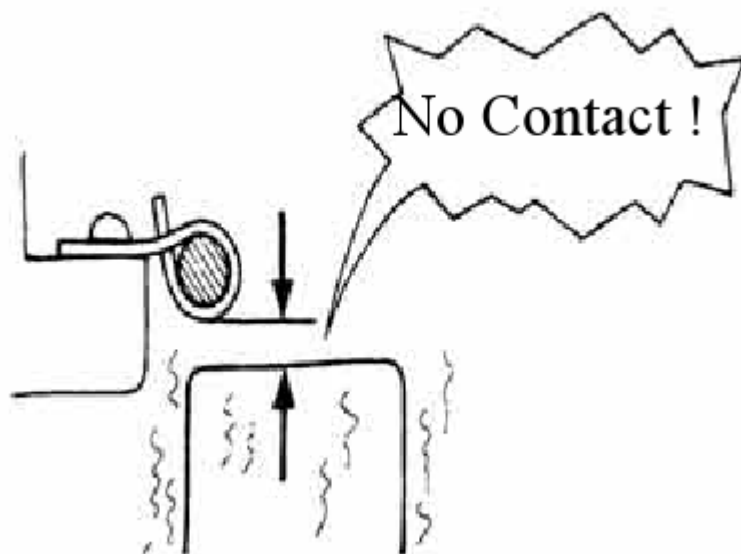
After clamping, check each wire to make sure it is secure.



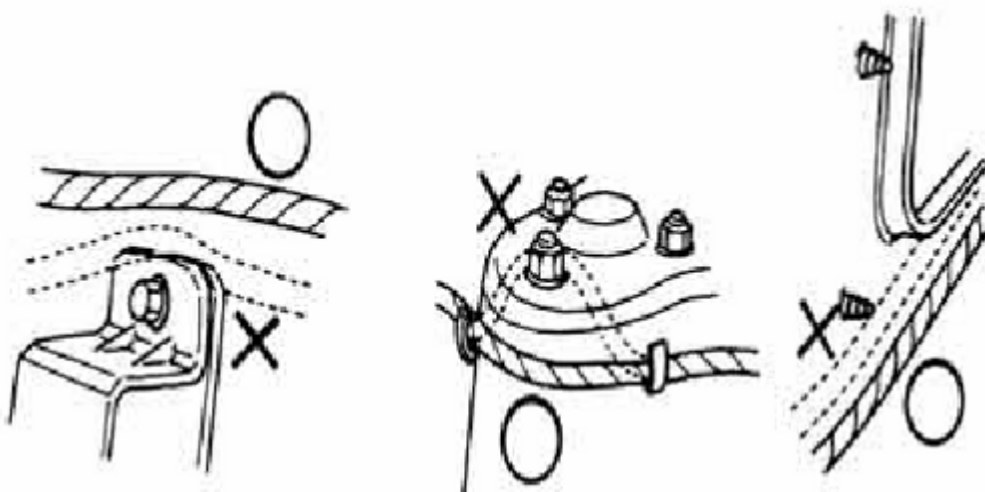
Do not squeeze wires against the weld or its clamp.



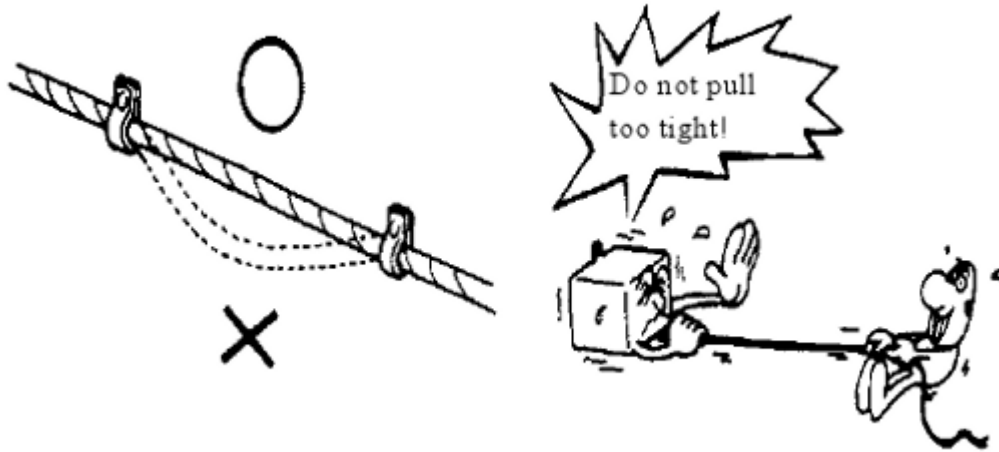
After clamping, check each harness to make sure that it is not interfering with any moving or sliding parts.



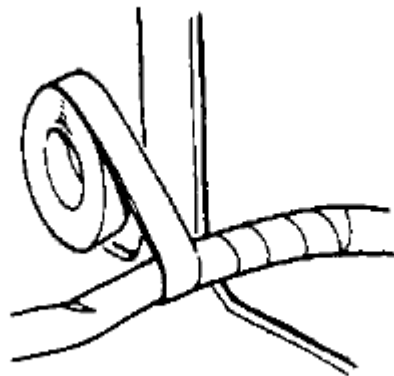
Secure the wire harness so that it will not make contact with parts which will generate high heat.



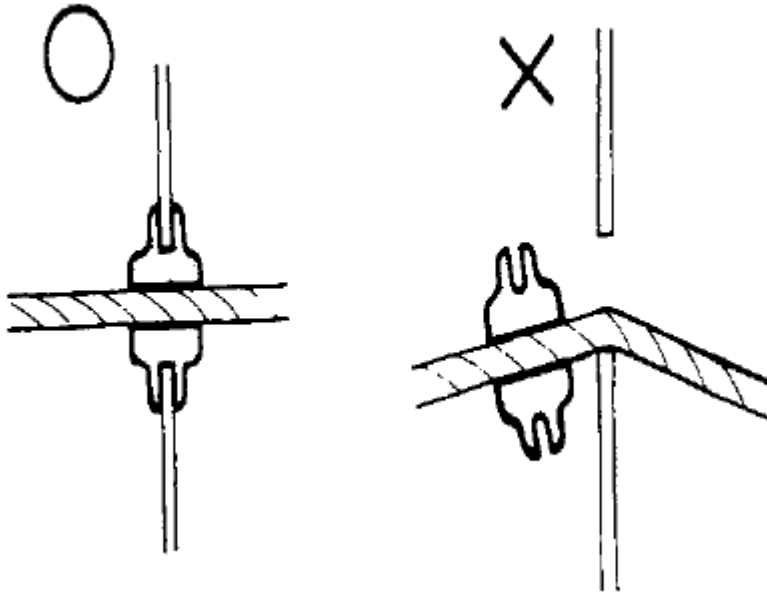
Route wire harnesses to avoid sharp edges or corners. Avoid the projected ends of bolts and screws. Route wire harnesses passing through the side of bolts and screws.



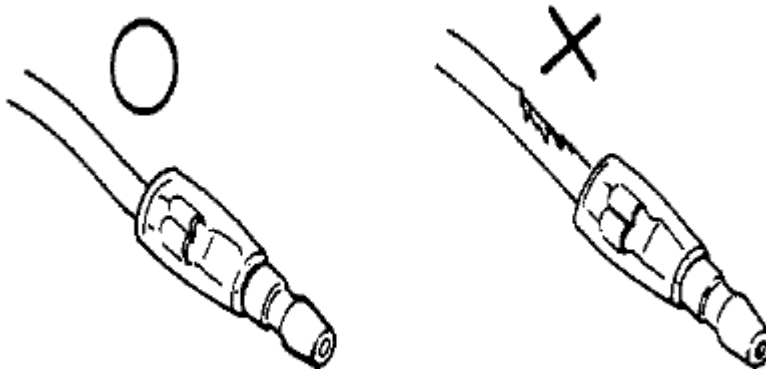
Route harnesses so they are neither pulled tight nor have excessive slack.



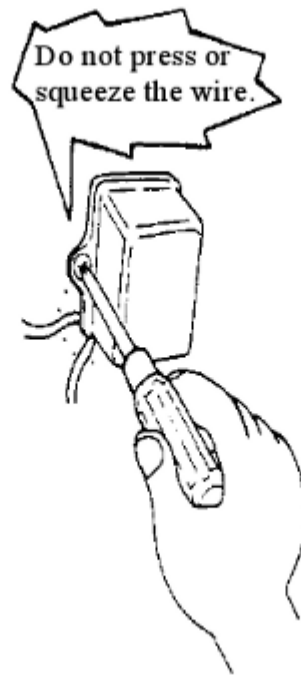
Protect wires and harnesses with electrical tape or tube if they contact a sharp edge or corner.



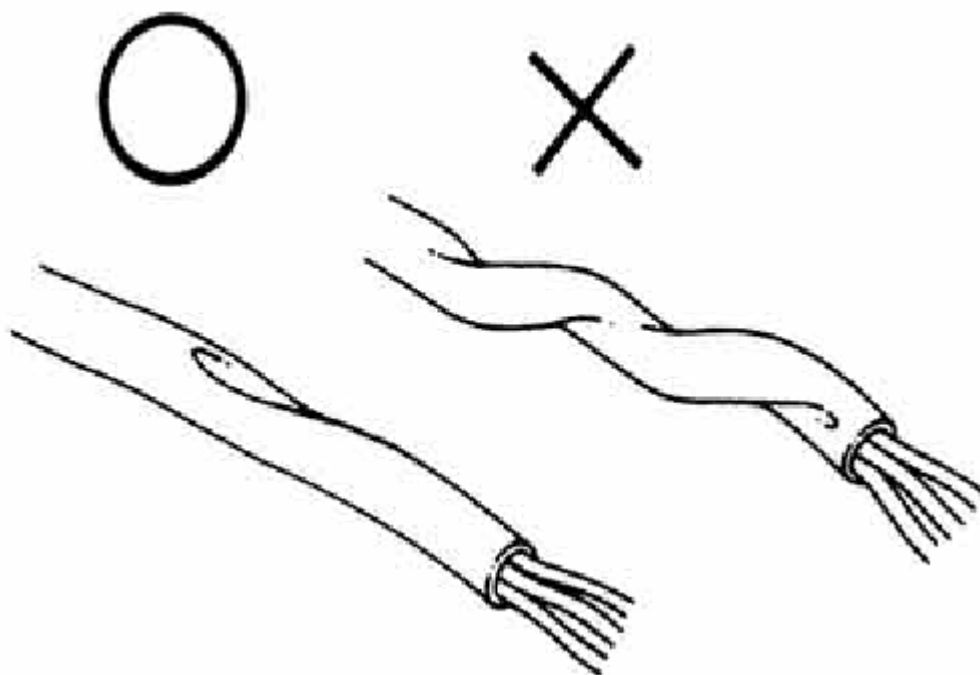
Make sure rubber wire grommets are installed correctly.



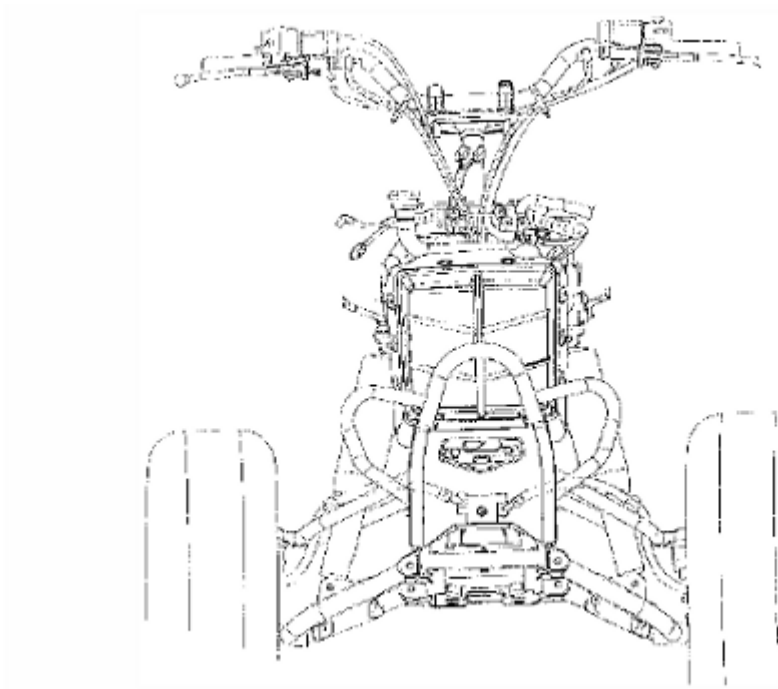
Do not break the sheath of wire. If a wire or harness has a broken sheath, repair it by wrapping it with protective tape or replace it if needed.



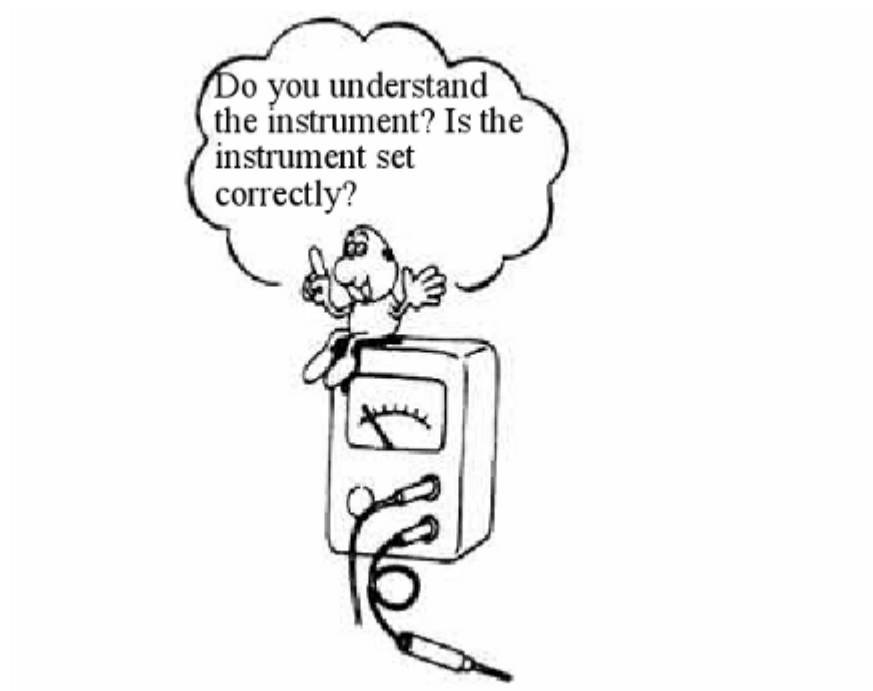
When installing other parts, do not press or squeeze the wires.



After routing, check that the wire harnesses are not twisted or kinked.



Wire harnesses routed along with handlebar should not be pulled tight, have excessive slack or interfere with adjacent or surrounding parts in all steering positions.



When a testing device is used, make sure to understand the operating methods thoroughly and operate according to the operating instructions.



Be careful not to drop any parts.



When rust is found on a terminal, remove the rust with sand paper or equivalent before connecting.

KYMCO UXV500i/700i Specifications

General Specifications

Name & Type		UXV 500i/700i
Overall length		2870 mm
Overall width		1500 mm
Overall height		1850 mm
Wheel base		1910 mm
Engine type		D.O.H.C.
Displacement		498.5 CC (UXV 500i) 694.6 CC (UXV 700i)
Fuel used		Nonleaded Gasoline
Dry weight	Front wheel	228 kg
	Rear wheel	297 kg
	Total	525 kg
Curb weight	Front wheel	243 kg
	Rear wheel	317 kg
	Total	560 kg
Tires	Front wheel	25 X 8R-12
	Rear wheel	25 X 10R-12
Ground clearance		310 mm (12.2 in)
Min. turning radius		4350 mm (170 in)
Starting system		Electric
Type		Gasoline, 4-stroke
Cylinder arrangement		Single cylinder
Combustion chamber type		Semi-sphere
Valve arrangement		4 valve DOHC, chain drive
Bore x stroke		92 X 75 mm (3.68 X 3 in) (UXV 500i) 102 X 85 mm (UXV 700i)
Compression ratio		10.5:1
Compression pressure		15 kgf/cm ² (1500kPa, 213 psi)
Intake valve	Opens	5° BTDC (at 1 mm lift) (UXV 500i) -5° BTDC (at 1 mm lift) (UXV 700i)

Intake valve	Closes	45° ABDC (at 1 mm lift) (UXV 500i) 54° BTDC (at 1 mm lift) (UXV 700i)
Exhaust valve	Opens	45° BBDC (at 1 mm lift) (UXV 500i) 50° BBDC (at 1 mm lift) (UXV 700i)
Exhaust valve	Closes	5° ATDC (at 1 mm lift) (UXV 500i) 3° ATDC (at 1 mm lift) (UXV 700i)
Valve clearance	Intake	0.1 mm (cold)
Valve clearance	Exhaust	0.18 mm (cold)
Idle speed (rpm)		1500 rpm(UXV 500i) 1500 rpm(UXV 700i)
Cooling type		Liquid cooled

Lubrication type		Forced pressure & Wet sump
Oil pump type		Trochoid
Oil filter type		Full-flow filtration
Oil capacity		3.6 liter (3.17 Imp qt, 3.82 Us qt) (UXV 500i) 2.9 liter (UXV 700i)
Oil exchanging capacity		3 liter (2.64 Imp qt, 3.18 Us qt) (UXV 500i) 2.4 liter (UXV 700i)
After draining and oil Filter cartridge change		3.2 liter (2.82 Imp qt, 3.39 Us qt) (UXV 500i) 2.6 liter (UXV 700i)
Air cleaner type		Wet type element
Fuel capacity		17 L (17.97 US qt)
Ignition System	Type	Full transistor digital ignition
	Ignition timing	5° / 1500 rpm(UXV 500i) 5° / 1500 rpm(UXV 700i)
	Spark plug	CR7E (NGK)
	Spark plug gap	0.6 - 0.7 mm (0.024 - 0.028 in.)
Battery	Capacity	12V18AH
Clutch type		Wet, centrifugal automatic
Clutch operation system		Automatic (V-belt)
Primary reduction system		V-belt
Secondary reduction system		Shaft drive
High reduction ratio		3.48(UXV 500i) 3.07~10.32(UXV 700i)

Low reduction ratio		6.464(UXV 500i) 5.42~18.21(UXV 700i)
Reverse ratio		5.31(UXV 500i) 4.33~14.55 (UXV 700i)
Tire pressure (person 75 kg)	Front	0.7 kgf/cc (10 psi)
	Rear	0.98 kgf/cc (14 psi)
Turning angle	Left	38.8°
	Right	38.8°
Brake system type	Front	Disk brake
	Rear	Disk brake
Suspension type	Front	Double wishbone
	Rear	Unit swing
Frame type		Double cradle

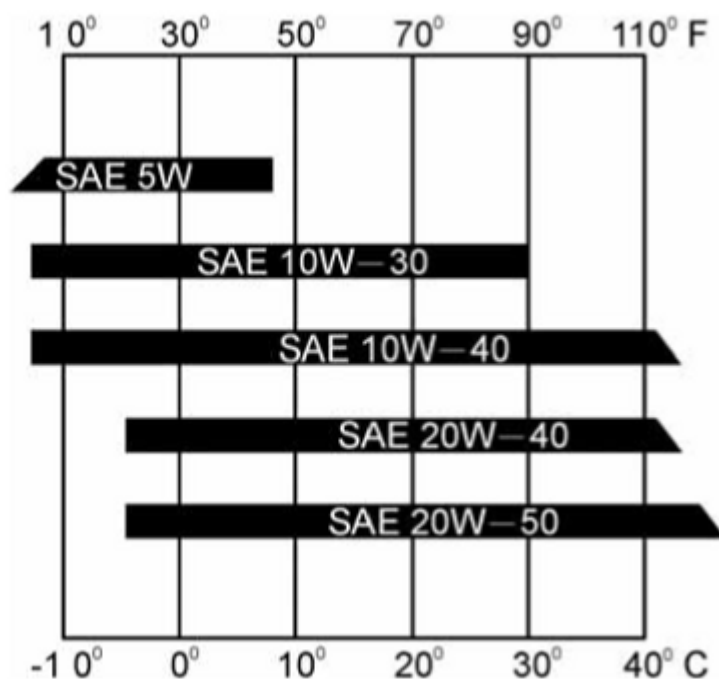
Maintenance Specifications

ITEM	SPECIFICATION
Throttle free play	3 - 5 mm (0.12 - 0.2 in)
Spark plug gap	0.8 - 0.9 mm
Spark plug: Standard	CR7E (NGK)
Valve clearance	IN: 0.1 mm
	EX: 0.18 mm
Idle speed	1500 + 100 rpm(UXV 500i) 1500 + 100 rpm(UXV 700i)
Front drive gear oil	
Recommended oil	SAE 80-90
At disassembly	270 cc (9.13 US oz)
At change	270 cc (9.13 US oz)
Rear drive gear oil	
Recommended oil	SAE 80-90
At disassembly	250 cc (8.45 US oz)
At change	250 cc (8.45 US oz)

Fuel Injection Specifications

ITEM		SPECIFICATIONS
Throttle body identification number		PTA1
Throttle cable free play		2-6 mm (1/16-1/4 in)
Fuel injector resistance (at 20°C/68°F)		10.6 - 15.9 Ω
Fuel pump resistance (at 20°C/68°F)	Float at full position	About 101 Ω
	Float at empty position	About 3 Ω
Fuel pump standard pressure (at 80 L/Hr)		300 \pm 10 kPa (43.5 psi)
Water temperature sensor resistance	At -20°C/-4°F	28.6 K Ω
	At 40°C/104°F	1.46 K Ω /3.51 K Ω \pm 1 0%
	At 100°C/212°F	0.176 K Ω
T-MAP sensor resistance (20°C) (1 and 2 pins)		1613 - 2544 Ω
Inductive ignition coil		Primary: 0.55-0.75 Ω
Throttle position sensor (TPS) resistance (at 20°C/68°F)		3500-6500 Ω (1.2 pin)
Crank position sensor resistance		96 -144 Ω
Roll sensor voltage	Standard	0.4 -1.4 V
	Over 65° (fall down)	3.7- 4.4 V

Lubrication Specifications



Other engine oil viscosities shown in the chart may be used when the average temperature in the riding area is within the indicated range.

Cooling System Specifications

ITEM		SPECIFICATIONS mm (in)
Coolant capacity	Radiator and engine	2 liter (2.1 US qt, 1.76 Imp qt)
	Reserve tank	0.45 liter (0.47 US qt, 0.39 Imp qt)
Radiator cap relief pressure		90 kPa (0.9 kgf/cm ² , 12.8 psi)
Thermostat	Begin to open	80 - 84°C (176 - 183°F)
	Fully open	95°C (203°F)
	Valve lift	8 mm (0.3 in) minimum
Standard coolant concentration		1:1 mixture with soft water

COOLANT GRAVITY CHART											
Coolant Concentration	Temperature °C										
	0	5	10	15	20	25	30	35	40	45	50
5%	1.009	1.009	1.008	1.008	1.007	1.006	1.005	1.003	1.001	0.009	0.997
10%	1.018	1.107	1.017	1.016	1.015	1.014	0.013	1.011	1.009	1.007	1.005
15%	1.028	1.027	1.026	1.025	1.024	1.022	1.020	1.018	1.016	1.014	1.012
20%	1.036	1.035	1.034	1.033	1.031	1.029	1.027	1.025	1.023	1.021	1.019
25%	1.045	1.044	1.043	1.042	1.040	1.038	1.036	1.034	1.031	1.028	1.025
30%	1.053	1.051	1.051	1.049	1.047	1.045	1.043	1.041	1.038	1.035	1.032
35%	1.063	1.062	1.060	1.058	1.056	1.054	1.052	1.049	1.046	1.043	1.040
40%	1.072	1.070	1.068	1.066	1.064	1.062	1.059	1.056	1.053	1.050	1.047
45%	1.080	1.078	1.076	1.074	1.072	1.069	1.056	1.063	1.062	1.057	1.054
50%	1.086	1.084	1.082	1.080	1.077	1.074	1.071	1.068	1.065	1.062	1.059
55%	1.095	1.093	1.091	1.088	1.085	1.082	1.079	1.076	1.073	1.070	1.067
60%	1.100	1.098	1.095	1.092	1.089	1.086	1.083	1.080	1.077	1.074	1.071

COOLANT MIXTURE (WITH ANTI-RUST AND ANTI-FREEZING EFFECTS)			
Freezing Point	Mixing Rate	KYMCO SIGMA Coolant Concentrate or equivalent	Distilled Water
-9 °C	20%		
-15 °C	30%	425cc	975cc
-25 °C	40%		
-37 °C	50%		
-44.5 °C	55%		

Wheel, Suspension, Tire, and Brake

Specifications

Tire pressure	1 Rider
Front	0.7 kgf/cm ² (10 psi)
Rear	0.98 kgf/cm ² (14 psi)
Tire size: Front	25 X 8 - 12
Tire size: Rear	25 X 10 - 12

Item		Standard mm (in)	Service Limit
Front wheel rim run out	Radial	-	2 (0.08)
	Axial	-	2 (0.08)
Tie rod length		379.75 ± 0.25 (15.19 ± 0.01)	-
Rod-end (tie rod) angle		180°	-

Item			Standard	Service Limit
Rear wheel	Rim run out	Radial	-	2 mm (0.08 in)
		Axial	-	2 mm (0.08 in)

Item	Standard	Service Limit
Brake disk thickness	3.8 - 4.2 mm (0.152 - 0.168 in)	3 mm (0.12 in)
Brake disk runout	-	0.3 mm (0.012 in)

Electrical Specifications

ITEM			SPECIFICATIONS
Battery	Capacity		12V-18 Ah
	Current leakage		0.5 Ma max.
	Voltage (20°C/68°F)	Full charged	13.0 - 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.8 A/5 - 10 h
		Quick	9 A/1 h
Alternator	Charging coil resistance (20°C/68°F)		0.1 - 0.3 Ω

Stator output current	Standard
1300 rpm	12.0 A Minimum
5000 rpm	22.0 A Minimum
10000 rpm	30.0 A Maximum

Item	Standard
Spark plug	NGK-CR7E
Spark plug gap	0.6 - 0.7 mm (0.024 - 0.028 in.)
Ignition system	Full transistor digital ignition
Ignition timing	5° / 1500 rpm

Torque Specifications

Item	Thread dia. (mm)	Torque kgf-m (N-m, ft-lb)	Remarks
MAINTENANCE:			
Spark plug	10	1.2 (12, 8.6)	
Tappet ADJ nut	5	0.9 (9, 6.5)	
Engine oil filter cap	30	1.5 (15, 11)	Apply oil
Engine oil filter cartridge	20	1 (10, 7.2)	Apply oil
Engine drain plug	12	2.5 (25, 18)	
LUBRICATION SYSTEM:			
Oil pump screw	4	0.3 (3)	
Oil pipe bolt	16	3.5 (35)	Apply oil
COOLING SYSTEM:			
Water pump bolt	6	1.3 (13)	
Fan motor bolt	5	0.53 (5)	
Fan motor switch	16	1.8 (17)	

Item	Thread dia. (mm)	Torque kgf-m (N-m)	Remarks
CYLINDER HEAD:			
Cylinder head bolt	10	4.8 (48)	Apply oil
Cylinder head bolt	5	2.3 (23)	Apply oil
Cylinder head nut	6	1 (10)	
Cylinder head cover	6	1 (10)	
Breather separator bolt	6	1.3 (13)	
Cam chain tensioner bolt	6	1.2 (12)	
Tensioner sealing bolt	10	1 (10)	
Rocker arm shaft	18	4.5 (45)	Apply oil
Chain guide pivot bolt	8	2 (20)	
Water joint bolt	6	1.2 (12)	
CYLINDER:			
Cylinder bolt	6	1 (10)	
DRIVE/DRIVEN PULLEY:			

1.Quick Reference

Drive pulley nut	20	14 (140)	Apply oil
Wet clutch nut	25	14 (140)	
Driven pulley nut	16	10 (100)	Apply oil
Driven pulley assembly plate nut	36	7.5 (75)	
TRANSMISSION:			
Crankcase bolt	6	1.2 (12)	Apply oil
Drive bevel gear nut	20	14 (140)	Apply oil
Driven bevel gear nut	20	14 (140)	Apply oil
Stopper lever bolt	8	2.5 (25)	
Stopper lever boss nut	12	3 (30)	
Shift came stopper plug	20	4.8 (48)	
Output shaft bearing nut	85	11 (110)	Apply oil
Drive shaft bearing bolt	8	3 (30)	
STARTER SYSTEM:			
Starter pulley nut	14	5.5 (55)	

Item	Thread dia. (mm)	Torque Kgf-m (N-m, lbf-ft)
STEERING:		
Steering column and intermediate shaft	8	2.7 (27, 15)
Steering assembly and intermediate shaft	8	2.7 (27,15)
Steering assembly and frame	10	4.8 (48, 34)
Steering column assembly and frame	10	3.2 (32, 23)
Steering wheel and steering column	12	3.5 (35, 25)
Front knuckle and front upper arm	10	4.8 (48, 34)
Front knuckle and front lower arm	10	4.8 (48, 34)
Tie-rod lock nut	12	4.0 (40, 28)
Front knuckle and Tie-rod	10	3.5 (35, 25.2)
WHEEL:		
Front wheel and front wheel hub	10	5.5 (55, 39)
Rear wheel and rear wheel hub	10	5.5 (55, 39)
Front wheel hub and cvj	18	20 (200, 145)
Rear wheel hub and cvj	18	20 (200,145)
FRONT SUSPENSION:		
Front upper arm and frame	10	4.8 (48, 34)

Front lower arm and frame	10	4.8 (48, 34)
Front shock absorber and frame	10	4.5 (45, 32.4)
Front shock absorber and front upper arm	10	4.5 (45, 32.4)
REAR SUSPENSION:		
Rear upper arm and frame	10	4.8 (48, 34)
Rear lower arm and frame	10	4.8 (48, 34)
Rear knuckle and rear upper arm	10	4.8 (48, 34)
Rear knuckle and rear lower arm	10	4.8 (48, 34)
Rear shock cushion and frame	10	4.5 (45, 32)
Rear shock cushion and rear lower arm	10	4.5 (45, 32)
Stabilizer and frame	10	3.2 (32, 23)
Stabilizer joint and stabilizer	10	5.5 (55, 39)
Stabilizer joint and rear lower arm	10	5.5 (55, 39)

Item	Thread dia. (mm)	Torque Kgf-m (N-m, lbf-ft)
BRAKE:		
Front caliper bracket mounting bolt	8	2.7 (27, 19)
Rear caliper bracket mounting bolt	8	2.7 (27, 19)
Front brake disc and wheel hub	8	3.5 (35, 25)
FR/RR brake caliper bleed screw	8	0.6 (6, 4)
Brake hose oil bolt	10	3.5 (35, 25)
Brake master cylinder and frame	8	2.2 (22, 15.6)
Rear disc holder and gear box	10	4.5 (45, 32)
Rear disc mounting bolt	8	3.5 (35, 25)
3-way junction nut	8	2.5 (25, 18)
FRAME:		
FR/RR hanger and damper	10	5.5 (55, 39)
Engine damper and frame	8	2.7 (27, 19)
Differential gear case	10	5.5 (55, 39)
Differential gear stay and frame	8	3.2 (32, 22.7)
Final drive gear case	10	5.5 (55, 40)
Fuel tank stay and frame	8	2.7 (27, 19)
Gas Damper	8	2.2 (22, 15.6)
FR bumper and frame	10	3.2 (32, 22.7)

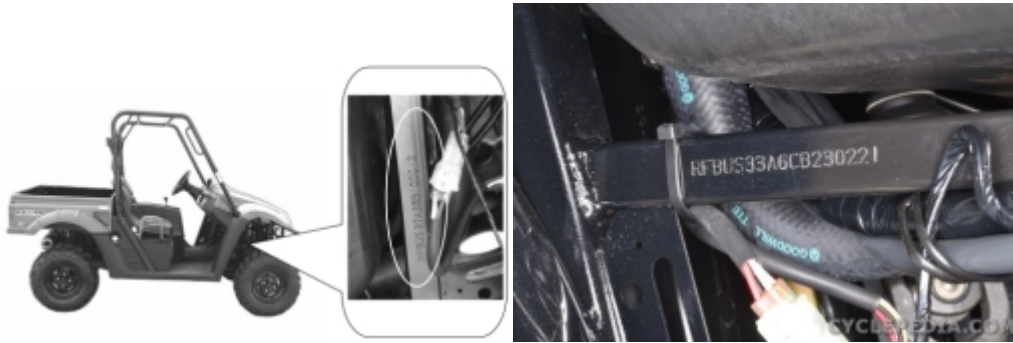
R/L roof and frame	10	6.4 (64, 45)
Cross pipe, roof	8	3.2 (32, 22.7)
Shifter	8	2.2 (22, 15.6)
Pedal assy.stay and frame	8	2.2 (22, 15.6)
Seat belt and frame	7/16-20unf	5.9 (59, 42)
Shifter rod assy	8	2.2 (22, 15.6)
ENGINE:		
Rear gear box and caliper bracket	8	3.2(32, 22.7)
Air cleaner and frame	10	1.6 (16, 11.7)
Exhaust pipe and engine head	8	2.0 (20, 15)
Muffler stay and frame	10	3.5 (35, 25)

General Torque Specifications

General torque specifications are only to be used when specific torque specifications for a fastener are not provided. These specifications are for clean unlubricated threads. The size given is for thread diameter not bolt head size.

Item	Torque	
	kgf-m	ft-lb
5 mm bolt, nut	0.45 - 0.6	3.25 - 4.34
6 mm bolt, nut	0.8 - 1.2	5.79 - 8.68
8 mm bolt, nut	1.8 - 2.5	13.02 - 18.08
10 mm bolt, nut	3.0 - 4.0	21.70 - 28.93
12 mm bolt, nut	5.0 - 6.0	36.17 - 43.40
5 mm screw	0.45 - 0.6	3.25 - 4.34
6 mm screw, SH bolt	0.7 - 1.1	5.06 - 7.96
6 mm flange bolt, nut	1.0 - 1.4	7.23 - 10.13
8 mm flange bolt, nut	2.4 - 3.0	17.36 - 21.70
10 mm flange bolt, nut	3.0 - 4.5	21.70 - 32.55

VIN and Engine Number Location



The VIN stamped into the front right side of the frame.



The engine number is stamped into the back of the left crankcase half.

Information and Warning Sticker Locations





2.Periodic Maintenance

This chapter covers the location and servicing of the periodic maintenance items.

This chapter includes all information necessary to perform recommended inspections and adjustments. These preventive maintenance procedures, if followed, will ensure more reliable vehicle operation and a longer service life. The need for costly overhaul work will be greatly reduced. This information applies to vehicles already in service as well as new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

1.Periodic Maintenance Chart	2-2
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WARNING

- Before running the engine, make sure that the working area is well-ventilated. Never run the engine in a closed area. The exhaust contains poisonous carbon monoxide gas which may cause death to people.
- Gasoline is extremely flammable and is explosive under some conditions. The working area must be well-ventilated and do not smoke or allow flames or sparks near the working area or fuel storage area.

Periodic Maintenance Chart

Periodic maintenance is required to keep the vehicle safe and performing properly. For use exceeding the chart repeat the service intervals.

ITEM			INITIAL	EVERY		
	WHICHEVER COMES FIRST	mi	100	600	1200	
		Km	150	1000	2000	
	ROUTINE	MONTH	1	6	12	
Engine oil	•Replace (Warm engine before draining).		o	o	o	
Oil strainer	•Clean. •Replace if necessary.		o	o	o	
Engine oil filter cartridge	•Replace		o	o	o	
Front drive gear oil	•Check oil level/oil leakage •Replace every 12 months.		o		o	
Rear drive gear oil	•Check oil level/oil leakage •Replace every 12 months,		o		o	
Air filter element (for engine)	•Clean. (More often in wet or dusty areas.) •Replace if necessary.			o	o	
Air filter element (for V-belt compartment)	•Clean. (More often in wet or dusty areas.) •Replace if necessary.			o	o	
Carburetor	•Check idle speed/starter operation. •Adjust if necessary.		o	o	o	
Cylinder head cover breather system	•Check breather hose for cracks or damage. •Replace if necessary.			o	o	
Spark plug	•Check condition, •Adjust gap and clean. •Replace if necessary.		o	o	o	
Fuel line	•Check fuel hose for cracks or damage. •Replace if necessary.			o	o	
Valves	•Check valve clearance,		o	o	o	

	•Adjust if necessary.				
Brake	•Check operation and brake fluid. •Replace brake pad if necessary.		o	o	o
Coolant	•Check coolant leakage. •Replace if necessary. •Replace coolant every 24 months.		o	o	o
V-belt	•Check operation. •Replace if damage or excessive wear.		o		o
Exhaust system	•Check leakage. •Retighten if necessary. •Replace gasket if necessary.			o	o
Spark arrester	•Clean			o	o
Wheels	•Check balance/damage/runout. •Replace if necessary.		o	o	o
Wheel bearings	•Check bearing assembly for looseness/damage. •Replace if damaged.		o	o	o
Steering system	•Check operation. •Replace if damaged. •Check toe-in. •Adjust if necessary.		o	o	o
Drive shaft boots	•Check operation. •Replace if damaged.			o	o
Suspension (front)	•Check operation. •Correct if necessary.			o	o
Suspension (rear)	•Check operation. •Correct if necessary.			o	o
Knuckle shafts/ Steering shaft	•Lubricate every 6 months.			o	o
Fittings and Fasteners	•Check all chassis fittings and fasteners. •Correct if necessary.		o	o	o

*Dusty or wet conditions require shorter maintenance intervals.

Air Filter Servicing

UXV 500i

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the seats. See the [Seat](#) topic for more information.

Remove the center cover. See the [Center Cover](#) topic for more information.



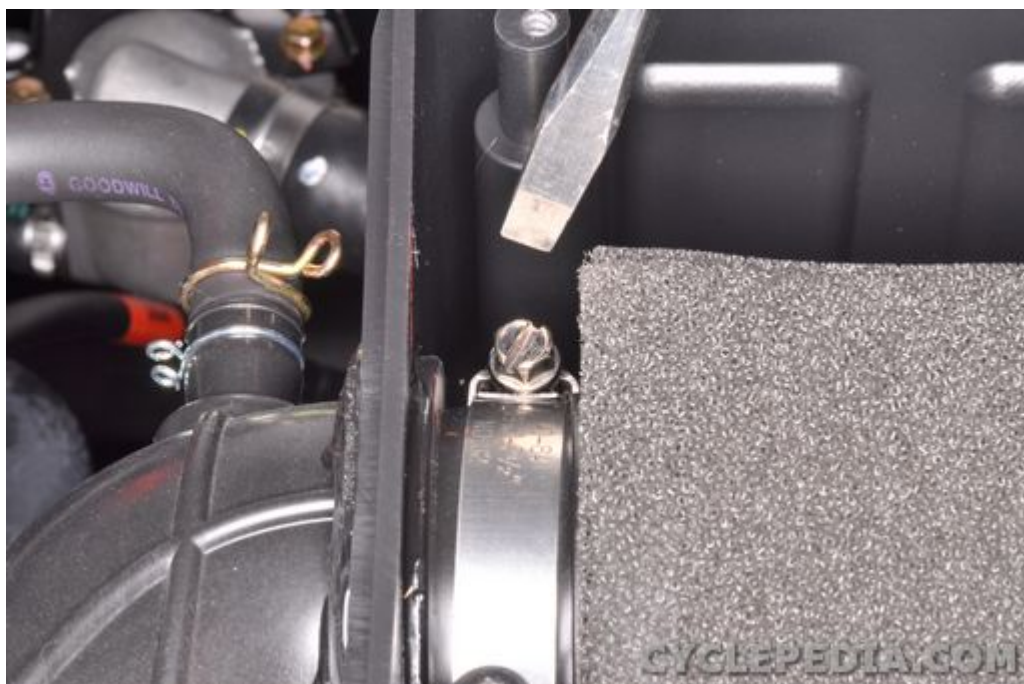
There are seven airbox cover screws.



Remove the airbox cover screws with a #2 Phillips screwdriver.



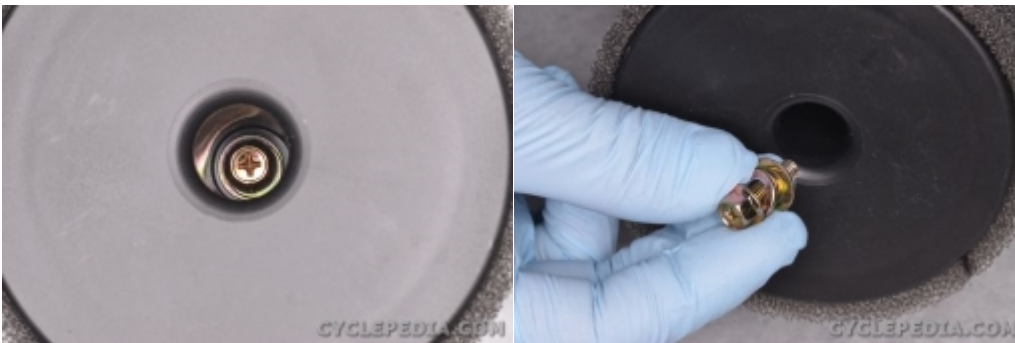
Remove the airbox cover.



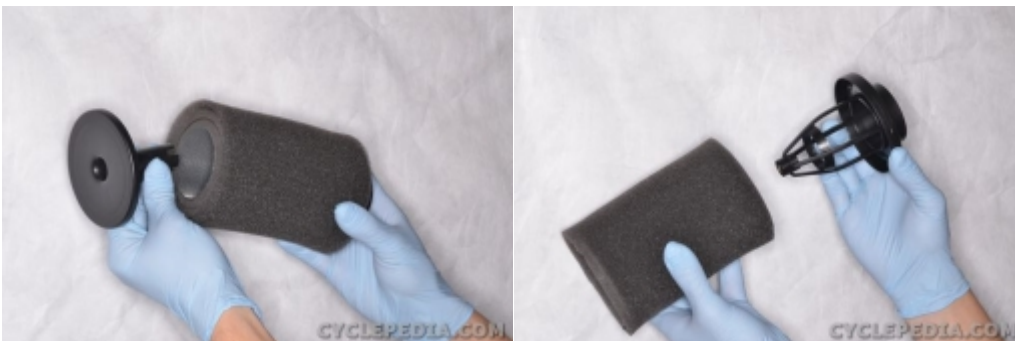
Loosen the air filter clamp screw with a flat blade screwdriver or an 8 mm socket.



Lift out the air filter. Clean out the airbox.



Loosen the air filter holder screw with a #2 Phillips screwdriver. Remove the screw and washers from the air filter.



Remove the air filter holders from the air filter.



Slide out the air filter screen.



Separate the inner and outer air filter element pieces.

Servicing



Place the filter in a container and saturate it with a foam air filter cleaner both inside and out. Products like Simple Green, dish soap, or most non-flammable solvents will work if foam air filter cleaner is unavailable.

Let the filter soak for approximately 5 minutes - follow cleaning product instructions if different. Rinse the element in warm water until the water runs clear. You may squeeze the filter to remove excess cleaner but never twist it.

Let the air filter dry completely.

Once the element is completely dry, blow it off with low pressure compressed air or pat it down with a clean shop towel to remove any remaining debris.

NOTE: Always wear safety glasses when using compressed air and never point it directly at yourself or anyone else.



Oil the filter with foam air filter oil or fresh engine oil. Squeeze out any excess oil. The element should be wet with oil, but not to the point of dripping.

Clean the out the airbox.

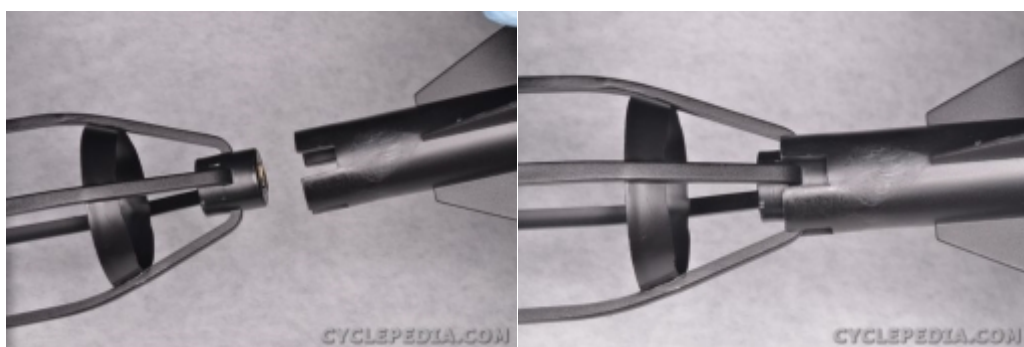
Installation



Fit the inner air filter element into the outer element.



Insert the screen into the air filter elements.



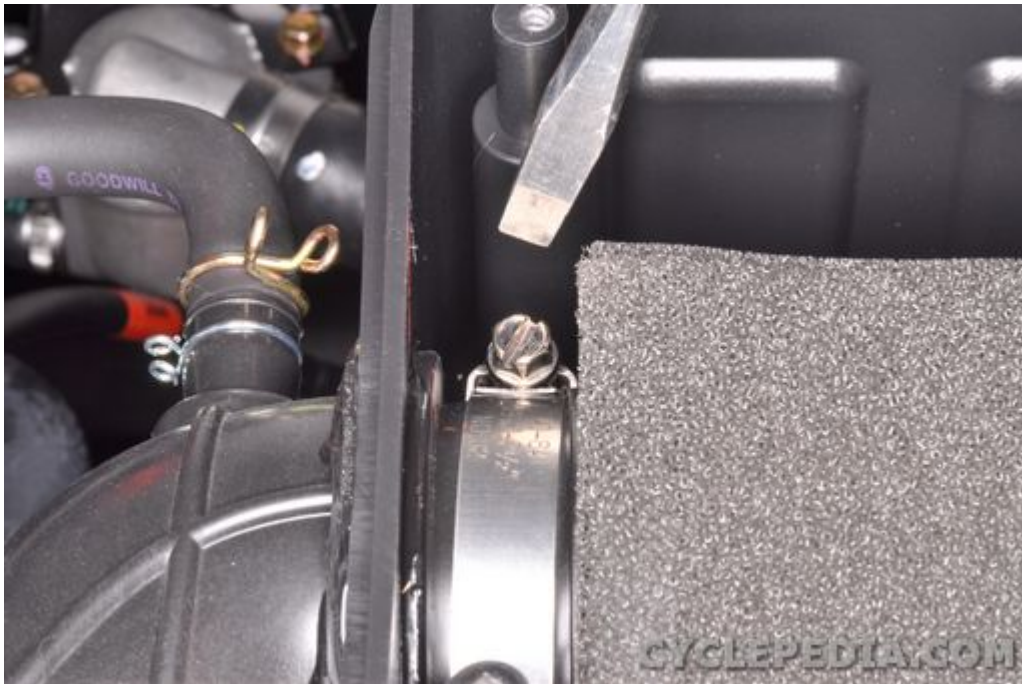
Install the air filter holders into the air filter. The holders must fit together as shown.



Install the air filter holder screw and washers. Tighten the air filter holder screw securely with a #2 Phillips screwdriver.



Fit the air filter into place as shown.



Tighten the air filter clamp screw securely with a flat blade screwdriver or an 8 mm socket.



Fit the airbox cover into place.



Insert the seven airbox cover screws. Tighten the airbox cover screws securely with a #2 Phillips screwdriver.



Inspect the airbox drain tube.



Remove the tube and drain away any fluid build up or debris that has collected. Return the tube and secure it with the clamp.

Install the center cover. See the [Center Cover](#) topic for more information.

Install the seats. See the [Seat](#) topic for more information.

Air Filter Servicing

UXV 700i

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the seats. See the [Seat](#) topic for more information.

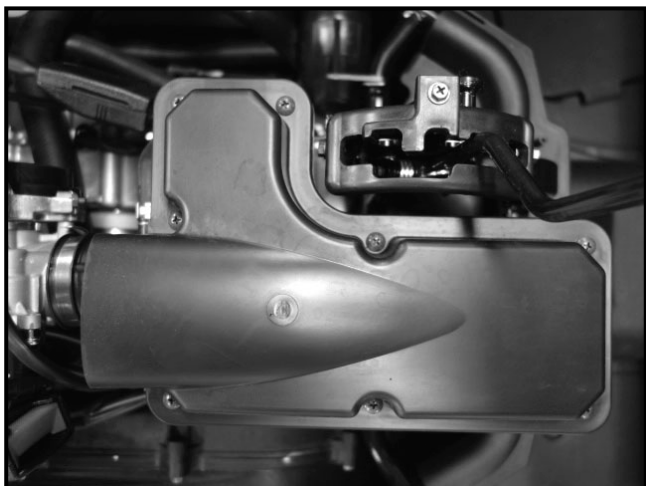
Remove the center cover. See the [Center Cover](#) topic for more information.



Remove the center cover fasteners.

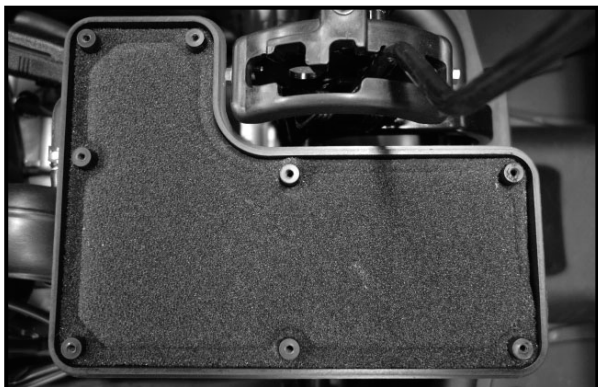


Remove gear selector screw and center cover.

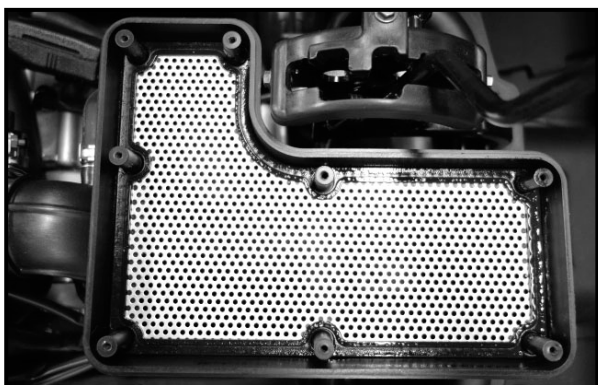


Remove the screws of the air cleaner cover.
And remove the air cleaner cover.

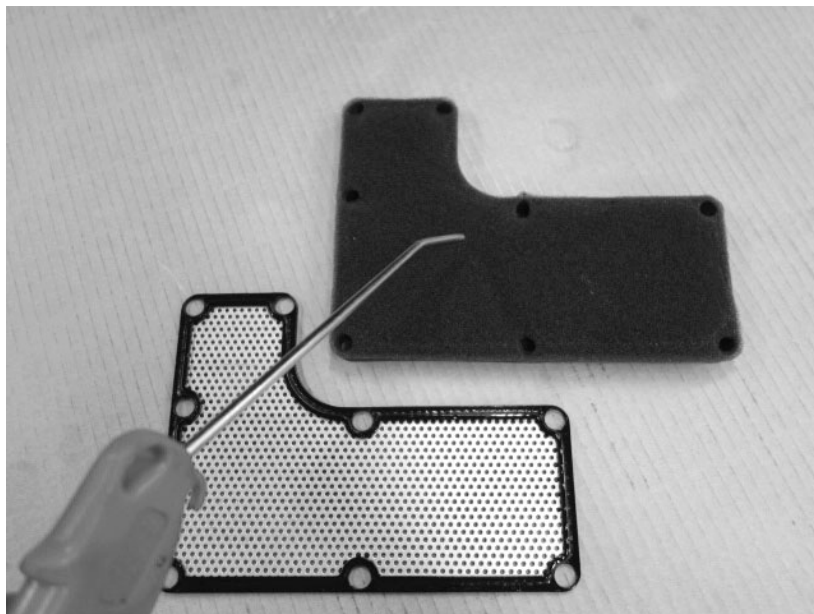
Remove air filter element.



Remove air filter element.



Using high pressure air to clean air filter element .
Inspect the air filter element and replace it if damaged.



Throttle Free Play

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Inspection



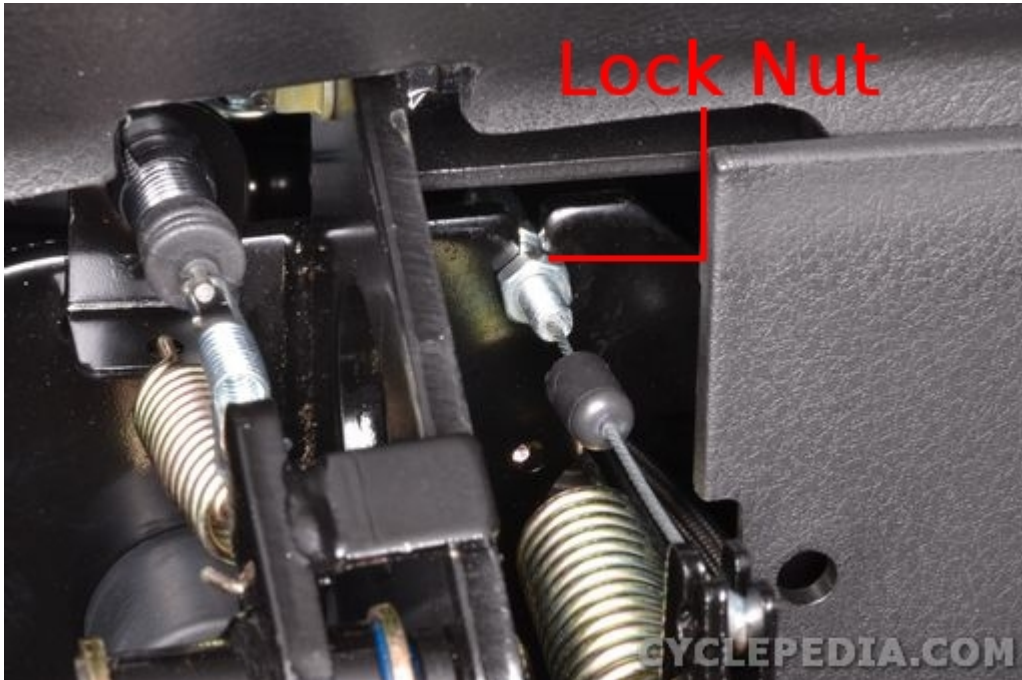
Inspect the throttle free play by operating the throttle pedal. The end of the throttle pedal should travel 3 - 5 mm (0.12 - 0.20 in) before the cable slack is taken up and the throttle begins to open.

When the throttle pedal is pushed all the way in and released it should return to its resting position quickly. Also, the throttle operation should be smooth.

Adjustment

First Step

Remove the pedal cover. See the [Pedal Cover](#) topic for more information.



Loosen the lock nut with a 10 mm wrench.



Adjust the adjuster nut on the other side with a 10 mm wrench until the free play is within specification. Tighten the lock nut when finished. Proceed to the second step if the correct free play can not be achieved.

Second Step



Slide back the rubber cover from the throttle cable.



To adjust the throttle free play loosen the lock nut on the throttle cable with an 8 mm wrench and turn the adjuster with an 8 mm wrench. Turn the adjuster out to decrease free-play and turn it in to increase free-play. Always check that the throttle operates freely and returns properly. Tighten the lock nut securely.

Install the pedal cover. See the [Pedal Cover](#) topic for more information.

Brake Fluid

The KYMCO UXV 500i/700i uses DOT 4 brake fluid. Do not mix the brake fluid types. The system should be bled whenever the brakes feel spongy, or if the brake system has been taken apart and rebuilt. Always use fresh brake fluid from a tightly sealed container.

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Warning: Brake fluid is very caustic and can damage paint, chrome and plastic. Wipe up any spills immediately.

Inspection

Place the vehicle on level ground. Turn the steering wheel so that the front tires are straight.

Open the hood. See the [Hood](#) topic for more information.





Remove the brake fluid panel at the bottom of the front cargo box.



Unscrew the master cylinder cap. Make sure the brake fluid level is acceptable.

Draining

Lift the hood. See the [Hood](#) topic for more information.

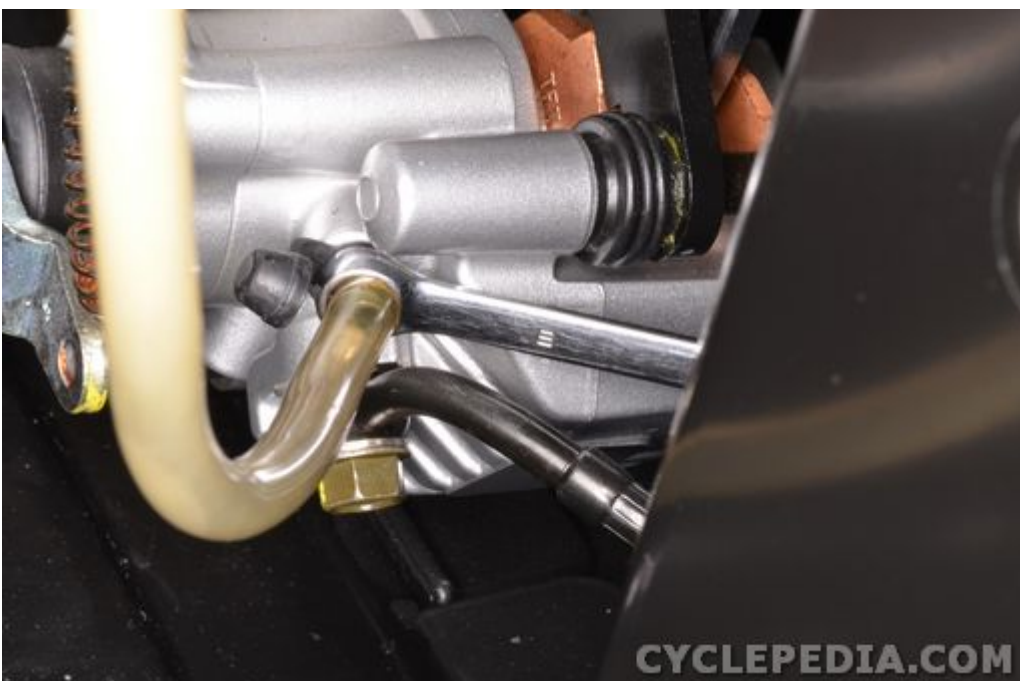
Remove the front cargo box. See the [Hood](#) topic for more information.



Place a suitable container under the master cylinder to catch the fluid. Remove the brake fluid drain bolt to drain the brake fluid.

Note: Do not splash brake fluid onto any rubber, plastic and coated parts. When working with brake fluid, use shop towels to cover these parts.

Note: The front and rear brakes follow the same procedure.



Crack open the bleeder valve on the brake caliper using an 8 mm wrench. This valve is usually very tight so use a box end wrench or a 6 point socket and ratchet to prevent rounding off the head. Snug the bleeder valve back down.

Place a length of 6 mm inside diameter clear hose on the bleeder valve and place the other end in a container to catch the old brake fluid.

Open the bleeder valve and pump the brake pedal to remove the brake fluid. Stop pumping the pedal when the fluid stops flowing.



Alternatively, you can use a Mighty -Vac or a similar device to suck out the old brake fluid.

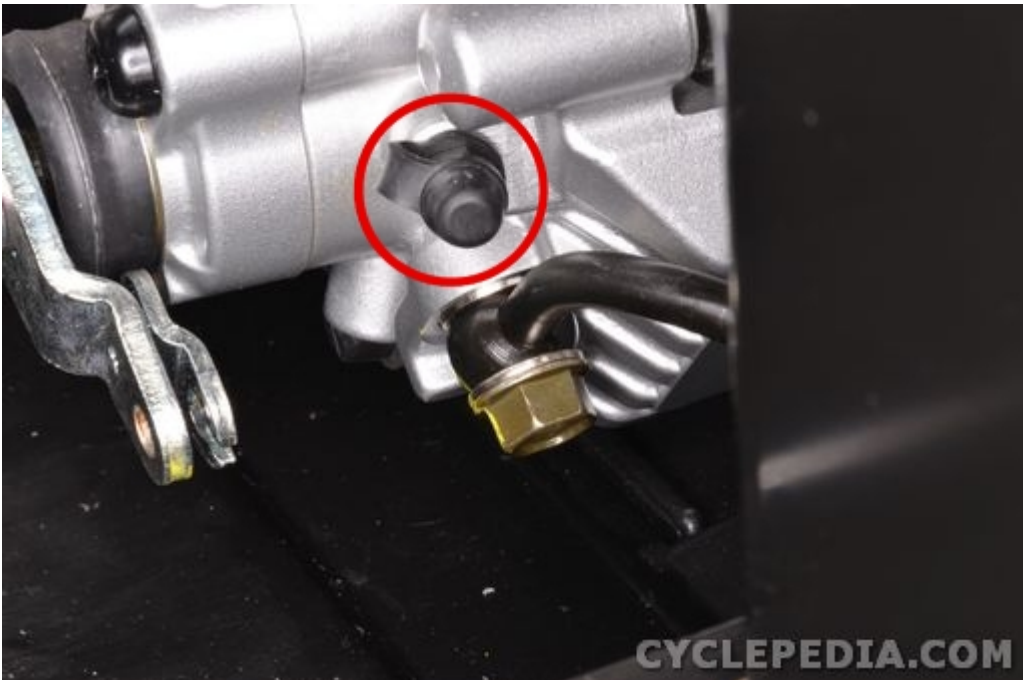
Bleeding

When bleeding the brakes start from the farthest caliper and work towards the master cylinder.

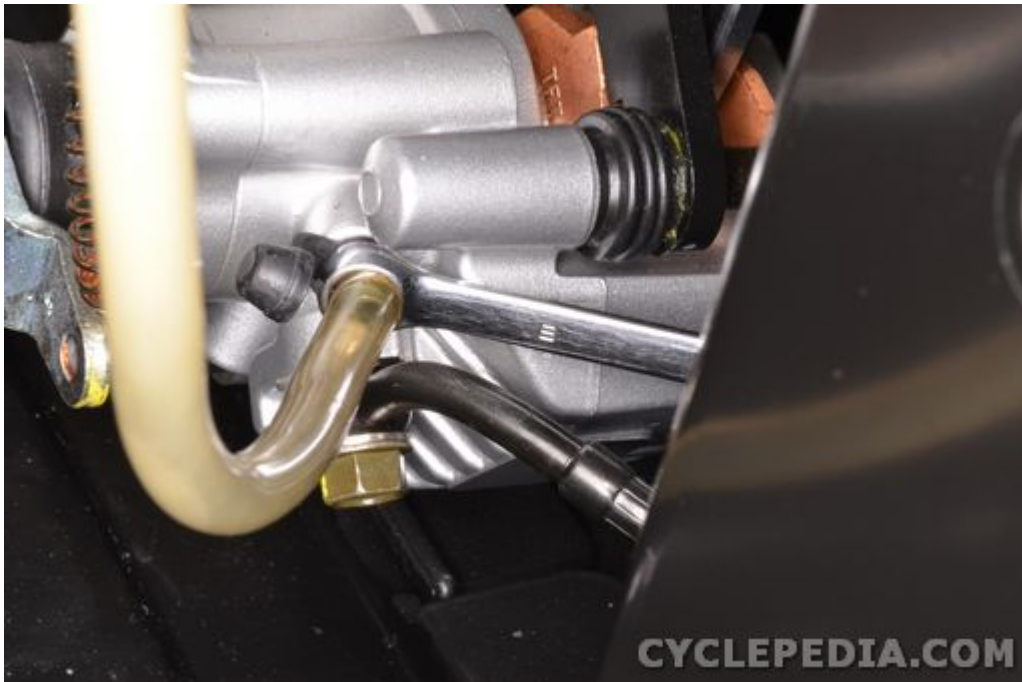


Fill the master cylinder with DOT 4 brake fluid from a fresh, newly opened container and bleed the brakes.

Note: The front and rear brakes follow the same procedure.



Pull off the rubber cap over the bleeder valve on the caliper you are working on.

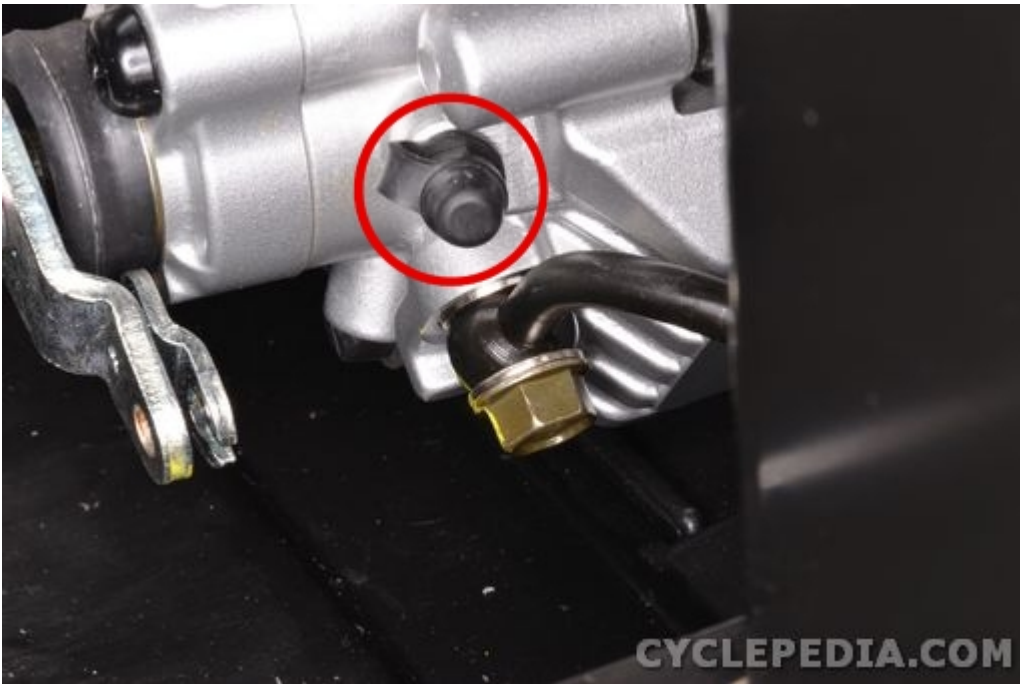


Crack open the bleeder valve on the brake caliper using an 8 mm wrench. This valve is usually very tight so use a box end wrench or a 6 point socket and ratchet to prevent rounding off the head. Snug the bleeder valve back down.

Place a length of 6 mm inside diameter clear hose on the bleeder valve and place the other end in a container.

Pump the brake pedal several times and hold the pedal down. While holding the pedal, crack open the bleeder valve. The brake pedal will travel all the way to the floor and brake fluid and/or air will come out of the bleeder valve into the 6 mm hose. Tighten the bleeder valve before releasing the brake pedal. Pump the pedal several times again and repeat the process.

Be certain to check the master cylinder reservoir occasionally to make sure the reservoir doesn't run dry. Add more brake fluid as necessary. Continue this process until clean brake fluid comes out of the bleeder valve and there are no air bubbles. The brake pedal should feel firm.



Tighten the bleeder valves to specification and push their rubber covers over the nipples.

Item	Kgf-m	N-m	lbf-ft
Bleeder valves	0.6	6	4

Make sure the reservoir has the proper amount of fluid.



Install the master cylinder cap.

Check the function of the brakes before operating the machine.

Brake Inspection

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Master Cylinder

Place the vehicle on level ground so the front master cylinder reservoir is level.

Lift the hood. See the [Hood](#) topic for more information.



Remove the brake fluid panel at the bottom of the front cargo box.



Check the level of brake fluid.

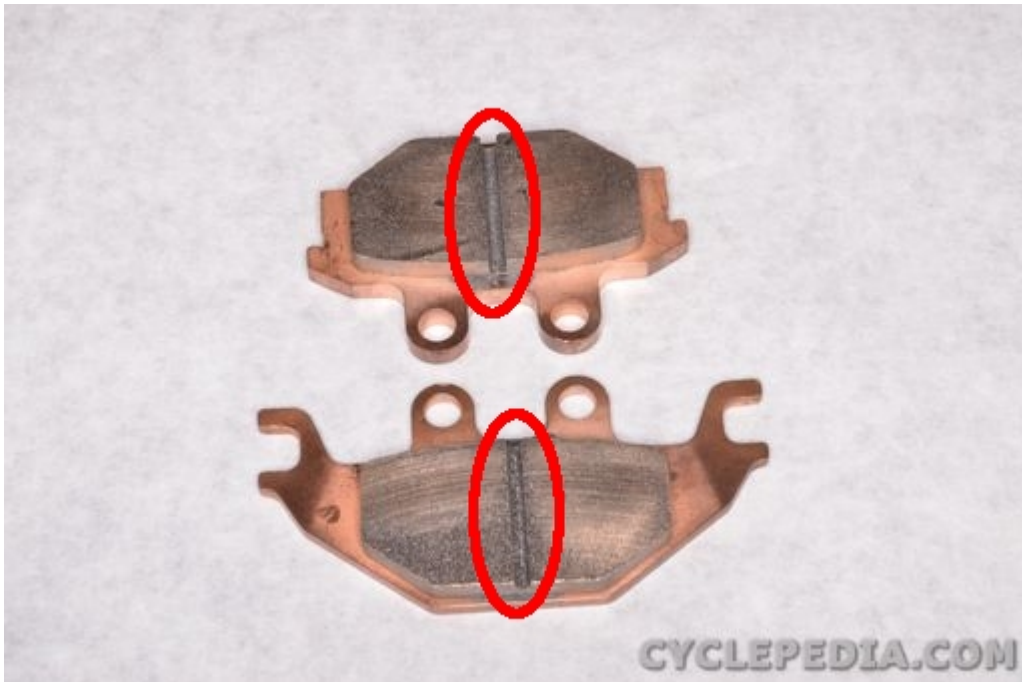
Front Pads and Rotors

Use a jack to raise the front wheels off the ground. Be sure it is on a level surface.

Remove the front wheels. See the [Wheels and Wheel Hubs](#) topic for more information.



Inspect the pad linings and rotors.



Replace the pads if they are worn to the limit line. Replace the rotors if they are not within specification. To replace the front brake pads and/or rotors see the [Front Caliper](#) and/or [Front Disc Brake](#) topic.

Install the front wheels. See the [Wheels and Wheel Hubs](#) topic for more information.

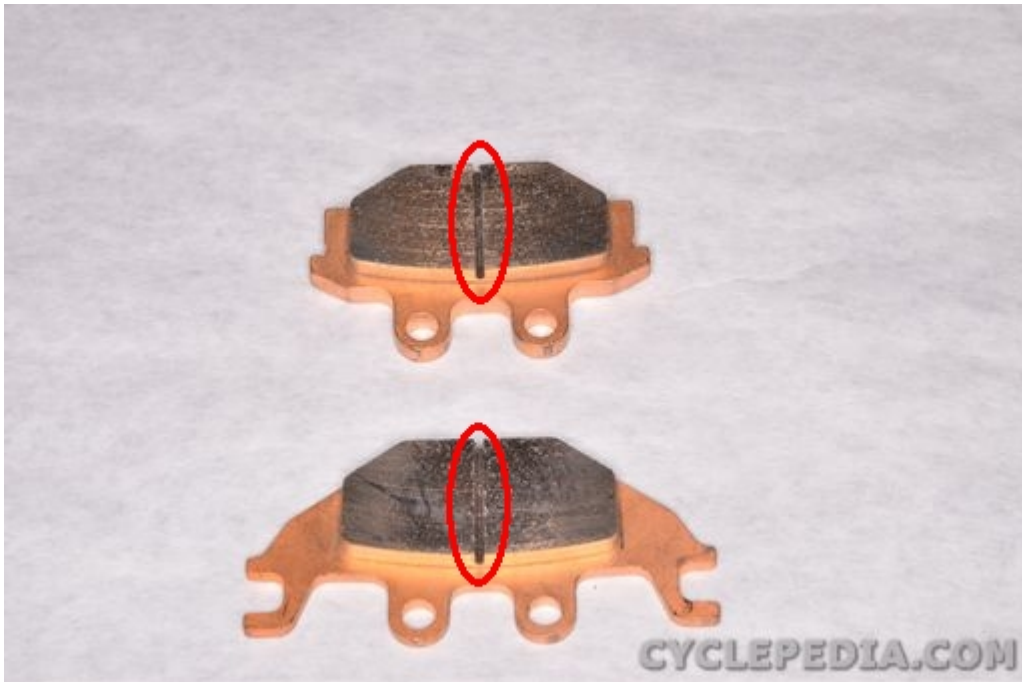
Rear Brake Pads and Rotors

Use a jack to raise the rear wheels off the ground. Be sure it is on a level surface.

Remove the rear wheels. See the [Wheels and Wheel Hubs](#) topic for more information.



Inspect the pad linings and rotor.



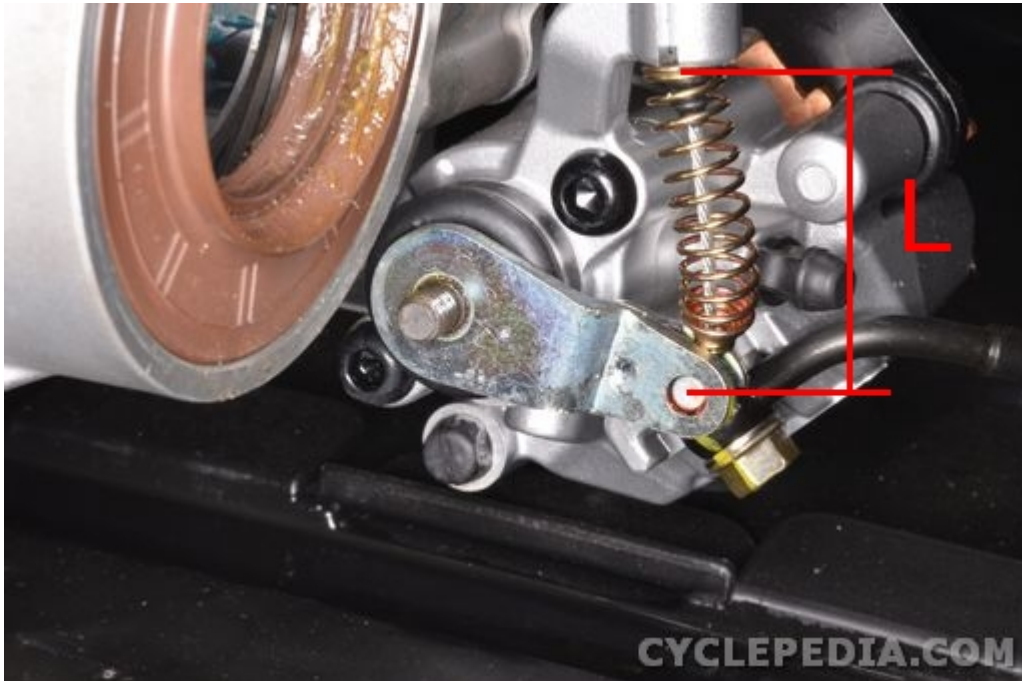
Replace the pads if they are worn to the limit line.

Replace the rotor if it is damaged or out of specification.

To replace the front brake pads and/or rotors see the [Rear Brake Caliper](#) and/or [Rear Brake Disc](#) topic.

Install the front wheels. See the [Wheels and Wheel Hubs](#) topic for more information.

Parking Brake

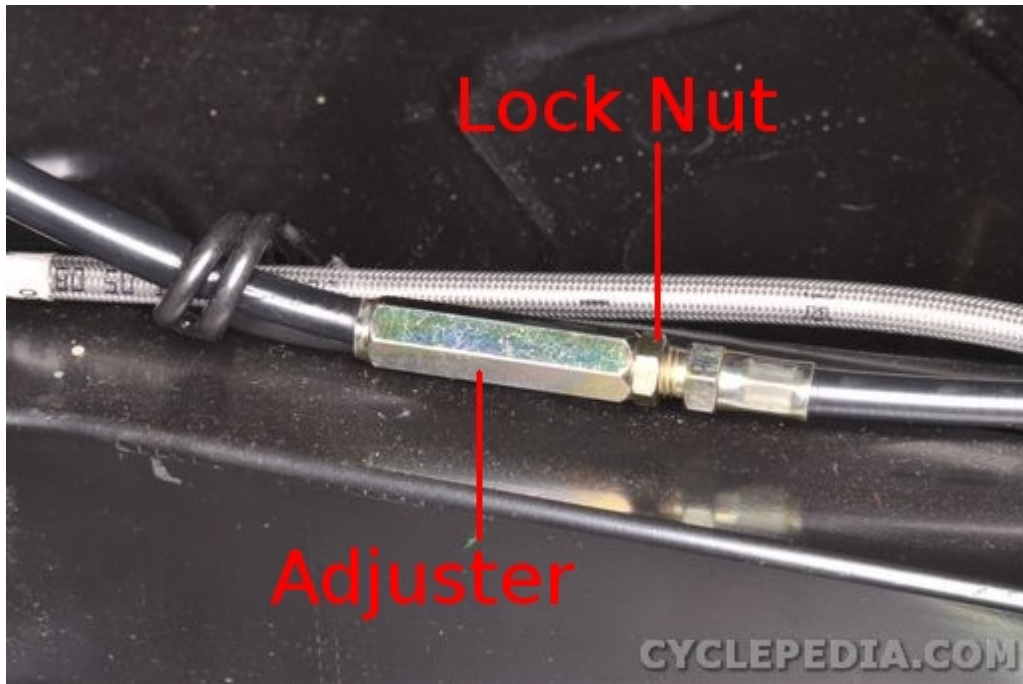


Measure the brake cable end length “L” and check it against the specification. See the [Rear Parking Brake Adjustment](#) topic for more information.

Rear Parking Brake Adjustment

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Make sure the parking brake doesn't drag when the lever is released, and the parking brake holds when the lever is applied. Adjust the inline cable adjuster as needed.



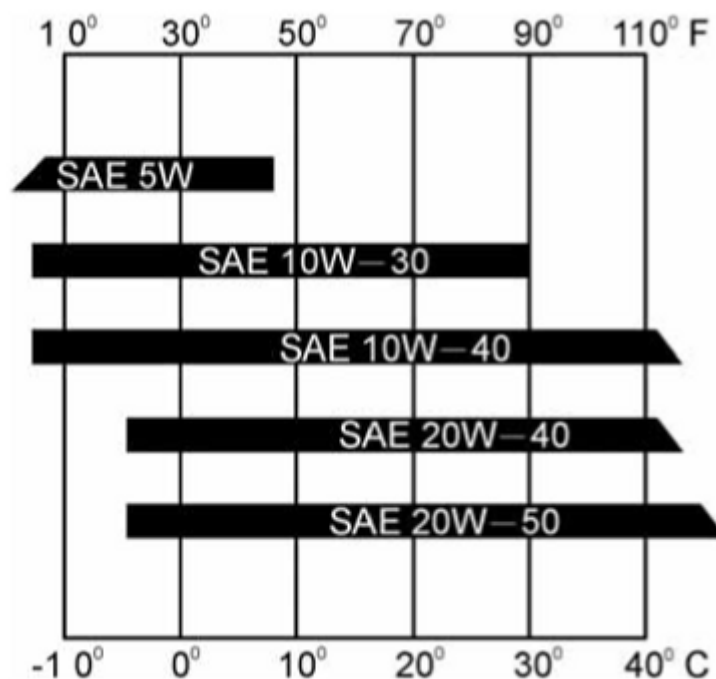
Trace the cable up from the parking brake until you reach the adjuster. Loosen the adjuster lock nut with a 10 mm wrench. Turn the adjuster out to decrease free-play and turn it in to increase free-play. Always check that the parking brake operates properly.

Engine Oil

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Type and Capacity

ITEM		STANDARD
Engine oil capacity	At draining	3 liter (2.64 Imp qt, 3.18 Us qt) (UXV 500i) 2.4 liter (UXV 700i)
	At disassembly	3.6 liter (3.17 Imp qt, 3.82 Us qt) (UXV 500i) 2.9 liter (UXV 700i)
	At draining and oil filter cartridge change	3.2 liter (2.82 Imp qt, 3.39 Us qt) (UXV 500i) 2.6 liter (UXV 700i)
Recommended engine oil		KYMCO 4-stroke oil or equivalent motor oil API service classification SJ Viscosity: SAE 5W-50



Other engine oil viscosities shown in the chart may be used when the average temperature in the riding area is within the indicated range.

Inspection

Start the engine and let it warm up for 2 - 3 minutes. Park the vehicle on a level surface. Stop the engine and allow the oil to settle for 2 - 3 minutes.



Inspect the oil level through the sight glass. The sight glass is located on the left side of the engine. The oil level should be between the "H" and "L" marks as shown.



If the oil level is at or below the "L" mark add more of the same type and brand of oil to the engine through the oil filler hole. Wipe down the area around the filler cap to prevent debris from entering the engine. Inspect the filler cap O-ring and replace it as needed.

If the oil level is above the upper mark drain some of oil from the drain plug.

Servicing

Remove the seats. See the [Seat](#) topic for more information.

Remove the center cover. See the [Center Cover](#) topic for more information.

Start and run the engine for a minute or two, this will heat the engine and allow the oil to drain out faster and more completely.

NOTE: Hot engine oil can burn you, take precautions not to touch the oil when draining.



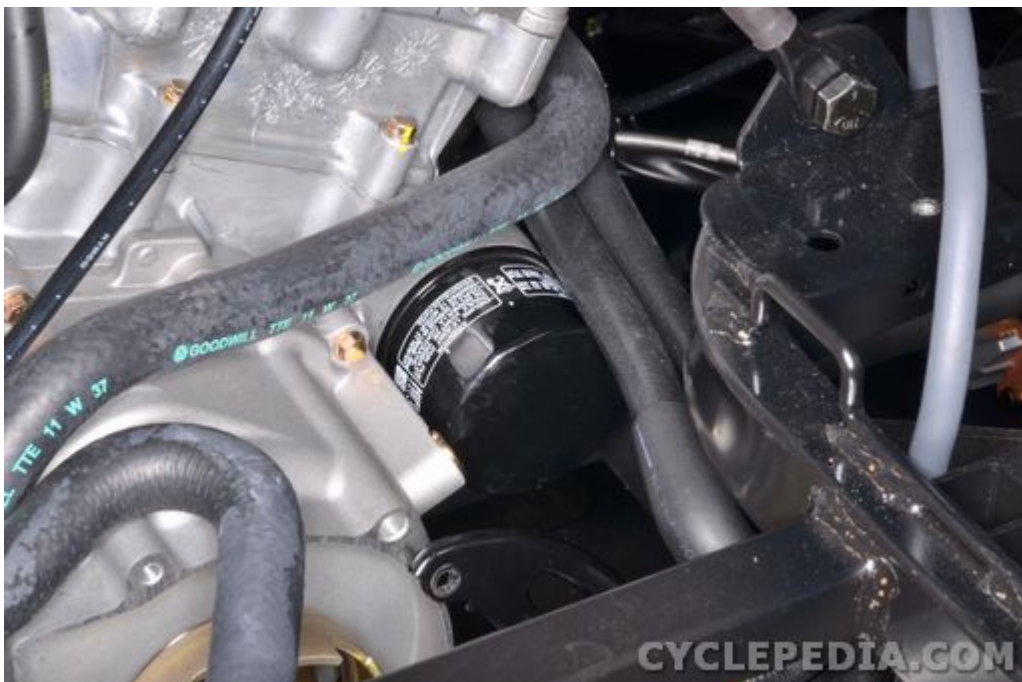
Place a drain pan under the oil filter cap and drain plug. Loosen the oil filter cap with a 17 mm socket.



Remove the drain plug, oil filter cap, strainer, spring and O-ring. Allow the oil to drain into the pan. Clean and inspect the strainer. Inspect the O-ring. Replace any parts if needed.



Remove the oil cap for faster draining.



Use a special oil filter wrench to remove the oil filter cartridge.

Special Tool- Oil Cartridge Wrench: A120E00061



Remove the oil filter and the rubber oil filter seal from the engine case.



Apply engine oil to the O-ring. When the oil has finished draining install the oil filter cap, strainer, spring and O-ring. Torque the oil filter cap to specification with a 17 mm socket.



Note: You can remove the drain plug to drain the engine oil also, but you will not be able to clean the strainer. This is a good way to drain engine oil if it was over-filled. Replace the sealing washer with a new item if it was removed.

Item	Torque kgf-m (N-m, ft-lb)	Remarks
Engine oil filter cap	1.5 (15, 11)	Apply oil
Engine drain plug	2.5 (25, 18)	-



Apply fresh engine oil to the rubber oil filter seal.



Install the oil filter onto the engine and tighten by hand until the oil filter contacts the engine.

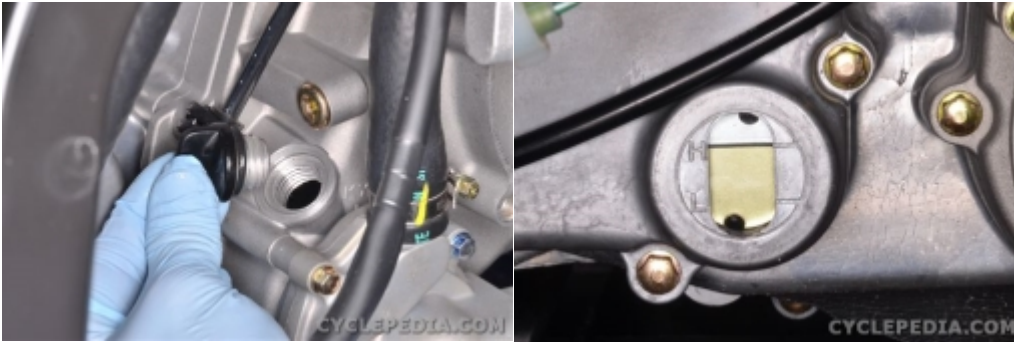


Tighten the oil filter with the special oil filter wrench to specification.

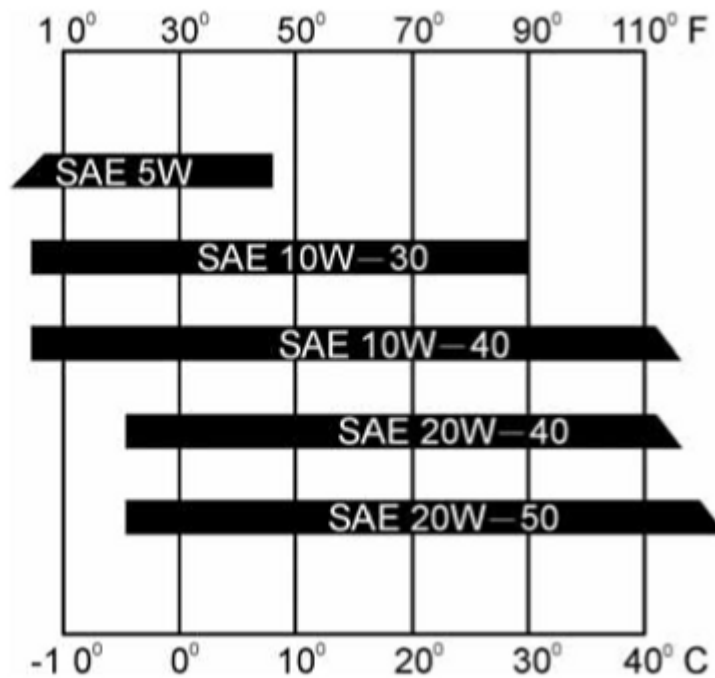
Special Tool- Oil Cartridge Wrench: A120E00061

Item	Torque kgf-m (N-m, ft-lb)	Remarks
Engine oil filter cartridge	1 (10, 7.2)	Apply oil

Refilling



Add the proper type and quantity of oil and install the oil filler cap. Start the engine and let it run for several minutes. Check for any oil leaks. Check the oil level as describe [above](#). If the oil level is too high drain the excess oil from the oil drain bolt.



Other engine oil viscosities shown in the chart may be used when the average temperature in the riding area is within the indicated range.

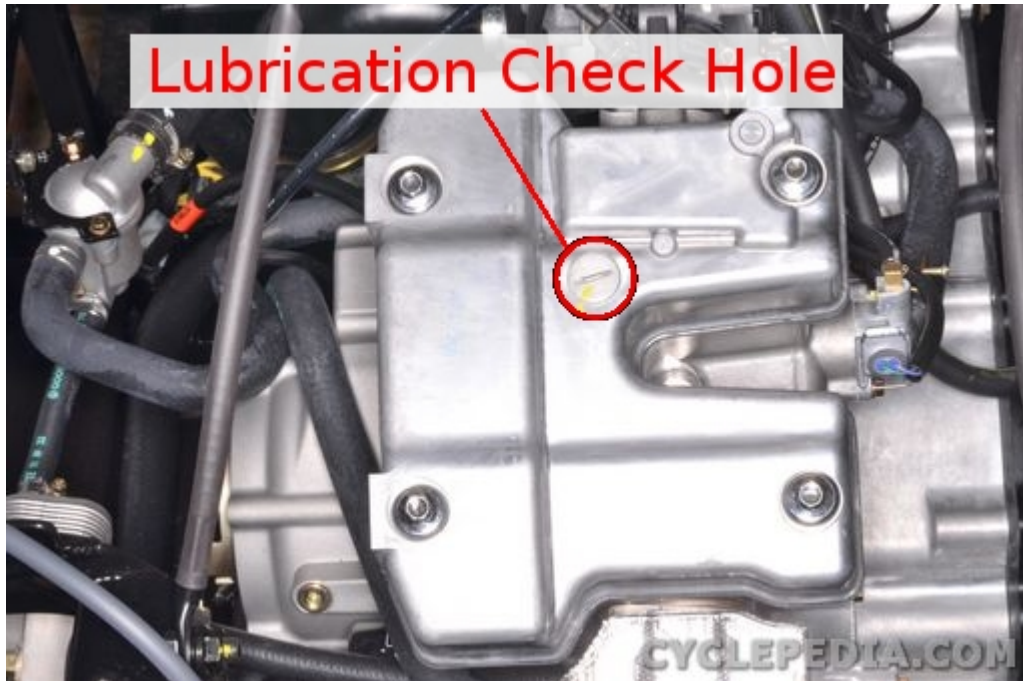
Install the center cover. See the [Center Cover](#) topic for more information.

Install the seats. See the [Seat](#) topic for more information.

Oil Pressure

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Remove the center cover. See the [Center Cover](#) topic for more information



Remove the check hole plug with O-ring. Inspect the O-ring and replace as needed. Start the engine. Check that oil gushed from the hole. If not, stop the engine immediately and determine the cause.

Install the check hole plug with O-ring and tighten it securely.

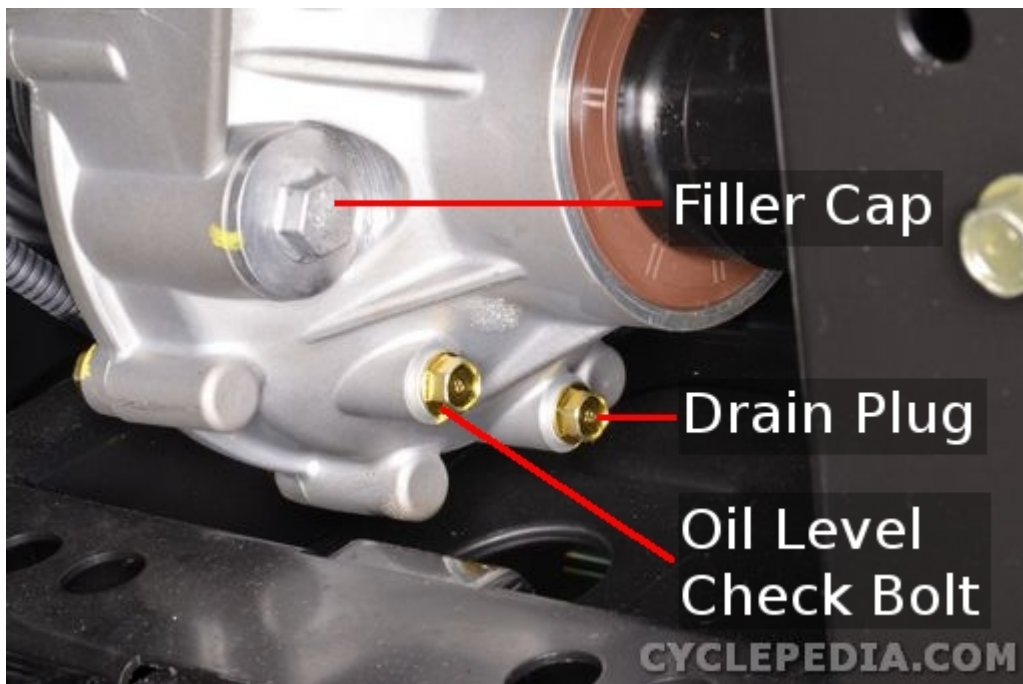
Final Drive Oil

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Drive the vehicle until the rear drive gear oil is warm. Place the vehicle on a level surface.

Rear Drive Gear Oil

Draining



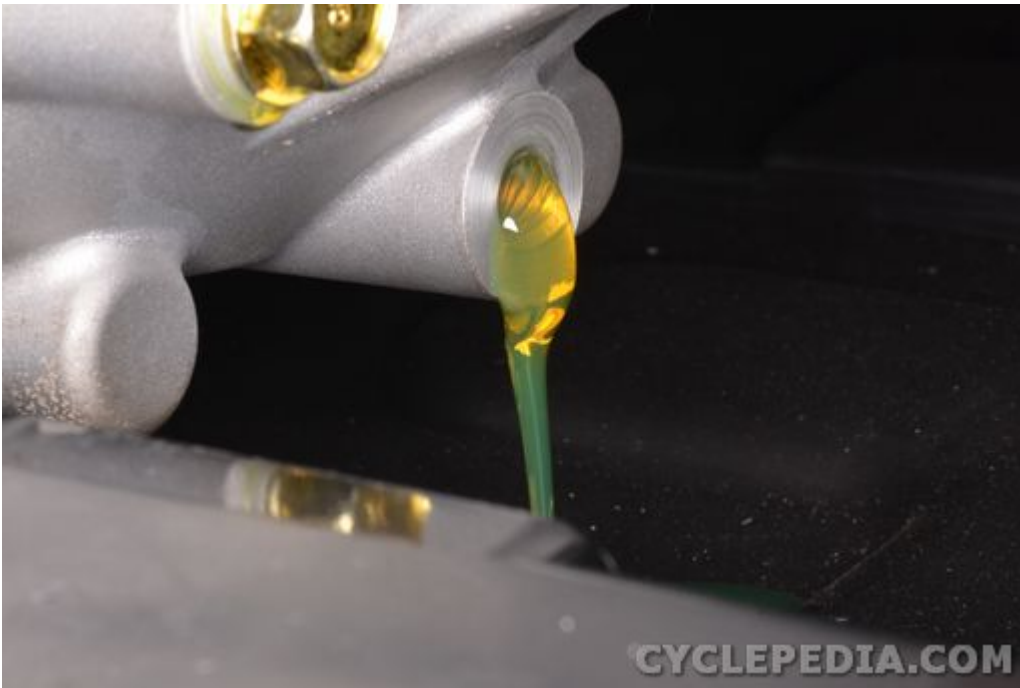
Place a suitable oil drain pan under the rear differential.



Remove the filler cap with a 17 mm socket.

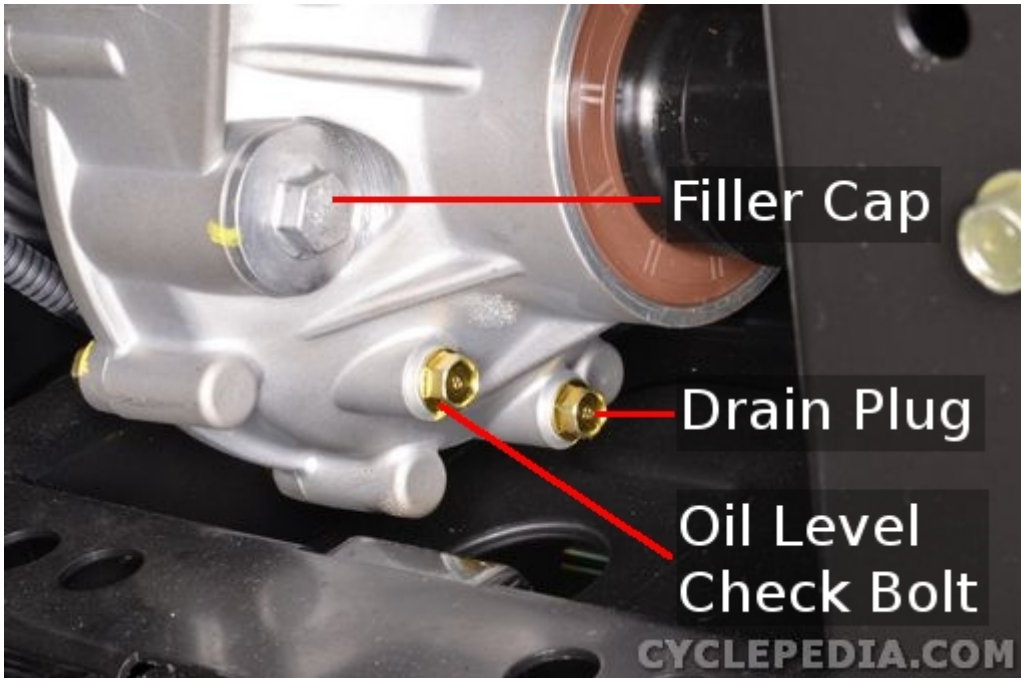


Inspect the filler cap O-ring and replace if needed.



Remove the drain plug with a 12 mm socket and allow the oil to completely drain.

Fill



Install a new sealing washer and the drain plug. Tighten the drain plug to specification with a 12 mm socket.

Item	N-m	kgf-m	ft-lb
Rear drive drain plug	20	2	15



Add the proper rear gear oil into the filler hole.

Type	Capacity
SAE 80~90 hypoid gear oil	250 cc (8.45 US oz)



Remove the oil level check bolt and sealing washer with a 12 mm socket. Check that the oil level reaches the oil level check hole.



Install the filler cap and O-ring. Tighten it to specification with a 17 mm socket.

Item	N-m	kgf-m	ft-lb
Rear drive filler cap	15	1.5	11



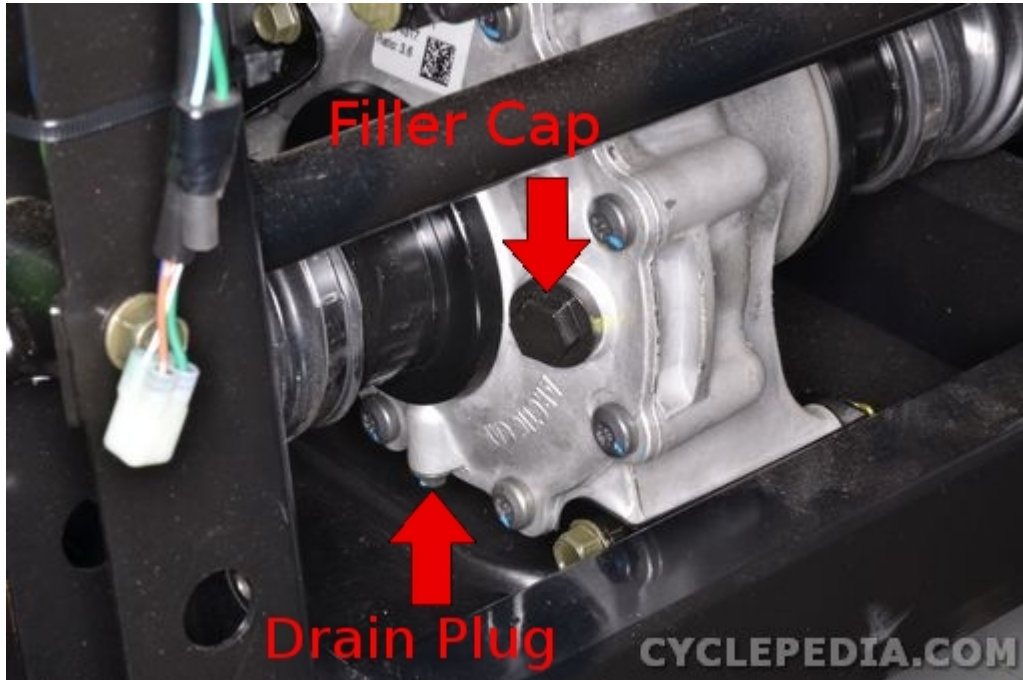
Install the oil level check bolt with a new sealing washer and tighten to specification using a 12 mm socket .

Item	N-m	kgf-m	ft-lb
Oil level check bolt	20	2	15

Front Drive Gear Oil

Draining

Remove the front skid plate. See the [Skid Plates](#) topic for more information.



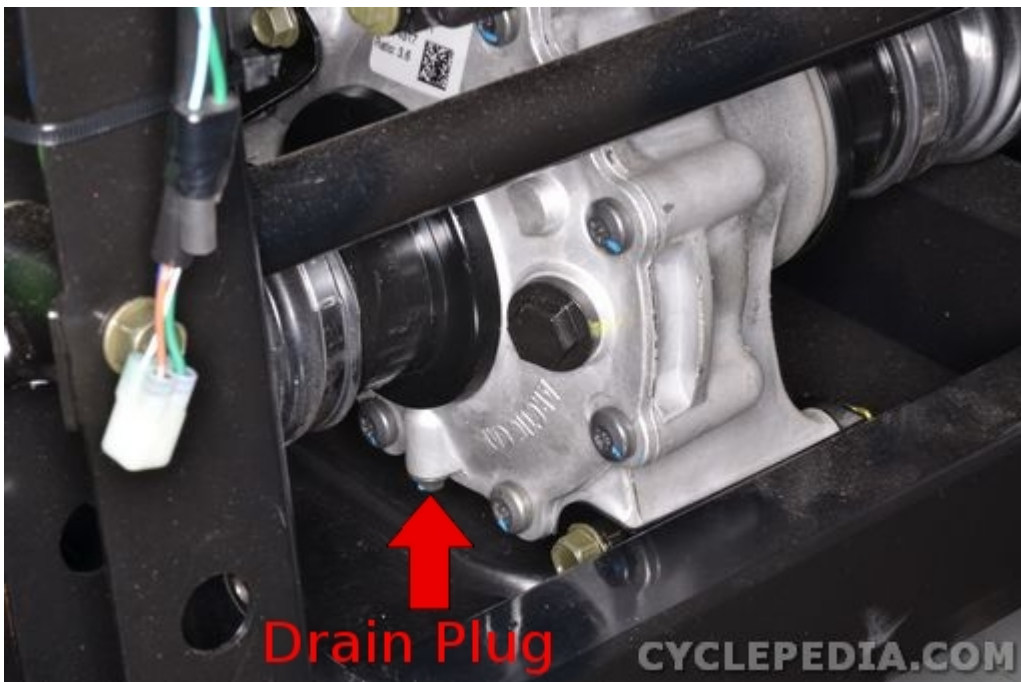
Place a suitable oil drain pan under the rear differential.



Remove the filler cap with a 17 mm socket.

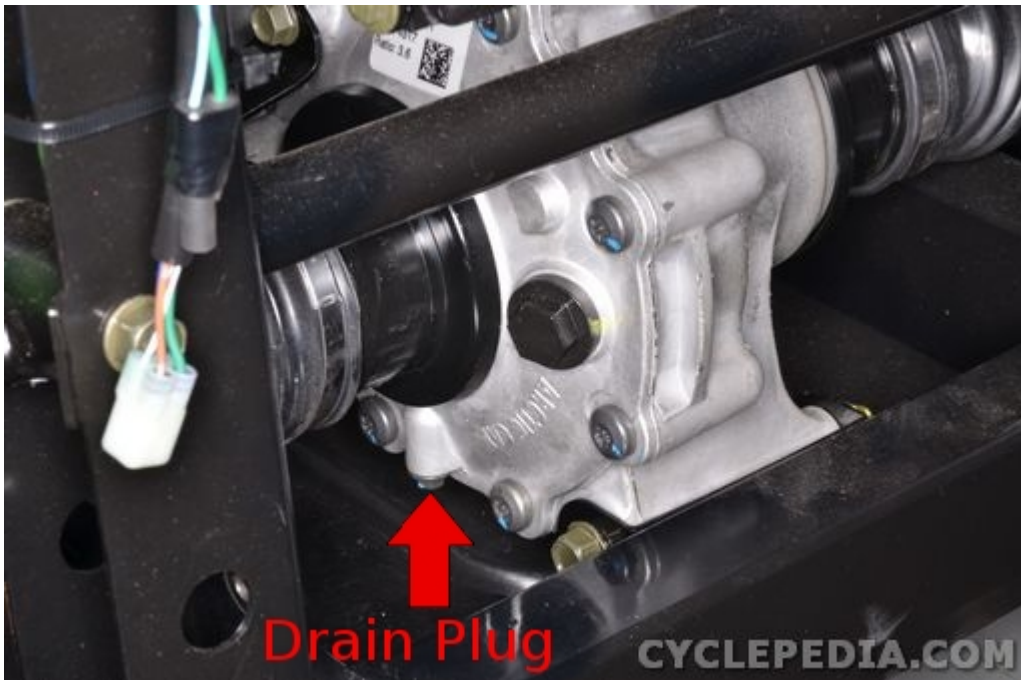


Inspect the filler cap O-ring and replace if needed.



Remove the drain plug with an 8 mm socket and allow the oil to completely drain.

Fill



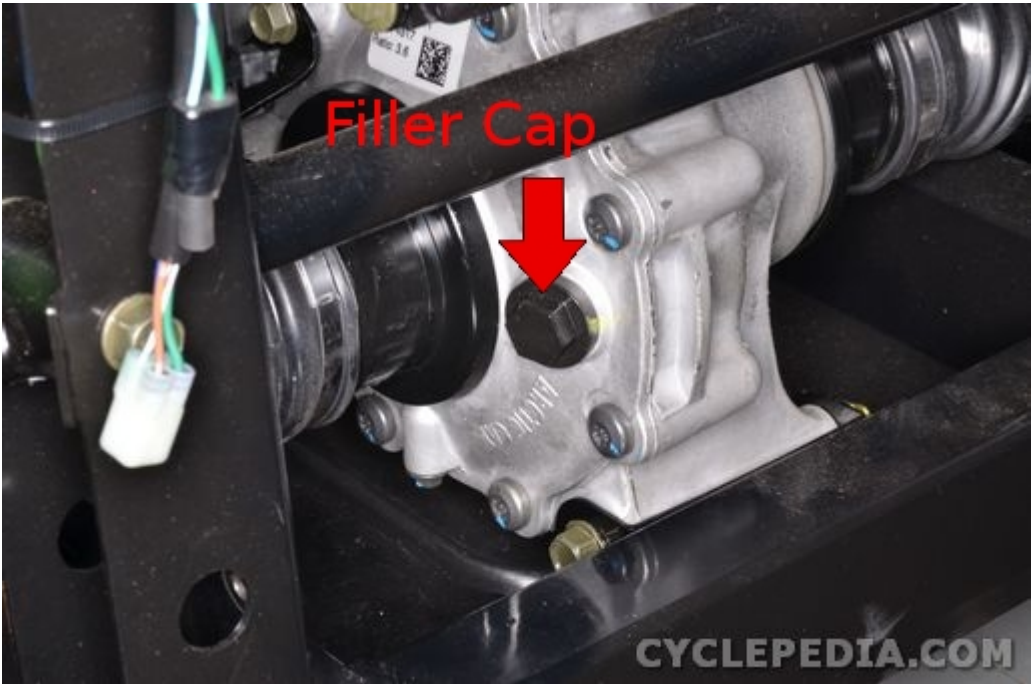
Install a new sealing washer and the drain plug. Tighten the drain plug to specification with an 8 mm socket.

Item	N-m	kgf-m	ft-lb
Front drive drain plug	32	3.2	23



Add the proper type and amount of rear gear oil into the filler hole.

Type	Capacity
SAE 80~90 hypoid gear oil	270 cc (9.13 US oz)



Install the filler cap and O-ring. Tighten it to specification with a 17 mm socket.

Item	N-m	kgf-m	ft-lb
Rear drive filler cap	35	3.5	25.5

Install the front skid plate. See the [Skid Plates](#) topic for more information.

Spark Plug (UXV 500i)

Item	Standard
Spark plug	NGK-CR7E
Spark plug gap	0.6 - 0.7 mm (0.024 - 0.028 in.)

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the center cover. See the [Center Cover](#) topic for more information.



Pull the spark plug cap off of the spark plug.

Clean off the area surrounding with compressed air or a shop towel to make sure debris doesn't get into the combustion chamber when the spark plug is removed.

NOTE: Always wear safety glasses when using compressed air and never point it directly at yourself or anyone else.



Remove the spark plug using a 5/8 in deep well spark plug socket.

Inspection



Inspect the spark plug for signs of damage. Always replace a spark plug if any part of it is damaged.



The color of the spark plug's porcelain tip can indicate how the mixture is burning. A white colored plug shows a lean mixture, where a dark plug shows a rich mixture. A light brown color is optimal. For more information see the spark plug trouble shooting chart.

<http://www.cyclepedia.com/spark-plug-troubleshooting/>

If the plug is dirty or has carbon build up it can be cleaned with small wire brush. Do not hesitate to replace a spark plug.



Always check the gap of the spark plugs before installation. If the gap needs to be adjusted bend the ground electrode carefully.

Item	Standard
Spark plug gap	0.6 - 0.7 mm (0.024 - 0.028 in.)

Installation



Install the spark plug by hand. Tighten it to specification a 5/8 in deep well spark plug socket.

Item	Torque kgf-m (N-m, ft-lb)
Spark plug	1.2 (12, 8.6)

Do not over tighten the spark plug. The cylinder head is made out of soft metal, and it can be easily damaged.



Install the spark plug cap onto the spark plug.
Install the center cover. See the [Center Cover](#) topic for more information.

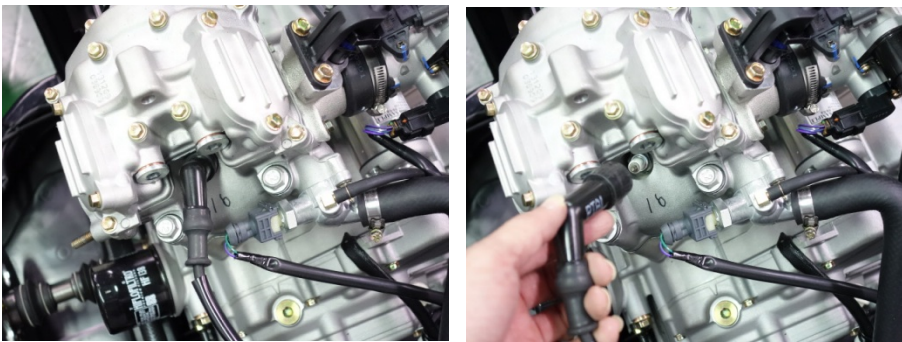
Spark Plug (UXV 700i)

Item	Standard
Spark plug	NGK-CR7E
Spark plug gap	0.6 - 0.7 mm (0.024 - 0.028 in.)

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the center cover. See the [Center Cover](#) topic for more information.



Pull the spark plug cap off of the spark plug.

Clean off the area surrounding with compressed air or a shop towel to make sure debris doesn't get into the combustion chamber when the spark plug is removed.

NOTE: Always wear safety glasses when using compressed air and never point it directly at yourself or anyone else.

Compression Check

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Run the engine to warm it up before conducting a compression test. Make sure your compression gauge is in good working order and does not leak.

Remove the center cover. See the [Center Cover](#) topic for more information.

Remove the spark plug. See the [Spark Plug](#) topic for more information.



Install the compression tester into the sparkplug hole using a compression gauge adapter and tighten it hand tight.

Hold the throttle wide open and use the electric starter to turn the engine over. Crank the engine until the needle on your compression gauge stops rising. This should occur in 4 to 7 seconds of engine cranking. Do not crank the engine for more than 7 seconds. Compare your reading with specification.

Cylinder head compression pressure	15 kg/cm ² (1500 kPa, 213 psi)
------------------------------------	---

Low compression is an indication of excessive engine wear, possibly worn rings or poorly sealing valves, or improper valve clearance.

High compression is possibly an indication of excessive carbon buildup on the piston or performance modifications.

Tires

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Tire Size



Tire size: Front	25 X 8 - 12
Tire size: Rear	25 X 10 - 12

Air Pressure



Check the tire pressure with a low pressure gauge.

Tire pressure (cold)	1 Rider
Front	0.7 kgf/cm ² (10 psi)
Rear	0.98 kgf/cm ² (14 psi)

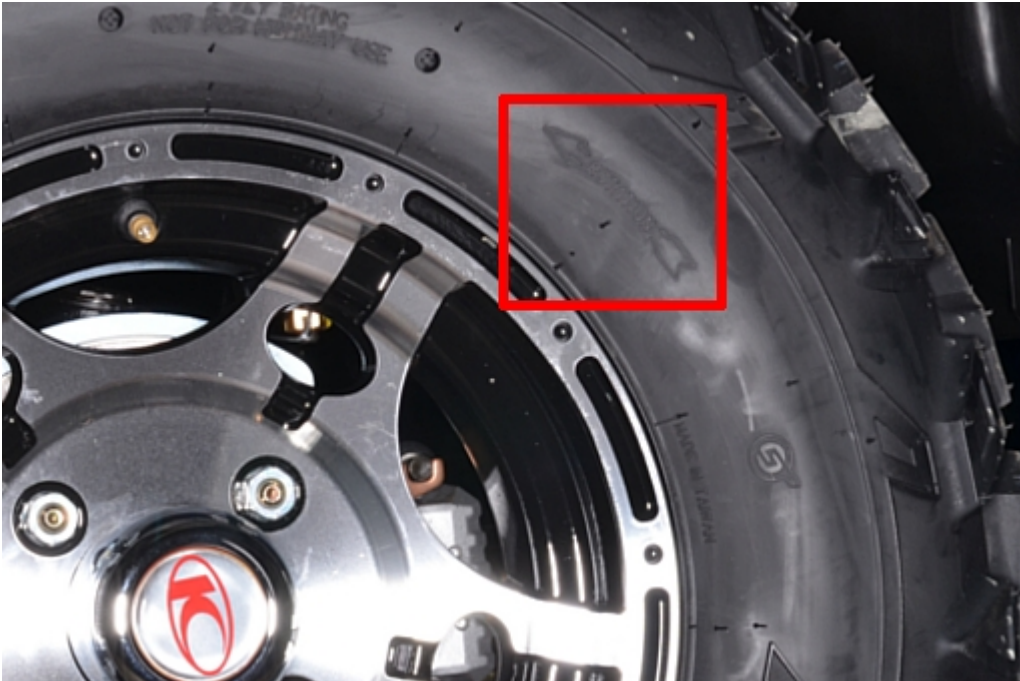
Tire Tread Depth



Check that the tire tread depth is within specification.

Tire Tread Depth Service Limit	
Front Tire	4 mm (0.16 in)
Rear Tire	4 mm (0.16 in)

Directional Rotation



Check the "ROTATION" arrow on the tire's sidewall. The arrow indicates the direction in which the tire should turn going forward.

Valve Clearance (UXV 500i)

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Inspection

The engine has to be cold (room temperature) to check the valve clearance.

Remove the seats. See the [Seat](#) topic for more information.

Remove the center cover. See the [Center Cover](#) topic for more information.

Remove the spark plug. See the [Spark Plug](#) topic for more information.

Remove the cylinder head cover. See the [Cylinder Head Cover](#) topic for more information.



Remove the timing cap on the right side of the engine with a flat blade screwdriver. Inspect the O-ring and replace it as needed.



Remove the recoil starter cover bolts with an 8 mm socket.



Remove the recoil starter cover.



Turn the crankshaft clockwise with a 19 mm socket.



Align the "T" mark on the flywheel with the index mark on the right crankcase cover. This shows the piston is at Top Dead Center (TDC).



Make sure the punch marks on the ends of the camshafts are pointed up. With the marks pointing up the piston is at TDC on the compression stroke. If the punch marks are not pointing up rotate the crankshaft clockwise until the piston is at TDC on the compression stroke.



Measure the valve clearance with a thickness feeler gauge. Insert the feeler gauge between the adjusting screw and the valve stem. The clearance is correct when there is a light drag on the feeler gauge. If the clearance is out of spec move on to the adjustment section.

Valve clearance	Intake	0.1 mm (cold)
Valve clearance	Exhaust	0.18 mm (cold)

Adjustment



Use a valve adjuster tool to adjust the valves.

Special Tool-

Valve Adjuster: A120E00036



Loosen the valve adjuster locknut with a wrench. Insert the valve adjuster tool through the opening as shown.

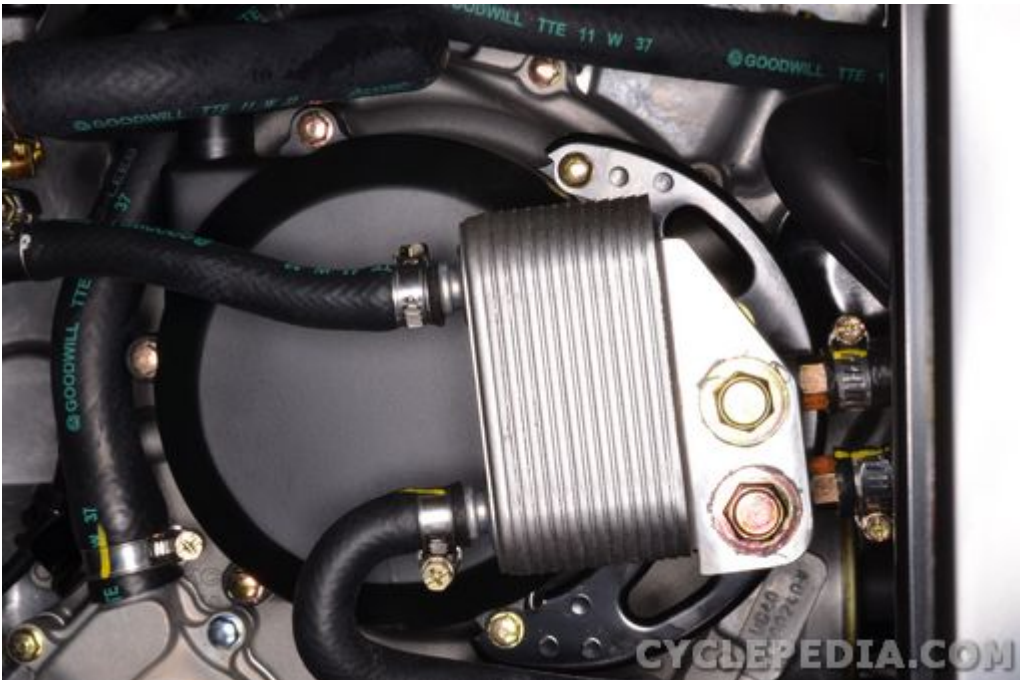
If the valve clearance is too tight, back out the valve adjusting screw with the valve adjustment tool. If the clearance is too loose, turn in the valve adjusting screw until there is a light drag on the feeler gauge. Hold the adjusting screw locknut in place with the wrench to make sure it doesn't interfere with the adjustment. Hold the adjuster in place when you tighten the locknut. Always recheck the clearance after tightening the locknut.

ITEM	N-m	kgf-m	ft-lb
Valve clearance adjuster locknut	9	0.9	6.5

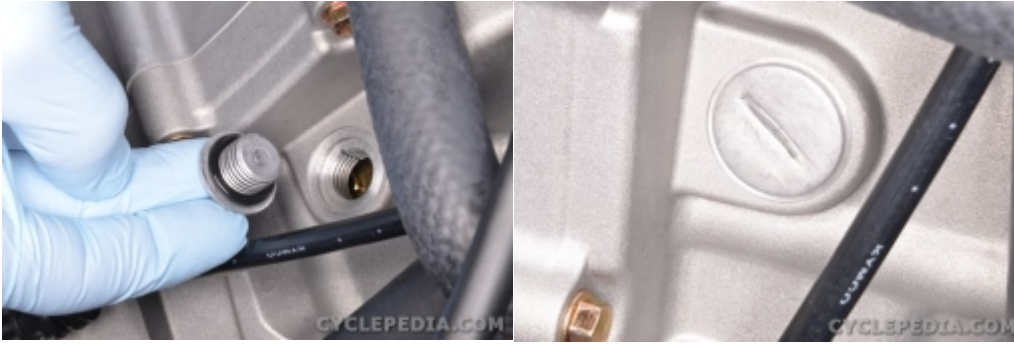
Assembly



Install the recoil starter cover.



Tighten the recoil starter bolts securely with an 8 mm socket.



Install the timing cap on the right side of the engine and tighten it securely with a flat blade screwdriver.

Install the cylinder head cover. See the [Cylinder Head Cover](#) topic for more information.

Install the spark plug. See the [Spark Plug](#) topic for more information.

Install the center cover. See the [Center Cover](#) topic for more information.

Install the seats. See the [Seat](#) topic for more information.

Valve Clearance

UXV 700i

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Inspection

The engine has to be cold (room temperature) to check the valve clearance.



Loosen the timing inspection plug with a large flat blade screwdriver. Remove the timing inspection plug and inspect its O-ring.



Remove the crankshaft cap on the left side of the engine with a 10 mm Allen socket.



Inspect the O-ring and replace it as needed.



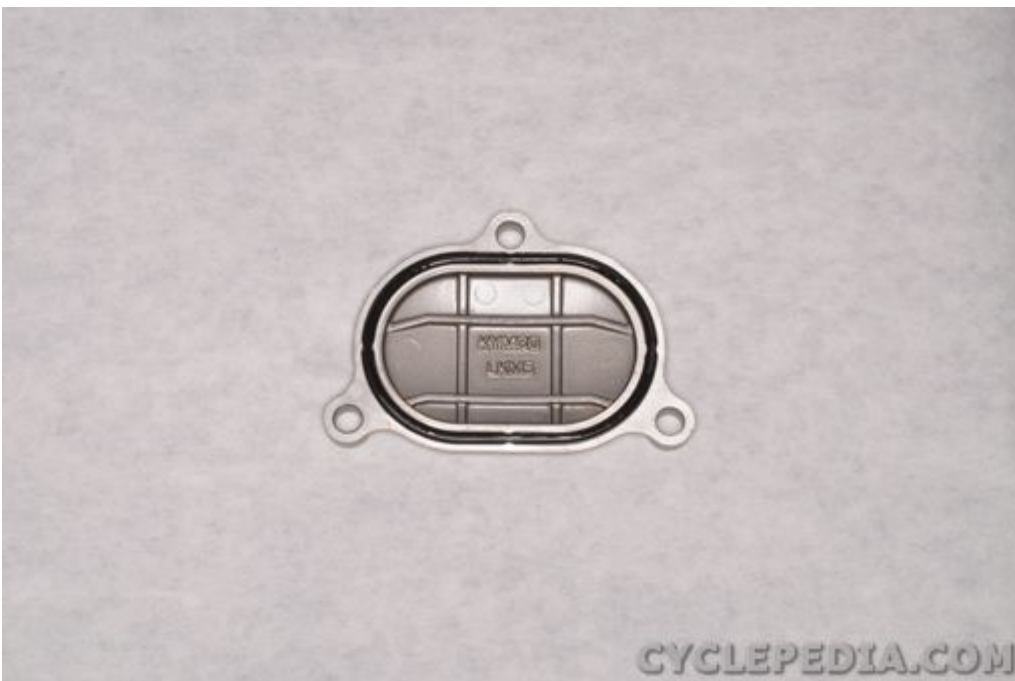
The valve adjuster covers are each held on with three bolts.



Remove the valve adjuster cover bolts with an 8 mm socket.



Lift off the valve adjuster covers.



Inspect the valve adjuster cover O-rings and replace them as needed.



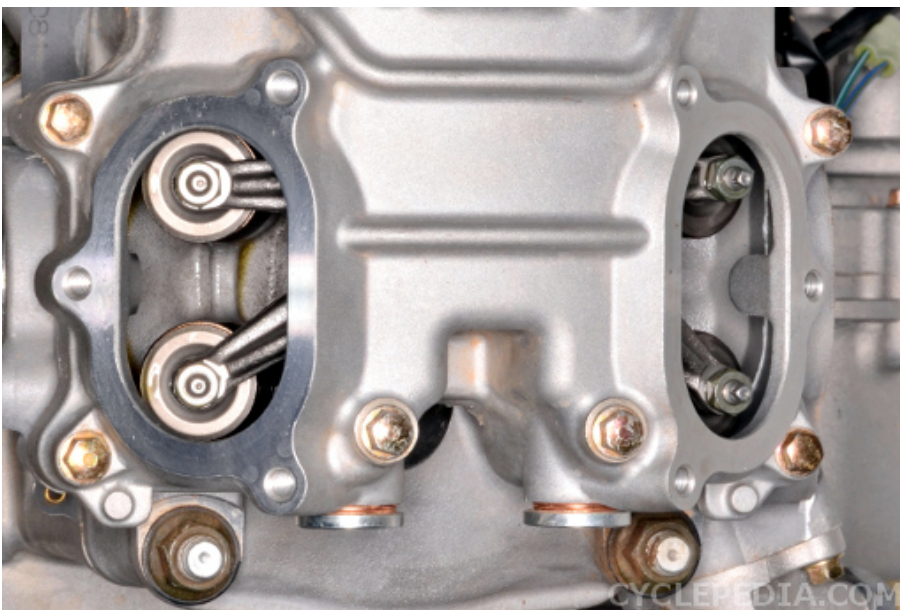
The piston should be at TDC (Top Dead Center) on the compression stroke to check the valve clearance. Turn the crankshaft clockwise with a 19 mm socket. Observe the movement of the intake valves and check the position of the flywheel through the timing hole.



The intake valves should open and close.



Align the "T" mark on the flywheel with the index mark on the crankcase cover. This shows the piston is at Top Dead Center (TDC).



The piston should now be at TDC (Top Dead Center) on the compression stroke. You can make sure that it is on the compression stroke by checking that there is some slack in the rocker arms. If the rocker arms are rigid, rotate the crankshaft 360° until the "T" mark is once again aligned with the notch on the case cover. There should now be slack in the rocker arms and the piston should be at TDC on the compression stroke.



Measure the valve clearance with a thickness feeler gauge. Insert the feeler gauge between the adjusting screw and the valve stem. The clearance is correct when there is a light drag on the feeler gauge. If the clearance is out of spec move on to the adjustment section.

Valve clearance (cold)	IN	0.1 mm
	EX	0.18 mm

Adjustment



Use a valve adjuster tool to adjust the valves.

Special Tool- Valve Adjuster: A120E00080

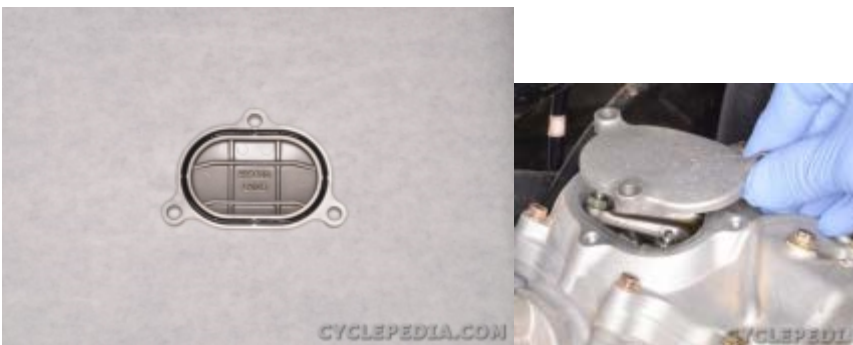


Loosen the valve adjuster locknut with a wrench. Use the valve adjuster tool to turn the adjuster in or out.

If the valve clearance is too tight back out the valve adjusting screw with the valve adjustment tool. If the clearance is too loose turn in the valve adjusting screw until there is a light drag on the feeler gauge. Hold the adjusting screw locknut in place with the wrench to make sure it doesn't interfere with the adjustment. Hold the adjuster in place when you tighten the locknut. Always recheck the clearance after tightening the locknut.

ITEM	THREAD SIZE AND TYPE	TORQUE VALUES	
		N-m	ft-lb
TAPPET ADJ. NUT	M5 x 0.5	6.9-10.8	5.1-7.9

Assembly



Make sure the valve adjuster cover O-rings are in good condition. Apply a light coat of fresh engine oil to the O-rings. Fit the valve adjuster covers into place.



Install the valve adjuster cover bolts. Tighten the bolts securely with an 8 mm socket.



Make sure the crankshaft cap O-ring is in good condition. Apply fresh engine oil to the O-ring.



Install the crankshaft cap.



Tighten the crankshaft cap securely with a 10 mm Allen socket. Do not over tighten this cap.



Make sure the timing plug O-ring is in good condition. Apply fresh engine oil to the O-ring.



Install the timing inspection plug and tighten it securely with a large flat blade screwdriver.

Install these components	
Component	Topic
Spark plug	Spark Plug
Right mudguard	Mudguards and Footrests
Side covers	Side Covers
Fuel tank and shield	Fuel Tank
Seat	Seat

Toe-In Adjustment

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Inspection

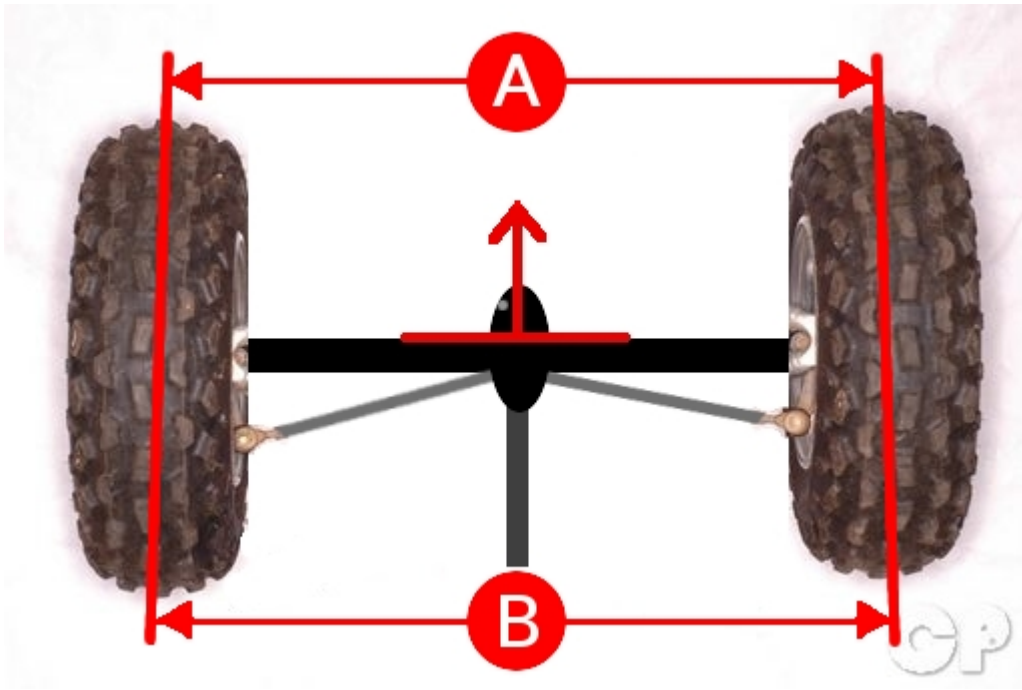
Check that all tires are properly inflated at the same pressure. See the [Tires](#) topic for more information.



Mark the center of both front tire treads.

Raise the front tires off the ground.

Straighten the front wheels on a level surface.



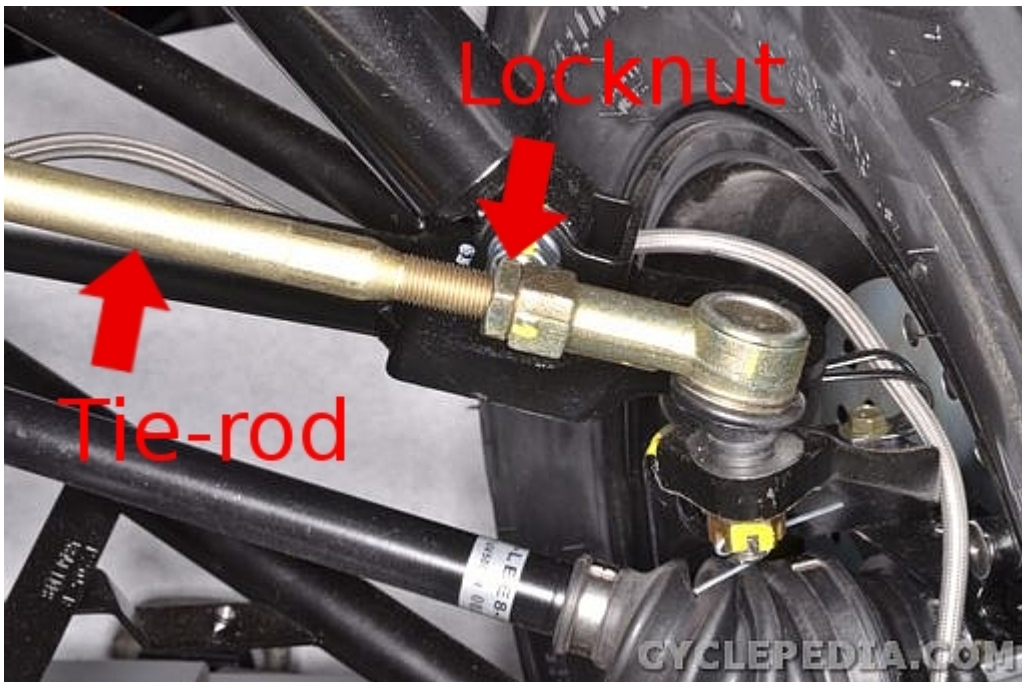
Measure the distances between the center of the tires with a toe-in-gauge on the front of the tires. Call this measurement A. Rotate the tires 180°. Measure the distances between the center of the tires with a toe-in-gauge on the rear of the front tires. Call the rear measurement B.

The toe-in measurement = $B - A$.

The toe-in should be 0 - 15 mm (0 - 0.6 in).

Adjustment

Mark the tie-rods for reference.



Loosen the left and right outer tie-rod locknuts with a 19 mm wrench. Hold the tie-rod end and turn the tie-rod. Turn both the tie-rods evenly until the toe-in is within specification. Moving the tie-rods out towards the wheels will increase toe-in. Moving the tie-rods towards the center will decrease toe-out. Temporarily tighten the tie-rod locknuts with a wrench and re-check the toe in.

The toe-in should be 0 - 15 mm (0 - 0.6 in).

Tighten the tie-rod locknuts to specification with a 19 mm wrench.

Item	N-m	Kgf-m	lbf-ft
Tie-rod end locknuts	35	3.5	25.2

After adjusting the toe-in take the machine for a slow test ride. If the machine pulls to the left or right when the steering wheel is facing straight ahead the toe-in needs to be readjusted more evenly.

Spark Arrestor

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

 WARNING
POTENTIAL HAZARD Improper cleaning of the spark arrester. Hot exhaust system.
WHAT CAN HAPPEN Could injure the eyes. Could cause burns. Could cause carbon monoxide poisoning, possibly leading to death. Could start a fire
HOW TO AVOID THE HAZARD When cleaning the spark arrester: Always let the exhaust system cool prior to touching exhaust components Do not start the engine when cleaning the exhaust system.

Removal

Note: Always allow the exhaust system plenty of time to cool before touching it.



Remove the three arrestor bolts with an 8 mm socket.



Remove the spark arrestor and gasket.

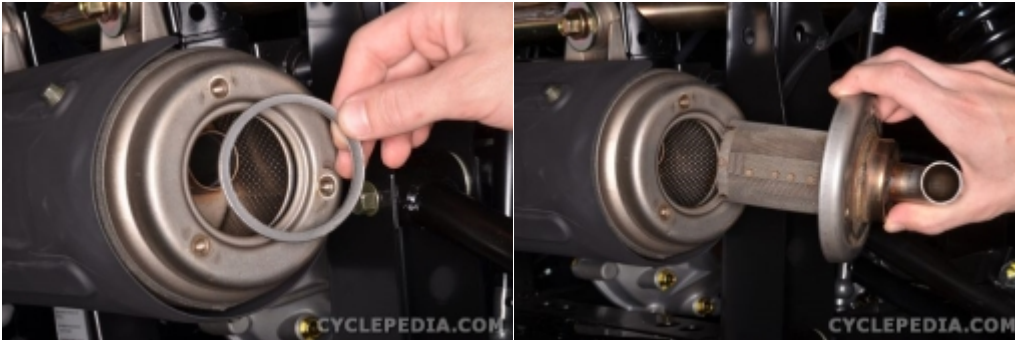


Clean the carbon off of the spark arrestor screen with a wire brush.



Inspect the spark arrestor screen for any damage and replace as needed.

Installation



Install the spark arrestor with a new gasket.



Install the spark arrestor bolts and tighten them securely with an 8 mm socket.

3.Fuel System

This chapter covers the location and servicing of the fuel system components.

1.Airbox3-2

2.Check Engine Lamp (CELP)3-8

3.Component Location3-12

4.Diagnostic Tool3-19

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9.Throttle Body Removal3-88

10.Throttle Body Components3-104

Airbox

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the center cover. See the [Center Cover](#) topic for more information.

Remove the air filter. See the [Air Filter Servicing](#) topic for more information.



The airbox is mounted to the frame with two bolts.



Remove the two airbox bolts with a 10 mm socket.



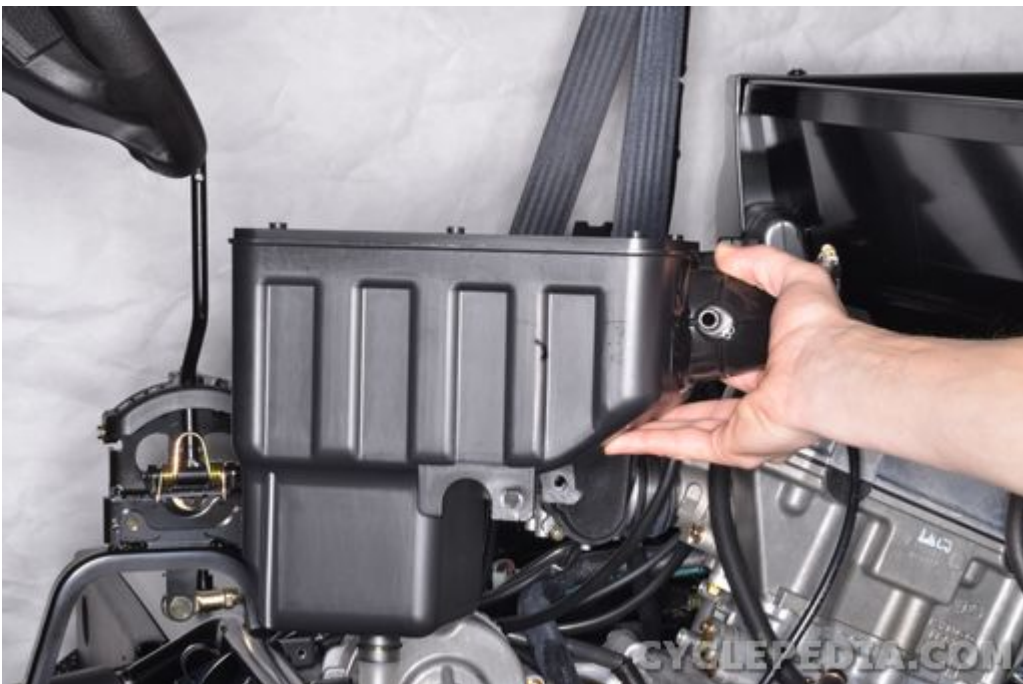
Squeeze the breather hose clip and slide it back. Free the breather hose from the airbox boot.



Loosen the airbox boot clamp with a #2 Phillips screwdriver.



Lift the airbox off of the frame. Free the airbox boot from the mouth of the throttle body.



Lift out the airbox.

Cover the mouth of the throttle body with a clean shop towel or tape to prevent debris from entering the engine.

Installation



Fit the airbox into place. Connect the airbox boot to the throttle body.



Fit the airbox onto the frame as shown.



Install the two airbox mounting bolts. Tighten the bolts securely with a 10 mm socket.



Tighten the airbox boot clamp securely with a #2 Phillips screwdriver.



Connect the breather hose to the airbox boot. Secure the hose with the clamp.

Install the air filter. See the [Air Filter Servicing](#) topic for more information.

Install the center cover. See the [Center Cover](#) topic for more information.

Check Engine Lamp (CELP)

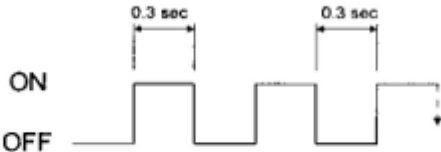


SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Note: The check engine lamp (CELP) will come on for 2 seconds when the key is turned on and then it should go off. If it lights after this the system has detected a problem. The vehicle should be immediately diagnosed as to what is causing the light to come on.



The check engine lamp (CELP) is located above the battery warning indicator. The CELP is illuminated in the photo above.

If the ECM connectors, or battery leads are disconnected the stored malfunction codes will be lost.

PRIORITY	LAMP ACTION
1	
2	
3	

There are 3 priority levels of the CELP while the engine is running.

Priority grade 1: The CELP blinks continuously letting you know this is the most severe condition. The rider must slow and immediately take the vehicle to the dealership service center for evaluation.

Priority grade 2: The CELP lights and doesn't blink, but stays on continuously. This shows a component is experiencing trouble or something has gone wrong with a circuit. Evaluate the trouble code to find the source of the problem.

Priority grade 3: The CELP blinks once and doesn't come back on. This is a warning. Example - the engine rpm was too high for a short time.

Without Diagnostic Special Tool

SELF-DIAGNOSTIC PROCEDURES

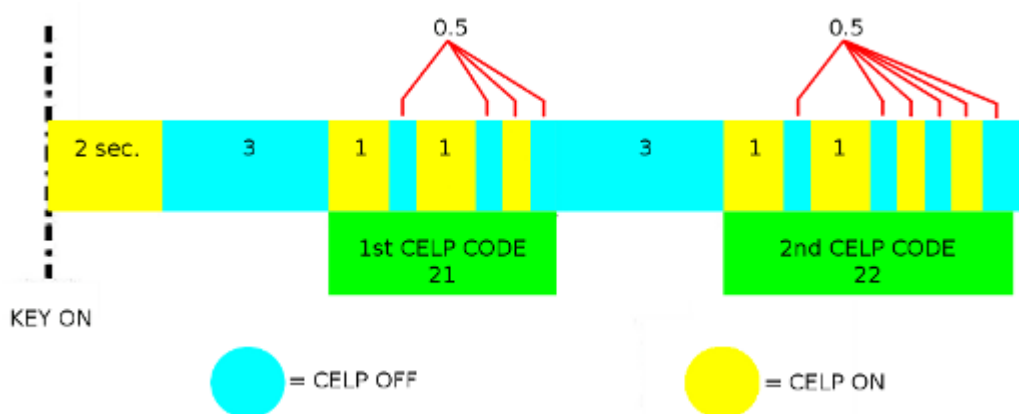
- Turn key to the ON position.
- The CELP will light for two seconds and then go off.
- If the engine has problem, the CELP will blink to show the failure codes.

- There're 22 failure codes for the Synerjet M3C system.

If the vehicle gets multiple failure codes, the CELP will display the lower number code, then progress to the higher number after four seconds. The failure codes will display repeatedly. After the codes cycle four times the codes will clear from the system memory.

EFI SELF-DIAGNOSIS FAILURE CODES

The CELP denotes the failure codes. When the indicator lights for one second that is equal to ten. A half second blink is equal to one.



In the example above the first code has two long blinks (10 X 2) and one short blink (+ 1). This equals 21 blinks.

$$(10 \times 2) + 1 = 21$$

The second code in the example shows three seconds after the first. The second code has two long blinks (10 X 2) and two short blinks (+ 2). This equals 22 blinks.

$$(10 \times 2) + 2 = 22$$

In this example the failure codes corresponding with 21 and 22 blinks need to be evaluated.

See the [Diagnostic Trouble Codes \(DTCs\)](#) topic for the full list of Diagnostic Trouble Codes.

With Special Tool

See the [Fuel Injection Diagnostic Tool](#) topic.

Self-Diagnosis Reset Procedure

After the codes cycle four times the codes will clear from the system memory. Always clear the memory after fixing the problem to prevent the light from showing the next time the vehicle is used.

TPS/ISC Reset

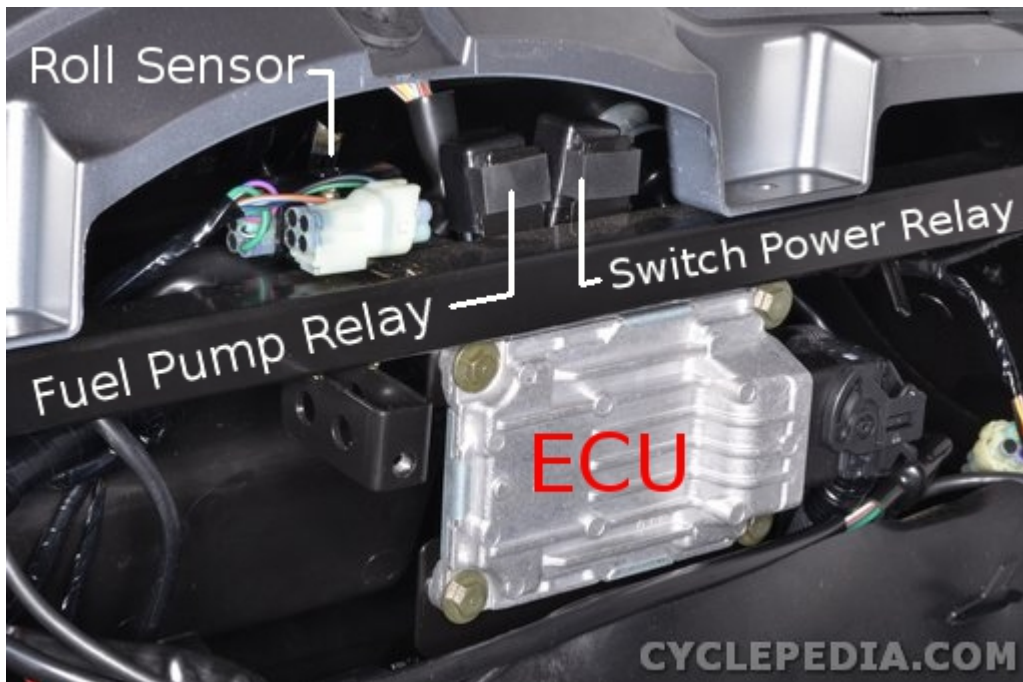
Start the engine and let it idle until the engine temperature has reached 85° C (185° F). The ECU will learn the new setting.

Component Location

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.



Open the hood to access the ECU and battery. See the [Hood](#) topic for more information.



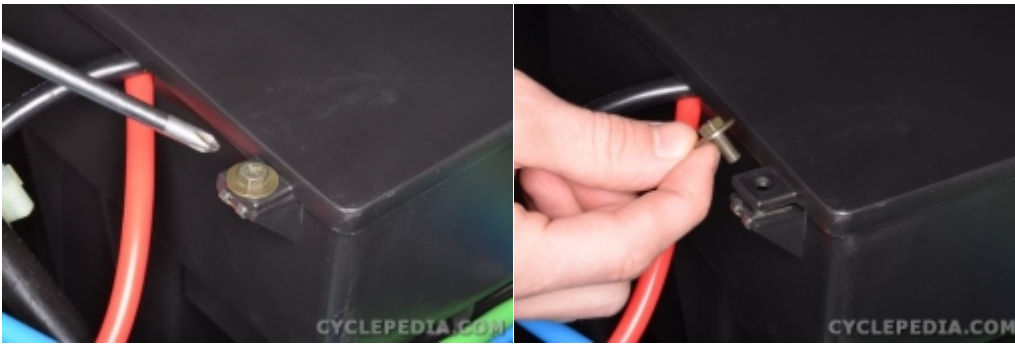
The following components can be found here. The ECU is mounted to the frame with four bolts. To remove the ECU see the [Ignition System](#) topic for more information.

- Roll Sensor
- Fuel Pump Relay
- Switch Power Relay
- ECU



The regulator/rectifier is located under the hood.

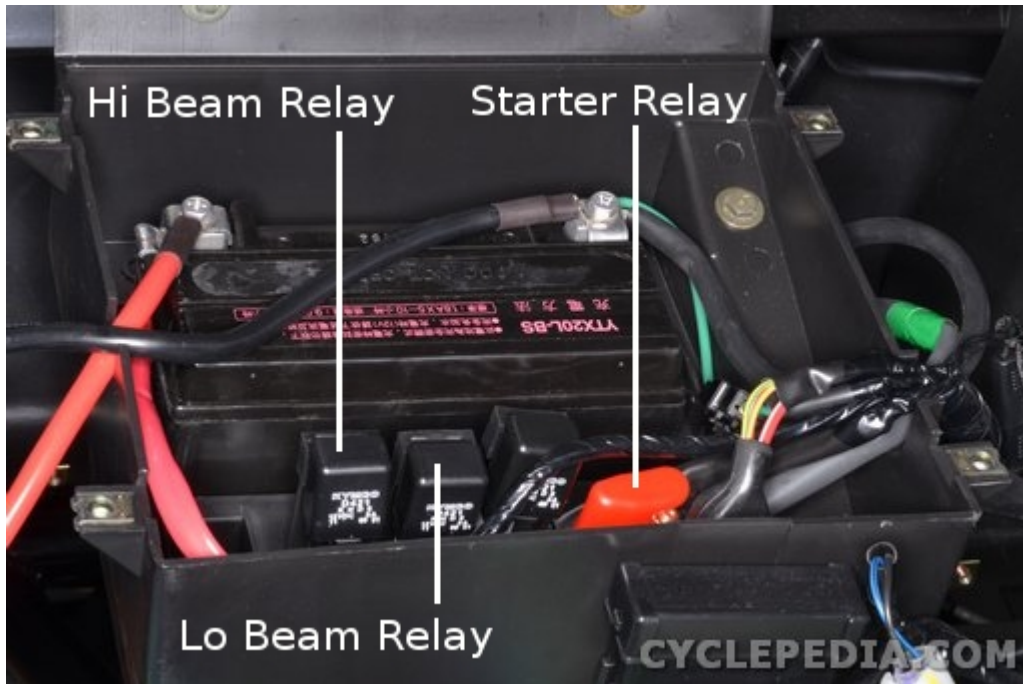




Remove the four battery cover screws with a #2 Phillips screwdriver.



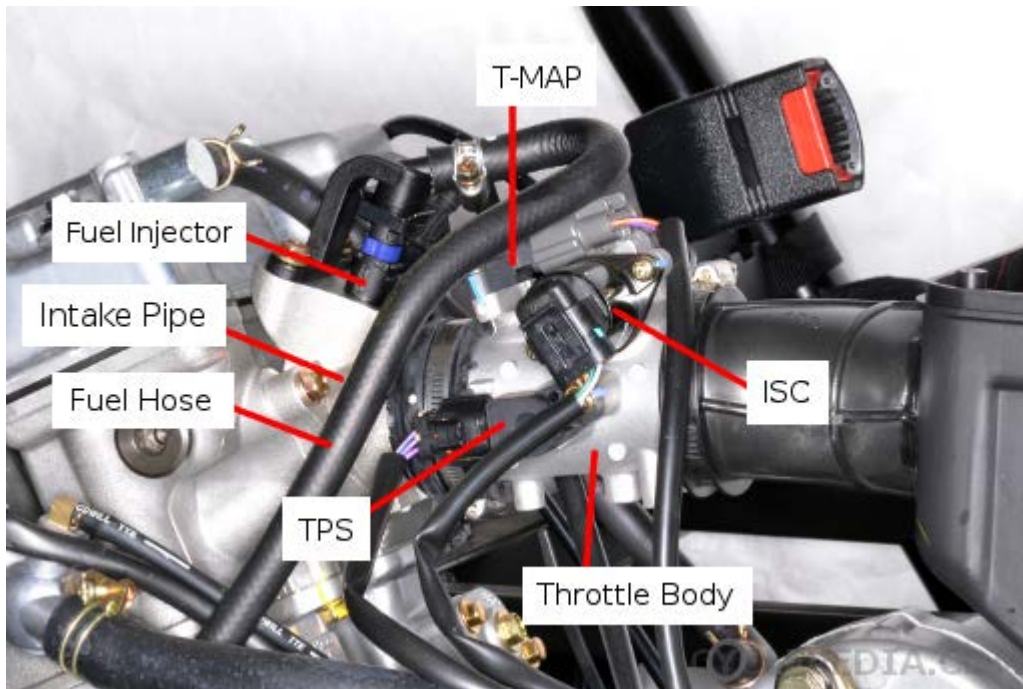
Remove the battery cover.



The Hi Beam Relay, Lo Beam Relay and Starter Relay are next to the battery as shown.

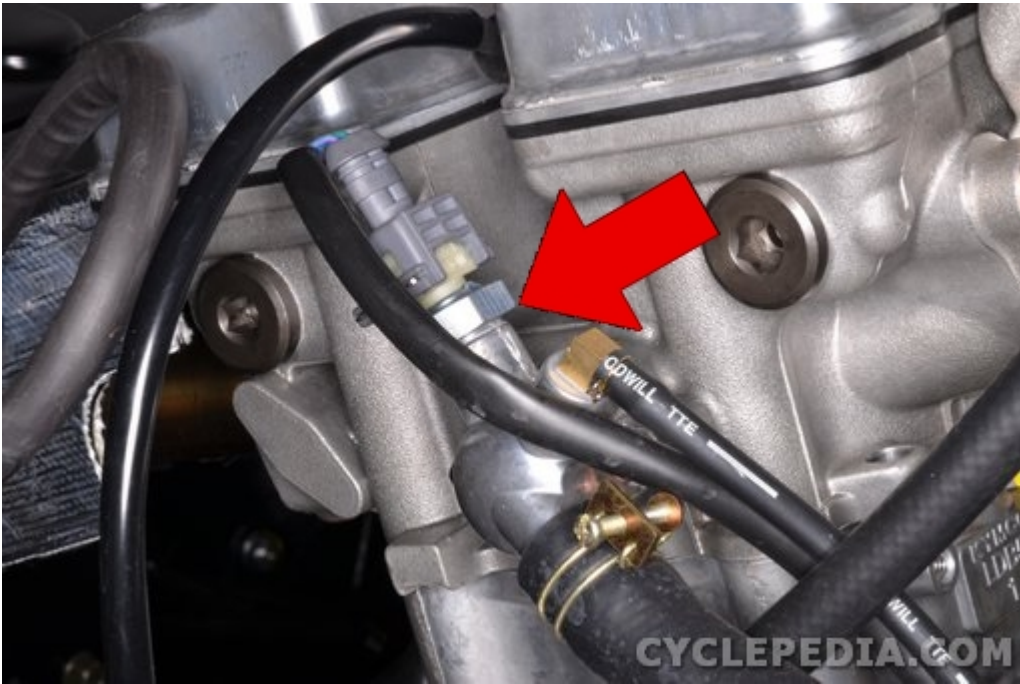


Many of the fuel injection components are located with the throttle body behind the cylinder head. Remove the center body covers to access these components.

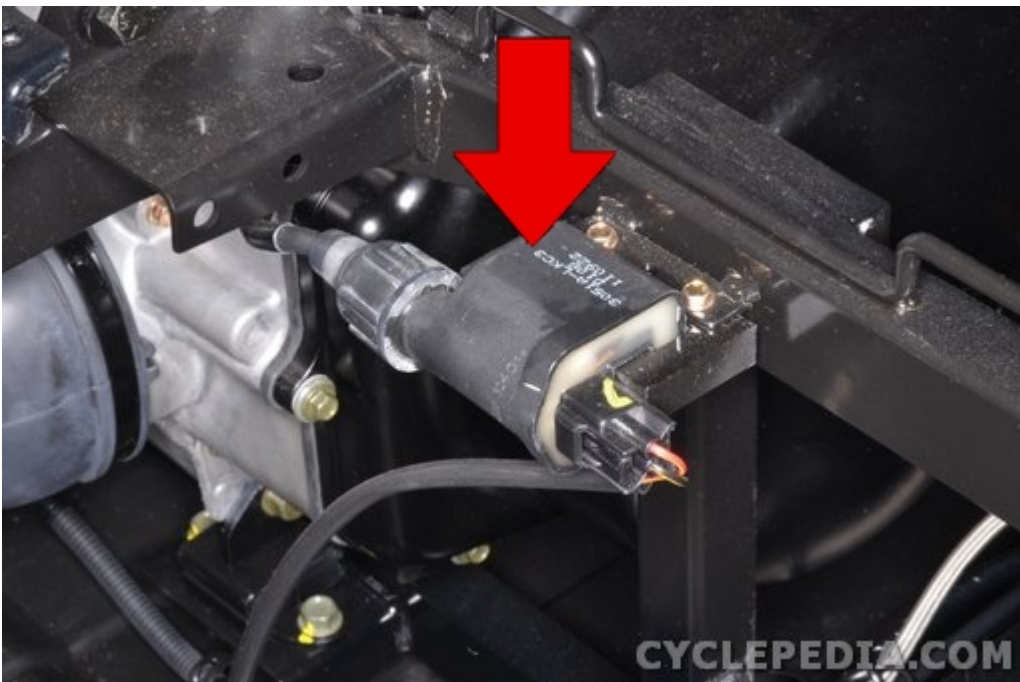


The following components can be found here.

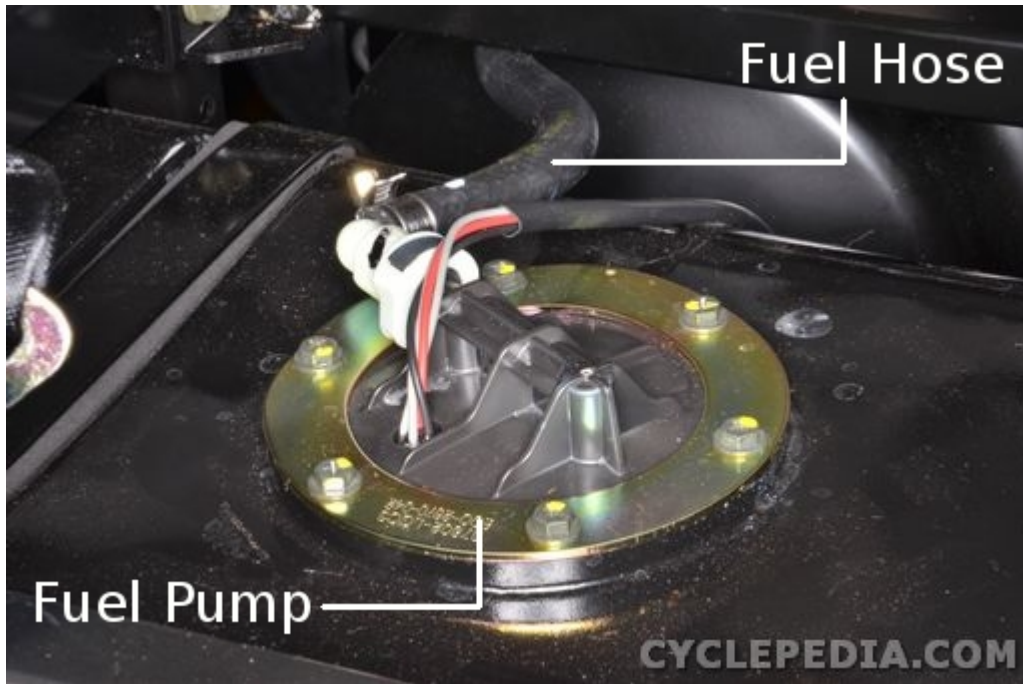
- Throttle Body
- T-MAP (Manifold Absolute Pressure)
- Fuel Injector
- Fuel Hose
- TPS (Throttle Position Sensor)
- ISC (Idle Speed Control)



The WTS (Water Temperature Sensor) is located on the right side of the engine cylinder.



The ignition coil is located on the frame behind the right seat. Remove the plastic cover to access it.



The fuel pump is mounted in the fuel tank.

Diagnostic Tool

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

OPERATION INSTRUCTIONS



Diagnostic tool Part Number: 3620A-LEB2-E00

CAN Linker Part Number: 3620A-LGC7-E000

This tool has been developed by KYMCO and for KYMCO vehicles only.

The tool software can be updated for new models with a computer via the USB cable.

Please refer to the specifications when servicing this vehicle.

This tool does not have an internal battery. The power for the tool is provided by the vehicle when connected. The vehicle should have a fully charged battery when using the diagnostic tool.

Set the transmission shifter in the P or N position.

Open the hood and pivot it forward. See the [Hood](#) topic for more information.



Plug the diagnostic tool connector into the CAN Linker as shown.

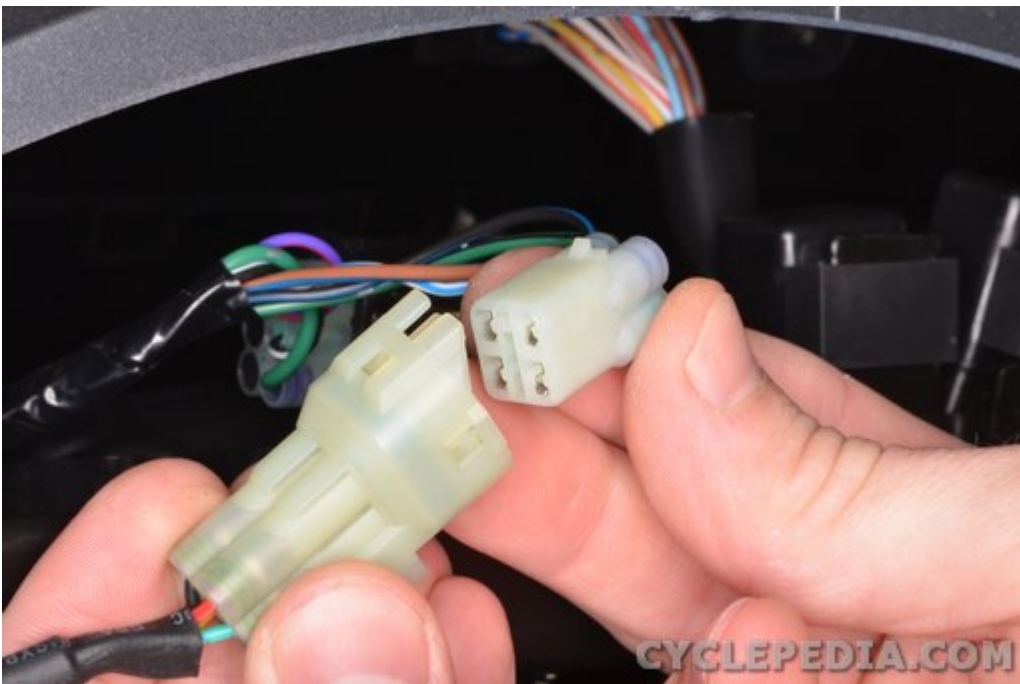




Free the diagnostic connector from the frame. Remove the dummy side of the connector.

Set a multimeter to reads voltage (DCV). Measure the voltage as indicated.

Terminal (+)	Terminal (-)	Normal
BR/L	G/B	Battery Voltage
B/L	W/L	Battery Voltage - 1



Connect the CAN Linker to the diagnostic plug.

Turn on the ignition switch to send power to the tool.



The FI tool has three buttons and two lights below the screen. The left button is the up button that will move the selector up. The right button is the down button that moves the selector down. The middle button is ENTER. This will select the item you have chosen. The left light indicated the tool has power, and the right light indicates a Diagnostic Trouble Code (DTC) is present.

The functions of the diagnostic tool include ECU version, model name, data analysis and adjust.

ECU version: includes model name, ECU number, identifications number and software version.

DTC Inspect: DTC reading, DTC clearing, and troubleshooting.

Data Analyze: For ECU's setting inspection and running condition analysis.

Adjust: Not allowed

ECU Version



The four functions will display when the tool is powered on. The model name will show LKC3 for the UXV500i.



Pressing the enter button on the ECU version will show information on the ECU software and calibration.

Press the down button (right) to return to the first page.

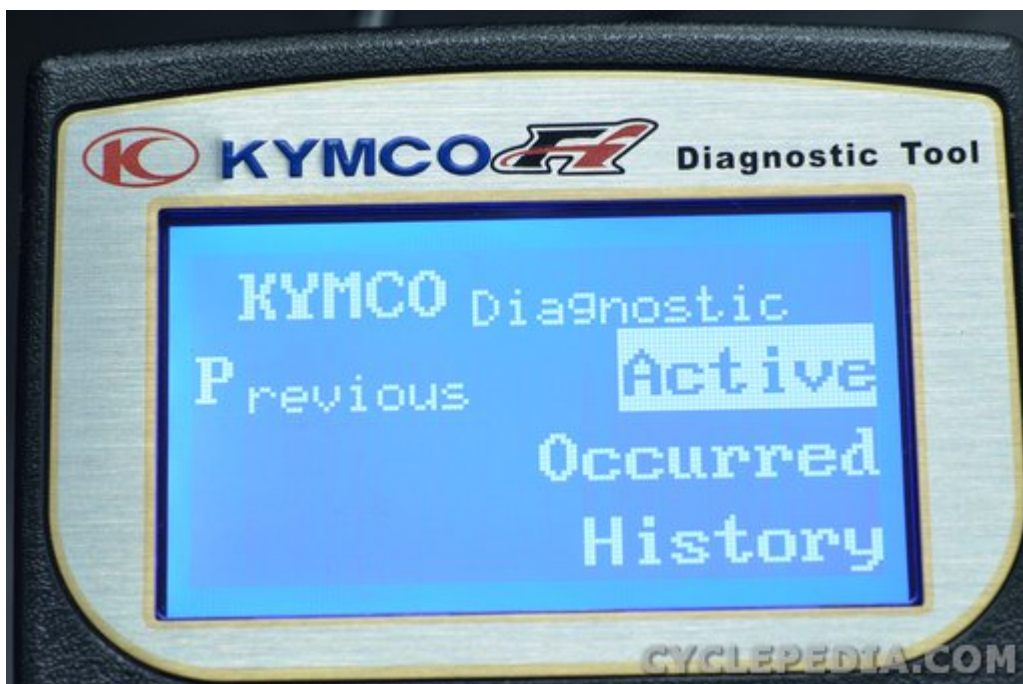
DTC (Diagnostic Trouble Code) INSPECTION PROCEDURE



Press the down button (right) to move the item selector down to the DTC Inspect item.



Pressing the enter button on the DTC Inspect item will bring up the options shown above. Select the DTC Load option and press the enter button to display the DTC options.



There are three DTC options - Active, Occurred, and History.

Move the selector to the Active option and press enter to display current DTC.



The diagnostic tool will display all current DTC. In the photo above only one code (12) is showing. Select the code number of interest and press enter for more information on that DTC.



In this instance the indicated code is 12 (CELP blinks). This corresponds to the DTC P0230.

Blinks	Failure Codes	Fault description	Priority	Fault management
12	P0230	Fuel pump relay or electric circuit malfunction	2	<ol style="list-style-type: none"> 1. Make sure the relay connector is connected correctly. 2. Check if the ECU sends a signal to relay. 3. Check the fuel pump relay resistance

Consult the DTC table for more information on how to troubleshoot the problem. See the [Diagnostic Trouble Codes \(DTCs\)](#) topic

Up button and select the previous options to return to the original screen.

DTC Clear Procedure



Press the down button (right) to move the item selector down to the DTC Inspect item.



Pressing the enter button on the DTC Inspect item will bring up the options shown above. Move the selector down to the Clear DTC option and press enter.



The diagnostic tool will show when the DTC in memory is cleared. Also, the DTC indicator light will be off.

Data Analysis Procedure

When using the data analysis feature for running condition items such as ignition advance, ISC step, ect., make sure the engine temperature has reached 80° C. The engine temperature is displayed on data analysis page 03.



Press the down button (right) to move the item selector down to the DATA Analyze item. Press enter to bring up the DATA Analyze page 01 shown below. Press the down button to continue through the seven DATA Analyze pages.

Page 01



The 01 page shows engine speed, idle speed set point, and battery voltage.

Page 02



The 02 page shows TPS position and TPI idle adapted.

Page 03



The 03 page shows engine temperature, air temperature, and intake pressure.

Page 04



The 04 page shows atmospheric pressure, fuel injection interval, and ignition advance.

Page 05



The 05 page shows the rollover voltage.

Page 06



The 06 page shows the ISC step and ISC learn step.

Page 07



The 07 page shows the ECU counter.

Diagnostic Report

Fuel Injection Sensors

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

You will need a digital multimeter to inspect the sensors.

Water Temperature Sensor (WTS)

Removal

Remove the center cover. See the [Center Cover](#) topic for more information.

Drain the coolant. See the [Coolant](#) topic for more information.

Turn the ignition switch to the OFF position.



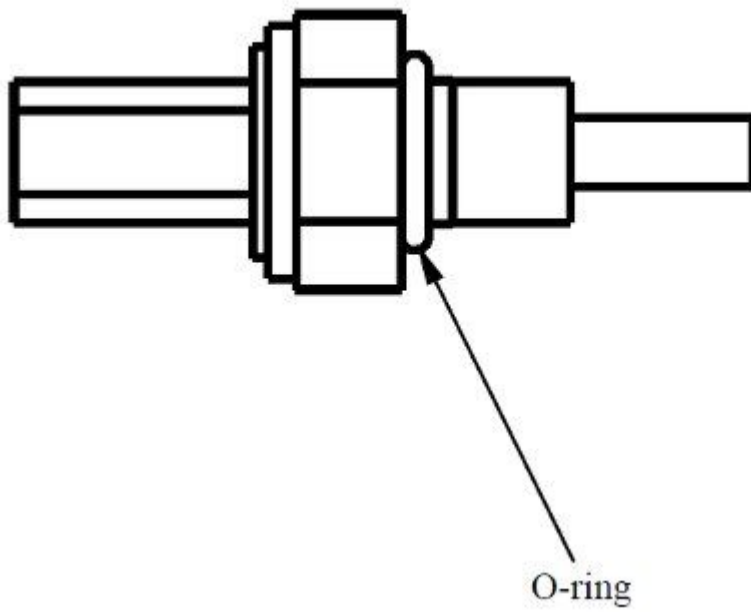
The WTS is located on the right side of the cylinder head.



Push in the spring and unplug the WTS sensor connector.

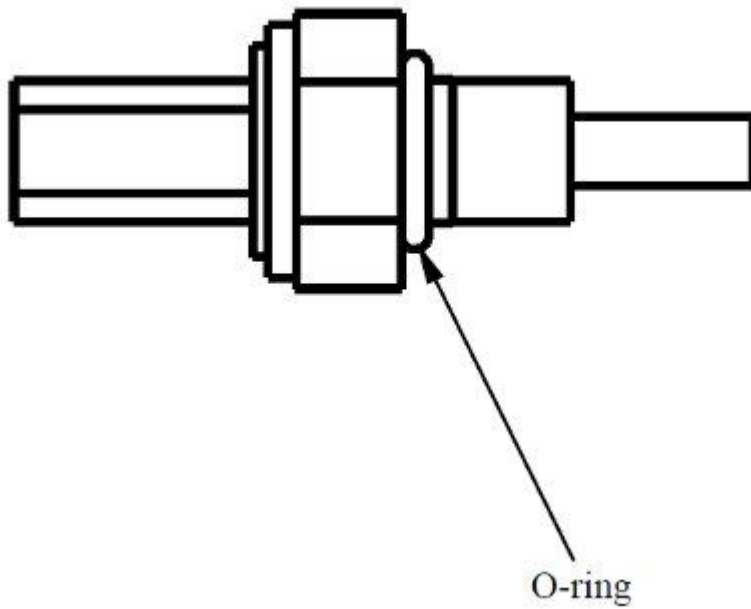


Remove the sensor with a 22 mm wrench.



Discard the O-ring seal.

Installation



Install a new O-ring onto the WTS.



Thread in the WTS. Tighten the WTS to specification with a deep well 22 mm socket.

ITEM	N-m	kgf-m	ft-lb
WTS	12	1.2	8.6

Inspection

Input Voltage

Turn the ignition switch to the OFF position.



Push in the spring and unplug the WTS sensor connector.

Set the multimeter to read voltage (DCV).

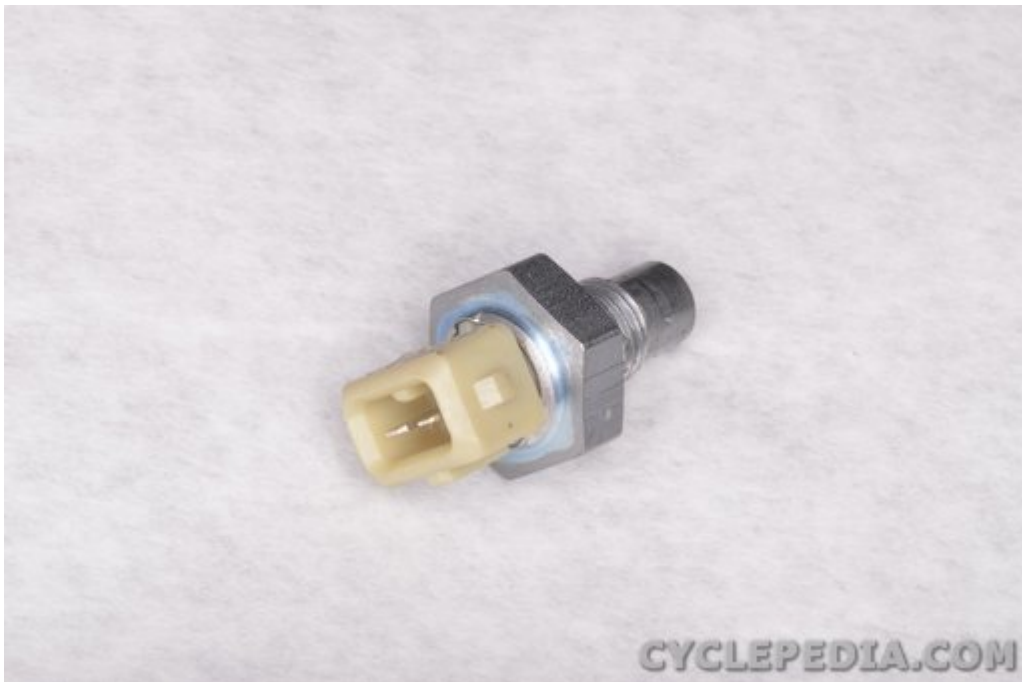
Turn the ignition switch to the ON position.

Measure the input voltage on the harness side of the connector.

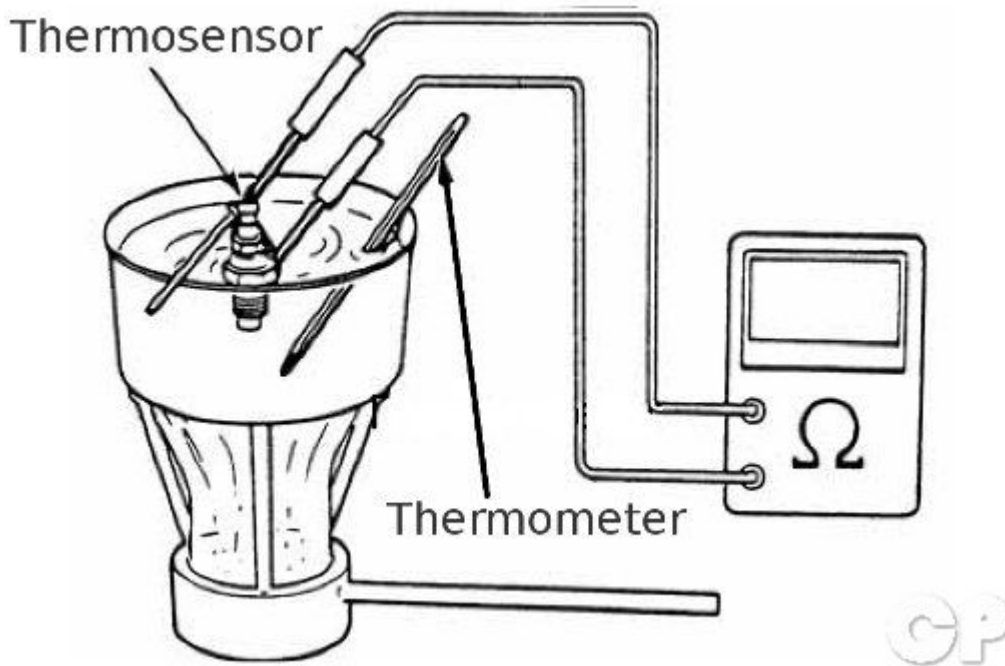
(WTS Input Voltage: 5 ± 0.1 V)

If the input voltage is out of specifications check the offending wires for a short or open lead.

Resistance



Set the multimeter to ohms of resistance ($k\Omega$).



Suspend the sensor and a thermometer in a pot of coolant with string. Make sure the WTS and the thermometer are not touching the pot. Bring the temperature up to the specification slowly and check the resistance between the sensor terminal and body.

Temperature	Standard Resistance (approximate)
-20° C (-4° F)	28.6 kΩ
20° C (68° F)	3.51 ± 10% kΩ
40° C (104° F)	1.46 kΩ
100° C (212° F)	0.176 kΩ

Temperature and Manifold Absolute

Pressure (T-MAP)

To remove and install the sensors on the throttle body see the [Throttle Body Components](#) topic.

Input Voltage Inspection

Turn the ignition switch to the OFF position.



Unplug the T-MAP connector.

Set the multimeter to read voltage (DCV).

Turn the ignition switch to ON position.

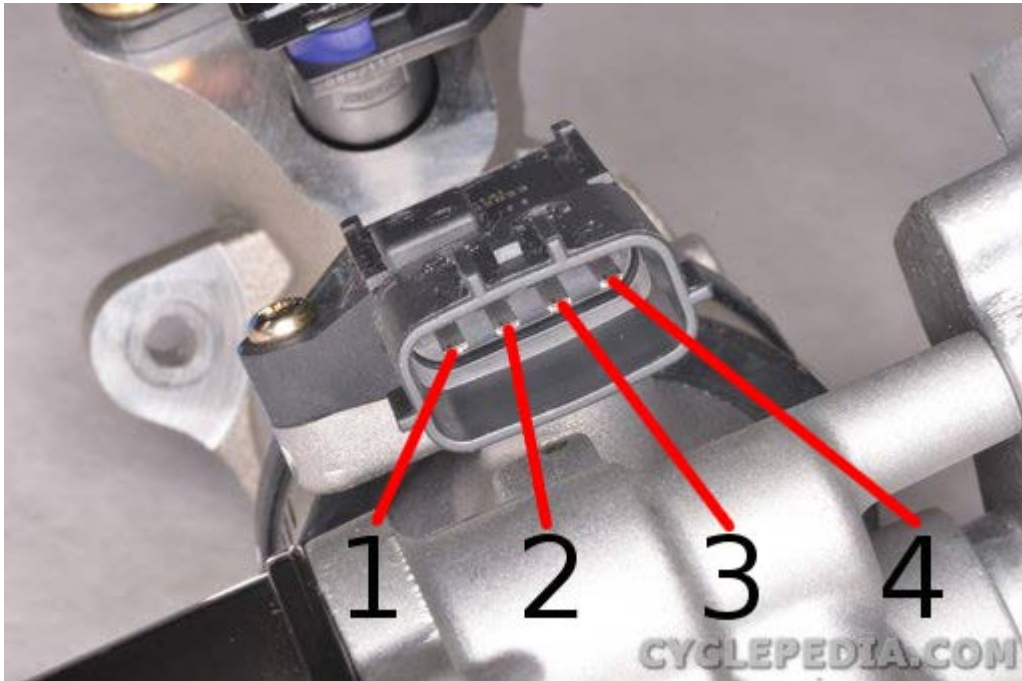
Measure if the ECU voltage outputs to the MAP between the following terminals of the MAP connector.

Terminal	Normal
Violet/Red (+) – Violet/Green (-)	5 V

If the input voltage is out of specifications check the offending wires for a short or open lead.

Resistance

Set the multimeter to ohms of resistance (k Ω).



Measure the resistance between the 3 and 4 pins of the T-MAP sensor.

ITEM	SPECIFICATION
T-MAP sensor resistance (20°C)	1613 - 2544 Ω

To replace the T-MAP sensor see the [Throttle Body Components](#) topic.

Throttle Position Sensor

Input Voltage Inspection



Unplug the TPS connector.

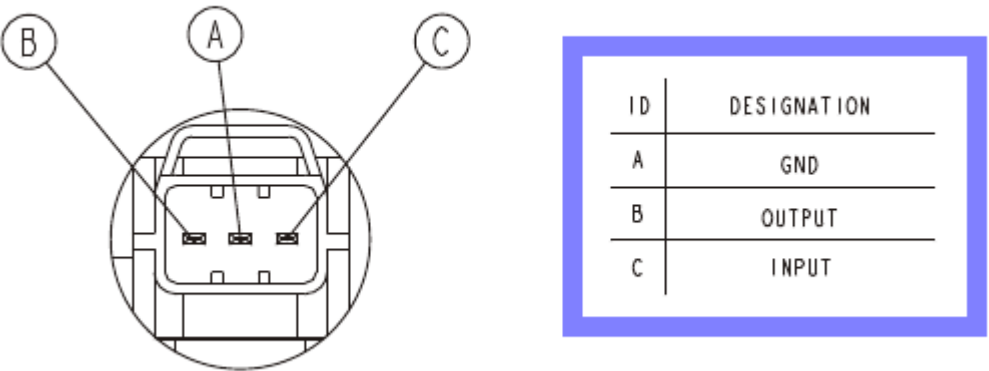
Turn the ignition switch to “ON”.

Measure if the ECU voltage outputs to TPS between the following terminals of the TPS connector.

Terminal	Normal
Violet/Red (+) – Violet/Green (-)	5 V

Resistance Inspection

Set the multimeter to ohms of resistance (kΩ).



Measure the resistance between the ground (A) and input (C) terminals of the TPS.

Throttle Position Sensor (TPS) resistance (at 20°C/68°F)	3500 - 6500 Ω
---	---------------

Data Analysis

Bring up data analysis page 02 to see information on the TPS. See the [Diagnostic Tool](#) topic for more information.



The TPS voltage should display as indicated in the table per the throttle position.

Throttle Position	Opening Angle	Standard
Close	0 %	0.67 ± 0.05 V
Open	> 90 %	1.8 - 2.3 V

To replace the TPS see the [Throttle Body Components](#) topic.

Ignition Pulse Generator / Crank Position

Sensor

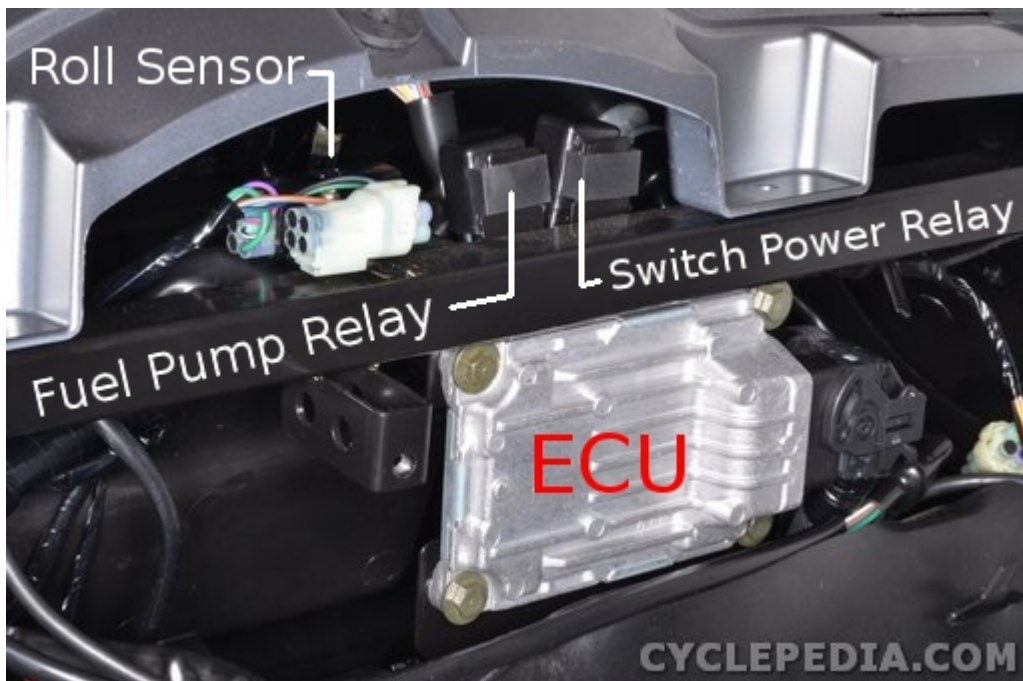
To inspect the ignition pulse generator/crank position sensor see the [Ignition System](#) topic.

To replace the ignition pulse generator/crank position sensor see the [Generator Cover](#) topic.

Roll Sensor / Tip-Over

Removal and Installation

Remove the hood. See the [Hood](#) topic for more information.



The roll sensor is mounted on the frame above the ECU.



Remove the two roll sensor screws with a #2 Phillips screwdriver. Unplug the roll sensor and remove it.

Plug in the roll sensor and install it so the UP mark faces up. Tighten the two roll sensor screws securely with a #2 Phillips screwdriver.

Inspection

Turn the ignition switch to the OFF position.



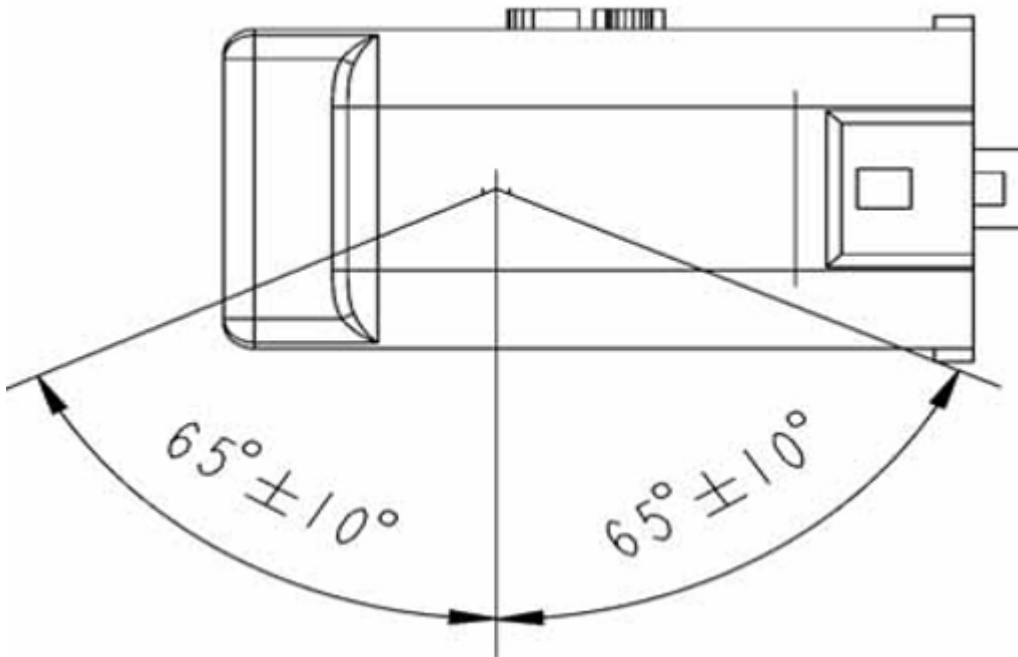
Remove the roll sensor screws, but leave the sensor plugged in.

Set the multimeter to read voltage (DCV).

Turn the ignition switch to the ON position.

Measure the voltage of the roll sensor wires with the connector plugged in and the sensor in the regular upright attitude.

Terminal	Normal
Violet/Red (+) - Green (-)	5 V (ECU Voltage)
Black/White (+) - Green (-)	0.4 - 1.4 V



Incline the roll sensor 65 ± 10 degrees to the left or right. Check the voltage.

Terminal	Normal
Violet/Red (+) - Green (-)	5 V (ECU Voltage)
Black/White (+) - Green (-)	0.4 - 1.4 V

If this test is to be repeated the ignition switch must be turned OFF to reset the system.

Fuel Injector

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Warning: Gas is extremely flammable! Do not work around an open flame or a source of sparks.

Removal

Remove the center cover. See the [Center Cover](#) topic for more information.

Clamp the fuel hose with a fuel hose clamp or relieve the fuel pressure in the fuel line as when removing the fuel pump. See the [Fuel Pump](#) topic for more information.



Loosen the fuel injector hose clamp with a #2 Phillips screwdriver.



Disconnect the fuel hose from the fuel injector.



Push in the spring clip and unplug the fuel injector connector.



Remove the two fuel injector mounting bolts with a 10 mm socket.



Remove the fuel injector and pipe from the intake pipe.



Slide off the clip and pull the fuel injector out of its pipe.



The O-rings should be replaced with new items on installation.

Inspection

A digital multimeter is needed to test the fuel injector.

Set the multimeter to read ohms of resistance (Ω).



Measure the resistance between the fuel injector terminals

ITEM	SPECIFICATIONS
Fuel injector resistance (at 20°C/68°F)	10.6 - 15.9 Ω

Check for continuity between the fuel injector terminals and a ground. There should not be continuity.

If the resistance is out of specification replace the fuel injector.

If the injector checks out and the error code is still present measure the fuel injector input voltage.

Set the multimeter to read DC voltage (DCV).

Turn the ignition switch to the ON position.

Measure the input voltage on the harness side of the connector. Touch one meter lead to the input hot wire terminal and the other to a ground.

The voltage can only be measured within 3 seconds of the ignition switch being turned on. The battery voltage should show.

If the voltage is not in specification there is a short or open circuit in the wire.

If the voltage is in specification, but the malfunction code doesn't go away, there is a problem with the ECM connector or the ECM.

Cleaning

PROBLEM

1. Fuel Injector cannot output the fuel.
2. The Injector injection time (ms) is shorter or longer.

Standard: < 1.6 ms. Check this with the FI Tool DATA Analyze page 04. See the [Diagnostic Tool](#) topic for more information.

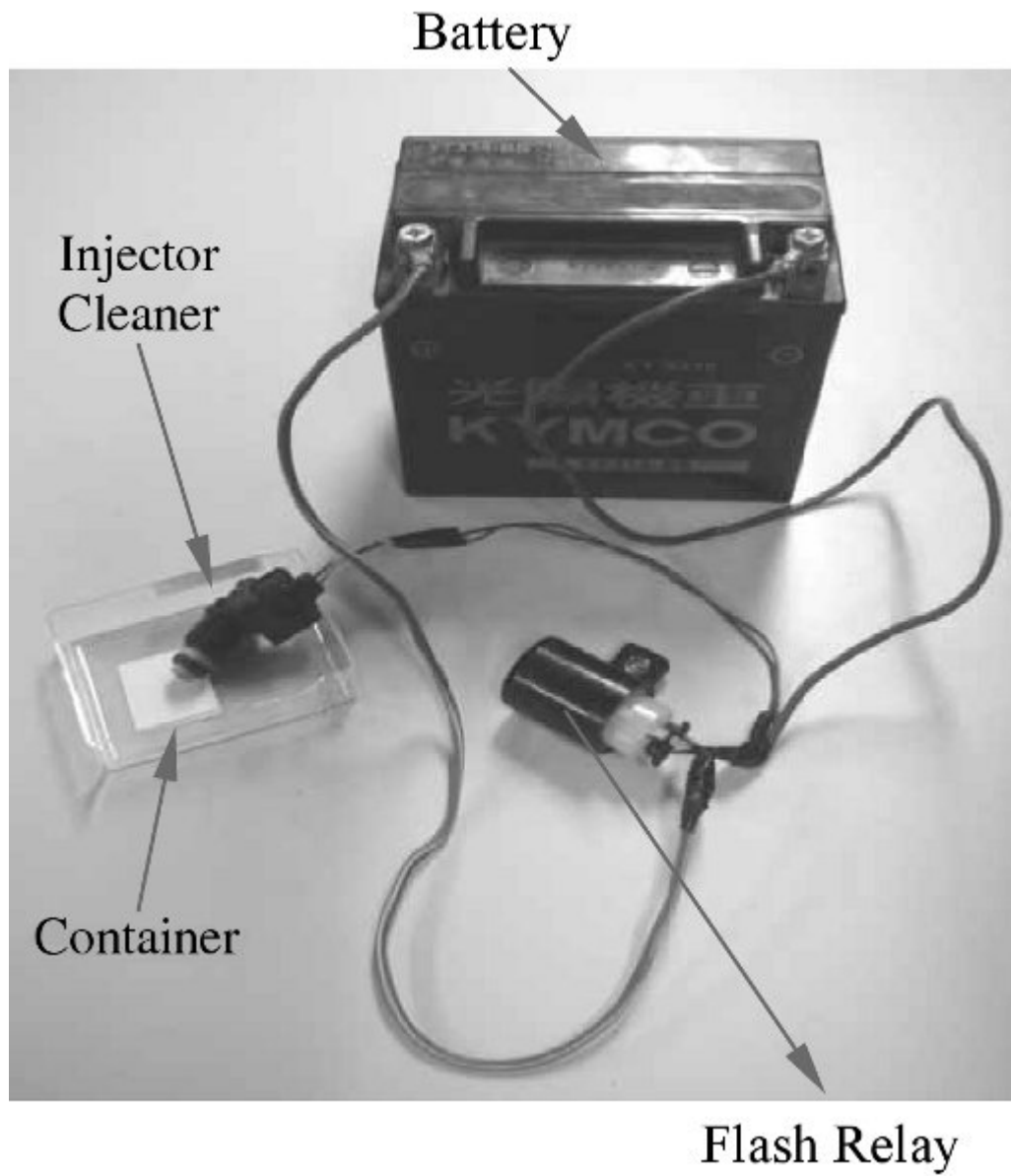
ANALYSIS

Injector block (With carbon build up).

SOLUTION

1. Use the specified injector cleaner.
2. Connect the battery as pictured.
3. The injector cleaner with the flash relay.
4. Keeping the fuel injector operating.

5. Wait for 20-30 minutes.
6. Clean the carbons completely from the injector.



Installation



Install new O-rings to the fuel injector. Apply a light coat of fresh engine oil to the fuel injector O-ring seals.



Install the fuel injector into the pipe. Install the clip to secure the fuel injector.



Install fuel injector and pipe onto the intake pipe. Guide the fuel injector into place, and be sure not to damage the O-ring.



Install the two fuel injector mounting bolts and tighten them securely.



Plug in the fuel injector connector.



Connect the fuel hose to the fuel injector pipe.



Tighten the fuel hose clamp securely with a #2 Phillips screwdriver.

Install the center cover. See the [Center Cover](#) topic for more information.

Fuel Pump

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Warning: Gas is extremely flammable! Do not work around an open flame or a source of sparks.

Fuel Line Inspection

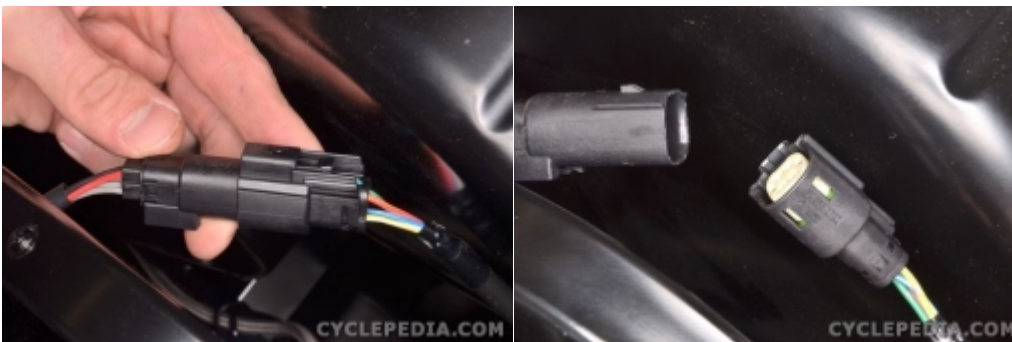
Remove the right seat. See the [Seat](#) topic for more information.

Remove the center cover. See the [Center Cover](#) topic for more information.



Inspect the fuel line from the fuel pump to the throttle body. Note the routing if it is to be replaced.

Input Voltage Inspection



Unplug the fuel pump connector.

Set the multimeter to read voltage (DCV).

Touch the multimeter leads to the harness side of the fuel pump connector, with the positive lead touching the orange/red wire terminal and the negative lead touching the green wire terminal.

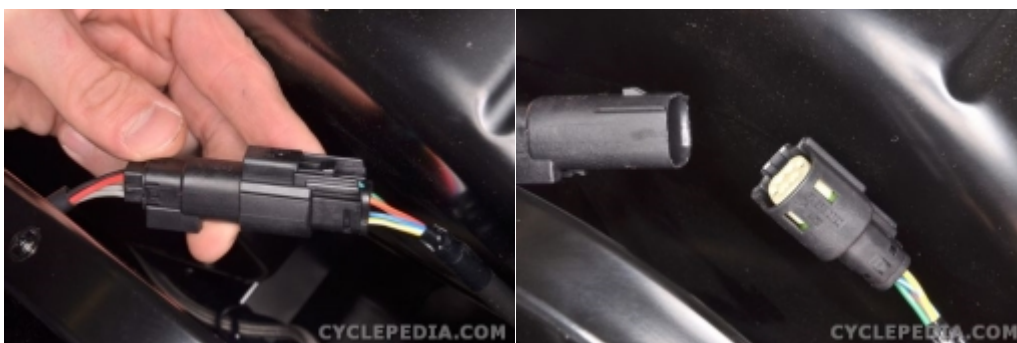
Turn the ignition switch ON. The battery voltage should show for a few seconds. Replace the fuel pump if it is not functioning and the input voltage is correct.

If the battery voltage is not present check the following:

- Fuse B (10 A)
- Fuel pump relay
- ECU

Removal

Turn the ignition switch off.



Unplug the fuel pump connector.



Remove the gas cap to normalize the pressure in the tank. Install the gas gap.

With the fuel pump connector still unplugged start the engine and allow it to run until it uses the remaining fuel in the line and stalls. Turn off the ignition switch after the engine stalls.



Clean the disconnect fitting and put a rag over it. Push down on the black release and disconnect the fuel fitting from the fuel tank. Place plastic bags over the fuel line ends to keep debris out and prevent damage.



Remove the six fuel pump bolts with a 10 mm socket.

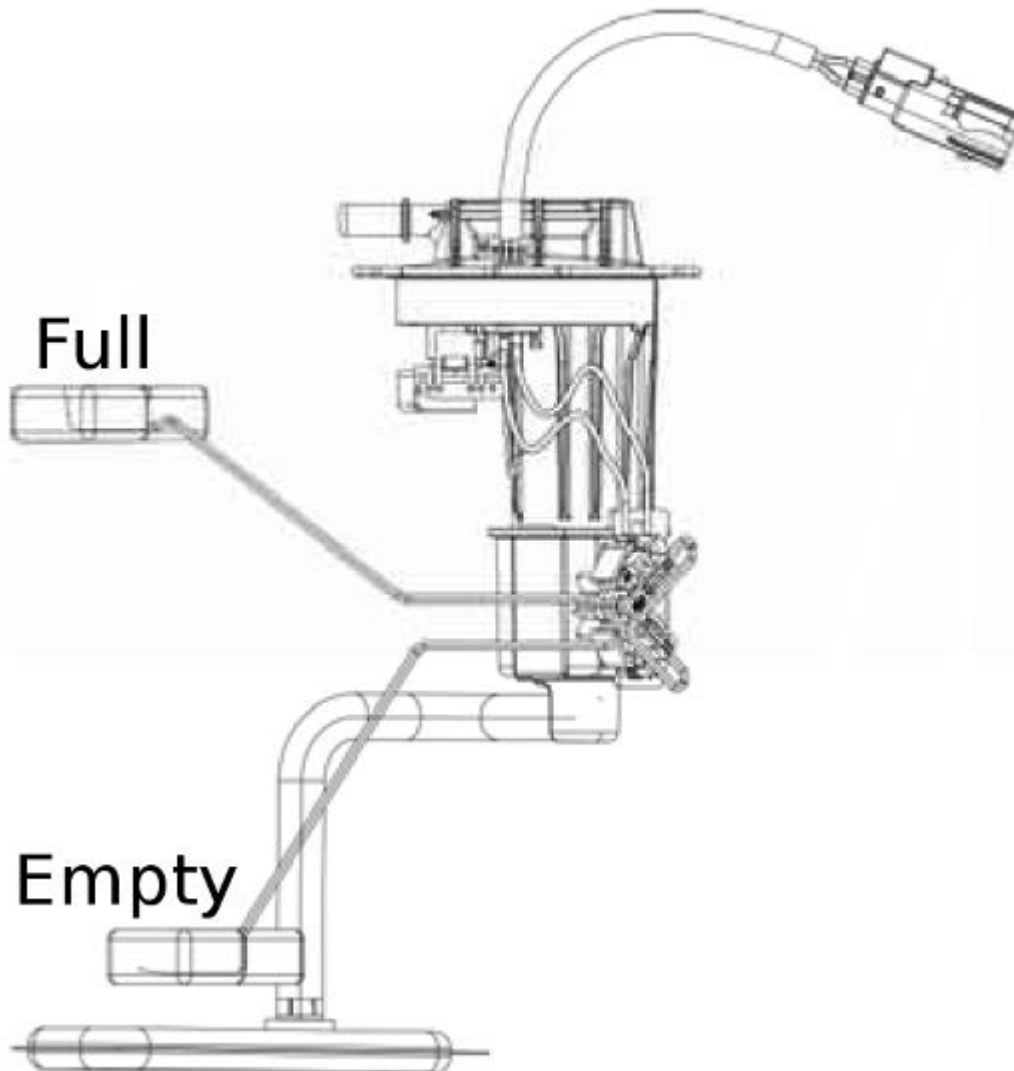


Carefully lift out the fuel pump. Guide the fuel level float out of the fuel tank with the pump.



Remove the O-ring from the fuel pump. Discard the fuel pump O-ring, and replace it with a new item on assembly.

Fuel Level Gauge Inspection





Make sure the fuel level gauge float arm moves smoothly. Using a digital multimeter set to ohms of resistance (Ω). Measure the resistance between the gray wire fuel pump/level gauge connector terminals with the float raised to the positions indicted below.

Fuel Level Float Position	Approximate Resistance
Full	101 Ω
Empty	3 Ω

Replace the fuel pump unit with a new part if the resistance is out of specification.

Fuel Output Pressure

Turn the key to the OFF position.

Use a fuel hose clamp to block the flow of fuel to the fuel injector.



Loosen the fuel injector hose clamp with a #2 Phillips screwdriver.



Disconnect the fuel hose from the fuel injector pipe. Connect the fuel pressure gauge to the fuel hose. Remove the fuel hose clamp. Turn the key to the ON position. Check the fuel pressure.

ITEM	SPECIFICATIONS
Fuel pump standard pressure (at 80 L/Hr)	300 ± 10 kPa (43.5 psi)

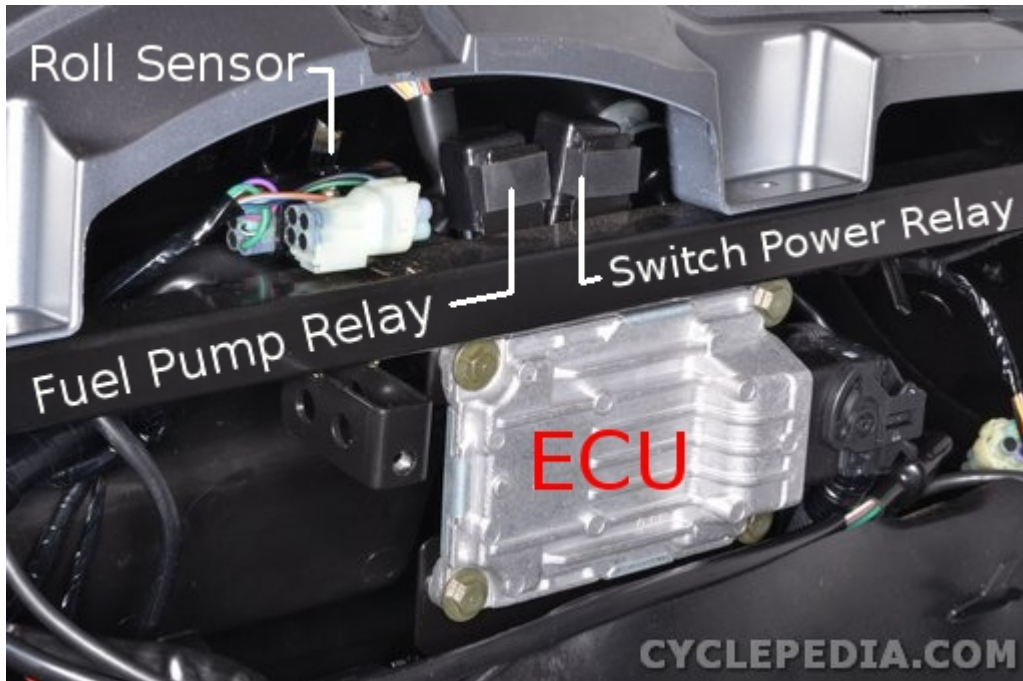
If the fuel output pressure is less than the specifications

If the fuel pressure is below specification check the fuel line for kinks and clogs. Also, inspect the fuel strainer screen on the fuel pump and the breather hose on the tank.

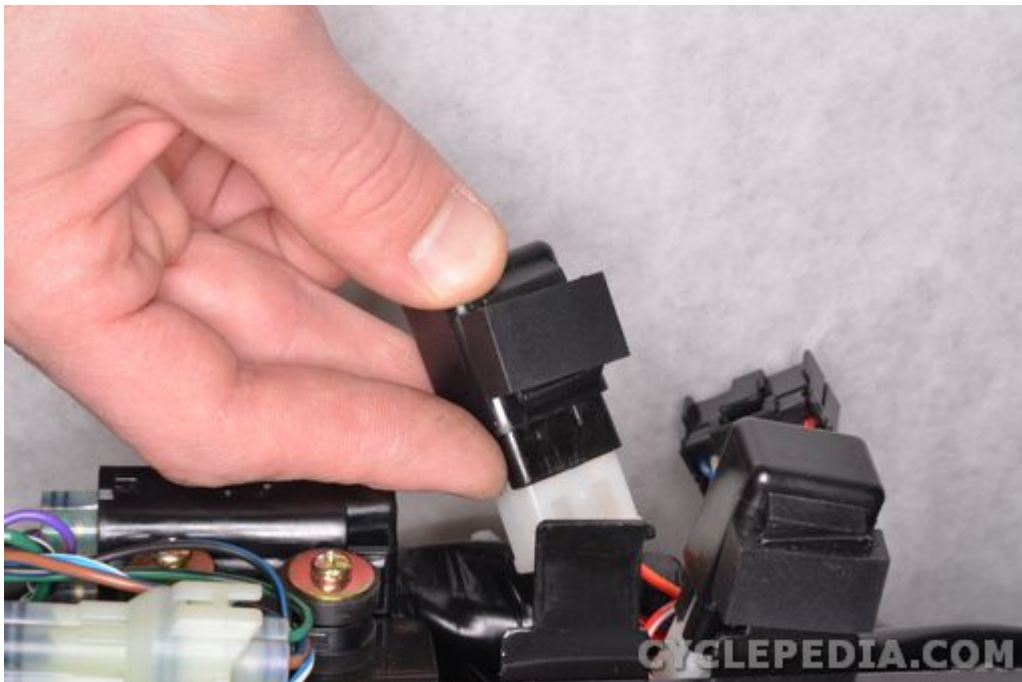
Fuel Pump Relay

Turn the key to the OFF position.

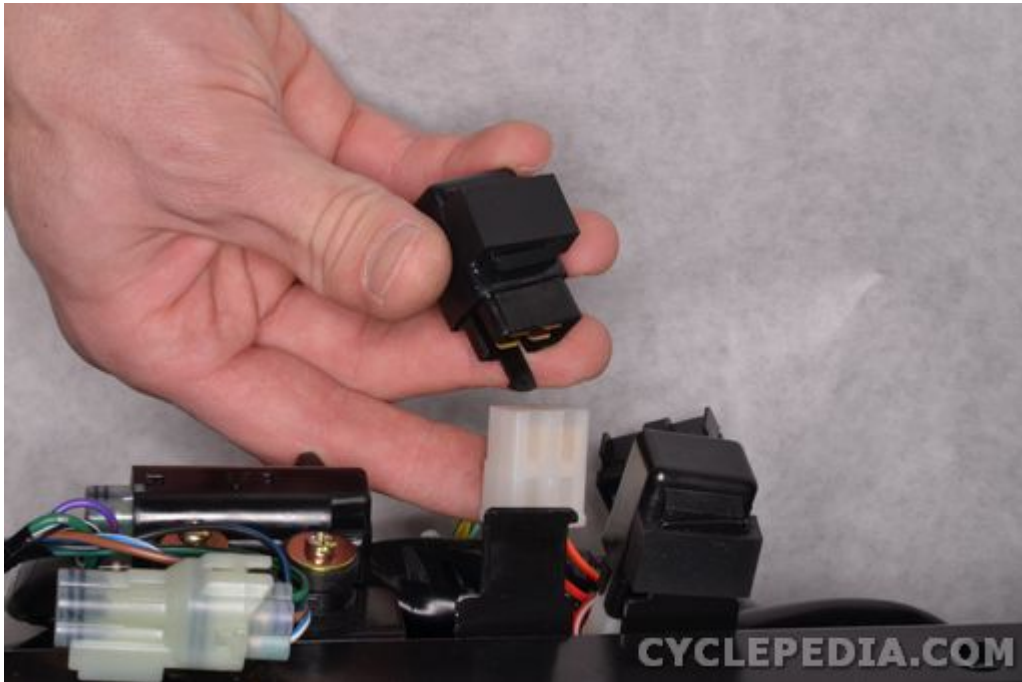
Open the hood. See the [Hood](#) for more information.



The fuel pump relay is located above the ECU.



Lift the fuel pump relay off of the finger on the frame.

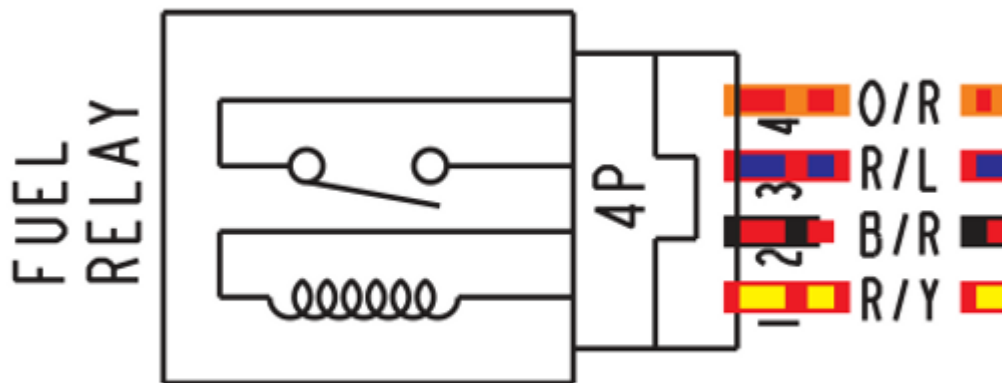


Remove the fuel pump relay from the connector.

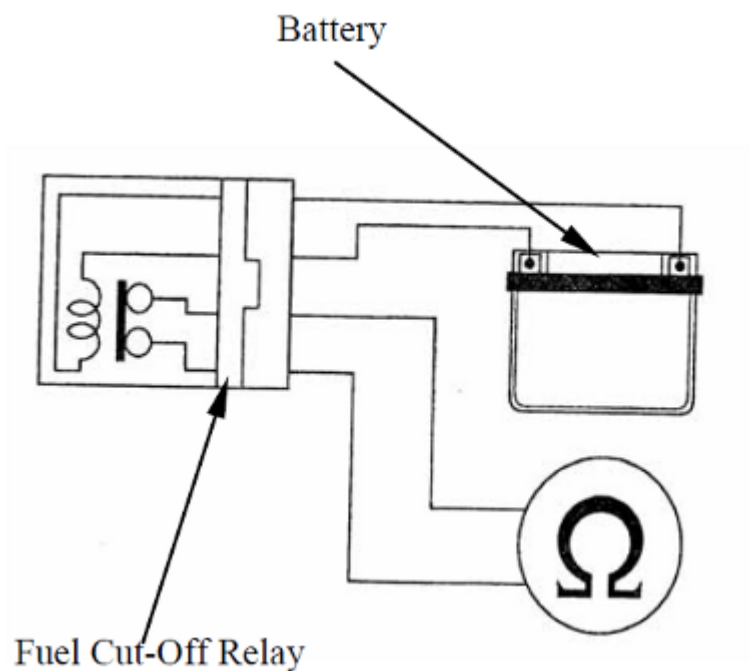
Continuity Test



Set the multimeter to read ohms of resistance (Ω).



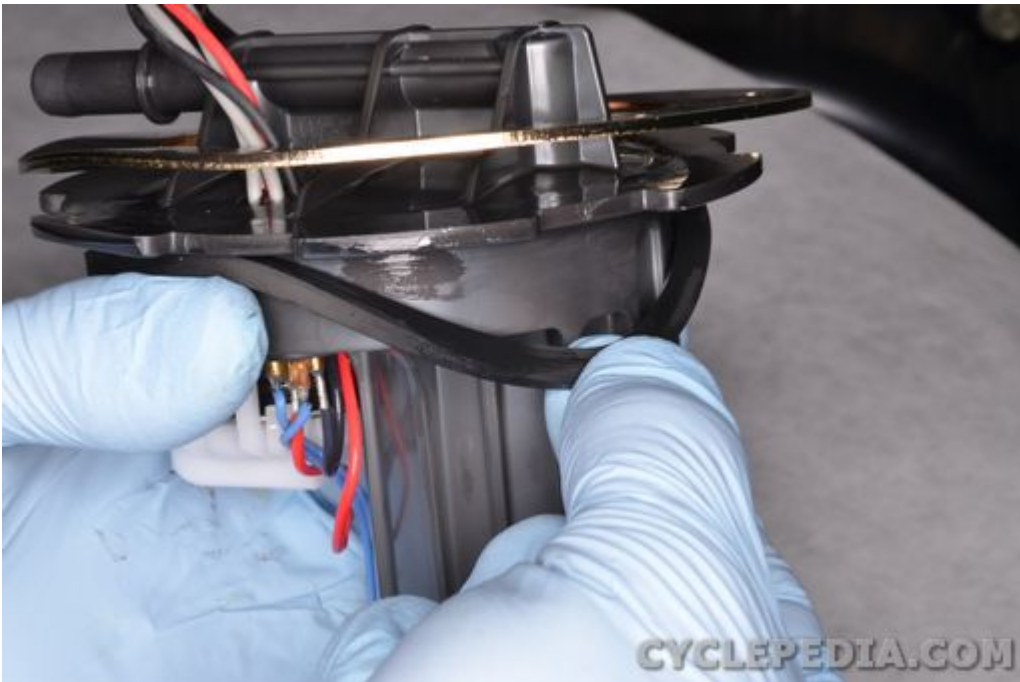
Check for continuity between the terminals of the relay that match up with the red/blue and orange/red wires.



Jump a 12 V battery to the terminals of the relay that match up with red/yellow and black/red wires.

There should be continuity only when 12 V battery connected. If there is not continuity when the 12 V battery is connected, replace the fuel pump relay.

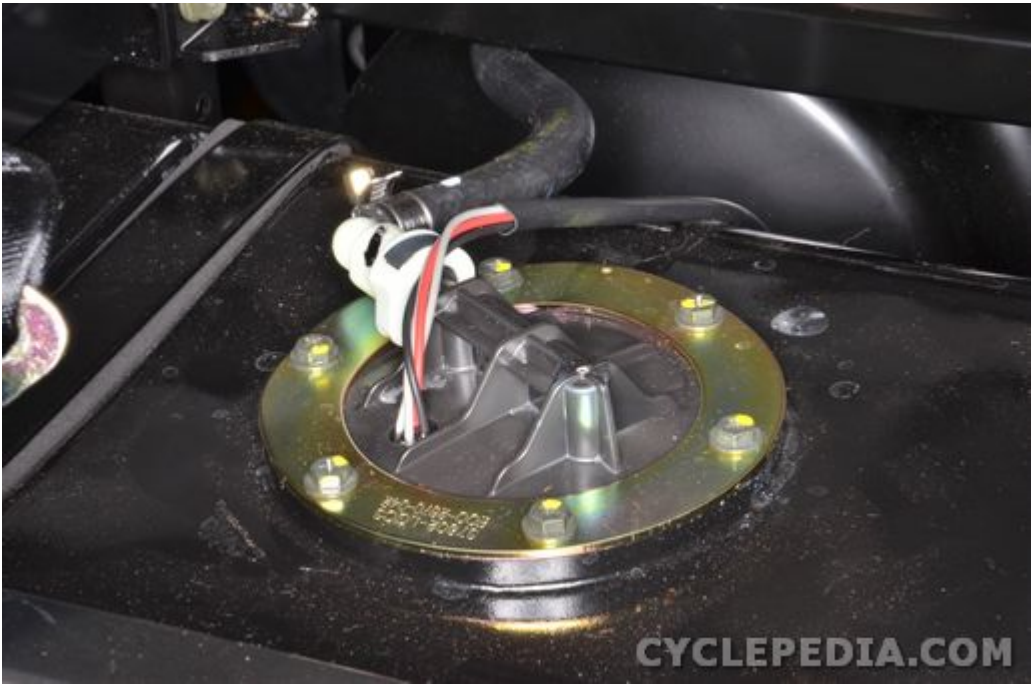
Installation



Replace the O-ring with new item and apply a small amount of fresh engine oil to the new O-ring.



Carefully insert the fuel pump into the tank. Avoid damaging the fuel pump wires and fuel strainer.



The fuel delivery pipe should face to the rear as shown.

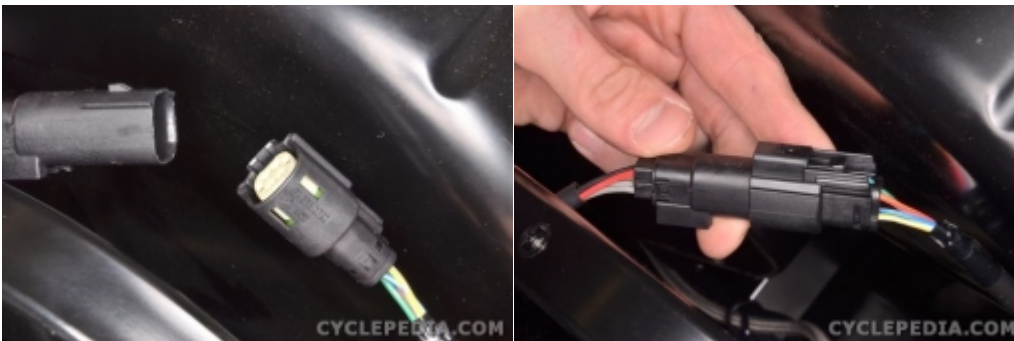


Install the six fuel pump bolts. Tighten the bolts evenly to specification with a 10 mm socket.

Item	Torque Kgf-m (N-m, lbf-ft)
Fuel Pump Bolts	0.35 (3.5, 2.5)



Connect the fuel hose to the outlet pipe on the fuel pump. Make sure the connector is securely attached to the outlet pipe.



Plug in the fuel pump connector.

Install the center cover. See the [Center Cover](#) topic for more information.

Install the right seat. See the [Seat](#) topic for more information.

Fuel Tank

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Warning: Gasoline is extremely flammable. Work in an area that is free of open flames and sources of sparks. Properly clean up any spilled gasoline as soon as possible.

Removal

Turn the ignition switch OFF.

Remove the seats. See the [Seat](#) topic for more information.

Remove the center cover. See the [Center Cover](#) topic for more information.

Tilt the cargo bead up. See the [Cargo Bed](#) topic for more information.

Remove the fuel pump on fuel injected models or disconnect the fuel line on carbureted models. See the [Fuel Pump](#) topic for more information on the fuel injected models.

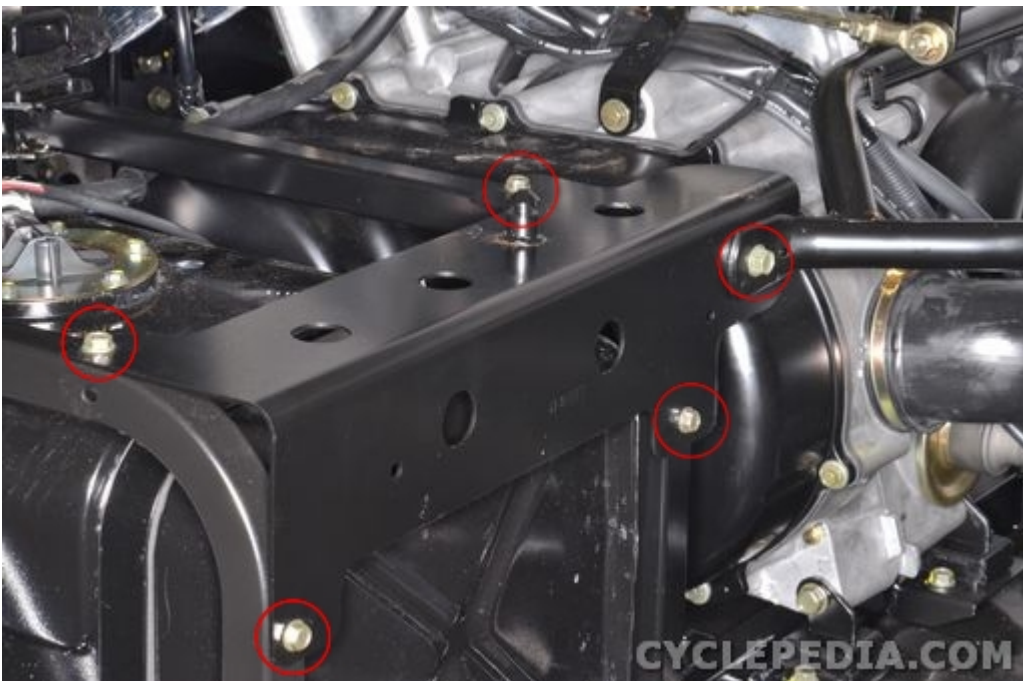


Remove the gas cap.



Remove the right rear side cover. See the [Side Covers](#) topic for more information.

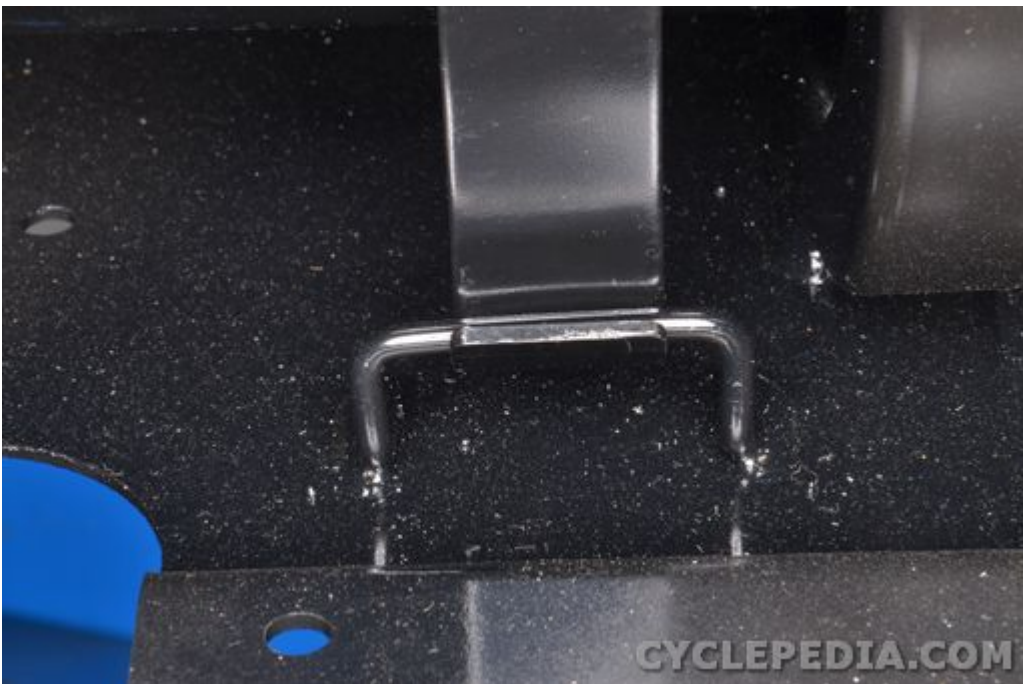
Remove the right under seat frame cover. See the [Frame Covers](#) topic for more information.



Remove the fuel tank frame plate bolts.



Remove the fuel tank frame plate.



Release the straps.



Remove the two strap bolts on the other side.



Remove the right fuel tank frame rail bolts.



Remove the right fuel tank frame rail.



Move the fuel tank forward and lift it out.

Installation



Install the fuel tank with the straps.



Install the right fuel tank frame rail.



Install the right fuel tank frame rail bolts and tighten them securely.



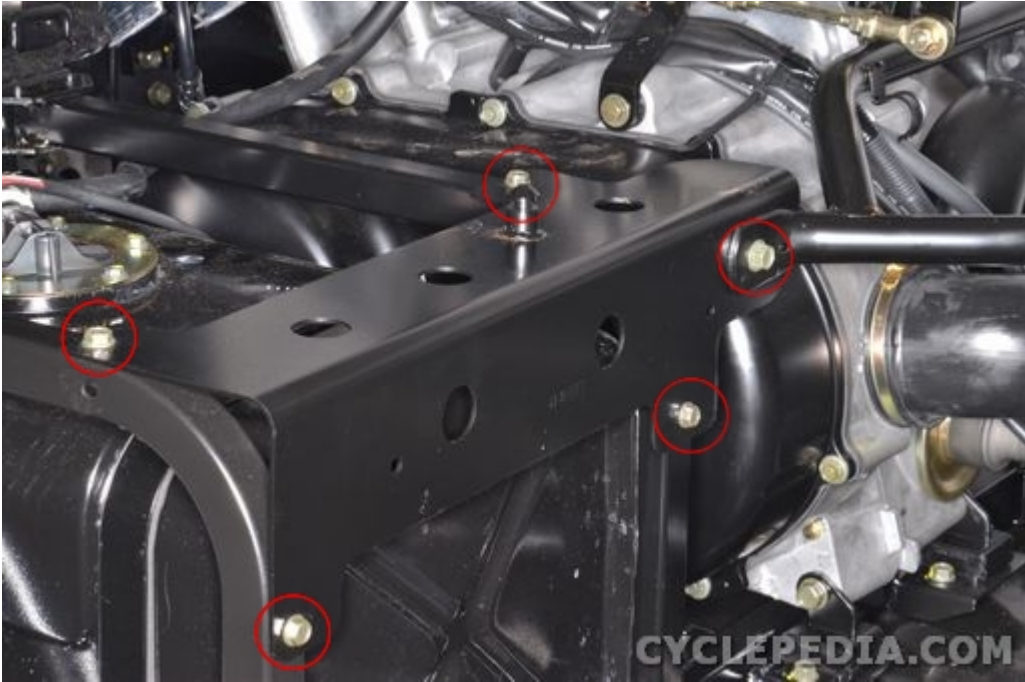
Install the two strap bolts on the side and tighten them securely.



Secure the straps.



Install the fuel tank plate.



Install the fuel tank plate bolts and tighten them securely.



Install the tank cover.



Install the tank cover screws with a Phillips screwdriver. Tighten them securely.



Install the right rear side cover. See the [Side Covers](#) topic for more information.



Install the gas cap.

Install the fuel pump or reconnect the fuel line as needed. See the [Fuel Pump](#) topic for more information.

Install the center cover. See the [Center Cover](#) topic for more information.

Install the seat. See the [Seat](#) topic for more information.

Close the cargo bead up. See the [Cargo Bed](#) topic for more information.

Throttle Body Removal and Installation

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

- Turn off the ignition switch during removal/installation.
- Check and confirm if the voltage is over 12V with a voltmeter after replacement.
- Check and confirm if the other connectors are installed correctly after replacement.
- Do not damage the throttle body, it may cause the throttle and idle valve to fail synchronization.
- The throttle body is preset in the KYMCO factory, do not disassemble it incorrectly.
- Do not loosen or tighten the painted bolts and screws for the throttle body. Loosening or tightening them can cause the throttle and idle valve synchronization to fail.
- TPS and ISC have to be reset after the throttle body MAP, TPS, ISC or ECU has been reinstalled.

Removal

Remove the center cover. See the [Center Cover](#) topic for more information.

Clamp the fuel hose with a fuel hose clamp or relive the fuel pressure in the fuel line as when removing the fuel pump. See the [Fuel Pump](#) topic for more information.

Remove the airbox. See the [Airbox](#) topic for more information.



Unplug the ISC connector.



Unplug the TPS connector.



Unplug the T-MAP connector.



Loosen the fuel injector hose clamp with a #2 Phillips screwdriver.



Disconnect the fuel hose from the fuel injector.



Push in the spring and unplug the fuel injector connector.



Remove the two throttle drum cover screws with a #2 Phillips screwdriver.



Remove the throttle drum cover.



Slide the throttle cable housing out of the throttle body.



Free the throttle cable from the throttle drum.



Remove the two intake pipe bolts that hold the intake pipe to the cylinder head.



Remove the throttle body and intake pipe from the cylinder head.

To remove the fuel injector see the [Fuel Injector](#) topic for more information.

To disassemble the throttle body see the [Throttle Body Components](#) topic for more information.

Installation



Install a new intake pipe O-ring. If this O-ring allows an air leak the engine will not run correctly.



Fit the throttle body and intake pipe onto the cylinder head.



Fit the intake pipe and throttle body to the cylinder head. Install the two intake pipe bolts and tighten them securely.



Fit the end of the throttle cable into the throttle drum.



Fit the throttle cable into the throttle body as shown.



Install the throttle drum cover.



Install the two throttle drum cover screws and tighten them securely with a #2 Phillips screwdriver.



Plug in the fuel injector connector.



Connect the fuel hose to the fuel injector pipe.



Tighten the fuel hose clamp securely with a #2 Phillips screwdriver.



Plug in the T-MAP connector.



Plug in the TPS connector.



Plug in the ISC connector.



Plug in the fuel pump connector if it was disconnected.

Install the airbox. See the [Airbox](#) topic for more information.

Install the center cover. See the [Center Cover](#) topic for more information.

Throttle Body Components

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

To remove the throttle body. See the [Throttle Body Removal and Installation](#) topic for more information.

To inspect the sensors see the [Fuel Injection Sensors](#) topic.

Disassembly

Fuel Injector

To remove the fuel injector see the [Fuel Injector](#) topic.

T-MAP Sensor



The T-MAP sensor sits on top of the throttle body.



Remove the T-MAP sensor set plate screw with a #2 Phillips screwdriver.



Remove the T-MAP sensor.

ISC (Idle Speed Control - Air Bypass Valve)



Remove the two ISC screws with a #2 Phillips screwdriver.



Remove the ISC from the throttle body.



Remove the O-ring from the ISC and discard it. Clean the tip of the ISC valve.

Inspection

If the engine is hard to start, stops, or idles rough the ISC may be faulty.

Use the data analysis feature of the FI Diagnostic Tool to see information on the ISC. See the [Diagnostic Tool](#) topic for more information.

Start the engine and let it run until the engine temperature reaches 80° C.



The ISC step should be below 65.

TPS Sensor



The TPS is located on the throttle shaft opposite the throttle drum.



Remove the TPS sensor with a #2 Phillips screwdriver.

Assembly

The throttle position sensor (TPS) and idle air bypass valve (ISC) have to be reset when the throttle body MAP, TPS, ISC or ECU have been reinstalled.

TPS/ISC Reset

Start the engine and let it idle until the engine temperature has reached 85° C (185° F). The ECU will learn the new setting.

TPS Sensor

Apply oil onto a new O-ring and place it on the TPS.



Install the TPS onto the throttle body so that it returns to the original position.



Install and tighten the screw securely with a #2 Phillips screwdriver.

ISC (Idle Speed Control - Air Bypass Valve)



Apply oil onto a new O-ring and place it on the ISC.



Install the ISC into the throttle body as shown, being careful not to damage the O-ring.

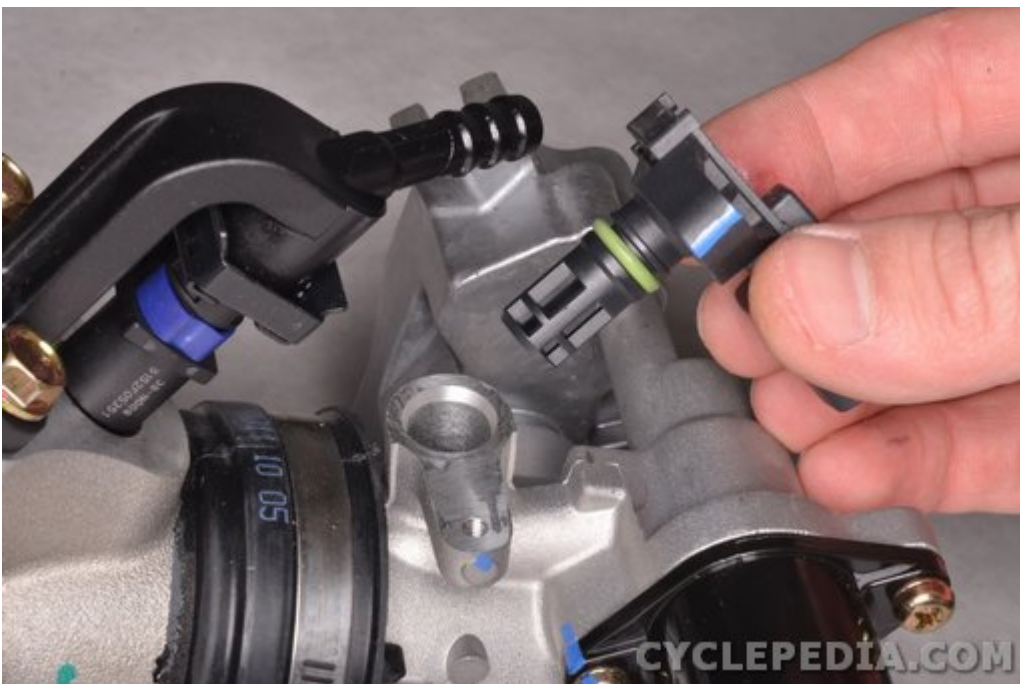


Install the two ISC screws and tighten them securely with a #2 Phillips.

T-MAP Sensor



Apply oil onto a new O-ring and place it on the T-MAP sensor.



Install the T-MAP into the throttle body, being careful not to damage the O-ring.



Install the T-MAP sensor screw and tighten it securely with a #2 Phillips.

Install the throttle body. See the [Throttle Body Removal and Installation](#) topic for more information.

WARNING

Gasoline is very dangerous. When working with gasoline, keep sparks and flames away from the working area.

Gasoline is extremely flammable and is explosive under certain conditions. Be sure to work in a well-ventilated area.

General Service Information

- Be sure to relieve the fuel pressure before fuel pump or fuel hose removal.
- Bending or twisting the control cables will affect operation and could cause the cables to stick or bind, resulting in loss of vehicle control.
- Work in a fully ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- Do not apply carburetor cleaners to the inside of the throttle body.
- Do not snap the throttle valve from fully open to fully close after the throttle cable has been removed; this may cause incorrect idle speed.
- Do not loosen or tighten the painted bolts and screws of the throttle body. This can cause throttle and idle valve synchronization failure.
- Seal the cylinder head intake ports with tape or a clean towel to prevent dirt and debris from entering the intake ports after the throttle body has been removed.
- Do not damage the throttle body. It may cause incorrect throttle and idle valve synchronization.
- When the fuel pump is removed make sure it is stored in a clean area where it cannot fall and be damaged. Also, be sure the fuel pump isn't resting on the fuel level sensor float arm.
- Always replace the fuel pump seal when the fuel pump is removed.

- The electronic fuel injection system is equipped with the self-diagnostic system. If the Check Engine Lamp “CELP” lights while riding, follow the self-diagnostic procedures to solve the problem.
- A faulty fuel injection problem is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- When disassembling the fuel injection parts, note the location of the O-rings. Replace them with new ones upon reassembly.
- Do not disconnect the battery negative (-) or positive (+) cable while engine is running, it may cause ECU damage.
- **Do not disconnect or connect the ECU connector while the ignition switch is in the ON position; it may cause the ECU damage.**

TROUBLESHOOTING

Engine fails to start

- Battery voltage too low
- Fuel level too low
- Pinched or clogged fuel hose
- Faulty fuel pump operating system
- Clogged fuel injector
- Faulty spark plug or wrong type
- Clogged Airflow Bypass Valve
- Wet spark plug

Backfiring or misfiring during acceleration

- Ignition system malfunction

Engine stall, hard to start, rough idling

- Intake air leak

- Fuel contaminated/deteriorated
- Pinched or clogged fuel hose
- Idle speed problem
- Wet spark plug

Poor performance (drive ability) and poor fuel economy

- Pinched or clogged fuel hose
 - Faulty injector
-

4.External Components

This chapter covers the location and servicing of the external components.

1.Boot Guard	4-5
2.Bumpers and Racks	4-7
3.Canopy Bars	4-15
4.Cargo Bed	4-23
5.Center Cover	4-36
6.Drive Selector	4-42
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10.Headlight	4-83
11.Hood	4-89
12.Instrument Cover	4-101
13.Pedal Cover	4-112
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15.Seats	4-127
16.Side Covers	4-130
17.Skid Plates	4-144

GENERAL INSTRUCTIONS

- When removing frame covers, use special care not to pull them by force because the cover joint claws may be damaged.
- Make sure to route cables and harnesses according to the Cable & Harness Routing.

TROUBLESHOOTING

Noisy exhaust muffler

- Damaged exhaust muffler
- Exhaust muffler joint air leaks

Lack of power

- Caved exhaust muffler
- Exhaust muffler air leaks
- Clogged exhaust muffler

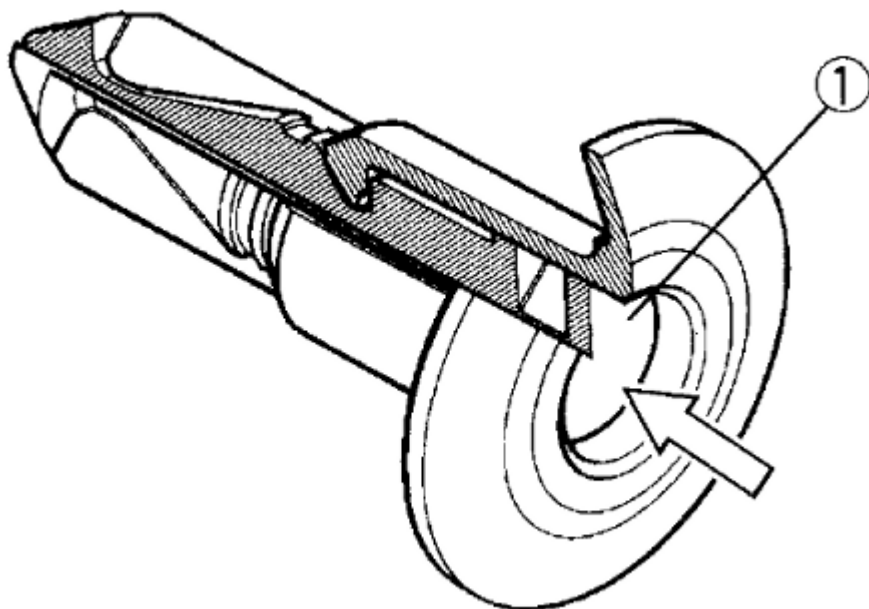
Trim Clips

Screw Type

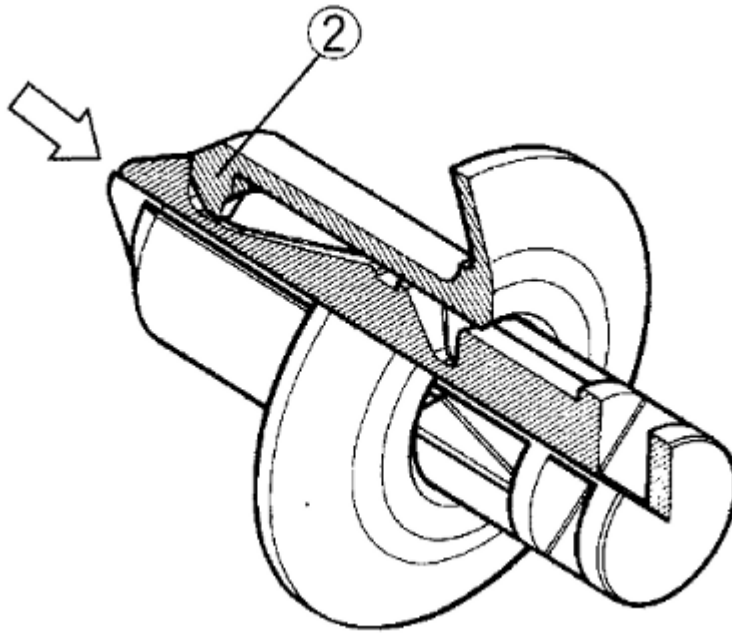


Back the screw out with a Phillips screwdriver to unlock the screw type trim clips. Install the trim clip and then turn in the screw to lock the clip in place.

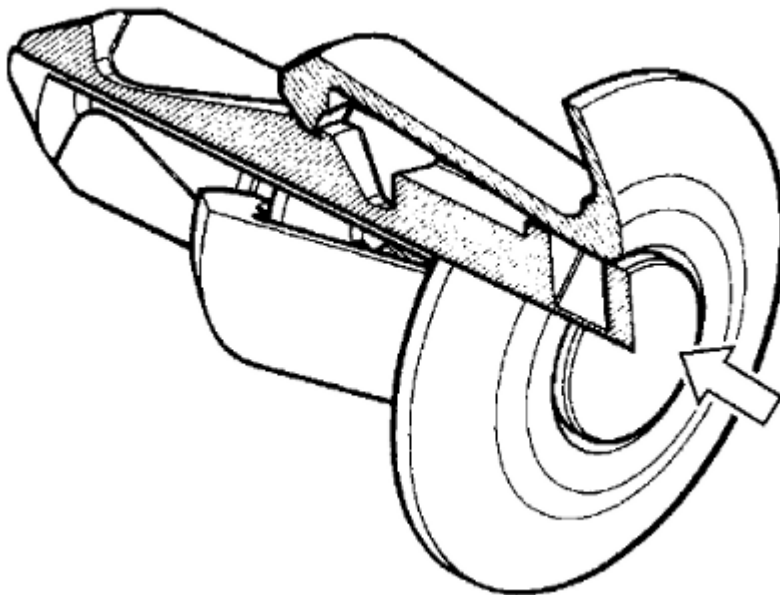
Button Type



Depress the head of trim clip center piece (1). Pull out the trim clips.



Let the center piece stick out toward the head so that the pawls (2) close. Insert the trim clip into the installation hole. To prevent the pawl (2) from damage, insert the fastener all the way into the installation hole.



Push in the head of center piece until it becomes flush with the trim clip outside face.

Boot Guard

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Note: The right and left side boot guards follow the same removal/installation procedure.



Remove the boot guard mounting bolt with a 10 mm socket.



Remove the boot guard.

Installation



Install the boot guard.



Install the boot guard mounting bolt and tighten it securely with a 10 mm socket.

Front Bumper

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Front Bumper Cover



The front bumper cover is held on with four mounting bolts.



Remove the four front bumper cover bolts with a 10 mm socket.



Remove the front bumper cover.

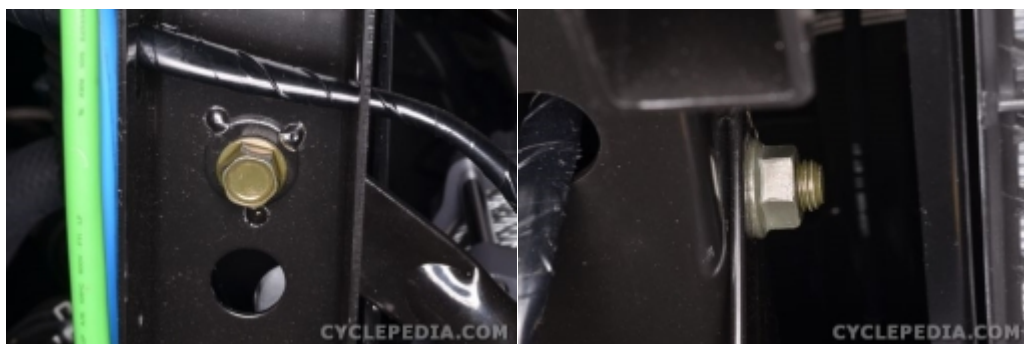
Front Bumper



On the winch equipped LE models disconnect the winch leads.



The front bumper is mounted to the frame with four bolts and nuts on the inside of the frame rail.



Support the front bumper. Remove the nuts and bolts with a 14 mm socket.



Remove the front bumper from the frame.

Installation

Front Bumper

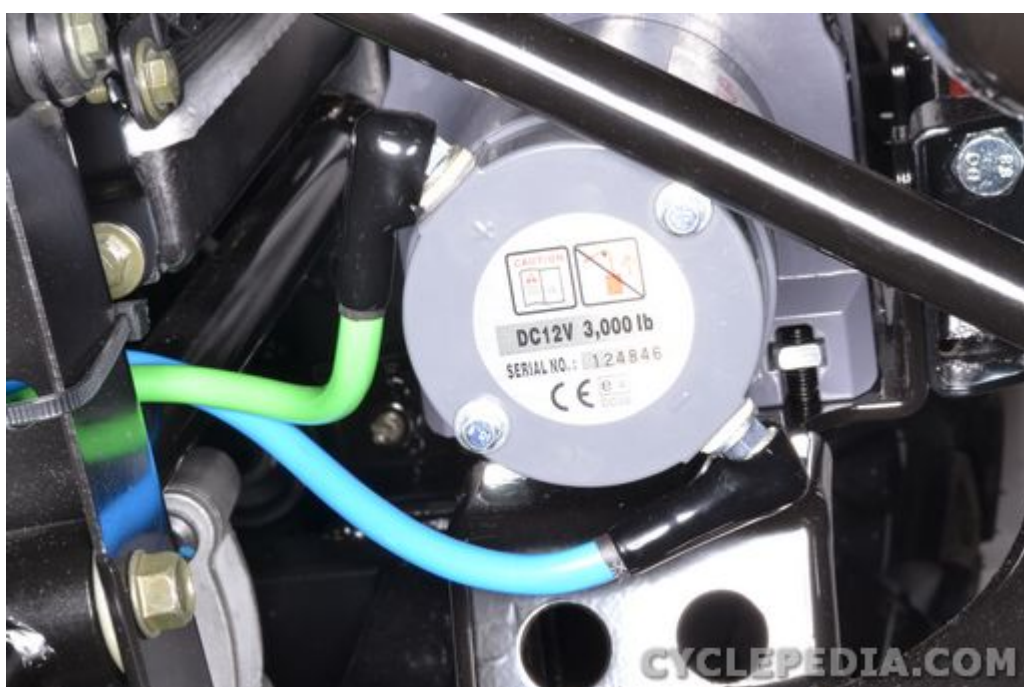


Fit the front bumper into place.





Install the four front bumper mounting nuts and bolts. Tighten them securely with a 14 mm socket.



Connect the leads to the winch on the LE models.

Front Bumper Cover



Fit the front bumper cover into place. If there is a winch make sure to position the end of the cable as shown.



Install the four front bumper cover mounting bolts and tighten them securely with a 10 mm socket.

Canopy Bars

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal



The headrests are mounted to the canopy bars with three #3 Phillips screws. Note, some headrest may be mounted with Allen screws.



Remove the upper seatbelt covers.



Remove the upper seatbelt mounting bolts and nuts with a 17 mm socket.



There are two upper crossbars. Support the bars as you remove the bolts. Remove the upper crossbar bolts with a 12 mm socket.



Remove the upper crossbars.



Remove the eight headrest cross tube bolts with a 12 mm socket. Remove the headrest cross tube.



Support the canopy bars. Loosen the bolts with an 8 mm Allen. Remove the four nuts and bolts for each canopy bar. Remove the canopy bars.

Installation



Install the canopy bars. Install the nuts and bolts as shown. Tighten the bolts to specification with an 8 mm Allen.

Item	Torque Kgf-m (N-m, lbf-ft)
Canopy Bar Bolts	6.4 (64, 47.2)



Install the headrest cross tube. Install the eight headrest cross tube bolts and tighten them to specification with a 12 mm socket.

Item	Torque Kgf-m (N-m, lbf-ft)
Cross tube bolts	3.2 (32, 23.6)



Install the two upper crossbars.



Install the eight headrest crossbar bolts and tighten them to specification with a 12 mm socket.

Item	Torque Kgf-m (N-m, lbf-ft)
Crossbar bolts	3.2 (32, 23.6)



Install the upper seatbelt mounting bolts and nuts. Tighten the fasteners to specification with a 17 mm socket.

Item	Torque Kgf-m (N-m, lbf-ft)
Seatbelt nuts and bolts	6.4 (64, 47.2)



Install the upper seat belt covers.



Install the headrests and tighten the fasteners securely.

Cargo Bed

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.



Release the latch and lift up the bed.



Unplug the taillight connectors. There is one for each side.



Remove the lift assist strut nuts with a 12 mm socket. Free the left and right lift assist struts from the bed.



With the help of an assistant support the bed in the closed position. Remove the locking clips and washers. Slide out the hinge pins. Lift off the bed with the help of an assistant.

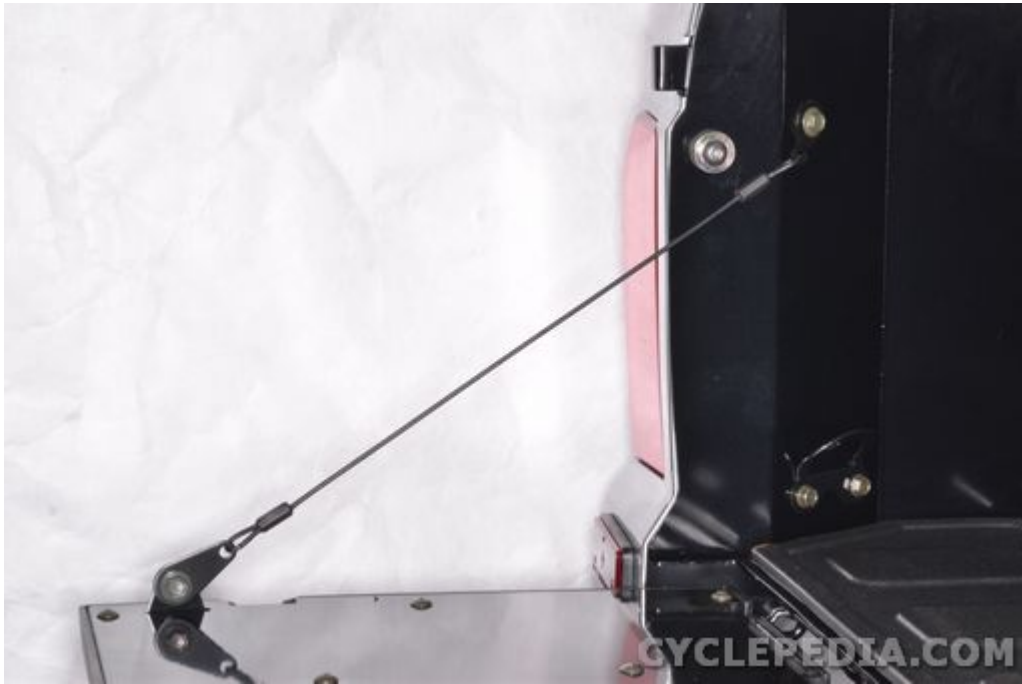
Inspection



Check the rubber dampers for wear and damage.



Check the latching mechanism for damage.



Check the tailgate cables for wear and damage.

Disassembly

Tie-Downs



To remove the tie-down anchors loosen the nuts and bolts with a 10 mm socket. Remove the nuts, washers, bolts, and tie-down anchors.

Wheel Wells



To remove the wheel well take out the seven bolts with a 10 mm socket.

To remove the rear fenders and taillights see the [Rear Fenders](#) topic for more information.

Installation

Wheel Wells



Install the wheel wells. Install the seven bolts with a 10 mm socket.

Tie-Downs



Fit the tie-down anchors into place.



Install the bolts, washers, and nuts. Tighten the fasteners securely with a 10 mm socket.

Cargo Bed



Fit the cargo bed into place with the help of an assistant.



Slide in the hinge pins with the bed in the closed position. Install the washers and locking clips.



Connect the two left and right lift assist struts to the bed.



Hold the lift assist strut with a 12 mm wrench and tighten the nut securely with a 12 mm socket.



Plug in the taillight connectors. There is one for each side.



Close the cargo bed.



Make sure the latch closes correctly.

Center Cover

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

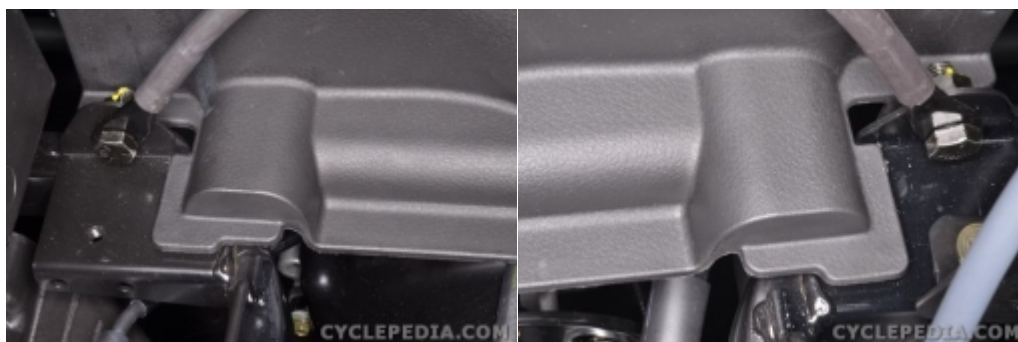
Remove the seats. See the [Seat](#) topic for more information.



Remove the gearshift lever knob bolt with a 4 mm Allen, and lift off the knob.



Remove the two trim clips from the front of the center cover cover.



Lift up on the back of the center cover cover and free the posts from the frame.



Lift off the center cover cover.

Installation



Lower the center cover cover into place.



Guide the shift lever through the cover.



Fit the posts at the rear of the cover into the holes in the frame.



Install the two trim clips at the front of the center cover cover.



Fit the shift knob into place.



Install the gearshift lever knob bolt and tighten it securely with a 4 mm Allen.

Install the seats. See the [Seat](#) topic for more information.

Drive Selector

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the seats. See the [Seat](#) topic for more information.



Remove the gearshift lever knob bolt with a 4 mm Allen, and lift off the knob.

Remove the center cover. See the [Center Cover](#) topic for more information.



Hold the drive selector rod bolt with a wrench and remove the nut with a socket.



Remove the two drive selector mounting bolts. Remove the drive selector assembly and rod.

To remove the internal gearshift components see the [Transmission Removal](#) topic.

Bracket



Remove the bolts from the bracket.



Remove the bracket.

Installation

Bracket



Install the bracket.



Install the bracket bolts and tighten them securely.

Drive Selector



Install the drive selector assembly. Install the two drive selector mounting bolts and tighten them securely.



Install the bolt and nut onto the drive selector rod and tighten securely.

Install the center cover. See the [Center Cover](#) topic for more information.



Fit the shift knob into place.



Install the gearshift lever knob bolt and tighten it securely with a 4 mm Allen.

Install the seat. See the [Seat](#) topic for more information.

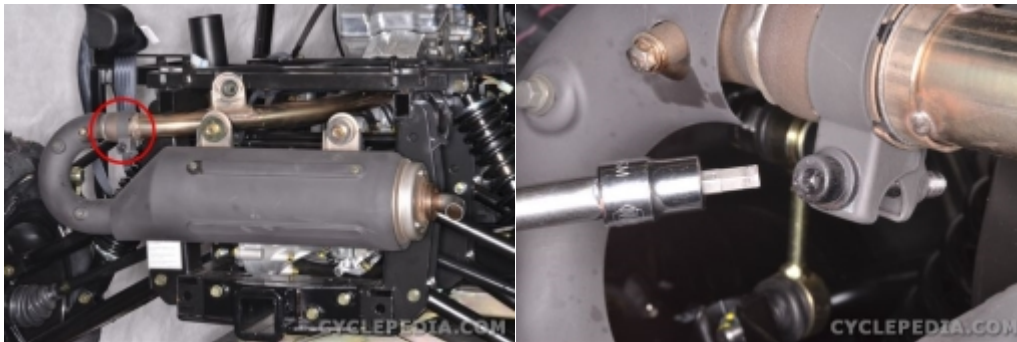
Exhaust System

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Always allow the exhaust system plenty of time to cool before touching it.

Removal

Muffler



Loosen the muffler clamp pipe with a 6 mm Allen socket.





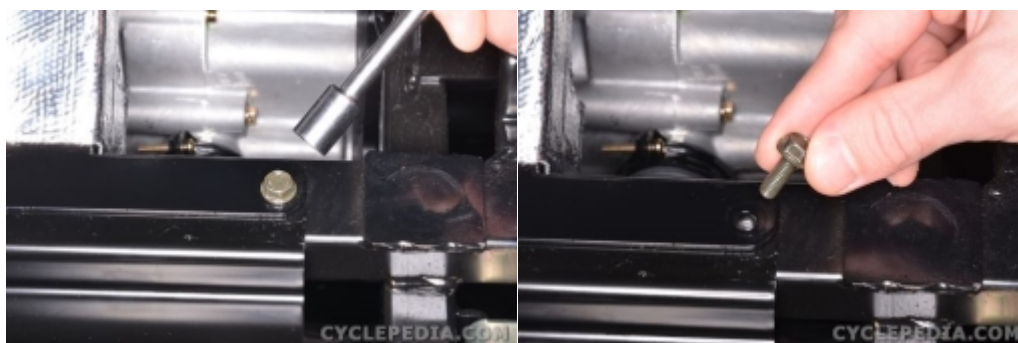
Remove the two muffler mounting bolts and washers with a 14 mm socket.



Slide off the muffler and gasket.

Exhaust Pipe

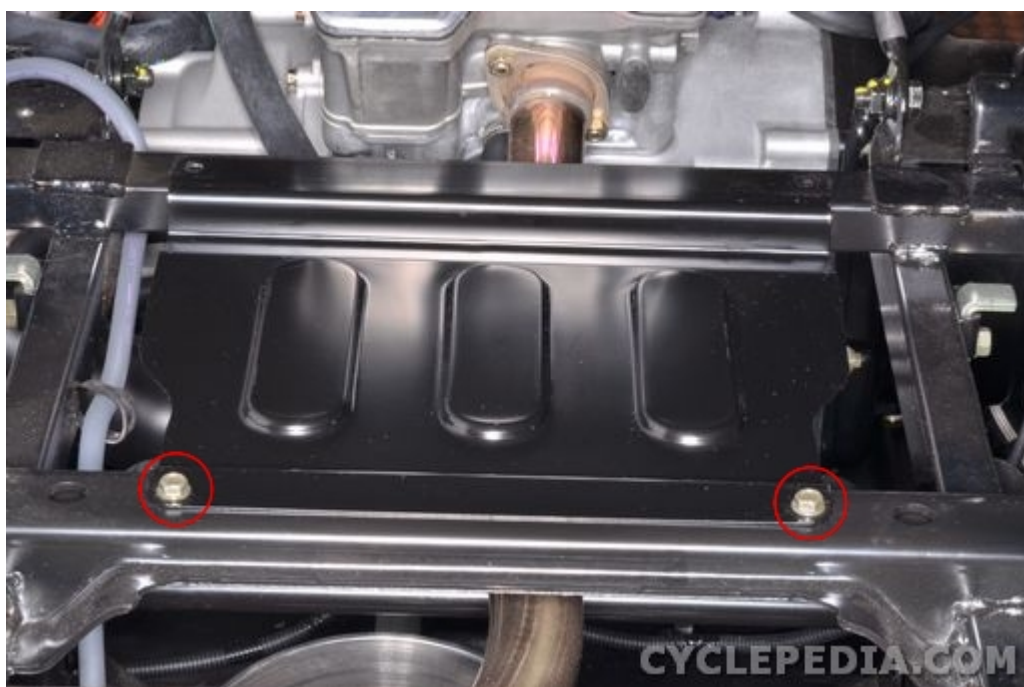
Remove the center cover. See the [Center Cover](#) topic for more information



Remove the heat shield panel bolts with a 14 mm socket.



Remove the heat shield panel.



Remove the floor panel bolts with a 14 mm socket.



Remove the floor panel.





Remove the exhaust pipe mounting nut with a 14 mm socket.



Remove the two header pipe joint nuts with a 12 mm socket.



Remove the header pipe.



Remove the exhaust gasket from the cylinder head.

Installation

Exhaust Pipe



Install a new exhaust gasket into the exhaust port. A small dab of grease will help hold it in place, just be aware that it will smoke and burn off when the engine is started.



Fit the header pipe into place.



Thread on the header pipe joint nuts. Tighten them securely with a 12 mm socket.

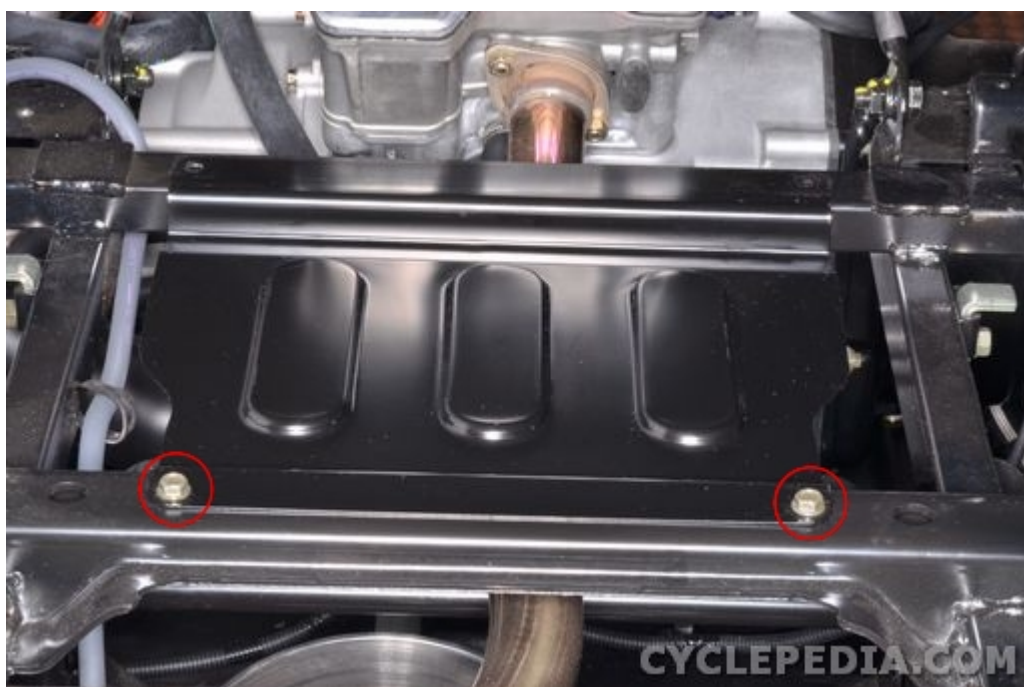


Install the exhaust pipe mounting nut and tighten it to specification with a 14 mm socket.

Item	N-m	kgf-m	ft-lb
Exhaust pipe mounting bolt	35	3.5	26



Install the floor panel.



Install the floor panel bolts and tighten them securely with a 14 mm socket.



Install the heat shield panel.





Install the heat shield panel bolts and tighten them securely with a 14 mm socket.

Install the center cover. See the [Center Cover](#) topic for more information

Muffler



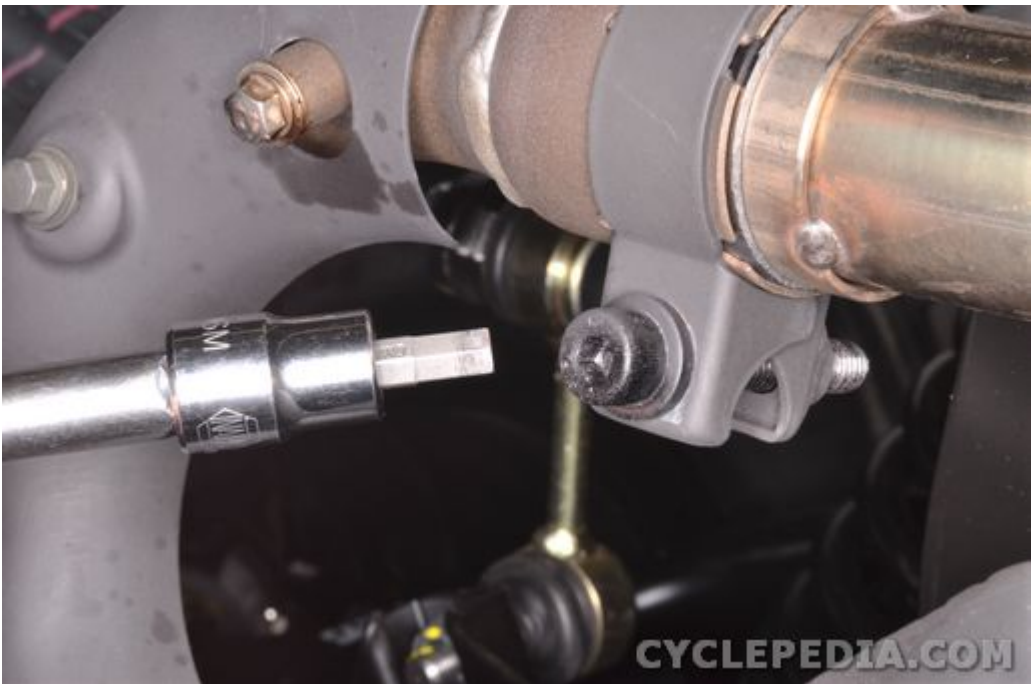
Slide on the muffler and gasket.





Install the two muffler mounting bolts and washers. Tighten them to specification with a 14 mm socket.

Item	N-m	kgf-m	ft-lb
Exhaust muffler mounting bolt	35	3.5	26



Tighten the muffler clamp pipe bolt to specification with a 6 mm socket.

Item	N-m	kgf-m	ft-lb
Muffler clamp pipe bolt	21	2.1	15

Frame Covers

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the side covers. See the [Side Covers](#) topic for more information.

Remove the seat/s. See the [Seat](#) topic for more information.

Under Seat Frame Covers



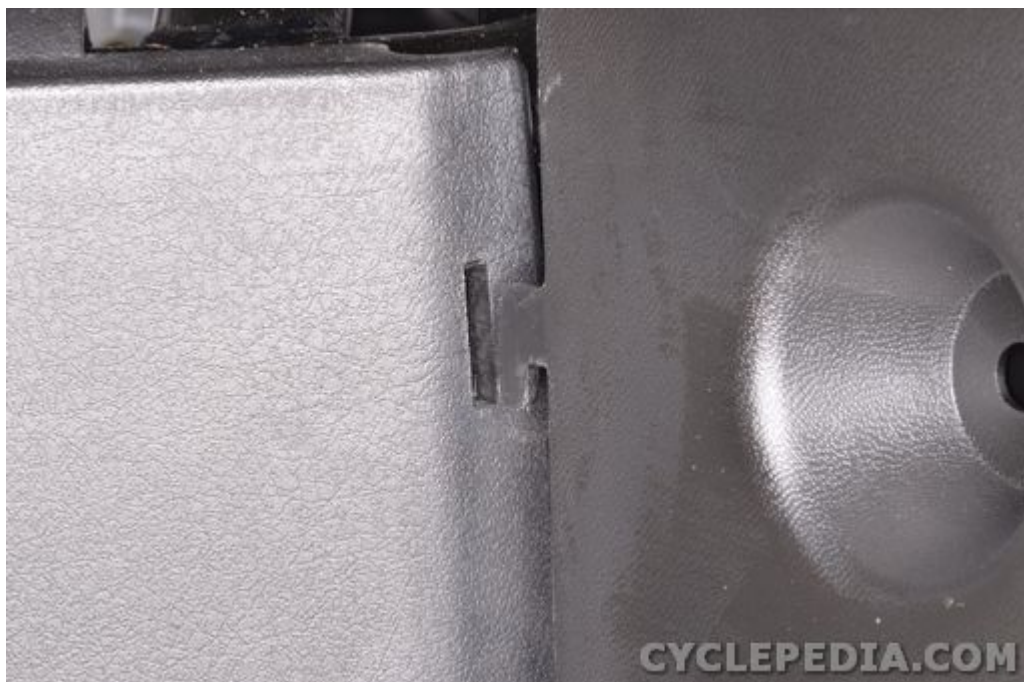
Remove the under seat frame cover trim clips with a #2 Phillips screwdriver.



Remove the under seat frame cover.



Remove the tank cover screws with a Phillips screwdriver.



Lift up on the under seat frame cover to free the tabs from the tunnel cover.



Remove the under seat frame cover. Remove the right and left under seat frame covers in the same manner.

Behind the Seat Frame Covers

Right



The right behind the seat frame cover is held in place by one bolt and four trim clips.



Remove the bolt with a 10 mm socket.



Remove the two bottom trim clips with a #2 Phillips screwdriver.



Remove the two inner trim clips with a #2 Phillips screwdriver.



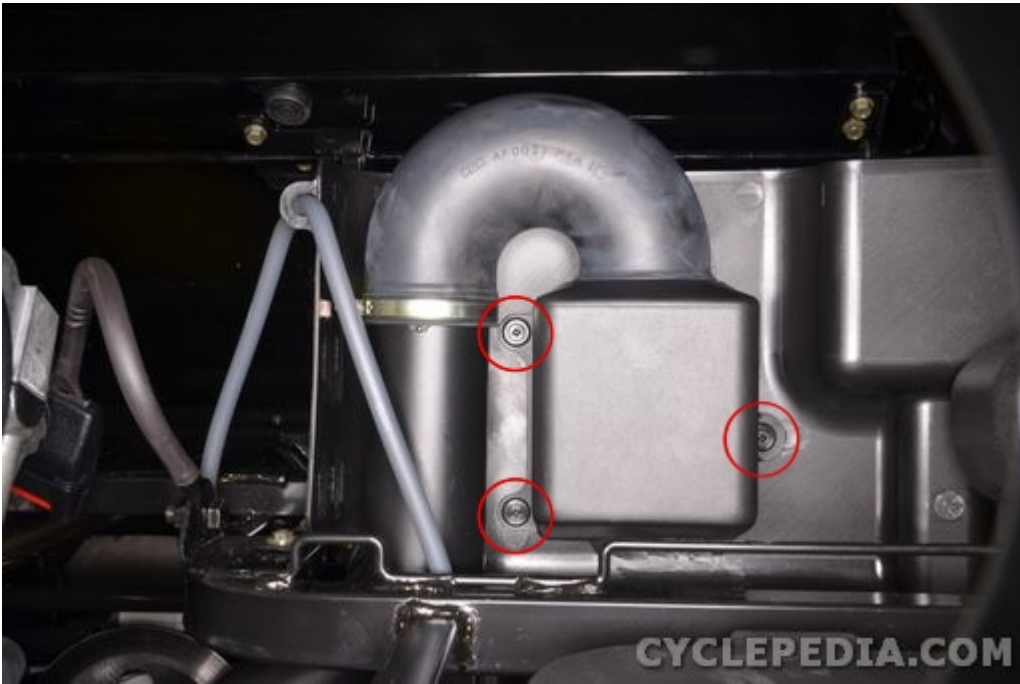
Move the right behind the seat frame cover back and remove it from the vehicle.

Left



Free the final drive gear hose from the frame cover.

The left behind the seat frame cover is held in place by seven trim clips and a bolt.



The left behind the seat frame cover is attached to the CVT cooling duct. Remove the three trim clip fasteners with a #2 Phillips screwdriver.



Remove the two inner and two lower trim clips with a #2 Phillips screwdriver.



Remove the bolt with a 10 mm socket.



Lift out the left behind the seat frame cover.

Installation

Left



Fit the left behind the seat frame cover into place.



Install the two inner and two lower trim clips with a #2 Phillips screwdriver.



Install the three CVT cooling duct trim clip fasteners with a #2 Phillips screwdriver.



Install the bolt and tighten it securely with a 10 mm socket.



Route the final gear case breather hose through its guide on the cover.

Right



Fit the right behind the seat frame cover into place.



Install the two inner trim clips with a #2 Phillips screwdriver.



Install the two bottom trim clips with a #2 Phillips screwdriver.



Install the bolt and tighten it securely with a 10 mm socket.

Install the side covers. See the [Side Covers](#) topic for more information.

Install the seat/s. See the [Seat](#) topic for more information.

Front Bumper

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Front Bumper Cover



The front bumper cover is held on with four mounting bolts.



Remove the four front bumper cover bolts with a 10 mm socket.



Remove the front bumper cover.

Front Bumper



On the winch equipped LE models disconnect the winch leads.



The front bumper is mounted to the frame with four bolts and nuts on the inside of the frame rail.



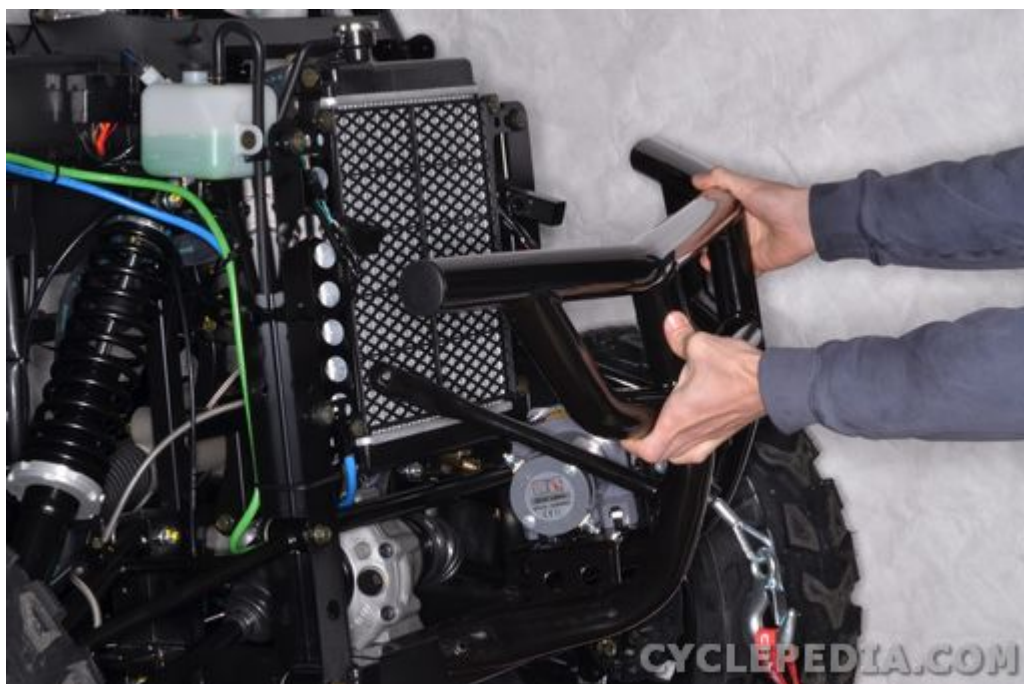
Support the front bumper. Remove the nuts and bolts with a 14 mm socket.



Remove the front bumper from the frame.

Installation

Front Bumper

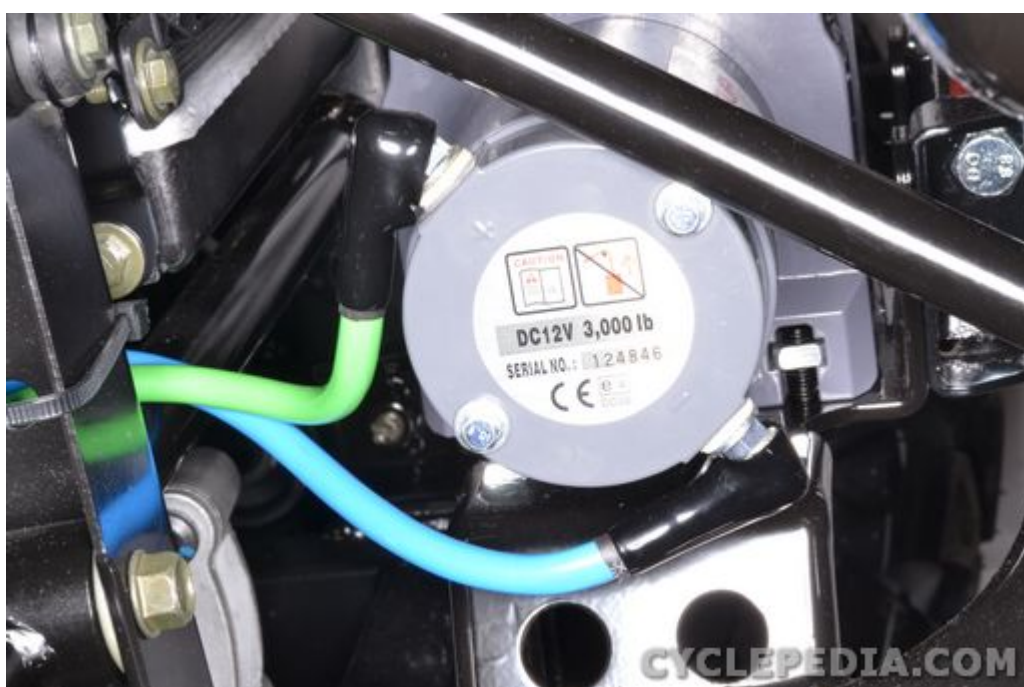


Fit the front bumper into place.





Install the four front bumper mounting nuts and bolts. Tighten them securely with a 14 mm socket.



Connect the leads to the winch on the LE models.

Front Bumper Cover



Fit the front bumper cover into place. If there is a winch make sure to position the end of the cable as shown.



Install the four front bumper cover mounting bolts and tighten them securely with a 10 mm socket.

Headlight

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Bulb Replacement

See the [Lights](#) topic.

Adjustment



Turn on the headlight switch. Adjust the headlight aim by turning the headlight aim adjustment screws with a #2 Phillips screwdriver or an 8 mm socket.

Removal

To replace the headlight bulb see the [Lights](#) topic for more information.

Remove the hood. See the [Hood](#) topic for more information.



Disconnect the headlight connectors if necessary.



Remove the headlight assembly mounting bolts with a socket.



Remove the headlight assembly mounting screw with a #2 Phillips.



Remove the headlight assembly.

Installation



Install the headlight assembly.



Install the headlight assembly mounting screw and tighten them securely with a #2 Phillips.



Install the headlight assembly mounting bolts and tighten securely with a socket.



Connect the headlight connectors if they were unplugged.
Install the hood. See the [Hood](#) topic for more information.

Hood

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Lift



There is a rubber retaining strap on each side of the hood.



Free the retaining straps from each side.



Lift up on the back of the hood and free the hood post from the grommet. Pivot the hood forward.

Removal



Unplug the headlight connectors.



Remove the cotter pins and washers from the hood pivot pins.



Slide the hood pivot pins out



Lift off the hood.



To remove the pivot bracket take out the three bolts and washers with a 10 mm socket.

To remove the headlights see the [Headlight](#) topic.

Front Cargo Box



There are four bolts that hold the front cargo box in place.



Remove the four front cargo box bolts with a 10 mm socket.



Lift out the front cargo box.

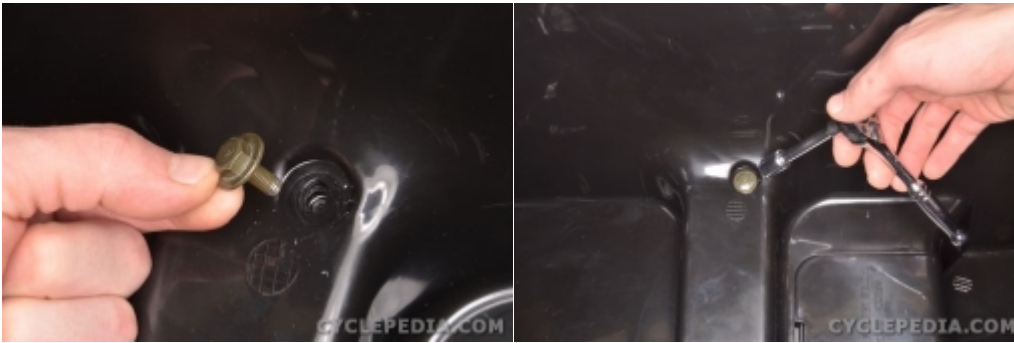
Installation

Front Cargo Box



Fit the front cargo box into place.





Install the four front cargo box bolts and tighten them securely with a 10 mm socket.

Hood



Fit the pivot bracket onto the hood. Install the three bolts and washers. Tighten the three bolts securely with a 10 mm socket.



Position the hood in place. Line up the pivot bracket with the frame.



Insert the pivot pins from the outside.



Install the washer on the inside of the pivot pin. Secure the washer and pin with a new cotter pin.



Plug in the two headlight connectors.



Close the hood and guide the pin into the grommet.



Guide the tabs on the side of the hood into place.



Secure the hood with the rubber retaining straps on each side.

Instrument Cover

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Lift the hood. See the [Hood](#) topic for more information.

Remove the steering wheel. See the [Steering Wheel](#) topic for more information.

Remove the seats. See the [Seat](#) topic for more information.

Remove the center cover. See the [Center Cover](#) topic for more information.

Remove the frame covers. See the [Frame Covers](#) topic for more information.

Remove the floor covers. See the [Floor Covers](#) topic for more information.



Remove the four mounting bolts with a 10 mm socket.



Disconnect the remote winch switch.



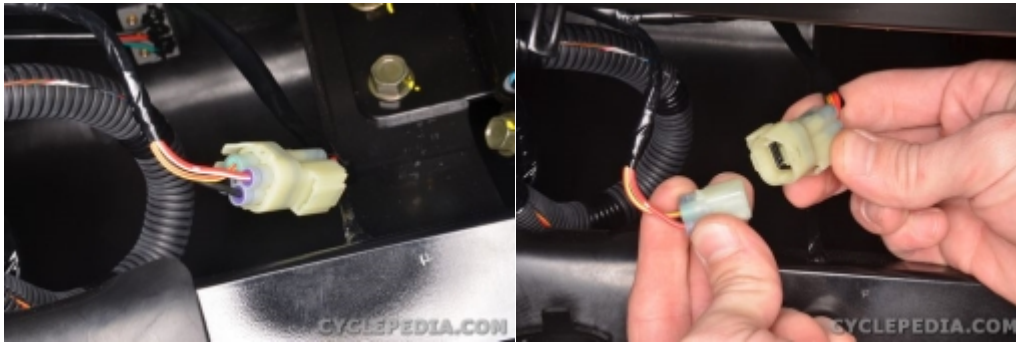
Disconnect the 12 volt accessory leads.



Disconnect the regulator winch switch.



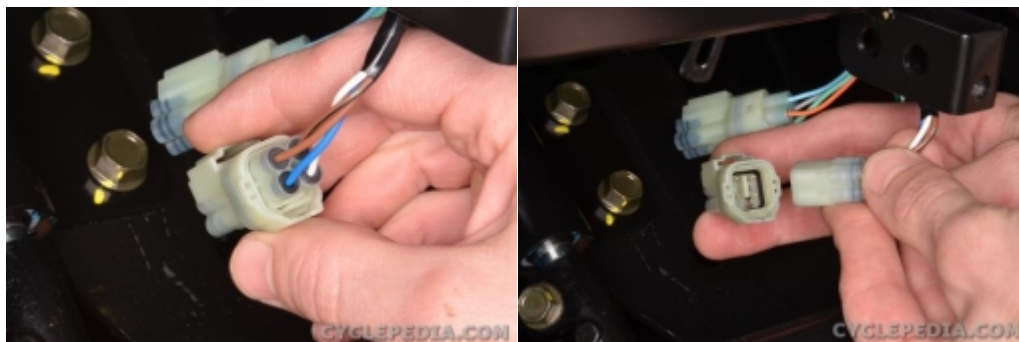
Disconnect the display meter harness.



Disconnect the ignition switch.



Remove the nut from the "DIFF LOCK" lever. Leave the lever as shown.



Disconnect the dimmer switch.



Disconnect the 2WD/4WD switch.



Remove the instrument cover.



Remove the fasteners to separate the dash from the instrument panel.

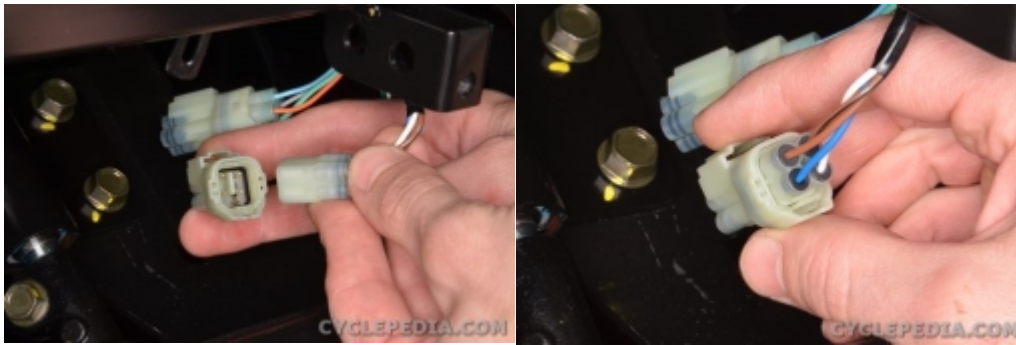
Installation



Install the instrument cover.



Connect the 2wd/4wd switch.



Connect the dimmer switch.



Install the nut onto the "DIFF LOCK" lever. Adjust if necessary. See the [Front Differential Removal and Installation](#) topic for more information.



Connect the ignition switch.



Connect the display meter harness.



Connect the regulator winch switch.



Connect the 12 volt accessory leads.



Connect the remote winch switch.



Install the four mounting bolts and tighten securely with a 10 mm socket.

Install the floor covers. See the [Floor Covers](#) topic for more information.

Install the frame covers. See the [Frame Covers](#) topic for more information.

Install the center cover. See the [Center Cover](#) topic for more information.

Install the seats. See the [Seat](#) topic for more information.

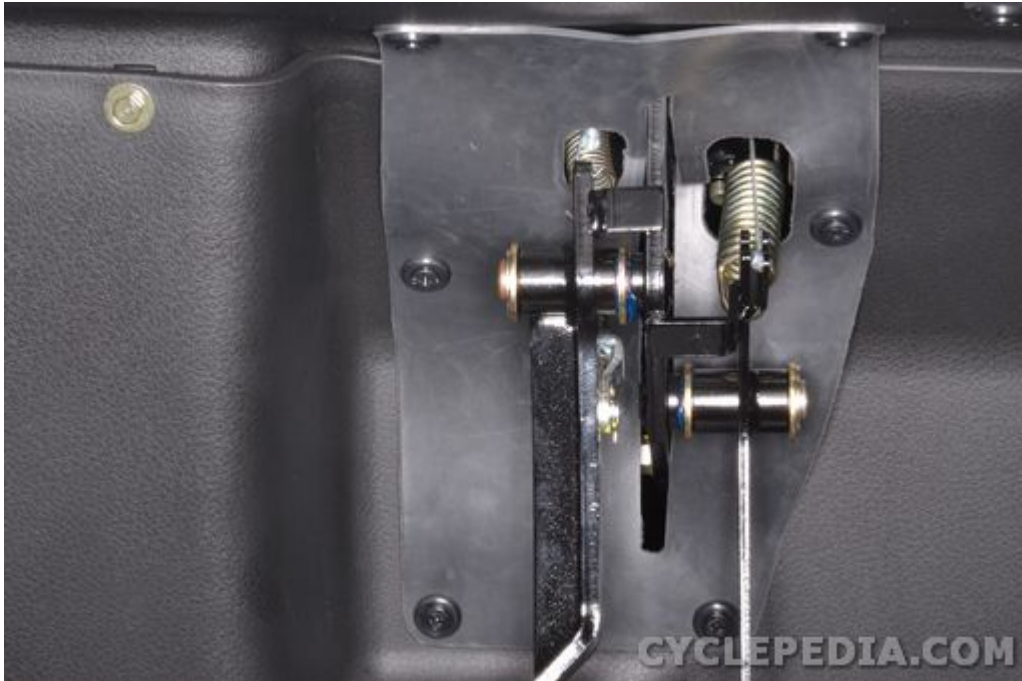
Install the steering wheel. See the [Steering Wheel](#) topic for more information.

Close the hood. See the [Hood](#) topic for more information.

Pedal Cover

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal



Use a #2 Phillips screwdriver to push in the center of the push pin until it pops up.



Remove the push pins.



Remove the pedal cover.

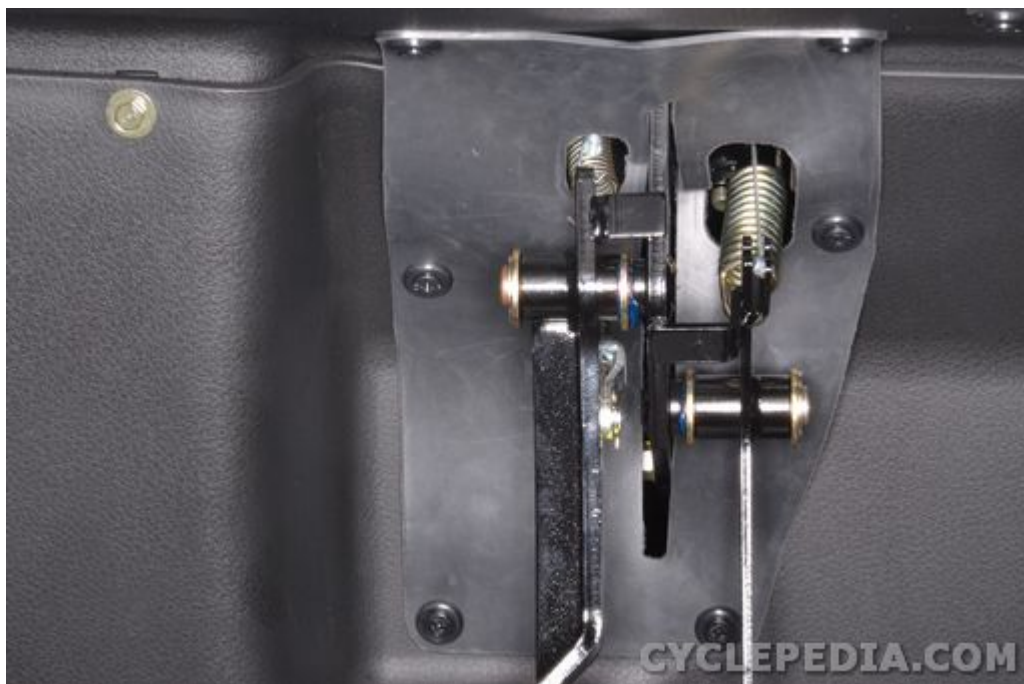
Installation



Install the pedal cover.



Install the push pins.



Use a #2 Phillips screwdriver to push in the center of the push pin until it locks.

Rear Fenders

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Fender Removal



The rear fenders mount to the sides of the cargo bed.



Unplug the taillight connectors. There is one for each side.



Loosen the nuts and bolts with a 10 mm socket. Remove the nuts, washers, bolts, and tie-down anchors.



Remove the trim clips from the top of the rear fender.



Remove the bottom trim clip.



Lift off the rear fender and make sure it clears the latch handle.

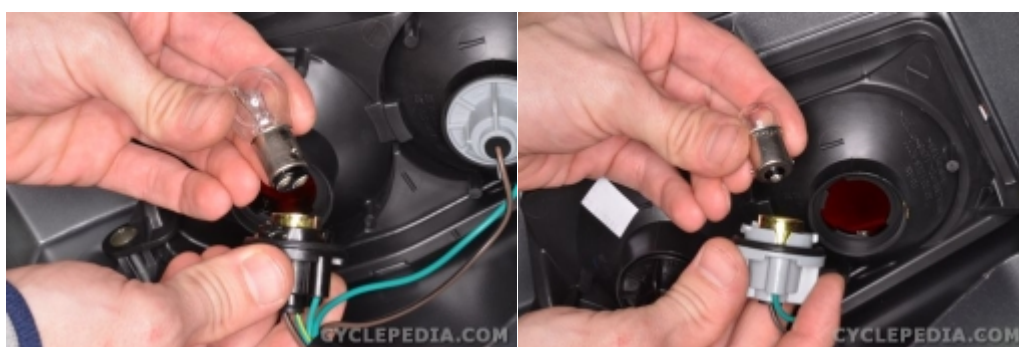
Taillights

Bulb Replacement





Turn the bulb sockets and free them from the housing.



Push in and turn counterclockwise to release the bulbs. Replace the bulbs as needed.



Insert the bulb sockets with the tabs aligned with the cutouts and rotate them to lock them into place.

Removal



Remove the three taillight mounting screws with a #2 Phillips screwdriver.



Remove the taillight from the inside of the fender.

Installation



Fit the taillight into the rear fender from inside the rear fender.



Install the taillight mounting screws and tighten them securely with a #2 Phillips screwdriver.

Fender Installation



Fit the rear fender/s into place.



Install the bottom trim clip.



Install the top trim clips.



Fit the tie-down anchors into place.



Install the bolts, washers, and nuts. Tighten the fasteners securely with a 10 mm socket.



Plug in the taillight connectors. There is one for each side.

Seat

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal



The release lever for the seat is located under the front of the seat.



Pull up on the seat release and lift up on the front of the seat.



Move the seat forward and free the three tabs from the bar on the frame. Lift out the seat.

Installation



Fit the seat into place. Slide the three tabs on the back of the seat under the bar on the frame.



Guide the latch onto the pin. Push down on the front of the seat so that the latch closes securely.

Side Covers

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

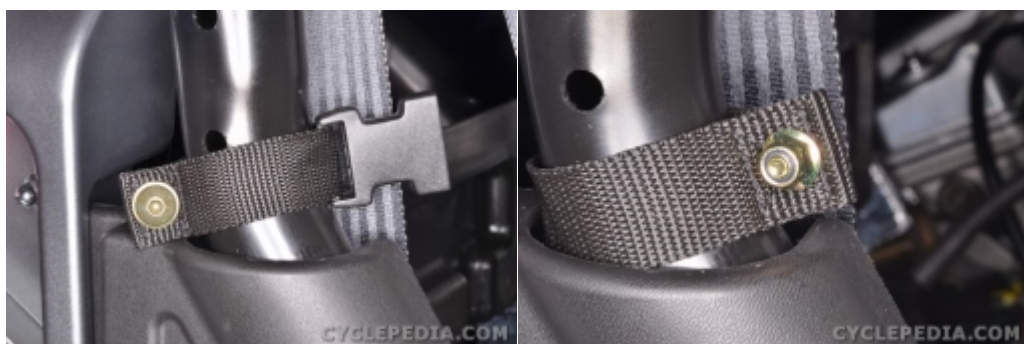
Net Doors



Disconnect the net door clips and free the Velcro strips.



Remove the two upper and two lower net door bolts with a 10 mm socket.



Hold the rear clip strap bolt with an Allen and loosen the nut. Remove the rear clip strap.



Remove the three front clip strap bolts with a 10 mm socket. Remove the front clips strap.

Lower Side Covers



Remove the three lower side cover bolts with a 10 mm socket. Note: two of the bolts should already be removed with the net doors.



Free the lower side cover tabs and remove the lower side covers.

Front Side Covers



Each side cover is held on by 5 bolts and a trim clips. The four lower bolts should be already be removed when taking off the net doors and lower side covers.



Remove the trim clip. Remove the upper bolt with a 10 mm socket.

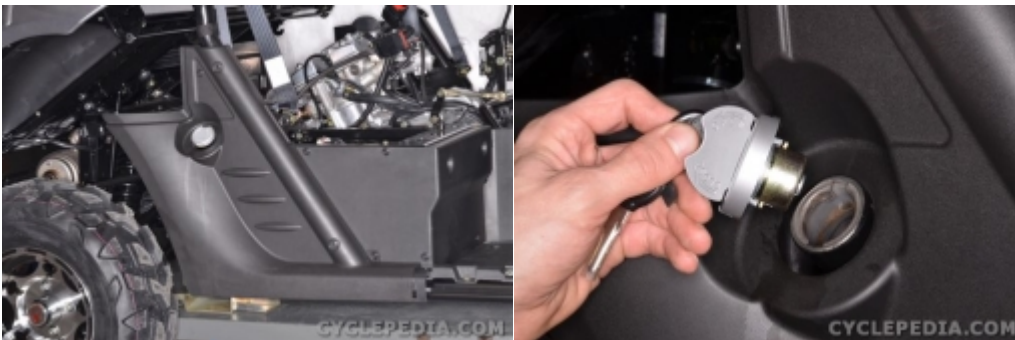


Remove the front side covers.

Rear Side Covers



The rear side covers are held on by six trim clips and three bolts. The bolts should be already be removed when taking off the net doors and lower side covers.



Temporarily remove the gas cap when removing the right rear side cover.



Remove the two rear trim clips.



Remove the two lower trim clips.



Remove the two side trim clips.



Remove the rear side covers.

Install the gas cap.

Installation

Rear Side Covers

Temporarily remove the gas cap when installing the right rear side cover.



Fit the rear side cover into place.



Install the two side trim clips.



Install the two lower trim clips.



Install the gas cap on the right side.

Front Side Covers



Fit the front side cover into place.



Install the upper bolt and trim clip. Tighten the bolts securely with a 10 mm socket.

Lower Side covers



Fit the lower side cover into place.



Guide the tabs on each end of the lower side cover into the front and rear side covers. Install the rear side cover bolt and tighten it to specification with a 10 mm socket. Install the other two bolts with the net doors.

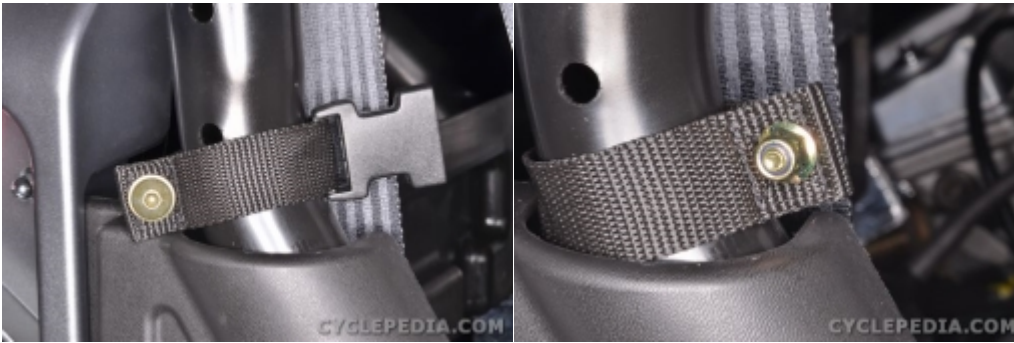
Net Doors



Install the front clips strap. Insert the three front clip strap bolts and tighten them securely with a 10 mm socket.



Install the two lower net door bolts and tighten them securely with a 10 mm socket.



Install the rear clip strap. Hold the rear clip strap bolt with an Allen and tighten the nut securely.



Fasten the net door clips and Velcro strips.

Skid Plates

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Rear Skid plate



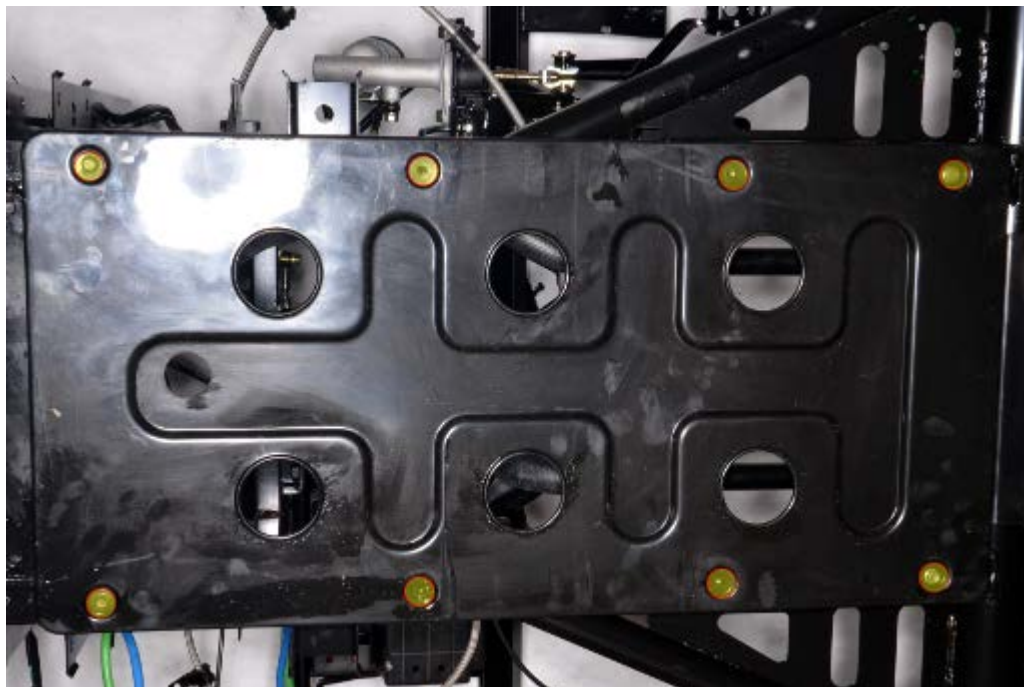
Remove the four bolts from the rear skid plate with a 10 mm socket. Free the tabs from the center skid plate by sliding the rear skid plate back. Remove the rear skid plate.

Center Skid Plate



Remove the 10 center skid plate bolts with a 10 mm socket. Slide the center skid plate back and free it from the front skid plate. Remove the center skid plate.

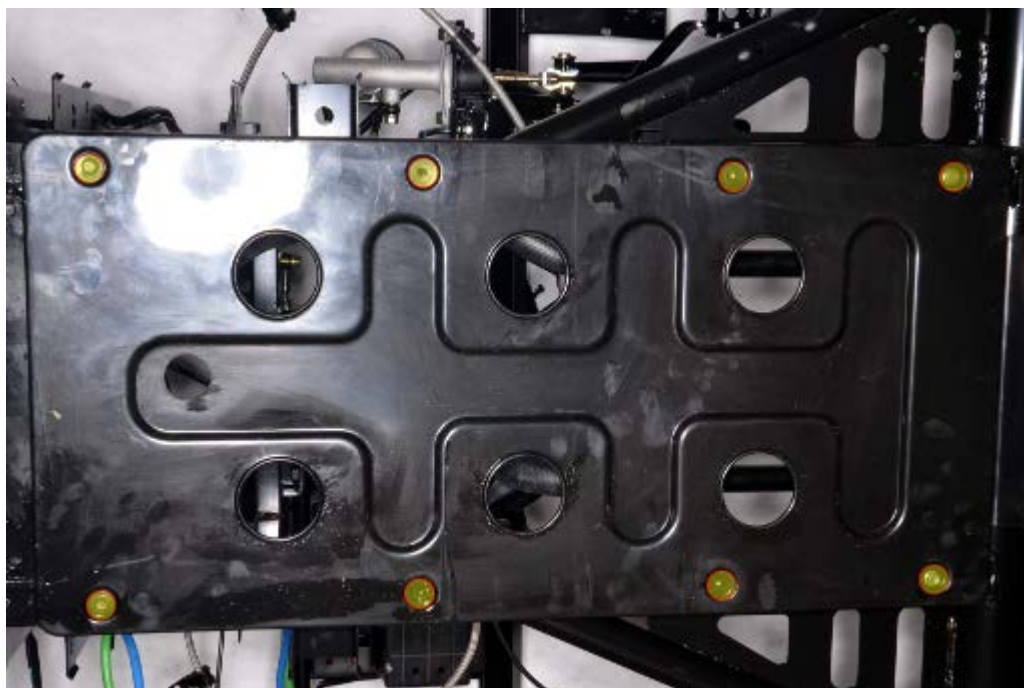
Front Skid Plate



Remove the eight front skid plate bolts with a 10 mm socket. Move the front skid plate forward and remove it.

Installation

Front Skid Plate



Fit the front skid plate into place. Install the eight bolts and tighten them securely with a 10 mm socket.

Center Skid Plate



Set the center skid plate into place. Install the eight outer bolts and tighten them securely. Wait to install the two rear bolts with the rear skid plate.

Rear Skid plate



Install the rear skid plate so that its tabs engage with the center skid plate. Install the four bolts and tighten them securely with a 10 mm socket.

5.Engine UXV 500i

This chapter covers the location and servicing of the engine components.

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12.Generator	5-145
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GENERAL INSTRUCTIONS

Lubrication System

The maintenance of lubrication system can be performed with the engine installed in the frame. Use care when removing and installing the oil pump not to allow dust and foreign matters to enter the engine

If any portion of the oil pump is worn beyond the specified service limits. replace the oil pump as an assembly. After the engine has been installed check that there are no oil leaks and that oil pressure is correct.

[Lubrication System Diagram](#)

TROUBLESHOOTING

Oil level too low

- Natural oil consumption
- Oil leaks
- Worn or poorly installed piston rings
- Worn valve guide or seal

Oil contamination (White appearance)

- From coolant mixing with oil
- Faulty water pump mechanical seal
- Faulty head gasket
- Water leak in crankcase

No oil pressure

- Oil level too low
- Oil pump drive chain broken
- Oil pump drive sprocket broken
- Oil pump damaged (pump shaft)
- Internal oil leak

Low oil pressure

- Pressure relief valve stuck open
- Clogged oil filter and strainer screen
- Oil pump worn or damaged
- Internal oil leak
- Incorrect oil being used
- Oil level too low

High oil pressure

- Pressure relief valve stuck closed
- Plugged oil filter, gallery, or metering orifice
- Faulty oil pump

Seized engine

- No or low oil pressure
- Clogged oil orifice/passage
- Internal oil leak
- Non-recommended oil used

Oil contamination

- Deteriorated oil
- Faulty oil filter
- Worn piston ring (White appearance with water or moisture)
- Damaged water pump mechanical seal
- Damaged head gasket
- Oil relief not frequent enough

Cylinder Head, Camshaft, and Valves

- The cylinder head can be serviced with the engine installed in the frame. Coolant in the radiator and water jacket must be drained.
- When assembling, apply molybdenum disulfide grease or engine oil to the valve guide, movable parts, and valve arm sliding surfaces for initial lubrication.
- The valve rocker arms are lubricated by engine oil through the engine oil passages. Clean and unclog the oil passages before assembling the cylinder head.
- After disassembly, clean the removed parts and dry them with compressed air before inspection.
- After removal, mark and arrange the removed parts in order. When assembling, install them in the reverse order of removal. The remove components should be returned to their original positions.

TROUBLESHOOTING

- The poor cylinder head operation can be diagnosed by a compression test or by tracing engine top-end noises.

Poor performance at idle speed

- Compression too low

Compression too low

- Incorrect valve clearance adjustment
- Burned or bent valves
- Incorrect valve timing
- Broken valve spring
- Poor valve and seat contact
- Leaking cylinder head gasket
- Warped or cracked cylinder head
- Poorly installed spark plug

Compression too high

- Excessive carbon build-up in combustion chamber

Abnormal noise

- Incorrect valve clearance adjustment
- Sticking valve or broken valve spring
- Damaged or worn camshaft
- Worn cam chain tensioner
- Worn camshaft and rocker arm

White smoke from exhaust muffler

- Worn valve stem or valve guide
- Damaged valve stem oil seal

Cylinder and Piston

- The cylinder and piston can be serviced with the engine installed in the frame.
- After disassembly, clean the removed parts and dry them with compressed air before inspection.
- When installing the cylinder, use a new cylinder gasket and make sure that the dowel pins are correctly installed.

TROUBLESHOOTING

When hard starting or poor performance at low speed occurs, check the crankcase breather for white smoke. If white smoke is found, it means that the piston rings are worn, stuck or broken.

Compression too low or uneven compression

- Worn, stuck or broken piston rings
- Worn or damaged cylinder and piston

Compression too high

- Excessive carbon build-up in combustion chamber or on piston head.

Excessive smoke from exhaust muffler

- Worn or damaged piston rings
- Worn or damaged cylinder and piston

Abnormal noisy piston

- Worn cylinder, piston and piston rings
 - Worn piston pin hole and piston pin
 - Incorrectly installed piston
-

Engine Removal

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Remove the seats. See the [Seat](#) topic for more information.

Remove the center cover. See the [Center Cover](#) topic for more information.

Remove the frame covers. See the [Frame Covers](#) topic for more information.

Drain the engine oil. See the [Engine Oil](#) topic for more information.

Drain the engine coolant. See the [Coolant](#) topic for more information.

Remove the exhaust system. See the [Exhaust System](#) topic for more information.

Remove the airbox. See the [Airbox](#) topic for more information.

Remove the throttle body. See the [Throttle Body Removal and Installation](#) topic for more information.

Remove the oil cooler. See the [Oil Cooler](#) topic for more information.

Remove the CVT cooling ducts. See the [CVT Cooling Ducts](#) topic for more information.

Remove the drive selector and bracket. See the [Drive Selector](#) topic for more information.



Loosen the bypass (smaller) and lower radiator hose (larger) clamp with a #2 Phillips screwdriver. Free the hoses from the water pump.



Push in the spring and unplug the WTS sensor connector.



Squeeze the clamp on the air bleed hose and slide it back. Loosen the thermostat hose clamp with a #2 Phillips screwdriver. Free the air bleed hose and thermostat hose from the WTS housing.



Remove the spark plug cap.



Disconnect the crankcase breather hose from the cylinder head cover.



Pull back the rubber cover from the starter motor terminal. Loosen the starter motor terminal nut with a 10 mm socket and free the lead from the terminal.



Remove the starter motor mounting bolt with the ground wire with an 8 mm socket. Free the ground wire from the engine.



Trace the wires up from the generator cover. Unplug the 2-pin ignition pulse generator / crank position sensor connector.



Unplug the 4-pin stator connector.



Disconnect the gear indicator switch connector.



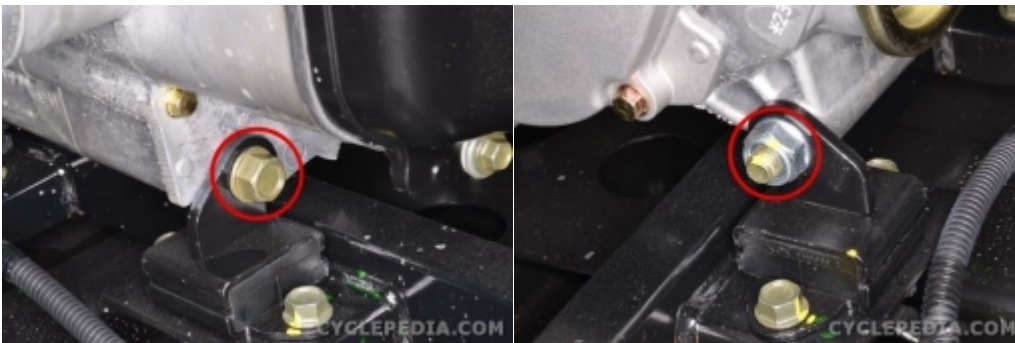
Disconnect the speed sensor connector.



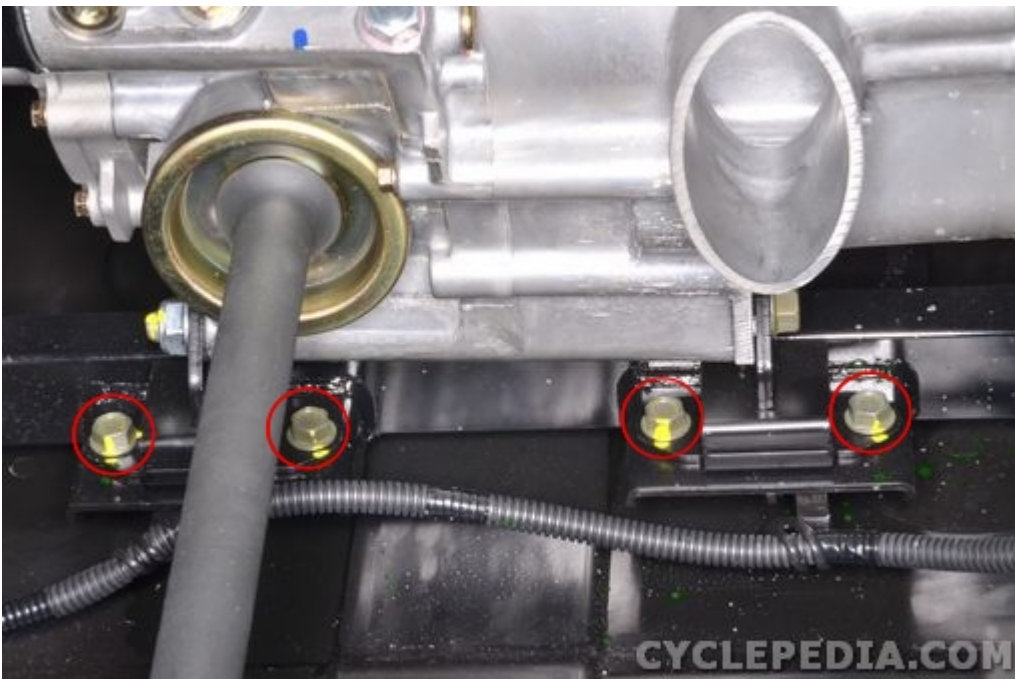
Pull the front propeller shaft away from the engine. Remove the front propeller shaft.



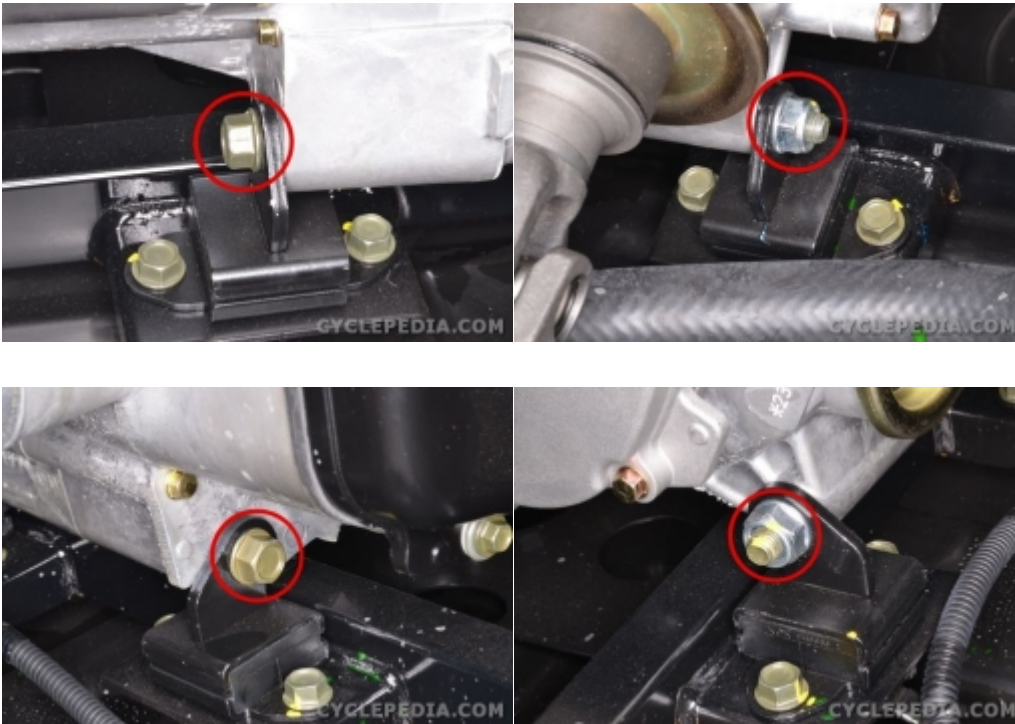
Hold the front engine mounting bolt with a 14 mm wrench. Loosen the front lower engine mounting nut with a 17 mm socket.



Hold the rear engine mounting bolt with a 14 mm wrench. Loosen the rear lower engine mounting nut with a 17 mm socket.



There are two engine hangers on each end of the engine. Loosen the four engine hanger bolts with a 12 mm socket.



Remove the bolts and hangers.



Slide the engine to the front. Remove the rear propeller shaft from the engine.
Note: Take care not to lose the compression spring in the rear drive gear case end.



Secure the engine and lift it out of the frame with a suitable engine hoist or crane. To install the engine. See the [Engine Installation](#) topic for more information.

Engine Installation

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

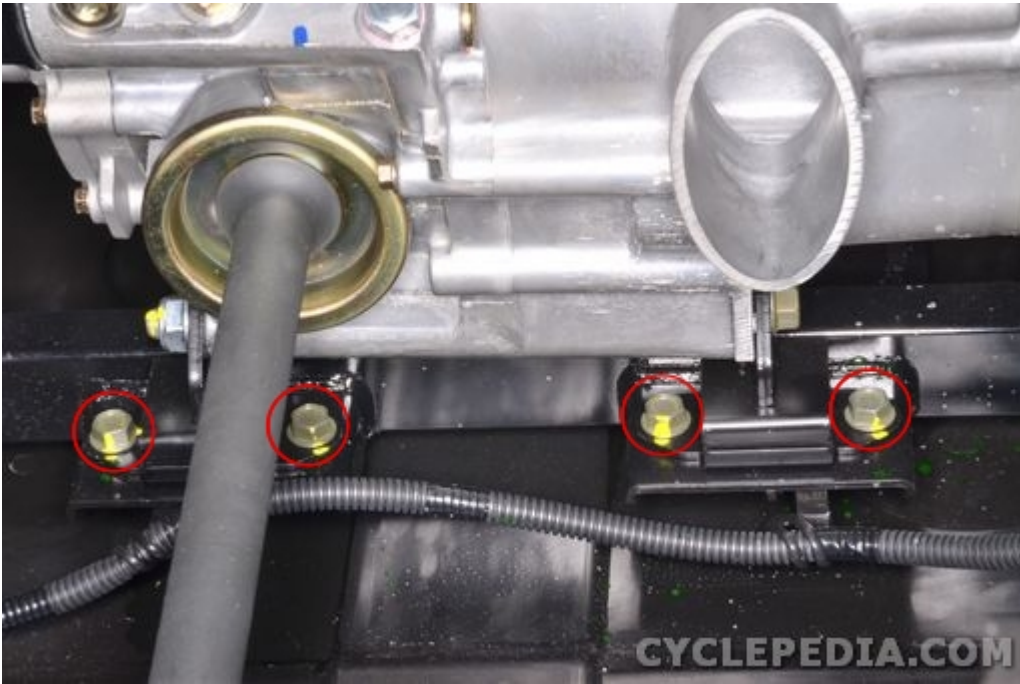
Lubricate the propeller shaft splines with a lightweight lithium-soap based grease.



Secure the engine and lower it into place with a suitable engine hoist or crane.



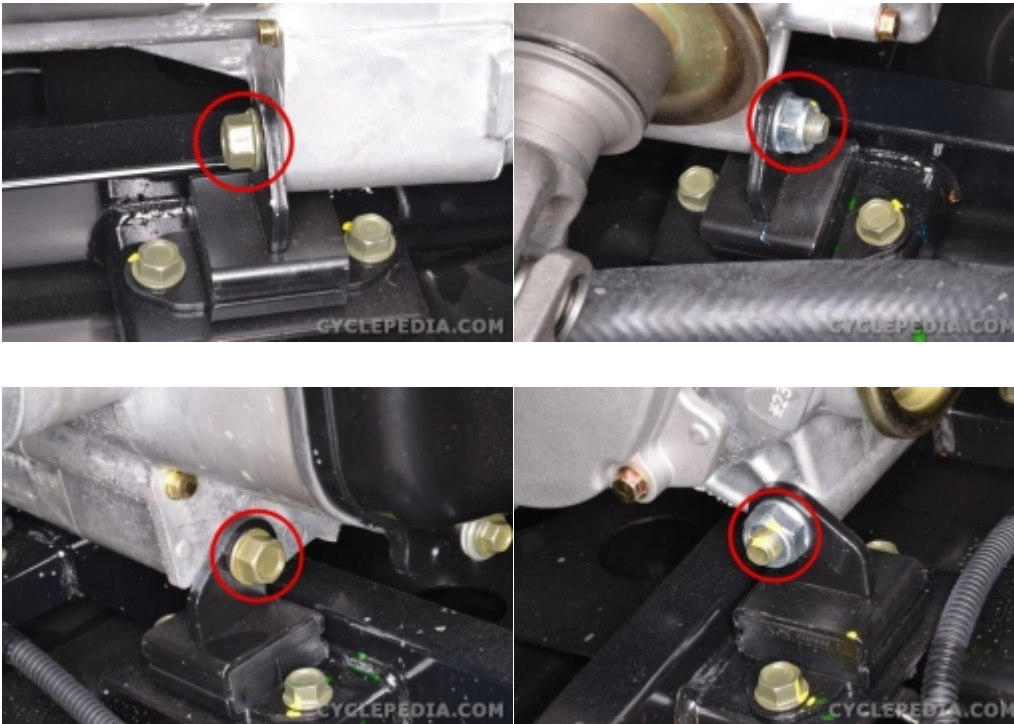
Apply lightweight lithium-soap base grease to the rear propeller shaft splines and output shaft splines. Guide the rear propeller shaft into place. Take up all the slack to allow for the installation of the front propeller shaft.



Install the engine hangers but wait to tighten the bolts. Install the front and rear engine mounting bolts and nuts.

Tighten the eight engine hanger bolts to specification with a 12 mm socket.

ITEM	N-m	kgf-m	ft-lb
Engine hanger bolt	35	3.5	25



Hold the engine mounting bolts with a 14 mm wrench and tighten the engine mounting nuts to specification with a 17 mm socket.

ITEM	N-m	kgf-m	ft-lb
Engine hanger bolt	60	6.0	43.5



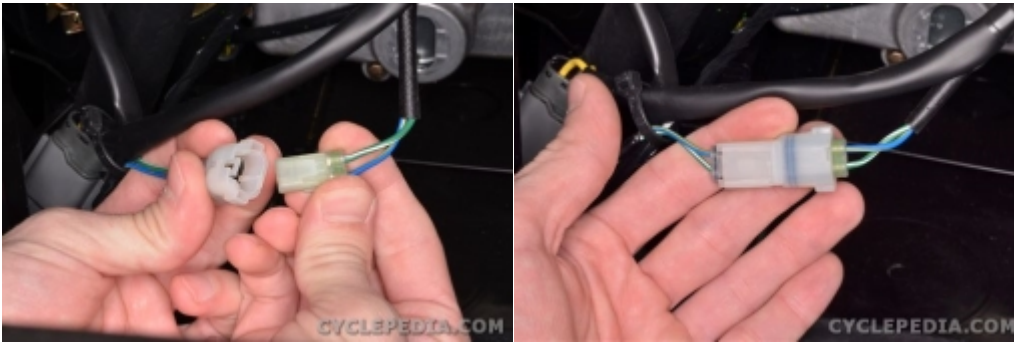
Apply lightweight lithium-soap base grease to the front propeller shaft splines and front output splines. Fit the front propeller shaft into place.



Plug in the speed sensor connector.



Plug in the 4-pin stator connector.



Plug in the 2-pin ignition pulse generator / crank position sensor connector.



Plug in the gear indicator switch connector.



Install the two starter motor mounting bolts and tighten them securely with an 8 mm socket. Be sure to slide the ground lead onto the mounting bolt before inserting it.

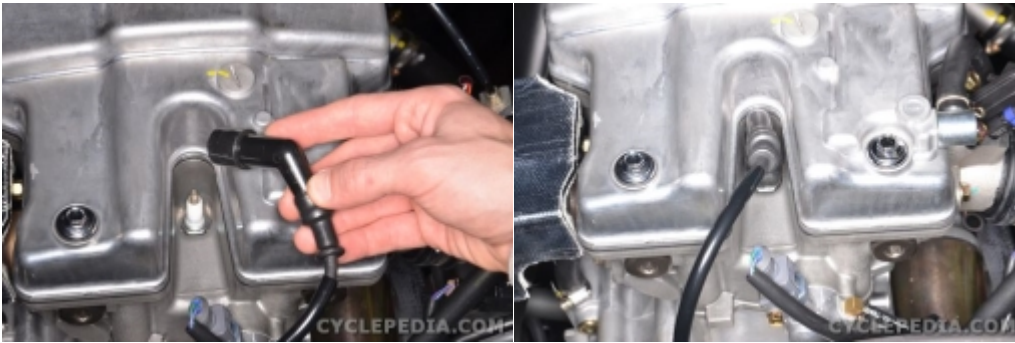


Install the starter motor terminal nut and lead with a 10 mm socket. Tighten the nut securely.

Slide on the rubber cover onto the starter motor terminal.



Connect the crankcase breather hose to the cylinder head cover. Secure the hose with the clamp.



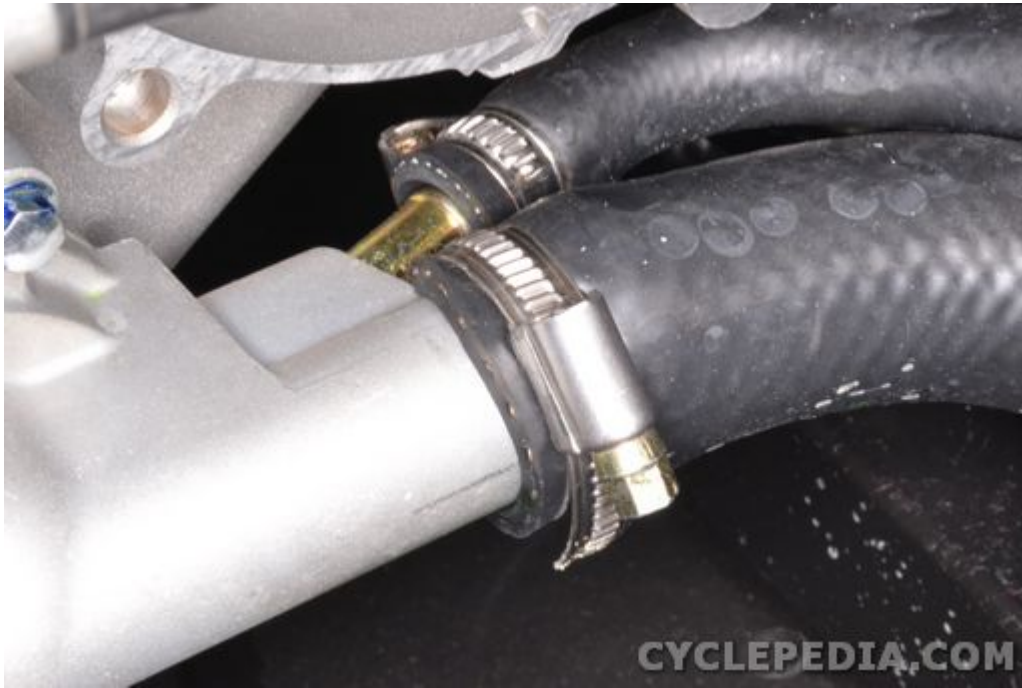
Install the spark plug cap onto the spark plug.



Connect the air bleed hose and thermostat hose to the WTS housing. Secure the hoses with the clamps.



Plug in the WTS sensor connector.



Connect the bypass hose (smaller) and lower radiator hose (larger) to the water pump. Install the clamps. Tighten the clamps securely with a #2 Phillips screwdriver.

Install the following components:

- [Drive Selector](#)
 - [CVT Cooling Ducts](#)
 - [Oil Cooler](#)
 - [Throttle Body Removal and Installation](#)
 - [Airbox](#)
 - [Exhaust System](#)
 - [Engine Oil](#)
 - [Coolant](#)
 - [Frame Covers](#)
 - [Center Cover](#)
 - [Seat](#)
-

Cylinder Head Cover

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the center cover. See the [Center Cover](#) topic for more information.



Disconnect the crankcase breather hose from the cylinder head cover.



Remove the four bolts, washers and rubber grommets with a 10 mm socket.



Remove the cylinder head cover.



Remove the cylinder head cover gasket.

Clean the mating surfaces of the cylinder head and cover.

Disassembly



Remove the three breather separator bolts with a 10 mm socket.



Remove the breather separator.

Assembly



Install the breather separator.



Install the three breather separator bolts and tighten them to specification with a 10 mm socket.

ITEM	N-m	kgf-m	ft-lb
Breather separator bolt	13	1.3	9

Installation



Apply fluid gasket (threebond: 1215) to the mating surface of the cylinder head cover, then install the rubber gasket.



Install the cylinder head cover.



Install the four grommets and washers onto the cylinder head cover. Install the four bolts.



Tighten the cylinder head cover bolts a small amount at a time in a crisscross pattern.
Tighten the bolts to specification with a 10 mm socket.

ITEM	N-m	kgf-m	ft-lb
Cylinder head cover bolt	10	1.0	7.2



Connect the crankcase breather hose to the cylinder head cover. Secure the hose with the clamp.

To remove the camshaft see the [Camshaft](#) topic for more information.

Install the center cover. See the [Center Cover](#) topic for more information.

Camshaft

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

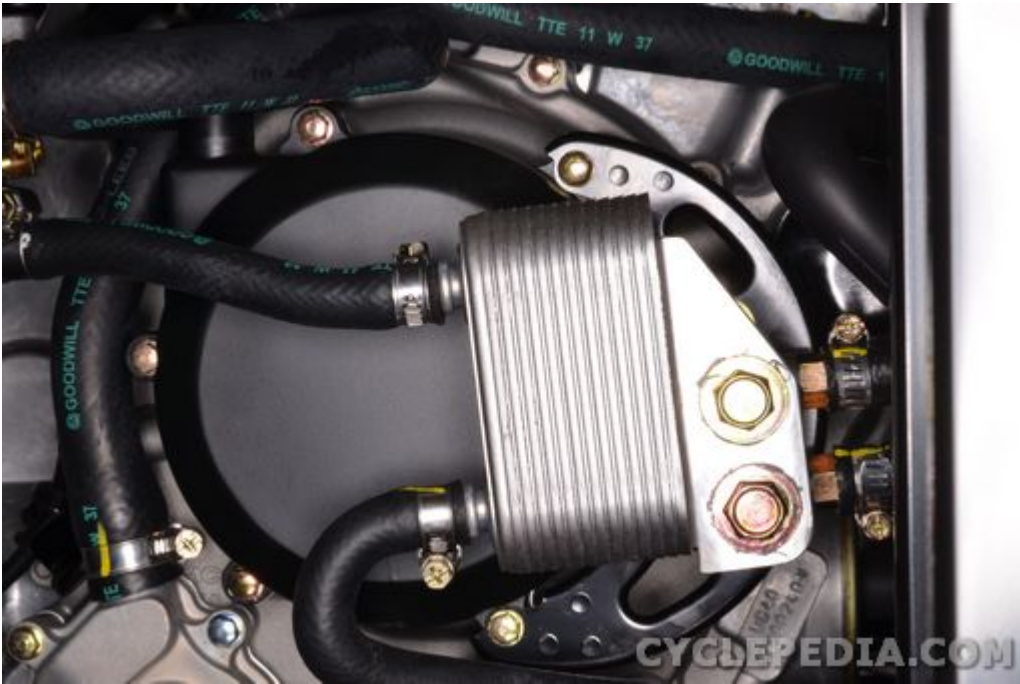
Remove the cylinder head cover. See the [Cylinder Head Cover](#) topic for more information.

Remove the right floor board. See the [Floor Covers](#) topic for more information.

Remove the spark plug. See the [Spark Plug](#) topic for more information.



Remove the timing cap on the right side of the engine with a flat blade screwdriver. Inspect the O-ring and replace it as needed.



Remove the recoil starter cover bolts with an 8 mm socket.



Remove the recoil starter cover.



Turn the crankshaft clockwise with a socket.



Align the "T" mark on the flywheel with the index mark on the right crankcase cover. This shows the piston is at Top Dead Center.



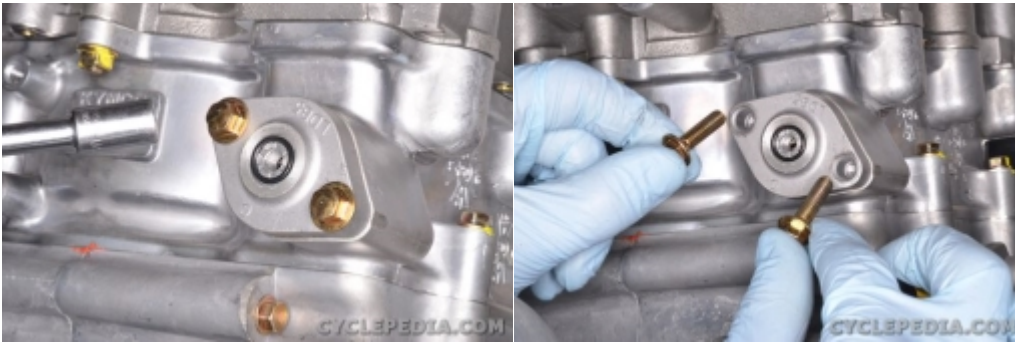
Make sure the punch marks on the ends of the camshafts are pointed up. With the marks pointing up the piston is at TDC on the compression stroke. If the punch marks are not pointing up rotate the crankshaft clockwise until the piston is at TDC on the compression stroke.

Cam Chain Tensioner

Note: Do not remove the cam chain tensioner until the crank and piston have been turned positioned at TDC.



Remove the cam chain tensioner sealing bolt with a 10 mm socket.



Remove the two cam chain tensioner bolts with an 8 mm socket.



Remove the cam chain tensioner and gasket.

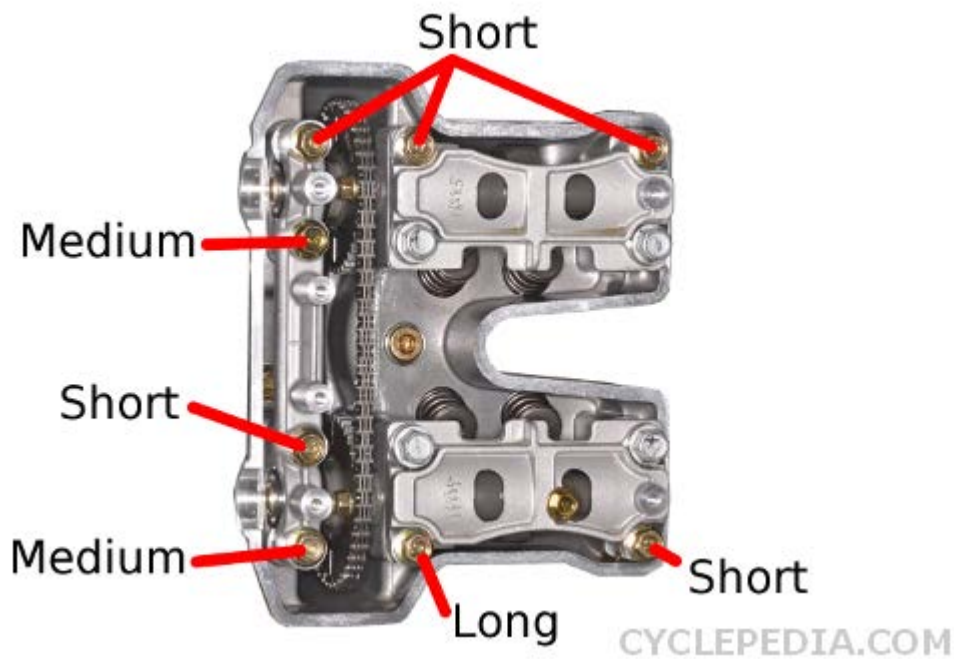
Camshafts



Remove the two cam chain guide bolts with an 8 mm socket.



Remove the cam chain guide.



Loosen the indicated eight camshaft holder bolts a small amount at a time in a crisscross pattern with a 12 mm socket. There are five short bolts, two medium bolts, and one long bolt.



The five short bolts are size 8 X 71 mm.



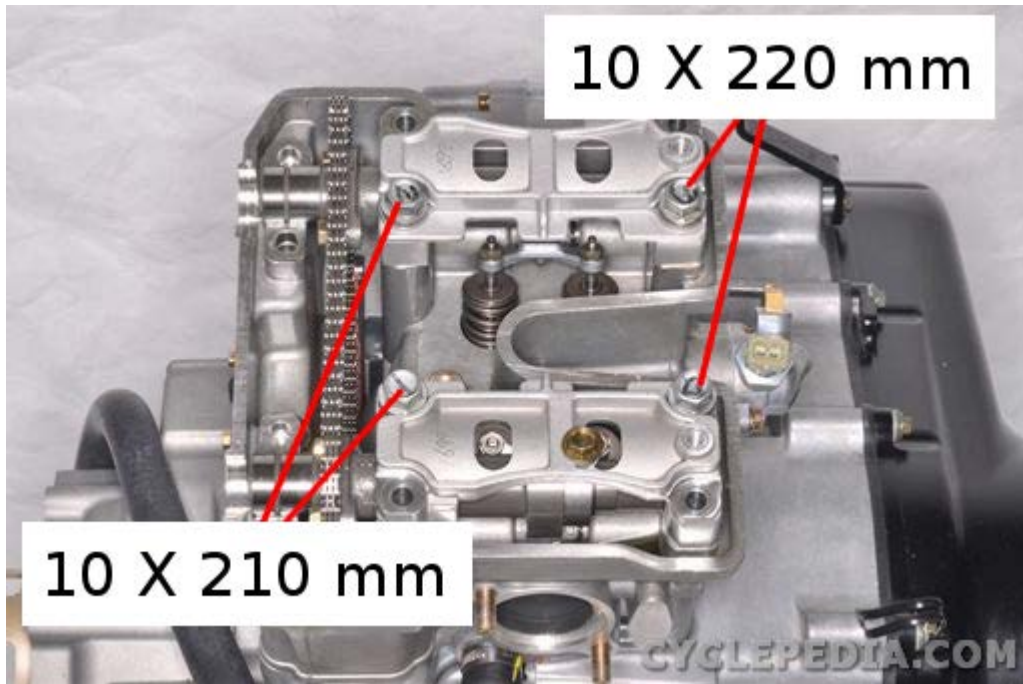
The two medium bolts are size 8 X 137 mm.



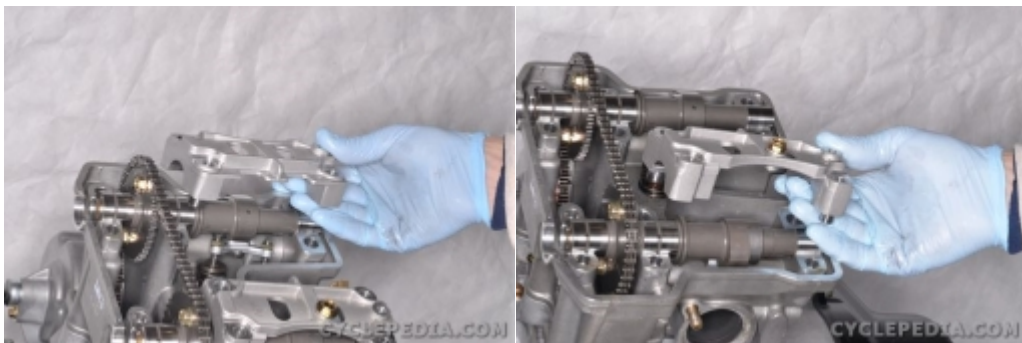
The size of the long bolt is 8 X 210 mm.



Remove the cam chain side camshaft holder and the two dowel pins.



Slowly loosen and the remaining four camshaft holder bolts a small amount at a time in a crisscross pattern with a 14 mm socket. Remove the two 10 X 220 mm and two 10 X 210 mm camshaft holder bolts.



Remove the camshaft holders and dowel pins. Note the position of the camshaft holders so that they can be returned to their original positions.



Lift the cam chain and remove the cam shafts and sprocket.

Note: Do not let the cam chain fall into the bottom end of the engine.



Secure the cam chain with a piece of wire to keep it from falling into the bottom end of the engine.

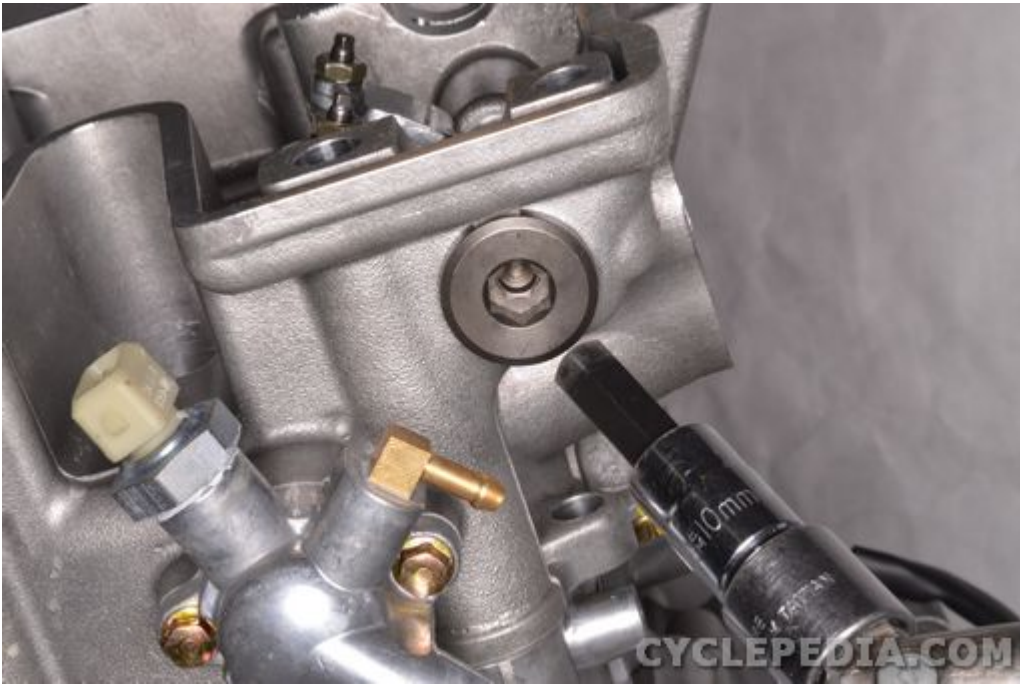
Rocker Arms



Note the location of the rocker arm components so that they can be returned to their original positions.



The rocker arms shafts must be removed from the side of the cylinder head opposite the cam chain.



Loosen the rocker arm shafts with a 10 mm Allen.

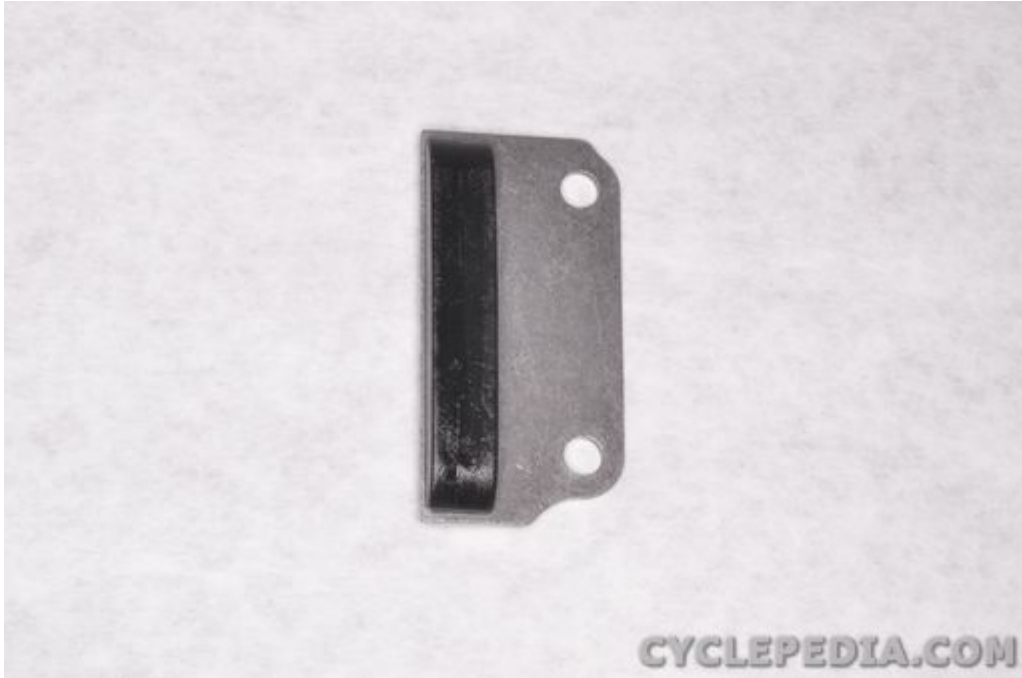


Remove the rocker arm shafts and washers from the cylinder head.

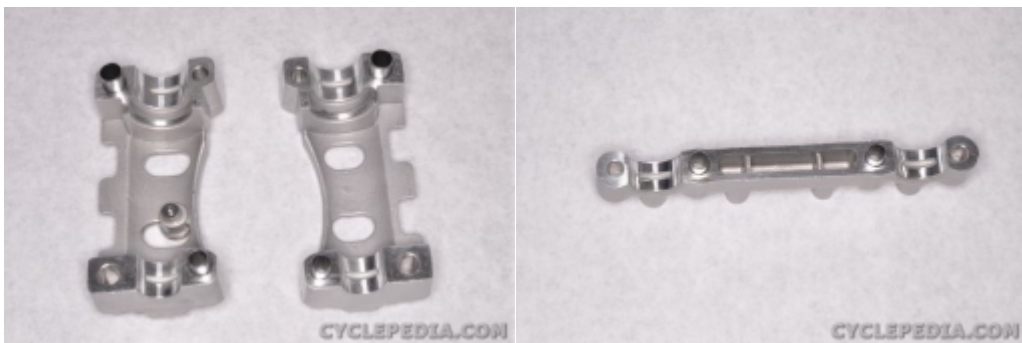


Remove the rocker arms from the cylinder head.

Inspection



Inspect the cam chain slipper surface of the cam chain guide for wear or damage.



Inspect the camshaft surface of each camshaft holder for scoring, scratches, or other damage.

Note: Always replace the camshaft holders and cylinder head as a set.



Check the stop pin spring on the exhaust camshaft holder.

The pin should move smoothly in and out without binding. Replace the stop pin assembly as needed.



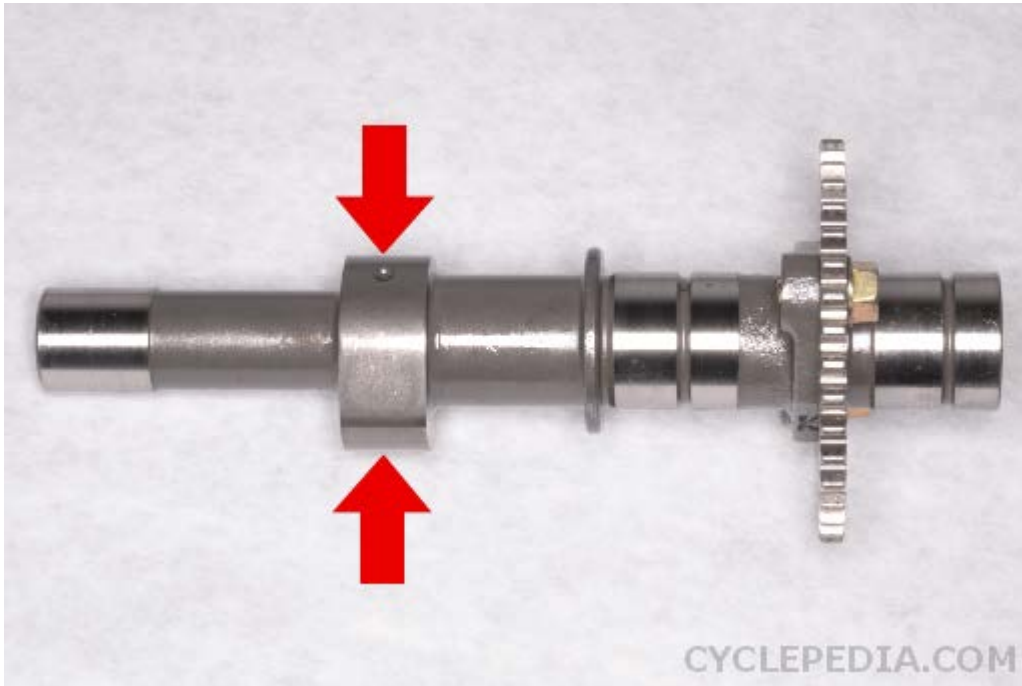
Check that the cam chain tensioner is functioning properly. Make sure the push rod slides smoothly when the locking mechanism is released.



Inspect the camshaft sprocket for wear and damage.



Inspect the camshaft lobes and journals wear and damage. If there are signs of damage or discoloration inspect the lubrication system.



Measure the maximum height of the cam lobes with vernier calipers or a micrometer.

Item		Standard mm (in)	Service Limit
Cam lobe height	IN	37.2614 (1.4905)	37.11 (1.4844)
	EX	37.0084 (1.4803)	36.86 (1.4744)



Place the ends of the camshafts in V-blocks and check the runout with a dial gauge.

Camshaft Runout Limit (IN & EX)	0.05 mm (0.002 in)
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Check the decompression system by turning the decompressor cam on the exhaust camshaft.

Camshaft Installation

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Installation

Rocker Arms

Lubricate the inside diameter of the rocker arms and the outside diameter of the rocker arm shaft pivot sections with fresh engine oil.



Fit the rocker arms into their original locations.



Apply Blue Loctite to the threads of the rocker arm shafts. Install the rocker arm shafts and washers.



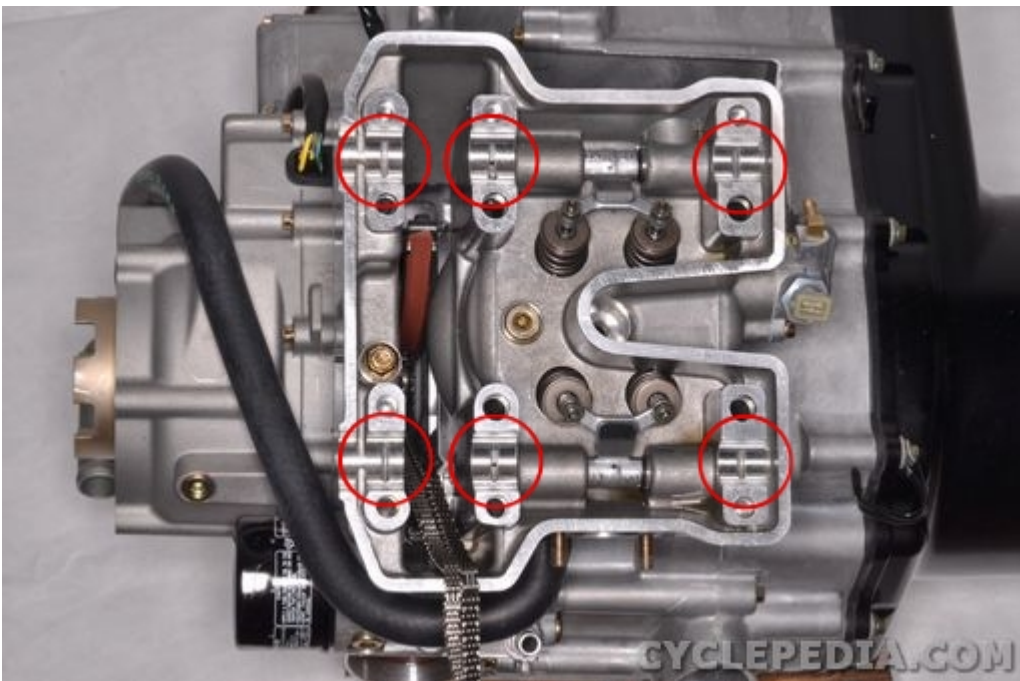
Tighten the rocker arm shafts to specification with a 10 mm Allen.

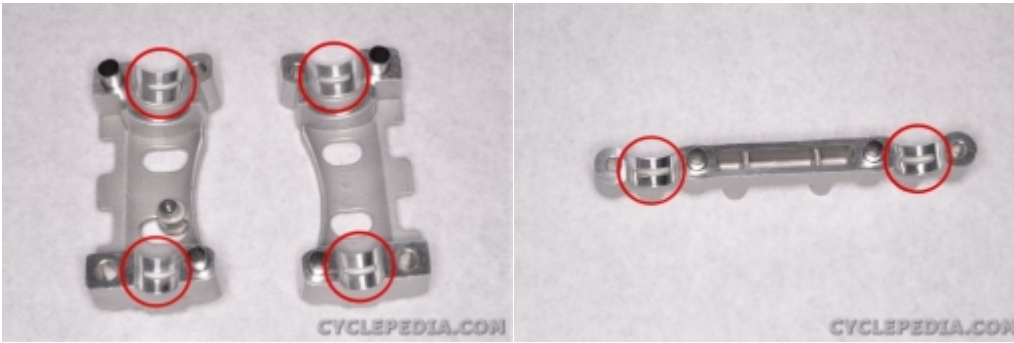
Item	Thread dia. (mm)	Torque kgf-m (N-m, lbf-ft)
Rocker arm shaft	18	4.5 (45, 32)

Camshafts



Position the piston at TDC as with removal. See the [Camshaft](#) topic for more information. Align the "T" mark on the flywheel with the index mark on the right crankcase cover. This shows the piston is at Top Dead Center.





Apply molybdenum oil to the camshaft lobes, the journal holders in the camshaft holders and the cylinder head.

Molybdenum oil: a mixture of molybdenum grease and fresh engine oil in a 50:50 ratio.



Fit the camshafts into place. Note the exhaust camshaft has a decompressor cam and intake camshaft doesn't.

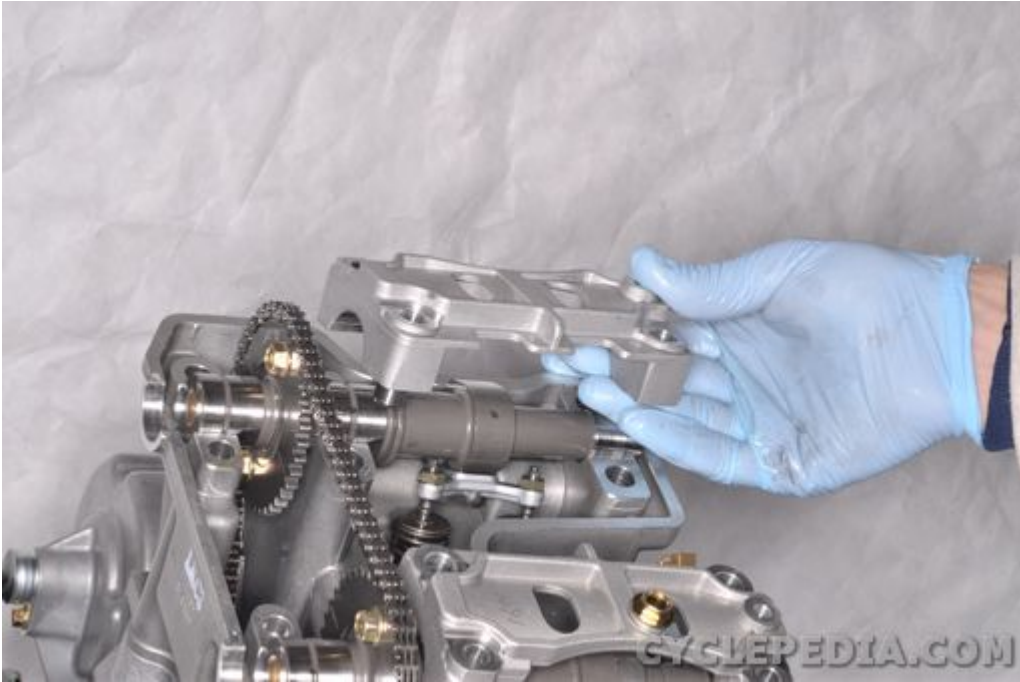


Position the camshafts so that the punch marks on the end are pointing up. Minimize the amount of slack in the cam chain between the camshaft sprockets. The lines on the camshaft sprockets must align with the cylinder head cover mating surface as shown.

Double check the timing after the cam chain tensioner is installed.

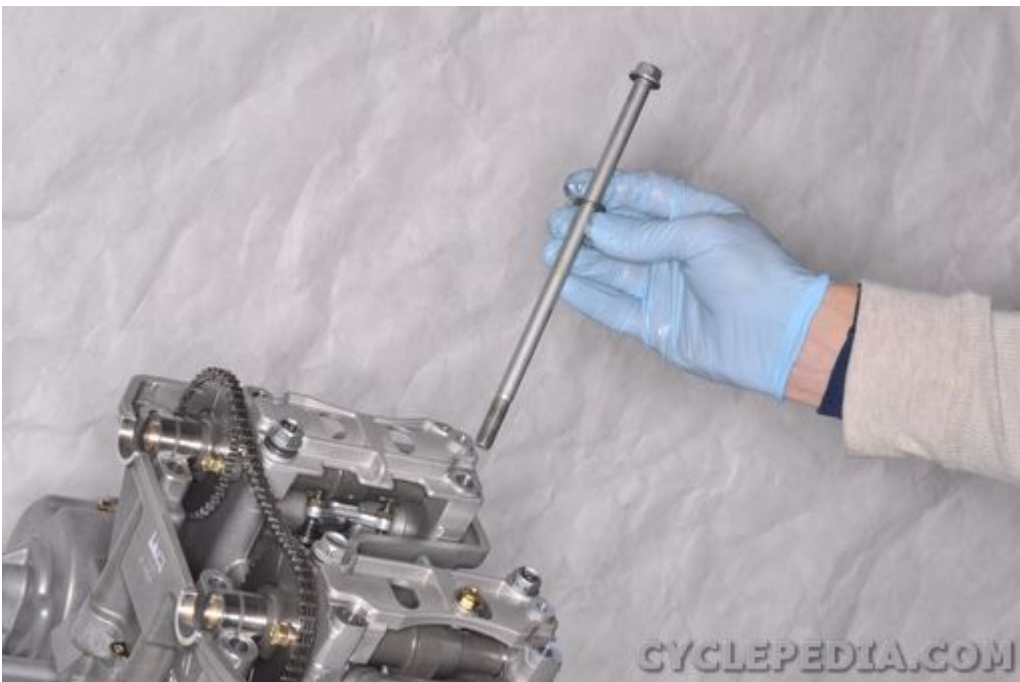


Install the exhaust camshaft holder with the two dowel pins. Note the exhaust camshaft holder has the stopper pin.

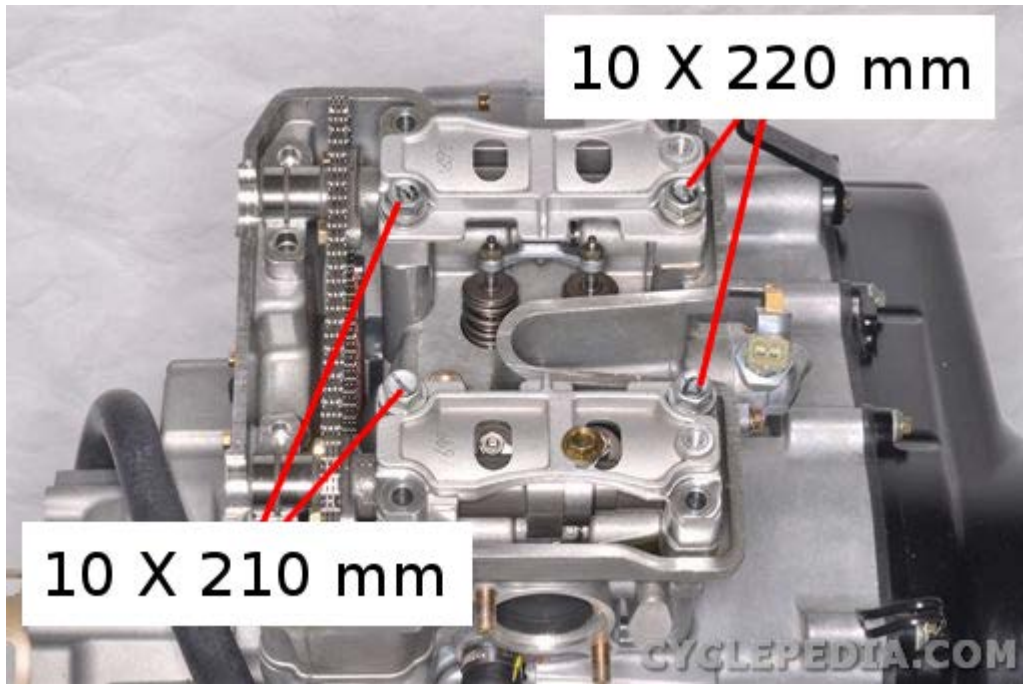


Fit the intake camshaft holder into place with the two dowel pins.

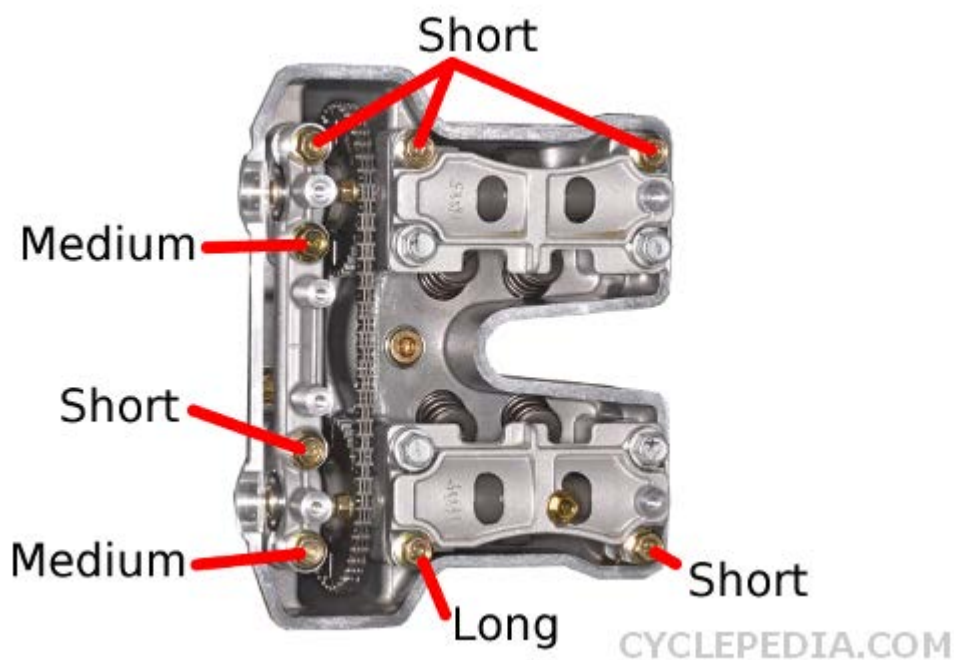
Lubricate the threads of the camshaft holder bolts with fresh engine oil.



Insert the four largest camshaft holder bolts with new washers.



Position the four large cylinder head bolts as shown.

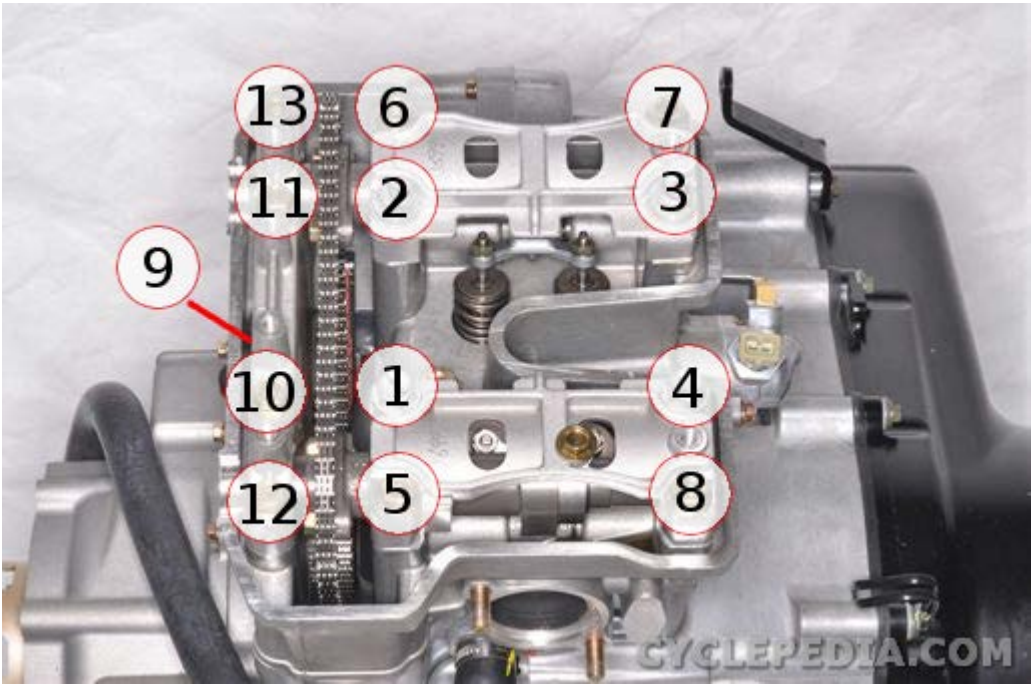


Insert the intake and exhaust camshaft holder bolts. Wait to install the cam chain side camshaft holder and bolts.

Long: 8 X 210 mm

Medium: 8 X 137 mm

Short: 8 X 71 mm



Tighten the bolts 1 - 9 in multiple steps in a crisscross pattern as shown below. Tighten the large bolts with a 14 mm socket and the smaller bolts with a 12 mm socket.

Camshaft Holder / Cylinder Head Bolt Torque			
kgf-m (N-m, ft-lb)			
Bolts	1, 2, 3, 4	5, 6, 7, 8, 9	10, 11, 12, 13
Step 1	2.4 (24, 17)	1.2 (12, 9)	
Step 2	3.8 (38, 27)	2.3 (23, 17)	
Step 3	4.8 (48, 35)		
Step 4			1.2 (12, 9)
Step 5			2.3 (23, 17)



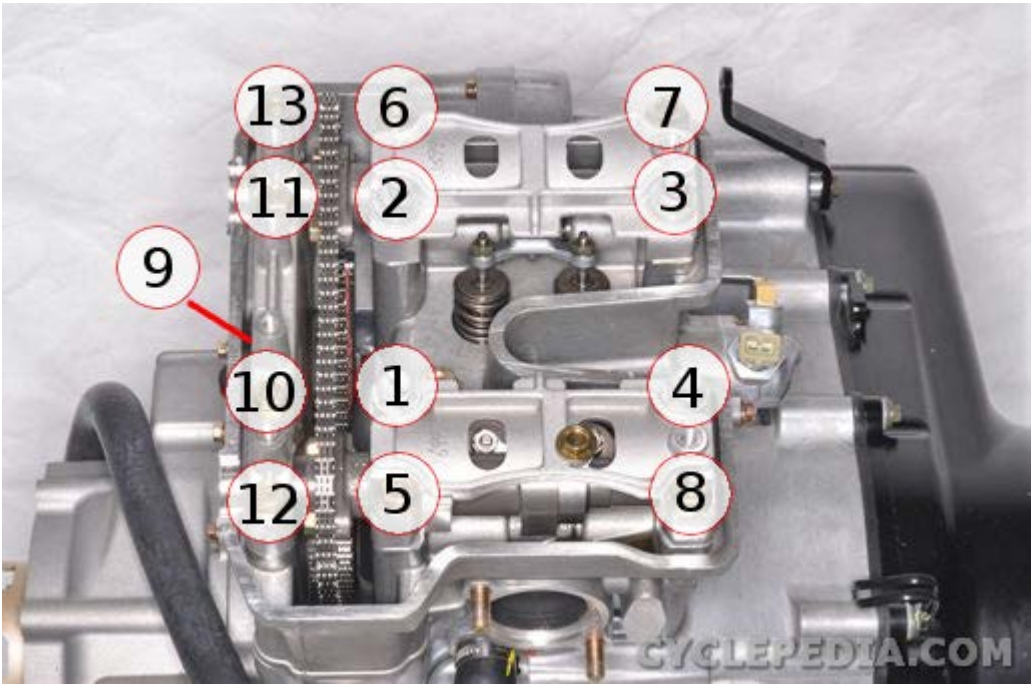
The cylinder head bolt is number 9.



Fit the cam chain side camshaft holder into place.



The arrow on the camshaft holder must face out.



Tighten the 10 - 13 bolts to specification with a 12 mm socket in multiple steps as indicated.

Camshaft Holder / Cylinder Head Bolt Torque	
kgf-m (N-m, ft-lb)	
Bolts	10, 11, 12, 13
Step 4	1.2 (12, 9)
Step 5	2.3 (23, 17)



Fit the upper cam chain guide into place.



Install the two cam chain guide bolts and tighten them securely with an 8 mm socket.

Cam Chain Tensioner

Make sure the cam chain tensioner mating surface is clean. Install a new gasket with the cam chain tensioner.



Use a small flat blade screwdriver to wind in the cam chain tensioner rod. Hold the screwdriver in place until both tensioner mounting bolts have been installed.



Install the two cam chain tensioner mounting bolts and tighten them to specification with an 8 mm socket. Install a new O-ring.

Item	Thread dia. (mm)	Torque kgf-m (N-m, ft-lb)
Cam chain tensioner bolt	6	1.2 (12, 8.6)



Install the cam chain tensioner sealing bolt and tighten it to specification with a 10 mm socket.

Item	Thread dia. (mm)	Torque kgf-m (N-m, ft-lb)
Tensioner sealing bolt	10	1 (10, 7.2)

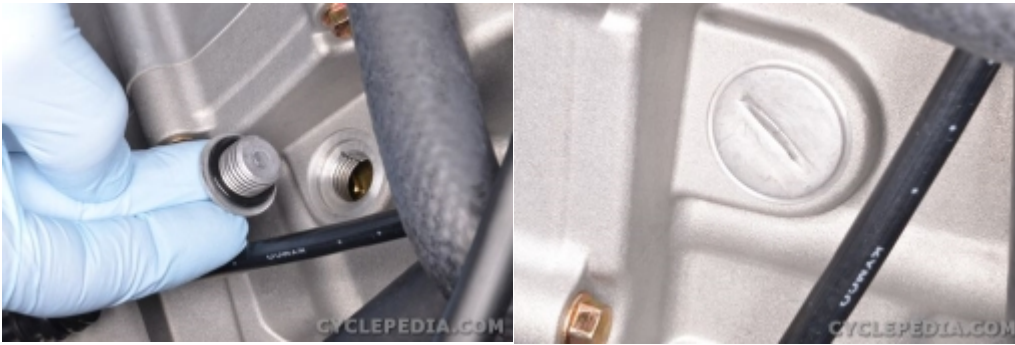
Adjust the valve clearance. See the [Valve Adjustment](#) topic for more information.



Install the recoil starter cover.



Tighten the recoil starter bolts securely with an 8 mm socket.



Install the timing cap on the right side of the engine and tighten securely with a flat blade screwdriver.

Install the cylinder head cover. See the [Cylinder Head Cover](#) topic for more information.

Install the spark plug. See the [Spark Plug](#) topic for more information.

Install the right floor board. See the [Floor Covers](#) topic for more information.

Cylinder Head

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Drain the coolant. See the [Coolant](#) topic for more information.

Remove the exhaust system. See the [Exhaust System](#) topic for more information.

Remove the cylinder head cover. See the [Cylinder Head Cover](#) topic for more information.

Remove the camshafts. See the [Camshaft](#) topic for more information.

Remove the throttle body. See the [Throttle Body Removal and Installation](#) topic for more information.



Push in the spring and unplug the WTS sensor connector.



Squeeze the clamp on the air bleed hose and slide it back. Loosen the thermostat hose clamp with a #2 Phillips screwdriver. Free the air bleed hose and thermostat hose from the WTS housing.





To remove the WTS housing remove the two bolts with an 8 mm socket.



Remove the WTS housing and cylinder head coolant stopper from the cylinder head.
Discard the WTS housing gasket.



Remove the two nuts under the cylinder head with a 10 mm socket.



Loosen the cylinder head bolt with a 12 mm socket.



Remove the cylinder head bolt.



Tap the reinforced areas of the cylinder head with a rubber mallet to free the dowel pins.



Lift off the cylinder head. Guide the cam chain through the opening, but do not allow it to fall into the bottom end of the engine.



Remove the cylinder head gasket.



Remove the two cylinder head dowel pins.

To remove the valves see the [Valves](#) topic.

Inspection

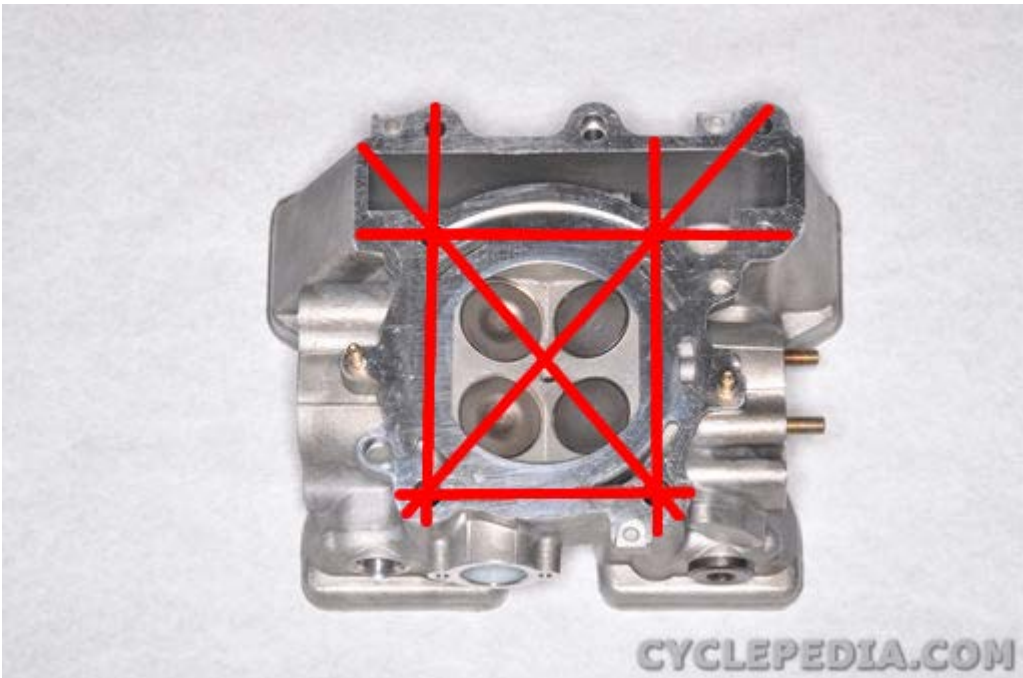


Clean the combustion chamber with contact cleaner, a plastic knife, brush and/or rag. Take care to only remove carbon and not scrape the head.



Place a straight edge on the deck of the cylinder head and check for cylinder head warp with a feeler gauge.

Cylinder head warpage limit	0.05 mm (0.002 in)
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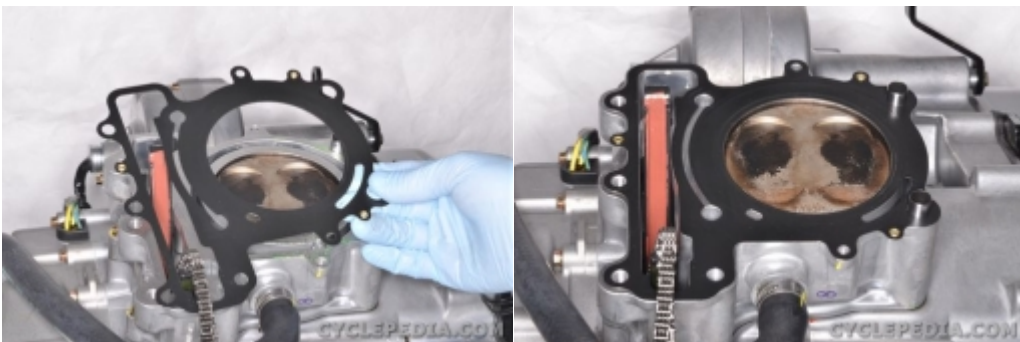
Check for warp in several places on the head. If the cylinder head is warped it must be resurfaced by a qualified machine shop or replaced.

Installation

Make sure the cylinder head mating surface is clean.



Install the two cylinder head dowel pins.



Fit a new cylinder head gasket into place.



Install the cylinder head to the cylinder. Guide the cam chain and cam chain guides through the opening in the cylinder head. Remember to keep the cam chain from falling into the bottom end of the engine.



Install the two nuts under the cylinder head with a 10 mm socket.

Item	Thread dia. (mm)	Torque kgf-m (N-m, ft-lb)
Cylinder head nut	6	1 (10, 7.4)



Install the cylinder head bolt. Wait to tighten it in sequence with the cylinder head / camshaft holder bolts.



Insert the coolant stopper into the cylinder head if it was removed. Install the WTS housing with a new gasket.



Install the two WTS housing bolts and tighten them to specification with an 8 mm socket.

Item	Thread dia. (mm)	Torque kgf-m (N-m, ft-lb)
WTS Housing bolt	6	1.2 (12, 8.6)

Install the camshaft. See the [Camshaft Installation](#) topic for more information.

Install the cylinder head cover. See the [Cylinder Head Cover](#) topic for more information.



Connect the air bleed hose and thermostat hose to the WTS housing. Secure the hoses with the clamps.



Plug in the WTS sensor connector.

Install the throttle body. See the [Throttle Body Removal and Installation](#) topic for more information.

Install the exhaust system. See the [Exhaust System](#) topic for more information.

Fill the coolant. See the [Coolant](#) topic for more information.

Valves

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the cylinder head. See the [Cylinder Head](#) topic for more information.



Note the location of all of the valve parts so that they can be returned to their original positions. Remove all of the valves in the same manner.

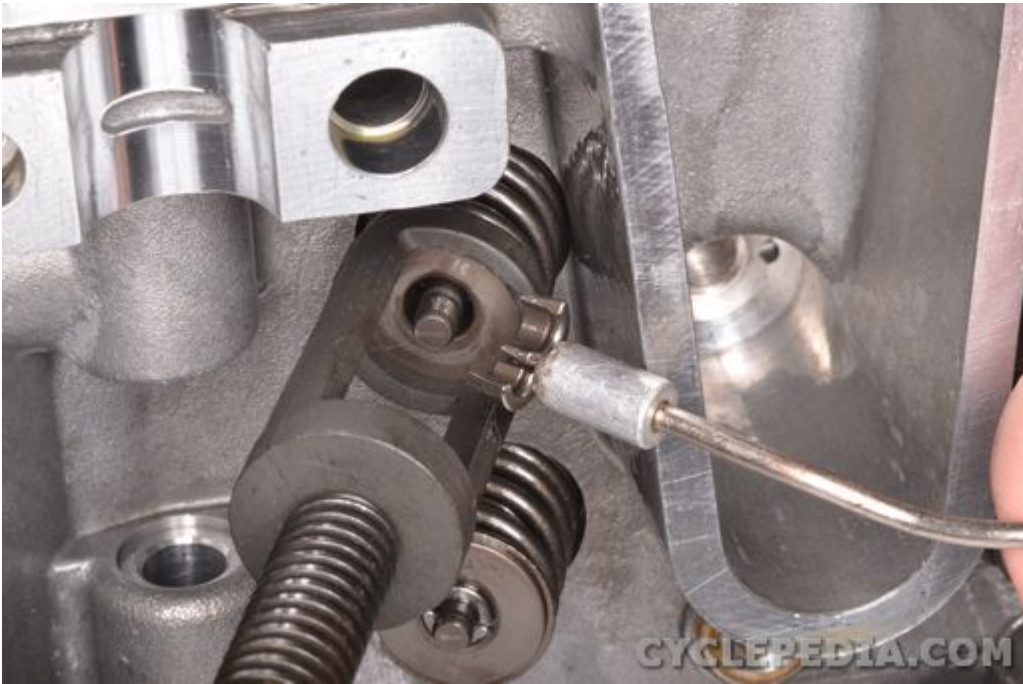


Use a valve spring compressor to remove the valves.

Special Tools- Valve Spring Compressor: A120E00040



Compress the valve springs only enough to remove the cotters.



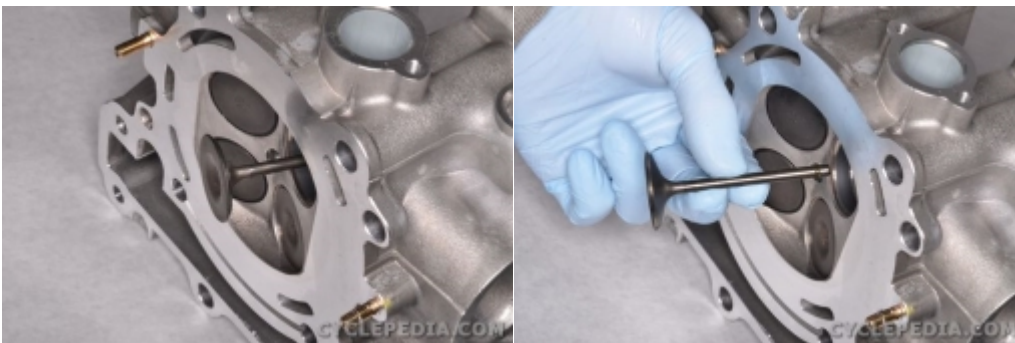
Remove the coppers from the valve stem with tweezers or a magnet.



Remove the spring retainers.



Lift out the valve springs.



Push the valves out through the bottom of the cylinder head.



Remove the stem seals with needle nose pliers and a pick. Discard the old stem seals.



Remove the spring seats.

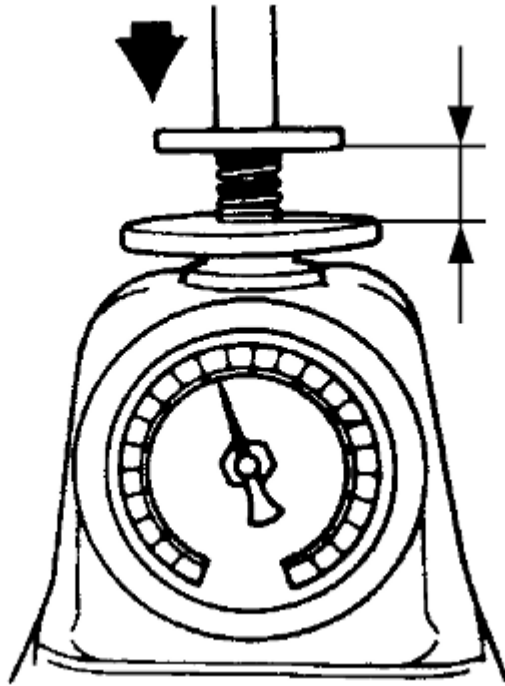
Inspection

Item		Standard mm (in)	Service Limit
Inner valve spring free length		-	33.4 (1.336)
Outer valve spring free length		-	38 (1.52)
Valve stem O.D.	IN	4.975 - 4.99 (0.199 - 0.1996)	4.925 (0.197)
	EX	4.955 - 4.97 (0.1982 - 0.1988)	4.915 (0.1966)
Valve guide I.D.	IN	5 - 5.015 (0.2 - 0.2006)	5.03 (0.2012)
	EX	5 - 5.015 (0.2 - 0.2006)	5.03 (0.2012)
Valve stem-to-guide clearance	IN	0.01 - 0.037 (0.004 - 0.0015)	0.08 (0.0032)
	EX	0.03 - 0.057 (0.0012 - 0.0023)	0.1 (0.004)



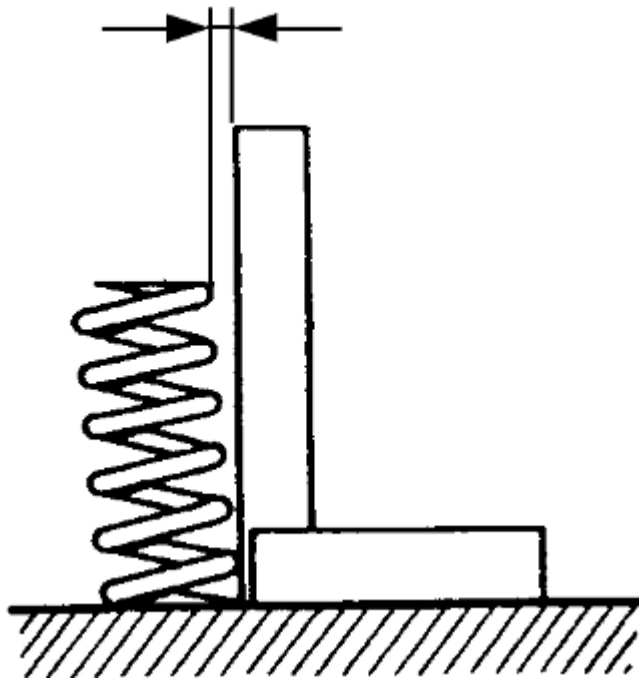
Measure the free length of the valve springs with vernier calipers. Replace the valve springs if they are below the service limit.

Item		Standard mm (in)	Service Limit
Inner valve spring free length		-	33.4 (1.336)
Outer valve spring free length		-	38 (1.52)



Measure the force to compress the valve spring with a scale. Replace the valve spring if it is out of specification.

Item	Standard
Inner valve spring compressed force	3.5 kg (@ 28.7 mm or 1.148 in)
Outer valve spring compressed force	13 kg (@ 31.43 mm or 1.2572 in)



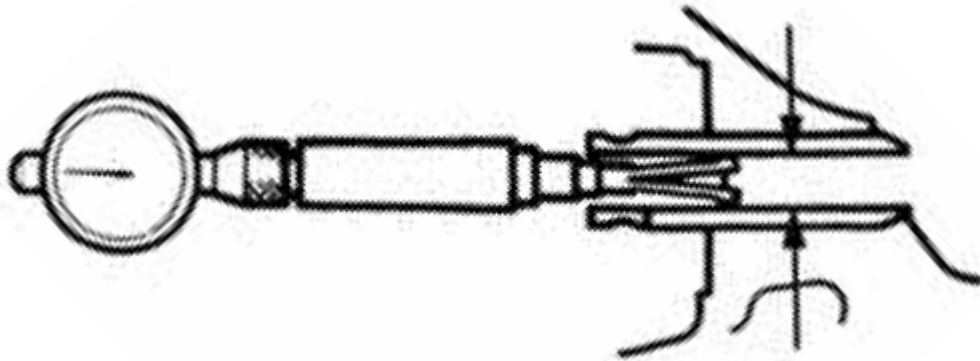
Check the valve spring for tilt. Replace the valve spring if it is out of specification.

Item	Standard mm (in)
Inner valve spring tilt	1.2 mm (0.048)
Outer valve spring tilt	1.2 mm (0.048)



Inspect the valve for damage. Measure the valve stem diameter with a micrometer or vernier calipers and compare the measurements with specification. Replace any valves that do not meet the standard.

Item		Standard mm (in)	Service Limit
Valve stem O.D.	IN	4.975 - 4.99 (0.199 - 0.1996)	4.925 (0.197)
	EX	4.955 - 4.97 (0.1982 - 0.1988)	4.915 (0.1966)



Measure the inside diameter of the valve guides. Replace the guides if the measurement is out of specification. Calculate the valve stem-to-guide clearance. Replace the guide and valve if the clearance is out of specification.

Item		Standard mm (in)	Service Limit
Valve guide I.D.	IN	5 - 5.015 (0.2 - 0.2006)	5.03 (0.2012)
	EX	5 - 5.015 (0.2 - 0.2006)	5.03 (0.2012)
Valve stem-to-guide clearance	IN	0.01 - 0.037 (0.004 - 0.0015)	0.08 (0.0032)
	EX	0.03 - 0.057 (0.0012 - 0.0023)	0.1 (0.004)

Replace the cylinder head if the valve guides are out of specification.

Assembly



Install the spring seats.



Lubricate the new valve stem seals with fresh engine oil. Install new valve stem seals. Push the seals straight onto the guide.



Coat the valve stem and end in fresh engine oil. Insert the valve through the valve guide. Twist the valve slowly to work it through the stem seal without damaging the seal. The valve should move smoothly in the guide and make good contact with the seat.



Install the valve springs with the tightly spaced coils facing down.



Install the spring retainers to their original locations.

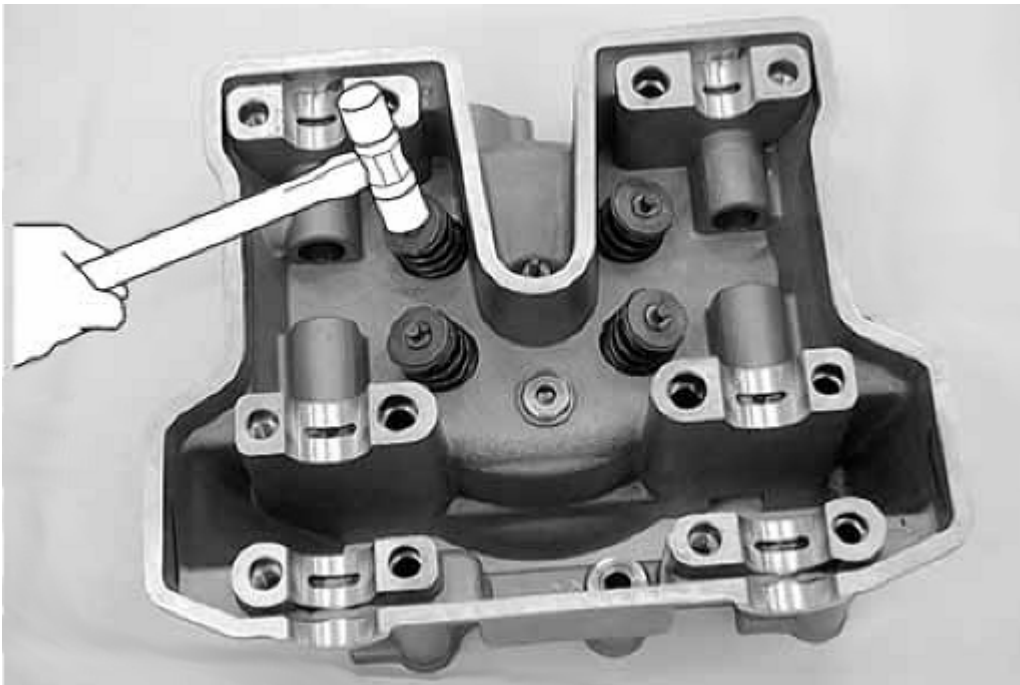


Use a valve spring compressor to install the cotters. Compress the valve springs only enough to install the cotters.

Special Tools- Valve Spring Compressor: A120E00040



Apply grease to the inside of the cotters. Apply a dab of grease to the end of a flat blade screwdriver. Set the keeper in the grease on the screwdriver and insert it onto the valve stem. Repeat this with the other keeper.



After the valves have been reassemble place a clean shop towel under the cylinder head in the combustion chamber area and gently tap each valve with a plastic rod and rubber mallet to make sure the valves and cotters are seated properly.

Cylinder and Piston

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the cylinder head. See the [Cylinder Head](#) topic for more information.



A coolant hose connects the cylinder cooling jacket to the water pump.



Loosen the cylinder coolant hose clamp with a #2 Phillips screwdriver. Free the coolant hose from the cylinder.



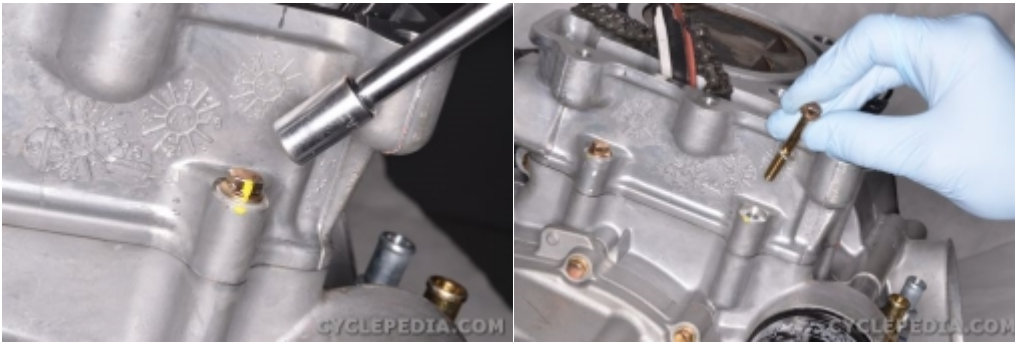
There is a coolant block pin located in the cooling jacket of the cylinder.



Remove the block pin from the cylinder.



There are two cylinder bolts with washers on the cam chain side of the cylinder.



Loosen the two cylinder bolts with an 8 mm socket. Remove the cylinder bolts and washers.



Gently tap the cylinder to free it from the crankcases.



Lift the cylinder up and off of the crankcases. Guide the cam chain through its opening in the cylinder. Make sure the cam chain and dowel pins do not fall into the bottom end of the engine.



Lift off the base gasket.



Remove the two dowel pins.



Place a clean shop towel around the base of the piston to prevent any parts or debris from falling into the crankcase.



Rotate the gap in the piston pin clip so that it sits in the access opening in the piston.



Remove the piston pin clip with a pick or needle nose pliers. Discard the piston pin clips.



Slide out the piston pin. Do not use a punch and a hammer to remove the pin.



Remove the piston. Clean off the cylinder mating surface, but take care to keep debris from falling into the crankcase.



Clean the carbon build up off of the piston with a stiff bristled plastic brush. Never use a wire brush to clean a piston.

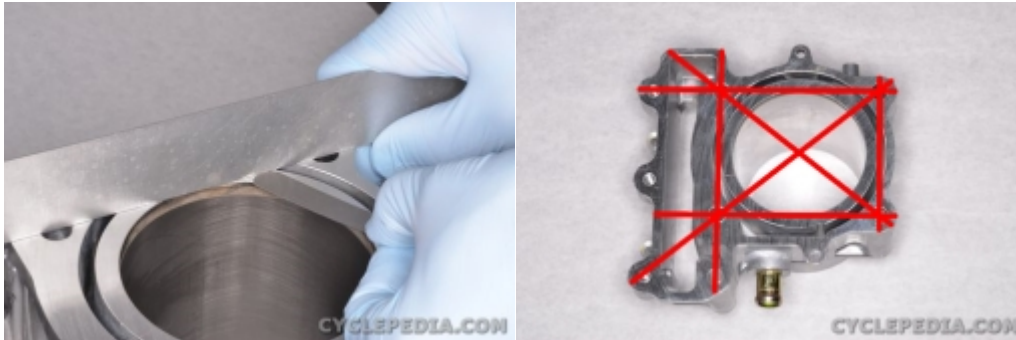


Spread the piston rings and lift them off opposite the gap. Spread the rings the minimum amount during removal. The rings can be easily damaged.

Clean out the ring grooves. You can use an old ring to scrape out any built up carbon in the grooves.

Inspection

Cylinder Warp



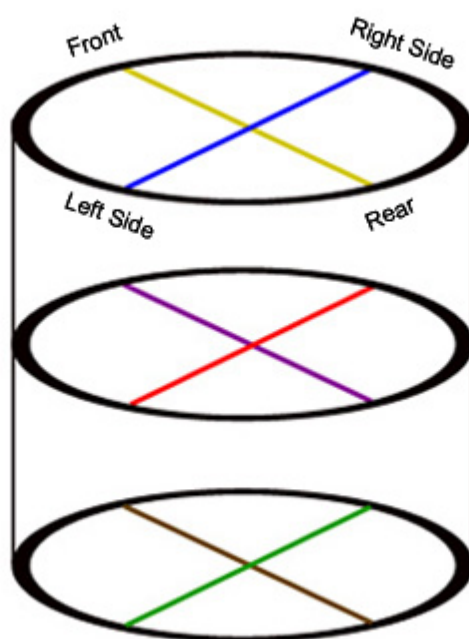
Test for cylinder warp with a straight edge and a feeler gauge. Try and insert the feeler gauge of the service limit under the straight edge. Place the straight edge in several places on the cylinder.

Item	Service Limit
Cylinder warpage across top	0.05 mm (0.002 in)

Cylinder Bore



Inspect the cylinder and measure side to side at three different height levels with a dial bore gauge or cylinder gauge set.

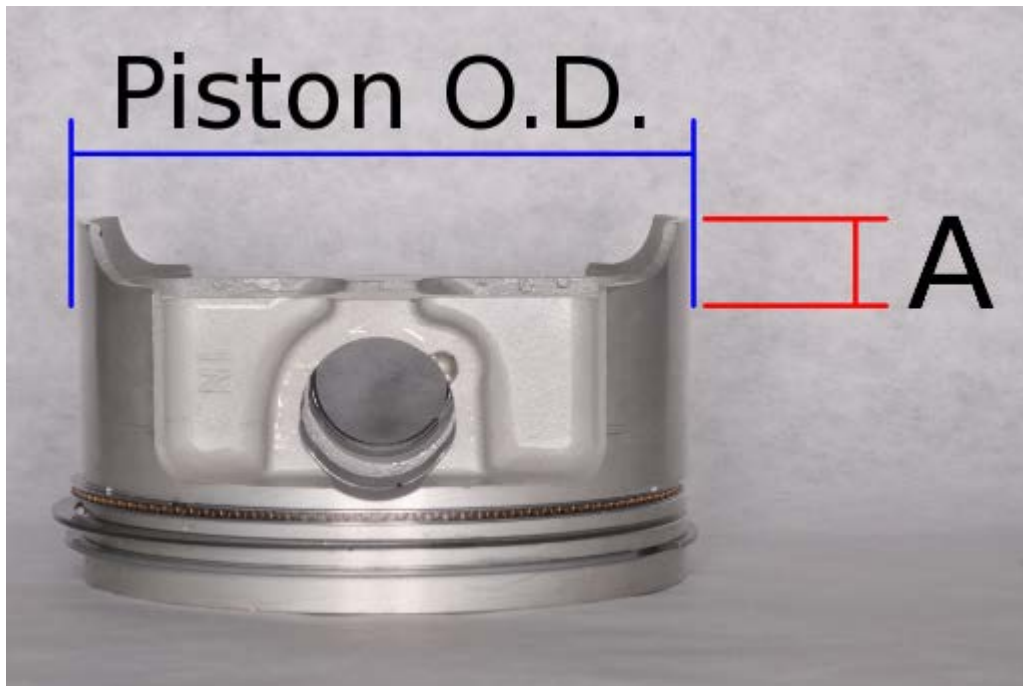


Calculate the cylinder taper. The taper is the maximum difference between either yellow and brown or blue and green. Calculate the cylinder out of round. The out of round is greatest out of yellow, purple, or brown minus the smallest of blue, red, or green.

Item		Standard	Service Limit
Cylinder	I.D.	92.005 - 92.015 (3.6802 - 3.6806)	92.1 (3.684)
	Warpage	0.01 (0.0004)	0.05 (0.002)
	Taper	0.01 (0.0004)	0.1 (0.004)
	Out-of-round	0.01 (0.0004)	0.1 (0.004)

If the cylinder is out of specification or damaged it should be repaired by a qualified machine shop or replaced.

Piston Diameter



Measure the diameter of the piston 10 mm (A) up from the bottom of the skirt at a 90° angle to the piston pin. Measure the piston with a micrometer. Replace the piston if the measurement is out of specification. Check the piston for wear and extreme discoloration.

ITEM	STANDARD mm (in)	LIMIT
Piston diameter	91.96 - 91.98 (3.6784 - 3.6793)	91.9 (3.676)
Piston O.D. measuring position	10 mm from bottom of the skirt	-

Piston-to-Cylinder Clearance

Subtract the diameter of the piston from the maximum front to rear diameter measurement of the cylinder to calculate the piston-to-cylinder clearance. If the clearance is over the service limit the cylinder and piston must be replaced.

ITEM	STANDARD mm (in)	LIMIT
Piston-to-cylinder clearance	0.01 - 0.045 (0.0004 - 0.0018)	0.1 (0.004)

Piston Ring-to-Groove Clearance



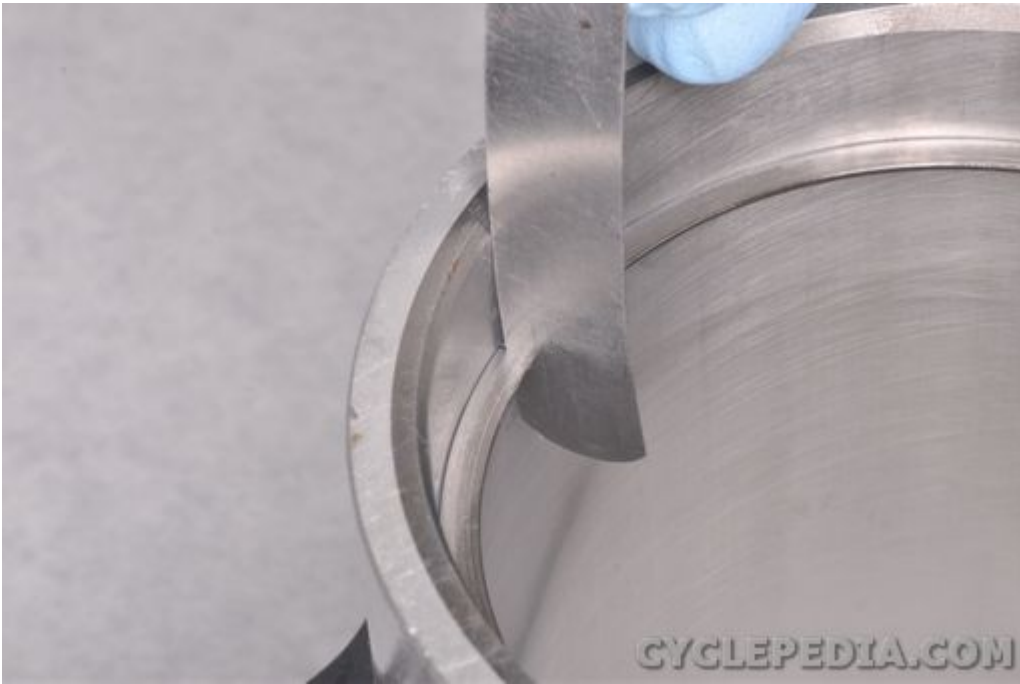
Check the ring-to-groove clearance with a feeler gauge. Make sure the ring is in the correct groove.

ITEM		STANDARD mm (in)	LIMIT
Ring-to-groove clearance	Top	0.03 - 0.065 (0.0012 - 0.0026)	0.08 (0.003)
	Second	0.015 - 0.05 (0.0006 - 0.002)	0.065 (0.0026)

Piston Ring End Gap



Insert the top ring into the cylinder. Push the top ring in the cylinder. Use the piston to push in the ring to keep it square with the cylinder.



Measure the ring gap with a feeler gauge. Repeat this procedure with second ring.

ITEM		STANDARD mm (in)	LIMIT
Ring end gap	Top	0.15 - 0.3 (0.006 - 0.012)	0.5 (0.02)
	Second	0.03 - 0.45 (0.012 - 0.018)	0.65 (0.026)
	Oil side rail	0.2 - 0.7 (0.008 - 0.028)	1 (0.04)

Piston Pin O.D.



Measure the piston pin outside diameter with a micrometer.

Item	Standard	Service Limit
Piston pin O.D	21.994 - 22 (0.8798 - 0.88)	21.96 (0.8784)

Piston Pin Bore I.D.



Measure the piston pin bore diameter with vernier calipers or dial gauge with a small bore gauge.

Special Tools-

Dial Gauge (1/1000 mm, 1 mm): 09900-20602

Small Bore Gauge (18 - 35 mm): 09900-22403

Item	Standard	Service Limit
Piston pin hole I.D.	22.002 - 22.008 (0.8801 - 0.8803)	22.04 (0.8816)
Piston-to-piston pin clearance	0.002 - 0.014 (0.0001 - 0.0006)	0.02 (0.001)

Connecting Rod Small End

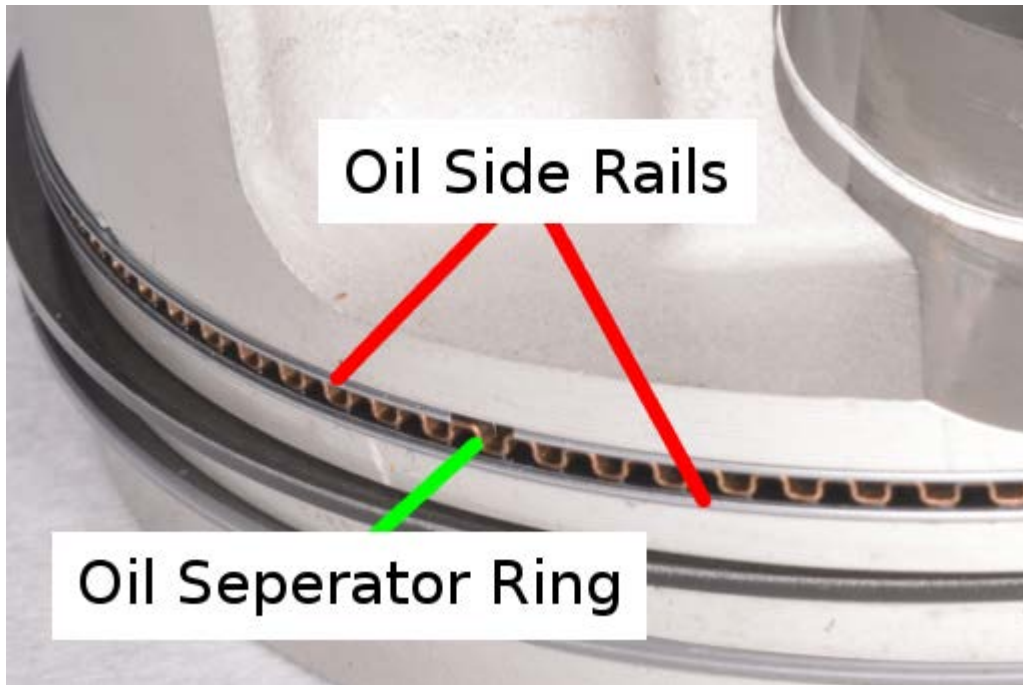


Measure the inside diameter of the small end of the connecting rod.

Item	Standard	Service Limit
Connecting rod small end I.D. bore	22.016 - 22.034 (0.8806 - 0.8814)	22.06 (0.8824)

Assembly

Clean the piston ring grooves, and apply fresh engine oil to the piston rings. Spread the rings the minimum amount possible to install them.



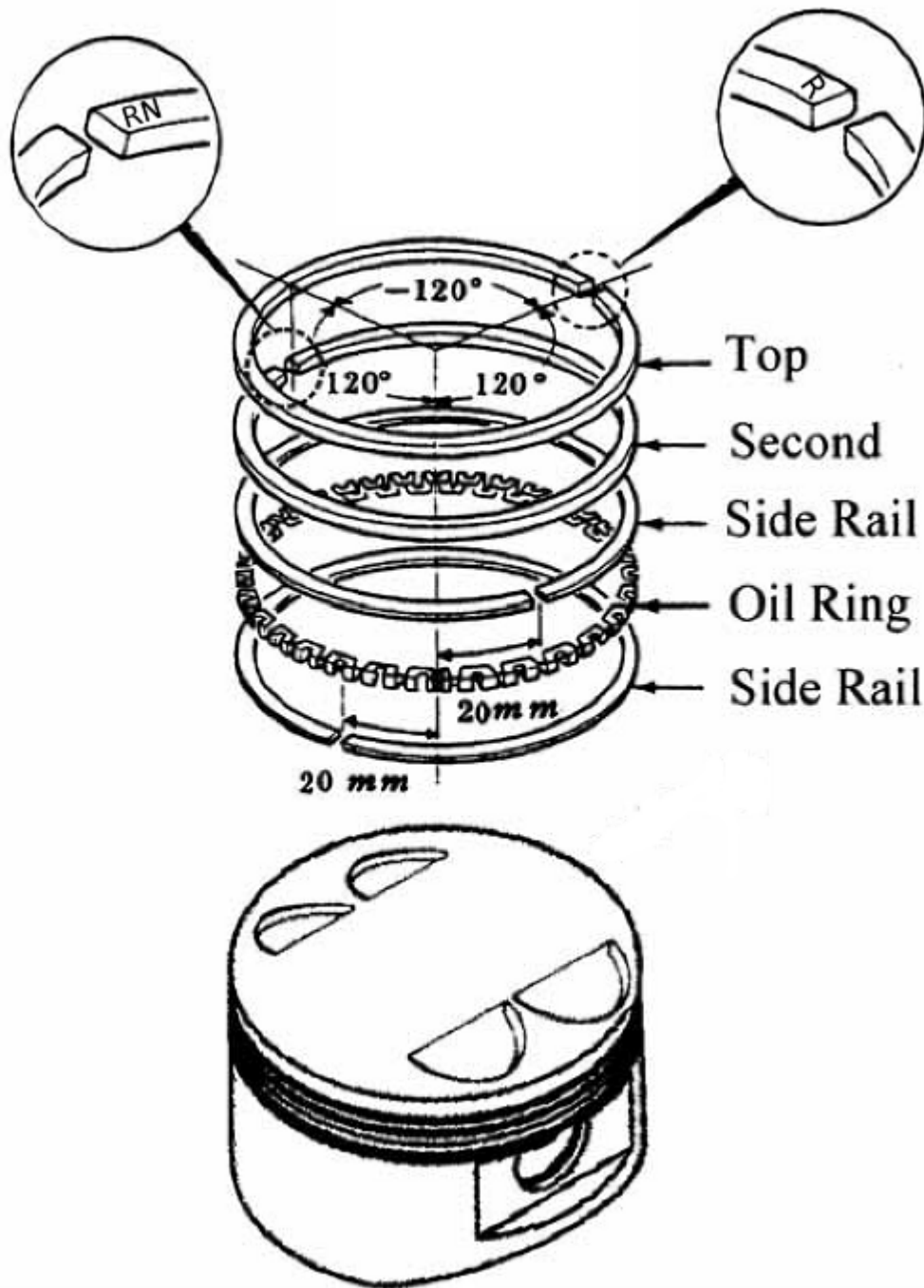
Install the oil ring first then the steel rails above and below the oil ring.



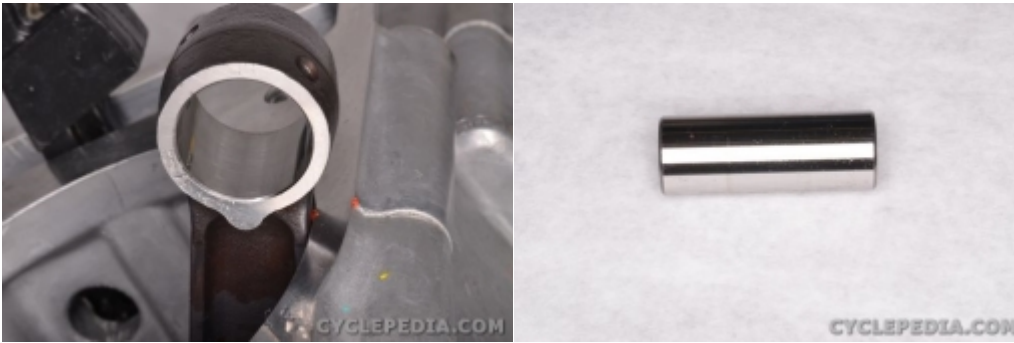
Install the second ring with the "RN" mark facing up.



Install the top ring with the "R" mark facing up. The top ring's upper inside edge is chamfered.



The top, second, and oil rings should be rotated so that their gaps divide the piston into thirds, or 120° apart. The gaps shouldn't line up with the gaps of any of the other rings. Also, none of the ring gaps should line up with the piston pin.



Lubricate the piston pin and the small end of the connecting rod with fresh engine oil.



Install the piston onto the connecting rod. The IN marks on the piston must sit on the intake side of the engine.



Insert the piston pin.



Place a clean shop towel around the base of the piston to prevent any parts or debris from falling into the crankcase. Install new piston pin clips securely into their grooves.



Turn the gap in the clips away from the access gap.



Make sure the cylinder mating area is clean. Install the two dowel pins.



Install the new base gasket.



Coat the inside of the cylinder, piston rings, and piston in fresh engine oil. Lower the cylinder into place and guide the piston into the cylinder while you are compressing the rings with your fingers. Be careful to not damage the rings during this step. Bring the cam chain and guides through the opening.

Note: If the crankshaft is rotated pull up on the cam chain to prevent it from being caught between the crankcase and the cam drive sprocket.



Install the two cylinder bolts and washers. Wait to tighten the bolts until the cylinder head and camshafts have been installed. Tighten the bolts to specification with an 8 mm socket.

ITEM	N-m	kgf-m	ft-lb
Cylinder base nut	10	1.0	7.0



Install the cooling block into the cooling jacket of the cylinder if it was removed.

Install the cylinder head. See the [Cylinder Head](#) topic.

Crankcase Bearings

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Remove the engine from the frame. See the [Engine Removal](#) topic for more information.

Remove the following engine components:

- [Cylinder Head Cover](#)
- [Camshaft](#)
- [Cylinder Head](#)
- [Cylinder and Piston](#)
- [Recoil Starter Cover](#)
- [Water Pump](#)
- [Generator Cover](#)
- [Flywheel](#)
- [Oil Pump](#)
- [Cam Chain](#)
- [Belt Case Cover](#)
- [Output Shaft and Bevel Gear](#)
- [CVT Removal](#)
- [Clutch Removal](#)
- [Starter Motor](#)

Split the crankcases. See the [Crankcase](#) topic.

Remove the crankshaft and balancer see the [Crankshaft](#) topic.

Remove the transmission see the [Transmission Removal](#) topic.

Inspection



Inspect the crankcase bearings.

Turn the bearings with a finger. They should turn freely with out noise or binding, but also without excessive play. Make sure the outer races of the bearings are secure in the crankcase.

Replacement



Place the new bearing in the freezer at least a half hour before you plan to install them.



Remove the bearings with a suitable bearing puller.

Special Tool - Bearing Puller: A120E00037



To replace the drive shaft bearing first remove the set plates. Remove the set plate bolts with a 6 mm Allen. Install the bearing set plates after the bearing has been replaced and tighten new bolts securely with a 6 mm Allen.



Replace the oil seal if its bearing is to be replaced.



Drive in the new bearings with a suitable bearing driver that has the same outside diameter of the bearing. The manufactures markings on the bearing must face out.

Special Tool - Bearing Driver: A120E00014

Recoil Starter Cover

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Note: The recoil starter mechanism is not installed on any UXV 500 models.

Removal

Remove the frame covers. See the [Frame Covers](#) topic for more information.



Remove the recoil starter cover bolts with an 8 mm socket.



Remove the recoil starter cover.

Remove the belt case and hold the drive pulley to keep the crank from turning with a drive pulley holder. See the [Belt Case Cover](#) topic for more information.

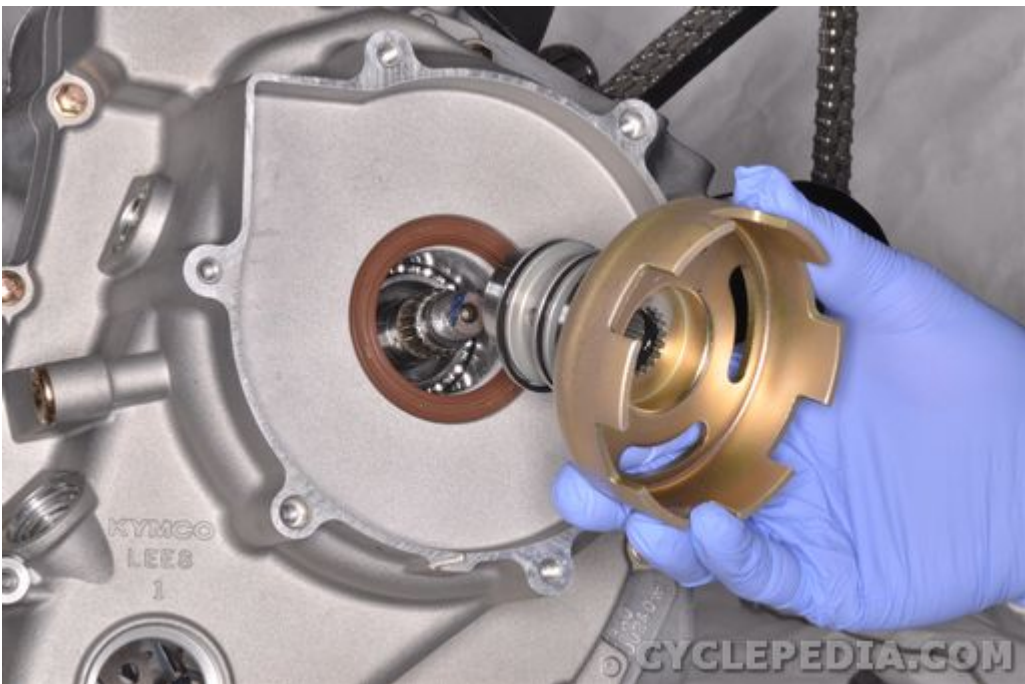
Special Tool - Drive Pulley Holder: A120E00058



Loosen the recoil starter nut with a 19 mm socket.



Remove the recoil starter nut and washer.



Slide out the recoil starter drum. Be careful to not damage the oil control rings.



Inspect the recoil starter oil control rings.



To replace the oil control rings carefully unlock the rings and remove them.



Inspect the recoil starter bearing and seal. Remove the generator cover to replace the bearing and seal as needed. See the [Generator Cover](#) topic for more information.

Installation



Install the oil control rings to the recoil starter. Lock the rings as shown above. Apply fresh engine oil to the oil control rings and the recoil starter seal.



Carefully install the recoil starter so that the oil control rings are not damaged.



Install the washer and the recoil starter nut.

Hold the drive pulley to keep the crank from turning with a drive pulley holder.

Special Tool - Drive Pulley Holder: A120E00058

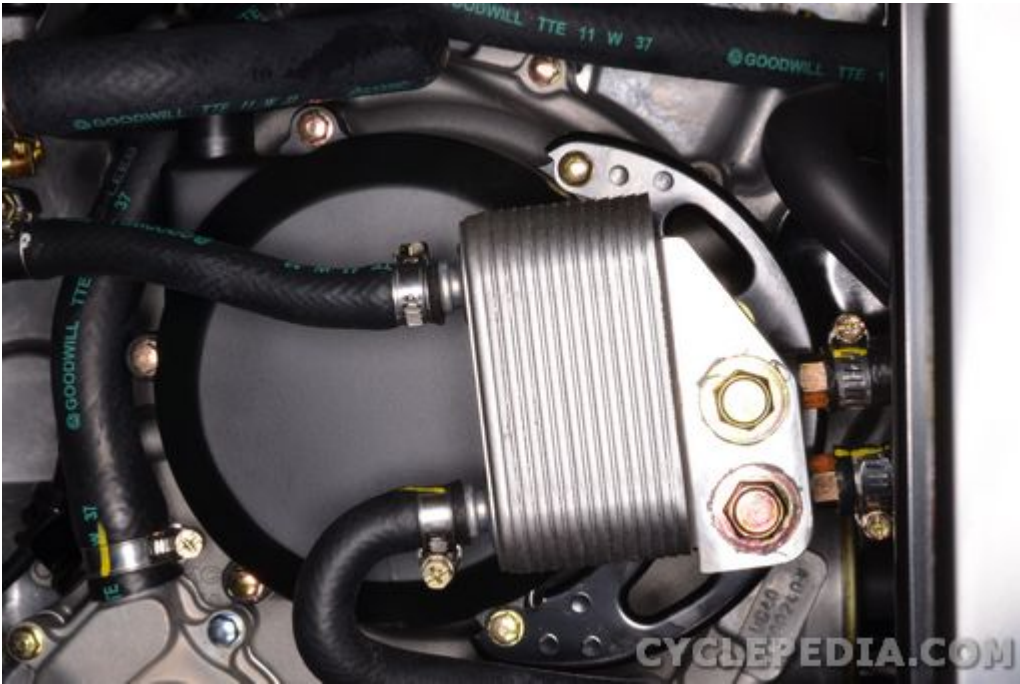


Tighten the recoil starter nut to specification with a 19 mm socket.

ITEM	N-m	kgf-m	ft-lb
Recoil starter nut	55	5.5	40



Install the recoil starter cover.



Tighten the recoil starter bolts securely with an 8 mm socket.

Install the frame covers. See the [Frame Covers](#) topic for more information.

Generator Cover

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Generator Cover

Remove the frame covers. See the [Frame Covers](#) topic for more information.

Drain the coolant. See the [Coolant](#) topic for more information.

Drain the engine oil if the water pump is to be removed. See the [Engine Oil](#) topic for more information.

Remove the water pump. See the [Water Pump](#) topic for more information.

Remove the recoil starter. See the [Recoil Starter Cover](#) topic for more information.

Trace the wires up from the generator cover.



Unplug the 2-pin ignition pulse generator / crank position sensor connector.



Unplug the 4-pin stator connector.



Loosen the 14 generator cover bolts evenly in a crisscross pattern.



Remove the 14 generator cover bolts with an 8 mm socket.



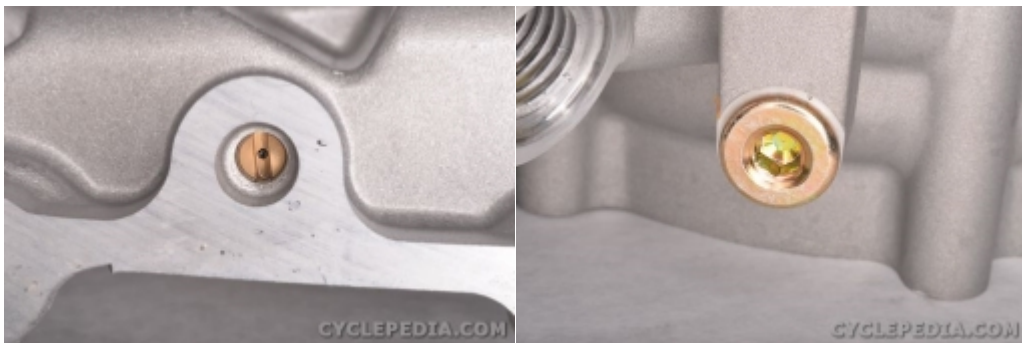
Utilize the pry points and remove the generator cover from the crankcase.



Remove the generator cover gasket.



Remove the two generator cover dowel pins.



Inspect the oil jet and passages for clogging. Clean them out if needed.

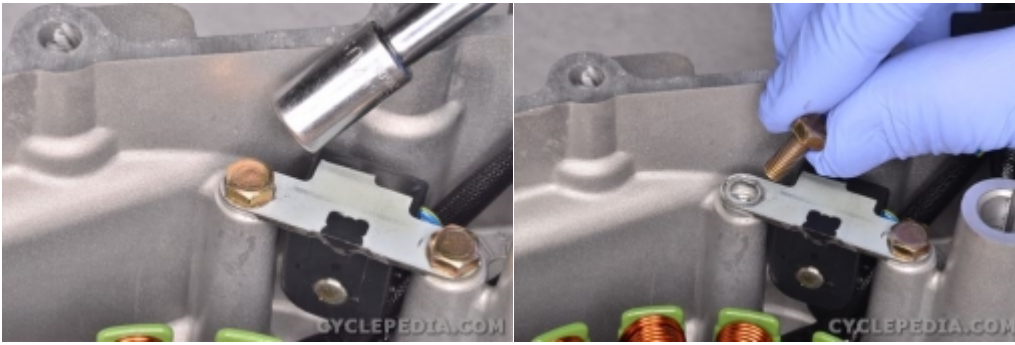
Stator and Ignition Pulse Generator



The stator and ignition pulse generator must be removed together.



Remove the three stator coil mounting bolts with an 8 mm socket.



Remove the two ignition pulse generator bolts with an 8 mm socket.



Free the ignition pulse generator and rubber wire grommet from the generator cover.



Lift out the stator and ignition pulse generator together.



If the bearing in the generator cover needs to be replaced remove the snap ring. Drive the bearing out from the outside in. Drive in the new bearing with a suitable driver that is the same outside diameter as the bearing. The manufactures markings on the bearing must face out. Install a new snap ring into the groove with snap ring pliers.

To remove the flywheel see the [Flywheel](#) topic

Installation



Fit the stator and ignition pulse generator into the cover together.



Install the three stator coil mounting bolts and tighten them to specification with an 8 mm socket.

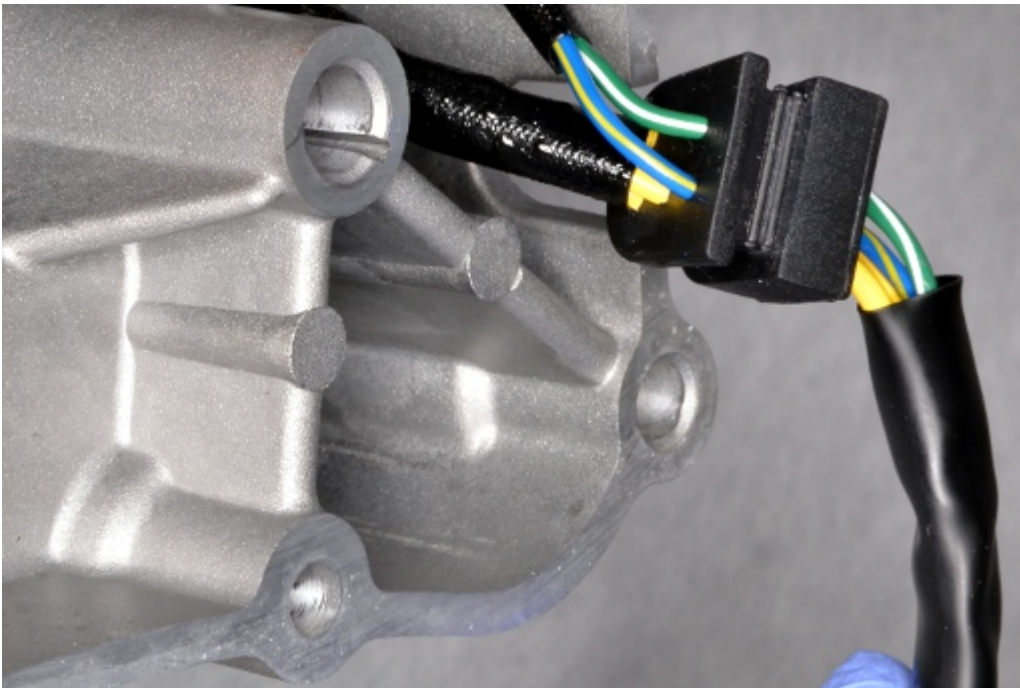
ITEM	N-m	kgf-m	ft-lb
Stator coil bolt	12	1.2	9



Install the two ignition pulse generator bolts and tighten them to specification with an 8 mm socket.

ITEM	N-m	kgf-m	ft-lb
Ignition pulse generator	12	1.2	9

Generator Cover



Apply a silicone sealant to the outside of the rubber wire grommet where it will fit into the generator cover and crankcase. Fit the grommet into the cover.



Install the two dowel pins and a new generator cover gasket.



Fit the generator cover onto the crankcase.



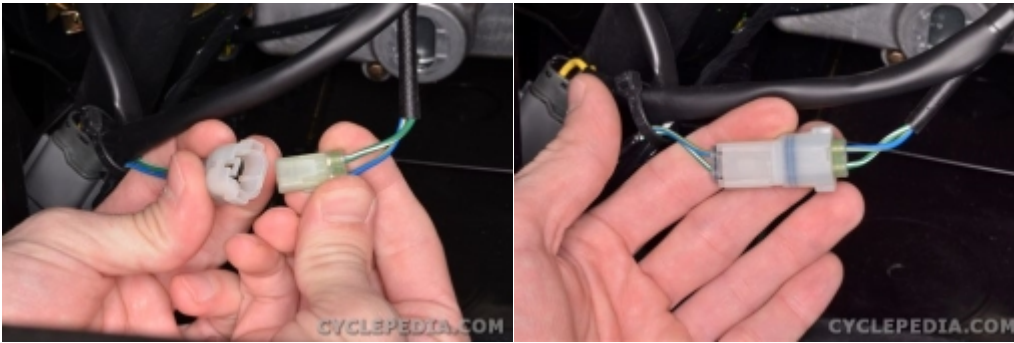
Install the 14 generator cover bolts. Tighten the bolts a small amount at a time in a crisscross pattern.



Tighten the generator cover bolts to specification with an 8 mm socket.



Plug in the 4-pin stator connector.



Plug in the 2-pin ignition pulse generator / crank position sensor connector.

Install the recoil starter. See the [Recoil Starter Cover](#) topic for more information.

Install the water pump. See the [Water Pump](#) topic for more information.

Fill the engine oil. See the [Engine Oil](#) topic for more information.

Fill the coolant. See the [Coolant](#) topic for more information.

Install the frame covers. See the [Frame Covers](#) topic for more information.

Flywheel

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the frame covers. See the [Frame Covers](#) topic for more information.

Drain the coolant. See the [Coolant](#) topic for more information.

Drain the engine oil if the water pump is to be removed. See the [Engine Oil](#) topic for more information.

Remove the water pump. See the [Water Pump](#) topic for more information.

Remove the recoil starter. See the [Recoil Starter Cover](#) topic for more information.

Remove the left crankcase cover. See the [Generator Cover](#) topic fore more information.

Flywheel



To remove the flywheel a special flywheel puller tool will be needed.

Special Tool- Flywheel Puller: A120E00060



Apply grease to the threads of the flywheel puller. Hold the body of the puller with a large wrench and turn in the pusher bolt to separate the flywheel from the crankshaft.



Remove the flywheel from the crankshaft.

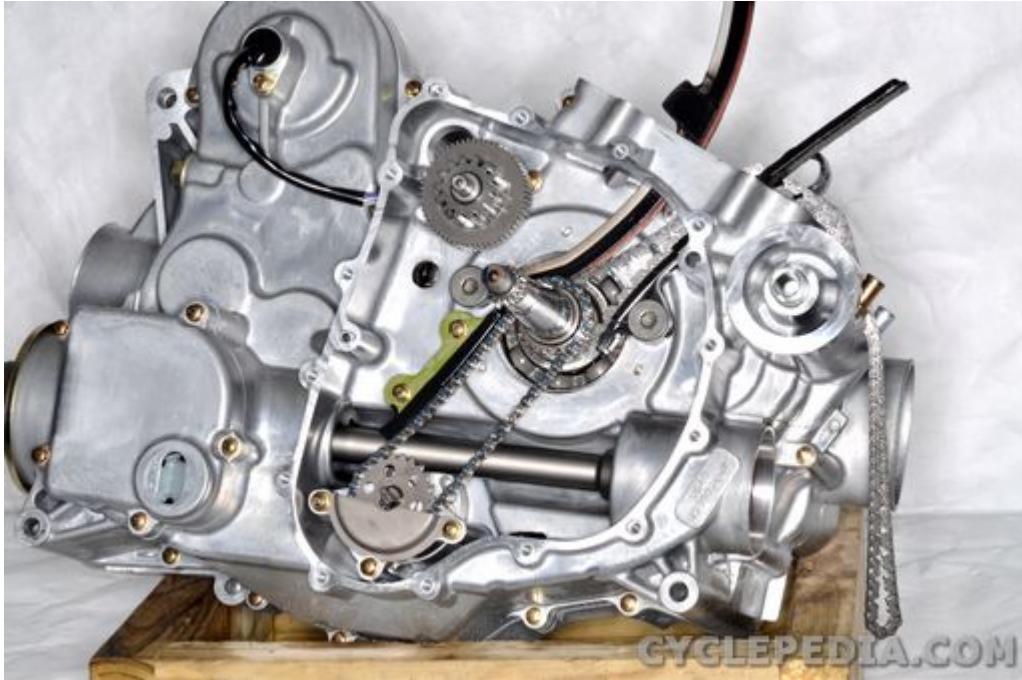


Remove the woodruff key from the crankshaft.



Slide off the starter driven gear.

Starter Reduction Gear



Remove the starter reduction gear from the crankcase.



Inspect the starter reduction gear for wear and damage. Replace the part as a whole if needed.

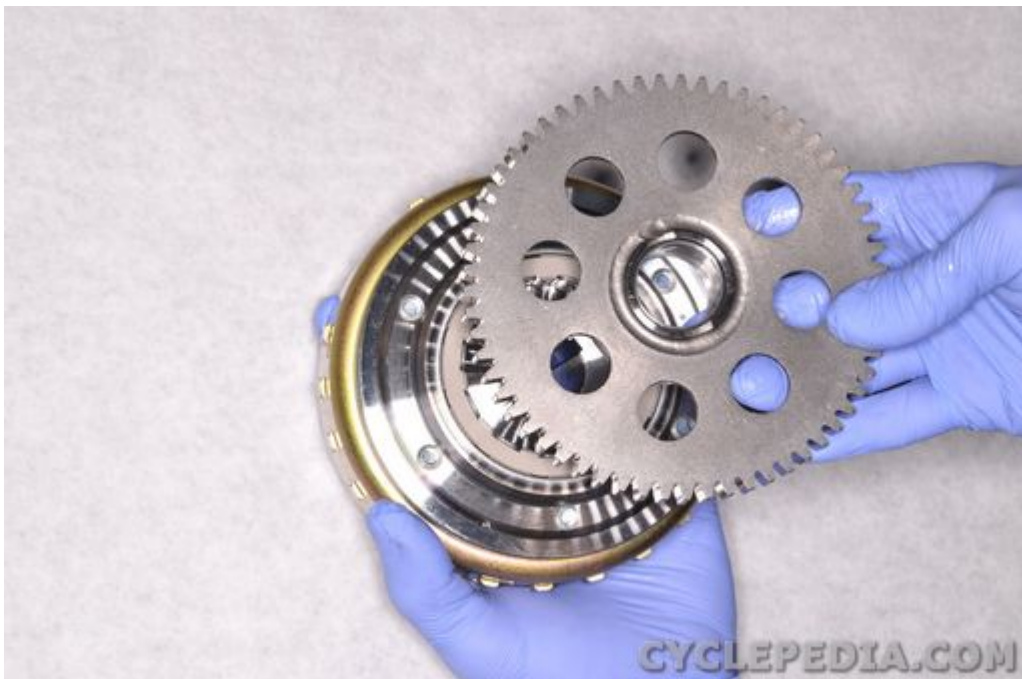
Starter Clutch



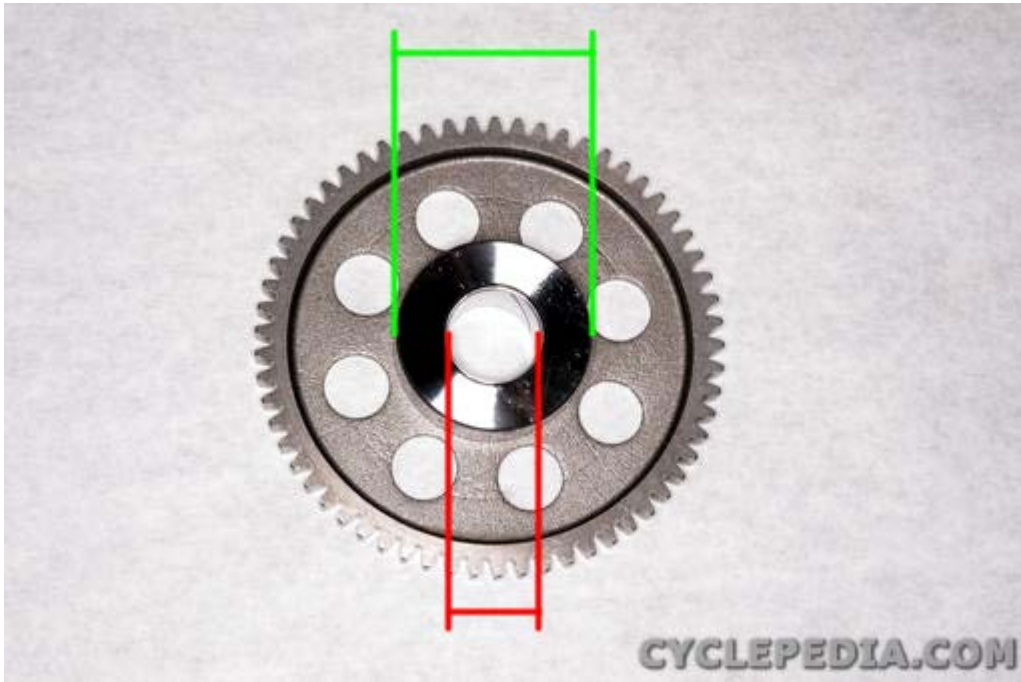
The starter clutch and starter driven gear ride on the back of the flywheel.



Inspect the function of the starter clutch by turning the starter driven gear. You should be able to turn the driven gear clockwise smoothly, but the gear should not turn counterclockwise. If the starter clutch allows the gear to turn either way, or will not turn smoothly it must be replaced.



Rotate the starter gear and remove it from the starter clutch on the back of the flywheel.



Inspect the starter driven gear for wear and damage. Measure the outside diameter of the starter driven gear boss and the inside diameter of the starter driven gear where it rides on the crankshaft.

Item	Service Limit
Starter driven gear boss O.D.	57.7 mm (2.272 in)
Starter driven gear bushing I.D.	27.1 mm (1.084 in)



There are six bolts that hold the starter clutch to the back of the flywheel.



Loosen the starter clutch bolts from the outside of the flywheel with a 6 mm Allen.



Remove the starter clutch bolts.



Remove the starter clutch and mounting plate from the back of the flywheel.



Remove the starter clutch from the mounting plate.

Installation

Starter Clutch



Fit the starter clutch into the mounting plate.



Place the starter clutch and mounting plate on the back of the flywheel.



Apply a thread locking agent to the threads of the six starter clutch bolts.



Tighten the starter clutch bolts evenly and securely with a 6 mm Allen.



Lubricate the boss of the starter driven gear with a 50:50 mixture of engine oil and molybdenum grease.



Rotate the starter driven gear clockwise as it is inserted into the starter clutch.

Starter Reduction Gear



Lubricate the starter reduction gear shaft with fresh engine oil.



Install the starter reduction gear into the crankcase as shown.

Flywheel



Install the starter driven gear onto the crankshaft.



Install the woodruff key into the crankshaft. Make sure the tapered area of the crankshaft is clean, oil free, and dry.



Guide the flywheel onto the crankshaft make sure the key lines up with the groove in the flywheel. Rotate the starter driven gear to fit it into the starter clutch if needed.

Install the left crankcase cover. See the [Generator Cover](#) topic for more information.

Install the recoil starter. See the [Recoil Starter Cover](#) topic for more information.

Install the water pump. See the [Water Pump](#) topic for more information.

Fill the engine oil. See the [Engine Oil](#) topic for more information.

Fill the coolant. See the [Coolant](#) topic for more information.

Install the frame covers. See the [Frame Covers](#) topic for more information.

Oil Pump

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the frame covers. See the [Frame Covers](#) topic for more information.

Drain the coolant. See the [Coolant](#) topic for more information.

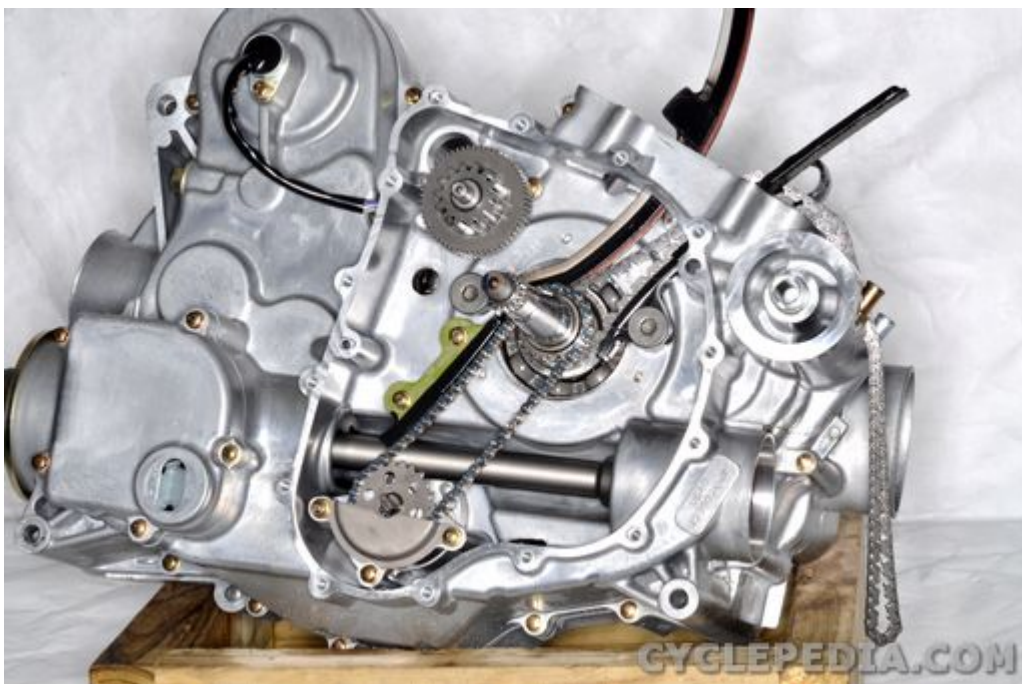
Drain the engine oil if the water pump is to be removed. See the [Engine Oil](#) topic for more information.

Remove the water pump. See the [Water Pump](#) topic for more information.

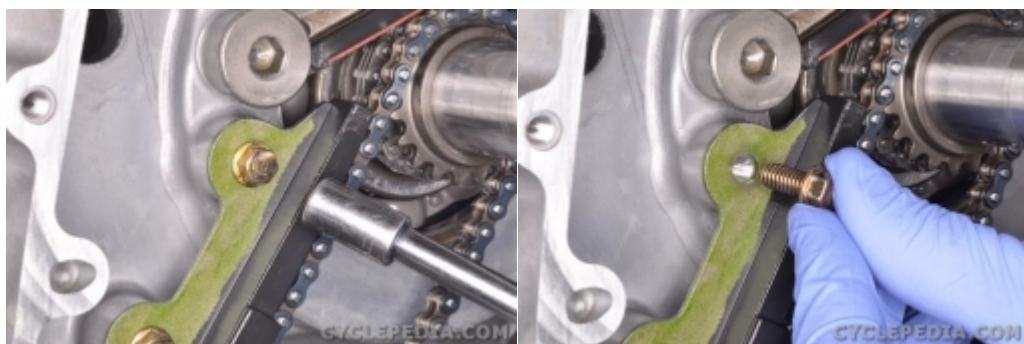
Remove the recoil starter. See the [Recoil Starter Cover](#) topic for more information.

Remove the left crankcase cover. See the [Generator Cover](#) topic for more information.

Remove the flywheel. See the [Flywheel](#) topic for more information.



The oil pump is driven by a chain off the crankshaft.



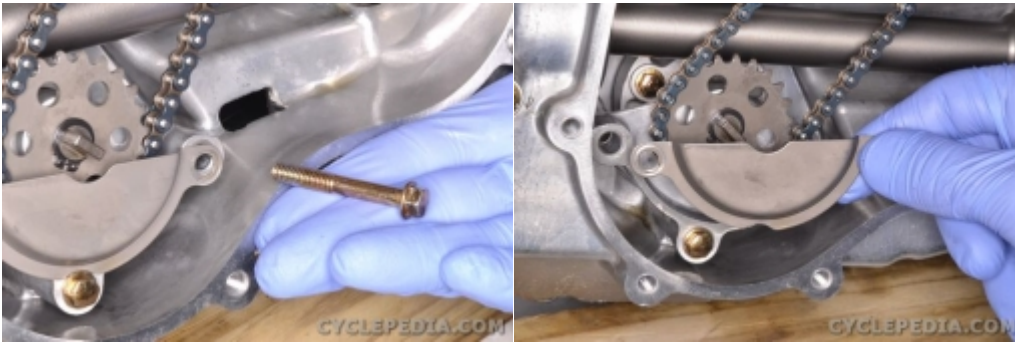
Remove the two oil pump chain guide bolts with an 8 mm socket.



Remove the oil pump chain guide.



Loosen the two oil pump oil separator bolts with an 8 mm socket.



Remove the oil separator bolts and the oil separator.



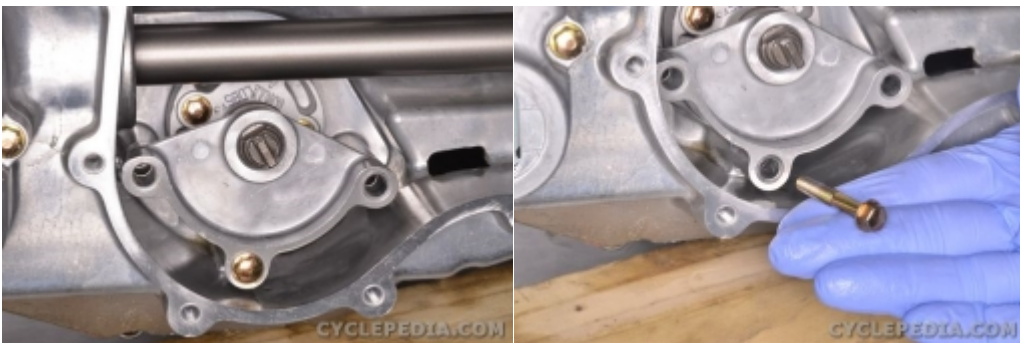
Remove the snap ring with snap ring pliers.



Slide the oil pump sprocket off of the oil pump shaft.



Free the oil pump chain from the crankshaft and remove the oil pump sprocket and chain.



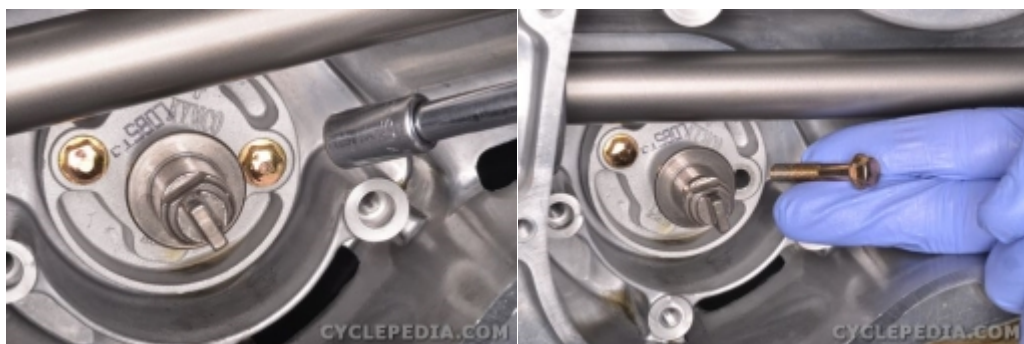
Remove the oil pump shaft holder bolt with an 8 mm socket.



Remove the oil pump shaft holder.



Remove the two oil pump shaft holder dowel pins.



Remove the two oil pump bolts with an 8 mm socket.



Remove the oil pump.

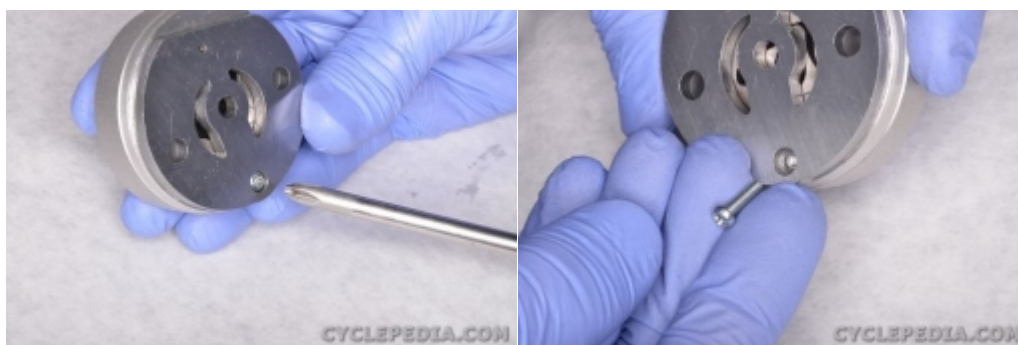
Turn the oil pump shaft and make sure it turns smoothly.

Disassembly



Slide the oil pump shaft out of the oil pump.





Remove the oil pump cover screw.



Remove the oil pump cover.



Remove the oil pump dowel pin.



Remove the inner and outer oil pump rotors.

Inspection



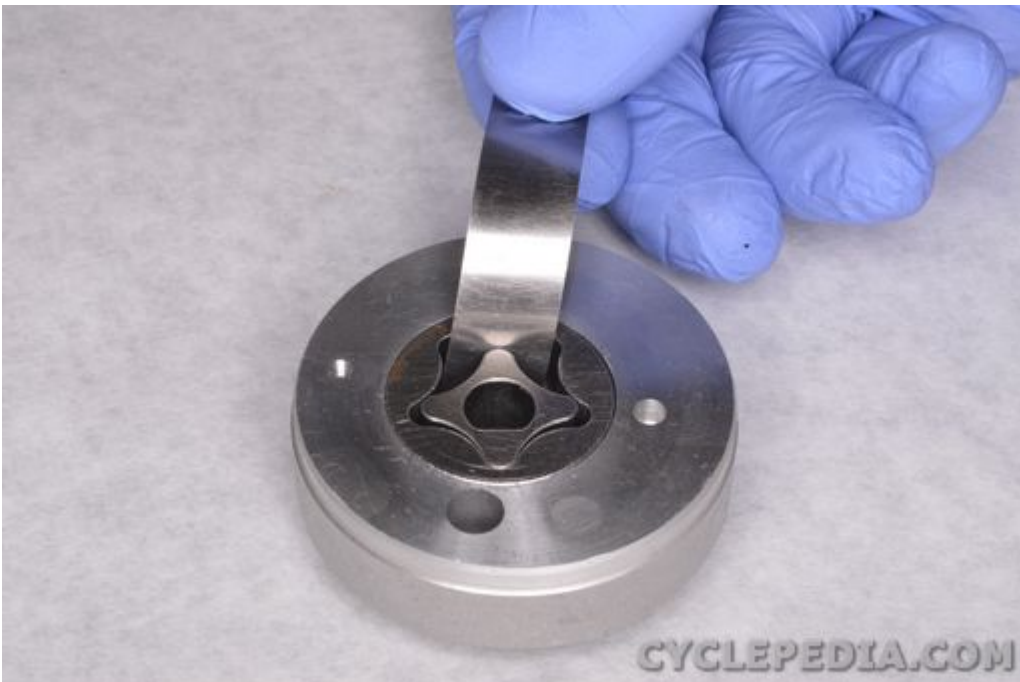
Check the oil pump chain guide for signs of excessive wear and damage. Replace it as needed.



Inspect the oil pump chain and sprocket for excessive wear and damage. Replace these components as needed.



Use a feeler gauge set to check the clearance between the outer oil pump rotor and the body (body clearance).



Use a feeler gauge set to check the clearance between the inner and outer rotors (tip clearance).



Place a straight edge across the oil pump body and rotors. Check the side clearance with a feeler gauge.

ITEM		STANDARD mm (in)	SERVICE LIMIT
Oil pump rotor	Tip clearance	0.15 (0.006) max	0.2 (0.008)
	Body clearance	0.15 - 0.2 (0.006 - 0.008)	0.25 (0.01)
	Side clearance	0.04 - 0.09 (0.0016 - 0.0036)	0.12 (0.0048)

Replace the oil pump if the oil pump rotors are damaged or the measurements are out of specification.

Assembly

Lubricate the rotating parts in fresh engine oil.



Fit the outer and inner rotors into the oil pump body.

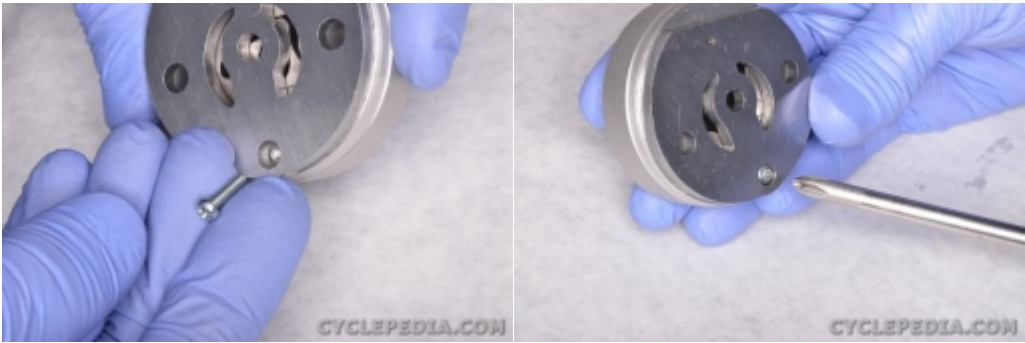


Install the oil pump dowel pin.



Install the oil pump cover.





Install the oil pump cover screw and tighten it to specification with a #2 Phillips screwdriver.

ITEM	N-m	kgf-m	ft-lb
Oil pump screw	3	0.3	2



Slide the oil pump shaft into the oil pump.

Installation



Fit the oil pump into place with the arrow pointing up.



Insert the two oil pump mounting bolts and tighten them securely



Turn the oil pump shaft and make sure it turns smoothly.



Install the two oil pump shaft holder dowel pins.



Fit the oil pump shaft holder into place.



Install the oil pump shaft holder bolt. Do not tighten, yet.



Fit the oil pump sprocket and chain into place. Engage the chain to its drive sprocket on the crankshaft.



Fit the oil pump sprocket onto the oil pump shaft.



Install the new snap ring with snap ring pliers.



Install the oil separator and the two mounting bolts.

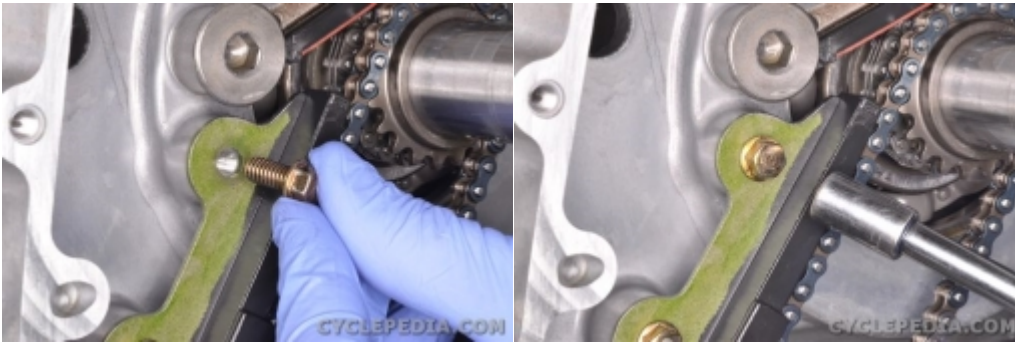


Tighten the oil pump holder shaft bolt and two oil separator mounting bolts securely with an 8 mm socket. Tighten the bolts evenly in a crisscross pattern.



Fit the oil pump chain guide into place.





Install the two oil pump chain guide bolts and tighten them securely with an 8 mm socket.

Install the flywheel. See the [Flywheel](#) topic for more information.

Install the left crankcase cover. See the [Generator Cover](#) topic for more information.

Install the recoil starter. See the [Recoil Starter Cover](#) topic for more information.

Install the water pump. See the [Water Pump](#) topic for more information.

Fill the engine oil. See the [Engine Oil](#) topic for more information.

Fill the coolant. See the [Coolant](#) topic for more information.

Install the frame covers. See the [Frame Covers](#) topic for more information.

Cam Chain

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

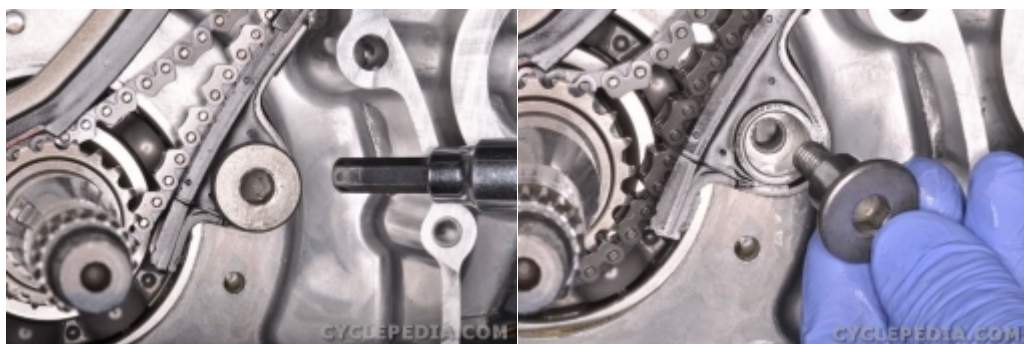
Removal

Remove the following components:

- [Cylinder Head](#)
- [Cylinder and Piston](#)
- [Recoil Starter Cover](#)
- [Generator Cover](#)
- [Flywheel](#)
- [Oil Pump](#) - Oil pump sprocket and chain



There are two cam chain guides that are mounting on pivot bolts. The larger guide is the one that is contacted by the cam chain tensioner.



Remove the two cam chain guide pivot bolts with an 8 mm Allen.



Inspect the cam chain guides for excessive wear and damage. Replace the guides as needed.



Remove the cam chain.



Inspect the cam chain for kinking, fatigue, and damage. Replace the cam chain as needed.

Installation

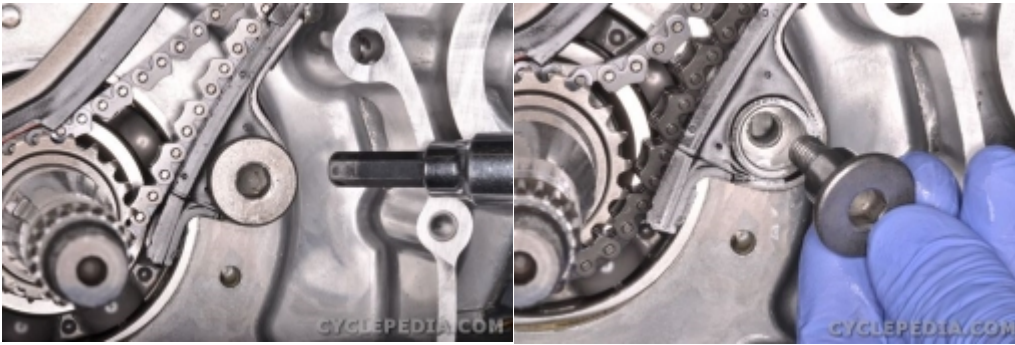


Fit the cam chain into place. Of the two sprockets on the crankshaft the cam chain's timing sprocket is the inner sprocket. The outer sprocket is the oil pump drive chain sprocket.



Install the two cam chain guides. The larger guide is on the tensioner side.





Install the two cam chain guide pivot bolts and tighten them to specification with an 8 mm Allen.

ITEM	N-m	kgf-m	ft-lb
Cam chain guide pivot bolt	20	2.0	15

Install the following components:

- [Oil Pump](#) - Oil pump sprocket and chain
 - [Flywheel](#)
 - [Generator Cover](#)
 - [Recoil Starter Cover](#)
 - [Cylinder and Piston](#)
 - [Cylinder Head](#)
-

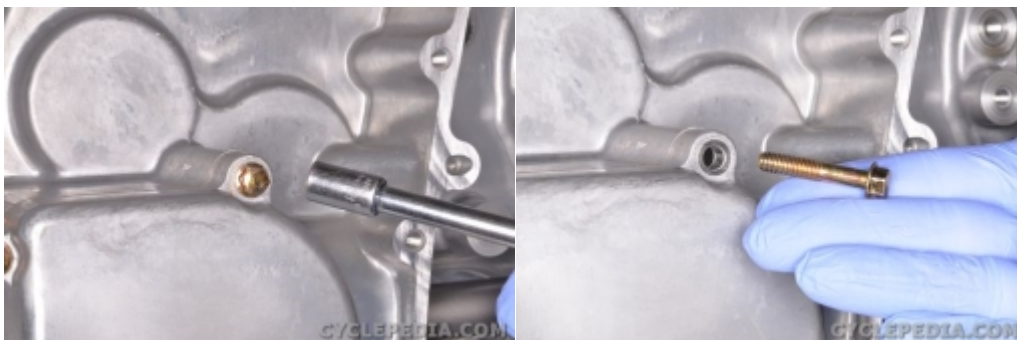
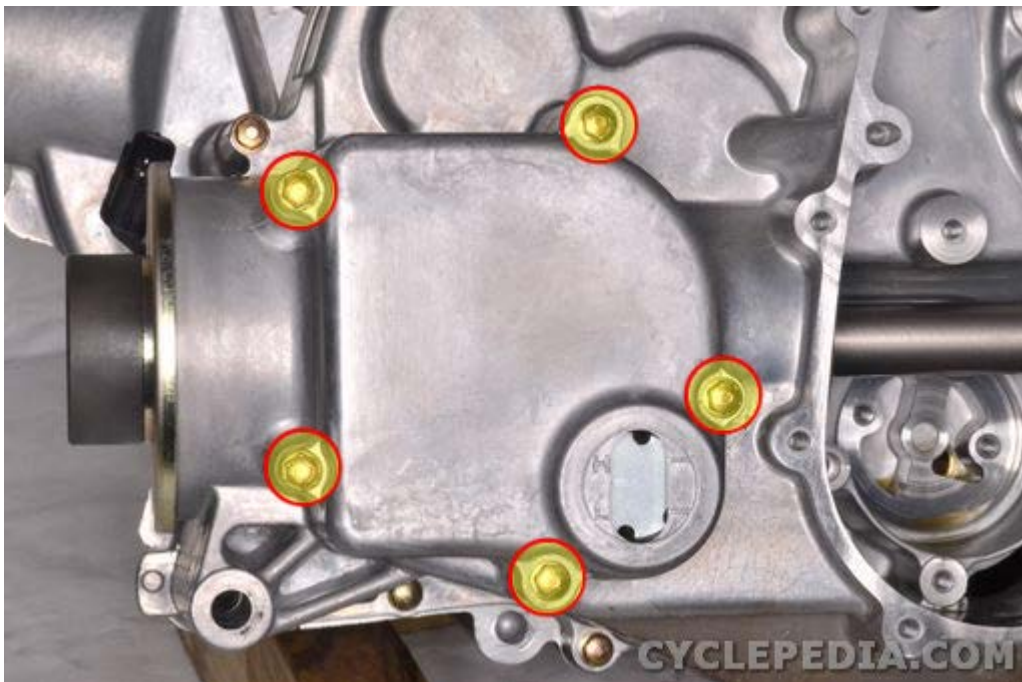
Output Shaft and Bevel Gear

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the engine. See the [Engine Removal](#) topic for more information.

Bevel Gear Cover



Remove the five bevel gear case cover bolts with an 8 mm socket.



Remove the bevel gear cover.



Remove the gasket and the two bevel gear cover dowel pins.

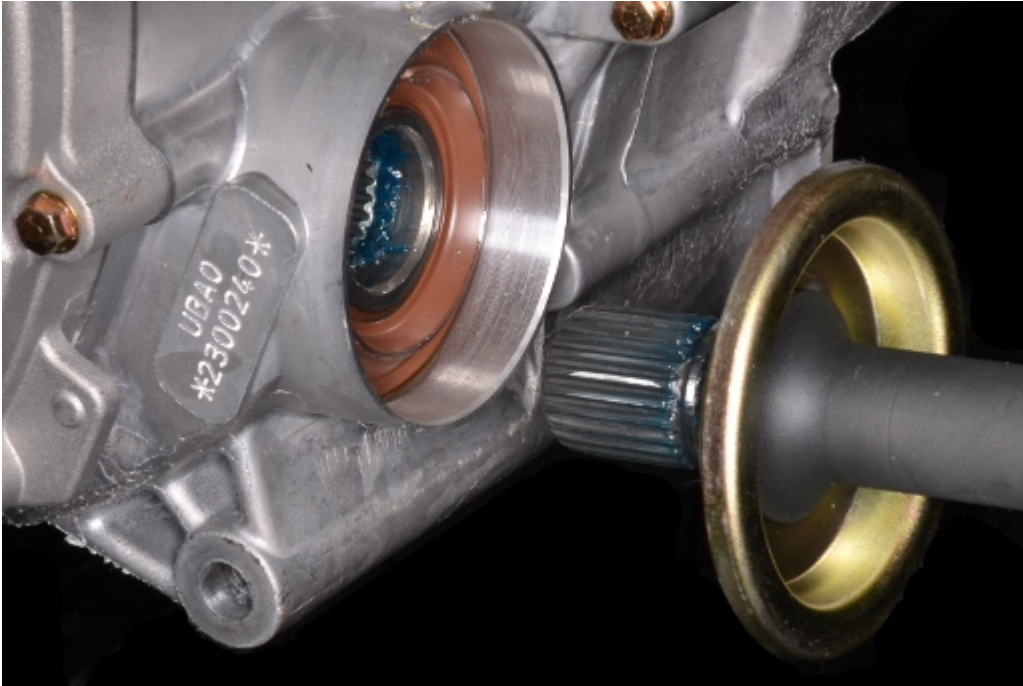


Inspect the oil sight glass and replace it as needed.

Output Shaft and Bevel Gears



Unstake the output shaft nut with a chisel and a hammer.



Insert the forward propeller shaft and hold it to keep the output shaft from turning.



Loosen the output shaft nut with a 26 mm socket.



Remove output shaft nut.



Remove the front propeller shaft coupler from the engine.



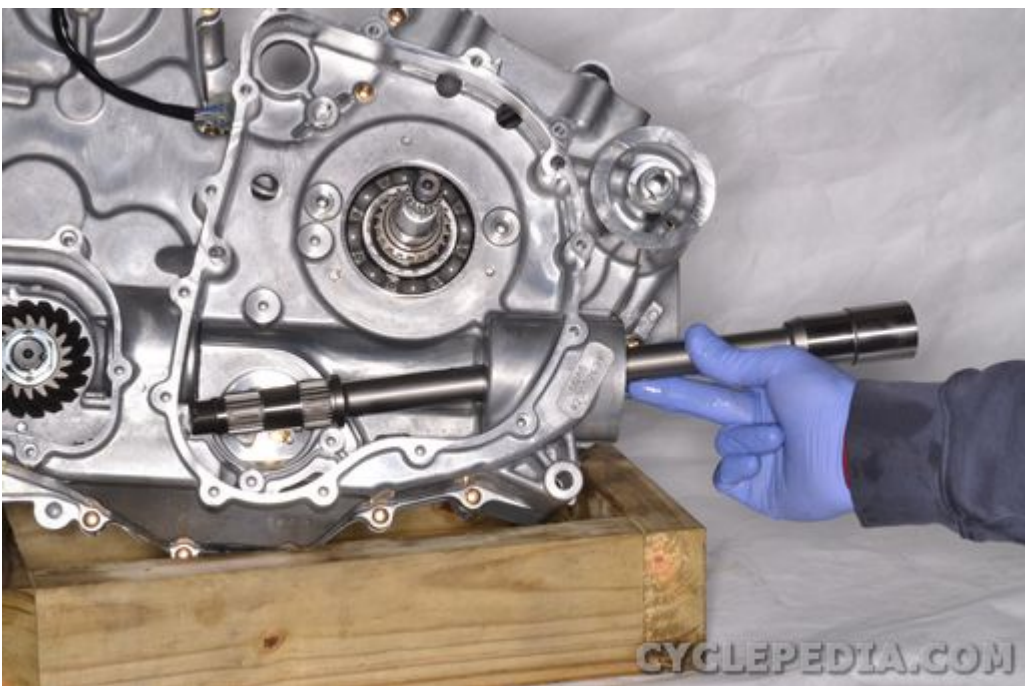
Tap the output shaft forward with a rubber mallet.



Move the output shaft forward so that the driven bevel gear can be removed.



Remove the driven bevel gear and shim.



Slide the output shaft out of the engine.



Unstake drive bevel gear nut with a chisel and a hammer.

Remove the belt case cover. See the [CVT Removal](#) topic. Hold the driven pulley with a Y-type holder.

Special Tool -

Y-Type Holder: A120E00056



Loosen the drive bevel gear nut with a deep well 26 mm socket.



Remove the drive bevel gear nut.

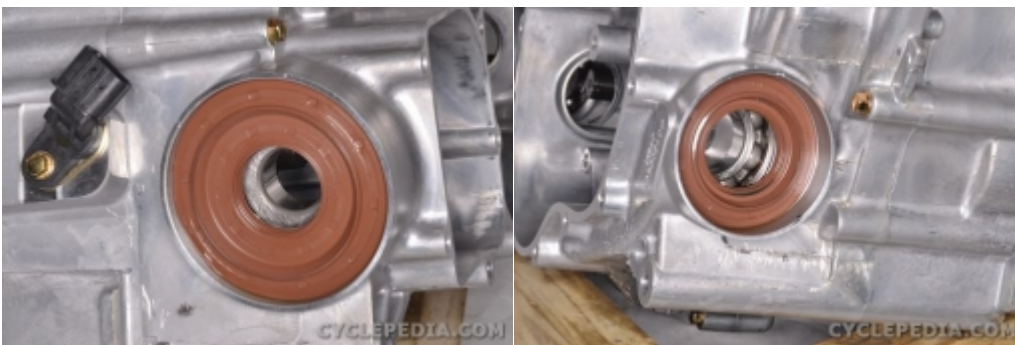


Slide off the drive bevel gear.



Remove the drive bevel gear shim.

Seals and Bearings



Inspect the propeller shaft oil seals for leaks and damage.



Inspect the bearings by turning them with a finger. Replace the bearings if they do not turn smoothly.



Remove the seals with a seal pick if needed. Replace the oil seals with new items if they are removed.



If the front bearing needs to be replaced the lock nut must be removed.



Remove the lock nut with the special tool.

Special Tool -

Nut Wrench: A120E00066



Remove the front bearing with a suitable bearing puller.

Special Tool-

Bearing Puller: A120E00037



Drive in the new bearing with a suitable driver that is the same outside diameter as the bearing. The manufactures markings on the bearing must face out.

Special Tool -

Bearing Driver: A120E00014



Install the lock nut with the special tool.

Special Tool -
Nut Wrench: A120E00066



Torque the lock nut to specification with the special tool.

ITEM	N-m	kgf-m	ft-lb
Driven pulley nut	110	11	79.2



If the rear bearing is to be replaced the snap ring must be removed.



Remove the bearing snap ring with snap ring pliers.



Remove the rear bearing with a suitable bearing puller.

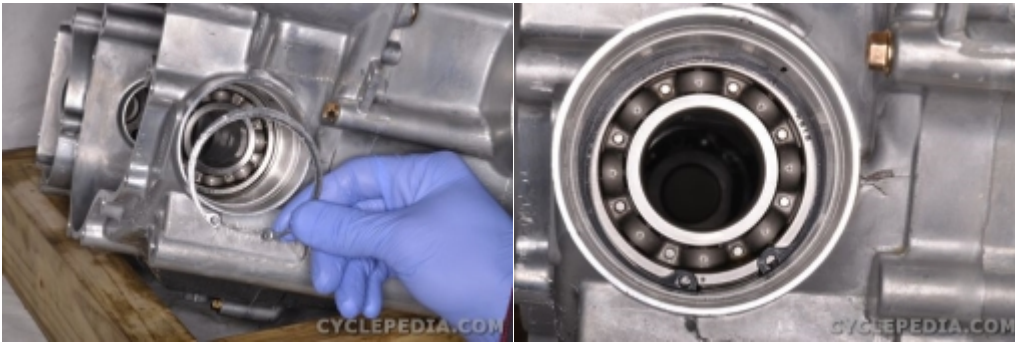
Special Tool- Bearing Puller: A120E00037



Drive in the new bearing with a suitable driver that is the same outside diameter as the bearing. The manufactures markings on the bearing must face out.

Special Tool -

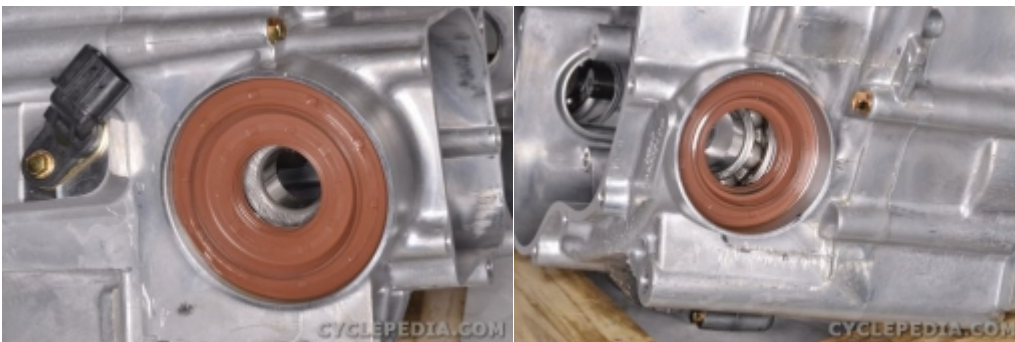
Bearing Driver: A120E00014



Install a new snap ring with snap ring pliers.



Lubricate the lips of the new oil seals with fresh engine oil.



Press in the new seals with a suitable driver with the same outside diameter as the seals.

Inspection



Inspect the propeller shaft couplers for wear and damage.



Inspect the bevel gears for wear and damage.



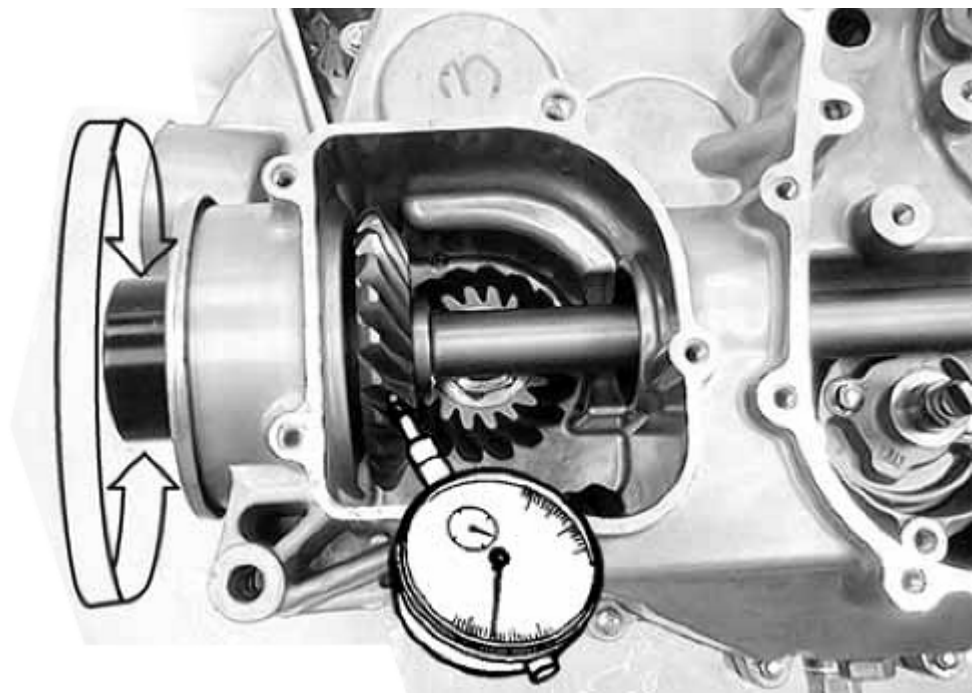
Inspect the output shaft for damage and wear.

Bevel Gear Backlash

Remove the bevel gear cover. The bevel gears must be installed as normal.



Set a dial gauge on the driven bevel gear as shown.



Measure the backlash by turning the rear propeller shaft in each direction, reading the total backlash on the dial gauge. If the backlash is not within specification, the shim must be changed and the backlash should be rechecked until correct.

Bevel gear backlash	0.03 - 0.15 mm (0.001 - 0.006 in)
---------------------	-----------------------------------

See the chart for appropriate shim thickness.

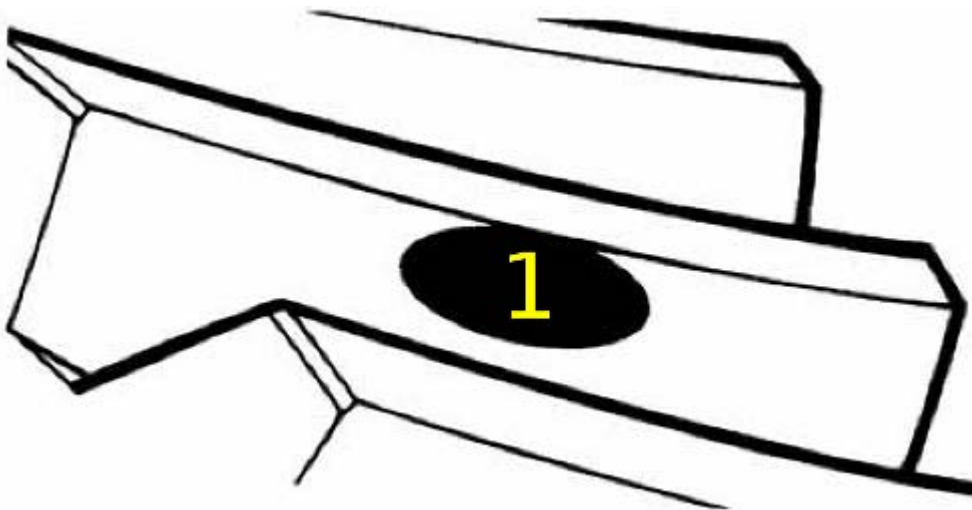
Backlash	Shim Adjustment
under 0.03 mm (0.001 in)	Reduce shim thickness
0.03 - 0.15 mm (0.001 - 0.006 in)	Correct shim thickness
over 0.15 mm (0.006 in)	Increase shim thickness

Drive/Driven bevel gear shims	
A	0.6 mm (0.024 in)
B	0.65 mm (0.026 in)
C	0.7 mm (0.028 in)
D	0.75 mm (0.03 in)
E	0.8 mm (0.032 in)
F	0.85 mm (0.034 in)
G	0.9 mm (0.036 in)
H	0.95 mm (0.038 in)
I	1 mm (0.04 in)
J	1.05 mm (0.042 in)
K	1.1 mm (0.044 in)
L	1.15 mm (0.046 in)

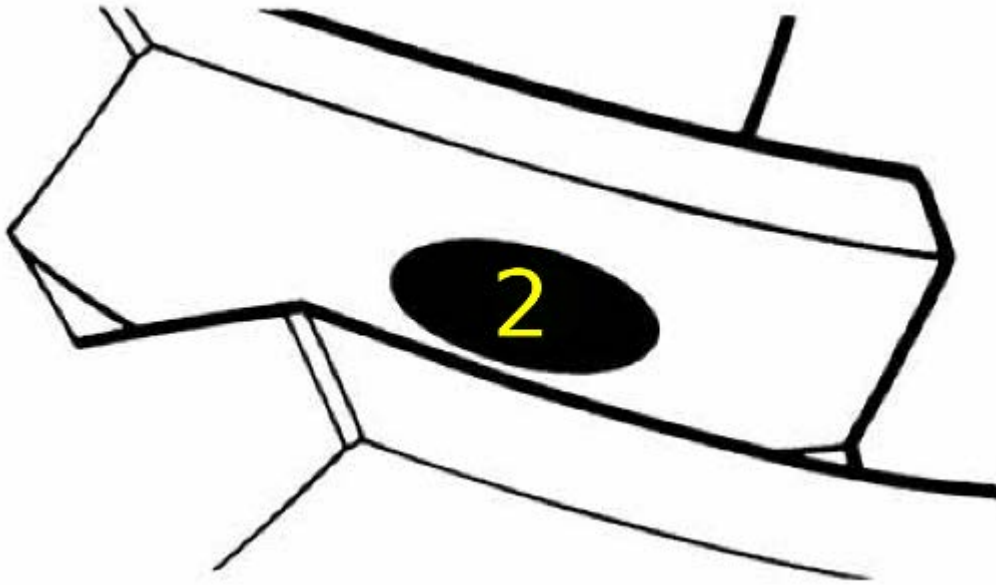
Bevel Gear Tooth Contact

After the backlash adjustment is carried out, the tooth contact must be checked as indicated below.

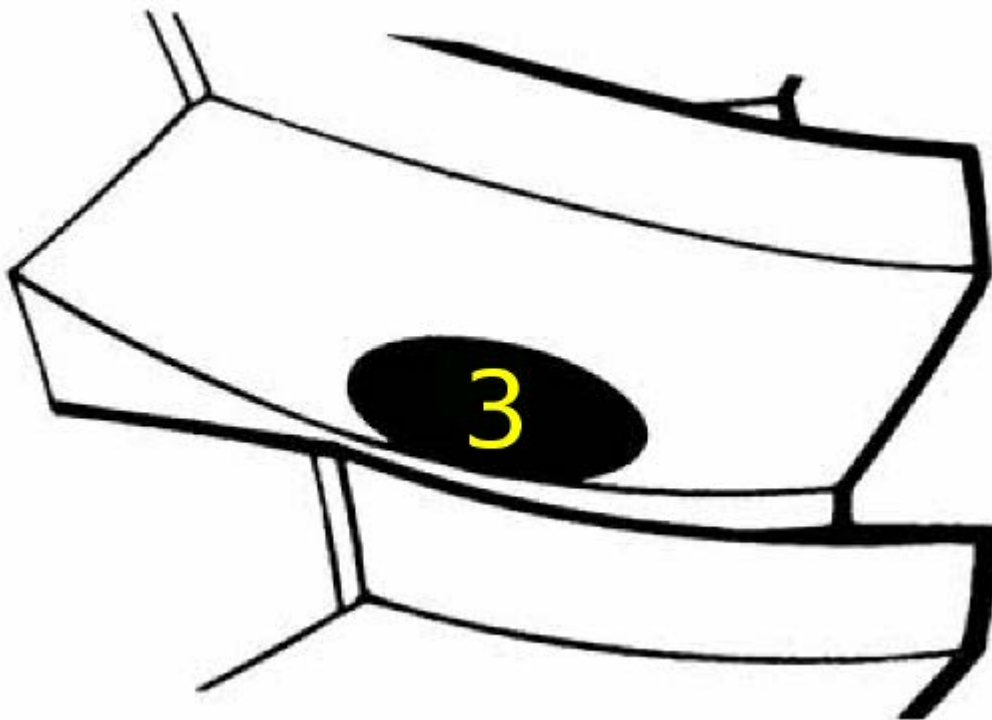
- Remove the driven bevel gear.
- Clean and degrease the teeth of the drive and driven bevel gears. Apply a coating of machinist's layout dye or paste to several teeth of the driven bevel gear.
- Install the driven bevel gear.
- Rotate the rear propeller shaft several turns in both directions.
- Remove the driven bevel gear and inspect the coated teeth of the drive bevel gear. The tooth contact pattern should be as shown the examples 1, 2 and 3.



1 - Incorrect (contact at tooth top)



2 - Correct



3 -

- If tooth contact is found to be correct (example 2) complete the installation.
- If tooth contact is found to be incorrect (examples 1 and 3), the shim thickness between the drive bevel gear and driven bevel gear must be changed and the tooth contact rechecked until correct.

Tooth Contact	Drive Bevel Gear Shim Adjustment	Driven Bevel Gear Shim Adjustment
Contact at tooth top (1)	Increase shim thickness	Increase shim thickness
Contact at tooth root (3)	Reduce shim thickness	Reduce shim thickness

Make sure to check the backlash after the tooth contact has been adjusted. The tooth contact shim adjustment may have changed the backlash. Adjust the tooth contact and backlash until they are both within specification. If the correct tooth contact cannot be maintained when adjusting the backlash, replace the drive and driven bevel gears.

Installation

Output Shaft and Bevel Gears



Install the drive bevel gear shim.



Slide on the drive bevel gear.



Lubricate the new drive bevel gear lock nut threads with engine oil. Thread on the new drive bevel gear lock nut.

Hold the driven pulley with a Y-type holder.

Special Tool -

Y-Type Holder: A120E00056



Tighten the drive bevel gear nut to specification with a deep well 26 mm socket.

ITEM	N-m	kgf-m	ft-lb
Drive bevel gear lock nut	140	14	100.8



Stake the drive bevel gear lock nut with a chisel and a hammer.



Slide the output shaft into the engine as shown.



Fit the driven bevel gear and shim into place.



Guide the output shaft through the driven bevel gear and shim.



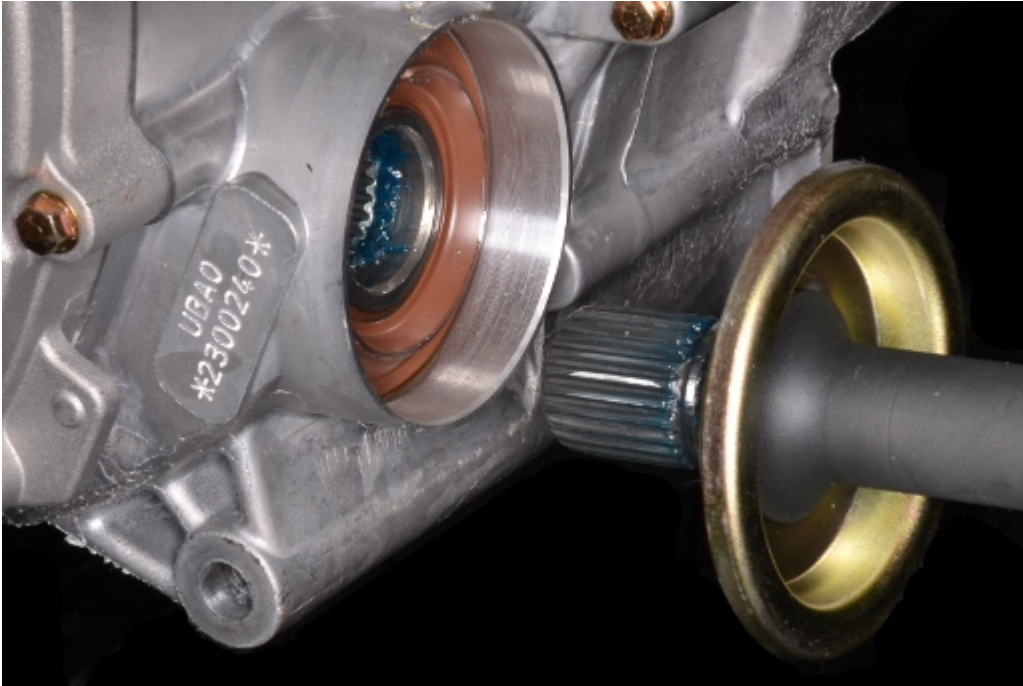
The output shaft must protrude through the seal.



Install the front propeller shaft coupler.



Lubricate the new output shaft nut threads with engine oil. Install the new output shaft nut.



Insert the rear propeller shaft and hold it to keep the output shaft from turning.



Tighten the output shaft nut to specification with a 26 mm socket.

ITEM	N-m	kgf-m	ft-lb
Driven bevel gear lock nut	140	14	100.8



Stake the output shaft nut with a chisel and a hammer.

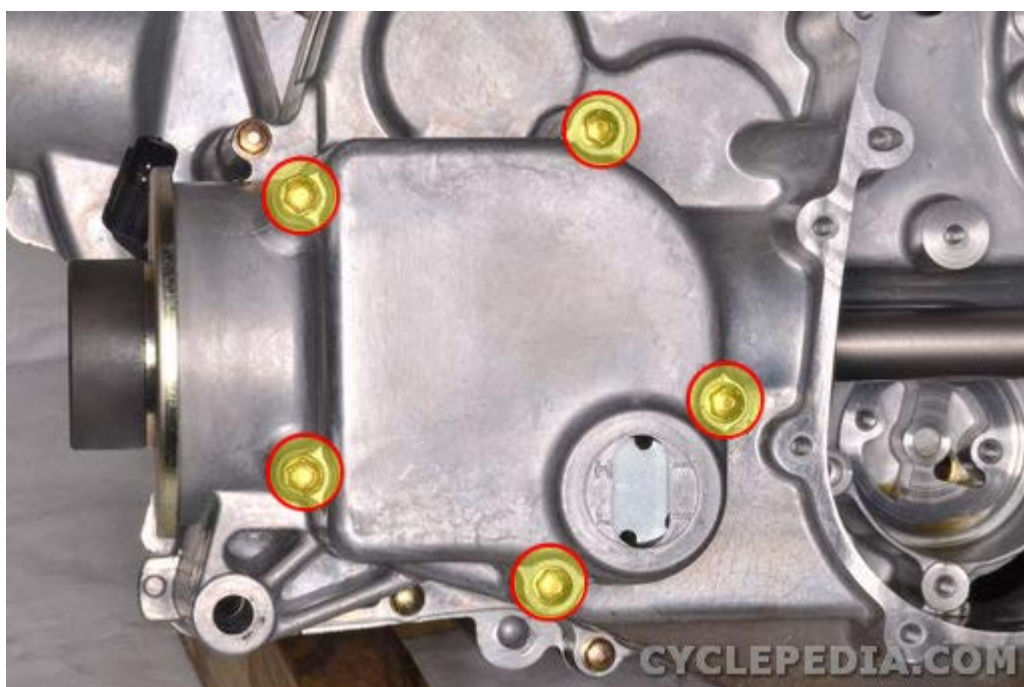
Bevel Gear Cover



Install two bevel gear cover dowel pins and a new gasket.



Fit the bevel gear cover into place.





Install the five bevel gear case cover bolts. Tighten the bolts evenly and securely with an 8 mm socket.

Install the engine. See the [Engine Installation](#) topic for more information.

Clutch Removal

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the CVT belt case cover. See the [Belt Case Cover](#) topic for more information.

Remove the CVT pulleys and belt. See the [CVT Removal](#) topic for more information.



Remove the five CVT fan cover bolts with an 8 mm socket.



Remove the CVT fan cover.



Loosen the 9 clutch cover bolts a little bit at a time and in a crisscross pattern.



Remove the clutch cover bolts.

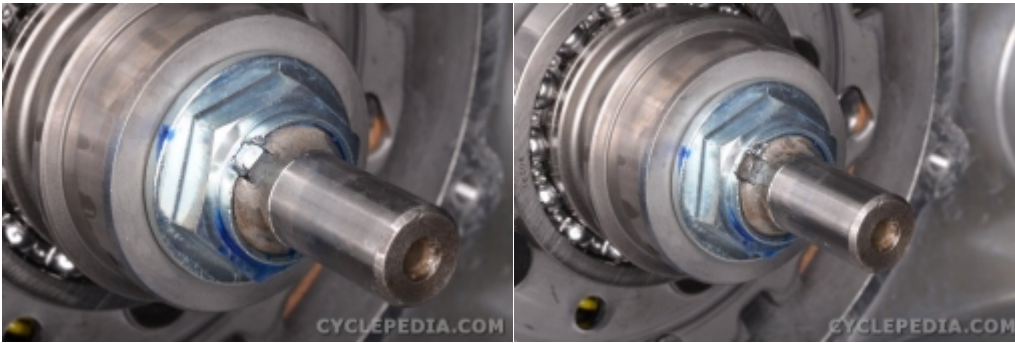


Remove the clutch cover assembly evenly.



Remove the two dowel pins and the clutch cover gasket.





Free the stake on the clutch nut with a chisel and a hammer.



Hold the clutch with the Y-type holder and loosen the clutch nut with a commercially available 26 mm deep well socket.

Special Tool -

Y-Type Holder: A120E00056



Remove the clutch nut.



Slide off the outer clutch collar.



Slide the clutch assembly off of the crankshaft.



Slide off the inner clutch collar.

Inspection



Remove the clutch outer and drive pulley shaft from the clutch cover.



To check the one-way clutch in the clutch outer temporarily install the clutch and set the clutch outer in place without the cover.



When turning the clutch outer clockwise, the clutch outer should turn freely. If not, the one-way clutch assembly is faulty and should be replaced.

When turning the clutch outer counterclockwise, the clutch outer and crankshaft should engaged by the one-way clutch. If not, the one-way clutch assembly is faulty and should be replaced.



Remove the one-way clutch and replace it as needed.

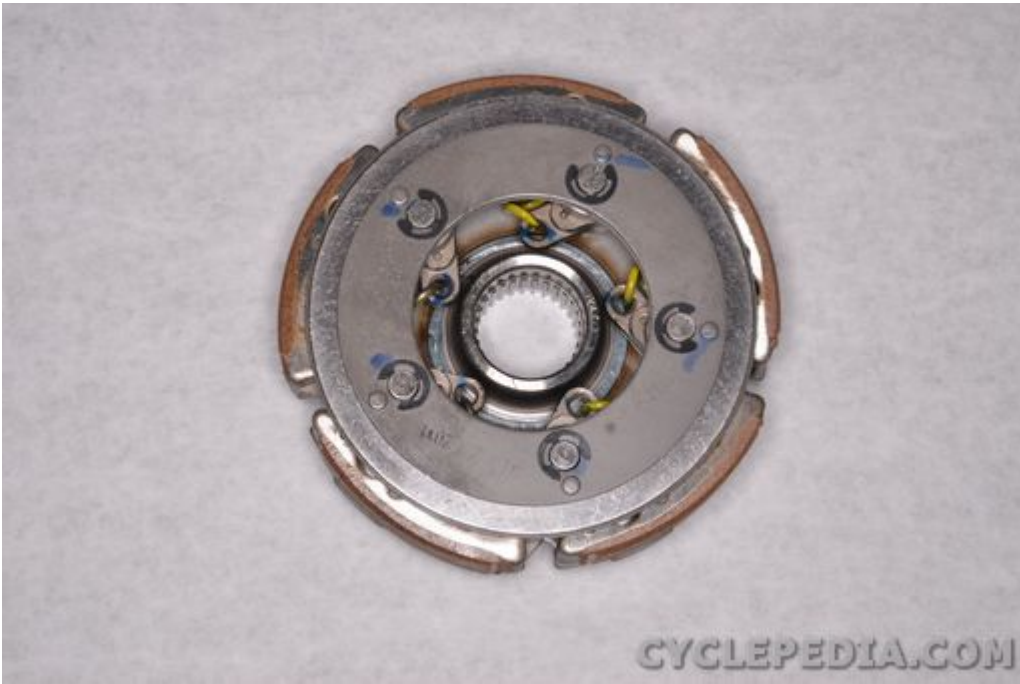
Install the clutch outer to the crankshaft with without the clutch and collars. When turning the clutch outer clockwise or counterclockwise, the clutch outer should turn smoothly. If not, the needle bearing or the clutch outer is damaged. Inspect these components.



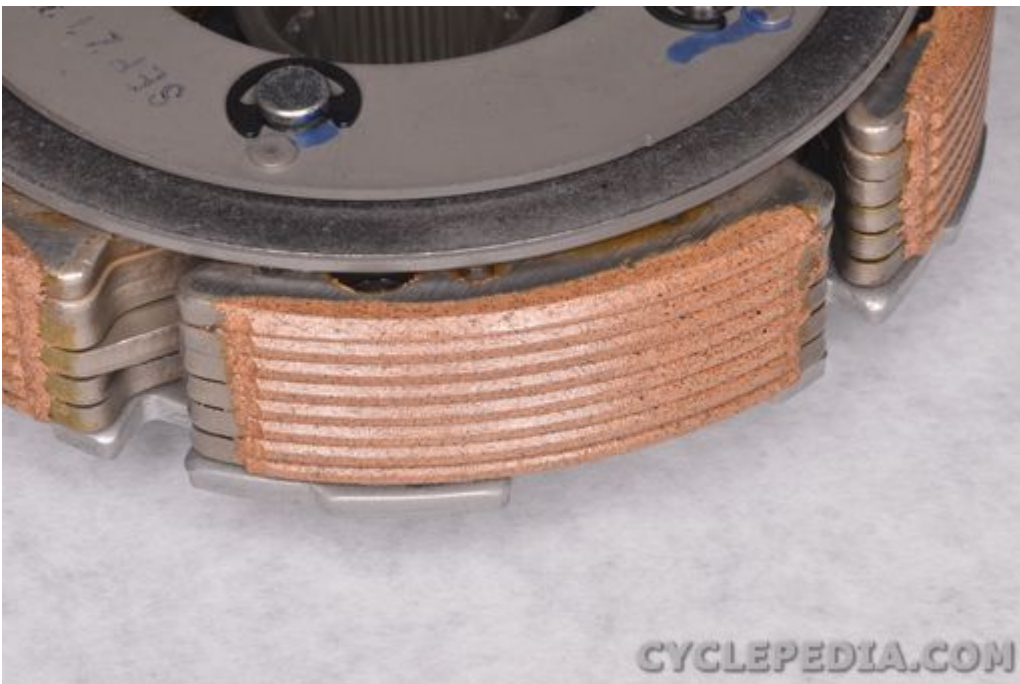
Inspect the inside of the clutch outer and needle bearing for wear and damage. Replace the components as needed.



If the needle bearing is in poor condition remove the snap ring and replace the bearing. Press in a new bearing and secure it with a new snap ring. Make sure the snap ring is secure in its groove.



Check the clutch linings for abnormal wear and damage.



Replace the clutch if the lining thickness is below 1 mm (0.04 in).



Inspect the clutch bearing by turning it with a finger. Replace the bearing if it doesn't turn smoothly or it has excessive play.



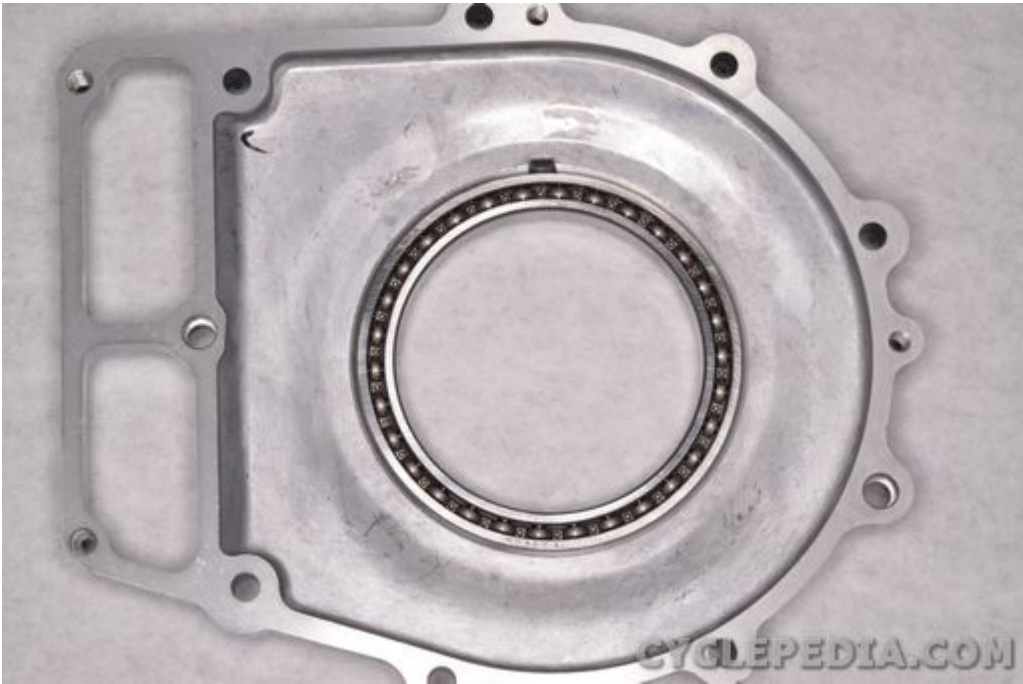
Inspect the clutch cover oil seal and replace it as needed.



Inspect the large ball bearing in the clutch cover. Turn the bearing with a finger. Replace the bearing if it doesn't turn smoothly. Remove the seal cover to replace the bearing.



Remove the four seal cover bolts with an 8 mm socket. Take off the seal cover and discard the gasket.



Drive the bearing out from the outside of the clutch cover. Drive in the new bearing from the inside of the clutch cover. Use a suitable driver that is the same outside diameter as the bearing. The manufactures markings on the bearing must face out.



Press a new seal into the seal cover. Use a suitable driver that is the same outside diameter as the seal.



Apply a light coat lightweight lithium-soap based grease to the lips of the oil seal.
For clutch assembly and installation see the [Clutch Installation](#) topic for more information.
Install the CVT belt case cover. See the [Belt Case Cover](#) topic for more information.

Clutch Installation

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.



Fit the seal cover to the clutch cover with a new gasket.



Install the four seal cover bolts and tighten them securely with an 8 mm socket.



Install the one-way clutch into the clutch outer if it was removed. Lubricate the one-way clutch bearings with molybdenum disulfide grease.



Apply a light coat lightweight lithium-soap based grease to the lips of the oil seal. Lubricate the clutch bearings with fresh engine oil. Fit the clutch outer into the clutch cover.



Lubricate the inner clutch collar with fresh engine oil and slide it onto the crankshaft as shown.



Slide the clutch onto the crankshaft. Be sure to align the splines.



Slide the outer clutch collar onto the crankshaft.



Thread on a new clutch lock nut.

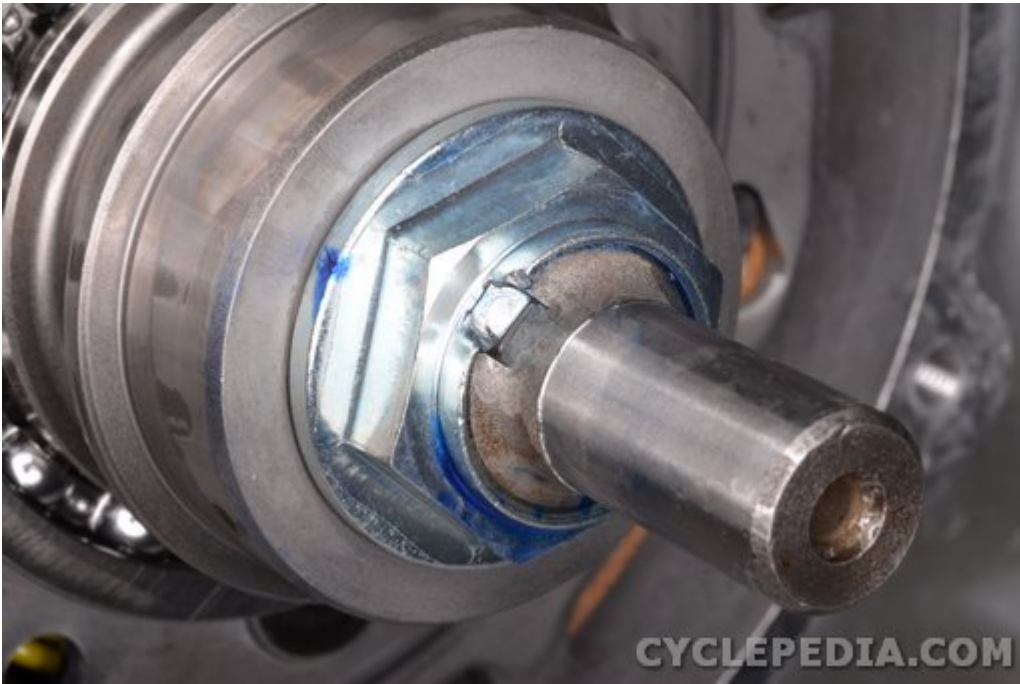


Hold the clutch with the Y-type holder and torque the clutch nut to specification with a deep well commercially available 26 mm socket.

Special Tool -

Y-Type Holder: A120E00056

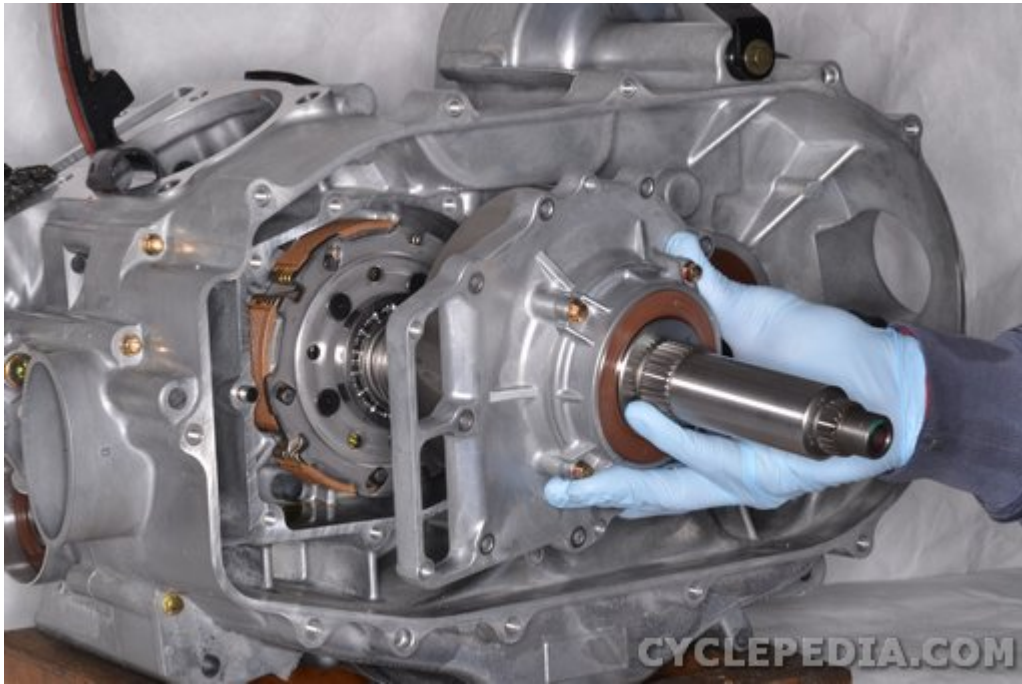
ITEM	N-m	kgf-m	ft-lb
Clutch nut	140	14	100.8



Stake the clutch nut at the groove on the crankshaft with a chisel and a hammer. Be careful to avoid damaging the threads.



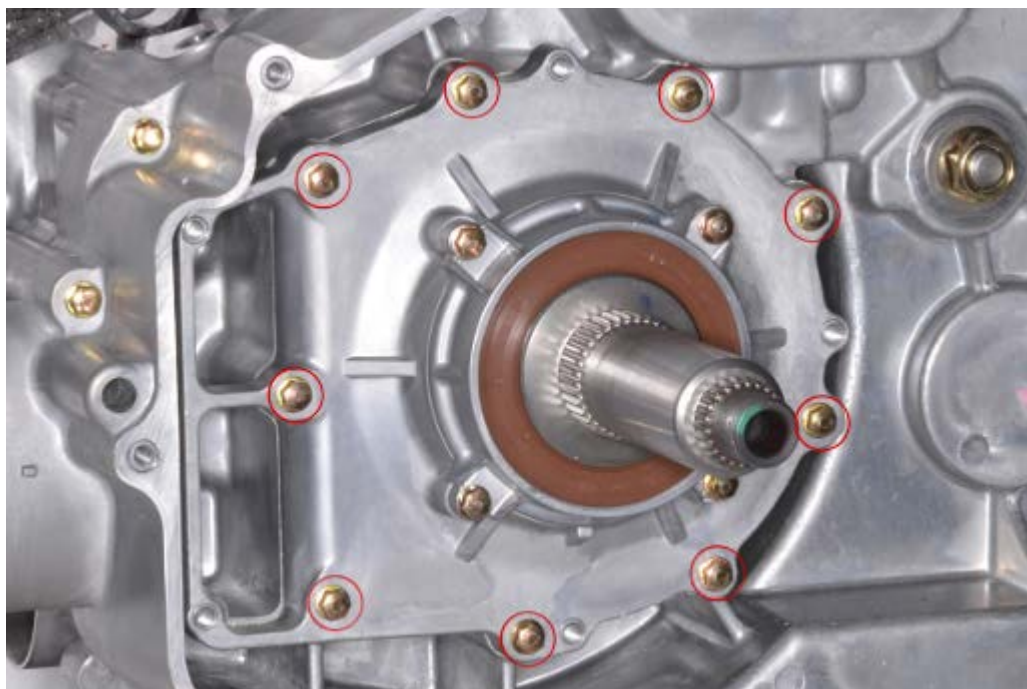
Install the two dowel pins and a new clutch cover gasket.



Guide the clutch cover assembly into place evenly.



Insert the 9 clutch cover bolts.



Tighten the clutch cover bolts a little bit at a time in a crisscross pattern. Torque the bolts to specification with an 8 mm socket.

ITEM	N-m	kgf-m	ft-lb
Clutch cover bolt	10	1	7.2



Install the CVT fan cover.



Install the five CVT fan cover bolts and tighten them securely with an 8 mm socket.

Install the CVT pulleys and belt. See the [CVT Installation](#) topic for more information.

Crankcase

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Splitting

Remove the engine from the frame. See the [Engine Removal](#) topic for more information.

Remove the following engine components:

- [Cylinder Head Cover](#)
- [Camshaft](#)
- [Cylinder Head](#)
- [Cylinder and Piston](#)
- [Recoil Starter Cover](#)
- [Water Pump](#)
- [Generator Cover](#)
- [Flywheel](#)
- [Oil Pump](#)
- [Cam Chain](#)
- [Belt Case Cover](#)
- [Output Shaft and Bevel Gear](#)
- [CVT Removal](#)
- [Clutch Removal](#)
- [Starter Motor](#)



Loosen the shift cam stopper plug with a 14 mm socket.



Remove the stopper plug, washer, spring, and stopper ball.



Inspect the shift cam stopper components and replace them as needed.



Remove the shift arm bolt with a 10 mm socket.



Remove the shift arm from the shift shaft.



Remove the gear position indicator switch bolt with an 8 mm socket.



Remove the gear position indicator switch. Note its position so that it can be returned to its original orientation.



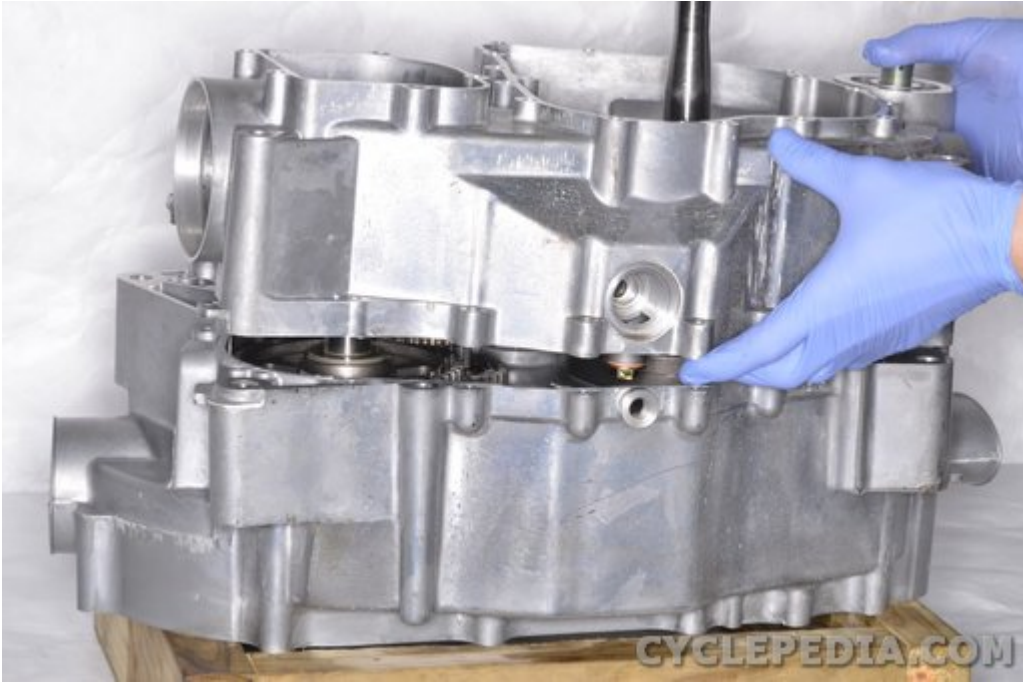
Remove the four bolts from the CVT side of the crankcase. There are three bolts on the clutch end, and one bolt on the other end. Remove the bolts with an 8 mm socket.



Loosen the 15 generator side crankcase bolts evenly and in a crisscross pattern.



Remove the generator side crankcase bolts with an 8 mm socket.



Utilize the pry points and separate the halves of the crankcases.



Remove the two dowel pins from the crankcase. Remove the old crankcase gasket material.

To remove the crankshaft and balancer see the [Crankshaft](#) topic.

To remove the transmission see the [Transmission Removal](#) topic.

To inspect and replace the crankcase bearings see the [Crankcase Bearings](#) topic for more information.

Oil Relief Valve



The oil relief valve is located in the crankcase.



If it is necessary, remove the oil pipe; Remove the two bolts, washers (on the oil pipe), oil pipe and washers (under oil pipe).



Remove the oil relief valve from the crankcase.



Push in on the oil relief valve piston and make sure it moves smoothly. Replace it if it sticks or refuses to move.



Discard the O-ring and replace it with a new item. Apply fresh engine oil to the new O-ring.



Fit the oil relief valve into place in the crankcase.

Assembly

Make sure the crankcase mating surfaces are clean.

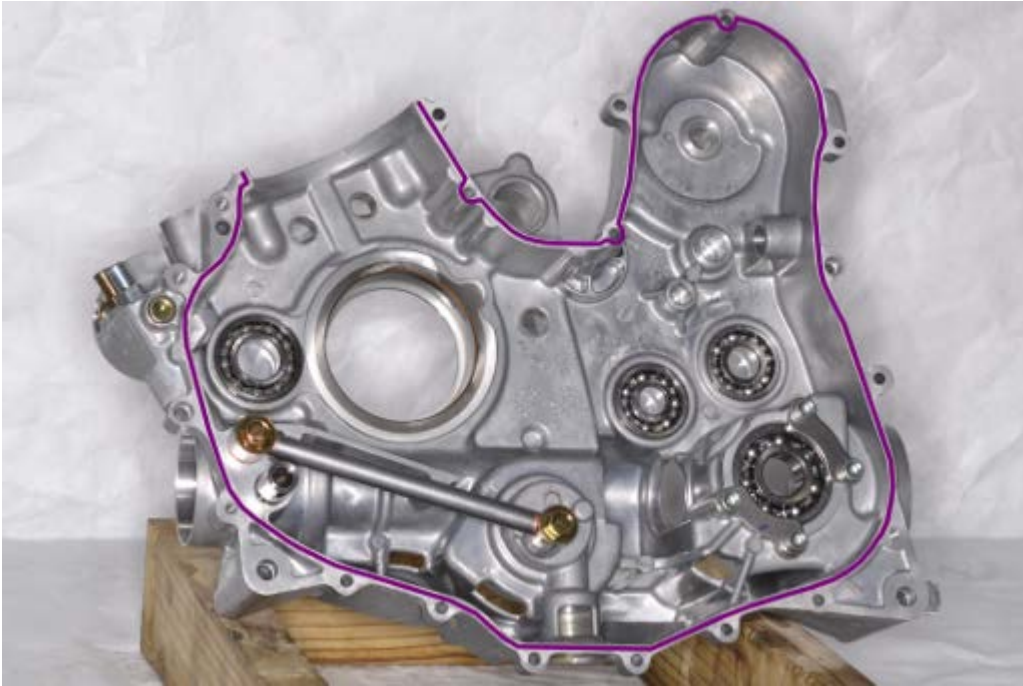


Install the inner washers on the right crankcase. Install the oil pipe with the thick side face upward. Apply clean engine oil to the bolts, then install the outer washers and two bolts. Tighten the two bolts to the specified torque.

ITEM	N-m	kgf-m	ft-lb
Oil pipe bolt	35	3.5	25.2



Install the two dowel pins into the left crankcase half.



Apply Threebond 1215 or other equivalent sealant to the crankcase mating surface. Do not allow the sealant to get into oil passages or bearings.

The crankcases must be joined in a few minutes or the sealant will not function correctly.



Fit the generator side crankcase half onto the CVT crankcase half. Make sure the shafts line up correctly.



Insert the 15 generator side crankcase bolts. Tighten the bolts evenly and in a crisscross pattern.



Torque the 15 generator side crankcase bolts to specification with an 8 mm socket.

ITEM	N-m	kgf-m	ft-lb
Crankcase bolt	12	1.2	8.6



Install the four CVT side of the crankcase bolts and tighten them to specification with an 8 mm socket.

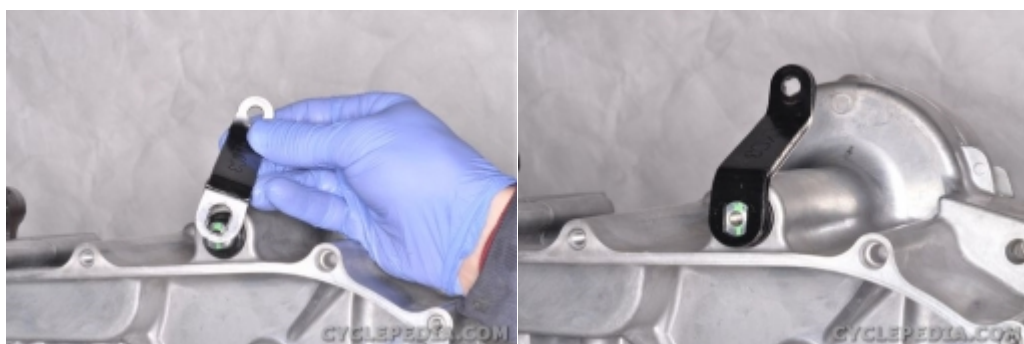
ITEM	N-m	kgf-m	ft-lb
Crankcase bolt	12	1.2	8.6



Install a new O-ring to the gear position indicator switch if needed. Lubricate the O-ring with fresh engine oil. Install the gear position indicator switch.



Install the gear position indicator switch bolt and tighten it securely with an 8 mm socket.



Install the shift arm to the shift shaft.



Install the shaft arm bolt and tighten it securely with a 10 mm socket.



Use a new sealing washer with the shift cam stopper plug.



Install the stopper plug, washer, spring, and stopper ball.



Tighten the stopper plug to specification with a 14 mm socket.

ITEM	N-m	kgf-m	ft-lb
Shift cam stopper plug	48	4.8	35

Make sure the engine shafts turn properly.

Install the following engine components:

- [Starter Motor](#)
- [Clutch Installation](#)
- [CVT Installation](#)
- [Output Shaft and Bevel Gear](#)
- [Belt Case Cover](#)
- [Cam Chain](#)
- [Oil Pump](#)
- [Flywheel](#)
- [Generator Cover](#)
- [Recoil Starter Cover](#)
- [Cylinder and Piston](#)
- [Cylinder Head](#)
- [Camshaft Installation](#)
- [Cylinder Head Cover](#)

Install the engine. See the [Engine Installation](#) topic.

Crankshaft

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Split the crankcases. See the crankcase [Crankcase](#) topic for more information.

Remove the transmission. See the [Transmission Removal](#) topic for more information.



Remove the crankshaft and balancer shaft together.

Inspection



Inspect the balancer shaft for wear and damage.

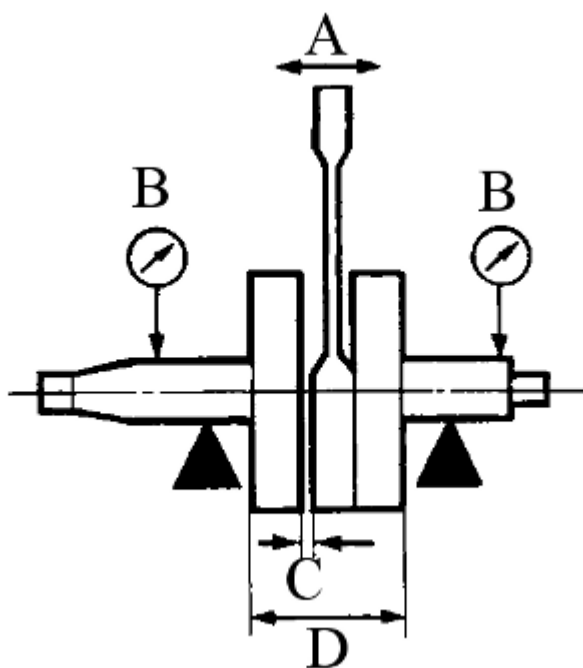


Inspect the crankshaft for wear or damage. Turn the crank bearings with a finger and make sure they turn smoothly. Replace the crankshaft if the bearings are faulty.



Measure the inside diameter of the small end of the connecting rod.

Item	Standard	Service Limit
Connecting rod small end I.D. bore	22.016 - 22.034 (0.8806 - 0.8814)	22.06 (0.8824)



Place the crankshaft on V-blocks and measure the runout on each side with a dial gauge. Check the side clearance of the big end of the connecting rod with a feeler gauge.

Item			Standard mm (in)	Service Limit
Crankshaft	Connecting rod big end side clearance (C)	Not USA type	0.01 - 0.4 (0.002 - 0.016)	0.6 (0.024)
		USA type	0.3 - 0.6 (0.012 - 0.024)	0.8 (0.032)
	Connecting rod big end radial clearance		0 - 0.008 (0 - 0.00032)	0.05 (0.002)
	Run out (B)		-	0.1 (0.004)
	Web width (D)		72 - 72.05 (2.88 - 2.882)	-
	Small end free play (A)		0.8 - 1.0 (0.032 - 0.04)	-

Installation

Lubricate the crankshaft and balancer bearings with fresh engine oil.



Fit the crank and balancer shafts into the crankcase together.



The line on the balancer sprocket must align with the line on the crankshaft.

Install the transmission. See the [Transmission Installation](#) topic for more information.

Assemble the crankcases. See the [Crankcase](#) topic for more information.

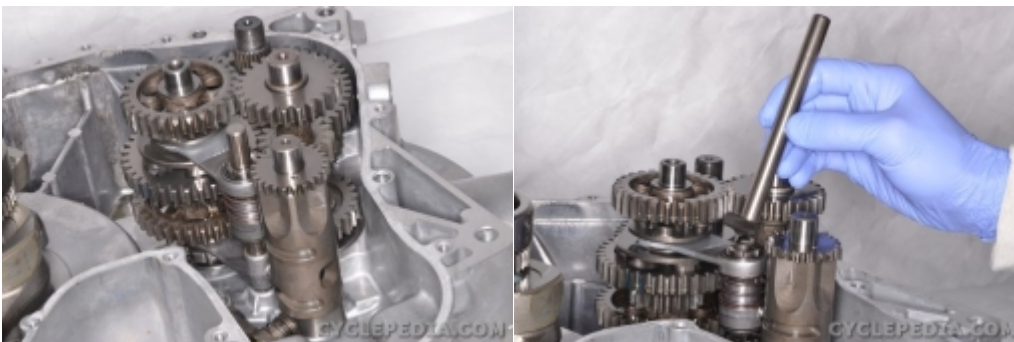
Transmission Removal

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Split the crankcases. See the [Crankcase](#) topic for more information.



Remove the shift shaft.



Remove the transmission guide bar.



Remove the upper and lower shift forks.



Remove the shift cam.



Remove the transmission shafts together from the crankcase.

To disassemble the transmission shafts see the [Transmission Shafts](#) topic for more information.



Remove the stopper lever bolt and washer with a 6 mm Allen wrench.



Remove the stopper lever and spring.



Remove the crankshaft and balancer shaft together. See the [Crankshaft](#) for more information.



Place the nut that was removed from the driven pulley back onto the transmission drive shaft to protect the threads and begin to press the shaft out. Remove the nut before it reaches the oil seal as it will not fit through. Remove the shaft.



If the bearing comes out with the transmission drive shaft press it off as shown.

Note: Always replace the bearing if it is removed from the crankcase.



If the transmission drive shaft bearing does not come out with the shaft and needs to be replaced; remove it with a bearing puller. See the [Crankcase Bearings](#) topic for more information.

Note: Always replace the bearing if it is removed from the crankcase.



Inspect the transmission drive shaft oil seal and replace if needed.



If it is necessary to remove the stopper lever shaft use a 19 mm socket to remove the nut and washer on the other side.

Upper Shift Fork Disassembly



Remove the snap ring with snap ring pliers.



Remove the washer.



Remove the shift fork and spring.



Remove the snap ring with snap ring pliers.



Remove the washer and cam pawl.

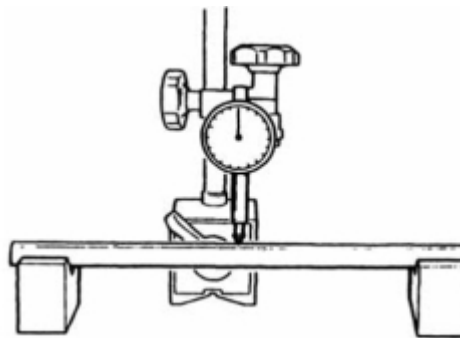
Inspection



Check the stopper lever pawl for bends, damage or wear. Inspect the spring for cracks or damage.



Check the transmission drive shaft gear teeth for blue discoloration, pitting or wear.



Measure the guide bar runout. Replace the bar if it is out of specification.

Item	Service Limit
Guide Bar Runout	0.03 mm (0.0012 in)



Inspect the upper shift fork cam followers, shift fork pawl and spring. If there is any damage or excessive wear replace the components as a set.



Inspect the upper shift fork cam followers and shift fork pawl. If there is any damage or excessive wear replace the part.



Check the shift cam grooves and shift cam gear. Check for wear and damage and replace if needed.



Inspect shift shaft gear and shift shaft for damage, bends or wear. Check the return spring for fatigue or damage. Replace the parts if needed.

Inspect the transmission bearings. See the [Crankcase Bearings](#) topic for more information.

To assemble the transmission see the [Transmission Installation](#) topic for more information.

Transmission Installation

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Upper Shift Fork Assembly



Install the cam pawl on the shaft and be sure to align the marks as shown.



Install the washer.



Install the snap ring with snap ring pliers.



Install the spring.



Install the shift fork on the shaft and be sure to align the marks as shown.



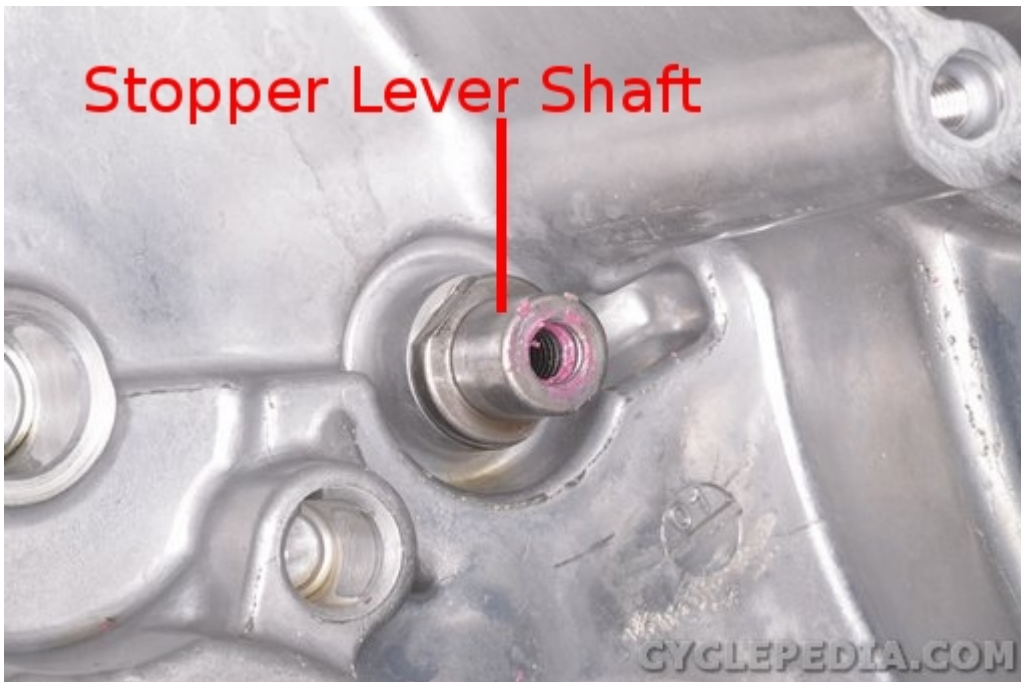
Install the washer.





Install the snap ring with snap ring pliers.

Installation



Install the stopper lever shaft if it was removed. Install the shaft on the outside and the nut with washer on the inside. Carefully hold the stopper lever shaft with a wrench if necessary. Tighten the bolt to specification with a 19 mm socket.

Item	N-m	kgf-m	lbf-ft
Stopper lever shaft nut	30	3	21.6



Apply clean engine oil to a new drive shaft oil seal lip. Install the transmission drive shaft oil seal. Use a suitable driver that is the same outside diameter as the seal.



Install the stopper lever and spring on the shaft.

Note: Hook the spring onto the hook part of the stopper lever, squeeze the spring in to the groove of the left crankcase.



Install the washer and a new stopper lever bolt. Hold the shaft nut on the other side. Tighten the bolt to specification with a 6 mm Allen wrench.

Item	N-m	kgf-m	lbf-ft
Stopper lever bolt	25	2.5	18



Install the transmission drive shaft bearing with a bearing driver.

Special Tool-

Bearing Driver: A120E00014

Note: Apply clean engine oil to the transmission drive shaft, countershaft and drive shaft.



Carefully press in the transmission drive shaft.



Install the transmission shafts together into the crankcase.



Apply clean engine oil to the shift cam and install it.



Apply clean engine oil to the upper and lower shift forks and pawls.



Install the lower gearshift fork into the lower shifter shift groove on the countershaft with its "LDB5" mark facing down. Fit the lower shift fork guide pin into the groove on the shift cam.



Install the upper gearshift fork into the upper shifter shift groove on the countershaft with its "LDB5" mark facing up. Fit the upper shift fork guide pin into the groove on the shift cam.



Apply clean engine oil to the transmission guide bar and install it.



Install the shift shaft. Be sure to align the shift shaft mark with the shift cam gear marks as shown.



Check the transmission operation.



Install the crankshaft and balancer shaft together (if they were removed). See the [Crankshaft](#) for more information.

Assemble the crankcases. See the [Crankcase](#) topic for more information.

Transmission Shafts

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Remove the transmission shafts from the transmission. See the [Transmission Removal](#) topic for more information.

Disassembly

When disassembling the transmission shafts be sure to keep track of the order and orientation of the parts as they come apart. Discard old snap rings. Clean all of the components using aerosol brake cleaner and a lint free cloth. Inspect the parts for visible signs of wear or damage. Replace any defective components.



Inspect all of the shifter dogs carefully for wear, especially on the outer edges. Also inspect the slots or other dogs on adjoining gears that the dogs fit into or against. Damage to the dogs or slots can cause the transmission to jump out of gear. Replace any gears that are damaged or worn even a little bit.

Countershaft



Remove the washer.



Remove the high drive gear.



Remove the bushing and washer.



Remove the high/low gear shifter.



Remove the snap ring with snap ring pliers.



Remove the washer and low drive gear.



On the other side of the countershaft; Remove the snap ring with snap ring pliers.



Remove the stopper wheel.



Remove the snap ring with snap ring pliers.



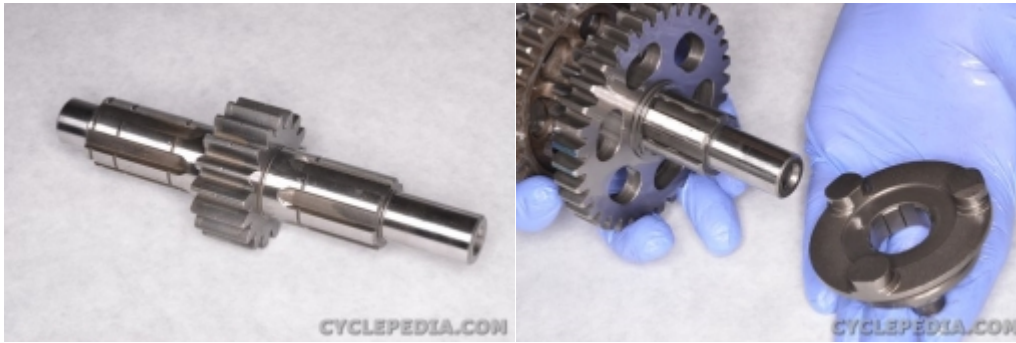
Remove the reverse gear shifter.



Remove the snap ring with snap ring pliers.



Remove the washer and reverse drive gear.



Inspect the countershaft, gear teeth and mated dogs. Check for blue discoloration, pitting or wear. Check for rounded edges, cracks or other damage. Replace as needed.

Bevel Gear Drive Shaft



Remove the thick washer.



Remove the reverse gear.



Remove the thin washer.



Inspect the gear teeth. Check for blue discoloration, pitting or wear. Replace as needed.



Inspect the needle bearing in the reverse gear. Check for wear or damage. Replace as needed.

Assembly



Use new snap rings when assembling the transmission shaft components. Install the snap ring (and thrust washer) so that the sharp edge is facing away from the gear that is putting thrust against it. The sharp edge is shown in the photo on the left.



Also, make sure the snap rings are fully seated in their grooves as shown. Spread the new snap rings only enough to slide them down the shaft and into their grooves.

Note: Coat the gears and shafts lightly with fresh engine oil before installation.

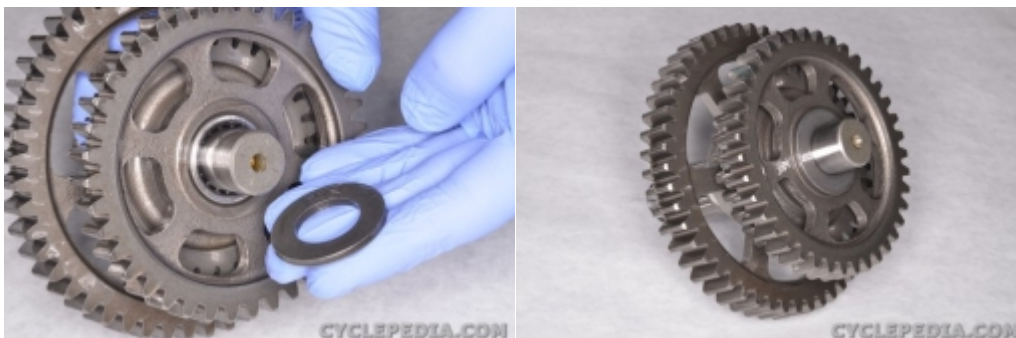
Bevel Gear Drive Shaft



Install the thin washer on the drive shaft.

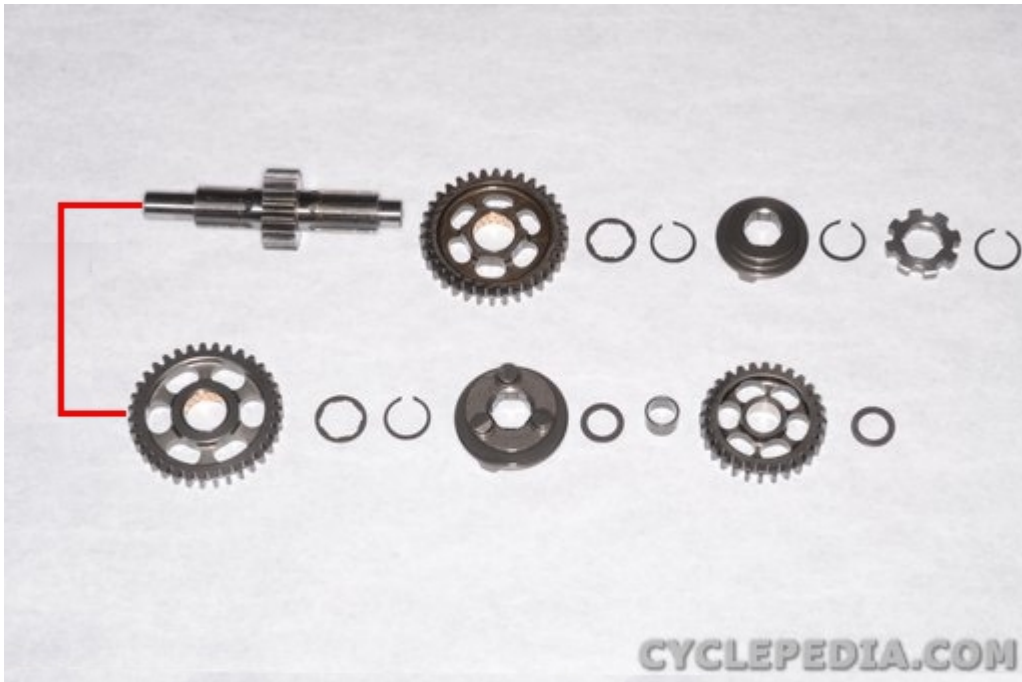


Install the reverse gear.



Install the thick washer.

Countershaft



Install the reverse drive gear and washer on the proper side of the countershaft.



Install the snap ring with snap ring pliers.



Install the reverse gear shifter.



Install the snap ring with snap ring pliers.



Install the stopper wheel.



Install the snap ring with snap ring pliers.



On the other side of the countershaft; Install the low drive gear and washer.



Install the snap ring with snap ring pliers.



Install the high/low gear shifter.



Install the washer and bushing.



Install the high drive gear.



Install the washer.

To install the transmission see the [Transmission Installation](#) topic.

6.Cooling System

This chapter covers the location and servicing of the external components.

1.Coolant	6-4
2.Oil Cooler	6-11
3.Pressure Testing	6-21
4.Radiator	6-23
5.Thermostat	6-35
6.Water Pump	6-40

GENERAL INSTRUCTIONS

WARNING: Removing the radiator cap while the engine is hot can allow the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the radiator cap.

CAUTION: Radiator coolant is toxic. Keep it away from eyes, mouth, skin and clothes.

- If any coolant gets in your eyes, rinse them with water and consult a physician immediately.
- If any coolant is swallowed, induce vomiting, gargle and consult a physician immediately.
- If any coolant gets on your skin or clothes, rinse thoroughly with plenty of water.

NOTE: Use coolant with silicate inhibitors may cause premature wear of water pump seals or blockage of radiator passages. Using tap water may cause engine damage.

- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system
- All cooling system services can be done with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.

TROUBLESHOOTING

Engine temperature too high

- Faulty temperature gauge or sensor
- Faulty radiator cap
- Air in system
- Faulty thermostat (stuck closed)
- Insufficient coolant
- Passages blocked in hoses or water jacket
- Clogged radiator fins
- Passages blocked in radiator
- Faulty water pump
- Faulty fan motor switch

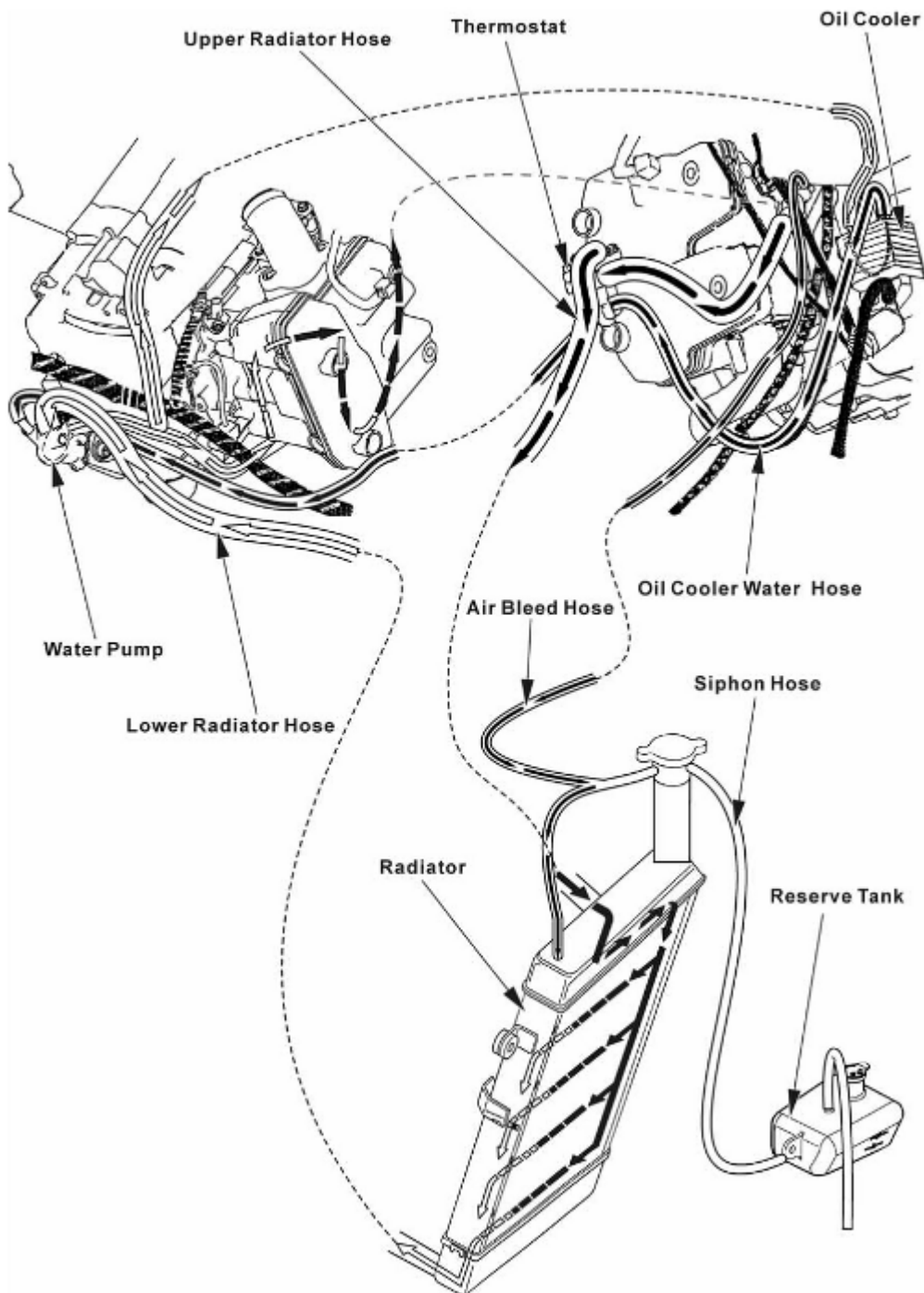
Engine temperature too low

- Faulty temperature gauge or sensor
- Faulty thermostat (stuck open)
- Faulty fan motor switch

Coolant leaks

- Faulty water pump mechanical (water) seal
- Deteriorated O-rings
- Damaged or deteriorated water hoses
- Loose hose connection or clamp
- Damaged or deteriorated cylinder head gasket
- Faulty radiator cap

Cooling System Diagram



Coolant

SAFETY FIRST: Antifreeze is highly toxic and can kill pets and animals if drank. Do not leave coolant where animals (including children) can get to it.

CAUTION: Never remove the radiator cap when the engine is hot.

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2 liter (2.1 US qt, 1.76 Imp qt)
	Reserve tank	0.45 liter (0.47 US qt, 0.39 Imp qt)
Standard coolant concentration		1:1 mixture with soft water

Inspection

Lift the hood. See the [Hood](#) topic for more information.



Check the coolant when cold. The coolant level should be between the two indicator lines.

Fill the reservoir tank to the FULL line with the appropriate coolant mixture if needed.

Draining

Note: The engine should be at room temperature to prevent coming into contact with scalding coolant.

Place the vehicle in a level upright position on a flat surface.

Remove the frame covers. See the [Frame Covers](#) topic for more information.



Remove the radiator cap by pushing down and turning it. Remove the radiator cap in two stages. Allow any built up pressure to vent and then open the cap all the way and remove it.



Place a drain pan underneath the water pump and remove the drain plug using an 8 mm wrench. Be prepared the coolant will spurt out quickly. Install the drain plug and tighten it securely after the cooling system has been drained.



Remove the two mounting bolts and drain the reservoir tank. Install the tank and tighten the two mounting bolts securely.

Refilling

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2 liter (2.1 US qt, 1.76 Imp qt)
	Reserve tank	0.45 liter (0.47 US qt, 0.39 Imp qt)
Standard coolant concentration		1:1 mixture with soft water



Slowly pour the new coolant into the radiator filler neck until it reaches the bottom of the neck.



Fill the reservoir tank to the FULL line. With the reservoir cap and the radiator cap off, start the engine and let it run for several minutes. Blip the throttle and rev the engine a few times. This will purge any air out of the cooling system. Add coolant to the radiator and the reservoir tank as needed.

Install the reservoir cap and the radiator cap and bring the engine up to operating temperature. Check the level of the coolant in the reservoir tank and add coolant if necessary. Do not remove the radiator cap with the engine hot!!!

Oil Cooler

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

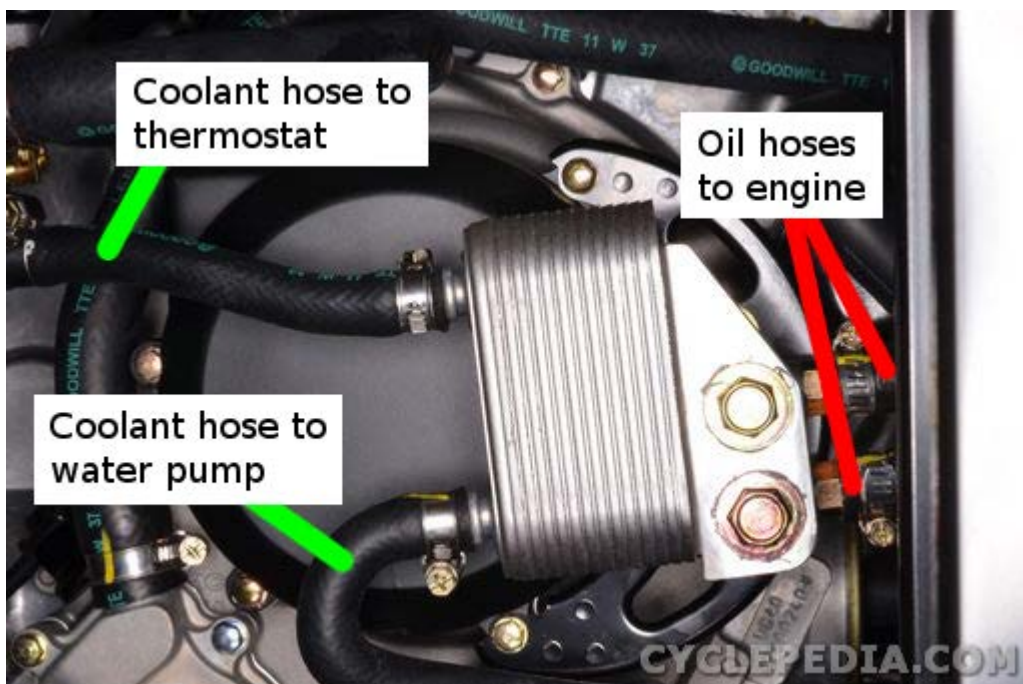
Removal

Drain the engine oil. See the [Engine Oil](#) topic for more information.

Drain the engine coolant. See the [Coolant](#) topic for more information.

Remove the center cover. See the [Center Cover](#) topic for more information.

Remove the left frame covers. See the [Frame Covers](#) topic for more information.



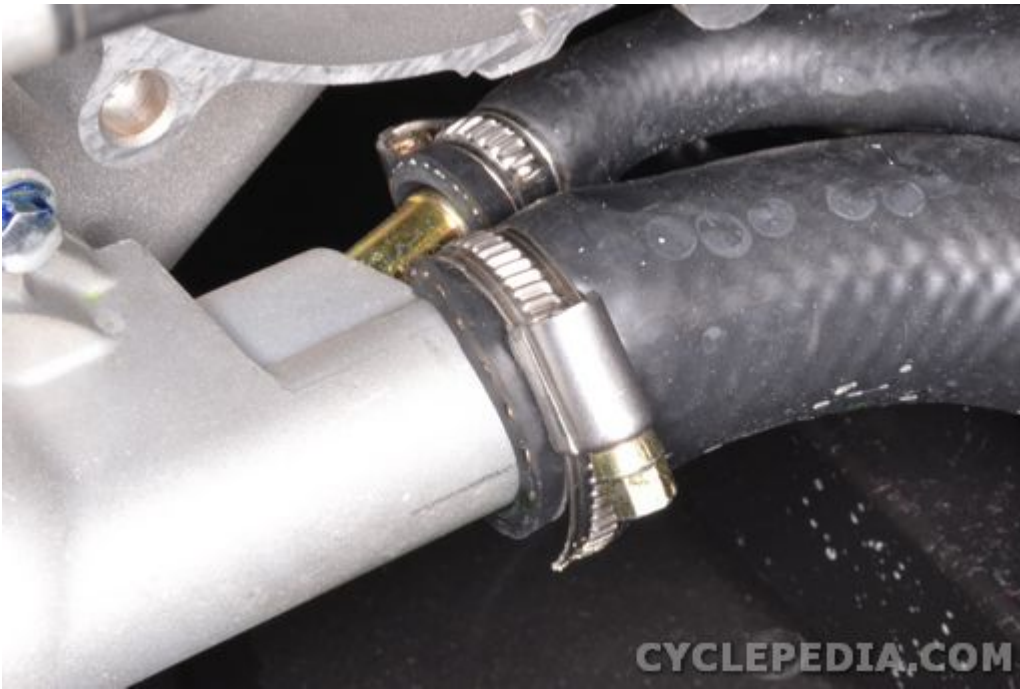
The oil cooler is mounted on the recoil starter cover. Remove the two bolts with an 8 mm socket and free the oil cooler bracket from the recoil starter cover. There are two coolant hoses and two oil hoses.



Loosen the oil hose clamps with a #2 Phillips screwdriver.



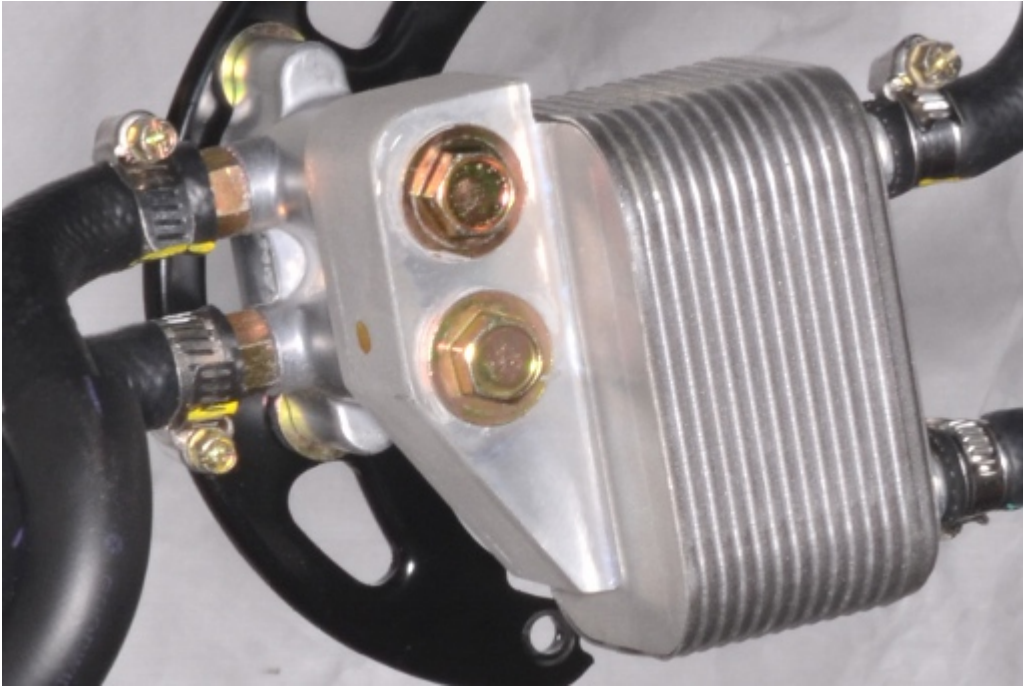
Free the oil hoses from the back of the engine.



Loosen the bypass hose (smaller) clamp with a #2 Phillips screwdriver. Free the bypass hose from the water pump.



Loosen the oil cooler to thermostat hose clamp with a #2 Phillips screwdriver. Remove the oil cooler hose from the thermostat.



Loosen the clamps with a #2 Phillips screwdriver to remove the hoses from the oil cooler.

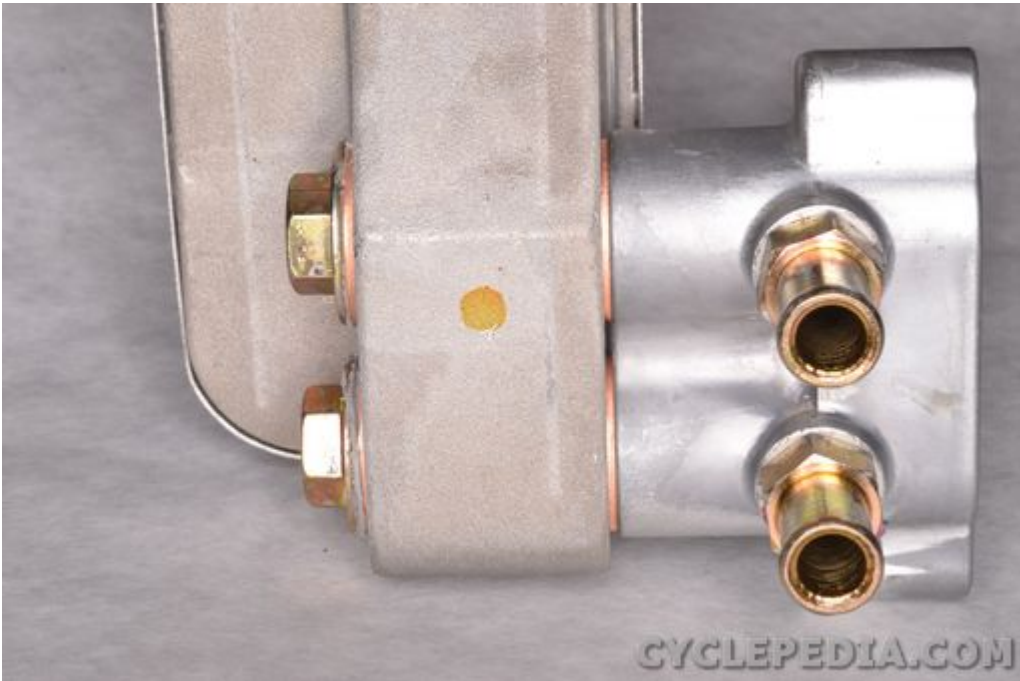


Remove the two bolts with an 8 mm socket to free the oil cooler from the mounting bracket.

Oil Pipe Fitting



The oil cooler and its oil pipe fitting can be separated if needed. Loosen the two bolts with a 14 mm socket.



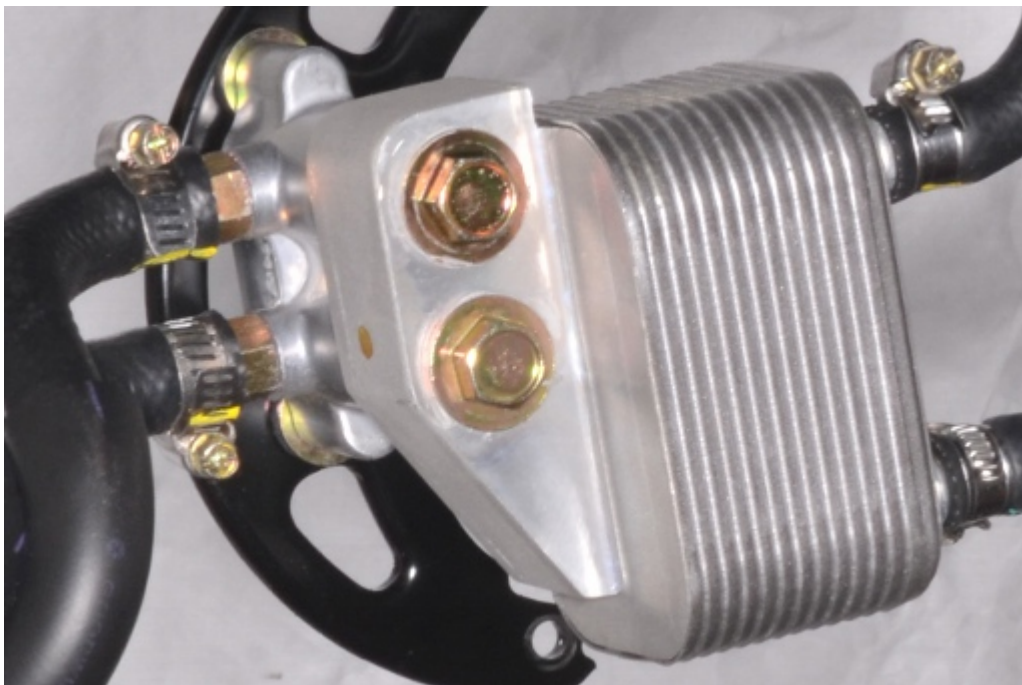
If the oil pipe fitting is returned to the cooler be sure to use new sealing washers. Tighten the two bolts to specification with a 14 mm socket.

ITEM	N-m	kgf-m	ft-lb
Oil cooler oil pipe fitting bolt	35	3.5	25

Installation



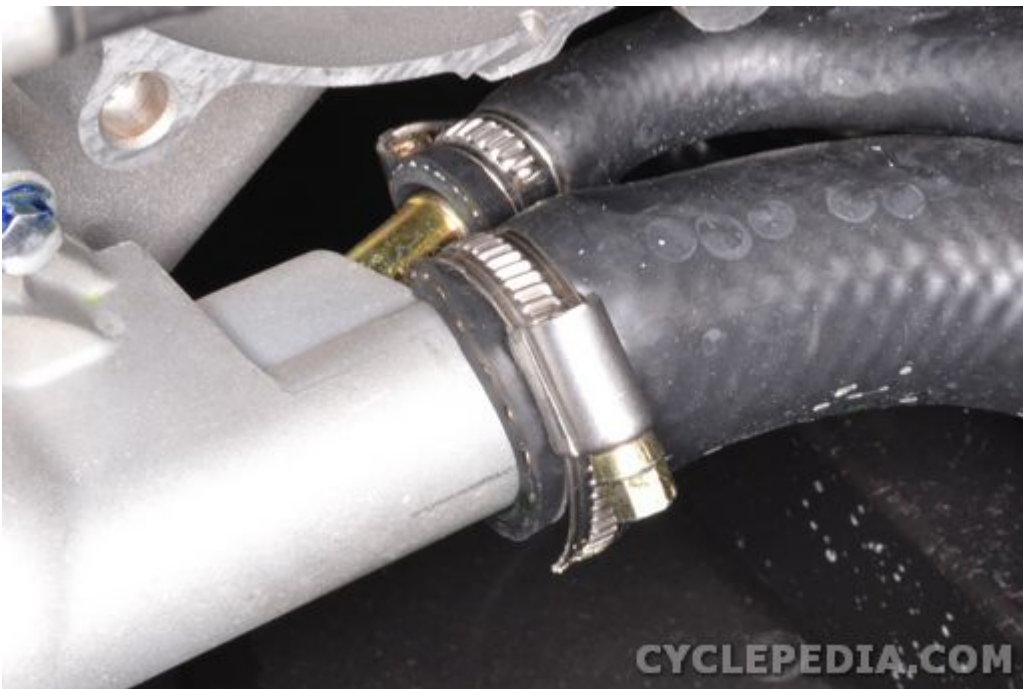
Install the oil cooler to the mounting bracket. Tighten the two bolts securely with an 8 mm socket.



Connect the oil hoses to the oil hose fitting of the oil cooler. Connect the coolant hoses to the oil cooler. Secure the hoses with the clamps. Tighten the clamps securely with a #2 Phillips screwdriver.



Connect the upper oil cooler coolant hose to the thermostat. Tighten the clamp securely with a #2 Phillips screwdriver.



Connect the bypass hose (smaller) to the water pump. Tighten the bypass hose clamp securely with a #2 Phillips screwdriver.



Route the oil hoses to the back of the engine as shown.



Install the oil hose clamps and tighten them securely with a #2 Phillips screwdriver.



Fit the oil cooler bracket to the recoil starter cover. Install the two bolts and tighten them securely with an 8 mm socket.

Fill the engine oil. See the [Engine Oil](#) topic for more information.

Fill the coolant and bleed the cooling system. See the [Coolant](#) topic for more information.

Install the frame covers. See the [Frame Covers](#) topic for more information.

Install the center cover. See the [Center Cover](#) topic for more information.

Pressure Testing

SAFETY FIRST: Antifreeze is highly toxic and can kill pets and animals if drank. Do not leave coolant where animals (including children) can get to it.

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

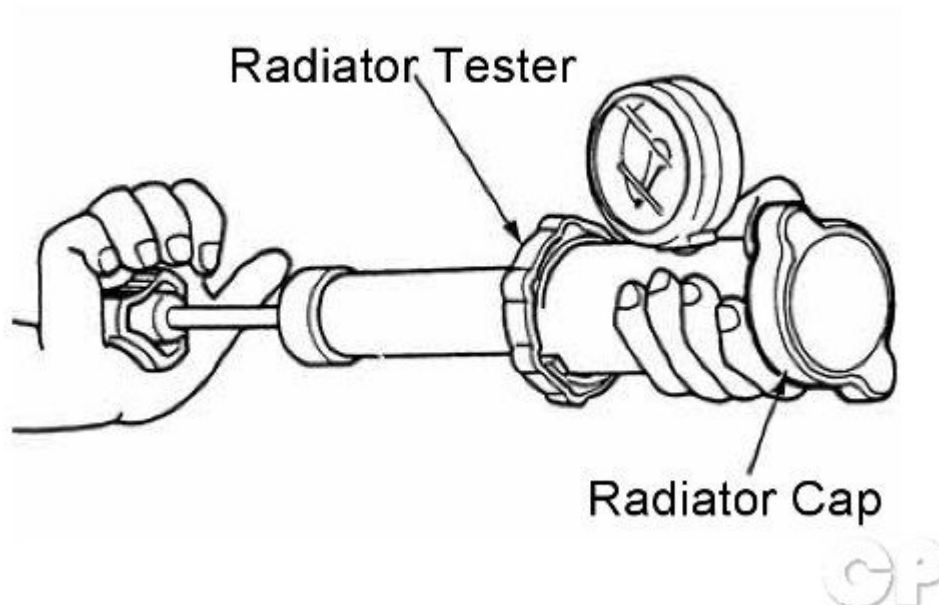
Lift the hood. See the [Hood](#) topic for more information.



Remove the radiator cap by pushing down and turning it. Remove the radiator cap in two stages. Allow any built up pressure to vent and then open the cap all the way and remove it.



When checking the cooling system for leaks you will need a pressure tester. Remove the radiator cap, wet the tester seal, and install the end of the pressure tester onto the filler neck. Pump the tester up until the gauge reads 0.9 kg/cm^2 or 12.8 psi . The cooling system should hold this pressure for at least 6 seconds. If it does not you will need to inspect the entire system for leaks. Do not pressurize the cooling system more than 1.05 kg/cm^2 or 14.9 psi .



Wet the seal on the radiator cap and install it to the pressure tester. Replace the cap if it does not relieve the pressure as specified.

Radiator cap relief pressure	90 kPa (0.9 kgf/cm^2 , 12.8 psi)
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Radiator

SAFETY FIRST: Antifreeze is highly toxic and can kill pets and animals if drank. Do not leave coolant where animals (including children) can get to it.

CAUTION: Never remove the radiator cap when the engine is hot.

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Pressure Testing

See the [Pressure Testing](#) topic.

Removal

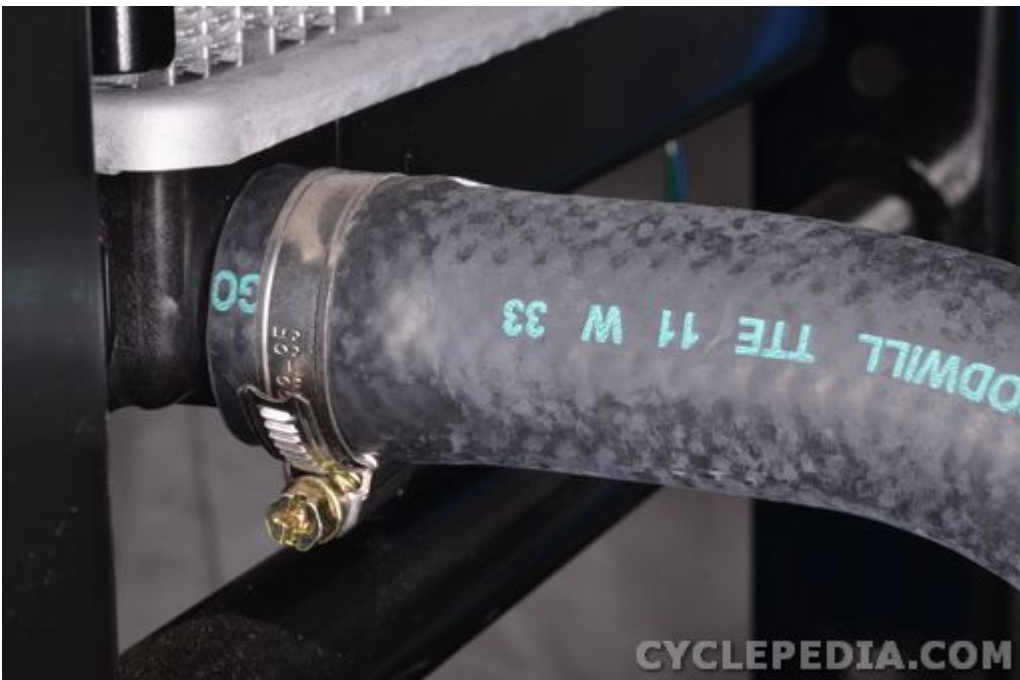
Remove the hood. See the [Hood](#) topic for more information.

Remove the front bumper. See the [Front Bumper](#) topic for more information.

Drain the coolant. See the [Coolant](#) topic for more information.



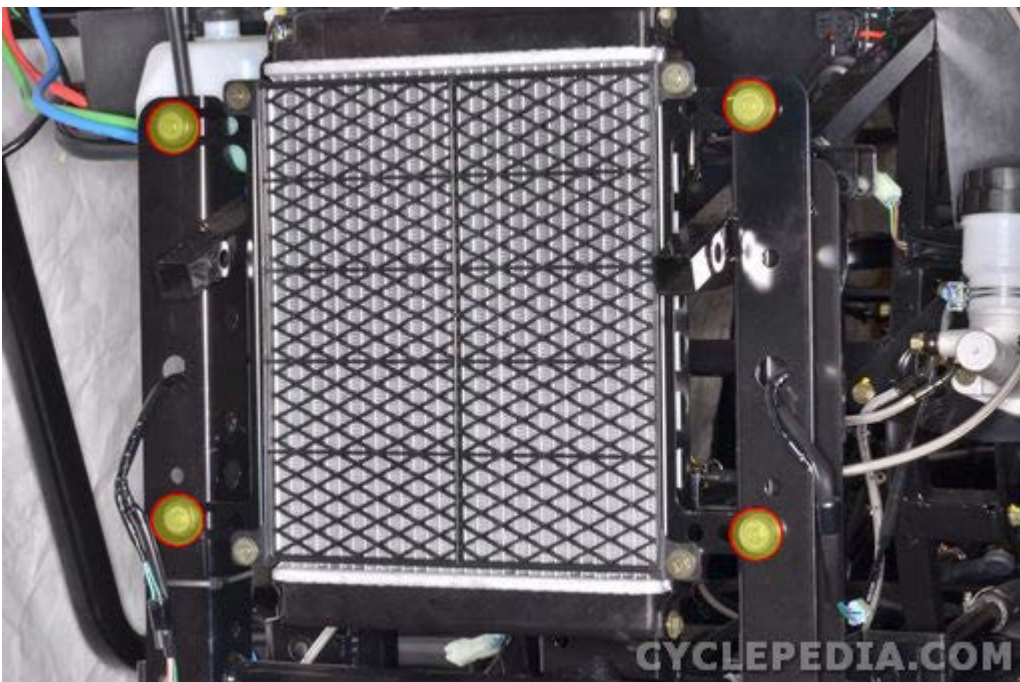
Unplug the radiator fan switch connectors. Loosen the upper radiator hose clamp and free the upper coolant hose from the radiator. Squeeze and slide back the clamps on the siphon and air bleed hoses. Free the siphon hose from the side of the filler neck and the air bleed hose from the back of the filler neck.



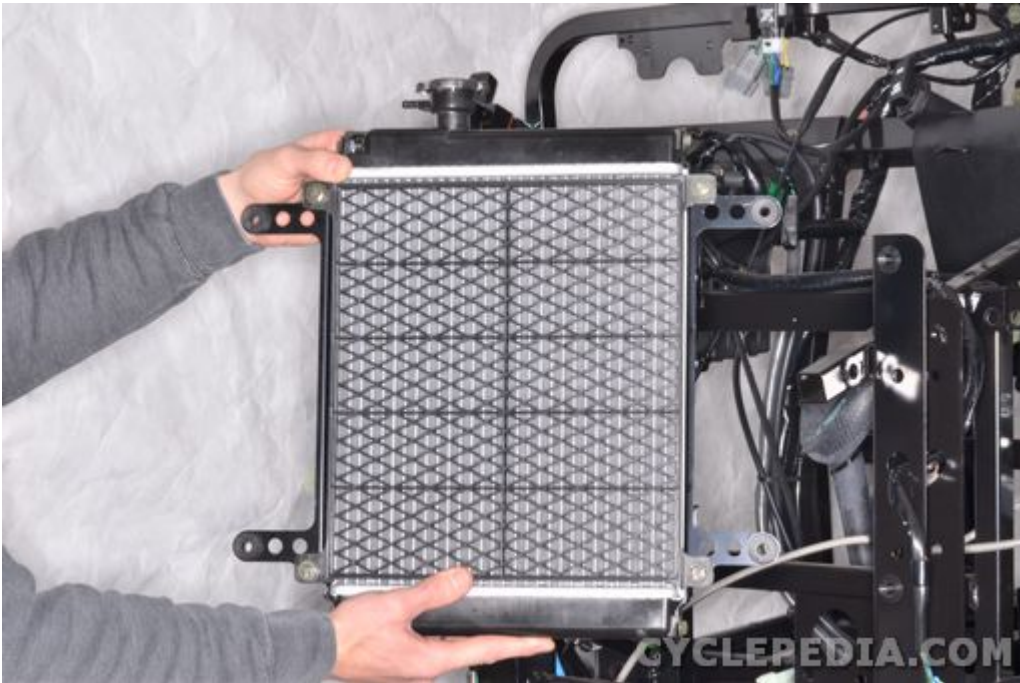
Loosen the lower radiator hose clamp and free the lower coolant hose from the radiator.



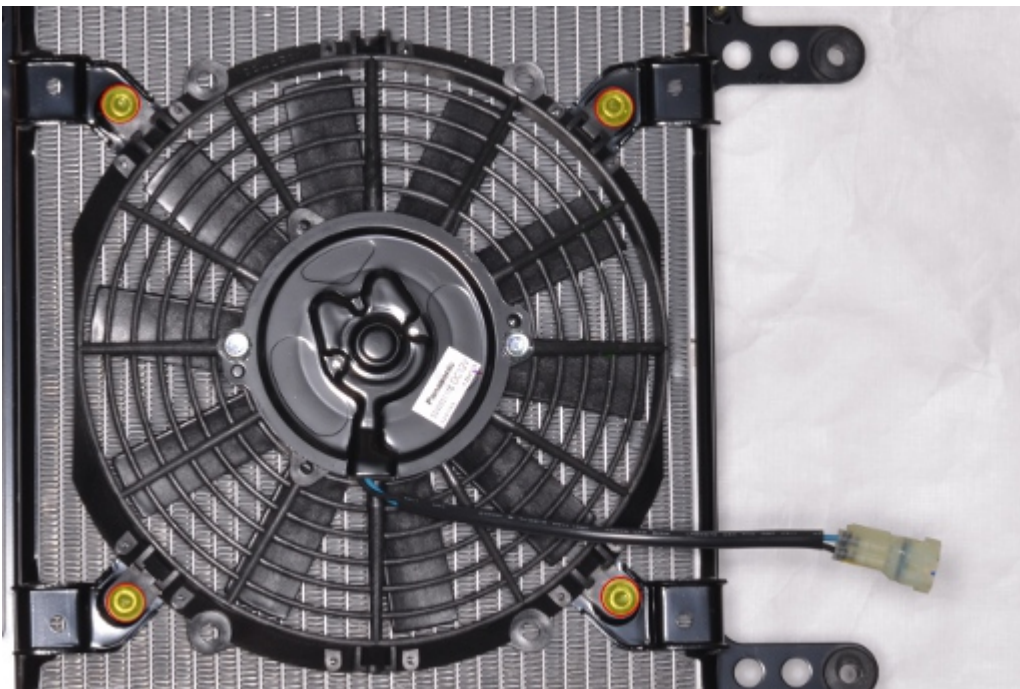
Unplug the radiator fan connector.



If the radiator grill needs to be remove take out the four radiator grill bolts. Remove the four radiator mounting bolts with a 10 mm socket.



Remove the radiator from the frame. Inspect the rubber grommets and replaced them if they are in poor condition.



To remove the fan take off the four mounting nuts with a 10 mm socket.

Inspection

Radiator Fins

Inspect the radiator fins for damage and clogging.

Clean out the fins with low pressure compressed air and water.

NOTE: Always wear safety glasses when using compressed air and never point it directly at yourself or anyone else.



Check the radiator for any bent or damaged fins. Use a small flat blade screwdriver to straighten them out, but be careful not to puncture the radiator.

Radiator Fan

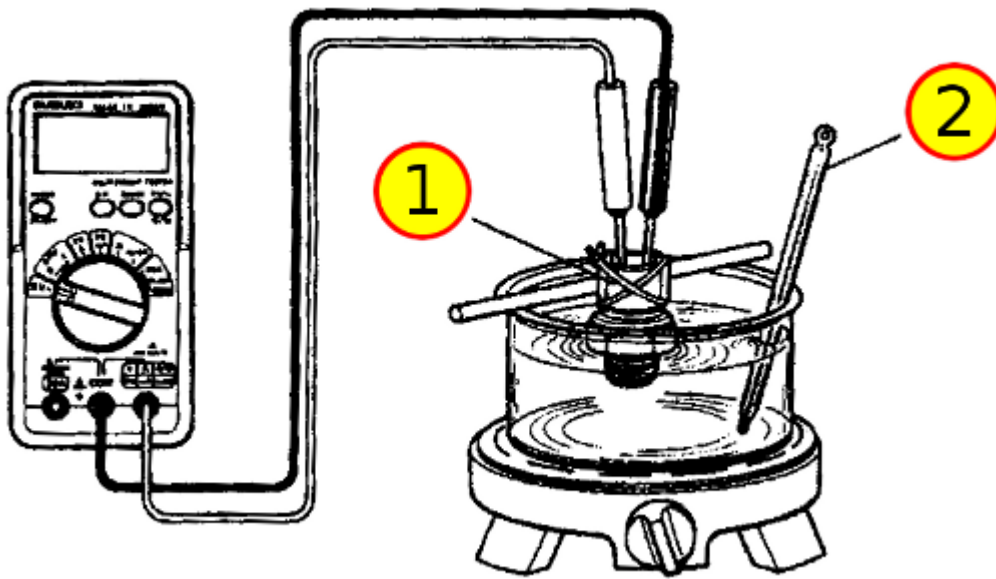


Jump a 12 volt battery to the fan connector and make sure the radiator fan operates.

Radiator Fan Switch



Remove the radiator fan switch with a 21 mm wrench. Be careful not to drop the switch as it is vulnerable to damage. Discard the O-ring.



Place the fail motor switch in oil contained in a pan as shown and raise the oil temperature gradually to check for the temperature at which the switch starts operates. Do not allow the switch or the thermometer to contact the container. If the switch operating temperature is not within the specified range, replace the switch with a new one.

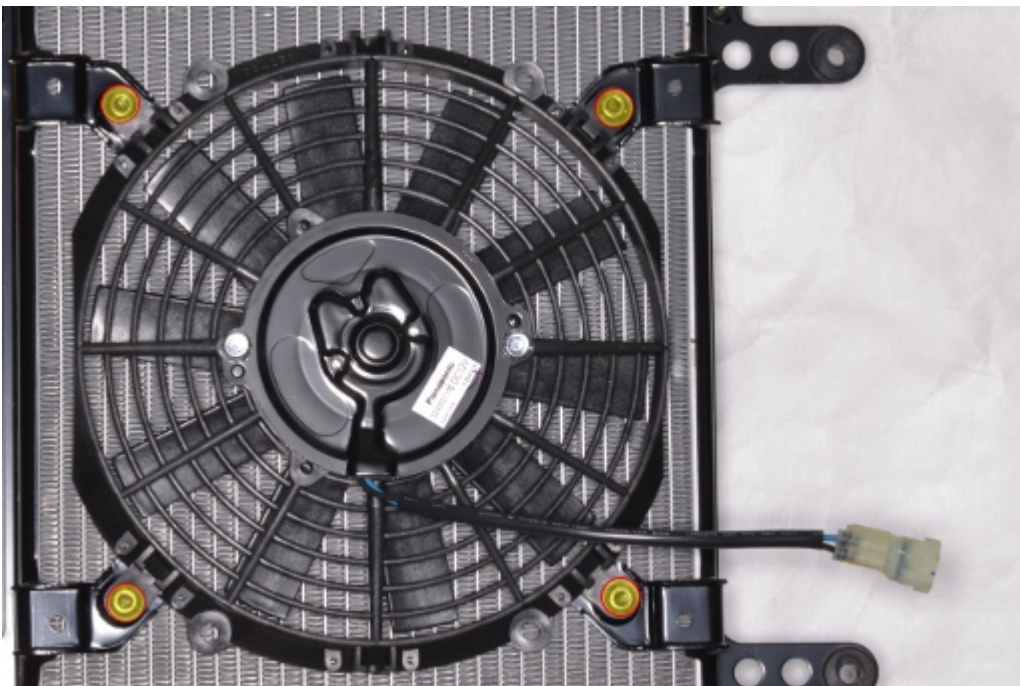
OFF to ON	Over 88 - 92° C
ON to OFF	Below 88 - 92° C

To inspect the water temperature sensor (WTS) see the [Fuel Injection Sensors](#) topic.

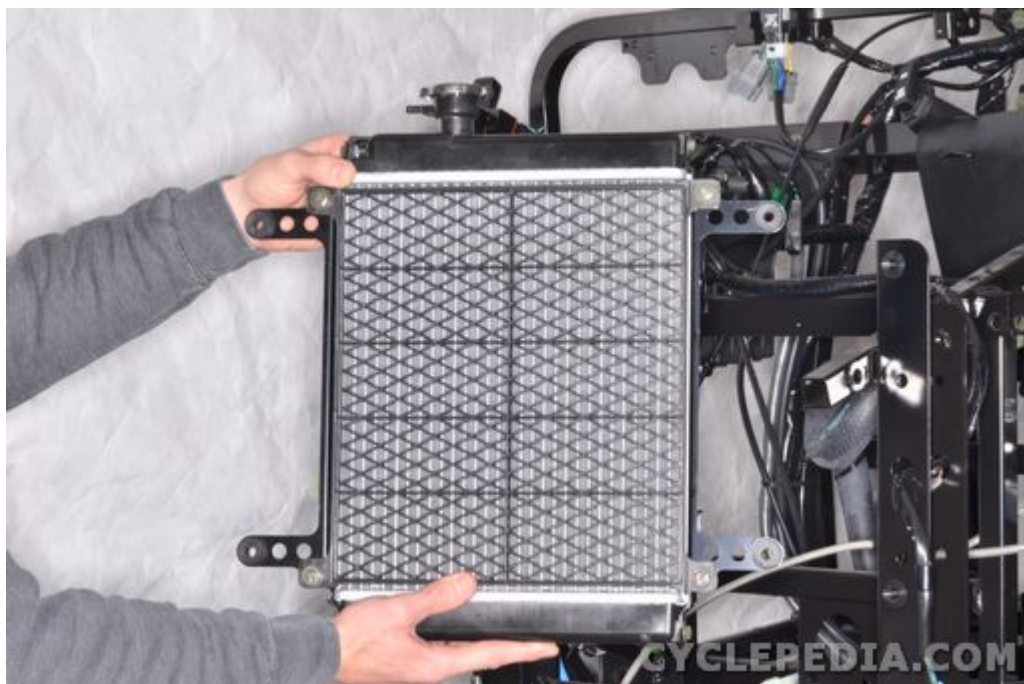
Installation



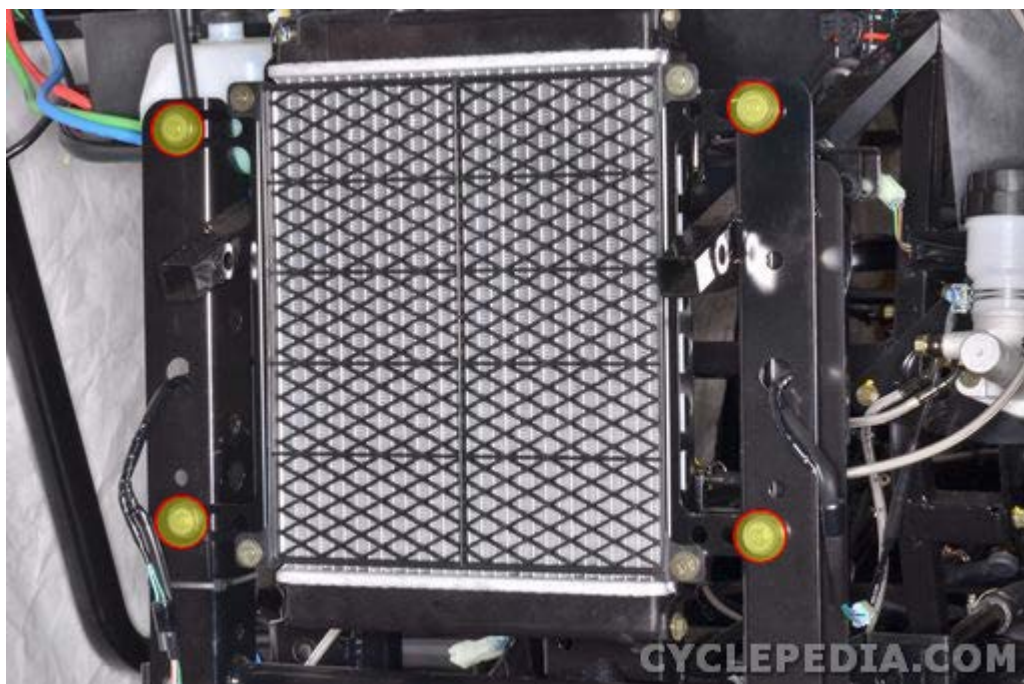
Install the radiator fan switch with a new O-ring. Tighten the switch securely with a deep well 21 mm socket.



Install the fan to the radiator and tighten the three nuts securely with a 10 mm socket.



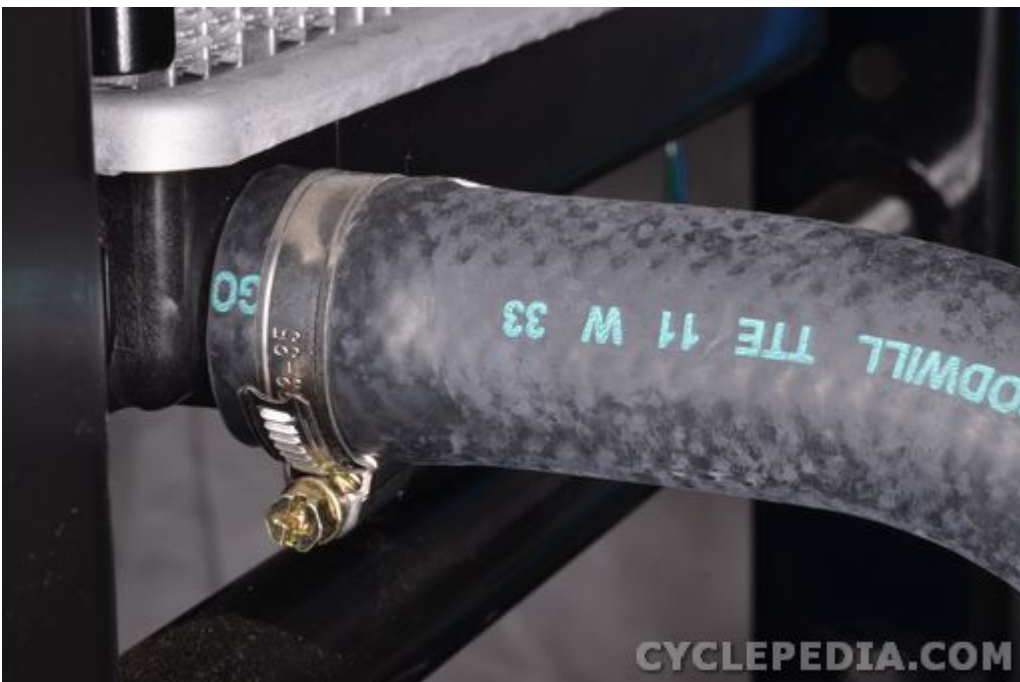
Fit the radiator into place.



Install the four radiator mounting bolts and tighten them securely with a 10 mm socket.



Plug in the radiator fan connector.



Connect the lower coolant hose to the radiator. Install the clamp and tighten it securely with a #2 Phillips screwdriver.



Connect the upper coolant hose to the radiator. Install the clamp and tighten its securely with a #2 Phillips screwdriver. Connect the siphon hose to the side of the filler neck and the air bleed hose to the back of the filler neck. Secure the hoses with the clamps. Plug in the radiator fan switch connectors.

Fill and bleed the coolant. See the [Coolant](#) topic for more information.

Install the front bumper. See the [Front Bumper](#) topic for more information.

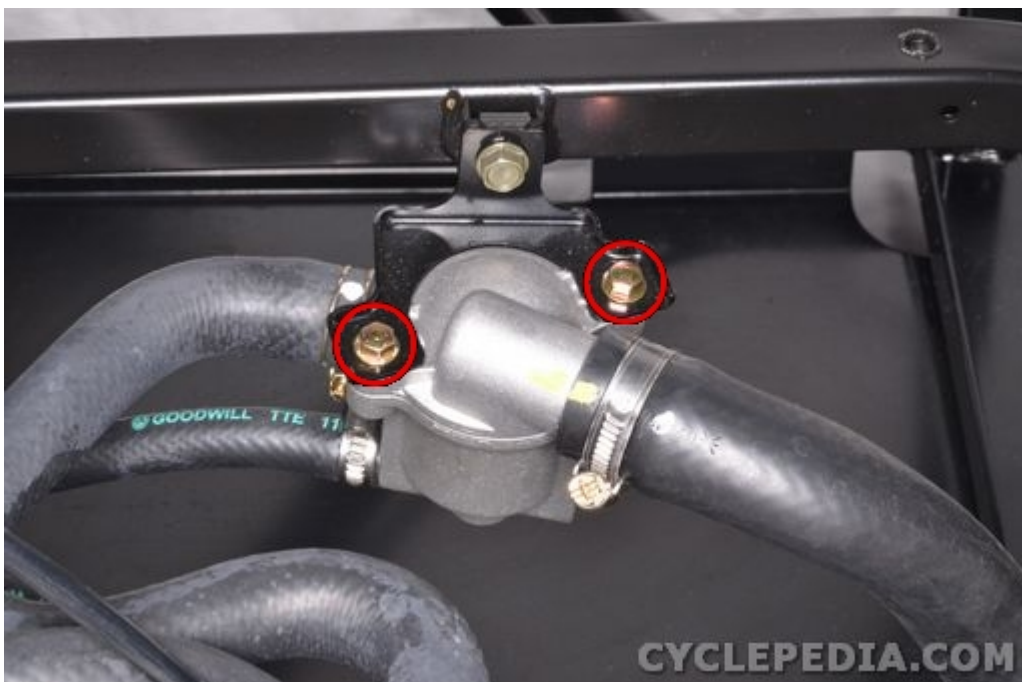
Install the hood. See the [Hood](#) topic for more information.

Thermostat

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Drain the coolant if necessary. See the [Coolant](#) topic for more information.



Remove the thermostat housing bolts with an 8 mm socket.



Separate the housing cover from the thermostat housing.



Remove the O-ring from the housing cover.



Remove the thermostat.

Inspection

Inspect the thermostat valve at room temperature, if the valve is open the thermostat is defective and needs to be replaced. Also, replace the thermostat if its seal ring is in poor condition.

To check the thermostat opening temperature, fill a pan with tap water and suspend the thermostat with a piece of wire, completely immersing it in the water making sure the thermostat does not touch the pan.

Place a thermometer in the pan and heat the water on a burner. Gently stir the water and notice what the temperature is when the thermostat starts to open.

Thermostat	Begin to open	80 - 84°C (176 - 183°F)
	Fully open	95°C (203°F)
	Valve lift	8 mm (0.3 in) minimum

Remove the thermostat from the heated water. The thermostat should close at room temperature.

Installation



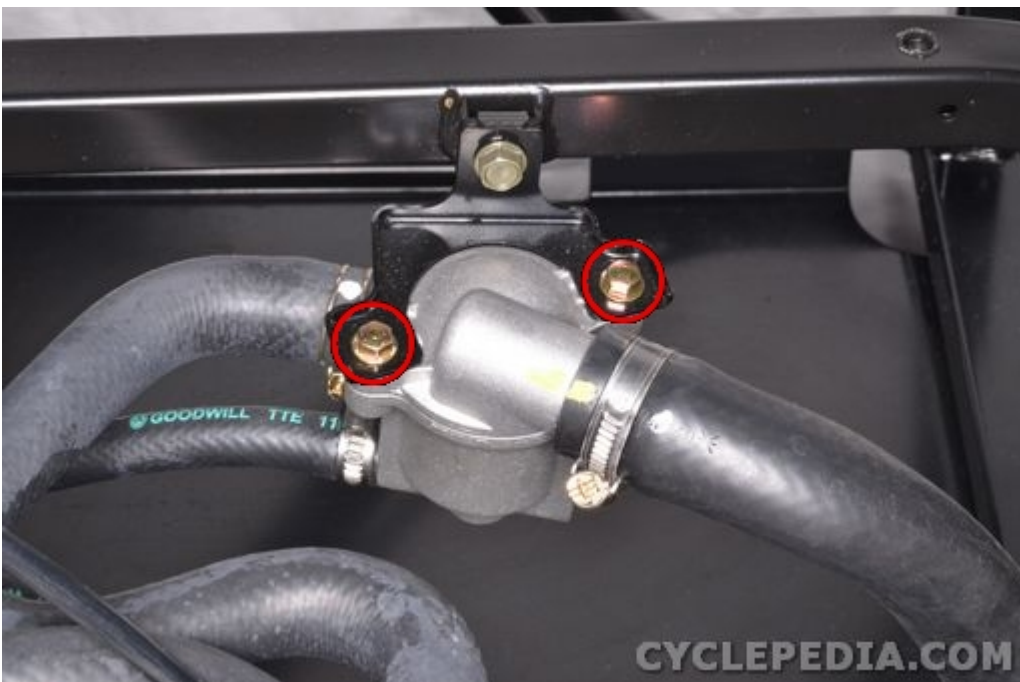
Install the thermostat so its air bleed hole faces up and aligns with the tab in the housing.



Install a new O-ring in the housing cover.



Join the housing cover with the thermostat housing.



Install the thermostat housing bolts and tighten them securely with an 8 mm socket. Fill the coolant if necessary. See the [Coolant](#) topic for more information.

Water Pump

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Mechanical Seal Inspection

Remove the frame covers. See the [Frame Covers](#) topic for more information.



Inspect the telltale hole in the water pump cover for signs of coolant leaking. If there is coolant coming from this hole the mechanical seal is compromised and the water pump must be replaced.

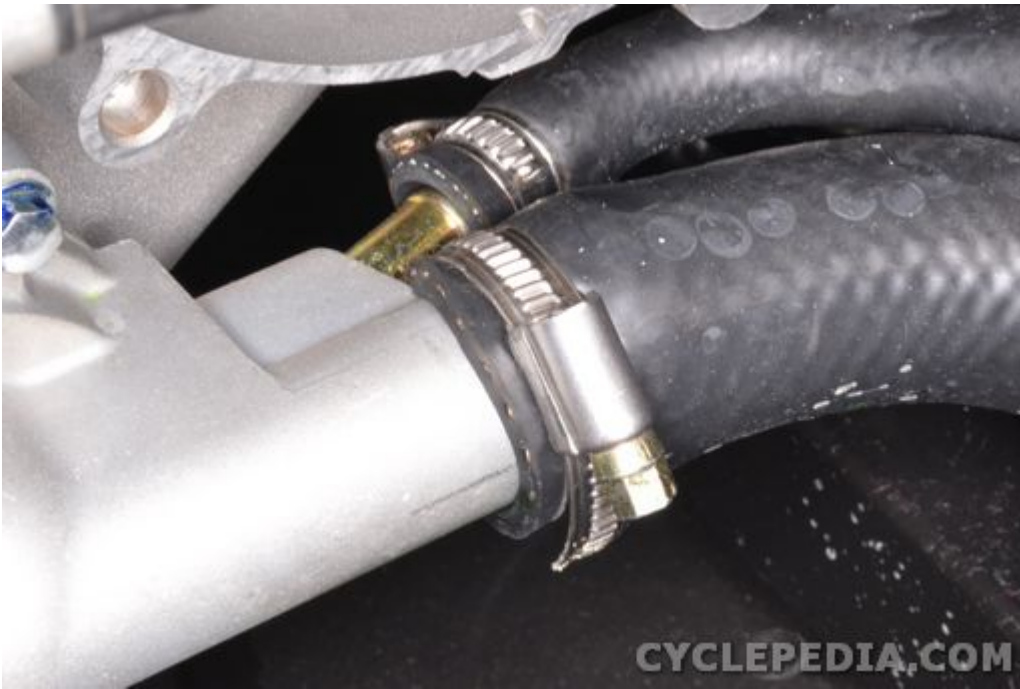
Removal

Drain the coolant. See the [Coolant](#) topic for more information.

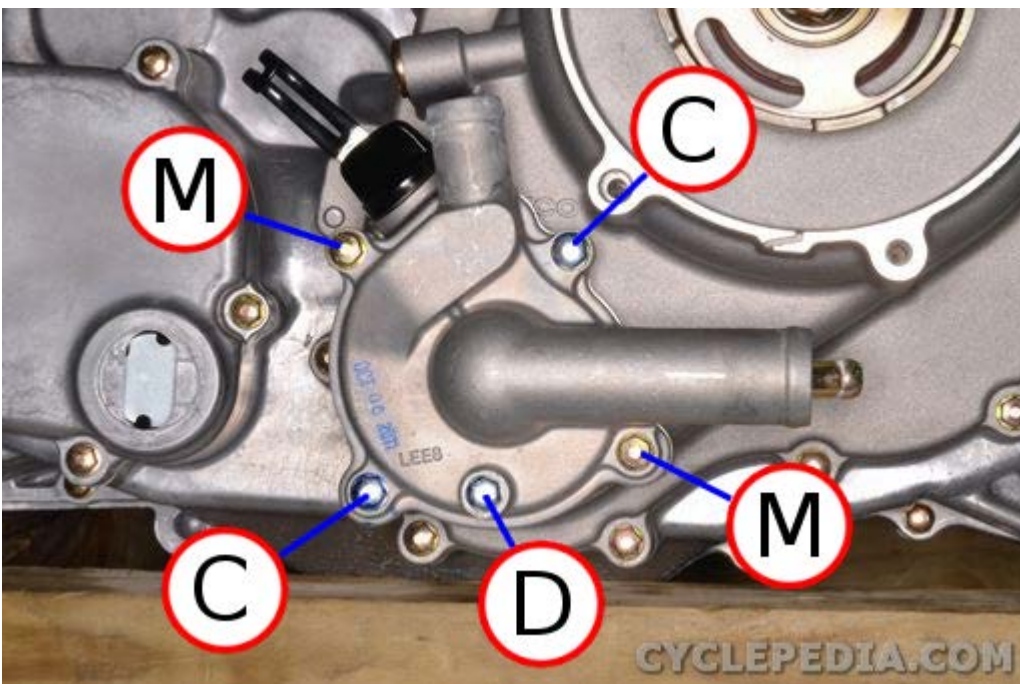
Drain the engine oil if the water pump is to be removed. See the [Engine Oil](#) topic for more information.



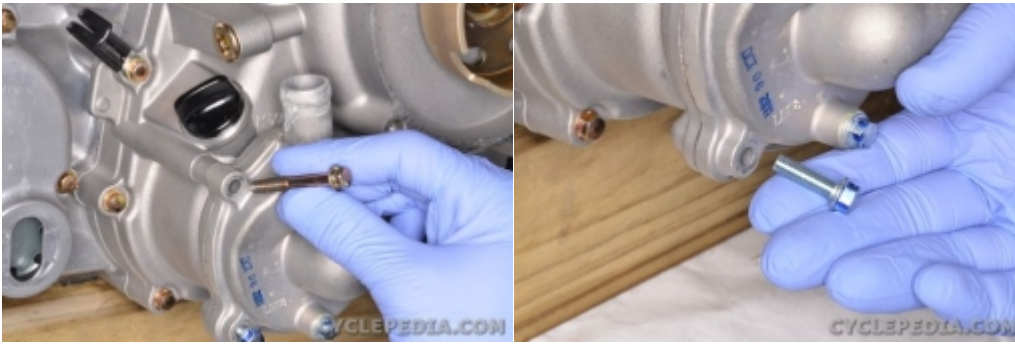
Loosen the water pump to cylinder coolant hose clamp with a #2 Phillips screwdriver. Free the cylinder coolant hose from the water pump.



Loosen the bypass (smaller) and lower radiator hose (larger) clamp with a #2 Phillips screwdriver. Free the hoses from the water pump.



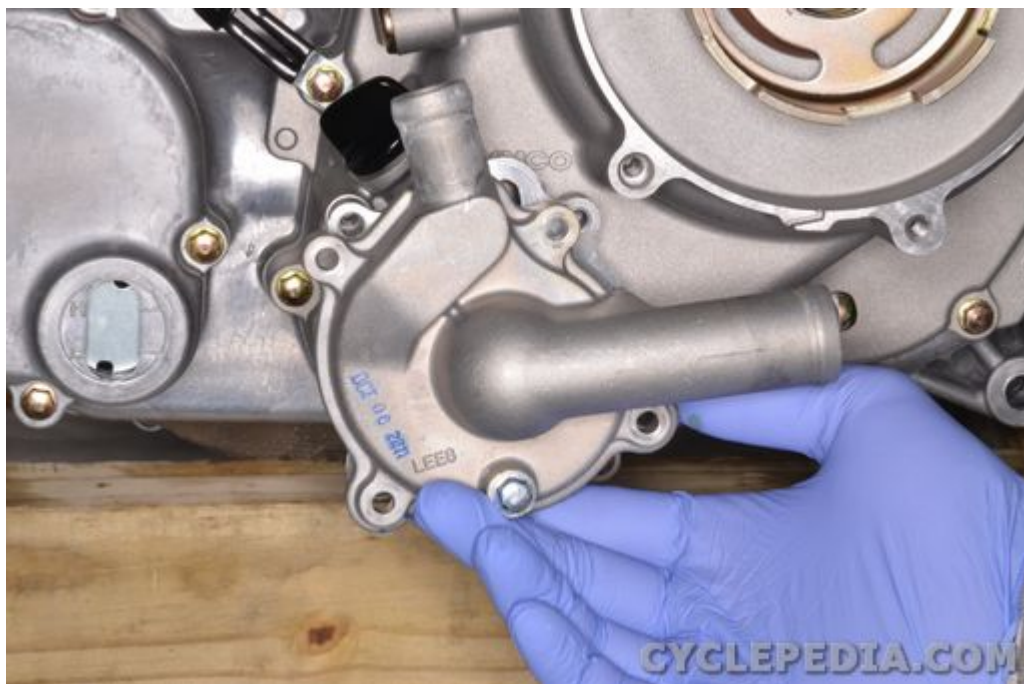
The water pump has two mounting bolts (M), two cover bolts (C), and a drain bolt (D). Go ahead and loosen the cover bolts while the water pump is installed if the cover is to be removed. Do not remove the cover unless necessary.



The mounting bolts are gold colored and longer than the silver cover bolts.



Remove the water pump bolts with an 8 mm socket.



Remove the water pump cover.



Remove the water pump O-ring and discard it.



Remove the water pump body from the engine.



Discard the water pump body O-ring. Replace it with a new item on installation. Turn the water pump shaft and make sure it turns smoothly without binding.



Inspect the water pump impeller. Replace the water pump as a whole if the impeller or shaft is damaged.

Installation



Install a new O-ring to the water pump body. Apply fresh engine oil to the O-ring.



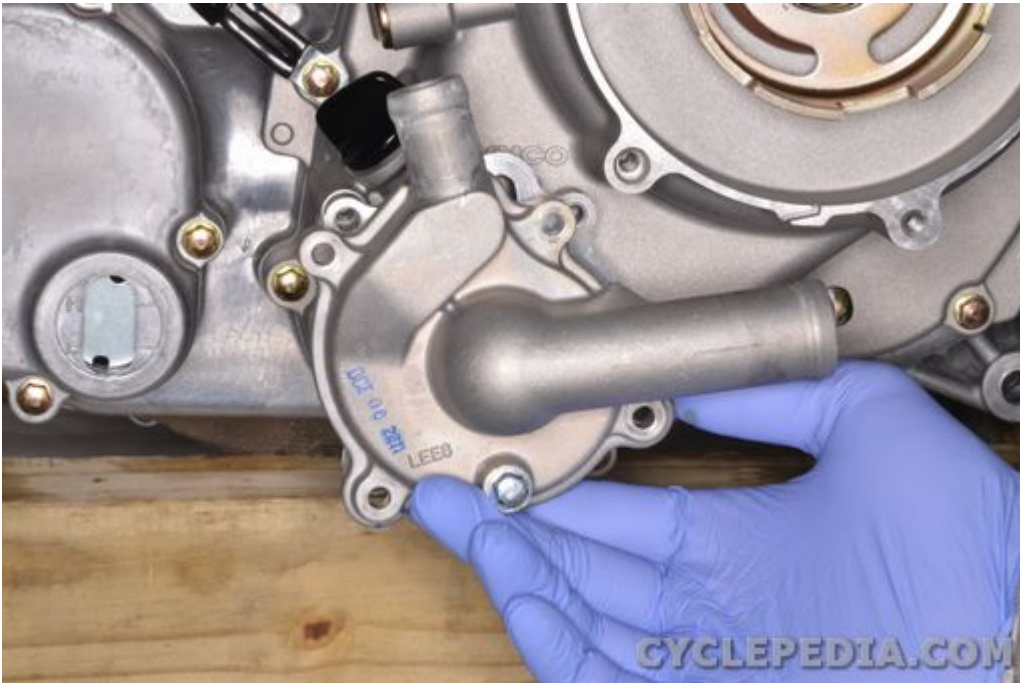
Fit the water pump body into place.



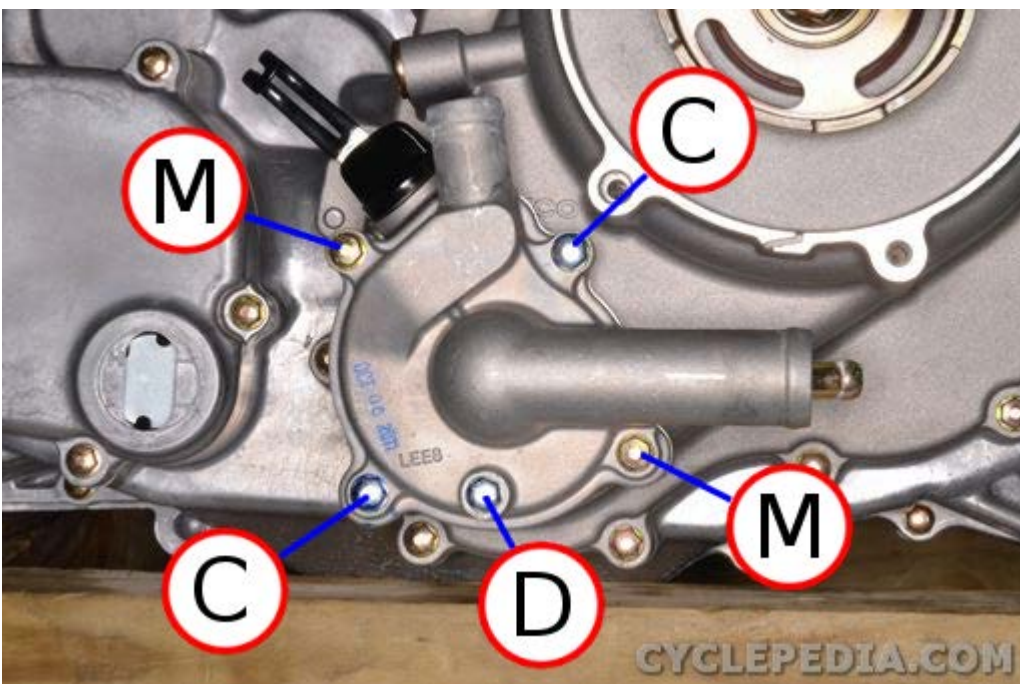
Guide the water pump shaft groove onto the end of the oil pump shaft.



Install a new O-ring into the groove on the water pump cover.



Fit the water pump cover into place.



The water pump has two mounting bolts (M), two cover bolts (C), and a drain bolt (D).
Install the mounting bolts before the cover bolts.

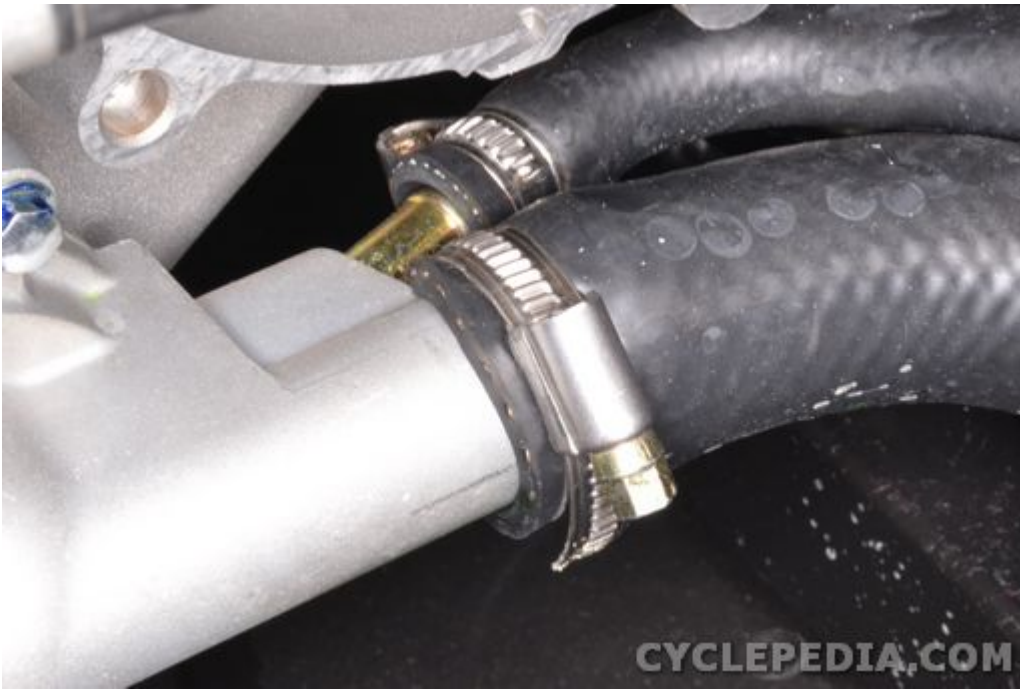


Install the water pump mounting bolts and cover bolts. The mounting bolts are gold colored and longer than the silver cover bolts.



Tighten the water pump bolts to specification with an 8 mm socket.

ITEM	N-m	kgf-m	ft-lb
Water pump bolt	13	1.3	9



Connect the bypass hose (smaller) and lower radiator hose (larger) to the water pump. Install the clamps. Tighten the clamps securely with a #2 Phillips screwdriver.



Connect the cylinder coolant hose to the water pump. Install the hose clamp and tighten it securely with a #2 Phillips screwdriver.

Fill the engine oil. See the [Engine Oil](#) topic for more information.

Fill the coolant and bleed the cooling system. See the [Coolant](#) topic for more information.

7.CVT Continuously Variable Transmission

This chapter covers the location and servicing of the CVT components.

1.Cooling Ducts	7-3
2.Belt Case Cover	7-9
3.Clutch Removal	7-17
4.Clutch Installation	7-32
5.CVT (UXV 500i)	7-40
6.CVT (UXV 700i)	7-70

GENERAL INSTRUCTIONS

- The drive pulley, clutch and driven pulley can be serviced with the engine installed.
- Avoid getting grease and oil on the drive belt and pulley faces. Remove any oil or grease from them to minimize the slipping of drive belt and drive pulley.

TROUBLESHOOTING

Engine starts but vehicle won't move

- Worn drive belt
- Broken ramp plate
- Worn or damaged clutch lining
- Broken driven face spring

Engine stalls or vehicle creeps

- Broken clutch weight spring

Lack of power

- Worn drive belt
- Weak driven face spring
- Worn weight roller
- Faulty driven face

CVT Cooling Ducts

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.



Remove the three trim clip fasteners with a #2 Phillips screwdriver.



Loosen the clamp with a #2 Phillips screwdriver.



Remove the cooling duct. Check the CVT airbox for debris contamination and water. Clean out the airbox.



Loosen the clamp with a #2 Phillips screwdriver and remove the rear CVT cooling duct from the engine.



Loosen the clamp with a #2 Phillips screwdriver and remove the front CVT cooling duct.

Clean the cooling ducts. If there are signs of contamination the CVT may need to be inspected. See the [Belt Case Cover](#) topic for more information.

Installation



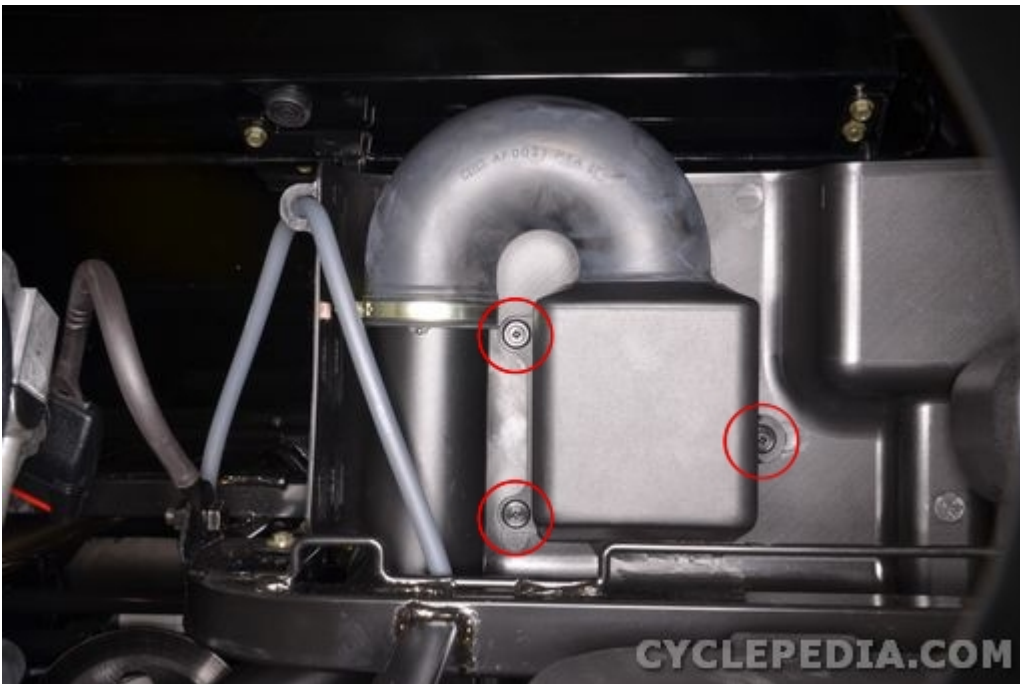
Install the rear CVT cooling duct to the engine. Tighten the clamp securely with a #2 Phillips screwdriver.



Install the rear cooling duct with airbox.



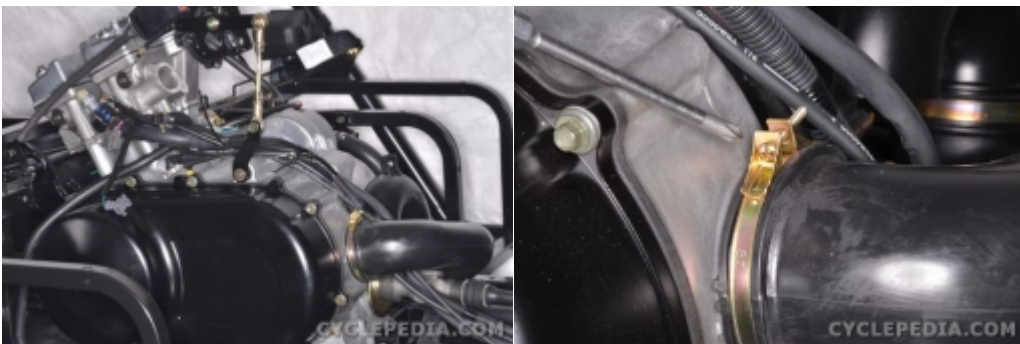
Tighten the clamp with a #2 Phillips screwdriver.



Install the three trim clip fasteners with a #2 Phillips screwdriver.



Install the front CVT cooling duct.



Tighten the front CVT cooling duct clamp securely with a #2 Phillips screwdriver.

Belt Case Cover

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Drain Bolt



There is a drain bolt on the bottom of the belt case. If this bolt is removed and any fluid comes out the CVT belt and pulleys should be inspected. Return the bolt with a new sealing washer and tighten it securely.

Removal



There are 10 belt case cover bolts.



Loosen the belt case cover bolts with an 8 mm socket.



Remove the bolts and their rubber grommets.



Utilize the pry points and remove the belt case cover.

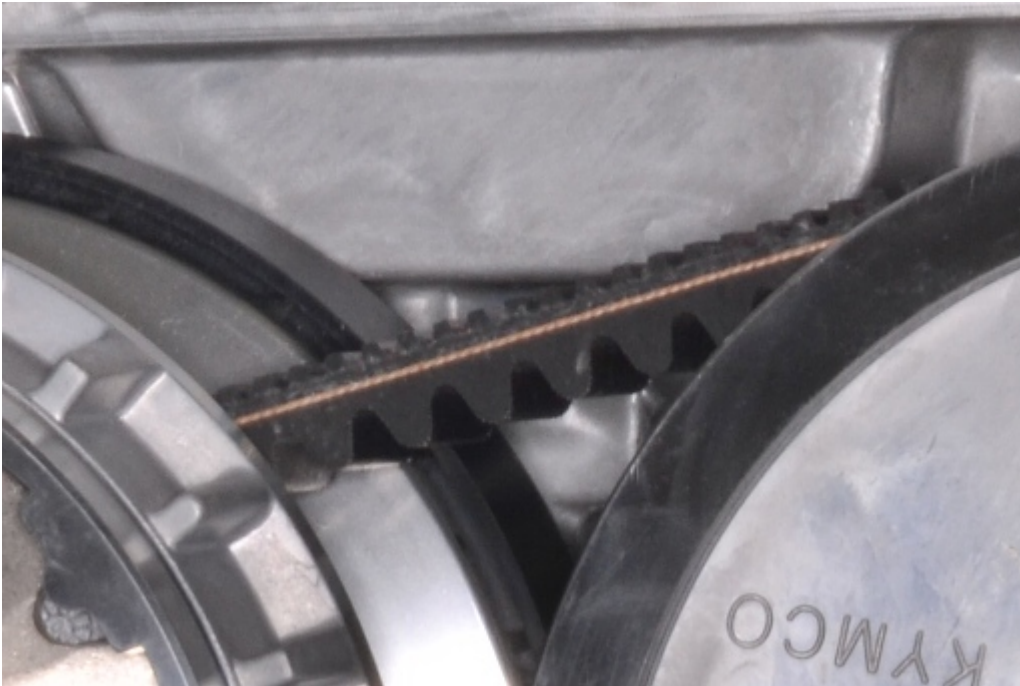


Remove the belt case cover rubber gasket.

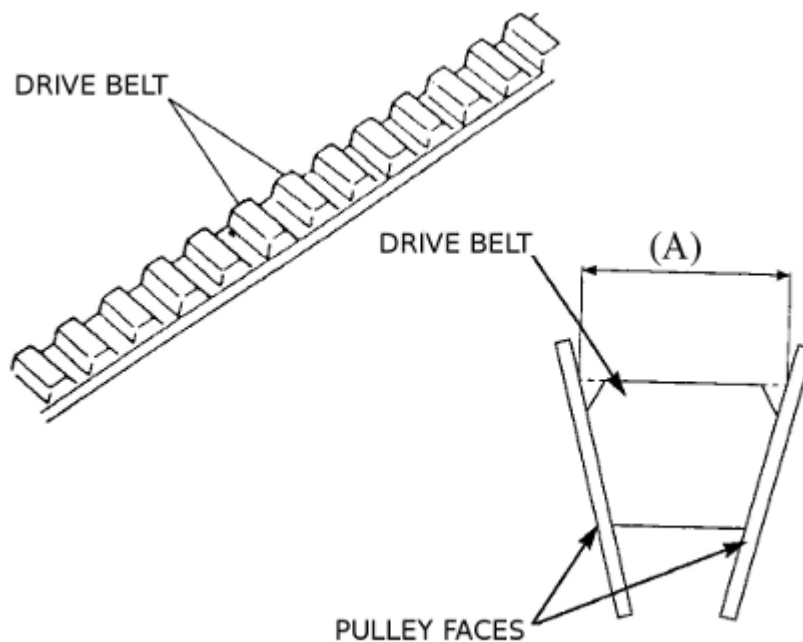


Remove the two belt case cover dowel pins.

Inspection



Inspect the drive belt for cracks or excessive wear.



Measure the distance between the pulley faces at the top of the belt as indicated (A).

Item	Standard mm (in)	Service Limit
Drive belt width	34.1 (1.364)	30.8 (1.232)

Replace the belt if it shows signs of damage or is out of specification.

Installation



Install the two dowel pins into the belt case.



Make sure the CVT belt case cover rubber gasket is in good condition.



Install the CVT belt case cover rubber gasket.



Install the belt case bolts with their gaskets.



Install the wire clamp with the belt case bolt as shown. Tighten the bolts evenly in a crisscross pattern.



Torque the belt case cover bolts to specification with an 8 mm socket.

ITEM	N-m	kgf-m	ft-lb
Belt case cover bolt	10	1.0	7.2

Clutch Removal

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the CVT belt case cover. See the [Belt Case Cover](#) topic for more information.

Remove the CVT pulleys and belt. See the [CVT Removal](#) topic for more information.



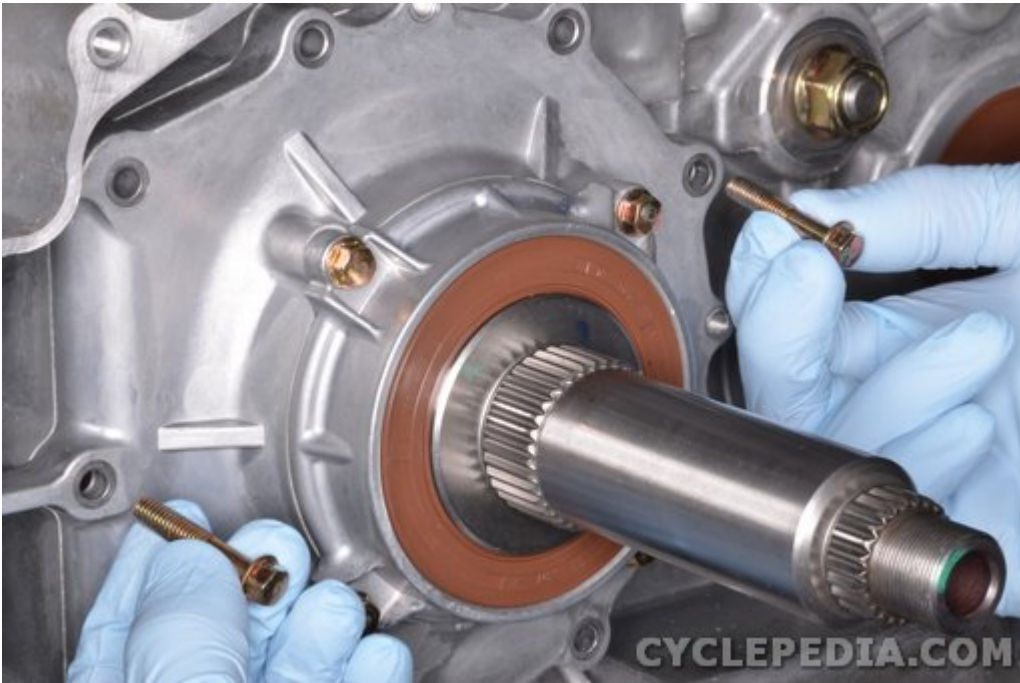
Remove the five CVT fan cover bolts with an 8 mm socket.



Remove the CVT fan cover.



Loosen the 9 clutch cover bolts a little bit at a time and in a crisscross pattern.



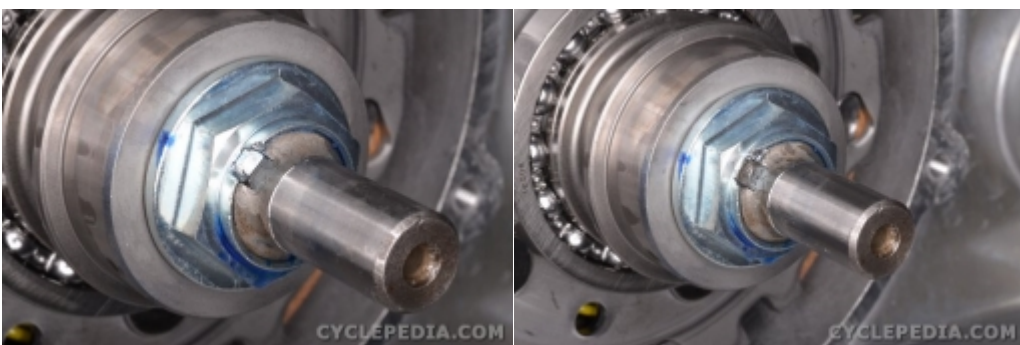
Remove the clutch cover bolts.



Remove the clutch cover assembly evenly.



Remove the two dowel pins and the clutch cover gasket.



Free the stake on the clutch nut with a chisel and a hammer.



Hold the clutch with the Y-type holder and loosen the clutch nut with a commercially available 26 mm deep well socket.

Special Tool -

Y-Type Holder: A120E00056



Remove the clutch nut.



Slide off the outer clutch collar.



Slide the clutch assembly off of the crankshaft.



Slide off the inner clutch collar.

Inspection



Remove the clutch outer and drive pulley shaft from the clutch cover.



To check the one-way clutch in the clutch outer temporarily install the clutch and set the clutch outer in place without the cover.



When turning the clutch outer clockwise, the clutch outer should turn freely. If not, the one-way clutch assembly is faulty and should be replaced.

When turning the clutch outer counterclockwise, the clutch outer and crankshaft should engaged by the one-way clutch. If not, the one-way clutch assembly is faulty and should be replaced.



Remove the one-way clutch and replace it as needed.

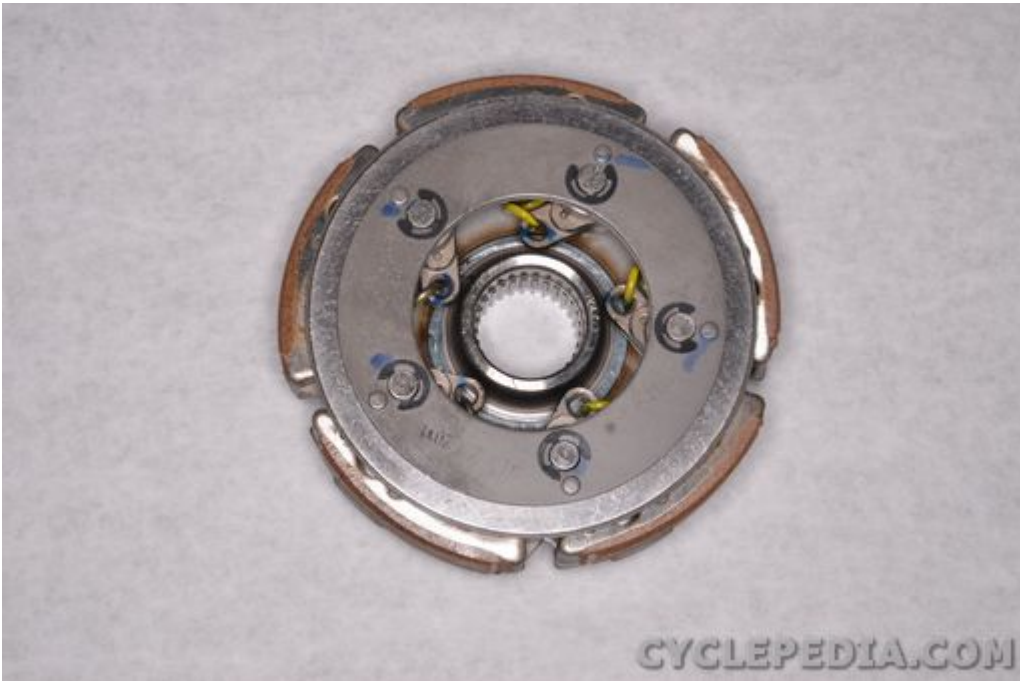
Install the clutch outer to the crankshaft with without the clutch and collars. When turning the clutch outer clockwise or counterclockwise, the clutch outer should turn smoothly. If not, the needle bearing or the clutch outer is damaged. Inspect these components.



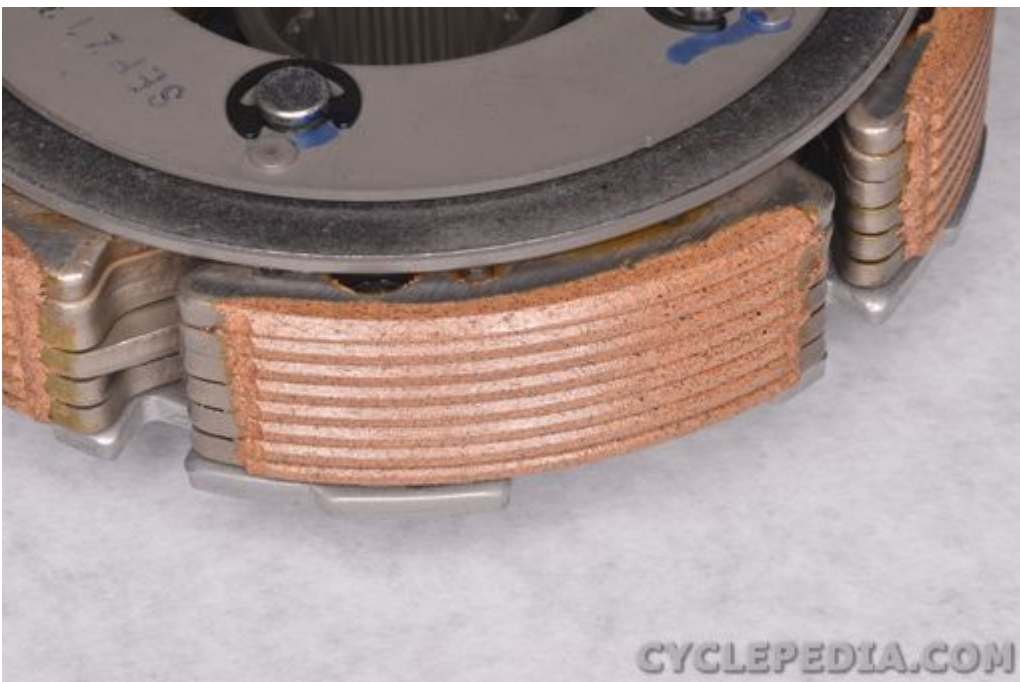
Inspect the inside of the clutch outer and needle bearing for wear and damage. Replace the components as needed.



If the needle bearing is in poor condition remove the snap ring and replace the bearing. Press in a new bearing and secure it with a new snap ring. Make sure the snap ring is secure in its groove.



Check the clutch linings for abnormal wear and damage.



Replace the clutch if the lining thickness is below 1 mm (0.04 in).



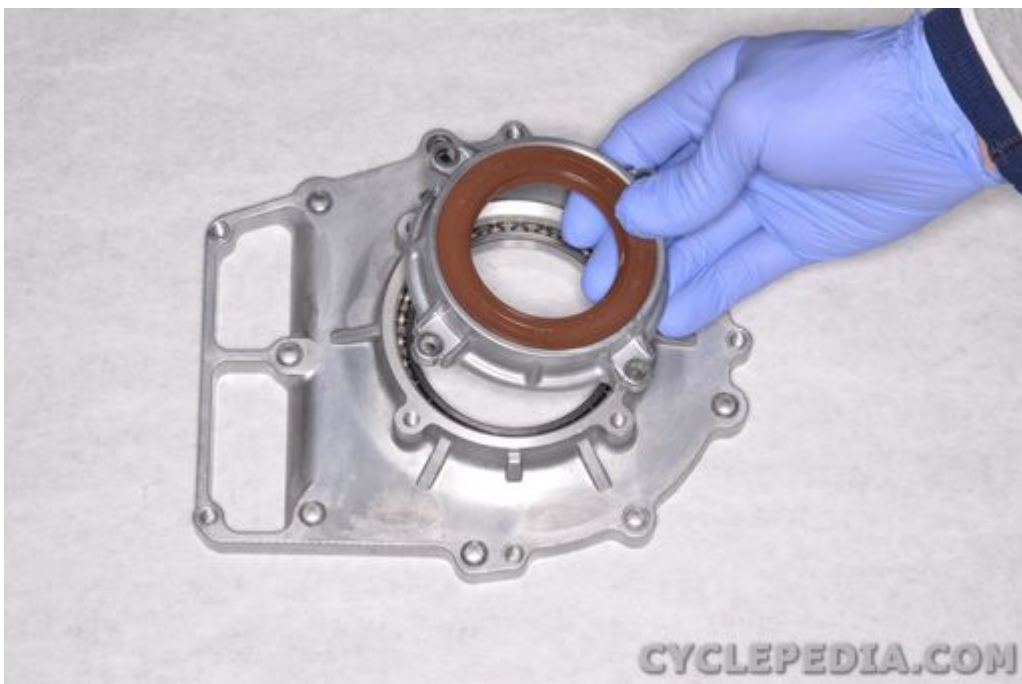
Inspect the clutch bearing by turning it with a finger. Replace the bearing if it doesn't turn smoothly or it has excessive play.



Inspect the clutch cover oil seal and replace it as needed.



Inspect the large ball bearing in the clutch cover. Turn the bearing with a finger. Replace the bearing if it doesn't turn smoothly. Remove the seal cover to replace the bearing.



Remove the four seal cover bolts with an 8 mm socket. Take off the seal cover and discard the gasket.



Drive the bearing out from the outside of the clutch cover. Drive in the new bearing from the inside of the clutch cover. Use a suitable driver that is the same outside diameter as the bearing. The manufactures markings on the bearing must face out.



Press a new seal into the seal cover. Use a suitable driver that is the same outside diameter as the seal.



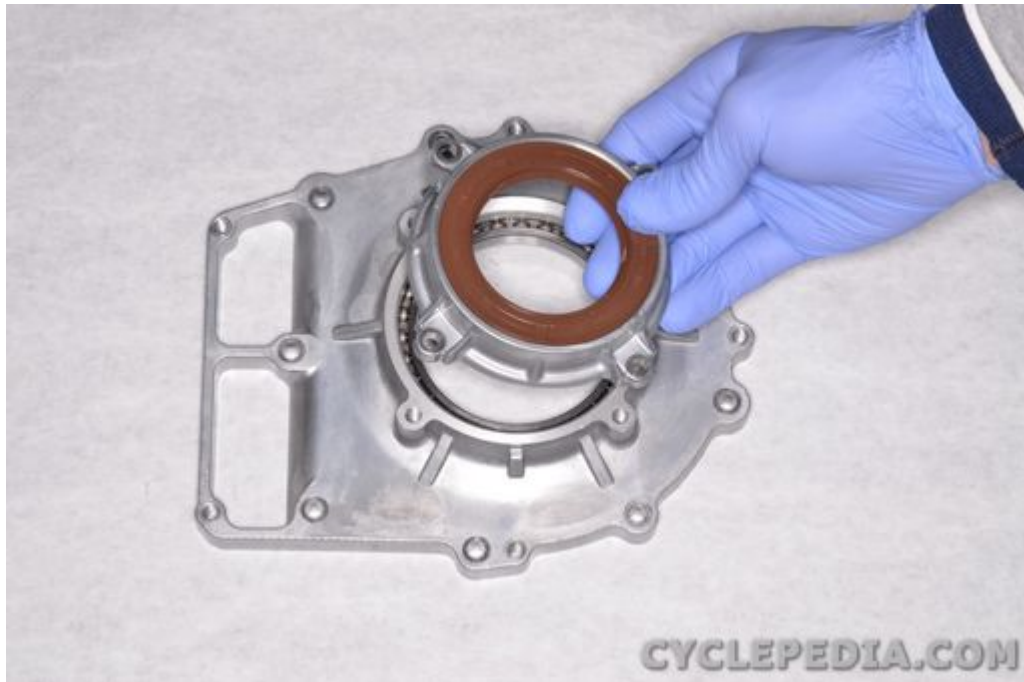
Apply a light coat lightweight lithium-soap based grease to the lips of the oil seal.

For clutch assembly and installation see the [Clutch Installation](#) topic for more information.

Install the CVT belt case cover. See the [Belt Case Cover](#) topic for more information.

Clutch Installation

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.



Fit the seal cover to the clutch cover with a new gasket.



Install the four seal cover bolts and tighten them securely with an 8 mm socket.



Install the one-way clutch into the clutch outer if it was removed. Lubricate the one-way clutch bearings with molybdenum disulfide grease.



Apply a light coat lightweight lithium-soap based grease to the lips of the oil seal. Lubricate the clutch bearings with fresh engine oil. Fit the clutch outer into the clutch cover.



Lubricate the inner clutch collar with fresh engine oil and slide it onto the crankshaft as shown.



Slide the clutch onto the crankshaft. Be sure to align the splines.



Slide the outer clutch collar onto the crankshaft.



Thread on a new clutch lock nut.

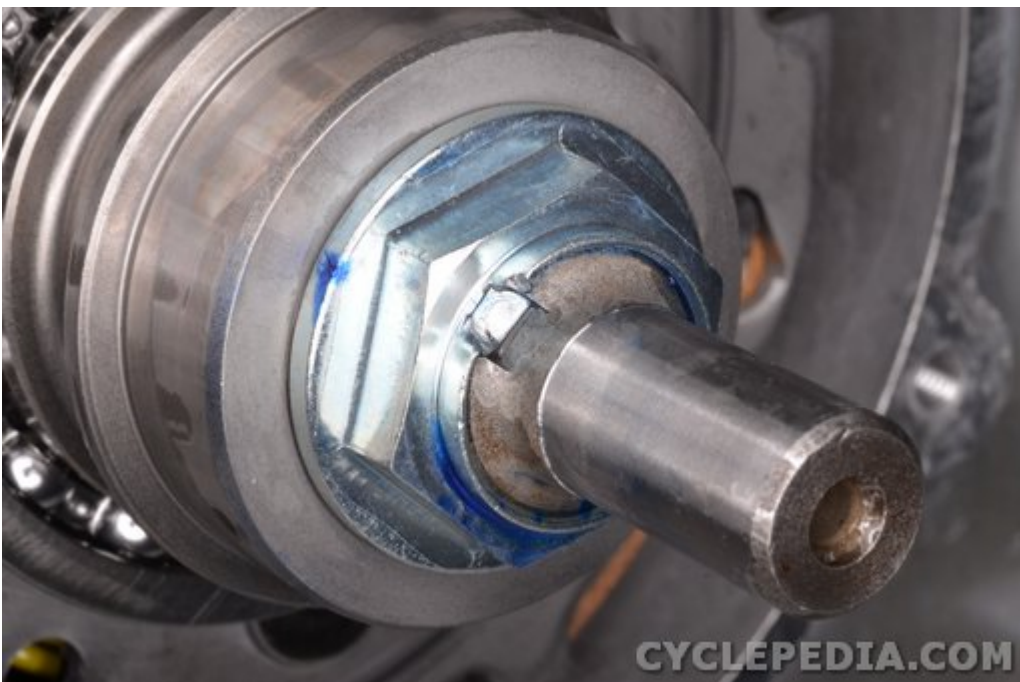


Hold the clutch with the Y-type holder and torque the clutch nut to specification with a deep well commercially available 26 mm socket.

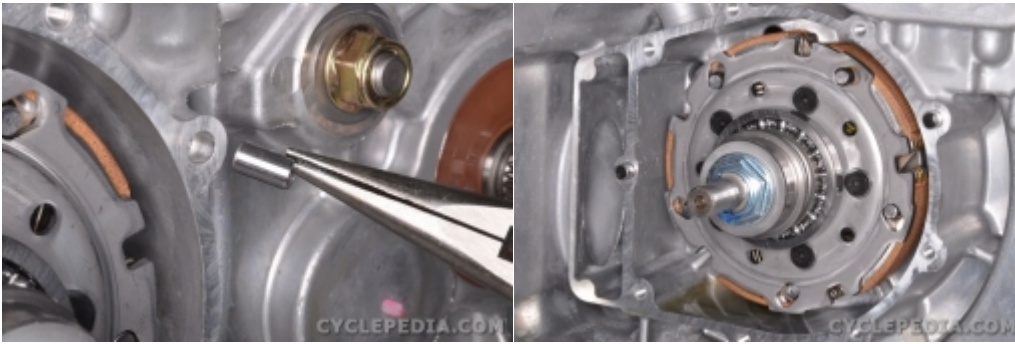
Special Tool -

Y-Type Holder: A120E00056

ITEM	N-m	kgf-m	ft-lb
Clutch nut	140	14	100.8



Stake the clutch nut at the groove on the crankshaft with a chisel and a hammer. Be careful to avoid damaging the threads.



Install the two dowel pins and a new clutch cover gasket.



Guide the clutch cover assembly into place evenly.



Insert the 9 clutch cover bolts.



Tighten the clutch cover bolts a little bit at a time in a crisscross pattern. Torque the bolts to specification with an 8 mm socket.

ITEM	N-m	kgf-m	ft-lb
Clutch cover bolt	10	1	7.2



Install the CVT fan cover.



Install the five CVT fan cover bolts and tighten them securely with an 8 mm socket.

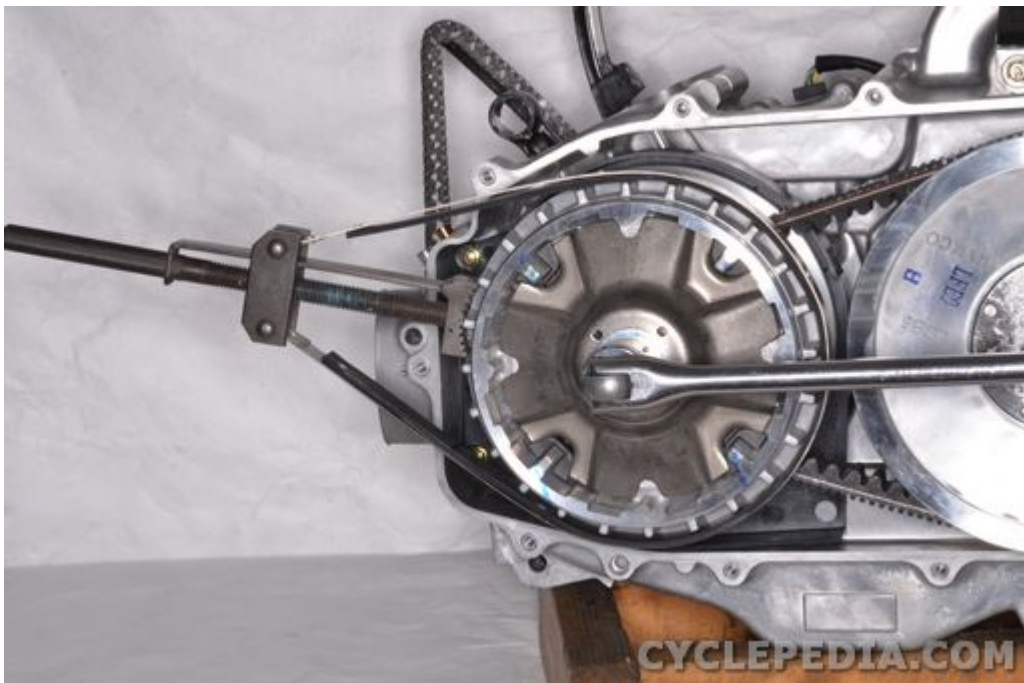
CVT (UXV 500i)

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Remove the belt case. See the [Belt Case](#) topic for more information.

Note: Do not contaminate the CVT belt and pulley faces with grease or oil.

Pulleys and Belt



Hold the drive pulley with a drive pulley holder tool and loosen the nut with a 26 mm socket.

Special Tool -

Drive Pulley Holder: A120E00058



Remove the drive pulley nut and washer from the drive pulley shaft.



Slide the movable drive face of the drive pulley off of the drive pulley shaft.



Hold the driven pulley with a Y-type holder and loosen the driven pulley nut with a 22 mm socket.

Special Tool -

Y-Type Holder: A120E00056



Remove the driven pulley nut.



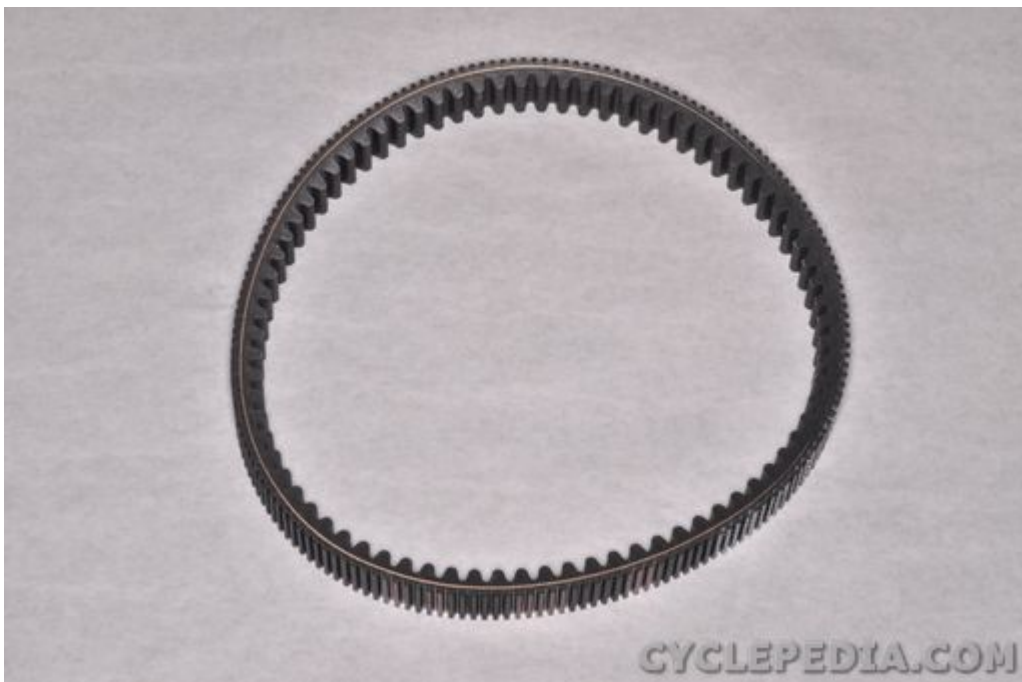
Remove the driven pulley and CVT belt.



Remove the washer from the driven pulley shaft.



Remove the drive belt from the driven pulley.

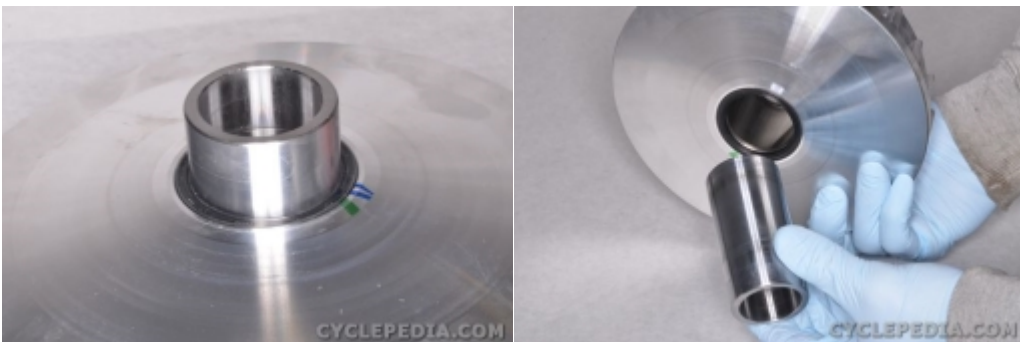


Inspect the drive belt for cracks or excessive wear.

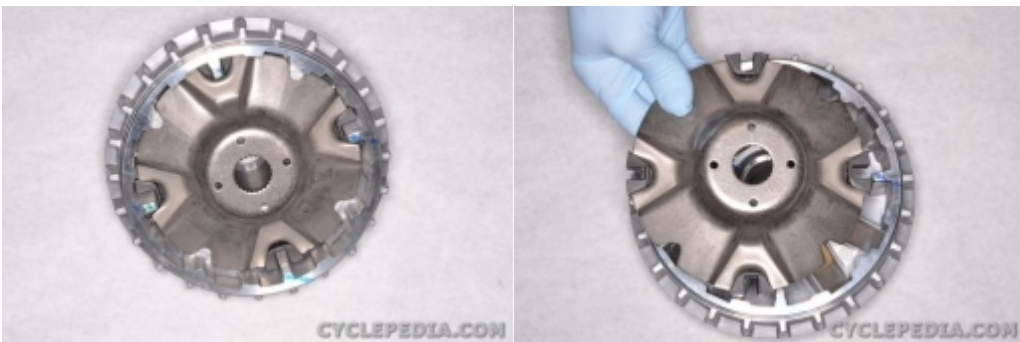


Slide off the fixed drive face of the drive pulley.

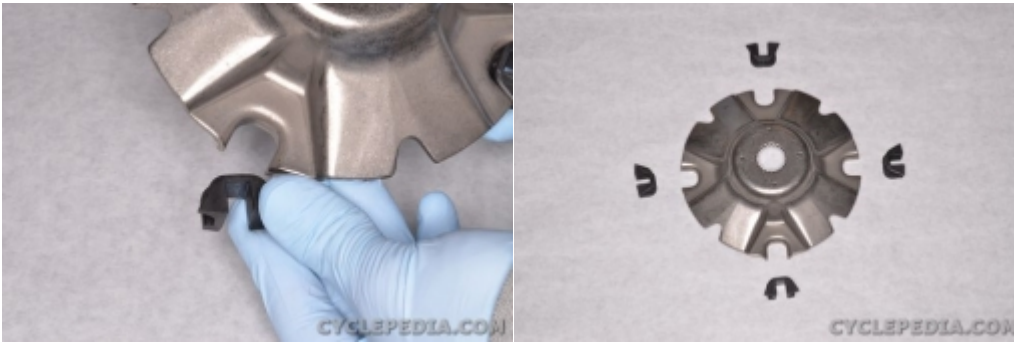
Drive Pulley Disassembly



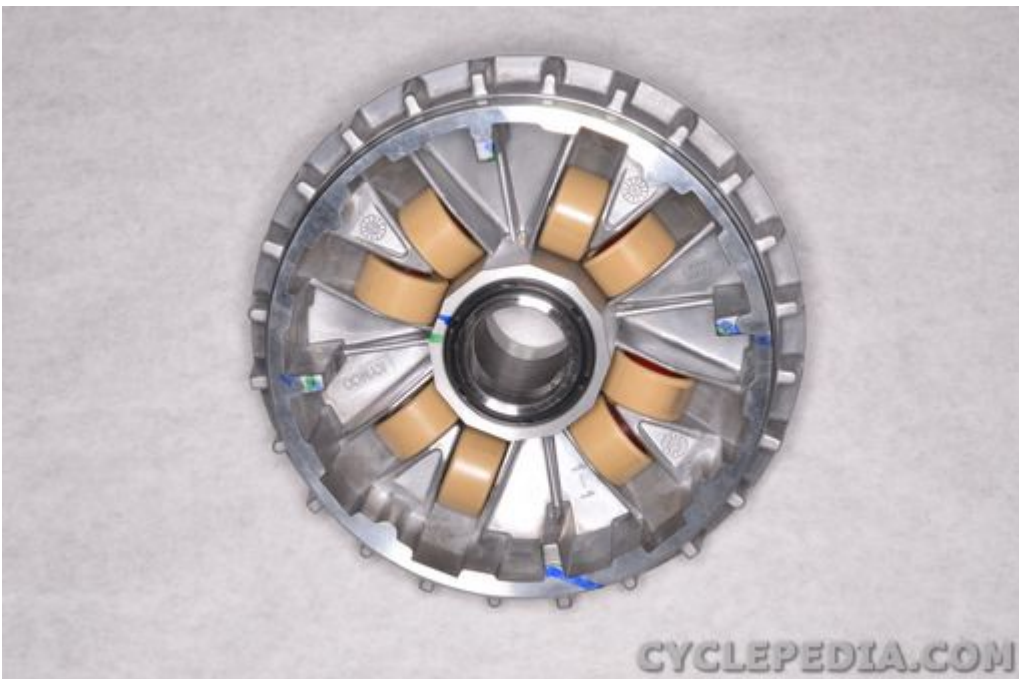
Remove the boss from the movable drive face of the drive pulley.



Lift the ramp plate out of the back of the movable drive pulley face.



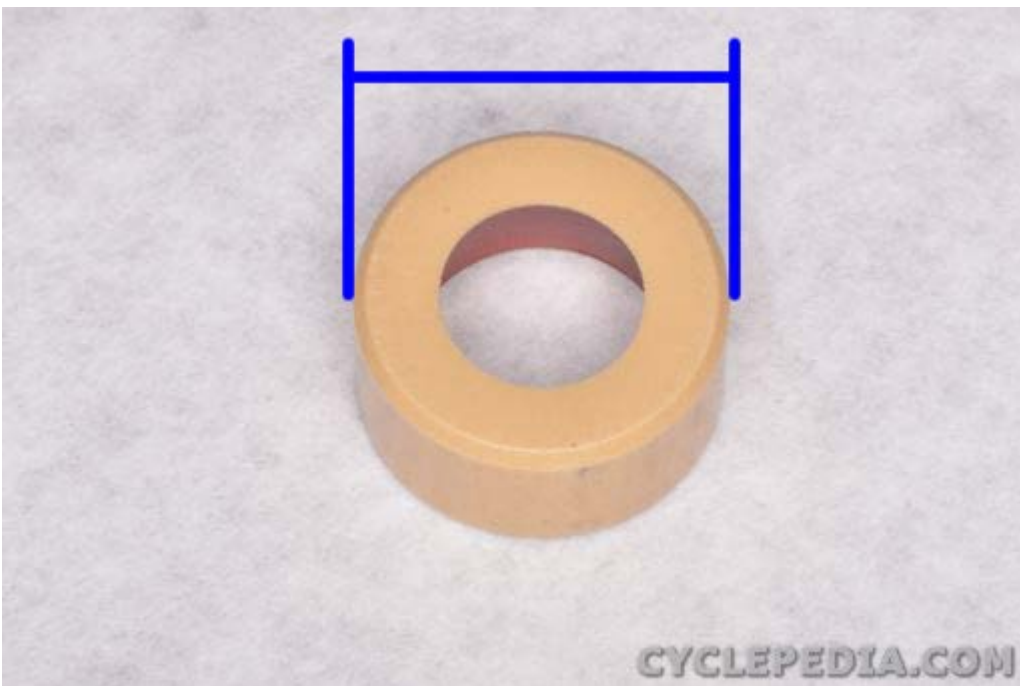
Remove the rubber damper pieces from the ramp. Replace the dampers if they are in poor condition.



There are eight weight rollers in the back of the right face of the drive pulley.

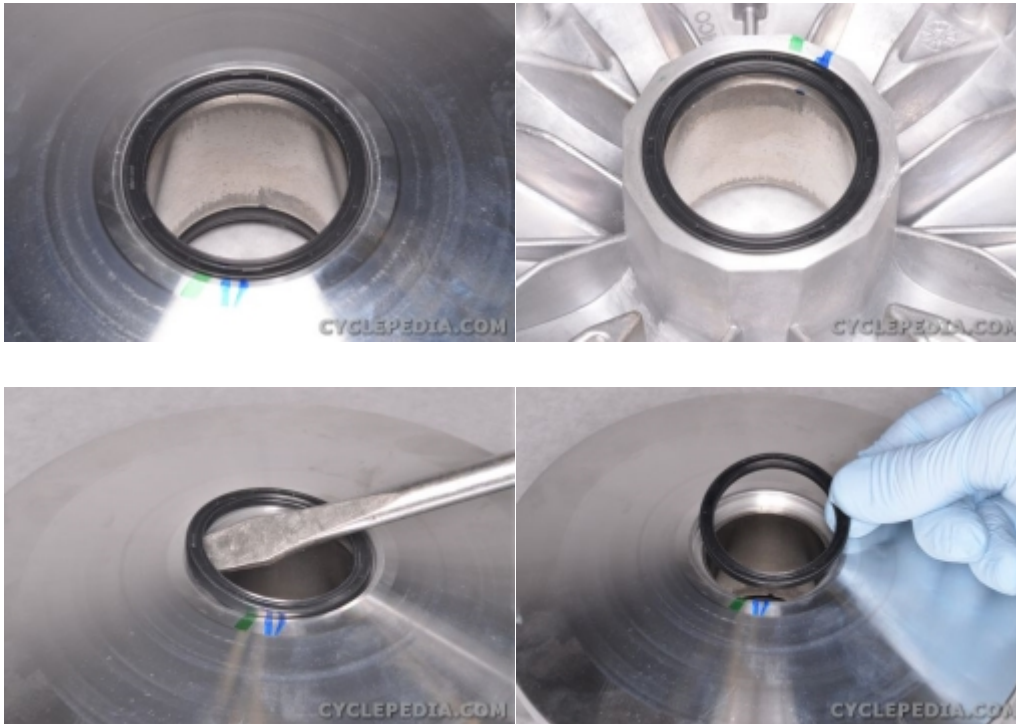


Remove the rollers and check them for excessive or uneven wear.



Measure the outside diameter of the rollers. Replace the weight rollers as needed.

Item	Standard mm (in)	Service Limit
Weight roller O.D.	29.9 - 30.1 (1.196 - 1.204)	29.5 (1.18)



Remove the dust seals.



Inspect the faces of the drive pulley. Clean away any grease from drive pulley components.

Driven Pulley Disassembly

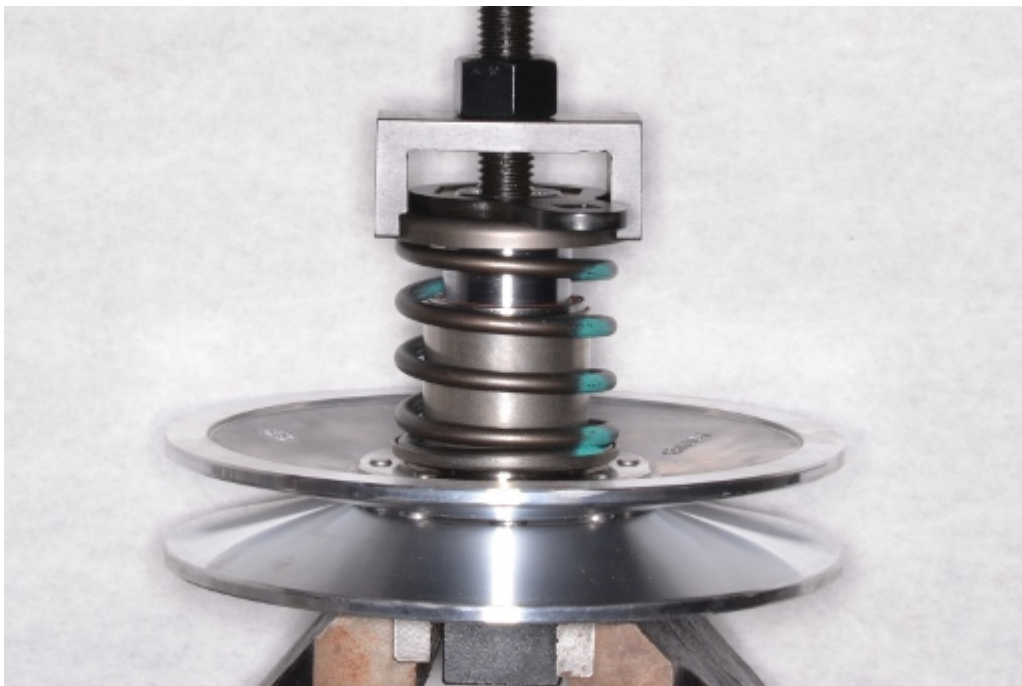
A driven pulley spring compressor is needed to disassembly the driven pulley.

Special Tool -

Driven Pulley Spring Compressor: A120E00059



Fit the driven pulley onto the special tool. Fit the posts on the tool into the holes as shown.



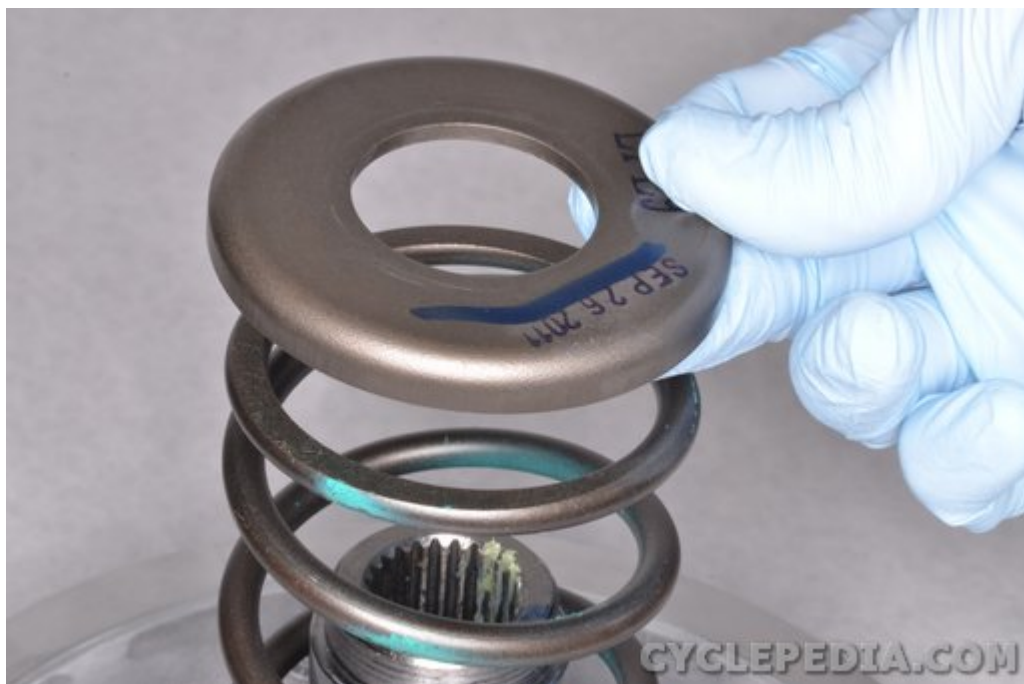
Place the special tool in a vise. Note the wrench of the special tool. Turn in the nut to compress the spring. The nut must have enough room to come free.



Loosen the nut with the wrench part of the special tool.



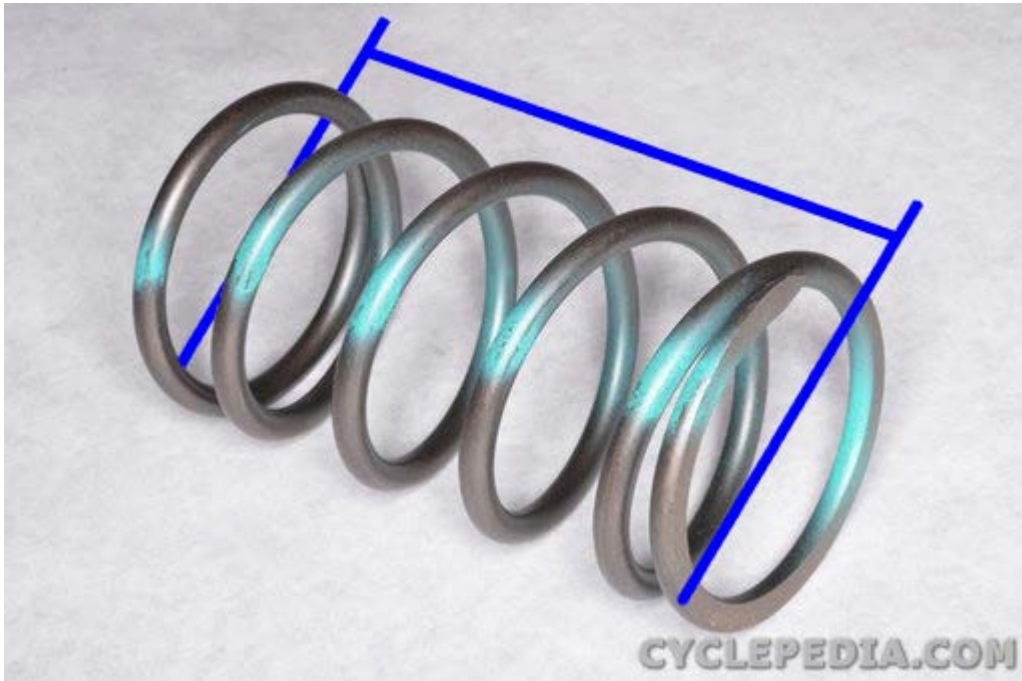
Remove the special tool components and the nut.



Remove the spring seat.



Lift off the spring.



Measure the free length of the spring. Replace the spring if it is out of specification.

Item	Standard mm (in)	Service Limit
Driven pulley spring	124.3 (4.972)	121.3 (4.852)



Slide off the spring collar.



Remove the four guide rollers with guide roller pins.



Separate the fixed and movable faces of the driven pulley. Inspect the faces of the driven pulley. Clean away any grease from the faces where the belt rides.



Remove the O-rings and seals from the movable face of the driven pulley.



Clean the driven pulley components with a high flash point solvent and compressed air. Remove all of the old grease.

NOTE: Always wear safety glasses when using compressed air and never point it directly at yourself or anyone else.

To install the CVT see the [CVT Installation](#) topic.

CVT Installation

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Driven Pulley



Install a new O-rings and dust seals into the movable face of the driven pulley. Drive in the new seals with a suitable driver with the same outside diameter as the seal. Coat the O-rings, seals, and inside of the movable face where it rides on the fixed face with grease.



Fit the movable driven face onto the fixed driven face. Wipe away any grease that gets on the faces where the belt will ride.



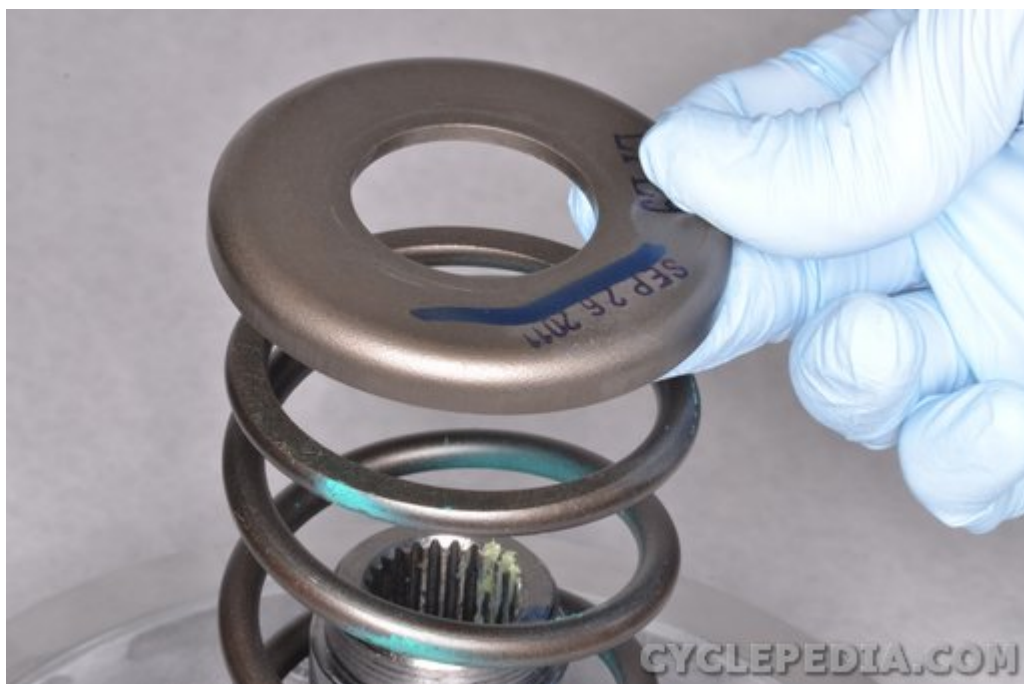
Lubricate the guide pins and rollers with grease. Place the rollers on the pins and insert the pins into driven pulley. Make sure the movable drive face moves smoothly in and out on the fixed face.



Install the spring collar.



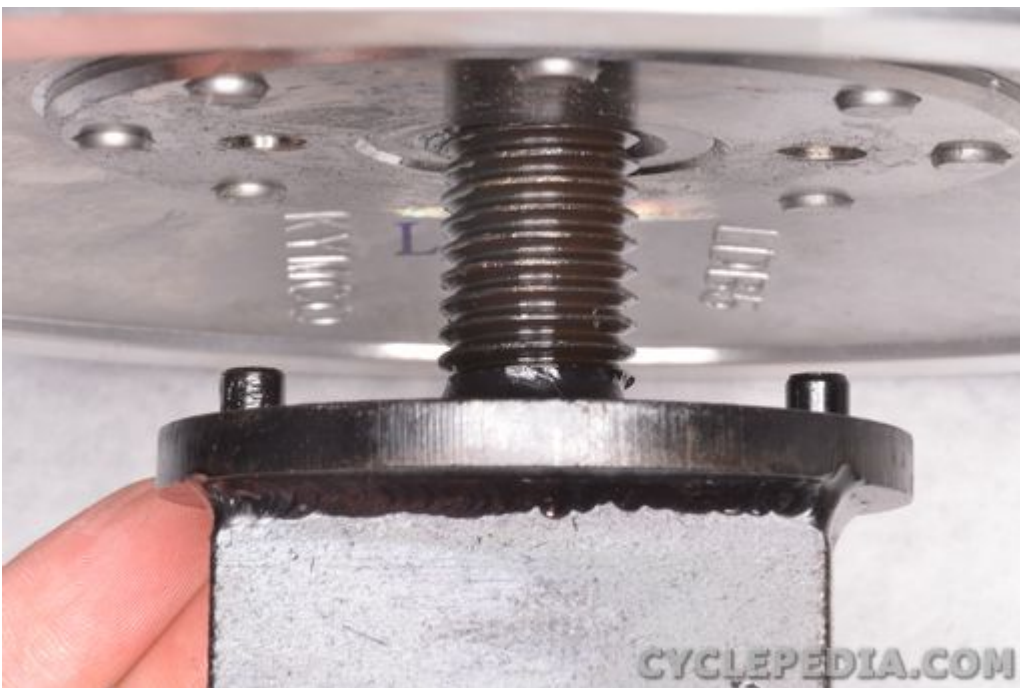
Install the spring.



Install the spring seat.

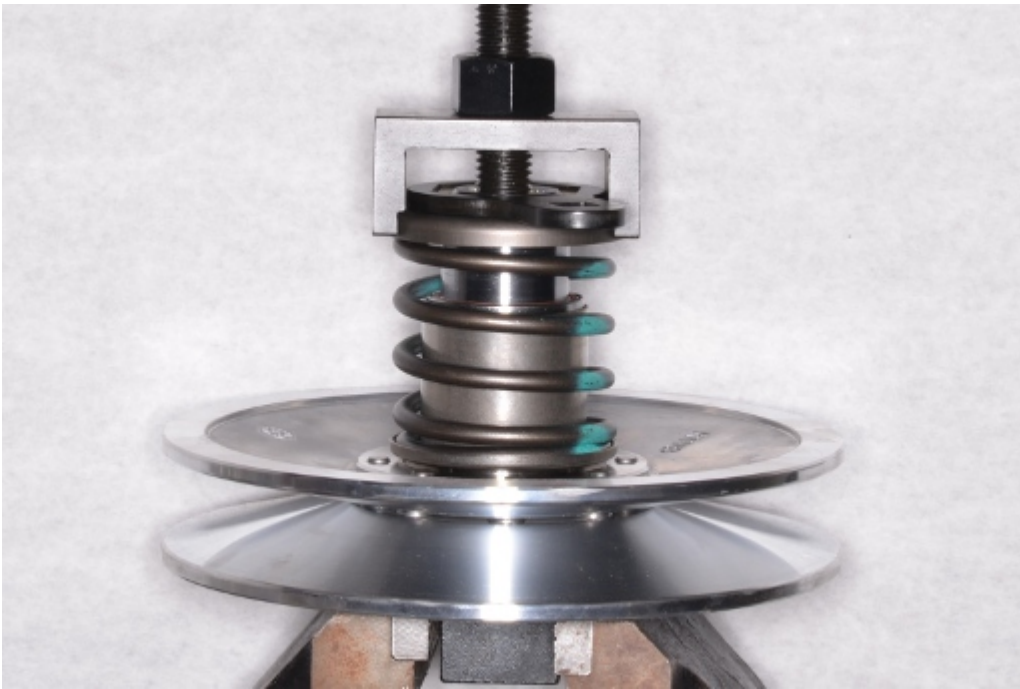


Place the nut over the spring seat.



Fit the driven pulley onto the special tool. Fit the posts on the tool into the holes as shown.

Special Tool - Driven Pulley Spring Compressor: A120E00059



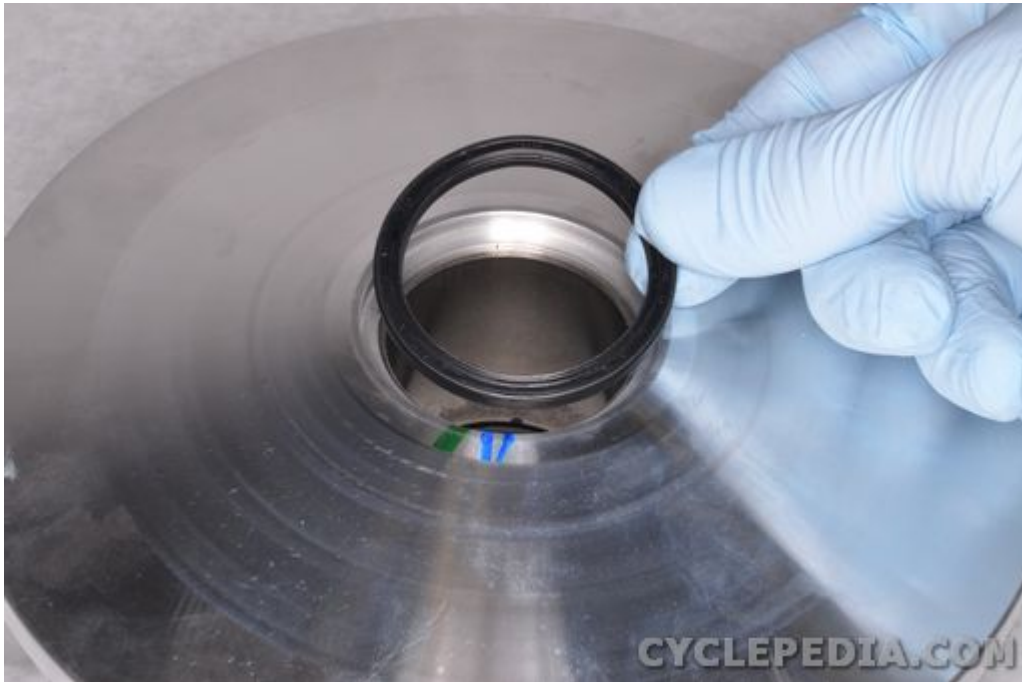
Place the special tool in a vice. Set the wrench part of the tool around the nut. Compress the spring with the special tool.



Tighten the nut to specification with the special tool.

ITEM	N-m	kgf-m	ft-lb
Driven pulley spring nut	75	7.5	54

Drive Pulley



Lubricate the lips of the new dust seals with a light coat grease. Drive in the new seals with a suitable driver with the same outside diameter as the seal.



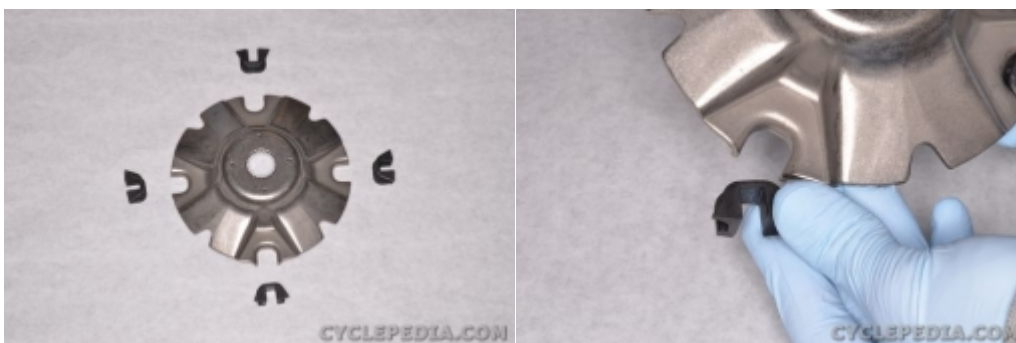
Insert the boss into the movable drive face. Apply a light coat of grease to the inside of the boss. Clean away any excess grease or any grease that contacts the pulley faces.



Install the rollers into the back of the movable drive face of the drive pulley. Position the rollers so that their thick sides are clockwise.



Install the eight rollers.



Fit the four rubber damper pieces onto the ramp.



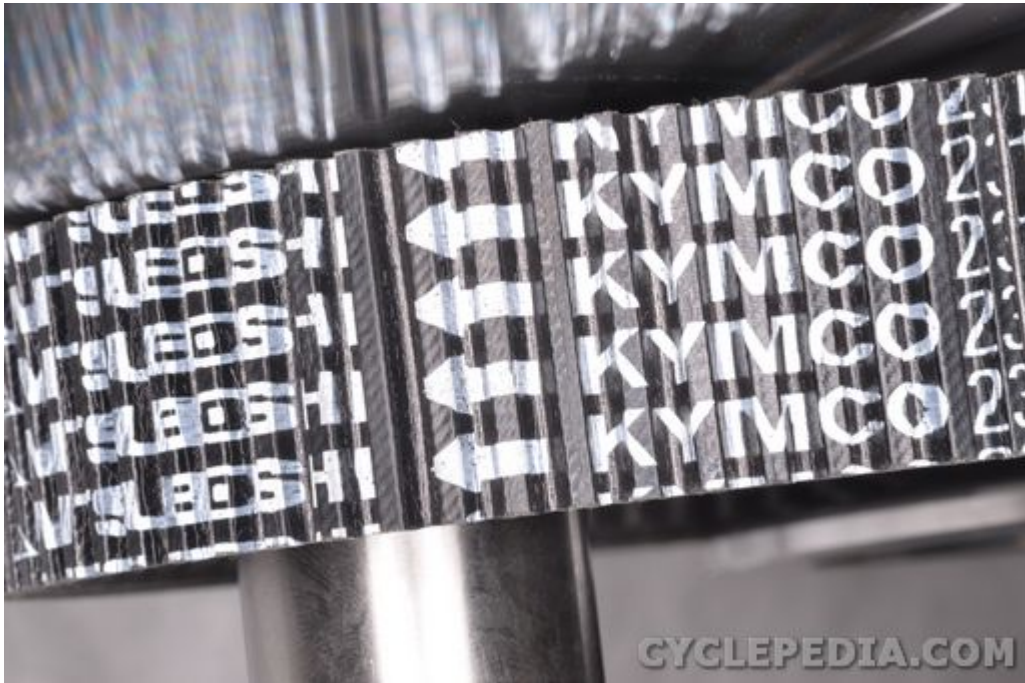
Fit the ramp into the back of the movable drive face of the drive pulley. Make sure the rubber dampers fit onto the ridges as shown.

Pulleys and Belt

Make sure the pulley faces are clean and grease free where they will contact the belt.



Slide the fixed face of the drive pulley onto the drive pulley shaft.



When the drive belt is installed make sure that the arrows are pointing towards the drive pulley when the arrow marks are on the top run of the belt.



Install the washer onto the driven pulley shaft.



Protect the threads on the driven pulley with a block.



Use a commercial bearing puller to compress the driven pulley spring. Fit the belt into the driven pulley and remove the bearing puller and block.



Install the driven pulley onto the driven pulley shaft.



Lubricate the threads of the driven pulley nut with oil. Thread on the driven pulley nut.



Hold the driven pulley with a Y-type holder and tighten the driven pulley nut to specification with a 22 mm socket.

Special Tool - Y-Type Holder: A120E00056

ITEM	N-m	kgf-m	ft-lb
Driven pulley nut	100	10	72



Slide the movable drive face of the drive pulley onto the drive pulley shaft. Grasp the upper and lower runs of the belt together between the drive and driven pulleys to allow for extra slack in the belt as it sits on the drive pulley faces. Adjust the position of the belt so that when the drive pulley nut is tightened the belt will not be pinched.

Caution: If the belt is sitting too low in the drive pulley it can be pinched when the nut is tightened. This creates an improper torque reading for the nut and can cause damage to the engine if it is run with an improperly installed belt.



Lubricate the threads of the drive pulley nut with oil. Install the drive pulley washer and nut onto the drive pulley shaft. The OUTSIDE mark on the washer must face out as shown.



Hold the drive pulley with a drive pulley holder tool and tighten the nut to specification with a 26 mm socket.

Special Tool - Drive Pulley Holder: A120E00058

ITEM	N-m	kgf-m	ft-lb
Driven pulley nut	140	14	100.8

Install the belt case. See the [Belt Case](#) topic for more information.

CVT Removal (UXV 700i)

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Note: Do not contaminate the CVT belt and pulley faces with grease or oil.

Outer Belt Cover

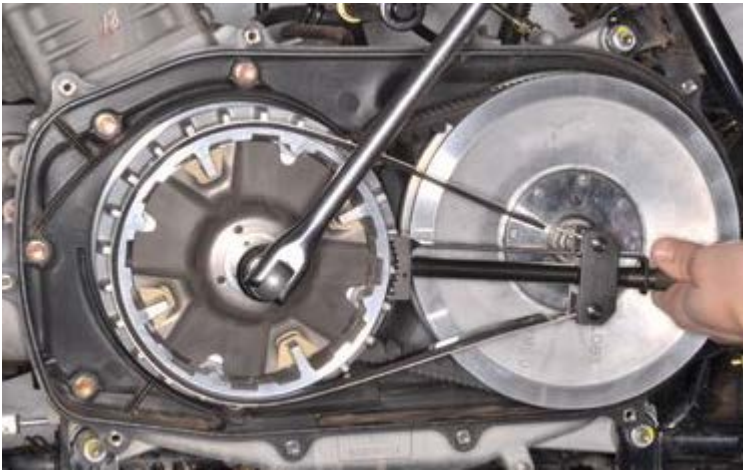


There are 10 belt case cover bolts.

Remove the belt case cover bolts with an 8 mm socket.

Remove the belt case cover. Inspect the rubber gasket and replace it as needed.

Pulleys and Belt



Hold the drive pulley with a drive pulley holder tool and loosen the nut with a 26 mm socket.

Special Tool -

Drive Pulley Holder: A120E00058



Remove the drive pulley nut and washer from the drive pulley shaft.



Slide the movable drive face of the drive pulley off of the drive pulley shaft.



Hold the driven pulley with a Y-type holder and loosen the driven pulley nut with a 22 mm socket.

Special Tool -

Y-Type Holder: A120E00056



Remove the driven pulley nut.



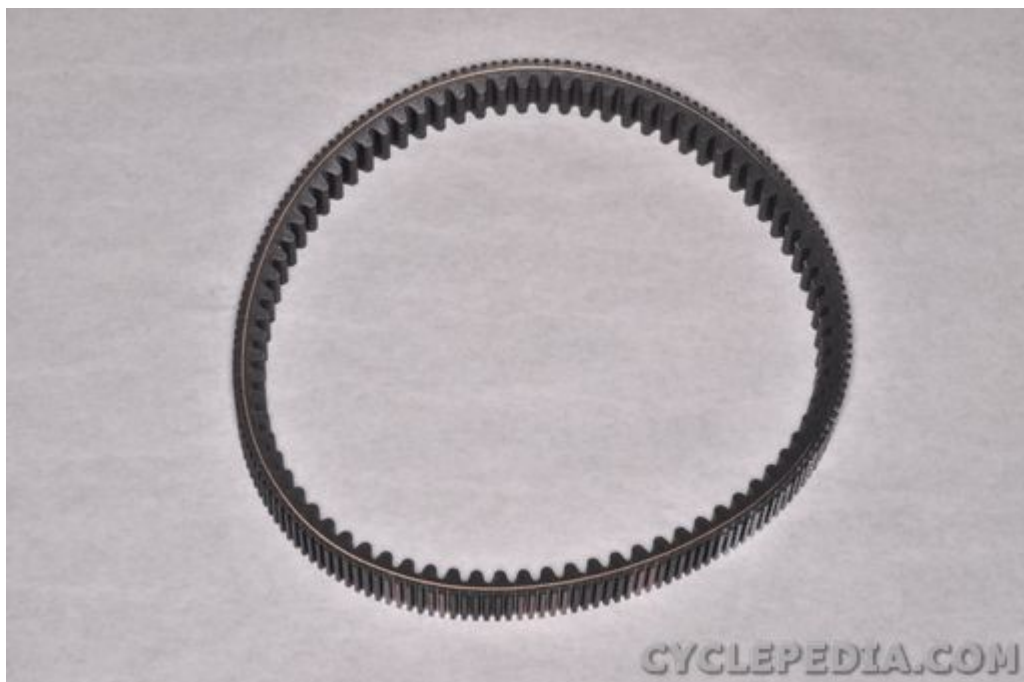
Remove the driven pulley and CVT belt.



Remove the washer from the driven pulley shaft.



Remove the drive belt from the driven pulley.

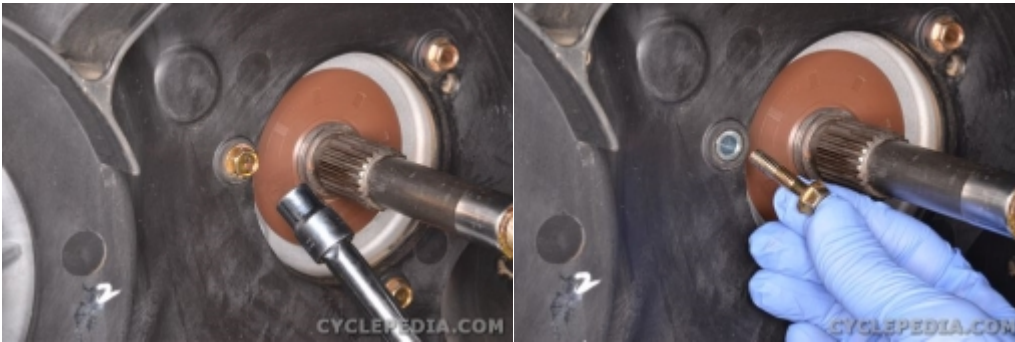


Inspect the drive belt for cracks or excessive wear.



Slide off the fixed drive face of the drive pulley.

Inner Belt Case



Remove the inner belt case bolts with a 10 mm socket.

Loosen the rear CVT cooling duct clamp with a #2 Phillips screwdriver. disconnect the cooling duct from the inner belt case.

Remove the inner belt case.

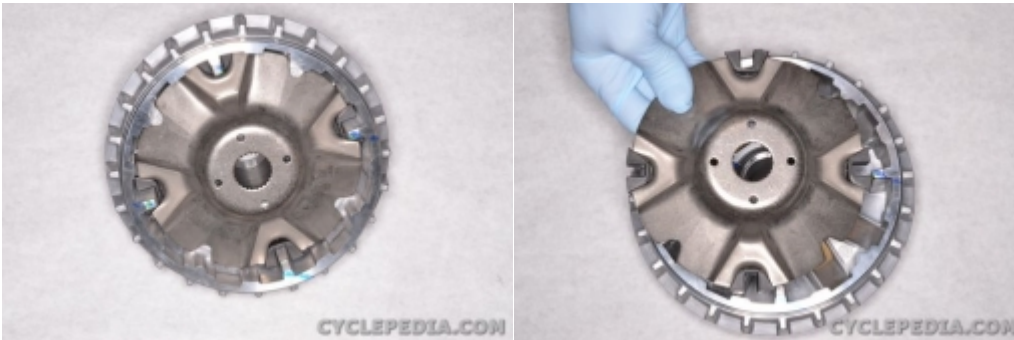


Inspect the two rubber gaskets on the back of the inner belt case.

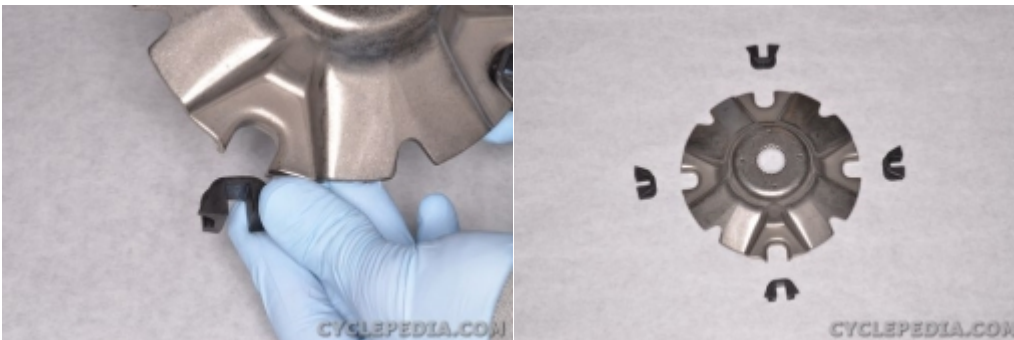
Drive Pulley Disassembly



Remove the boss from the movable drive face of the drive pulley.



Lift the ramp plate out of the back of the movable drive pulley face.



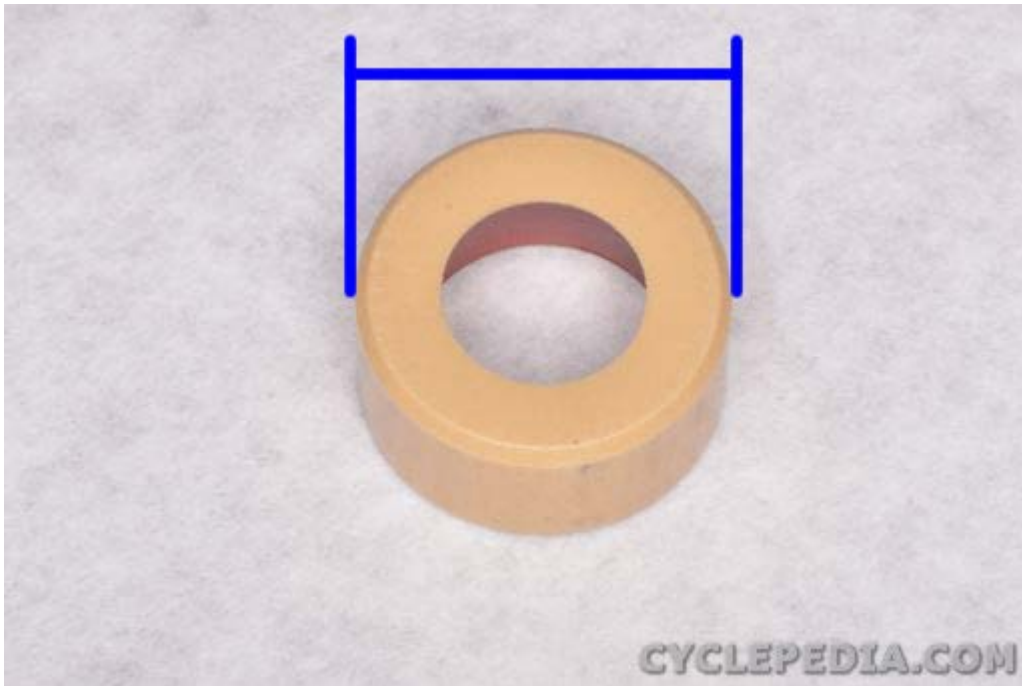
Remove the rubber damper pieces from the ramp. Replace the dampers if they are in poor condition.



There are eight weight rollers in the back of the right face of the drive pulley.

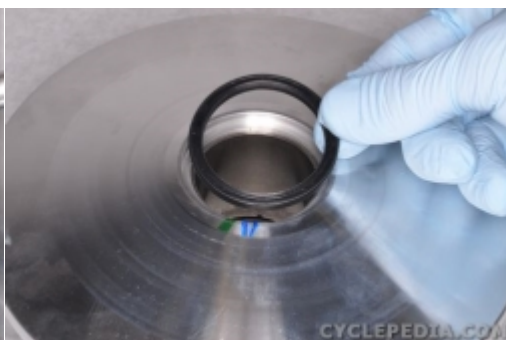


Remove the rollers and check them for excessive or uneven wear.



Measure the outside diameter of the rollers. Replace the weight rollers as needed.

Item	Standard mm (in)	Service Limit
Weight roller O.D.	29.9 - 30.1 (1.196 - 1.204)	29.5 (1.18)



Remove the dust seals.



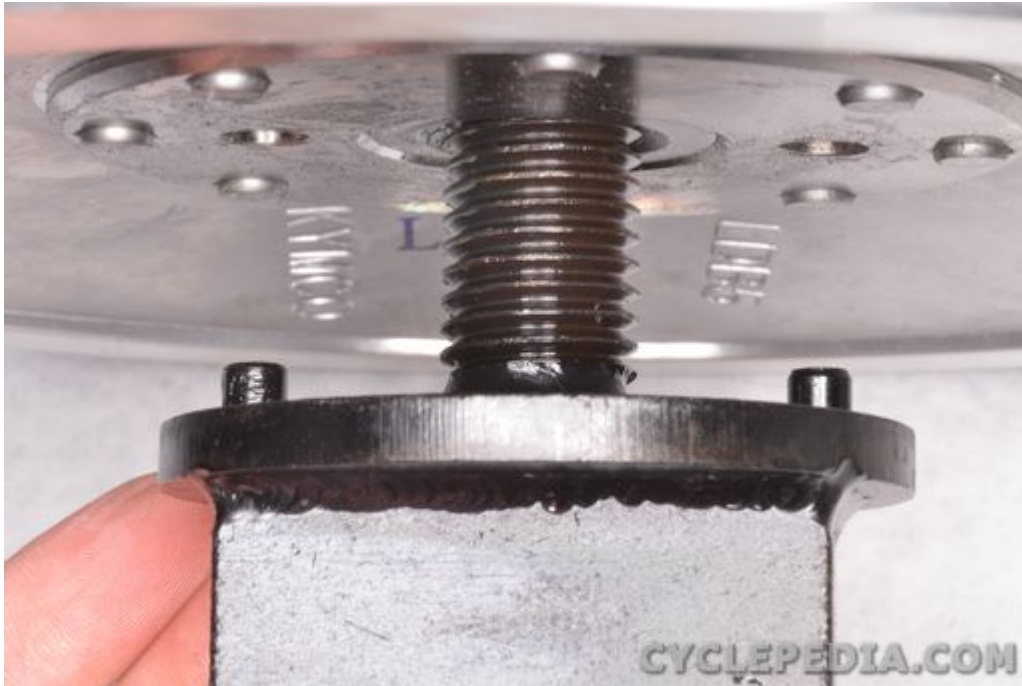
Inspect the faces of the drive pulley. Clean away any grease from drive pulley components.

Driven Pulley Disassembly

A driven pulley spring compressor is needed to disassembly the driven pulley.

Special Tool -

Driven Pulley Spring Compressor: A120E00059



Fit the driven pulley onto the special tool. Fit the posts on the tool into the holes as shown.



Place the special tool in a vise. Note the wrench of the special tool. Turn in the nut to compress the spring. The nut must have enough room to come free.



Loosen the nut with the wrench part of the special tool.



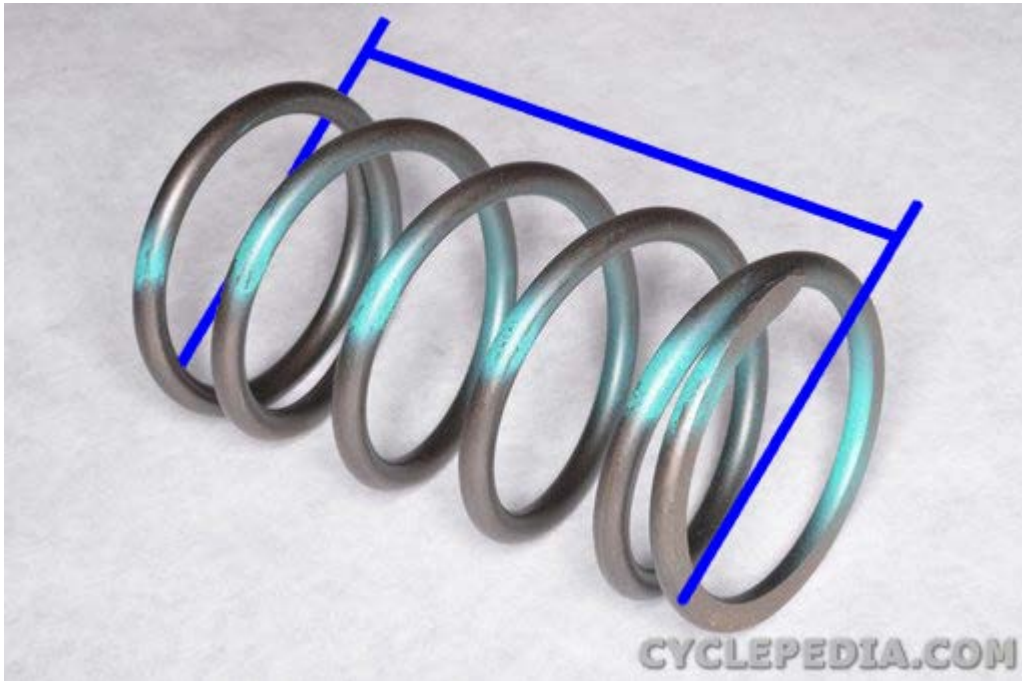
Remove the special tool components and the nut.



Remove the spring seat.



Lift off the spring.



Measure the free length of the spring. Replace the spring if it is out of specification.

Item	Standard mm (in)	Service Limit
Driven pulley spring	124.3 (4.972)	121.3 (4.852)



Slide off the spring collar.



Remove the four guide rollers with guide roller pins.



Separate the fixed and movable faces of the driven pulley. Inspect the faces of the driven pulley. Clean away any grease from the faces where the belt rides.



Remove the O-rings and seals from the movable face of the driven pulley.



Clean the driven pulley components with a high flash point solvent and compressed air.
Remove all of the old grease.

NOTE: Always wear safety glasses when using compressed air and never point it directly at yourself or anyone else.

CVT Installation

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Driven Pulley



Install a new O-rings and dust seals into the movable face of the driven pulley. Drive in the new seals with a suitable driver with the same outside diameter as the seal. Coat the O-rings, seals, and inside of the movable face where it rides on the fixed face with grease.



Fit the movable driven face onto the fixed driven face. Wipe away any grease that gets on the faces where the belt will ride.



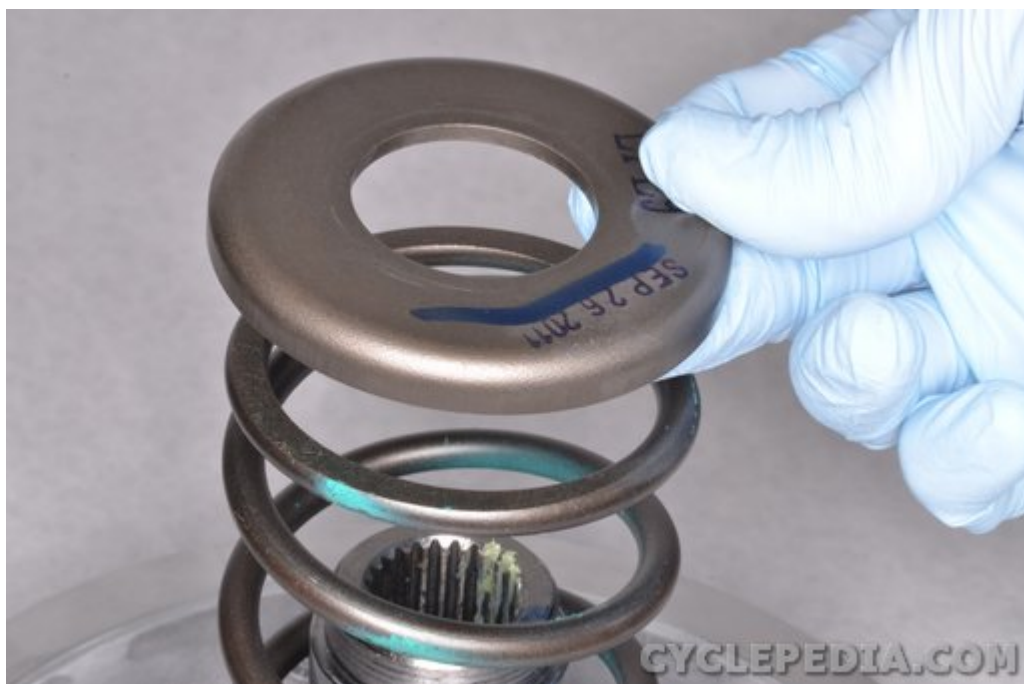
Lubricate the guide pins and rollers with grease. Place the rollers on the pins and insert the pins into driven pulley. Make sure the movable drive face moves smoothly in and out on the fixed face.



Install the spring collar.



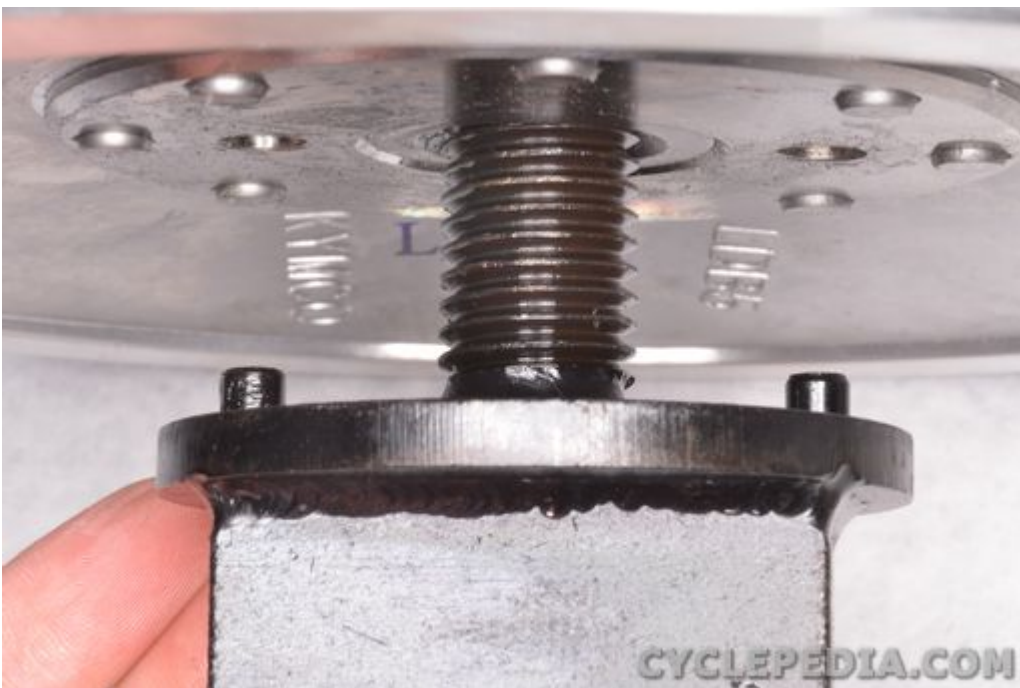
Install the spring.



Install the spring seat.



Place the nut over the spring seat.



Fit the driven pulley onto the special tool. Fit the posts on the tool into the holes as shown.

Special Tool - Driven Pulley Spring Compressor: A120E00059



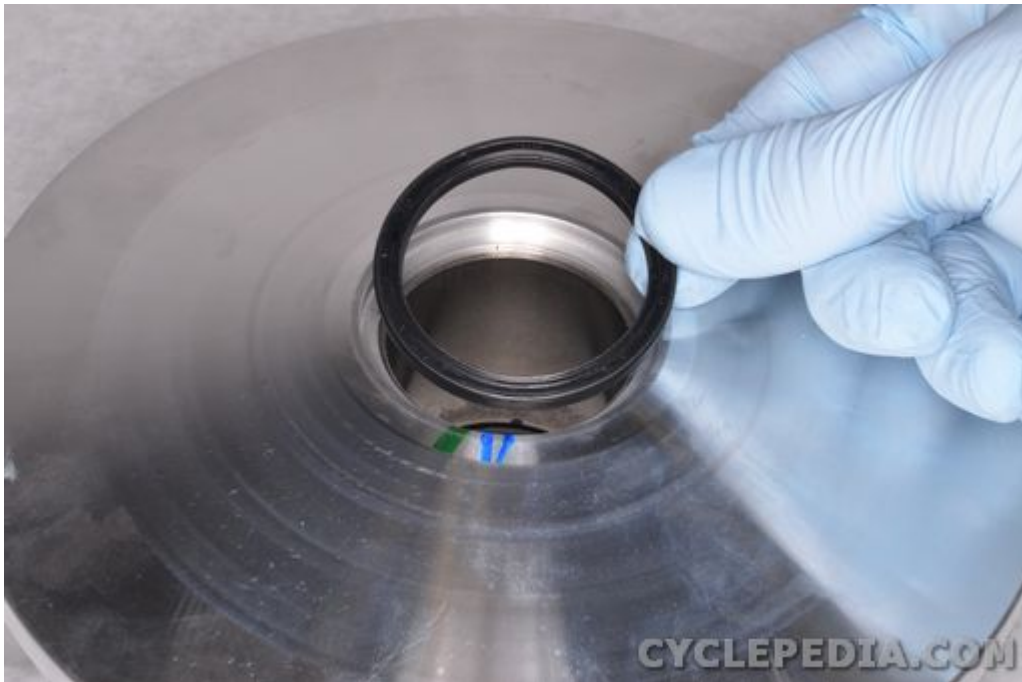
Place the special tool in a vice. Set the wrench part of the tool around the nut. Compress the spring with the special tool.



Tighten the nut to specification with the special tool.

ITEM	N-m	kgf-m	ft-lb
Driven pulley spring nut	75	7.5	54

Drive Pulley



Lubricate the lips of the new dust seals with a light coat grease. Drive in the new seals with a suitable driver with the same outside diameter as the seal.



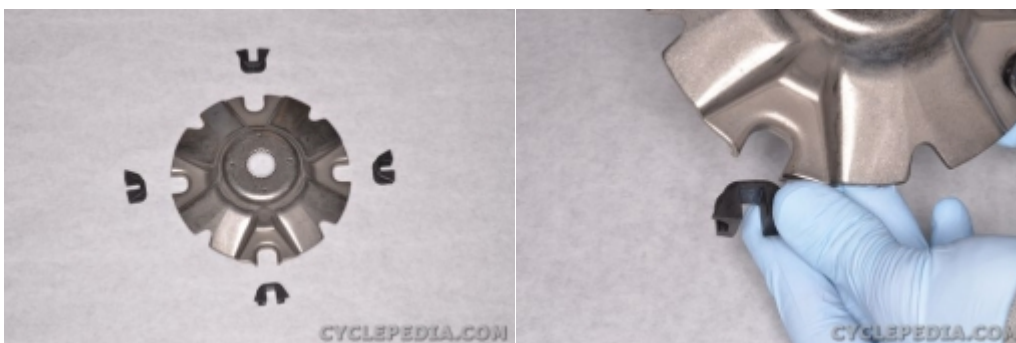
Insert the boss into the movable drive face. Apply a light coat of grease to the inside of the boss. Clean away any excess grease or any grease that contacts the pulley faces.



Install the rollers into the back of the movable drive face of the drive pulley. Position the rollers so that their thick sides are clockwise.



Install the eight rollers.



Fit the four rubber damper pieces onto the ramp.



Fit the ramp into the back of the movable drive face of the drive pulley. Make sure the rubber dampers fit onto the ridges as shown.

Inner Belt Case



Install the two rubber gaskets to the back of the inner belt case.
Install the inner belt case.





Install the inner belt case bolts and tighten them securely with a 10 mm socket.

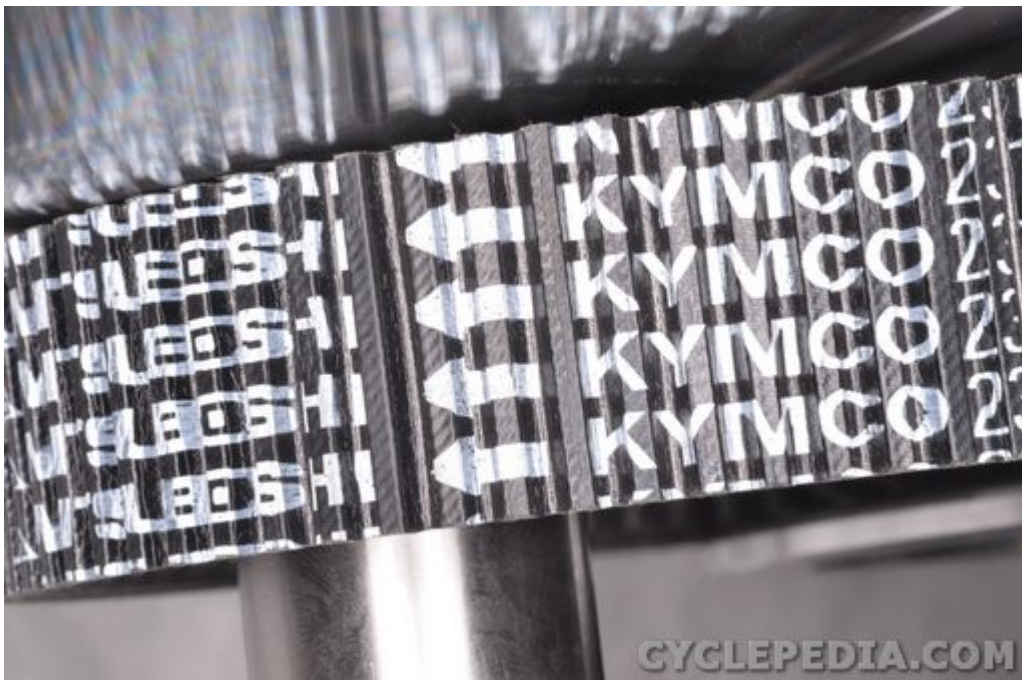
Connect the rear cooling duct to the inner belt case as shown. Tighten the duct clamp securely with a #2 Phillips screwdriver.

Pulleys and Belt

Make sure the pulley faces are clean and grease free where they will contact the belt.



Slide the fixed face of the drive pulley onto the drive pulley shaft.



When the drive belt is installed make sure that the arrows are pointing towards the drive pulley when the arrow marks are on the top run of the belt.



Install the washer onto the driven pulley shaft.



Protect the threads on the driven pulley with a block.



Use a commercial bearing puller to compress the driven pulley spring. Fit the belt into the driven pulley and remove the bearing puller and block.



Install the driven pulley onto the driven pulley shaft. Fit the belt over the drive pulley shaft.



Lubricate the threads of the driven pulley nut with oil. Thread on the driven pulley nut.



Hold the driven pulley with a Y-type holder and tighten the driven pulley nut to specification with a 22 mm socket.

Special Tool - Y-Type Holder: A120E00056

ITEM	THREAD SIZE AND TYPE	TORQUE VALUES		REMARKS
		N-m	ft-lb	
PULLEY,DRIVEN	M16 x 1.5	98	72.3	APPLY OIL



Slide the movable drive face of the drive pulley onto the drive pulley shaft. Grasp the upper and lower runs of the belt together between the drive and driven pulleys to allow for extra slack in the belt as it sits on the drive pulley faces. Adjust the position of the belt so that when the drive pulley nut is tightened the belt will not be pinched.

Caution: If the belt is sitting too low in the drive pulley it can be pinched when the nut is tightened. This creates an improper torque reading for the nut and can cause damage to the engine if it is run with an improperly installed belt.



Lubricate the threads of the drive pulley nut with oil. Install the drive pulley washer and nut onto the drive pulley shaft. The OUTSIDE mark on the washer must face out as shown.



Hold the drive pulley with a drive pulley holder tool and tighten the nut to specification with a 26 mm socket.

Special Tool - Drive Pulley Holder: A120E00058

ITEM	THREAD SIZE AND TYPE	TORQUE VALUES		REMARKS
		N-m	ft-lb	
DRIVE FACE	M20 x 1.0	137.2	101.2	APPLY OIL

Outer Belt Cover

Remove the belt case cover. Make sure the rubber gasket is in place.



Install the belt case bolt as shown. Tighten the bolts evenly in a crisscross pattern.

ITEM	N-m	kgf-m	ft-lb
Belt case cover bolt	10	1.0	7.2

Install the left footrest/mudguard. See the [Mudguards and Footrests](#) topic for more information.

Clutch Removal

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

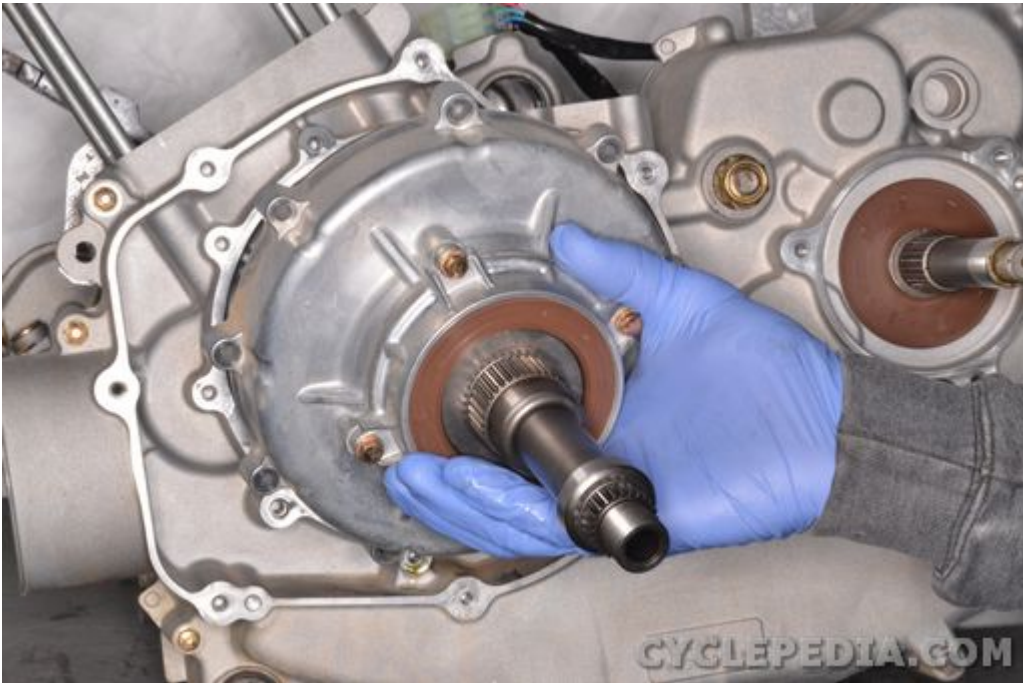
Remove the CVT pulleys and belt. See the [CVT Removal](#) topic for more information.



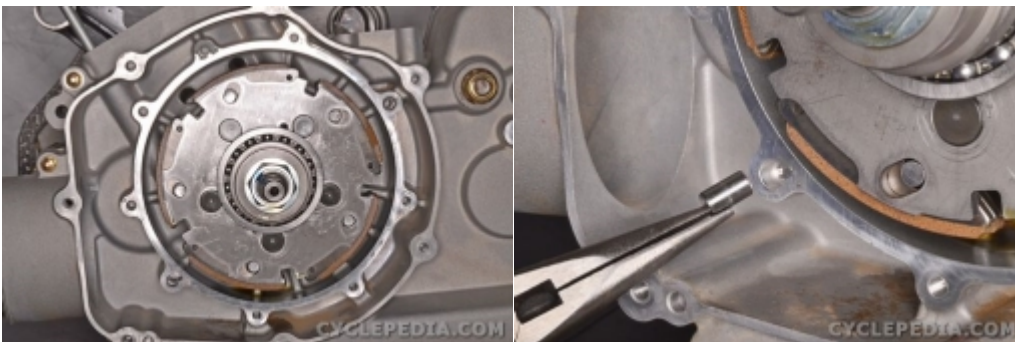
Loosen the 9 clutch cover bolts a little bit at a time and in a crisscross pattern.



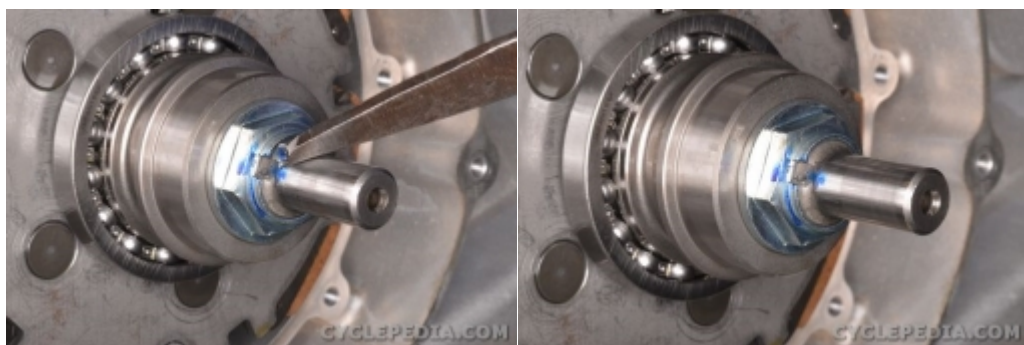
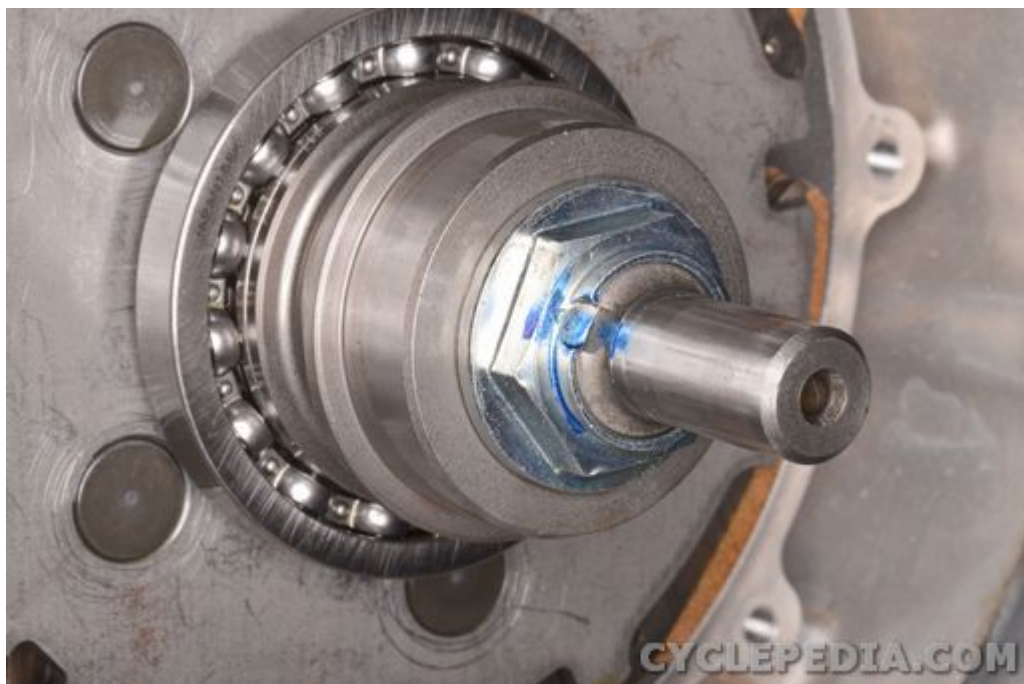
Remove the clutch cover bolts with an 8 mm socket.



Remove the clutch cover assembly evenly.



Remove the two dowel pins and the clutch cover gasket.



Free the stake on the clutch nut with a chisel and a hammer.



Hold the clutch with the Y-type holder and loosen the clutch nut with a commercially available 26 mm deep well socket.

Special Tool -

Y-Type Holder: A120E00056

Lock Nut Wrench: A120E00079



Remove the clutch nut.



Slide off the outer clutch collar.



Slide the clutch assembly off of the crankshaft.



Slide off the inner clutch collar.

Inspection



Remove the clutch outer and drive pulley shaft from the clutch cover.



To check the one-way clutch in the clutch outer temporarily install the clutch and set the clutch outer in place without the cover.



When turning the clutch outer clockwise, the clutch outer should turn freely. If not, the one-way clutch assembly is faulty and should be replaced.

When turning the clutch outer counterclockwise, the clutch outer and crankshaft should be engaged by the one-way clutch. If not, the one-way clutch assembly is faulty and should be replaced.



Remove the one-way clutch and replace it as needed.

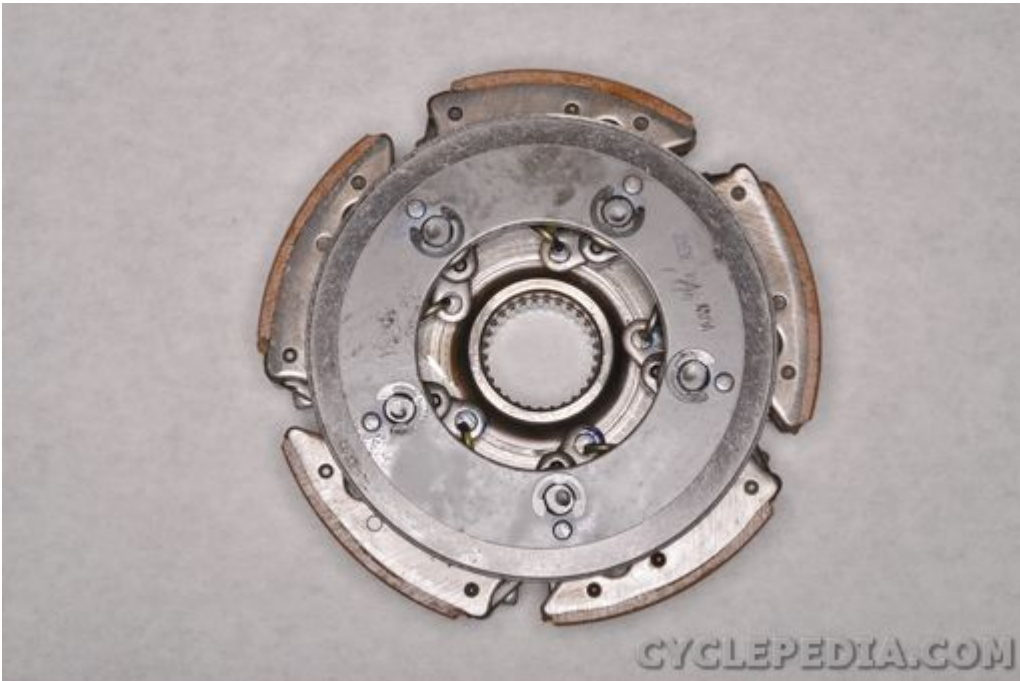
Install the clutch outer to the crankshaft without the clutch and collars. When turning the clutch outer clockwise or counterclockwise, the clutch outer should turn smoothly. If not, the needle bearing or the clutch outer is damaged. Inspect these components.



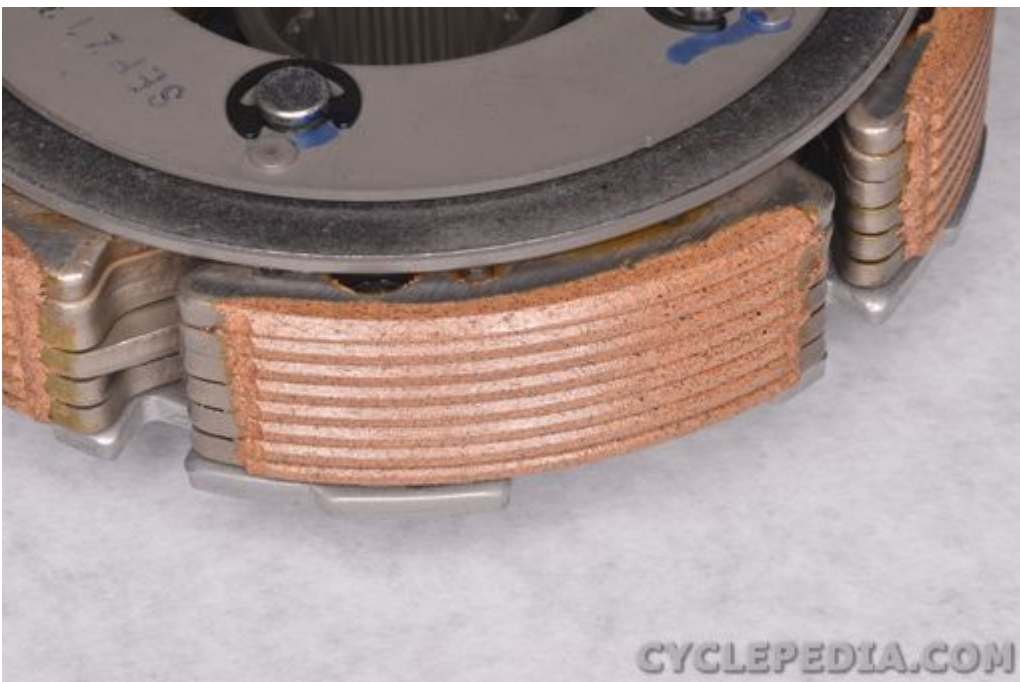
Inspect the inside of the clutch outer and needle bearing for wear and damage. Replace the components as needed.



If the needle bearing is in poor condition remove the snap ring and replace the bearing. Press in a new bearing and secure it with a new snap ring. Make sure the snap ring is secure in its groove.



Check the clutch linings for abnormal wear and damage.



Replace the clutch if the lining thickness is below 1 mm (0.04 in).



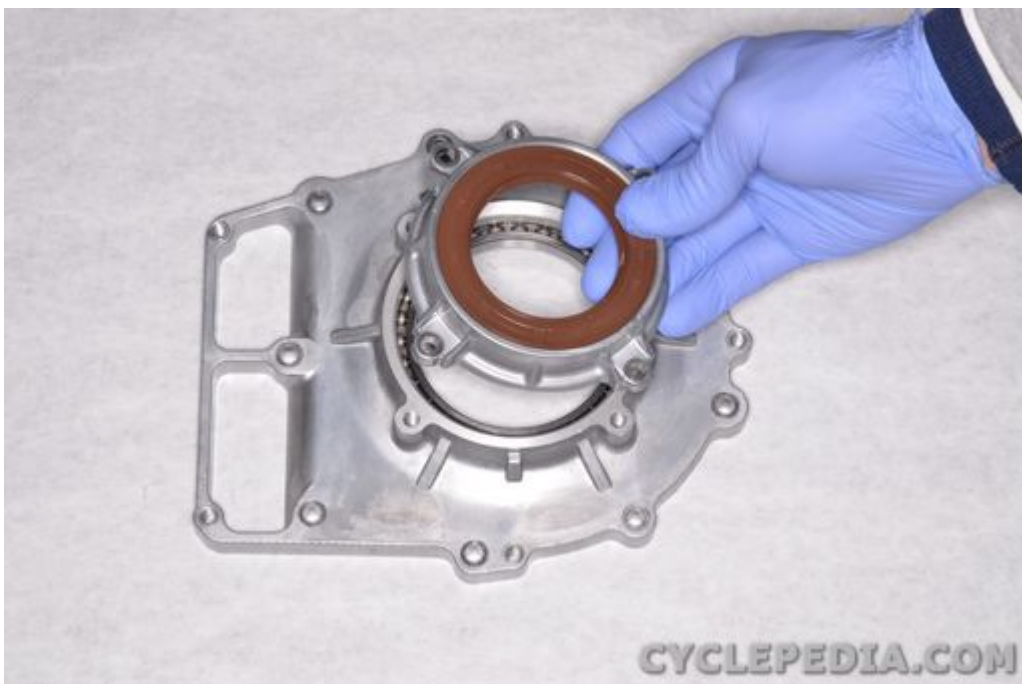
Inspect the clutch bearing by turning it with a finger. Replace the bearing if it doesn't turn smoothly or it has excessive play.



Inspect the clutch cover oil seal and replace it as needed.



Inspect the large ball bearing in the clutch cover. Turn the bearing with a finger. Replace the bearing if it doesn't turn smoothly. Remove the seal cover to replace the bearing.



Remove the four seal cover bolts with an 8 mm socket. Take off the seal cover and discard the gasket.



Drive the bearing out from the outside of the clutch cover. Drive in the new bearing from the inside of the clutch cover. Use a suitable driver that is the same outside diameter as the bearing. The manufactures markings on the bearing must face out.



Press a new seal into the seal cover. Use a suitable driver that is the same outside diameter as the seal.



Apply a light coat lightweight lithium-soap based grease to the lips of the oil seal.

For clutch assembly and installation see the [Clutch Installation](#) topic for more information.

Clutch Installation

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.



Fit the seal cover to the clutch cover with a new gasket. Install the four seal cover bolts and tighten them securely with an 8 mm socket.



Install the one-way clutch into the clutch outer if it was removed. Lubricate the one-way clutch bearings with molybdenum disulfide grease.



Apply a light coat lightweight lithium-soap based grease to the lips of the oil seal. Lubricate the clutch bearings with fresh engine oil. Fit the clutch outer into the clutch cover.



Lubricate the inner clutch collar with fresh engine oil and slide it onto the crankshaft as shown.



Slide the clutch onto the crankshaft. Be sure to align the splines.



Slide the outer clutch collar onto the crankshaft.



Thread on a new clutch lock nut.



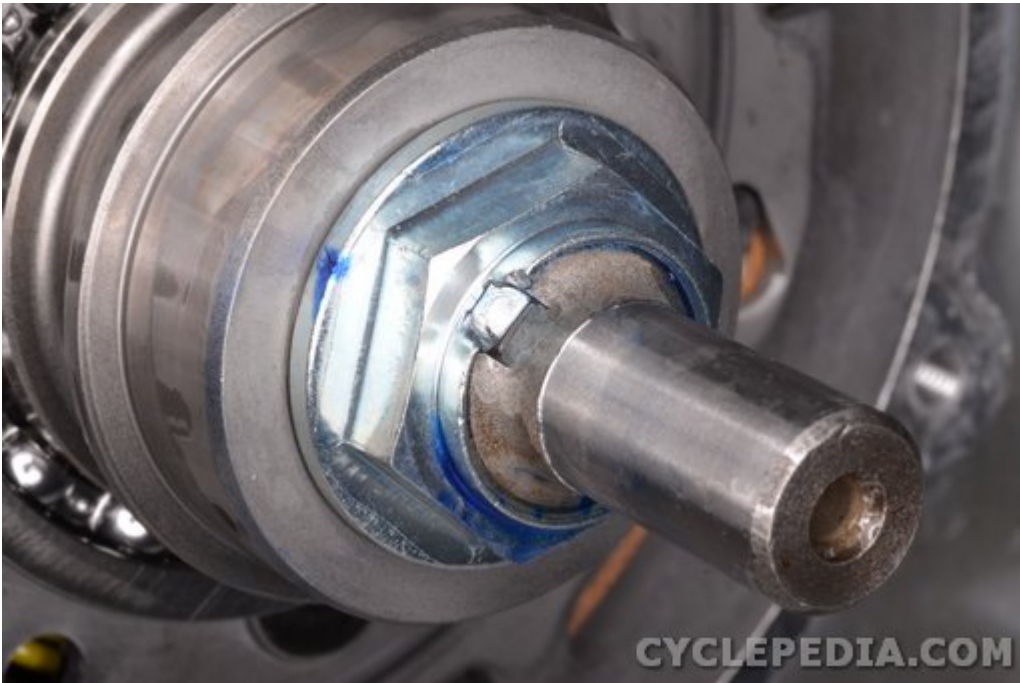
Hold the clutch with the Y-type holder and torque the clutch nut to specification with a deep well commercially available 26 mm socket.

Special Tool -

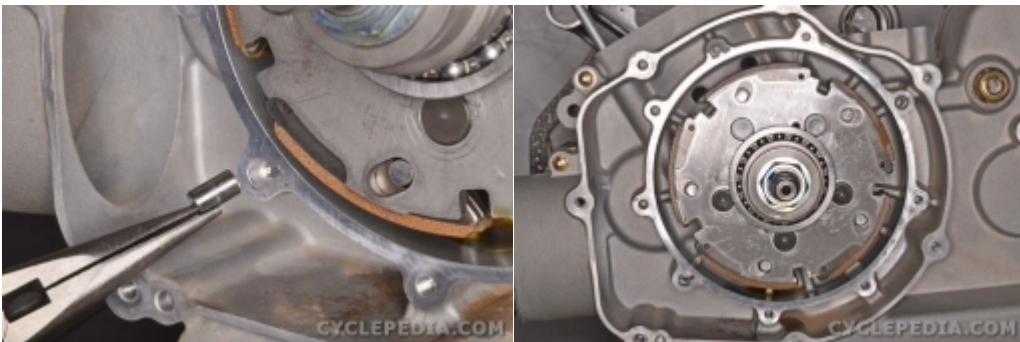
Y-Type Holder: A120E00056

Lock Nut Wrench: A120E00079

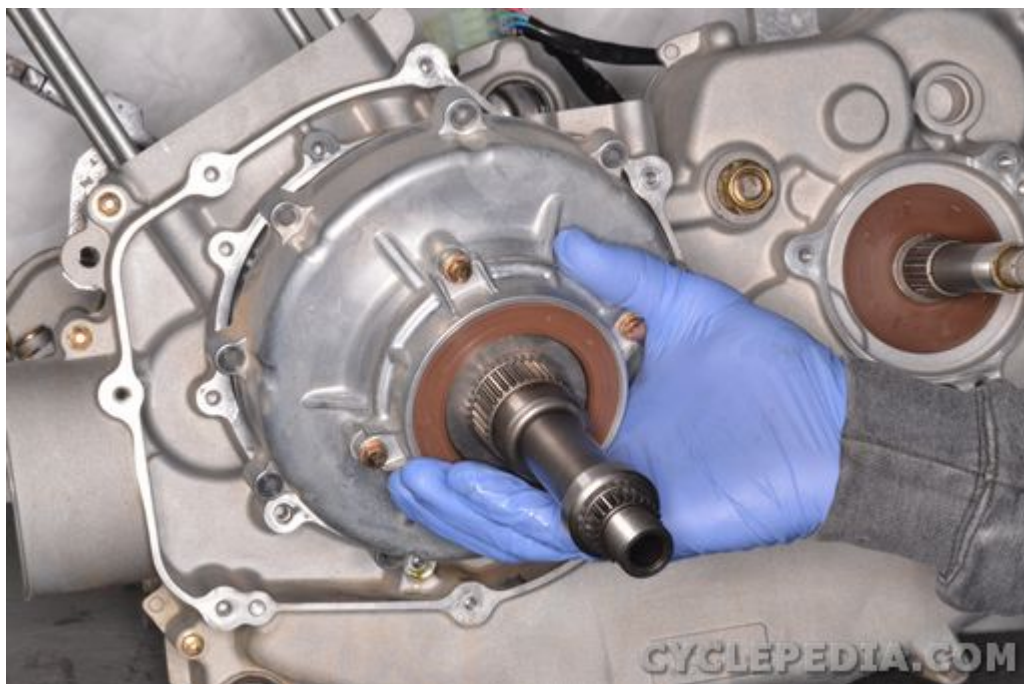
ITEM	THREAD SIZE AND TYPE	TORQUE VALUES		REMARKS
		N-m	ft-lb	
WET CLUTCH	M25 x 1.5	156.8	115.6	APPLY OIL



Stake the clutch nut at the groove on the crankshaft with a chisel and a hammer. Be careful to avoid damaging the threads.



Install the two dowel pins and a new clutch cover gasket.



Guide the clutch cover assembly into place evenly.



Insert the 9 clutch cover bolts.



Tighten the clutch cover bolts a little bit at a time in a crisscross pattern. Torque the bolts to specification with an 8 mm socket.

ITEM	N-m	kgf-m	ft-lb
Clutch cover bolt	10	1	7.2

8.Final Drive

This chapter covers the location and servicing of the final drive components.

- 1.Universal Joints8-2
- 2.Front Drive Shafts8-3
- 3.Rear Drive Shafts8-16
- 4.Front Differential Removal And Installation8-29
- 5.Front Differential Disassembly And Assembly8-37
- 6.Final Drive Gear8-118
- 7.Final Drive Gear Disassembly8-125

Universal Joints

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Front Removal

Remove the front differential. See the [Front Differential Removal and Installation](#) topic for more information.

Disassemble the front differential. See the [Front Differential Disassembly](#) topic for more information.



For the rear remove the U-joint assembly from the rear propeller shaft. rear propeller shaft. Be sure to not lose the spring.

Inspection



Check that the U-joint moves smoothly. Replace as needed.

Installation

Assemble the front differential. See the [Differential Assembly](#) topic for more information.

Install the front differential. See the [Front Differential Removal and Installation](#) topic for more information.

Front Drive Shafts

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the front wheels and hubs. See the [Wheels and Wheel Hubs](#) topic for more information.

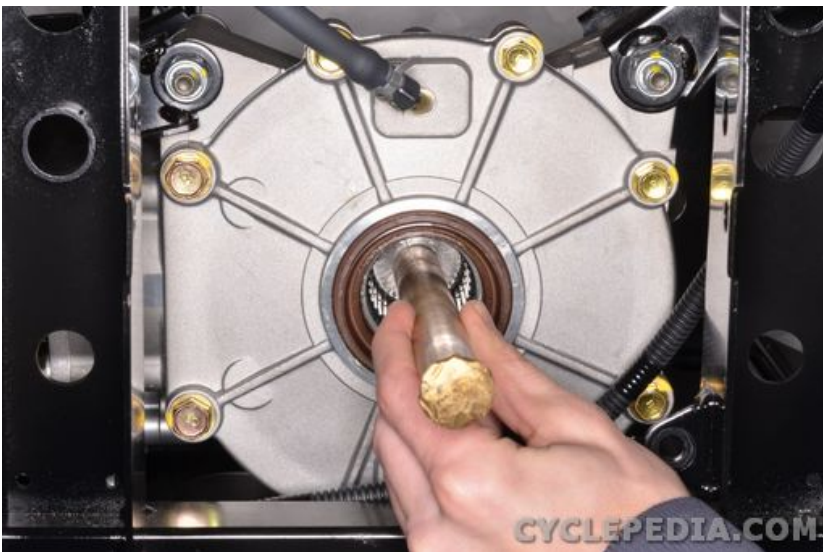
Remove the boot guards. See the [Boot Guard](#) topic for more information.

Drain the final drive gear oil. See the [Final Drive Oil](#) topic for more information.

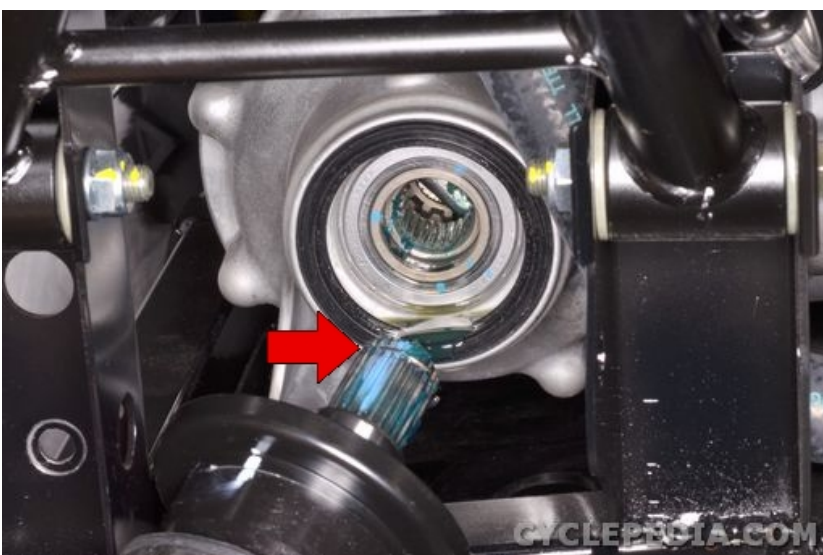
Remove the steering knuckle. See the [Steering Knuckles](#) topic for more information.



Hold the front drive shaft level and pull it free. Repeat the procedure on the other side.



Drive out either drive shaft if one will not pull free.



Remove the circlip.

Inspection



Check the axle for bends or damage. Check the boots and boot bands for any damage or excessive wear. Replace parts as needed.



Inspect the splines for wear or damage.



Push and pull on the axle shaft and wheel spindle to check the play in the axle.

Disassembly

Note: Do not disassemble the wheel side joint, just replace it with a new one if there is any damage.



Note: To remove the boot on the wheel side all the parts on the case side are removed first.



Carefully remove the boot bands by bending and discard.



Pull the boot off the outer race.



Remove the stopper ring from the outer race with a flat head screwdriver.



Remove the outer race.



Wipe off any grease and remove the snap ring with a pair of snap ring pliers.



Carefully drive the shaft out of the cage.



Remove the cage and replace if needed.



Remove the stopper ring and boot. Clean the boot with a clean shop rag. Inspect the boots and replace if they are damaged.



Remove and discard all the boot bands.



Inspect the circlip and snap ring and outer race for wear or damage. If any damage is found, replace part(s) with new ones.



Inspect the cage and inner surface of case side joint for pitting, wear or damage. If any damages are found, replace them with new ones.

Wash all parts (except for the boots) before assembly, clean the inside and outside of the boot with a cloth. Do not wash the boots in any commercially available de-greaser, such as gasoline or kerosene. Washing in a de-greaser causes deterioration of the boot. Clean the boots with a clean shop rag.

Assembly

Wheel Side



To install the boot on the wheel side; Install the new large band first, the boot second and the new small band third. Install the parts on the case side as follows.

Note: The end of the boot bands should face away from the rotation of the drive shaft.

Case Side



Install a new small boot band onto the shaft groove end.

Note: The end of the boot band should face away from the rotation of the drive shaft.



Fit the boot on the drive shaft end, fitting the small diameter side of the boot to the shaft groove. Fix its end with the small boot band.



Install a new large boot band.

Note: The end of the boot band should face away from the rotation of the drive shaft.



Install the cage on the shaft with the large diameter side facing the shaft end.



Install the snap ring into the groove with a pair of snap ring pliers.



Apply molybdenum disulfide grease to the entire surface of the cage and the inside of the case side joint/wheel side joint.

	Location	
	Wheel Side Joint	Case Side Joint
Quantity of Grease	45 g (1.5 oz)	85 g (2.8 oz)

Note: The tube of joint molybdenum disulfide grease is included in the wheel side boot set or wheel side joint assembly of spare parts.



Insert the cage into the case side joint (outer race).



Install the stopper ring in the groove of the case side.

Note: Locate the opening of the circlip so that the opening is not lined up with any ball in the cage.



After fitting the boot on the case side joint, insert a screw driver into the boot on the case side joint and allow air to enter the boot so that the air pressure in the boot becomes the same as the atmospheric pressure.



Fix the boot on the case side joint with a new boot band, taking care not distort the boot. Bend down the tabs to secure the tabs.

Note: The dust boots should be fastened with the boot bands at the grooves in the drive shaft.

Installation



Insert a new stopper ring into the groove in the shaft splines. Lightly coat the drive shaft ends with grease. Install the differential end of the drive shaft.

Note: Be careful not to damage the oil seal in the front gear case. After installing check the circlip is seated properly by pulling the case side joint lightly.

Install the front A-arms. See the [A-arms](#) topic for more information.

Install the steering knuckles. See the [Steering Knuckles](#) topic for more information.

Fill the final drive gear oil. See the [Final Drive Oil](#) topic for more information.

Install the front shock absorbers. See the [Front Shock Absorbers](#) topic for more information.

Install the front wheels and hubs. See the [Wheels and Wheel Hubs](#) topic for more information.

Install the boot guards. See the [Boot Guard](#) topic for more information.

Check the toe-in. See the [Toe-In Adjustment](#) topic for more information.

Rear Drive Shafts

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the rear wheels and hubs. See the [Wheels and Wheel Hubs](#) topic for more information.

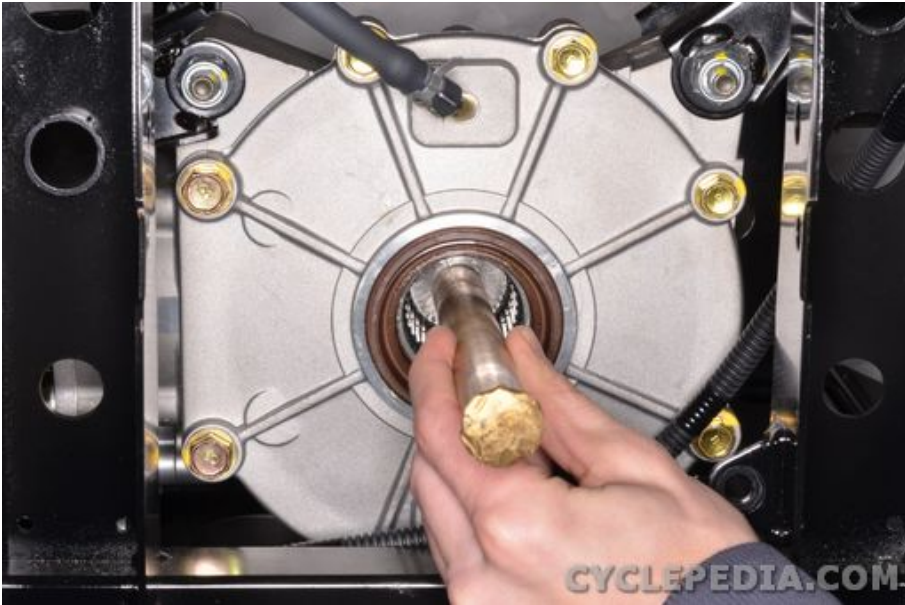
Drain the final drive gear oil. See the [Final Drive Oil](#) topic for more information.

Remove the rear shock absorbers. See the [Rear Shock Absorbers](#) topic for more information.

Remove the rear suspension arms and knuckles. See the [Rear Suspension Arms](#) topic for more information.



Remove the left rear drive shaft horizontally. Remove the drive shaft with the special tools if it is difficult to remove by hand. Remove the circlip.



Carefully drive the right drive shaft out from the left side.



Remove the right drive shaft horizontally. Remove the circlip.

Inspection



Check the axle for bends or damage. Check the boots and boot bands for any damage or excessive wear. Replace parts as needed.



Inspect the splines for wear or damage.



Push and pull on the axle shaft and wheel spindle to check the play in the axle.

Disassembly

Note: Do not disassemble the wheel side joint, just replace it with a new one if there is any damage.



Carefully remove the boot bands and discard.



Pull the boot off the outer race.



Remove the stopper ring from the outer race with a flat head screwdriver.



Remove the outer race.



Wipe off any grease and remove the snap ring with a pair of snap ring pliers.



Carefully drive the shaft out of the cage.



Remove the cage and replace if needed.



Remove the stopper ring and boot. Clean the boot with a clean shop rag. Inspect the boots and replace if they are damaged.



Remove and discard all the boot bands.



Inspect the circlip and snap ring for wear or damage.
If any damages are found, replace them with new ones.



Inspect the cage and inner surface of case side joint for pitting, wear or damage. If any damages are found, replace them with new ones.

Wash all parts (except for the boots) before assembly, clean the inside and outside of the boot with a cloth. Do not wash the boots in any commercially available de-greaser, such as gasoline or kerosene. Washing in a de-greaser causes deterioration of the boot. Clean the boots with a clean shop rag.

Assembly



Install a new small boot band onto the shaft groove end.



Note: The end of the boot band should face away from the rotation of the drive shaft.



Fit a boot on the drive shaft end, fitting the small diameter side of the boot to the shaft groove. Fix its end with the small boot band.



Install the cage on the shaft with the large diameter side facing the shaft end.



Install the snap ring into the groove with a pair of snap ring pliers.



Apply molybdenum disulfide grease to the entire surface of the cage and the inside of the case side joint/wheel side joint.

	Location	
	Wheel Side Joint	Case Side Joint
Quantity of Grease	45 g (1.5 oz)	85 g (2.8 oz)

Note: The tube of joint molybdenum disulfide grease is included in the wheel side boot set or wheel side joint assembly of spare parts.



Insert the cage into the case side joint (outer race).



Install the stopper ring in the groove of the case side.

Note: Locate the opening of the circlip so that the opening is not lined up with any ball in the cage.



After fitting the boot on the case side joint, insert a screw driver into the boot on the case side joint and allow air to enter the boot so that the air pressure in the boot becomes the same as the atmospheric pressure.



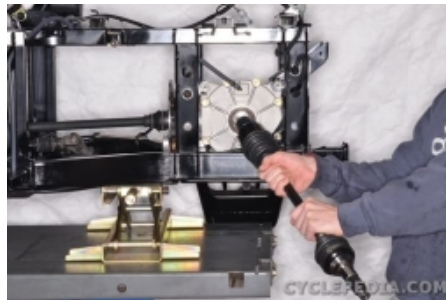
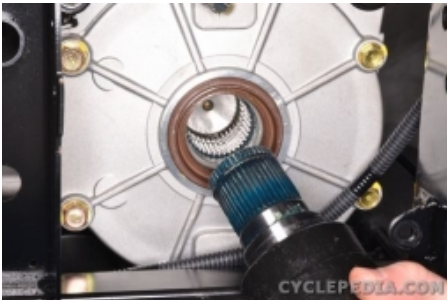
Fix the boot on the case side joint with a new boot band, taking care not distort the boot.



Note: The end of the boot band should face away from the rotation of the drive shaft.

Note: The dust boots should be fastened with the boot bands at the grooves in the drive shaft.

Installation



Install a new circlip. Grease the left drive shaft splines. Install the left rear drive shaft into the gear case horizontally.



Install a new circlip. Grease the right drive shaft splines. Install the right drive shaft horizontally.

Note: Be careful not to damage the oil seals in the rear gear case. After installing check the circlip is seated properly by pulling the case side joint lightly.

Install the rear suspension arms and knuckles. See the [Rear Suspension Arms](#) topic for more information.

Install the shock absorbers. See the [Rear Shock Absorbers](#) topic for more information.

Fill the final drive gear oil. See the [Final Drive Oil](#) topic for more information.

Install the rear wheels and hubs. See the [Wheels and Wheel Hubs](#) topic for more information.

Adjust the rear parking brake. See the [Rear Parking Brake Adjustment](#) topic for more information.

Front Differential Removal and Installation

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the front wheels and hubs. See the [Wheels and Wheel Hubs](#) topic for more information.

Remove the front skid plate. See the [Skid Plates](#) topic for more information.

Drain the differential oil. See the [Final Drive Oil](#) topic for more information.

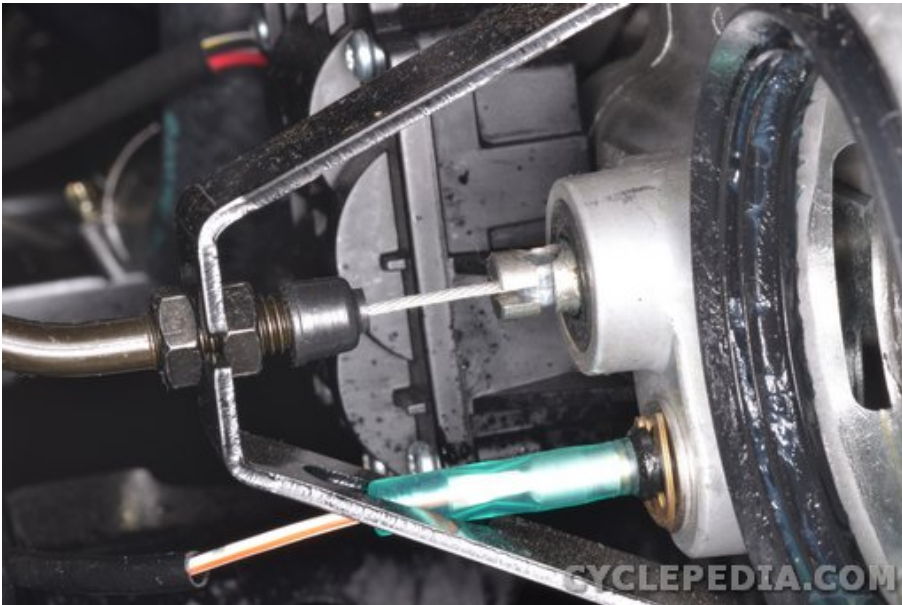
Remove the steering knuckles. See the [Steering Knuckles](#) topic for more information.

Remove the front drive shafts. See the [Front Drive Shafts](#) topic for more information.

Remove the front suspension arms. See the [A-arms](#) topic for more information.



Unplug the 2WD/4WD shifting motor. Free the wires from the wire band on the frame.



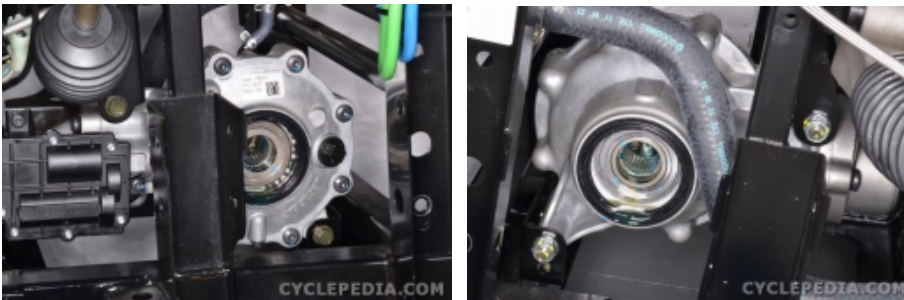
The 2WD/4WD switch and front differential lock out cable are both located on the right side of the differential. Unplug the 2WD/4WD switch connector.



Remove the two differential locking cable bracket bolts with a 12 mm socket. Free the end of the differential locking cable from the differential.



Inspect the front differential breather hose and case for damage. Squeeze and slide back the clamp to remove the breather hose and case.



Hold the front differential mounting bolts with a 14 mm socket and loosen the nuts with a 17 mm socket. Remove the front differential mounting bolts and nuts.



Support the front differential. Remove the two front differential mounting bracket bolts with a 12 mm socket. Remove the front differential mounting bracket.



Move the front differential forward and free it from the propeller shaft.



Lower the front differential out of the frame.

To disassemble the front differential see the [Front Differential Disassembly](#) topic for more information.

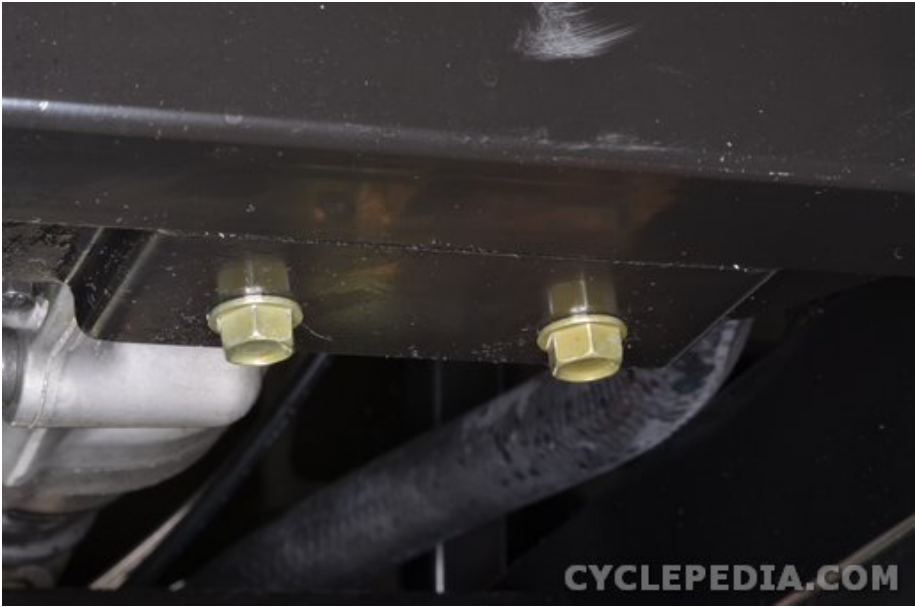
Installation



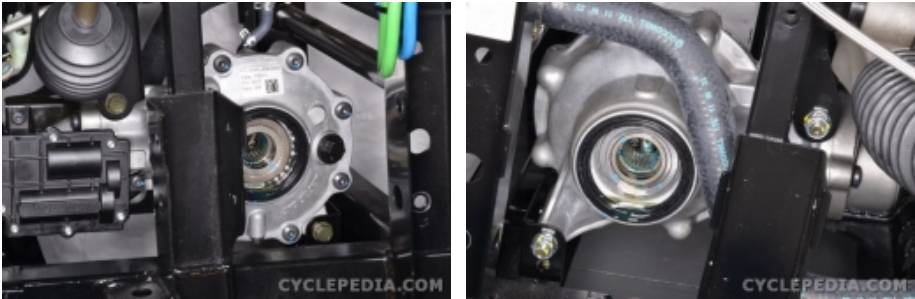
Install the front differential onto the vehicle.



Apply waterproof grease to the splines of the propeller shaft. Mate the propeller shaft with the front differential input shaft. Fit the rubber joint seal into place over the propeller shaft.



Install the front differential mounting bracket with the two bolts. Tighten the bolts securely with a 12 mm socket.



Install the front differential mounting bolts and nuts. Insert the bolts from the right side. Hold the front differential mounting bolts with a 14 mm socket and torque the nuts to specification with a 17 mm socket.

ITEM	N-m	kgf-m	ft-lb
Front drive (differential) gear case mounting nut	40	4.0	29



Install the breather hose and case. Secure the hose with the clamp.



Connect the front differential locking cable to the differential. Install the cable bracket. Tighten the bolts to securely with a 12 mm socket.



Plug in the 2WD/4WD detecting switch connector. Adjust the front differential locking cable free play with the nuts as needed to make sure it functions correctly. Check this after the vehicle has been assembled.



Plug in the 2WD/4WD shifting motor connector. Secure the wires to the frame with the wire band.

Install the front suspension arms. See the [A-arms](#) topic for more information.

Install the front drive shafts. See the [Front Drive Shafts](#) topic for more information.

Install the steering knuckles. See the [Steering Knuckles](#) topic for more information.

Install the front skid plate. See the [Skid Plates](#) topic for more information.

Install the front wheels. See the [Wheels and Wheel Hubs](#) topic for more information.

Fill the differential oil. See the [Final Drive Oil](#) topic for more information.

Differential

Noted: There are some optional differentials in different version of models. UXV 500i goes with front differential/rear gear box. UXV 700i goes with front differential/rear gear box and front/rear differential. UXV 700i US version goes with front gear box/rear differential and front/rear differential.

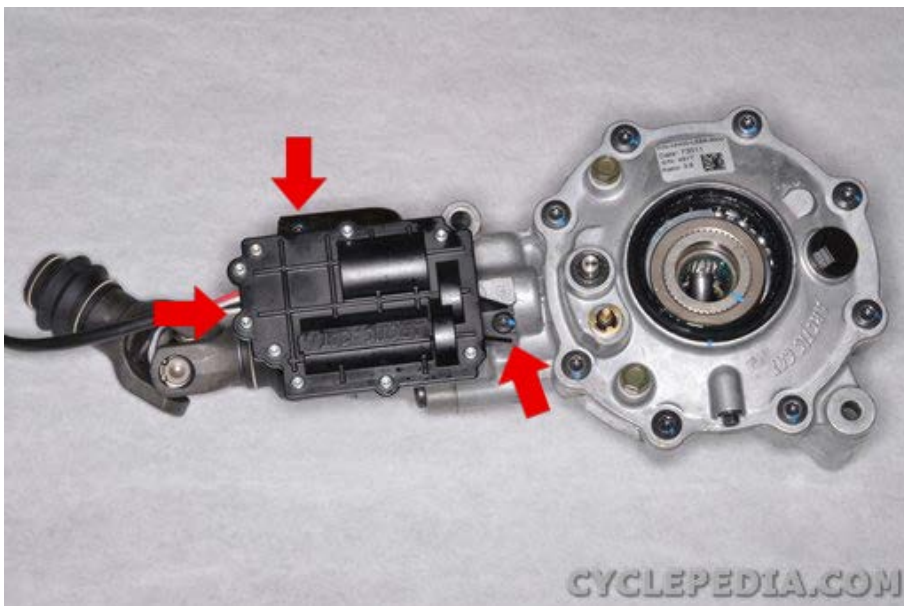
Front Differential Disassembly (UXV 500i)

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

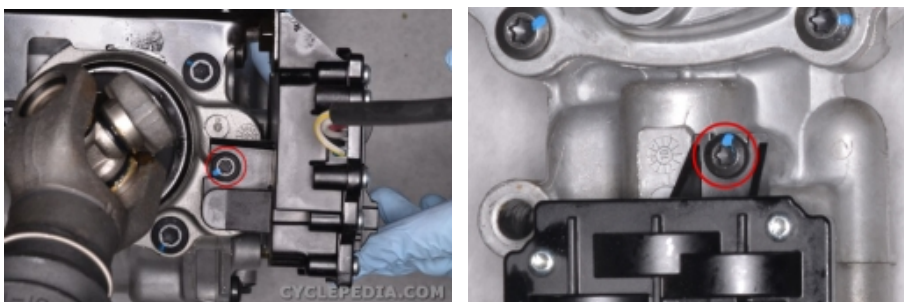
Remove the differential. See the [Front Differential Removal and Installation](#) topic for more information.

2WD/4WD Shifting Motor Assembly

To test the 2WD/4WD shifting motor assembly see the [Switches](#) topic.



The 2WD/4WD shifting motor assembly is mounted to the front differential with three bolts.



Remove the 2WD/4WD shifting motor assembly bolts with a T40 Torx socket.



Slide the 2WD/4WD shifting motor assembly back and free it from the actuator fork rod.



Remove the 2WD/4WD shifting motor assembly.

Pinion Housing



Remove the three pinion housing bolts with a T40 Torx socket.



Remove the bracket and the pinion housing.



Remove the pinion housing gasket and dowel pin.



Remove the input shaft snap ring with snap ring pliers.



Remove the input shaft from the pinion housing. Check input shaft splines for wear and damage. Inspect the input shaft seals and replace as needed.

Bearing replacement



Inspect the pinion housing seal and bearing.



If the bearing or seal needs to be replaced remove the seal with a seal pick.



Remove the snap ring with snap ring pliers.



Drive the bearing out from the inside of the housing.



Drive in the new bearings with a suitable bearing driver that has the same outside diameter of the bearing. The manufactures markings on the bearing must face out.

Special Tool - Bearing Driver: A120E00014



Secure the new bearing by installing a new snap ring into the groove with snap ring pliers.



Apply waterproof grease to the lips of the new seal. Press in the seal with a suitable driver that has the same outside diameter as the seal.

2WD/4WD Shifting Mechanism

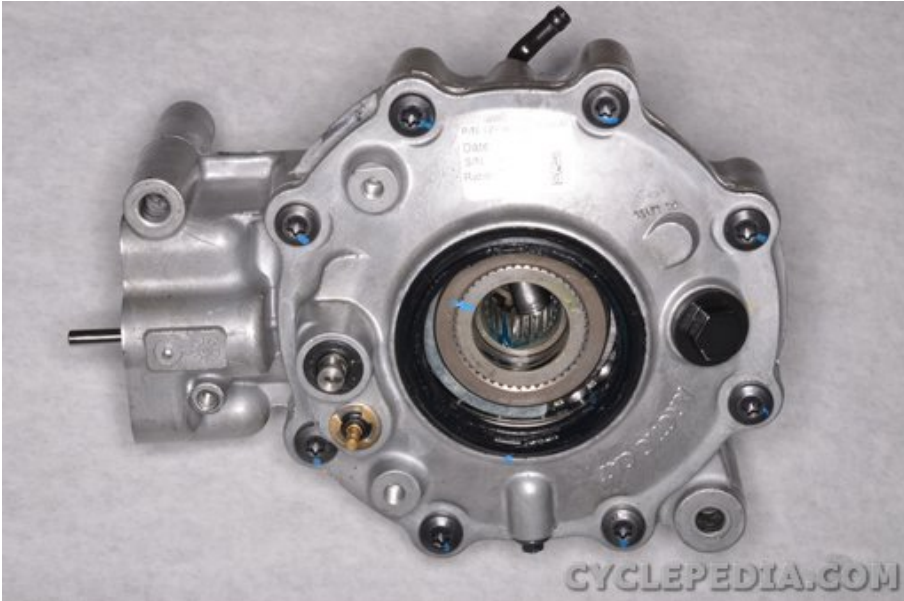


Remove the actuator fork, collar, and spring.



Inspect the actuator fork and collar for wear and damage. Replace the components as needed.

Differential



Loosen the eight differential cover bolts evenly with a T40 Torx socket.



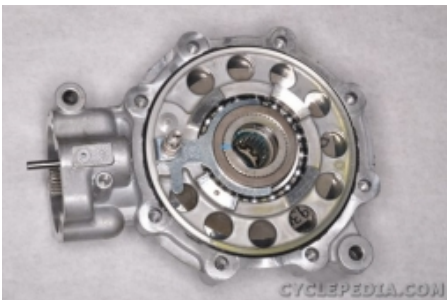
Remove the differential cover bolts.



Utilize the pry points and separate the cover from the differential case.



Inspect the differential cover seals. Replace them as needed. Apply waterproof grease to the lips of the new seals. Press in the seal with a suitable driver that has the same outside diameter as the seal.



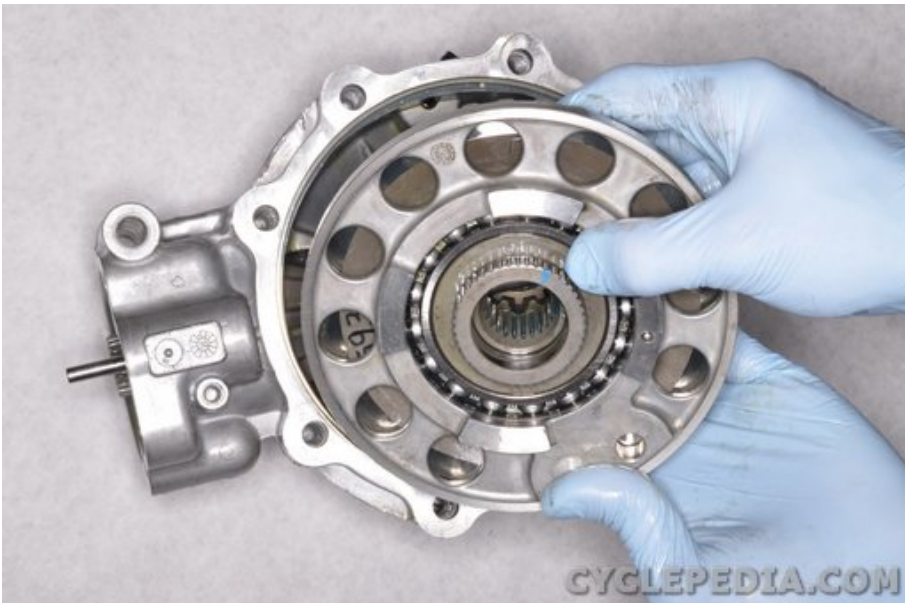
Remove the differential locking fork and collar.



Inspect the differential locking fork and collar for wear and damage.



Use a suitable driver and tap out the ring gear assembly.



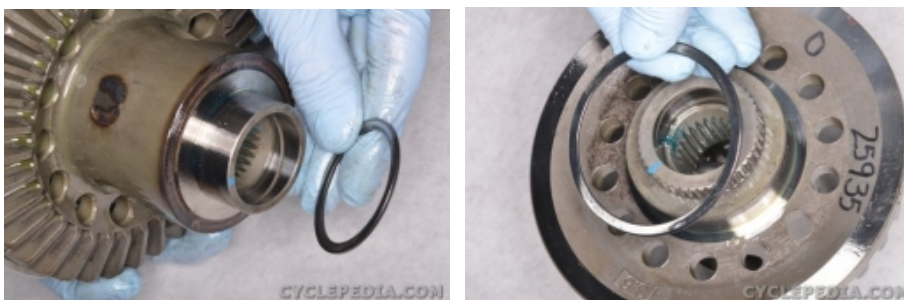
Remove the ring gear assembly from the differential case. Remove the differential case O-ring.



Lift off the bearing plate.



Inspect the bearing plate bearing and replace it as needed. Drive in the new bearing with a suitable bearing driver that has the same outside diameter of the bearing. The manufactures markings on the bearing must face out.



Remove the shims from each side of the ring gear. Keep track of the location of the shims so that they can be returned to their original positions.



Inspect the ring gear for wear and damage.



Inspect the differential case bearing and seal. Remove the seal with a seal pick if needed.



Drive the bearing out from the outside if needed.



Drive in the new bearing with a suitable bearing driver that has the same outside diameter of the bearing. The manufactures markings on the bearing must face out.

Pinion Gear



Unstake the pinion gear locknut with a suitable punch or a drill. Be very careful to avoid damaging the differential case.



Place the differential case in a vice. Use soft jaws or other suitable method to prevent damage to the differential case and its mating surface. Loosen pinion gear nut with the special lock nut wrench.

Special Tool - Bearing Driver: A120F00025



Remove the pinion gear nut.



Drive out the pinion gear shaft with a suitable punt or drift with a hammer.



Remove the pinion gear and ball bearing from the differential case.

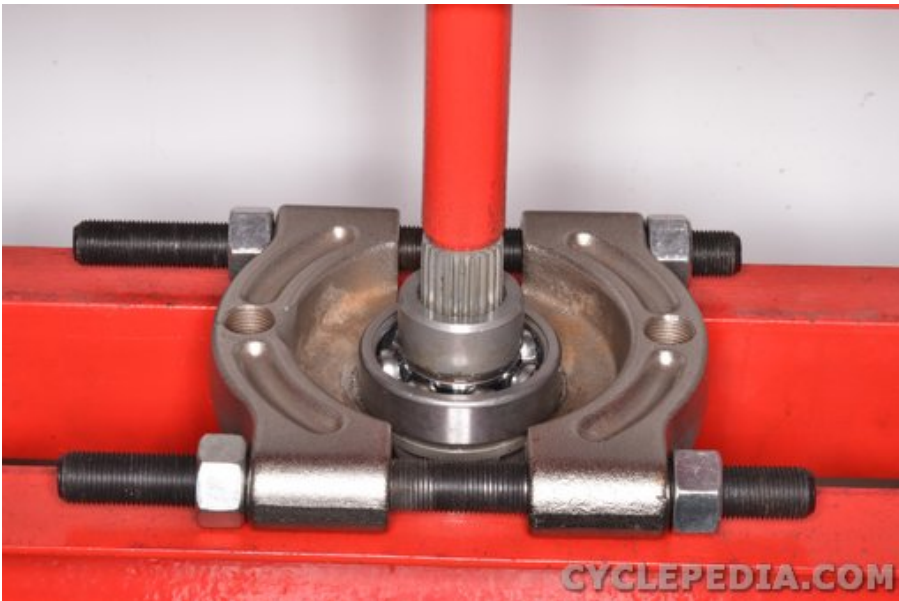


Inspect the pinion gear, shaft, and ball bearing. Replace the parts as needed.

Pinion Gear Shaft Bearings



Use a commercially available bearing puller to free the ball bearing from the pinion gear shaft.



Use a press and a split bearing puller if available.



Remove the ball bearing, and spacer from the pinion gear shaft.



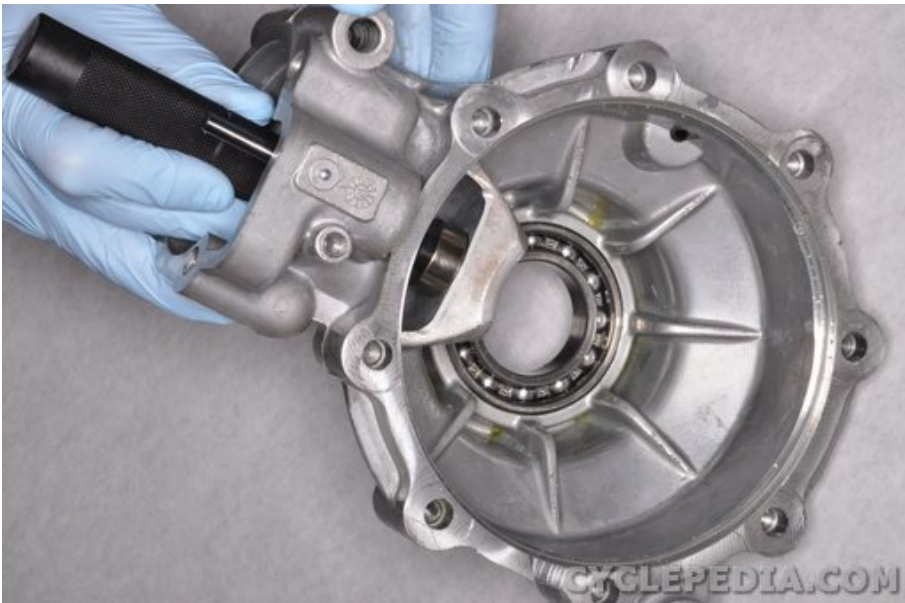
Use a press to install the new bearing and spacer onto the pinion gear shaft.



Inspect the pinion gear shaft needle bearing in the differential case.



Remove the pinion gear needle bearing with a suitable bearing puller.



Drive in a new pinion gear needle bearing with a suitable bearing driver that is the same outside diameter as the bearing.

Backlash Inspection and Shim Adjustment

Temporarily assemble the differential with the shims.

Hold the pinion gear so that it doesn't move. Place a horizontal type dial gauge through the filler hole and against the ring gear of the differential. Rotate the differential back and forth and check the backlash. Check the back lash at three different evenly spaced sections of the differential ring gear.

ITEM	STANDARD mm (in)
Front drive (differential) gear backlash	0.05 - 0.25 (0.002 - 0.010)

If the backlash is out of specification the shim/s must be adjusted.

Backlash	Right Shim adjustment
Under 0.05 mm (0.0020 in)	increase shim thickness
0.05 - 0.25 mm (0.002 - 0.010 in)	Correct
Over 0.25 mm (0.010 in)	Decrease shim thickness



If the right shim is changed the left shim/s needs to change to compensate.

Gear Tooth Contact

After the proper shims have been selected the gear tooth contact must be checked.

Remove the differential and pinion gear. Clean the differential ring gear and pinion gear.

Apply machinists dye to several teeth of the pinion gear. Install the pinion gear and differential into the case. Temporarily assemble the differential.

Turn the differential ring gear back and forth so the dye coated gear teeth contact the ring gear.

The dye should show that the contact area of the gear teeth is centered on the teeth. If the contact is too high or low on the teeth the differential shims must be changed so that the tooth contact is correct while maintaining the correct backlash.

To assemble the front differential see the [Differential Assembly](#) topic.

Differential Assembly

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Clean the final drive gear case components with a high flash point solvent and compressed air.

NOTE: Always wear safety glasses when using compressed air and never point it directly at yourself or anyone else.

Lubricate the bearings with fresh gear oil.

Pinion Gear



Install the pinion gear shaft into the differential case.



Install a new pinion gear lock nut.



Place the differential case in a vice. Use soft jaws or other suitable method to prevent damage to the differential case and its mating surface. Tighten the pinion gear nut to specification with the special lock nut wrench.

Special Tool - Bearing Driver: A120F00025

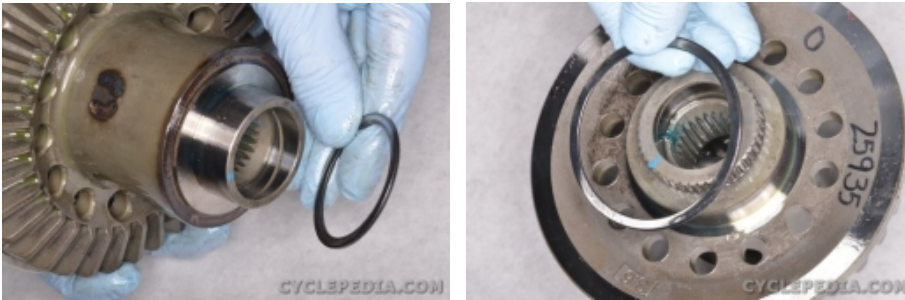
ITEM	N-m	kgf-m	ft-lb
Front drive (differential) pinion gear shaft nut	169	16.9	125



Stake the pinion gear locknut with a suitable punch and hammer. Be very careful to avoid damaging the differential case.

Differential

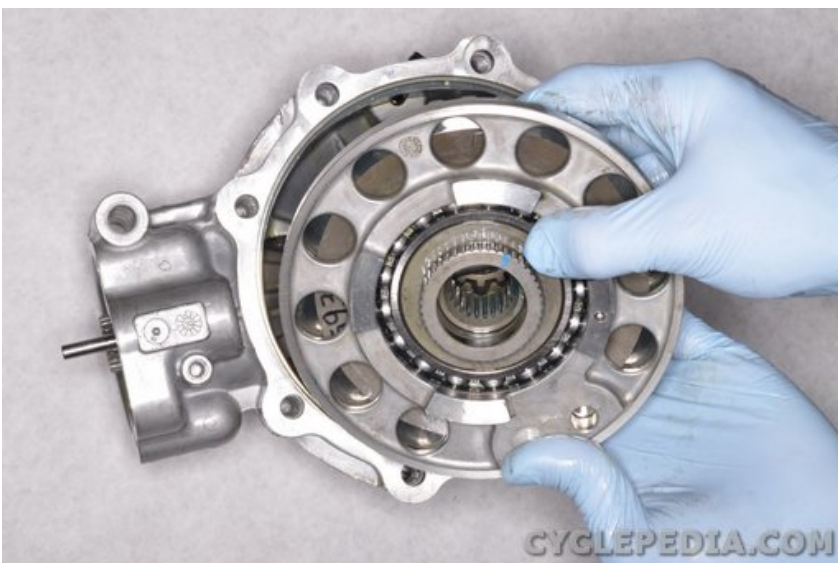
Select the proper shims as covered in the [Front Differential Disassembly](#) topic.



Install the correct shims onto each side of the ring gear.



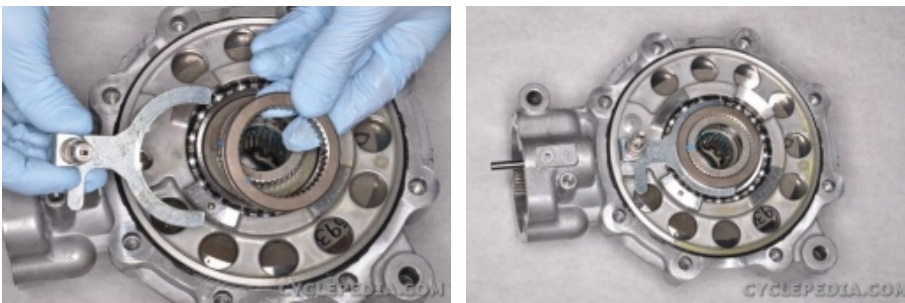
Fit the bearing plate into place as shown.



Fit the ring gear assembly and bearing plate into the differential case.



Install the new O-ring into the groove outside the bearing plate. Be very careful to not damage this O-ring during reassembly



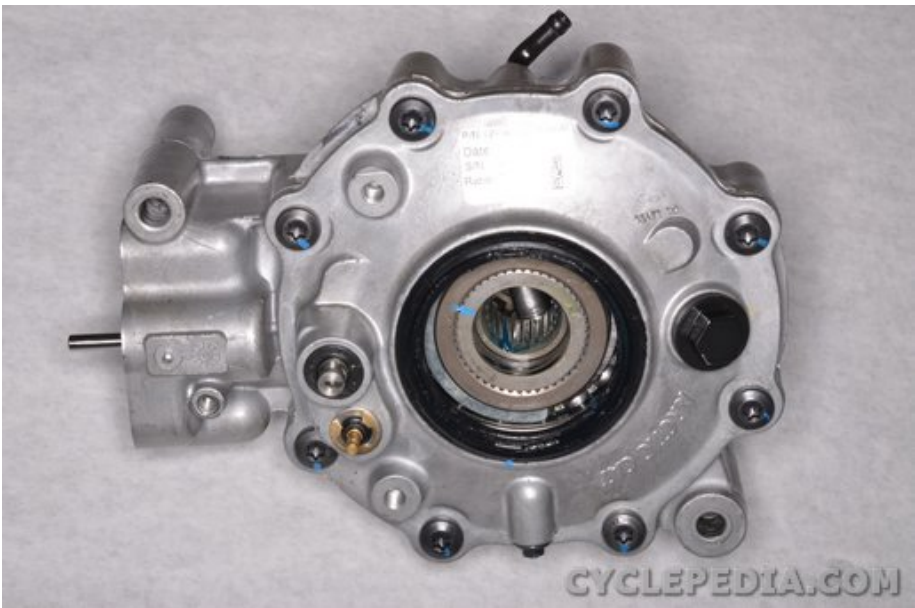
Install the differential locking fork and collar.



Fit the differential cover into place. The pin on the bearing plate must fit into the differential cover.



Apply a light coat of Threebond 1215 or other equivalent sealant to the threads of the differential cover bolts. Install the eight differential cover bolts.



Tighten the eight differential cover bolts evenly and securely with a T40 Torx socket.

ITEM	N-m	kgf-m	ft-lb
Front drive (differential) case bolt	23	2.3	16.5

2WD/4WD Shifting Mechanism



Lubricate the actuator fork and collar with fresh differential oil.



Install the actuator spring.



Install the actuator collar and fork.

Pinion Housing



Fit the input shaft into the pinion housing.



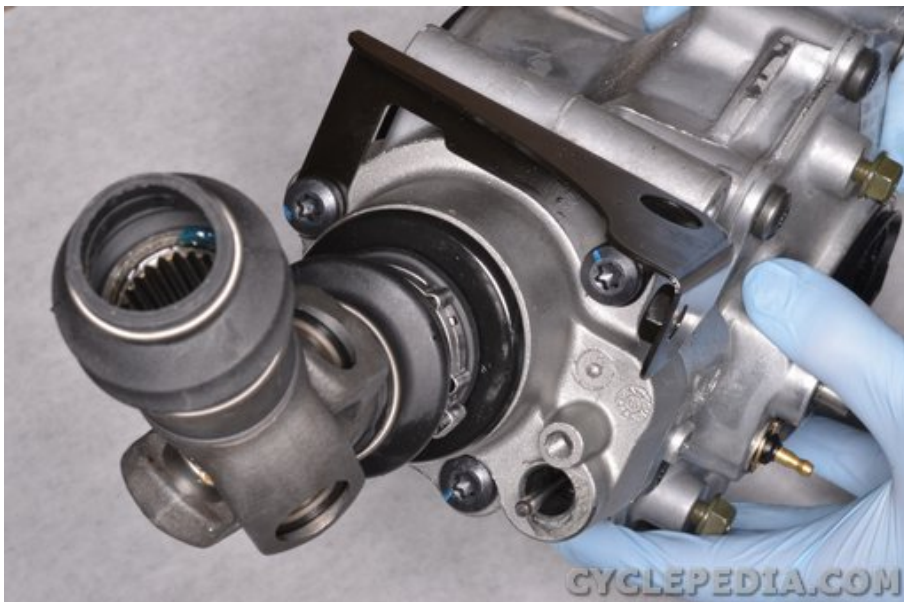
Install a new snap ring into the groove on the with snap ring pliers.



Install the pinion housing gasket and dowel pin.



Fit the pinion housing and bracket into place.



Apply a light coat of Threebond 1215 or other equivalent sealant to the threads of the pinion housing bolts. Install the bracket and the three pinion housing bolts. Tighten the bolts securely with a T40 Torx socket.

2WD/4WD Shifting Motor Assembly



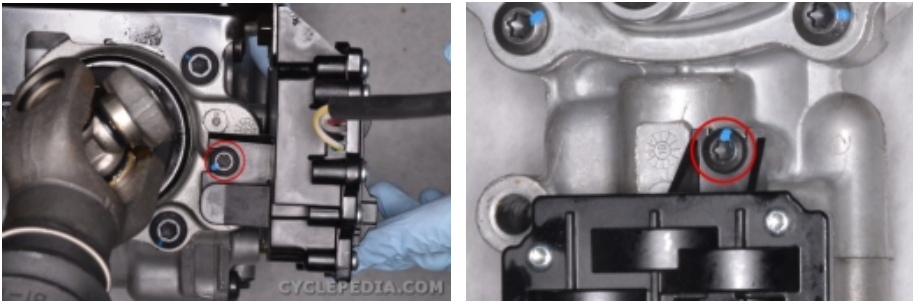
Install the 2WD/4WD shifting motor assembly.



Lubricate the shifting motor assembly O-ring with grease. Guide the rod into the shifting motor assembly.



Apply Threebond sealant to the threads of the 2WD/4WD shifting motor assembly mounting bolts. The install the three 2WD/4WD shifting motor assembly mounting bolts.



Tighten the 2WD/4WD shifting motor assembly bolts to specification with a T40 Torx socket.

ITEM	N-m	kgf-m	ft-lb
2WD/4WD shifting motor mounting bolt (M8)	23	2.3	16.5
2WD/4WD shifting motor mounting bolt (M6)	12	1.2	8.5

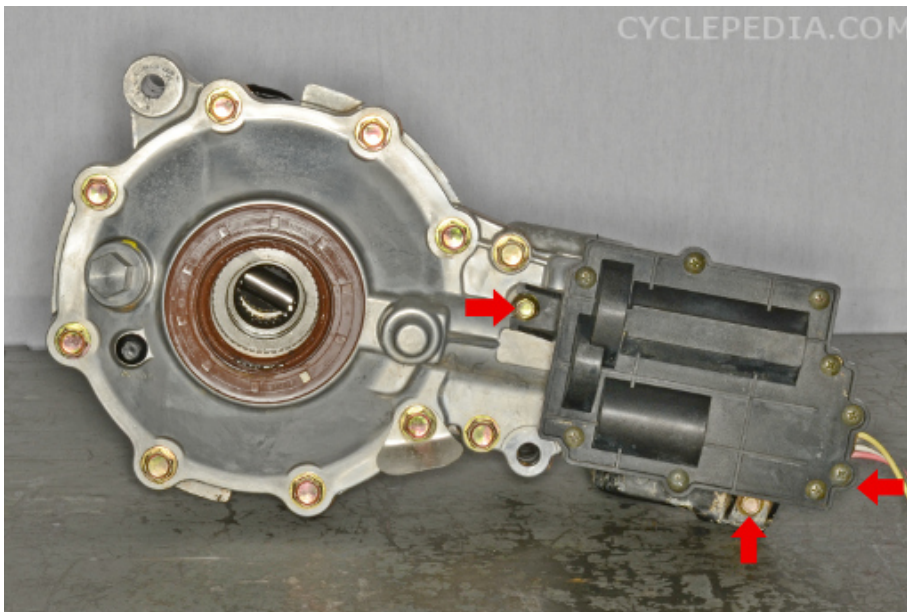
Install the differential. See the [Front Differential Removal and Installation](#) topic for more information.

Differential Disassembly(UXV 700i)

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

2WD/4WD Shifting Motor Assembly

To test the 2WD/4WD shifting motor assembly see the [Switches](#) topic.



The 2WD/4WD shifting motor assembly is mounted to the front differential with three bolts.



Remove the 2WD/4WD shifting motor assembly bolts.



Remove the cap.



The 2WD/4WD shifting rod is held in place by a small circlip.



Carefully spread the circlip and remove it.



Remove the spacer.



Slide the 2WD/4WD shifting motor assembly back and free it from the actuator fork rod.
Remove the 2WD/4WD shifting motor assembly.

Pinion Housing



Remove the three pinion housing bolts with a 12 mm socket.



Remove the bracket.



Remove the pinion housing.



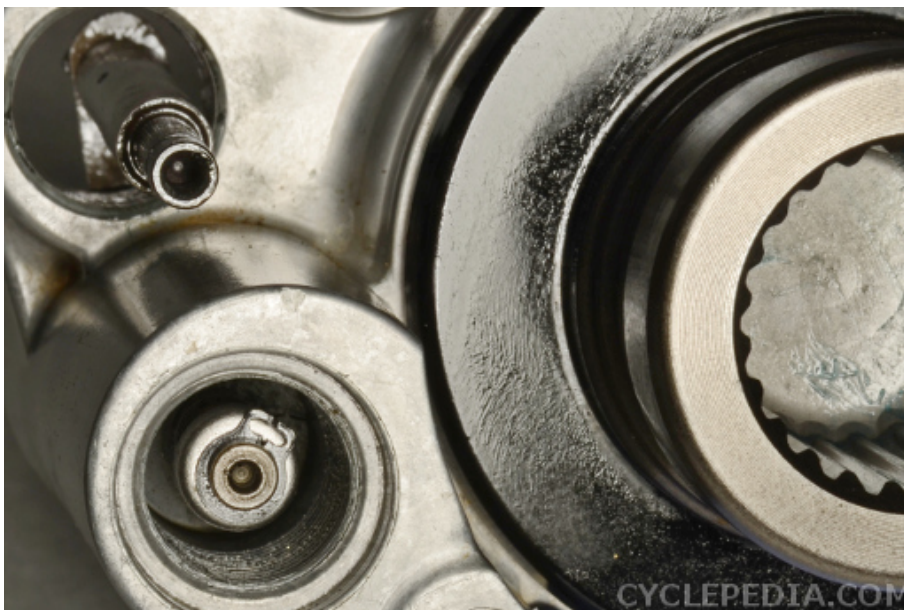
Remove the dowel pin.



Remove the gasket.



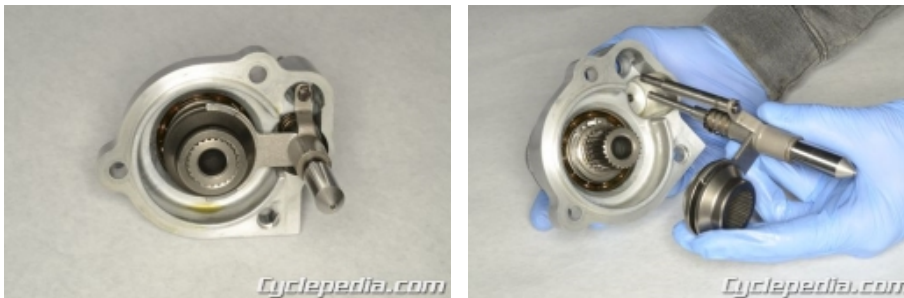
To remove the 2WD/4WD shifting and locking components remove the plug with a large flat blade screwdriver. Inspect the O-ring and replace it as needed.



The differential locking shaft is held in place by a small circlip. Carefully spread the circlip and remove it.



Remove the circlip, spring seat, and spring.



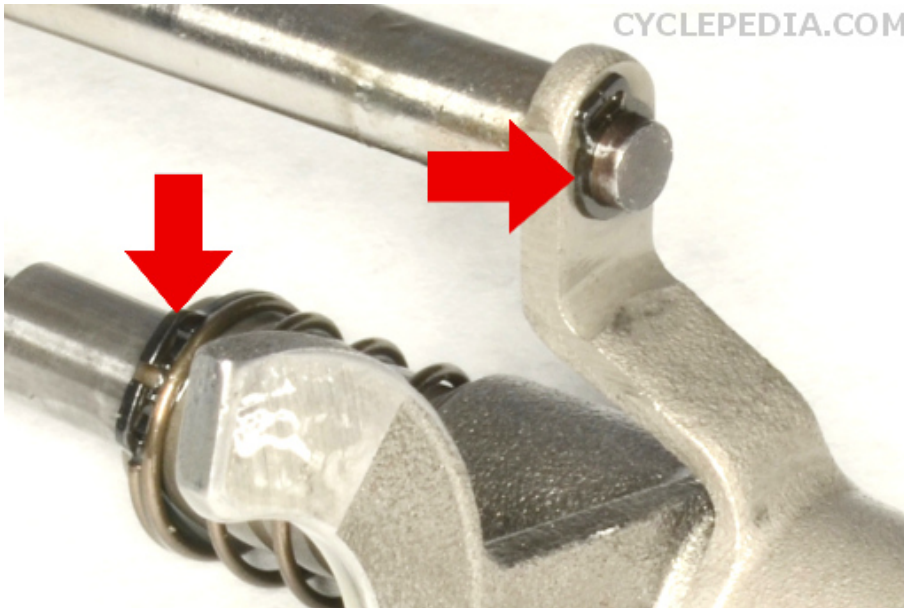
Slide the 2WD/4WD shifting and locking components out of the pinion housing.



Remove the drive coupler from the fork. Inspect the drive coupler for wear and damage.



Inspect the 2WD/4WD shifting and locking rod components for wear and damage.



To disassemble the individual components of the 2WD/4WD shifting and locking assembly remove the two snap rings with snap ring pliers.



To remove the input shaft remove the snap ring with snap ring pliers.



Remove the input shaft from the pinion housing. Check the input shaft splines for wear and damage. Inspect the input shaft seals and replace as needed.

Bearing replacement



Inspect the pinion housing seal and bearing.



If the bearing or seal needs to be replaced remove the seal with a seal pick.



Remove the snap ring with snap ring pliers.



Drive the bearing out from the inside of the housing.



Drive in the new bearings with a suitable bearing driver that has the same outside diameter of the bearing. The manufactures markings on the bearing must face out.

Special Tool - Bearing Driver: A120E00014



Secure the new bearing by installing a new snap ring into the groove with snap ring pliers.



Apply waterproof grease to the lips of the new seal. Press in the seal with a suitable driver that has the same outside diameter as the seal.

Differential



Loosen the 10 differential cover bolts evenly with a 12 mm socket.



Remove the differential cover bolts.



Utilize the pry points and separate the cover from the differential case.



Remove the differential cover from the case.



Remove the gasket.



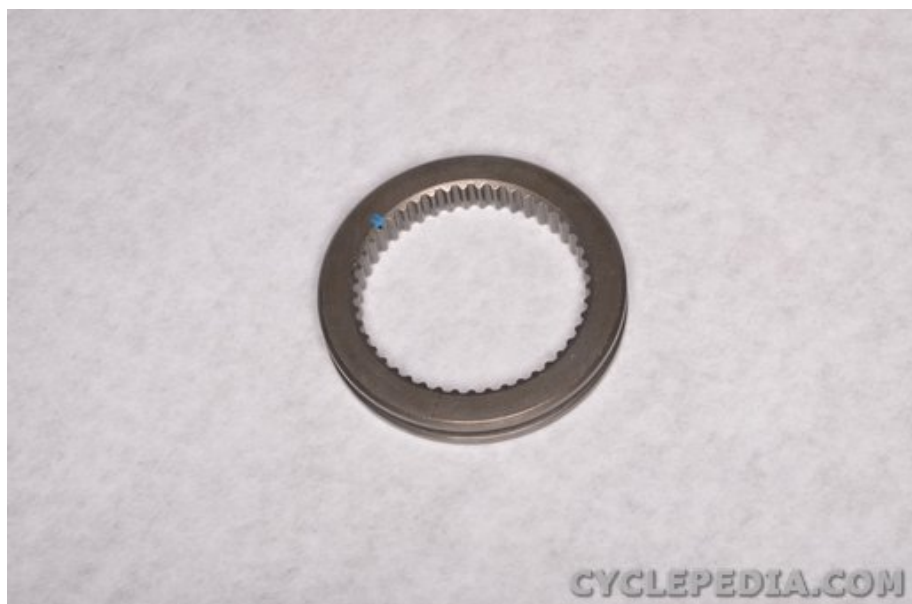
Remove the dowel pins.



Inspect the differential cover seals. Replace them as needed. Apply waterproof grease to the lips of the new seals. Press in the seal with a suitable driver that has the same outside diameter as the seal.



Remove the differential locking fork and collar.





Inspect the differential locking fork and collar for wear and damage.



Use a suitable driver and tap out the ring gear assembly.



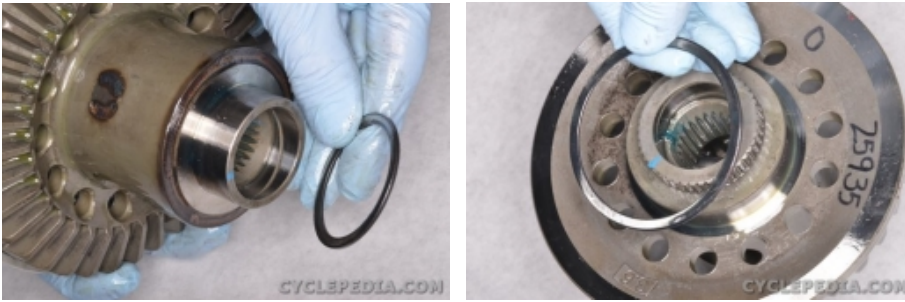
Remove the ring gear assembly from the differential case. Remove the differential case O-ring.



Lift off the bearing plate.



Inspect the bearing plate bearing and replace it as needed. Drive in the new bearing with a suitable bearing driver that has the same outside diameter of the bearing. The manufactures markings on the bearing must face out.



Remove the shims from each side of the ring gear. Keep track of the location of the shims so that they can be returned to their original positions.



Inspect the ring gear for wear and damage.



Inspect the differential case bearing and seal. Remove the seal with a seal pick if needed.



Drive the bearing out from the outside if needed.



Drive in the new bearing with a suitable bearing driver that has the same outside diameter of the bearing. The manufactures markings on the bearing must face out.

Pinion Gear



Unstake the pinion gear locknut with a suitable punch or a drill. Be very careful to avoid damaging the differential case.



Place the differential case in a vice. Use soft jaws or other suitable method to prevent damage to the differential case and its mating surface. Loosen pinion gear nut with the special lock nut wrench.

Special Tool - Bearing Driver: A120F00025



Remove the pinion gear nut.



Drive out the pinion gear shaft with a suitable punt or drift with a hammer.



Remove the pinion gear and ball bearing from the differential case.

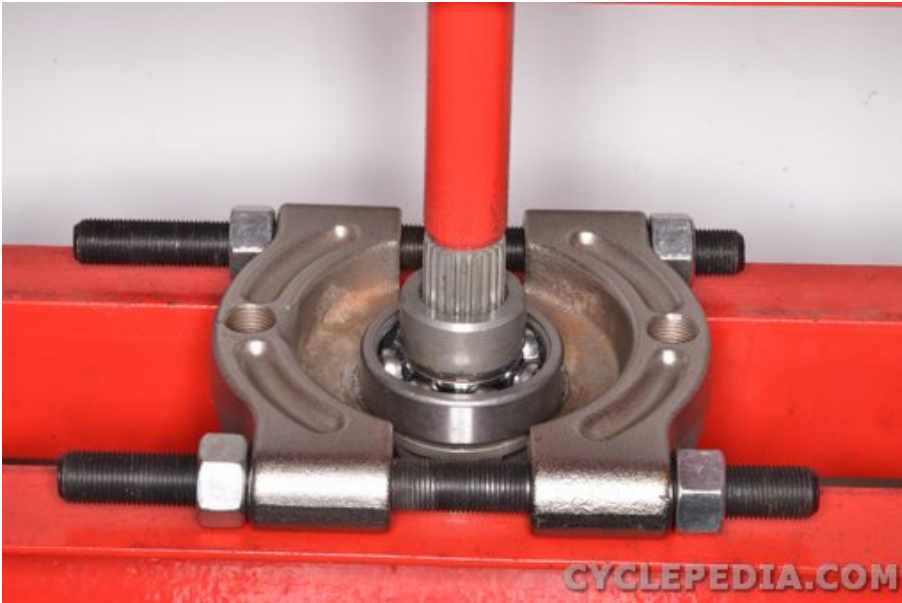


Inspect the pinion gear, shaft, and ball bearing. Replace the parts as needed.

Pinion Gear Shaft Bearings



Use a commercially available bearing puller to free the ball bearing from the pinion gear shaft.



Use a press and a split bearing puller if available.



Remove the ball bearing, and spacer from the pinion gear shaft.



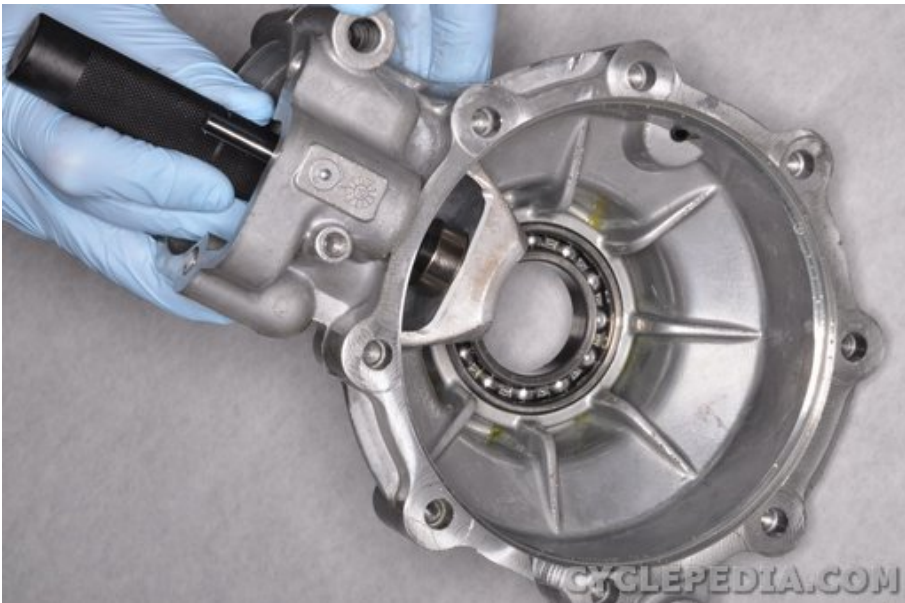
Use a press to install the new bearing and spacer onto the pinion gear shaft.



Inspect the pinion gear shaft needle bearing in the differential case.



Remove the pinion gear needle bearing with a suitable bearing puller.



Drive in a new pinion gear needle bearing with a suitable bearing driver that is the same outside diameter as the bearing.

Backlash Inspection and Shim Adjustment

Temporarily assemble the differential with the shims.

Hold the pinion gear so that it doesn't move. Place a horizontal type dial gauge through the filler hole and against the ring gear of the differential. Rotate the differential back and forth and check the backlash. Check the back lash at three different evenly spaced sections of the differential ring gear.

ITEM	STANDARD mm (in)
Front drive (differential) gear backlash	0.05 - 0.25 (0.002 - 0.010)

If the backlash is out of specification the shim/s must be adjusted.

Backlash	Right Shim adjustment
Under 0.05 mm (0.0020 in)	increase shim thickness
0.05 - 0.25 mm (0.002 - 0.010 in)	Correct
Over 0.25 mm (0.010 in)	Decrease shim thickness



If the right shim is changed the left shim/s needs to change to compensate.

Gear Tooth Contact

After the proper shims have been selected the gear tooth contact must be checked.

Remove the differential and pinion gear. Clean the differential ring gear and pinion gear.

Apply machinists dye to several teeth of the pinion gear. Install the pinion gear and differential into the case. Temporarily assemble the differential.

Turn the differential ring gear back and forth so the dye coated gear teeth contact the ring gear.

The dye should show that the contact area of the gear teeth is centered on the teeth. If the contact is too high or low on the teeth the differential shims must be changed so that the tooth contact is correct while maintaining the correct backlash.

To assemble the front differential see the [Differential Assembly](#) topic.

Differential Assembly

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Clean the final drive gear case components with a high flash point solvent and compressed air.

NOTE: Always wear safety glasses when using compressed air and never point it directly at yourself or anyone else.

Lubricate the bearings with fresh gear oil.

Pinion Gear



Install the pinion gear shaft into the differential case.



Install a new pinion gear lock nut.



Place the differential case in a vice. Use soft jaws or other suitable method to prevent damage to the differential case and its mating surface. Tighten the pinion gear nut to specification with the special lock nut wrench.

Special Tool - Bearing Driver: A120F00025

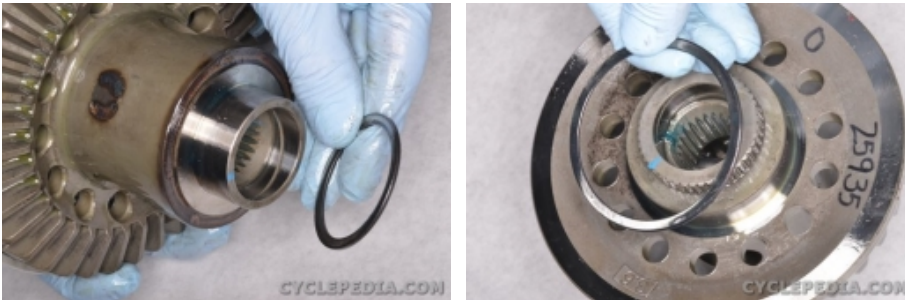
ITEM	N-m	kgf-m	ft-lb
Front drive (differential) pinion gear shaft nut	169	16.9	125



Stake the pinion gear locknut with a suitable punch and hammer. Be very careful to avoid damaging the differential case.

Differential

Select the proper shims as covered in the [Front Differential Disassembly](#) topic.



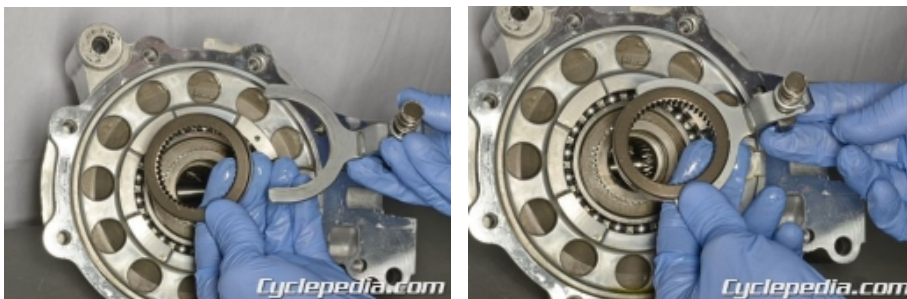
Install the correct shims onto each side of the ring gear.



Fit the bearing plate into place as shown.



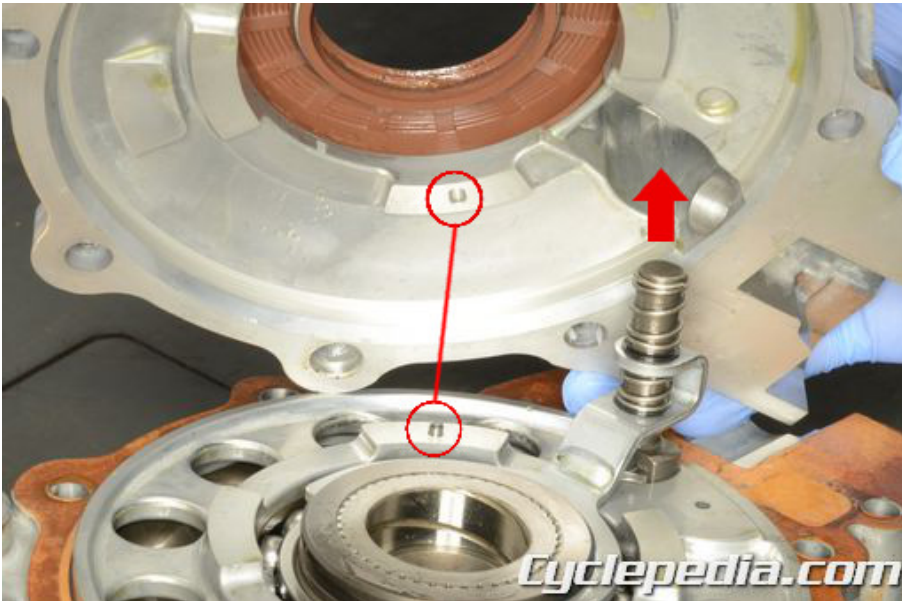
Fit the ring gear assembly and bearing plate into the differential case.



Install the differential locking fork and collar.



Install the dowel pins and a new gasket.



Fit the differential cover into place. The pin on the bearing plate must fit into the differential cover. The locking fork projection must fit into the space in the cover.



Apply a light coat of Threebond 1215 or other equivalent sealant to the threads of the differential cover bolts. Install the differential cover bolts.



Tighten the differential cover bolts evenly and securely with a 12 mm socket.

ITEM	N-m	kgf-m	ft-lb
Front drive (differential) case bolt	23	2.3	16.5

Pinion Housing



Install the input shaft into the bearing.



Install the snap ring into the groove with snap ring pliers.



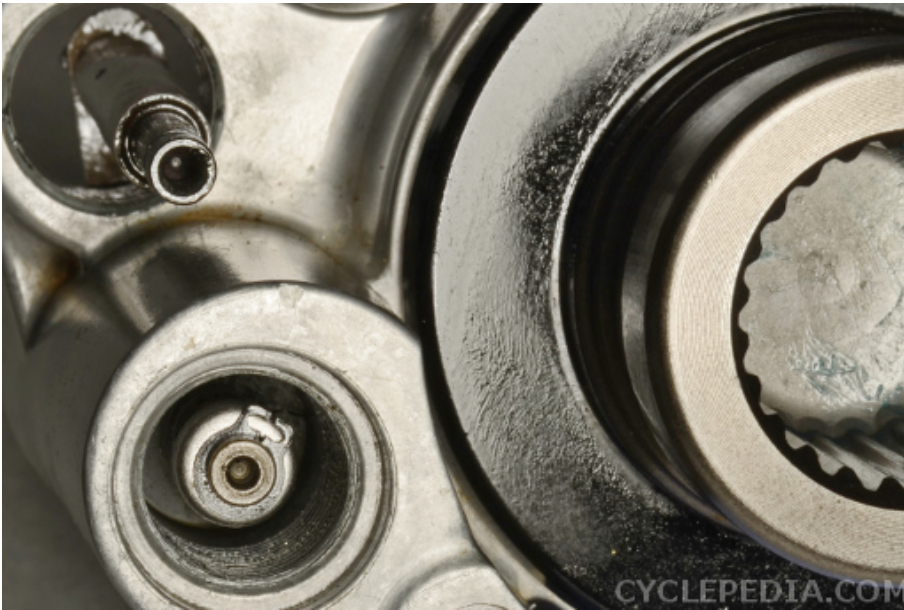
Lubricate the actuator fork and drive coupler with fresh differential oil. Fit the drive coupler into the fork as shown.



Slide the 2WD/4WD shifting and locking components into the pinion housing.



Install the spring, spring seat and circlip onto the locking shaft.



Gently spread the circlip and slide it into place in the groove on the shaft.



Install the plug. Make sure the O-ring is in good condition. Tighten the plug securely with a large flat blade screwdriver.

Item	Q'ty	Thread dia. (mm)	Torque Kgf-m (N-m, ft-lb)
Shifting fork shaft plug	1	8	1.5 (15, 11)



Install a new pinion housing gasket and dowel pin.



Fit the pinion housing into place.



Apply a light coat of Threebond 1215 or other equivalent sealant to the threads of the pinion housing bolts. Install the bracket and the three pinion housing bolts.



Tighten the pinion housing bolts securely with a 12 mm socket.

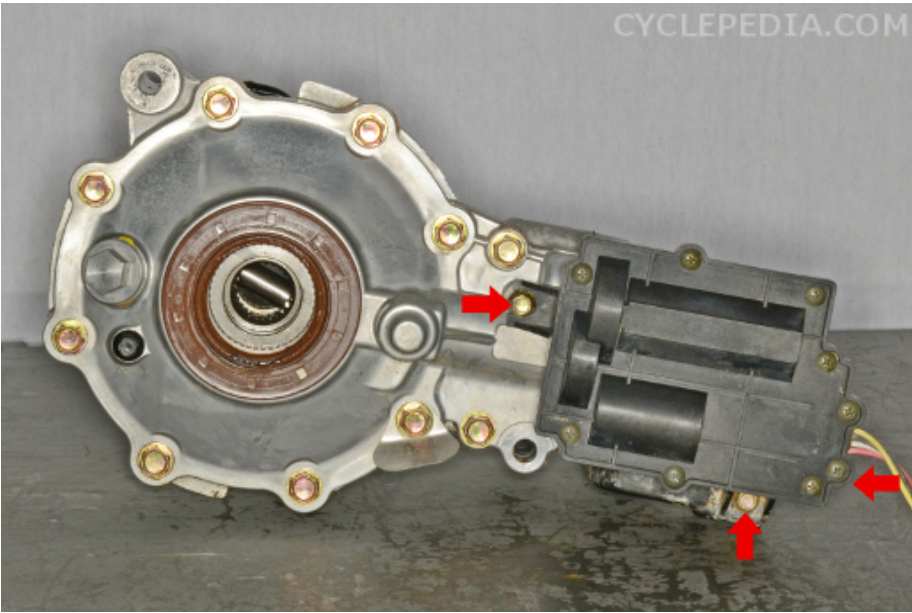
2WD/4WD Shifting Motor Assembly



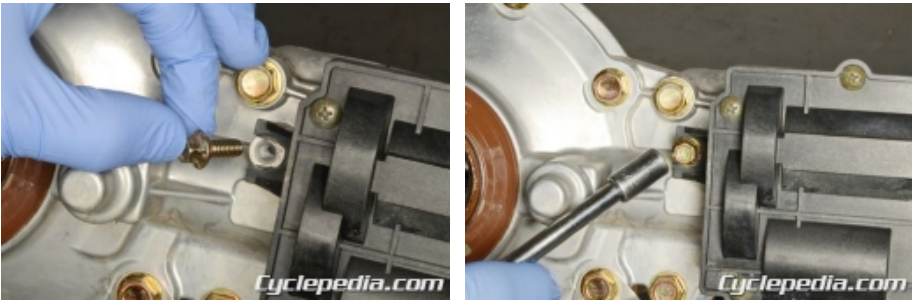
Lubricate the shifting motor assembly O-ring with grease.



Install the 2WD/4WD shifting motor assembly. Guide the rod into the shifting motor assembly.



Apply Threebond sealant to the threads of the 2WD/4WD shifting motor assembly mounting bolts. The install the three 2WD/4WD shifting motor assembly mounting bolts.



Tighten the 2WD/4WD shifting motor assembly bolts to specification.

Item	Q'ty	Thread dia. (mm)	Torque Kgf-m (N-m, ft-lb)	Remarks
2WD/4WD shift motor mounting bolt	1	8	2.3 (23, 16.5)	Apply threebond: 1215
2WD/4WD shift motor mounting bolt	2	6	1.2 (12, 8.5)	



Install the spacer onto the 2WD/4WD shifting rod.



Carefully spread the circlip and install it into the groove in the 2WD/4WD shifting rod.



Apply a light coat of silicone sealant to the outside of the plug and install the plug. Install the differential. See the [Differential Removal and Installation](#) topic for more information.

Rear Final Drive Gear

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the rear wheels and hubs. See the [Wheels and Wheel Hubs](#) topic for more information.

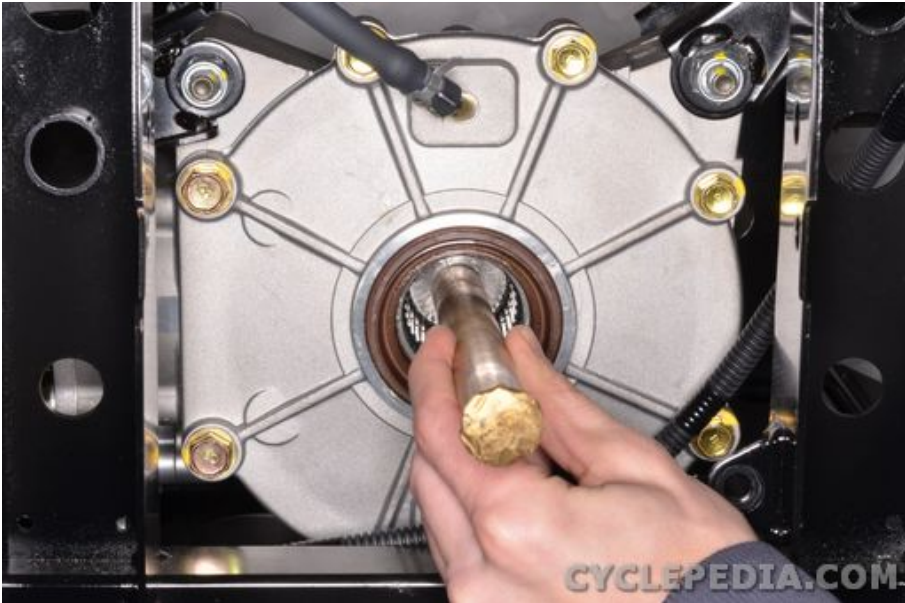
Drain the final drive gear oil. See the [Final Drive Oil](#) topic for more information.

Remove the rear shock absorbers. See the [Rear Shock Absorbers](#) topic for more information.

Remove the rear suspension arms and knuckles. See the [Rear Suspension Arms](#) topic for more information.



Remove the left rear drive shaft horizontally. Remove the drive shaft with the special tools if it is difficult to remove by hand. Remove the circlip.



Carefully drive the right drive shaft with a brass punch and hammer.

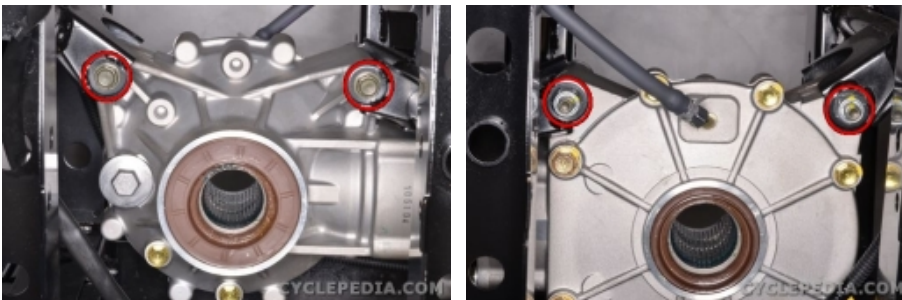


Remove the right drive shaft horizontally. Remove the circlip.

Note: Do not use the front brake while the caliper and brake pads are not installed on the vehicle.



Remove the rear caliper. See the [Rear Brake Caliper](#) topic for more information.



Hold the two gear case mounting bolts with a 14 mm wrench and remove the nuts with a 17 mm socket. Remove the bolts.



Slide off the main rear drive shaft horizontally.



Remove the rear final drive.

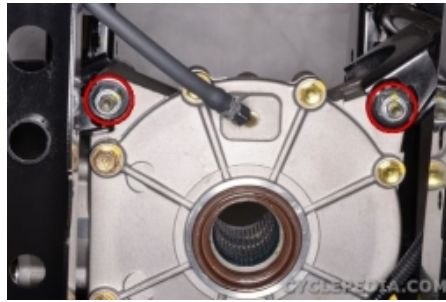
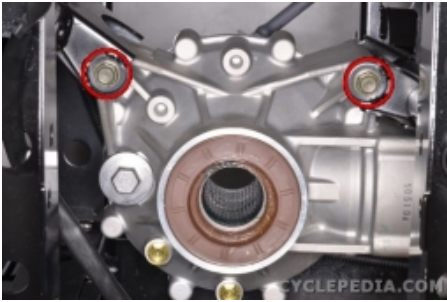
Installation



Install the rear final drive.



Grease the main rear drive shaft contact areas. Slide the drive shaft into the gear case horizontally.



Install the two gear case mounting bolts and nuts. Hold the bolts with a 14 mm wrench and tighten the nuts to specification with a 17 mm socket.

Item	N-m	Kgf-m	lbf-ft
Rear gear case mounting bolt	55	5.5	40



Install a new circlip. Grease the left drive shaft splines. Install the left rear drive shaft into the gear case horizontally.

Note: Be careful not to damage the oil seal in the front gear case. After installing check the circlip is seated properly by pulling the case side joint lightly.



Install a new circlip. Grease the right drive shaft splines. Install the right drive shaft horizontally.

Note: Be careful not to damage the oil seal in the front gear case. After installing check the circlip is seated properly by pulling the case side joint lightly.



Install the rear caliper. See the [Rear Brake Caliper](#) topic for more information.

Install the rear suspension arms and knuckles. See the [Rear Suspension Arms](#) topic for more information.

Install the shock absorbers. See the [Rear Shock Absorbers](#) topic for more information.

Fill the final drive gear oil. See the [Final Drive Oil](#) topic for more information.

Install the rear wheels and hubs. See the [Wheels and Wheel Hubs](#) topic for more information.

Adjust the rear parking brake. See the [Rear Parking Brake Adjustment](#) topic for more information.

Check that the brakes work properly before riding.

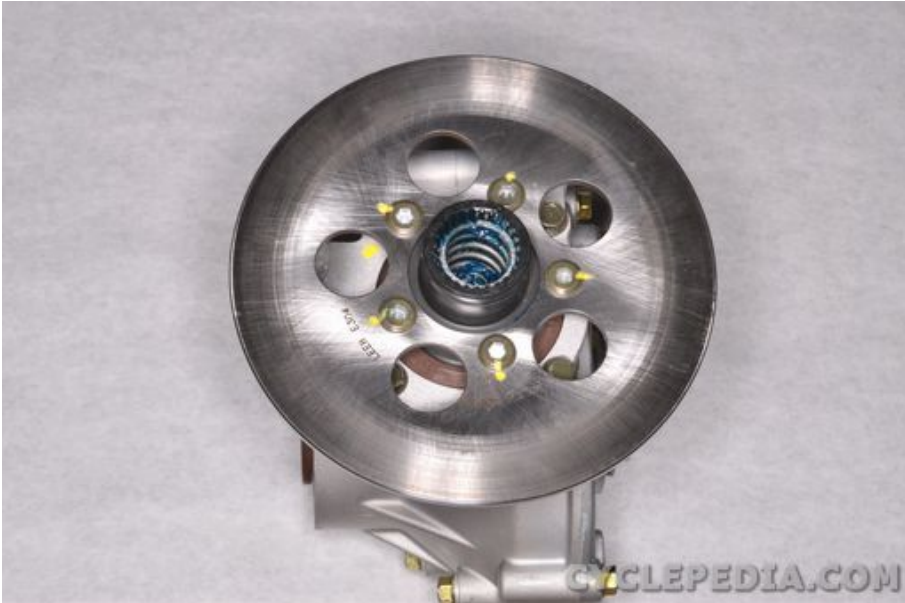
Final Drive Gear Disassembly

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.



Remove the rear final drive. See the [Rear Final Drive Gear](#) topic for more information.

Rear Brake Disc and Holder



Remove the five rear brake disc bolts with a 6 mm Allen socket.



Remove the rear brake disc from the brake disc holder.



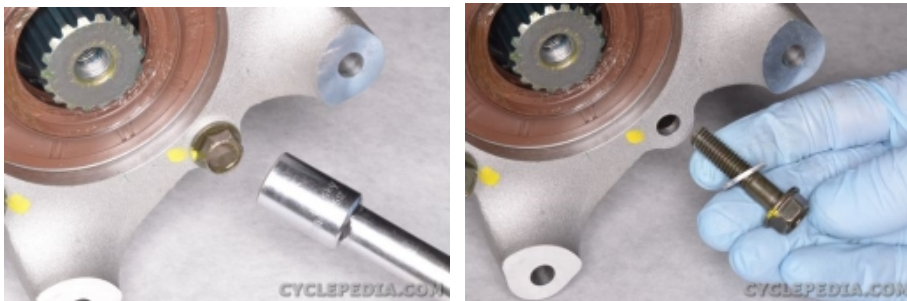
Remove the spring from the brake disc holder.



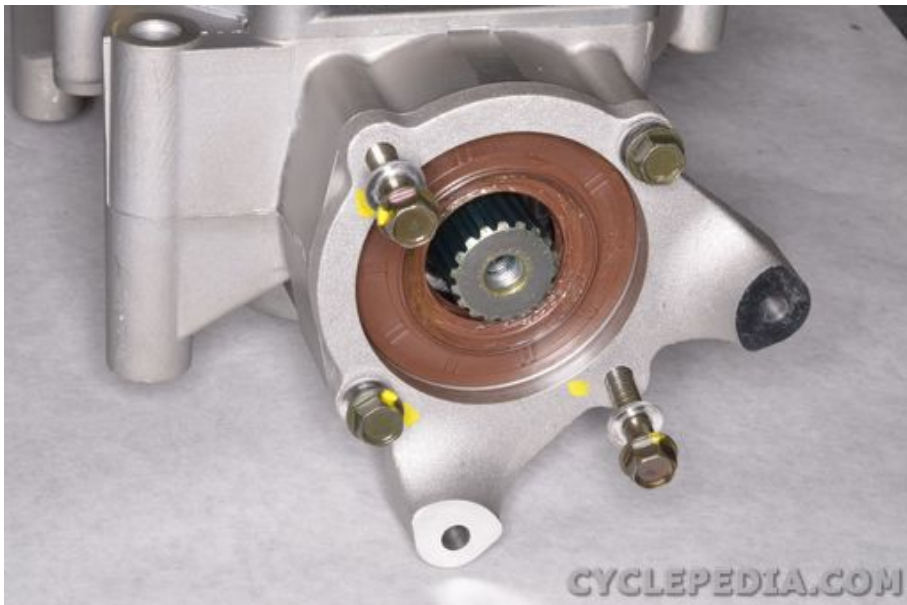
Loosen the rear brake disc holder bolt with a 14 mm socket.



Remove the rear brake disc holder from the pinion shaft.



Loosen the four rear brake caliper holder bolts with a 12 mm socket. Remove the four rear brake caliper holder bolts.



Note there are two different sizes for the rear brake caliper holder bolts.



Remove the rear brake caliper holder.



Remove the two dowel pins.

Backlash Inspection and Shim Adjustment

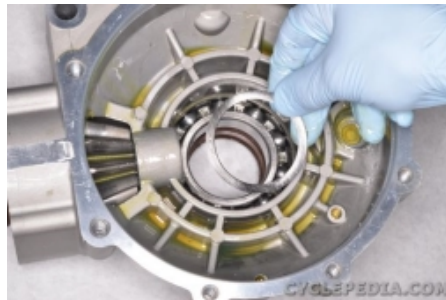
Temporarily assemble the rear final gear with the shims.

Hold the pinion gear so that it doesn't move. Place a horizontal type dial gauge through the filler hole and against the ring gear of the differential. Rotate the pinion gear shaft back and forth and check the backlash. Check the backlash at three different evenly spaced sections of the ring gear.

ITEM	STANDARD mm (in)
Rear final drive gear backlash	0.05 - 0.25 (0.002 - 0.010)

If the backlash is out of specification the shim/s must be adjusted.

Backlash	Right Shim adjustment
Under 0.05 mm (0.0020 in)	increase shim thickness
0.05 - 0.25 mm (0.002 - 0.010 in)	Correct
Over 0.25 mm (0.010 in)	Decrease shim thickness



If the right shim is changed the left shim/s needs to change to compensate.

Gear Tooth Contact

After the proper shims have been selected the gear tooth contact must be checked.

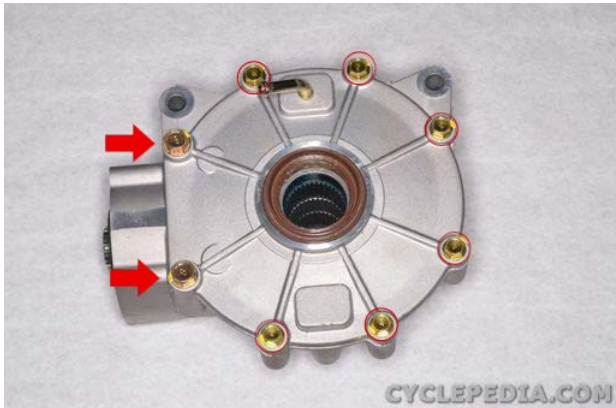
Remove the final drive gears. Clean the differential ring gear and pinion gear.

Apply machinists dye to several teeth of the pinion gear. Install the pinion gear and ring gear into the case. Temporarily assemble the final drive gear case.

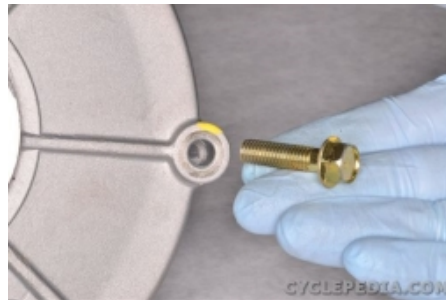
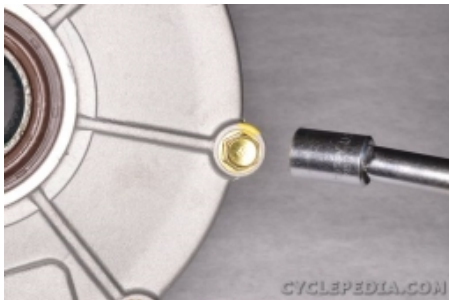
Turn the ring gear back and forth so the dye coated gear teeth contact the ring gear.

The dye should show that the contact area of the gear teeth is centered on the teeth. If the contact is too high or low on the teeth the pinion gear shaft shims must be changed so that the tooth contact is correct while maintaining the correct backlash.

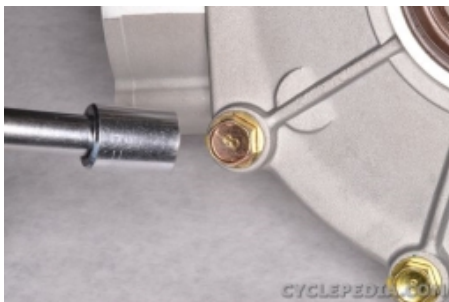
Final Gear Case Cover



The rear final drive cover has eight bolts. There are two large bolts (arrows) and six small bolts (circles).



Loosen the small bolts with a 12 mm socket.



Remove the two large bolts with a 14 mm socket.



Utilize the pry point and remove the rear final gear case cover.

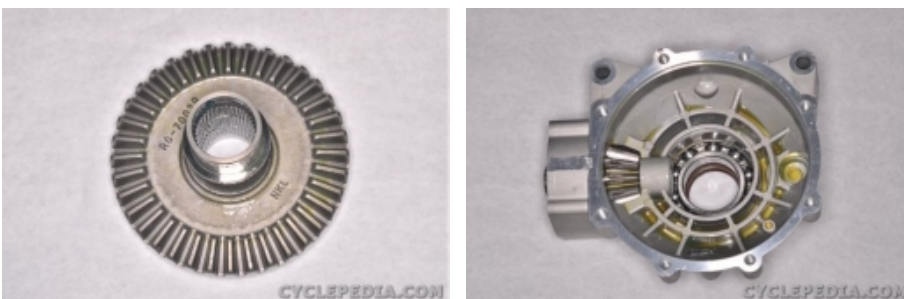
Ring and Pinion Gears



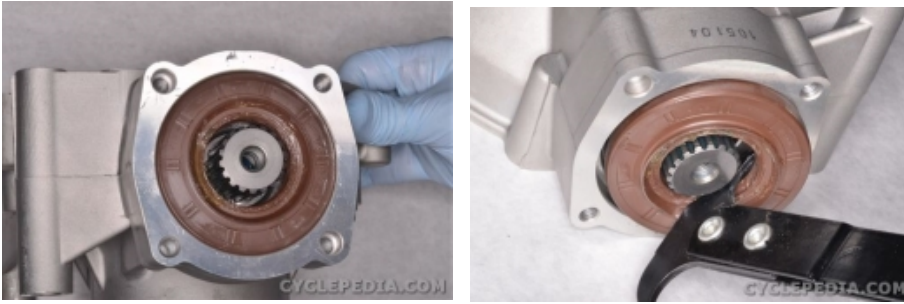
Remove the ring gear.



Remove the shims from each side of the ring gear. Keep track of the location of the shims so that they can be returned to their original positions.



Inspect the ring and pinion gears for wear and damage.



If the pinion gear shaft needs to be removed the oil seal must be removed first. Remove the pinion shaft oil seal with a seal pick.



The pinion gear shaft has a locknut that requires a special tool to remove. Also, a special puller tool will be needed to pull the pinion gear out of the final gear case.

Place the final gear case in a vice. Use soft jaws or other suitable method to prevent damage to the case and its mating surface.



Secure the case in a soft jawed vise and remove the locknut with the special wrench.

Special Tool - Pinion Gear Shaft Puller: A120F00020



To remove the pinion shaft a special tool set is needed.
Special Tool - Pinion Gear Shaft Puller: A120F00026



Lubricate the puller threads with grease.



Thread the puller part of the tool into the pinion gear shaft.



Install the puller plate onto the final gear case.



Thread the shaft onto the puller.



Install the rest of the tool.



Hold the shaft still and turn the nut with a large wrench to pull the shaft up.



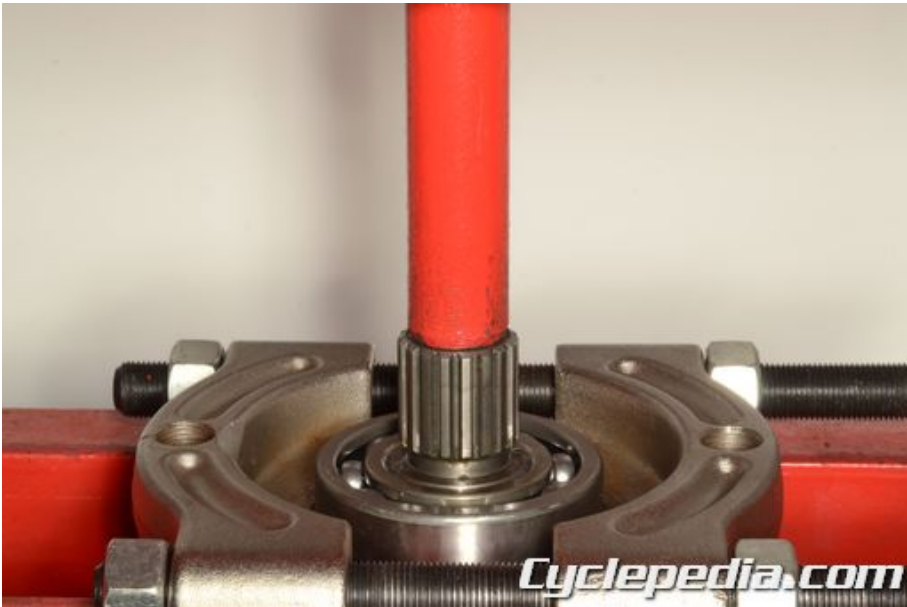
Remove the pinion gear shaft from the case.



Inspect the pinion shaft, gear, and bearing for wear and damage. The bearing must be removed to access the shim.

Bearing Replacement

Pinion Bearing



Use a commercially available bearing puller or press to free the ball bearing from the pinion gear shaft.



Remove the shim. Be sure to have the appropriate shim for installation.



Install the shim and press the new bearing onto the shaft.

Final Gear Case Pinion Gear Needle Bearing



Inspect the pinion gear shaft needle bearing in the case.



Remove the needle bearing snap ring with snap ring pliers.



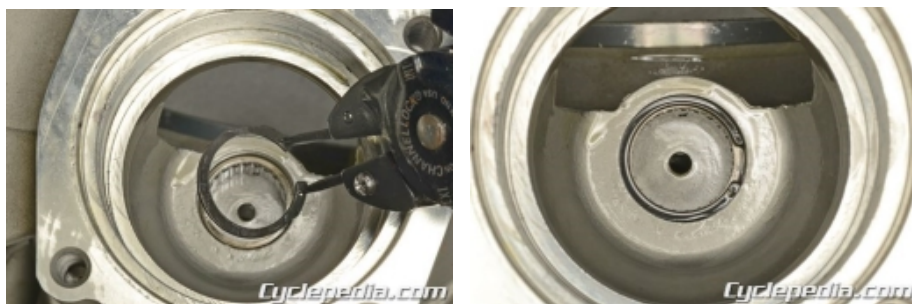
Remove the pinion gear needle bearing with a suitable bearing puller.



Drive in a new pinion gear needle bearing with a suitable bearing driver that is the same outside diameter as the bearing.



Lubricate the new needle bearing with fresh final drive oil.



Install a new snap ring into the groove with snap ring pliers.

Cover Ring Gear Bearing



Inspect the final drive gear cover bearing and seal.



Remove the oil seal with a seal pick if needed.



Drive the final drive gear cover bearing out from the outside of the final drive gear cover.



Drive the new bearing into the final drive gear cover with a suitable driver that is the same outside diameter as the bearing. The markings on the bearing must face out.

Special Tool - Bearing Driver: A120E00014



Apply waterproof grease to the lips of the new seal. Press in the seal with a suitable driver that has the same outside diameter as the seal.

Final Gear Case Ring Gear Bearing



Inspect the final drive gear case bearing and seal.



Remove the oil seal with a seal pick if needed.



Remove the circlip with snap ring pliers.



Drive the drive gear case bearing out from the inside.



Drive the new bearing into the final drive gear cover with a suitable driver that is the same outside diameter as the bearing. The markings on the bearing must face out. Install a new snap ring into the groove with snap ring pliers.



Apply waterproof grease to the lips of the new seal. Press in the seal with a suitable driver that has the same outside diameter as the seal.

To assemble the final drive gear case see the [Final Drive Gear Assembly](#) topic.

9.Brake System

This chapter covers the location and servicing of the front brake components.

1.Front Caliper	9-2
2.Front Disc Brake	9-17
3.Front Brake Lines	9-25
4.Master Cylinder	9-32
5.Brake Pedal	9-37
6.Parking Brake	9-41
7.Rear Brake Caliper	9-47
8.Rear Brake Disc	9-64
9.Rear Parking Brake Adjustment	9-70

Front Caliper

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Warning: Brake fluid is very caustic and can damage paint, chrome and plastic. Wipe up any spills immediately.

Removal

Remove the front wheels. See the [Wheels and Wheel Hubs](#) topic for more information.

Drain the brake fluid. See the [Brake Fluid](#) topic for more information.

Note: If you are only replacing the brake pads it is not necessary to drain the brake fluid.

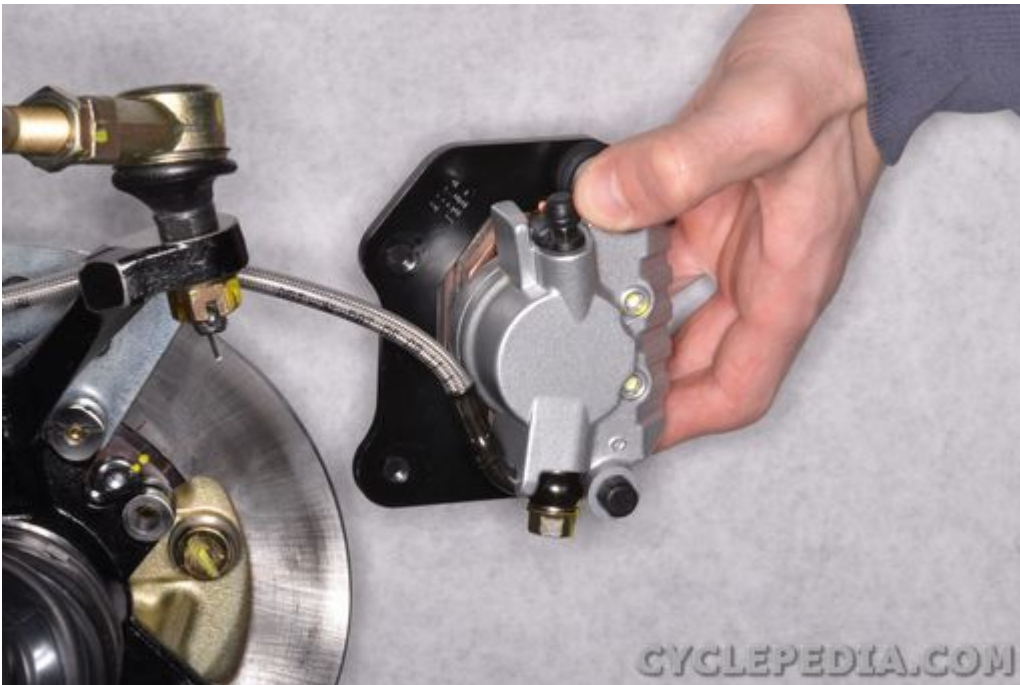


Loosen the two brake pad mounting pins with a 5 mm Allen wrench.



Remove the two brake pad mounting bolts with a 12 mm socket.

Note: Do not use the front brake while the caliper and brake pads are not installed on the vehicle.



Remove the brake caliper.

Brake Pad Replacement



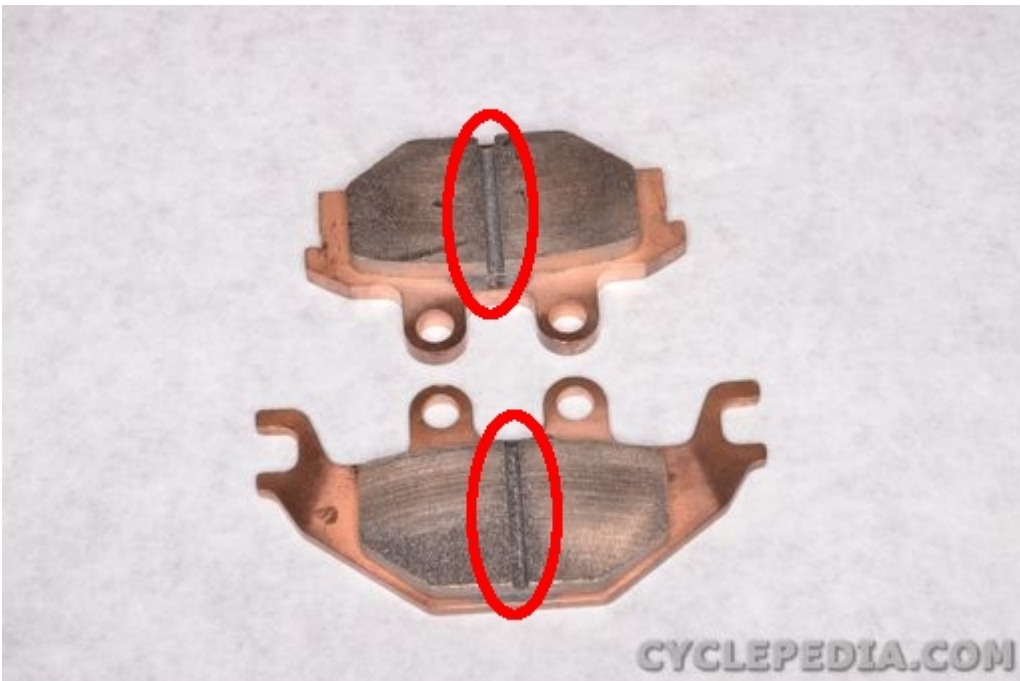
Remove the brake pad pins.



Compress the brake caliper holder.



Remove the brake pads and replace them if needed. Always replace them as a set.



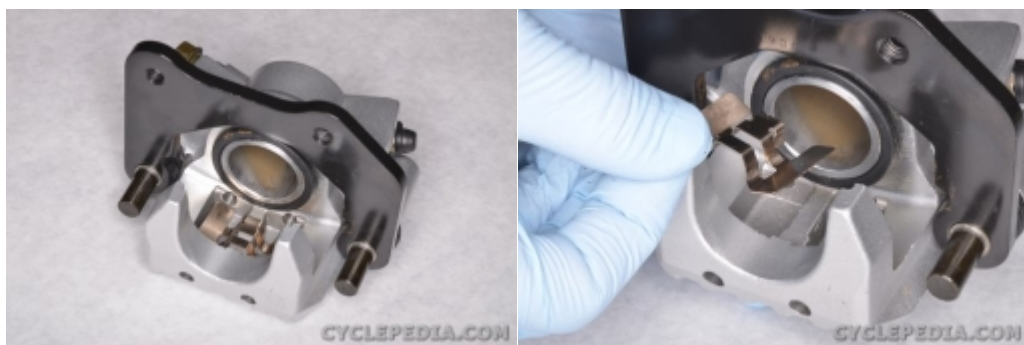
Replace the brake pads if the wear indicators are worn away.

Install the brake pads. See the [Installation](#) topic for more information.

Disassembly



Loosen the brake hose banjo bolt with a 12 mm socket. Remove the banjo bolt and sealing washers.



Remove the brake pad spring.



Remove the caliper bracket.



Remove the rubber boots. Replace if damaged.

NOTE: Always wear safety glasses when using compressed air and never point it directly at yourself or anyone else.



Place a thick rag over caliper piston and use compressed air to move the piston out. Do not place your fingers over the caliper piston while removing it as serious injury could result.



Remove the caliper piston by hand.



Remove the dust seal from the outer caliper bore and discard.



Use a mechanics pick to remove the piston seal from the inner caliper bore and discard.

Inspection



Check the brake caliper bore for any scratches, damage or excessive wear. Clean the brake caliper bore with DOT 4 brake fluid. Do not dry off with a rag.



Check the piston for any scratches, damage or excessive wear. Clean the piston with DOT 4 brake fluid. Do not dry off with a rag.



Check the brake caliper holder for damage.

Assembly

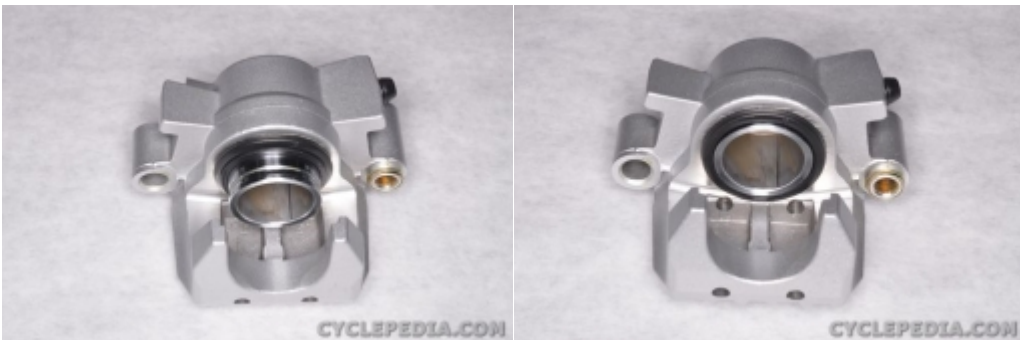
Note: Coat the new seals with DOT 4 brake fluid.



Install a new piston seal into the inner caliper bore groove.



Coat the caliper bore and piston with DOT 4 brake fluid. Install a new dust seal onto the piston as shown.



Install the piston into the caliper bore.



Install the rubber boots.



Apply silicone grease to the caliper bracket pins. Install the caliper bracket.



Install the brake pad spring.

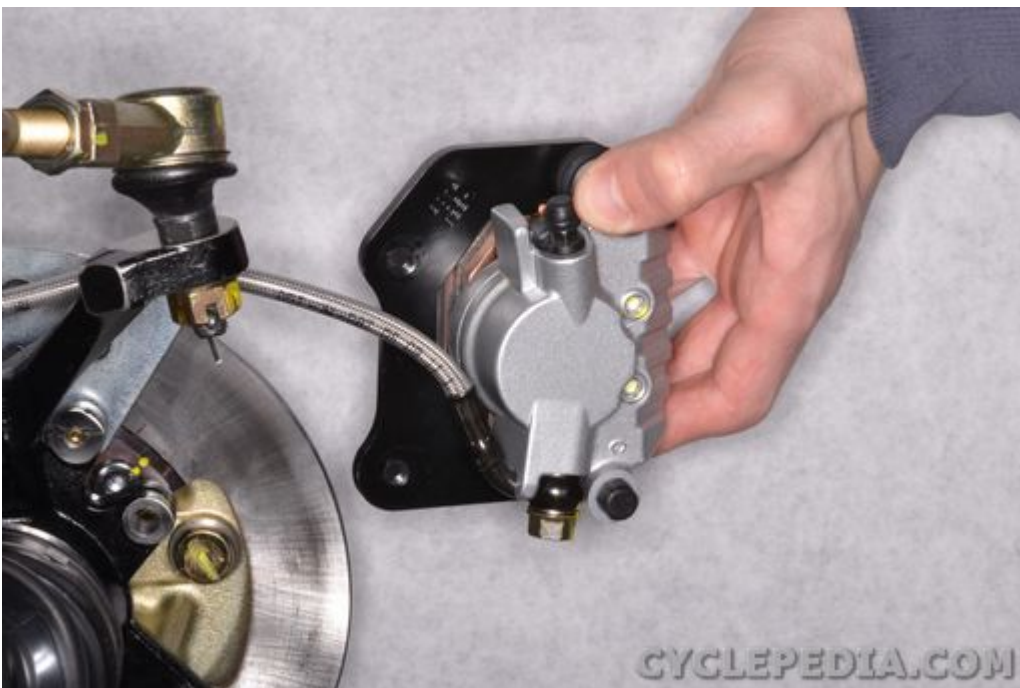
Installation



Install the brake pads.



Install the two the brake pad mounting pins into the caliper and through the brake pads.



Install the brake caliper.



Install the two brake pad mounting bolts and tighten them to specification with a 12 mm socket.

ITEM	N-m	kgf-m	ft-lb
Brake caliper mounting bolt	32	3.2	25



Tighten the pad pins to specification with a 5 mm Allen wrench.

ITEM	N-m	kgf-m	ft-lb
Brake pad mounting pin	18	1.8	13



Install new sealing washers and tighten the brake hose banjo bolt to specification with a 12 mm socket.

ITEM	N-m	kgf-m	ft-lb
Brake hose banjo bolt	35	3.5	25

Install the front wheels. See the [Wheels and Wheel Hubs](#) topic for more information.

Fill the master cylinder reservoir with brake fluid and bleed the brakes. See the [Brake Fluid](#) topic for more information.

Check that the brakes work properly before riding.

Front Disc Brake

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Inspection

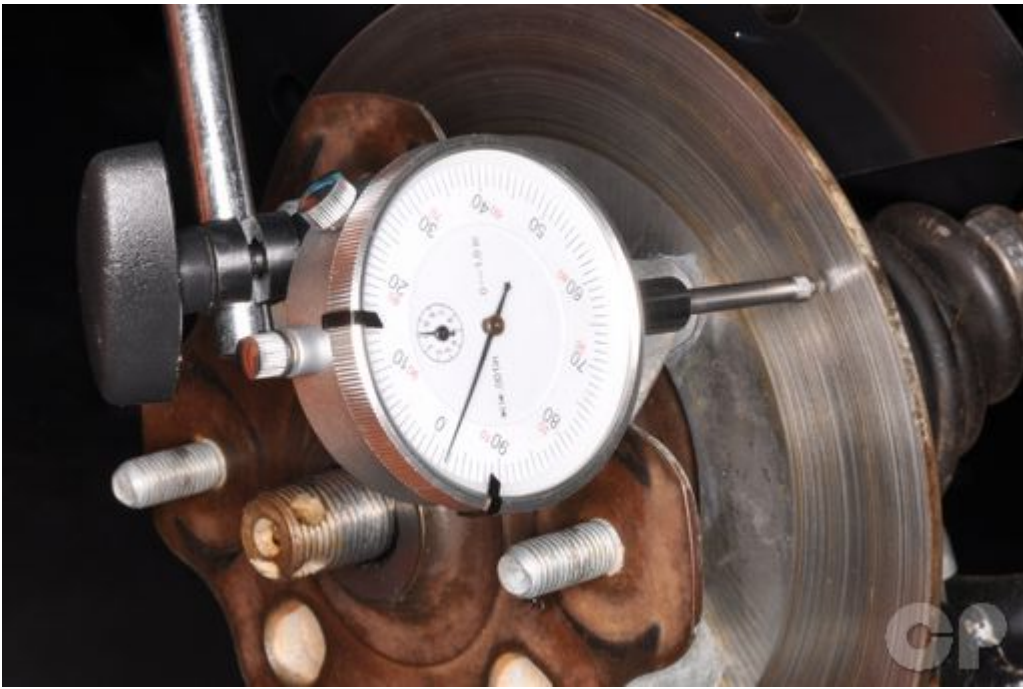
Remove the front wheels. See the [Wheels and Wheel Hubs](#) topic for more information.

Check the front brake discs for damage or excessive wear.



Measure the brake disc thickness with a micrometer. Replace both rotors as a set if any are below the service limit.

ITEM	STANDARD mm (in)	LIMIT
Brake disc thickness	3.8 - 4.2 (0.152 - 0.168)	3.0 (0.12)



Using a dial gauge and stand measure the disc brake runout. Replace both rotors as a set if any are below the service limit.

ITEM	LIMIT
Brake disc runout	0.30 mm (0.012 in)

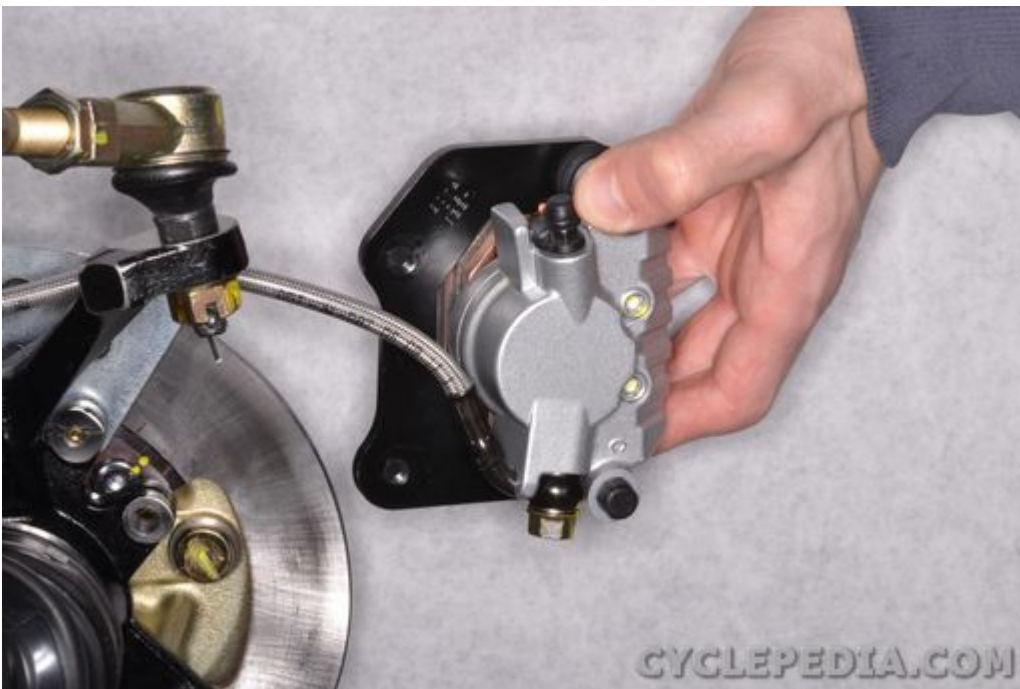
Removal



Remove the cotter pin and discard.



Apply the front brakes and remove the axle nut with a 30 mm socket.



Remove the caliper and support it. See the [Front Caliper](#) topic for more information.

Note: Do not use the front brake while the caliper and brake pads are not installed on the vehicle.



Slide off the wheel hub assembly.



Remove the four disc brake bolts with a 6 mm Allen wrench. Separate the disc brake from the wheel hub.

Installation



Install the disc brake onto the wheel hub. Install four new bolts to specification with a 6 mm Allen wrench.

ITEM	N-m	kgf-m	ft-lb
Brake disc bolt	35	3.5	25.2



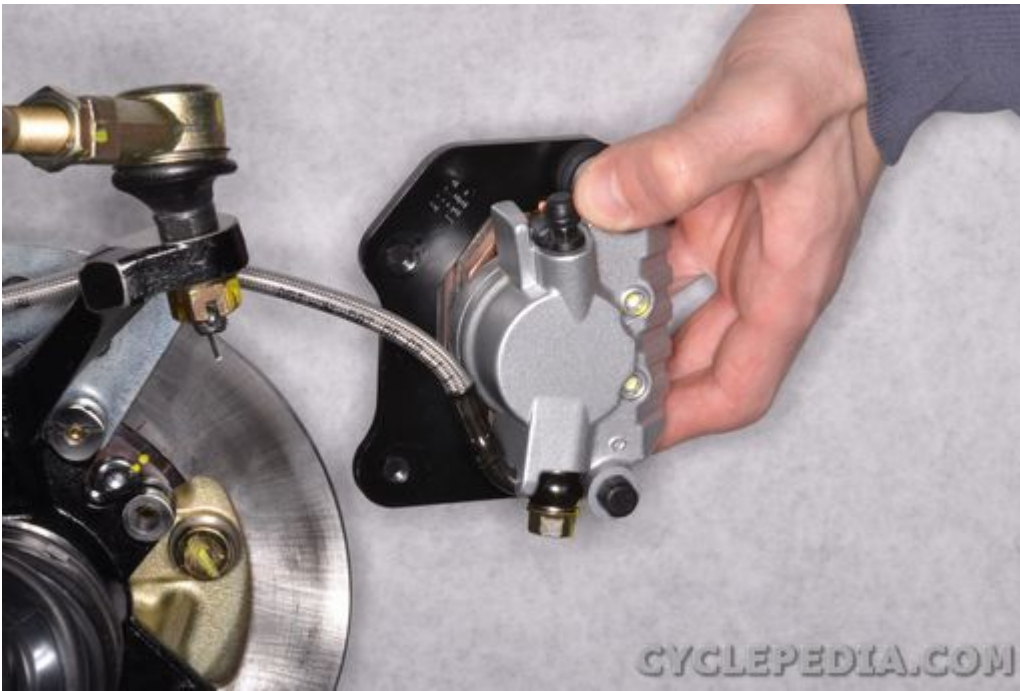
Apply grease to the wheel hub splines.



Slide on the wheel hub assembly.



Thread on the wheel hub nut.



Install the caliper so the disc brake is between the brake pads. See the [Front Caliper](#) topic for more information.



Apply the front brakes and tighten the axle nut to specification with a 30 mm socket.

Item	N-m	Kgf-m	lbf-ft
Front axle hub nut	200	20	145



Install a new cotter pin.

Install the front wheels. See the [Wheels and Wheel Hubs](#) topic for more information.

Check that the brakes work properly before riding.

Front Brake Lines

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the front wheels. See the [Wheels and Wheel Hubs](#) topic for more information.

Drain the brake fluid. See the [Brake Fluid](#) topic for more information.



Loosen the brake hose banjo bolt on the caliper with a 12 mm socket. Remove the banjo bolt and sealing washers.



Remove the inner brake line holder from the A-arm.



Remove the lower brake line from its holder.



Remove the brake line from its holder by bending back the clamp.



To remove the 3-way junction; remove the banjo bolts and mounting nut.



To remove the brake lines from the master cylinder see the [Master Cylinder](#) topic for more information.

Installation



Install new sealing washers and tighten the brake hose banjo bolt on the caliper to specification with a 12 mm socket.

ITEM	N-m	kgf-m	ft-lb
Brake hose banjo bolt	35	3.5	25



Install the inner brake line holder onto the A-arm and tighten securely as shown.



Install the lower brake line onto its holder.



Install the brake line to its holder by bending the clamp.



To install the 3-way junction; Install the banjo bolts with new sealing washers and tighten them to specification. Install and tighten the 3-way junction mounting nut to specification.

Item	N-m	Kgf-m	lbf-ft
Banjo bolt	35	3.5	25
3-way junction nut	25	2.5	18



To install the brake lines onto the master cylinder see the [Master Cylinder](#) topic for more information.

Item	N-m	Kgf-m	lbf-ft
Banjo bolt	35	3.5	25

Install the front wheels. See the [Wheels and Wheel Hubs](#) topic for more information.

Fill the master cylinder reservoir with brake fluid and bleed the brakes. See the [Brake Fluid](#) topic for more information.

Master Cylinder

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Warning: Brake fluid is very caustic and can damage paint, chrome and plastic. Wipe up any spills immediately.

Removal

Lift the hood. See the [Hood](#) topic for more information.

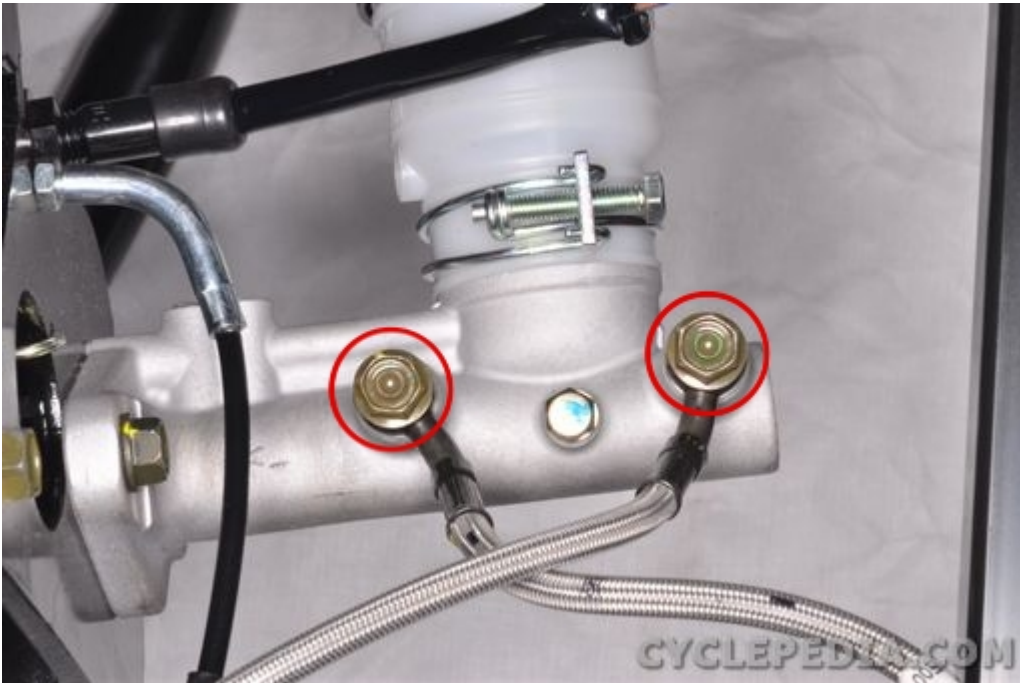
Remove the front cargo box. See the [Hood](#) topic for more information.

Remove the pedal cover. See the [Pedal Cover](#) topic for more information.



Remove the brake fluid drain bolt to drain the brake fluid. Install the bolt after draining and tighten securely.

Note: Do not splash brake fluid onto any rubber, plastic and coated parts. When working with brake fluid, use shop towels to cover these parts.



Note the position of the position of the two brake lines on the master cylinder. Remove the two brake hose banjo bolts from the master cylinder with a 12 mm socket. Discard the sealing washers.

Note: When removing the brake fluid hose bolt, be sure to place towels under the hose and plug the hose end to avoid brake fluid leakage and contamination.



Remove the two master cylinder mounting bolts.



Remove the master cylinder rod clip and pivot pin. Remove the master cylinder.

Note: The master cylinder can not be repaired. Replace the assembly with a new one.

Installation



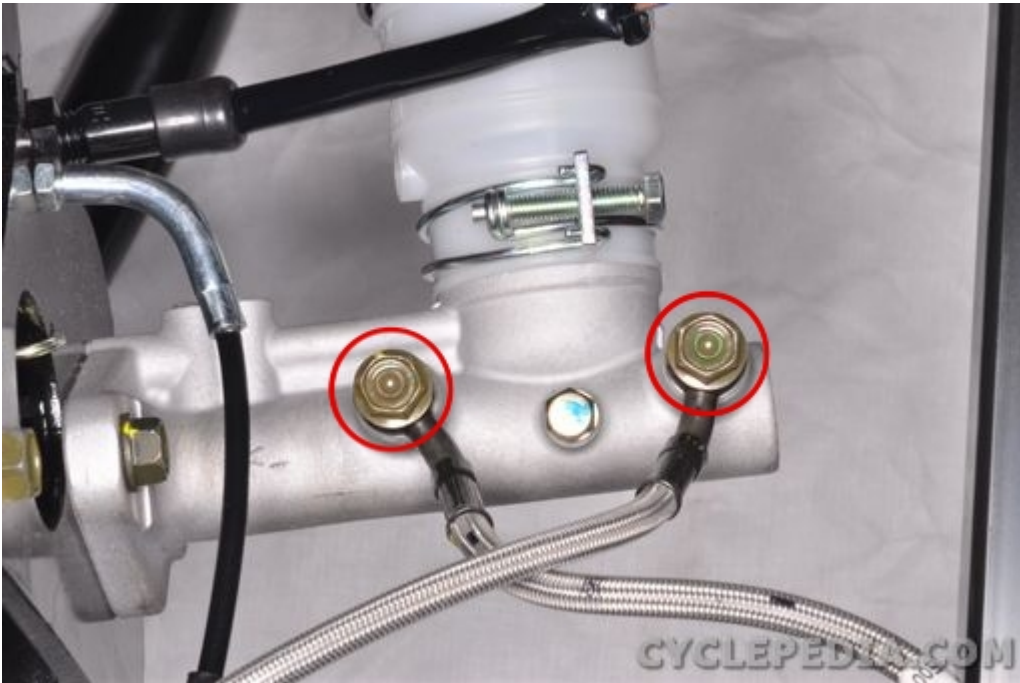
Install the master cylinder. Install the master cylinder rod pivot pin and clip onto the brake pedal.



Install the two master cylinder mounting bolts. Tighten the master cylinder bolts to specification.

ITEM	N-m	kgf-m	ft-lb
Master cylinder mounting bolt	22	2.0	15.6

Note: Do not splash brake fluid onto any rubber, plastic and coated parts. When working with brake fluid, use shop towels to cover these parts.



Connect the brake hoses to the master cylinder. Use new sealing washers with the banjo bolts. Torque the banjo bolts to specification with a 12 mm socket.

ITEM	N-m	kgf-m	ft-lb
Brake hose banjo bolt	35	3.5	25

Fill the master cylinder with fresh brake fluid from a tightly sealed container and bleed the brakes. See the [Brake Fluid](#) topic for more information.

Check that the brakes work properly before riding.

Install the front cargo box and close the hood. See the [Hood](#) topic for more information.

Install the pedal cover. See the [Pedal Cover](#) topic for more information.

Brake Pedal

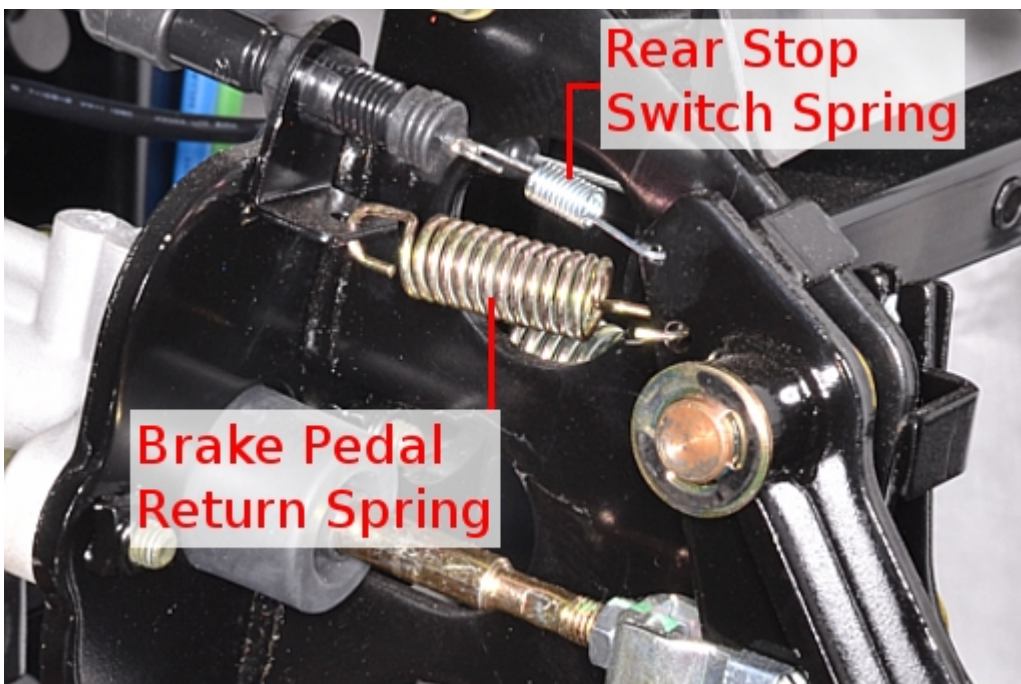
SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

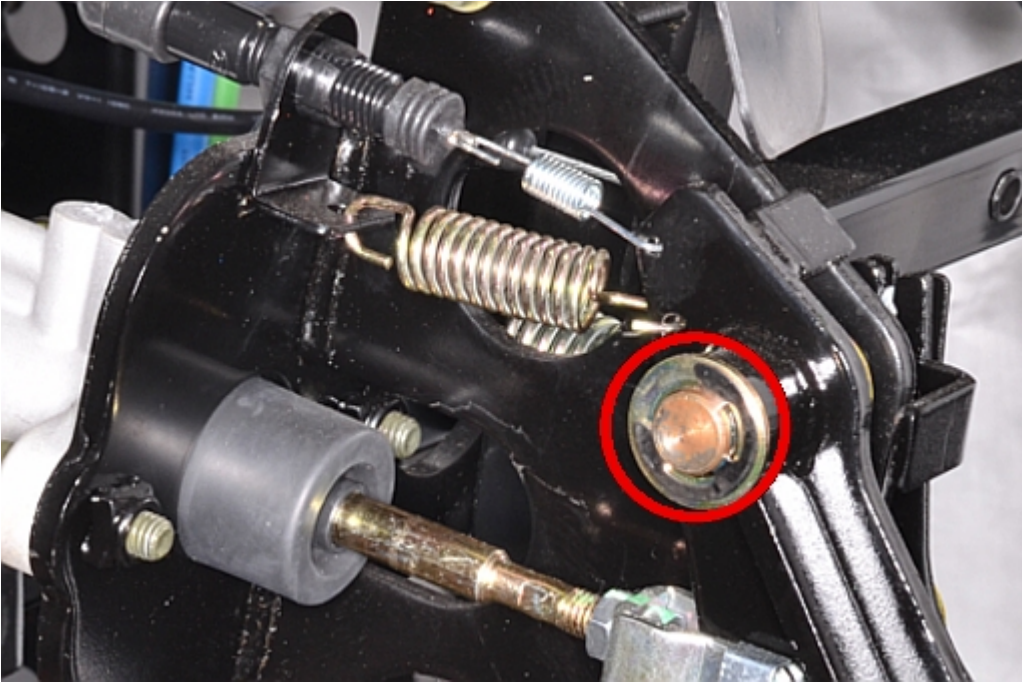
Remove the pedal cover. See the [Pedal Cover](#) topic for more information.



Remove the master cylinder rod clip and pivot pin. Separate the master cylinder rod from the brake pedal.



Remove the return spring and stop switch spring from the brake pedal.

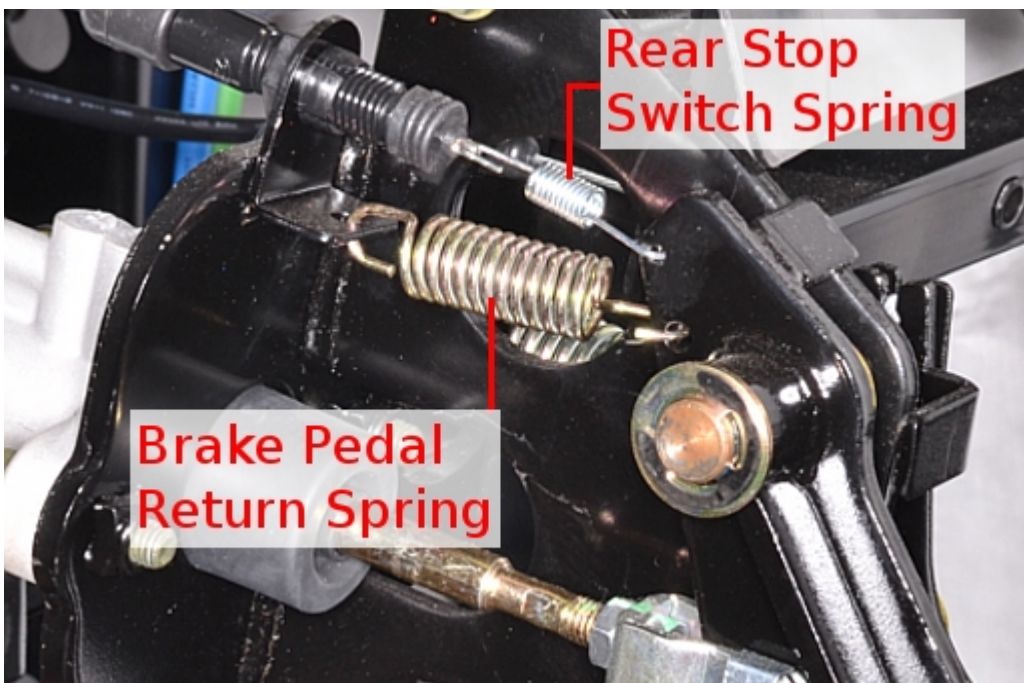


Remove the E-ring from the brake pedal. Remove the brake pedal.

Installation



Lightly coat the brake pedal pivot in grease. Install the brake pedal. Install the E-ring and be sure it fits properly.



Install the return spring and stop switch spring onto the brake pedal.



Install the master cylinder rod pivot pin and clip onto the brake pedal.

Install the pedal cover. See the [Pedal Cover](#) topic for more information.

Parking Brake

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Lever



Remove the parking brake lever screw with a #2 Phillips screwdriver.



Lift off the top handle of the parking brake lever.



Remove the push button.



Remove the push button lever.



Remove the lower handle screw with a #2 Phillips screwdriver. Remove the lower handle.



Remove the six parking brake plate screws with a #2 Phillips screwdriver.



Remove the parking brake plate.

Installation



Install the parking brake cover.



Install the six parking brake plate screws with a #2 Phillips screwdriver.



Install the lower handle. Install the lower handle screw and tighten it securely with a #2 Phillips screwdriver.



Install the push button lever.



Install the push button.



Install the top handle of the parking brake lever.



Install the parking brake lever screw and tighten it securely with a #2 Phillips screwdriver.

Adjust the parking brake if needed. See the [Rear Parking Brake Adjustment](#) topic for more information.

Rear Brake Caliper

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

NOTE: Brake fluid is a corrosive chemical and can damage paints and some plastics. Avoid contact with skin.

Removal

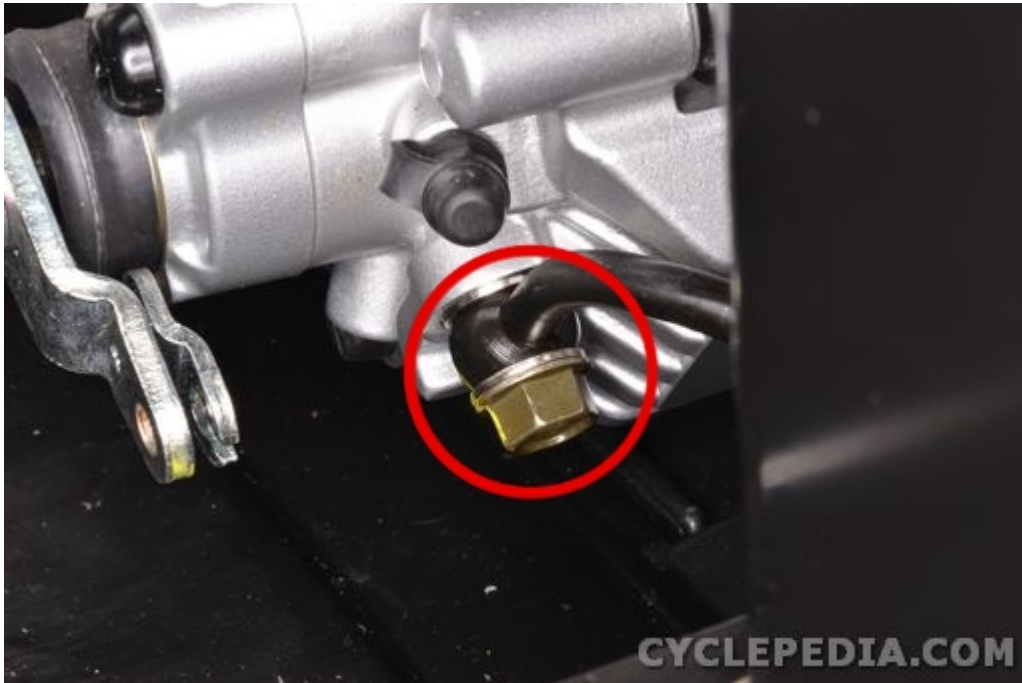
Remove the rear wheel. See the [Wheels and Wheel Hubs](#) topic for more information.

Drain the brake fluid. See the [Brake Fluid](#) topic for more information.

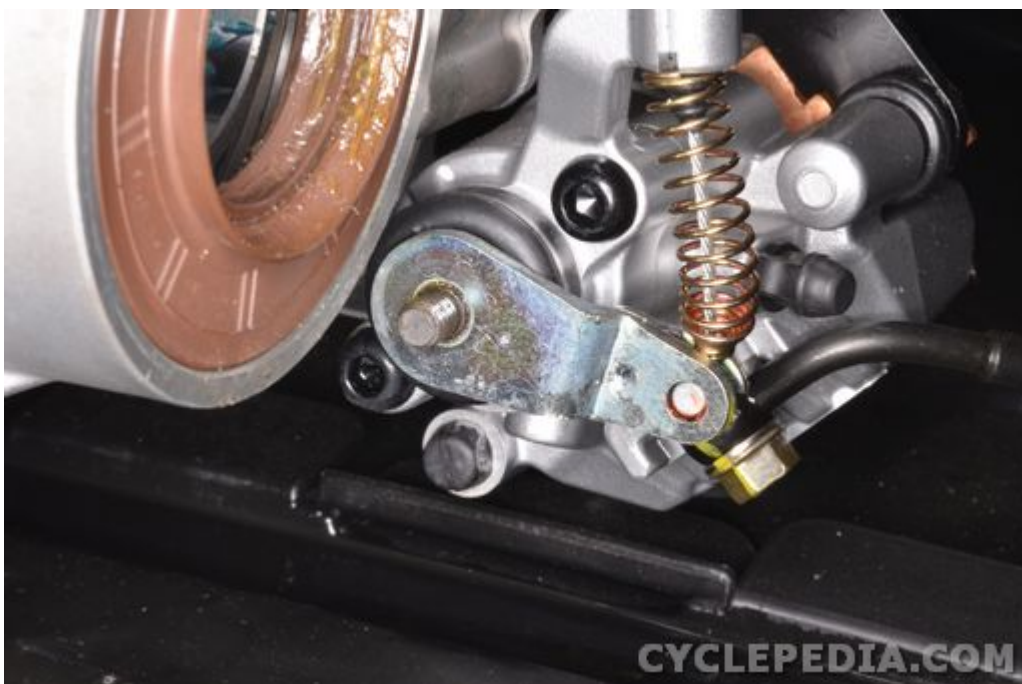
Note: If you are only replacing the brake pads it is not necessary to drain the brake fluid.



Loosen the two brake pad pins from the brake caliper with a 5 mm Allen wrench.

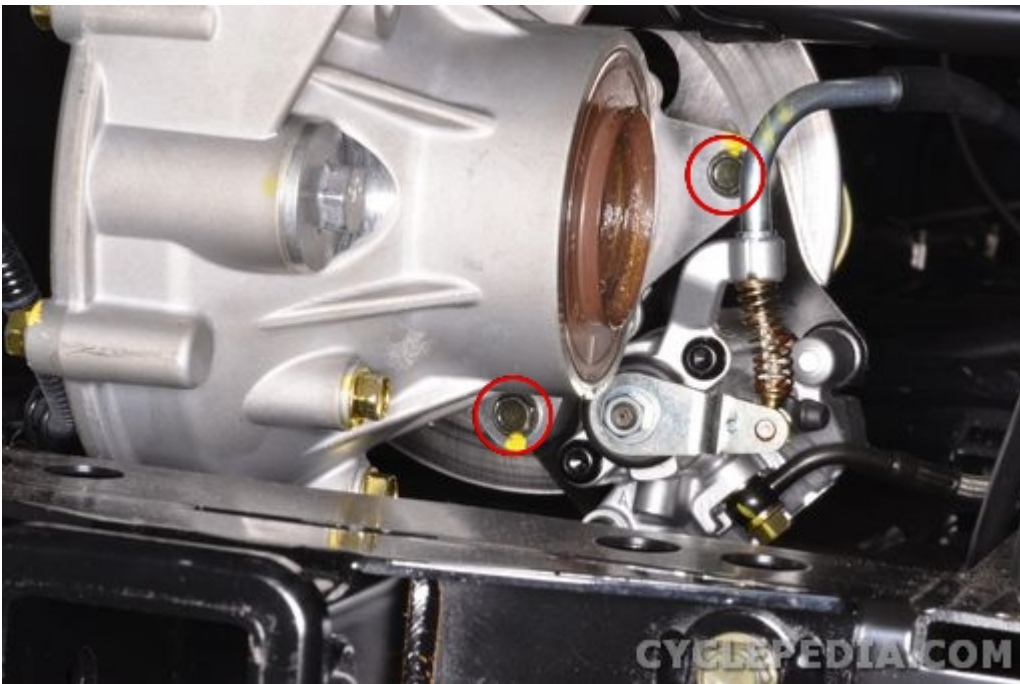


If the rear brake caliper is to be disassembled the rear brake hose must be disconnected. Loosen the brake hose banjo bolt with a 12 mm socket. Remove the banjo bolt and sealing washers.





Remove the parking brake cable.



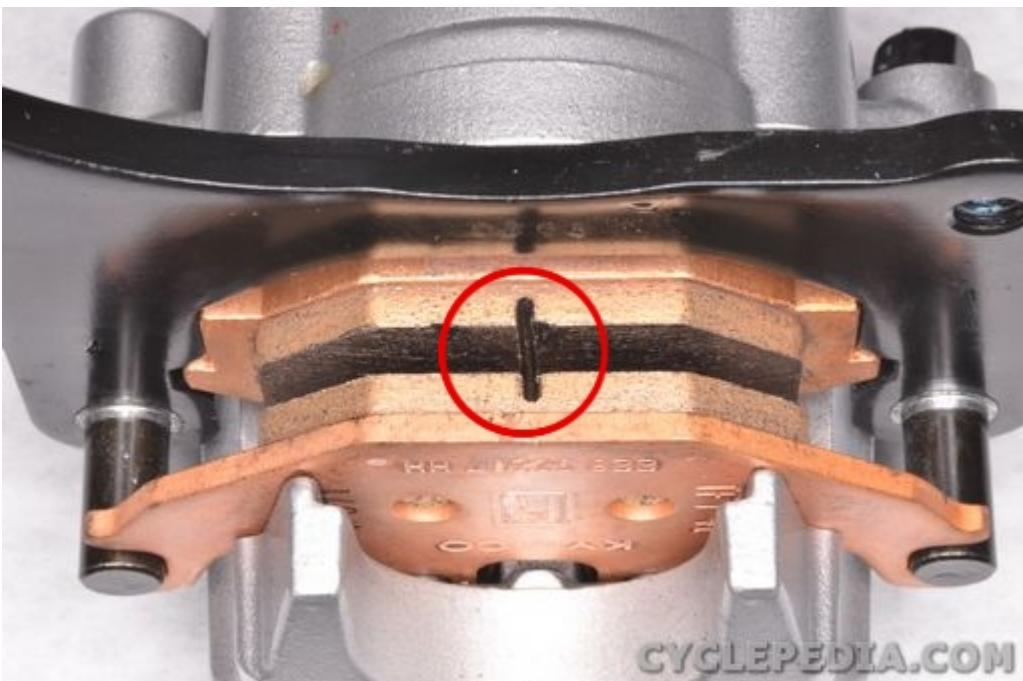
Remove the two rear caliper mounting bolts with a 12 mm socket.

Note: Do not use the brake while the caliper and brake pads are not installed on the vehicle.



Remove the rear caliper.

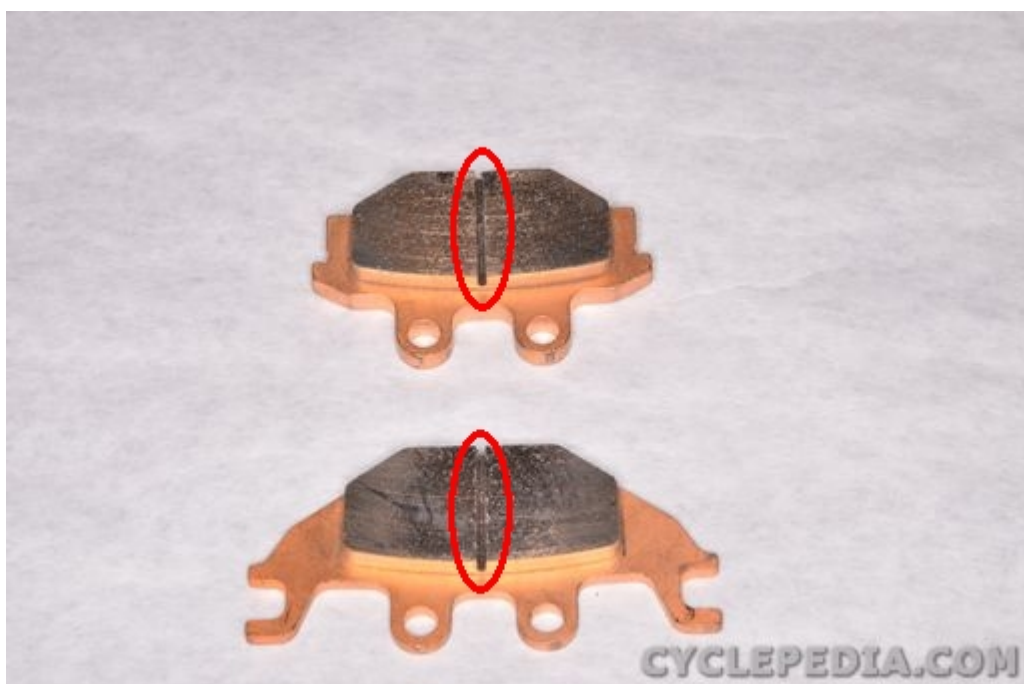
Brake Pad Replacement



Replace the brake pads if the wear indicators are worn away.



Remove the two brake pad pins from the brake caliper.





Remove the brake pads. Replace the brake pads if the wear indicators are worn away. Install the brake pads. See the [Installation](#) topic for more information.

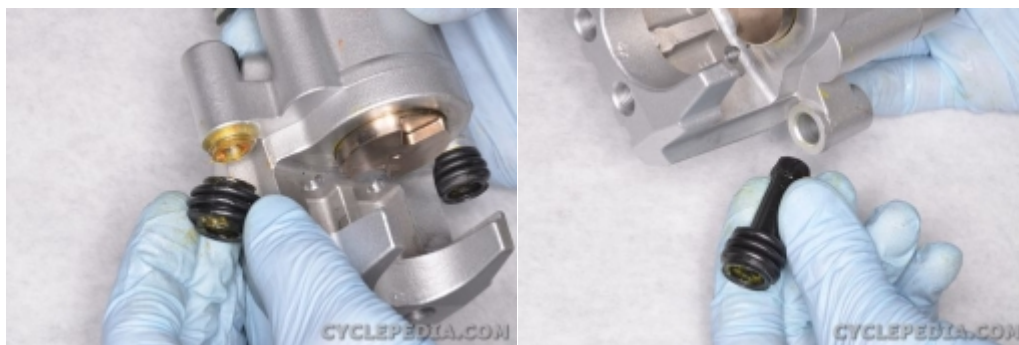
Disassembly



Remove the brake pad spring.



Remove the caliper bracket.



Remove the rubber boots. Replace if damaged.



Remove the caliper piston by twisting it counterclockwise.



Remove the seals using a small pick. Discard the old seals.

Inspection



Check the brake caliper bore for any scratches, damage or excessive wear. Check the drive shaft and shaft guide for wear or damage. Clean the brake caliper bore with DOT 4 brake fluid. Do not dry off with a rag.



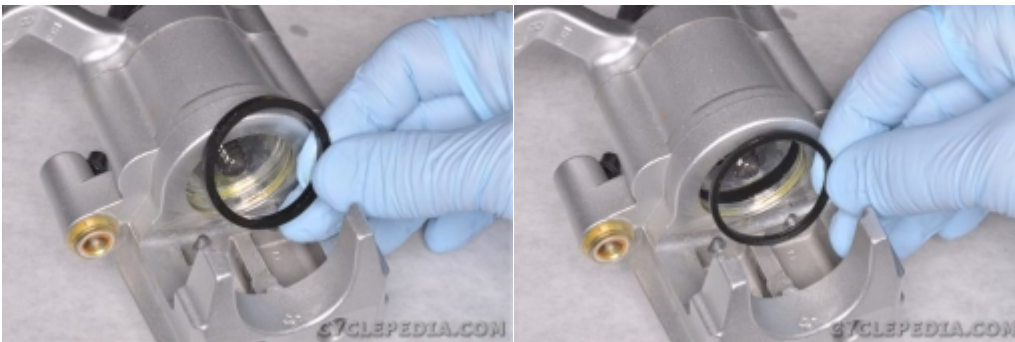
Check the piston for any scratches, damage or excessive wear. Clean the piston with DOT 4 brake fluid. Do not dry off with a rag.



Check the brake caliper holder for damage.

Assembly

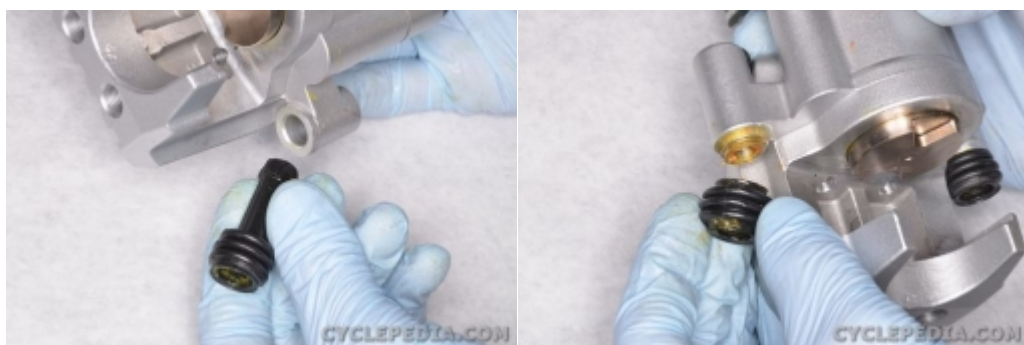
Note: Coat the new seals with DOT 4 brake fluid.



Install new seals into the caliper bore as shown.



Coat the caliper bore and piston with DOT 4 brake fluid. Install the piston into the caliper bore by twisting it clockwise.



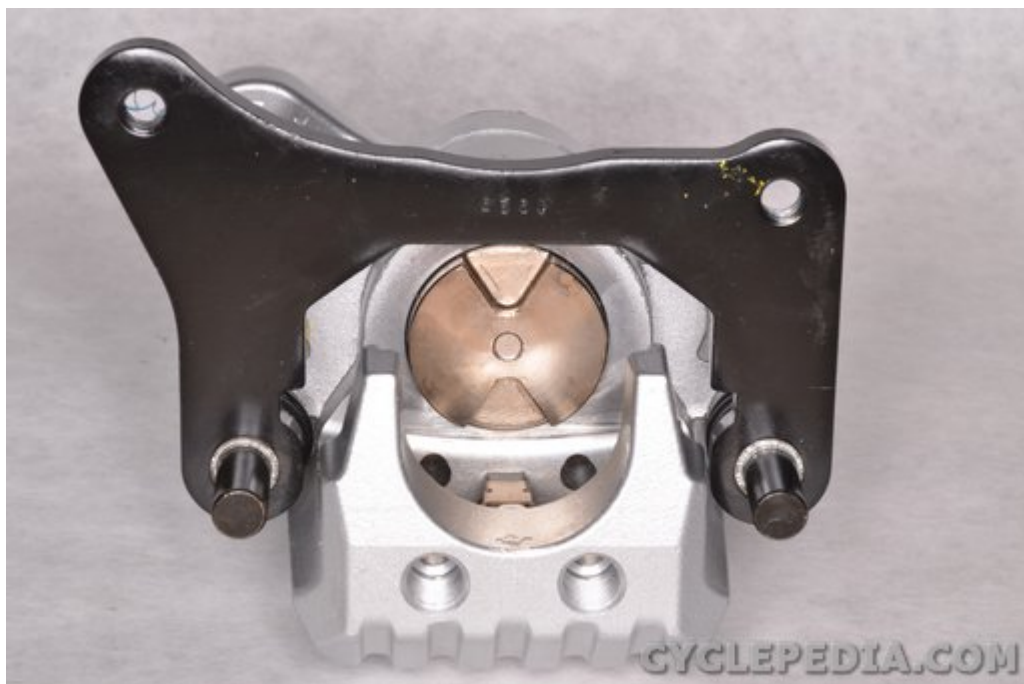
Install the rubber boots.



Apply silicone grease to the caliper bracket pins. Install the caliper bracket.



Install the brake pad spring.

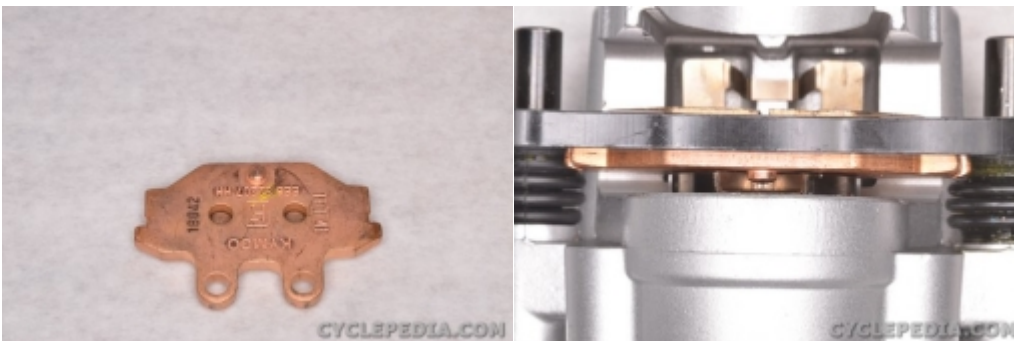


Make sure the rear brake caliper piston grooves are positioned as shown.

Installation



Install the brake pads.



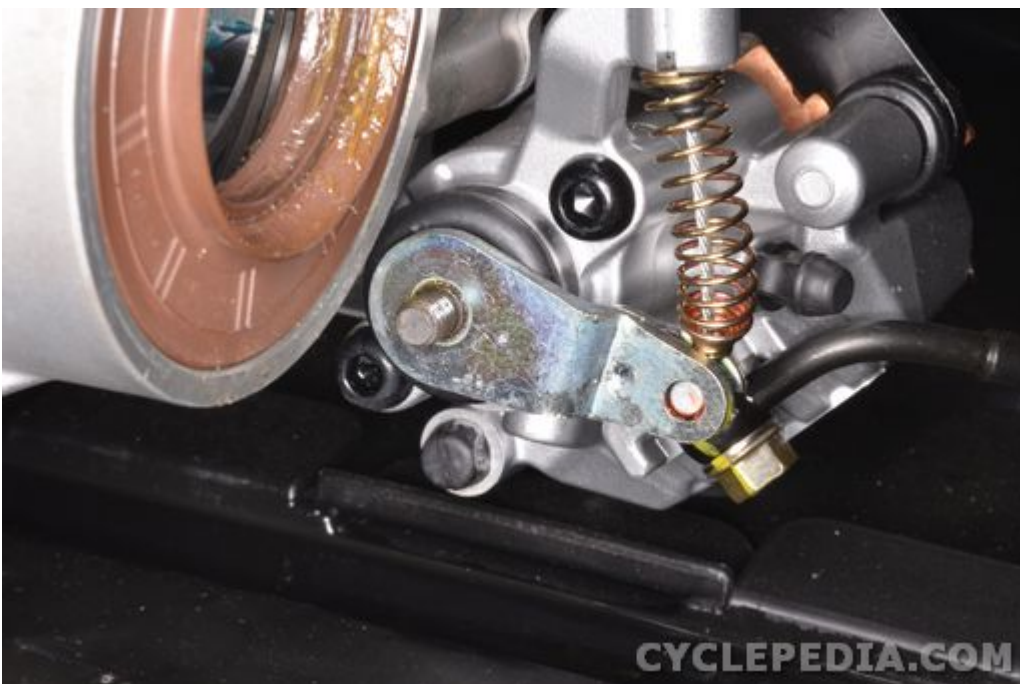
Make sure the pin on the inner brake pad fits into the piston groove as shown.



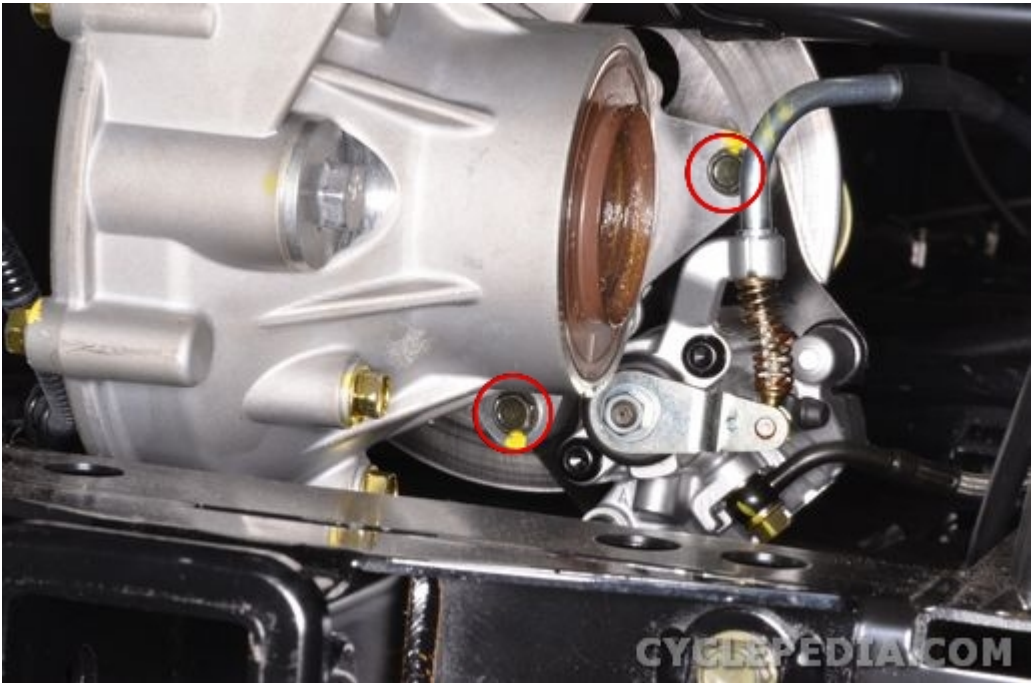
Install the two the brake pad mounting pins into the caliper and through the brake pads.



Install the brake caliper.

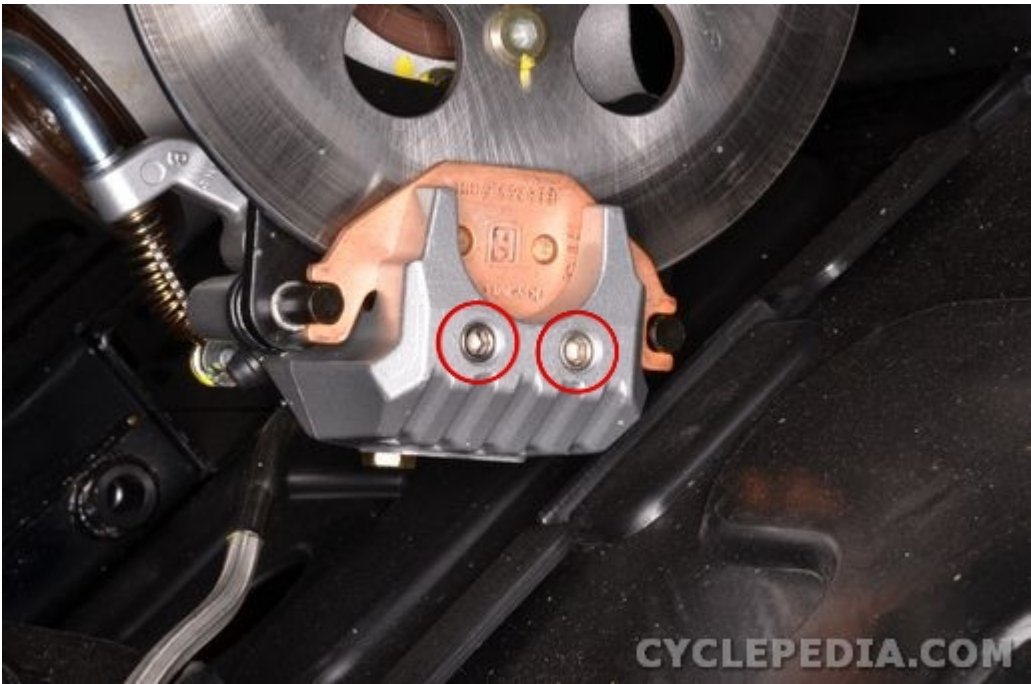


Install the parking brake cable.



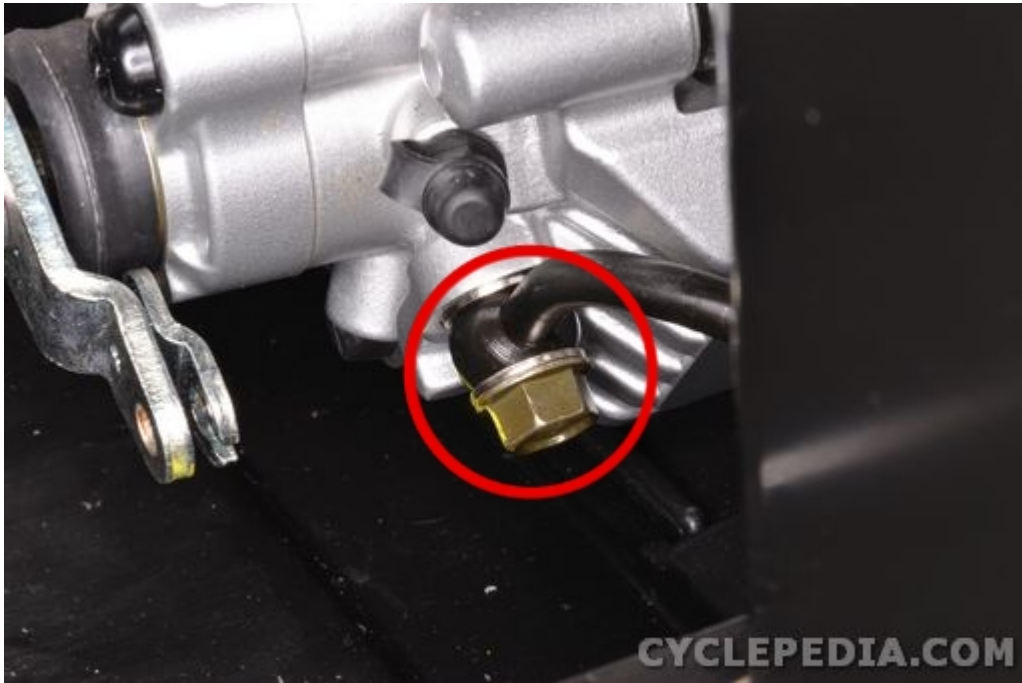
Install the two brake pad mounting bolts and tighten them to specification with a 12 mm socket.

ITEM	N-m	kgf-m	ft-lb
Brake caliper mounting bolt	32	3.2	25



Tighten the pad pins to specification with a 5 mm Allen wrench.

ITEM	N-m	kgf-m	ft-lb
Brake pad mounting pin	18	1.8	13



Install new sealing washers and tighten the brake hose banjo bolt to specification with a 12 mm socket.

ITEM	N-m	kgf-m	ft-lb
Brake hose banjo bolt	35	3.5	25

Install the rear wheel. See the [Wheels and Wheel Hubs](#) topic for more information.

Fill the master cylinder reservoir with brake fluid and bleed the brakes. See the [Brake Fluid](#) topic for more information.

Adjust the rear parking brake. See the [Rear Parking Brake Adjustment](#) topic for more information.

Check that the brakes work properly before riding.

Rear Brake Disc

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Inspection

Check the rear brake disc for damage or excessive wear.



Measure the brake disc thickness with a micrometer. Replace the rotor if it is below the service limit.

Special Tool-

Micrometer (0-25 mm): 09900-20205

ITEM	LIMIT
Brake disc thickness	4.0 mm (0.12 in)



Using a dial gauge and stand measure the disc brake runout. Replace the rotor if it is below the service limit.

Special Tool-

Dial Gauge (1/100 mm): 09900-20607

Magnetic Stand: 09900-20701

ITEM	LIMIT
Brake disc runout	0.30 mm (0.012 in)

Removal



Remove the rear final drive. See the [Rear Final Drive Gear](#) topic for more information.





Remove the five rear brake disc bolts with a 6 mm Allen socket. Use an impact driver if necessary.

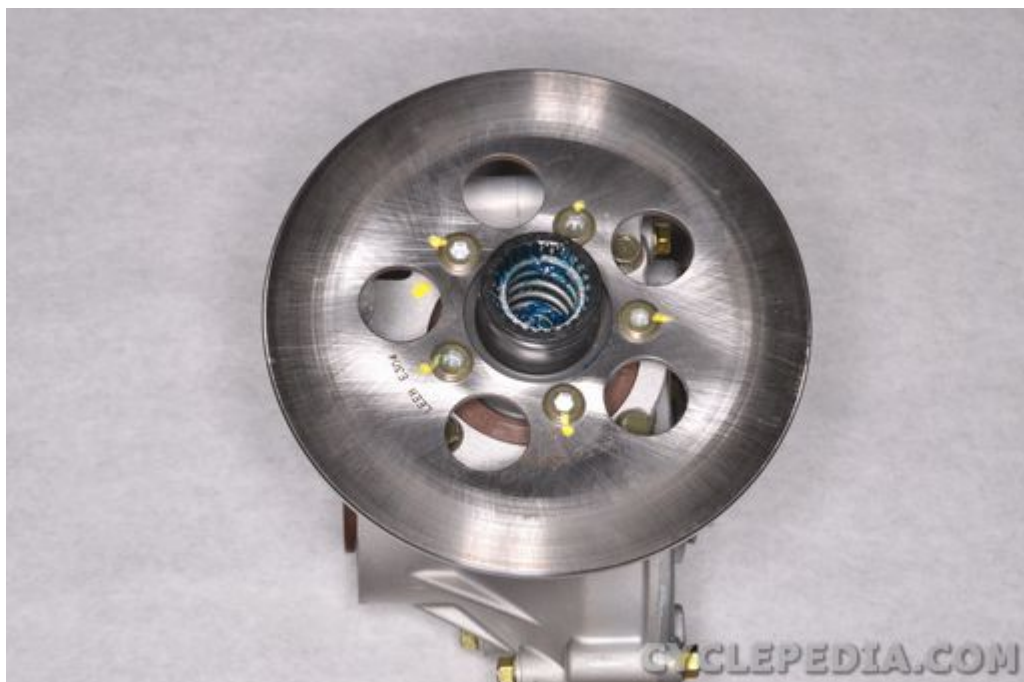


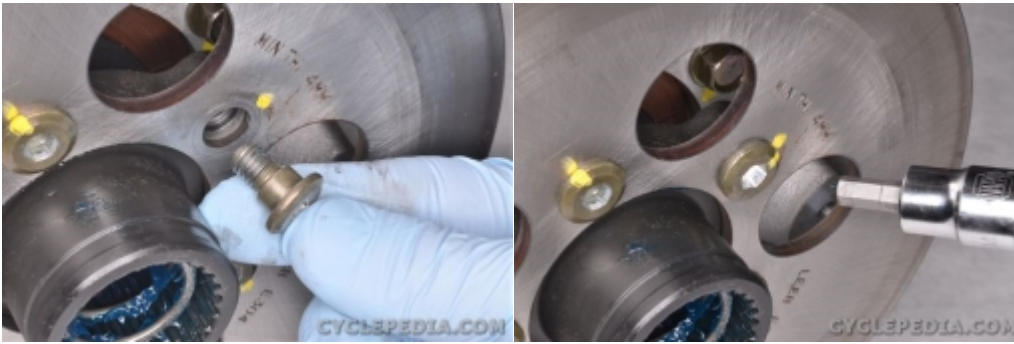
Remove the rear brake disc from the brake disc holder.

Installation



Install the rear brake disc on the brake disc holder.





Install the five rear brake disc bolts and tighten to specification with a 6 mm Allen socket.

ITEM	N-m	kgf-m	ft-lb
Brake disc bolt	35	3.5	25.2



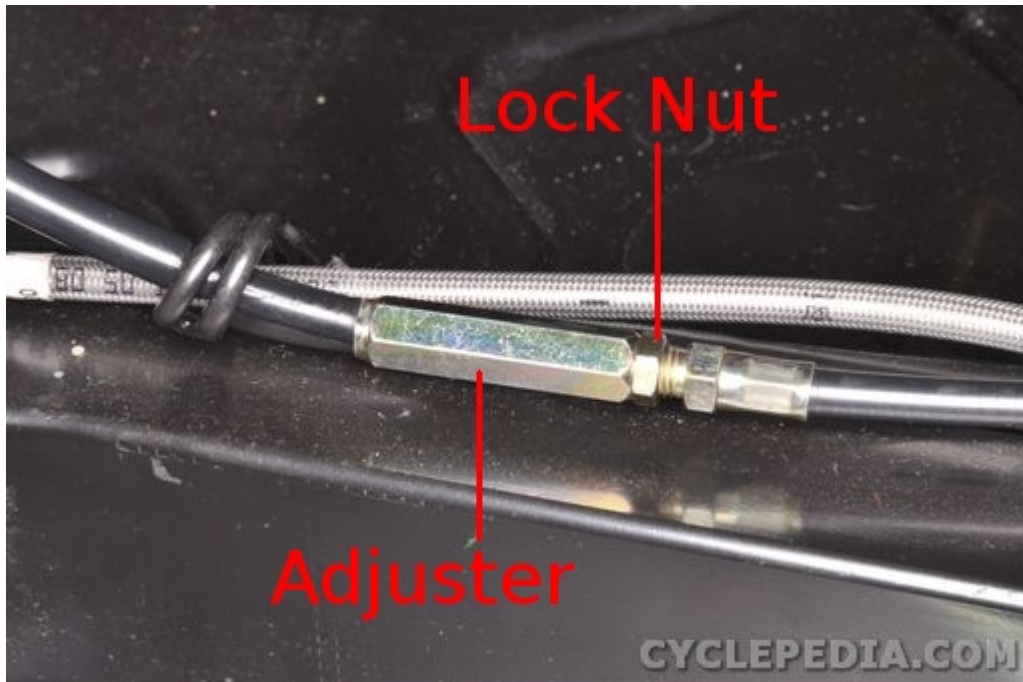
Install the rear final drive. See the [Rear Final Drive Gear](#) topic for more information.

Check that the brakes work properly before riding.

Rear Parking Brake Adjustment

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Make sure the parking brake doesn't drag when the lever is released, and the parking brake holds when the lever is applied. Adjust the inline cable adjuster as needed.



Trace the cable up from the parking brake until you reach the adjuster. Loosen the adjuster lock nut with a 10 mm wrench. Turn the adjuster out to decrease free-play and turn it in to increase free-play. Always check that the parking brake operates properly.

10.Wheels

This chapter covers the location and servicing of the wheel components.

1.Wheel Specifications	10-2
2.Wheels	10-3
3.Wheel Bearings	10-24

TROUBLESHOOTING

Front wheel wobbling

- Bent rim
- Excessive wheel bearing play
- Bent spoke plate
- Faulty tire
- Improperly tightened axle nut

Rear wheel wobbling

- Bent rim
 - Faulty tire
 - Axle not tightened properly
-

General Specifications

Tire pressure	1 Rider
Front	0.7 kgf/cm ² (10 psi)
Rear	0.98 kgf/cm ² (14 psi)
Tire size: Front	25 X 8 - 12
Tire size: Rear	25 X 10 - 12

Item		Standard mm (in)	Service Limit
Front wheel rim run out	Radial	-	2 (0.08)
	Axial	-	2 (0.08)
Tie rod length		379.75 ± 0.25 (15.19 ± 0.01)	-
Rod-end (tie rod) angle		180°	-

Item			Standard	Service Limit
Rear wheel	Rim run out	Radial	-	2 mm (0.08 in)
		Axial	-	2 mm (0.08 in)

Item	Standard	Service Limit
Brake disk thickness	3.8 - 4.2 mm (0.152 - 0.168 in)	3 mm (0.12 in)
Brake disk runout	-	0.3 mm (0.012 in)

Wheels and Wheel Hubs

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Front Wheel Removal



Brake the wheel nuts loose a 17 mm socket.



Use a jack to raise the front wheels off the ground.



Remove the four wheel nuts. Remove the front wheel.

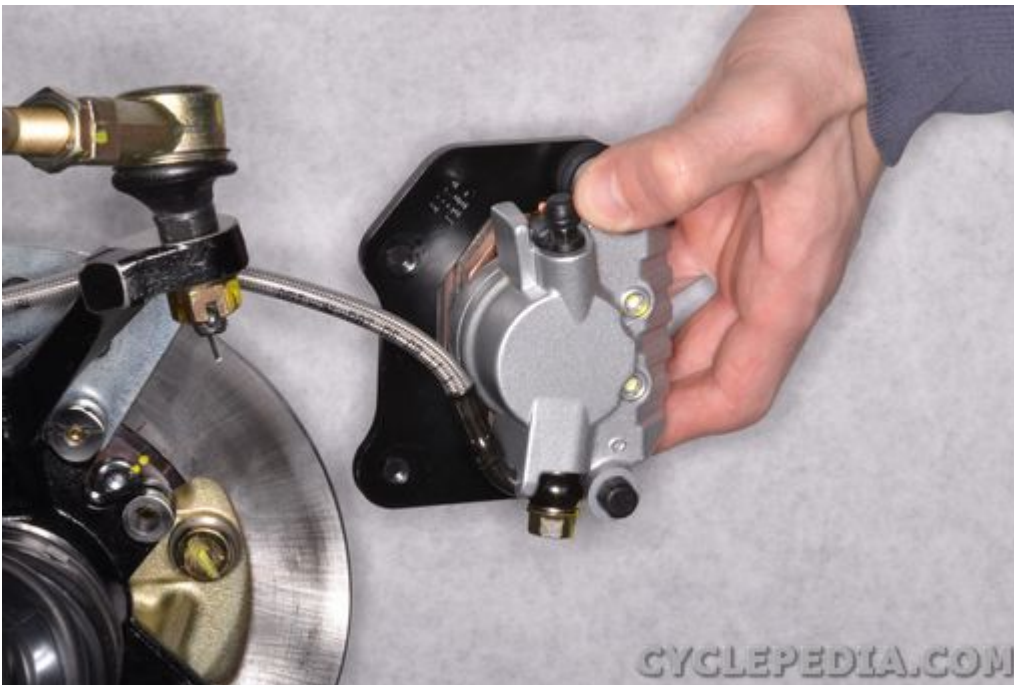
Front Wheel Hub Removal



Remove the cotter pin and discard it.



Apply the front brakes and remove the axle nut with a 30 mm socket.



Remove the caliper. See the [Front Caliper](#) topic for more information.

Note: Do not use the front brake while the caliper and brake pads are not installed on the vehicle.



Slide off the wheel hub assembly.



To remove the brake disc take out the four disc brake bolts with a 6 mm Allen wrench. Separate the disc brake from the wheel hub.

Installation

Front Wheel Hub Installation



Install the disc brake onto the wheel hub. Install four new bolts to specification with a 6 mm Allen wrench.

ITEM	N-m	kgf-m	ft-lb
Brake disc bolt	35	3.5	25.2



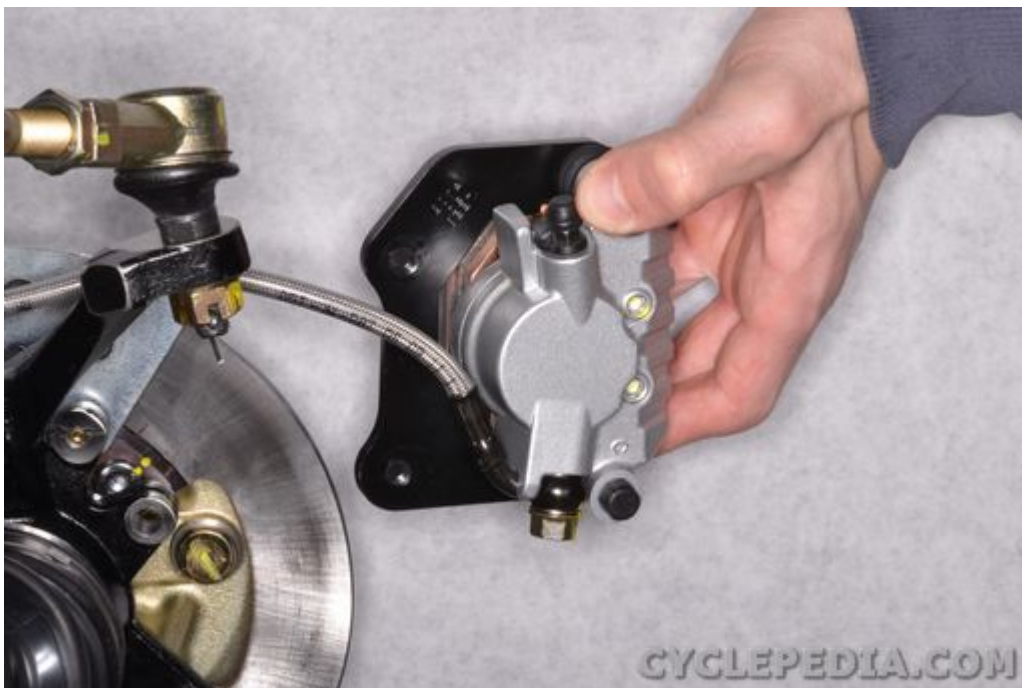
Apply grease to the wheel hub splines.



Slide on the wheel hub assembly.



Thread on the wheel hub nut.



Install the caliper. See the [Front Caliper](#) topic for more information.



Apply the front brakes and tighten the axle nut to specification with a 30 mm socket.

ITEM	N-m	kgf-m	ft-lb
Front axle hub nut	200	20	145

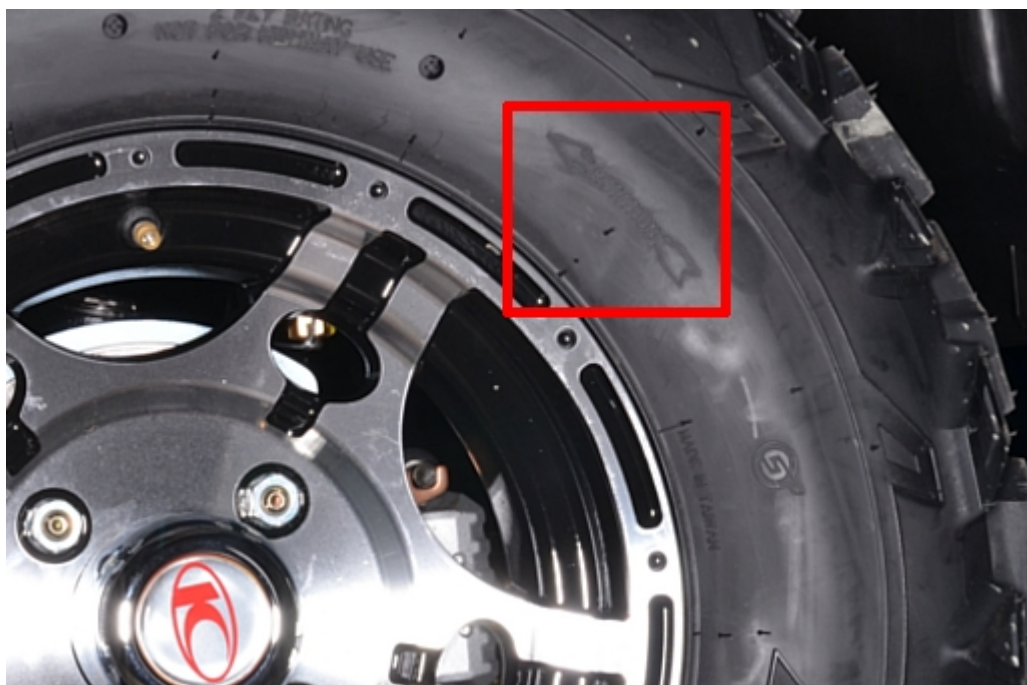


Install a new cotter pin and bend it to secure the nut.

Front Wheel Installation



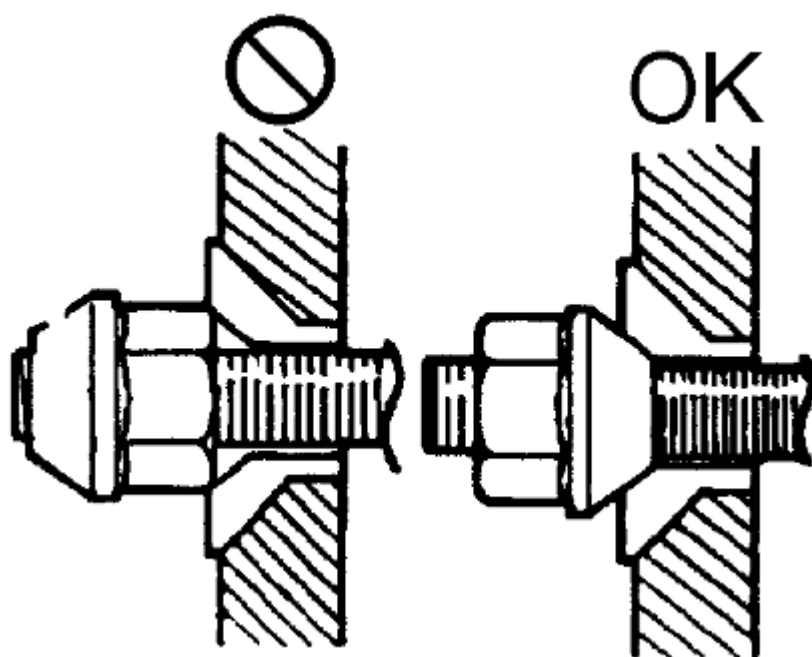
Place the wheel on the hub.



Make sure the tire rotation direction is correct. The arrow indicates the direction in which the tire should turn going forward.



Thread on the wheel nuts with their curved side facing toward the wheel.



The wheel nuts can only be installed as shown.

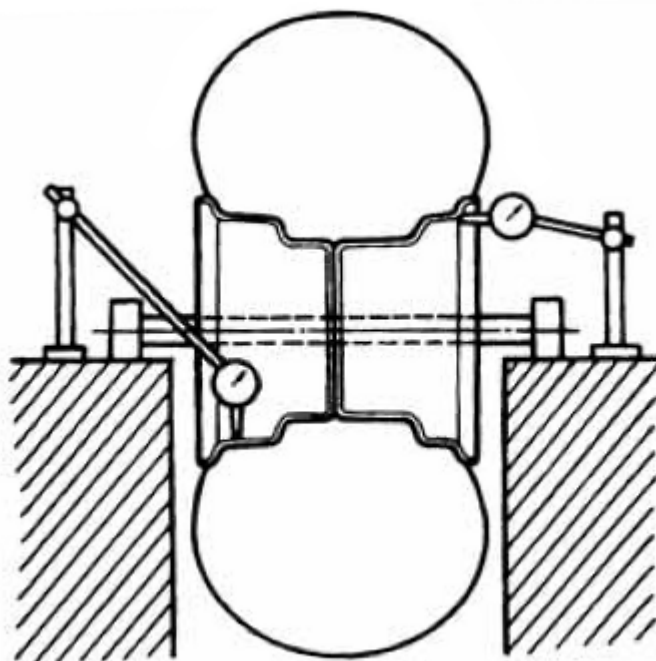


Tighten the wheel nuts with a 17 mm socket. Lower the front wheels to the ground and torque the nuts to specification.

ITEM	N-m	kgf-m	ft-lb
Front wheel and front wheel hub	55	5.5	39

Wheel Inspection

Check the wheels for damage.



Measure the wheel runout with a wheel stand and dial gauge. The lateral and vertical runout limits are both 2 mm (0.08 in).

Rear Wheels

Rear Wheel Removal



Brake the wheel nuts loose a 17 mm socket.



Use a jack to raise the rear wheels off the ground.



Remove the four wheel nuts. Remove the rear wheel.

Rear Wheel Hub Removal



Remove the cotter pin and discard it.



Hold the brake and loosen the wheel hub nut with a 30 mm socket.



Remove the wheel hub nut.



Slide off the rear wheel hub. Inspect the hub for damage.



Inspect the rear wheel hub dust seal in the axle housing. Replace it as needed.

Rear Wheel Hub Installation



Apply lightweight lithium-soap base grease onto the wheel hub splines, rear axle splines and dust seal of the axle housing.



Fit the rear wheel hub onto the axle.

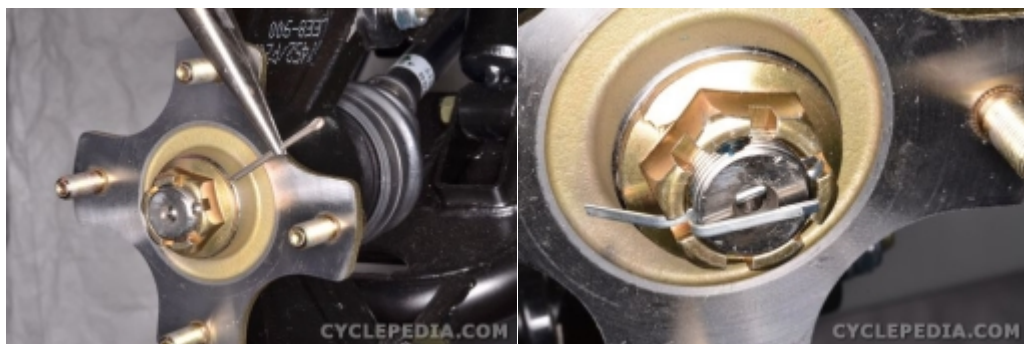


Thread on the rear wheel hub nut.



Hold the rear brake and tighten the hub nut to specification with a 30 mm socket.

ITEM	N-m	kgf-m	ft-lb
Rear wheel hub nut	200	20	145

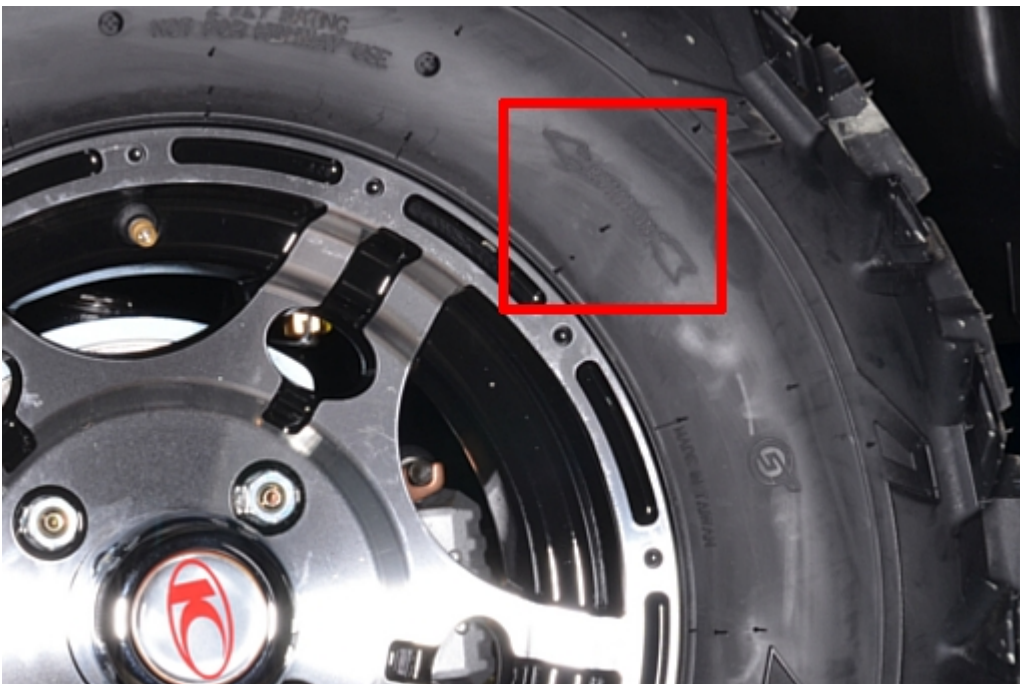


Install a new cotter pin and bend it to secure the nut.

Rear Wheel Installation



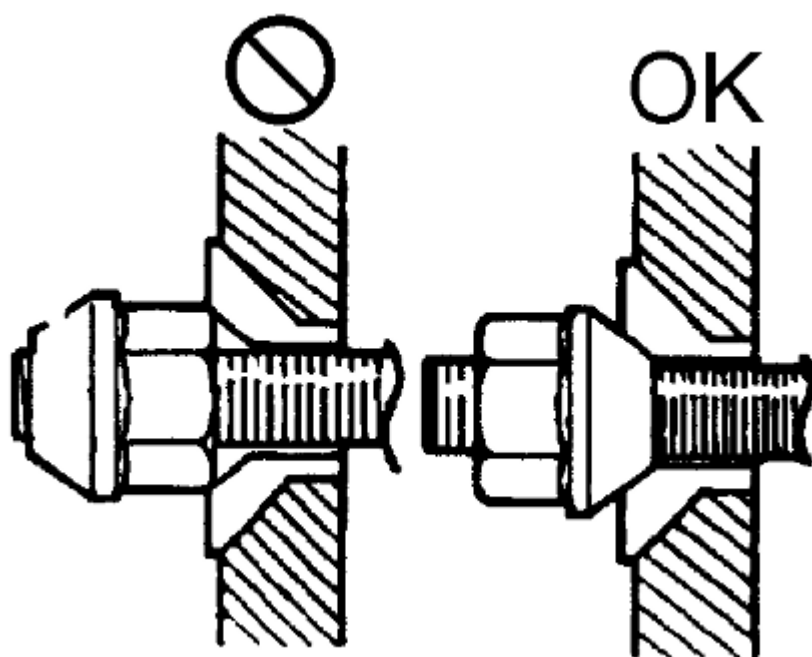
Place the wheel on the hub.



Make sure the tire rotation direction is correct. The arrow indicates the direction in which the tire should turn going forward.



Thread on the wheel nuts with their curved side facing toward the wheel.



The wheel nuts can only be installed as shown.



Tighten the wheel nuts with a 17 mm socket. Lower the rear wheels to the ground and torque the nuts to specification.

ITEM	N-m	kgf-m	ft-lb
Rear wheel hub nut	55	5.5	39

Wheel Bearings

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Front Bearings and Seals

Removal

Remove the front wheels. See the [Wheels and Wheel Hubs](#) topic for more information.

Remove the steering knuckle. See the [Steering Knuckles](#) topic for more information.

Disassembly



Remove the outer dust seal from the steering knuckle and discard it.



Remove the inner dust seal from the steering knuckle and discard it.



Check that the bearings rotate smoothly and do not bind. Replace as needed.



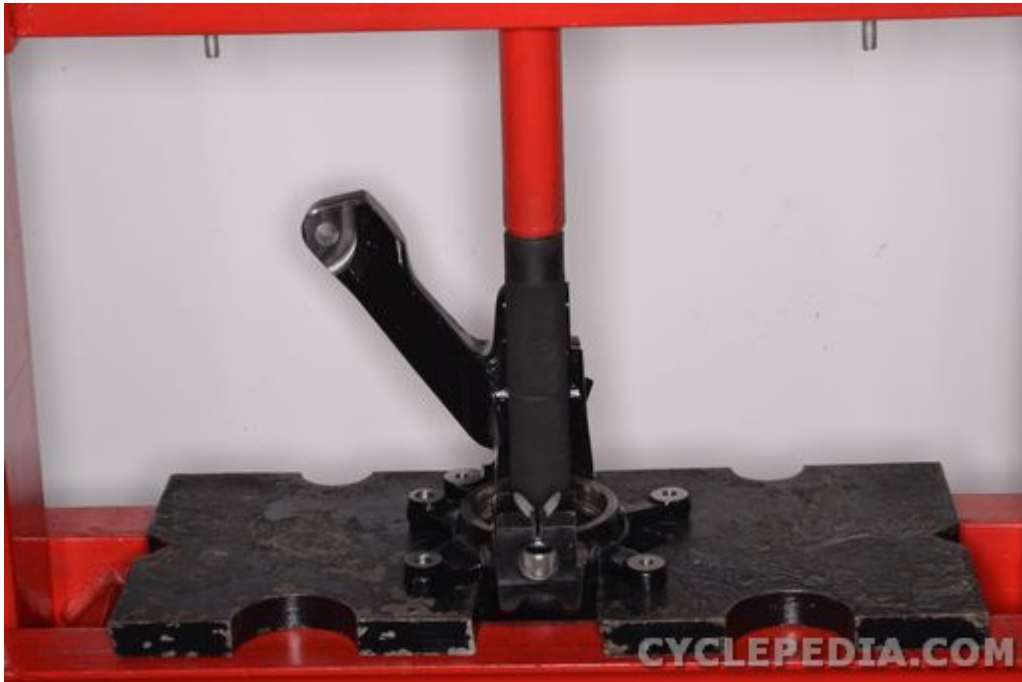
Remove the snap ring with a pair of snap ring pliers.

Driver Method



Drive the bearing out with a bearing driver tool from the inside out. Heat the area around the bearing to aid in removal.

Press Out Method



Press out the bearing with a press if available.



Remove the bearing and replace it with a new one.

Assembly

Place the new bearing in a freezer for at least a half hour before installation. Heat the knuckle.



Install the new bearing using one of the two methods below.

Drive In Method



Drive in a new bearing with a suitable driver with the same outside diameter as the bearing. The manufactures markings on the bearing must face out.

Press In Method



Press the new bearing in by its outside diameter.



Install the snap ring with a pair of snap ring pliers. Be sure it fits securely into its groove.



Apply lightweight lithium-soap base grease to the lips of the new dust seals. Install the dust seal with a suitable driver with the same outside diameter as the seal.

Special Tool-

Oil Seal and Bearing Driver: A120E00014

Installation

Install the steering knuckle. See the [Steering Knuckles](#) topic for more information.

Install the front wheels and hubs. See the [Wheels and Wheel Hubs](#) topic for more information.

Check the toe-in. See the [Toe-In Adjustment](#) topic for more information.

Rear Bearings

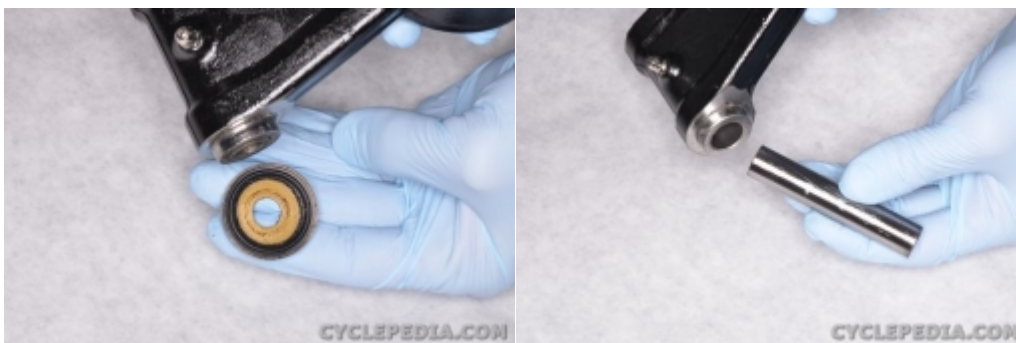
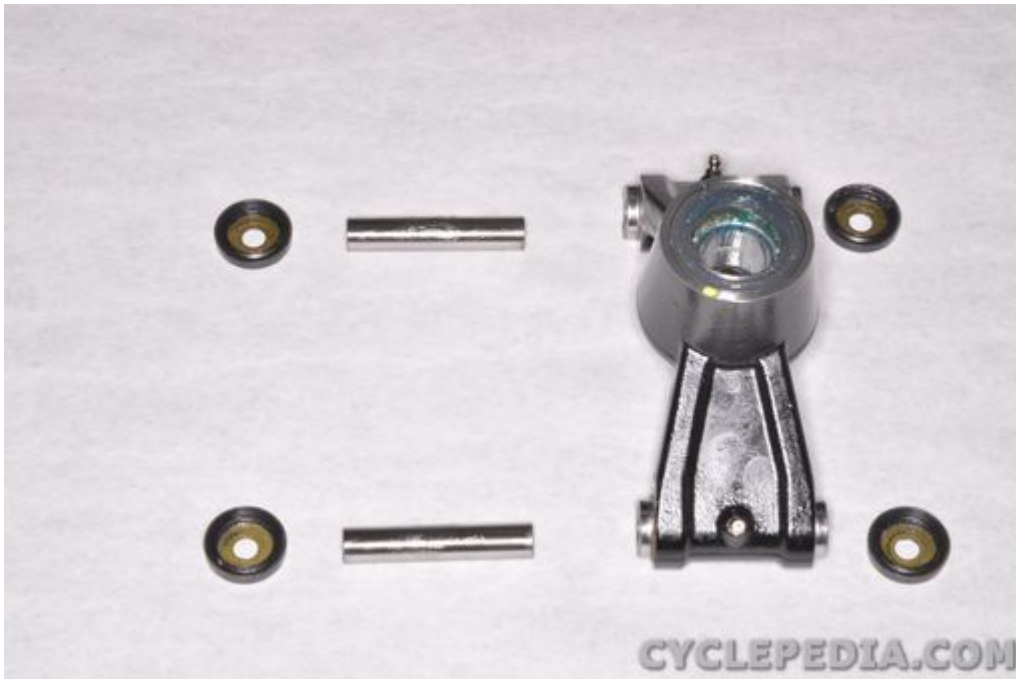
Remove the rear wheels and hubs. See the [Wheels and Wheel Hubs](#) topic for more information.

Remove the shock absorbers. See the [Rear Shock Absorbers](#) topic for more information.

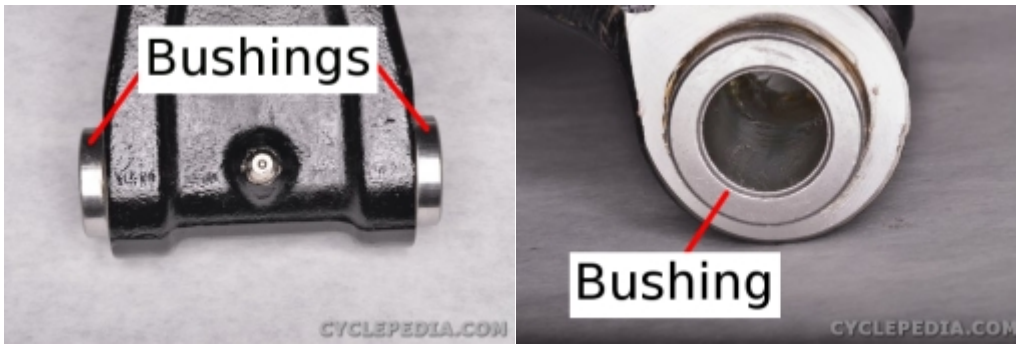
Remove the rear knuckle. See the [Rear Suspension Arms](#) topic for more information.



Inspect the half shafts and wheel hub knuckle dust seals for damage and deterioration.



Remove the side dust seals and the pivot collars. Inspect the side dust seals and collars. Replace these components as needed.



Inspect the bushings and replace them as needed.

Knuckle Bearing Replacement



Inspect the knuckle bearing by turning it with a finger if the bearing doesn't turn smoothly it must be replaced.



Remove the wheel hub side dust seal.



Remove the half shaft side dust seal.



Remove the bearing snap ring with snap ring pliers.



Drive out the bearing from the half shaft side of the knuckle. Heat the knuckle around the bearing to aid removal. Use a press if available.

Special Tool -

Oil Seal and Bearing Driver: A120E00014

Place the new knuckle bearing in a freezer for at least a half hour before installation.



Heat the knuckle around the bearing cavity to aid installation. Drive in the new knuckle bearing from the wheel hub side of the knuckle.



Install the bearing retainer snap ring into the groove with snap ring pliers.





Lubricate the dust seals with lightweight lithium-soap bases grease to the lips of the dust seals. Drive in the dust seals with a suitable driver with the same outside diameter as the dust seals.

Install the rear knuckle. See the [Rear Suspension Arms](#) topic for more information.

Install the shock absorbers. See the [Rear Shock Absorbers](#) topic for more information.

Install the rear wheels. See the [Wheels and Wheel Hubs](#) topic for more information.

11.Steering

This chapter covers the location and servicing of the steering components.

1.Steering Knuckles	11-2
2.Steering Rack	11-21
3.Steering Shaft	11-30
4.Steering Wheel	11-36
5.EPS (Electrical Power Steering)	11-37

Steering Knuckles

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the front wheels and hubs. See the [Wheels and Wheel Hubs](#) topic for more information.



Free the brake hose from the clamp.



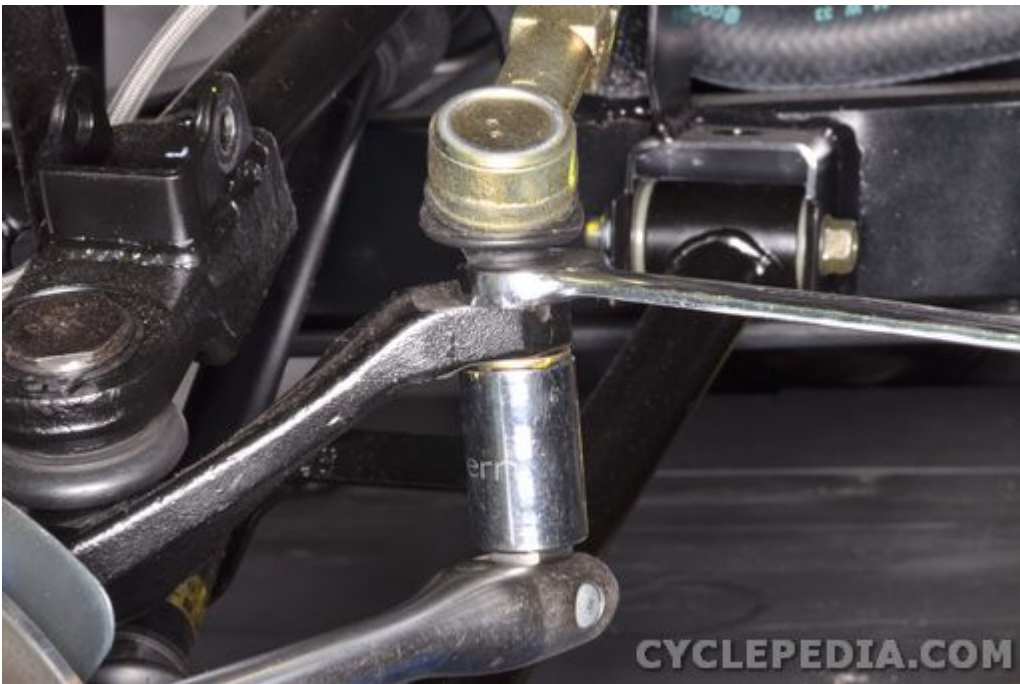
Remove the three brake disc protection plate bolts with a 10 mm socket.



Remove the brake disc protection plate.



Remove the cotter pin from the tie-rod nut and discard it.



Hold the tie-rod joint with a 14 mm wrench and loosen the nut with a 17 mm socket.



Remove the tie-rod end nut and washer.



Remove the tie-rod end from the steering knuckle.

Note: Use a ball joint remover if needed.



Remove the two steering knuckle bolts with a 14 mm socket.



Remove the steering knuckle from the upper and lower A-arms.

Note: Use a ball joint remover if needed.

To remove the front drive shafts see the [Front Drive Shafts](#) topic.

Inspection



Inspect the brake disc protection plate for damage and replace if needed.

Bearings and Seals

Disassembly





Remove the outer dust seal from the steering knuckle and discard it.



Remove the inner dust seal from the steering knuckle and discard it.



Check that the bearings rotate smoothly and do not bind. Replace as needed.



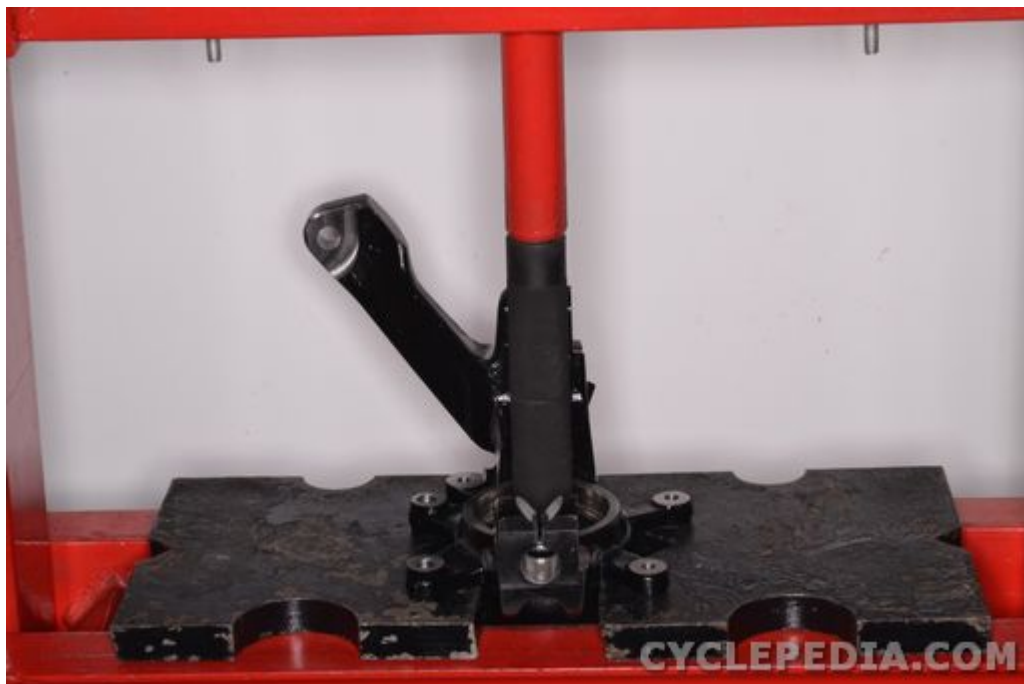
Remove the snap ring with a pair of snap ring pliers.

Driver Method



Drive the bearing out with a bearing driver tool from the inside out. Heat the area around the bearing to aid in removal.

Press Out Method



Press out the bearing with a press if available.



Remove the bearing and replace it with a new one.

Assembly

Note: Place the new bearing in a freezer for at least a half hour before installation. Heat the knuckle.



Install the new bearing using one of the two methods below.

Drive In Method



Drive in a new bearing with a suitable driver with the same outside diameter as the bearing. The manufactures markings on the bearing must face out.

Press In Method



Press the new bearing in by its outside diameter.



Install the snap ring with a pair of snap ring pliers. Be sure it fits securely into its groove.



Apply lightweight lithium-soap base grease to the lips of the new dust seals. Install the dust seal with a suitable driver with the same outside diameter as the seal.

Special Tool-

Oil Seal and Bearing Driver: A120E00014

Installation



Install the steering knuckle onto the drive shaft, upper and lower A-arms.



Install the two steering knuckle bolts and tighten to specification with a 14 mm socket.

ITEM	N-m	kgf-m	ft-lb
Steering knuckle bolt	48	4.8	34



Install the tie-rod end into the steering knuckle.



Install the tie-rod end nut and washer.



Hold the tie-rod joint with a 14 mm wrench and tighten the nut to specification with a 17 mm socket.

ITEM	N-m	kgf-m	ft-lb
Tie-rod end nut	35	3.5	25



Install a new cotter pin onto the tie-rod joint nut.



Install the brake disc protection plate.



Install the three brake disc protection plate bolts and tighten them securely with a 10 mm socket.



Secure the brake hose with the clamp.

Install the front wheels and hubs. See the [Wheels and Wheel Hubs](#) topic for more information.

Check the toe-in. See the [Toe-In Adjustment](#) topic for more information.

Steering Rack and Tie Rods

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the front wheels. See the [Wheels and Wheel Hubs](#) topic for more information.



Remove the cotter pin from the tie-rod nut and discard it.



Hold the tie-rod joint with a 14 mm wrench and loosen the nut with a 17 mm socket.



Remove the tie-rod end nut and washer.



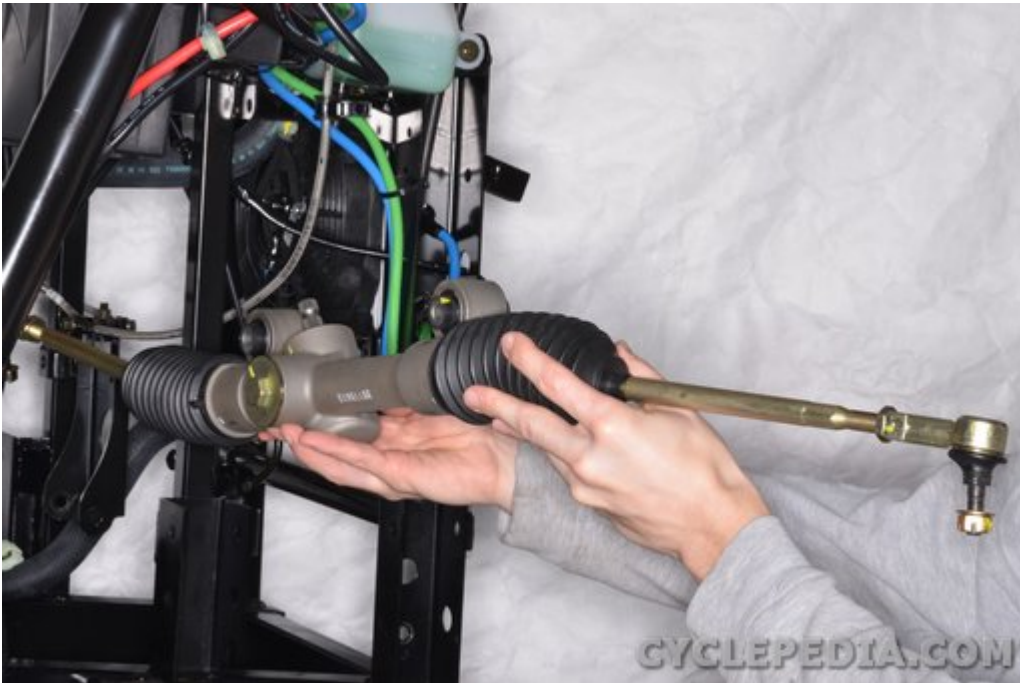
Remove the tie-rod end from the steering knuckle.



Remove the intermediate shaft. See the [Steering Shaft](#) topic for more information.



Remove the two steering rack bolts.



Remove the steering rack.

Inspection



Inspect the steering rack for leaks or damage. Replace as needed.



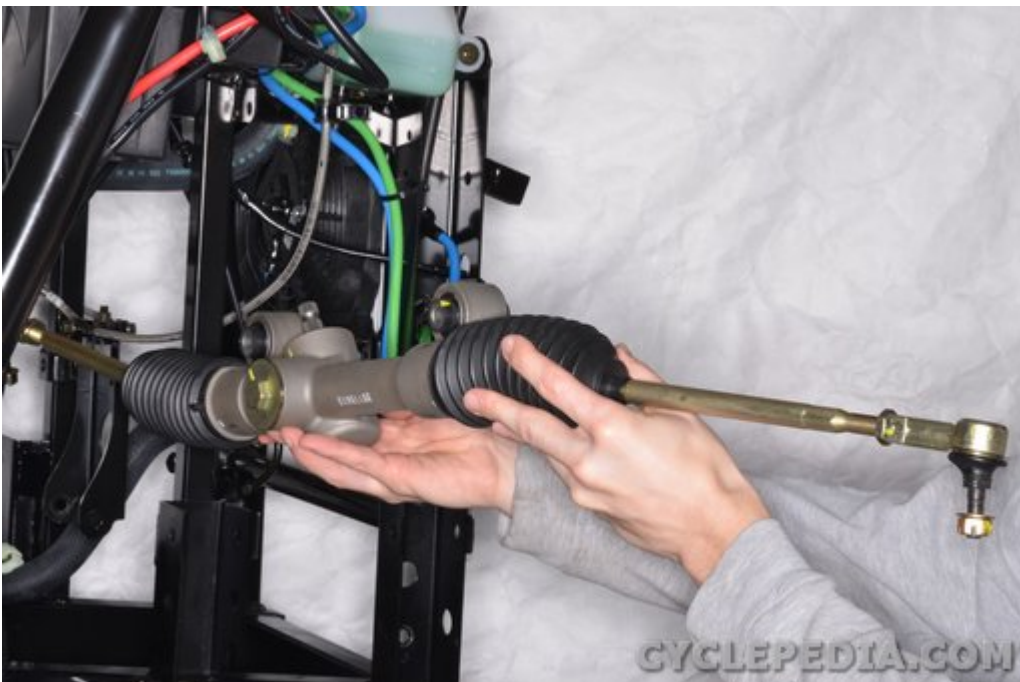
Inspect the tie-rods for damage. Make sure the joint boots are in good condition and the joints move smoothly. Replace the joints and boots as needed if they are in poor condition.

Tie Rod Assembly



Install the boots and tie-rods if they were removed.

Installation



Install the steering rack.



Install the two steering rack bolts and tighten them to specification.

ITEM	N-m	kgf-m	ft-lb
Steering rack bolt	48	4.8	34



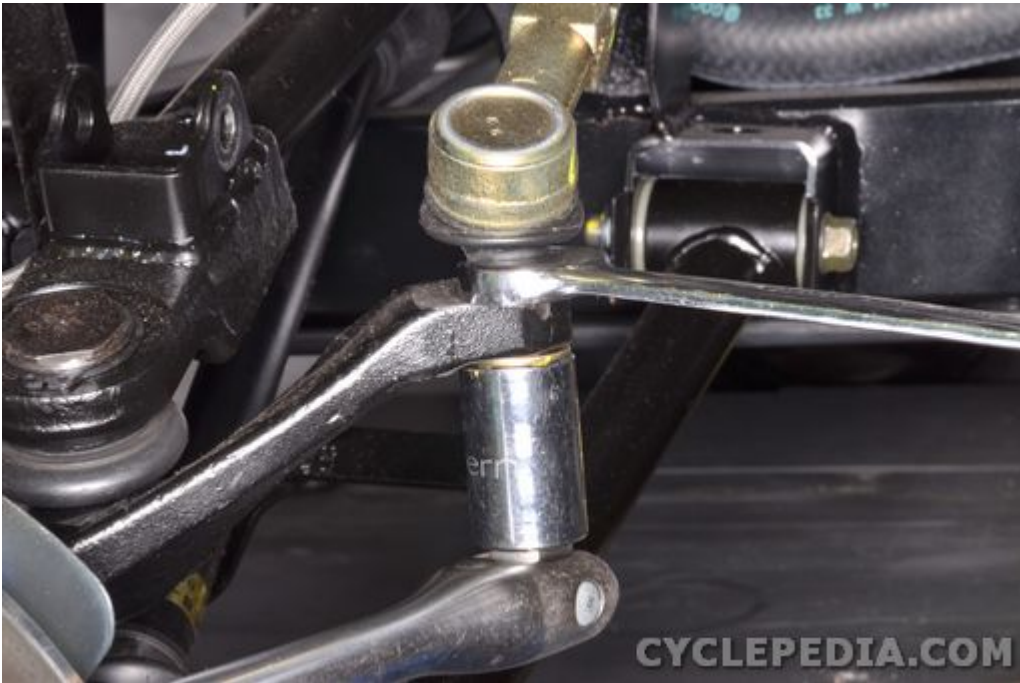
Install the intermediate shaft. See the [Steering Shaft](#) topic for more information.



Install the tie-rod end into the steering knuckle.



Install the tie-rod end nut and washer.



Hold the tie-rod joint with a 14 mm wrench and tighten the nut to specification with a 17 mm socket.

ITEM	N-m	kgf-m	ft-lb
Tie-rod end nut	35	3.5	25



Install a new cotter pin onto the tie-rod joint nut.

Install the front wheels and hubs. See the [Wheels and Wheel Hubs](#) topic for more information.

Adjust the toe-in. See the [Toe-In Adjustment](#) topic for more information.

Steering Shaft

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Lift the hood and remove the front cargo box. See the [Hood](#) topic for more information.

Turn the front wheels so they face straight ahead.

Remove the steering wheel. See the [Steering Wheel](#) topic for more information.

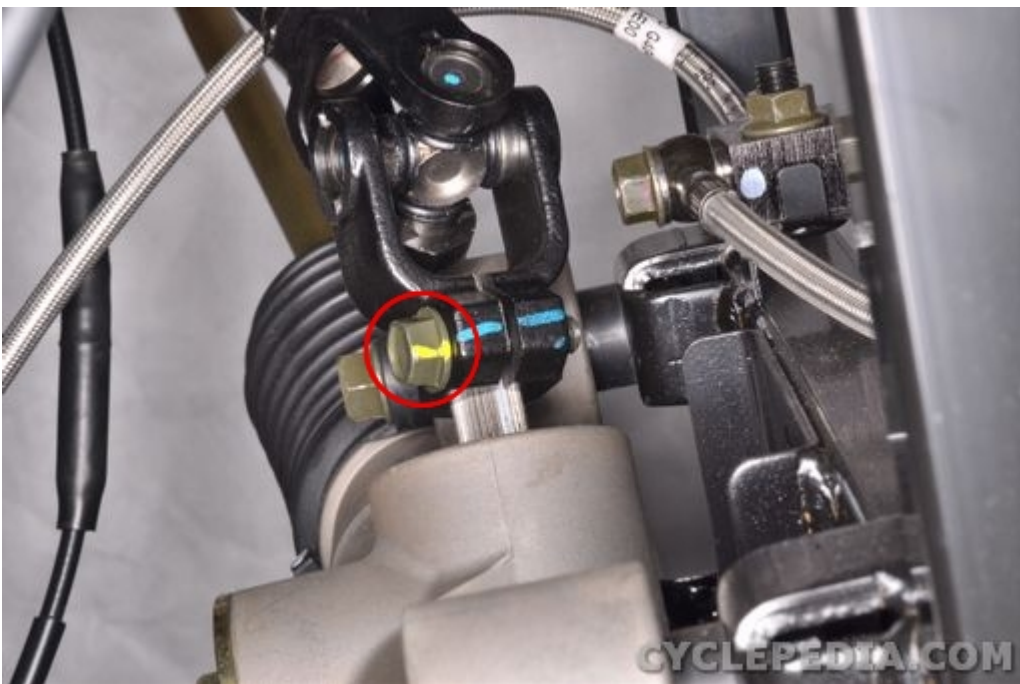
Remove the instrument cover. See the [Instrument Cover](#) topic for more information.



Remove the four main shaft mounting bolts with a 14 mm socket. Remove steering gear shaft clamp bolt with a 12 mm socket.



Remove the main shaft.



Remove the steering gear shaft clamp bolt with a 12 mm socket.



Remove the intermediate shaft.

Inspection



Inspect the main shaft for bending or damage.



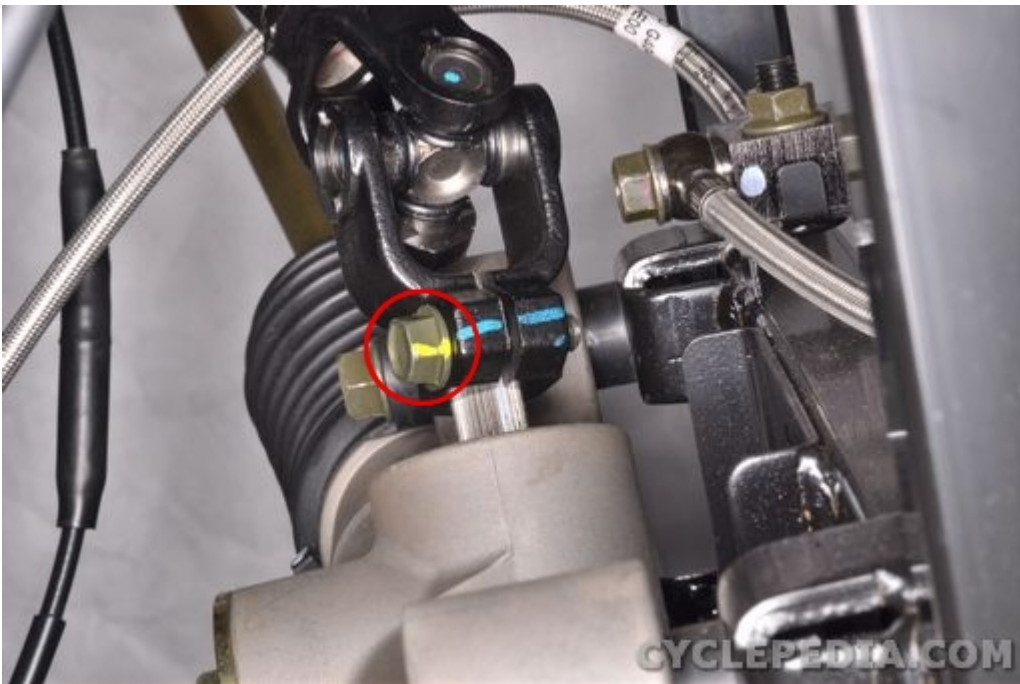
Inspect the intermediate shaft for bending or damage.

Installation





Install the lower section of the intermediate shaft onto the steering rack.



Install the steering gear shaft clamp bolt and tighten it to specification with a 12 mm socket.

ITEM	N-m	kgf-m	ft-lb
Steering assembly and intermediate shaft	27	2.7	15



Grease the splines of the main shaft/intermediate shaft. Install the main shaft.



Install the four main shaft mounting bolts (14 mm socket) and steering gear shaft clamp bolt (12 mm socket). Tighten them to specification.

ITEM	N-m	kgf-m	ft-lb
Steering gear shaft clamp bolt	27	2.7	15
Main shaft mounting bolts	32	3.2	23

Install the instrument cover. See the [Instrument Cover](#) topic for more information.

Make sure the front wheels are pointing straight ahead.

Install the steering wheel. See the [Steering Wheel](#) topic for more information.

Install the front cargo box and close the hood. See the [Hood](#) topic for more information.

Check the toe-in. See the [Toe-In Adjustment](#) topic for more information.

Steering Wheel

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal



Push in the tabs and free the center cover from the steering wheel.



Loosen the steering wheel nut with a 19 mm socket.



Remove the steering wheel nut and washer.



Slide the steering wheel off of the steering shaft.

Installation

Make sure the front wheels are pointing straight ahead.



Fit the steering wheel onto the steering shaft.



Install the steering wheel washer and nut.



Tighten the nut to specification with a 19 mm socket.

Item	N-m	Kgf-m	lbf-ft
Steering wheel nut	52	5.3	38

Take the vehicle for a short test drive and make sure the steering wheel is properly aligned with the front wheels.



Fit the steering wheel cover into place. Make sure the tabs pop into place.

EPS(Electronic Power Steering) (Only EPS Model)

EPS Operation

The EPS module calculates steering assist by sensing the difference between the input torque of the steering and the output torque required to turn the wheels, and then provides assist by energizing an electric motor. The process provides a smooth seamless assist.

The system is continuously running diagnostic checks and monitoring factors such as battery voltage, ground speed and engine speed. In the event an internal or external issue that affects the EPS system is detected, the system will illuminate a fault indicator and transition to a normal mechanically coupled steering system.



EPS indicator (EPS Model only)

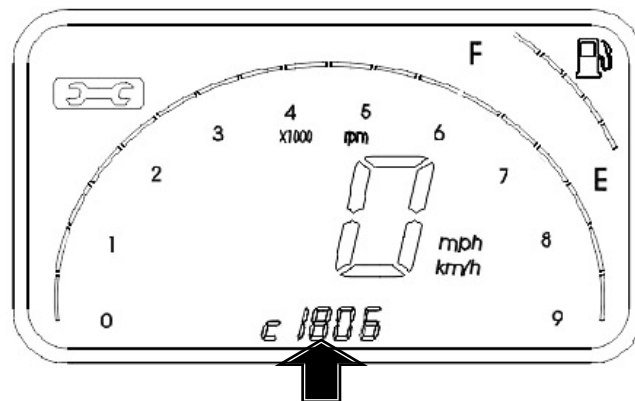
The EPS indicator illuminates when the key is turned to the ON position and will go off after 3 seconds. If the light remains on, the EPS system is inoperative.

Electronic power steering engages when the ignition key is turned to the ON position. EPS remains engaged whether the vehicle is moving or idle.

NOTE:

KYMCO recommends steering component repair and adjustment be performed by an authorized KYMCO Dealer. Only a qualified technician should replace worn or damaged steering parts. Use only genuine KYMCO replacement parts.

EPS(Electronic Power Steering) (Only EPS Model)



EPS Error Code (EPS Model only)

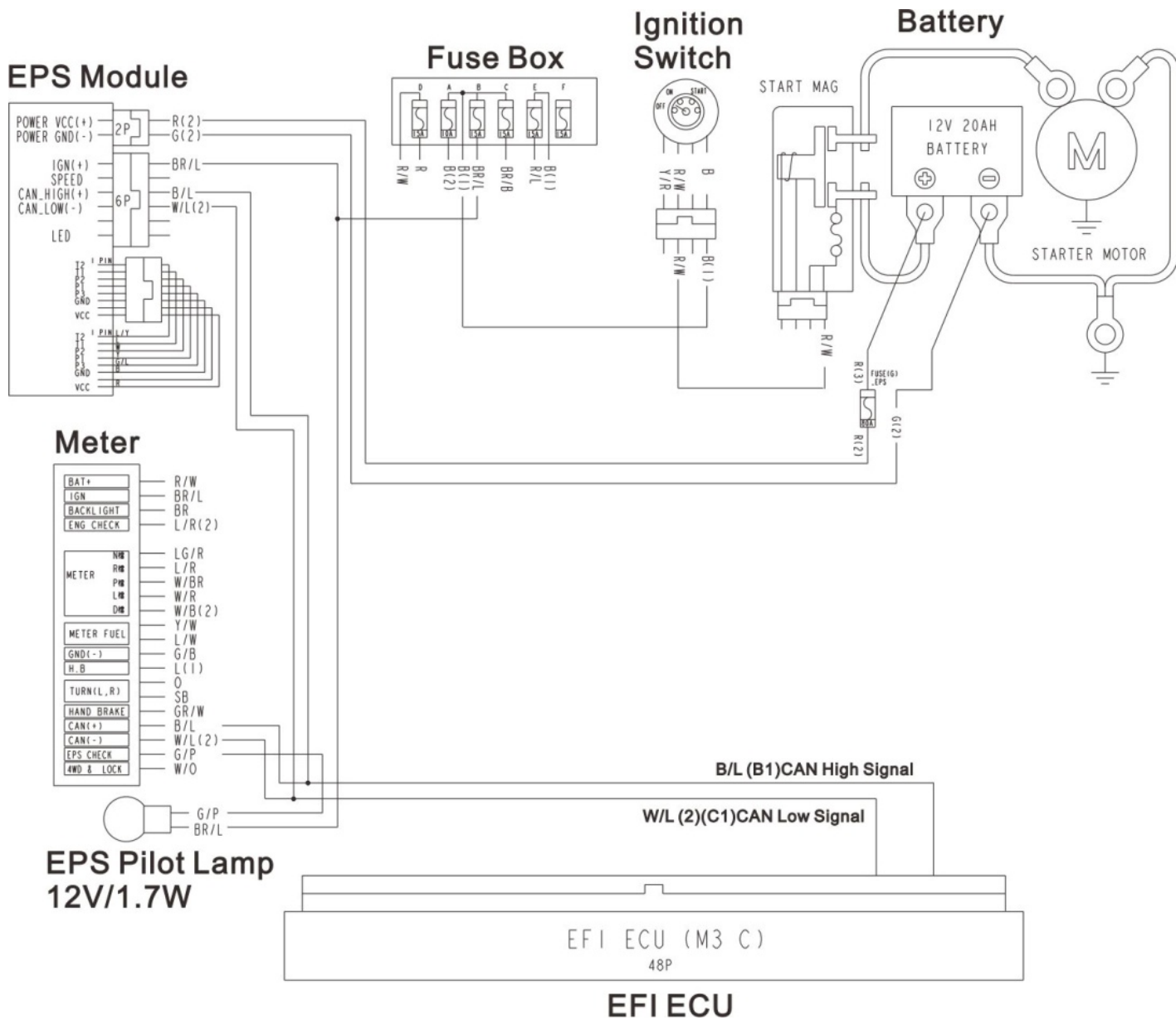
When the EPS system problem detected, the error code will be displayed on the instrument.

C1800	DTC-00 Power Error
C1801	DTC-01 Car Speed Error
C1802	DTC-02 Software Error
C1803	DTC-03 Hardware Error
C1804	DTC-04 Motor Signal Error
C1805	DTC-05 Motor Error
C1806	DTC-06 Torque Sensor Signal Error
C1807	DTC - 07 Torque Sense Connector Error
C1808	DTC-08 Safety Relay Error
C1809	DTC-09 It Self Power Reduction Error
C180A	DTC-10 CAN Communication Error
C180B	DTC-11 Torque Supply Voltage Error
C180C	DTC-12 EPS Was Not Calibrated Error
C180D	DTC-13 Motor Encoder Error
C180E	DTC-14 Motor Is Too Hot Error
C180F	DTC-15 Torque Sensor Circuit Error

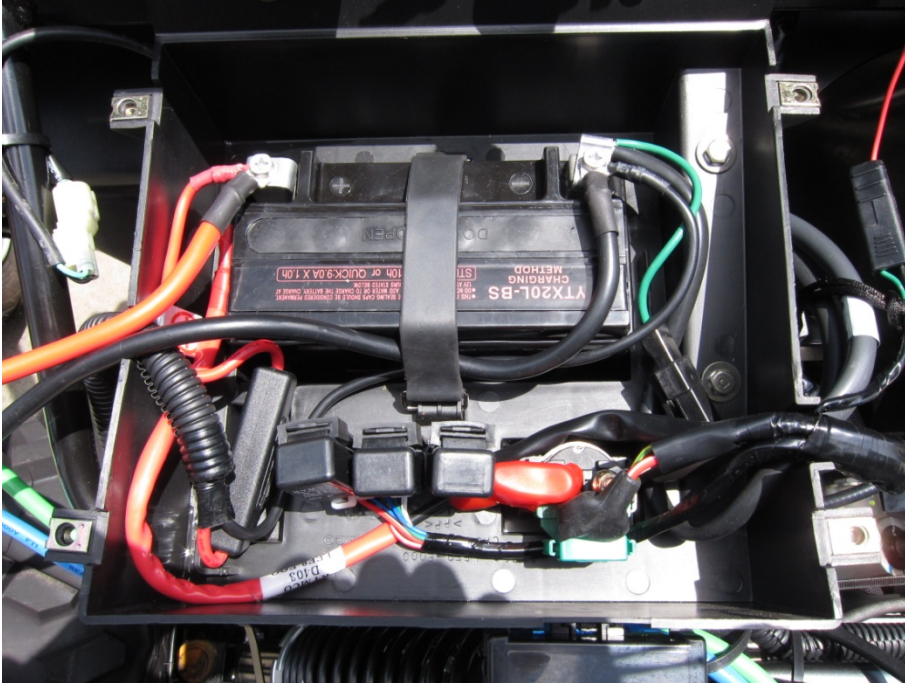
NOTE:

The error code will be erased after problem solved and turn off the ignition switch.

EPS Circuit Diagram (Only EPS Model)

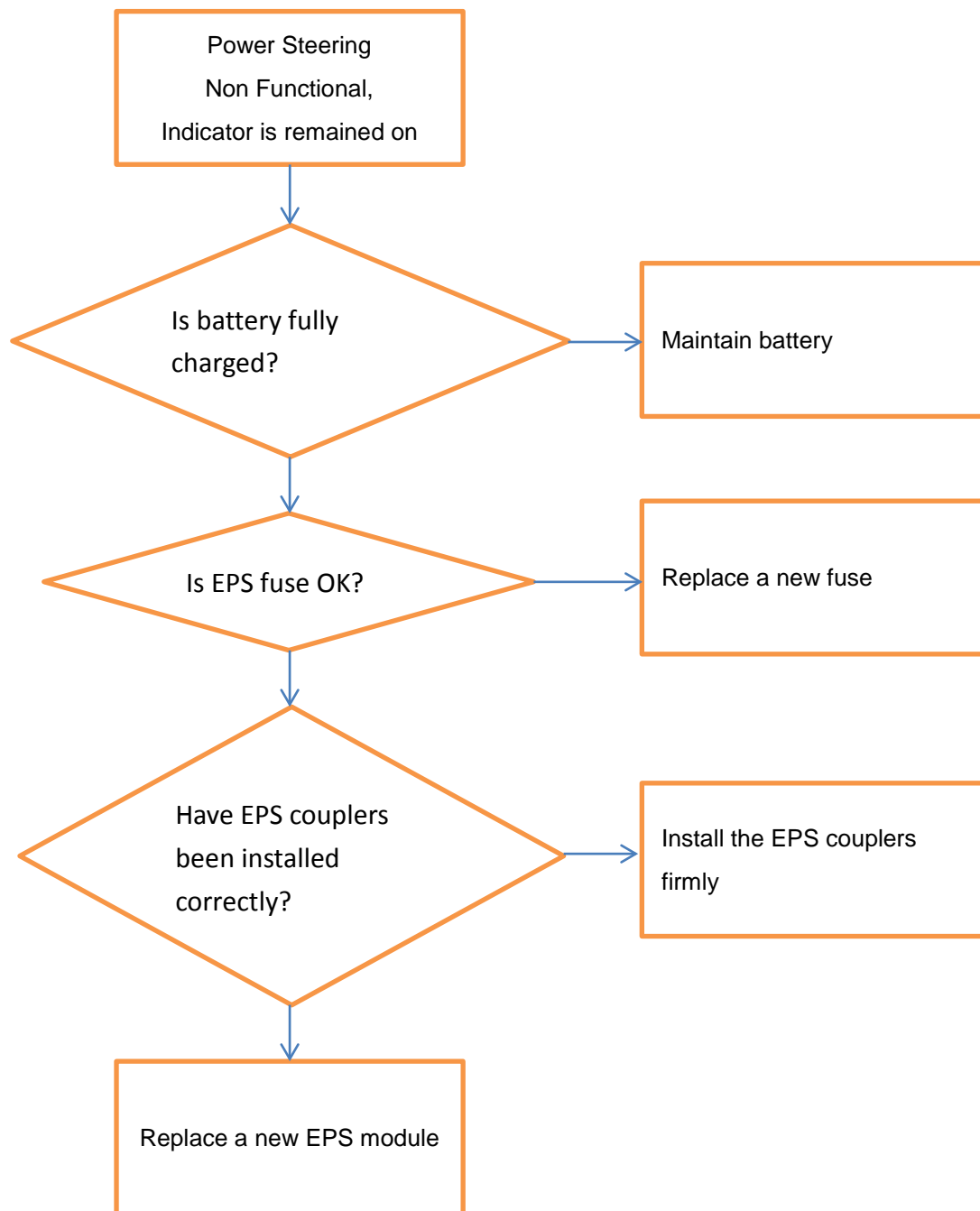


There is 80 A fuse for the power steering system in the battery box. If the fuse is blown, steering becomes heavy. Replace the blown fuse with a fuse of the same specific amperage and type.

**NOTE:**

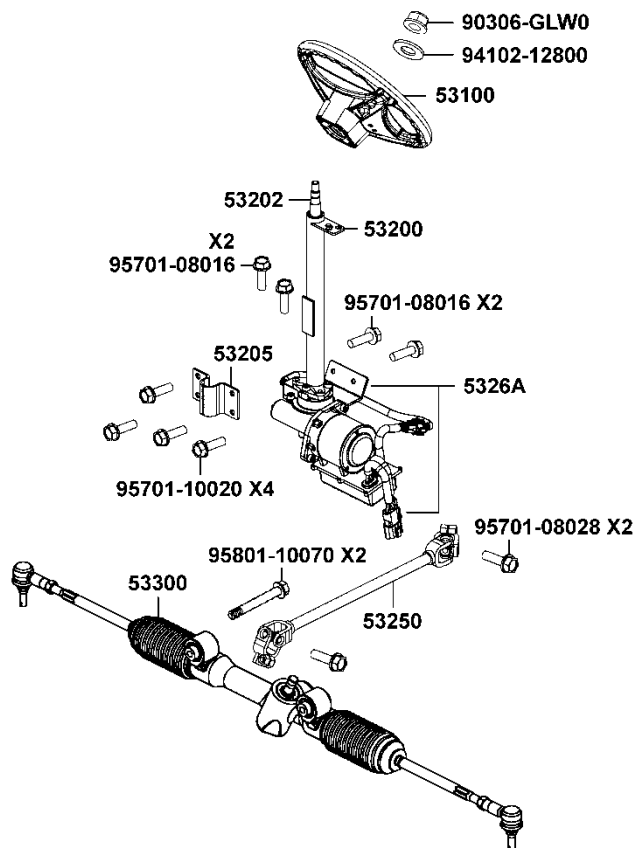
The electrical system can produce electrical shocks. When replacing the 80 A fuse, first remove the cables from the battery terminals to avoid electric shock.

EPS(Electronic Power Steering) (Only EPS Model)



NOTE:

The EPS module is not maintainable, when the EPS problem occurs, check the battery voltage, fuse and the couplers. If the problem remained, replace the EPS whole module. Do not try to dismantle the components of the EPS module for repair.



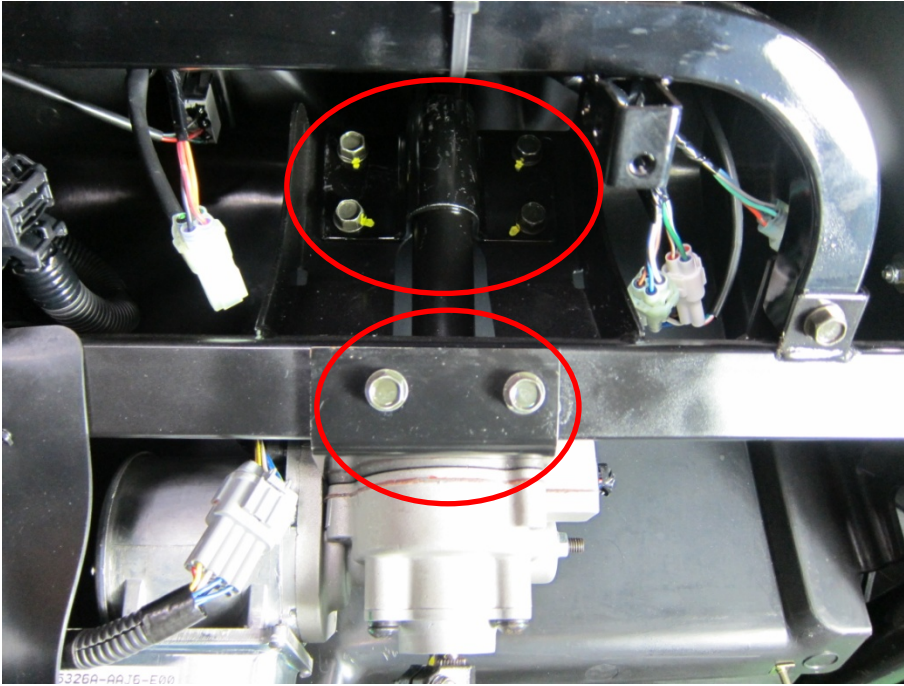
EPS(Electronic Power Steering) (Only EPS Model)

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the luggage box.

Remove the six bolts of the steering fixed plate.



Remove the bolt of EPS connector and remove the joint rod.



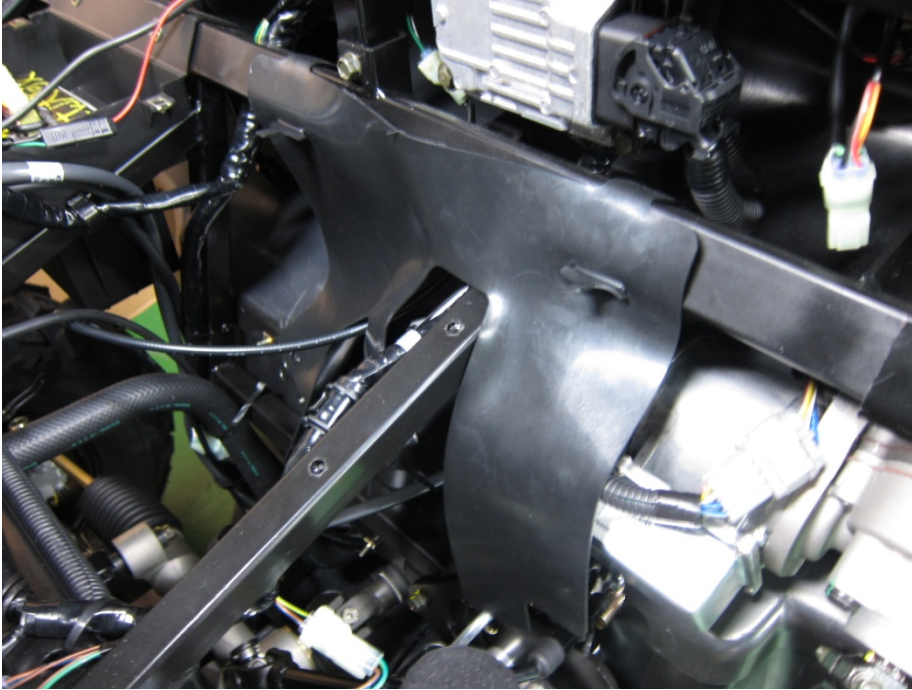
**NOTE:**

Do not strike the steering joint, striking the steering post can permanently damage the EPS unit and cause a power steering fault.

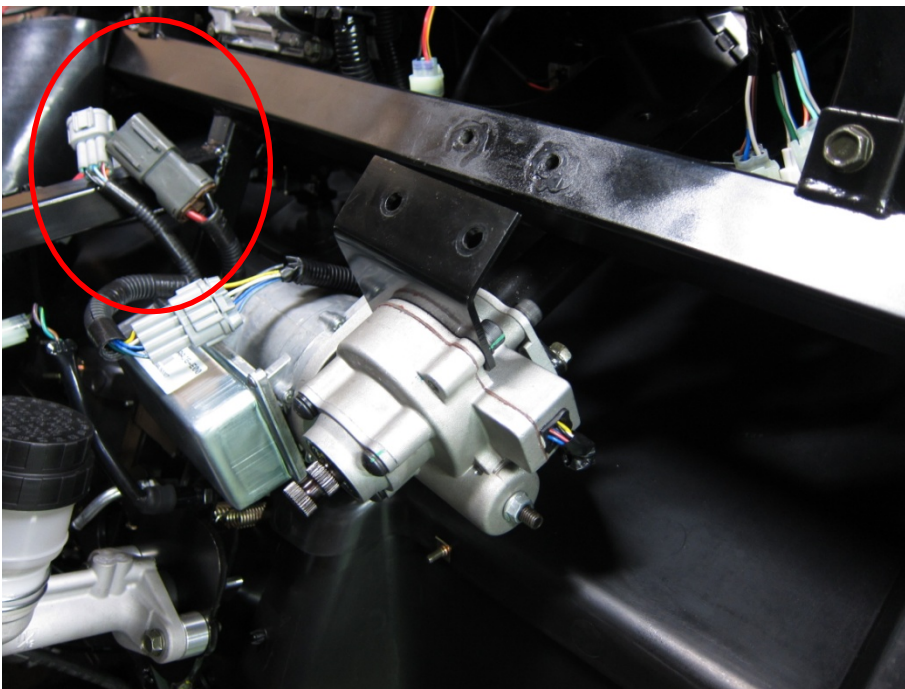
**NOTE:**

Do not adjust the nut of the EPS module which was set by original manufacturer. If you adjust the nut will cause adversely affected and will cause serious driving problems.

Remove the rubber protector.



Dismantle two of the EPS couplers.



Remove the steering wheel cover.



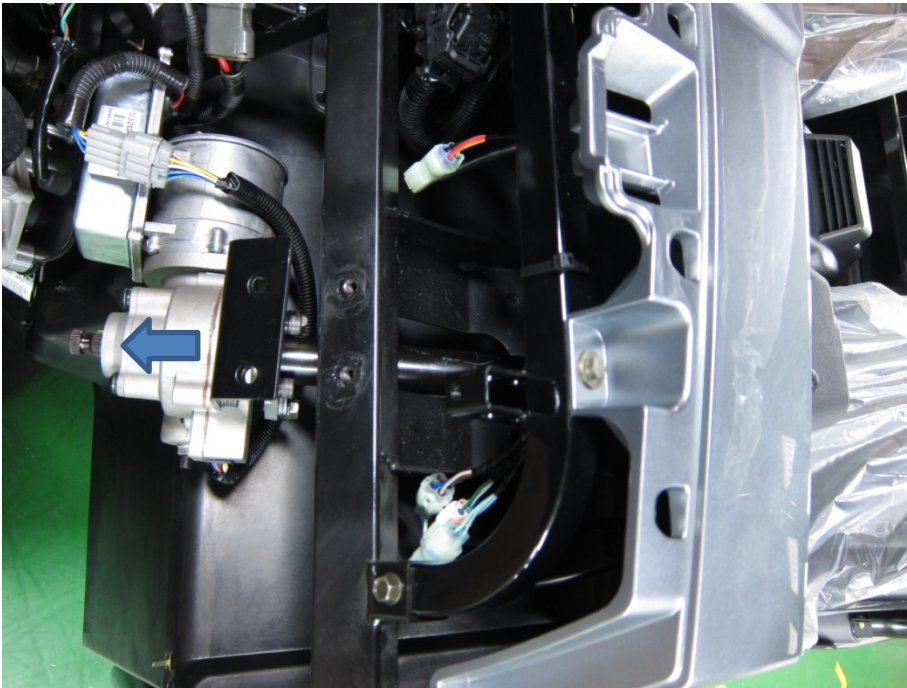
Remove the nut and washer of the steering wheel.



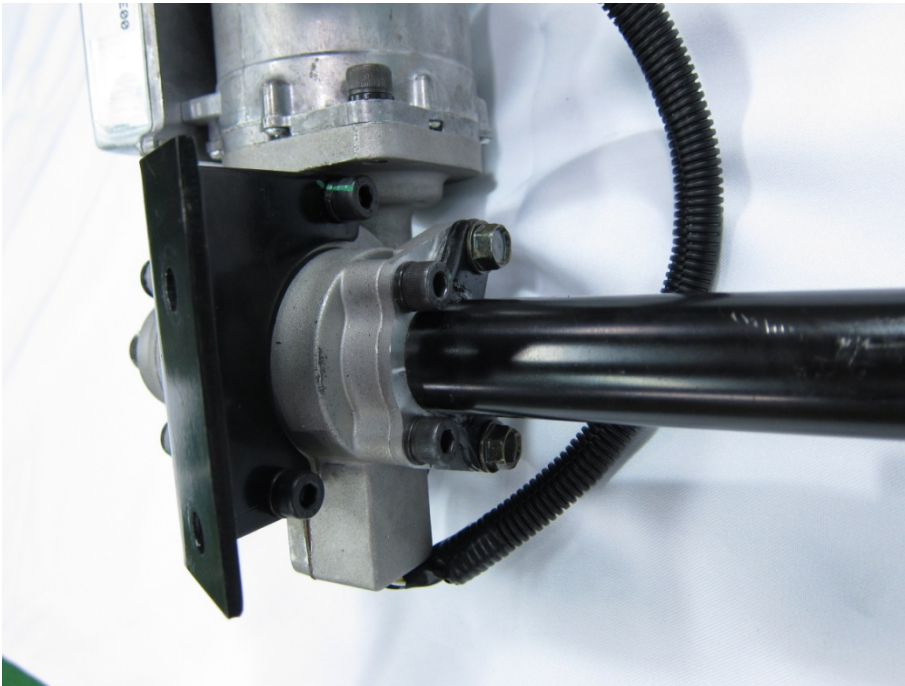
Remove the steering wheel.



Remove the EPS module with the direction as below picture.



Remove two bolts of the steering pipe.



And then remove the steering pipe.



Fix the EPS module on a vice and slightly tap the steering shaft out.



NOTE:

Do not strike the shaft hard, striking too hard can permanently damage the EPS unit and cause a power steering fault.

And remove the steering shaft.



Fix the EPS module on a vice, cover the thread protector on the top and slightly tap the steering shaft in completely when installation.



NOTE:

Do not strike the shaft hard, striking too hard can permanently damage the EPS unit and cause a power steering fault.



NOTE:

The EPS module is not maintainable, when the EPS problem occurs, check the battery voltage, fuse and the couplers. If the problem remained, replace the EPS whole module. Do not try to dismantle the components of the EPS module for repair.

Fix the EPS module on a vice and slightly tap the steering shaft out.



NOTE:

Do not strike the shaft hard, striking too hard can permanently damage the EPS unit and cause a power steering fault.

And remove the steering shaft.



EPS(Electronic Power Steering) (Only EPS Model)

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Installation

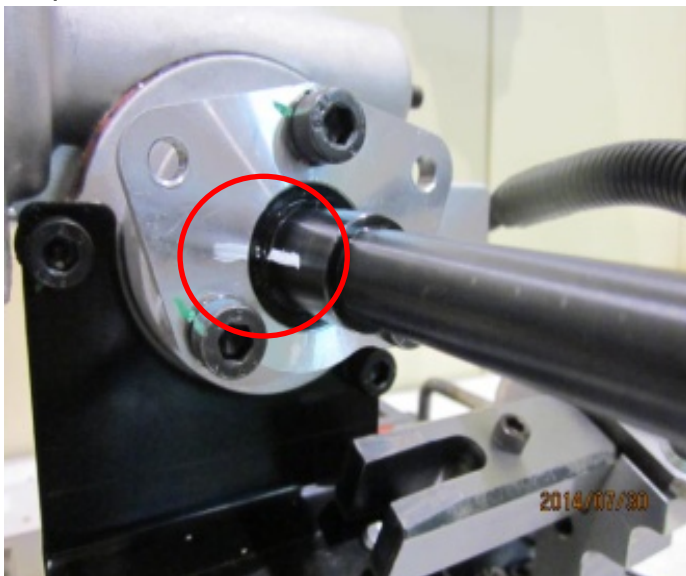
NOTE:

When installing with the new EPS module, confirm the following points.

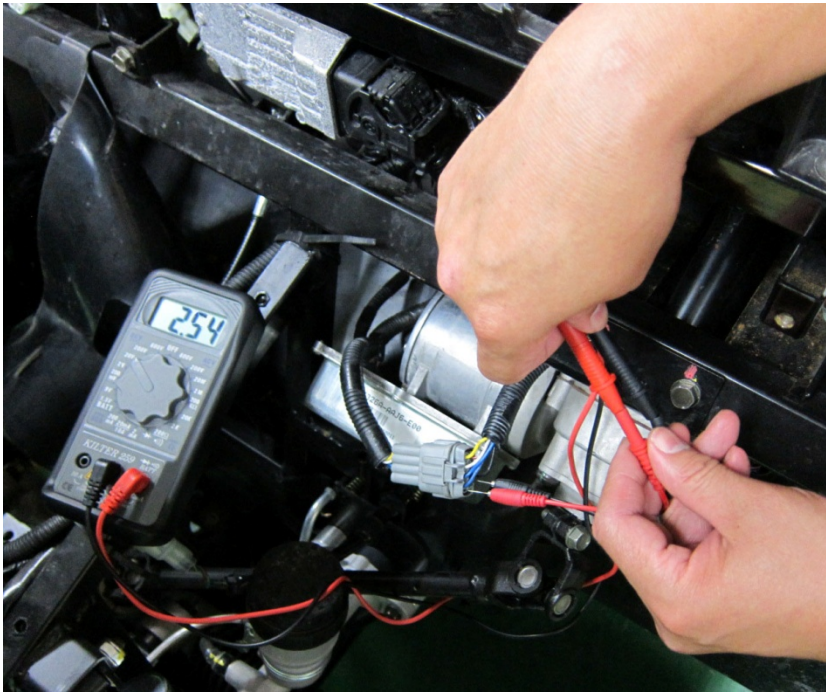
1. Confirm the correct part number: 5326A-AAJ6-E00 to make sure EPS ECU with correct software version.



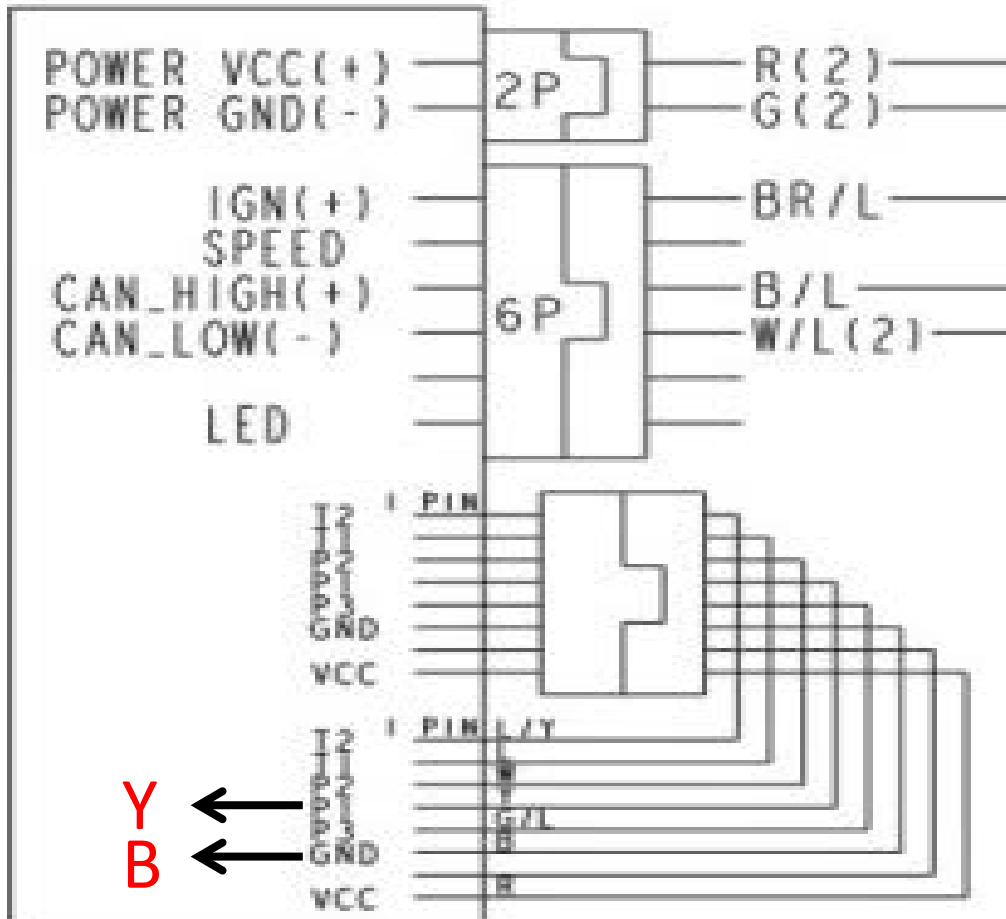
2. With a new spare part, the paint mark should be aligned. Before installation, do not rotate the axle of the EPS module and make sure the align mark is on the correct position.



3. If the axle is rotated before installation, the steering wheel will not be on correct position. After installation, check and confirm the voltage between red wire and black wire (Ground), the voltage should be in standard (2.35V~2.65V), and make sure the align mark is on the correct position.



EPS MODULE



12.Front Suspension

This chapter covers the location and servicing of the front suspension components.

1.Front Shock Absorbers12-2

2.A-arms12-9

TROUBLESHOOTING

Hard steering (heavy)

- Insufficient tire pressure

Steers to one side or does not track straight

- Uneven front shock absorbers
- Bent front arm
- Bent steering knuckle

Front shock absorber noise

- Slider bending
- Loose arm fasteners
- Lack of lubrication

Soft front shock absorber

- Weak shock springs
- Insufficient damper oil

Front Shock Absorbers

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Support the front of the vehicle with a suitable stand or jack so that the front wheels are off of the ground.

Remove the front wheels. See the [Wheels and Wheel Hubs](#) topic for more information.

Note: The front shock absorber removal procedure is the same for both sides.

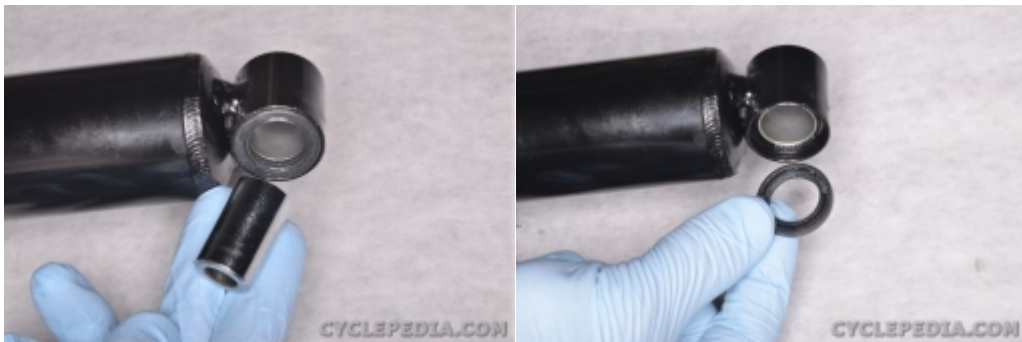




Hold the lower shock absorber mounting bolt with a 14 mm wrench and loosen the nut with a 17 mm socket. Remove the lower shock absorber mounting nut and bolt. Hold the upper shock absorber mounting bolt with a 14 mm wrench and loosen the nut with a 17 mm socket. Remove the upper shock absorber mounting nut and bolt.



Remove the shock absorber.



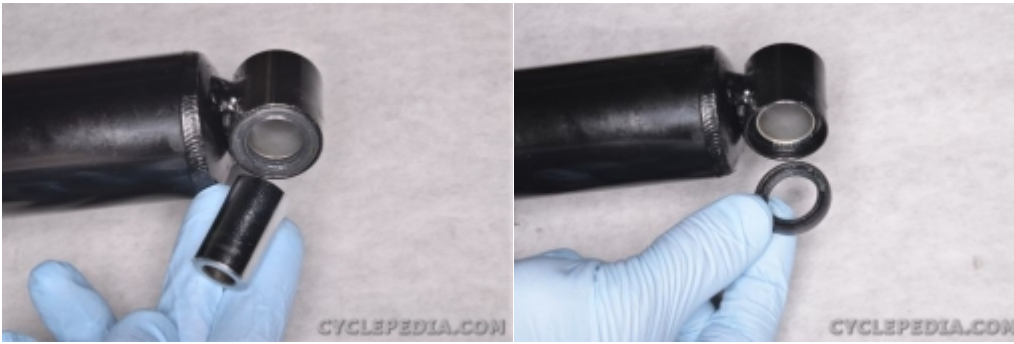
Remove the collar and dust seals.

Inspection



Inspect the shock absorber for damage, leaks or other wear. Replace the shock absorber with a new one as needed.





Inspect the collar, dust seals and bushings. Replace parts as needed.

Installation



Install the dust seals and collar.



Install the shock absorber.





Apply grease to the bushings . Install the upper and lower mounting bolts and nuts. Hold the upper shock absorber mounting bolt with a 14 mm wrench and tighten the nut to specification with a 17 mm socket. Hold the lower shock absorber mounting bolt with a 14 mm wrench and tighten the nut to specification with a 17 mm socket.

ITEM	N-m	kgf-m	ft-lb
Front shock absorber mounting bolt (Upper/Lower)	45	4.5	32

Install the front wheels. See the [Wheels and Wheel Hubs](#) topic for more information.

A-arms

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Remove the front wheels and hubs. See the [Wheels and Wheel Hubs](#) topic for more information.

Remove the steering knuckles. See the [Steering Knuckles](#) topic for more information.

Remove the front shock absorbers. See the [Front Shock Absorbers](#) topic for more information.

Inspection



Move the suspension arms up and down. Also, try and move them front to back. If there is excessive play or noise the spherical bearings may need to be replaced.



Check the suspension arms for signs of damage.

Upper A-arm



Remove the brake hose holder bolt from the A-arm with a 10 mm socket.



Free the brake hose from the holders.





Hold the upper A-arm pivot bolt with a 14 mm wrench and loosen the nut with a 17 mm socket. Remove the nut and bolt. Repeat the procedure for the second nut and bolt.



Remove the upper A-arm.

Lower A-arm



Hold the lower A-arm pivot bolt with a 14 mm wrench and loosen the nut with a 17 mm socket. Remove the nut and bolt. Repeat the procedure for the second nut and bolt. Remove the lower A-arm.

Knuckle Ends



Check the knuckle joint boot for wear or damage and replace as needed.



Remove the snap with snap ring pliers on the back of the knuckle end.

Press out the knuckle joint with a bearing installer.



Press in the knuckle joint into the A-arm with a bearing installer. Install the snap ring on the back of the knuckle end with snap ring pliers. Be sure the snap ring sits in the groove properly.

Pivot Spherical Bearings



Remove the side collars from the suspension arm pivots.

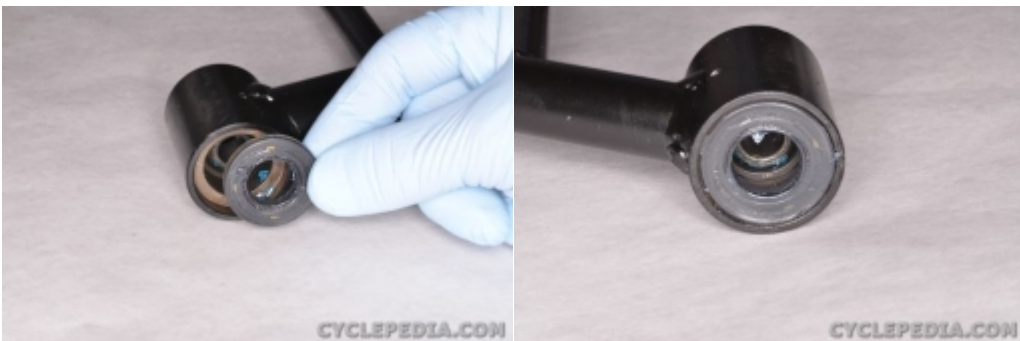


Remove the dust seals.



Replace the spherical bearings as needed.

Press in new spherical bearings with a driver that contacts the outside diameter of the bearings. Lubricate the bearings with waterproof grease.



Lubricate the new dust seal lips with waterproof grease. Press in the new seals with a suitable driver that has the same outside diameter as the seals.



Install the side collars.

Installation



Fit the A-arms into place.



Install the pivot bolts from the outside and thread on the nuts.



Hold the bolts with a 14 mm socket and tighten the nuts to specification with a 17 mm socket.

ITEM	N-m	kgf-m	ft-lb
Front suspension arm pivot nut	48	4.8	34.8



Guide the brake hose along the upper A-arm.



Fit the brake hose into the holders on the upper A-arm.



Install the bolt with the upper brake hose holder. Tighten it securely with a 10 mm socket.

Install the steering knuckles. See the [Steering Knuckles](#) topic for more information.

Install the front shock absorbers. See the [Front Shock Absorbers](#) topic for more information.

Install the front wheels and hubs. See the [Wheels and Wheel Hubs](#) topic for more information.

13.Rear Suspension

This chapter provides the rear suspension specifications.

1.Shock Absorbers13-2

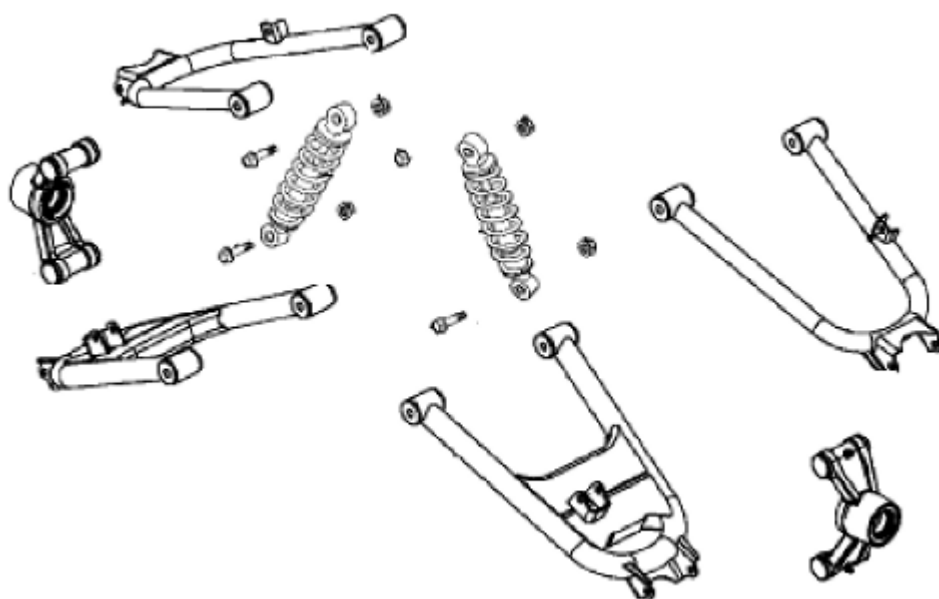
2.Suspension Arms13-7

TROUBLESHOOTING

Soft rear shock absorber

- Weak shock absorber spring
- Faulty damper

Rear Suspension Diagram



Rear Shock Absorbers

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

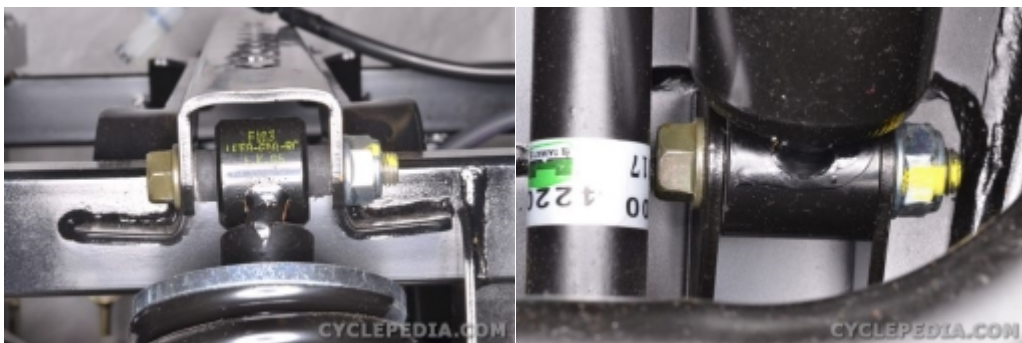
Removal

Support the back of the frame so that the vehicles weight is not resting on the rear suspension.

Remove the rear wheels. See the [Wheels and Wheel Hubs](#) topic for more information.



The rear shock absorbers are mounted to the frame and the lower suspension arms.



Hold the rear shock absorber mounting bolts with a 14 mm socket and loosen the nuts with a 17 mm socket.



Remove the upper and lower shock absorber mounting nuts and bolts.



Remove the shock absorber.

Inspection



Inspect the shock absorber for damage and leaks. Replace as needed.



Inspect the shock absorber bushings. Replace the shock absorber if the bushings are damaged.

Installation



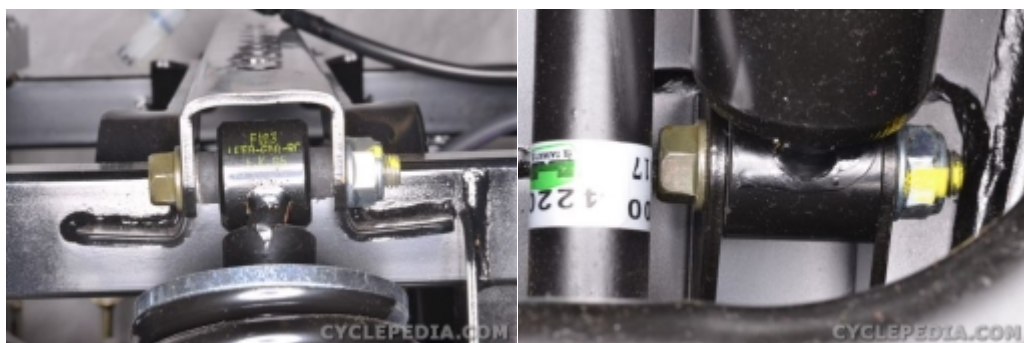
Lubricate the shock absorber bushings with grease.



Install the shock absorber as shown.



Insert the rear shock absorber mounting bolts from the rear. Thread on the nuts.



Hold the shock absorber mounting bolts with a 14 mm socket and tighten the nuts to specification with a 17 mm socket.

ITEM	N-m	kgf-m	ft-lb
Rear shock absorber mounting bolt	45	4.5	32

Install the rear wheels. See the [Wheels and Wheel Hubs](#) topic for more information.

Rear Suspension Arms

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Support the back of the frame so that the vehicles weight is not resting on the rear suspension.

Remove the rear wheels and hubs. See the [Wheels and Wheel Hubs](#) topic for more information.

Remove the shock absorbers. See the [Rear Shock Absorbers](#) topic for more information.

Tie-Rods



The stabilizer bar tie-rods connect the stabilizer bar to the upper rear suspension arms.



Hold the tie-rod joints with a 12 mm socket and loosen the nuts with a 17 mm socket.



Remove the tie-rods. Note their locations so they can be returned to their original positions.



Inspect the tie rod ball joints and boots for wear and damage. Move the ball joint by hand and make sure it moves smoothly. Replace the stabilizer ball joint as needed.

Stabilizer Bar / Sway Bar



Remove the two bolts for each stabilizer bushing mount.



Remove the stabilizer bar and bushings.

Inspect the bar and bushings. Replace the components as needed.

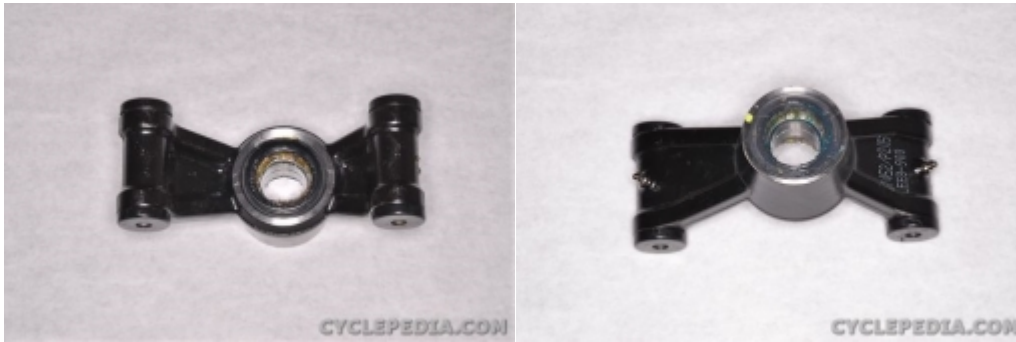
Rear Knuckles



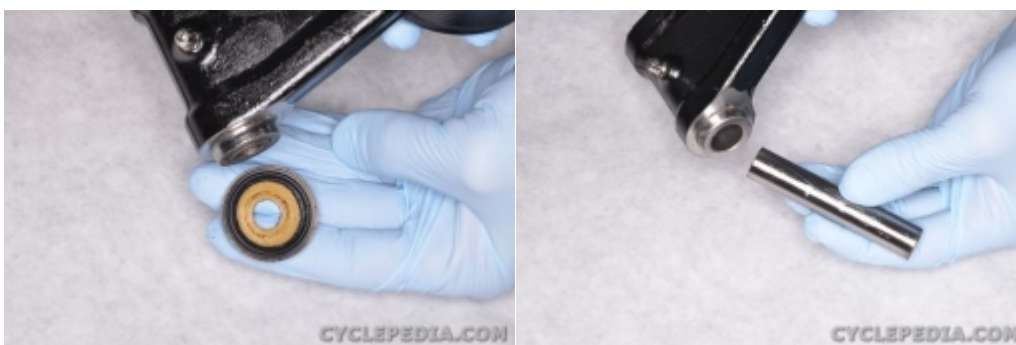
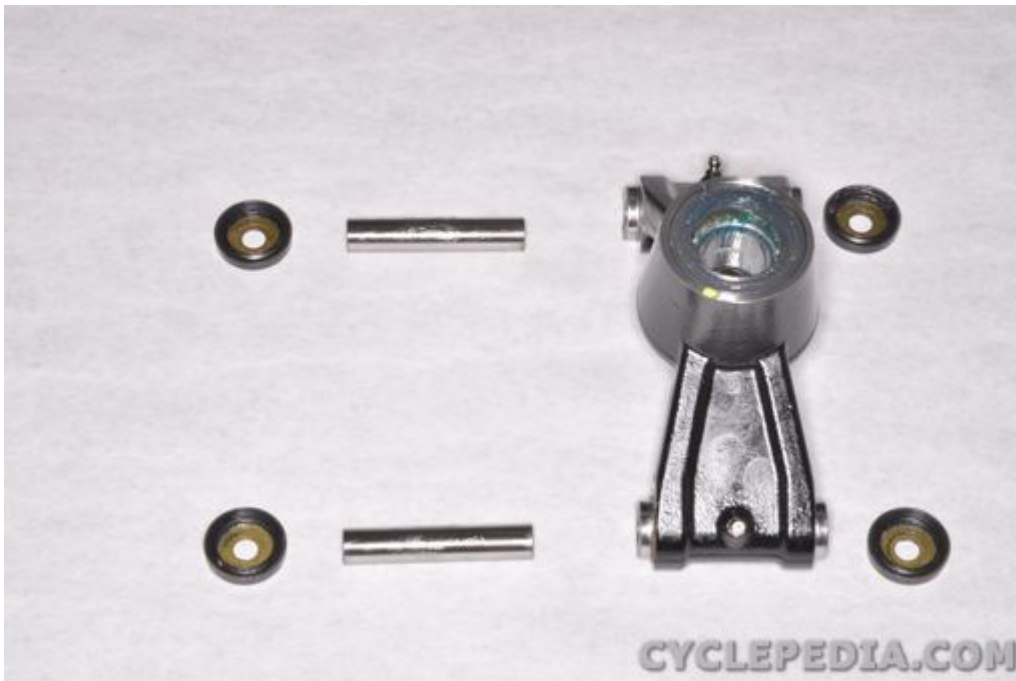
Hold the rear knuckle arm bolts with a 14 mm wrench and loosen the nuts with a 17 mm socket.



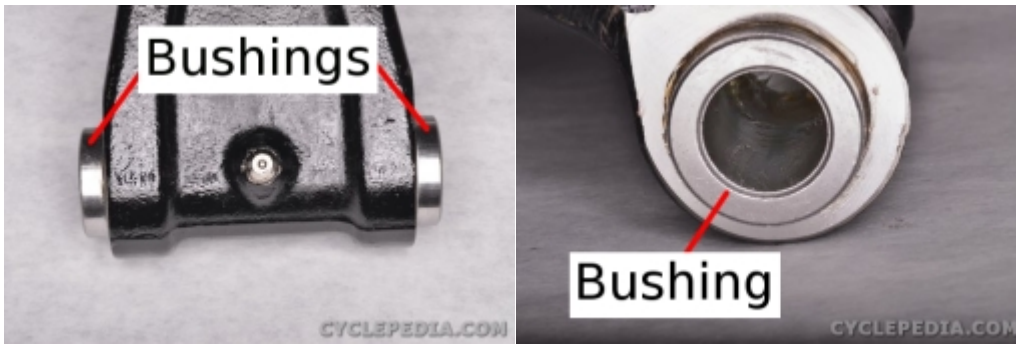
Remove the rear knuckle nuts and bolts. Free the rear knuckle from the rear arms and the half shaft.



Inspect the half shafts and wheel hub knuckle dust seals for damage and deterioration.



Remove the side dust seals and the pivot collars. Inspect the side dust seals and collars. Replace these components as needed.

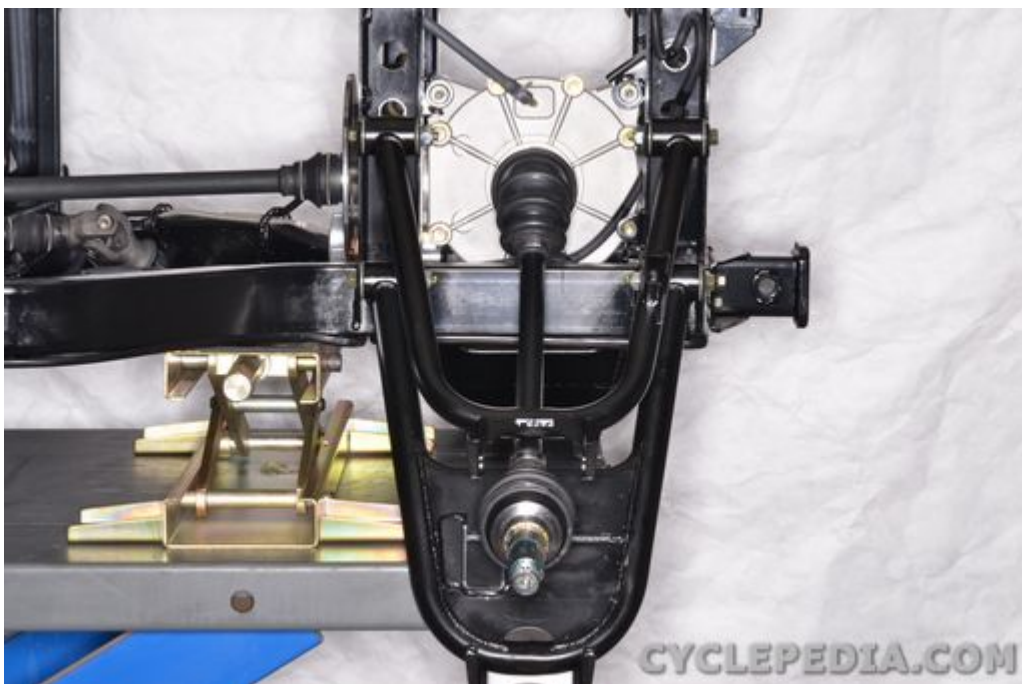


Inspect the bushings and replace them as needed.

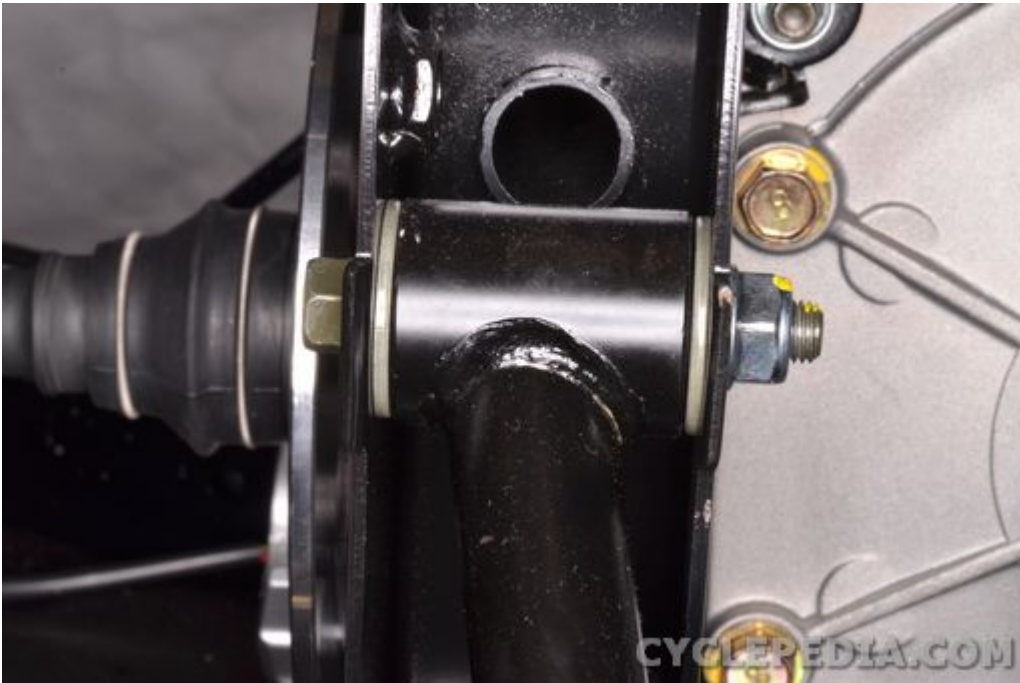
Knuckle Bearing Replacement

To replace the bearings see the [Wheel Bearings](#) topic for more information.

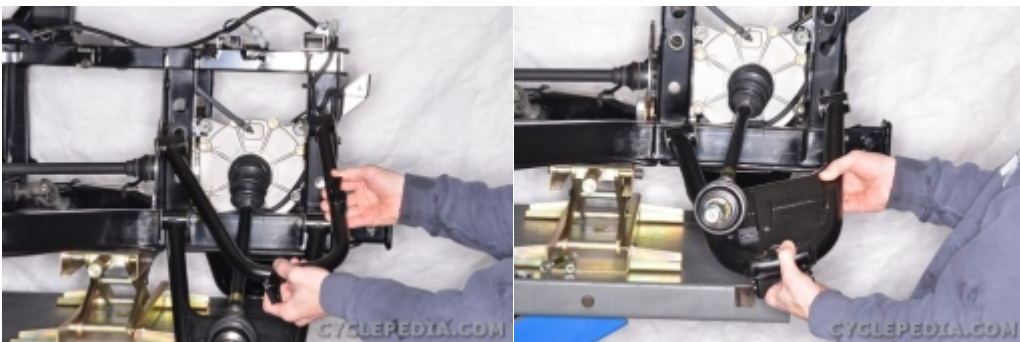
Rear Suspension Arms



Move the suspension arms up and down. Also, try and move them front to back. If there is excessive play or noise the spherical bearings may need to be replaced. The upper and lower suspension arms are each held to the frame with two pivot bolts and nuts.



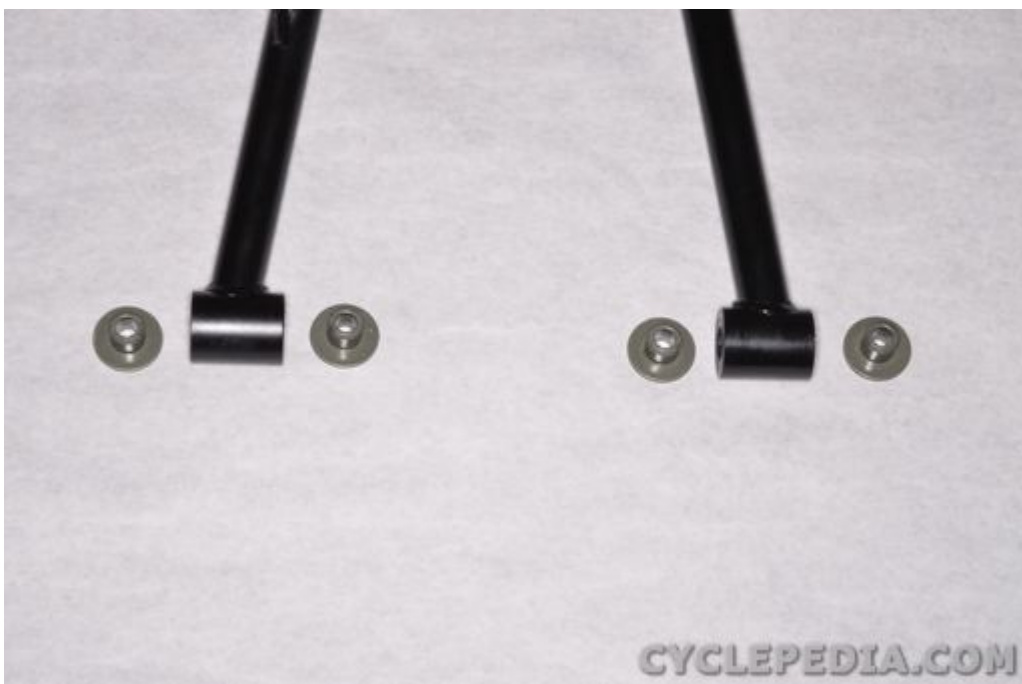
Hold the bolts with a 14 mm socket and loosen the nuts with a 17 mm socket.



Remove the pivot bolts and nuts. Remove both suspension arms in the same manner.



Inspect suspension arms for signs of damage.



Remove the side collars from the suspension arm pivots.



Remove the dust seals.

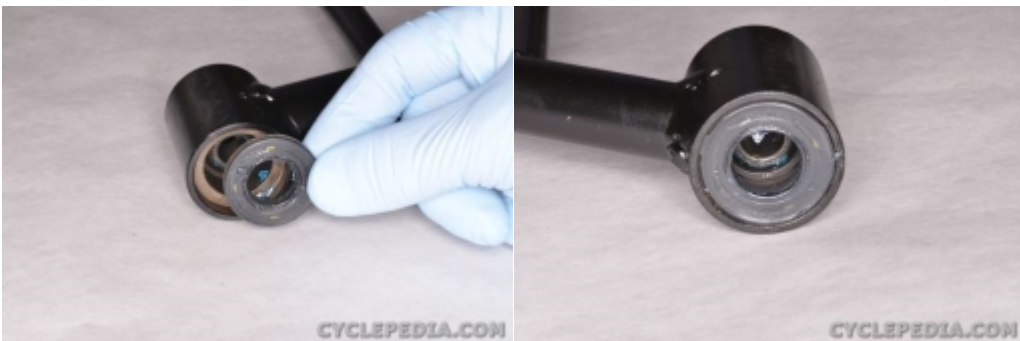


Replace the spherical bearings as needed.

Installation



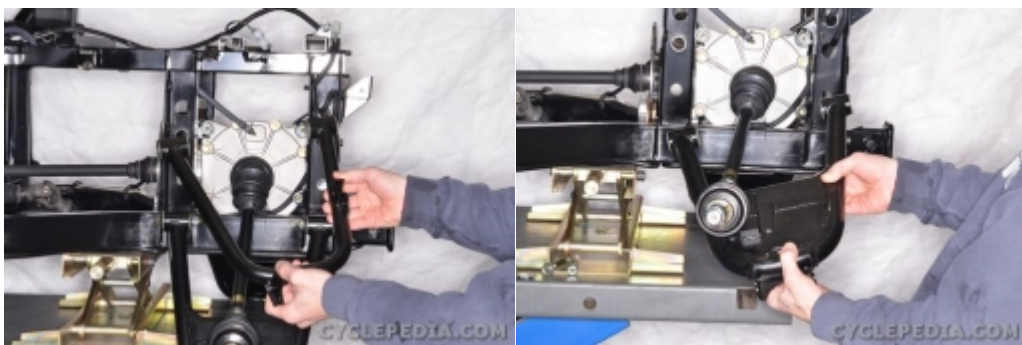
Press in new spherical bearings with a driver that contacts the outside diameter of the bearings. Lubricate the bearings with waterproof grease.



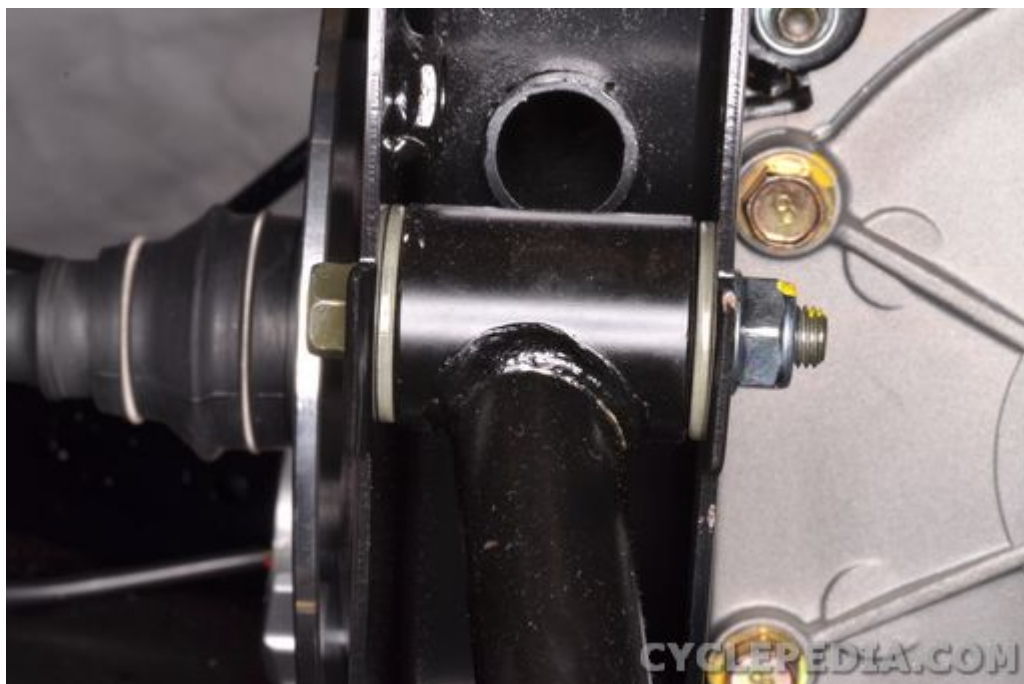
Lubricate the new dust seal lips with waterproof grease. Press in the new seals with a suitable driver that has the same outside diameter as the seals.



Install the side collars.



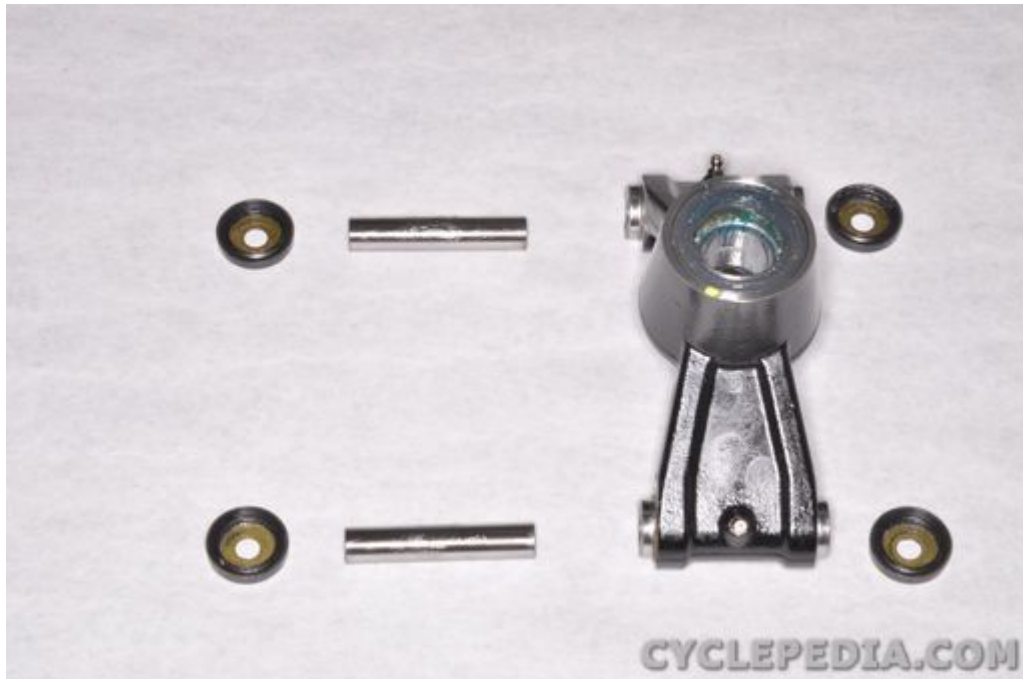
Fit the rear suspension arms into place. Install the pivot bolts from the outside and thread on the nuts.



Hold the bolts with a 14 mm socket and tighten the nuts to specification with a 17 mm socket.

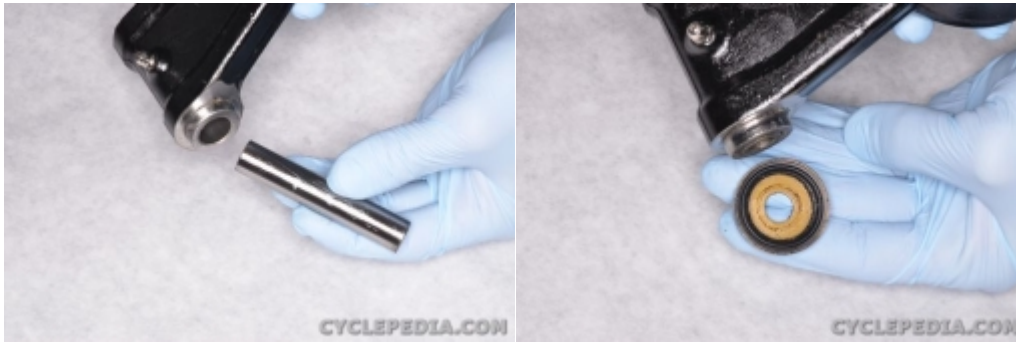
ITEM	N-m	kgf-m	ft-lb
Rear suspension arm pivot nut	48	4.8	34.8

Rear Knuckles



Apply waterproof grease to the pivot collars and the lips of the side dust seals.





Install the pivot collars and dust seats.



Grease the drive shaft splines. Fit the knuckle into place as shown. Guide the half shaft through the bearing in the knuckle.



Insert the rear knuckle bolts from the rear and thread on the nuts. Hold the bolts with a 14 mm wrench and tighten the nuts to specification with a 17 mm socket.

ITEM	N-m	kgf-m	ft-lb
Rear knuckle nuts	48	4.8	34.8



Apply grease to the fittings.

Stabilizer Bar / Sway Bar



Fit the stabilizer bar and bushings into place.



Install the two bolts for each stabilizer bushing mount.

ITEM	N-m	kgf-m	ft-lb
Stabilizer and frame	32	3.2	23



Fit the stabilizer tie-rods into place in their original positions.



Thread on the tie-rod nuts.



Hold the tie-rod joints with a 12 mm socket and tighten the nuts to specification with a 17 mm socket.

ITEM	N-m	kgf-m	ft-lb
Stabilizer tie-rod joint nut	55	5.5	39

Install the shock absorbers. See the [Rear Shock Absorbers](#) topic for more information.

Install the rear wheels. See the [Wheels and Wheel Hubs](#) topic for more information.

14.Electrical Systems

This chapter covers the location and servicing of the electrical systems.

1.Electrical Specifications	14-12
2.Battery	14-13
3.Charging System	14-19
4.Fuses	14-33
5.Ignition System	14-36
6.Lights	14-53
7.Starter Motor	14-59
8.Starting System	14-63
9.Switches	14-77

CHARGING SYSTEM AND BATTERY

CAUTION

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
 - If electrolyte gets on your skin, flush with water.
 - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous.
 - If swallowed, drink large quantities of water or milk and call your local Poison Control Center or physician immediately, KEEP OUT OF REACH OF CHILDREN.

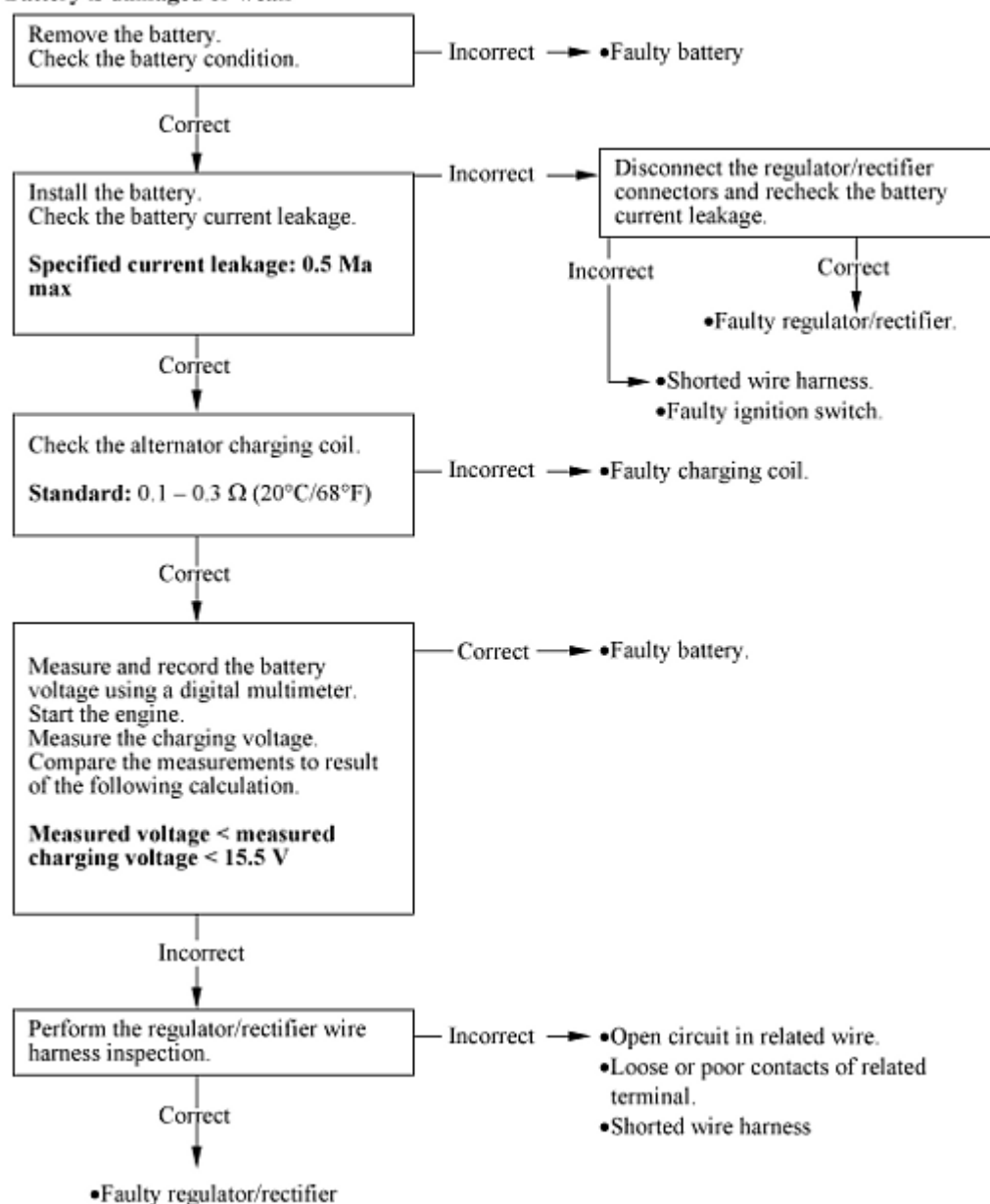
GENERAL INSTRUCTIONS

- Always turn off the ignition switch before disconnecting any electrical component.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is turned to "ON" and current is present.
- For extended storage, remove the battery. give it a full charge, and store it in a cool, dry place.
- For a battery remaining in a stored vehicle, disconnect the negative battery cable from the battery.
- The battery caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.
- The maintenance free battery must be replaced when it reaches the end of its service life.

- The battery can be damaged if overcharged or undercharged, or if left to discharge for long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2-3 years.
- Battery voltage may recover after battery charging, but under heavy load, the battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight on for long periods of time without riding the vehicle.
- The battery self-discharge when the vehicle is not in use. for this reason, charge the battery every 2 weeks to prevent sulfate from occurring.
- Filling a new battery with electrolyte will produce some voltage, but in order to achieve its maximum performance, always charge the battery. Also, the battery life is lengthened when it is initially charged.
- When checking the charging system, always follow the steps in the troubleshooting flow chart.

TROUBLESHOOTING

Battery is damaged or weak



BATTERY CHARGING

- This model comes with a maintenance free (MF) battery. Remember the following about MF batteries.
 - Use only the electrolyte that comes with the battery.
 - Use all of the electrolyte
 - Seal the battery properly
 - Never open the seals again

- For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.

IGNITION SYSTEM

GENERAL INSTRUCTIONS

- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is "ON" and current is present.
- The ignition timing cannot be adjusted since the ignition control module is already adjusted in factory.
- The ignition control module or ECU maybe damaged if dropped or the connector is disconnected when the key is "ON", the excessive voltage may damage the ignition control module or ECU. Always turn off the ignition switch before servicing.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding.
- Make sure the battery is adequately charged. Using the starter motor with weak battery results in a slower engine cranking speed as well as no spark at the spark plug.
- Use a spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.

TROUBLESHOOTING

Low peak voltage

- Cranking speed is too low (battery is undercharged).
- Poorly connected connectors or an open circuit in the ignition system.
- Faulty ignition-coil.
- Faulty ignition control module.

No peak voltage

- Short circuit in engine stop switch or ignition switch wire.
- Faulty engine stop switch or ignition switch.
- Loose or poorly connected ignition control module connectors.
- Open circuit or poor connection in ground wire of the ignition control module.
- Faulty ignition pulse generator/crank position sensor.
- Faulty ignition control module.

Peak voltage is normal, but no spark jumps at the plug

- Faulty spark plug or leaking ignition coil secondary current.
- Faulty ignition coil.

Starting System

GENERAL INSTRUCTIONS

- Always turn the ignition switch to "OFF" before servicing the starter motor. The motor could suddenly start, causing serious injury.
- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart.
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.

TROUBLESHOOTING

Starter motor will not turn

- Fuse burned out
- Weak battery
- Faulty ignition switch
- Faulty starter clutch or gear
- Faulty starter relay
- Poorly connected, broken or shorted wire
- Faulty starter motor

Lack of power

- Weak battery
- Loosed wire or connection
- Foreign matter stuck in starter motor

Starter motor rotates but engine does not start

- Faulty starter pinion
- Starter motor rotates in reverse
- Weak battery

LIGHTS, SWITCHES, AND FUEL PUMP

GENERAL INSTRUCTIONS

- Note the following when replacing the halogen headlight bulb
 1. Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
 2. If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
 3. Be sure to install the dust cover after replacing the bulb.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the scooter.
- Route the wires and cables properly after servicing each component.

TROUBLESHOOTING

Lights do not come on when ignition switch is “ON”

- Burned bulb
- Faulty switch
- Poorly connected, broken or shorted wire

Temperature gauge does not register correctly

- Faulty temperature gauge
- Faulty thermosensor
- Broken or shorted wire between the temperature gauge and thermosensor

Fuel gauge does not work or shows wrong figures

- Faulty fuel gauge
 - Faulty fuel unit
 - Poorly connected wire between fuel gauge and fuel unit
 - Fuse burned out
-

General Specifications

ITEM		SPECIFICATIONS
Throttle body identification number		PTA1
Idle speed		1500 ± 100 rpm
Throttle cable free play		2-6 mm (1/16-1/4 in)
Fuel injector resistance (at 20°C/68°F)		10.6 - 15.9 Ω
Fuel pump resistance (at 20°C/68°F)	Float at full position	About 101 Ω
	Float at empty position	About 3 Ω
Fuel pump standard pressure (at 80 L/Hr)		300 ± 10 kPa (43.5 psi)
Water temperature sensor resistance	At -20°C/-4°F	28.6 KΩ
	At 40°C/104°F	1.46 KΩ/3.51 KΩ ±1 0%
	At 100°C/212°F	0.176 KΩ
T-MAP sensor resistance (20°C) (1 and 2 pins)		1613 - 2544 Ω
Inductive ignition coil		Primary: 0.55-0.75 Ω
Throttle position sensor (TPS) resistance (at 20°C/68°F)		3500-6500 Ω (1.2 pin)
Crank position sensor resistance		96 -144 Ω
Roll sensor voltage	Standard	0.4 -1.4 V
	Over 65° (fall down)	3.7- 4.4 V

Electrical Specifications

ITEM			SPECIFICATIONS
Battery	Capacity		12V-18 Ah
	Current leakage		0.5 Ma max.
	Voltage (20°C/68°F)	Full charged	13.0 - 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.8 A/5 - 10 h
		Quick	9 A/1 h
Alternator	Charging coil resistance (20°C/68°F)		0.1 - 0.3 Ω

Stator output current	Standard
1300 rpm	12.0 A Minimum
5000 rpm	22.0 A Minimum
10000 rpm	30.0 A Maximum

Item	Standard
Spark plug	NGK-CR7E
Spark plug gap	0.6 - 0.7 mm (0.024 - 0.028 in.)
Ignition system	Full transistor digital ignition
Ignition timing	5° / 1500 rpm

Battery

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

The KYMCO UXV500I/700I uses a YTX20L-BS 12V, battery.

ITEM			SPECIFICATIONS
Battery	Capacity		12V-18 Ah
	Current leakage		0.5 Ma max.
	Voltage (20°C/68°F)	Full charged	13.0 - 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.8 A/5 - 10 h
		Quick	9 A/1 h

Removal

Turn OFF the ignition switch.

Lift up the hood. See the [Hood](#) topic for more information.

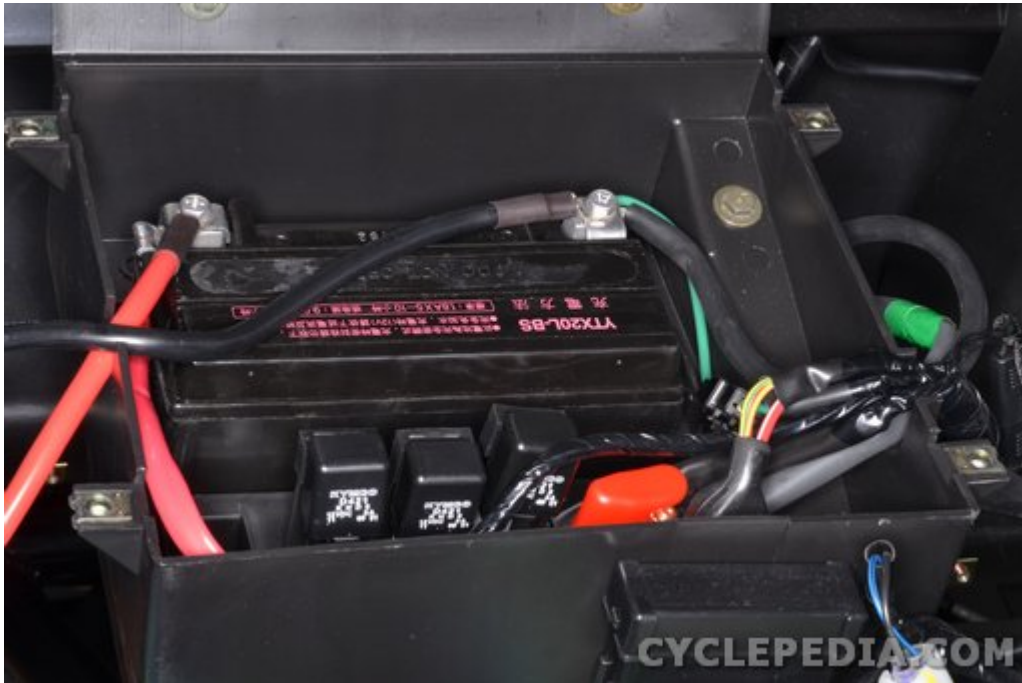




Remove the four battery cover screws with a #2 Phillips screwdriver.



Remove the battery cover.



Remove the rubber battery retaining strap.



Remove the negative battery cable (black) first with a #3 Phillips or 10 mm socket.



Remove the positive battery cable (red) after the negative battery cable has been removed with a #3 Phillips or 10 mm socket. Also, free the winch leads from the battery if a winch is installed. Lift out the battery.

Testing

Voltage



Check the battery voltage with a multimeter set to read DC voltage (DCV). Place the positive probe onto the positive battery terminal and the negative probe to the negative battery terminal. If the battery reads under 12.3 V it is undercharged.

Battery Voltage (20°C/68°F)	Full charged	13.0 - 13.2 V
	Needs charging	Below 12.3 V

Current Leakage

Turn the ignition switch OFF. disconnect the negative (-) cable from the battery.

Set the multimeter to read amperage. When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level.



Connect the ammeter (+) probe to the negative (-) cable and the ammeter (-) probe to the battery (-) terminal.

With the ignition switch OFF, check for current leakage.

Current flow higher than the range selected may blow out the fuse in the tester. While measuring current, do not turn the ignition switch ON. A sudden surge of current may blow out the fuse in the tester.

If current leakage exceeds the specified value, a short circuit is likely.

Locate the short by disconnecting electrical connections one by one and measuring the current.

Battery Current (Leak)	0.5 Ma max
------------------------	------------

Charging System Testing

To test the charging system see the [Charging System](#) topic.

Battery Charging

Remove the battery.



Connect the charger positive (+) cable to the battery positive (+) terminal. Connect the charger negative (-) cable to the battery negative (-) terminal.

Charging current	Normal	1.8 A/5 - 10 h
	Quick	9 A/1 h

Quick charging should only be done in an emergency; slow charging is preferred. For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery. Use a suitable battery charger. Do not connect the charger leads to the battery while the charger is on. Also, do not remove the charger leads from the battery while the charger is on. Turn the charger off before connecting or disconnecting the charger leads.

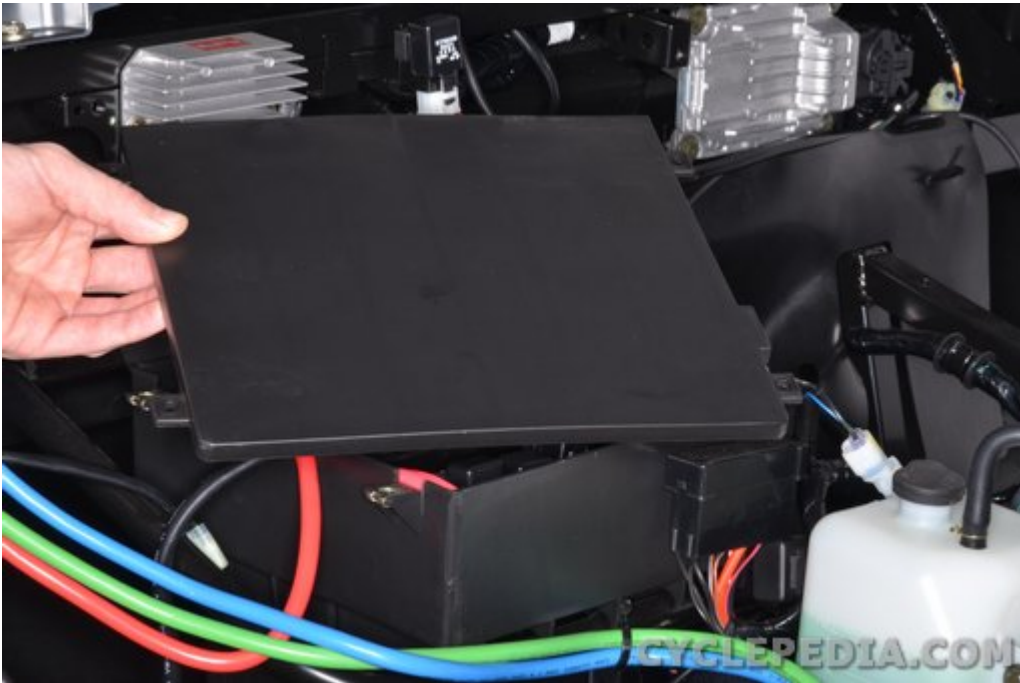
Installation

Install the battery.

Install the winch leads with their corresponding battery cables if a winch is installed.

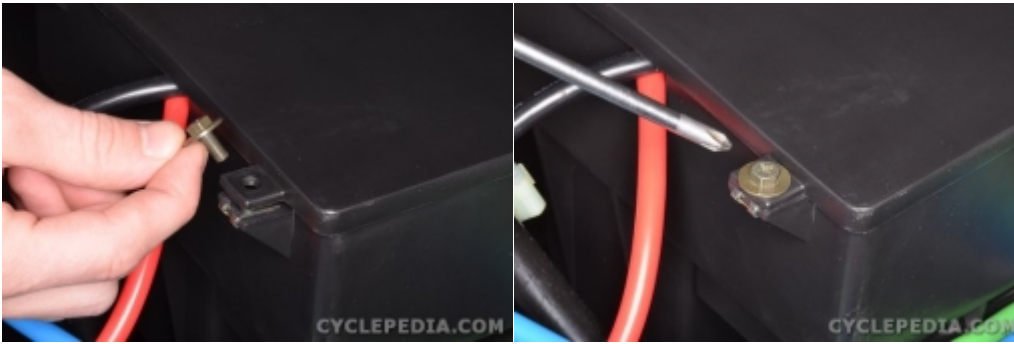


Connect the positive cable to the positive batter terminal and thread in the terminal screw. Tighten the screw securely with a #3 Phillips or 10 mm socket. Install the winch leads if a winch is present. Place the negative lead over the negative batter terminal and thread in the screw. Tighten the screw securely with a #3 Phillips screwdriver or a 10 mm socket. Install the rubber battery retaining strap.



Fit the battery cover into place.





Install the four battery cover screws and tighten them securely with a #2 Phillips screwdriver.

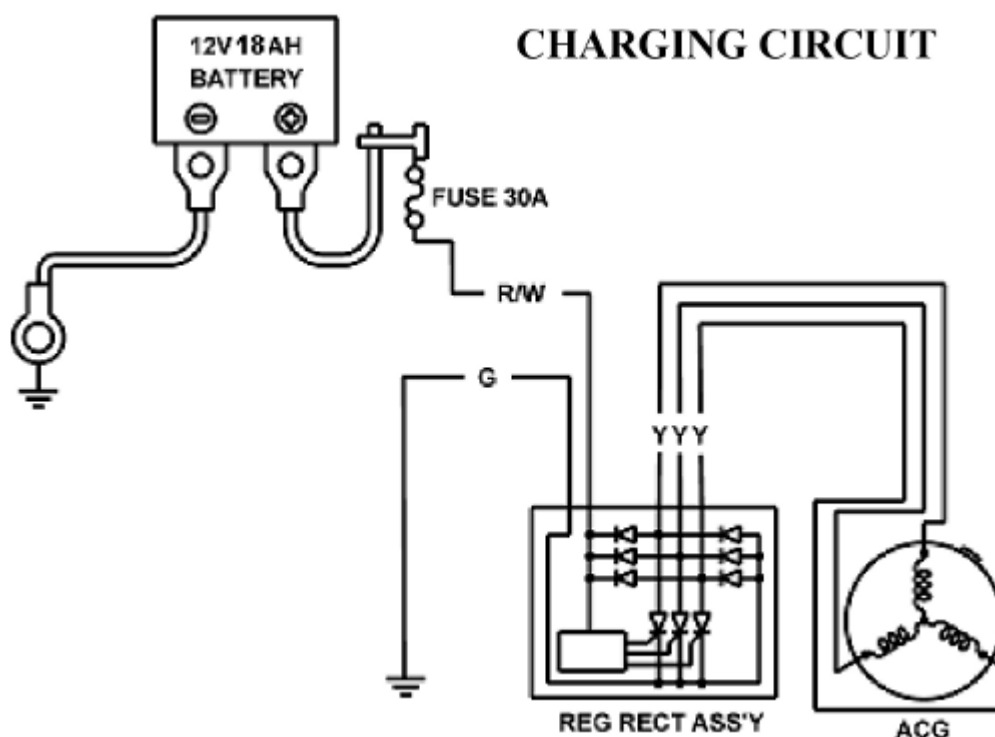
Install the hood. See the [Hood](#) topic for more information.

Charging System

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

You will need a digital multimeter to inspect the charging system.

Charging System Diagram



Battery

To access and test the battery see the [Battery](#) topic.

Charging Voltage

Make sure the battery is fully charged.

Check the charging voltage with a multimeter set to read DC voltage (DCV).

Connect a tachometer. Start the engine and let warm up to for several minutes.

Stop the engine.

Place the positive probe onto the positive battery terminal and the negative probe to the negative battery terminal.

Start the engine.



Turn on the lights and turn the dimmer switch to "HI". Rev the engine to 5,000 rpm and measure the voltage. The voltage should be greater than the battery voltage, and no more than 15.0 V. Turn the ignition switch off before disconnecting any charging system components.

Alternator Coil Resistance

Lift up the hood. See the [Hood](#) topic for more information.



Unplug the alternator regulator/rectifier connector with the three yellow wires.

Set the multimeter to read ohms of resistance (Ω).

Check that the alternator coil resistance is within specification by measuring the resistance between the three yellow wires. Also, check for continuity between the yellow wires and a ground. There should not be continuity.

Alternator coil resistance	yellow - yellow	0.1 - 0.3 Ω
----------------------------	-----------------	--------------------

Replace the stator coil if the resistance is not in specification or there is continuity between a yellow wire and ground. See the [Generator Cover](#) topic for more information.

Regulator/Rectifier

Inspection

Connectors



Inspect the connections of the regulator/rectifier connectors. Inspect the connectors for loose wires and corroded terminals.

Battery Line

Unplug the four pin regulator/rectifier connector with the green, black, and red/white wires.

Set the multimeter to read DC voltage (DCV).

Measure the voltage between the Red/White wire terminal on the harness side of the connector and a ground. There should be battery voltage at all times.

Voltage Feedback Line

Unplug the four pin regulator/rectifier connector with the green, black, and red/white wires.

Set the multimeter to read DC voltage (DCV).

Measure the voltage between the black wire terminal on the harness side of the connector and a ground.

There should be battery voltage with the ignition switch ON, and no voltage with the ignition switch OFF.

Ground Line

Unplug the four pin regulator/rectifier connector with the green, black, and red/white wires.

Set the multimeter to read ohms of resistance (Ω).

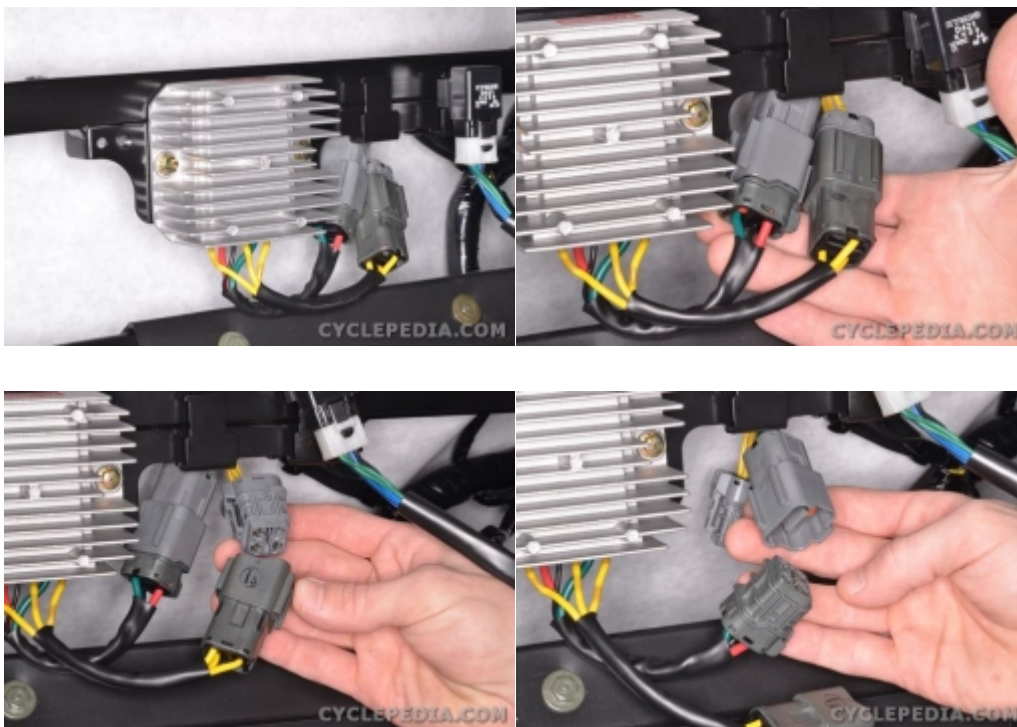
Check the continuity between the Green wire terminal and ground. There should be continuity at all times.

Removal

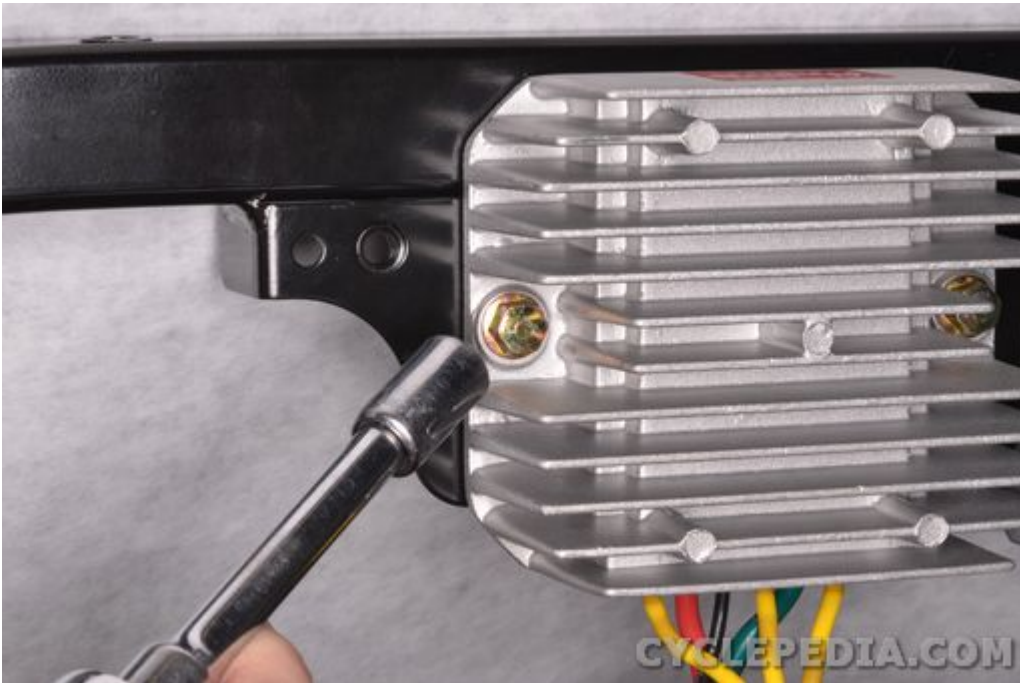
Lift up the hood. See the [Hood](#) topic for more information.



The regulator/rectifier is located under the hood.



Unplug the regulator/rectifier connectors.



Remove the two regulator/rectifier mounting bolts with an 8 mm socket.



Remove the regulator/rectifier.

Installation



Fit the regulator/rectifier into place.



Install the two regulator/rectifier mounting bolts and tighten securely with an 8 mm socket.

Fuses

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Fuse Box

Open the hood. See the [Hood](#) topic.



The fuse box is mounted on the front of the battery holder.



Lift off the fuse box cover.



Check for blown fuses and replace them as needed.

Main Fuse

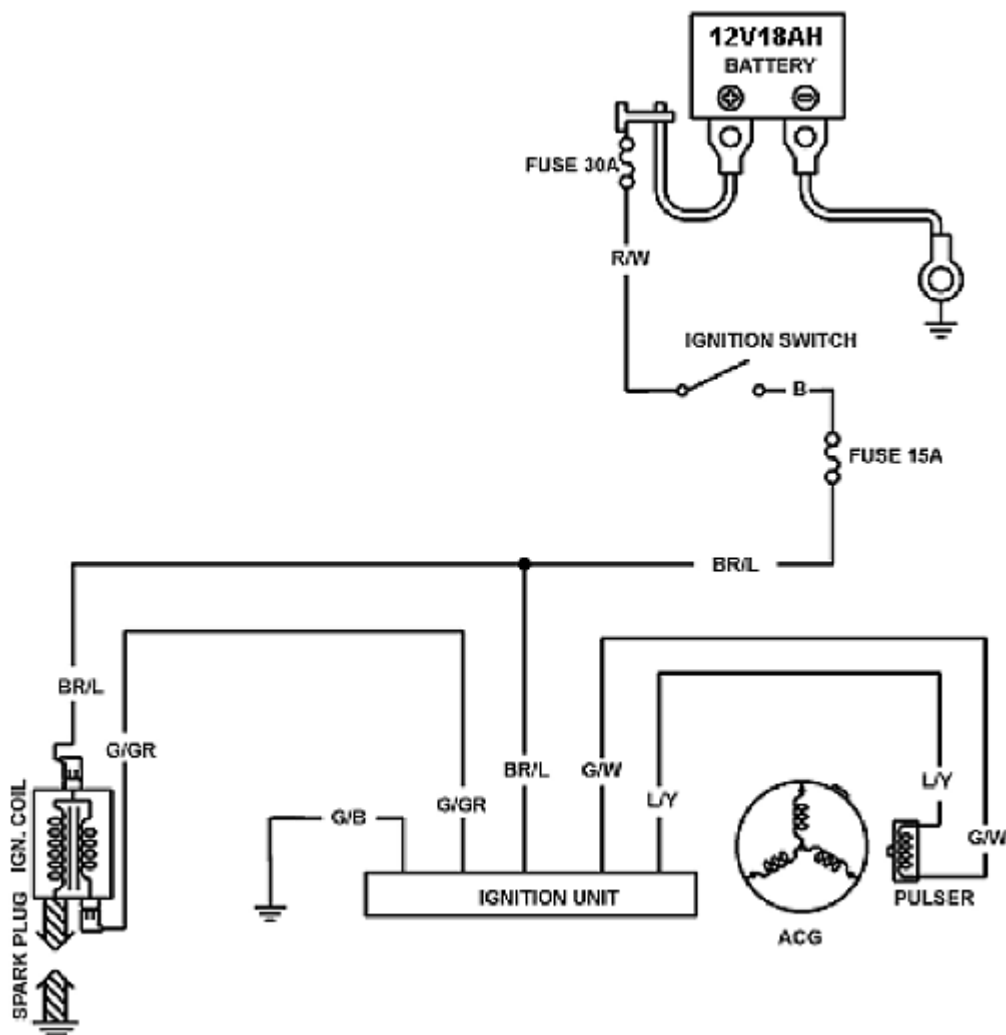


The main fuse is located with the starter relay. See the [Starting System](#) topic for more information on checking this fuse.

Ignition System

The ignition timing is set at the factory and is not adjustable. To troubleshoot the ignition system, you will need a digital multimeter. Perform the following checks. Before performing any tests make sure the electrical connections are not loose or corroded. Also, make sure the engine has good compression, the transmission is in neutral, the engine kill switch is in the run position, the main fuse is not blown, and the battery has a full charge.

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.



Electrical Connections

Make sure all electrical connections are good. There must not be open, loose, or rusted connections.

Make sure the battery is fully charged and the fuses are in good condition. See the [Battery](#) and [Fuses](#) topics for more information.

Troubleshooting

See the troubleshooting chart on the [Electrical Systems General Information](#) topic.

Spark Check

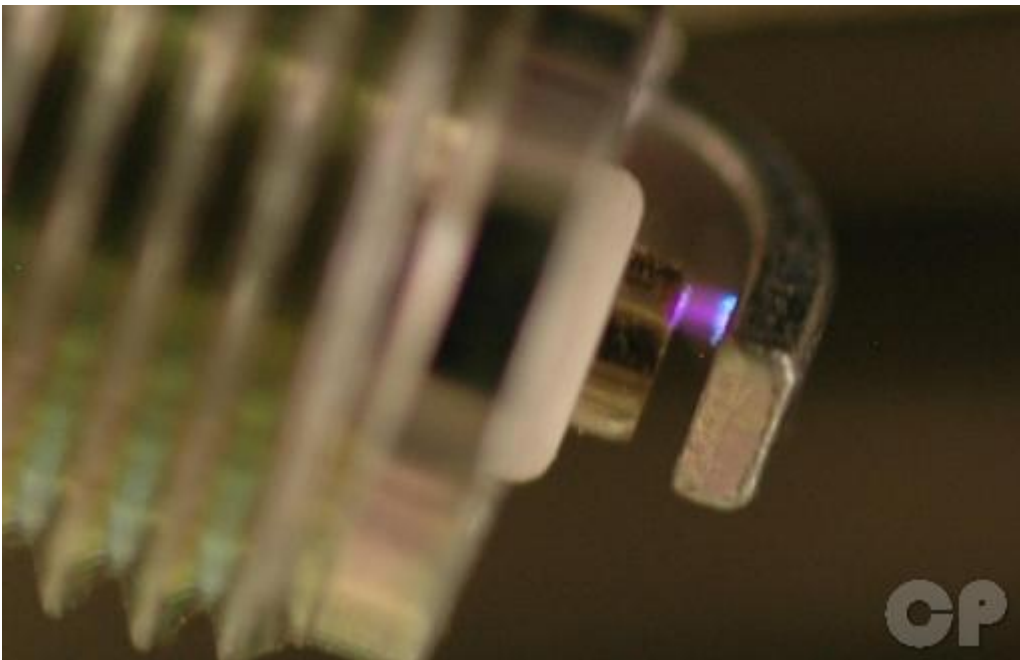
Warning: Do not touch the spark plug or spark plug wire while cranking or running the engine as this can result in a severe shock.

Remove the center cover. See the [Center Cover](#) topic for more information.

Check the spark plug to see if it is the correct type and gapped properly. If the spark plug is black and fouled, replace it. See the [Spark Plug](#) topic for more information.



Connect a known good spark plug to the cap and ground the plug to the engine. There should still be a spark plug installed in the cylinder head.



Turn the key as to start the engine and check that the plug will spark. If the plug does not spark go through the following procedures to find the problem.

Ignition Coil

Primary Resistance

Remove the frame cover behind the right seat. See the [Frame Covers](#) topic for more information.



Unplug the connector from the ignition coil.

Set the multimeter to read ohms of resistance (Ω).

Measure the resistance between the ignition coil terminals.

Ignition coil resistance	Primary	$0.63 \pm 0.03 \Omega$ at 23°C
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Ignition Advance Check

Connect the diagnostic tool. See the [Diagnostic Tool](#) topic for more information.

Start the engine and let it run until it reaches 80° C at idle.



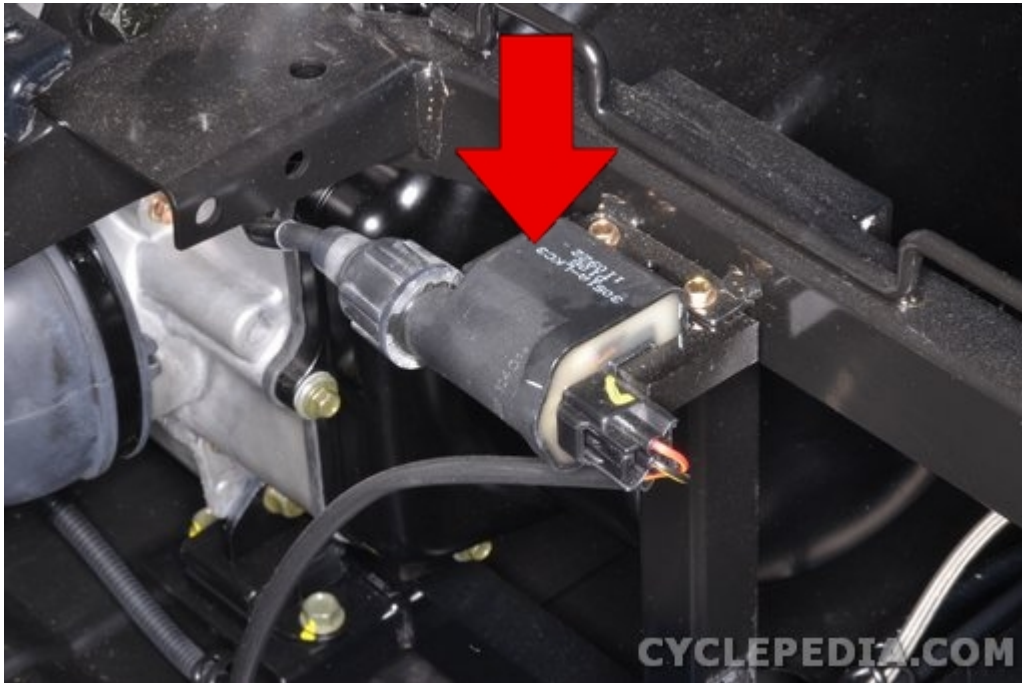
Bring up the data analysis page 04.

At idle the ignition advance should show 10 - 15° at idle with a closed throttle.

Removal

Remove the center cover. See the [Center Cover](#) topic for more information.

Remove the frame cover behind the right seat. See the [Frame Covers](#) topic for more information.



The ignition coil is located to the right of the engine cylinder on the frame.



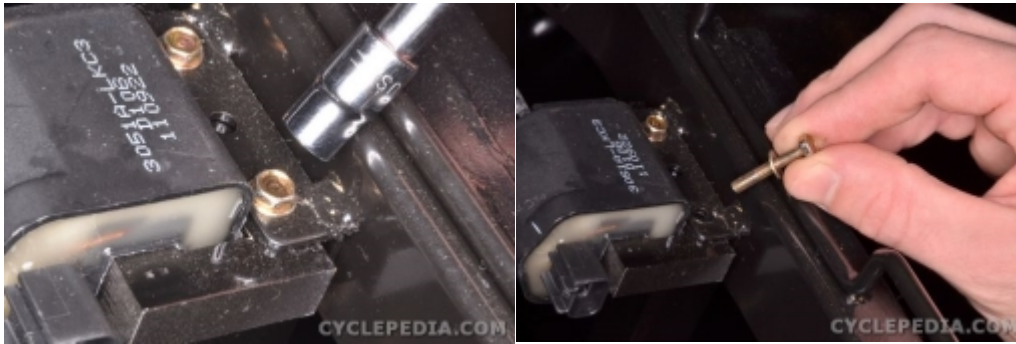
Pull the spark plug cap off of the spark plug.



Free the spark plug lead from the clamp on the CVT belt case cover.



Unplug the ignition coil lead.



Remove the ignition coil mounting bolts.



Remove the ignition coil.

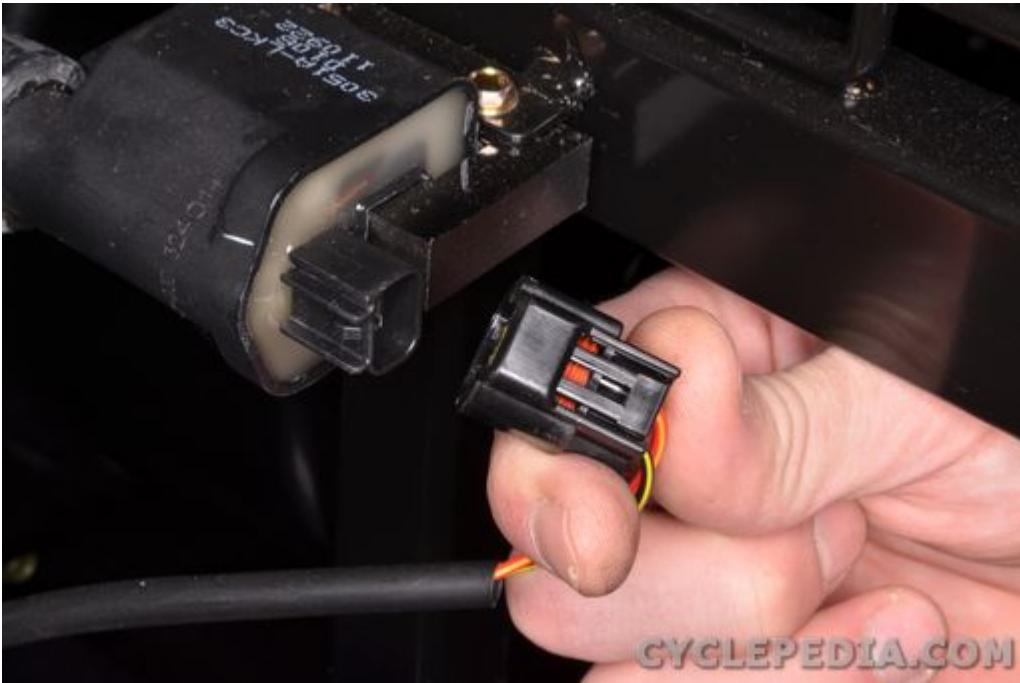
Installation



Fit the ignition coil into place.



Install the two ignition coil mounting bolts and tighten the bolts securely.



Plug in the ignition coil lead connector.



Fit the spark plug cap onto the spark plug.

Install the frame cover behind the right seat. See the [Frame Covers](#) topic for more information.

Install the center cover. See the [Center Cover](#) topic for more information.

Ignition Pulse Generator / Crank Position

Sensor

Trace the wires up from the generator cover.



Unplug the 2-pin ignition pulse generator / crank position sensor connector.

Set the multimeter to read ohms of resistance (Ω).

Measure the resistance between the terminals of the ignition pulse generator connector.

ITEM	SPECIFICATIONS
Crank position sensor resistance	96 -144 Ω

ECU Input Voltage

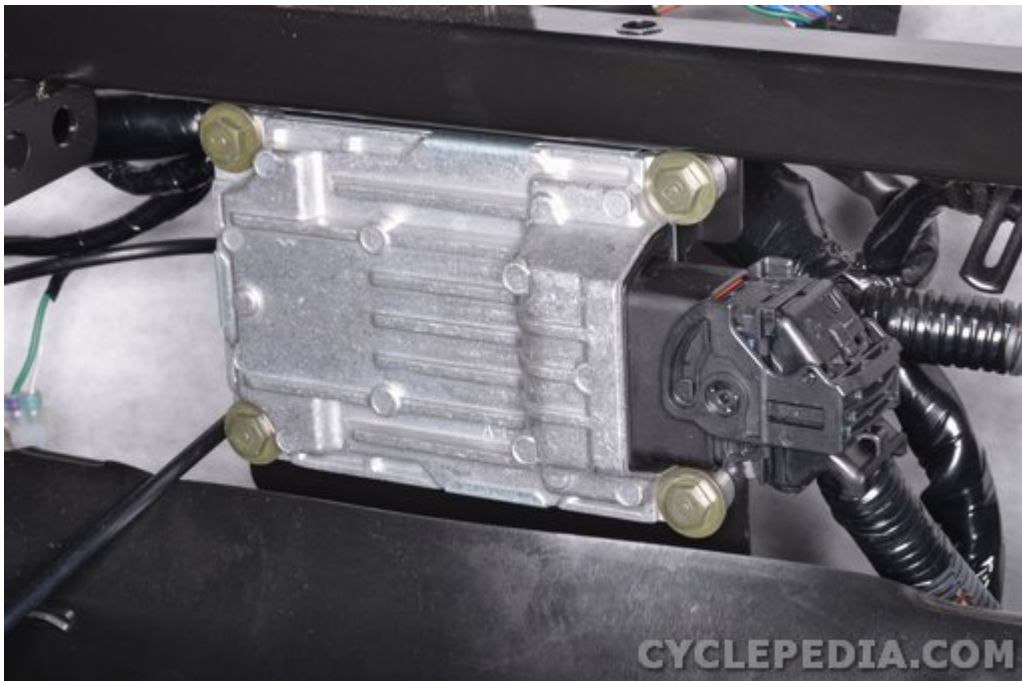
Unplug the ECU connector.

Set the multimeter to read DC voltage (DCV).

Connect the meter (+) probe to the B4(R/W) wire and the meter (-) probe to the M3(G/B) wire to measure the voltage. There should be 12 V.

Removal

Lift up the hood. See the [Hood](#) topic for more information.



Remove the four ECU bolts with a 10 mm socket.



Remove the ECU from the frame.



Push in the tab and rotate the clip to unlock the ECU.



Unplug the ECU connector. Check the ECU for damaged pins.



Check the back of the ECU for information.

Installation



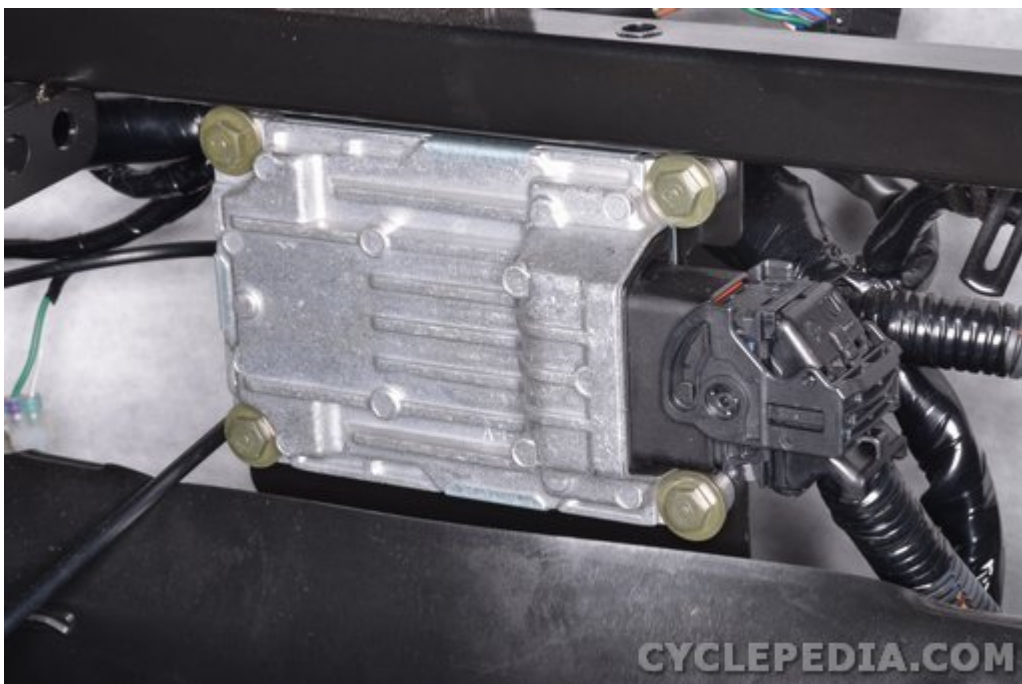
Plug in the ECU connector.



Rotate the clip and lock the connector to the ECU.



Fit the ECU into place.



Install the four ECU bolts and tighten them securely with a 10 mm socket.

Lights

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Headlight

To adjust or remove the headlight assembly see the [Headlight](#) topic for more information.

Position Light Replacement

Replacement bulbs are 12 V 5 W (right and left sides).

Remove the hood. See the [Hood](#) topic for more information.



Remove the bulb socket.



Replace the bulb if need and install the bulb socket back in place.

Install the hood. See the [Hood](#) topic for more information.

Headlight Bulb Replacement

Replacement bulbs are 12 V 35W/35 W (right and left sides).

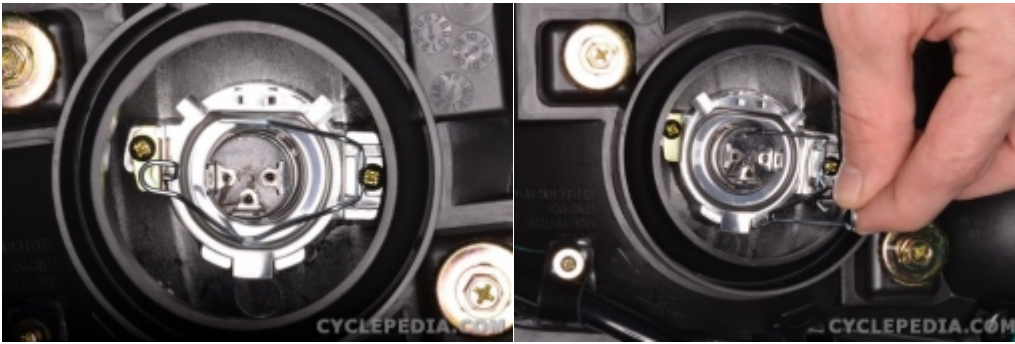
Remove the hood. See the [Hood](#) topic for more information.



Remove the rubber cover.



Unplug the headlight connector.



Remove the bulb spring.



Remove the headlight bulb and replace if needed. Do not touch glass with bare hands.



Install the bulb spring.



Plug in the headlight connector.



Install the rubber cover.

Install the hood. See the [Hood](#) topic for more information.

Taillight

Bulb Replacement



To replace/remove the taillights see the [Rear Fenders](#) topic.

Starter Motor

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Turn OFF the ignition switch.

Remove the throttle body. See the [Throttle Body Removal and Installation](#) topic for more information.



Pull back the rubber cover from the starter motor terminal.

Loosen the starter motor terminal nut with a 10 mm socket and free the lead from the terminal.



Remove the two starter motor mounting bolts with an 8 mm socket. Move the ground wire.



Remove the starter motor.

Installation



Fit the starter motor into place on the top of the crankcases.



Install the two starter motor mounting bolts and tighten them securely with an 8 mm socket. Be sure to slide the ground lead onto the mounting bolt before inserting it.



Install the starter motor terminal nut and lead with a 10 mm socket. Tighten the nut securely.

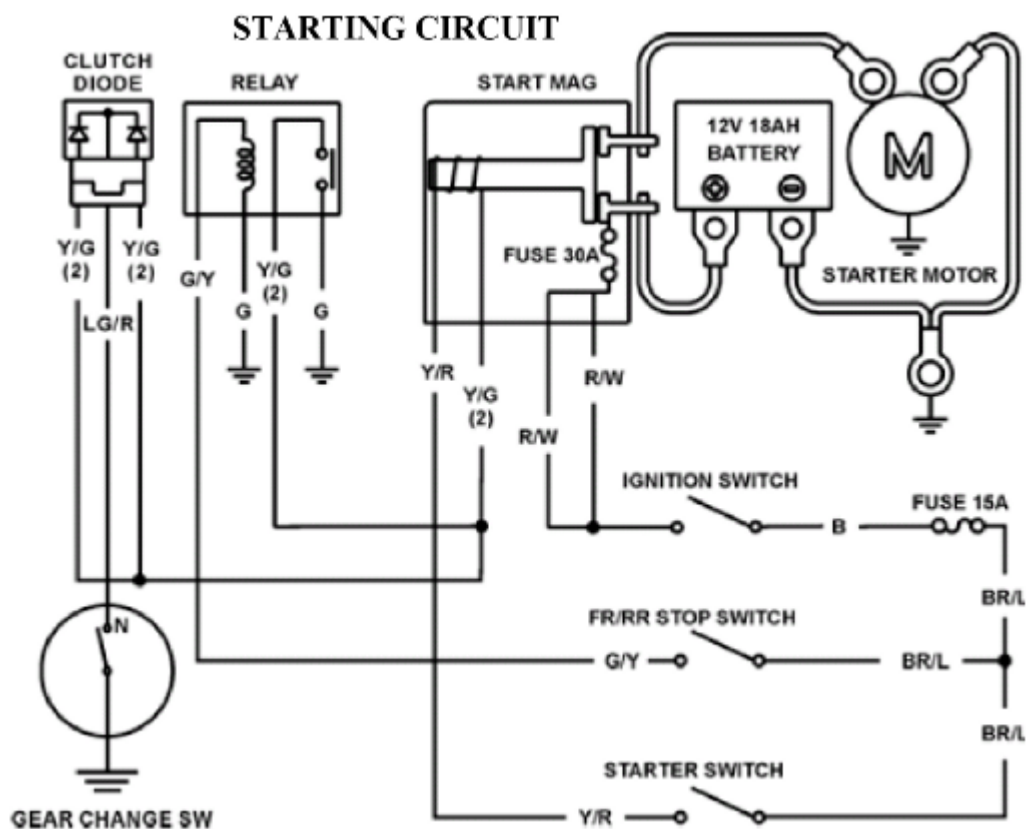
Slide on the rubber cover onto the starter motor terminal.

Install the throttle body. See the [Throttle Body Removal and Installation](#) topic for more information.

Starting System

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

You will need a digital multimeter to inspect the starting system.



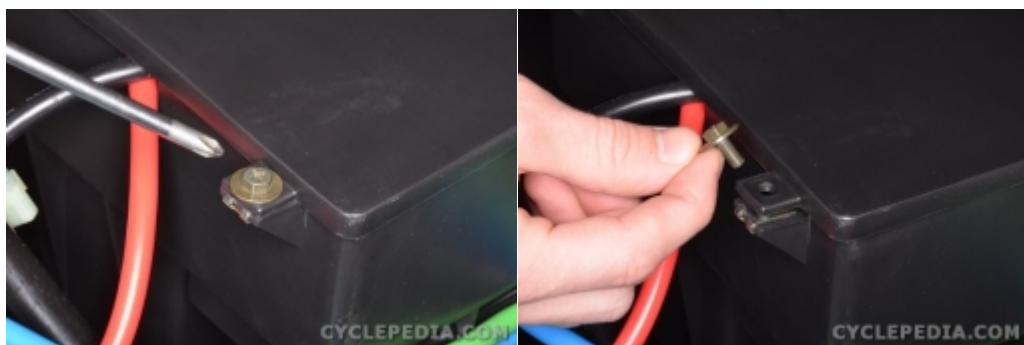
Starter Motor

See the [Starter Motor](#) topic.

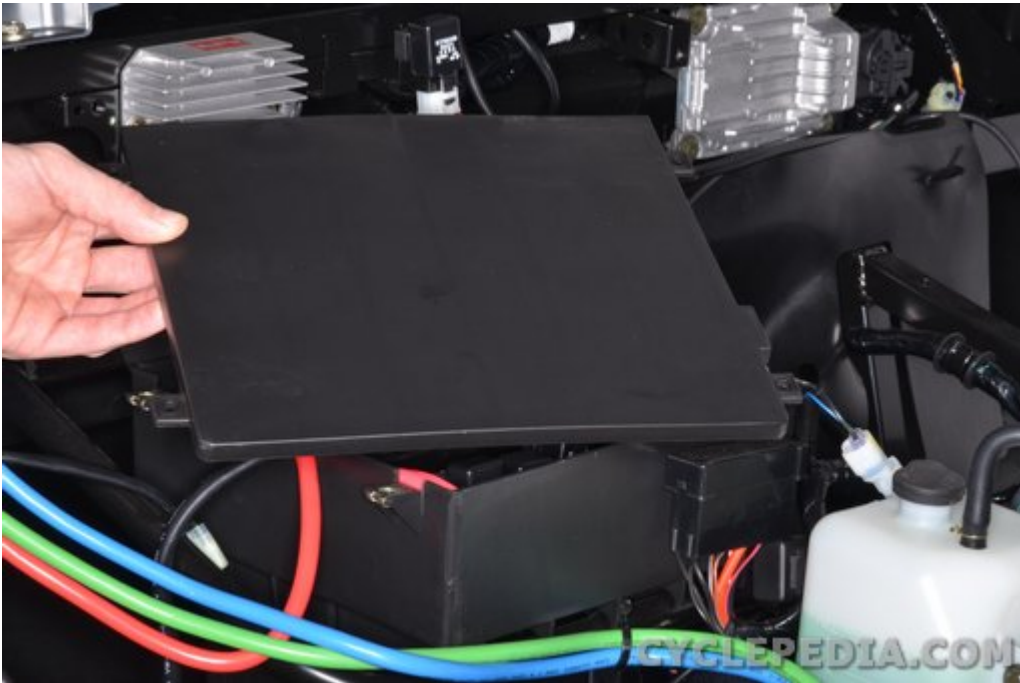
Starter Relay

Operation Inspection

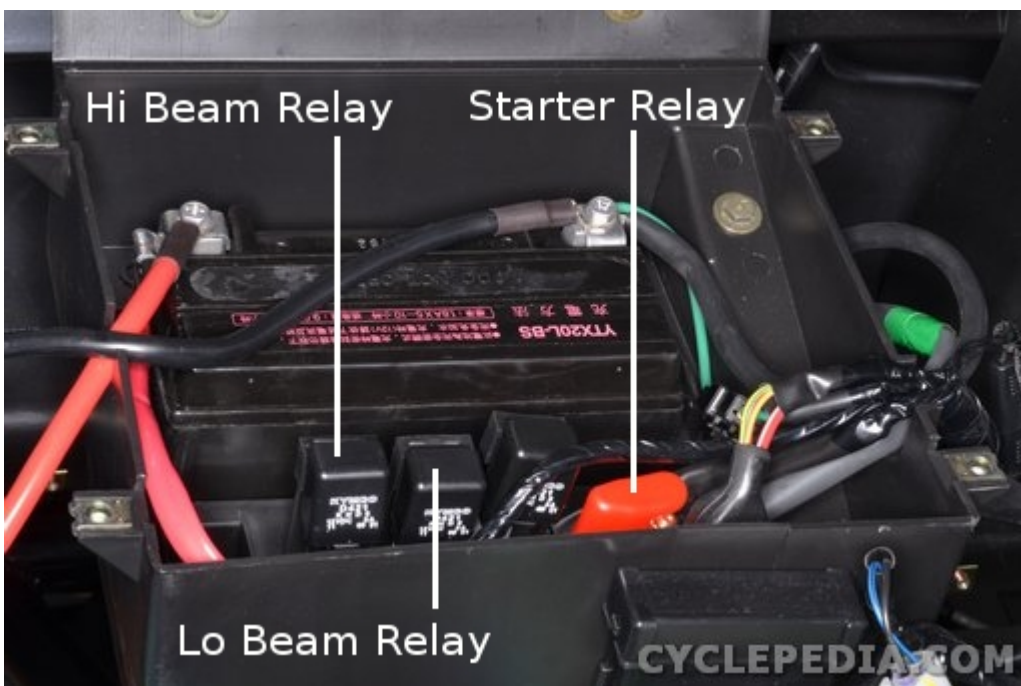
Lift up the hood. See the [Hood](#) topic for more information.



Remove the four battery cover screws with a #2 Phillips screwdriver.



Remove the battery cover.



The Hi Beam Relay, Lo Beam Relay and Starter Relay are next to the battery as shown. Turn the ignition switch to the ON position. Press the brake pedal. Turn the key to start the engine and listen for the starter relay to click. Inspect the starter relay if it doesn't click.

Fuse



Lift the starter relay out of the battery holder.



Unplug the connector from the starter relay.



Remove the fuse (30A). Replace the fuse if it is blown.

Ground Line Inspection



Unplug the connector from the starter relay.

Check for continuity between a ground and the green wire terminal of the starter relay connector. There should be continuity.

Voltage Inspection

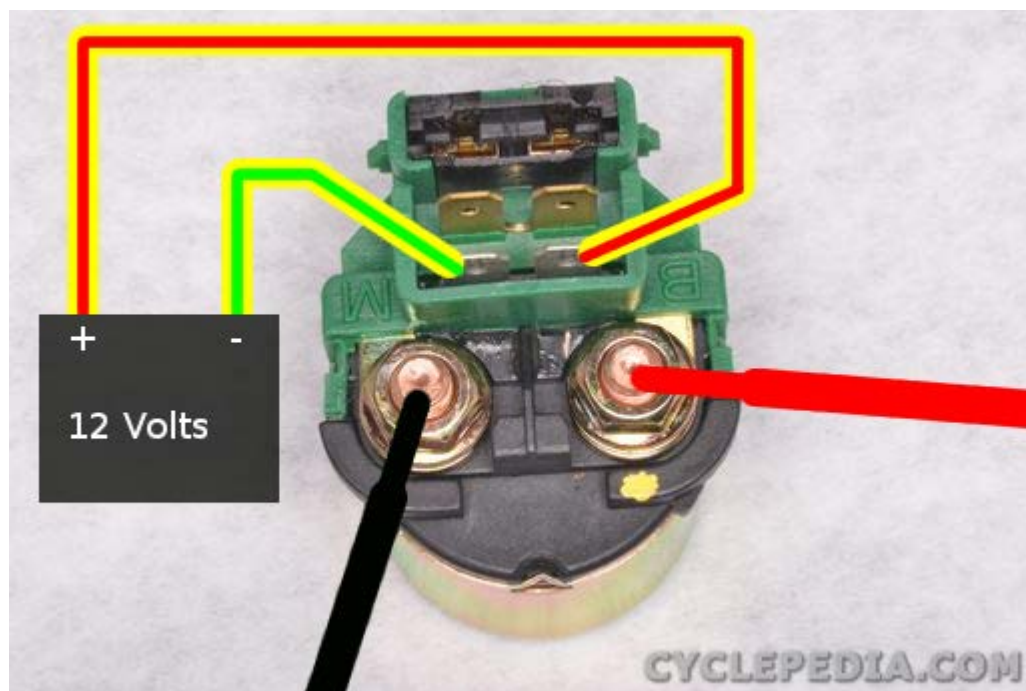
Set the multimeter to read DC voltage (DCV).



Check the voltage with the starter relay connector plugged in. Measure the voltage between the yellow/red wire and a ground. There should only be voltage with the gear position switch in neutral and the key is turned to start the engine or the brake pedal is pushed in and the key is turned to start the engine.

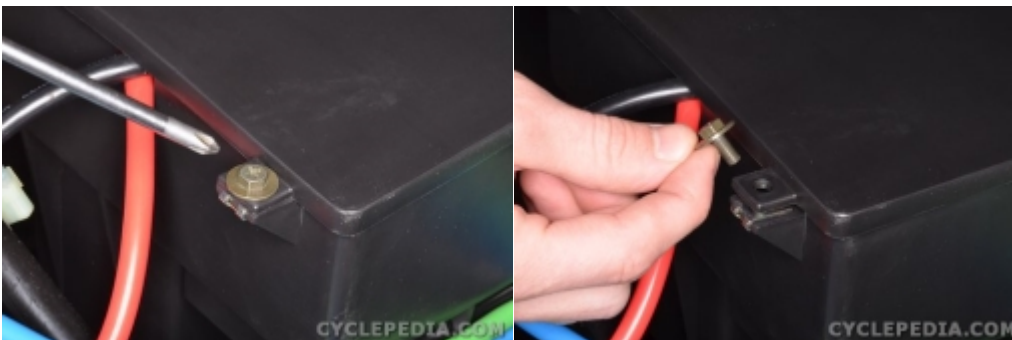
Continuity Inspection

Remove the starter relay.

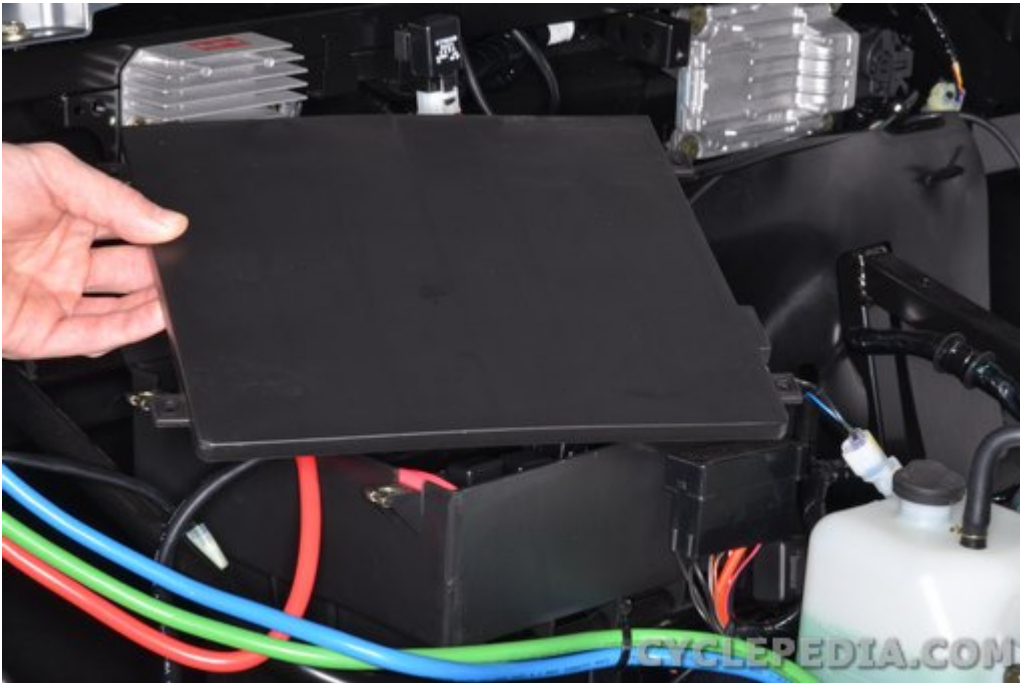


Connect a fully charged 12 V battery positive wire to the relay switch Yellow/Red wire terminal and negative wire to the Yellow/Green wire terminal. There should be continuity between the cable terminals while the battery is connected, and no continuity when the battery is disconnected.

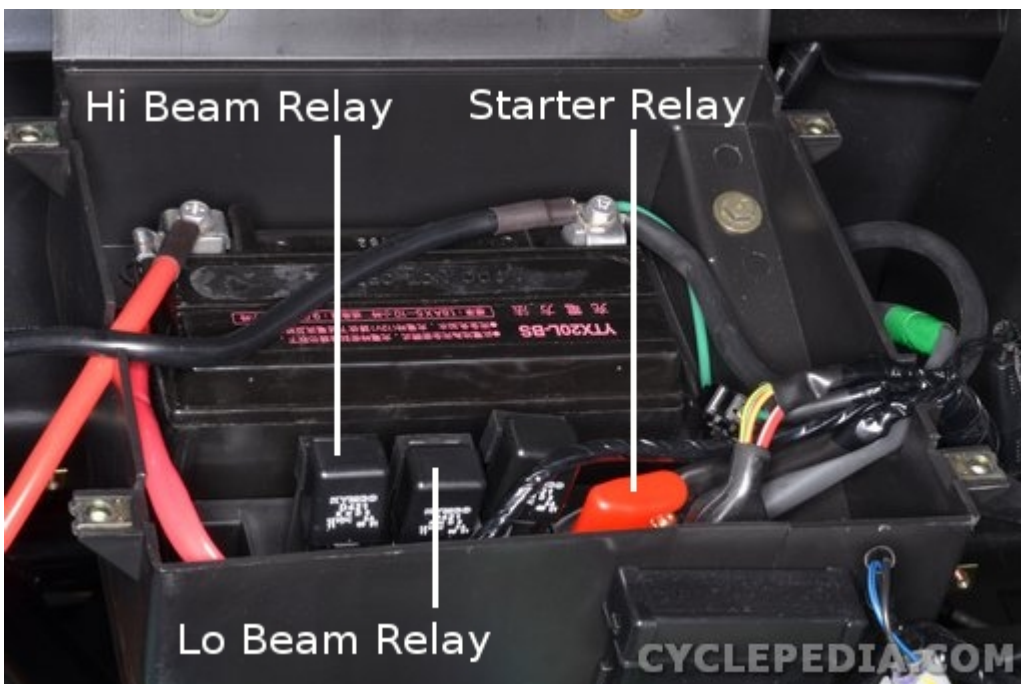
Removal



Remove the four battery cover screws with a #2 Phillips screwdriver.



Remove the battery cover.



The Hi Beam Relay, Lo Beam Relay and Starter Relay are next to the battery as shown.



Lift the starter relay out of the battery holder.

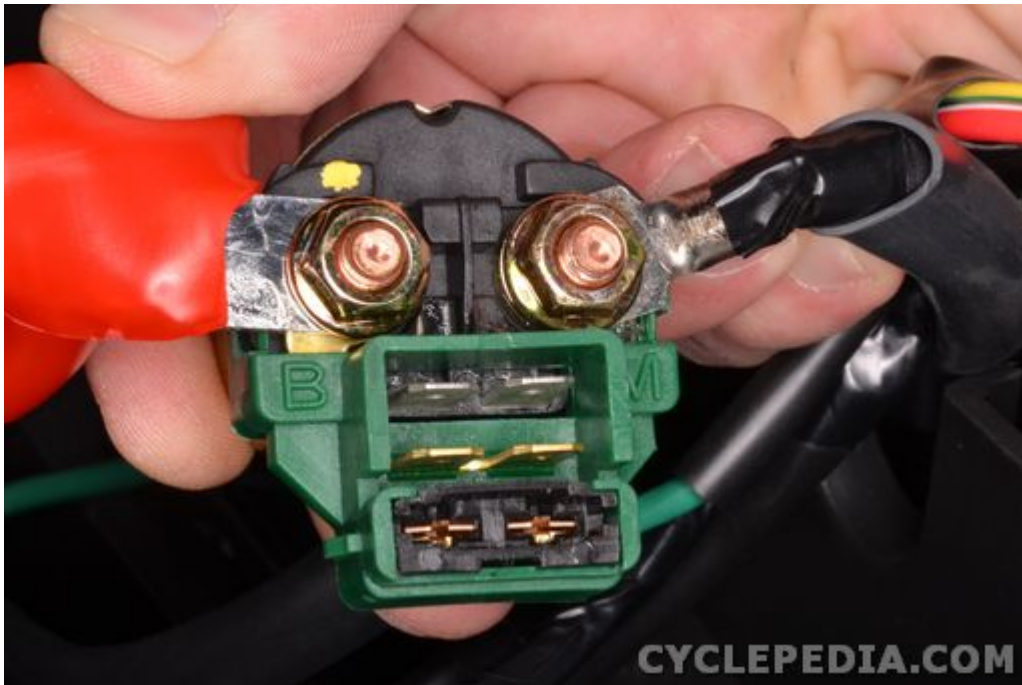


Unplug the connector from the starter relay.



Remove the positive battery lead and starter motor lead nuts with a 10 mm socket. Free the positive battery and starter motor leads from the terminals.

Installation



Connect the starter motor lead to the terminal marked M. Connect the positive battery lead to the terminal marked B. Tighten the terminal nuts securely with a 10 mm socket. Move the red cover into place over the nut.



Install the fuse (30A).



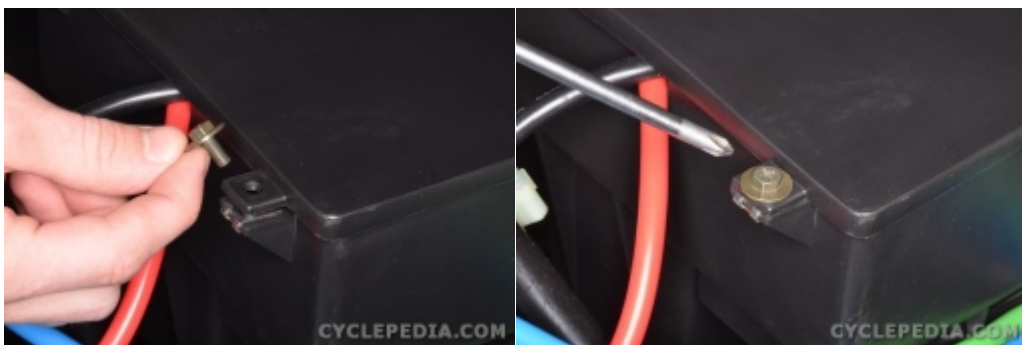
Plug in the starter relay connector.



Fit the starter relay into place in the battery holder.



Fit the battery cover into place.



Install the four battery cover screws and tighten them securely with a #2 Phillips screwdriver.

Install the hood. See the [Hood](#) topic for more information.

Switches

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

To test these switches, you will need a digital multimeter set to Ω (Ohms of resistance). If a switch does not meet specification replace it. Check the wiring diagrams for the continuity diagrams for the specific model being tested. See the [Wiring Diagrams](#) topic for more information.





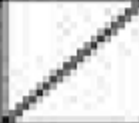
Ignition Switch

Open the hood. See the [Hood](#) topic for more information.



Disconnect the ignition switch.

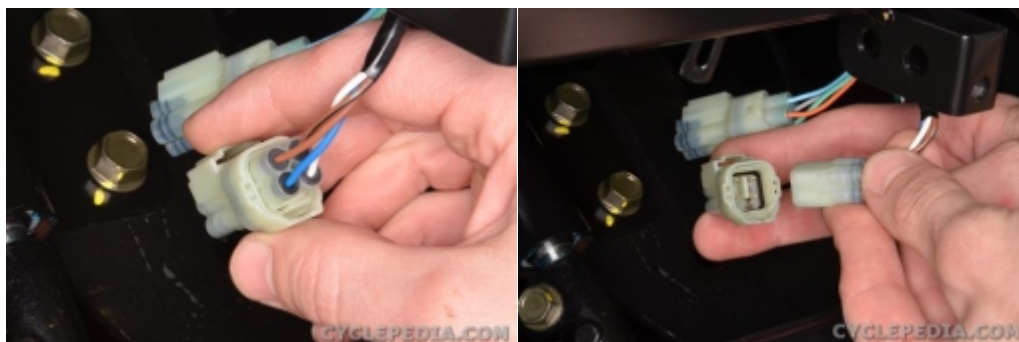
Ignition Switch

OFF					
ON					
START					
COLOR	R	B	Y/R		

Check for continuity as indicated.










Dimmer Switch

Open the hood. See the [Hood](#) topic for more information.



Disconnect the dimmer switch.

LIGHT SW

	P0	L0	HI
			
			
			
COLOR	BR/B	W	L









Check for continuity as indicated.

Gear Position Switch

Remove the center cover. See the [Center Cover](#) topic for more information.



Disconnect the gear indicator switch connector.

Gear						
L						
H						
N						
R						
P						
COLOR	W/BR	L/R	LG/R	W/B	W/R(1)	G

Check for continuity between the switch wire terminals and a ground (G) as indicated.

To replace the gear position switch see the [Crankcase](#) topic.

Speed Sensor

Lift up the cargo bed. See the [Cargo Bed](#) topic for more information.



Inspect the speed sensor connector. Make sure the connector is making good contact with the sensor. If the speed sensor looks good but the speedometer doesn't function replace the speedometer with a known good unit.

If the known good speedometer fails to function replace the speed sensor.

2WD/4WD Actuator and Switch

2WD/4WD Actuator Inspection

Set the multimeter to read DC voltage (DCV).

1. Select the 2WD position on the front drive selector switch; then disconnect the connector on the actuator wiring harness.
2. With the ignition switch in the OFF Position, connect the black tester lead to the black wire in the supply harness; then connect the red tester lead to the brown/lavender wire in the supply harness.
3. Turn the ignition switch to the ON position. The meter must show 12 DC volts.
4. Connect the red tester lead to the white/blue wire in the supply harness. The meter must show 12 DC volts.
5. Select the 4WD position on the front drive selector switch, then connect the red tester lead to the white/blue wire in the supply harness. The meter must show 0 DC volts.
6. Connect the red tester lead to the brown/lavender wire in the supply harness. The meter must show 12 DC volts.

2WD/4WD Switch

Open the hood. See the [Hood](#) topic for more information.



Disconnect the 2WD/4WD switch.

1. Set the multimeter selector to the read ohms of resistance (Ω).
2. Connect the one tester lead to the BR/L wire, then connect the other tester Lead to the W/R wire. Select switch position at 4WD. Measure resistance. Meter must show less than 1 Ω .
3. Connect the one tester lead to the BR/L wire, then connect the other tester Lead to the W/L wire. Select switch position at 2WD. Measure resistance. Meter must show Ω data.

Note: If the meter does not show as specified, replace the front drive selector switch.

