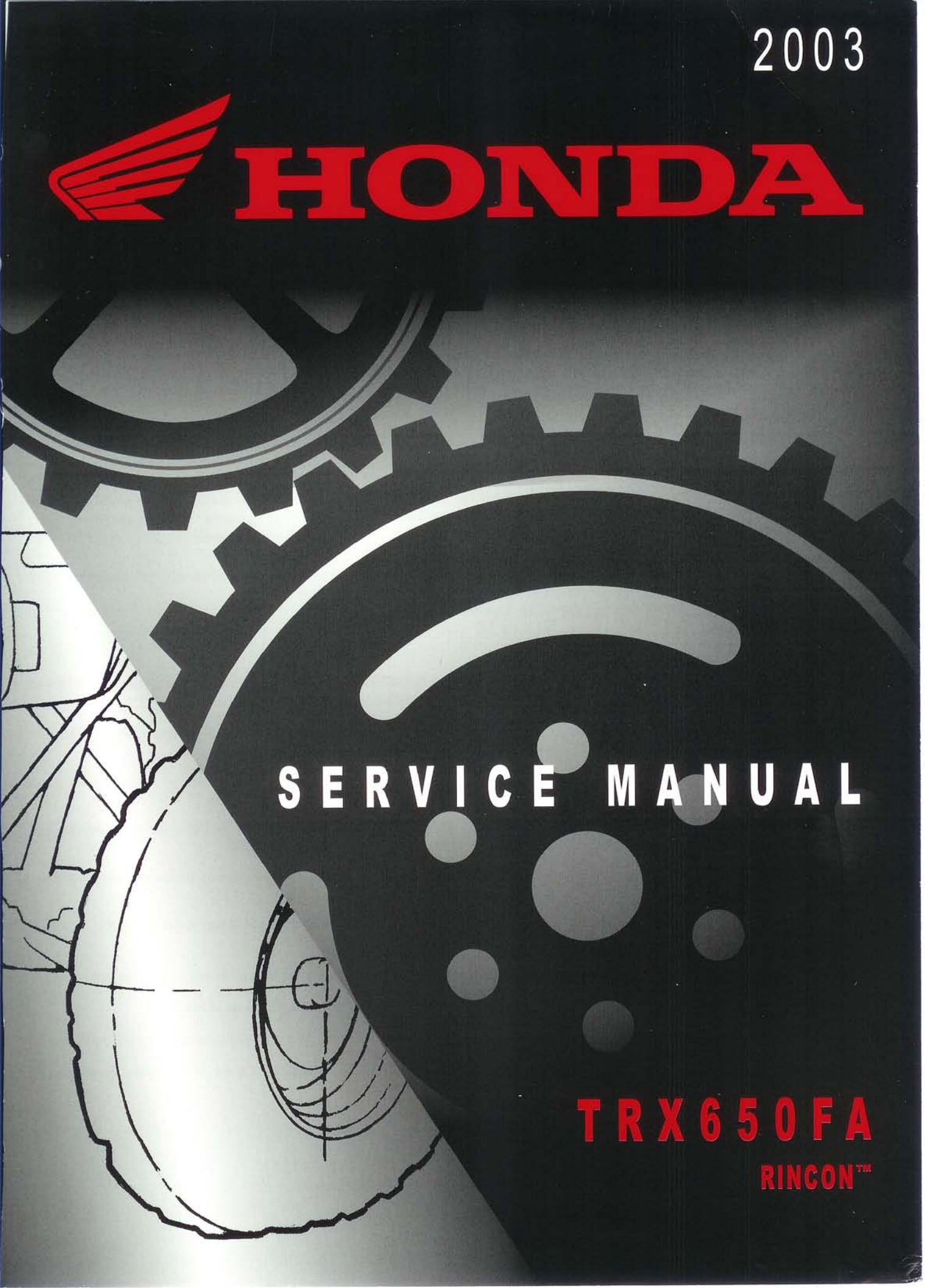
2003

HONDA



SERVICE MANUAL

TRX650FA

RINCON™

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LUBRICATION SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	2.8 liters (3.0 US qt, 2.5 Imp qt)	–
	After draining/filter change	2.9 liters (3.1 US qt, 2.6 Imp qt)	–
	After disassembly	4.1 liters (4.3 US qt, 3.6 Imp qt)	–
Recommended engine oil		Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil (USA & Canada), or Honda 4-stroke oil (Canada only), or an equivalent motorcycle oil API service classification: SG or Higher except oils labeled as energy conserving on the circular API service label JASO T 903 standard: MA Viscosity: SAE 10W-40, 5W-30	–
Oil pressure at 5,000 rpm/80°C (176°F)		785 kPa (8.0 kgf/cm^2, 114 psi)	–
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.12 – 0.22 (0.005 – 0.009)	0.25 (0.010)
	Side clearance	0.02 – 0.09 (0.001 – 0.004)	0.11 (0.004)

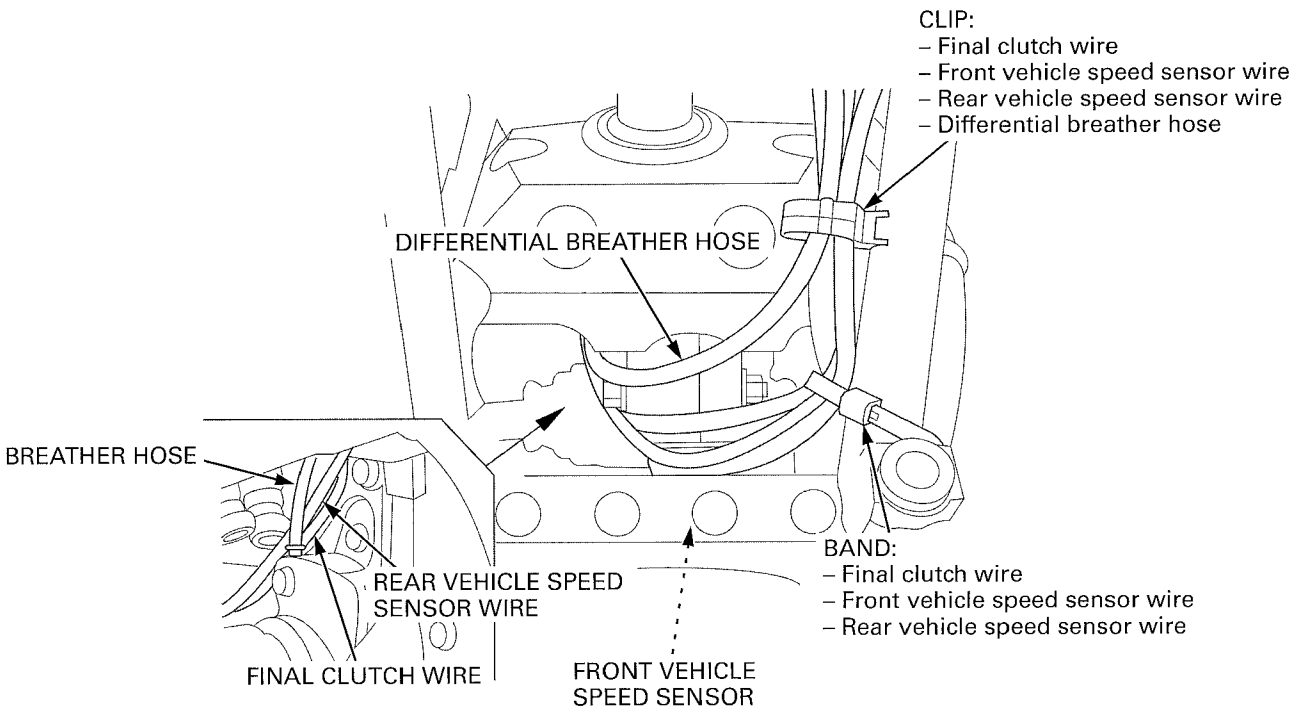
FUEL SYSTEM SPECIFICATIONS

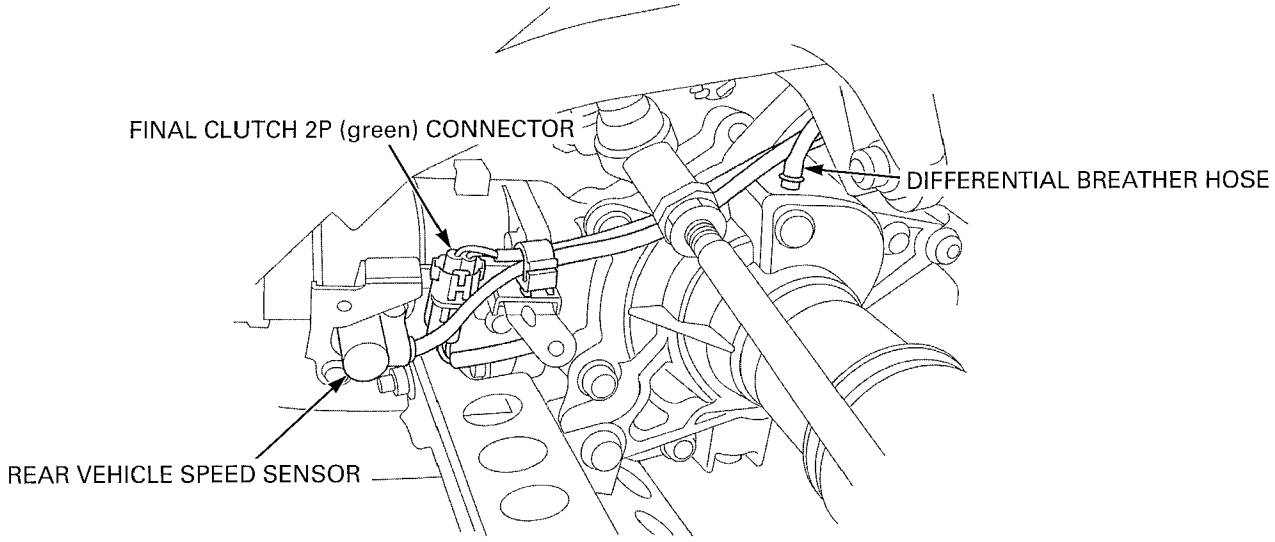
ITEM	SPECIFICATIONS
Carburetor identification number	VE89A
Main jet	# 152
Slow jet	# 50
Pilot screw opening	See page 5-20
Float level	15.9 mm (0.63 in)
Idle speed	1,400 ± 100 rpm
Throttle grip free play	3 – 8 mm (1/8 – 5/16 in)

COOLING SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.0 liters (2.1 US qt, 1.8 Imp qt)
	Reserve tank	0.46 liter (0.49 US qt, 0.40 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm^2, 16 - 20 psi)
Thermostat	Begin to open	80 – 84°C
	Fully open	95°C
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors
Standard coolant concentration		1:1 mixture with distilled water

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Puller shaft	07931-ME40000	NOTE 1: 07931-ME4010B and 07931-HB3020A (U.S.A.only)	13, 18
Puller, 35 x 1.0 mm	07933-HA80000	NOTE 1: 07933-HB3000A (U.S.A. only)	12
Bearing remover handle	07936-3710100		11, 12, 13, 17, 18
Bearing remover, 17 mm	07936-3710300		11, 12, 13, 18
Bearing remover, 20 mm	07936-3710600		13
Bearing remover, 30 mm	07936-8890200		17
Bearing remover head, 10 mm	07936-GE00200	NOTE 1: 07936-GE00A00 (U.S.A. only)	10
Bearing remover shaft	07936-GE00100	NOTE 1: 07936-GE00A00 (U.S.A. only)	10
Bearing remover head, 15 mm	07936-KC10200	NOTE 1: 07936-KC10500	6, 17
Bearing remover shaft	07936-KC10100	NOTE 1: 07936-KC10500	6, 17
Mechanical seal driver attachment	07945-4150400	NOTE 1: 07965-415000A (U.S.A. only)	6
Attachment, 28 x 30 mm	07946-1870100		11, 14
Fork seal driver body	07947-KA50100		15
Driver	07949-3710001		14
Oil seal driver	07965-KE80200	NOTE 3	18
Assembly collar	07965-VM00100		13
Assembly shaft	07965-VM00200		13
Threaded adaptor	07965-VM00300		13
Valve guide reamer, 5.5 mm	07984-2000001	NOTE 1: 07984-200000D (U.S.A. only)	8
Assembly collar spacer	07AMF-HN8A100	NOTE 4	13
Attachment, 78 x 90 mm	07GAD-SD40101		13
Compressor bolt assembly	07GAE-PG40200	NOTE 1: 07GAE-PG4020A (U.S.A. only)	12, 14
Inspection adaptor	07GMJ-ML80100		23, 24
Peak voltage adaptor	07HGJ-0020100	NOTE 1: IgnitionMate Peak voltage tester (U.S.A. only)	20
Pinion puller base	07HMC-MM80110	NOTE 1: 07HMC-MM8011A (U.S.A. only)	18
Spherical bearing driver	07HMF-HC00100	NOTE 3	15
Adjustable bearing remover set	07JAC-PH80000		14
Oil seal driver	07JAD-PH80101		14, 15
Differential inspection tool	07KMK-HC50101	NOTE 1: 07KMK-HC5010A (U.S.A. only)	17
Driver attachment	07LAD-PW50500		18
Oil seal driver	07LAD-SM40100		15
Clutch compressor attachment	07LAE-PX40100		12, 14
Press attachment	07LME-GE20100		17
Ball joint remover, 28 mm	07MAC-SL002000		14, 17
Recoil pulley holder	07SMB-HM70100		10
Pinion holder	07SMB-HM70200		18
Ball joint remover/installer	07WMF-HN00100		13, 14
Puller attachment	07YMC-GCS0100	NOTE 3/NOTE 1: 07949-3710001, 07746-0010700 and 07746-0040400	18
Torque limiter attachment B	07YMJ-MCF0200		10
Tensioner B	07ZMG-MCAA400		8
Compression tester	EEPV303A		8
Adaptor	MT26J200		8
Cooling system adaptor	OTCJ33984A		6
Cooling system pressure tester	SVTS4AH		6


CLIP:
– Final clutch wire
– Front vehicle speed sensor wire
– Rear vehicle speed sensor wire
– Differential breather hose
DIFFERENTIAL BREATHER HOSE
BREATHER HOSE
REAR VEHICLE SPEED SENSOR WIRE
FINAL CLUTCH WIRE
FRONT VEHICLE SPEED SENSOR
BAND:
– Final clutch wire
– Front vehicle speed sensor wire
– Rear vehicle speed sensor wire


FINAL CLUTCH 2P (green) CONNECTOR
DIFFERENTIAL BREATHER HOSE
REAR VEHICLE SPEED SENSOR

2. FRAME/BODY PANELS/EXHAUST SYSTEM

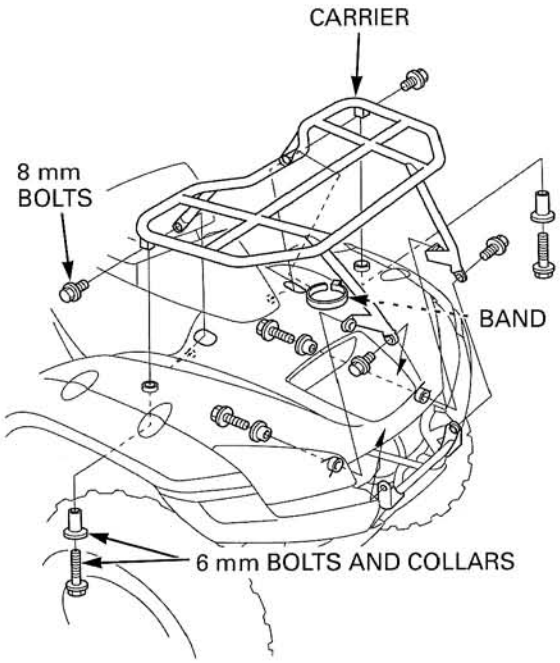
FRONT CARRIER

The front carrier and fender can be removed as an assembly for service. If removed, use the procedure described on page 2-12.

Remove the following:
- center front grille (page 2-10)
- wire band (that secured the headlight wire on the carrier pipe)
- two 6-mm bolts and collars (attached to fender)
- two 6-mm bolts and collars (attached to headlight case)
- four 8-mm bolts
- front carrier

Installation is in the reverse order of removal.

TORQUE: 8 mm bolt: 37 N·m (3.8 kgf·m, 27 lbf·ft)



FRONT FENDER

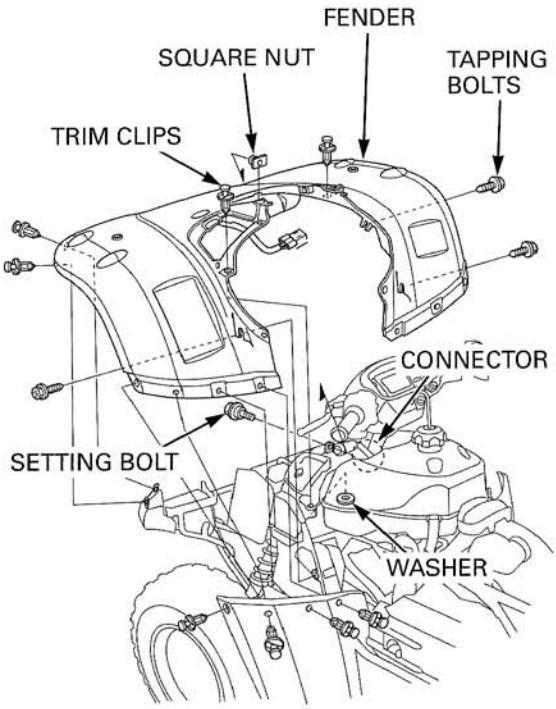
The front carrier and fender can be removed as an assembly for service. If removed, use the procedure described on page 2-12.

Remove the following:
- fuel tank side covers (page 2-6).
- front carrier (page 2-11).

Remove the following connector and fasteners:
- headlight 3P (black) connector (from the frame and disconnect it)
- 14 trim clips and setting washer (inside the storage compartment)
- setting bolt and square nut
- three tapping bolt (loosen)

Remove the front fender while spreading the rear portion of it.

Installation is in the reverse order of removal.



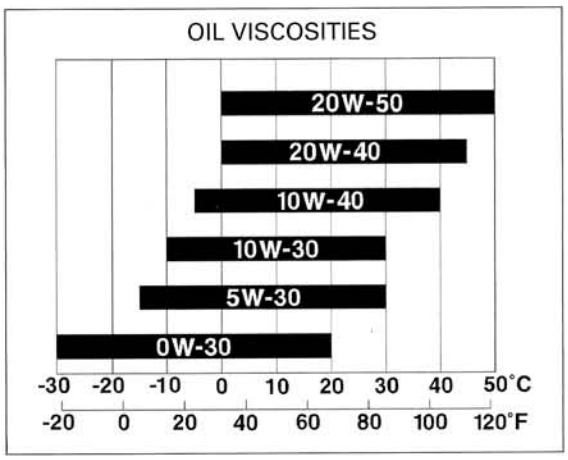
3. MAINTENANCE

3

NOTE:

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

Reinstall the oil filler cap, oil filler cap cover and dipstick.



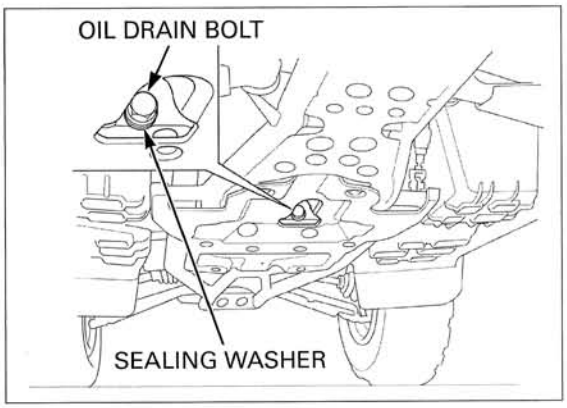
OIL CHANGE

NOTE:

- Pour the engine oil after replacing the oil filter (page 3-12).
- Change the oil with the engine warm to assure complete and rapid draining.

Start the engine and let it idle for a few minutes.
Stop the engine and remove the oil filler cap.

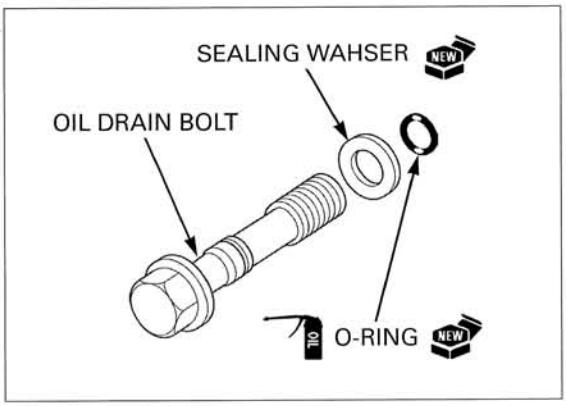
Remove the oil drain bolt and drain the engine oil.



Remove the O-ring and sealing washer from the drain bolt.
Install a new sealing washer onto the drain bolt.
Coat a new O-ring with oil and install it into the groove in the drain bolt.

After draining the oil completely, install the drain bolt and tighten it.

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)



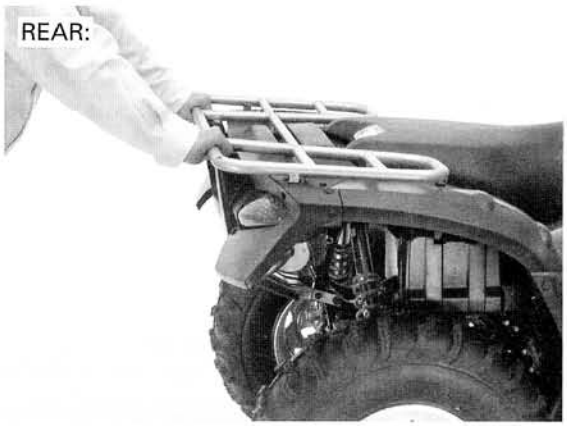
SUSPENSION

Loose, worn or damaged suspension parts impair vehicle stability and control.

Check the action of the front and rear shock absorbers by compressing them several times.
Check the entire shock absorber assembly for signs of leaks, damage or loose fasteners.
Replace damaged components which cannot be repaired.
Tighten all nuts and bolts.

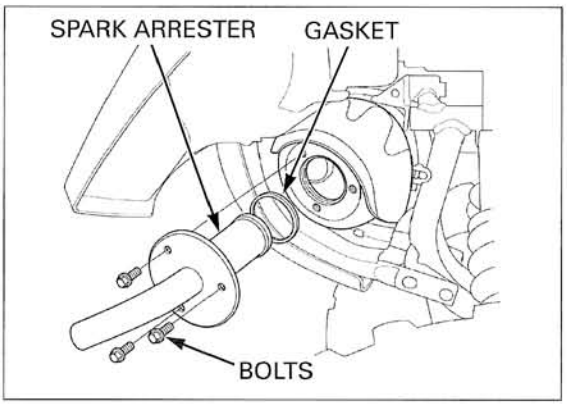
FRONT:

REAR:



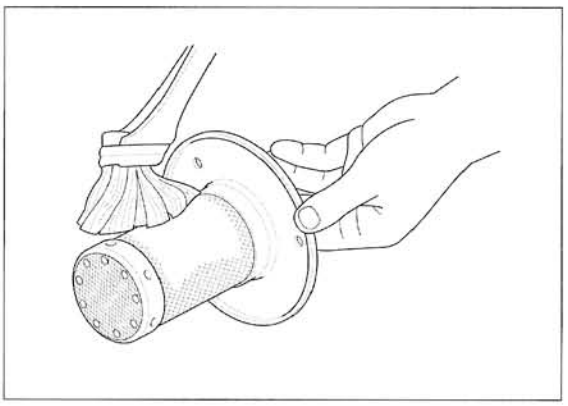
SPARK ARRESTER

Remove the three bolts and the spark arrester with the gasket.



Use a brush to remove carbon deposits from the screen mesh, being careful not to damage the screen mesh.
The screen mesh must be free of breaks and holes.
Replace the spark arrester if necessary.

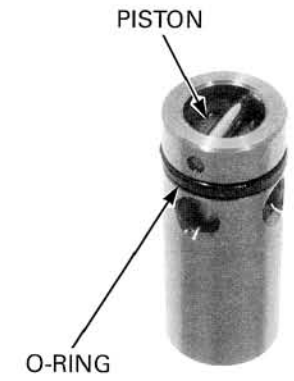
Install the spark arrester with a new gasket and tighten the bolts securely.



INSPECTION

Remove the O-ring from the pressure relief valve.

Check the operation of the pressure relief valve by pushing on the piston.



Temporarily assemble each inner rotor, outer rotor and drive pin on the pump shaft, and install them into each pump body individually.

Measure the rotor tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)

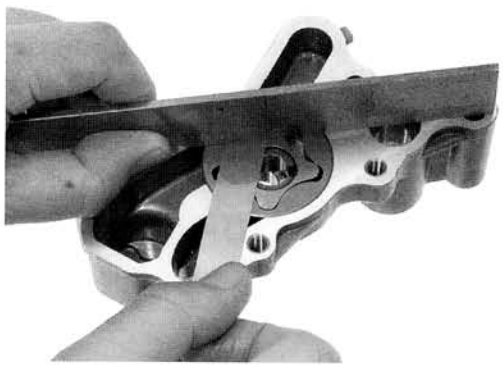
Measure the pump body clearance.

SERVICE LIMIT: 0.25 mm (0.010 in)

Remove the oil pump shaft and drive pin.

Measure the oil pump side clearance.

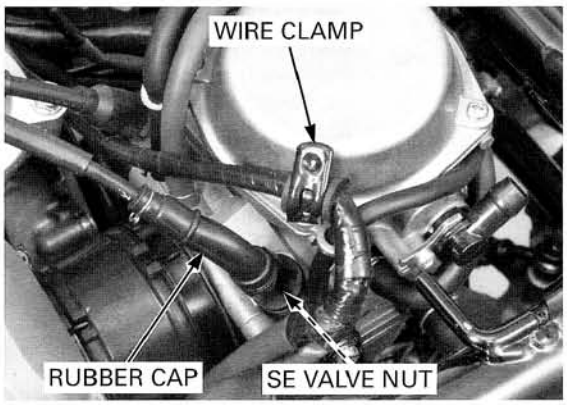
SERVICE LIMIT: 0.11 mm (0.004 in)



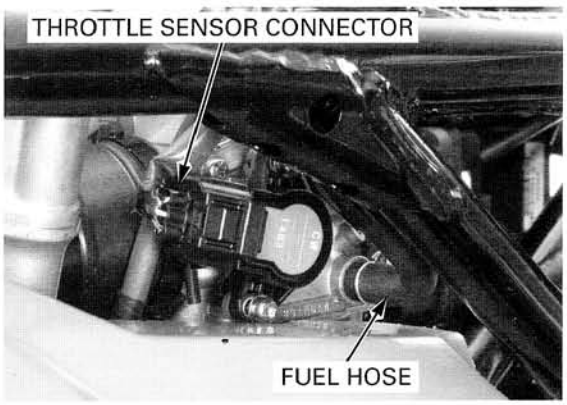
CARBURETOR REMOVAL

Remove the air cleaner housing (page 5-5).
Remove the left fuel tank side cover (page 2-6).

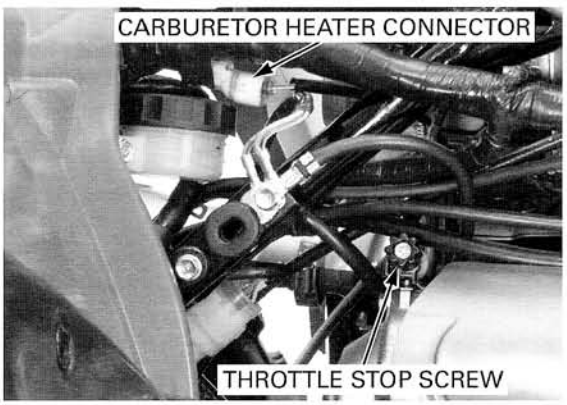
Remove the throttle position sensor/thermosensor wire from the clamp.
Slide the rubber cap off the starting enrichment (SE) valve nut.
Loosen the SE valve nut and remove the SE valve from the carburetor.



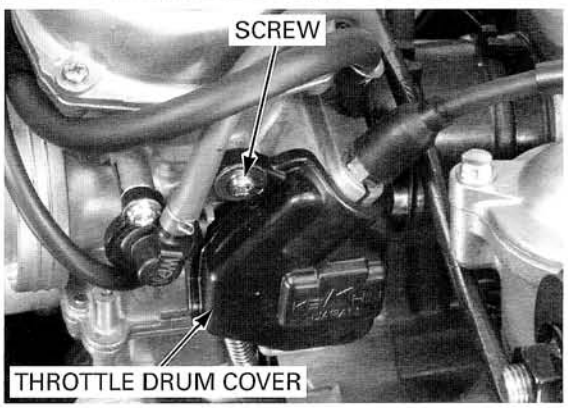
Turn the fuel valve to "OFF" and disconnect the fuel hose from the carburetor.
Disconnect the throttle sensor 3P connector.



Remove the throttle stop screw cable from the cable clip.
Disconnect the carburetor heater 2P connector.
Remove the carburetor drain hose from the hose guide on the recoil starter.

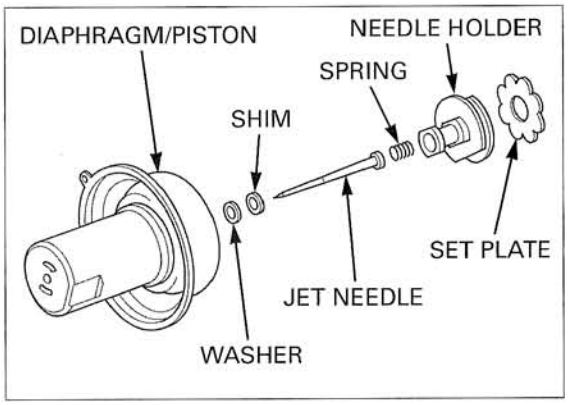


Remove the screw and throttle drum cover.

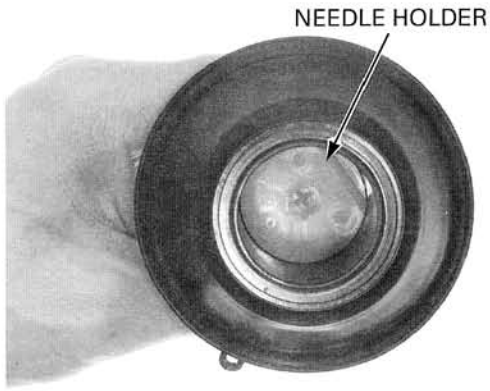


Install the shim and washer onto the jet needle and insert the jet needle into the vacuum piston.

Install the spring set plate onto the needle holder. Install the spring into the needle holder and set the needle holder into the vacuum piston.

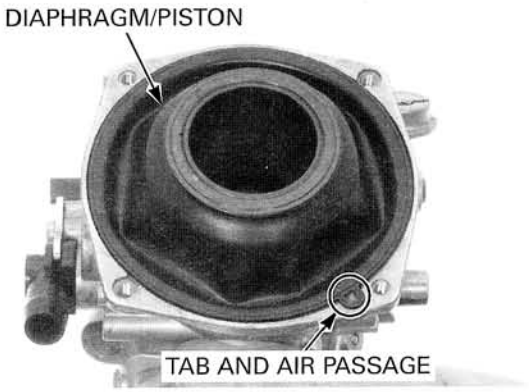


Turn the needle holder 90 degrees clockwise while pressing it until it locks.



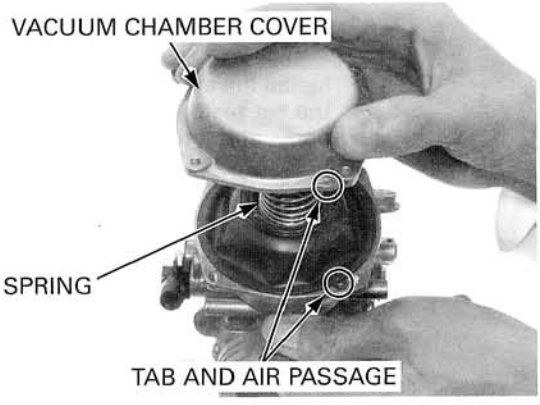
Be careful not to damage the jet needle.

Install the diaphragm/vacuum piston into the carburetor body by aligning the tab of the diaphragm with the air passage, then insert the jet needle into the needle jet.
Lift the bottom of the piston with your finger to set the diaphragm rib into the groove in the carburetor body.



Be careful not to pinch the diaphragm under the chamber cover, and to keep the spring straight when compressing the spring.

Install the compression spring and vacuum chamber cover while lifting the piston in place. Align the lug of the cover with the air passage and secure the cover with at least two screws before releasing the vacuum piston.



SERVICE INFORMATION

GENERAL

⚠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 and mouth.

- 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.

NOTICE

Using coolant with silicate inhibitors may cause premature wear of water pump seals or blockage of radiator passage. Using tap water may cause engine damage.

- Add coolant to the system at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system service 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.
- Refer to page 22-14 for engine coolant temperature sensor information.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.0 liters (2.1 US qt, 1.8 Imp qt)
	Reserve tank	0.46 liter (0.49 US qt, 0.40 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm^2, 16 – 20 psi)
Thermostat	Begin to open	80 – 84°C
	Fully open	95°C
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors
Standard coolant concentration		1:1 mixture with distilled water

TORQUE VALUE

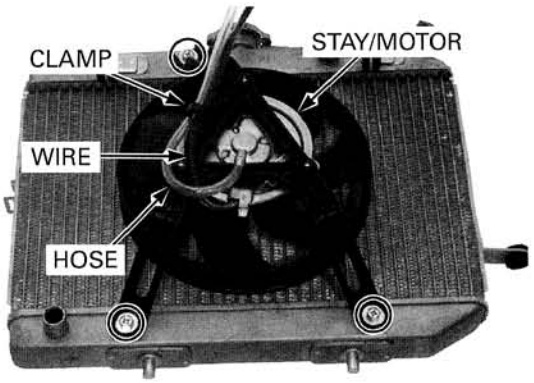
Water pump impeller	12 N·m (1.2 kgf·m, 9 lbf·ft)

TOOLS

Cooling system pressure tester	SVTS4AH
Cooling system adaptor	OTCJ33984A
Remover head, 15 mm	07936-KC10200 or 07936-KC10500
Bearing remover shaft	07936-KC10100 or 07936-KC10500
Remover weight	07741-0010201 or 07936-371020A or 07936-3710200 (U.S.A. only)
Mechanical seal driver attachment	07945-4150400 or 07965-415000A (U.S.A. only)

Install the stay/motor assembly onto the radiator and tighten the three washer-bolts securely.

Connect the breather hose to the motor breather joint. Route the fan motor wire and breather hose through the clamp.



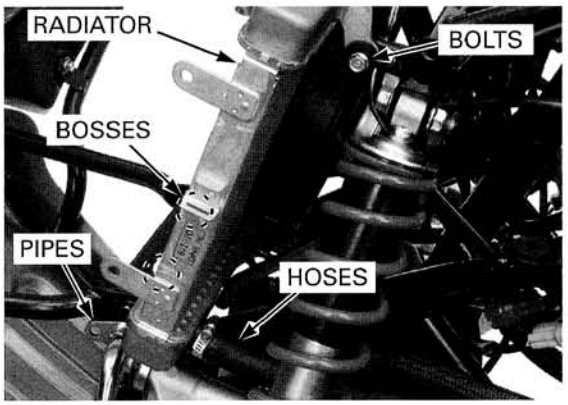
INSTALLATION

Be careful not to damage the radiator fins with the oil pipe.

Insert the bosses on the radiator bottom into the holes (mounting rubbers) in the frame to install the radiator assembly.

Install the mounting bolts and tighten them.

Connect the upper and lower water hoses, and tighten the hose clamps securely.



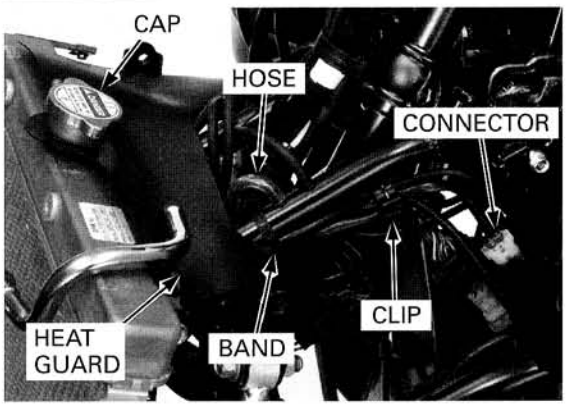
Route the wire and hose properly (page 1-21).

Connect the fan motor 2P connector and secure the wires with the clip. Install the wire band.

Connect the breather hose (pink) to the frame pipe.

Remove the radiator cap and install the rubber heat guard over the filler neck. Reinstall the radiator cap.

Set the rubber heat guard properly (page 1-21).

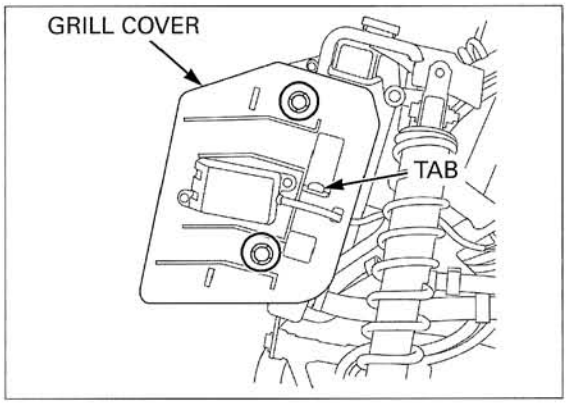


Install the left and right grill covers with the trim clips (page 2-4). For the left grill cover, align the tab with the groove in the radiator.

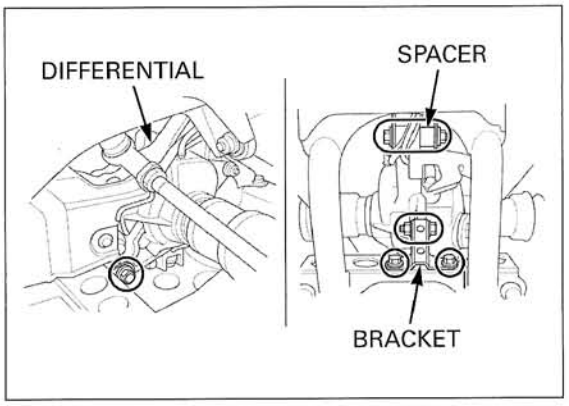
Install the following:
- oil cooler (page 4-12)
- radiator reserve tank (page 6-10)

Fill and bleed the cooling system (page 6-6).

After bleeding, install the following:
- left inner fender (page 2-9)
- front fender (page 2-12)

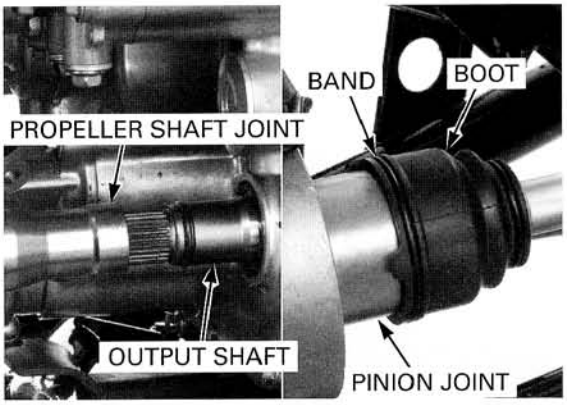


Remove the differential mounting fasteners, spacer and bracket.
Move the front differential forward to get the clearance for front propeller shaft removal.

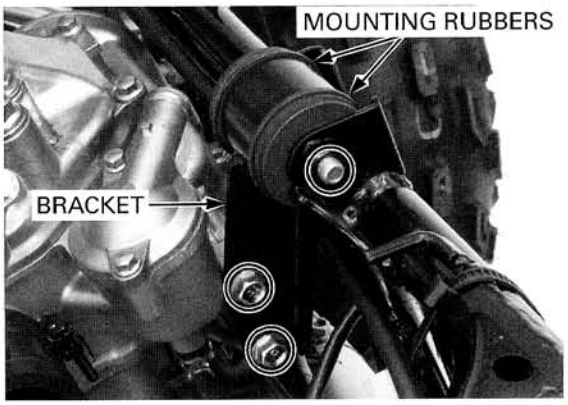


Pull the propeller shaft joint out of the output shaft.

Remove the boot band from the dust boot and release the boot off the pinion joint of the differential.
Pull the propeller shaft to force the stopper ring at the shaft end past the groove in the pinion joint and remove the propeller shaft.

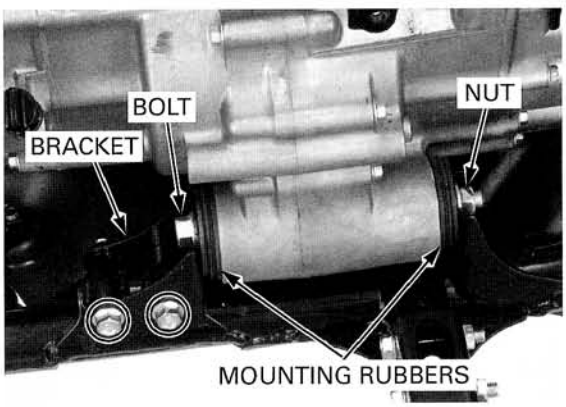


Remove the following mounting fasteners:
- upper engine hanger bolts
- hanger bracket
- mounting rubbers



Set suitable wooden blocks between the engine and lower frame pipe to support the engine for ease of bolt removal.

- left lower engine hanger nut and bolt
- mounting rubbers
- two bolts and hanger bracket



CYLINDER COMPRESSION

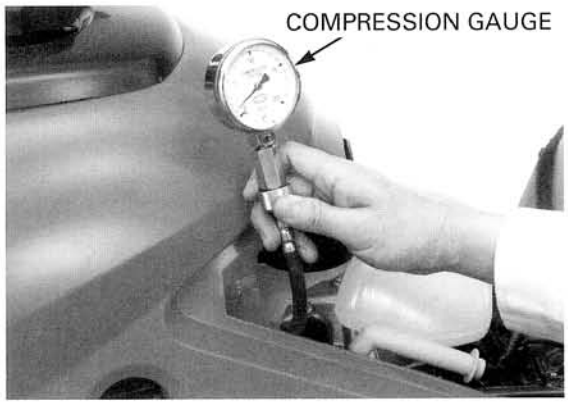
Warm up the engine to normal operating temperature.
Stop the engine, disconnect the spark plug cap and remove the spark plug (page 3-7).

Install the compression gauge into the spark plug hole.

TOOLS:

Compression tester	**EEPV303A**
Adaptor	**MT26J200**

Shift the transmission in neutral.
Open the throttle all the way and crank the engine with the starter motor until the gauge reading stops rising. The maximum reading is usually reached within 4 – 7 seconds.



COMPRESSION PRESSURE:
510 kPa (5.2 kgf/cm², 74 psi) at 390 rpm

Check that there is no leakage at the gauge connection.

Low compression can be caused by:
- blown cylinder head gasket
- improper valve adjustment
- valve leakage
- worn piston ring or cylinder

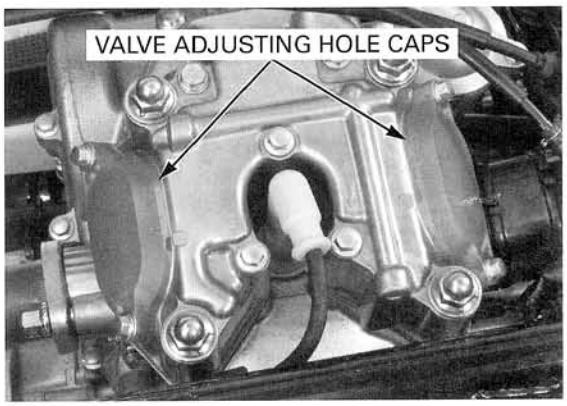
High compression can be caused by:
- carbon deposits in combustion chamber or on piston head

CYLINDER HEAD COVER REMOVAL/ DISASSEMBLY

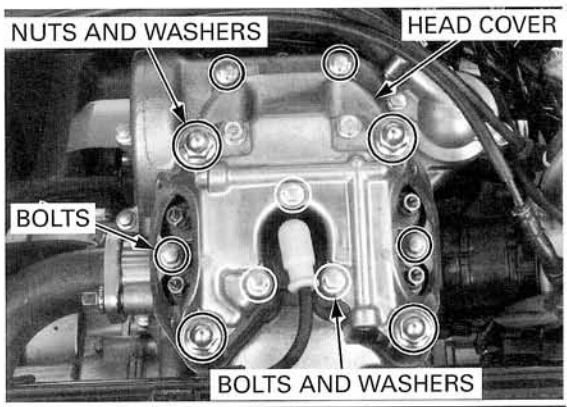
REMOVAL

Remove the fuel tank and heat guard plate (page 5-22).

Remove the following and set the piston position to Top Dead Center on the compression stroke (page 3-8):
- timing hole cap
- four bolts and valve adjusting hole caps



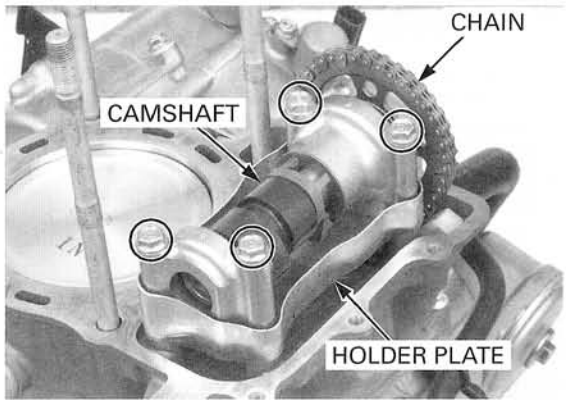
Remove the following:
- spark plug cap
- seven bolts and three washers
- four cap nuts and washers
- cylinder head cover



Remove the four camshaft holder bolts.

Suspend the cam chain with a piece of wire to prevent it from falling into the crankcase.

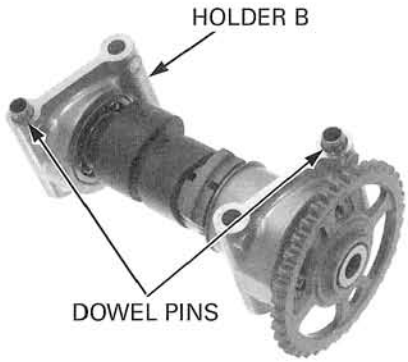
Raise the holder plate so the dowel pins fitted in the camshaft holders are removed off the cylinder. Release the cam chain from the cam sprocket to remove the camshaft assembly and holder plate.



Remove the camshaft holder B from the camshaft assembly.

Do not forcibly remove the dowel pins from the camshaft holders.

Remove the dowel pins.



INSPECTION

For cam chain tensioner lifter inspection, see page 9-7.

Check the sprocket teeth for wear or damage.

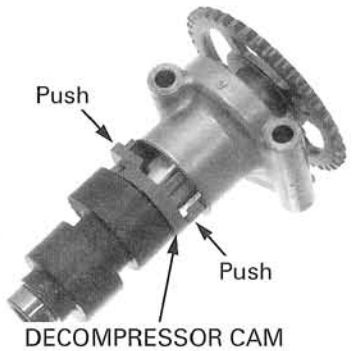
Turn the camshaft holder to check each bearing. Replace the camshaft assembly if the bearing does not turn smoothly and quietly.

Check the cam surfaces for scoring, scratches or evidence of insufficient lubrication.

Measure each cam lobe height.

SERVICE LIMITS: IN: 34.775 mm (1.3691 in)
EX: 35.068 mm (1.3806 in)

Check the decompressor cam operation.
Press on the decompressor cam as shown.
As you press on one side, the decompressor cam should lock above the base of the exhaust cam lobe.
As you press on other side, the decompressor cam lobe should extend below the base of the exhaust cam lobe.



SERVICE INFORMATION

GENERAL

- The cylinder and piston can be serviced with the engine installed in the frame.
- Take care not to damage the cylinder wall and piston.
- Be careful not to damage the mating surfaces when removing the cylinder.
- Rocker arm and valve lubricating oil is fed through the oil passage in the cylinder. Clean the oil passage before installing the cylinder.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		100.000 – 100.015 (3.9370 – 3.9376)	100.05 (3.939)
	Out-of-round		–	0.05 (0.002)
	Taper		–	0.05 (0.002)
	Warpage		–	0.05 (0.002)
Piston, piston pin, piston ring	Piston O.D. at 15 (0.6) from bottom		99.960 – 99.990 (3.9354 – 3.9366)	99.86 (3.931)
	Piston pin hole I.D.		23.002 – 23.008 (0.9056 – 0.9058)	23.03 (0.907)
	Piston pin O.D.		22.994 – 23.000 (0.9053 – 0.9055)	22.98 (0.905)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Piston ring end gap	Top	0.25 – 0.35 (0.010 – 0.014)	0.5 (0.02)
		Second	0.40 – 0.55 (0.016 – 0.022)	0.7 (0.03)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.9 (0.04)
	Piston ring-to-ring groove clearance	Top	0.045 – 0.080 (0.0018 – 0.0031)	0.095 (0.0037)
		Second	0.025 – 0.060 (0.0010 – 0.0024)	0.075 (0.0030)
Cylinder-to-piston clearance			0.010 – 0.055 (0.0004 – 0.0022)	0.19 (0.007)
Connecting rod small end I.D.			23.030 – 23.050 (0.9067 – 0.9075)	23.06 (0.908)
Connecting rod-to-piston pin clearance			0.030 – 0.056 (0.0012 – 0.0022)	0.08 (0.003)

TORQUE VALUES

Cylinder stud bolt	See page 9-7

TROUBLESHOOTING

Compression too low, hard starting or poor performance at low speed
- Leaking cylinder head gasket
- Worn, stuck or broken piston ring
- Worn or damaged cylinder and piston

Compression too high, overheating or knocking
- Excessive carbon built-up on piston head or combustion chamber

Excessive smoke
- Worn cylinder, piston or piston rings
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

Abnormal noise
- Worn piston pin or piston pin bore
- Worn connecting rod small end
- Worn cylinder, piston or piston rings

SERVICE INFORMATION

GENERAL

- This section covers service of the recoil starter, alternator stator and flywheel/starter clutch. These parts can be serviced with the engine installed in the frame.
- Crankshaft lubricating oil is fed through the oil passage in the alternator cover. Clean the oil passage before installing the alternator cover.
- Be careful not to damage the mating surfaces of the alternator and crankcase covers when servicing.
- Refer to page 11-5 for rear crankcase cover removal/installation
- Refer to page 19-2 for alternator stator inspection.
- Refer to page 21-2 for starter motor servicing.

SPECIFICATION

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.	51.705 – 51.718 (2.0356 – 2.0361)	51.61 (2.032)
Torque limiter slip torque	53 – 84 N·m (5.4 – 8.6 kgf·m, 39 – 62 lbf·ft)	–

TORQUE VALUES

Starter clutch bolt	30 N·m (3.1 kgf·m, 22 lbf·ft) Apply locking agent to the threads
Recoil starter driven pulley bolt	108 N·m (11.0 kgf·m, 80 lbf·ft) Apply engine oil to the threads and seating surface
Alternator stator bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Ignition pulse generator bolt	6 N·m (0.6 kgf·m, 4.3 lbf·ft) Apply locking agent to the threads

TOOLS

Driver	07749-0010000
Attachment, 24 x 26 mm	07746-0010700
Attachment, 42 x 47 mm	07746-0010300
Pilot, 10 mm	07746-0040100
Pilot, 30 mm	07746-0040700
Bearing remover head, 10 mm	07936-GE00200 or 07936-GE00A00 (U.S.A. only)
Bearing remover shaft, 10 mm	07936-GE00100 or 07936-GE00A00 (U.S.A. only)
Remover weight	07741-0010201 or 07936-371020A or 07936-3710200 (U.S.A. only)
Flywheel holder	07725-0040000 or equivalent commercially available in U.S.A.
Rotor puller	07733-0020001
Recoil pulley holder	07SMB-HM70100
Torque limiter attachment B	07YMJ-MCF0200
Torque limiter attachment D	070MJ-HN80100 (Newly designed tool)

TROUBLESHOOTING

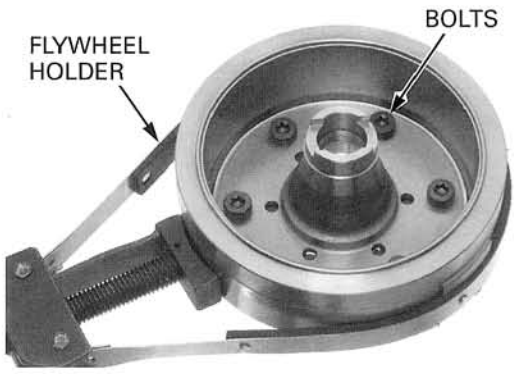
Starter motor turns, but engine does not turn

- Faulty starter clutch
- Damaged reduction gears or torque limiter

Hold the flywheel with the special tool and remove the starter clutch bolts (T40).

TOOL:

Flywheel holder	**07725-0040000 or equivalent commercially available in U.S.A.**



Remove the starter clutch assembly from the flywheel.

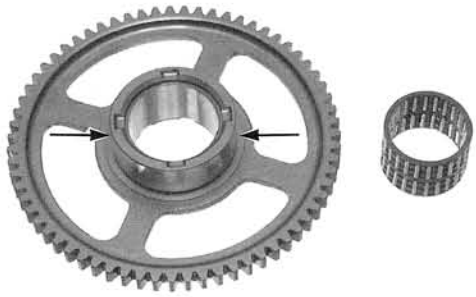
Remove the sprag clutch from the clutch outer.

Check the clutch outer and sprag clutch for abnormal wear or damage.

Check the starter driven gear teeth and needle bearing for wear or damage.

Measure driven gear boss O.D.

SERVICE LIMIT: 51.61 mm (2.032 in)



STARTER CLUTCH ASSEMBLY

Lubricate the sprag clutch with engine oil and install it into the clutch outer with the flanged side facing the flywheel side.

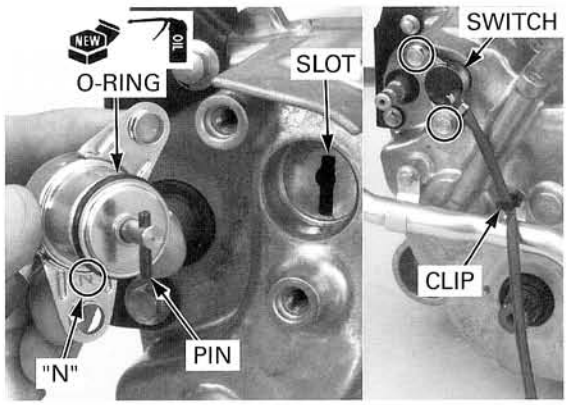
Coat a new O-ring with engine oil and install it into the groove in the gear position switch.

Be careful not to damage the switch pin during installation.

Align the long end of the switch pin with the "N" mark. Install the switch by aligning the switch pin with the slot in the crankcase cover.
Install the bolts and tighten it.

Install the wire clip into the stay of the filler pipe.

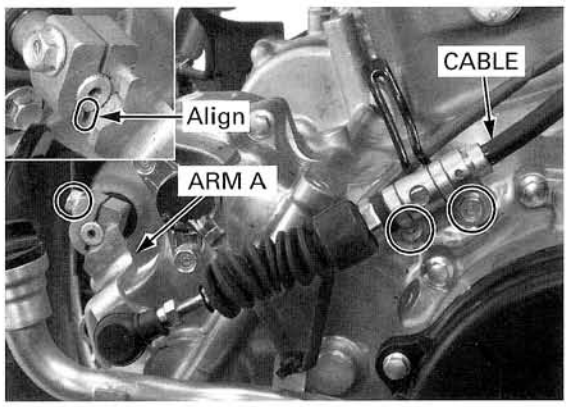
Install the following:
- alternator cover and reduction gears!
- starter motor!



Install the gear selector arm A by aligning the groove with the wide tooth of the spindle. Install the pinch bolt and tighten it.

TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)

Secure the selector cable onto the engine with the two cable holder bolts.



Route the wires properly !.

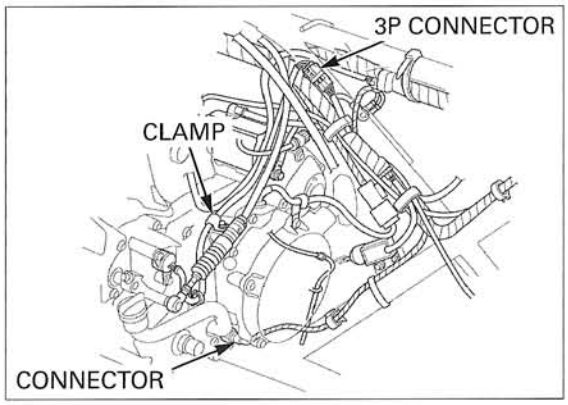
Connect the oil temperature sensor connector and gear position switch 3P (white) connector.
Secure the wire with the clamp on the cable holder.

Adjust the gear selector cable if necessary (page 11-15).

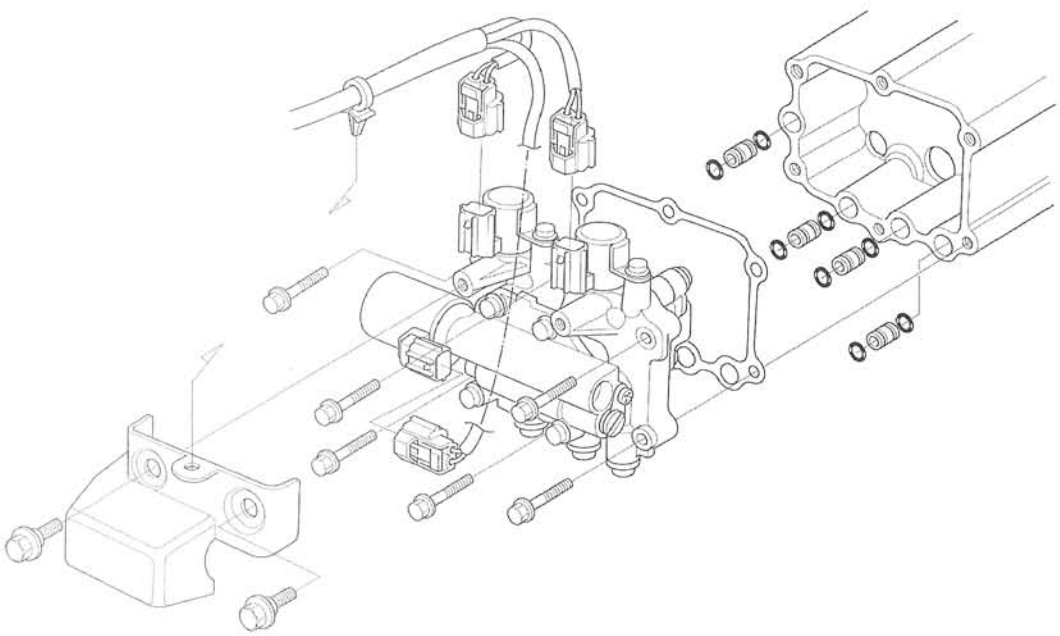
Connect the front propeller shaft over the output shaft (page 7-9).

Install the following:
- final drive/sub-frame assembly!
- starter motor !
- engine guard!
- engine side covers!
- center mud guards!
- inner fenders !
- front mud guard !
- front center grille !

Fill the engine with recommended oil !.



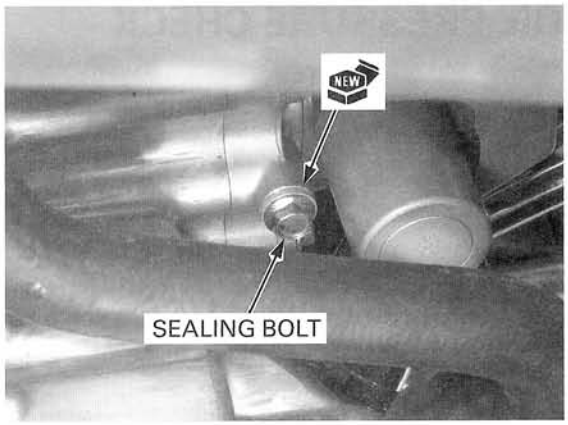
SYSTEM COMPONENTS

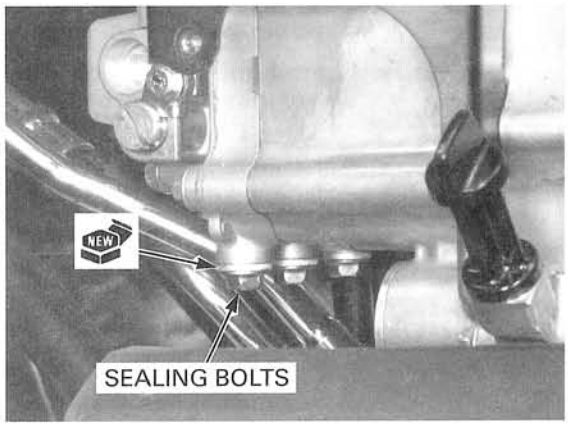


Remove the pressure gauge and hose(s).

Install each sealing bolt with a new sealing washer and tighten the bolt(s).

After the oil pressure check is completed, start the engine and make sure there are no oil leaks.





TROUBLESHOOTING CHART OF HYDRAULIC CIRCUIT

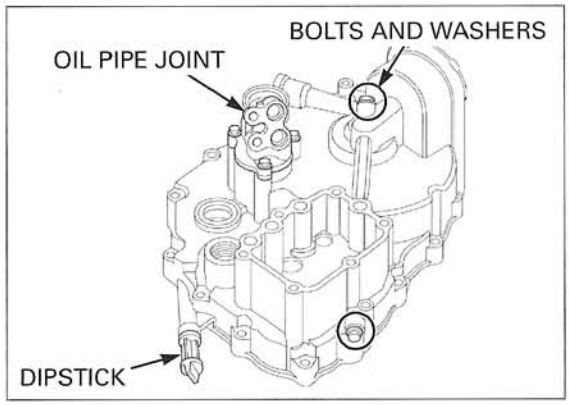
PRESSURE CHECK SECTION		MEASUREMENT RESULT (■: Abnormal / Blank: Normal)									REFER TO PAGE
Line pressure										■	
1st clutch pressure					■		■	■	■	■	
2nd clutch pressure				■		■		■	■	■	
3rd clutch pressure			■			■	■		■	■	
PROBABLE FAULTY PART (applied to O)	Linear solenoid valve								O		12-12
	Emergency valve								O		
	1-2 shift valve			O	O						
	2-3 shift valve		O	O							
	Shift solenoid valve A			O	O						
	Shift solenoid valve B		O	O							
	2nd orifice control valve										
	3rd orifice control valve										
	Shift valve body					O	O	O	O		
	Orifice control valve body					O	O	O	O		
	1st clutch				O						12-29
	2nd clutch			O							
	3rd clutch		O								
	Feed pipe A				O						12-20
	Feed pipe B		O	O		O					
	Feed pipe C		O	O		O					
	Torque converter									O	12-25
	Oil pump									O	4-5
	Oil pipe setting collar		O	O	O					O	12-19
	Oil filter									O	3-12
	Oil strainer									O	13-5
	Oil level									O	3-10

For function of each component, refer to page 26-2.

CLEANING/INSPECTION

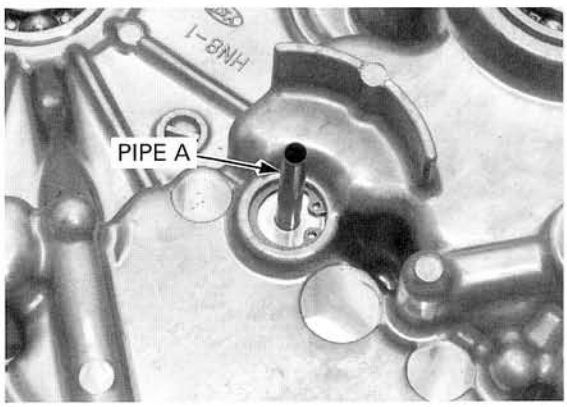
Remove the following:
- oil filter (page 3-12)
- dipstick
- sealing bolts and washers
- three bolts and oil pipe joint

Wash the crankcase cover with solvent and blow through all the passages with compressed air to clean them thoroughly.



The feed pipes are supplying engine oil to each shift clutch; A: 1st, B: 2nd and C: 3rd.

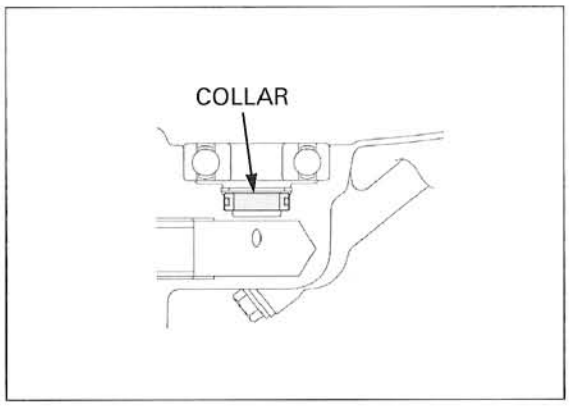
Check the feed pipe A, B and C for abnormal wear or damage.



The hydraulic oil in the torque converter is supplied through the crankshaft.

Check the crankshaft seal collar behind the bearing for abnormal wear or damage.

For replacement, see page 12-20.



BEARING REPLACEMENT

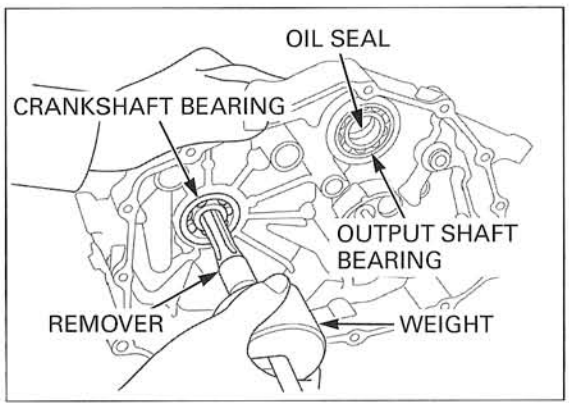
Remove the crankshaft bearing using the special tools.

TOOLS:

Bearing remover, 17 mm	**07936-3710300**
Remover handle	**07936-3710100**
Remover weight	**07741-0010201 or 07936-371020A or 07936-3710200 (U.S.A. only)**

Remove the output shaft oil seal.

Drive the output shaft bearings out of the crankcase cover.

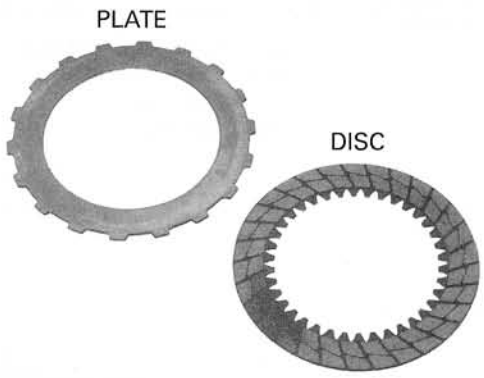


CLUTCH DISC AND PLATE

Replace the clutch discs and plates as a set.

Check the linings of the clutch discs for wear (disc groove disappearance).

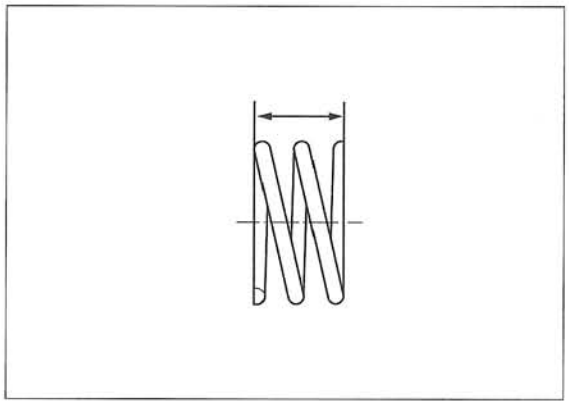
Check the clutch plates for discoloration.



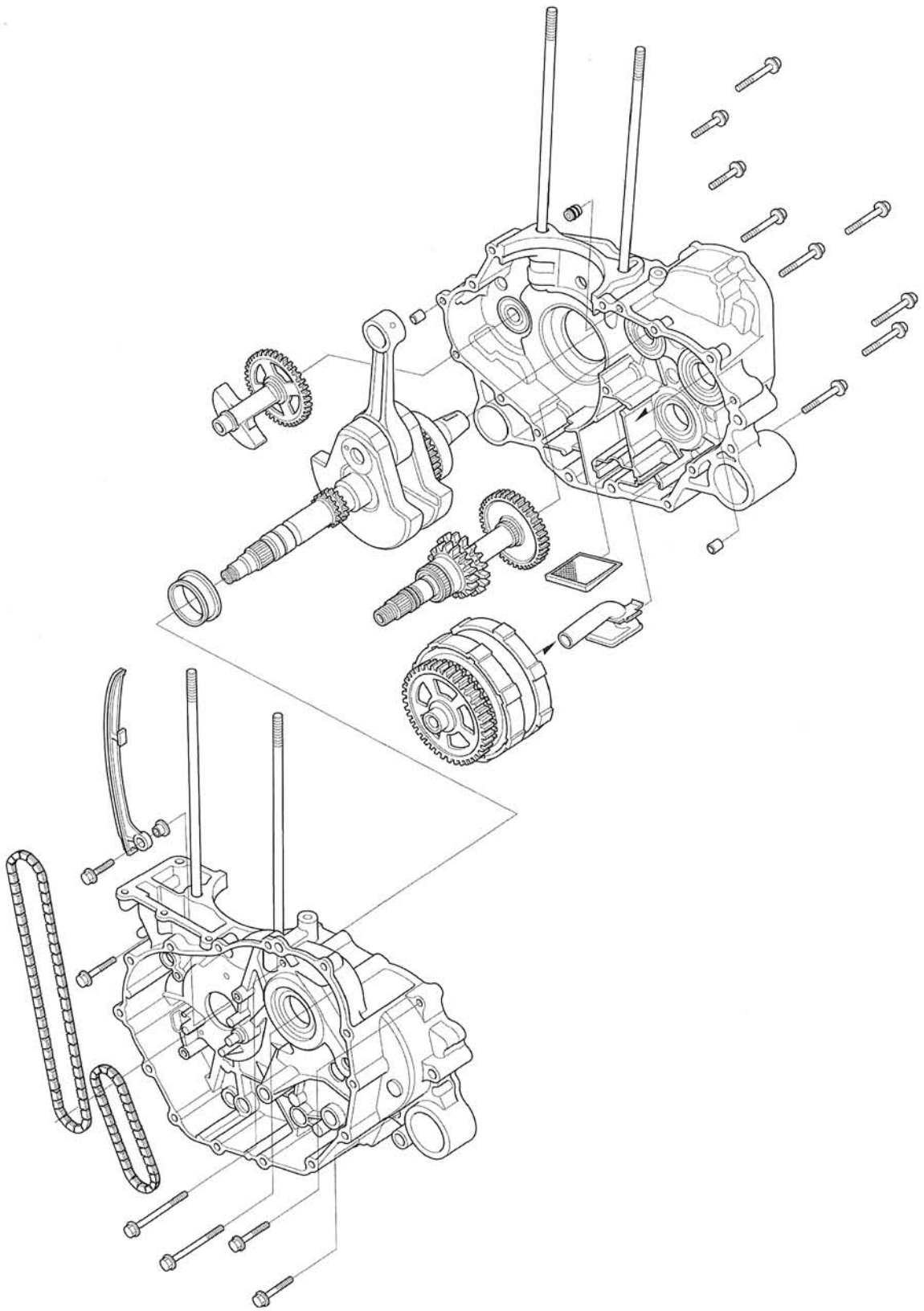
CLUTCH RETURN SPRING

Measure the spring free length.

SERVICE LIMIT: 31.8 mm (1.25 in)



SYSTEM COMPONENTS



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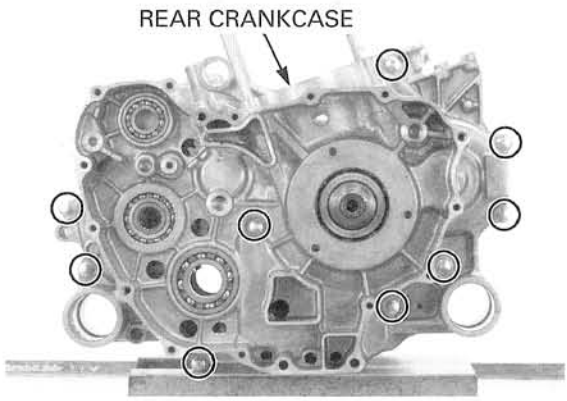
Install the nine rear crankcase bolts.

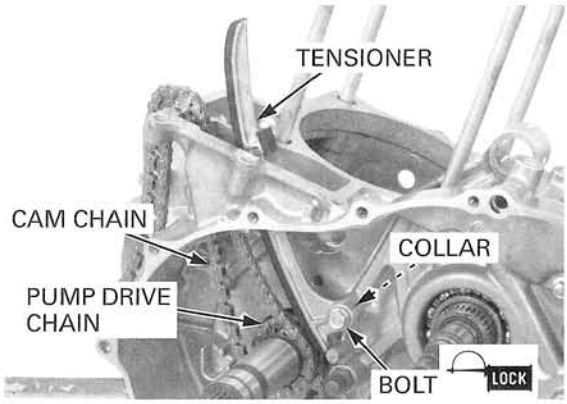
Tighten all the crankcase bolts in a crisscross pattern in several steps.



Apply locking agent to the threads of the tensioner pivot bolt.
Install the cam chain tensioner and pivot collar with the flange side of the collar facing to the crankcase, and tighten the bolt.

Install the oil pump drive and cam chains onto the crankshaft.

Install the following:
- oil pump (page 4-11)
- 1st shift clutch and torque converter (page 12-36)
- flywheel/starter clutch (page 10-14)
- sub-transmission/gearshift linkage (page 11-12)
- cylinder and piston (page 9-8)
- engine (page 7-7)

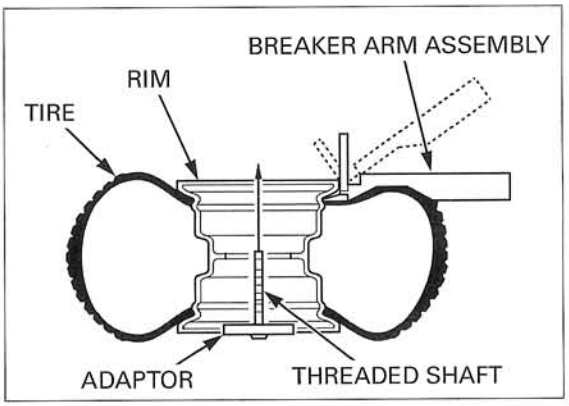


Place the proper size adaptor onto the threaded shaft and then put the wheel over the threaded shaft and adaptor.

Use only water as a lubricant when removing or mounting tires. Soap or some mounting lubricants may leave a slippery residue which can cause the tire to shift on the rim and lose air pressure during riding.

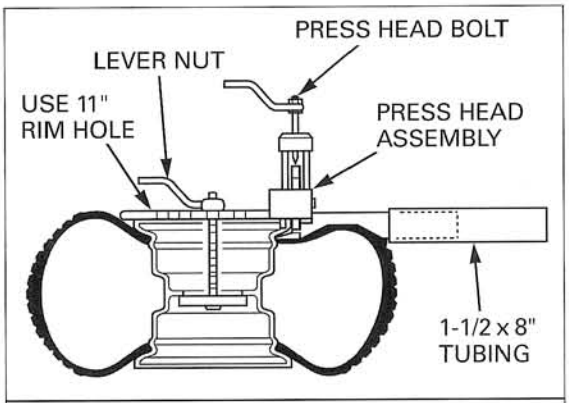
Lube the bead area with water, pressing down on the tire sidewall/bead area in several places to allow the water to run into and around the bead. Also lube the area where the breaker arm will contact the sidewall of the tire.

While holding the breaker arm assembly at an approximate 45° position, insert the blade of the breaker arm between the tire and rim. Push the breaker arm inward and downward until it is in the horizontal position with its press block in contact with the rim.



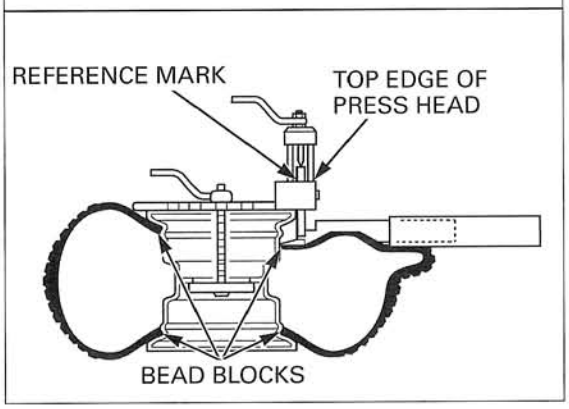
With the breaker arm in the horizontal position, place the breaker press head assembly over the breaker arm press block. Make sure the press head bolt is backed out all the way and use one of the two nylon buttons positioned on the press head against the inside edge of the rim.

Insert the thread shaft through the appropriate hole in the breaker press head assembly and then tighten the lever nut until both ends of the breaker press head assembly are in firm contact with the rim.



Tighten the press head bolt until the reference mark on the press block is aligned with the top edge of the press head.

If the rest of the bead cannot be pushed down into the center of the rim by hand, loosen the press head bolt and the lever nut.
Rotate the breaker arm assembly and breaker press head assembly 1/8 to 1/4 the circumference of the rim.
Tighten the lever nut and then tighten the press head bolt as described.



Repeat this procedure as necessary until the remainder of the bead can be pushed down into the center of the rim.

Assemble the Universal Bead Breaker on the other side of the wheel and break the bead following the same procedures.

Remove the tire from the rim using a tire change machine or tire irons and rim protectors.

Remove the tire from the side of the rim that has the smallest shoulder area to simplify removal.

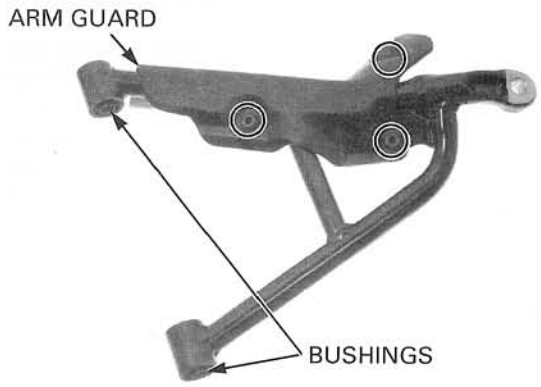
TIRE REPAIR

NOTE:

- Use the manufacture's instructions for the tire repair kit you are using. If your kit does not have instructions, use the procedures provided hear.

Remove the three flange bolts and lower arm guard if necessary.

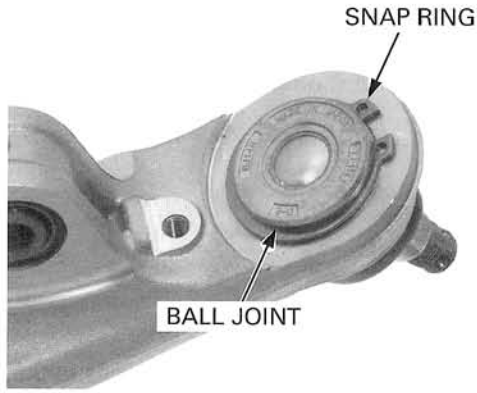
Check the pivot bushings in the lower arm for wear or damage.



BALL JOINT REPLACEMENT

UPPER ARM

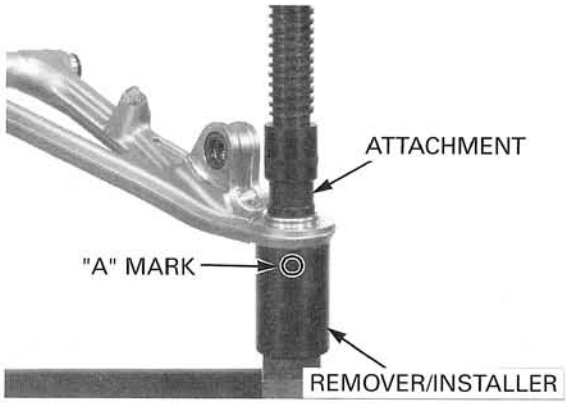
Remove the snap ring from the ball joint.



Set the upper arm and special tools with "A" mark side of the remover/installer facing to the ball joint as shown.
Press the ball joint out of the upper arm.

TOOLS:

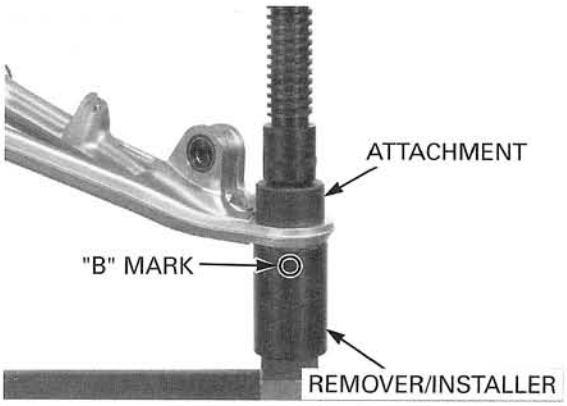
Ball joint remover/installer	**07WMF-HN00100**
Attachment, 28 x 30 mm	**07946-1870100**



Set the upper arm and special tools with "B" mark side of the remover/installer facing to the ball joint as shown.
Press the ball joint into the upper arm until it is fully seated.

TOOLS:

Ball joint remover/installer	**07WMF-HN00100**
Attachment, 20 mm I.D.	**07746-0020400 or**
Attachment, 17 mm I.D.	**07746-0020300 or**
Attachment, 15 mm I.D.	**07746-0020200**



NOTICE

If you feel strong resistance when lowering the press, stop. Reset the attachment of the tool so the ball joint head can go into the hollow of the attachment and try again. Failure to reset the attachment will damage the ball joint and/or the upper arm.

INSTALLATION

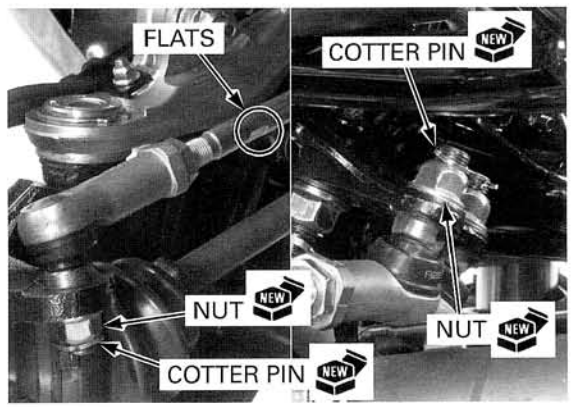
Install the tie-rod with the flat side of the rod toward the knuckle. Install new joint nuts and adjust the toe-out (page 3-22).

Tighten the joint nuts by holding the ball joint stud flats with an open end wrench.

TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)

Install new cotter pins.

Install the following:
- inner fender (page 2-9)
- front wheel (page 14-9)



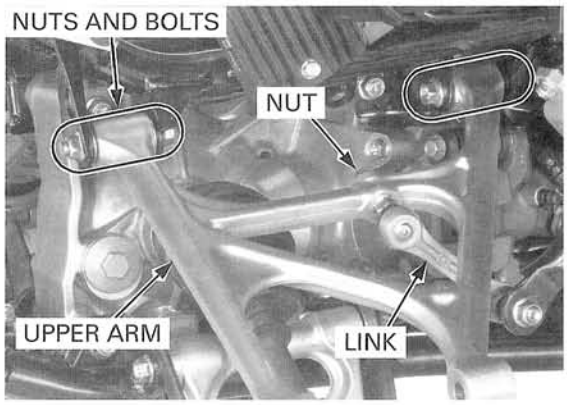
SUSPENSION ARM REMOVAL

UPPER ARM

Remove the pivot collar (page 15-9).

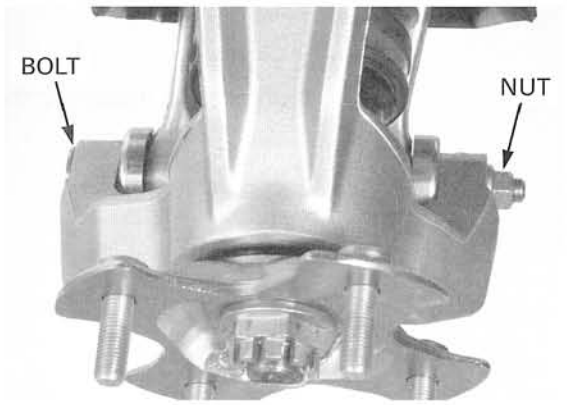
Right upper arm: Remove the right side cover (page 2-4).
Left upper arm: Remove the oil filler lid (page 2-8).

Remove the following:
- stabilizer link nut (to disconnect the link)
- two pivot nuts and bolts
- upper arm

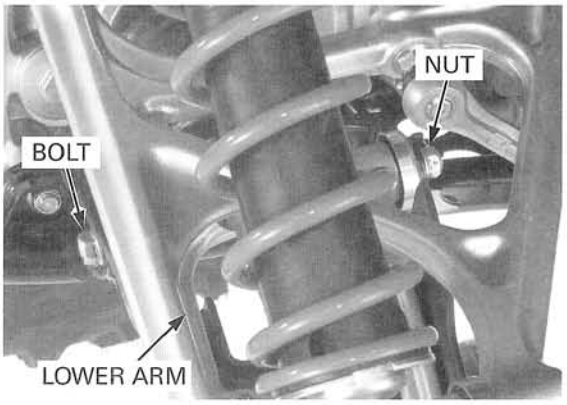


LOWER ARM

Remove the following:
- lower arm pivot nut and bolt (to disconnect the knuckle)

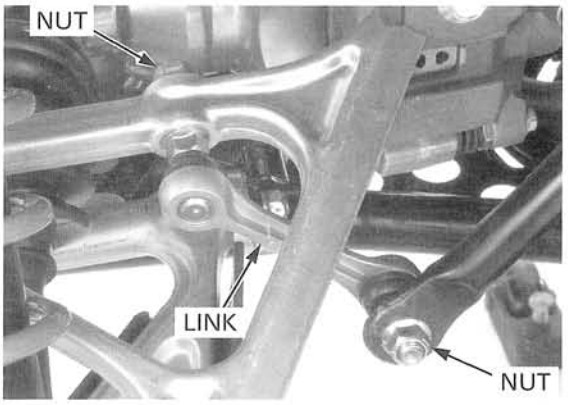


- lower arm pivot nut and bolt
- lower arm



STABILIZER ARM AND LINK

Remove the following:
- link nuts
- stabilizer links



SERVICE INFORMATION

GENERAL

⚠ CAUTION

Frequent inhalation of brake lining or pad dust, regardless of material composition could be hazardous to your health.
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

- A contaminated brake lining, drum, disc or pad reduces stopping power. Discard contaminated linings or pads, and clean a contaminated drum or disc with a high quality brake degreasing agent.
- Spilled brake fluid will severely damage the plastic parts and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the reservoir is horizontal first.
- Never allow contaminates (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 3 or DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid as they may not be compatible.
- Always check brake operation before riding the vehicle.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Recommended brake fluid		DOT 4 brake fluid	–
Front brake	Drum I.D.	160.0 – 160.3 (6.30 – 6.31)	161 (6.34)
	Shoe lining thickness	4.0 (0.16)	1.0 (0.04)
	Brake panel warpage	–	0.4 (0.02)
	Waterproof seal lip length	22 (0.9)	20 (0.8)
	Master cylinder I.D.	14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
	Master piston O.D.	13.957 – 13.984 (0.5495 – 0.5506)	13.945 (0.5490)
	Wheel cylinder I.D.	19.050 – 19.102 (0.7500 – 0.7520)	19.12 (0.753)
	Wheel cylinder piston O.D.	18.997 – 19.030 (0.7479 – 0.7492)	18.81 (0.741)
Rear brake	Brake disc thickness	7.5 (0.30)	6 (0.2)
	Brake disc runout	–	0.5 (0.02)
	Master cylinder I.D.	15.870 – 15.913 (0.6248 – 0.6265)	15.925 (0.6270)
	Master piston O.D.	15.827 – 15.854 (0.6231 – 0.6242)	15.815 (0.6226)
	Caliper cylinder I.D.	30.230 – 30.280 (1.1902 – 1.1921)	30.29 (1.193)
	Caliper piston O.D.	30.148 – 30.198 (1.1869 – 1.1889)	30.14 (1.187)

TORQUE VALUES

Brake hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Wheel cylinder bleed valve	6 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Brake lever pivot bolt	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Brake lever pivot nut	6 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Front master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Rear brake reservoir hose joint screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)	Apply locking agent to the threads.
Wheel cylinder bolt	8 N·m (0.8 kgf·m, 5.8 lbf·ft)	
Wheel cylinder nut	17 N·m (1.7 kgf·m, 12 lbf·ft)	
Wheel cylinder oil pipe joint nut	17 N·m (1.7 kgf·m, 12 lbf·ft)	
Front brake panel bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	Special bolt; replace with a new one.
Front wheel hub nut	78 N·m (8.0 kgf·m, 58 lbf·ft)	Castle nut.
Rear brake caliper bleed valve	6 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Rear brake caliper bracket pin bolt	32 N·m (3.3 kgf·m, 24 lbf·ft)	
Rear brake caliper pin retaining bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Rear brake caliper parking nut	27 N·m (2.8 kgf·m, 20 lbf·ft)	Apply locking agent to the threads.
Rear brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	ALOC bolt: replace with a new one.
Rear brake disc bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	ALOC bolt: replace with a new one.

TOOLS

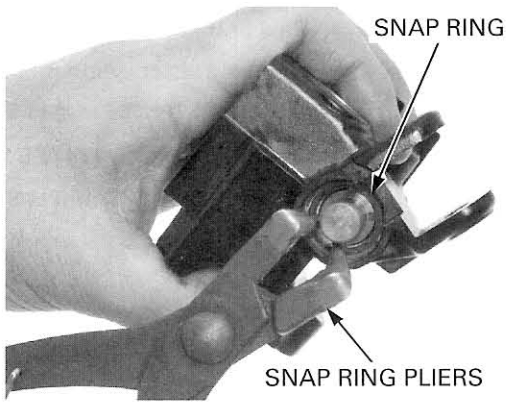
Snap ring pliers	07914-SA50001 or 07914-3230001
Lock nut wrench, 20 x 24 mm	07716-00201001

Make sure the snap ring is firmly seated in the groove.

Install the snap ring into the groove in the master cylinder, using the special tool.

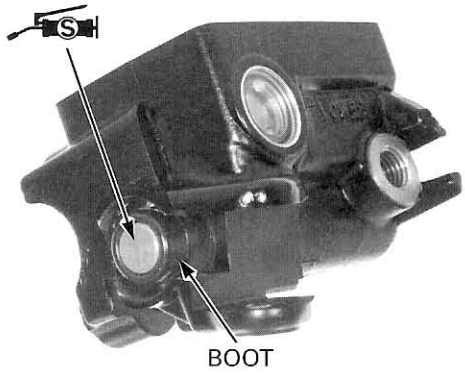
TOOL:

Snap ring pliers	**07914-SA50001 or 07914-3230001**



Install the boot into the master cylinder and the groove in the piston

Apply silicone grease to the brake lever-to-master piston contact area.



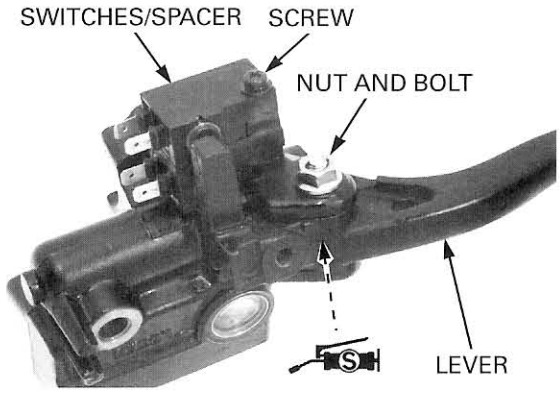
Apply silicone grease to the brake lever pivot.

Install the brake lever and pivot bolt.
Tighten the pivot bolt to the specified torque.

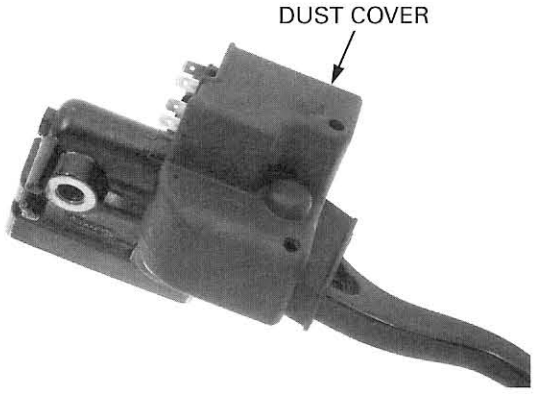
TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

Install the pivot nut and tighten it to the specified torque.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)



Install the dust cover.



BRAKE PANEL INSPECTION

Do not get grease on the shoe linings.

Clean any grease from the brake panel thoroughly.

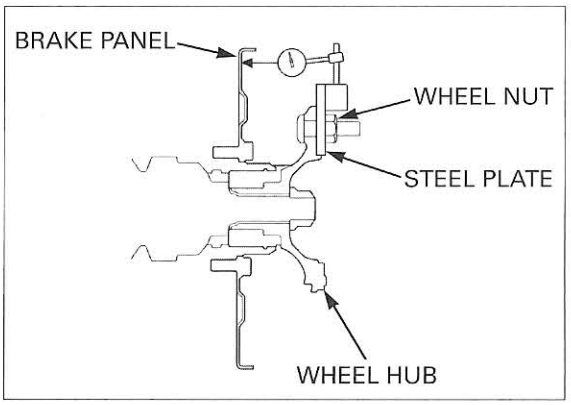
Check the brake panel at the waterproof seal lip contact area for abnormal scratches or wear.

Install a suitable steel plate onto the wheel hub and secure it with the wheel nut as shown.

Measure the brake panel on the points attached to the seal lip for warpage using a dial gauge.

SERVICE LIMIT: 0.4 mm (0.02 in)

See page 16-24 for brake panel replacement.

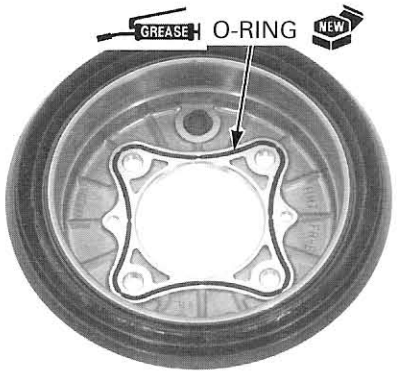


BRAKE DRUM INSTALLATION

Do not get grease on the brake drum and shoe linings.

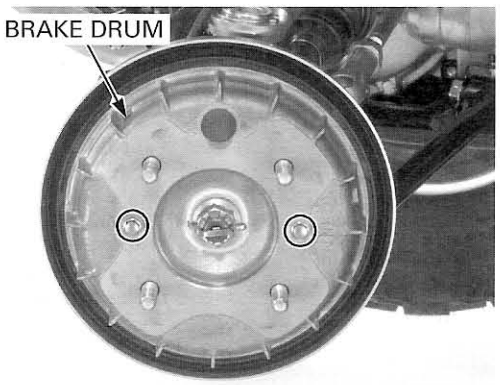
Coat a new O-ring with grease and install it into the brake drum groove.

Make sure that the waterproof seal is packed with the multi-purpose grease (NLGI #3).



Install the brake drum onto the hub and tighten the two bolts securely.

Install the front wheel (page 14-9).

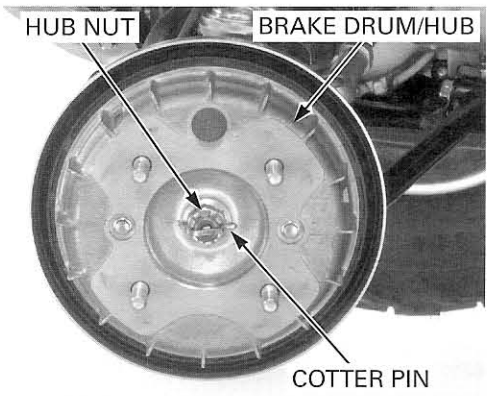


FRONT WHEEL CYLINDER/BRAKE PANEL

DISASSEMBLY

Drain the brake fluid from the front brake hydraulic system (page 16-6).

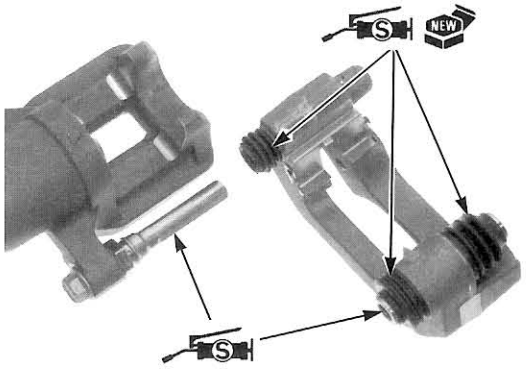
Remove the following:
- front wheel (page 14-9)
- cotter pin
- hub nut
- brake drum/wheel hub



Apply silicone grease to the lips of new boots and install them into the caliper bracket.

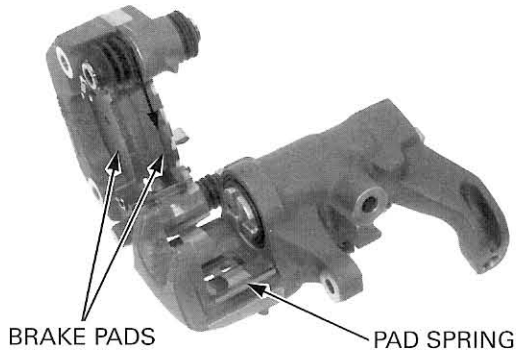
Coat the collar with silicone grease and install it into the caliper bracket.

Coat the caliper pin of the caliper body with silicone grease and install it into the caliper bracket.



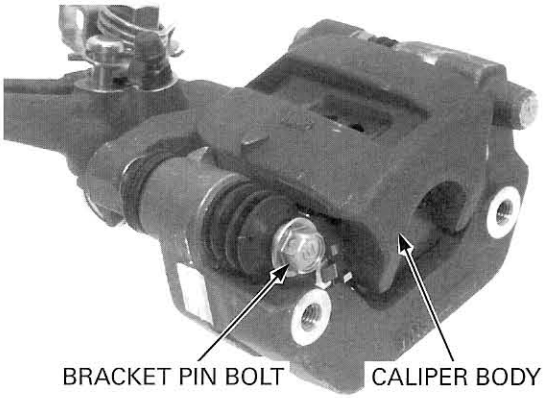
Install the pad spring in the caliper body as shown.

Install the brake pads onto the caliper bracket.



Pivot the caliper body over the pads and bracket.

Temporarily install the bracket pin bolt.

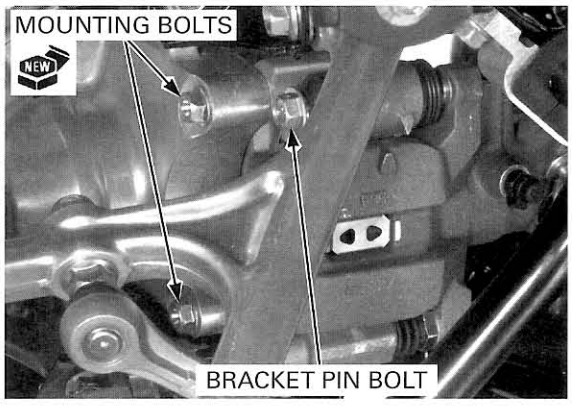


Install the brake caliper with new mounting bolts and tighten the bolts.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Tighten the bracket pin bolt.

TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)

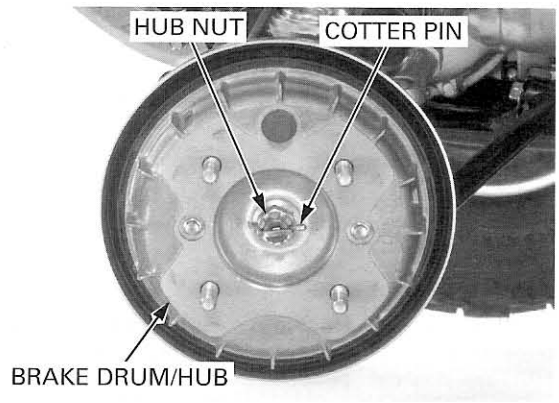


FRONT DRIVE SHAFT

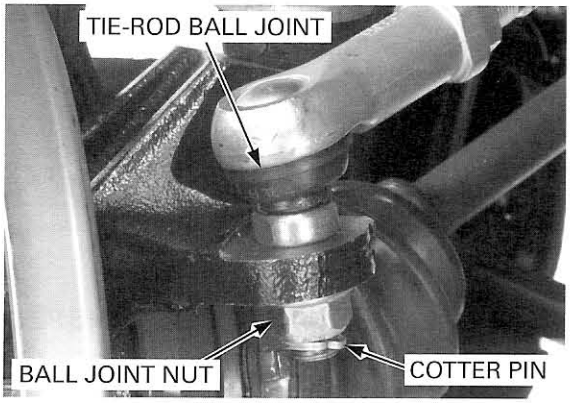
REMOVAL

Remove the front wheel (page 14-9).

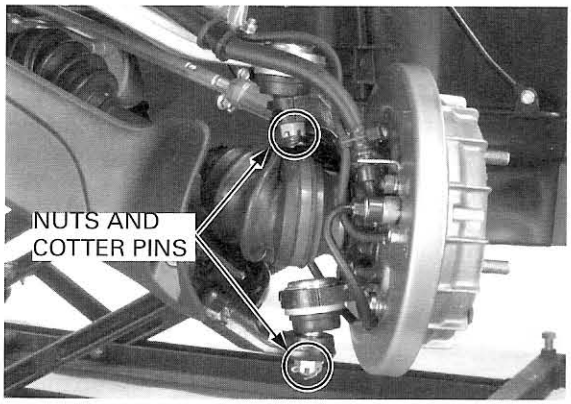
Remove the cotter pin and loosen the hub nut.



Remove the cotter pin.
Remove the tie-rod ball joint nut while holding the joint stud flats with an open end wrench.
Remove the tie-rod from the knuckle.

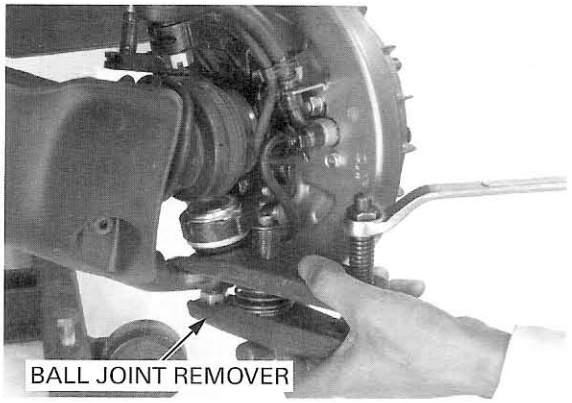


Remove the cotter pins and loosen the castle nuts of the suspension arm ball joints, but do not remove them yet.



Separate the ball joints, using the special tool according to the instructions on page 14-13.

TOOL:
Ball joint remover, 28 mm 07MAC-SL00200

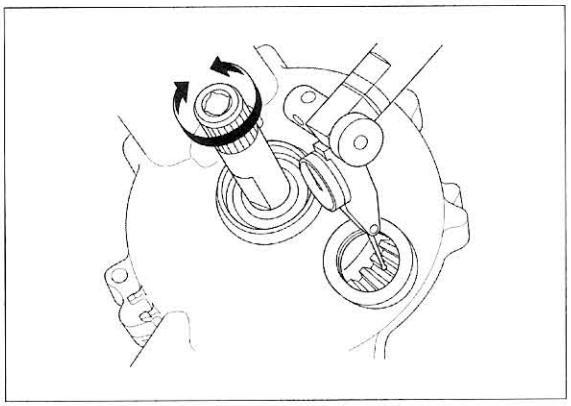


BACKLASH INSPECTION

Hold the pinion gear with the 8 mm nut.

Set the differential case into a jig or vise with soft jaws.

Install the differential inspection tool into the right side of the differential.



TOOL:

Differential inspection tool	**07KMK-HC50101 or 07KMK-HC5010A (U.S.A. only)**

Remove the oil filler cap and set a horizontal type dial indicator on the ring gear through the filler hole.
Turn the ring gear back and forth to read backlash.

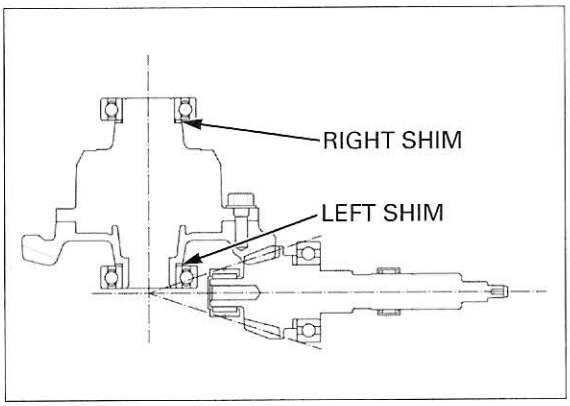
STANDARD: 0.05 – 0.25 mm (0.002 – 0.010 in)
SERVICE LIMIT: 0.4 mm (0.02 in)

Remove the dial indicator. Turn the ring gear 120° and measure backlash. Repeat this procedure once more. Compare the difference of the three measurements.

SERVICE LIMIT: 0.2 mm (0.01 in)

If the difference in measurements exceeds the service limit, it indicates that the bearing is not installed squarely, or the case is deformed. Inspect the bearings and case.

If the backlash is excessive, replace the ring gear left side shim with a thinner one.
If the backlash is too small, replace the ring gear left side shim with a thicker one.
The backlash is changed by about 0.06 mm (0.002 in) when the thickness of the shim is changed by 0.10 mm (0.004 in).



NOTE:

- Twenty-three different thickness shims are available from the thinnest (0.50 mm) shim to the thickest (1.60 mm) shim in increments of 0.05 mm.

Ring gear shims:
A: (thinnest): 0.50 mm (0.020 in)
K: (standard): 1.00 mm (0.039 in)
W: (thickest): 1.60 mm (0.063 in)

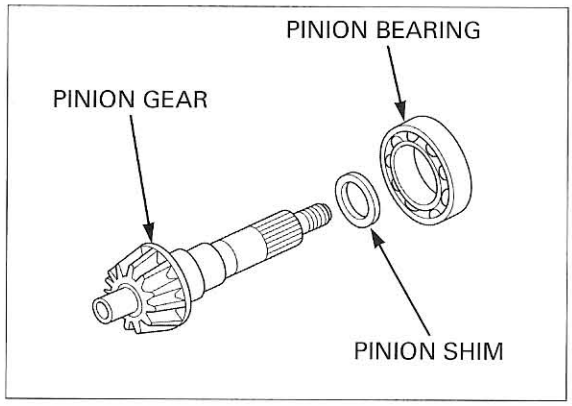
Change the right side shim an equal thickness and opposite amount of what the left side shim was changed; If the left shim was replaced with a 0.10 mm (0.004 in) thicker shim, replace the right shim with one that is 0.10 mm (0.004 in) thinner.

PINION GEAR INSTALLATION

Install the shim and bearing onto the pinion gear.

NOTE:

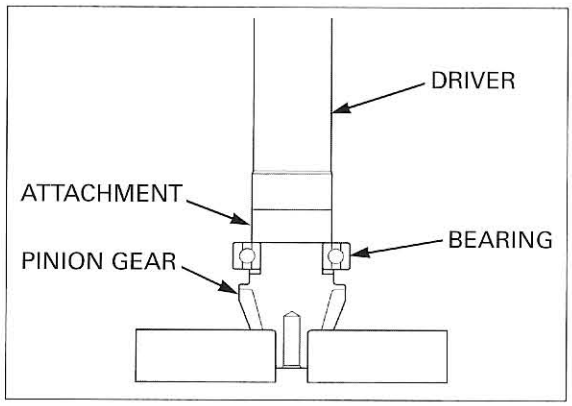
- When the gear set, differential bearing, differential housing and/or gear case has been replaced, use a 2.00 mm (0.079 in) thick shim for initial reference.



Press the pinion bearing onto the pinion gear.

TOOLS:

Driver, 40 mm I.D.	**07746-0030100**
Attachment, 30 mm I.D.	**07746-0030300**

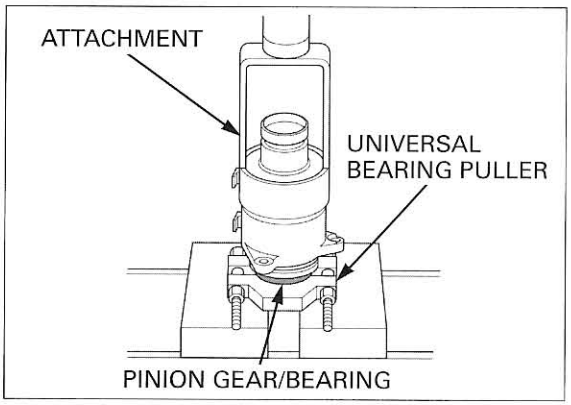


Be careful not to damage the oil seal lips in the final clutch.

Press the pinion gear/bearing assembly into the front final clutch using the special tools.

TOOLS:

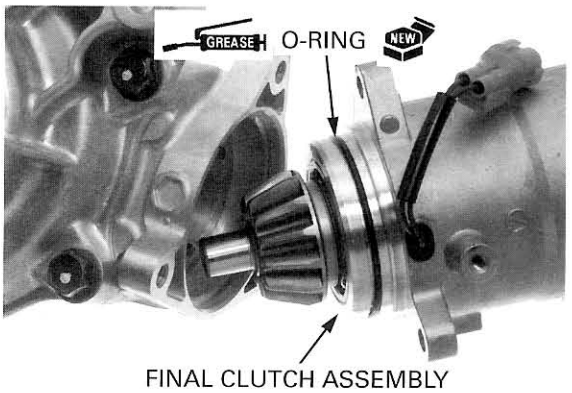
Universal bearing puller	**07631-0010000**
Press attachment	**07LME-GE20100**



Be sure to wear heavy gloves to avoid burns when handling the heated final clutch case.

U.S.A. only:
Heat the final clutch case to about 100°C (212°F). Drop the pinion gear assembly into the warm final clutch case.

Coat a new O-ring with grease and install it into the groove in the front final clutch assembly.



TROUBLESHOOTING

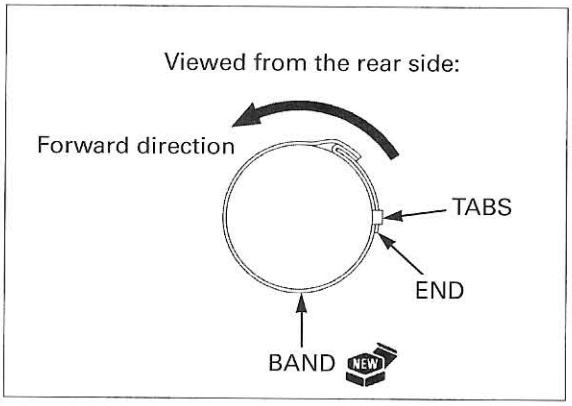
Excessive noise
- Worn or damaged bearing
- Worn or scored splines
- Worn or damaged drive shaft, propeller shaft or universal joint
- Worn pinion and ring gears
- Excessive backlash between pinion and ring gears
- Oil level too low

Wobble or vibration in vehicle
- Axle not tightened properly
- Bent axle

Oil leak
- Oil level too high
- Clogged breather
- Damaged seals
- Loose case cover

Install new boot bands so the band ends are facing opposite the forward direction.

Bend down each band end and secure it with the lock tabs. Tap the lock tabs with a plastic hammer.



FINAL DRIVE DISASSEMBLY/ INSPECTION

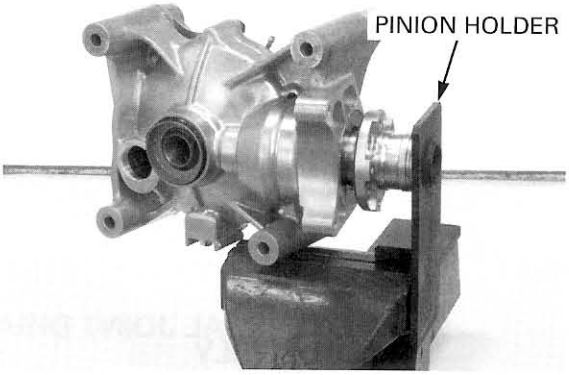
BACKLASH INSPECTION

Remove the oil filler cap.

Install the special tool into the pinion joint, and set the final drive assembly and tool in a vise.

TOOL:
Pinion holder **07SMB-HM70200**

Install the drive shaft into the final drive assembly and hold it.

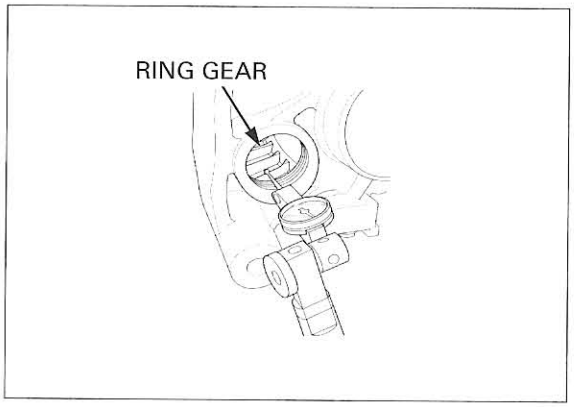


Set a horizontal type dial indicator on the ring gear through the filler hole.
Turn the ring gear back and forth with the drive shaft to read backlash.

STANDARD: 0.05–0.25 mm (0.002–0.010 in)
SERVICE LIMIT: 0.4 mm (0.02 in)

Remove the dial indicator. Turn the ring gear 120° and measure backlash.
Repeat this procedure once more.
Compare the difference of the three measurements.

SERVICE LIMIT: 0.2 mm (0.01 in)

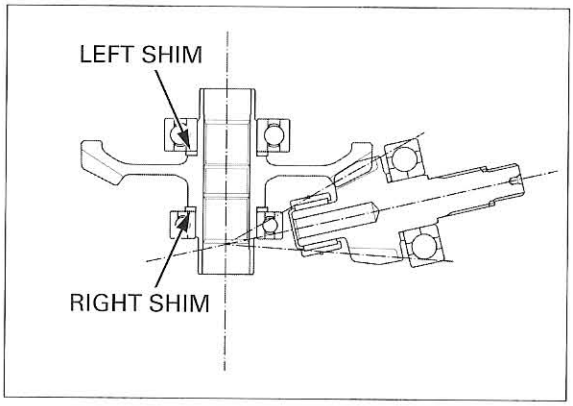


If the difference in measurements exceeds the service limit, it indicates that the bearing is not installed squarely, or the case is deformed.
Inspect the bearings and case.

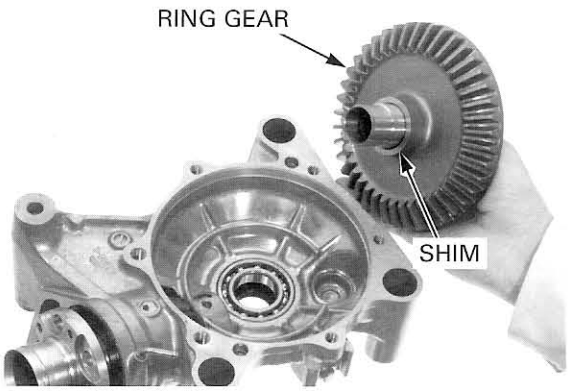
If the backlash is excessive, replace the ring gear right shim with a thinner one.
If the backlash is too small, replace the ring gear right shim with a thicker one.
Backlash is changed by about 0.06 mm (0.002 in) when thickness of the spacer is changed by 0.12 mm (0.005 in).

NOTE:

- Ten different shims (from A to J) are available in thickness increments of 0.06 mm (0.002 in).

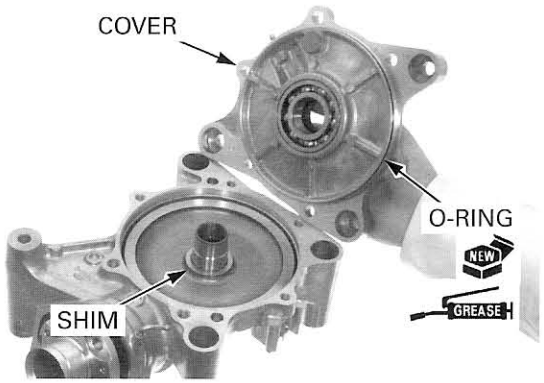


Install the proper ring gear shims onto the ring gear and install them into the gear case.



Coat a new O-ring with grease and install it into the cover groove.

Install the case cover onto the gear case.



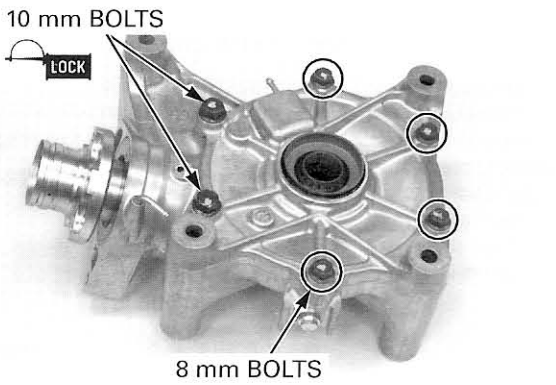
Apply locking agent to the threads of the two 10-mm bolts.

It is important to turn the pinion while tightening the bolts. If the ring gear shim is too thick, the gears will lock after only light tightening.

Install the cover bolts and tighten them in several steps until the cover evenly touches the case. Then, while rotating the pinion gear, tighten the bolts to the specified torque in a crisscross pattern in several steps.

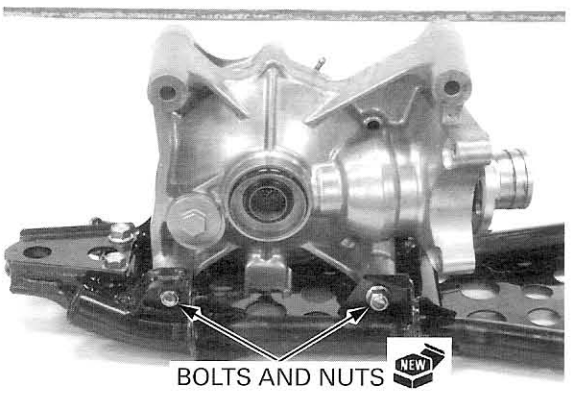
TORQUE:
10 mm bolt: 49 N·m (5.0 kgf·m, 36 lbf·ft)
8 mm bolt: 25 N·m (2.6 kgf·m, 19 lbf·ft)

Check that the gear assembly turns smoothly without binding.



FINAL DRIVE INSTALLATION

Install the final drive assembly onto the sub-frame by inserting the mounting bolts from the left side. Install new mounting nuts but do not tighten them yet.



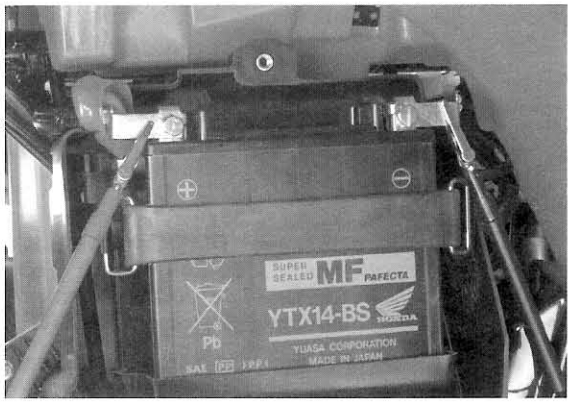
If current leakage exceeds the specified value, a shorted circuit is likely.
Locate the short by disconnecting connections one by one and measuring the current.

CHARGING VOLTAGE INSPECTION

Remove the battery cover (page 19-5).

Be sure the battery is in good condition before performing this test.

Warm up the engine to normal operating temperature.
Connect the multimeter between the battery positive (+) and negative (–) terminals.



NOTICE

- *To prevent a short, make absolutely certain which are the positive* (+) and negative (–) *terminals or cables.*
- *Do not disconnect the battery or any cable in the charging system without first switching off the ignition switch. Failure to follow this precaution can damage the tester or electrical components.*

With the headlights on, measure the voltage on the multimeter when the engine runs at 5,000 rpm.

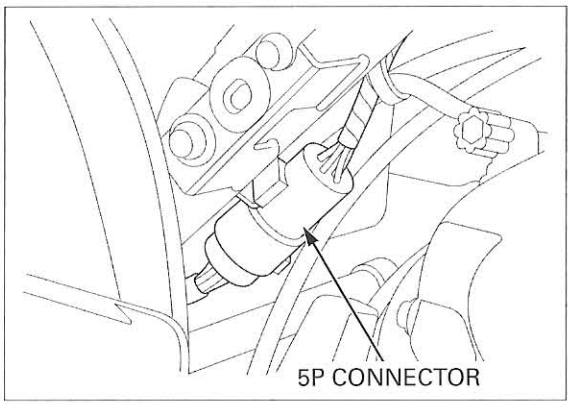
Standard: Measured battery voltage (page 19-5)< Measured charging voltage < 15.5 V

ALTERNATOR CHARGING COIL

INSPECTION

Remove the right side cover (page 2-4).

Disconnect the alternator 5P connector.
Check the connector for loose contacts or corroded terminals.



Measure the resistance between the Yellow wire terminals of the alternator side connector.

STANDARD: 0.1 – 1.0 Ω (at 20°C/68°F)

Check for continuity between each Yellow wire terminal of the alternator side connector and ground.
There should be no continuity.

Replace the alternator stator if resistance is out of specification, or if any wire has continuity to ground.

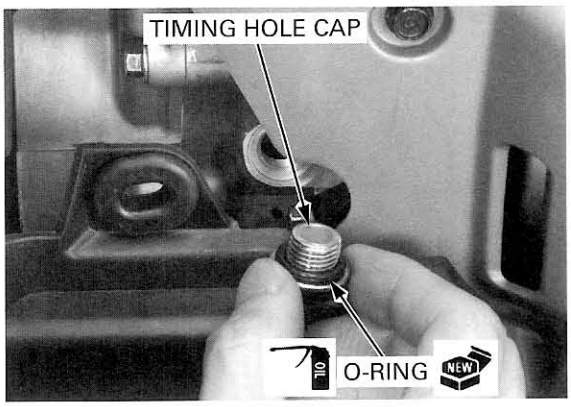
Refer to page 10-7 for alternator stator replacement.

Coat a new O-ring with oil and install it onto the timing hole cap.

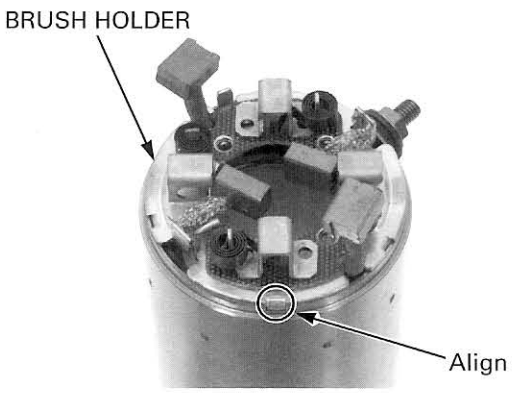
Install the timing hole cap and tighten it to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the right side cover (page 2-6).



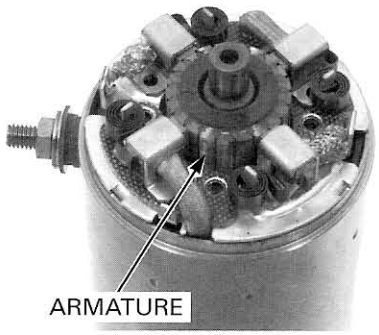
Install the brush holder, aligning the holder tab with the case groove, and the holder grooves with the insulated brush wires.



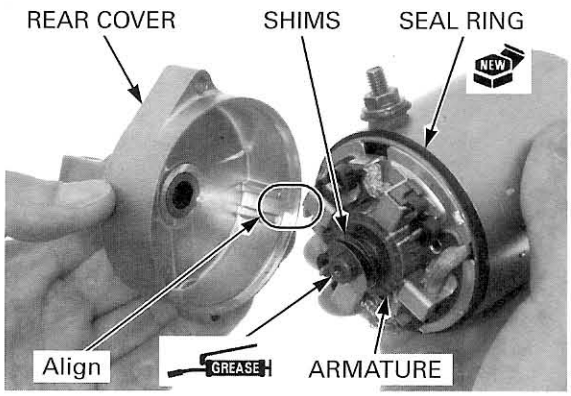
Push and hold the brushes inside the brush holder, and install the armature through the motor case and brush holder.
When installing the armature into the motor case, hold the armature tightly to keep the magnet of the case from pulling the armature against it.

NOTICE

The coil may be damaged if the magnet pulls the armature against the case.

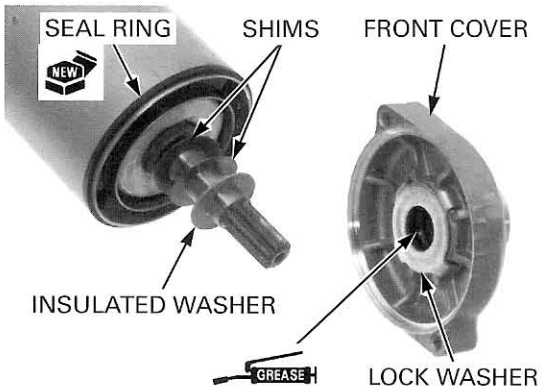


Install the same number of shims in the same location as noted during removal.
Install a new seal ring onto the motor case.
Apply a thin coat of grease to the armature shaft end.
Install the rear cover, aligning its groove with the brush holder tab.



Install the shims properly as noted during removal.

Install the shims and insulated washer onto the armature shaft.
Install a new seal ring onto the motor case.
Apply grease to the oil seal lip and needle bearing in the front cover.
Install the lock washer onto the front cover.
Install the front cover.



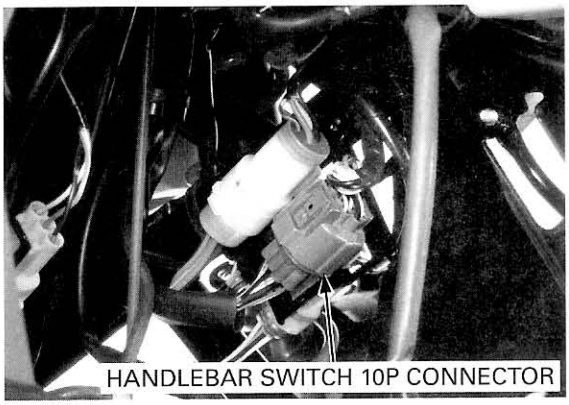
HANDLEBAR SWITCH

INSPECTION

Remove the right inner fender (page 2-9).

Remove the handlebar switch 10P connector from the frame and disconnect it.

Check for continuity between the switch side connector terminals in each switch position.
Continuity should exist between the color coded wires as shown below:


HANDLEBAR SWITCH 10P CONNECTOR

LIGHTING SWITCH

Position \ Color	Bl/Br	Br
ON	○	○ ○
OFF		

DIMMER SWITCH

Position \ Color		W	Bu/Bl
Low	○	○	
(N)	○	○	○
High	○		○

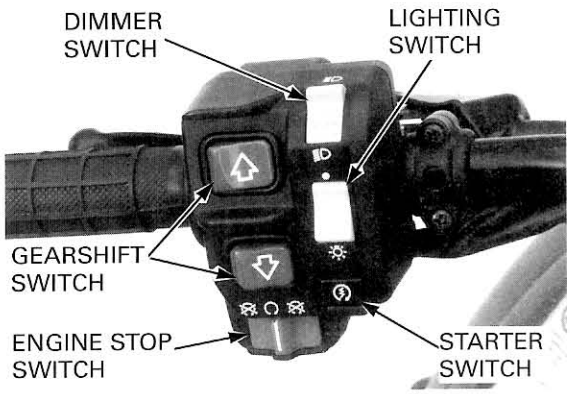
ENGINE STOP SWITCH

Position \ Color	Bl/G	Bl/W
OFF		
RUN	○	○
OFF		

STARTER SWITCH

Position \ Color	Bl/W	Y/R
FREE		
PUSH	○	○

See page 24-40 for gearshift switch inspection.



Replace the oil temperature sensor if it is out of specifications by more than 10% at any temperature listed.

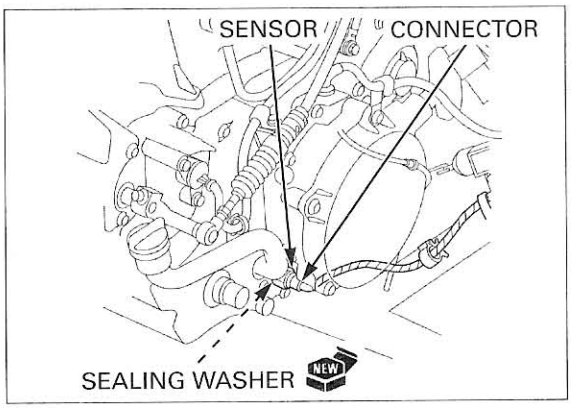
Install the oil temperature sensor with a new sealing washer and tighten it.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Connect the oil temperature sensor connector.

Install the removed parts in the reverse order of removal.

Fill the recommended engine oil (page 3-11).



BRAKE LIGHT SWITCH

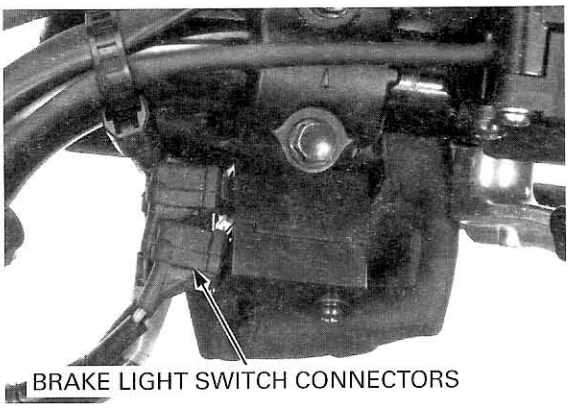
FRONT BRAKE LEVER

NOTE:

- The lower switch is the front brake light switch.

Disconnect the front brake lever switch connectors and check for continuity between the switch terminals.

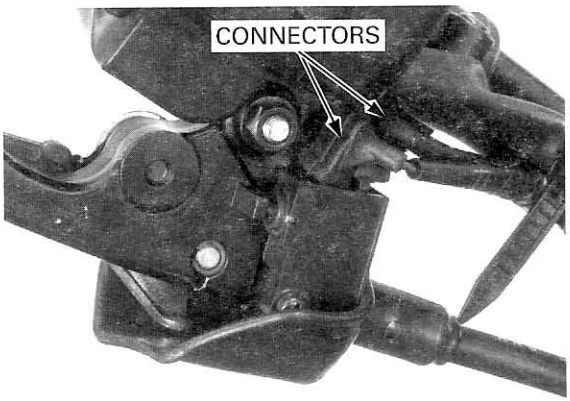
There should be continuity with the front brake lever squeezed and no continuity with the lever released.



REAR BRAKE LEVER

Disconnect the rear brake lever switch connectors and check for continuity between the switch terminals.

There should be continuity with the rear brake lever squeezed and no continuity with the lever released.



4. **Rear VSS Ground Line Inspection**

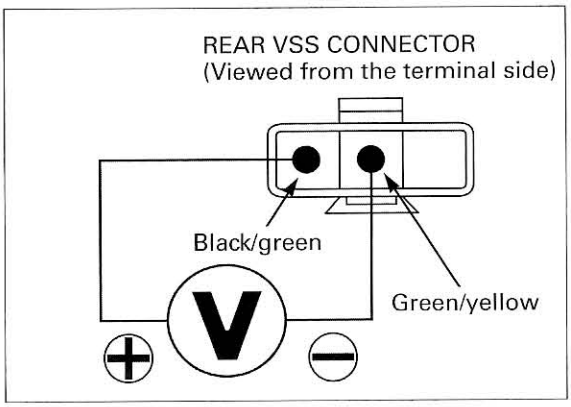
Measure the voltage between the wire harness side rear VSS 3P connector terminals.

Connection: Black/green (+) – Green/yellow (–)

Is the voltage more than 10 V?

NO – Open circuit in the Green/yellow wire.

YES – GO TO STEP 5.



5. **Rear VSS Output Line Inspection**

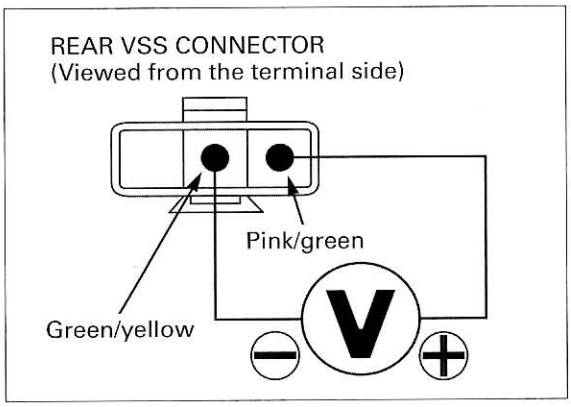
Measure the voltage between the wire harness side rear VSS 3P connector terminals.

Connection: Pink/green (+) – Green/yellow (–)

Is the voltage approximately 5 V?

NO – Open or short circuit in the Pink/green wire.

YES – GO TO STEP 6.



6. **Rear VSS Inspection**

Turn the ignition switch to "OFF".
Connect the inspection adaptor to the rear VSS 3P connectors.

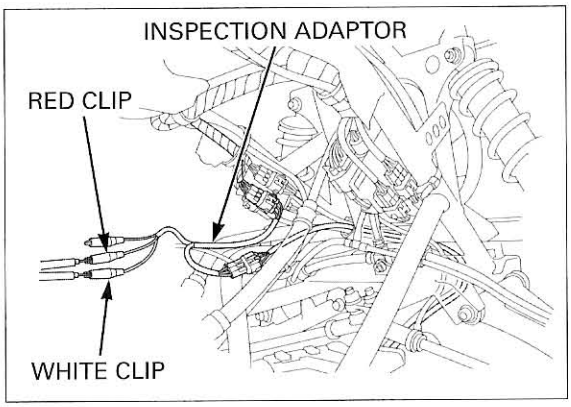
TOOL:
Inspection adaptor **07GMJ-ML80100**

Shift the transmission in neutral.
Raise the wheels off the ground and support the vehicle securely with a hoist or equivalent.
Turn the ignition switch to "ON".
Measure the voltage between the Red clip (+) and White clip (–) while slowly turning the rear wheels by hand.

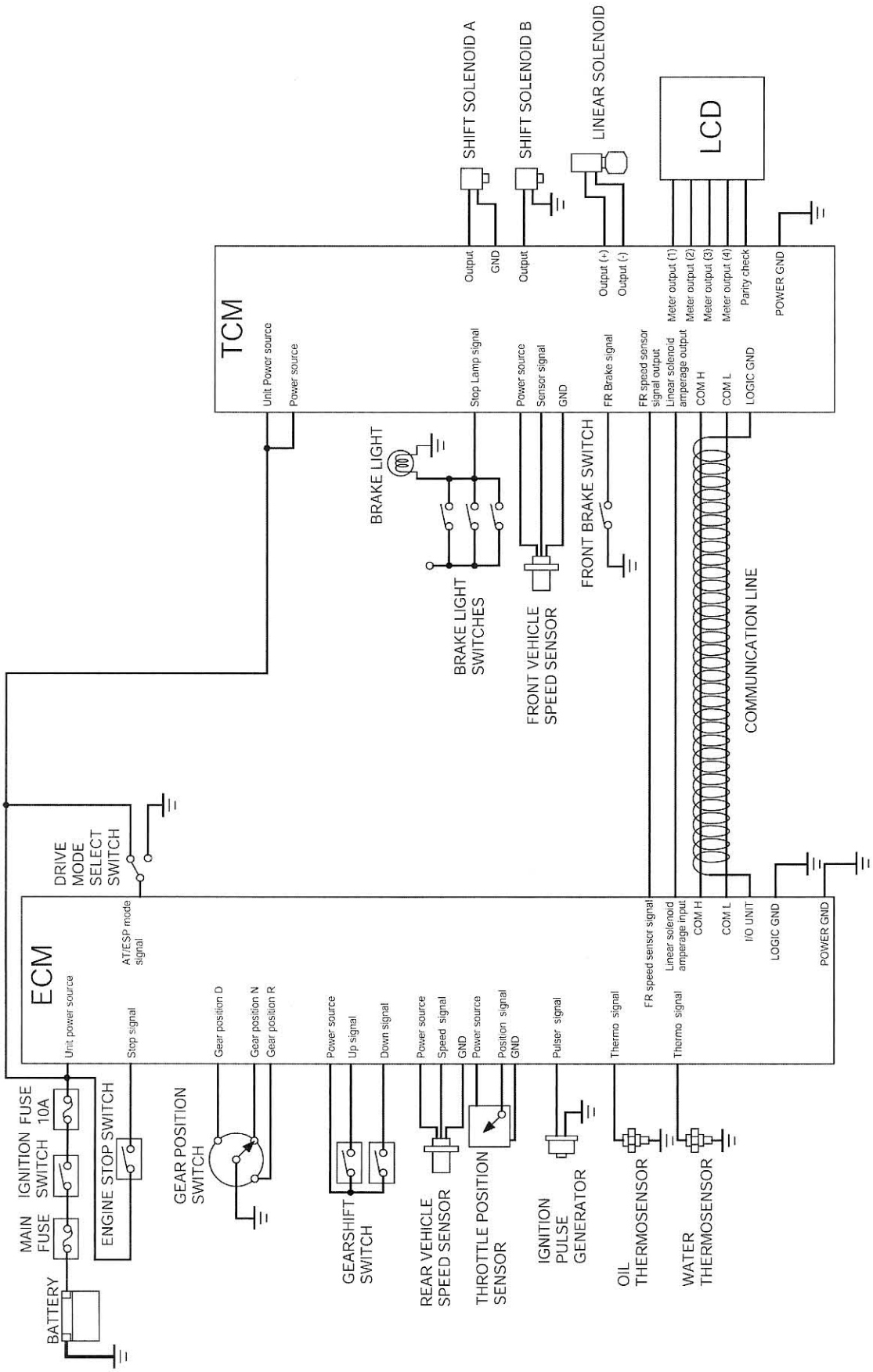
Is there 0 to 5 V pulse voltage?

NO – Faulty rear VSS.

YES – GO TO STEP 7.



SYSTEM DIAGRAM



PROBLEM CODE 3: GEARSHIFT SWITCH

1. ECM Connector Inspection

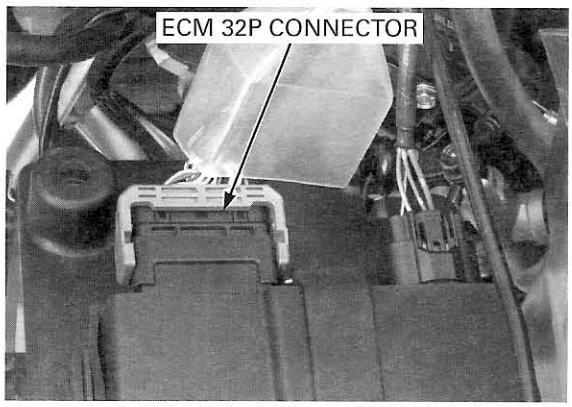
Seal the ECM connector with tape to prevent dirt and oil from entering the connector after disconnecting the 32P connector.

Turn the ignition switch to "OFF".
Disconnect the ECM 32P connector by releasing the lock lever (page 20-6).
Check the connector for loose contacts or corroded terminals.

Is the connector in good condition?

NO – Loose or poorly connected ECM 32P connector.

YES – GO TO STEP 2.



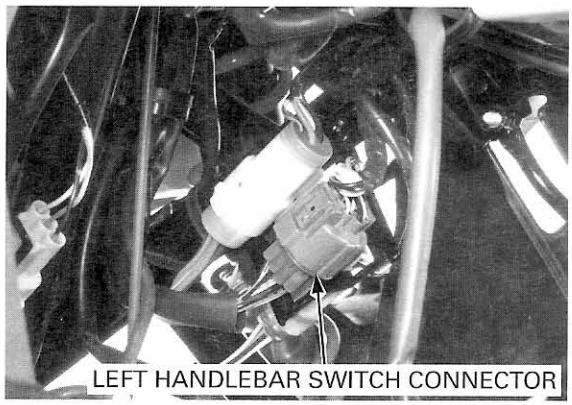
2. Gearshift Switch Connector Inspection

Remove the left handlebar switch 10P connector from the frame and disconnect it.
Check the connector for loose contacts or corroded terminals.

Is the connector in good condition?

NO – Loose or poorly connected left handlebar switch 10P connector.

YES – GO TO STEP 3.



3. Gearshift Switch Line Inspection (ECM side)

Be careful not to bend the connector terminals.

Connect the left handlebar switch 10P connector.
Check for continuity between the ECM connector terminals in each switch position (page 24-41).

Is there normal continuity?

NO – GO TO STEP 4.

YES – GO TO STEP 6.

4. Gearshift Switch Inspection (Handlebar switch side)

Remove the left handlebar switch 10P connector from the frame and disconnect it.
Check for continuity at the switch side 10P connector terminals in each switch position (page 24-41).

Is there normal continuity?

NO – GO TO STEP 5.

YES –
- Open or short circuit in the White/red wire.
- Open or short circuit in the White/yellow wire.
- Open or short circuit in the White/blue wire.

7. Failure Reproduction

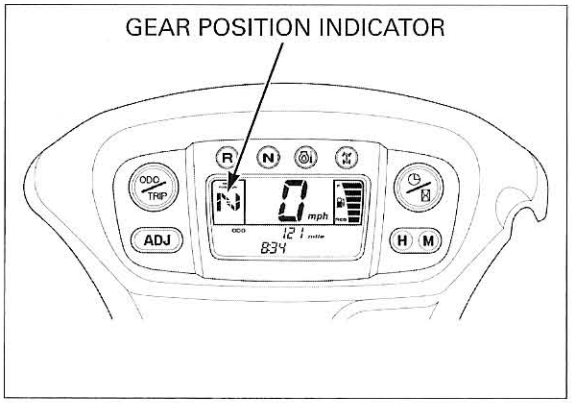
When connecting the ECM and TCM 32P connectors, check that there is no dirt and oil in the connectors.

Connect the ECM, TCM and linear solenoid valve connectors.
Turn the ignition switch to "ON" and check the gear position indicator.

Does the gear position indicator blink 6 or 7 times?

NO – No problem (Temporary failure).

YES – GO TO STEP 8.



8. Failure Reproduction With a New TCM

Replace the TCM with a new one.
Turn the ignition switch to "ON" and check the gear position indicator.

Does the gear position indicator blink 6 or 7 times?

NO – Faulty TCM.

YES – Faulty ECM.

PROBLEM CODE 13 OR 14: ECM-TO-TCM COMMUNICATION

1. ECM Connector Inspection

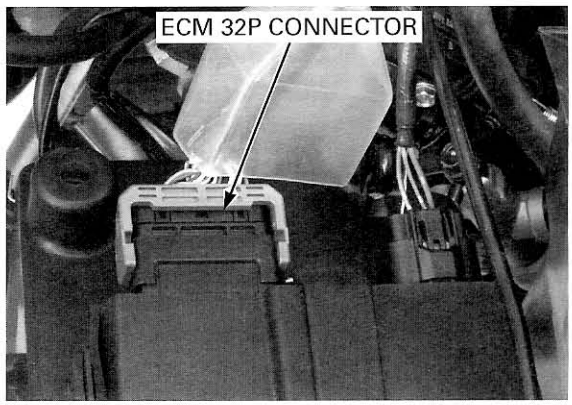
Seal the ECM connector with tape to prevent dirt and oil from entering the connector after disconnecting the 32P connector.

Turn the ignition switch to "OFF".
Disconnect the ECM 32P connector by releasing the lock lever (page 20-6).
Check the connector for loose contacts or corroded terminals.

Is the connector in good condition?

NO – Loose or poorly connected ECM 32P connector.

YES – GO TO STEP 2.



2. TCM Connector Inspection

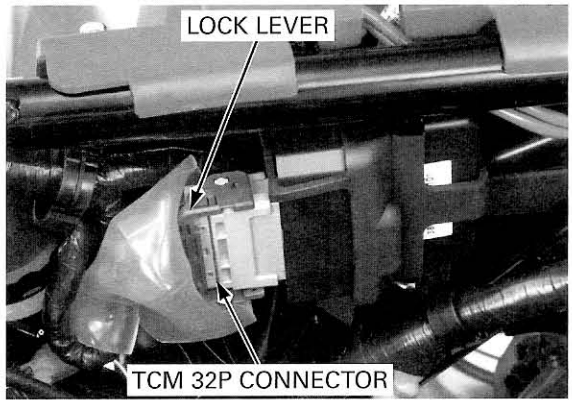
Seal the TCM connector with tape to prevent dirt and oil from entering the connector after disconnecting the 32P connector.

Remove the air cleaner housing (page 5-5).
Disconnect the TCM 32P connector by releasing the lock lever.
Check the connector for loose contacts or corroded terminals.

Is the connector in good condition?

NO – Loose or poorly connected TCM 32P connector.

YES – GO TO STEP 3.



3. Communication Line Open Circuit Inspection

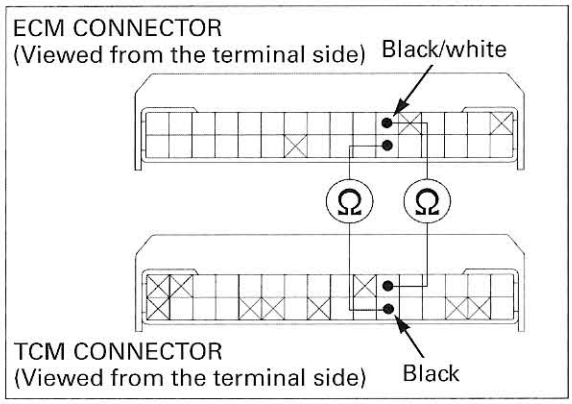
Be careful not to bend the connector terminals.

Check the Black and Black/white wires for continuity between the ECM and TCM connectors terminals.

Is there continuity?

NO – • Open circuit in the Black wire.
• Open circuit in the Black/white wire.

YES – GO TO STEP 4.



4. Failure Reproduction

When connecting the ECM and TCM 32P connectors, check that there is no dirt and oil in the connectors.

Connect the ECM and TCM connectors.
Turn the ignition switch to "ON" and check the gear position indicator.

Does the gear position indicator blink 13 or 14 times?

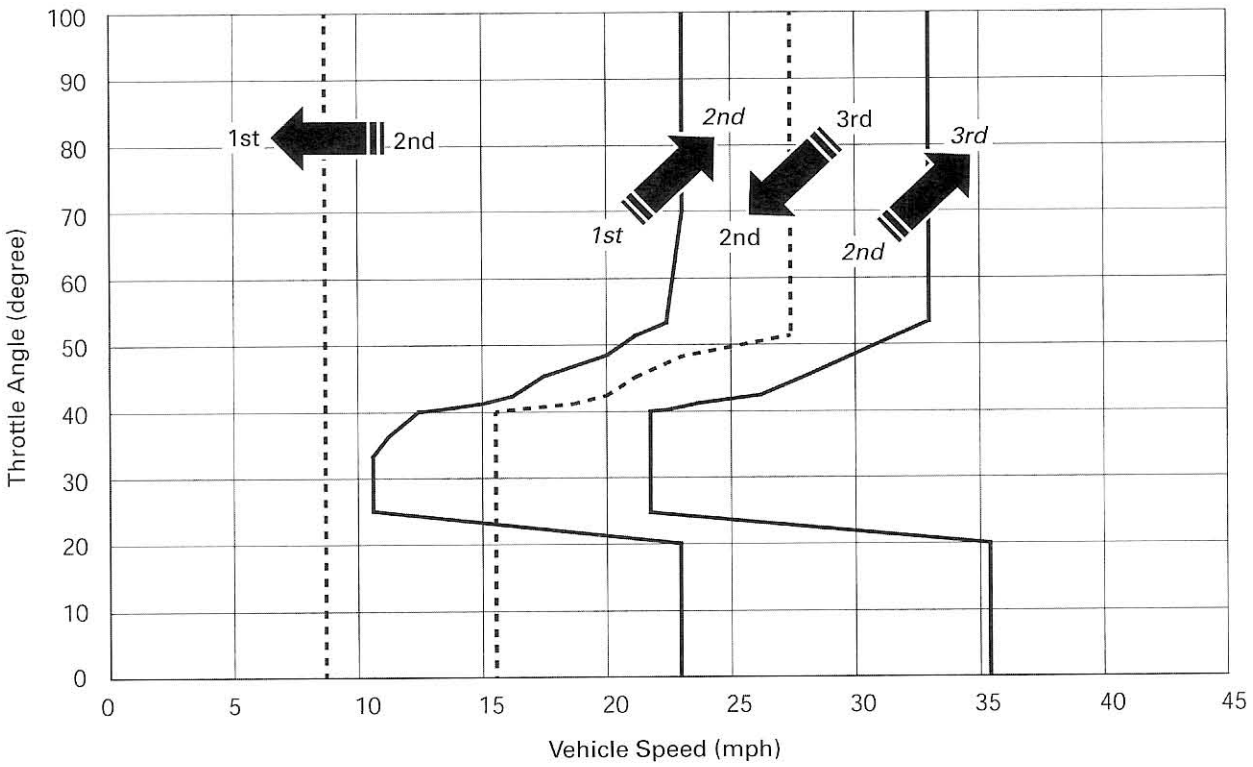
NO – No problem (Temporary failure).

YES – Faulty ECM or TCM.

MEMO

AUTOMATIC TRANSMISSION PERFORMANCE CURVE

See the following graph for the relationship between the vehicle speed and the throttle angle.
It shows the shift timing (shift-up shown with the solid lines and shift-down with the dotted lines) and the ranges of shift position.



The vehicle condition is not applied the brake.

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