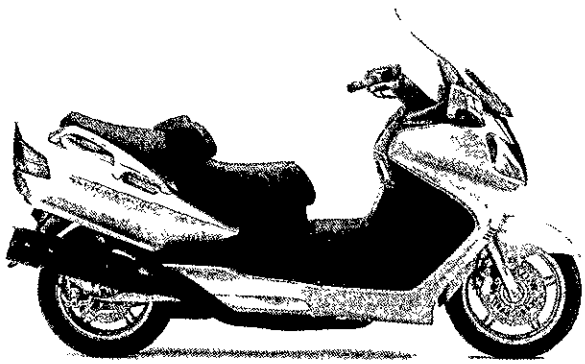
SUZUKI

AN650

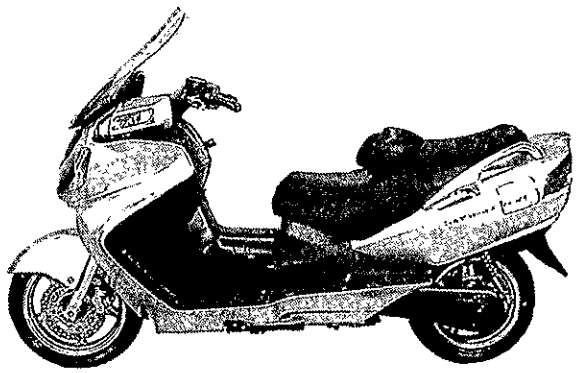
SERVICE MANUAL

99500-36110-01E

SUZUKI AN650K3 ('03-MODEL)



RIGHT SIDE

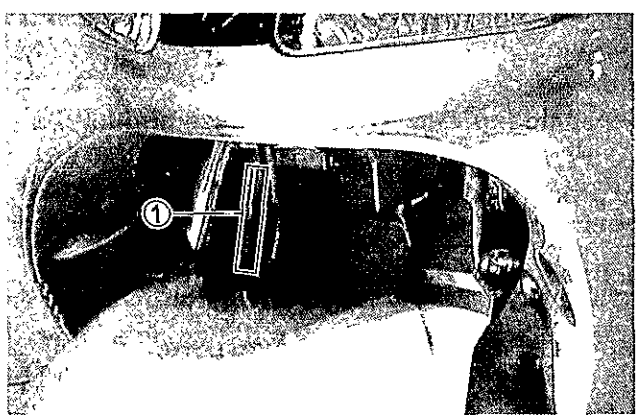


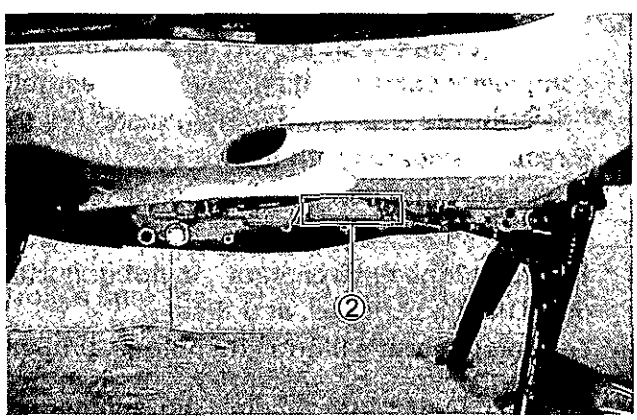
LEFT SIDE

* Difference between photographs and actual motorcycles depends on the markets.

SERIAL NUMBER LOCATION

The frame serial number or V.I.N. (Vehicle Identification Number) ① is stamped on the right side of the frame down tube. The engine serial number ② is located on the left side of the crankcase. These numbers are required especially for registering the machine and ordering spare parts.





FUEL, OIL AND ENGINE COOLANT RECOMMENDATION

FUEL (FOR USA AND CANADA)

Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$) or 91 octane or higher rated by the research method.

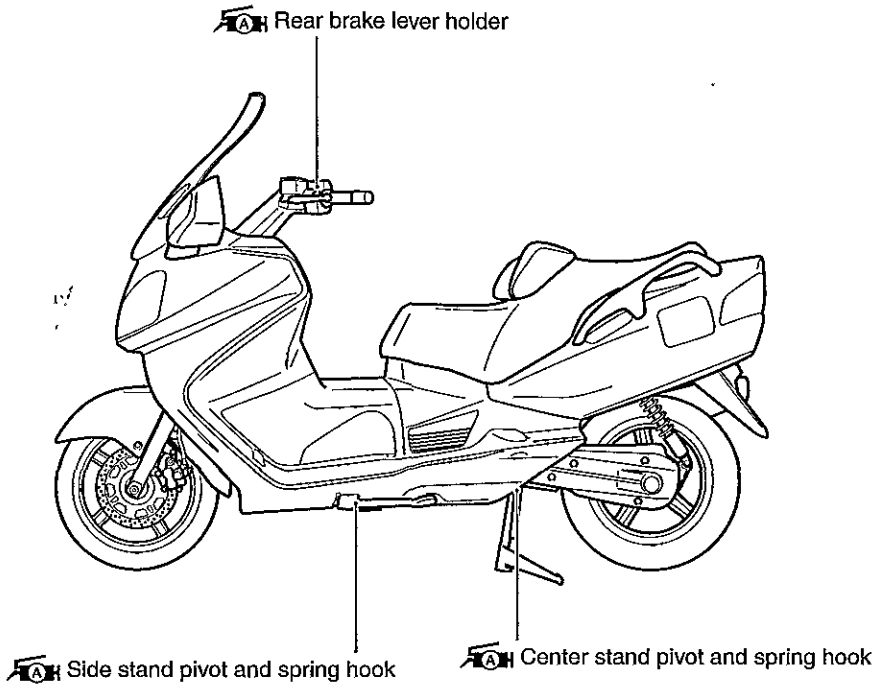
Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.

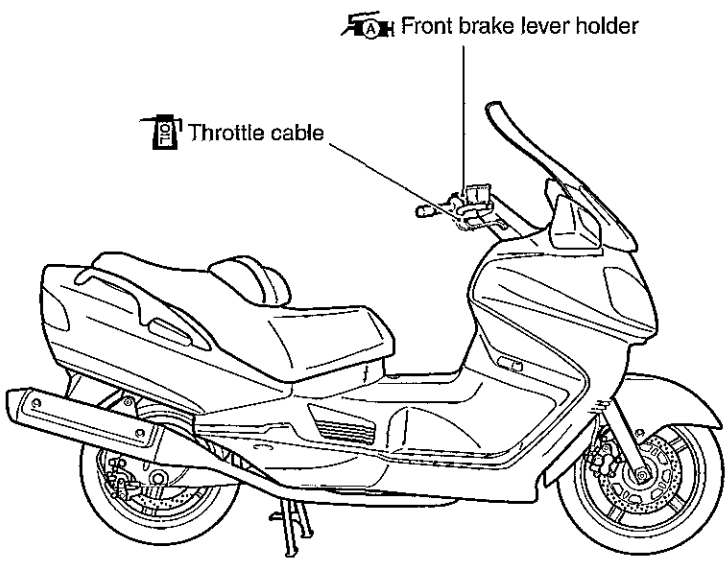
FUEL (FOR OTHER COUNTRIES)

Gasoline used should be graded 91 octane (Research Method) or higher. Unleaded gasoline is recommended.

LUBRICATION POINTS

Proper lubrication is important for smooth operation and long life of each working part of the motorcycle. Major lubrication points are indicated below.





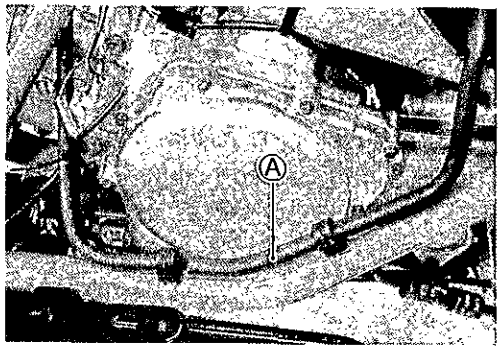
NOTE:

** Before lubricating each part, clean off any rusty spots and wipe off any grease, oil, dirt or grime.*

** Lubricate exposed parts which are subject to rust, with a rust preventative spray whenever the motorcycle has been operated under wet or rainy conditions.*

FUEL HOSE

Inspect every 6 000 km (4 000 miles, 6 months).
Replace every 4 years.



Inspect the fuel feed hose Ⓐ for damage and fuel leakage. If any defects are found, the fuel hoses must be replaced.

ENGINE OIL AND OIL FILTER

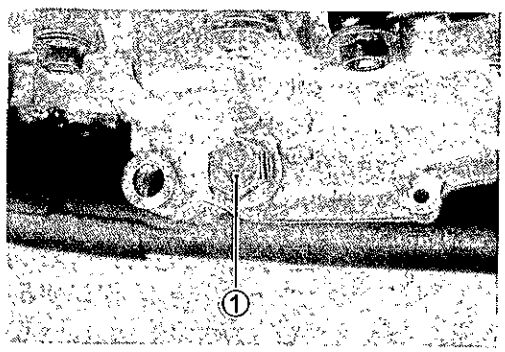
(ENGINE OIL)
Replace initially at 1 000 km (600 miles, 1 month) and every 6 000 km (4 000 miles, 6 months) thereafter.

(OIL FILTER)
Replace initially at 1 000 km (600 miles, 1 month) and every 18 000 km (11 000 miles, 18 months) thereafter.

Oil should be changed while the engine is warm. Oil filter replacement at the above intervals, should be done together with the engine oil change.

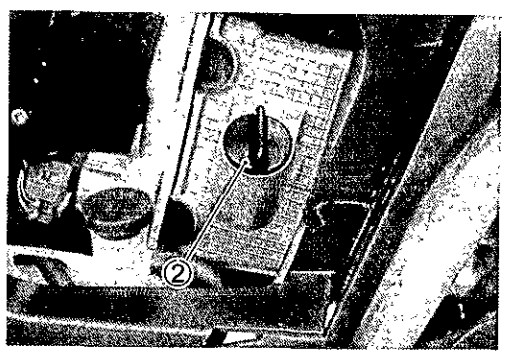
ENGINE OIL REPLACEMENT

- Keep the motorcycle upright with the center stand.
- Remove the maintenance lid. (☞9-13)
- Place an oil pan below the engine, and drain oil by removing the drain plug ① and filler cap ②.



- Tighten the drain plug ① to the specified torque, and pour fresh oil through the oil filler. The engine will hold about 2.6 L (2.7/2.3 US/Imp qt) of oil. Use an API classification of SF or SG oil with SAE 10W-40 viscosity.

Oil drain plug: 23 N·m (2.3 kg-m, 16.5 lb-ft)



⚠ WARNING

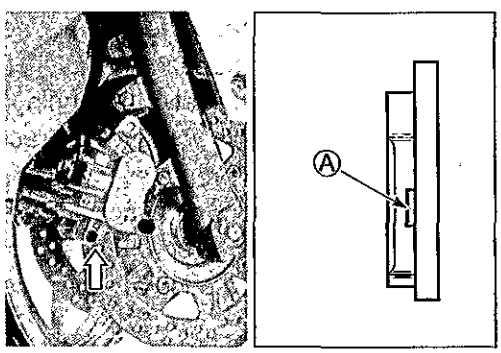
The brake system of this motorcycle is filled with a glycol-based brake fluid. Do not use or mix different types of fluid such as silicone-based or petroleum-based. Do not use any brake fluid taken from old, used or unsealed containers. Never re-use brake fluid left over from the last servicing or stored for a long period.

⚠ WARNING

Brake fluid, if it leaks, will interfere with safe running and immediately discolor painted surfaces. Check the brake hoses and hose joints for cracks and fluid leakage before riding.

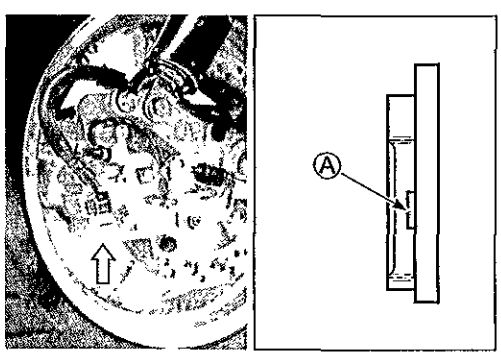
BRAKE PADS

The extent of brake pad wear can be checked by observing the grooved limit Ⓐ on the pad. When the wear exceeds the grooved limit, replace the pads with new ones. (☞9-64, 9-74)



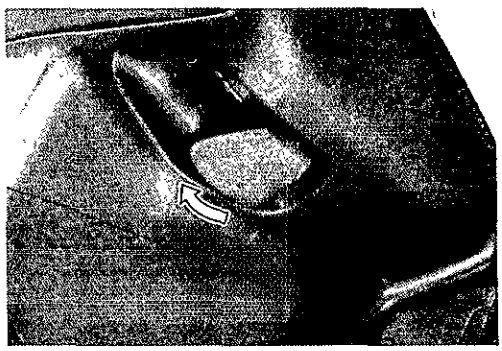
CAUTION

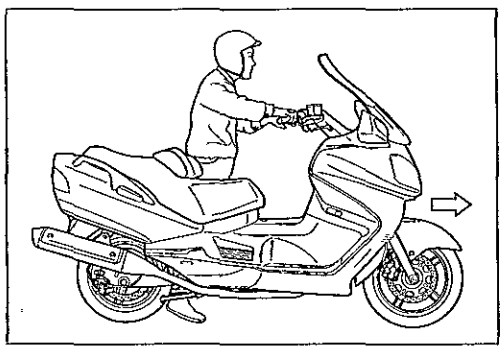
Replace the brake pad as a set, otherwise braking performance will be adversely affected.



BRAKE-LOCK INSPECTION

Inspect that the rear wheel is locked up when pulling the brake-lock lever 4 to 6 notches and moving the motorcycle forward to make sure that the brake-lock acts enough.
Adjust the brake-lock, if necessary. (☞9-85)



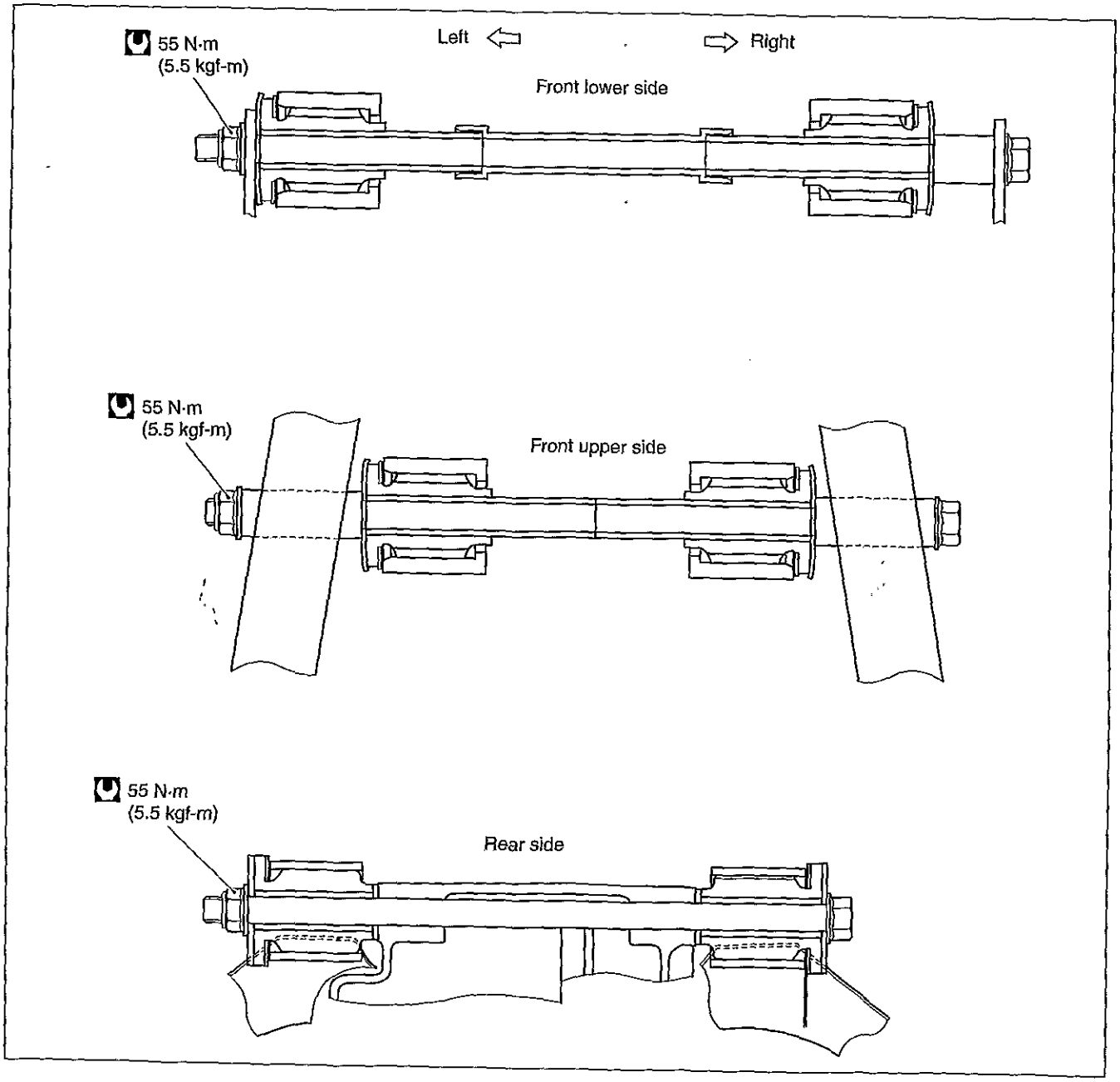


ENGINE REMOUNTING

- Reinstall the engine assembly following the procedure below:
  Assembling of center stand (☞11-26)
  Installation of final gear case (☞4-7)
  Installation of rear wheel (☞9-56)
  Installation of CVT unit (☞5-4)
  Installation of rear brake caliper (☞9-81)
- Pass through the engine mounting bolt from the right side of the chassis.
- Tighten the engine mounting nut with the specified torque.

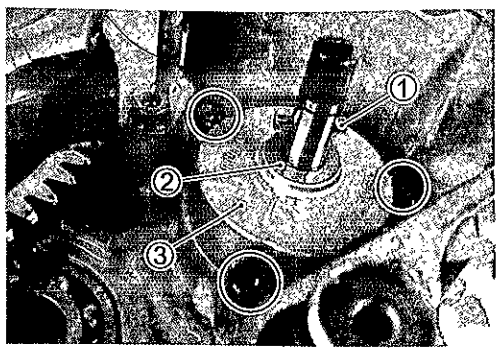
CAUTION

The engine mounting nut is the self-lock type and cannot be used repeatedly. If the self-lock effect is lost, replace it with new one.

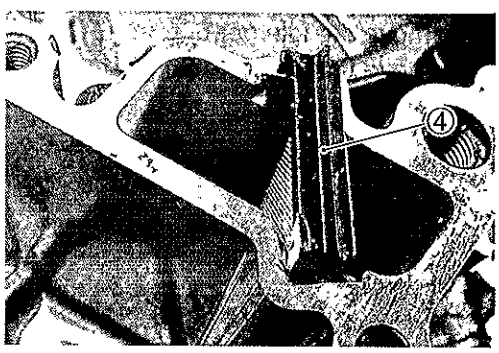


OIL PUMP

- Remove the pin ①, washer ②, oil pump assembly ③.

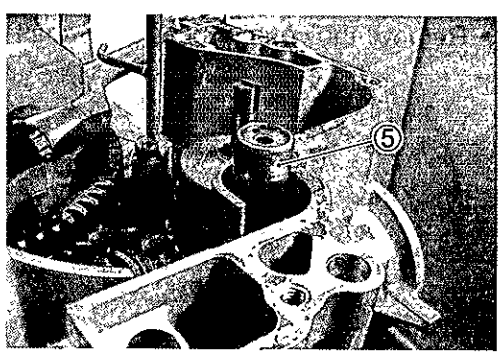


- Remove the oil sump filter ④.



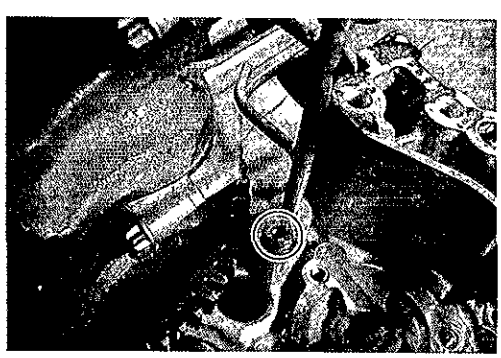
OIL PRESSURE REGULATOR

- Remove the oil pressure regulator ⑤.

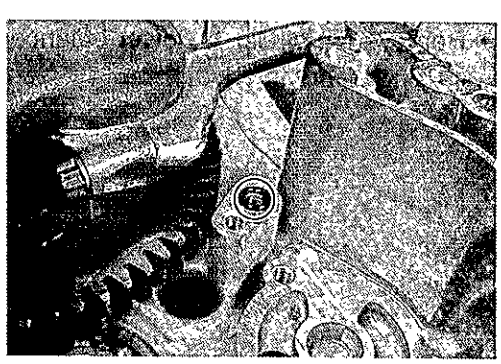


PISTON COOLING NOZZLE

- Remove the piston cooling nozzle.



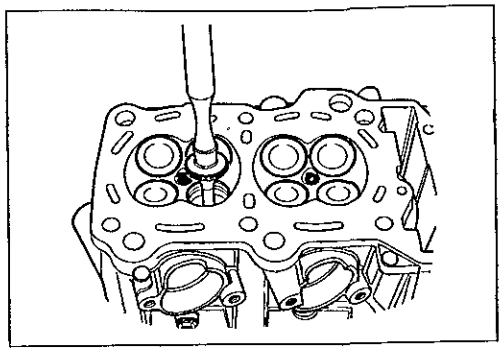
- Remove the O-ring.



VALVE SEAT WIDTH INSPECTION

- Visually check for valve seat width on each valve face.
- If the valve face has worn abnormally, replace the valve.
- Coat the valve seat with Prussian Blue and set the valve in place. Rotate the valve with light pressure.
- Check that the transferred blue on the valve face is uniform all around and in center of the valve face.

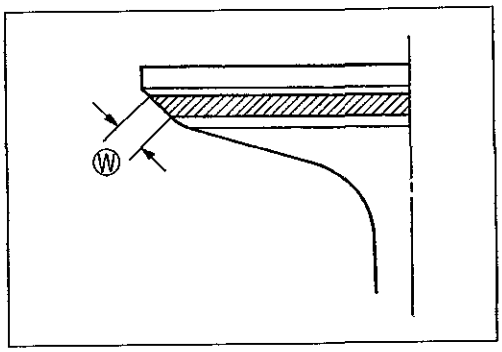
TOOL 09916-10911: Valve rapper set



•If the seat width W measured exceeds the standard value, or seat width is not uniform reface the seat using the seat cutter.

DATA Valve seat width Ⓦ:
Standard: 0.9 – 1.1 mm (0.035 – 0.043 in)

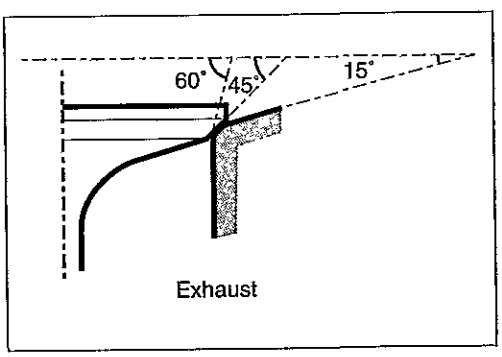
If the valve seat is out of specification, recut the seat.



VALVE SEAT SERVICING

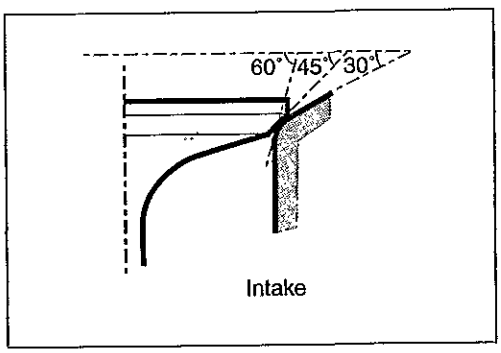
- The valve seats for both the intake and exhaust valves are machined to four different angles. The seat contact surface is cut at 45°.

	INTAKE	EXHAUST
15°		N-121
30°	N-126	
45°	N-122	N-122
60°	N-111	N-111



TOOL 09916-21111: Valve seat cutter set
09916-20630: Valve seat cutter (N-126)
09916-20640: Solid pilot (N-100-4.5)

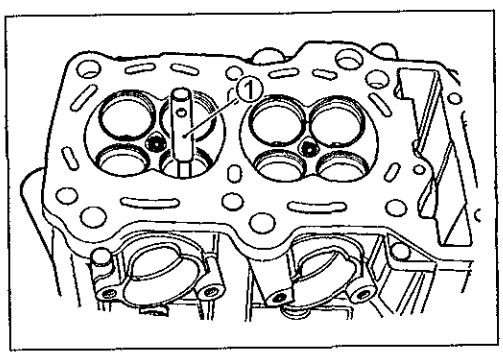
NOTE:
The valve seat cutters (N-121), (N-122) and (N-111) are included in the valve seat cutter set (09916-21111).



CAUTION

The valve seat contact area must be inspected after each cut.

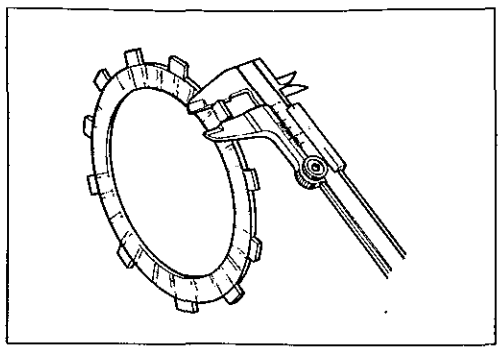
- When installing the solid pilot ①, rotate it slightly.



- Measure the claw width of drive plates with a vernier calipers.
- Replace the drive plates found to have worn down to the limit.

DATA Drive plate claw width:
Service Limit: 13.05 mm (0.5138 in)

TOOL 09900-20102: Vernier calipers

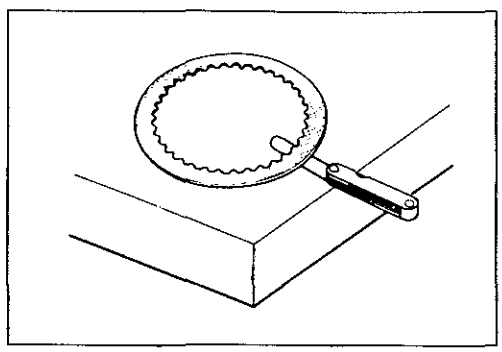


CLUTCH DRIVEN PLATE NO.2 INSPECTION

- Check for discoloration due to burning.
- Measure the distortion of the plate on the level block with a thickness gauge.
- If the service limit has been exceeded, replace with new one.

DATA Distortion of driven plate:
Service Limit: 0.1 mm (0.004 in)

TOOL 09900-20803: Thickness gauge

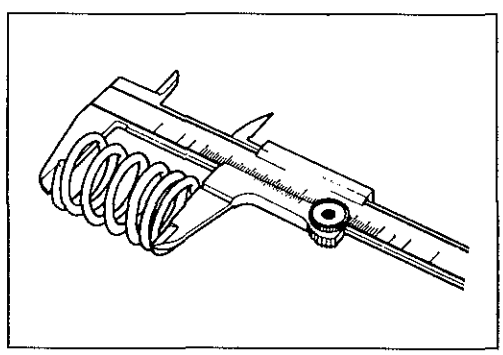


CLUTCH SPRING FREE HEIGHT

- Measure the free length of the clutch spring with vernier calipers.
- If the length is below the service limit, replace the spring.

DATA Clutch spring free length:
Service Limit: 13.2 mm (0.5197 in)

TOOL 09900-20102: Vernier calipers

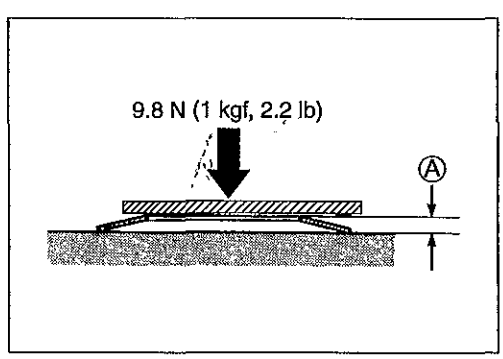


CLUTCH PLATE CONCAVED WASHER INSPECTION

- Measure the clutch plate concaved washer height Ⓐ when applying the weight 9.8 N (1 kgf, 2.2 lb) as shown.
- If clutch plate concaved washer height is less than the limit, replace it with the new one.

DATA Clutch plate wave washer height:
Service Limit: 3.1 mm (0.12 in)

TOOL 09900-20102: Vernier calipers



ROLLER

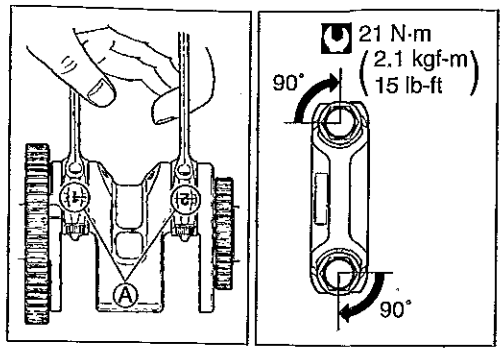
- Check that there is no abnormal wear or damage on the roller, if any defects are found, replace the rollers as a set.

- When fitting the conrods on the crankshaft, make sure that I.D. Ⓐ of the conrods face each cylinder intake valve sides.
- Apply engine oil to the bearing cap bolts.
- Tighten the bearing cap bolts as following two steps.

Conrod bearing cap bolt

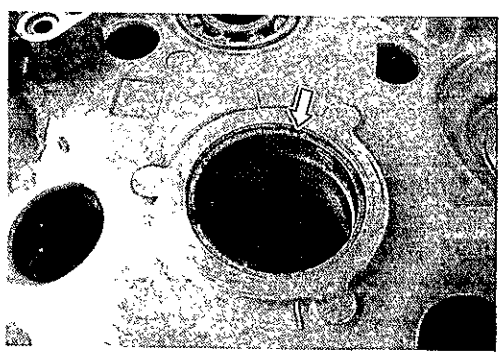
(Initial) : 21 N·m (2.1 kgf-m, 15 lb-ft)
(Final) : After tightening the bolts to the above torque, tighten them ¼ of a turn (90°).

- Check the conrod movement for smooth turning.



CRANKCASE-CRANKSHAFT BEARING INSPECTION

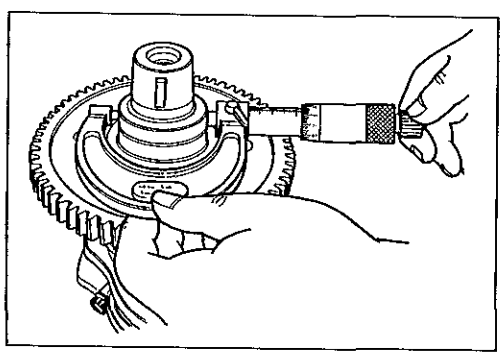
- Inspect the crankshaft journal bearings for any damage. If any, replace them with a specified set of bearings.



- Inspect the crankshaft journal for any damage.
- Measure the crankshaft journal O.D. with the special tool.

DATA Crankshaft journal O.D.
Standard: 47.985 – 48.000 mm (1.8892 – 1.8898 in)

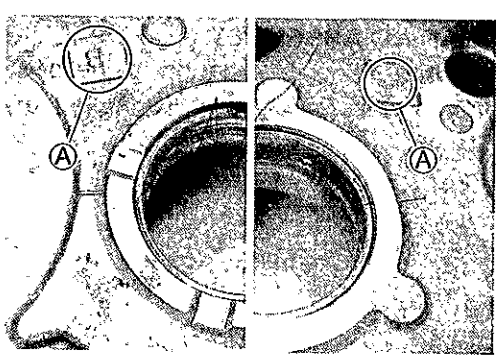
TOOL 09900-20202: Micrometer (25 – 50 mm)



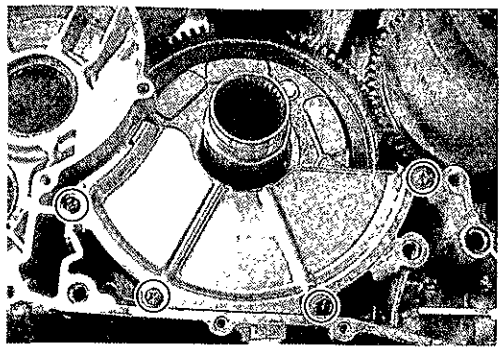
CRANKCASE-CRANKSHAFT BEARING SELECTION

Select the specified bearings from the crankcase bore I.D. code. The crankcase bore I.D. code Ⓐ "A", "B" or "C", is stamped on the inside of each crankcase half.

I.D. code Ⓐ	Color	Thickness
A	Green	1.988 – 1.991 mm (0.0783 – 0.0784 in)
B	Black	1.991 – 1.994 mm (0.0784 – 0.085 in)
C	Brown	1.994 – 1.997 mm (0.085 – 0.0786 in)

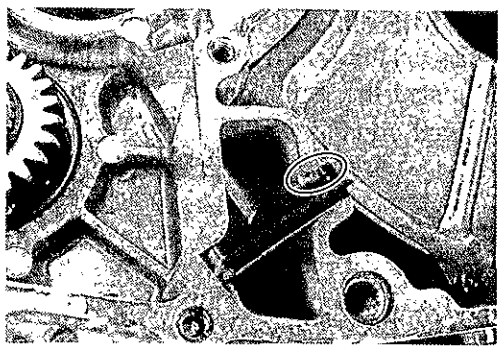


- Install the crankcase oil separator.



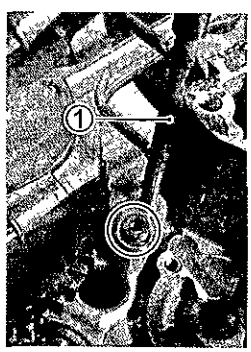
OIL SUMP FILTER

- Install the oil strainer aligning the recess of the oil strainer to the concave on the crankcase.



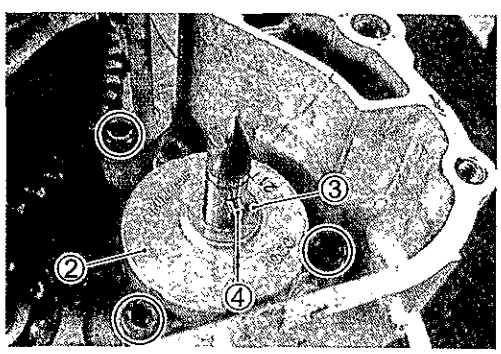
PISTON COOLING NOZZLE

- Coat the O-ring with a small amount of grease and install the piston cooling nozzle ①.



OIL PUMP/ OIL PRESSURE REGULATOR

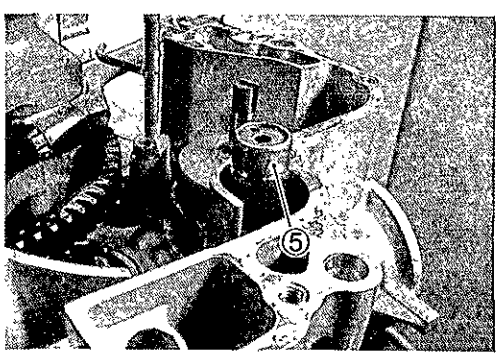
- Install the oil pump ②, washer ③, pin ④.



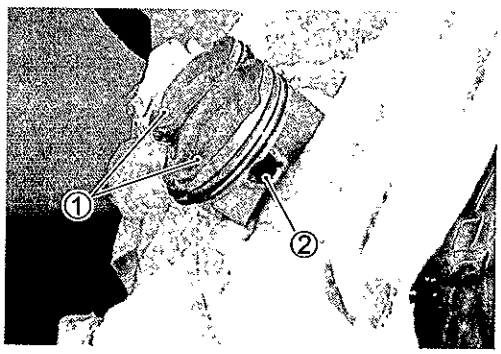
- Coat the O-ring with grease and install the oil pressure regulator ⑤ to the crankcase.

CAUTION

Use a new O-ring.



PISTON



- Coat the outer periphery of the piston pin and connecting rod small end with molybdenum oil.

MOLYBDENUM OIL SOLUTION

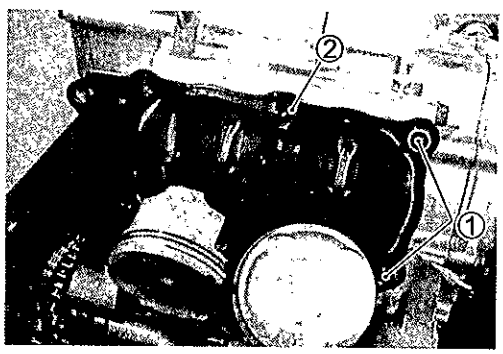
- Facing the ● mark on the piston head to the exhaust side of the cylinder, install the piston ①.

- Spread cloth under the piston and fit the circlip ②.

CAUTION

Use a new circlip.

CYLINDER

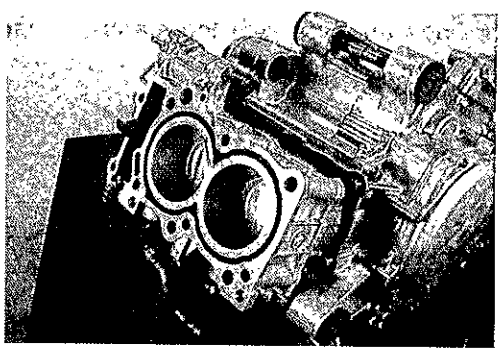


- Coat the connecting rod big end with oil.
- Install the dowel pin ① and cylinder gasket ②.

CAUTION

Use a new gasket.

- Coat the cylinder inside surface and the piston ring with engine oil and install the cylinder.

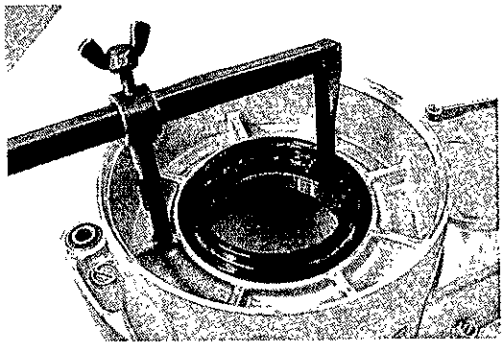


CAUTION

Keep the cam chain pulled out not to be caught between the sprocket and crankshaft.

- Remove the oil seal with the special tool.

09913-50121: Oil seal remover



CAUTION

Replace the removed oil seal with a new one.

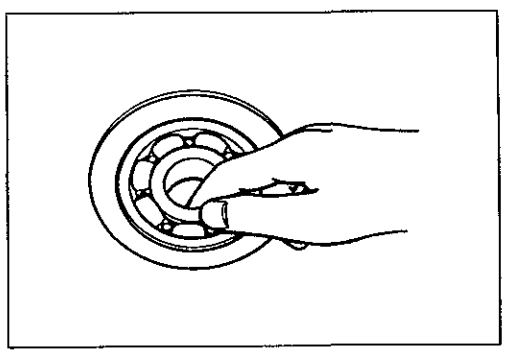
- Install the new oil seal to the final gear case.
- Apply SUZUKI SUPER GREASE "A" to the oil seals.

99000-25010: SUZUKI SUPER GREASE "A"

NOTE:
Direction of the oil seal is shown in the illustration at page 4-2.

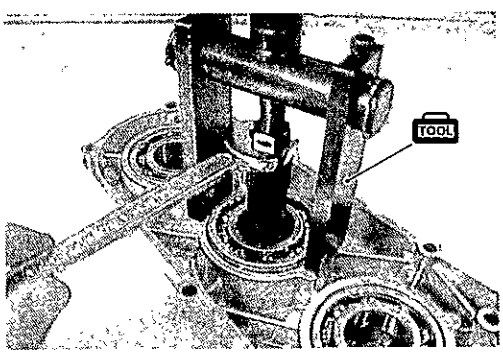
BEARINGS

Inspect the inner race play of the bearing by hand while it is in the final gear case.
Rotate the inner race by hand to inspect for abnormal noise and smooth rotation.
If there is anything unusual, replace the bearing with a new one.



- Remove the bearing with the special tool.

09921-20240: Bearing remover set

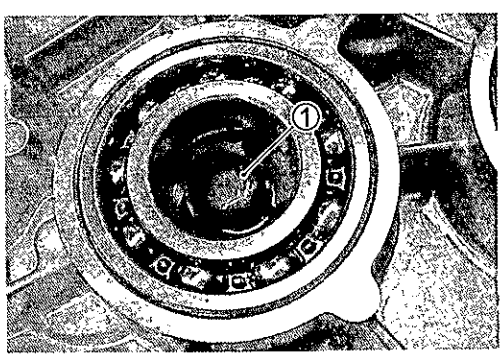


- To facilitate setting the special tool, knock down the plate ① that is at the No.2 gear bearing.
- Remove the bearing with the special tool.

09921-20240: Bearing remover set

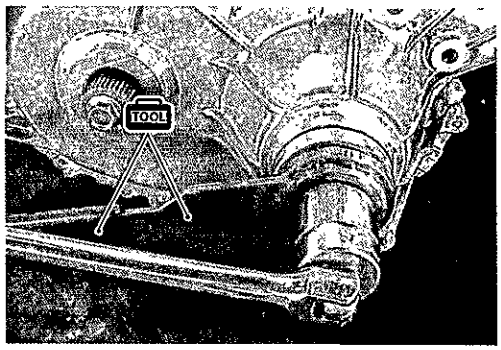
CAUTION

Replace the removed plate ① with a new one.

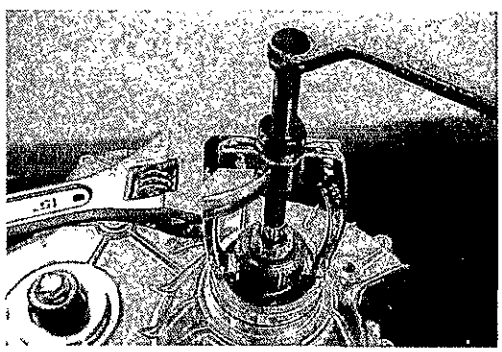


- Remove the secondary pulley shaft nut by holding the shaft with the special tools.

TOOL **09920-31020: Extension handle**
09920-31030: CVT secondary pulley shaft holder

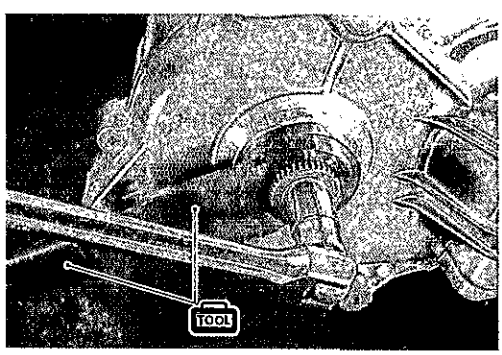


- Remove the secondary shaft adaptor with a bearing puller.



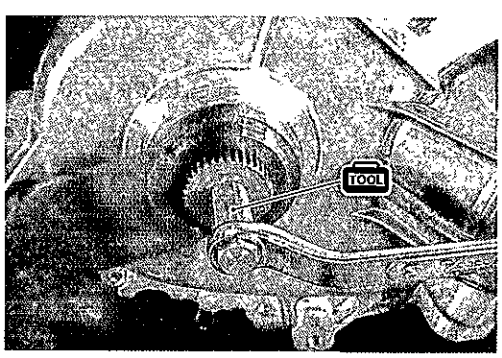
- Remove the primary pulley shaft bolt by holding the primary pulley shaft with the special tools.

TOOL **09920-31010: CVT primary pulley shaft holder**
09920-31020: Extension handle



- Screw in the special tool and remove the primary pulley shaft adaptor.

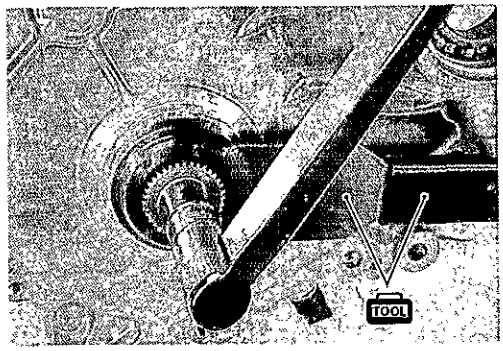
TOOL **09920-31040: CVT primary pulley shaft adaptor remover**



- Tighten the primary pulley shaft bolt to the specified torque with the special tools.

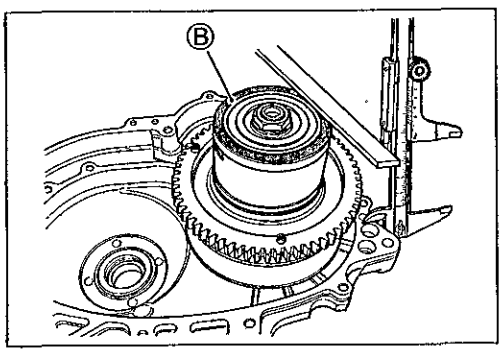
Primary pulley shaft bolt: 64 N·m (6.4 kgf-m, 46.5 lb-ft)

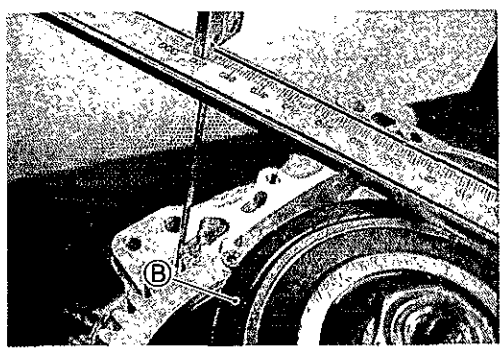
09920-31010: CVT primary pulley shaft holder
09920-31020: Extension handle

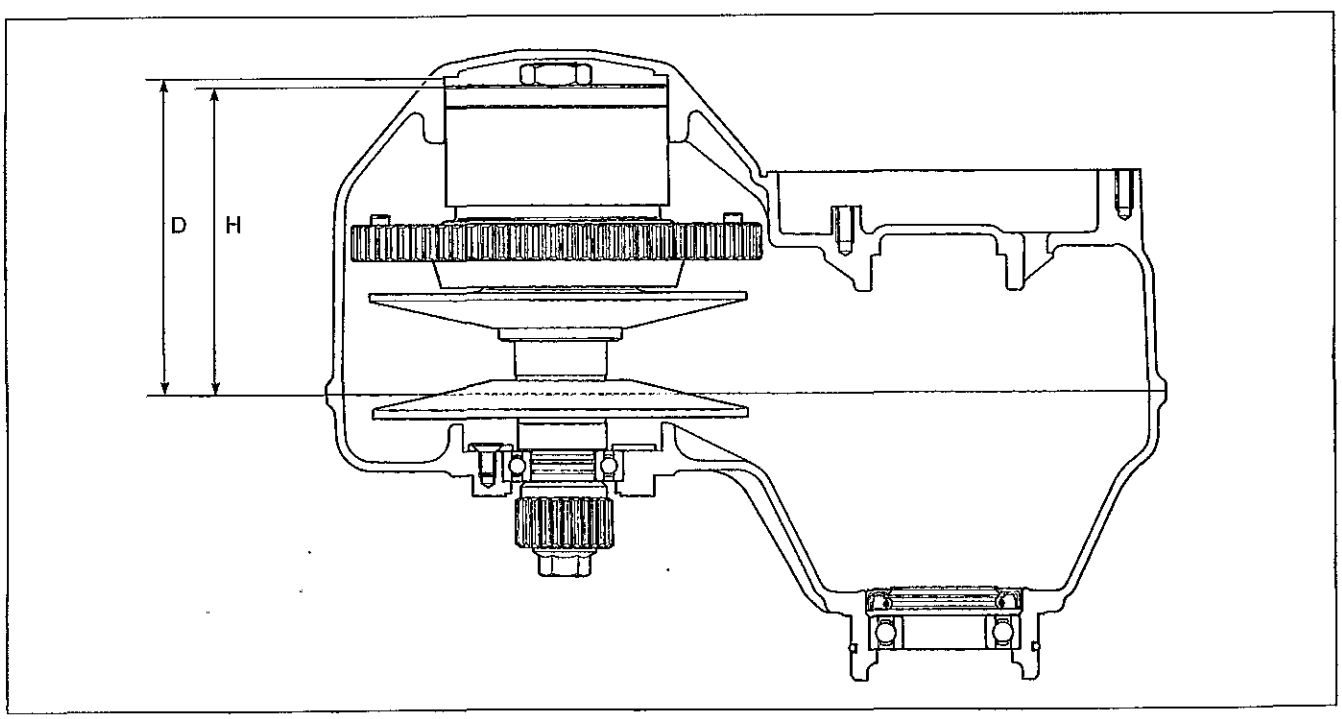


- Fix the CVT casing securely with its mating face positioned horizontally.
- With the straightedge placed on the casing mating face, measure the height H to the face Ⓑ of the primary pulley assembly using the vernier calipers.
- Measure the height H at three points and note the measured value H_1, H_2 and H_3.

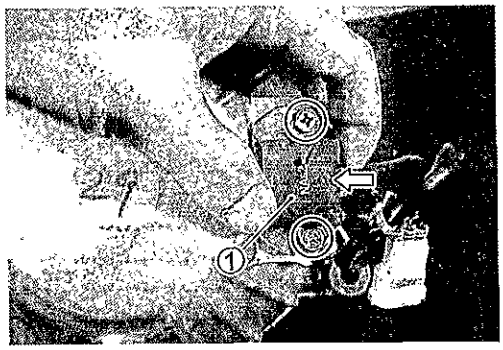
09900-20102: Vernier calipers







- Install the pulley position sensor with the sensor pushed toward the primary pulley shaft side.



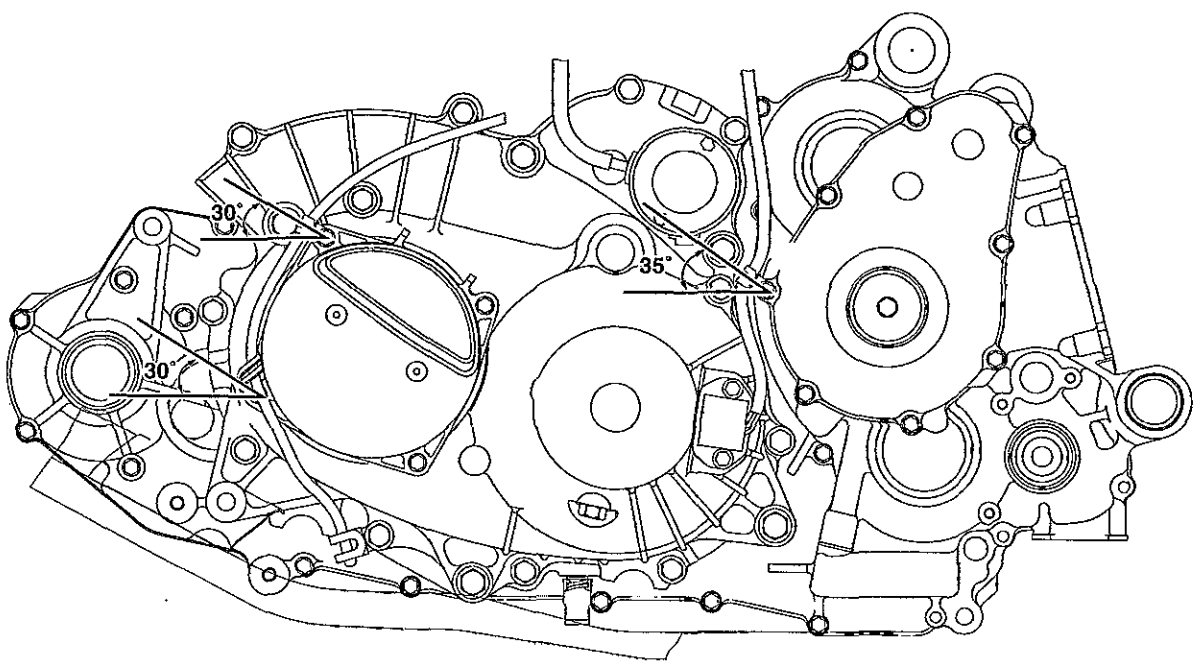
CVT BELT BRAKE-IN PROCEDURES

- It is necessary to allow the CVT belt to "BRAKE-IN" before subjecting the CVT to maximum stresses.

Brake -in engine speed
Initial 800 km (500 miles): Below 4 000 rpm.

NOTE:
When the CVT belt is new, the engine rpm may jump briefly under hard acceleration due to the smoothness of the belt.

CLAMP LOCATION



COMPENSATION OF INJECTION TIME (VOLUME)

The following different signals are output from the respective sensors for compensation of the fuel injection time (volume).

SIGNAL	DESCRIPTION
ATMOSPHERIC PRESSURE SENSOR SIGNAL	When atmospheric pressure is low, the sensor sends the signal to the ECM and reduce the injection time (volume).
ENGINE COOLANT TEMPERATURE SENSOR SIGNAL	When engine coolant temperature is low, injection time (volume) is increased.
INTAKE AIR TEMPERATURE SENSOR SIGNAL	When intake air temperature is low, injection time (volume) is increased.
HEATED OXYGEN SENSOR SIGNAL (E-02, 19)	Air/fuel ratio is compensated to the theoretical ratio from density of oxygen in exhaust gasses. The compensation occurs in such a way that more fuel is supplied if detected air/fuel ratio is lean and less fuel is supplied if it is rich.
BATTERY VOLTAGE SIGNAL	ECM operates on the battery voltage and at the same time, it monitors the voltage signal for compensation of the fuel injection time (volume). A longer injection time is needed to adjust injection volume in the case of low voltage.
ENGINE RPM SIGNAL	At high speed, the injection time (volume) is increased.
STARTING SIGNAL	When starting engine, additional fuel is injected during cranking engine.
ACCELERATION SIGNAL/ DECELERATION SIGNAL	During acceleration, the fuel injection time (volume) is increased, in accordance with the throttle opening speed and engine rpm. During deceleration, the fuel injection time (volume) is decreased.

INJECTION STOP CONTROL

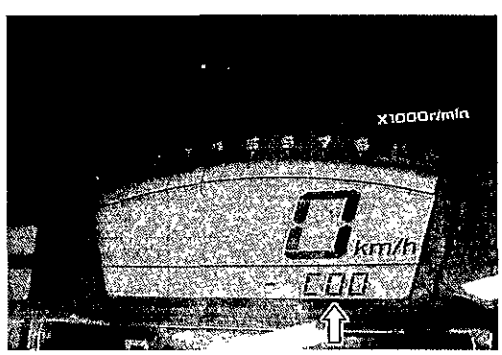
SIGNAL	DESCRIPTION
TIP OVER SENSOR SIGNAL (FUEL SHUT-OFF)	When the motorcycle tips over, the tip over sensor sends a signal to the ECM. Then, this signal cuts OFF current supplied to the fuel pump, fuel injectors and ignition coils.
OVER-REV. LIMITER SIGNAL	The fuel injectors stop operation when engine rpm reaches rev. limit rpm.

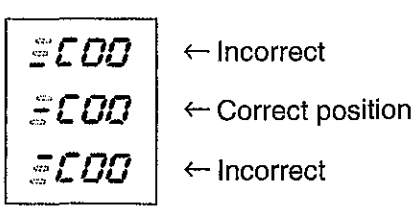
CODE	MALFUNCTION PART	REMARKS
C00	None	No defective part
C11	Camshaft position sensor (CMPS)	
C12	Crankshaft position sensor (CKPS)	Pick-up coil signal, signal generator
C13	Intake air pressure sensor (IAPS)	
C14	Throttle position sensor (TPS)	
C15	Engine coolant temp. sensor (ECTS)	
C16	Speed sensor	Speed sensor signal for FI system
C21	Intake air temperature sensor (IATS)	
C22	Atmospheric pressure sensor (APS)	
C23	Tip over sensor (TOS)	
C24	Ignition signal #1 (IG coil #1)	For #1 cylinder
C25	Ignition signal #2 (IG coil #2)	For #2 cylinder
C32	Fuel injector signal #1	For #1 cylinder
C33	Fuel injector signal #2	For #2 cylinder
C40	Idle air control valve (IAC valve)	
C41	Fuel pump control system (FP control system)	Fuel pump, Fuel pump relay
C42	Ignition switch signal (IG switch signal)	Anti-theft
C44	Heated oxygen sensor (HO2S)	E-02, 19
C50	CVT serial communication	
C51	CVT motor	
C52	CVT pulley position sensor	
C53	CVT speed sensor	Speed sensor signal for CVT system
C54	CVT secondary pulley revolution sensor	
C55	CVT engine revolution signal	
C56	CVT throttle position signal	
C58	CVT reduction ratio disagreement	

In the LCD (DISPLAY) panel, the malfunction code is indicated from small code to large code.

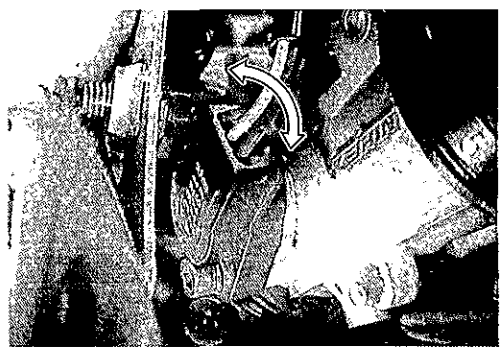
TPS ADJUSTMENT

1. Warm up the engine and adjust the engine idle speed to 1 200 ± 100 rpm. (☞2-18)
2. Stop the engine.
3. Connect the special tool (Mode select switch) and select the dealer mode.
4. If the throttle position sensor adjustment is necessary, loosen the screw and turn the throttle position sensor and bring the line to middle.
5. Then, tighten the screw to fix the throttle position sensor.





← Incorrect
← Correct position
← Incorrect



3 Remove the IAP sensor.
Connect the vacuum pump gauge to the vacuum port of the IAP sensor.
Arrange 3 new 1.5 V batteries in series (check that total voltage is 4.5 – 5.0 V) and connect ⊖ terminal to the ground terminal and ⊕ terminal to the Vcc terminal.
Check the voltage between Vout and ground. Also, check if voltage reduces when vacuum is applied up to 40 cmHg by using vacuum pump gauge. (See table below.)

09917-47010: Vacuum pump gauge
09900-25008: Multi circuit tester

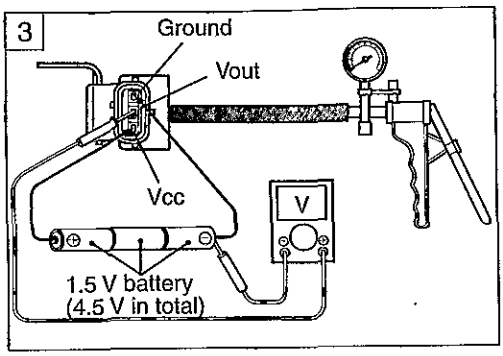
Tester knob indication: Voltage (⎓)

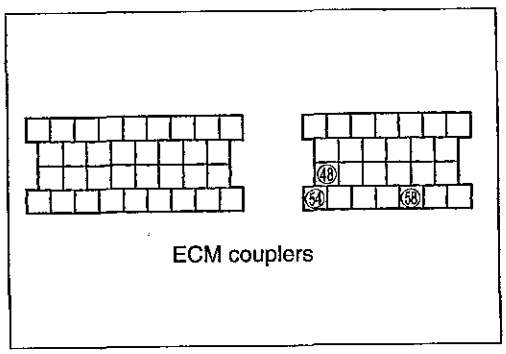
No → If check result is not satisfactory, replace IAP sensor with a new one.

Yes

Red, Lg/B or B/Br wire open or shorted to ground, or poor ㊽, ㊿ or ㊽ connection.
If wire and connection are OK, intermittent trouble or faulty ECM.
Recheck each terminal and wire harness for open circuit and poor connection.

→ Replace the ECM with a new one, and inspect it again.





ECM couplers

Output voltage (Vcc voltage 4.5 – 5.0 V, ambient temp. 20 – 30 °C, 68 – 86 °F)

ALTITUDE (Reference)		ATMOSPHERIC PRESSURE		OUTPUT VOLTAGE
(ft)	(m)	(mmHg)	kPa	(V)
0 | 2 000	0 | 610	760 | 707	100 | 94	3.1 – 3.6
2 001 | 5 000	611 | 1 524	707 | 634	94 | 85	2.8 – 3.4
5 001 | 8 000	1 525 | 2 438	634 | 567	85 | 76	2.6 – 3.1
8 001 | 10 000	2 439 | 3 048	567 | 526	76 | 70	2.4 – 2.9

"C24" or "C25" IGNITION SYSTEM MALFUNCTION

***Refer to the IGNITION SYSTEM for details. (☞10-18)**

"C32" or "C33" FUEL INJECTOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
CKP signal is produced but fuel injector signal is interrupted continuous by 4 times or more.	• Injector circuit open or short. • Injector malfunction. • ECM malfunction.

INSPECTION

- Remove the front box. (☞9-18)

1 Turn the ignition switch OFF.
Check the injector coupler for loose or poor contacts.
If OK, then measure the injector resistance.
Disconnect the coupler and measure the resistance between terminals.

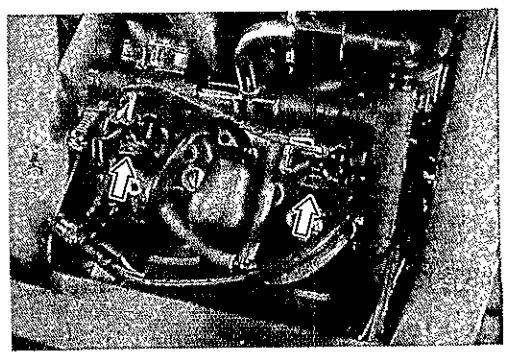
DATA **Injector resistance: 11 – 13 Ω at 20 °C (68 °F) (Terminal – Terminal)**

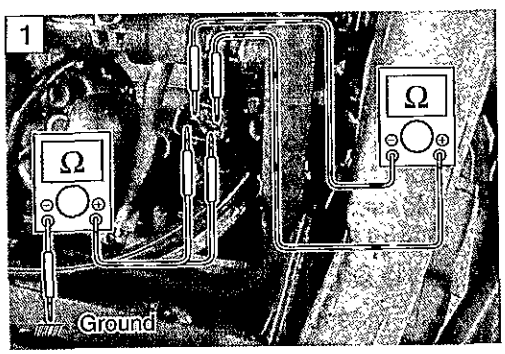
If OK, then check the continuity between each terminal and ground.

DATA **Injector continuity: ∞ Ω (Infinity) (Terminal – Ground)**

TOOL **09900-25008: Multi circuit tester**

Tester knob indication: Resistance (Ω)





No → Replace the injector with a new one. (☞7-17, 21)

Yes ↓

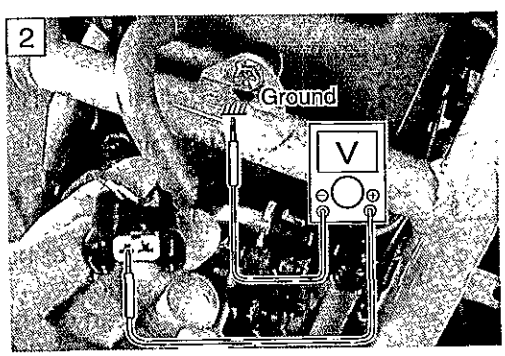
2 Turn the ignition switch ON.
Measure the injector voltage between Y/R wire and ground.

DATA **Injector voltage: Battery voltage (Y/R – Ground)**

NOTE:
Injector voltage can be detected only 3 seconds after ignition switch is turned ON.

TOOL **09900-25008: Multi circuit tester**

Tester knob indication: Voltage (⎓)

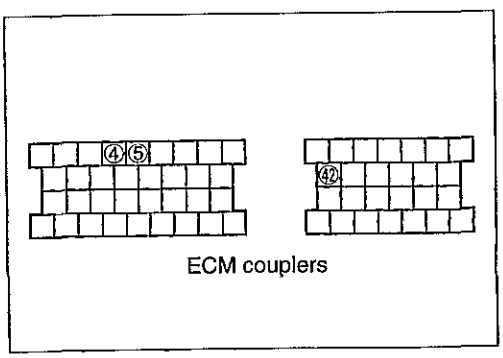


No → Open circuit in the Yellow/ Red wire.

Yes ↓

Gr/W, Gr/B or Y/R wire open or shorted to ground, or poor ④, ⑤ or ㊷ connection.
If wire and connection are OK, intermittent trouble or faulty ECM.
Recheck each terminal and wire harness for open circuit and poor connection.

→ Replace the ECM with a new one, and inspect it again.



ECM couplers

3 Check the speed sensor output voltage.
Insert the copper wires to the lead wire caupler. (White – Black/White)
Turn the ignition switch ON.
Check that the voltage varies when a screwdriver is brought close to the pick-up face of the speed sensor.

09900-25008: Multi circuit tester

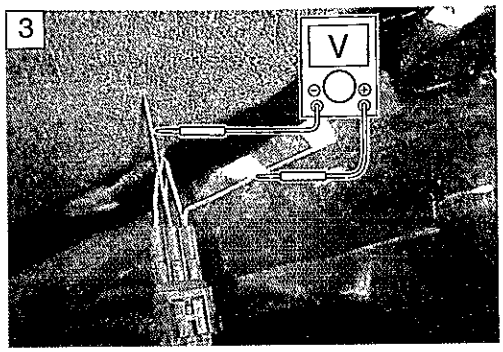
Tester knob indication: Voltage (⎓)

NG → Short circuit in the lead wire.
Replace the speed sensor with a new one.

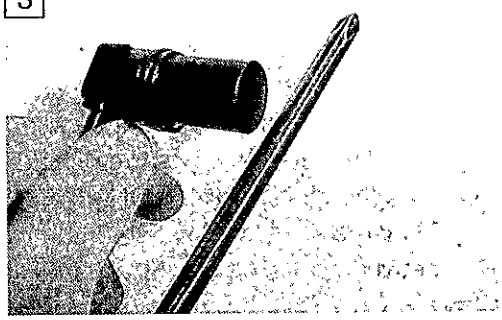
OK

Recheck the CVT control unit coupler for loose or poor contacts.
Replace the CVT control unit with a new one and inspect it again.

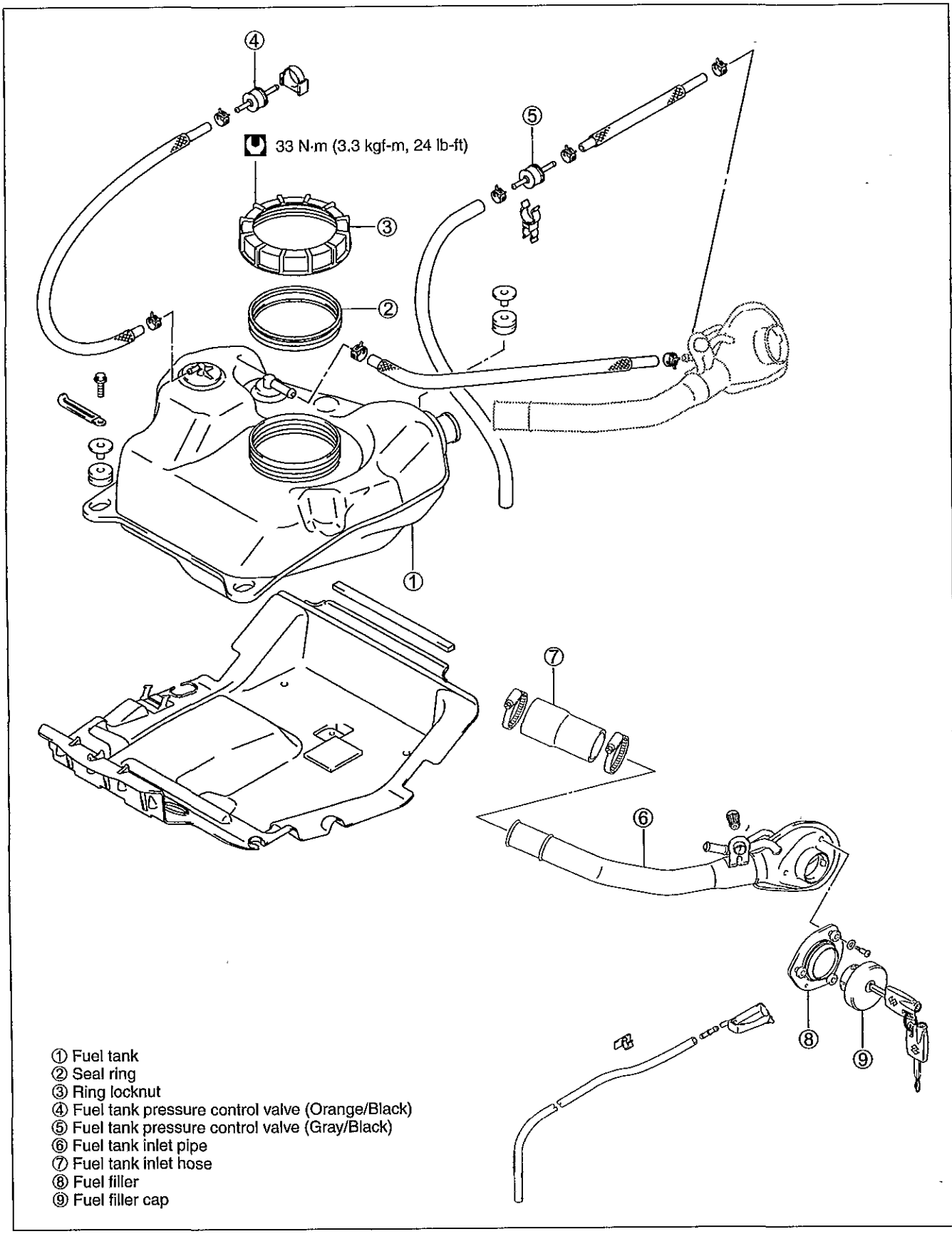
3



3

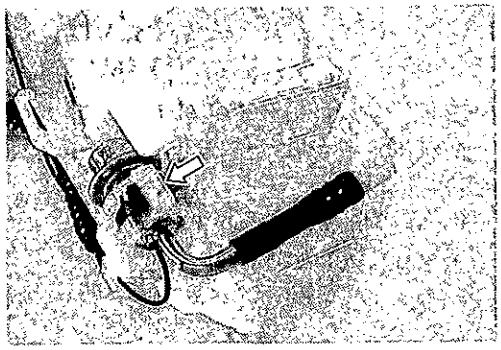


FUEL SYSTEM
FUEL TANK COMPONENTS

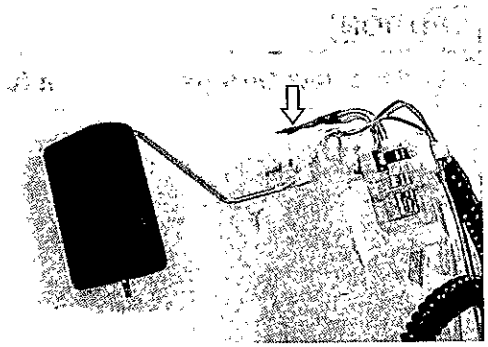


① Fuel tank
② Seal ring
③ Ring locknut
④ Fuel tank pressure control valve (Orange/Black)
⑤ Fuel tank pressure control valve (Gray/Black)
⑥ Fuel tank inlet pipe
⑦ Fuel tank inlet hose
⑧ Fuel filler
⑨ Fuel filler cap

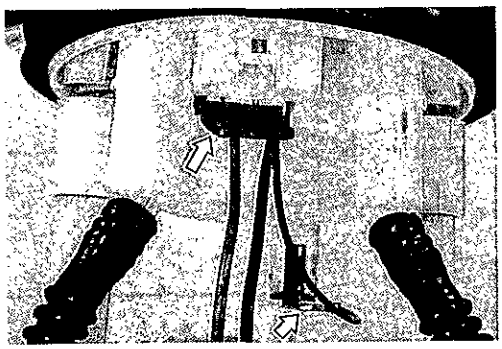
- Install the fuel pressure regulator and ground wire.

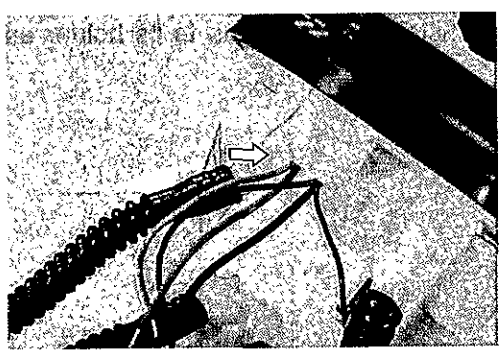


- Install the fuel level gauge.

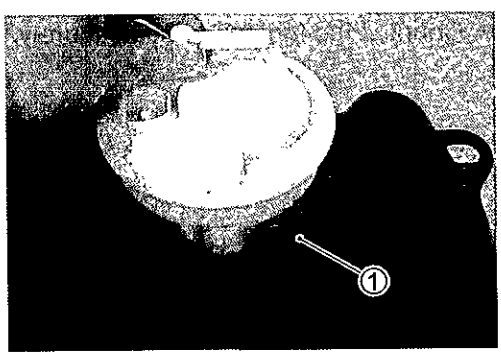


- Connect the fuel pump lead wire coupler, ground wire and fuel level gauge lead wire coupler.





- Install the new seal ring ① to the fuel tank.
- Install the fuel pump assembly.

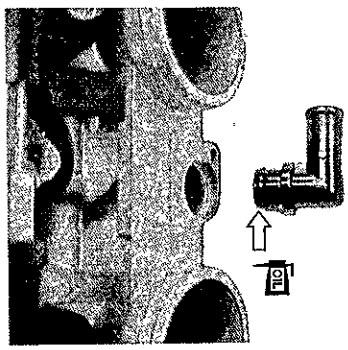


- Install the IAC hose connector.

CAUTION

Replace the O-ring with a new one.

- Apply thin coat of the engine oil to the new O-ring.

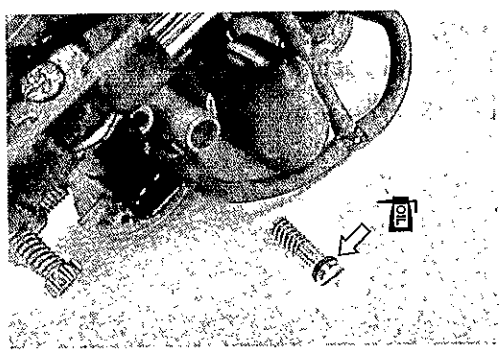


- Install the synchronizing screw to the original setting by turning the screw in until it lightly seats, and then backing it out the same number of turns counted during disassembly.

CAUTION

Replace the O-ring with a new one.

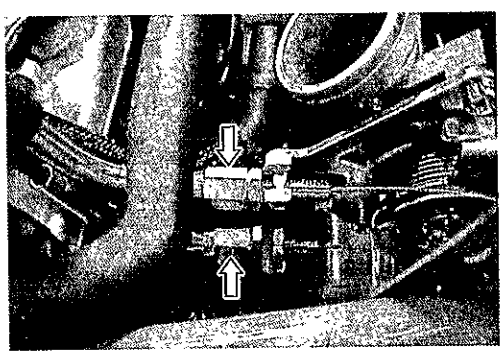
- Apply thin coat of the engine oil to the new O-ring.



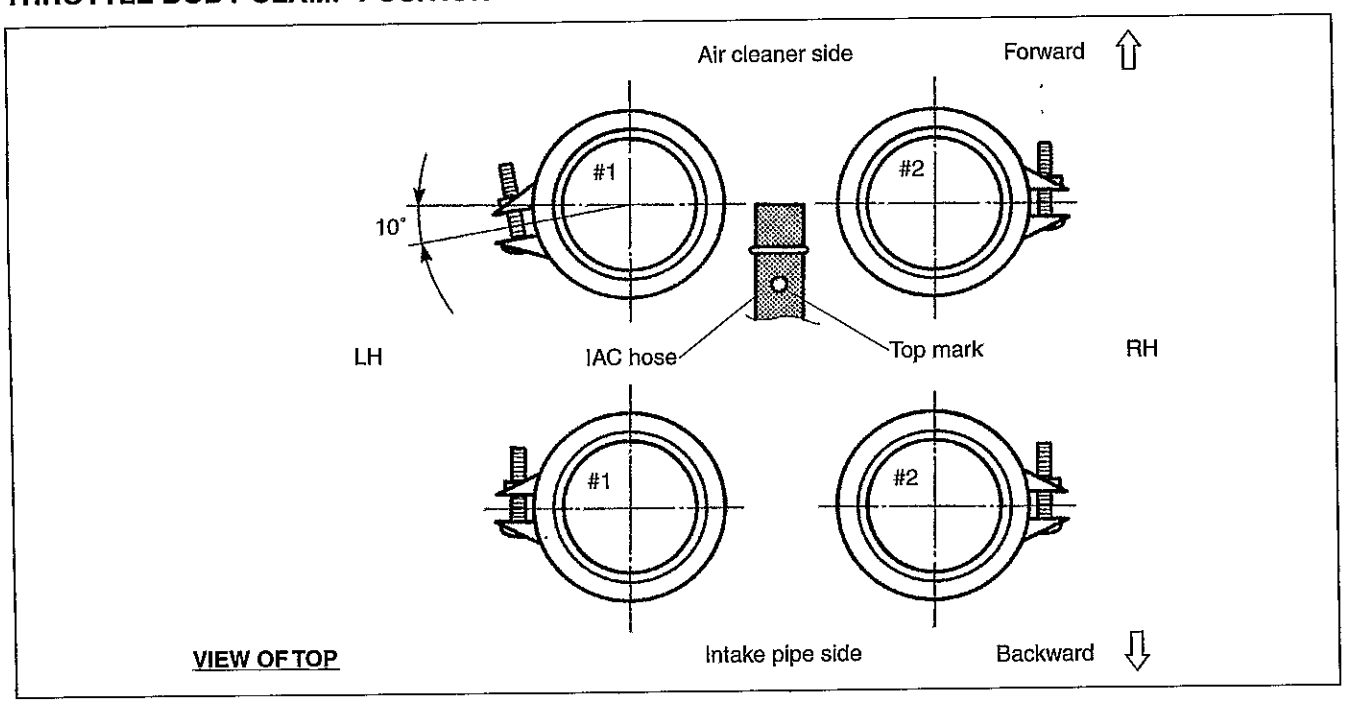
THROTTLE BODY INSTALLATION

Installation is in the reverse order of removal. Pay attention to the following points:

- Connect the throttle pulling cable and throttle returning cable to the throttle cable drum.
- Adjust the throttle cable play with the cable adjusters. Refer to page 2-19 for details.

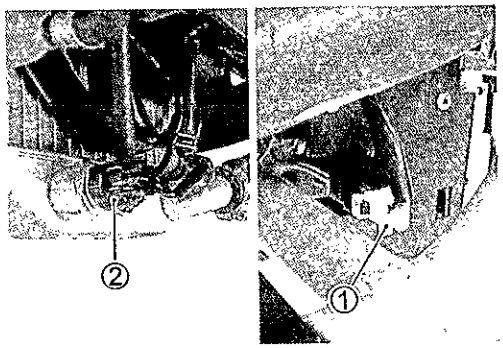


THROTTLE BODY CLAMP POSITION



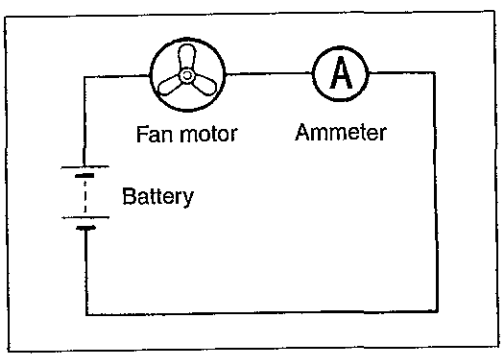
COOLING FAN

INSPECTION



- Remove the leg side cover and footboard. (☞9-12, 9-18)
- Disconnect the cooling fan motor lead wire coupler ① and fan switch coupler ②.

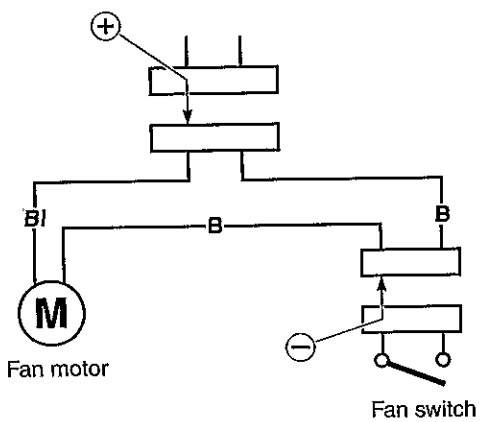
Test the cooling fan motor for load current with an ammeter connected as shown in the illustration.



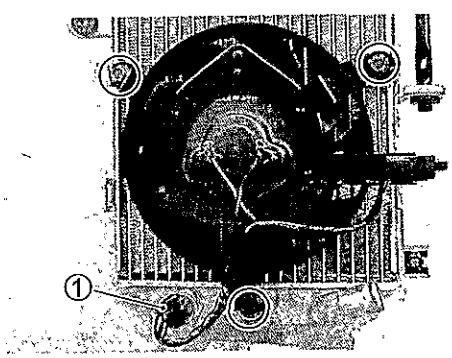
The voltmeter is for making sure that the battery applies 12 volts to the motor. With the motor with electric motor fan running at full speed, the ammeter should be indicating not more than 5 amperes.
If the fan motor does not turn, replace the motor assembly with a new one.

NOTE:
When making above test, it is not necessary to remove the cooling fan.

Connection: ⊕ → Fan motor lead wire coupler BLUE
⊖ → Fan switch coupler BLACK (fan motor side)

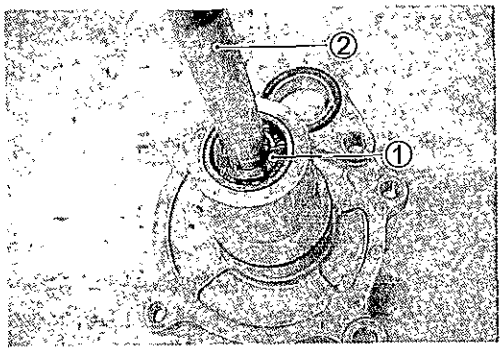


REMOVAL



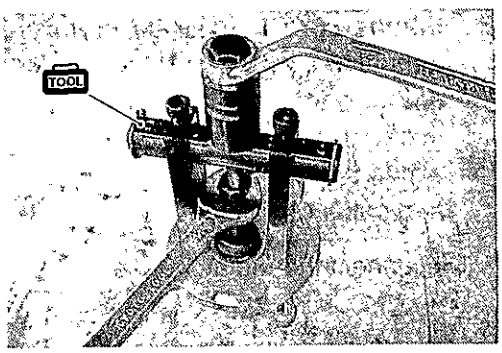
- Remove the radiator. (☞8-6)
- Disconnect the cooling fan switch coupler ①.
- Remove the three mounting bolts and the cooling fan unit.

• Remove the E-ring ① and impeller ②.



• Remove the mechanical seal using the special tool.

TOOL 09921-20240: Bearing remover set



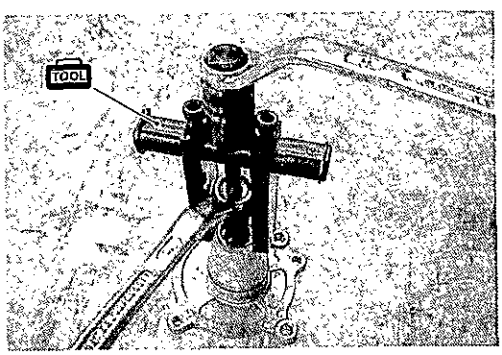
NOTE:
If there is no abnormal condition, the mechanical seal removal is not necessary.

CAUTION

The removed mechanical seal must be replaced with a new one.

• Remove the outer bearing using the special tool.

TOOL 09921-20240: Bearing remover set

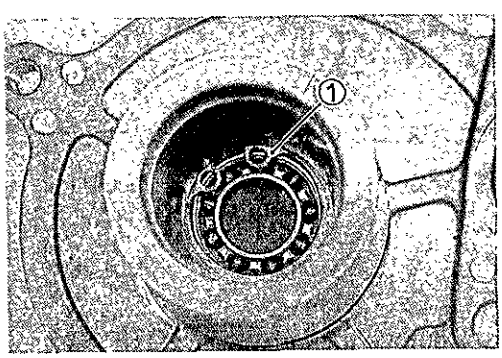


NOTE:
If there is no abnormal noise, bearing removal is not necessary.

CAUTION

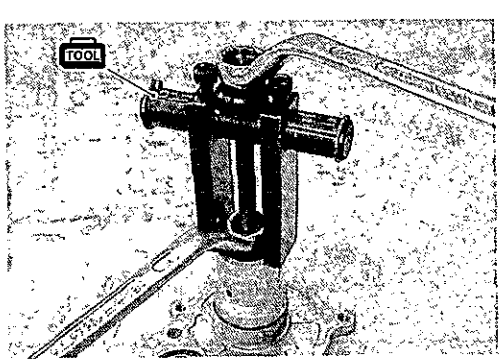
The removed bearing must be replaced with a new one.

• Remove the circlip ①.



• Remove the inner bearing using the special tool.

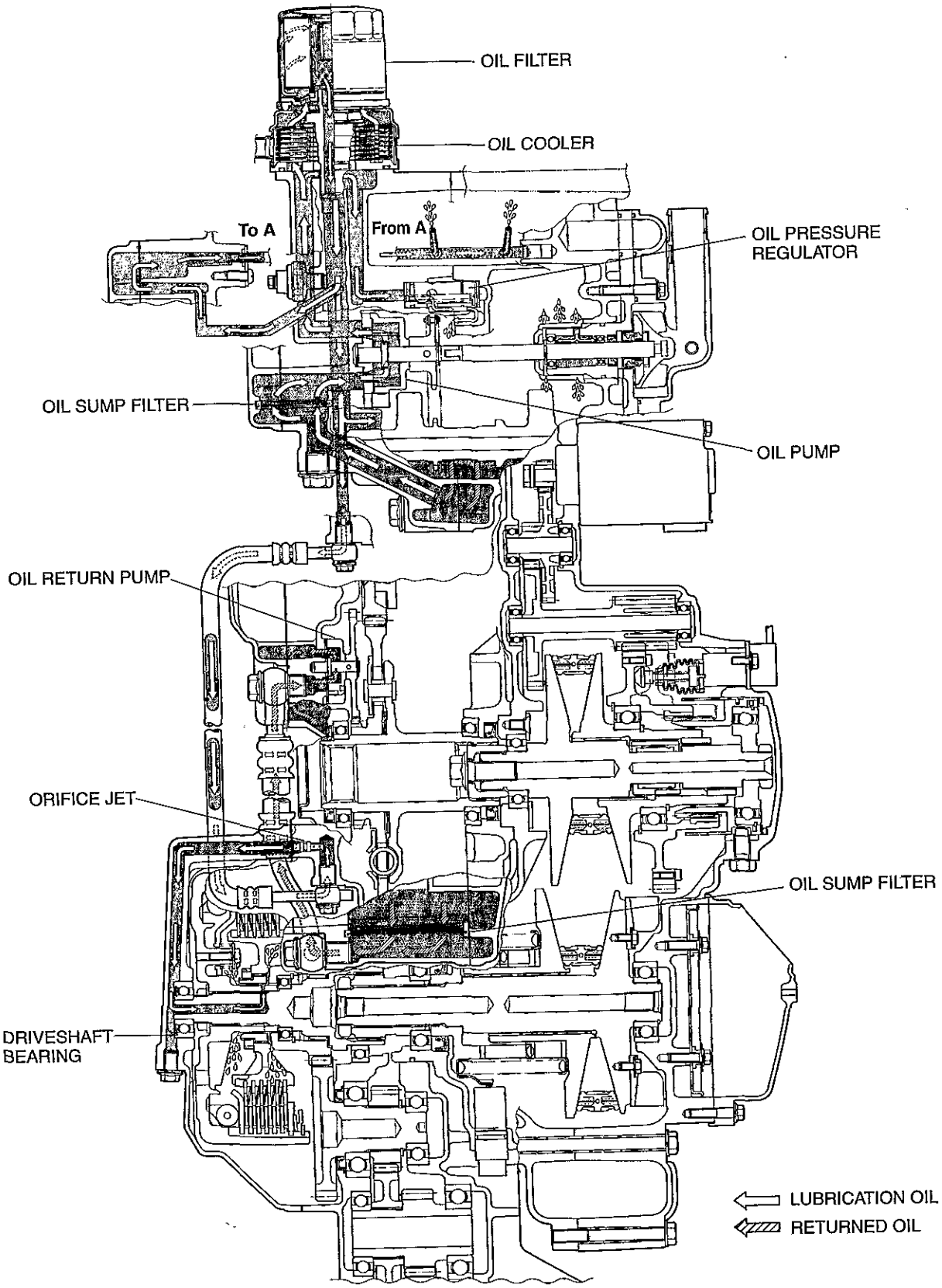
TOOL 09921-20240: Bearing remover set



NOTE:
If there is no abnormal noise, bearing removal is not necessary.

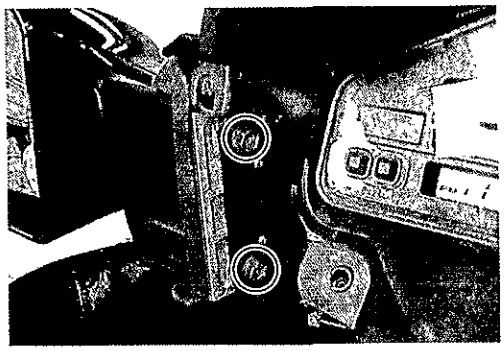
CAUTION

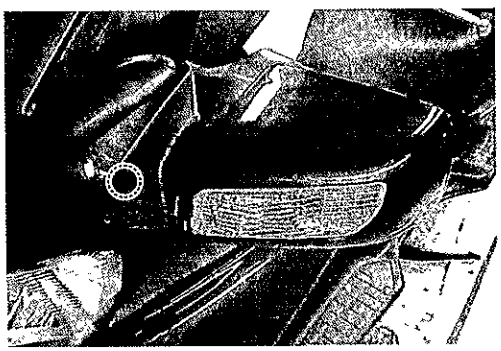
The removed bearing must be replaced with a new one.


OIL FILTER
OIL COOLER
To A
From A
OIL PRESSURE REGULATOR
OIL SUMP FILTER
OIL PUMP
OIL RETURN PUMP
ORIFICE JET
OIL SUMP FILTER
DRIVESHAFT BEARING
LUBRICATION OIL
RETURNED OIL

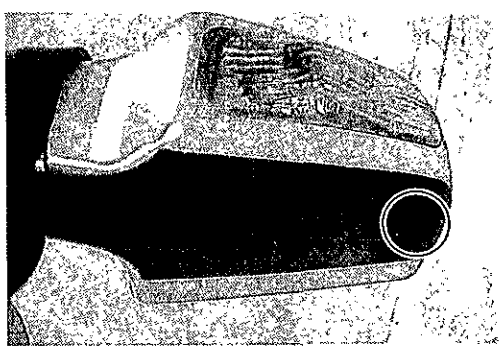
REAR VIEW MIRROR

- Remove the handlebar covers. (☞9-8)
- Remove the front panel. (☞9-8)
- Remove the bolts.
- Disconnect the turn signal coupler which is located under the combination meter.

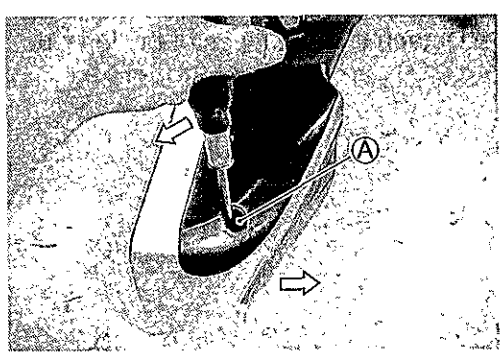




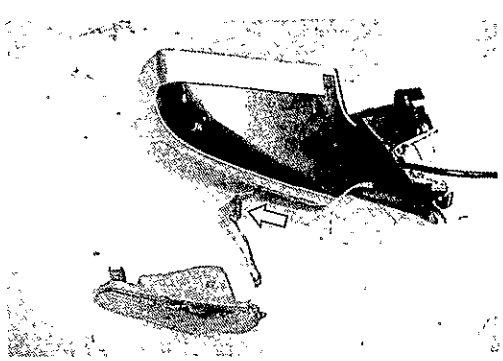
- Remove the screws.



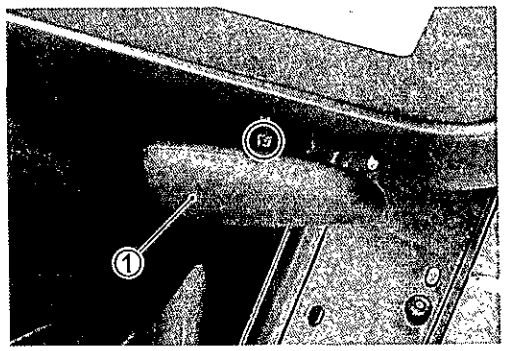
- Insert the screw driver into the hole Ⓐ.
- Pry the turn signal light out. (☞10-32)



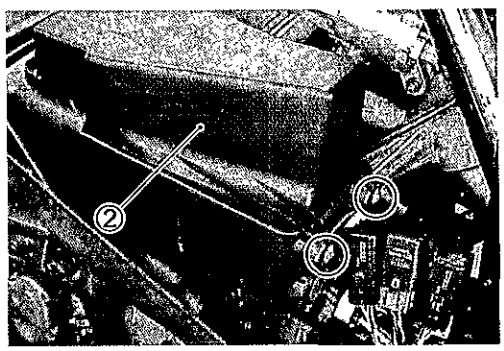
- Disconnect the turn signal coupler.



- Pull the brake lock knob.
- Remove the brake lock knob ①.

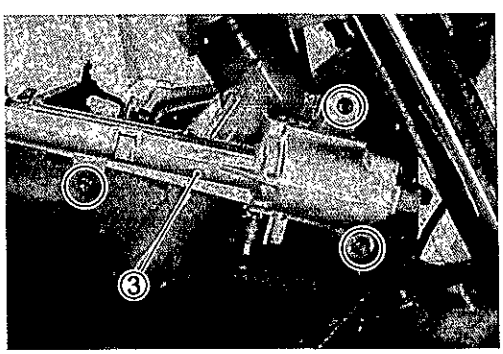


- Remove the inner box ②.

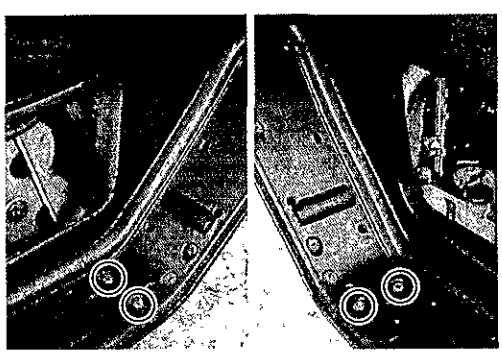


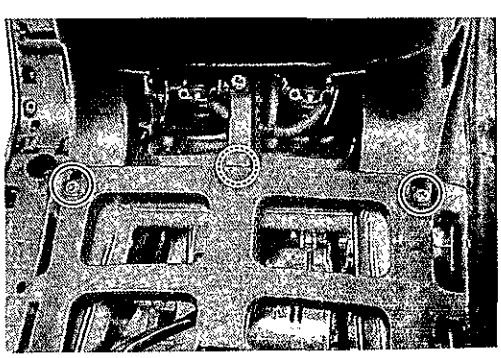
- Remove the ignition switch ③ by using the special tools.

TOOL **09930-11930: Torx bit JT30H**
09930-11940: Bit holder



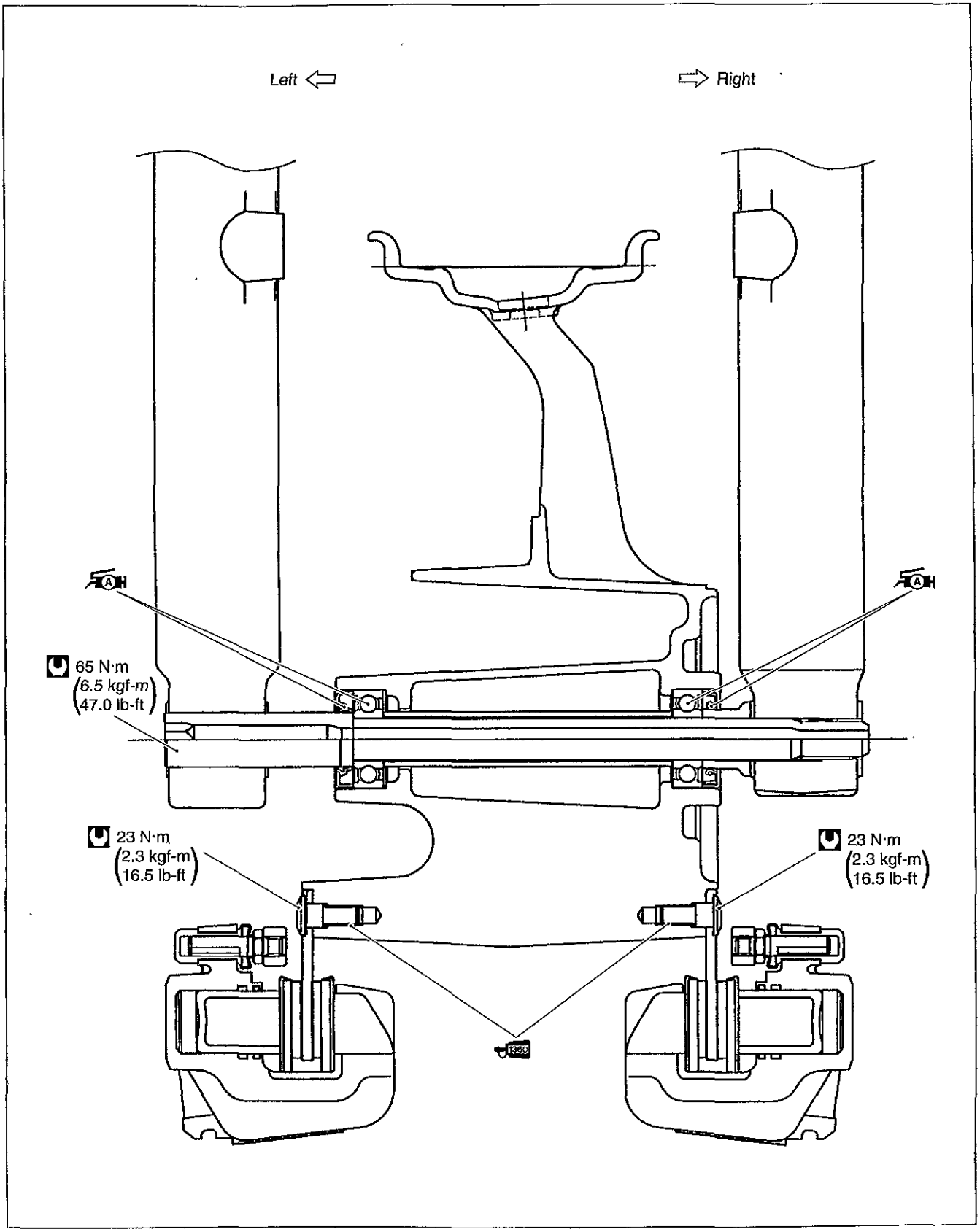
- Remove the screws.
- Remove the front box.





REASSEMBLY AND REMOUNTING

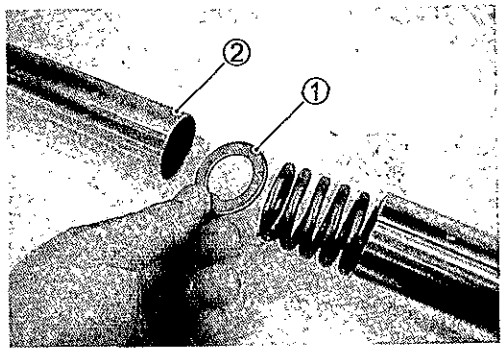
Reassemble and remount the front wheel in the reverse order of removal and disassembly. Pay attention to the following points:



FORK SPRING

- Install the fork spring into the front fork.
- Install the washer ① and the spacer ②.

NOTE:
The smaller spring pitch end must face upward.



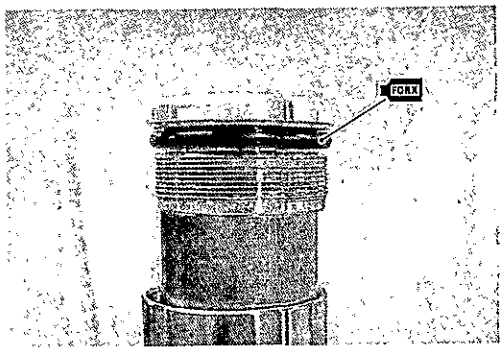
FRONT FORK CAP BOLT

- Apply fork oil lightly to the O-ring.

CAUTION

Use a new O-ring to prevent oil leakage.

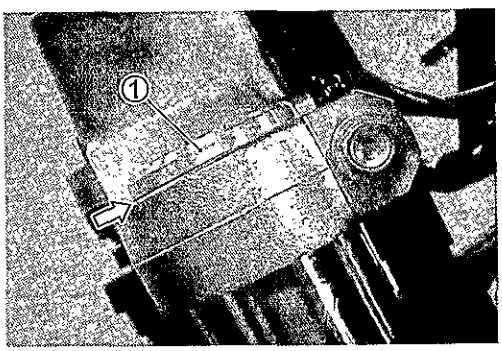
- Tighten the front fork cap bolt temporarily.



- Set the front fork to the front fork lower bracket temporarily by tightening the lower clamp bolts.
- Tighten the front fork cap bolt ① to the specified torque with the special tool.

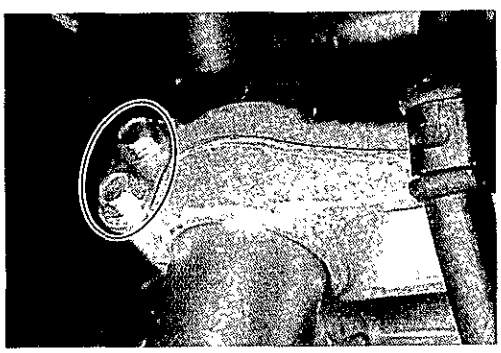
Front fork cap bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

09940-30230: Socket hexagon (17 mm)



- Align the top of the inner tube with the upper surface of the steering stem upper bracket.
- Tighten the front fork upper and lower clamp bolts.

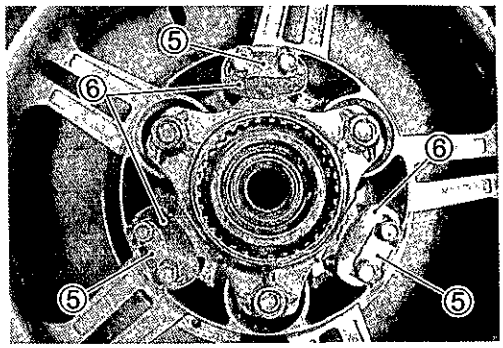
Front fork upper clamp bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)
Front fork lower clamp bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)



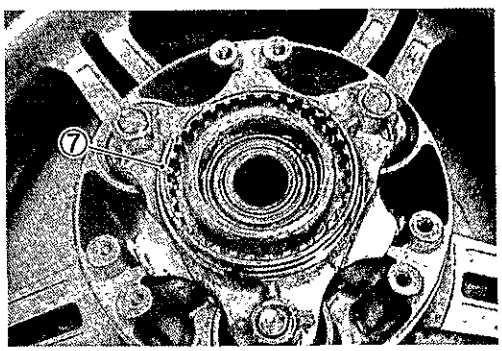
- Install the front fender.
- Install the front wheel and brake calipers. (☞9-31)

NOTE:
After install the brake calipers, front brake should be efficient by pumping the front brake lever.

- Flatten the lock washers ⑤.
- Remove the bolts and washers ⑥.



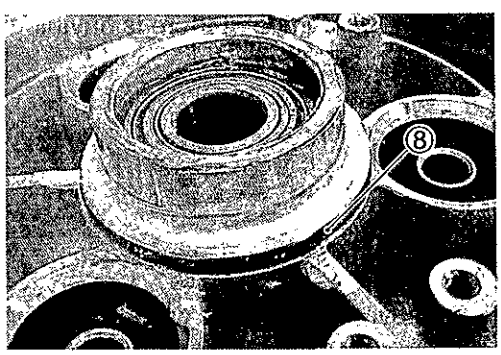
- Remove the rear hub driven joint ⑦.



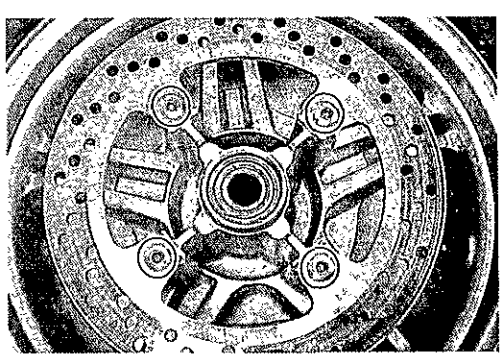
- Remove the O-ring ⑧.

CAUTION

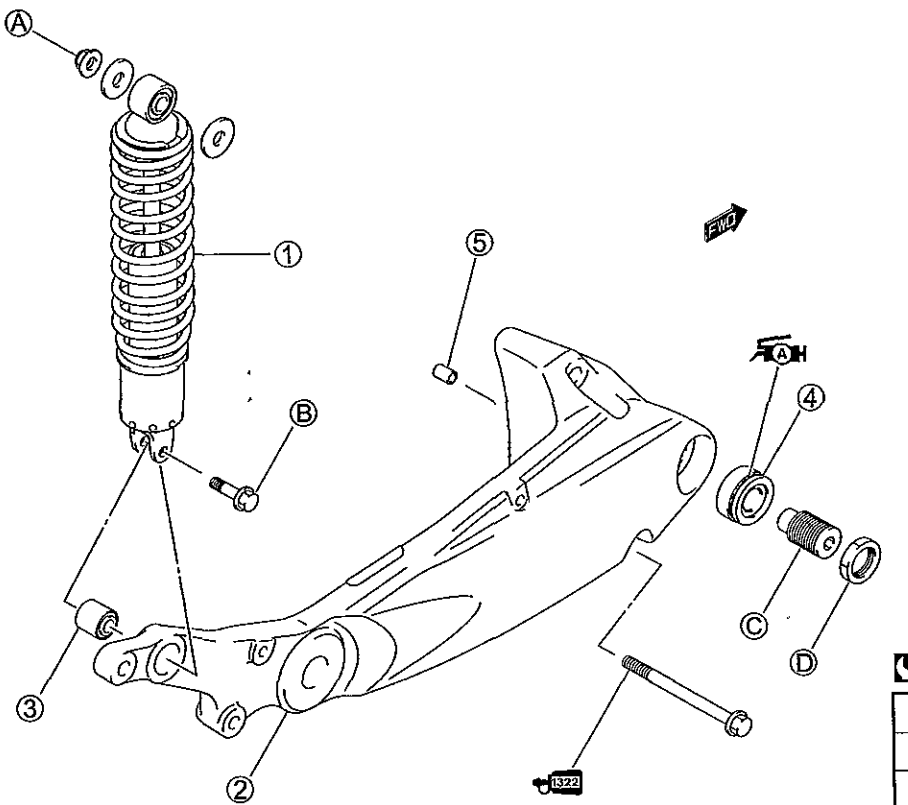
Replace the removed O-ring with a new one.



- Remove the brake disc.



REAR SWINGARM
CONSTRUCTION



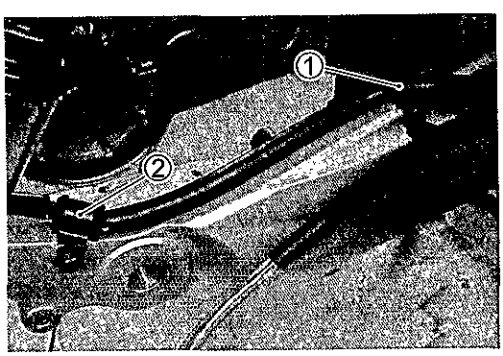
① Rear shock absorber
② Swingarm
③ Bushing
④ Bearing
⑤ Dowel pin

Ⓐ Rear shock absorber mounting nut
Ⓑ Rear shock absorber mounting bolt
Ⓒ Pivot bolt
Ⓓ Locknut

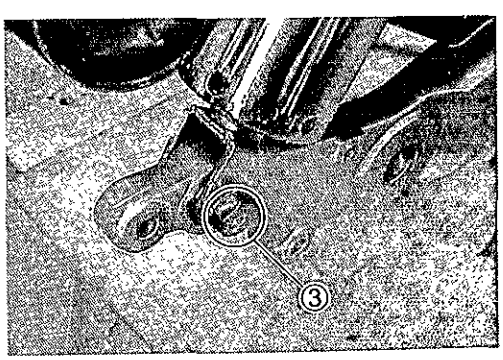
ITEM	N·m	kgf-m	lb-ft
Ⓐ	29	2.9	21.0
Ⓑ	29	2.9	21.0
Ⓒ	9.5	0.95	7.0
Ⓓ	100	10.0	72.5

REMOVAL

- Place the motorcycle on the center stand.
- Remove the exhaust muffler. (☞3-7)
- Remove the rear wheel. (☞9-48)
- Remove the rear brake hose guide ①, ②.



- Remove the rear shock absorber bolt ③.



CALIPER HOLDER

- Apply THREAD LOCK SUPER "1303" to the pin ②.

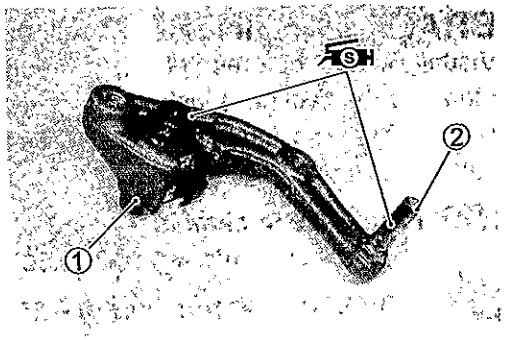
99000-32030: THREAD LOCK SUPER "1303"

- Tighten the pin ② to the caliper holder ① to the specified torque.

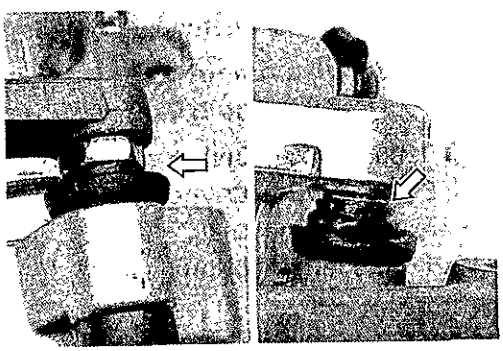
Caliper holder pin: 13 N·m (1.3 kgf-m, 9.5 lb-ft)

- Apply SUZUKI SILICONE GREASE to the brake caliper holder pin ②.

99000-25100: SUZUKI SILICONE GREASE

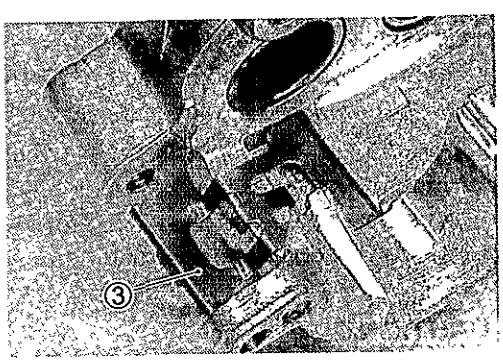


- Be sure to check that the boot is fitted on the slide pin.



- Install the pad spring ③.
- Install the brake pads. (☞9-64)

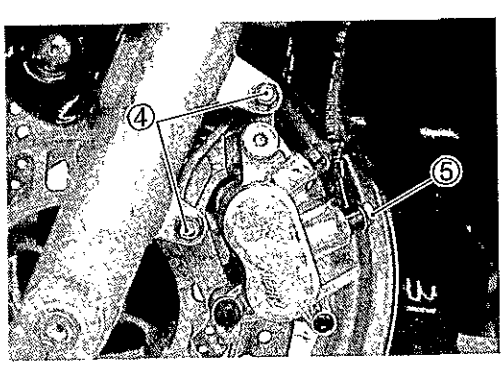
NOTE:
Before remounting the caliper, push the piston all the way into the caliper.



- Remount the brake caliper to the front fork.
- Tighten each bolt to the specified torque.

Front brake caliper mounting bolt ④:
26 N·m (2.6 kgf-m, 19.0 lb-ft)

Front brake hose union bolt ⑤:
23 N·m (2.3 kgf-m, 16.5 lb-ft)

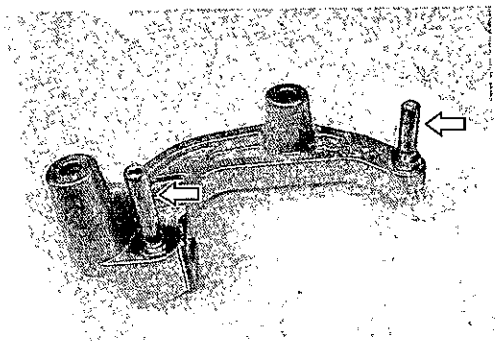


CAUTION

*** The seal washers should be replaced with the new ones to prevent fluid leakage.**
*** Bleed air from the system after reassembling the caliper. (☞2-24)**
*** Brake fluid, if it leaks, will interfere with safe running and discolor painted surfaces. Check the brake hose and hose joints for cracks and fluid leakage.**

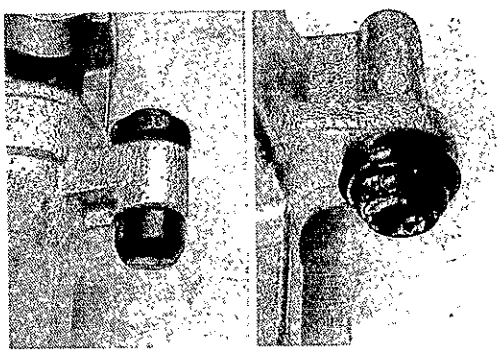
CALIPER HOLDER

Inspect the brake holder sliding pins for wear and other damage. If any damage is found, replace the sliding pin with a new one.



BOOT

Inspect the boots for damage and wear. If any damage is found, replace boots with new ones.

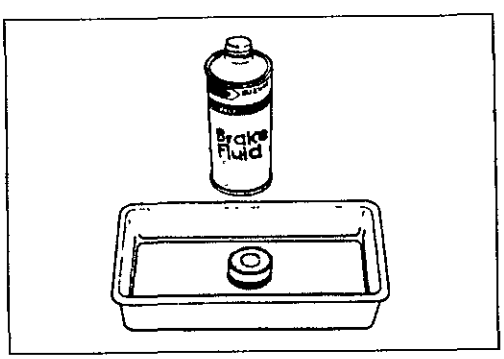


CALIPER REASSEMBLY AND REMOUNTING

Reassemble and remount the caliper in the reverse order of removal and disassembly. Pay attention to the following points:

CAUTION

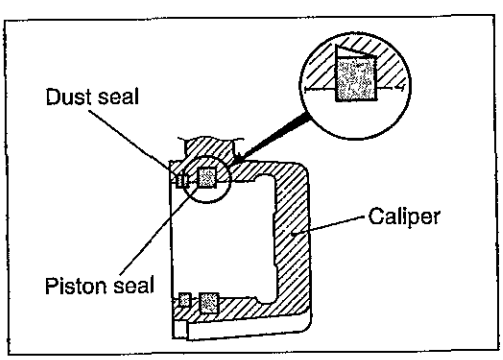
*** Wash the caliper components with fresh brake fluid before reassembly. Never use cleaning solvent or gasoline to wash them.**
*** Apply brake fluid to the caliper bore and piston to be inserted into the bore.**



Specification and Classification: DOT 4

PISTON SEAL

- Install the piston seals as shown in the right illustration.
- Install the pistons to the caliper.

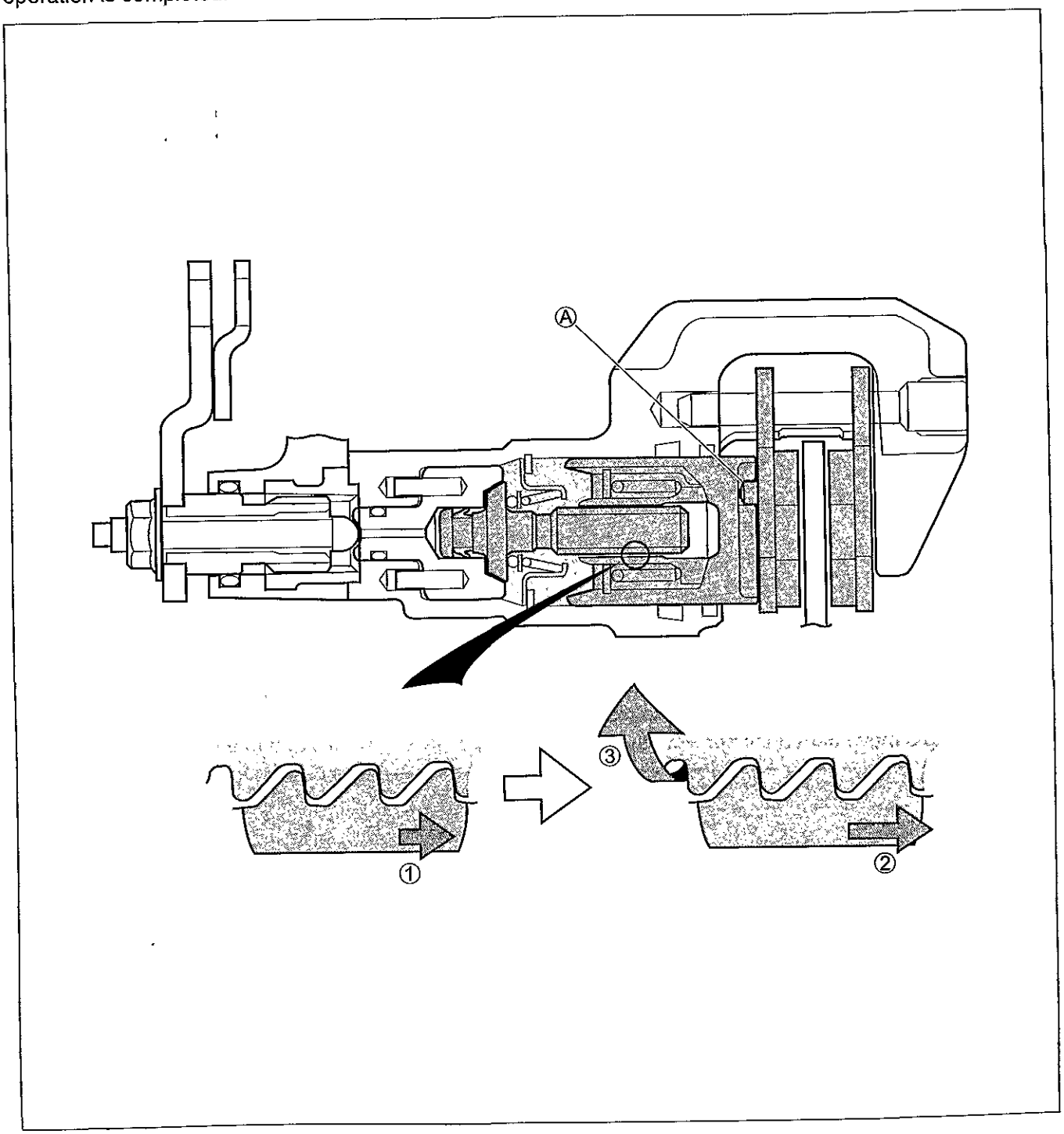


OPERATION (Brake pads are worn→Braking→Automatic adjuster operate)

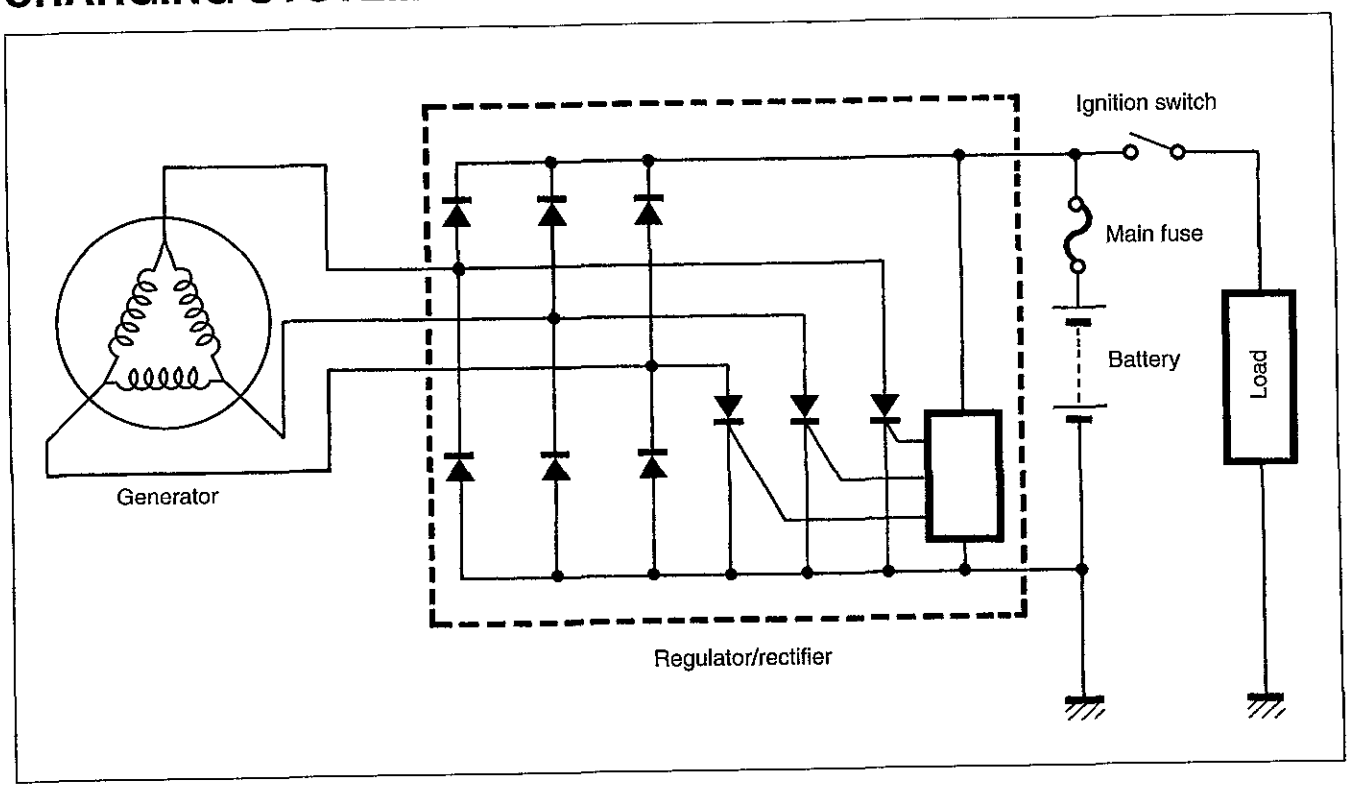
If braking when the brake pad being worn, the caliper piston/adjust-nut move [①] untill the clearance depended on abrasion is done away.

The axial movement [②] is converted to rotary movement and acts on the adjust-bolt and adjust-nut. Only the adjust-bolt turns [③] because the caliper piston/adjust-nut is fixed to the brake pad with caliper piston groove and pad boss at Ⓐ. Thus, the adjust-bolt keeps original position with rotating as well as the caliper piston/adjust-nut moves outside.

The adjust-bolt stops rotating once the brake pad-to-disc clearance become zero, so the automatic adjuster operation is completed.



CHARGING SYSTEM



TROUBLESHOOTING

Battery runs down quickly.

Check accessories which use excessive amounts of electricity.
- Accessories are installed → • Remove accessories
- No accessories ↓

Check the battery for current leaks. (☞10-8)
- Current leaks → • Short circuit of wire harness • Faulty electrical equipment
- No current leaks ↓

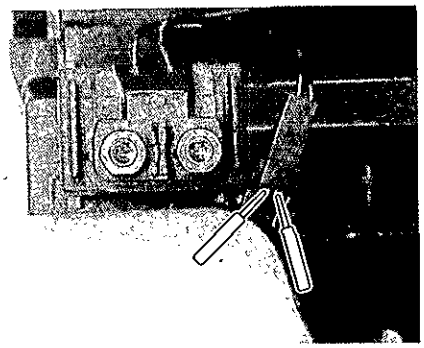
Measure the charging voltage between the battery terminals. (☞10-9)
- Correct → • Faulty battery • Abnormal driving condition
- Incorrect ↓

Continued on next page

Measure the relay coil resistance between the terminals using the multi circuit tester. If the resistance is not within the specified value, replace the starter relay with a new one.

TOOL 09900-25008: Multi circuit tester set

DATA Starter relay resistance: 3 – 6 Ω



SIDE-STAND/IGNITION INTERLOCK SYSTEM PARTS INSPECTION

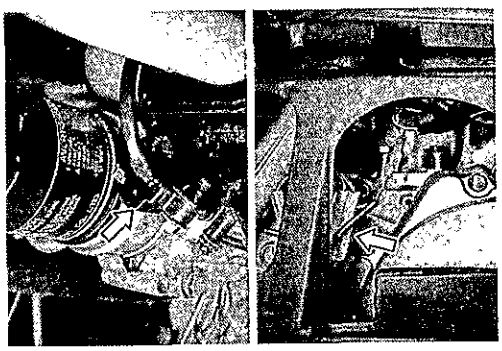
Check the interlock system for proper operation. If the interlock system does not operate properly, check each component for damage or abnormalities. If any abnormality is found, replace the component with a new one.

SIDE-STAND SWITCH

- Remove the maintenance lid. (☞9-13)
- Remove the left leg shield cover. (☞9-12)
- Disconnect the side-stand switch coupler and measure the voltage between Green and Black/White lead wires.

TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Diode test (⊣◀)



	Green (⊕ Probe)	Black/White (⊖ Probe)
ON (Side-stand up)	0.4 – 0.6 V	
OFF (Side-stand down)	More than 1.4 V (Tester's battery voltage)	

NOTE:
If the tester reads under 1.4 V when the tester probes are not connected, replace its battery.

SIDE-STAND RELAY

- Remove the leg shield. (☞9-10)
- Remove the side-stand relay. (☞10-4)

NOTE:
Wire color of the side-stand relay lead wire are G, O/W, B/W and Y/B.

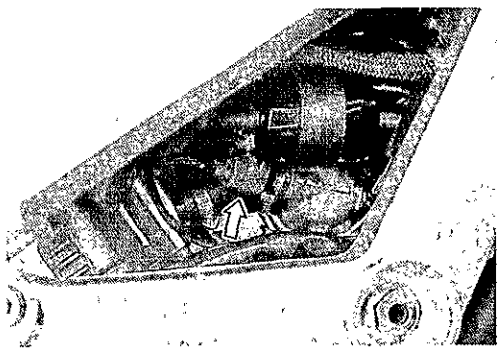
INSPECTION

ENGINE COOLANT TEMPERATURE METER AND INDICATOR LIGHT

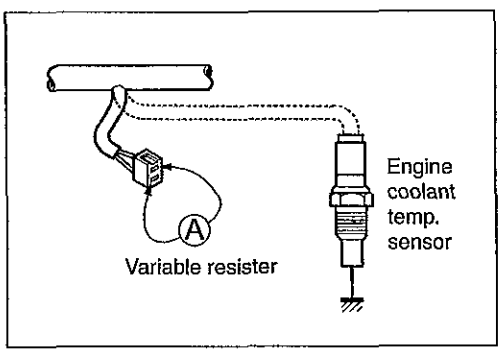
- Disconnect the engine coolant temperature sensor coupler.

CAUTION

When connecting and disconnecting the engine coolant temp. sensor lead wire coupler, make sure to turn OFF the ignition switch, or electronic parts may get damaged.



- Connect the variable resistor Ⓐ between the terminals.
- Turn the ignition switch "ON".
- Check the display of engine coolant temperature meter as shown below. If any abnormality is found, replace the combination meter with a new one.



Engine coolant temperature sensor. (☞8-13)

Engine coolant temperature	Under 39 °C	40 – 59 °C	60 – 99 °C	100 – 111 °C
Resistance	More than 1.148 kΩ	1.148 – 0.587 kΩ	0.587 – 0.188 kΩ	0.188 – 0.140 kΩ
Engine coolant temperature meter	ON C □□□□□ H	ON C ■□□□□ H	ON C ■■□□□ H	ON C ■■■□□ H
Engine coolant temperature indicator light	OFF	OFF	OFF	OFF

Engine coolant temperature	112 – 119 °C	Over 120 °C
Resistance	0.140 – 0.116 kΩ	Less than 0.116 kΩ
Engine coolant temperature meter	ON C ■■■■□ H	Flicker C ■■■■■ H
Engine coolant temperature indicator light	OFF	ON

CVT POWER SWITCH

Color / Position	Br/W	R/W
FREE		
PUSH	○	○

CVT "D" ↔ "M" SWITCH

Color / Position	Br/W	Bl/Y
FREE		
PUSH	○	○

TRUNK LIGHT SWITCH

Color / Position	R	B/W
OFF		
ON	○	○
OFF		

TRUNK LIGHT SEAT SWITCH

Color / Position	B	B/W
•	○	○
PUSH		

OIL LEVEL SWITCH

☞10-29

OIL PRESSURE SWITCH

Color / Position	G/Y	Ground
ON (engine is stopped)	○	○
OFF (engine is running)		

NOTE:
Before inspecting the oil pressure switch check if engine oil level is enough. (☞2-14)

COOLING FAN THERMO SWITCH

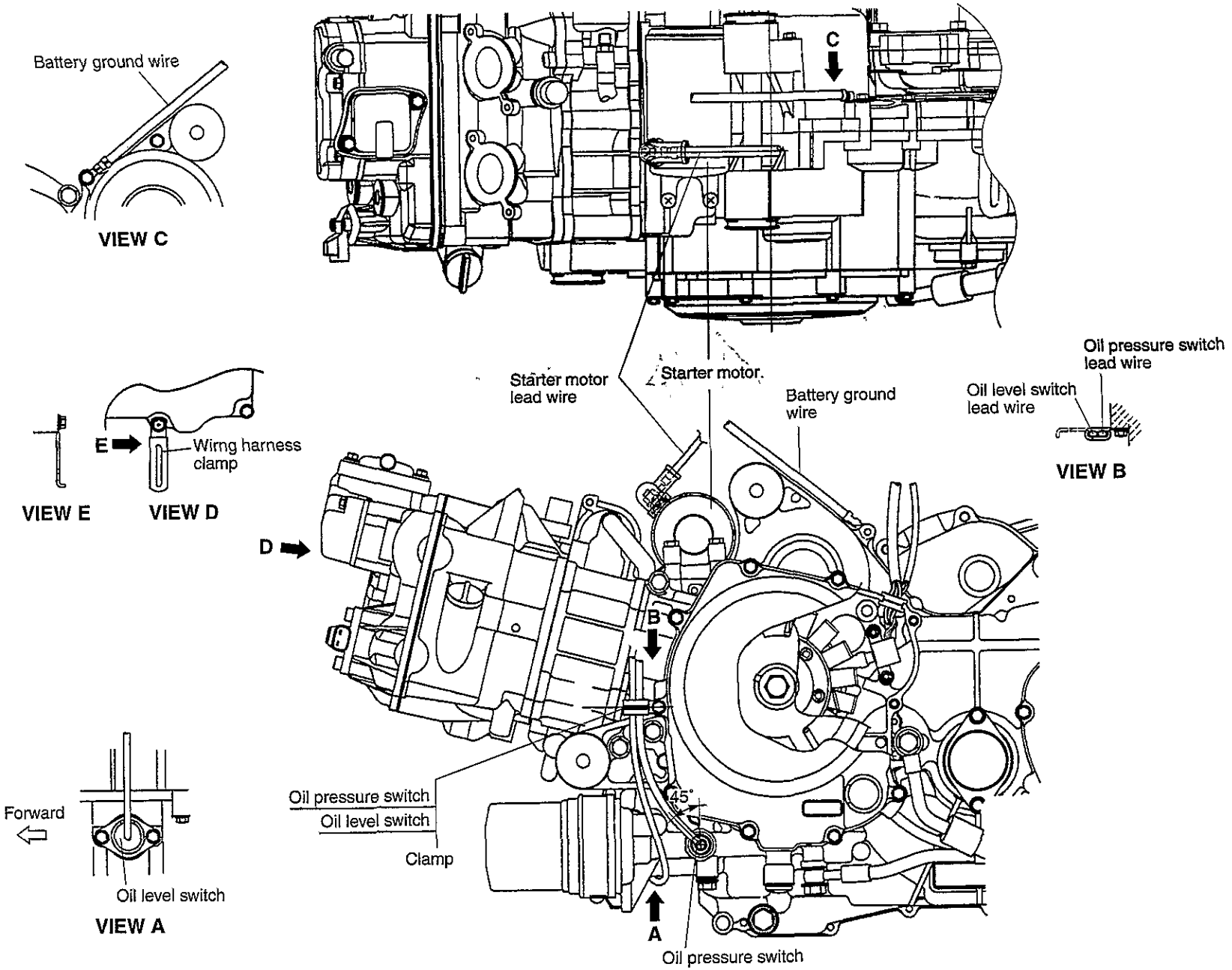
☞8-16

WIRE COLOR

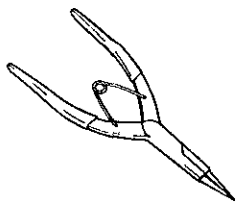
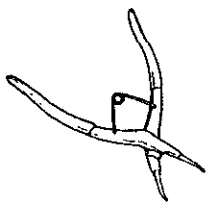
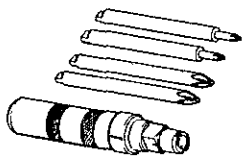
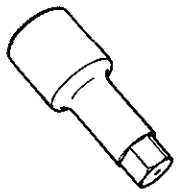
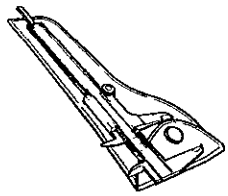
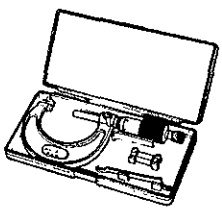
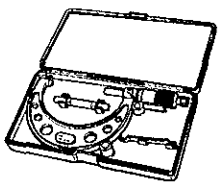
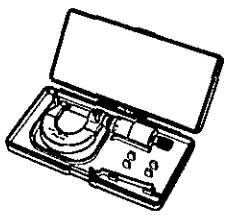
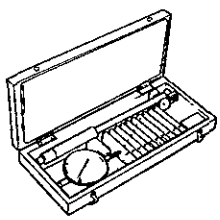
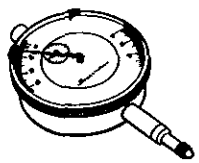
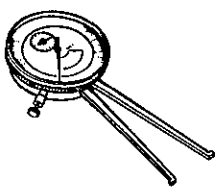
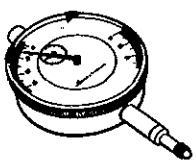
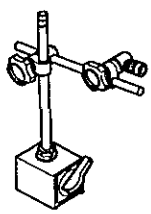
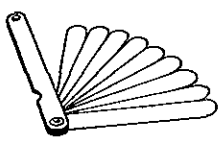
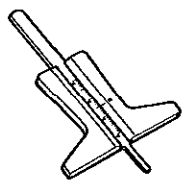
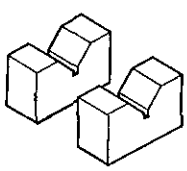
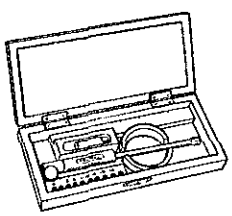
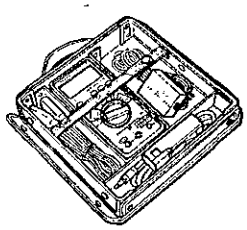
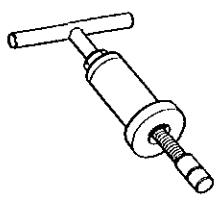
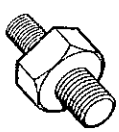
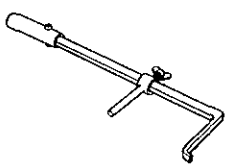
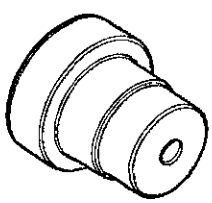
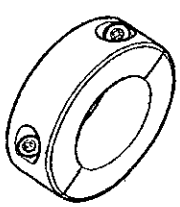
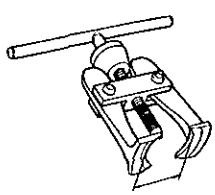
B	: Black	Lbl	: Light blue	Y	: Yellow
Br	: Brown	Lg	: Light green	W	: White
G	: Green	O	: Orange		
Gr	: Gray	R	: Red		

B/Bl : Black with Blue tracer
B/G : Black with Green tracer
B/W : Black with White tracer
B/R : Black with Red tracer
Bl/Y : Blue with Yellow tracer
Br/W : Brown with White tracer
G/Y : Green with Yellow tracer
O/B : Orange with Black tracer
O/Bl : Orange with Blue tracer
O/G : Orange with Green tracer
O/R : Orange with Red tracer
O/W : Orange with White tracer
R/W : Red with White tracer
Y/G : Yellow with Green tracer
Y/W : Yellow with White tracer

Complaint	Symptom and possible causes	Remedy
Engine runs poorly in high speed range.	**Defective air flow system**	
	1. Clogged air cleaner element.	Clean or replace.
	2. Defective throttle valve.	Adjust or replace.
	3. Defective IAC valve.	Replace.
	4. Sucking air from throttle body joint.	Repair or replace.
	5. Imbalanced throttle valve synchronization.	Adjust.
	Defective control circuit or sensor	
	1. Low fuel pressure.	Repair or replace.
	2. Defective throttle position sensor.	Replace.
	3. Defective intake air temp. sensor.	Replace.
	4. Defective camshaft position sensor.	Replace.
	5. Defective crankshaft position sensor.	Replace.
	6. Defective gear position switch.	Replace.
	7. Defective intake air pressure sensor.	Replace.
	8. Defective atmospheric pressure sensor.	Replace.
	9. Defective ECM.	Replace.
	10. Throttle position sensor out of adjustment.	Adjust.
	11. Defective fuel tank pressure control valve.	Replace.
Engine lacks power.	**Defective engine internal/electrical parts**	
	1. Loss of tappet clearance.	Adjust.
	2. Weakened valve springs.	Replace.
	3. Valve timing out of adjustment.	Adjust.
	4. Worn piston rings or cylinders.	Replace.
	5. Poor seating of valves.	Repair.
	6. Fouled spark plug.	Clean or replace.
	7. Incorrect spark plug.	Adjust or replace.
	8. Clogged injector.	Clean.
	9. Throttle position sensor out of adjustment.	Adjust.
	10. Clogged air cleaner element.	Clean.
	11. Imbalanced throttle valve synchronization.	Adjust.
	12. Sucking air from throttle valve or vacuum hose.	Retighten or replace.
	13. Too much engine oil.	Drain out excess oil.
	14. Defective fuel pump or ECM.	Replace.
	15. Defective crankshaft position sensor and ignition coil.	Replace.
	Defective control circuit or sensor	
	1. Low fuel pressure.	Repair or replace.
	2. Defective throttle position sensor.	Replace.
	3. Defective intake air temp. sensor.	Replace.
	4. Defective camshaft position sensor.	Replace.
	5. Defective crankshaft position sensor.	Replace.
	6. Defective gear position switch.	Replace.
	7. Defective intake air pressure sensor.	Replace.
	8. Defective atmospheric pressure sensor.	Replace.
	9. Defective ECM.	Replace.
	10. Imbalanced throttle valve synchronization.	Adjust.
	11. Throttle position sensor out of adjustment.	Adjust.
	12. Defective fuel tank pressure control valve.	Replace.


Battery ground wire
VIEW C
C
Starter motor lead wire
Starter motor
Battery ground wire
Oil pressure switch lead wire
Oil level switch lead wire
VIEW B
E
Wiring harness clamp
VIEW E
VIEW D
D
B
Forward
Oil level switch
VIEW A
Oil pressure switch
Oil level switch
Clamp
45°
A
Oil pressure switch

SPECIAL TOOLS

 09900-06107 Snap ring pliers	 09900-06108 Snap ring pliers	 09900-09004 Impact driver set	 09900-18710 Hexagon socket 12 mm	 09900-20102 Vernier calipers
 09900-20202 Micrometer (25 – 50 mm)	 09900-20204 Micrometer (75 – 100 mm)	 09900-20205 Micrometer (0 – 25 mm)	 09900-20508 Cylinder gauge set	 09900-20602 Dial gauge (1/1000 mm, 1 mm)
 09900-20605 Dial gauge	 09900-20607 Dial gauge (1/100 mm, 10 mm)	 09900-20701 Magnetic stand	 09900-20803 09900-20806 Thickness gauge	 09900-20805 Tire depth gauge
 09900-21304 V-block (100 mm)	 09900-22301 09900-22302 Plastigauge	 09900-22401 Small bore gauge (10 – 18 mm)	 09900-25008 Multi circuit tester set	 09910-32812 Crankshaft installer
 09910-32850 Crankshaft installer attachment	 09913-50121 Oil seal remover	 09913-60210 09913-60230 Journal bearing remover/installer	 09913-60241 Journal bearing holder	 09913-60912 or 09913-61110 or 09913-61510 Bearing puller

INJECTOR + FUEL PUMP + FUEL PRESSURE REGULATOR

ITEM	SPECIFICATION	NOTE
Injector resistance	11 – 13 Ω at 20 °C (68 °F)	—
Fuel pump discharge amount	More than 0.9 L (0.95/0.79 US/Imp qt) For 30 sec, at 300 kPa (3.0 kgf/cm², 43 psi)	—
Fuel pressure regulator operating set pressure	Approx. 300 kPa (3.0 kgf/cm², 43 psi)	—

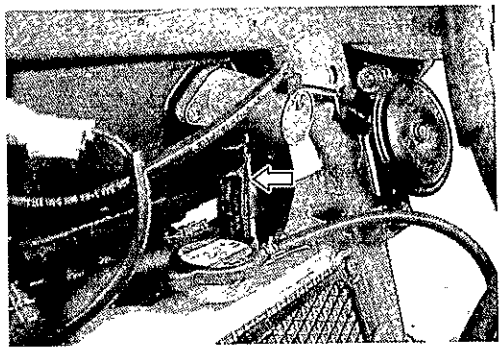
FI/CVT-SENSORS

ITEM	SPECIFICATION		NOTE
CMP sensor resistance	0.9 – 1.7 kΩ		
CMP sensor peak voltage	More than 0.5 V (When cranking)		⊕: B/Y, ⊖: Br
CKP sensor resistance	150 – 300 Ω		
CKP sensor peak voltage	More than 2.0 V (When cranking)		⊕: Bl, ⊖: G
IAP sensor input voltage	4.5 – 5.5 V		
IAP sensor output voltage	Approx. 2.6 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor resistance	Closed	Approx. 1.1 kΩ	
	Opened	Approx. 4.2 kΩ	
TP sensor output voltage	Closed	Approx. 1.1 V	
	Opened	Approx. 4.3 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor resistance	Approx. 2.45 kΩ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor resistance	Approx. 2.45 kΩ at 20 °C (68 °F)		
AP sensor input voltage	4.5 – 5.5 V		
AP sensor output voltage	Approx. 3.6 V at 760 mmHg (100 kPa)		
TO sensor resistance	19.1 – 19.7 kΩ		
TO sensor output voltage	Normal	Less than 1.4 V	
	Leaning	Less than 3.7 V	
Injector voltage	Battery voltage		
Ignition coil primary peak voltage	More than 80 V (When cranking)		#1 ⊕: W/Bl, ⊖: Ground #2 ⊕: B/Y, ⊖: Ground
HO2 sensor resistance	4 – 5 Ω at 23 °C (73.4 °F)		
HO2 sensor output voltage	Idle speed	Less than 0.4 V	
	3 000r/min.	More than 0.6 V	
PAIR solenoid valve resistance	20 – 24 Ω at 20 °C (68 °F)		
CVT primary pulley position sensor	Compressed	1.9 – 2.3 kΩ	
	Extended	0.2 – 1.0 kΩ	
CVT primary pulley position sensor output voltage	1st: Idle speed	Approx. 3.3 V	
	3rd: 3 000 r/min.	Approx. 1.3 V	
	5th: 3 000 r/min.	Approx. 0.5 V	
CVT secondary pulley revolution sensor resistance	400 – 600 Ω		
CVT secondary pulley revolution sensor peak voltage	More than 5V at idle speed		⊕: Y, ⊖: W

PAIR (AIR SUPPLY) SYSTEM INSPECTION

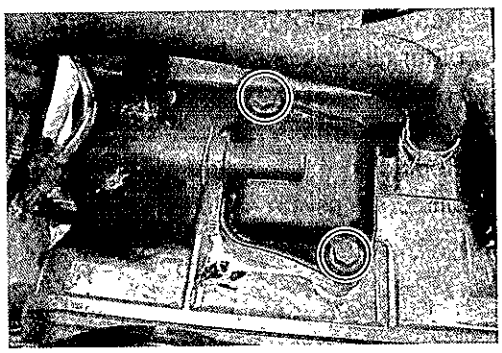
HOSE

- Remove the front box. (☞9-18)
- Inspect the hose for wear or damage.
- Inspect that the hose is securely connected.

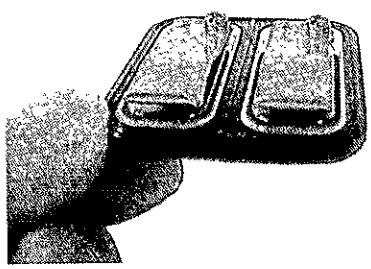


PAIR REED VALVE

- Remove the air chamber. (☞7-16)
- Remove the PAIR reed valve cover.

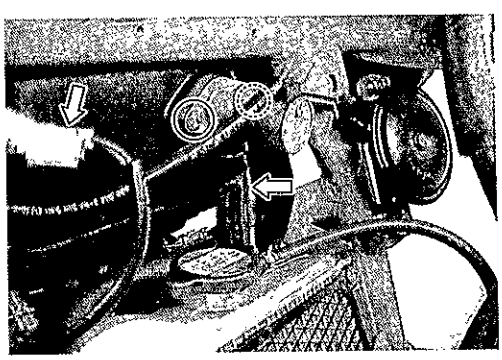


- Inspect the reed valve for the carbon deposit.
- If the carbon deposit is found in the reed valve, replace the PAIR reed valve with a new one.
- Installation is in the reverse order of removal.



PAIR CONTROL SOLENOID VALVE

- Disconnect the PAIR control solenoid valve lead wire coupler.
- Disconnect the PAIR hose.
- Remove the PAIR control solenoid valve.



- Check that air flows through the air inlet port to the air outlet port.
- If air does not flow out, replace the PAIR control solenoid valve with a new one.