

FI SYSTEM

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PRECAUTIONS IN SERVICING

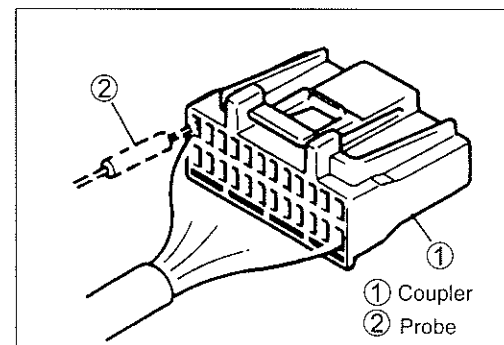
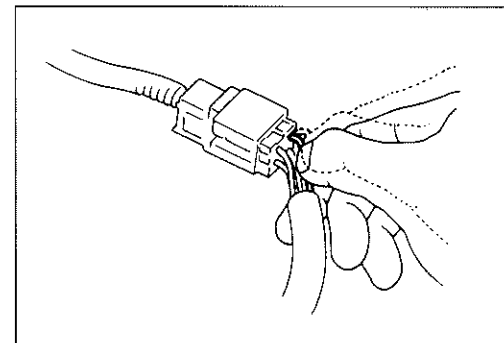
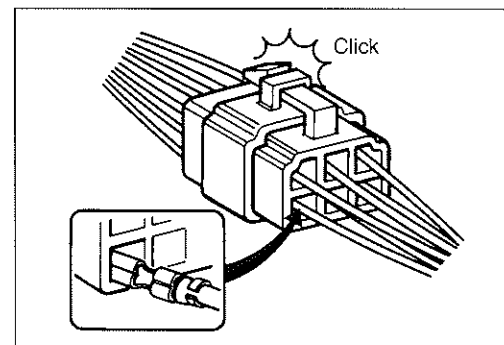
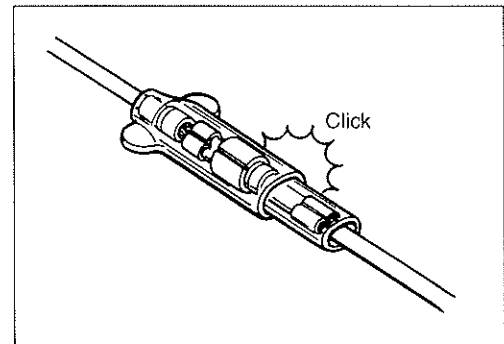
When handling the FI component parts or servicing the FI system, observe the following points for the safety of the system.

CONNECTOR/COUPLER

- When connecting a connector, be sure to push it in until a click is felt.
- With a lock type coupler, be sure to release the lock when disconnecting, and push it in fully till the lock works when connecting it.
- When disconnecting the coupler, be sure to hold the coupler body and do not pull the lead wires.
- Inspect each terminal on the connector/coupler for looseness or bending.
- Inspect each terminal for corrosion and contamination. The terminals must be clean and free of any foreign material which could impede proper terminal contact.

- Inspect each lead wire circuit for poor connection by shaking it by hand lightly. If any abnormal condition is found, repair or replace.

- When taking measurements at electrical connectors using a tester probe, be sure to insert the probe from the wire harness side (backside) of the connector/coupler.

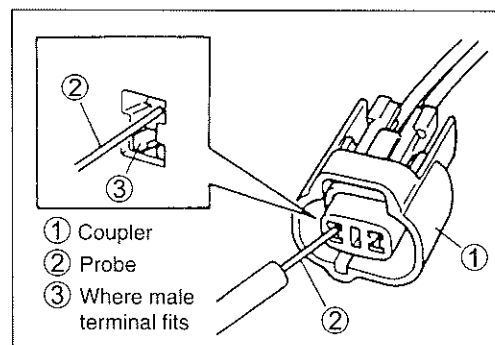


- When connecting meter probe from the terminal side of the coupler (connection from harness side not being possible), use extra care not to force and cause the male terminal to bend or the female terminal to open.

Connect the probe as shown to avoid opening of female terminal.

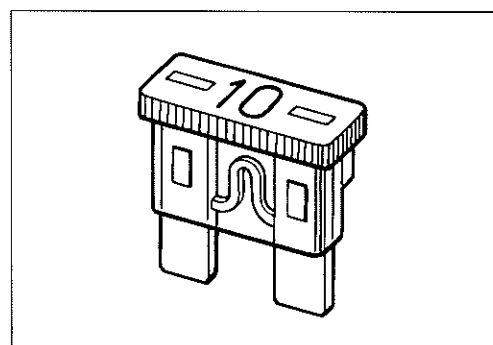
Never push in the probe where male terminal is supposed to fit.

- Check the male connector for bend and female connector for excessive opening. Also check the coupler for locking (looseness), corrosion, dust, etc.



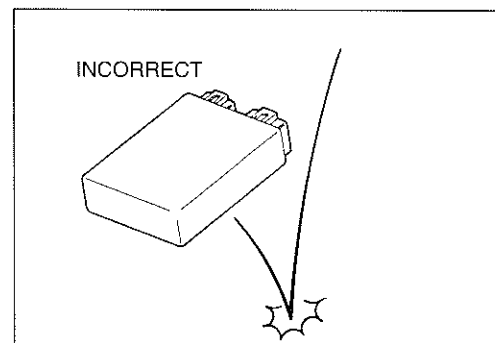
FUSE

- When a fuse blows, always investigate the cause, correct it and then replace the fuse.
- Do not use a fuse of a different capacity.
- Do not use wire or any other substitute for the fuse.

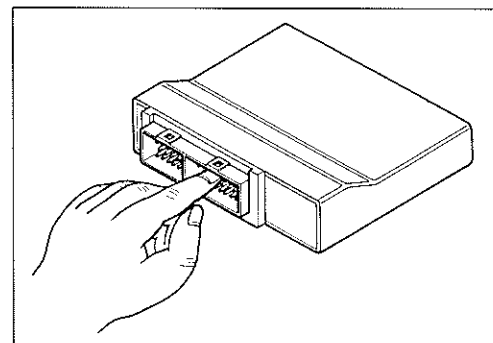


ECM/VARIOUS SENSORS

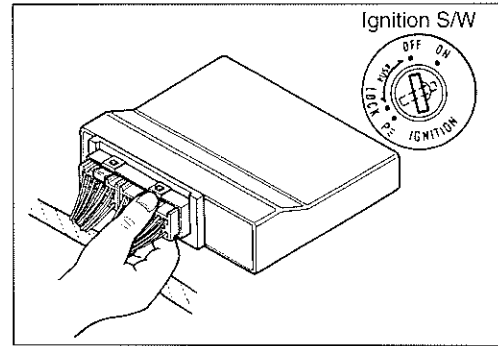
- Since each component is a high-precision part, great care should be taken not to apply any sharp impacts during removal and installation.



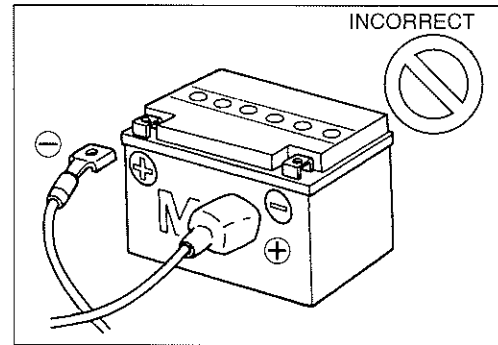
- Be careful not to touch the electrical terminals of the ECM. The static electricity from your body may damage this part.



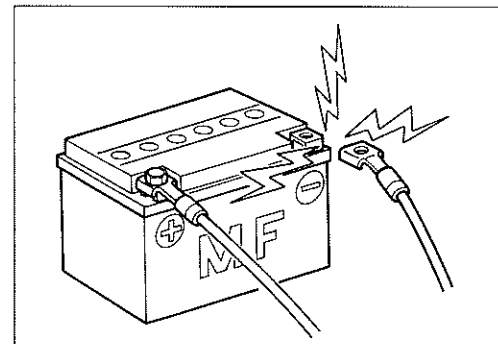
- When disconnecting and connecting the ECM couplers, make sure to turn OFF the ignition switch, or electronic parts may get damaged.



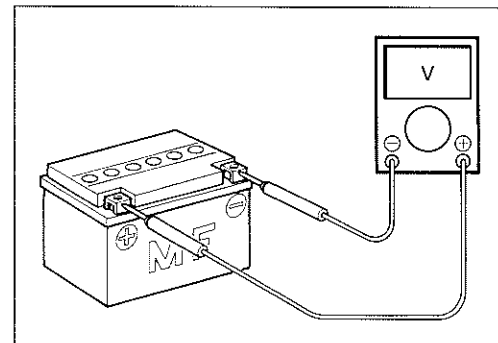
- Battery connection in reverse polarity is strictly prohibited. Such a wrong connection will damage the components of the FI system instantly when reverse power is applied.



- Removing any battery terminal of a running engine is strictly prohibited. The moment such removal is made, damaging counter electromotive force will be applied to the ECM which may result in serious damage.



- Before measuring voltage at each terminal, check to make sure that battery voltage is 11 V or higher. Terminal voltage check at low battery voltage will lead to erroneous diagnosis.



- Never connect any tester (voltmeter, ohmmeter, or whatever) to the ECM when its coupler is disconnected. Otherwise, damage to ECM may result.
- Never connect an ohmmeter to the ECM with its coupler connected. If attempted, damage to ECM or sensors may result.
- Be sure to use a specified voltmeter/ohmmeter. Otherwise, accurate measurements may not be obtained and personal injury may result.

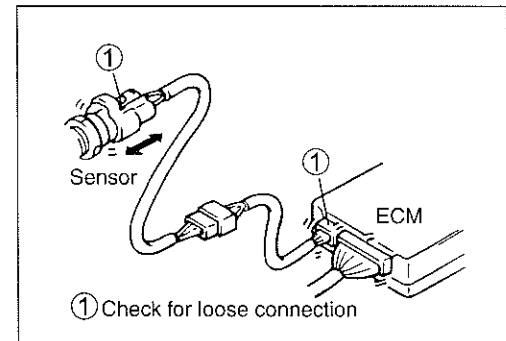
ELECTRICAL CIRCUIT INSPECTION PROCEDURE

While there are various methods for electrical circuit inspection, described here is a general method to check for open and short circuit using an ohmmeter and a voltmeter.

OPEN CIRCUIT CHECK

Possible causes for the open circuit are as follows. As the cause can exist in the connector/coupler or terminal, they need to be checked carefully.

- Loose connection of connector/coupler
- Poor contact of terminal (due to dirt, corrosion or rust, poor contact tension, entry of foreign object etc.)
- Wire harness being open
- Poor terminal-to-wire connection
- Disconnect the negative cable from the battery.
- Check each connector/coupler at both ends of the circuit being checked for loose connection. Also check for condition of the coupler lock if equipped.

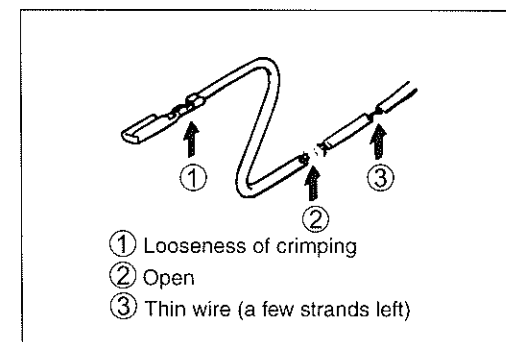
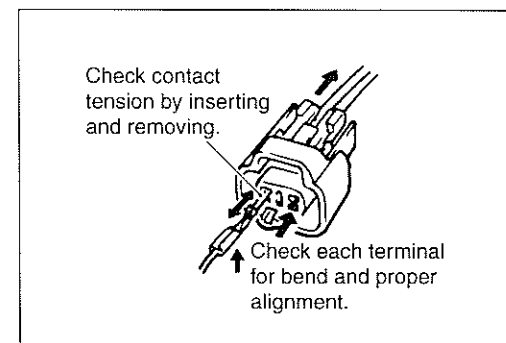


- Using a test male terminal, check the female terminals of the circuit being checked for contact tension. Check each terminal visually for poor contact (possibly caused by dirt, corrosion, rust, entry of foreign object, etc.). At the same time, check to make sure that each terminal is fully inserted in the coupler and locked.

If contact tension is not enough, rectify the contact to increase tension or replace.

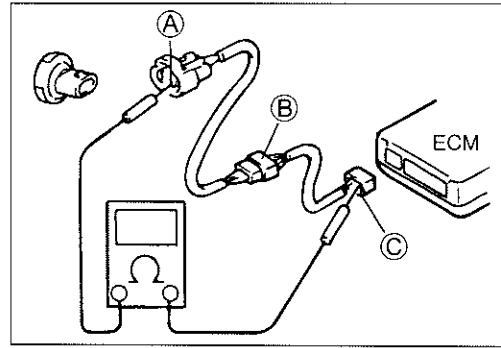
The terminals must be clean and free of any foreign material which could impede proper terminal contact.

- Using continuity inspect or voltage check procedure as described below, inspect the wire harness terminals for open circuit and poor connection. Locate abnormality, if any.

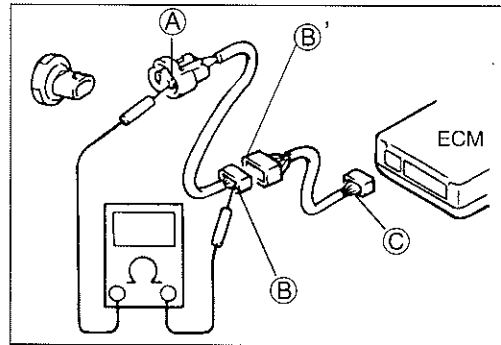


Continuity check

- Measure resistance across coupler (B) (between (A) and (C) in the figure).
If no continuity is indicated (infinity or over limit), the circuit is open between terminals (A) and (C).



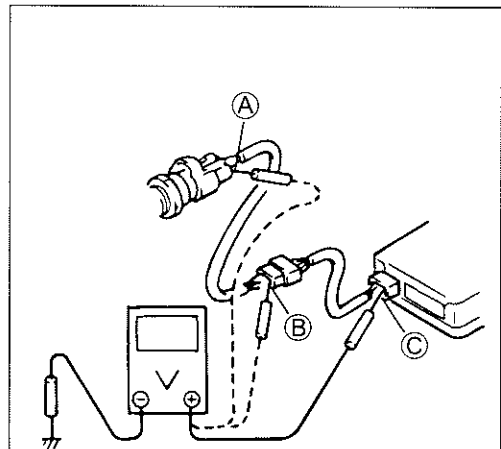
- Disconnect the coupler (B) and measure resistance between couplers (A) and (B).
If no continuity is indicated, the circuit is open between couplers (A) and (B). If continuity is indicated, there is an open circuit between couplers (B') and (C) or an abnormality in coupler (B') or coupler (C).



VOLTAGE CHECK

If voltage is supplied to the circuit being checked, voltage check can be used as circuit check.

- With all connectors/couplers connected and voltage applied to the circuit being checked, measure voltage between each terminal and body ground.



If measurements were taken as shown in the figure at the right and results are as listed below, it means that the circuit is open between terminals (A) and (B).

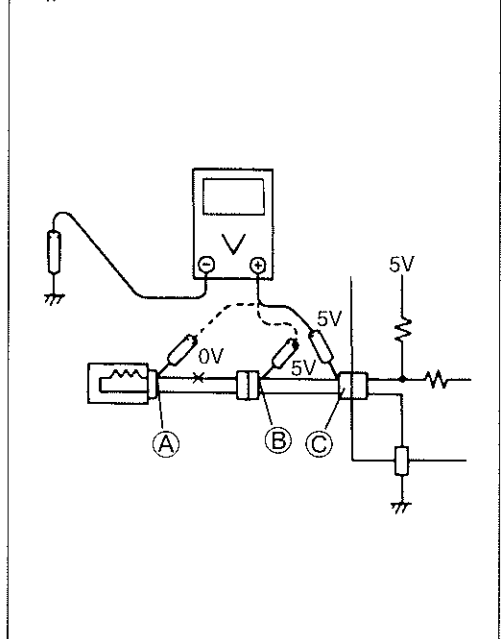
Voltage Between:

- (C) and body ground: Approx. 5V
- (B) and body ground: Approx. 5V
- (A) and body ground: 0V

Also, if measured values are as listed below, a resistance (abnormality) exists which causes the voltage drop in the circuit between terminals (A) and (B).

Voltage Between:

- (C) and body ground: Approx. 5V
 - (B) and body ground: Approx. 5V
 - (A) and body ground: 3V
- └── 2V voltage drop



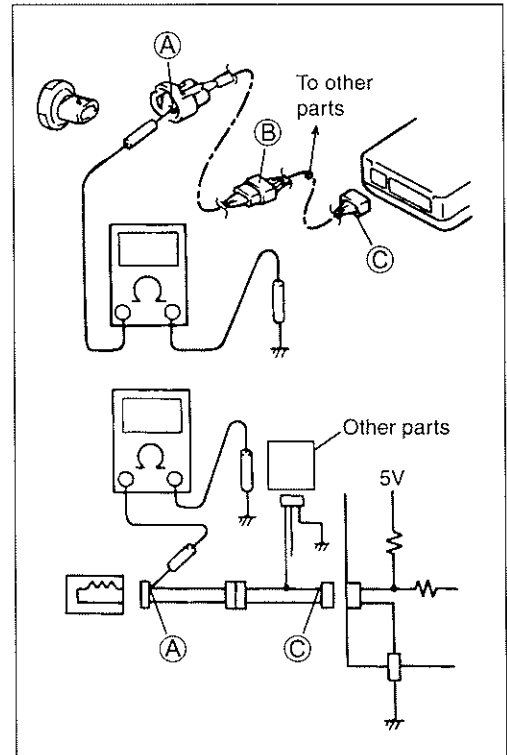
SHORT CIRCUIT CHECK (WIRE HARNESS TO GROUND)

- Disconnect the negative cable from the battery.
- Disconnect the connectors/couplers at both ends of the circuit to be checked.

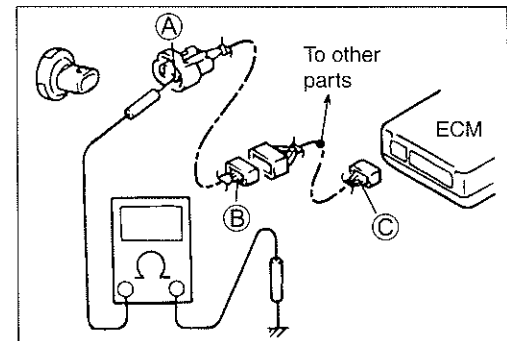
NOTE:

If the circuit to be checked branches to other parts as shown, disconnect all connectors/couplers of those parts. Otherwise, diagnosis will be misled.

- Measure resistance between terminal at one end of circuit (A terminal in figure) and body ground. If continuity is indicated, there is a short circuit to ground between terminals A and C.



- Disconnect the connector/coupler included in circuit (coupler B) and measure resistance between terminal A and body ground. If continuity is indicated, the circuit is shorted to the ground between terminals A and B.



USING TESTERS

- Use the Suzuki multi-circuit tester (09900-25008).
- Use well-charged batteries in the tester.
- Be sure to set the tester to the correct testing range.

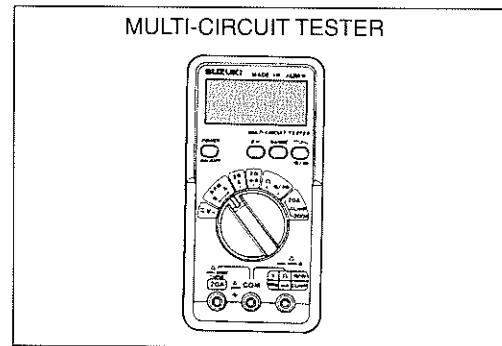
Using the tester

- Incorrectly connecting the \oplus and \ominus probes may cause the inside of the tester to burnout.
- If the voltage and current are not known, make measurements using the highest range.
- When measuring the resistance with the multi-circuit tester, ∞ will be shown as 10.00 M Ω and "1" flashes in the display.
- Check that no voltage is applied before making the measurement. If voltage is applied, the tester may be damaged.
- After using the tester, turn the power off.

09900-25008: Multi-circuit tester

NOTE:

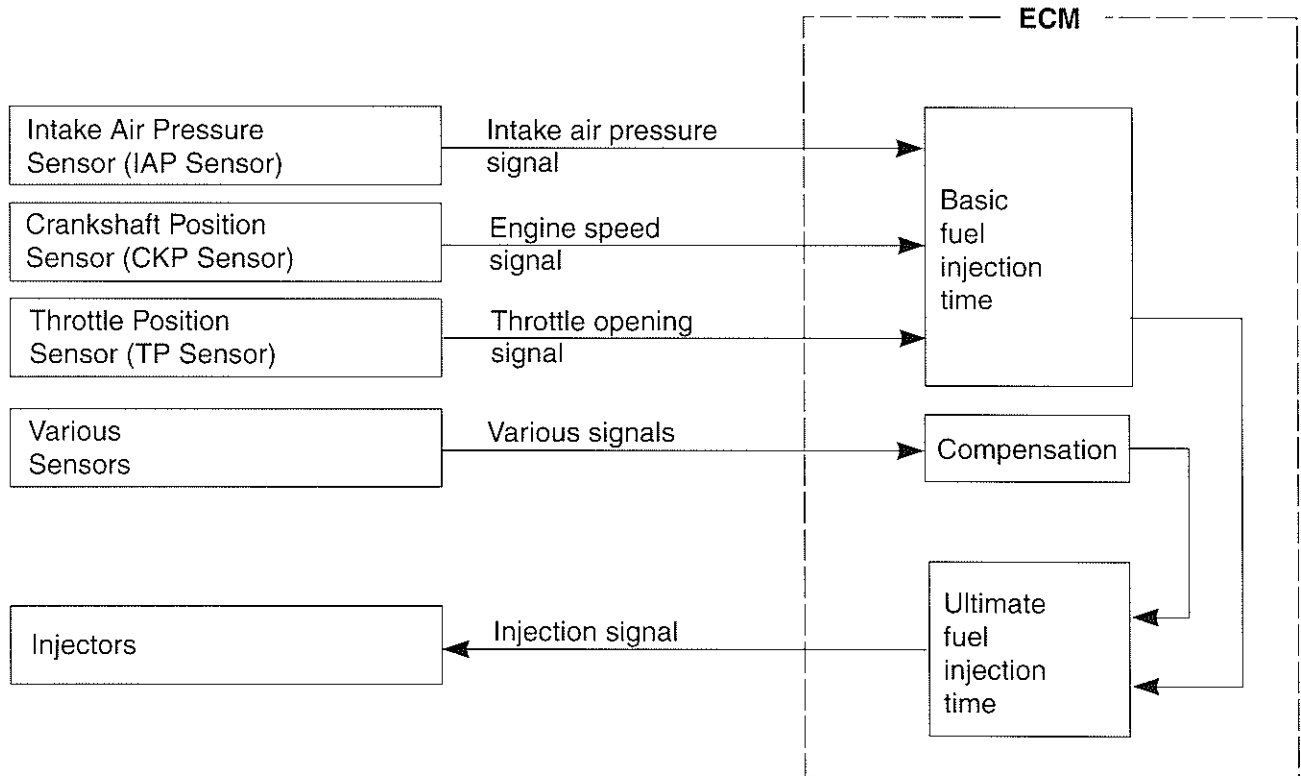
- * When connecting the multi-circuit tester, use a fine needle pointed probe or install fine copper wires (O.D is below 0.5 mm) to the back side of the lead wire coupler and connect the probes of tester to them.
- * Use a fine copper wire, the outer diameter being below 0.5 mm, to prevent the rubber of the water proof coupler from damage.



FI SYSTEM TECHNICAL FEATURES

INJECTION TIME (INJECTION VOLUME)

The factors to determine the injection time include the basic fuel injection time which is calculated on the basis of the intake air pressure, engine speed and throttle opening angle, and various compensations. These compensations are determined according to the signals from various sensors that detect the engine and driving conditions.



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 OIL TEMPERATURE SENSOR SIGNAL	When engine oil temperature is low, injection time (volume) is increased.
INTAKE AIR TEMPERATURE SENSOR SIGNAL	When intake air temperature is low, injection time (volume) is increased.
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.

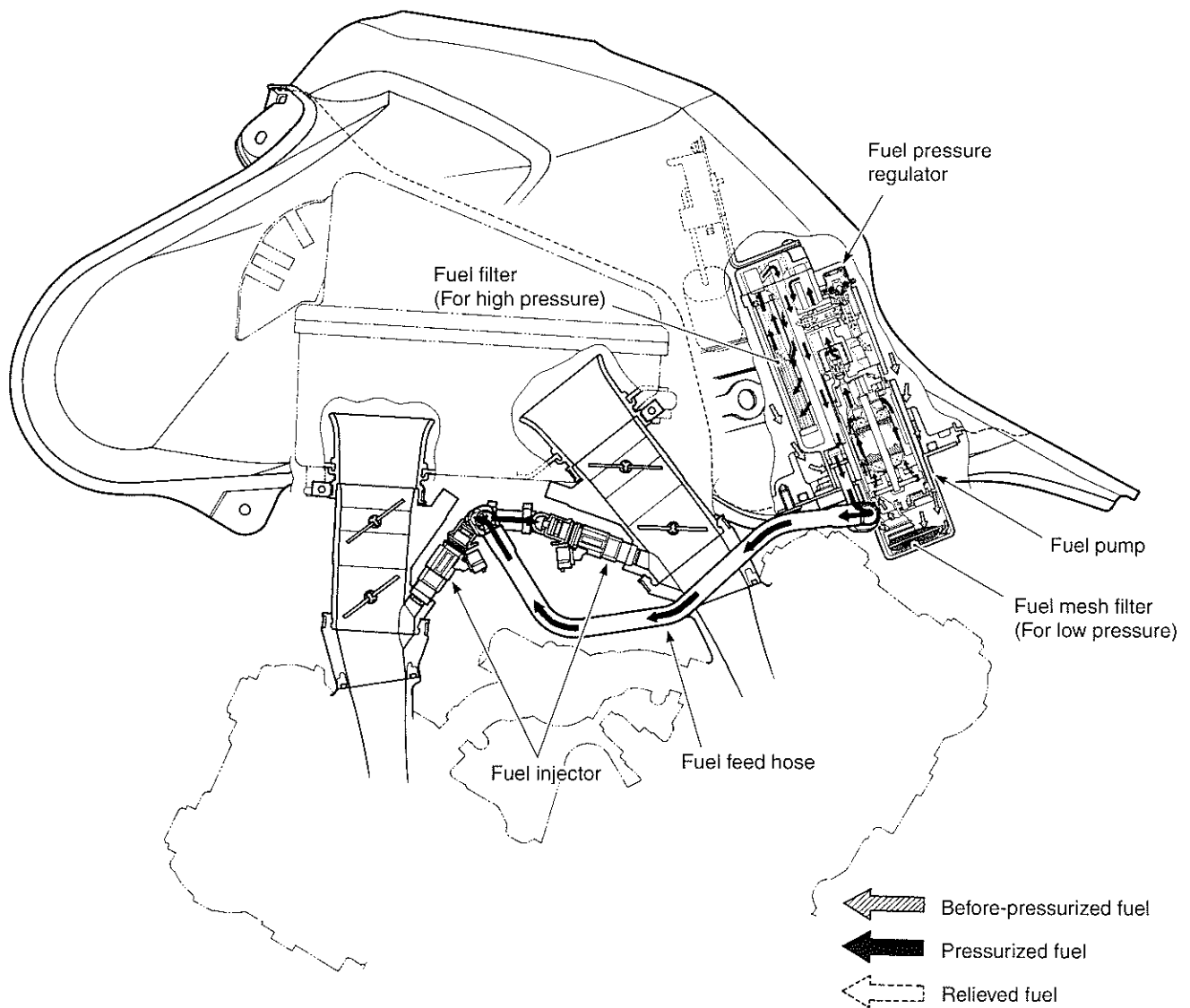
INJECTION STOP CONTROL

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.

FUEL DELIVERY SYSTEM

The fuel delivery system consists of the fuel tank, fuel pump, fuel filters, fuel feed hose, fuel delivery pipe (including fuel injectors) and fuel pressure regulator. There is no fuel return hose. The fuel in the fuel tank is pumped up by the fuel pump and pressurized fuel flows into the injector installed in the fuel delivery pipe. Fuel pressure is regulated by the fuel pressure regulator. As the fuel pressure applied to the fuel injector (the fuel pressure in the fuel delivery pipe) is always kept at absolute fuel pressure of 300 kPa (3.0 kgf/cm², 43 psi), the fuel is injected into the throttle body in conic dispersion when the injector opens according to the injection signal from the ECM.

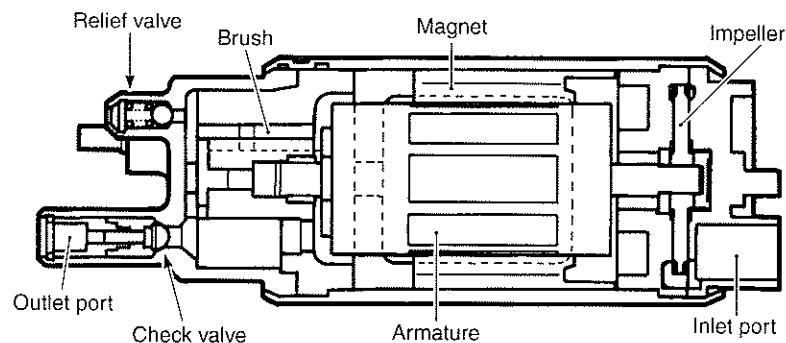
The fuel relieved by the fuel pressure regulator flows back to the fuel tank.



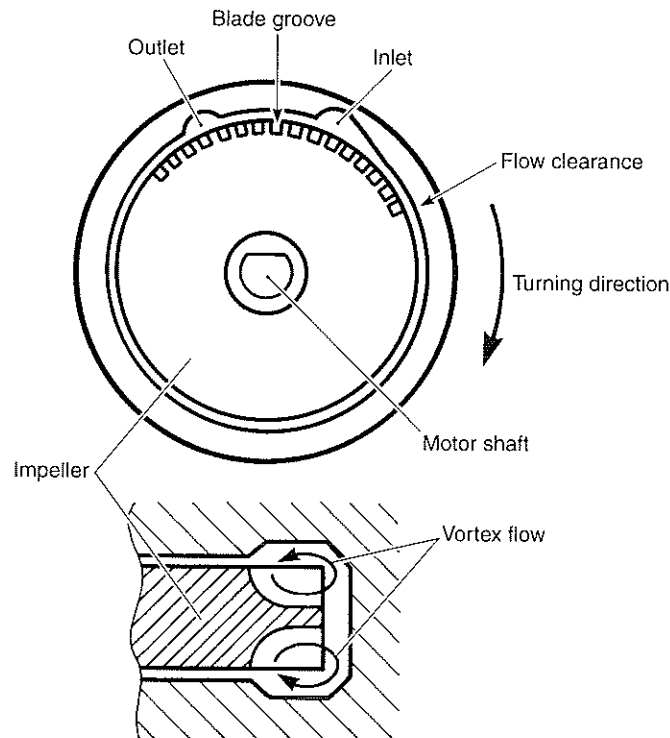
FUEL PUMP

The electric fuel pump is mounted at the bottom of the fuel tank, which consists of the armature, magnet, impeller, brush, check valve and relief valve. The ECM controls its ON/OFF operation as controlled under the FUEL PUMP CONTROL SYSTEM.

When electrical energy is supplied to the fuel pump, the motor in the pump runs and together with the impeller. This causes a pressure difference to occur on both sides of the impeller as there are many grooves around it. Then the fuel is drawn through the inlet port, and with its pressure increased, it is discharged through the outlet port. The fuel pump has a check valve to keep some pressure in the fuel feed hose even when the fuel pump is stopped. Also, the relief valve is equipped in the fuel pump, which releases pressurized fuel to the fuel tank when the outlet of the fuel pressure has increased up to 450 – 600 kPa (4.5 – 6.0 kgf/cm², 64 – 85 psi).



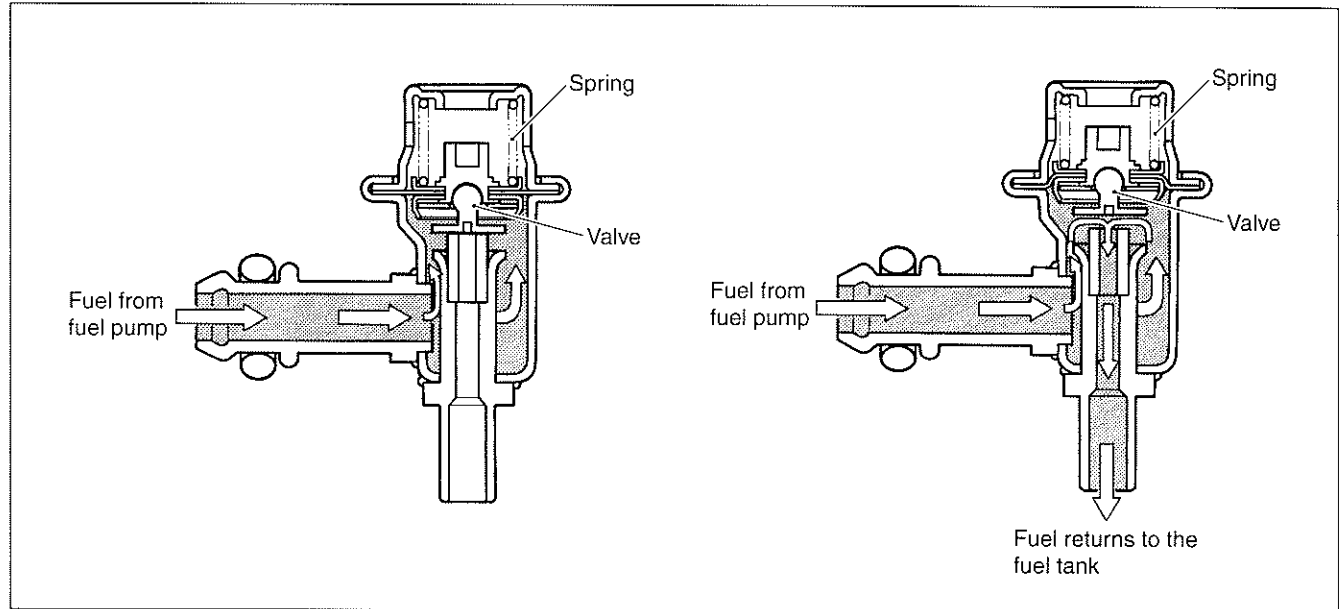
When the impeller is driven by the motor, pressure differential occurs between the front part and the rear part of the blade groove as viewed in angular direction due to fluid friction. This process continuously takes place causing fuel pressure to be built up. The pressurized fuel is then let out from the pump chamber and discharged through the motor section and the check valve.



FUEL PRESSURE REGULATOR

The fuel pressure regulator consists of the spring and valve. It keeps absolute fuel pressure of 300 kPa (3.0 kgf/cm², 43 psi) to be applied to the injector at all times.

When the fuel pressure rises more than 300 kPa (3.0 kgf/cm², 43 psi), the fuel pushes the valve in the regulator open and excess fuel returns to the fuel tank.

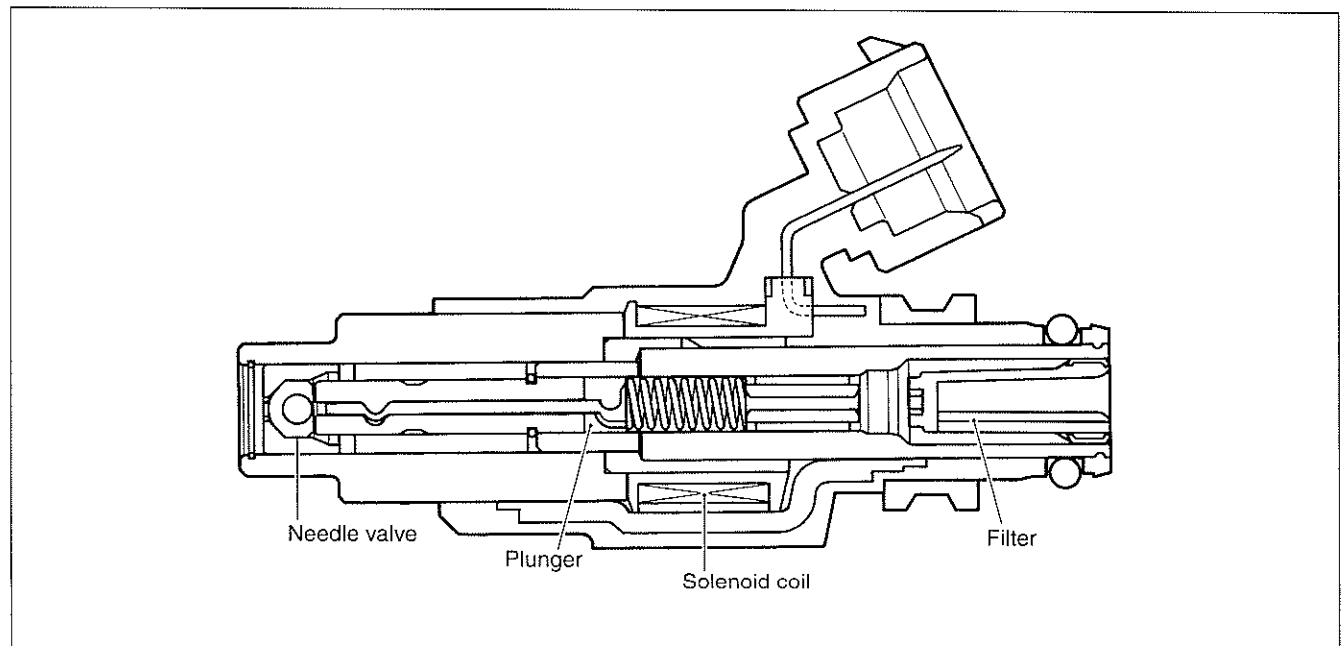


FUEL INJECTOR

The fuel injector consists of the solenoid coil, plunger, needle valve and filter.

It is an electromagnetic type injection nozzle which injects fuel in the throttle body according to the signal from the ECM.

When the solenoid coil of the injector is energized by the ECM, it becomes an electromagnet and attracts the plunger. At the same time, the needle valve incorporated with the plunger opens and the injector which is under the fuel pressure injects fuel in conic dispersion. As the lift stroke of the needle valve of the injector is set constant, the volume of the fuel injected at one time is determined by the length of time during which the solenoid coil is energized (injection time).



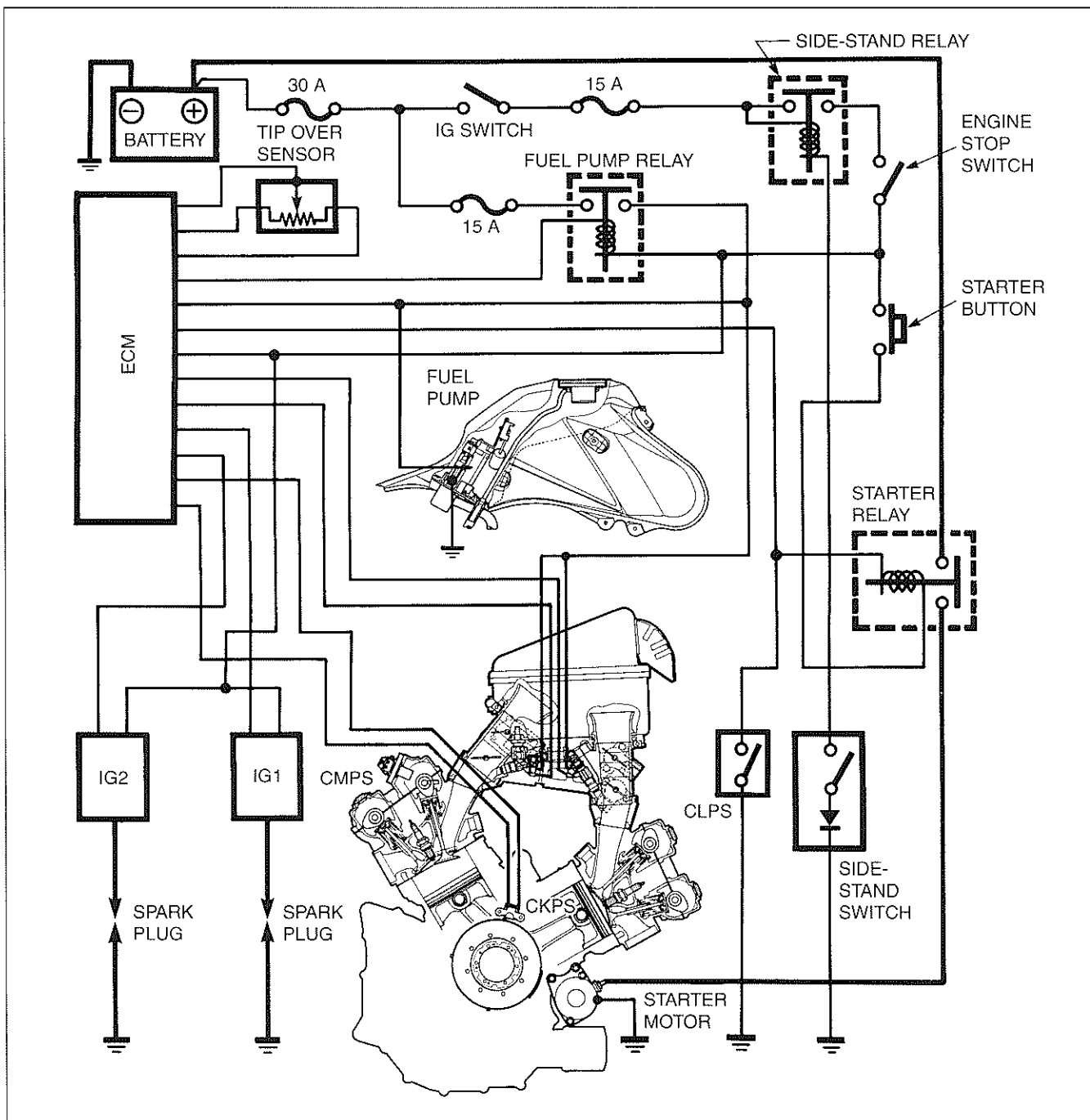
FUEL PUMP CONTROL SYSTEM

When the ignition switch is turned on, current from the battery flows to the fuel pump motor through the side-stand relay and the fuel pump relay causing the motor to turn.

Since the ECM has a timer function, the fuel pump motor stops turning in three seconds after the switch has been turned on.

Thereafter, when the crankshaft is turned by the starter motor or the engine has been started, the engine revolving signal is input to the ECM. Then, current flows to the fuel pump motor from the battery through the side-stand relay and the fuel pump relay so that the pump continues to function.

A tip over sensor is provided in the fuel pump control circuit. By this provision, anytime the motorcycle tips over, the tip over sensor sends a signal to the ECM to turn off power to the fuel pump relay, causing the fuel pump motor to stop. At the same time, current to the fuel injectors as well as the ignition coil is interrupted, which then stops the engine.



ECM (FI CONTROL UNIT)

The ECM is located under the seat.

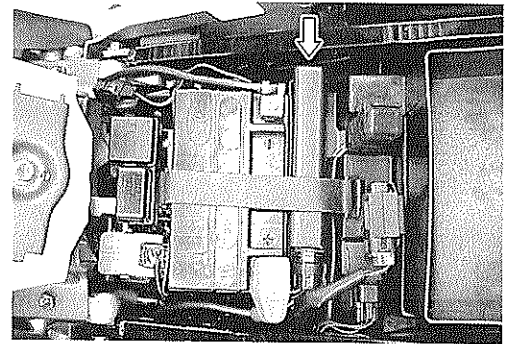
The ECM consists of CPU (Central Processing Unit), memory (ROM) and I/O (Input/Output) sections. The signal from each sensor is sent to the input section and then sent to CPU. On the basis of signal information received, CPU calculates the volume of fuel necessary for injection using maps programmed for varying engine conditions. Then, the operation signal of the fuel injection is sent from the output section to the fuel injector.

The eight kinds of independent program maps are programmed in the ROM.

These eight kinds of maps are designed to compensate for differences of the intake/exhaust systems and cooling performance.

LIGHT LOAD: When the engine is running in a light load, the fuel injected volume (time) is determined on basis of the intake air pressure and engine speed.

HEAVY LOAD: When the engine is running in a heavy load, the fuel injected volume (time) is determined on the basis of the throttle valve opening and engine speed.



INJECTION TIMING

The system employs a sequential, front-and-rear-cylinder independent injection type, using the crankshaft position sensor (signal generator) to determine the piston position (injection timing and ignition timing) and the camshaft position sensor to identify the cylinder during operation, and these information are sent to the ECM. This makes it possible to inject the optimum volume of fuel in the best timing for the engine operating conditions.

SENSORS

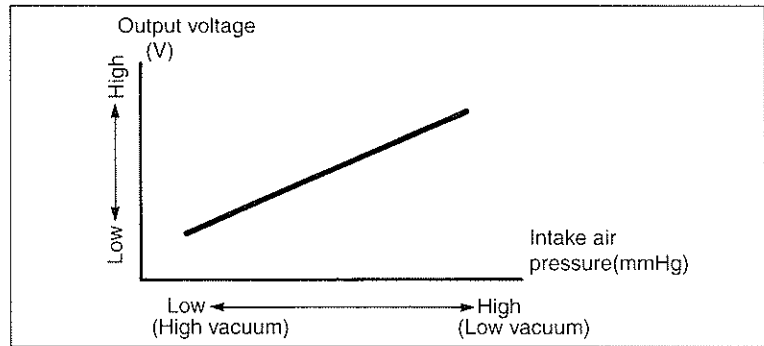
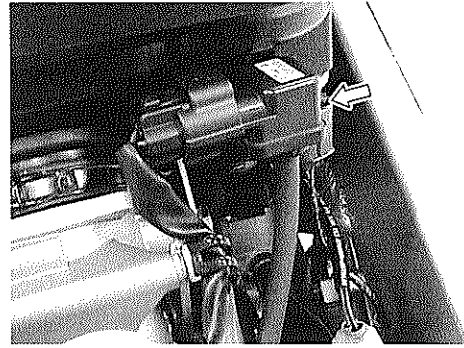
INTAKE AIR PRESSURE SENSOR (IAP SENSOR)

The intake air pressure sensor is located at the rear side of the air cleaner box and its vacuum hose is connected to the throttle body.

The sensor detects the intake air pressure, which is then converted into voltage signal and sent to the ECM.

The basic fuel injection time (volume) is determined according to the voltage signal (output voltage).

The voltage signal increases when the intake air pressure is high.



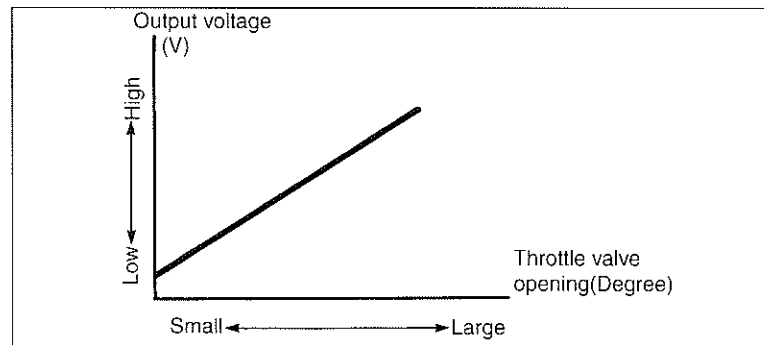
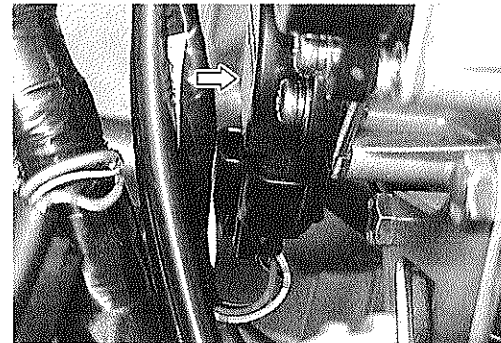
THROTTLE POSITION SENSOR (TP SENSOR)

The throttle position sensor is installed on the No.1 throttle body. The throttle position sensor is a kind of variable resistor which detects the throttle opening angle.

The battery voltage in the sensor is changed to the throttle position voltage which is then sent to the ECM.

The basic fuel injection time (volume) is determined according to the voltage signal (output voltage).

The voltage signal increases as the throttle is opened wider.



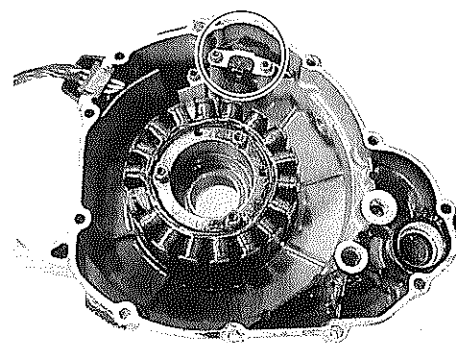
CRANKSHAFT POSITION SENSOR (CKP SENSOR)

The signal rotor is mounted on the left end of the crankshaft, and the crankshaft position sensor (Pick-up coil) is installed in the generator cover.

The sensor generates the pick-up signal to be supplied to the ECM.

The ECM calculates and decides both the fuel injection timing and ignition timing.

The injection volume increases when the engine rpm is high.

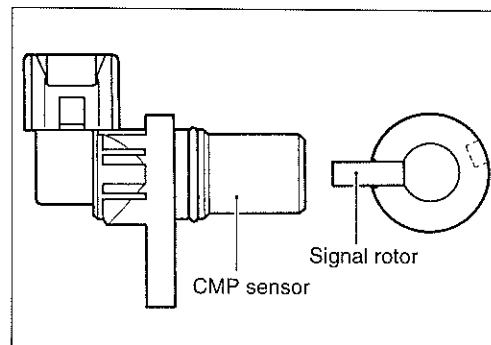
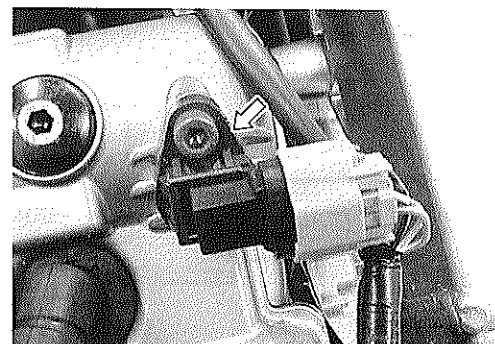


CAMSHAFT POSITION SENSOR (CMP SENSOR)

The signal rotor is installed on the No.2 intake camshaft, and the camshaft position sensor (Pick-up coil) is installed on the No.2 cylinder head cover.

The sensor generates the pick-up signal to be supplied to the ECM.

The ECM calculates and decides the cylinder identity and sequential injection timing.

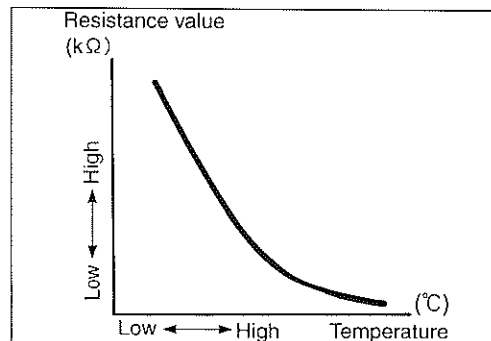
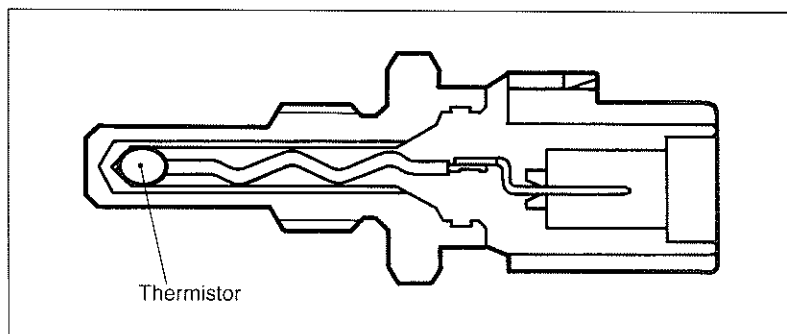
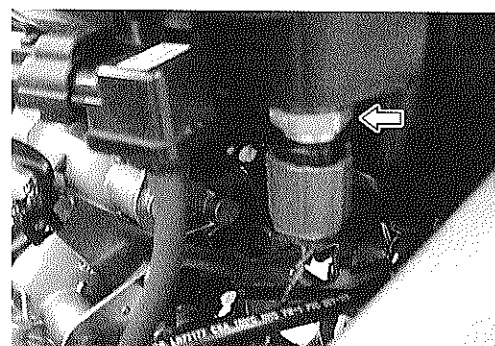


INTAKE AIR TEMPERATURE SENSOR (IAT SENSOR)

The intake air temperature sensor is installed at the rear side of the air cleaner box.

The sensor detects the intake air temperature in thermistor resistance value. With this resistance value converted to voltage signal, the signal is sent to the ECM. The injection volume increases as intake air temperature decreases.

The thermistor resistance value increases when the intake air temperature is low, and decreases when the intake air temperature is high.

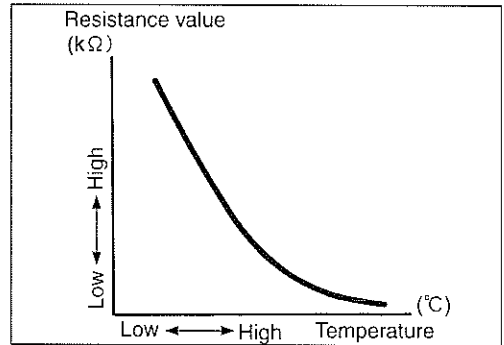
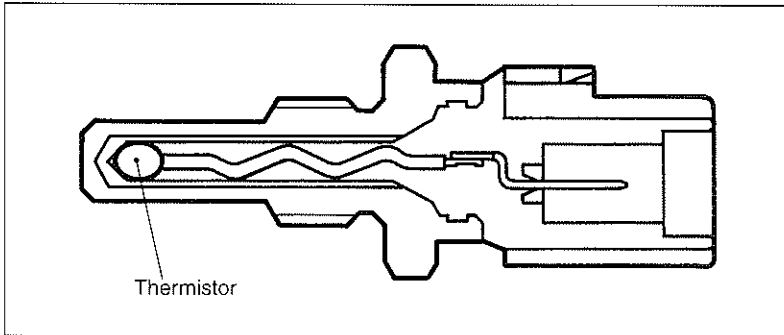
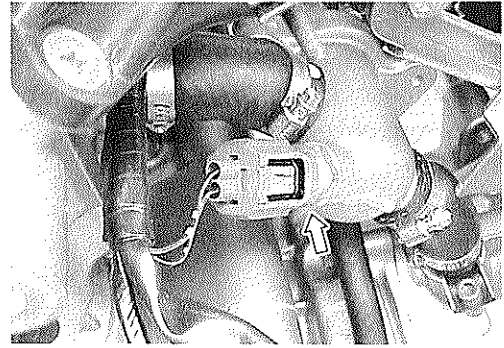


ENGINE COOLANT TEMPERATURE SENSOR (ECT SENSOR)

The engine coolant temperature sensor is installed at the thermostat case.

The sensor detects the engine oil temperature in thermistor resistance value, which is then converted to voltage signal and sent to the ECM. The injection volume increases as oil temperature decreases.

The thermistor resistance value increases when the engine oil temperature is low, and decreases when the engine oil temperature is high.

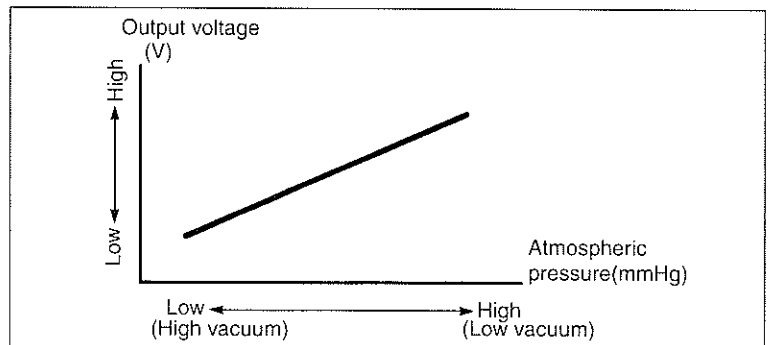


ATMOSPHERIC PRESSURE SENSOR (AP SENSOR)

The atmospheric pressure sensor is located under the seat.

The sensor detects the atmospheric pressure. The detected pressure is converted into voltage signal and sent to the ECM. The injection time (volume) is controlled according to the voltage signal (output voltage).

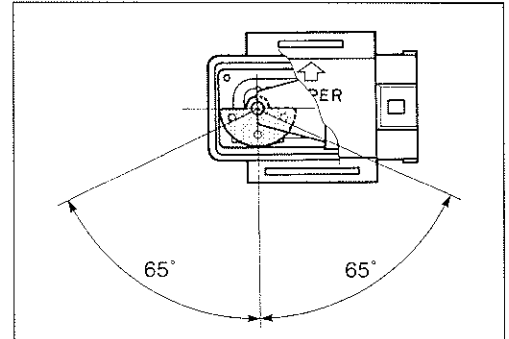
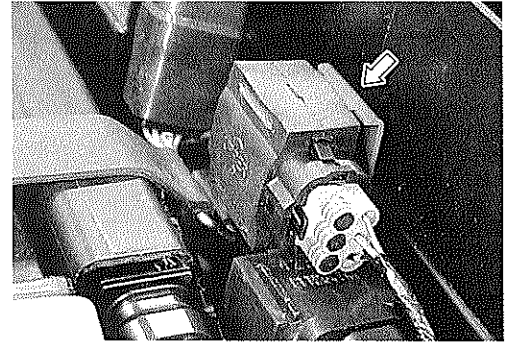
The voltage signal increases as the atmospheric pressure rises.



TIP OVER SENSOR (TO SENSOR)

The tip over sensor is located above the AP sensor.

The sensor detects the leaning of the motorcycle. When it leans more than 65° , the mechanical switch turns ON and a signal is sent to the ECM. At the same time, this signal cuts OFF current supply to the fuel pump, fuel injectors and ignition coils.



SECONDARY THROTTLE POSITION SENSOR (STP SENSOR)

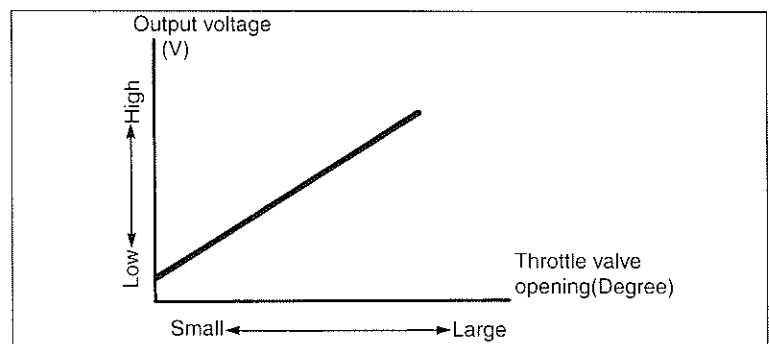
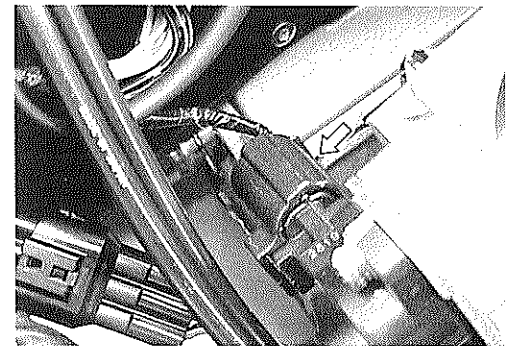
The secondary throttle position sensor is installed on the No.1 throttle body.

The secondary throttle position sensor is a kind of variable resistor which detects the secondary throttle opening angle.

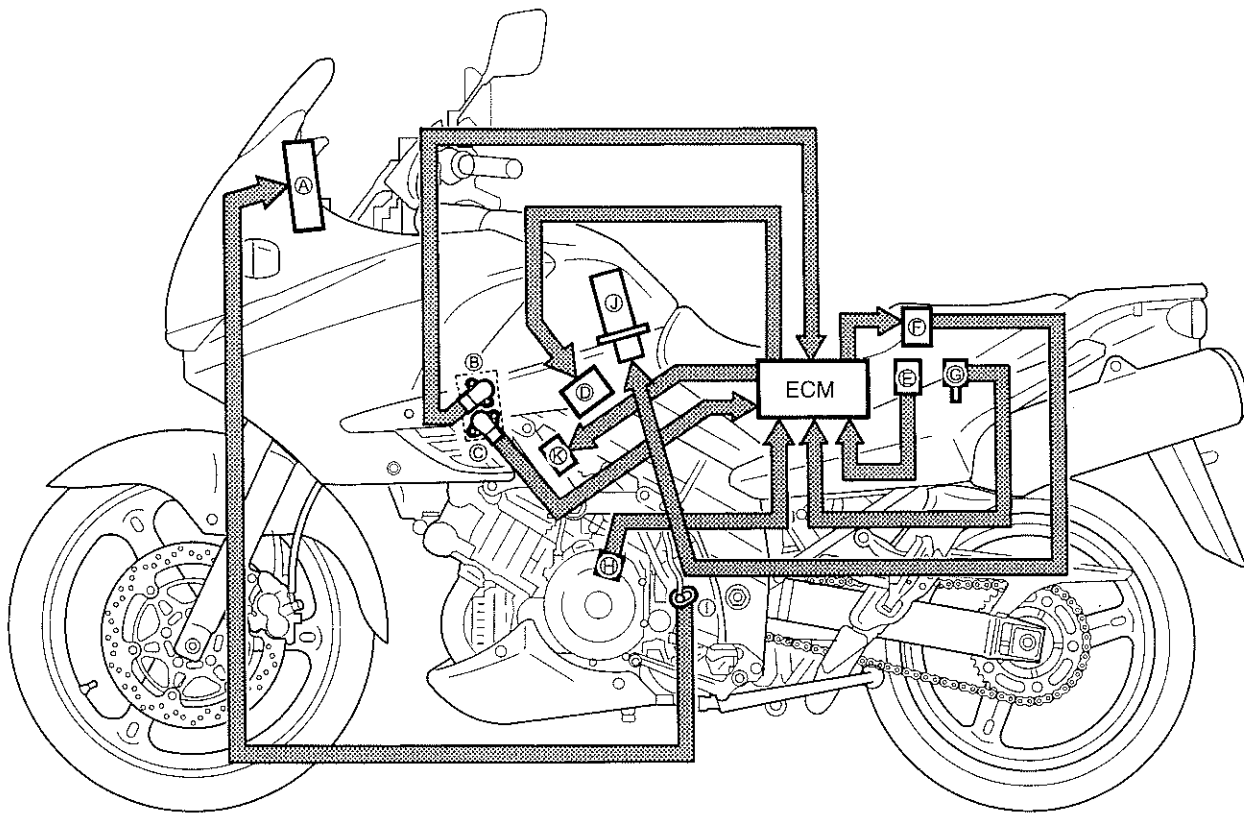
The STP sensor detects the STV actuator movement by the voltage signal which is then sent to the ECM.

The ECM determines the ST valve angle based on the operation map.

The voltage signal increases as the secondary throttle is opened wider.

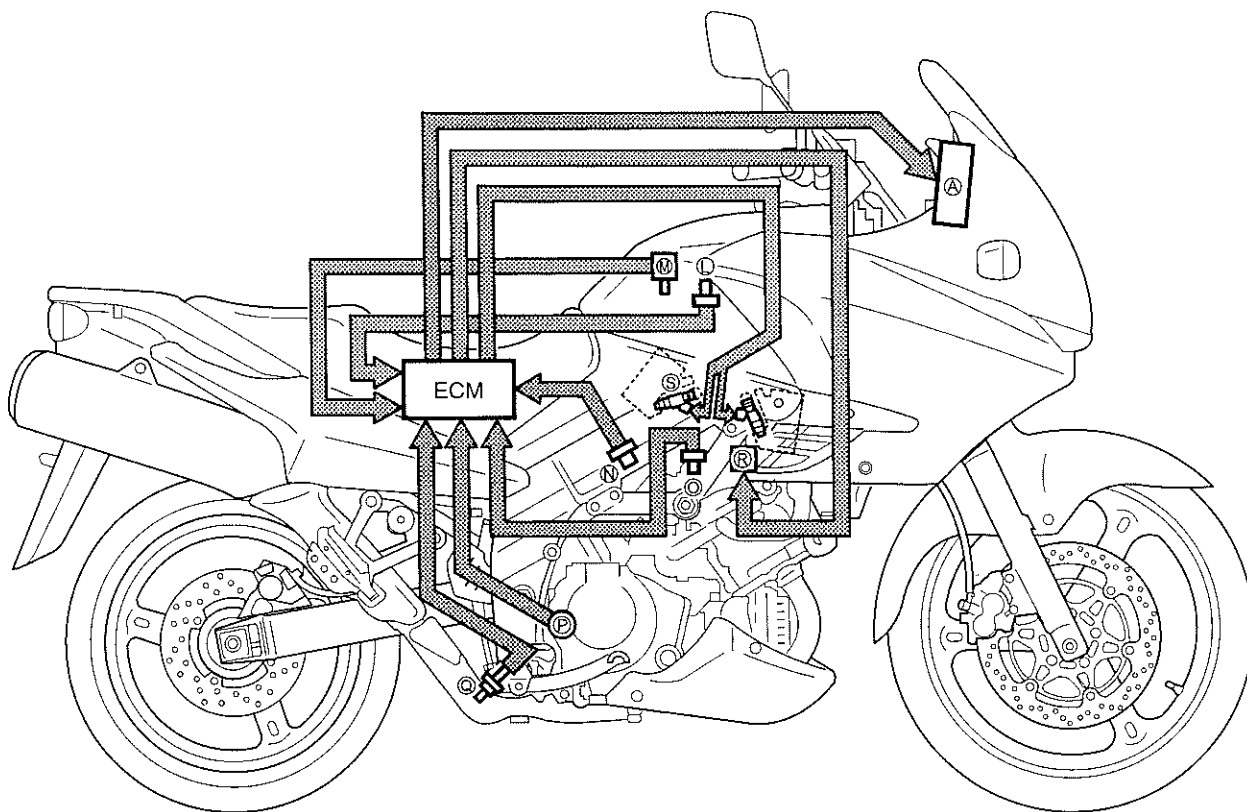


FI SYSTEM PARTS LOCATION



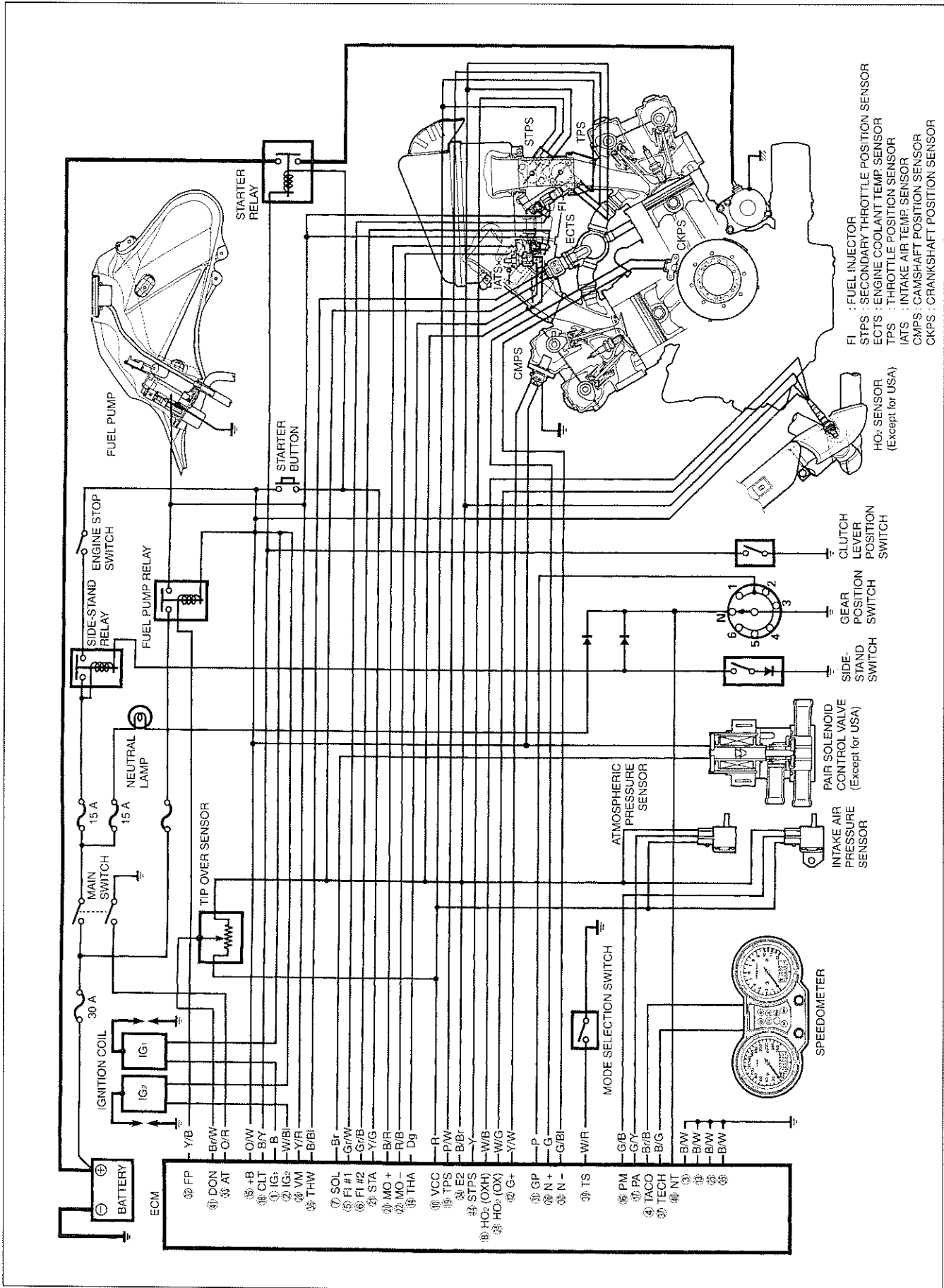
- Ⓐ Speedometer
- Ⓑ Secondary throttle position sensor (STPS)
- Ⓒ Throttle position sensor (TPS)
- Ⓓ Secondary throttle valve actuator (STVA)
- Ⓔ Tip over sensor (TOS)
- Ⓕ Fuel pump relay (FP RELAY)

- Ⓖ Atmospheric pressure sensor (APS)
- Ⓗ Crankshaft position sensor (CKPS)
- Ⓘ Speed sensor
- ⓵ Fuel pump (FP)
- Ⓚ Ignition coil (IG COIL)



- | | |
|--|--|
| Ⓛ Intake air temperature sensor (IATS) | Ⓟ Gear position switch |
| Ⓜ Intake air pressure sensor (IAPS) | Ⓠ Heated oxygen sensor (HO ₂ S) |
| Ⓝ Camshaft position sensor (CMPS) | Ⓡ PAIR solenoid valve |
| Ⓞ Engine coolant temperature sensor (ECTS) | Ⓢ Fuel injector (FI) |

FI SYSTEM WIRING DIAGRAM



SELF-DIAGNOSIS FUNCTION

The self-diagnosis function is incorporated in the ECM. The function has two modes, "User mode" and "Dealer mode". The user can only be notified by the LCD (DISPLAY) panel and LED (FI light). To check the function of the individual FI system devices, the dealer mode is prepared. In this check, the special tool is necessary to read the code of the malfunction items.

USER MODE

MALFUNCTION	LCD (DISPLAY) INDICATION	FI LIGHT INDICATION	INDICATION MODE
"NO"	Odometer	—	—
"YES"	Odometer and "FI" letters	FI light turns ON.	Each 2 sec. Odometer or "FI" is indicated.
	Engine can start *1		
Engine can not start	"FI" letters *2	FI light turns ON and blinks.	"FI" is indicated continuously.

*1

When one of the signals is not received by ECM, the fail-safe circuit works and injection is not stopped. In this case, "FI" and odometer are indicated in the LCD panel and motorcycle can run.

*2

The injection signal is stopped, when the crankshaft position sensor signal, tip over sensor signal, #1/#2 ignition signals, #1/#2 injector signals, fuel pump relay signal or ignition switch signal is not sent to ECM. In this case, "FI" is indicated in the LCD panel. Motorcycle does not run.

"CHEC": The LCD panel indicates "CHEC" when no communication signal from the ECM is received for 3 seconds.

For Example:

The ignition switch is turned ON, and the engine stop switch is turned OFF. In this case, the speedometer does not receive any signal from the ECM, and the panel indicates "CHEC".

If CHEC is indicated, the LCD does not indicate the trouble code. It is necessary to check the wiring harness between ECM and speedometer couplers.

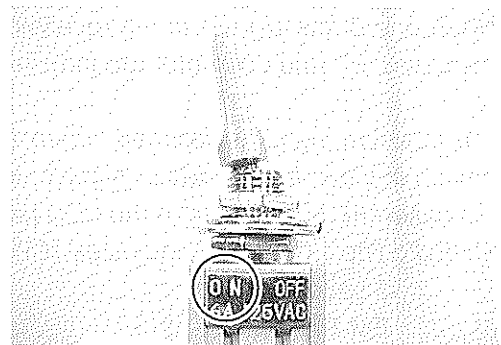
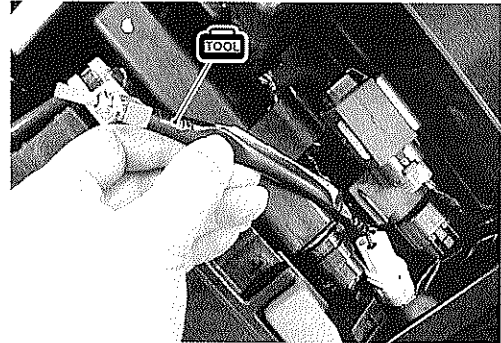
The possible cause of this indication is as follows;

Engine stop switch is in OFF position. Side-stand/ignition inter-lock system is not working. Ignition fuse is burnt.

DEALER MODE

The defective function is memorized in the computer. Use the special tool's coupler to connect to the dealer mode coupler. The memorized malfunction code is displayed on LCD (DISPLAY) panel. Malfunction means that the ECM does not receive signal from the devices. These affected devices are indicated in the code form.

 **09930-82710: Mode select switch**



CAUTION

Before checking the malfunction code, do not disconnect the ECM lead wire couplers. If the couplers from the ECM are disconnected, the malfunction code memory is erased and the malfunction code can not be checked.

MALFUNCTION	LCD (DISPLAY) INDICATION	FI LIGHT INDICATION	INDICATION MODE
"NO"	C00	FI light turns OFF.	—
"YES"	C** code is indicated from small numeral to large one.		For each 2 sec., code is indicated.

CODE	MALFUNCTION PART	REMARKS	
C00	None	No defective part	
C11	Camshaft position sensor (CMPS)	Pick-up coil signal, signal generator	
C12	Crankshaft position sensor (CKPS)		
C13	Intake air pressure sensor (IAPS)		
C14	Throttle position sensor (TPS)		
C15	Engine coolant temp. sensor (ECTS)		
C21	Intake air temp. 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
C28	Secondary throttle valve actuator (STVA)		*3
C29	Secondary throttle position sensor (STPS)		
C31	Gear position signal (GP switch)		
C32	Injector signal #1 (FI #1)		For #1 cylinder
C33	Injector signal #2 (FI #2)		For #2 cylinder
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 (HO ₂ S)		


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

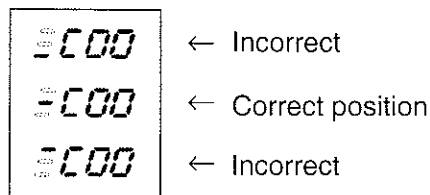
*3

When the secondary throttle valve actuator and secondary throttle position sensor signals are not sent to ECM, C29 is indicated.

TPS ADJUSTMENT

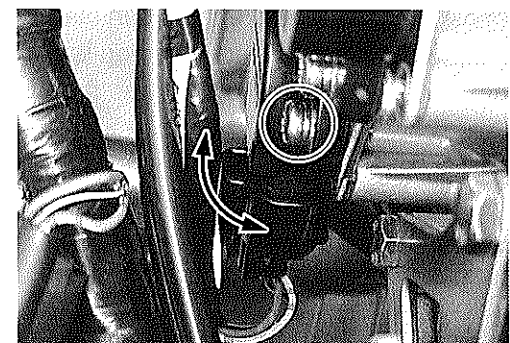
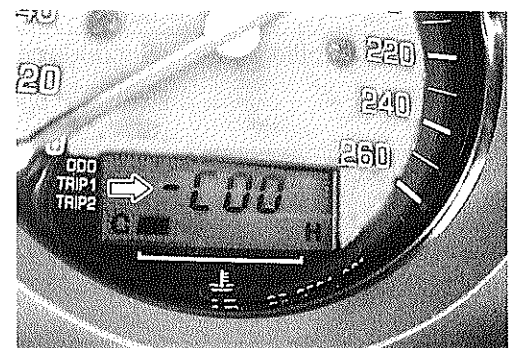
1. Adjust the engine rpm to 1 200 ± 100 rpm. (MF2-15)
2. Stop the engine and connect the special tool (Mode select switch) to the dealer mode coupler at the wiring harness.
3. If the throttle position sensor adjustment is necessary, loosen the screws and turn the throttle position sensor and bring the line to middle.
4. Then, tighten the screws to fix the throttle position sensor.

 09930-11950: Torx wrench



The LCD indicates 0.4 sec./time.

The correct position must be determined when the middle line is indicated twice or more, where the sensor should be fixed.



FAIL-SAFE FUNCTION

FI system is provided with fail-safe function to allow the engine to start and the motorcycle to run in a minimum performance necessary even under malfunction condition.

ITEM	FAIL-SAFE MODE	STARTING ABILITY	RUNNING ABILITY
Intake air pressure sensor	Intake air pressure is fixed to 760 mmHg.	"YES"	"YES"
Throttle position sensor	The throttle opening is fixed to full open position. Ignition timing is also fixed.	"YES"	"YES"
Engine coolant temperature sensor	Engine coolant temperature value is fixed to 80°C.	"YES"	"YES"
Intake air temperature sensor	Intake air temperature value is fixed to 40°C.	"YES"	"YES"
Atmospheric pressure sensor	Atmospheric pressure is fixed to 760 mmHg.	"YES"	"YES"
Ignition signal	#1 #1 Ignition-off	"YES"	"YES"
		#2 cylinder can run.	
	#2 #2 Ignition-off	"YES"	"YES"
		#1 cylinder can run.	
Injection signal	#1 #1 Fuel-cut	"YES"	"YES"
		#2 cylinder can run.	
	#2 #2 Fuel-cut	"YES"	"YES"
		#1 cylinder can run.	
Secondary throttle valve actuator	Secondary throttle valve is fixed to half open position.	"YES"	"YES"
Secondary throttle position sensor	Secondary throttle valve is fixed to half open position.	"YES"	"YES"
Gear position signal	Gear position signal is fixed to 6th gear.	"YES"	"YES"
Heated oxygen sensor (Except for USA)	Fuel-air compensation ratio is fixed to normal condition.	"YES"	"YES"

"Yes" means that the engine can start and can run even if the above signal is not received from each sensor. But, the engine running condition is not complete, providing only emergency help (by fail-safe circuit). In this case, it is necessary to bring the motorcycle to the workshop for complete repair.

FI SYSTEM TROUBLESHOOTING

CUSTOMER COMPLAINT ANALYSIS

Record details of the problem (failure, complaint) and how it occurred as described by the customer. For this purpose, use of such an inspection form will facilitate collecting information to the point required for proper analysis and diagnosis.

EXAMPLE: CUSTOMER PROBLEM INSPECTION FORM

User name:	Model:	VIN:	
Date of issue:	Date Reg.	Date of problem:	Mileage:

Malfunction indicator lamp condition (LED)	<input type="checkbox"/> Always ON <input type="checkbox"/> Sometimes ON <input type="checkbox"/> Always OFF <input type="checkbox"/> Good condition
Malfunction display/code (LCD)	User mode: <input type="checkbox"/> No display <input type="checkbox"/> Malfunction display ()
	Dealer mode: <input type="checkbox"/> No code <input type="checkbox"/> Malfunction code ()

PROBLEM SYMPTOMS	
<input type="checkbox"/> Difficult Starting <input type="checkbox"/> No cranking <input type="checkbox"/> No initial combustion <input type="checkbox"/> No combustion <input type="checkbox"/> Poor starting at (<input type="checkbox"/> cold <input type="checkbox"/> warm <input type="checkbox"/> always) <input type="checkbox"/> Other _____	<input type="checkbox"/> Poor Driveability <input type="checkbox"/> Hesitation on acceleration <input type="checkbox"/> Back fire/ <input type="checkbox"/> After fire <input type="checkbox"/> Lack of power <input type="checkbox"/> Surging <input type="checkbox"/> Abnormal knocking <input type="checkbox"/> Other _____
<input type="checkbox"/> Poor Idling <input type="checkbox"/> Poor fast Idle <input type="checkbox"/> Abnormal idling speed (<input type="checkbox"/> High <input type="checkbox"/> Low) (r/min) <input type="checkbox"/> Unstable <input type="checkbox"/> Hunting (r/min. to r/min) <input type="checkbox"/> Other _____	<input type="checkbox"/> Engine Stall when <input type="checkbox"/> Immediately after start <input type="checkbox"/> Throttle valve is opened <input type="checkbox"/> Throttle valve is closed <input type="checkbox"/> Load is applied <input type="checkbox"/> Other _____
<input type="checkbox"/> OTHERS:	

MOTORCYCLE/ENVIRONMENTAL CONDITION WHEN PROBLEM OCCURS	
Environmental condition	
Weather	<input type="checkbox"/> Fair <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain <input type="checkbox"/> Snow <input type="checkbox"/> Always <input type="checkbox"/> Other
Temperature	<input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (°F/ °C) <input type="checkbox"/> Always
Frequency	<input type="checkbox"/> Always <input type="checkbox"/> Sometimes (times/ day, month) <input type="checkbox"/> Only once <input type="checkbox"/> Under certain condition
Road	<input type="checkbox"/> Urban <input type="checkbox"/> Suburb <input type="checkbox"/> Highway <input type="checkbox"/> Mountainous (<input type="checkbox"/> Uphill <input type="checkbox"/> Downhill) <input type="checkbox"/> Tarmacadam <input type="checkbox"/> Gravel <input type="checkbox"/> Other
Motorcycle condition	
Engine condition	<input type="checkbox"/> Cold <input type="checkbox"/> Warming up phase <input type="checkbox"/> Warmed up <input type="checkbox"/> Always <input type="checkbox"/> Other at starting <input type="checkbox"/> Immediately after start <input type="checkbox"/> Racing without load <input type="checkbox"/> Engine speed (r/min)
Motorcycle condition	During driving: <input type="checkbox"/> Constant speed <input type="checkbox"/> Accelerating <input type="checkbox"/> Decelerating <input type="checkbox"/> Right hand corner <input type="checkbox"/> Left hand corner <input type="checkbox"/> When shifting (Gear position) <input type="checkbox"/> At stop <input type="checkbox"/> Motorcycle speed when problem occurs (km/h, Mile/h) <input type="checkbox"/> Other _____

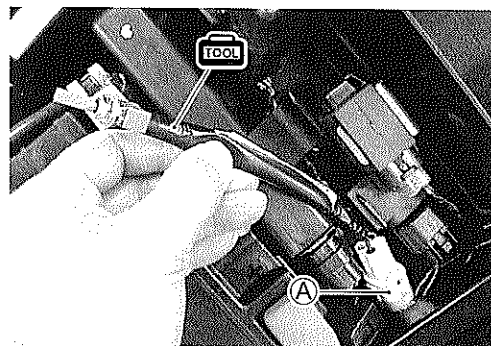
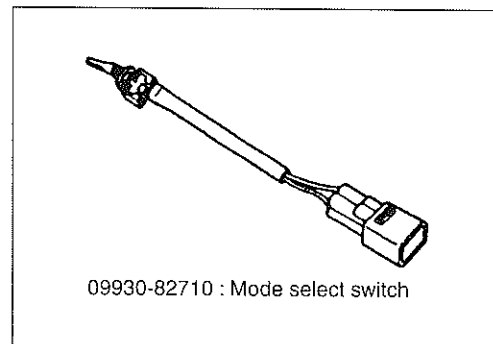
NOTE:

The above form is a standard sample. It should be modified according to conditions characteristic of each market.

SELF-DIAGNOSTIC PROCEDURES

- Don't disconnect couplers from ECM, battery cable from battery, ECM ground wire harness from engine or main fuse before confirming malfunction code (self-diagnostic trouble code) stored in memory. Such disconnection will erase memorized information in ECM memory.
- Malfunction code stored in ECM memory can be checked by the special tool.
- Before checking malfunction code, read SELF-DIAGNOSIS FUNCTION "USER MODE and DEALER MODE" (☞ 4-23, -24 and -25) carefully to have good understanding as to what functions are available and how to use it.
- Be sure to read "PRECAUTIONS for Electrical Circuit Service" (☞ 4-5) before inspection and observe what is written there.
- Remove the seat.
- Connect the special tool to the dealer mode coupler (A) at the wiring harness, and start the engine or crank the engine for more than 4 seconds.
- Turn the special tool's switch ON and check the malfunction code to determine the malfunction part.

 **09930-82710: Mode select switch**



SELF-DIAGNOSIS RESET PROCEDURE

- After repairing the trouble, turn OFF the ignition switch and turn ON again.
- If the malfunction code indicates (C00), the malfunction is cleared.
- Disconnect the special tool from the dealer mode coupler.



MALFUNCTION CODE AND DEFECTIVE CONDITION

MALFUNCTION CODE	DETECTED ITEM	DETECTED FAILURE CONDITION CHECK FOR
C00	NO FAULT	
C11	Camshaft position sensor	The signal does not reach ECM for more than 3 sec. after receiving the starter signal. The camshaft position sensor wiring and mechanical parts. (Camshaft position sensor, intake cam pin, wiring/coupler connection)
C12	Crankshaft position sensor	The signal does not reach ECM for more than 3 sec. after receiving the starter signal. The crankshaft position sensor wiring and mechanical parts. (Crankshaft position sensor, wiring/coupler connection)
C13	Intake air pressure sensor	The sensor should produce following voltage. ($0.10 \text{ V} \leq \text{sensor voltage} < 4.80 \text{ V}$) Without the above range, C13 is indicated. Intake air pressure sensor, wiring/coupler connection.
C14	Throttle position sensor	The sensor should produce following voltage. ($0.10 \text{ V} \leq \text{sensor voltage} < 4.80 \text{ V}$) Without the above range, C14 is indicated. Throttle position sensor, wiring/coupler connection.
C15	Engine coolant temperature sensor	The sensor voltage should be the following. ($0.10 \text{ V} \leq \text{sensor voltage} < 4.60 \text{ V}$) Without the above range, C15 is indicated. Engine coolant temperature sensor, wiring/coupler connection.
C21	Intake air temperature sensor	The sensor voltage should be the following. ($0.10 \text{ V} \leq \text{sensor voltage} < 4.60 \text{ V}$) Without the above range, C21 is indicated. Intake air temperature sensor, wiring/coupler connection.
C22	Atmospheric pressure sensor	The sensor voltage should be the following. ($0.10 \text{ V} \leq \text{sensor voltage} < 4.80 \text{ V}$) Without the above range, C22 is indicated. Atm. pressure sensor, wiring/coupler connection.
C23	Tip over sensor	The sensor voltage should be less than the following for more than 4 sec. after ignition switch turns ON. ($0.20 \text{ V} \leq \text{sensor voltage} < 4.60 \text{ V}$) Without the above value, C23 is indicated. Tip over sensor, wiring/coupler connection.
C24 or C25	Ignition signal	Crankshaft position sensor (pick-up coil) signal is produced but signal from ignition coil is interrupted continuous by two times or more. In this case, the code C24 or C25 is indicated. Ignition coil, wiring/coupler connection, power supply from the battery.

C28	Secondary throttle valve actuator	When no actuator control signal is supplied from the ECM or communication signal does not reach ECM or operation voltage does not reach STVA motor, C28 is indicated. STVA can not operate. STVA lead wire/coupler.
C29	Secondary throttle position sensor	The sensor should produce following voltage. ($0.10 \text{ V} \leq \text{sensor voltage} < 4.80 \text{ V}$) Without the above range, C29 is indicated. Secondary throttle position sensor, wiring/coupler connection.
C31	Gear position signal	Gear position signal voltage should be higher than the following for more than 4 seconds. (Gear position switch voltage $> 1.0 \text{ V}$) Without the above value, C31 is indicated. Gear position sensor, wiring/coupler connection. Gearshift cam etc.
C32 or C33	Fuel injector signal	When fuel injection signal stops, the C32 or C33 is indicated. Injector, wiring/coupler connection, power supply to the injector.
C41	Fuel pump relay signal	When no signal is supplied from fuel pump relay, C41 is indicated. Fuel pump relay, connecting lead, power source to fuel pump relay.
C42	Ignition switch signal	Ignition switch signal is not input in the ECM. Ignition switch, lead wire/coupler.
C44 (Except for USA)	Heated oxygen sensor (HO ₂ S)	The sensor voltage should be less than the following after warming up condition. (Sensor voltage $< 0.4 \text{ V}$) Without the above value, C44 is indicated. Heater operation voltage does not reach in the oxygen heater circuit, C44 in indicated. The Heater can not operate. HO ₂ S lead wire/coupler connection. Battery voltage supply to the HO ₂ S.

“C11” CMP SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
No CMP sensor signal for 3 seconds at engine cranking.	<ul style="list-style-type: none"> • Metal particles or foreign material being attached on the CMP sensor and rotor tip. • CMP sensor circuit open or short. • CMP sensor malfunction. • ECM malfunction.

INSPECTION

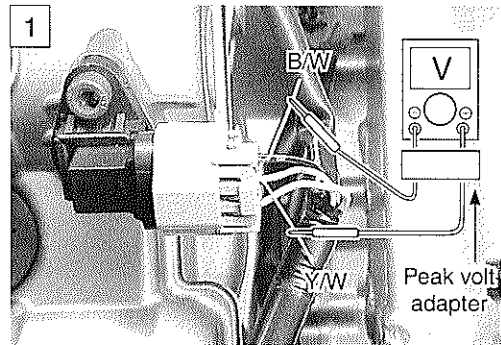
- Lift and support the fuel tank with its prop stay. (☞ 4-51)

1 Check the CMP sensor coupler for loose or poor contacts. If OK, then measure the CMP sensor peak voltage. Insert the copper wires to the CMP sensor coupler and crank the engine a few seconds or start the engine, and measure the peak voltage.

DATA CMP sensor peak voltage: More than 3.7 V
(⊕Y/W – ⊖B/W)

TOOL 09900-25008: Multi circuit tester

Tester knob indication: Voltage (---)



No → Replace the CMP sensor with a new one.

Yes ↓

2 Remove the CMP sensor. If the metal particles or foreign material is attached on the CMP sensor and rotor tip, signal not flow correctly to the ECM. Clean the CMP sensor and rotor tip with a spray-type carburetor cleaner and blow dry with compressed air and also change the engine oil if necessary.

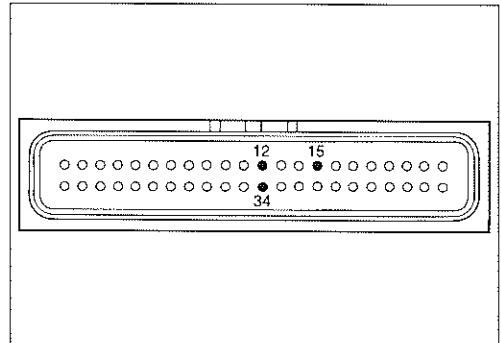
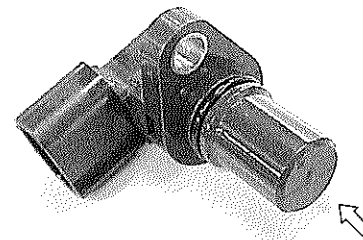
No → Loose or poor contacts on the CMP sensor coupler or ECM coupler. Replace the CMP sensor with a new one.

Yes ↓

O/W, Y/W or B/W wire open or shorted to ground, or poor ⑫, ⑮ or ⑳ connection. (☞ 4-22)
If wire and connection are OK, intermittent trouble or faulty ECM.
Recheck each terminal and wire harness for open circuit and poor connection. (☞ 4-5)

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

2



“C12” CKP SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
No CKP sensor signal for 3 seconds at engine cranking.	<ul style="list-style-type: none"> • Metal particles or foreign material being attached on the CKP sensor and rotor tip. • CKP sensor circuit open or short. • CKP sensor malfunction. • ECM malfunction.

INSPECTION

- Remove the left frame cover. (☞ 6-5)

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

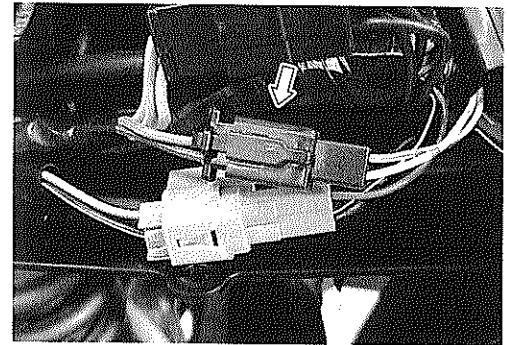
DATA CKP sensor resistance: 130 – 240 Ω
 (Blue – Green)

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

DATA CKP sensor continuity: ∞Ω (Infinity)
 (Blue – Ground)
 (Green – Ground)

TOOL 09900-25008: Multi circuit tester

Tester knob indication: Resistance (Ω)



No → Replace the CKP sensor with a new one.
 Yes →

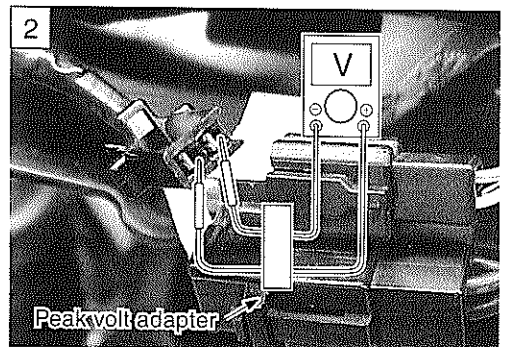
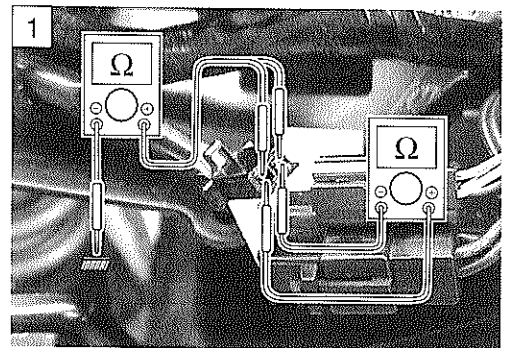
2 Disconnect the CKP sensor coupler.
 Crank the engine a few seconds with the starter motor,
 and measure the CKP sensor peak voltage at the coupler.

DATA CKP sensor peak voltage: More than 3.7 V
 (Blue – Green)

Repeat the above test procedure a few times and measure the highest peak voltage.
 If OK, then measure the CKP sensor peak voltage at the ECM terminals. (N+/N- or 26/30)

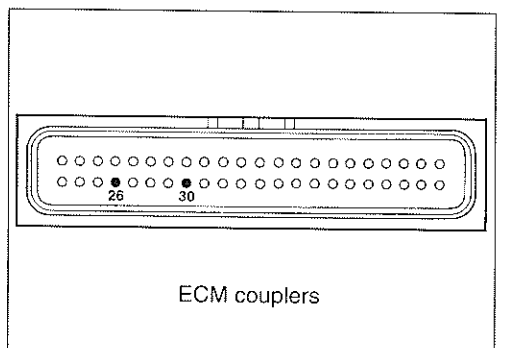
TOOL 09900-25008: Multi circuit tester

Tester knob indication: Voltage (V)



No → Loose or poor contacts on the CKP sensor coupler or ECM coupler.
 Clean the CKP sensor and rotor tips or replace the CKP sensor with a new one.
 Yes →

Blue or Green wire open or shorted to ground, or poor 26 or 30 connection. (☞ 4-22)
 If wire and connection are OK, intermittent trouble or faulty ECM.
 Recheck each terminal and wire harness for open circuit and poor connection. (☞ 4-5)



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

“C13” IAP SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
Low pressure and low voltage. High pressure and high voltage. ($0.10\text{ V} \leq \text{Sensor voltage} < 4.80\text{ V}$) without the above range. NOTE: Note that atmospheric pressure varies depending on weather conditions as well as altitude. Take that into consideration when inspecting voltage.	<ul style="list-style-type: none"> • Clogged vacuum passage between throttle body and IAP sensor. • Air being drawn from vacuum passage between throttle body and IAP sensor. • Red wire circuit open or shorted to ground. • B/Br or G/B wire circuit shorted to ground. • IAP sensor malfunction. • ECM malfunction.

INSPECTION

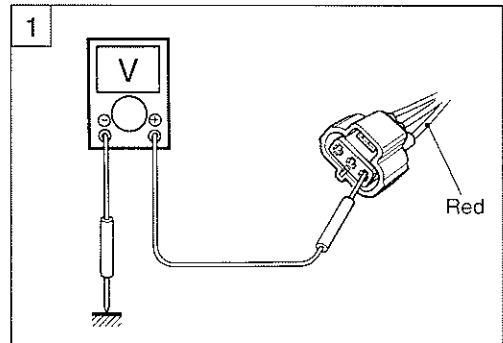
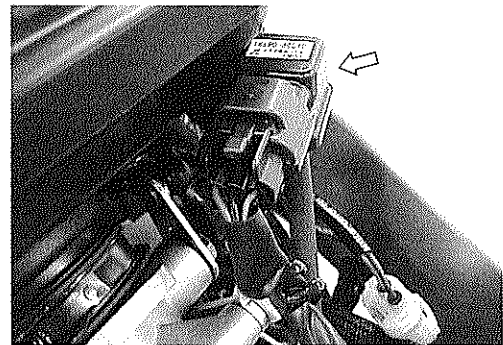
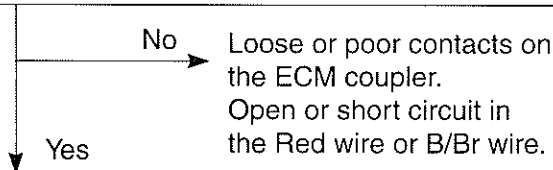
- Lift and support the fuel tank with its prop stay. (☞ 4-51)

1 Turn the ignition switch OFF.
 Check the IAP sensor coupler for loose or poor contacts.
 If OK, then measure the IAP sensor input voltage.
 Disconnect the IAP sensor coupler.
 Turn the ignition switch ON.
 Measure the voltage at the Red wire and ground.
 If OK, then measure the voltage at the Red wire and B/Br wire.

DATA IAP sensor input voltage: 4.5 – 5.5 V
 (⊕Red – ⊖Ground)
 (⊕Red – ⊖B/Br)

TOOL 09900-25008: Multi circuit tester

Tester knob indication: Voltage (V)

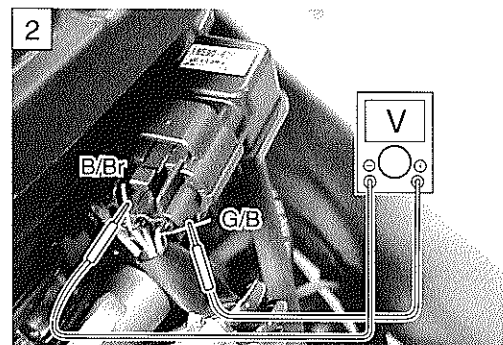
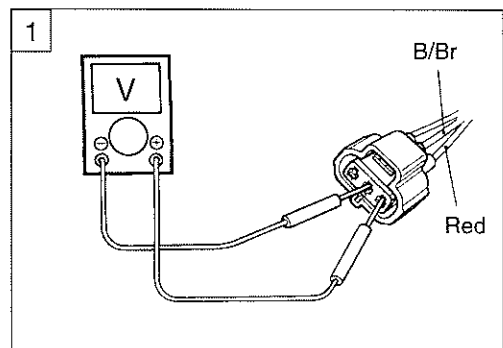
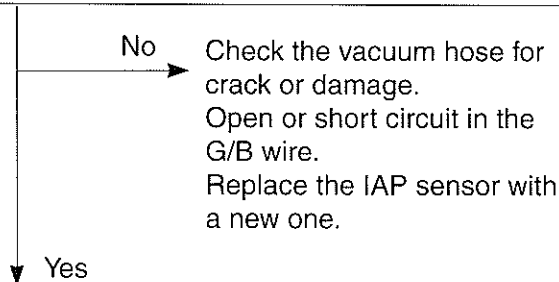


2 Connect the IAP sensor coupler.
 Insert the copper wires to the lead wire coupler.
 Start the engine at idling speed.
 Measure the IAP sensor output voltage at the wire side coupler (between G/B and B/Br wires).

DATA IAP sensor output voltage: Approx. 2.5 V at idle speed (⊕G/B – ⊖B/Br)

TOOL 09900-25008: Multi circuit tester

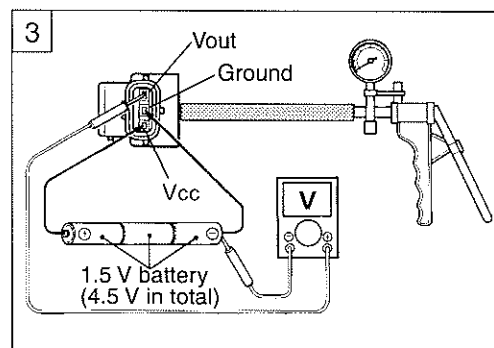
Tester knob indication: Voltage (V)



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.)

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

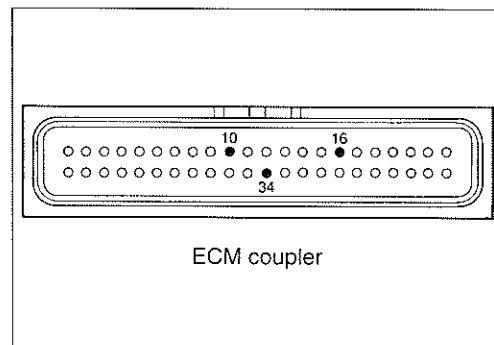
Tester knob indication: Voltage (---)



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

Yes

Red, G/B or B/Br wire open or shorted to ground, or poor ⑩, ⑯ or ⑳ connection. (☞ 4-22)
 If wire and connection are OK, intermittent trouble or faulty ECM.
 Recheck each terminal and wire harness for open circuit and poor connection. (☞ 4-5)



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

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	0	760	100	3.4 – 4.0
2 000	610	707	94	3.0 – 3.7
2 001	611	707	94	2.6 – 3.4
5 000	1 524	634	85	2.4 – 3.1
5 001	1 525	634	85	
8 000	2 438	567	76	
8 001	2 439	567	76	
10 000	3 048	526	70	

“C14” TP SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
Signal voltage low or high. Difference between actual throttle opening and opening calculated by ECM in larger than specified value. $(0.10 \text{ V} \leq \text{Sensor voltage} < 4.80 \text{ V})$ without the above range.	<ul style="list-style-type: none"> • TP sensor maladjusted. • TP sensor circuit open or short. • TP sensor malfunction. • ECM malfunction.

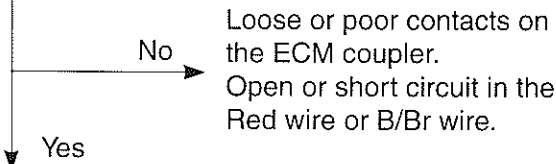
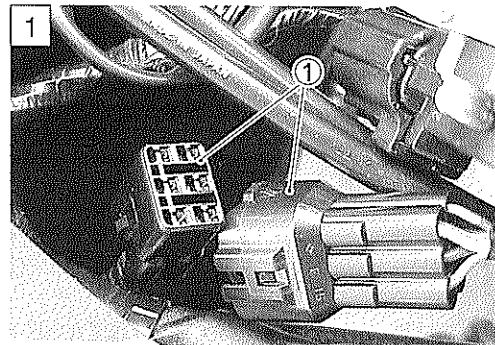
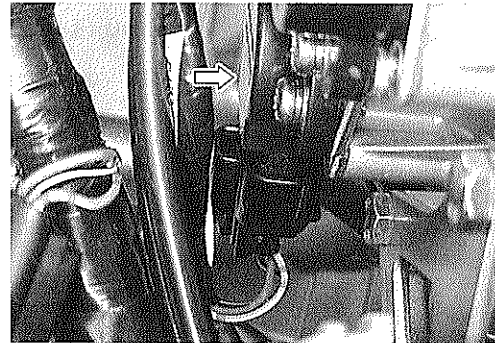
INSPECTION

- Remove the fuel tank and air cleaner box. (☞ 4-52 and -60)

1 Turn the ignition switch OFF.
 Check the TP sensor coupler for loose or poor contacts.
 If OK, then measure the TP sensor input voltage.
 Disconnect the TP sensor/injector coupler ①.
 Turn the ignition switch ON.
 Measure the voltage at the Red wire and ground.
 If OK, then measure the voltage at the Red wire and B/Br wire.

DATA TP sensor input voltage: 4.5 – 5.5 V
 (⊕Red – ⊖Ground)
 (⊕Red – ⊖B/Br)

TOOL 09900-25008: Multi circuit tester
Tester knob indication: Voltage (-)



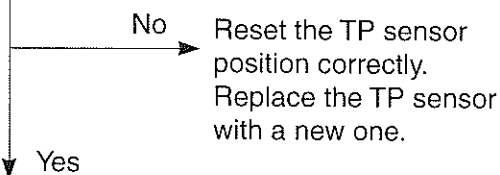
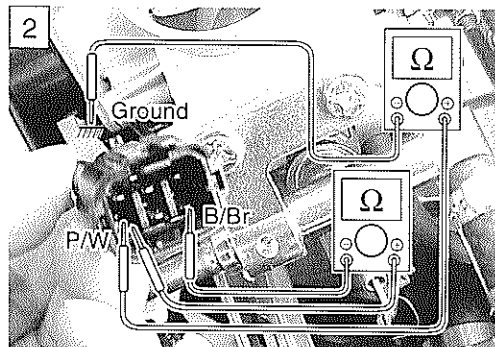
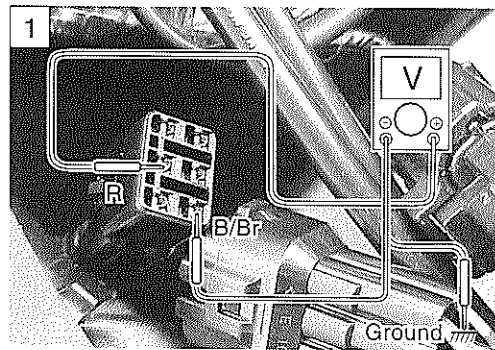
2 Turn the ignition switch OFF.
 Disconnect the TP sensor/injector coupler.
 Check the continuity between P/W wire and ground.

DATA TP sensor continuity: $\infty \Omega$ (Infinity)
 (P/W – Ground)

If OK, then measure the TP sensor resistance at the coupler (between P/W and B/Br wires).
 Turn the throttle grip and measure the resistance.

DATA TP sensor resistance
 Throttle valve is closed : Approx. 1.1 k Ω
 Throttle valve is opened: Approx. 4.3 k Ω

TOOL 09900-25008: Multi circuit tester
Tester knob indication: Resistance (Ω)

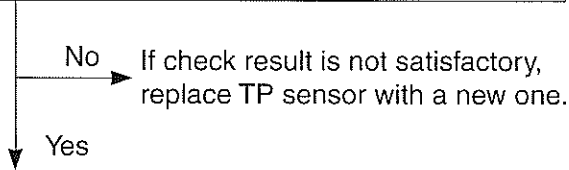
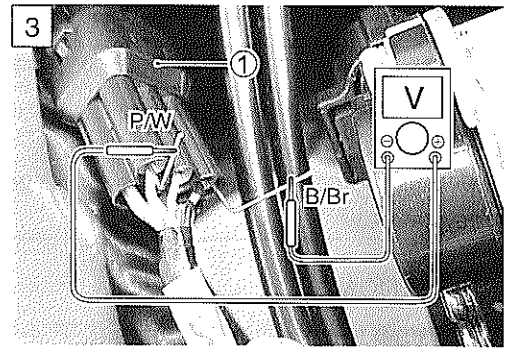


3 Connect the TP sensor/injector coupler ①.
 Insert the copper wires to the lead wire coupler.
 Turn the ignition switch ON.
 Measure the TP sensor output voltage at the coupler
 (between P/W and B/Br wires) by turning the throttle grip.

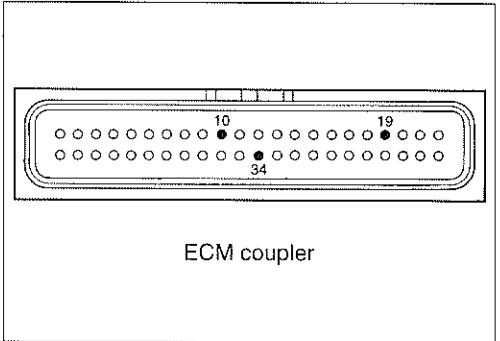
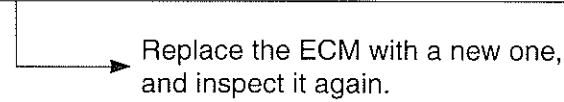
DATA TP sensor output voltage
 Throttle valve is closed : Approx. 1.1 V
 Throttle valve is opened: Approx. 4.3 V

TOOL 09900-25008: Multi circuit tester

V Tester knob indication: Voltage (---)



Red, P/W or B/Br wire open or shorted to ground, or poor ⑩,
 ⑱ or ⑳ connection. (↗ 4-22)
 If wire and connection are OK, intermittent trouble or faulty
 ECM.
 Recheck each terminal and wire harness for open circuit
 and poor connection. (↗ 4-5)



“C15” ECT SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
High engine coolant temp. (Low voltage – Low resistance)	<ul style="list-style-type: none"> • B/BI circuit shorted to ground. • B/Br circuit open.
Low engine coolant temp. (High voltage – High resistance)	<ul style="list-style-type: none"> • ECT sensor malfunction. • ECM malfunction.

INSPECTION

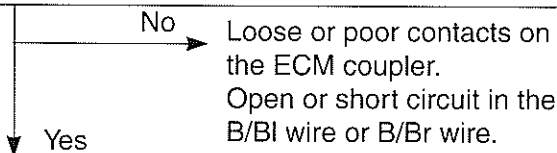
- Remove the vacuum damper. (☞ 4-61)

1 Turn the ignition switch OFF.
 Check the ECT sensor coupler for loose or poor contacts.
 If OK, then measure the ECT sensor voltage at the wire side coupler.
 Disconnect the coupler and turn the ignition switch ON.
 Measure the voltage between B/BI wire terminal and ground.
 If OK, then measure the voltage between B/BI wire terminal and B/Br wire terminal.

DATA ECT sensor voltage: 4.5 – 5.5 V
 (⊕ B/BI – ⊖ Ground)
 (⊕ B/BI – ⊖ B/Br)

TOOL 09900-25008: Multi circuit tester

Tester knob indication: Voltage (V)

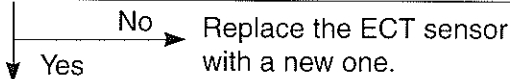


2 Turn the ignition switch OFF.
 Measure the ECT sensor resistance.
DATA ECT sensor resistance: 2.3 – 2.6 kΩ at 20°C (68°F)
 (Terminal - Terminal)

TOOL 09900-25008: Multi circuit tester

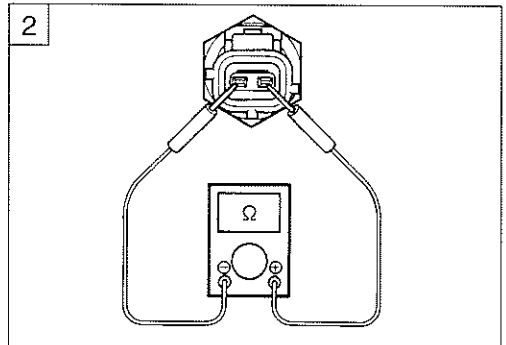
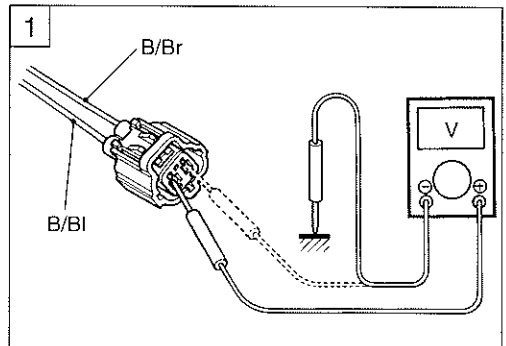
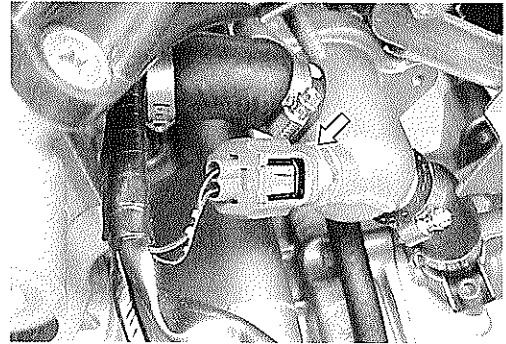
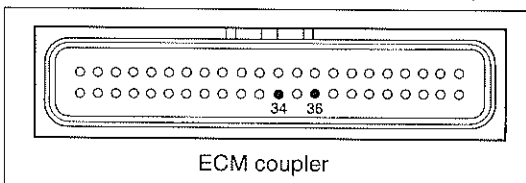
Tester knob indication: Resistance (Ω)

Refer to page 5-8 for details.



B/BI or B/Br wire open or shorted to ground, or poor ③④ or ③⑤ connection. (☞ 4-22)
 If wire and connection are OK, intermittent trouble or faulty ECM.
 Recheck each terminal and wire harness for open circuit and poor connection. (☞ 4-5)

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



Engine Coolant Temp.	Resistance
20°C (68 °F)	Approx. 2.45 kΩ
40°C (104 °F)	Approx. 1.148 kΩ
60°C (140 °F)	Approx. 0.587 kΩ
80°C (176 °F)	Approx. 0.322 kΩ

"C21" IAT SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
High intake air temp. (Low voltage – Low resistance)	<ul style="list-style-type: none"> Dg circuit shorted to ground. B/Br circuit open.
Low intake air temp. (High voltage – High resistance)	<ul style="list-style-type: none"> IAT sensor malfunction. ECM malfunction.

INSPECTION

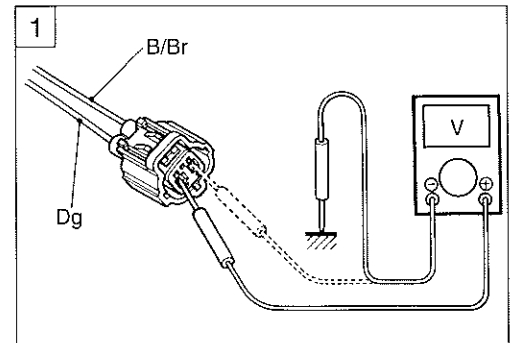
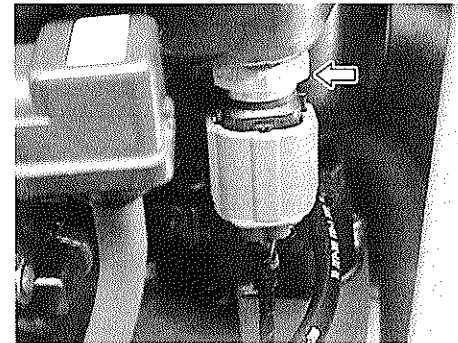
- Lift and support the fuel tank with its prop stay. (☞ 4-51)

1 Turn the ignition switch OFF.
 Check the IAT sensor coupler for loose or poor contacts.
 If OK, then measure the IAT sensor voltage at the wire side coupler.
 Disconnect the coupler and turn the ignition switch ON.
 Measure the voltage between Dg wire terminal and ground.
 If OK, then measure the voltage between Dg wire terminal and B/Br wire terminal.

DATA IAT sensor voltage: 4.5 – 5.5 V
 (+Dg – –Ground)
 (+Dg – –B/Br)

TOOL 09900-25008: Multi circuit tester

Tester knob indication: Voltage (V)



No → Loose or poor contacts on the ECM coupler.
 Open or short circuit in the Dg wire or B/Br wire.

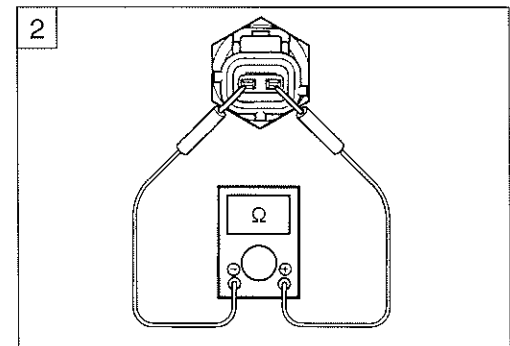
Yes →

2 Turn the ignition switch OFF.
 Measure the IAT sensor resistance.

DATA IAT sensor resistance: 2.3 – 2.6 kΩ at 20°C (68°F)
 (Terminal – Terminal)

TOOL 09900-25008: Multi circuit tester

Tester knob indication: Resistance (Ω)

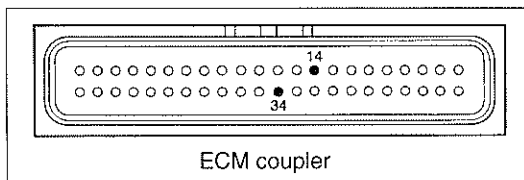


No → Replace the IAT sensor with a new one.

Yes →

Dg or B/Br wire open or shorted to ground, or poor ⑭ or ⑳ connection. (☞ 4-22)
 If wire and connection are OK, intermittent trouble or faulty ECM.
 Recheck each terminal and wire harness for open circuit and poor connection. (☞ 4-5)

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



Intake Air Temp.	Resistance
20°C (68 °F)	Approx. 2.45 kΩ
40°C (104 °F)	Approx. 1.148 kΩ
60°C (140 °F)	Approx. 0.587 kΩ
80°C (176 °F)	Approx. 0.322 kΩ

NOTE:
 IAT sensor resistance measurement method is the same way as that of the ECT sensor. Refer to page 5-10 for details.

“C22” AP SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
Low pressure and low voltage. High pressure and high voltage. ($0.10\text{ V} \leq \text{Sensor voltage} < 4.80\text{ V}$) without the above range. NOTE: Note that atmospheric pressure varies depending on weather conditions as well as altitude. Take that into consideration when inspecting voltage.	<ul style="list-style-type: none"> • Clogged air passage with dust. • Red wire circuit open or shorted to ground. • B/Br or G/Y wire circuit shorted to ground. • AP sensor malfunction. • ECM malfunction.

INSPECTION

- Remove the seat. (☞ 6-4)

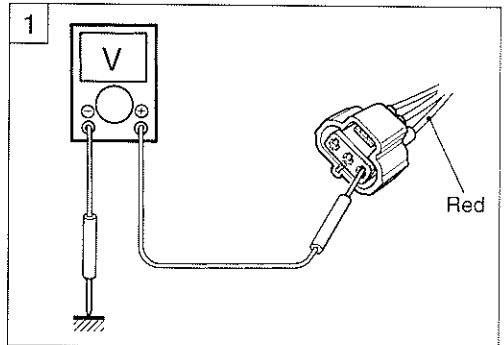
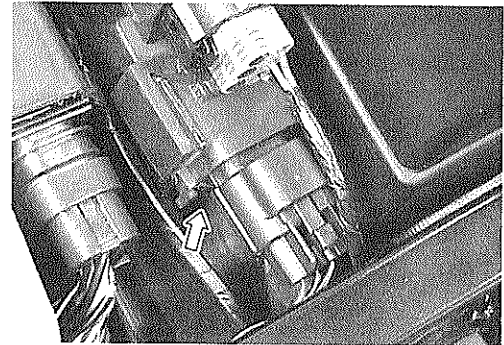
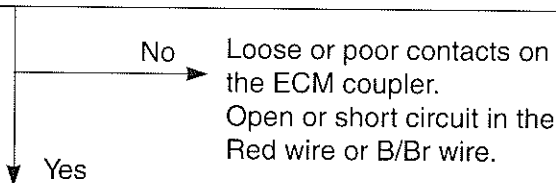
- 1 Turn the ignition switch OFF.
 Check the AP sensor coupler for loose or poor contacts.
 If OK, then measure the AP sensor input voltage.
 Disconnect the AP sensor coupler.
 Turn the ignition switch ON.
 Measure the voltage between Red wire and ground.
 If OK, then measure the voltage between Red wire and B/Br wire terminal.

DATA AP sensor input voltage: 4.5 – 5.5 V

(⊕Red – ⊖Ground)
 (⊕Red – ⊖B/Br)

TOOL 09900-25008: Multi circuit tester

Tester knob indication: Voltage (---)

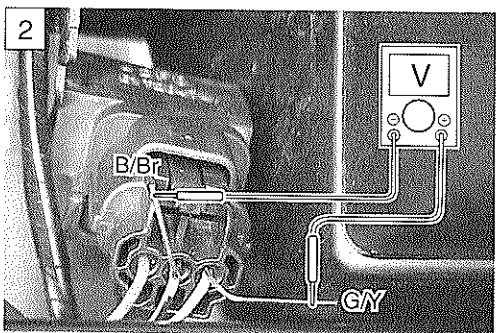
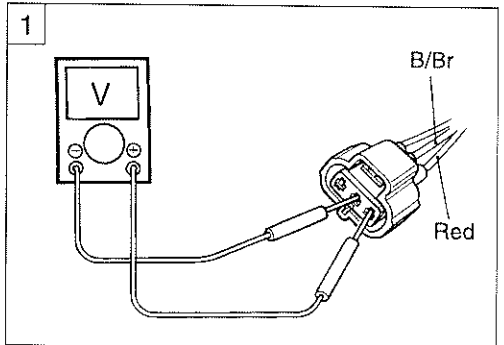
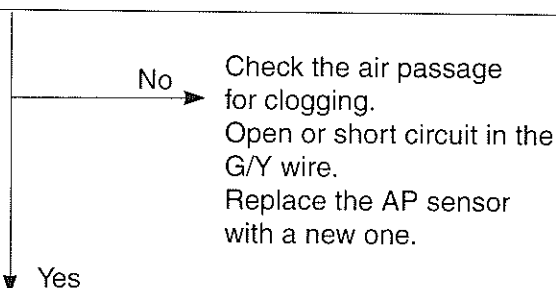


- 2 Connect the AP sensor coupler.
 Insert the copper wires to the lead wire coupler.
 Turn the ignition switch ON.
 Measure the AP sensor output voltage at the wire side coupler between G/Y and B/Br wires.


DATA AP sensor output voltage: Approx. 4.0 V
 at 760 mmHg (100 kPa)
 (⊕G/Y – ⊖B/Br)

TOOL 09900-25008: Multi circuit tester

Tester knob indication: Voltage (---)



3 Remove the AP sensor.
 Connect the vacuum pump gauge to the air passage port of the AP 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.)

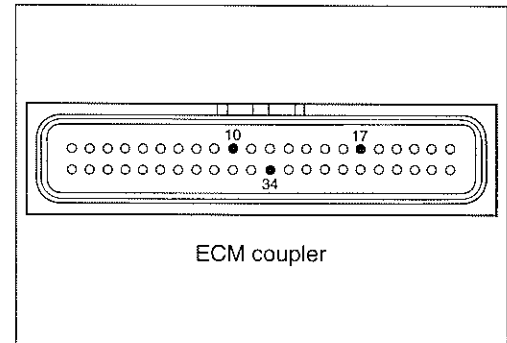
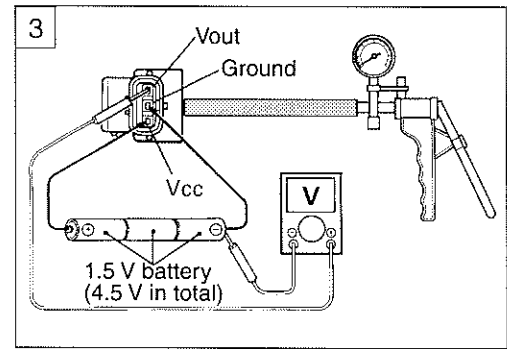
 **09917-47010: Vacuum pump gauge**
09900-25008: Multi circuit tester

 **Tester knob indication: Voltage (---)**

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

Red, G/Y or B/Br wire open or shorted to ground, or poor ⑩, ⑰ or ⑳ connection. (↗ 4-22)
 If wire and connection are OK, intermittent trouble or faulty ECM.
 Recheck each terminal and wire harness for open circuit and poor connection. (↗ 4-5)

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



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	0	760	100	3.4 – 4.0
2 000	610	707	94	3.0 – 3.7
2 001	611	707	94	2.6 – 3.4
5 000	1 524	634	85	2.4 – 3.1
5 001	1 525	634	85	
8 000	2 438	567	76	
8 001	2 439	567	76	
10 000	3 048	526	70	

“C23” TO SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
No TO sensor signal for more than 4 seconds, after ignition switch turns ON. Sensor voltage high. $(0.2\text{ V} \leq \text{Sensor voltage} < 4.6\text{ V})$ without the above range.	<ul style="list-style-type: none"> • TO sensor circuit open or short. • TO sensor malfunction. • ECM malfunction.

INSPECTION

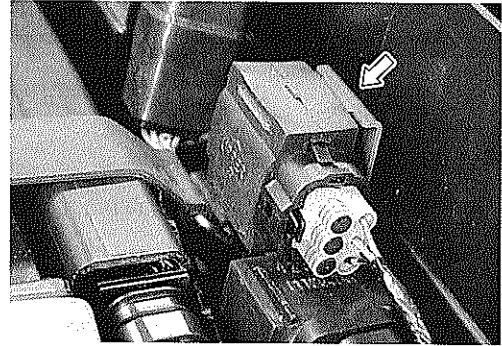
- Remove the seat. (☞ 6-4)

1 Turn the ignition switch OFF.
 Check the TO sensor coupler for loose or poor contacts.
 If OK, then measure the TO sensor resistance.
 Disconnect the TO sensor coupler.
 Measure the resistance between Red and B/Br wire terminals.

DATA TO sensor resistance: 19.1 – 19.7 kΩ (Red – B/Br)

TOOL 09900-25008: Multi circuit tester

Tester knob indication: Resistance (Ω)



No → Replace the TO sensor with a new one.
 Yes →

2 Connect the TO sensor coupler.
 Insert the copper wires to the lead wire coupler.
 Turn the ignition switch ON.
 Measure the voltage at the wire side coupler between Br/W and B/Br wires.

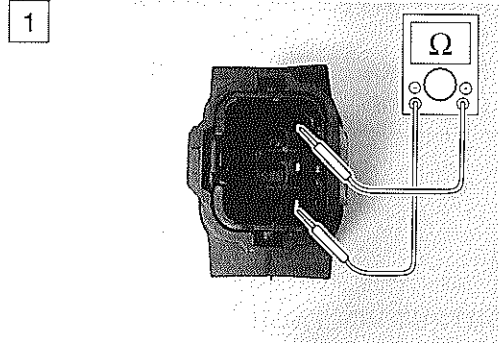
DATA TO sensor voltage: 0.4 – 1.4 V (Br/W – B/Br)

Also, measure the voltage when leaning of the motorcycle.
 Dismount the TO sensor from its bracket and measure the voltage when it is leaned more than 65°, left and right, from the horizontal level.

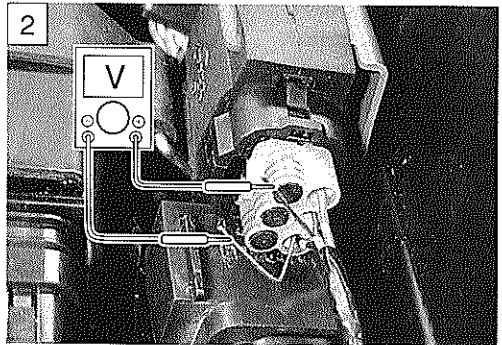
DATA TO sensor voltage: 3.7 – 4.4 V (Br/W – B/Br)

TOOL 09900-25008: Multi circuit tester

Tester knob indication: Voltage (V)

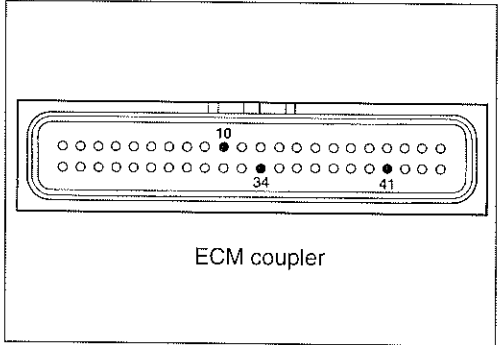


No → Loose or poor contacts on the ECM coupler.
 Open or short circuit in the Br/W wire or B/Br wire.
 Replace the TO sensor with a new one.
 Yes →



Red, Br/W or B/Br wire open or shorted to ground, or poor ⑩, ⑪ or ⑫ connection. (☞ 4-22)
 If wire and connection are OK, intermittent trouble or faulty ECM.
 Recheck each terminal and wire harness for open circuit and poor connection. (☞ 4-5)

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



“C24” or “C25” IGNITION SYSTEM MALFUNCTION

*REFER TO THE IGNITION SYSTEM FOR DETAILS. (☞ 7-19)

“C28” STV ACTUATOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
The operation voltage does not reach the STVA. ECM does not receive communication signal from the STVA.	<ul style="list-style-type: none"> • STVA malfunction. • STVA circuit open or short. • STVA motor malfunction.

INSPECTION

- Remove the fuel tank and air cleaner element. (☞ 4-52 and 2-5)

1 Turn the ignition switch OFF.
Check the STVA lead wire coupler for loose or poor contacts.
Turn the ignition switch ON to check the STV operation.
STV operating order: Half open → full close → Full open → 75% open → Half open (about 20 seconds later)

No → Loose or poor contacts on the STVA coupler.
Open or short circuit in the Red and Black wires.

Yes

2 Turn the ignition switch OFF.
Check the STVA lead wire coupler for loose or poor contacts.
Disconnect the STVA lead wire coupler.
Check the continuity between Red wire and ground.

DATA STVA continuity: $\infty\Omega$ (Infinity)

If OK, then measure the STVA resistance. (between Red and Black wires)

DATA STVA resistance: Approx. 4.8 – 7.2 Ω
(⊕ Red – ⊖ Black)

TOOL 09900-25008: Multi circuit tester

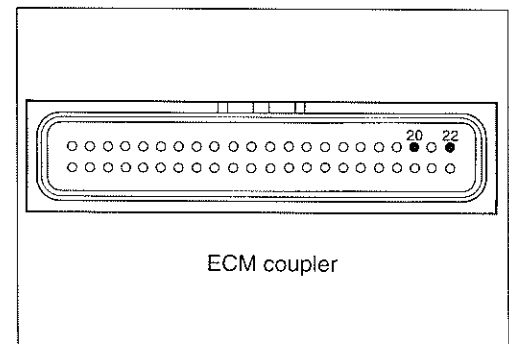
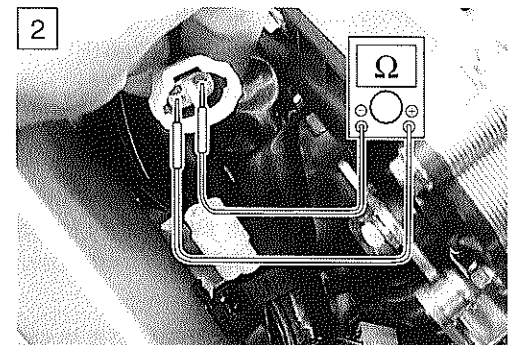
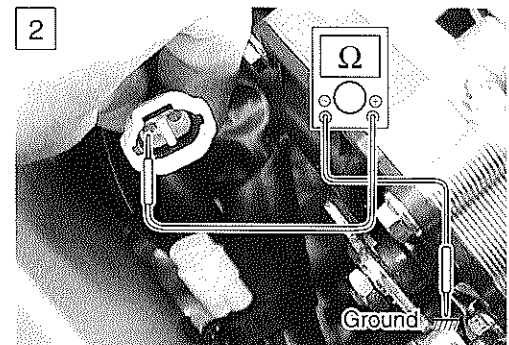
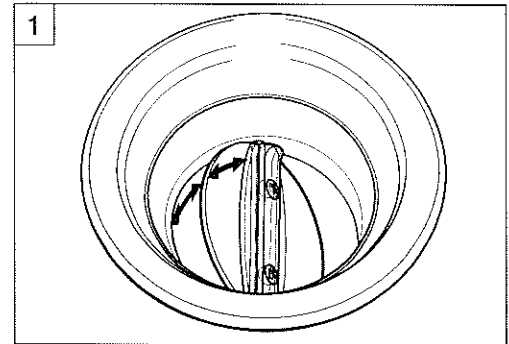
Tester knob indication: Resistance (Ω)

No → Replace the STVA with a new one.

Yes

Loose or poor contacts on the STVA coupler, or poor ⑳ or ㉓ connection. (☞ 4-22)
If wire and connection are OK, intermittent trouble or faulty ECM. Recheck each terminal and wire harness for open circuit and poor connection. (☞ 4-5)

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



“C29” STP SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
Signal voltage low or high. Difference between actual throttle opening and opening calculated by ECM is larger than specified value. ($0.10\text{ V} \leq \text{Sensor voltage} < 4.80\text{ V}$) without the above range.	<ul style="list-style-type: none"> • STP sensor maladjusted. • STP sensor circuit open or short. • STP sensor malfunction. • ECM malfunction.

INSPECTION

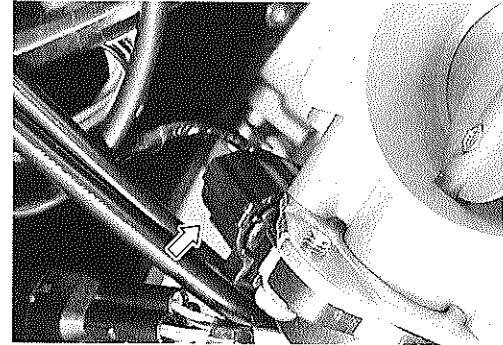
- Remove the fuel tank and air cleaner box. (☞ 4-52 and -60)

1 Turn the ignition switch OFF.
 Check the STP sensor coupler for loose or poor contacts.
 If OK, then measure the STP sensor input voltage.
 Disconnect the STP sensor coupler.
 Turn the ignition switch ON.
 Measure the voltage at the Red wire and ground.
 If OK, then measure the voltage at the Red wire and B/Br wire.

DATA STP sensor input voltage: 4.5 – 5.5 V
 (⊕Red – ⊖Ground)
 (⊕Red – ⊖B/Br)

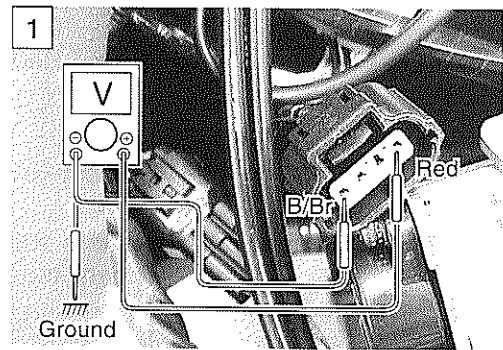
TOOL 09900-25008: Multi circuit tester

Tester knob indication: Voltage (V)



No → Loose or poor contacts on the ECM coupler.
 Open or short circuit in the Red wire or B/Br wire.

Yes ↓



2 Turn the ignition switch OFF.
 Disconnect the STP sensor coupler.
 Check the continuity between T₃ terminal wire and ground.

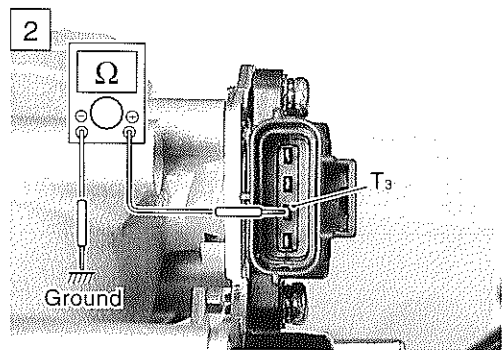
DATA STP sensor continuity: ∞Ω (Infinity)
 (T₃ terminal – Ground)

If OK, then measure the STP sensor resistance at the coupler (between T₃ and T₄ terminals).
 Close and open the secondary throttle valve by finger, and measure the valve closing and opening resistance.

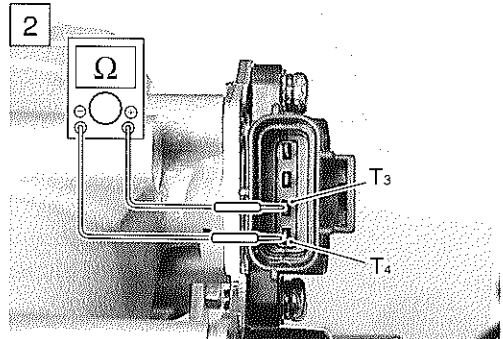
DATA STP sensor resistance
 Secondary throttle valve is closed : Approx. 1.1 kΩ
 Secondary throttle valve is opened: Approx. 4.3 kΩ

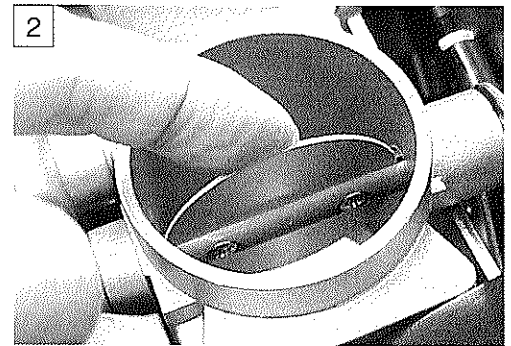
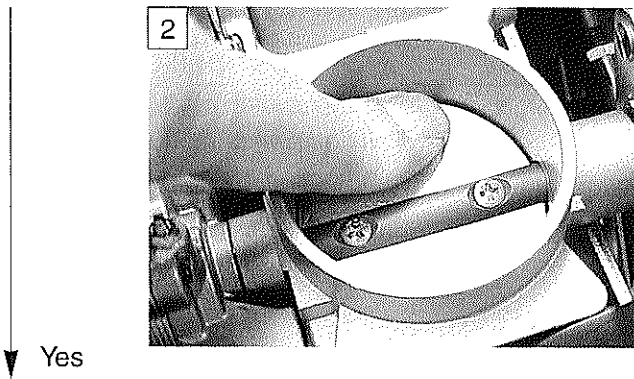
TOOL 09900-25008: Multi circuit tester

Tester knob indication: Resistance (Ω)



No → Reset the STP sensor position correctly. (☞ 4-68)
 Replace the STP sensor with a new one.



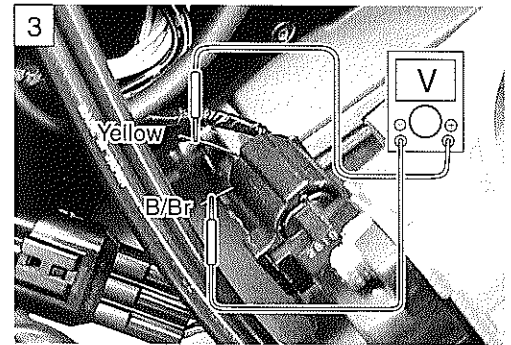


3 Turn the ignition switch OFF.
 Connect the STP sensor coupler.
 Insert the copper wires to the lead wire coupler.
 Disconnect the STVA lead wire coupler.
 Turn the ignition switch ON.
 Measure the STP sensor output voltage at the coupler (between Yellow and B/Br wires) by turning the secondary throttle valve (close and open) with a finger.

DATA STP sensor output voltage
 Throttle valve is closed: Approx. 1.1 V
 Tester knob indication : Approx. 4.3 V

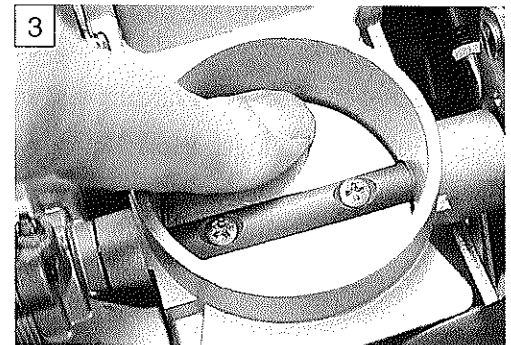
TOOL 09900-25008: Multi circuit tester

Tester knob indication: Voltage (V)



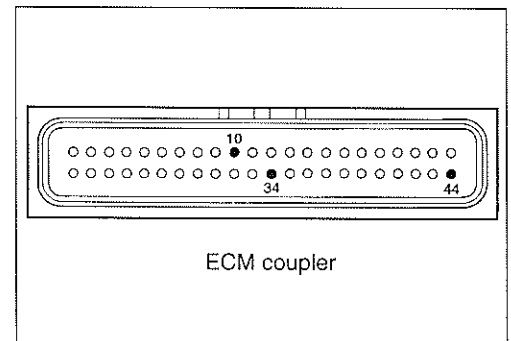
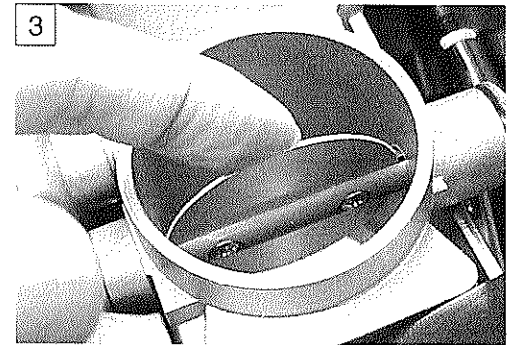
No → If check result is not satisfactory, replace STP sensor with a new one.

Yes ↓



Red, Yellow or B/Br wire open or shorted to ground, or poor ⑩, ④④ or ③④ connection. (☞ 4-22)
 If wire and connection are OK, intermittent trouble or faulty ECM.
 Recheck each terminal and wire harness for open circuit and poor connection. (☞ 4-5)

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



“C31” GEAR POSITION (GP) SWITCH CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
No Gear Position switch voltage Switch voltage low. (Switch Voltage > 1.0 V) (without the above value.)	<ul style="list-style-type: none"> • Gear Position switch circuit open or short. • Gear Position switch malfunction. • ECM malfunction.

INSPECTION

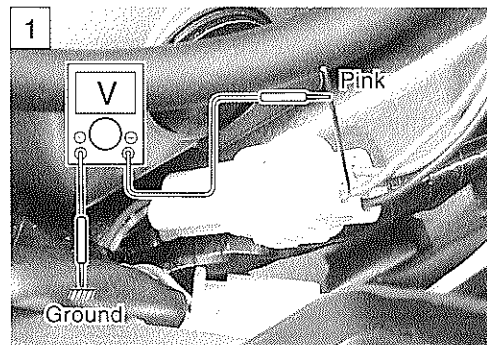
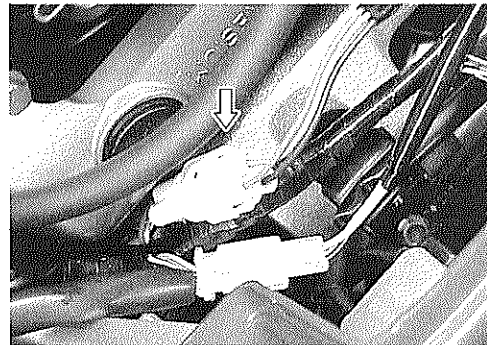
- Lift and support the fuel tank with its prop stay. (↗ 4-51)

1 Turn the ignition switch OFF.
 Check the GP switch coupler for loose or poor contacts.
 If OK, then measure the GP switch voltage.
 Support the motorcycle with a jack.
 Turn the side-stand to up-right position.
 Turn the engine stop switch ON.
 Insert the copper wire to the lead wire coupler.
 Turn the ignition switch ON.
 Measure the voltage at the wire side coupler between
 Pink wire and ground, when shifting the gearshift lever
 from 1st to Top.

DATA GP switch voltage: More than 1.0 V
 (Pink – Ground)

TOOL 09900-25008: Multi circuit tester

Tester knob indication: Voltage (V)

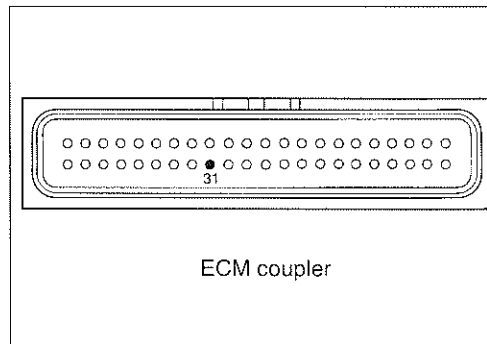


No → Open or short circuit in the Pink wire.
 Replace the GP switch with a new one.

Yes

Pink wire open or shorted to ground, or poor ③① connection.
 (↗ 4-22)
 If wire and connection are OK, intermittent trouble or faulty ECM.
 Recheck each terminal and wire harness for open circuit and
 poor connection. (↗ 4-5)

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



“C32” or “C33” FUEL INJECTION MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
No injector current.	<ul style="list-style-type: none"> • Injector circuit open or short. • Injector malfunction. • ECM malfunction.

INSPECTION

- Remove the fuel tank and air cleaner box. (☞ 4-52 and -60)

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

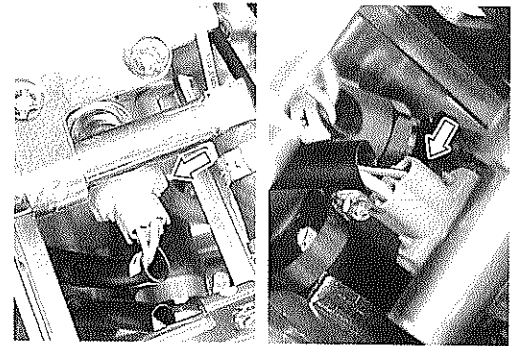
DATA Injector resistance: 12 – 18 Ω at 20°C (68°F)
 (No.1 : Y/R – Gr/W)
 (No. 2 : Y/R – Gr/B)

If OK, then check the continuity between Y/R wire and ground.

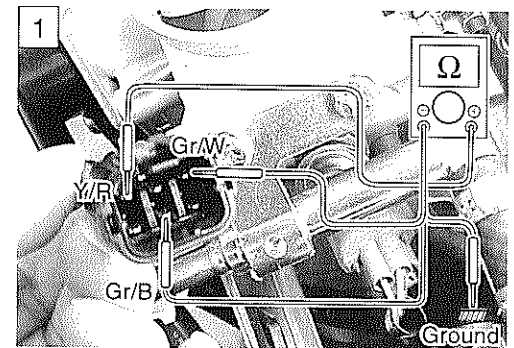
DATA Injector continuity: ∞Ω (Infinity)
 (Y/R – Ground)

TOOL 09900-25008: Multi circuit tester

Tester knob indication: Resistance (Ω)



No → Replace the injector with a new one. (☞ 4-67)
 Yes ↓



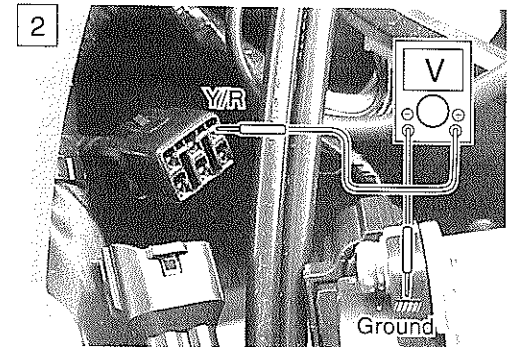
2 Turn the ignition switch ON.
 Measure the injector voltage between Y/R wire and ground.

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

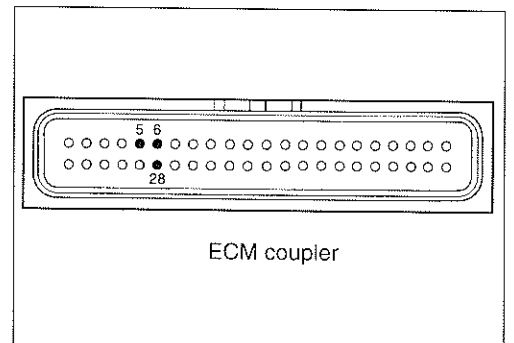
Tester knob indication: Voltage (V)



No → Open circuit in the Yellow/Red wire.
 Yes ↓

Gr/W, Gr/B or Y/R wire open or shorted to ground, or poor ⑤, ⑥ or ⑳ connection. (☞ 4-22)
 If wire and connection are OK, intermittent trouble or faulty ECM.
 Recheck each terminal and wire harness for open circuit and poor connection. (☞ 4-5)

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



“C41” FP RELAY CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
No signal from fuel pump relay.	<ul style="list-style-type: none"> • Fuel pump relay circuit open or short. • Fuel pump relay malfunction. • ECM malfunction.

INSPECTION

- Remove the seat. (☞ 6-4)

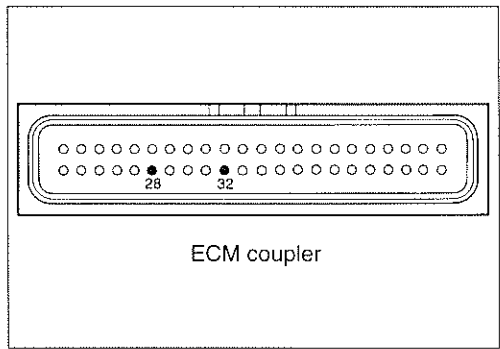
1 Turn the ignition switch OFF.
Check the FP relay coupler for loose or poor contacts.
If OK, then check the insulation and continuity. Refer to page 4-51 for details.

No → Replace the FP relay with a new one.

Yes ↓

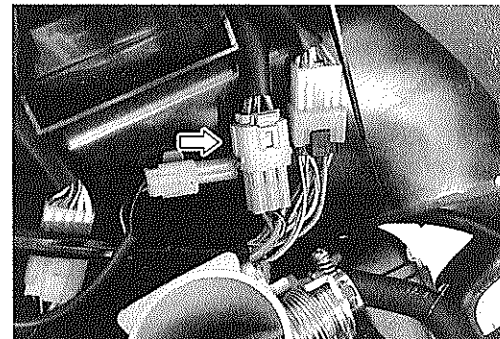
Y/B or O/W wire open or shorted to ground, or poor ③② or ②⑧ connection. (☞ 4-22)
If wire and connection are OK, intermittent trouble or faulty ECM.
Recheck each terminal and wire harness for open circuit and poor connection. (☞ 4-5)

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



“C42” IG SWITCH CIRCUIT MALFUNCTION

- * Refer to the IGNITION SWITCH INSPECTION for details.
- Remove the fuel tank and air cleaner box. (☞ 4-52 and -60)
- Inspect the ignition switch. (☞ 7-32)



“C44” HO₂ SENSOR (HO₂S) CIRCUIT MALFUNCTION (Except for USA)

DETECTED CONDITION	POSSIBLE CAUSE
Output voltage of HO ₂ Sensor higher than the specification or lower than the specification.	<ul style="list-style-type: none"> • HO₂ sensor or its circuit open or short. • Fuel system malfunction. • ECM malfunction.

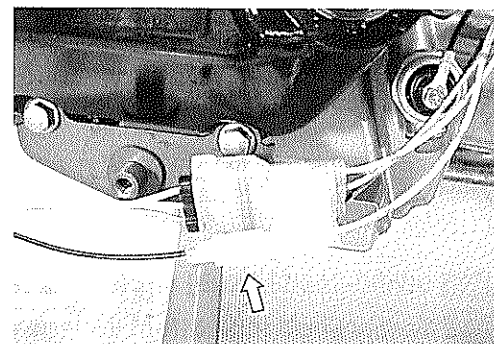
INSPECTION

- Remove the engine under cover and seat. (☞ 3-3 and 6-4)

1 Turn the ignition switch OFF.
 Check the HO₂ sensor coupler for loose or poor contacts.
 If OK, then check the continuity.
 Disconnect the HO₂ sensor coupler and ECM coupler.
 Check the continuity between the HO₂ sensor coupler terminal (White/Green) and ECM coupler terminal (White/Green).
 Also, check the infinity between the HO₂ sensor coupler terminal and ground.

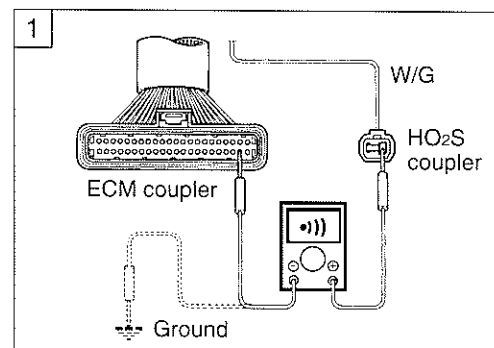
TOOL 09900-25008: Multi circuit tester

Tester knob indication: Continuity (•||)



No → Loose or poor contacts on the ECM coupler.
 Open or short circuit in the White/Green wire.

Yes ↓



2 Connect the HO₂ sensor coupler and ECM coupler.
 Insert the copper wires to the HO₂ sensor lead wire coupler.
 Start the engine and warm up the engine up to engine coolant temperature is 80 °C (176 °F).
 Measure the HO₂ sensor output voltage at the coupler (between White/Green and Black/Brown wires) when idling condition.
 Also, measure the HO₂ sensor output voltage while holding the engine speed at 5 000 r/min.

DATA HO₂ sensor output voltage at idle speed:

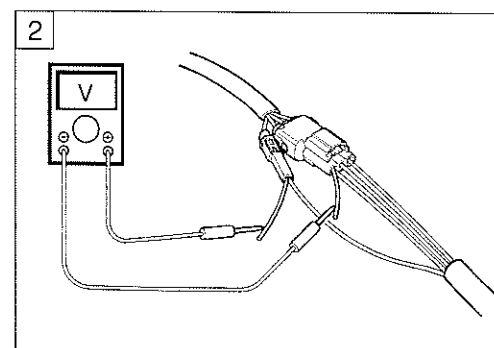
less than 0.4 V (⊕ W/G – ⊖ B/Br)

HO₂ sensor output voltage at 5 000 r/min:

more than 0.6 V (⊕ W/G – ⊖ B/Br)

TOOL 09900-25008: Multi circuit tester

Tester knob indication: Voltage (—)



No → Replace the HO₂ sensor with a new one.

Yes
↓

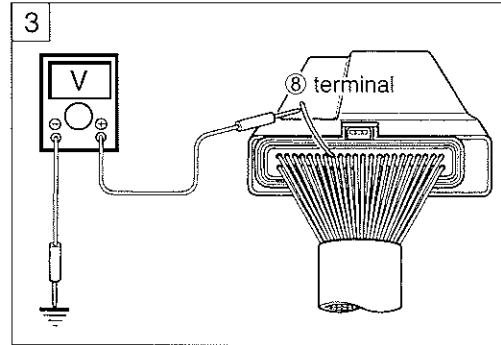
3 Turn the ignition switch OFF.
Insert the copper wire to the ECM lead wire coupler (8) terminal (Heater circuit).
Turn the ignition switch ON and measure the heater voltage between (8) terminal and ground.
If the tester voltage indicates the battery voltage for few seconds it is good condition.

DATA Heater voltage: Battery voltage
(8) terminal – Ground)

NOTE:
Battery voltage can be detected only during few seconds after ignition switch is turned ON.

TOOL 09900-25008: Multi circuit tester

Tester knob indication: Voltage (V)



No → Replace the HO₂ sensor with a new one.
Yes ↓

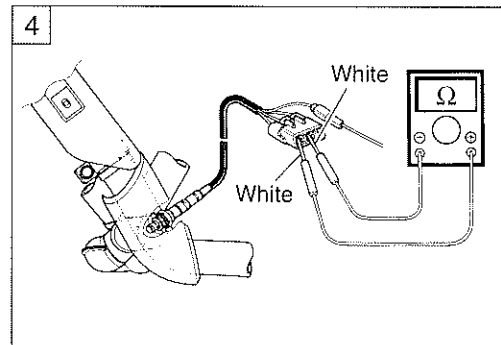
4 Turn the ignition switch OFF.
Disconnect the HO₂ sensor coupler.
Check the resistance between the terminals (White – White) of the HO₂ sensor.

DATA HO₂ sensor resistance: 4 – 5 Ω (at 23 °C/73.4 °F)

NOTE:
* Temperature of the sensor affects resistance value largely.
* Make sure that the sensor heater is at correct temperature.

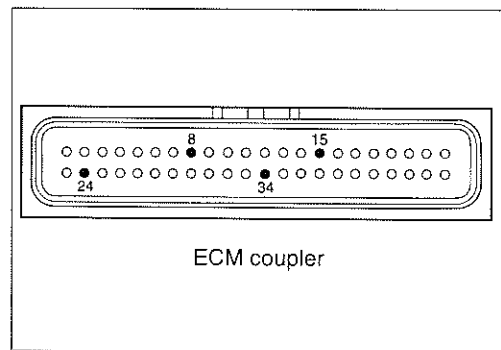
TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Resistance (Ω)



No → Replace the HO₂ sensor with a new one.
Yes ↓

Black, W/Gr, White, W/B, Gray, B/Br or O/W wire open or shorted to ground, or poor (8), (15), (24) or (34) connection. (4-22)
If wire and connection are OK, intermittent trouble or faulty ECM.
Recheck each terminal and wire harness for open circuit and poor connection. (4-5)

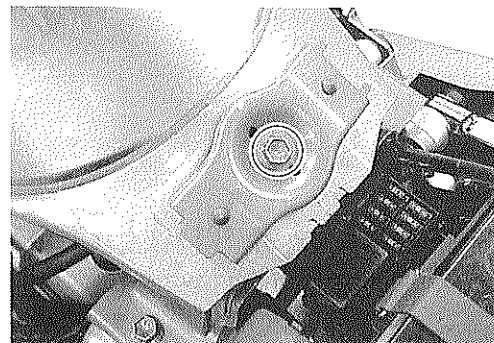
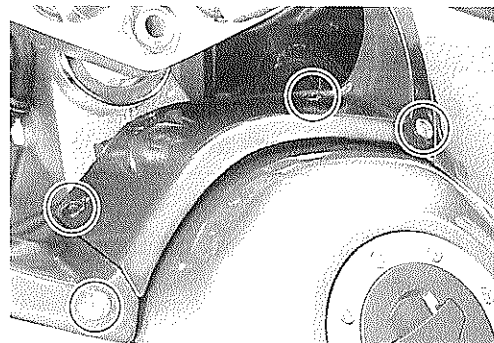
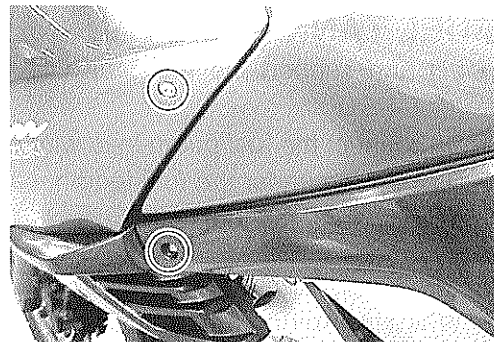


Check the fuel supply system, if the system is OK, replace the ECM with a new one, and inspect it again.

FUEL SYSTEM

FUEL TANK LIFT-UP

- Remove the seat. (☞ 6-4)
- Remove the fuel tank side covers, left and right.
- Remove the cowling fitting bolts, left and right.
- Remove the fuel tank top cover by removing the bolts and fasteners.
- Remove the fuel tank mounting bolt.
- Lift and support the fuel tank with the fuel tank prop stay.



FUEL TANK REMOVAL

- Lift and support the fuel tank with the fuel tank prop stay. (4-51)
- Disconnect the fuel pump lead wire coupler ①.
- Place a rag under the fuel feed hose and disconnect the feed hose ② from the fuel tank.

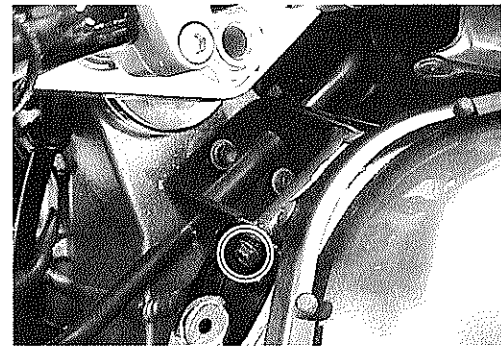
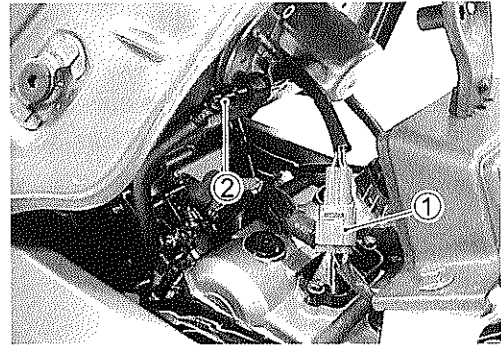
CAUTION

When removing the fuel tank, do not leave the fuel feed hose ② on the fuel tank side.

⚠ WARNING

Gasoline is highly flammable and explosive. Keep heat, spark and flame away.

- Remove the fuel tank mounting bolt.
- Remove the fuel tank.



FUEL TANK INSTALLATION

- Installation is in the reverse order of removal.

FUEL PRESSURE INSPECTION

- Lift and support the fuel tank with the fuel tank prop stay. (☞ 4-51)
- Place a rag under the fuel feed hose. (☞ 4-52)
- Remove the fuel feed hose and install the special tools between the fuel tank and fuel delivery pipe.

- TOOL** 09940-40211: Fuel pressure gauge adaptor
 09940-40220: Fuel pressure gauge hose attachment
 09915-77330: Oil pressure gauge
 09915-74520: Oil pressure gauge hose

Turn the ignition switch ON and check the fuel pressure.

DATA Fuel pressure: Approx. 300 kPa (3.0 kgf/cm², 43 psi)

If the fuel pressure is lower than the specification, inspect the following items:

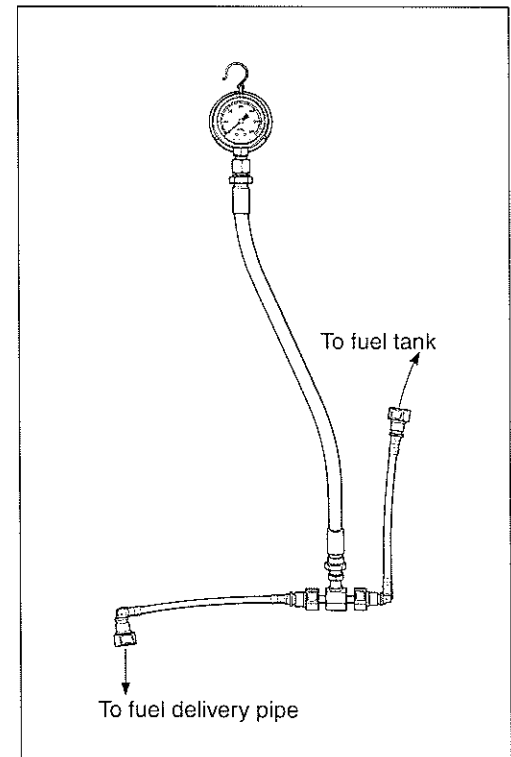
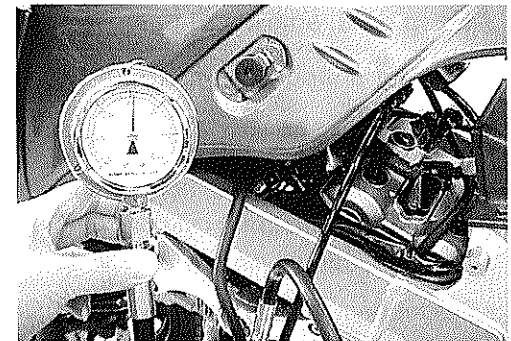
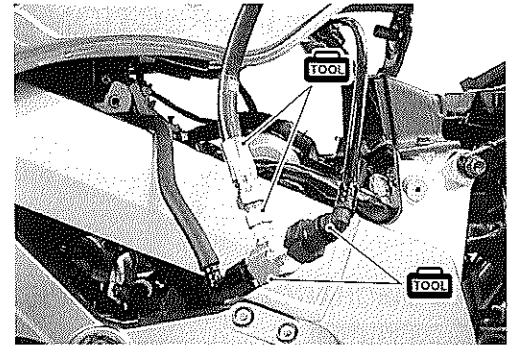
- * Fuel hose leakage
- * Clogged fuel filter
- * Pressure regulator
- * Fuel pump

If the fuel pressure is higher than the specification, inspect the following items:

- * Fuel pump check valve
- * Pressure regulator

⚠ WARNING

- * Before removing the special tools, turn the ignition switch to OFF position and release the fuel pressure slowly.
- * Gasoline is highly flammable and explosive. Keep heat, sparks and flame away.



FUEL PUMP INSPECTION

Turn the ignition switch ON and check that the fuel pump operates for few seconds.

If the fuel pump motor does not make operating sound, replace the fuel pump assembly or inspect the fuel pump relay and tip over sensor.

FUEL DISCHARGE AMOUNT INSPECTION

⚠ WARNING

**Gasoline is highly flammable and explosive.
Keep heat, spark and flame away.**

- Lift and support the fuel tank with the fuel tank prop stay. (Fig 4-51)
- Disconnect the fuel feed hose from the fuel tank.
- Connect a proper fuel hose to the fuel pump.
- Place the measuring cylinder and insert the fuel hose end into the measuring cylinder.
- Disconnect the ECM lead wire coupler.
- Push the lock ④ to pull out the power source lead wire (Yellow with red tracer).

- Apply 12 volts to the fuel pump for 30 seconds and measure the amount of fuel discharged.

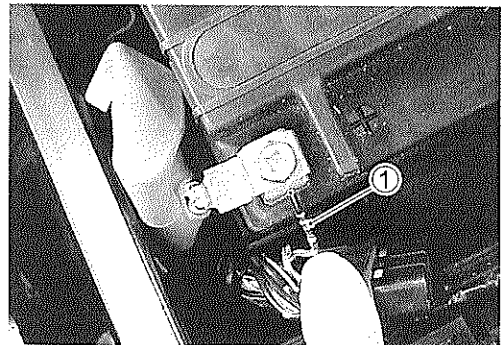
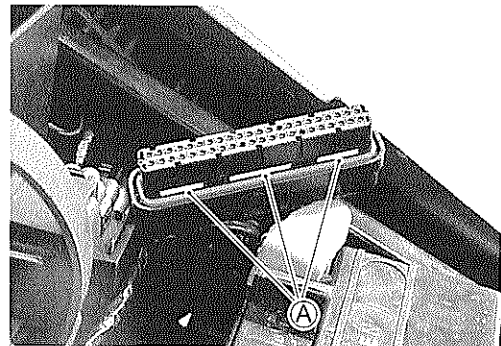
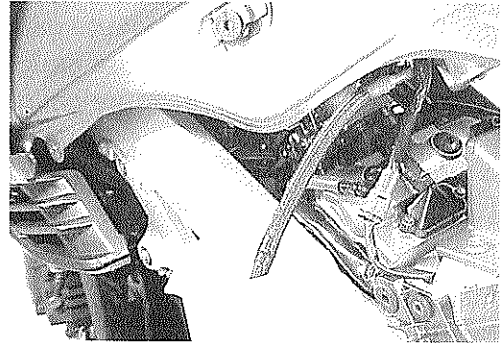
Battery ⊕ terminal — Power source lead wire ①
(Yellow with red tracer)

If the pump does not discharge the amount specified, it means that the fuel pump is defective or that the fuel filter is clogged.

DATA Fuel discharge amount: **Approx. 1 200 ml/30 sec.**
(1.3/1.1 US/Imp oz)/30 sec.

NOTE:

The battery must be in fully charged condition.



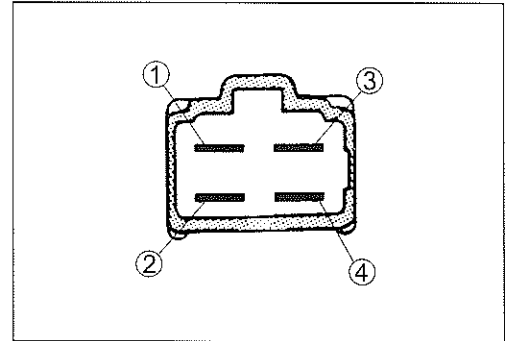
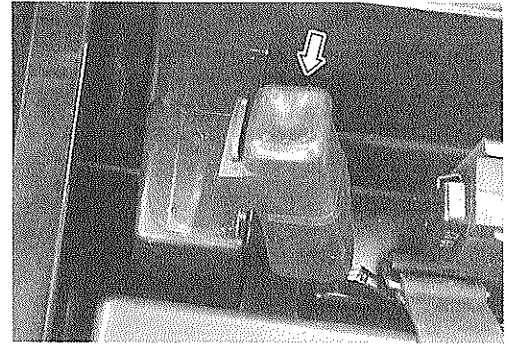
FUEL PUMP RELAY INSPECTION

Fuel pump relay is located behind the ECM.

- Remove the seat.
- Remove the fuel pump relay.

First, check the insulation between ① and ② terminals with pocket tester. Then apply 12 volts to ③ and ④ terminals, ⊕ to ③ and ⊖ to ④, and check the continuity between ① and ②.

If there is no continuity, replace it with a new one.

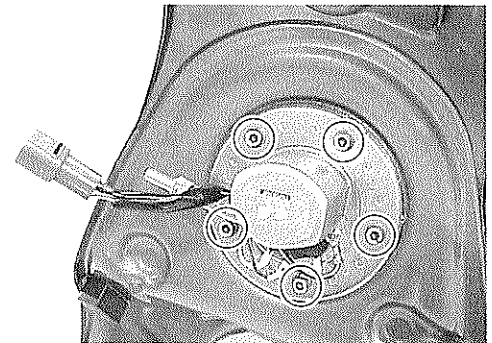


FUEL PUMP AND FUEL FILTER REMOVAL

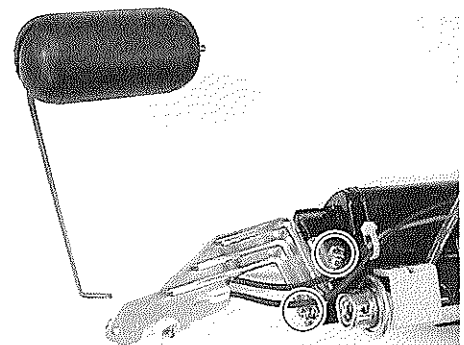
- Remove the fuel tank. (☞ 4-52)
- Remove the fuel pump assembly by removing its mounting bolts diagonally.

⚠ WARNING

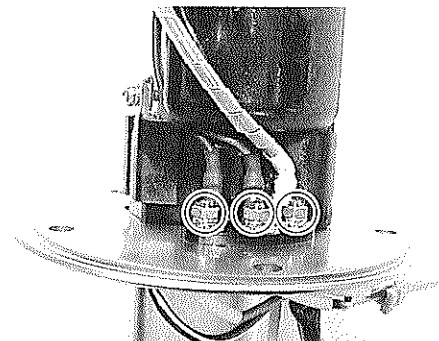
Gasoline is highly flammable and explosive.
Keep heat, spark and flame away.



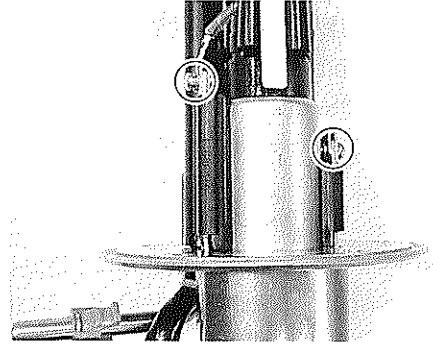
- Remove the fuel level gauge.



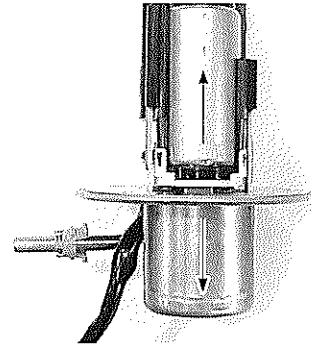
- Remove the nuts.



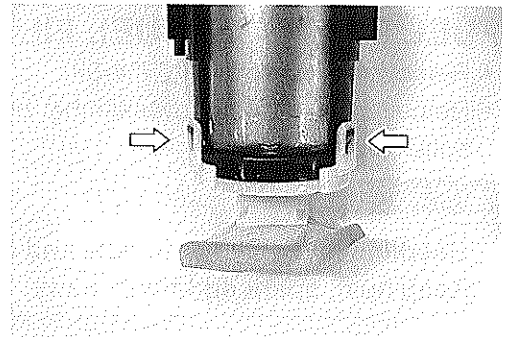
- Remove the screws.



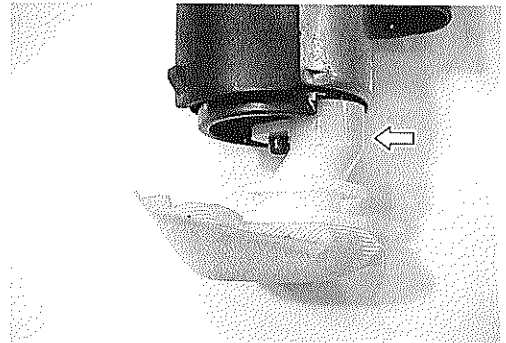
- Remove the fuel pump assy from the fuel pump plate.



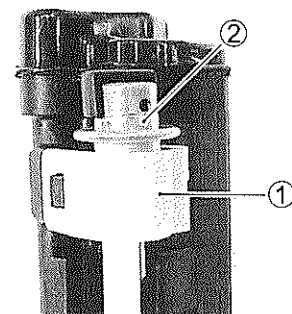
- Remove the fuel pump holder.



- Remove the fuel mesh filter.



- Remove the fuel pressure regulator holder ① and the fuel pressure regulator ②.

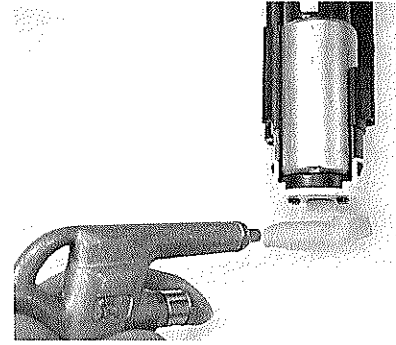


FUEL MESH FILTER INSPECTION AND CLEANING

If the fuel mesh filter is clogged with sediment or rust, fuel will not flow smoothly and loss in engine power may result. Blow the fuel mesh filter with compressed air.

NOTE:

If the fuel mesh filter is clogged with many sediment or rust, replace the fuel filter cartridge with a new one.



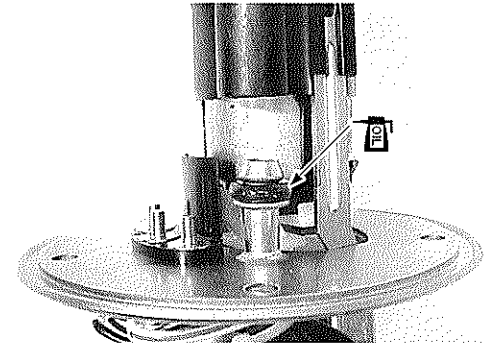
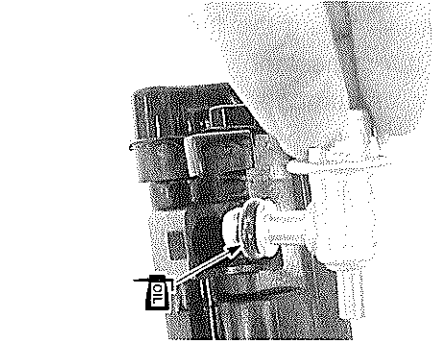
FUEL PUMP AND FUEL MESH FILTER INSTALLATION

Install the fuel pump and fuel mesh filter in the reverse order of removal, and pay attention to the following points:

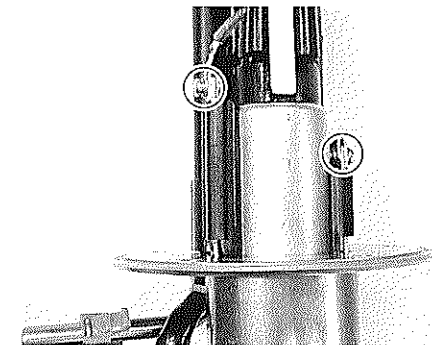
- Install the new O-rings to the fuel pressure regulator and fuel pipe.
- Apply thin coat of the engine oil to the O-rings.

CAUTION

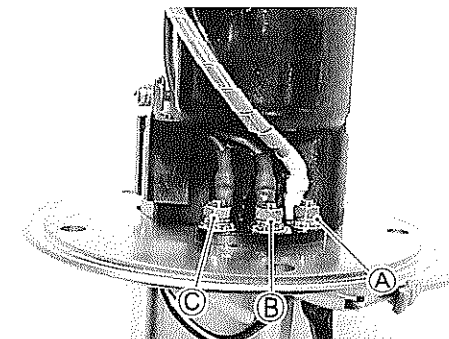
Use the new O-rings to prevent fuel leakage.



- Tighten the screws together with the lead wire terminals.



- Tighten the nuts together with the lead wire terminals.
 - Ⓐ ⊕ terminal for fuel pump
 - Ⓑ ⊕ terminal for fuel level gauge
 - Ⓒ ⊖ terminal for fuel level gauge
- Install the fuel level gauge.

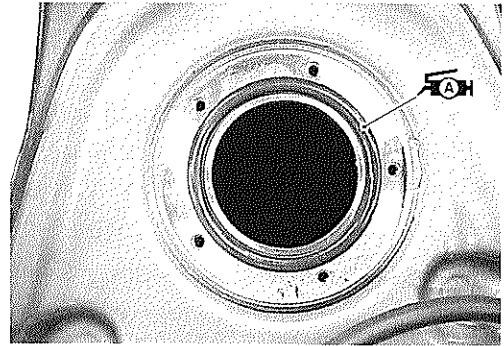


- Install the new O-ring and apply grease to it.

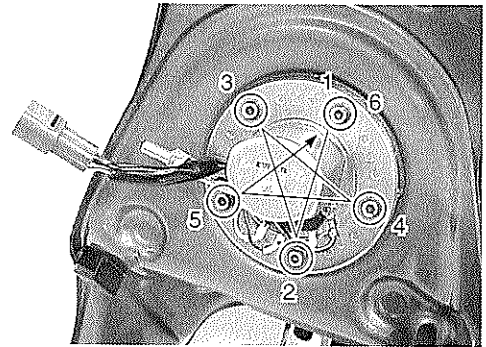
⚠ WARNING

The O-ring must be replaced with a new one to prevent fuel leakage.

- 🔧 99000-25030: SUZUKI SUPER GREASE "A" (USA)
- 99000-25010: SUZUKI SUPER GREASE "A" (Others)



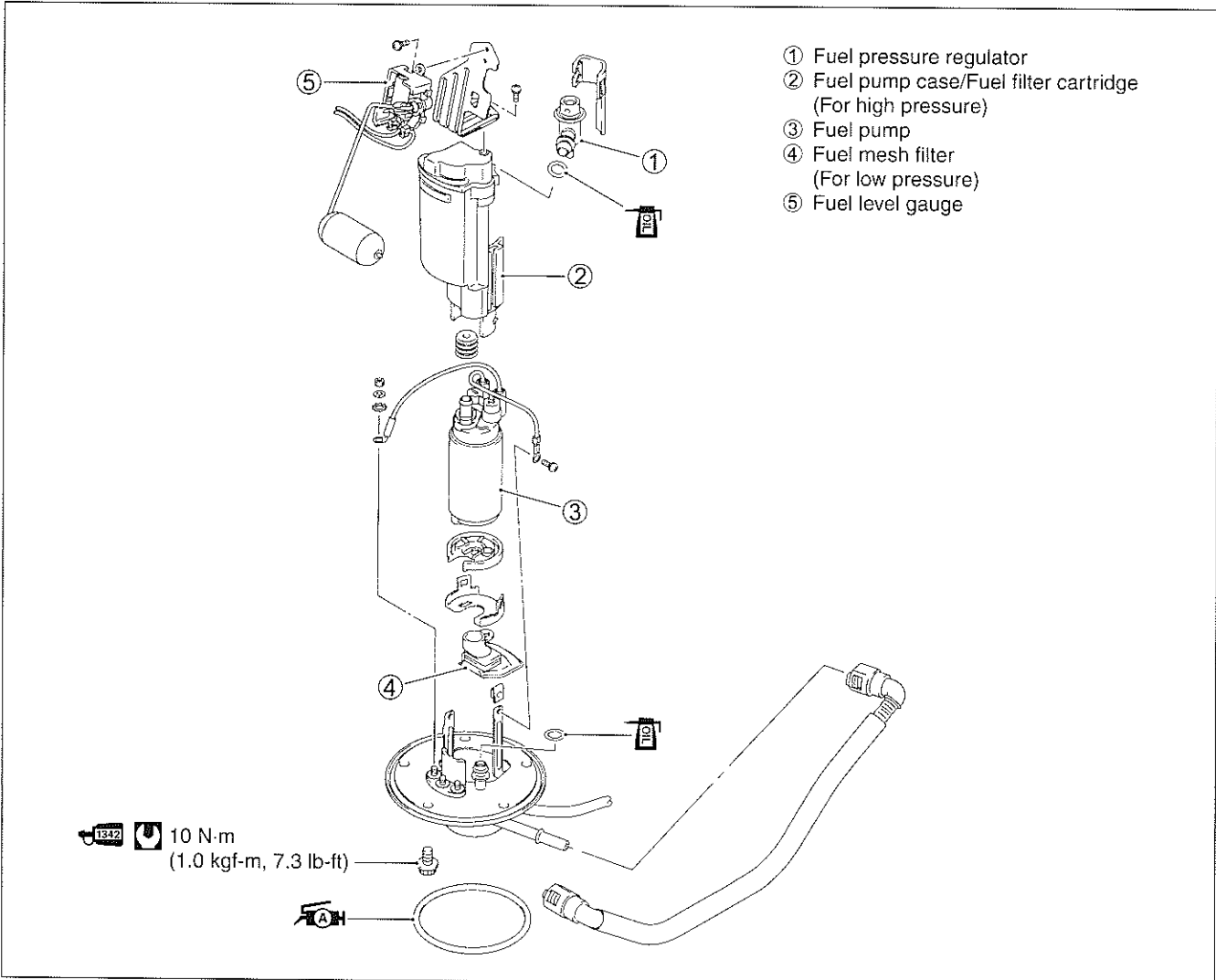
- When installing the fuel pump assembly, first tighten all the fuel pump assembly mounting bolts lightly in the ascending order of numbers, and then tighten them to the specified torque in the above tightening order



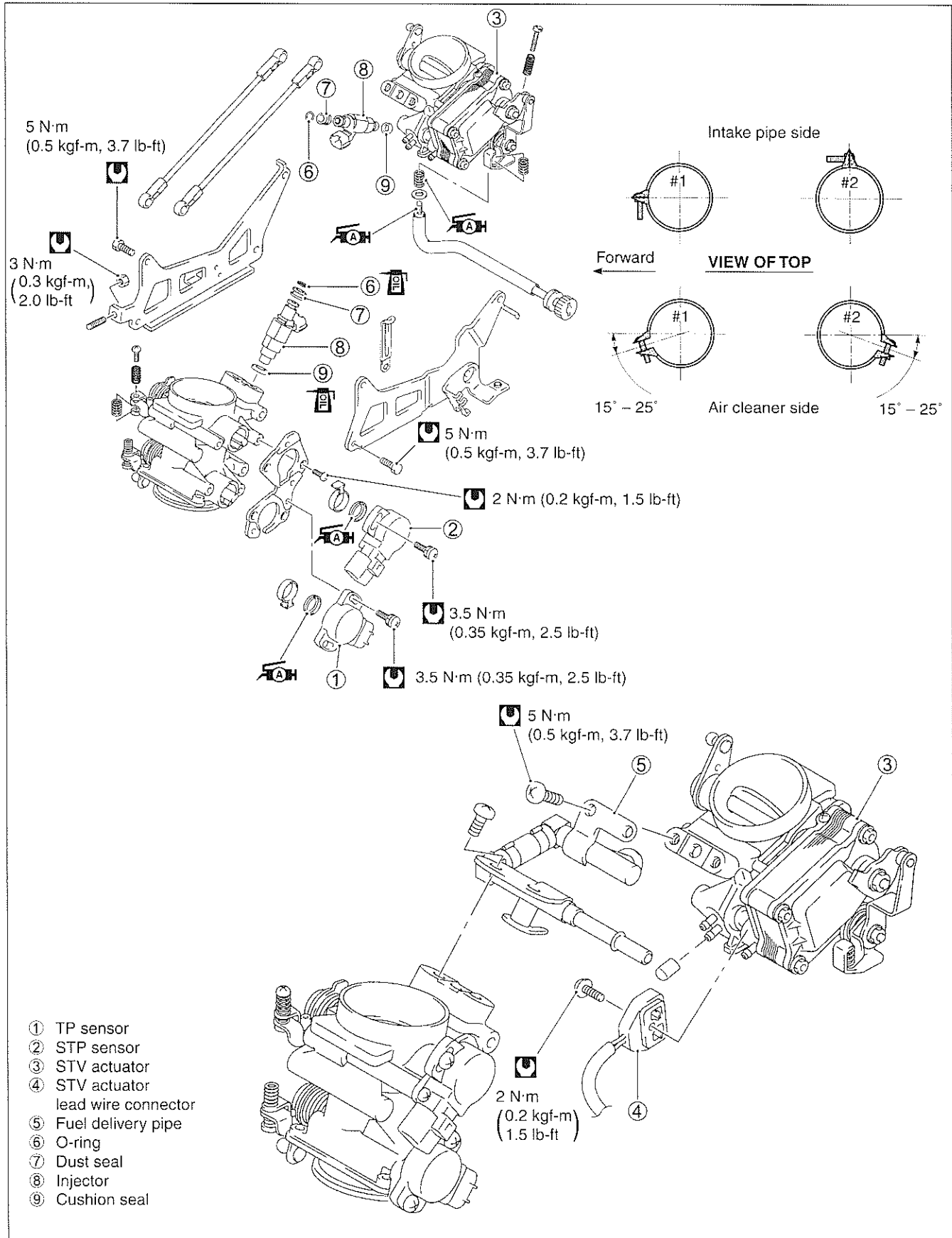
🔧 Fuel pump mounting bolt: 10 N·m (1.0 kgf·m, 7.3 lb·ft)

NOTE:
Apply a small quantity of the **THREAD LOCK "1342"** to the thread portion of the fuel pump mounting bolt.

- 🔧 1342 99000-32050: **THREAD LOCK "1342"**

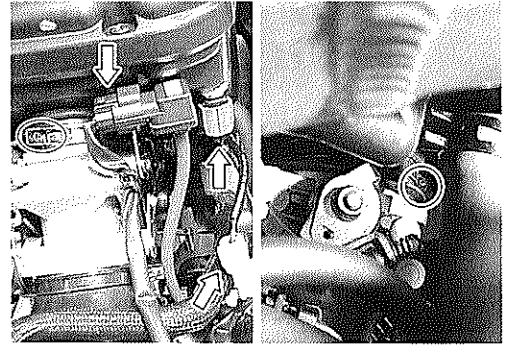


THROTTLE BODY AND STV ACTUATOR CONSTRUCTION

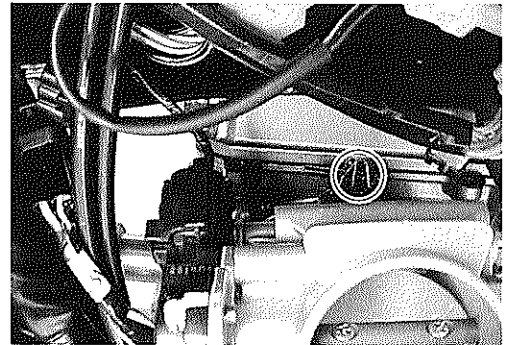


THROTTLE BODY REMOVAL

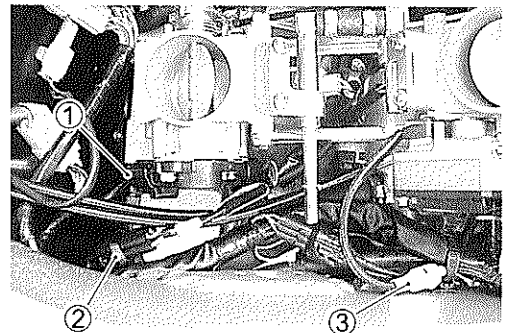
- Remove the fuel tank. (☞ 4-52)
- Loosen the respective throttle body clamp screws (air cleaner side).
- Disconnect the *PAIR solenoid valve lead wire coupler, IAP sensor coupler and IAT sensor coupler.
- Disconnect the PAIR hoses from the PAIR solenoid valve.
- Remove the air cleaner box.
- * For E-24 model is operated by the vacuum.



- Loosen the respective throttle body clamp screws (intake pipe side).



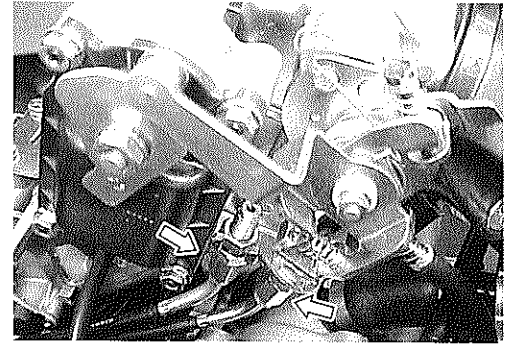
- Disconnect the various lead wire couplers.
 - ① STP sensor
 - ② TP sensor/Fuel injector
 - ③ STVA motor



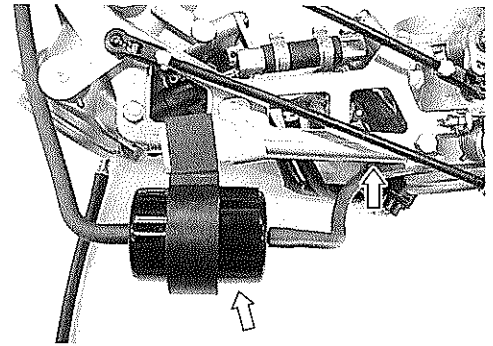
- Disconnect the throttle cables from their drum.
- Dismount the throttle body assembly.

CAUTION

- * Be careful not to damage the throttle cable bracket and fast idle lever when dismantling or remounting the throttle body assembly.
- * After disconnecting the throttle cables, do not snap the throttle valve from full open to full close. It may cause damage to the throttle valve and throttle body.

**THROTTLE BODY DISASSEMBLY**

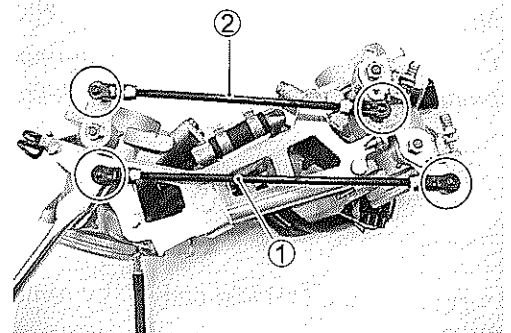
- Remove the IAP sensor vacuum damper and its hose.



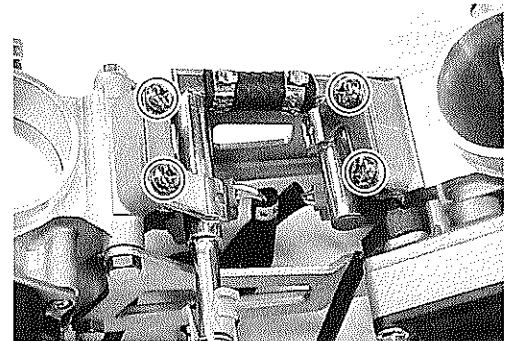
- Remove the throttle link rod ① and secondary throttle link rod ②.

NOTE:

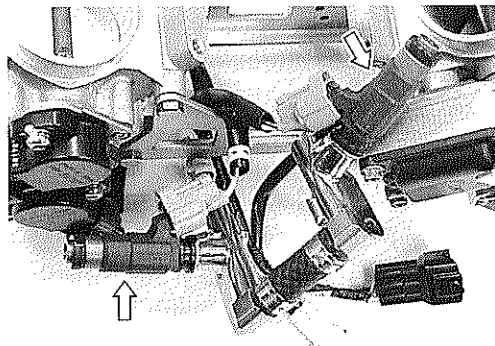
The throttle link rod ① is longer than the secondary throttle link rod ②.



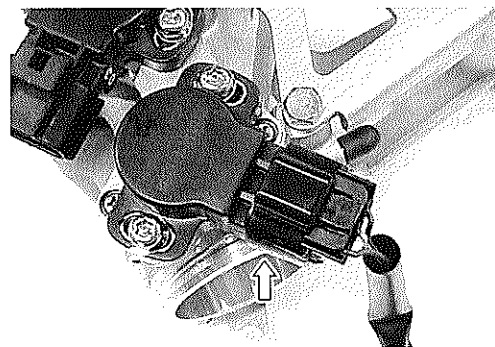
- Remove the fuel delivery pipe.



- Remove the fuel injectors.



- Disconnect the TPS coupler.

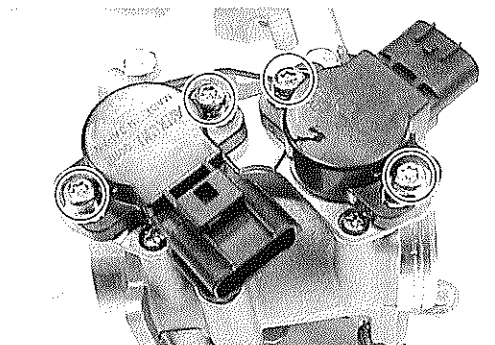


- Remove the TPS and STPS with the special tool.

TOOL 09930-11950: Torx wrench

NOTE:

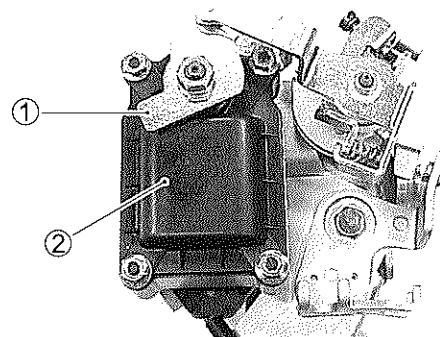
Prior to disassembly, mark each sensor's original position with a paint or scribe for accurate reinstallation.



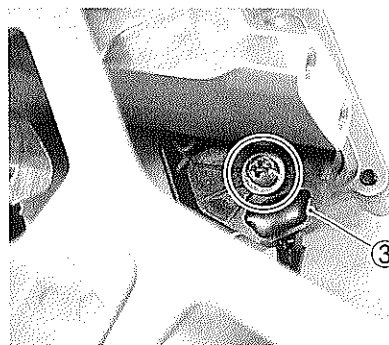
- Remove the fast idle cam ① by removing its mounting nut.

CAUTION

**Do not attempt to disassemble the secondary throttle valve actuator assembly. (Except for the cover ②)
Actuator is available only as an assembly.**

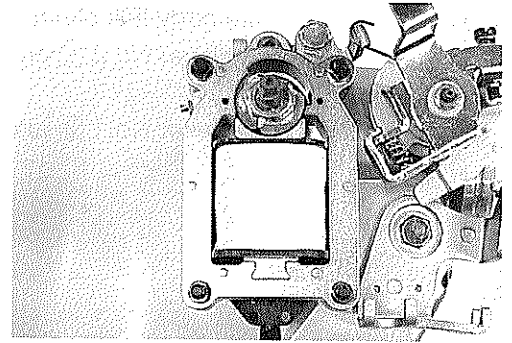


- Remove the STVA motor lead wire connector ③ by removing the screw.

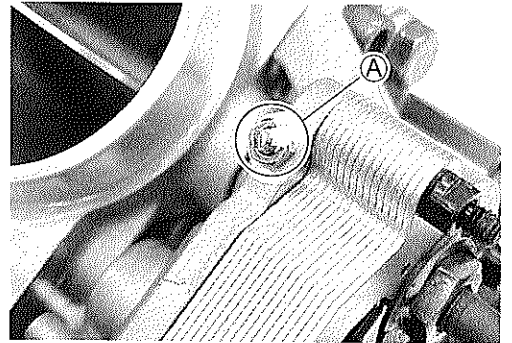


CAUTION

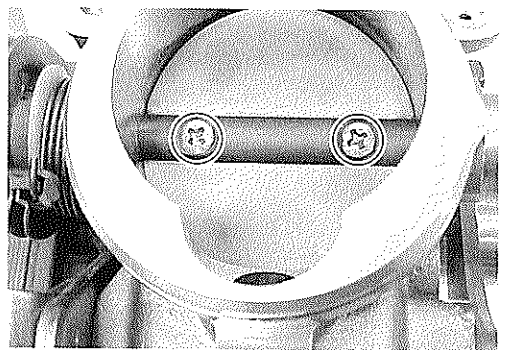
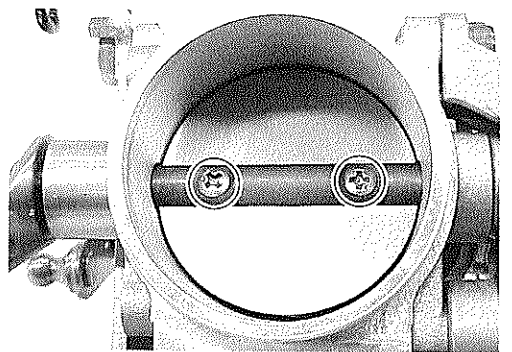
Never remove the STVA motor yoke and motor.

**CAUTION**

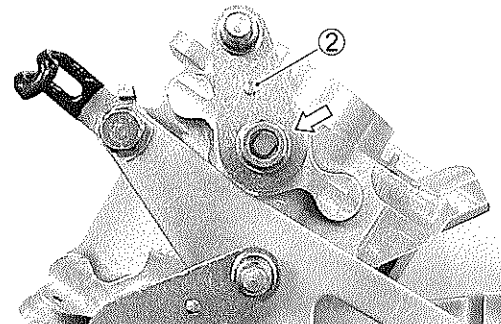
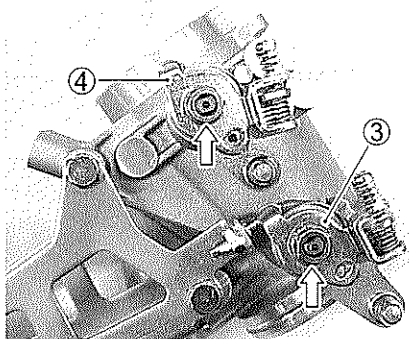
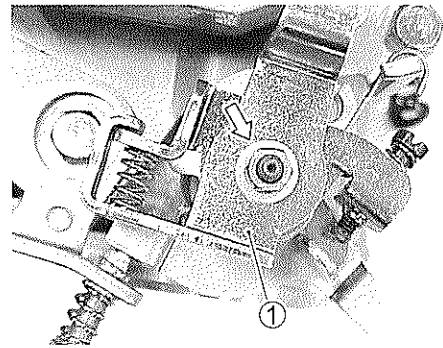
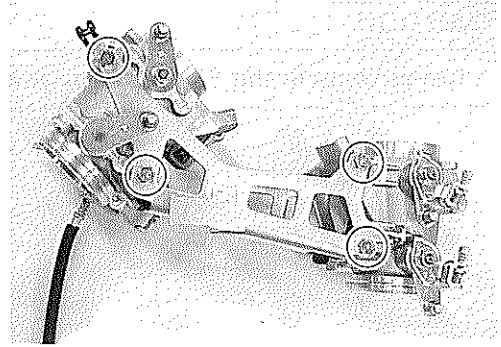
Avoid removing the STV adjuster **A** unless absolutely necessary.

**CAUTION**

Never remove the throttle valve and secondary throttle valve.



- Remove the throttle body link plates.
- Remove the throttle lever No.2 ① and secondary throttle lever No.2 ②.
- Remove the throttle lever No.1 ③ and secondary throttle lever No.1 ④.



THROTTLE BODY CLEANING

▲ WARNING

Some carburetor cleaning chemicals, especially dip-type soaking solutions, are very corrosive and must be handled carefully. Always follow the chemical manufacturer's instructions on proper use, handling and storage.

- Clean all passageways with a spray-type carburetor cleaner and blow dry with compressed air.

CAUTION

Do not use wire to clean passageways. Wire can damage passageways. If the components cannot be cleaned with a spray cleaner it may be necessary to use a dip-type cleaning solution and allow them to soak. Always follow the chemical manufacturer's instructions for proper use and cleaning of the throttle body components. Do not apply carburetor cleaning chemicals to the rubber and plastic materials.

INSPECTION

Check following items for any damage or clogging.


- | | |
|-----------------------------------|-------------------------|
| * O-ring | * Fuel injector filter |
| * Throttle shaft bushing and seal | * Injector cushion seal |
| * Throttle valve | * Injector dust seal |
| * Secondary throttle valve | * Vacuum hose |

THROTTLE BODY REASSEMBLY

Reassemble the throttle body in the reverse order of disassembly.

Pay attention to the following points:


- Be careful not to apply grease to the other parts when applying the grease to the shaft.

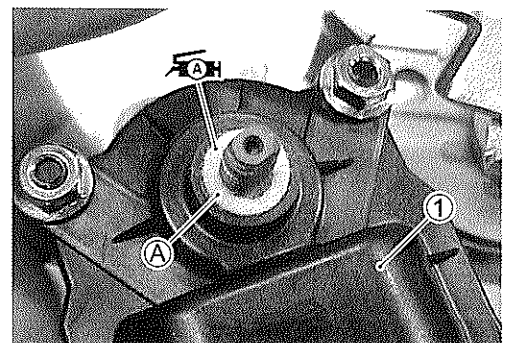
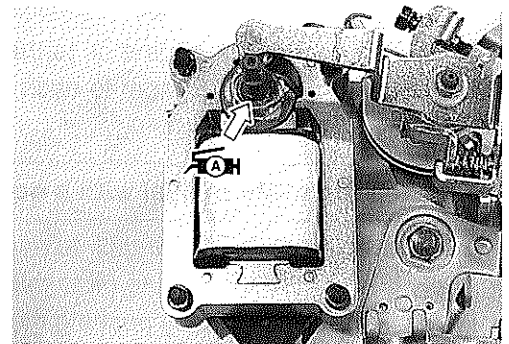
 99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)

- Install the actuator cover ①.

NOTE:

Before installing the cover ①, apply grease lightly to the dust seal ②.

 99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)



- Apply thread lock "1342" to the actuator cover nuts and tighten them.

 **99000-32050: THREAD LOCK "1342"**

 **STVA cover nut: 2.0 N·m (0.2 kgf-m, 1.5 lb-ft)**

- Install the fast idle cam and tighten its mounting nut.

 **Fast idle cam mounting nut: 4.0 N·m (0.4 kgf-m, 3.0 lb-ft)**

- Tighten the throttle body link plate bolts securely.

 **Throttle body link plate bolt: 5 N·m (0.5 kgf-m, 3.7 lb-ft)**

- Position the TV control lever between the TV synchronizing screw (A) and spring as shown.
- Set each TV to the same opening by turning the synchronizing screw (A).
- Position the STV control lever between the STV balance screw (B) and spring as shown.

NOTE:

Apply grease to the screw end and spring if necessary.

- Apply thin coat of the engine oil to the new fuel injector cushion seals (1), and install them to each fuel injector.

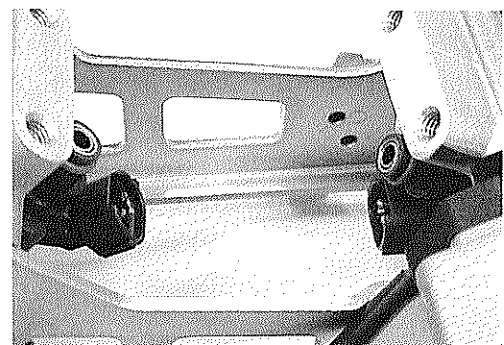
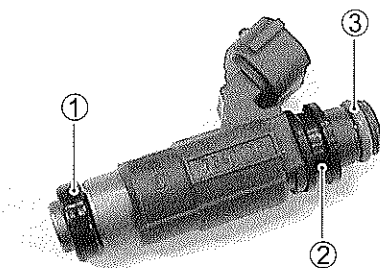
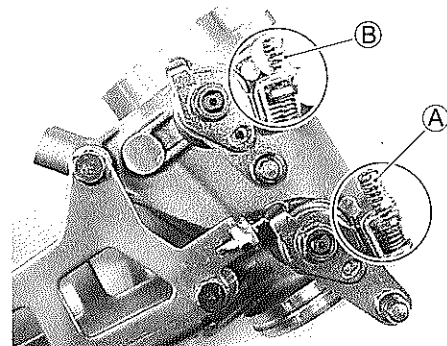
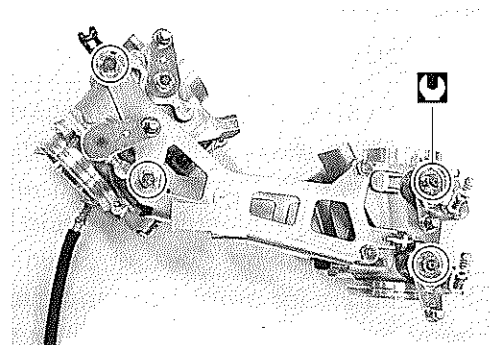
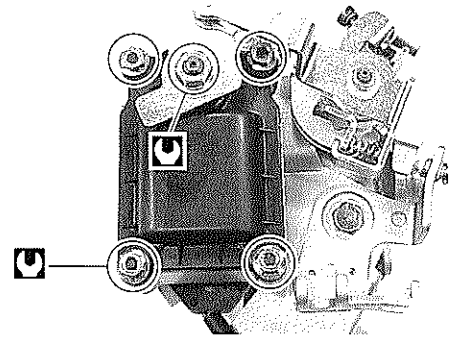
CAUTION

Replace the cushion seal with a new one.

- Install the seal (2) and O-ring (3) to each fuel injector.
- Apply thin coat of the engine oil to the new O-rings (3).
- Install the fuel injectors by pushing them straight to each throttle body.

CAUTION

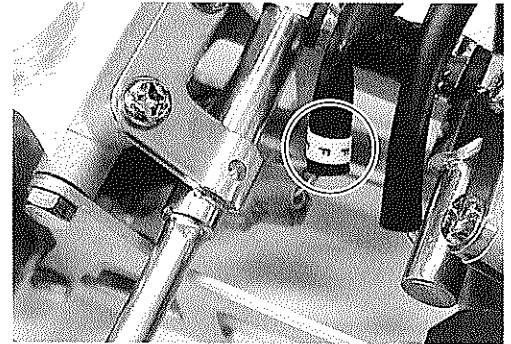
**Replace the dust seal and O-ring with the new ones.
Never turn the injector while pushing it.**



- Connect the fuel injector couplers to the fuel injectors.

NOTE:

The fuel injector coupler No.1 (FRONT) can be distinguished from that of the No.2 (REAR) by the "F" mark.



- Install the fuel delivery pipe assembly to the throttle body assembly.

CAUTION

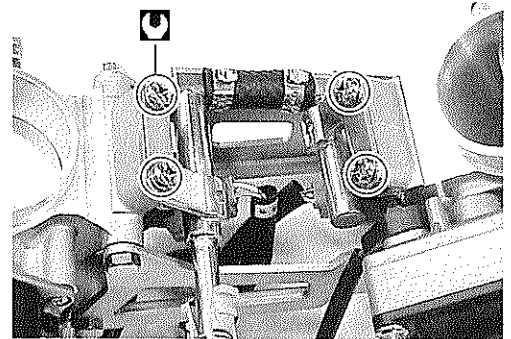
Never turn the fuel injectors while installing them.

- Tighten the fuel delivery pipe mounting screws.



Fuel delivery pipe mounting screw:

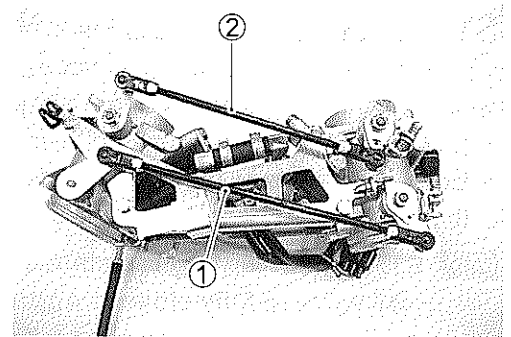
5 N·m (0.5 kgf·m, 3.7 lb-ft)



- Install the throttle link rod ① and secondary throttle link rod ②.

NOTE:

The throttle link rod ① is longer than the secondary throttle link rod ②.

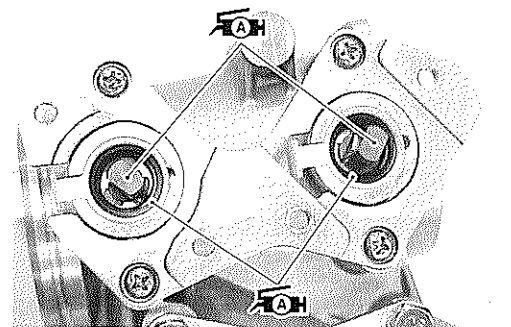


- Apply a small quantity of grease to the shaft ends and seal lips.



99000-25030: SUZUKI SUPER GREASE "A" (USA)

99000-25010: SUZUKI SUPER GREASE "A" (Others)



- With the STV fully closed, install the STP sensor.



09930-11950: Torx wrench



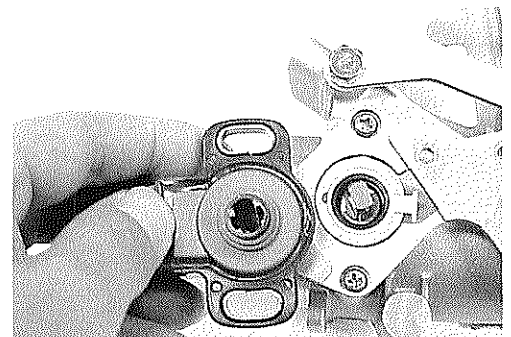
STP sensor mounting screw: 3.5 N·m (0.35 kgf·m, 2.5 lb-ft)

NOTE:

STP sensor and TP sensor reassemble each other very closely in external appearance.

Make sure to check the terminal numbers of coupler.

STP sensor: 4-pin TPS sensor: 3-pin



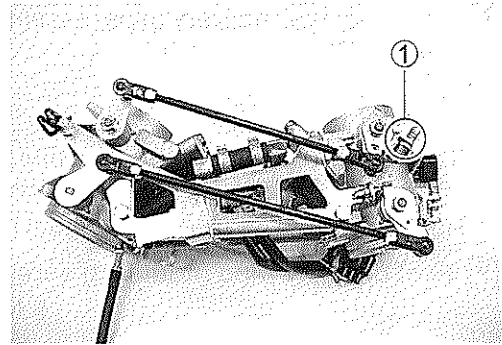
- With the TV fully closed, install the TP sensor.

TOOL 09930-11950: Torx wrench

U TP sensor mounting screw: 3.5 N·m (0.35 kgf·m, 2.5 lb-ft)



- Set each STV to the same opening by turning the balance screw ①.



STP SENSOR ADJUSTMENT

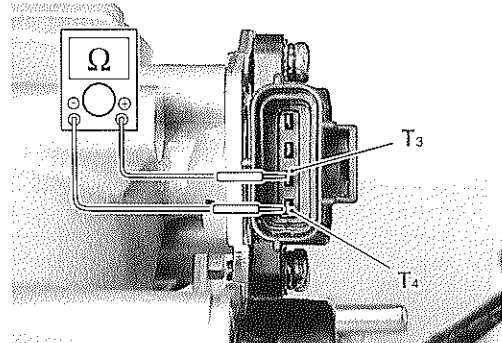
If the STP sensor adjustment is necessary, measure the sensor resistance and adjust the STP sensor positioning as follows:

- Disconnect the STP sensor coupler.
- Set the ST valve to fully close position by finger and measure the resistance T₃ and T₄ terminals.

DATA STP sensor setting resistance

ST valve is fully closed: Approx. 1.1 kΩ

(+ T₃ - - T₄)



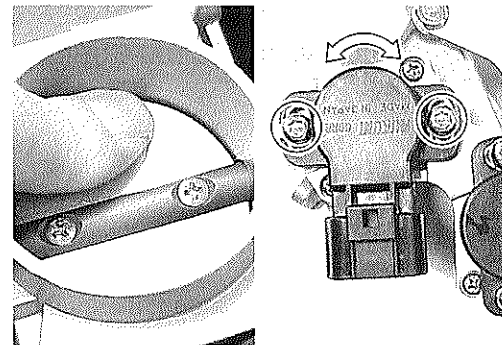
TOOL 09900-25008: Multi circuit tester

U Tester knob indication: Resistance (Ω)

- Loosen the STP sensor mounting screws.
- Adjust the STP sensor until resistance is within specification and tighten the STP sensor mounting screws.

TOOL 09930-11950: Torx wrench

U STP sensor mounting screw: 3.5 N·m (0.35 kgf·m, 2.5 lb-ft)



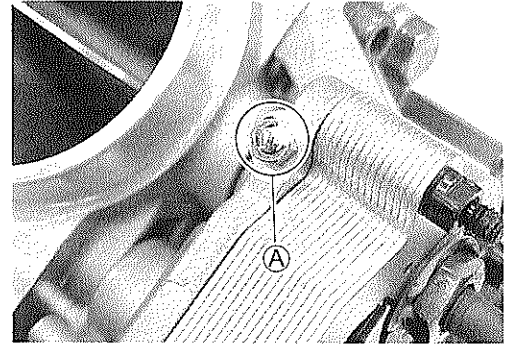
If the measured resistance is not within specification, adjust the STV adjuster **A** as follows:

- Under above condition, turn in or out the STV adjuster **A** until the resistance becomes specified value.

If the measured resistance is not obtain, replace the STP sensor with a new one, and adjust the STP sensor positioning again.

NOTE:

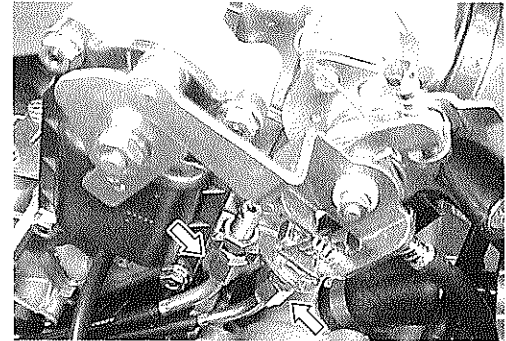
To adjust the TP sensor, install the throttle body assembly to the engine and after warming up engine. (☞ 4-64)



THROTTLE BODY INSTALLATION

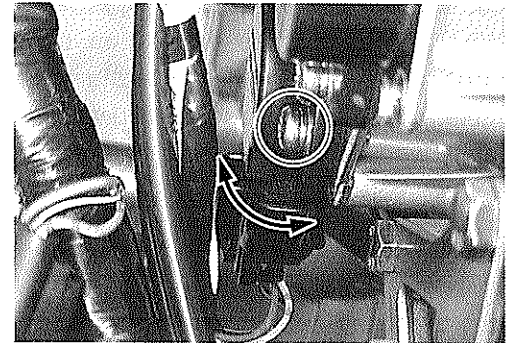
Installation is in the reverse order of removal. Pay attention to the following points:

- 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 2-16 for details.



TP SENSOR ADJUSTMENT

- After checking or adjusting the throttle valve synchronization, adjust the TP sensor positioning as follows:
- After warming up engine, adjust the idling speed to $1\ 200 \pm 100$ rpm.
- Stop the warmed-up engine and connect the special tool to the dealer mode coupler. (☞ 4-24)

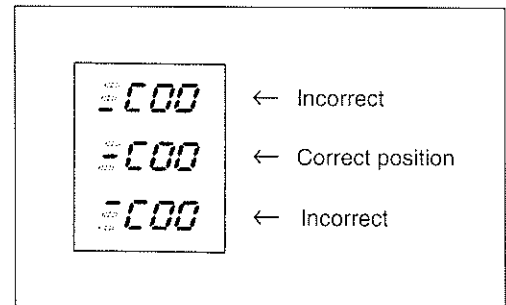


TOOL 09930-82710: Mode select switch

- If the TP sensor adjustment is necessary, loosen the TP sensor mounting screws.
- Turn the TP sensor and bring the line to middle.
- Tighten the TP sensor mounting screws.

TOOL 09930-11950: Torx wrench

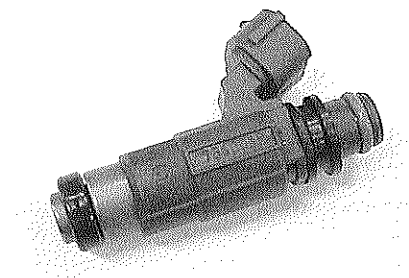
TP sensor mounting screw: 3.5 N·m (0.35 kgf·m, 2.5 lb·ft)



FUEL INJECTOR INSPECTION

The fuel injector can be checked without removing it from the throttle body.

Refer to page 4-47 for details.



FUEL INJECTOR REMOVAL

- Remove the fuel tank and air cleaner box. (☞ 4-52 and -60)
- Remove the fuel delivery pipe assembly. (☞ 4-61)
- Disconnect the injector couplers.
- Remove the fuel injectors No.1 and No.2. (☞ 4-62)

INSPECTION

Check fuel injector filter for evidence of dirt and contamination. If present, clean and check for presence of dirt in the fuel lines and fuel tank.

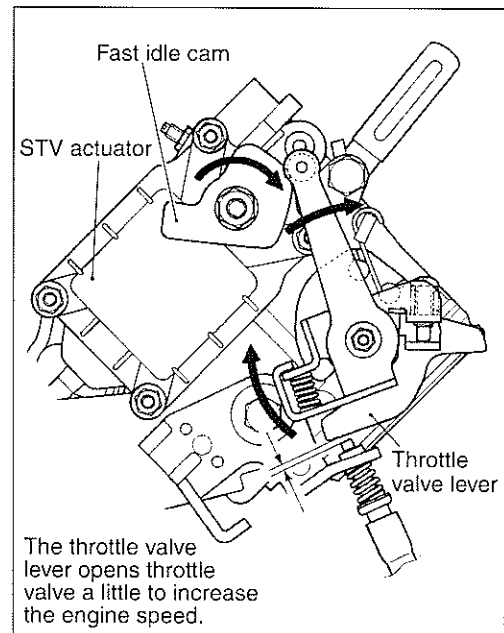
FUEL INJECTOR INSTALLATION

- Apply thin coat of the engine oil to new injector cushion seals and O-rings.
- Install the injector by pushing it straight to the throttle body. Never turn the injector while pushing it. (☞ 4-67)

FAST IDLE INSPECTION

The fast idle system is automatic type.

When the fast idle cam is turned by the secondary throttle valve actuator, the cam pushes the lever on the throttle valve shaft causing the throttle valve to open and raise the engine speed. When the engine has warmed up, depending on the water temperature and ambient temperature as shown in the following table, the fast idle is cancelled allowing the engine to resume idle speed.



DATA

Ambient Temp.	Fast idle rpm	Fast idle cancelling Water Temp.
- 5 °C (- 23 °F)	1 800 - 2 400 rpm	50 - 60 °C (122 - 140 °F)
15 °C (59 °F)	1 700 - 2 300 rpm	45 - 55 °C (113 - 131 °F)
25 °C (77 °F)	1 500 - 2 100 rpm	45 - 55 °C (113 - 131 °F)

If, under the above conditions, the fast idle cannot be cancelled, the cause may possibly be short-circuit in engine coolant temperature sensor or wiring connections or maladjusted fast idle.

FAST IDLE ADJUSTMENT

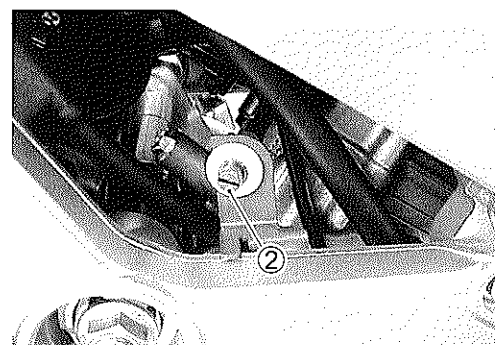
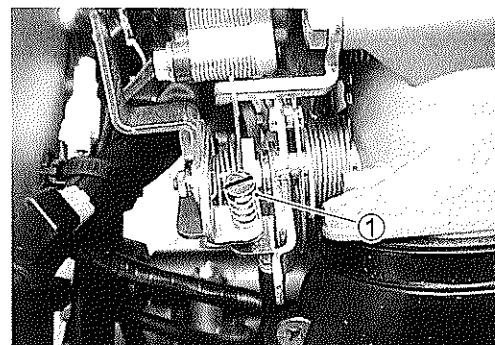
- Remove the fuel tank and air cleaner box. (☞ 4-52 and -60)
- Disconnect the STVA lead wire coupler and turn the ignition switch ON.
- Open the STV gradually with the finger and just when the STP sensor output voltage has become 3.0 V. With the STV held at this position, measure the output voltage of the TP sensor.
- If the TP sensor output voltage is out of specification, turn the fast idle adjusting screw ① and adjust the output voltage to specification (1.158 V).

DATA TP sensor output voltage: 1.158 V

TOOL 09900-25008: Multi circuit tester

Tester knob indication: Voltage (V)

- After adjusting the fast idle speed, set the idle speed to 1 100 – 1 300 rpm by turning the throttle stop screw ②.



THROTTLE VALVE SYNCHRONIZATION

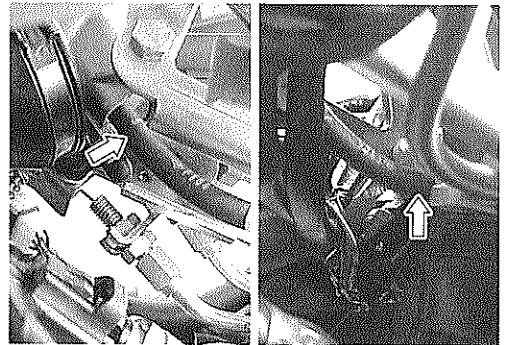
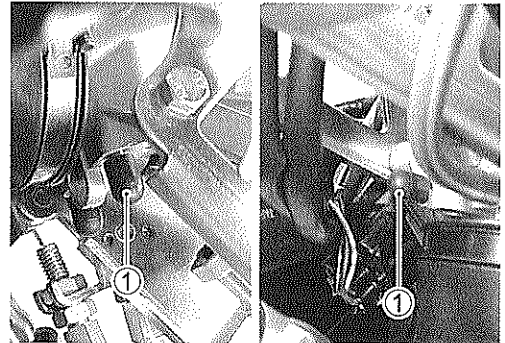
Check and adjust the throttle valve synchronization between two cylinders.

TOOL 09913-13121: Vacuum balancer gauge

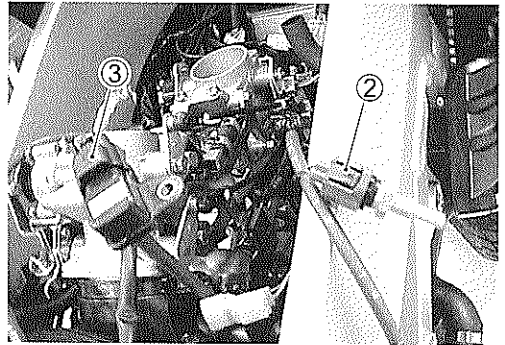
NOTE:

Before balancing the throttle valves, calibrate each vacuum balancer gauge.

- Remove the fuel tank and air cleaner box. (➡ 4-52 and -60)
- Remove the rubber caps ① from the vacuum nipples on the respective throttle bodies and connect the vacuum balancer gauge hoses to each vacuum nipple.



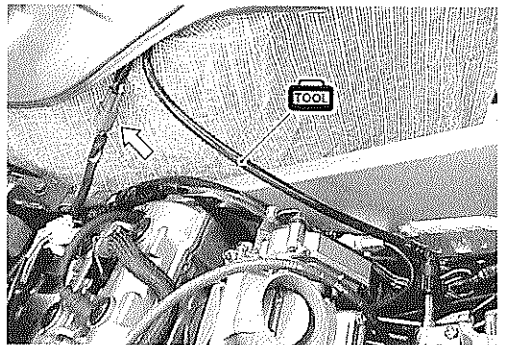
- Connect the removed IAT sensor ② and IAP sensor ③.



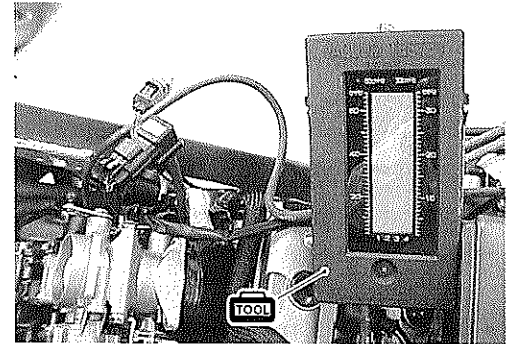
- Connect the fuel tank and fuel delivery pipe with the fuel feed hose (special tool).

TOOL 09940-40220: Fuel pressure gauge hose attachment

- Connect the fuel pump lead wire coupler.



- Start up the engine and run it in idling condition for warming up.
- Stop the warmed-up engine.
- Connect a tachometer and start up the engine.
- Bring the engine rpm to 1 200 rpm by the throttle stop screw.
- Check the vacuum of the two cylinders and balance the two throttle valves with the synchronizing screw. (☞ 4-66)



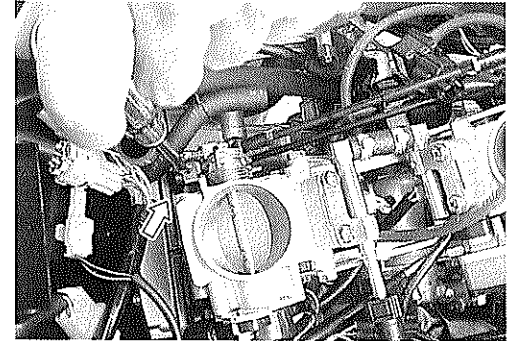
NOTE:

* During balancing the throttle valves, always set the engine rpm at 1 200 rpm, using throttle stop screw.

* After balancing the two valves, set the idle rpm to 1 200 rpm.

CAUTION

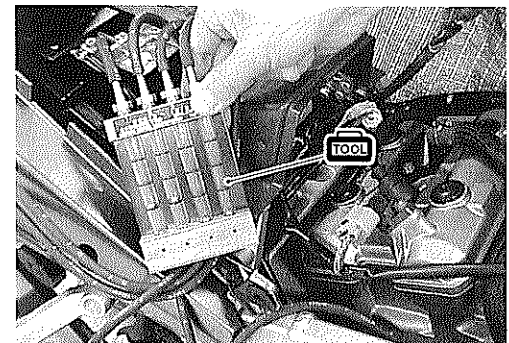
Avoid drawing dirt into the throttle body while running the engine without air cleaner box. Dirt drawn into the engine will damage the internal engine parts.



For vacuum balancer gauge (09913-13121)

The vacuum gauge is positioned approx. 30° from the horizontal level, and in this position the two balls should be within one ball dia. If the difference is larger than one ball, turn the synchronizing screw on the throttle body and bring the ball to the same level.

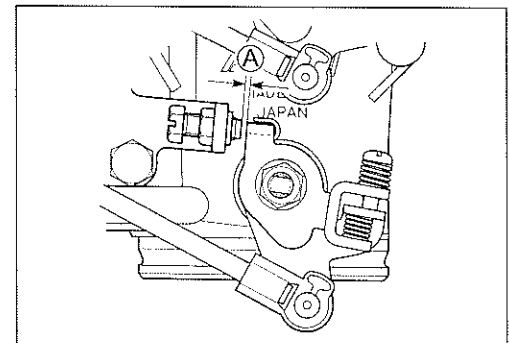
A correctly adjusted throttle valve synchronization has the balls in the No.1 and No.2 at the same level.



NOTE:

Make sure that the throttle lever should have a gap \textcircled{A} (between the throttle lever and throttle lever stopper screw) during synchronization.

DATA Throttle lever gap \textcircled{A} : 0.31 mm (0.012 in)



THROTTLE CABLE ADJUSTMENT

NOTE:

Minor adjustment can be made by the throttle grip side adjuster. (☞ 2-15)

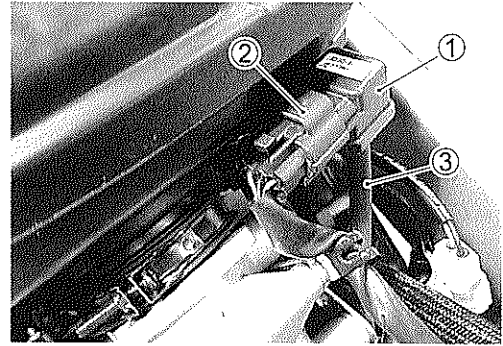
SENSOR

IAP SENSOR INSPECTION

The intake air pressure sensor is located at the rear side of the air cleaner box. (☞ 4-34)

IAP SENSOR REMOVAL/INSTALLATION

- Lift and support the fuel tank. (☞ 4-51)
- Remove the IAP sensor ① by removing the screw and disconnect the coupler ② and vacuum hose ③.
- Installation is in the reverse order of removal.

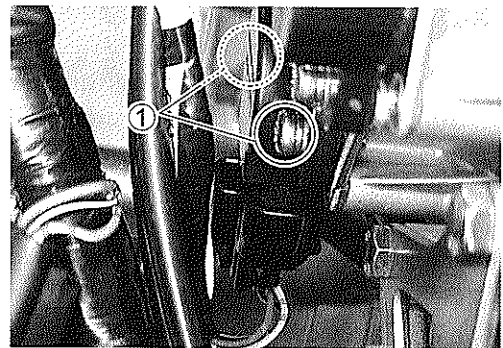


TP SENSOR INSPECTION

- The throttle position sensor is installed on the No.1 throttle body. (☞ 4-36)

TP SENSOR REMOVAL/INSTALLATION

- Remove the fuel tank and air cleaner box. (☞ 4-52 and -60)
- Remove the TP sensor setting screws ① and disconnect the coupler.
- Install the TP sensor to the No.1 throttle body. Refer to page 4-68 for TP sensor setting procedure.

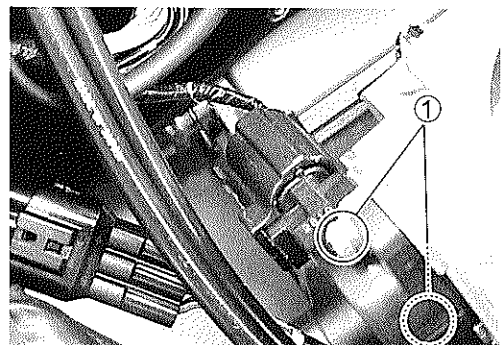


STP SENSOR INSPECTION

The secondary throttle position sensor is installed on the No.1 throttle body. (☞ 4-44)

STP SENSOR REMOVAL/INSTALLATION

- Remove the fuel tank and air cleaner box. (☞ 4-52 and -60)
- Remove the STP sensor setting screws ① and disconnect the coupler.
- Install the STP sensor to the No.1 throttle body. Refer to pages 4-67 and -68 for STP sensor setting procedure.

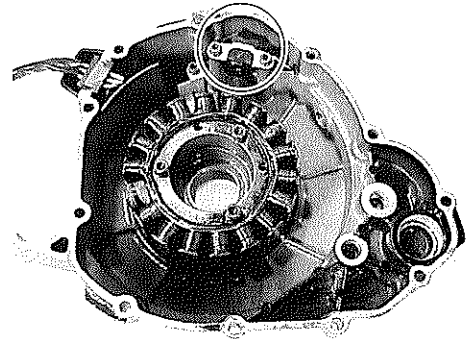
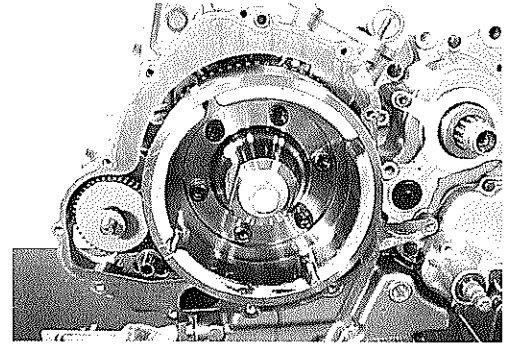


CKP SENSOR INSPECTION

The signal rotor is mounted on the generator rotor and crankshaft position sensor (Pick-up coil) is installed in the generator cover. (☞ 4-33)

CKP SENSOR REMOVAL/INSTALLATION

(☞ 3-77)

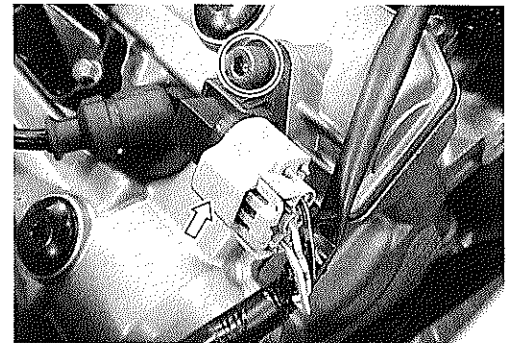


CMP SENSOR INSPECTION

The signal rotor is installed on the No.2 intake camshaft, and the camshaft position sensor (Pick-up coil) is installed on the No.2 cylinder head cover. (☞ 4-32)

CMP SENSOR REMOVAL/INSTALLATION

- Lift and support the fuel tank. (☞ 4-51)
- Disconnect the coupler and remove the CMP sensor.
Installation is in the reverse order of removal. (☞ 3-34)




IAT SENSOR INSPECTION

The intake air temperature sensor is installed at the rear side of the air cleaner box. (☞ 4-39)

IAT SENSOR REMOVAL/INSTALLATION

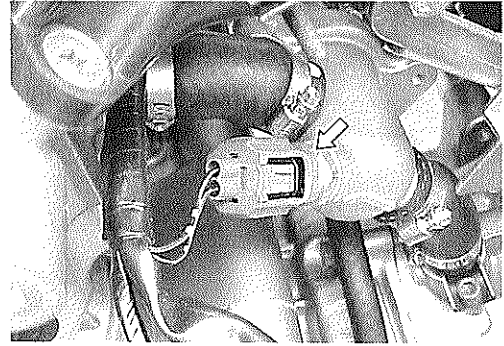
- Lift and support the fuel tank. (☞ 4-51)
- Disconnect the IAT sensor coupler ① and remove the IAT sensor from the air cleaner box.
- Installation is in the reverse order of removal.

 IAT sensor: 18 N·m (1.8 kgf-m, 13.0 lb-ft)



ECT SENSOR INSPECTION

The engine coolant temperature sensor is installed on the thermostat case. (☞ 4-38 and 5-10)

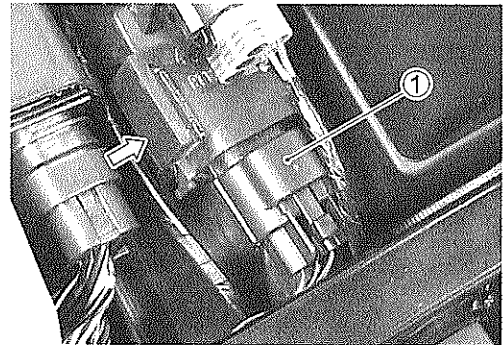


ECT SENSOR REMOVAL/INSTALLATION

(☞ 5-10)

AP SENSOR INSPECTION

The atmospheric pressure sensor is located under the seat. (☞ 4-40)



AP SENSOR REMOVAL/INSTALLATION

- Remove the seat. (☞ 6-4)
- Disconnect the coupler ① and remove the AP sensor.
- Installation is in the reverse order of removal.

TO SENSOR INSPECTION

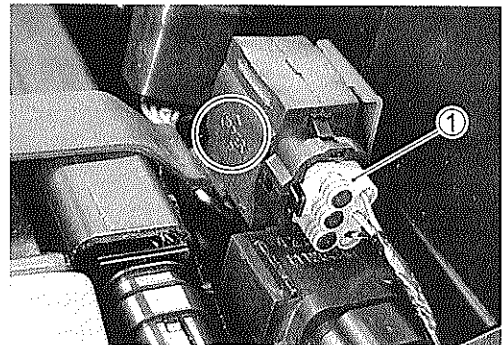
The tip over sensor is located above the AP sensor. (☞ 4-42)

TO SENSOR REMOVAL/INSTALLATION

- Remove the seat. (☞ 6-4)
- Disconnect the coupler ① and remove the TO sensor.
- Installation is in the reverse order of removal.

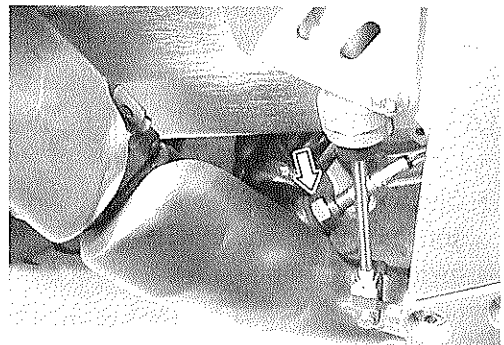
NOTE:

When installing the TO sensor, bring the "UPPER" letter on it to the top.



HO₂ SENSOR INSPECTION (Except for USA)

The heated oxygen sensor is installed on the exhaust pipe. (☞ 4-49)



HO₂ SENSOR REMOVAL/INSTALLATION

- Remove the engine under cover.
- Disconnect the HO₂ sensor lead wire couplers.
- Remove the HO₂ sensor unit.

⚠ WARNING

Do not remove the HO₂ sensor while it is hot.

CAUTION

Be careful not to expose it to excessive shock.
Do not use an impact wrench while removing or installing the HO₂ sensor unit.
Be careful not to twist or damage the sensor lead wire.

- Installation is in the reverse order of removal.

CAUTION

Do not apply oil or other materials to the sensor air hole.

- Tighten the sensor unit to the specified torque.

ⓘ HO₂ SENSOR: 47.5 N·m (4.75 kgf-m, 34.3 lb-ft)

- Route the HO₂ sensor lead wire into the frame. (☞ 8-16)
- Connect the HO₂ sensor couplers.

