

# FI SYSTEM DIAGNOSIS

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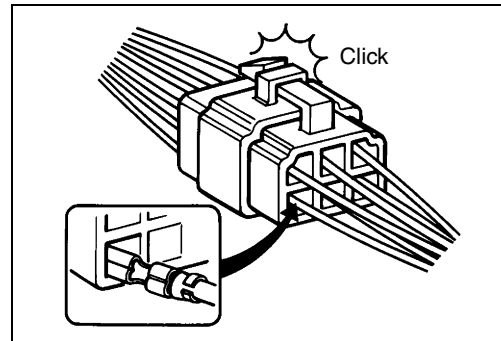
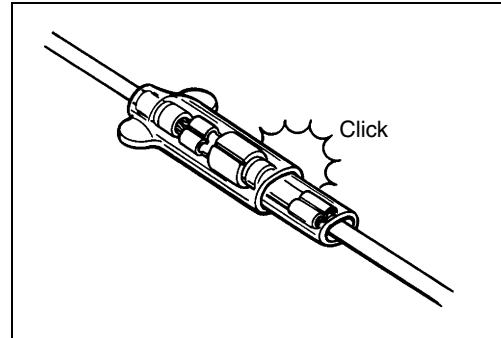
## PRECAUTIONS IN SERVICING

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

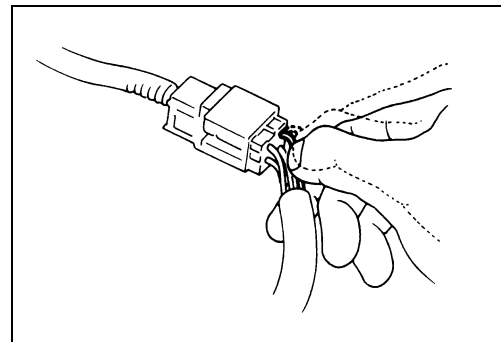
### ELECTRICAL PARTS

#### CONNECTOR/COUPLER

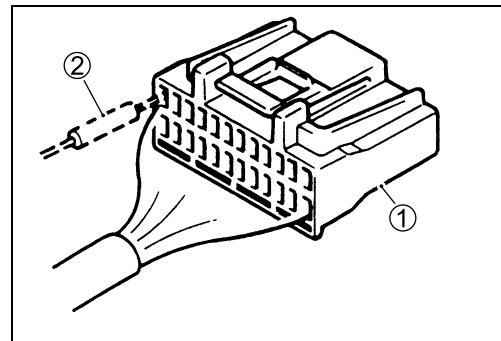
- When connecting a connector, be sure to push it in until a click is felt.
- With a lock type coupler, be sure to release the lock when disconnecting, and push it in fully till the works when connecting it.
- When disconnecting the coupler, be sure to hold the coupler body and do not pull the lead wires.
- 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.



- ① Coupler
- ② Probe

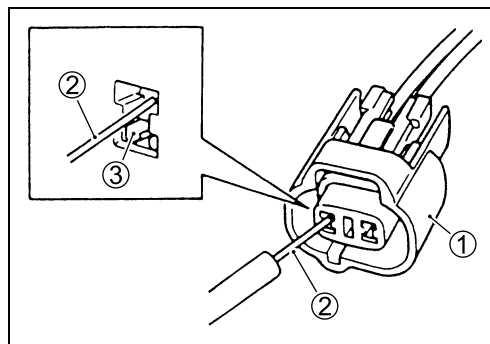
- When connecting meter probe from the terminal side of the coupler (connection from harness side not being possible), use extra care not to force and cause the male terminal to bend or the female terminal to open.

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

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

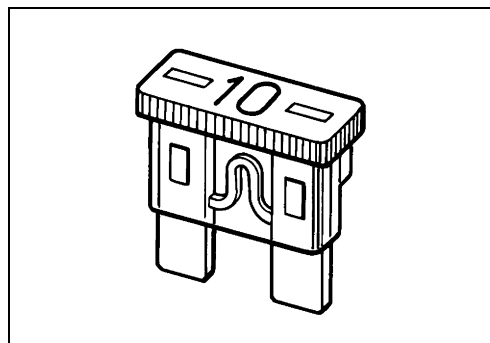
- Check the male connector for bend and female connector for excessive opening. Also check the coupler for locking (looseness), corrosion, dust, etc.

- ① Coupler
- ② Probe
- ③ Where male terminal fits.



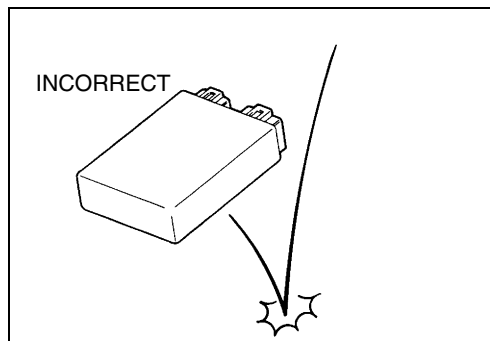
## FUSE

- 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.

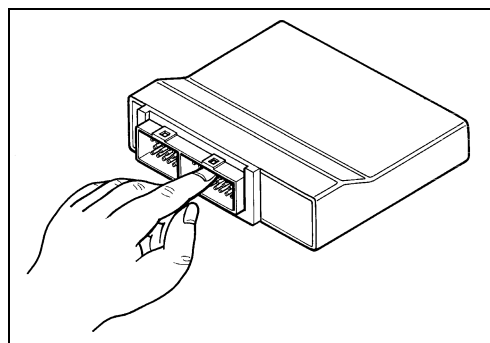


## ECM/VARIOUS SENSORS

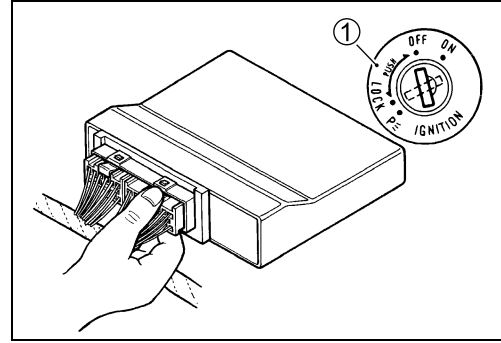
- Since each component is a high-precision part, great care should be taken not to apply any sharp impacts during removal and installation.



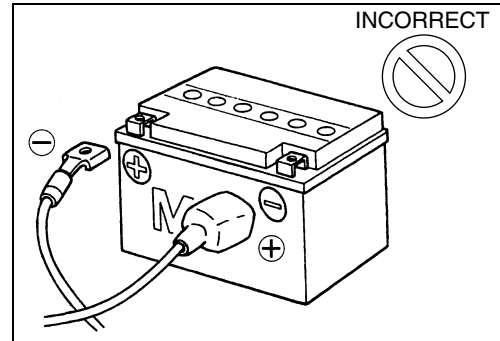
- Be careful not to touch the electrical terminals of the ECM. The static electricity from your body may damage this part.



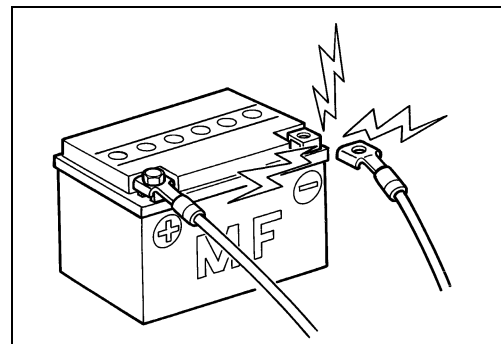
- When disconnecting and connecting the ECM, make sure to turn OFF the ignition switch ①, or electronic parts may get damaged.



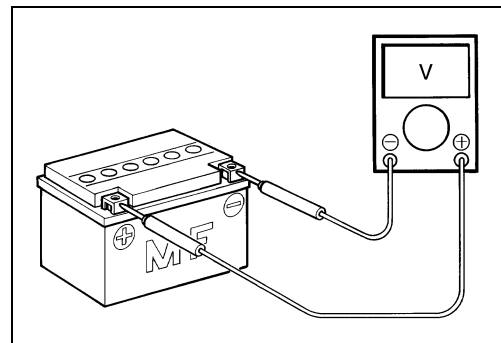
- Battery connection in reverse polarity is strictly prohibited. Such a wrong connection will damage the components of the FI system instantly when reverse power is applied.



- 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

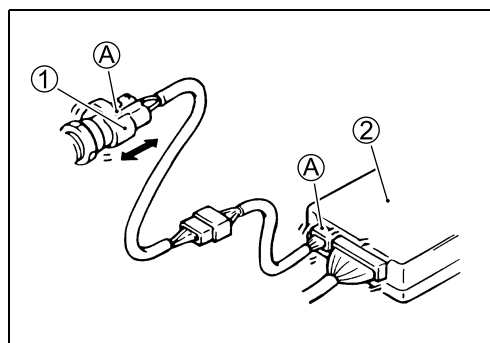
While there are various methods for electrical circuit inspection, described here is a general method to check for open and short circuit using an ohmmeter and a voltmeter.

### OPEN CIRCUIT CHECK

Possible causes for the open circuits 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.

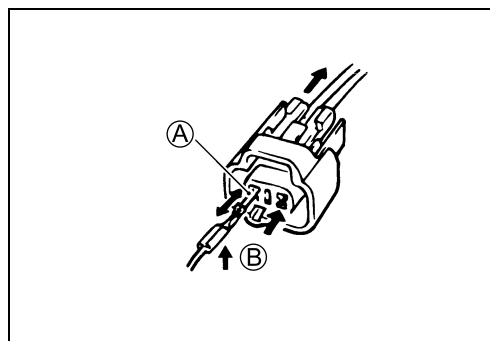
- ① Sensor
- ② ECM
- Ⓐ Check for loose connection.



- 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.

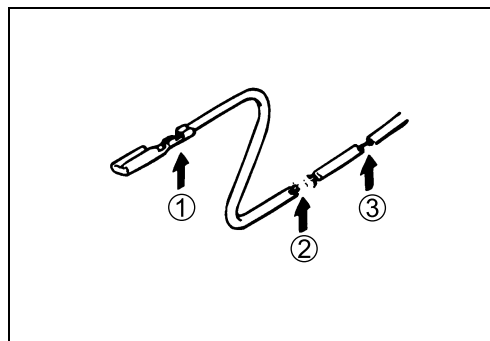
The terminals must be clean and free of any foreign material which could impede proper terminal contact.

- Ⓐ Check contact tension by inserting and removing.
- Ⓑ Check each terminal for bend and proper alignment.



- 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.

- ① Looseness of crimping
- ② Open
- ③ Thin wire (a few strands left)

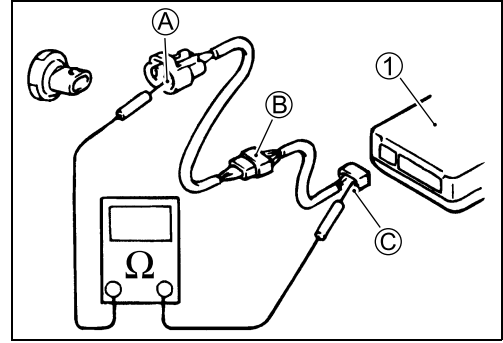


**Continuity check**

- Measure resistance across coupler ② (between ① and ③ in the figure).

If no continuity is indicated (infinity or over limit), the circuit is open between terminals ① and ③.

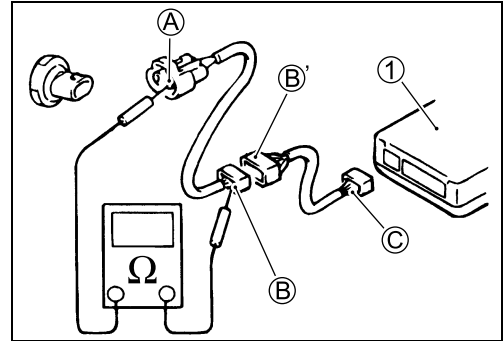
① ECM



- Disconnect the coupler ② and measure resistance between couplers ① and ②.

If no continuity is indicated, the circuit is open between couplers ① and ②. If continuity is indicated, there is an open circuit between couplers ②' and ③ or an abnormality in coupler ②' or coupler ③.

① ECM

**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 ① and ②.

**Voltage Between:**

③ and body ground: Approx. 5 V

② and body ground: Approx. 5 V

① and body ground: 0 V

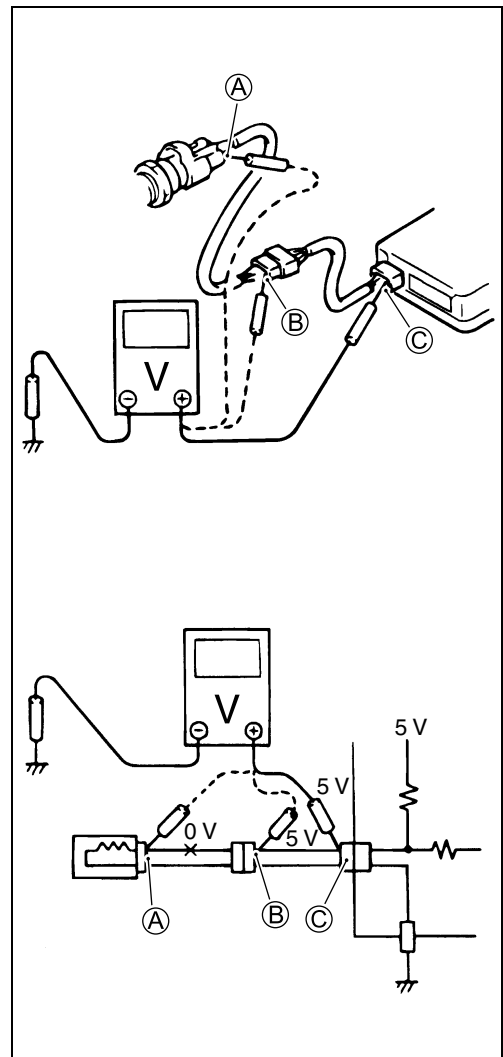
Also, if measured values are as listed below, a resistance (abnormality) exists which causes the voltage drop in the circuit between terminals ① and ②.

**Voltage Between:**

③ and body ground: Approx. 5 V

② and body ground: Approx. 5 V — 2 V voltage drop

① and body ground: 3 V



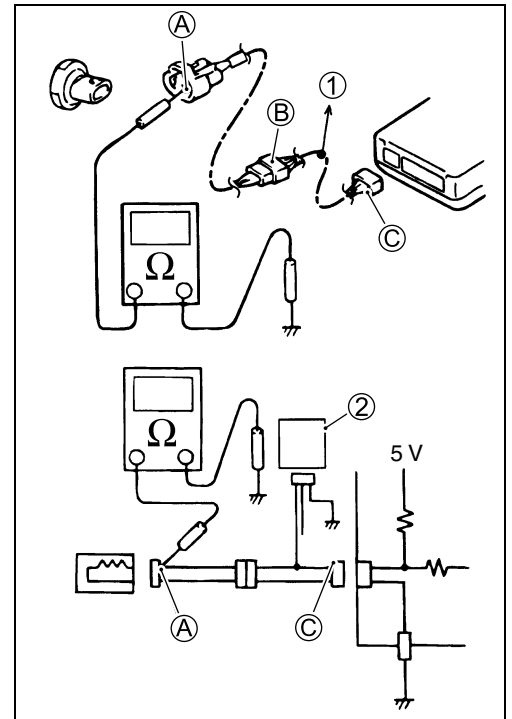
**SHORT CIRCUIT CHECK (WIRE HARNESS TO GROUND)**

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

**NOTE:**

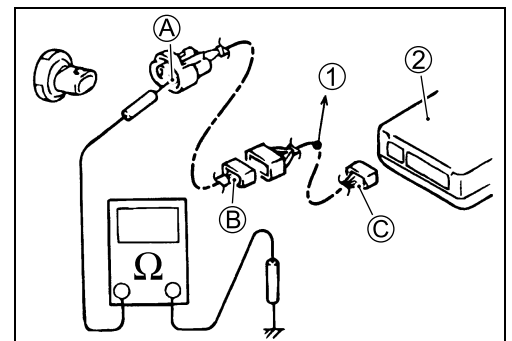
*If the circuit to be checked branches to other parts as shown, disconnect all connectors/couplers of those parts. Otherwise, diagnosis will be misled.*

- 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.
  - ① To other parts.
  - ② Other parts



- 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.

- ① To other parts.
- ② ECM





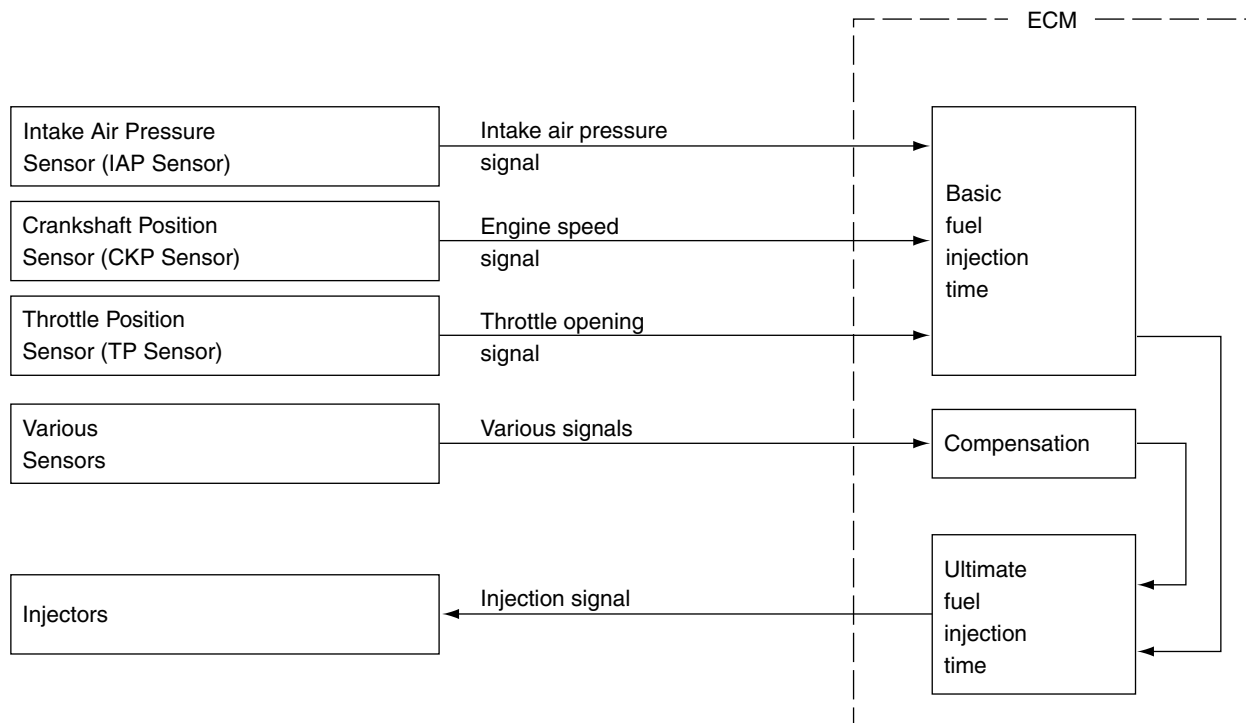


## FI SYSTEM TECHNICAL FEATURES

### INJECTION TIME (INJECTION VOLUME)

The factors to determine the injection time include the basic fuel injection time, which is calculated on the basis of 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)

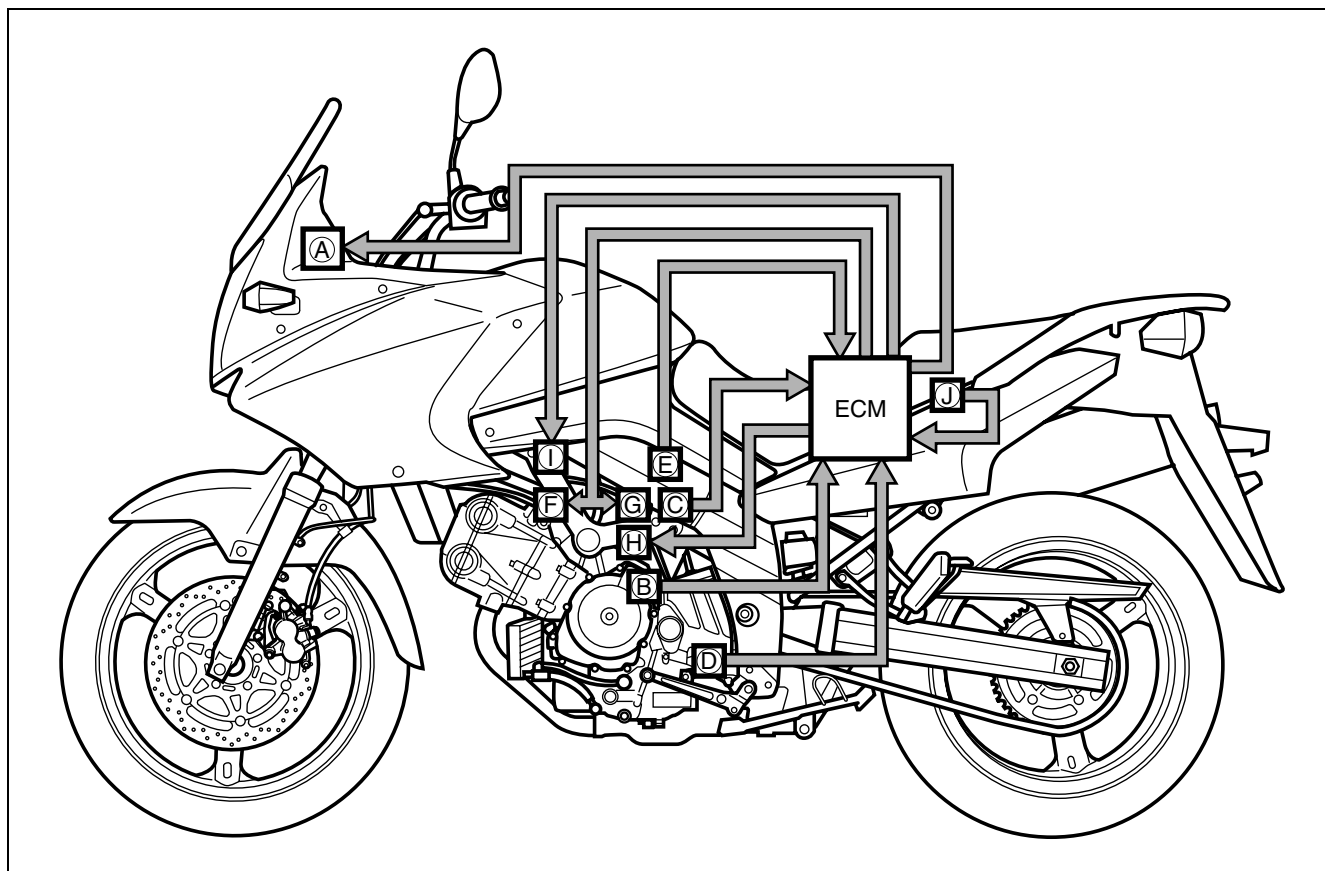
The following different signals are output from the respective sensors for compensation of the fuel injection time (volume).

SIGNAL	DESCRIPTION
ENGINE COOLANT TEMPERATURE SENSOR SIGNAL	When engine coolant temperature is low, injection time (volume) is increased.
INTAKE AIR TEMPERATURE SENSOR SIGNAL	When intake air temperature is low, injection time (volume) is increased.
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.
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

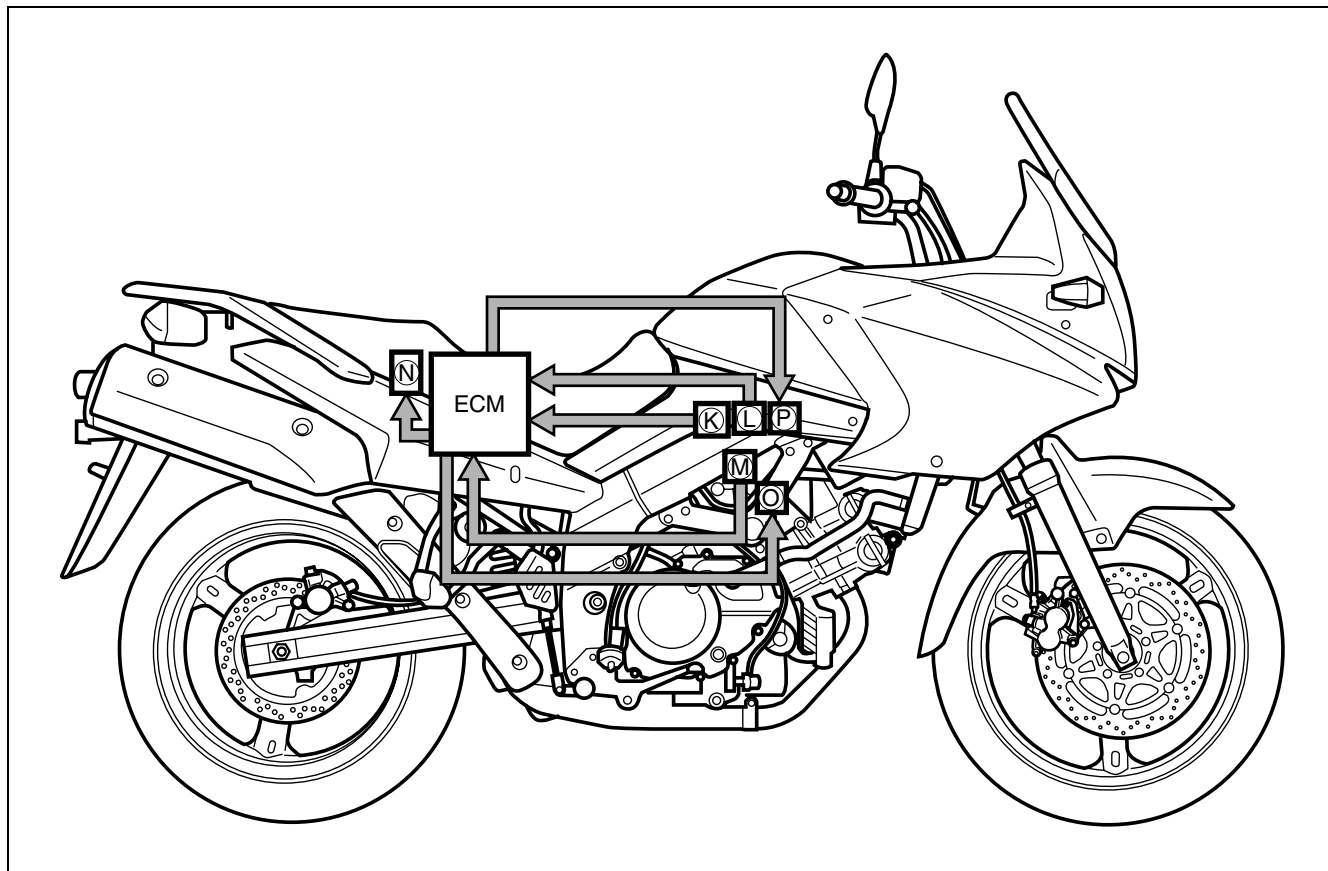
SIGNAL	DESCRIPTION
TIP OVER SENSOR SIGNAL (FUEL SHUT-OFF)	When the motorcycle tips over, the tip over sensor sends a signal to the ECM. Then, this signal cuts OFF current supplied to the fuel pump, fuel injector and ignition coil.
OVER-REV. LIMITER SIGNAL	The fuel injectors stop operation when engine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

## FI SYSTEM PARTS LOCATION



- Ⓐ Speedometer
- Ⓑ CKP sensor
- Ⓒ TP sensor
- Ⓓ Gear position sensor
- Ⓔ STP sensor

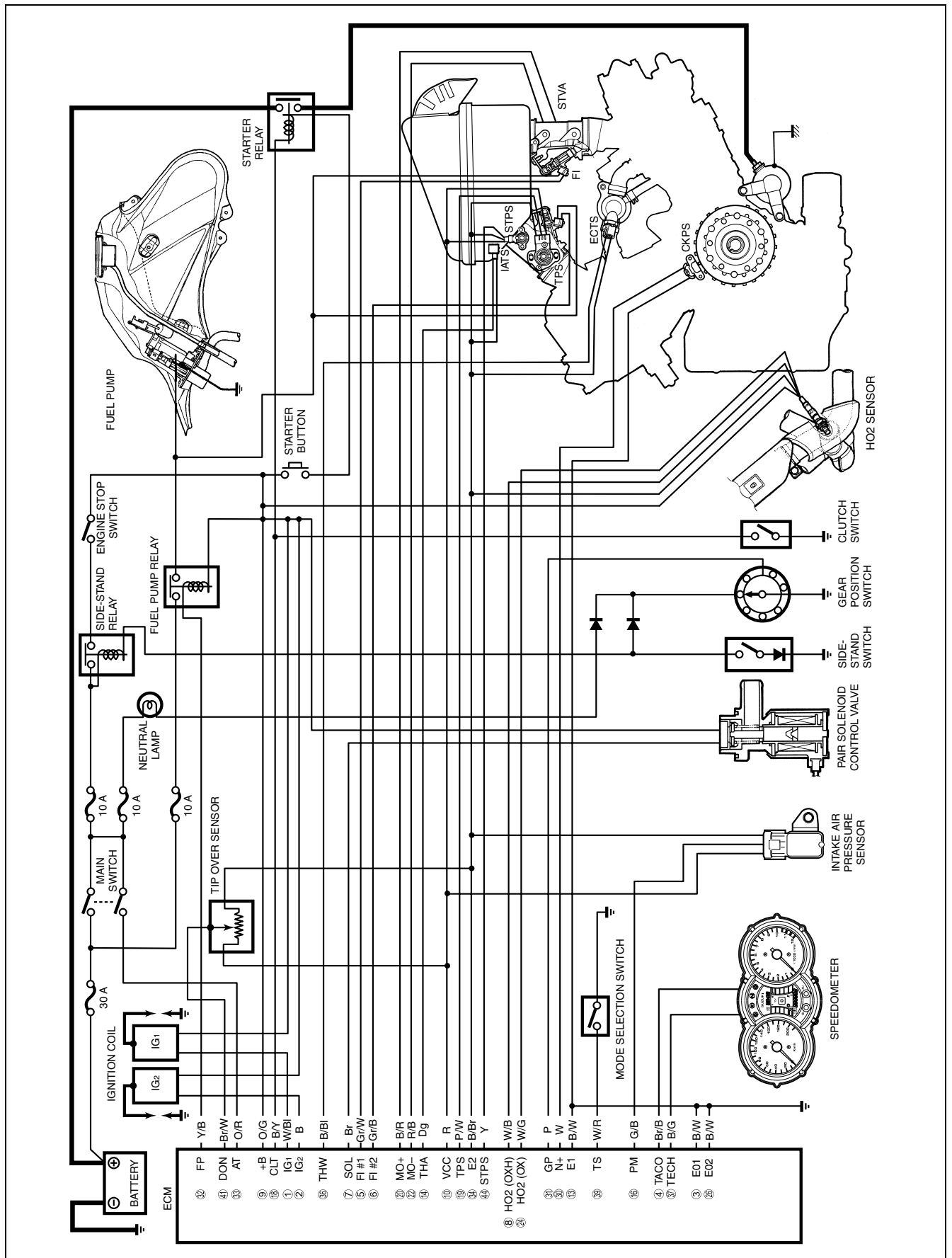
- Ⓕ Fuel injector, No.1
- Ⓖ Fuel injector, No.2
- Ⓗ Ignition coil, No.1
- Ⓘ STVA
- ⓵ TO sensor



- Ⓚ IAP sensor
- Ⓛ IAT sensor
- Ⓜ ECT sensor

- Ⓝ Fuel pump relay
- Ⓞ Ignition coil, No.2
- Ⓟ PAIR control valve

## 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”	Clock	—	—
“YES” Engine can start	Clock and “FI” letters *1	FI light turns ON.	Each 2 sec. Clock or “FI” is indicated.
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 clock 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 speed-meter does not receive any signal from 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.

#### NOTE:

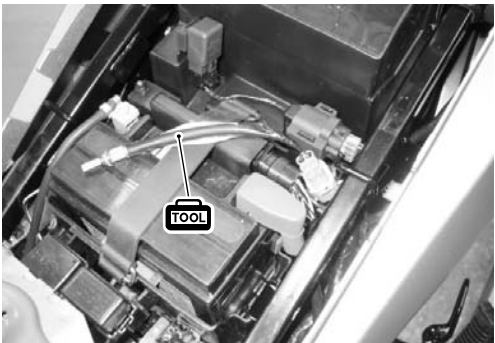
*Until starting the engine, the FI light turns ON.*

*The FI light is also turned ON when engine temperature is high or oil pressure is low.*

DEALER MODE

The defective function is memorized in the computer. Use the special tool's coupler to connect to the dealer mode coupler. (↗ 4-20) 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.

 09930-82720: Mode select switch



CAUTION

- \* Do not disconnect the ECM lead wire couplers, before checking the malfunction code, or the malfunction code memory is erased and the malfunction code can not be checked.
- \* Confirm the malfunction code after ignition ON or cranking the engine for few seconds.

MALFUNCTION	LCD (DISPLAY) INDICATION	FI LIGHT INDICATION	INDICATION MODE
"NO"	C00	"FI" letter 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
C12	Crankshaft position sensor (CKPS)	Pick-up coil signal, signal generator
C13	Intake air pressure sensor (IAPS)	
C14	Throttle position sensor (TPS)	
C15	Engine coolant temperature sensor (ECTS)	
C21	Intake air temperature sensor (IATS)	
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)	
C29	Secondary throttle position sensor (STPS)	
C31	Gear position signal (GP switch)	
C32	Fuel injector signal #1	For #1 cylinder
C33	Fuel injector signal #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 (HO2S)	For E-02, 19
C49	PAIR control solenoid valve	

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

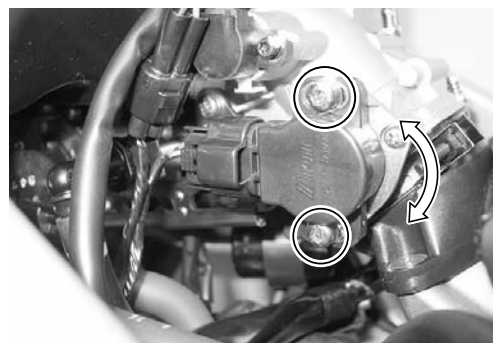
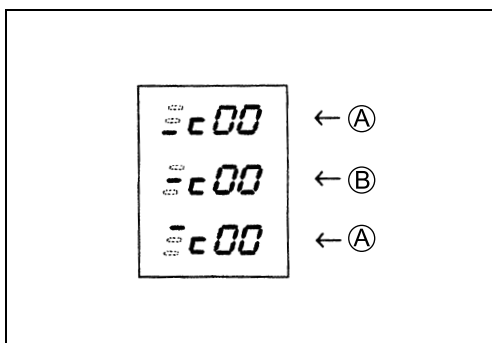
## TPS ADJUSTMENT

1. Warm up the engine and adjust the engine idle speed to  $1\,300 \pm 100$  rpm. (2-15)
2. Stop the engine.
3. Connect the special tool (Mode select switch) and select the dealer mode.
4. If the throttle position sensor adjustment is necessary, loosen the screws and turn the throttle position sensor and bring the line to middle.
5. Then, tighten the screw to fix the throttle position sensor.



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

- (A) Incorrect  
 (B) Correct position



**09930-11950: Torx wrench**  
**09930-82720: Mode select switch**

## 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 and atmospheric pressure are fixed to 760 mmHg.	"YES"	"YES"
Throttle position sensor	The throttle opening signal is fixed to full open position, and STV is fixed at 1/2 open position. Ignition timing is also fixed.	"NO"	"YES"
Engine coolant temperature sensor	Engine coolant temperature value is fixed to 80 °C (176 °F).	"YES"	"YES"
Intake air temperature sensor	Intake air temperature value is fixed to 40 °C (104 °F).	"YES"	"YES"
Ignition signal	#1 #1 Fuel cut	"YES"	"YES"
		#2 cylinder can run.	
	#2 #2 Fuel cut	"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	ECM stops controlling STV.	"YES"	"YES"
Secondary throttle position sensor	ECM stops controlling STV.	"YES"	"YES"
Gear position signal	Gear position signal is fixed to 4th gear.	"YES"	"YES"
Heated oxygen sensor (E-02, 19)	Fuel-air compensation ratio is fixed to normal condition.	"YES"	"YES"
PAIR control solenoid valve	ECM stops controlling PAIR control solenoid valve.	"YES"	"YES"

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"/> <b>Difficult Starting</b> <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"/> <b>Poor Driveability</b> <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"/> Engine rpm jumps briefly <input type="checkbox"/> Other _____
<input type="checkbox"/> <b>Poor Idling</b> <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"/> <b>Engine Stall when</b> <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	
<b>Environmental condition</b>	
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
<b>Motorcycle condition</b>	
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"/> 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" (☞ 4-14, 15) carefully to have good understanding as to what functions are available and how to use it.

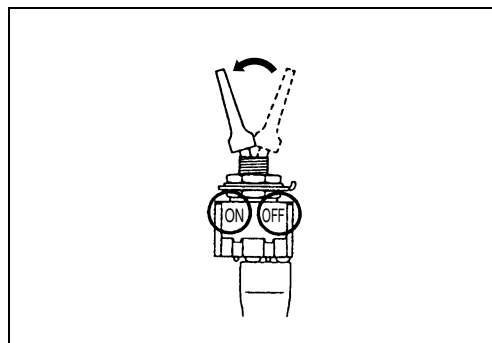
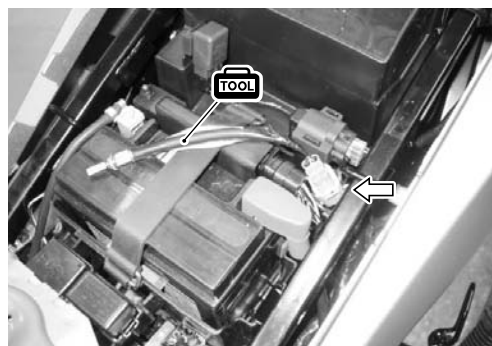
Be sure to read "PRECAUTIONS for Electrical Circuit Service" (☞ 4-2) before inspection and observe what is written there.

- Remove the seat. (☞ 7-4)
- Connect the special tool to the dealer mode coupler at the wiring harness, and start the engine or crank the engine for 4 seconds and more.
- Turn the special tool's switch ON and check the malfunction code to determine the malfunction part.

 **09930-82720: Mode select switch**

### NOTE:

*The dealer mode coupler is located inside of the left frame cover.*



## SELF-DIAGNOSIS RESET PROCEDURE

- After repairing the trouble, turn OFF the ignition switch and turn ON again.
- If C00 is indicated, the malfunction codes are 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	—————
C12	Crankshaft position sensor	The signal does not reach ECM for 3 sec. and more, after receiving the IAP signal.
		The crankshaft position sensor wiring and mechanical parts. (Crankshaft position sensor, lead wire/coupler connection)
C13	Intake air pressure sensor	The sensor should produce following voltage. $0.1\text{ V} \leq \text{sensor voltage} \leq 4.8\text{ V}$ Without the above range for 4 sec. and more, C13 is indicated.
		Intake air pressure sensor, lead wire/coupler connection.
C14	Throttle position sensor	The sensor should produce following voltage. $0.1\text{ V} \leq \text{sensor voltage} < 4.8\text{ V}$ Without the above range for 4 sec. and more, C14 is indicated.
		Throttle position sensor, lead wire/coupler connection.
C15	Engine coolant temperature sensor	The sensor voltage should be the following. $0.1\text{ V} \leq \text{sensor voltage} < 4.6\text{ V}$ Without the above range for 4 sec. and more, C15 is indicated.
		Engine coolant temperature sensor, lead wire/coupler connection.
C21	Intake air temperature sensor	The sensor voltage should be the following. $0.1\text{ V} \leq \text{sensor voltage} < 4.6\text{ V}$ Without the above range for 4 sec. and more, C21 is indicated.
		Intake air temperature sensor, lead wire/coupler connection.
C23	Tip over sensor	The sensor voltage should be the following for 2 sec. and more after ignition switch turns ON. $0.2\text{ V} \leq \text{sensor voltage} \leq 4.6\text{ V}$ Without the above value for 2 sec. and more, C23 is indicated.
		Tip over sensor, lead wire/coupler connection.
C24/C25	Ignition signal #1/#2	Crankshaft position sensor (pick-up coil) signal is produced, but signal from ignition coil is interrupted continuous by 8 times or more. In this case, the code C24 or C25 is indicated.
		Ignition coil, wiring/coupler connection, power supply from the battery.

MALFUNCTION CODE	DETECTED ITEM	DETECTED FAILURE CONDITION
		CHECK FOR
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. $0.1 \text{ V} \leq \text{sensor voltage} \leq 4.8 \text{ V}$ Without the above range for 4 sec. and more, C29 is indicated.
		Secondary throttle position sensor, lead wire/coupler connection.
C31	Gear position signal	It judges from gear position voltage, engine speed and throttle position by ECM, when the gear position voltage is 0.2 V and less.
		Gear position sensor, wiring/coupler connection. Gearshift cam etc.
C32/C33	Fuel injector #1/#2	When fuel injector voltage gets 1.3 V and less, C32 or C33 is indicated.
		Injector, wiring/coupler connection, power supply to the injector.
C41	Fuel pump relay	No voltage is applied to the both injectors #1/#2 for 3 sec. after the contact of fuel pump relay is turned ON. Or voltage is applied to the both injectors #1/#2, when the contact of fuel pump is OFF.
		Fuel pump relay, connecting lead wire, power source to fuel pump relay, fuel injectors.
C42	Ignition switch	Ignition switch signal is not input in ECM.
		Ignition switch, lead wire/coupler.
C44	Heated oxygen sensor (HO2S) [E-02, 19]	The sensor voltage should be the following and less after warming up condition. (Sensor voltage $\leq 0.4 \text{ V}$ ) 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.
		HO2S lead wire/coupler connection. Battery voltage supply to the HO2S.
C49	PAIR control solenoid valve	PAIR control solenoid valve voltage is not input in ECM.
		PAIR control solenoid valve, lead wire/coupler.

## “C12” CKP SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
The signal does not reach ECM for 3 sec. and more, after receiving the IAP signal.	<ul style="list-style-type: none"> <li>• Metal particles or foreign material being attached on the CKP sensor and rotor tip.</li> <li>• CKP sensor circuit open or short.</li> <li>• CKP sensor malfunction.</li> <li>• ECM malfunction.</li> </ul>

### INSPECTION

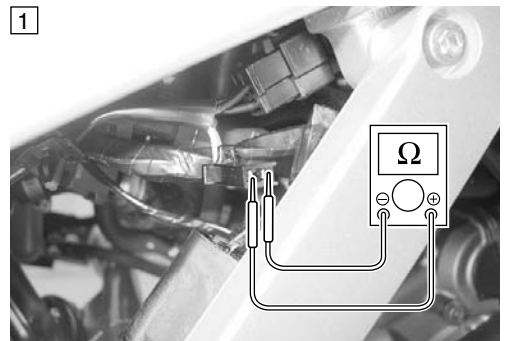
#### Step1

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



- 3) Disconnect the CKP sensor coupler and measure the resistance.

**DATA** CKP sensor resistance: 130 – 240  $\Omega$   
(White – Green)



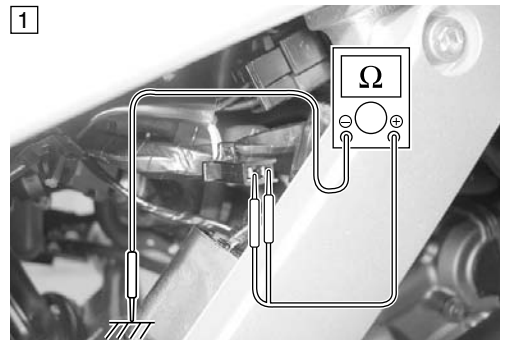
- 4) If OK, then check the continuity between each terminal and ground.

**DATA** CKP sensor continuity:  $\infty \Omega$  (Infinity)  
(White – Ground)  
(Green – Ground)

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

**Tester knob indication: Resistance ( $\Omega$ )**

Are the resistance and continuity OK?

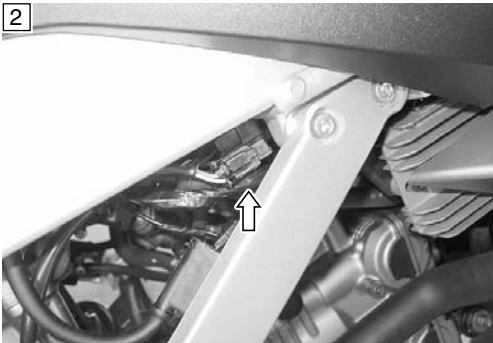


YES	Go to Step 2.
NO	Replace the CKP sensor with a new one.



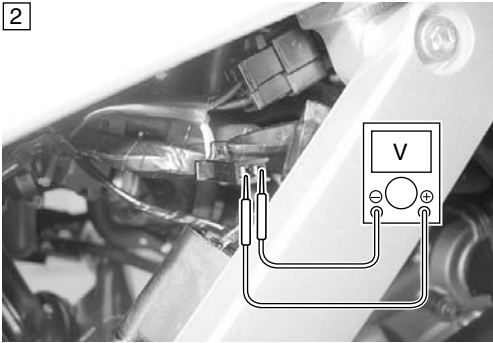
Step2

1) Disconnect the CKP sensor coupler.



2) 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: 3.7 V and more  
(⊕ White – ⊖ Green)

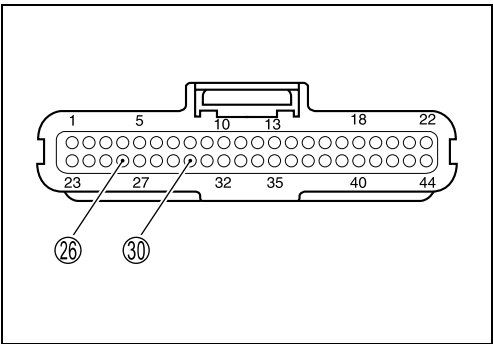


3) Repeat the above test procedure a few times and measure the highest peak voltage.  
If OK, then measure the CKP sensor peak voltage at the ECM terminals. (26 – 30)

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

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

Is the voltage OK?



YES	<ul style="list-style-type: none"><li>• B/W or White wire open or shorted to ground, or poor 26 or 30 connection.</li><li>• If wire and connection are OK, intermittent trouble or faulty ECM.</li><li>• Recheck each terminal and wire harness for open circuit and poor connection.</li></ul>
NO	<ul style="list-style-type: none"><li>• Loose or poor contacts on the CKP sensor coupler or ECM coupler.</li><li>• Replace the CKP sensor with a new one.</li></ul>

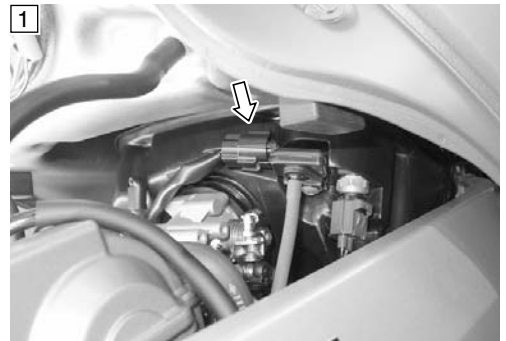
## “C13” IAP SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
IAP sensor voltage is out of the specified range. $0.1\text{ V} \leq \text{Sensor voltage} \leq 4.8\text{ V}$ <b>NOTE:</b> <i>Note that atmospheric pressure varies depending on weather conditions as well as altitude.</i> <i>Take that into consideration when inspecting voltage.</i>	<ul style="list-style-type: none"> <li>• Clogged vacuum passage between throttle body and IAP sensor.</li> <li>• Air being drawn from vacuum passage between throttle body and IAP sensor.</li> <li>• IAP sensor circuit open or shorted to ground.</li> <li>• IAP sensor malfunction.</li> <li>• ECM malfunction.</li> </ul>

### INSPECTION

#### Step 1

- 1) Lift and support the fuel tank. (→ 5-7)
- 2) Turn the ignition switch OFF.
- 3) Check the IAP sensor coupler for loose or poor contacts.  
If OK, then measure the IAP sensor input voltage.



- 4) Disconnect the IAP sensor coupler.
- 5) Turn the ignition switch ON.
- 6) Measure the voltage at the Red wire ① and ground.  
If OK, then measure the voltage at the Red wire ① and B/Br wire ②.

**DATA** IAP sensor input voltage: 4.5 – 5.5 V

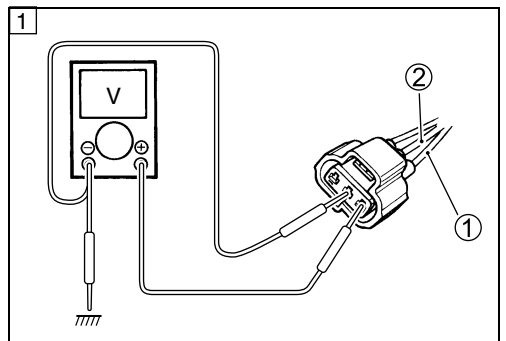
(+ Red – (–) Ground)

(+ Red – (–) B/Br)

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

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

Is the voltage OK?



YES	Go to Step 2
NO	<ul style="list-style-type: none"> <li>• Loose or poor contacts on the ECM coupler.</li> <li>• Open or short circuit in the Red wire or B/Br wire.</li> </ul>

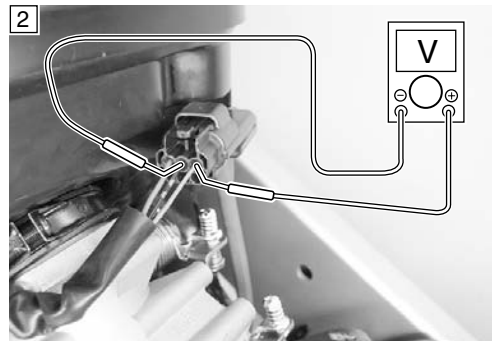
**Step 2**

- 1) Connect the IAP sensor coupler.
- 2) Insert the needle pointed probes to the lead wire coupler.
- 3) Start the engine at idle speed.
- 4) Measure the IAP sensor output voltage at the wire side coupler (between G/B and B/Br wires).

**DATA** IAP sensor output voltage: Approx. 2.7 V at idle speed  
(⊕ G/B – ⊖ B/Br)

**TOOL** 09900-25008: Multi circuit tester set  
09900-25009: Needle pointed probe set

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



YES	Go to Step 3
NO	<ul style="list-style-type: none"> <li>• Check the vacuum hose and the passage of throttle body vacuum for crack or damage.</li> <li>• Open or short circuit in the G/B wire.</li> <li>• Replace the IAP sensor with a new one.</li> </ul>

**Step 3**

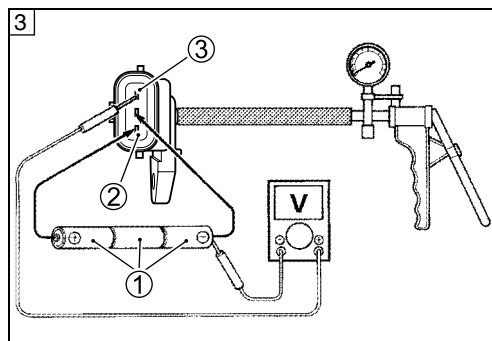
- 1) Remove the IAP sensor. (4-49)
- 2) Connect the vacuum pump gauge to the vacuum port of the IAP sensor.

Arrange 3 new 1.5 V batteries in series ① (check that total voltage is 4.5 – 5.0 V) and connect ⊖ terminal to the ground terminal and ⊕ terminal to the Vcc ② terminal.

Check the voltage between Vout ③ and ground. Also, check if voltage reduces when vacuum is applied up to 400 mmHg by using vacuum pump gauge. (4-27)

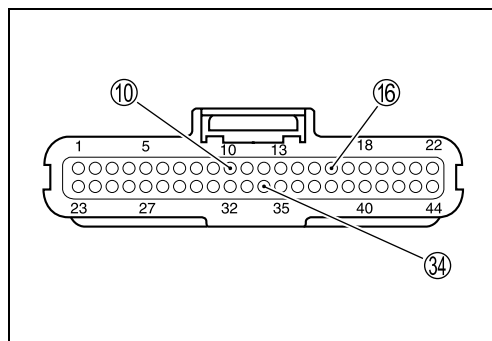
**TOOL** 09917-47011: Vacuum pump gauge  
09900-25008: Multi circuit tester set

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



Is the voltage OK?

YES	<ul style="list-style-type: none"> <li>• Red, G/B or B/Br wire open or shorted to ground, or poor ⑩, ⑯ or ③④ connection.</li> <li>• If wire and connection are OK, intermittent trouble or faulty ECM.</li> <li>• Recheck each terminal and wire harness for open circuit and poor connection.</li> </ul>
NO	If check result is not satisfactory, replace IAP sensor with a new one.



**Output voltage (Vcc voltage 4.5 V, ambient temp. 25 °C, 77 °F)**

ALTITUDE (Reference)		ATMOSPHERIC PRESSURE		OUTPUT VOLTAGE
(ft)	(m)	(mmHg)	kPa	(V)
0   2 000	0   610	760   707	100   94	Approx. 3.3 – 3.6
2 001   5 000	611   1 524	707   634	94   85	Approx. 3.0 – 3.3
5 001   8 000	1 525   2 438	634   567	85   76	Approx. 2.7 – 3.0
8 001   10 000	2 439   3 048	567   526	76   70	Approx. 2.5 – 2.7

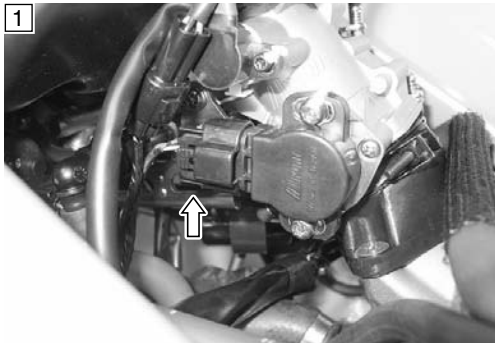
“C14” TP SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
Output voltage is out of the specified range. $0.1\text{ V} \leq \text{Sensor voltage} < 4.8\text{ V}$	<ul style="list-style-type: none"><li>• TP sensor maladjusted.</li><li>• TP sensor circuit open or short.</li><li>• TP sensor malfunction.</li><li>• ECM malfunction.</li></ul>

INSPECTION

Step 1

- 1) Remove the fuel tank (🔧 5-7).
- 2) Turn the ignition switch OFF.
- 3) Check the TP sensor coupler for loose or poor contacts.  
If OK, then measure the TP sensor input voltage.
- 4) Disconnect the TP sensor coupler.



- 5) Turn the ignition switch ON.
- 6) Measure the voltage at the Red wire and ground.
- 7) 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)

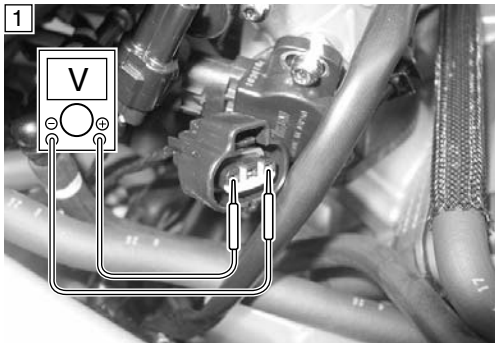
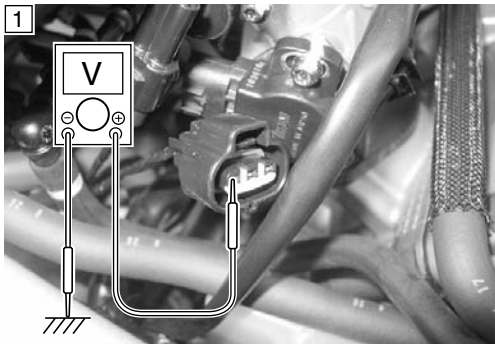
(⊕ Red – ⊖ B/Br)

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

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

Is the voltage OK?

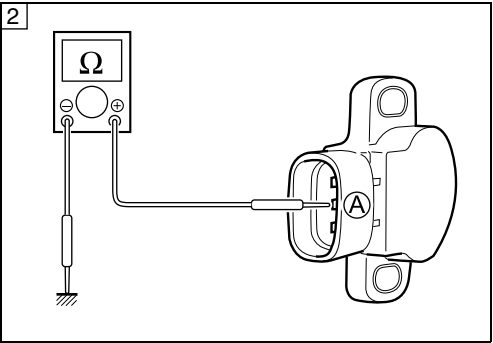
YES	Go to Step 2
NO	<ul style="list-style-type: none"><li>• Loose or poor contacts on the ECM coupler.</li><li>• Open or short circuit in the Red wire or B/Br wire.</li></ul>



Step 2

- 1) Remove the air cleaner box. (➡5-15)
- 2) Turn the ignition switch OFF.
- 3) Disconnect the TP sensor coupler.
- 4) Check the continuity between Ⓐ and ground.

**DATA** TP sensor continuity: ∞ Ω (Infinity)  
(Ⓐ – Ground)



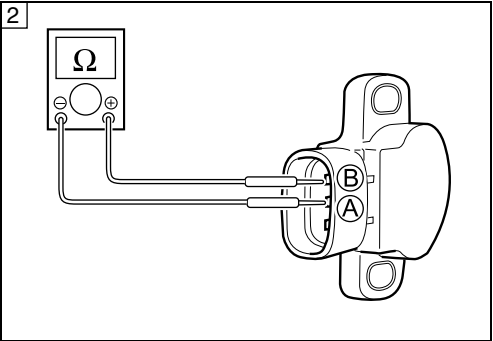
- 5) If OK, then measure the TP sensor resistance (between Ⓐ and Ⓑ).
- 6) Turn the throttle grip and measure the resistance.

**DATA** TP sensor resistance  
Throttle valve is closed : Approx. 1.12 kΩ  
Throttle valve is opened: Approx. 4.26 kΩ

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

**Tester knob indication: Resistance (Ω)**

Are the resistance and continuity OK?



YES	Go to Step 3
NO	<ul style="list-style-type: none"><li>• Reset the TP sensor position correctly.</li><li>• Replace the TP sensor with a new one.</li></ul>

Step 3

- 1) Connect the TP sensor coupler.
- 2) Insert the needle pointed probes to the lead wire coupler.
- 3) Turn the ignition switch ON.  
Measure the TP sensor output voltage at the coupler (between ⊕ P/W and ⊖ B/Br) by turning the throttle grip.

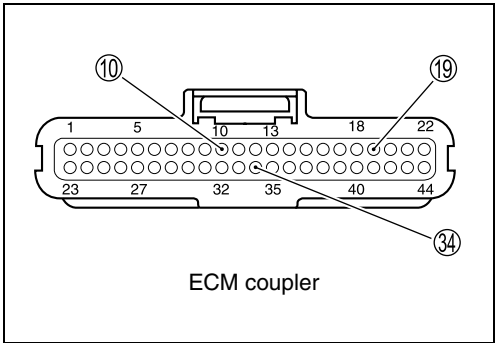
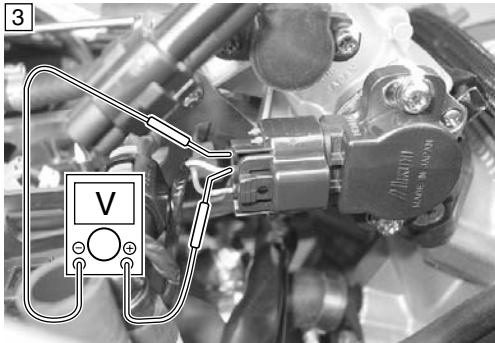
**DATA** TP sensor output voltage  
Throttle valve is closed : Approx. 1.12 V  
Throttle valve is opened: Approx. 4.26 V

**TOOL** 09900-25008: Multi circuit tester set  
09900-25009: Needle pointed probe set

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

Is the voltage OK?

YES	<ul style="list-style-type: none"><li>Red, P/W or B/Br wire open or shorted to ground, or poor ⑩, ⑲ or ③④ connection.</li><li>If wire and connection are OK, intermittent trouble or faulty ECM.</li><li>Recheck each terminal and wire harness for open circuit and poor connection.</li></ul>
NO	If check result is not satisfactory, replace TP sensor with a new one.



“C15” ECT SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
Output voltage is out of the specified range. $0.1\text{ V} \leq \text{Sensor voltage} < 4.6\text{ V}$	<ul style="list-style-type: none"><li>ECT sensor circuit open or short.</li><li>ECT sensor malfunction.</li><li>ECM malfunction.</li></ul>

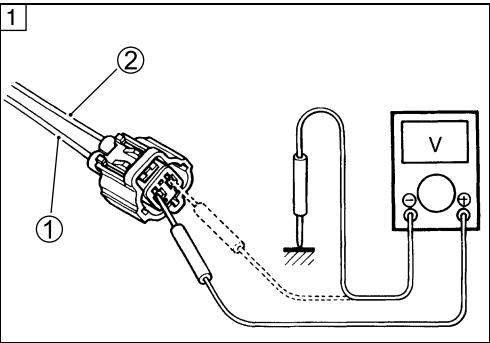
INSPECTION

Step 1

- 1) Turn the ignition switch OFF.
- 2) Check the ECT sensor coupler for loose or poor contacts.  
If OK, then measure the ECT sensor voltage at the wire side coupler.
- 3) Disconnect the coupler and turn the ignition switch ON.



- 4) Measure the voltage between B/BI wire terminal ① and ground.
- 5) If OK, then measure the voltage between B/BI wire terminal ① and B/Br wire terminal ②.



**DATA** ETC sensor voltage: 4.5 – 5.5 V  
(+ B/BI – – Ground)  
(+ B/BI – – B/Br)

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

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

Is the voltage OK?

YES	Go to Step 2
NO	<ul style="list-style-type: none"><li>Loose or poor contacts on the ECM coupler.</li><li>Open or short circuit in the B/BI wire or B/Br wire.</li></ul>



Step 2

- 1) Turn the ignition switch OFF.
- 2) Measure the ECT sensor resistance. (Refer to page 6-10 for details.)

**DATA** ECT sensor resistance:  
Approx. 2.45 kΩ at 20 °C (68 °F) (Terminal – Terminal)

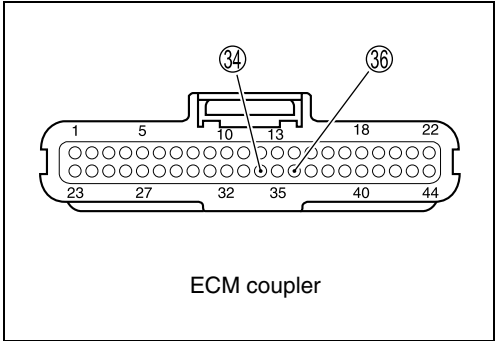
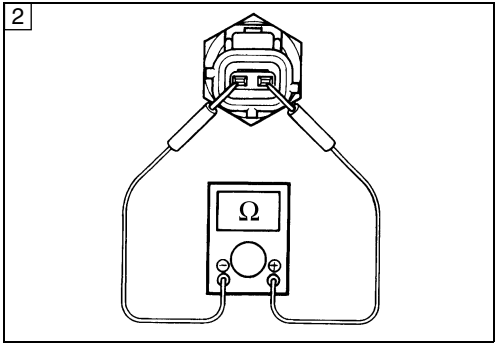
**TOOL** 09900-25008: Multi circuit tester set

**Tester knob indication: Resistance (Ω)**

Is the resistance OK?

YES	<ul style="list-style-type: none"><li>• B/Br or B/BI wire open or shorted to ground, or poor ③④ or ③⑥ connection.</li><li>• If wire and connection are OK, intermittent trouble or faulty ECM.</li><li>• Recheck each terminal and wire harness for open circuit and poor connection.</li></ul>
NO	Replace the ECT sensor with a new one.

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



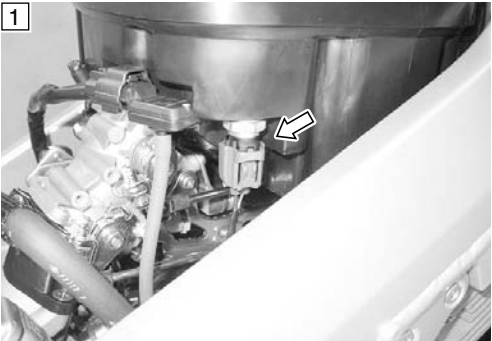
“C21” IAT SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
Output voltage is out of the specified range. 0.1 V ≤ Sensor voltage < 4.6 V	<ul style="list-style-type: none"><li>• IAT sensor circuit open or short.</li><li>• IAT sensor malfunction.</li><li>• ECM malfunction.</li></ul>

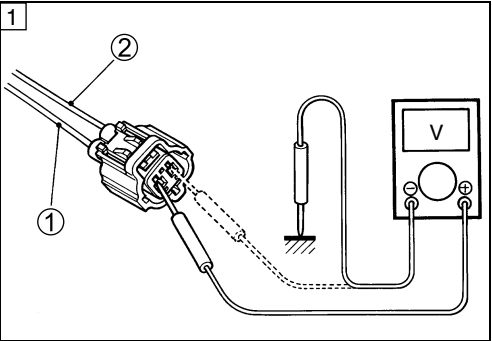
INSPECTION

Step 1

- 1) Lift and support the fuel tank. (📖 5-7)
- 2) Turn the ignition switch OFF.
- 3) Check the IAT sensor coupler for loose or poor contacts.  
If OK, then measure the IAT sensor voltage at the wire side coupler.
- 4) Disconnect the coupler and turn the ignition switch ON.



- 5) Measure the voltage between Dg wire terminal ① and ground.
- 6) If OK, then measure the voltage between Dg wire terminal ① and B/Br wire terminal ②.



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

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

**TESTER** Tester knob indication: Voltage (V)

Is the voltage OK?

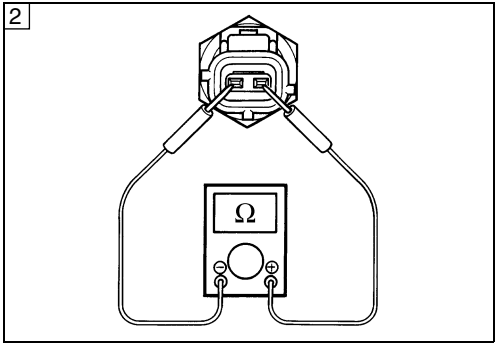
YES	Go to Step 2
NO	<ul style="list-style-type: none"><li>• Loose or poor contacts on the ECM coupler.</li><li>• Open or short circuit in the Dg wire or B/Br wire.</li></ul>

Step 2

- 1) Turn the ignition switch OFF.
- 2) Measure the IAT sensor resistance.

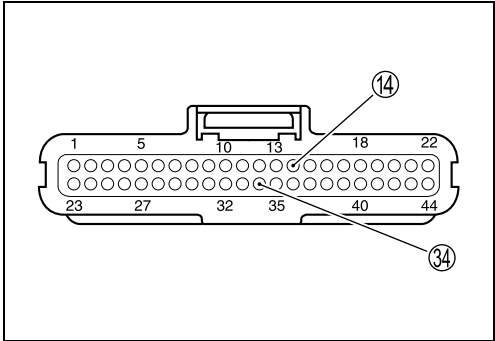
**DATA** IAT sensor resistance:  
Approx. 2.45 kΩ at 20 °C (68 °F) (Terminal – Terminal)

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



Is the resistance OK?

YES	<ul style="list-style-type: none"><li>• Dg or B/Br wire open or shorted to ground, or poor ⑭ or ⑳ connection.</li><li>• If wire and connection are OK, intermittent trouble or faulty ECM.</li><li>• Recheck each terminal and wire harness for open circuit and poor connection.</li></ul>
NO	Replace the IAT sensor with a new one.



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 6-10 for details.

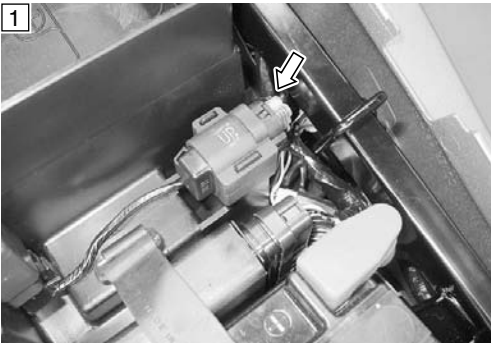
“C23” TO SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
The sensor voltage should be the following for 2 sec. and more after ignition switch turns ON. $0.2\text{ V} \leq \text{Sensor voltage} \leq 4.6\text{ V}$	<ul style="list-style-type: none"><li>• TO sensor circuit open or short.</li><li>• TO sensor malfunction.</li><li>• ECM malfunction.</li></ul>

INSPECTION

Step 1

- 1) Remove the seat. (➡ 7-4)
- 2) Turn the ignition switch OFF.
- 3) Check the TO sensor coupler for loose or poor contacts.  
If OK, then measure the TO sensor resistance.



- 4) Remove the TO sensor.
- 5) Measure the resistance between ① and ② terminals.

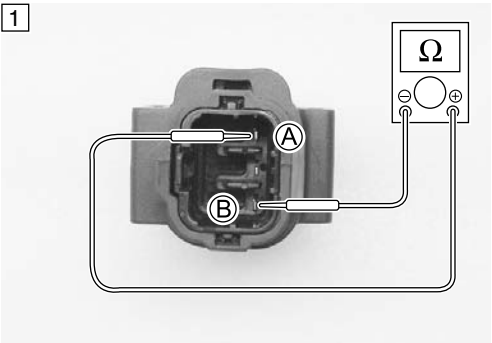
**DATA** TO sensor resistance:

19.1 – 19.7 kΩ (① – ② terminals)

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

**Tester knob indication: Resistance (Ω)**

Is the resistance OK?



YES	Go to Step 2
NO	Replace the TO sensor with a new one.

**Step 2**

- 1) Connect the TO sensor coupler.
- 2) Insert the needle pointed probe to the lead wire coupler.
- 3) Turn the ignition switch ON.
- 4) Measure the voltage at the wire side coupler between Br/W and B/Br wires of the TO sensor at horizontal.

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

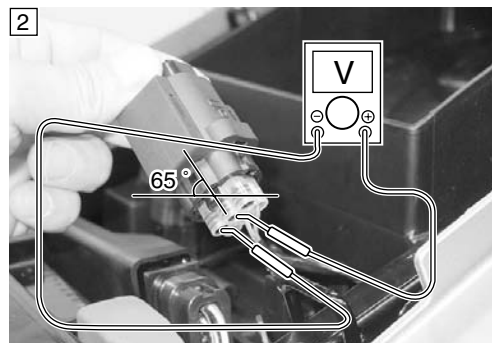
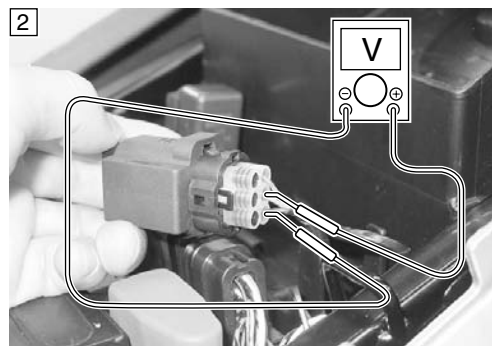
Also, measure the voltage when leaning of the motorcycle.

- 5) 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)

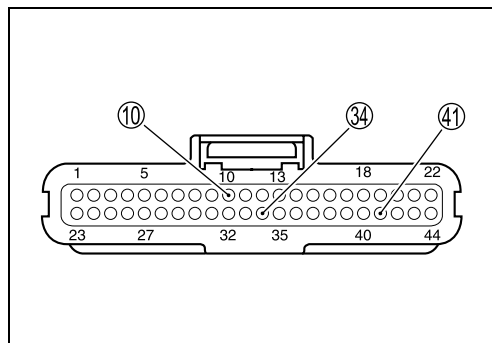
**TOOL** 09900-25008: Multi circuit tester set  
09900-25009: Needle pointed probe set

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



Is the voltage OK?

YES	<ul style="list-style-type: none"> <li>Red, Br/W or B/Br wire open or shorted to ground, or poor ⑩, ④① or ③④ connection.</li> <li>If wire and connection are OK, intermittent trouble or faulty ECM.</li> <li>Recheck each terminal and wire harness for open circuit and poor connection.</li> </ul>
NO	<ul style="list-style-type: none"> <li>Loose or poor contacts on the ECM coupler.</li> <li>Open or short circuit in the Br/W wire or B/Br wire.</li> <li>Replace the TO sensor with a new one.</li> </ul>



## “C24” or “C25” IGNITION SYSTEM MALFUNCTION

\*Refer to the IGNITION SYSTEM for details. (➡ 8-23)

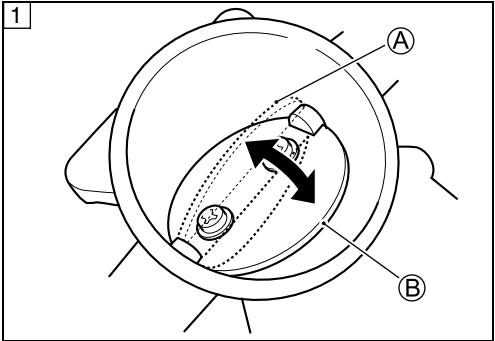
“C28” STV ACTUATOR CIRCUIT MALFUNCTION

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"><li>• STVA malfunction.</li><li>• STVA circuit open or short.</li><li>• STVA motor malfunction.</li></ul>

INSPECTION

Step 1

- 1) Remove the fuel tank and air cleaner box. (➡ 5-15)
- 2) Turn the ignition switch OFF.
- 3) Check the STVA coupler for loose or poor contacts.
- 4) Turn the ignition switch ON to check the STV operation.  
STV operating order: Full open (A) → Open (B)  
(Approx. 1 seconds later)  
Is the operation OK?

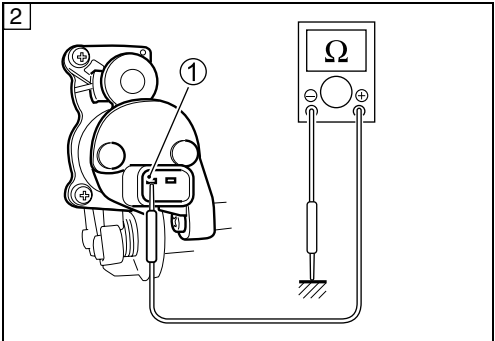


YES	Go to Step 2
NO	<ul style="list-style-type: none"><li>• Loose or poor contacts on the STVA coupler.</li><li>• Open or short circuit in the B/R and R/B wires.</li></ul>

Step 2

- 1) Turn the ignition switch OFF.
- 2) Check the STVA coupler for loose or poor contacts.
- 3) Disconnect the STVA coupler.
- 4) Check the continuity between terminal ① and ground.

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



- 5) If OK, then measure the STVA resistance.

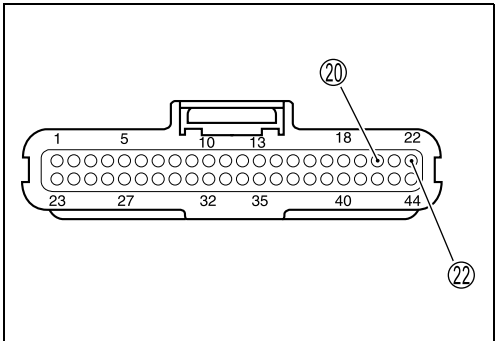
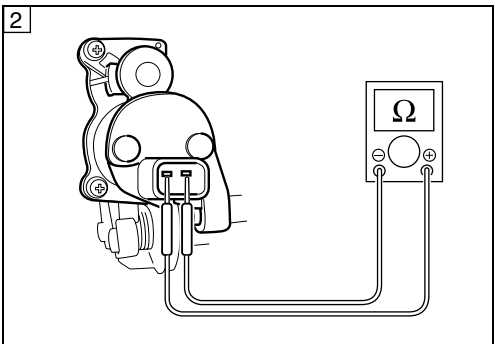
**DATA** STVA resistance: Approx. 7 – 14  $\Omega$

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

**Tester knob indication: Resistance ( $\Omega$ )**

Is the resistance OK?

YES	<ul style="list-style-type: none"><li>• Loose or poor contacts on the STVA coupler, or poor ⑳ or ㉔ connection.</li><li>• If wire and connection are OK, intermittent trouble or faulty ECM. Recheck each terminal and wire harness for open circuit and poor connection.</li></ul>
NO	Replace the STVA with a new one.



“C29” STP SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
Signal voltage is out of the specified range. Difference between actual throttle opening and opening calculated by ECM is larger than specified value. $0.1\text{ V} \leq \text{Sensor voltage} \leq 4.8\text{ V}$	<ul style="list-style-type: none"><li>• STP sensor maladjusted.</li><li>• STP sensor circuit open or short.</li><li>• STP sensor malfunction.</li><li>• ECM malfunction.</li></ul>

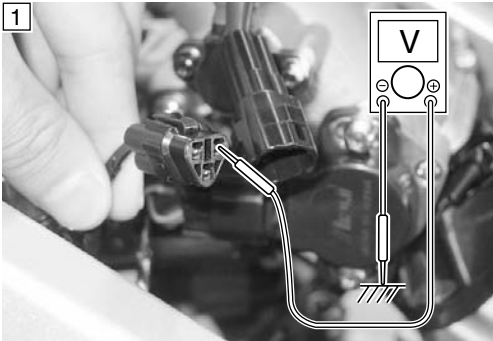
INSPECTION

Step 1

- 1) Remove the air cleaner box. (☞ 5-15)
- 2) Turn the ignition switch OFF.
- 3) Check the STP sensor coupler for loose or poor contacts.  
If OK, then measure the STP sensor input voltage.



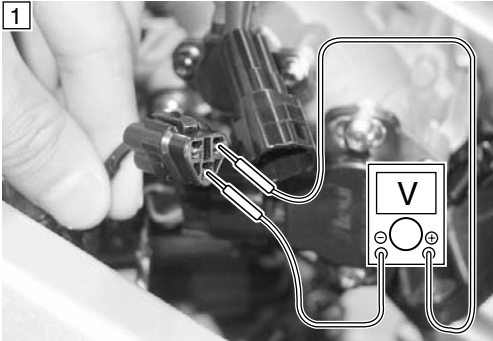
- 4) Disconnect the STP sensor coupler.
- 5) Turn the ignition switch ON.
- 6) Measure the voltage at the Red wire and ground.
- 7) If OK, then measure the voltage at the Red wire and B/Br wire.



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

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

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



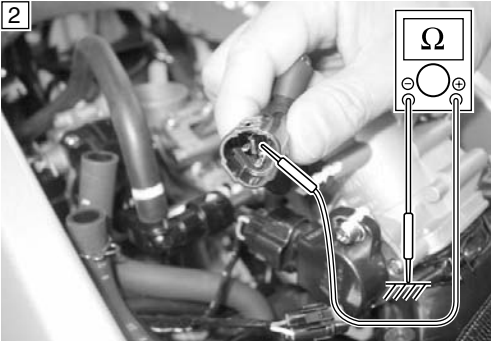
Is the voltage OK?

YES	Go to Step 2
NO	<ul style="list-style-type: none"><li>• Loose or poor contacts on the ECM coupler.</li><li>• Open or short circuit in the Red wire or B/Br wire.</li></ul>

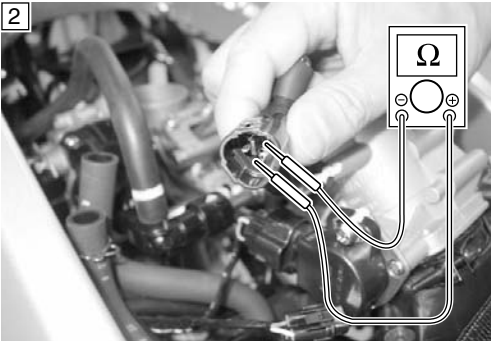
Step 2

- 1) Turn the ignition switch OFF.
- 2) Disconnect the STP sensor coupler.
- 3) Check the continuity between Yellow wire and ground.

**DATA** STP sensor continuity:  $\infty \Omega$  (Infinity)  
(Yellow – Ground)



- 4) If OK, then measure the STP sensor resistance at the coupler (between Yellow and Black wires).

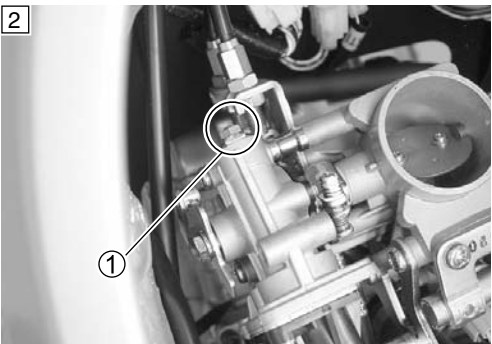


- 5) Close and open the secondary throttle valve fully by turning the actuator shaft end ①, and measure the STP sensor resistance with both STV positions.

**DATA** STP sensor resistance  
Secondary throttle valve is closed: Approx. 0.58 k $\Omega$   
Secondary throttle valve is opened: Approx. 4.38 k $\Omega$

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

**Tester knob indication: Resistance ( $\Omega$ )**



**CAUTION**

Do not use the tool for turning the STVA shaft to prevent breakdown.

Is the resistance OK?

YES	Go to Step 3
NO	<ul style="list-style-type: none"><li>Reset the STP sensor position correctly. (5-29)</li><li>Replace the STP sensor with a new one.</li></ul>



**Step 3**

- 1) Turn the ignition switch OFF.
- 2) Connect the STP sensor coupler.
- 3) Insert the needle pointed probes to the STP sensor coupler.
- 4) Disconnect the STVA coupler.
- 5) Turn the ignition switch ON.
- 6) Measure the STP sensor output voltage at the coupler (between ⊕ Yellow and ⊖ B/Br wires) when the secondary throttle valve is full closed and opened.

**NOTE:**

The secondary throttle valve can be turned by rotating the actuator shaft end ①.

**DATA** STP sensor output voltage

Secondary throttle valve is closed: Approx. 0.58 V

Secondary throttle valve is opened: Approx. 4.40 V

**TOOL** 09900-25008: Multi circuit tester set  
09900-25009: Needle pointed probe set

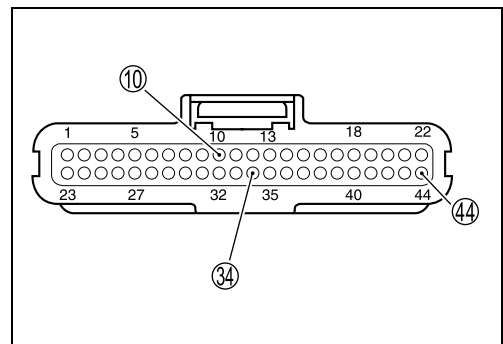
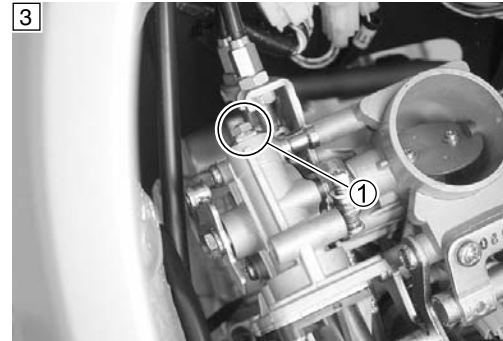
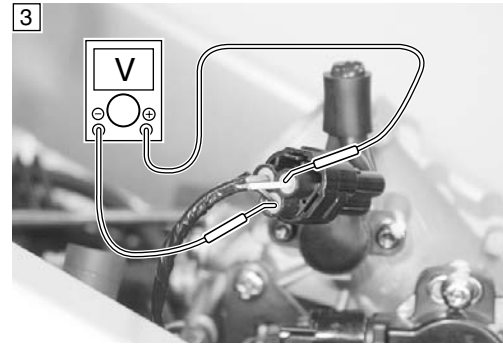
**Tester knob indication: Voltage (V)**

**CAUTION**

**Do not use the tool for turning the STVA shaft to prevent breakdown.**

Is the voltage OK?

YES	<ul style="list-style-type: none"> <li>Red, Yellow or B/Br wire open or shorted to ground, or poor ⑩, ④④ or ③④ connection.</li> <li>If wire and connection are OK, intermittent trouble or faulty ECM.</li> <li>Recheck each terminal and wire harness for open circuit and poor connection.</li> </ul>
NO	If check result is not satisfactory, replace STP sensor with a new one.



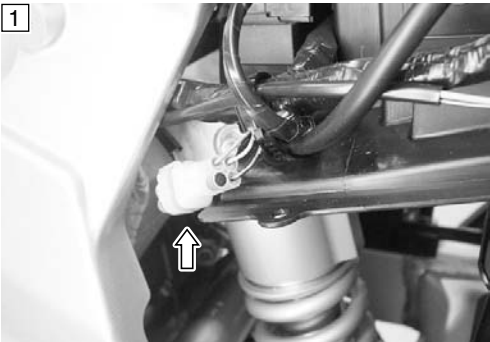
“C31” GEAR POSITION (GP) SWITCH CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
No Gear Position switch voltage Switch voltage is out of the specified range. Switch Voltage ≤ 0.2 V	<ul style="list-style-type: none"><li>• Gear Position switch circuit open or short.</li><li>• Gear Position switch malfunction.</li><li>• ECM malfunction.</li></ul>

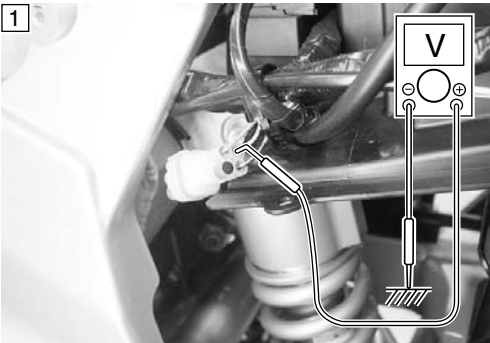
INSPECTION

Step 1

- 1) Remove the left frame cover. (↗ 7-5)
- 2) Turn the ignition switch OFF.
- 3) Check the GP switch coupler for loose or poor contacts.  
If OK, then measure the GP switch voltage.



- 4) Support the motorcycle with a jack.
- 5) Turn the side-stand to up-right position.
- 6) Make sure the engine stop switch is in the “RUN” position.
- 7) Insert the needle pointed probes to the GP switch coupler.
- 8) Turn the ignition switch ON.
- 9) Measure the voltage at the wire side coupler between Pink wire and ground, when shifting the gearshift lever from 1st to Top.



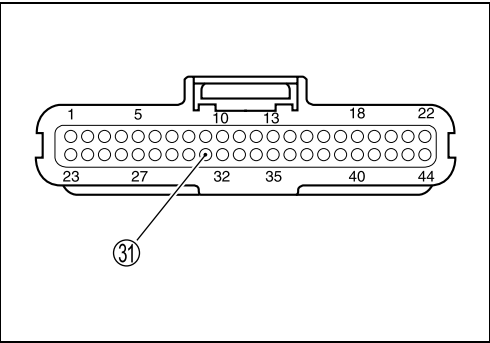
**DATA** GP switch voltage: 1.0 V and more  
(Pink – Ground)

**TOOL** 09900-25008: Multi circuit tester set  
09900-25009: Needle pointed probe set

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

Is the voltage OK?

YES	<ul style="list-style-type: none"><li>• Inspect the GP switch voltage. (↗ 8-20)</li><li>• Pink wire open or shorted to ground, or poor ③① connection.</li><li>• If wire and connection are OK, intermittent trouble or faulty ECM.</li><li>• Recheck each terminal and wire harness for open circuit and poor connection.</li></ul>
NO	Open or short circuit in the Pink wire.



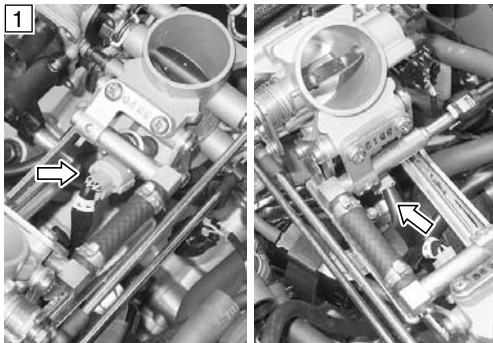
“C32” or “C33” FUEL INJECTOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
Fuel injector voltage is 1.3 V and less.	<ul style="list-style-type: none"><li>• Injector circuit open or short.</li><li>• Injector malfunction.</li><li>• ECM malfunction.</li></ul>

INSPECTION

Step 1

- 1) Remove the air cleaner box. (🔧 5-15)
- 2) Turn the ignition switch OFF.
- 3) Check the injector couplers for loose or poor contacts.  
If OK, then measure the injector resistance.



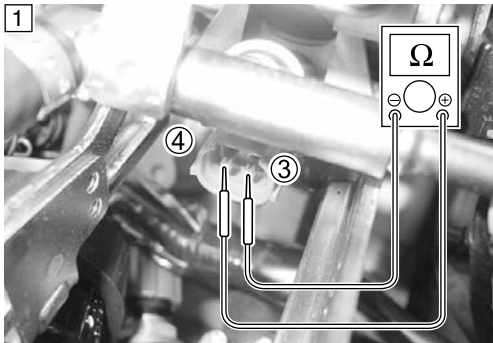
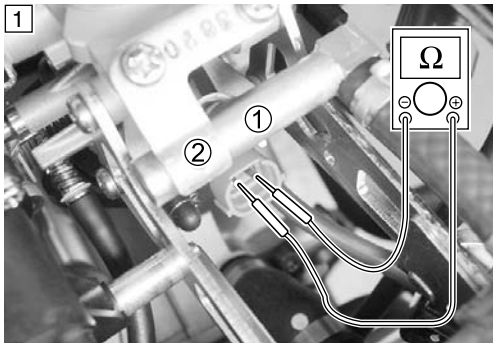
- 4) Disconnect the injector couplers and measure the resistance between terminals.

**DATA** Injector resistance: 11 – 13  $\Omega$  at 20 °C (68 °F)  
(No.1: ① – ②)  
(No.2: ③ – ④)

- 5) If OK, then check the continuity between injector terminals and ground.

**DATA** Injector continuity:  $\infty \Omega$  (Infinity)  
(No.1: ① – Ground)  
(No.2: ③ – Ground)

**TOOL** 09900-25008: Multi circuit tester set  
 Tester knob indication: Resistance ( $\Omega$ )



Is the resistance OK?

YES	Go to Step 2
NO	Replace the Injector with a new one. (🔧 5-18)

Step 2

- 1) Disconnect the injector couplers.
- 2) Turn the ignition switch ON.
- 3) Measure the injector voltage between Y/R wire (No.1 injector coupler and No.2 injector coupler) and ground.

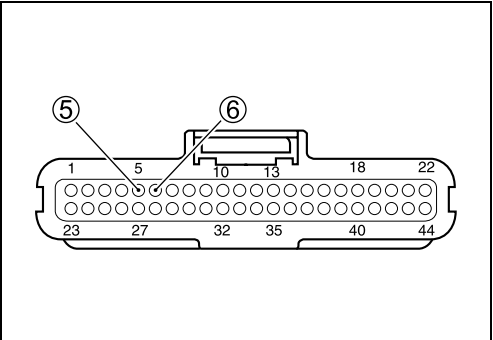
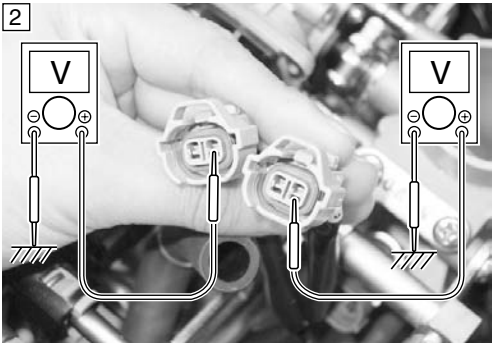
**DATA** **Injector voltage: Battery voltage**  
(⊕ Y/R – ⊖ Ground)

**NOTE:**  
Injector voltage can be detected only 2 seconds after ignition switch is turned ON.

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

Is the voltage OK?

YES	<ul style="list-style-type: none"><li>• Gr/W or Gr/B wire open or shorted to ground, or poor ⑤ or ⑥ connection.</li><li>• If wire and connection are OK, intermittent trouble or faulty ECM.</li><li>• Recheck each terminal and wire harness for open circuit and poor connection.</li></ul>
NO	<ul style="list-style-type: none"><li>• Inspect the fuel pump relay. (🔧 5-10)</li></ul>

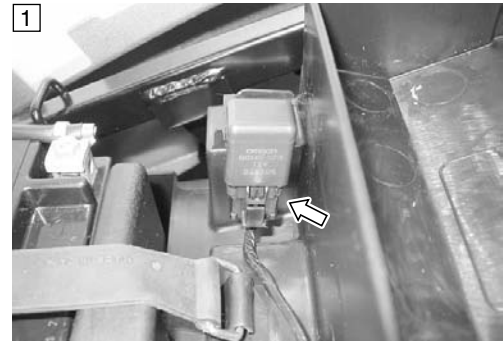


**“C41” FP RELAY CIRCUIT MALFUNCTION**

DETECTED CONDITION	POSSIBLE CAUSE
No voltage is applied to the both injectors for 3 sec. after the contact of fuel pump relay is turned ON. Or voltage is applied to the both injectors, when the contact of fuel pump is OFF.	<ul style="list-style-type: none"> <li>Fuel pump relay circuit open or short.</li> <li>Fuel pump relay malfunction.</li> <li>ECM malfunction.</li> </ul>

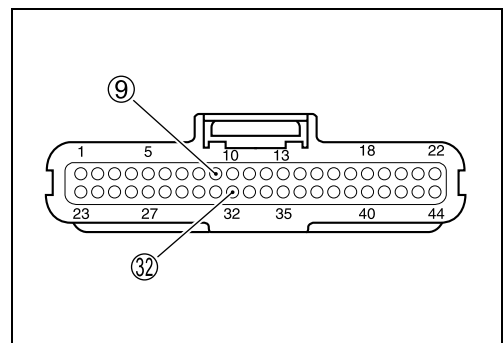
**INSPECTION****Step 1**

- 1) Remove the seat. (👉 7-4)
- 2) Turn the ignition switch OFF.
- 3) Check the FP relay coupler for loose or poor contacts.  
If OK, then check the insulation and continuity. Refer to page 5-10 for details.



Is the FP relay OK?

YES	<ul style="list-style-type: none"> <li>Y/B or O/G (O/W: For E-03, 24, 28 and 33) wire open or shorted to ground, or poor ③② or ⑨ connection.</li> <li>If wire and connection are OK, intermittent trouble or faulty ECM.</li> <li>Recheck each terminal and wire harness for open circuit and poor connection.</li> <li>Inspect the fuel injectors. (👉 4-42)</li> </ul>
NO	Replace the FP relay with a new one.

**NOTE:**

When the both fuel injectors break down at a time, “C41” is indicated.

**“C42” IG SWITCH CIRCUIT MALFUNCTION**

DETECTED CONDITION	POSSIBLE CAUSE
Ignition switch signal is not input in the ECM.	<ul style="list-style-type: none"> <li>Ignition system circuit open or short.</li> <li>ECM malfunction.</li> </ul>

**INSPECTION**

\*Refer to the IGNITION SWITCH INSPECTION for details. (👉 8-39)

“C49” PAIR CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
PAIR control solenoid valve voltage is not input in ECM.	<ul style="list-style-type: none"><li>• PAIR control solenoid valve circuit open or short.</li><li>• PAIR control solenoid valve malfunction.</li><li>• ECM malfunction.</li></ul>

INSPECTION

Step 1

- 1) Remove the fuel tank. (🔧 5-7)
- 2) Turn the ignition switch OFF.
- 3) Check the PAIR control solenoid valve coupler for loose or poor contacts.  
If OK, then measure the PAIR control solenoid valve resistance.



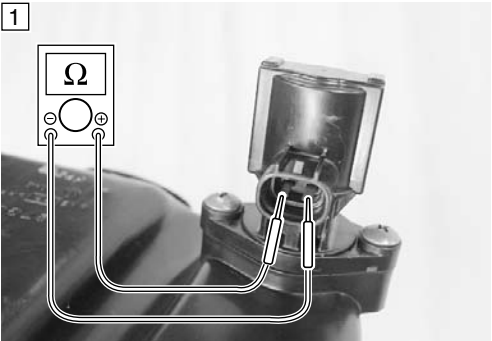
- 4) Remove the air cleaner box. (🔧 5-15)
- 5) Disconnect the PAIR control solenoid valve coupler and measure the resistance between terminals.

**DATA** PAIR control solenoid valve resistance:  
20 – 24 Ω at 20 °C/68 °F

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

**Tester knob indication: Resistance (Ω)**

Is the resistance OK?



YES	Go to Step 2
NO	<ul style="list-style-type: none"><li>• Loose or poor contacts on the ECM coupler.</li><li>• Replace the PAIR control solenoid valve with a new one.</li></ul>

Step 2

- 1) Connect the PAIR control solenoid valve coupler.
- 2) Turn the ignition switch ON.
- 3) Insert the needle pointed probes to the PAIR control solenoid valve coupler.
- 4) Measure the voltage at the wire side coupler between Brown wire and ground.

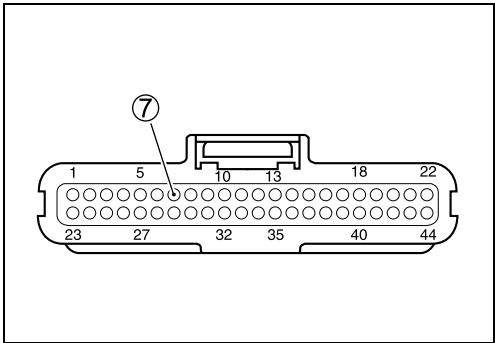
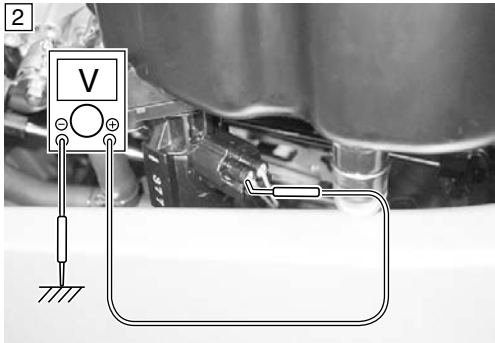
**DATA** PAIR control solenoid valve voltage: Battery voltage  
(⊕ Brown – ⊖ Ground)

**TOOL** 09900-25008: Multi circuit tester set  
09900-25009: Needle pointed probe set

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

Is the voltage OK?

YES	<ul style="list-style-type: none"><li>• Brown wire open or shorted to ground, or ⑦ connection.</li><li>• If wire and connection are OK, intermittent trouble or faulty ECM.</li><li>• Recheck each terminal and wire harness for open circuit and poor connection.</li></ul>
NO	Open or short circuit in the Brown wire.

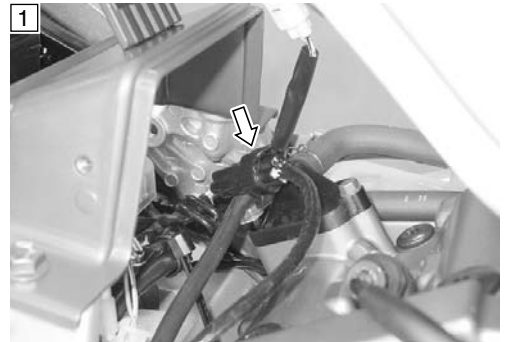


**“C44” HO2 SENSOR (HO2S) CIRCUIT MALFUNCTION (E-02, 19)**

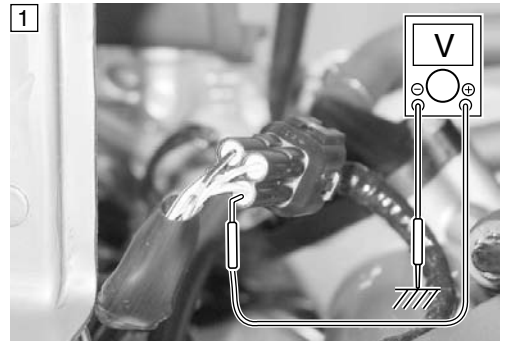
DETECTED CONDITION	POSSIBLE CAUSE
The sensor voltage should be the following and less after warming up condition. (Sensor Voltage $\leq 0.4$ V)	<ul style="list-style-type: none"> <li>• HO2 sensor or its circuit open or short.</li> <li>• Fuel system malfunction.</li> <li>• ECM malfunction.</li> </ul>

**INSPECTION****Step 1**

- 1) Lift and support the fuel tank. (→ 5-7)
- 2) Turn the ignition switch OFF.
- 3) Check the HO2 sensor coupler for loose or poor contacts.



- 4) Insert the needle pointed probes to the HO2 sensor coupler.
- 5) Turn the ignition switch ON and measure the heater voltage between O/W wire (ECM side) and ground.
- 6) If the tester voltage indicates the battery voltage for few seconds, it is good condition.



**DATA** Heater voltage: Battery voltage (O/W – Ground)

**NOTE:**

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

**TOOL** 09900-25008: Multi circuit tester set  
09900-25009: Needle pointed probe set

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

Is the voltage OK?

YES	Go to Step 2
NO	Replace the HO2 sensor with a new one.



Step 2

- 1) Warm up the engine enough.
- 2) Insert the needle pointed probes to the HO2 sensor coupler.
- 3) Measure the HO2 sensor output voltage at the coupler (between W/G and B/Br wires) when idling condition.
- 4) 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:

0.4 V and less (⊕ W/G – ⊖ B/Br)

HO2 sensor output voltage at 5 000 r/min:

0.6 V and more (⊕ W/G – ⊖ B/Br)

**TOOL** 09900-25008: Multi circuit tester set  
09900-25009: Needle pointed probe set

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

Is the voltage OK?

YES	Go to Step 3
NO	Replace the HO2 sensor with a new one.



Step 3

- 1) Turn the ignition switch OFF.
- 2) Disconnect the HO2 sensor coupler.
- 3) Check the resistance between the terminals (White – White) of the HO2 sensor.

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

NOTE:

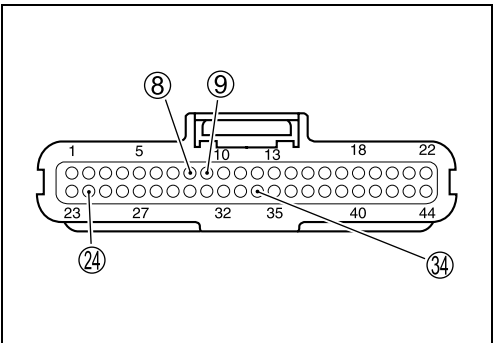
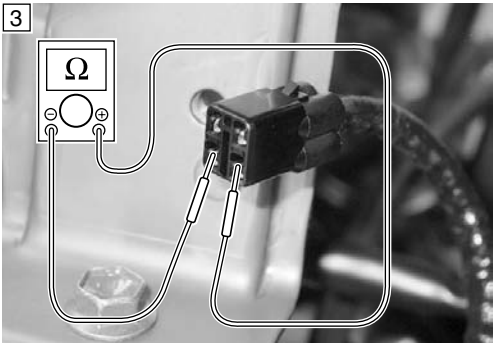
- \* Temperature of the sensor affects resistance value largely.
- \* Make sure that the sensor heater is at correct temperature.

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

**Tester knob indication: Resistance (Ω)**

Is the resistance OK?

YES	<ul style="list-style-type: none"><li>• W/B, O/G, W/G or B/Br wire open or shorted to ground, or poor ⑧, ⑨, ②④ or ③④ connection.</li><li>• If wire and connection are OK, intermittent trouble or faulty ECM.</li><li>• Recheck each terminal and wire harness for open circuit and poor connection.</li></ul>
NO	Replace the HO2 sensor with a new one.



## SENSORS

### CKP SENSOR INSPECTION

The crankshaft position sensor is installed in the generator cover. (🔧 4-23)

### CKP SENSOR REMOVAL AND INSTALLATION

- Remove the generator cover. (🔧 3-26)
- Install the generator cover in the reverse order of removal.



### IAP SENSOR INSPECTION

The intake air pressure sensor is installed at the rear side of the air cleaner box. (🔧 4-25)

### IAP SENSOR REMOVAL AND INSTALLATION

- Lift and support the fuel tank. (🔧 5-7)
- Remove the IAP sensor from the air cleaner box.
- Install the IAP sensor in the reverse order of removal.



### TP SENSOR INSPECTION

The throttle position sensor is installed at the left side of the No.2 throttle body. (🔧 4-28)

### TP SENSOR REMOVAL AND INSTALLATION

- Remove the air cleaner box. (🔧 5-15)
- Remove the TP sensor. (🔧 5-19)
- Install the TP sensor in the reverse order of removal.

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

### TPS ADJUSTMENT

- Adjust the TP sensor. (🔧 4-16)



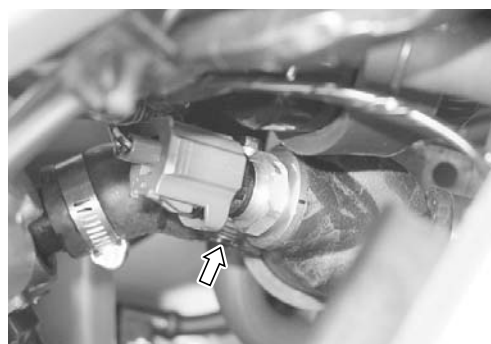
### ECT SENSOR INSPECTION

The ECT sensor is installed on the thermostat case. (🔧 4-31)

### ECT SENSOR REMOVAL AND INSTALLATION

- Remove the ECT sensor. (🔧 6-10)
- Install the ECT sensor in the reverse order of removal.

🔧 ECT sensor: 19 N·m (1.9 kgf-m, 13.5 lb-ft)



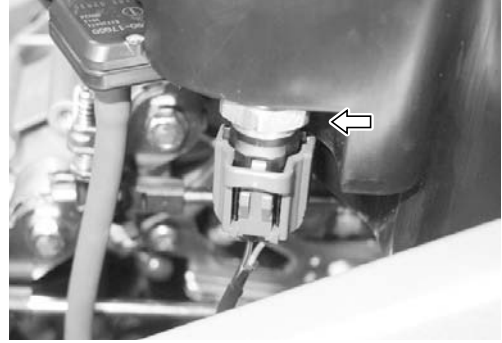
## IAT SENSOR INSPECTION

The intake air temperature sensor is installed on the right side of the air cleaner box. (🔧 4-33)

## IAT SENSOR REMOVAL AND INSTALLATION

- Lift and support the fuel tank. (🔧 5-7)
- Remove the IAT sensor from the air cleaner box.
- Install the IAT sensor in the reverse order of removal.

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



## TO SENSOR INSPECTION

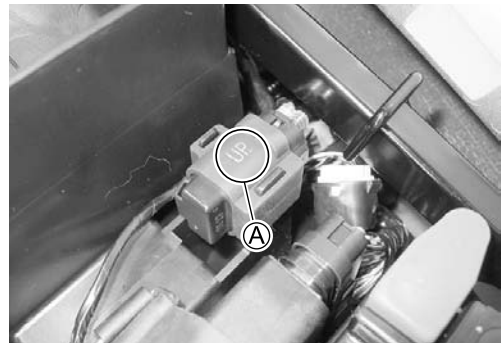
## TO SENSOR REMOVAL AND INSTALLATION

The tip over sensor is located in under the seat. (🔧 4-35)

- Remove the right frame cover. (🔧 7-5)
- Remove the TO sensor from the rear fender.
- Install the TO sensor in the reverse order of removal.

### NOTE:

When installing the TO sensor, the "UP" mark Ⓐ must be pointed upward.



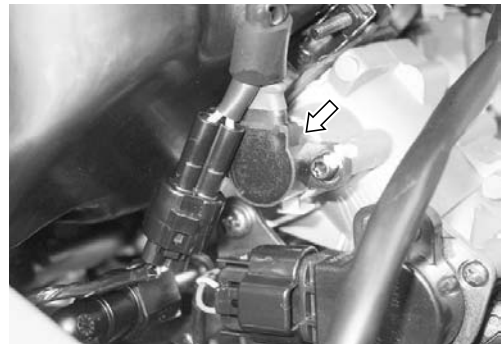
## STP SENSOR INSPECTION

## STP SENSOR REMOVAL AND INSTALLATION

The secondary throttle position sensor is installed at the left side of the No.2 throttle body.

- Remove the air cleaner box. (🔧 5-15)
- Remove the STP sensor. (🔧 5-19)
- Install the STP sensor in the reverse order of removal.

🔧 STP sensor mounting screw: 2.0 N·m (0.2 kgf-m, 1.5 lb-ft)



## STP SENSOR ADJUSTMENT

- Adjust the STP sensor. (🔧 5-28)

## HO2 SENSOR INSPECTION (E-02, 19)

## HO2 SENSOR REMOVAL AND INSTALLATION

The HO2 sensor is installed at the exhaust pipe.

- Remove the seat. (🔧 7-4)
- Disconnect the HO2 sensor lead wire coupler and remove the HO2 sensor.
- Install the HO2 sensor in the reverse order of removal.

🔧 HO2 sensor: 47.5 N·m (4.75 kgf-m, 34.3 lb-ft)

