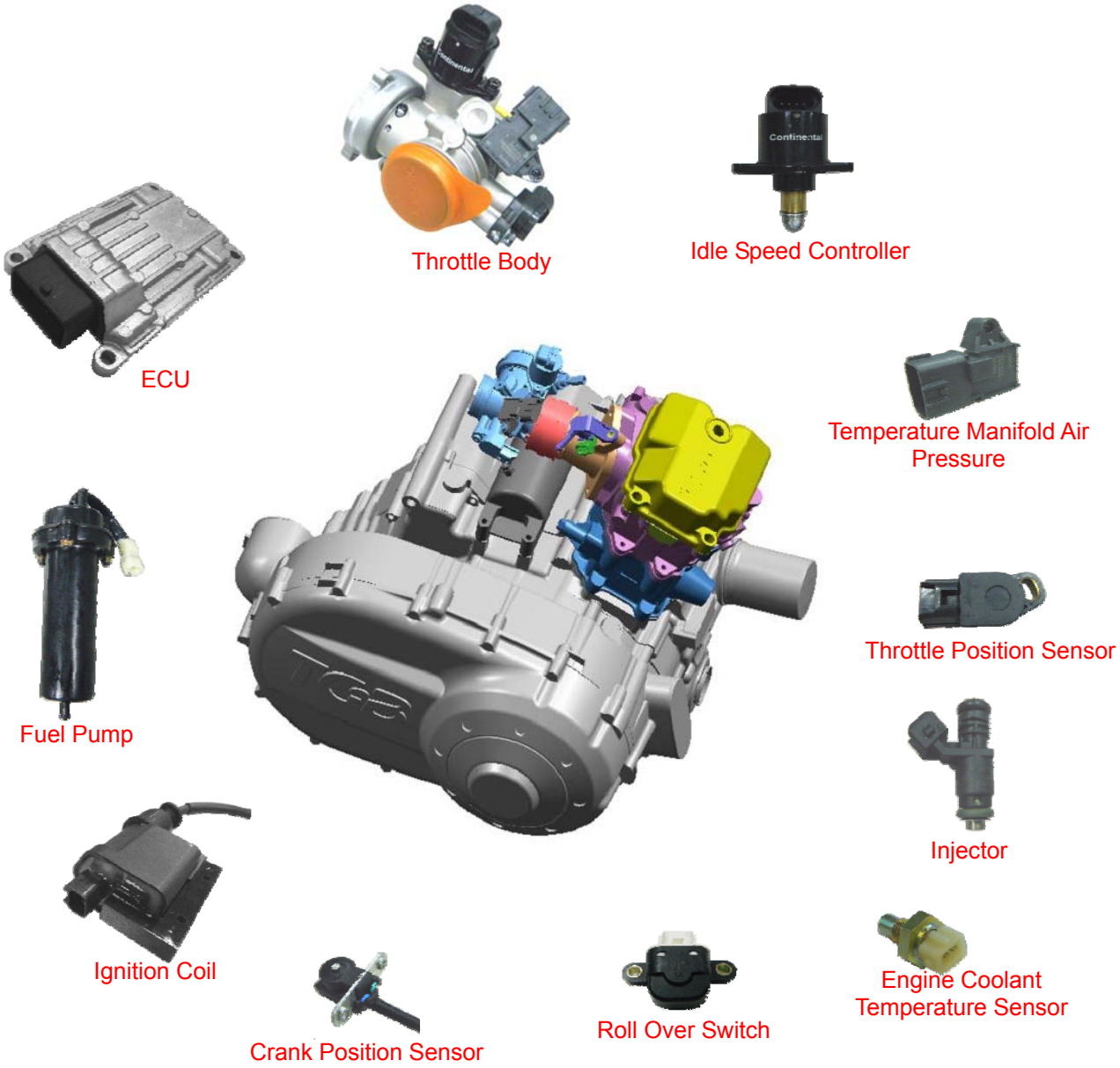
Fuel Injection System Components



PRECAUTIONS IN SERVICING

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

GENERAL

Be sure to relieve the fuel pressure while the engine is OFF.

Bending or twisting the control cables will impair smooth operation and could cause the cables to stick or bind, resulting in loss of vehicle control.

Work in a well-ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.

FUEL SYSTEM

- Do not apply commercially available carburetor cleaners to the inside of the throttle bore, which is coated with molybdenum.
- Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.
- Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed.
- Do not apply excessive force to the fuel pipe on the throttle body while removing or installing the throttle body.
- Do not damage the throttle body. It may cause incorrect throttle and idle valve synchronization.
- Prevent dirt and debris from entering the throttle bore, fuel tube and return tube, clean them using compressed air.
- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Do not loosen or tighten the white painted bolts and screws of the throttle body. Loosening or tightening them can cause throttle and idle valve synchronization failure.
- Do not push the fuel pump base under the fuel tank when the fuel tank is stored.
- Always replace the packing when the fuel pump is removed.
- Fuel injection system location, see page 8.
- A faulty EFI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- When disassembling the EFI parts, note the location of the O-rings. Replace them with new ones upon reassembly.
- Before disconnecting the fuel hose, release the fuel pressure.
- Always replace the clamp when the fuel hose is removed or loosened.
- Use a diagnosis tool for EFI system inspection.

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 in fully to engage the lock when connecting.
- 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 where (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 to 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.

ECU/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 ECU. The static electricity from your body may damage this part.
- When disconnecting and connecting the ECU 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 ECU, 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 with a low voltage battery will lead to erroneous diagnosis.
- Never connect any tester (voltmeter, ohmmeter, or whatever) to the ECU when its coupler is disconnected. Otherwise, damage to the ECU may result.

• Never connect an ohmmeter to the ECU with its coupler connected. If attempted, damage to the ECU or sensors may result.
• Be sure to use a specified voltmeter/ohmmeter. Otherwise, accurate measurements may not be obtained and personal injury may result.

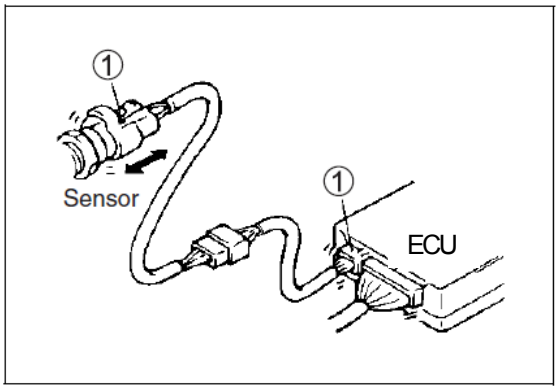
ELECTRICAL CIRCUIT INSPECTION PROCEDURE

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.

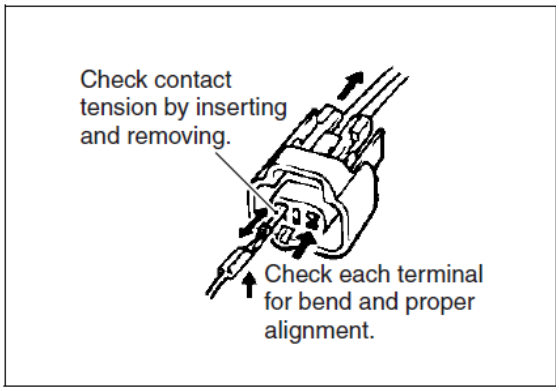
OPEN CIRCUIT CHECK

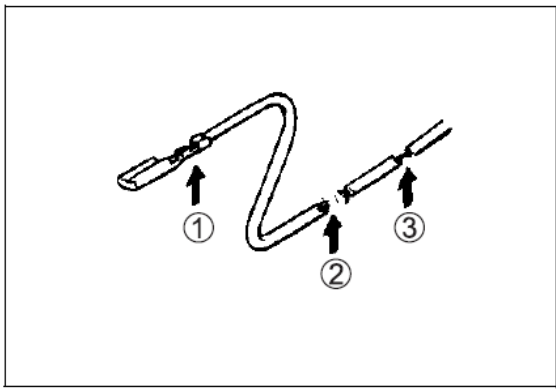
Possible causes for the open circuit are as follows. As the cause can exist in the connector/coupler or terminal, they need to be checked carefully.

• 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.



1. Check for loose connection



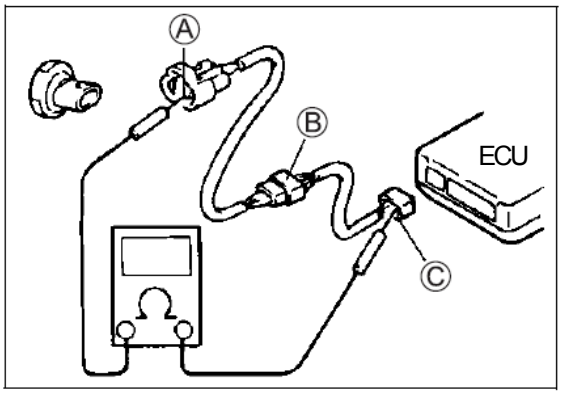


1. Looseness of crimping
2. Open
3. Thin wire (a few strands left)

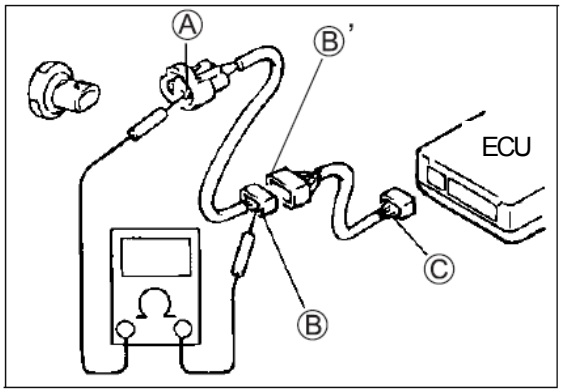
• Using continuity inspect or voltage check procedure as described below, inspect the wire harness terminals for open circuit and poor connection. Locate abnormality, if any.

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.

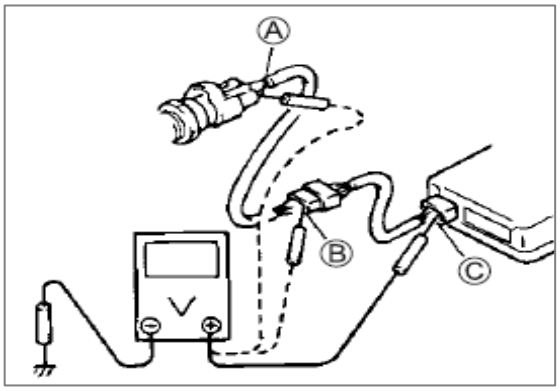


- Disconnect the coupler B and measure resistance between couplers A and B.
- If no continuity is indicated, the circuit is open between couplers A and B. If continuity is indicated, there is an open circuit between couplers B' and C or an abnormality in coupler B' or coupler C.



VOLTAGE CHECK

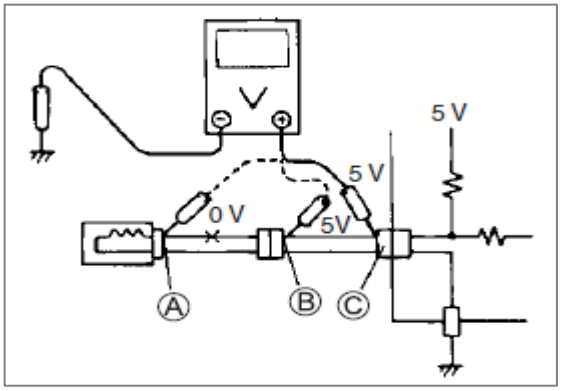
- If voltage is supplied to the circuit being checked, voltage check can be used as circuit check.
- With all connectors/couplers connected and voltage applied to the circuit being checked, measure voltage between each terminal and body ground.
- If measurements were taken as shown in the figure at the 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. 5 V
B and body ground: Approx. 5 V
A 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 A and B.

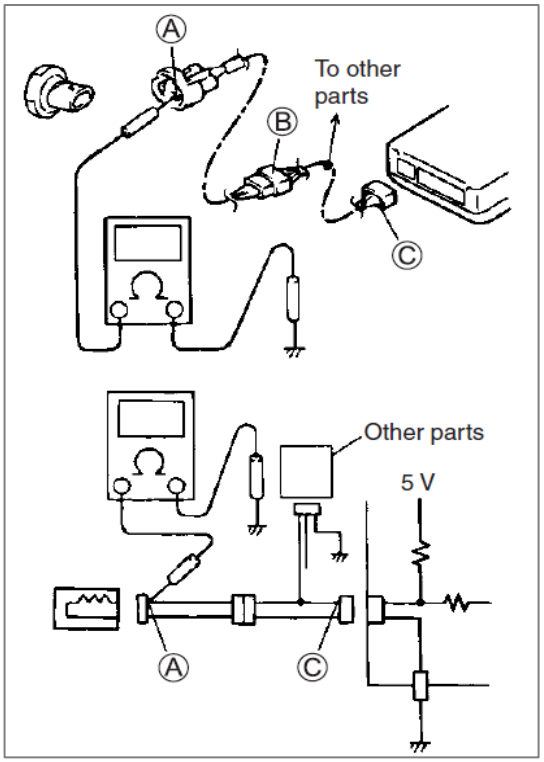


Voltage Between:

C and body ground: Approx. 5 V
B and body ground: Approx. 5 V
A and body ground: 3 V (2 V 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.

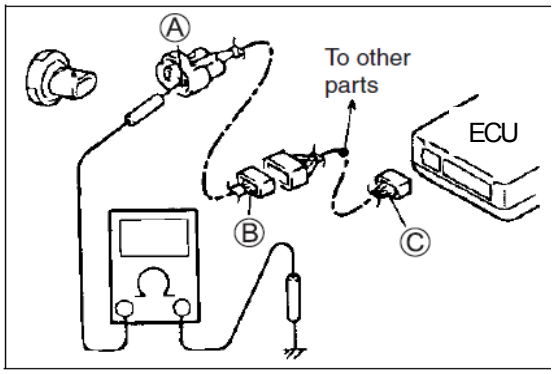


NOTE:

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.



SPECIFICATIONS

ITEM	SPECIFICATIONS
Throttle body identification number	
Starter valve vacuum difference	
Idle speed	1500+/- 100 rpm
Throttle grip free play	2~4 mm
Intake air temperature sensor resistance	Ω
Engine coolant temperature sensor resistance	Ω
Fuel injector resistance	Ω
Ignition pulse generator peak voltage	V
Manifold absolute pressure at idle	420 +/- 30 mm Hg
Fuel pressure at idle	300 kPa

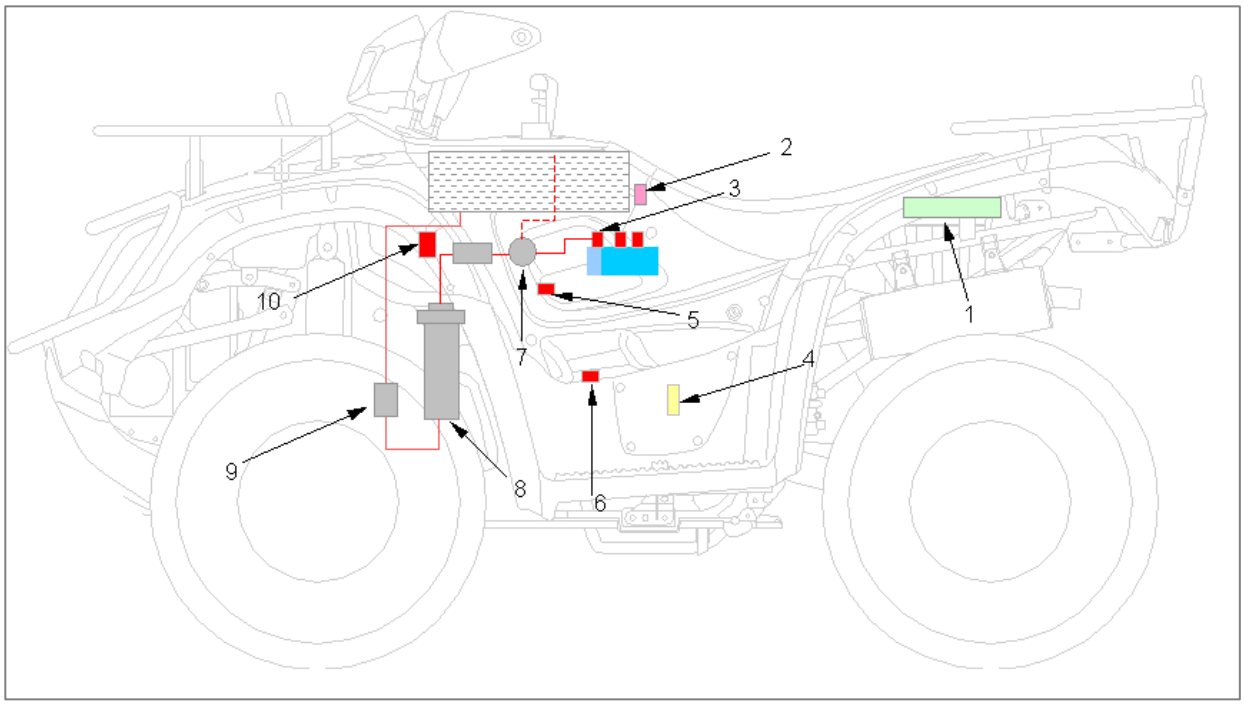
TORQUE VALUES

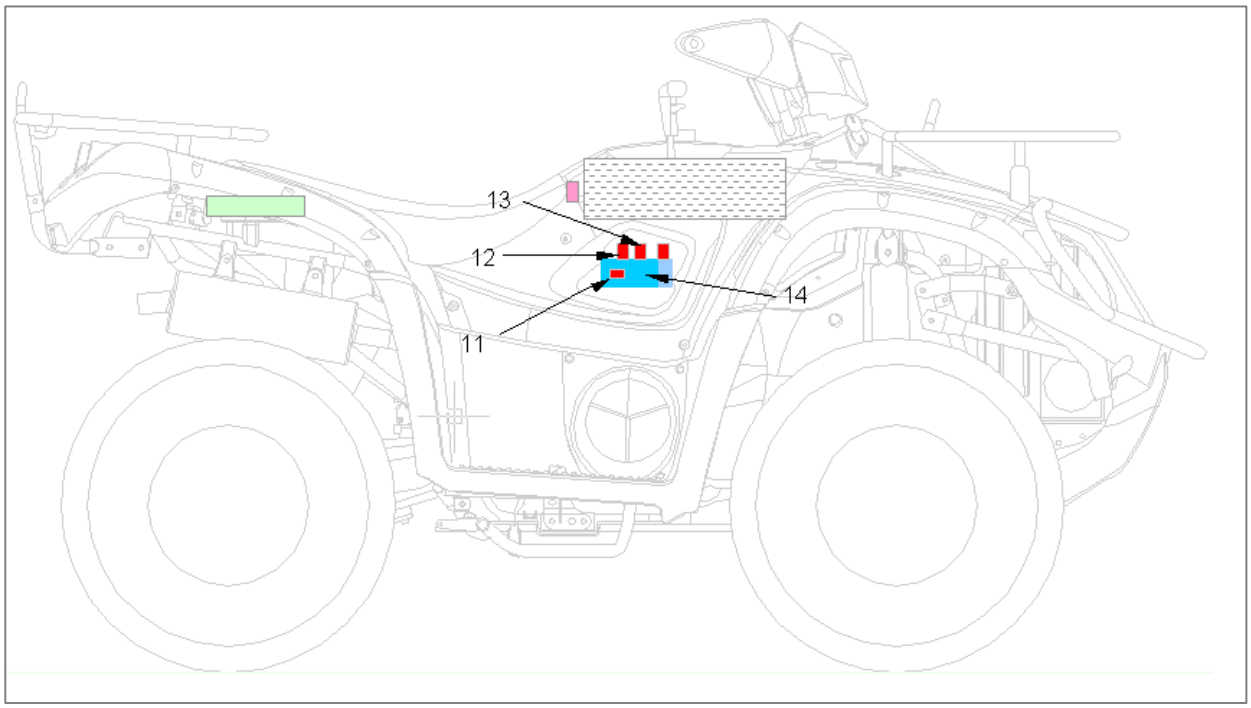
ECT sensor

Pressure regulator mounting bolt

Fuel pump mounting nut

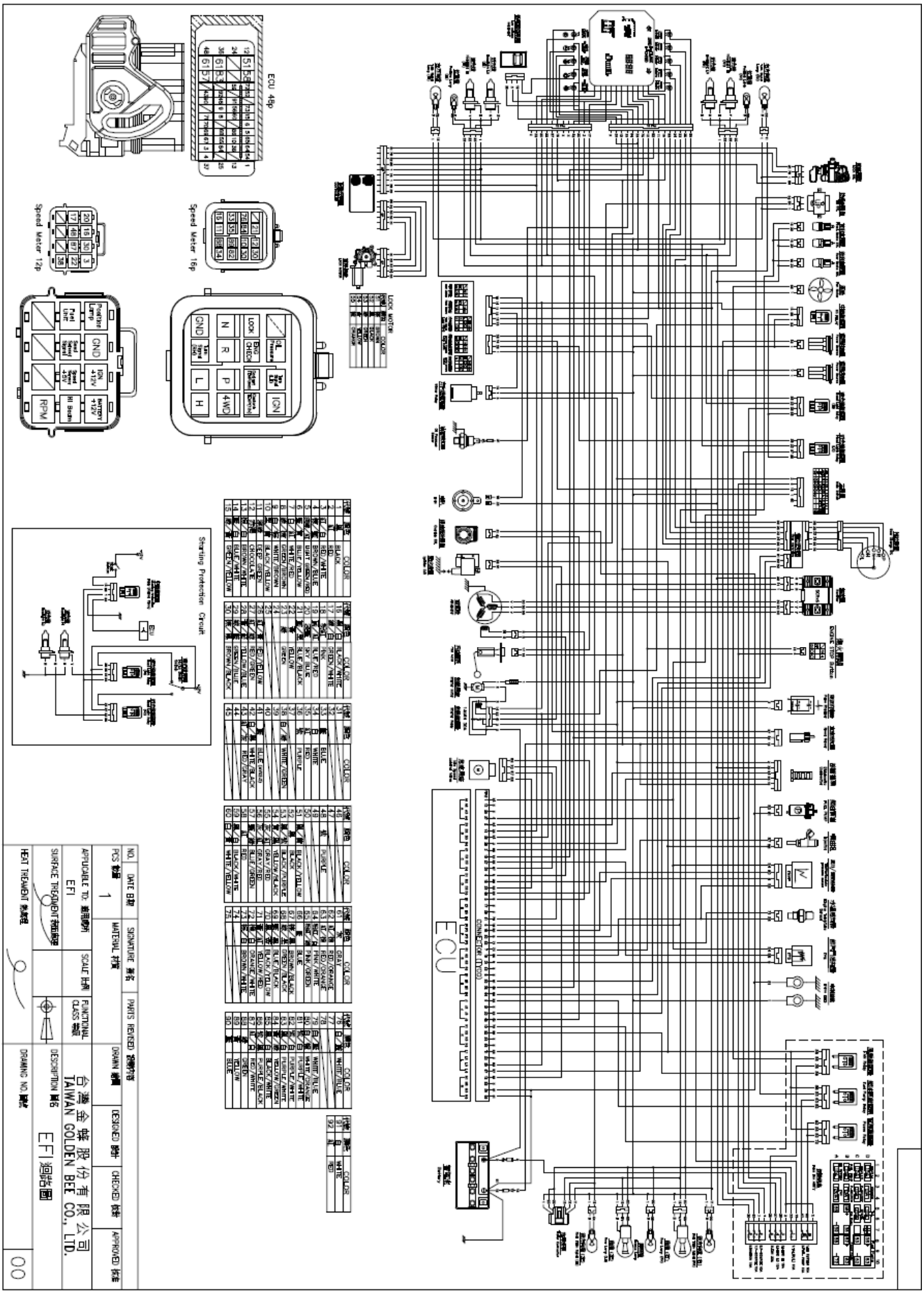
PARTS LOCATION





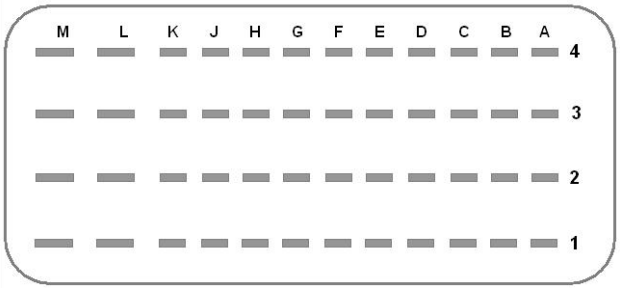
1	ECU	8	Fuel Pump (Reservoir)
2	Roll Over Sensor	9	Fuel Filter x 2
3	Injector	10	Ignition Coil
4	Speed Sensor	11	Throttle Position Sensor
5	Engine Coolant Temperature	12	Idle Speed Controller
6	Crank Position Sensor	13	Temperature Manifold Air Pressure
7	Pressure Regulator	14	Throttle Body

WIRING DIAGRAM



ECU TERMINAL

HARNESS



ECU PLUG

Pin No.	Pin Code	Wire Color	Circuit	Note	Pin No.	Pin Code	Wire Color	Circuit	Note
A1	1	Y/B	VSENS	Sensor voltage	G1	7	Br/W		
A2	13		Blank		G2	19	Gr/R	SGND2	Signal ground
A3	25		Blank		G3	31	W/Br	TPS	Throttle position sensor
A4	37	Br/L	VBK	Key SW voltage	G4	43		Blank	
B1	2	P/W	CAN_H	Diagnosis Tool	H1	8		Blank	
B2	14	W/G	RPM		H2	20	W	Gear B	
B3	26	Y/G	MIL	Engine Check	H3	32	Pu	VEH	Speed sensor
B4	38	R/W	VBD	Battery Voltage	H4	44	L	Gear C	
C1	3	P/G	CAN_L	Diagnosis Tool	J1	9	B		Fuel Pump relay
C2	15	B/Y	Temp.	Temperature LED	J2	21		Blank	
C3	27	Gr/R	SGND1	Signal Ground	J3	33	R	Gear A	
C4	39	Br/B	Stepper B		J4	45	R/Gr		Override switch
D1	4	LG/R	CPS-	Crank position sensor (-)	K1	10	O/W		Main relay
D2	16	Pu/B			K2	22	B/W		Fan relay
D3	28	G/B	Stepper D		K3	34		Blank	
D4	40	L/B	Stepper A		K4	46		Blank	
E1	5	L/Y	CPS+	Crank position sensor (+)	L1	11	R	VBR	Start relay voltage
E2	17		Blank		L2	23		Blank	
E3	29		Blank		L3	35	B/W		Starter
E4	41	B/Y	Stepper C		L4	47	L/G		Injector
F1	6	G/Y		Brake SW	M1	12	B/Y		Ignition
F2	18	W/Y	MAP	Manifold Air Pressure	M2	24		Blank	
F3	30	G/Br	TIA	Temperature Intake Air	M3	36	Gr	PGND	Ground
F4	42	Y/R	ECT	E/G Temperature sensor	M4	48	Gr	PGND	Ground

SYSTEM TROUBLSHOOTING CUSTOMER COMPLAINT ANALYSIS

Record details of problem (failure, complaint) and how it occurred as described by the customer. For this purpose, use of an inspection form such as below will facilitate collecting information 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 lamp condition (LED)	□Always ON □Sometimes ON □Always OFF □Good condition
Malfunction code	Malfunction code（ ）

PROBLEM SYMPTOMS	
□ **Difficult Starting** □ No cranking □ No initial combustion □ No combustion □ Poor starting at （□cold □warm □always） □ Other_____	□ **Poor Drivability** □ Hesitation on acceleration □ Back fire / □ After fire □ Lack of power □ Surging □ Abnormal knocking □ Engine rpm jumps briefly □ Other _____
□ **Poor Idling** □ Poor fast idle □ Abnormal idling speed （□ High □ Low）（ rpm） □ Unstable □ Hunting（ rpm to rpm） □ Other _____	□ **Engine Stall when** □ Immediately after start □ Throttle valve is opened □ Throttle valve is closed □ Load is applied □ Other _____
□ OTHERS:	

ATV ENVIROMENTAL CONDITION WHEN PROBLEM OCCURS	
Environmental condition	
Weather Temperature Frequency Road	☐Fair ☐Cloudy ☐Rain ☐Snow ☐Always ☐Other _____ ☐Hot ☐Warm ☐Cool ☐Cold(℃) ☐Always ☐Always ☐Sometimes (times/ day, month) ☐Only once ☐Under certain condition ☐Urban ☐Suburb ☐Highway ☐Mountainous (☐Uphill ☐Down hill) ☐Tar macadam ☐Gravel ☐Other _____
ATV condition	
Engine condition	☐Cold ☐Warming up phase ☐warmed up ☐Always ☐Other at starting ☐Immediately after start ☐Racing without load ☐Engine speed (rpm)
ATV condition	During driving: ☐Constant speed ☐Accelerating ☐Decelerating ☐Right hard corner ☐Left hand comer ☐At shop ☐ATV speed when problem occurs (km/h, mile/h) ☐ Other _____

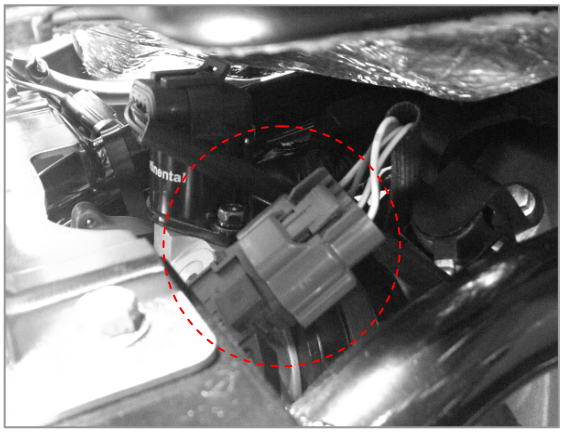
NOTE:

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

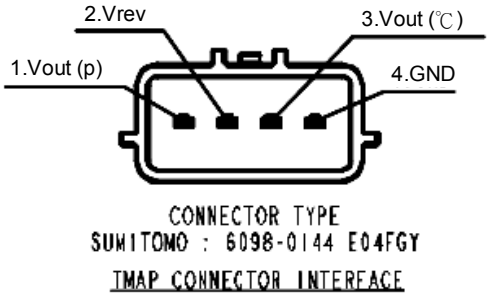
EFI SYSTEM COMPONENTS INSPECTION

T-MAP SENSOR

- Turn the ignition OFF.
- Disconnect the T-MAP sensor 4P connector.
- Check for loose or poor contact on the MAP sensor connector.

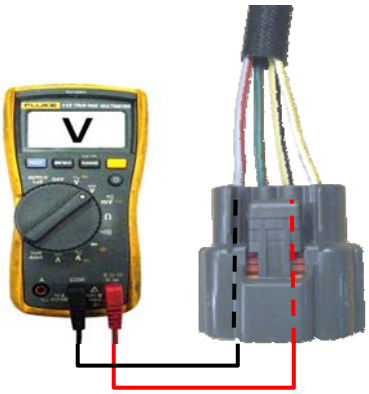


- Connect the T-MAP sensor connector.
- Start the engine and check that the MIL light.



- Turn the ignition switch OFF.
- Disconnect the MAP sensor 4P connector.
- Turn the ignition switch ON.
- Measure the voltage at the wire harness side connector.
  Connection: Yellow/Black (+)—Ground(-)
  Standard: 5.0 +/- 0.1V

- Measure the voltage between the connector terminals of wire harness side.
  Connection: Yellow/Black (+)—Gray/Red(-)
  Standard: 5.0 +/- 0.1V

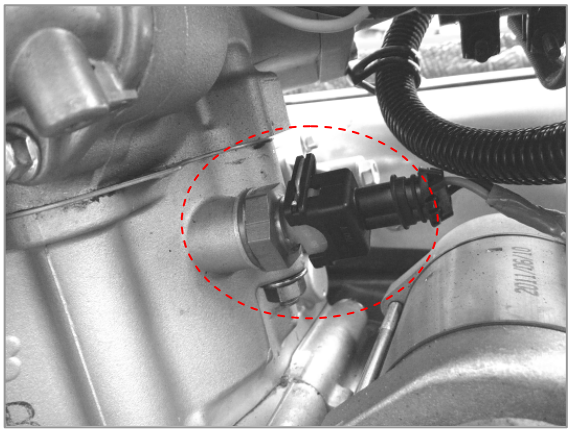


- Turn the ignition switch OFF.
- Connect the TMAP sensor 4P connector.

ECT SENSOR

INSPECTION

- Turn the ignition switch OFF.
- Disconnect ECT sensor 2P connector.
- Check for loose or poor contact on the ECT sensor connector.



- Connect the ECT sensor connector.
- Turn the ignition switch ON.
- Check the MIL light.

- Turn the ignition switch OFF.
- Disconnect the ECT sensor connector.
- Measure the resistance at ECT sensor terminals.

  Connection:

  Standard:2.3~2.6 kΩ (at 20℃)

- Turn the ignition switch ON.
- Measure the voltage between the ECT sensor connector terminal of the wire harness side and ground.

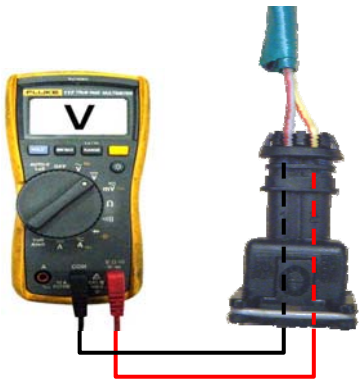
  Connection: Yellow/Red (+)－Ground(-)

  Standard: 5.0 +/- 0.1V

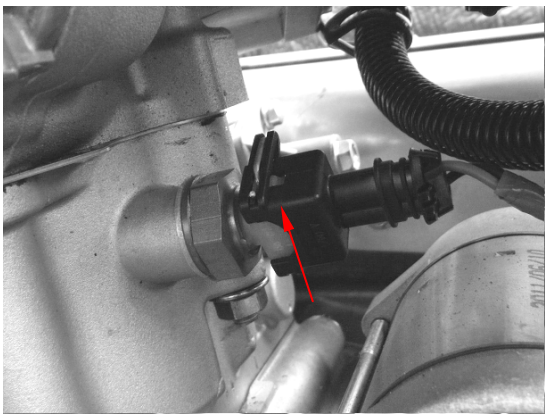
- Measure the voltage at ECT sensor connector of the wire harness side.

  Connection: Yellow/Red (+)－Gray/Red(-)

  Standard: 5.0 +/- 0.1V



REMOVAL / INSTALLATION



- Disconnect the ECT sensor 2P connector from the sensor
- Remove the ECT sensor.
- Install the new ECT sensor.

TORQUE: 120 kgf/cm

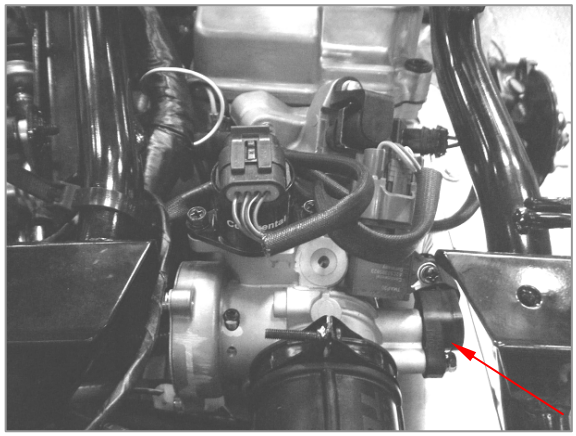
- Connect the ECT sensor 2P connector.

Standard:

TEMPERATURE(℃)	RESISTANCE VALUES(OHM)	TOL. (OHM)
20	3500	±250
60	704	±45
90	260	±20

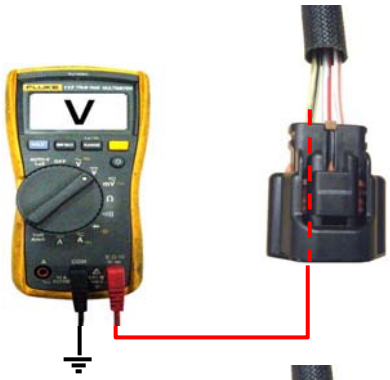
TP SENSOR

INSPECTION



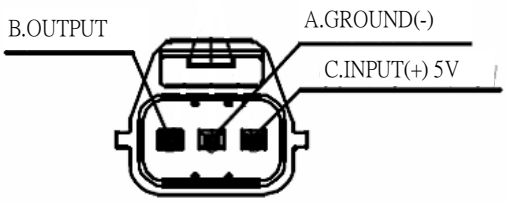
- Turn the ignition switch OFF.
- Disconnect the TP sensor 3P connector.
- Check for loose or poor contact on the TP sensor connector.

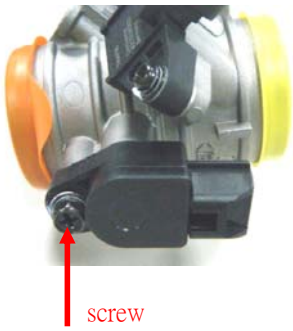
- Connect the TP sensor connector.
- Start the engine and check the MIL light.



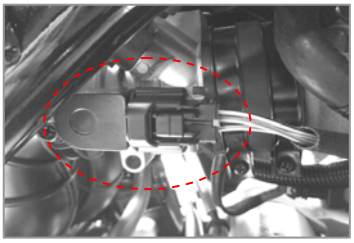
- Turn the ignition switch OFF.
- Disconnect the TP sensor 3P connector.
- Turn the ignition switch ON.
- Measure the voltage between the wire harness side connector terminal and ground.
  Connection: Yellow/Black (+)—Ground(-)
  Standard: 5.0 +/- 0.1V

- Measure the voltage at TP sensor terminals of the wire harness side.
  Connection: Yellow/Black (+)—Gray/Red(-)
  Standard: 5.0 +/- 0.1V
- Working voltage value: 5.0±0.1V
- Full throttle open voltage: **3.9±0.2V**
- Full throttle closed voltage: **0.5±0.05V**
- WARNING!
  Never loosen the screw of TPS, result the unsteady idle.



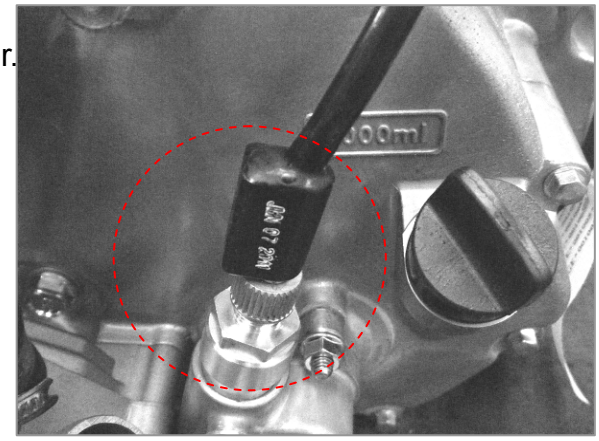


- Using diagnosis tool to confirm the throttle output signal.
  1. Connected to the "diagnosis tool", and open the main switch, but not to start engine.
  2. "Diagnosis tool" selects to a "Live Data" screen.
  3. Rotations throttle and check voltages.

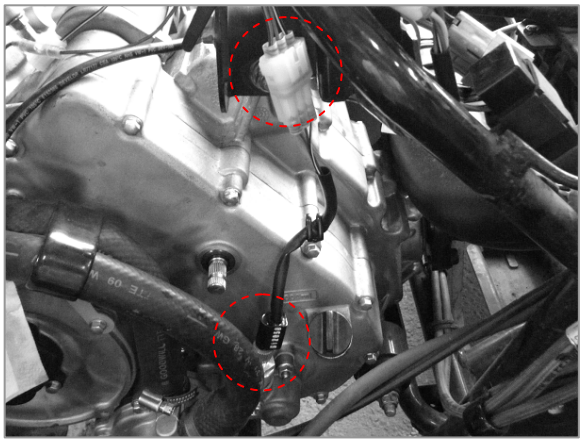


VEHICLE SPEED SENSOR

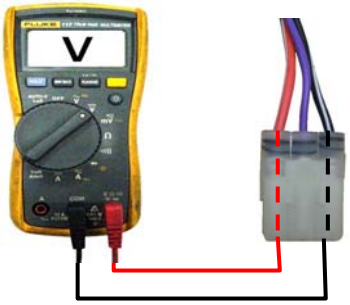
- Turn the ignition switch OFF.
- Disconnect the vehicle speed sensor 3P connector.
- Check for loose or poor contact on the vehicle speed sensor connector.



- Connect the vehicle speed sensor 3P connector.
- Start the engine.
- Ride the vehicle and keep the engine more than 5,000 RPM about 20 seconds or more.
- Check the MIL light.

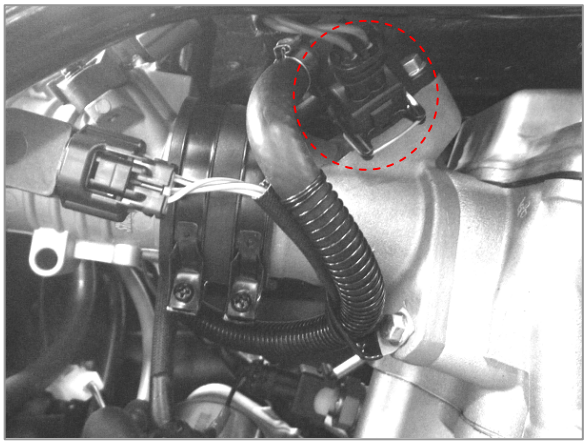


- Turn the ignition switch OFF.
- Disconnect the vehicle speed sensor 3P connector.
- Turn the ignition switch ON.
- Measure the voltage at the wire harness side connector.
  Connection: Red (+)—Black/White(-)
  Standard: 12 V



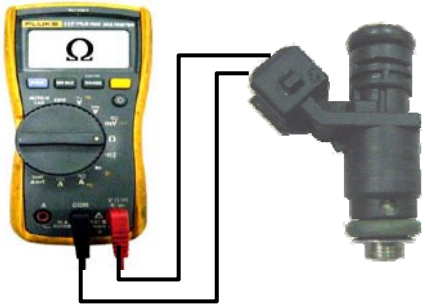
INJECTOR

• Turn the ignition switch OFF.
• Disconnect the injector 2P connector.
• Check for loose or poor contact on the injector 2P connector.

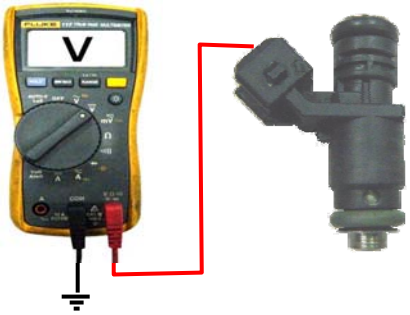


• Connect the injector 2P connector.
• Turn the ignition switch ON.
• Check the MIL light.

• Turn the ignition switch OFF.
• Disconnect the injector 2P connector and measure the resistance of the injector.
  Connection: Red (+) — Blue/Green(-)
  Standard:12.0+/-0.6Ω



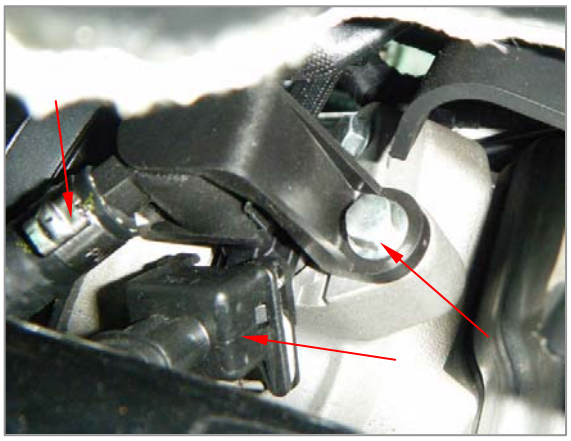
• Check for continuity between the injector and ground.
  Connection: Red (+) — Ground(-)
  Standard: continuity



• Turn the ignition switch ON.
• Measure the voltage between the injector connector of the wire harness side and ground.
  Connection: Red (+) — Ground(-)
  Standard: battery voltage

INSPECTION

- Start the engine and let it idle.
- Confirm the injector operating sounds with a sounding rod or stethoscope.
- If the injector does not operate, replace the injector.



REMOVAL

- Disconnect the injector 2P connector.
- Remove the bolts and fuel rail assembly.
- Remove the injector from the intake pipe.

INSTALLATION

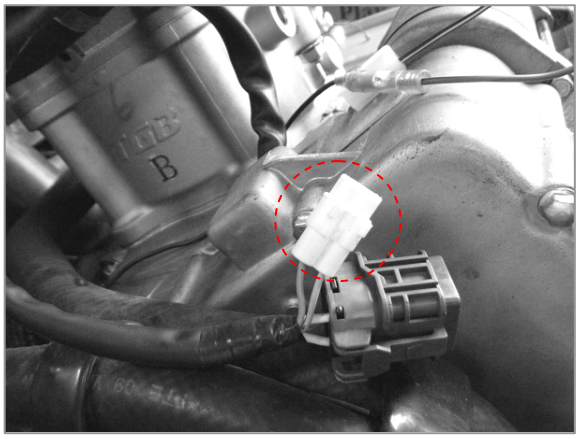
- Install injector on the intake pipe.
- Being careful not to damage the O-ring of injector.
- Install fuel rail assembly and tighten the bolt.

TORQUE: 120 kgf-cm

- Connect the injector 2P connector.

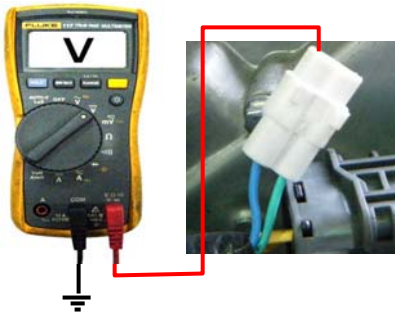
CRANK POSITION SENSOR

- Turn the ignition switch OFF.
- Disconnect the crank position sensor 2P connector.
- Check for loose or poor contact on the crank position sensor 2P connector.

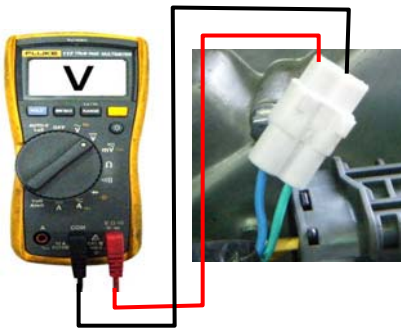


- Connect the crank position sensor 2P connector.
- Turn the starter motor more than 10 seconds and then check that the MIL light.

- Turn the ignition switch OFF.
- Disconnect the crank position sensor 2P connector.
- Check for continuity between the crank position sensor connector terminal and ground.
  Connection: Blue (+) — Ground(-)
  Standard: No continuity

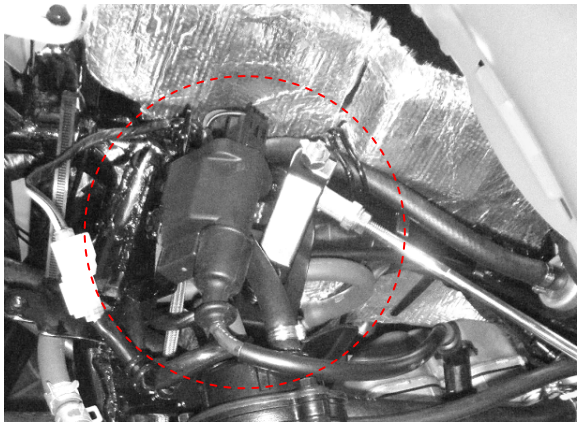


- Crank the engine with the starter motor, and measure the crank position sensor peak voltage at the crank position sensor 2P connector.
  Connection: Blue (+) — Sky Blue(-)
  Standard: 0.7V



IGNITION COIL

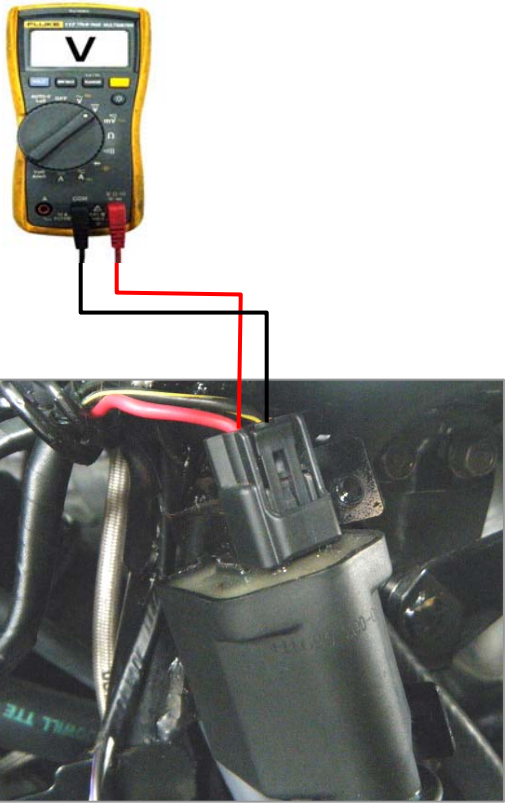
• Turn the ignition switch OFF.
• Disconnect the ignition coil 2P connector.
• Check for loose or poor contact on the ignition coil 2P connector.



• Connect the ignition coil 2P connector.
• Turn the starter motor more than 10 seconds and then check that the MIL light.

• Turn the ignition switch OFF.
• Disconnect the ignition coil 2P connector.
• Check for continuity between the ignition coil connector terminal and ground.
Connection: Red (+) — Ground(-)
Standard: No continuity

• Crank the engine with the starter motor, and measure the ignition coil peak voltage at the ignition coil 2P connector.
Connection: Red (+) — Black/Yellow(-)
Standard: 0.7V



• Check for resistance between the ignition coil connector terminal and ground.
Standard: 0.63±0.05Ω

THROTTLE BODY

REMOVAL

NOTE:

- *Before disconnecting the fuel hose, release the fuel pressure by loosening the clamp.*
- *Always replace the clamp when the fuel hose is removed or loosened.*

DISASSEMBLY

- Disconnect the TP sensor, T-MAP sensor and ISC sensor connector from the throttle
- Disconnect intake pipe rubber tube from the throttle body.
- Disconnect the throttle body from the air cleaner case.

NOTE:

- *Do not damage the throttle body. It may cause incorrect throttle and idle valve.*
- ***The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.***
- ***Do not loosen or tighten the white painted bolts and screws of the throttle body. Loosening or tightening them can cause throttle and idle valve failure.***

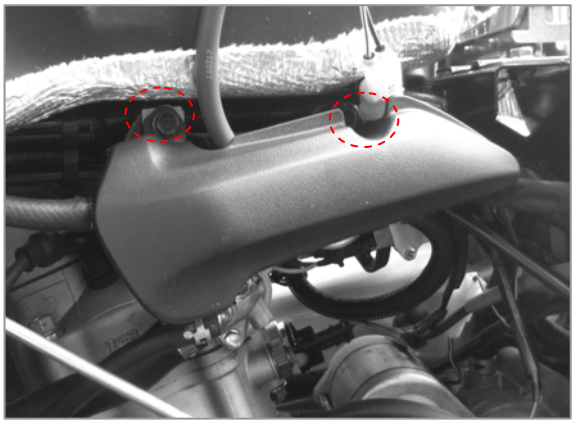
- Disconnect the throttle cable end from the throttle drum.

ASSEMBLY

- Connect the throttle cable end to the throttle drum.
- Connect the TP, T-MAP and ISC sensor connector on the throttle body.
- Install and tighten the intake pipe rubber tube on the throttle body.
- Install the throttle body to the air cleaner case.

PRESSURE REGULATOR

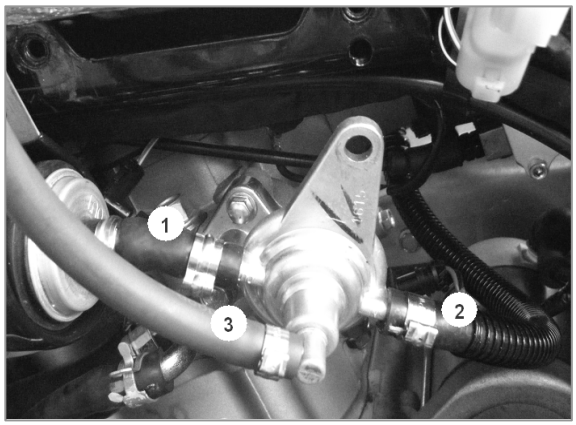
REMOVAL / INSTALLATION



NOTE:

• Remove the pressure regulator mounting bolts and cover then remove the pressure regulator.

• Disconnect injector fuel hose (2) to release fuel pressure.
• Disconnect fuel supply hose (1).
• Disconnect fuel return hose (3).



NOTE:

• Recommends that hose clamp be discarded and replaced each time they are removed or loosened. They are one time usage only.

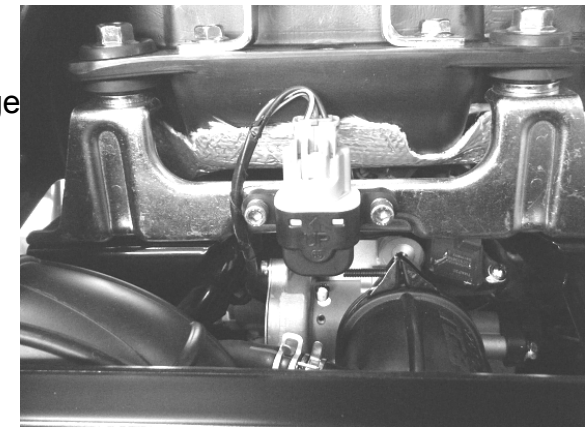
Special Tool:

• Install the pressure regulator in the reverse order of removal.

TORQUE: 100kgf-cm

ROLL OVER SENSOR

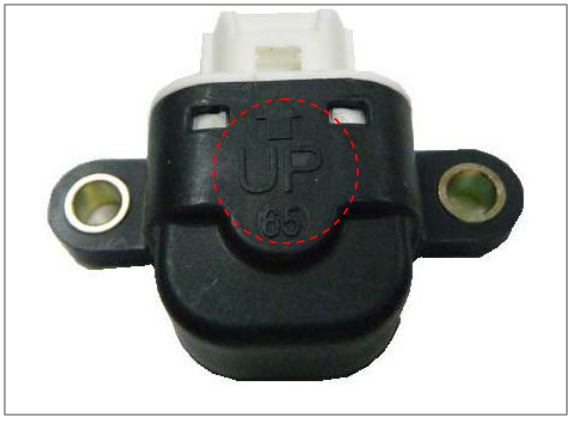
INSPECTION



- Remove the seat set.
- Turn the ignition switch ON and measure the voltage between the following terminals of the Roll Over sensor connector with the connector connected.

TERMINAL	STANDARD

- Turn the ignition switch OFF.
- Remove the screws, washers, nuts and roll over sensor.
- Place roll over sensor horizontal as shown and turn the ignition switch ON.



- The roll over sensor is normal if the power supply is closed.
- Incline the roll over sensor approximately 65 degrees to the left or right with the ignition switch ON.
- The roll over sensor is normal if the power supply is open.
- If you repeat this test, first turn the ignition switch OFF then turn the ignition switch ON.

REMOVAL / INSTALLATION

- Disconnect the roll over sensor 2P connector.
- Remove the two screws, nuts and roll over sensor.
- Installation is in the reverse order of removal.
- Tighten the mounting screws securely.

NOTE: ***Install the roll over sensor with its "UP" mark facing up.***

ECU

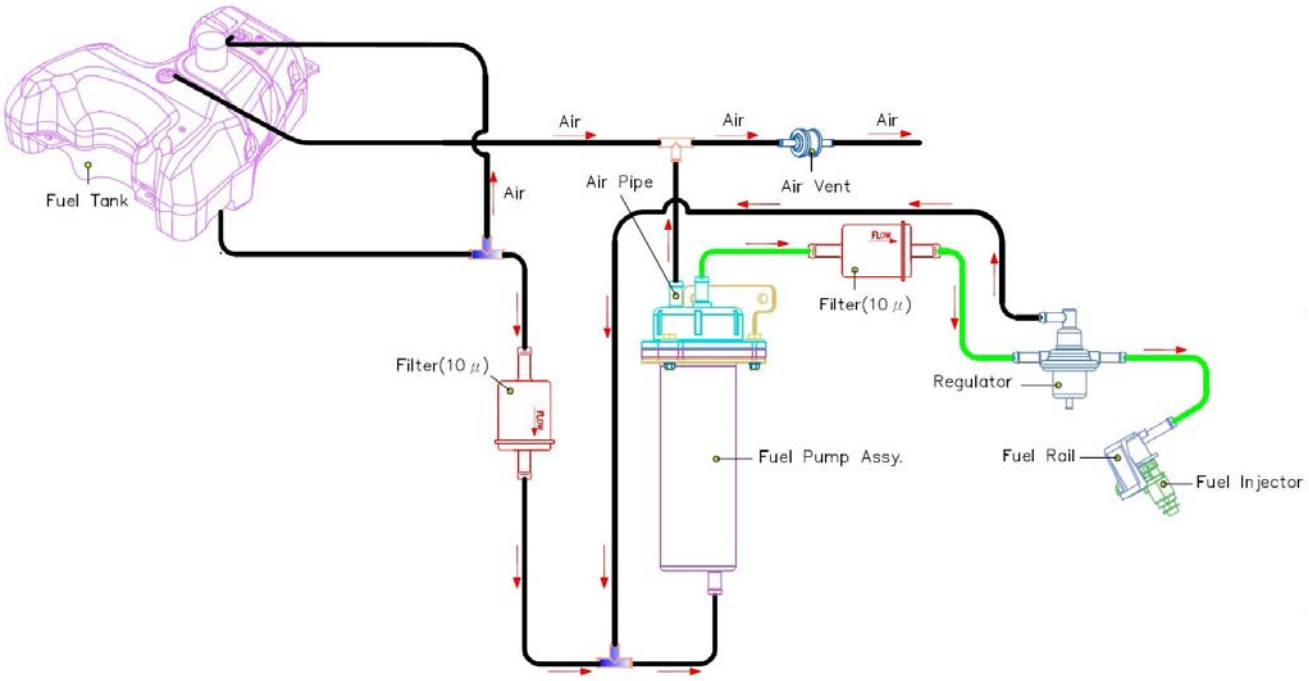
REMOVAL / INSTALLATION

- Remove the seat set.
- Disconnect the ECU 48P connectors.

POWER INPUT LINE

- Turn the ignition switch ON.
- Measure the voltage between the ECU and ground.
- There should be battery voltage.
- If there is no voltage, check for an open circuit in Black/White wire between the ECU and roll over sensor/relay.
- If the wire is OK, check for the roll over sensor/relay.

FUEL LINE INSPECTION



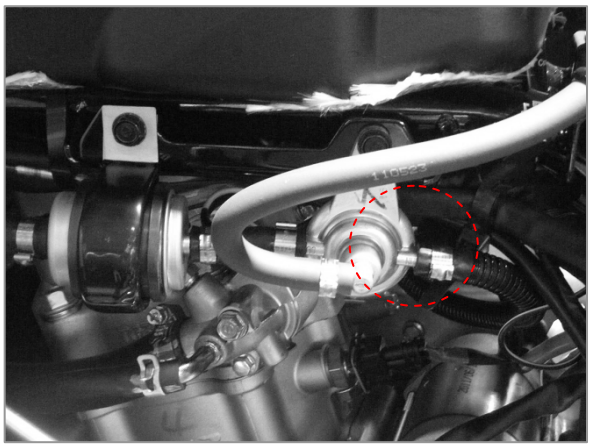
FUEL PRESSURE INSPECTION

NOTE:

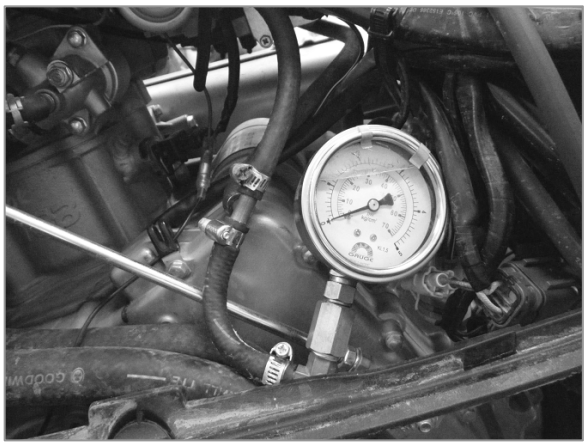
- Before disconnecting fuel hose, release the fuel pressure by loosening the pressure regulator fuel hose clamp on the injector hose.
- Always replace the clamp when the hose is removed or loosened.

- Disconnect the battery negative cable from the battery terminal.

• Disconnect the pressure regulator output hose and plug the hose.
• Slowly catch the remaining fuel using an approved gasoline container.



• Install the 3-way connector and attach the fuel pressure gauge as shown.



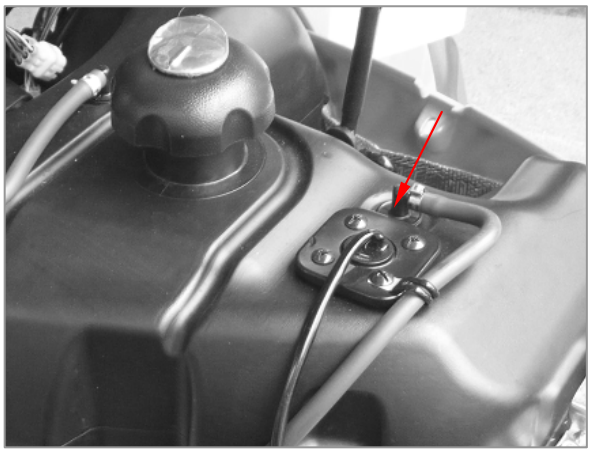
• Connect the battery negative cable.
• Start the engine.
• Read the fuel pressure at idle speed.
IDLE SPEED: 1500+/-100 RPM
STANDARD:300 kPa

• If the fuel pressure is higher than specified, inspect the following:
- Pinched or clogged fuel return hose.
- Pressure regulator
- Fuel pump

• If the fuel pressure is lower than specified, inspect the following:
- Fuel line leaking.
- Clogged fuel filter
- Pressure regulator
- Fuel pump

• After inspection, remove the fuel pressure gauge and reinstall and tighten the fuel hose clamp using the new clamp.
• Always replace the clamp when the fuel hose is removed or loosened.
• Connect the pressure regulator output hose.
• Install the removed parts in reverse order of removal.

FUEL FLOW INSPECTION



- Disconnect the fuel pump relay.
- Jump the Black/Purple and Red/Orange wire terminals of the wire harness side using a jumper wire.
- When the fuel return hose is disconnected, gasoline will spill out from the hose. Use an approved gasoline container to drain the gasoline.
- Wipe off spilled gasoline.
- Disconnect the fuel return hose on the top of fuel tank; plug the fuel tank inlet joint.
- Turn the ignition switch ON for 10 seconds.
- Measure the amount of fuel flow.

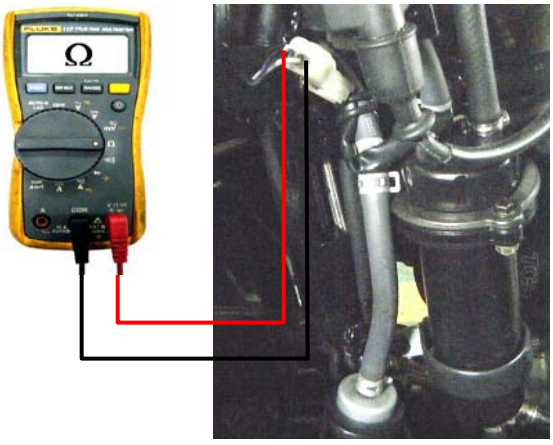
  Amount of fuel flow:

  300 cm3 minimum/*10 seconds at 12V
- If the fuel flow is less than specified, inspect the following:

- Pinched or clogged fuel hose and fuel return hose
  - Clogged fuel filter
  - Pressure regulator
  - Fuel pump
- After inspection, connect the fuel return hose.
- Start the engine and check for leaks.

FUEL PUMP

INSPECTION



- Turn the ignition switch ON and confirm that the fuel pump operates for a few seconds.
- If the fuel pump does not operate, inspect as follow:
- Disconnect the fuel pump 2P connector.
- Turn the ignition switch ON and measure the voltage between the terminals.

  Connection: Gray (+) Black/Purple (-)

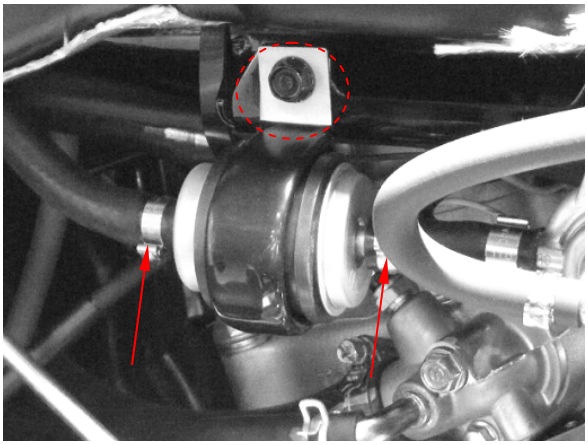
  The standard is 4±1Ω
- There should be battery voltage for a few seconds.
- If there is battery voltage, replace the fuel pump.
- If there is no battery voltage, inspect the following:
  - Main fuse 30A
  - Fuel pump relay
  - Roll Over sensor

- ECU

REMOVAL

NOTE:

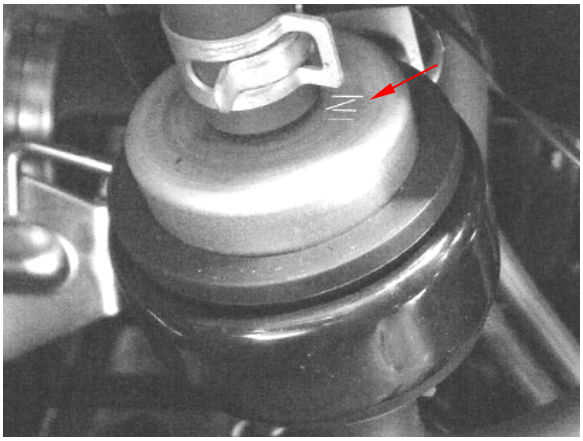
• Before disconnecting the fuel hose, release the fuel pressure.
• Always replace the clamp when the fuel hose is removed or loosened.
• Remove the fuel tank
• Remove the fuel pump mounting nuts.
• Remove the fuel pump assembly and packing.



FUEL FILTER REPLACEMENT

• Disconnect the fuel hose from the fuel filter.
• Remove the screw, clamp and fuel filter.
• Install the fuel filter in the reverse order of removal.

NOTE: The direction of fuel filter with “IN” mark.



INSTALLATION

• Place new packing onto the fuel tank.
• Install the fuel pump, being careful not to damage the fuel pump wire.
• Install and tighten the fuel pump mounting nuts in the sequence shown.

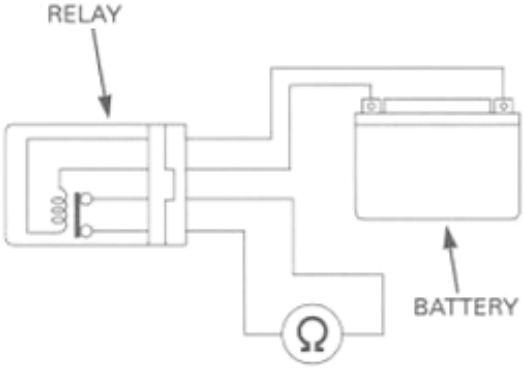
TORQUE: 120 kgf/cm.

FUEL PUMP RELAY

• Disconnect the fuel pump relay 5P connector, remove the fuel pump relay.
• Connect the ohmmeter to the fuel pump relay connector terminals 30 and 87.

CONNECTION:

• Connect the 12V battery to the fuel pump relay connector terminals 85 and 86.



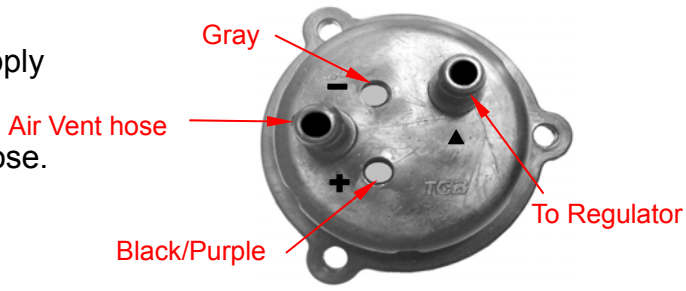
CONNECTION:

• There should be continuity only when the 12V battery is connected.
• If there is no continuity when the 12V battery is connected, replace the fuel pump relay.

FUEL TANK/RESERVOIR (FUEL PUMP ASSEMBLY)

ROMOVAL

• Loosen the fuel tank mounting bolt/nut.
• Release the fuel pressure.
• Disconnect the fuel tank air vent hose and supply hose.
• Remove the clamp then disconnect the fuel hose.
• Remove the following:
  - Fuel tank supply hose
  - Fuel tank air vent hose
  - Fuel pump/reserve sensor 2 P connector



NOTE: The clamp for one time use only.

• Clamp the fuel return hose.
• Disconnect the fuel return hose at the pressure regulator.
• Install the following:
  - Fuel hose (with "▲" mark)
  - Air vent hose
  - Fuel pump/reserve sensor 2P connector

NOTE:

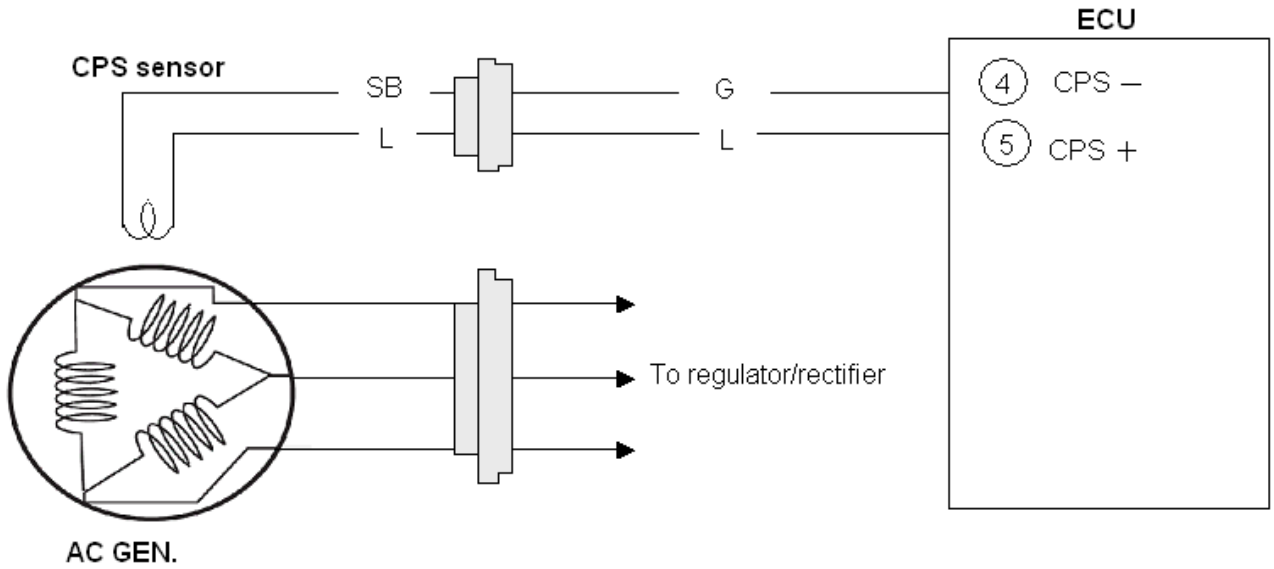
• Always replace new clamp while disassemble or loosen.
• Connect the fuel hose to the pressure regulator.
• Connect the fuel pump/reserve sensor 2P connector.
• Connect the fuel output hose to the fuel rail with new clamp.
• While pushing the fuel hose to the fuel rail, install and tighten the clamp.

NOTE: *Do not apply excessive force to the fuel pipe.*

SENSOR CIRCUIT TROUBLESHOOTING

CPS SENSOR CIRCUIT MALFUNCTION

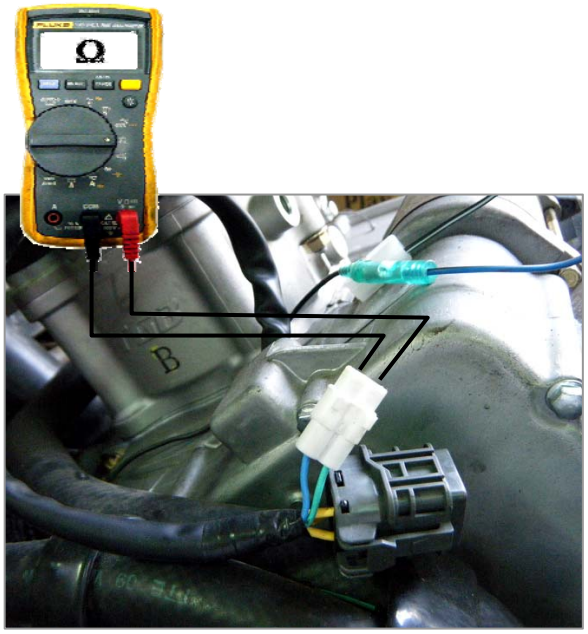
DETECTED CONDITION	POSSIBLE CAUSE
The signal does not reach ECU for 3 sec. or more, after receiving the starter signal.	• Metal particles or foreign material being stuck on the CPS sensor and rotor tip • CPS sensor circuit open or short • CPS sensor malfunction • ECU malfunction



INSPECTION

Step 1

1) Remove the seat set.
2) Remove the left side cover.
3) Turn the ignition switch OFF.
4) Check the CPS sensor coupler for loose or poor contacts.
   If OK, then measure the CPS sensor resistance.
5) Disconnect the CPS sensor coupler and measure the resistance.
   CPS sensor resistance: 115 +/- 10 Ω
   (Blue –Sky Blue)
6) If OK, then check the continuity between each terminal and ground.
   CPS sensor continuity: ∞ Ω (Infinity)
   (Blue – Ground)
   (Green – Ground)



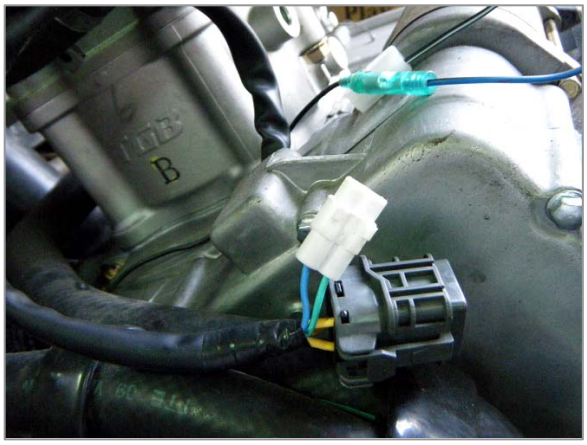
Are the resistance and continuity OK?

YES	Go to next step 2
NO	Replace CPS sensor with new one

7) After repairing the trouble, clear the DTC using Diagnosis Tool.

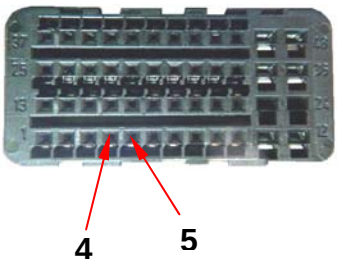
Step 2

1) Crank the engine a few seconds with the starter motor, and measure the CPS sensor peak voltage at the coupler.
2) Repeat the above test procedure a few times and measure the highest peak voltage.
   CPS sensor peak voltage: 4.0 V and more
   (+ Blue – - Sky-Blue)



Is the voltage OK?

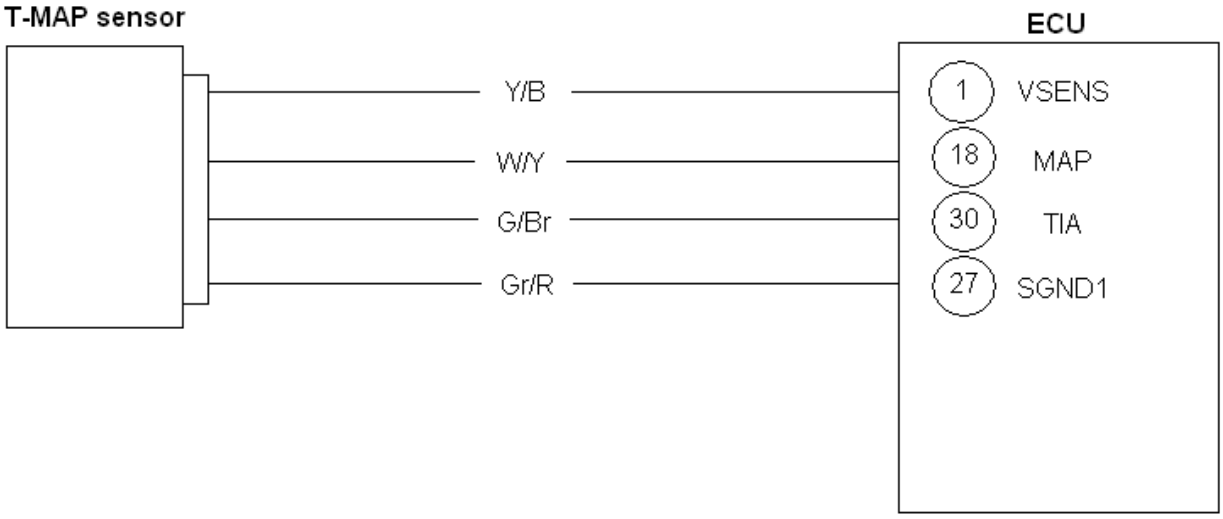
YES	•Blue or Sky-Blue wire open or shorted to ground • Loose or poor contacts on the CPS sensor coupler or ECU coupler (terminal 4 or 5) • If wire and connection are OK, intermittent trouble or faulty ECU. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECU with a known good one, and inspect it again.
NO	• Inspect that metal particles or foreign material stuck on the CPS sensor and rotor tip. • If there are no metal particles and foreign material, then replace the CPS sensor with a new one.



3) After repairing the trouble, clear the DTC using Diagnosis tool.

TMAP SENSOR CIRCUIT MALFUNCTION

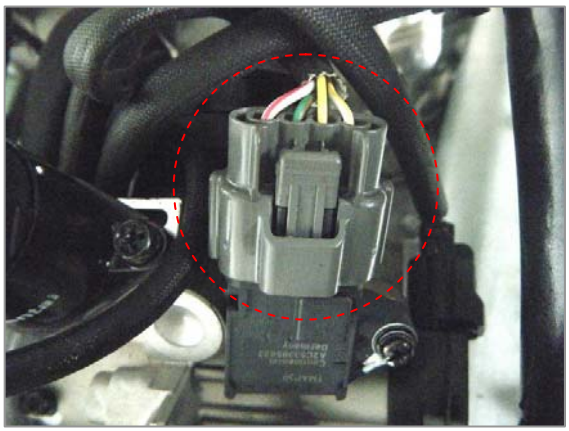
DETECTED CONDITION	POSSIBLE CAUSE
T-MAP sensor voltage low or high (0.1 V Sensor voltage < 4.8 V) NOTE: *Note that atmospheric pressure varies depending on weather conditions as well as altitude.* *Take that into consideration when inspecting voltage.*	• Clogged vacuum passage between throttle body and T-MAP sensor • Air being drawn from vacuum passage between throttle body and T-MAP sensor • T-MAP sensor circuit open or shorted to ground • T-MAP sensor malfunction • ECM malfunction

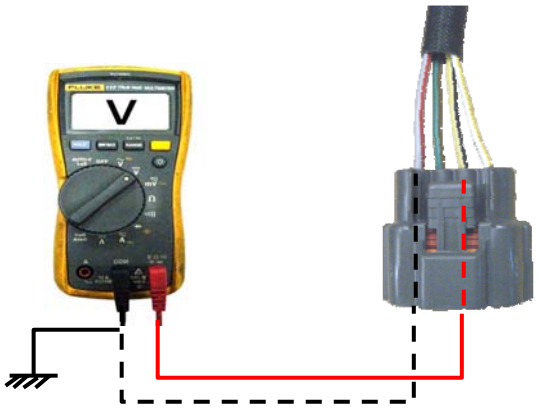


INSPECTION

Step 1

1) Loosen and lift up the fuel tank.
2) Turn the ignition switch OFF.
3) Check the T-MAP sensor couple for loose or poor contacts.
   If OK, then measure the T-MAP sensor input voltage.
4) Disconnect the T-MAP sensor coupler.
5) Turn the ignition switch ON.
6) Measure the voltage at the Yellow/Black wire and ground.
7) Also, measure the voltage at the Yellow/Black wire and Gray/Red wire.
   T-MAP sensor input voltage: 4.5 – 5.5 V
   (+Yellow/Black – - Ground)
   (+Yellow/Black – - Gray/Red)

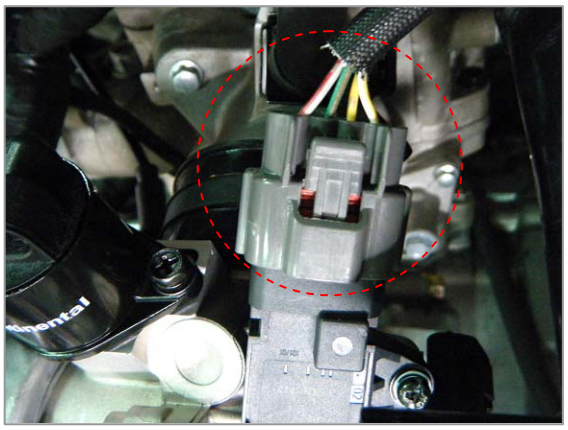




Is the voltage OK?

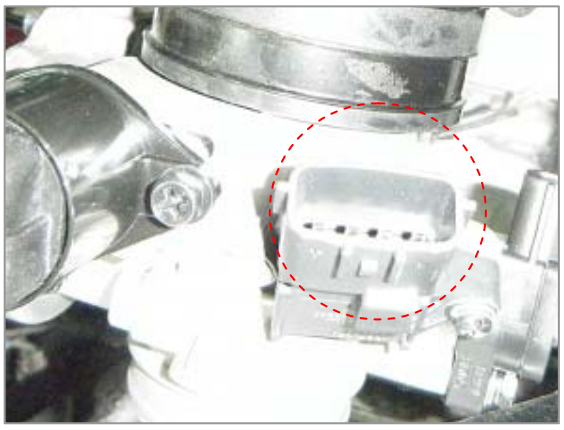
YES	Go to next step 2
NO	• Loose or poor contacts on the ECU coupler terminal 1 or 27 • Open or short circuit in the Yellow/Black wire or Gray/Red wire

8) After repairing the trouble, clear the DTC using Diagnosis tool.



Step 2

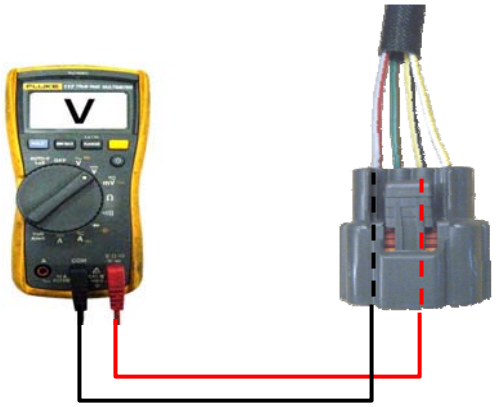
1) Connect the T-MAP sensor coupler.
2) Insert the needle pointed probes to the lead wire coupler.
3) Start the engine at idle speed and measure the T-MAP sensor output voltage at the wire side coupler.
   T-MAP sensor output voltage: Approx. 2.6 V at idle speed
   (+Yellow/Black – - Gray/Red)



Is the voltage OK?

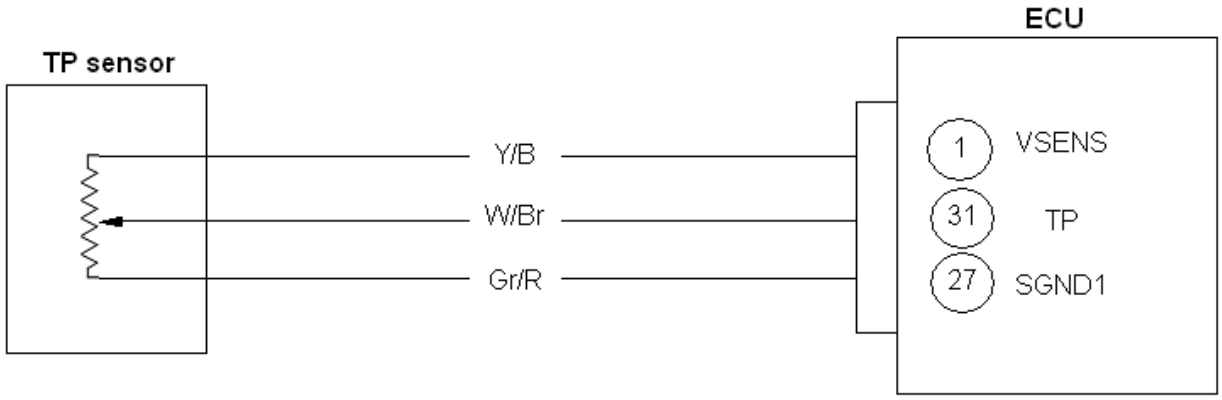
YES	•Yellow/Black or Gray/Red wire open or shorted to ground, or poor 18, 30 or 1 connection. • If wire and connection are OK, intermittent trouble or faulty ECU. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECU with a known good one, and inspect it again.
NO	• If check result is not satisfactory, replace new T-MAP (throttle body).

5) After repairing the trouble, clear the DTC using Diagnosis tool.



TP SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
Output voltage is not within the following range. Difference between actual throttle opening and opening calculated by ECU is larger than specified value. 0.1 V Sensor voltage < 4.8 V	• TP sensor maladjusted • TP sensor circuit open or short • TP sensor malfunction • ECU malfunction
Sensor voltage is higher than specified value.	• TP sensor circuit shorted to VSENS or ground circuit open
Sensor voltage is lower than specified value.	• TP sensor circuit open or shorted to ground or VSENS circuit open

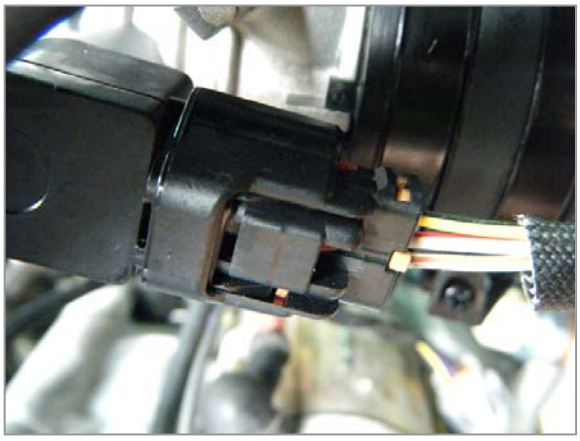


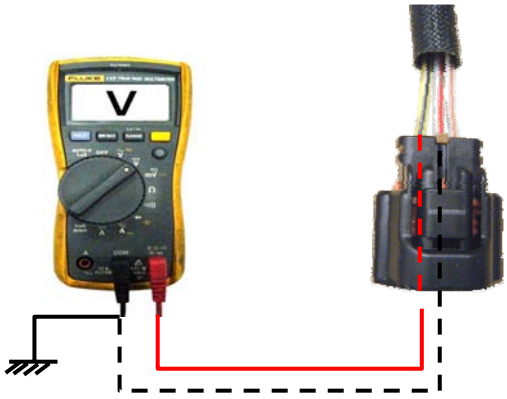
INSPECTION

Step 1

(When output voltage is out of specified)

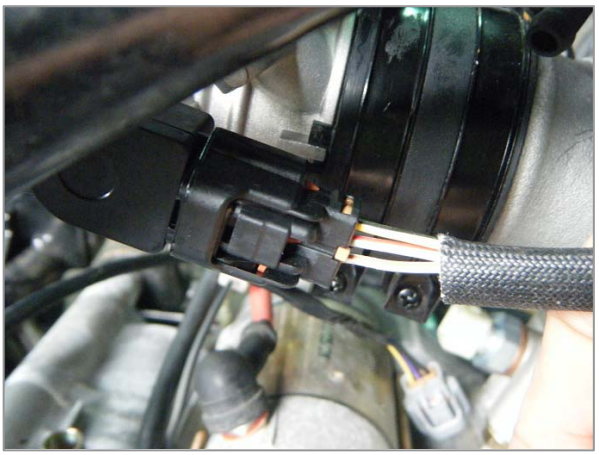
1) Loosen and lift up the fuel tank.
2) Turn the ignition switch OFF.
3) Check the TP sensor coupler for loose or poor contacts.
   If OK, then measure the TP sensor input voltage.
4) Disconnect the TP sensor coupler.
5) Turn the ignition switch ON.
6) Measure the voltage at the Red wire B and ground.
7) Also, measure the voltage at the Yellow/Black wire and Gray/Red wire.
   TP sensor input voltage: 4.5 – 5.5 V
   (+Yellow/Black – - Ground)
   (+Yellow/Black – - Gray/Red)





Is the voltage OK?

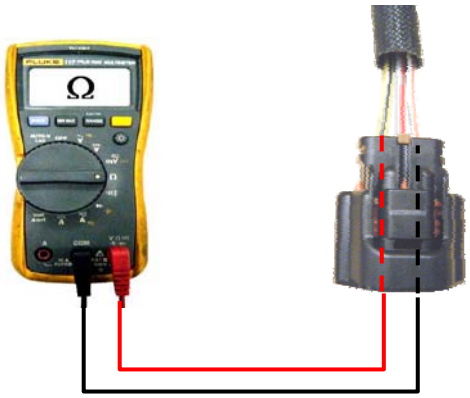
YES	Go to next step 2
NO	• Loose or poor contacts on the ECU coupler (terminal 1 or 27) • Open or short circuit in the Yellow/Black wire or Gray/Red wire



Step 1

(When sensor voltage is higher than specified)

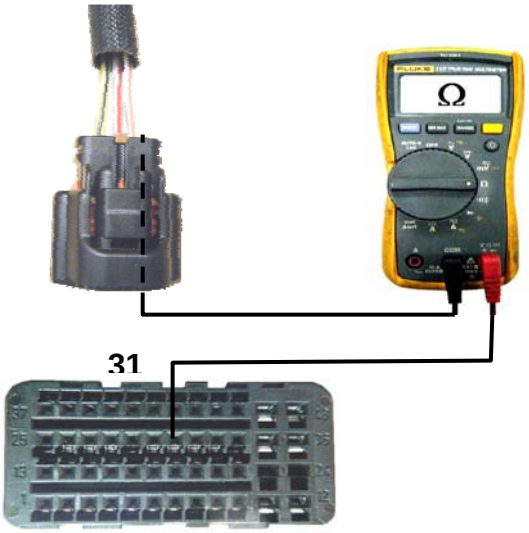
1) Loosen and lift up the fuel tank.
2) Turn the ignition switch OFF.
3) Check the TP sensor coupler for loose or poor contacts.
   If OK, then check the TP sensor lead wire continuity.
4) Disconnect the TP sensor coupler.
5) Check the continuity between W/Br wire and Y/B wire.
   If the sound is not heard from the tester, the circuit condition is OK.
6) Disconnect the ECU coupler.
7) Check the continuity between W/Br wire and terminal 31.
8) Also, check the continuity between Gr/R wire and terminal 27.
   TPS lead wire continuity: Continuity (sound)



Is the continuity OK?

YES	Go to next step 2
NO	W/Br wire shorted to VSENS or SGND1 wire open

9) After repairing the trouble, clear the DTC using Diagnosis tool.



Step 1

(When sensor voltage is lower than specified)

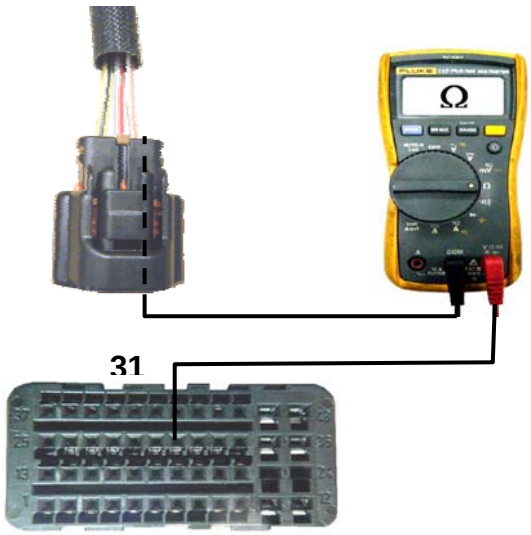
1) Loosen and lift up the fuel tank.
2) Turn the ignition switch OFF.
3) Check the TP sensor coupler for loose or poor contacts.
   If OK, then measure the TP sensor lead wire continuity.

4) Disconnect the TP sensor coupler.
5) Check the continuity between W/Br wire and ground.
6) Also, check the continuity between W/Br wire and Gr/R wire

C. If the sound is not heard from the tester, the circuit condition is OK.

7) Disconnect the ECU coupler.
8) Check the continuity between W/Br wire and terminal 31.
9) Also, check the continuity between Y/B wire and terminal .

TPS lead wire continuity: Continuity (sound)



Is the continuity OK?

YES	Go to step 1 and step 2
NO	Y/B wire or Gr/R wire open, or Gr/R wire shorted to ground

10) After repairing the trouble, clear the DTC using Diagnosis tool.

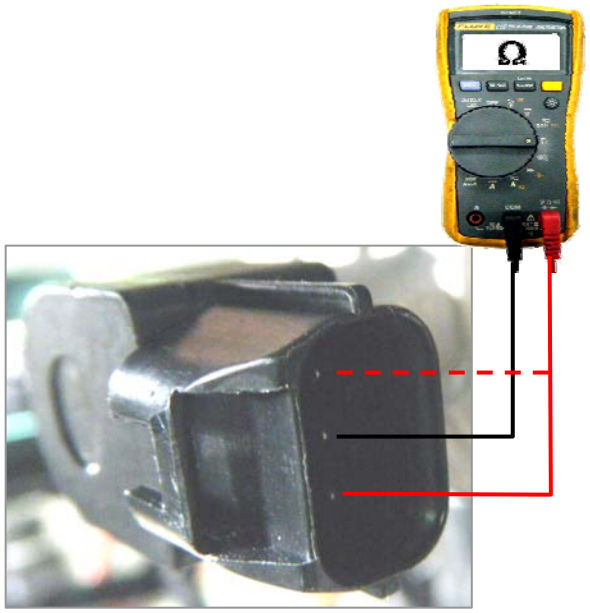
Step 2

1) Turn the ignition switch OFF.
2) Disconnect the TP sensor coupler.
3) Check the continuity between W/Br wire and ground.

TP sensor continuity: ∞ Ω (Infinity)
(White/Brown – Ground)

4) If OK, then measure the TP sensor resistance at the terminals (between Bottom and Center pin).
5) Turn the throttle grip and measure the resistance.

TP sensor resistance
Throttle valve is closed: Approx. 1.1 kΩ
Throttle valve is opened: Approx. 4.4 kΩ



6) If OK, then measure the TP sensor resistance at the terminals (between Upper and Center pin).

TP sensor resistance: Approx. 4.66 kΩ
(Upper pin – Center pin)

Are the continuity and resistance OK?

YES	Go to step 3
NO	• Reset the TP sensor position correctly. • Replace the new TP sensor (throttle body).

7) After repairing the trouble, clear the DTC using Diagnosis tool.

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.
4) Measure the TP sensor output voltage at the coupler (between W/Br wire and Gr/R wire) by turning the throttle grip.

TP sensor output voltage

Throttle valve is closed: Approx. 1.1 V

Throttle valve is opened: Approx. 4.4 V

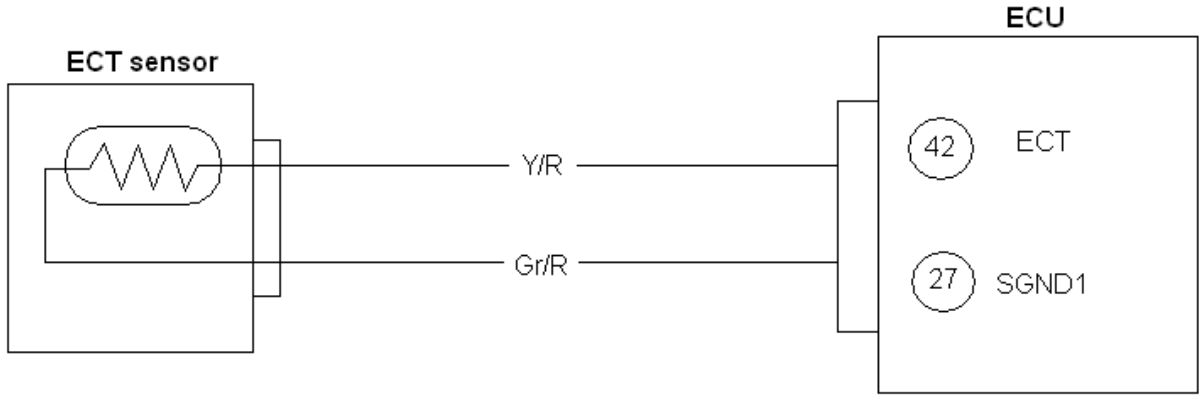
Is the voltage OK?

YES	• Y/B, W/Br or Gr/R wire open or shorted to ground, or poor 1, 31 or 27 connection • If wire and connection are OK, intermittent trouble or faulty ECU. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECU with a known good one, and inspect it again.
NO	If check result is not satisfactory, replace new TP sensor (throttle body).

5) After repairing the trouble, clear the DTC using Diagnosis tool.

ECT SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
Output voltage is not within the following range. 0.1 Sensor voltage < 4.6 V	• ECT sensor circuit open or short • ECT sensor malfunction • ECU malfunction
Sensor voltage is higher than specified value.	• ECT sensor circuit open or ground circuit open
Sensor voltage is lower than specified value.	• ECT sensor circuit shorted to ground

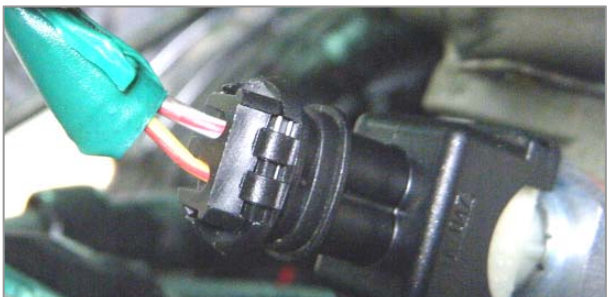


INSPECTION

Step 1

(When output voltage is out of specified)

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 ECT sensor coupler and turn the ignition switch ON.
4) Measure the voltage between Y/R wire terminal and ground.
5) Also, measure the voltage between Y/R wire terminal and Gr/R wire terminal.
   ECT sensor input voltage: 4.5 – 5.5 V
   (+Y/R – - Ground)
   (+Y/R – - Gr/R)



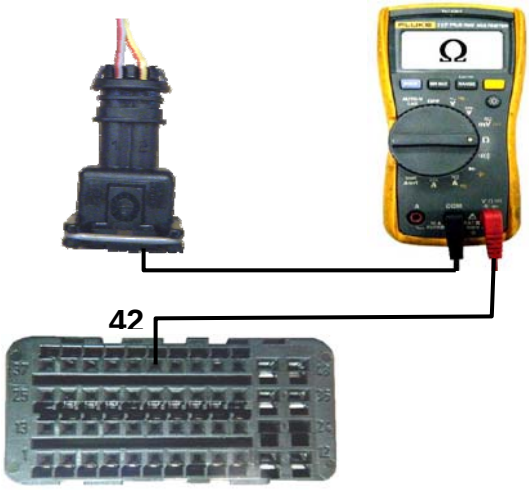
Is the voltage OK?

YES	Go to step 2
NO	• Loose or poor contacts on the ECU coupler (terminal 42 or 27) • Open or short circuit in the Y/R wire or Gr/R wire

Step 1

(When sensor voltage is higher than specified)

1) Turn the ignition switch OFF.
2) Check the ECT sensor coupler for loose or poor contacts.
   If OK, then check the ECT sensor lead wire continuity.
3) Remove the left side cover.
4) Disconnect the ECT sensor coupler.
5) Remove the ECU coupler.
6) Check the continuity between Y/R wire and terminal 42.
7) Also, check the continuity between Gr/R wire and terminal 27.
   ECTS lead wire continuity: Continuity (sound)



Is the continuity OK?

YES	Go to step 2
NO	Y/R or Gr/R wire open

8) After repairing the trouble, clear the DTC using Diagnosis tool.

Step 1

(When sensor voltage is lower than specified)

1) Turn the ignition switch OFF.
2) Check the ECT sensor coupler for loose or poor contacts.
   If OK, then check the ECT sensor lead wire continuity.
3) Disconnect the ECT sensor coupler.
4) Check the continuity between Y/R wire and ground.
5) If the sound is not heard from the tester, the circuit condition is OK.
   Tester knob indication: Continuity (sound)

6) Connect the ECT sensor coupler.
7) Turn the ignition switch ON.
8) Measure the voltage between Y/R wire and ground.
Output voltage: 0.1 – 4.6 V
(+ Y/R – - Ground)

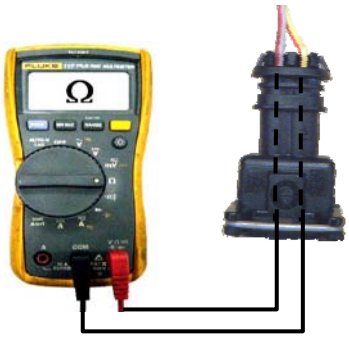
Are the continuity and voltage OK?

YES	Go to step 2
NO	Y/R wire shorted to ground.

9) After repairing the trouble, clear the DTC using Diagnosis tool.

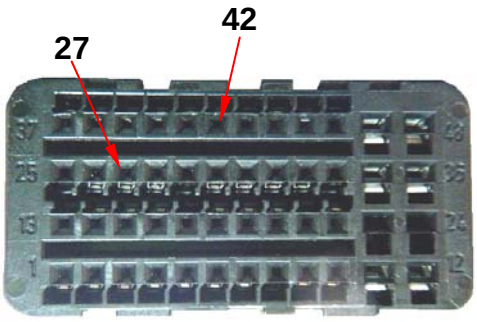
Step 2

1) Turn the ignition switch OFF.
2) Disconnect the ECT sensor coupler.
3) Measure the ECT sensor resistance.
ECT sensor resistance:
Approx. 2.3 – 2.6 kΩ at 20 °C (68 °F)
(Terminal – Terminal)

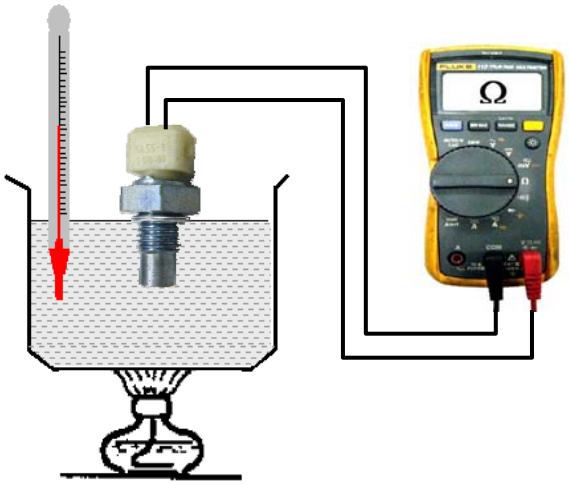


Is the resistance OK?

YES	• Y/R or Gr/R wire open or shorted to ground, or poor 42 or 27 connection • If wire and connection are OK, intermittent trouble or faulty ECU. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECU with a known good one, and inspect it again.
NO	Replace ECT sensor with a new one.



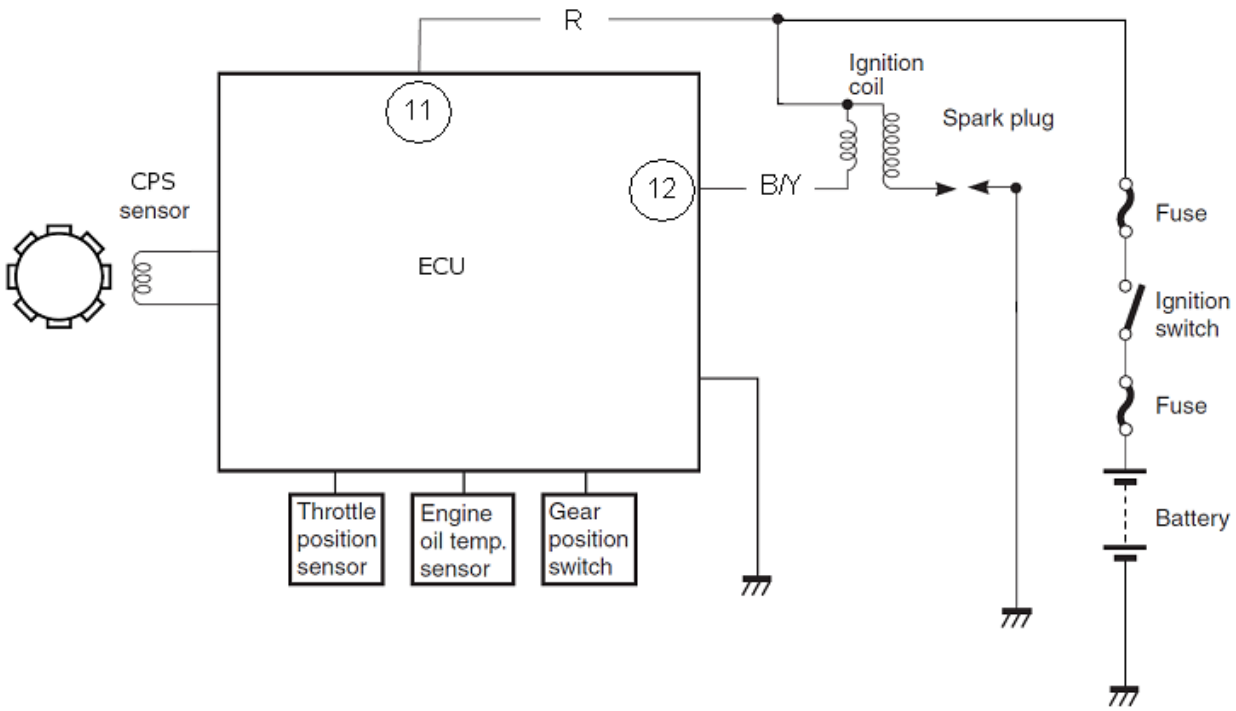
4) After repairing the trouble, clear the DTC using Diagnosis tool.



ECT sensor specification

Engine Coolant Temperature	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

IGNITION SYSTEM MALFUNCTION



TROUBLESHOOTING

No spark or poor spark

NOTE:

Check that the transmission is in neutral and check that the fuse is not blown and the battery is fully charged before diagnosing.

Step 1

1) Check the ignition system couplers for poor connections.

Is there connection in the ignition switch couplers?

YES	Go to step 2
NO	Poor connection of couplers

Step 2

1) Measure the battery voltage between input lead wires at the ECU with the ignition switch in the "ON" position.

Is the voltage OK?

YES	Go to step 3
NO	• Faulty ignition switch • Broken wire harness or poor connection of related circuit couplers

Step 3

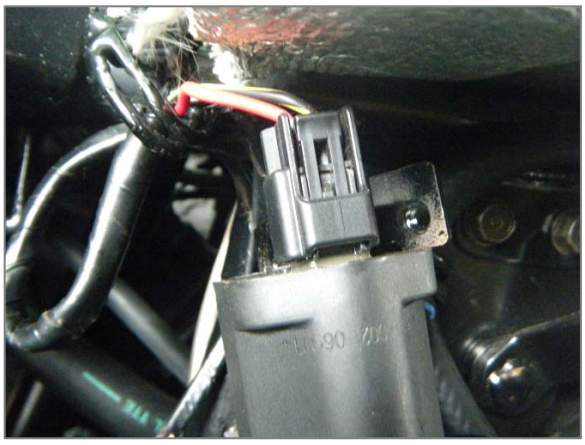
1) Measure the ignition coil primary peak voltage.

NOTE:

This inspection method is applicable only with the multi circuit tester and the peak volt adaptor.

Is the peak voltage OK?

YES	Go to step 4
NO	Go to step 5



Step 4

1) Check the plug caps for poor contacts.
2) If OK, then inspect the spark plugs.

Are the spark plugs OK?

YES	Go to step 5
NO	Faulty spark plug (-s)

Step 5

1) Inspect the ignition coils.

Are the ignition coils OK?

YES	Go to step 6
NO	Faulty ignition coil (-s)

Step 6

1) Measure the CPS sensor peak voltage and its resistance.

NOTE:

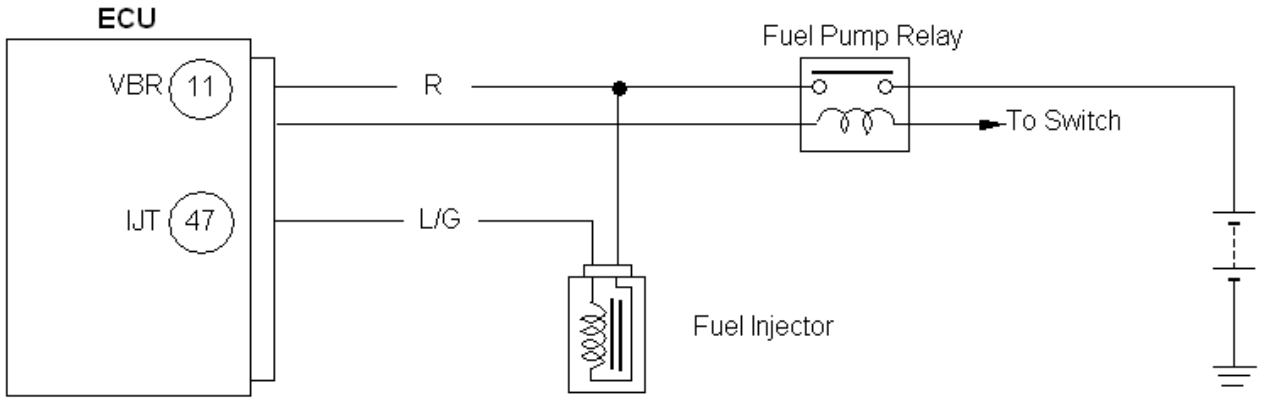
The CPS peak voltage inspection is applicable only with the multi-circuit tester and peak volt adaptor.

Are the peak voltage and its resistance OK?

YES	• Faulty ECU • Open or short circuit in wire harness • Poor connection of ignition couplers
NO	• Faulty CPS sensor • Metal particles or foreign material being stuck on the CPS sensor and rotor tip

FUEL INJECTOR CIRCUIT MALFUNCTION

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



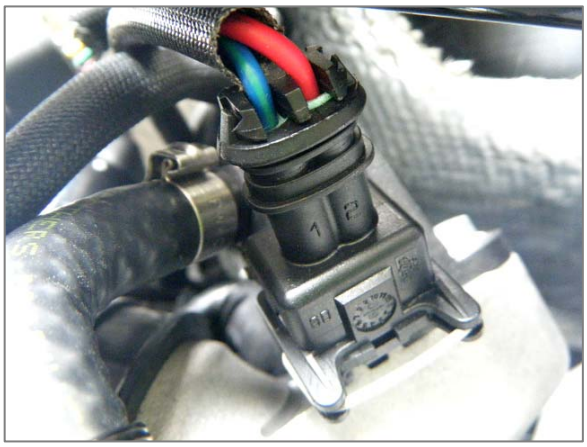
Step 1

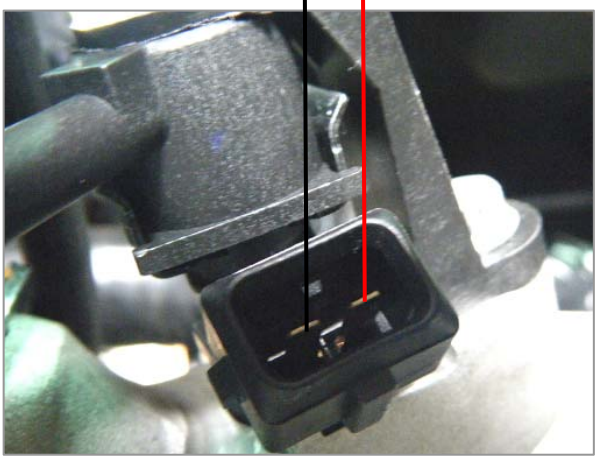
1) Turn the ignition switch OFF.
2) Check the injector coupler for loose or poor contacts.
   If OK, then measure the injector resistance.
3) Disconnect the injector coupler and measure the resistance between terminals.
   Injector resistance:
   Approx. 11.7 Ω at 20 °C (68 °F)
   (Terminal – Terminal)
4) If OK, then check the continuity between each terminal and ground.
   STP sensor continuity: ∞ Ω (Infinity)

Are the resistance and continuity OK?

YES	Go to step 2
NO	Replace the injector with a new one.

5) After repairing the trouble, clear the DTC using Diagnosis tool.



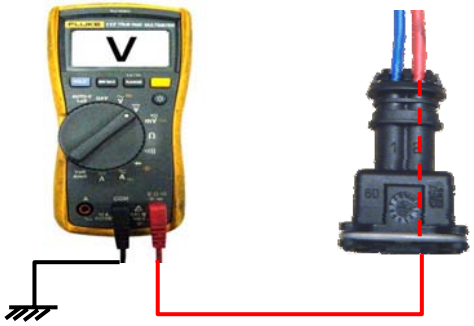


Step 2

1) Turn the ignition switch ON.
2) Measure the injector voltage between R wire and ground.
   Injector voltage: Battery voltage
   (+ R – - Ground)

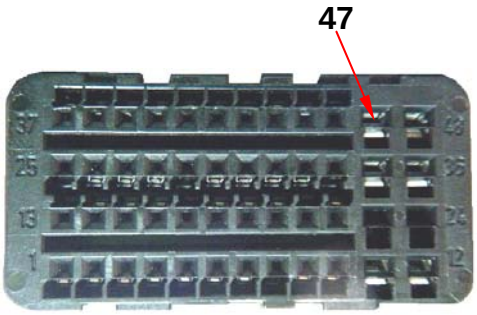
NOTE:

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



Is the voltage OK?

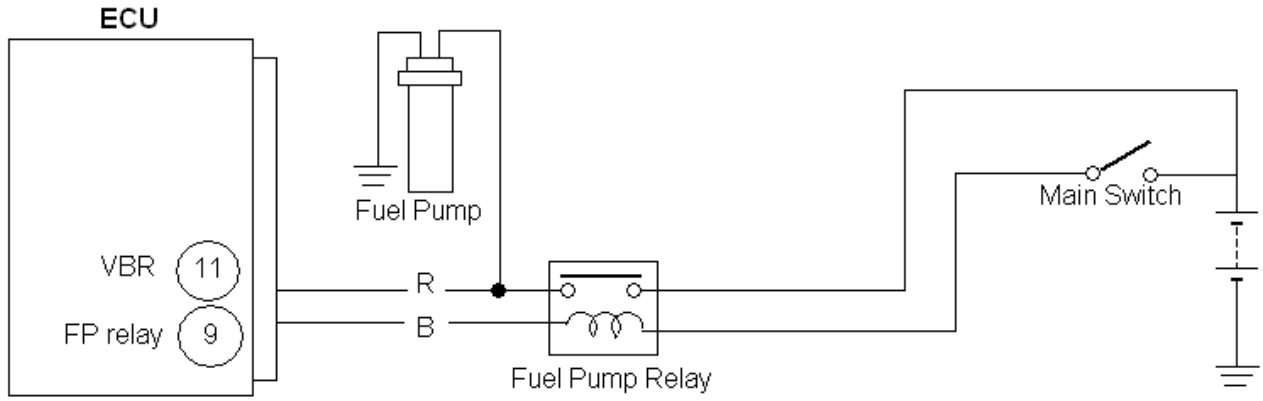
YES	• L/G wire open or shorted to ground, or poor 47 connection (cylinder side) • If wire and connection are OK, intermittent trouble or faulty ECU. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECU with a known good one, and inspect it again.
NO	Open circuit in the R wire



3) After repairing the trouble, clear the DTC using Diagnosis tool.

FP RELAY CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
No voltage is applied to fuel pump although fuel pump relay is turned ON, or voltage is applied to fuel pump, although fuel pump relay is turned OFF.	• Fuel pump relay circuit open or short • Fuel pump relay malfunction • ECU malfunction



INSPECTION

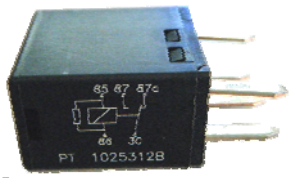
Step 1

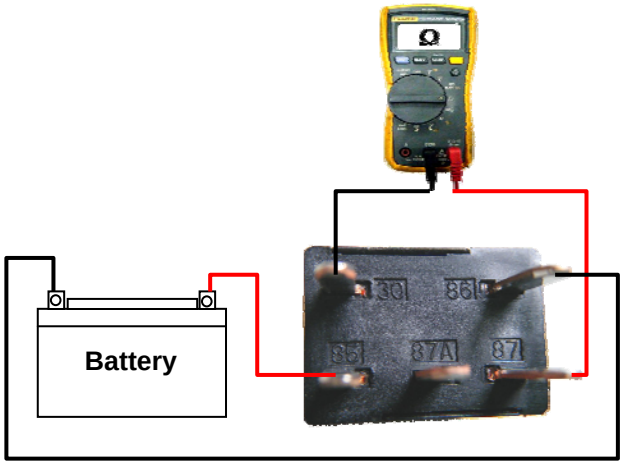
1) Remove the seat.
2) Turn the main switch OFF.
3) Check the FP relay coupler for loose or poor contacts.
   If OK, then check the FP relay.

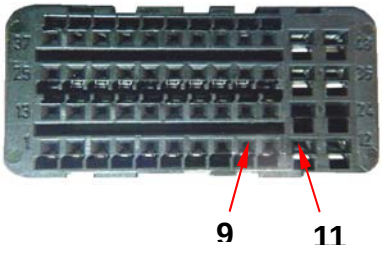
Is the FP relay OK?

YES	• Blue wire open or shorted to ground, or poor 9 connection • Red wire open or poor 11 connection • If wire and connection are OK, intermittent trouble or faulty ECU. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECU with a known good one, and inspect it again.
NO	Replace the FP relay with a new one.

4) After repairing the trouble, clear the DTC using Diagnosis tool.

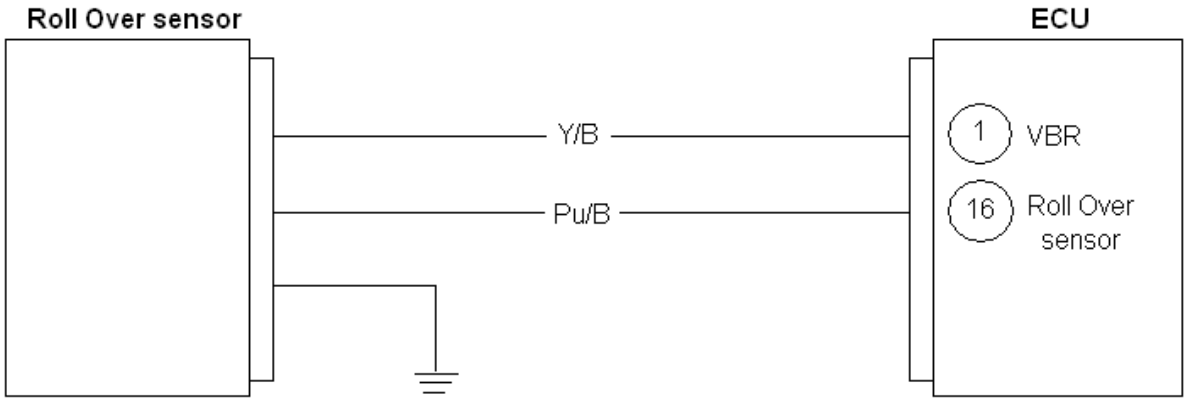






ROLL OVEWR SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
The sensor voltage should be the following for 2 sec. and more, after ignition switch is turned ON. 0.2 Sensor voltage < 4.6 V	• TO sensor circuit open or short • TO sensor malfunction • ECU malfunction
Sensor voltage is higher than specified value.	•TO sensor circuit open or shorted to VSENS or ground circuit open
Sensor voltage is lower than specified value.	•TO sensor circuit shorted to ground or VSENS circuit open

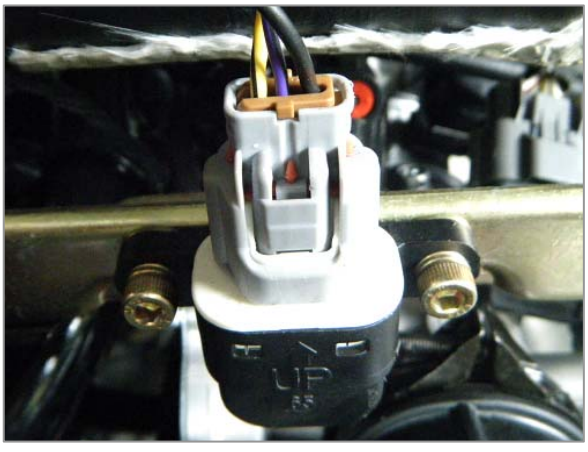


INSPECTION

Step 1

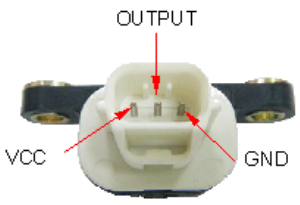
(When output voltage is out of specified)

1) Remove the seat set.
2) Turn the ignition switch OFF.
3) Check the Roll over sensor coupler for loose or poor contacts.
   If OK, then measure the Roll over sensor resistance.
4) Disconnect the Roll over sensor coupler.
5) Measure the resistance between terminal A and terminal C.
   Roll over sensor resistance: 19.1–19.7 kΩ
   (Terminal A – Terminal C)



Is the resistance OK?

YES	Go to step 2
NO	Replace the Roll over sensor with a new one.



Step 1

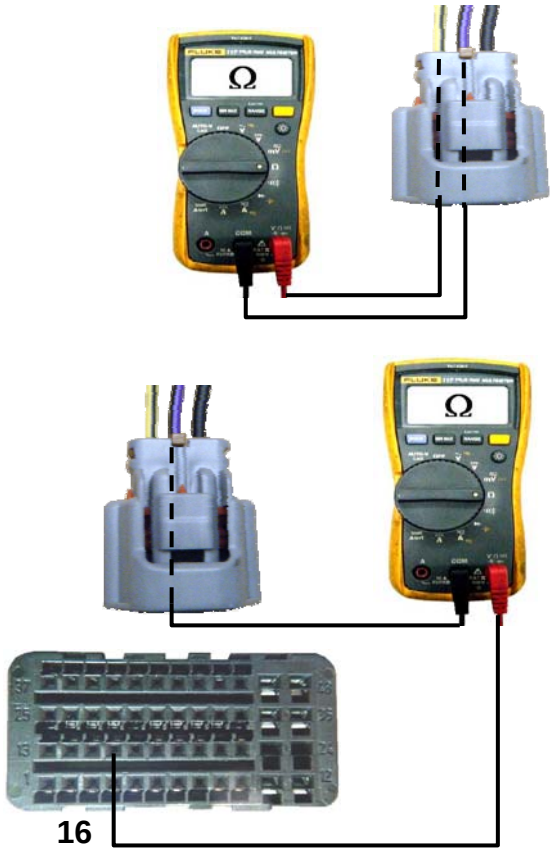
(When sensor voltage is higher than specified)

1) Remove the seat set.
2) Turn the ignition switch OFF.
3) Check the Roll over sensor coupler for loose or poor contacts.
   If OK, then check the Roll over sensor lead wire continuity.
4) Disconnect the Roll over sensor coupler.
5) Check the continuity between Y/B wire and Pu/B wire.
   If the sound is not heard from the tester, the circuit condition is OK.
6) Disconnect the ECU coupler.
7) Check the continuity between Pu/B wire and terminal 16.

Is the continuity OK?

YES	Go to step 2
NO	Pu/B wire shorted to VBR

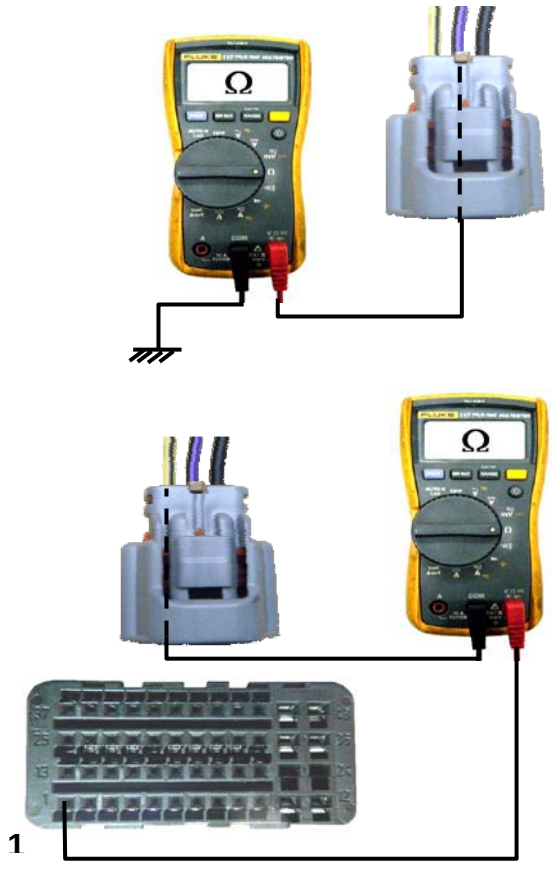
8) After repairing the trouble, clear the DTC using Diagnosis tool.



Step 1

(When sensor voltage is lower than specified)

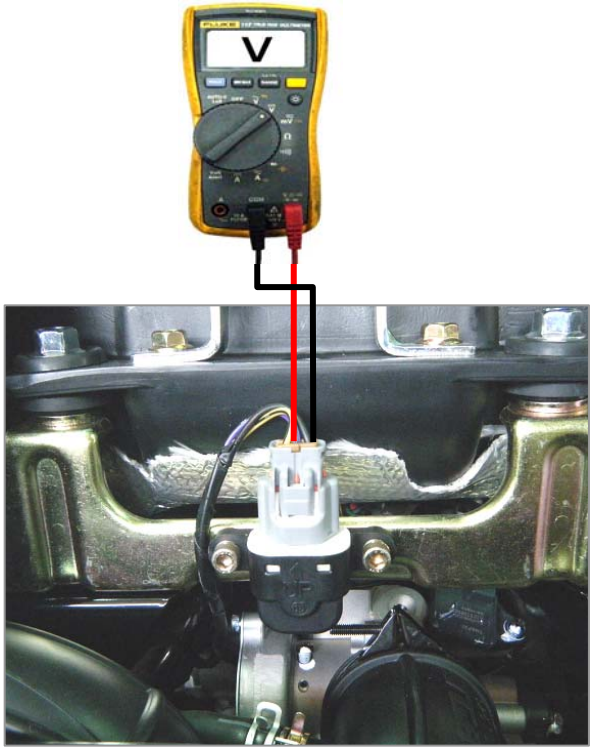
1) Remove the seat set.
2) Turn the ignition switch OFF.
3) Check the Roll over sensor coupler for loose or poor contacts.
   If OK, then check the Roll over sensor lead wire continuity.
4) Disconnect the Roll over sensor coupler.
5) Check the continuity between Pu/B wire and ground. If the sound is not heard from the tester, the circuit condition is OK.
7) Disconnect the ECU coupler.
8) Check the continuity between Y/B wire and terminal 1.
9) Also, then check the continuity between Pu/B wire B and terminal 16.
   Roll over sensor lead wire continuity:
   Continuity (sound)



Is the continuity OK?

YES	Go to step 2
NO	Y/B or Pu/B wire open or Pu/B wire shorted to ground

10) After repairing the trouble, clear the DTC using Diagnosis tool.

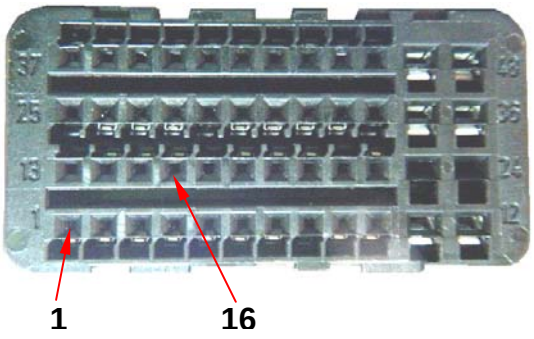


Step 2

1) Connect the Roll over sensor coupler.
2) Insert the needle pointed probes to the lead wire coupler.
3) Turn the ignition switch ON.
4) Measure the voltage at the wire side coupler between Pu/B and B wires.
   Also, measure the voltage when leaning the vehicle.
   Roll over sensor voltage (Normal): 0.4 – 1.4 V (+ Pu/B – - B)
5) Dismount the Roll over sensor from its bracket and measure the voltage when it is leaned 65° and more, left and right, from the horizontal level.
   Roll over sensor voltage (Leaning): 3.7 – 4.4 V (+ Pu/B – - B)

Is the voltage OK?

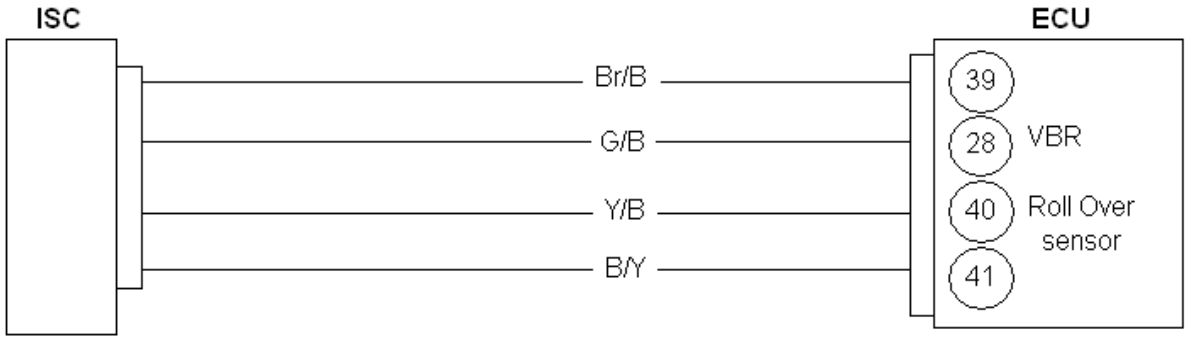
YES	• Y/B or Pu/B wire open or shorted to ground, or poor 1 or 16 connection • If wire and connection are OK, intermittent trouble or faulty ECU. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECU with a known good one, and inspect it again.
NO	• Loose or poor contacts on the ECU coupler • Open or short circuit • Replace the Roll over sensor with a new one.



6) After repairing the trouble, clear the DTC using Diagnosis tool.

IDLE SPEED CONTROLLER CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
The operation voltage does not reach the ISC. ECU does not receive communication signal from the ISC.	• ISC malfunction • ISC circuit open or short • ISC motor malfunction



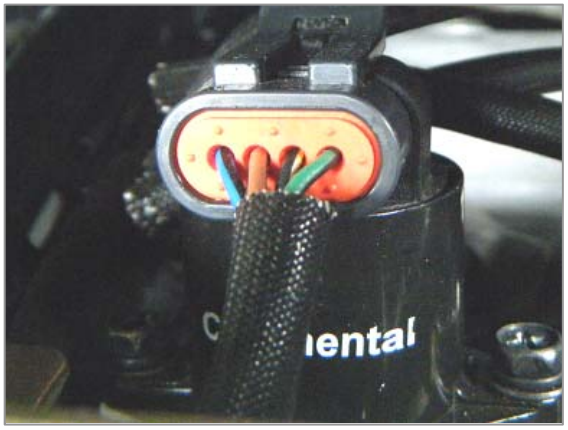
INSPECTION

Step 1

1) Remove the fuel tank.
2) Turn the ignition switch OFF.
3) Check the ISC lead wire coupler for loose or poor contacts.
4) Remove the air cleaner rubber tube.
5) Turn the ignition switch ON to check the ISC operation.
   (ISC operating order: 95% open → full open → 95% open)

Is the operating OK?

YES	Go to step 2.
NO	• Loose or poor contacts on the ISC coupler • Open or short circuit in the Br/B, G/B, Y/B or B/Y wires • If wire and connection are OK, go to Step 2.



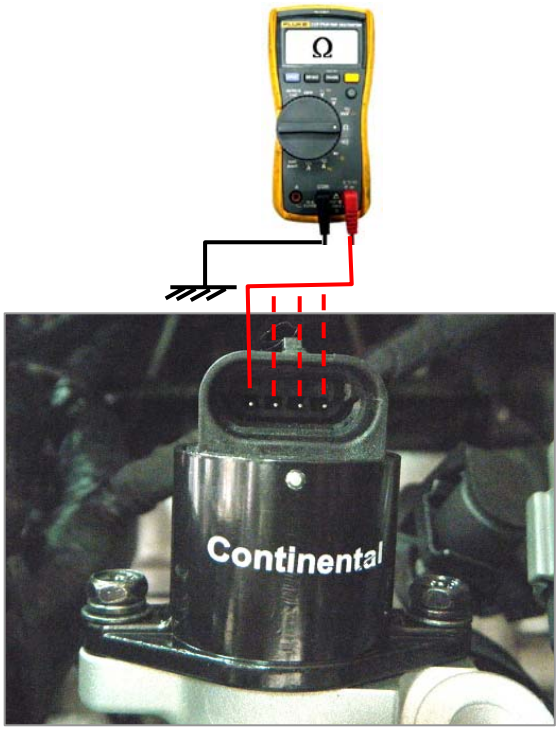
6) After repairing the trouble, clear the DTC using Diagnosis tool.

Step 2

1) Turn the ignition switch OFF.
2) Disconnect the ISC lead wire coupler.
3) Check the continuity between each terminal and ground.

ISC continuity: ∞ Ω (Infinity)
(Terminal – Ground)

4) If OK, then measure the ISC resistance (between Br/B, G/B, Y/B and B/Y wires).
ISC resistance: Approx. 6.5 Ω

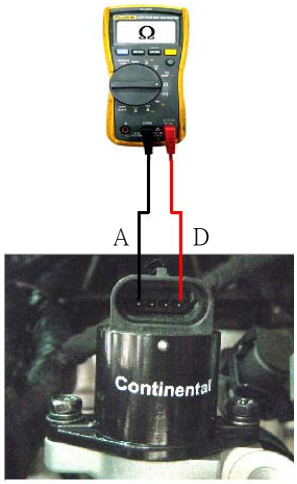


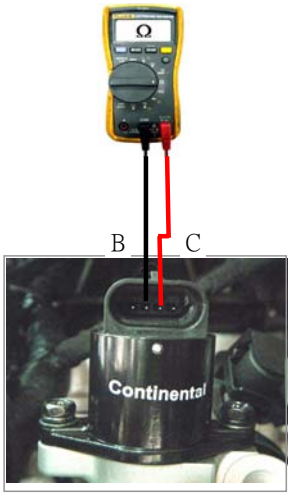
Is the resistance OK?

YES	•Br/B, G/B, Y/B and B/Y wire open or shorted to ground, or poor 28, 39, 40 and 41 connection • If wire and connection are OK, intermittent trouble or faulty ECU. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECU with a known good one, and inspect it again.
NO	• Loose or poor contacts on the ECU coupler • Replace new ISC (throttle body).

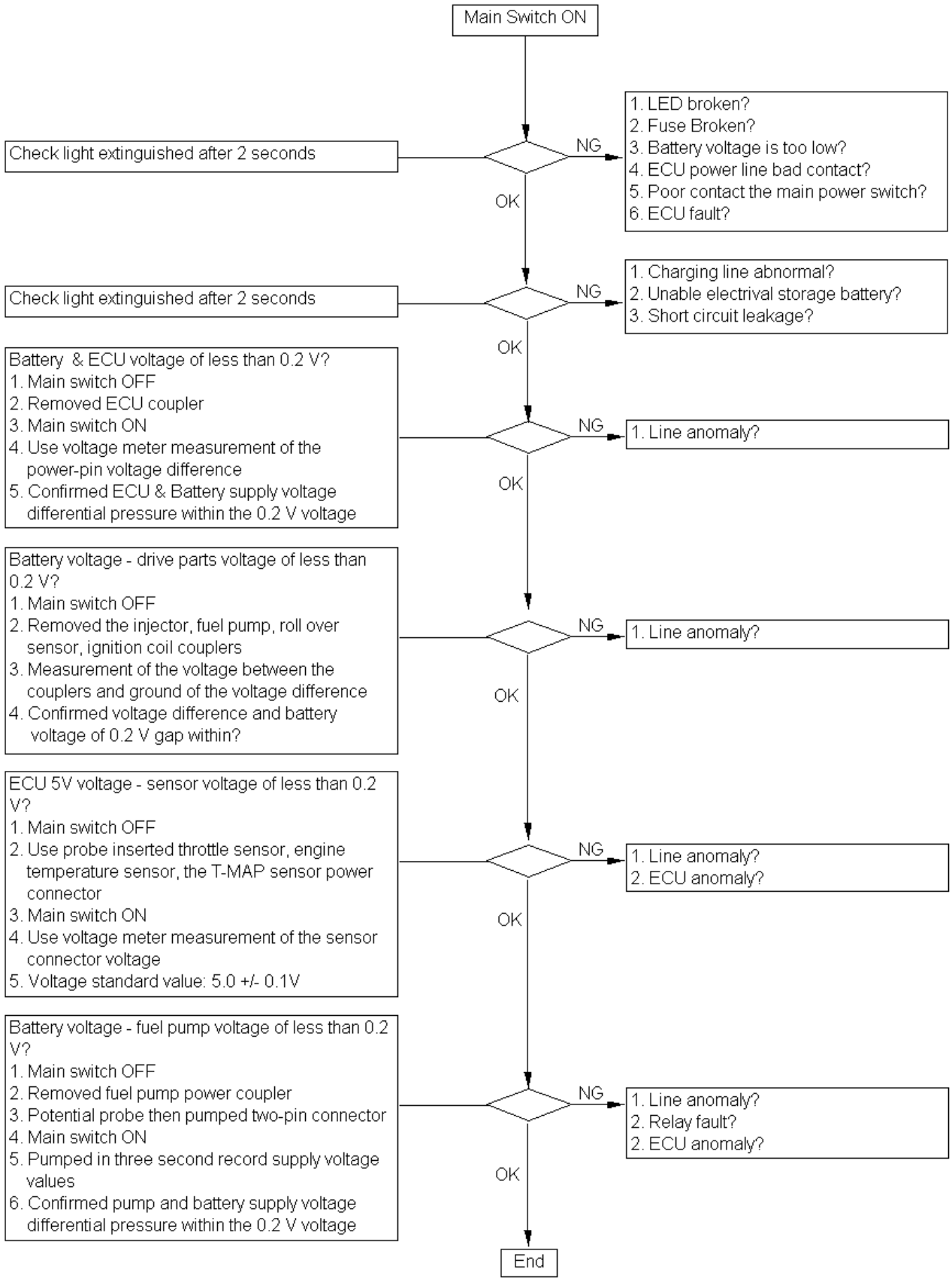
5) After repairing the trouble, clear the DTC using Diagnosis tool.

• Measure the resistance between A-D and B-C as below
• The standard are all follow 50±0.5Ω.

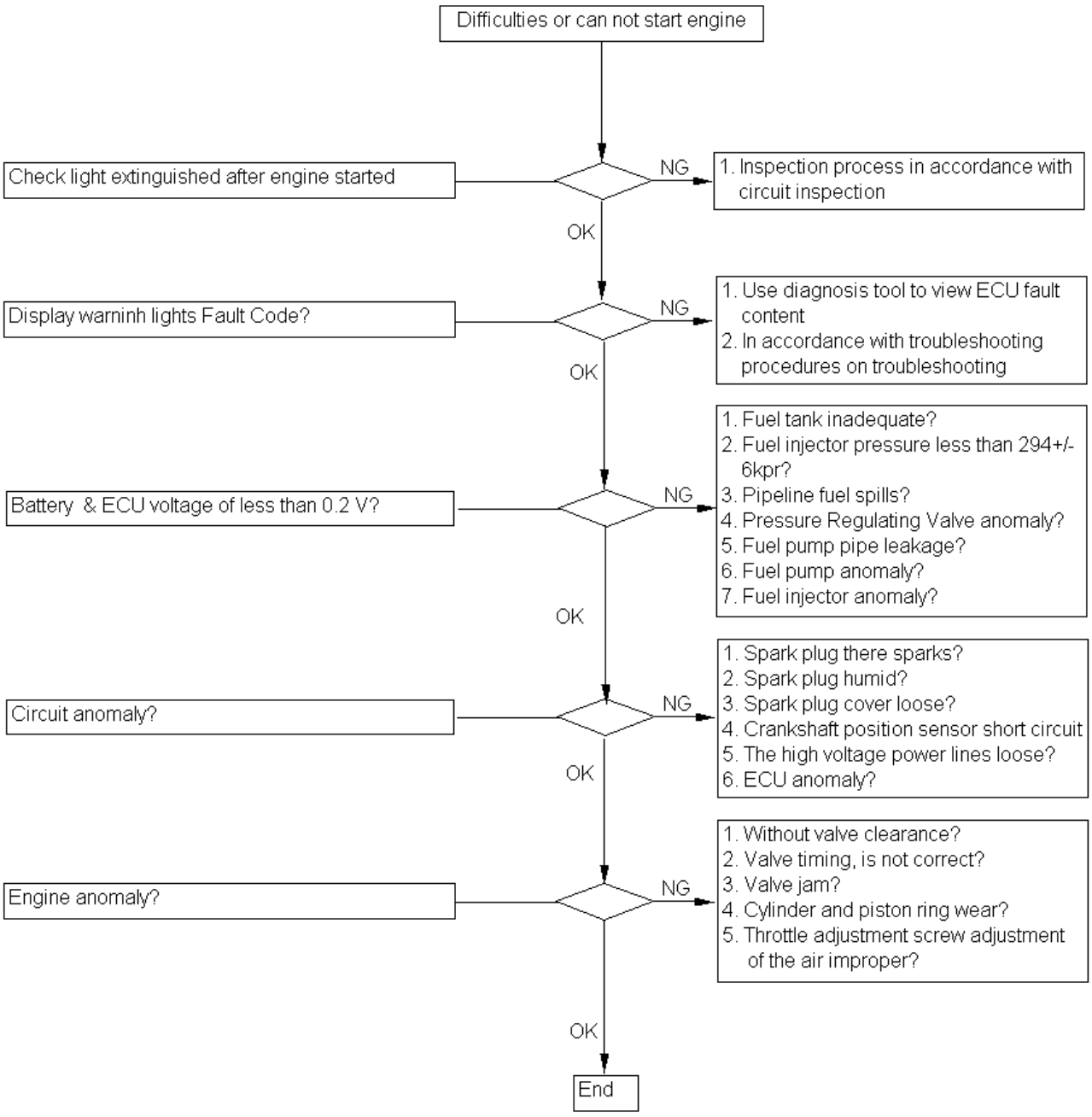




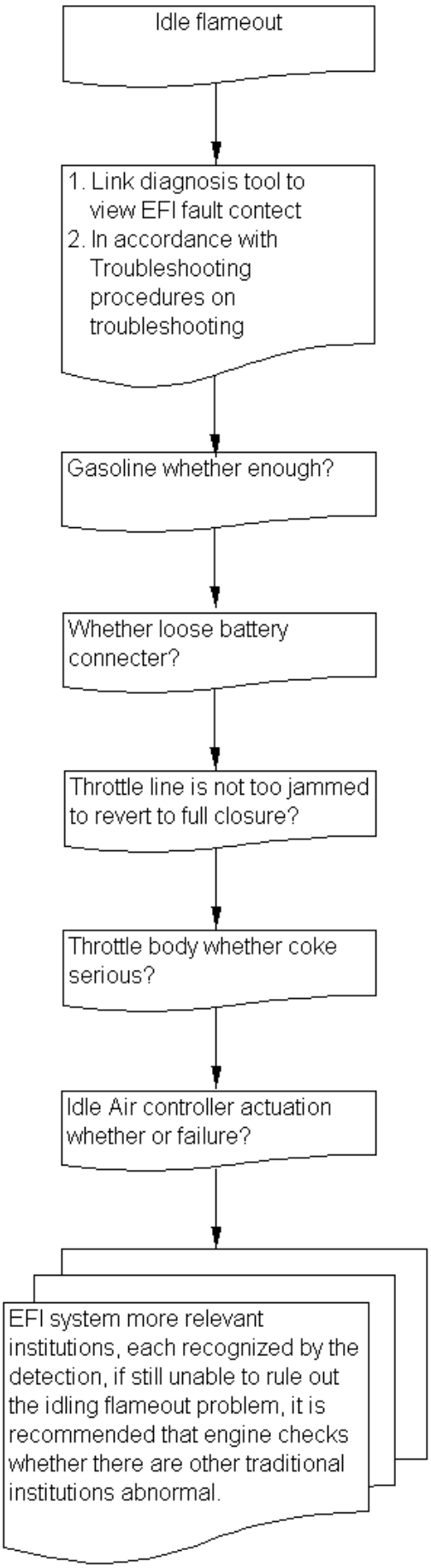
Fault Diagnosis
EFI Circuit inspection



Can not Start the engine or difficult to start inspection



Idle flameout diagnosis



Integrated Fault Diagnosis Program

Checking adjusting project	Detection of maintenance projects and steps	Fault status determination		Fault reasons	Parts specifications
Battery Voltage	· Use meter direct measurement battery voltage · Use diagnosis tool detection battery voltage	· Battery voltage is 10 V above? · Diagnosis tool show whether the voltage of 10 V above?	NO	· Battery electricity · Battery connector loose · Harness circuit opening · ECU coupler not connected properly	· Diagnosis tool display voltage required to achieve more than 10 V
		YES			
Diagnosis fault code inspection	· Use of the diagnosis tool detection fault code · Elimination of fault codes and then start engine	· Diagnostic tool show whether or not a fault code? · Fault Code cleared after show again?	YES	· TPS fault · ETS fault · CPS fault · T-MAP fault · Tilt fault · ECU fault	· The sensor detection methods and specifications, please refer to repair manual
		NO			
Fuel quantity and fuel pressure	· Removed the injector on the intake manifold but not removal of harness coupler. (Injector and cap tightly by hands, fuel spills should not be the case) · Start the engine · Examine whether injector fuel injection · Between the tank and injector, Installation the pressure gauge · Check fuel pressure adequancy	· Injector whether injection? · Injector spray angle is normal? · Fuel pressure enough?	NO	· Less than fuel tank · Injector fault · Fuel pump relay fault · Fuel pump fault · ECU fault · Fuel pump filter obstructive	· Pressure fuel specifications: Open the main switch ten seconds after but not start engine->more than 250 kPa Idle->294+/- 6kPa · Injecetor resistance specifications: 11.7+/- 0.6Ω
		YES			
Ignition situation	· Removed the spark plug from the cylinder head, but then power lines still ring · Start the engine · Check spark plug sparks	· Examine whether the spark plug ignition? · Check spark plug sparks strength is normal?	NO	· Spark plug fault · Roll over sensor fault · ECU fault · Ignition coil fault · Crankshaft position sensor fault	· Dspark plug specifications: NGK-CR7E
		YES			
Engine Vaccum	· Use diagnosis tool to detect of the manifold pressure	· Diagnosis tool manifold pressure for compliance with specifications?	NO	· Valve clearance is not normal · Intake system leak	· Manifold pressure Specifications: 32~38 kPa

YES

Normal starting → Finish

Can not starting or starting difficulties → In traditional engine overhaul way to maintenance

Fault Diagnosis Note

When the motorcycle injection system in the wrong signal, causing abnormal functioning of the engine or can not start engine, MIL light at the dashboard will be lighting, to inform drivers to carry out maintenance.

Overhaul, the diagnosis tool can be used for troubleshooting. If the fault has been ruled out or repair after the MIL light will be extinguished, but ECU fault code will be recorded, so the need to get rid of fault codes.

Diagnosis tool for overhaul

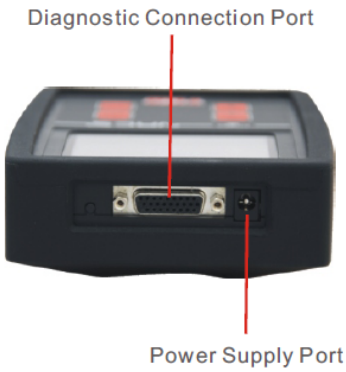
Diagnosis tool will connect to the motorcycle for coupler diagnosis, according to the use of diagnostic tool testing methods, when belong fuel injection system fault or parts fault, according to the diagnosis tool of the fault code display messages do describe parts of the inspection testing maintenance and replacement parts. When after the maintenance, the need to get rid of fault codes.

Fault Code And The Sensors Of The Table

No.	Fault codes	Fault Description
1	XXXXX	Un define
2	B2225	Tilt switch diagnosis (SCP)
3	B2226	Tilt switch diagnosis (SCG_OL)
4	P0000	No DTC
5	P0031	Sensor heater diagnosis #0 (SCG/OL)
6	P0032	Sensor heater diagnosis #0 (SCP)
7	P0051	Sensor heater diagnosis #1 (SCG/OL)
8	P0052	Sensor heater diagnosis #1 (SCP)
9	P0107	MAP sensor diagnosis (SCG_OL)
10	P0108	MAP sensor diagnosis (SCP)
11	P0112	Intake air temperature sensor diagnosis (SCG)
12	P0113	Intake air temperature sensor diagnosis (SCP_OL)
13	P0114	Electrical intake air temperature intermittent diagnosis (failure)
14	P0117	Coolant Temperature Sensor (SCG)
15	P0118	Coolant Temperature Sensor (SCP_OL)
16	P0119	Coolant temperature intermittent diagnosis (failure)
17	P0121	TPS position sensor adaptation diagnosis (out of range)
18	P0122	Throttle Position Sensor 1 (SCG_OL)
19	P0123	Throttle Position Sensor 1 (SCP)
20	P0131	Lambda sensor #0 diagnosis (SCG)
21	P0132	Lambda sensor #0 diagnosis (SCP)
22	P0133	Lambda sensor #0 diagnosis (OL)
23	P0151	Lambda sensor #1 diagnosis (SCG)
24	P0152	Lambda sensor #1 diagnosis (SCP)
25	P0153	Lambda sensor #1 diagnosis (OL)
26	P0171	Lambda control diagnosis #0 (too high)
27	P0172	Lambda control diagnosis #0 (too low)
28	P0174	Lambda control diagnosis #1 (too high)
29	P0175	Lambda control diagnosis #1 (too low)
30	P0217	Engine coolant over temperature protection diagnosis
31	P0219	Engine over speed detection diagnosis
32	P0231	Electric fuel pump diagnosis (SCG/OL)
33	P0232	Electric fuel pump diagnosis (SCP)
34	P0261	Injection valve diagnosis #0 (SCG/OL)
35	P0262	Injection valve diagnosis #0 (SCP)
36	P0264	Injection valve diagnosis #1 (SCG/OL)

37	P0265	Injection valve diagnosis #1 (SCP)
38	P0351	Ignition diagnosis #0 (SCP)
39	P0352	Ignition diagnosis #1 (SCP)
40	P0370	Loss of synchronization diagnosis
41	P0371	Crankshaft sensor diagnosis
42	P0373	Crankshaft sensor diagnosis
43	P0462	FUEL sensor diagnosis (SCG)
44	P0463	FUEL sensor diagnosis (SCP_OL)
45	P0484	Cooling fan diagnosis (SCP)
46	P0485	Cooling fan diagnosis (SCG/OL)
47	P0530	Light relay diagnosis
48	P0560	Battery voltage diagnosis (too low)_VBR
49	P0561	Battery voltage diagnosis (too high)_VBR
50	P0562	Battery voltage diagnosis (too low)_VBK
51	P0563	Battery voltage diagnosis (too high)_VBK
52	P0608	Reference voltage diagnosis (SCP)
53	P0609	Reference voltage diagnosis (SCG_OL)
54	P0615	Starter 1 diagnosis (OL)
55	P0616	Starter 1 diagnosis (SCG)
56	P0617	Starter 1 diagnosis (SCP)
57	P0630	VIN coherence
58	P0651	MIL diagnosis (SCG/OL)
59	P0652	MIL diagnosis (SCP)
60	P1352	Ignition diagnosis #0 (SCG_OL)
61	P1353	Ignition diagnosis #1 (SCG_OL)
62	P1508	Stepper motor diagnosis (SCG_OL)
63	P1509	Stepper motor diagnosis (SCP)
64	P1615	Starter 2 diagnosis (OL)
65	P1616	Starter 2 diagnosis (SCG)
66	P1617	Starter 2 diagnosis (SCP)
67	U1600	IMMO sensor diagnosis (exist)
68	U1601	BUS error handling (OFF)
69	U1602	Frame 20 diagnosis
70	U1603	IMMO sensor diagnosis (aerial)
71	U1604	IMMO sensor diagnosis (unknown)

Use diagnosis tool

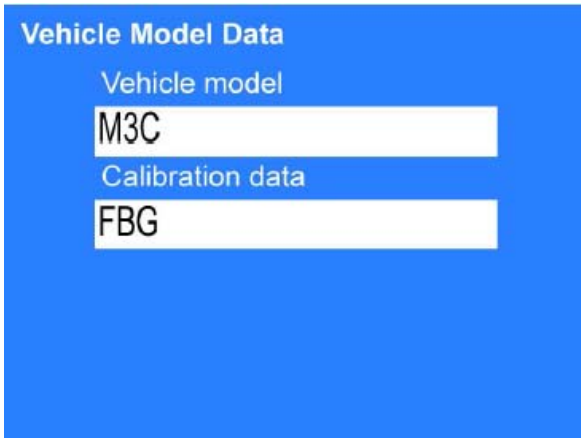


Note:

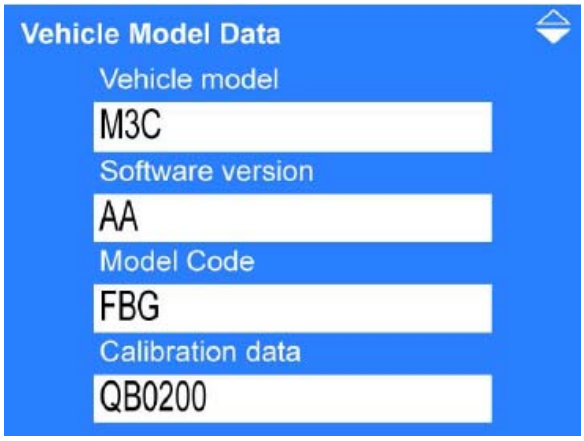
- When problems arise, can be used for diagnosis tool of the fault is detected, and exclusion.
- In addition to testing, troubleshooting, another of the operation can be carried out data analysis-type monitor.

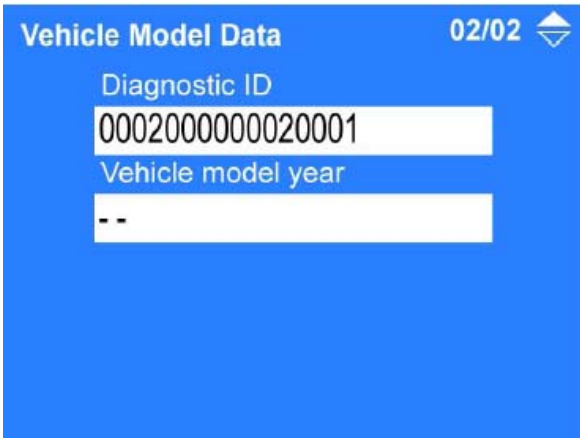
Method of Use:

1. Connected to the diagnostic connector for diagnosis tool.
   NACS→TGB interface→Transfer Cable→TGB 3 pin/6 pin Diagnosis Cable→Vehicle.
2. When the IG of the motorcycle is on, the system starts to run, entering into boot screen.
3. Key ON and the diagnosis display screen appeared the words connection.
4. Press the “ENTER” button and the system will identify the vehicle model automatically and display the vehicle info on the screen, as following picture



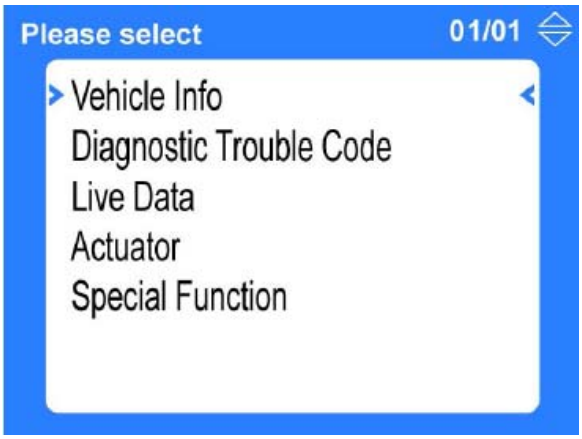
5. Press “ENTER” button again for more detailed vehicle information. Press ▲▼ button to view all information.





Diagnosis Use Note

Press ”ENTER” button to the function menu.



Options main functional areas:

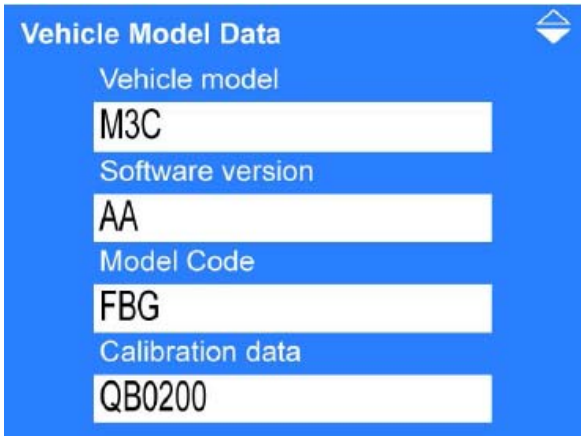
1. **Vehicle Info**
2. **Diagnostic Trouble Code**
3. **Live Data**
4. **Actuator**
5. **Special Function**

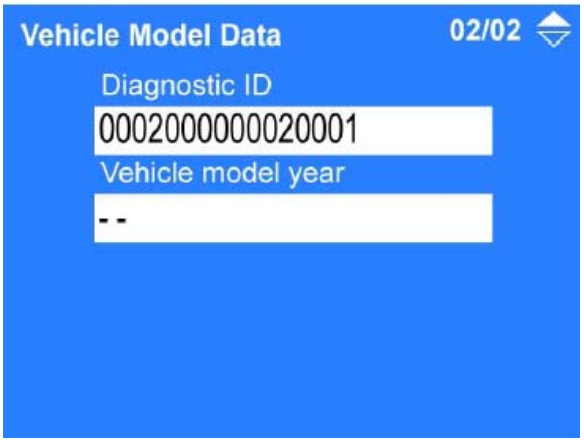
Press ▲▼ button to choose one function.

1. Vehicle Info

Move the cursor to ”**Vehicle Info**” and press **ENTER** to see the content

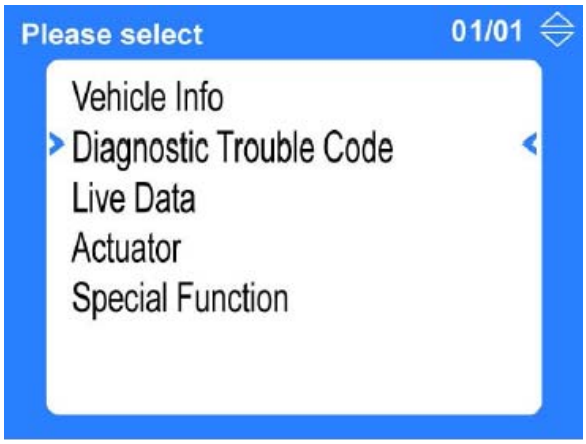
This is the page of “**Vehicle Info**”, press ▲▼ button to view all vehicle info.

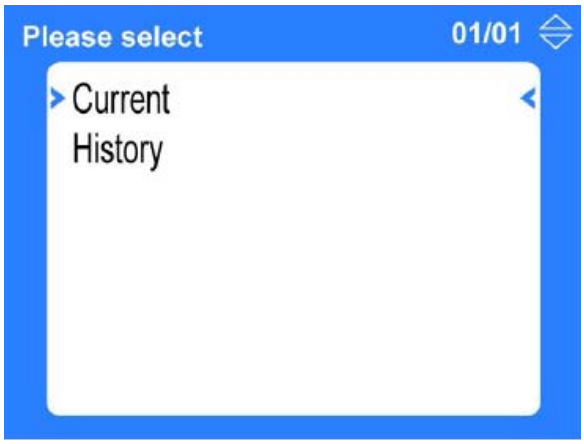




2. Diagnostic Trouble Code

Move the cursor to "**Diagnostic Trouble Code**" and press **ENTER** to see the content.



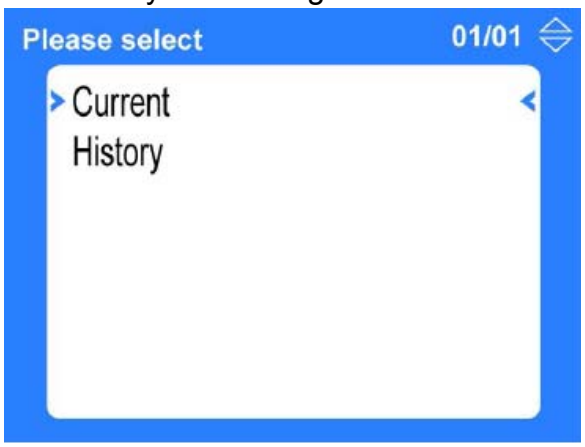


2-1. Current

Current" is for the Diagnostic Trouble Code occurred at the time

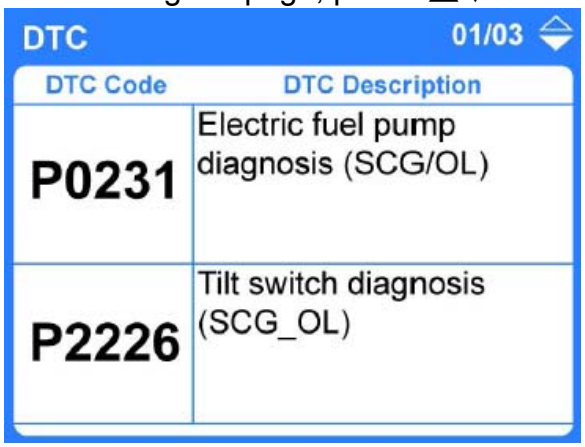
2-2. History

"History" is for Diagnostic Trouble Code occurred in the past.



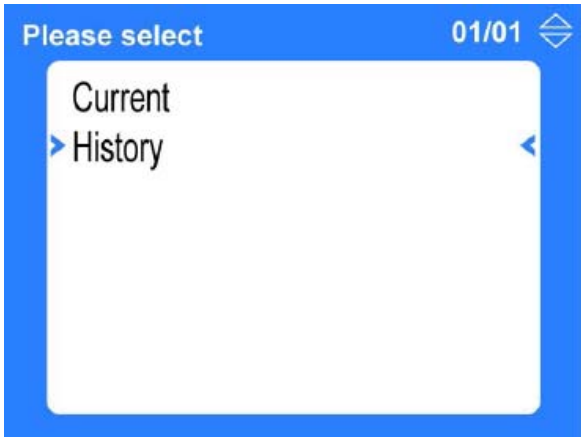
Move the cursor to "**Current**" and press "**ENTER**" to continue

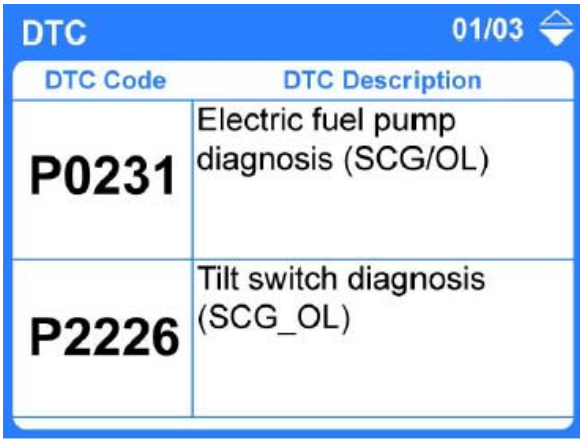
After entering the page, press ▲▼ to view all the Diagnostic Trouble Code.



After viewing the Diagnostic Trouble Code, press ESC to return to the previous page.

Move the cursor to “**History**” and press “**ENTER**” to continue

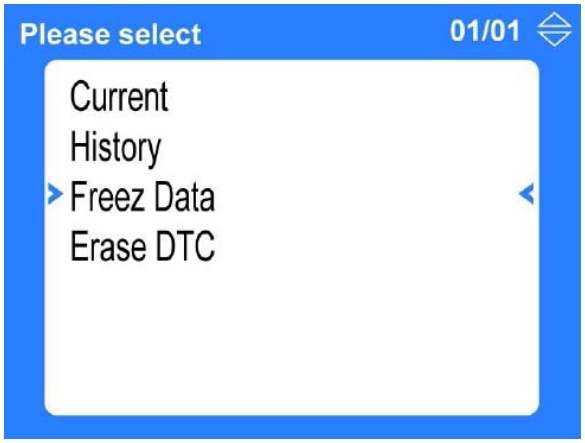




After entering the page, press ▲▼ to view all the Diagnostic Trouble Code occurred in the past.
After viewing the Diagnostic Trouble Code, press ESC to return to the previous page.

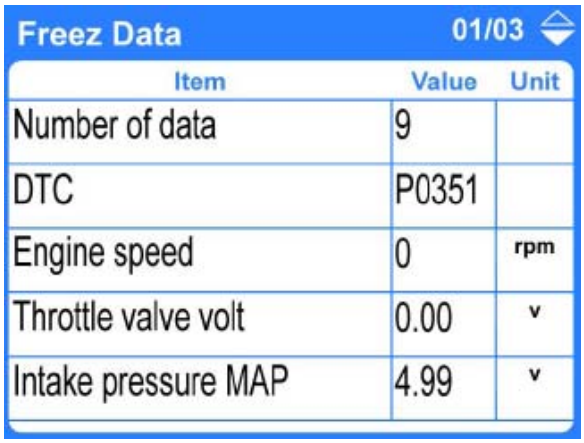
※
After viewing the content of “Current” or “History” Diagnostic Trouble Code, press **ESC** to return to the previous page, you will see two more items on the screen - “Freeze Data” and “Erase DTC”.
“**Freeze Data**” is the data recorded when FIRST Diagnostic Trouble Code occurred, and one time only record one Diagnostic Trouble Code freeze data, it’s for saving the engine dynamic data for further analysis.
“**Erase DTC**” is the function to erase all Diagnostic Trouble Code in both “Current” and “History”.

2-3. Freeze Data
This is the content you will see when entering into the “Freeze Data”. Press ▲▼ to view the Freeze Data.

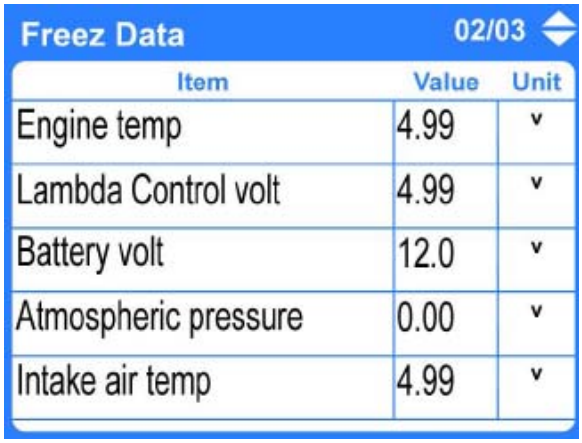


★ NOTE: not all ECU support this function.
Numerical analysis of images (1 / 3), the waveform can be displayed as shown in the following items:

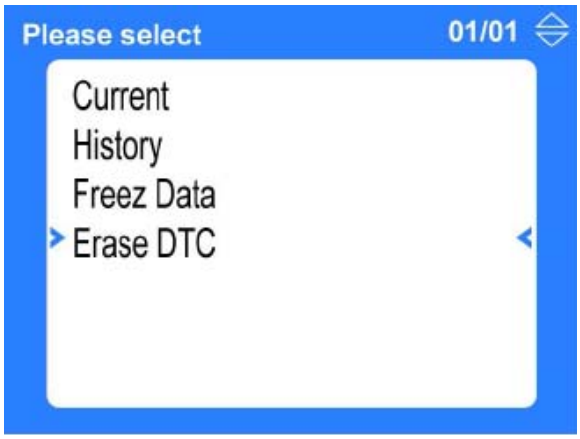
Freeze Data (01/03)
Number of data
DTC
Engine speed
Throttle valve volt
Intake pressure MAP

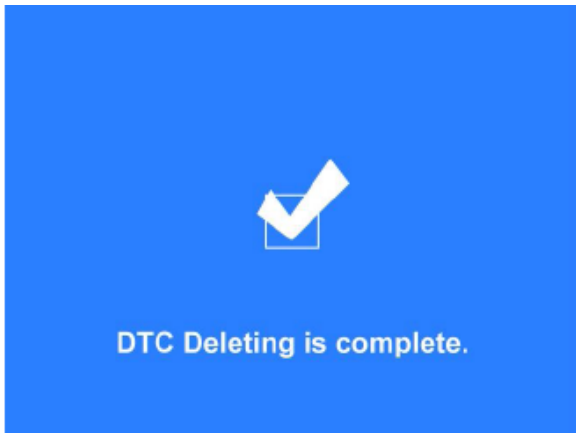


Freeze Data (02/03)
Engine temp
Lambda Control volt
Battery volt
Atmospheric pressure
Intake air temp



2-4. Erase DTC
Move the cursor to “Erase DTC” item and press ENTER to EARSE ALL DIAGNOSTIC TROUBLE CODE DIRECTLY!

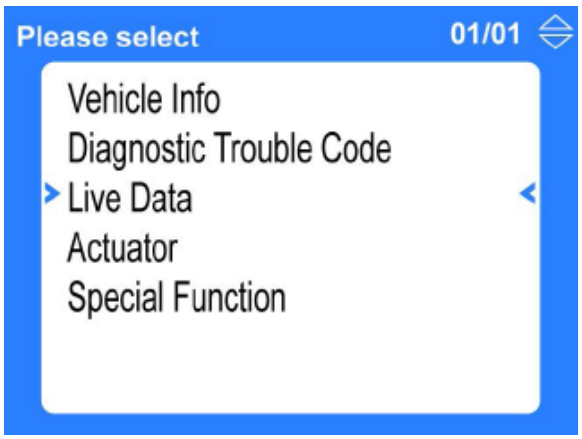




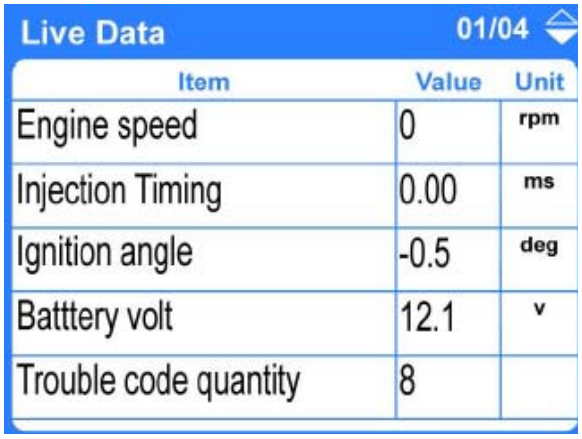
When you see the following picture on the screen, the Diagnostic Trouble Code erasure is completed. Press ESC button back to the main menu.

3. Live Data

Back to the main menu, move the cursor to "**Live Data**" and press ENTER to view the content.

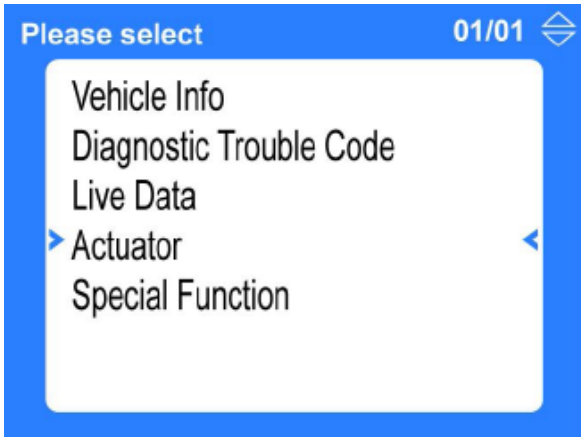


Press ▲▼ button to view all Live Data

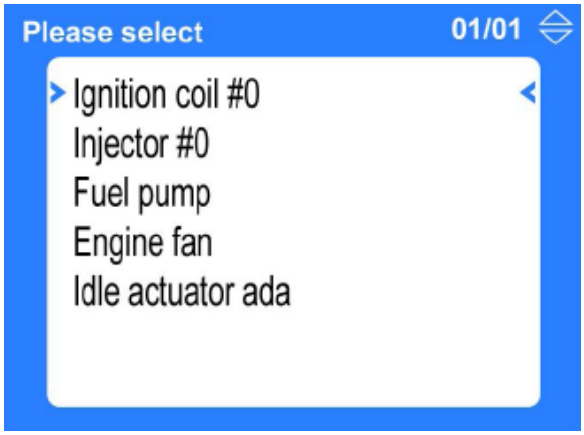


4. Actuator

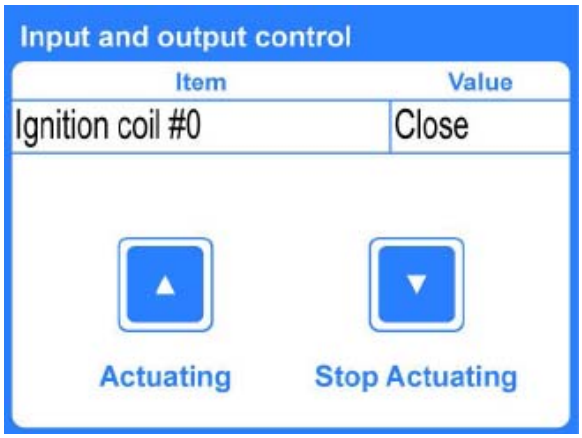
Move the cursor to "Activator" and press ENTER to see the content (To perform this function, IG must be **ON** and engine stop running.)



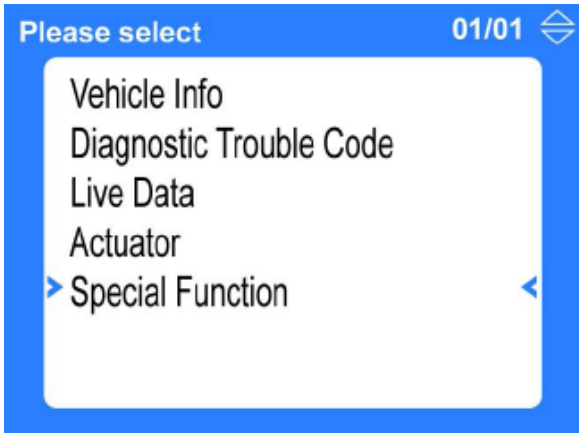
This is the page after entering the “Activator” function



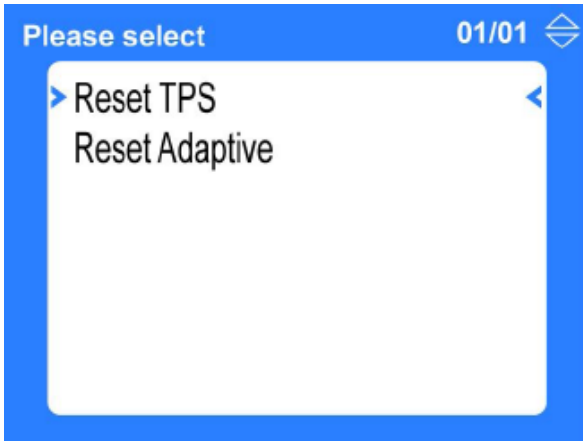
Take one activation function for example: move the cursor to “Ignition coil” item and press ENTER to continue.
When pressing “Actuating “▲ button, the test is activated and the “Value” column shows Open.
When pressing “Stop Actuating” ▼ button, the test is de-activated and the “Value” column shows close.



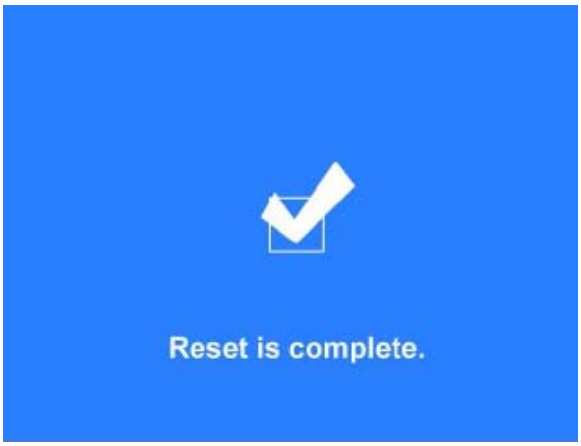
5. Special Function
Move the cursor to “Special Function” and press ENTER to view the content



There are two items under “Special Function”: “Reset TPS” and “Reset Adaptive”.



Move the cursor to “Reset TPS” and press ENTER. Then you will see the following picture, which means the RESET is completed. Press ESC button to return to the previous page.



Troubleshooting Table

Test Items / Abnormal phenomena		Comprehensive Testing Program						Parts		
		Power voltage	Fuel press.	Ignition state	Engine vacuum	Injection state	Fault code detection	ECU	Throttle position sensor	Engine temp. sensor
Start state	Can't start	※	※	※	※	※	※	※		
	Difficult to start	※	※		※		※		※	※
Idle state	Without Idle			※	※	※	※		※	※
	Idle not smooth					※	※	※	※	
	RPM NG						※	※		
	CO NG		※			※	※	※		
Acceleration	Not smooth		※	※	※	※	※	※	※	※
	Inability and slow		※	※	※	※	※	※	※	※
Flameout	Idle flameout				※		※			
	Acceleration flameout						※	※		

Related spare parts					
Roll over sensor	Fuel pump	Ignition coil	Inlet pipe	Injector
Power relay	Fuel pressure adjustment valve	Spark plug	Cylinder head	Fuel pump
	Fuel pump relay		Inlet pressure sensor	Fuel pressure adjustment valve
Main switch	Fuel filter			
Battery				

Notes: 1. Integrated test motorcycle, according to the "Comprehensive Maintenance list" implementation.
2. Spare parts, according to the "EFI System components description" implementation.

Comprehensive Maintenance List

No.	Maintenance Project	Testing Procedures	Test items	Determine benchmarks	Fault reasons
1	**Power and voltage**	Use meter direct measurement battery voltage Use diagnosis tool detection of battery voltage	Battery	Battery voltage = 10 V above	Battery electricity Battery connector loose Harness circuit opening ECU coupler not connected properly
2	**Fuel pressure**	Use fuel pressure gauge connected in series between the injector and the pressure regulating valve Main switch ON but not start engine Check fuel pressure Start engine (Idle) Check change of fuel pressure Throttle several rotation Check to the change of fuel pressure again	Open the main switch but not to start the engine of pressure Pressure in Idle Rotating throttle, situation of pressure changes	Open main switch but not start: Pressure = 250 kPa (stable value) Idle state: Pressure = 300+/-6 kPa (Beating situation from top to bottom) Rotating throttle moment: Pressure=300+/-6kPa(slightly beating)	Fuel not enough Fuel pump relay fault Fuel pump fault Injector fault ECU fault
3	**Ignition state**	The spark plug removed from the cylinder head but the power lines still ring Start engines or use for the diagnosis tool of output view spark plug ignition conditions	Spark plug specifications Whether the spark plug ignition Spark plug sparks whether it is normal strength	Specifications: NGK-CR7H Ignition conditions: With traditional engines found ways	Spark plug fault Roll over sensor fault ECU No. 12 pin fault Ignition coil fault Crankshaft position sensor fault
4	**Engine vacuum**	Diagnosis tool to detect the use of	Manifold pressure of diagnosis tool	Manifold pressure = 32~38 kPa	Valve clearance abnormal Intake system leak
5	**Injection state**	The injector removed from the throttle body but not dismantle pipeline Main switch ON but not start engine Investigation the injector it's leaking fuel? Start engines again or use for the diagnosis tool of output function Check injector fuel injection and the injection situation	Open the main switch but did not start engine the injection situation Injector state when start	Not started, Injector not leaking fuel In started, the injection state must show fan shape	Fuel pump relay fault Fuel pump fault Injector fault ECU fault
6	**Fault Code Detection**	Use of diagnosis tool existing fault detection code or historical Fault Code Eliminated of the implementation of fault codes, check can be eliminated Start engine again Check fault is it happen again	Diagnosis toll of the fault code is it can be eliminated Start engine, the fault is it will happen again	Without any residual Fault Code If residual Fault Code, according to the "Fault Code Maintenance Form" implementation of troubleshooting	Throttle position sensor fault Engine temperature sensor fault Intake temperature sensor fault Manifold pressure sensor fault CPS fault ECU fault Tilt sensor fault

Notes: 1. Fuel pressure gauge connected between the fuel tank and injector, open the main switch to repeatedly shut down, fuel system makes pressure stability.

2.Injector and injector cap tightly by hands, fuel spills should not be the case.