SUZUKI

VL1500

SUPPLEMENTARY SERVICE MANUAL

USE THIS MANUAL WITH:
VL1500 SERVICE MANUAL (99500-39166-01E)

99501-39550-01E

VL1500K5 ('05-MODEL)

This manual describes service specifications, service data and servicing procedures which differ from those of the VL1500K4 ('04-model).

NOTE:
- *Any differences between the VL1500K4 ('04-model) and VL1500K5 ('05-model) in specifications and service data are indicated with an asterisk mark (*).*
- *Please refer to the VL1500 service manual for details which are not given this manual.*

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SUZUKI MOTOR CORPORATION

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COUNTRY AND AREA CODES

The following codes stand for the applicable country (-ies) and area (-s).

CODE	COUNTRY or AREA	EFFECTIVE FRAME NO.
E-03	U.S.A. (Except for California)	JS1VY52A 52100001 –
E-19	EU	JS1AL211100105237 –
E-24	Australia	JS1AL211300100688 –
E-28	Canada	JS1VY52A 52100001 –
E-33	California (U.S.A.)	JS1VY52A 52100001 –

ABBREVIATIONS USED IN THIS MANUAL

A

ABDC	: After Bottom Dead Center
AC	: Alternating Current
ACL	: Air Cleaner, Air Cleaner Box
API	: American Petroleum Institute
ATDC	: After Top Dead Center
ATM Pressure	: Atmospheric Pressure Atmospheric Pressure Sensor (APS)
A/F	: Air Fuel Mixture

B

BBDC	: Before Bottom Dead Center
BTDC	: Before Top Dead Center
B+	: Battery Positive Voltage

C

CKP Sensor	: Crankshaft Position Sensor (CKPS)
CKT	: Circuit
CLP Switch	: Clutch Lever Position Switch (Clutch Switch)
CO	: Carbon Monoxide
CPU	: Central Processing Unit

D

DC	: Direct Current
DMC	: Dealer Mode Coupler
DOHC	: Double Over Head Camshaft
DRL	: Daytime Running Light

E

ECM	: Engine Control Module Engine Control Unit (ECU) (FI Control Unit)
EOT Sensor	: Engine Oil Temperature Sensor (EOTS), Oil Temp. Sensor
EVAP	: Evaporative Emission
EVAP Canister	: Evaporative Emission Canister (Canister)

F

FI	: Fuel Injection, Fuel Injector
FP	: Fuel Pump
FPR	: Fuel Pressure Regulator
FP Relay	: Fuel Pump Relay

G

GEN	: Generator
GND	: Ground
GP Switch	: Gear Position Switch

H

HC	: Hydrocarbons
HO2 Sensor	: Heated Oxygen Sensor (HO2S)

I

IAP Sensor	: Intake Air Pressure Sensor (IAPS)
IAT Sensor	: Intake Air Temperature Sensor (IATS)
IG	: Ignition

L

LCD	: Liquid Crystal Display
LED	: Light Emitting Diode (Malfunction Indicator Lamp)
LH	: Left Hand

M

MAL-Code : Malfunction Code (Diagnostic Code)
Max : Maximum
MIL : Malfunction Indicator Lamp (LED)
Min : Minimum

N

NOx : Nitrogen Oxides

O

OHC : Over Head Camshaft
OPS : Oil Pressure Switch

P

PAIR : Pulsed Secondary Air Injection
PCV : Positive Crankcase Ventilation (Crankcase Breather)

R

RH : Right Hand
ROM : Read Only Memory

S

SAE : Society of Automotive Engineers
STC System : Secondary Throttle Control System (STCS)
STP Sensor : Secondary Throttle Position Sensor (STPS)
ST Valve : Secondary Throttle Valve (STV)
STV Actuator : Secondary Throttle Valve Actuator (STVA)

T

TO Sensor : Tip Over Sensor (TOS)
TP Sensor : Throttle Position Sensor (TPS)

SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length		2 525 mm (99.4 in)	
Overall width	*	995 mm (40.2 in)	E-24
Overall width	*	1 020 mm (40.2 in)	Others
Overall height	*	1 125 mm (44.3 in)	
Wheelbase		1 700 mm (66.9 in)	
Ground clearance	*	140 mm (5.5 in)	
Seat height		700 mm (27.6 in)	
Dry mass	*	302 kg (665 lbs)	

ENGINE

Type		4-stroke, Air-cooled, OHC
Number of cylinders		2
Bore		96 mm (3.780 in)
Stroke		101 mm (3.976 in)
Displacement		1 462 cm^3 (89.2 cu. in)
Compression ratio		8.5 : 1
Fuel system	*	Fuel injection
Air cleaner		Non-woven fabric element
Starter system		Electric
Lubrication system		Wet sump
Idle speed		1 000 ± 100 r/min

DRIVE TRAIN

Clutch	Wet multi-plate type
Transmission	5-speed constant mesh
Gearshift pattern	1-down, 4-up
Primary reduction ratio	1.490 (76/51)
Secondary reduction ratio	0.852 (29/34)
Gear ratios, Low	3.000 (36/12)
2nd	1.823 (31/17)
3rd	1.333 (28/21)
4th	1.041 (25/24)
Top	0.884 (23/26)
Final reduction ratio	2.666 (19/19 × 32/12)
Drive system	Shaft drive

CHASSIS

Front suspension		Telescopic, coil spring, oil damped
Rear suspension		Link type, coil spring, oil damped
Front suspension stroke		140 mm (5.5 in)
Rear wheel travel		118 mm (4.6 in)
Caster		32°
Trail		138 mm (5.43 in)
Steering angle		39° (right & left)
Turning radius		3.1 m (10.2 ft)
Front brake		Disc brake, twin
Rear brake		Disc brake
Front tire size		150/80-16 M/C 71H, tubeless
Rear tire size		180/70-15 M/C 76H, tubeless

ELECTRICAL

Ignition type		Electronic ignition (Transistorized)
Ignition timing	*	9° B.T.D.C. at 1 000 r/min
Spark plug		NGK DPR7EA-9 or DENSO X22EPR-U9
Battery	*	12 V 64.8 kC (18 Ah)/10 HR
Generator		Three-phase A.C. generator
Main fuse		30 A
Fuse		10/10/10/15/15/10 A
Headlight		12 V 60/55 W (H4)
Position/Parking light	*	12 V 5 W .....Except E-03, 24, 28, 33
Brake light/Taillight		12 V 21/5 W
Front turn signal light		12 V 21/5 W E-03, 28, 33
		12 V 21 W .....Others
Rear turn signal light		12 V 21 W
Speedometer light	*	LED
Turn signal indicator light	*	LED
Neutral indicator light	*	LED
High beam indicator light	*	LED
Oil pressure indicator light		LED
FI warning light	*	LED

CAPACITIES

Fuel tank	*	14.0 L (3.7/3.1 US/Imp gal)
Engine oil, oil change		3 700 ml (3.9/3.3 US/Imp qt)
with filter change		4 300 ml (4.5/3.8 US/Imp qt)
overhaul		5 000 ml (5.3/4.4 US/Imp qt)
Final gear oil		200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp oz)

PERIODIC MAINTENANCE SCHEDULE

The chart below lists the recommended intervals for all the required periodic service work necessary to keep the motorcycle operating at peak performance and economy. Mileages are expressed in terms of kilometers, miles and time for your convenience.

NOTE:
More frequent servicing may be performed on motorcycles that are used under severe conditions.

PERIODIC MAINTENANCE CHART

Item \ Interval	km	1 000	6 000	12 000	18 000	24 000
	miles	600	4 000	7 500	11 000	14 500
	months	2	12	24	36	48
Air cleaner element		—	I	I	R	I
* Exhaust pipe nuts and muffler bolts		T	—	T	—	T
Spark plugs		—	I	R	I	R
* Fuel hose		—	I	I	I	I
		Replace every 4 years.				
Engine oil		R	R	R	R	R
Engine oil filter		R	—	I	R	—
* Engine idle speed		I	I	I	I	I
* Throttle cable play		I	I	I	I	I
Automatic decompression cable		I	I	I	I	I
* Throttle valve synchronization		I (E-33 only)	—	I	—	I
* Evaporative emission control system (E-33 only)		—	—	I	—	I
		Replace vapor hose every 4 years.				
* PAIR (air supply) system		—	—	I	—	I
Clutch hose		—	I	I	I	I
		Replace every 4 years.				
Clutch fluid		—	I	I	I	I
		Replace every 2 years.				
Final gear oil		R	—	I	—	I
Brakes		I	I	I	I	I
Brake hose		—	I	I	I	I
		Replace every 4 years.				
Brake fluid		—	I	I	I	I
		Replace every 2 years.				
Tires		—	I	I	I	I
Steering		I	—	I	—	I
Front forks		—	—	I	—	I
Rear suspension		—	—	I	—	I
Chassis bolts and nuts		T	T	T	T	T

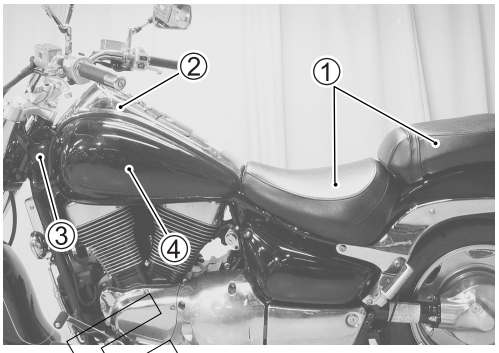
NOTE:
I = Inspect and clean, adjust, replace or lubricate as necessary; R = Replace; T = Tighten

MAINTENANCE AND TUNE-UP PROCEDURES

This section describes the servicing procedures for each Periodic Maintenance item which differ from those of the VL1500K4 ('04-MODEL).
For details other than the following items, refer to the VL1500 Service Manual.

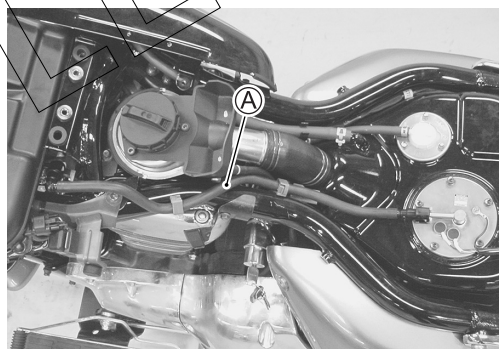
FUEL HOSE

Inspect every 6 000 km (4 000 miles, 12 months).
Replace every 4 years.



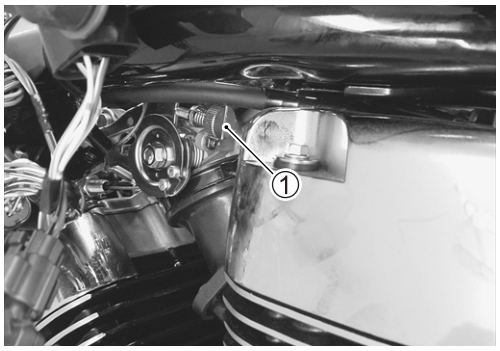
- Remove the seats ①. (☞Page 121)
- Remove the speedometer and fuel inlet cover ②. (☞VL1500 Service Manual 6-3)
- Remove the left frame head cover ③ and left frame upper cover ④. (☞VL1500 Service Manual 6-3)

Inspect the fuel feed hose Ⓐ for damage and fuel leakage. If any defect is found, the fuel feed hose must be replaced.



ENGINE IDLE SPEED

Inspect initially at 1 000 km (600 miles, 2 months) and every 6 000 km (4 000 miles, 12 months).



NOTE:
Warm up the engine before adjusting the engine idle speed.

- Adjust the throttle cable play.(☞Page 9)
- Remove the left frame upper cover. (☞VL1500 Service Manual 6-3)
- Start the engine, turn the throttle stop screw ① and set the engine idle speed as follows.
- Connect the multi-circuit tester to the high-tension cord.

DATA Engine idle speed: 1 000 ± 100 r/min

TOOL 09900-25008: Multi-circuit tester set

Lock-nut
THROTTLE CABLE PLAY

Inspect initially at 1 000 km (600 miles, 2 month) and every 6 000 km (4 000 miles, 12 months) thereafter.

Adjust the throttle cable play Ⓐ with the following three steps.

MINOR ADJUSTMENT

First step:

- Loosen the lock-nut ① of the throttle returning cable ② and turn in the adjuster ③ fully into the threads.

Second step:

- Loosen the lock-nut ④ of the throttle pulling cable ⑤.
- Turn the adjuster ⑥ in or out until the throttle cable play Ⓐ (at the throttle grip) is between 2.0 – 4.0 mm (0.08 – 0.16 in).
- Tighten the lock-nut ④ while holding the adjuster ⑥.

Third step:

- While holding the throttle grip at the fully closed position, slowly turn out the adjuster ③ of the throttle returning cable ② until resistance is felt.
- Tighten the lock-nut ① while holding the adjuster ③.

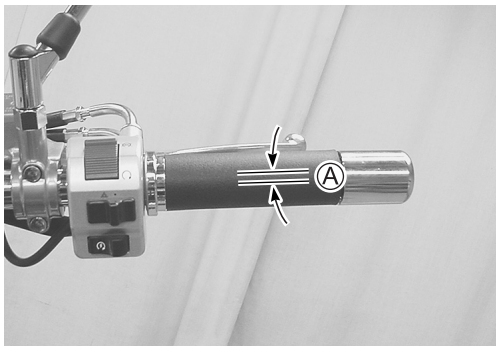
DATA **Throttle cable play Ⓐ: 2.0 – 4.0 mm (0.08 – 0.16 in)**

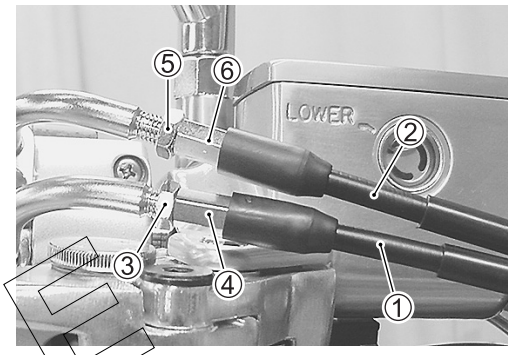
⚠ WARNING

After the adjustment is completed, check that handlebar movement does not raise the engine idle speed and that the throttle grip returns smoothly and automatically.

NOTE:

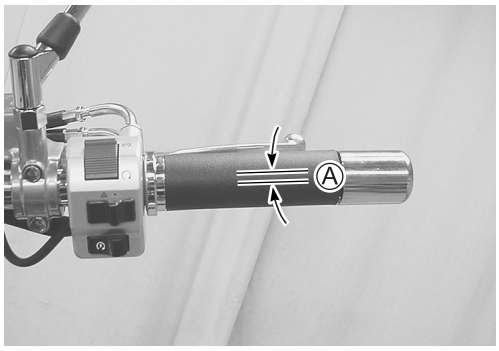
Major adjustment can be made by the throttle body side adjuster.





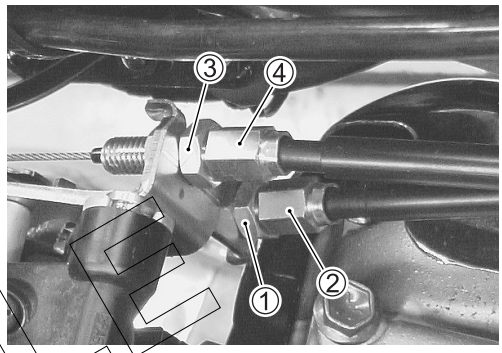
MAJOR ADJUSTMENT

- Remove the air cleaner box. (☞Page 103)
- Loosen the lock-nut ① of the throttle returning cable.
- Turn the returning cable adjuster ② to obtain proper cable play.
- Loosen the lock-nut ③ of the throttle pulling cable.
- Turn the pulling cable adjuster ④ in or out until the throttle cable play Ⓐ (at the throttle grip) is between 2.0 – 4.0 mm (0.08 – 0.16 in).
- Tighten the lock-nut ③ securely while holding the adjuster ④.



DATA Throttle cable play Ⓐ: 2.0 – 4.0 mm (0.08 – 0.16 in)

- While holding the throttle grip at the fully closed position, slowly turn the returning cable adjuster ② to obtain a slack of 1.0 mm (0.04 in).
- Tighten the lock-nut ① securely.



⚠ WARNING

After the adjustment is completed, check that handlebar movement does not raise the engine idle speed and that the throttle grip returns smoothly and automatically.

THROTTLE VALVE SYNCHRONIZATION

Inspect initially at 1 000 km (600 miles, 2 month) (E-33 only) and every 12 000 km (7 500 miles, 24 months).

Inspect the throttle valve synchronization periodically.
(☞Page 114)

PAIR (AIR SUPPLY) SYSTEM

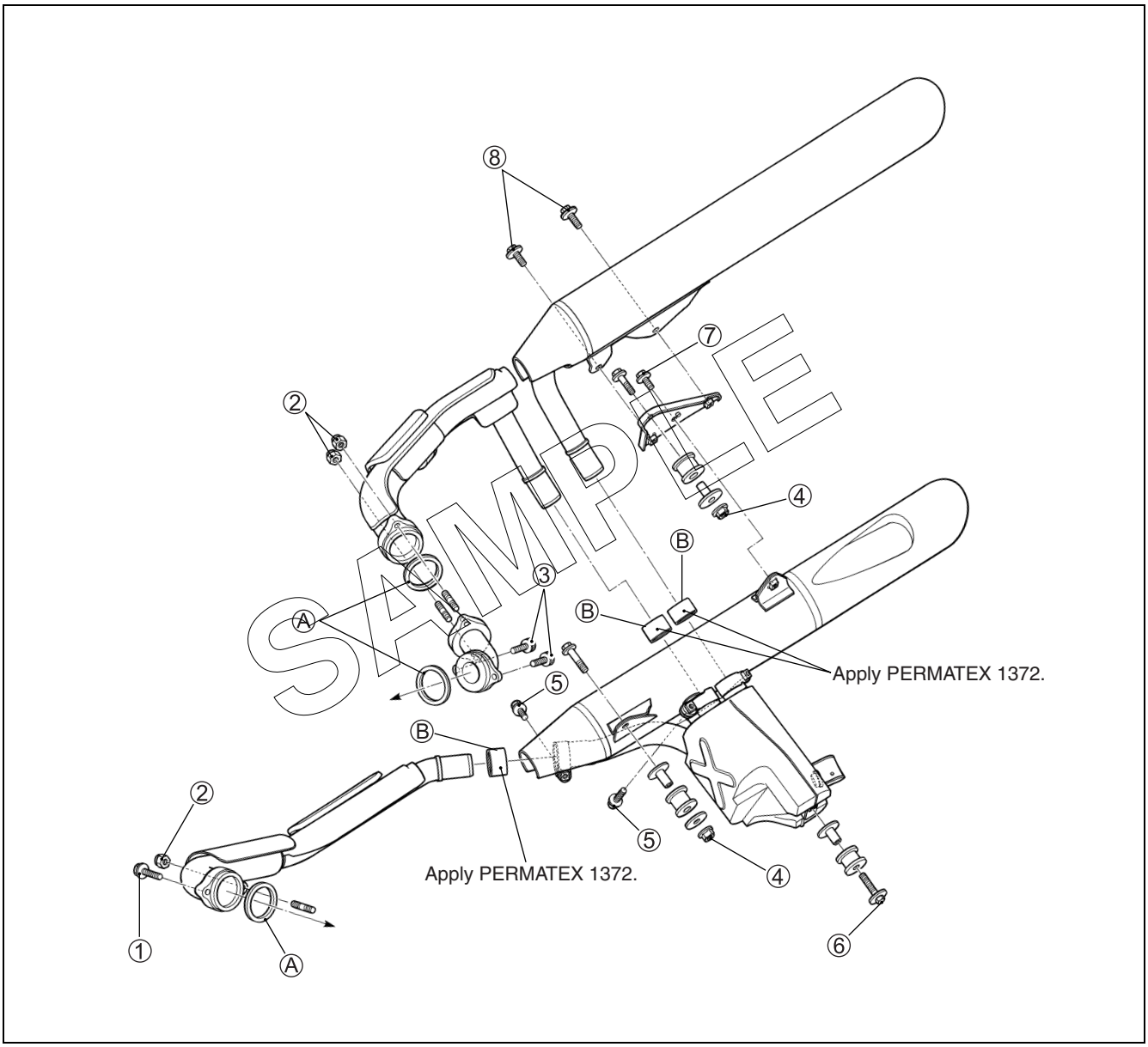
Inspect every 12 000 km (7 500 miles, 24 months).

Inspect the PAIR (air supply) system periodically.
(☞Page 172)

EXHAUST PIPE BOLTS AND MUFFLER BOLTS

Tighten initially at 1 000 km (600 miles, 2 month) and every 12 000 km (7 500 miles, 24 months) thereafter.

- Tighten the exhaust pipe bolts and muffler mounting bolts to the specified torque.



Ⓐ	Gasket
Ⓑ	Exhaust pipe connector

ITEM	N·m	kgf-m	lb-ft
①②④⑤⑧	25	2.5	18.0
③⑥	23	2.3	16.5
⑦	55	5.5	40.0

CHASSIS BOLTS AND NUTS

Tighten initially at 1 000 km (600 miles, 2 month) and every 6 000 km (4 000 miles, 12 months) thereafter.

Check that all chassis bolts and nuts are tightened to their specified torque. (Refer to VL1500 Service Manual 2-18 for the locations of the following nuts and bolts.)

ITEM	N·m	kgf-m	lb-ft
Front axle	65	6.5	47.0
Front axle pinch bolt	23	2.3	16.5
Brake disc bolt (Front and Rear)	23	2.3	16.5
* Front fork cap bolt	23	2.3	16.5
* Front fork upper clamp bolt	23	2.3	16.5
Front fork lower clamp bolt	23	2.3	16.5
Steering stem head nut	90	9.0	65.0
Front brake master cylinder mounting bolt	10	1.0	7.0
Front brake caliper mounting bolt	35	3.5	25.5
Front brake caliper housing bolt	35	3.5	25.5
Brake hose union bolt	23	2.3	16.5
Front brake hose joint nut	15	1.5	11.0
Front brake hose adaptor	23	2.3	16.5
Air bleeder valve	7.5	0.75	5.5
* Handlebar set bolt	23	2.3	16.5
* Handlebar holder nut	70	7.0	50.5
Front footrest bolt	50	5.0	36.0
Rear brake master cylinder rod lock nut	18	1.8	13.0
Rear brake pedal bolt	16	1.6	11.5
Rear brake master cylinder mounting bolt	10	1.0	7.0
Clutch hose union bolt	23	2.3	16.5
Clutch master cylinder mounting bolt	10	1.0	7.0
Rear swingarm pivot bolt (Left)	100	10.0	72.5
Rear swingarm pivot bolt (Right)	9.5	0.95	7.0
Rear swingarm pivot lock nut	100	10.0	72.5
Rear shock absorber mounting nut (Upper and Lower)	50	5.0	36.0
Rear cushion lever/rod mounting nut	135	13.5	97.5
Rear axle nut	110	11.0	79.5
Rear caliper mounting bracket bolt/nut	60	6.0	43.5
Rear brake caliper mounting bolt	35	3.5	25.5
Rear brake caliper housing bolt	33	3.3	24.0
Final gear case mounting nut	40	4.0	29.0

ENGINE COMPONENTS REMOVABLE WITH ENGINE IN PLACE

The parts listed below can be removed and reinstalled without removing the engine from the frame. Refer to the page listed in each section for removal and reinstallation instructions.

ENGINE LEFT SIDE

PARTS	REMOVAL	INSTALLATION
Secondary case	3-24, 4-5	3-41, 4-10
Secondary driven bevel gear	3-25, 4-5	3-40, 4-10
* Gear position switch body	17	17
Clutch release cylinder	6-59	6-61
Starter torque limiter	3-27, 3D-1	3-36, 3D-6
Starter idle gear	3-17, 3D-1	3-60, 3D-6
Starter clutch	3-27, 3D-1, 3D-5	3-38, 3D-5, 3D-6
Gearshift lever and linkage	3-26, 3E-1	3-38, 3E-5
Generator	3-27, 3D-1	3-38, 3D-6

ENGINE RIGHT SIDE

PARTS	REMOVAL	INSTALLATION
Clutch cover	3-20, 3C-1	3-50, 3C-5
Clutch pressure, drive and driven plates	3-20, 3C-1	3-48, 3C-5
Clutch sleeve hub	3-21, 3C-1	3-46, 3C-5
Clutch housing	3-22, 3C-2	3-46, 3C-4
Oil pump drive gears	3-22, 3C-2	3-46, 3C-4
Oil pump driven gears	3-23	3-45
Oil pressure switch	3-24, 3G-5	3-43, 3G-7
Oil pressure regulator	3-23, 3G-3	3-45, 3G-4
* EOT sensor	17	17
Back torque limiter	3-22, 3C-2	3-46, 3C-5
Rear clutch cover	3-6	3C-6

ENGINE CENTER

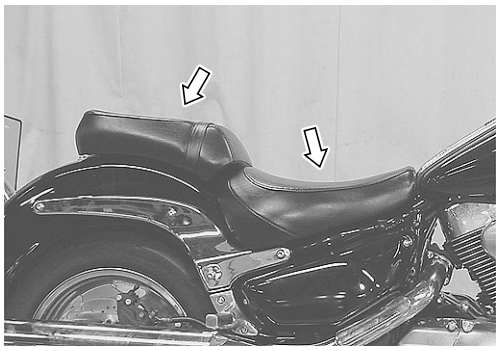
PARTS	REMOVAL	INSTALLATION
* Throttle body	104	110
Oil filter	2-6	2-7
Oil cooler	3G-5	3-13
Starter motor	7-14	7-17

ENGINE REMOVAL AND INSTALLATION

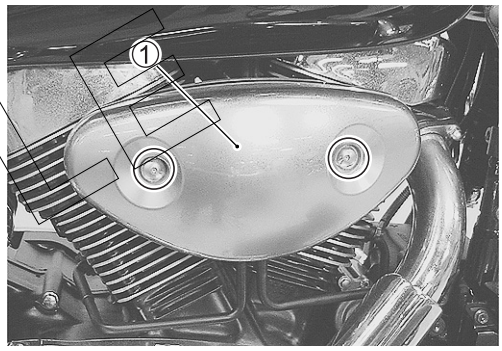
ENGINE REMOVAL

The engine removal procedure is different from that of the VL1500K4 ('04-MODEL). For details other than the removal procedure, refer to the VL1500 Service Manual.

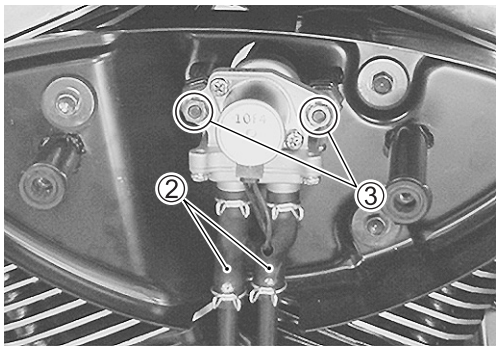
- Remove the seats. (☞Page 121)



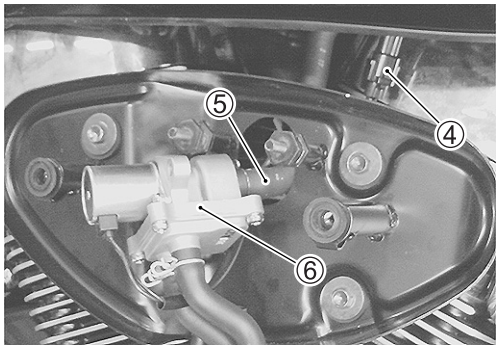
- Remove the PAIR cover ①.



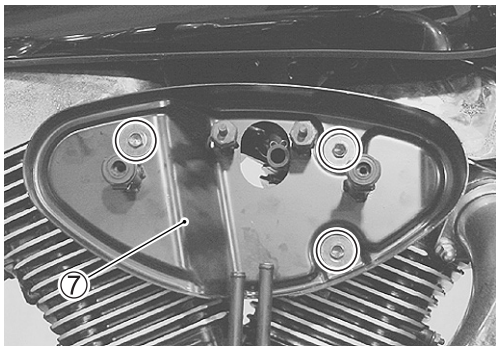
- Disconnect the PAIR hoses ② from the pipes.
- Remove the PAIR control solenoid valve nuts ③.



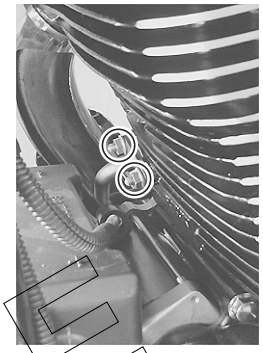
- Disconnect the PAIR control solenoid valve coupler ④ and PAIR hose ⑤.
- Remove the PAIR control solenoid valve ⑥.

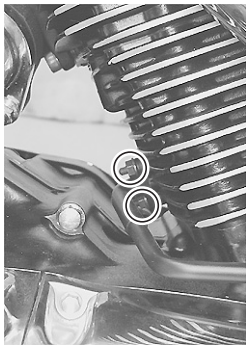


- Remove the PAIR device bracket ⑦.

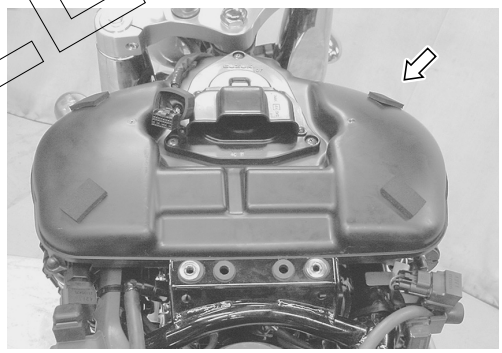


- Remove the No. 1 and No. 2 PAIR pipes.

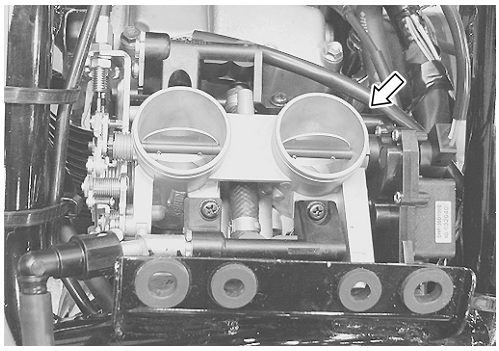




- Remove the air cleaner box. (☞Page 103)



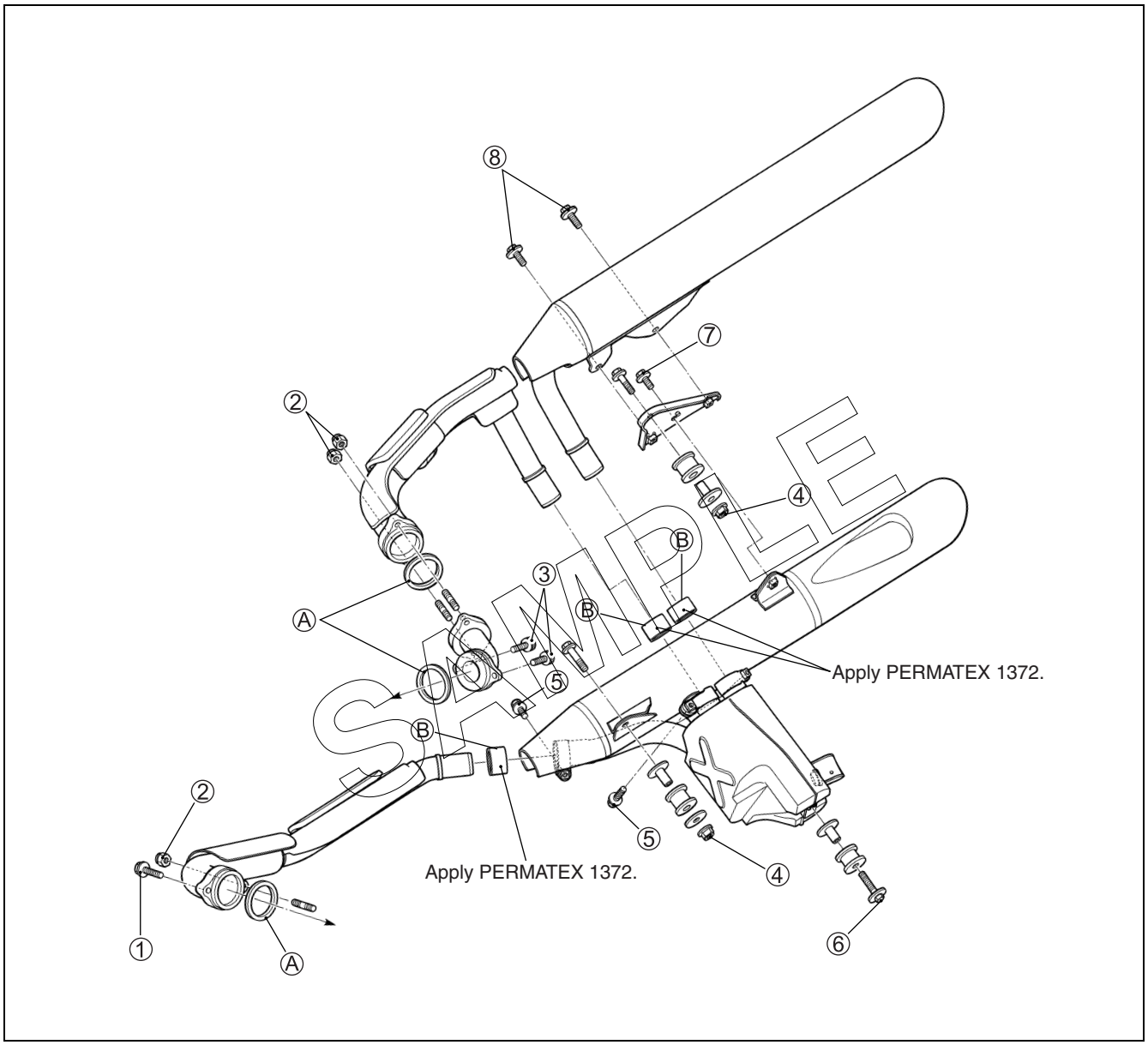
- Remove the throttle body. (☞Page 104)



ENGINE INSTALLATION

Installation is in the reverse order of removal procedure.

- Tighten the exhaust pipe bolts and muffler mounting bolts to the specified torque.



CAUTION

Replace the gaskets with the new ones.

- Adjust the following items to the specification.

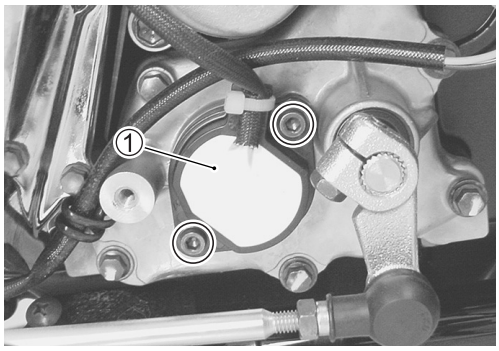
* Engine oil (☞VL1500 Service Manual 2-6)
* Throttle valve synchronization (☞Page 114)
* Throttle cable play (☞Page 9)
* Engine idle speed (☞Page 8)
* Automatic decompression cable (☞VL1500 Service Manual 2-8)
* Clutch air bleeding (☞VL1500 Service Manual 6-59)
* Wiring harness, cables and hoses (☞Page 144)

ENGINE DISASSEMBLY AND REASSEMBLY

The engine disassembly and reassembly procedures are different from those of the VL1500K4 ('04-MODEL). For details other than the following parts, refer to the VL1500 Service Manual.

GEAR POSITION SWITCH REMOVAL

- Remove the gear position switch ①.



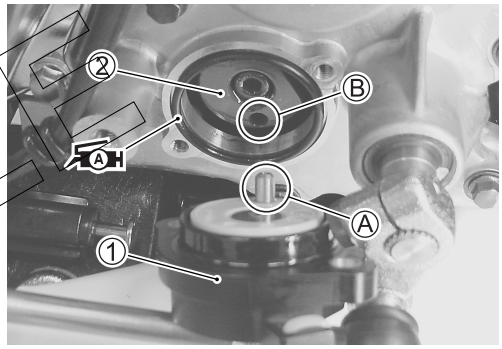
GEAR POSITION SWITCH REASSEMBLY

- Apply SUZUKI SUPER GREASE "A" to the O-ring.
- When installing the gear position switch ①, align the pin Ⓐ with the hole Ⓑ in the gearshift cam retainer ②.

CAUTION

Use a new O-ring to prevent oil leakage.

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

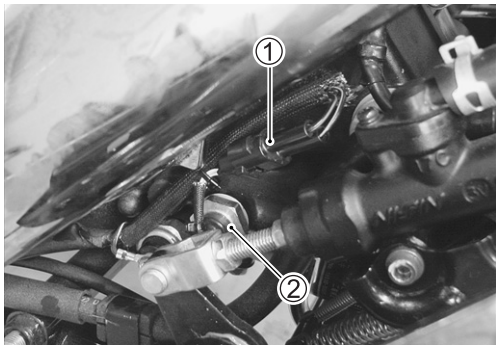


EOT SENSOR REMOVAL

- Place an oil pan below the EOT sensor.
- Disconnect the EOT sensor coupler ① and remove the EOT sensor ②.

⚠ WARNING

Do not remove the EOT sensor when the engine is hot.



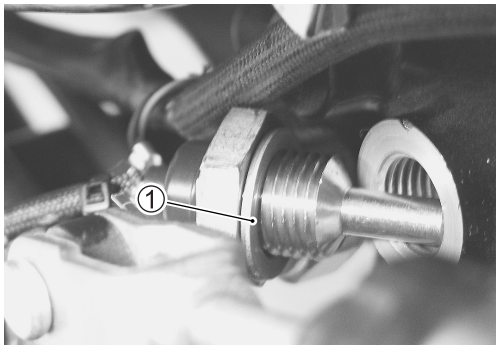
EOT SENSOR REASSEMBLY

- Install a new gasket washer ①.
- Tighten the EOT sensor to the specified torque.

CAUTION

Take special care when handling the temperature sensor. It may cause damage if it gets a sharp impact.

EOT sensor: 22 N·m (2.2 kgf-m, 16.0 lb-ft)



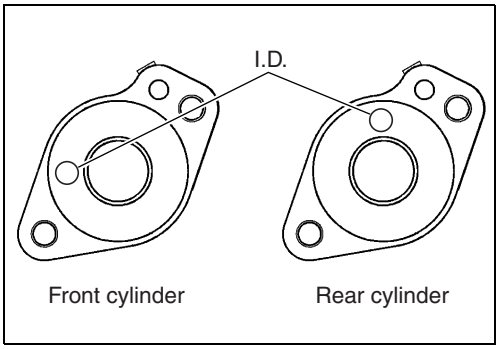
ENGINE COMPONENTS INSPECTION AND SERVICING

CAMSHAFT

For details other than the following, refer to the VL1500 Service Manual.

Each camshaft I.D. code has been changed which is stamped on the camshaft end.

	Front cylinder	Rear cylinder
I.D. code	B	C

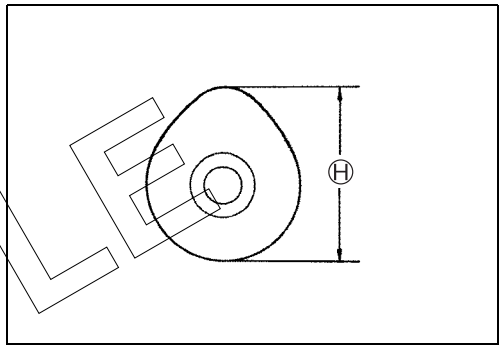


CAM WEAR

DATA Cam height Ⓗ

Service Limit (IN) : 35.02 mm (1.379 in)
(EX) : 36.58 mm (1.440 in)

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

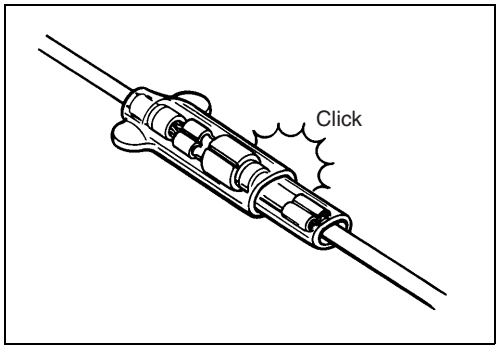


PRECAUTIONS IN SERVICING

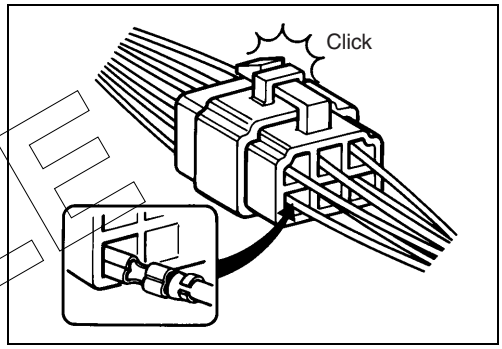
When handling the FI component parts or servicing the FI system, observe the following points for the safety of the system.

CONNECTOR/COUPLER

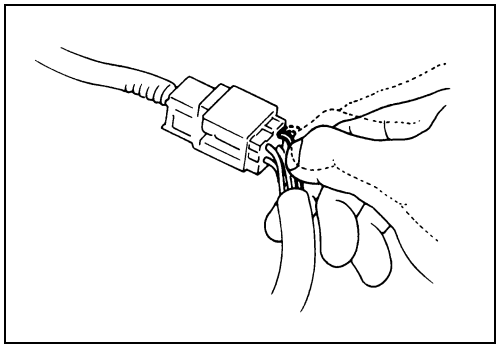
- When connecting a connector, be sure to push it in until a click is felt.
- With a lock type coupler, be sure to release the lock when disconnecting, and push in fully to engage the lock when connecting.
- When disconnecting the coupler, be sure to hold the coupler body and do not pull the lead wires.
- Inspect each terminal on the connector/coupler for looseness or bending.



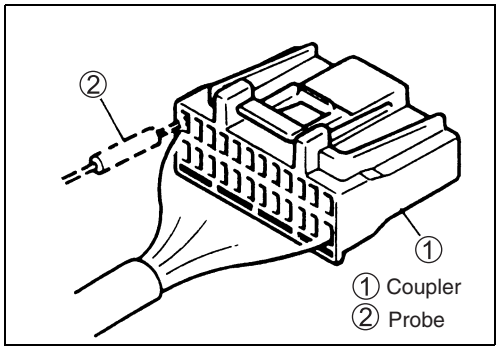
- Inspect each terminal for corrosion and contamination.
  The terminals must be clean and free of any foreign material which could impede proper terminal contact.



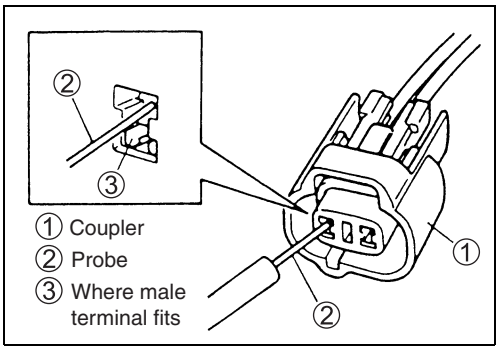
- Inspect each lead wire circuit for poor connection by shaking it by hand lightly. If any abnormal condition is found, repair or replace.



- 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

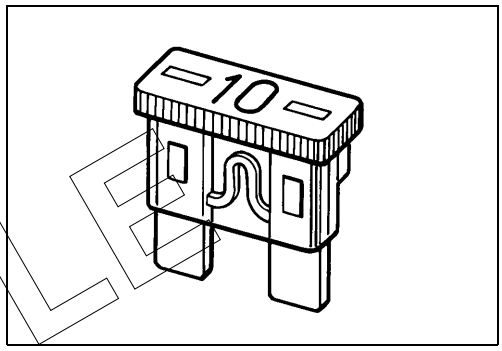


- When connecting meter probe from the terminal side of the coupler where (connection from harness side not being possible), use extra care not to force and cause the male terminal to bend or the female terminal to open.
  Connect the probe as shown to avoid opening of female terminal.
  Never push in 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.



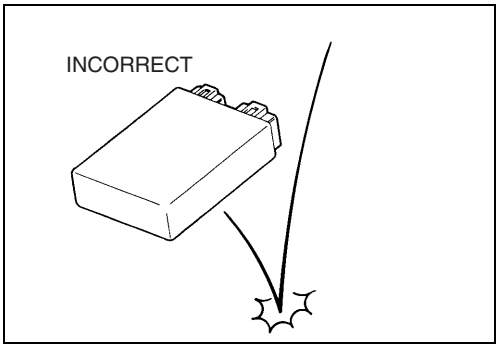
FUSE

- 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.

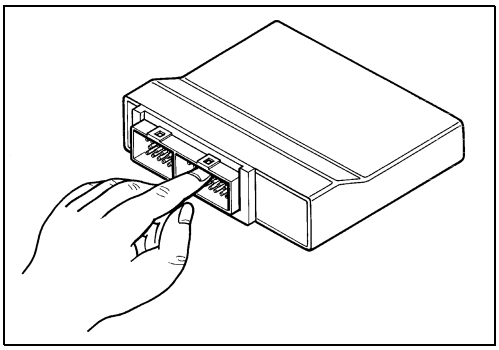


ECM/VARIOUS SENSORS

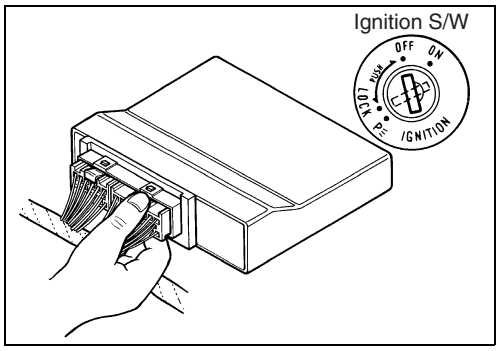
- Since each component is a high-precision part, great care should be taken not to apply any sharp impacts during removal and installation.



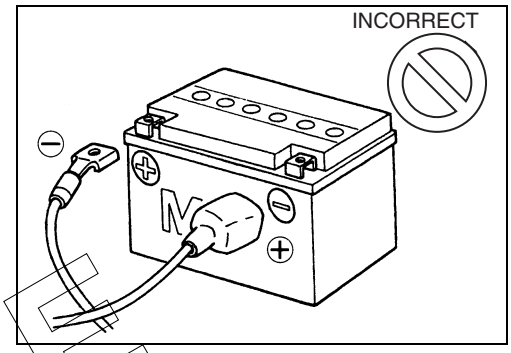
- Be careful not to touch the electrical terminals of the ECM. The static electricity from your body may damage this part.



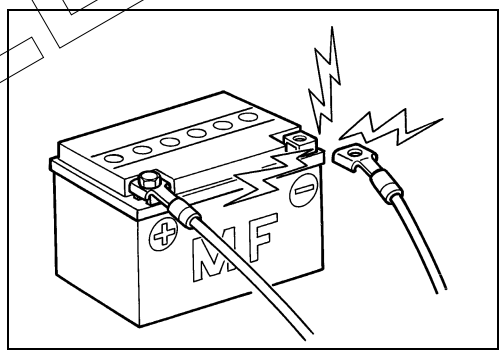
- When disconnecting and connecting the ECM couplers, make sure to turn OFF the ignition switch, or electronic parts may get damaged.



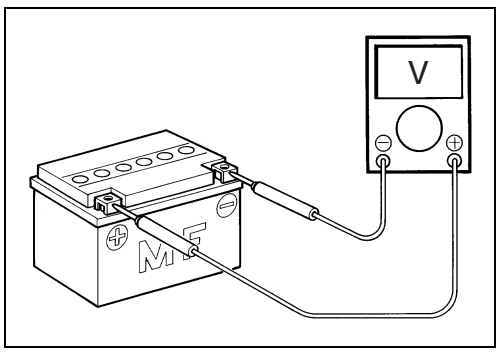
- Battery connection in reverse polarity is strictly prohibited. Such a wrong connection will damage the components of the FI system instantly when reverse power is applied.



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



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



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

ELECTRICAL CIRCUIT INSPECTION PROCEDURE

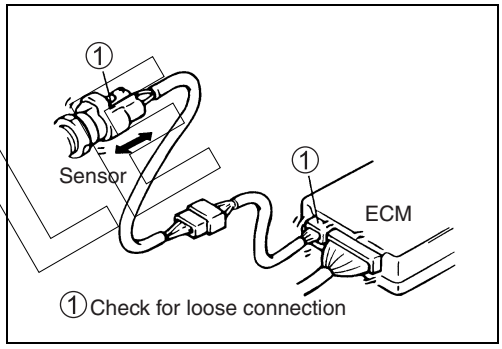
While there are various methods for electrical circuit inspection, described here is a general method to check for open and short circuit using an ohmmeter and a voltmeter.

OPEN CIRCUIT CHECK

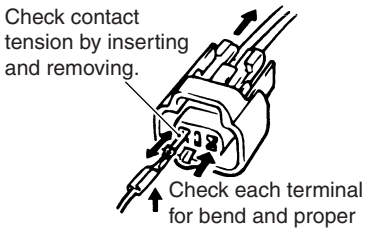
Possible causes for the open circuit are as follows. As the cause can exist in the connector/coupler or terminal, they need to be checked carefully.

- Loose connection of connector/coupler
- Poor contact of terminal (due to dirt, corrosion or rust, poor contact tension, entry of foreign object etc.)
- Wire harness being open
- Poor terminal-to-wire connection

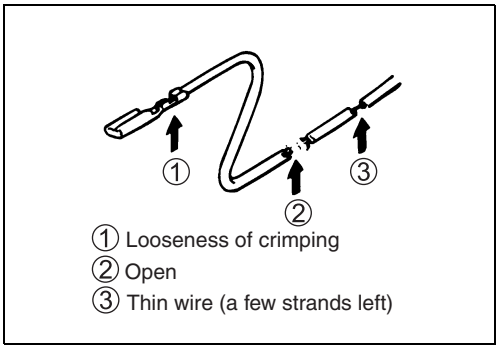
- Disconnect the negative cable from the battery.
- Check each connector/coupler at both ends of the circuit being checked for loose connection. Also check for condition of the coupler lock if equipped.



- Using a test male terminal, check the female terminals of the circuit being checked for contact tension.
  Check each terminal visually for poor contact (possibly caused by dirt, corrosion, rust, entry of foreign object, etc.). At the same time, check to make sure that each terminal is fully inserted in the coupler and locked.
  If contact tension is not enough, rectify the contact to increase tension or replace.
  The terminals must be clean and free of any foreign material which could impede proper terminal contact.

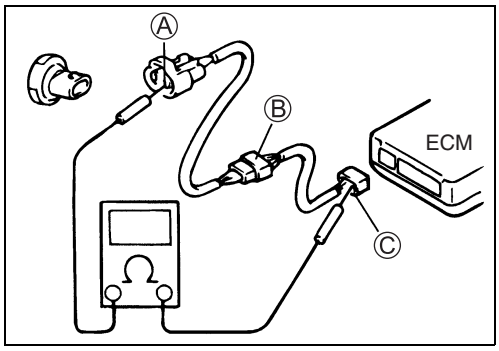


- Using continuity inspect or voltage check procedure as described below, inspect the wire harness terminals for open circuit and poor connection. Locate abnormality, if any.

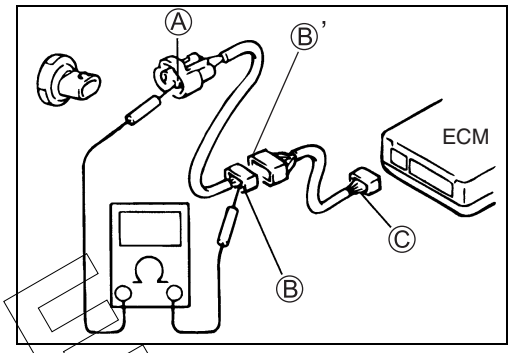


Continuity check

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



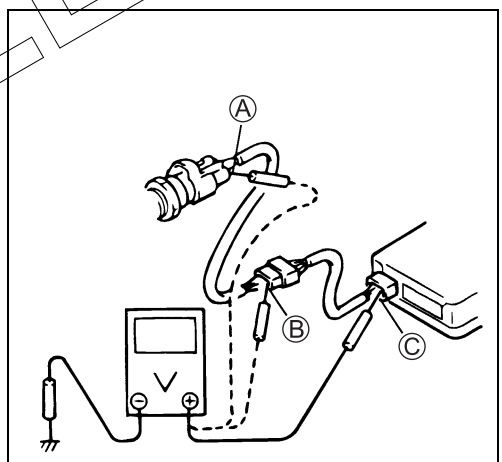
- Disconnect the coupler Ⓑ and measure resistance between couplers Ⓐ and Ⓑ.
  If no continuity is indicated, the circuit is open between couplers Ⓐ and Ⓑ. If continuity is indicated, there is an open circuit between couplers Ⓑ' and Ⓒ or an abnormality in coupler Ⓑ' or coupler Ⓒ.



VOLTAGE CHECK

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

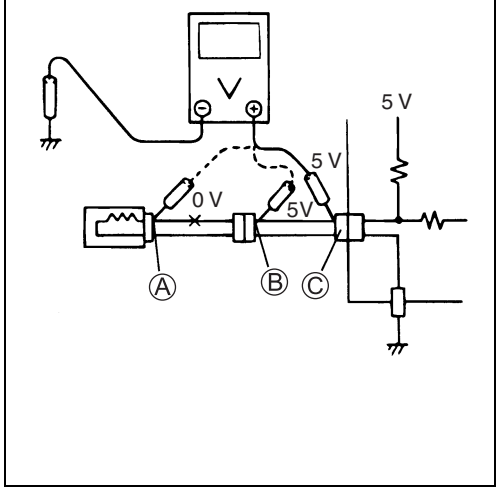
- With all connectors/couplers connected and voltage applied to the circuit being checked, measure voltage between each terminal and body ground.



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 Ⓐ and Ⓑ.

Voltage Between:

Ⓒ and body ground: Approx. 5 V
Ⓑ and body ground: Approx. 5 V
Ⓐ 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 Ⓐ and Ⓑ.

Voltage Between:

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

2 V voltage drop

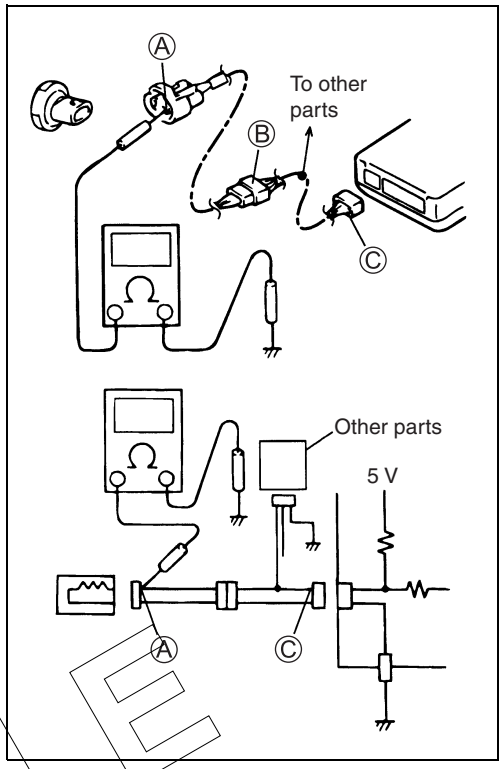
SHORT CIRCUIT CHECK (WIRE HARNESS TO GROUND)

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

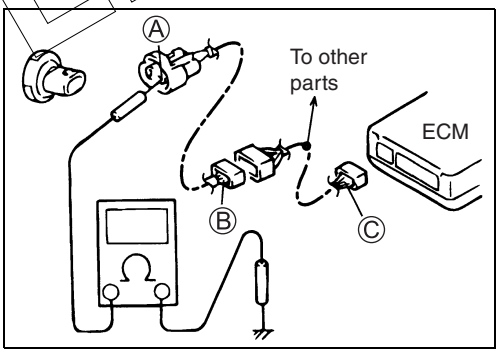
NOTE:

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 (Ⓐ terminal in figure) and body ground. If continuity is indicated, there is a short circuit to ground between terminals Ⓐ and Ⓒ.

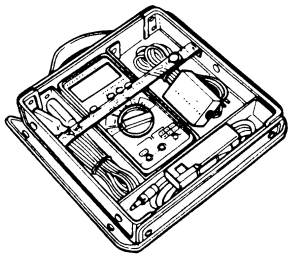


- Disconnect the connector/coupler included in circuit (coupler Ⓑ) and measure resistance between terminal Ⓐ and body ground.
  If continuity is indicated, the circuit is shorted to the ground between terminals Ⓐ and Ⓑ.



USING THE MULTI-CIRCUIT TESTER

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



USING THE TESTER

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

TOOL 09900-25008: Multi-circuit tester set

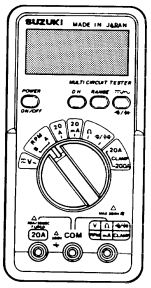
NOTE:

** When connecting the multi-circuit tester, use a needle pointed probe set to the back side of the lead wire coupler and connect the probes of tester to them.*

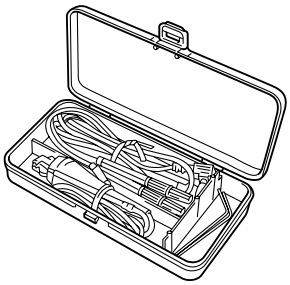
** Use a needle pointed probe set to prevent the rubber of the water proof coupler from damage.*

TOOL 09900-25009: Needle pointed probe set

MULTI-CIRCUIT TESTER



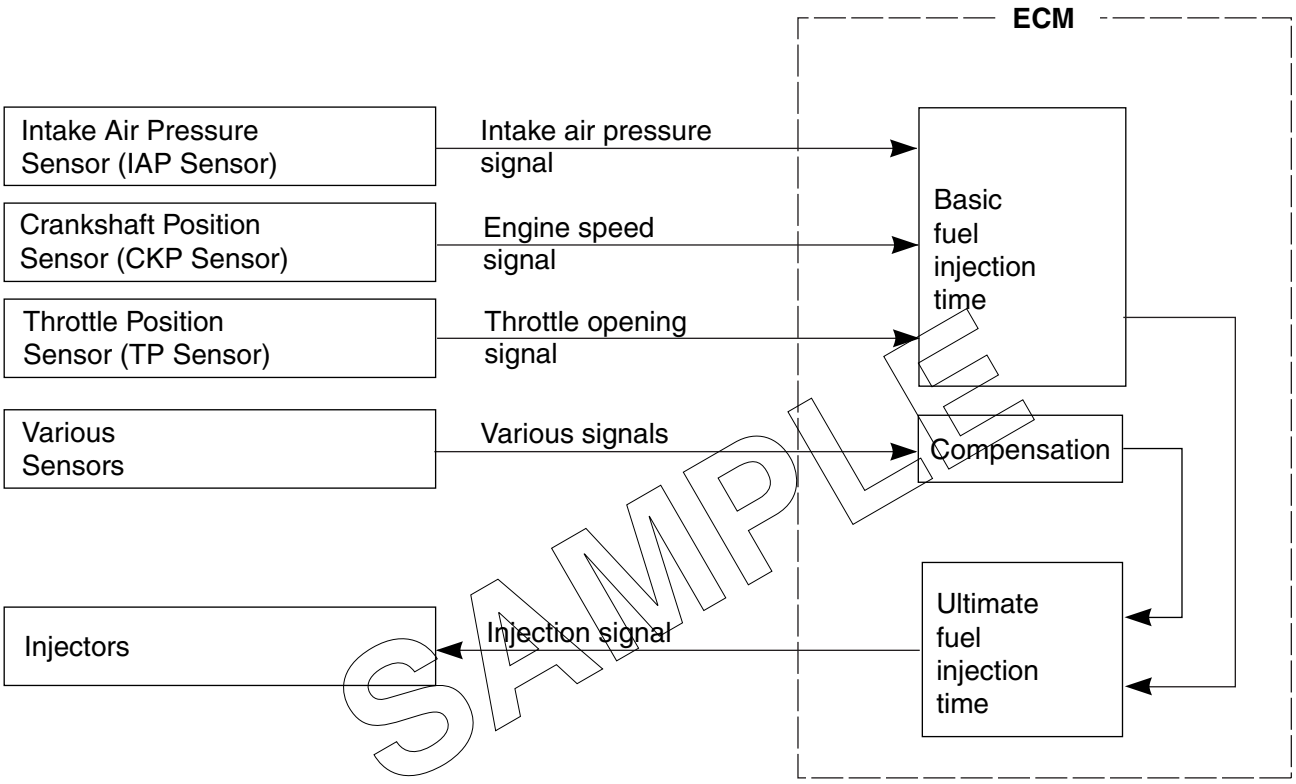
NEEDLE POINTED PROBE SET



FI SYSTEM TECHNICAL FEATURES

INJECTION TIME (INJECTION VOLUME)

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



COMPENSATION OF INJECTION TIME (VOLUME)

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

SIGNAL	DESCRIPTION
ENGINE OIL TEMPERATURE SENSOR SIGNAL	When engine oil temperature is low, injection time (volume) is increased.
INTAKE AIR TEMPERATURE SENSOR SIGNAL	When intake air temperature is low, injection time (volume) is increased.
HEATED OXYGEN SENSOR SIGNAL (FOR E-02, 19, 24)	Air/fuel ratio is compensated to the theoretical ratio from density of oxygen in exhaust gasses. The compensation occurs in such a way that more fuel is supplied if detected air/fuel ratio is lean and less fuel is supplied if it is rich.
BATTERY VOLTAGE SIGNAL	ECM operates on the battery voltage and at the same time, it monitors the voltage signal for compensation of the fuel injection time (volume). A longer injection time is needed to adjust injection volume in the case of low voltage.
ENGINE RPM SIGNAL	At high speed, the injection time (volume) is increased.
STARTING SIGNAL	When starting engine, additional fuel is injected during cranking engine.
ACCELERATION SIGNAL/ DECELERATION SIGNAL	During acceleration, the fuel injection time (volume) is increased, in accordance with the throttle opening speed and engine rpm. During deceleration, the fuel injection time (volume) is decreased.

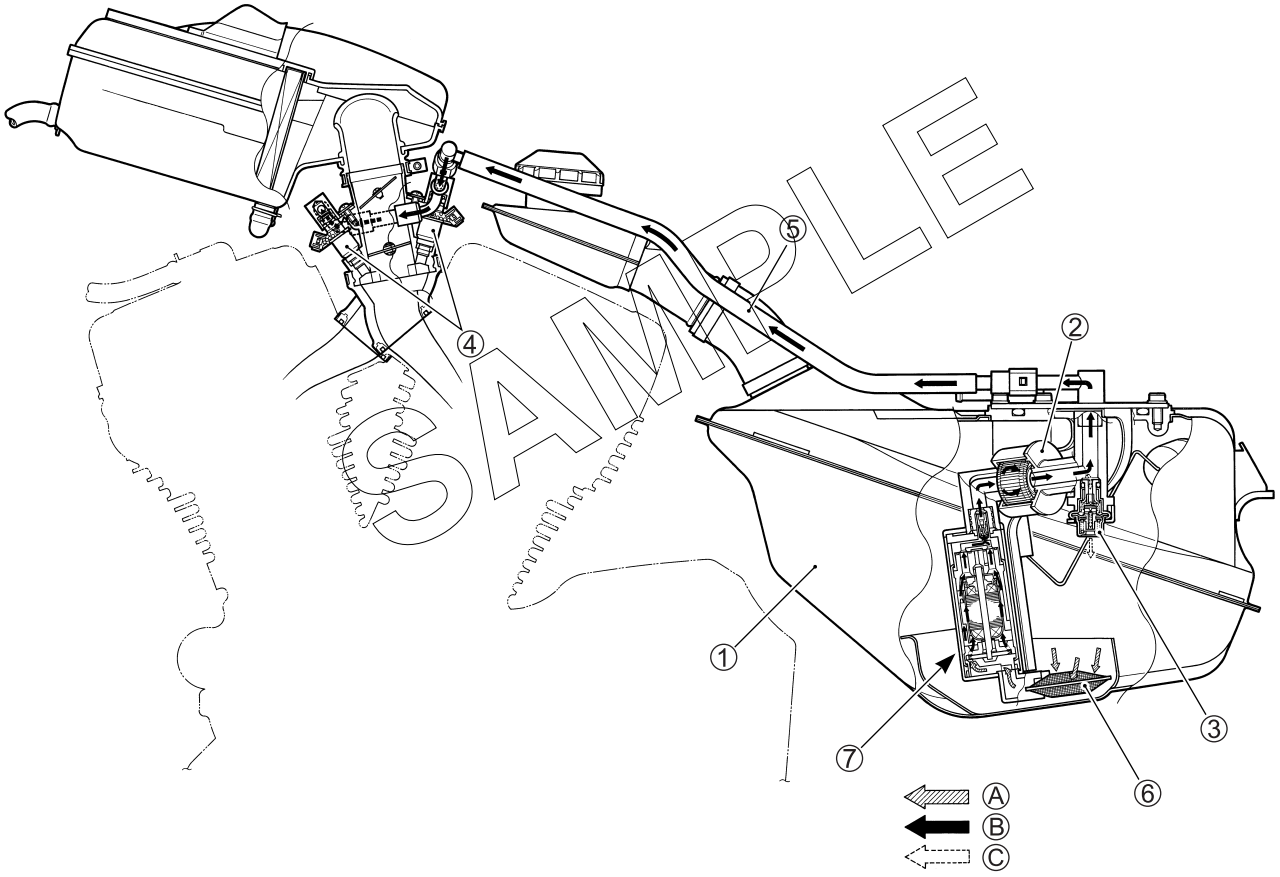
INJECTION STOP CONTROL

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

FUEL DELIVERY SYSTEM

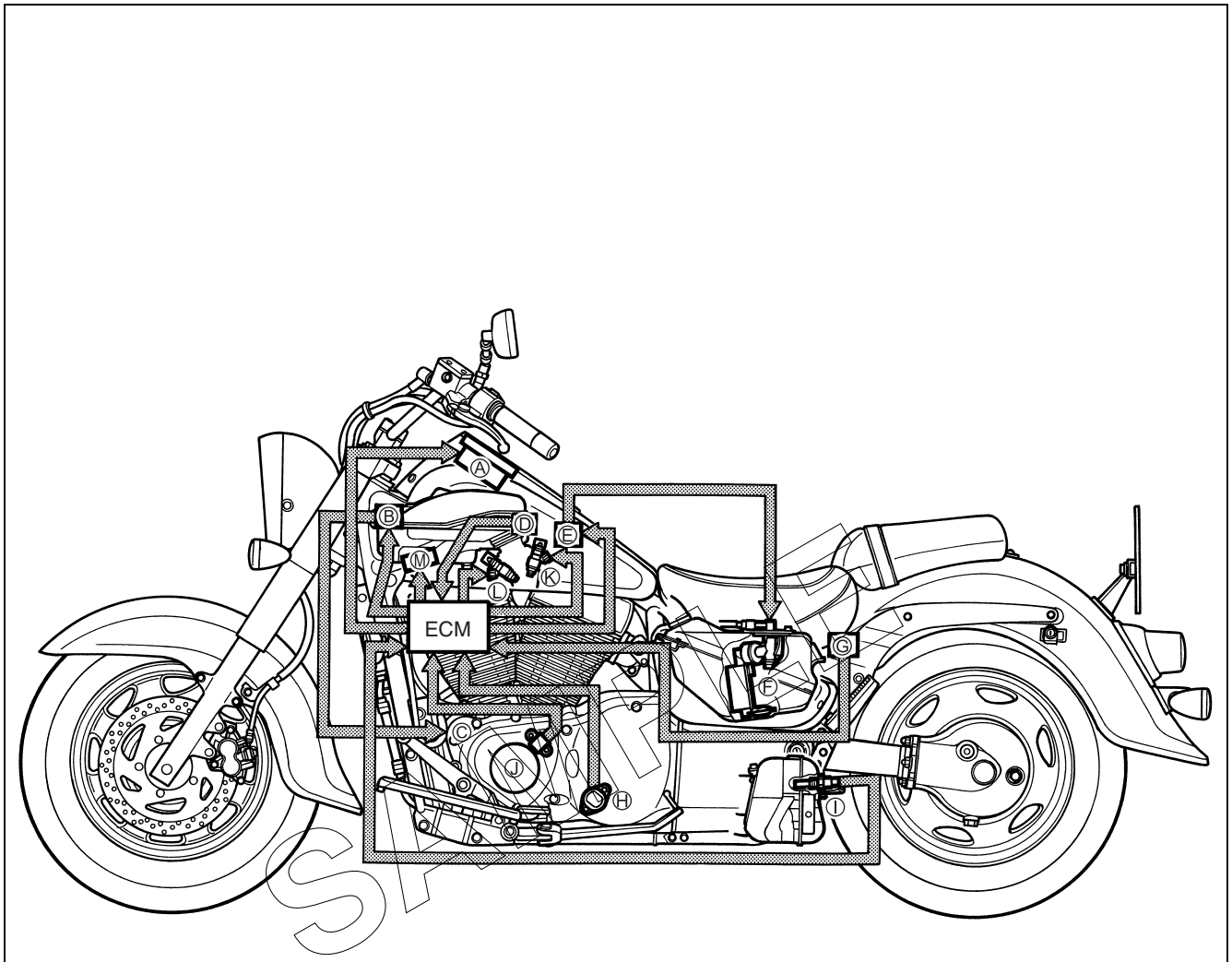
The fuel delivery system consists of the fuel tank, fuel pump, fuel filters, fuel feed hose, fuel delivery pipe (including fuel injectors) and fuel pressure regulator. There is no fuel return hose. The fuel in the fuel tank is pumped up by the fuel pump and pressurized fuel flows into the injector installed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

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

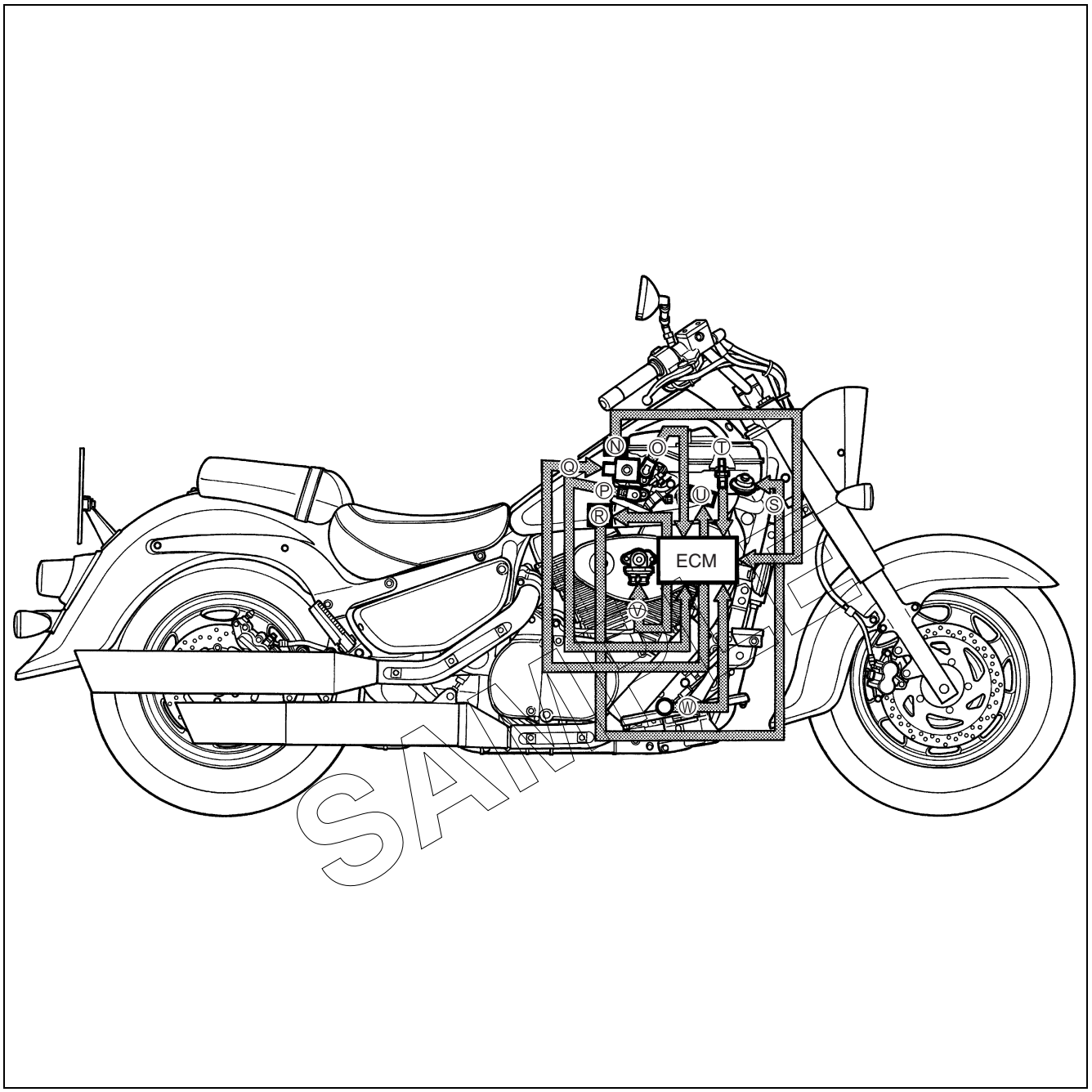


①	Fuel tank	⑥	Fuel mesh filter (For low pressure)
②	Fuel filter (For high pressure)	⑦	Fuel pump
③	Fuel pressure regulator	Ⓐ	Before-pressurized fuel
④	Fuel injector	Ⓑ	Pressurized fuel
⑤	Fuel feed hose	Ⓒ	Relieved fuel

FI SYSTEM PARTS LOCATION

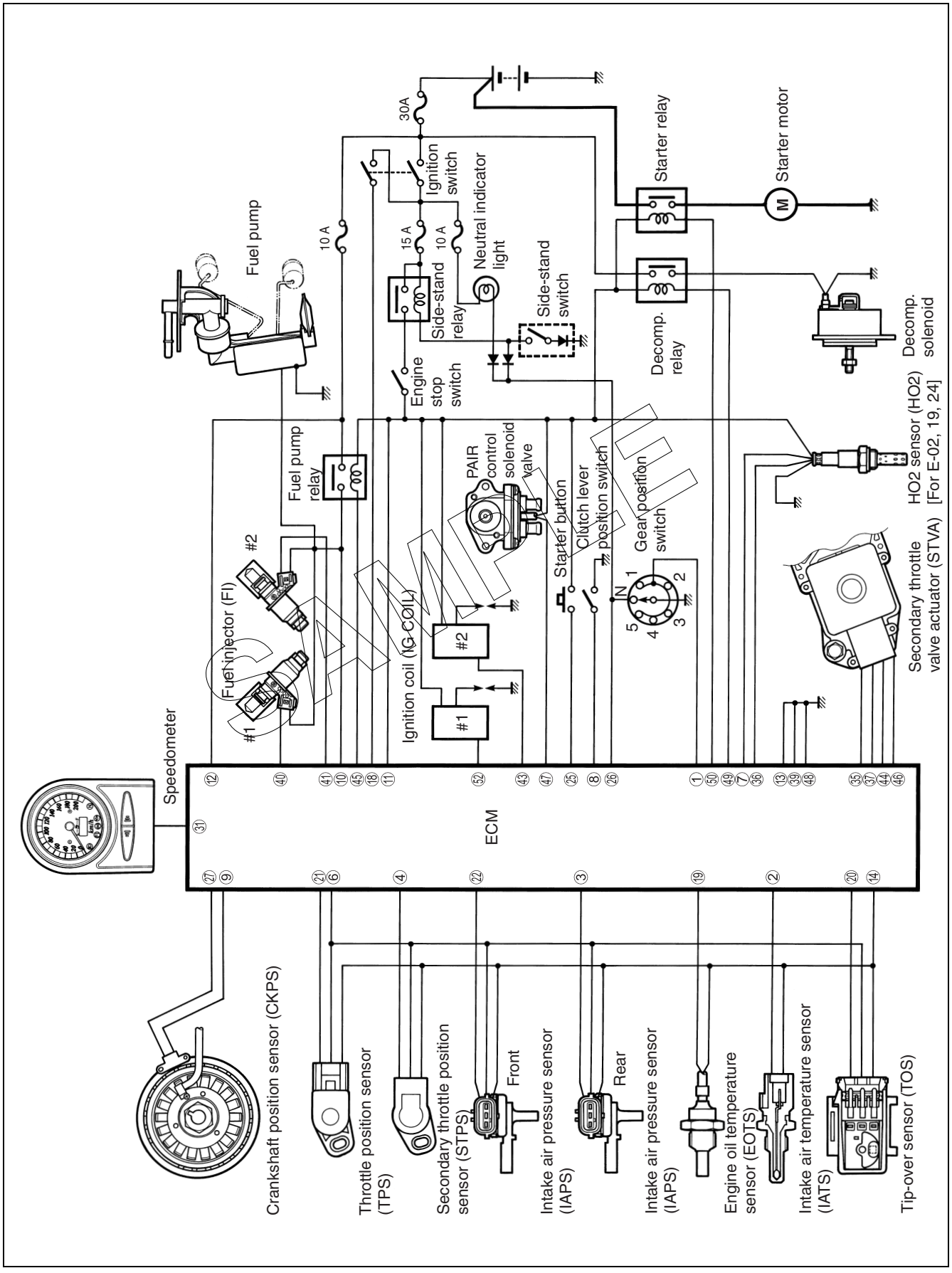


Ⓐ	Speedometer	Ⓗ	Gear position switch
Ⓑ	Starter relay	Ⓘ	HO2 sensor (HO2S) [For E-02, 19, 24]
Ⓒ	Starter motor	Ⓙ	Crankshaft position sensor (CKPS)
Ⓓ	Intake air pressure sensor #1 (IAPS)	Ⓚ	Fuel injector #2 (FI)
Ⓔ	Fuel pump relay (FP RELAY)	Ⓛ	Fuel injector #1 (FI)
Ⓕ	Fuel pump	Ⓜ	Ignition coil #1 (IG COIL)
Ⓖ	Tip-over sensor (TOS)		

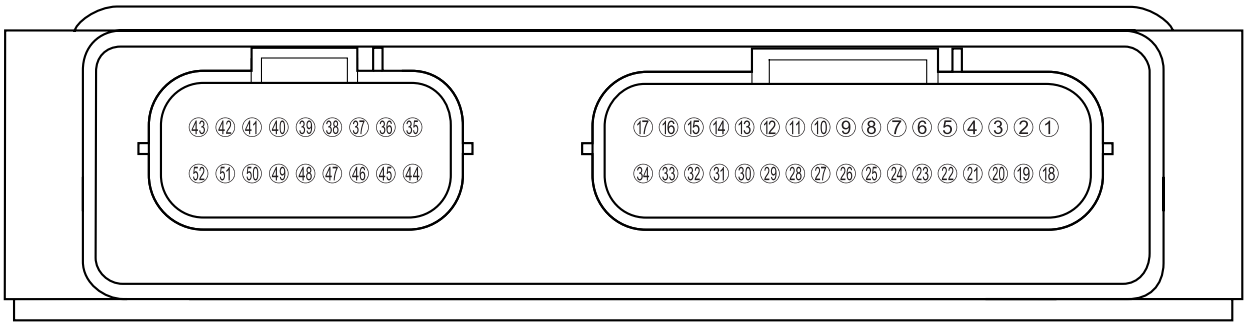


Ⓝ	Intake air pressure sensor #2 (IAPS)	Ⓢ	Decompression solenoid
Ⓞ	Secondary throttle position sensor (STPS)	Ⓣ	Intake air temperature sensor (IATS)
Ⓟ	Throttle position sensor (TPS)	Ⓤ	Ignition coil #2 (IG COIL)
Ⓠ	Secondary throttle valve actuator (STVA)	Ⓥ	PAIR solenoid valve
Ⓡ	Decompression relay	Ⓦ	Engine oil temperature sensor (EOTS)

FI SYSTEM WIRING DIAGRAM



ECM TERMINAL



TERMINAL NO.	CIRCUIT	TERMINAL NO.	CIRCUIT
①	GP switch signal (GP)	⑱	Ignition switch signal (AT)
②	IAT sensor signal (IAT)	⑲	EOT sensor signal (EOT)
③	Rear cylinder IAP sensor signal (IAP. R)	⑳	TO sensor signal (TOS)
④	STP sensor signal (STP)	㉑	TP sensor signal (TP)
⑤	Blank	㉒	Front cylinder IAP sensor signal (IAP. F)
⑥	Power source for sensors (VCC)	㉓	HO2 control selector (EXS) [For E-02, 19, 24]
⑦	HO2 sensor signal (HO2S) [For E-02, 19, 24]	㉔	Mode select switch (MS)
⑧	Clutch lever position switch (CLP)	㉕	Starter switch (STA)
⑨	CKP sensor signal (CKP-)	㉖	Neutral switch (NT)
⑩	Power source for fuel injector (VM)	㉗	CKP sensor signal (CKP+)
⑪	Power source (B+1)	㉘	–
⑫	Power source for back-up (B+2)	㉙	Blank
⑬	ECM ground (E1)	㉚	Blank
⑭	Sensors ground (E2)	㉛	Serial data for speedometer (TECH)
⑮	–	㉜	Serial data for self-diagnosis (SDL)
⑯	–	㉝	–
⑰	–	㉞	–

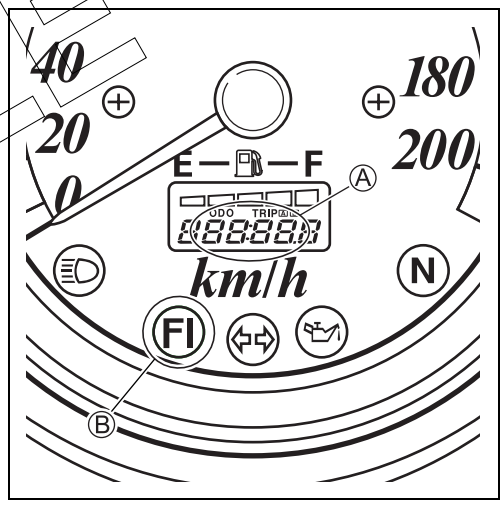
TERMINAL NO.	CIRCUIT	TERMINAL NO.	CIRCUIT
㉟	STVA signal (STVA. 1B)	㊹	STVA signal (STVA. 2B)
㊱	HO2 sensor heater (HO2. H) [For E-02, 19, 24]	㊺	Fuel pump relay (FP Relay)
㊲	STVA signal (STVA. 1A)	㊻	STVA signal (STVA. 2A)
㊳	Blank	㊼	PAIR control solenoid valve (PAIR)
㊴	Ground (E01)	㊽	Ground (E02)
㊵	Rear cylinder Fuel injector (#1)	㊾	Decomp. solenoid (DRL)
㊶	Front cylinder Fuel injector (#2)	㊿	Starter relay (STR)
㊷	Blank	(51)	Blank
㊸	Front cylinder Ignition coil (IG2)	(52)	Rear cylinder Ignition coil (IG1)

SELF-DIAGNOSIS FUNCTION

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

USER MODE

MALFUNCTION	LCD (DISPLAY) INDICATION Ⓐ	FI LIGHT INDICATION Ⓑ	INDICATION MODE
"NO"	Odometer *1	—	—
"YES"	Odometer (*1) and "FI" letters	FI light turns ON.	Each 2 sec. Odometer (*1) and "FI" are indicated alternately.
Engine can start	*2		
Engine can not start	"FI" letter *3	FI light turns ON and blinks.	"FI" is indicated continuously.



*1
Current letter displayed any one of the Odometer, Tripmeter or Clock.

*2
When one of the signals is not received by ECM, the fail-safe circuit works and injection is not stopped. In this case, "FI" and Odometer (*1) are indicated in the LCD panel and motorcycle can run.
However, when starter relay signal is not received by ECM, the engine can not be restarted.

*3
The injection signal is stopped, when the crankshaft position sensor signal, tip-over sensor signal, both #1/#2 ignition signals, both #1/#2 injector signals, fuel pump relay signal or ignition switch signal is not sent to ECM. In this case, "FI" is indicated in the LCD panel. Motorcycle does not run.

"CHEC": The LCD panel indicates "CHEC" when no communication signal from the ECM is received for 5 seconds.

For Example

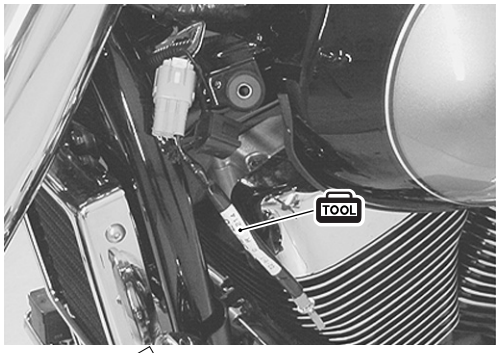
: The ignition switch is turned ON, and the engine stop switch is turned OFF. In this case, the speedometer does not receive any signal from ECM, and the panel indicates "CHEC".
If CHEC is indicated, the LCD does not indicate the trouble code. It is necessary to check the wiring harness between ECM and speedometer couplers.
The possible cause of this indication is as follows;
Engine stop switch is in OFF position. Side-stand/ignition inter-lock system is not working. Ignition fuse is burnt.

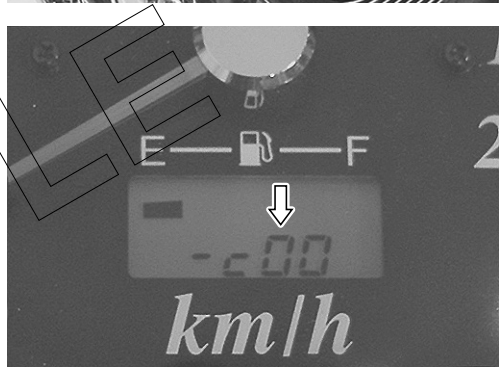
NOTE:
Until starting the engine, the FI light turns ON.
The FI light is also turned ON when engine temperature is high or oil pressure is low.

DEALER MODE

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

09930-82720: Mode select switch





CAUTION

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

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

CODE	MALFUNCTION PART	REMARKS
C00	None	No defective part
C12	Crankshaft position sensor (CKPS)	Pick-up coil signal, signal generator
C13	Intake air pressure sensor #2 (IAPS #2)	For Front cylinder
C14	Throttle position sensor (TPS)	*1
C15	Engine oil temp. sensor (EOTS)	
C17	Intake air pressure sensor #1 (IAPS #1)	For Rear cylinder
C18	Decomp. control system	
C19	Starter control system	
C21	Intake air temp. sensor (IATS)	
C23	Tip-over sensor (TOS)	
C24	Ignition signal #1 (IG coil #1)	For Rear cylinder
C25	Ignition signal #2 (IG coil #2)	For Front cylinder
C28	Secondary throttle valve actuator (STVA)	
C29	Secondary throttle valve position sensor (STPS)	*2
C31	Gear position signal (GP switch)	
C32	Injector signal #1 (FI #1)	For Rear cylinder
C33	Injector signal #2 (FI #2)	For Front cylinder
C41	Fuel pump control system (FP control system)	Fuel pump, fuel pump relay
C42	Ignition switch signal (IG switch signal)	Anti-theft
C44	Heated oxygen sensor (HO2S)	For E-02, 19, 24
C49	PAIR control solenoid valve (PAIR valve)	

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

*1

To get the proper signal from the throttle position sensor, the sensor basic position is indicated in the LCD (DISPLAY) panel. The malfunction code is indicated in three digits. In front of the three digits, a line appears in any of the three positions, upper, middle or lower line. If the indication is upper or lower line when engine rpm is 1 000 r/min, slightly turn the throttle position sensor and bring the line to the middle.

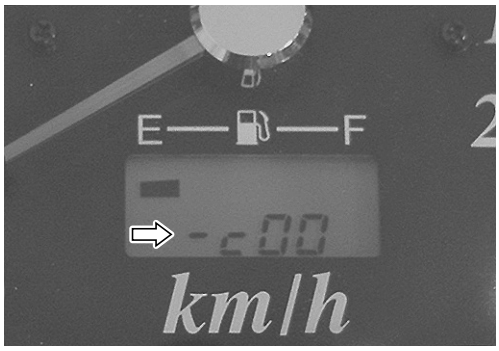
In the normal condition, the throttle valve stop screw pushes throttle valves slightly, and middle line will be indicated.

*2

When the secondary throttle valve actuator and secondary throttle position sensor signals are not sent to ECM. In this case, C28 and C29 are indicated alternately.

TPS ADJUSTMENT

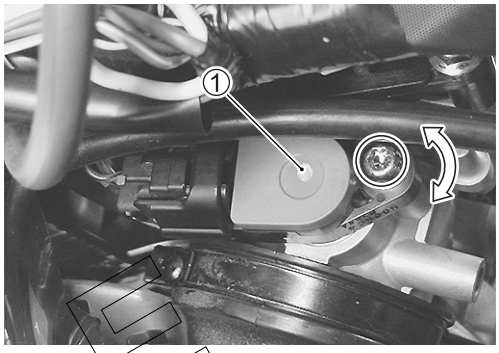
1. Warm up the engine and adjust the engine idle speed to 1 000 ± 100 r/min. (☞Page 8)
2. Connect the special tool (Mode select switch) and select the dealer mode.

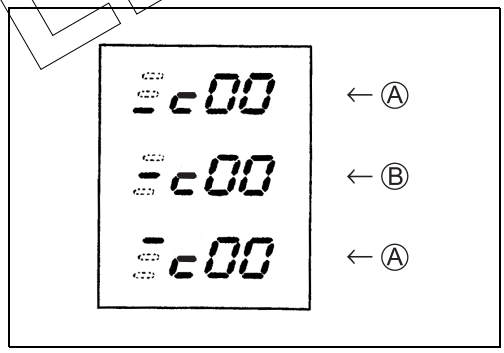


3. Remove the right frame upper cover. (☞VL1500 Service Manual 6-3)
4. Loosen the screw and turn the throttle position sensor ① and bring the line to the middle.
5. Then, tighten the screws to fix the throttle position sensor.

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

The LCD displays the line for 0.4 sec. at a time, and when such a display repeats two times, it indicates the current position where the sensor is fixed.





Ⓐ Incorrect
Ⓑ Correct position

FAIL-SAFE FUNCTION

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

ITEM	FAIL-SAFE MODE	STARTING ABILITY	RUNNING ABILITY
IAP sensor	Intake air pressure is fixed to 760 mmHg.	"YES"	"YES"
TP sensor	The throttle opening is fixed to full open position. Ignition timing is also fixed.	"YES"	"YES"
EOT sensor	Engine oil temperature value is fixed to 80 °C (176 °F).	"YES"	"YES"
IAT sensor	Intake air temperature value is fixed to 40 °C (104 °F).	"YES"	"YES"
Ignition signal	#1 Ignition-off and #1 Fuel-cut	"YES"	"YES"
		#2 cylinder can run.	
	#2 Ignition-off and #2 Fuel-cut	"YES"	"YES"
		#1 cylinder can run.	
Injection signal	#1 Fuel-cut	"YES"	"YES"
		#2 cylinder can run.	
	#2 Fuel-cut	"YES"	"YES"
		#1 cylinder can run.	
STV actuator	Secondary throttle valve is fixed in any position. When motor disconnection or lock occurs, power from ECM is shut off.	"YES"	"YES"
STP sensor	Secondary throttle valve is fixed in any position.	"YES"	"YES"
Gear position signal	Gear position signal is fixed to 5th gear.	"YES"	"YES"
HO2 sensor (For E-02, 19, 24)	Feedback compensation is inhibited. (Air/fuel ratio is fixed to normal.)	"YES"	"YES"
PAIR control solenoid valve	O2 feedback control is stopped and PAIR valve is fixed to open position.	"YES"	"YES"

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

When two ignition signals or two injector signals are not received by ECM, the fail-safe circuit can not work and ignition or injection is stopped.

FI SYSTEM TROUBLESHOOTING

CUSTOMER COMPLAINT ANALYSIS

Record details of the problem (failure, complaint) and how it occurred as described by the customer. For this purpose, use of 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 indicator lamp condition (LED)	☐ Always ON ☐ Sometimes ON ☐ Always OFF ☐ Good condition
Malfunction display/code (LCD)	User mode: ☐ No display ☐ Malfunction display ( )
	Dealer mode: ☐ No code ☐ Malfunction code ( )

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

MOTORCYCLE/ENVIRONMENTAL CONDITION WHEN PROBLEM OCCURS	
Environmental condition	
Weather	☐ Fair ☐ Cloudy ☐ Rain ☐ Snow ☐ Always ☐ Other _____
Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (°C/ °F) ☐ Always
Frequency	☐ Always ☐ Sometimes (times/ day, month) ☐ Only once
	☐ Under certain condition
Road	☐ Urban ☐ Suburb ☐ Highway ☐ Mountainous (☐ Uphill ☐ Downhill)
	☐ Tarmacadam ☐ Gravel ☐ Other _____
Motorcycle condition	
Engine condition	☐ Cold ☐ Warming up phase ☐ Warmed up ☐ Always ☐ Other at starting
	☐ Immediately after start ☐ Racing without load ☐ Engine speed (r/min)
Motorcycle condition	During driving: ☐ Constant speed ☐ Accelerating ☐ Decelerating
	☐ Right hand corner ☐ Left hand corner
	☐ At stop ☐ Motorcycle 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.

VISUAL INSPECTION

- Prior to diagnosis using the mode select switch or SDS, perform the following visual inspections. The reason for visual inspection is that mechanical failures (such as oil leakage) cannot be displayed on the screen with the use of mode select switch or SDS.

* Engine oil level and leakage (☞VL1500 Service Manual 2-6)
* Fuel level and leakage (☞Page 8)
* Clogged air cleaner element (☞VL1500 Service Manual 2-4)
* Battery condition (☞VL1500 Service Manual 7-36)
* Throttle cable play (☞Page 9)
* Vacuum hoses looseness, bend and disconnection
* Broken fuse
* FI light operation (☞Page 33 and 140)
* Each warning light operation (☞Page 140)
* Speedometer operation (☞Page 141)
* Exhaust gas leakage and noise (☞Page 11)
* Each coupler disconnection
* Clogged oil cooler fins (☞VL1500 Service Manual 3G-6)

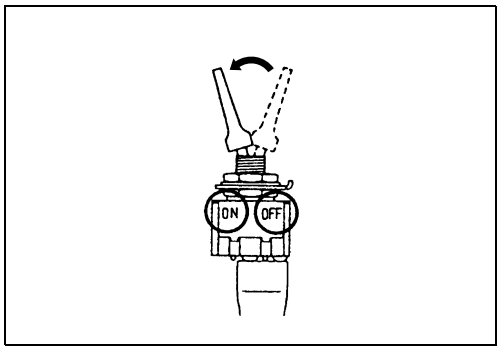
SELF-DIAGNOSTIC PROCEDURES

NOTE:

* *Don't disconnect couplers from the ECM, the battery cable from the battery, ECM ground wire harness from the engine or main fuse before confirming the malfunction code (self-diagnostic trouble code) stored in memory. Such disconnection will erase the memorized information in ECM memory.*
* *Malfunction code stored in ECM memory can be checked by the special tool.*
* *Before checking malfunction code, read SELF-DIAGNOSIS FUNCTION "USER MODE and DEALER MODE" (☞Page 33 and 36) carefully to have good understanding as to what functions are available and how to use it.*
* *Be sure to read "PRECAUTIONS IN SERVICING" (☞Page 19) before inspection and observe what is written there.*

- Remove the left frame head cover. (☞VL1500 Service Manual 6-3)
- Connect the special tool to the dealer mode coupler at the wiring harness, and start the engine or crank the engine for more than 4 seconds.
- Turn the special tool's switch ON and check the malfunction code to determine the malfunction part.

TOOL 09930-82720: Mode select switch



SELF-DIAGNOSIS RESET PROCEDURE

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

NOTE:

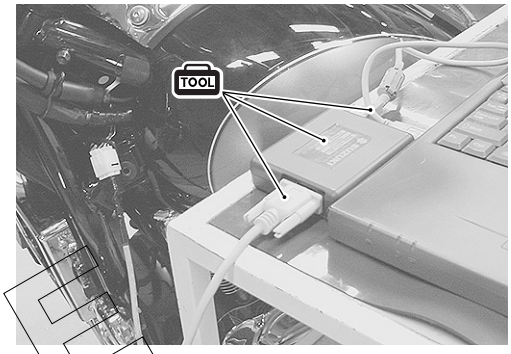
* *Even though the malfunction code (C00) is indicated, the previous malfunction history code still remains stored in the ECM. Therefore, erase the history code memorized in the ECM using SDS.*
* *The malfunction code is memorized in the ECM also when the wire coupler of any sensor is disconnected. Therefore, when a wire coupler has been disconnected at the time of diagnosis, erase the stored malfunction history code using SDS.*

USE OF SDS DIAGNOSTIC PROCEDURES

** Don't disconnect couplers from ECM, the battery cable from the battery, ECM ground wire harness from the engine or main fuse before confirming the malfunction code (self-diagnostic trouble code) stored in memory. Such disconnection will erase the memorized information in ECM memory.*

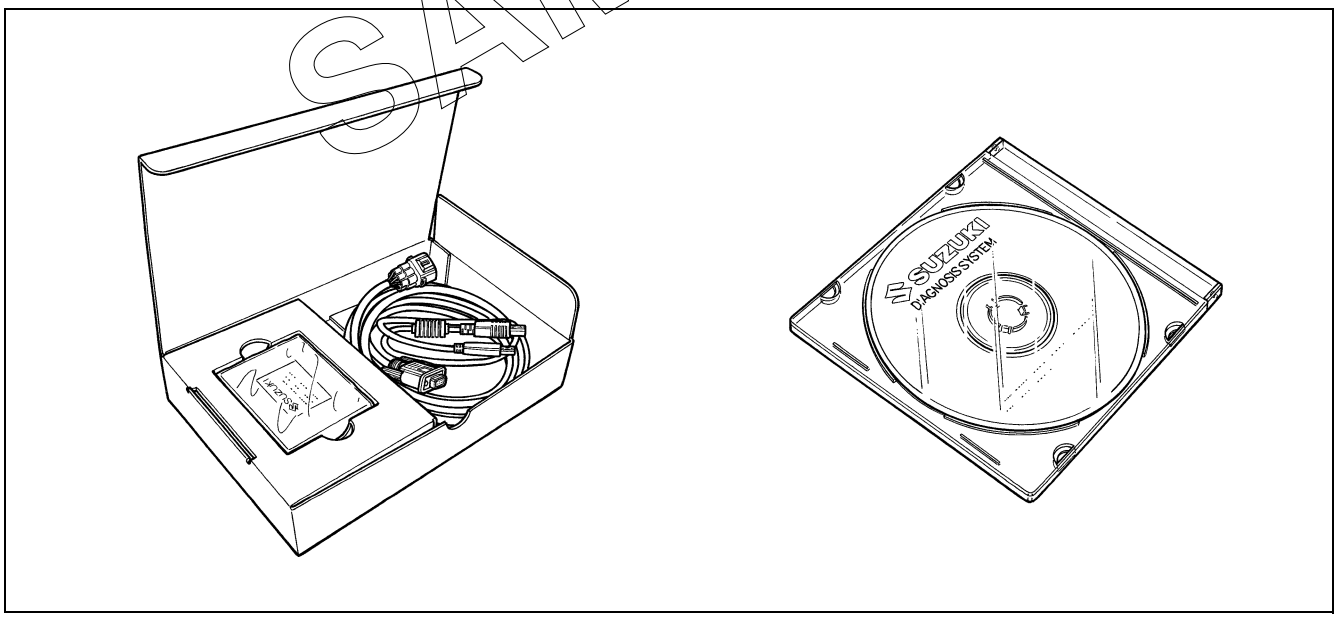
** Malfunction code stored in ECM memory can be checked by the SDS.*

** Be sure to read "PRECAUTIONS IN SERVICING" (☞ Page 19) before inspection and observe what is written there.*



- Remove the left side frame head cover. (☞VL1500 Service Manual 6-3)
- Set up the SDS tool. (Refer to the SDS operation manual for further details)
- Read the DTC (Diagnostic Trouble Code) and show data when trouble (displaying data at the time of DTC) according to instructions displayed on SDS.
- Not only is SDS used for detecting Diagnostic Trouble Codes but also for reproducing and checking on screen the failure condition as described by customers using the trigger.
- How to use trigger. (Refer to the SDS operation manual for further details.)

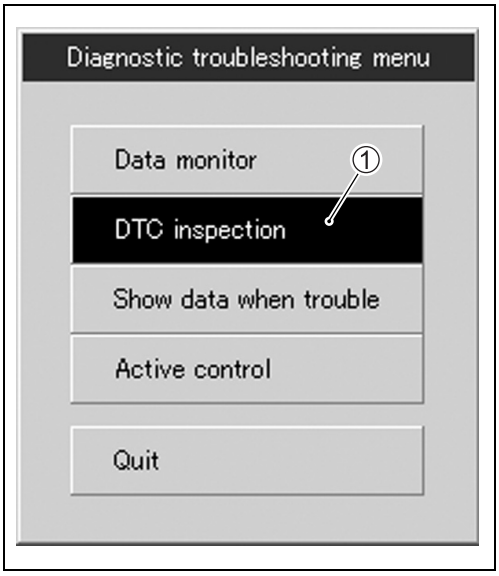
TOOL 09904-41010: SDS set tool
99565-01010-004: CD-ROM Ver. 4



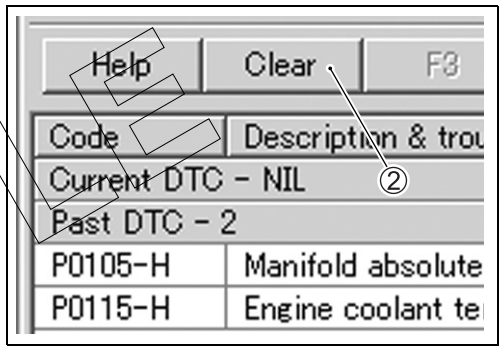
USE OF SDS DIAGNOSIS RESET PROCEDURE

- After repairing the trouble, turn OFF the ignition switch and turn ON again.
- Click the DTC inspection button ①.
- Check the DTC.
- The previous malfunction history code (Past DTC) still remains stored in the ECM. Therefore, erase the history code memorized in the ECM using SDS tool.

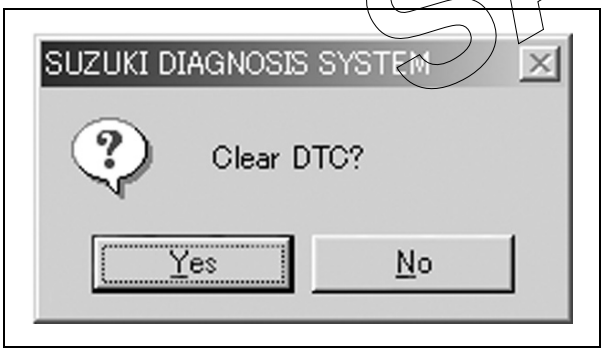
NOTE:
The malfunction code is memorized in the ECM also when the wire coupler of any sensor is disconnected. Therefore, when a wire coupler has been disconnected at the time of diagnosis, erase the stored malfunction history code using SDS.



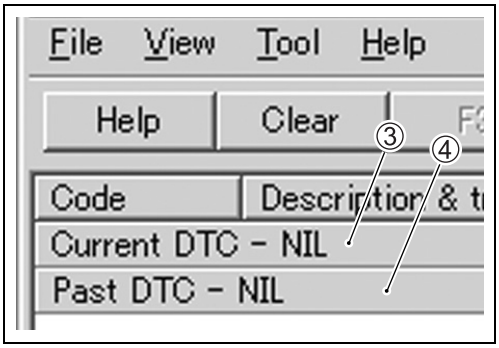
- Click "Clear" ② to delete history code (Past DTC).



- Follow the displayed instructions.

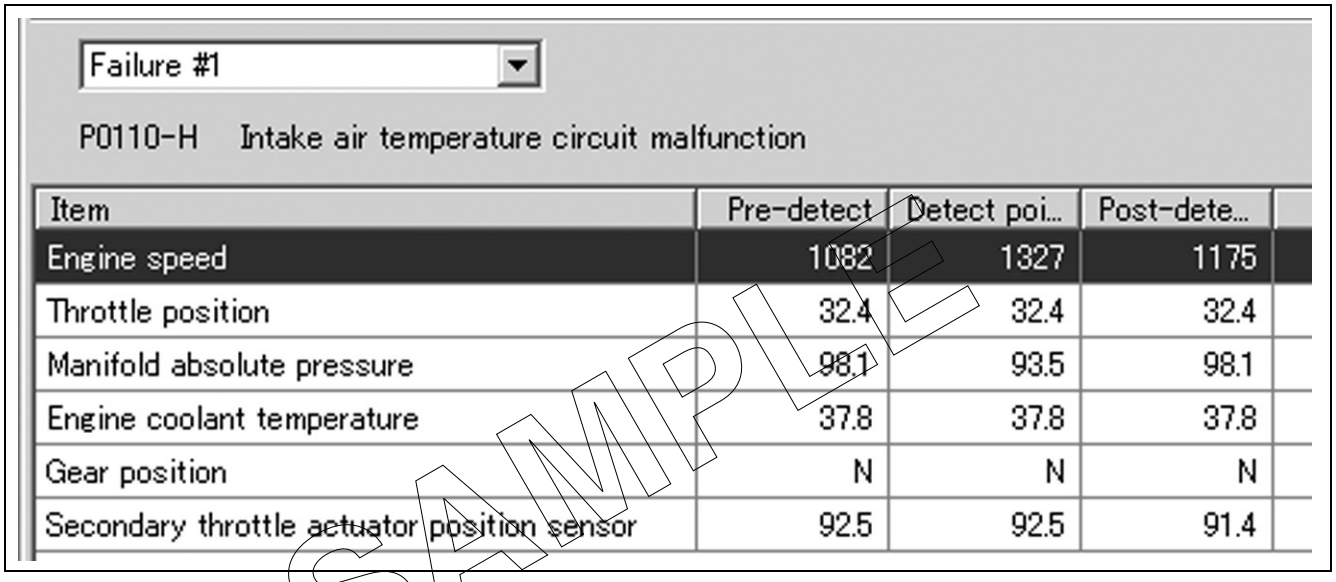


- Check that both "Current DTC" ③ and "Past DTC" ④ are deleted (NIL).

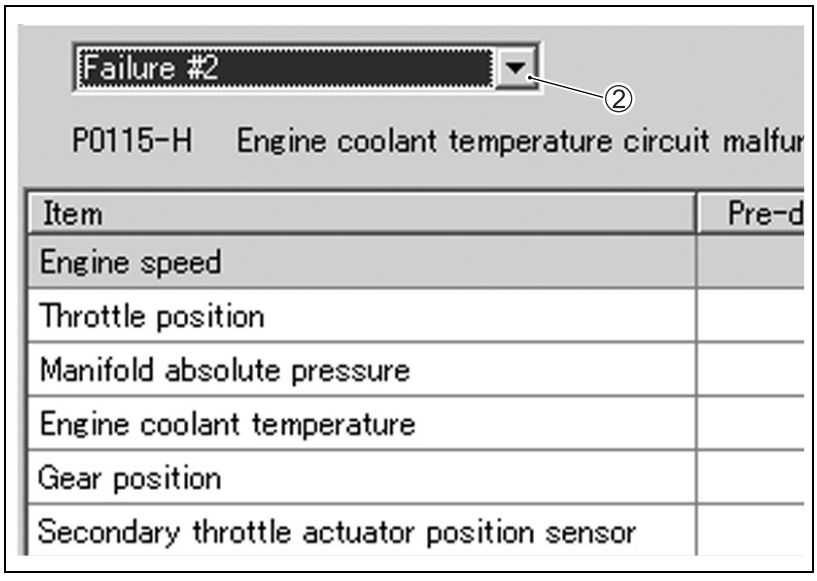


SHOW DATA WHEN TROUBLE (DISPLAING DATA AT THE TIME OF DTC)

ECM stores the engine and driving conditions (in the form of data as shown in the figure) at the moment of the detection of a malfunction in its memory. This data is called "Show data when trouble".
Therefore, it is possible to know engine and driving conditions (e.g., whether the engine was warm or not, where the motorcycle was running or stopped) when a malfunction was detected by checking the show data when trouble. This show data when trouble function can record the maximum of two Diagnostic Trouble Codes in the ECM.
Also, ECM has a function to store each show data when trouble for two different malfunctions in the order as the malfunction is detected. Utilizing this function, it is possible to know the order of malfunctions that have been detected. Its use is helpful when rechecking or diagnosing a trouble.



- Click "Show data when trouble" ① to display the data. By clicking the drop down button ②, either "Failure #1" or "Failure #2" can be selected.



MALFUNCTION CODE AND DEFECTIVE CONDITION

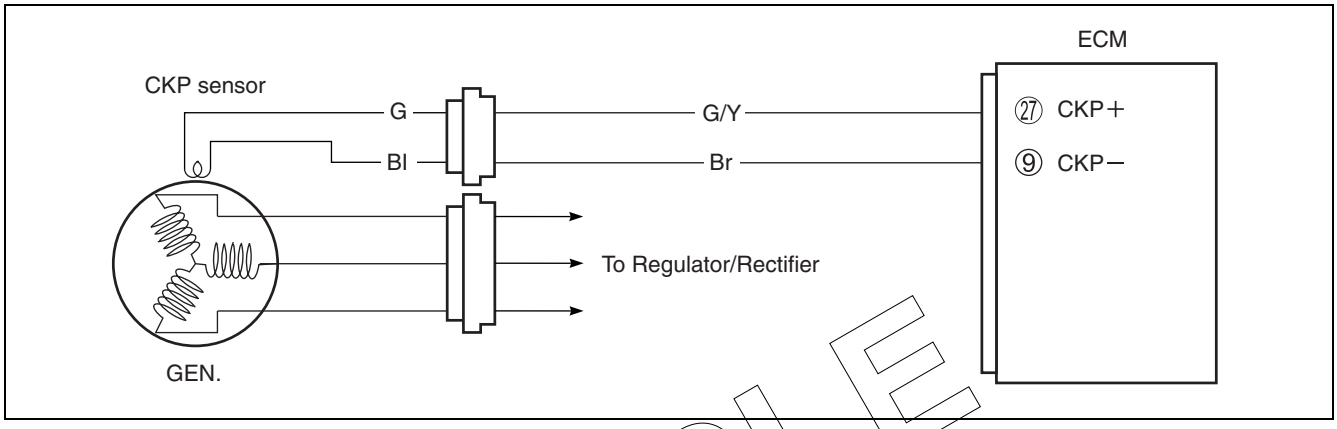
DTC No.		DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR
C00		NO FAULT	————	————
C12		CKP sensor	The signal does not reach ECM for 3 sec. or more, after receiving the starter signal.	CKP sensor wiring and mechanical parts. CKP sensor, lead wire/coupler connection.
P0335				
C13/C17		IAP sensor	The sensor should produce following voltage. 0.1 V ≦ sensor voltage < 4.8 V In other than the above range, C13 (P1750) or C17 (P0105) is indicated.	IAP sensor, lead wire/coupler connection.
P1750/P0105				
C14		TP sensor	The sensor should produce following voltage. 0.1 V ≦ sensor voltage < 4.8 V In other than the above range, C14 (P0120) is indicated.	TP sensor, lead wire/coupler connection.
P0120	H		Sensor voltage is higher than specified value.	TP sensor circuit shorted to VCC or ground circuit open.
	L		Sensor voltage is lower than specified value.	TP sensor circuit open or shorted to ground or VCC circuit open.
C15		EOT sensor	The sensor voltage should be the following. 0.1 V ≦ sensor voltage < 4.6 V In other than the above range, C15 (P0115) is indicated.	EOT sensor, lead wire/coupler connection.
P0115	H		Sensor voltage is higher than specified value.	EOT sensor circuit open or ground circuit open.
	L		Sensor voltage is lower than specified value.	EOT sensor circuit shorted to ground.
C18		Decomp. relay	Decomp relay signal is not input to ECM.	Decomp. relay, lead wire/coupler connection.
P1751				
C19		Starter relay	Starter relay signal is not input to ECM.	Starter relay, lead wire/coupler connection.
P0615				

DTC No.		DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR
C21		IAT sensor	The sensor voltage should be the following. 0.1 V ≦ sensor voltage < 4.6 V In other than the above range, C21 (P0110) is indicated.	IAT sensor, lead wire/coupler connection.
P0110	H		Sensor voltage is higher than specified value.	IAT sensor circuit open or ground circuit open.
	L		Sensor voltage is lower than specified value.	IAT sensor circuit shorted to ground.
C23		TO sensor	The sensor voltage should be the following for 2 sec. and more, after ignition switch is turned ON. 0.2 V ≦ sensor voltage ≦ 4.6 V In other than the above value, C23 (P1651) is indicated.	TO sensor, lead wire/coupler connection.
P1651	H		Sensor voltage is higher than specified value.	TO sensor circuit open or shorted to VCC or ground circuit open.
	L		Sensor voltage is lower than specified value.	TO sensor circuit shorted to ground or VCC circuit open.
C24/C25		Ignition signal	CKP sensor (pick-up coil) signal is produced, but signal from ignition coil is interrupted 8 times or more continuously. In this case, the code C24 (P0351) or C25 (P0352) is indicated.	Ignition coil, lead wire/coupler connection, power supply from the battery.
P0351/P0352				
C28		Secondary throttle valve actuator	When no actuator control signal is supplied from the ECM, communication signal does not reach ECM or operation voltage does not reach STVA motor, C28 (P1655) is indicated. STVA can not operate.	STVA motor, STVA lead wire/coupler.
P1655				
C29		STP sensor	The sensor should produce following voltage. 0.1 V ≦ sensor voltage < 4.8 V In other than the above range, C29 (P1654) is indicated.	STP sensor, lead wire/coupler connection.
P1654	H		Sensor voltage is higher than specified value.	STP sensor circuit shorted to VCC or ground circuit open.
	L		Sensor voltage is lower than specified value.	STP sensor circuit open or shorted to ground or VCC circuit open.

DTC No.	DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR
C31 P0705	Gear position signal	Gear position signal voltage should be higher than the following for 3 seconds and more. Gear position sensor voltage > 0.6 V If lower than the above value, C31 (P0705) is indicated.	GP switch, lead wire/coupler connection, gearshift cam, etc.
C32/C33 P0201/P0202	Fuel injector	CKP sensor (pickup coil) signal is produced, but fuel injector signal is interrupted 4 times or more continuously. In this case, the code C32 (P0201) or C33 (P0202) is indicated.	Fuel injector, wiring/coupler connection, power supply to the injector.
C41 P0230	Fuel pump relay	No voltage is applied to the 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, lead wire/coupler connection, power source to the fuel pump relay and fuel injectors.
C42 P1650	Ignition switch	Ignition switch signal is not input to ECM.	Ignition switch, lead wire/coupler.
C44 P0130	HO2 sensor (For E-02, 19, 24)	HO2 sensor output voltage is not input to ECM during engine operation and running condition. (Sensor voltage $\leqq$ 0.1 V) In other than the above value, C44 (P0130) is indicated.	HO2 sensor circuit open or shorted to ground.
C44 P0135		The heater can not operate so that heater operation voltage is not supply to the oxygen heater circuit, C44 (P0135) is indicated.	HO2 sensor, lead wire/coupler connection. Battery voltage supply to the HO2 sensor.
C49 P1656	PAIR control solenoid valve	PAIR control solenoid valve voltage is not input to ECM.	PAIR control solenoid valve, lead wire/coupler.

"C12" (P0335) CKP SENSOR CIRCUIT MALFUNCTION

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



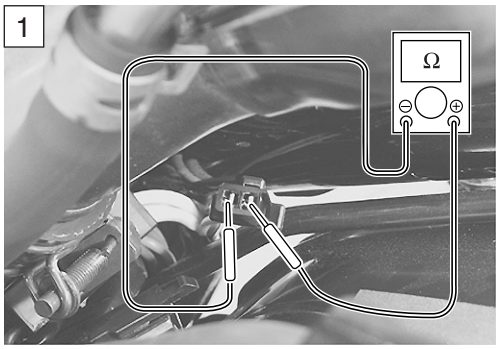
INSPECTION

Step 1

1) Remove the seats. (☞Page 121)
2) Remove the left and right frame upper covers. (☞VL1500 Service Manual 6-3)
3) Remove the speedometer and fuel inlet cover. (☞VL1500 Service Manual 6-3)
4) Turn the ignition switch OFF.
5) Check the CKP sensor coupler for loose or poor contacts. If OK, then measure the CKP sensor resistance.

6) Disconnect the CKP sensor coupler and measure the resistance.

DATA **CKP sensor resistance: 178 – 242 Ω (Green – Blue)**

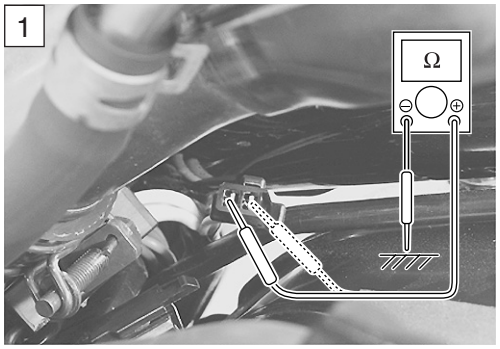


7) If OK, then check the continuity between each terminal and ground.

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

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)



Are the resistance and continuity OK?

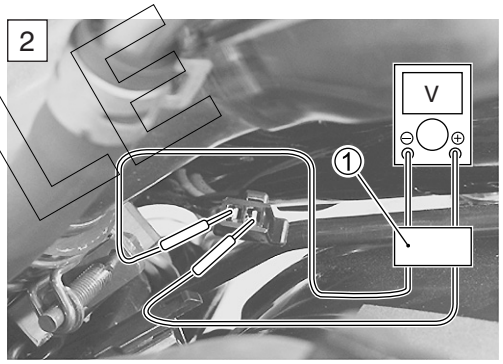
YES	Go to step 2.
NO	Replace the CKP sensor with a new one.

8) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

Step 2

1) Crank the engine a few seconds with the starter motor, and measure the CKP sensor peak voltage at the coupler.
2) Repeat the above test procedure a few times and measure the highest peak voltage.

DATA CKP sensor peak voltage: 2.4 V and more
(⊕ Green – ⊖ Blue)

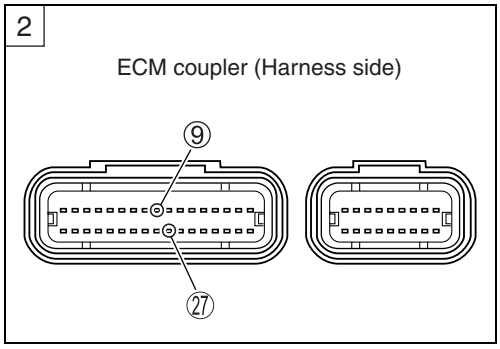


① Peak volt adaptor

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)

Is the voltage OK?

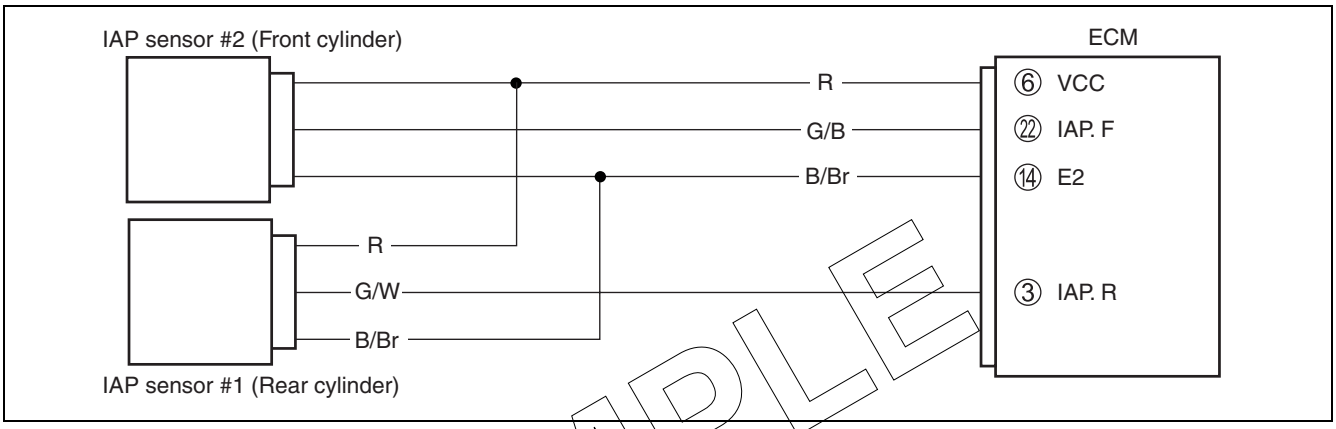


YES	• G/Y or Brown wire open or shorted to ground. • Loose or poor contacts on the CKP sensor coupler or ECM coupler (terminal ⑨ or ㉗). • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	• Inspect that metal particles or foreign material stuck on the CKP sensor and rotor tip. • If there are no metal particles and foreign material, then replace the CKP sensor with a new one.

3) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

"C13" (P1750) or "C17" (P0105) IAP SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
IAP 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 IAP sensor. • Air being drawn from vacuum passage between throttle body and IAP sensor. • IAP sensor circuit open or shorted to ground. • IAP sensor malfunction. • ECM malfunction.



INSPECTION

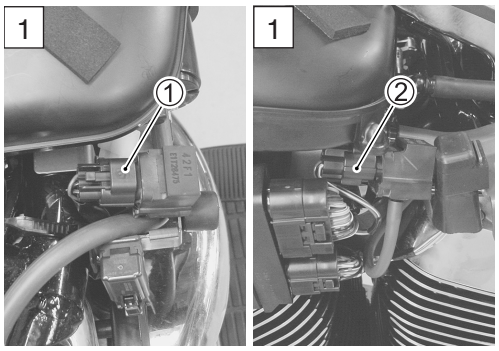
Step 1

(When indicating C13/P1750 for IAP sensor #2)

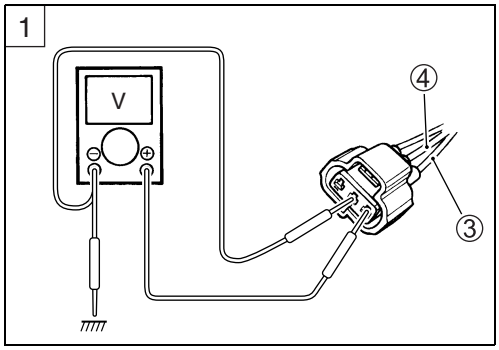
1) Remove the right frame upper cover.
   (☞VL1500 Service Manual 6-3)
   For the other inspection procedures are the same as C17/P0105.

(When indicating C17/P0105 for IAP sensor #1)

1) Remove the left frame upper cover.
   (☞VL1500 Service Manual 6-3)
2) Turn the ignition switch OFF.
3) Check the IAP sensor coupler (Front cylinder side ① or Rear cylinder side ②) for loose or poor contacts.
   If OK, then measure the IAP sensor input voltage.



4) Disconnect the IAP sensor coupler.
5) Turn the ignition switch ON.
6) Measure the voltage at the Red wire ③ and ground.
7) Also, measure the voltage at the Red wire ③ and B/Br wire ④.



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

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)

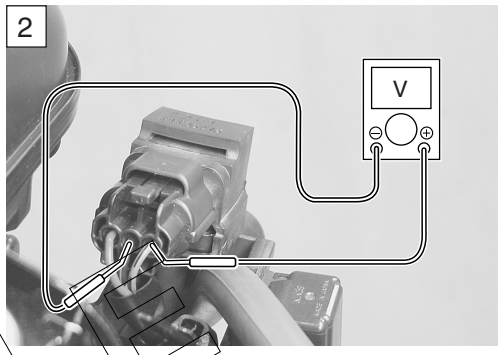
Is the voltage OK?

YES	Go to Step 2.
NO	• Loose or poor contacts on the ECM coupler (terminal ⑥ or ⑭). • Open or short circuit in the Red wire or B/Br wire.

8) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

Step 2

1) Connect the IAP sensor coupler.
2) Insert the needle pointed probes to the lead wire coupler.
3) Start the engine at idle speed and measure the IAP sensor output voltage at the wire side coupler.
   (Front cylinder side: between G/B and B/Br wires)
   (Rear cylinder side: between G/W and B/Br wires)



DATA IAP sensor output voltage: Approx. 2.53 V at idle speed
(Front cylinder side: ⊕ G/B – ⊖ B/Br)
(Rear cylinder side: ⊕ G/W – ⊖ B/Br)

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

Tester knob indication: Voltage (⎓)

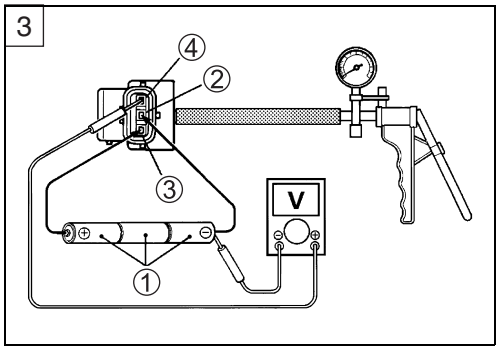
Is the voltage OK?

YES	Go to Step 3.
NO	• Check the vacuum hose for crack or damage. • Open or short circuit in the G/B wire. (Front cylinder side) • Open or short circuit in the G/W wire. (Rear cylinder side) • If vacuum hose and wire are OK, replace the IAP sensor with a new one.

4) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

Step 3

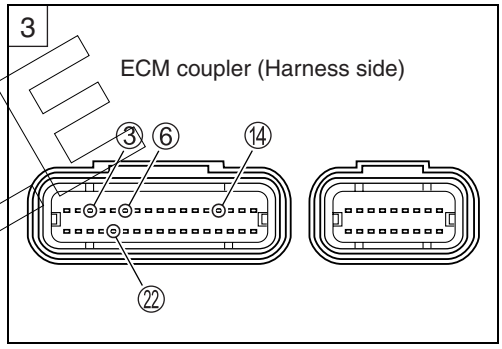
1) Turn the ignition switch OFF.
2) Remove the IAP sensor. (☞Page 118)
3) Connect the vacuum pump gauge to the vacuum port of the IAP sensor.
4) Arrange 3 new 1.5 V batteries in series ① (check that total voltage is 4.5 – 5.0 V) and connect ⊖ terminal to the ground terminal ② and ⊕ terminal to the Vcc terminal ③.
5) Check the voltage between Vout ④ and ground. Also, check if voltage reduces when vacuum is applied up to 400 mmHg by using vacuum pump gauge. (☞Page 52)



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

Tester knob indication: Voltage (⎓)

Is the voltage OK?



YES	• Red, B/Br or G/B wire open or shorted to ground, or poor ⑥, ⑭ or ㉒ connection. (Front cylinder side) • G/W, Red or B/Br wire open or shorted to ground, or poor ③, ⑥ or ⑭ connection. (Rear cylinder side) • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	If check result is not satisfactory, replace the IAP sensor with a new one.

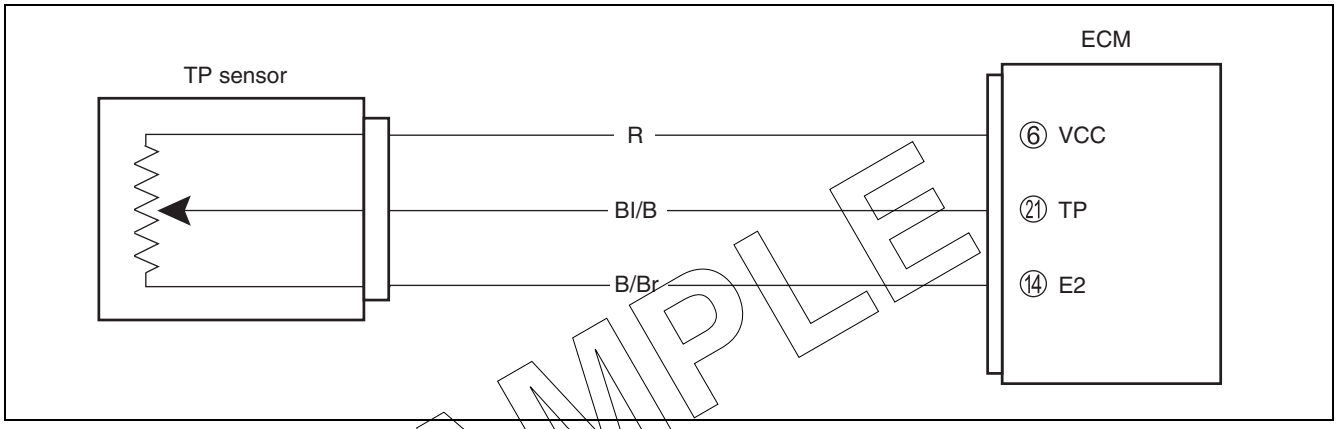
6) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

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

ALTITUDE (Reference)		ATMOSPHERIC PRESSURE		OUTPUT VOLTAGE
(ft)	(m)	(mmHg)	kPa	(V)
0 | 2 000	0 | 610	760 | 707	100 | 94	3.4 – 4.0
2 001 | 5 000	611 | 1 524	707 | 634	94 | 85	2.8 – 3.7
5 001 | 8 000	1 525 | 2 438	634 | 567	85 | 76	2.6 – 3.4
8 001 | 10 000	2 439 | 3 048	567 | 526	76 | 70	2.4 – 3.1

"C14" (P0120-H/L) TP SENSOR CIRCUIT MALFUNCTION

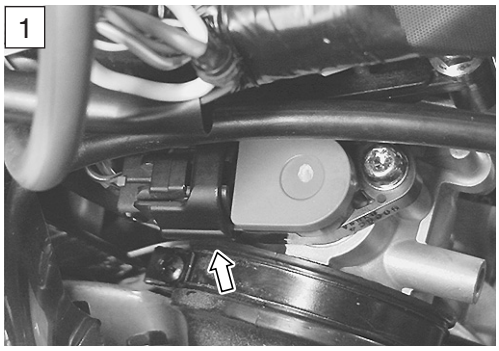
DETECTED CONDITION			POSSIBLE CAUSE
C14		Output voltage is not within the following range. Difference between actual throttle opening and opening calculated by ECM is larger than specified value. 0.1 V ≦ Sensor voltage < 4.8 V	• TP sensor maladjusted. • TP sensor circuit open or short. • TP sensor malfunction. • ECM malfunction.
P0120	H	Sensor voltage is higher than specified value.	• TP sensor circuit shorted to VCC or ground circuit open.
	L	Sensor voltage is lower than specified value.	• TP sensor circuit open or shorted to ground or VCC circuit open.



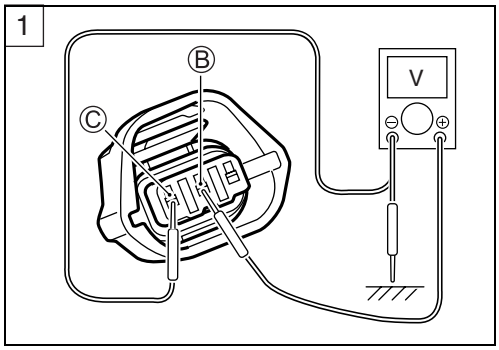
INSPECTION

Step 1 (When indicating C14:)

1) Remove the right frame upper cover.
   (☞VL1500 Service Manual 6-3)
2) Turn the ignition switch OFF.
3) Check the TP sensor coupler for loose or poor contacts.
   If OK, then measure the TP sensor input voltage.
4) Disconnect the TP sensor coupler.
5) Turn the ignition switch ON.
6) Measure the voltage at the Red wire Ⓑ and ground.
7) Also, measure the voltage at the Red wire Ⓑ and B/Br wire Ⓒ.



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



TOOL 09900-25008: Multi-circuit tester set

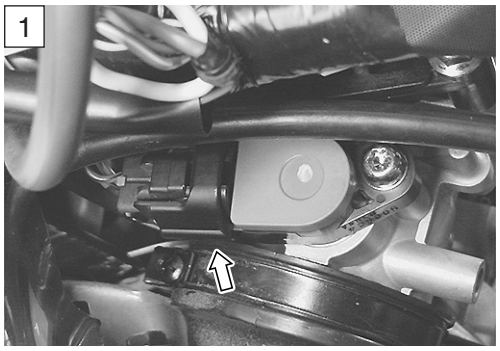
Tester knob indication: Voltage (⎓)

Is the voltage OK?

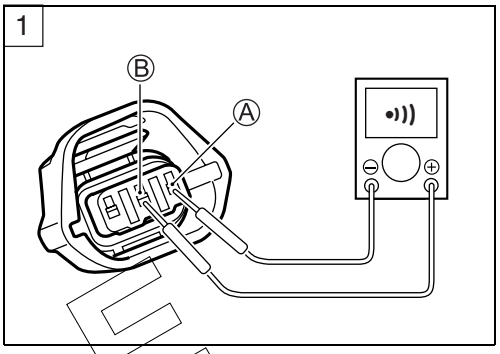
YES	Go to Step 2.
NO	• Loose or poor contacts on the ECM coupler (terminal ⑥ or ⑭). • Open or short circuit in the Red wire or B/Br wire.

Step 1 (When indicating P0120-H:)

1) Remove the right frame upper cover.
   (☞VL1500 Service Manual 6-3)
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 BI/B wire Ⓐ and Red wire Ⓑ.
   If the sound is not heard from the tester, the circuit condition is OK.

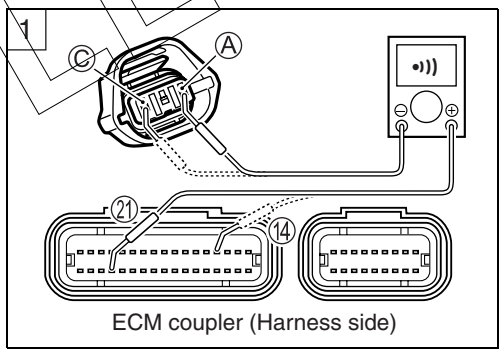


6) Remove the left frame upper cover (☞VL1500 Service Manual 6-3) and disconnect the ECM coupler.
7) Check the continuity between BI/B wire Ⓐ and terminal ㉑.
8) Also, check the continuity between B/Br wire Ⓒ and terminal ⑭.

DATA TPS lead wire continuity: Continuity (•))))

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

Tester knob indication: Continuity test (•))))



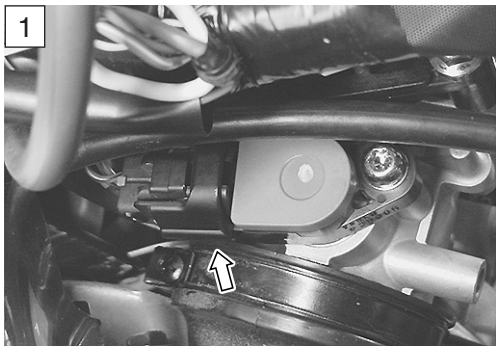
Is the continuity OK?

YES	Go to Step 2.
NO	BI/B wire shorted to VCC, or B/Br wire open.

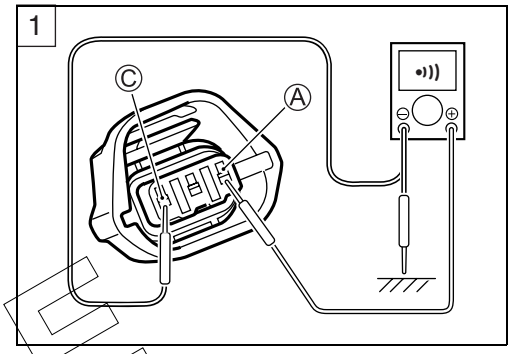
9) After repairing the trouble, clear the DTC using SDS tool.
   (☞Page 42)

Step 1 (When indicating P0120-L:)

1) Remove the right frame upper cover.
   (☞VL1500 Service Manual 6-3)
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 BI/B wire Ⓐ and ground.
6) Also, check the continuity between BI/B wire Ⓐ and B/Br wire Ⓒ. If the sound is not heard from the tester, the circuit condition is OK.

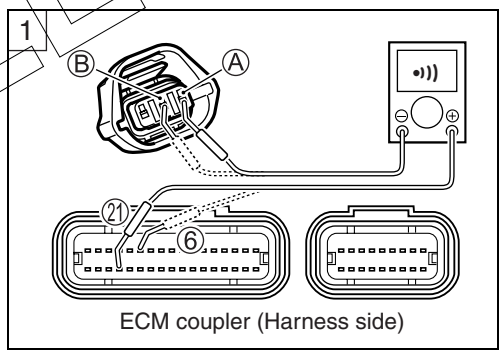


7) Remove the left frame upper cover. (☞VL1500 Service Manual 6-3) and disconnect the ECM coupler.
8) Check the continuity between BI/B wire Ⓐ and terminal ㉑.
9) Also, check the continuity between Red wire Ⓑ and terminal ⑥.

DATA TPS lead wire continuity: Continuity (•))))

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

Tester knob indication: Continuity test (•))))



ECM coupler (Harness side)

Is the continuity OK?

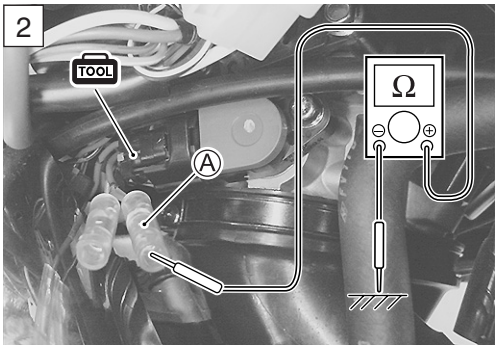
YES	Go to Step 1 (☞Page 53) and Go to Step 2.
NO	Red wire or BI/B wire open, or BI/B wire shorted to ground.

10) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

Step 2

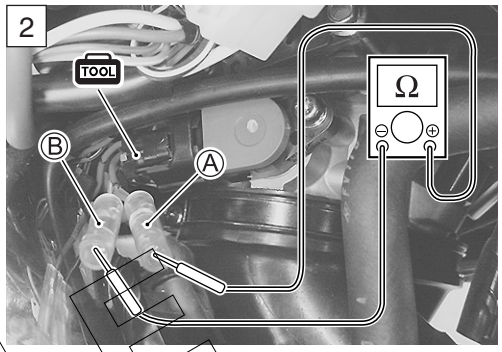
1) Turn the ignition switch OFF.
2) Disconnect the TP sensor coupler.
3) Install the test harness to the TP sensor.
4) Check the continuity between terminal Ⓐ and ground.

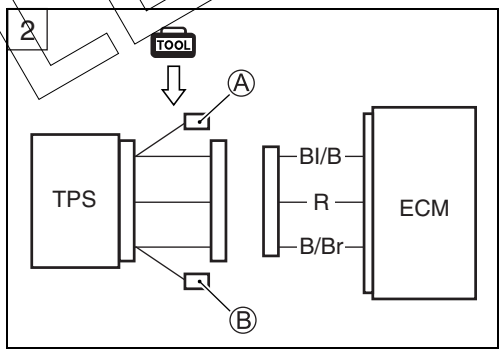
DATA TP sensor continuity: ∞ Ω (Infinity)
(Terminal Ⓐ – Ground)



5) If OK, then measure the TP sensor resistance at the test harness terminals (between terminal Ⓐ and terminal Ⓑ).
6) Turn the throttle grip and measure the resistance.

DATA TP sensor resistance
Throttle valve is closed: Approx. 1.12 kΩ
Throttle valve is opened: Approx. 4.41 kΩ



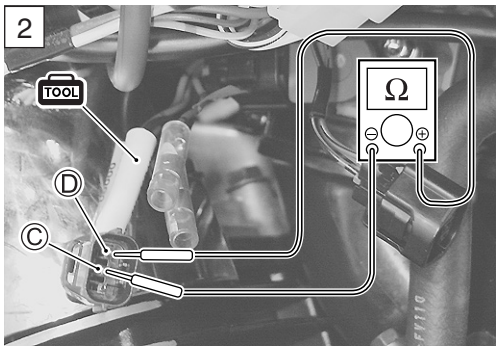


7) If OK, then measure the TP sensor resistance at the test harness terminals (between terminal Ⓒ and terminal Ⓓ).

DATA TP sensor resistance: Approx. 4.66 kΩ
(Terminal Ⓒ – Terminal Ⓓ)

TOOL 09900-25008: Multi-circuit tester set
09900-28630: TPS test wire harness

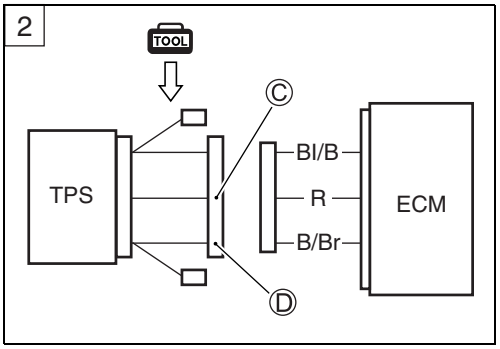
Tester knob indication: Resistance (Ω)



Are the continuity and resistance OK?

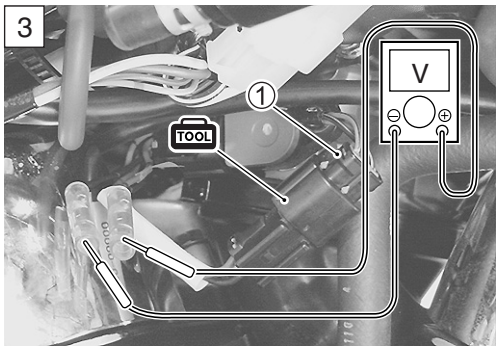
YES	Go to Step 3.
NO	• Reset the TP sensor position correctly. • Replace the TP sensor with a new one.

8) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)



Step 3

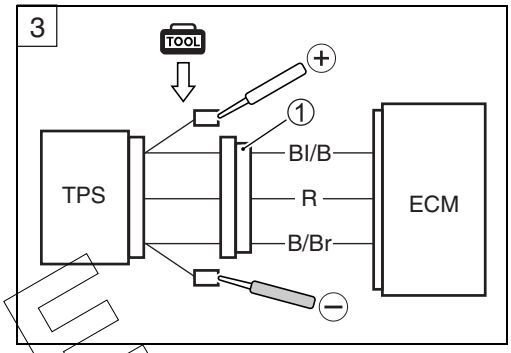
1) Connect the TP sensor coupler ① to the test harness.
2) Turn the ignition switch ON.
3) Measure the TP sensor output voltage at the coupler (between ⊕ BI/B and ⊖ B/Br) by turning the throttle grip.



DATA TP sensor output voltage
Throttle valve is closed: Approx. 1.12 V
Throttle valve is opened: Approx. 4.41 V

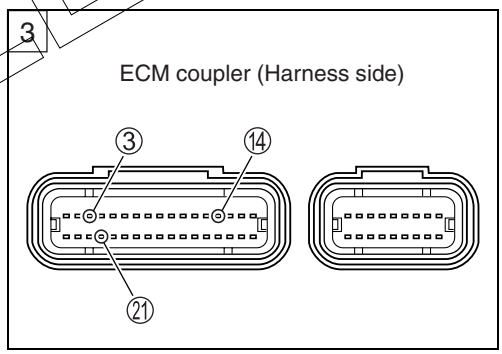
TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)



Is the voltage OK?

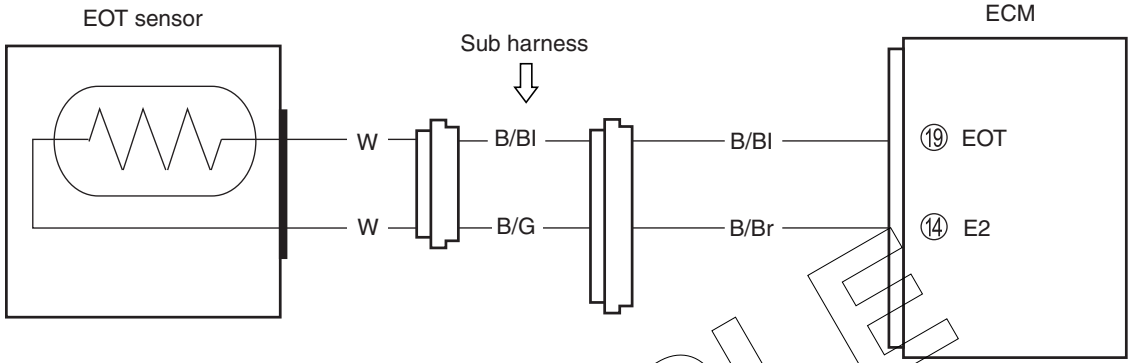
YES	• R, B/Br or BI/B wire open or shorted to ground, or poor ⑥, ⑭ or ㉑ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	If check result is not satisfactory, replace TP sensor with a new one.



4) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

"C15" (P0115-H/L) EOT SENSOR CIRCUIT MALFUNCTION

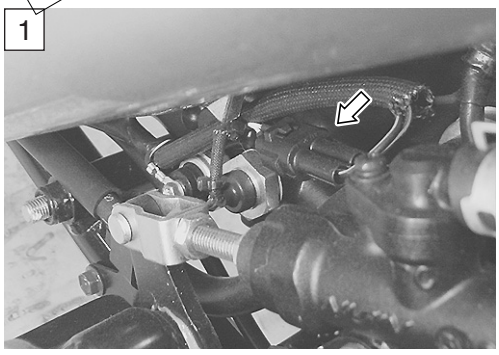
DETECTED CONDITION			POSSIBLE CAUSE
C15		Output voltage is not within the following range. 0.1 ≦ Sensor voltage < 4.6 V	• EOT sensor circuit open or short. • EOT sensor malfunction. • ECM malfunction.
P0115	H	Sensor voltage is higher than specified value.	• EOT sensor circuit open or ground circuit open.
	L	Sensor voltage is lower than specified value.	• EOT sensor circuit shorted to ground.

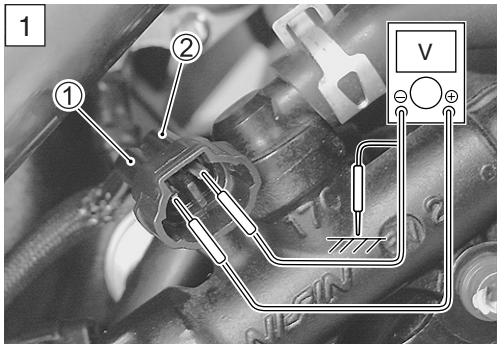


INSPECTION

Step 1 (When indicating C15:)

1) Turn the ignition switch OFF.
2) Check the EOT sensor coupler for loose or poor contacts.
   If OK, then measure the EOT sensor voltage at the wire side coupler.
3) Disconnect the EOT sensor coupler and turn the ignition switch ON.
4) Measure the voltage between B/Bl wire terminal ① and ground.
5) Also, measure the voltage between B/Bl wire terminal ① and B/G wire terminal ②.





DATA EOT sensor input voltage: 4.5 – 5.5 V
(⊕ B/Bl – ⊖ Ground)
(⊕ B/Bl – ⊖ B/G)

TOOL 09900-25008: Multi-circuit tester set

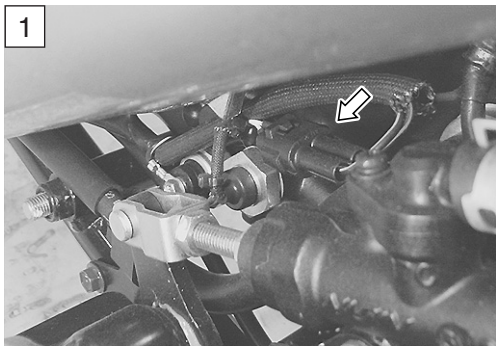
Tester knob indication: Voltage (⎓)

Is the voltage OK?

YES	Go to Step 2.
NO	• Loose or poor contacts on the ECM coupler (terminal ⑭ or ⑲) or sub harness coupler. • Open or short circuit in the B/Bl wire or B/Br wire or sub harness.

Step 1 (When indicating P0115-H:)

1) Turn the ignition switch OFF.
2) Check the EOT sensor coupler for loose or poor contacts.
   If OK, then check the EOT sensor lead wire continuity.

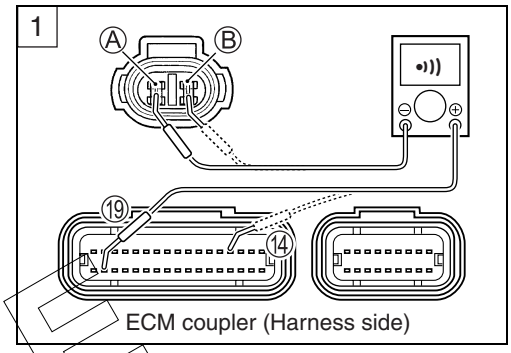


3) Remove the left frame upper cover.
   (☞VL1500 Service Manual 6-3)
4) Disconnect the EOT sensor coupler and ECM coupler.
5) Check the continuity between B/Bl wire Ⓐ and terminal ⑲.
6) Also, check the continuity between B/G wire Ⓑ and terminal ⑭.

DATA EOTS lead wire continuity: Continuity (•))))

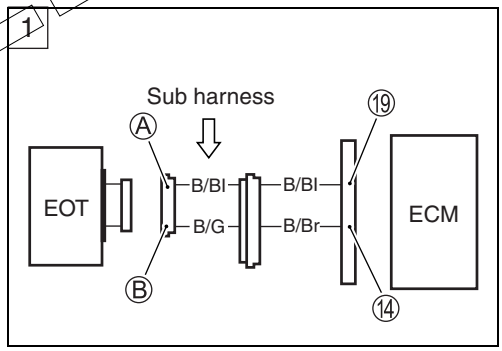
TOOL 09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Continuity test (•))))



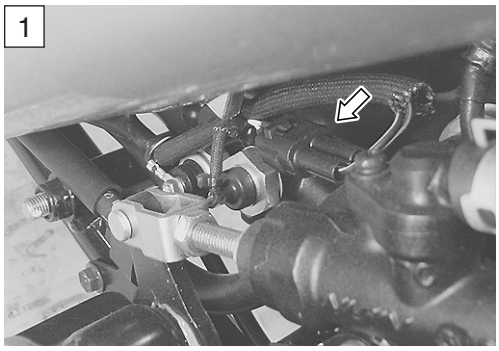
Is the continuity OK?

YES	Go to Step 2.
NO	• B/Bl, B/Br wire or sub harness (B/Bl or B/G wire) open. • Loose or poor contacts on the sub harness coupler.



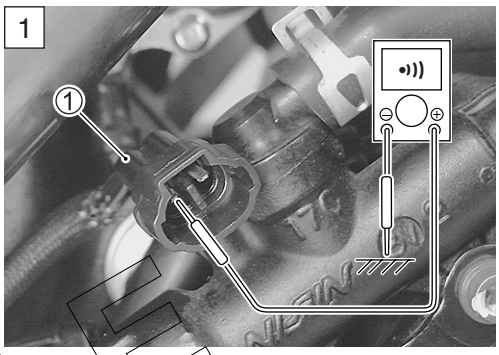
7) After repairing the trouble, clear the DTC using SDS tool.
   (☞Page 42)

Step 1 (When indicating P0115-L:)
1) Turn the ignition switch OFF.
2) Check the EOT sensor coupler for loose or poor contacts.
   If OK, then check the EOT sensor lead wire continuity.



3) Disconnect the EOT sensor coupler.
4) Check the continuity between B/Bl wire ① and ground.
   If the sound is not heard from the tester, the circuit condition is OK.

Tester knob indication: Continuity test (•))))

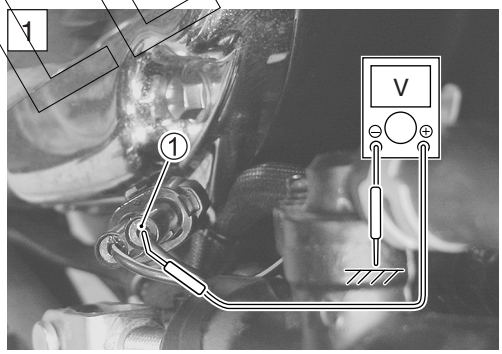


5) Connect the EOT sensor coupler and turn the ignition switch ON.
6) Measure the voltage between B/Bl wire ① and ground.

EOT sensor output voltage: 0.1 – 4.6 V
(⊕ B/Bl – ⊖ Ground)

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

Tester knob indication: Voltage (⎓)



Are the continuity and voltage OK?

YES	Go to Step 2.
NO	• B/Bl wire or sub harness (B/Bl wire) shorted to ground. • If wire and sub harness are OK, go to Step 2.

7) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

Step 2

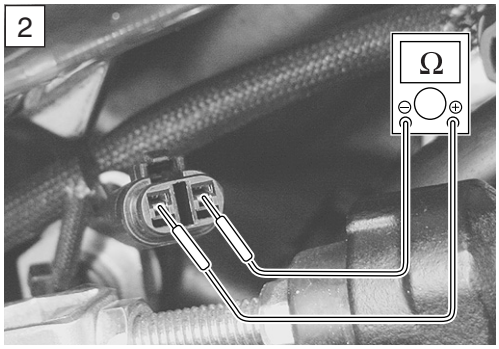
1) Turn the ignition switch OFF.
2) Disconnect the EOT sensor coupler.
3) Measure the EOT sensor resistance.

DATA EOT sensor resistance:
Approx. 61.3 kΩ at 20 °C (68 °F)
(White – White)

TOOL 09900-25008: Multi-circuit tester set

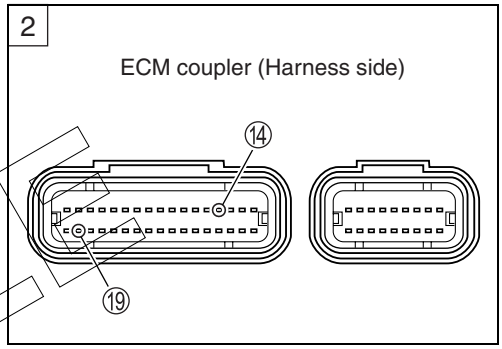
Tester knob indication: Resistance (Ω)

Refer to next page for details.



Is the resistance OK?

YES	• B/Bl or B/Br wire open or shorted to ground, or poor ⑭ or ⑲ connection. • Open or short circuit in the sub harness, or sab-harness connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	Replace the ECT sensor with a new one.



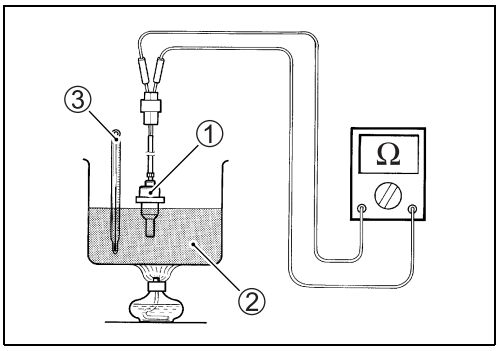
4) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

DATA EOT sensor specification

Engine Oil Temp	Resistance
20 °C (68 °F)	Approx. 61.3 kΩ
50 °C (122 °F)	Approx. 17.8 kΩ
80 °C (176 °F)	Approx. 6.2 kΩ
110 °C (230 °F)	Approx. 2.5 kΩ

EOT SENSOR INSPECTION

- Remove the EOT sensor. (☞Page 119)
- Check the EOT sensor by testing it at the bench as shown in the figure. Connect the EOT sensor ① to a circuit tester and place it in the oil ② contained in a pan, which is placed on a stove.
- Heat the oil to raise its temperature slowly and read the column thermometer ③ and the ohmmeter.
- If the EOT sensor ohmic value does not change in the proportion indicated, replace it with a new one.



DATA EOT sensor specification

Engine Oil Temp	Resistance
20 °C (68 °F)	Approx. 61.3 kΩ
50 °C (122 °F)	Approx. 17.8 kΩ
80 °C (176 °F)	Approx. 6.2 kΩ
110 °C (230 °F)	Approx. 2.5 kΩ

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

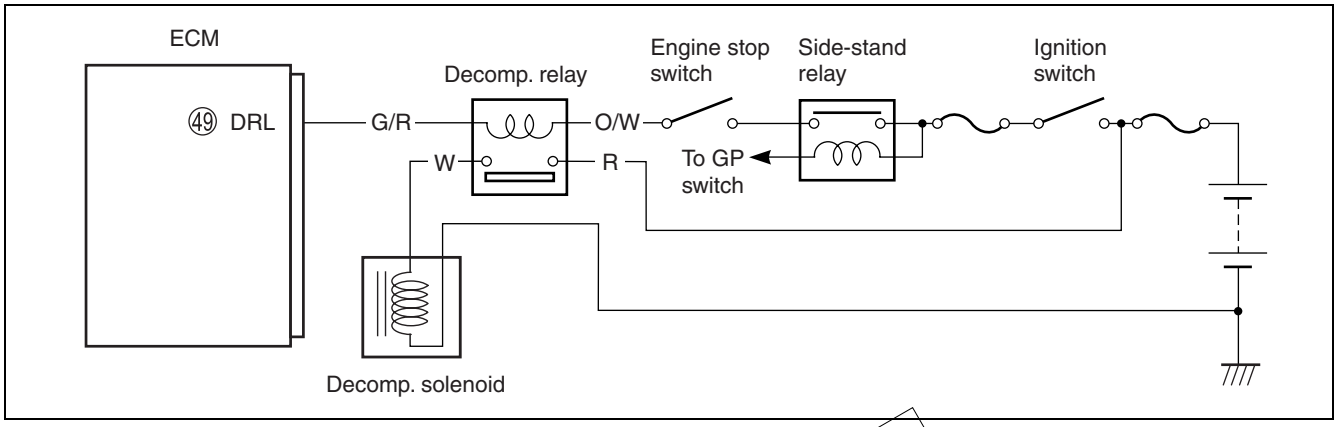
If the resistance is noted to show infinity or too much different resistance value, replace the EOT sensor with a new one.

CAUTION

*** Take special care when handling the EOT sensor. It may cause damage if it gets a sharp impact.**
*** Do not contact the EOT sensor and the column thermometer with a pan.**

"C18" (P1751) DECOMP. RELAY CIRCUIT MALFUNCTION

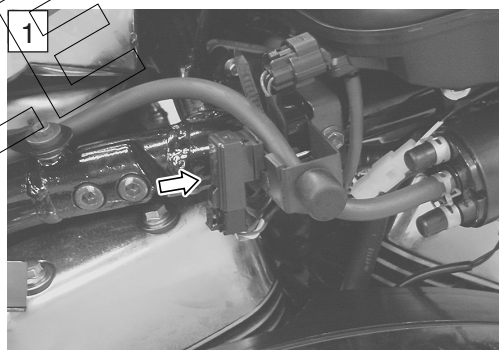
DETECTED CONDITION	POSSIBLE CAUSE
Decomp. relay signal is not input to ECM.	• Decomp. system circuit open or short. • ECM malfunction.



INSPECTION

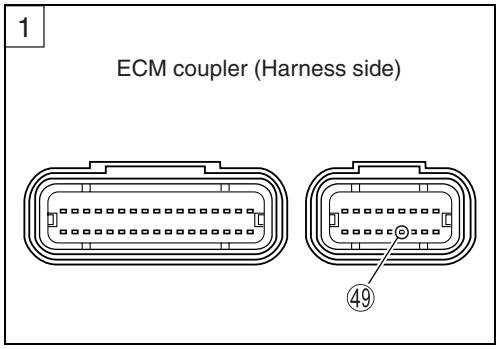
Step 1

1) Remove the right frame upper cover.
   (☞VL1500 Service Manual 6-3)
2) Turn the ignition switch OFF.
3) Check the Decomp. relay coupler for loose or poor contacts.
   If OK, then check the Decomp. relay.
   (☞VL1500 Service Manual 7-20)



Is the Decomp. relay OK?

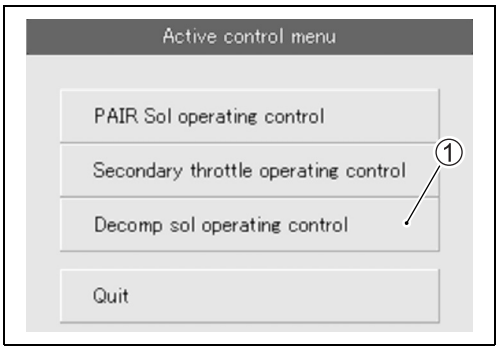
YES	• O/W or G/R wire open or shorted to ground, or poor ⑭ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	Replace the Decomp. relay with a new one.



4) After repairing the trouble, clear the DTC using SDS tool.
   (☞Page 42)

ACTIVE CONTROL INSPECTION

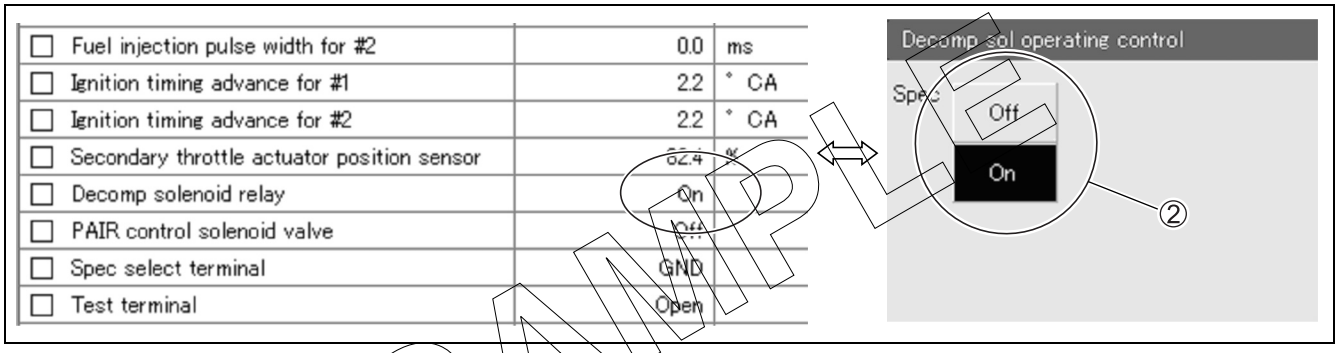
1) Set up the SDS tool. (Refer to the SDS operation manual for further details)
2) Turn the ignition switch ON.
3) Click "Decomp sol operating control" ①.



4) With the engine starter button pushed, click "On" button ②.
   At this time, if an operation sound is heard from the decomp. solenoid valve, the function is normal.

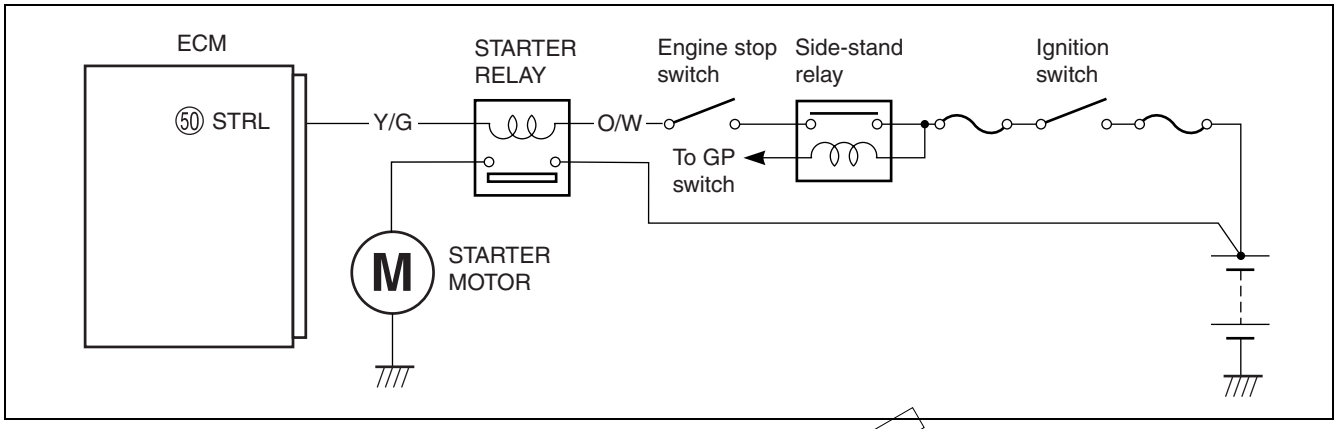
NOTE:

Decomp. solenoid valve can be operated about one second after button is turned "On".



"C19" (P0615) STARTER RELAY CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
Starter relay signal is not input to ECM.	• Starter system circuit open or short. • ECM malfunction.



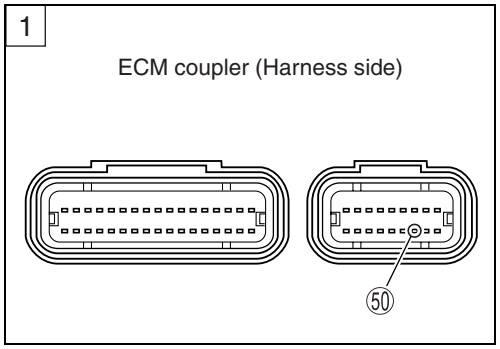
INSPECTION

Step 1

1) Remove the left frame upper cover.
   (☞VL1500 Service Manual 6-3)
2) Turn the ignition switch OFF.
3) Check the Starter relay coupler for loose or poor contacts.
   If OK, then inspection the Starter relay.
   (☞VL1500 Service Manual 7-17)

Is the Starter relay OK?

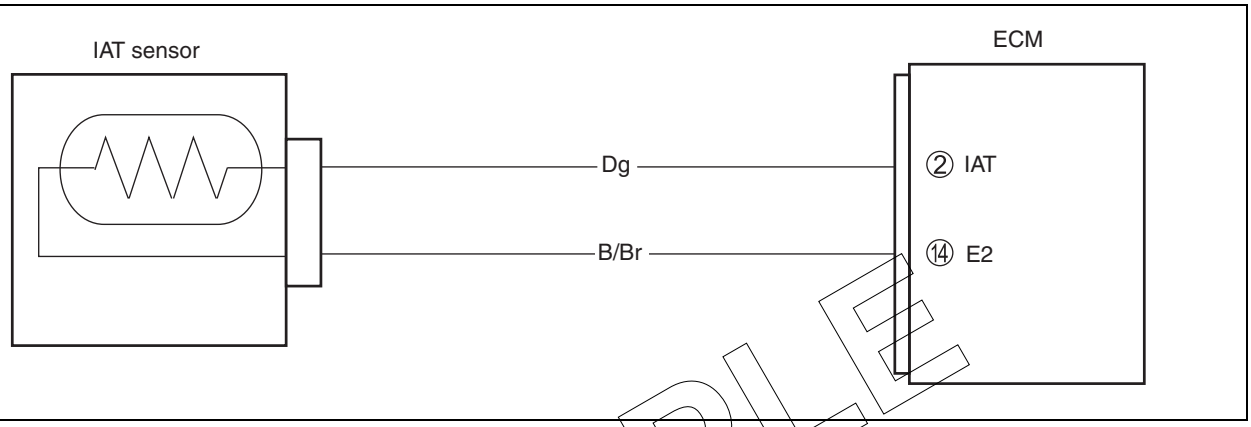
YES	• O/W and Y/G wire open or shorted to ground, or poor ⑤⓪ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	Replace the Starter relay with a new one.



4) After repairing the trouble, clear the DTC using SDS tool.
   (☞Page 42)

"C21" (P0110-H/L) IAT SENSOR CIRCUIT MALFUNCTION

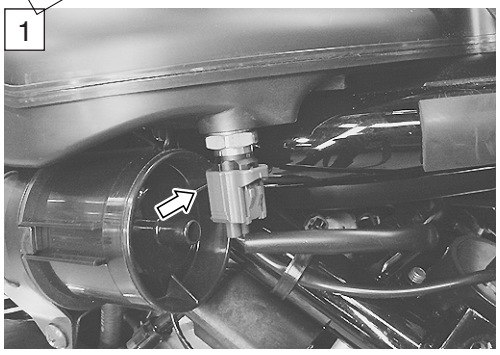
DETECTED CONDITION			POSSIBLE CAUSE
C21		Output voltage is not within the following range. 0.1 ≦ Sensor voltage < 4.6 V	• IAT sensor circuit open or short. • IAT sensor malfunction. • ECM malfunction.
P0110	H	Sensor voltage is higher than specified value.	• IAT sensor circuit open or ground circuit open.
	L	Sensor voltage is lower than specified value.	• IAT sensor circuit shorted to ground.

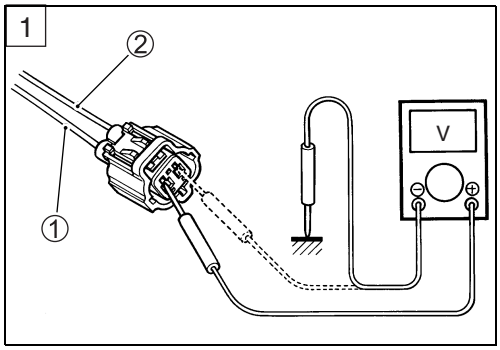


INSPECTION

Step 1(When indicating C21:)

1) Remove the right frame upper cover.
   (☞VL1500 Service Manual 6-3)
2) Turn the ignition switch OFF.
3) Check the IAT sensor coupler for loose or poor contacts.
   If OK, then measure the IAT sensor voltage at the wire side coupler.
4) Disconnect the IAT sensor coupler and turn the ignition switch ON.
5) Measure the voltage between Dg wire terminal ① and ground.
6) Also, measure the voltage between Dg wire terminal ① and B/Br wire terminal ②.





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

TOOL 09900-25008: Multi-circuit tester set

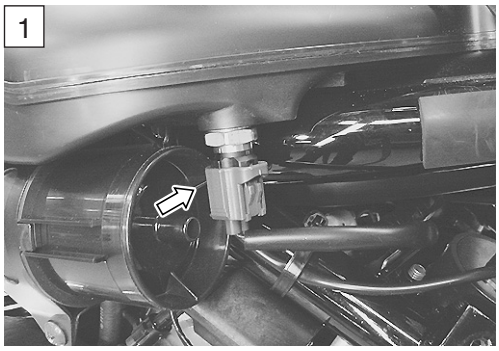
Tester knob indication: Voltage (⎓)

Is the voltage OK?

YES	Go to Step 2.
NO	• Loose or poor contacts on the ECM coupler (terminal ② or ⑭). • Open or short circuit in the Dg wire or B/Br wire.

Step 1 (When indicating P0110-H:)

1) Remove the right frame upper cover.
   (☞VL1500 Service Manual 6-3)
2) Turn the ignition switch OFF.
3) Check the IAT sensor coupler for loose or poor contacts.
   If OK, then check the IAT sensor lead wire continuity.

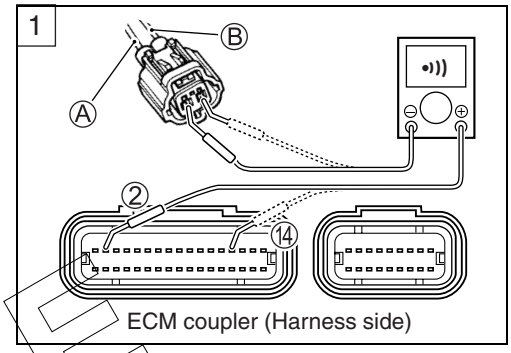


4) Remove the left frame upper cover.
   (☞VL1500 Service Manual 6-3)
5) Disconnect the IAT sensor coupler and ECM coupler.
6) Check the continuity between Dg wire Ⓐ and terminal ②.
7) Also, check the continuity between B/Br wire Ⓑ and terminal ⑭.

DATA IATS lead wire continuity: Continuity (•))))

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

Tester knob indication: Continuity test (•))))



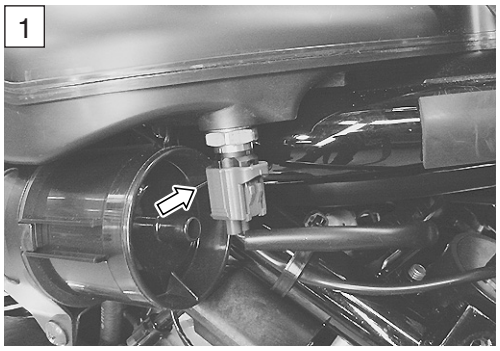
Is the continuity OK?

YES	Go to Step 2.
NO	Dg wire or B/Br wire open.

8) After repairing the trouble, clear the DTC using SDS tool.
   (☞Page 42)

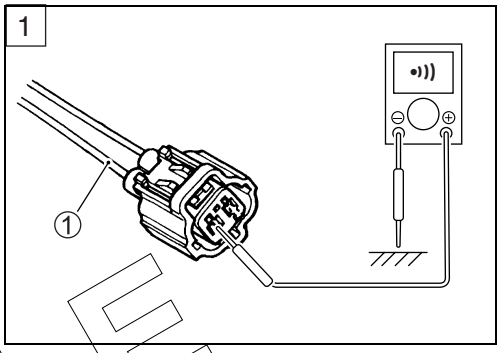
Step 1 (When indicating P0110-L:)

1) Remove the right frame upper cover.
   (☞VL1500 Service Manual 6-3)
2) Turn the ignition switch OFF.
3) Check the IAT sensor coupler for loose or poor contacts.
   If OK, then check the IAT sensor lead wire continuity.



4) Disconnect the IAT sensor coupler.
5) Check the continuity between Dg wire ① and ground. If the sound is not heard from the tester, the circuit condition is OK.

Tester knob indication: Continuity test (•))))

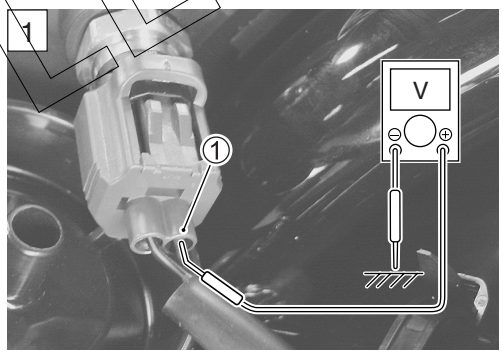


6) Connect the IAT sensor coupler and turn the ignition switch ON.
7) Measure the voltage between Dg wire ① and ground.

IAT sensor output voltage: 0.1 – 4.6 V
(⊕ Dg – ⊖ Ground)

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

Tester knob indication: Voltage (⎓)



Are the continuity and voltage OK?

YES	Go to Step 2.
NO	• Dg wire shorted to ground. • If wire is OK, go to Step 2.

8) After repairing the trouble, clear the DTC using SDS tool.
   (☞Page 42)

Step 2

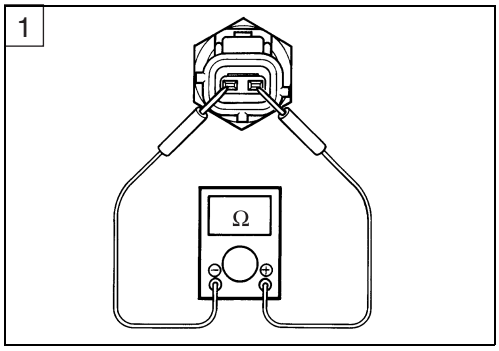
1) Turn the ignition switch OFF.

2) Measure the IAT sensor resistance.

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

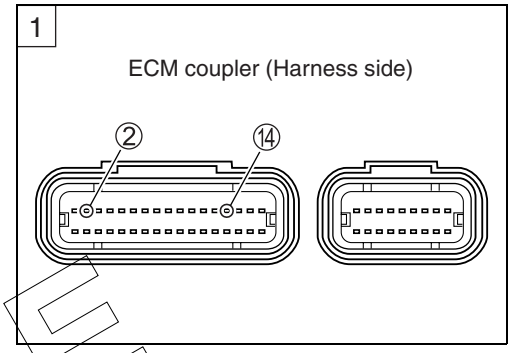
TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)



Is the resistance OK?

YES	• Dg or B/Br wire open or shorted to ground, or poor ② or ⑭ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	Replace the IAT sensor with a new one.



DATA IAT sensor specification

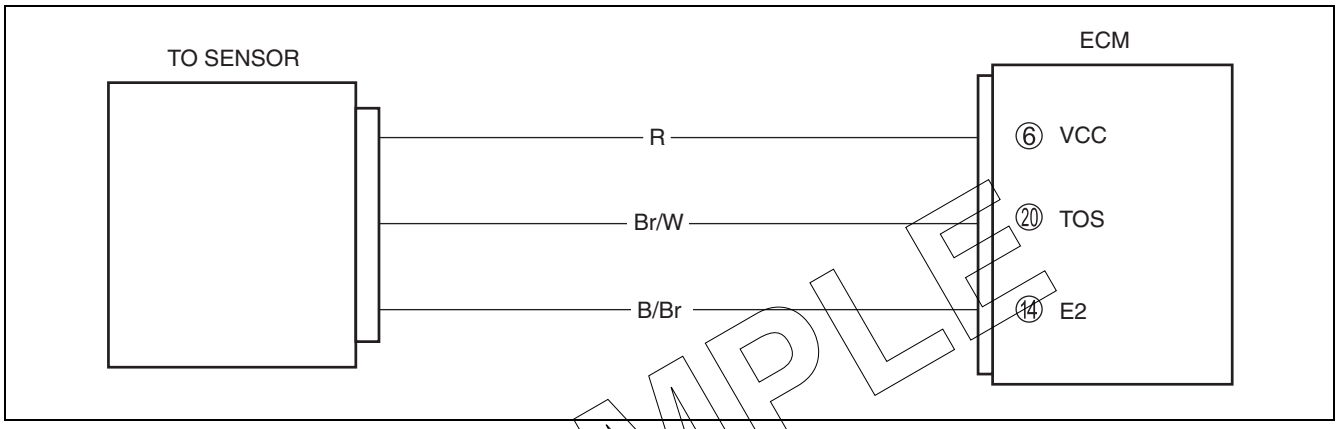
Intake Air Temp	Resistance
20 °C (68 °F)	Approx. 2.45 kΩ
40 °C (104 °F)	Approx. 1.148 kΩ
60 °C (140 °F)	Approx. 0.587 kΩ
80 °C (176 °F)	Approx. 0.322 kΩ

NOTE:

IAT sensor resistance measurement method is the same way as that of the EOT sensor. Refer to page 62 for details.

"C23" (P1651-H/L) TO SENSOR CIRCUIT MALFUNCTION

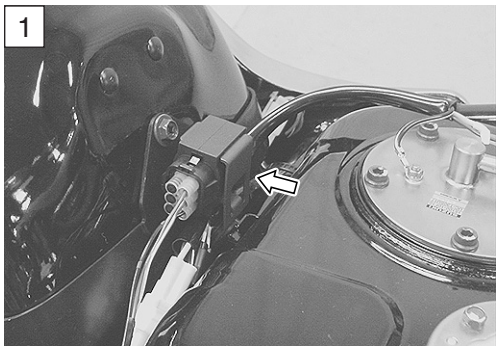
DETECTED CONDITION			POSSIBLE CAUSE
C23		The sensor voltage should be the following for 2 sec. and more, after ignition switch is turned ON. 0.2 ≦ Sensor voltage < 4.6 V	• TO sensor circuit open or short. • TO sensor malfunction. • ECM malfunction.
P1651	H	Sensor voltage is higher than specified value.	• TO sensor circuit open or shorted to VCC or ground circuit open.
	L	Sensor voltage is lower than specified value.	• TO sensor circuit shorted to ground or VCC circuit open.



INSPECTION

Step 1 (When indicating C23:)

1) Remove the seats. (☞Page 121)
2) Turn the ignition switch OFF.
3) Check the TO sensor coupler for loose or poor contacts.
   If OK, then measure the TO sensor resistance.
4) Disconnect the TO sensor coupler.

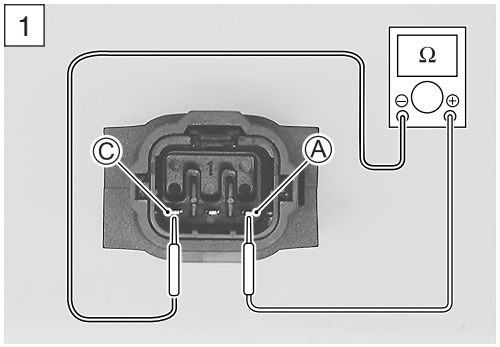


5) Measure the resistance between terminal Ⓐ and terminal Ⓒ.

DATA TO sensor resistance: 19.1 – 19.7 kΩ
(Terminal Ⓐ – Terminal Ⓒ)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

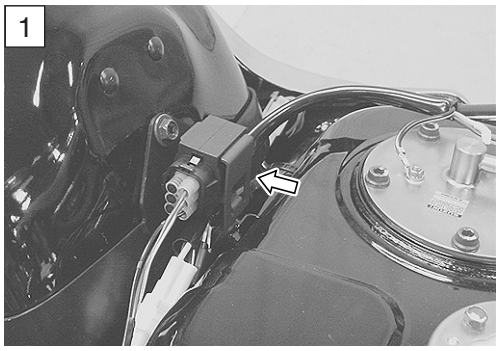


Is the resistance OK?

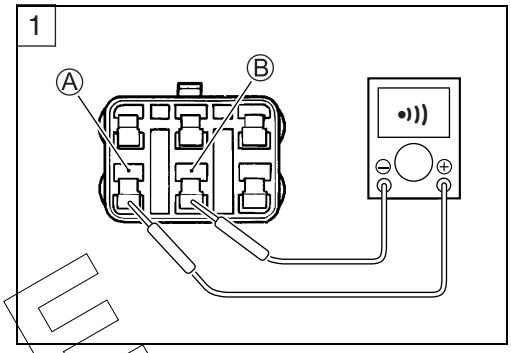
YES	Go to Step 2.
NO	Replace the TO sensor with a new one.

step 1 (When indicating P1651-H:)

1) Remove the seats. (☞Page 121)
2) Turn the ignition switch OFF.
3) Check the TO sensor coupler for loose or poor contacts.
   If OK, then check the TO sensor lead wire continuity.



4) Disconnect the TO sensor coupler.
5) Check the continuity between Red wire Ⓐ and Br/W wire Ⓑ.
   If the sound is not heard from the tester, the circuit condition is OK.

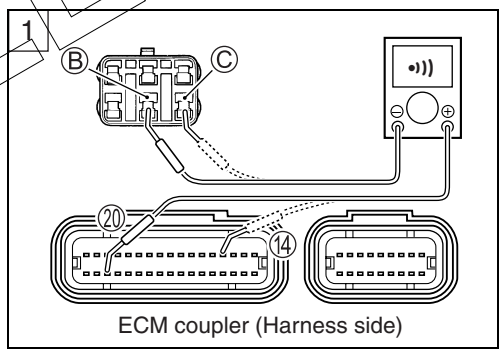


6) Remove the left frame upper cover (☞VL1500 Service Manual 6-3) and disconnect the ECM coupler.
7) Check the continuity between Br/W wire Ⓑ and terminal ⑳.
8) Also, check the continuity between B/Br wire Ⓒ and terminal ⑭.

DATA TOS lead wire continuity: Continuity (•))))

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

Tester knob indication: Continuity test (•))))



ECM coupler (Harness side)

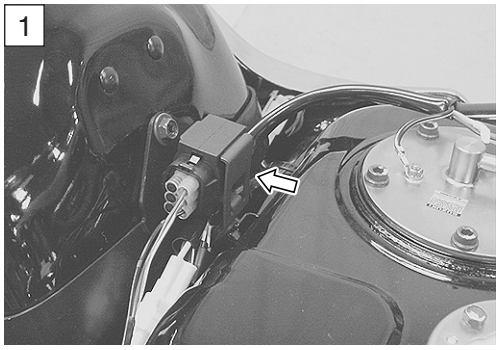
Is the continuity OK?

YES	Go to Step 2.
NO	Br/W wire shorted to VCC, or B/Br wire open.

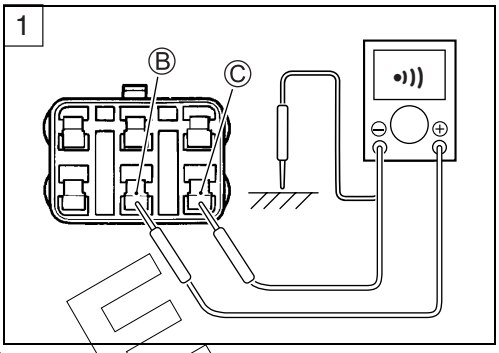
9) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

Step 1 (When indicating P1651-L:)

1) Remove the seats. (☞Page 121)
2) Turn the ignition switch OFF.
3) Check the TO sensor coupler for loose or poor contacts.
   If OK, then check the TO sensor lead wire continuity.



4) Disconnect the TO sensor coupler.
5) Check the continuity between Br/W wire Ⓑ and ground.
6) Also, check the continuity between Br/W wire Ⓑ and B/Br wire Ⓒ. If the sound is not heard from the tester, the circuit condition is OK.

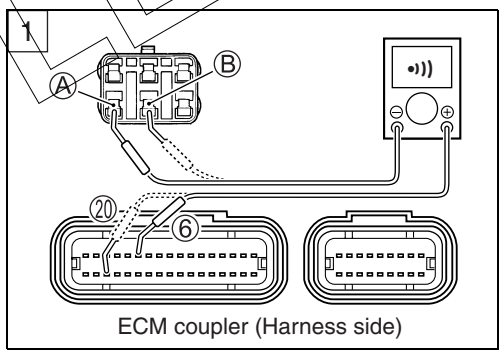


7) Remove the left frame upper cover (☞VL1500 Service Manual 6-3) and disconnect the ECM coupler.
8) Check the continuity between Red wire Ⓐ and terminal ⑥.
9) Also, then check the continuity between Br/W wire Ⓑ and terminal ⑳.

DATA TOS lead wire continuity: Continuity (•))))

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

Tester knob indication: Continuity test (•))))



Is the continuity OK?

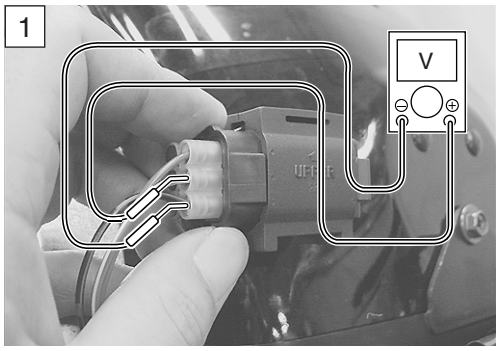
YES	Go to Step 2.
NO	Red or Br/W wire open, or Br/W wire shorted to ground.

10) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

Step 2

1) Connect the TO 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 Black and B/Br wires.

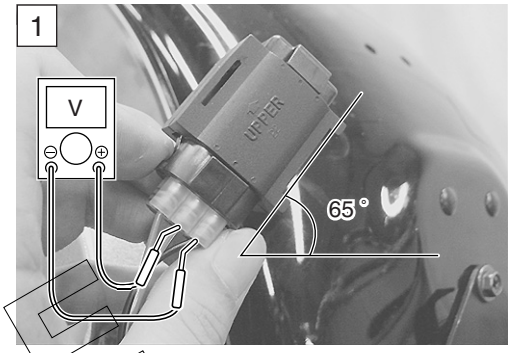
DATA TO sensor voltage (Normal): 0.4 – 1.4 V
(⊕ Br/W – ⊖ B/Br)



Also, measure the voltage when leaning the motorcycle.

5) Dismount the TO sensor from its bracket and measure the voltage when it is leaned 65° and more, left and right, from the horizontal level.

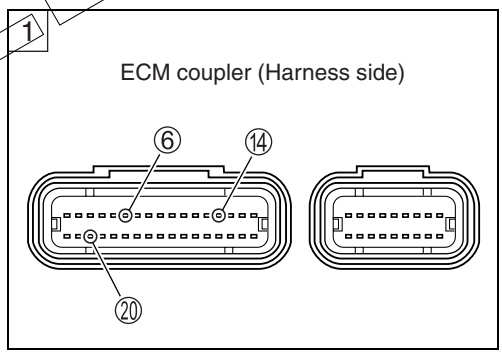
DATA TO sensor voltage (Leaning): 3.7 – 4.4 V
(⊕ Br/W – ⊖ B/Br)



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

Tester knob indication: Voltage (⎓)

Is the voltage OK?



YES	• Red, Br/W or B/Br wire open or shorted to ground, or poor ⑥, ⑭ or ⑳ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	• Loose or poor contacts on the ECM coupler. • Open or short circuit. • Replace the TO sensor with a new one.

6) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

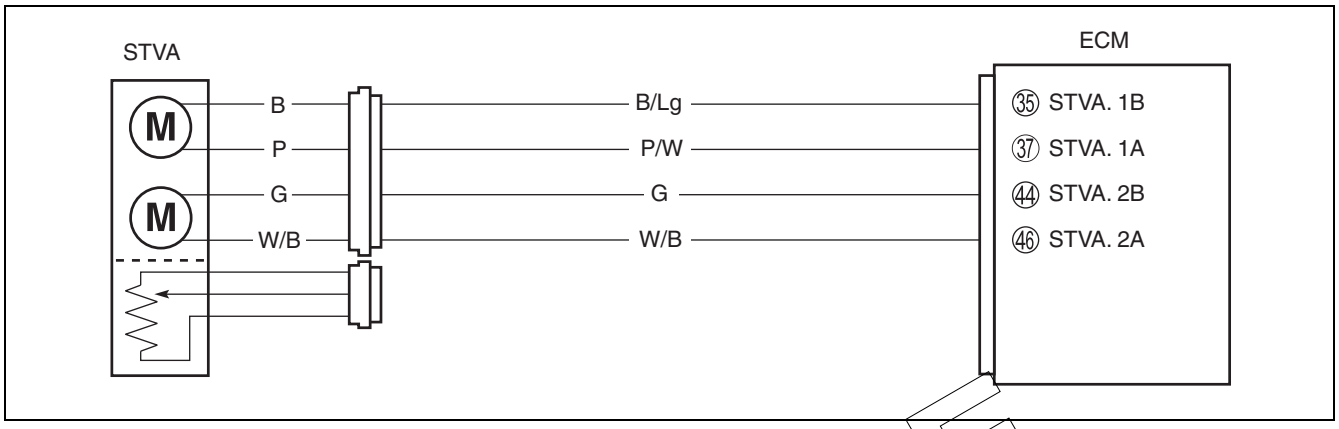
"C24" (P0351) or "C25" (P0352) IGNITION SYSTEM MALFUNCTION

(When indicating C24/P0351 for IG coil #1)
(When indicating C25/P0352 for IG coil #2)

*** Refer to the IGNITION SYSTEM for details. (☞Page 133)**

"C28" (P1655) STV ACTUATOR CIRCUIT MALFUNCTION

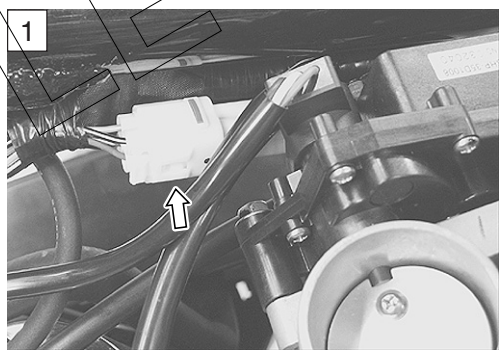
DETECTED CONDITION	POSSIBLE CAUSE
The operation voltage does not reach the STVA. ECM does not receive communication signal from the STVA.	• STVA malfunction. • STVA circuit open or short. • STVA motor malfunction.



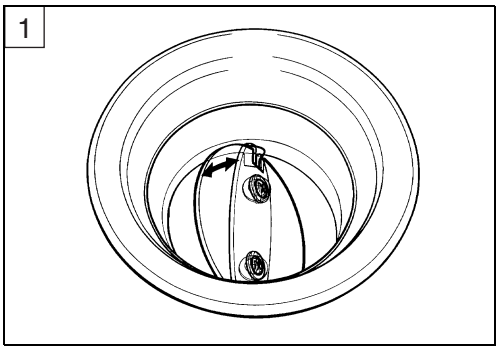
INSPECTION

Step 1

1) Remove the air cleaner box. (☞Page 103)
2) Turn the ignition switch OFF.
3) Check the STVA lead wire coupler for loose or poor contacts.



4) Turn the ignition switch ON to check the STV operation.
   (STV operating order: 95% open → Full open → 95% open)



Is the operating OK?

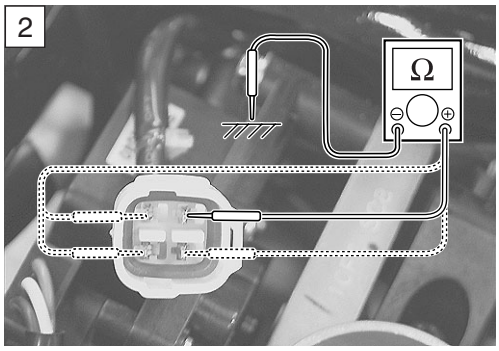
YES	Go to Step 2.
NO	• Loose or poor contacts on the STVA coupler. • Open or short circuit in the B/Lg, P/W, W/B or Green wires. • If wire and connection are OK, go to Step 2.

5) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

Step 2

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

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

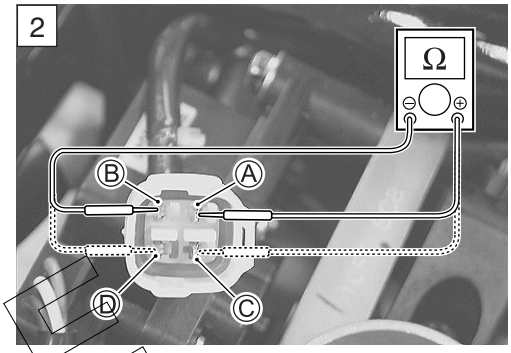


4) If OK, then measure the STVA resistance (between Black wire Ⓐ and Pink wire Ⓑ) and (between Green wire Ⓒ and W/B wire Ⓓ).

DATA **STVA resistance: Approx. 6.5 Ω**
(Black Ⓐ – Pink Ⓑ)
(Green Ⓒ – W/B Ⓓ)

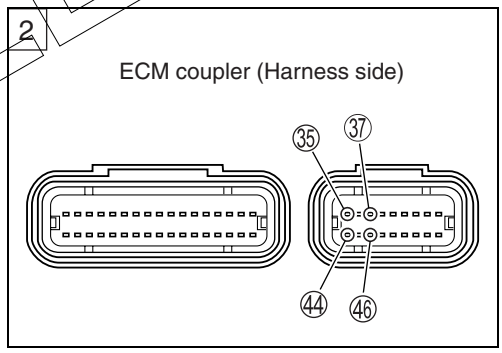
TOOL **09900-25008: Multi-circuit tester set**

Tester knob indication: Resistance (Ω)



Is the resistance OK?

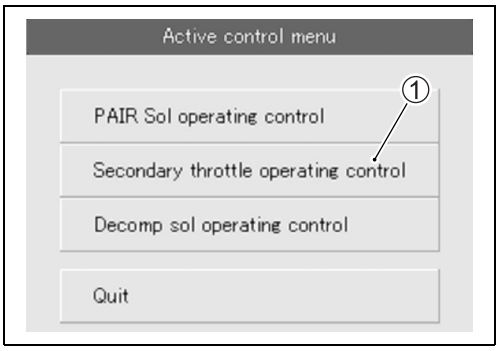
YES	• B/Lg, P/W, Green and W/B wire open or shorted to ground, or poor ㉟, ㊲, ㊹ and ㊻ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	• Loose or poor contacts on the ECM coupler. • Replace the STVA with a new one.



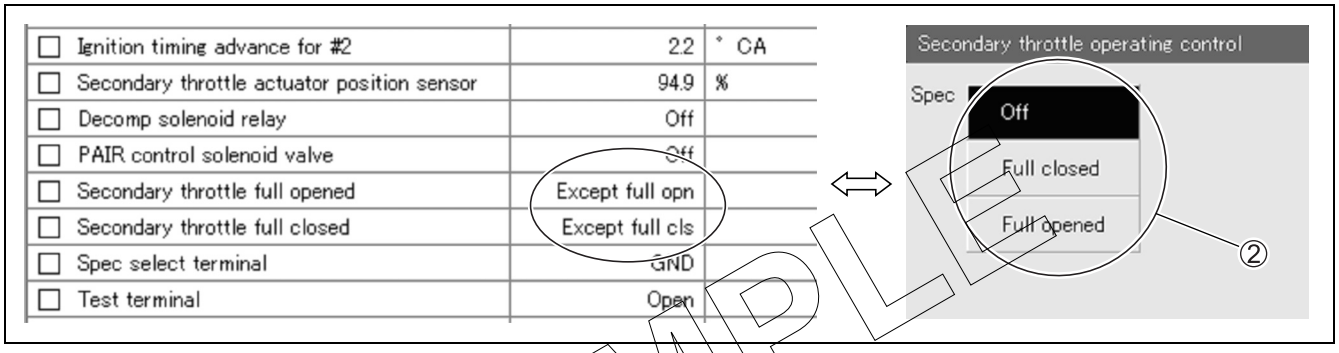
5) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

ACTIVE CONTROL INSPECTION

1) Set up the SDS tool. (Refer to the SDS operation manual for further details.)
2) Turn the ignition switch ON.
3) Click "Secondary throttle operating control" ①.

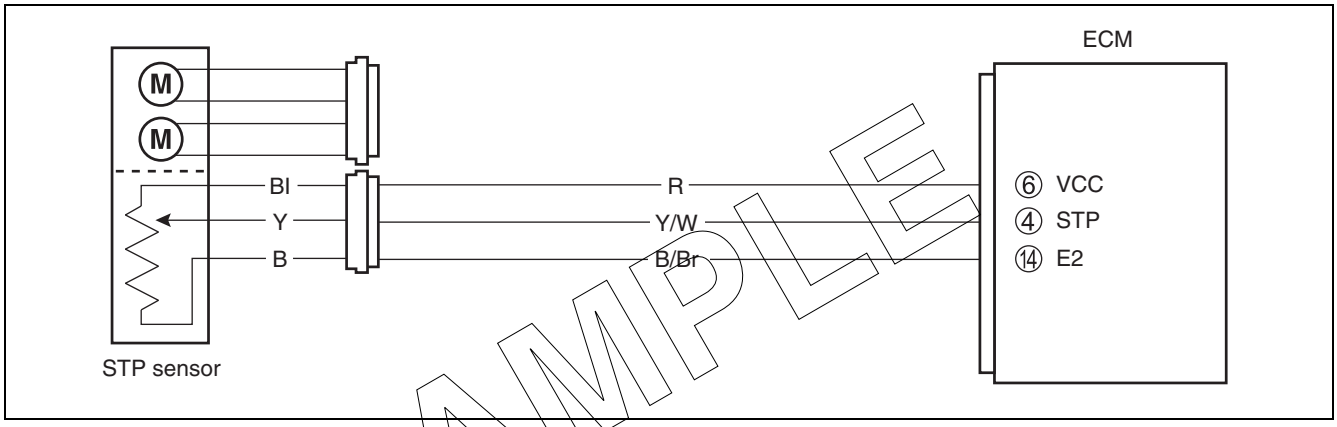


4) Click each button ②.
   At this time, if an operation sound is heard from the STVA, the function is normal.



"C29" (P1654-H/L) STP SENSOR CIRCUIT MALFUNCTION

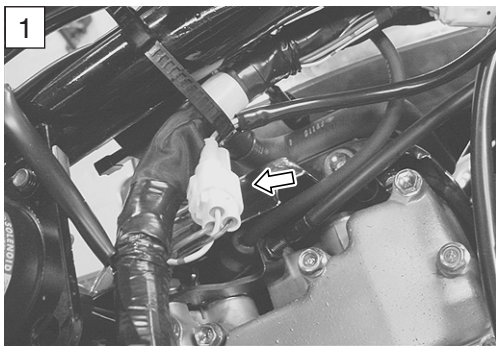
DETECTED CONDITION			POSSIBLE CAUSE
C29		Signal voltage is not within the following range. Difference between actual throttle opening and opening calculated by ECM is larger than specified value. 0.1 V ≦ Sensor voltage < 4.8 V	• STP sensor maladjusted. • STP sensor circuit open or short. • STP sensor malfunction. • ECM malfunction.
P1654	H	Sensor voltage is higher than specified value.	• STP sensor circuit shorted to VCC or ground circuit open.
	L	Sensor voltage is lower than specified value.	• STP sensor circuit open or shorted to ground or VCC circuit open.



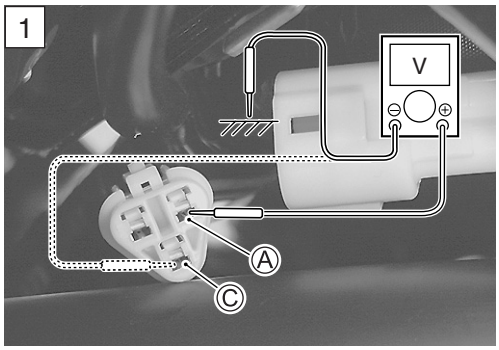
INSPECTION

Step 1 (When indicating C29:)

1) Remove the air cleaner box. (☞Page 103)
2) Turn the ignition switch OFF.
3) Check the STP sensor coupler for loose or poor contacts.
   If OK, then measure the STP sensor input voltage.
4) Disconnect the STP sensor coupler.
5) Turn the ignition switch ON.
6) Measure the voltage at the Red wire Ⓐ and ground.
7) Also, measure the voltage at the Red wire Ⓐ and B/Br wire Ⓒ.



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



TOOL 09900-25008: Multi-circuit tester set

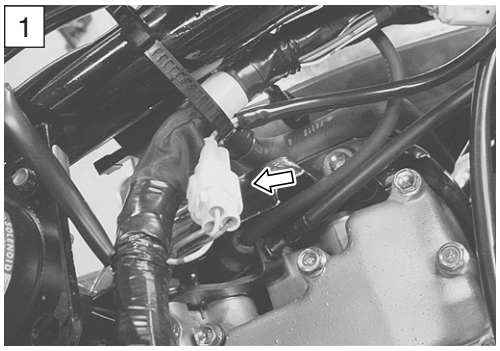
Tester knob indication: Voltage (⎓)

Is the voltage OK?

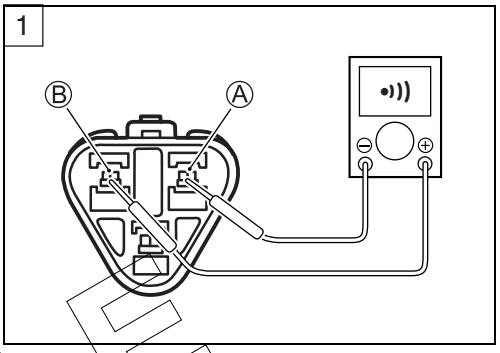
YES	Go to Step 2.
NO	• Loose or poor contacts on the ECM coupler (terminal ⑥ or ⑭). • Open or short circuit in the Red wire or B/Br wire.

Step 1 (When indicating P1654-H:)

1) Remove the air cleaner box. (☞Page 103)
2) Turn the ignition switch OFF.
3) Check the STP sensor coupler for loose or poor contacts.
   If OK, then check the STP sensor lead wire continuity.



4) Disconnect the STP sensor coupler.
5) Check the continuity between Y/W wire Ⓑ and Red wire Ⓐ.
   If the sound is not heard from the tester, the circuit condition is OK.

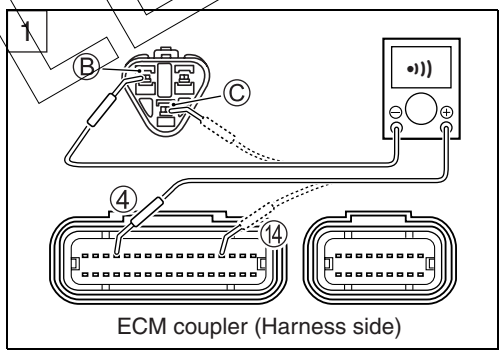


6) Remove the left frame upper cover (☞VL1500 Service Manual 6-3) and disconnect the ECM coupler.
7) Check the continuity between Y/W wire Ⓑ and terminal ④.
8) Also, check the continuity between B/Br wire Ⓒ and terminal ⑭.

DATA STPS lead wire continuity: Continuity (•)))

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

Tester knob indication: Continuity test (•)))



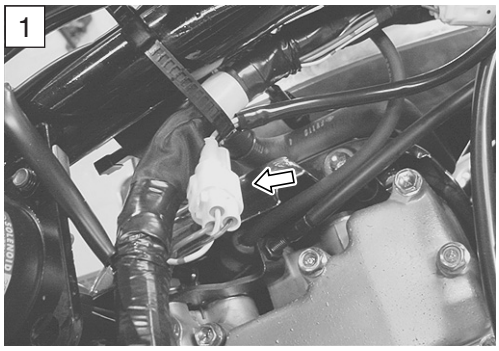
Is the continuity OK?

YES	Go to Step 2.
NO	Y/W wire shorted to VCC, or B/Br wire open.

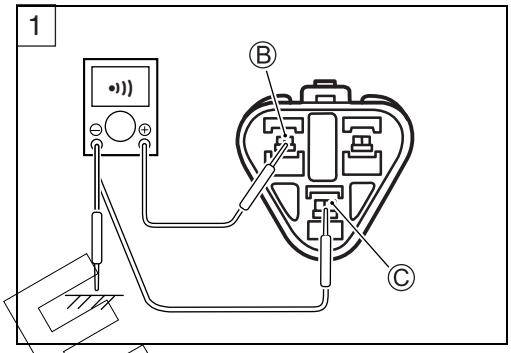
9) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

Step 1 (When indicating P1654-L:)

1) Remove the air cleaner box. (☞Page 103)
2) Turn the ignition switch OFF.
3) Check the STP sensor coupler for loose or poor contacts.
   If OK, then check the STP sensor lead wire continuity.



4) Disconnect the TO sensor coupler.
5) Check the continuity between Y/W wire Ⓑ and ground.
6) Also, check the continuity between Y/W wire Ⓑ and B/Br wire Ⓒ. If the sound is not heard from the tester, the circuit condition is OK.

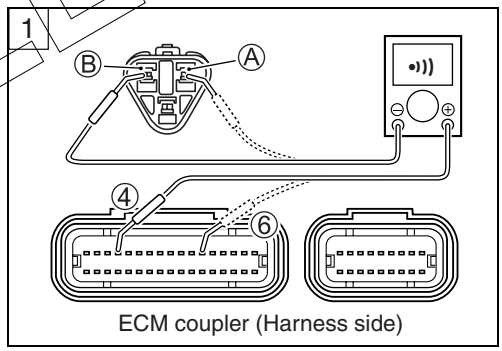


7) Remove the left frame upper cover (☞VL1500 Service Manual 6-3) and disconnect the ECM coupler.
8) Check the continuity between Y/W wire Ⓑ and terminal ④.
9) Also, check the continuity between Red wire Ⓐ and terminal ⑥.

DATA STPS lead wire continuity: Continuity (•)))

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

Tester knob indication: Continuity test (•)))



Is the continuity OK?

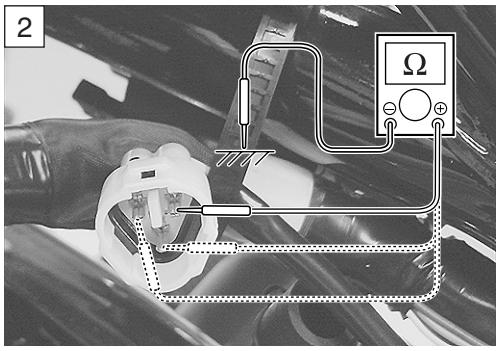
YES	Go to Step 1 (☞Page 77) and Go to Step 2.
NO	Red or Y/W wire open, or Y/W wire shorted to ground.

10) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

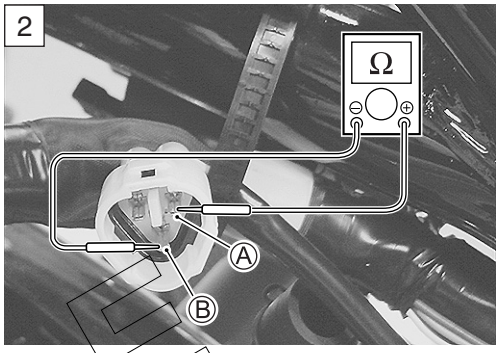
Step 2

1) Turn the ignition switch OFF.
2) Remove the air cleaner box. (☞Page 103)
3) Disconnect the STP sensor coupler.
4) Check the continuity between each terminal and ground.

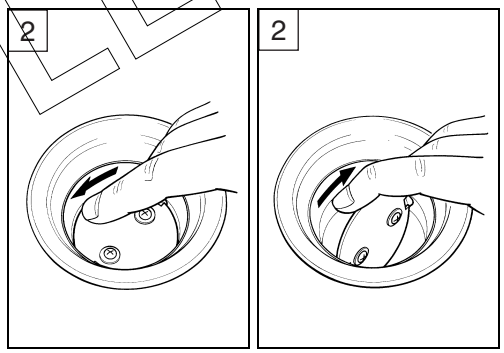
DATA STP sensor continuity: ∞ Ω (Infinity)
(Terminal – Ground)



5) If OK, then measure the STP sensor resistance at the wire terminals (between Yellow wire Ⓐ and Black wire Ⓑ).
6) Close and open the secondary throttle valve by finger, and measure the valve closing and opening resistance.



DATA STP sensor resistance
Secondary throttle valve is closed : Approx. 0.5 kΩ
Secondary throttle valve is opened: Approx. 3.9 kΩ
(Yellow Ⓐ – Black Ⓑ)

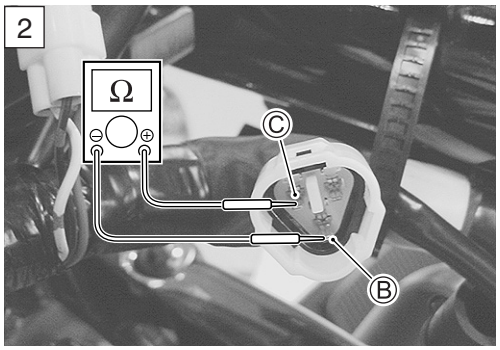


7) If OK, then measure the STP sensor resistance at the wire terminals (between Blue wire ⓒ and Black wire Ⓑ).

DATA STP sensor resistance: Approx. 4.69 kΩ

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)



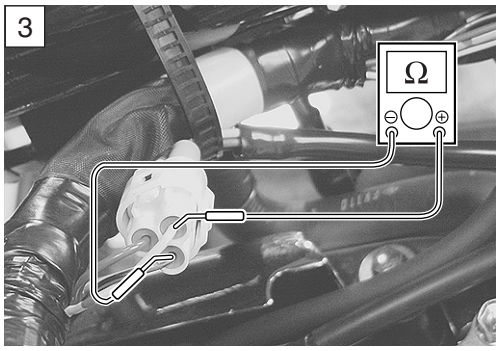
Are the continuity and resistance OK?

YES	Go to Step 3.
NO	• Reset the STP sensor position correctly. • Replace the STP sensor with a new one.

8) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

Step 3

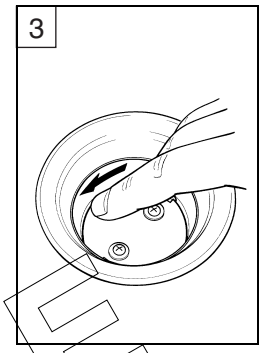
1) Turn the ignition switch OFF.
2) Connect the STP sensor coupler.
3) Insert the needle pointed probes to the STP sensor coupler.
4) Disconnect the STVA lead wire coupler.
5) Turn the ignition switch ON.
6) Measure the STP sensor output voltage at the coupler (between ⊕ Y/W wire and ⊖ B/Br wire) by turning the secondary throttle valve (close and open) with a finger.

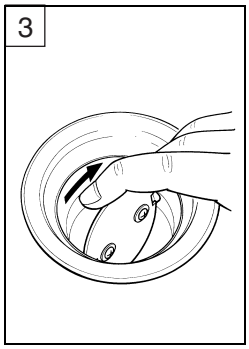


DATA STP sensor output voltage
Secondary throttle valve is closed: Approx. 0.5 V
Secondary throttle valve is opened: Approx. 3.9 V

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

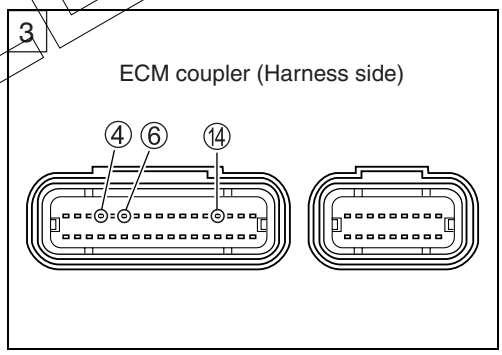
Tester knob indication: Voltage (⎓)





Is the voltage OK?

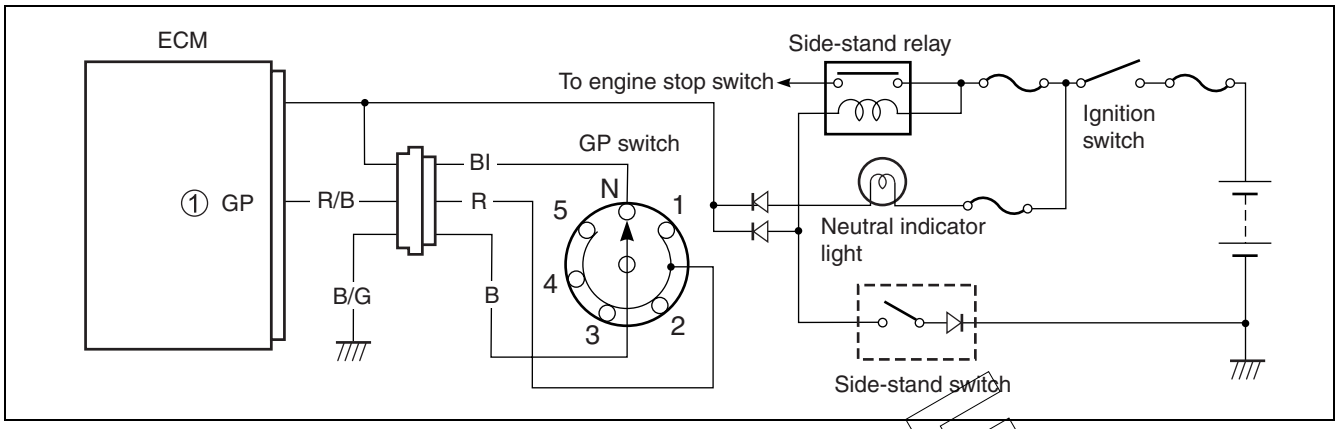
YES	• Red, Y/W or B/Br wire open or shorted to ground, or poor ④, ⑥ or ⑭ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	If check result is not satisfactory, replace STP sensor with a new one.



7) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

"C31" (P0705) GP SWITCH CIRCUIT MALFUNCTION

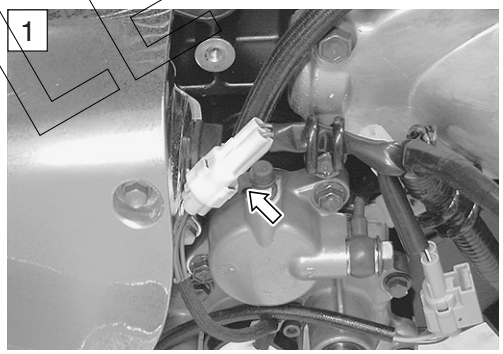
DETECTED CONDITION	POSSIBLE CAUSE
No Gear Position switch voltage. Switch voltage is not within the following range. Switch voltage > 0.6 V	• Gear Position switch circuit open or short. • Gear Position switch malfunction. • ECM malfunction.



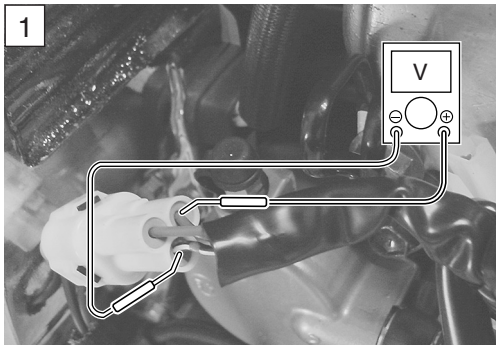
INSPECTION

Step 1

1) Remove the secondary gear case cover.
   (☞VL1500 Service Manual 3-7)
2) Turn the ignition switch OFF.
3) Check the GP switch coupler for loose or poor contacts.
   If OK, then measure the GP switch voltage.



4) Support the motorcycle with a jack.
5) Fold the side-stand to up position.
6) Make sure the engine stop switch is in the "RUN" position.
7) Insert the needle pointed probe to the lead wire coupler.
8) Turn the ignition switch ON.
9) Measure the voltage at the wire side coupler between R/B wire and B/G wire, when shifting the gearshift lever from 1st to Top.



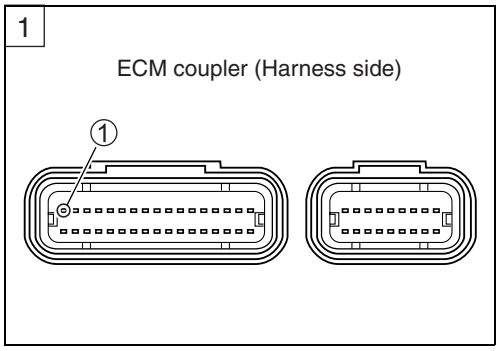
DATA GP switch voltage: 0.6 V and more
(⊕ R/B – ⊖ B/G)

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

Tester knob indication: Voltage (⎓)

Is the voltage OK?

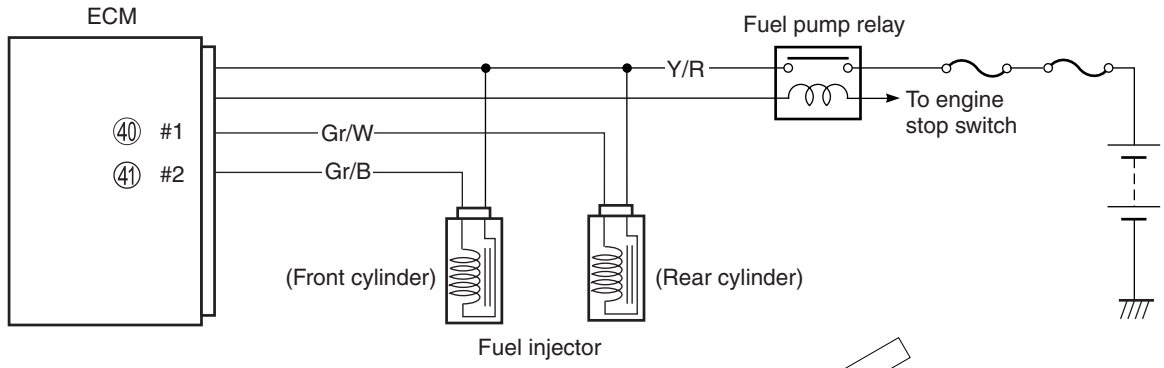
YES	• Red or R/B wire open or shorted to ground. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	• R/B or B/G wire open, or R/B or Red wire shorted to ground. • Loose or poor contacts on the ECM coupler (terminal ①). • If wire and connection are OK, replace the GP switch with a new one.



10)After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

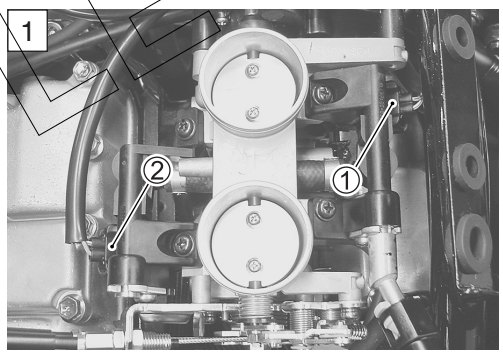
"C32" (P0201) or "C33" (P0202) FUEL INJECTOR CIRCUIT MALFUNCTION

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



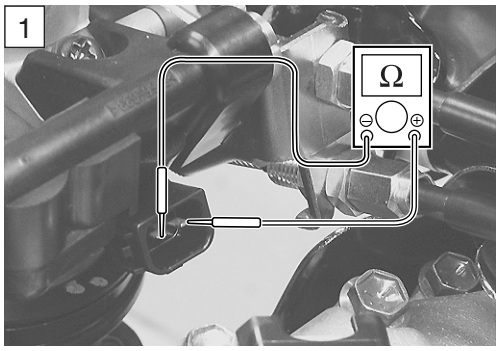
INSPECTION
(When indicating C32/P0201 for fuel injector #1)
(When indicating C33/P0202 for fuel injector #2)

Step 1
1) Remove the air cleaner box. (☞Page 103)
2) Turn the ignition switch OFF.
3) Check the injector coupler (Front cylinder side ① or Rear cylinder side ②) for loose or poor contacts.
   If OK, then measure the injector resistance.



4) Disconnect the injector coupler and measure the resistance between terminals.

DATA **Injector resistance: Approx. 11.7 Ω at 20 °C (68 °F)**
(Terminal – Terminal)

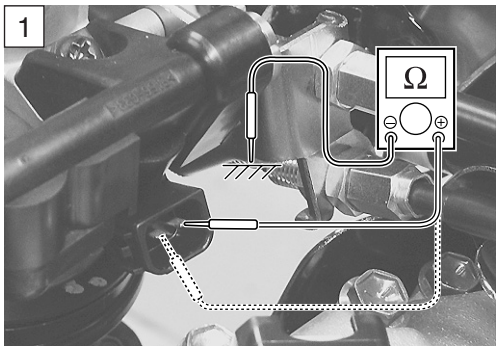


5) If OK, then check the continuity between each terminal and ground.

DATA STP sensor continuity: ∞ Ω (Infinity)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)



Are the resistance and continuity OK?

YES	Go to Step 2.
NO	Replace the injector with a new one. (☞Page 111)

6) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

Step 2

1) Turn the ignition switch ON.

2) Measure the injector voltage between Y/R wire and ground.

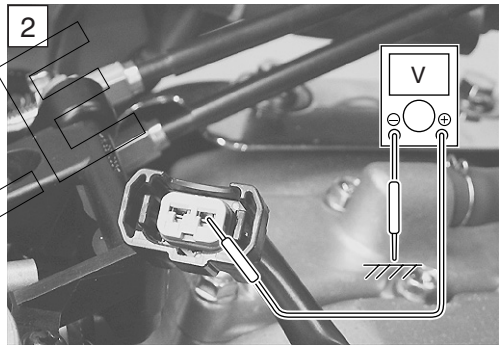
DATA Injector voltage: Battery voltage (⊕ Y/R – ⊖ Ground)

NOTE:

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

TOOL 09900-25008: Multi-circuit tester set

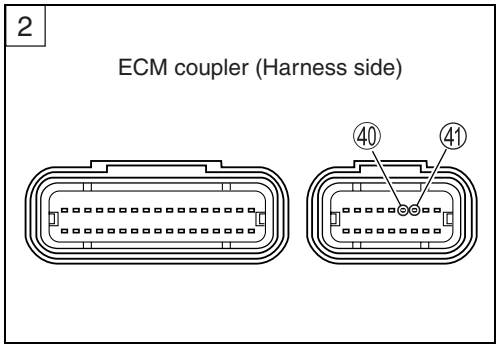
Tester knob indication: Voltage (⎓)



Is the voltage OK?

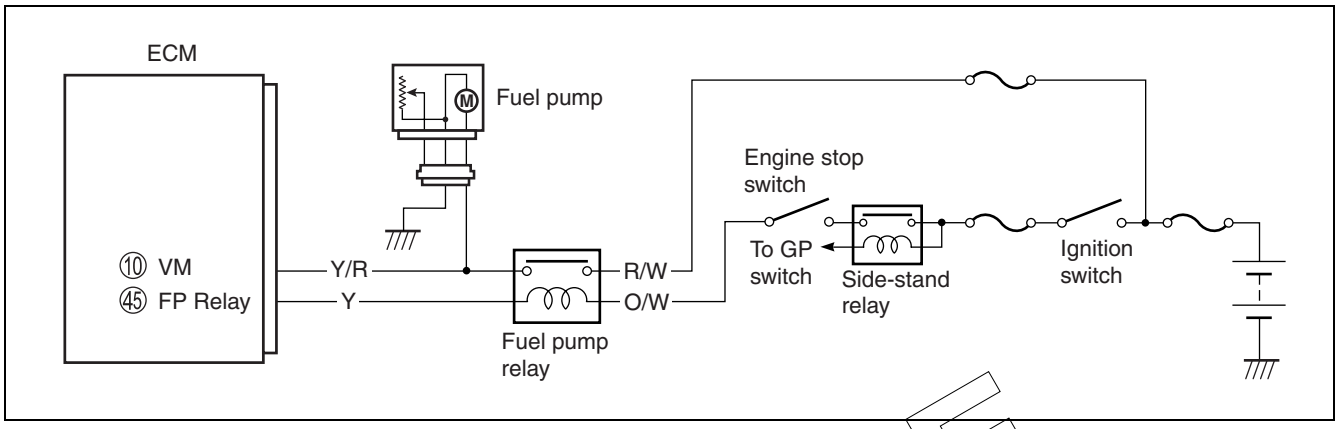
YES	• Gr/B wire open or shorted to ground, or poor ㊶ connection. (Front cylinder side) • Gr/W wire open or shorted to ground, or poor ㊵ connection. (Rear cylinder side) • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	Open circuit in the Y/R wire.

3) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)



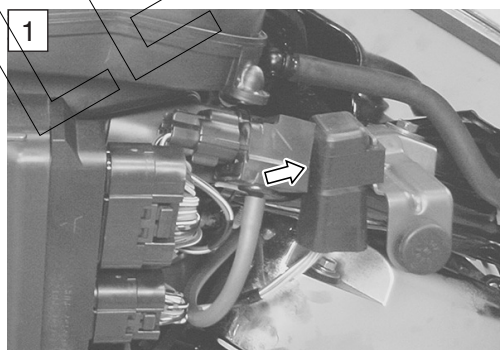
"C41" (P0230) FP RELAY CIRCUIT MALFUNCTION

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. • ECM malfunction.

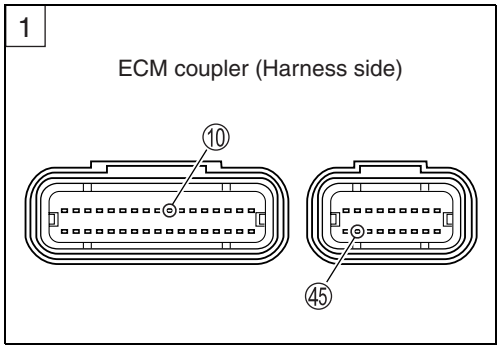


INSPECTION
Step 1
1) Remove the right frame upper cover.
(☞VL1500 Service Manual 6-3)
2) Turn the ignition switch OFF.
3) Check the FP relay coupler for loose or poor contacts.
If OK, then check the FP relay.
(☞Page 96)

Is the FP relay OK?



YES	• Yellow or O/W wire open or shorted to ground, or poor ㊺ connection. • Y/R or R/W wire open or poor ⑩ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a 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 SDS tool. (☞Page 42)

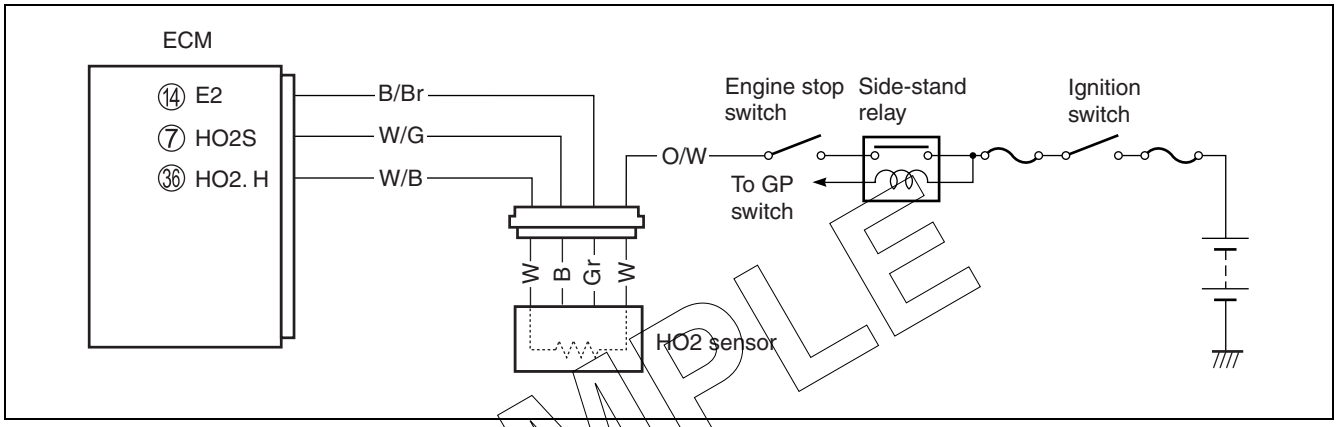
"C42" (P01650) IG SWITCH CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
Ignition switch signal is not input in the ECM.	• Ignition system circuit open or short. • ECM malfunction.

INSPECTION
***Refer to the IGNITION SWITCH INSPECTION for details. (☞Page 142)**

"C44" (P0130/P0135) HO2 SENSOR (HO2S) CIRCUIT MALFUNCTION (FOR E-02, 19, 24)

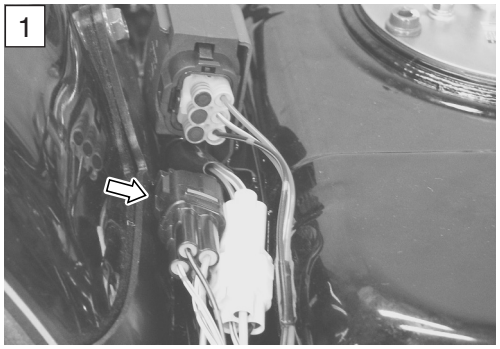
DETECTED CONDITION		POSSIBLE CAUSE
C44 (P0130)	HO2 sensor output voltage is not input to ECM during engine operation and running condition. (Sensor voltage $\leqq$ 0.7 V)	• HO2 sensor circuit open or shorted to ground. • Fuel system malfunction. • ECM malfunction.
C44 (P0135)	The heater can not operate so that heater operation voltage is not supply to the oxygen heater circuit.	• Battery voltage supply to the HO2 sensor.



INSPECTION

Step 1 (When indicating C44/P0130:)

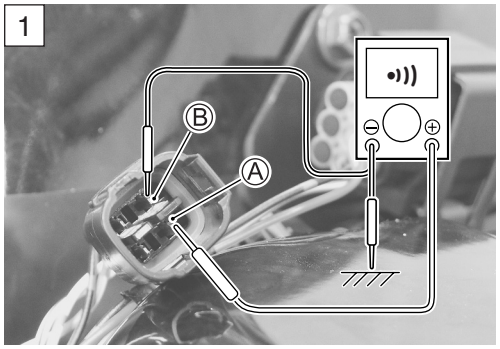
1) Remove the seats. (☞ Page 121)
2) Turn the ignition switch OFF.
3) Check the HO2 sensor for loose or poor contacts.
   If OK, then check the HO2 sensor lead wire continuity.



4) Disconnect the HO2 sensor coupler
5) Check the continuity between W/G wire Ⓐ and ground.
6) Also, check the continuity between W/G wire Ⓐ and B/Br wire Ⓑ. If the sound is not heard from the tester, the circuit condition is OK.

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Continuity test (•))))

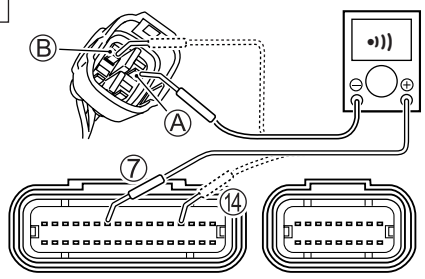


7) Remove the left frame upper cover. (☞VL1500 Service Manual 6-3) and disconnect the ECM coupler.
8) Check the continuity between W/G wire Ⓐ and terminal ⑦.
9) Also, check the continuity between B/Br wire Ⓑ and terminal ⑭.

DATA HO2S lead wire continuity: Continuity (•))))

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

Tester knob indication: Continuity test (•))))

1


ECM coupler (Harness side)

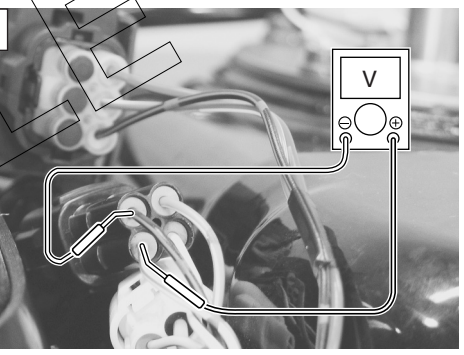
Is the continuity OK?

YES	Go to Step 2. (When indicating C44/P0130:)
NO	W/G wire shorted to ground, or W/G or B/Br wire open.

10) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

Step 2 (When indicating C44/P0130:)
1) Connect the ECM coupler and HO2 sensor coupler.
2) Warm up the engine enough.
3) Measure the HO2 sensor output voltage between W/G wire and B/Br wire, when idling condition.

DATA HO2 sensor output voltage at idle speed:
0.4 V and less (⊕ W/G – ⊖ B/Br)

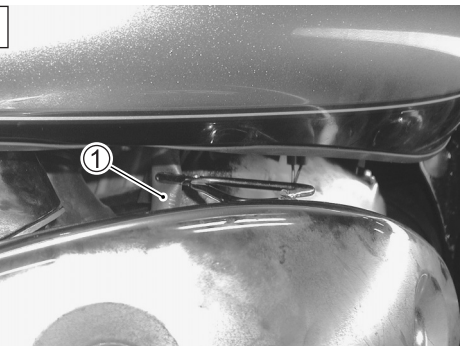
2


4) If OK, then pinch the PAIR hose ① with a proper hose clamp.
5) Measure the HO2 sensor output voltage while holding the engine speed at 5 000 r/min.

DATA HO2 sensor output voltage at 5 000 r/min:
0.6 V and more (⊕ W/G – ⊖ B/Br)

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

Tester knob indication: Voltage (⎓)

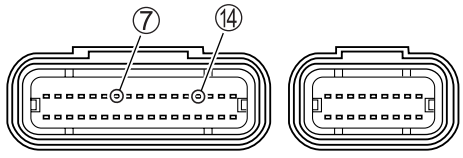
2


Is the voltage OK?

YES	• W/G wire or B/Br wire open or shorted to ground, or poor ⑦ or ⑭ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	Replace the HO2 sensor with a new one.

6) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

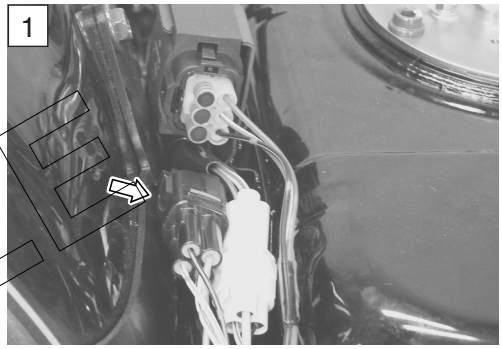
2



Step 1 (When indicating C44/P0135:)

1) Remove the seats. (☞Page 121)
2) Turn the ignition switch OFF.
3) Check the HO2 sensor for loose or poor contacts.
   If OK, then measure the HO2 sensor resistance.

1



4) Disconnect the HO2 sensor coupler and measure the resistance between terminals.

DATA HO2 heater resistance: 6.5 – 8.9 Ω at 23 °C (73.4 °F)
(White – White)

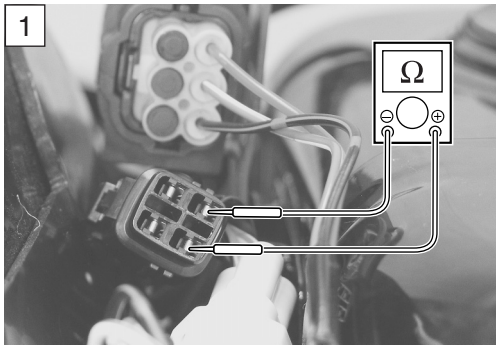
NOTE:

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

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

1



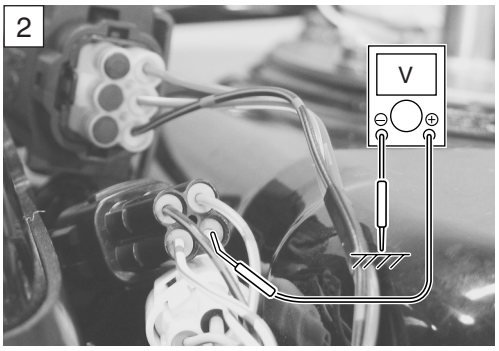
Is the voltage OK?

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

5) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

Step 2 (When indicating C44/P0135:)

1) Connect the HO2 sensor coupler.
2) Insert the needle pointed probes to the HO2 sensor coupler.
3) Turn the ignition switch ON and measure the heater voltage between W/B wire and ground.
4) If the tester voltage indicates the battery voltage, it is good condition.



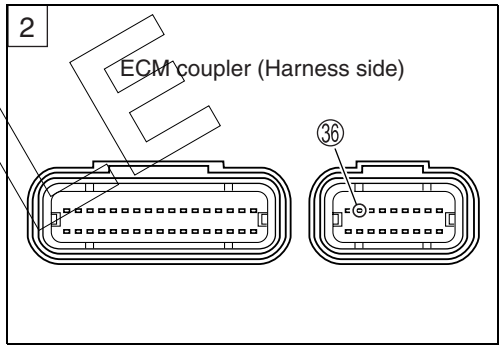
DATA Heater voltage: Battery voltage
(⊕ W/B – ⊖ Ground)

NOTE:
Battery voltage can be detected only before starting the engine.

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

Tester knob indication: Voltage (⎓)

Is the voltage OK?

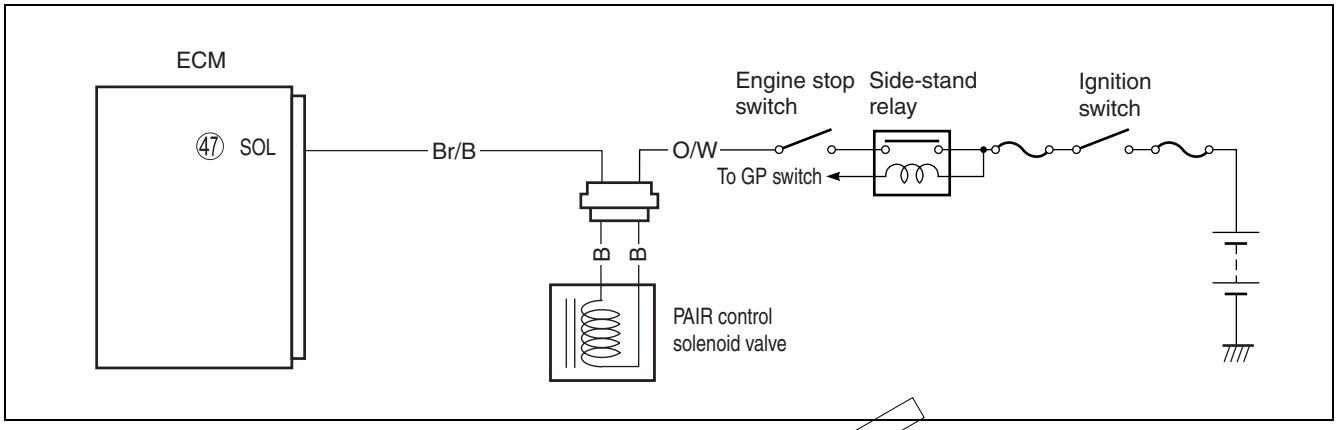


YES	• O/W or W/B wire open or shorted to ground, or poor ㊱ connection. • Recheck each terminal and wire harness for open circuit and poor connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Replace the ECM with a known good one, and inspect it again.
NO	• Open or short circuit in the W/B wire or O/W wire. • Loose or poor contacts on the ECM coupler (terminal ㊱) or HO2 sensor coupler.

5) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

"C49" (P1656) PAIR CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION

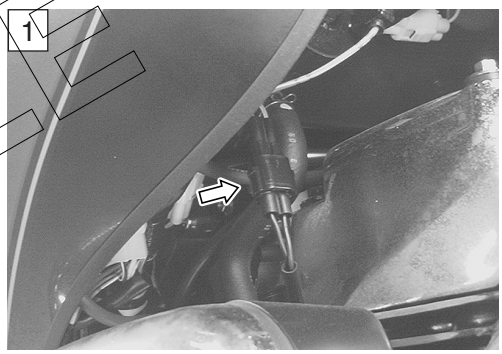
DETECTED CONDITION	POSSIBLE CAUSE
PAIR control solenoid valve voltage is not input to ECM.	• PAIR valve circuit open or short. • PAIR valve malfunction. • ECM malfunction.



INSPECTION

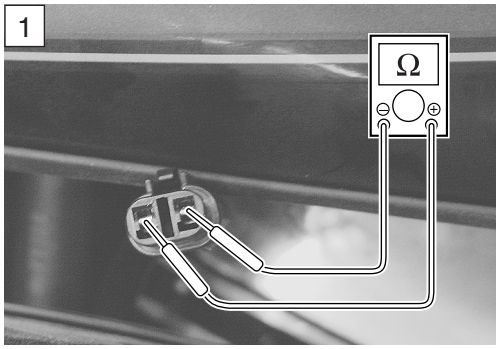
Step 1

1) Turn the ignition switch OFF.
2) Check the PAIR control solenoid valve coupler for loose or poor contacts.
   If OK, then measure the PAIR control solenoid valve resistance.



3) Disconnect the PAIR control solenoid valve coupler.
4) Measure the resistance between Black and Black wire terminals.

DATA PAIR valve resistance:
20 – 24 Ω at 20 – 30 °C (68 – 86 °F)
(Black – Black)

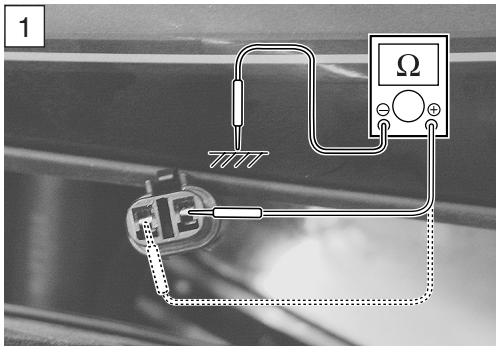


TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

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

DATA PAIR valve resistance: ∞ Ω (Infinity)
(Terminal – Ground)



Tester knob indication: Resistance (Ω)

Is the resistance OK?

YES	Go to Step 2.
NO	Replace the PAIR valve with a new one.

6) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

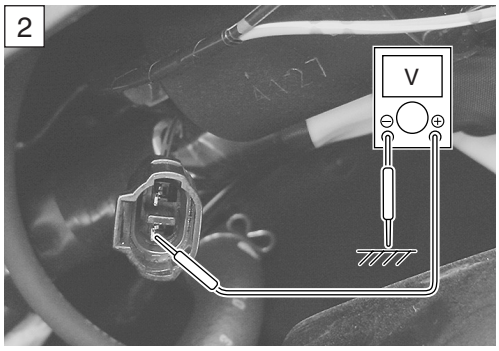
Step 2

1) Turn the ignition switch ON.
2) Measure the voltage between O/W wire and ground.

DATA PAIR valve voltage: Battery voltage
(⊕ O/W – ⊖ Ground)

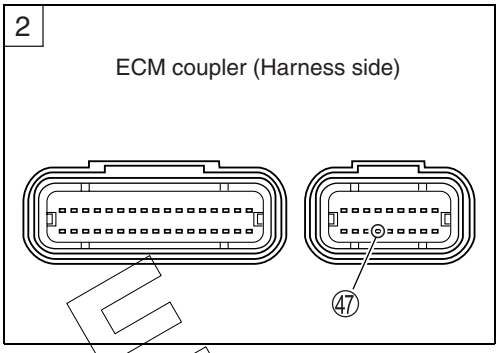
TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)



Is the voltage OK?

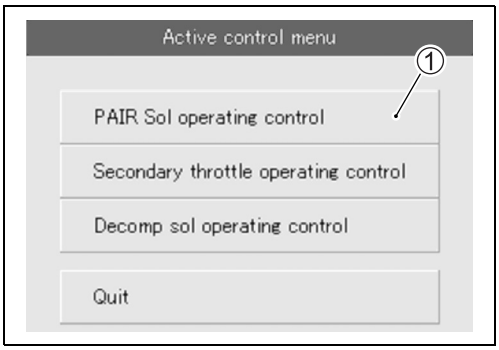
YES	• Br/B wire open or shorted to ground, or poor ㊼ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	Open or short circuit in the O/W wire.



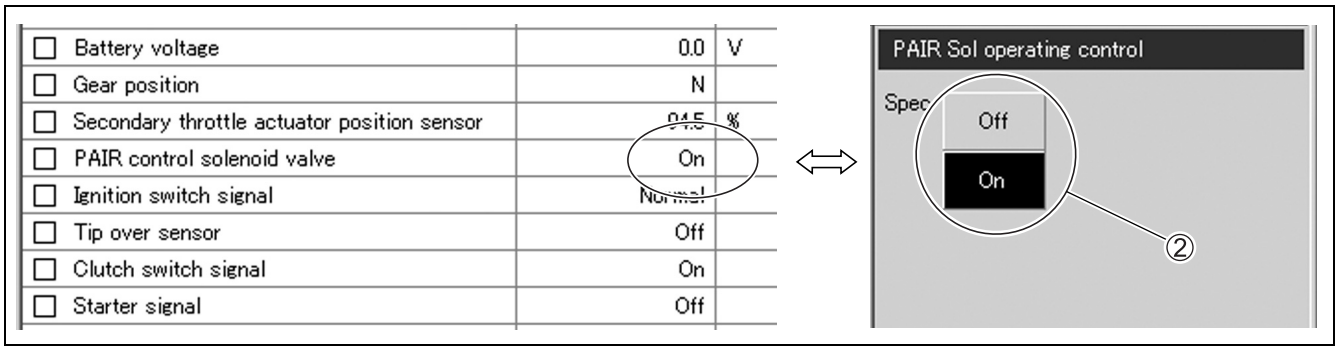
3) After repairing the trouble, clear the DTC using SDS tool. (☞Page 42)

ACTIVE CONTROL INSPECTION

1) Set up the SDS tool. (Refer to the SDS operation manual for further details.)
2) Turn the ignition switch ON.
3) Click "PAIR Sol operating control" ①.

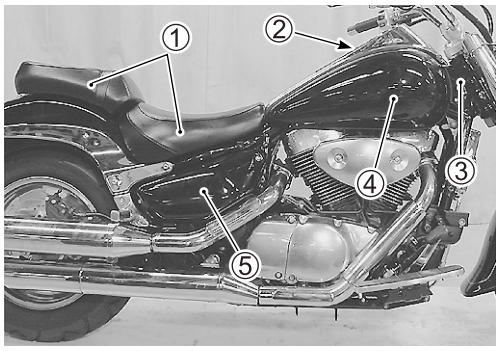


4) Click each button ②.
At this time, if an operation sound is heard from the PAIR control solenoid valve, the function is normal.

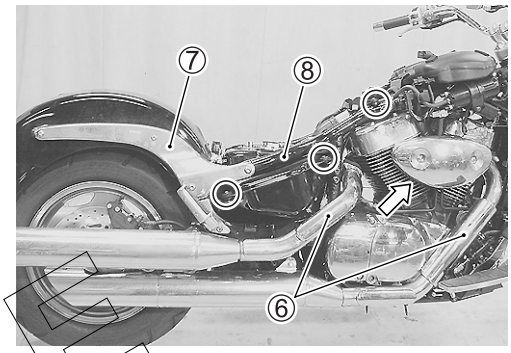


FUEL SYSTEM

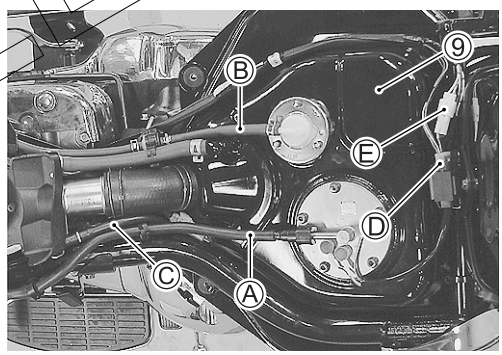
FUEL TANK REMOVAL



- Remove the seats ①. (☞Page 121)
- Remove the speedometer and fuel inlet cover ②. (☞VL1500 Service Manual 6-3)
- Remove the frame head covers ③ and frame upper covers ④. (☞VL1500 Service Manual 6-3)
- Remove the frame covers ⑤. (☞VL1500 Service Manual 6-2)



- Remove the PAIR cover, PAIR control valve and PAIR bracket. (☞Page 14)
- Remove the exhaust pipes and mufflers ⑥. (☞VL1500 Service Manual 3-5)
- Remove the heat shield bolt and fuel tank mounting bolts. (☞VL1500 Service Manual 5-2)
- Remove the right frame handle grip ⑦ and seat frame ⑧. (☞VL1500 Service Manual 5-2)



- Remove the fuel feed hose Ⓐ, fuel tank breather hose Ⓑ and fuel drain hose Ⓒ.
- Disconnect the TO sensor coupler Ⓓ and fuel pump coupler Ⓔ.
- Remove the fuel tank ⑨.

⚠ WARNING

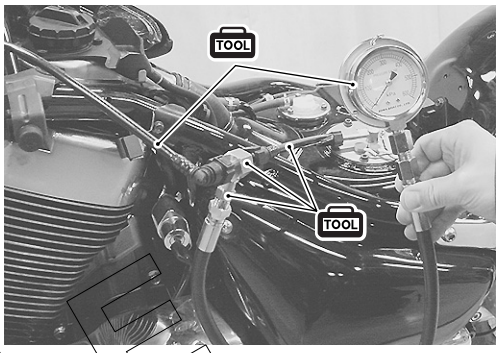
Gasoline is highly flammable and explosive.
Keep heat, spark and flame away.

FUEL PRESSURE INSPECTION

- Remove the seats. (☞Page 121)
- Remove the speedometer and fuel inlet cover. (☞VL1500 Service Manual 6-3)
- Remove the left frame head cover and left frame upper cover. (☞VL1500 Service Manual 6-3)
- Place a rag under the fuel feed hose.
- Remove the fuel feed hose ①.

- Install the special tools between the fuel tank and fuel delivery pipe.

TOOL 09940-40211: Fuel pressure gauge adaptor
09940-40220: Fuel pressure gauge hose attachment
09915-74511: Oil pressure gauge set



Turn the ignition switch ON and check the fuel pressure.

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

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

* Clogged fuel filter
* Pressure regulator
* Fuel pump

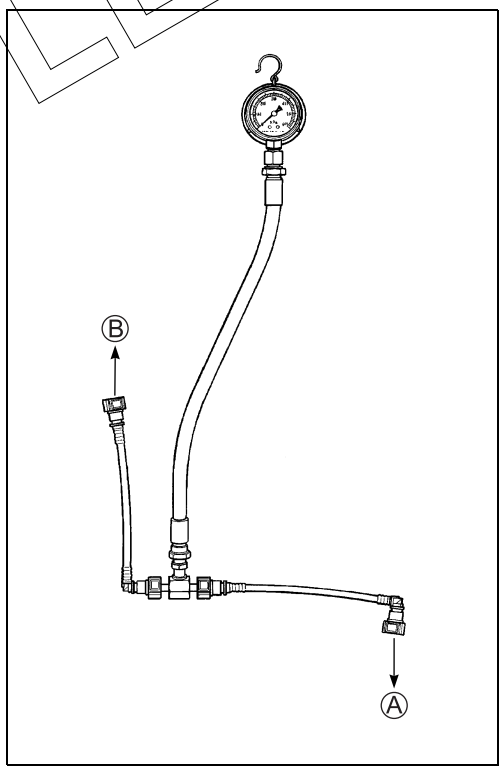
If the fuel pressure is higher than the specification, inspect the following items:

* Fuel pump check valve
* Pressure regulator

⚠ WARNING

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

Ⓐ To fuel tank.
Ⓑ To fuel delivery pipe.



FUEL PUMP INSPECTION

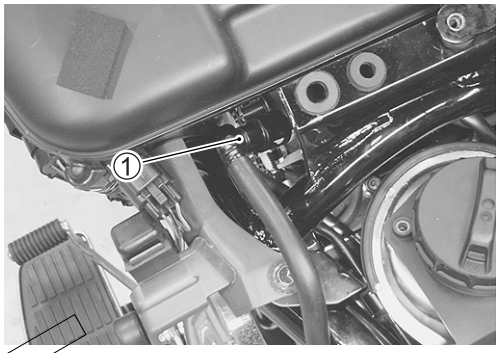
Turn the ignition switch ON and check that the fuel pump operates for few seconds.
If the fuel pump motor does not make operating sound, inspect the fuel pump circuit connections or inspect the fuel pump relay and tip-over sensor.
If the fuel pump relay, tip-over sensor and fuel pump circuit connections are OK, the fuel pump may be faulty, replace the fuel pump with a new one.

FUEL DISCHARGE AMOUNT INSPECTION

⚠ WARNING

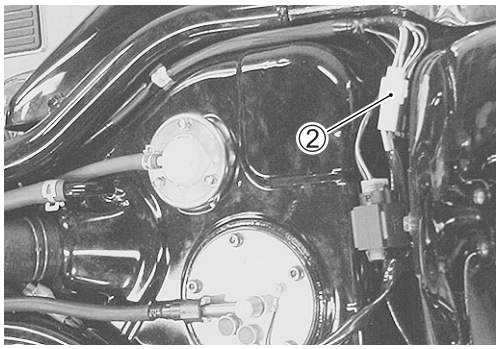
Gasoline is highly flammable and explosive.
Keep heat, spark and flame away.

- Remove the seats. (☞Page 121)
- Remove the speedometer and fuel inlet cover. (☞VL1500 Service Manual 6-3)
- Remove the left frame head cover and left frame upper cover. (☞VL1500 Service Manual 6-3)
- Disconnect the fuel feed hose ① from the fuel delivery pipe.

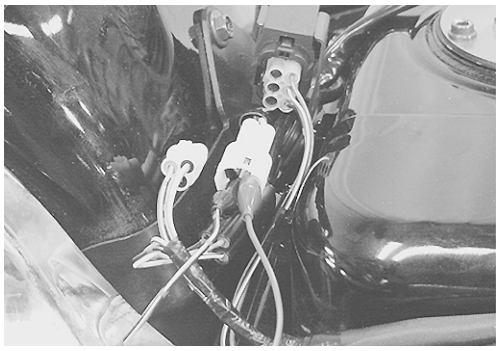


- Place the measuring cylinder and insert the fuel feed hose end into the measuring cylinder.

- Disconnect the fuel pump lead wire coupler ②.



- Connect a proper lead wire into the fuel pump lead wire coupler (fuel pump side) and apply 12 volts to the fuel pump (between Y/R wire and B/W wire) for 10 seconds and measure the amount of fuel discharged.
  Battery ⊕ terminal ———(Yellow with red tracer)
  Battery ⊖ terminal ———(Black with white tracer)



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

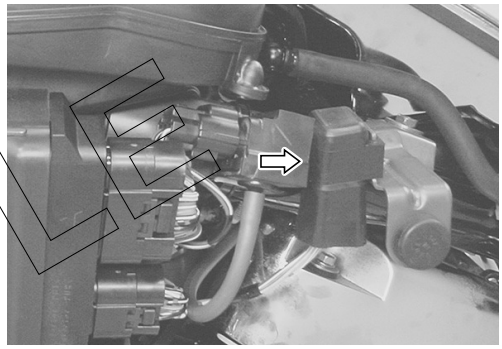
DATA Fuel discharge amount: 168 ml and more/10 sec.
(5.7/5.9 US/Imp oz)/10 sec.

NOTE:
The battery must be in fully charged condition.

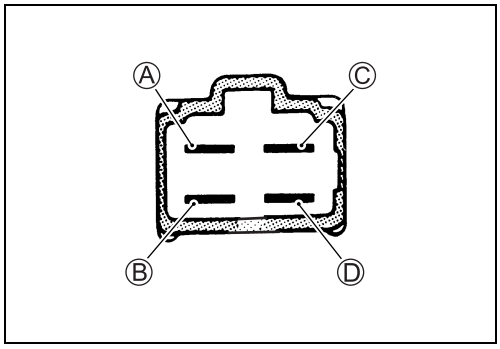
FUEL PUMP RELAY INSPECTION

Fuel pump relay is located at the right side of the ECM.

- Remove the left frame head cover. (☞VL1500 Service Manual 6-3)
- Remove the fuel pump relay.

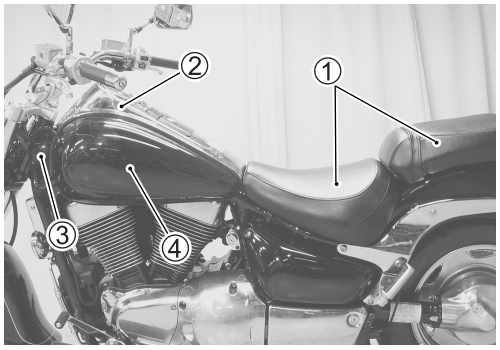


First, check the insulation between Ⓐ and Ⓑ terminals with pocket tester. Then apply 12 volts to Ⓒ and Ⓓ terminals, ⊕ to Ⓒ and ⊖ to Ⓓ, and check the continuity between Ⓐ and Ⓑ.
If there is no continuity, replace it with a new one.



FUEL PUMP ASSEMBLY REMOVAL

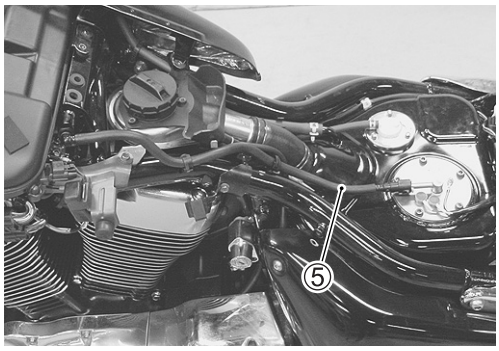
- Remove the seats ①. (☞Page 121)
- Remove the speedometer and fuel inlet cover ②. (☞VL1500 Service Manual 6-3)
- Remove the left frame head cover ③ and left frame upper cover ④. (☞VL1500 Service Manual 6-3)



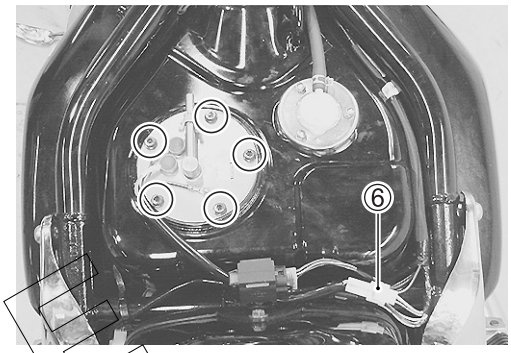
- Remove the fuel feed hose ⑤.

⚠ WARNING

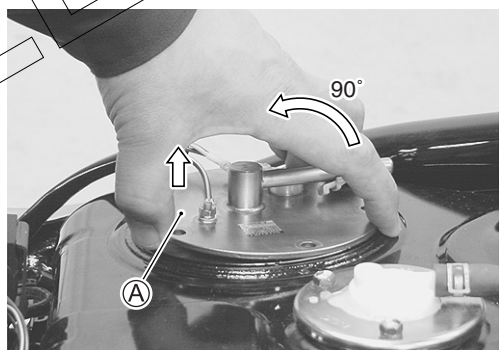
Gasoline is highly flammable and explosive.
Keep heat, spark and flame away.



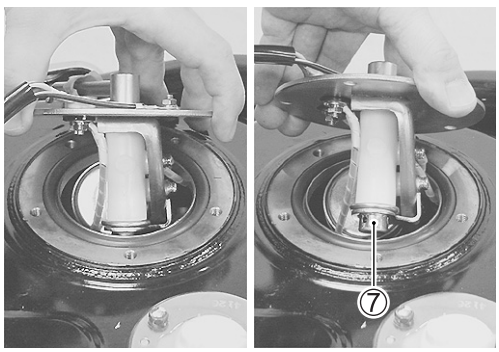
- Disconnect the fuel pump coupler ⑥.
- Remove the fuel pump mounting bolts diagonally.



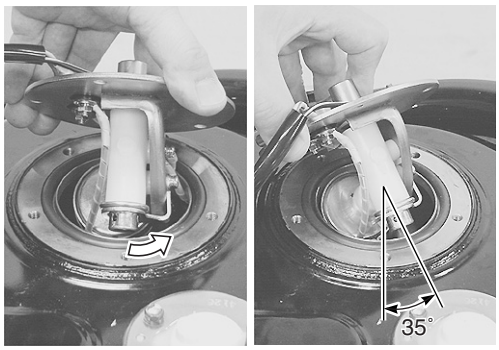
- Lift up the rear part Ⓐ and turn the fuel pump mounting plate counterclockwise to approx. 90°.



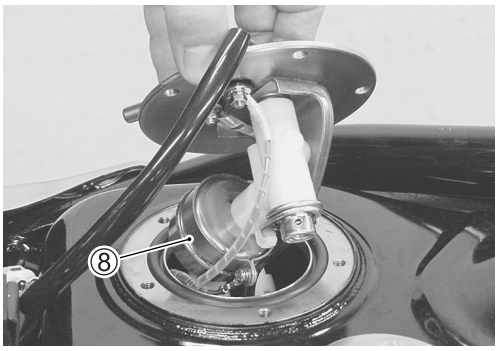
- Pull out the fuel pump mounting plate until the fuel pressure regulator ⑦ comes out from the fuel tank.



- Turn the fuel pump mounting plate counterclockwise to approx. 35°.



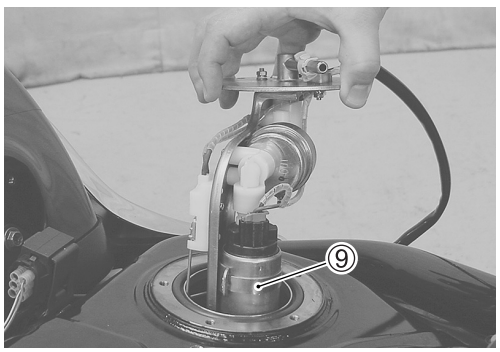
• Pull the fuel pump mounting plate until the fuel filter ⑧ comes out from the fuel tank.



• Set the fuel pump mounting plate to the horizontal line.

• Turn the fuel pump mounting plate counterclockwise to approx. 90°.

• Pull the fuel pump mounting plate until the fuel pump band ⑨ comes out from the fuel tank.



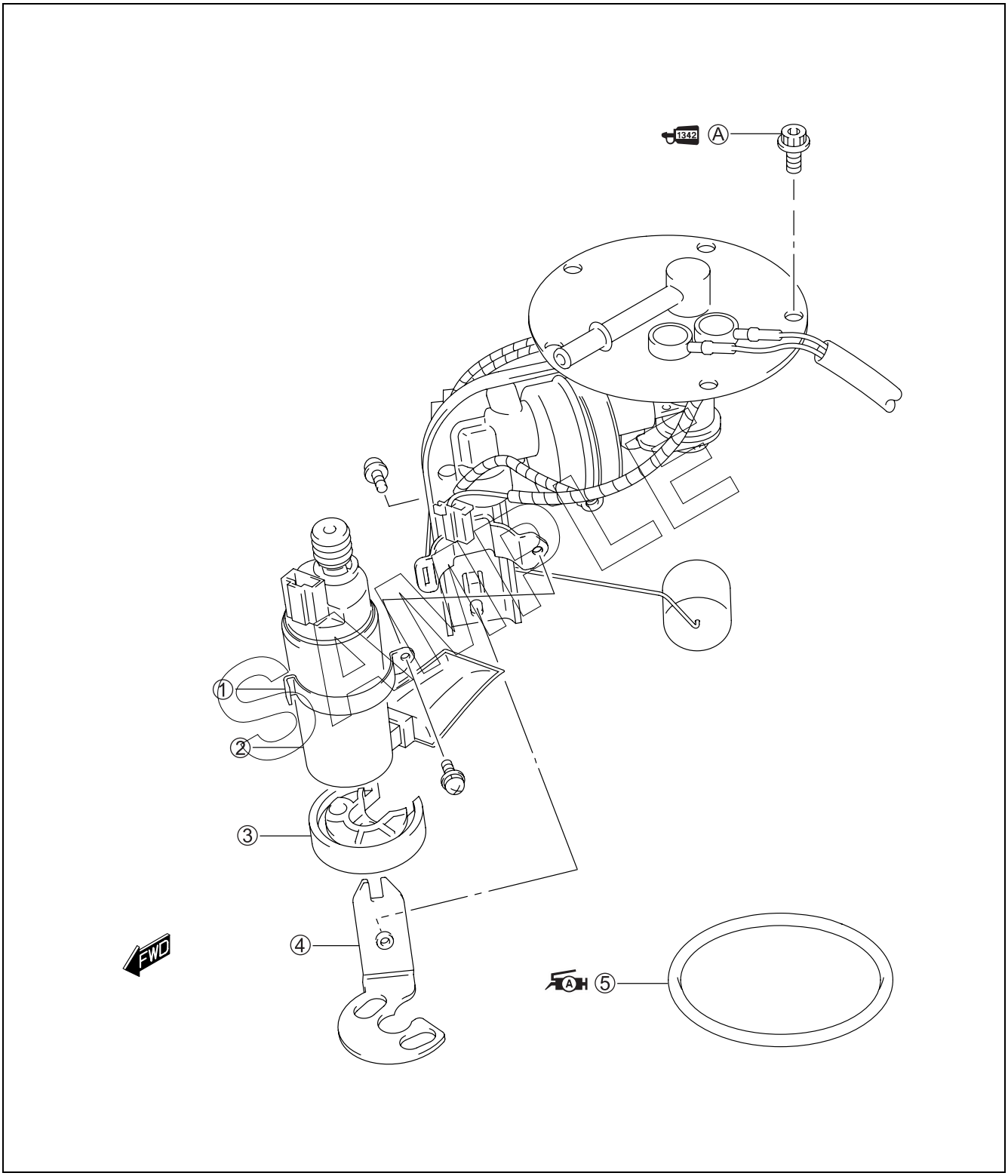
• Remove the fuel pump assembly.

CAUTION

Be careful not to bend the fuel level gauge.

FUEL PUMP DISASSEMBLY

CONSTRUCTION

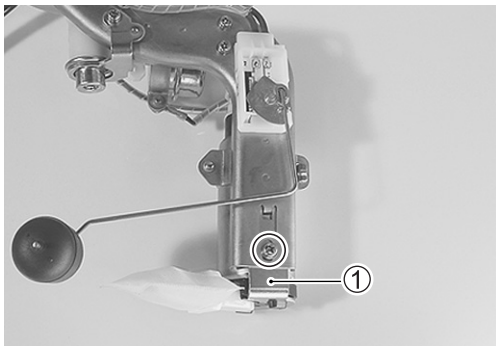


①	Band	④	Fuel pump holder
②	Fuel pump	⑤	O-ring
③	Rubber cushion	Ⓐ	Fuel pump mounting bolt

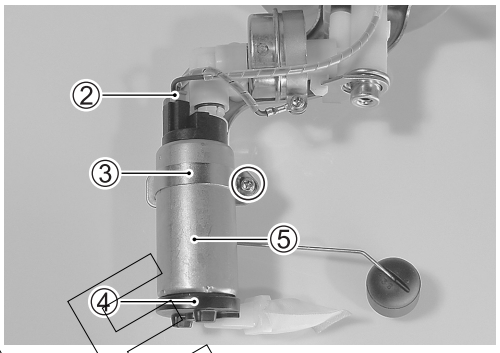
ITEM	N·m	kgf-m	lb-ft
Ⓐ	10	1.0	7.0

DISASSEMBLY

- Remove the fuel pump holder ①.



- Disconnect the fuel pump coupler ②.
- Remove the band ③, rubber cushion ④ and fuel pump ⑤.



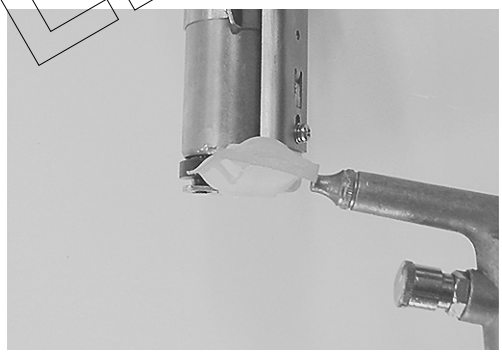
FUEL MESH FILTER INSPECTION AND CLEANING

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

- Blow the fuel mesh filter with compressed air.

NOTE:

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

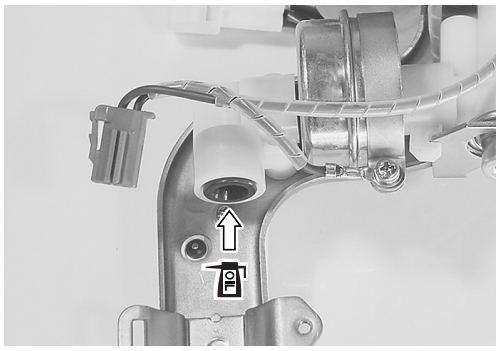


REASSEMBLY

- Reassembly the fuel pump in the reverse order of disassembly, and pay attention to the following points:
- Apply thin coat of engine oil to the new bushing and install it to the fuel joint pipe.

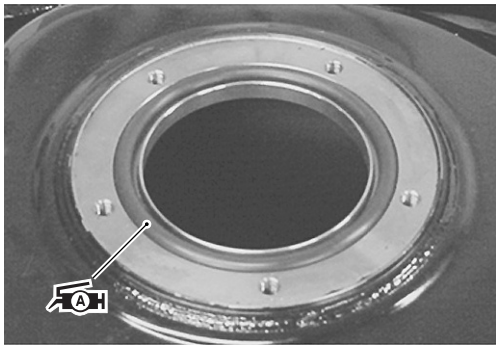
CAUTION

Use the new bushing to prevent fuel leakage.



INSTALLATION

- Install the fuel pump in the reverse order of removal, and pay attention to the following points:
- Install the new O-ring and apply grease to it.

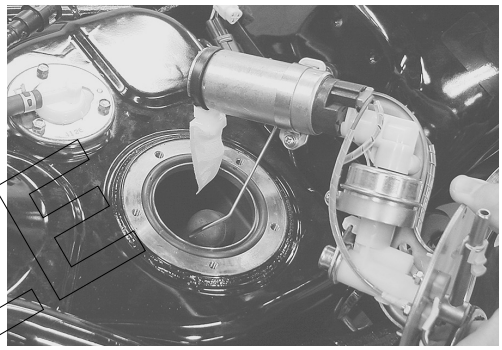


⚠ WARNING

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

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

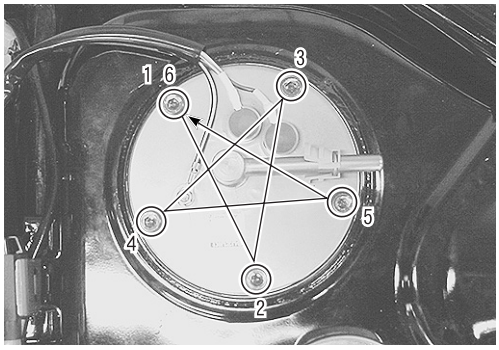
- Install the fuel pump assembly.



CAUTION

Be careful not to bend the fuel level gauge.

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

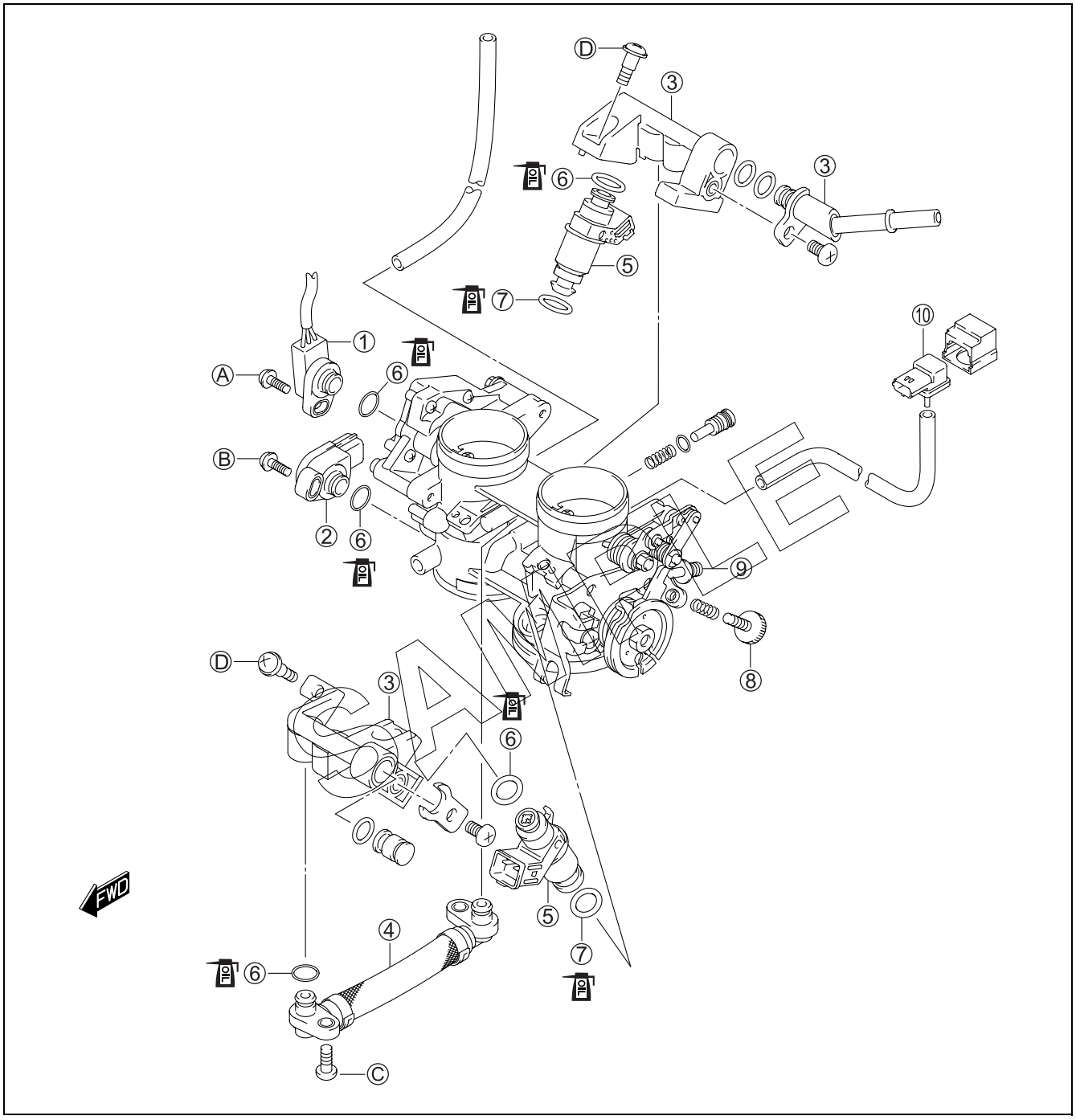


Fuel pump mounting bolt: 10 N·m (1.0 kgf-m, 7.3 lb-ft)

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

1342 99000-32050: THREAD LOCK "1342"

THROTTLE BODY
CONSTRUCTION

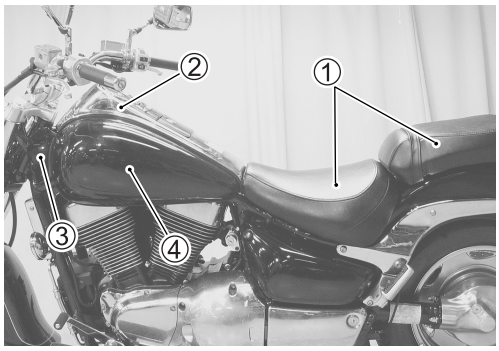


①	STP sensor	⑨	Fast idle screw
②	TP sensor	⑩	IAP sensor
③	Fuel delivery pipe	Ⓐ	STP sensor mounting screw
④	Fuel delivery pipe joint hose	Ⓑ	TP sensor mounting screw
⑤	Fuel injector	Ⓒ	Fuel delivery pipe joint hose mounting screw
⑥	O-ring		
⑦	Cushion seal	Ⓓ	Fuel delivery pipe mounting screw
⑧	Throttle stop screw		

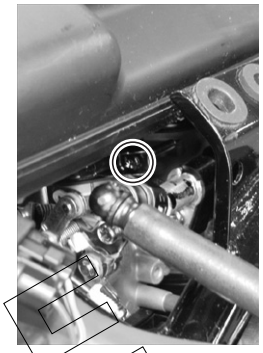
ITEM	N·m	kgf-m	lb-ft
Ⓐ	3.5	0.35	2.5
Ⓑ	3.5	0.35	2.5
Ⓒ	3.5	0.35	2.5
Ⓓ	3.5	0.35	2.5

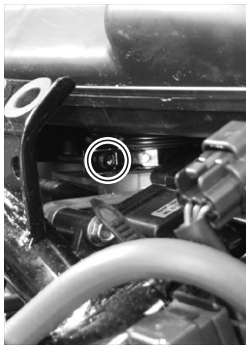
AIR CLEANER BOX REMOVAL

- Remove the seats ①. (☞Page 121)
- Remove the speedometer and fuel inlet cover ②, frame head covers ③, and frame upper covers ④.
  (☞VL1500 Service Manual 6-3)



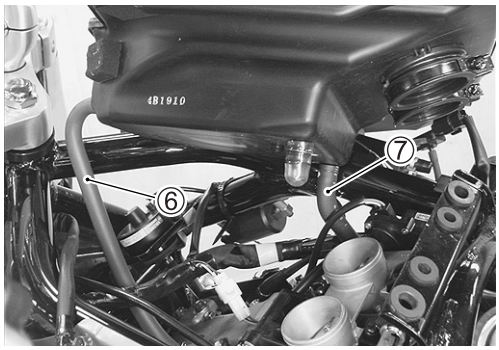
- Loosen the throttle body clamp screws.





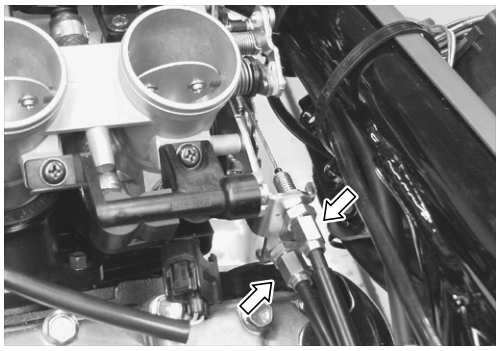
- Disconnect the IAT sensor coupler ⑤.

- Disconnect the PCV hose ⑥ and PAIR hose ⑦.



THROTTLE BODY REMOVAL

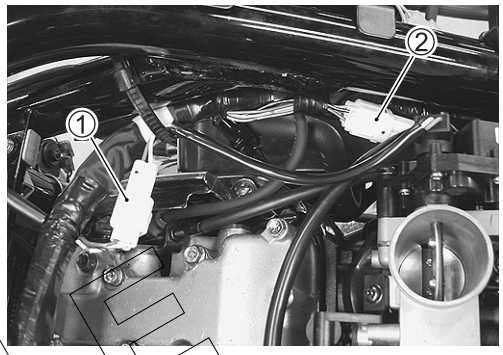
- Remove the air cleaner box. (☞Page 103)
- Disconnect the throttle cables from their drum.



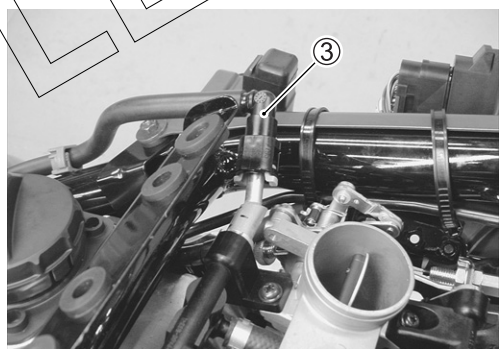
CAUTION

After disconnecting the throttle cables, do not snap the throttle valve from full open to full close. It may cause damage to the throttle valve and throttle body.

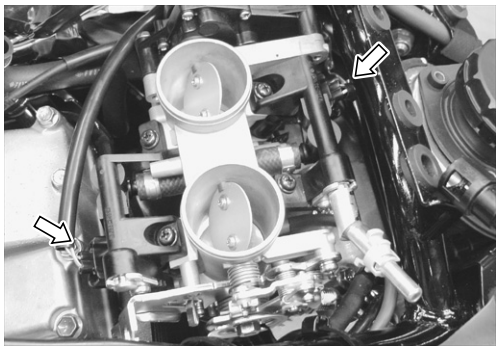
- Disconnect the STP sensor coupler ① and STVA coupler ②.



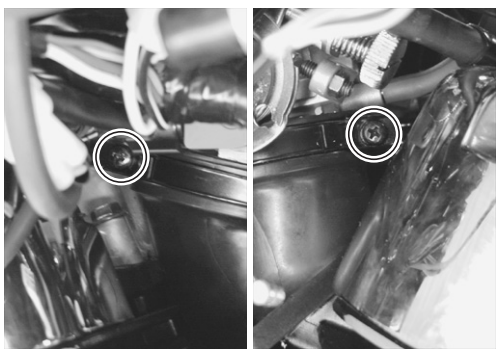
- Place a rag under the fuel feed hose and disconnect the fuel feed hose ③ from the delivery pipe.



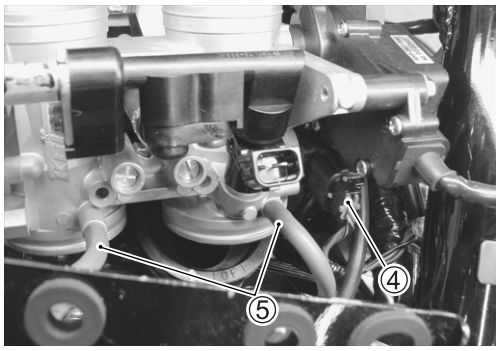
- Disconnect the fuel injector couplers.



- Loosen the throttle body clamp screws at the intake pipe side.

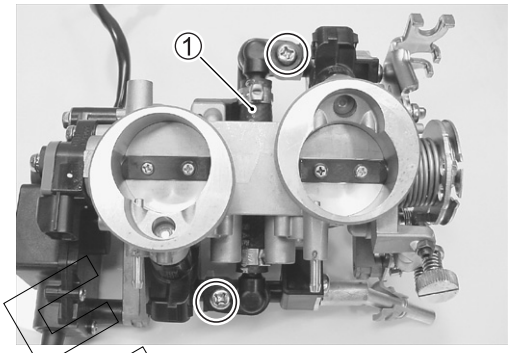


- Disconnect the TP sensor coupler ④ and IAP sensor vacuum hoses ⑤.
- Remove the throttle body assembly.

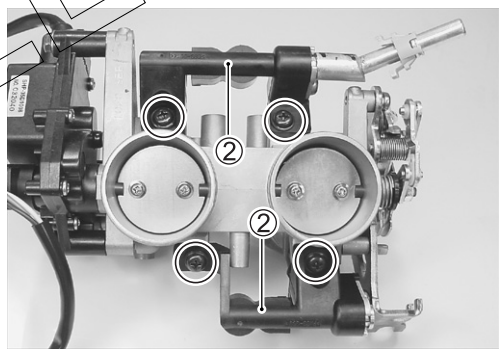


THROTTLE BODY DISASSEMBLY

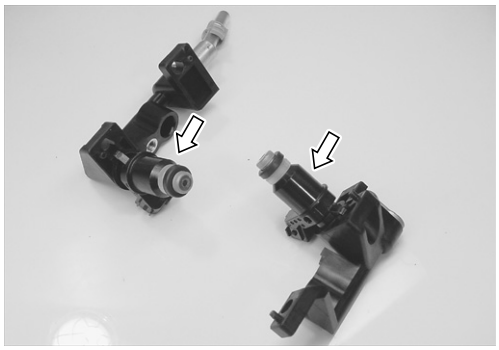
- Remove the fuel delivery pipe joint hose ①.



- Remove the fuel delivery pipes ②



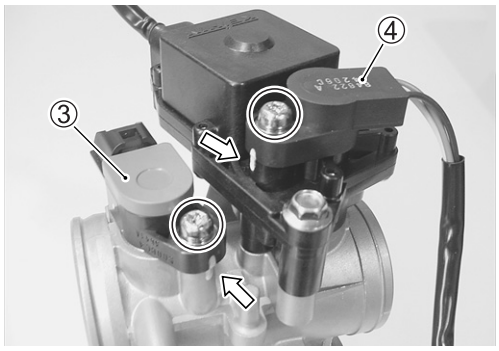
- Remove the fuel injectors.



• Remove the TP sensor ③ and STP sensor ④ with the special tool.

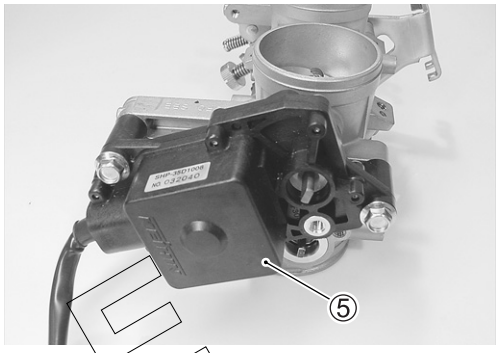
TOOL 09930-11950: Torx wrench

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



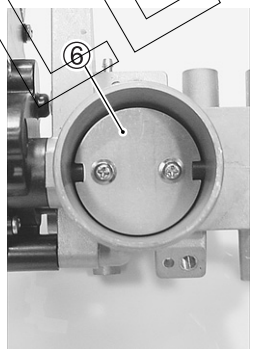
CAUTION

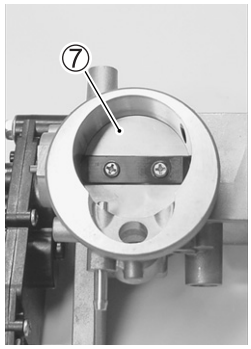
Never remove the STVA ⑤ from the throttle body.



CAUTION

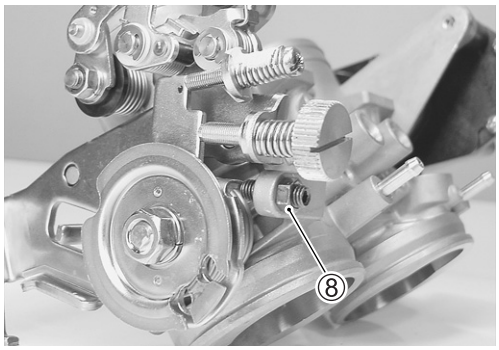
Never remove the secondary throttle valve ⑥ and throttle valve ⑦.





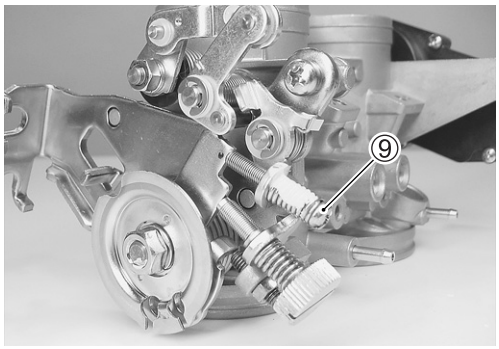
CAUTION

Avoid removing the throttle valve adjuster ⑧ unless absolutely necessary.



CAUTION

The fast idle screw ⑨ is factory-adjusted at the time of delivery and therefore avoid removing or turning it unless otherwise necessary.



THROTTLE BODY CLEANING

⚠ WARNING

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

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

CAUTION

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

INSPECTION

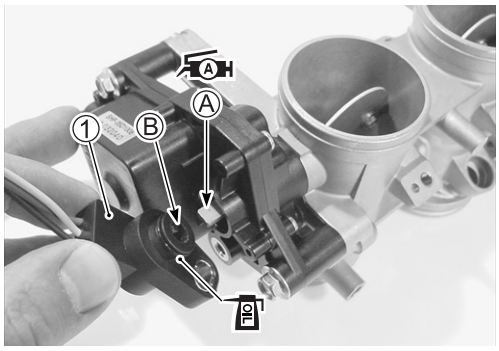
Check following items for any damage or clogging.

* O-ring
* Throttle valve
* Secondary throttle valve
* Vacuum hose
* Delivery pipe joint hose
* Injector cushion seal

THROTTLE BODY REASSEMBLY

Reassemble the throttle body in the reverse order of disassembly. Pay attention to the following points:

- With the STV fully open, install the STP sensor ① and tighten the STP sensor mounting screw to the specified torque.



NOTE:

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

** Align the secondary throttle shaft end Ⓐ with the groove Ⓑ of STP sensor.*

** Apply SUZUKI SUPER GREASE "A" to the secondary throttle shaft end Ⓐ if necessary.*

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

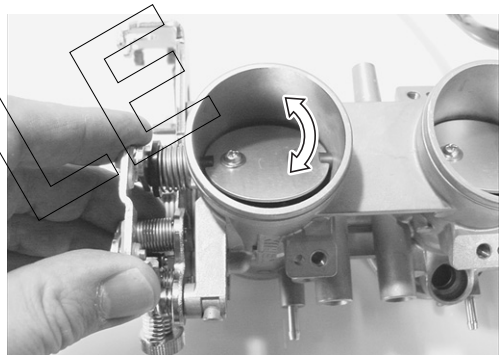
TOOL 09930-11950: Torx wrench

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

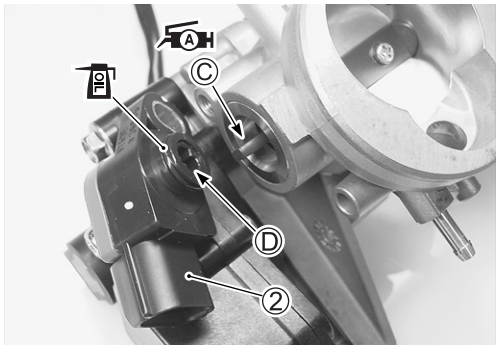
NOTE:

** Make sure the STP valve open or close smoothly.*

** If the STP sensor adjustment is necessary, refer to page 110 for STP sensor setting procedure.*



- With the throttle valve fully closed, install the TP sensor ② and tighten the TP sensor mounting screw to the specified torque.



NOTE:

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

** Align the throttle shaft end Ⓒ with the groove Ⓓ of TP sensor.*

** Apply SUZUKI SUPER GREASE "A" to the throttle shaft end Ⓒ if necessary.*

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

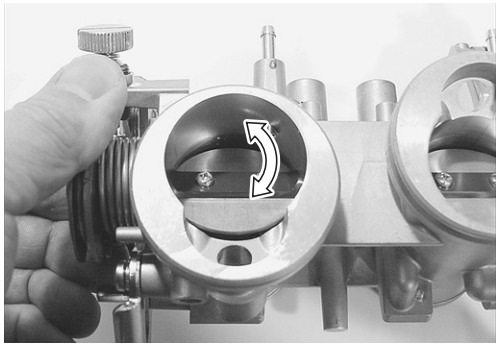
TOOL 09930-11950: Torx wrench

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

NOTE:

** Make sure the throttle valve open or close smoothly.*

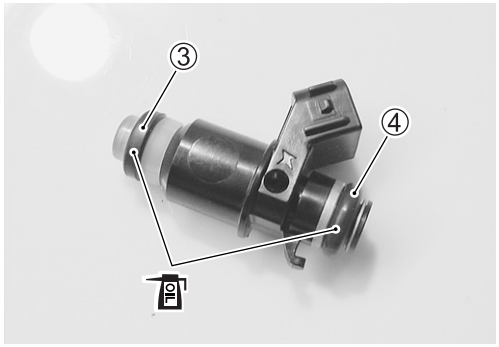
** TP sensor setting procedure. (☞Page 36)*



• Apply thin coat of the engine oil to the new fuel injector cushion seal ③, and install it to the fuel injector.

CAUTION

Replace the cushion seal and O-ring with the new ones.



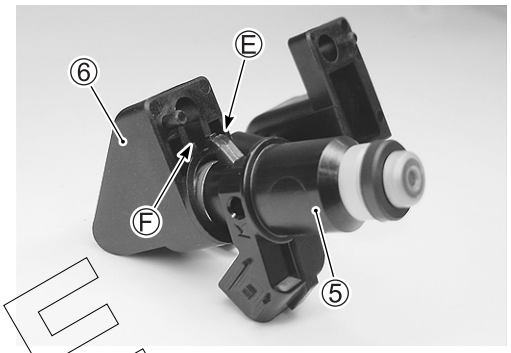
• Install the O-ring ④ to the fuel injector.
• Apply thin coat of the engine oil to the new O-ring ④.

• Install the fuel injector ⑤ by pushing it straight to the delivery pipe ⑥.

NOTE:
Align the boss Ⓔ of the injector with the groove Ⓕ of the delivery pipe.

CAUTION

Never turn the injector while pushing it.



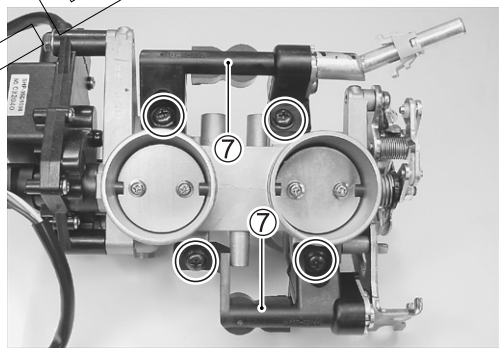
• Install the fuel delivery pipes ⑦ along with the fuel injectors.

CAUTION

Never turn the fuel injectors while installing them.

• Tighten the fuel delivery pipe mounting screws to the specified torque.

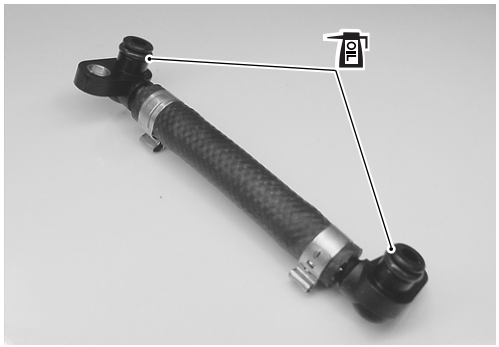
Fuel delivery pipe mounting screw:
3.5 N·m (0.35 kgf-m, 2.5 lb-ft)



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

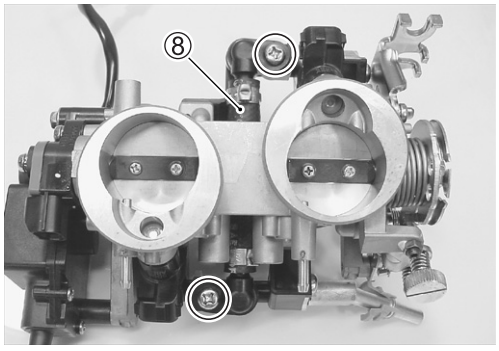
CAUTION

Replace the O-rings with the new ones.



• Install the fuel delivery pipe joint hose ⑧ to the delivery pipes.
• Tighten the fuel delivery pipe hose mounting screws to the specified torque.

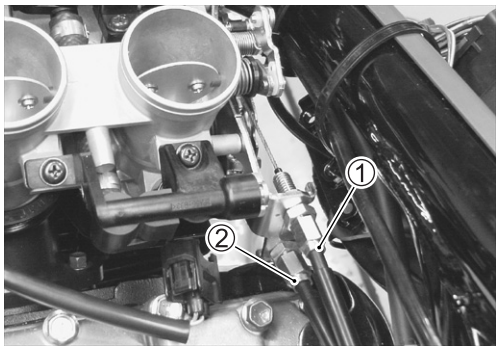
Fuel delivery pipe joint hose mounting screw:
3.5 N·m (0.35 kgf-m, 2.5 lb-ft)



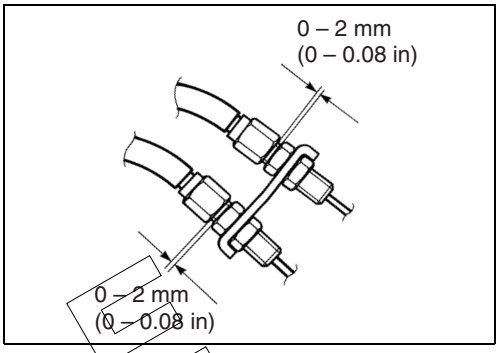
THROTTLE BODY INSTALLATION

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

- Connect the throttle pulling cable ① and throttle returning cable ② to the throttle cable drum.



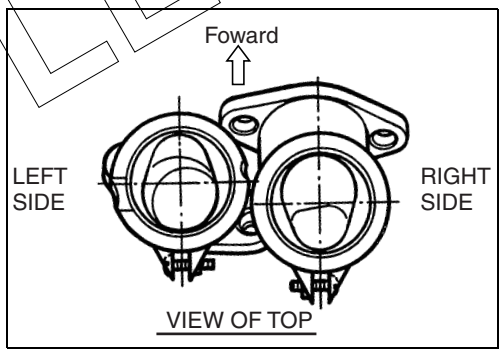
- Loosen each throttle cable lock-nut.
- Turn in each throttle cable adjuster fully and locate each outer cable so that the clearance is 0 – 2 mm (0 – 0.08 in).
- Tighten each lock-nut.
- Adjust the throttle cable play.
  Refer to page 9 for details.



AIR CLEANER BOX INSTALLATION

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

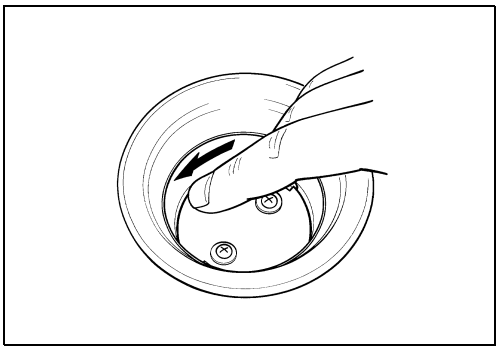
- Install the air cleaner box and tighten the throttle body clamp screws as shown in the illustration.



STP SENSOR ADJUSTMENT

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

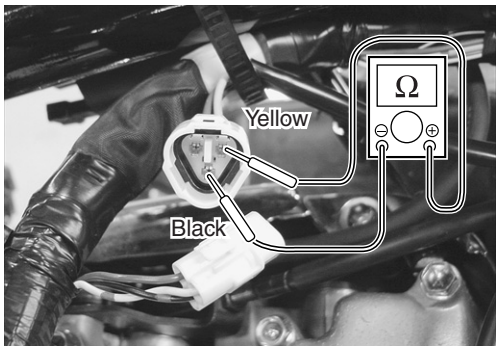
- Remove the air cleaner box. (☞Page 103)
- Disconnect the STVA coupler and STP sensor coupler. (☞Page 74 and 77)
- Close the secondary throttle valve by finger, and measure the STP sensor resistance.



DATA STP sensor setting resistance
ST valve is fully closed: Approx. 0.5 kΩ
(⊕ Yellow – ⊖ Black)

TOOL 09900-25008: Multi-circuit tester set

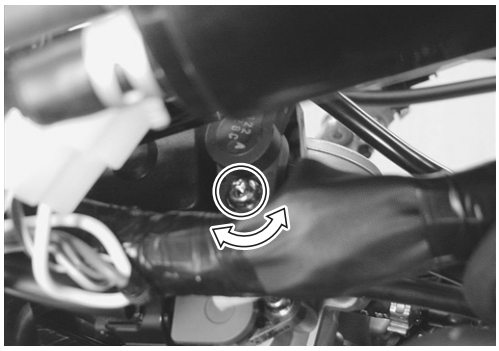
Tester knob indication: Resistance (Ω)



- If the STP sensor resistance is out of specification, loosen the STP sensor mounting screw and adjust the STP sensor resistance to specification.
- Tighten the STP sensor mounting screw.

TOOL 09930-11950: Torx wrench

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



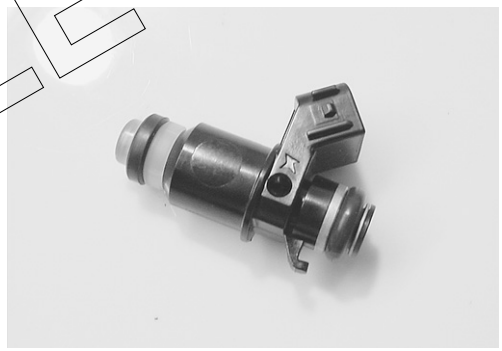
FUEL INJECTOR REMOVAL

- Remove the air cleaner box. (☞Page 103)
- With battery negative cable disconnected, disconnect the injector couplers.
- Remove the fuel delivery pipe hose and pipes. (☞Page 105)
- Remove the fuel injectors #1 and #2. (☞Page 105)

FUEL INJECTOR INSPECTION

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

NOTE:
The fuel injector can be checked without removing it from the throttle body.
Refer to page 84 for details.



FUEL INJECTOR INSTALLATION

- Apply thin coat of the engine oil to new injector cushion seal and O-rings. (☞Page 109)
- Install the injector by pushing it straight to the throttle body. Never turn the injector while pushing it. (☞Page 109)

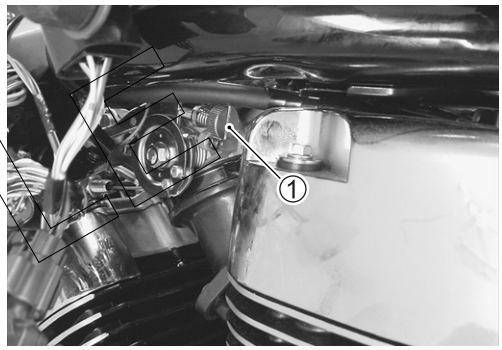
FAST IDLE

The fast idle system is automatic type.
When the fast idle cam is turned by the secondary throttle valve actuator, the cam pushes the lever on the throttle valve shaft causing the throttle valve to open and raise the engine speed. When the engine has warmed up, depending on the oil temperature, ambient temperature and lapsed time, the fast idle is cancelled allowing the engine to resume idle speed.

Ambient Temp.	Fast idle rpm	Fast idle cancelling time
–5 °C (23 °F)	1 400 – 2 000 rpm	Approx. 100 sec.
15 °C (59 °F)	1 400 – 2 000 rpm	Approx. 40 sec.
25 °C (77 °F)	1 400 – 2 000 rpm	Approx. 30 sec.

FAST IDLE ADJUSTMENT

- Remove the seats. (☞Page 121)
- Remove the speedometer and fuel inlet cover, frame head covers and frame upper covers.
  (☞VL1500 Service Manual 6-3)
- Start up the engine and run it in idling condition for warming up.
- Connect a tachometer and set the idle rpm to 1 000 rpm by the throttle stop screw ①.
- Check and adjust the TP sensor. (☞Page 36)

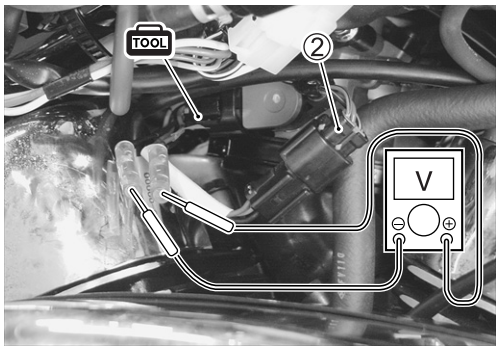


- Turn the ignition switch OFF.
- Disconnect the TP sensor coupler ② and install the test harness.
- Start up the engine.
- Measure the TP sensor output voltage at the wire terminals (between ⊕ Red and ⊖ Black).

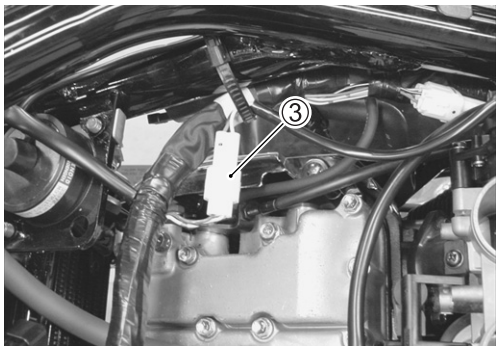
DATA TP sensor output voltage at idle position: Approx. 1.12 V

TOOL 09900-28630: TPS test wire harness
09900-25008: Multi-circuit tester set

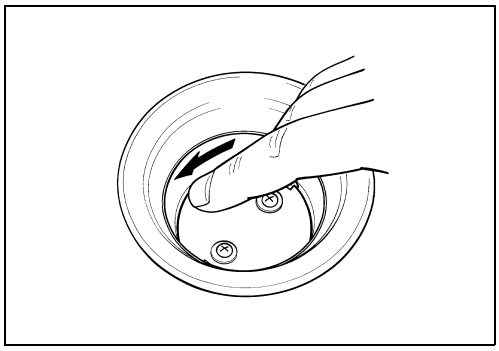
Tester knob indication: Voltage (⎓)



- Turn the ignition switch OFF.
- Remove the air cleaner box. (☞Page 103)
- Disconnect the STVA coupler ③.



- Turn the ignition switch ON.
- Open the secondary throttle valve fully by turning it with your finger.
- With the secondary throttle valve held at this position, measure the output voltage of the TP sensor as shown.
- Calculate the voltage difference between TP sensor output voltage at idle and TP sensor output voltage with the STV full opened.

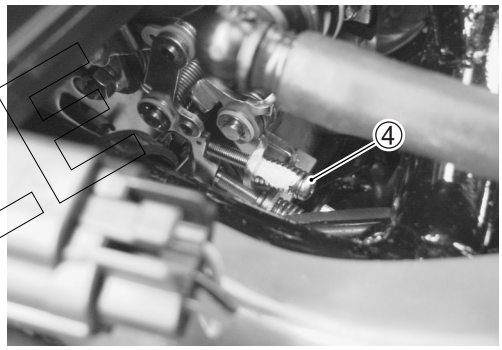


Example: TP sensor output voltage with the STV fully open
Minus TP sensor output voltage at idle is 0.08 V

STV fully open		**1.20 V**
Idle	**-**	**1.12 V**
		0.08 V

DATA TP sensor output voltage variation: 0.064 – 0.096 V

- If the voltage variation is out of specification, turn in or out the fast idle adjust screw ④ to adjust the voltage to specification.



CAUTION

The fast idle screw is factory-adjusted at the time of delivery and therefore avoid removing or turning it unless otherwise necessary.

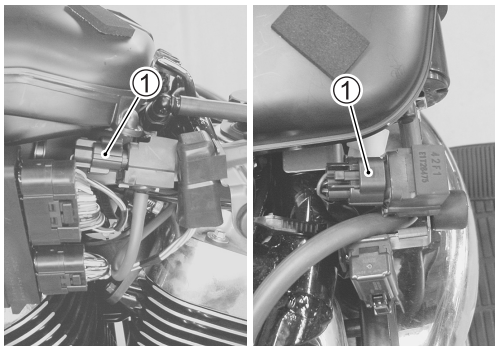
- Cool down the engine to ambient air temperature and start the engine to check the fast idle rpm comes within the specified rpm.

DATA Standard
Fast idle rpm: 1 400 – 2 000 r/min (Cold engine)
Idle rpm : 1 000 ± 100 r/min (Warmed engine)

- If it is not at the specified rpm, the cause may possibly be short-circuit in oil temperature sensor or wiring harness or STVA.

THROTTLE VALVE SYNCHRONIZATION

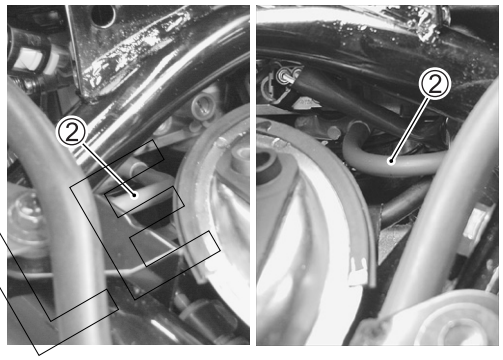
Check and adjust the throttle valve synchronization among two cylinders.



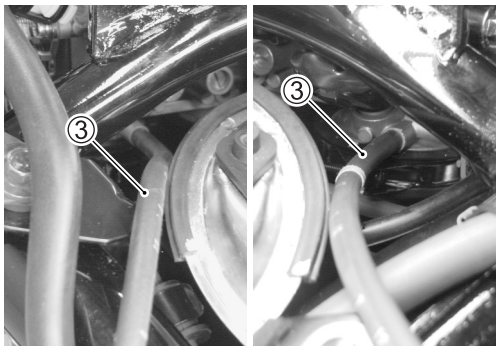
USE OF DIGITAL VACUUM TESTER

Step 1

- Remove the seats. (☞Page 121)
- Remove the speedometer and fuel inlet cover, frame head covers and upper frame covers.
  (☞VL1500 Service Manual 6-3)
- Start up the engine and run it in idling condition for warming up.
- Stop the warmed-up engine.
- Disconnect the IAP sensor couplers ①.
- Disconnect the IAP sensor vacuum hoses ② from each throttle body.



- Connect the vacuum tester hoses ③ to each vacuum nipple on the throttle body.



Step 2

- Connect a tachometer and start up the engine.
- Bring the engine rpm to 1 000 r/min by the throttle stop screw ④.
- Check the vacuum of the two cylinders. If the adjustment is necessary, proceed to the next step.

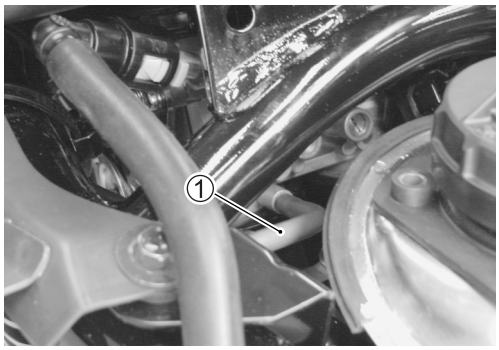
NOTE:
During balancing the throttle valves, always set the engine rpm at 1 000 r/min, using throttle stop screw.

Step 3
- Turn in all the idle air screws to the complete close position.
- Check for difference of vacuum between No. 1 and No. 2.
- Equalize these two by gradually turning back the air screw on the higher vacuum side until the vacuum comes down to the lower.
- Check for the synchronization adjustment. If the adjustment is not yet correct, remove each idle air screw and clean them with a spray-type carburetor cleaner and blow dry with a compressed air.
- Also, clean the idle air screw passageways.

NOTE:
** Slowly turn the idle air screw in clockwise and count the number of turns until the screw is lightly seated.*
** Make a note of how many turns were made so the screw can be reset correctly after cleaning.*
** After balancing the two valves, set the idle rpm to 1 000 r/min by the throttle stop screw.*

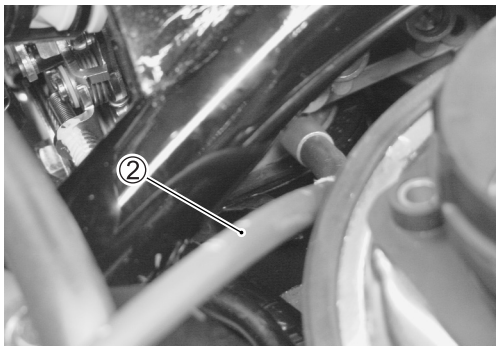
Step 4
Repeat the above procedure (Step 3) until the correct condition.

USE OF VACUUM BALANCER GAUGE
Calibrating each vacuum gauge
- Remove the seats. (☞Page 121)
- Remove the speedometer and fuel inlet cover, frame head covers and frame upper covers.
  (☞VL1500 Service Manual 6-3)
- Start up the engine and run it in idling condition for warming up.
- Stop the warmed-up engine.
- Disconnect the IAP sensor couplers. (☞Page 49)
- Disconnect the IAP sensor vacuum hose ① from the No. 1 throttle body.



- Connect one of the vacuum balancer gauge hose ② to the vacuum nipple on the No. 1 throttle body.

TOOL 09913-13121: Vacuum balancer gauge

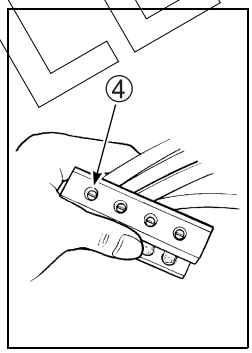


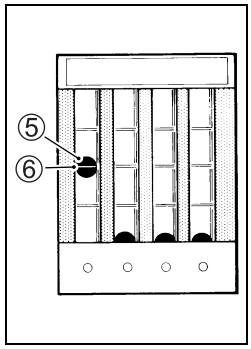
- Connect a tachometer.
- Start up the engine and keep it running at 1 000 r/min by turning throttle stop screw ③.

TOOL 09900-25008: Multi-circuit tester set

- Turn the air screw ④ of the gauge so that the vacuum acting on the tube of that hose will bring the steel ball ⑤ in the tube to the center line ⑥.

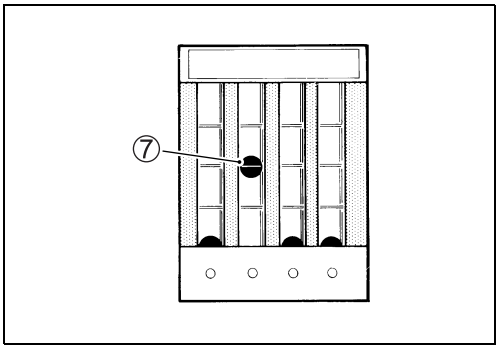
NOTE:
The vacuum gauge is positioned approx. 45° from the horizontal level.





- After making sure that the steel ball stays steady at the center line, disconnect the hose from the No.1 throttle body vacuum nipple and connect the next hose to this vacuum nipple.
- Turn air screw to bring the other steel ball ⑦ to the center line.

The balancer gauge is now ready for use in balancing the throttle valves.

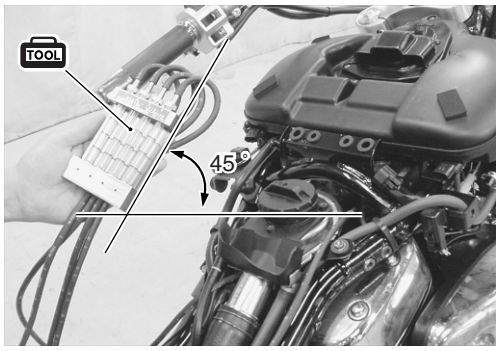


Throttle valve synchronization

Using the vacuum balancer gauge, inspect the throttle valve synchronization in the same manner as the digital vacuum tester. Pay attention to the following points:

The vacuum gauge is positioned approx. 45° from the horizontal level, and in this position the two balls should be within one ball dia. If the difference is larger than one ball, turn the idle air screw on the throttle body and bring the ball to the same level.

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



TOOL 09913-13121: Vacuum balancer gauge

NOTE:

* *During balancing the throttle valves, always set the engine rpm at 1 000 r/min, using throttle stop screw.*
* *After balancing the four valves, set the idle rpm to 1 000 r/min by the throttle stop screw.*

THROTTLE POSITION SENSOR (TPS) SETTING

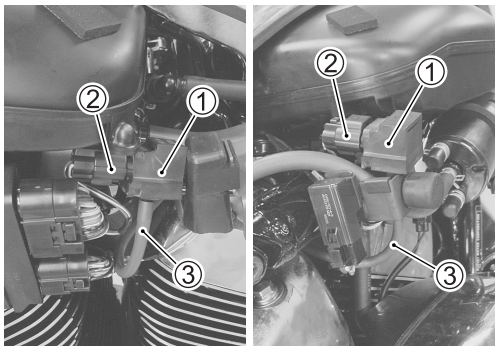
After all adjustments are completed, check or adjust the TPS setting condition. (☞Page 36)

SENSORS

IAP SENSOR INSPECTION

The intake air pressure sensor is located at the rear side of the air cleaner box. (☞Page 49)

IAP SENSOR REMOVAL/INSTALLATION

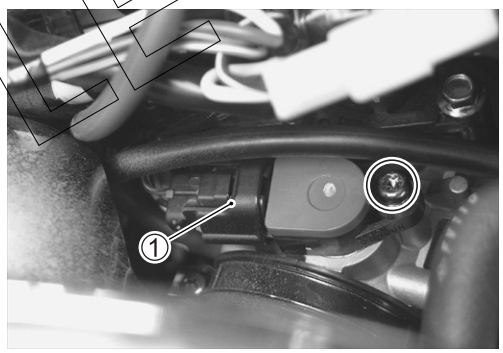


- Remove the frame head covers and frame upper covers. (☞VL1500 Service Manual 6-3)
- Remove the IAP sensors ① and disconnect the couplers ② and vacuum hoses ③.
- Installation is in the reverse order of removal.

TP SENSOR INSPECTION

The throttle position sensor is installed on the No. 2 throttle body. (☞Page 53)

TP SENSOR REMOVAL/INSTALLATION



- Remove the right frame head cover and right frame upper cover. (☞VL1500 Service Manual 6-3)
- Remove the TP sensor and disconnect the coupler ①.

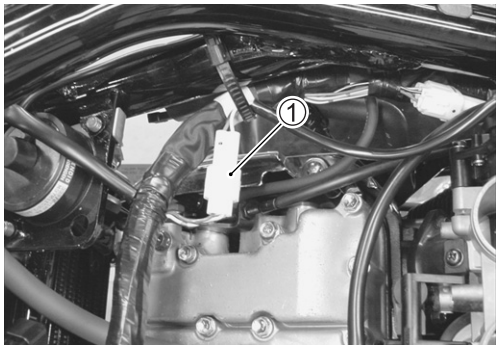
09930-11950: Torx wrench

- Install the TP sensor to the No. 2 throttle body. (☞Page 108)
- TP sensor setting procedure. (☞Page 36)

STP SENSOR INSPECTION

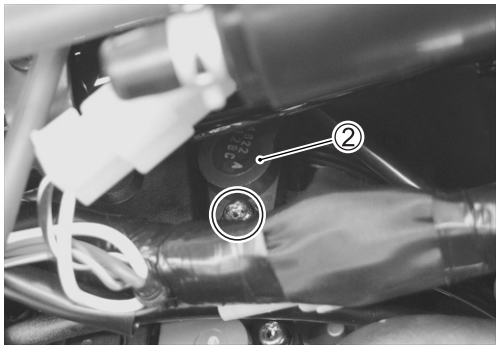
The secondary throttle position sensor is installed on the No. 2 throttle body. (☞Page 77)

STP SENSOR REMOVAL/INSTALLATION



- Remove the right frame head cover and right frame upper cover. (☞VL1500 Service Manual 6-3)
- Disconnect the coupler ① and remove the STP sensor ②.

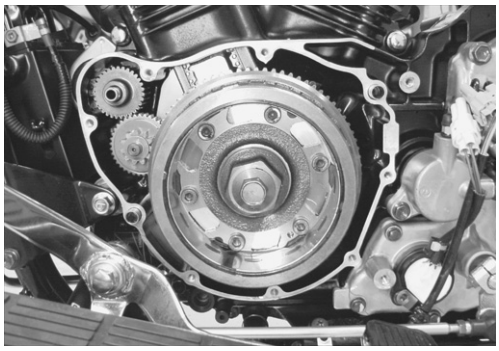
09930-11950: Torx wrench



- Install the STP sensor to the No. 2 throttle body. (☞Page 108)
- STP sensor setting procedure. (☞Page 110)

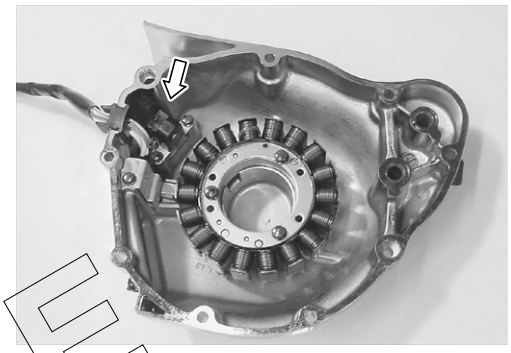
CKP SENSOR INSPECTION

The signal rotor is mounted on the generator rotor and crankshaft position sensor is installed at the inside of the generator cover.
(☞VL1500 Service Manual 3-16)



CKP SENSOR REMOVAL/INSTALLATION

(☞VL1500 Service Manual 3D-4)



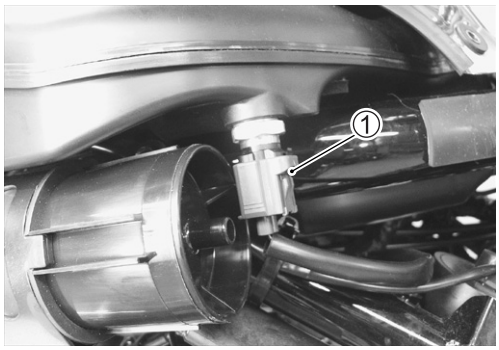
IAT SENSOR INSPECTION

The intake air temperature sensor is installed at the front right side of the air cleaner box. (☞Page 66)

IAT SENSOR REMOVAL/INSTALLATION

- Remove the right frame head cover and right frame upper cover. (☞VL1500 Service Manual 6-3)
- Disconnect the IAT sensor coupler ① and remove the IAT sensor.
- Installation is in the reverse order of removal.

IAT sensor: 20 N·m (2.0 kgf-m, 14.4 lb-ft)



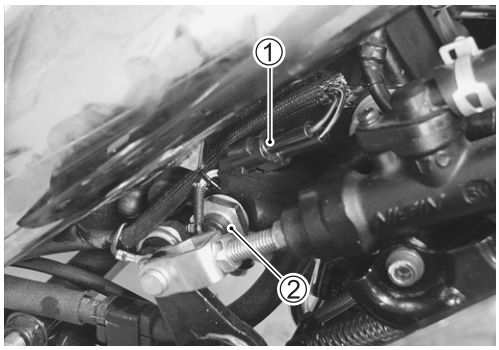
EOT SENSOR INSPECTION

The engine oil temperature sensor is installed at the right crankcase. (☞Page 62)

EOT SENSOR REMOVAL/INSTALLATION

- Disconnect the EOT sensor coupler ① and remove the EOT sensor ②.
- Installation is in the reverse order of removal.

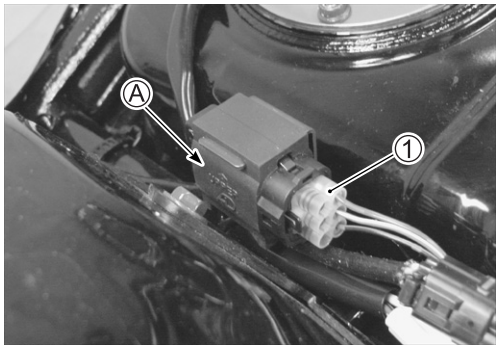
EOT sensor: 22 N·m (2.2 kgf-m, 16.0 lb-ft)



TO SENSOR INSPECTION

The tip-over sensor is located under the front seat.
(☞Page 70)

TO SENSOR REMOVAL/INSTALLATION



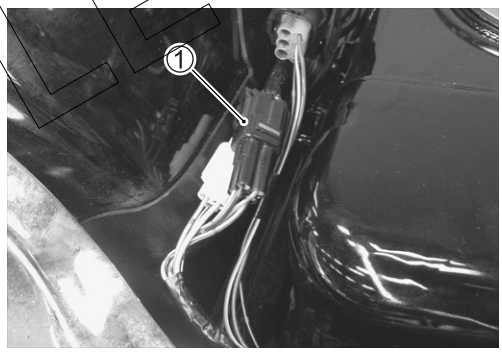
- Remove the seats. (☞Page 121)
- Disconnect the coupler ① and remove the TO sensor.
- Installation is in the reverse order of removal.

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

HO2 SENSOR INSPECTION (FOR E-02, 19, 24)

The heated oxygen sensor is installed on the pre-muffler.
(☞Page 87)

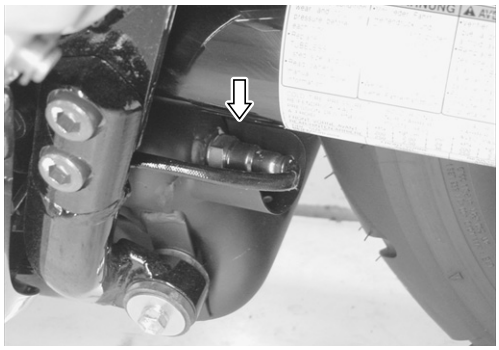
HO2 SENSOR REMOVAL/INSTALLATION



- Remove the seats. (☞Page 121)
- Disconnect the coupler ① and remove the HO2 sensor unit.

⚠ WARNING

Do not remove the HO2 sensor while it is hot.



CAUTION

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

- Installation is in the reverse order of removal.

CAUTION

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

- Tighten the sensor unit to the specified torque.

HO2 SENSOR: 25 N·m (2.5 kgf-m, 18.0 lb-ft)

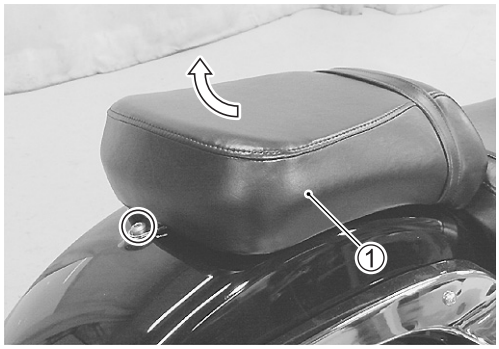
- Route the HO2 sensor lead wire properly.
(☞Page 145 and 146)

EXTERIOR PARTS

SEAT REMOVAL

This section gives only exterior parts removal procedure which differ from that of the VL1500K4 ('04-MODEL). For details refer to the chapter 6 of Service Manual.

- Remove the rear seat ①.



CAUTION

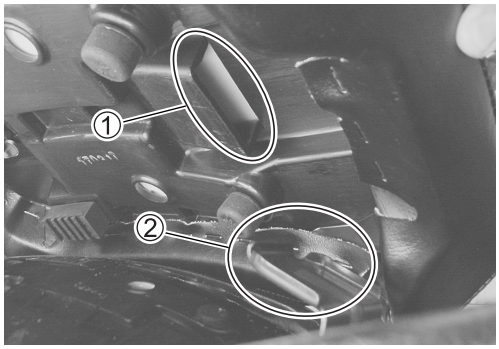
Be careful not to scratch the rear fender.

- Remove the seat bracket ② and front seat ③.

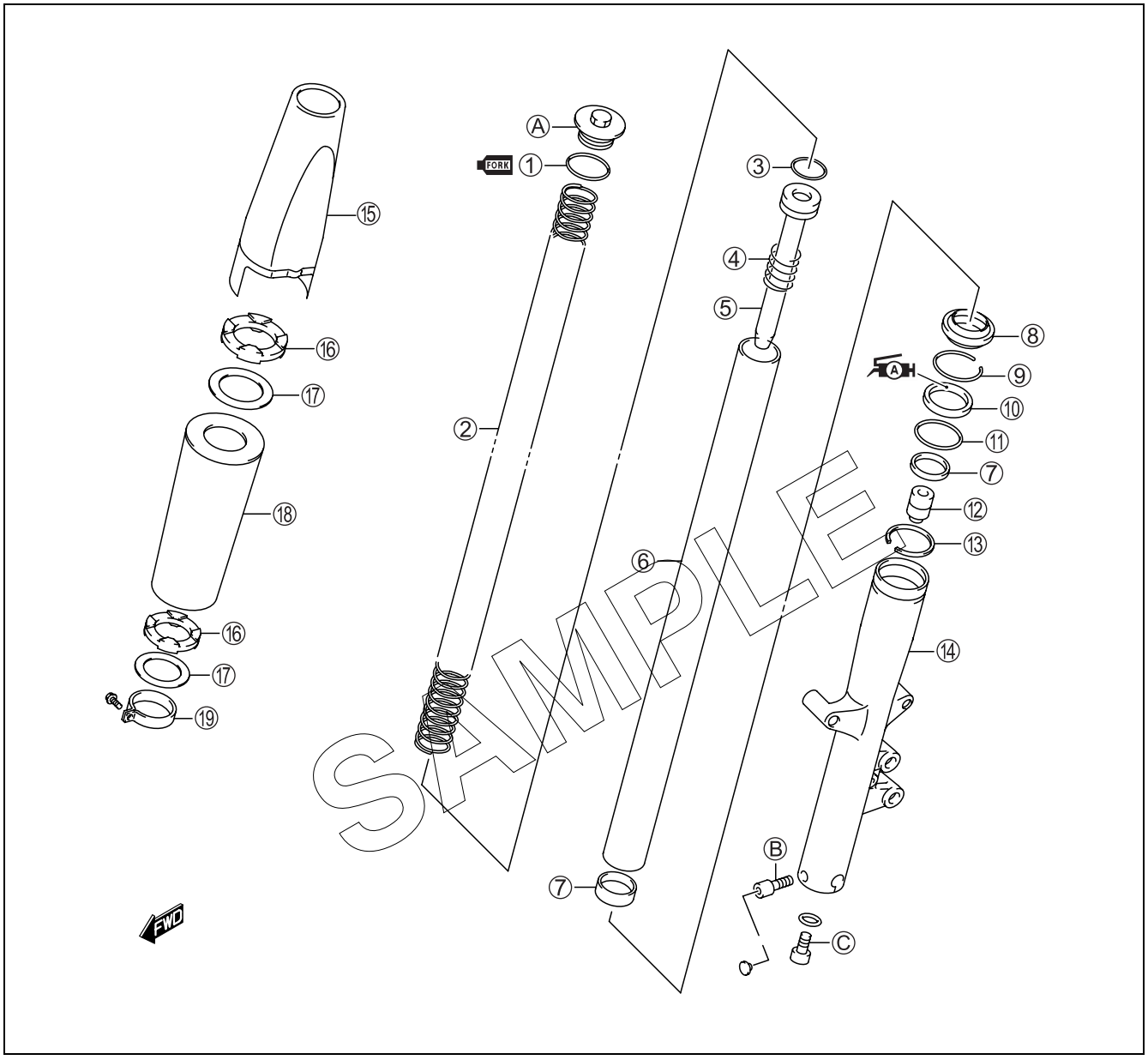
SEAT INSTALLATION

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

- With the recessed part ① of the rear seat engaged with the tongue ② of the front seat bracket, install the rear seat.



FRONT FORK
CONSTRUCTION



①	O-ring	⑫	Oil lock piece
②	Front fork spring	⑬	Inner tube cover guide
③	Damper rod ring	⑭	Outer tube
④	Rebound Spring	⑮	Upper inner tube cover
⑤	Damper rod	⑯	Rubber
⑥	Inner tube	⑰	Washer
⑦	Slide metal	⑱	lower inner tube cover
⑧	Dust seal	⑲	Inner tube cover stopper
⑨	Oil seal stopper ring	Ⓐ	Front fork cap bolt
⑩	Oil seal	Ⓑ	Front axle pinch bolt
⑪	Oil seal retainer	Ⓒ	Damper rod bolt

ITEM	N·m	kgf-m	lb-ft
Ⓐ	23	2.3	16.5
Ⓑ	23	2.3	16.5
Ⓒ	20	2.0	14.5

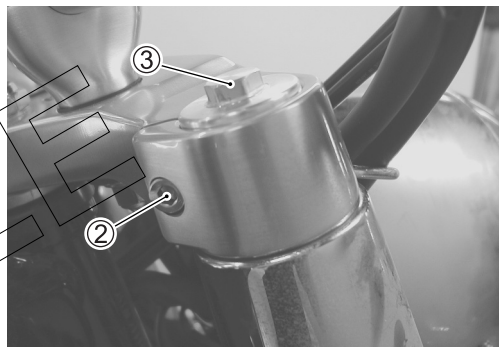
REMOVAL AND DISASSEMBLY

The front fork removal and disassembly procedures are different from those of the VL1500K4 ('04-MODEL). For details other than the following, refer to the VL1500 Service Manual.

- Remove the front wheel, front fender and front brake calipers. (☞VL1500 Service Manual 6-7 and 6-12)
- Loosen the steering stem head nut ①.

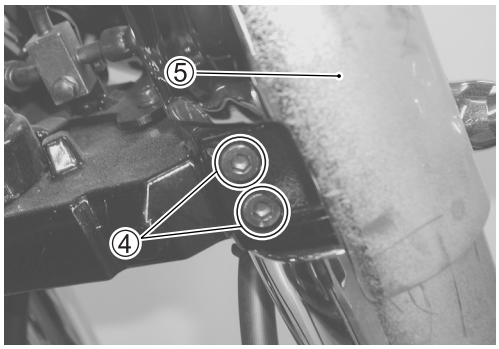
- Loosen the front fork upper clamp bolts ②, left and right.

NOTE:
Slightly loosen the front fork cap bolts ③ before loosening the lower clamp bolts to facilitate later disassembly.



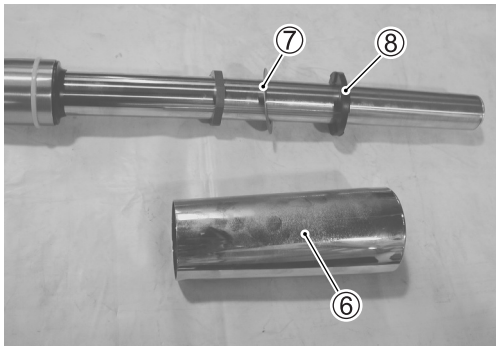
- Loosen the front fork lower clamp bolts ④, left and right.

NOTE:
Hold the front fork by the hand to prevent it from falling down.

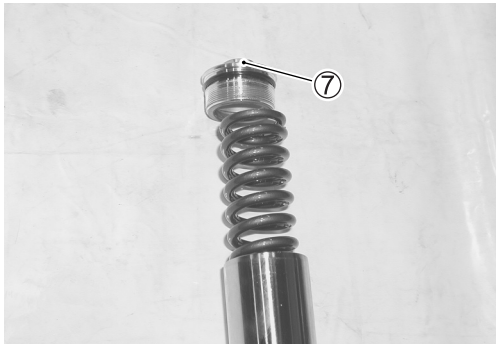


- Remove the front forks, left and right.
- Remove the upper inner tube covers ⑤, washers and rubbers, left and right.

- Remove the front fork lower inner tube cover ⑥, washer ⑦ and rubber ⑧.



• Remove the front fork cap bolts ⑦.

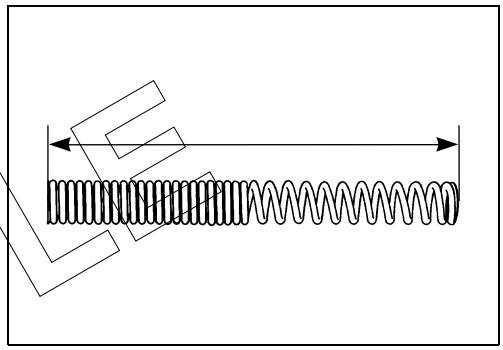


INSPECTION

For details other than the following, refer to the VL1500 Service Manual.

FORK SPRING

DATA **Front fork spring free length**
Service Limit: 589 mm (23.2 in)

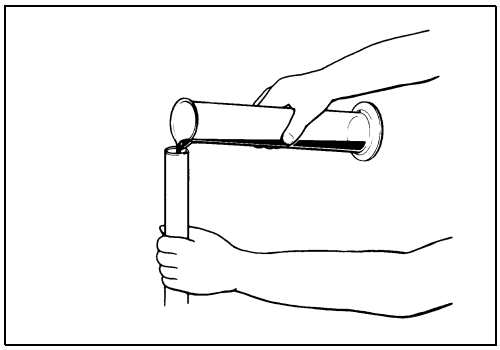


REASSEMBLY AND REMOUNTING

The front fork reassembly and remounting procedures are different from those of the VL1500K4 ('04-MODEL). For details other than the following, refer to the VL1500 Service Manual.

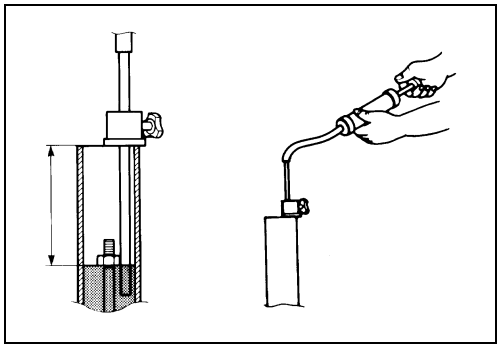
FORK OIL

DATA **Capacity (each leg): 416 ml (14.1/14.6 US/Imp oz)**



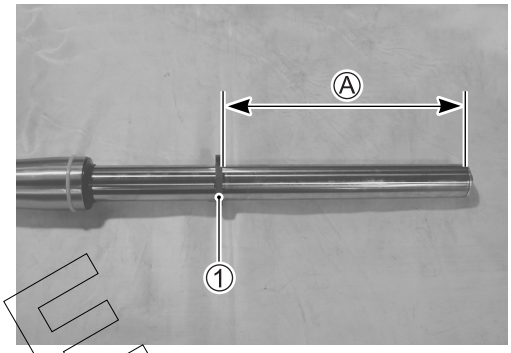
DATA **Fork oil level: 192 mm (7.56 in)**

TOOL **09943-74111: Front fork oil level gauge**

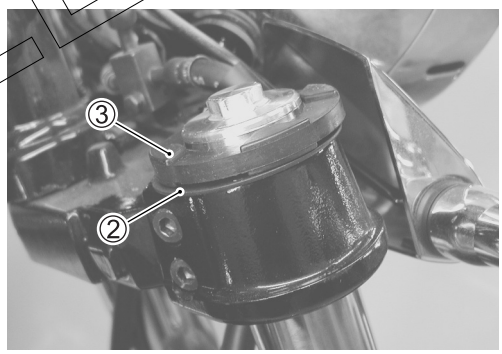


- Install the front fork cap bolt.

- Install the inner tube cover stopper ① at 284.3 mm (11.19 in) Ⓐ from the upper surface of the inner tube.

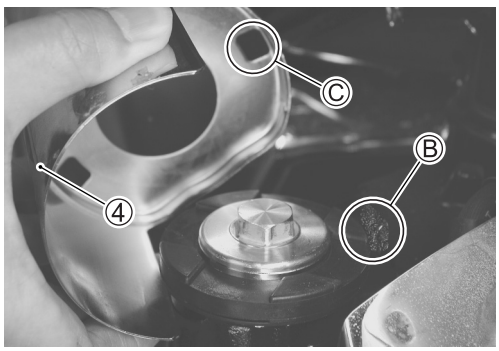


- Set the washer ② and rubber ③ to the inner tube.



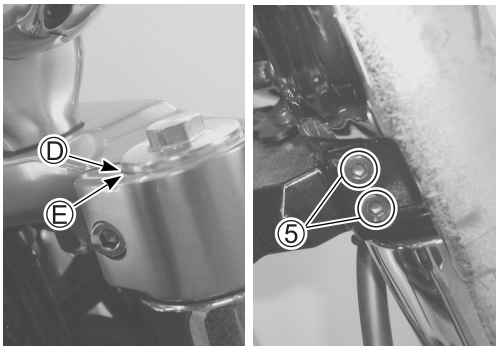
- Install the upper inner tube cover ④.

NOTE:
When installing the front fork inner tube upper cover, align the hole Ⓒ in the front fork inner tube upper cover and protrusion Ⓑ on the steering stem lower bracket.



- When installing the front fork assembly, align the upper surface Ⓓ of the inner tube with the surface Ⓔ of the steering upper bracket.
- Tighten the front fork lower clamp bolts ⑤ to the specified torque.

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

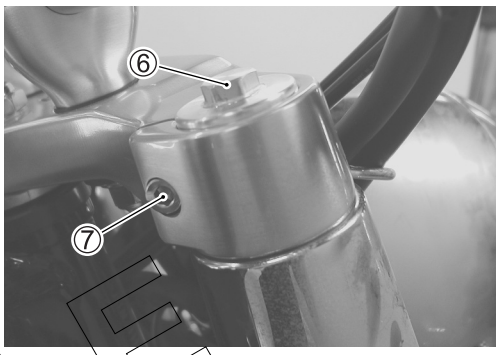


- Tighten the front fork cap bolt ⑥ to the specified torque.

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

- Tighten the front fork upper clamp bolt ⑦ to the specified torque.

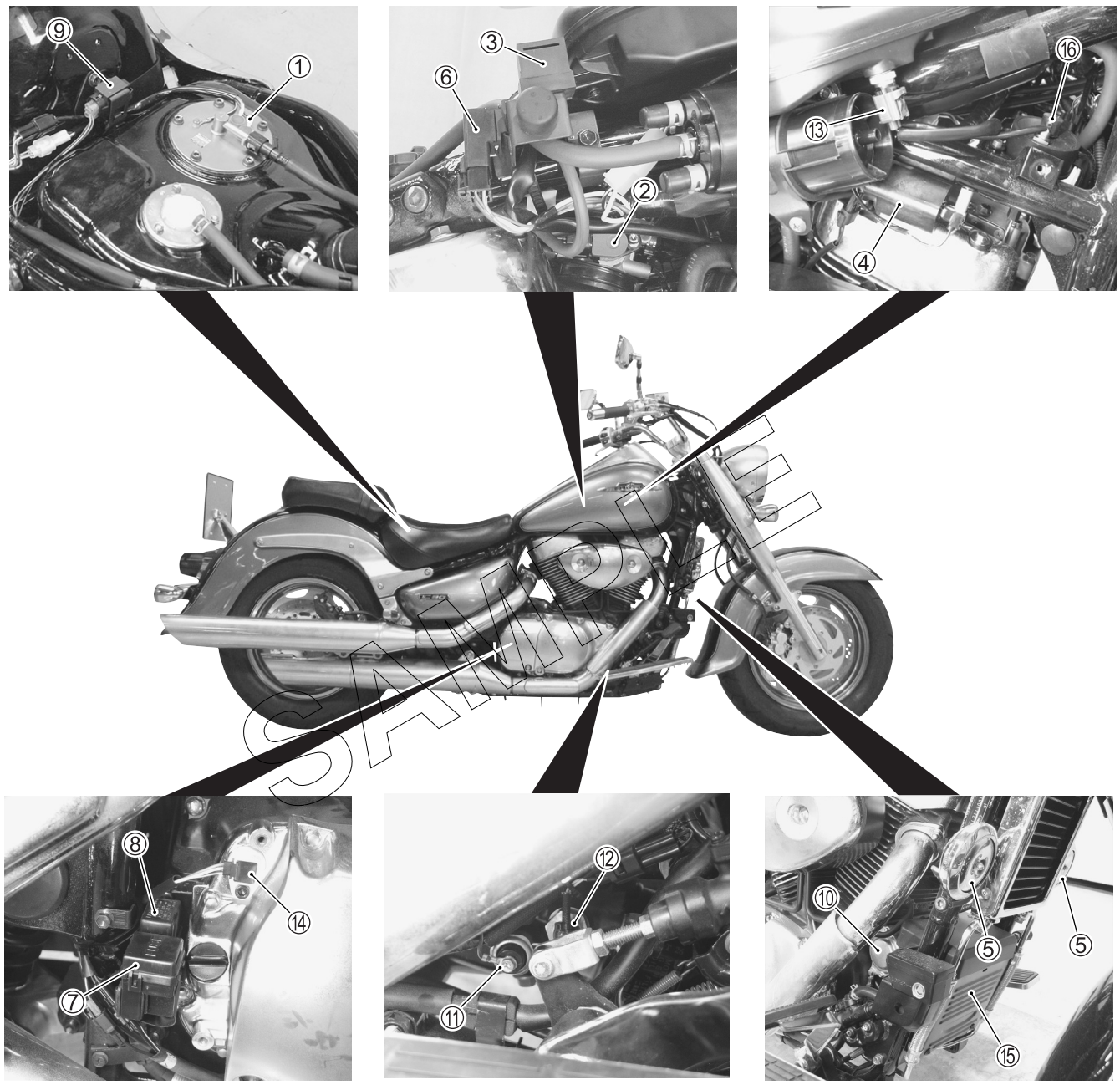
Front fork upper clamp bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)



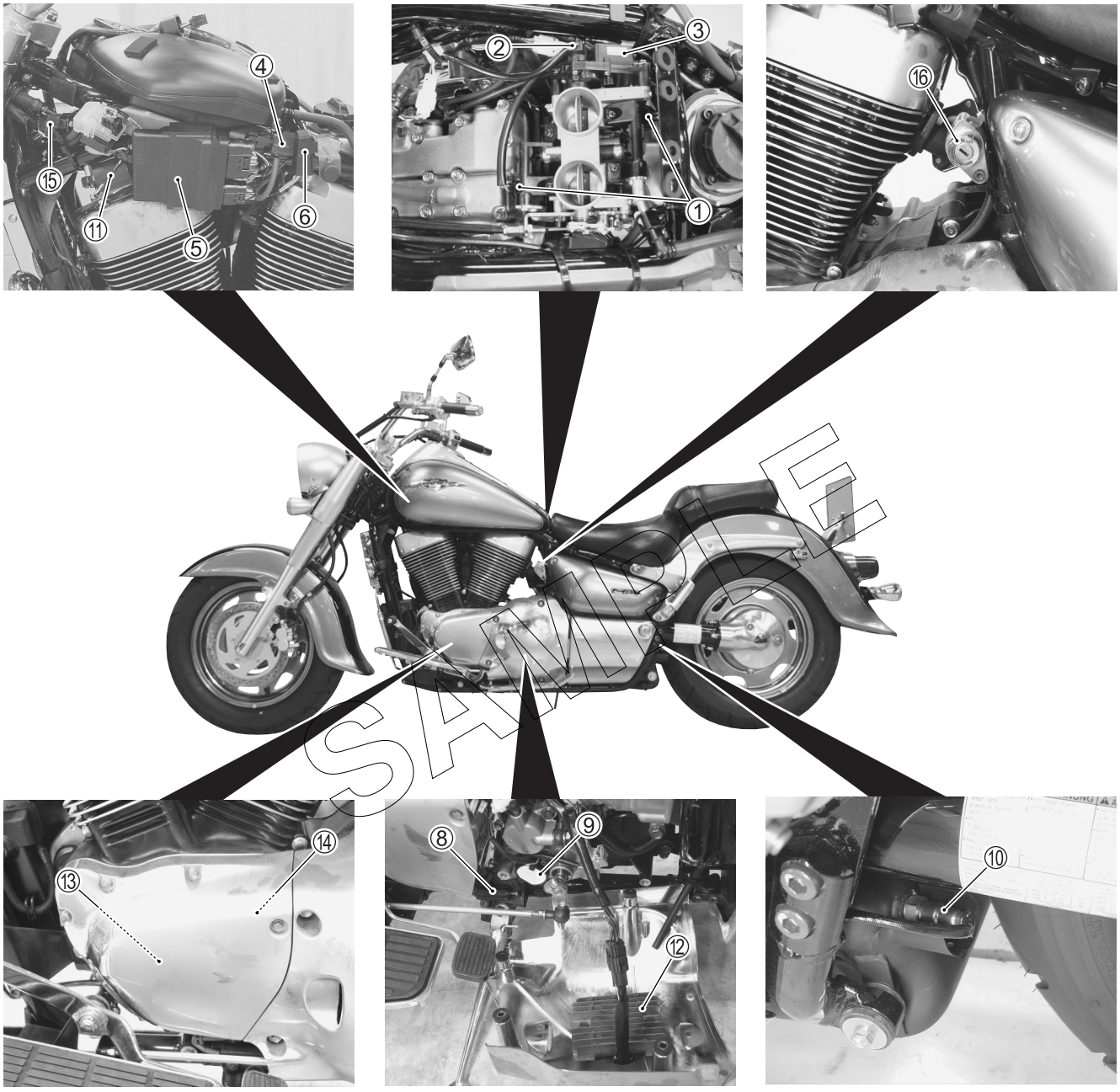
- Tighten the steering stem head nut ⑧ to the specified torque.

Steering stem head nut: 90 N·m (9.0 kgf-m, 65.0 lb-ft)

LOCATION OF ELECTRICAL COMPONENTS



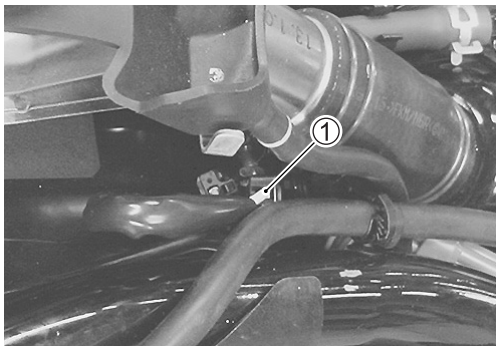
① Fuel pump and level gauge (☞Page 95)
② TP sensor (☞Page 53)
③ IAP sensor (Front) (☞Page 49)
④ Ignition coil (#2)
⑤ Horn (** Except for E-03, 24, 28 and 33)
⑥ Automatic decompression relay
⑦ Fuse box
⑧ Side-stand/turn signal relay
⑨ TO sensor (☞Page 70)
⑩ Starter motor
⑪ Oil pressure switch
⑫ EOT sensor (☞Page 58)
⑬ IAT sensor (☞Page 66)
⑭ Speed sensor (☞Page 141)
⑮ Battery
⑯ Automatic decompression solenoid
(**): Horn is located under the ECM.
(For E-03, 24, 28 and 33)



① Fuel injector (#1 & #2)(☞Page 84)
② STP sensor (☞Page 77)
③ STV actuator (☞Page 74)
④ IAP sensor (Rear) (☞Page 49)
⑤ ECM (Engine Control Module)
⑥ Fuel pump relay (☞Page 96)
⑦ Starter relay/Main fuse
⑧ Side-stand switch
⑨ GP switch (☞Page 82)
⑩ HO2 sensor (For E-02, 19, 24) (☞Page 87)
⑪ Ignition coil (#1)
⑫ Regulator/rectifier
⑬ Generator
⑭ CKP sensor (☞Page 47)
⑮ Mode selection switch coupler
⑯ Ignition switch

CHARGING SYSTEM
INSPECTION

GENERATOR COIL RESISTANCE



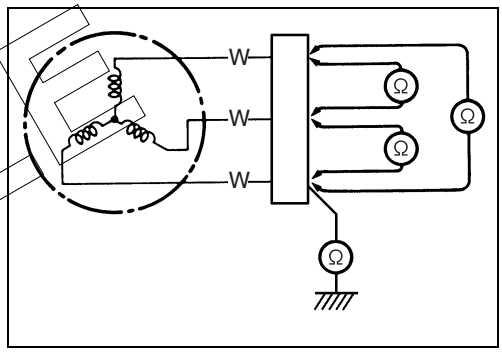
- Remove the seats. (☞Page 121)
- Remove the speedometer and fuel inlet cover, frame head covers and frame upper covers.
  (☞VL1500 Service Manual 6-3)
- Disconnect the generator coupler ①.
- Measure the resistance among the three lead wires.
  If the resistance is not specified value, replace the stator with a new one. Also, check that the generator core is insulated.

DATA Generator coil resistance: 0.1 – 1.0 Ω (White – White)
∞ Ω (White – Ground)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

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



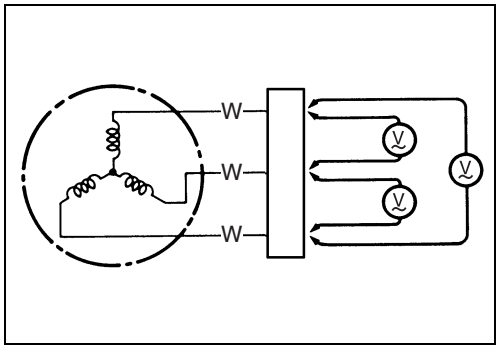
GENERATOR NO-LOAD PERFORMANCE

- Disconnect the generator coupler. (☞Above)
- Start the engine and keep it running at 5 000 r/min.
- Using the multi-circuit tester, measure the voltage among the three lead wires.
  If the tester reads under the specified value, replace the generator with a new one.

DATA Generator no-load performance:
80 V and more at 5 000 r/min (When engine is cold)

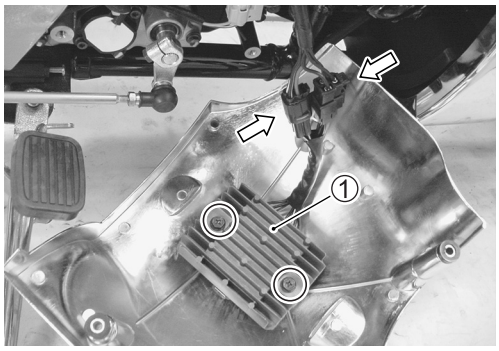
TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (~)

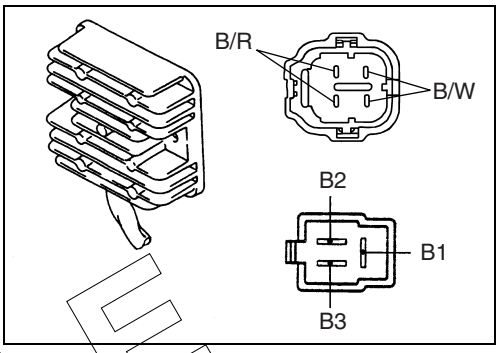


REGULATOR/RECTIFIER

- Remove the secondary gear case cover. (☞VL1500 Service Manual 3-7)
- Disconnect the couplers and remove the regulator/rectifier ①.



- Measure the voltage between the terminals using the multi circuit tester as indicated in the table below. If the voltage is not within the specified value, replace the regulator/rectifier with a new one.



09900-25008: Multi-circuit tester set

Tester knob indication: Diode test (⊣◀)

Unit: V

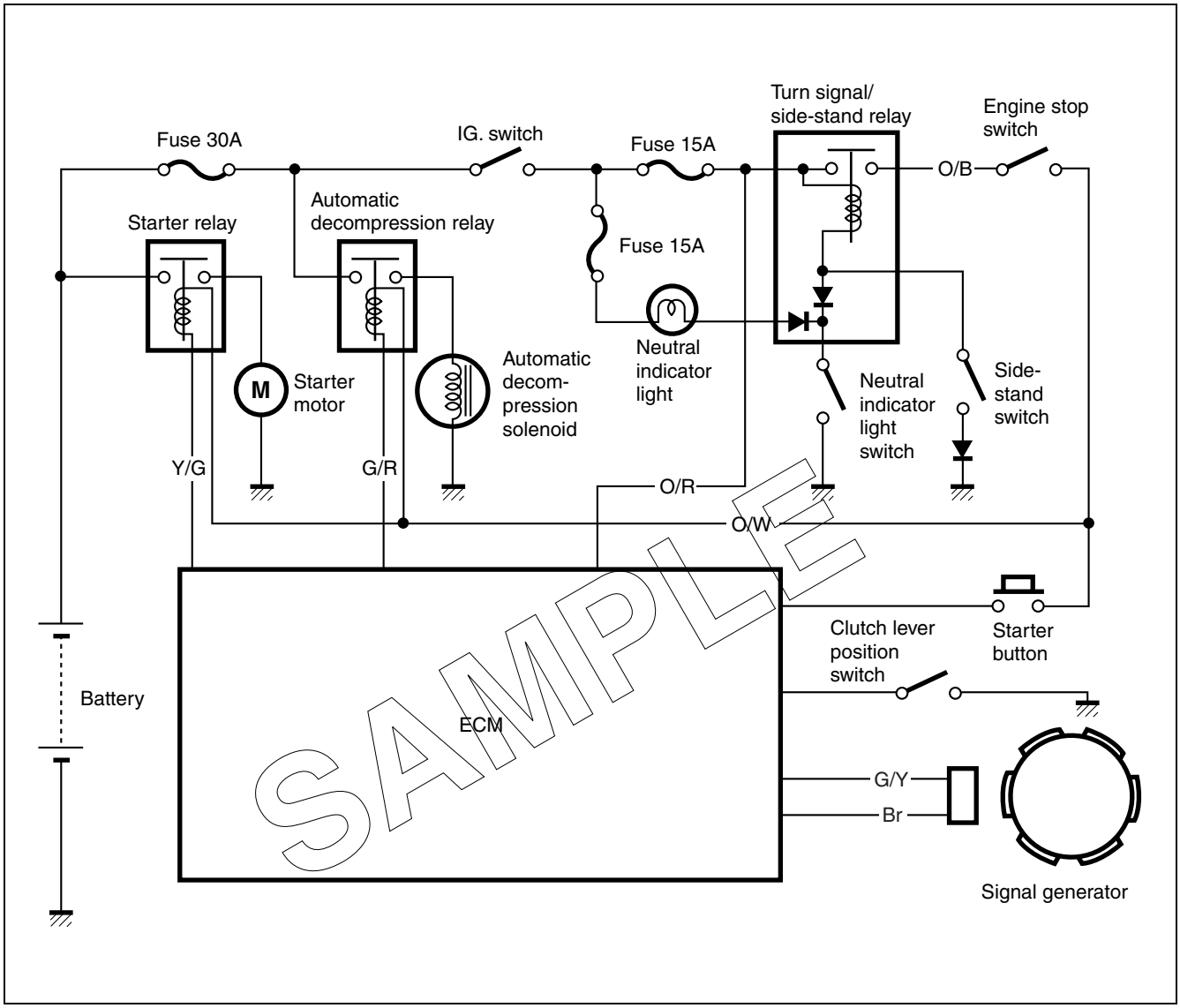
Probe of tester to: ⊖	Probe of tester to: ⊕ B/R	B1	B2	B3	B/W
B/R		0.4 – 0.7	0.4 – 0.7	0.4 – 0.7	0.5 – 1.2
B1	✻		✻	✻	0.4 – 0.7
B2	✻	✻		✻	0.4 – 0.7
B3	✻	✻	✻		0.4 – 0.7
B/W	✻	✻	✻	✻	

B: Black, B/R: Black with Red, B/W: Black with White tracer
✻ 1.4 V and more (tester's battery voltage)

NOTE:

If the tester reads 1.4 V and below when the tester probes are not connected, replace the battery of the multi-circuit tester.

AUTOMATIC DECOMPRESSION SYSTEM/STARTER SYSTEM AND SIDE-STAND IGNITION INTERLOCK SYSTEM

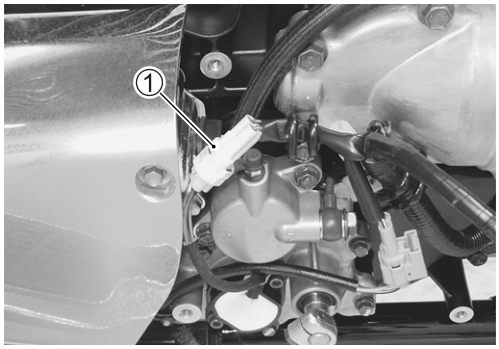


SIDE-STAND/IGNITION INTERLOCK SYSTEM PARTS INSPECTION

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

GEAR POSITION SWITCH

- Remove the secondary gear case cover. (☞VL1500 Service Manual 3-7)
- Disconnect the gear position switch coupler ① and check the continuity between Blue and Black with the transmission in "NEUTRAL".



TOOL 09900-25008: Multi-circuit tester set

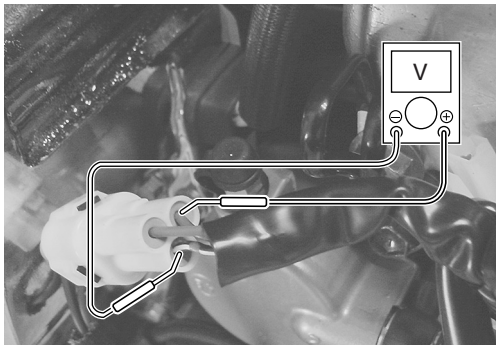
Tester knob indication: Continuity test (•))))

	Blue	Black
ON (Neutral)	○———	———○
OFF (Other than neutral)		

CAUTION

When disconnecting and connecting the gear position switch coupler, make sure to turn OFF the ignition switch, or electronic parts may get damaged.

- Connect the gear position switch coupler to the wiring harness.
- Turn the ignition switch to "ON" position and side-stand to upright position.
- Insert the needle pointed probes to the gear position switch coupler.
- Measure the voltage between Red/Black and Black/Green lead wires using the multi-circuit tester when shifting the gear-shift lever from low to top.



DATA GP switch voltage: 0.6 V and more (⊕ R/B – ⊖ B/G)
(* Low to top gear positions except neutral position.)

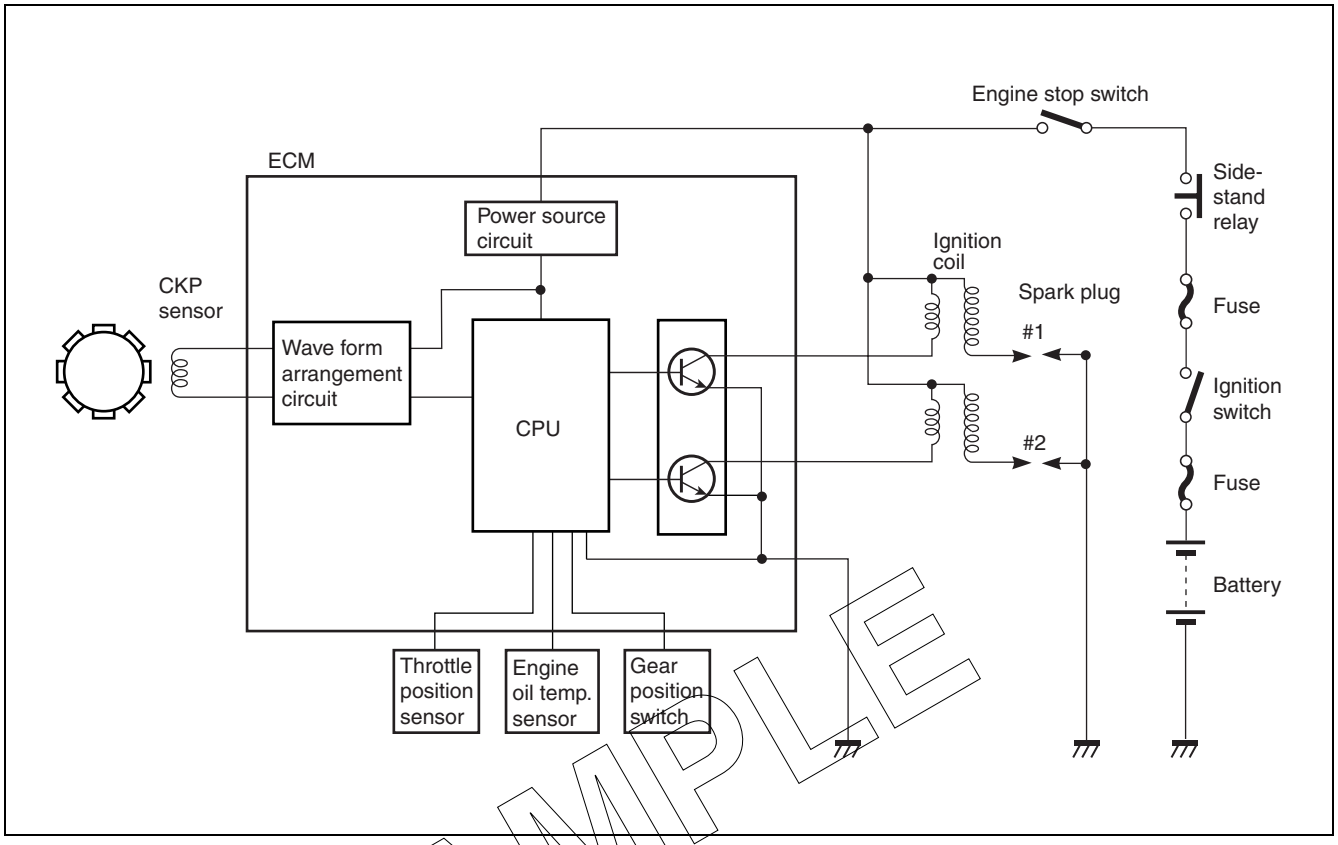
TOOL 09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Voltage (⎓)

CAUTION

Use the special tool to prevent the rubber of the water proof coupler from damage.

IGNITION SYSTEM



NOTE:

The fuel cut-off circuit is incorporated in this ECM in order to prevent over-running of engine. When engine speed reaches 5 800 – 6 000 r/min during running, this circuit cuts off fuel at the fuel injector.

TROUBLESHOOTING

No spark or poor spark

NOTE:

Check that the transmission is in neutral and the engine stop switch is in the "RUN" position. Squeeze the clutch lever. 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 ECM with the ignition switch in the "ON" position. (E-02, 19, 24: O/G and B/W, E-03, 28, 33: O/W and B/W)
   Is the voltage OK?

YES	Go to Step 3.
NO	• Faulty ignition switch • Faulty turn signal/side-stand relay • Faulty engine stop switch • Broken wire harness or poor connection of related circuit couplers

Step 3

1) Measure the ignition coil primary peak voltage. (☞Page 135)

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. (☞VL1500 Service Manual 2-4)
   Are the spark plugs OK?

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

Step 5

1) Inspect the ignition coils. (☞Page 136)
   Are the ignition coils OK?

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

Step 6

1) Measure the CKP sensor peak voltage and its resistance. (☞Page 136 and 137)

NOTE:

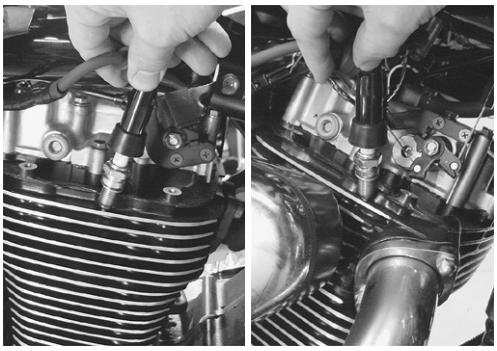
The CKP peak voltage inspection is applicable only with the multi-circuit tester and peak volt adaptor.

Are the peak voltage and its resistance OK?

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

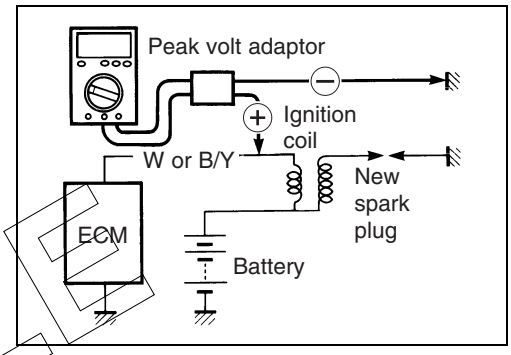
INSPECTION

IGNITION COIL PRIMARY PEAK VOLTAGE



- Remove the frame head covers and frame upper covers. (☞VL1500 Service Manual 6-3)
- Remove the cylinder head side caps and disconnect the spark plug caps. (☞VL1500 Service Manual 3-8)
- Connect new spark plugs to each spark plug cap and ground them to the cylinder head.

NOTE:
Make sure that all couplers and spark plugs are connected properly and the battery used is in fully-charged condition.



Measure the #1 and #2 ignition coils primary peak voltage in the following procedure.

- Connect the multi-circuit tester with peak voltage adaptor as follows.

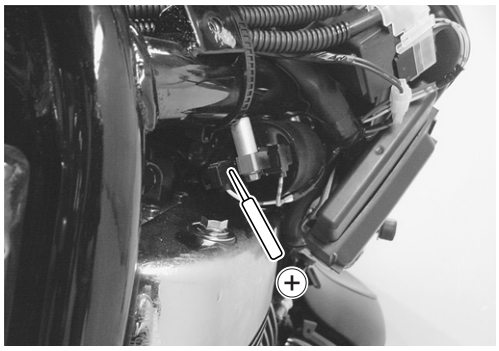
#1 ignition coil: ⊕ Probe: White terminal
⊖ Probe: Ground
2 ignition coil: ⊕ Probe: Black/Yellow terminal
⊖ Probe: Ground

NOTE:
Do not disconnect the ignition coil primary wire coupler.

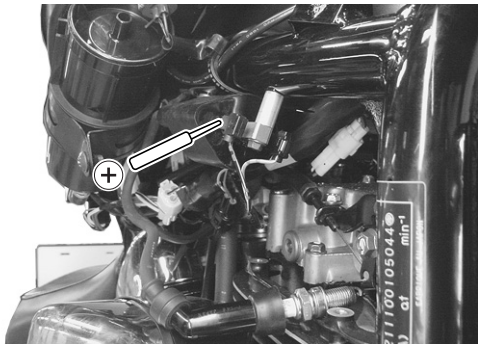
TOOL 09900-25008: Multi-circuit tester set

CAUTION

Before using the multi-circuit tester and peak volt adaptor, be sure to refer to the appropriate instruction manual.



- Shift the transmission into neutral and turn ignition switch "ON".
- Crank the engine a few seconds with the starter motor by depressing starter button and check the ignition coil primary peak voltage.
- Repeat the above procedure a few times and measure the highest ignition coil primary peak voltage. If the peak voltage is lower than the specified values, inspect the ignition coil.



DATA Ignition coil primary peak voltage: 180 V and more

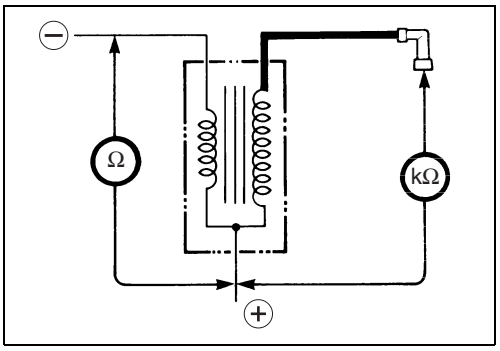
Tester knob indication: Voltage (⎓)

⚠ WARNING

Avoid touching the tester probes and spark plugs to prevent an electric shock while testing.

IGNITION COIL RESISTANCE

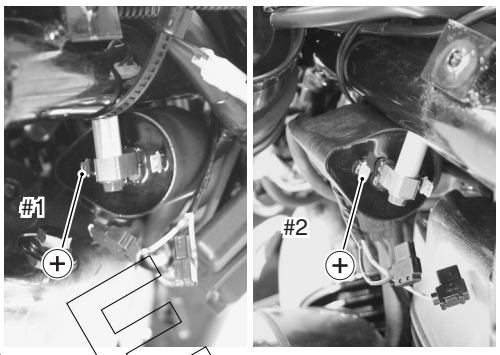
- Remove the frame head covers and frame upper covers. (☞VL1500 Service Manual 6-3)
- Remove the cylinder head side caps and disconnect the spark plug caps. (☞VL1500 Service Manual 3-8)
- Measure the ignition coil resistance in both the primary and secondary windings. If the resistance is not within the standard range, replace the ignition coil with a new one.



DATA Ignition coil resistance
Primary: 1 – 7 Ω (⊕ terminal – ⊖ terminal)
Secondary: 18 – 28 kΩ (Plug cap – ⊕ terminal)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

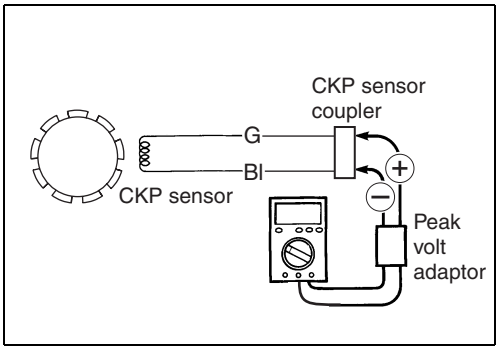


CKP SENSOR PEAK VOLTAGE

- Remove the seats. (☞Page 121)
- Remove the speedometer and fuel inlet cover, frame head covers and frame upper covers. (☞VL1500 Service Manual 6-3)

NOTE:
Make sure that all of the couplers are connected properly and the battery used is in fully-charged condition.

- Measure the CKP sensor peak voltage in the following procedures.
- Disconnect the CKP sensor lead wire coupler ①.
- Connect the multi-circuit tester with the peak volt adaptor as follows.
  ⊕ Probe: Green lead wire
  ⊖ Probe: Blue lead wire



CAUTION

Before using the multi-circuit tester and peak volt adaptor, be sure to refer to the appropriate instruction manual.

- Shift the transmission into the neutral and turn ignition switch "ON".
- Crank the engine a few seconds with the starter motor by depressing starter button and check the CKP sensor peak voltage.
- Repeat the above procedure a few times and measure the highest peak voltage.

DATA CKP sensor peak voltage: 2.4 V and more (Green – Blue)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)

If the peak voltage on the CKP sensor lead wire coupler is OK but on the ECM coupler is out of specification, the wire harness must be replaced. If both peak voltages are out of specification, the CKP sensor must be replaced and re-checked.

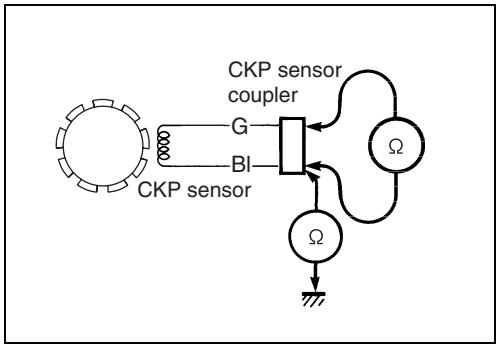
CKP SENSOR RESISTANCE

- Remove the seats. (☞Page 121)
- Remove the speedometer and fuel inlet cover, frame head covers and frame upper covers. (☞VL1500 Service Manual 6-3)
- Disconnect the CKP sensor lead wire coupler ①.
- Measure the resistance between the lead wires and ground. If the resistance is not specified value, the CKP sensor must be replaced.

DATA CKP sensor resistance: 178 – 242 Ω (Green – Blue)
∞ Ω (Blue – Ground)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)



SPEEDOMETER

DESCRIPTION

This speedometer mainly consists of the stepping motor, LCD (Liquid Crystal Display) and LED (Light Emitting Diode). This speedometer is light, thin and of high response compared to those currently in use because of this composition.

The speedometer pointer is driven by the stepping motor.

The LCD indicates Odo/Trip A/Trip B/Clock/FI and Fuel level respectively.

NOTE:

If the engine stop switch is turned OFF while the ignition switch is ON, the LCD displays "CHEC". But it is not a malfunction.

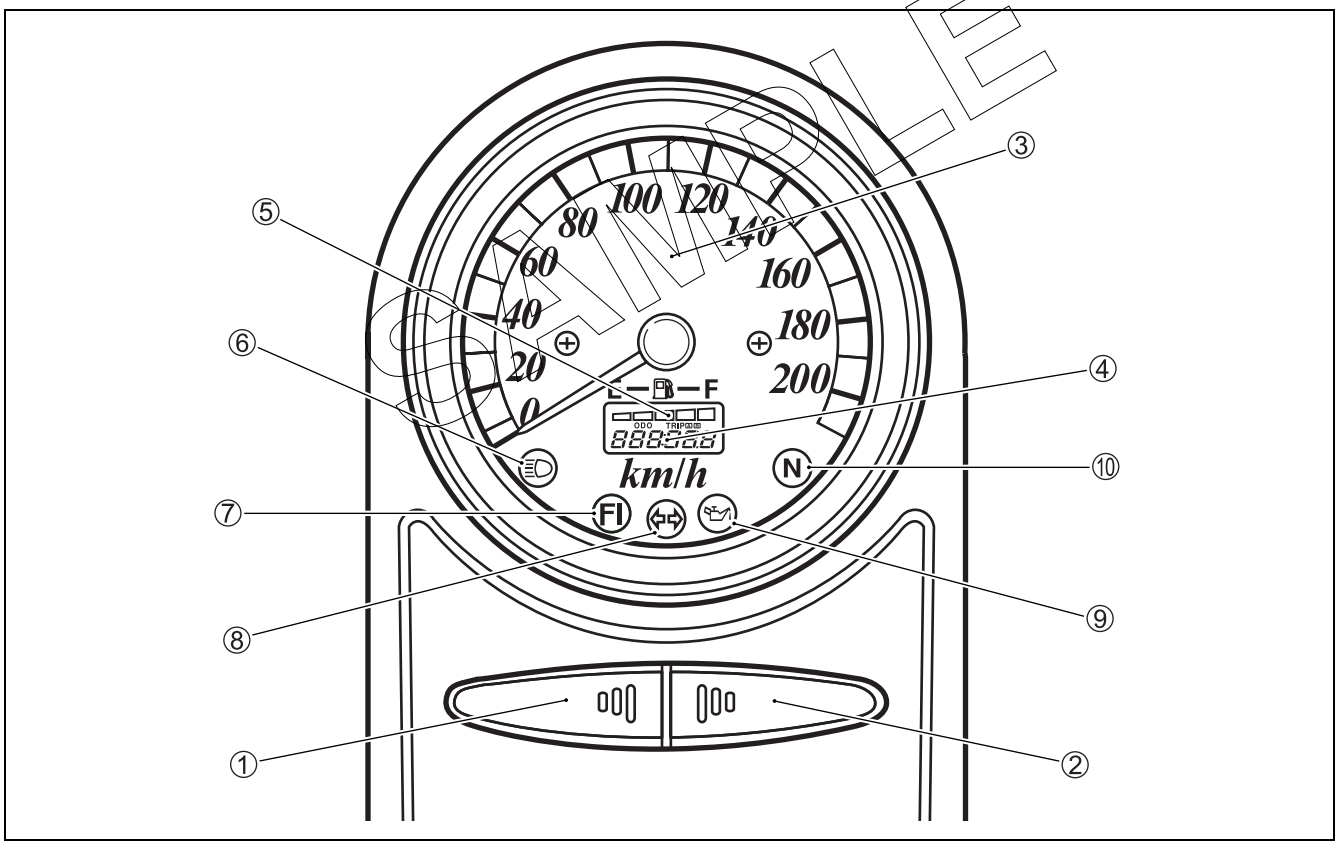
This condition implies that combination meter receives no signal from the ECM.

In that case, they are restored to normal indication by turning the engine stop switch to RUN position.

LED (Light Emitting Diode)

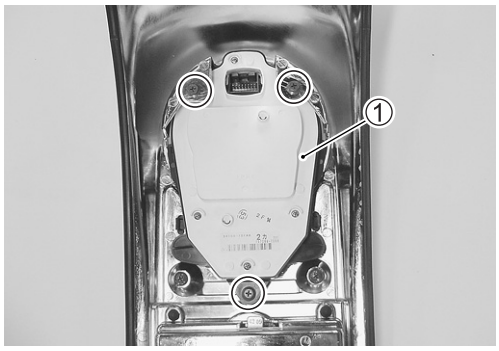
LED is used for the illumination light and each indicator light.

LED is maintenance free. LED is less electric-power consuming and stronger to vibration resistance compared to the bulb.



①	Select switch (Odo/Trip/clock)	⑥	LED (High-beam indicator light)
②	Reset switch	⑦	LED (FI indicator light)
③	Speedometer	⑧	LED (Turn signal indicator light)
④	LCD (Odo/Trip A/Trip B/Clock/FI)	⑨	LED (Oil pressure indicator light)
⑤	LCD (Fuel level)	⑩	LED (Neutral indicator light)

REMOVAL AND DISASSEMBLY

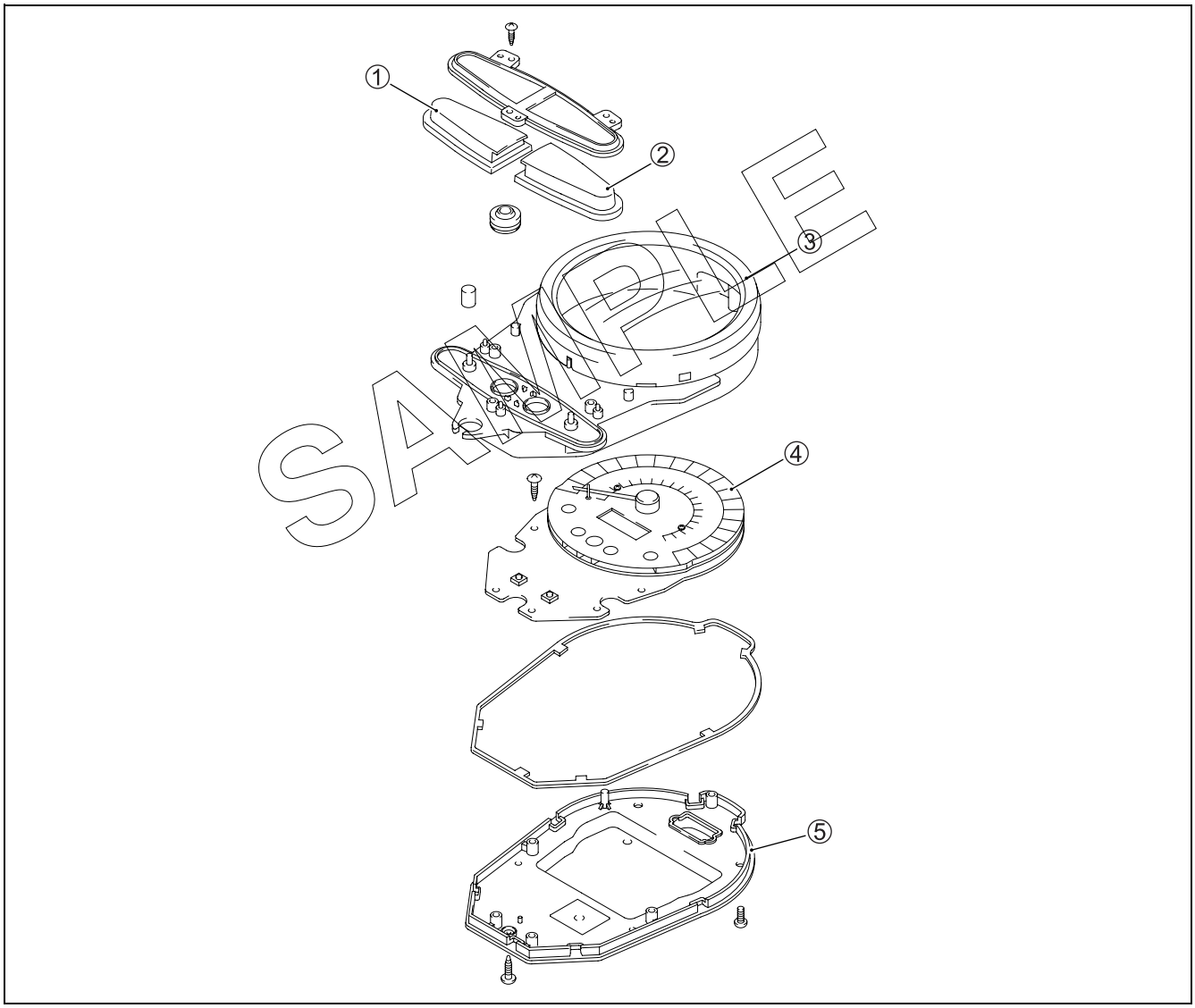


- Remove the seats. (☞Page 121)
- Remove the speedometer and fuel inlet cover. (☞VL1500 Service Manual 6-3)
- Remove the speedometer ①.

CAUTION

When disconnecting and reconnecting the speedometer coupler, make sure to turn OFF the ignition switch, or electronic parts may get damaged.

- Disassemble the speedometer as follows.



①	Select switch cover	③	Speedometer cover	⑤	Speedometer case
②	Reset switch cover	④	Speedometer unit		

CAUTION

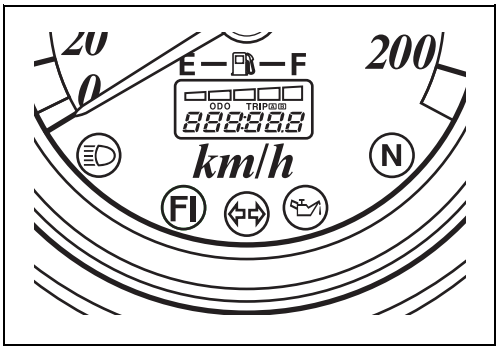
Do not attempt to disassemble the Speedometer unit ④.

INSPECTION

LED (LIGHT EMITTING DIODE)

Check that the LEDs illuminate (FI light and Oil pressure indicator light) immediately after turning the ignition switch on. Also, check the other LEDs for their lighting (Neutral indicator light, High-beam indicator light and turn signal indicator light) in accordance with their switch positions.

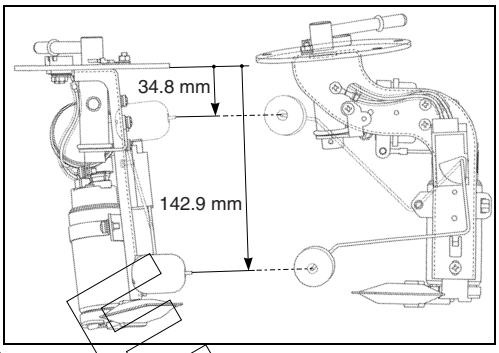
If the LED fails in operation, replace the speedometer unit with a new one after checking its wire harness/coupler.



FUEL LEVEL GAUGE

- Remove the fuel pump assembly. (☞Page 96)
- Measure the resistance at each fuel level gauge float position. If the resistance is incorrect, replace the fuel level gauge with a new one.

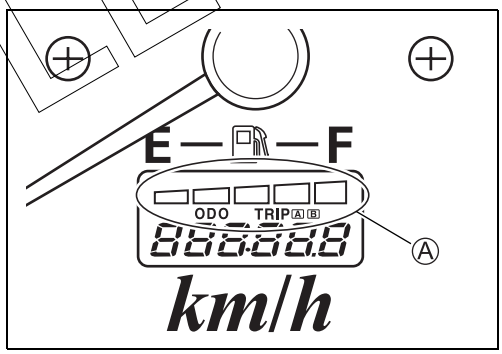
Float position	Resistance
34.8 mm (1.37 in)	4 – 10 Ω
142.9 mm (5.63 in)	90 – 100 Ω



FUEL LEVEL INDICATOR

If the fuel level indicator Ⓐ does not function properly, check the fuel level gauge and its lead wire/coupler.

If the fuel level gauge and its lead wire/coupler are functioning properly, replace the speedometer with a new one.



OIL PRESSURE INDICATOR

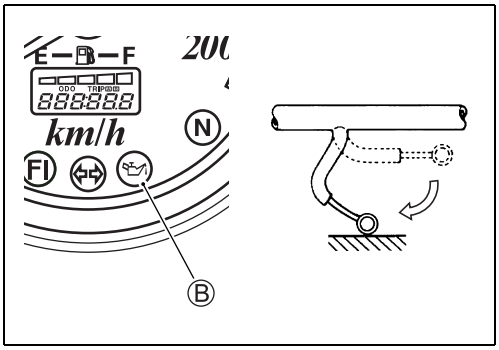
NOTE:

Before inspecting the oil pressure switch, check if the engine oil level is correct. (☞VL1500 Service Manual 2-6)

- Disconnect the oil pressure switch lead wire from the oil pressure switch.
- Turn the ignition switch ON.

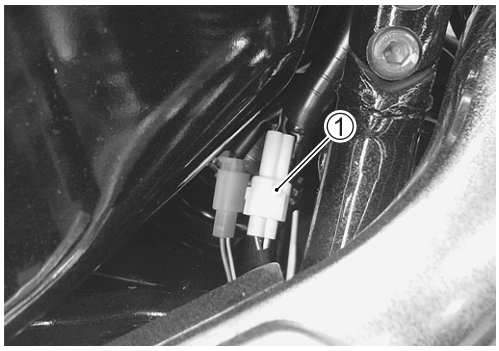
- Check if the oil pressure indicator Ⓑ will light, when grounding the lead wire.

  If any indications are abnormal, replace the combination meter with a new one after checking connection of couplers.



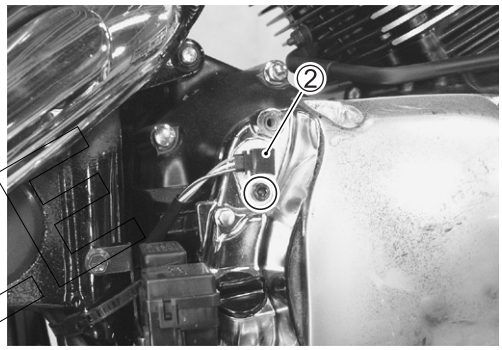
SPEEDOMETER

If the speedometer, odometer or trip meter does not function properly, inspect the speedometer sensor and connection of coupler ①. If the speedometer sensor and connection are all right, replace the meter with a new one.



SPEEDOMETER SENSOR

- Remove the right frame cover.
  (☞ VL1500 Service Manual 6-2)
- Remove the rear clutch cover.
  (☞ VL1500 Service Manual 3-6)
- Disconnect the speed sensor lead wire coupler ①.
- Remove the speedometer sensor ② by removing its mounting bolt.

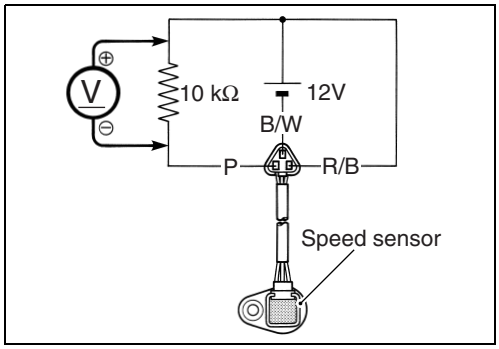


- Connect 12 V battery, 10 kΩ resistor and the multi-circuit tester as shown in the right illustration.

R/B: Red with Black tracer
B/W: Black with White tracer
P: Pink

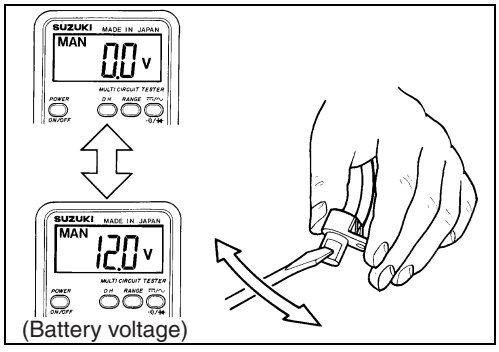
TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)



- Under above condition, if a suitable screwdriver touching the pick-up surface of the speedometer sensor is moved, the tester voltage reading should change (0 V → 12 V or 12 V → 0 V). If the tester voltage reading does not change, replace the speedometer sensor with a new one.

NOTE:
The highest voltage reading in this test will be the same as that of battery voltage.



RELAYS

FUEL PUMP RELAY

☞Page 96

SWITCHES

inspect each switch for continuity with the multi-circuit tester. If any abnormality is found, replace the respective switch assemblies with new ones.

09900-25008: Multi-circuit tester set

IGNITION SWITCH

Color / Position	R	O	O/Y	Gr	Br
P	○				○
LOCK					
OFF					
ON	○	○	○	○	○

DIMMER SWITCH

Color / Position	W	Y	Y/W
HI		○	○
LO	○		○

TURN SIGNAL SWITCH

Color / Position	Lg	Lbl	B
L		○	○
PUSH			
R	○		○

PASSING LIGHT SWITCH

Color / Position	O/R	Y
•		
PUSH	○	○

ENGINE STOP SWITCH

Color / Position	O/B	O/W
OFF		
RUN	○	○

STARTER BUTTON

Color / Position	O/W	Y/G	Y/W	O/R
•			○	○
PUSH	○	○		

HORN BUTTON

Color / Position	B/Bl	B/W
•		
PUSH	○	○

HAZARD

Color / Position	B	Lbl	Lg
OFF			
ON	○	○	○

FRONT BRAKE SWITCH

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

REAR BRAKE SWITCH

Color / Position	O	W/B
ON	○	○
OFF		

CLUTCH LEVER POSITION SWITCH

Color / Position	B/Y	B/Y
FREE		
•	○	○

OIL PRESSURE SWITCH

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

NOTE:

Before inspecting the oil pressure switch, check the engine oil level. (☞VL1500 Service Manual 2-6)

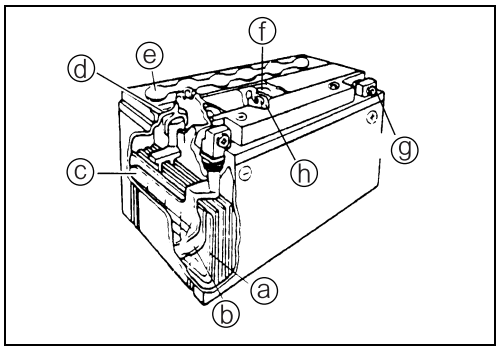
WIRE COLOR

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

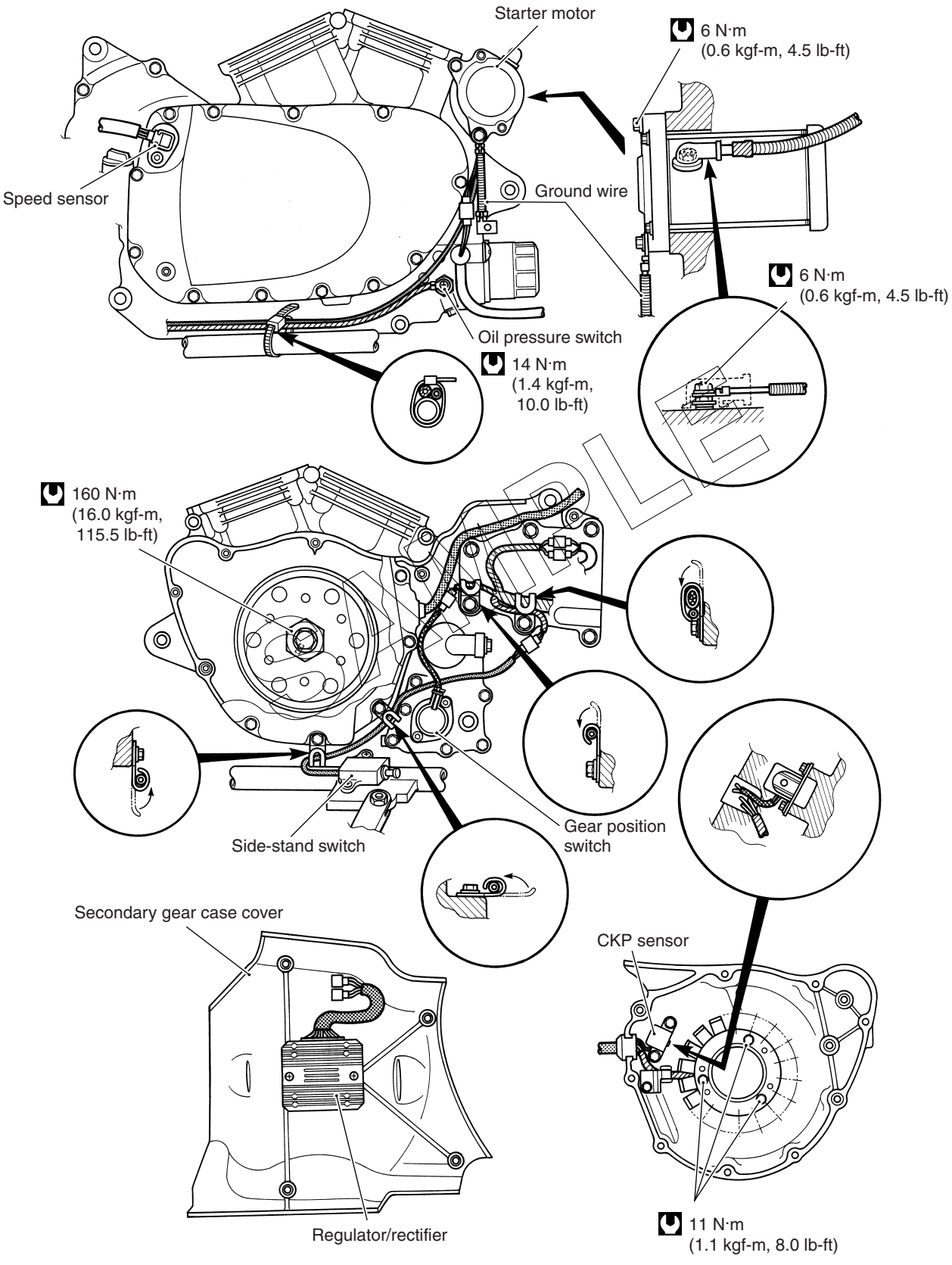
BATTERY
SPECIFICATIONS

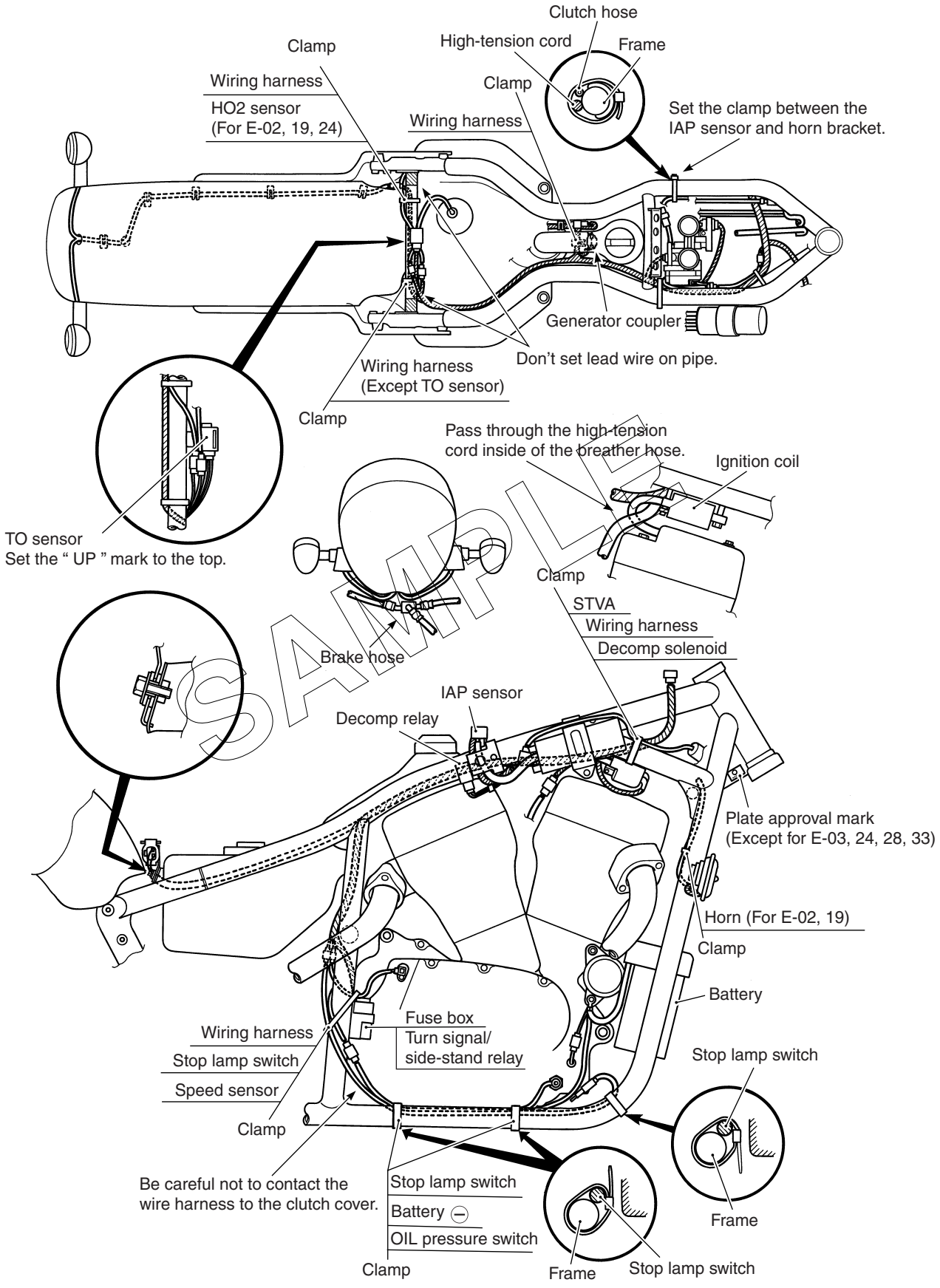
Type designation	FTZ16-BS-1
Capacity	12 V, 64.8 kC (18 Ah)/10 HR

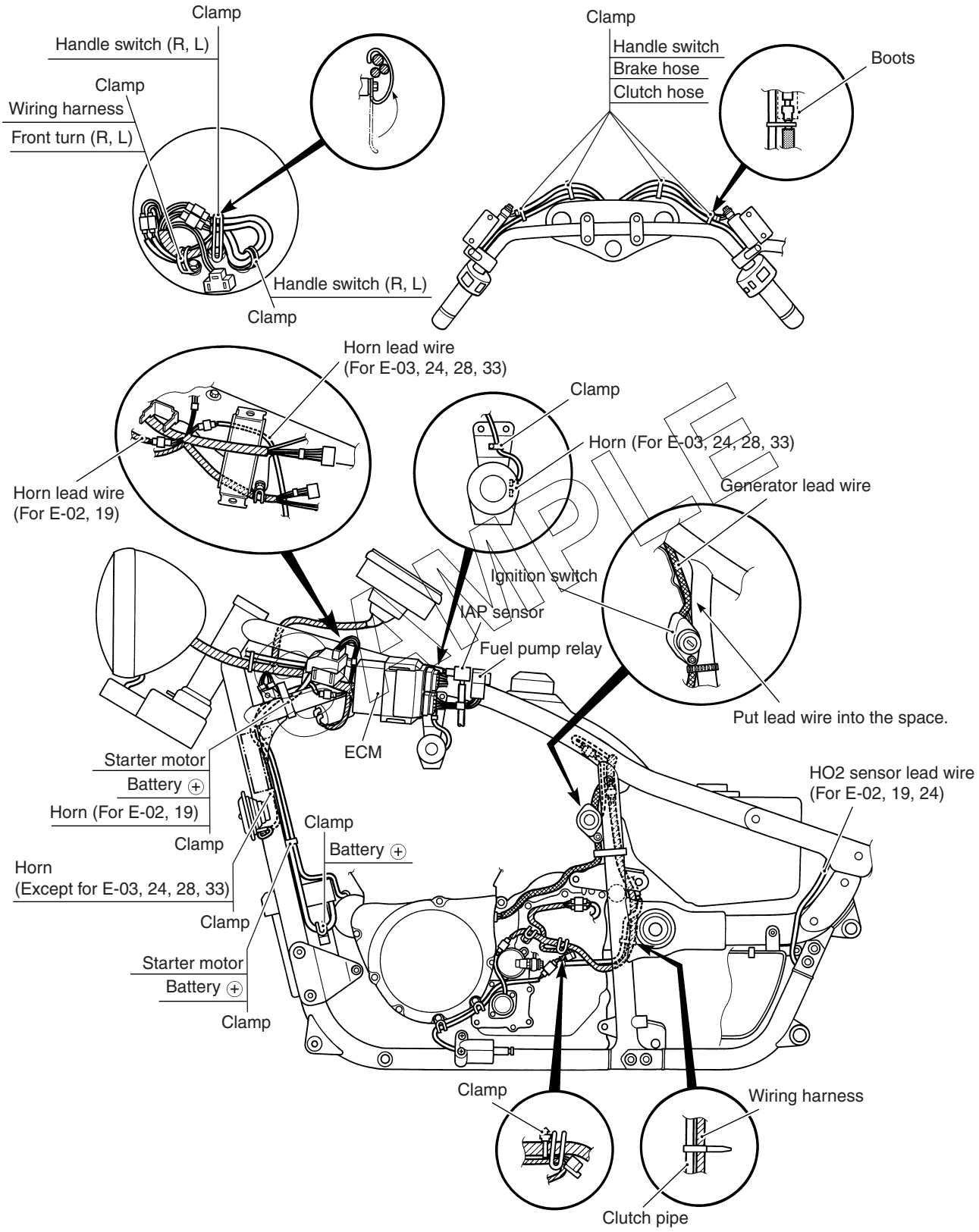
ⓐ Anode plates
ⓑ Separator (fiberglass plate)
ⓒ Cathode plates
ⓓ Upper cover breather
ⓔ Stopper
ⓕ Filter
ⓖ Terminal
ⓗ Safety valve



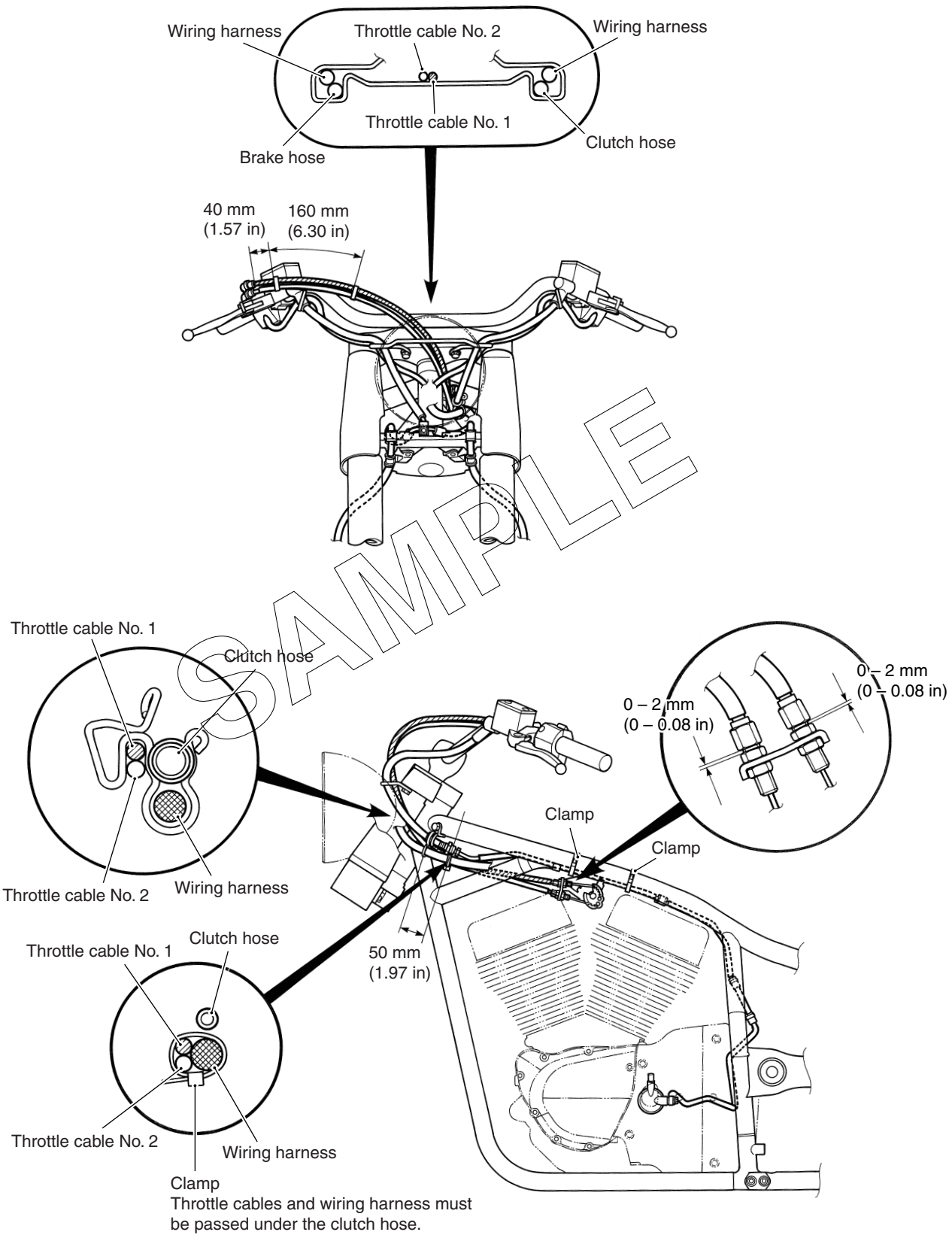
WIRING HARNESS, CABLE AND HOSE ROUTING
WIRING HARNESS ROUTING



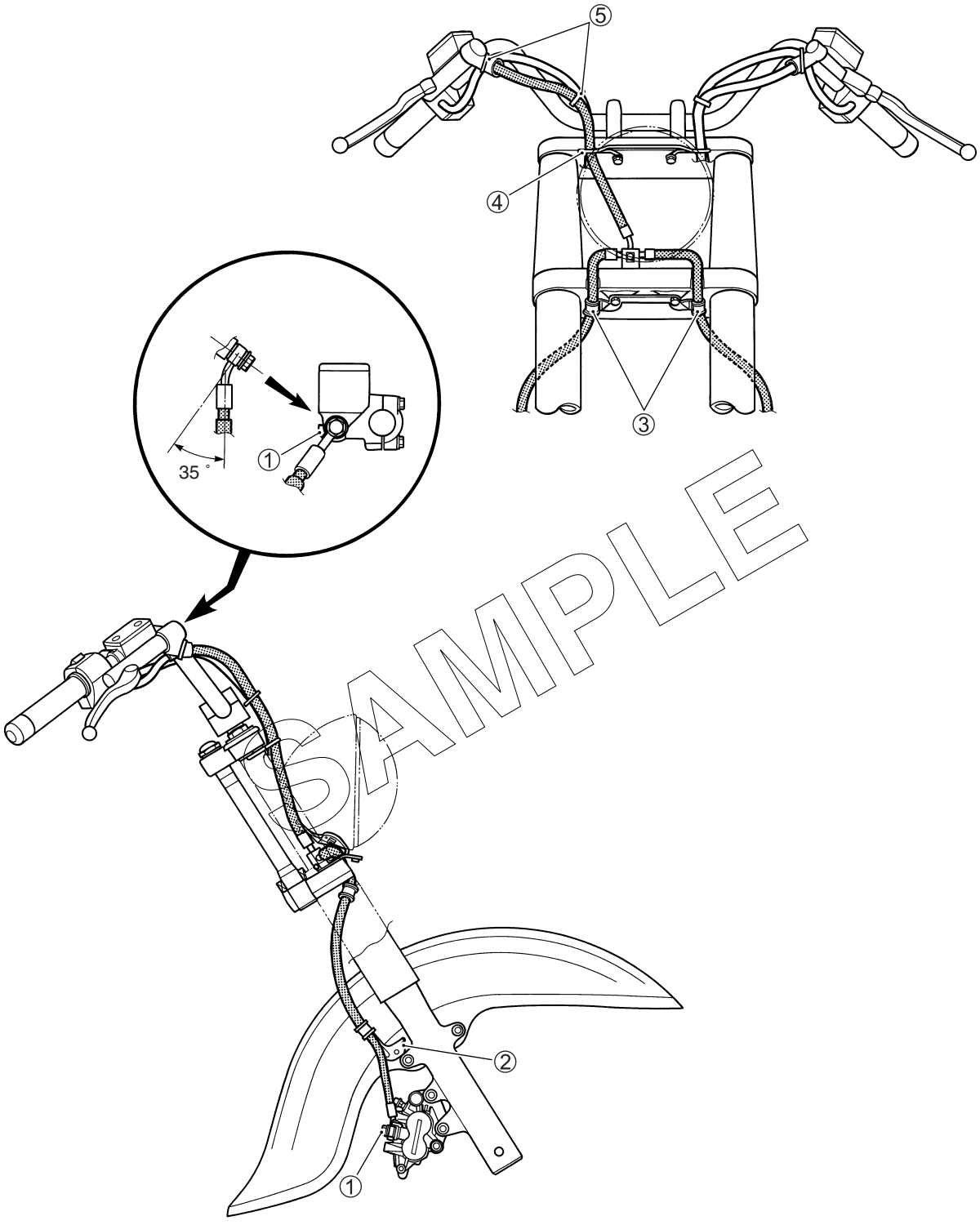

Clutch hose
High-tension cord
Frame
Clamp
Wiring harness
HO2 sensor
(For E-02, 19, 24)
Clamp
Wiring harness
Set the clamp between the
IAP sensor and horn bracket.
Generator coupler
Don't set lead wire on pipe.
Wiring harness
(Except TO sensor)
Clamp
TO sensor
Set the " UP " mark to the top.
Pass through the high-tension
cord inside of the breather hose.
Ignition coil
Clamp
STVA
Wiring harness
Decomp solenoid
Brake hose
IAP sensor
Decomp relay
Plate approval mark
(Except for E-03, 24, 28, 33)
Horn (For E-02, 19)
Clamp
Battery
Fuse box
Turn signal/
side-stand relay
Wiring harness
Stop lamp switch
Speed sensor
Clamp
Stop lamp switch
Be careful not to contact the
wire harness to the clutch cover.
Stop lamp switch
Battery ⊖
OIL pressure switch
Clamp
Frame
Frame
Stop lamp switch


Clamp
Handle switch (R, L)
Clamp
Wiring harness
Front turn (R, L)
Handle switch (R, L)
Clamp
Clamp
Handle switch
Brake hose
Clutch hose
Boots
Horn lead wire
(For E-03, 24, 28, 33)
Clamp
Horn (For E-03, 24, 28, 33)
Horn lead wire
(For E-02, 19)
Generator lead wire
Ignition switch
IAP sensor
Fuel pump relay
Put lead wire into the space.
ECM
Starter motor
Battery ⊕
Horn (For E-02, 19)
Clamp
Clamp
Battery ⊕
HO2 sensor lead wire
(For E-02, 19, 24)
Horn
(Except for E-03, 24, 28, 33)
Clamp
Starter motor
Battery ⊕
Clamp
Clamp
Wiring harness
Clutch pipe

CABLE AND HOSE ROUTING

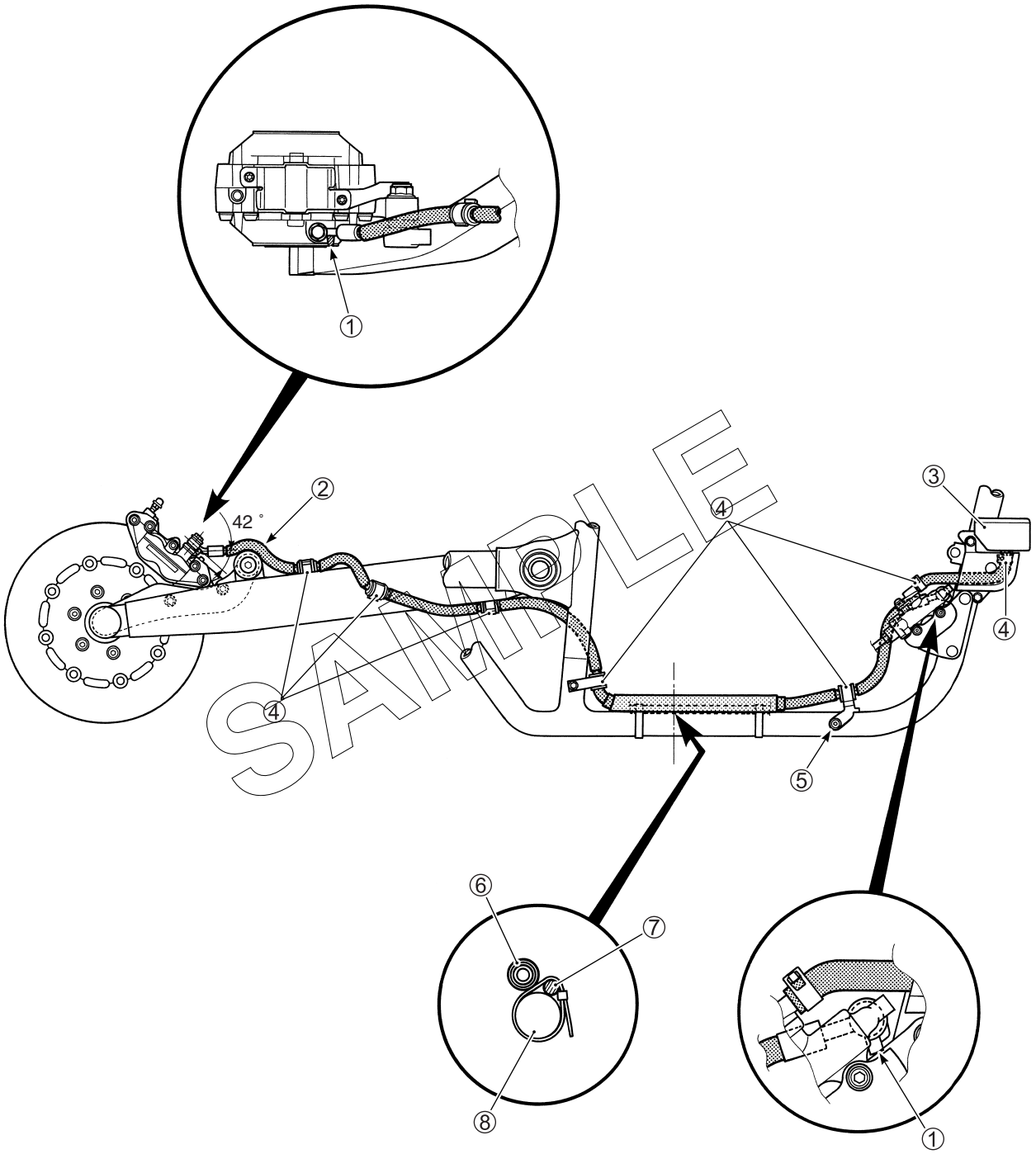


FRONT BRAKE HOSE ROUTING



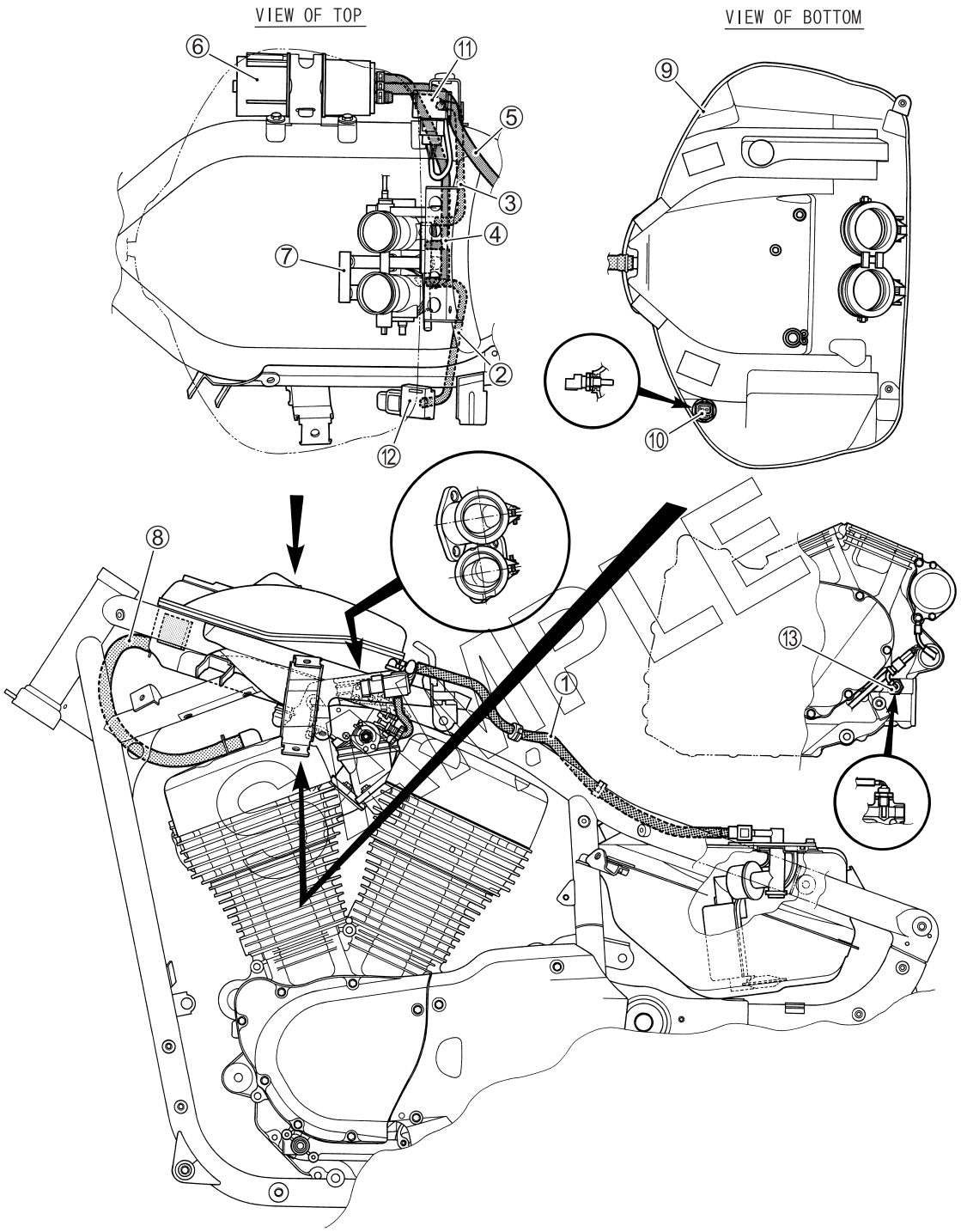
①	After the brake hose union has contacted the stopper, tighten the union bolt to the specified torque.	④	Pass through the brake hose inside of the hose guide.
②	After positioning the hose clamp with stopper, tighten the clamp bolt.	⑤	Bind the brake hose together with the wire harness by the wire clamp.
③	Clamp the brake hose firmly.		

REAR BRAKE HOSE ROUTING



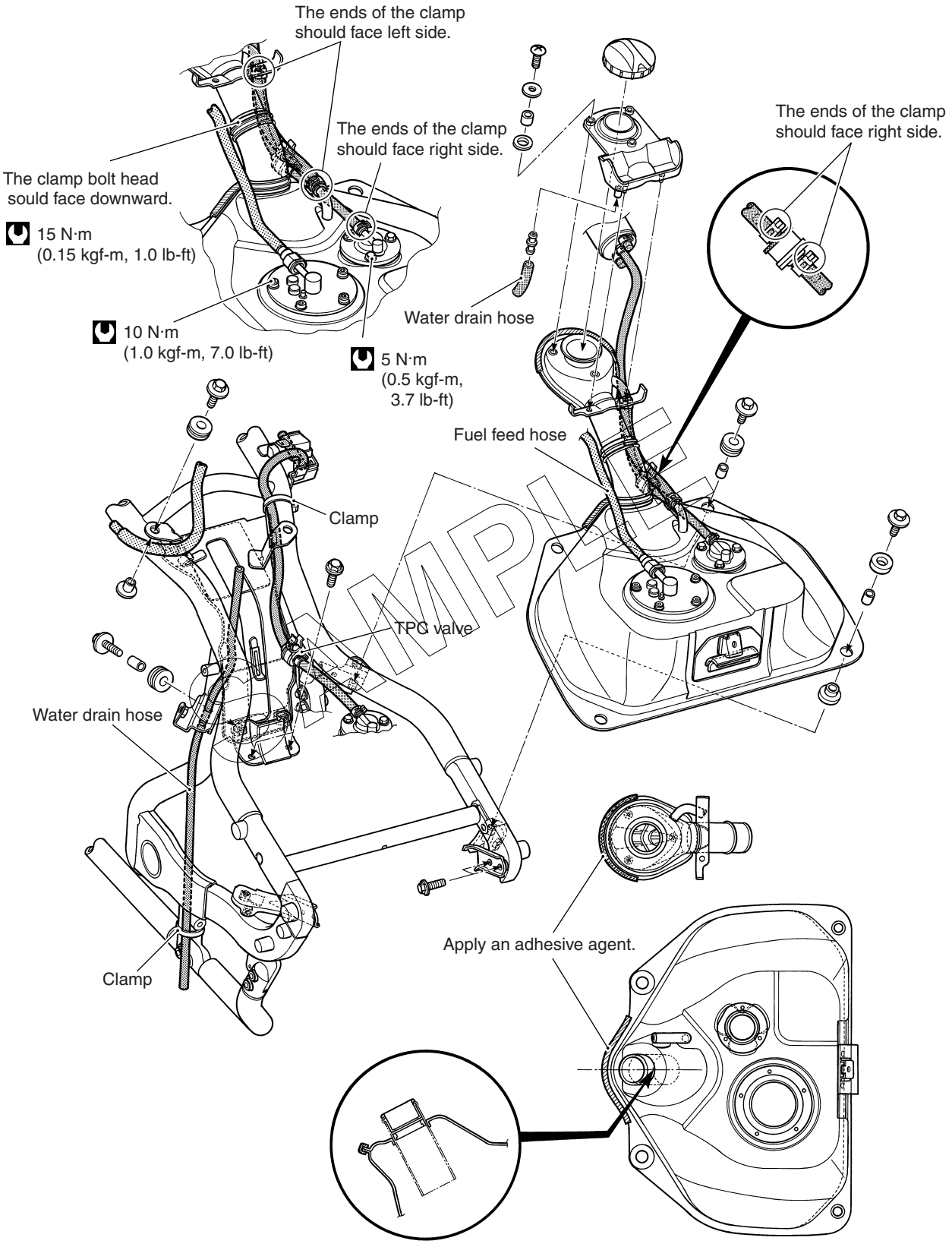
①	After the brake hose union has contacted the stopper, tighten the union bolt.	⑤	After positioning the clamp with the stopper, tighten the clamp bolt.
②	Brake hose must be passed over the brake support boss and caliper bracket.	⑥	Brake hose
③	Reservoir tank	⑦	Wire harness
④	Clamp	⑧	Frame

FUEL SYSTEM HOSE ROUTING

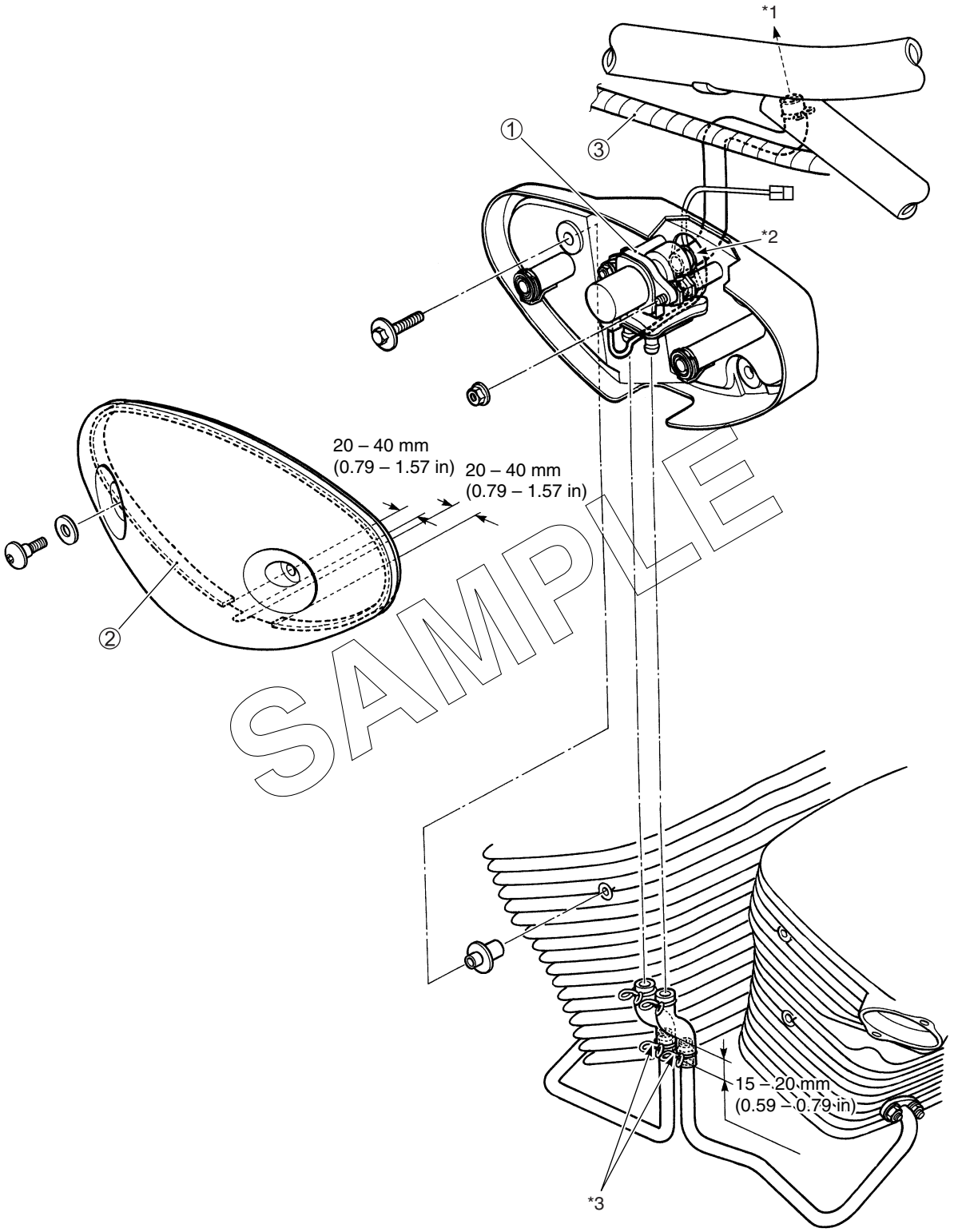


①	Fuel feed hose	⑧	PCV (Breather) hose
②	IAP sensor vacuum hose (Rear cylinder)	⑨	Air cleaner box
③	IAP sensor vacuum hose (Front cylinder)	⑩	IAT sensor
④	Purge hose (E-33 only)	⑪	IAP sensor (Front cylinder)
⑤	Surge hose (E-33 only)	⑫	IAP sensor (Rear cylinder)
⑥	EVAP canister (E-33 only)	⑬	EOT sensor
⑦	Throttle body		

ITEM	N·m	kgf-m	lb-ft
⑩	20	2.0	14.4
⑬	22	2.2	16.0

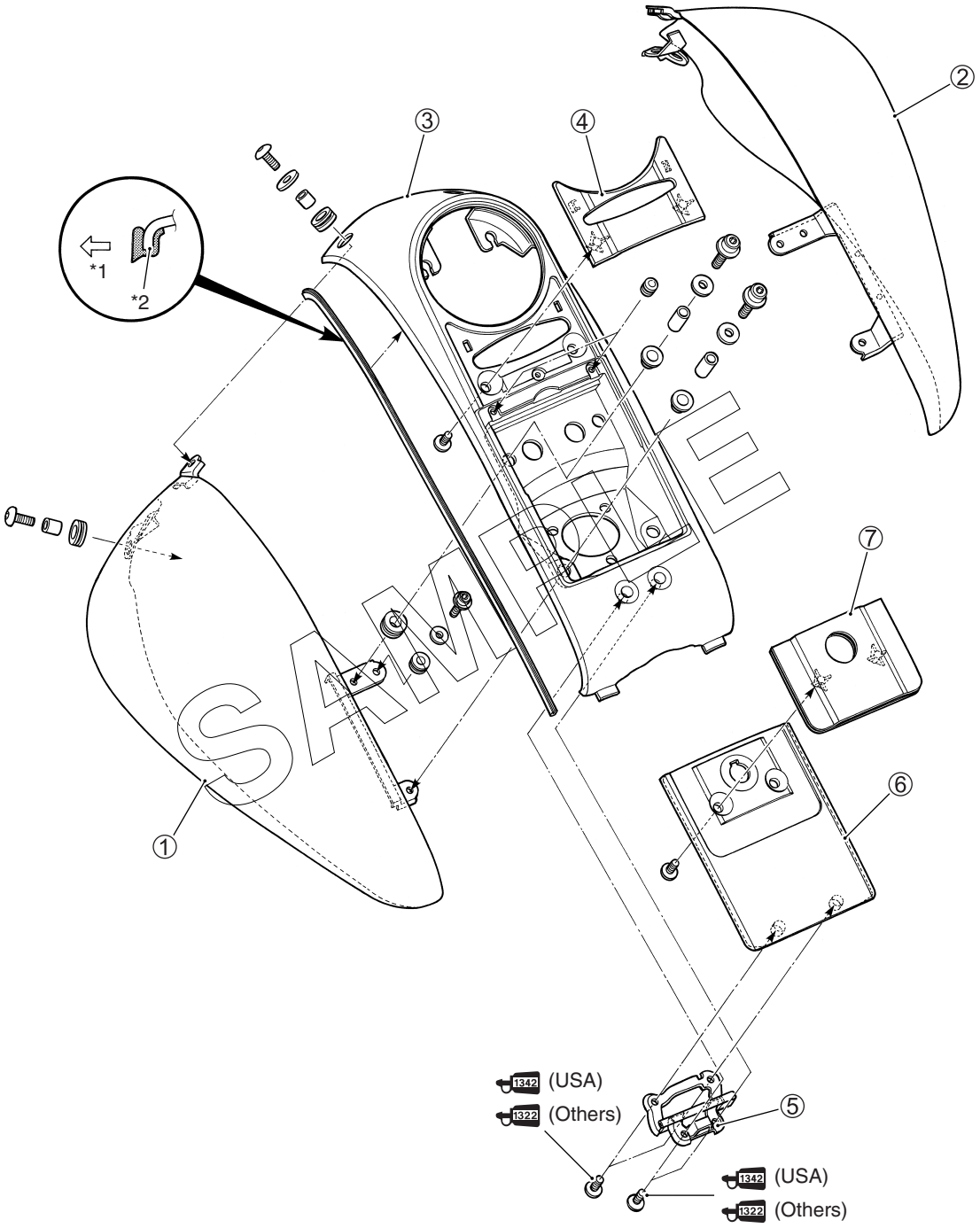

The ends of the clamp should face left side.
The ends of the clamp should face right side.
The clamp bolt head sould face downward.
15 N·m (0.15 kgf-m, 1.0 lb-ft)
10 N·m (1.0 kgf-m, 7.0 lb-ft)
5 N·m (0.5 kgf-m, 3.7 lb-ft)
The ends of the clamp should face right side.
Water drain hose
Fuel feed hose
Clamp
TPC valve
Water drain hose
Clamp
Apply an adhesive agent.

PAIR (AIR SUPPLY) SYSTEM HOSE ROUTING



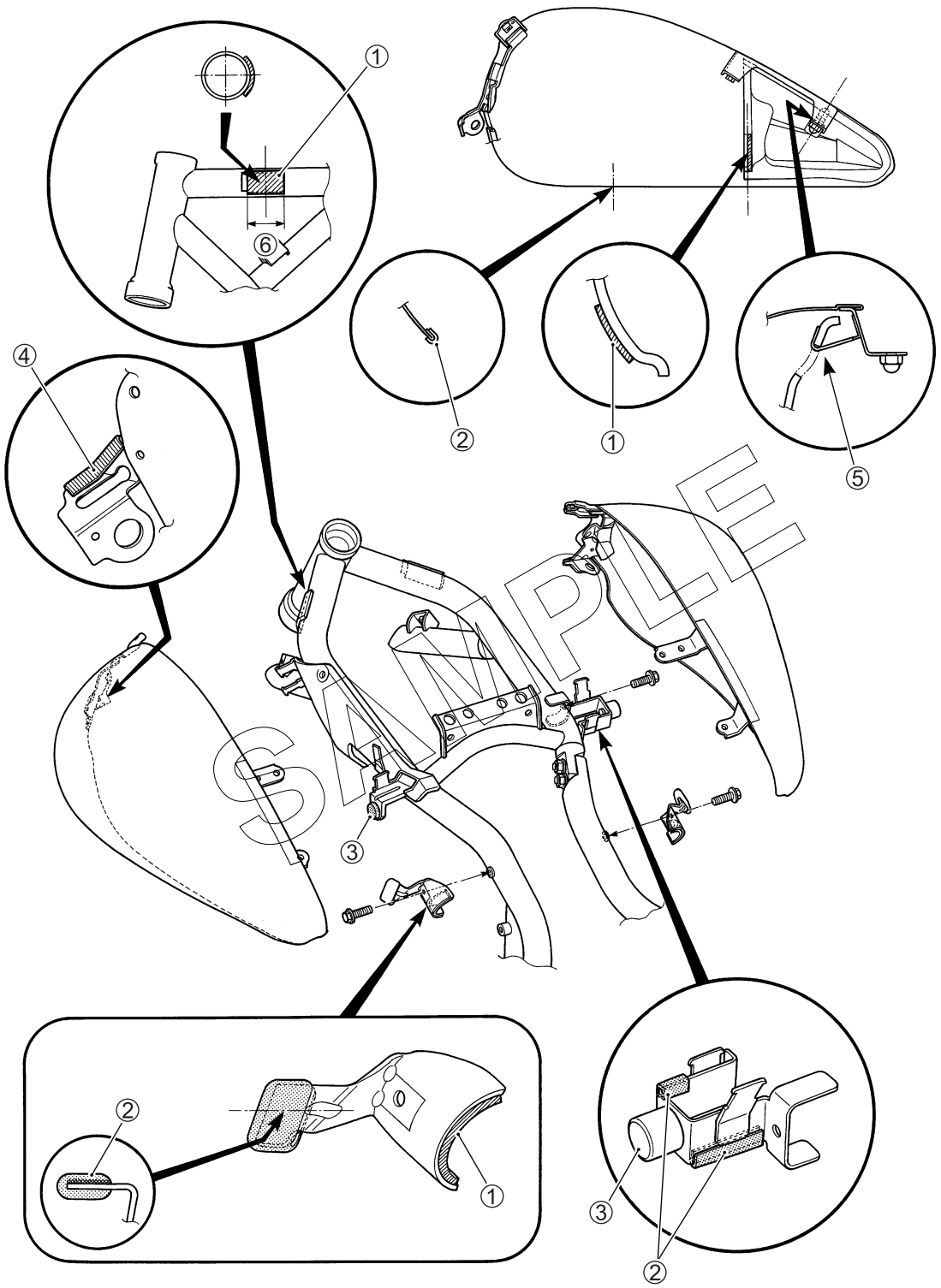
①	PAIR control solenoid valve with PAIR reed valve	*1	Connect the air hose to the air cleaner box.
②	Cushion seat (Apply an adhesive agent to the cushion seat.)	*2	Matching mark (Yellow)
③	Wiring harness	*3	Matching mark (White)

EXTERIOR PARTS INSTALLATION
METER/FUEL INLET COVER INSTALLATION



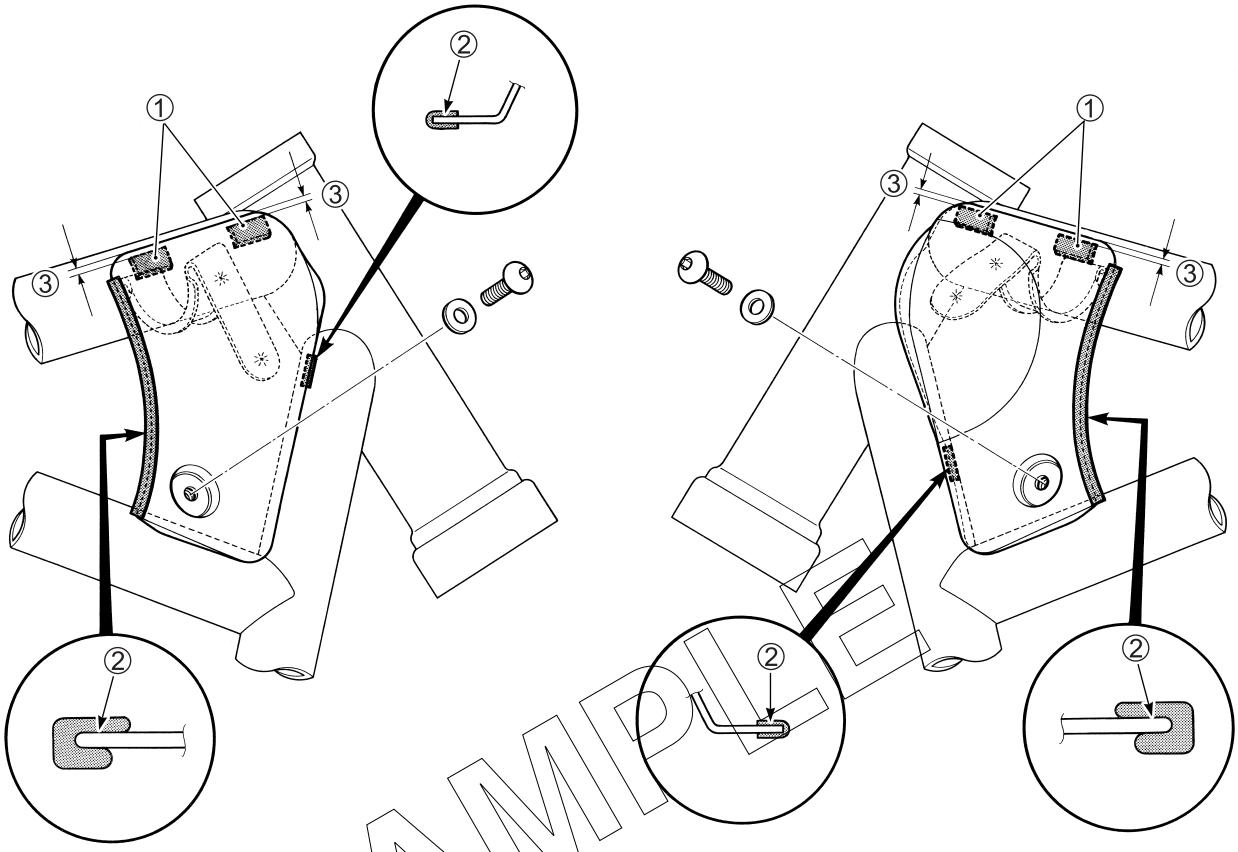
①	Frame upper cover (L)	⑤	Fuel lid hinge bracket
②	Frame upper cover (R)	⑥	Fuel lid
③	Speedometer/Fuel inlet cover	⑦	Fuel lid cover
④	Speedometer switch cover	*1	Outside
		*2	Apply an adhesive agent.

FRAME UPPER COVER INSTALLATION



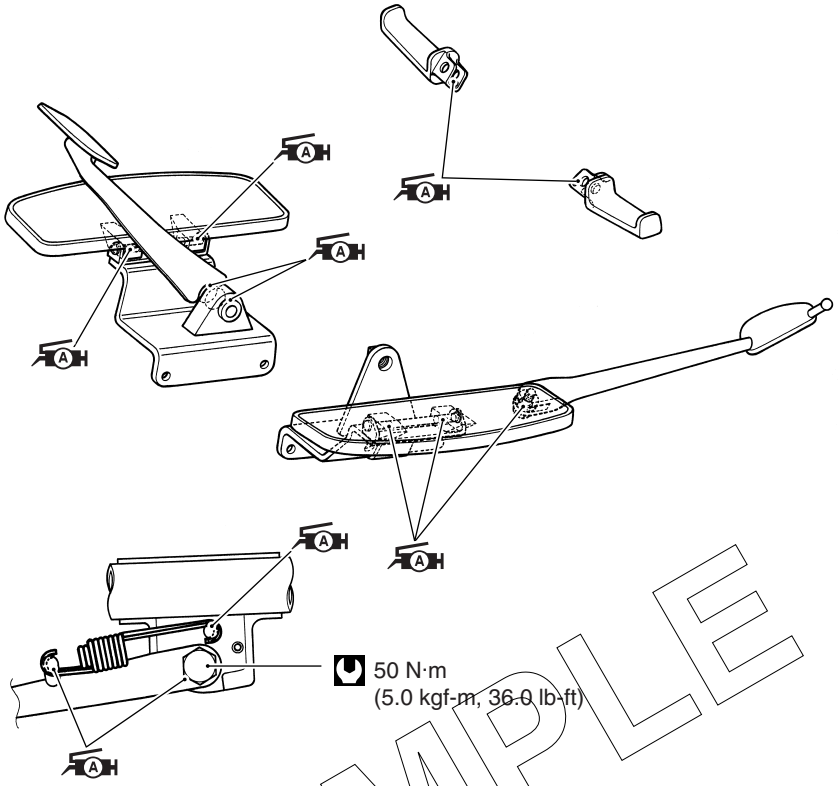
①	Cushion seat	④	Molding
②	Apply an adhesive agent.	⑤	Bend up the stay.
③	Cushion rubber	⑥	50 mm (2.0 in)

FRAME HEAD COVER INSTALLATION

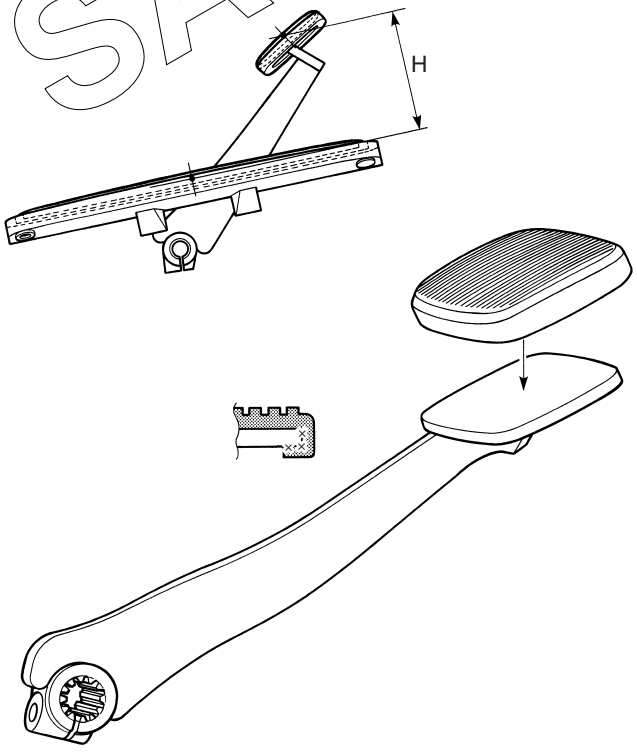


①	Cushion seat	③	3 mm (0.12 in)
②	Apply an adhesive agent.		

GREASE-UP POINTS

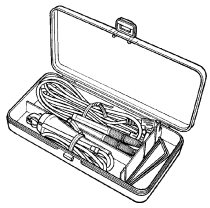
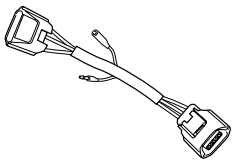
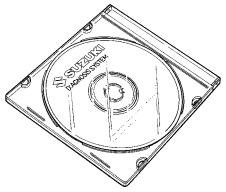
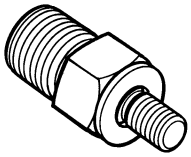
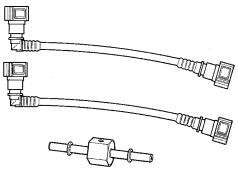
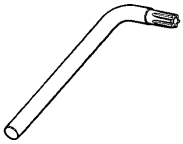
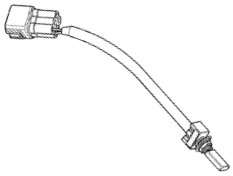


BRAKE PEDAL INSTALLATION



H	Brake pedal height: 98 mm (3.86 in)	×	Apply an adhesive agent.

SPECIAL TOOLS

 **09900-25009 Needle pointed probe set**	 **09900-28630 TPS test wire harness**	 **09904-41010 SDS set tool**	 **99565-01010-004 CD-ROM Ver. 4**	 **09915-74511 Oil pressure gauge**
 **09940-40211 Fuel pressure gauge adapter**	 **09940-40220 Fuel pressure gauge hose attachment**	 **09930-11950 Torx wrench**	 **09930-82720 Mode selection switch**	

NOTE:
When order the special tool, please confirm whether it is available or not.

TIGHTENING TORQUE

* FI SYSTEM AND INTAKE AIR SYSTEM

ITEM	N·m	kgf-m	lb-ft
IAT sensor	20	2.0	14.4
HO2 sensor (For E-02, 19, 24)	25	2.5	18.0
EOT sensor	22	2.2	16.0
Fuel pump mounting bolt	10	1.0	7.0
STPS mounting screw	3.5	0.35	2.5
TPS mounting screw	3.5	0.35	2.5
Fuel delivery pipe mounting screw	5	0.5	3.5
Fuel delivery pipe hose mounting screw	5	0.5	3.5

* CHASSIS

ITEM	N·m	kgf-m	lb-ft
Front fork cap bolt	23	2.3	16.5
Front fork upper clamp bolt	23	2.3	16.5
Handlebar set bolt	23	2.3	16.5
Handlebar holder nut	70	7.0	50.5

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 (1.3)	—
	EX.	40 (1.6)	—
Lash-adjuster plunger stroke	0 – 0.5 (0 – 0.02)		—
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	—
	EX.	0.040 – 0.070 (0.0016 – 0.0028)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN.	5.500 – 5.512 (0.2165 – 0.2170)	—
	EX.	7.000 – 7.015 (0.2756 – 0.2762)	—
Valve stem O.D.	IN.	5.475 – 5.490 (0.2156 – 0.2161)	—
	EX.	6.945 – 6.960 (0.2734 – 0.2740)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN.	—	2.5 (0.10)
	EX.	—	2.2 (0.09)
Valve seat width	IN.	0.9 – 1.1 (0.035 – 0.043)	—
	EX.	1.0 – 1.2 (0.039 – 0.047)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length (INTAKE)	INNER	—	35.0 (1.38)
	OUTER	—	37.8 (1.49)
Valve spring free length (EXHAUST)	—		40.6 (1.60)
Valve spring tension (INTAKE)	INNER	53 –65 N (5.3 – 6.5 kgf) (11.68 – 14.33 lbs) at length 28.0 mm (1.10 in)	—
	OUTER	140 – 142 N (14.0 – 14.2 kgf) (30.86 – 31.31 lbs) at length 31.5 mm (1.24 in)	—
Valve spring tension (EXHAUST)	203 – 233 N (20.3 – 23.3 kgf) (44.75 – 51.37 lbs) at length 35.0 mm (1.38 in)		—

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	* 35.320 – 35.370 (1.3905 – 1.3925)	* 35.02 (1.379)
	EX.	36.880 – 36.930 (1.4521 – 1.4537)	36.58 (1.440)
Camshaft journal oil clearance	IN. & EX.	0.032 – 0.066 (0.0013 – 0.0026)	0.150 (0.0060)
Camshaft journal holder I.D.	Front head right side, rear head left side	20.012 – 20.025 (0.7879 – 0.7884)	—
	Front head left side, rear head right side	25.012 – 25.025 (0.9847 – 0.9852)	—
Camshaft journal O.D.	Front head right side, rear head left side	19.959 – 19.980 (0.7858 – 0.7866)	—
	Front head left side, rear head right side	24.959 – 24.980 (0.9826 – 0.9835)	—
Camshaft runout	Front & Rear	—	0.10 (0.004)
Rocker arm I.D.	IN.	14.000 – 14.018 (0.5511 – 0.5519)	—
	EX.	16.000 – 16.018 (0.6299 – 0.6303)	—
Rocker arm shaft O.D.	IN.	13.966 – 13.984 (0.5498 – 0.5506)	—
	EX.	15.966 – 15.984 (0.6286 – 0.6293)	—
Cylinder head distortion	—		0.05 (0.002)
Cylinder head cover distortion	—		0.05 (0.002)

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD			LIMIT
Compression pressure (Automatic decompression actuated)	1 000 – 1 400 kPa (10 – 14 kgf/cm², 142 – 199 psi)			—
Compression pressure difference	—			200 kPa (2 kgf/cm², 28 psi)
Piston to cylinder clearance	0.02 – 0.03 (0.0008 – 0.0012)			0.120 (0.0047)
Cylinder bore	96.000 – 96.015 (3.7795 – 3.7801)			Nicks or Scratches
Piston diam.	95.975 – 95.990 (3.7785 – 3.7791) Measure at 16 mm (0.6 in) from the skirt end.			95.88 (37.7748)
Cylinder distortion	—			0.05 (0.002)
Piston ring free end gap	1st	T	Approx. 13.5 (0.53)	10.8 (0.43)
	2nd	T	Approx. 14.0 (0.55)	11.2 (0.44)

ITEM	STANDARD		LIMIT
Piston ring end gap	1st	0.30 – 0.45 (0.012 – 0.018)	0.70 (0.028)
	2nd	0.45 – 0.60 (0.018 – 0.024)	1.00 (0.039)
Piston ring to groove clearance	1st	—	0.180 (0.007)
	2nd	—	0.150 (0.006)
Piston ring groove width	1st	1.210 – 1.230 (0.0476 – 0.0484)	—
	2nd	1.510 – 1.530 (0.0594 – 0.0602)	—
	Oil	2.810 – 2.830 (0.1106 – 0.1114)	—
Piston ring thickness	1st	1.160 – 1.175 (0.0457 – 0.0463)	—
	2nd	1.470 – 1.490 (0.0579 – 0.0587)	—
Piston pin bore	23.002 – 23.008 (0.9056 – 0.9058)		23.030 (0.9067)
Piston pin O.D.	22.992 – 23.000 (0.9052 – 0.9055)		22.980 (0.9047)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.015 – 23.023 (0.9061 – 0.9064)	23.040 (0.9071)
Conrod big end side clearance	0.10 – 0.20 (0.004 – 0.008)	0.3 (0.012)
Conrod big end width	21.95 – 22.00 (0.864 – 0.866)	—
Crank pin width	22.10 – 22.15 (0.870 – 0.872)	—
Conrod big end oil clearance	0.024 – 0.042 (0.0009 – 0.0017)	0.080 (0.0031)
Crank pin O.D.	49.982 – 50.000 (1.9678 – 1.9685)	—
Crankshaft journal oil clearance	0.020 – 0.050 (0.0008 – 0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	51.965 – 51.980 (2.0459 – 2.0465)	—
Crankshaft journal I.D.	52.000 – 52.015 (2.0472 – 2.0478)	—
Crankshaft thrust bearing thickness	1.925 – 2.175 (0.0758 – 0.0856)	—
Crankshaft thrust clearance	0.05 – 0.10 (0.002 – 0.004)	—
Crankshaft runout	—	0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	1.154 (76/51 × 31/40)	—
Oil pressure (at 60 °C, 140 °F)	Above 350 kPa (3.5 kgf/cm², 50 psi) Below 650 kPa (6.5 kgf/cm², 92 psi) at 3 000 r/min	—

CLUTCH

Unit: mm (in)

ITEM	STANDARD	LIMIT
Drive plate thickness	2.90 – 3.10 (0.114 – 0.122)	2.60 (0.102)
Drive plate claw width	15.6 – 15.8 (0.614 – 0.622)	14.8 (0.583)
Driven plate distortion	—	0.10 (0.004)
Clutch spring free length	34.47 (1.357)	32.7 (1.29)
Clutch master cylinder bore	14.000 – 14.043 (0.5512 – 0.5529)	—
Clutch master cylinder piston diam.	13.957 – 13.984 (0.5495 – 0.5506)	—
Clutch release cylinder bore	33.600 – 33.662 (1.3228 – 1.3253)	—
Clutch release cylinder piston diam.	33.550 – 33.575 (1.3209 – 1.3218)	—

DRIVE TRAIN

Unit: mm (in) Except ratio

ITEM		STANDARD	LIMIT
Primary reduction ratio		1.490 (76/51)	—
Secondary reduction ratio		0.852 (29/34)	—
Final reduction ratio		2.666 (19/19 × 32/12)	—
Gear ratios	Low	3.000 (36/12)	—
	2nd	1.823 (31/17)	—
	3rd	1.333 (28/21)	—
	4th	1.041 (25/24)	—
	Top	0.884 (23/26)	—
Shift fork to groove clearance		0.1 – 0.3 (0.004 – 0.012)	0.5 (0.020)
Shift fork groove width		5.50 – 5.60 (0.217 – 0.220)	—
Shift fork thickness		5.30 – 5.40 (0.209 – 0.213)	—
Damper spring free length		—	73.6 (2.90)
Gearshift lever height		82 (3.23)	—
Secondary bevel gear backlash		0.03 – 0.15 (0.001 – 0.006)	—
Final bevel gear backlash		0.03 – 0.64 (0.001 – 0.025)	—

* INJECTOR + FUEL PUMP + FUEL PRESSURE REGURATOR

ITEM	SPECIFICATION	NOTE
Injector resistance	Approx. 11.7 Ω at 20 °C (68 °F)	
Fuel pump discharge amount	168 ml (5.7/5.9 US/Imp oz) and more/10 sec.	
Fuel pressure regulator operating set pressure	Approx. 300 kPa (3.0 kgf/cm², 43 psi)	

* FI-SENSORS

ITEM	SPECIFICATION		NOTE
CKP sensor resistance	178 – 242 Ω		
CKP sensor peak voltage	2.4 V and more (When cranking)		
IAP sensor input voltage	4.5 – 5.5 V		
IAP sensor output voltage	Approx. 2.53 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor resistance	Approx. 4.66 kΩ		
	Closed	Approx. 1.12 kΩ	
	Opened	Approx. 4.41 kΩ	
TP sensor output voltage	Closed	Approx. 1.12 V	
	Opened	Approx. 4.41 V	
EOT sensor input voltage	4.5 – 5.5 V		
EOT sensor output voltage	0.1 – 4.6 V		
EOT sensor resistance	Approx. 61.3 kΩ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor output voltage	0.1 – 4.6 V		
IAT sensor resistance	Approx. 2.45 kΩ at 20 °C (68 °F)		
TO sensor resistance	19.1 – 19.7 kΩ		
TO sensor voltage	Normal	0.4 – 1.4 V	
	Leaning	3.7 – 4.4 V	When leaning 65 °
GP switch voltage	0.6 V and more (From 1st to top)		
Injector voltage	Battery voltage		
STP sensor input voltage	4.5 – 5.5 V		
STP sensor resistance	Approx. 4.69 kΩ		
	Closed	Approx. 0.5 kΩ	
	Opened	Approx. 3.9 kΩ	
STP sensor output voltage	Closed	Approx. 0.5 V	
	Opened	Approx. 3.9 V	
STV actuator resistance	Approx. 6.5 Ω		
Heated oxygen sensor output voltage	0.4 V and less at idle speed		For E-02, 19, 24
	0.6 V and more at 5 000 r/min		
Heated oxygen sensor resistance	6.5 – 8.9 Ω at 23 °C (73.4 °F)		
PAIR solenoid valve resistance	20 – 24 Ω at 20 – 30 °C (68 – 86 °F)		

* THROTTLE BODY

ITEM	SPECIFICATION
ID No.	10F0 (For E-02, 19, 03, 24, 28), 10F1 (For E-33)
Bore size	36 mm
Fast idle r/min	1 400 – 2 000 r/min When cold engine
Idle r/min	1 000 ± 100 r/min
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)

ELECTRICAL

Unit: mm (in)

ITEM			SPECIFICATION		NOTE
Firing order			R · F		
Spark plug			Type	NGK: DPR7EA-9 DENSO: X22EPR-U9	
			Gap	0.8 – 0.9 (0.031 – 0.035)	
Spark performance			Over 8 (0.3) at 1 atm.		
* CKP sensor resistance			178 – 242 Ω		Bl – G
* CKP sensor peak voltage			2.4 V and more		
Ignition coil resistance			Primary	1 – 7 Ω	Terminal – Terminal
			Secondary	18 – 28 kΩ	Plug cap – Terminal
Ignition coil primary peak voltage			Front	* 180 V and more	B/Y – Ground
			Rear	* 180 V and more	W – Ground
Generator coil resistance			0.1 – 1.0 Ω		* W – W
Generator Max. output			*Approx. 375 W at 5000 r/min		
Generator no-load voltage (when engine is cold)			80 V (AC) and more at 5 000 r/min		
Regulated voltage			13.5 – 15.0 V at 5 000 r/min		
Decomp. solenoid resistance			0.1 – 1.5 Ω		
Fuel pump resistance			70 – 110 Ω		
Starter relay resistance			3 – 6 Ω		
* GP switch voltage			0.6 V and more (From 1st to top)		
Battery	Type designation		* FTZ16-BS-1		
	Capacity		* 12 V 64.8 kC (18 Ah)/10 HR		
Fuse size	Headlight	HI	10 A		
		LO	10 A		
	Signal		15 A		
	Ignition		15 A		
	Fuel		10 A		
	Power source		10 A		
	Main		30 A		

WATTAGE

Unit: W

ITEM		SPECIFICATION		
		E-03, 28, 33	E-24	Others
Headlight	HI	60	←	←
	LO	55	←	←
Position/Parking light				* 12/5
Brake light/Taillight		21/5	←	←
Turn signal light	Front	21/5	21	←
	Rear	21	←	←
Speedometer light		* LED	←	←
Turn signal indicator light		* LED	←	←
High beam indicator light		* LED	←	←
Neutral indicator light		* LED	←	←
Oil pressure indicator light		LED	←	←
* FI indicator light		LED	←	←

BRAKE + WHEEL

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal height		98 (3.86)	—
Brake disc thickness	Front	4.8 – 5.2 (0.189 – 0.205)	4.5 (0.18)
	Rear	6.6 – 7.0 (0.260 – 0.276)	6.3 (0.25)
Brake disc runout		—	0.30 (0.012)
Master cylinder bore	Front	15.870 – 15.913 (0.6248 – 0.6265)	—
	Rear	12.700 – 12.743 (0.5000 – 0.5017)	—
Master cylinder piston diam.	Front	15.827 – 15.854 (0.6231 – 0.6242)	—
	Rear	12.657 – 12.684 (0.4983 – 0.4994)	—
Brake caliper cylinder bore	Front	30.230 – 30.306 (1.1902 – 1.1931)	—
	Rear	30.230 – 30.306 (1.1902 – 1.1931)	—
Brake caliper piston diam.	Front	30.150 – 30.200 (1.1870 – 1.1890)	—
	Rear	30.150 – 30.200 (1.1870 – 1.1890)	—
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)

ITEM	STANDARD		LIMIT
Wheel rim size	Front	16 × MT3.50, 16M/C × MT3.50	—
	Rear	15M/C × MT5.00	—
Tire size	Front	150/80-16 71H, 150/80-16M/C 71H	—
	Rear	180/70-15M/C 76H	—
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	140 (5.5)	—	
Front fork spring free length	* 601.5 (23.68)	* 589 (23.2)	
Front fork oil level	*192 (7.56)	—	
Rear shock absorber spring set length	222.0 (8.74)	—	
Rear wheel travel	118 (4.6)	—	

TIRE PRESSURE

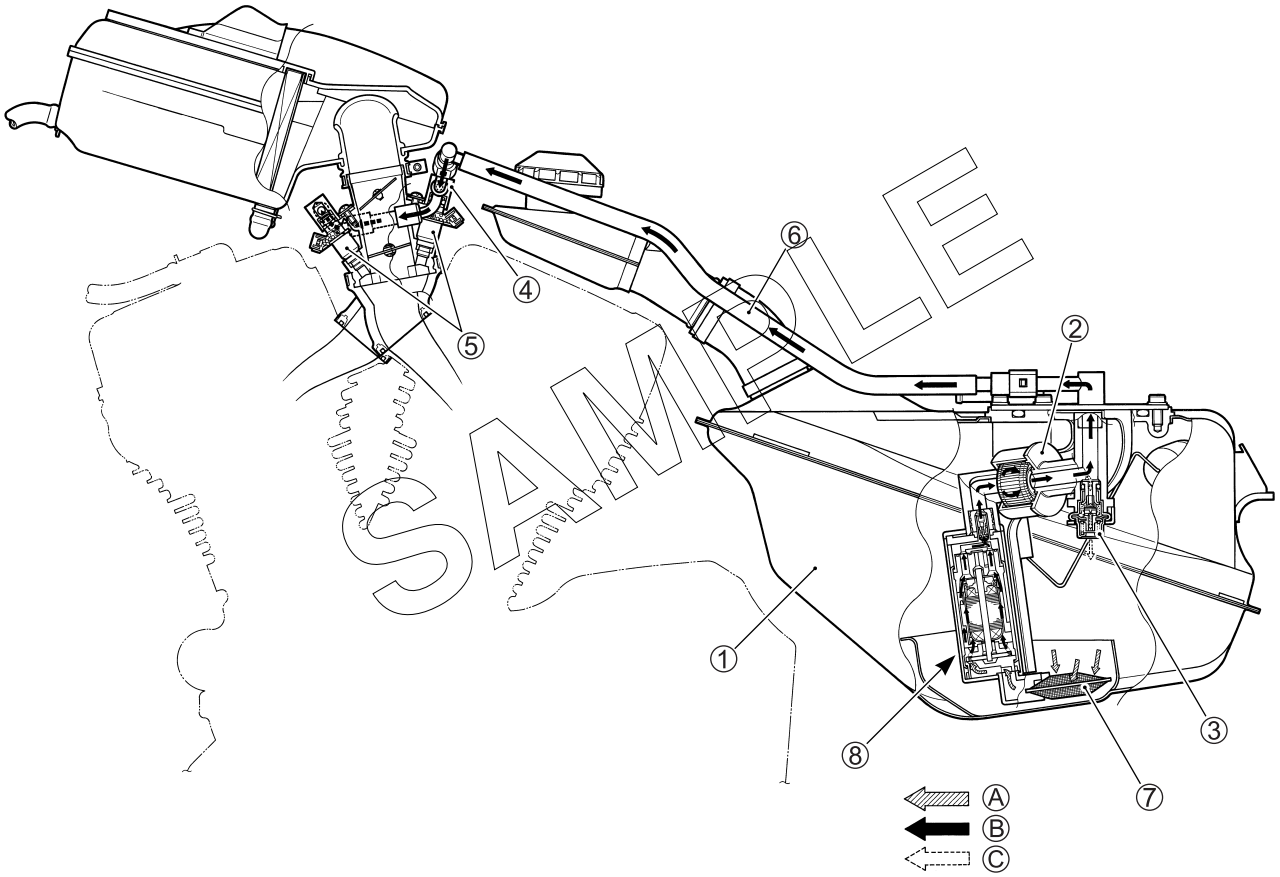
COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kgf/cm²	psi	kPa	kgf/cm²	psi
FRONT	200	2.00	29	200	2.00	29
REAR	250	2.50	36	250	2.50	36

FUEL + OIL

ITEM	SPECIFICATION		LIMIT
Fuel type	Use only unleaded gasoline of at least 87 pump octane (R/2 + M/2) or 91 octane or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03, 28, 33
	Gasoline used should be graded 91 octane or higher. An unleaded gasoline is recommended.		The others
Fuel tank	* 14.0 L (3.7/3.1 US/Imp gal)		
Engine oil type	SAE 10W-40, API SF or SG		
Engine oil capacity	Change	3 700 ml (3.9/3.3 US/Imp qt)	
	Filter change	4 300 ml (4.5/3.8 US/Imp qt)	
	Overhaul	5 000 ml (5.3/4.4 US/Imp qt)	
Front fork oil type	SUZUKI FORK OIL SS-08 (#10) or equivalent fork oil		

ITEM	STANDARD		LIMIT
Front fork oil capacity (each leg)	*416 ml (14.1/14.6 US/Imp oz)		
Bevel gear oil type	Hypoid Gear oil #90 API GL-5		
Bevel gear oil capacity	Final	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp oz)	
Brake fluid type	DOT 4		

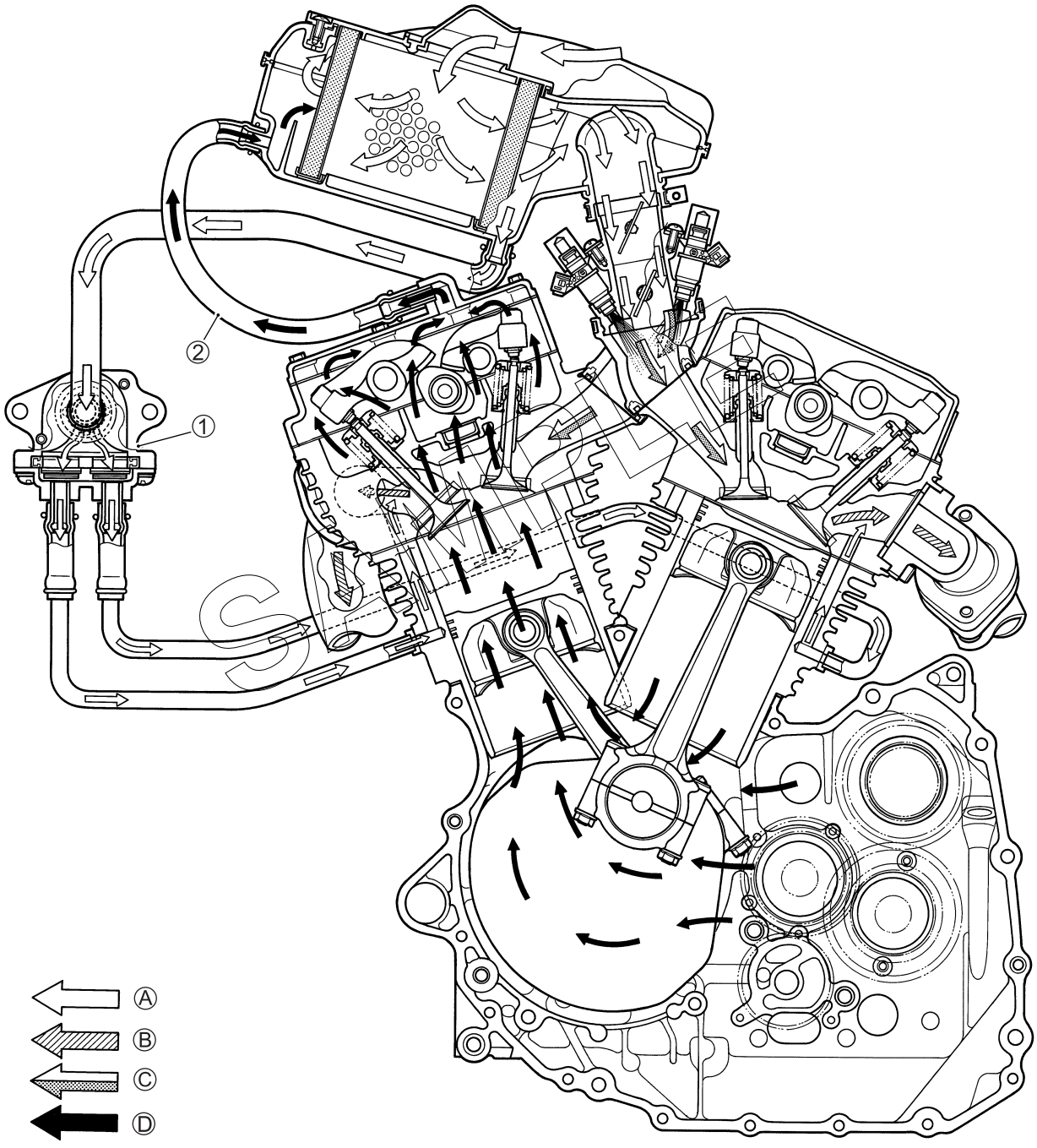
EMISSION CONTROL SYSTEMS
FUEL INJECTION SYSTEM
VL1500K5 motorcycles are equipped with a fuel injection system for emission level control.
This fuel injection system is precision designed, manufactured and adjusted to comply with the applicable emission limits.



①	Fuel tank	⑦	Fuel mesh filter (For low pressure)
②	Fuel filter (For high pressure)	⑧	Fuel pump
③	Fuel pressure regulator	Ⓐ	Before-pressurized fuel
④	Fuel delivery pipe	Ⓑ	Pressurized fuel
⑤	Fuel injector	Ⓒ	Relieved fuel
⑥	Fuel feed hose		

CRANKCASE EMISSION CONTROL SYSTEM

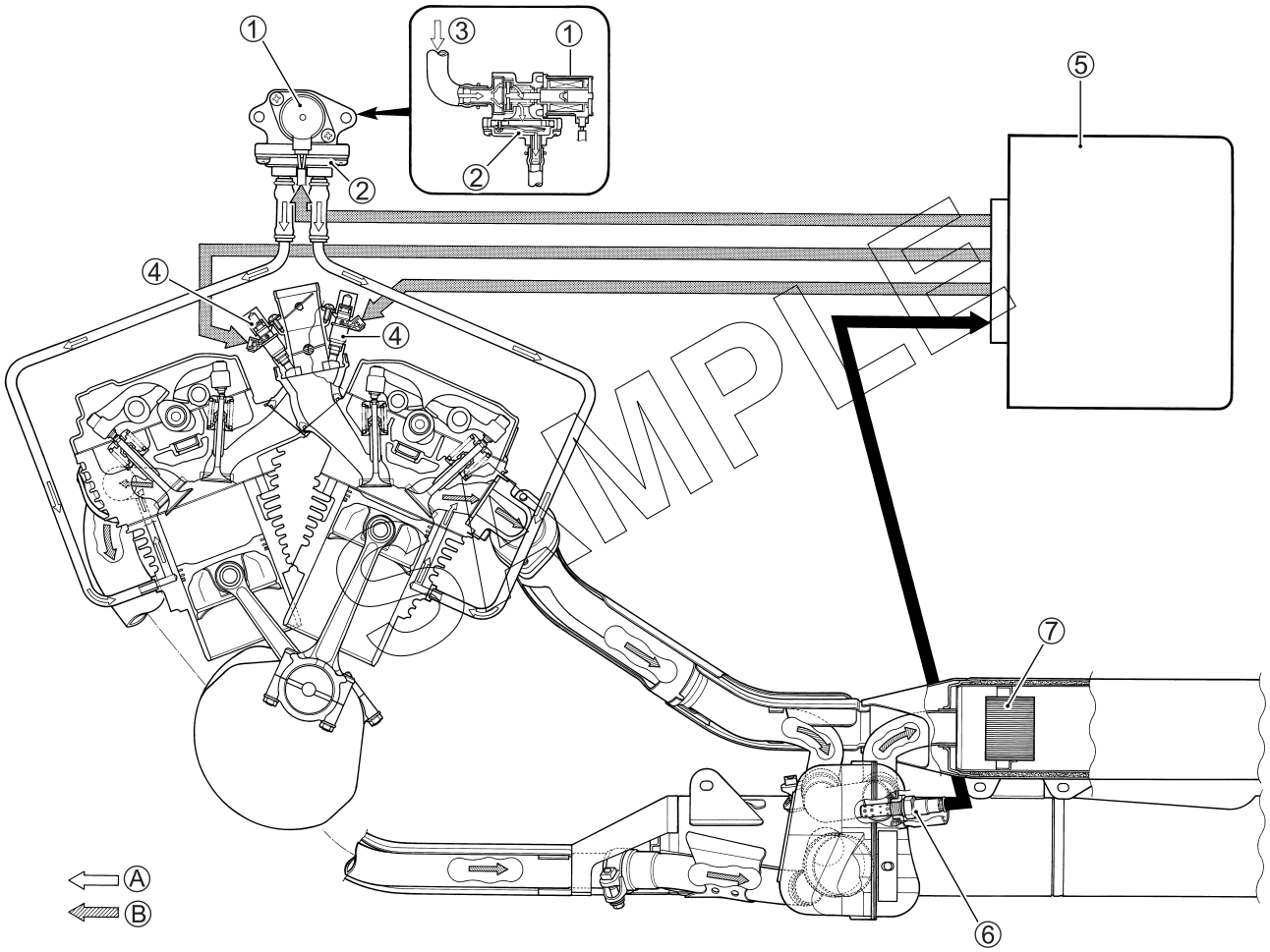
The engine is equipped with a PCV system. Blow-by gas in the engine is constantly drawn into the crankcase, which is returned to the combustion chamber through the PCV (breather) hose, air cleaner and throttle body.



①	PAIR control solenoid valve	Ⓑ	EXHAUST GAS
②	PCV hose	Ⓒ	FUEL/AIR MIXTURE
Ⓐ	FRESH AIR	Ⓓ	BLOW-BY GAS

EXHAUST EMISSION CONTROL SYSTEM (PAIR SYSTEM)

The exhaust emission control system is composed of the PAIR system and THREE-WAY CATALYST system (For E-02, 19, 24 and 33). The fresh air is drawn into the exhaust port through the PAIR solenoid valve and PAIR reed valve. The PAIR solenoid valve is operated by the ECM, and the fresh air flow is controlled according to the TPS, EOTS, IATS, IAPS and CKPS.



①	PAIR control solenoid valve	⑥	HO2 sensor (E-02, 19, 24)
②	PAIR reed valve	⑦	Three-way catalyst (E-02, 19, 24, 33)
③	Fresh air from air cleaner box.	Ⓐ	FRESH AIR
④	Fuel injector	Ⓑ	EXHAUST GAS
⑤	ECM		

NOISE EMISSION CONTROL SYSTEM

TAMPERING WITH THE NOISE CONTROL SYSTEM PROHIBITED: Local law prohibits the following acts or the causing thereof:

1. The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use, or
2. The use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

AMONG THOSE ACTS PRESUMED TO CONSTITUTE TAMPERING ARE THE ACTS LISTED BELOW:

- Removing or puncturing the muffler, baffles, header pipes, screen type spark arrester (if equipped) or any other component which conducts exhaust gases.
- Removing or puncturing the air cleaner case, air cleaner cover, baffles or any other component which conducts intake air.
- Replacing the exhaust system or muffler with a system or muffler not marked with the same model specific code as the code listed on the Motorcycle Noise Emission Control Information label.

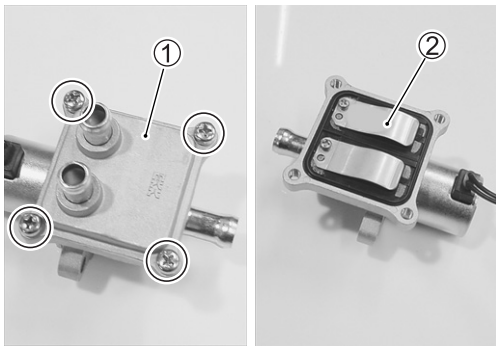
PAIR (AIR SUPPLY) SYSTEM INSPECTION

HOSES AND PIPES

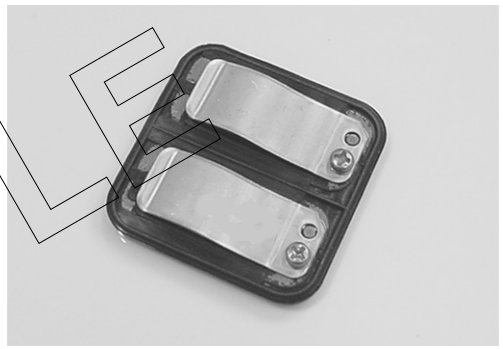
- Remove the PAIR cover. (☞Page 14)
- Inspect the hoses for wear or damage.
- Inspect that the hoses for secure connection.

PAIR REED VALVE

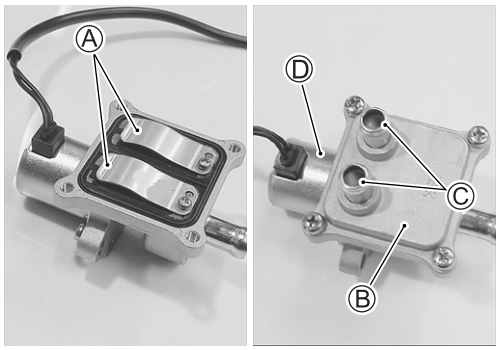
- Remove the PAIR control solenoid valve. (☞Page 14)
- Remove the reed valve case ① and PAIR reed valve ②.



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

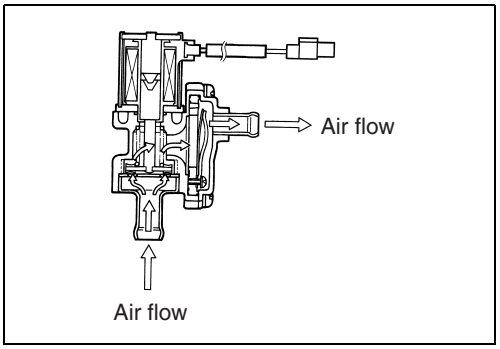


- Install the reed valve Ⓐ and its case Ⓑ with outlet pipes Ⓒ the facing the PAIR control solenoid valve Ⓓ.

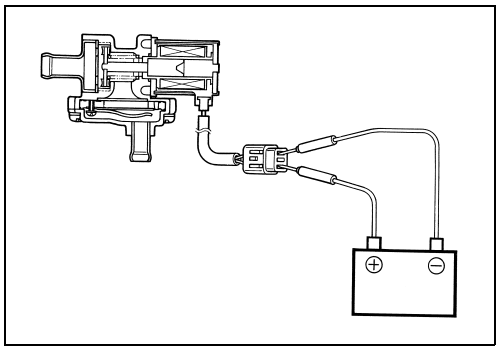


PAIR CONTROL SOLENOID VALVE

- Remove the PAIR control solenoid valve. (☞Page 14)
- Check that air flows through the air inlet port to the air outlet ports.
- If air does not flow out, replace the PAIR control solenoid valve with a new one.



- Connect the 12 V battery to the PAIR control solenoid valve terminals and check the air flow.
- If air does not flow out, the solenoid valve is in normal condition.

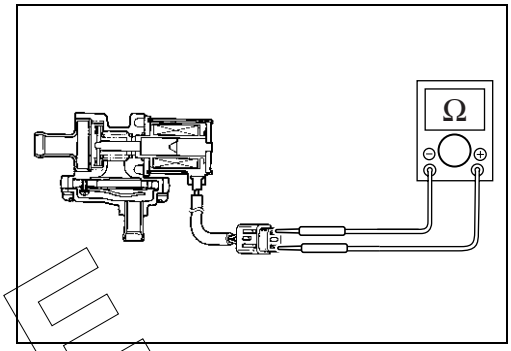


- Check the resistance between the terminals of the PAIR control solenoid valve.

DATA Resistance: 20 – 24 Ω at 20 – 30 °C (68 – 86 °F)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)



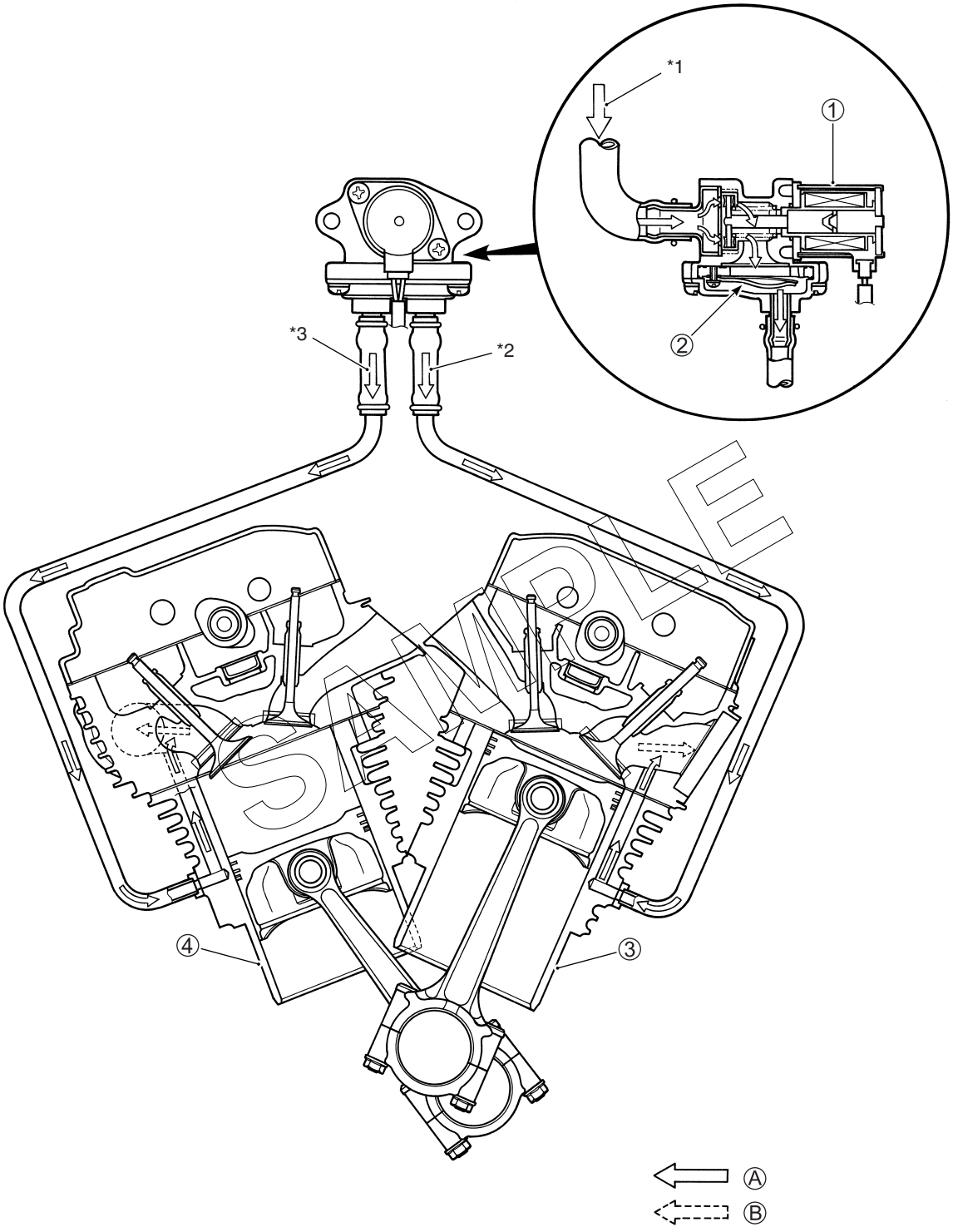
If the resistance is not within the standard range, replace the PAIR control solenoid valve with a new one.

Installation is in the reverse order of removal.

- Connect the lead wire coupler of the PAIR control solenoid valve and PAIR hoses securely.

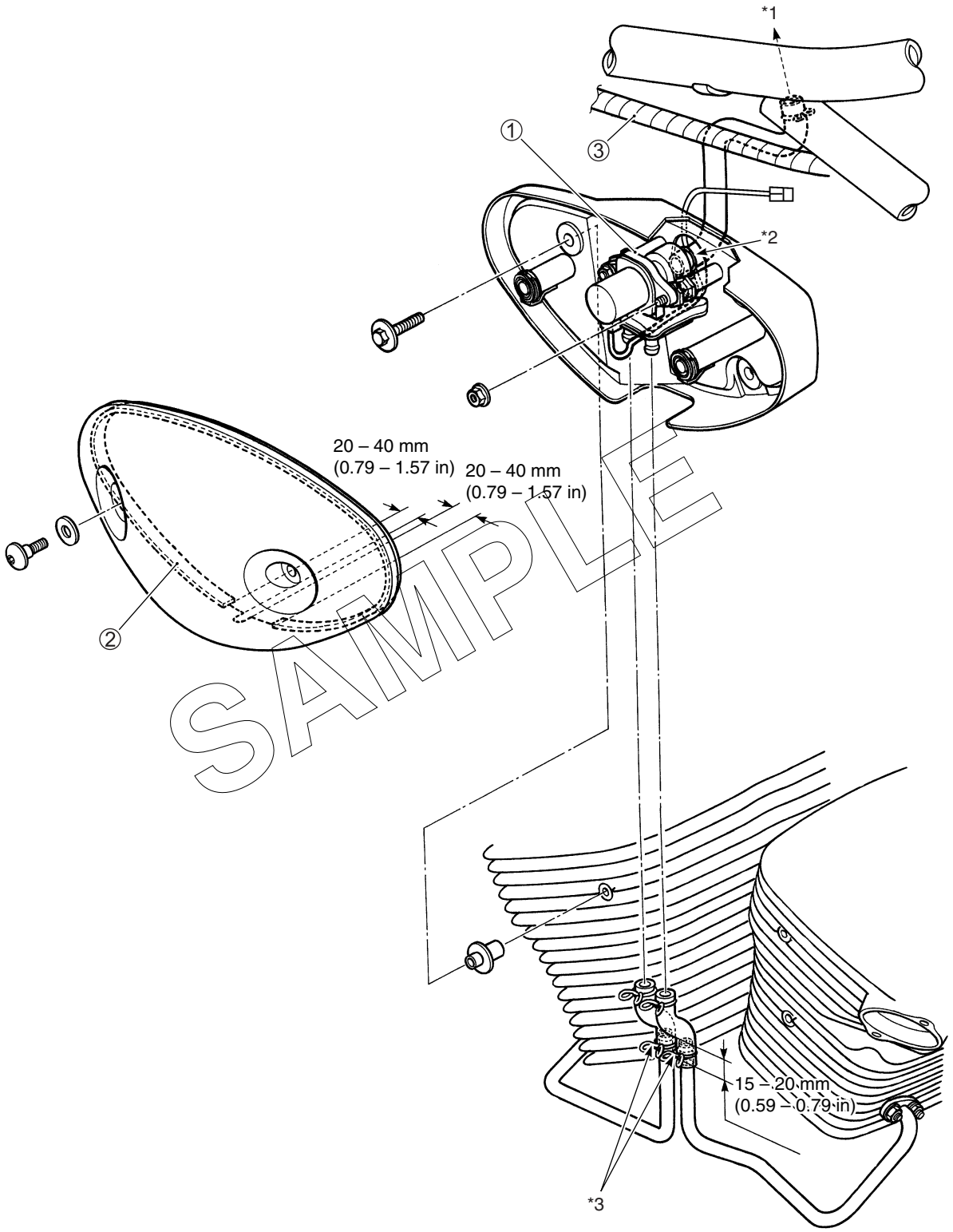
PAIR system hose routing. (☞ Page 175)

PAIR (AIR SUPPLY) SYSTEM DIAGRAM



Ⓐ	FRESH AIR	④	No. 2 cylinder
Ⓑ	EXHAUST GAS	*1	From air cleaner
①	PAIR control solenoid valve	*2	To No. 1 cylinder
②	PAIR reed valve	*3	To No. 2 cylinder
③	No. 1 cylinder		

PAIR (AIR SUPPLY) SYSTEM HOSE ROUTING



①	PAIR control solenoid valve with PAIR reed valve	*1	Connect the air hose to the air cleaner box.
②	Cushion seat (Apply adhesive agent to the cushion seat)	*2	Matching mark (yellow).
③	Wiring harness	*3	Matching mark (white).

HEATED OXGEN SENSOR (HO2S) INSPECTION (FOR E-02, 19, 24)

The HO2 sensor coupler is located at the rear side of the fuel tank. (☞Page 87)

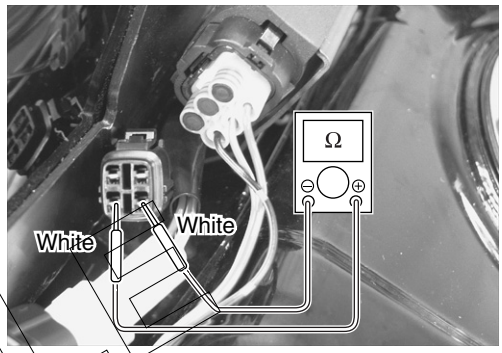
- Inspect the HO2 sensor and its circuit referring to flow table of the malfunction code C44 (P0130/P0135).

- Check the resistance between the terminals of the HO2 sensor.

DATA Resistance: 6.5 – 8.9 Ω at 23 °C (73.4 °F)
(White – White)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)



If the resistance is not within the standard range, replace the HO2 sensor with a new one.

NOTE:

** Temperature of the sensor affects resistance value largely.*

** Make sure that the sensor heater is at correct temperature.*

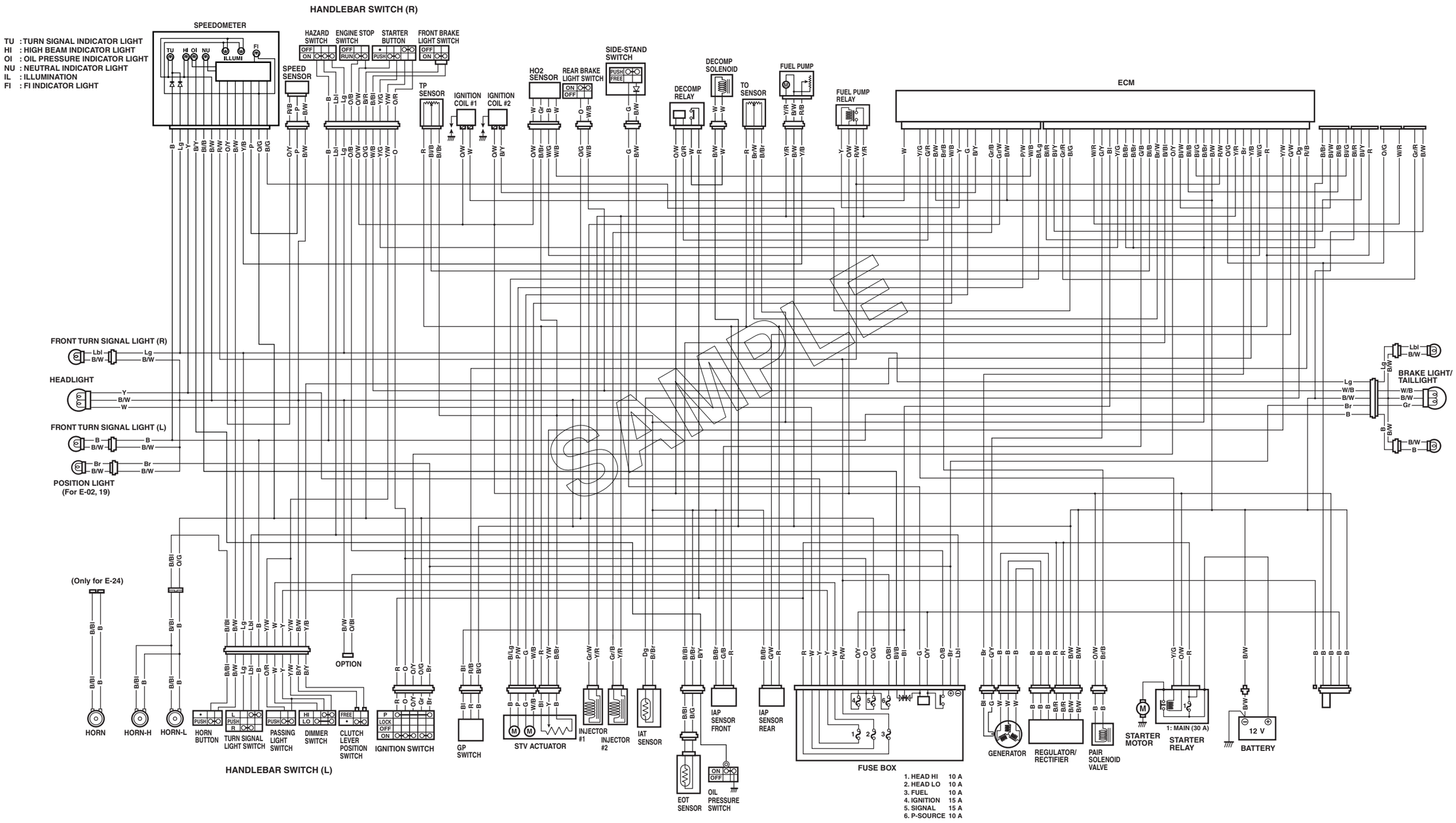
⚠ WARNING

Do not remove the HO2 sensor while it is hot.

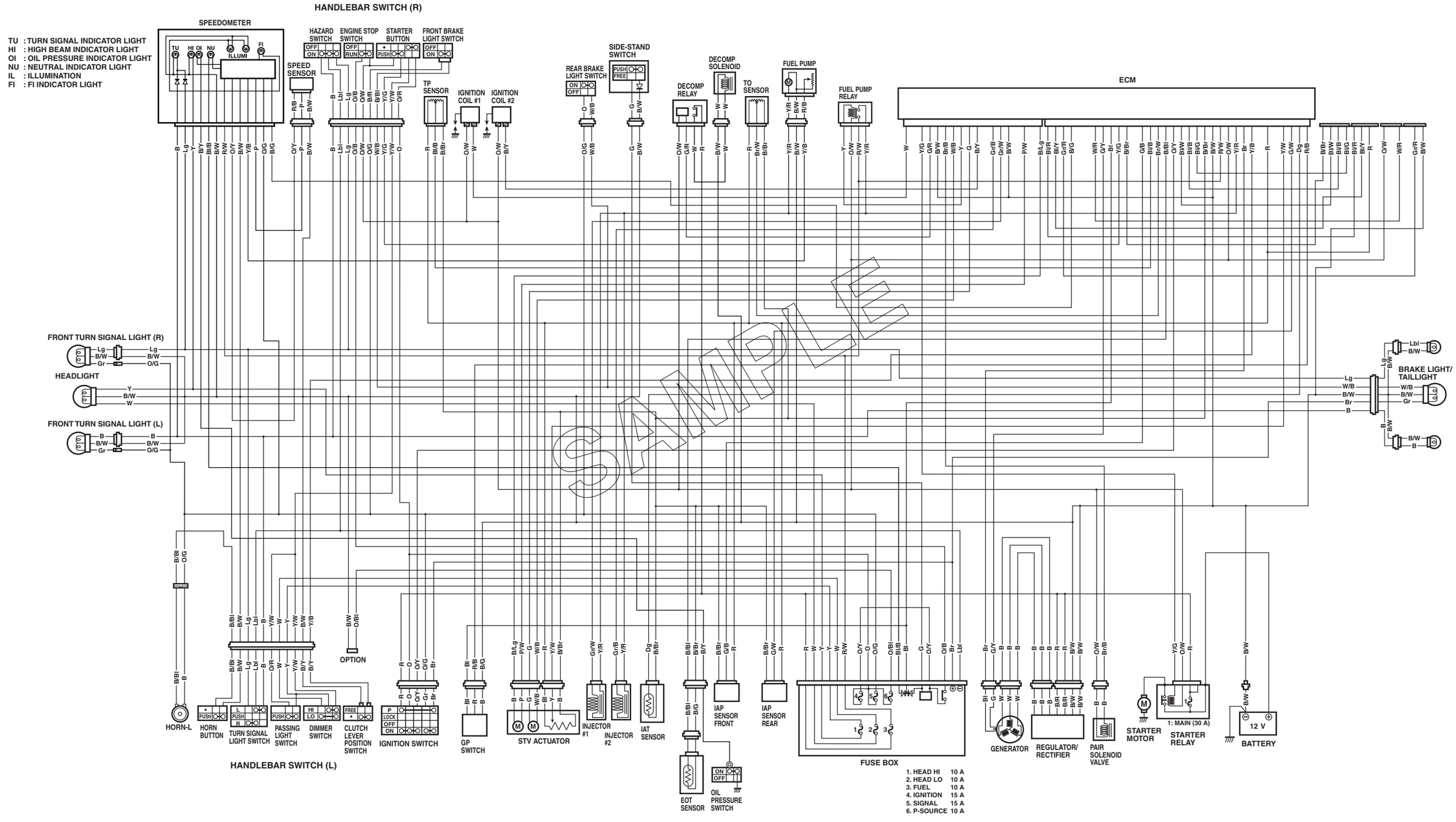
CAUTION

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

WIRING DIAGRAM
E-02, 19, 24



E-03, 28, 33


TU : TURN SIGNAL INDICATOR LIGHT
HI : HIGH BEAM INDICATOR LIGHT
OI : OIL PRESSURE INDICATOR LIGHT
NU : NEUTRAL INDICATOR LIGHT
IL : ILLUMINATION
FI : FI INDICATOR LIGHT
SPEEDOMETER
ILLUMI
HANDLEBAR SWITCH (R)
HAZARD SWITCH
ENGINE STOP SWITCH
STARTER BUTTON
FRONT BRAKE LIGHT SWITCH
SPEED SENSOR
TP SENSOR
IGNITION COIL #1
IGNITION COIL #2
REAR BRAKE LIGHT SWITCH
SIDE-STAND SWITCH
DECOMP RELAY
DECOMP SOLENOID
TO SENSOR
FUEL PUMP
FUEL PUMP RELAY
ECM
FRONT TURN SIGNAL LIGHT (R)
HEADLIGHT
FRONT TURN SIGNAL LIGHT (L)
BRAKE LIGHT/ TAILLIGHT
OPTION
HORN-L
HORN BUTTON
TURN SIGNAL LIGHT SWITCH
PASSING LIGHT SWITCH
DIMMER SWITCH
CLUTCH LEVER POSITION SWITCH
IGNITION SWITCH
HANDLEBAR SWITCH (L)
GP SWITCH
STV ACTUATOR
INJECTOR #1
INJECTOR #2
IAT SENSOR
EOT SENSOR
OIL PRESSURE SWITCH
IAP SENSOR FRONT
IAP SENSOR REAR
FUSE BOX
1. HEAD HI 10 A
2. HEAD LO 10 A
3. FUEL 10 A
4. IGNITION 15 A
5. SIGNAL 15 A
6. P-SOURCE 10 A
GENERATOR
REGULATOR/ RECTIFIER
PAIR SOLENOID VALVE
STARTER MOTOR
STARTER RELAY
1: MAIN (30 A)
BATTERY
12 V

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