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.*

CONTENTS

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

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	—	—	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	—	I	—	I
		(E-33 only)				
* 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

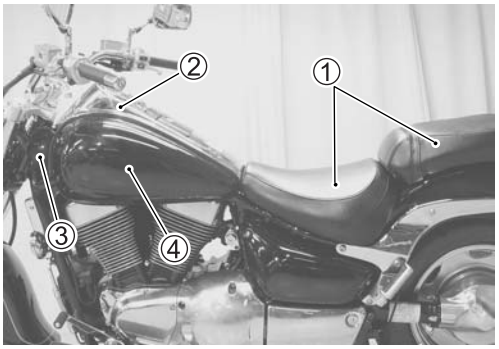
NOTE:
** I = Inspect and clean, adjust, replace or lubricate as necessary; R = Replace; T = Tighten*
** Item marked with asterisk (*) is exclusive to VL1500K5 ('05-MODEL).*

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 chapter 2 of Service Manual.

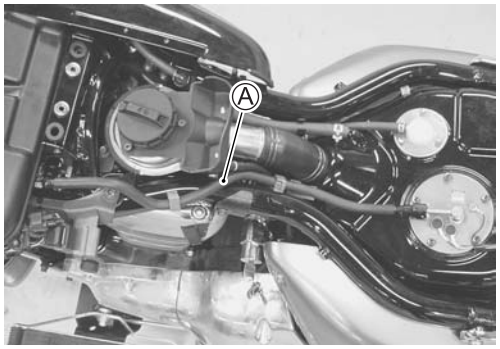
FUEL HOSE

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



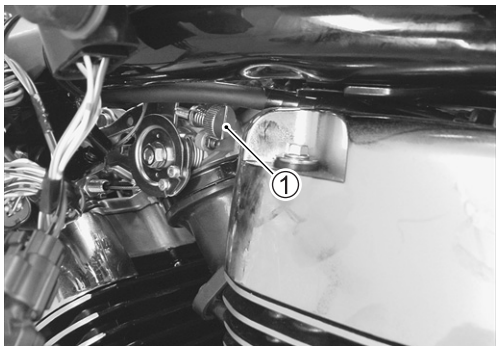
- Remove the seats ①. (☞Page 121)
- Remove the speedometer and fuel inlet cover ②. (☞VL1500 Service Manual 6-3)
- Remove the left frame head cover ③ and left frame upper cover ④. (☞VL1500 Service Manual 6-3)

Inspect the fuel feed hose Ⓐ for damage and fuel leakage. If any defect is are 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.

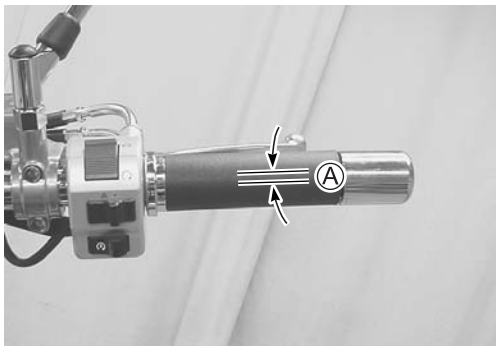
- Adjust the throttle cable play.(☞Below)
- Remove the left frame upper cover. (☞VL1500 Service Manual 6-3)
- Start the engine, turn the throttle stop screw ① and set the engine idle speed as follows.
- Connect the multi-circuit tester to the high-tension cord.

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

TOOL 09900-25008: Multi-circuit tester set

THROTTLE CABLE PLAY

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

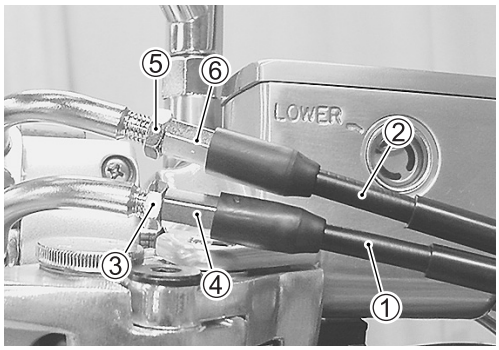


Adjust the throttle cable play Ⓐ with the following three steps.

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

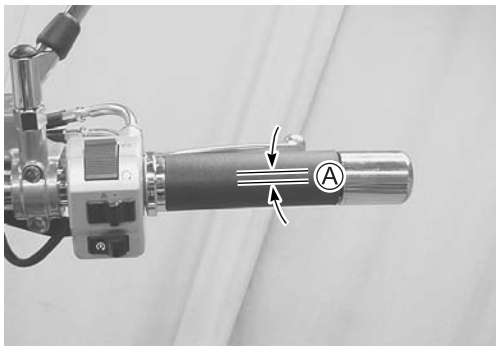
After the adjustment is completed, check that handlebar movement does not raise the engine idle speed and that the throttle grip returns smoothly and automatically.

NOTE:

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

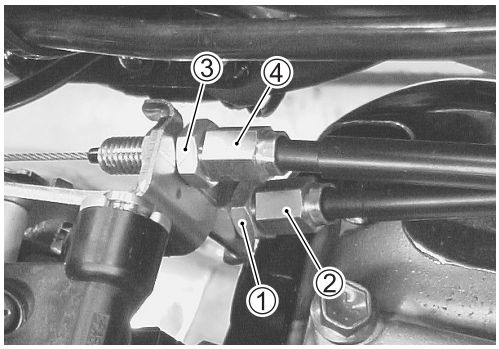
MAJOR ADJUSTMENT

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

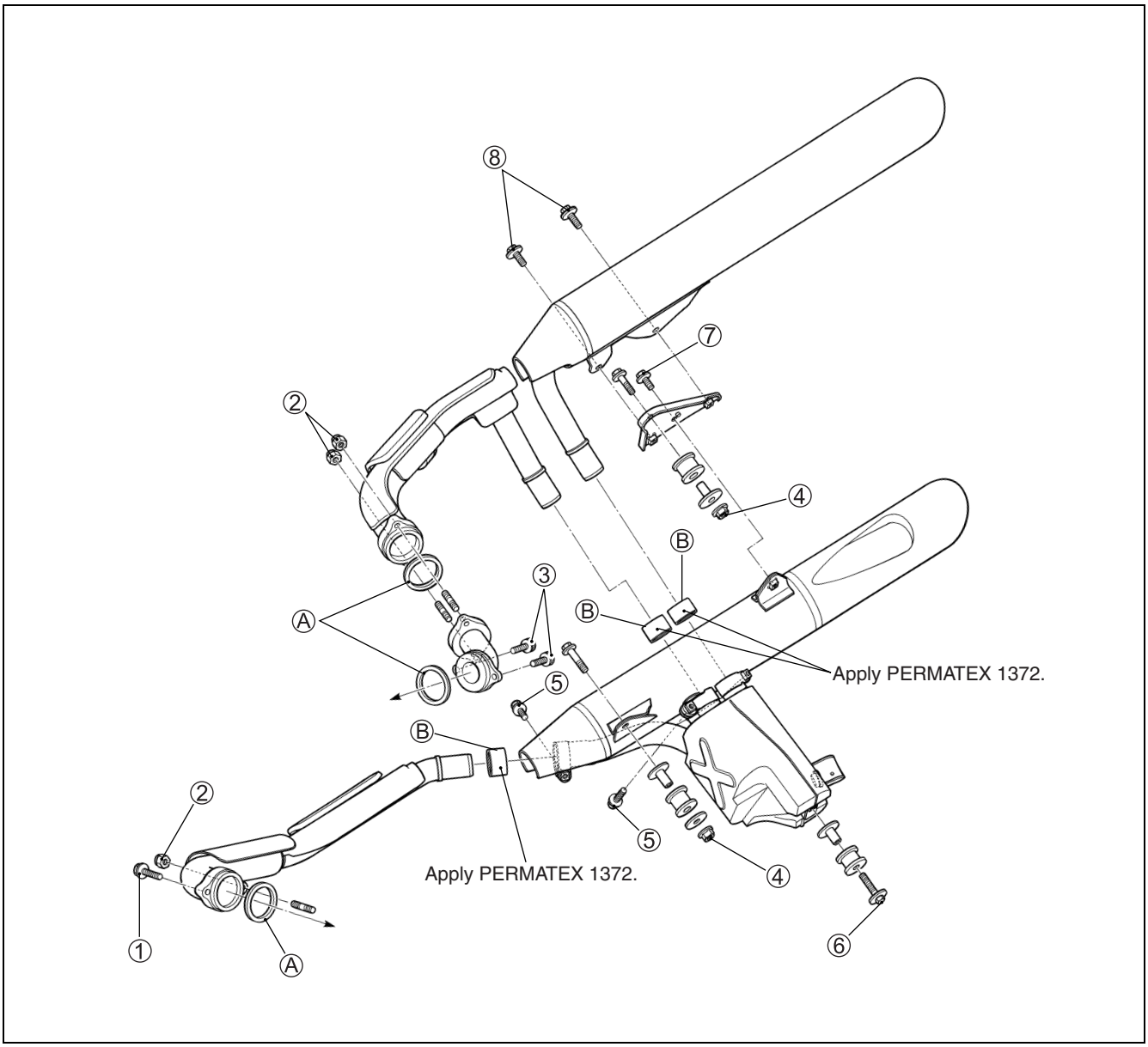
Inspect every 12 000 km (7 500 miles, 24 months).

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

NOTE:

** Item marked with asterisk (*) is exclusive to VL1500K5 ('05-MODEL).*

** Refer to page 126 for the Ⓐ, Ⓑ and Ⓒ tightening.*

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

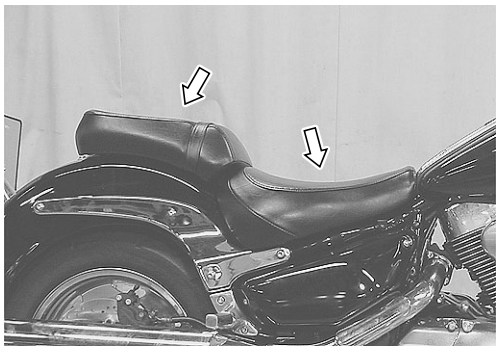
PARTS	REMOVAL	INSTALLATION
* Throttle body	104	110
Oil filter	2-6	2-7
Oil cooler	3G-5	3-13
Starter motor	7-14	7-17

ENGINE REMOVAL AND INSTALLATION

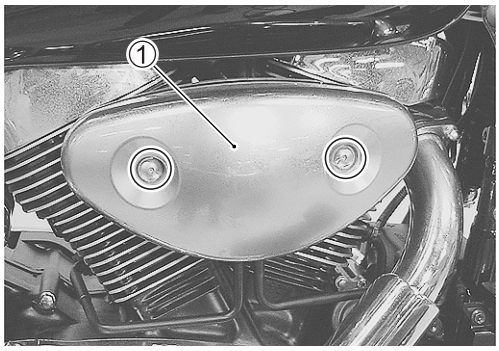
ENGINE REMOVAL

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.

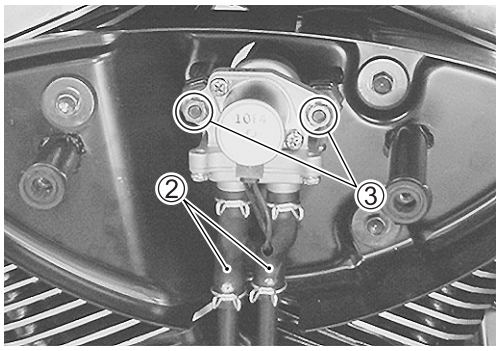
- Remove the seats. (☞Page 121)



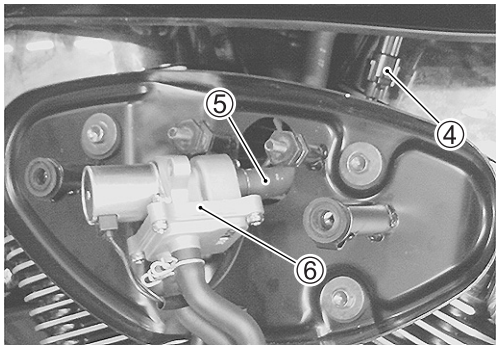
- Remove the PAIR cover ①.



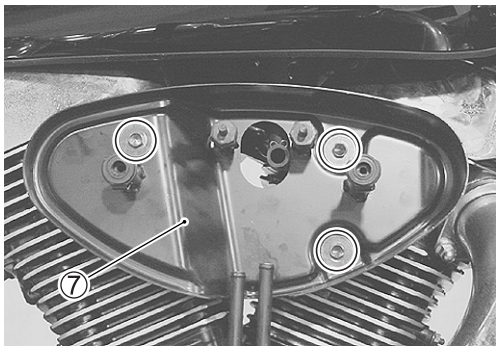
- Disconnect the PAIR hoses ② from the pipes.
- Remove the PAIR control solenoid valve nuts ③.



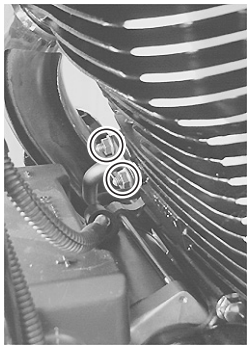
- Disconnect the PAIR control solenoid valve coupler ④ and PAIR hose ⑤.
- Remove the PAIR control solenoid valve ⑥.

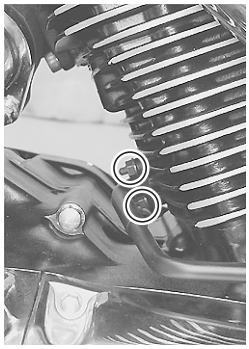


- Remove the PAIR device bracket ⑦.

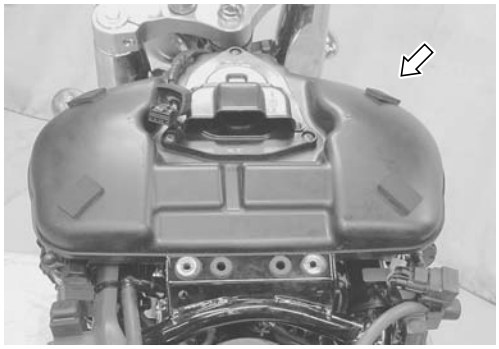


- Remove the No. 1 and No. 2 PAIR pipes.

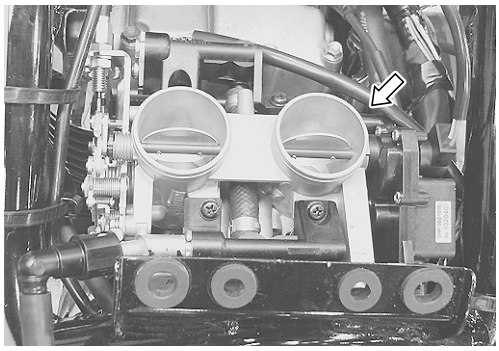




- Remove the air cleaner box. (☞Page 103)



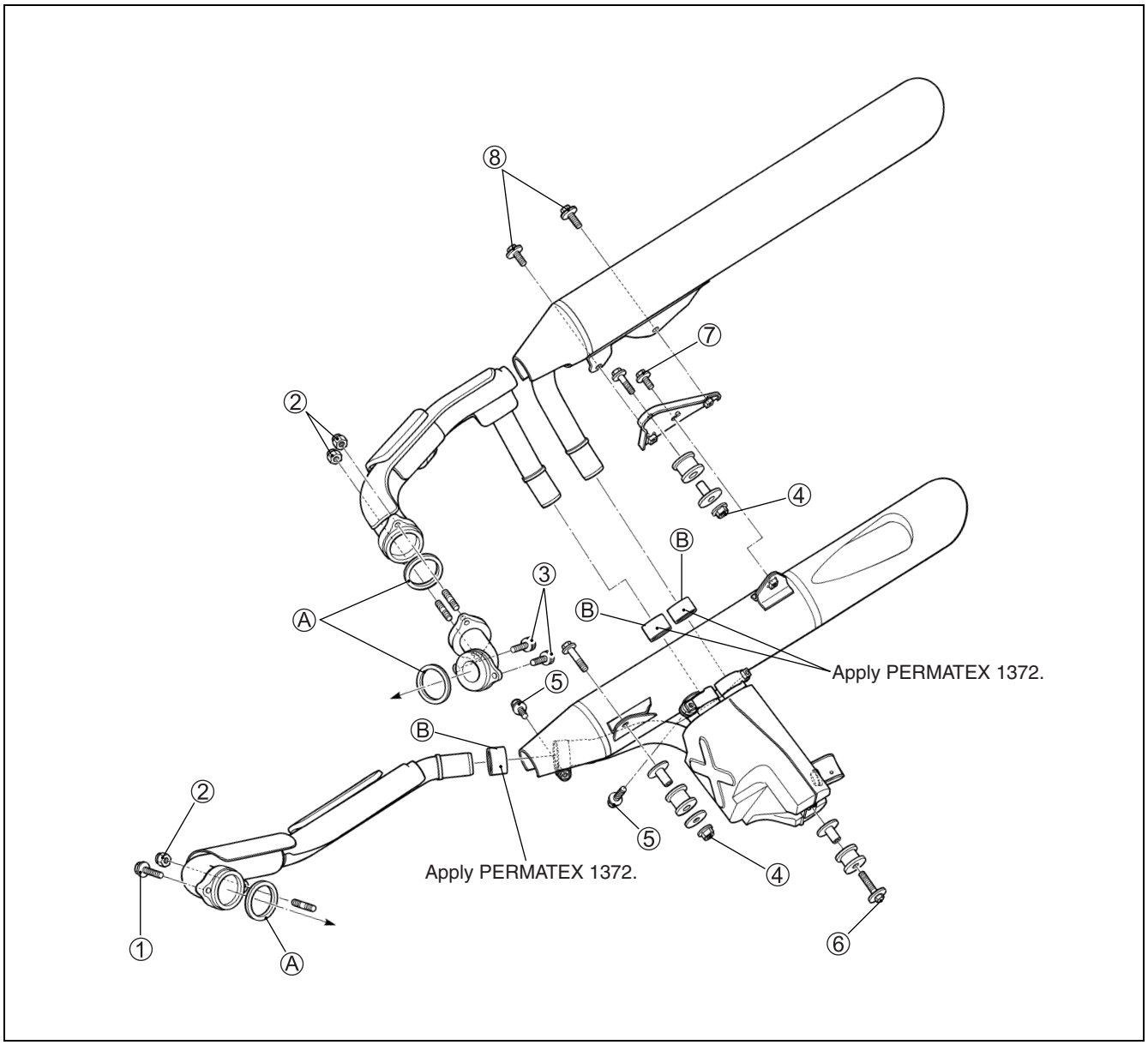
- Remove the throttle body. (☞Page 104)



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.

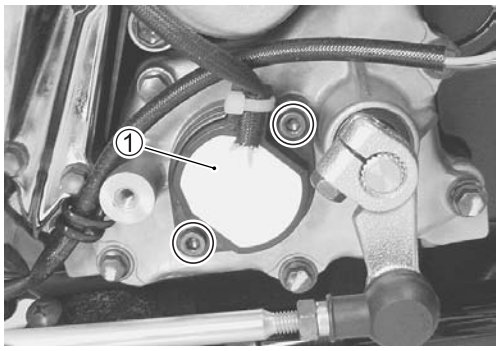
* Engine oil (☞VL1500 Service Manual 2-6)
* Throttle valve synchronization (☞Page 114)
* Throttle cable play (☞Page 9)
* Engine idle speed (☞Page 8)
* Automatic decompression cable (☞VL1500 Service Manual 2-8)
* Clutch air bleeding (☞VL1500 Service Manual 6-59)
* Wiring harness, cables and hoses (☞Page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



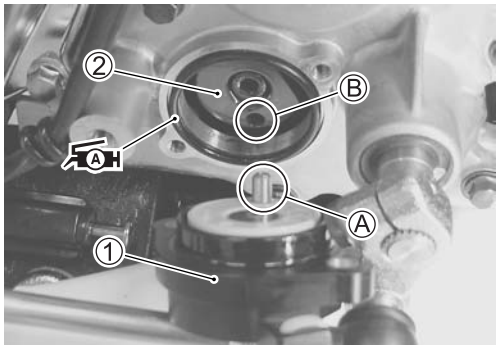
GEAR POSITION SWITCH REASSEMBLY

- 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)

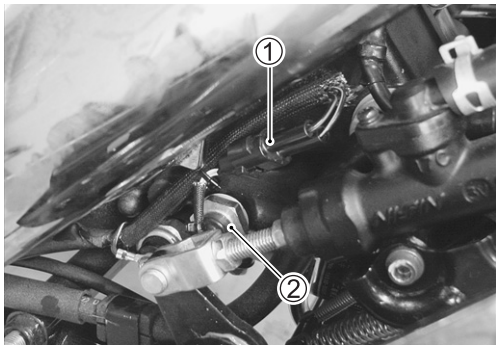


EOT SENSOR REMOVAL

- 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.



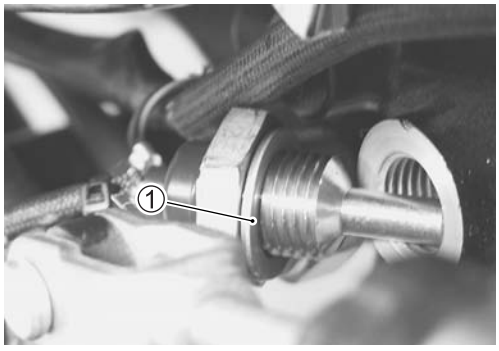
EOT SENSOR REASSEMBLY

- 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)



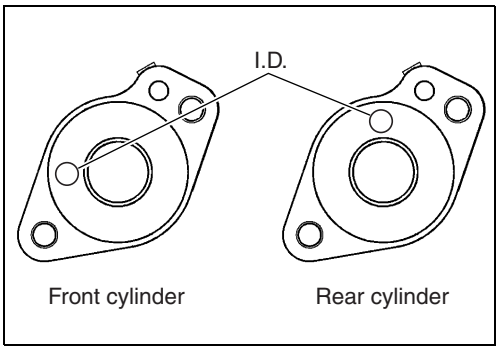
ENGINE COMPONENTS INSPECTION AND SERVICING

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

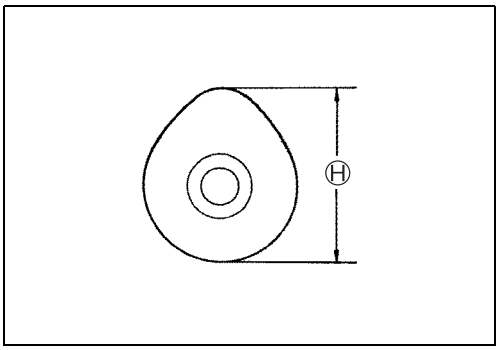


CAM WEAR

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)

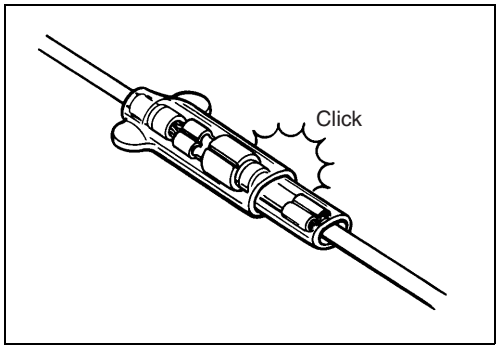


PRECAUTIONS IN SERVICING

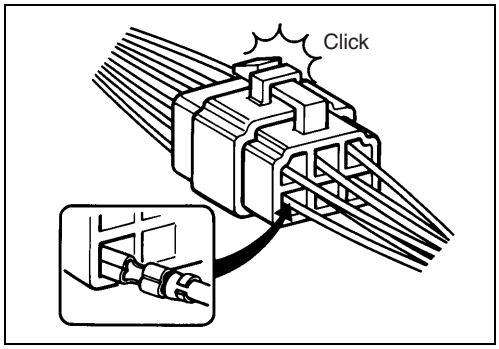
When handling the FI component parts or servicing the FI system, observe the following points for the safety of the system.

CONNECTOR/COUPLER

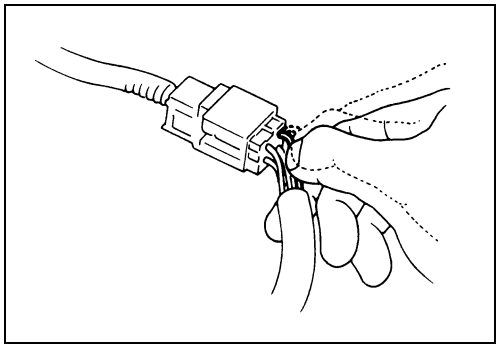
- When connecting a connector, be sure to push it in until a click is felt.
- With a lock type coupler, be sure to release the lock when disconnecting, and push in fully to engage the lock when connecting.
- When disconnecting the coupler, be sure to hold the coupler body and do not pull the lead wires.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



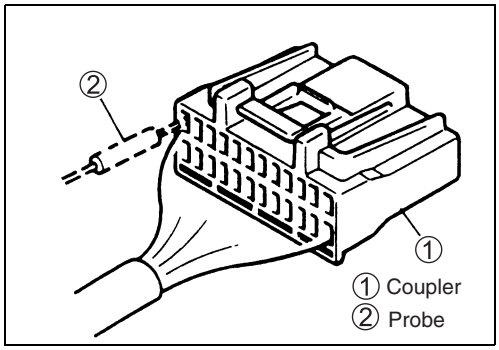
- Inspect each terminal for corrosion and contamination.
  The terminals must be clean and free of any foreign material which could impede proper terminal contact.



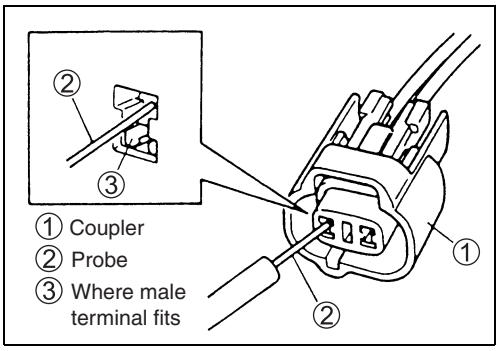
- Inspect each lead wire circuit for poor connection by shaking it by hand lightly. If any abnormal condition is found, repair or replace.



- 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

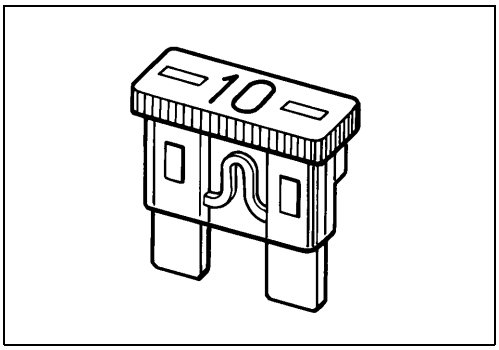


- When connecting meter probe from the terminal side of the coupler where (connection from harness side not being possible), use extra care not to force and cause the male terminal to bend or the female terminal to open.
  Connect the probe as shown to avoid opening of female terminal.
  Never push in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



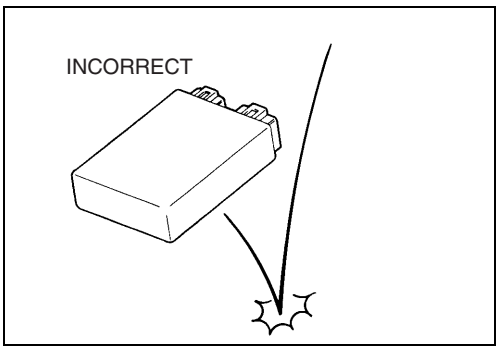
FUSE

- 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.

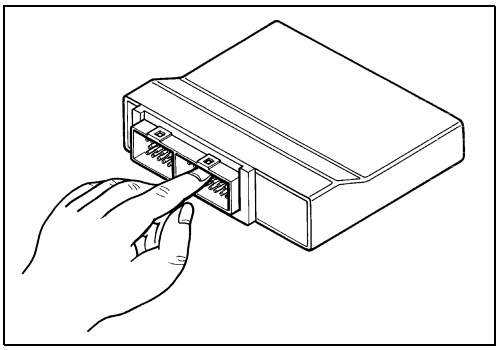


ECM/VARIOUS SENSORS

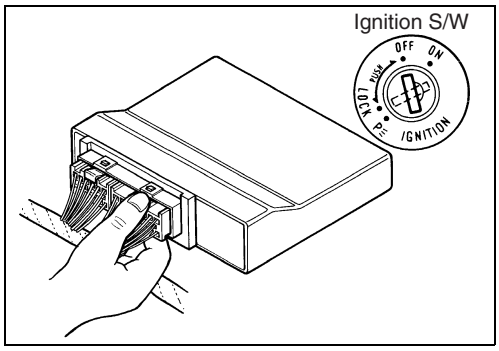
- Since each component is a high-precision part, great care should be taken not to apply any sharp impacts during removal and installation.



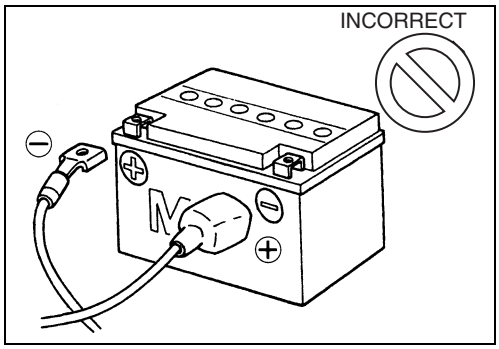
- Be careful not to touch the electrical terminals of the ECM. The static electricity from your body may damage this part.



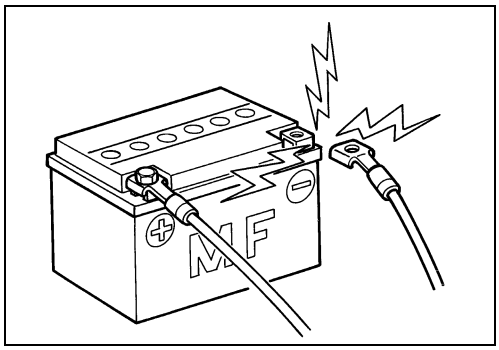
- When disconnecting and connecting the ECM couplers, make sure to turn OFF the ignition switch, or electronic parts may get damaged.



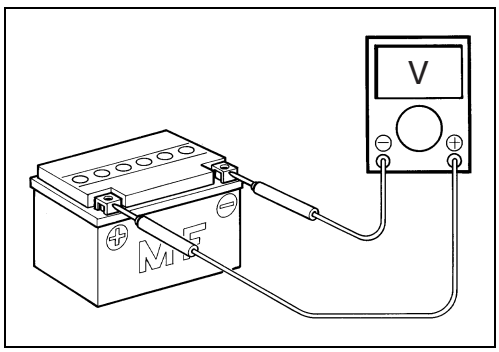
- Battery connection in reverse polarity is strictly prohibited. Such a wrong connection will damage the components of the FI system instantly when reverse power is applied.



- 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

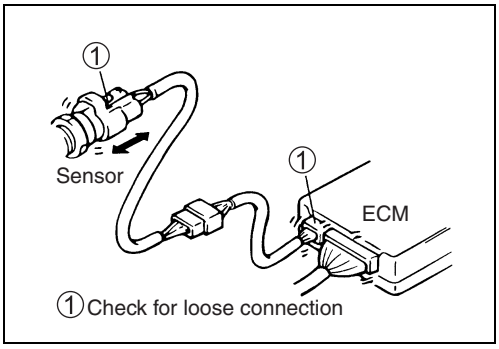
While there are various methods for electrical circuit inspection, described here is a general method to check for open and short circuit using an ohmmeter and a voltmeter.

OPEN CIRCUIT CHECK

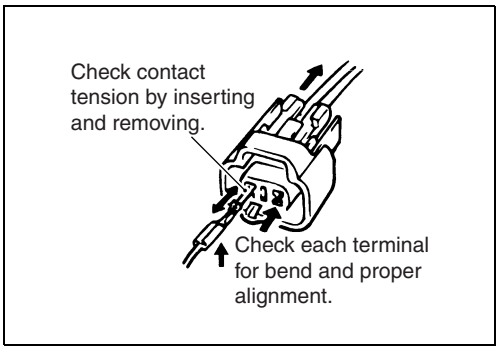
Possible causes for the open circuit are as follows. As the cause can exist in the connector/coupler or terminal, they need to be checked carefully.

- 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

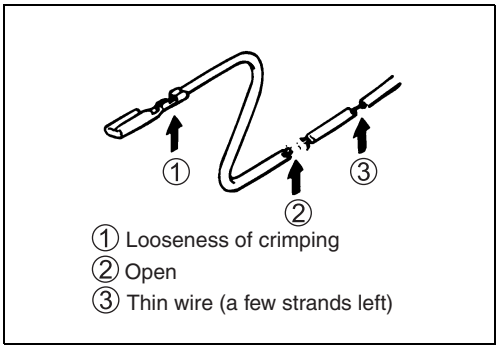
- Disconnect the negative cable from the battery.
- Check each connector/coupler at both ends of the circuit being checked for loose connection. Also check for condition of the coupler lock if equipped.



- 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.

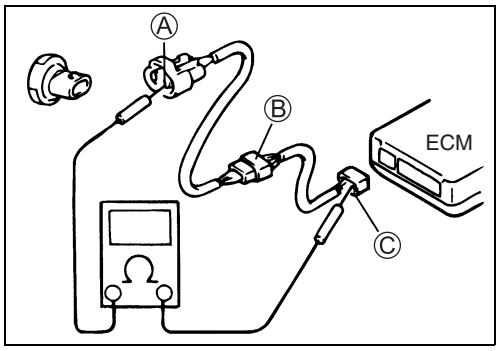


- Using continuity inspect or voltage check procedure as described below, inspect the wire harness terminals for open circuit and poor connection. Locate abnormality, if any.

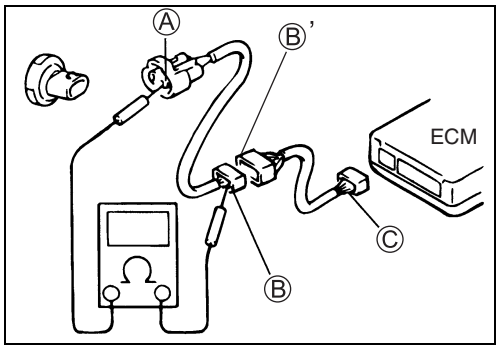


Continuity check

- 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 Ⓒ.



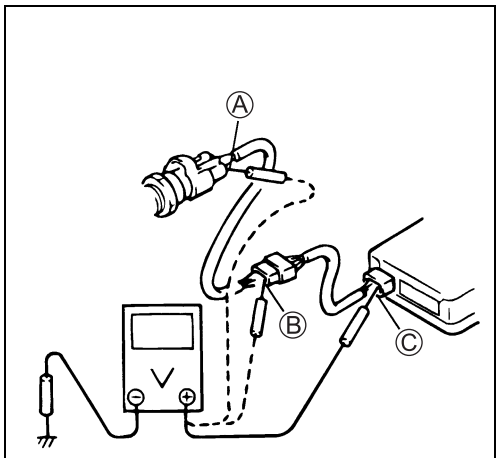
- Disconnect the coupler Ⓑ and measure resistance between couplers Ⓐ and Ⓑ.
  If no continuity is indicated, the circuit is open between couplers Ⓐ and Ⓑ. If continuity is indicated, there is an open circuit between couplers Ⓑ' and Ⓒ or an abnormality in coupler Ⓑ' or coupler Ⓒ.



VOLTAGE CHECK

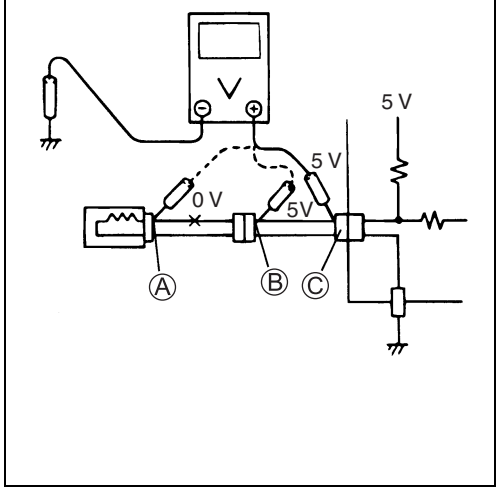
If voltage is supplied to the circuit being checked, voltage check can be used as circuit check.

- 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

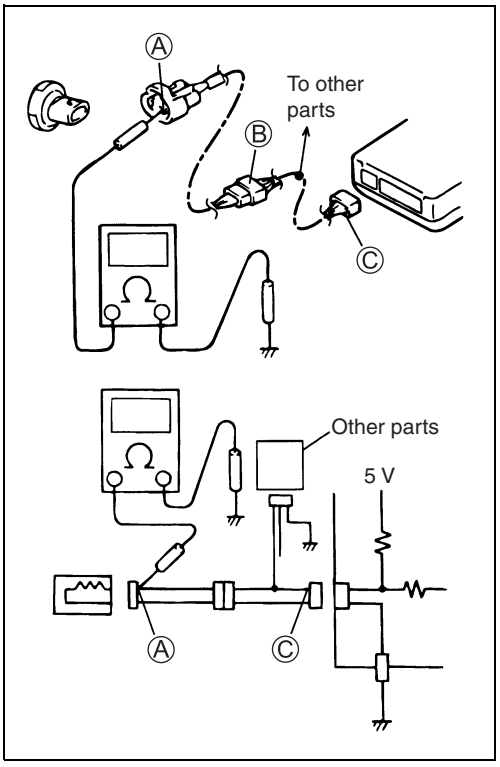
SHORT CIRCUIT CHECK (WIRE HARNESS TO GROUND)

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

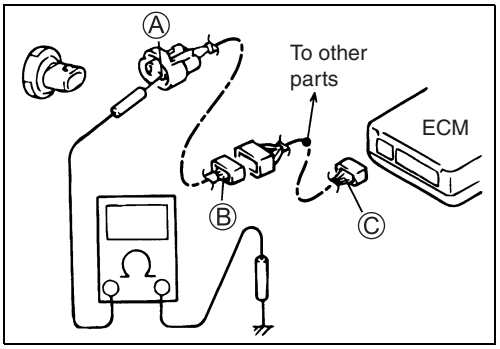
NOTE:

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 Ⓒ.

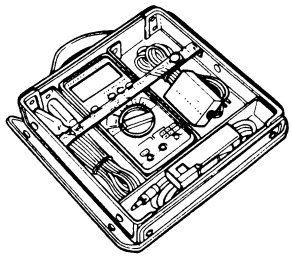


- Disconnect the connector/coupler included in circuit (coupler Ⓑ) and measure resistance between terminal Ⓐ and body ground.
  If continuity is indicated, the circuit is shorted to the ground between terminals Ⓐ and Ⓑ.



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.

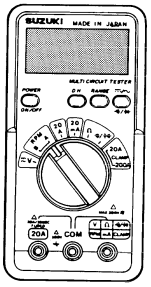


USING THE TESTER

- 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

MULTI-CIRCUIT TESTER



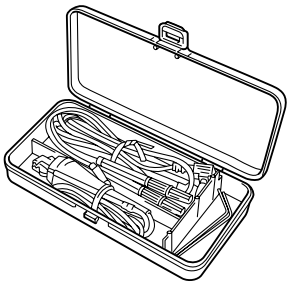
NOTE:

** 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

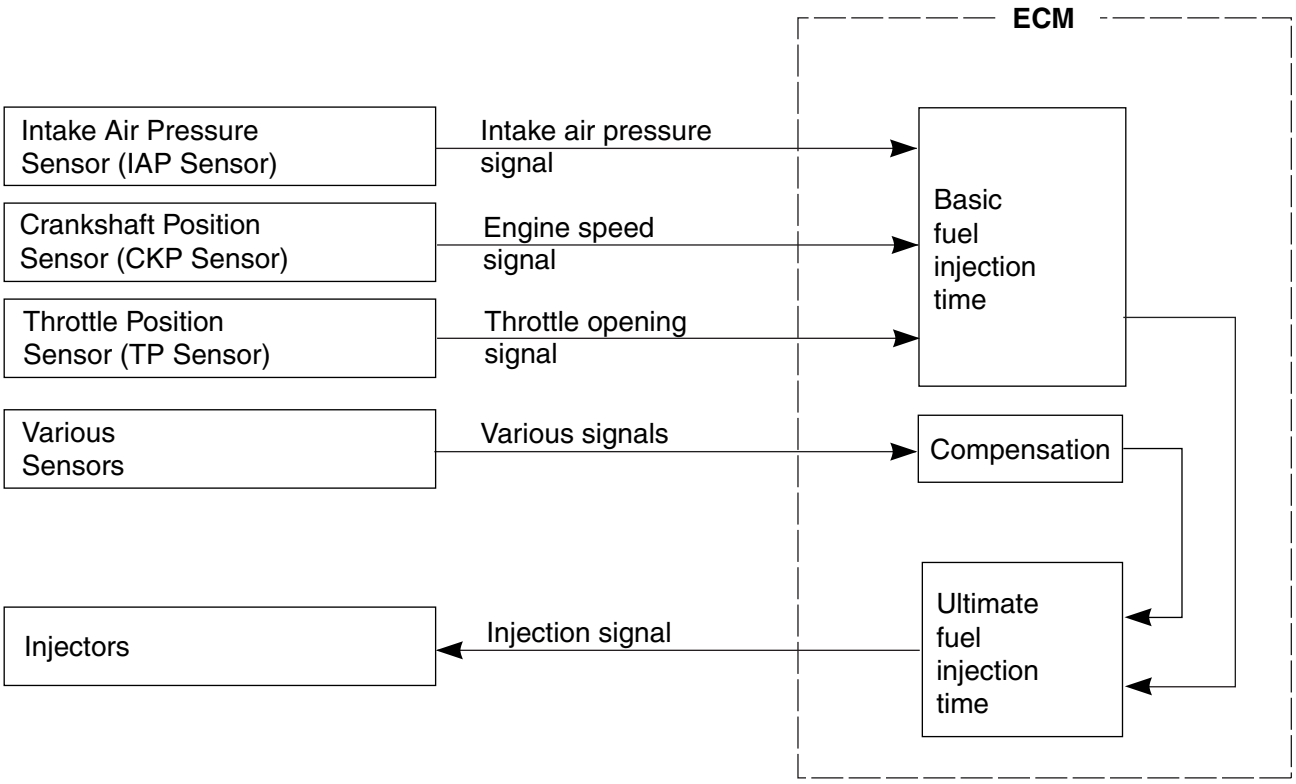
NEEDLE POINTED PROBE SET



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.

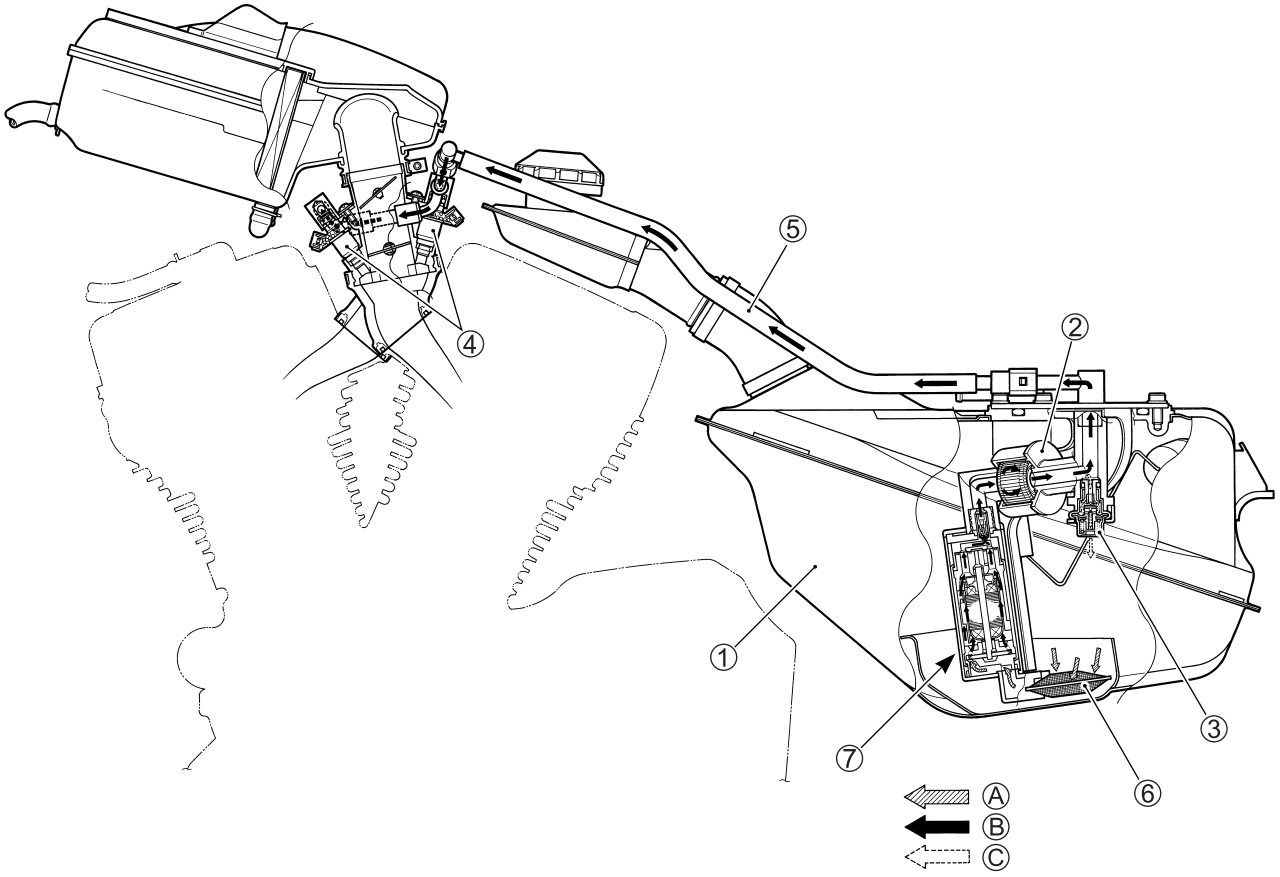
INJECTION STOP CONTROL

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

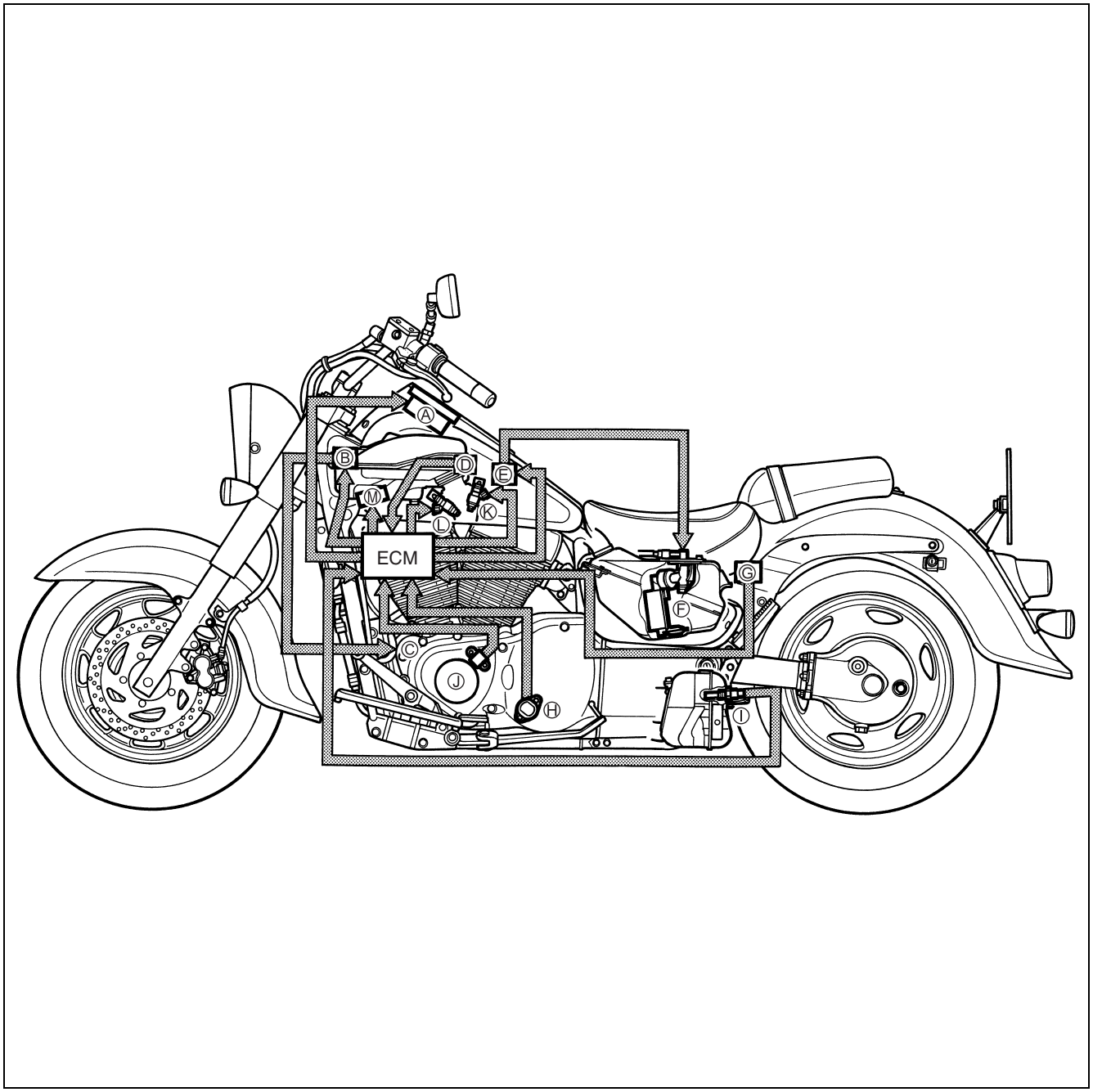
The fuel delivery system consists of the fuel tank, fuel pump, fuel filters, fuel feed hose, fuel delivery pipe (including fuel injectors) and fuel pressure regulator. There is no fuel return hose. The fuel in the fuel tank is pumped up by the fuel pump and pressurized fuel flows into the injector installed 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)		